SECTION 323119 – DECORATIVE METAL FENCES AND LANDSCAPE SCREENS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Decorative Laser Cut Metal Panel Fences

Landscape Laser Cut Metal Panel Screens

Exterior Laser Cut Metal Wall Panels & Screens

FotoFacade Image Perforated Metal Panels

Fasteners.

Miscellaneous materials.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 033000 Cast in Place Concrete - Mounting substrate

Section 04200 Unit Masonry – Mounting substrate

Section 051200 Structural Steel Framing – Mounting substrate

Section 061053 Miscellaneous Rough Carpentry - Wood blocking for anchoring panels

* + - 1. DEFINITIONS
				1. Decorative Metal Fence Panel System: Barriers, screens and similar devices used for pedestrian guidance, visual separation and decorative elements.
			2. COORDINATION AND SCHEDULING
				1. Coordinate installation of anchorages for fence metal panel systems. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
				2. Where fence panel assemblies are used at electrical transformers, coordinate installation with owner or supplier of transformer for proper electrical grounding of fence panels. (NEMA 250 – Enclosures for electrical equipment.
				3. Schedule installation so system attachments are made with coordination with other trades. Do not support metal panel systems temporarily by any means that do not meet structural performance requirements.
			3. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

If needed, insert a list of conference participants not mentioned in Section 013100 "Project Management and Coordination."

* + - 1. ACTION SUBMITTALS
				1. Product Data:

Manufacturer's product lines of [**aluminum**] [**stainless steel**] [**steel**] decorative metal panels assembled from VIVA / Metalspaces standard components.

Laser cut metal panels.

Illuminated metal panels.

Fasteners.

Brackets.

Bituminous paint.

Metal finishes.

* + - * 1. Sustainable Design Submittals:

Retain "Product Data" Subparagraph below to require minimum recycled content for LEED v4.1, MRc 4.1 and 4.2 - "Recycled Content."

Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

* + - * 1. Shop Drawings: Include plans, elevations, sections, and attachment details.

For illuminated metal panels, include wiring diagrams and roughing-in details.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For products involving selection of color, texture, or design.
				2. Samples for Verification: For each type of exposed finish required.

Delete or revise subparagraphs below for required product.

Sections of each distinctly different linear member.

Laser Cut panel 11” x 11” pattern sample.

Color chip sample

Illuminated perforated panel.

Fittings and brackets.

Assembled sample of metal panel system, made from full-size components. Sample need not be full height.

Show method of [**connecting**] [**and**] [**finishing**] members at intersections.

Retain "Delegated Design Calculations" Paragraph below if design services have been delegated to Contractor.

* + - * 1. Delegated Design Calculations: For metal panel system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. When specifically requested by the architect or general contractor.
			1. INFORMATIONAL SUBMITTALS

Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.

Testing is by Owner:

* + - * 1. Qualification Data: For [**delegated design professional engineer**]
			1. QUALITY ASSURANCE
				1. Installer Requirements: Installed by experienced installer with similar systems.

Retain "Welding Qualifications" Paragraph below if shop or field welding is required.

* + - * 1. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

Retain applicable subparagraphs below. Most of VIVA / METALSPACES' connections are mechanical, but field welding may be required in some cases.

AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

AWS D1.1/D1.1M, "Structural Welding Code - Steel."

Retain "Mockups" Paragraph below for samples and to suit Project.

* + - * 1. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Mockups may be designed as separate decorative elements and left in place.

Build mockups as [**cut-down assembly**] [**one section of metal panel system**] [**indicated on Drawings**].

Retain subparagraph below if the intention is to make an exception to the default requirement in Section 014000 "Quality Requirements" for demolishing and removing mockups.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. FIELD CONDITIONS

If possible, design metal panels so they do not have to fit other construction and delete this article.

* + - * 1. Field Measurements: Verify actual locations of walls and other construction contiguous with metal panels by field measurements before fabrication and indicate measurements on Shop Drawings.
1. PRODUCTS
	* + 1. MANUFACTURERS
				1. Source Limitations for Decorative Laser Cut Metal Panel and Components: Obtain from single source from single manufacturer for each component and installation method.
				2. Decorative Laser Cut Metal Panels:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Basis-of-Design: Provide VIVA / METALSPACES info@vivarailings.com; Decorative Laser Cut Metal Panel Fence System. Fence Type [Choose Fence Type] reference [Metalspaces Wall System Product Data](https://vivarailings.com/products/wall-systems)

Substitutions: None.

