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## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

### 1.2 SYSTEM DESCRIPTION

- .1 Communication systems consist of, but may not be limited to, structured wiring system (voice and data), cable T.V. (CATV) systems; low voltage wiring associated with the lighting system and building automation system (BAS).
- .2 Communications system wiring refers to all wiring associated with the systems indicated above.
- .3 Related Work By Electrical Contractor:
  - .1 26 05 31 Splitter, Junction, Pull Boxes and Cabinets
  - .2 26 05 32 Outlet Boxes, Conduit Boxes and Fittings
  - .3 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
  - .4 26 05 36 Cable Trays for Electrical Systems
  - .5 27 10 05 Structured Cabling for Communications Systems
  - .6 28 13 00 Access Control
  - .7 28 16 00 Intrusion Detection
- .4 Related Work By Mechanical Contractor:
  - .1 Division 25 – Building Automation System

## PART 2 - PRODUCTS

### 2.1 COMMUNICATION SYSTEMS WIRE AND CABLE

- .1 Low Voltage Cable:
  - .1 Cable, unless specifically indicated otherwise, minimum FT-6 rated cable is to be used throughout.
  - .2 Cable jacket:
    - .1 Labeled with the following information, as a minimum:
      - .1 Cable type.
      - .2 FT-6 rating.
      - .3 Temperature rating.
      - .4 CSA number.
      - .5 Rated voltage.
      - .6 Gauge and number of conductors.
    - .2 Cable not identified as above will not be permitted to be installed on this project.

- .3 Coloured as follows:

System Description	Jacket Colour
Voice	Blue
Data	White
Intrusion Detection	Red
Access Control System	Red
Fire Alarm	Red
Low Voltage Lighting	Brown
BAS and Multi-media	Yellow

## 2.2 SUPPORT SYSTEMS

- .1 J-hooks: Galvanized steel, wide base, smooth beveled edges, sized to support cables as described elsewhere in this section, complete with retainer clip. Erico Caddy CAT HP series or approved equal.

## PART 3 – EXECUTION

### 3.1 WIRING METHODS.

- .1 EMT type conduit wall-stub c/w flush installed device box is required in all partitions, regardless of construction material. Stubs shall be turned out into accessible ceiling space within the same room as the outlet box, c/w nylon insulated throat, Arlington bushing or threaded type bushing. Minimum size shall be 27 mm (1 inch).
- .2 Where communication cables, with the exception of BAS system wiring, are permitted to be installed in ceiling spaces without benefit of conduit, main runs shall be installed in a cable tray assembly. BAS system wiring is not to be installed in cable tray.
- .3 Cables exiting cable trays are to be routed through the top portion of the tray.
- .4 Ensure that both the device box and accompanying conduit sleeve are bonded to ground, as follows:
- .1 Outlet box installed in partition utilizing metal studs, adjacent to receptacle box:
- .1 Provide a #12 green insulated RW90 bonding conductor between receptacle device box and communication outlet device box. Provide a push-on non-metallic insulated bushing on the end of the conduit stub, similar to Arlington Series EMT\*\*\* (T&B Insuliner sleeves not acceptable).
- .2 Outlet box not otherwise bonded to ground:
- .1 Where bonding connection is available from an overhead source (junction box, cable tray, etc), provide a #12 green insulated RW90 bonding conductor from the bonding connection, through the conduit sleeve to the device box. Terminate bond wire at the device box. Provide a push-on non-

metallic insulated bushing on the end of the conduit stub similar to Arlington Series EMT\*\*\* (T&B Insuliner sleeves not acceptable).

- .5 When cables not installed in cable trays are required to pass through a partition separating a corridor from a room, or between rooms, EMT type conduit sleeves are required, sized in accordance with the information contained in this section. Sleeves shall be installed into accessible ceiling space, c/w nylon insulated throats or threaded type bushings. Provide a bonding bushing for all conduit sleeves. Seal the ends of all conduits after installation of cables. Firestop where required to maintain a fire resistance rating. Smoke seal where required.
- .6 J hooks and adjustable cable support loops shall be installed only in rooms in which telecommunications outlets and/or television outlets are installed, with a maximum spacing of 1220 mm (48"). Standard J hooks shall be used to support up to ten cables; J hooks with a reusable cable retention system or adjustable type cable supports shall be used to support eleven or more cables. Utility columns (e.g. pac poles) shall not be used. J Hooks shall not be used in corridor or common area ceiling spaces.
- .7 The electrical contractor is to supply and install a suitably sized electrical junction box for all wiring supplied by the electrical contractor, regardless of system voltage. This electrical box will contain all electrical connections associated with wiring for all electrical systems.
- .8 When cables originating from cable trays are required to pass from the cable tray through a partition separating the corridor from a room, two (2) 53 mm (2 inch) EMT type conduits are required. Conduits shall extend into the room accessible ceiling space; c/w nylon insulated throats or threaded type bushings. Provide a bonding conductor, connected to the cable tray for all conduits. Seal the ends of all conduits after installation of cables. Firestop where required to maintain a fire resistance rating. Smoke seal where required.
- .9 Where grouping of various systems outlets or multiple type outlets in drywall type construction is required, the use of box mounting brackets as manufactured by Caddy #RBS16 or #RBS24 or approved equal, are to be installed between, and secured to both metal studs. Secure brackets to metal studs using low profile sheet metal screws. Install suitable sized 102 mm (4") square and/or 119 mm (4 11/16") boxes c/w single gang raised tile rings.
- .10 All surface wiring installed in rooms and/or other areas not having any hung, or drop type ceilings, or where otherwise installed on, or to wall surfaces etc., are to always be contained or sleeved in EMT type conduits.
- .11 All non-concealed, surface type wiring installed on either ceilings and/or walls, is to also be sleeved in EMT type conduit.
- .12 All concealed wiring routed through rooms with drywall or other inaccessible ceiling types are to be installed in a conduit system. The installation of access doors or recessed light fixtures in these areas does not change these types of ceilings from inaccessible to accessible.
- .13 Pull boxes are to be sized in conformance with CEC Rule 12-3036, unless noted otherwise. In addition, pull boxes installed on conduits used for the installation of communication systems

for straight pulls, shall conform to the following minimum requirements:

