FRONT END DESIGN STANDARD (DS-00)

Facilities Architecture & Engineering
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METROLINX

Metrolinx Design Standards
Front End Design Standard (DS-00)
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Amendment Record

Version No.	Publication Date	Remarks
1.0	March 2020	Pilot version
2.0	February 2025	Editorial changes to reduce duplication of requirements across modal standards, incorporate requirements from STS-001 Rev01 Bulletin Operations and Maintenance Requirements Station Services, restructure numbering for consistency with Design Standards, and reorganize flow of content. New content has been developed to provide additional information and clarifications on Design Standards, continuous improvements, and deviations. Terminology and abbreviations have been centralized in the front-end document to provide a convenient harmonized location, architectural principles have been removed from the modal standards and are captured for areas where they are applicable across modes.

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1 INTRODUCTION

1.1. PREFACE

This is the second edition of the Metrolinx DS-00 Front End Design Standard document. This document acts as the first chapter of the Design Standards Catalogue, a compilation of standards entailing a broad range of design components applicable to customer-facing assets within Metrolinx owned transit facilities. It also includes cost-saving flexibilities that facilitate efficiency and maintainability while optimizing the customer experience.

The requirements set out in this standard are applicable to all Metrolinx projects and provides architectural and urban design requirements for stations and associated customer-facing infrastructure. Operator-specific requirements and amenities are not in the scope of this standard and shall be expanded on a project-by-project basis.

For additional information, contact the owner of this Standard.

Refer to Appendix D for more information related to standards development and improvements.

1.2. APPROACH TO STANDARDIZATION

The objective of the design standards is to communicate requirements for transit infrastructure that provide certainty and predictability in design outcomes, ensuring relevant design needs and expectations are satisfied by those engaged in the delivery of Metrolinx transit infrastructure. A key goal in designing Metrolinx customer facilities is to strike a balance between regional transit priorities and the interests of local communities, including considerations of Aboriginal and Treaty Rights. While a "one size fits all" approach will not work in a region as large and diverse as the Greater Golden Horseshoe Area (GGHA). The objective is to provide a consistent experience for our customers and the recognition of the distinct identities and sense of place that characterize many of the communities we serve. As such, the Design Standards establish requirements to outline Elements of Consistency that Metrolinx considers to be essential to the customer experience. The modal Design Standards seek to establish an approach to requirements that is scalable and adaptable while maintaining a consistent language across the network. This approach which is sometimes referred to as a "kit-of-parts", allows for consistency as well as the right sizing of infrastructure to ensure Metrolinx assets are fit for purposes, and is a key strategy used in the Standards.

1.3. SCOPE OF THE DESIGN STANDARDS

The Design Standards are a compilation of requirements related to various components and design elements of Metrolinx transit infrastructure with an emphasis on public-facing elements. The Standards cover design elements that are both internal and external to transit station and stop environments.

1.4. ORGANIZATION OF THIS STANDARD

The purpose of this DS-00 Front End Design Standard is to establish priorities, objectives, and design direction related to station and facility asset design while outlining administrative requirements for subsequent Metrolinx Design Standard documents. This standard is intended to be read in conjunction with the mode-specific and cross-modal Architectural Design Standards that provide direction on customer-facing infrastructure to ensure

consistency, quality, and safety. The below outlines the intent for each of the sections within this standard.

Introduction:

The introduction section serves to provide essential background information and outline its purpose. It contextualizes the standard and highlights the importance of standardization. The introduction also establishes the authority behind the standard. Additionally, it often offers guidance on how to navigate the document, helping readers understand its structure and content. Overall, the introduction sets the stage for the reader, ensuring a clear understanding of the standard's objectives, applicability, and importance.

Terminology and Abbreviations:

The Terminology and Abbreviations section ensures clarity, consistency, and accurate understanding by defining key terms and explaining abbreviations used throughout the standards. It eliminates ambiguity by providing standardized definitions for technical terms and acronyms, ensuring all readers interpret the content in the same way. This section supports the unambiguous and consistent application of the standard. This standard contains the terminology and abbreviations used across the various Design Standards.

Administration Of The Design Standards:

The administration section outlines how the standard will be implemented, maintained, and enforced. This section references relevant standards, applicable laws, or industry practices. It provides direction on how the standard is applied, monitored, and evaluated, safeguarding consistency in its enforcement and adherence. This section helps ensure that the standard is properly managed, consistently followed, and adapted when necessary.

Design Priorities:

The design priorities section outlines key factors for creating safe, functional, and sustainable spaces across different transit modes. It ensures designs are safe, secure, consistent, reliable, and maintainable while improving navigation and customer experience. The section promotes adaptability for future changes while maintaining consistency and quality across projects. It also focuses on creating spaces that adapt with their surrounding environment, use resources efficiently, and are easy to operate and maintain, ensuring long-term resilience and cost-effectiveness. Overall, the priorities guide designs that are efficient today and adaptable for the future.

General Design Requirements:

The General Design Requirements section outlines cross-modal requirements to ensure that designs are functional, user-focused, sustainable, and efficient. It emphasizes requirements to prioritize the needs and experience of end users while ensuring the design is fit for purpose and practical. This section provides detailed requirements for a design that harmonizes with the environment, encourages energy-efficient systems, responsible material use, and eco-friendly practices. A key premise is to ensure that various building systems work together seamlessly for optimal performance. This section sets out to provide a holistic, well-rounded approach to creating spaces that are safe, functional, and adaptable to future needs.

Appendices:

Appendices provide supplementary information that supports the main content without overloading the core sections. They offer detailed information, technical specifications, clarify complex concepts, and provide references to related processes. The appendices are mandatory requirements that outline the depth needed for thorough understanding and compliance.

All requirements within Metrolinx Standards, drawings and specifications are assured against as part of the design review process and are considered mandatory for all relevant project phases. Compliance with these requirements must be verified and documented during design reviews to ensure that they are adequately addressed and incorporated into the final design.

For information on relationship between this standard and the modal standards, refer to section 3.4.

2 TERMINOLOGY AND ABBREVIATIONS

2.1. TERMINOLOGY

TERM	DEFINITION
Access Aisle	Marked transfer space to the side and rear of a car parking space, to allow the safe transfer of passengers to and from vehicles. Provided for car parking spaces designated for customers with disabilities.
Access Reports	Documentation of the provisions for a project, in relation to accessibility. Used to facilitate the approvals process.
Accessibility	In transportation terms, accessibility refers to the ease of reaching destinations for users regardless of personal circumstances. See also Universal Design.
Accessible Path of Travel	The safest and most convenient path for customers with disabilities, providing a continuous unobstructed external and internal path connecting all accessible features and facilities to enable personal barrier free mobility. Not that this is not necessarily always the shortest path – although for inclusion purposes, the travel distance should be as close to alternatives as possible.
Accessible Station	A station is accessible when persons with disabilities can safely access the same infrastructure and services as any other customer with a similar level of convenience and customer experience in conformance with Metrolinx Universal Design Standards.
Alcoves	A recess in the wall of a room or space.
Alighting	Exit a train, bus, or other form of transportation.
Amenity	Feature or service which provide convenience and comfort to customers, examples of which include washrooms, parking, CCTV, digital signage, etc.
Area of Refuge	A safe holding space for customers to wait in an emergency if they are unable to evacuate independently. Firefighters are made aware of the existence of an area of refuge via the fire safety plan and they will assist those located there to safely evacuate the building.
Audit Reports	Documentation of an audit, highlighting remedial actions in order of priority.
Audits	Review of existing buildings / facilities / environments to highlight non-compliances and identify ways of improving accessibility and universal design.
Bikeways	Paths designated for use by cyclists. Note that whilst we use 'bicycle' and 'bikeway', these routes apply to both two-wheel and other kinds of cycles, including adapted cycles, tandems, and electric cycles.
Boarding	Entering a train, bus, or other form of transportation.
Bus Stop	A place on a bus route where buses can stop to pick-up or Drop-off passengers.
Clear Space	Space without obstructions, allowing circulation and maneuvering.
Clear Opening Width	Unobstructed width provided by a door when it opens. This width is measured from the furthest protrusion (normally the door hardware) and the door stop.

TERM	DEFINITION
Controlled Crossings	A signalized crossing operated by pedestrians via a control button. This activates the traffic signals and in turn instructs motorists for a period of time to allow pedestrians to cross the road.
CP24	Canadian English language Category A specialty cable and satellite television
Cross slopes	Gradient across a footpath (perpendicular to the main line of travel) for drainage of surface water.
Crosswalks	An identified point at which pedestrians and cyclists are provided access across a road.
Crutch	A long stick with a crosspiece at the top, used as a support under the armpit by customers with restricted mobility / customers with disabilities.
Cultural Heritage	Includes all properties containing Built Heritage Resources, Cultural Heritage Landscapes, and/or Archaeological Resources identified as having heritage value
Curb ramp	Provides step-free access between the pavement and road level, usually at crossings. Consists of one main panel and two flares.
Curbs	The edge between a pavement and a road, consisting of a line of curbstones.
Customer Journey	The full stages of experience that a GO customer undertakes when travelling from the start of their journey to the end.
Customers with restricted mobility	Customers with mobility requirements (not wheelchair users) – e.g. customers who use walking aids.
Delineation	Indication of priority zones for different users, by means of a visual and / or tactile marking.

TERM	DEFINITION
Depressed curb	A continuous length of curb along a pedestrian route that is lowered to the level of an adjacent roadway. Such curb may be located at vehicle loading/unloading areas or at intersections.
Destination dispatch elevators	Passengers enter the elevator lobby area and select a floor. Based upon the floor they're visiting, they're assigned an elevator car. Considered to be a more efficient system of moving customers, instead of having control buttons within elevator cars.
Digital Signage	Changeable electronic message sign, providing real-time information to passengers (e.g., at bus stops).
Disability	A physical, cognitive, or mental condition that limits a person's movements, senses, or activities.
Distraction Patterns	Visible markings on glazed surfaces. Required to highlight the presence of glazing to partially sighted persons.
Door Closers	A mechanical device that closes a door after someone opens it.
Door Hardware	Door furniture or door hardware refers to any of the items that are attached to a door to enhance its functionality or appearance. This includes door handles and pulls / pushes bars.
Door Nib	Clear space to the side of the door on the leading edge (latch side), to allow access to the door hardware.
Door Spring Hinges	Spring hinges return the door to the closed position by means of internal springs.
Double Doors	Two doors of equal width that meet in the middle of the door frame when closed.

TERM	DEFINITION
Drainage Gratings	Slots in the ground to allow surface water to drain from the walking surface.
Drop-off and Pick-up	Identified areas where vehicles are permitted to stop to Drop-off or to pick-up passengers.
Emergency Call Systems	Alarm, provided within wheelchair accessible toilets, to allow users to call for assistance in an emergency.
Evacuation	Exiting in the case of an emergency – e.g., fire.
Fare Gate	A device that limits access to a space until a fare is paid. A variety of barriers are possible, including turnstiles, swing gates and retractable flaps."
Fare Machines	Passenger operated machines that dispense tickets for travel.
Fareline	The line dividing the fare paid and unpaid areas. In a gated system, this is where the fare gates are installed.
Flares	Sloping side panel of a cut curb.
Forward Approach	Direct access to an amenity or service with the user facing the direction of travel.
Forward Reach	Direct stretch of an arm to touch or grasp something, with the user facing item in question.
GO Master Elevator Performance Specification	Elevator Specification (R04) as found in the GO Standard Drawings and Specifications
GO Standard Drawings and Specifications	A reference tool for consultants, designers, and contractors. The Standard Drawings and Specifications apply to net new construction, retrofits, and state of good repair capital infrastructure programs.

TERM	DEFINITION
GO Standard Drawings for the Elevator Cab	Elevator Panel Technical Drawing as found in GO Standard Drawings and Specifications
GO Station	The overall physical entity that allows customers to access the GO Network.
GO Station Categorization Framework	Document that designates each line station on the GO Network based on ridership volume and surrounding land-use density.
Grab Bar / Rail	A bar attached to a wall to provide a support for customers who require it.
Gradients	An incline along an access route.
Grey Scale	A measure of tonal contrast, which related to the LRV percentages.
Guideline	A guideline is a document that provides non-mandatory guidance and background information to support design or other processes. It may be issued by special interest organizations for broad application or tailored specifically for particular industries or organizations.
Handrails	A rail fixed to posts or a wall to provide support and guidance. Usually provided for stairs, ramps, and elevators.
Hazard	A danger or risk to health or safety.
Horizontal Circulation	Movement in the horizontal plane.
Illuminance	The amount of luminous flux per unit area.
Induction Loop System	Aid for hearing aid users. A loop of cable which generates a magnetic field, picked up by the hearing aid.

TERM	DEFINITION
Infrastructure	The physical and interconnecting structures supporting the operation of the transportation system. E.g., streets and roads connecting to a transportation facility.
Interchange	The connections and links between different modes of transportation.
Intuitive Wayfinding	Refers to a navigation system that is easy to understand and follow without the need for detailed instructions or complex maps. It relies on clear visual cues, logical layouts, and recognizable landmarks to guide people through spaces. It is intended to simplify the process of orientation and reduces confusion, making the space more accessible and user-friendly.
International Symbol for Access	Refers to ISO 7001:PI_AC_001 used to indicate routes and facilities designed to be barrier free.
International Symbol of T-Coil	Refers to ISO 7001-PI PF 048 used to indicate facilities where there are special provisions for the hard of hearing and provision of hearing induction loop.
Islands	A raised area in the middle of a road that provides a safe place for pedestrians to stand and marks a division between two lanes of vehicular traffic.
Joints	Point at which two paving slabs are joined.
Kit of Parts	The use of repetitive architectural elements, such as materials, forms, colour, patterns, modularity, and design language, to establish a system-wide design approach that is consistent, recognizable and reinforces the system's identity.
Knee Clearance	Recess beneath a surface to accommodate a person's knees. E.g., under a work surface, to allow someone to pull in closer to the work surface.

TERM	DEFINITION
Landing	Level area providing an opportunity for customers to wait, rest or prepare for their journey. Usually provided at entrances, elevators, stairs, and ramps.
Leaf	The door panel is the main part of the door that opens and closes within a fixed frame.
Leaf-and-a-half	Two doors that meet in the middle of the door frame when closed, of unequal widths.
Life Cycle Costing	An analysis conducted to assess all costs associated with the construction, operation, and maintenance of a building or infrastructure throughout its entire life span/ life term. This includes costs related to the initial acquisition of the asset, construction, ongoing operation, maintenance, and eventual disposal or decommissioning.
Light Reflectance Value (LRV)	LRV is a measurement of the amount of light reflected from a surface. It is measured by percentage. Pure white has a LRV of 100; pure black has a LRV of 0.
Lobbies	A room providing a space out of which other rooms or corridors lead
Long Cane	A cane to provide safety and orientation information to blind and partially sighted persons.
Low-floor Vehicles	A vehicle that has no steps between one or more entrances and part or the entire passenger car.
Lux	The unit of illuminance, equal to one lumen per square meter.

TERM	DEFINITION
Maintain Good Appearance	In a specification, "maintain good appearance" means that materials, finishes, and workmanship should uphold intended aesthetic standards throughout their lifespan. This varies by material: for concrete, it may include resistance to cracking, scaling, popouts, or staining; for masonry, spalling and pitting; for plastics, hazing, fading, and yellowing; for marble, etching and loss of gloss, and for metals, corrosion. Key performance factors depend on the material, its application, and operating conditions.
Make Good	'Making good' or 'make good' is used in construction to refer to the process of repairing or bringing something up to a finished standard, or restoring it to its previous condition.
Management	The persons responsible for and controlling the service or facility.
Means of Egress	Includes exits and access to exits and means a continuous path of travel provided for the escape of persons from any point in a building or in a contained open space to, a separate building, an open public thoroughfare, or an exterior open space that is protected from fire exposure from the building and that has access to an open public thoroughfare.
Metrolinx Design Standards	Standards at Metrolinx that sets out requirements around the design of architecture, landscape, urban design, interior design, wayfinding, and sustainability in support of customer experience, greater operational efficiency, and reduced capital costs.

TERM	DEFINITION
Mitigation Hierarchy	A guiding principle commonly applied to ecological offsetting programs which calls for the avoidance of impacts first, then minimization followed by mitigation, with compensation as a final option following tree and vegetation removals.
Modules	A strategy for the design of Station Buildings using scalability to address levels of ridership served and services provided.
Motion Sensors	Devices to detect movement by measuring change in speed or vector of an object or objects in the field of view.
Newton (N)	The unit of force, equal to the force that produces an acceleration of one meter per second per second on a mass of one kilogram.
Natural Surveillance	A design concept aimed at reducing crime opportunities through establishing clear sightlines and enhancing visibility throughout an area.
Nosings	The edge of a step, highlighted on both the vertical and horizontal planes.
Open Risers	Stairs designed with open vertical surfaces between treads.
Opening Forces	Effort required accessing a required item – e.g., doors, buttons, and controls.
Operations and Maintenance Requirements	Passenger Operations Facility Maintenance Requirements as prepared by Station Services, Metrolinx
Overpasses	A bridge by which a road or railroad passes over another.
Parallel Approach	Access to a facility or service with the user perpendicular to the direction of travel.