* + - * 1. Illuminated Back-lit Decorative Laser Cust Metal Panels:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Basis-of-Design Product: Provide VIVA / METALSPACES; iPANEL, info@vivarailings.com; Illuminated Back-lit Laser Cut Metal Panel Fence System. Fence Type [Choose Fence Type] reference [Metalspaces Wall System Product Data](https://vivarailings.com/products/wall-systems)

Substitutions: None

* + - * 1. Panel Material:

Retain "Panel Material" choose appropriate material and delete which do not meet criteria.

Aluminium: To ASTM B209.

Material Thickness: [**1/8”**], [**3/16”**], [**1/4”**], [**As required for loads.**], alloy 5052-H32

Flat Sheet Size: [**4’ x 8’ standard**] [**4’ x 4’**] [**4’-11” x 9’-10” max. size**] [**As indicated on drawings**]

Shape: Per design details

Finish: **[Powder Coat, AAMA-2604] [Fluoropolymer Finish AAMA-2605] [Clear Anodized, Class I] [Mill finish]**

Color: **[As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>**

Stainless Steel sheet type 304

Material Thickness 14Ga, alloy 304

Flat Sheet size [**4’ x 8’ standard**] [**4’ x 4’**] [**As indicated on drawings**]

Shape: Per design detail

Finish: Brushed Satin

Surface: Smooth

Steel

Material Thickness: [**14 Ga**], [**11 GA**], [**As required for loads.**], A36 Hot Rolled, Pickled and Oiled

Flat Sheet size [**4’ x 8’ standard**] [**4’ x 4’**] [**As indicated on drawings**]

Shape: Per design details

Finish: Zinc primer and powder coat, AAMA-2604

Color**: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>**

* + - * 1. Perforations and Patterns

Select from VIVA / Metalspaces standard patterns and designs. Pattern: [\_\_\_\_\_] reference [Metalspaces Pattern Data](https://vivarailings.com/products/architectural-panels)

Custom pattern to be designed by Architect / Designer.

FotoFacade Image Perforated Panels will be a custom design by Architect / Designer. Image file to be furnished by Architect / Designer.

Standard patterns and designs can be scaled opened and closed if it retains panels structural integrity.

Retain "Attachments and Assembly" Paragraph below if sub-framing is required. Paragraph is not required for panel only systems. Exposed aluminum sub-framing finish is Clear Anodized. VIVA / Metalspaces standard.

* + - * 1. Attachments and Assembly:

Manufacturer’s standard attachments, steel post sizes and steel framing sizes as required per system type and design loads. Steel finish shall be **[Zinc rich primer and powder coat AAMA-2604] [Galvanized] [Primer Coat] [Primer Coat and final paint by others]**

* + - * 1. Product Options: Drawings indicate size, profiles, and dimensional requirements of metal panels and are based on the specific system indicated. See Section 016000 "Product Requirements."

Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to the Architect for review.

* + - 1. PERFORMANCE REQUIREMENTS
				1. General: For engineering decorative metal panels to withstand structural loads indicated.
				2. Structural Performance: Decorative metal panels, including attachment to building construction, shall withstand the effects of gravity loads and live loads within limits and under conditions indicated.

Delete "Wind Loads" & “Snow Loads” lines below if only interior panel systems are required.

Design Wind Loads: As indicated on drawings.

Design Snow Loads: As indicated on drawings.

Delete "Thermal Movements" Paragraph below if only interior panels are required.

* + - * 1. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal panel systems by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

Differential values in "Temperature Change" Subparagraph below (for aluminum in particular) are suitable for most of the United States.

Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

* + - * 1. Fire Protection:

Include as part of an assembly tested in accordance with and complying with NFPA 285 criteria.

Differential values in "Temperature Change" Subparagraph below (for aluminum in particular) are suitable for most of the United States.

Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces

* + - 1. METALS, GENERAL
				1. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
			2. DECORATIVE METAL FENCE SYSTEMS
				1. Aluminum Alloy Sheet and Plate: ASTM B209
				2. Aluminum Alloy Extruded Bars, Tubes, Rods, Wires and Profiles: ASTM B221
				3. Steel Sheet: ASTM A1008/A1008M, Type B
				4. Structural Steel: ASTM A36
				5. Steel Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010
				6. Steel Tubing: ASTM A500
				7. Stainless Steel Tubing: ASTM A554, [**Grade MT 304**] [**Grade MT 316**].
				8. Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A666, [**Type 304**] [**Type 316**].
				9. Stainless Steel Bars and Shapes: ASTM A276, [**Type 304**] [**Type 316**].
				10. Stainless Steel Pipe: ASTM A312/A312M, [**Grade TP 304**] [**Grade TP 316**].
			3. ILLUMINATED METAL PANEL LIGHT

The product below is VIVA / METALSPACES' standard.

* + - * 1. Illuminated Units: Provide internal illumination using concealed, internally wired, raceway with integral LED-strip fixture system to illuminate wall surfaces adjacent to wall panels. Make provisions for servicing and for concealed connection to electric service. Coordinate electrical characteristics with those of the power supply provided.

Light Color: [**Cool white; 4000 K**] [**Warm white; 3000 K**].

185 lumens/ft. and 250 lumens/ft. are available in cool or warm white.

Light Output: [**185 lumens/ft. medium output**] [**250 lumens/ft. high output**]

Light Angle: 120 degrees.

Power Supply: [**120 V**] [**277 V**] AC input, 12 V DC output.

Driver: [**60 W**] [**120 W**].

Power Consumption: [**3.0 W/ft. (medium output)**] [**5.0 W/ft. (high output)**].

IP Rating: IP67.

Retain “Backer Panel” if required. LED may face from back to front, around formed perimeter edge facing in or perimeter facing back to wash wall. Acrylic panels are not recommended when LED is to face back to wash wall.

Backer Panel: Acrylic 1/8”, #2447 white

* + - 1. FASTENERS
				1. Fastener Materials: Unless otherwise indicated, provide the following:

Retain or revise applicable requirements in subparagraphs below.

For Stainless Steel and Aluminum Panel Components: [**Type 304**] [**Type 316**] stainless steel fasteners unless otherwise indicated.

For Dissimilar Metal Panel Components: [**Type 304**] [**Type 316**] stainless steel fasteners unless otherwise indicated.

Retain subparagraph below if exposed fasteners are allowed, especially with color anodic finish.

Finish exposed fasteners heads matching panels color / shade by means of plastic caps or factory applied coating unless otherwise indicated.

* + - * 1. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring metal panel system to other types of construction [**and capable of withstanding design loads**].
				2. Provide fasteners for interconnecting panel components and for attaching panels to other work unless otherwise indicated.

Revise subparagraph below if another type of head is required or is standard with system specified.

Provide hex, hex socket, or hex-button head machine screws for exposed fasteners unless otherwise indicated.

* + - 1. MISCELLANEOUS MATERIALS
				1. Brackets, Outriggers, Post and Support Arms: As indicated.

Retain "Welding Rods and Bare Electrodes" Paragraph below to suit Project.

* + - * 1. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

Provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

* + - * 1. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
			1. FABRICATION
				1. General: Fabricate metal panel system 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. Shop assemble panels to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

Clearly mark units for reassembly and coordinated installation.

Use connections that maintain structural value of joined pieces.

* + - * 1. Cut, drill and punch metals cleanly and accurately.

Remove burrs.

Remove sharp or rough areas on exposed surfaces.

* + - * 1. Form work true to line and level with accurate angles and surfaces.
				2. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
				3. Connections: Fabricate panel system with mechanical connections unless otherwise indicated.

Delete "Welded Connections" Paragraph below if only mechanical connections are acceptable or are compatible with metals and finishes retained. Connections below are generally applicable to exposed welding of steel and stainless steel.

* + - * 1. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld connections as required for design loads.

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

Obtain fusion without undercut or overlap.

Remove flux immediately.

At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint.

* + - * 1. Mechanical Connections: Connect members with mechanical fasteners and fittings.

Fabricate members and fittings to produce smooth rigid joints.