1. Minimum size of pull box: 150 X 150 X 100 (6 x 6 x 4 inch)
  2. 35 mm (1-1/4 in): 150 wide X 510 long X 100 deep (6 x 20 x 4 inch).
  3. 41 mm (1-1/2 in): 200 wide X 686 long X 100 deep (8 x 27 x 4 inch).
  4. 50 mm (2 in): 200 wide X 914 long X 150 deep (8 x 36 x 4 inch).
  5. 75 mm (3 in): 300 wide X 1220 long X 100 deep (12 x 48 x 6 inch).
  6. 100 mm (4 in): 375 wide X 1525 long X 200 deep (15 x 60 x 8 inch)
- .14 All communications systems wiring installed within millwork is to be installed in a conduit system. Flexible metal conduit is permitted between outlet box and pull box. Where liquid tight metal flexible conduit is used for this purpose, matching liquid tight connectors are required. Increase one trade size.
- .15 Unless specifically indicated otherwise, minimum FT-4 rated cable is to be used throughout.
- .16 All communications system wiring (with the exception of low voltage lighting system control cables and BAS control cables) installed within accessible type ceiling spaces and not otherwise laying in cable trays or contained in conduits, are to be secured directly to the structure via the use of wide base, beveled edge supports approved, equal to, or better than those as manufactured by Caddy, CableCat cable type supports, Catalog # CAT16HP for up to 7 cables, Catalog # CAT32HP for up to 25 cables, Catalog # CAT48HP for up to 60 cables. Support of low voltage cables to the structure is not to be greater than 1200 mm (48 inch) intervals. In addition, cables are to be bundled together at midpoint between each support via the use of Velcro Softcinch wire management. Do not use nylon tie wraps for this purpose.
- .17 Install backbone cable in EMT conduit as indicated. Connect FT-4 rated, corrugated Innerduct to EMT using an approved adaptor fitting in the Communications rooms and extend to the cable tray. Provide Innerduct for the slack loop in the cable tray and extend innerduct to the rack containing the fibre patch panels.
- .18 Low voltage lighting system control cables and BAS control cables installed within accessible ceiling spaces and not installed in a conduit system are to be secured directly to the steel deck, above the support structure. Provide supports at 1200 mm (48") intervals.
- .19 All cable supports used for communications system wiring with the exception of lighting system low voltage cables and BAS control cables are to be installed no more than 760 mm (30 inches) above a finished ceiling, to permit ready access for future additions.
- .20 In addition to the above requirements, BAS control circuit wiring 50 volts and less is to be installed as follows:
- .1 EMT conduits are to be extended to within 760 mm (30 inches) of all various control devices associated with the operation of any given piece of mechanical equipment or device they might feed.
  - .2 Unless specifically indicated otherwise, liquid tight metal type conduit c/w matching liquid tight type connectors are to be used for final connection between end of EMT conduit and applicable control device.
  - .3 Bonding conductors are not required in flexible metal conduits where the conduit

terminates in a non-metallic electrical box.

- .21 Maximum Conduit Fill for Voice and Data Wiring. Note that the minimum acceptable conduit size for communications pathways shall be 27 mm (1 inch), unless noted otherwise:

1.	27 (1)	Up to 4 Cat 6A cables
2.	35 (1 1/4)	5 to 8 Cat 6A cables
3.	41 (1 1/2)	9 to 10 Cat 6A cables
4.	53 (2)	11 to 17 Cat 6A cables
5.	63 (2 1/2)	18 to 24 Cat 6A cables
6.	78 (3)	25 to 37 Cat 6A cables
7.	103 (4)	38 to 64 Cat 6A cables

END OF SECTION

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## PART 1 - GENERAL

### 1.1            RELATED SECTIONS

- .1        26 05 00 Common Work Results for Electrical
- .2        26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- .3        26 05 36 Cable Trays for Electrical Systems
- .4        27 05 28 Pathways for Communication Systems

### 1.2            REFERENCE STANDARDS

- .1        CAN/CSA Standards
  - .1        CAN/CSA T527-94 (Reaffirmed 1999) Grounding & Bonding for Telecommunications in Commercial Buildings.
  - .2        CAN/CSA T528-93 (Reaffirmed 1997) Design Guidelines for Administration of Telecommunications Infrastructure in Commercial Buildings.
  - .3        CAN/CSA T529-95 (Reaffirmed 2000) Telecommunications Cabling Systems in Commercial Buildings.
  - .4        CAN/CSA T530-99. Commercial Building Standard for Telecommunications Pathways and Spaces.
  - .5        CAN/CSA-C22.2 No. 226-92 (Reaffirmed 2006) - Protectors in Telecommunications Networks.
  - .6        C22-1-12 Canadian Electrical Code
- .2        ANSI/TIA/EIA Standards
  - .1        2.3.1 TIA-526-7 - Measurement of Optical Power Loss of Installed Singlemode Fibre Cable Plant.
  - .2        TIA-526-14-A - Optical Power Loss Measurements of Installed Multimode Fibre Cable Plant.
  - .3        ANSI/TIA/EIA-568-B.1 - Commercial Building Telecommunications Cable Standard: General Requirements.
  - .4        ANSI/TIA/EIA-568-B.2 - Commercial Building Telecommunications Cabling Standard: Balanced Twisted-Pair Cabling Components.
  - .5        ANSI/TIA/EIA-568-B.3 - Optical Fibre Cabling Components Standard.
  - .6        ANSI/TIA-569-B - Commercial Building Standard for Telecommunications Pathways and Spaces.
  - .7        ANSI/TIA-569-C - Optical Fibre Colour Coding.
  - .8        ANSI/TIA/EIA-606-A - Administration Standard for Commercial Telecommunications Infrastructure.
  - .9        ANSI-J-STD-607-A - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
  - .10      ANSI/TIA-758-A - Customer-Owned Outside Plant Telecommunications Infrastructure Standard
- .3        BICSI Standards
  - .1        BICSI/TDMM – Telecommunications Distribution Methods Manual. (12th. Edition)
  - .2        BICSI Information Transport Systems Installation Methods Manual (ITSIMM).

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### 1.3            SCOPE OF WORK

- .1    Provide a complete structured cabling system to carry voice and data, as indicated on the drawings. System components include but may not be limited to the following:
  - .1    Category 6 Modular Patch Panels.
  - .2    Category 6 Patch cords.
  - .3    Category 6 UTP wiring (FT-6 rated) CMR.
  - .4    Cable management.
  - .5    Information outlets and faceplates.
  - .6    Cable and connectors for multimedia system.
  - .7    IDC connectors and mounts.
  - .8    12/24 port (1U) SC fibre patch panels.
  - .9    Grounding and bonding system.
  - .10   Identification of all network components, terminations, information outlets, etc.
  - .11   Complete project documentation and as built drawings.

### 1.4            STRUCTURED WIRING SYSTEM CONTRACTOR QUALIFICATIONS.

- .1    The Structured Wiring System installation contractor must be an authorized installation agent for that particular manufacturer's solution and provide that manufacturer's system warranty upon project completion.
- .2    The Structured Wiring System installation contractor shall be a current member of BICSI "Building Industry Consulting Services International" and must provide an RCDD "Registered Communications Distribution Designer" as Communications System Project Manager for the duration of the project.

## PART 2 - PRODUCTS

### 2.1            GENERAL

- .1    All products installed in this system must be part of a complete end to end solution by a single manufacturer. Approved cable partners for that particular solution will be acceptable provided appropriate documentation is submitted at the time of shop drawing submittal and a warranty level is provided in conformance with this specification.

### 2.2            COPPER VOICE BACKBONE SYSTEM

- .1    Cable
  - .1    Category 3, 24AWG voice riser cable, pairs as indicated.
  - .2    CMR (FT6 Rated).
  - .3    Belden IBDN D-Inside multipair type.
- .2    Patch Panels
  - .1    48 port (2U) 8 position modular patch panels.
  - .2    EIA-310-D 482 mm (19") Mount Compliant.
  - .3    Wiring Configuration T568A (ISDN).
  - .4    Terminated 2 pair per port.
  - .5    Belden IBDN 10GX series.
  - .6    Category 6 Compliant.

