

## Amendment Notice: Electrical Updates

This bulletin applies to and amends the following document:

### **GO Design Requirements Manual (GO DRM) - GO-DRM-STD-2017-Rev5**

- Section 5.2.10.1.10: Removed the requirement of the spare power and communications backbone conduits across the platform
- Section 5.2.2.26.12.1 - Provided further clarification on conduit requirements.
- Section 5.2.26.12.2: Removed the requirement of the 8x53 mm conduits for power communications between communication rooms.
- Section 5.2.26.13.4: Removed communication and the power communication conduit requirement for platforms.
- Section 5.5.1: Removed the following sections in digital signs at line stations, terminals, and carpool lots from the DRM to avoid redundancy with the current Architecture Design Standard (DS-04) updates
  - 5.5.1.1: Suite of sign types
  - 5.5.1.2.1: Location criteria for digital departure signs
  - 5.5.1.2.2: Placement & appearance criteria for digital departure signs
  - 5.5.1.2.4: The number of monitors for digital departure signs
  - 5.5.1.3.1: Location criteria - rail
  - 5.5.1.3.2: Location criteria - bus
  - 5.5.1.3.3: Placement & appearance criteria
  - 5.5.1.3.5: Number of monitors
- Section 5.5.1.5.1: Changed the section language to provide more clarity on the scope of work of the contractor and Metrolinx I&IT as reflected in the Metrolinx I&IT Telecommunication and Systems Standard Revision 02 updates.
- Section 5.5.1.5.2: Revised the naming of sub-section © from "Poles and mounting standards" to "Poles mounting and placement standards"
- Section 5.5.1.5.2: New placement requirements has been included under sub-section (c) in line with the recent design and I&IT standards.
- Section 5.5.1.5.2: Provided more clarity on the shop drawing submittals.
- Section 5.5.1.5.3 (a): Replaced the word "devices" with "Monitor / Digital Media Player" and clarified the requirements for each digital screen.
- Section 5.5.1.5.3 (c): Replaced "Multimode" to "Singlemode" fiber to reflect with I&IT standards.
- Section 5.5.1.5.4- New requirement for digital signage NEMA enclosure added in sub-section (f).
- Section 5.5.1.5.4 (a): Replaced "for receivers and fiber terminations" to "for receivers and all cable terminations"
- Section 5.5.1.5.4 (e): Provided more clarification on NEMA enclosure locations for digital screens.
- Section 5.5.1.5.5: Provided more clarity on the power and communications conduit and cable requirements.
- Section 5.5.1.5.6 (c): Added "See Technical Requirements for Backup Required Time in this document (DRM)" and removed "If the existing UPS does not provide enough capacity or if there is no UPS whatsoever"
- Section 5.5.1.5.7 (c): Revise statement to include "or approved equivalent".5.5.1.4: Digital parking counter

Amendments to the GO DRM are provided in the following attachment:

Revisions to GO DRM September 2023 - Electrical Updates

The Bulletin is available for internal and external users to download via the Metrolinx public download site ([www.gosite.ca/engineering\\_public/GO Design Requirements Manual](http://www.gosite.ca/engineering_public/GO_Design_Requirements_Manual)).

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#### 5.2.10.1 Raceways and conductors

- 5.2.10.1.1 Raceways and branch circuitry shall be implemented to minimize failure of a complete system due to failure or malfunctioning of any single electrical component.
- 5.2.10.1.2 Distribution minimizing conductors of different circuits sharing common raceways and pull-boxes, etc., shall be implemented. No free air cabling is allowed. All wiring shall be in conduit of the proper type, size and material as identified in the DRM and GO Specifications
- 5.2.10.1.3 Raceways shall not exceed a maximum of 40% capacity.
- 5.2.10.1.4 Communication backbone raceways sized 53mm shall not exceed a maximum of 30% capacity for communication cabling.
- 5.2.10.1.5 Raceways selected shall suitably resist mechanical damage and environmental deterioration effects. In particular, special attention shall be applied to corrosion inhibitors and protective coatings or treatments on surface mounted conduit in underground areas (e.g., tunnels, below grade electrical rooms, Bridges and parking structures etc.). Minimum 30% spare conduits with ground wire and pull-cords shall be provided for future use, coordinate with Metrolinx. Bundling of cables with different operating voltages is not permitted. Empty conduits shall be sealed at the ends.
- 5.2.10.1.6 A minimum 12 AWG stranded copper wire green insulated RWU90 below grade and RW90 above grade shall be placed inside each raceway. This wire shall be used as a tracer wire inside a buried raceway for the purpose of locates after installation.
- 5.2.10.1.7 Slack wire shall be provided. In all runs, the amount of slack shall be no less than 1.0m at each termination point and 600mm in each pull point. Access wire shall be neatly coiled and be available for future use.
- 5.2.10.1.8 When installing wires in an existing raceway, it shall be the responsibility of the installer to ensure that new wires are neatly installed and tied together with all existing wiring.
- 5.2.10.1.9 Drip loops shall be provided on all outside hanging raceways or conductors.
- 5.2.10.1.10 Refer to Metrolinx Standard Specifications: Rail Corridor Raceway Requirements, Raceway for Electrical Systems 36 05 34 and Electrical Conductors and Cables 26 05 21 Refer to Metrolinx electrification standards for electromagnetic interference (EMI) protection of devices and cables.

