

**Part 1            General**

**1.1            Related Requirements**

- .1    Note Used

**1.2            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 communications equipment and include product characteristics, performance criteria, physical size, finish and limitations.
- .3    Sustainable Design Submittals:
  - .1    Construction Waste Management:
    - .1    Submit project Construction/Demolition Waste Management and Disposal in accordance with Section 10 74 21

**1.3            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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2    Store and protect communications 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 Packaging Waste Management: remove for reuse and return by manufacturer of. packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2            Products**

**2.1            Grounding Conductor**

- .1    Inspect Ground wire for cable tray and provide No. 6 AWG stranded annealed copper conductor with colour Green polyvinyl chloride insulation designed for ground connections to protect cable terminals and protectors should it not exist on the cable tray.

## **2.2 Equipment Rack**

- .1 EIA compliant 19" pivoting equipment rack shall have a minimum of 42 useable rackspaces and a useable depth of 939mm.
- .2 Overall dimensions of rack shall be 1998mm H x 600mm W x 1086mm D
- .3 Shall have a 2300 lb. weight capacity.
- .4 Features:
  - .1 Constructed in 16-gauge steel.
  - .2 Meets PCI DSS (Payment Card Industry Data Security Standard)
  - .3 compliance requirements.
  - .4 Inside rear of cabinet includes two (2) toolless PDU cable trays for cable management and industry-standard vertical PDU installation.
  - .5 Cabinet doors feature a minimum 65% airflow perforation pattern that meets or exceeds equipment manufacturer requirements.
  - .6 Top panel is easily removable for cable installation. The generous cable access panels make it easy to install top panel without affecting installed cabling.
  - .7 Ships with doors and rails fully assembled ready for installation on-site. Side panels come packaged inside cabinet for on-site installation.
  - .8 Built in joining kit speeds up baying of multiple RB-DC cabinets within a row.
- .5 Specifications:
  - .1 One (1) locking front cabinet door with curved surface for added stability.
  - .2 One (1) locking pair of split rear cabinet door making access easier in tight spaces.
  - .3 Two (2) pairs of split, locking and removable side panels. Split panels are more versatile for removing.
  - .4 Two (2) pairs of 19in EIA-310-D compliant square hole punched rails with rack unit markings.
    - .1 Rails easily adjust in depth in 1/4" increments.
    - .2 Starter pack of (50) M6 screws, cage nuts and washers included.
    - .3 For 10-32 hardware see the CAGKIT Series.
  - .5 Two (2) tool less PDU cable tray.
  - .6 Six (6) hinged plastic cable grommets on top panel.
  - .7 One (1) removable top panel with numerous cable grommets.
  - .8 Four (4) adjustable leveling feet.
  - .9 Four (4) recessed casters allows for clearance through a standard height doorway.
    - .1 Casters can be removed.
    - .2 Casters are for moving an empty cabinet into place, not to support equipment load.
  - .10 Generous bonding locations provided on frame.
  - .11 Open Bottom

- .12 Fished in textured black powder paint
- .13 Tested to 2300 lbs of equipment load

- .6 Acceptable Product: Hammond RB-DC4242 with keylock complete with minimum 5 duplex receptacle power bar mounted vertical at the back of the rack, grommets, bonding kit, rear rail and fan, Middle Atlantic, Electron Metal.

Part 3 Execution

**3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for communications equipment 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 Inspect grounding and ensure a continuous bond of the cable tray and rack exists for the project.
- .2 Mount the rack on the floor and ensure it is level and bolted on the floor

**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 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.

**2.4 Protection**

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

**END OF SECTION**

**Part 1 General****1.1 Related Requirements**

- .1 Not Used

**1.2 References**

- .1 American National Standards Institute
  - .1 ANSI J-STD-607-B-2011, Joint Standard - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
- .2 Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA)
  - .1 TIA/EIA-606-B-2012, Administration Standard for the Commercial Telecommunications Infrastructure.
- .3 U.S. Department of Labor/Occupational Safety and Health Administration (OSHA)
  - .1 Nationally Recognized Testing Laboratory (NRTL).
- .4 Canadian Standards Association (CSA International)
  - .1 CSA C22.1-15, Canadian Electrical Code 23rd Ed.
- .5 Building Industry Consulting Services International (BICSI)
  - .1 BICSI Telecommunications Distribution Methods Manual 13th Edition

**1.3 System Description**

- .1 Telecommunications grounding and bonding system consist of grounding busbars, bonding backbones, and other bonding conductors.
- .2 Provides ground reference for telecommunications systems within building and bonding to it of telecommunications rooms.
- .3 Metallic pathways, cable shields, conductors, and hardware within telecommunications spaces are bonded to telecommunications grounding and bonding system.

**1.4 Quality Assurance**

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.5 Delivery, Storage And Handling**

- .1 Waste Management and Disposal:
- .2 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2            Products****2.1            Telecommunications Grounding Busbar (TGB)**

- .1    A Pre-drilled electroplated copper Busbar with holes for use with standard 2 hole lugs with standard NEMA bolt hole sizing and spacing..
- .2    Shall be sized accordance with the immediate connection requirements with a minimum of 4 extra sets of holes.
- .3    Shall be a minimum size of 6mm thick, 53mm high and variable in length.
- .4    Shall include Insulated supports with a minimum of 50mm separation from mount.
- .5    Shall be listed by a nationally recognized testing laboratory.
- .6    Acceptable Products: Cable-Talk CT-BIBB 2X10-12, Panduit GB2B0306TPI-1, Erico TGB-A14L06PT.

**2.2            Bonding Conductor for Telecommunications**

- .1    3/0 AWG stranded copper conductor, green insulated marked to: ANSI J-STD-607-B.

**2.3            Telecommunications Bonding Backbone (TBB)**

- .1    3/0 AWG stranded copper conductor, green insulated marked to: ANSI J-STD-607-B.

**2.4            Grounding Equalizer (GE)**

- .1    3/0 AWG stranded copper conductor, green insulated marked to: ANSI J-STD-607-B.

