METROLINX

Engineering Bulletin

01 February 2022 (Revision Date - 11 September 2023)

Station Services

STS-001_Rev 01

Amendment Notice: Operations and Maintenance Requirements – Station Services

This bulletin applies to and amends the following documents:

- DS-00 Front End
- DS-03 Wayfinding Design Standard
- DS-04 GO Station Architecture Design Standard
- DS-10 Site and Landscape Design Standard (to be published in the future)
- ~~GO Design Requirements Manual (DRM)~~ DRM related content have been incorporated into the DRM Rev 5 dated September 2023 as part of consolidating all approved bulletins and updates into the new DRM version.

The Operations and Maintenance Requirements (O&M) - Station Services standard adds the operations team's perspective to the DS-00 Front End, DS-03 Wayfinding Design Standard, DS-04 GO Station Architecture Design Standard, DS-10 Site and Landscape Design Standard, and the GO Design Requirements Manual (DRM). Upcoming revisions to the standards listed above will incorporate these O&M requirements by the end of this year, eliminating the need for a standalone O&M standard in the future.

Amendments to the DS-00 Front End, DS-03 Wayfinding Design Standard, DS-04 GO Station Architecture Design Standard, DS-10 Site and Landscape Design Standard (to be published in the future), and GO Design Requirements Manual are provided in the following attachment:

- Operations and Maintenance Requirements – Station Facilities, 2021

On MyLinx, the Bulletin is located on the Go Manual page and Metrolinx Design Standards page.

The Bulletin is also available for external users to download via the Metrolinx public download site (http://www.gosite.ca/engineering_public/).

For support and inquires contact Zakaria Nahas: Zakaria.Nahas@metrolinx.com

Ken Koson
Director, Station Services

Bhavana Nelliparambil
Director, Architecture & Urban Design

Michael Mortimer
Director, Facilities E&AM

2021

Destination for Content

Standard	Highlight Colour
DS-00 Front End	
DS-03 Wayfinding Design Standard	
DS-04 GO Station Architecture Standard	
DS-10 Site and Landscape Design Standard (Pending)	

Operations and Maintenance Requirements - Station Facilities

PREFACE

1. OBJECTIVE

Under the customer facilities asset category, Metrolinx (through Station Services & Customer Communications) operates and maintains 116 facilities ranging from large rail passenger stations to bus passenger terminals, carpool lots and other facilities, with an estimated total footprint of 3,232,423 gross square meters (GSM) or 323 hectares. This document provides an overview of the assets required and the requirements that shall be met to ensure those assets are serviceable.

Metrolinx is tasked with operating and maintaining facility assets from handover to decommissioning. As the end user, front line technicians are the most impacted by design and construction deficiencies and are uniquely qualified to provide guidance on elements that affect the operational integrity of the built environment. These requirements have been an incorporated throughout the design and construction phases:

Operational Attributes:

A. Modularity, scalability and consistency of design elements, controls and assets;

B. Design elements that are Reliable, Available, Maintainable and Safe (RAMS);

C. Assets that are resilient, lifecycle cost efficient and are aligned with the Metrolinx Climate Adaptation Strategy and Sustainability Strategy;

D. Site plans and room layouts that optimize operational efficiency and support ease of maintenance access for front line technicians and service providers.

Metrolinx facilities are made up of complex and interconnected systems of infrastructure assets including architectural, structural, mechanical, electrical, civil and process systems. Metrolinx aims to make the best use of available funding to manage these assets at an optimal level of service. Key performance metrics, asset lifecycle costs as well as the RAMS principals noted above are significant factors which need to be considered when design and construction decisions are made. Often these decisions are made years or months ahead of installation and may have long term consequences if not adequately informed.

2. OPERATIONAL AND MAINTENANCE REQUIREMENTS

Prioritizing operational and maintenance requirements can help make better use of time spent on standard development, preliminary and detailed design as well as construction and handover processes. As station infrastructure expands to meet service and ridership demands, these requirements become more significant in ensuring that central performance metrics are met.

