MODERA INTERNATIONAL DISTRICT

PROJECT TEAM

Developer
Mill Creek Residential Trust

Architect
Tiscareno Associates

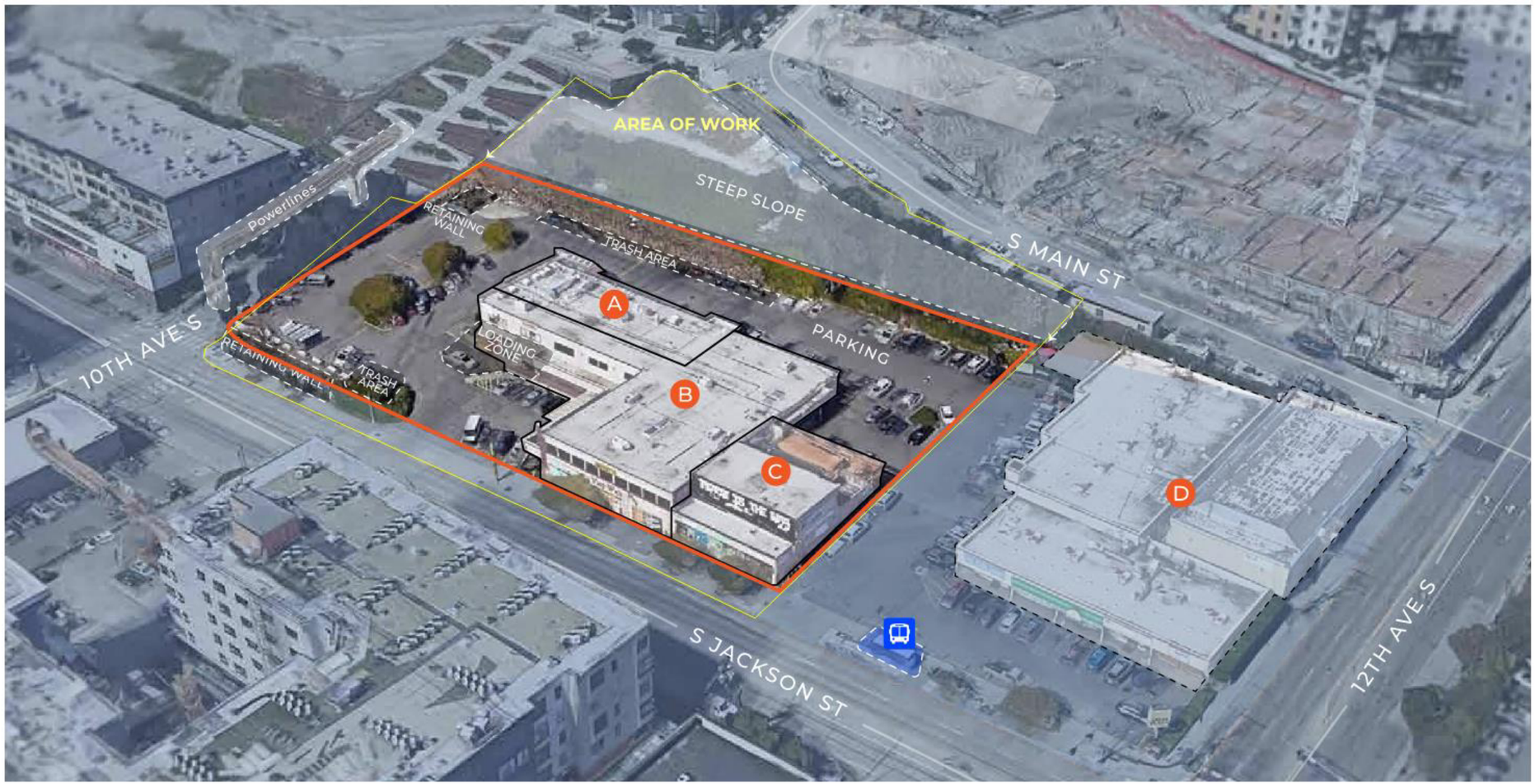
Landscape
Communita Atelier

PROPOSED BUILDING DESCRIPTION

A mixed use housing development composed of two, seven-story buildings on a shared, stepped podium containing structured parking. The site fronts Jackson Street, which will be lined with retail uses at street level, and portions of Main and 10th streets, which will have residential uses.

PROPOSED BUILDING SUMMARY
(all numbers approximate)

Structure Heights: 75’ max from midpoints on Jackson and Main
Number of Residential Units: 397
Building Area: 475,000 sf
Residential Area: 315,000 sf
Retail Area: Approx. 6,000 sf
Parking Stalls: 236
Bicycle Stalls: Approx. 314



A Retail/Restaurant

Vacant

Masonry Construction

B Viet Wah Supermarket

Masonry Construction

C Retail/Restaurant

Partially Vacant

Masonry Construction

2 Stories

D Asian Plaza - Retail/Restaurant

Masonry Construction

S Jackson St & 12th Ave Bus Stop

All elements within the highlighted boundary are proposed for demolition

Jackson Street, 1911

Subject Site, 1936

Existing Building, Built 1960

For more information, see Historic Resources Report

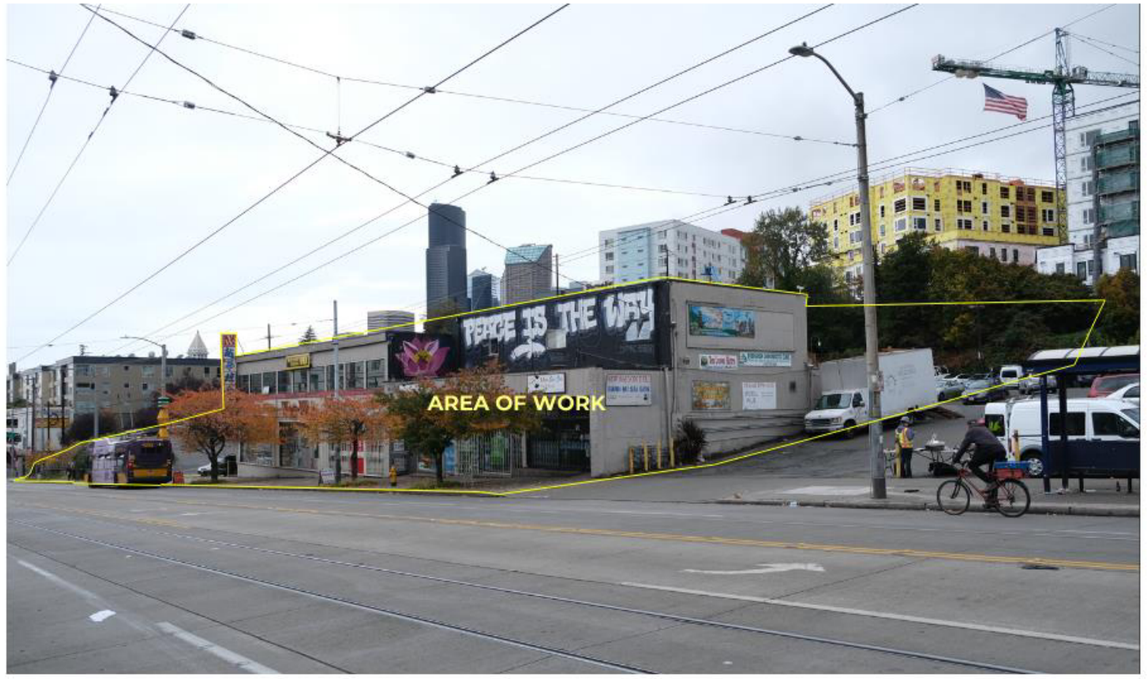
VIEW OF NORTHWEST CORNER - PUBLIC R.O.W.

VIEW OF NORTH SLOPE

VIEW OF NORTH SLOPE

VIEW OF NORTH SLOPE

VIEW OF SOUTHWEST CORNER



VIEW FROM JACKSON STREET

VIEW OF MAIN STREET - PUBLIC R.O.W.

VIEW FROM JACKSON STREET


NEW SAIGON DELI
BÁNH MÌ SÀI GÒN
1


2


3


4


5


6


7


Ten Leaves Bistro
8


9


S MAIN ST
10TH AVE S
12TH AVE S
S JACKSON ST
1
2
3
4
5
6
7
8
9

1

2

3

4

Currently under construction

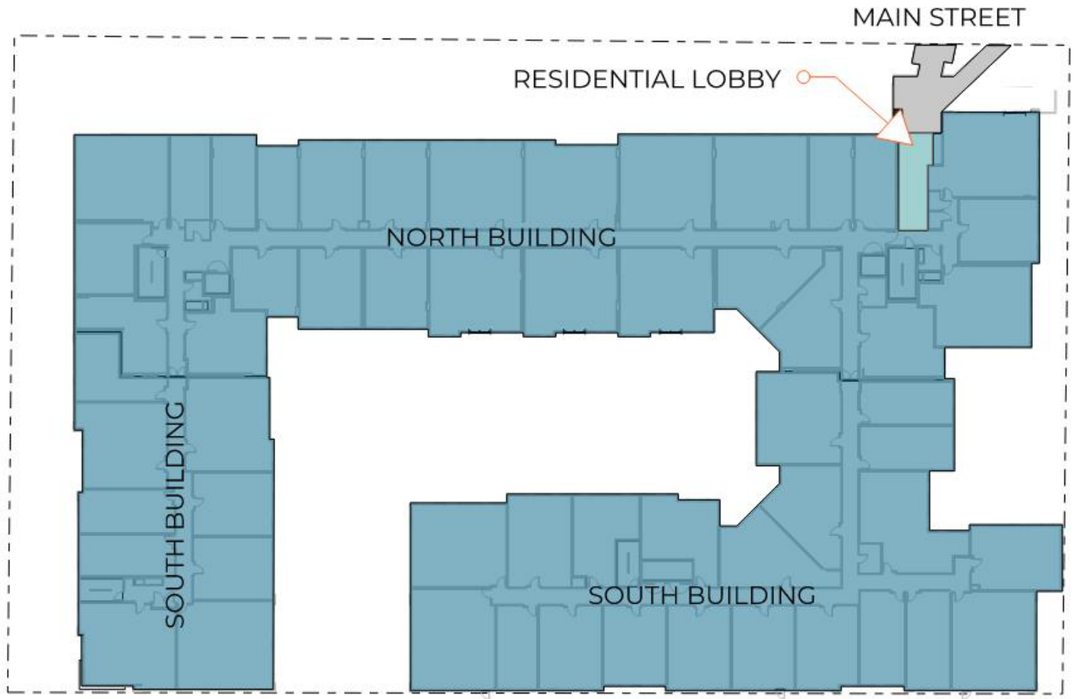
5

6

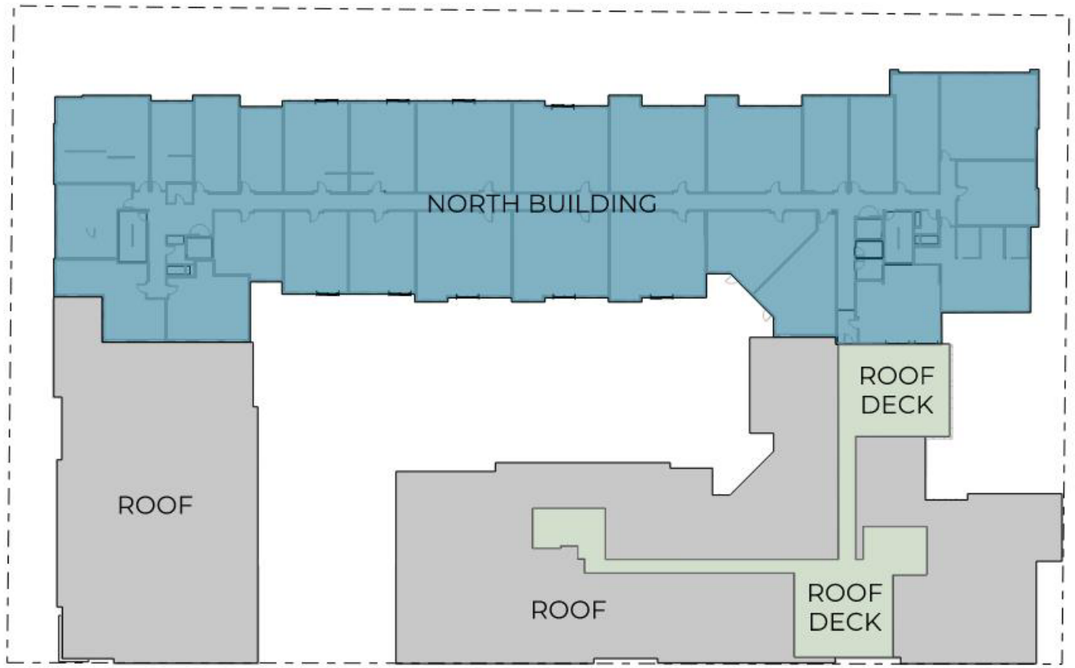
7

8

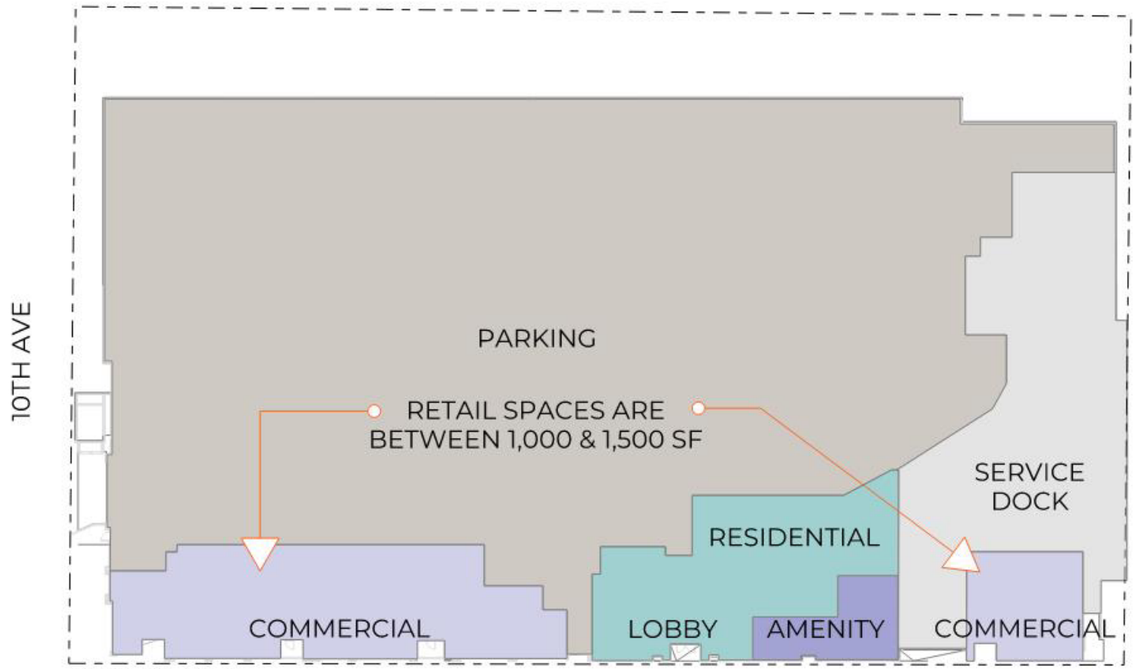

Extensively Planted Hillside Improves Aesthetics and Stabilizes Soils
New Street Trees
MAIN STREET
New Light Poles Improve Pedestrian Experience
New Secondary Planter Strip
Main Street Resident and Guest Entrance with Bike Parking
EXISTING HILLCLIMB AND PLANTING
MAIN BUILDING
UPPER ROOF DECK
New Railing Adjacent to 10th Ave Hillclimb
Three Layers of Planted Areas and New Light Poles Improve the Pedestrian Experience
10TH AVENUE
10TH AVE S
10TH BUILDING
JACKSON BUILDING
LOWER ROOF DECK
DOCK
Screened Service Area
Residential Garage Entry
Retail Entries
Retail Entry
New Sidewalk, Landscape Strip and Light Poles Improve the Pedestrian Experience
Residential Entry
Retail Entry
Service Vehicle Entry



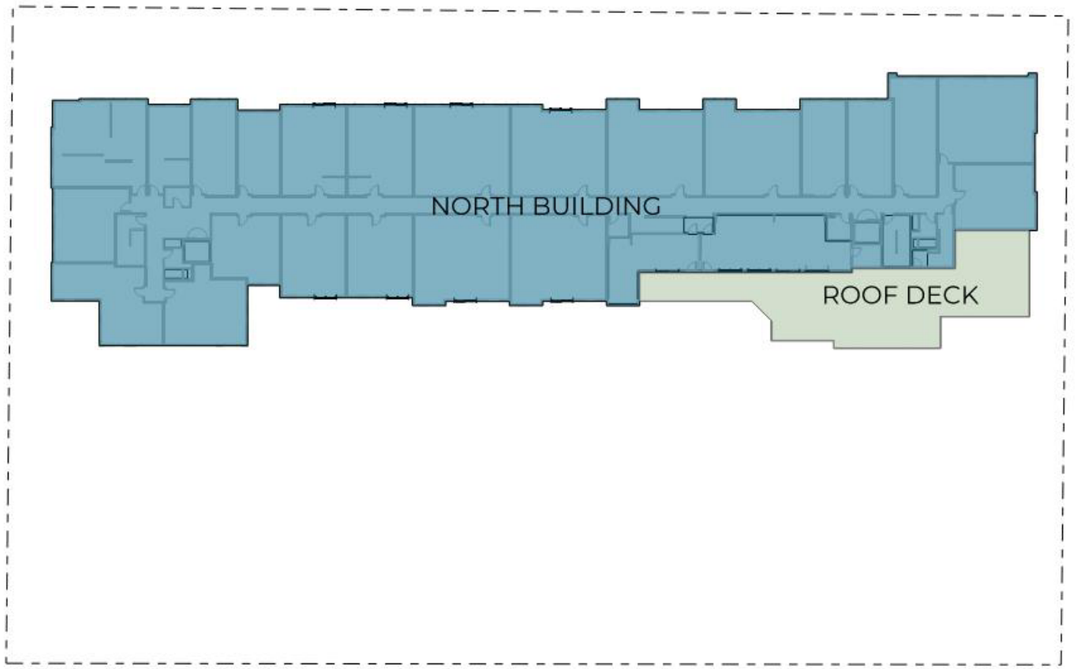
LEVEL 3



LEVEL 6



LEVEL B1/B2



LEVEL 9

*Signage is only conceptual.

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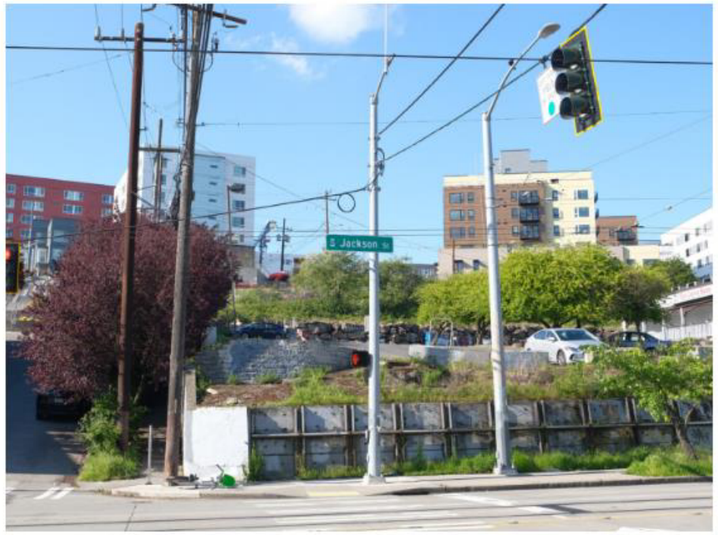
ARCHITECTURE + URBAN DESIGN

MILL CREEK RESIDENTIAL

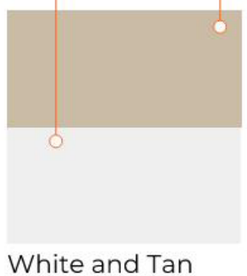
MODERA INTERNATIONAL DISTRICT

VIEW AT 10TH & JACKSON STREET



Existing View of Stacked Retaining Walls at Corner of 10th and Jackson Street

*Signage is only conceptual.



White and Tan Window Frames

Earthen-Colored Lap Siding

Tiled Kneewalls Yellow, Woven

Brick - Dark Gray Running Bond / Medium Grout

Dark Gray Running Bond Brick

*Signage is only conceptual.

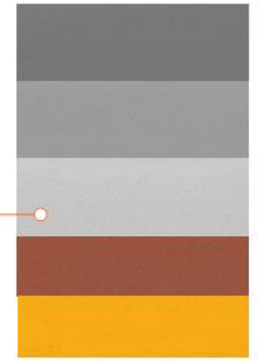
Tiled Kneewalls

Double Height Storefront

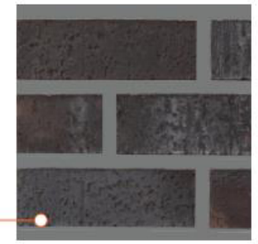
Main Entrance

Glass Panel Balconies

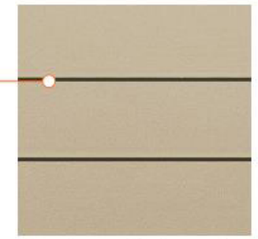
Recessed Entries



Fiber Cement Panels

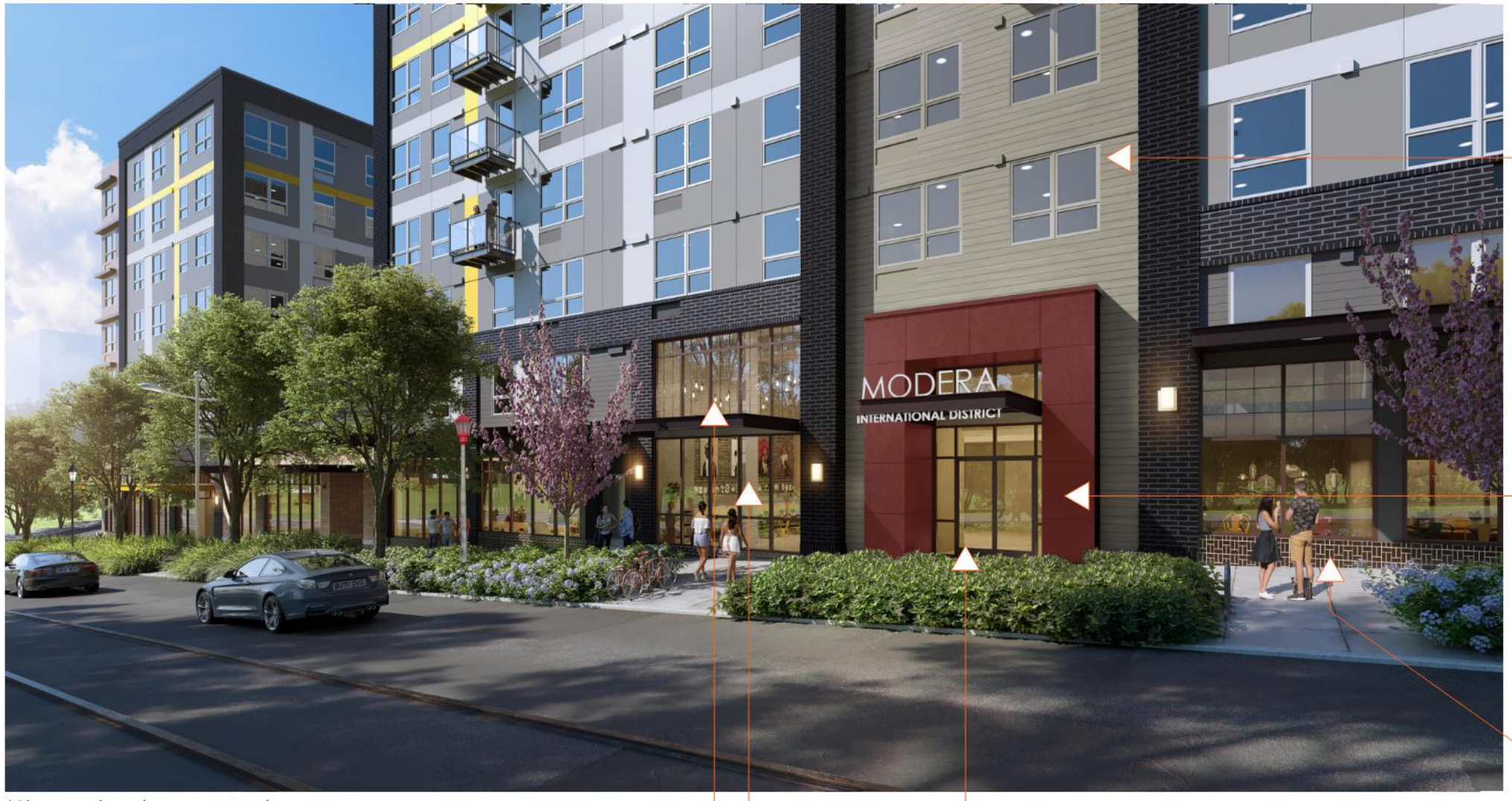


Brick - Dark Gray



Earthen-Colored Lap Siding

Dark Gray Running Bond Brick

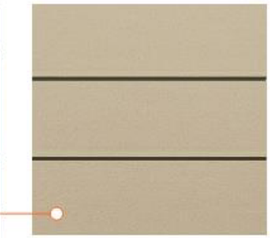


*Signage is only conceptual.

Main Entrance

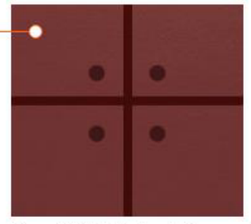
Double Height Storefront

CID Inspired Patterning

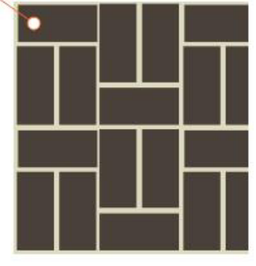


Earthen-Colored Lap Siding

Dark Bronze Storefront



Backlit Metal Panel with Exposed Fasteners

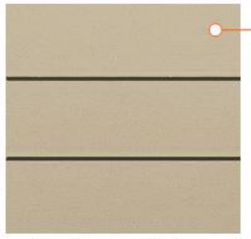


Tiled Kneewalls - Bronze, Woven Pattern

Recessed Entries, Storefront Patterns and Kneewall Precedents in the CID Inspire the Proposed Design

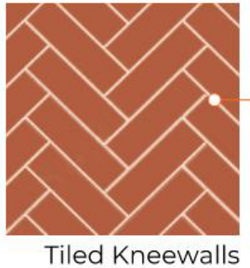
Glass Panel Balconies

**Signage is only conceptual.*



Earthen-Colored Lap Siding

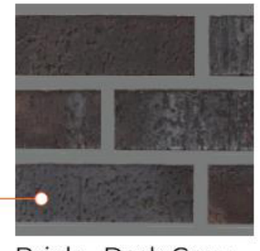
White and Tan Window Frames



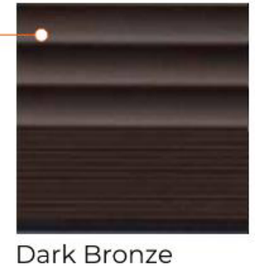
Tiled Kneewalls Red, Woven Pattern

Fiber Cement Panel - Grays

Dark Gray Running Bond Brick



Brick - Dark Gray



Dark Bronze Storefront

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MILL CREEK RESIDENTIAL

MODERA INTERNATIONAL DISTRICT

VIEW OF EAST RETAIL AT JACKSON STREET

BRICK

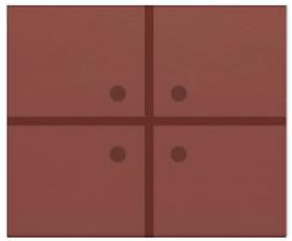
Brick - Dark Gray Running Bond / Light Grout

Brick - Light Gray Running Bond / Light Grout

Brick - Dark Gray Running Bond / Medium Grout

METAL

Storefront - Medium Dark Bronze



Metal Panel - Red w/Exposed Fasteners

WINDOWS

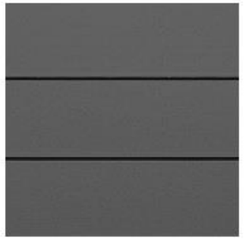
Window Frame - Tan and White

FIBER CEMENT PANEL

Fiber Cement Panel - Gray Tones

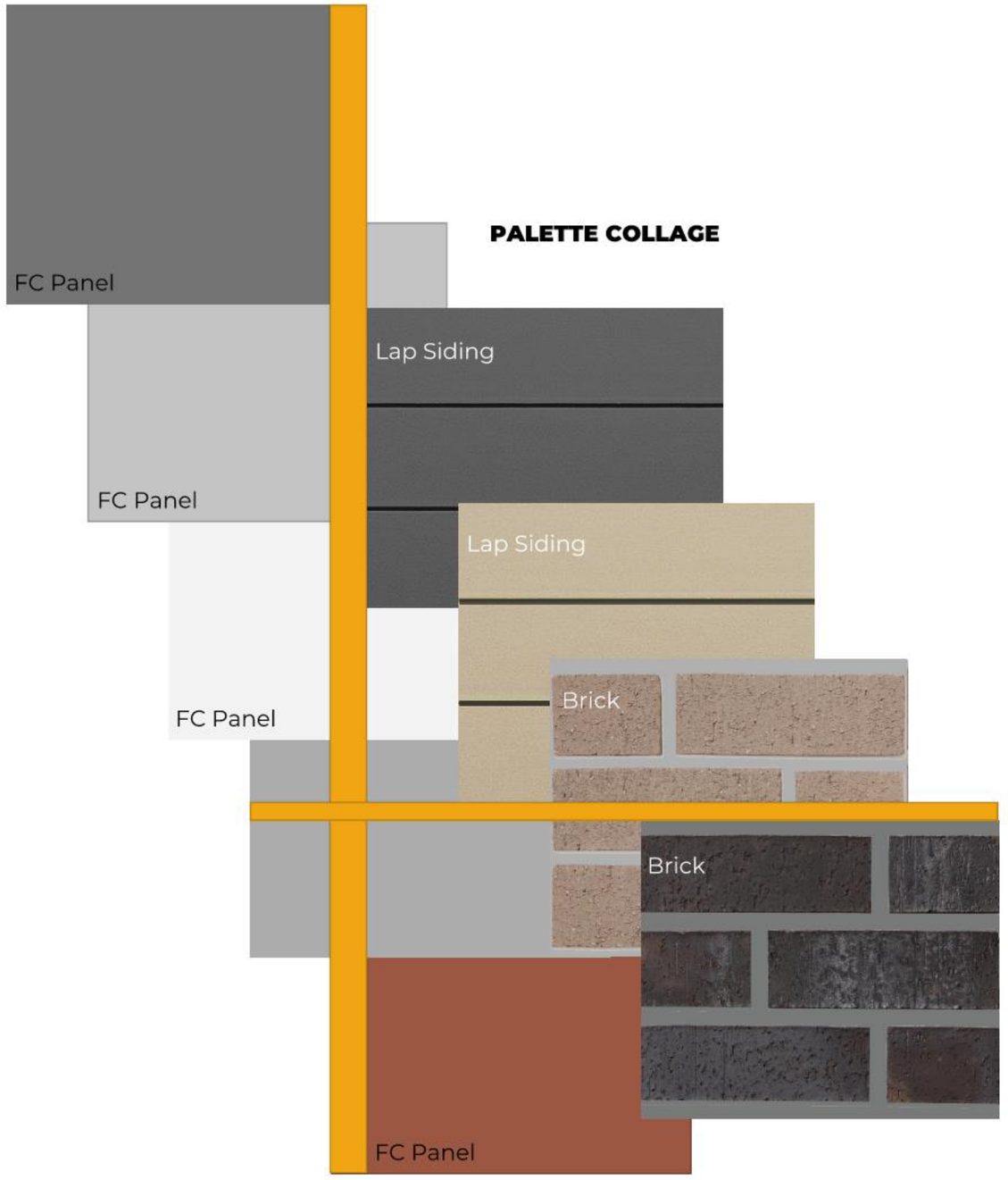
Fiber Cement Panel - Red and Yellow

Earthen-Colored, Smooth Lap Siding

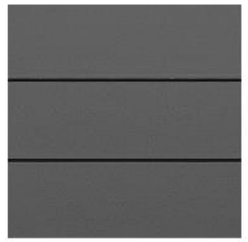


Fiber Cement Lap Siding - Gray

PALETTE COLLAGE



Earthen-Colored Lap Siding



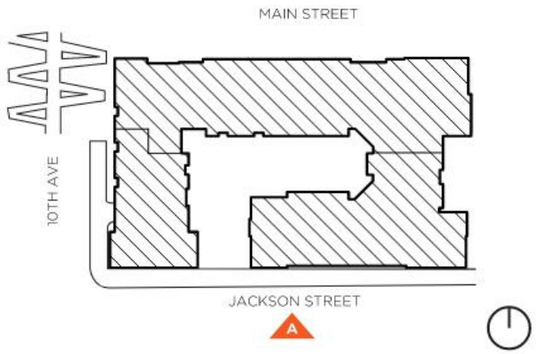
Fiber Cement Panel Lap Siding - Gray

Fiber Cement Panel - Grays

Brick - Dark Gray Running Bond / Dark Grout

Dark Gray Running Bond Brick

Light Gray Running Bond Brick



*Signage is only conceptual.