**2.5            Equipment Bonding Conductor (EC)**

- .1    6 AWG stranded copper conductor, green insulated marked to: ANSI J-STD-607-B.

**2.6            Raceway Bonding Conductor (RBC)**

- .1    6 AWG stranded copper conductor, green insulated marked to: ANSI J-STD-607-B.

**2.7            Bonding Conductor Termination**

- .1    Two-Hole compression lugs, long barrel type, sized as per AWG of cable.
- .2    High conductivity wrought copper.
- .3    Electro tin plated
- .4    Hole spacing as per TMGB and TGB.

**2.8            Insulated Conduit Ground Bushings**

- .1    Each Metal Conduit originating in the Telecom Entrance Facility, Telecom Room or Equipment Room shall be directly connected to the TMGB or TGB via a compression lug.
- .2    Ground bushing shall be insulated.

**2.9            Bonding And Grounding Clamps**

- .1    All ground wires originating at the TMGB or TGB shall be clamped to the plywood backboard "B" ground wire clamps.

- .2 Shall be mechanically galvanized ASTM B695
  - .3 5.6mm hole diameter
- 2.10 Cable Tray Bonding Clamps
  - .1 Shall be constructed of malleable iron
  - .2 Zinc plated
  - .3 Shall allow for clamping of ground wire of multiple gauges.
- 2.11 Warning Labels
  - .1 Non-metallic warning labels in English and French to: ANSI J-STD-607-B.
  - .2 Identify labels with wording "If this connector is loose or must be removed, please call the building telecommunications manager".
- Part 3 Execution
  - 3.1 General Installation Requirements
    - .1 Install all Bonding Conductors as per CEC. And manufacturers recommended installation procedures.
  - 3.2 Telecommunications Grounding Busbar (TGB)
    - .1 Install TGB in main terminal/equipment room and each telecommunications room.
    - .2 Install 3/0 AWG copper bonding conductor from TGB to alternating current equipment ground (ACEG) of serving electrical power panel (panel board) or main electrical grounding bus bar.
  - 3.3 Bonding Conductors General
    - .1 When placed in ferrous metallic conduit or EMT longer than 1 m, bond to each end of conduit or EMT using grounding bushing and #6 AWG copper conductor.
  - 3.4 Bonding Conductor For Telecommunications
    - .1 Install bonding conductor for telecommunications from TMGB to service equipment (power) ground.
    - .2 Use approved 2-hole compression lugs for connection to TMGB.
  - 3.5 Telecommunications Bonding Backbone (TBB)
    - .1 Install TBB from TMGB to each TGB as indicated.
    - .2 Use approved 2-hole compression lugs for connection to TMGB and TGBs.
  - 3.6 Grounding Equalizer (GE)
    - .1 Install GE between TBBs in multi-storey building by bonding TGBs with GE on top floor and every third floor in between top and bottom floors.

**3.7 Bonding to TGB**

- .1 Bond metallic raceways in telecommunications room to TGB using #6 AWG green insulated copper conductor.
- .2 For cables within telecommunications room having shield or metallic member, bond shield or metallic member to TGB using #12 AWG green insulated copper conductor.
- .3 Bond equipment rack and cabinet located in telecommunications room to TGB using #6 AWG green insulated copper conductor.

**3.8 Labelling**

- .1 Apply warning labels to telecommunications bonding and grounding conductors.
- .2 Apply additional administrative labels to: TIA/EIA-606-B.

END OF SECTION

**1.1 General**

**1.2 References**

- .1 American National Standards Institute (ANSI)/Telecommunications Industry Association (TIA)
  - .1 ANSI/TIA-569-C–2012, Telecommunications Pathways and Spaces
- .2 Building Industry Consulting Services International (BICSI)
  - .1 BICSI Telecommunications Distribution Methods Manual 13th Edition
- .3 Canadian Standards Association (CSA International)
  - .1 CSA C22.1-12, Canadian Electrical Code

**1.3 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 communication raceway systems and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 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.

**1.4 Delivery, Storage And Handling**

- .1 Deliver, store and handle materials in accordance 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 communication raceway systems 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 and in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan



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

## **Part 2 Products**

### **2.1 System Description**

- .1 Empty telecommunications raceways system consists of outlet boxes, floor box, cover plates, single gang raise plaster adapter ring, conduits, cable trays, pull boxes, sleeves and caps, fish wires, service fittings.
- .2 Cable tray distribution system installed in raise floor space.
- .3 Voice and data cabling installation is not in contract. Shared Service Canada (SSC) is responsible for the installation, termination, testing and commissioning of voice and data cabling.
- .4 Separate conduit system to be provided for Intrusion alarm system, access control, sound masking, audio/video and video surveillance system.
- .5 Not all conduits are shown on the drawing, Contractor is responsible to provide all required conduits to support system requirements.

### **2.1 CABLE TRAYS: BASKET STYLE CABLE TRAY**

- .1 Shall be a pre-fabricated structure, minimum 300 mm wide by 103mm tall consisting of a Basket bottom within basket two side rails.
- .2 Shall be supported as per manufacturer's instruction and applicable codes.
- .3 Use proper manufactured fittings; accessories and fittings such as cable drop-out fitting, elbow, reducers, crossovers, tees and risers will be used for any change of direction, height or size of the basket cable tray.
- .4 Acceptable Manufacturers: Cablofil, Hubbell, Thomas and Betts

### **2.2 Hangers And Supports For Communications Systems**

- .1 Cable tray shall be supported by Cantilever brackets, Trapeze Brackets or manufacturer recommended support system..
- .2 Supports shall be approved types of wall brackets or trapeze hangers. Additional bracing may be required for seismic restraints.
- .3 Conduits entering a room shall be appropriately racked on a trapeze support suspended from the structure.
- .4 Cable tray shall be supported via Manufactures brackets, or supports manufactured on site using Unistrut or B-line channel, meeting all the manufacturers' requirements for loading.
- .5 Conduits should be independently supported, free from any other mechanical system.
- .6 Conduit and cable tray support systems shall be securely and adequately installed to preclude movement of conduit and cable tray during pulling operations.