#### 5.2.26.12 Communications and Hub Rooms Communications Connectivity

- 5.2.26.12.1 A minimum of nine 53 mm conduits shall provide connectivity from the Main Communications Room to each Hub Room and Mini-Hub Room. Note that these nine conduits are only to be used to provide communication cabling and should not be used to provide power. Additional power conduits should be provided in accordance with other sections of the DRM". If more than one Hub Room is required, then each Room must have its own direct dedicated set of conduits linking it to the Main Communications Room, which may be designed as a pass-through layout. Spare communication conduits (excluding tracks and signals) shall be 53 mm.
- 5.2.26.12.2 If more than one Communications Room on site, a minimum of nine (9) 53 mm (2") dedicated conduits shall provide connectivity from one Communications Room to the other. Refer to IT Telecommunications and Systems Document for the list of equipment. Spare communication conduits (excluding tracks and signals shall be 53mm.

#### 5.2.26.13 Conduit Infrastructure

- 5.2.26.13.1 Communications conduit shall be included in all rail platforms, power, communication and mechanical systems.
- 5.2.26.13.2 Power shall be run in a dedicated duct bank. Communications shall be run in a dedicated duct bank.
- 5.2.26.13.3 Power and Communications shall run the entire length of the platform and be fed from the Systems designated Main Electrical Room and Main Communications Room respectively.
- 5.2.26.13.4 Provide routing of all conduits with the capability of connecting the Mini-Hub rooms and terminating at each end of the platforms in hand-wells that can provide future connectivity to rail corridor systems.

## 5.5 Fixtures and Furnishings

### 5.5.1 Digital Signs at Line Stations, Terminals and Carpool Lots

#### 5.5.1.1.3.2 Monitor Type and Size

##### 5.5.1.1.1.1 Use current I&IT Telecommunication and Systems Standard (MX-IIT-STD-001)

#### 5.5.1.1.3.2 Number of Monitors

##### 5.5.1.1.2.1 Set of two screens, back-to-back, at each location.

#### 5.5.1.1.3.2 Technical Requirements

##### 5.5.1.1.3.1 Process Requirements:

- a) Contractor shall supply and install all Display Signage related components and hardware, including (but not limited to): Displays, Digital Media Players, media converters, enclosures, encasements, mounting hardware All display accessories (i.e.: remote controls, user manuals) must be delivered to the Metrolinx I&IT representative during commissioning.. Metrolinx I&IT shall install the PCs, routers, and switches in the communications or mini-hub rooms;
- b) Contractor shall supply and install all, interconnecting cables, power supplies, power cabling, and data cabling to the monitors from the communication or mini-hub rooms;
- c) Contractor shall supply and install all transceivers, cabling terminations, communications and mini-hub room racks, and all civil work (conduits, pulling of wiring, pole footings, pole structure, mountings, NEMA boxes, etc.);
- d) Fully installed and tested solution by the Contractor; and
- e) Contractor shall perform the commissioning by the Contractor in coordination with Metrolinx I&IT and Station Operations.