- .7 CAT5e rated patch panels with equal specifications as described above are an acceptable alternate for voice backbone termination only (orange and purple fields).
- .3 Distribution Connectors
  - .1 25 pair IDC punch down connector with 5 pair marking.
  - .2 Category 6 Compliant.
  - .3 Belden IBDN QCBIXIA connector.
- .4 Distribution Mounts
  - .1 250 pair capacity capable of accepting ten (10) distribution connectors.
  - .2 2 D-rings to be included for each mount.
  - .3 Belden IBDN QMBIX10A.

### 2.3 HORIZONTAL CABLING SYSTEM

- .1 Cable
  - .1 23 AWG 4 pair Category 6 cable.
  - .2 CMR (FT6 Rated).
  - .3 Blue Outer Jacket for voice, White Outer Jacket for data.
  - .4 CSA T529-95 Category 6 Compliant to 568-C.2.
  - .5 Belden IBDN 10GX series.
- .2 Copper Patch Panels
  - .1 48 port (2U) 8 position mod patch panels.
  - .2 E1A-310-D 482 mm (19") Mount Compliant.
  - .3 Wiring Configuration T568A (ISDN).
  - .4 Belden IBDN 10GX series.
  - .5 Category 6 Compliant.
- .3 Information Outlet
  - .1 Outlet Boxes
    - .1 Provide single gang outlet box for all communications outlets, c/w stainless steel cover plates.
  - .2 Outlet boxes in common walls shall not be installed back to back and must provide a minimum 103mm (4 inch) lateral clearance.
    - .1 Grounding and bonding provided as per Section 27 05 28.
  - .3 Faceplate
    - .1 Single Gang faceplate.
    - .2 Brushed stainless steel, punched to accept flush mount keystone style insert.
    - .3 Four ports per plate.
    - .4 Blank to be supplied for unused ports.
    - .5 Belden IBDN#AX1002009.
  - .4 Inserts
    - .1 8W8P UTP category 6 module.
    - .2 IDC-type connection.
    - .3 Category 6 Compliant.
    - .4 Blue in colour for voice.
    - .5 Grey in colour for data.
    - .6 Wiring Configuration T568A (ISDN).



- .7        Belden IBDN 10GX Module, Keystone.
- .4        Fiber Patch Panels
  - .1        1U modular patch panel c/w fiber connection cassettes;
  - .2        EIA-310-D 482mm(19”) mount compliant;
  - .3        OM3 SC duplex cassettes for 12 fibers;
  - .4        Belden FiberExpress AX103143 panel;
  - .5        Belden FiberExpress AX103711 cassettes

## 2.4                MULTI-MEDIA OUTLET CABLE AND CONNECTORS

- .1        Not applicable.

## 2.5                PATCH CORDS

- .1        Patch cords must be the same manufacturer type as the warranty solution being provided.
  - .1        Telecommunications Rooms
    - .1        Copper Patch Cords for Structured Wiring Racks
      - .1        Four (4) pair, 24 AWG Stranded Wire, 8MOD-8MOD.
      - .2        Category 6 Compliant.
      - .3        Wiring Configuration T568A (ISDN).
      - .4        Blue in Colour.
      - .5        1m ( 3 foot) , 2m (6 foot), 3m (10 foot) in length for green field to blue field. (Provide 1/3 quantity of each).
      - .6        1m ( 3 foot) , 2m (6 foot), 3m (10 foot) in length for silver field to hubs. (Provide 1/3 quantity of each).
      - .7        Provide a patch cord for each installed voice and data port plus 25%.
      - .8        Belden IBDN 10GX Modular Patch Cords.
    - .2        Fibre Patch Cords
      - .1        Patch Panel to Patch Panel
        - .1        Duplex SC-SC 50/125 laser optimized.
        - .2        3m in length
        - .3        CSA T529-95 Compliant.
        - .4        Provide quantity of six (6) for optical backbone interconnection.
        - .5        Belden IBDN Optical Fibre Patch Cords.
      - .2        Patch Panel to Active Components
        - .1        Duplex SC-MT-RJ 50/125 micron multi-mode fibre patch cable
        - .2        3m in length
        - .3        CSA T529-95 Compliant.
        - .4        Provide quantity of 12 patch cords.
        - .5        Belden IBDN Optical Fibre Patch Cords.
  - .2        Work Area
    - .1        Copper Patch Cords
      - .1        Four (4) pair, 24 AWG Stranded Wire, 8MOD-8MOD
      - .2        Category 6 Compliant.
      - .3        Wiring Configuration T568A (ISDN).
      - .4        White in colour.
      - .5        3m (10 foot) in length.
      - .6        Provide a patch cord for each installed voice and data port plus 25%.

- .7        Belden IBDN 10GX Modular Patch Cords.

## 2.6            OPTICAL FIBRE BACKBONE

- .1        OM3 rating
- .2        12-strand fiber backbone
- .3        CMR (FT4) rated backbone cable
- .4        Belden IBDN optical fibre backbone.

## 2.7            STANDARD OF ACCEPTANCE

- .1        Belden IBDN with a 25 year warranty on parts and labour.

## 2.8            ACCEPTABLE MANUFACTURERS, TO THE REQUIREMENTS ABOVE:

- .1        Systimax with a 25 year warranty on parts and labour.
- .2        Panduit Pan-Net with a 25 year warranty on parts and labour.
- .3        Hubbell Premise Wiring with a 25 year warranty on parts and labour.
- .4        Leviton.

## 2.9            EQUIPMENT RACKS AND ACCESSORIES

- .1        Equipment racks for voice and data shall be 480 mm open frame type with holes tapped 10-32 at EIA standard spacing and a minimum capacity of 44U. Equipment racks shall be complete with vertical cable management (minimum size 254mm wide x 230mm deep) on both sides and be of the same height as the rack. All racks shall have a minimum of 25% spare capacity.
- .2        Multiport (minimum 8) EMI/RFI filtered power bar complete with 2-stage surge suppression and 20A receptacles.
- .3        48 port patch panels, 2U blank plates, horizontal and vertical cable management as indicated on the drawings.
- .4        Provide single phase power distribution units where noted. Belden #9BF1-061002 or equal.
- .5        Acceptable manufacturers: Middle Atlantic or approved equal by Hammond Manufacturing.