* + - * 1. Form changes in direction as follows:

Retain one subparagraph below.

As detailed.

By bending to smallest radius that will not result in distortion of panels.

Retain first paragraph below if bending is allowed or required.

* + - * 1. Bend members to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
				2. Brackets, Flanges, Fittings, Support arms and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect metal panel members to other Work unless otherwise indicated.

Retain subparagraph below if any panels are supported from plaster or gypsum board walls.

At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.

* + - 1. METAL FINISH REQUIREMENTS, GENERAL
				1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
				2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

Retain "Appearance of Finished Work" Paragraph below for variable finishes, such as anodized or patina finishes.

* + - * 1. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Retain paragraph below if exposed fasteners are allowed, especially with color anodic finish.

* + - 1. ALUMINUM FINISHES
				1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

Retain or revise finishes in this article to suit Project. If retaining more than one finish in paragraphs below, indicate location of each on Drawings or by inserts.

Retain for interior applications. "Powder-Coat Finish" Paragraph below references AAMA 2603

* + - * 1. Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

Retain for exterior applications. “Powder-Coat Finish” Paragraph below reference AAMA 2604.

* + - * 1. Powder-Coat Finish: AAMA 2604 hard surface, super durable powder coating finish that provides high impact, chemical and U/V resistance. Meets or exceeds 50% PVDF finishes.

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

 Retain for exterior seacoast and severe environments applications. “High Performance Finish” Paragraph below reference AAMA 2605.

* + - * 1. High Performance Finish: Fluoropolymer finishes complying with AAMA 2605 and containing not less than 70 percent polyvinylidene fluoride PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions [**for seacoast and severe environments**].

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

Retain one of two options in "Clear Anodic Finish" Paragraph below. Class II finish is standard with many manufacturers; Class I finish is heavy anodized. Verify availability with manufacturers.

* + - * 1. Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm] or thicker.
				2. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

Options in "Color" Subparagraph below are examples only and may vary in color range and availability among manufacturers.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**].

* + - 1. STAINLESS STEEL FINISHES
				1. Surface Preparation: Remove tool die marks and stretch lines, or blend into finish.
				2. Stainless Steel Finishes:

Directional Brushed Satin Finish

* + - 1. STEEL FINISHES
				1. Surface Preparation: Remove tool die marks and stretch lines, or blend into finish.
				2. Steel Finishes:

Zinc rich primer and Powder Coat AAMA-2604

Color and Gloss: **[As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.**

Primer Coat

Mill

1. EXECUTION
	* + 1. EXAMINATION

Delete the first paragraph below if no panels are attached to plaster or gypsum board assemblies.

* + - * 1. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.
				2. Installation Tolerances: Structural steel and concrete walls and slabs to be within 1/8 inch in 10 ft. (3 mm in 3 m) horizontally and 1/8 inch (3 mm) vertically. Correct out-of-tolerance conditions to meet metal panels manufacturer's requirements.
			1. INSTALLATION, GENERAL
				1. Perform cutting, drilling, and fitting required for installing panels.

Fit exposed connections together to form tight joints, unless otherwise indicated.

Install panels level, plumb, square, true to line, without distortion, warp, or rack.

Set panels accurately in location, alignment, and elevation; measured from established lines and levels.

Do not weld, cut, or abrade surfaces of panels components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

* + - * 1. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
				2. Adjust panels before anchoring to ensure matching alignment at abutting joints.
				3. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing panels and for properly transferring loads to in-place construction.
			1. METAL PANEL CONNECTIONS

Retain "Nonwelded Connections" or "Welded Connections" Paragraph below unless both methods are required. If both mechanical and welded connections are required, indicate locations of each on Drawings.

* + - * 1. Nonwelded Connections: Use mechanical joints for permanently connecting panel components. Use wood blocks and padding to prevent damage to panel members and fittings.
				2. Welded Connections: Use welded joints for permanently connecting panel components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
			1. PROTECTION

Maintain metal panel system with monthly washing with soap and water. This is particularly critical in salt environments or conditions to prevent corrosion.

* + - * 1. Protect finishes of metal panel system from damage during construction period with temporary protective coverings approved by metal panels manufacturer. Remove protective coverings at time of Substantial Completion.
				2. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

END OF SECTION 323119