#### 5.5.1.1.3.2 Technical Design Requirements:

- a) Each Digital Sign location must be shown on the electrical drawings and must include data and electrical outlet locations as well as any enclosures or other infrastructure associated with these signs:
  - 1) Monitors: (Use current IT standard);
  - 2) Digital Media Player (DMP):(Use current IT standard).
- b) Contractor to provide transceivers/receivers, associated with cabling type and the balance of digital sign components. Provide receivers with minimal profile; by Extron or approved equivalent – reference products:
  - 1) Extron DTP HDMI 4K 330 Transmitter/ Receiver for shielded cable;
  - 2) Extron HFX 100 Transmitter/Receiver for fiber.
- c) Poles mounting and placement standards
  - 1) Refer to digital signage location criteria and requirements; GO pole conceptual design drawings under development. Shop drawings to be developed by the Contractor and shall be reviewed and stamped by a licensed professional engineer in coordination with digital signage equipment requirements
  - 2) Sign locations shall be coordinated with CCTV camera placement so as not to block or partially obstruct the viewing areas of the CCTV cameras
  - 3) All digital signs and cabling within the area of influence is subject to GO Electricification Standards, Drawings and Specifications where applicable
  - 4) Mounting hardware shall be compatible with screen type and load requirement of indoor and outdoor digital signage systems . Also mounting hardware should allow for the monitors to be tilted to achieve a non-reflective angle for best viewing.

#### 5.5.1.5.3 Connectivity Requirements:

- a) Each of these digital monitors/digital media devices requires a minimum of one CAT6 network outlet. These network outlets are to be cabled back to the nearest telecommunications room network rack switch equipped NEMA box, or mini-hub room, and terminated in accordance with the copper horizontal cabling requirements; b) CAT6 shielded cable for devices placed within 90m from the Communications ( Hub) Room; and
- c) Singlemode 6 strand fiber for installation beyond the 90m mark.

#### 5.5.1.5.4 NEMA Enclosure Requirements:

- a) NEMA enclosures shall be provided for receivers and all cable terminations at digital screens;
- b) NEMA/EEMAC Type 4X IP-65 with solid door capable to accept box lock requested by IT Field Services, and physically separated into two compartments to isolate power from communications devices;
- c) BEL R SS Series EEMAC/NEMA 4-4x-12 / IP-65 or Hoffman CONCEPTTM Type 4x or any other box meeting NEMA Type 4X IP-65, physical separation capabilities and box lock requirements;

- d) The enclosure size selection shall be based on the electrical and electronic equipment to be housed inside the box;
- e) All NEMA enclosures shall be secured and located in between back to back screen in the case of a single screen installation, NEMA enclosure shall be placed behind the screen or finishes adjacent to the screen. Visible NEMA boxes shall not be accepted. Provide access to concealed NEMA boxes. Do not drill or perforate the integrity of the NEMA box in any manner; and
- f) Feeding NEMA enclosures though the top is not permitted due to moisture ingress.

5.5.1.5.5 Conduit Requirements:

- a) Provide minimum one 53mm conduit for power and a minimum of one separate 53mm conduit for data from the communications or mini-hub room all the way to the last pull point before the device; from the last pull use 25mm conduit to the device;
- b) Follow DRM in terms of conduit selection (PVC for buried conduit, RGSEC (Rigid Galvanized Steel Epoxy Coated at the factory) for all exposed locations such as tunnels, etc); 53mm liquid-tight conduits from the NEMA enclosure to the monitor mounting bracket. Provided with drip loops and easy release on the NEMA enclosure side;
- c) All conduits and connections to be concealed within poles or adjacent finishes;
- d) Spare conduits for digital screens shall be 53mm; and
- e) All cables used in conduits shall be outdoor rated and any cables installed in underground conduits or duct banks shall be of burial rated cable grade. All cabling should terminate into media patch panel inside NEMA enclosure accordingly – copper or fiber.

5.5.1.5.6 Power Requirements:

- a) Dedicated single 5-20R duplex receptacles shall be used;
- b) Outdoor locations require sizing based on external enclosure and screen power draws. All receptacles must be GFI Type which may be reset at the NEMA enclosure. This is to be coordinated at time of design and must adhere to DRM. All field assembled equipment installed in any NEMA box shall have final accredited certification as approved for use from the appropriate authority; and
- c) All devices shall be UPS backed-up. Provide a Surge Protection Device in the local panel where the monitor and DMP is fed from. This device shall be appropriate for the specific panel at each location. See Technical Requirements for Backup Required Time in this document (DRM).

5.5.1.5.7 Data Requirements:

- a) DMP's to be placed in Communication (Hub) Rooms;
- b) Assume one DMP per digital display. (confirm with IT); and
- c) For design assumptions, use Cisco Interactive Experience Client 4650 or approved equivalent.