# Transit Oriented Communities

# Reference Concept Design – Electrical Engineering – Thorncliffe Park

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938

Ontario Line Technical Advisor

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# Quality and Revision Information

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| | Signatures | | | | |

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# Abbreviations

ANSI – American National Standards Institute

ASHRAE – American Society of Heating, Refreigiration and Air Condioning Engineers

BICSI – Building Industry Consulting Service International

Civil Project Co – Design, Build and Finance contractor responsible for South civil works

CACF – Central Alarm and Control Facility

EF – Entrance Facility

EMI – Electromagnetic Interference

ER – Equipment Room

HVAC – Heating, Ventilation and Air-conditioning

ICT – Information and Communications Technology

IEEE – Institute of Electrical and Electronics Engineers

LED – Light Emitting Diode

LV – Low Voltage

MPH – Mechanical Penthouse

MV – Medium Voltage

OESC – Ontario Electrical Safety Code

OLTA – Ontario Line Technical Advisor

PVC – Poly Vinyl Chloride

RCD – Reference Concept Design

RGS - Rigid Galvanized Steel

TC – Telecom Closet

TDMM – Telecommunications Distribution Methods Manual

TIA – Telecommunications Industry Association

TR – Telecom Room

TOC – Transit Oriented Community

UPS – Uninterruptible Power Supply

# 1 Introduction

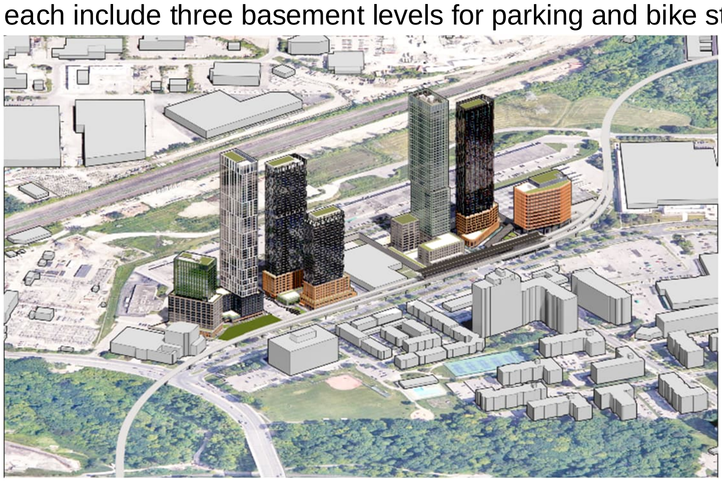
## 1.1 Background

The Ontario Line rapid transit project being delivered by Infrastructure Ontario and Metrolinx will be a 15.6-kilometre stand-alone rapid transit line connecting the Ontario Science Centre to Exhibition/Ontario Place through the Toronto downtown core. Fifteen stations are proposed, with numerous connections to the city's broader transit network. The project also intends to develop Transit Oriented Communities (TOCs) at selected stations to enhance communities along the length of the transit line. In developing the TOC strategy, the area adjacent to the proposed Thorncliffe Park Station was identified as an opportunity area for development.

The Thorncliffe Park TOCs are collectively five separate sites adjacent to Thorncliffe Park station and the elevated guideway along the north side of Overlea Boulevard. Divided into two groups, the east and west sites are separated by a mosque operated by the Islamic Society of Toronto at 20 Overlea Boulevard. The blocks are all intended to provide mixed-use developments, allocating a portion of the ground floor to retail use and the remainder to residential or office space.

The east sites include blocks D, D1 and E1. Blocks D1 and E1 are residential developments with 46 and 56 story towers, respectively. The tower at Block E1 is set back from the guideway at the northwest corner of the site, and includes a u-shaped podium varying from 7 to 11 stories. The block D1 tower and 8 story podium are centered within, and integrated with the proposed TTC bus loop. The bus loop runs between Thorncliffe Station and the residential development, fully wrapping around the structure. Block D is a 13 story office building. All three structures provide three levels of below grade parking with blocks D and D1 sharing their basement levels.

The west sites include blocks E3 and E4/E5 housing residential developments. The blocks each include two towers, extending to 31 and 46 stories at block E3 and 24 and 56 stories at block E4/E5. The towers at E3 are connected through a low 3 story podium while at E4/E5, these are independent, sharing only the basement levels. The blocks each include three basement levels for parking and bike storage.