The following requirements and guiding principles shall apply to relevant key areas of a facility or an asset:

i. 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.

ii. Reliability: Individual design elements and assets considered by the designer, developer or contractor shall be selected to reliably perform its specific function while minimizing the risk of failure or operational strain throughout its life-cycle.

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

iv. Maintainability: Servicing an asset within an operational rail or bus facility requires a high degree of ease to maximize work efficiency and minimize access impacts. Careful planning shall be employed to 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.

v. Safety Engineering: Functionality of a system and its components through its lifecycle will help eliminate hazards due to failure, reducing safety risk to the environment, customers, employees and the community.

vi. Durability: All exterior and interior materials shall be selected to suit a high traffic, heavily serviced rail or bus facility. Material to remain functional, without requiring additional maintenance or repair beyond the design intention. Material 'toughness' shall be able to absorb wear and tear without deform or fracturing and be resilient when stressed.

vii. Facility Inspections: Front line staff monitors and inspect the facilities throughout the service day. There shall be no visual obstructions or hidden areas throughout the site which prevents efficient and safe inspections. All spaces shall be designed to facilitate easy inspection of equipment and fixtures, with clear view of critical components and consumables.

viii. Interior Volumes: If equipment requires overhead interior access, this shall be designed to a maximum height of 8000mm. Any specialized equipment (excluding scissor lift) required to access building systems shall be avoided to minimize downtime, safety risk and additional expenditures.

a. Maintainable assets shall not be placed above main access doors to minimize customer impact with the exception of assets directly supporting the access doors.
b. Any interior space with a height greater than 3500mm shall include a separate service door to accommodate a scissor lift.
c. Access cover panels, equipment and boxes shall be located in areas outside of main travel paths and far enough away to allow ladders and lifts to service without creating an obstruction. This requirement also applies to exterior work.
d. Adequate interior circulation shall be provided to accommodate safe operation of equipment.

ix. Exterior Volumes: If equipment or elements such as panels or glazing requires overhead exterior access, this shall be designed for easy, safe and convenient

access. A max height of 13000mm shall be applied. Catwalks should be installed where possible. Any specialized equipment (excluding scissor lift) required to access building systems shall be avoided to minimize downtime, safety risk and additional expenditures, or as directed by MX.

a. Maintainable assets shall not be placed above main access doors to minimize customer impact with the exception of assets directly supporting the access doors.

b. For necessary structures taller than 13000mm, a roof installed (e.g., cranes or tie-offs) or wall mounted safety tie-off system for access to panels or glazing shall be provided.

c. Access catwalks along with safety tie-off system and guardrails shall be provided as directed by MX. This is required to ensure safe and cost-effective access for staff when conducting work.

x. Staffed Areas: While other Metrolinx Standards provide direction for these spaces, additional consideration to other mitigating factors such as thermal comfort may be enhanced if the orientation of walls and windows help to shield the counter from direct sunlight and solar heat gain. Automated blinds are to be incorporated within the Ambassador Office and service counter design.

xi. Fixtures & Furnishings: Office shelving and storage cabinet units shall be floor to ceiling or shall be fixed to bulkheads to minimize dust collection and improve service efficiencies. In addition, all storage cabinets shall be lockable and secured.

a. Millwork for storage or service areas shall be metal or high pressure laminate finishes.

xii. Access & Service Doors: Door type, swing, size, and placement shall minimize conflict with pedestrian flow, promote ease of movement including customers who use wheelchairs, scooters, bikes, strollers and luggage. This shall also allow easy movement of maintenance tools and equipment.

a. All exterior swing doors shall be equipped with extra heavy duty commercial grade frame hinges, locks, handles, push bars and exposed door closers.

b. All interior swing doors shall be equipped with heavy duty commercial grade frame, hinges, locks, handles, push bars and exposed door closers.

c. All swing doors shall be equipped with a 10" kick plate to improve durability

d. Power door operators' controls shall be strategically placed to ensure visibility, accessible operability and comply with the DS-02 Universal Design Standard. Avoid placing on a stand-alone post at entrances as this will interfere with efficient snow and ice control

operations or as a general obstacle to efficient pedestrian flow.

