

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
SPECIAL PROVISION
ATLANTA BELTLINE, INC.
BILL KENNEDY WAY INTERIM TRAIL
Section 515 – Decorative Metal Railings

Delete Section 515.1 and add the following:

515.1 General Description

This Work includes placing special design handrails.

- A. Handrail, Special Design.

Add the following:

515.1.02 Referenced Documents

B. Referenced Documents

- AISI 304L – Stainless Steel Plate (general)
- ASTM A 276 – Stainless Steel Bars
- ASTM A 666 – Annealed Stainless Steel Sheet/Strip/Plate/Flat Bar
- ASTM A 743/A 743M– Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application
- ASTM C 1107 – Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
- ASTM E 488 – Standard Test Methods for Strength of Anchors in Concrete Elements
- ASTM E 894 – Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings
- ASTM E 935 – Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings

515.1.03 Submittals

A. Action Submittals

1. Product Data: For the following –
 - a. Manufacturer’s product lines of railings assembled from standard components.
2. Shop Drawings:

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- a. Submit complete shop drawings of all decorative metal railing work. Include plans, full elevations, sections and details as required to show all materials, layout, dimensions, jointing and connections for all items required.
- b. Shop drawings requiring accurate dimensional relationships to newly built or as-built construction shall be prepared following a review and confirmation of existing conditions to remain. Prepare shop drawings based on surveyed line and grade of newly built or as-built conditions that are scheduled to receive decorative metal railings.
3. Samples: For each type of exposed finish required.
4. Delegated-Design Submittal; For installed products indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the qualified professional engineer responsible for their preparation.

B. Informational Submittals

1. Qualification Data: For qualified professional engineer registered in the state of Georgia and testing agency.
2. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
3. Preconstruction test reports.

515.1.04 Performance Requirements

- A. **Delegated Design:** Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. **Structural Performance:** Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Railings:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Uniform load of 15psf applied normal to the metal fabric fence as required by AASHTO LRFD Bridge Design Specification, Paragraph 13.8.2. Testing agency shall submit a procedure for approval indicating a proposed method for applied the required load in a uniform manner.
 - c. Infill load and other loads need not be assumed to act concurrently.
- C. **Control of Corrosion:** Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

515.1.05 Preconstruction Testing

- A. **Preconstruction Testing Service:** Engage a qualified testing agency to perform preconstruction testing on laboratory mockups.
 1. Build laboratory mockups at testing agency facility; use personnel, materials, and methods of construction that will be used at project site.
 2. Test (3) railing panels according to ASTM E 894 and ASTM E 935.

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515.1.06 Quality Assurance

- A. Product Options:** Information on Drawings and in Specifications establishes requirements for system’s aesthetic effects and performance characteristics. Do not modify intended aesthetic effects, as indicated on the Drawings and in Specifications, except with Owner’s Representative approval.
- B. Mockups:** Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components.
 2. Incorporate mockups of railing into one or more mockups for the granite masonry wall as required in Special Provision 999 – Granite Facing.

515.2 Materials

A. Manufacturers:

1. Stainless Steel Decorative Safety Railing with Stainless Steel Mesh Infill: Custom fabricated from the following components:
 - a. Custom Stainless Steel Decorative Safety Railings: Subject to compliance with requirements, provide products by the following:

TYPE 1- SAFETY RAIL:

Product: Stainless Steel Decorative Railing and Mesh Infill: Subject to compliance with requirements, provide products by one of the following:

- a. Carl Stahl DecorCable Innovations, LLC, Chicago, IL(www.decorable.com)

TYPE 2- METROPOLITAN ABUTMENT WALL SAFETY RAIL:

Product: Stainless Steel Wire Mesh Panel Infill - Subject to compliance with requirements, provide Stainless steel wires 2” O.C., every fourth wire shall be ¼” diameter with 11 gauge intermediate wires. Every other wire shall be welded to the perimeter channel. All ¼” diameter wires shall be welded to the picture frame. Products by one of the following manufacturers or an approved equal:

- a. C.I. Banker Wire & Iron Works, Mukwango, WI (www.bankerwire.com)
- b. McNichols, (<http://www.mcnichols.com>)
- c. Newark Wire Works Inc. Edison, NJ. (<http://newarkwireworks.com/>)

2. Stainless Steel Illuminated Decorative Handrail: Subject to compliance with requirements, provide products by the following:
 - a. Manufacturer: Wagner, R & B, Inc.; a division of the Wagner Companies, Milwaukee, WI (www.lumenrail.com); Lumenrail lighted handrail and railing system or an approved equal.
 - b. Product: Lumenrail Ledpod, rail size – 40, Rail wall thickness – 1512, LED lights – 3000k, Asymmetric lighting distribution, rail ht. – 36”.
 - c. Post Mount Assemblies:
 1. Snap-on Cover Flange: 1 ½” pipe size, 1.900” O.D., stainless steel type 304 (no. 2077.4) or an approved equal.
 2. Snap-on Cover Flange Base: 1 ½” pipe size, 1.900” O.D., stainless steel type 304 (no. 2077B) or an approved equal.
 3. Concrete Post Mount: EZ Sleeve, model EZ3006, or an approved equal.

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B. Metals, General

1. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

C. Stainless Steel:

1. Castings: ASTM A 743/ A 743M, Grade CF 8 or CF 20.
2. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
3. Bars and Shapes: ASTM A 276, Type 304.
4. Metal Mesh:

Type 1: ASTM A 492 Type 304 stainless steel, 7x7 or 7x19 wire rope joined with Type 304 stainless steel ferrules.