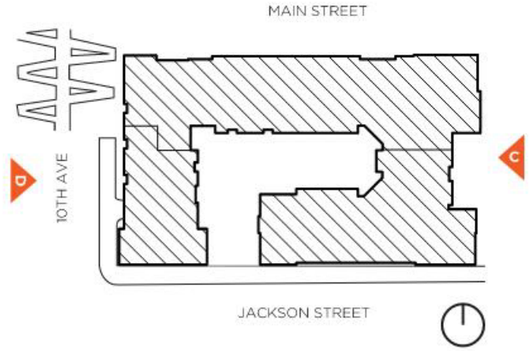
A **JACKSON FACADE - SOUTH ELEVATION**
1" = 30'

D

10TH FACADE - WEST ELEVATION
1" = 30'

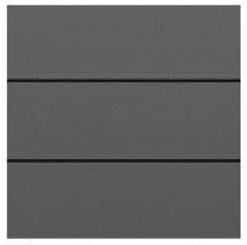
C

EAST FACADE ELEVATION
1" = 30'



Earthen-Colored
Lap Siding

Brick - Dark Gray
Running Bond /
Dark Grout



Fiber Cement Panel
Lap Siding - Gray

Fiber Cement Panel
Grays + White

Fiber Cement Pane
Red and Yellow

White and Tan
Window Frames

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MODERA INTERNATIONAL DISTRICT

BUILDING ELEVATIONS

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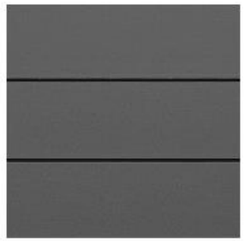
MODERA INTERNATIONAL DISTRICT

NORTHEAST CORNER VIEW

Earthen-Colored
Lap Siding

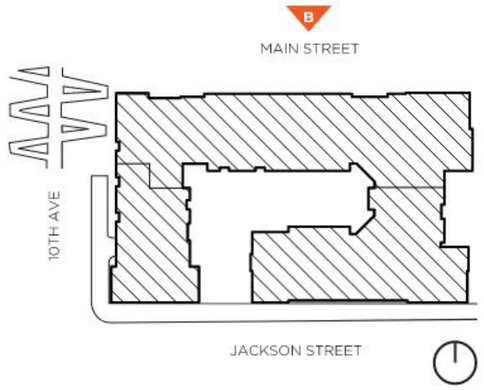
Fiber Cement Panel
Grays + White

Fiber Cement Panel
Yellow & Red



Fiber Cement Panel
Lap Siding - Gray

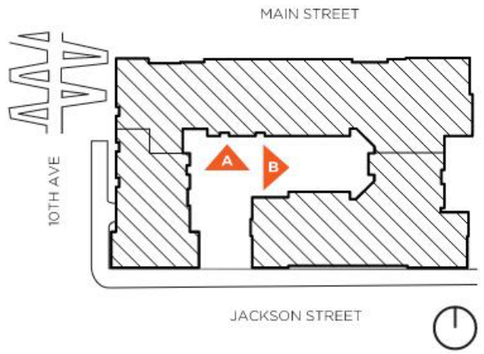
White and Tan
Window Frames



B **MAIN STREET FACADE - NORTH ELEVATION**
1" = 30'

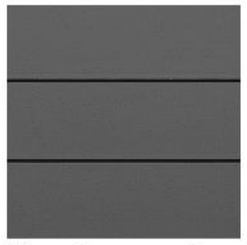
A **COURTYARD - NORTH ELEVATION**
1" = 30'

B **COURTYARD - EAST ELEVATION**
1" = 30'




Earthen-Colored Lap Siding


Brick - Dark Gray Running Bond / Dark Grout


Fiber Cement Panel Lap Siding - Gray

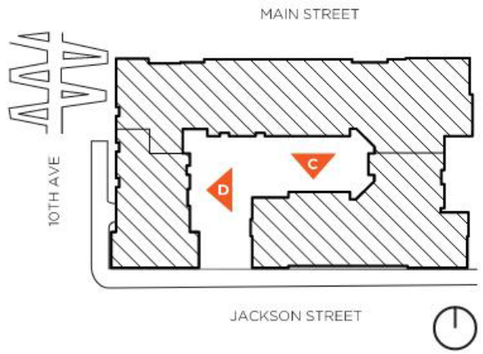


Fiber Cement Panel Grays + White


Fiber Cement Pane Red and Yellow


White and Tan Window Frames

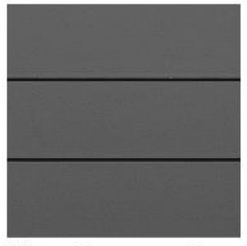
C **COURTYARD - SOUTH ELEVATION**
1" = 30'



D **COURTYARD - WEST ELEVATION**
1" = 30'


Earthen-Colored Lap Siding


Brick - Dark Gray Running Bond / Dark Grout

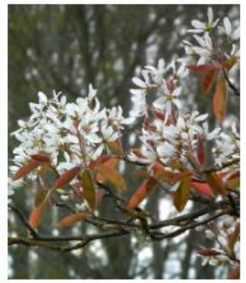
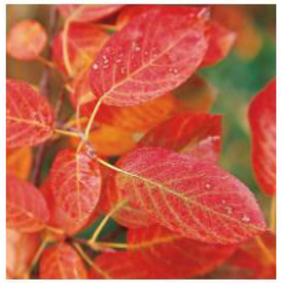

Fiber Cement Panel Lap Siding - Gray


Fiber Cement Panel Grays + White


Fiber Cement Pane Red and Yellow


White and Tan Window Frames

AMELANCHIER X GRANDIFLORA "AUTUMN BRILLIANCE" / APPLE SERVICEBERRY

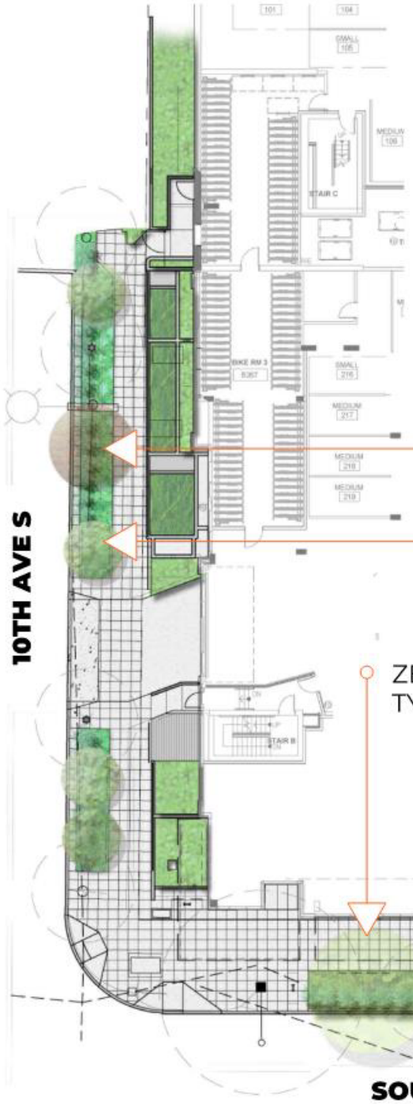




ZELKOVA SERRATA "GREEN VASE"



PRUNUS 'SARGENTII' / SARGENT'S CHERRY





EXISTING PURPLELEAF PLUM TREE TO REMAIN

FOUR, AMELANCHIER X GRANDIFLORA "AUTUMN BRILLIANCE" / APPLE SERVICEBERRY TREES (SAME AS ON THE HILLCLIMB)

ZELKOVA SERRATA "GREEN VASE" TYP OF 6

PRUNUS 'SARGENTII' / SARGENT'S CHERRY

1"=30'-0"

N

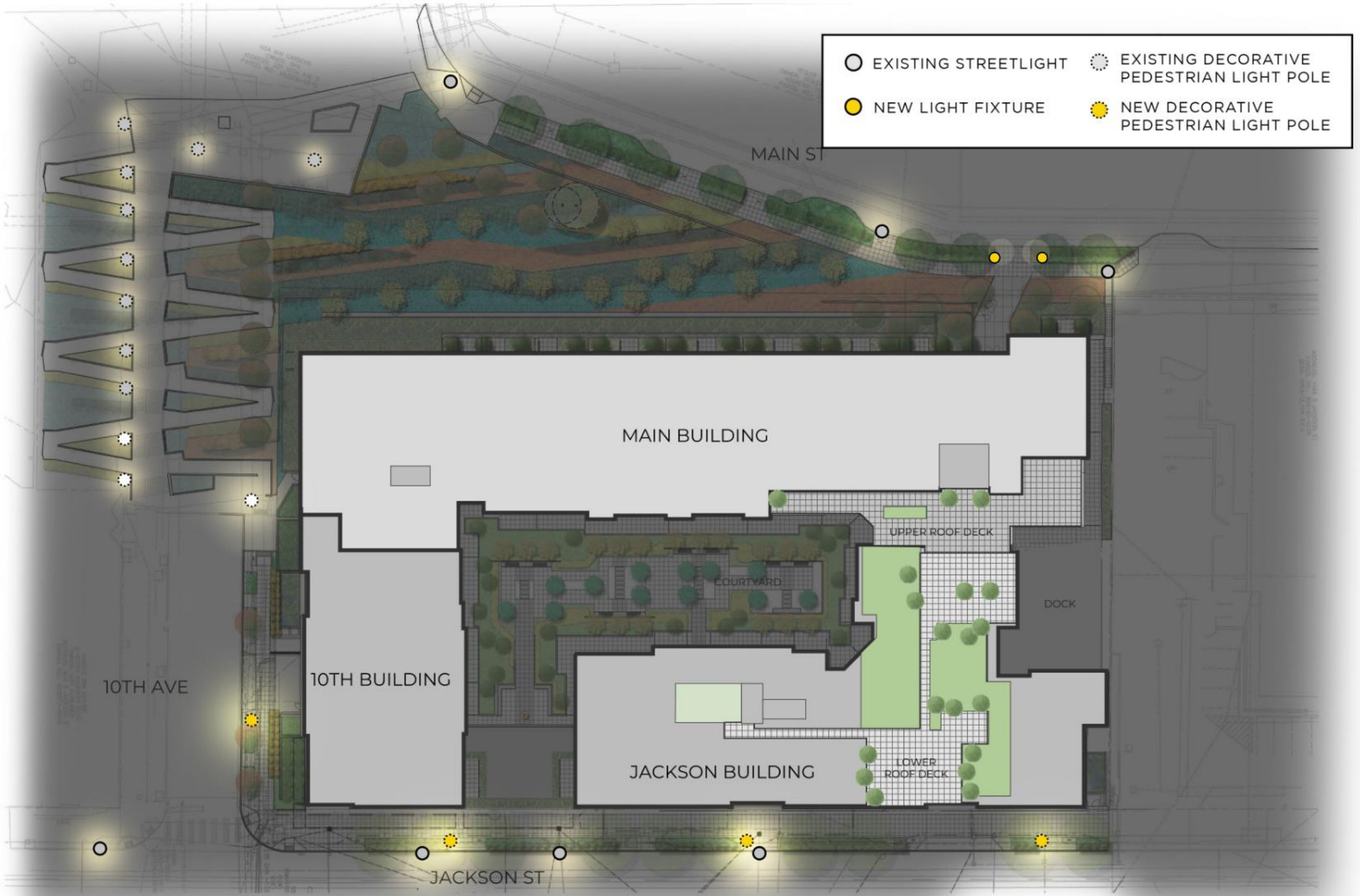
Scale: 1"=20'-0"

N

MAIN STREET:
NYSSA SYLVATICA/ BLACK TUPELO

ON SITE TREE:
AMELANCHIER × GRANDIFLORA 'AUTUMN BRILLIANCE'/SERVICEBERRY

ON SITE TREE:
CORNUS 'EDDIES WHITE WONDER'/ EDDIES WHITE WONDER DOGWOOD



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ARCHITECTURE + URBAN DESIGN

MILL CREEK RESIDENTIAL

MODERA INTERNATIONAL DISTRICT

SITE LIGHTING PLAN

TISCARENO ASSOCIATES
ARCHITECTURE + URBAN DESIGN

MILL CREEK RESIDENTIAL

MODERA INTERNATIONAL DISTRICT

BUILDING LIGHTING PLAN

10TH AVE ELEVATION - LIGHTING

LIGHTING FIXTURE - TYPE A OPTIONS

LIGHTING FIXTURE - TYPE A OPTIONS

JACKSON STREET ELEVATION - LIGHTING
1" = 10'-0"

UNDER CANOPY LIGHT

ACCENT FIXTURE

DECORATIVE PEDESTRIAN LIGHT POLE

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ARCHITECTURE + URBAN DESIGN

MILL CREEK RESIDENTIAL

1032 S. JACKSON CONCEPTUAL SIGNAGE PACKAGE

Notice to Commercial Tenants

Exterior signs to be installed along S. Jackson St., 10th Ave S. and S. Main St. respectively are subject to the following guide-lines, Landlord/Owner review and approval prior to International Special Review District (ISRD) Review and Approval. The site is within the ISRD, in addition to any permits required, each sign will need to apply for a Certificate of Approval through the ISRD.

Landlord/Owner will conduct a final review and approval of all materials, sizing, etc. prior to Business Owners submitting signs and graphics to the ISRD. Please review all guidelines as presented by the ISRD Design Guidelines. Guidelines can be found at:

http://www.seattle.gov/neighborhoods/programs-and-services/historic-preservation/historic-districts/internationaldistrict

All signs will need to apply for a Certificate of Approval from the ISRD Board. These include all new signs and the re-facing of existing signs. The approval process is outlined in the ISRD Guidelines and applications can be found on the link noted above. This process can take some time for the review of the application prior to submittal to the ISRD Board for approval. For the latest review timeline please contact the ISRD coordinator. Contact information can be found on the web site noted above. Please plan accordingly.

The following signage types are not permitted in the District:
a. Free-standing signs (except for those in parks and those authorized for surface parking lots)
b. Portable signs
c. Roof signs
d. Off-premises advertising
e. Signs that flash, change-images, incorporate video display methods, or have text that appears in motion

The ISRD Board considers a sign's size, shape, location, material, color, method of attachment, and lighting in relation to the use of the building, the design of the building where the sign is proposed, and the location of other signs in the District.

Ensure that signs:
a. Do not hide, damage, or obstruct any significant architectural elements of the building;
b. Promote a pedestrian environment while considering visibility for other traffic such as personal vehicles, buses, and bicycles.

Multi-lingual signage is encouraged.

Prominent, creative and colorful illuminated signage is recommended. Encourage a variety of signs with unique character to signify the business district.

Durable, high-quality materials are encouraged.

Neon-lit signs and the restoration of historic signage are encouraged to enhance the visual experience along the retail corridors. Clear backing for neon window signs is preferred.

Signs are also subject to Seattle Municipal Code section 23.66.338 and 23.55

All new signs will need to be permitted by SDCI. Street facing signs, as identified by the Dept. of Neighborhoods coordinator, need to be obtain a Certificate of Approval from the D.O.N and the ISRD Board. Business owners installing signs are responsible for obtaining any necessary permits and approvals prior to installing their signs.

Exterior street facing signs for the residential building shall meet the following criteria:

Primary sign shall be located facing S. Jackson St., mounted on the building. The sign shall be no larger than 50 sq. ft. or as allowed by code.

Materials and illumination: fabrication shall be weather resistant, long lasting materials with durable coatings (example: powder coated aluminum).

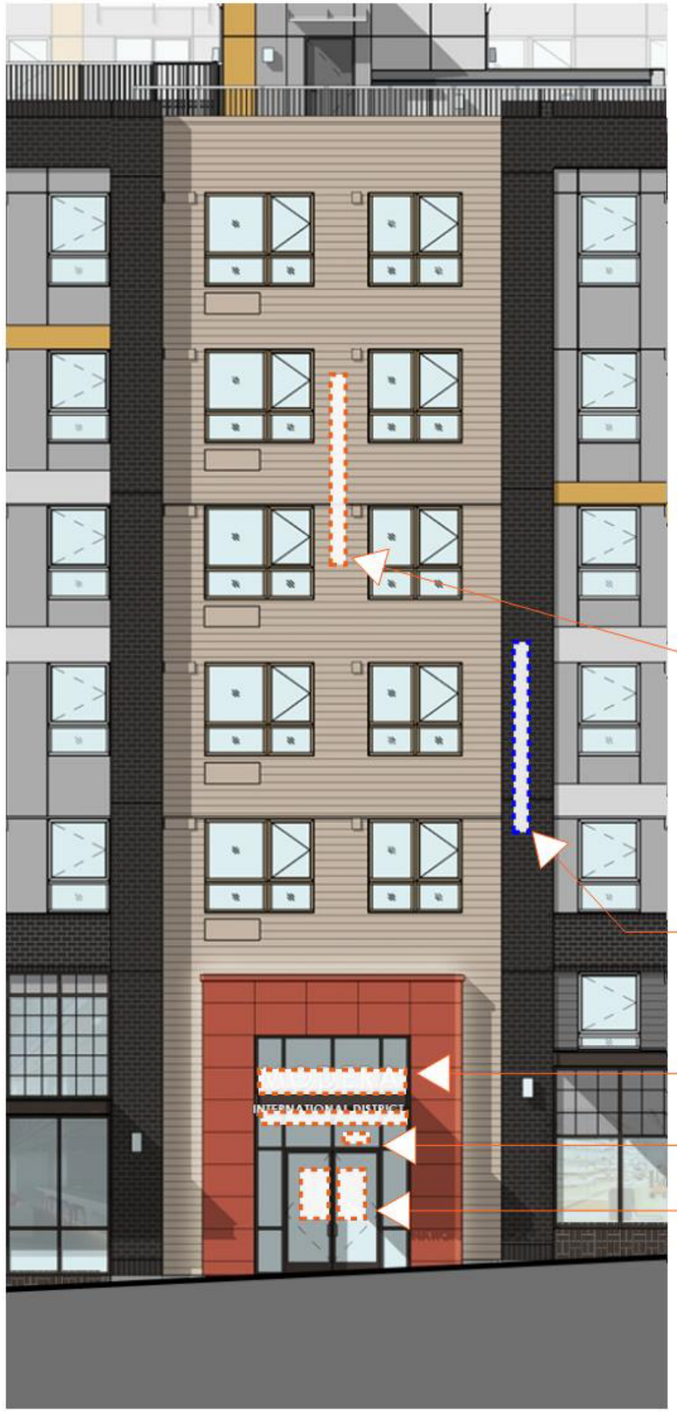
Signs can include illumination, including neon signs designed to reflect the character and tone the project is striving for.

Attach all signage securely to building following all applicable Codes for safety and structure. Coordinate with Architect to confirm the best method of attachment to the building envelope at each location.

Character and tone: the sign should fit the character of the residences and the architecture.

JACKSON FACADE ELEVATION - WEST
1" = 10'

- Canopy Mounted Sign - Under or Over
- Window Graphics
- Blade Sign Hung from Canopy
- Canopy Mounted Sign
- Window Graphics
- Blade Sign Hung from Canopy
- Canopy Mounted Sign - Under or Over
- Window Graphics
- Blade Sign Hung from Canopy



JACKSON FACADE ELEVATION - CENTRAL
1" = 10'

PERSPECTIVE

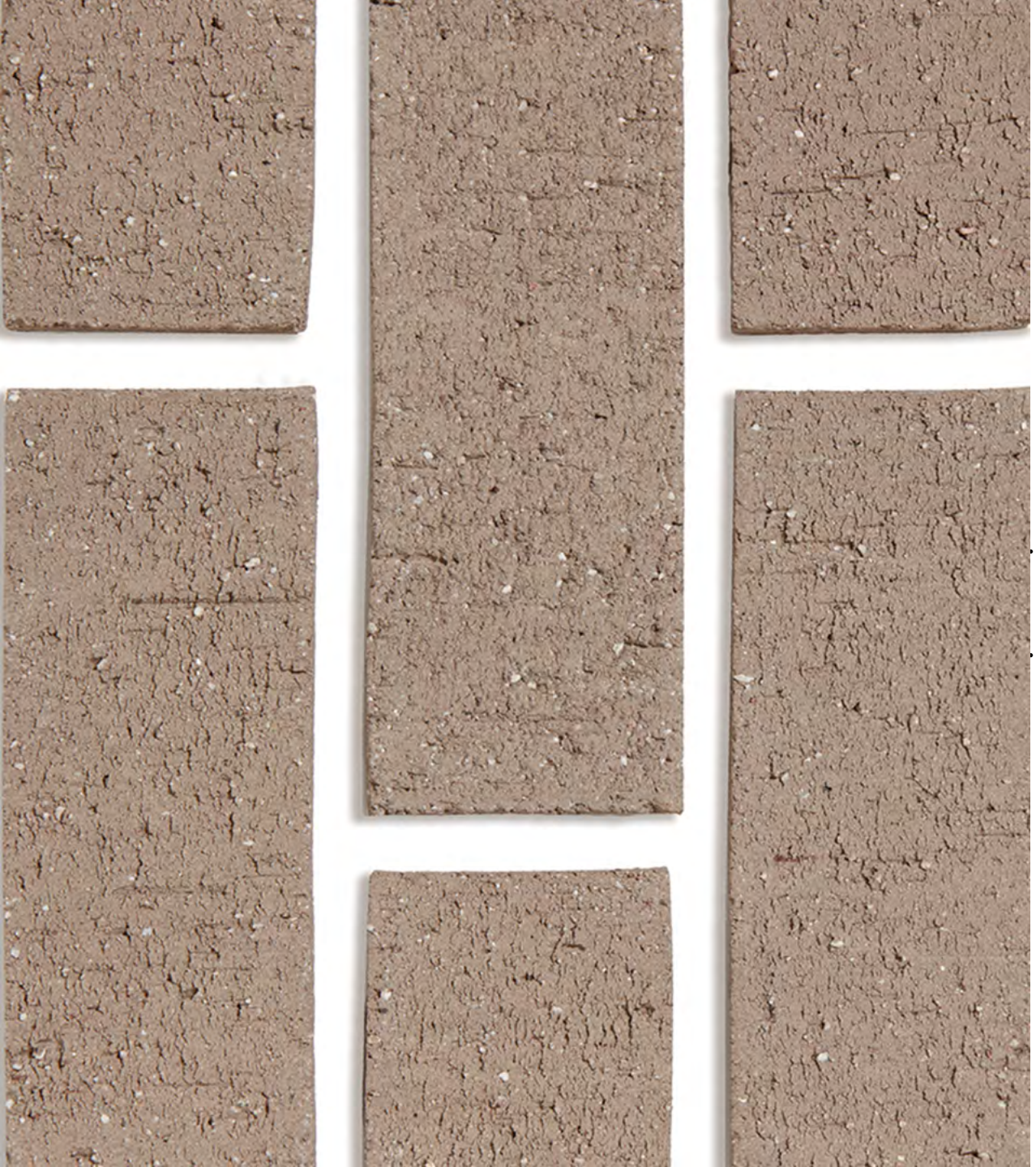
JACKSON FACADE ELEVATION - EAST
1" = 10'

RENDERED VIEW

MAIN FACADE ELEVATION - NORTH
1" = 10'

MCRT Jackson Apartments - International District

CUTSHEET PACKAGE



THE BRICK BOOK

COLORS | TEXTURES | ASTM

Whites & Grays

COLOR*: **Redondo Gray**

TEXTURE: **Mission**

TYPE: **Stocking**

PLANT: **Mica, WA**

COLLECTION: **The Heritage Collection**

ASTM: **ASTM C-216, SW, FBX**

- *Due to the limitations of photography, the actual product shipped is not guaranteed to duplicate the image shown here. Final color and product selection should be made from actual samples.*
- ◪ *Special Order Texture. May require a minimum order. Additional production time should be allowed.*

Considering brick for your project?

For samples and ordering information, contact your Mutual Materials Sales Representative or call (888) 688-8250.

MUTUALMATERIALS®

www.mutualmaterials.com

THE BRICK BOOK

COLORS | TEXTURES | ASTM

Traditional Iron Wash

COLOR*: **Coal Creek**

TEXTURE: **Coated**

TYPE**: **Stocking**

PLANT: **Columbia, OR**

COLLECTION: **The Northwest Collection**

ASTM: **ASTM C-216, SW, FBA**

- *Due to the limitations of photography, the actual product shipped is not guaranteed to duplicate the image shown here. Final color and product selection should be made from actual samples.*
- *** Special Order Colors require a minimum order. Additional production time should be allowed.*

Considering brick for your project?

For samples and ordering information, contact your Mutual Materials Sales Representative or call (888) 688-8250.

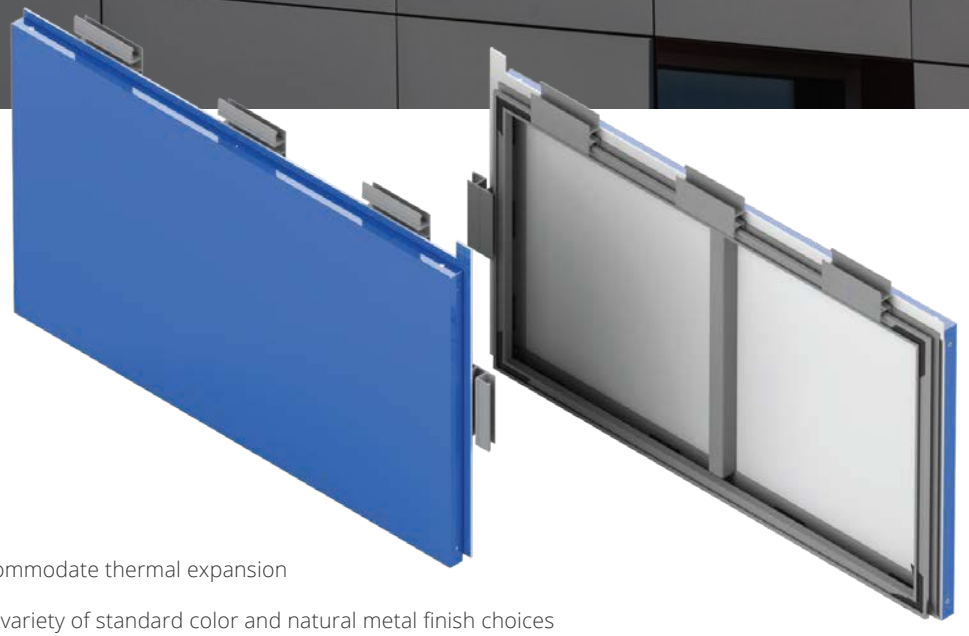
MUTUALMATERIALS®

www.mutualmaterials.com

The ACM Series

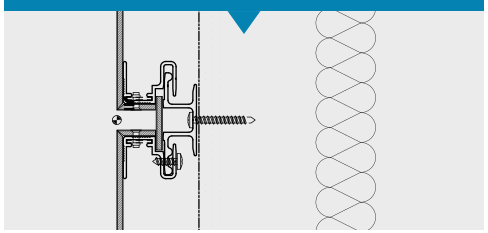
Aluminum Composite Panel System

When your design vision requires sleek, smooth expanses of metal with minimal reveals, you need NorthClad® ACM.

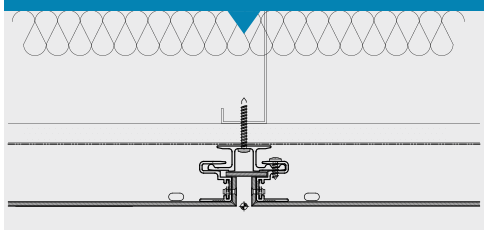


- Panel system consists of ACM and NorthClad® extrusions
- NorthClad® ACM Series panels feature a drained, ventilated rainscreen design
- See our design guide for details and specifications
- Aluminum composite material (ACM) consists of 2 layers of aluminum sandwiching a resin core
- Fire rated cores are also available
- Panels feature coil - coated Kynar® paint for a 20 - 30 - year finish
- 4mm and 6mm cores available
- The NorthClad® extrusion attachment system is engineered to provide superior wind uplift resistance and accommodate thermal expansion
- NorthClad® utilizes ACM from Larson®, Arconic®, Alcotex®, Alpolic®, Citadel®, and others allowing for a wide variety of standard color and natural metal finish choices
- Contact us for detailing assistance and a custom fit and look on your building with panel sizes up to 16’ x 5’
- Made in the USA

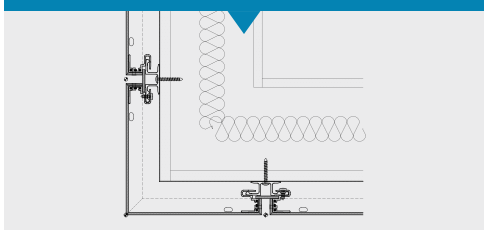
Horizontal Joint



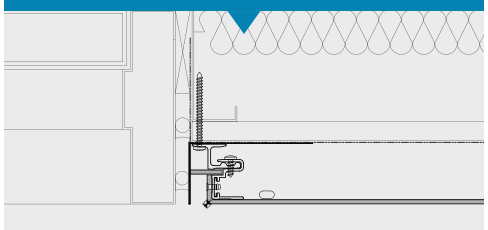
Vertical Joint

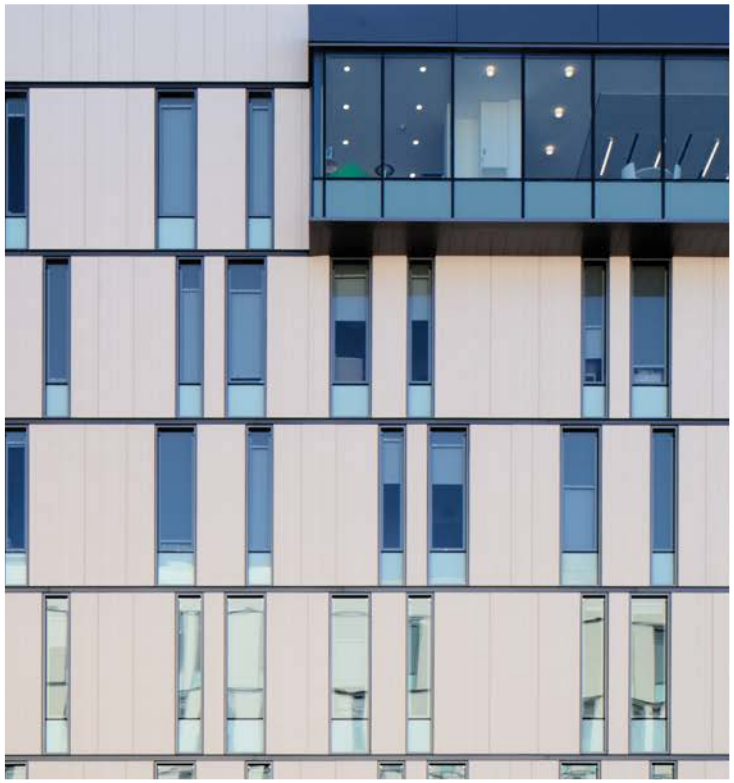


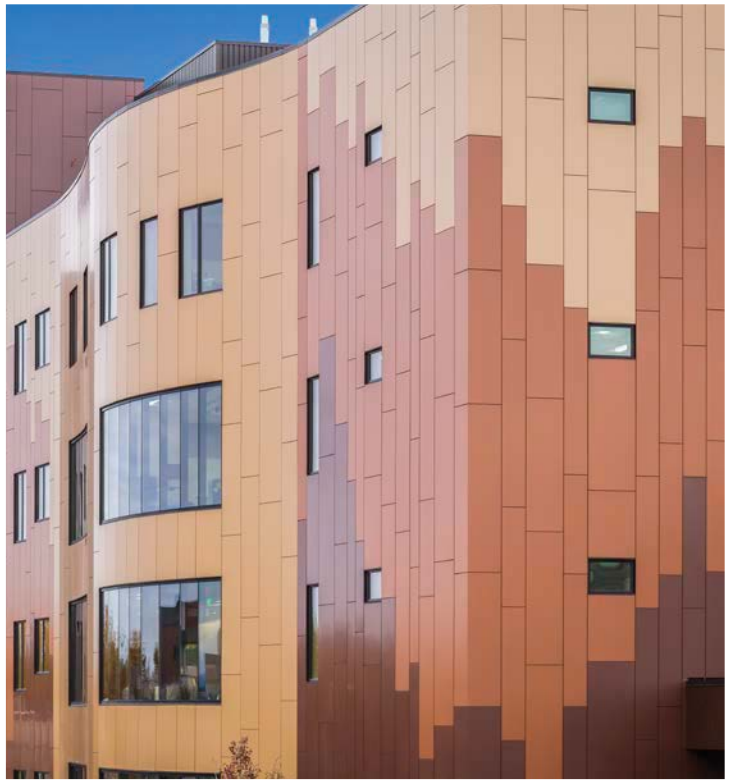
Outside Corner

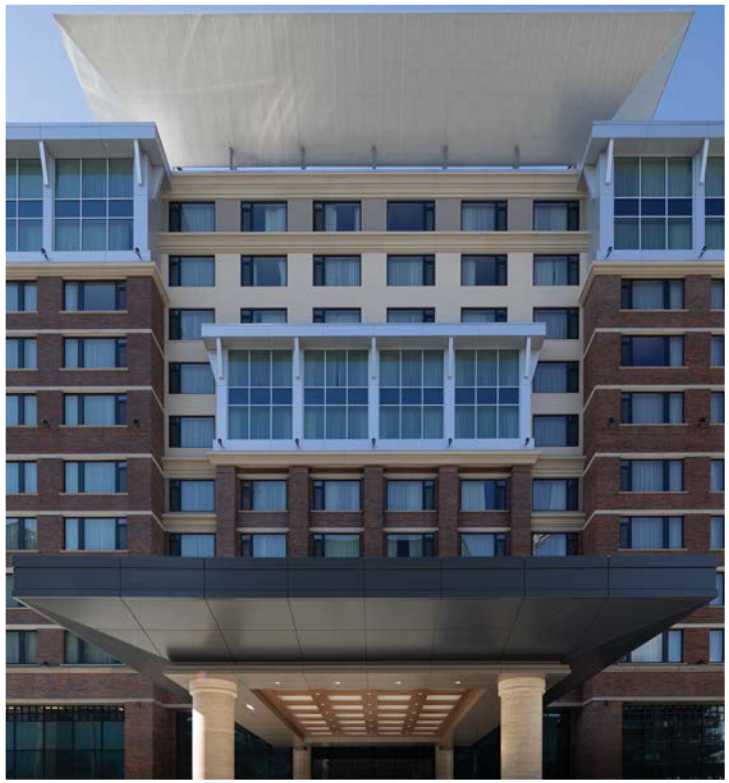


Door Jamb Right









A classic look that stands the test of time.

Hardie® Plank

From Victorians to Colonials, Hardie® Plank is the perfect siding for your style, and has the durability and long-lasting beauty that can transform your home exterior. With endless gorgeous color and plank pairings available, you'll discover a Hardie® Plank style that transforms your home's aesthetic.

Hardie® Plank

Smooth

Select Cedarmill® & Smooth — **Thickness** 5/16 in — **Length** 12 ft planks

Width	8.25 in
Exposure	7 in
Prime Pcs/Pallet	230
ColorPlus® Pcs/Pallet	210
Pcs/Sq.	14.3

Smooth

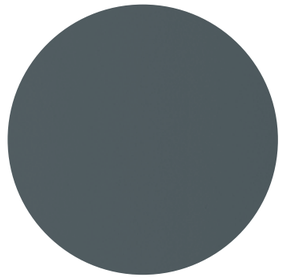
Width	8.25 in
Statement Collection™	
Dream Collection™	•
Prime	•

Designed for versatility and beautiful performance.

Hardie® Panel

Hardie® Panel delivers style and substance. When combined with Hardie® Trim Batten, it achieves the rustic board-and-batten look that defines your charming cottage or modern farmhouse. Its crisp, clean lines and ability to pair beautifully with other siding products make Hardie® Panel a smart choice for the home of your dreams.

Hardie® Panel



Smooth

Smooth

Size	4 ft x 8 ft
Statement Collection™	
Dream Collection™	•
Prime	•

Protection in every detail, complete confidence in every area.

Hardie® Soffit

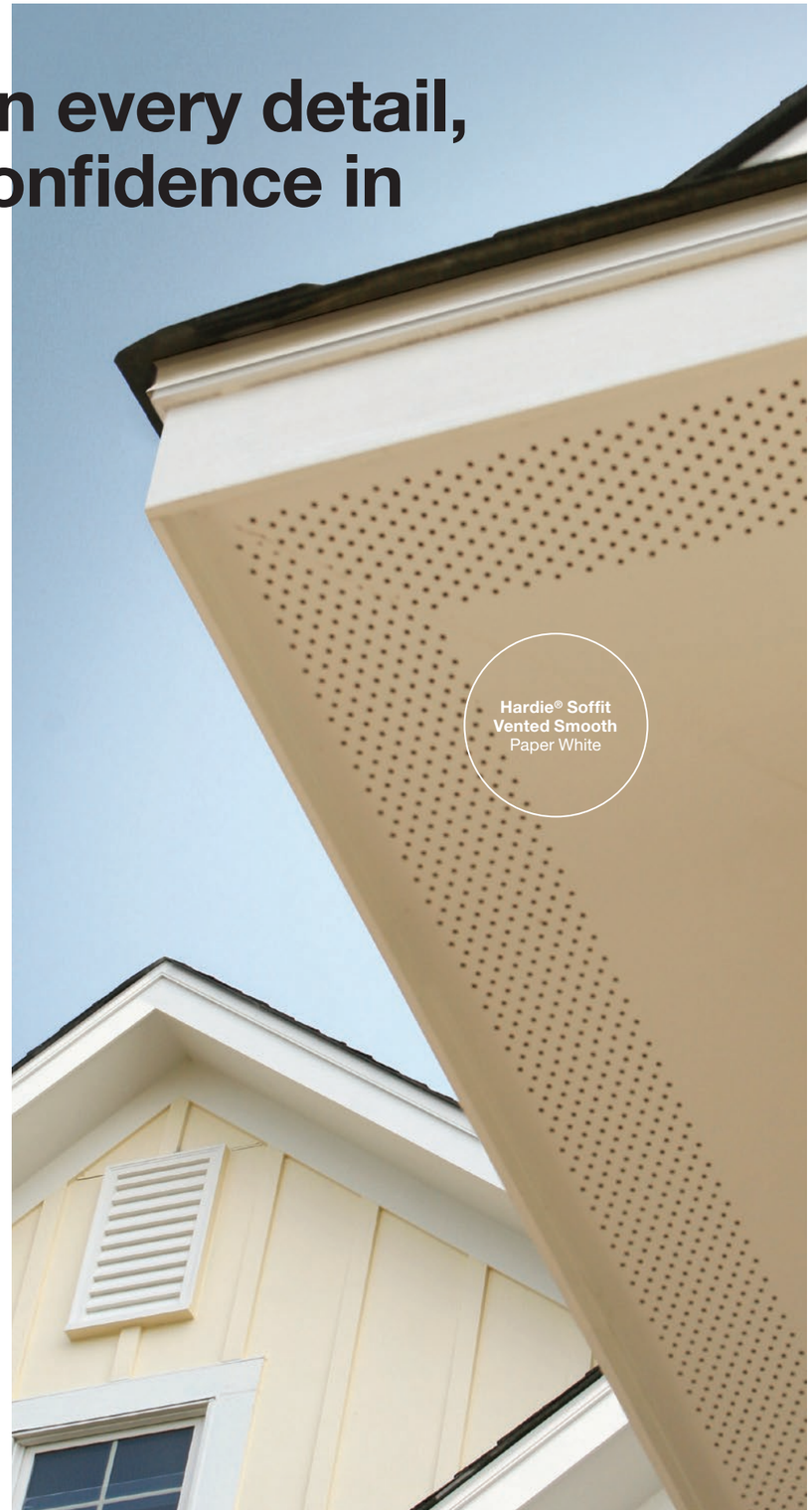
Every part of your home's exterior matters. With Hardie® Soffit panels, you can live confidently, knowing that gaps between eaves and exterior walls are covered to provide trusted protection.

DID YOU KNOW?

Using vented soffit improves ventilation and reduces the chance of water-vapor condensation that can promote mold, mildew and stains and which can damage your home's framing over time.

In warm climates, vented soffit allows hot, humid air to escape, which not only helps prevent condensation in the attic, but also helps reduce air-conditioning costs.

