## Part 1 General

### 1.1 REFERENCES

.1 Canadian Standards Association (CSA International):

.1 CSA-C22.2 No. 214, Communications Cables (Bi-National standard with UL 444).

.2 CSA-C22.2 No. 232, Optical Fiber Cables.

.2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA):

.1 TIA/EIA-568-B.1, Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.

.2 TIA/EIA-568-B.2, Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.

.3 TIA/EIA-568-B.3, Optical Fiber Cabling Components Standard.

.4 TIA/EIA-606-A, Administration Standard for the Commercial Telecommunications Infrastructure.

.5 TIA TSB-140, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.

.6 TIA-598-C], Optical Fiber Cable Color Coding.

### 1.2 DEFINITIONS

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

### 1.3 SYSTEM DESCRIPTION

.1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fiber cables, terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and video.

.2 Installed in physical star configuration with separate horizontal and backbone sub-systems:

.1 Horizontal cables link work areas to IT closet.

.2 IT closet linked to Kiosk by fibre optic backbone cables.

.3 IT closet linked to service pedestal at property line.

### 1.4 SUBMITTALS

.1 Provide submittals in accordance with E3 – Shop Drawings.

.2 As-built records and drawings:

.1 Provide manufacture cut sheets for equipment, cable test results, wiring/architecture diagram.

## Part 2 PRODUCTS

### 1.5 FOUR-PAIR 100 OHM BALANCED TWISTED PAIR CABLE

.1 Four-pair, 100 ohm balanced unshielded-twisted-pair (UTP) cable, flame test classification FT4 to: CSA-C22.2 No. 214, Category 6 to: TIA/EIA-568-B.2.

### 1.6 WORK AREA UTP 4-PAIR MODULAR JACK

.1 Eight-position modular jack ("RJ-45"), type T568A Category 6 to: TIA/EIA-568- B.2:

.1 In self-contained flush-mount box, two jacks per box.

.2 Multi-user telecommunications outlet assembly (MUTOA), two ports, each port equipped with factory installed "RJ-45" jacks, type T568A Category 6 to: TIA/EIA-568-B.2.

### 1.7 TERMINATION AND CROSS-CONNECTION HARDWARE FOR UTP

.1 IDC Terminal strips, 25 pair, for terminating 4 pair 100 ohm balanced twisted pair cables and supporting cross-connections using jumper wires or compatible plug-ended patch cords: Category 6 to: TIA/EIA-568-B.2.

.2 Mount or block for housing 10 IDC terminal strips, mounted on rack 48 cm wide.

.1 Distribution rings or channels capable of externally mating with the above mount for managing cross-connection wires.

.3 Patch panel, two rack units high, and 48 ports:

.1 Each port equipped with factory installed "RJ-45" jacks, type T568A Category 6 to: TIA/EIA-568-B.2.

.2 Horizontal cable-management unit for every 48 ports.

### 1.8 UTP CROSS-CONNECT WIRE

.1 Category 6, 4 pairs to: TIA/EIA-568-B.2.

### 1.9 UTP PATCH CORDS

.1 1 metres long, with factory-installed male plug at one end to mate with "RJ-45" jack and with factory-installed male plug at other end to mate with "RJ-45" jack Category 6, 4-pairs to: TIA/EIA-568-B.2.

### 1.10 UTP EQUIPMENT CABLE

.1 4 pair "pigtail", 3 m long, with factory-installed male plug on one end to mate with "RJ-45" jack and other end equipped with factory-installed male plug to mate with "RJ-45" jack Category 6 to: TIA/EIA-568-B.2.

### 1.11 OPTICAL-FIBER CABLE

.1 Distribution without conductive members, multi-mode 50/125, laser-optimized, 2000 MHz km capacity, CSA-C22.2 No. 232 and TIA/EIA-568- B.3, flame test classification FT4, each end terminated with duplex SC connectors.

.2 Six strand for individual camera connections.

.3 12 strand for Kiosk connections.

.4 Cable shall be waterblocked and rated for outdoor duct installation.

**1.12 OPTICAL-FIBER PATCH PANEL**

.1 Mounted in rack 48cm wide, four rack units, with cover, capable of terminating 80 pairs of fiber, equipped with duplex SC compatible adapters.

**1.13 OPTICAL-FIBER PATCH CORDS**

.1 Interconnect cable, two strands, and 1 m long, each end equipped with duplex SC connectors. Multi-Mode 50/125, laser-optimized, 2000 MHz km capacity to: TIA/EIA-568-B.3.