Cable Diameter x Mesh Aperture Dimensions:

- 42” and 54” ht safety rail: 2.0 mm x 100mm
- 102” ht safety rail: 2.0mm x 50mm

Type 2: Type 304 Stainless Steel

- a. Perimeter Finishing:

Type 1: Closed loops with loose ferrules for ‘sewn-on’ installation.

Type 2: Stainless steel U-edge perimeter channel – custom 1” leg dimension. 11 gauge.

- b. Direction (Grain) of Mesh:

Type 1:

- a. Horizontal mesh direction for rectangular frame shapes.
- b. Diagonal mesh direction for staircases

Type 2: Mount mesh panel parallel to vertical frame members

- c. Ferrule Style:

1. Seamless AISI 304L stainless steel ferrule.

- d. Support Frame Style:

1. Edge supports as shown on the Drawings constructed of stainless steel flat bars complying with ASTM A 276. Supports to be spaced no more than 5 feet apart, depending on composition and size of support bars.

D. Fasteners:

1. Fastener Materials: Unless otherwise indicated, provide the following:
 - a. Stainless Steel Components: Type 304 Stainless steel fasteners.
 - b. Dissimilar Metals: Type 304 stainless steel fasteners.
2. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

E. Miscellaneous Materials:

1. Nonshrink, Nonmetallic Grout: Factory packaged, nonstaining, noncorrosive, nongaseous grout complying with

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ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Fabrication:

1. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
2. Connections: Fabricate railings with welded connections unless otherwise indicated.
3. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. weld all around at connections, including at fittings.
 - a. At exposed connections, finish exposed welds to comply with NOMMA’s “Voluntary Joint Finish Standards” for Type I welds: no evidence of a welded joint.
4. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.
5. Form changes in direction by inserting prefabricated elbow fittings.
6. Close exposed ends of hollow railing members with prefabricated end fittings.
7. Brackets, Flanges, Fittings and Anchors: Provide flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
8. Metal Mesh Infill Panels: Fabricate infill panels from metal mesh made from stainless steel.
 - a. Infill panels shall be dimensioned and manufactured to specified size and labeled according to installer’s specifications.

G. Fittings and Accessories

1. Type 1 Metal Mesh Attachment Cable Material: ASTM A 492, Type 304 stainless steel 7x7 or 7x19 wire rope.
2. Type 1 Metal Mesh Accessories: Provide grommet, bushings, washers, swaging ferrules, studs, receivers, fittings, and other components as required for system installation.

H. Fabrication

1. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
2. Connections: Fabricate railings with welded or nonwelded connections unless otherwise indicated.
3. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - a. At exposed connections, finish exposed welds to comply with NOMMA’s “Voluntary Joint Finish Standards” for Type 1 welds: no evidence of a weld joint.
4. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.
5. Form changes in direction by inserting prefabricated elbow fittings.
6. Close exposed ends of hollow railing members with prefabricated end fittings.
7. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
8. Brackets, flanges, fittings and anchors; provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
9. Metal mesh infill panels: fabricate infill panels from metal mesh made from stainless steel.
 - a. Infill panels shall be dimensioned and manufactured to specified size and labeled accordingly to installer’s specifications.

I. Stainless Steel Finishes:

1. Directional Satin Finish: No. 4.

515.3 Construction Requirements

Delete Section 515.3.05 and add the following:

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515.3.05 Construction

A. Installation:

1. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - a. Set stanchion posts perpendicular to wall coursing, within a tolerance of 1/16 inch in 3 feet.
 - b. Align rails so variations from level for horizontal members (where applicable) and variations from parallel with rake of steps and ramps for sloping members do not exceed ¼ inch in 12 feet.
2. Use steel anchors or pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with grout.
3. Anchor posts to metal surfaces as indicated using fittings designed and engineered for this purpose.
4. Metal Mesh Infill Panels: Install assembly to comply with manufacturer’s written instructions and the approved shop drawings.
 - a. Provide anchored devices and fittings to secure to in-place construction; including threaded fittings for concrete inserts, toggle bolts and through-bolts. Install mesh panel infill system plumb, level, square, and taut.
 - b. Anchor railing system to mounting surfaces as indicated on the drawings.
 - c. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
 - d. Use manufacturer’s supplied mounting hardware.
 - e. Terminate and tension mesh panels in accordance with manufacturer’s instructions.
 - f. Ensure mesh is clean, and without waves, kinks, or sags.
 - g. Adjust frame support cable tension and connecting hardware.
5. Stainless Steel Illuminated Decorative Railings: Install assembly to comply with railing manufacturer’s written instructions and with requirements in other Part 3 articles.

B. Cleaning:

1. Remove temporary coverings and protection of adjacent work areas.
2. Clean installed products in accordance with manufacturer’s instructions before Owner’s Representative acceptance. Do not use chlorine-based or abrasive cleaners.
3. Remove from project site and legally dispose of construction debris associated with this work.

C. Protection:

1. Protect installed product from damage during subsequent construction activities.

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Add the following:

515.4 Measurement

The accepted safety rail and handrail quantities are measured per linear foot (LF) in place in the completed work.

515.5 Payment

Safety rail is measured at the unit price bid for each unit complete and in place as specified. Handrail is measured at the unit price bid for each unit complete and in place as specified. The handrail unit price includes the lighting elements, power source, wiring, and all materials required to provide power to the handrail lighting elements.

Payment will be made under:

Item No. 515	Handrail, Special Design	Per Linear Foot
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End of Section 515