In cool climates, vented soffit helps prevent condensation from forming on the interior side of the roof sheathing and reduces the chances of roof-damaging ice dams.



Hardie® Soffit

Non-Vented Smooth

Thickness 1/4 in

Length	12 ft
Width	12 in
Prime Pcs/Pallet	200
ColorPlus® Pcs/Pallet	216

Non-Vented Smooth

Size	12 ft x 16 in
Statement Collection™	
Dream Collection™	•
Prime	•

WOODTONE
inspired living, *inside and out*

RUSTICSERIES™ LAP SIDING

SUBMITTAL DOCUMENT

Submitted to:

Project Name:

Submitted by:

Date:

Substrate:

Profile:

Color:

RUSTICSERIES™ LAP SIDING

SPECIFICATION SHEET

Manufacturer
Woodtone Building Products
- *8007 Aitken Road, Chilliwack BC*
- *9403 24th Place West, Everett WA*

Features
- *Two-tone wood look without the maintenance*
- *Sustainable substrate and coating practices*
- *20-year coating warranty + substrate warranty*

Available Substrates
- *James Hardie fiber cement profiles - 12'*
  5¼", 6¼", 7¼", 8¼", 9¼", 12"
- *Allura fiber cement profiles - 12'*
  5¼", 6¼", 7¼", 8¼", 9¼", 12"
- *LP Smartside engineered wood profiles - 16'*
  6", 8", 12"

Colors
RusticSeries™ is available in 18 two-tone colors.
- *Aspen Ridge*
- *Black Canyon*
- *Caribou Trails*
- *Cascade Slate*
- *Coastal Gray*
- *Midnight Tide*
- *Mountain Cedar*
- *Old Cherry*
- *River Rock*
- *Roasted Walnut*
- *Rosewood*
- *Sand Castle*
- *Stone Blue*
- *Summer Wheat*
- *Warm Espresso*
- *White Granite*
- *White Rapids*
- *Winchester Brown*

Use
Woodtone RusticSeries™ is used as exterior wall covering. This product is prefinished and available in fiber cement or engineered wood substrates.

Texture & Finish
Woodtone RusticSeries™ is applied to textured substrate only. The coating is manufactured by Akzo Nobel and applied in a controlled factory setting.

Trim and Caulking
Solid color trim suggestions and matching caulking available for each RusticSeries™ color at woodtone.com.

Installation
Install Woodtone RusticSeries™ in accordance with:
- *HardiePlank lap siding installation instructions*
- *Allura lap siding installation instructions*
- *LP Smartside installation instructions*

Storage and Handling
Full Care and Maintenance guide: woodtone.com
- *Do not store pallets directly on the ground.*
- *Ensure that slip sheeting stays between boards*
- *Use plastic wrap provided to keep the product dry*
- *Do not lift more than 2 packs by forklift at a time*
- *Do not stack pallets more than 3 high*

Touch-up
Order touch-up online at woodtone.com/store
- *Check the touch-up color ordered is correct*
- *Mix paint well, do not allow paint to freeze*
- *Test the color on the sample piece or hidden area*

RusticClarity™
Woodtone RusticSeries™ coating carries a limited 20 year warranty. Following, we offer RusticClarity™, a one coat application to bring back the vibrance of your siding.

Warranty
Woodtone RusticSeries™ carries a 20 year limited coating warranty in addition to the substrate manufacturer's warranty. Visit woodtone.com for full details.

Important Notes
- *RusticSeries™ replicates the natural beauty and warmth of real wood siding. Each substrate and profile will vary in terms of grain pattern and color.*
- *Woodtone will consider the installation of the product as final acceptance of the product.*
- *Improper installation of product will void warranty.*

Strategic Accounts/Large Job Quotes
For assistance with commercial or multi-residential applications and large job quotes, please contact our Strategic Accounts team at spec@woodtone.com.

11.6" RECESSED INTERCOM CUTSHEET v2 (see pages 2 and 3 for measurements)

TOUCHSCREEN

- Brightness : 1000 Nits
- Diagonal length: 11.6"
- Resolution: 1920 x 1080
- Contrast ratio : 700:1
- Capacitive touch
- IP65 dust and water resistance
- Chemical resistant/ Anti-glare coated

COMPLETE SYSTEM

- Bluetooth connectivity
- Touch screen withstands a 225g drop ball test from 1.6 meters
- Designed for standard power socket: NEMA 5-15
- Max temperature: +60° C/+140° F

DIMENSIONS

- 14.26” x 13.9” x 2.48”
- 362mm x 354mm x 63mm

POWER REQUIREMENTS

- Intercom input voltage: 24VDC
- Standard power consumption: 31W at 24VDC input
- Maximum power consumption: 65W at 24VDC input
- Relay max switching current: 5A, relay max switching power: 1250W
- No AC power directly connected to intercom
- Coordinate dedicated electrical circuit on UPS (power conditioned)

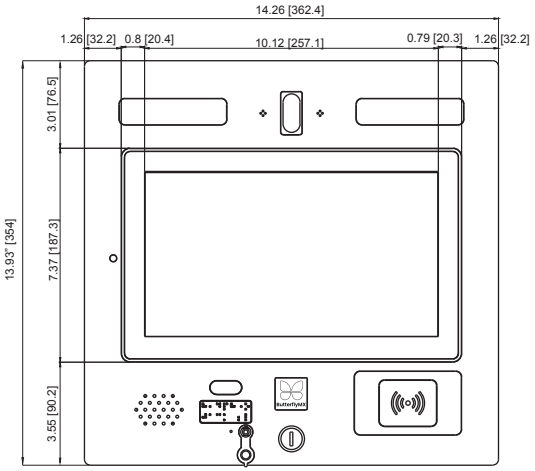
NETWORK REQUIREMENTS

- 2 Mbps ethernet connection - Cat5e/Cat6
- No WiFi
- No DSL
- IP assigned by DHCP by default - for static IP assignment call support
- 4G SIM card is supported (refer to building network requirements for details)

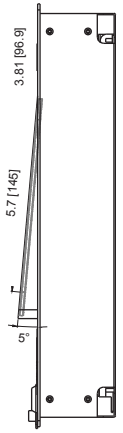
MISC.HARDWARE SPECIFICATIONS

- For camera angle adjustment, call support
- For the installation of the backbox, M4 countersink screws will be needed (not provided)

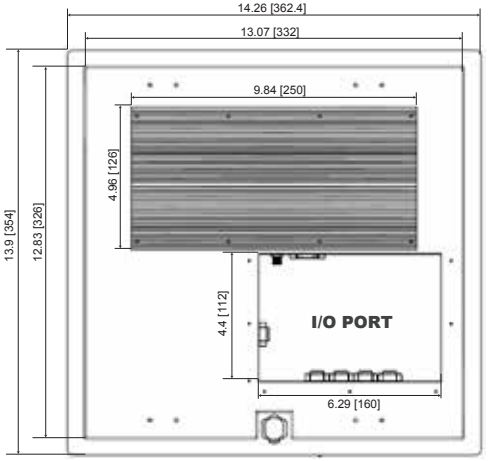
Support:
P: **(800) 398-4416 ext. 2** (Mon-Fri, 6am-10pm EST)
E: **support@butterflymx.com**



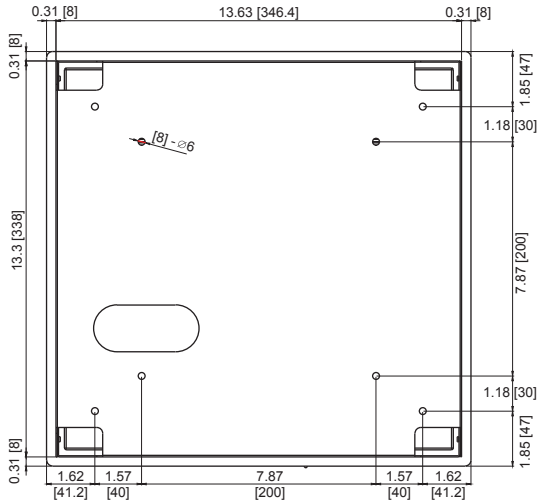
1 INTERCOM FRONT ELEVATION
NOT TO SCALE



2 INTERCOM SIDE
NOT TO SCALE

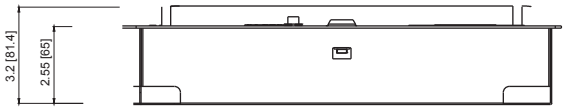


3 INTERCOM BACK ELEVATION
NOT TO SCALE

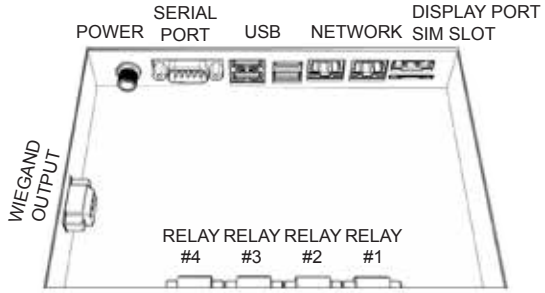


5 BACKBOX FRONT ELEVATION
NOT TO SCALE

7 BACKBOX SIDE
NOT TO SCALE



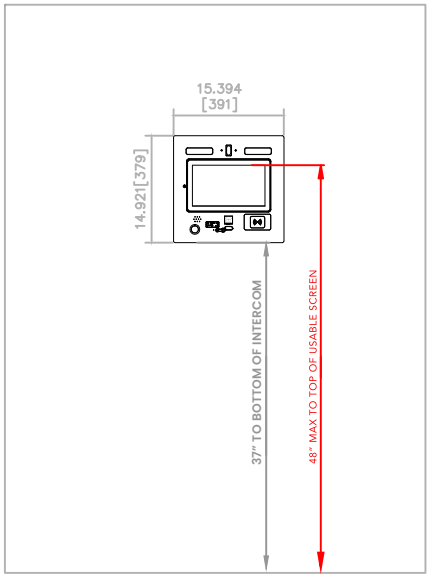
6 INTERCOM BOTTOM VIEW
NOT TO SCALE



I/O PORT DETAIL

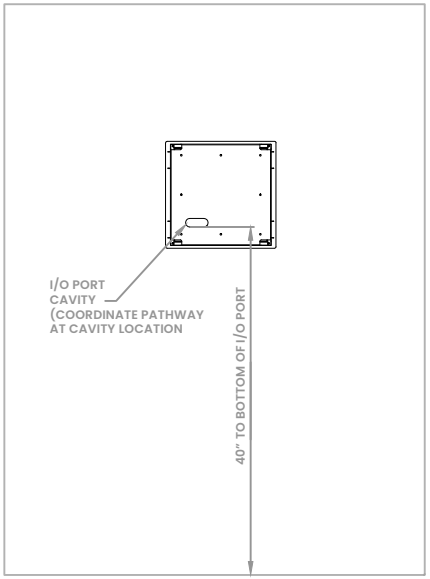
8 I/0 PORT DETAIL
NOT TO SCALE

The following plans are diagramatic. It will be up to the installation contractor to coordinate with associated trades to formalize a complete submission for installation. Intercom mounting height to be ADA Compliant.

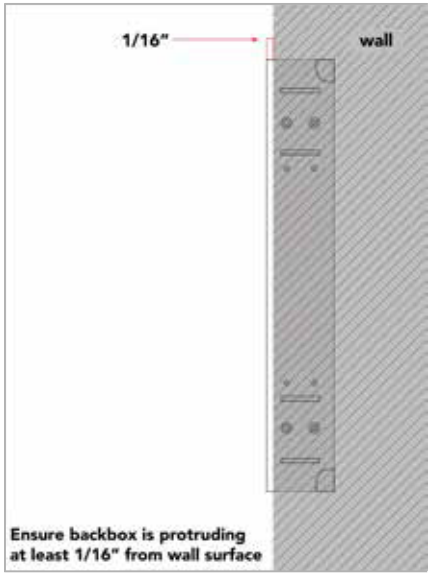


ADA Compliance Requirement

1 FRONT VIEW
NOT TO SCALE



2 FRONT VIEW: BACKBOX PLACEMENT
NOT TO SCALE



3 SIDE VIEW: BACKBOX IN WALL
NOT TO SCALE

NOTES:
1. COORDINATE INTERCOM ON WALL LOCATION SO TOP OF SCREEN IS 48" AFF MAX.
2. COORDINATE BOTTOM OF INTERCOM FROM FINISHED FLOOR WITH RESPECT TO MEASUREMENTS IN DETAIL #1.
3. COORDINATE PATHWAY OF CABLING TO 1/0 PORT LOCATION AS NOTED IN DETAIL #2 (AS VIEWED FROM FRONT ELEVATION).

The following plans are diagramatic. It will be up to the installation contractor to coordinate with associated trades to formalize a complete submission for installation. Intercom mounting height to be ADA Compliant.

MICRO NITE STAR LED

IP66 RATED

DATE:	PROJECT:	TYPE:

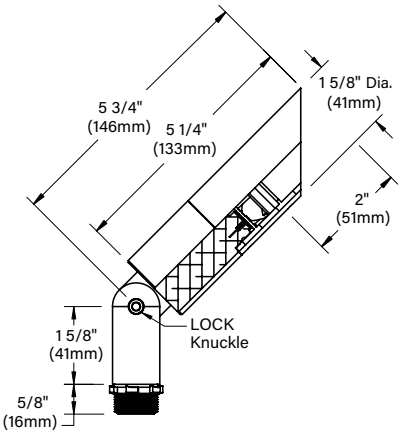
CATALOG NUMBER LOGIC:

**Designed for use with LED transformer. Requires magnetic low voltage dimmer.*

***The 360SL cost is already included in the price of UPM, UPM dual, and Power Canopy.*

CATALOG NUMBER LOGIC
Example: B - MN - LED - e68 - SP - WHP - 12 - 11 - A - 360SL
MATERIAL
(Blank) - Aluminum B - Brass
SERIES
MN - Micro Nite Star
SOURCE
LED - with Integral Dimming Driver (25W min. load when dimmed)*

SHIELDING
11 - Honeycomb Baffle



"A/D" CAP

STANDARD FINISHES

Bronze Wrinkle
(BZW)

Click Here to view larger, full-color swatches of all available finishes on our website.

MICRO NITE STAR LED

IP66 RATED

DATE:	PROJECT:	TYPE:

SPECIFICATIONS

ELECTRICAL	WATTAGE	7W LED
	WIRING	XLPE, 18GA,150C, 600V, rated and certified to UL3321.
	REMOTE TRANSFORMER	For use with 12VAC remote transformer or magnetic transformers only. B-K Lighting cannot guarantee performance with third party manufacturers' transformers.
PHYSICAL	MATERIALS	Furnished in copper-free aluminum (6061-T6) or brass (360).
	BODY	Unibody design with enclosed, water-proof wireway and integral heat sink is fully machined from solid billet.
	KNUCKLE	LOCK Knuckle is integral to the body and features an interior taper machined from solid billet and a second, reverse angle taper allowing full 180° vertical adjustment without the use of aim-limiting serrated teeth. High temperature, silicone 'O' Ring provides water-tight seal and compressive resistance to maintain fixture position. Design withstands 73 lbs. static load prior to movement for optical alignment with a ½" pipe thread for mounting. Optional 360SL provides biaxial source control with 360° horizontal rotation in addition to vertical adjustment.
	CAP	Fully machined and accommodates two (2) lens or louver media.
	LENS	Shock-resistant, tempered glass lens is factory adhered to fixture cap and provides hermetically sealed optical compartment.
	LED	Integrated solid state system and modular design with electrical disconnects allow for easy field upgrade and maintenance. High power, forward throw source complies with ANSI C78.377 binning requirements and exceeds ENERGY STAR® lumen maintenance requirements. LM-80 certified components. Integral, constant current driver. 12VAC/VDC input. 50/60Hz. Proprietary input control scheme achieves power factor correction and eliminates inrush current (limited to <250mA non-dimming). Output, overvoltage, open-circuit, and short circuit protected. Conforms to Safety Std. C22.2 No. 250.13-12.
	DIMMING	Line voltage dimmable via magnetic low voltage dimmer with dedicated neutral conductor. Remote magnetic transformer with LED loads should be loaded to 25% of the transformer VA (watts) rated value.
	OPTICS	Interchangeable OPTIKIT modules permit optical field changes. Color-code: Narrow Spot (NSP) = red; Spot (SP) = green; Medium Flood (MFL) = yellow; Wide Flood (WFL) = blue.
	HARDWARE	Tamper-resistant, stainless steel hardware. LOCK aiming screw is black oxide treated for additional corrosion resistance.
	FINISH	StarGuard, our 15-stage chromate-free process cleans and conversion coats aluminum components prior to application of Class 'A' TGIC polyester powder coating and is RoHS compliant. Powder coat or metal finish options available for brass material.
	WARRANTY	5-year limited warranty.
	CERTIFICATION & LISTING	ITL tested to IESNA LM-79. UL Listed. Certified to CAN/CSA/ANSI Standards. RoHS compliant. Suitable for indoor or outdoor use, in wet locations, and for installation within 4' of the ground. IP66 Rated. Made in the USA with sustainable processes.

c UL us LISTED

RoHS

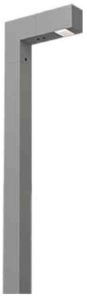
MADE IN THE USA

SQUARE LITESTICK LED

IP66 RATED

DATE:	PROJECT:	TYPE:

CATALOG NUMBER LOGIC:



CATALOG NUMBER LOGIC

Example: SQ-LT - 12 - LED - e72 - BZP - F - PP18B - SF

MATERIAL

Aluminum

SERIES

SQ-LT - Square Litestick

SOURCE

LED - with Non-Dimming Integral Driver*

**Designed for use with 12 VAC. LED transformer.*

***For use up to 24" maximum overall height.*

CAP STYLE

F - Square Shade (Only available with Straight Style)

SQUARE LITESTICK LED

IP66 RATED

DATE:	PROJECT:	TYPE:

SPECIFICATIONS

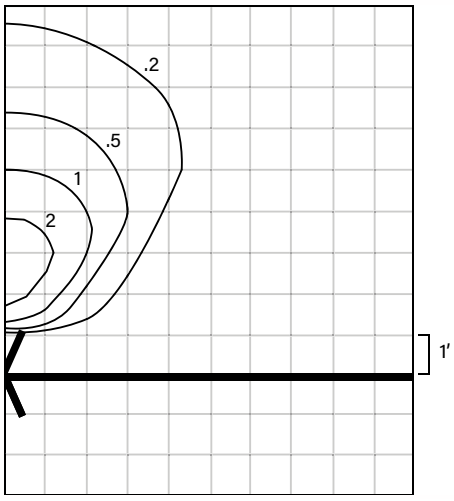
ELECTRICAL	WATTAGE	3W LED
	WIRING	PVC coated, 18AWG, 150V, 60°C rated and certified to UL 1838 standard.
	TRANSFORMER	For use with 12VAC remote transformer or magnetic transformers only. B-K Lighting cannot guarantee performance with third party manufacturers' transformers.
PHYSICAL	STYLE	Machined T adapter enables independent fixture adjustment from a single mounting position.
	MATERIALS	Furnished in copper-free aluminum (6061-T6).
	BODY	Unibody design is fully machined from solid billet and provides enclosed, water-proof wireway and integral heat sink for maximum component life. Integral knuckle for maximum mechanical strength. High temperature, silicone 'O' Ring provides water-tight seal.
	CAP	Fully machined from solid billet with 11/16" lens opening. 360° rotation for precise optic positioning. Tamper resistant, stainless steel set screw.
	STEM	Fully machined, 1" dia. with internal threads for maximum visual appeal. Available in configurable lengths to 24" maximum.
	LENS	Shock-resistant, tempered, frosted glass lens is factory adhered to fixture cap and provides hermetically sealed optical compartment.
	LED	Integrated solid state system and modular design with electrical disconnects allows for easy field upgrade and maintenance. High power, forward throw source complies with ANSI C78.377 binning requirements and exceeds ENERGY STAR® lumen maintenance requirements. LM-80 certified components. Integral, constant current driver. 12VAC/VDC input. 50/60Hz. Proprietary input control scheme achieves power factor correction and eliminates inrush current (limited to <250mA non-dimming). Output, overvoltage, open-circuit, and short circuit protected. Conforms to Safety Std. C22.2 No. 250.13-12.
	POWER PIPE	Provides a clean transition from wiring system to fixture. Schedule 80, 18" PVC housing for direct burial into soil or concrete. Machined 2-1/4" dia. cap for fixture mounting. Optional 6" diameter, molded stability flange, which simplifies installation and projects into substrate to reinforce housing stability. For use with 12VAC remote transformer or magnetic transformers only. B-K Lighting cannot guarantee performance with third party manufacturers' transformers.
	POWER PIPE WITH ADJUSTABLE MOUNT	Features 18" Power Pipe and 18" stem which passes through a machined Delrin® bushing within the Power Pipe Cap. Three (3) stainless steel set screws secure fixture position (Not available with integral transformer).
	HARDWARE	Tamper-resistant, stainless steel hardware.
	FINISH	StarGuard, our 15-stage chromate-free process cleans and conversion coats aluminum components prior to application of Class 'A' TGIC polyester powder coating and is RoHS compliant. Powder coat or metal finish options available for brass material and metal finish option only for stainless steel material.
c UL us LISTED RoHS MADE IN THE USA	CERTIFICATION & LISTING	UL tested to IESNA LM-79. UL Listed. Certified to CAN/CSA/ANSI Standards. RoHS compliant. Suitable for indoor or outdoor use, in wet locations, and for installation within 4' of the ground. IP66 Rated. Made in the USA with sustainable processes.

07/21/2020 SKU-1391
SUB-2818-00

HORIZONTAL FOOTCANDLES (Square Litestick - SQ-LT)

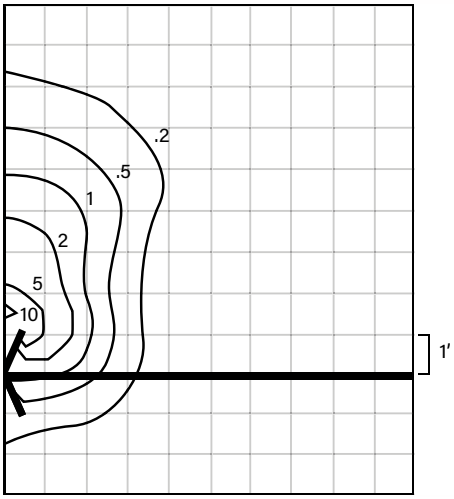
DATE:	PROJECT:	TYPE:

SQ-LT-12-LED-e72 (3W) 4000K (Straight)



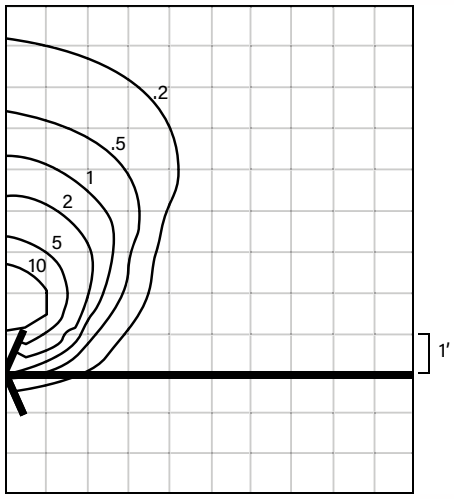
HORIZONTAL FOOTCANDLES
Light Loss Factor = 1.0
Luminaire Lumens = 125
Maximum Calculated Value = 68
2.7K Multiplier = 0.92
3K Multiplier = 0.97
BUG Rating = B0 U2 G1

SQ-LT-12-LED-e72-F (3W) 4000K (Cap Style F)



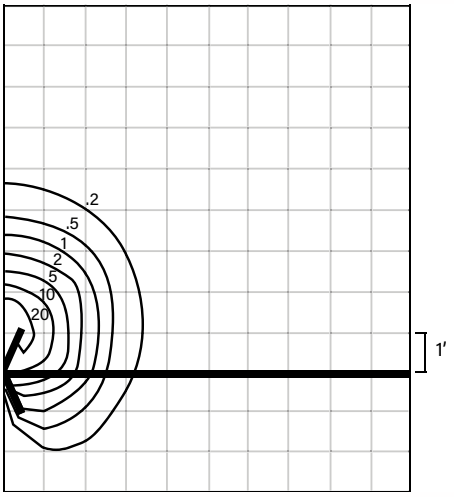
HORIZONTAL FOOTCANDLES
Light Loss Factor = 1.0
Luminaire Lumens = 76
Maximum Calculated Value = 47
2.7K Multiplier = 0.92
3K Multiplier = 0.97
BUG Rating = B0 U1 G0

SQ-LT-45-12-LED-e72 (3W) 4000K (45° Bend)



HORIZONTAL FOOTCANDLES
Light Loss Factor = 1.0
Luminaire Lumens = 133
Maximum Calculated Value = 72
2.7K Multiplier = 0.92
3K Multiplier = 0.97
BUG Rating = B0 U1 G0

SQ-LT-90-12-LED-e72 (3W) 4000K (90° Bend)



HORIZONTAL FOOTCANDLES
Light Loss Factor = 1.0
Luminaire Lumens = 127
Maximum Calculated Value = 86
2.7K Multiplier = 0.92
3K Multiplier = 0.97
BUG Rating = B0 U1 G0

Type:
BEGA Product:
Project:
Modified:

Application
LED recessed wall luminaire with asymmetrical light distribution for the illumination of ground surfaces, building entrances, stairs and footpaths.

Materials
Luminaire housing constructed of die-cast aluminum marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy
Clear safety glass
Silicone applied robotically to casting, plasma treated for increased adhesion
High temperature silicone gasket
Mechanically captive stainless steel fasteners
Stainless steel screw clamps
Composite installation housing

NRTL listed to North American Standards, suitable for wet locations
Protection class IP65
Weight: 1.5 lbs

Electrical

Operating voltage	120-277V AC
Minimum start temperature	-40° C
LED module wattage	4.1 W
System wattage	6.0 W
Controlability	0-10V dimmable
Color rendering index	Ra > 80
Luminaire lumens	231 lumens (3000K)
LED service life (L70)	60,000 hours

LED color temperature

4000K - Product number + **K4**
☐ 3500K - Product number + **K35**
3000K - Product number + **K3**
☐ 2700K - Product number + **K27**
☐ Amber - Product number + **AMB**

Wildlife friendly amber LED - Optional
☐ Luminaire is optionally available with a narrow bandwidth, amber LED source (585-600nm) approved by the FWC. This light output is suggested for use within close proximity to sea turtle nesting and hatching habitats. Electrical and control information may vary from standard luminaire.

LED module wattage	3.6 W (Amber)
System wattage	4.6 W (Amber)
Luminaire lumens	56 lumens (Amber)

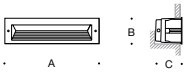
BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

Fully enclosed luminaire with installation housing ensures seamless integration and weathertight operation.

Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Bronze (BRZ)

☐ ☐ ☐
☐ ☐ ☐



LED recessed wall luminaires · asymmetrical

	LED	A	B	C
33 053	4.1 W	6⅝	2¾	5

BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

Updated 08/22/19

Type:
BEGA Product:
Project:
Modified:

Application
Bollards designed for use in the private home and garden that provide direct light towards the ground surface with offering a high degree of visual comfort and safety.

Materials
Luminaire housing and post constructed of extruded and die-cast marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy
Clear safety glass with optical texture
Reflector made of pure anodized aluminum
Silicone applied robotically to casting, plasma treated for increased adhesion
High temperature silicone gasket
Mechanically captive stainless steel fasteners
Galvanized steel mounting stem

NRTL listed to North American Standards, suitable for wet locations
Protection class IP65
Weight: 6.0lbs

Electrical

Operating voltage	Magnetic 12V AC
Minimum start temperature	-40° C
LED module wattage	1.9W
System wattage	4.0W
Color rendering index	Ra > 80
Luminaire lumens	146 lumens (3000K)
LED service life (L70)	60,000 hours

LED color temperature

- ☐ 4000K - Product number + **K4**
- ☐ 3500K - Product number + **K35**
- ☐ 3000K - Product number + **K3**
- ☐ 2700K - Product number + **K27**
- ☐ Amber - Product number + **AMB**

Wildlife friendly amber LED - Optional
Luminaire is optionally available with a narrow bandwidth, amber LED source (585-600nm) approved by the FWC. This light output is suggested for use within close proximity to sea turtle nesting and hatching habitats. Electrical and control information may vary from standard luminaire.

LED module wattage	2.1W (Amber)
System wattage	2.9W (Amber)
Luminaire lumens	119 lumens (Amber)

BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

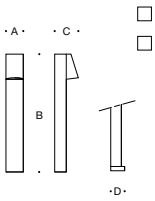
Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Bronze (BRZ)

Available Accessories

536 300VA 12VAC Transformer

See individual accessory spec sheet for details.



Garden and pathway bollard · directed light · hardscape base

	LED	A	B	C
77249	1.9W	3	27½	5

BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

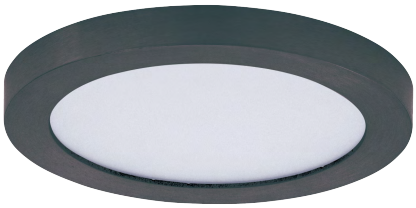
Updated 03/19/19

CHIP | FLUSH MOUNT

57690 | 57692 | 57694| 57695| 57697| 57699

- Size options: 7,"
- Available in 3000k (Made-to-order Color Temperatures available)
- Suitable for Closets according to NEC Section 410.8 & 410.16
- Black (BK)
- Dimmable with Triac and ELV Dimmers
- Easy to install: fits in 3-0 and 4-0 Outlet Box (pancake and mud ring acceptable)
- Pendant light accessory available (sold separately)
- Edge-Lit LED Technology
- Suitable for Wet Location, for use on ceilings outdoor and above showers
- cETLus

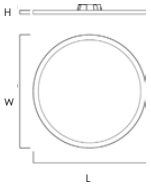
Job Name : _____
Job Type : _____
Quantity : _____
Comments : _____



Round

PRODUCT DESCRIPTION

This low profile flush mount is our entry level Wafer. Manufactured of a plastic shell with aluminum backing, the Chip brings all the look of the Wafer at economical pricing for residential applications. The bright and even lighting effect is delivered by edge-lit technology offering an upscale surface mount solution to substitute recessed can lighting.



MEASUREMENTS

MODEL	DIMENSION	WIRE LENGHT
57692	7"W x 1.25"H x 7"L	8"L

Always consult a qualified electrician before installing any lighting product

FINISHES OPTIONS:

Black (BK)

MATERIAL:

Polycarbonate + Steel

GLASS:

White

AVAILABLE SIZE:

7"

RATINGS:

cETLus
Wet Location
Title 24 JA8 Compliant
Energy Star
ADA

ADDITIONAL:

INSTALL UP/DOWN: UP
RATED LIFE: 50,000 hours
OPERATING TEMPERATURE: -20°C (-4°F), 40°C (104°F)

MAXIM LIGHTING

WESTERN DISTRIBUTION CENTER (HEADQUARTER)
253 NORTH VINELAND AVE I CITY OF INDUSTRY, CA 91746

EASTERN DISTRIBUTION CENTER
4200 SHIRLEY DR. I ATLANTA, GA 30336

P. 626.956.4200 I **F.** 626.956.4225 I maximlighting.com

Tower LED Outdoor Wall Sconce

By ET2 Lighting

A5
COMMERICAL SCONCE #1

LUMENS

Call Us (877) 445-4486

Tower LED Outdoor Wall Sconce
By ET2 Lighting

Product Options

Size: Small

Details

Finish: Black

Dimensions

Small Option Backplate: Width 8", Height 13.4"
Small Option Fixture: Width 8", Height 15", Depth 4", Weight 5.03Lbs

Lighting

Small

Lamp Type	LED Built-in
Total Lumens	1200
Total Watts	15.00
Volts	120
Color Temp	3000 (Soft White)
Average Lifespan (Hours)	35,000
CRI	90
Equivalent Halogen, CFL or LED Bulb Can Be Used	No

Additional Details

Product URL:
https://www.lumens.com/tower-led-outdoor-wall-sconce-by-et2-lighting-ET22359040.html
Rating: ETL Listed Wet

ITEM#: ET22359040

Notes:

Prepared by:

Prepared for:
Project:
Room:
Placement:
Approval:

Created February 8th, 2023

Eyebrow Round LED Outdoor Wall Sconce

By Maxim Lighting

A6
COMMERICAL
SCONCE #2

LUMENS

Call Us (877) 445-4486

Eyebrow Round LED Outdoor Wall Sconce
By Maxim Lighting

Details

Includes 6" wire
Round backplate
Finish: Black
Material: Die Cast Aluminum
Shade Material: Clear Acrylic / Frosted On The Inside
ADA compliant, Title 24 compliant
UL Listed Wet
Warranty: 1 Year
Made In China

Dimensions

Backplate: Diameter 6.5"
Fixture: Width 6.75", Height 6.75", Depth 4", Weight 2.09Lbs
Shade: Depth 2.75", Lower Diameter 6.15", Upper Diameter 5"

Additional Details

Product URL:
https://www.lumens.com/eyebrow-round-led-outdoor-wall-sconce-by-maxim-lighting-MXL1762712.html
Rating: UL Listed Wet

Notes:

Prepared by:

Prepared for:
Project:
Room:
Placement:
Approval:

ITEM#: MXL1762712

Created February 8th, 2023

Westport No Scratch® Bicycle Rack

Capacity: 2 **Warranty: 1 Year**

- » No Scratch® bumper protects bike frames
- » Superior functionality and aesthetics
- » High security
- » Extremely difficult to cut
- » Works with a variety of lock types

Product Specifications

Materials:

- » Stainless Steel or Mild Steel
  - » Outer Tube: 2” x 1” x 0.120” rectangular tubing
  - » Inner Bar: 0.25” x 2” flat bar
- » Santoprene® Rubber Bumper

Finishing Options:

☐ Mild Steel Powder Coat

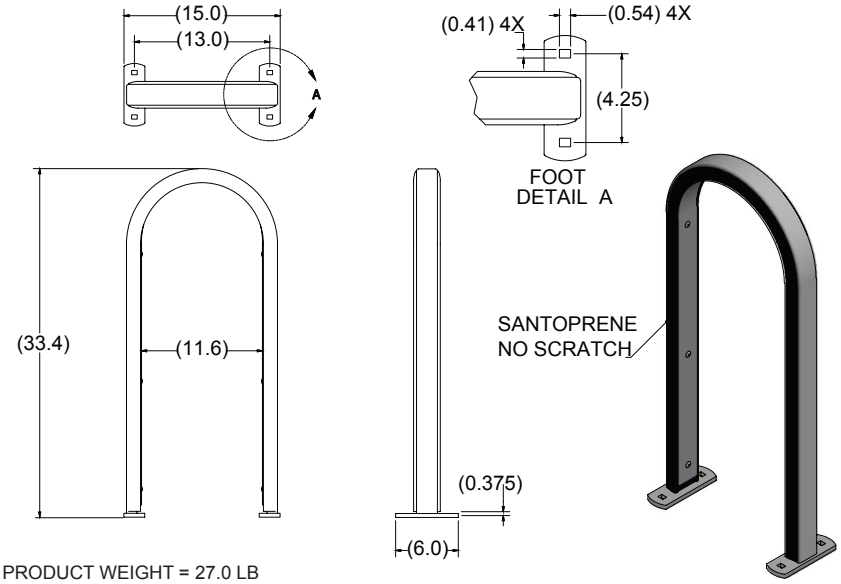
Mounting Options:

☐ Surface Mount: 0.375” x 2” x 6” flat bar foot
☐ Embedded In-Ground Mount into concrete footing
☐ Mounting Rails - Bolted to two aluminum mounting rails - see website for configurations: www.sportworks.com/product/mounting-rails

Hardware Options:

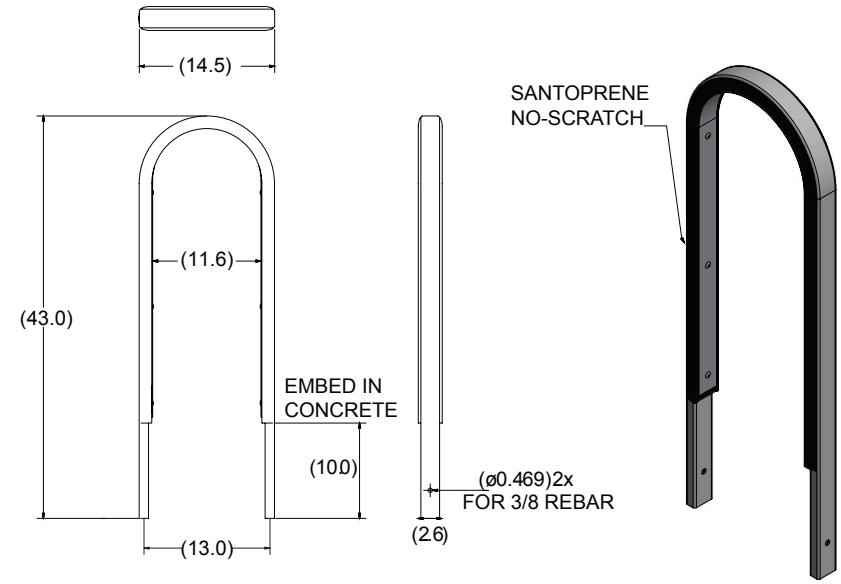
☐ Concrete Wedge Anchors (standard)
  ☐ + Tamper Resistant Nuts (recommended)
*For other hardware options contact our sales and support staff.