e. All doors within the public path of travel shall have heavy duty commercial grade overhead door stops. All other doors shall be equipped with heavy duty commercial grade door stops. Where required, door guards are to be installed and shall be of metal construction and comply with the DS-02 Universal Design Standard. Service room doors shall not swing into a pedestrian or driving routes.

f. All sliding doors shall be tested and approved for GGH climate based on conservative climate projections for the lifespan of the asset. Sliding doors shall be installed with no bottom threshold to ensure that they are winter operational including heat traced mechanical glides. Sliding doors shall also be equipped with deadbolt and magnetic lock with remote and key fob access.

xiii. Fare Devices: Shall be placed to facilitate easy access at key touch points within the facility.

a. Fare devices shall be easily identified and be placed immediately adjacent to the accessible path of travel to ensure quick access and shall include adequate queuing space. Every effort shall be made to avoid disruption of pedestrian traffic flow by placing devices away from the main path of travel.

b. There shall be sufficient room around fare devices to ensure maintenance staff can access all aspects for cleaning, repair or replacement.

c. Placement of fare devices shall not interfere with customers accessing or congregating around other amenities/assets such as digital signage, elevators or retail spaces. Devices shall not be placed beside Railway Track or adjacent to an unprotected platform edge.

xiv. Digital & Static Signage: In addition to the requirements within the DS-03 Wayfinding Design Standard, careful consideration shall be given to placement of digital and static signs to ensure there are minimal interferences on platforms and circulation routes. Snow removal equipment may cause damage to signage supports and, therefore, keeping them adjacent to rather than in the path of travel is preferred.

xv. Washrooms: The staff washroom within the back of house shall not be in direct view from the access door separating the public space. Washrooms are frequently used as a changing area for staff and requires at least 2 clothes hangers and sufficient circulation space. Public washrooms shall be door-less multi-use or a universal washroom as per DS-04 GO Station Architecture Design Standard, DS-Universal Design Standards and DRM. The door-less washrooms require a robust and customer friendly retractable barrier to secure this space for servicing.

a. Public washroom fixtures and finishes shall be durable to dissuade vandalism and abuse as well as strategically placed to promote linear and efficient circulation. Anti-graffiti partitions shall be installed where needed.

xvi. Flooring: In order to eliminate staining and help remove bio-hazardous spills, floor finishes shall be durable, sealed and be rated for heavy foot traffic within a commercial environment including floors being treated with an anti-slip coating)

a. Selection of grout color shall be considered to minimize discoloration over time.

b. Floor drainage grates shall be provided at all public entrances and be non-slip, non-corrosive and integrated within drainage systems. As per the DRM, all drains within unconditioned spaces shall be heat traced to avoid ice build-up and promote resiliency.

xvii. Walls: In addition to requirements within the DRM; Individual aluminum, metal, glass, or porcelain panel sizes shall be modules within its material family and standardized throughout the site to ensure ease of inventory management, replacement and repair. This includes service rooms (comm, electric, mechanical) and other non-public spaces.

a. All exterior walls shall be equipped with a durable, impact resistant knee wall at a minimum 600mm above grade.

b. Exterior wall panel systems used to support material choice shall be designed to avoid bird nesting and pest infiltration of any kind

c. All wall materials including painted surfaces shall be durable with simple and effective methods of cleaning to ensure longevity and minimize total life cycle costs.

d. Consideration shall be given to a materials ability to resist or deter graffiti, etching and markers within high risk areas such as washrooms, auxiliary buildings, noise walls and tunnels. Impervious finishes shall be employed to facilitate graffiti resistance. Surface applied graffiti resistance is not a viable solution – as this shall be reapplied after every cleaning/graffiti removal

xviii. Roofing: Roofs and canopies shall be designed for long-term resiliency and energy performance. Additional consideration shall be given to minimize accumulation of ice and snow with adequately spaced snow-guards at public thoroughfares.

a. Roofing membranes shall be high albedo to improve energy performance.

b. Soffits shall be of prefinished metal and provide adequate ventilation and air flow through adjoining spaces, while blocking and deterring any/all pests.