## 1.2 Purpose and Limitation of Document

This document presents the basis of design for the reference concept design developed for the Thorncliffe TOC development. It is intended to be part of the Disclosed Data (in the data room) to provide Proponents with context to the development of the Reference Concept Design (RCD). The RCD for the TOCs represent an approximate 10% level of design development. As such, this report provides only key engineering parameters required for the concept design. A number of areas will require future consideration, and these are noted through the report.

The report describes the station interfaces, design criteria and design approach for the overbuild electrical design.

This memo is not intended to dictate how to design and construct the project or relieve the developer of design responsibility. Moreover, the document is not prescriptive and does not limit or prevent the TOC Developer from adapting the design to suit the future TOC building. Instead, this document intends to be informative and outline the design data used to develop the reference design and presents a potential design option for this location. Also, the electrical design of the bus loop located adjacent to the station and above the TOC basement is outside the scope of this document.

## 1.3 Referenced Documents

This memo is intended to be read in conjunction with the following key documents:

- Station -TOC Interface Drawings (MMCL and SvN)
- TOC architecture reference concept design (SvN)
- Station architecture reference concept designs (HDR)
- Mechanical concept design memo
- Electrical concept design memo
- Desktop Geotechnical Engineering Design Report (Thurber)
- Constructability memo (MMCL and HDR)
- Available existing building record drawings from City of Toronto

# 2 Design Responsibilities

Division of responsibilities related to the general design of the TOC Development:

### Infrastructure Ontario

Infrastructure Ontario (IO) is the client and leads the development of the TOCs associated with the Ontario Line subway project.

### Civil Project Co

Civil Project Co identifies the joint venture selected by Metrolinx to design and build the Station Civil Infrastructure for the North Ontario Line segment.

### Rolling Stock, Systems, Operation and Maintenance Project Co

Rolling Stock, Systems, Operation and Maintenance (RSSOM) Project Co identifies the joint venture selected by Metrolinx to design, build, operate, and maintain the Ontario Line Infrastructure for 30 years following substantial completion of the works.

### City of Toronto

The City of Toronto is a key stakeholder in the Ontario Line project and will grant planning approvals for the development of the TOC.

### TOC Developer

The TOC Developer will be responsible for developing and constructing the TOC building in accordance with the latest editions of revisions of applicable codes and standards, City of Toronto guidelines and the constraints identified in the Developer Agreement.

# 3 Site Overview

## 3.1 Site Information

| | |
|---|---|
| Site Name: | Block D, D1, E1, E3 and E4+E5 |
| Location: | The TOC sites will be located adjacent to Thorncliffe Park station and the elevated guideway along the north side of Overlea Boulevard. |
| TOC Address: | D: 36 Overlea Boulevard<br>D1: 6 Thorncliffe Park Drive<br>E1: 26 Overlea Boulevard<br>E3: 14-16 Overlea Boulevard<br>E4+E5: 4-10 Overlea Boulevard |


Figure 3-1. – Site Location Plan

# 4 Design Criteria

## 4.1 Introduction

Electrical systems should be designed and installed based on efficient use of space, energy efficiency, optimum ratings, adequate clearances, relevant codes, standards, and industry practice. The electrical and communications services to the building or facility shall terminate at a service entrance equipment for distribution within the building. The location of such equipment should be as close to the point of entry of service to the building/premises as possible to minimize the travel of utility service within the building.

## 4.2 Main Features

### 4.2.1 Operational Safety and Reliability

The electrical systems shall include safety by design. All electrical systems and operations shall be in conformance to CAN/CSA-Z462-21 Workplace Electrical Safety. Safe conditions shall be ensured under all operating conditions (normal and emergency). Provide emergency power to all emergency lighting, life safety systems and fire pump(s) as well as any other loads that require backup power. Electrical system design shall ensure sufficient reliability, redundancy, and resiliency.

### 4.2.2 Maintainability and Accessibility

Electrical systems shall be designed with optimum service clearances to be accessible for maintenance and capable of being repaired and replaced.

### 4.2.3 Standardization of Equipment and Materials

Electrical equipment selection shall include standard products from reputable suppliers and shall be CSA/ULC approved. Equipment which, at the time of purchase, is known to become obsolete in the near future shall not be selected. Equipment of similar nature, identical components and construction shall be of the same manufacturer.

### 4.2.4 Interface with Building Services

The design and installation of electrical systems shall be coordinated with other divisions to minimize interferences.

### 4.2.5 Energy Efficiency

All electrical equipment shall be selected to maintain highest efficiency in the use of electrical energy.