Surface Mount Dimensions



PRODUCT WEIGHT = 27.0 LB

Embedded Mount Dimensions



PRODUCT WEIGHT = 27.9 LB

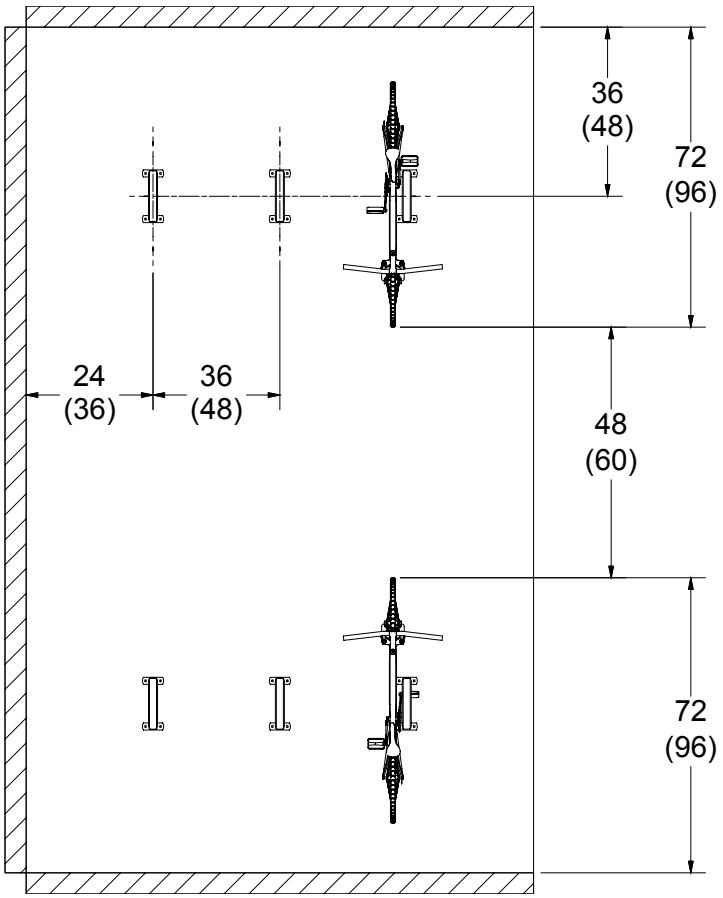
* All dimensions are in inches

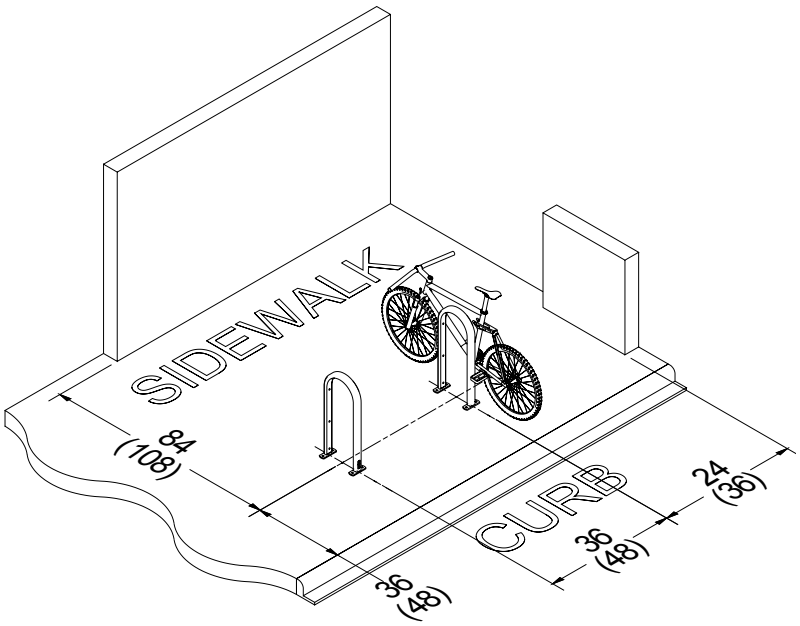
sportworks®

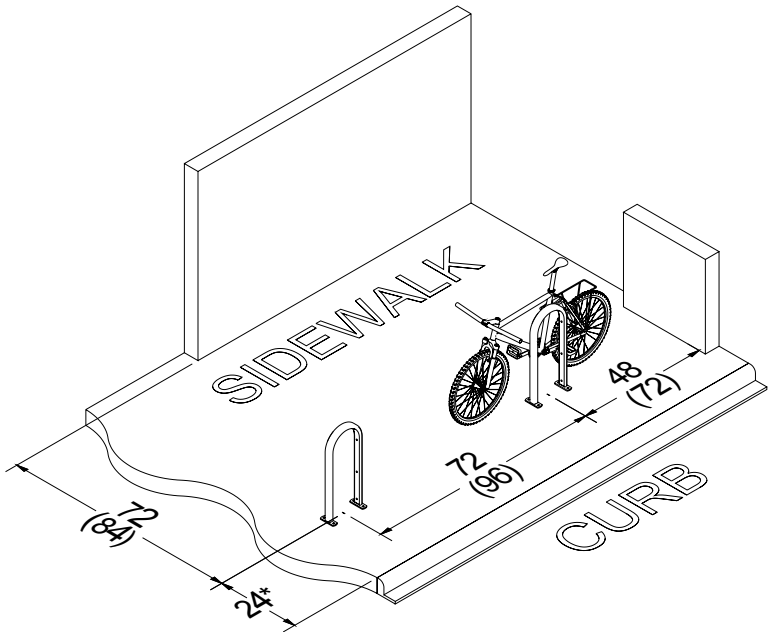
Spacing and Setbacks

*Many local governments will specify minimum spacing and setback requirements

**All dimensional drawings are in inches. Minimum dimensions are placed above the recommended dimensions. Recommended dimensions are in ().







Powder Coat Options:

*All colors are available in both Powder Coat and Thermoplastic (Plascoat) except for Dark Blue. Dark Blue is only available as a powder coat color.

Black

Contractor:

Job:

Notes:

Contact Information:

888-661-0555
sales@sportworks.com
www.sportworks.com

15540 Woodinville Redmond Rd NE, Bldg A-200,
Woodinville, WA 98072

MADE IN WASHINGTON

U.S. GREEN BUILDING COUNCIL LEED USGBC

Declare.

VPI Quality Windows

Envision Series

Commercial Casement and Projected Windows for Retrofit and New Construction

Envision, achieving new heights

VPI Quality Windows, a leader in high performance vinyl commercial window systems, introduces the next generation of windows for mid- and high-rise building applications, *the Envision Series.*

Energy codes continue to evolve, requiring new approaches to building cladding and fenestration design. A ground-breaking new window and door system, *the Envision Series* combines the proven energy efficiency of PVC with the robust structural strength needed in high wind load applications. Providing new design freedom with multiple fused colors, the Envision Series is available in a wide variety of weather-tight configurations.

Strength and beauty

A vinyl window designed to meet the strict structural performance standards of the AW classification, Envision provides thermal performance not possible in traditional aluminum or fiberglass windows and gives you substantial design flexibility. Whether it's a building-length ribbon wall or a single window configured for your contemporary mixed use project, every panel can be designed for the space behind it. Architectural bronze on the exterior and adobe on the inside? It can now be done with Envision's patented dual-coextrusion, color infused process.

Aluminum windows have become all but nonexistent in new residential applications. Cold and inefficient, they have been replaced by vinyl framed products. Available in fixed, hopper, casement and door operation types or combinations of each, Envision's leak proof fusion welded corners and warm, condensation resistant vinyl frames are here to offer a step up for the commercial window market.

The evolution is complete for mid- and high-rise commercial and mixed use applications. The future belongs to the Envision Series!

ENVISION SERIES

Specify the ideal mix of strength, energy performance and aesthetics with Envision!

WE SELL ENERGY STAR

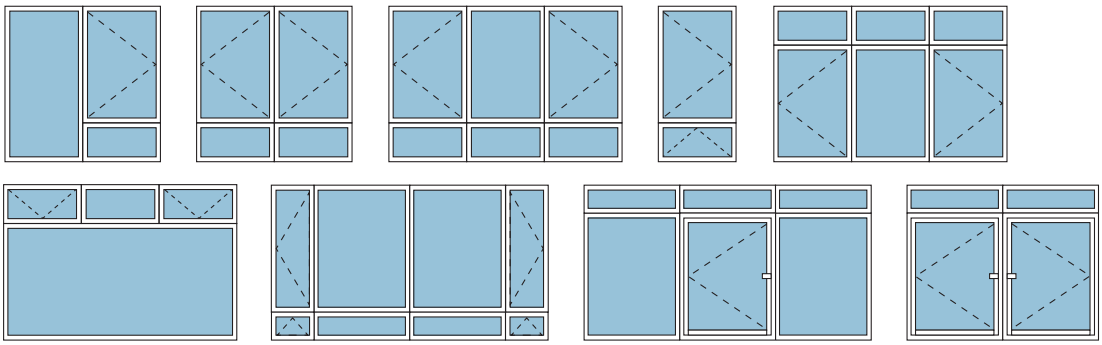
VPI Quality Windows manufactures ENERGYSTAR® qualified products, that use less energy.

Commercial-Rated Performance:

Mid- To High-Rise Construction

PRODUCT	PERFORMANCE							
Window Type	**Test Size**	**AAMA**	**Infil (CFM/ft2)**	**Exfil (CFM/ft2)**	**Water (PSF)**	**U-Factor**	**SHGC**	**VT**
Casement-Int. Glazed	36" x 60"	CW-PG60	.01	.01	9.20	.27	.14	.32
Hopper-Int. Glazed	60" x 36"	CW-PG55	.03	.02	8.35	.27	.14	.32
Door Type	**Test Size**	**AAMA**	**Infil (CFM/ft2)**	**Exfil (CFM/ft2)**	**Water (PSF)**	**U-Factor**	**SHGC**	**VT**
Inswing-Int. Glazed	41" x 96"	CW-PG50	.03	.02	7.52	.25	.16	.35
Inswing-Int. Glazed ADA	41" x 96"	CW-PG50	.26	.20	0.00	.25	.16	.35
Outswing-Int. Glazed	41" x 96"	CW-PG45	.01	.01	6.90	.25	.16	.35
Outswing-Int. Glazed ADA	41" x 96"	CW-PG55	.03	.04	0.00	.25	.16	.35
Combination Units	**Test Size**	**AAMA**	**Infil (CFM/ft2)**	**Exfil (CFM/ft2)**	**Water (PSF)**	**U-Factor**		
Casement - Picture - Casement	144" x 78"	AW-PG60	.01	.01	9.20	.27	.14	.32

Standard Configuration Features:



PRODUCT	STC & OITC PERFORMANCE						
Window Type	**Test Size**	**Glass Configuration**	**Spacer Size**	**Argon**	**Lami**	**STC**	**OITC**
Casement-Int. glazed	Testing in Progress						
Fixed-Int. glazed	Testing in Progress						
Hopper-Int. glazed	Testing in Progress						
Picture over Awning (Int Glazed)	Testing in Progress						
Picture over Hopper (Int Glazed)	Testing in Progress						
6-Lite (Interior Glazed)	Testing in Progress						

Standard Features on all Configurations:

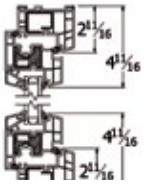
- **COMPRESSION-SEAL DESIGN** enhances protection against water intrusion, air infiltration, and allows ease of glass replacement
- **VINYL FRAMES** Increase thermal performance, add color options, and reduce condensation
- **FRAME AND SASH** have hollow compartments that allow for optimal reinforcement required in heavy commercial applications
- **FUSION WELDED CORNERS** provide environmental comfort and protect against leaks
- **MULTIPLE LOCKING POINTS** ensure security and provide a triple weather seal for superior air and water resistance
- **EASY TO OPERATE HARDWARE** delivers a wide opening for ventilation and cleaning
- **INTEGRAL BAR** allows for freedom of design while maintaining structural and thermal performance

Selected CAD Details

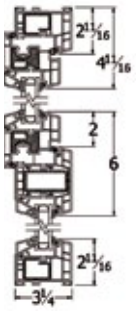
Hopper Window

3¼" Frame Depth

Hopper
Horizontal Cross Section



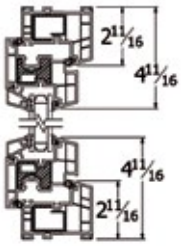
Hopper Vertical
Horizontal Cross Section



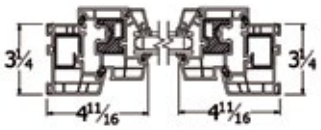
Hopper Above Picture
Horizontal Cross Section

Casement Window

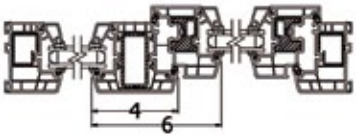
3¼" Frame Depth



Casement
Vertical Cross Section



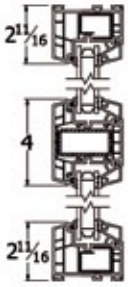
Casement
Horizontal Cross Section



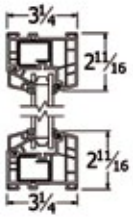
Casement Picture
Horizontal Cross Section

Fixed Window

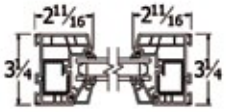
3¼" Frame Depth



Fixed Above Picture
Cross Section



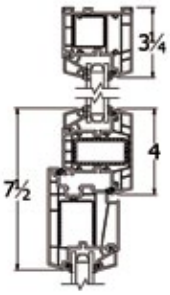
Fixed Horizontal Cross
Section



Fixed Vertical Cross
Section

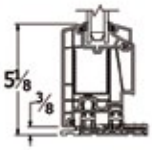
Swing Door

3¼" Frame Width

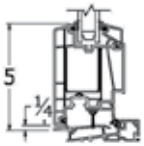


Outswing Door with
Transom Above

Inswing Door Common



Outswing Door Low Profile
(LP)



Outswing Door High Profile
(H P)

Envision by VPI Quality Windows

Test- and Performance-Proven

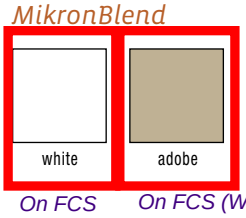
Envision features a proprietary vinyl compound. Formulated to withstand the toughest conditions and standards, it is tested tough and real-world proven. This vinyl compound has been through the harshest field test environments: hot, dry Arizona desert, Floridian heat and humidity, and extreme Midwestern weather.

Additionally, ASTM test procedures verify this vinyl's Delta-E performance. It surpasses strict industry measures for color fastness and UV degradation and won't chalk or appreciably fade, even after years of weather performance.

The system incorporates superior, patent-pending, SuperCapSR™ thermally-fused color technology, which absorbs less heat to prevent heat-related profile distortion, even in darker colors. SuperCapSR is available in architectural bronze, adobe, black, and silver (replicating a clear anodized aluminum finish). Also available in white, adobe, or almond MikronBlend® vinyl compound.

Colors:

MikronBlend



On FCS *On FCS (Woodtone)*

Exceeds Tough Industry Standards:

- AAMA 613 for Color Retention
- AAMA 614 for Weathering
- AAMA 615 for Durability, testing to 12x harder than competitive paint coatings
- Tested and passed per ASTM: D3363, D4214, D2247, D4585, D714, D523, D4726, D3359, D4803 and D968

Celebrating our 25th anniversary

A quarter century of window manufacturing has resulted in VPI's ability to manufacture the highest quality vinyl windows in the United States, offering the best combination of new technology, performance and value. Our dedication to quality gives you the confidence that your windows will provide long-lasting, durable performance.

VPI is known throughout the western United States for having industry leading vinyl window technology and manufacturing processes that are specified and used by architects, envelope consultants, developers, general contractors and homeowners. We have over 120,000 square feet of manufacturing space located in Spokane, WA and Beaverton, OR, with on-site engineering support in both locations. If your commercial or residential project demands superior windows and doors, the clear choice is *VPI Quality Windows*.

ENVISION SERIES

vpi Quality Windows

www.vpiwindows.com
(800) 634-1478 | info@vpiwindows.com
3420 E. Ferry, Spokane, WA 99202

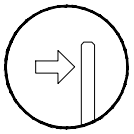
TC-470 SERIES

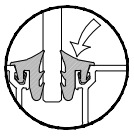
TC-470 SERIES THERMAL/IMPACT
2 1/4" X 4 1/2" WINDOW WALL SYSTEM

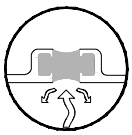

Penthouse at The Plaza Luxury Condominiums, Fort Lee, NJ

MULTIPLE CONFIGURATIONS AVAILABLE

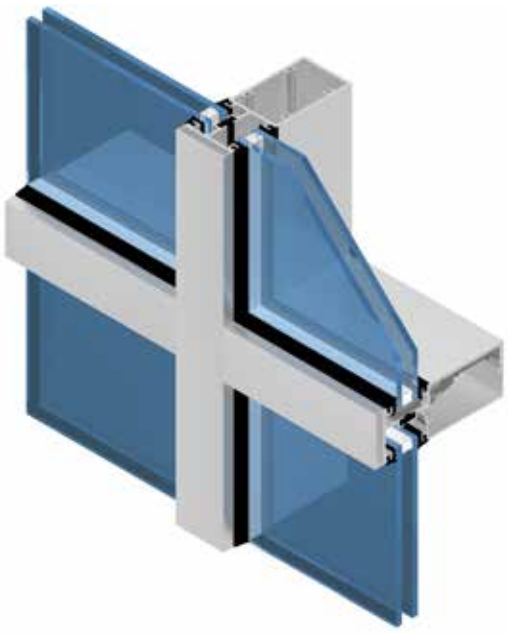
VISIT OUR WEBSITE AT: WWW.ARCADIAINC.COM FOR THE FOLLOWING:
Product Specifications (PDF) • Elevations & Plan Details (PDF & DWG) • Product Warranty Information (PDF) Maintenance & Cleaning Guidelines (PDF) • Product Installation Manuals (PDF)


Offset Glazed


Top Load


Thermal

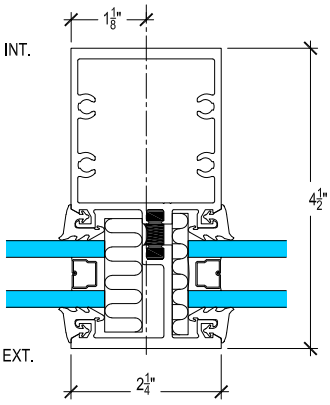

Impact



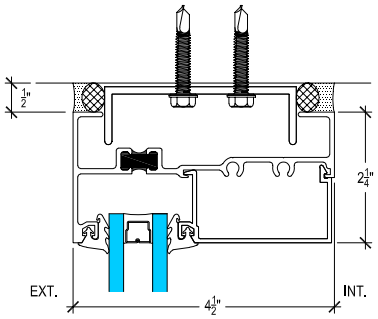
TC-470 SERIES
FEATURES AND OPTIONS

- Can be made to meet impact rated hurricane codes - optional
- Tested performances for hurricane impact resistant - ASTM 1886/1996
- Low air & water infiltration performance
- 2 ¼" x 4 ½" depth frame - versatile window wall system
- 4 ½" square 2-pc snap in tube available for mulling sections together in line and at 90 degree angles
- Set up for interior glazing - can accommodate 1", 1 1⁄16" or 1 ⅛" insulated glass
- Unlimited configuration options to accommodate any combination of fixed & operable windows
- Male-Female Jamb members to accommodate sections of window wall being mulled together
- Extruded - custom designed sub sills available to accommodate this system
- Ideal for slab to slab installations - high structural & water performance
- Installation videos available on YouTube search under "Arcadia Door"
- Stock finishes - dark bronze or satin clear anodized - class 1 - standard
- Duranar or Valspar finish or other anodized finish - optional

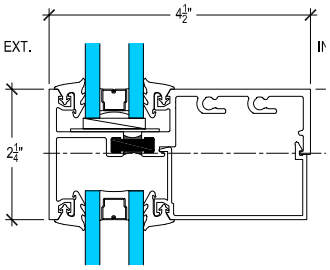
Can be made to meet impact rated hurricane codes - optional



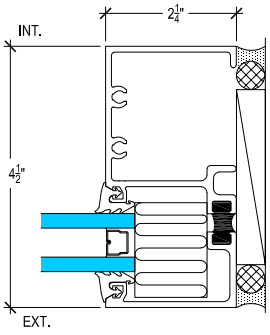
VERTICAL



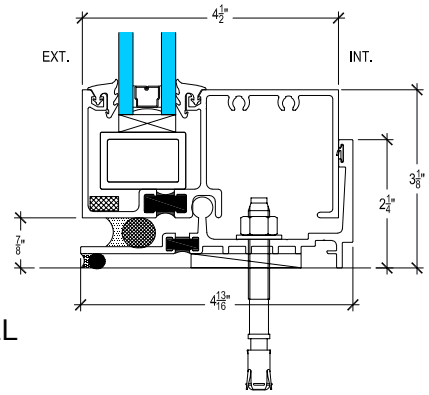
HEAD



HORIZONTAL



JAMB



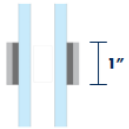
SILL

FEATURES

MUNTINS

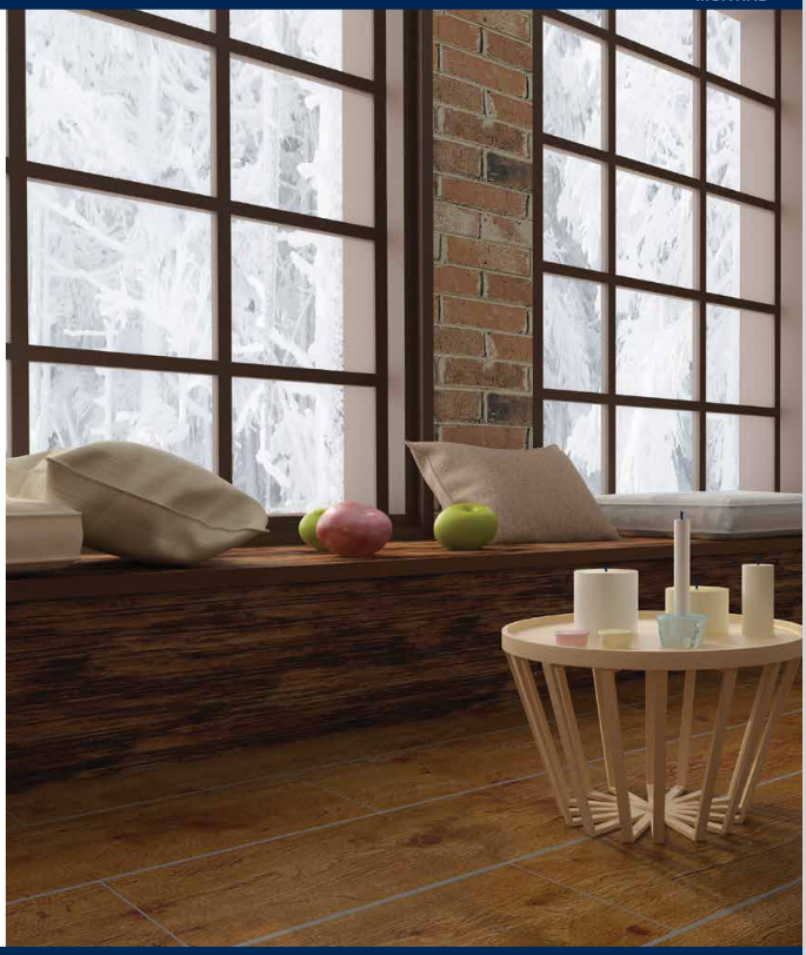
Use muntins to create interest or fit particular architectural designs. Arcadia Custom products can be ordered with custom grid patterns in either SDL or TDL options.

SDL | Simulated-Divided-Lite



SDL | Simulated-divided-lite

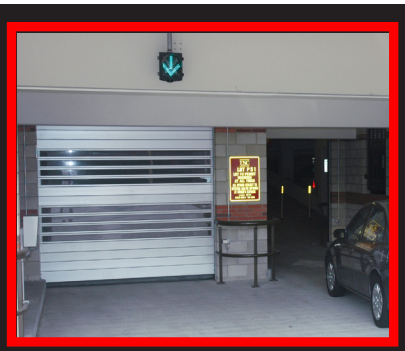
Available in all products



TYPICAL FINISH FOR STOREFRONT
(RETAIL GLAZING AND DOORS, LOBBY GLAZING AND DOORS)

RYTEC
HIGH PERFORMANCE DOORS

High Speed Doors for Parking Applications



COMMERCIAL · GOVERNMENT · RESIDENTIAL · PUBLIC GARAGES · UNIVERSITIES · HOTELS · ARENAS · HOSPITALS

High Performance Doors for Parking Applications

Spiral®

SmartSurround™ ADVANCED DETECTION & ALERT SYSTEM

- Exclusive, patented technology
- Rigid aluminum double walled slats with integral rubber weatherseals
- Insulated, ventilated or vision slat options available
- Opening speed up to 60 ips

Spiral® VT (Ventilated)

SmartSurround™ ADVANCED DETECTION & ALERT SYSTEM

- Maximize fresh air with ventilated slats to meet ventilation requirements of garage
- Provides air flow and security for high-speed, high-cycle applications
- Opening speed up to 100 ips

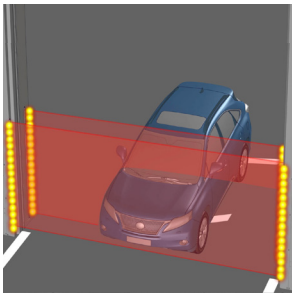
At Jackson St Door

At 10th Ave Door

High Performance Technology

Patented Spiral® Technology

Our Spiral Series doors offer a unique spiral track design that ensures no metal-to-metal contact for ultra-quiet operation. This also guards against wear and tear on the aluminum panel, resulting in minimal maintenance, preserved aesthetics and longer life.



Safety Focused

Rytec offers multiple standard and optional safety features to provide safeguards and assure operational standards.

- SmartSurround™ Detection & Alert System
- Advanced³ Light Curtain Safety System
- Pathwatch®/Pathwatch II Safety Light Systems
- Electric reversing edge with Ry-Wi® Wireless System
- Dual thru-beam photo eyes

Performance Under Control

Our next generation System 4® and MS4 Remote door controllers provide greater functionality and unprecedented efficiency. Featuring smart technology, easy installation and a standard NEMA 4X rated enclosure.

Reduced Maintenance Costs

- Specifically engineered for high-traffic, high-cycle environments
- Assured operation without expensive ongoing maintenance
- Fabric and rubber door models can withstand vehicle impact and be reset in seconds, without tools

Lasting Reliability

- Engineered to withstand the daily rigors of use and last for millions of operating cycles
- High-speed operation assures smooth, efficient, high-volume traffic flow
- Custom manufactured for optimal fit and performance

Improved Security

- Rapid opening and closing prohibits unauthorized access
- High speed operation optimizes traffic flow by reducing waiting time
- Cycle speeds deter 'tailgating' or 'piggybacking' activity

Stylish Aesthetics

- Modern, crisp lines and materials coordinate with many types of architectural styles
- Variety of RAL classic or custom match colors and additional options to help fit the visual appeal of individual structures and buildings

North America's Leading Independent High Performance Door Manufacturer

Quality. Performance. Reliability.

Rytec doors offer our customers the highest value and day in, day out performance — and are supported by the knowledge and expertise of dedicated employees, authorized dealers and trained installers across North America. With over 100,000 doors in operation — many with millions of operating cycles — our doors provide energy savings, safety and security and require only minimal maintenance.

American Owned, American Made

Watch All Rytec Testimonials

*Miami-Dade County, Florida NOA No. 17-1106.02, 11/8/2022. Florida Building Code: FL# FL16612

RytecDoors.com
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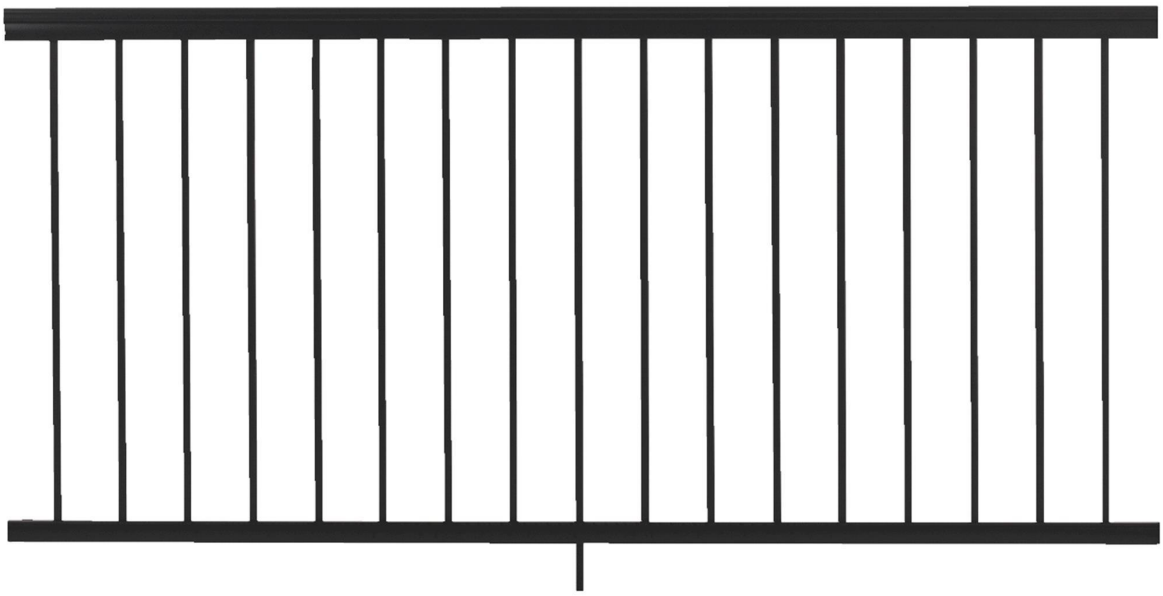
info@rytecdoors.com
P: 262.677.9046 F: 262.677.2058
One Cedar Parkway, PO Box 403
Jackson, WI 53037-0403

RYTEC® HIGH PERFORMANCE DOORS

ON-SITE SECURITY FENCE AND GUARDRAILS

Bronze Matte



GLASS RAILINGS AND JULIET PANELS

PROJECT MANUAL

MILL CREEK – MODERA INTERNATIONAL DISTRICT

1032 S JACKSON ST. SEATTLE, WA

April 24, 2023

OWNER:
MILL CREEK RESIDENTIAL TRUST 1417 116TH AVE NE, SUITE 208
BELLEVUE, WA 98004

ARCHITECT:
TISCARENO ASSOCIATES, PS 1200 6TH AVE, SUITE 605
SEATTLE, WA 98101

DIVISION 04 – MASONRY

04 20 00 Unit Masonry – YT

DIVISION 05 – METALS

05 50 00 Metal Fabrications - MCRT
05 50 10 Exterior Metal Fabrications - MCRT

05 73 00 Prefabricated Balconies and Decorative Railings - MCRT

07 33 64 Vegetated Roof Assemblies

07 42 00 Metal Wall Panels - MCRT
07 46 00 Siding – MCRT

07 62 00 Sheet Metal Flashing and Trim – C2DG

DIVISION 08 – OPENINGS

08 11 10 Hollow Metal Doors and Frames - MCRT

08 16 60 Aluminum and Glass Sliding Glass Doors - MCRT

08 33 10 Overhead Coiling Doors – MCRT
08 36 10 Sectional Doors

08 53 13 Vinyl Windows and Doors - MCRT

08 80 00 Glazing - MCRT

08 90 00 Louvers & Vents - MCRT

DIVISION 09 – FINISHES

09 30 00 Tiling - MCRT

09 96 50 Graffiti Resistant Coatings - MCRT

DIVISION 10 – SPECIALTIES

10 14 00 Signage – MCRT

10 82 10 Rooftop Mechanical Screens - MCRT

DIVISION 12 – FURNISHINGS

12 93 00 Site Furnishings - CA
12 93 10 Bicycle Racks - MCRT

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 14 13 Unit Paving - CA
32 8400 Planting Irrigation – CA

32 9300 Landscape Planting - CA

SECTION 042000

UNIT MASONRY

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Concrete masonry units.
2. Installation of architectural precast concrete units.
3. Mortar and grout.
4. Insulation for CMU cores at Garage and other exterior locations without cavity insulation.
5. Reinforcing steel, masonry joint reinforcement, ties and anchors.
6. Through-wall flashing.
7. Temporary facilities, including but not limited to scaffolding, temporary heating, tarps, lifts, protection and other required items. Comply with requirements of Section 011000 – GENERAL REQUIREMENTS and as specified herein below.
    a. Hoisting Equipment: The Masonry contractor shall furnish, install, and maintain in safe and adequate condition, all hoisting equipment, operating personnel, and rigging that is necessary for the proper execution of the Work of this Section.
    b. Staging, Planking and Scaffolding: The Masonry contractor shall furnish, install and maintain in safe and adequate condition, all staging, planking and scaffolding that is necessary for the proper execution of the Work in this Section.

B. Refer also to the Structural Drawings for additional requirements. In case of conflict, the Structural Drawings shall govern.

C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 061600 - SHEATHING for wood panel and gypsum sheathing.
2. Section 072100 - THERMAL INSULATION for wall insulation.
3. Section 072710 - WEATHER BARRIERS for sheet building wrap, and associated flexible flashing.
4. Section 078440 - FIRE-RESISTIVE JOINT SYSTEMS for fire-resistive joint systems openings in masonry walls and at heads of masonry walls.
5. Section 079200 - JOINT SEALANTS for sealing control and expansion joints in unit masonry.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:
   1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

C. Samples for Verification: For each type and color of the following:

   1. Exposed concrete masonry units.
   2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
   3. Weep holes/vents.
   4. Accessories embedded in masonry.

D. Qualification Data: For testing agency.

E. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

   1. Masonry units:

      a. Include material test reports substantiating compliance with requirements.
      b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   6. Joint reinforcement.
   7. Anchors, ties, and metal accessories.

F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

   1. Include test reports, per ASTM C 780 for mortar mixes required to comply with property specification.
   2. Include test reports, per ASTM C 1019 for grout mixes required to comply with compressive strength requirement.

G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Preconstruction Testing Service: The Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by the Owner. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

1. Prism Test: For each type of construction required, per ASTM C 1314.

E. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01. Agenda shall include protection of air barrier membrane during construction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection of Air Barrier Membrane: During construction, protect air barrier membrane from penetrations which allow air to pass through air barrier assemblies. Engage original installer to repair damage promptly using identical materials and methods of installation, and to the satisfaction of the Architect.

B. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

C. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

E. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

F. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective work within specified warranty period.

1. Warranty Period: As standard with manufacturer unless indicated otherwise.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 CONCRETE MASONRY UNITS (CMUs)

A. Concrete Masonry Units: ASTM C 90, normal weight unless indicated otherwise manufactured to dimensions 3/8 inch less than nominal dimensions.

B. Shapes: Provide standard shapes indicated and as required for building configuration. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

1. Where shown, provide lip units for concealing shelf angles
2. Provide solid units at shelf angles, lintels, copings and where required.

2.3 MORTAR AND GROUT MATERIALS

A. Regional Materials: Provide aggregate for mortar and grout, cement, and lime that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Available Products:
   a. LanXess; Bayferrox Iron Oxide Pigments.
   b. Davis Colors; True Tone Mortar Colors.
   c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.
2. Refer to exterior matrix for colors.

E. Aggregate for Mortar: ASTM C 144. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

F. Aggregate for Grout: ASTM C 404.

G. Cold-Weather Admixture: Non-chloride, non-corrosive, ASTM C 494, Type C.

H. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951 or as indicated on structural drawing.

1. Interior Walls: Mill-galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size and Spacing: As required by Code.
4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Multiwythe Masonry:

1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.

2.5 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.

B. Adjustable Anchors for Connecting to Structure: Provided under Section 051200 – STRUCTURAL STEEL FRAMING.

C. Partition Top Anchors: Refer to Structural Drawings.

D. Stone/Precast Anchors: Fabricate dowels, cramps, and other stone anchors from stainless steel.

2.6 MISCELLANEOUS ANCHORS

A. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.7 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing:

1. Asphalt-Coated Copper Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
2. Available Products:
   a. Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
   b. Polytite Manufacturing Corp.; Copper Fabric Flashing.
   c. York Manufacturing, Inc.; York Copper Fabric Flashing.
   d. Or approved equal

B. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 – SHEET METAL FLASHING AND TRIM.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates. Verify compatibility between flashing materials and substrates.