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## PART 3 - EXECUTION

### 3.1                INSTALLATION

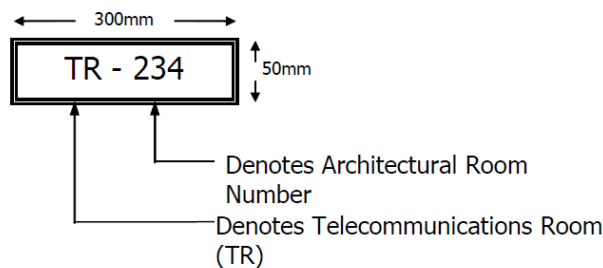
- .1        The structured wiring system contractor must retain the services of at least one Registered Communication Distribution Designer (RCDD) for the duration of the project. The RCDD must be identified prior to the submittal of structured wiring system shop drawings. Provide a copy of the RCDD certificate and proof of membership in BICSI upon award of contract.
- .2        The RCDD shall be responsible for the following:
  - .1        Review the structured wiring system and all related components proposed for project. Review the size and locations of all proposed communications rooms. Notify the Engineer of any concerns relating to component location and length of horizontal cables.
  - .2        Review the size and locations of all proposed communications rooms. Review the proposed equipment rack location and configuration within all communications rooms. Prepare a 1 to 50 (1/4 scale) scale drawing of each communication room illustrating equipment rack configuration and placement. This floor plan is to include proposed cable tray installation. Submit this drawing for Engineer's approval. Do not initiate equipment installation prior to Engineer's approval.
  - .3        Prepare a front elevation drawing for each equipment rack detailing the number and location of all equipment mounted in that rack.
  - .4        Attend project construction job meetings, on a regular basis, or upon request of Engineer.
  - .5        Ensure installation practices and procedures comply with all applicable industry standards and specifications.
  - .6        Provide regular project status reports and updates to the Engineer.
  - .7        Observe testing procedures and approve manufacturer's certification and warranties.
  - .8        Prepare As-built documentation, certifications and drawings and provide current RCDD seal on all.
- .3        The structured wiring system contractor, in conjunction with the RCDD shall provide a set of floor plans indicating the routing of the longest run of structured wiring from each communications room. The length of the longest run of horizontal cable cannot exceed 90 metres (295 feet). The structured wiring system contractor, in conjunction with the RCDD will notify the Engineer, in writing, if any proposed horizontal cable run exceeds this length, so that corrective action can be taken. This notification is to be submitted prior to installation. It is the Contractor's responsibility to ensure that all installed runs of horizontal cable are installed in compliance with published standards.
- .4        The minimum warranty requirement will be 25 years for the network passive components. Upon completion of the project, a certification certificate stating the warranty of the system must be supplied to the end user.
- .5        Provide a complete structured cabling system for voice and data, including all components and wiring as indicated.
- .6        Install horizontal cabling in conformance with 27 05 28 Pathways for Communications Systems.

- .7      Install a grounding and bonding system extending to all communications rooms.
- .8      Provide identification as per Section 26 05 00 and as described below in Section 3.2.
- .9      Provide a slack loop of three (3) meters within each telecommunication room for all installed cables. The purpose of this service loop is to allow any future re- configuration and / or upgrade of these telecommunications rooms.
- .10     Provide a (1) meter slack loop above each structured cabling outlet in the accessible ceiling space. The slack loop is to be stored in a "Figure 8" configuration with each loop of the figure 8 (minimum diameter 200 mm (8 inch)) supported on separate J-hooks.
- .11     Install copper backbone cable in a conduit system. *All voice backbone shall have 2 pairs per port punched down.*
- .12     Install fiber backbone cable in EMT raceway installed in inner duct.
- .13     Permanently identify voice and data horizontal cabling at each end. The identification must be identical and indicate the originating Telecommunications Rooms (TR) and the consecutively numbered jack for voice and data. This same information is to appear on the patch panel and outlet jack location.
- .14     Provide a two gang outlet box for all communications outlets, c/w stainless steel cover plates. Minimum dimensions as follows: 100mm (4 inch) x 100mm (4 inch) x 65mm (2.5 inch) deep.
- .15     Provide 19 mm (3/4 inch) void free plywood backboards, painted with a flame-retardant finish (two coats on all surfaces) in all TR where wall mounted equipment is to be installed.
- .16     Provide equipment racks, mounting hardware, patch panels, etc. where indicated on drawings.
- .17     Cable trays shall be installed in corridors and shall be sized to carry applicable cables plus a minimum 25% spare capacity. Provide conduit within corridors to connect cable tray to adjacent rooms. Cable trays shall be complete with partitions to separate the different systems wired through them. Cables shall exit cable trays from the top in all instances, with the exception of communications rooms.
- .18     Provide a record drawing of each floor plan detailing all structured wiring cables and jacks.
- .19     Perform an Augmented Category 6 permanent link test of each installed cable to 500 MHz performance parameters. Submit test results for review. All cords tested must meet or exceed the minimum transmission requirements as per Augmented Category 6 requirements.
- .20     Provide complete system documentation at completion of the work, c/w a hard copy of the following:

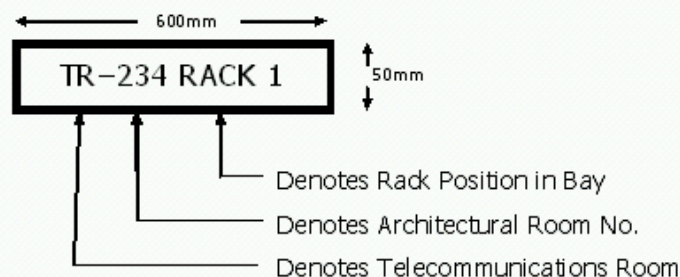
- .1 Cable test reports.
  - .2 Record floor plan drawings in AutoCAD format, indicating all communications racks, information outlet location and numerical identification.
  - .3 Record drawings of the front elevation of each communication rack, detailing the location, size and description of all equipment.
- .21 The AutoCAD floor plan drawings indicating all communications racks, information outlet location and numerical identification are to be laminated and wall mounted in each telecommunications room.

### 3.2 IDENTIFICATION

- .1 A unique identifier shall be associated with each element of the ITS infrastructure to be administered.
- .2 Telecommunications spaces:
  - .1 All telecommunications spaces within a building shall be uniquely identified as part of a complete administration system. The TR, ER or MTR shall be identified by the room designation assigned by the architectural design. The assigned number shall be used within the administration system identifier and shall be a Lamicoid type plate minimum (50mm H) X (300mm L) as shown below and secured to the exterior of the door frame entering that space.

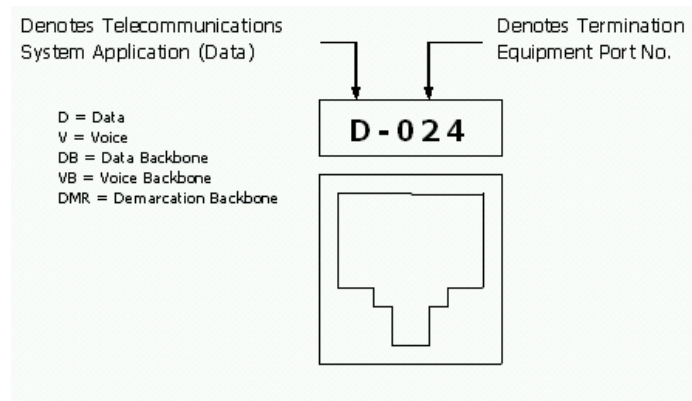


- .2 All telecommunications equipment racks within the telecommunications space require a unique component identifier as part of the administration system by a Lamicoid nameplate, minimum (50mm H) X (600mm L) as shown below and secured to the upper horizontal rail of the equipment rack.



