PART 1 General

1.1 RELATED WORK

.1	Basic Electrical Materials and Methods	Section 26 05 01
.2	Conduit	Section 26 05 34
.3	Communication System Raceways	Section 27 05 14
.4	Cable Tray	Section 26 05 36

1.2 CODES & STANDARDS

.1 EIA/TIA TSB 40 Additional Transmission specifications for Unshielded Twisted Pair Connecting Hardware.

.2 EIA/TIA - 56B Commercial Building Telecommunications Wiring Standards.

.3 CAN/CSA T529 - M-91 High Performance specifications for horizontal UTP.

.4 CAN/CSA - T530-M-90 Building Facilities, Design Guidelines for Telecommunications.

1.3 USE OF A CSV

.1 Data Communications work as specified shall be the responsibility of Certified System Vendor (CSV). The CSV is required to:

.1 provide proof of Certification with Bid Submission;

.2 design a Category 6 wiring system based on contract documents;

.3 comply with Nordx IBDN design guide and installation principles;

.4 perform and supervise the cable pull;

.5 ONLY qualified technicians directly employed by the CSV shall terminate cables (at either ends), test and perform cross-connects;

.6 after completion, provide standard and enhanced testing on all cable runs, and documentation of test results.

.7 provide and install equipment as specified herein;

.8 provide documentation of the Installation;

.9 provide CSV Letter of Certification within two weeks of completion of Job which will include performance level, the Identification of the Installation by the location and installation date.

1.4 GENERAL COMMENTS

.1 Each work station and office, conference rooms shall be provided with one (or more) CAT 6 data outlet c/w RJ 45 jack. Staff and public areas to have RJ 45 CAT 6 outlets where shown.

.2 Provide cabinets as indicated on the drawings to allow grouping of approximately four conduit "risers" and termination therein on BIX punch down - to RJ 45 cross connects.

.3 Each consolidation point will contain a switch with suitable number of ports (plus 10% spare) for cross connect of each outlet to local network system. Between consolidation points and "head end" system in telephone room and LAN room, run fibre optic cable or copper trunk line . Provide hardware for termination and network connection hardware at both ends of each fibre and or trunk line cables.

.4 Work to be done under this section to include finishing of labour materials, and equipment required for a Category 6 Data wiring system Installation.

.5 The Contractor will be responsible for supplying all parts, labour warranties, as well as testing documentation for the wiring system. All parts, components, connectors and physical connections must confirm to a level 6 category wiring plan. Certification of 350 MHz speeds end to end is required.

.6 Contractor is responsible for all cross connects at distribution panel as well as equipment/patch cable (2m) at floor site and equipment rooms.

.7 Contractor must demonstrate that they can meet the installation standards required.

.8 An autocad drawing (on disk) of the cabling structure for each floor is to be supplied indicating runs and identification numbers on project completion by the contractor.

.9 The contractor is responsible for all facets of the project, including but not limited to, access between floors for the cables, backboards in the LAN room, system cabinets, wiring and wall outlets.

.10 Fibre Optic cable should have enough slack to provide 2 metres out using STC connectors on both ends in the LAN and/or hub room.

.11 Provide standard racks (free standing) as indicated on drawing and as revised to house cross connects and customer supplied hubs and equipment.

PART 2 Products

2.1 STATION OUTLETS

.1 For each outlet provide:

.1 2 Category 6, Voice/Data Outlet, complete with icon type numbered labels: DXX-YYYA, where XX=floor level (08, 09, 10) of Work Station, YYY is work

station number (001, to 100 etc.) and A is wire to outlet. Outlets as manufactured by Thomas & Betts or equals in accordance with B6.

.2 Termination of cables on Bix Block at applicable cabinet.

.3 Cable and termination of same on Bix Block to back of cross connect outlet on rack

.4 One cross connect jumper.

.2 Provide Nordx Category 6 BIX RJ45 jacks for all cabinet/racks.

2.2 UTP CABLE

.1 Horizontal cable shall be Category 6 cable 24 AWG unshielded twisted pair. All cables shall be installed as per CSA C22.1. Part 1, Section 50 and Section 60.

.2 In the Wiring/Equipment (LAN) room, provide cables to each equipment cabinet/rack.

.3 All cables in the Wiring/Equipment room are to be placed in a neat and professional manner and routed as per specifications and drawings provided. All cables must be combed and/or routed in such a manner to ensure all bundled cabling is neat and parallel to all other cables in the bundles. All exposed cable bundles are to be tie-wrapped at a maximum of 200 mm apart.