D. Drip Edge: Provide type 316, 0.016 inch (0.40 mm) thick stainless steel drip edge plates with factory applied adhesive strip for all through-wall flashing conditions. Provide preformed outside and inside corner drip plate corners with smooth uninterrupted soldered seams and hemmed drip edges to maintain continuity. See drawings for profiles required.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Provide strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings or equivalent. Available products:

1. Advanced Building Products Inc.; Mortar Break II.
2. Mortar Net USA, Ltd.; Mortar Net.

F. Brick Ledger Angles: Provide brick ledger angles in accordance with structural drawings and material requirements of Section 055000 – Metal Fabrications.

2.9 MASONRY-CELL INSULATION

A. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Concrete Block Insulating Systems; Korfil.
b. Shelter Enterprises Inc.; Omni Core.

2. Locations: Refer to drawings.

2.10 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available Manufacturers:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

B. Mild Detergent Cleaner: Provide mild detergent cleaner for cleaning adjacent windows and metals.

C. Locations: Exposed brick locations.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement and lime.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

C. Pigmented Mortar: Use standard colored cement product unless otherwise indicated in matrix. Pigments shall not exceed 10 percent of portland cement by weight. Provide three colors plus gray as selected by the Architect.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Cover windows and fenestration with 6 mil. polyethylene sheets, and maintain until final cleaning.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed. Do not use units cut to less than one-half size.

E. Do not install concrete masonry units with more than 5 percent damage to the face. Do not install brick units which will show defects after installation.

F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

G. Provide proper control joints and gap at top of wall, above and below windows as indicated on the structural drawings.

H. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs. Prior to installation review bond pattern with Architect.
1. Where no bond pattern shown, use one-half running bond. Where bricks larger than standard modular are used, lay brick in one third running bond.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

F. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

G. Coordinate with elevator shaft requirements prior to start of work.

H. Refer to architectural and structural drawings for required space between walls and structure.

I. Refer to architectural and structural drawings for required space between windows and masonry veneer.

J. During inclement weather, cover masonry with plastic sheeting or visqueen for 24 hours after setting courses to limit efflorescence.

K. Build non-load-bearing interior partitions full height of story to 1/2" less underside of solid floor or roof structure above, unless otherwise indicated.
   1. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:

   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not furrow bed joints or slush head joints.

C. Set precast trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

   1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
   2. Allow cleaned surfaces to dry before setting.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches. Space reinforcement not more than 16 inches o.c.

B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure. Attachment to structure shall be performed under Section 051200 – STRUCTURAL STEEL FRAMING.
3. Space anchors as indicated on structural drawings, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.7 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through insulation and sheathing to wall framing and to concrete and masonry backup as applicable with metal fasteners of type indicated.
2. Embed tie sections in masonry joints. Provide air space indicated on the Drawings between back of masonry veneer and face of insulation.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors per structural notes and details, as required by Code and recommendations of Brick Institute of America.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 - JOINT SEALANTS but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

D. Joint locations: As shown, but not less than the following:

1. Vertical control joints: Spaced not more than 5 feet from corners nor more than 40 feet on center for each wall surface.
2. Horizontal control ("soft") joints at relieving angles.
3. Comply with Brick Institute of America Tech Note 18A *Expansion Joints*.
4. Precise locations of all joints shall be obtained from the Architect before beginning work.

3.9 LINTELS

A. Install steel lintels where indicated on structural drawings.

B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows, unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe, and extending 6" above to of cavity drainage material.
3. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge covered with elastomeric membrane, lapping at least 4 inches.
4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use open head joints to form weep holes.
2. Space weep holes 24 inches o.c., unless otherwise indicated.

E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

F. Install vents in head joints in exterior wythes at spacing indicated, in course directly below shelf angles, wall caps, masonry sills, soffits and top of brick veneer walls.

G. Install metal drip edge plate in accordance with architectural details and manufacturer’s requirements.

3.11 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.12 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof. Test types as determined by the independent testing and inspection agency.

3.13 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, around penetrations and where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
7. Verify with local jurisdiction to confirm acceptable cleaning products.
8. Clean stone trim to comply with stone supplier's written instructions.
9. Clean windows and fenestration with mild detergent cleaners.

3.14 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site, and provide for legal recycle or return to manufacturer.

END OF SECTION

SECTION 055000

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items.

B. Delegated Design: Design metal fabrications, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.02 RELATED REQUIREMENTS

A. Section 099000 - Painting and Coating: For surface preparation and application of prime only steel surfaces.

B. Section 099600 - High Performance Coatings: for surface preparation and application of high-performance coatings to steel fabrications.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

G. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories; with clear and consistent piece markings. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.05 QUALITY ASSURANCE

A. Design embeds under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated for this Project in material, design, and extent.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

C. Plates: ASTM A 283.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: See Section 09 90 00.

H. High Performance Primer and Paint: See section 09 96 00.

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209/B 209M, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221/221M, Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.04 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
   2. Rungs: one-inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.
   4. Space rungs 6 inches from wall surface for elevator pit ladder. Coordinate allowable with elevator manufacturer.
   5. Wall anchor bracket: 3/8 x 2 inches 'L' brackets welded to rungs and drilled for 3/8" diameter bolt attachment to wall.

B. Bollards: Steel pipe with steel cap, as detailed; prime paint finish.

C. Lintels: As detailed; hot-dip galvanized and prime paint finish.

D. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

E. Elevator Hoistway Rail Support Columns: Column sections; prime paint finish.

F. Stair Gate: Welded steel tube frame construction, fabricated to detail indicated, gate hardware specified in Section 08 71 00, prime paint finish.

G. Welded Heavy Duty Bar Grates with Anchored Embed Angle Frames:
   1. Elevator Pit Sump Grate: 1-1/4 x 1/4 inches 12 WH 4; galvanized finish.
   2. Louver Well Grate: 2-1/2 x 1/4 inches15 WH 4; galvanized finish.

H. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

I. Structural Steel Embeds: As detailed on drawings. Prime paint at conditioned locations, and galvanized at non-conditioned areas.

J. Ships Ladders and Railings:
   1. Engineer, fabricate and install metal ship's ladders for locations indicated in Drawings and complying with Regulations.
   2. Quality Assurance: Comply with the following requirements as applicable to ship's ladder:
      a. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
         1) Concentrated Live Load: 500 pounds.
      b. 29 CFR 1910.27 - Fixed ladders; Occupational Safety and Health Standards.
      c. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
      d. NAAMM AMP 510, Commercial Class.
   3. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers, pipe and tube railings, and bar grating treads, abrasive nosing. Provide brackets and fittings for installation.
      a. Fabricate ships' ladders, including treads and railings from steel.
      b. Comply with applicable requirements in Division 05 Section "Metal Stairs" (this Section) for railings.
      c. Coordinate design with roof hatch.
   4. Prime interior steel ships' ladders, including treads, railings, brackets, and fasteners, with primer specified in Section 09 90 00.

K. Canopy Fabrication:
   1. Provide canopies of design indicated. Fabricate to detail from structural steel complying with referenced standards. Fabricate accurately for anchorage connection components so components fit tightly to each other and to building structure.
   2. Metal Jointing and Finish Quality Levels:
      a. Joints as inconspicuous as possible, whether welded or mechanical.
         1) Welded Joints: Continuously welded and ground smooth and flush.
         2) Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
         3) Exposed Edges and Corners: Eased to small uniform radius.
         4) Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
   3. Finish: Prime and High-Performance Paint Coating.

L. Aluminum Balcony Decks
   1. Engineer, fabricate and install aluminum balconies for locations indicated in Drawings and complying with Regulations. **Refer to Exterior Finish Materials Matrix. See structural drawings for required design loads.**

M. Steel mesh panels: all steel mesh fabrication to be completed in accordance to steel mesh fabricator recommendation. Provide shop drawings for steel mesh panel construction, layout and mounting. Leave no exposed mesh edges. Finish per interior design schedule in accordance to mesh fabricator recommendation.

N. Ballet Barres: Provide primed steel tube bars and mounting brackets.

2.05 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exception: Galvanized items to be embedded or in contact with concrete or masonry.
   2. Exception: Galvanized items to be installed outside and not scheduled to receive other finishes.
   3. Exception: Miscellaneous steel receiving high performance coatings or shop applied metal coating finishes.
   4. Exception: Interior steel concealed from view.

B. Prime Painting: See Section 09 90 00.

C. Galvanizing of Fabricated Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

D. Galvanizing Repair Paint: MPI #18, MPI #19, or SSPC Paint 20.

E. High performance coatings for exterior visible steel, see Section 09 96 00.

2.06 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

C. See matrix for specified color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

3.04 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes but is not limited to all miscellaneous shop fabricated ferrous metal indicated or otherwise required to complete the work, except as otherwise indicated.

B. Shop fabricated steel and other miscellaneous metal items, including:

1. Steel planter edge and custom steel planters.

1.2 RELATED SECTIONS

A. Section 32 91 20 - Soil Preparation.

1.3 REFERENCES

A. AISC - Manual of Steel Construction, Load and Resistance Factor Design; 1994.

B. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

C. ASTM A 588 - Standard Specification for High-Strength Low-Alloy Structural Steel

D. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 1998.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006.

F. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.4 PERFORMANCE REQUIREMENTS

A. General Fabrication of Structures and Connections: Provide details of structures and connections required by the Contract Documents to be selected or completed by steel fabricator to withstand LRFD loads indicated and comply with other information and restrictions indicated.

B. Select and complete connections using AISC's “Manual of Steel Construction, Load and Resistance Factor Design.”

1.5 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories required for each fabrication indicated. Include erection drawings, elevations, and details where applicable. Provide templates for anchors and bolts specified for installation under other sections.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Provide finish samples on material similar to those used in metal fabrications, for all finish types.

1.6 QUALITY ASSURANCE

A. Fabricator: Company specializing in manufacturing the types of products specified in this section, and with minimum five years of documented experience.

B. Installer: Company specializing in performing the work of this section with minimum four years of experience.

C. Design Metal Fabrications under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Washington. Include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the engineer.

D. Regulatory Requirements: Products shall meet requirements of the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.

1.7 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction work which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication, delivery and installation schedule with construction progress to avoid delay of work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction with work of other trades to ensure that actual dimensions correspond to guaranteed dimensions. Allow for fitting and trimming.

PART 2 - PRODUCTS

2.1 METAL SURFACES

A. For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.

2.2 STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

F. Bolts, Nuts, and Washers: ASTM A316, Grade A, plain.

G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION - GENERAL

A. Form metal fabrications from materials of size thickness, and shapes indicated but not less than sizes required to comply with performance requirements indicated. Work to dimensions indicated, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight, sharp edges.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

E. Weld corners and seams continuously to comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
5. On all steel members exposed to exterior, weld all joints and seams continuously all around to prevent moisture penetration of joints or seams.

F. Fit and shop assemble items in pre-fabricated sizes as shown on the Drawings for delivery to site. Minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

G. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Fabricate items with joints tightly fitted and secured.

I. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

J. Coordinate installation with adjacent construction.

2.4 FABRICATED ITEMS

A. Steel Planter:

1. Comply with forms, depths, dimensions, support spacing, anchorage, and other details as indicated in the Drawings.
2. Coordinate installation with adjacent construction.

B. Steel Planter Edge:

1. Comply with forms, depths, dimensions, support spacing, anchorage, and other details as indicated in the Drawings.
2. Coordinate installation with adjacent construction.

C. Rough Hardware: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting

woodwork. Straight bolts and other stock rough hardware items are specified in division 6. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.5 FINISHES - STEEL

A. Prime Painting: One coat.

B. Final coat: to match architectural metal finish.

2.6 FABRICATION TOLERANCES

A. Squareness: 1/8-inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/8 inch.

C. Maximum Misalignment of Adjacent Members: 1/8 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/8 inch in 48 inches.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects. Non-biodegradable shims/blocking to be used. Distribute blocking at 24" on -center maximum along all edges and corners of planters and steel edging for support.

B. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connections as required.

C. Perform cutting, drilling, and fitting required for installation of metal fabrications. Set metal fabrications accurately in location, alignment and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding (only if necessary): Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

F. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

3.2 ADJUSTING AND CLEANING

A. Obtain approval prior to site cutting or making adjustments not scheduled.

3.3 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/8 inch.

B. Maximum Offset from True Alignment: 1/8 inch.

C. Maximum Out-of-Position: 1/8 inch.

END OF SECTION

SECTION 057300

PREFABRICATED BALCONIES AND DECORATIVE RAILINGS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. This Section includes the following:

1. Prefabricated decorative aluminum picket type railing and balcony assemblies.
2. Glass railings.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 055100 - METAL STAIRS AND RAILINGS for steel stairs, handrails, and guardrails.
2. Section 061000 - ROUGH CARPENTRY for wood blocking for anchoring railings.
3. Section 092110 - GYPSUM BOARD ASSEMBLIES for metal backing for anchoring railings.

1.3 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings and balconies, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings and balconies to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
2. Stainless Steel: 60 percent of minimum yield strength.
3. Glass: 25 percent of mean modulus of rupture (50 percent probability of breakage), as listed in "Mechanical Properties" in AAMA's Aluminum Curtain Wall Series No. 12, "Structural Properties of Glass."

C. Structural Performance of Railings and Balconies: Provide railings capable of withstanding the effects of gravity loads and Code required loads and stresses within limits and under conditions indicated.

1. Glass-Supported Railings: Support each section of top rail by a minimum of three glass panels or by other means so top rail will remain in place if any one panel fails.

D. Thermal Movements: Provide exterior railings and balconies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of railings and balconies assembled from standard components.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of railings and balconies; fabrication; and fastening and anchorage details, including mechanical fasteners. Include plans, elevations, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For railing and balcony products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
2. Each type of glass required.
3. Fittings and brackets.
4. Welded connections.
5. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.

E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

F. Welding certificates.

G. Qualification Data: For professional engineer.

1.6 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal railings that are similar to those indicated for this Project in material, design, and extent.

C. Installer Qualifications: Fabricator of products.

D. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

E. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code--Aluminum."
2. AWS D1.6, "Structural Welding Code--Stainless Steel."

F. 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 that are full height and are not less than 24 inches in length.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. 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 such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Prefabricated Railings and Balconies:

a. Skyline Engineered Systems, 13421 39th Ave NE, Marysville, WA 98271.
b. Northwest Natural Lighting, 7906 230th St SW, Edmonds, WA 98026.
c. RailPro Architectural Aluminum, 18862, 72nd Ave S., Kent, WA 98032.
d. Superior Sole Welding, 7402 44th Ave NE, PO Box 1589, Marysville, WA 98270.
e. Aluminum & Bronze Fabricators, 231 D St NW, Auburn, WA 98001.
f. Blum, Julius & Co., Inc.
g. Blumcraft of Pittsburgh.

2. Glass Railings:

a. Skyline Engineered Systems, 13421 39th Ave NE, Marysville, WA 98271.
b. Northwest Natural Lighting, 7906 230th St SW, Edmonds, WA 98026.
c. RailPro Architectural Aluminum, 18862, 72nd Ave S., Kent, WA 98032.
d. Superior Sole Welding, 7402 44th Ave NE, PO Box 1589, Marysville, WA 98270.
e. Aluminum & Bronze Fabricators, 231 D St NW, Auburn, WA 98001.
f. Blum, Julius & Co., Inc.
g. Blumcraft of Pittsburgh.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

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

1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
3. Provide extruded-aluminum brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

2.3 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.

B. Extruded Bars and Shapes, Including Extruded Tubing: ASTM B 221/B 221M, Alloy 6063-T5/T52.

C. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.

1. Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.

D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.

E. Plate and Sheet: ASTM B 209, Alloy 6061-T6.

F. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.

G. Castings: ASTM B 26/B 26M, Alloy A35

2.4 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 304 at interior locations and 316L at exterior locations.

B. Pipe: ASTM A 312, Grade TP 304 at interior locations and 316L at exterior locations.

C. Castings: ASTM A 743, Grade CF 8 or CF 20.

D. Plate and Sheet: ASTM A 666, Type 304 at interior locations and 316L at exterior locations.

2.5 GLASS AND GLAZING MATERIALS

A. Glass: Provide as specified in Section 088000 - GLAZING.

2.6 FASTENERS

A. General: Provide the following:

1. Aluminum Components: Type 316 stainless-steel fasteners.
2. Stainless-Steel Components: Type 316 stainless-steel fasteners.
3. Dissimilar Metals: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work, unless exposed fasteners are the standard fastening method for railings indicated.

D. Anchors: Provide anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.7 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For aluminum railings, 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.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

C. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout

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

2.8 FABRICATION

A. 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.

B. Assemble railings in the shop to 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.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Form changes in direction as detailed on the Drawings and as standard with system selected.

H. Comply with “Guideline 1: Joint Finishes”, by National Ornamental & Miscellaneous Metals Association (NOMMA), as follows:

1. Ornamental Railing: Type 1.

I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.

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

J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

K. Provide caps, plates, escutcheons, closers, and other items for a complete system.

2.9 GLAZING PANEL FABRICATION

A. General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

B. Structural Glass Balusters: Factory-bond glass to aluminum base and top-rail channels in railing manufacturer's plant using glazing cement to comply with manufacturer's written specifications, unless field glazing is standard with manufacturer.

C. Apply ceramic linework on glass to comply with GANA's "Engineering Standards Manual."

2.10 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. 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.

2.11 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Powder-Coat Finish: AAMA 2603 with a minimum dry film thickness of 2.0 mils, and 5 stage Pre-Treatment with Non-Chrome Sealer. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.12 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform finish indicated, free of cross scratches.

1. Run grain of directionally textured finishes with long dimension of each piece.

C. Directional Satin Finish: No. 4.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. 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.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. 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.

1. Do not weld, cut, or abrade surfaces of railing 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.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Corrosion Protection: Coat concealed surfaces of aluminum and copper alloys that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

A. Adjust railings before anchoring to ensure matching alignment at abutting joints.

B. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 ANCHORING POSTS

A. Use steel 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 non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

D. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch buildup, sloped away from post.

E. Anchor steel posts to steel with flanges, angle or floor type as required by conditions, welded to posts and bolted to metal supporting members.

F. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.
2. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

G. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.3 ANCHORING RAILING ENDS

A. Anchor railing ends to concrete and masonry as indicated on the drawings and anchored to wall construction with anchors and bolts.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.

3.4 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.

3.5 INSTALLING GLASS PANELS

A. Glass-Supported Railings: Install assembly to comply with railing manufacturer's written instructions.

1. Attach base channel to building structure, then insert and connect factory-fabricated and -assembled glass panels.

a. Support glass panels in base channel at quarter points with channel-shaped setting blocks that also act as shims to maintain uniform space for glazing cement. Fill remaining space in base channel with glazing cement for uniform support of glass.

2. Adjust spacing of glass panels so gaps between panels are equal before securing in position.
3. Erect glass railings under direct supervision of manufacturer's authorized technical personnel.

3.6 CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

B. Clean and polish glass.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 073364

VEGETATED ROOF SYSTEM

PART I GENERAL

1.01 Summary

A. Furnish all labor, materials, tools, and equipment to furnish and install garden roof system, drainage materials, growth media and plants as specified and detailed.

B. Basis of Design: SOPRANATURE by SOPREMA.

C. Comparable products by one of the following:

1. Columbia Green Technologies; Tele: 503-964-3218

2. LiveRoof: Tele: 800-875-1392

1.02 PERFORMANCE REQUIREMENTS

A. Maintain a vegetated green roof for the life of the purposed warranty.

B. Install all components of green roof in accordance with manufactures guidelines and in a manner that will not damage the waterproofing membrane.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM).
B. (FLL) guidelines

1.04 DEFINITIONS

A. Garden Roof -- An area of planting/landscaping, built up on a waterproofed substrate at any level that is separated from the natural ground by a man-made structure.
B. Extensive Garden Roof -- Low maintenance landscaping consisting of shallow soil depths (3 to 6 inches) with plant varieties to be chosen by a certified Landscape Architect.
C. Garden Roof Contractor – A contractor certified by the Garden Roof System Manufacturer to install all components of a comprehensive green roof system including, but not limited to protection layer, thermal insulation, drainage layer, filter fabric, edging, growing medium (soil), and vegetation.

1.05 SYSTEM DESCRIPTION

A. Furnish and install a completed Garden Roof System including geotextile leveling layer, protection layer/root barrier, rigid thermal tapered insulation, drainage layer, filter fabric, river gravel maintenance strip / ballast or pavers, lightweight engineered growing medium (soil), and vegetation.

1.06 SUBMITTALS

A. Product Data: For each type of roofing material indicated.

1. Provide product data on all components of the garden roof assembly.
2. Submit list of materials and data sheets describing physical characteristics and performance criteria for materials proposed for use
3. Include sample of warranty customized for this project.

B. Samples for Verification: For each of the following products:

1. Submit sample of ballast.
2. Manufacturer's standard sample of tapered board insulation.
3. Manufacturer's standard sample of drainage/water storage board, protection layer and moisture relocation matt.
4. Submit a sample bag of soil media.
5. Nursery's listing of available plants complying with listed specifications.
6. 12" section of perforated metal edging.

C. Installer Certificates: Signed by manufacturer's certifying that installers comply with requirements.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.

E. Maintenance: Provide scope for yearly maintenance of Garden Roofing.

F. Warranties: Provide documentation either with roof warranty or stand alone for Garden Roof components.

G. Inspection Report for Information: Copy of roofing system manufacturer's inspection report of completed roofing membrane.

1.07 QUALITY ASSURANCE

A. Refer to Section 1.06 SUBMITTALS.

B. The Garden Roof Contractor shall demonstrate qualifications to perform the work of this Section by submitting the following documentation:

1. Approved by the Garden Roof System Manufacturer as an authorized installer in good standing.

C. Installation of roof membrane protection board leveling layer, separation layer, drainage layer and insulation shall be the responsibility of the Garden Roof Contractor to ensure undivided responsibility.

D. Supplier Qualifications:

1. Green Roof plant supplier that specializes in the propagation of green roof plants.
2. Green Roof plant supplier must have 5 years' experience in the production and maintenance of green roof plants specifically chosen.
3. Engineered planting media by a firm that specifically mixes rooftop media and is approved by Soprema. Coordinate with roofing spec, if the alternate Siplast SBS system is used.

E. Drainage mat manufacturer should have successfully produced drainage mat material for at least 15 years, and should be the same as or approved by roofing manufacturer where in contact with roofing membrane

F. Garden Roof System Manufacturer shall have available an in-house technical staff to assist the Garden Contractor, when necessary, in application of the products and final inspection of the assembly.

G. Pre-construction conference to be held with the Owner, Architect, Garden Roof Contractor's field superintendent, Garden Roof System Manufacturer's representative, and other involved trades to discuss waterproofing practices applicable to this project, including schedule for waterproofing, flood testing, installation or soil media and planting schedule. Pre-installation conference should include general contractor's plan for green roof protection, if necessary.

1. Review structural load limitations of roof deck during and after roofing.
2. Review flashing, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
3. Review regulations and requirements of authorities having jurisdiction for insurance certifications, inspection and testing, if applicable.
4. Review temporary protection requirements for roofing system during and after installation.
5. Review roof observation and repair procedures after roofing installation.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original unopened containers of packaging clearly labeled with manufacturer's name, brand name, instruction for use, all identifying numbers, and U.L. labels.

B. Materials shall be stored in a neat, safe manner, not to exceed the allowable structural capacity of the storage area.

C. Store materials in a clean, dry area protected from water and direct sunlight.

D. Membrane rolls shall be stored lying down on pallets and fully protected from moisture with canvas tarpaulins.

E. Bonding adhesives shall be stored at temperatures above 40°F (5°C).

F. Deliver roof media in bags on site and protect from contamination dumping on site is not accepted.

1.09 PROJECT CONDITIONS

A. Proceed with Garden roof installation only after roof membrane has been completed.
B. Do not work in rain or snow or adverse weather conditions. Comply with applicable installation requirements for all components.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.

D. The Garden Roof Contractor shall take precautions that storage and/or application of materials and/or equipment does not overload the deck or building structure.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or damage.

F. Arrange work sequence to avoid use of newly-constructed garden roof for storage, walking surface, and equipment movement. Where such access is absolutely required, the Roof/Waterproofing Contractor shall provide all necessary protection and barriers to segregate

the work area and to prevent damage to adjacent areas. Any damage which occurs to the garden roof system is to be brought to the attention of the Owner's Representative and/or Architect and the Garden Roof System Manufacturer's representative. All damage is to be repaired according to Garden Roof System Manufacturer recommendations.

G. Prior to and during installation, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air, pressure washing and/or similar methods per manufacturer's written instructions.

H. All materials shall be immediately taken off the site to a legal dumping or recycling area authorized to receive such materials.

I. If any unusual or concealed condition is discovered, stop work and notify the Owner's Representative and/or Architect and Garden Roof System Manufacturer's representative immediately, in writing.

J. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks and excessive heat. All products including solvents, compatible with and not detrimental to plant components and plant growth.

K. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to come into direct contact with the waterproofing membrane. Any such contact shall be reported to Owner's Representative and/or Architect and the Garden Roof System Manufacturer's representative immediately.

L. Site cleanup, including both interior and exterior building areas below or adjacent to, or in any way affected by the construction, shall be complete and to the Owner's satisfaction.

M. All landscaped areas affected by the garden roof system installation shall be raked clean and restored to original conditions, if required.

N. All paved areas shall be swept clean.

O. All areas stained, dirtied, and discolored or otherwise damaged due to the garden roof system installation shall be cleaned, restored, and replaced as required.

P. Garden Roof Contractor shall assure that adequate protection is provided after installation so other trades do not damage garden areas.

1.10 WARRANTY

A. Please refer to the roofing portion of this specification to see what the warranty will cover. The following are some components that may or may not be covered: protection layer/root barrier, rigid thermal tapered insulation, drainage layer, filter fabric, river gravel maintenance strip / ballast, lightweight engineered growing medium (soil), vegetation, and automatic irrigation system. All components must be warranted by the Roofing Manufacture as a single-source warranty for all components.

Some warranties include comprehensive coverage of plant survivability at a rate of 80% after two years, as well as possibly the removal and replacement of overburden to access the waterproofing membrane.
1. Duration of Membrane/Flashing: See Roofing Section
2. Material Integrity of Green Roof Components: 20-years
3. Extensive Vegetation: 2-year thrive coverage (min. 50% coverage after 1st year; 80% after 2nd)

PART II PRODUCTS

2.01 GREEN ROOF ASSEMBLY

A. General: Provide products required by manufacturers to be fully compatible with each other and with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

B. Root barrier:

1. MicroFab Root Barrier – Is an 18-mil thick, coated woven, micro-perforated polyethylene fabric. Used above the drainage layer/moisture retention layers; or approved equal.

Properties
a. Roll lengths: 300’x11’ or 300’x3’
b. Roll weight: 105 lbs. or 30 lbs.
c. Thickness: 18 mils
d. Tensile Strength: 45 lb./ft
e. Elongation at Break: 15%
f. Tear strength: 6.7 lb./ft
g. Mullen Burst Strength: 70 psi

C. Soprema Drainage and/or water retention layer:

1. Soprema Moisture Retention Mat – Made from 100% recycled materials 35% polypropylene and 65% polyester. Contains no organic material and will not decompose. Designed to hold moisture in the garden roof assembly; or approved equal.

MRM30 (6’x75’) Properties
a. Water retention: .201 gal/sf
b. Roll weight: 110 lbs.
c. Thickness: .397 in
d. Bursting strength: 776 lbs.
e. Puncture resistance: 275 lbs.
f. Elongation: Warp: 153%; Fill 131%
g. Breaking strength: 282 lbs.; Fill 435 lbs.

D. Extruded Polystyrene Insulation (if necessary):

1. Dow Styrofoam; or approved equal.
a. Insulation shall meet ASTM C-578, Type VI or VII.
b. Minimum compressive strength, ASTM D-1621, 60 psi (variance by type of product). Provide 60 psi insulation under garden system.
c. Maximum water absorption by volume per ASTM C-272,0.1%
d. Water vapor permeance for 1" product per ASTM E-96, 1.0 perm (max.) (63 ng/Pa/s/m2)
e. Insulation shall have an R value of 5.0°F ft2 h/Btu/in. (0.88 K m2/W) of thickness when tested at 75°F (23.9°C) mean temperature in accordance with ASTM C-518
f. Product shall be free of CFC's

E. Filter Fabric

1. Soprema Filter Fabric – is a virgin non-recycled polypropylene, staple fiber, needle punched

and non-woven geotextile. Additionally, the fibers in the fabric are needled to filter fabric for a stable network that retains dimensional stability relative to one another. Soprema Filter Fabric resists UV degradation and to biological and chemical environments typically found in soil. System Filter is to be used as a separation between drainage layers and medias with green roof systems; or approved equal.

Fabric Properties
a. Flow: 150 gal/min/sq. ft.
b. Tensile: 90 lbs.
c. Elongation: 50%
d. Mullen Burst: 185 psi
e. Puncture Strength: 55 lbs.
f. Trapezoidal Tear: 40 lb. (130 N)
g. Apparent Opening Size (AOS): 70 US Sieve#

E. Soil

1. Soprema Soil Mixtures - Extensive soil mix; or approved equal.

F. Sedum mats

1. Soprema Vegetative mats – consist of different varieties of sedum grown into holding mat at a nursery; or approved equal.

a. Coconut Coir vegetative mat is a coconut fiber blanket with a layer of planting substrate and filled with a layer of low-profile, drought-tolerant vegetation. Rolls are 4 ft x 6 ft

2.02 Accessories

A. Soprema Edge Restraints – Designed to meet or exceed drainage capacity of all manufactured green roof drainage panels. Made from .100 thick Aluminum 5052 sheet; or approved equal.

Edges with 12 slots per foot, effective slot mean diameter .375 in. area per slot .11 sq. in. Factory Flow = .0119 CFS/5.4 GPM.

Size as indicated on Drawings. Standard aluminum finish.

Provide manufacturers clips, bolts, and corner pieces for attachment.

B. Soprema Inspection Chambers: Designed to fit over most standard drains and to keep out large debris and contaminates; to promote positive drainage in the garden roof system. 304 BB 18 gauge stainless steel. They have a removable top for easy inspection of the drain after installation; or approved equal.

Slot dimensions are 3/16-inch x 3-15/16-inch, with a flow rate of 110 gallons per minute. Size: 11”x11”x5/8”

C. Stone Ballast: As shown on the plans, or if not indicated on the plans use well screened and washed stone gravel meeting ASTM D-448-80, gradations #57, 2, 4 or 5

PART III EXECUTION

3.01 INSPECTION

A. The Green Roof/Waterproofing Contractor shall examine all surfaces to receive the garden roof system to verify it is acceptable and proper for the installation of the garden roof.

B. The Roof/Waterproofing Contractor shall not proceed with the installation of the garden roof system until all roof defects have been corrected. A water test may be required before placement of any overburden.

3.02 PREPARATION

A. Substrate cleaning

1. Thoroughly sweep the substrate which is to receive the extensive green roof system.

3.03 INSTALLATION

A. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

B. Water Test

3.04 EXTRUDED INSULATION INSTALLATION

A. Insulation Placement

1. Install one or more layers of rigid insulation to required thickness. Stagger all joints, cut and fit to within 3/4 inch of all projections, perimeter walls and penetrations. Insulation is to be loose laid and tightly butted with joints not greater than 3/8 inch.

2. Multi-layer insulation applications require the bottom layer of insulation to be the thickest layer and shall be a minimum of 2" thick. All layers shall be loose laid with the joints of the second layer staggered and offset from all joints of the preceding layer. Each successive layer shall be offset from the underlying layer(s).

3.05 GARDEN ROOF COMPONENTS INSTALLATION

A. Root Barrier Installation

1. Unroll the specified root barrier over the entire surface, around all edges and upstands (vertical surfaces); overlapping all seams a minimum 4” (four inches). Seal all side and end laps with specified adhesive in a continuous and unbroken ¾” (three-quarter inch) ribbon strip.

2. Install Drainage layer RB30 below the drainage layer always.

B. Air layer/Drainage / Water Retention Installation

1. Install the specified drainage / water retention course over waterproofing or insulation layers with the black filter fabric or water retention mat facing up (product dependent).

2. Properly position drainage course, carefully cutting and fitting panels to fit the surface. Typically drainage mats will be run over the full length of the roofing system and turned up walls to provide protection for flashing sheets. Cut and snuggly fit the drainage course at all perimeters, curbs and penetrations, following the membrane manufacturer's installation

procedures. Cut holes to expose all drain areas

3. Drainage mat must be positioned so the 3” overlap, laps over the next sheet. It is recommend to adhere this overlap with adhesive to hold it in place for the install of the soil. This can be accomplished with a one-part urethane adhesive or a butyl tape.

4. Drainage mats should be covered with soil as soon as possible to avoid any deterioration to the filter fabric or retention mats.

C. Root Barrier Installation (Micro-fab)

1. Unroll the specified root barrier over the entire surface, around all edges and upstands (vertical surfaces); overlapping all seams a minimum 4” (four inches). Seal all side and end laps with specified adhesive in a continuous and unbroken ¾” (three-quarter inch) ribbon strip.

2. Micro-fab root barrier can be installed above the Drainage layer.

D. Edge Restraints and Extensions

1. Installed on top of Drainage, water retention or root barrier course, so the perforated edge is vertical with a horizontal leg positioned in area that is to receive the soil and vegetation.
2. Metal edge restraints shall be fastened together using clips and corner pieces. These will be secured with bolts and washers.
3. Edge restraints may need to be cut to size depending on design.
4. Extension pieces are secured using bolts and washers.

E. Inspection Chambers and Extensions

1. Fit Inspection Chamber or existing drains.

2. Provide extensions can be used to extend the Inspection Chamber up to the soil level. Secure with bolts and washers.

F. Water Retention layer

1. Loose laid in areas to receive soil, above the drainage or root barrier layer.

G. Filter Fabric

1. Filter Fabric shall be laid over the drainage layer, lapping adjacent rolls a minimum of 6 inches. Enough material shall be left to be drawn up above the anticipated soil level. Any excess shall be trimmed down to the level of the soil.

H. Garden roof soil

1. Soil shall be placed carefully to avoid damage or displacement of other materials such as walls, paving, drainage components, filter fabric, and roofing membrane.

2. Garden roof soil shall be placed to within 1 inch greater than final grade or to a depth of no greater than 4 inches and compacted as described in below. For final grades less than 4 inches only one round of compaction shall be performed and remaining soil loosely placed such that top of soil exceeds final grade by 1 inch (see 3.08.D. below). For final grades greater than 4 inches, place soil at no greater than 4 inches and repeat procedure until soil has been compacted within 1 inch of final grade.

3. Compaction shall be performed with a 75 lb. landscape roller to achieve a 50 – 60 % compaction as determined by ASTM D1557.

4. After compaction remaining soil shall be placed at 1 inch greater than final grade and thoroughly watered or jetted over entire area. Low settled areas shall be filled with additional soil and re-wet to achieve uniform prescribed final grade.

K. Stone ballast or pavers

1. Installed at all roof perimeters, building walls, penetrations, and access hatches and as required for flashing vegetation barriers, proper wind design, fire breaks, and as walkway/maintenance
paths.

2. Ballast design shall be in accordance with Dow Chemical Company TechNote 508 Ballast Design Guide for IRMA Roofs, and other applicable codes or wind design guides.

M. VEGETATION INSTALLATION

1. Install the vegetation by Vegetate Mat in accordance with design drawings.

2. Sowing seed for grass or meadow flower plantings must be done so as to achieve the maximum uniformity possible over the entire surface of the medium at the density specified by the seed provider. Once sown, the surface of the medium is gently raked (as with the backside of a leaf rake) to lightly bury the seed; the surface is then gently rolled with a garden roller.

3. Rolls of sod or vegetative mat are laid out in a staggered pattern, snugly butted side-to-side and end-to-end; do not stretch the rolls. The surface is then gently rolled with a garden roller.

4. In all instances, all plantings must be thoroughly watered to the point of saturation Immediately after planting.

3.06 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from extensive green roof installation operation.

B. Repair or replace garden roof system that is vandalized until final acceptance is granted.

END OF SECTION

SECTION 074200

METAL WALL PANELS

1.01 SECTION INCLUDES

A. Manufactured metal panels for walls and soffits, with related flashings and accessory components.

1.02 RELATED REQUIREMENTS

A. Section 014330- Coordinated mock-ups for mock-up requirements.

B. Section 072500 - Air Barriers: Weather barrier under wall panels.

C. Section 079200 - Joint Sealants.

1.03 DESIGN REQUIREMENTS

A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with Project requirements shown (but not limited to) the Structural Drawings.

B. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing. See Structural Drawings for movement information.

C. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

D. Provide continuity of air barrier and vapor retarder seal at building enclosure elements (and interface locations) in conjunction with materials specified in Section 07 25 00.