## Part 3 EXECUTION

**1.14 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE**

.1 Install termination and cross-connect hardware in rack as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A.

.2 Install consolidation points, as indicated according to manufacturer's instructions. Identify and label as indicated to: TIA/EIA-606-A.

**1.15 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES**

.1 Install horizontal cables as indicated in conduits from telecommunication closet to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.

**1.16 INSTALLATION OF BACKBONE CABLES**

.1 Install backbone cables from telecommunications closet to Kiosk building

.1 Identify and label as indicated to: TIA/EIA-606-[A].

.2 Install backbone cables from Building to service pedestal at property line.

.1 Identify and label as indicated to: TIA/EIA-606-A.

.3 Install backbone cables from telecommunications closed to Video Camera junction boxes as indicated and according to manufacturer's instructions.

.1 Identify and label as indicated to: TIA/EIA-606-A.

**1.17 FIELD QUALITY CONTROL**

.1 Test horizontal UTP cables as specified below and correct deficiencies provide record of results as hard copy.

.1 Perform tests for Permanent Link on installed cables, including spares:

.1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.1.

.2 Perform tests for Channel on 100% of cross-connected data horizontal cabling installed from each telecommunications room, including shortest and longest drops from each telecommunications room.

.1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.].

.2 Test Optical-fiber strands for attenuation to: TIA/EIA-568-B.1 and correct deficiencies: provide record of results as hard copy.

.1 Test horizontal links need at only one wavelength (850 nm or 1300 nm) and in one direction.

.1 Attenuation to be less than 2.0 dB, unless consolidation point is used.

.2 If consolidation point is used, attenuation test result to be less than 2.75 dB when testing between horizontal cross-connect and telecommunications outlet/connector.

.2 Test backbone links in both direction. Backbone links:

.1 Test multi-mode fiber at both applicable wavelengths (850 nm and 1300 nm).

.3 Maximum attenuation: Cable attenuation + Connector loss + Splice loss.

.1 Multi-mode-fiber attenuation coefficients:

.1 3.5 db/km @ 850 nm; and

.2 1.5 db km @ 1300 nm

.2 Maximum connector insertion loss: 0.75 db per pair and maximum splice insertion loss: 0.3 db.

.3 Perform additional Tier 2 tests using optical time domain reflectometer (OTDR) on backbone fiber pairs to: TSB-140.

.1 Correct deficiencies.

.2 Provide record of results as described in SUBMITTALS.

.4 Provide record of results as hard copy to: TIA/TSB-140.

**END OF SECTION**

## Part 1 General

### 1.1 SECTION INCLUDES

.1 Materials and installation for telephone drop and underground cable terminals.

### 1.2 RELATED SECTIONS

.1 E3 – Shop Drawings.

### 1.3 REFERENCES

.1 Canadian Standards Association (CSA International):

.1 CSA C22.2 No.21402, Communications Cables (Bi-national standard, with UL 444).

.2 CSA T530, Commercial Building Standard for Telecommunications Pathways and Spaces (Adopted ANSI/TIA/EIA-569-A).

### 1.4 PRODUCT DATA

.1 Submit product data in accordance with E3 – Shop Drawings.

## Part 2 PRODUCTS

### 2.1 TELEPHONE DROP CABLE TERMINALS

.1 Individual drop cable terminal block: 2-line terminals, one ground terminal and solid state 150 micrometres gap lightning protectors without fuse, with housing designed for interior mounting.

.2 Multiple drop cable 3 pairs terminal block: solid state lightning protectors without fuse, with housing designed for interior mounting.

### 2.2 UNDERGROUND TELEPHONE CABLE TERMINALS

.1 Direct burial rated, rodent protected 12-pair cable conforming to Cat 6 standards.

.2 Cable installed from pedestal to HHW Building IT closet telecommunication rack.

## Part 3 EXECUTION

### 3.1 INSTALLATION

.1 Install underground telephone cables. Burry 78mm conduit a minimum 900 mm below finished grade. Place conduit in 75 mm sand bedding. Place red warning tape at 450 mm below finished grade Backfill to pre-existing conditions.

.2 Cables to enter building through conduit sleeve cast in floor.

.3 Seal conduit after entry of cable.

.4 Terminate cable at both ends on punch down blocks.

.5 Test cable to Category 6 using certified level IIe tester to: TIA/EIA-568-B.1 standards

## 3.2 INSTALLATION OF TELEPHONE CABLES

.1 Install 4-pair Category 6 cables from telephone punch down block to RJ-45 jacks at operator workstations

.2 Use appropriate tool for connecting conductors to terminals.

**END OF SECTION**