.4 Each 4-pair cable shall be terminated in an eight position modular (RJ45) jack (typically QCBIX46DI). Data pin/pair assignment must meet ISDN standard. Standard 4-pair colour codes, Tip (T) and Ring (R) and Pin assignments are illustrated below:

Standard	4-Pair	Wiring Colour Codes	RJ45
Pair 1	T	White/Blue	Pin 5
	R	Blue/White	Pin 4
Pair 2	T	White/Orange	Pin 3
	R	Orange/White	Pin 6
Pair 3	T	White/Green	Pin 1
	R	Green/ White	Pin 2
Pair 4	T	White/Brown	Pin 7
	R	Brown/White	Pin 8

.5 Data communications cables shall be routed in conduit and terminated in a connection location as specified.

.6 Cable runs shall be completed without splices.

2.3 FIBRE SPECIFICATION FOR DUAL WINDOW MULTIMODE FIBRE USING THE 1300 WAVELENGTH PER THE FOLLOWING:

.1	Core Diameter	62.5um plus or minus 3um
.2	Cladding Diameter	125um plus or minus 4um
.3	Buffer Diameter	90um
.4	Numerical Aperture	0.275 plus or minus 0.015
.5	CoreCladding offset	3um maximum
.6	Core non-circulatory	6% maximum
.7	Cladding non-circulatory	2% maximum
.8	Maximum attenuation:	
	850 nm	3.75 db/km
	133	1.5 db/km
.9	Minimum Band width:	
	850 nm	160 MHz/km
	1300 nm	500 MHz/km

2.4 DISTRIBUTION/EQUIPMENT TERMINATION

.1 Supply and Install QMBIX10A mounts, QCBIX1A4 distribution connectors, designation strips and labels, distribution rings according to horizontal runs and in compliance with approved IBDN IDC (Installation Displacement Connection) design.

.2 Supply and Install QMBIX10C mounts and QCBIX46DI connectors for cabinet/rack located in the Wiring/Equipment Room.

.3 Terminate all horizontal cables on the “Distribution” block and the equipment cables on the “Equipment” block in the Wiring/Equipment room on raised plywood backboard, supplied by the Contractor.

.4 All cables in the Wiring/Equipment room are to be installed to the equipment; cables are to be dressed neatly into the equipment using cable tie-wraps.

.5 To ensure proper Jumper wire routing, replace the vertical distribution rings in the “Equipment” portion of the plywood backboard with “Wire Distribution Spools” with captive screw (#10 wood screw), Anixter part #061688 as shown on the “typical backboard” layouts provided.

PART 3 Execution

3.1 INSTALLATION

.1 Install drops into wall mounted outlets with appropriate connectors as required.

.2 Path must be straight through, as per specifications on pin outs, pairs and wire colours attached.

.3 The installation is to be a certified level 6 installation.

.4 Cables to be identified at both ends of cable with 5 cm from termination. Port on cross connected to be identified as well.

.5 All cables shall be terminated on the cross connect panel and DVO with no more that 1.27 cm of untwisted cable before termination.

.6 Provision of cross connect cables in various lengths; stranded level 5 cable meeting main cable specifications which are to be determined and identified as price per piece (include 100 1.5m cables in base bid).

Communication Raceway System

PART 1 General

1.1 RELATED WORK

.1	Basic Electrical Materials and Methods	Section 26 05 01
.2	Conduit	Section 26 05 34
.3	Cabinets, Splitters, Junction, and Pull boxes	Section 26 05 31
.4	Outlet Boxes and Fittings	Section 26 05 32
.5	Communications Infrastructure	Section 27 05 13

1.2 SYSTEM DESCRIPTION

.1 Complete empty telephone raceway system consists of outlet boxes, cover plates, cable troughs, pull boxes, sleeves, fish wires, plywood backboards, and grounding conductors.

1.3 COORDINATION WITH UTILITY

.1 Coordinate complete installation with telephone utility.

PART 2 Products

2.1 MATERIALS

.1 Conduits: EMT, as per Section 26 05 34.

.2 Junction boxes and T-cabinets: as per Section 26 05 31.

.3 Outlet boxes and fittings: to Section 26 05 32.

.4 Pull cord: polypropylene type.

2.2 DVO OUTLETS - GENERAL

.1 Flush wall mounted telephone outlet to consist of a 2-gang back box with a single gang extension ring. Provide a 3/4" (19 mm) conduit from each outlet stubbed into the ceiling space.

.2 Refer to Communications Infrastructure for cable and jack details.

PART 3 Execution

3.1 INSTALLATION

.1 Install empty raceway system, fish wires, terminal cabinets, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, and miscellaneous material to constitute a complete system.

.2 Conduit bends to be 10 times the interior diameter of conduit.

.3 Ground raceways in accordance with the requirements of the telephone utility.

.4 Install pull boxes such that no conduit run is longer than 50' (15 m) or contains more than two 90 bends along its length. Conduit fittings are not acceptable as pull boxes.

.5 Conform to all requirements of the telephone utility for the installation of the raceway system.

.6 Install pull cord in all conduits.