TERM	DEFINITION
Passenger Assistance Intercoms (PAI)	A Two-Way communication device which assists customers with inquiries at rail station site to provide an enhanced customer service amenity at our platforms, elevators, parking structures and universal washrooms.
Passing Places	Space for customers to pass one another (e.g., if moving in opposite directions).
Paving Slabs	A precast concrete paving unit.
Pedestrian Routes	Paths designated for use by pedestrians.
Perch Seating	A seat that allows someone to rest in a standing position.
Project Agreement	Is used generally in this document to refer to any contract that sets out Metrolinx requirements for a given project.
Raised Character / Indication	Tactile information (embossed) to allow blind and partially sighted persons to read using the tips of their fingers.
Raised Vehicle Boarding Areas	Raised areas on a pavement to assist step-free access into a vehicle.
Resting Places	Spaces for customers to rest along their journey, especially over longer routes and walking distances.
Retail	Units to allow third-parties the sale of goods to the public.
Revolving Doors	Doors with partitions that turn about a central axis.
Revolving Gates	Gates with partitions that turn about a central axis.
Risers	Vertical element of a step.

TERM	DEFINITION
Secondary Platform Access	A location, other than the Station Building, that provides access to rail platform(s) at a GO Station
Service Animal	An animal trained to aid or assist customers with disabilities in daily activities.
Shading	See Weather Protection.
Side Reach	Stretch of an arm to touch or grasp something, with the user parallel to the item in question.
Slip Resistance	Materials with appropriate characteristics to prevent slippage or skidding.
Slopes	Gradients that are shallower than 1:20, therefore not considered to be ramps.
Standard	A formal and established requirement that must be met. Requirements are mandatory for compliance, ensuring consistency and safety across industries or practices. They provide specific criteria and measurable benchmarks that must be adhered to.
Station	An enclosed passenger facility with an underground, at-grade or above-ground platform where passengers can board and alight vehicles on a transit system (GO, LRT, Subway, Bus, BRT).
Station Building	The main public-facing facility on a Station site.
Stop	A location along a street, either at-grade or grade-separated, with a platform and shelter, where passengers can board and alight vehicles on a transit system (LRT, BRT or Bus).
Street Furniture	Objects and pieces of equipment installed on streets and roads.
Tactile Warning Surface Indicators (TWSI)	Detectable underfoot, paving to assist navigation for blind and partially sighted persons.

TERM	DEFINITION
Temporary Street Works	Construction works on streets that require temporary management and warning, to ensure that pedestrians are made aware of the obstruction and to ensure that access is not disrupted.
Ticket Counters	Managed area where tickets can be purchased from a member of staff.
Ticket Machines	See Fare Machine.
Tip-up Seat	Seats that fold up when not in use.
Toe Clearance	Recess beneath a surface to accommodate a wheelchair user's toes and foot plate.
Treads	Horizontal element of a step.
Turning Space	Space required for a wheelchair user to turn through 360 degrees.
Uncontrolled Crossing	A non-signalized crossing. This is reliant on visual communication between a pedestrian and motorist.
Underpasses	A road or pedestrian tunnel passing under another road or a railroad.
Universal Design	Design that is suitable for all users. See also Accessibility.
User Groups	Groups consisting of the end user, who should be consulted as part of the design development, to ensure that the design is fit for purpose.
Vertical Clearance	Headroom, clear of any obstructions and protrusions.
Vestibules	Series of two or more doors to separate space, usually for privacy or security reasons.
Vision Panels	Panes of glass within a door, to allow customers to see if someone is approaching from the opposite direction. Aim to avoid collision and injury.
Wash Hand Basin	A basin for washing hands.
Weather Protection	Shading from the natural elements. This may include purpose-built canopies, use of overhanging upper floors of a building, trees, and vegetation.

2.2. ABBREVIATIONS

TERM	ABBREVIATION
AAMA	American Architectural Manufacturers Association
AHJ	Authority Having Jurisdiction
AMCA	Air Movement and Control Association
AM&M	Asset Management & Maintenance
ANSI	American National Standards Institute
AODA	Accessibility for Ontarians with Disabilities Act
AP	Access Points
APBP	Association of Pedestrian and Bicycle Professionals
APS	Accessible Pedestrian Signal
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
ATM	Automatic Teller Machines
AVM	Added Value Machine
BOH	Back of House
BUG Rating	Backlight, Uplight, and Glare Rating
CAN/CGSB	Canadian General Standards Board
CAN/ULC	Underwriters Laboratories of Canada
CCTV	Closed Circuit Television
CPTED	Crime Prevention Through Environmental Design
CS	Commercial Steel
CSA	Canadian Standards Association
CSDMA	Canadian Steel Door and Frame Manufacturing Association
dB	Decibel
DM	Design Manual
DRM	Design Requirements Manual
DWA	Designated Waiting Area
EAB	Emergency Assistance Button
EAM	Engineering and Asset Management
EAS	Electronic Article Surveillance
EEB	Emergency Exit Building – also referred to as Emergency Egress Building
ELE/ITS	Electrical and IT System cabinets
ENT	Electrical Non-metallic Tubing
EQ	Equal
FACP	Fire Alarm Control Panel
FD	Floor Drain
FFE	Finish Floor Elevation
FFL	Finish Floor Level
FOH	Front of House
FVM	Fare Vending Machine
GFCI	Ground Fault Circuit Interrupter
GGHA	Greater Golden Horseshoe Area
GL	Glass
GO	GO Transit
GTHA	Greater Toronto and Hamilton Area
HDPC	High-Density Plastic Composite
HDPE	High-Density Polyethylene

TERM	ABBREVIATION
HMMA	Hollow Metal Manufacturers Association
HOV	High-Occupancy Vehicle
HVAC	Heating Ventilation and Air Conditioning
IENSA	Illuminating Engineering Society of North America
IoT	Internet of Things
IK	Impact Protection
IP	Internet Protocol
ISO	International Standards Organization
ISP	Internet Service Providers
kN	Kilo Newtons
LAN	Local Area Network
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
LOS	Level of Service
LRV	Light Reflectance Value
MASK	Metrolinx Accessible Self-Service Kiosk
MPI	Master Painter Institute
MSF	Maintenance and Storage Facility - also referred to as Operations and Maintenance Storage Facility (OMSF)
MSP	Municipal Service Provider (also referred to as Transit Agencies or Local Transit Provider)
MTO	Ministry of Transportation Ontario
MUP	Multi-Use Path

TERM	ABBREVIATION
MX	Metrolinx
N	Newton
NAFS	North American Fenestration Standard
NBC	National Building Code
NCS	Natural Colour System
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NOC	Network Operations Centre
NRC	Noise Reduction Coefficient
O.C.	On Centre
OBC	Ontario Building Code
OCC	Operations Control Centre
OCS	Overhead Catenary System
OESC	Ontario Electrical Safety Code
OHSA	Occupational Health and Safety Act
OPS	Ontario Public Service
PA	Project Agreement
PAI	Passenger Assistance Intercom
PAS	Public Address System
PED	Platform Edge Doors
PEEP	Personal Emergency Evacuation Plans
POPS	Privately-Owned Public Space
PSI	Pounds per Square Inch
PSOS	Project Specific Output Specification
PUDO	Pick-Up and Drop-Off

TERM	ABBREVIATION
PV	Photovoltaic
PVC	Polyvinyl Chloride
PVIS	Passenger Visual Information System
RAL	International colour matching system
ROW	Right of Way
SFTP	Self-Fare Transaction Processor
SME	Subject Matter Experts
SOV	Single Occupant Vehicle
SPOS	Station Point of Sale
SR	Solar Reflectance
SRI	Solar Reflectance Index
SSG	Structural Silicone Glazing
STC	Sound Transmission Class
T/O	Top of
TA	Transit Agencies
TAC	Transportation Association of Canada
TAI	Tactile Attention Indicators
TDI	Tactile Direction Indicators
TGS	Toronto Green Standards (City of Toronto)
TNC	Transportation Network Company
TOC	Transit-Oriented Community
TOD	Transit-Oriented Development
TPS	Traction Power Substation – interchangeable with TPSS
TTC	Toronto Transit Commission
TTMAC	Terrazzo Tile & Marble Association of Canada

TERM	ABBREVIATION
TVA	Threat and Vulnerability Assessment
TVM	Ticket Vending Machine
TWSI	Tactile Warning Surface Indicators
U/S	Underside
UGRL	Unified Glare Rate
UHPC	Ultra High Performance Concrete
ULC	Underwriters Laboratories of Canada
USB	Universal Serial Bus
UV	Ultraviolet
VCE	Vertical Circulation Element
VMS	Variable Message Sign(s)
VOC	Volatile Organic Compound
WC	Washroom
WMA	Wheeled Mobility Aid

3 ADMINISTRATION OF THE DESIGN STANDARDS

The Design Standards have been developed through the Metrolinx Standard Development process. The process embodies a cross-functional approach engaging a number of disciplines and stakeholders internal to Metrolinx such as the Capital Projects Group (CPG), Customer Insights (CI), Station Operations and Maintenance (CSD), and other divisions within Metrolinx. The process is intended to address matters of practicality, user functionality, customer experience, stakeholder commitments, cost, durability, maintenance, operations, sustainability, lifecycle and performance.

3.1. STRUCTURE OF THE DESIGN STANDARDS

The structure of Design Standards incorporates a hierarchy of headings, sections, and subsections for the purpose of articulating relevant information. In general, the organization of a standard(s) is set out under the following headings:

HEADING	DESCRIPTION
Standard Cover	Displays the title of the Design Standard and incorporates a document owner;
Table of Contents	A numbered, chronological summary of all headings, sections and sub-sections identifying the standard content including appendices. Depending on the length of the standard, this section may or may not be needed;
Preface	Introduces the Design Standard, explains the relevance of the standard broadly speaking and how it interfaces with Metrolinx transit infrastructure or facilities
Objective	Outlines what the Design Standard is setting out to achieve;
Requirements	Sets out what the Design Standard requires, i.e. a mandatory undertaking, uses 'shall' within the narration.
Guidance	Sets out what the Design Standard recommends, i.e. a direction to be considered in arriving at an acceptable outcome, uses 'should' within the narration; unless it illustrates a requirement.
Demonstration Designs	Includes drawings, visuals, precedents, photographs, sketches, and illustrations that interpret the requirements

3.2. COMPOSITION OF REQUIREMENTS

The Metrolinx Design Standards have been developed using a combination of guidance, performance, and prescriptive requirements. The objective is to address the requirements relative to the need and best practice for required outcomes. These requirement types are used together as appropriate to provide sufficient information for designers to understand the goal or desired outcome, what is required to achieve the goal, and the required performance.

3.3. DEVIATIONS

Any deviations required to these Standards need to be formally requested through the Metrolinx Deviation Process. In no case shall a project review be taken as an approval for any deviation from the Design Standards in the absence of a formal deviation request and process, see Metrolinx Procedure for Requesting Deviations to Metrolinx Standard Technical Requirements for details.

For additional information, connect with the owner of the standard and Technical Standards Development (TSD).

3.4. RELATIONSHIP TO OTHER METROLINX DOCUMENTS

Metrolinx Design Standards are intended to work with all Metrolinx Standards, Drawings, and Specifications, including the GO Design Requirements Manual (DRM).

The Design Standards apply to net new construction, retrofits, and state-of-good repair capital infrastructure programs. It should be noted that neither the GO Design Requirements Manual, Metrolinx Design Standards, and Specifications are mutually supportive and do not take precedence over one another. They are designed to be applied to Metrolinx projects in a consistent manner. Any noted discrepancies between the GO DRM, Metrolinx Standards, and Specifications shall be reported to the owner of the Standard.

Figure 3-1: Iconography for mode-specific Architecture Standards

The Design Standards build on and make reference to a suite of resources that are made available to consultants. These documents shall be read in conjunction with the Design Standards:

- GO Transit Rail Station Access Plan
- GO Transit Brand Guidelines

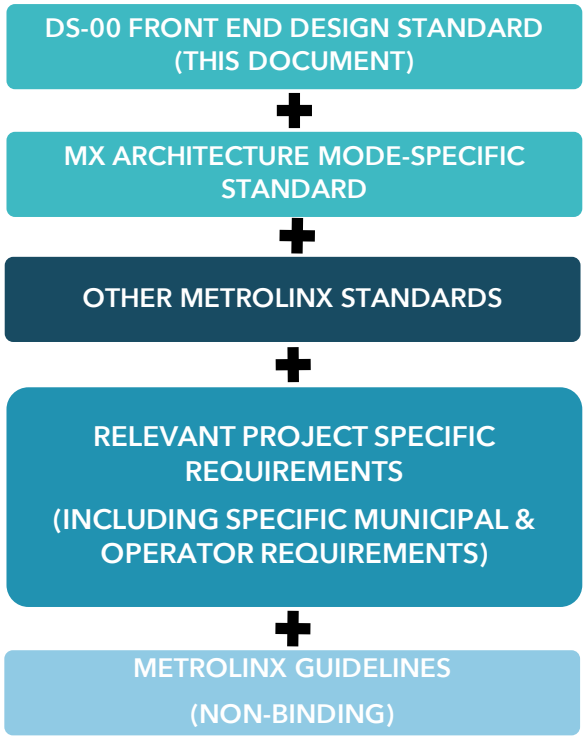

Figure 3-2: Relationship to Metrolinx Documents

3.5. LEGISLATIVE, CODES AND REGULATORY REQUIREMENTS

Consultants are required to design in accordance with all applicable standards, regulations, and codes to the approval of all authorities having jurisdiction.

Where conflicts exist between the requirements of Metrolinx Standards or legislation enacted by the federal or provincial governments, the most stringent requirements shall apply.

Consultants for specific projects shall define codes as applicable and list them in the contract tender documents.

The following is a list of codes and standards that have been referenced in this document. It is not intended to provide an exhaustive or definitive list of applicable codes and standards.

Codes and regulatory requirements shall be met in all cases and this document is intended to provide additional requirements but is not intended to replace codes and regulatory requirements.

Other codes and regulations, imperative to the business that must be adhered to include but not limited to:

- Ontario Building Code
- Ontario Building Code Supplementary Standard
- Ontario Fire Code
- Occupational Health and Safety Act (OHSA) – Regulation 851
- Industrial Establishments
- Ontario Electrical Safety Code

- Municipal By-Laws (where applicable)
- Accessibility for Ontarians with Disabilities Act (AODA)
- Applicable Municipal Green Standards
- Railway Safety Act (RSA)
- Transport Canada Grade Crossing Regulations
- Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide
- Transport Canada RTD-10 Technical Standards Manual; RTD-10 will govern requirements for active warning system
- AREMA (American Railway Engineering and Maintenance of Way Association) Communications and Signals Manual
- Existing Railway Corridors Standard and Specifications for Crossing Warning
- Manual of Uniform Traffic Control Devices for Canada
- Ontario Provincial Standards
- Acts and Regulations applicable for environment, cultural heritage, and biodiversity
- Referenced Standard Organizations
- National Fire Protection Association (NFPA)
- Canadian Standards Association (CSA)
- International Standards Organization (ISO)

Metrolinx Standards and Guidelines

- Refer to Metrolinx public website for full list (https://www.gosite.ca/engineering_public/)

Other Design Guidelines

- Ministry of Environment, Conservation and Parks, NPC 300 Environmental Noise Guideline
- Canadian Hard of Hearing Association, Universal Design and Barrier-Free Access, Guidelines for Persons with Hearing Loss, Section 6.0 Desirable Acoustics
- CNIB, Clearing our Path, Section 2.4.0 Acoustics
- Crime Prevention Through Environmental Design (CPTED)
- ASHRAE 55
- 2015 ASHRAE Handbook – HVAC Applications, Chapter 48 – Noise and Vibration Control
- IESNA
- Ontario Information and Privacy Commissioner - "Guidelines for the Use of Video Surveillance Cameras in Public Places"
- Privacy and Video Surveillance in Mass Transit Systems - "A Special Investigation Report MC07-68"

3.6. DESIGN REVIEWS AT METROLINX

Project design review is required at various points throughout the Project Lifecycle, refer to Appendix B for typical milestones. All project design reviews include formal submissions as well as a minimum of one design presentation meeting.

Mandatory project review points include:

a) Project reviews are mandatory, however they shall not relieve the project delivery team and any contracted third party (Technical Advisor, Vendor, Developer, Project Co., Contractor, etc.) from the requirement to comply with Metrolinx Standards as well as all other relevant codes and standards.

b) Metrolinx shall not be responsible for any missed items during project reviews, nor for site dimensions, means and methods of fabrication or construction, staging or constructability.

4 DESIGN PRIORITIES

4.1. METROLINX DESIGN OBJECTIVES

The objective is to develop and implement a consistent approach to customer experience across transit modes and delivery agents to support an easy, seamless, and safe journey while ensuring our assets are durable and easily maintained.