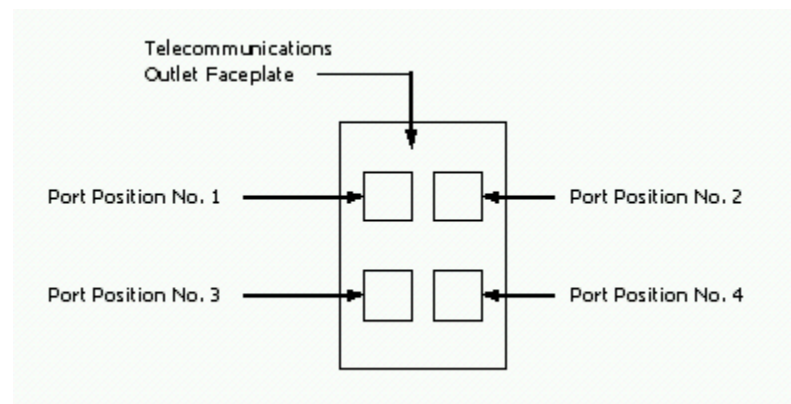
- .3 All ITS termination hardware within the telecommunications space requires a unique component identifier as part of the administration system. Identifiers must be self-adhesive thermal transfer type and placed appropriately to indicate all ports.
- .3 Horizontal Distribution Systems:

- .1 All horizontal cabling shall be uniquely identified with a wrap type self-laminating adhesive label with mechanically generated (not hand written) identifier.
- .2 Horizontal cable identifiers shall denote basic information transport system application and originating telecommunications space termination equipment port as shown below.

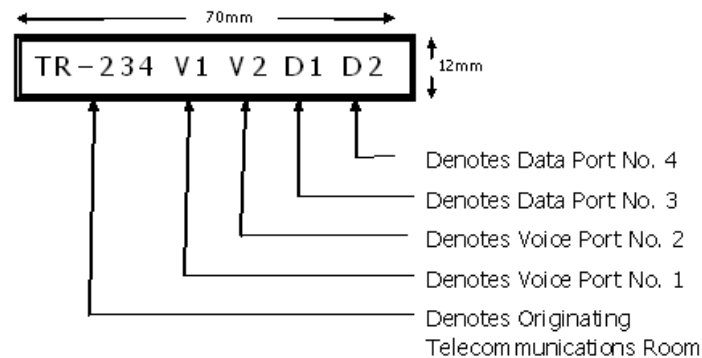


.4 Work Areas:

- .1 For the purposes of system administration the work area shall include the telecommunications outlet faceplate and all outlet termination hardware.
- .2 All telecommunications outlet faceplates shall be standard four port configuration with port assignments as shown below.

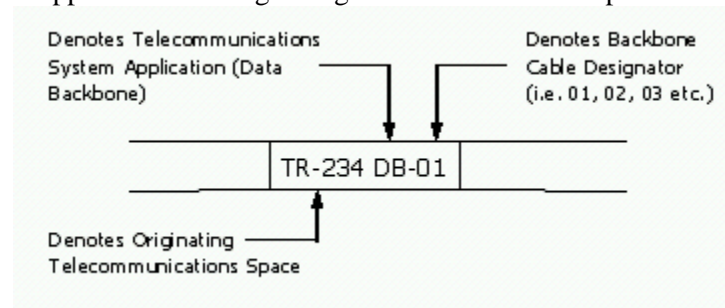


- .3 All telecommunications outlet locations require a unique component identifier as part of the administration system by a Lamicoid nameplate, minimum 120mm H X 70mm L and secured to the wall-space centered and above (min. 12mm) the telecommunications outlet faceplate.
- .4 Telecommunications work area outlet identifiers must denote basic information transport system application, originating telecommunications space and termination equipment port as shown below.



.5 Backbone System:

- .1 All backbone system cabling shall be uniquely identified with a wrap type self-laminating adhesive label with mechanically generated (not hand written) identifier.
- .2 Backbone cable identifiers shall denote basic information transport system application and originating telecommunications space as shown below.



.6 Telecommunications Demarcation Facilities

- .1 For the purposes of system administration, the information transport system demarcation facilities shall include three basic components;
  - .1 Building cross-connect hardware;
  - .2 Building demarcation backbone cable;
  - .3 Building demarcation termination hardware.
- .2 All Building cross-connect hardware within the telecommunications space requires a unique component identifier as part of the administration system. Identifiers must be self-adhesive thermal transfer type and placed appropriately to indicate applicable pair assignments as shown below.

Building Demarcation Backbone (2 Pair / Port)											
P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24

Building / Owner RJ-21 Pigtail																								
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

- .3 All information transport system demarcation backbone cabling shall be uniquely identified with a wrap type self-laminating adhesive label with mechanically generated (not hand written) identifier.
- .4 All information transport system demarcation backbone cable identifiers shall denote basic telecommunications system application and originating telecommunications space.

### 3.3 COMMISSIONING

- .1 Commission the system in accordance with Sections 26 05 00 and 26 91 13.

END OF SECTION



PART 1.: GENERAL

1.1 SECTION INCLUDES

1. This section includes general description of the technical scope of the work, bid requirements and other conditions surrounding the delivery of the technical aspects of the system.
2. Read all parts of this document in conjunction with documents referenced in 1.3 (Related Documents).

1.2 DEFINITIONS

1. The term PROVIDE shall be synonymous, complementary and interchangeable with SUPPLY, INSTALL, CONFIGURE, MAKE OPERATIONAL AS REQUIRED and WARRANTY, in reference to any and all required hardware, software, labour and materials, unless explicitly stipulated otherwise.

1.3 RELATED DOCUMENTS

1. The following sections form part of the technical scope of the work under this Contract:
  1. Section 27 42 17 – Flight Information Display System (System);
  2. Architectural Drawing A-112 showing FIDS display locations;
  3. All other documents that form part of this RFP, as may be necessary;

1.4 PROPOSAL REQUIREMENTS

1. General
  1. Provider of the FIDS technology shall have demonstrated presence and experience in the installation of systems in the Canadian market.
  2. State your understanding of this project with respect to functional intent and how the goods and services as outlined in this document will be provided.
  3. Review all documents and identify any discrepancies that may exist, whether in text, figures or drawings. The Departmental Representative reserves the right to deem any such information as correct at any time, unless formally clarified. The Proponent shall be responsible for all costs of associated corrective work, including design, labour and materials.
  4. Identify all critical interdependencies with the Departmental Representative or any third parties that would require addressing during the project.
  5. Provide all technical information required to evaluate the solution, including proposed equipment, diagrams, layout and functional/operational benefits.