.7 Identify raceway system components as per Section 26 05 01.

.8 Provide a #6 insulation ground in conduit and a duplex receptacle at each backboard for MTS use.

Public Address System

PART 1 General

1.1 RELATED WORK

.1	Basic Electrical Materials and Methods	Section 26 05 01
.2	Conduit	Section 26 05 34
.3	Wire and Cable	Section 26 05 21
.4	Outlet Boxes and Fittings	Section 26 05 32
.5	Communications Raceways	Section 27 05 14

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Section 26 05 01 including:

.1 Layout of equipment.

.2 Complete wiring diagram, including connections to devices.

1.3 OPERATION AND MAINTENANCE DATA

.1 Provide data for incorporation into Maintenance Manual specified in Section 26 05 01.

.2 Operation and Maintenance Manual to include:

.1 Operation and maintenance instructions for complete sound system to permit effective operation and maintenance.

.2 Technical data - illustrated parts lists with parts catalogue numbers.

.3 Copy of reviewed shop drawings.

1.4 MAINTENANCE

.1 Provide one year's free maintenance with two inspections by manufacturer during the first year of service. Submit Inspection Report to City of Winnipeg. Replace or repair the equipment not functioning as intended.

1.5 SERVICE

.1 The supplier of the system must employ factory-trained technicians and maintain a service organization within driving distance of the job site.

1.6 WARRANTY

.1 The system shall carry a one-year warranty from date of acceptance by the City of

Winnipeg.

1.7 ON-SITE INSTRUCTION

.1 The sound system supplier shall provide on-site instruction to familiarize personnel with the operational techniques and procedures for the system.

1.8 SYSTEM DESCRIPTION

.1 The Electrical Subcontractor shall supply and install a complete and operating new sound system as herein specified and as shown on the drawings.

.2 The new sound system shall be capable of the following functions:

.1 Transmission of paging messages to all loudspeakers on any or all zones from the paging microphone.

.2 Individual zone or all-call paging selection from the zone selector switches built-in to the reception desk microphone.

.3 Transmission of background music to all loudspeakers from an internal tape/CD system, tuner.

.4 Provision of volume control of background music in selected areas with override of paging messages.

.5 Suppression of background music during a paging message.

PART 2 Products

2.1 GENERAL

.1 Acceptable Manufactures: Advance Pro, Inland Audio Visual, or equals in accordance with B6.

2.2 POWER AMP/PRE-AMP

.1 Power amp/pre-amp shall have the following specifications, integral in one chassis:

.1 3 outputs: one 70V music; one 70V page; one music on hold 600 OHM, transformer isolated.

.2 Output power 150 watts RMS (20 - 20 kHz, 0.1% THD) per channel at 70V.

.3 Frequency response: 20 - 20 kHz, 3 dB rolloff, 60 Hz (70V).

.4 Distortion: 0.01% THD @ 1 kHz.

.5 Input sensitivity/impedance:

.1 MIC input: 0.8 mV - 190 mV, 2 k OHM balanced.

.2 Line: 37 mV - 9V, 100 k OHM balanced.

.3 Music: 0.04 - 10V, 10 k OHM (0.1 sensitivity SW) 0.4 - 10V, 10 k OHM (1.0 sensitivity SW).

.6 Noise: (20 - 20 kHz controls centered):

.1 Master volume on minimum - 100 dB.

.2 Master volume on maximum - 1V input: 83 dB.

.3 Master volume on maximum - 0.1V input: 73 dB.

.7 Front controls (each zone):

.1 Master treble: ±10 dB @ 15 kHz.

.2 Master bass: ±10 dB @ 50 kHz.

.3 Master volume: -6 dB on center.

.4 Master volume: 0 dB on center, +6 dB maximum.

.5 Music source: 4 position and off/remote.

.6 Paging volume: 0 dB on center +6 dB maximum.

.7 A/C power: push ON/OFF.

.8 Front indicators:

.1 2 illuminated output meters (Zones A, B).
.2 2 MIC input signals: MIC 1, 2 (LED).
.3 4 music input signals (LED).
.4 4 MIC assign signals (LED).
.5 8 music assign signals (LED).

.9 Special features:

.1 Fixed MIC AGC.
.2 Adjustable music setting.
.3 Adjustable output limiting.
.4 Auxiliary ±15V power supply.
.5 Remote control page volume, music volume and music source selection.

2.3 AM/FM STEREO TUNER

.1 AM/FM stereo tuner shall have the following features:

.1 Quartz locked, frequency synthesized digital tuning.

.2 10 presettable memories - each for AM and FM.

.3 Four digit frequency display.

.4 Automatic next station scan.

.5 Signal strength indicator.

2.4 CD/DVD PLAYER

.1 5 Disc DVD/CD player, base specification Panasonic or equals in accordance with B6.