## 4.3 Code, Standards and Requirements

The TOC Developer shall be responsible for adapting the design to suit applicable code revisions that are published after this reference design. Electrical systems shall be in accordance with applicable codes, standards and requirements of authorities having jurisdiction including, but not limited to:

- CSA C22.1 - Canadian Electrical Code, Part I Safety Standard for Electrical Installations - 25th Edition, 2021
- CSA C282:19 Emergency electrical power supply for buildings - 7th Edition, 2019
- CAN/CSA-Z462-21 Workplace Electrical Safety - 5th Edition, 2021
- CSA-B72:20 Installation Code for Lightning Protection Systems – 3rd Edition, 2020
- National Building Code of Canada - 2020 Edition
- National Energy Code of Canada for Buildings 2020 (NECB)
- National Fire Code of Canada 2020
- ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
- Ontario Building Code (OBC) 2012 with applicable amendments
- Ontario Electrical Safety Code (OESC) 28th edition - 2021
- Ontario Fire Code 2022
- ANSI/TIA-568.1 - Commercial building telecommunications cabling standard
- ANSI/TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standard
- ANSI/TIA-568.3 Optical Fiber Cabling and Components Standard
- ANSI/TIA-607-D Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
- BICSI TDMM 14th Edition
- The IES Lighting Library Standards Collection, Illuminating Engineering Society
- CAN/ULC-S524:2019 - Standard for the Installation of Fire Alarm Systems
- CAN/ULC-S536:2019 – Standard for Inspection and Testing of Fire Alarms
- Toronto Green Standard Version 4
- Toronto Hydro Requirements for the Design and Construction of Customer-Owned High Voltage Substations
- IEEE-80-2013 Guide for Safety in AC Substation Grounding

## 4.4 Utilities

### 4.4.1 Power distribution Network

Connection to local power distribution network is under the jurisdiction of Toronto Hydro, therefore, all design and construction related to incoming electrical supply shall be based on Toronto Hydro requirements. The demarcation point is the property line; the design of the incoming service feeder routing shall account for a concrete encased duct bank from the property line to the location of the MV switchgear. The Toronto Hydro normal supply voltage is either 13.8kV or 27.6 kV depending on site location. The route of the incoming service shall be based on ease of construction and least interference with building elements. The location of the MV switchgear shall be chosen for the shortest distance and as straight a run of the duct bank as possible from the demarcation point to the MV switchgear. Feeder sizes shall be based on load calculations provided during detail design phase.

### 4.4.2 Telecommunication Network

Connection to local telecommunication network is under the jurisdiction of local telecom service providers, e.g., Rogers & Bell. Accordingly, all design shall be based on their requirements. The demarcation point is the property line; the design of the incoming service feeder routing shall account for a concrete encased duct bank from the property line to the location of the EF or ER. The route of the incoming service shall be based on ease of construction, as straight a path as possible and shortest distance from the demarcation point to the EF. EF, ER, TR and TC shall be located and sized in accordance with BICSI TDMM.

## 4.5 Power distribution

### 4.5.1 Distribution voltage

Power distribution system shall be designed based on following criteria:

- Provide 347/600V, 3 phase, 4-wire for larger electrical and mechanical loads.
- Provide 120/208V, 3 phase, 4-wire for power to smaller loads, receptacles communications equipment, fire alarm system, security system, etc.

### 4.5.2 Equipment

Equipment for power distribution shall be sized based on the loads they service and spare capacity for future loads. The location of the electrical equipment shall be in the main electrical room, transformer/switchgear room, low voltage (LV) electrical room and electrical/telecom riser closets.

Power distribution equipment consists of the following elements:

Switchgear – location in the main electrical room or in switchgear room. Size shall be based on Toronto Hydro requirements, type of connection of the incoming service feeder and type of system available on specific site.

Main Transformer – shall be dry type, three-phase delta/wye, 347/600V secondary for larger buildings where 347/600V supply is required for mechanical loads or 120/208V secondary for smaller buildings where there is no issue of voltage drop. Locate main transformer or in transformer/switchgear room.

LV switchboard - locate in the main electrical room or LV electrical room.

Distribution panels and other LV equipment - shall be located in LV electrical rooms and in riser closets.

### 4.5.3 Electrical Rooms, Risers, and Closets

Electrical rooms, risers, and closets should be designed as per relevant codes, standards, and industry practice. Locations of the main electrical room and switchgear/transformer room are dictated by Toronto Hydro requirements and location of the available incoming service feeder as shown on services plan. The main service entrance facility (main electrical, transformer or switchgear room) may be above grade or on Level B1 as per available space and agreement with Toronto Hydro. Design of the main electrical room, transformer or switchgear room which shall accommodate MV switchgear, transformers and the other related electrical equipment should be based on the latest revision of the document: “Toronto Hydro Requirements for the Design and Construction of Customer-owned High Voltage Substations”. During detail design phase all technical solutions which need to secure accessibility and maintainability of the room and the equipment must be coordinated, reviewed, and approved by Toronto Hydro. Where there are no ramps to underground levels the location of the main electrical room or switchgear room should be above grade for ease of accessibility and maintenance. LV electrical rooms may be located on lower levels. Where space is limited above grade, transformer or switchgear rooms may be designed to accommodate only switchgear and main transformer. The rest of the LV equipment can then be in LV rooms on lower levels.

For high-rise buildings over 20 stories high, additional LV electrical rooms on the MPH level should be provided. As per Toronto Hydro requirements where the service entrance must be in such a location that underground cables cannot be pulled directly into the electrical room an acceptable cable pull room, or cable chamber should be provided to facilitate MV cable installation.

For mixed use buildings (commercial & residential) or buildings comprising of several occupancies, such as, commercial, residential, hospitality, recreational, healthcare, etc., design should include separate main electrical rooms for each occupancy.

The electrical risers should be provided in all buildings. Locations of riser closets should be coordinated with other services. Where space constraints exist, risers should be designed to share space for power and ICT cabling. Where power and ICT services share space, separation between such services should be maintained to mitigate EMI. Separation should be in accordance with BICSI TDMM requirements. Electrical closets should be designed to allow space for electrical panels and telecommunication panels installed on alternate floors. Size of riser closet to be determined by the size of equipment and required clearances.

Electrical demand load calculations are performed in accordance with watts per square meter and demand factors in Table 14 of the OESC (Table 4-1 of this report) and best engineering practices based on similar construction projects. This calculation is preliminary and developed based on information available at this stage of concept design. The purpose of the calculation is not for sizing of services but only for space proofing for the electrical equipment. In coordination with architectural discipline up to 20% spare capacity has been included in sizing the rooms to accommodate the electrical equipment. A summary of electrical data based on electrical load calculation is shown in Table 4-2.

Detailed load calculation shall be developed during detail design and the load schedule including lighting, mechanical, small power, ICT, and other loads shall be validated as part of the detail design development.

| **OESC Table 14<br>Watts per square metre and demand factors for services and feeders for various types of occupancy<br>(See Rules 8-002 and 8-210.)** | | | |
|---|---|---|---|
| **Type of occupancy** | **Watts per square metre** | **Demand factor, %** | |
| | | **Insulated service conductors or cables** | **Feeders** |
| Store, restaurant | 30 | 100 | 100 |
| Office | | | |
| First 930m$^2$ | 50 | 90 | 100 |
| All in excess of 930m$^2$ | 50 | 70 | 90 |
| Industrial and commercial | 25 | 100 | 100 |
| Church | 10 | 100 | 100 |
| Garage | 10 | 100 | 100 |
| Storage Warehouse | 5 | 70 | 90 |
| Theatre | 30 | 75 | 95 |
| Armouries and auditoriums | 10 | 80 | 100 |
| Banks | 50 | 100 | 100 |
| Barbershops and beauty parlours | 30 | 90 | 100 |
| Clubs | 20 | 80 | 100 |
| Courthouses | 20 | 100 | 100 |
| Lodges | 15 | 80 | 100 |

### Table 4-1. OESC Table 14

| Station | Site (Block) | Building / Block | Electrical riser/Closet dimension (mm) | Electrical room location/type | Electrical room minimum space required (m$^2$) | Total Electrical Load (kW) |
|---|---|---|---|---|---|---|
| Thorncliffe | D | Office | 2450x480 | Level 1 / Switchgear room | 40 | **1479** |
| | | | | Level B1 / LV Electrical room | 50 | |
| | | | | Level B2 / LV Electrical room | 50 | |
| Thorncliffe | D1 | Residential | 2450x480 | Level 1 / Switchgear room | 50 | **3678** |
| | | | | Level B1 / LV Electrical room | 130 | |
| Thorncliffe | E1 | Residential | 2450x480 | Level 1 / Switchgear room | 60 | **4934** |
| | | | | Level B1+B2 / LV Electrical room | 130 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Level B2 / LV Electrical room | 75 | |
| Thorncliffe | E3 | Residential | 2450x480 | Level 1 / Switchgear room | 60 | **5111** |
| | | | | Level B1 / LV Electrical room | 130 | |
| Thorncliffe | E4+E5 | Residential | 2450x480 | Level 1/ Switchgear room | 60 | **5627** |
| | | | | Level B1+B2 / LV Electrical room | 130 | |

**Table 4-2. Electrical Data**

### 4.5.4 Metering

Utility metering and sub-metering for units shall be provided. Sub-meters for units should be located inside the electrical riser closets.

### 4.5.5 Voltage Drop

Voltage drop on main feeders and on branch circuit shall not exceed the limits prescribed by the OESC.

### 4.5.6 Cable Management System

The primary system for the low voltage wiring shall be cable in conduit. In areas where cable in conduit is not feasible, Teck Cable in tray may be used. All wiring to be run in conduits in slab, conduits in walls or conduits in ceiling space. Raceway criteria is as follows:

- RGS for exposed interior non-corrosive area
- PVC coated RGS conduits for corrosive environment
- Rigid PVC conduits direct buried as allowed by OESC
- Concrete encased PVC duct bank for MV cables
- For fiber optic service entrance and backbone cable: Direct buried or concrete encased PVC conduit below grade and RGS inside the building
- Minimum conduit size should be 21mm

# 5 Description of TOC Design

## 5.1 General

Electrical and communications systems should be designed and installed to maximize usable space within the building while maintaining optimum service clearances for maintenance and repair.

## 5.2 Electrical Systems

### 5.2.1 Exterior and Interior Lighting

Interior lighting design should be based on illuminance levels for each area as recommended in the IES Lighting Library Standards Collection. Luminaire selection should be based on area being served. All interior lighting should be energy efficient LED type. Occupancy and vacancy sensors, daylight sensors, dimming modules and manual override switches to be used where appropriate. Exterior lighting design should be based on illuminance levels recommended in the IES Lighting Library Standards Collection. Exterior lighting should be controlled via a timer and by a photocell control. Exterior lighting to be LED with luminaires suitable for the environment. Emergency lighting should be unswitched and should be fed from the life safety lighting panel. Exit signs and signs that integrate egress components should be fed from the life safety lighting panel. Egress light levels should be in accordance with OBC requirements.

### 5.2.2 Grounding and Lightning Protection

The entire electrical installation consisting of non-current carrying metal parts (I.e., raceways, cable trays, panelboards, boxes, cabinets, fixtures, switches, transformers, equipment, etc.) shall be completely and effectively grounded and bonded in accordance with OESC. A grounding system shall be provided, including electrical room grounding and communications room grounding.  A ground potential rise study shall be conducted in accordance with IEEE-80 standard. The grounding system shall be designed in accordance with the grounding study to control the touch and step potentials in the service entrance facility and/or the switchgear room as mandated by the OESC.

Provide ground grid comprising driven ground rods, spaced per the grounding study, connected together with bare stranded copper conductor, and installed in conformance to IEEE-80 standard. Connect main service entrance equipment to the ground grid. Ground grid may be installed exterior to the building or inside the main switchgear room. The ground rods shall be Copper-clad 19mm in diameter, 3m long.

Carry out risk assessment of loss due to lightning strike. Based on the results of the risk assessment provide lightning protection system for the building. The lightning protection system shall be designed in accordance with CSA B72:20 standard.

### 5.2.3 Emergency and Standby Power

An emergency power system shall be provided to meet the requirements of CSA282:19 standard. Emergency Power System shall provide automatic backup power in the event of normal power loss. The emergency and standby power shall be provided for life safety equipment and essential loads. Life safety equipment includes egress lighting, emergency lighting, smoke control system, emergency parking ventilation, stairwell pressurization system, fire alarm system, fire pump(s), elevators. The essential loads include: the UPSs and HVAC units serving service rooms with security, control, and telecommunication equipment. Standby emergency generators shall be natural gas engine driven and shall have gas supply completely separate from gas supply for the rest of the building. The generator shall be located in generator room at outdoor on the roof or on ground at grade level if space permits. Size of the generator room shall be designed based on the generator size, necessary clearances and space needed to accommodate associated mechanical and electrical equipment. Space for outdoor generators shall be provided based on generators dimensions with enclosure included. Generator enclosure shall be weatherproof with sound attenuation in compliance with the noise criteria as outlined in the Ministry of Environment and Climate Change's NPC-300 in the City By-laws. Location for generator rooms and outdoor generators shall meet the conditions for easy accessibility and maintenance. Installation of generators on MPH or roof shall be by using a crane. Future operational space for the crane needs to be considered by the architectural team. At this stage we are providing high-level estimate sizes of generators based on our load estimate calculation. Detailed load classification and precisely sizing of generators shall be developed during detail design and further space development of the space needed should follow. For mixed use buildings (commercial & residential) or buildings comprising multiple occupancies separate generators may be provided for each occupancy. The selected generator sizes with minimum space required for this specific site are shown in Table 5-1.

| Station | Site | Building / Block | Type | Location | Minimum space required ($m^2$) | Size of Generator (kVA/kW) |
|---|---|---|---|---|---|---|
| Thorncliffe | D | Office | Gas/outdoor | Mechanical Penthouse | 32 | **625/500** |
| Thorncliffe | D1 | Residential | Gas/outdoor | Mechanical Penthouse | 60 | **938/750** |
| Thorncliffe | E1 | Residential | Gas/outdoor | Mechanical Penthouse | 60 | **781/625** |
| | | | | | 60 | **781/625** |
| Thorncliffe | E3 | Residential | Gas/outdoor | Mechanical Penthouse | 60 | **781/625** |
| | | | | | 60 | **781/625** |
| Thorncliffe | E4+E5 | Residential | Gas/outdoor | Mechanical Penthouse | 60 | **781/625** |
| | | | | | 60 | **781/625** |

**Table 5-1. Emergency Generator Selection**

## 5.2.4 Fire Alarm System

Provide fire detection and alarm system in accordance with CAN/ULC-S524:2019 Standard for the Installation of Fire Alarm System. Fire alarm system shall be verified in accordance with CAN/ULC-S536:2019 standard.

## 5.2.5 Security System

Provide access control system (Security System) for each building. Access control and intrusion detection devices shall be provided at all critical locations. Power supplied to the security systems to be provided from a UPS panel in the LV Room. A separate conduit system to be provided for security devices. Control panels to be located in security rooms and fed from UPS power.

### 5.2.6 CCTV System

CCTV camera coverage to be provided for all critical areas. Camera communication cables to use a separate raceway system with Category 6 (Cat6) copper cable. Generally, a Cat6 cable shall be adequate for a cable run of up to 90 m. If longer runs are required provide 1GB/s “Gamechanger” Cat6 cable from Paige Datacom Solutions to increase cable run up to 200m. For cable runs in excess of 200m provide multi-mode fiber optic cable. For outdoor installations provide cameras with weatherproof housing with heater in the housing for condensation control. Power over Ethernet (PoE) may not be sufficient for the heaters, as such, 120VAC power may be required for such heaters. All headend monitoring and control equipment shall be fed from UPS power and located in security rooms.

### 5.2.7 Communications

The communications service shall enter the communications EF which is the TR at Level B1 via a concrete encased duct bank containing one 103 mm duct for fiber optic cable and one 103 mm duct for multiconductor copper cable. The service provider company (e.g., Bell, Telus) will provide the service to the EF. From EF the cables need to transition to the combined Electrical and TCs on the upper levels. Provide equipment for terminating and distributing the cables. All rooms containing communications equipment shall be designed in accordance with BICSI TDMM. Provide equipment racks, distribution racks, patch panels, cable management infrastructure, provision for cooling, power supply from a UPS, lighting, security access and fire alarm devices connected to the building fire alarm system. Grounding and bonding of communications systems shall be provided in accordance with ANSI/TIA-607 standard and in accordance with BICSI TDMM.

### 5.2.8 Service rooms

Provide monitoring and control headend equipment and fire alarm system control panel in a separate room located on the ground floor level. For mixed use buildings (commercial, residential, retail, recreational, etc.) separate telecommunication and security rooms to be provided for each occupancy. The control and fire alarm equipment shall be located in a dedicated CACF. The CACF shall be located on ground level to accommodate elevator’s control equipment and Fire Alarm control equipment. Minimum size of CACF shall be $10m^2$.

# 6 Station and TOC Interfaces

## 6.1 Electrical Interfaces

The electrical design of the bus loop located adjacent to the station and above the TOC basement is outside the scope of this document. The following paragraph describes the interfaces between the electrical systems of the TOC buildings and the adjacent station and guideway.

The TOCs are not connected to or built over any station. Therefore, there is no station interface. There is also no interface between the electrical systems for the rail corridor and TOCs.