6. Submit a summary bill of materials and catalogue sheets for all major active and passive components for the project. Include model numbers, revision numbers for hardware and software as applicable. Although not expected as part of the Proposal, a complete bill of materials shall be required to be in place and agreed upon with the Departmental Representative prior to Contract signing.
7. Provide a statement of guarantee that all required equipment and materials will be available for timely delivery of the project.
8. Submit a security and backup plan for all documentation and system data related to this project. The plan should outline how the project related information (hardcopy and electronic) will be safeguarded against loss or damage.
9. Submit documentation regarding manufacturer's standard warranty, available options and support procedure for Warranty issues.
10. References
  - .1 Demonstrate by way of three (3) references, that the proposed technology has been successfully deployed in an environment of similar size, scope and function, and within the last three (3) years.
  - .2 The Departmental Representative will contract only with the Proponent having a successful minimum five (5) year history of sales, installation, service, and support.

## 2. Compliance Traceability

1. For each clause within the FIDS specifications (274216 and 274217), provide acknowledgement of compliance, indicating where in the bid the compliance with the clause is described. There shall be three (3) accepted responses to each clause:
  - .1 "COMPLY FULLY";
  - .2 "COMPLY WITH CONDITION" – With explanation;
  - .3 "DO NOT COMPLY" – With explanation;
2. Where clauses and statements are of a general nature, the Proponents shall indicate "READ AND UNDERSTOOD".
3. Compliance Traceability may be submitted in a table format or in-line with the specifications document, so long as section numbers, unmodified RFP clauses and Proponent compliance responses are clearly reflected;

## 3. Substitutions

1. The specifications are meant to outline the minimum requirements and are not meant to limit or inhibit the Proponents from submitting enhanced or alternative solutions.

2. Enhanced or alternative solutions may be proposed, stipulating all variations from the Specification, and clearly identifying any cost savings and operational benefits of the proposed alternative approach.
4. Omissions
  1. Omissions in the Proposal of any provision herein described shall not be construed as to relieve the Proponent of their responsibility or obligation to the complete and satisfactory delivery of the Departmental Representative's intent for the project.

## PART 2.: SCOPE OF THE WORK

### 2.1 GENERAL

1. In general, the scope of work under this specification shall include the supply, installation and configuration of Flight Information Display System at Wabush Airport.:
  1. Work with the Departmental Representative and the project design teams to produce the final, coordinated FIDS system design;
  2. Provide and install head end system, including any required data network and communications CPE hardware, in the designated rack in the Computer room as instructed by the Departmental Representative;
  3. Work with the design team to establish optimal locations for the displays and any specific requirements for content at each location;
  4. Provide and install FIDS displays using installation/suspension and support hardware as coordinated with the Architect and other design team members to ensure appropriate rough-ins structural support;
  5. Provide and install operator workstation as coordinated with the Departmental Representative;
2. Coordinate all activities as necessary and as directed, with the General Contractor, Departmental Representative, interfacing design teams and vendors as necessary.

### 2.2 CONFIGURATION AND INTEGRATION

1. Configure the system as directed by the Departmental Representative, and provide customised content as may be necessary;
2. Coordinate with the Departmental Representative for provisioning of Internet services in order to obtain flight status data;

### 2.3 CABLING

1. Supply and install all Category 6 patch cabling required to deliver the system, including:
  1. All equipment interconnect cabling;

2. Equipment network connections;
2. Refer to section 27 00 00 for exact cabling specifications.

#### 2.4 ON SITE CONDITIONS

1. The Departmental Representative and/or the General Contractor will provide the following, during the course of the construction Contract:
  1. Computer Room with rack space and 120V NEMA 5-15 power;
  2. Infrastructure:
    - .1 Fibre-optic cable connection from the Computer Room to the building Entrance Room;
    - .2 Category 6 horizontal distribution cabling from the designated rack in the Computer Room to each FIDS display and workstation location;
    - .3 Secure Internet connection hand-off by way of a RJ-45 port;

#### 2.5 PROJECT IMPLEMENTATION

1. Assign a Project Manager to manage the delivery of this system. The Project Manager shall have a minimum five (5) year experience in the delivery of IP network based FIDS systems.
2. Technical staff assigned to the project shall be certified by the proposed technology Vendors/Manufacturers to design, engineer, configure and maintain the proposed equipment.
3. Pre-approved technical and engineering staff originally assigned to the project shall remain available to the project for the entire duration. Any exceptions shall be coordinated with the Departmental Representative.
4. Provide design submittals for approvals in advance of purchase decisions. Maintain and update all documents as required.
5. Develop an implementation schedule in concert with the project team. Progress shall be reviewed against Proponent's published schedule, as coordinated with the General Contractor.
6. Adhere to the change control process and procedures established with the Departmental Representative. The Proponent shall not affect any actions that may result in change to scope, schedule, quality and formally agreed upon design, unless formally instructed by the Departmental Representative.

#### 2.6 INSTRUCTION AND TRAINING

1. The Proponent shall develop a training program for approval by the Departmental Representative. Once approved, the Proponent shall provide the following training to the

Departmental Representative for all delivered systems:

1. Installation and maintenance
2. Configuration and management
2. At least 30 days prior to commencing training, the Proponent shall submit to the Departmental Representative for review three (3) draft copies of training course outlines and training manuals.
3. The Proponent shall provide classroom based training for system administrators and for the system users, including operations and airline staff.

## 2.7 TESTING, COMMISSIONING, DEMONSTRATION AND ACCEPTANCE

1. Factory Testing
  1. Proponent shall submit all factory/staging facility test and certification information prior to installation of equipment on site. No equipment shall be installed on site without documented pre-testing against DOA for all components.
2. Commissioning
  1. Provide a commissioning plan for review. The Contractor shall use the commissioning plan to test and validate the work completed;
  2. The Commissioning Plans shall contain clearly organized test scripts with demonstrable results. The Commissioning Plans shall include the following:
    - .1 Bill of Materials check list;
    - .2 Physical condition and installation check list;
    - .3 Base system functionality and performance test scripts;
    - .4 As-built check list and delivery dates;
3. Functional Demonstration and Substantial Performance
  1. Following the Departmental Representative's review and acceptance of the Commissioning Report, the Proponent shall conduct a Demonstration activity to demonstrate to the Departmental Representative, the operational, functional and performance attributes of the system.
  2. Functional demonstration shall be done by means of verifying the check lists or results of any or all of the test scripts from the Proponent's Commissioning Plan against the results from the accepted Commissioning Report.

## 2.8 WARRANTY AND SUPPORT PLAN

1. The Proponent shall Warranty all equipment to be free from defects in materials and workmanship from the time of purchase until 12 months following Total Performance, regardless of any manufacturer warranty limitations and disclaimers.
2. Warranty shall cover replacement or repair within 24 hours, of any defective component, assembly, or sub-system that malfunctions or fails while operating for the purpose intended by the manufacturer. Warranty replacement and repair shall include all shipping, handling and materials, if and as required.
3. The Proponent shall provide assurance that all system direct-replacement components shall be available for a minimum of five (5) years from the date of Total Performance. The assurance may be in the form of documentation from the Manufacturer, confirming component and support availability for the required time period.
4. All hardware, software and firmware delivered as part of this Contract shall become the property of the Departmental Representative, in that the software, firmware and any associated licenses delivered for this Project shall not expire or require the Departmental Representative to incur additional costs to maintain them in any way, i.e. patches and fixes.