2.5 AC DISTRIBUTION PANEL

.1 The master AC distribution panel shall provide a minimum four separate chassis-mounted grounded Type AC duplex receptacles. Receptacles to be pre-wired to a common terminal point for connection to the incoming power circuits from the breaker panel. The distribution panel shall occupy no more than 1-3/4" (45 mm) of panel mounting space, and shall be finished to match the other equipment panels.

2.6 CONTROL CENTRE

.1 Provide flush twelve switch control centre for paging/MIC selection. Switches shall be locking Type DPDT with silver contacts, rated at 3 amps.

2.7 PAGING MIC

.1 Make provisions for paging through the receptionist's telephone handset, including 1" (25 mm) C from reception desk to telephone closet.

2.8 PACKAGED SPEAKERS

.1 Flush mounted speakers with integral backboxes equal to Bose 102.

2.9 SPEAKERS (GENERAL)

.1 All speakers/enclosures shall be suitable for air plenum mounting.

2.10 BAFFLES

.1 Flush ceiling baffle shall be fabricated from one piece steel finished in flat white baked enamel suitable for repainting to match surrounding decor and shall measure 12" (300 mm) square. The 8" (200 mm) loudspeaker shall fasten to the backbox with torsion springs and no screws shall be visible on the front of the baffle.

.2 Baffles for surface-mounted installations to be similar to flush baffles, except to be suitable for mounting in surface backboxes.

2.11 BACKBOXES

.1 Backbox for flush baffles shall be constructed of electric-plated steel and shall have the interior coated with a resonance damping material. Two slotted rackets shall provide mounting facilities for torsion spring-type baffles. Mounting straps and knockouts for conduit connection shall be provided. Backbox to be square sized to accommodate the square baffle.

.2 Backbox for surface-mounted installations shall be 12" (300 mm) square, finished in flat white baked enamel and be constructed similar to a flush backbox.

2.12 LOUDSPEAKERS

.1 Loudspeakers shall be an 8" (200 mm) permanent magnet core-type using a 6 ounce (170 grams) ceramic magnet. Voice coil diameter shall be 1" (25 mm) and shall have an impedance of 8 ohms. Continuous power rating shall be 11 watts and uniform frequency range shall be from 50 to 12,000 hertz. The minimum axial sensitivity shall be 94 dB (at 4' (1.2 m) with 1 watt input).

2.13 MATCHING TRANSFORMER

.1 Transformer shall have a power handling capacity of 4 watts. Frequency response at full rated power shall be 50 - 10,000 Hz plus or minus 1 dB. Primary winding shall be tapped to draw 4, 2, 1, 1/2, and 1/4 watt from a 70.7V line with an 8 ohm load. Transformer shall be impregnated to withstand 1500V RMS breakdown test. Transformers to be tapped at 1/2 watt at initial installation.

2.14 VOLUME CONTROLS

.1 Volume controls shall consist of a SPDT 24V DC relay, auto transformer and stainless steel wall plate. The wall plate shall have a dial scale to indicate attenuator position and shall mount to a standard electrical backbox.

2.15 ZONING

.1 The P.A. sound system shall be zoned as indicated on the drawings.

2.16 WIRING

.1 Speaker wiring shall be 4/c #18 with overall jacket.

.2 Paging microphone wiring shall be 2/c #18 twisted shielded with multi-pair #18 unshielded control cable, complete with overall jacket.

PART 3 Execution

3.1 GENERAL

.1 Locate, install, wire and connect all components and devices in accordance with the requirements of the manufacturer.

3.2 MOUNTING OF EQUIPMENT

.1 Mount equipment at heights as described in Section 26 05 01.

.2 Mount equipment square and plumb with building lines. Install devices flush and square with finished surfaces.

.3 Install antennae on a roof-mounted mast and make the signal cable and ground connections. Connect the lightning arrester with a separate down lead to a dedicated ground electrode.

3.3 TERMINATION OF CONDUCTORS

.1 Terminate conductors directly to the terminals of each device.

3.4 IDENTIFICATION

.1 Identify equipment as per Section 26 05 01.

.2 Clearly identify zones on control panels, devices, etc.

.3 Identify wires and cables with wire markers to indicate zone numbers. Identify wiring in each box, panel, cabinet, etc.

3.5 WIRING AND CONDUIT

.1 Install wiring in an independent conduit system.

.2 Install speaker back boxes to form part of the conduit system. Conduit to be sized to accommodate the wiring being installed.

3.6 TESTING

.1 The complete system shall be tested in the presence of the City of Winnipeg's representative on completion of the work. Tests shall demonstrate that the P.A. system will function in an acceptable manner, using each specified input as well as CD, and Cassette player input.

.2 Conduct intelligibility test. Adjust tap settings on individual speakers to suit volume requirements.

.3 Set master controls.