E. Panel Flatness: All exposed flat exterior metal panels shall be designed, fabricated, and installed in such a manner that they are visually flat when viewed from any angle. Any short length distortions, ripples, waves, oil canning, or telegraphing of fasteners will not be permitted. Provisions shall be made to allow for differential thermal expansion between framing members and the exposed metal without noise and without distortion of the exposed face.

1. In the event that metal flatness requires interpretation by measurement, this shall be done by measuring and calculating the deviation between edges or any two points on the exposed surface. Total deviation (d) from flatness shall not exceed 0.003 times the length (L), and 0.004 times the width (W), and 0.0035 times any chord of at least 12 inches.
2. Panel flatness shall be subject to visual inspection and approval by the Architect.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: Submit two samples of wall panel and soffit panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a twenty-year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

C. Correct defective Work within a five-year period after Substantial Completion, including defects in water tightness and integrity of seals.

D. Correct defective Work within a ten-year period after Substantial Completion, including delaminations or other structural failures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Refer to **Exterior Finish Schedule**.

2.02 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
   1. Provide exterior panels and subgirt framing assembly.
   2. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall.
   3. Maximum Allowable Deflection of Panel: 1/90 of span.
   4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
   5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
   6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
   7. Corners: Factory-fabricated in one continuous piece per manufacturer’s standard detail.
   8. Provide continuity of air barrier and vapor retarder seal at building enclosure elements in conjunction with materials specified in Section 07 25 00.
   9. Exterior Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat.
   10. Exterior Panel Back Coating: Panel manufacturer's standard polyester wash coat.

B. Exterior Panels:
   1. Refer to **Exterior Finish Schedule**.

C. Expansion Joints: Same material, thickness and finish as exterior sheets.

D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

E. Anchors: Stainless steel.

2.03 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Sealants: As specified in Section 079200.

C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers. Exposed fasteners same finish as panel system.

2.04 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest practicable lengths.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

B. Verify that weather barrier has been installed over substrate completely and correctly.

3.02 PREPARATION

A. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated.

3.03 INSTALLATION

A. Install panels on walls and soffits in accordance with manufacturer's instructions.

B. Fasten panels to structural supports; aligned, level, and plumb.

C. Provide expansion joints where indicated.

D. Use concealed fasteners unless otherwise approved by Architect.

E. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.04 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.05 QUALITY ASSURANCE

A. Color Consistency

1. Provide and furnish a compatible field touch-up PVDF coating system formulated for air-drying at ambient temperature, based on the Kynar ADS fluoropolymer resin, in color to match the factory applied finish. Submit samples of the air-dry system as well as samples of actual touch-up work to factory applied coating system, subject to sample approval procedures described herein.

3.06 CLEANING

A. Remove site cuttings from finish surfaces.

END OF SECTION

SECTION 074600

SIDING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Fiber cement siding, soffits, panels and boards.
2. Associated standing and running trim.
3. Factory finishes, priming and sealing.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 061100 - ROUGH CARPENTRY for sheathing substrate for building wrap system.
2. Section 061600 - GYSPUM SHEATHING for sheathing substrate.
3. Section 072100 - THERMAL INSULATION for insulation in studs.
4. Section 072710 - WEATHER BARRIERS for building wrap.
5. Section 076200 - SHEET METAL FLASHING AND TRIM for flashings.
6. Section 079200 - JOINT SEALANTS for field-applied sealants not otherwise specified in this Section.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type, color, texture, and pattern required.

1. 12-inch-long-by-actual-width Sample of siding, soffits and trim.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of siding through one source from a single manufacturer.

B. Unit Mock-up: Provide materials, products, and components as specified herein for 1 complete unit mock-up. Refer to Section 014330 – Mock-ups for additional requirements.

C. Mock-Up: Mock-up of exterior wall including siding is required. Comply with requirements of Section 014330, Mock-Ups.

1. Construct a 5' x 8' sample panel. Locate sample on a corner as directed by the architect. Demonstrate corner detail, trim, typical siding installation and painting and sealant by others. Do not proceed with the work of this section until sample area is approved by the architect. Approved, accepted sample area may be incorporated into the final work upon acceptance.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Meet with the Owner Project Manager; Architect, Owner insurer if applicable; testing and inspecting agency representative; siding Installer; siding manufacturer's senior representative; sheathing and air barrier Installer; and installers whose work interfaces with or affects siding, including installers of windows and doors.
2. Review methods and procedures related to siding installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate conditions for compliance with requirements, including flatness and fastening.
5. Review flashings, special siding details, siding penetrations, trim installation, and finishes.
6. Review temporary protection requirements for siding during and after installation.
7. Review siding observation and repair procedures after siding installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry, well-ventilated, weathertight place.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions.

1.7 SEQUENCING

A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace siding that does not comply with requirements or that fails within specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIBER CEMENT SIDING, PANELS, AND SOFFITS

A. Acceptable Manufacturer (for siding): See **Exterior Finishes Schedule**. **Hardie 1.0 – 5/16", pre-primed.**

B. Panel and Siding Units:
   1. Thickness: See **Exterior Finishes Schedule**.
   2. Size: Refer to drawings and project **Exterior Finishes Schedule**.

C. Trim Units: See **Exterior Finishes Schedule**.

D. Fasteners: Galvanized or stainless-steel ring shank nails with blunt or diamond point and roofing head. Use nails of sufficient length to penetrate wood studs 1 inch.

E. Texture: Provide smooth surface unless otherwise selected by Architect.

F. Factory finish: Cementitious siding shall be shipped to the job site with factory applied latex acrylic primer ~~and high-performance finish coatings~~ of type recommended and accepted by the siding manufacturer. Primers shall be applied to all six surfaces of panels and boards.
   1. Do not back prime components where manufacturer does not recommend application.
   ~~2. Colors: Provide colors as indicated in project matrix.~~

2.2 ACCESSORIES

A. Blocking, Shims, and Nailers: Under requirements of Section 06100 - ROUGH CARPENTRY, Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Flashing: Provide flashing complying with Section 076200 - SHEET METAL FLASHING AND TRIM at window and door heads and where indicated.

C. Screws: Select material, type, size, and finish required for each use, nonferrous metal or hot- dip galvanized, unless otherwise indicated. Comply with ASME B18.6.1 for applicable requirements.

   1. For fastening to metal, use screws of sufficient length to penetrate a minimum of 1/4 inch or 3 screw-threads into substrate.

2.3 FABRICATION

A. Fabricate woodwork to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

C. Shop-cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and seal edges with the linseed-based wood stain selected for the exposed face.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Use tools and cutting methods recommended. Comply with the following:

1. Do not install damaged components.
2. Primed or finished units shall have cut edges shall be sealed to match selected for the exposed face finish.
3. Install work plumb, level, true and straight with no distortions. Shim as required using concealed shims.
4. Provide furring strips behind panels in accordance with manufacturers requirements.
5. Joints shall spaced per manufacturer’s recommendations and so formed as to conceal shrinkage or movement. Secure exposed work to prevent movement, checks or warps
6. Work shall be properly framed, closely fitted and accurately set to the required lines and levels and shall be rigidly secured in place. Layout work before installation.
7. Stock shall be in as long lengths as practicable, and spliced only where necessary, and only when approved by Architect. Splices shall be beveled and jointed where solid fastenings can be made.
8. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
9. Cutting: In general cuts shall be made with saws. Where cut edges are exposed to view or weather use diamond blades.
10. Work shall be free of defects or blemishes on surfaces exposed to view after final finish is applied. Keep work free from machine and tool marks, mill glaze, abrasions, raised grain, or other defects on surfaces exposed to view. Replace any such work with new acceptable work

B. Blind fasten work to the greatest extent possible. Where surface attachment is required by project conditions, set and fill nails to match adjacent work. Surface attachment shall be done with fasteners equally spaced, vertically and horizontally aligned.

1. Provide concealed fastening as specified.
2. Where exposed surface nailing is required by project conditions, Architect shall approve location and nailing pattern.

C. Install joint sealants as specified in Division 07 Section "Joint Sealants" and to produce a weathertight installation.

3.4 INSTALLATION OF CEMENT FIBER SIDING PANELS AND BOARDS

A. Install cement fiber siding over properly installed specified building wrap or paper. Place fasteners 1 inch from top edge, between 3/4 to 1 inch from bottom edge and between 1/2 to 3/8 inch from side edge. Install siding with gap between planks and panels. Provide not less than 6-inch clearance between bottom edge to finish grade and 1-inch clearance to roofing. Lap siding shall be installed to provide a 1-1/4-inch minimum overlap.

B. Lay butt joints only over stud or solid blocking. Do not use splice plates or other devices to install butt joints over spaces between studs or blocking.

C. Fur out wall with borate treated PT 1x4 furring at all locations, spaced not more than 24 inches on center and secured to wall over a vapor barrier or specified building wrap. Install furring vertically unless otherwise indicated.

D. In general, blind nail siding. Face nailing may be used where siding is covered with trim and in approved locations only. Do not blind nail “Hardiplank” when studs are spaced 24 inches on center nor when using 12-inch-wide boards.

E. Install approved corrosion resistant nails driven perpendicular to siding to a snug fit. Do not overdrive nail heads or drive nails at an angle. If nail is countersunk, caulk nail hole with approved material, and add a nail. Pneumatic nail guns may be used if provided with flush mount attachment and pressure set from proper snug (not overdriven) fit. Use of staples is not permitted. Where pre-finished material is used, use pre-finished fasteners.

F. Where fasteners are chipping, cracking or otherwise damaging siding, provide pre-drilled holes for fasteners. Unless not recommended by manufacturer, stock greater than 5/16-inch-thick shall be pre-drilled before fasteners are installed. Subject to review and approval by the Architect, repair minor dents and chips with approved cementitious patching compounds of type recommended by manufacturer. Cracked siding and siding not considered acceptable by the Architect shall be replaced with new acceptable work.

3.5 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

C. Touch-up paint damaged finishes in accordance with manufacturers written installation instructions.

END OF SECTION

SECTION 076110

SHEET METALSIDING

PART 1 GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Pre-finished Aluminum Architectural Sheet and Coil material for shop and field formed metal wall panels per drawings
      a. Accessories.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
   1. Section 061000 - ROUGH CARPENTRY for wood nailers, curbs, and blocking.
   2. Section 076200 - SHEET METAL FLASHING AND TRIM for fasciae, copings, and flashings that are not part of sheet metal siding.
   3. Section 079200 - JOINT SEALANTS for field-applied sheet metal siding sealants.

1.03 PERFORMANCE REQUIREMENTS

A. General: Provide complete sheet metal siding panels system, including, but not limited to, custom-fabricated metal siding pans, cleats, clips, anchors and fasteners, sheet metal flashing and drainage components related to sheet metal siding, fascia panels, trim, underlayment, and accessories as indicated and as required for a weathertight installation.

B. See structural design drawings for specific wind loads and other loading requirements.

C. Thermal Movements: Provide sheet metal siding panels that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal siding panels thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Water Infiltration: Provide sheet metal siding panels that does not allow water infiltration to building interior, with metal flashing and connections of sheet metal siding panels lapped to allow moisture to run over and off the material.

1.04 SUBMITTALS

A. Product Data: For each product indicated. Include details of construction relative to materials, dimensions of individual components and profiles, and finishes.
   1. Notice of Acceptance (NOA): Submit *Product Control Notice of Acceptance* as reviewed by the Miami-Dade County Building Code Compliance Office (BCCO). Notice shall include Acceptance No., Expiration Date, and Approved Date.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal siding panels, including plans, elevations, and keyed references to termination points. Distinguish between shop- and

field-assembled work. Include the following:

1. Details for forming sheet metal siding panels, including seams and dimensions.
2. Details for joining and securing sheet metal siding panels, including layout of fasteners, clips, and other attachments. Include pattern of seams.
3. Details of termination points and assemblies, including fixed points.
4. Details of expansion joints, including showing direction of expansion and contraction.
5. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings.
6. Details of special conditions.
7. Details of connections to adjoining work.
8. Details of the following accessory items, at a scale of not less than 1-1/2 inches per 12 inches:
    a. Flashing and trim.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal siding panels: 12 inches long by actual pan width, including finished seam. Include fasteners, cleats, closures, and other attachments.
2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: 12-inch-long Samples for each type of accessory.

D. Qualification Data: For Installer and manufacturer.

E. Maintenance Data: For siding system to include in maintenance manuals.

F. Inspection Report: Copy of siding system manufacturer's inspection report of completed siding installation.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain components for siding system from or approved by siding system manufacturer.

B. Manufacturer and erector shall demonstrate experience of a minimum of five (5) years in this type of project.

C. Sheet Metal siding panels Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

D. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 01. Review methods and procedures related to siding system including, but not limited to, the following:
1. Meet with the Architect; Architect, Owner's insurer if applicable; testing and inspecting agency representative; siding Installer; siding system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects siding, including installers of siding accessories.
2. Review methods and procedures related to siding installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review temporary protection requirements for siding system during and after installation.

E. Unit Mock-up: Provide materials, products, and components as specified herein for 1 complete unit mock-up. Refer to Section 014330 – Mock-ups for additional requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal siding pans, components, and other sheet metal siding materials so as not to be damaged or deformed. Package sheet metal siding materials for protection during transportation and handling.

B. Unload, store, and erect sheet metal siding materials in a manner to prevent bending, warping,

twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Store sheet metal siding materials to ensure dryness. Do not store sheet metal siding materials in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on sheet metal siding from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal siding installation.

1.07 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit siding system to be installed according to manufacturer's written instructions and warranty requirements.

1.08 WARRANTY

A. Finish warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finish within specified warranty period.
   1. Exposed Panels Finish - deterioration includes the following:
      a. Color fading more than 5 hunter units when tested according to ASTM D 2244
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214
      c. Cracking, checking, peeling or failure of a paint to adhere to a bare metal.
   2. Warranty Period: 20 Years from the date of substantial completion

B. Applicator shall furnish written warranty for a one (1) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight condition

1.09 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Each sheet metal siding type, 100 square feet.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. AEP Span, or approved equal.

2.02 MATERIALS AND FINISHES

A. Preformed metal panels shall be fabricated of .050 Aluminum (unless noted otherwise – see schedule in Part 4 below), and wall panels shall be Herr-Voss corrective leveled for flat appearance. Architect to verify.
   1. Material to comply with: ASTM B209 Standard Specification for Aluminum and Aluminum- Alloy Sheet and Plate.

B. Color shall be (3) three coat metallic finish. Refer to project **Exterior Finish Schedule**.
   1. Number of Coats: 3-coat. Coating shall be factory applied on a continuous process paint line. Coating shall consist of a 0.2 mil prime coat, a 0.75 mil barrier coat, a 0.75 mil metallic/color coat containing 70% Kynar resins, and a 0.5 mil clear coat containing 70% Kynar resins (Note mil thickness is approximate.)

C. If Strippable coating to be applied on the pre-finished panels to the top side to protect the finish during fabrication, shipping and handling, film shall be removed before installation.

D. Trim: Trim shall be fabricated of the same material and finish to match the profile, and will be press broken in lengths of 10 to 12 feet. Trim shall be formed only by the manufacturer of their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on

drawings. Miter conditions shall be factory welded material to match the sheeting.

E. Accessories/Fasteners: Fasteners shall be of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous framing members to substrates. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the wall panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces, except at designed points of roof panel fixity

2.03 UNDERLAYMENT MATERIALS

A. Refer to Section 072500 – Weather Barriers.
B. Slip Sheet: Building paper, minimum 5 lb./100 sq. ft., rosin sized.

2.04 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete siding system and as recommended by fabricator for sheet metal siding.
B. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
   1. Exposed Fasteners: Heads matching color of sheet metal siding by means of plastic caps or factory-applied coating.
   2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
   3. Blind Fasteners: Stainless steel rivets.
C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape.
D. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to produce joints in sheet metal siding that will remain weathertight and as recommended by roll-formed sheet metal siding manufacturer for installation indicated.
E. Expansion-Joint Sealant: For hooked-type expansion joints, which must be free to move, provide non-setting, nonhardening, nonmigrating, heavy-bodied polyisobutylene sealant.
F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities. Provide butyl based self-adhered membrane behind locations where mastic may come in contact with weather barrier.

2.05 ACCESSORIES

A. Sheet Metal Siding Accessories: Provide components required for a complete sheet metal siding assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of sheet metal siding, unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as sheet metal siding.
   2. Clips: Minimum 0.0625-inch-thick, stainless steel panel clips designed to withstand negative-load requirements.
   3. Cleats: For mechanically seaming into joints and formed from the following materials:
      a. Aluminum Siding: 0.0250-inch- thick stainless steel.
   4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
B. Flashing and Trim: Formed from same material and with same finish as sheet metal siding, minimum 0.0179-inch-thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.

1. Pipe and Penetration Flashing: Premolded, flashing sleeve or pipe collar with flexible metal ring bonded to sloped base. Intended to provide weatherproof seal and to isolate pipe movement from vibration and expansion/contraction.

C. Sealants
1. Exterior grade silicone sealant Dow 795.

D. Hat Channels: Provide galvanized steel vertical hat channels per assemblies V10 and V11.

2.06 FABRICATION

A. General: Custom fabricate sheet metal siding panels to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions (pan width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal siding and accessories at the shop to greatest extent possible.
1. Flat-Seam Siding: Form flat-seam pans from metal sheets 20 by 28 inches with 1/2-inch notched and folded edges.

B. General: Fabricate roll-formed sheet metal siding panels to comply with details shown and roll-formed sheet metal siding manufacturer's written instructions.

C. Fabricate sheet metal siding panels to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks, true to line and levels indicated, and with exposed edges folded back to form hems.
1. Lay out sheet metal siding panels so cross seams, when required, are made in direction of flow with higher pans overlapping lower pans. Stagger cross seams.
2. Fold and cleat eaves and transverse seams in the shop.
3. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal siding panels to profiles, patterns, and drainage arrangements shown and as required for leakproof construction.

D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant (concealed within joints).

E. Sealant Joints: Where movable, non-expansion-type joints are indicated or required to produce weathertight seams, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturers of dissimilar metals or by fabricator.

G. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams with flat-lock seams.
3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.07 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. 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.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, sheet metal siding panels supports, and other conditions affecting performance of work.
    1. Examine solid sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances.
    2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored, and that provision has been made for flashings, and penetrations through sheet metal siding panels.
    3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
B. Examine roughing-in for components and systems penetrating sheet metal siding panels to verify actual locations of penetrations relative to seam locations of sheet metal siding panels before sheet metal siding panels installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Install flashings and other sheet metal to comply with requirements specified in Section 076200 - SHEET METAL FLASHING AND TRIM.

3.03 UNDERLAYMENT INSTALLATION

A. Refer to Section 072500 – Weather Barriers.
B. Install flashings to cover underlayment to comply with requirements specified in Section 076200 - SHEET METAL FLASHING AND TRIM.
C. Apply slip-sheet over underlayment before installing sheet metal siding panels.

3.04 INSTALLATION, GENERAL

A. General: Install sheet metal siding panels perpendicular to purlins or supports. Anchor sheet metal siding panels and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete siding system and as recommended by fabricator for sheet metal siding panels.
    1. Field cutting of sheet metal siding panels by torch is not permitted.
    2. Rigidly fasten eave end of sheet metal siding panels and allow ridge end free movement due to thermal expansion and contraction. Predrill siding.
    3. Provide metal closures at each side of ridge caps.
    4. Flash and seal sheet metal siding panels with weather closures at eaves, rakes, and at

perimeter of all openings. Fasten with self-tapping screws.

5. Locate and space fastenings in uniform vertical and horizontal alignment.
6. Install ridge caps as sheet metal siding panels work proceeds.
7. Locate siding splices over, but not attached to, structural supports. Stagger siding splices and end laps to avoid a four-panel lap splice condition.
8. Lap metal flashing over sheet metal siding panels to allow moisture to run over and off the material.

B. Fasteners: Use fasteners of sizes that will not penetrate completely through substrate.
   1. Steel Siding: Use stainless-steel fasteners.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal siding panels or manufacturers of dissimilar metals.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Fascia: Align bottom of sheet metal siding panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal sheet metal siding panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.05 CUSTOM-FABRICATED SHEET METAL SIDING PANEL INSTALLATION

A. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form a hem on concealed side of exposed edges, unless otherwise indicated.
   1. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation.
   2. Nail cleats not more than 12 inches o.c. Bend tabs over nails.

B. Seal joints as shown and as required for leakproof construction. Provide low-slope transverse seams using cleats where backup of moisture may occur.
   1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
   2. Prepare joints and apply sealants to comply with requirements in Section 079200 - Joint Sealants.

C. Provide expansion cleats in siding panels that exceed 30 feet in length.

D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre- tinned surface would show in completed Work.
   1. Do not solder metallic-coated steel or aluminum sheet.
   2. Do not pre-tin zinc-tin alloy-coated copper.
   3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
   4. Copper Siding: Tin edges of uncoated copper sheets, using solder for copper.

E. Flat-Seam Siding: Attach flat-seam metal pans to substrate with cleats, starting at eave and working upward toward ridge. After pans are in place, mallet seams and apply sealant.
   1. Attach metal base flashing with cleats spaced not more than 24 inches o.c. Lock and solder pans to base flashing.
   2. Attach edge flashing to face of roof edge with continuous cleat nailed at 12 inches o.c. and attach to substrate with cleats. Lock pans to edge flashing and apply sealant.

3.06 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete sheet metal siding panels assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.07 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal siding panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.08 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
   1. Steel and Aluminum Materials: Clean off excess sealants.
   2. Copper Materials: Clean and neutralize flux materials. Clean off excess solder and sealants.

B. Remove temporary protective coverings and strippable films, if any, as sheet metal siding panels is installed. On completion of sheet metal siding panels installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

C. Replace panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Sheet metal flashing and trim for the following applications:
   a. Through-wall flashing.
   b. Formed flashing and trim.
   c. Formed low-slope roof flashing and trim.
   d. Fascia wrap.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 042000 - UNIT MASONRY for installation of through-wall flashings.
2. Section 061000 - ROUGH CARPENTRY for wood nailers, curbs, and blocking; flexible flashing at openings.
3. Section 072500 - WEATHER BARRIERS for flexible flashing and perimeter terminations at building wrap.
4. Section 075400 – THERMOPLASTIC MEMBRANE ROOFING for installing sheet metal flashing and trim integral with roofing membrane.
5. Section 077100 - ROOFING SPECIALTIES for roof-edge drainage gutters, downspouts and conductor
6. Section 079200 - JOINT SEALANTS for field-applied sheet metal flashing and trim sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Fabricate and install roof edge flashing and copings capable of resisting the following forces required by Code according to recommendations in FMG Loss Prevention Data Sheet 1-49:

C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base

engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

A. Unit Mock-up: Provide materials, products, and components as specified herein for 1 complete unit mock-up. Refer to Section 014330 – Mock-ups for additional requirements.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1. Meet with the Owner, Architect and Owner’s insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective work within specified warranty period.

1. Warranty Period: As standard with manufacturer unless indicated otherwise.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005. Thickness as specified in this Section. Temper suitable for forming and structural performance required, but not less than H14, finished as follows:

1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a minimum total dry film thickness of 1.5 mil; complying with AAMA 2605.

      1) Color: As selected by Architect from manufacturer's full range. **See Exterior Finish Schedule.**

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:

1. Exposed High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Three-Coat Fluoropolymer: AAMA 2605. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.

C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation pre-painted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:
   a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent 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.

3. Uncoated steel is not permitted.
4. Thickness: As indicated.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: 30 to 40 mils thick minimum, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. **hi-temp self adhered membrane under coping or other horizontal locations such as roofs or ledges or self-adhered membrane where not exposed, both should be compatible with WRB / AB; note where in contact with air barrier use butyl adhesive based self adhered membranes.**

1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
2. Low Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
3. Available Products:

a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; Dri-Start "HR" High Performance Roofing Underlayment.
b. Grace, W. R. & Co.; Vycor Ultra.
c. Henry Company; Perma-Seal PE.
d. TC MiraDRI; WIP 300HT.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
1. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
2. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

D. Elastomeric Sealant, Exposed Seams: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
1. Where seam is not exposed, non-skinning butyl sealant is also acceptable.

E. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other

characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.5 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Caps: Fabricate in minimum 96-inch-long, but not exceeding 10-foot- long, sections. Furnish with 6-inch-wide joint cover plates.

1. Joint Style: Butt, with 12-inch-wide concealed backup plate.
2. Fabricate from the following material:
   a. Aluminum: 0.050 inch (1.27 mm) thick.
   b. Coated Steel: 0.019 inch (0.48 mm) thick.

B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners and seal watertight.

1. Joint Style: Butt, with 12-inch-wide concealed backup plate.
2. Fabricate copings from the following material:
   a. Extruded Aluminum: 0.080 inch thick or more.
   b. Coated Steel: 0.025 inch (0.64 mm) thick.

C. Base Flashing: Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 0.019 inch (0.48 mm) thick.

D. Counterflashing: Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 0.019 inch (0.48 mm) thick.

E. Roof-Penetration Flashing: Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 0.019 inch (0.48 mm) thick.

F. Splash Pans: Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 0.019 inch (0.48 mm) thick.

G. Roof-Drain Flashing: Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 0.019 inch (0.48 mm) thick.

2.6 WALL SHEET METAL FABRICATIONS

A. Through-Wall and Other Flashing and Trim **(including window, door, penetration head flashing, knife plate trim, drips):** Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch-high end dams. Fabricate from the following material:

1. Aluminum: 0.032-inch-thick for sheets up to 24” wide, 0.050 for sheets over 24” wide.
2. Coated Steel: 24 ga; 0.0239" (uncoated) - 0.0276"(galv.) thick.

B. Through-Wall Flashing, In Masonry: Through-wall flashing in masonry is specified in Section 042000 – UNIT MASONRY.

C. Aluminum Fascia Wrap: 0.032-inch-thick for sheets up to 24” wide, 0.50 for sheets over 24” wide; prefinished aluminum.

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip-sheet or install a course of polyethylene underlayment.
3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

1. Aluminum: Use aluminum or stainless-steel fasteners.

H. Seal joints with elastomeric sealant as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 - JOINT SEALANTS.

I. Aluminum Flashing: Rivet joints in uncoated aluminum where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal roof flashing and trim to comply with performance requirements [, sheet metal manufacturer's written installation instructions,] and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

1. Secure in a waterproof manner by means of snap-in installation and sealant.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

1. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for flashing on vent piping.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 - UNIT MASONRY.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 081110

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Steel glazing frames.

F. Accessories.

1.02 SUBMITTALS

A. See Section 01 30 00 - Submittal Procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
   1. Schedule: Coordinated with other doors, frames, hardware, glazing, finishes and accessories.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

C. Unit entry doors shall have an STC 28 rating including door, frame and seals as tested per ASTM E90.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Door Top Closures: Flush with top of faces and edges.
   2. Door Edge Profile: Beveled on both edges.
   3. Door Texture: Smooth faces.
   4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   5. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the

requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.02 STEEL DOORS

A. Exterior Doors Type HM:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2.
   2. Core: Polyurethane, foamed in place.
   3. Flanged doors shall be used at exterior locations.
   4. Finish: Factory primed, for field finishing.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2.
   2. Core: Polystyrene foam.
   3. Finish: Factory primed, for field finishing.

C. Interior Doors, Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
      a. Provide units listed and labeled by UL.
      b. Attach fire rating label to each fire rated unit.
   3. Smoke and Draft Control Doors: In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10-inch w.g. pressure at both ambient and elevated temperatures; if necessary, provide additional gasketing or edge sealing. Refer to door schedule.
   4. Core: Mineral fiberboard as required by code.
   5. Finish: Factory primed, for field finishing.

2.03 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. Exterior Frames: ANSI A250.8 Level 1 Doors: 16 gage frames.
      b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage.
      c. Frames for Sound-Rated and Fire-Rated Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 2.
      d. Refer to matrix for steel fire-rated window frames.
   2. Finish: Same as for door.
   3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
   4. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
   5. Frame with Opening Wider than 48 inches: Increase material thickness by 2 gages.
   6. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.

B. Exterior Door Frames: Fully welded.
   1. Weatherstripping: Separate, see Section 08 71 00.
   2. Provide integral flange as indicated on drawings.

C. Interior Door Frames, Non-Fire-Rated: As noted on the door matrix.

D. Interior Door Frames, Fire-Rated: Fully welded type.
   1. Fire Rating: Same as door, labeled.

E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.04 ACCESSORY MATERIALS

A. Metal Louvers for Non-Rated Doors: CT-700 Series manufactured by Titus:

1. Material and Finish: Extruded aluminum; pre-painted finish to match door color.
2. Louver Blade: Inverted V blade, sight proof.
3. Frame: surface mount style with surface fasteners.

B. Glazing: As specified in Section 08 80 00, factory installed.

C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
1. Do not prepare frames for silencers where weatherstripping or gasketing is indicated.

E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.05 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard, except silicone modified resin is not acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Coordinate installation of hardware.

E. Coordinate installation of glazing.

F. Coordinate installation of electrical connections to electrical hardware items.

G. Touch up damaged factory finishes.

H. At acoustically rated locations, install door in a manner consistent with manufacturer recommendations maintaining the STC rating. Any door tested in the field shall meet a DTC no less than 28.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 081217

PREFINISHED STEEL DOOR FRAMES

Part 1 - GENERAL

1.01 Work Included

A. The work under this section shall include the furnishing of all items shown on the drawings and as specified, including but not limited to, the following:

1. Knocked down, site assembled pre-finished steel door frames

2. Knocked down, site assembled sidelight, borrowed light, transom, and full-bound access door frames

3. Pocket trim jambs and casings (Pocket frame and hardware not included)

4. Knocked down, site assembled Double Egress steel door frames

1.02 Related Sections

A. Section 08 71 00 - Hardware

B. Section 08 80 00 - Glazing

1.03 References

A. ASTM A1008M – Standard for cold rolled steel material

B. UBC 7-2-97, UBC 7-4-97 Positive Pressure Fire Test Certification.

C. UL 10B Fire test of Door Assemblies and UL10C Standard for Positive Pressure Fire Tests of Door Assemblies

D. NFPA 80 - Fire Doors and Windows (Latest Edition)

E. NFPA-101 - Life Safety Codes (Latest Edition)

F. ASTM D2197 - Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.

G. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

H. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

I. ASTM D3361 - Standard Practice for Unfiltered Open-Flame Carbon-Arc exposures of Paint and Related Coatings.

J. ASTM B117 – Standard test for salt spray testing

1.04 Submittals

A. Section 01 10 00: General Requirements.

B. Product Data: Indicate frame material, gage, configuration and finishes.

C. Shop Drawings: See section 08 06 00. Indicate frame elevations, details of frame anchorage, reinforcements required, rough opening requirements, location of hardware embosses, and finishes. Detail each floor of the building separately.

D. Samples: Submit one standard frame samples, illustrating factory finished frame colors.

E. Manufacturer's Installation Instructions: Provide installation instructions for all products under this section.

F. Manufacturer's Certificate of Warranty: (See Section 01 78 36) Provide manufacturer's standard warranty certificate stating material is warranted for a period of one year from date of building occupancy

1.05 Quality Assurance

A. Quality Standards

1. Material free from defects in material and according to project specifications for pre-engineered opening systems

2. Proven durability of factory finishes allowing for bending and shaping of material after finish is applied

B. Fire Rated Frame Construction

1. Conform to ASTM E152, NFPA 252, UL 10B and 10C.

C. Installed Frame Assembly: Conform to NFPA 80

1. Use only installers familiar with installation of pre-finished opening systems and applied casing frame installation

1.06 Delivery, Storage and Handling

A. Section 01 60 00: Transport, handle, store, and protect products in a dry area off the ground.

B. Accept frames on site in manufacturer's box packaging with identification labels intact. Inspect for damage.

C. Do not open individual boxes until installation is to begin.

Part 2 - PRODUCTS

2.01 Acceptable Manufacturers

A. Timely Industries, A Division of SDS Industries, Inc., 10241 Norris Avenue, Pacoima, CA, 91331-2292; Phone toll free: 800-247-6242; Fax: 818-492-3530. Web site: www.timelyframes.com.

B. Frames: Provide interior frames shown on drawings and door schedule.

C. Substitutions: Refer to Section 01 60 00

2.02 Frames

A. Frame Material: Cold rolled steel, for interior frames in normal atmospheric exposures.

B. Frame Throat Opening: As shown on plan details to suit finished wall thickness.

C. Where shown, fire rated frames to have kerf formed into frame profile for installation of smoke gasket or weatherstrip material

D. Frame Profile - Unequal Rabbet profile, standard with manufacturer

1. "S" Series, 0.9 mm (20 gage) thick, room interior frames

2. "C" Series, 1.2 mm (18 gage) thick, non-standard walls

3. “CK” Series, 1.2 mm (18 gage) thick, with kerf for door seal/gasket, fire rated, room entry, exterior locations

4. “AK” Series, 0.9 mm (20 gage) thick, with kerf for door seal/gasket, fire rated room entry, exterior locations – available as prime finish only (Specify only if using field applied finishes)

5. “DE” Series, 1.2mm (18 gage) thick, for cross corridor double egress application

6. “P” Series, 1.2mm (18 gage) thick, for Pocket door trim

E. Side Light Frames: 1.2 mm (18 gage)

F. Casings

1. Provide steel casings formed to be applied to heat treated clips on frame face after frame is anchored to wall

2. Standard Steel - TA-8 with 6 mm (1/4 inch) reveal, on steel, stainless steel, and/or brass frames. Fit factory assembled units with MiterGard corner alignment clips. Provide per manufacturer’s recommended corner rosettes if shown.

3. Provide wood casings at Unit Entry Doors per ID Drawings.

2.03 Frame Reinforcement and Accessories

A. Provide reinforcements shipped loose to project site for hardware application

1. TA-10 - Regular arm closers, casing mounted door guards and coordinators

2. TA-12 - Parallel arm closers, Rim Exit device strikes, other stop mounted surface hardware

3. TA-12K – For CK frame, Parallel arm closers, Rim Exit device strikes, other stop mounted surface hardware

4. TA-25 - Double acting spring hinges, continuous hinges, other surface mounted hardware on door rabbet or cased opening frame

5. Provide hinge reinforcement (TA-11) of 14 gage steel pierced to create depth of thread for hinge screws equal to or exceeding 7 gage steel.

B. Weatherstrip/Smoke Gasket: TA-46 (QDS500) 90-minute rated gasket for kerfed frames. Provide for all CK Series frames with factory installed gasket. Provide manufacturer’s standard colors to closely match frame color. (Custom colors not available on TA-46); or approved equal.

C. Silencers: TA-5 vinyl, clear stick-on type. Silencers not required on Kerfed frames or frames schedule to receive stop mounted gasket or weatherstrip

D. Adjustable strikes: Emboss frames for TA-1 strike for cylindrical lock. Provide TA-1 strike in finish compatible with hardware finish. (ANSI 2-3/4” T strike supplied with cylindrical lock cannot be used with standard frame because of unique strike location and screw piercing method)

E. Prepare frames for ASA 4-7/8” strikes where required. Provide minimum ¼” epth of threads in factory tapped screw holes

2.04 Fabrication

A. Openings for single swing, pair, borrowed light and sidelight frames to be pre-cut, notched and fabricated at the manufacturer’s facility. For fire rated and exterior openings, provide kerf at stop for installation of smoke gasket or weatherstrip

B. Provide minimum 14 gage hinge reinforcement plate tapped for machine screws supplied with hinges. Hinge plate to be mechanically attached to hinge emboss on frame

C. Casing Clips: Fabricate frames with factory applied, heat treated clips to ensure no deflection in the clip upon application or removal of casing. Attachment clips may not be of same material as frame

D. Provide notches, tabs and/or stops for positive alignment of frame parts at all corners

E. Mullions to be notched as required to provide tight joints

F. Provide manufacturer's standard mullion brackets for positive connection of frame and mullion parts

G. Provide insert channel full width of borrowed lights installed on finish floor. Provide full width head channel for ceiling height units.

H. Provide adequate structural support (by others) for ceiling insert channel for ceiling height frames

I. Transoms bars fixed type with same profiles as jamb and head

J. Attach approved mylar label to each fire-rated frame indicating fire rating details

K. Primed frames to have 90-minute fire label embossed into frame in lieu of mylar label

L. Factory install TA-46 smoke gasket or approved equal on all pre-finished, CK series frames. Install with factory mitered corners to ensure adequate seal and pleasing appearance

2.05 Finishing

A. Frame Units: Pre-finished with factory applied impact resistant, polyester baked enamel finish or optional electrostatic applied water-based paint system

B. Casing Finishes

1. Steel: Prefinished with factory applied impact resistant, polyester baked enamel finish.

2. Primer: Electro Galvanized with 2 coat off white prime paint

C. Colors: See Finish Matrix.

Part 3 – EXECUTION

3.01 Examination

A. Verify acceptability of existing conditions before starting work.

B. Verify that opening sizes and wall thicknesses are within specified tolerances. Verify that all finished walls are in plane to ensure proper door alignment.