## 2.9 SPARE PARTS

1. The Proponent shall submit a recommended list of spare parts including a detailed listing and description of all components.
2. The parts list shall include the following information:
  1. Name of the part;
  2. Complete description of the part;
  3. Each specific location that the listed part is used in the system(s);
  4. Total number of parts in the system(s);
  5. Manufacturer of part;
  6. Manufacturer's part number;
  7. Source of supply;
  8. Price per unit;
  9. Lead time or availability of part;
  10. Estimated Spare Parts List required for first year of operation;
  11. Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR).
3. The Departmental Representative shall determine, in concert with the Proponent, the actual extent of spare parts to be provided prior to Contract signing.

## 2.10 GENERAL REQUIREMENTS

1. The system and all its components shall be supplied, installed, configured and commissioned to ensure complete end-to-end interoperability and compatibility of all component subsystems, including:
  1. Passive and active devices;
  2. Interfaced systems;
  3. Communication protocols;
  4. Associated cabling and connectors;
2. The Contractor shall make own arrangements for telephone and Internet services while on-site. The Contractor may engage the Construction Manager for permission to use such services, if and as available.
3. The Contractor shall arrange and pay for all permits, inspections and fees required and/or levied by authorities having jurisdiction for the supply and installation of all systems under the Contract, if so required.
4. The Contractor shall coordinate all work with the Construction Manager, and other Contractors as appropriate, where work phasing, sequencing and co-occupancy of work space are necessary.
5. All equipment and hardware provided by the Contractor shall be new, unblemished and of the most recent make and model. After installation, each item of equipment and hardware shall be cleaned by qualified staff to the satisfaction of the Departmental Representative following manufacturers recommended procedures.
6. A thorough and professional installation shall be provided. The Contractor shall utilize only skilled labour familiar with the work at hand. Unsafe practices, poor workmanship, incomplete submissions and documentation will be rejected.
7. The Contractor shall observe and maintain site safety rules and procedures in accordance with best industry practices, local codes, the requirements of the Construction Manager and the Departmental Representative.
8. Continuity of Service
  1. The Contractor shall not take any action that will interfere with, or interrupt, any operational building services or systems unless previous arrangements have been made with Construction Manager.
  2. Should services be inadvertently interrupted due to action by the Contractor, the Contractor shall immediately furnish labour, including overtime, material and equipment necessary for prompt restoration of the interrupted services at no cost to the Construction Manager.
  3. All activities having potential for the disruption shall be strictly coordinated with

the Construction Manager.

9. The Contractor shall clean their work areas daily and dispose of waste (including unused or empty boxes and packing material) in a safe manner as directed by the Departmental Representative and the Construction Manager.
10. Materials Guarantee
  1. Ensure that all correct parts are ordered and installed. Maintain records and submit as part of the as-built package part numbers for all installed equipment.
11. Manufacturer's Instructions
  1. Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
  2. Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document shall be followed.
12. Conformance
  1. When materials or products are specified by a Standard, Prescriptive or Performance Specifications, the conformance of delivered materials or products must be verifiable by means of documentation published by the vendor or an independent recognized testing authority.
13. Units of Measure
  1. Imperial units of measurement shall be used exclusively on the drawings and in the Specifications for this project.
14. Documentation
  1. All submittal documentation shall be provided in electronic format and in hardcopy. Each hardcopy submittal shall include a cover page, clearly identifying:
    - .1 Contract No.;
    - .2 Title;
    - .3 Revision ID, date and author;
    - .4 Summary outlining context and purpose;
    - .5 Revision history, showing issue date, author and change summary for each revision;
    - .6 Noted as "For Comments", "For Approval" or "For Information"



.7 Noted as "Response Requested By: YYYY-MM-DD" if applicable.

2. Electronic submittal documents shall be in PDF. These documents shall be made available upon request in native, editable format, and shall include, as applicable:

.1 Microsoft Office 2007 (or newer) documents;

.2 Microsoft Visio, Microsoft Project documents (2007 or newer);

3. The Contractor shall manage a documentation library consisting of all documents developed under this agreement, including specifications, design documents, test reports and others.

4. The Contractor shall implement and manage a Configuration Management Plan in order to:

.1 Document and monitor changes that effect scope, schedule and costs.

.2 Supervise approval and delivery status of proposed changes.

.3 Evaluate and address any impact of the proposed change on schedule, cost, functionality and performance.

#### 15. Substitutions

1. No substitutions shall be permitted without prior written approval by Departmental Representative.

2. Substitutions will be considered if:

.1 Substitute materials which are brought to the attention of and considered by the Departmental Representative as equivalent to the material specified and will result in a credit to the Contract amount; and

.2 Such substitutions are considered by the Contractor as a result of factors which would be deemed outside of the Contractor's control and not as the result of the Contractor's neglect or oversight;

3. Should substitution(s) be accepted by the Departmental Representative, either in part or in whole, the Contractor shall then be responsible for costs when the substitution results in increased cost for other work on the project. The Contractor shall bear any costs for design or drawing changes required as result of substitution;

4. Amounts of all credits arising from approval of substitutions will be determined by the Departmental Representative and Contract price will be reduced accordingly.

#### 16. Damage to Equipment and Property

1. The Contractor shall take all appropriate measures to prevent damage to

equipment, materials and property, including that of Other Contractors or Suppliers. All such damage shall be rectified by the Contractor immediately, at no cost to Departmental Representative.

2.11 WORK NOT INCLUDED

1. Provision of backbone and horizontal cabling infrastructure;
2. Provision of racks/cabinets;
3. Provision of electrical and mechanical services;

PART 3.: EXECUTION

1. Examination
  1. Prior to commencing work, examine current site conditions and inform the Departmental Representative of any unusual existing conditions that may affect the Work.
  2. Verify that critical dimensions are correct and conditions are acceptable. Proceed with installation only after unsatisfactory conditions have been coordinated and rectified.
2. Preparation and Staging
  1. Cooperate and coordinate with the Departmental Representative and the Construction Manager for the location of all right-of-ways and access/egress paths to any area required to remain accessible for maintenance and removal of equipment or related components.
  2. Coordinate with all necessary discipline contractors on site and with the Departmental Representative, the overall project schedule, equipment delivery and system equipment layout in relation to the facility.
3. Quality Assurance
  1. All equipment shall be installed in accordance with the equipment manufacturer's requirements and recommendations.
4. Workmanship
  1. All work shall be performed to applicable standards and industry best practices.
  2. Equipment shall be fastened in racks using appropriate fastening brackets and materials to ensure front and rear support per manufacturer's installation guidelines.
  3. Cabling shall be neatly routed in cableways as required and as recommended in applicable standards.