## **2.3 Conduit, Pull Boxes And Outlet Boxes For Communications And Security Systems**

- .1 Metallic Conduit
  - .1 EMT, reamed and bushed at both ends.
  - .2 Minimum Size for communications is 27mm inside diameter.
  - .3 Installed above ceilings, under access floors and in walls only; not acceptable for in floor use.
  - .4 Conduits, conduit fittings, hanger and supports: in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings, Section 26 05 29 Hangers and Support for Electrical Systems, Section 26 05 33 Raceway and Boxes for Electrical System
  - .5 Fish wire: polypropylene type.
- .2 Pull Boxes
  - .1 Shall be made of code gauge steel and shall have a rust resistant finish.
  - .2 Shall be constructed in accordance with Canadian Standards Association.
  - .3 Shall be sized in accordance with ANSI/TIA/EIA-569B, Table 12.
  - .4 Pull Boxes for Security systems shall not have pre-punched knockouts.
  - .5 Junction boxes, cabinets type: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .3 Outlet Boxes for communications systems
  - .1 Shall be a minimum size of 100mm x 100mm x 65mm deep.
  - .2 Shall have a raised Plaster adapter ring sized for a single gang opening for communications Outlets.
  - .3 Shall have raised plaster adapter ring sized for Access Control devices.
  - .4 Shall have raised plaster adapter ring sized for Intrusion Alarm devices.
  - .5 Outlet boxes 2-gang type with single gang plaster ring, conduit, and fittings: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.

## **2.4 FLOOR BOX FOR ELECTRICAL AND COMMUNICATIONS.**

- .1 Refer to electrical specification for a shared electrical and telecommunication floor box.

## **Part 3 Execution**

### **3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for communication raceway systems 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 empty raceway system for voice and data system, including underfloor overhead distribution system, pull cord, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, cable tray, miscellaneous and positioning material to constitute complete system.
- .1 Install all systems as per the CEC and manufacturers recommended installation procedures.
- .2 Ground and bond all conduits and cable tray in accordance with section 27 05 26 and CEC.
- .3 Provide separate conduit/cable tray system for the following systems:
  - .1 Intrusion Alarm System
  - .2 Access Control System
  - .3 Telecommunications System
  - .4 Sound Masking System,
  - .5 Video Surveillance system
  - .6 Intercom System
  - .7 Audio/Video System
- .4 Electrical Metallic Tubing (EMT) conduits for all Voice Data Systems, Access Control and video surveillance systems minimum size to be 27mm unless specified otherwise.
- .5 Electrical Metallic Tubing (EMT) conduits for all Intrusion Alarm, Sound Masking and Intercom systems minimum size to be 21mm unless specified otherwise.
- .6 Provide the following separation from Electrical Power systems installed in conduits:
  - .1 300mm from circuits of 300Volt and less.
  - .2 600mm from circuits 300Volt and higher.
  - .3 2 Metres from Circuits between 600V and 15KV.
  - .4 3 Metres for circuits above 15KV.
  - .5 Electrical or Mechanical systems cannot share the same cable tray or be racked on the same support structure.
- .7 Heights of Communications system Outlet Boxes:
  - .1 Telecommunications outlets, 400mm Above Finished Floor (AFF) (the same height as adjacent receptacles)
  - .2 Wall Mounted Telephones 1200mm AFF.
  - .3 Video Intercom 1400mm
  - .4 Access control Card readers, 1200mm AFF.
  - .5 Intrusion alarm keypads, 1200mm AFF Barrier free standard, 1400mm non-barrier free
  - .6 Barrier Free Buttons, 900mm AFF

- .7 Door Contacts, on leading edge of door frame at top of frame.

### **3.3 Installation Of Hangers And Supports For Communications Systems.**

- .1 Support Cable tray of approved types of wall brackets, trapeze supports. Plumbers perforated straps are not permitted means of supports.
- .2 Centre hung cable tray is not acceptable for communications cabling.
- .3 Conduits and equipment shall be independently supported, free from any other mechanical system.
- .4 Conduit and Cable Tray support systems shall be securely and adequately installed to preclude movement of conduit and cable tray during pulling operations.
- .5 Communications outlet boxes shall not be placed back to back with another communications outlet box or any other box.
- .6 Maximum Height for installed communications systems is 11ft.
- .7 Only communications system can be attached to the trapeze supports of the cable tray.
- .8 Power or mechanical controls shall not be attached to communications racking.

### **3.4 Installation Of Conduit, Pull Boxes And Outlet Boxes For Communications Systems.**

- .1 Conduit Installation Requirements
  - .1 All Communications systems shall be installed in conduit or cable tray unless otherwise indicated.
  - .2 The inside radius of a bend in conduit shall be not less than 10 times the internal diameter of the conduit.
  - .3 All Conduits shall be identified and labelled at both ends. Tags shall identify start and finish of conduit.
  - .4 A Maximum of one communications outlet per 27mm conduit run.
  - .5 Back to back or offset outlets shall not be used.
  - .6 All Conduits shall originate in the communications room, pull box or cable tray.
  - .7 Conduits shall be rigidly and adequately fastened to withstand pulling tensions as per manufacturer's recommendations.
  - .8 Conduits must follow building lines.
  - .9 90-degree LB, LL, LR, or condulets shall not be used in any instance for communications cabling.
  - .10 A pull box shall be installed in conduit runs where:
    - .1 The length of conduit is over 30 metres
    - .2 There are more than two 90-degree bends
  - .11 Offsets or kicks are to be considered 90 degree bend for communications
  - .12 Conduits protruding through the floor shall be terminated 25-50 mm above the finished floor.
  - .13 Riser sleeves protruding through the floor shall be terminated 25-75mm above the finished floor, including sleeve and bonding bushing.