c. Colors shall be of standard offering, readily available and locally source.

d. Gutters and Scuppers shall be designed to ensure that debris will not collect and that clean out is easily performed without the need for any specialized equipment.
e. Careful consideration shall be given to the layout of gutters etc. to ensure overflow is not dripping onto customers in the path of travel to/from the regularly accessed areas of the facility.
f. Drains, Downspouts and Rainwater Leaders shall be heat traced to ensure no buildup of ice in winter months.
g. Downspouts in areas susceptible to damage from equipment shall be protected.
h. Cleanouts shall be provided in areas that can easily be accessed by maintenance staff without impeding customer flow and without requiring staff to put them in harm's way within the corridor.

xix. Ceilings: Ceiling panels shall be non-corrosive, non-staining and mounted using mechanical fasteners. Any ceiling access panels shall be subtly marked and hinged on one side to allow for safe and effective access to equipment (these panel requirements do not apply to service rooms).

a. Ceiling Panels shall be of a size that can be managed by a single person using a lift (or ladder where reach permits): no dimension shall be greater that 1220mm and weigh more than 10kg (when expected maintenance is by a single individual).

xx. Windows and Glazing: Glazing shall be the minimum required to facilitate passive wayfinding and CPTED solutions. In addition to an increase in operating costs, excessive glazing crates solar gain in summer and heat loss in winter – placing additional pressure on HVAC equipment.

a. Building systems shall take in to account all glazing and be adjusted accordingly to ensure minimal operational costs. Early energy modeling is requested to ensure operational and design efficiencies.

b. All glazing used in safety sensitive areas such as the Station Building, Platform Access Buildings or Pedestrian Bridges as well as the Rail Platform shall be tempered and laminated glass. When stressed, glazing should shatter but remain in place as a safety requirement.

c. Standardized and module glass sizes, will increase operational efficiencies and improve inventory management practices.

d. 1220 x 1830mm (4 x 6 ft.) is the ideal size for Metrolinx Technicians to manage on site.

e. Shallow frames/mullions are preferred to minimize dust shelves/collection and potential bird rests.

f. Colors shall be selected that are fade tolerant and that are of standard offering to allow for ease of repair and maintenance.

g. It is preferred that films are laminated within glazed panels to ensure clean-ability. If applies externally, films shall be locally available to allow for replacement or repair.

xxi. Stairs: Shall be of durable, impervious and non-slip material. Well designed and planned stairs can help minimize slip & falls and encourage intuitive ascending/descending behaviors.

a. Exterior stairs shall be weather protected (enclosed or canopied with heat-trace) to minimize safety risk and snow and ice control operations. All exposed staircases shall maintain snowmelting capabilities (electrical of mechanical depending on location and practicality)

b. Contrast nosing shall be installed such that the contrasting edge is visible in both the rise and run of the stair. The nosing shall be of a non-slip finish embedded within the run and shall *not* be surface applied and shall meet requirements under DS-02 Universal Design Standard.

c. Do not install large drains, grates, pits or any other potential obstruction at the top, mid or lower stair landings. Positive drainage towards the side drain channels shall be provided and shall flow towards a heat-traced sanitary drain at the bottom of the stairs.

xxii. Ramps: Shall be of durable, impervious and non-slip material. Well designed and planned elevation changes could optimize pedestrian flow, encourage access and should minimize the number of 'zig-zags' to provide succinct thoroughfare. Ramps shall meet requirements under DS-02 Universal Design Standard.

a. Exterior ramps shall be weather protected (enclosed, provided with electrical or mechanical snowmelting services or canopied with heat-trace) to minimize safety risk to customers and reduce liability of snow and ice control operations.

b. Do not install large drains, grates, pits or any other potential obstruction at the top, mid or lower ramp landings. Positive drainage towards side drain channels shall be provided and shall flow towards a heat-traced sanitary drain at the bottom of the ramp.

xxiii. Guardrails & Handrails: Stainless steel or galvanized finishes are required to minimize ongoing maintenance costs and ensure ease or changing/ repairing. Typically, we prefer stainless steel utilized on interior while galvanized is predominately used on exterior. Lights utilized in handrails shall be modular and easily replaceable

a. Shall be rust free throughout

b. Painted finishes are not acceptable. Ensure proper surface preparation is done with galvanized finishes.

c. Continuous tubular metal is preferred to ensure ease of repair. If metal is cut, welded, ground and refinished on site, rusting of the finished or welded joint is not acceptable.

xxiv. Elevators: Elevators shall comply with Metrolinx Standards ((DRM, DS-02 and DS-04)

a. HVAC controls for the elevator shaft shall be located outside of the shafts for ease of access.

xxv. Escalators: Escalators shall comply with TSSA and Provincial regulations. Escalators are not to be used to access rail platforms with the exception of Union Stations.

xxvi. Hardscaping: Plazas at stations shall be sized for succinct pedestrian access and minimize plaza areas to reduce walking distances and time for customers. Functional plazas will also positively affect the overall operational costs at GO facilities.

a. Plaza and station access areas shall be constructed of durable materials that are weather tolerant, and capable of withstanding heavy maintenance equipment and service vehicles.

b. Materials and finishes shall be easily maintained, durable and non-slip.

c. Design shall discourage recreational skateboarding and loitering due to increases in property damage and safety risk associated with these activities.

d. Site furnishings shall be of the GO standard bench or similar design that does not encourage customers to lie down. This will optimize seating availability.

i. Multi-use paths, bicycle paths or active walkways shall not run parallel and directly adjacent to rail/bus platforms unless there are segregation/barriers. Potential cyclist/pedestrian interface increases liability and safety risk.

xxvii. Landscaping: Lighting in landscaping shall be Dark Sky compliant

a. Drought resistant, local (where suitable), hearty varieties of all landscape materials are preferred to ensure survival.

b. Sodded areas shall be kept to a minimum and generally in accordance with local requirements.

i. Sod shall not be located in areas where pedestrian traffic could wear away material. Curbs shall be added to the sides around sod beds to prevent rain-related erosion.

c. Deciduous trees need to be carefully considered for distribution on site. Providing

shade and reducing the heat island effect are of great importance but variety selection and placement can improve work efficiency within fall months.

d. Trees shall be located away from areas designated or utilized as snow storage to ensure survival.

e. All defoliating trees and plants shall be placed away from rail corridor. Leaves within the corridor contribute to break slip and sensor impacts.

f. Fruit or nut bearing trees are not permitted.

xxviii. Fencing: Fencing shall be of a standard, commercially available product that is locally sourced.

a. Corridor fencing shall comply with rail operations requirements. Include CPTED Principles when locating fence and the type of fence.

b. Decorative/architectural fencing is acceptable at stations to enhance the design. Materials shall be durable, sturdy, vandal resistant and repairable. Stainless steel or galvanized metal is the preferred finish.

xxix. Rail Platform Access: Corridor access shall be provided at all rail station facilities for platform maintenance and transferring of materials, tools and equipment.

a. A dedicated, hatched and signed area shall be provided for platform access. Gates and removable bollards shall be provided to ensure area is always clear and available.

b. Careful consideration shall be given to ensure corridor access requirements do not disrupt customer access to amenities etc.

xxx. Winter Maintenance:

a. Architectural, structural and furnishings shall be organized in such a way as to minimize areas of congestion to ensure snow clearing equipment has full access. A minimum of 6' wide clearance is required between obstacles.

b. Snow storage areas shall be integrated into all landscape plans for each facility. It is required to create a snow removal strategy (to be approved by Metrolinx Station Services) to ensure that:

i. Safe temporary storage of snow after a large snow event.

ii. That there is clear access to this location with minimal impact to traffic flow.

iii. That the accumulation storage area has a substrate compatible with the material – i.e., salt tolerant, positive drainage. Appropriately distanced from fencing / curbs to prevent plow damage.

c. Parking Lots (including bus loops & PUDO): Due to the need for expedience when clearing snow and ice, there shall be no raised walkways or boulevards which would hinder efficient and effective operations. For the raised curb locations please refer to the DRM.