5. Delivery, Storage and Site Conditions

1. Equipment deliveries shall be the sole responsibility of the Contractor. All related activities, such as transport, loading/off-loading equipment and personnel shall be the responsibility of the Contractor.
2. The Contractor shall be solely responsible for providing and maintaining on-site storage facilities, including all mechanical and electrical services.
3. Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
4. Prevent damage and contamination of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
5. Store material and equipment in accordance with suppliers' instructions.

6. Installation

1. Equipment shall be mounted in accordance with manufacturers recommended/supplied hardware and fasteners by staff deemed to be qualified by the manufacturer.

7. Protection

1. After installing the equipment, clean finished surfaces as required.
2. Protect equipment not yet installed by storing it in original packaging and in secure area. Secure storage spaces, as well as transport of equipment to and from that area are the sole responsibility of the Contractor.

8. Clean Up

1. Remove all unnecessary tools and equipment, unused materials, packing materials, and debris from each area where work has been completed unless designated for storage.
2. Clean up all areas around system equipment and ensure that internal equipment component area is free from debris.

END OF SECTION

PART 1.:     GENERAL

1.1           SECTION INCLUDES

1.       Functional and performance specifications for the Flight Information Display System (FIDS);

1.2           RELATED DOCUMENTS

1.       This section shall be read in conjunction with all other parts of the RFP.

1.3           DESIGN/PROJECT SUBMITTALS

1.       Supply the following for review (2 copies):
  1.       Shop Drawings (design documents that will require review prior to release for construction):
    - .1       Equipment information (catalogue sheets);
    - .2       FIDS architecture (physical and logical) and interconnect drawings;
    - .3       Proposed display screen layout and content;
    - .4       Proposed mounting configuration and detail;
    - .5       Commissioning and Training Plan;
  2.       As-Built Drawings (catalogue of all information documenting the design and products as delivered at time of hand-over):
    - .1       Updated shop drawing documentation;
    - .2       Network requirements schedule (spreadsheet) documenting all connection and configuration needs;
    - .3       Instructions for installation and operation of all provided equipment and products whether hardware or software;
    - .4       Complete schedule of all equipment and software including as appropriate:
      - .1       Manufacturer/Vendor information;
      - .2       Model and version numbers;
      - .3       Warranty information;
      - .4       All license information;
      - .5       Maintenance contact;

- .5 Configuration details in PDF and editable/native format, of all FIDS equipment (hardware and software) including monitors, monitor computers, server(s), workstations, and any related components.
  - .6 Interface Control Documentation (ICD) detailing physical, protocol and integration particulars (airline flight information feeds, other systems, etc.) as applicable;
  - .7 Operator manuals containing user and administrative level guides, feature definitions, system nomenclature, screen-shots, etc.;
  - .8 Maintenance Manuals containing recommended maintenance practices, intervals, replacement part numbers, etc.;
3. Provide all firmware and software components for the project to be of the latest published, stable release up to 30 days prior to the scheduled Departmental Representative commissioning/demonstration activity. This includes service and bug patches/fixes.

## PART 2.: PRODUCTS

### 2.1 REFERENCE STANDARDS

1. All hardware, installation materials and workmanship shall meet applicable building codes and fire codes, and shall be subject to agreement with the Departmental Representative.
2. The design and implementation shall observe and follow current state and legacy technology standards as required to deliver this project.
3. The solution shall support standard message transport interfaces, as applicable:
  1. UDP
  2. TCP/IP
  3. FTP
  4. HTTP
  5. MQ
  6. ODBC
  7. JDBC
  8. JMS
4. The solution shall support common file loader standards, as applicable:
  1. IATA SSIM

2. ACL Score
3. OAG/Innovata
4. ASM message processing
5. SSM message processing
6. Spreadsheet

## 2.2

### FUNCTIONAL DESCRIPTION

1. The system shall have minimal footprint on-site, or be hosted by the FIDS service provider, including acquisition of the flight data service;
2. Use commercial, off the shelf products and technologies, as well as maximum use of modular technologies;
3. The system shall display flight and time of day information to the public, airline and other airport users, via screen formats;
4. The system shall be IP based, and the network switch required to connect end devices and head end hardware shall be provided by the FIDS contractor;
5. Engagement Requirements:
  1. Provide in all designated locations, required FIDS displays, display controllers, mounting hardware, patch cabling and terminations to meet the requirements of this and other relevant sections.
    - .1 Coordinate with the Departmental Representative, the Architect and other trades for exact mounting locations and methods;
    - .2 Develop display pages to present flight arrival and departure information as coordinated with airport operations;
  2. Configuration
    - .1 Configure all FIDS equipment as required and as coordinated with the Departmental Representative and interfacing Vendors and Contractors to satisfy required Flight Information requirements. Configuration responsibilities shall include but not be limited to:
      - .1 FIDS system setup and configuration;
      - .2 Acquisition of airline flight information data, including:
        - .1 Airline A
        - .2 Airline B

3. The FIDS displays shall be capable of displaying the following information:
  - .1 Flight related information, including arrivals and departures, received from the airlines;
  - .2 Airline logos, with one or more logos as coordinated;
  - .3 Visual paging messages, configurable via console application;
4. Information shall be displayed on each screen in English and French. The system shall also support the ability to display information in other languages as may become necessary in the future;
5. The system shall support the following capabilities:
  - .1 Automated and manual backup, and restore mechanism via a hosted service;
  - .2 Ability for manual data entry for flight status change or in the event that data feed becomes unavailable;
  - .3 Ability of the system to alert in the event of feed data outage;

## 2.3

### APPLICATION REQUIREMENTS

1. All display devices shall be using a screen builder application that allows for the creation or modification of display formats or templates;
2. The user shall be able to create display formats for displaying data on display devices quickly and easily. The screen builder shall allow the user to make custom screens and changes without the services of the vendor;
3. The screen builder application will have a test capability that shows on the workstation what should appear on the display device;
4. Graphics shall be capable of natively displaying in the following formats:
  1. JPEG
  2. BMP
  3. TIF
  4. MPEG
  5. GIF
  6. AVI
5. The Flight Information System shall have the capability of displaying multiple formats on the same device at the same time by a split screen or rotating display

option;

6. Video display windowing shall be supported by the screen builder to allow creation of templates for selected single screens to display multiple windows such as:
  1. Visual paging information;
  2. Dynamic and static public information;
  3. Ticket and gate display formats with airline graphics, real-time links to other systems and canned and manual free-form text messages appearing on a single screen;
  4. Other messaging and graphics;

## 2.4

### DISPLAY AND MOUNT REQUIREMENTS

1. The displays shall be 42" flat panel NEC V423, or functional and performance equivalent;
2. Display computer shall be suitable for driving a minimum of two displays, mountable to standard VESA plate, and with MTBF of minimum 5 years;
3. Display mounts shall be installed on vertical surfaces, with capability to orient the display in landscape and portrait configurations, with pan and tilt controls;

## 2.5

### MANAGEMENT SYSTEM

1. A hosted solution shall include a web portal, allowing operations personnel to configure screen display real-estate and modify data elements such as flight information, free-form text messages etc.;

## 2.6

### SIMPLIFIED SYSTEM DIAGRAM