- .14 Conduits entering and exiting through the ceiling of a communications Room (TR) shall protrude into the room 25-50mm above the 2400mm level.
  - .15 All zone conduits entering a TR (unless otherwise stipulated will protrude into the TR from 25-50 mm without a bend.
  - .16 The maximum fill rate authorized for conduits is 40 percent.
  - .17 Pull boxes shall not be installed higher than 3353mm above finished floor. Approval of this deviation is on a case by case basis.
  - .18 Communications conduits shall NEVER be run over:
    - .1 Boilers
    - .2 Incinerators
    - .3 Hot Water lines
    - .4 Steam lines
    - .5 Electrical rooms and Closets
    - .6 Washrooms
  - .19 All Conduits shall be bonded in accordance with section 27 05 26 and the CEC.
  - .20 All Conduits shall use the trapeze hanger method to support the conduits, shall use threaded rod not less than 3/8" diameter.
  - .21 Install pull string in all conduits and cable tray tied at both ends for installation by Voice data system contractor.
- .2 PULL BOX INSTALLATION REQUIREMENTS
- .1 In all instances pull boxes shall be placed in straight sections of a conduit run and shall NOT be used in lieu of a bend. Corresponding ends of the conduit are to be aligned with each other. Conduit fittings shall not be used in place of pull boxes. Conduits shall always protrude in the direction of pull. Conduits shall not exit the sides bottom or back of the pull box.
  - .2 All Communications system conduits including Intrusion Alarm, sound masking, intercom, audio/video and Access control shall follow the requirements of this section.
  - .3 Pull boxes shall be placed in an exposed location, and readily accessible. Pull boxes shall not be placed in a fixed false ceiling space, unless immediately above a suitably marked and hinged panel. If the pull box is installed above a suspended type ceiling a green indicator dot shall be placed on ceiling t-rail to indicate the location of pull box.
  - .4 All Boxes shall be adequately secured. They shall not be supported by the conduits entering the box.
  - .5 Riser cables and Communications outlet cannot share the same conduit system or pull boxes.
- .3 OUTLET BOX INSTALLATION REQUIREMENTS
- .1 Install communications Outlet boxes for voice data systems same level as adjacent receptacles and flush to the wall wherever possible.
  - .2 Where communications Outlets are installed in steel stud type systems, provide additional cross bracing and or straps to make the installation completely rigid prior to the application of the wall facing material.
  - .3 Back to back and offset outlets shall not be used.

- .4 Apply appropriate acoustic sealing as necessary on back of communications outlet boxes to ensure the STC rating is maintained.
- .5 Ensure conduits are installed not to de-rate the STC rating of the wall.
- .6 Ensure Outlet Box is mechanically bonded to the Conduit system.
- .7 Conduits must enter the outlet box from the top or bottom.

### **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.
- .3 Waste Management: separate waste materials for reuse, 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 pathways for communications systems installation.

**END OF SECTION**

**Part 1 General****1.1 Related Requirements**

- .1 Not Used

**1.2 References**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
  - .1 TIA/EIA-568-C.1-2011, Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
  - .2 TIA/EIA-568-C.2-(2011), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
  - .3 TIA/EIA-606-A-(2008), Administration Standard for the Commercial Telecommunications Infrastructure.
  - .4 TIA TSB-140-2004, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.

**1.3 Definitions**

- .1 Refer to TIA/EIA-598-D, Annex A for definitions of terms: optical-fiber interconnect, distribution, and breakout cables.

**1.4 System Description**

- .1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fiber cables, terminations, faceplate, jacks, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.
- .2 Shared Services Canada (SSC) is responsible for the supply, installation, testing and commissioning of a complete horizontal and backbone cabling infrastructure and equipment.
- .3 Contractor will provide a separate conduit pathway rough-in infrastructure for voice and data system. Rough-in to include 100 x 100 x 65mm device box complete with single gang raised plaster ring, pull boxes, bushing, bonding and grounding, cable tray, floor box shared with electrical and Voice/data. All empty conduits to be provided with pull string. Existing cable tray will remain and will be re-used as indicated in the plan.
- .4 Contractor is responsible for the removal of existing horizontal voice and data cables from the existing telecom room in the 4<sup>th</sup> floor to the floor boxes on the same floor.

**END OF SECTION**



**Part 1 General**

**1.1 References**

- .1 ASTM E1374-06 (11) – Standard Guide for Open Office Acoustics and Applicable ASTM Standards
- .2 ASTM E1573-09 – Standard Test Method for Evaluating Masking Sound in Open Office Using A-Weighted and One-Third Octave Band Sound Pressure Levels
- .3 ASTM E1130-08 – Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index
- .4 ASTM E2638 – Standard Test Method for Objective Measurement of Speech Privacy Provide by Closed Rooms
- .5 Acoustical Design of Conventional Open Plan Offices, Canadian Acoustics, vol 27, no. 3, 2003 (NRCC-46274)

**1.2 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 Sound Masking systems and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Include single line diagram, sound masking speaker layout of complete Sound Masking system including cable types and size.
- .3 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

**1.3 Closeout Submittals**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for Sound Masking systems for incorporation into manual.
- .3 Include parts list using component identification numbers standard to electronics industry.

**1.4 Delivery, Storage And Handling**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address. Inspect manufacturer's packages upon receipt.
- .2 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 Sound Masking systems from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Protect from moisture during shipping, storage and handling.
- .5 Handle packages carefully.
- .3 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

## **Part 2 Products**

### **2.1 Materials**

- .1 Conduits: size as indicated, in accordance with Section 26 05 00 - Common Work Results for Electrical and in accordance with Section 27 05 28 - Pathways for Communications Systems.
- .2 Communication conductors: type and size as indicated, in accordance with manufacturer's cable type and sizes, to be CMP or FT6 Plenum rated.

### **2.2 System Description**

- .1 The contractor shall supply and install a complete and operational Sound Masking System as indicated in the plan.
- .2 The sound masking speaker shall be direct field, radiating directly into space.
- .3 The sound masking system shall automatically adjust based on the room's or zone's ambient noise level. Shall be software controlled and has rack mounted volume controls for manual volume adjustment. Has wall mounted volume control system in some of the areas.
- .4 System Architecture
  - 1. The system shall be of a networked decentralized architecture with addressable masking devices distributed throughout the installation area.
  - 2. The sound masking system shall be arranged into zones from 1 to 6 speakers.
    - .1 Each zone shall be individually addressable and controllable for both volume and spectrum for fine tuning of the system.
- .5 Sound masking generating system
  - 1. The system shall use digital signal processing (DSP) technology for masking sound generation and output adjustment of masking signals.

2. Sound masking generator shall include an automatic calibration process on 340 narrow bands or third-octave bands from 100Hz to 6.3kHz based on DSP technology.
  3. The masking sound shall be generated via a truly-random, non-deterministic digital process with no repeat cycle.
  4. The system shall provide independently controllable masking zones that efficiently allow the ability to control and monitor the operation of each zone and provide:
    - .1 A third-octave equalizer per zone with minimum 18 bands, ranging from 100Hz to 6 300Hz
    - .2 Possibility to select specific spectrum for each masking zone.
    - .3 Definition of the sound masking spectrum by increment of 0,1 dB in each 1/3 octave band.
    - .4 An independent masking volume control providing minimum 0.1 dBA volume increments and an output range of 35 to 85 dBA @ 1m from the loudspeaker
    - .5 A temporary mute function for the masking output
    - .6 The ability to completely disable the masking output
    - .7 Possibility to provide a masking volume ramp-up function of up to 4 weeks to facilitate the introduction of the system in the buildings that are already occupied.
    - .8 The system shall provide a function to allow a gradual ramp up of masking volume each time power is applied.
- .6 System control and software
1. The configuration and the adjustment of the system shall be made with a PC or a tablet connected by a wireless connection. The wireless connection is required only during the configuration of the system.
  2. The sound masking system shall include graphical software interface that integrates the design, setup, and calibration stages directly on the office layout plan.
  3. When adjustment needs to be made on the sound masking system, the operator shall be able to make the changes directly from the area that needs modification. The operator control PC or tablet shall be able to communicate with the system by wireless.
- .7 Sound Masking Systems Acoustical Performance
1. The preferred target sound masking frequency spectrum to be used shall be the one shown in Table 1 and in Acoustical Design of Conventional Open Plan Offices, Canadian Acoustics, vol 27, no. 3, 2003 (NRCC-46274) for each zone
    - .1 The frequency contour provided shall be maintained at different dBA target levels by equally applying the positive or negative difference, between the nominal 45 dBA level and the target dBA level, to each of the one-third octave frequency band's dB level, so as to equally shift the entire contour.

(e.g. A target level of 42 dBA, will required shifting the entire 45 dBA spectrum down equally by 3 dB in each of the 1/3 octave frequency bands)

Table 1: Optimal Sound Masking Spectrum (ref. Bradley, NRCC-46274 report)

– Nominal 45 dBA Contour

1/3 Octave Band Center Frequency	1/3 Octave dB Sound Levels ( overall = 45 dBA nominal)
Hz	dB
100	42.5
125	42
160	41.5
200	41.5
250	41
315	40.5
400	39.5
500	38.5
630	37.5
800	37
1,000	35.5
1,250	33.5
1,600	31
2,000	28.5
2,500	26.5
3,150	23.5
4,000	21.5
5,000	19.5

2. Provide Adaptive volume control adjustment for the entire space.
3. Masking sound levels for each location type shall be as follows:
  - .1 45 dBA in open plan areas.
  - .2 45 +/- 2 dBA in open areas with the adaptive volume control adjustment.
  - .3 42 dBA in enclosed rooms
4. The supplier shall setup the sound masking system to meet acoustical performance requirements when HVAC systems are functioning under what is considered a "normal" mode of operation for occupied periods.
  - .1 It is the Departmental Representative's responsibility to ensure HVAC systems are operating as required during sound masking system's scheduled commissioning.
  - .2 The supplier shall not be responsible to meet acoustical performance requirements in locations where, existing background noise exceeds sound masking spectrum levels, and/or where building design details or other constraints prevent its proper installation, setup and operation.

5. The spectrum should be verified and adjust to match target spectrum for every 100 to 150 square meters in open area and in 20% of enclosed rooms. The measurement shall be performed at representative locations 1.5m above floor level 1m away from demising partitions and walls or large reflecting surfaces, in concordance with ASTM E1573 measurement procedures.
6. After adjustment, the system shall provide spatial uniformity within the tolerances provide below.
  - .1 Overall dBA levels measured within zones and in enclosed rooms shall be within +/- 1 dBA, of the specified target level for the combined mechanical and sound masking level.
  - .2 Uniformity in any third-octave band shall vary no more than +/- 2 dBA, from the 1/3 octave band contour levels indicated in Table 1.
  - .3 In the situation where building background noise exceeds the target spectrum, special attention should be taken to identify the source.
7. To meet the above requirement, and allow flexible adjustments of the masking level, each 100 to 150 square meters of an open area should have an independent adjustment capability.
8. Upon completion of installation, and final setup the supplier shall provide a report to Departmental Representative of the sound masking systems acoustical performance.
- .8 Adaptive volume control adjustment in open areas
  1. The adaptive volume control system provides a real-time volume adjustment of the masking sound level based on the level of distracting noise in a zone.
  2. The ambient noise shall be measured with sensors installed in the ceiling.
  3. The adaptive adjustment system shall be based on the latest DSP technology
  4. Sensitivity of the active volume control shall be programmable to adapt masking level with ambient noise increase.
  5. Level variations rates shall be adjustable with 0.1dB steps, update every 15s.
  6. The minimum and maximum sound masking level and the sensitivity of the active volume control shall be programmable.
  7. It should be possible to control the masking sound volume in each zone independently.
  8. History of the active volume control shall be recorded on a 7 days period to allow the performance of the system to be analysed.
  9. Specification
    - .1 Sensitivity: -35±4 dB (0 dB = 1V/pa, 1 kHz)
    - .2 Directivity: Omnidirectional
    - .3 Frequency range: 20-20,000 Hz
    - .4 Diameter: 9.5mm

- .5 Length: 70mm approx.
- .6 Standard operation voltage: 3 volts
- .7 Current consumption: Max. 0.5 mA
- .8 S/N ratio: More than 62 dB
- .9 Measurement range: 35 to 95 dB at 17 mV/Pa
- .10 Connectors Type: BNC
- .11 Colour: White

.9 In-Room occupant Control

- 1. Provide wall mounted, in-room controls as indicated on the plan giving the user's manual controls over the loudspeaker volume in designated room or zone.
- 2. Provide device boxes and conduit up to accessible ceiling space.

.10 Security Performance

- 1. The system shall provide:
  - .1 Password-protected access to the project manager software.
  - .2 Storage of settings in memory in each networked masking device, which shall be maintained during power outages.

.11 Speakers

- .1 The system loudspeaker shall be designed to generate the optimum masking sound or surface-mounted applications.
- .2 It shall be equipped with a 165 mm driver installed in a sealed enclosure.
- .3 It must be installed on the surface of drywall ceiling or on ceiling tiles through a 193 mm diameter hole.
- .4 It shall have four different power taps ( $\frac{1}{2}$ , 1, 2 and 4 W) controlled with a rotary switch allows quick adjustments of the output level.
- .5 Specification
  - .1 Power: 10 watts
  - .2 Line Voltage: 25 V
  - .3 Sensitivity: 88 dB
  - .4 Material: ABS fire proof
  - .5 Frequency Response: 100-8000 Hz
  - .6 Connectors: Spring Loaded Terminals
  - .7 Driver: 16.5 cm (6.5 in.) full range
  - .8 Color: White
  - .9 Weight: 4 lbs
  - .10 Shipping Weight: 4.4 lbs

.12 Audio Mixer

- .1 Remote-Controlled Audio Mixer
- .2 VCA Level Control for Each Input Pair
- .3 Format-A Twisted Pair Inputs
- .4 Balanced and Unbalanced Outputs
- .5 Two Mono Unbalanced Outputs to Feed Stereo Amplifier

- .6 Inputs and Outputs on Detachable Connectors
  - .7 Twisted Pair Interconnection to Remote Control
  - .8 Directly Controlled by RDL Remote Controls
  - .9 Two and Three Channel Remote Controls Available
  - .10 Local Input Available if Only Two Twisted Pair Inputs Used
  - .11 Paging Source May Connect to Local Input
  - .12 Front-Panel Gain Trim Matches Active or Passive Format-A Senders
  - .13 Dual-LED VU Meter Displays Mixer Output Level
  - .14 Audio Presence Detector Controls Open-Collector Outputs
  - .15 Detector Outputs Intended to Enable Power Amplifiers or System Power
  - .16 Energy Savings Possible Using Detector Outputs
  - .17 Selectable 10 or 20 Minute Detector Release Delay
  - .18 Complete with power supply
  - .19 TYPICAL PERFORMANCE
    - .1 Inputs (3): RDL FORMAT-A; Balanced line level
    - .2 Input Connections: RJ45 (FORMAT-A); Detachable Terminal Block (Pair C)
    - .3 Outputs (3): 150  $\Omega$  balanced; 1 k $\Omega$  unbalanced (2)
    - .4 Output Connections: Detachable Terminal Block (balanced); RCA Phono Jacks (unbalanced)
    - .5 Output Level: +4 dBu balanced, -10 dBV unbalanced
    - .6 Frequency Response: 20 Hz to 20 kHz (+/- 0.25 dB)
    - .7 THD+N: < 0.05% (20 Hz to 20 kHz); <0.02% (1 kHz)
    - .8 Noise below +4 dBu: < -100 dB (all channels off); <-75 dB (any channel on); <-70 dB (all channels on)
    - .9 Headroom above +4 dBu: > 18 dB
    - .10 CMRR: > 80 dB (50 Hz to 150 Hz)
    - .11 VCA attenuation: >90 dB (each input, remote control volume off)
    - .12 Indicators (3): Dual-LED VU meter (2); Audio present (threshold = 35 dB below +4 dBu output)
    - .13 Power Connections (3): Terminal block; dc power jack (2)
    - .14 Power Requirement: 24 Vdc @ 120 mA plus connected FORMAT-A sender currents
  - .20 Overall Dimensions:
    - .1 Height: 1.42 in. 3.61 cm
    - .2 Width: 3.25 in. 8.26 cm
    - .3 Length: 8.14 in. 20.68 cm
- .13 Microphone Outlet
1. The outlet module shall have an XLR microphone input. The module provides IEC 24 V phantom and accepts input signals from both dynamic and condenser microphones. The input signal shall be amplified using a studio-quality microphone preamplifier optimized for normal operating levels. The rear-panel GAIN switch is normally set by the installer for NORM (normal) gain. If consistently low mic levels are expected, this switch may be set to the HIGH gain position. The pre-amplified microphone source is routed to one output cable pair selected during installation using a rear-panel switch.
  2. These modules drive only one cable pair, therefore they accept signals and power from other mic-level or line-level Format-A senders. The modules shall have a second RJ45 jack for these input cables. Two other single-pair senders may be chained or a single two-pair sender may be connected. If three single-pair

senders are connected together, each sender must feed a different pair: A, B or C. The module must be set to feed pair A if it is connected together with an RDL two-pair sender that feeds stereo audio on pairs B and C. The power pair and all three audio pairs are fed through both rear-panel RJ45 jacks.