3.02 Installation

A. Install frames in accordance with manufacturer's requirements.

B. Anchor frames with screws located at every casing clip or every 11" as shown on manufacturer's instructions. Field verify quantity and location of fasteners prior to installing casing.

C. Install Pre-finished frames near end of the project after wall painting and wall coverings.

D. Install frames using qualified installers familiar with installation of pre-finished drywall frames.

E. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 21 00.

F. Touch-up blemishes on finished frames with factory prepared touch up paint.

END OF SECTION

SECTION 081660

ALUMINUM AND GLASS SLIDING DOORS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Interior aluminum frames for doors and glazing installed in gypsum board partitions.
2. Interior aluminum-framed sliding doors.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 087100 - DOOR HARDWARE for door hardware.
2. Section 088000 - GLAZING for glazed lites.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, fire-resistance rating, and finishes.

B. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
2. Locations of reinforcements and preparations for hardware.
3. Details of each type of door.
4. Details of each different wall-opening condition.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduits and preparations for power, signal, and control systems.

C. Schedule: For interior aluminum frames and doors. Use same designations indicated on Drawings. Coordinate with door hardware schedule and glazing.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of interior aluminum frame.

E. Maintenance Data: For interior aluminum frames to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain interior aluminum frames from single source from single manufacturer.

B. Fire-Rated Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

C. Accessible Entrances: Comply with authorities having jurisdiction, local state building code and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver interior aluminum frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic. Store interior aluminum frames under cover at Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Solar Innovations
2. Cox USA.
3. Hufcor
4. Klein
5. Or approved equal.

2.2 COMPONENTS

A. Aluminum Framing: ASTM B 221, Alloy 6063-T5 or alloy and temper required to suit structural and finish requirements, not less than 0.062-inch-thick, except not less than 0.072-inch-thick at door framing.

B. Door Frames: Extruded aluminum, reinforced for hinges, strikes, and closers.

C. Glazing Frames: Extruded aluminum, for glazing thickness indicated.

D. Doors: Manufacturer's standard glazed doors, for sliding operation, with continuous tracks, rollers, and acoustical stripping.

E. Ceiling Tracks: Extruded aluminum.

F. Trim: Extruded aluminum, not less than 0.062-inch-thick, with removable snap-in casing trim glazing stops and door stops without exposed fasteners.

2.3 ACCESSORIES

A. Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.

B. Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.

C. Glazing: Comply with requirements in Section 088000 - GLAZING.

D. Door Hardware: Comply with requirements in Section 087100 - DOOR HARDWARE.

1. Opening-Force Requirements for Accessible Interior Doors: Not more than 5 lbf required to open door to minimum required width.

2.4 FABRICATION

A. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted or mitered connections.

B. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.

1. Locate removable stops on the inside of spaces accessed by keyed doors.

C. Fabricate components to allow secure installation without exposed fasteners.

2.5 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and ceilings, with Installer present, for conditions affecting performance of the Work.

B. Verify that wall thickness does not exceed standard tolerances allowed by throat size indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install interior aluminum frames plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's written instructions.

B. Set frames accurately in position and plumbed, aligned, and securely anchored to substrates.

1. At fire-protection-rated openings, install interior aluminum frames according to NFPA 80 and NFPA 105.

C. Install frame components in the longest possible lengths; components up to 96 inches long must be one piece.

1. Fasten to suspended ceiling grid on maximum 48-inch centers, using sheet metal screws or other fasteners approved by frame manufacturer.
2. Use concealed installation clips to produce tightly fitted and aligned splices and connections.
3. Secure clips to extruded main-frame components and not to snap-in or trim members.
4. Do not leave screws or other fasteners exposed to view when installation is complete.

D. Install glazing as specified in Section 088000 - GLAZING.

E. Install doors to produce smooth operation and tight fit at contact points.

1. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 CLEANING

A. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended by frame manufacturer and according to AAMA 609 & 610.

B. Touch up marred frame surfaces so touchup is not visible from a distance of 48 inches. Remove and replace frames with damaged finish that cannot be satisfactorily repaired.

3.4 ADJUSTING

A. Doors: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.

END OF SECTION

SECTION 083310

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Electric-motor-operated overhead coiling doors of the following types:
   a. High-speed roll-up door at garage entry.
   b. Standard coiling doors.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 055000 - METAL FABRICATIONS for miscellaneous steel supports and sound isolating frame.
2. Section 087100 - DOOR HARDWARE for lock cylinders and keying.
3. Division 26 - ELECTRICAL for electrical service and connections for powered operators and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

1. Wind Load: Uniform pressure (velocity pressure) required by Code but not less than 20 lbf/sq. ft. acting inward and outward.

B. Operation-Cycle Requirements: Provide overhead coiling door components and operators capable of operating for not less than 100,000 cycles and for 400 cycles per day.

1.4 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:

1. Summary of forces and loads on walls and jambs.
2. Fire-Rated Doors: Include description of fire-release system including testing and resetting instructions.

B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's product data.

C. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

1. Obtain operators and controls from overhead coiling door manufacturer.

C. Fire-Test-Response Characteristics: Provide assemblies complying with NFPA 80 that are identical to door and frame assemblies tested for fire-test-response characteristics per UL 10b and NFPA 252, and that are listed and labeled for fire ratings indicated by UL, FMG, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with all standard construction requirements of tested and labeled fire-rated door assemblies except for size.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.

1.6 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective work within specified warranty period.

1. Warranty Period: Two year for standard and one year for high speed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Overhead Door Corp.
2. Raynor.
3. Rytec Corp.
4. Approved Equal

B. Basis-of-Design for Low-Height Garage Door: Spiral LH Rigid Rolling Door by Rytec Corp.

1. Provide solid or open slotted type as indicated in door/frame schedule.
2. High speed door springs shall have a minimum 50k cycle life. with 2 yr. maintenance/warranty period.

C. Basis-of-Design for Parking Garage Entry Door (**refer to door/frame schedule in Architectural plans).**

1. Fire rated door springs shall have 100k cycle life.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Aluminum Door Curtain Slats: Double-walled, insulated, aluminum slats, 6 inches high by 1-9/16 inches thick. Trash room doors are not required to be insulated.

   a. Seal: Integral rubber weatherseal between each of the panels.
   b. Hinge: Door slats shall be connected by a reinforced hinge system to provide additional rigidity and security to door panel. Door curtain shall not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.

2. Insulation: Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane-foam-type thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces.
3. Inside Curtain Slat Face: To match material of outside metal curtain slat.

B. Endlocks and Windlocks for Service Doors: Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Service Doors: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8-inch-thick; galvanized, stainless-steel, or aluminum extrusions to suit type of curtain slats.

D. Curtain Jamb Guides for Service Doors: Fabricate curtain jamb guides of steel angles or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch- (thick galvanized steel sections complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Slot boltholes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.3 HIGH SPEED COILING CURTAIN MATERIALS AND CONSTRUCTION

A. Door Panel: aluminum slat frames with clear polycarbonate windows are 9” high. Thickness of slats ranges from 1.2” – 2.4”, depending on overall size of door. Integral rubber weatherseal between each slat. Door slats are connected by hinge system to provide additional rigidity and security to door panel. Door curtain does not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.

B. Side Frames: Galvanized steel side frames with full height weatherseal on both sides to seal against door panel. Dual thru-beam photo-eyes mounted within door jamb. Doors using an external coil cord will not be accepted.

C. Bottom Bar: Extruded aluminum bottom bar with electric, reversing edge that reverses the door upon contacting an object.

D. Counterbalance: Up to six extension springs in each side column, depending on the size of the door. Springs assist the motor in opening the door. Mechanical release lever on side column allows door to be easily opened in the event of a power failure. Doors using torsion springs for counterbalance or doors with springs located within a barrel will not be accepted.

E. Drive System: Minimum 2 HP motor with variable speed AC drive which allows for soft acceleration and braking. Doors using a motor with a clutch or pump will not be accepted.

F. Travel Speed: Opens at up to 100 inches per second and closes at lower speed.

G. Electrical Controls:

1. Rytec controller housed in a UL/CUL Listed NEMA 4X-rated enclosure with factory set parameters.
2. Parameter changes and all door configurations can be made from the face of the control box, no exposure to high voltage. Control panels that require opening of the control box and reaching inside to make parameter changes will not be accepted.
3. Controls include a variable speed AC drive system capable of infinitely variable speed control in both directions.
4. Programmable inputs and outputs accommodate special control applications (traffic lights, horns, actuation devices, timing sequences, etc.) without the need for additional electrical components.
5. Self-diagnostic scrolling two-line vacuum fluorescent display provides expanded informational messages for straightforward installation, control adjustments and error reporting.
6. Complete history of door, at least two years, is logged and encrypted onto a USB flash drive. All errors have a time and date stamp for reference. Control panels not logging up to two years of door history will not be accepted.

H. Door to use rotary encoder to regulate door travel limits. Limits to be self-adjusting, without the use of tools, from floor level at the control panel. Doors using mechanical limits switches or doors that require tools to set the limits will not be accepted.

I. Door Track: Spiral rollup design features not metal-to-metal contact which results in whisper-quiet, low maintenance operation and eliminates wear on panel slats. Doors that roll up on a barrel or whose track design allows metal-to-metal contact will not be accepted.

J. Windload: Door testing indicates the door is capable of withstanding winds up to and exceeding 75 mph (14 psf).

K. Provide manufacturer standard safety light system.

2.4 HOODS AND ACCESSORIES

A. Hood: Form to act as weatherseal and entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top

and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and provide fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sagging.

1. Fabricate hoods from same material and finish as doors.
2. Include automatic drop baffle to guard against passage of smoke or flame.

B. Weather Seals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and top of exterior doors, unless otherwise indicated. At door head, use 1/8-inch-thick, replaceable, continuous sheet secured to inside of hood.

1. Provide motor-operated doors with combination bottom weatherseal and sensor edge.
2. In addition, provide replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene at doorjambs for a weathertight installation.

C. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks. Lock cylinder is specified in Section 087100 - DOOR HARDWARE.

D. If door unit is power operated, provide safety interlock switch to disengage power supply when door is locked.

E. Provide automatic-closing device that is inoperative during normal door operations, with governor unit complying with requirements of NFPA 80 and with an easily tested and reset release mechanism, and designed to be activated by building fire alarm and detection system and door-holder-release devices.

2.5 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to door curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
1. Attention is directed to high performance cycle requirements, Article 1.3.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate.

2.6 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

B. Comply with NFPA 70.

C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging chain and sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

D. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

E. Provide control equipment complying with requirements of project access control provisions.

F. Door-Operator Type: Provide wall-, hood-, or bracket-mounted, jackshaft-type door operator unit consisting of electric motor, drive, and chain and sprocket secondary drive.

G. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors complying with NEMA MG 1; with overload protection; sized to start, accelerate, and operate door in either direction from any position, at not less than 2/3 fps and not more than 1 fps, without exceeding nameplate ratings or service factor.

1. Type: Polyphase, medium-induction type.
2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.

H. Floor Induction Loops: Provide floor induction loops on both sides of each door opening, at all door locations.

I. Readers and Tags: Provide programmable readers (1 per door) and tags (1.25 for each Residential Apartment Unit in project).

J. Photo-Eye Safety: Provide electronic photo-eyes mounted at jamb.

2.7 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. 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.

B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

2.8 ACOUSTIC ISOLATION FEATURE

A. For door installed immediately below or adjacent to dwelling units, provide the following sound control features:

1. Custom designed extra quiet acoustic, noise and vibration dampening assemblies.
2. Foam lined drive chassis.
3. Noise and vibration reducing belts.
4. Motor vibration isolation.
5. Belt adjustment to drives or door to structure and substructure.
6. Neoprene pads at bearing plates.
7. Acoustically insulated door housing.
8. Neoprene sleeves and pads for bolts shafts and bolt and nut bearing assemblies.
9. Neoprene sound isolation products are available from:
   http://www.soundisolationcompany.com/products.php
   http://www.kineticsnoise.com/hvac/npng.html
   http://www.wilrep.com/index.html
10. Rytec Kinetic Elastomeric Isolators Model RQ or equal as standard with LH doors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install coiling doors and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports.

1. Install fire-rated doors to comply with NFPA 80.

3.2 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with weathertight fit around entire perimeter.

3.3 STARTUP SERVICES

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup check according to manufacturer's written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

   a. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

SECTION 083310

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Electric-motor-operated overhead coiling doors of the following types:
   a. High-speed roll-up door at garage entry.
   b. Standard coiling doors.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 055000 - METAL FABRICATIONS for miscellaneous steel supports and sound isolating frame.
2. Section 087100 - DOOR HARDWARE for lock cylinders and keying.
3. Division 26 - ELECTRICAL for electrical service and connections for powered operators and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

1. Wind Load: Uniform pressure (velocity pressure) required by Code but not less than 20 lbf/sq. ft. acting inward and outward.

B. Operation-Cycle Requirements: Provide overhead coiling door components and operators capable of operating for not less than 100,000 cycles and for 400 cycles per day.

1.4 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:

1. Summary of forces and loads on walls and jambs.
2. Fire-Rated Doors: Include description of fire-release system including testing and resetting instructions.

B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's product data.

C. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

1. Obtain operators and controls from overhead coiling door manufacturer.

C. Fire-Test-Response Characteristics: Provide assemblies complying with NFPA 80 that are identical to door and frame assemblies tested for fire-test-response characteristics per UL 10b and NFPA 252, and that are listed and labeled for fire ratings indicated by UL, FMG, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with all standard construction requirements of tested and labeled fire-rated door assemblies except for size.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.

1.6 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective work within specified warranty period.

1. Warranty Period: Two year for standard and one year for high speed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Overhead Door Corp.
2. Raynor.
3. Rytec Corp.
4. Approved Equal

B. Basis-of-Design for Low-Height Garage Door: Spiral LH Rigid Rolling Door by Rytec Corp.

1. Provide solid or open slotted type as indicated in door/frame schedule.
2. High speed door springs shall have a minimum 50k cycle life. with 2 yr. maintenance/warranty period.

C. Basis-of-Design for Parking Garage Entry Door (**refer to door/frame schedule in Architectural plans).**

1. Fire rated door springs shall have 100k cycle life.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Aluminum Door Curtain Slats: Double-walled, insulated, aluminum slats, 6 inches high by 1-9/16 inches thick. Trash room doors are not required to be insulated.

   a. Seal: Integral rubber weatherseal between each of the panels.
   b. Hinge: Door slats shall be connected by a reinforced hinge system to provide additional rigidity and security to door panel. Door curtain shall not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.

2. Insulation: Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane-foam-type thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces.
3. Inside Curtain Slat Face: To match material of outside metal curtain slat.

B. Endlocks and Windlocks for Service Doors: Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Service Doors: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8-inch-thick; galvanized, stainless-steel, or aluminum extrusions to suit type of curtain slats.

D. Curtain Jamb Guides for Service Doors: Fabricate curtain jamb guides of steel angles or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch- (thick galvanized steel sections complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Slot boltholes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.3 HIGH SPEED COILING CURTAIN MATERIALS AND CONSTRUCTION

A. Door Panel: aluminum slat frames with clear polycarbonate windows are 9” high. Thickness of slats ranges from 1.2” – 2.4”, depending on overall size of door. Integral rubber weatherseal between each slat. Door slats are connected by hinge system to provide additional rigidity and security to door panel. Door curtain does not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.

B. Side Frames: Galvanized steel side frames with full height weatherseal on both sides to seal against door panel. Dual thru-beam photo-eyes mounted within door jamb. Doors using an external coil cord will not be accepted.

C. Bottom Bar: Extruded aluminum bottom bar with electric, reversing edge that reverses the door upon contacting an object.

D. Counterbalance: Up to six extension springs in each side column, depending on the size of the door. Springs assist the motor in opening the door. Mechanical release lever on side column allows door to be easily opened in the event of a power failure. Doors using torsion springs for counterbalance or doors with springs located within a barrel will not be accepted.

E. Drive System: Minimum 2 HP motor with variable speed AC drive which allows for soft acceleration and braking. Doors using a motor with a clutch or pump will not be accepted.

F. Travel Speed: Opens at up to 100 inches per second and closes at lower speed.

G. Electrical Controls:

1. Rytec controller housed in a UL/CUL Listed NEMA 4X-rated enclosure with factory set parameters.
2. Parameter changes and all door configurations can be made from the face of the control box, no exposure to high voltage. Control panels that require opening of the control box and reaching inside to make parameter changes will not be accepted.
3. Controls include a variable speed AC drive system capable of infinitely variable speed control in both directions.
4. Programmable inputs and outputs accommodate special control applications (traffic lights, horns, actuation devices, timing sequences, etc.) without the need for additional electrical components.
5. Self-diagnostic scrolling two-line vacuum fluorescent display provides expanded informational messages for straightforward installation, control adjustments and error reporting.
6. Complete history of door, at least two years, is logged and encrypted onto a USB flash drive. All errors have a time and date stamp for reference. Control panels not logging up to two years of door history will not be accepted.

H. Door to use rotary encoder to regulate door travel limits. Limits to be self-adjusting, without the use of tools, from floor level at the control panel. Doors using mechanical limits switches or doors that require tools to set the limits will not be accepted.

I. Door Track: Spiral rollup design features not metal-to-metal contact which results in whisper-quiet, low maintenance operation and eliminates wear on panel slats. Doors that roll up on a barrel or whose track design allows metal-to-metal contact will not be accepted.

J. Windload: Door testing indicates the door is capable of withstanding winds up to and exceeding 75 mph (14 psf).

K. Provide manufacturer standard safety light system.

2.4 HOODS AND ACCESSORIES

A. Hood: Form to act as weatherseal and entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top

and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and provide fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sagging.

1. Fabricate hoods from same material and finish as doors.
2. Include automatic drop baffle to guard against passage of smoke or flame.

B. Weather Seals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and top of exterior doors, unless otherwise indicated. At door head, use 1/8-inch-thick, replaceable, continuous sheet secured to inside of hood.

1. Provide motor-operated doors with combination bottom weatherseal and sensor edge.
2. In addition, provide replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene at doorjambs for a weathertight installation.

C. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks. Lock cylinder is specified in Section 087100 - DOOR HARDWARE.

D. If door unit is power operated, provide safety interlock switch to disengage power supply when door is locked.

E. Provide automatic-closing device that is inoperative during normal door operations, with governor unit complying with requirements of NFPA 80 and with an easily tested and reset release mechanism, and designed to be activated by building fire alarm and detection system and door-holder-release devices.

2.5 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to door curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
1. Attention is directed to high performance cycle requirements, Article 1.3.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate.

2.6 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

B. Comply with NFPA 70.

C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging chain and sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

D. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

E. Provide control equipment complying with requirements of project access control provisions.

F. Door-Operator Type: Provide wall-, hood-, or bracket-mounted, jackshaft-type door operator unit consisting of electric motor, drive, and chain and sprocket secondary drive.

G. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors complying with NEMA MG 1; with overload protection; sized to start, accelerate, and operate door in either direction from any position, at not less than 2/3 fps and not more than 1 fps, without exceeding nameplate ratings or service factor.

1. Type: Polyphase, medium-induction type.
2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.

H. Floor Induction Loops: Provide floor induction loops on both sides of each door opening, at all door locations.

I. Readers and Tags: Provide programmable readers (1 per door) and tags (1.25 for each Residential Apartment Unit in project).

J. Photo-Eye Safety: Provide electronic photo-eyes mounted at jamb.

2.7 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. 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.

B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

2.8 ACOUSTIC ISOLATION FEATURE

A. For door installed immediately below or adjacent to dwelling units, provide sound control features called for in the Veneklansen Acoustical report for the project.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install coiling doors and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports.

1. Install fire-rated doors to comply with NFPA 80.

3.2 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with weathertight fit around entire perimeter.

3.3 STARTUP SERVICES

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup check according to manufacturer's written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

a. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

SECTION 083610

SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead sectional doors, electrically operated.

B. Operating hardware and supports.

C. Electrical controls.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

B. Product Data: Show component construction, anchorage method, and hardware.

C. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.

D. Operation Data: Include normal operation, troubleshooting, and adjusting.

E. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three years of experience.

C. Conform to applicable code for motor and motor control requirements.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for warranty requirements.

B. Correct defective Work within a five-year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ALUMINUM DOOR COMPONENTS

A. Expanded Aluminum Sectional Overhead Doors: Units shall have the following characteristics:
   1. Door Assembly: Stile and rail assembly secured with 1/4-inch (6 mm) diameter through rods.
      a. Panel Thickness: 1 3/4 inches (44 mm).
      b. Center Stile Width: 21/32 inch (17 mm).
      c. End Stile Width: 2 3/4 inches (70 mm).
      d. Intermediate Rail Pair Width: 1 3/8 inches (35 mm).
      e. Top Rail Width: 3 3/4 inches (95 mm).
      f. Bottom Rail Width: 4 1/2 inches (114 mm).
      g. Aluminum Panels: 0.050 inch (1.3 mm) thick, aluminum.
         1.) Perforations: Provide panels with perforation pattern as indicated on drawings to achieve 50 sf of free air area.
         2.) Basis of Design: Rytec, High Speed Spiral LH.
      h. Stiles and Rails: Aluminum.

i. Springs: 100,000 cycles.

2. Finish and color:
   a. Powder Coating Finish: Manufacturer’s Light Grey.
3. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
4. Lock: Interior galvanized single unit.
5. Weather-stripping:
   a. Flexible bulb-type strip at bottom section.
   b. Flexible Jamb seals.
   c. Flexible Header seals.
6. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
7. Rubber rollers to eliminate metal to metal contact.

2.02 ELECTRICAL OPERATION

A. Electrical Characteristics: Manufacturer’s standard.

B. Motor: Manufacturer’s standard.

C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

D. Disconnect Switch: Factory mount disconnect switch in control panel.

E. Electric Operator: Side mounted on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.

F. Safety Edge: At bottom of door panel, full width; electro-mechanical sensitized type, wired to stop door upon striking object; hollow neoprene covered to provide weather-strip seal.

G. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.

H. Control Station: for each electric operator: Per manufacturer and remote-control access devices, one for each unit count, plus an extra 30.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

B. Apply primer to wood frame.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor assembly to wall construction and building framing without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware.

E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus, or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

E. Door in open position to have 8'-2" minimum clearance.

3.05 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weather-stripping.

3.06 CLEANING

A. Clean doors and frames and glazing.

B. Remove temporary labels and visible markings.

3.07 PROTECTION

A. Protect installed products from damage during subsequent construction.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 084110

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with steel stiffener, head flashing, and sill pans.

B. Infill panels of glass.

C. Operable Aluminum doors and windows.
   1. Weatherstripping.
   2. Perimeter sealant.

1.02 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load. Provide verification of these values w/ structural for worst case location and loading, if any are located near a corner it may be significantly higher
   1. Wind and Seismic Criteria: Indicated in Structural Drawings
   2. Positive Design Wind Load: See Structural General Notes.
   3. Negative Design Wind Load: See Structural General Notes.
   4. Member Deflection: Limit member deflection to L/175 in any direction, with full recovery of glazing materials.
   5. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   6. Story Drift: Accommodate design displacement of adjacent stories indicated in Structural Drawings; criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement.
   7. Thermal Performance: See energy calculations on Drawings.
   8. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.
   9. Condensation Resistance Factor: CRF of no less than 60 measured at the frame when measured in accordance with AAMA 1503.1.
   10. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 15% of structural wind load rating.
   11. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   12. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12-hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.03 RELATED REQUIREMENTS

A. Section 01 43 39 - Coordinated mock-ups for mock-up requirements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Submittal Procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, effected related Work, expansion and contraction joint location and details, and field welding required.

1. Indicate and accurately depict all transitions and adjacent building materials and assemblies.

1.05 QUALITY ASSURANCE

A. If required to meet loading requirements, design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State of Oregon.

B. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum 10 years of documented experience.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond to aluminum when exposed to sunlight or weather.

1.08 PROJECT CONDITIONS

A. Coordinate the work with installation of firestopping components or materials.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation. Comply with VOC limit requirements specified in Section 01 62 00 - Product Requirements.

1.10 WARRANTY

A. See Section 01 77 00 - Closeout Procedures, for additional warranty requirements.

B. Correct defective Work within a five-year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Storefront Design Basis: Kawneer Trifab VersaGlaze series in conformance with energy calculations (see drawings G4.00), 2 x 4.5 inch, thermally broken, captured offset glazed, screw spline, shear block, or punched opening fabrication, center set for 1-inch insulated glass unit.

B. Door Design Basis: Kawneer, 1-3/4 inch thick, thermally broken medium stile frame.

C. Other Acceptable Manufacturers:
   1. EFCO, a Pella Company, S-402.
   2. Arcadia.
   3. Oldcastle BuildingEnvelope.
   4. Or approved equal.

2.02 STOREFRONT COMPONENTS

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, sill pans, anchorage and attachment devices.
   1. Framing Members, Transition Members, Mullions, Adaptors, and Mounting: Extruded 6063-T6 aluminum alloy (ASTM B 221 - Alloy G. S. 10a T6).
   2. Screws, Fastening Devices, and Internal Components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM A 164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.
   3. Glazing Gasket (Silicone Compatible):
      a. Compression type design, replaceable, molded or extruded santoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
      b. Shall be of type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.
   4. Hinged Doors: Glazed aluminum.

a. Thickness: Per manufacturer.
b. Top Rail: 6 inches wide.
c. Vertical Stiles: 4.50 inches wide.
d. Bottom Rail: 10 inches wide.
e. Glazing Stops: Square.
f. Finish: Same as storefront.

2.03 ENTRANCE COMPONENTS

A. Door Members: Extruded 6063-T6 aluminum alloy (ASTM B 221 - Alloy G. S. 10a T6).

B. Thermal Barrier: Two glass reinforced polyamide nylon struts.

C. Screws, Fastening Devices, and Internal Components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM A 164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.

D. Glazing Gasket: Compression type design.

E. Hard-backed poly-pile weather-stripping in door and/or frame. Meeting stile of pairs of doors have a double line of hard-backed poly-pile astragal.

F. Thermally broken extruded aluminum threshold with ribbed surface.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).

B. Sheet Aluminum: ASTM B 209 (ASTM B209M).

C. Extruded Structural Pipe and Tubes: ASTM B 429.

D. Fasteners: Stainless steel.

E. Exposed Flashings: 0.040-inch-thick aluminum sheet; finish to match framing members.

F. Concealed Flashings: 0.013-inch-thick stainless steel.

G. Perimeter Sealant: Type silicone specified in Section 07 90 05 - Joint Sealers.

H. Glass: As specified in Section 08 80 00 - Glazing.

I. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 FINISHES

A. Architectural Class II or I color anodic coating conforming with AA-M12C22A44; Dark Bronze.

2.06 HARDWARE

A. Door Hardware: As specified in Section 08 71 00 - Door Hardware. Door hardware for doors specified in this section shall be provided under this section.

B. Weather-stripping: Per manufacturer, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all doors.

D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.
   1. Provide thresholds specified in Section 08 71 00 - Door Hardware. If not specified, provide Manufacturer's threshold approved in Shop Drawings.

2.07 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce components internally for door hardware.

G. Reinforce framing members for imposed loads.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   2. Form aluminum shapes before finishing.
   3. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
   4. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
      a. Profiles that are sharp, straight, and free of defects or deformations.
      b. Accurately fitted joints with ends coped or mitered.
      c. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
      d. Physical and thermal isolation of glazing from framing members.
      e. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
      f. Provisions for field replacement of glazing from exterior.
      g. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   5. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
      a. At exterior doors, provide compression weather stripping at fixed stops.
   6. Doors: Reinforce doors as required for installing hardware.
      a. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
      b. At exterior doors, provide weather sweeps applied to door bottoms.
   7. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
   8. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
   1. DO NOT install units through sill condition. Installation of units shall be via back angle method, into backside of storefront extrusion from interior. Sill condition of window, to include rigid metal flashings and flexible membranes shall be free of penetrations as a result of storefront unit installation.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form watertight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of mastic and secure.

J. See Section 08 71 00 - Door Hardware for hardware installation requirements.

K. Install glass and infill panels in accordance with Section 08 80 00 - Glazing, using glazing method required to achieve performance criteria.

L. Install perimeter sealant in accordance with Section 07 90 05 - Joint Sealers.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2.

3.05 ADJUSTING

A. Adjust operating hardware for smooth operation.

3.06 CLEANING AND PROTECTION

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

E. Protect finished work from damage.

END OF SECTION

SECTION 085313

VINYL WINDOWS AND DOORS

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL REQUIREMENTS and all Sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.01 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Fixed and operable vinyl windows with factory installed glass and glazing.
   2. Single swinging vinyl doors with factory-installed glass and glazing
   3. Sliding vinyl doors with factory-installed glass and glazing.
   4. Operating hardware; push/pull with 4-inch limiter.
   5. Insect screens.
   6. Perimeter sealant.
   7. Trickle vents, as required per code and as indicated on drawings.

B. Sustainable Design Intent: Comply with project requirements intended to achieve sustainable design, measured and documented according to the LEED Green Building Rating System, of the US Green Building Council. Refer to Section 018110, Sustainable Design Requirements for certification level and certification requirements. **This requirement applies only if this is a LEED Certified project.**

1.02 RELATED REQUIREMENTS

A. Section 01 43 39 - Coordinated Mock-ups; for mock-up requirements.

B. Section 07 62 00 – Sheet Metal Flashing and Trim

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; American Architectural Manufacturers Association/Window & Door Manufacturers Association/Canadian Standards Association.

B. AAMA 701/702 - Voluntary Specification for Pile Weather-stripping and Replaceable Fenestration Weather seals; American Architectural Manufacturers Association.

C. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Cyclic Static Air Pressure Difference.

D. Window Certification: WDMA certified with label attached to each window.

E. ASTM E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element for acoustical performance

1.04 DESIGN PARAMETERS

A. Design and size components to withstand dead and live loads caused by positive and negative pressure acting normal to plane of window.
   1. Calculate design pressures in accordance with applicable code.

B. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.

C. Minimum Basic Wind Speeds: Site specific values for the fastest mile speeds as obtained from the 1998 OSSC; Figure 16-1.

D. Design Wind Loads (AKA Design Pressure): Building height specific values as calculated from the 2010 OSSC.
   1. See structural drawings for specific loading.
   2. **See exterior finish matrix for minimum design wind load.**

1.05 PERFORMANCE REQUIREMENTS

A. Performance Requirements: As specified in PART 2, with the following addition requirements:

B. AAMA/WDMA/CSA 101/I.S.2/A440; Minimum Certified Performance Grade: CW-PG40 Casement; CW-PG35 Awning; and LC-PG30 Sliding Glass Door.

C. Water Penetration System Design: Resist water infiltration at laboratory and in an in-situ field test.
   1. Water Resistance Test Pressure (Lab Test): Minimum. 15% of AAMA rated windows rated design pressure. field test:10% of AAMA rated windows rated design pressure.
   2. Measure performance of units by testing in accordance with ASTM E 331, using uniform structural load test pressure equal to 1.5 times the design wind pressure.
   3. No water leakage allowed as defined by ASTM E1105 and AAMA 101/I.S.2/A440.

D. Air Infiltration: Limit air infiltration through assembly to 0.3 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.

E. Thermal Resistance of Assembly:
   1. Low-E366 for casements: U value of 0.27; NFRC certified.
   2. Low-E366 for pictures: U value of 0.26; NFRC certified.
   3. Sliding Glass Doors: U-value 0.29; NFRC certified.

F. Vapor Seal: No vapor seal failure at interior static pressure of 1 inch, 72 degrees F, and 40 percent relative humidity.

G. Condensation Resistance Factor: CRF of 63* when measured in accordance with AAMA 1503.

H. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

I. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapor retarder.

J. Thermal Movement: Design sections to permit movement caused by thermal expansion and contraction of plastic to suit glass, infill, and perimeter opening construction.
   1. Design Temperature Range: 120 F degrees ambient.
   2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

K. See Acoustical report for exterior façade acoustical performance including STC and octave band Transmission Loss acoustical performance. Windows must satisfy these requirements. Minimum STC rating is 29. Higher STC requirements may be required.

1.06 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section. Agenda shall include:
   1. Review Contract Documents, submittals, status of coordinating work, availability of materials, and installation facilities.
   2. Review methods and procedures related to window and air barrier installation, including manufacturer's written instructions.

3. Examine substrate conditions and finishes for compliance with requirements, including flatness, tolerances and attachment to structural members.
4. Review flashings, special details, and conditions of other construction that will affect window installation.
5. Review governing regulations and requirements for insurance, certifications, and inspection and testing.
6. Review and finalize construction schedule related to window installation work, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
7. Review observation and repair procedures after window installation.
8. Discuss window system protection requirements for construction period extending beyond window installation.
9. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant.
10. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.07 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, attachment information, anchorage and fasteners, glass, internal drainage details.

C. Indicate new window sizes based on the opening dimensions shown on the Architectural drawings.

D. Manufacturer's Certificate: Certify that products of this section meet or exceed specified requirements.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Fabrication Sample for Verification: For each type of exposed finish required, provide cut-away sample for review.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience.

C. Mock-up: Provide sequential mock-up of window installation with accessories and sealants per Architect and Consultant’s requirements. The intent of the window mock-up is to review the sequential layering of materials and Building Envelope Consultant should be present for the entire process.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

C. Acoustical performance shall be one of the items (STC rating) clearly indicated on the sticker that is provided for any window supplied to the jobsite.

1.10 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during until sealants have fully cured.

1.11 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer standard warranty indicating that the window unit will be free from material and workmanship defects for ten (10) years from the date of substantial completion.

C. See Section 08 80 00 - Glazing for glazing warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Vinyl Windows:
   1. Design Basis: VPI Quality Windows, Endurance Series.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Vinyl Doors:
   1. Design Basis (Swinging Door): VPI Quality Windows, and Marathon Series Out Swing Door.
   2. Design Basis (Sliding Door): VPI Bellevue Sliding Exterior Door.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 VINYL WINDOWS AND DOORS

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
   1. Configuration: As indicated on drawings.
   2. Swing Doors: Match window frame style and color.
   3. Color: Refer to project matrix.
   4. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
   5. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
   6. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
   7. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
   8. Mounting Flange: Integral to frame assembly, providing weather stop at entire perimeter of frame. V notch flange per BE details. Provide flangeless attachment clips at assemblies with exterior insulation.

B. Performance Requirements: Provide products that comply with the following:
   1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements in accordance with the following:
   2. Performance Validation: Windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.

2.03 COMPONENTS

A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.

B. Windows and Doors: Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
   1. Configuration: As indicated.

2. Color: Color as indicated on Exterior Finish Matrix.

C. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.
   1. Frame Color: As indicated on Exterior Finish Matrix.
   2. Mesh Color: As indicated on Exterior Finish Matrix.

D. Operable Sash Weather-stripping: Wool pile; permanently resilient, profiled to maintain weather seal in accordance with AAMA 701/702.

E. Fasteners: Stainless steel.

F. Opening limiters: At operable windows except level 1 courtyard windows.

G. Trickle Vents: Provide trickle vents of type as required by code and as acceptable to Architect. Refer to drawings for additional requirements.

2.04 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08 80 00.

2.05 SEALANT MATERIALS

A. Manufacturer's standard.

2.06 HARDWARE

A. Operator: Geared rotary crank handle fitted to projecting sash arms with 4-inch limit stop restrictors. Provide ADA compliant opener and locks at operable windows in Type A units, and hardware is to be within reach range limits in any stage of function.

B. Sash lock: Lever handle with cam lock.

C. Finish For Exposed Hardware: Baked enamel.

D. Color: Refer to Exterior Finish Matrix.

2.07 FABRICATION

A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.

B. Form sills and stools in one piece. Slope sills for wash.

C. Form snap-in glass stops, closure molds, weather stops, and flashings of extruded PVC for tight fit into window frame section.

D. Form weather stop flange to perimeter of unit.

E. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

F. Arrange fasteners to be concealed from view.

G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

H. Assemble insect screen frame, miter and reinforced frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.

I. Double weather-strip operable units.

J. Factory glaze window units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive this work.

B. Inspect rough opening for compliance with window manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

3.02 WEATHER BARRIER INSTALLATION

A. Installation of Water and Air Barrier Membranes
   1. Install self-adhering window sill flashings, back angle and integration to field weather resistive barrier (WRB) / air barrier in strict conformance with the project documents.
   2. Integrate air barrier prestrip membranes at jambs and head conditions as shown on the project documents. Allow ample selvage of pre-strip membrane to interior to allow for interior air sealant joint. Do not fasten to outward portion of air barrier membrane.

3.03 INSTALLATION, GENERAL

A. Install door and window units in accordance with manufacturers instructions and as shown on drawings.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.

C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

E. Coordinate attachment and seal of perimeter air and vapor barrier materials.

F. Install operating hardware.

G. Install glass and infill panels in accordance with Section 08 80 00, to glazing method required to achieve performance criteria.