The five priorities that underpin Metrolinx's overall approach to establishing design requirements are:

1. Prioritizing customer and employee safety;
2. Designing for all users;
3. Durability for ease of maintenance and operations;
4. Consistency, legibility, and intuitive design, leading to a convenient, high-quality experience for passengers; and
5. Responding to contextual, local, sensitive, and probable future conditions.

Figure 4-1: Union Station - GO ridership is expected to grow exponentially and will require a robust transit system that is durable and designed for ease of maintenance and operations.

Figure 4-2: Rotterdam Central Station - promote uncluttered design to reduce visual distractions.

Figure 4-3: UP Express at Union Station Rendering – Material selection.

4.2. SAFETY BY DESIGN

Safety is fundamental to Metrolinx design principles and requirements. Designs shall prioritize customer safety and create a safe and efficient space for the movement of passengers as they travel throughout their end-to-end journey - between stations or stops, platforms, adjacent bus infrastructure, sidewalks, and areas along corridors and guideways in the community.

Applying methods to minimize occupational hazards and enhance customer comfort, security, and safety early in the design process, with an emphasis on optimizing health and safety throughout the life cycle of a project and asset, is fundamental. Safety by Design is a concept that encourages construction and/or product designers to identify and mitigate health and safety risks to the greatest extent during the design development phase.

Crime Prevention Through Environmental Design (CPTED), also known as defensible space, is a key aspect of safety by design and is defined as a multi-disciplinary approach for reducing crime through urban and environmental design and the management and use of built environments. CPTED strategies aim to reduce victimization, deter offender decisions that precede criminal acts, and build a sense of community among inhabitants so they can gain territorial control of areas and reduce opportunities for crime and fear of crime.

4.2.1. Life Safety and Fire Protection

The following guiding principles for Life Safety and Fire Protection are applied to station design:

a) Provide fire and life safety designs that limit fire spread and impacts on patron safety, damage to property and business continuity;

b) Means shall also be provided to restrict the overcrowding of platforms during peak operating conditions;

c) Stations shall be designed to accommodate the volumes of people that may use them in peak hours and emergency conditions;

d) Fire protection systems shall be provided for emergency responders; and

e) Refer to the relevant codes, standards, and project-specific requirements for detailed requirements.

4.2.2. Code Compliance

a) A Code Analysis Report with consideration of all applicable Regulatory Codes and Requirements shall be provided to Metrolinx:

   i. Signed and stamped by Registered Code Agency in compliance with the Building Code Act;

   ii. Consider impacts on the entirety of station site and all exiting to public right of way;

4.2.3. CPTED and Transparency

Crime Prevention through Environmental Design (CPTED) is action to design the built environment in ways that reduce or remove identifiable crime risks. It is essential to incorporate CPTED in the initial design stages. CPTED design principles address visibility, lighting, access control, security hardware, landscaping, vandal resistance, and ease of maintenance.

Use CPTED principles to:

a) Build station/stops and facility environments that deter opportunities for crime;

b) Help deter and control crime of any type;

c) Increase actual and perceived safety and security of customers;

d) Create a clean, well-lighted, and safe environment;

e) Design environments that are transparent and open along all public-facing façades and façades facing open spaces;

f) Promote openness between levels and across spaces by ensuring unobstructed views and use of transparent materials;

g) Design platforms with a continuous band of clear vision glazing where there are views into any public/customer space, including elevator enclosures and connections to passenger stairs and pedestrian bridges;

h) Place waste receptacles in locations that are visible to customers and staff, ensuring views are unobstructed and in clear view from strategically located CCTV cameras;

i) Establish a holistic approach to enhance safety and security measure through engineering requirements, such as, fire life safety, structural, HVAC, communications systems (CCTV, two-way communication for passenger assistance and audio speakers), and electrical and lighting requirements; and

j) Maximize transparency at vertical circulation areas, including coordinating building elements (such as vertical structure and vertical mullions) to minimize visual interference and maximize transparency at the detail level.

4.2.4. Site Design

a) Build station/stops and facility environments that deter opportunities for crime;

b) Help deter and control crime of any type;

c) Increase actual and perceived safety and security of customers;

d) Create a clean, well-lighted, and safe environment;

e) Design environments that are transparent and open along all public-facing façades and façades facing open spaces;

f) Promote openness between levels and across spaces by ensuring unobstructed views and use of transparent materials;

g) Design platforms with a continuous band of clear vision glazing where there are views into any public/customer space, including elevator enclosures and connections to passenger stairs and pedestrian bridges;

h) Place waste receptacles in locations that are visible to customers and staff, ensuring views are unobstructed and in clear view from strategically located CCTV cameras;

i) Establish a holistic approach to enhance safety and security measure through engineering requirements, such as, fire life safety, structural, HVAC, communications systems (CCTV, two-way communication for passenger assistance and audio speakers), and electrical and lighting requirements; and

j) Maximize transparency at vertical circulation areas, including coordinating building elements (such as vertical structure and vertical mullions) to minimize visual interference and maximize transparency at the detail level.

4.2.5. Layouts, Sight Lines, and Wayfinding

a) In Station entrances, passenger transfer zones and platforms, provide optimum openness to aid in navigation and support principles of CPTED;

b) Station signage shall be located so as not to impede sightlines or interfere with equipment (i.e., CCTV) and designed as per DS-03 MTX Wayfinding Design Standard and DS-03-P1&P2 Metrolinx Sign Implementation Manuals;

c) Appropriate signage shall be installed where the area is under video surveillance and the CCTV camera operates when the Passenger Assistance Intercom (PAI) is activated;

d) Avoid poorly placed lights that create blind spots for potential observers and miss critical areas;

e) Ensure potential problem areas are well lit: pathways, stairs, entrances/exits, parking areas, ATMs, kiosks, service areas etc.;

f) Avoid overly bright security lighting that creates blinding glare and/or deep shadows, hindering the view for potential observers;

g) Layouts shall minimize the length of movement predictors which are defined by tunnels, stairways, walkways, and corridors that allow potential assailants to predict passenger movement and reduce the ability of a passenger to escape from a threatening situation;

h) Equipment layout shall not impede passenger sight lines of signage, access to intercom panels, or CCTV coverage;

i) Designs shall address safety and terrorism prevention by eliminating blind corners and entrapment areas such as alcoves and nooks where one can hide, or suspicious packages can be hidden;

j) All waste and recycle streams shall be visible on all sides using a clear and transparent material to aid in preventing terrorism-related activity;

k) Furniture seating bases shall have clear sightlines to prevent concealment of packages;

l) Operator-specific requirements shall be confirmed prior to design development to ensure appropriate functions, such as automatic locking doors;

m) Designs shall demonstrate maximum clear sight lines for passengers navigating the station;

n) Designs shall provide clear sight lines for leased concession employees and the station ambassador;

o) Lighting placement shall not create blind spots for potential observers and miss critical areas. Ensure potential problem areas are well lit, including pathways, stairs, entrances/exits, parking areas, ATMs, phone kiosks, service areas, self-serve hubs, TVMs, etc.;

p) Security lighting shall not create blinding glare and/or deep shadows, hindering the view for potential observers;

q) Where feasible, the implementation of Platform Edge Doors (PEDs) on platforms should be considered to further enhance safety and security by restricting access to the track and preventing accidents and acts of vandalism or terrorism;

r) Where tunnels are located, they shall be animated to reduce perceived risks to safety, such as through the use of advertising and/or Metrolinx communications; and

s) Walking distances shall be minimized between points of transfer with direct, visible, well-lit routes.

Figure 4-5: Application of CPTED principles along main streets and TOD centers. Image from Metrolinx Mobility Hub Guidelines.

4.3. OPERATIONS AND MAINTENANCE

Metrolinx facilities are complex and interconnected systems of infrastructure assets that include architectural, structural, mechanical, electrical, civil, and process systems. Assets shall be designed for durability and ease of maintenance and operations. Station design must anticipate and address the heavy everyday use of a busy transit system to ensure asset performance and service life are maintained. Key performance metrics, asset lifecycle costs and the RAMS principles noted above are significant factors that need to be considered when design and construction decisions are made. The following are key areas of focus:

- Modularity, scalability and consistency of design elements, controls, and assets;
- Design elements that are Reliable, Available, Maintainable and Safe (RAMS);
- Assets that are resilient, lifecycle cost efficient and are aligned with the Metrolinx DS-05 Sustainable Design Standard;
- Site plans and room layouts that optimize operational efficiency and support ease of maintenance access for front-line technicians and service providers.

4.3.1. REQUIREMENTS

The following requirements and guiding principles shall apply:

a) Modularity: Provide consistency in material choices during design that can be used in different applications or systems to promote flexibility, interoperability, inventory management and an increase in maintenance efficiencies.

b) Reliability: Individual design elements and assets shall be selected to reliably perform its specific function while minimizing the risk of failure or operational strain throughout its lifecycle.

c) Availability: 'As reliability and maintainability increases, so does availability'. Upon Substantial Completion and throughout the warranty term, an asset shall be fully functional.

d) Maintainability: Design shall ensure there are no interferences or impediments to serviceable assets. Full access to all required equipment and/or facility amenities shall be provided for maintainability.

e) Safety Engineering: Functionality of a system and its components throughout its lifecycle will help eliminate hazards due to failure, reducing safety risks to the environment, customers, employees, and the community.

f) Durability: All exterior and interior materials shall be selected to suit a high-traffic, heavily serviced rail, or bus facility. Materials shall be selected to minimize maintenance needs while ensuring that regular maintenance protocols are in place to uphold their performance and lifespan. Materials shall also be selected to withstand anticipated environmental factors such as freeze-thaw cycles, UV radiation, moisture ingress, and corrosion. Material shall be able to absorb wear and tear without deform or fracturing and be resilient when stressed.

g) Redundancy: Stations shall be designed and planned so that operational strategies are not expected/ relied upon to overcome deficiencies in design such as ensuring sufficient provision of VCEs. For example, where there is inadequate spare capacity of elevators, operational strategies may be required, however, this would not be a desirable solution.

4.4. CONTINUITY AND DESIGN IDENTITY

The identity and brand of the various Metrolinx assets are expressed through the customer journey and key infrastructure elements. The look and feel of these aspects are intended to be recognizably consistent across all customer and public-facing environments.

The customer journey and the way passengers navigate a space must be as consistent, legible, and intuitive as possible. The specific arrangement and application of consistent design components, or the kit-of-parts, to facilitate coherence and allow some variability in response to a particular site. The specific arrangement and application of the design components, or the kit-of-parts, allows for variability in response to a particular site.

At minimum, every commuter goes through six consistent experiences at every station:

1. Arrival – the customer arrives and identifies the station;
2. Transaction – the customer purchases the fare;
3. Access – the customer proceeds to the platform;
4. Platform – the customer waits for the train/LRV/bus;
5. Travel – the customer boards the train/LRV/bus to get to their final destination; and
6. Departure – the customer departs through a station or stop;

Within these six experiences, key elements have been identified to ensure that the brand identity and personality is conveyed through its consistent application in each of the Metrolinx modal standards.

4.5. CONTEXTUAL AND FUTURE CONDITIONS

Designs shall address local, contextual, or site-specific needs. While consistency in design elements is essential system-wide, stations may also reflect the site's unique history, landscapes, heritage, and Indigenous perspectives

5 GENERAL DESIGN REQUIREMENTS

5.1. CUSTOMER-CENTRIC DESIGN REQUIREMENTS

a) Spaces shall be designed to include visual cues, features, and/or elements to support intuitive wayfinding and highlight key decision-making points, such as access points, vertical circulation etc. through the use of lighting, colour, and/or materiality.

b) Travel distances shall be minimized for all customers at all journey touchpoints, particularly at points of transfer between one transit service/mode to the next.

   i. The routes the customers take shall be clear, direct, and as short as possible.

   ii. The design shall support and facilitate ease of transfer between transit modes and connections and minimize the need for transfers and switchbacks.

   iii. All passenger amenities, services and security items shall be consolidated to achieve maximum visibility, circulation space and clear, direct pedestrian flow.

c) The design shall ensure an equitable and inclusive experience for customers with diverse abilities and backgrounds to inform the design.

   i. Placement of elements, services and amenities shall be located not to impede the passenger flows but shall be consistently and prominently located to facilitate ease of use for the full spectrum of users.

d) Crime Prevention Through Environmental Design (CPTED) principles shall be used across all touchpoints in the site, Station environment, and associated facilities.

e) Customer amenities provided across a mode shall be consistent and systematized so that customers can rely on a consistent service across their end-to-end journey.

f) The design of structure, public areas, and amenity spaces shall strive for optimal openness to reinforce pedestrian flow and intuitive wayfinding.

g) Customer comfort shall be provided through protection from rain, wind, snow, and sun to maintain customer thermal and acoustical comfort levels. Where spaces are enclosed, extremes in temperatures shall be avoided.

h) Openness and transparency shall be provided through clear views/sightlines and spatial penetration.

   i. Visual transparency to, from, and between the infrastructure shall be provided to support principles of CPTED, increase safety and security (actual and perceived), and promote ease of wayfinding.

   ii. Transparency and openness shall be emphasized along all public-facing façades and/or façades facing open spaces while balancing building energy performance and glazing maintainability.

i) Lighting that enhances a customer's sense of safety and security shall be provided.

i. Lighting strategy shall provide continuous illumination and mitigate shadows cast by passengers.

ii. In areas where customers may feel vulnerable such as a point of fare purchase, facility entrances, tunnels, and designated waiting areas, enhanced lighting levels shall be used to support a customer's actual and perceived safety.

iii. Lighting shall enhance the customer experience by using special lighting to highlight architectural, interior, and landscape design features and zones, reinforcing and aiding in safety and intuitive wayfinding.

5.2. ARCHITECTURAL DESIGN REQUIREMENTS

a) Infrastructure design shall be deliberate and coherent across the line through:

i. Similar architectural expression, look and feel of infrastructure, consistent materials and finishes, colour, modularity, architectural elements, design expression, and detailing.

ii. Systematic use of colour and/or pattern, modularity, materials, and finishes that integrate with the existing transit infrastructure or system as an identifiable feature for a consistent customer experience.

iii. An architectural strategy for the application of Elements of Consistency and Variability.

b) Maintain consistent horizontal and vertical datums. A consistent approach to form-making, building volumes, and detailing, shall reinforce an architectural signature that is recognizable across the system.

c) Designs shall strive for simplicity of architectural expression through integrated design of all systems and elements such as structural, mechanical, electrical, and plumbing systems. Infrastructure shall be integrated and organized to be visually less prominent, conceal systems, and prevent vandalism while being easily accessible for maintenance.

i. Where possible, customer amenities shall be consolidated to avoid visual clutter while facilitating ease of use and maintenance, including the ability to clean or replace components.

d) A modular approach to design and material application shall be considered to generate an organizational structure for the clean integration of all building systems; develop a modular approach to systems with structural, mechanical, and electrical elements less visually prominent, and a systematic approach to how architectural, structural, mechanical, and electrical designs are expressed.

e) Vents, mechanical elements, Electrical & IT System Cabinets, etc. shall be generally screened from public view using a consistent architectural material palette that is part of the overall line-wide language.

f) The design and building form shall be based on functionality and establish an architectural approach that supports ease of operational and maintenance activities. Form shall follow function and avoid non-essential form-making.

i. Design shall support simplicity in detailing material intersections, connections, and transitions.

ii. Repeated modules and concealed fasteners shall be used throughout the system.

iii. Finishes and textures shall be organized and systematic to maintain a consistent and ordered visual appearance.

iv. Design shall reflect the heavy everyday use of a busy transit system, with the application of recyclable, robust materials with low life-cycle environmental impacts that will enhance the quality of the transit environment.

v. Consideration of lifecycle costs and ease of operations and maintenance shall be demonstrated in all aspects of specifications, design, and detailing.

g) Simplified, integrated, and modular materials and designs that are consistent across the line shall be provided.

i. Elements, placement, and installation methodology shall be consistent.

ii. Designs shall promote ease of maintenance.

iii. Materials and finishes shall be durable and resistant to vandalism through the provision of tamper-proof design including graffiti-resistant, easy-to-clean surfaces.

h) Designs shall have a consistent palette of materials, colour, and patterns, scaled in proportion to reflect the typical cladding and glazing module.

i) The location and orientation of all Infrastructure, including ancillary structures, shall support the potential for future development and minimize impact on communities.

5.3. SITE AND LANDSCAPE DESIGN REQUIREMENTS

a) Stations and sites shall identify opportunities to draw inspiration from the unique history and context of the site. They may reflect the values and character of the surrounding community through celebrating locality, highlighting unique landscapes, celebrating heritage, siting that is responsive to the neighbourhood, municipal stakeholder considerations, respective Indigenous perspectives, as well as services, retail and civic amenities that respond to local community needs.

i. Infrastructure shall be integrated with the neighbourhoods in which it resides, align entrances to work with site circulation, and demonstrate a coordinated approach to station or facility elements that interact with the adjacent community and surrounding context.

ii. Trees and landscaping shall be used to frame views and circulation routes; giving them prominence on the site and making them part of the customer journey and experience.

b) Designs shall establish a consistent landscape vision that includes a strategy for hard and soft landscaping that complements the site and architecture design.

i. Soft landscaping shall consist of low-maintenance species.

ii. The design of hard landscaping shall take into consideration the safety, operations, and maintenance of the site.

iii. Where applicable, dissuasive vegetation may be used to decrease undesirable activities, such as trespassing and graffiti, around buildings and retaining walls.

c) Site design and landscape treatments shall be consistent along major pedestrian routes and bike lanes to provide a recognizable cue to customers and guide them toward the station/stop or facility.

d) Sites for stations/stops, facilities, and applicable infrastructure shall be directly connected to the public realm and integrated into the surrounding community and urban or suburban fabric.

e) Sites shall be designed and constructed to prevent any potential conflicts between pedestrians, cyclists, and vehicles in open spaces or where pedestrians may wait before crossing.

f) Respond to the impact of local site conditions. Properties impacted and demolished for the Project shall be left in an interim condition that includes a primary landscape strategy that limits the need for fencing.

g) To the greatest extent possible, designs shall avoid impacts to natural features. Where not possible, impacts shall be minimized.

h) For sites with known Indigenous significance or a longstanding Indigenous presence, consider Indigenous perspectives and knowledge in the site and landscape design.

5.4. SUSTAINABLE DESIGN REQUIREMENTS

a) The design shall reflect sustainability and climate resiliency:

i. Infrastructure shall be designed to maintain or reduce climate vulnerabilities and extend projected asset life cycle.

ii. Minimize energy use and reduce GHG emissions over the project life cycle.

iii. Maximize daylight, manage stormwater, and minimize embodied carbon and regional environmental impacts.

iv. Accommodate for future change including changing climatic conditions.

5.5. SYSTEMS INTEGRATION DESIGN REQUIREMENTS

a) Closed Circuit Television Circuit (CCTV), PA systems, and two-way communication for passenger assistance form a network to inform, protect, and assist the customer and operational and security teams.

i. CCTV cameras shall be selected to integrate within the architectural aesthetic of the station and its surroundings;

ii. Cameras for both interior and exterior shall be tinted dome enclosure type to conceal the direction of the camera;

iii. Domes specified shall be constructed of vandal-resistant hardened shells. Optical domes shall be able to withstand temperature extremes and not become brittle or cloudy with exposure to solar and ultraviolet radiation, humidity, and precipitation;

iv. Where platform curvature negatively impacts visibility of the length of the platform, CCTV shall be integrated with the digital screen to ensure remote surveillance of the platform;

v. Locate CCTV to enhance customer's perception of safety, such as within tunnels and overpasses.

b) Clear public address messaging through both audio (speakers) and visual means such as Variable Message Signs (VMS) are both essential forms of communication that together keep the customer informed.

i. Audible information shall be provided in both English and French as per the French Language Act.

ii. Clear audible information shall be designed to be reliable, consistent, and provided in real-time to inform all customers such that the outcome ensures that all messages are understood at the first broadcast.

iii. Audible and visual information shall be synchronized for all customers at the same time, while addressing customers with accessible needs and equitable access.

iv. In addition to using speakers within a public address system, alternate means of providing information using a digital screen or hearing loop system, shall be provided for those that are hard of hearing.

v. Speakers shall be integrated into exterior and interior environments including ceilings, walls, structure, and enclosure envelopes (cladding assembly, soffits etc.).

vi. The colour of public-facing elements, such as speaker trim, exposed raceways, etc., shall match the colour of the mounting surface/background to avoid colour contrast and appear visually less prominent for aesthetic consistency.

vii. Speaker housing shall be recessed and concealed in suspended ceiling or soffit system where the speaker cover plate is flush with ceiling. Speakers shall be fully integrated within architectural ceiling or soffit system and positioned to minimize clutter while resistant to vandalism and other damage.

c) Where suspended ceilings do not occur, CCTV and speakers shall be surface mounted. Colour of all surface mount speakers and mounting brackets shall match the background colour.

d) All infrastructure, including conduit and cabling, shall be concealed.

e) Where speakers are required to be pole mounted, these elements shall be collocated, where possible, to minimize interferences on platforms.

APPENDIX A: CONSULTANT QUALIFICATIONS AND EXPERIENCE

A.1 PURPOSE

a) The consultant qualification requirements below have been developed to assist project delivery teams in procuring the right consultants during the early stages of a project, to ensure consistent, elevated customer experience, through quality of design and construction of customer-facing infrastructure.

b) These consultant qualification requirements are agnostic of delivery type and cover architectural related interests in the subject areas of:

   i. Architectural Design

   ii. Urban Design

   iii. Landscape Design

   iv. Universal Design

   v. Sustainable Design

   vi. Interior Design

   vii. Industrial Design

   viii. Signage & Wayfinding Design

A.2 APPLICABILITY – WHEN TO USE

a) These consultant qualification requirements shall be used for all design and/or construction activities that include:

   i. An off-corridor infrastructure component; and/or

   ii. A customer-facing infrastructure component, both on-corridor and off-corridor; and/or

   iii. A landscape, site planning or urban design component, both on-corridor and off-corridor.

b) These requirements shall be used for all project life cycle phases that are post initial business case (IBC), up to and including commissioning and handover.

   i. Exclusion: Planning activities up to IBC are excluded from these requirements. Post-construction activities, unless of significant scope, are also excluded.

c) These requirements shall apply to all delivery methodologies, including third party deliveries, market-driven strategy deliveries, joint developments, alternate finance, and procurement (AFP), construction management (CM), design build (DB), design bid build (DBB), and any other procurement types that involve design and/or construction of customer facing infrastructure.

A.3 METHODOLOGY – HOW TO USE

Once the project scope is identified, contact the owner of this standard for agreement on applicable consultant qualification requirements. Refer also to the Governance section for further details.

a) After required positions are decided, the project delivery teams, and/or the teams responsible for third party negotiations shall embed consultant qualification requirements into respective procurements - refer to Applicability - When to use section for applicable procurement types.

b) Procurement evaluation criteria shall be associated with consultant qualification requirements. Evaluation criteria and

evaluation details, including who evaluates and at what stage, shall be agreed upon with the owner of this standard in writing.

A.4 GOVERNANCE

a) Decisions related to Key Personnel, Other Personnel and Additional Other Personnel requirements shall be made by Subject Matter Experts (SMEs) and, in the case of the positions listed below, by the owner of this standard.

   i. As a general guideline, the applicability of the roles and requirements shall be evaluated by Metrolinx against multiple criteria including consideration of project scope, project budget, extent and importance of customer-facing infrastructure, complexity of intervention, and public sensitivity of project;

   ii. Generally, Key Personnel and Other Personnel roles, or a selection thereof, shall apply to all contract types; and

   iii. Generally, Additional Other Personnel Positions shall apply to contract types that require the establishment of hourly rates (such as emergent contracts or vendors of record). This list is not exhaustive and is being provided as guidance only. Other positions may be required. The owner of this standard can assist in providing a finer granularity and qualification requirements, as relevant to the specific project.

b) Project delivery teams and other negotiators shall contact the owner of this standard early in the procurement process to ensure agreement on a complete list of consultant requirements.

c) Unless agreed in writing ahead of time with the owner of this standard, evaluation of consultant qualifications for the positions listed within this document shall include the owner of this standard, both at procurement stage and/or later.

A.5 KEY PERSONNEL POSITIONS:

A.5.1 POSITION – LEAD DESIGN ARCHITECT

a) Years of Experience: 15;

b) Professional designation(s): OAA (Member, Ontario Association of Architects) or eligible for temporary license; and

c) Required qualifications and experience:

   i. Demonstrated experience in design and construction of public buildings and infrastructure, with three design award-winning constructed architectural projects, including international examples, that are both relevant and similar in scope and complexity to the project identified in this Scope of Work, and that illustrate a design that integrates functional and customer facing elements;

      1. Demonstrated experience in playing a leadership role as lead design architect (e.g. design principal) in at least five projects, including the three projects listed above;

      2. Comparable projects to the Scope of Work in the range of CAD $50M or greater in construction costs;

      3. Demonstrated experience in design and construction of transit infrastructure, transit network, pedestrian bridges and tunnels and systems design is an asset;

   ii. Relevant design awards include those awards which are peer reviewed by design professionals and awarded competitively by relevant design related organizations including but not limited to:

1. Architecture, Landscape Architecture, Industrial Design and Interior Design professional associations (Federal - RAIC (Royal Architectural Institute of Canada), CSLA (Canadian Society of Landscape Architects); Provincial – OAA (Ontario Association of Architects), OALA (Ontario Association of Landscape Architects), AIBC (Architectural Institute of British Columbia), AAA (Alberta Association of Architects); International – AIA (American Institute of Architects), RIBA (Royal Institute of British Architects);
2. Heritage Design Awards for Architecture;
3. Design Publications (Azure AZ Awards, Canadian Architect Awards of Excellence, MARK, Details, Wallpaper, etc.);
4. Design Organizations (CCA – Canadian Center for Architecture, Design Exchange – DX Awards, Pritzker, etc.);
5. Government and regulatory bodies (Municipal architecture awards, Governor General's awards and medals);
6. Design Competitions (project specific);
7. Notes:
    a. Awards from external disciplines and trades, such as those from engineering or construction organizations are not considered relevant design awards;
    b. Awards from manufacturing and supplier organizations, such as those awarded by the Canadian Concrete Masonry Producers Association, or the Canadian Wood Council are not considered relevant design awards;
    c. Awards from facility-specific organizations or special interest groups such as the International Parking Institutes Awards of Excellence or APTA – American Public Transport Association are not considered relevant design awards;
    d. Awards from manufacturing and supplier organizations, external disciplines, and trades, such as those from engineering or construction organizations are not considered relevant design awards;

iii. Demonstrated experience designing buildings that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, sensitive to the local context, and lead to satisfied clients and users;

iv. Demonstrated experience producing designs that integrate design excellence with the technical, mechanical, customer facing and site design and site integration requirements;

v. Demonstrated experience in playing a leadership role in community/municipal stakeholder engagement:
    1. Provide relevant examples of community/ municipal stakeholder engagement processes that led to successful outcomes in terms of key project objectives;

vi. Demonstrated experience working with public sector agencies and institutions is an asset;

vii. Other demonstrated design experience including architectural or urban design publications; experience on

design review panels, competition juries, industry panels, is an asset;

viii. Project Examples demonstrate projects undertaken shall be within the past 10 years. The architectural portfolio shall include a short design narrative highlighting the design objectives, process and approach, response to site and context, building program or brief, project specific challenges and how they were met, unique design solutions and key architectural features, approach to hierarchy and sequence of public and private space, and overall project significance; and

ix. The Lead Design Architect shall be accountable for, but not limited to, the following:

1. The comprehensive design of all buildings, customer facing and staff-facing infrastructure elements as well as the site design of the Project;

2. The implementation of design on the Project, including interdisciplinary coordination on buildings, as well as all customer facing and staff-facing infrastructure; and

3. Demonstrating and defining clear roles and responsibilities between the Lead Design Architect, Lead Project Architect, and other Design team members, as required, to meet the needs of the project specific requirements and agreements;

A.5.2 POSITION – LEAD PROJECT ARCHITECT

a) Years of Experience: 15;

b) Professional designation(s): OAA (Member, Ontario Association of Architects); and

c) Required qualifications and experience:

i. Demonstrated experience in design and construction of public buildings and infrastructure, with three design award-winning constructed architectural projects, including international examples, that are both relevant and similar in scope and complexity to the project identified in this Scope of Work, and that illustrate a design that integrates functional and customer facing elements;

1. Demonstrated experience in playing a leadership role as lead project architect in at least five projects, including the three projects listed above;

2. Comparable projects to the Scope of Work in the range of CAD $50M or greater in construction costs;

3. Demonstrated experience in design and construction of transit infrastructure, transit network, pedestrian bridges and tunnels and systems design is an asset;

ii. Demonstrated experience producing designs that integrate with the technical, mechanical, customer facing and site design and site integration requirements;

iii. Relevant design awards include those awards which are peer reviewed by design professionals and awarded competitively by relevant design related organizations, refer to A.5.1.b)ii;

iv. Demonstrated experience with various delivery methods and construction contracts;

v. Demonstrated experience designing buildings that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, sensitive to the local context, and lead to satisfied clients and users;;

vi. Demonstrated experience in playing a leadership role in community/municipal stakeholder engagement;

1. Provide relevant examples of community/ municipal stakeholder engagement processes that led to successful outcomes in terms of key project objectives;

vii. Demonstrated experience working with public sector agencies and institutions an asset;

1. Project Examples demonstrate projects undertaken shall be within the past 10 years. The architectural portfolio shall include a short project narrative highlighting the design objectives, process and approach, response to site and context, building program or brief, project specific challenges and how they were met, unique design solutions and key architectural features, approach to hierarchy and sequence of public and private space, and overall project significance;

viii. Other demonstrated project experience including architectural or urban design awards; publications; experience on design review panels, competition juries, industry panels, is an asset;

ix. Demonstrated experience in project management; and

x. Required responsibilities to be demonstrated:

1. The Lead Project Architect shall be accountable for the comprehensive design of all buildings, customer facing and staff-facing infrastructure elements as well as the site design of the Project;

2. The Lead Project Architect shall be accountable for the implementation of design on the Project, including interdisciplinary coordination on buildings, as well as all customer-facing and staff-facing infrastructure;

3. The Lead Project Architect shall be accountable for the delivery of the design component through the entire Project, including final commissioning and handover to Metrolinx;

4. To be coordinated and further detailed to define the role of the Lead Project Architect and Lead Design Architect, as required, to meet the needs of the project-specific requirements and agreements; and

5. The Lead Project Architect shall remain in the role throughout the entire Project.

A.5.3 POSITION – LANDSCAPE ARCHITECT

a) Years of Experience: 10;

b) Professional designation(s): OALA (Member, Ontario Association of Landscape Architects); and

c) Required qualifications and experience:

i. Demonstrated experience in playing a leadership role (e.g. partner-in-charge, lead landscape designer, or a substantial contributor to the project design) in at least one design award-winning constructed landscape architecture and/or landscape design project that is both relevant and similar in scope and complexity to the project identified in the Scope of Work;

ii. Demonstrated experience in developing design, performance specifications, and tender documentation for projects similar in scope and nature to the Scope of Work;

iii. Demonstrated experience in design of landscapes that are award-winning, sustainable, durable, cost-effective, respect heritage, and lead to satisfied clients and users;

iv. Demonstrated experience with sustainable landscape design, low impact development approaches, and storm water management;

v. Demonstrated experience with specification of low maintenance, drought tolerant and native species;

vi. Demonstrated experience with implementing sustainability in parking lot design is considered an asset;

vii. Demonstrated Experience working in brownfields (previously developed land with potential contamination);

viii. Experience which demonstrates an advanced understanding of urban design principles and experience designing urban landscapes including but not limited to, plazas, streetscapes;

ix. Demonstrated Experience, working with local Conservation Authorities;

x. Demonstrated experience in project management;

xi. Other demonstrated design experience including landscape architecture or urban design awards; publications; experience on design review panels, competition juries, industry panels is an asset; and

xii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Landscape Architect shall be responsible for
2. The landscape architecture and landscape design of the Project;
3. Note: The Landscape Architect shall remain in the role throughout the entire Project.

A.5.4 POSITION – LEED AND SUSTAINABILITY CONSULTANT

a) Years of Experience: 10;

b) Professional designation(s): O.A.A (Member, Ontario Association of Architects) or P.Eng. (Professional Engineer) licensed in the province of Ontario, and LEED AP (LEED Accredited Professional); and

c) Required qualifications and experience:

i. Demonstrated experience related to the design and construction of environmentally sustainable facilities;

1. Demonstrated experience with sustainable transit facilities is an asset;

ii. Demonstrated experience with the provision of Whole Building Energy Simulation and Measurement and Verification, as defined by LEED;

iii. Demonstrated experience as the prime sustainability and/or LEED consultant on a minimum of 25 commercial, institutional and/or industrial building Whole Building Energy Simulation engagements; provide project names and locations;

iv. Demonstrated experience playing a significant role in obtaining LEED Gold or better certification for at least two projects;

1. Provide project descriptions, including name, location, type of facility, year of accreditation, major sustainability features, LEED certification level and one photograph;

v. Demonstrated experience working with environmental product declarations and construction material lifecycle;

vi. Demonstrated experience on total life cycle sustainability issues of concrete and cementitious materials, and other construction materials;

vii. Demonstrated hands on experience with the analysis of HVAC systems, renewable technologies, building envelope and green mechanical systems;

viii. Demonstrated experience with the Envision Sustainable Infrastructure Framework will be considered an asset; and

ix. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The LEED and Sustainability Consultant shall be responsible for LEED on the Project;

2. Note: The LEED and Sustainability Consultant shall remain in the role throughout the entire Project.

A.5.5 POSITION – WAYFINDING DESIGN LEAD FOR STATIC AND DIGITAL INFORMATION

a) Years of Experience: 10;

b) Required qualifications and experience:

i. Demonstrated experience in playing a leadership role in at least three large-scale transportation, institutional or commercial projects delivering customer-focused information planning, but not limited to the following, for both digital and static signage:

1. Movement and legibility assessment;

2. Customer-focused information planning;

3. Stakeholder consultation

4. Information placement;

5. Content planning and scheduling;

6. Preparation of design briefs and art working oversight;

7. Technical engineering for signage systems and housing details as per industry standards;

8. Production-ready specifications; and

9. Preparation of tender documents.

ii. Demonstrated experience in playing a leadership role in large-scale transportation projects is considered an asset;

iii. Demonstrated experience preparing analytical reports and design briefs;

iv. Demonstrated experience working with diverse stakeholders; and a) Demonstrated experience working with public sector agencies and institutions is considered an asset;

v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Wayfinding Design Lead shall produce legibility and customer movement assessments, decision sequences, locations of wayfinding tools (including but

not limited to signs, maps, digital screens, audio cues), static content and digital messaging schedules, and related accessibility and legibility recommendations; and

2. The Wayfinding Design Lead shall be responsible for the design and implementation of static and digital signage for the Project;

3. Note: The Wayfinding Design Lead shall remain in the role throughout the entire Project.

A.5.6 POSITION – HERITAGE ARCHITECT

a) Required for all Contracts/Projects with a Heritage scope/component;

b) Years of Experience: 10;

c) Professional designation(s): OAA (Member, Ontario Association of Architects) or eligible for temporary license;

d) Holds membership in good standing with The Canadian Association of Heritage Professionals; and

e) Required qualifications and experience:

i. Demonstrated experience in playing a leadership role (e.g. partner-in-charge, lead designer, or a substantial contributor to the design) in at least one design award-winning constructed architectural project that is similar in scope and nature to the project identified in the Scope of Work;

1. Relevant design awards include those awards which are peer reviewed by design professionals and awarded competitively by relevant design related organizations including but not limited to:

(1) Architecture, Landscape Architecture, Industrial Design and Interior Design professional associations (Federal - RAIC (Royal Architectural Institute of Canada), CSLA (Canadian Society of Landscape Architects); Provincial – OAA (Ontario Association of Architects), OALA (Ontario Association of Landscape Architects), AIBC (Architectural Institute of British Columbia), AAA (Alberta Association of Architects); International – AIA (American Institute of Architects), RIBA (Royal Institute of British Architects), ASLA (American Society of Landscape Architects), IFLA (International Federation of Landscape Architects); Interior Design – ARIDO (Association of Registered Interior Designers of Ontario);

(2) Heritage Design Awards for Architecture, and Industrial Design;

(3) Design Publications (Azure AZ Awards, Canadian Architect Awards of Excellence, MARK, Details, Wallpaper, etc.);

(4) Design Organizations (CCA – Canadian Center for Architecture, Design Exchange – DX Awards, Pritzker, etc.);

(5) Government and regulatory bodies (Municipal urban design and architecture awards, Governor General's awards and medals);

(6) Design Competitions (project specific).

(7) Notes:

(a) Awards from external disciplines and trades, such as those from engineering or construction organizations are not considered relevant design awards;

(b) Awards from manufacturing and supplier organizations, such as those awarded by the Canadian Concrete Masonry Producers Association, or the Canadian Wood Council are not considered relevant design awards;

(c) Awards from facility-specific organizations or special interest groups such as the International Parking Institutes Awards of Excellence or APTA – American Public Transport Association are not considered relevant design awards;

ii. Demonstrated experience in designing buildings that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, and lead to satisfied clients and users;

iii. Demonstrated experience working with heritage buildings and projects which demonstrate applicability of recognized heritage conservation principles and values, including the Standards and Guidelines for the Conservation of Historic Places in Canada;

iv. Demonstrated experience working with public sector agencies and institutions is considered an asset;

v. Other demonstrated design experience including architectural or urban design awards; publications; experience on design review panels, competition juries, industry panels is considered an asset; and

vi. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Heritage Architect shall be responsible for all heritage-related decisions on the Project;

2. Note: The Heritage Architect shall remain in the role throughout the entire Project.

A.5.7 POSITION – INDUSTRIAL DESIGNER

a) Required for all Contracts/Projects with significant industrial design scope, including passenger amenities, ticketing devices, furniture, digital signage enclosures, other specific infrastructure elements, and fixtures and fitments;

b) Years of Experience: 10;

c) Professional designation(s): ACIDO (Member, Association of Chartered Industrial Designers of Ontario) or national or international equivalent; and

d) Required qualifications and experience:

i. Demonstrated experience playing a significant role in the design of at least one award-winning constructed industrial design projects similar in scope and nature to the projects identified in the Scope of Work;

ii. Demonstrated experience in the following areas of work, including but not limited to: materials, public amenities, ticketing devices, furniture, digital signage enclosures, other specific infrastructure elements, and fixtures and fitments into the overall integration of architectural, interior, universal and sustainable, and urban design of the project;

iii. Other demonstrated design experience including industrial design, architecture, or landscape architecture awards; publications; experience on design review panels, competition juries, industry panels is an asset; and

iv. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Industrial Designer shall be responsible for the industrial design of the Project;

2. Note: The Industrial Designer shall remain in the role throughout the entire Project.

A.5.8 POSITION – ENVISION SUSTAINABILITY SPECIALIST

a) Required for all Contracts/Projects with a significant Envision component;

b) Years of Experience: 10;

c) Professional designation(s): ENV SP (Envision Sustainability Professional); and

d) Required qualifications and experience:

i. Demonstrated experience in documentation and project coordination for a project verified by the Institute for Sustainable Infrastructure under the Envision Sustainability Rating System;

ii. Experience as the lead ENV SP on a verified project will be considered an asset;

iii. Experience in infrastructure planning and design;

iv. Experience in consulting engineering; and

v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Envision Sustainability Specialist shall be responsible for Envision on the Project;

2. Note: The Envision Sustainability Specialist shall remain in the role throughout the relevant part of the Project.

A.5.9 POSITION – CLIMATE ADAPTION AND RESILIENCE DESIGN SPECIALIST

a) Required for all Contracts/Projects with a significant climate adaptation and resiliency component;

b) Years of Experience: 10;

c) Professional designation(s): or P.Eng. (Professional Engineer) licensed in the province of Ontario, or equivalent; and

d) Required qualifications and experience:

i. Demonstrated experience with weather and climate data systems, networks, and portals for application across the GTHA;

ii. Demonstrated experience with climate data, including climate change projections and expertise in applying to infrastructure design;

iii. Demonstrated experience identifying and assessing climate change risks and vulnerabilities for infrastructure from various climate parameters such as extreme temperatures, more intense rainfall events, more frequent ice storms, higher wind gusts, increased flooding, and more prolonged periods of drought;

iv. Demonstrated experience in embedding relevant infrastructure standards to withstand current and future climate extremes;

v. Demonstrated experience of national and international best practices for climate change adaptation and resilience in infrastructure design and construction;

vi. Demonstrated experience with applying cost-benefit analysis to project components that provide/ enhance resilience;

vii. Experience related Advanced Public Private Partnerships ("P3") and Alternative Finance and Procurement ("AFP") and/or market driven strategy delivery models will be considered an asset, including demonstrated experience with in applying methods and processes to incorporate climate change language in design of infrastructure elements; and

viii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Climate Adaptation and Resilience Design Specialist shall be responsible for climate adaptation and resiliency of the Project;

2. Note: The Climate Adaptation and Resilience Design Specialist shall remain in the role throughout the relevant part of the Project.

A.5.10 POSITION – TECHNICAL COMMUNICATIONS LEAD

a) Years of Experience: 12

b) Required qualifications and experience:

c) Required for all standards and guideline development work

d) CSP (Member, Constructions Specifications Canada); RSW (Registered Specifications Writer) preferred; or other designation related to technical writing and communication is an asset

e) Demonstrated excellence and experience writing technical specifications for projects of similar scope and complexity; and

f) Demonstrated experience translating design vision, intent, and Reference Concept Designs (RCDs) into performance language appropriate for Project Specific Output Specifications (PSOS);

g) Demonstrated excellence and experience writing technical specifications for projects of similar scope and complexity; and

h) Project Examples demonstrating projects or architectural standards undertaken within the past 10 years will be an asset.

i) The writing portfolio shall include a short narrative highlighting the project objectives, design process and approach, project challenges and how they were met, unique solutions and key features of the document, approach to hierarchy, sequence, and decision-making in the document.

OTHER PERSONNEL POSITIONS:

A.5.11 POSITION – UNIVERSAL ACCESSIBILITY CONSULTANT

a) Years of Experience: 10

b) Required qualifications and experience:

i. Demonstrated experience in architecture with a focus on accessibility and universal design;

ii. Demonstrated experience with the Accessibility for Ontarians with Disabilities Act (AODA) legislation, regulations and standards for compliance; Demonstrated experience working with on projects exceeding the Accessibility for Ontarians with Disabilities Act (AODA) and Ontario Building Code (OBC), which demonstrate applicability of and applying recognized better practice accessibility standards including CSA (Canadian Standards Association) B651 Accessible design for the built environment, and ISO (International Organization for Standardization) 23599 Assistive Products for Blind and Vison Impaired Persons – Tactile Walking Surface Indicators; and ISO 21542 Building construction – Accessibility and usability of the built environment;

iii. Demonstrated experience in best practices including CSA (Canadian Standards Association) and ISO (International Organization for Standardization) accessibility standards; Ability to read, interpret, and analyze local codes and standards to compare and contrast with better practice accessibility requirements for transit infrastructure;

iv. Demonstrated experience with emerging issues related to accessibility (including environmental, customer service); Demonstrated experience with applying trends in Universal Design, to respond to emerging issues in existing facilities and both national and international best practices for accessible public transportation;

v. Demonstrated experience providing functional guidance and expertise on all aspects of customer accessibility, assessment of existing built conditions, and development of practical recommendations that considers constructability, operability, and maintainability of transit infrastructure in design and implementation of universal design standards exceeding AODA and Ontario Building Code (OBC); a) Demonstrated experience shall include but not limited to buildings and sites;

vi. Demonstrated experience in consulting engineering;

vii. Demonstrated experience participating in and leading consultations on infrastructure with members of the accessibility community, including the development of accessible formats to support consultation;

viii. Demonstrated experience related Advanced Public Private Partnerships ("P3") and Alternative Finance and Procurement ("AFP") models will be considered an asset; and

ix. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Universal Accessibility Consultant shall be responsible for universal accessibility of the Project;

2. Additional accessibility accreditation from form local and/or international regulatory bodies will be considered an asset.

3. Note: The Universal Accessibility Consultant shall remain in the role throughout the entire Project.

A.5.12 POSITION – URBAN DESIGNER

a) Years of Experience: 10;

b) Professional designation(s): MCIP/RPP/OPPI (Member Canadian Institute of Planners/ Registered Professional Planner/ Member, Ontario Professional Planners Institute) or RAIC/OAA (Member, Royal Architectural Institute of Canada/Member, Ontario Association of Architects) or CSLA/OALA (Member, Canadian Society of Landscape Architects/ Member Ontario Association of Landscape Architects); and

c) Required qualifications and experience:

   i. Demonstrated experience developing sites, master plans and urban design guidelines that are pedestrian and transit supportive, create an award-winning public realm, respect the local context, and anticipate intensification and future development;

   ii. Demonstrative experience with current trends and directions in urban design inclusive of public realm/ complete streets, place-making, complete communities, active transportation integration and transit supportive principles;

   iii. Demonstrated experience thorough understanding of recognized urban design principles, concepts and best practices and its integration with Transit Oriented Development is an asset;

   iv. Demonstrated experience playing a leadership role in community/municipal stakeholder engagement;

   v. Demonstrated exceptional graphic design skills;

   vi. Demonstrated LEED / Environmental sustainability experience;

   vii. Demonstrated experience including but not limited to awards, publications, experience on juries, panels, boards; and

   viii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

      1. The Urban Designer shall be responsible for the urban design of the Project;

      2. Note: The Urban Designer shall remain in the role throughout the entire relevant part of Project.

A.5.13 POSITION – PLANNER

a) Years of Experience: 10;

b) Professional designation(s): MCIP/RPP (Member Canadian Institute of Planners/ Registered Professional Planner); and

c) Required qualifications and experience:

   i. Demonstrated experience with the relevant planning policy framework, including relevant documents at the provincial level (Provincial Policy Statement), regional level (Growth Plan for the Greater Golden Horseshoe, The Big Move), and local level (Official Plan, Transportation Plan, Zoning By-Laws, etc.);

   ii. Demonstrated experience with land use planning and regulatory tools and requirements and third party permits and approval processes relating to large development or infrastructure projects in Ontario considered an asset;

   iii. Demonstrated experience in land use planning analysis;

iv. Demonstrated experience in environmental assessment, mitigation, permits, approvals, and compliance;

v. Demonstrate understanding of urban design concepts and best practices;

vi. Demonstrate experience with Transit Oriented Development;

vii. Demonstrated implementation expertise, including the creation of phasing plans and significant experience with planning and development tools;

viii. Demonstrated experience with third party agencies, governments, municipalities, and other stakeholders;

ix. Demonstrated experience in a transportation/ municipal planning environment will be considered an asset;

x. Demonstrated experience including but not limited to awards, publications, experience on juries, panels, boards; and

xi. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Planner shall be responsible for land use on the Project;

2. Note: The Planner shall remain in the role throughout the relevant part of Project.

A.5.14 POSITION – INTERIOR DESIGNER

a) Years of Experience: 10;

b) Professional designation(s): Member in good standing of at least one of the following NCIDQ (National Council for Interior Design Qualification); ARIDO (Association of Registered Interior Designers of Ontario); IIDA (International Interior Design Association); ASID (American Society of Interior Designers); NCARB (National Council of Architectural Registration Boards); OAA (Ontario Association of Architects) or eligible for temporary licence; and

c) Required qualifications and experience:

i. Demonstrated experience in playing a leadership role (e.g. design principal, senior interior designer, or a substantial contributor to the project design) in at least one design award-winning constructed interior design project both relevant and similar in scope and complexity to the project identified in the Scope of Work;

1. Relevant design awards include those awards which are peer reviewed by design professionals and awarded competitively by relevant design related organizations including but not limited to:

(1) Interior Design – ARIDO, Interior Design Best of Year Award, IIDA Annual Interior Design Competition;

2. Architecture, Landscape Architecture, Industrial Design professional associations (Federal - RAIC, CSLA; Provincial – OAA, AIBC, AAA; International – AIA, RIBA, ASLA, IFLA

3. Design Publications (including Azure AZ Awards, Canadian Architect Awards of Excellence, MARK, Details, Wallpaper);

4. Notes:

(1) Awards from industry-specific organizations or special interest groups such as the CoreNet are not considered relevant design awards;

ii. Demonstrated experience with interior designs that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, and successfully meet users' needs;

iii. Demonstrated experience working with public sector agencies and institutions including with diverse stakeholders is considered an asset;

iv. Demonstrated experience including but not limited to interior design awards; publications; experience on design review panels, competition juries, industry panels; and

v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Interior Designer shall be responsible for the interior design of the Project;

2. The Interior Designer shall remain in the role throughout the entire Project.

A.5.15 POSITION – LIGHTING DESIGNER

a) Years of Experience: 10;

b) Professional designation(s): Member in good standing of at least one of the following IALD (International Association of Lighting Designers); IESNA (Illuminating Engineering Society of North America);

c) Certification(s): NCQLP (National Council on Qualifications for the Lighting Professions) Lighting Certification; and

d) Required qualifications and experience:

i. Demonstrated experience in developing design, performance specifications, and tender documentation for major projects similar in and complexity to the project identified in the Scope of Work;

ii. Must have played a significant role in the design of at least one design award-winning lighting design projects similar in scope and relevant to the Project;

1. Relevant design awards include those awards which are peer-reviewed by design professionals and awarded competitively by relevant design related organizations including but not limited to:

(1) Lighting Design professional associations (including but not limited to IALD (Instrumental Activities of Daily Living), IES (Illuminating Engineering Society), IESNA (Illuminating Engineering Society of North America);

(2) Design Publications (including but not limited to Architectural Lighting Magazine, Mondo, Interior Design, Azure);

(3) Design Organizations (including but not limited to ARIDO (Association of Registered Interior Designers of Ontario);

(4) Government and regulatory bodies (Municipal urban design and architecture awards, Governor General's awards and medals);

(5) Design Competitions (project-specific);

iii. Notes:

1. Awards from external disciplines and trades, such as those from engineering or construction organizations are not considered relevant design awards;

2. Awards from manufacturing and supplier organizations are not considered relevant design awards;

iv. Demonstrated experience including but not limited to lighting design for major public spaces, heritage buildings, cultural institutions, public-facing transit facilities, commercial public spaces, and installations of programmable dynamic lighting systems;

v. Demonstrated experience in delivering lighting designs that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, and successfully meet users' needs;

vi. Demonstrated experience including but not limited to lighting design awards; experience on design review panels, competition juries, and industry panels;

vii. Demonstrated experience working with transit or public sector agencies and institutions is considered an asset; and

viii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Lighting Designer shall be responsible for the lighting design of the Project;

2. Note: The Lighting Designer shall remain in the role throughout the entire Project.

A.5.16 POSITION – COST CONSULTANT / QUANTITY SURVEYOR

a) Years of Experience: 10

b) Professional Designation(s): PQS (Professional Quantity Surveyor) or CEC (Construction Estimator Certified); and

c) Required qualifications and experience:

i. Demonstrated experience in cost estimating public sector/institutional /commercial/industrial buildings, civil works, landscape projects, and green buildings;

ii. Demonstrated experience estimating construction and life-cycle costs; and

iii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Cost Consultant / Quantity Surveyor shall be responsible for the accurate cost estimating of the Project;

2. The Cost Consultant / Quantity Surveyor shall remain in the role throughout the entire relevant part of the Project.

A.5.17 POSITION – CONTRACT ADMINISTRATOR

a) Required for all Contracts/Projects with a construction scope of work;

b) Years of Experience: 10; and

c) Required qualifications and experience:

i. Demonstrated experience with contract administration of site projects including commercial buildings with significant customer-facing elements and site elements;

ii. Demonstrated experience with contract administration of buildings with both exterior and interior finishes and components, including significant customer-facing elements;

iii. Demonstrated experience with contract administration of finishes, fixtures, equipment, and millwork;

iv. Demonstrated experience with all phases of building contract administration including Building Occupancy, Substantial Completion, final deficiencies, and commissioning and handover; and

v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Contract Administrator shall be responsible for the contract administration of the customer-facing and staff-facing elements of the Project, including all buildings and the site;

2. Note: The Contract Administrator shall remain in the role throughout the construction, handover, and commissioning phases of the Project

A.5.18 POSITION – TECHNICAL WRITER

a) Required for all Contracts/Projects with a Specifications/ Requirements/documentation scope of work;

b) Years of Experience: 10;

c) Professional designation(s): CSP (Member, Constructions Specifications Canada); RSW (Registered Specifications Writer) preferred; and

d) Required qualifications and experience:

i. Demonstrated experience translating design vision, intent, and Reference Concept Designs (RCDs) into language-appropriate and highly specific language for the Project Specific Output Specifications (PSOS);

ii. Demonstrated experience with writing technical specifications for projects of similar scope and complexity; and

iii. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

1. The Technical Writer shall be responsible for the technical writing of the Project with a duty to provide neutral specifications;

2. Note: The Technical Writer shall remain in the role throughout the entire relevant part of the Project.

A.5.19 POSITION – FIRE PROTECTION AND BUILDING CODE CONSULTANT

a) Required for all Contracts/Projects with code analysis scope;

b) Years of Experience: 10;

c) Professional designation(s): P.Eng. (Professional Engineer) licensed in the province of Ontario; and

d) Required qualifications and experience:

   i. Demonstrated experience in transit/urban/public building and site design on a minimum of five major projects – provide project names, locations, and brief descriptions;

   ii. Demonstrated experience in transit design including stations, rail platforms and electrification is considered an asset;

   iii. Demonstrated experience with smoke studies;

   iv. Demonstrated experience as a lead code consultant on at least five projects of similar complexity; and

   v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

      1. The Fire Protection and Building Code Consultant shall be responsible for the Code analysis and Code compliance on the Project;

      2. Note: The Fire Protection and Building Code Consultant shall remain in the role throughout the entire Project.

A.5.20 POSITION – ELEVATOR CONSULTANT

a) Required for all Contracts/Projects with specialized elevator work and with customized elevator requirements;

b) Years of Experience: 10;

c) Professional designation(s): P.Eng. (Professional Engineer) licenced to practice in the Province of Ontario, or equivalent.; and

d) Required qualifications and experience:

   i. Demonstrated experience with complex elevator projects including customized elevator requirements;

   ii. Demonstrated experience as a lead elevator consultant on at least five projects of similar complexity;

   iii. Demonstrated experience with all project phases: design, construction, and handover;

   iv. Relevant experience in transit design considered an asset; and

   v. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

      1. The Elevator Consultant shall be responsible for all elevators on the Project, through design and implementation;

      2. Note: The Elevator Consultant shall remain in the role throughout the entire Project.

A.5.21 POSITION – ACOUSTICAL CONSULTANT

a) Required for all Contracts/Projects with acoustical analysis scope;

b) Years of Experience: 10;

c) Professional designation(s): P.Eng. (Professional Engineer) lichened to practice in the Province of Ontario, or equivalent.; and

d) Required qualifications and experience:

   i. Demonstrated experience with complex acoustical analysis and modeling of interior spaces;

   ii. Demonstrated experience with noise walls and complex acoustical analysis and modeling of exterior spaces;

   iii. Demonstrated experience as a lead acoustical consultant on at least five projects of similar complexity;

   iv. Demonstrated experience with all project phases: design, construction, and handover;

   v. Relevant experience in transit design considered an asset; and

   vi. Required responsibilities to be demonstrated in a RACI (responsible, accountable, consulted, and informed) matrix:

      1. The Acoustical Consultant shall be responsible for acoustical analysis and acoustical requirement design, specification, and implementation on the Project;

      2. Note: The Acoustical Consultant shall remain in the role throughout the entire Project.

ADDITIONAL OTHER PERSONNEL POSITIONS:

A.5.22 POSITION – ARCHITECT(S)

a) Years of Experience: 10;

b) Professional designation(s): OAA (Member, Ontario Association of Architects); and

c) Required qualifications and experience:

   i. Demonstrated experience related to design and construction of transit, commercial and municipal infrastructure, including but not limited to transit stations, parking structures, parking, track, signals, bridges, grade separations, tracks, underground tunnels, and rehabilitation of transit facility building projects;

   ii. Demonstrated experience in design of buildings that are award-winning, sustainable, durable, cost-effective, respect heritage, are integrated into their surroundings, and successfully meet users' needs;

   iii. Experience related Advanced Public Private Partnerships ("P3") and Alternative Finance and Procurement ("AFP") models will be considered an asset;

   iv. Demonstrated experience in project management; and

   v. Experience working with public sector agencies and institutions and asset.

A.5.23 POSITION – LANDSCAPE ARCHITECT(S)

a) Years of Experience: 10;

b) Professional designation(s): OALA (Member, Ontario Association of Landscape Architects) or approved provincial or international licencing equivalent; and

c) Required qualifications and experience:

   i. Demonstrated experience related to the design and construction of transit, commercial and municipal infrastructure, including but not limited to transit stations, parking structures, parking, tracks, signals, bridges, grade separations, tracks, underground tunnels, and rehabilitation of facility building projects;

   ii. Experience in sustainable landscape design, low-impact development approaches, and stormwater management;

   iii. Demonstrated experience in designing landscapes that are award-winning, sustainable, durable, cost-effective, and respect heritage;

   iv. Experience which demonstrates an advanced understanding of urban design principles and experience designing urban landscapes including but not limited to plazas, streetscapes, public and commercial space;

   v. Demonstrated experience with sustainable parking lot design is considered an asset;

   vi. Demonstrated experience in project management; and

   vii. Experience related to Advanced Public Private Partnerships ("P3") and Alternative Finance and Procurement ("AFP") models will be considered as an asset.

A.5.24 POSITION – HORTICULTURALIST(S) / LANDSCAPE RESTORATION SPECIALIST(S)

a) Years of Experience: 10;

b) Professional designation(s): OALA (Member, Ontario Association of Landscape Architects); and

c) Required qualifications and experience:

   i. Demonstrated experience developing design, performance specifications, and tender documentation for projects similar in scope and nature to the Scope of Work;

   ii. Demonstrated experience with sustainable landscape design, habitat creation, low impact development approaches, and stormwater management;

   iii. Demonstrated experience with the specification of low maintenance, drought tolerant and native species; and

   iv. Demonstrated experience working in brownfields (previously developed land with potential contamination).

A.5.25 POSITION – LEED AND SUSTAINABILITY CONSULTANT(S)

a) Years of Experience: 10;

b) Professional designation(s): LEED AP BD+C (LEED Accredited Professional with Building Design and Construction Specialty) with Professional designation(s): MCIP/RPP/OAA/P.Eng (Member Canadian Institute of Planners/ Registered Professional Planner/ Member, Ontario Association of Architects/ Professional Engineer licensed to practice in the Province of Ontario), or a university degree in a related

discipline (Planning/ Environmental Management/ Environmental Science); and

c) Required qualifications and experience:

i. Demonstrated experience related to the design and construction of environmentally sustainable facilities;

ii. Demonstrated experience related to the design and construction of environmentally sustainable transit facilities is an asset;

iii. Demonstrated experience with the provision of Whole Building Energy Simulation and Measurement and Verification as required by LEED;

iv. Demonstrated experience as the prime LEED and/ or sustainability consultant on a minimum of 15 commercial, institutional and/or industrial building Whole Building Energy Simulation engagements;

v. Must have played a significant role in obtaining LEED NC Gold or better certification for at least two projects;

vi. Demonstrated experience in specialized technical total life cycle sustainability issues of concrete and cementitious materials, and other construction materials;

vii. Demonstrative experience working with environmental product declarations and construction material lifecycle is considered an asset;

viii. Demonstrated hands on experience with the analysis of HVAC systems, renewable technologies, building envelope and green mechanical systems;

ix. Demonstrated experience with the Envision Sustainable Infrastructure Framework is an asset; and

x. Project management experience managing numerous specialist groups and/or sub-consultants.

A.5.26 POSITION – ENERGY MODELLING SPECIALIST

a) Required for all Contracts/Projects with a LEED and/or an energy modelling requirement;

b) Years of Experience: 10;

c) Professional designation(s): BEMP (Building Energy Modeling Professional) or approved equivalent; and

d) Required qualifications and experience:

i. Demonstrated experience and understanding of the construction process and its impact on equipment installation and overall building efficiency;

ii. Demonstrated experience carrying out the technical surveys necessary for the realization of the energy simulation models and analysis of building plans in order to extract building energy modeling data;

iii. Demonstrated experience conducting statistical comparisons between the energy consumption of various buildings;

iv. Membership of the Canada Green Building Council's experienced modeller's list an asset;

v. Demonstrated experience in design will be considered an asset; and

vi. Demonstrated experience in consulting engineering will be considered an asset.

A.5.27 POSITION – DAYLIGHTING MODELLER(S)

a) Years of Experience: 5; and

b) Required qualifications and experience

i. Demonstrated experience in daylight modelling to meet LEED requirements with a minimum of 10 projects of similar scope and complexity.

A.5.28 POSITION – CONSTRUCTION SPECIFICATIONS PRACTITIONER(S)

a) Years of Experience: 15;

b) Professional designation(s): CSP (Member, Constructions Specifications Canada); and

c) Required qualifications and experience:

i. Demonstrated experience as the specifications lead on a minimum of 5 projects of similar scope and complexity.

A.5.29 POSITION – COMPUTER AIDED DRAWINGS AND 3D MODELLING EXPERT(S)

a) Years of Experience: 5; and

b) Required qualifications and experience:

i. Demonstrated experience as the lead Building Information Modeler (BIM) on at least 5 projects of similar scope and complexity;

ii. Demonstrated experience and expertise in AutoCAD, Revit, SketchUp and 3D Studio Max;

iii. Demonstrated experience and expertise to create complex digital drawings that are attractive, legible, easily editable, and have well-labelled and organized layers; and

iv. Demonstrated experience and expertise to create accurate, photo-realistic 3D images.

A.5.30 POSITION – GRAPHIC DESIGNER(S)

a) Years of Experience: 5; and

b) Required qualifications and experience:

i. Demonstrated experience and expertise in Adobe Photoshop, Illustrator, and InDesign; and

ii. Demonstrated experience and expertise and ability to create complex images, drawings and documents that are including but not limited to being award winning, legible, easily editable, have well-labelled and organized layers, text, and paragraph styles.

A.5.31 POSITION – COMMUNITY RELATIONS SPECIALIST(S)

a) Years of Experience: 10; and

b) Required qualifications and experience:

i. Demonstrated experience in community outreach initiatives that involve minimizing negative impacts on communities, including during construction and operations;

ii. Demonstrated experience with at least 5 corporate social responsibility engagements for clients; and

iii. Demonstrated experience in the provision of requirements and assessment criteria to evaluate submittals related to the

provision of community economic benefits, employment, training programs and workforce development.

A.5.32 POSITION – FACILITATOR

a) Required for all Projects with public facilitation scope;

b) Years of Experience: 10; and

c) Required qualifications and experience:

   i. Demonstrated experience facilitating large group stakeholder meetings, public meetings, and design workshops, with the potential to host and manage the input of a number of stakeholders;

      1. Demonstrated experience documenting the session with key findings;

   ii. Demonstrated experience with proficiency in consultation planning and a wide range of innovative facilitation techniques and engagement strategies, meeting formats, and means of soliciting meaningful feedback; and

   iii. Depending on scope, further qualifications and experience requirements may be required.

A.5.33 POSITION – NOISE AND VIBRATION SPECIALIST(S)

a) Years of Experience: 10;

b) Professional designation(s): P. Eng. (Professional Engineer) licensed to practice in the Province of Ontario, or equivalent.; and

c) Required qualifications and experience:

   i. Demonstrated project experience in the investigation and evaluation of relevant site condition data in the context of the delivery of large scale, complex development, and infrastructure development projects; and

   ii. Demonstrated project experience as the lead noise and vibration specialist on a minimum of 5 projects of similar scale and complexity.

A.5.34 POSITION – AUDIO-VISUAL CONSULTANT(S)

a) Years of Experience: 10;

b) Professional designation(s): Industry professional licensed to practice in the Province of Ontario; and

c) Required qualifications and experience:

   i. Demonstrated experience with all forms of digital display and display management systems in large scale enterprises;

   ii. Demonstrated experience in coordination with other relevant disciplines including I&IT, electrical, architectural and/or industrial design; and

   iii. Demonstrated project experience as the lead audio-visual consultant/ specialist on a minimum of 5 projects of similar scale and complexity.

A.5.35 POSITION – WIND ENGINEER(S)

a) Years of Experience: 10;

b) Professional designation(s): P.Eng (Professional Engineer) licensed to practice in the Province of Ontario; and

c) Required qualifications and experience:

i. Demonstrated experience as a lead wind engineer in facilities including snow and wind studies;

ii. Demonstrated experience as a lead wind engineer in transit facilities including snow and wind studies is an asset; and

iii. Demonstrated experience as a lead wind engineer on at least 5 projects of similar complexity.

APPENDIX B: SUBMISSION REQUIREMENTS

B.1 SUBMISSION OVERVIEW

For the purposes of the below, Design phases shall include architecture and urban design, universal design, sustainable design, landscape, interior design, and signage and wayfinding. The milestones provided are intended to be generic and reflect the minimum expectations; any further development or refinement of submission requirements will be detailed in the respective Project Agreements.

B.1.1 EARLY DESIGN

Submitted at approximately the 5-10% Design Stage.

a) The objective of this Submission is to demonstrate to Metrolinx a concept plan identifying the major project components, site analysis, functional programming and relationships, spatial planning and requirements, code and zoning constraints and design concept for the project.

B.1.2 SCHEMATIC DESIGN

Submitted at approximately the 15-20% Design Stage.

a) The objective of this Submission is to demonstrate to Metrolinx:

   i. A concept master plan to show relationship between transit facility and development site, for projects delivered through market-driven strategy;

   ii. A concept plan identifying the major project components, site analysis, functional programming and relationships, spatial planning and requirements, code and zoning constraints and design concept of the project; and

   iii. That Metrolinx comments have been responded to and addressed in the design.

B.1.3 CONCEPT DESIGN

Submitted at approximately the 30% Design Completion Stage, aligned with the Concept Design phase in Alliance Procurement Model e.g. Concept Design Development Period (CDDP).

a) The objective of this submission is to demonstrate to Metrolinx:

   i. That Metrolinx comments have been responded to and addressed in the design;

   ii. The concept is valid and coordinated through multidisciplinary design input and coordination; and

   iii. All requirements set out in the Metrolinx Standards, project-specific requirements and project-specific agreements have been met.

B.1.4 PRELIMINARY DESIGN

Submitted at approximately the 60% Design Completion Stage, aligned with the Preliminary Design Phase in Alliance Procurement Model, e.g., Preliminary Design Development Period (PDDP)

a) The objective of this submission is to demonstrate to Metrolinx:

i. That Metrolinx comments have been responded to and addressed in the design;

ii. The concept is valid and coordinated through multidisciplinary design input and coordination;

iii. All requirements set out in the Metrolinx Standards, project-specific requirements and project-specific agreements have been met; and

iv. To provide Life Cycle Costing.

B.1.5 ENHANCED DESIGN

Submitted at the 90% Design Stage, aligned with the Enhanced Design Phase in Alliance Procurement Model, e.g., Enhanced Design Development Period (EDDP)

a) The objective of this submission is to demonstrate to Metrolinx:

i. That Metrolinx comments have been responded to and addressed in the design and Life Cycle Costing;

ii. The concept is valid and coordinated through multidisciplinary design input and coordination; and

iii. All requirements set out in the Metrolinx Standards, project-specific requirements and project-specific agreements have been met.

B.1.6 100% DESIGN

a) The objective of this submission is to demonstrate to Metrolinx:

i. That Metrolinx comments have been responded to and addressed in the design and Life Cycle Costing;

ii. The concept is valid and coordinated through multidisciplinary design input and coordination; and

iii. All requirements set out in the Metrolinx Standards, project-specific requirements and project-specific agreements have been met.

B.1.7 ISSUE FOR CONSTRUCTION

a) The objective of this submission is to allow Metrolinx a final review and approval to ensure all comments have been addressed and consolidated in the design drawings and specifications by which the project will be constructed.

B.1.8 DURING CONSTRUCTION

a) The purpose of submissions during construction is to flag any on-site issues that require a redesign of a certain portion of the project; if project team is proposing an alternative for a finish; or to flag any design changes from that previously included in the contract; and ensure general quality assurance of end product.

B.1.9 HANDOVER & COMMISSIONING

a) Assuring that all systems and components of the project are designed, installed, tested, and operate as per Metrolinx requirements, that maintenance and operations staff is trained for optimal operation of the project and all its components, and that required

project documentation has been handed over to Metrolinx.

B.1.10 RECORD DRAWINGS AND OPERATIONS MANUALS

Record Drawings and Operations Manuals shall include Design-related content in accordance with industry standards, including finishes of components and subcomponents, catalogue cut sheets for furnishing, fixtures and equipment, relevant shop drawings, etc. Record drawings should also capture all design changes made to the IFC set during construction through RFI, Change Orders, Variation Enquiry, Variation Confirmation, and Variation Directives.

B.1.11 WARRANTY REVIEW

Prior to the expiry of the warranty, Metrolinx shall participate in the scheduled site review and shall be circulated a detailed report identifying any deficiency issues with the Work experienced since occupancy

B.2 REQUIREMENTS

B.2.1 EARLY DESIGN

Submitted at approximately the 5-10% Design Stage.

Minimum Submissions Required for Review:

a) **Site Plan**

i. Identify locations and connections between all major scope elements including but not limited to: Metrolinx customer circulation routes, municipal/other transit connections, parking lot, Passenger Pick-Up and Drop Off (PUDO), building(s), bus loop, road connections, accessible path(s), pedestrian tunnels, corridor entrance points, platform and track alignments, rail corridor works and associated works on public roads or infrastructure;

ii. Preliminary Site Plan, at a minimum, should contain: location plan, North Arrow, major grid line, property lines, building setbacks, key spot elevations, major dimensions, future street widening, curb cuts, and preliminary site statistics: land use, density, setbacks, parking, site and building area, green roof areas, natural features, watercourses, and wetlands if applicable. Site plan to indicate potential opportunities for building expansion and/or future transit connections.

iii. Resolve and validate horizontal track profiles, track chainage, track alignment, tie into existing track and associated signal adjustments;

iv. For projects that are part of a market-driven strategy delivery, relationships to private development, including functional adjacencies, entrances and access points, major circulation routes (all modes) and elements of impact and/or influence between private development and Metrolinx customers; and

v. Plan(s) shall be drawn to scale, private development is to be shown and greyed out. The preliminary design concept shall demonstrate that elements fit in the allowable or defined space.

b) **Supporting Design Drawings**:

i. Concept master plan to show the relationship between transit facility and development site, for projects delivered through market-driven strategy;

ii. Preliminary Functional Layout showing building (s) footprint, providing functional program summary and adjacencies for Metrolinx off-corridor areas; include tunnel(s) and/or bridge(s) as applicable;

iii. Preliminary Landscape Concept Plan, at a minimum, illustrating overarching design intent, areas of paving, planting, ecological mitigation and restoration, and amenities;

iv. Preliminary Site Elevation and Section illustrating site massing, overall building heights, typical material finishes, dimensions of critical heights for the parapets, openings, and functional relationships (min. scale 1:500); and

v. Using right-hand flow principles for passenger circulation provide Preliminary Platform Concept Plan for Bus and Rail for customer-facing elements including accessible path of travel and barrier-free path of travel.

vi. Preliminary signage and wayfinding locations at major decision point along path of travel highlighting progressive disclosure planning principles.

vii. Submissions shall be provided at a minimum, with a level of detail that demonstrates, representation of the requirements of the Canadian Handbook of Practice for Architects, Second Edition 2009, Chapter 2.3.5, Schematic Design and at a minimum contain the following: North Arrow, grid lines, dimensions, room names, overall areas, surge spaces.

viii. **Design Brief:** Outlining the design concept, addressing architectural and urban context, Future Expansion opportunities, code /regulatory and zoning approach and constraints, landscape design, universal design, sustainable design, key customer-facing fixtures, furnishings, amenities, interior and industrial design approach; include precedent photos where appropriate;

ix. Supporting Material:

1. Renderings as required for communicating key aspects of the project, and not less than three, showing surrounding context and buildings;

2. Shadow study and Pedestrian Level Wind Study – for buildings greater than 20m in height;

3. Building Massing Model and conceptual massing study (computer generated, include all buildings/ structures); and

4. Preliminary material considerations for exterior and interior (material and colour sample board).

x. **PowerPoint Presentation:** PowerPoint Presentation comprising of the following items (at minimum) shall be presented:

1. A 100-word statement of the design concept;

2. Preliminary functional program summary and adjacencies for Metrolinx off-corridor areas;

3. Metrolinx customer circulation routes (entering site and station to platforms and vice versa);

4. Building massing illustrated in three dimensions in context;

5. Context site plan illustrating site adjacencies, including major intersections, roadways, access points to the site, natural features and municipal networks that can integrate with the site;

6. Brief overview of existing conditions site plan, including property lines and easements, natural features, and photos;

7. Photos of the site from key high traffic locations, such as neighbouring roads and highways, railways, bridges, etc.; Photos of key natural features adjacent to the site;

8. Proposed site plan concept with surrounding context;

9. Diagrams illustrating site circulation and surrounding context circulation – municipal/other transit, accessible routes/pathways, accessible parking area, vertical circulation routes, cycling, kiss 'n ride, private vehicle, including potential for future expansion etc.;

10. Building footprint and functional plan with major access points;

11. Landscape concept illustrating overarching design intent, areas of paving, planting, habitat, amenities, site furniture, bicycle parking, pedestrian and accessible circulation, sustainable and ecological landscape design concepts, and general character of the landscape;

12. Preliminary landscape design grading plan that is coordinated with civil engineering requirements;

13. Preliminary sustainability potential analysis, including but not limited to approaches to reducing consumption of natural resources, climate change mitigation, and improving/restoring ecosystem services, such

as through building orientation, green infrastructure, storm water management, materials, etc.;

14. Preliminary concept for mobility management and integration (secure bike parking, EV parking, etc.);
15. Preliminary outline of operations and maintenance considerations;
16. Any specialized equipment/expenses; and
17. Three high-resolution images as jpegs submitted separate from the PowerPoint presentation – refer to Rendering and Visualization Requirements.

B.2.2 SCHEMATIC DESIGN

Submitted at approximately the 15-20% Design Stage.

Minimum Submissions Required for Review:

a) **Design drawings:** Supporting material and narratives updated to address Metrolinx comments from Design Submission 1, including notes to identify major changes;

b) **Further drawing development:** Update and provide additional supporting material and narratives as required to demonstrate design progression; additional supporting material shall include:

   i. Preliminary Stormwater management report, and traffic study;
   ii. Preliminary Egress Calculations showing the LOS (Level of Service);
   iii. Preliminary Fire Separation drawings;
   iv. Preliminary Demolition drawings; and
   v. Preliminary Staging drawings.

c) **Municipal Site Plan Approval requirements;**

d) **Minimum drawing submissions:**

   i. context plan (scale 1:1000);
   ii. site plan including station and corridor entry points, and site sections (scale 1:500) including immediate context (roads, buildings, trees, natural features);
   iii. floor plans and floor finish plans to show fare equipment and surge spaces (scale 1:100 or 1:200);
   iv. elevations and building sections (scale 1:100 or 1:200);
   v. Platform design for customer-facing elements; and
   vi. Interim submissions as appropriate to request and/ or receive feedback.

e) **Retail strategy for Metrolinx areas; showing the retail type and associated amenities.**

f) **Preliminary material selections;**

g) **PowerPoint Presentation:** PowerPoint Presentation comprising of the following items (at minimum) shall be presented:

i. All requirements from the Preliminary Design presentation, updated;

ii. Updated functional program summary and adjacencies for Metrolinx off-corridor areas;

iii. Updated Metrolinx customer circulation routes (entering site and station to platforms and vice versa);

iv. Demonstration of how the relevant Metrolinx Standards, requirements, and guidelines have been interpreted and localized to suit the programmatic and site-specific conditions of the project;

v. Building Massing Model (computer generated);

vi. Site Plan showing surrounding context and landscaping;

vii. Landscape plan;

viii. Functional Plan and Building Plan drawing(s) at scale readable on a screen;

ix. Site and Building Elevation Concept;

x. Site and Building Section Concept;

xi. Renderings showing surrounding context and buildings; minimum of three, one showing view at pedestrian level and from other key viewpoints, such as neighbouring roads, highways, railways, bridges, etc. Renderings shall incorporate up-to-date imagery of the transit brand (e.g. latest logos, train exterior, etc.) and include depictions of people that reflect the diversity of GGHA transit users (including individuals with disabilities) – refer to Rendering and Visualization Requirements.

xii. An eye-level animation or series of renderings demonstrating a typical user experience of the building – refer to Rendering and Visualization Requirements for applicability and requirements;

xiii. Shadow study (if the building is more than four storeys tall or is directly next to residential property or public open space);

xiv. Exterior material and colour sample board (interior materials optional);

xv. A Design Brief that includes all above material plus a 500-word description of design approach/ concept, including precedent photos where appropriate;

xvi. Pedestrian Level Wind Study – for buildings greater than 20m in height;

xvii. Three (3) high resolution images as JPEG submitted separate from the PowerPoint presentation; and

xviii. Virtual walk-through (animation) showing the customer path of travel – refer to Rendering and Visualization Requirements for applicability and requirements;

xix. Summary of Metrolinx Early Design comments and responses.

B.2.3 CONCEPT DESIGN

Minimum Submissions Required for Review:

a) Architectural & Urban Design:

i. Demonstrate a cohesive design that has considered structural, civil, electrical, mechanical, track and other multidisciplinary design input with clear and complete cross-referencing, key-plans and legends for all customer facing elements including but not limited to: buildings, access structures, platforms, interior/exterior spaces, service, support and back of house spaces; as well as potential for future expansion opportunities.

ii. Submissions shall be provided at a minimum, with a level of detail that demonstrates, representation of the requirements of the Canadian Handbook of Practice for Architects, Second Edition 2009, Chapter 2.3.7, Construction Documents – Drawings and Chapter 2.3.8 Checklist: Assembling and Writing the Specifications;

iii. For projects that are part of a market-driven strategy delivery, relationships to private development shall be illustrated, including functional adjacencies, entrances and access points, major circulation routes (all modes) and elements of impact and/ or influence between private development and Metrolinx customers; and

iv. Copy of Site Plan Approval, including all comments received and resolved.

b) Architectural and site plans: sections, elevations, sections, and details for all customer facing elements including buildings, access structures, platforms, interior/exterior spaces, service, support and back of house spaces shall be provided with a level of detail that demonstrates, representation of the following at a minimum:

i. Preliminary site and building circulation analysis illustrating all pedestrian, cycling and all vehicular routes – from the public realm interfaces and internal to the site, to the station building/platform access structures, parking and drop off areas, alternative transportation access, bus access, platforms, and all customer amenities. This shall include representation of all accessible routes through site and building. Identification of any crash walls, retaining walls, noise walls and fencing, and their impact on customer experience and the public realm;

ii. Preliminary site context plan (min. scale 1:1000) showing connection(s) and layout to existing and future privately/third party-owned building elements; urban realm, municipal connections, building sections of each entrance where integrated into a facility developed through a market-driven strategy, indicating all permanent and temporary easements required to construct the entrance(s)/ access(es);

iii. Preliminary site plan details (min. scale: 1:200) and site sections (min. scale 1:500) as appropriate;

iv. Preliminary building floor plans, roof plans, reflected ceiling plans, sections, exterior elevations (min. scale 1:100);

v. Preliminary interior plans, details, and elevations (min. scale 1:50) of all public areas including washrooms indicating proposed finishes and all amenities and elements, including but not limited to elevators, seating and waste receptacles, fare vending devices, SFTP's, retail, advertising, and digital signage;

vi. Preliminary wall sections (min. scale 1:20) as required to demonstrate components of all exterior or shared assemblies;

vii. Preliminary signage and wayfinding location plans (1:50 scale) highlighting any special connection hardware and support structure.

viii. Preliminary doors, windows, sidelights and interior glazing and details (min. scale 1:20);

ix. Preliminary exterior wall details (min. scale 1:10) as required to demonstrate components of exterior assemblies;

x. Preliminary stair plans, sections, and details (min. scales 1:50 and 1:10);

xi. Preliminary hardware details (min. scale 1:10 and as required); and

xii. Drawings to be coordinated with all other disciplines.

c) An architectural written narrative/design brief, that shall include at a minimum the following topics:

i. General urban design, architecture and landscape design approach and strategies for achieving customer experience guiding principles;

ii. Properties of heritage interest, if applicable at the site;

iii. Analysis of customer path of travel and any critical design and/or customer experience issues;

iv. A description of the design concept including the functional and technical requirements and how it attains its functional requirement, and meets other requirements set out in the Metrolinx Standards, project-specific requirements, and project-specific agreements;

v. Description of approach to meet durability and design life requirements in accordance with Metrolinx Standards, project-specific requirements, and project-specific agreements, including discussion of both interior and exterior materials and assemblies;

vi. Description of immediate context beyond the site (roads, buildings, trees, utilities, natural habitat);

vii. Strategies for the protection of connections to future buildings on the site, including safety, utility, and structural requirements for overbuild, to ensure that the Metrolinx station will remain functional throughout the site development;

viii. Delineation of ownership, access and maintenance by Metrolinx and any Third Party/Developer; if applicable;

ix. Integration with municipal transit, if applicable at the site;

x. Building envelope, exterior and interior finishes;

xi. Drawings, schedules, renderings, and other supplementary materials as necessary to illustrate the design; and

xii. Any special provisions for construction of the Building Structures.

d) The following supporting material shall be provided at a minimum:

i. Preliminary passenger flow modelling report;

ii. Preliminary code analysis addressing buildings, structures, platform, and fire/life safety issues;

iii. CPTED analysis;

iv. Life Cycle Costing, including a written narrative describing life cycle approach to all building components, systems, and major pieces of equipment, including: building envelope, exterior finishes, and interior finishes;

v. Preliminary lighting design concepts (interior and exterior) with selection of lighting equipment and schedule of fixture light levels at all locations that will be visible to customers or staff;

vi. Preliminary catalogue cut sheets for all lighting, mechanical, audio visual, communication, equipment and fixtures, furnishings and equipment (FF&E); that will be visible to customers or staff indicating availability of the product or system from the manufacturer or supplier as well as the types of warranties available; performance criteria; durability and maintenance requirements; availability of various colours, finishes, textures or other features; fabrication and installation requirements; past performance and comparative analysis with similar products in the marketplace;

vii. Preliminary interior and exterior material schedules and material sample boards;

viii. Preliminary special provisions around handrails, guardrails, and vertical circulation (elevators, stairs, ramps, etc.);

ix. Preliminary unit space/ room data sheets and room schedules; and

x. Renderings and or an eye-level video walk-throughs showing both exterior and interior conditions (articulate passenger movement from public realm, through development if applicable, to station area, platform access, and platforms (bus and rail), showing proposed integrated finishes, amenities and elements including, furniture, signage and wayfinding, landscape, advertising, and fare equipment integration) – refer to Rendering and Visualization Requirements;

e) Landscape plans: cross-sections, elevations and details shall be provided with a level of detail that

demonstrates representation of the following at a minimum:

i. Preliminary paving and planting plans, cross sections, details including reference to lighting, materials, furniture, and fixtures (scale: 1:200) and other scales as appropriate;

ii. Preliminary streetscape plans, cross-sections and details including reference to lighting, materials, and furniture (scale: 1:200) and other scales as appropriate;

iii. Preliminary planter details (min. scale 1:20) and urban furniture details, as applicable;

iv. Preliminary details on any crash walls, retaining walls or noise walls and immediate adjacency;

v. Preliminary planting schedules;

vi. Preliminary tree compensation plans; and

vii. A written narrative describing the Landscape design concept including the functional and technical requirements and how it attains its functional requirement, and meets other requirements set out in Metrolinx Standards, project-specific requirements, and project-specific agreements.

f) Sustainability:

i. Refer to requirements outlined in DS-05 Sustainable Design Standards.

g) Accessibility:

i. Preliminary universal design drawings and narrative describing concept, accessible routes, accessible design elements/features and relevant codes and standards;

ii. A description of the universal design/accessible design concept including the functional and technical requirements and how it attains its functional requirement, and meets other requirements set out in Metrolinx Standards, project-specific requirements, and project-specific agreements;

iii. Identify designated passenger waiting areas and accessible multi-modal connections.

iv. Accessibility Compliance Report:

1. Focusing on customer-facing infrastructure, provide overarching summary of each station scope, and identify adjacencies between structures and scheme description;

2. Describe the customer journey from grade to platform (from major accessible arrival areas to the accessible boarding location of the platform(s)) highlighting accessibility features supporting the customer experience of persons who have disabilities;

3. Include section drawings or isometric views to clearly illustrate the elevator strategy;

4. Detailing and demonstrating adherence to the Metrolinx DS-02 Universal Design Standard, including identified non-

conformances and mitigation strategies to achieve functional accessibility.

h) Structural:

   i. Preliminary structural design drawings including framing plans, general arrangement plans, pertinent general notes, and standard details;

   ii. Narrative describing structural concept describing major elements, design criteria and relevant codes and standards; and

   iii. Identification of crash wall and retaining walls in plan and narrative, and cross-reference with site and architectural plans.

i) Civil including Storm Water, Roads, and Traffic:

   i. Preliminary civil drawings indicating sizing and location of major civil elements; and Narrative describing concept for civil design describing major elements, design criteria and relevant codes and standards.

j) Utilities including relocations, new and protect in place:

   i. Preliminary utility drawings showing locations;

   ii. Preliminary composite utility drawings; and

   iii. Narrative/drawings describing approach to utility relocations, new utility services and utility protection requirements.

k) Electrical and Communications Systems:

   i. Preliminary electrical and communication systems drawings to demonstrate compliance with the requirements; and

   ii. Narrative describing concept for electrical and communications design describing major elements, design criteria and relevant codes and standards.

l) Mechanical Systems:

   i. Preliminary mechanical design drawings indicating location of major elements are compliance with the requirements; and

   ii. Narrative describing concept for mechanical design describing major elements, design criteria and relevant codes and standards.

m) Track Work:

   i. Preliminary plan and profile drawings outlines horizontal and vertical alignment design; and

   ii. Narrative describing concept for track design describing major elements, design criteria and relevant codes and standards.

n) Signals and Communications in Rail Corridor:

   i. Preliminary signal and communication design drawings indicating location of major elements; and

   ii. Narrative describing concept for signal and communications design describing major

elements, location, design criteria and relevant codes and standards.

o) Signage and Wayfinding:

   i. Preliminary design drawings indicating location of major signage and wayfinding elements demonstrating compliance with the requirements;

   ii. Preliminary signage drawings including plan(s) noting signage locations & signs used, layout, mountings, and housing (scales as required) for static and digital signage;

   iii. Signage graphics and details representing typical and specific signs for each location;

   iv. Draft signage specifications for static and digital signage, including mountings and housing; and

   v. Narrative describing concept for signage and wayfinding describing major elements, design criteria and relevant codes and standards.

p) Proposed design variations with mitigation plans Electrification including Grounding & Bonding and OCS pole bases, and coordination with Other Works:

   i. Preliminary design drawings indicating location of major Electrification elements demonstrating compliance with the requirements;

   ii. Narrative describing design; and

   iii. Interface provisions requiring coordination with rail platform structure or other customer-facing or public realm elements.

q) Summary of all past Metrolinx comments and responses.

B.2.4 PRELIMINARY DESIGN

Minimum Submissions Required for Review:

a) Design drawings: supporting material and narratives updated to address Metrolinx comments from the 30% Design Submission, including notes to identify major changes;

b) Further drawing development: supporting material and narratives as required to demonstrate design progression to completion of design;

c) Riser or block diagrams showing the overall layout of different systems

d) For each discipline narrative, add a section on Life Cycle Costing for major components; and

e) The following additional materials:

   i. Draft specifications and schedules including:

      1. door, screen, and room finish schedule, wall types and assemblies;

      2. Metrolinx standard specifications for corresponding systems and assets;

      3. Commissioning test procedures with expected test results for all systems;

   ii. Draft catalogue cut sheets of lighting, electrical and I&IT equipment, mechanical diffusers, and

mechanical equipment visible to customers or to staff (office and washroom areas);

iii. Draft catalogue cut sheets for all other Metrolinx owned and maintained;

iv. Draft Erosion and Sediment Control drawings.

f) Summary of all past Metrolinx comments and responses.

B.2.5 ENHANCED DESIGN

Minimum Submissions Required for Review:

a) Design drawings: supporting material and narratives updated to address Metrolinx comments from the 60% Design Submission, including notes to identify major changes;

b) Further drawing development: supporting material and narratives as required to demonstrate design progression;

c) For each discipline narrative, add a section on Life Cycle Costing for major components; and

d) The following additional materials:

i. Draft specifications and schedules including window, door, glazing and louver schedule;

ii. Draft catalogue cut sheets of lighting, electrical and I&IT equipment, mechanical diffusers, and mechanical equipment visible to customers or to staff (office and washroom areas);

iii. Draft catalogue cut sheets for all other Metrolinx owned and maintained equipment; and

iv. Interference drawings for building systems and components (structural, mechanical, electrical, I&IT, audio-visual).

Minimum Submissions Required for Review:

a) Design drawings: supporting material and narratives updated to address Metrolinx comments from the 60% Design Submission, including notes to identify major changes;

b) Further development of drawings: supporting material and narratives as required to demonstrate design progression; and

c) Updated Life Cycle Costing for major components

d) The following additional materials:

i. Specifications and schedules including:

1. window, door, glazing and louver schedule;

2. detailed commissioning test procedures with expected test results for all systems and assets

ii. Catalogue cut sheets of lighting, electrical and I&IT equipment, mechanical diffusers, and mechanical equipment visible to customers or to staff (office and washroom areas);

iii. Catalogue cut sheets for all other Metrolinx owned and maintained equipment and devices; and

iv. Interference drawings for building systems and components (structural, mechanical, electrical, I&IT, audio-visual).

v. Summary of all past Metrolinx comments and responses

B.2.6 100% DESIGN

Minimum Submissions Required for Review:

a) Design drawings: supporting material and narratives updated to address Metrolinx comments from the 90% Design Submission, including notes to identify major changes;

b) Further drawing development: supporting material and narratives as required to demonstrate completion of design;

c) For each discipline narrative, add a section on Life Cycle Analysis for major components; and

d) Updated Life Cycle Costing for major components

e) The following additional materials:

i. Specifications and schedules including hardware schedule;

ii. Catalogue cut sheets of lighting, electrical and I&IT equipment, mechanical diffusers, and mechanical equipment visible to customers or to staff (office and washroom areas);

iii. Catalogue cut sheets for all other Metrolinx owned and maintained equipment; and

iv. Interference drawings for building systems and components (structural mechanical, electrical, I&IT, audio-visual).

B.2.7 ISSUED FOR CONSTRUCTION (IFC)

Submit for review if 100% Design comments have not been addressed and if there are any customer facing design-related changes (submit at time of change). All changes made during construction are required to be updated in the record drawing submission.

Minimum Submissions Required:

a) Issue for Construction Drawings; all disciplines, including Staging/Phasing, with seals sealed by an Architect, licensed to practice in the Province of Ontario, respectively by a Professional Engineer, licensed to practice in the Province of Ontario, according to the discipline that is being submitted; include notes to identify major changes.

b) Specifications;

c) Signed design certificates;

d) Summary of all past Metrolinx comments and responses;

e) Architectural submissions: shall be provided at a minimum, with a level of detail that demonstrates, representation of the requirements of the Canadian Handbook of Practice for Architects, Second Edition 2009, Chapter 2.3.7, Construction Documents – Drawings and Chapter 2.3.8 Checklist: Assembling and Writing the Specifications; and

f) Municipal Building Permit: complete with all comments received and resolved.

B.2.8 DURING CONSTRUCTION

The following is required during construction and shall be captured within Project Agreements and/or Project Contracts:

a) Notify Metrolinx of any Design-related issues, deficiencies, or changes;

b) Provide the following documentation:

   i. All Design-related instructions and changes issued to construction team as amendments to Issue for Construction document, including contemplated change notices, notices of change/change orders and site instructions (or equivalent, if labeled differently);

   ii. This shall include instructions and changes that impact relationships of private development, if applicable, including functional adjacencies, entrances and access points, major circulation routes (all modes) and other elements of impact and/or influence between private development and Metrolinx customers;

   iii. All site review reports raising/describing Design related issues;

   iv. Photographs of site progress; and 5. Summary of issues and changes.

c) Provide the following submittal during construction:

   i. Shop drawings for all Design related elements, components, and assemblies, in accordance with industry standards;

   ii. Samples of all materials used on the project, in accordance with industry standards;

   iii. Catalogue cut sheets for all fixtures, furnishings, and equipment (FF&E);

   iv. Catalogue cut sheets for all light fixtures;

   v. Catalogue cut sheets for all equipment that will be visible to customers or staff (office and washroom areas) – electrical, communications, audio-visual, mechanical, etc.; and

   vi. All mock-ups required to satisfy the Metrolinx Standards, project-specific requirements, and project-specific agreements; where mock-ups are required, they shall be full, working mock-ups that include all power, lighting, utilities, materials, and components.

d) Include the owner of this standard in the following reviews and site reviews:

   i. All mock-up reviews;

   ii. Site reviews shall occur at key construction milestones. Milestones shall be determined at the beginning of the construction phased for the project;

   iii. Site reviews for sign-off on all design deficiencies and finish deficiencies; and

iv. Reviews/site reviews of any significant design-related issues/deficiencies.

B.2.9 HANDOVER AND COMMISSIONING

The following is required at the end of the project and shall be captured within Project Agreements and/or Project Contracts:

a) Final deficiency reviews: shall include the customer experience perspective, including finishes, fittings, equipment, and their installation;

b) Metrolinx sign-off: is required on design and finishes (interior and exterior) and customer facing elements at Handover & Commissioning

c) Inspection and testing reports: as defined in the Metrolinx Standards, project-specific requirements, and project-specific agreements, including:

i. Commissioning plan for buildings, infrastructure, and equipment, which have an impact on GO Transit's Operations;

ii. Architectural inspection and testing;

iii. Roofing and waterproofing testing;

iv. Air quality testing;

v. Air leakage testing;

vi. Fire stops and smoke seal field inspection and testing;

vii. Testing of building envelope;

viii. Tests/inspections for any suspended ceiling systems; and

ix. Air quality testing (per LEED Rating requirements).

B.3 RENDERING AND VISUALIZATION REQUIREMENTS

B.3.1 USE CASES

a) The requirements outlined within this section are high-level requirements to be used as a basis for developing renderings and visualization requirements as part of review procedure submittals.

b) These requirements shall be used for:

   i. Design Review;

   ii. Sponsor Office business cases;

   iii. Senior Management and Board sign-off;

   iv. Hoardings;

   v. Medial releases;

   vi. Editorial content.

c) Submission requirements - Renderings:

   i. A three-dimensional textured model representing the design progression at each submission milestone. The model is to have the various components that encompass the scope of work to produce the renderings and visualizations/ animations, such that:

   ii. The model shall be photo-realistic, clearly indicating opaque and transparent surfaces, and use material colours, but not actual material textures, for the Preliminary Design, Schematic Design and 30% Design Submittals; and

   iii. The model shall be photo-realistic, clearly indicating opaque and transparent surfaces with all material

   iv. Views and camera paths to convey items of customer-experience interest, including but not limited to the design intent, branding, resident experience, pedestrian and cyclist experience, materiality, scale, scope, focal points, capacity, and coordination with any adjacent transit-oriented development, and provincial or municipal public realm projects, where applicable. The renderings shall clearly indicate materiality and lighting strategy and articulate all integrated finishes, amenities, and elements including lighting design. Refer to item 4. Process below for further detail in establishing and confirming camera paths.

   v. The following shall be submitted for each rendering:

      1. A separate file, each in an 8”x10”, 600 dpi, RGB, TIFF file format in both horizontal and vertical orientations.

d) Submission requirements - Animations: A set of three-dimensional photo-realistic animated camera paths that:

   i. Are separate files, each in an HD 1920x1080p Apple ProRes 422 HQ format;

      1. Showcase a minimum of ten directional camera sweeps across the scope of work and the surrounding site context

2. Showcases a typical pedestrian walkthrough perspective of the completed scope of work, for a minimum of four different camera paths;

ii. Showcases a variety of pedestrian walkthrough perspectives of the completed scope of work, resulting in a minimum of eight different camera paths at the platform level; and

iii. Articulates all integrated finishes, amenities, and elements including lighting design.

iv. Note: Animation requirements shall apply on a project-by-project basis. They shall be required for major projects or projects selected because the animation is critical to communicating key aspects of the project to external stakeholders and the public to understand the design proposal. Consult the owner of this standard for further detail and to determine whether animations are required.

e) Process: The consultant shall organize a two-hour meeting with the Metrolinx staff and key external stakeholders to coordinate the content of the submission including:

i. For the three-dimensional photo-realistic animated camera paths:

1. Camera paths and angles;

2. Specific views;

3. Overlaid information significant to the design, whether via text or sound; and

4. The intent of use including Metrolinx communications, marketing, and social media.

APPENDIX C: COMPOSITION OF DESIGN STANDARD REQUIREMENTS

C.1 UTILIZATION OF GUIDANCE

a) To provide direction for parameters that are inherently subjective and difficult to measure (quality of urban design, TOC, community benefits, any qualitative attributes);

b) Where high levels of uncertainty make establishing measurable targets difficult. (E.g. Subject to available space, heritage, TOC);

c) Provide information or guidance related to the design or function of an area of influence for the customer experience. For example, public or POPS areas immediately adjacent to transit agency-owned station property;

d) To provide other non-mandatory criteria such as background information, design priority, or intended function; and

e) To support prescriptive or performance requirements:

   i. As proof of concept through demonstration designs

   ii. To help the designer understand the purpose of a requirement, or the underlying operational or customer need.

f) Provide insight into how an area is to be used.

C.2 UTILIZATION OF PRESCRIPTIVE REQUIREMENTS

a) Where there is benefit to constraining the solution to match specific Mx needs:

   i. Where a consistent look, feel, and predictability is important. Especially for elements/systems that reinforce perception of service/product quality, such as finishes, colours, textures, proportions, thickness, transparency, etc.; and

   ii. Safety & Function such as, platform widths, run-offs, surge spaces, maintenance clearances, critical adjacencies etc.

C.3 UTILIZATION OF PERFORMANCE REQUIREMENTS

a) To allow our requirements to be scalable and adaptable for different sites, and to ensure key outcomes and relationships are maintained regardless of site/ project constraints;

b) To support prescriptive and guidance requirements by defining critical aspects/outcomes in measurable terms. This allows Mx standards to:

   i. Ensure intended function and performance to support Mx Asset management and O&M for the entire project Lifecyle.

   ii. Reinforce basis of requirements (helps evaluation of substitution.)

   iii. Be more agnostic of procurement model.

c) To allow flexibility for market efficiencies such as site and station layout, assemblies (ceilings, floors, interior

walls), envelope systems (exterior walls, curtain walls, roofs); and

d) Measurable performance requirements provide benefits where there are known or probable market efficiencies. These occur where there is relative freedom in means and methods and choice of systems that can provide the same level of benefit (i.e., intended function, durability, ease of maintenance) Examples (Structural systems, Tunnels, bridges, MEP Systems, signalling, Roof systems).

APPENDIX D: CONTINUOUS IMPROVEMENT

Design Standards set out minimum requirements for new construction and renovations for Metrolinx Stations and Facilities. Revisions to Design Standards are generally released every two to five years. If an immediate need arises for updates, bulletins are developed and published separately from the Design Standard update.

As part of continuous improvement, the FAE standards team collects lessons learned on a continuous basis. Internal Metrolinx team members may submit lessons learned or suggestions for improvement to the follow:

https://forms.office.com/r/fVQ03G9scg

For new standards work, including proposed revisions or new standards, individuals may propose revisions and new editions, these may be submitted through the standards development process for review and approval by the owner of the standard. For information on the standards development process reach out to the Technical Standards Delivery team.

Approaches to external requests for changes to standards are categorized by the following types of requests:

- Simple: correcting errors, alignment with established best practices, clarifications etc.
- Complex: may impact business units, benefits not well understood, lifecycle costs vs benefits etc.
- As standards must represent a consensus of what the business needs, requirements should be evidence-based where possible. In order to make an informed decision, it is important to understand the following:
- What is the problem that needs to be solved?
- What is the rationale or justification?
- What is the proposed change?
- For complex changes: what are the impacts and implications?
- For complex changes: Is there sufficient research available to establish facts and evidence to support the change?
- For complex changes: Can there be consensus amongst business units for acceptance?

Requesting complex changes to a standard requires due diligence on the part of the requester to validate the quality of the work/output including the level of agreement across the organization. These changes would require their ideas and recommendations to be vetted by critical stakeholders.

As such, the acceptance can be tied to criteria based on the level of complexity and novelty of the request.

- Complexity: the change requested impacts multiple business units, has interrelating elements, and multiples considerations that need to be accounted for prior to making any revisions to the standard
- Novelty ("innovation"): a new method or idea for the way things are designed, operated, or maintained; and
- Safety: potential to cause danger, risk or injury to customers or employees.