3. The modules may be powered directly from a 24 Vdc power supply using the rear-panel detachable terminal block. Local power connected to the module is also fed to all connected remote modules. The -TPS1A may be remotely powered through the twisted pair cable from any other module, signal distributor or RDL power inserter connected to the same twisted pair cable. Module power is indicated by a front-panel LED.
  4. The module shall provide superior audio performance that rivals or exceeds shielded wiring. Design simplicity, ease of installation, unsurpassed flexibility, automatic fused power, exceptional hum rejection, low noise, and low distortion provide designers and installers the optimum choice in economical twisted pair products.
  5. TYPICAL PERFORMANCE
  6. Input Connection: XLR
  7. Input Level: -45 to -65 dBu Bal.; Max: -40 dBu (HIGH Gain), -28 dBu (NORM Gain)
  8. Format-A Signal Pair Used: Switch-selectable A, B, or C Gain: 50 dB (NORM) or 63 dB (HIGH), Switch-selectable on rear panel Format-A Input: RJ45 (not applicable to EM-)
  9. Output: RDL TP Format-A
  10. Output Connection: RJ45
  11. Frequency Response: 100 Hz to 30 kHz (+/- 1 dB); integral low-cut filter -10 dB @ 30 Hz
  12. THD+N: < 0.1% (80 Hz to 20 kHz)
  13. Noise below +4 dBu: < -80 dB (NORM Gain), < -70 dB (HIGH Gain)
  14. Headroom above +4 dBu: > 18 dB
  15. CMRR (50 to 150 Hz): > 60 dB (HIGH Gain), > 65 dB (NORM Gain)
  16. Indicator: Power In
  17. Power Connections (2): Detachable terminal block; RJ45
  18. Power Requirement: 24 Vdc @ 65 mA plus connected loads
  19. Maximum Load Current: 135 mA
  20. Dimensions: 1.6" (4.06 cm) W; 4.11" (10.45 cm) H; 1.89" (4.8 cm) D
  21. Mounting Box Min. Depth: 2.4"
- .14 Paging Microphone
1. Professional gooseneck electret condenser microphone for use in general installed sound reinforcement applications.
  2. Shall have dual gooseneck sections for full articulation, CentraVerse goosenecks provide scalable, best-in-class performance in a wide variety of locations, including podiums and desktops.
  3. Cardioid polar pattern with tailored response for speech
  4. Dual-section gooseneck positioning
  5. Available in 12" and 18" lengths
  6. XLR connector for easy installation
  7. Desktop base
  8. Configurations: With Inline Preamp and Mute Switch/LED Indicator
  9. Polar Pattern: Cardioid



10. Cartridge Type: Electret Condenser
11. Frequency Response: 70–16000 Hz
12. Output Impedance: 180  $\Omega$
13. Sensitivity open circuit voltage, @ 1 kHz, typical: –33 dBV/Pa (22 mV)
14. Maximum SPL 1 kHz, at 1% THD: 120 dB SPL
15. Signal-to-Noise Ratio Ref. 94 dB SPL at 1 kHz: 67 dB
16. Dynamic Range: 93 dB
17. Self Noise equivalent SPL, A-weighted, typical: 27 dB SPL
18. Preamplifier Output Clipping Level @ 1 kHz, at 1% THD: –7 dBV
19. Common Mode Rejection 10 Hz to 100 kHz: >45 dB
20. Operating Temperature: –18 to 57°C (0 to 135°F)
21. Storage Temperature: –18 to 57°C (0 to 135°F)
22. Power Requirements: 11–52 V DC, 2.0 mA
23. Weight: CVG/12 6.3 oz. (177 g)

## 2.3. SUBMITTALS

- .1 Product Data: Manufacturer's specifications and installation instructions.
- .2 System Design: Schematics of the system showing quantity and location of components, related cabling and accessories.
- .3 Warranty Documents: Warranty documents covering the system components.

## 2.4. QUALITY ASSURANCE

- .1 System Design: Performed by an approved manufacturer representative.
- .2 Installer Qualifications: Approved by manufacturer representative and are trained with the specified components or have demonstrated experience with the installation of similar products to those specified.
- .3 System Adjustment: Done by an approved manufacturer representative or trained contractor.

## 2.5. REGULATORY TESTING AND CERTIFICATIONS

- .1 The relevant system components shall conform to:
  1. UL 60065 / ULC 60065 – Standard for Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General
  2. FCC – EN 55103-1&2 – Audio, Video and Entertainment Lighting Control

## 2.6. WARRANTY AND MAINTENANCE

- .1 Provide a written warranty that the system components installed shall be free from defects in parts or assembly for a 5-year period from date of first use (the date of system initialization).

# Part 3 Execution

## 3.1 System Design

- .1 Design system according to manufacturer's specifications.

### **3.2 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for intercommunications systems installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of .
  - .2 Inform of unacceptable conditions immediately upon discovery.
  - .3 Ensure that facility build out is at a stage suitable for the system installation.
  - .4 Ensure that facility is constructed according to plans, including wall locations, ceiling types and plenum barriers.
  - .5 Ensure that the plenum height is appropriate as per manufacturer's recommendations and as per plan.
  - .6 Ensure power requirements have been provided as per plan.
  - .7 Ensure sufficient space for centrally located components is available as per plan and manufacturer's specifications.
  - .8 Ensure any third-party components required to be interfaced with the system have been provided.
  - .9 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from .

### **3.3 Permits**

- .1 Obtain necessary permits for installation work.

### **3.4 Installation**

- .1 Install equipment as indicated and in accordance with manufacturer's instructions.
- .2 Interconnect system components.
- .3 Follow all applicable codes and standards for the area.
- .4 Follow manufacturer's recommendations regarding installation.
- .5 Follow the system design for location of loudspeakers and wiring.
- .6 Record any necessary changes to the system design on the plan.
- .7 Ensure that supplementary materials used meet applicable safety standards.

### **3.5 Field Quality Control**

- .1 Ensure that loudspeakers are suspended in a level manner.
- .2 Minimize obstructions to loudspeakers, to the extent possible.
- .3 Ensure cables are properly supported in the ceiling.
- .4 Ensure cables are securely terminated.
- .5 Ensure cables are Plenum rated

### **3.6 System Configuration And Adjustment**

- .1 Follow manufacturer's recommendations for system settings as found in the User Manual.

### **3.7 Demonstration And Training**

- .1 Demonstrate operational system to the Departmental Representative by walking the space.
- .2 Demonstrate functionality of the system to the Departmental Representative.
- .3 Provide any training to the Departmental Representative that may be required under the terms of the contract to maintain and/or operate the system or any optional devices (e.g., in room controls)
- .4 Provide 2 hour training for users and 2 hour training for maintenance personnel.

### **3.8 Tests**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conduct intelligibility performance test.

### **3.9 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 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.

### **3.10 Protection**

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

**END OF SECTION**

**Part 1 General****1.1 References**

- .1 Note used

**1.2 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 Intercommunications systems and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Include riser diagram, talk paths of complete intercom system.
- .3 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.