H. Install perimeter sealant and backing materials in accordance with Section 07 90 05.

I. Interior Air Seal
   1. After proper install of window, provide continuous air seal at full perimeter of windows and doors.
   2. Fit appropriately sized backer rod per SECTION 079200 – JOINT SEALANTS into void.
   3. Provide interior sealant application between window and air barrier prestrip at head, jambs and sill conditions. Tool joints.
   4. Rippled, discontinuous or otherwise poor sealant application will not be accepted.

3.04 TOLERANCES

A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

3.05 FIELD QUALITY CONTROL

A. Test installed windows and doors for compliance with performance requirements for water penetration, in accordance with ASTM E1105 Procedure B Cyclic at 4.5psf under AAMA 502-8. Water test pressure shall be 15% the DP at a 2/3 reduction at 4 cycles of 5min with a 1min rest period in-between.

B. Test installed windows for compliance with performance requirements for water penetration, in accordance with ASTM E1105.

1. Test 3 windows, randomly selected. Test windows to be representative of the different window types installed in the project.
2. For each failure, test (**1**) additional window of that size and type at Contractor's expense.

C. Replace windows that have failed field testing and retest until performance is satisfactory.

3.06 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.07 CLEANING

A. Remove protective material from pre-finished surfaces.

B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

END OF SECTION

SECTION 085313

VINYL WINDOWS AND DOORS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Fixed and operable vinyl windows with factory-installed glass and glazing.
2. Single swinging vinyl doors with factory-installed glass and glazing.
3. Sliding vinyl doors with factory-installed glass and glazing.

B. Sustainable Design Intent: If this project is a LEED Project - Comply with project requirements intended to achieve sustainable design, measured and documented according to the LEED Green Building Rating System, of the US Green Building Council. Refer to Section 018110, SUSTAINABLE DESIGN REQUIREMENTS for certification level and certification requirements.

C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 076200 - SHEET METAL FLASHING AND TRIM.

1.3 PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Refer to cladding and component schedule on structural plans and architectural window schedule.

C. Thermal Transmittance: NFRC 100 maximum whole-window minimum U-factor of 0.30 Btu/sq. ft. x h x deg F.

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window minimum SHGC of 0.30.

E. Sound Transmission Coefficinet (STC): Minimum 29 based on whole window unit testing.

F. Mulled Units: Provide testing verification for compliance with specified requirements.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
3. Expansion provisions.
4. Flashing and drainage details.
5. Weather-stripping details.
6. Glazing details.
7. Window cleaning provisions.
8. Window System Operators: Show locations, mounting, and details for installing operator components and controls.
9. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation and used to determine the following:

a. Structural test pressures and design pressures from basic wind speeds indicated.
b. Deflection limitations of glass framing systems.

C. Samples for Verification: Full-size operable window of each type of window.

D. Qualification Data: For Installer, professional engineer and testing agency.

E. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

F. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency, for each type, grade, and size of window. Test results based on use of down-sized test units will not be accepted.

G. Performance Reports: Based on systems, components and glazing methods proposed for use on this Project, proof that windows as glazed for this Project meet or exceed Code requirements for the following:

1. U-value.
2. Solar heat-gain coefficient.

H. Maintenance Data: For operable window sash, operating hardware, weather stripping, and finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to window manufacturer for installation of units required for this Project.

B. Source Limitations: Obtain windows through one source from a single manufacturer.

C. Product Options: Information on Drawings and in Specifications establishes requirements for windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by

dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

D. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Provide AAMA certified windows with an attached label.

E. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

F. Unit Mock-up: Provide materials, products, and components as specified herein for 1 complete unit mock-up. Refer to Section 014330 – Mock-ups for additional requirements.

G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup for types of windows indicated, in locations shown on Drawings.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01. Review methods and procedures related to windows including, but not limited to, the following:

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review required testing and inspecting procedures.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Failure to meet performance requirements.
2. Structural failures including excessive deflection.
3. Water leakage, air infiltration, or condensation.
4. Faulty operation of movable sash and hardware.
5. Deterioration of material, material finishes, beyond normal weathering.
6. Insulating glass failure.

B. Warranty Period: The following warranty provisions are a minimum to be achieved either directly from the proposed manufacturer's warranty or supplemented with an additional third-party warranty to comply with minimum requirements.

1. Windows: Manufacturer's standard commencing on the date of Substantial Completion.
   a. The vinyl extrusions shall be fully warranted to be free from defects under normal use and service, and shall be warranted not to pit, rot, rust, flake, corrode, peel or blister.
2. Glass Units: Manufacturer's standard commencing on the date of Substantial Completion.
   a. The insulating glass shall be warranted against defects resulting in material obstruction of vision from film formation, dust collection or moisture collection between the interior glass surfaces.
3. Hardware: Manufacturer's standard commencing on the date of Substantial Completion.
   a. The hardware and other components or accessories shall be warranted against defects under normal use, care and cleaning.

C. All warranties shall be transferable to Owner of property at any time during the duration of warranty. Provide written documentation from manufacturer indicating compliance at time of Submittal.

1. Ownership of property may change multiple times during warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Andersen Windows and Doors.
2. Harvey.
3. Hurd- Superseal.
4. Fen-Tech, Inc.
5. Jeld-Wen.
6. Pella.
7. PlyGem.
8. Sierra-Pacific.
9. Stergis Windows and Doors.
10. VPI Quality Windows.

B. Basis-of-Design for Windows: Stergis Windgate vinyl for single hung, fixed, and casement windows.

1. Fixed Window Locations: Provide fixed windows in common areas including but not limited to corridors, stairwells, clubhouse and other common area locations.

C. Basis-of-Design for Sliding Doors: Stergis 1100 Series.

D. Basis-of-Design for Swinging Doors: Botanica Series 150 by Fen-Tech, Inc.

2.2 VINYL WINDOWS AND DOORS

A. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Finish: Integral color, as selected by the Architect

B. Insulating-Glass Units: ASTM E 2190, certified through IGCC as complying with requirements of IGCC.

1. Basis of Design: Cardinal Glass.
2. Glass: ASTM C 1036, Type 1, Class 1, q3.

a. Tint: Clear.
b. Kind: Fully tempered where indicated on Drawings.

3. Lites: Two.
4. Filling: Fill space between glass lites with **argon**.
5. Low-E Coating: Manufacturer’s standard.
6. Thickness: 3/4 inch.

C. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

1. Refer to unit/floor plans for interior door swings affecting windows.

D. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

E. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only. Provide custodial locks.
3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
4. Limit Devices: Concealed, adjustable limit devices designed to restrict sash opening.

a. Limit clear opening to 4 inches for ventilation; emergency release as required by code. Verify availability with manufacturer.
b. Limit devices shall be shipped loose for installation in the field, unless local code requires them to be installed for CO.
c. Frames shall accept limit devices.

F. Swinging and Sliding Door Hardware: Provide manufacturer’s standards, to match test data.

1. Security Bars: Provide security bars for sliding doors on first floor levels.

G. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

H. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

I. Drywall Loading: Provide 5% of windows fabricated for drywall loading.

J. Windows with flanges shall have integral/welded nailing fins. Mechanical flanges are not permitted.

2.3 ACCESSORIES

A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.

1. Material: Manufacturer's standard.
2. Pattern: Refer to drawings.
3. Profile: As selected by Architect from manufacturer's full range.
4. Color: Refer to plans and window schedule for color.

2.4 INSECT SCREENS

A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Provide for each operable exterior sash or ventilator.

B. Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
2. Finish: Match window members.

C. Glass-Fiber Mesh Fabric: 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656.

1. Mesh Color: Manufacturer's standard.

2.5 FABRICATION

A. General: Fabricate windows, in sizes indicated, that comply with AAMA/NWWDA 101/I.S.2 for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows.

B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.

C. Weep Holes: Provide concealed weep holes and internal passages to conduct infiltrating water to exterior.

D. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

E. Factory-Glazed Fabrication: Glaze windows in the factory where practical and possible for applications indicated. Comply with AAMA/NWWDA 101/I.S.2.

F. Use of plasticized PVC is not permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Provide additional anchorage to prevent bowing where shim spaces and gaps are sealed with foam.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. Testing Services: Testing and inspecting of installed windows shall take place as follows:

1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
2. Air-Infiltration Testing:

    a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
    b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

3. Water-Resistance Testing:

    a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
5. Test Reports: Prepared according to AAMA 502.

C. Remove and replace noncomplying windows and retest as specified above.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION

SECTION 088000

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

C. Hardwood glazing system.

D. Glass films.

1.02 REFERENCE STANDARDS

A. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

C. ASTM C 1036 - Standard Specification for Flat Glass.

D. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.

E. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.

F. ASTM C 1193 - Standard Guide for Use of Joint Sealants.

G. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.

H. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

I. GANA (GM) - GANA Glazing Manual; Glass Association of North America.

J. GANA (SM) - FGMA Sealant Manual; Glass Association of North America.

1.03 DEFINITIONS

A. ASHRAE NFRC 2001 Terms and abbreviations:
   1. U-Value; U-Factor, winter. Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
   2. VTL; Visible Light Transmittance. Center-of-glazing values, according to NFRC 300.
   3. SHGC; Solar Heat Gain Coefficient. Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   4. STC; Sound Transmission Class, STC, when tested per ASTM E 90.

B. Safety Glazing: Laminated glass complying with ASTM C 1172, and 16 CF 1201, Category II or tempered glass complying with ASTM C 1048.

C. Hazardous Locations: The following shall be considered specific hazardous locations requiring safety glazing materials:
   1. Glazing in swinging doors except jalousies (as indicated in OSSC Section 2406.4.1).
   2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
   3. Glazing in storm doors.
   4. Glazing in unframed swinging doors.
   5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above a standing surface.
   6. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch (610mm) arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches (1524mm) above the walking surface.

a. Exceptions:
   1) Panels where there is an intervening wall or other permanent barrier between the door and glazing.
   2) Where access through the door is to a closet or storage area 3 feet (914mm) or less in depth. Glazing in this application shall comply with Section 2406.4, Item 7.
   3) Glazing in walls perpendicular to the plane of the door in a closed position, other than the wall towards which the door swings when opened, in one- and two-family *dwellings* or within *dwelling units* in Group R-2.

7. Glazing in an individual fixed or operable panel, other than in those locations described in preceding Items 5 and 6, which meets all of the following conditions:
   a. Exposed area of an individual pane greater than 9 square feet (0.84 square meters);
   b. Exposed bottom edge less than 18 inches (457 mm) above the floor;
   c. Exposed top edge greater than 36 inches (914 mm) above the floor; and
   d. One or more walking surface(s) within 36 inches (914mm) horizontally of the plane of the glazing.
   e. Exception:
      1) A protective bar 1 1/2 inches (38mm) or more in height, capable of withstanding a horizontal load of 50 pounds plf (730 N/m) without contacting the glass, is installed on the accessible sides of the glazing 34 inches to 38 inches (864 mm to 965 mm) above the floor.
      2) The outboard pane in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet (7620mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.78 rad) surface adjacent to the glass exterior.
8. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs, and spas where all of the following conditions are present:
   a. The bottom edge of the glazing on the pool or spa side is less than 60 inches (1524mm) above a walking surface on the pool or spa side of the glazing; and
   b. The glazing is within 60 inches (1524mm) horizontally of the water's edge of a swimming pool or spa.
10. Glazing adjacent to stairways, landings and ramps within 36 inches (914mm) horizontally of a walking surface; when the exposed surface of the glass is less than 60 inches (1524mm) above the plane of the adjacent walking surface.
11. Glazing adjacent to *stairways* within 60 inches (1524mm) horizontally of the bottom tread of a *stairway* in any direction when the exposed surface of the glass is less than 60 inches (1524mm) above the nose of the tread.
    a. Exception: Safety glazing for Item 10 or 11 is not required for the following installations where:
       1) The side of a *stairway*, landing or ramp which has a *guard* or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7; and
       2) The plane of the glass is greater than 18 inches (457mm) from the railing.

1.04 PERFORMANCE REQUIREMENTS

A. Provide exterior glass and glazing materials for continuity of building enclosure vapor retarder and air barrier and for code required glazing of exterior canopy:
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
   2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.
   3. Exterior glass canopy to be custom designed, engineered, detailed, factory fabricated, and site assembled and erected.
      a. Design Requirements: For design loads see structural notes.

b. Design, size components, and install glass canopy in accordance with ASTM E1300 to withstand these loads without breakage, loss, failure of seals, product deterioration, and other defects.

B. Select type and thickness of all glass and glass units to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with Building code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Material thicknesses listed are minimum.

1.05 RELATED REQUIREMENTS

A. Section 01 33 00 - LEED for Homes Requirements - See this section for contract requirements and procedural responsibilities.

1.06 SUBMITTALS

A. See Section 01 30 00 - Submittal Procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
   1. Design Data: When required by AHJ; Section 01 34 00.
   2. Safety Glazing: Identify all locations where required.

E. Samples; Submit the following:
   1. Glass; Two 12 by 12 inches in size of glass and insulated glass units showing coloration and design.
   2. Sealants; One 8-inch-long bead of glazing sealant in selected color

F. Test reports: Provide published test reports that products meet or exceed specified requirements.
   1. Testing reports required for non-standard or special products.

G. Installer's Qualifications.

H. Sample Warranties.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Source Limitations for Glass: Obtain ultra-clear float glass, tinted float glass, coated float glass, laminated glass, and insulating glass from single source manufacturer (for each glass type).

E. IGU Fabricator: Certified by glass coating manufacturer for products specified.

F. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.
   1. A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.08 WARRANTY

A. See Section 01 77 00 - Closeout Procedures, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, inter-pane dusting or misting. Warranty to cover full replacement of failed units.

PART 2 PRODUCTS

2.01 GLASS REQUIREMENTS

A. Provide Heat Strengthened and Tempered treatment for glass at all locations required by code.

B. Provide Safety Glazing at all hazardous locations as defined by and required by code.

C. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; of class, kind and condition indicated; horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed.

D. Laminated Glass: Comply with ASTM C 1172 and 16 CFR 1201, Category II. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

E. Exposed Edges of Glass: Ground and polished.

2.02 GLASS MANUFACTURERS

A. AGC Flat Glass North America, Inc: www.afgglass.com.

B. Guardian Industries Corp: www.sunguardglass.com.

C. Pilkington North America Inc: www.pilkington.com.

D. PPG Industries, Inc: www.ppg.com.

E. Cardinal Glass Industries: www.cardinalcorp.com.

F. Substitutions: See Section 01 63 00 - Product Substitution Requirements.

2.03 GLASS TYPES

A. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat Strengthened and Tempered: ASTM C 1048; Heat Strengthened (HS) and Fully Tempered (FT), Coated and Uncoated Glass where required.
   3. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

B. Laminated Glass: Float glass laminated in accordance with ASTM C 1172, and meeting the requirements of ANSI Z97.1 and CPSC 16 CFR.
   1. Plastic Interlayer: 0.060 inch thick, minimum.
   2. Where fully tempered is specified or required, provide glass that has been tempered by the tong-less horizontal method.

C. Coated Glass Type 1; with the following characteristics (measurements for a two pane IGU):
   1. Basis of Design: Refer to Energy Sheet G203.
      a. Other listed manufacturers and substitutions will be considered provided the overall performance is within the specified range(s) and the overall appearance is not significantly different from that of the specified product.

D. Obscuring Glass: Heat-treated clear float glass, with window film applied on inside face.
   1. Basis of Design Product: 3M Decorative Window Films; Product: Farsa Privacy Glazing Film, “milky” or comparable product subject to approval for compliance with requirements.
   2. Film Color and Pattern: Translucent white, single pattern continuously consistent over vision surface.
   3. Comply with:
      a. ASTM E84 for surface burning characteristics.
      b. Ultraviolet Rejected (ASTM E903): Not less than 99 percent.

c. Visible Light Transmittance (ASTM E903): Not more than 83 percent.
d. Visible Light Rejected (ASTM E903): Not less than 8 percent.
e. Solar Heat Reduction: Not less than 8 percent.
f. Shading Coefficient at 90 Degrees (Normal Incidence - ASTM E903): Not less than 0.91.

E. Provide window film at amenity areas per interior design finish schedule. Provide physical sample of film for approval.

2.04 SEALED INSULATING GLASS UNIT TYPES

A. Manufacturers: Certified by glass coating Manufacturer.
1. Any of the manufacturers listed for glass.
2. Current member of The Insulating Glass Certification Council (IGCC).
3. Substitutions: Refer to Section 01 63 00 - Product Substitution Requirements.

B. Requirements.
1. Comply with ASTM E 774 and E 773, Class CBA.
2. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
3. Edge Spacers: Provide durable low conductance (warm edge; non-metal) spacers.
4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
5. Place low E coating on No.2 surface within the unit
6. Purge inter-pane space with dry hermetic air.
7. Total unit thickness of 1 inch, unless noted otherwise.

C. Type IGU-1; Insulated Glass Unit: Double pane with double edge seal.
1. Outer pane of Coated Glass Type 1, inner pane of Float Glass.
2. Coating on No.2 surface within the unit.
3. Visible light transmittance: 72%.
4. Solar Heat Gain Coefficient; SHGC: 0.41.
5. U-Value: 0.32.
6. Fading Transmission; TDW: 0.55.

D. Type IGU-2: Obscure Glass Unit: Double pane with double edge seal.
1. Outer pane of Coated Glass Type 1, inner pane of Obscuring Glass.
2. Coating on No.2 surface within the unit.
3. Obscure coating on No.3 surface within the unit.
4. Visible light transmittance: N/A.
5. Solar Heat Gain Coefficient; SHGC: 0.41.
6. U-Value: 0.32.
7. Fading Transmission; TDW: 0.55.

2.05 FIRE-RATED GLAZING (TYPE FR)

A. Manufacturers:
1. Design Basis Product: Subject to compliance with requirements, provide fire-rated glazing systems by Technical Glass Products (TGP); Product: FireLite Plus; www.fireglass.com, and where required, in combination with Pilkington; Product: Pyrostop; www.pilkington.com. Manufacturers providing comparable products that may be incorporated into the Work include, but are not limited to, the following:
a. Safti First; www.safti.com.
b. Substitutions: See Section 01 63 00 - Product Substitution Requirements.

B. System Requirements:
1. Fire-Rated, Safety-Rated Glass Ceramic:
a. Fire-Rating: 20-180 minutes, with required hose stream test.
1) FR-1: FireLite Plus 20-Minute fire-rating.
2) FR-2: FireLite Plus 45-Minute fire-rating.
3) FR-3: Pilkington Pyrostop for fire-rating
b. Safety-Rating: meets ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II)

c. Type: Clear, wireless.
d. Passes positive pressure test standards UL 9, UL 10C, UL 263, UBC 7-2, UBC 7-4, ASTM E 119, and NFPA 257.

2. See drawings and Section 08 14 11 - Wood-Veneer Fire-Rated Frames for additional requirements.

2.06 GLAZING COMPOUNDS

A. Manufacturers:
1. Bostik Inc: www.bostik-us.com.
2. Dow Chemical Company: www.dow.com.
3. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
4. Pecora Corporation: www.pecora.com.
5. BASF Construction Chemicals-Building Systems: www.chemrex.com.
6. Substitutions: See Section 01 63 00 - Product Substitution Requirements.

B. Silicone Sealant (Type 1): Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

2.07 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4-inch x width of glazing rabbet space minus 1/16-inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3-inch-long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; selected color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement; weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Prime surfaces scheduled to receive sealant.

C. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

D. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.04 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

3.06 SCHEDULE

A. EXTERIOR: Clear glass - typical, unless otherwise indicated.
   1. Type: IGU-1.
   2. Glass thickness: Individual pane thicknesses as required to comply with performance requirements.
   3. Includes all Curtain Walls, Windows, and Doors.

B. EXTERIOR: Clear glass - typical, unless otherwise indicated.
   1. Type: Monolithic laminated.
   2. Glass thickness: Glass thicknesses as required to comply with performance requirements.
   3. Installation: As required to comply with performance requirements, exterior dry method.

C. INTERIOR: Glass in Fire Rated Assemblies.
   1. Type: FR Glass Unit.

D. INTERIOR; Casework.
   1. Type: Laminated Glass.

END OF SECTION

SECTION 089000

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Fixed extruded-aluminum louvers and frames.
2. Elevator vents.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 079200 - JOINT SEALANTS for sealants installed in perimeter joints between louver frames and adjoining construction.
2. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING for louvers that are a part of mechanical equipment.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and wind loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers. Loads as required by Code.

B. Seismic Performance: Provide louvers capable of withstanding the effects of earthquake motions as required by code.

C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

1. For installed louvers indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: For each type of metal finish required.

D. Qualification Data: For professional engineer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code--Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective work within specified warranty period.

1. Warranty Period: As standard with manufacturer unless indicated otherwise.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Louvers and Vents:
   a. Airolite Company, LLC.
   b. Construction Specialties, Inc.
   c. Greenheck.
   d. Industrial Louvers, Inc.
   e. McDermott Metal Works Corporation
   f. Nystrom Building Products.
   g. Ruskin Company.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Fully Recessed Mullions: Provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.

F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 ELEVATOR VENTS

A. Elevator Vents: Factory-fabricated horizontal or through-wall dampered elevator vents as detailed on the Drawings meeting local state building code requirements.

1. Finish: Manufacturer’s standard fluoropolymer finish as selected by Architect from manufacturer’s full range.

2.5 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louvers:

1. Louver Depth: 4 inches.
2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch.
3. Performance Requirements:

a. Free Area: Comply with requirements indicated on the Drawings.
b. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rain fall rate of 3 inches per hour and a wind speed of 29 mph at a core area intake velocity of 300 fpm.

4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

B. High-Performance Organic-Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Fluoropolymer Three-Coat Coating System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.6 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening.

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

D. Louver Screening for Aluminum Louvers:

1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.

2.7 BLANK-OFF PANELS

A. Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.

1. Thickness: 1 inch.
2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch nominal thickness.
3. Insulating Core: Rigid insulation board.
4. Seal perimeter joints between panel faces and louver frames with 1/8-by-l-inch PVC compression gaskets.
5. Panel Finish: Same finish applied to louvers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 - JOINT SEALANTS for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 093000

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Ceramic accessories

1.02 REFERENCES

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2005.

B. ASTM C 1178/C 1178M - Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel; 2004.

C. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of North America, Inc.; 2007.

1.03 SUBMITTALS

A. See Section 01 30 00 - Submittal Procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Tile layout. Indicate general lay-out, surrounding construction, edge details and special conditions.

D. Samples: Provide tile samples for each color. Provide physical tile and grout submittal sample for approval.

1.04 MAINTENANCE MATERIAL SUBMITTALS

A. See Section 01 62 00 - Product Requirements, for additional provisions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 QUALITY ASSURANCE:

A. Pre-Installation conferences: Schedule and administer a meeting to review and discuss the tile installation a min of one week prior to start of setting tile. Required attendance: tile setter and general contractor Agenda: Installation scheduling and coordination, Preparation, installation methods and protection requirements Tile grout patterns and expansion joint locations Material and installation tolerances Alignments with other surfaces and materials

PART 2 PRODUCTS

2.01 TILE

A. Refer to project **Interior Finish Schedule**.

2.02 ADHESIVE MATERIALS

A. Manufacturer: Laticrete.
   1. Product: 4237 Latex Thin-Set Mortar Adhesive.
   2. Color: Refer to project **Interior Finish Schedule**.
   3. Substitutions: See Section 01 6300 - Product Substitution Procedures.

2.03 GROUT MATERIALS

A. Basis of Design: Custom Building Products
   1. Equal Product: Un-sanded. Laticrete: 3701 Mortar admixture and 101 Rapid Set Latex.
   2. Color: Refer to project **Interior Finish Schedule**.

3. Substitutions: See Section 01 63 00 - Product Substitution Procedures.

2.04 ACCESSORY MATERIALS

A. Sealant: Silicone Caulking - to match grout color.

B. Coated Glass Mat Backer Board: ASTM C 1178/C 1178M, with coated inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
   1. Product: DensShield, manufactured by Georgia Pacific.
   2. Standard Type: Thickness 1/4 inch.
   3. Substitutions: See Section 01 63 00 - Product Substitution Procedures.

C. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

D. Cleavage Membrane: 4 mil (0.1 mm) thick polyethylene film.

E. Uncoupling Membrane: 1/8 inch (3 mm) thick polyurethane matting with three-dimensional grid structure with dovetail shaped cavities and fleece webbing laminated to the underside to provide a mechanical bond to the substrate adhesive (DITRA).
   1. Acceptable Product: Schluter Systems "DITRA."
   2. Or approved equal.

F. Waterproofing Membrane at Floors and Walls: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10. Redguard or approved equal.

G. Aluminum Transitions: Architect and flooring installer to verify sku numbers work with tile transitions
   1. TR-4 - Schluter, Schiene AKB-80
   2. TR-6 - Schluter, Reno-U AU100AK
   3. TR-7 - Schluter, Deco, EB100D
   4. TR-8 - Schluter, AERP 125 B65
   5. TR-10 - Schluter, Schiene A100AKB

H. Anti-Fracture Membrane: Provide Merkrete (Red Guard) – Fracture Guard 700 at Common Area over PT Concrete, and where indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

B. Verify that required utilities and devices are level and in the precisely correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Install tile backer board in strict accordance with manufacturer's instructions, using corrosion-resistant bugle head drywall screws. Set screw-heads flush with tile backer board.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCNA Handbook recommendations.

B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form edges and bases neatly.

C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

D. Sound tile after setting. Replace hollow sounding units.

E. Allow tile to set for a minimum of 48 hours prior to grouting.

F. Grout tile joints.

G. Apply sealant to junction of tile with dissimilar materials.

H. Tile installation company to include an approved "additive" in the grout for sealing.

3.04 INSTALLATION - WALL TILE

A. Over coated glass mat backer board on studs, install in accordance with TCNA Handbook Method W245.

3.05 CLEANING

A. Clean tile and grout surfaces.

3.06 SCHEDULE

A. Refer to project matrix, interior finish legend and finish schedule.

END OF SECTION

SECTION 099650

GRAFFITI RESISTANT COATINGS

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Surface preparation and field application of graffiti resistant coatings.

1.3 SUBMITTALS

A. Product Data: Submit data on all finishing products and coatings.

B. Manufacturer's Installation Instructions: Submit special surface preparation procedures, and substrate conditions requiring special attention.

1.4 OPERATION AND MAINTENANCE DATA

A. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of coated surfaces.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with sufficient previous experience.

B. Applicator: Company specializing in performing the work of this section with sufficient previous experience.

1.6 PRE-INSTALLATION MEETINGS

A. Convene pre-installation meeting in conjunction with regularly scheduled progress meeting.

1.7 MOCK UP

A. Apply graffiti resistant coating to mockup panel at location where directed by Architect.

B. Mock up may remain as part of this project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the coating product manufacturer.

B. Do not apply coatings during rain or snow, when relative humidity is outside the humidity ranges, or moisture content of surfaces exceed those required by the paint product manufacturer.

1.10 WARRANTY

A. Provide five year manufacturer warranty for coatings.

PART 2 PRODUCTS

2.1 COATINGS

A. Manufacturers: **Refer to Exterior Finish Schedule.**

B. Coating: Clear, solvent-based or water-based silicone emulsion where required complying with local VOC regulations, permanent film forming, breathable type, to weatherproof concrete materials; protects treated surfaces from graffiti attacks without altering natural appearance.

C. Accessory Materials: As recommended by the manufacturer and not specifically indicated but required to achieve the finish specified; commercial quality.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and substrate conditions are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.2 PREPARATION

A. Protect adjacent windows, glass, painted surfaces, anodized aluminum, metal, and all non-masonry surfaces from product, residue, splash, fumes and wind drift.

B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

C. Repointed surfaces shall cure for 28 days before coating application.

D. Concrete Surfaces Scheduled to Receive Coating Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Do not use raw acid cleaners. Allow to dry.

3.3 APPLICATION

A. Apply coating in accordance with manufacturer's instructions.
   1. Apply multiple coats when required by manufacturer.

B. Do not apply coating when temperature is below 40 degrees F nor higher than 90 degrees F.

C. Do not apply coating to surfaces that are not dry. Do not allow applied coats to dry before next coat is applied.

D. Pretest surfaces to receive coating using method recommended by manufacturer to ensure desired results.

E. Apply each coat to uniform appearance and in strict accordance with manufacturer's instructions. Do not over apply.

F. Inspect and test questionable coated areas.

3.4 CLEANING

A. Remove overspray and spills as soon as possible per manufacturer's instructions.

END OF SECTION

SECTION 101400

SIGNAGE

GENERAL

1.01 SUMMARY

A. Work of this Section includes signage required by code only:
   1. Accessible entries and routes.
   2. Accessible Public Restrooms.
   3. Accessible Parking.
   4. Electrical Rooms.
   5. Elevator Machine Rooms.
   6. Fire Riser Room.
   7. Roof Access.
   8. Stairs.
   9. Other signage deemed necessary by Authority Having Jurisdiction.
   10. LEED Signage: (ex: No smoking within 25 feet of building openings).

B. Balance of signage will be owner provided and installed.

C. Work of this Section includes:
   1. Fabrication, installation and sign permits for all signs in this package.

D. Design/Regulatory Requirements:
   1. Provide signage that conforms to applicable requirements of ANSI A117.1, IBC and the Americans with Disabilities Act (ADA) Accessibility Guidelines, and Fair Housing (FHA).

1.02 SYSTEM DESCRIPTION

A. Standards: Comply with applicable standards of sign products industry and construction industry for selection of materials, fabrication of components, assembly, and installation/erection of the system, except to the extent more explicit or stringent requirements are indicated.

1.03 SUBMITTALS

A. See Section 01 30 00: Submittal Procedures.

B. Fabricator must submit the following:
   1. Product Data: Submit manufacturers' specifications and installation instructions for all manufactured materials and products. Include manufacturers' certifications and laboratory test reports as specified.

1.04 QUALITY ASSURANCE

A. Supplier qualifications: Engage an experienced supplier who has completed fabrication and installation of signage similar in design and extent to that required for this project and which has resulted in construction with a record of successful in-service performance.
   1. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

1.05 WARRANTY

A. General: Provide a written warranty indicating all work of this Bid Lot, excluding vinyl lettering products will be free from defects in material and workmanship for a period of one (1) year after Owner acceptance and that for a period of one (1) year after Owner acceptance repairs/replacements and said defects shall be performed in a timely manner at no expenses to the Owner.

B. Vinyl Lettering: Provide a written warranty indicating all vinyl lettering will be free from defects in material and workmanship for a period of one (1) year after Owner acceptance and that for a period of one (1) year after Owner acceptance repairs/replacements and said defects shall be performed in a timely manner at no expense to the Owner.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store products of this section in protective packaging until installation.

B. Maintain dry, climate-controlled storage area for products of this section until installation of products.

PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer / Basis of Design: Fast Signs or approved equal.

B. Other Manufacturers: Comply with substitution procedure, Section Substitutions: See Section 01 63 00 - Product Substitution Requirements.

2.02 MATERIALS AND FABRICATION

A. General: All materials shall be new stock, free from defects impairing strength, durability and appearance. All fabrication and installation shall be in accordance with the highest standards of the trade. All signs and components shall be complete and free from visual and structural/mechanical flaws.

B. Code signage shall be design-build in accordance with owner provided sign schedule and drawings.

EXECUTION

3.01 INSTALLATION

A. All sign installations shall comply with the guidelines of the Americans with Disabilities Act.

B. The supplier is responsible for staking all sign locations and field verifying with contracting officer before installing signs.

C. The supplier is responsible for securely installing all signs. When the type of mounting is not otherwise specified, all signs shall be permanently mounted.

D. Install all items as described in specifications and shown in drawings provided. If site conditions do not allow for sign placement as described herein, seek advice from architect. Check all items for correct placement.

E. Make all provisions necessary and take special precautions to protect and prevent damage to Owner’s property. Any items damaged shall be restored to the original condition and the supplier charged with the expense thereof.

F. All wall-mounted sign panels are to be installed in such a way that wall surfaces are not damaged. Use 3M pressure sensitive double-sided vinyl tape and/or screws as specified.
   1. Use adhesives and/or fasteners as recommended by manufacturer at interior drywall locations, concrete, CMU, and exterior materials.

G. Maintain a clean work area; remove all crating and debris from project site at the end of each work day and when installation is complete.

3.02 CLEANING AND PROTECTION

A. Clean signs after installation. Remove fingerprints. No exposed installation adhesives shall be allowed on the exposed surface of the sign or its background surface. Clean or polish items as required by manufacturers‘ instructions. Touch up any scratched surfaces as necessary.

END OF SECTION

SECTION 108210

ROOFTOP MECHANICAL SCREENS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Exterior rooftop mechanical equipment screens, that attach to equipment without penetrating roofing system.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 074200 - METAL WALL PANELS for metal wall screens.
2. Section 077200 - ROOF ACCESSORIES for rooftop equipment curbs.
3. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING for rooftop mechanical equipment.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install screens to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal Movements: Provide screens that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

B. Shop Drawings: For rooftop mechanical screen systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include structural analysis data signed and sealed by the qualified professional engineer registered in the jurisdiction where the Project is located responsible for their preparation.
2. Include details of attachment to rooftop equipment.
3. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Qualification Data: For Installer and Engineer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.

1. Engineering Responsibility: Preparation of data for screens including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.6 PROJECT CONDITIONS

A. Field Measurements: Where rooftop mechanical screen is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Envisor, by CityScapes, Hilliard, OH 43026; www.cityscapesinc.com.

2.2 MATERIALS

A. Thermoformed Plastic Panels: Acrylic Butylene Styrene (ABS) medium impact type, rigid thermoformed sheets.

1. Thickness: 3/16 in min.
2. Coating System: Manufacturer’s standard factory applied color coating.

a. Color: To be selected by Architect from manufacturer’s full range.

B. Aluminum Framing: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

C. Fasteners, Anchors and Inserts: Provide stainless steel fasteners, anchors and inserts, as recommended by the manufacturer. Conceal from view to greatest extent possible. Finish exposed items to match screens.

2.3 FABRICATION

A. Shop fabricate work with interlocking panel connections to the greatest extent possible. Fabricate work to be truly straight, plumb, level and square. Cut panels to precise lengths, as indicated on approved Shop Drawings.

1. Panel Style and Height: As indicated on Drawings.
2. Panel Design: Louver.

B. Trim and Closures: Fabricated from min. 24 ga aluminum sheet in profiles and sizes indicated.

2.4 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Mill Finish: Manufacturer’s standard.

C. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install screens according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Anchor screens and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Fasten structural supports to rooftop mechanical equipment without damaging operation of equipment.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Take care to not damage roof system.

B. Install components plumb and true in alignment with established lines and grades, without warp or rack.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by screen manufacturer.

3.3 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal-faced composite wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

END OF SECTION

SECTION 129300

SITE

FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Bench
2. Bike Rack
3. Daybed
4. Exterior Sink and Faucet
5. Gas BBQ Grill
6. Landscape Boulders
7. Pre-fabricated Planter
8. Swing Seat
9. Tree Grates

1.2 ACTION SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data: For each product.

C. Product Schedule: For all site furnishings.

D. Shop Drawings: Submit for specially fabricated items. Indicate details necessary for complete fabrication and installation, including spacing and sizes of connections and members, finishes of members, and other necessary information.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For all site furnishings, include maintenance manual for owner.

1.4 COORDINATION

A. Coordinate with other sections of Specifications to ensure proper scheduling for delivery and installation of Work and to ensure that proper provisions are made for installation of work specified.

PART 2 - PRODUCTS

2.1 Bench

A. Manufacturer: Forms and Surfaces, https://www.forms-surfaces.com/

B. Model: Apex - SBAPX-72SC-W

C. Length: 6ft

D. Metal Finish: TBD – provide physical samples of:
1. Aluminum
2. Argento
3. Cream
4. Dark Gray

2.2 Bike Racks

A. Manufacturer: Sportworks, https://www.sportworks.com/

B. Model: Tofino

C. Finish: stainless steel

2.3 DayBeds

A. Manufacturer: Texacraft, https://www.texacraft.com/
B. Model: In-Pool Affinity 66” Square Daybed (LL-AF-DB-66SQ-FC)
C. Cushion: Flat
D. Fabric Finish: TBD – provide samples for:
   1. Pacific Blue – 4601
   2. Tuscan – 4677
   3. Burgundy - 4631
   4. Charcoal Gray - 4644

2.4 Exterior Sink

A. Manufacturer: Kohler
B. Model: 15”x15”x9-5/16”
C. Notes: under-mount, Single Faucet hole, stainless

2.5 Exterior Sink Faucet

A. Manufacturer: Kohler
B. Model: Simplice
C. Notes: polished chrome, Pull-down spout

2.6 Gas BBQ Grill

A. See Landscape Drawings.

2.7 Landscape Boulders

A. Supplier: Marenakos, https://marenakos.com/
B. