DESIGN DIRECTIVE

To: Distribution

From: Erik J. Stoothoff, P.E. EJS
Chief Engineer

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RE: Walkways, Ramps and Stairs

This design directive is intended to consolidate, reiterate, supplement, and clarify the MBTA's walkway, ramp and stair design approach, preferences, and requirements.

In the event that conditions warrant deviation from this directive, a design waiver signed by The Chief Engineer and department owning the scope of work will be required of the project.

Design Consultants shall design to standards as prescribed by Code. MBTA Standards shall apply only where Code does not address a topic or the MBTA requires a standard above and beyond Code. The more stringent shall always apply.

OBJECTIVE

Design for Walkways, Ramps and Stairs for all new construction, repair or replacement projects shall follow standards that are consistent with MBTA's priorities to the safety and accessibility of our passengers and staff. As such, design shall prioritize safety, functionality and ease of maintenance over time.

CODES, STANDARDS AND POLICIES

- 780 CMR – Massachusetts State Building Code
- 521 CMR – Massachusetts Architectural Access Board
- US DOT ADA Regulations & Standards

DESIGN PRINCIPLES

General Notes:

- In general, there shall be at least two accessible paths to all platforms and at multimodal stations there should be at least two accessible paths between points of interest within each portion of the station.
- The accessible pathway shall be the shortest and most convenient pedestrian pathway in and around a station or stop, making it the preferred pathway for station users of all abilities.

- Accessible paths of travel shall be coincident with stairs. If the end-points for all vertical circulation elements are not coincident, then preference shall be given to designing the end closest to the public way as coincident.
- Whenever possible, customers should require only one ramp or elevator to reach their mode and direction of travel and they shall not require the use of more than two. Ramps or elevators shall be located accordingly.
- Where circulation paths are interior, accessible routes shall also be interior.
- Sight lines should be clear between ramps, elevators and stairs, platforms, and any elements of the path of travel. Each obstruction shall be justified by the Engineer of Record and impact to sight obstruction minimized.
- Where vertical circulation elements of ramps, elevators, and or stairs are adjacent or in a line, canopies shall fully cover both ends such that the canopies end at the same place as well as connect into station roof and platform canopy. There shall be no break in canopy coverage between exterior vertical circulation and platform canopies.
- A number of factors must be considered, in coordination with System-Wide Accessibility (SWA) and the Office of the Chief Engineer (OCE), when determining whether a ramp or an elevator is the most appropriate means of vertical circulation. However, generally speaking when a ramp providing the accessible path of travel requires a length of greater than 102 feet (inclusive of the level landings), then at least one of the accessible paths of travel must be an elevator.
- Exterior ramps, sloped walkways and stairs within 15 feet of tracks or crossing over tracks shall provide an MBTA approved missile barrier or transparent surface installed per MBTA Standards.
- Dissimilar metals shall be isolated.

Walkways & Sloped Walkways:

- Walkways shall be designed to be as wide as possible but shall be no less than 60 inches wide measured between obstructions such as signs, light poles, benches, etc. If a greater minimum clearance is required by NFPA, the greater dimension shall govern.
- Exterior walkways shall be designed and constructed with a minimum clearance of 96 inches, or greater if required for snow removal equipment or other code requirement.
- The running slope of a sloped walkway shall not exceed 5% (1:20) once constructed. In order to ensure this final outcome, sloped walkways shall be designed with a maximum running slope of 0.5% less than required by code, unless otherwise approved by SWA and OCE. Where sloped walkways cannot be designed to meet the maximum grade requirements when intersecting with existing conditions, the designer must procure additional spot elevation survey at the intersecting existing conditions prior to requesting a relaxing of this standard, while meeting all applicable ADA codes and guidelines (5% or 1:20).
- The cross slope of any walkway shall not exceed 2% (1:50) once constructed. In order to ensure this final outcome, cross slopes shall be designed to 1.0% (1:100).
- Walkways shall be designed with a single cross slope.
- Handrails and canopies are not required for sloped walkways, although both shall be considered in all situations.

Ramps:

Any accessible path of travel with a running slope between 5% (1:20) and 8.3% (1:12) is considered a ramp and shall meet the following requirements:

- Ramps shall be designed and constructed with the least slope possible. The running slope of a ramp shall not exceed 8.3% (1:12) once constructed. In order to ensure this final outcome, ramps shall be designed with a maximum running slope of 0.5% less than required by code, unless otherwise approved by SWA and OCE. Where ramps cannot be designed to meet the maximum grade requirements when intersecting with existing conditions, the designer must procure additional spot elevation survey at the intersecting existing conditions prior to requesting a relaxing of this standard, while meeting all applicable ADA codes and guidelines (8.33% or 1:12).
- The cross slope of any ramp, walkway or landing shall not exceed 2% (1:50) once constructed. In order to ensure this final outcome, cross slopes shall be designed to 1.0% (1:100).
- Ramps and walkways be designed with a single cross slope.
- The minimum clear width for all ramp runs shall be 60 inches, measured between the railings and any other station elements such as signs, light poles, benches, and etc. If a greater minimum clearance is required by NFPA, the greater dimension shall govern.
- Exterior ramps shall be designed and constructed with a minimum clearance of 96 inches, or greater if required for snow removal equipment or other code requirement.
- Level landings shall be designed and constructed with a length of not less than 72 inches and a clear width at least as wide as the ramp. If a greater minimum landing length or clear width is required by NFPA, the greater dimension shall govern. For instances where turns are facilitated by level landings, additional width may be required to facilitate the turning requirements of MBTA snow removal equipment and lifts. The Designer of record shall demonstrate that the landing is sized appropriately.
- Level landings on ramps shall never exceed 2% in any direction once constructed. In order to ensure this outcome and to facilitate free drainage, slopes shall be designed to 1.0% in any given direction.
- Where any ramp exceeds 102 feet or has three or more landings or switchbacks, an accessible bench must be provided on at least one landing. The accessible bench shall not reduce the clear path of travel. The landing shall also be extended to provide the bench, per MBTA Standards.
- Exterior ramps shall be provided with overhead canopies. Canopies shall extend at least 5 feet beyond the ramp at each exterior landing. In certain situations, canopy coverage may need to be extended in order to ensure equitable coverage between the accessible path of travel and an accessible path of travel.
- Ramp alignment with stairs is required.
- For station alterations and renovations, existing walkways, sidewalks and ramps that consist of irregular, rough, tumbled brick, chamfered pavers or cobble like walking surfaces shall be replaced with MBTA approved interior and exterior finishes.