**1.3 Closeout Submittals**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for intercommunications systems for incorporation into manual.
- .3 Include parts list using component identification numbers standard to electronics industry.

**1.4 Delivery, Storage And Handling**

- .1 Deliver, store and handle materials in accordance 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect intercommunications systems from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products****2.1 Materials**

- .1 Conduits: size as indicated, in accordance with Section 26 05 00 - Common Work Results for Electrical and in accordance with Section 27 05 28 - Pathways for Communications Systems.
- .2 Communication conductors: type and size as indicated, in accordance manufacturer's recommended cable type and sizes.

**2.2 Intercom Reception Desk and Door Station**

- .1 Video Intercom Door Station
  - .1 Color video camera with audio intercom
  - .2 PanTilt Zoom camera lens
  - .3 2-way hands-free voice communication with master/sub stations
  - .4 Call button to initiate call to master(s)
  - .5 White LED illuminator for low light conditions
  - .6 Simple 2-conductor wiring
  - .7 Surface mount die cast aluminum construction
  - .8 330' wiring distance to Master on 18AWG 2 conductor cable.
  - .9 Power Source: Supplied by Master station
  - .10 Communication: Hands-free
  - .11 Camera: CMOS
  - .12 Scanning lines: 525 lines
  - .13 Min. illumination: 5 Lux at 1'6"
  - .14 Wiring: 2-conductor, PE insulation, Aiphone
  - .15 wire #871802
  - .16 Wiring Distance: Door to master, 330'
  - .17 Operating Temp: 14 – 140° F (-10 ~ 60° C)
  - .18 Dimensions (HxWxD): 6-13/16" x 3-7/8" x 1" (173 x 98 x 29.5 mm)
  - .19 Weight: (approx) 1.43lbs (650g)
  - .20 Acceptable Product: Aiphone JK-DA
- .2 Video Intercom Master Station (Reception Desk)
  - .1 The master monitor shall be compatible for the video intercom with PanTilt & Zoom video entry security system. The system shall be able to support 1 video door station and 2 inside color monitor stations.
  - .2 The video intercom shall have a 170° camera view and gives the user the ability to PanTilt and Zoom the camera to a desired area for a better view of the visitor.
  - .3 Shall have a built in picture memory feature that can be set to record automatically when the visitor calls, or the record can be done manually by the user. Up to 40 images can be recorded at a rate of 1 frame per second and 6 frames per image (240 total frames). Up to 10 images (60 frames) can be saved and protected from automatic overwriting.

- .4 Shall have a backlight/night sensitivity adjustment. In low light (night time) and heavy background light (sunny day) situations, the user can press the ADJUST button to improve the image quality to aid them in identifying the visitor. Monitor shall be aesthetically flexible with changeable front-mask so to match apartment design ( Black and White options required)
- .5 Power Source: 18VDC, PS-1820UL
- .6 Call: Varying ring tones from door based on how set in the Menu
- .7 Communication: Hands-free (VOX) after TALK button is pressed once, or push-to-talk
- .8 Capacity: 1 door, 2 monitors
- .9 Wiring: 2-conductor, PE insulation, Aiphone wire #871802 from doors & #871804 between monitors
- .10 Wiring Distance: Door to farthest monitor, 330'
- .11 Talk Path: Single channel
- .12 Operating Temp: 32 – 104° F (0 ~ 40° C)
- .13 Dimensions (HxWxD): 7-5/16" x 5-5/16" x 1-1/16" (185 x 135 x 27 mm)
- .14 Acceptable Product: Aiphone JK-1MED complete with power supply.

## **2.3**

### **Security Window Intercom System**

- .1 This security window intercom system shall provide a Voice-actuated Communication (VOX) operated hands- free as means of communication for two people conducting business on either side of a security window.
- .2 The intercom system shall have an acoustic tube system is used that combines an acoustic tube speaker with a noise canceling microphone. This ensures clear sound quality with sufficient volume.
- .3 The use of the acoustic tube system means that the unit can be installed without having to make a hole in the barrier glass.
- .4 The acoustic tube is long and thin, ensuring that the field of vision between the operator and the customer is not obstructed.
- .5 The circuit of the noise canceling microphone shall be built in to the acoustic tube system, lessening the effects of ambient noise and making sure the operator accurately hears the customer.
- .6 The sound of the customer's voice is concentrated ensuring that nothing is misheard, and the voice of the operator is detected by the VOX circuit and transmitted automatically. This means that no operations are necessary during communication, making it a smooth and user-friendly system.
- .7 When the operator leaves the booth or does not want voices from inside to be heard outside, the system can be put into standby mode by turning off the TALK switch so that sound is not be transmitted.
- .8 The volume switch shall be able to changed from "Lo" to "Hi" when there is an increase in ambient noise or if a customer is hard of hearing.

- .9 The intercom shall have a sensor that automatically switches the system to standby mode when there are no customers (automatic operation system).
- .10 The intercom shall have a built-in paging function so that customers in outside waiting rooms can be easily called. The paging speaker to be installed in the waiting area.
- .11 Acceptable Product: Shall be complete with mounting accessories.
  - .1 Reception side: Aiphone Operation unit OU-100, Gooseneck microphone IME-100, Main unit MU-100
  - .2 Waiting area side: Aiphone Sensor ISE-100, Driver Unit DR-100, Extension tube IAX-100, Acoustic I/O tube AI-100

### **Part 3 Execution**

#### **3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for intercommunications systems 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 equipment as indicated and in accordance with manufacturer's instructions.
- .2 Interconnect system components.
- .3 The video intercom shall be connected the access control system. The door where the door station is installed shall be able to remotely unlock the door through the video intercom desk station at the reception.
- .4 Provide additional relay and wiring necessary to integrate these function.

#### **3.3 Tests**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conduct intelligibility performance test.

#### **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 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.

### **3.5 Protection**

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

### **3.6 Training**

- .1 Contractor to provide 2 hour training user group and 2 hour training for maintenance staff.

**END OF SECTION**