Stairs:

- All stairs shall be manufactured with cast aluminum of embedded carborundum treads, unless otherwise directed by the MBTA, and with the exception of exterior commuter rail station stairs. Nosings will not be accepted.
- Prior to installing cast aluminum treads, concrete base shall be treated with MBTA approved corrosion inhibitor and bonding agent. An approved separation agent shall be applied to prevent chemical reactions detrimental to the aluminum stair treads.
- Mounting hardware shall be stainless steel and flush mounted with stair tread and shall be set in epoxy fill to mitigate moisture infiltration.
- All seams shall be sealed watertight. Gaps between the stair tread and adjacent vertical surfaces shall be a maximum of ¼ inch and filled with quick set flexible sealant, Shore A hardness of 60 or greater, capable of bonding to aluminum, concrete and steel.
- For exterior stairs at commuter rail stations, open grate stair treads shall be used. Open grates shall be manufactured dovetail slot pressure locked grating, with square openings 7/16 inches by 4 inches.
- All stairs must incorporate yellow nosing, at least 2 inches wide (in the running stair direction) for the full length of the stair tread less 1 inch at the end of tread. Yellow nosing width shall not exceed 3 inches. Nosing shall use Federal Standard Yellow, FS13591 [RGB Hex Code – F7D100].
- Granite stair treads shall incorporate epoxy abrasive inserts at nosings. Inserts shall be inlaid and cast-in-place. Inserts shall not rise more than 1/16 inch above the finished stair tread and shall be inspected for integrity on an annual basis and replaced as needed.
- Concrete filled metal stairs will not be allowed.
- A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.
- Exterior stairs shall have canopies. The canopy must extend for at least 5 feet beyond each landing.
- All stair railings shall be surface mounted and mounting hardware shall not contain sharp or abrasive edges and corners.
- Intermediate railings shall be provided at regular intervals consistent with requirements of state and local code. For monumental stairs, or where the width of a stairway meets or exceeds 20 feet, railing spacing shall be coordinated through SWA, OCE and the MBTA Project Manager and shall consider NFPA 130 egress analysis.
- All handrails on switchback or dogleg stairs shall be continuous.
- Wherever space allows, the designer shall consider a more generous tread-to-riser ratio for all stairs, specifically exterior stairs, as they provide a safer and easier path of travel.

Railings:

- Handrails are required on all stairs and ramps
- Handrails shall have a circular cross-section with an outside diameter of 1.25 inch minimum and 2inch maximum. Alternative cross-sections are not permitted.
- Handrails shall provide code required 12inch long extensions at the ends of a ramp, stair, or walkway run, as well as at all landings, where railings are discontinuous.
- Handrails shall provide lower “child” rail.

- The handgrip portion shall be free of any sharp or abrasive elements, including on the underside of railing.
- Railings and mounting hardware shall be easily maintained, repaired or replaced without welding.
- Railing hardware shall be stainless steel and isolated from dissimilar metals.
- Railings shall be mounted on curb walls sized in accordance with pedestal directive.
- Railing anchor bolts shall be stainless steel and set by template in concrete construction.

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ADDITIONAL DESIGN GUIDANCE

Design – Ramp and landing areas that are to intersect with existing features shall have the elevations and locations specifically identified on the existing condition plan. The Engineer of Record shall not utilize interpolated or estimated values from a topographic survey to establish tie in points for ramps, stairs, walkways or landings beyond a 1-foot horizontal grid spacing. This may require additional survey effort.

Construction – Specifications and notes on the construction documents shall direct the contractor to provide surveyed layout data to the MBTA PM for formwork, prior to pouring final components of a ramp, stair, landing or walkway systems showing conformance with the plans and details slopes and requirements. Following the completion of the features subject to ADA guidelines and requirements, the contractor shall again survey and verify conformance with plans and details. Failure to provide a detailed survey of the formwork prior to the pouring of these features constitutes the contractors acceptance of the shown existing grades and elevations and as shown on the plans. Failure to meet the plans and details slopes and dimensions required for ADA conformance, without notifying the MBTA PM upon completion of formwork, and prior to pouring or finalization, shall constitute an acceptance by the contractor for all financial and time impacts for removing, replacing and redesign of any and all ramp, stairway, landing or other feature, under local state or federal ADA guidelines and requirements.

Submittal of complete manufacturer's product data to MBTA for approval is required. This shall consist of complete product description and specifications, catalog cuts, and other descriptive data required for complete product use and information.

Provide samples of all materials to be exposed in the completed work.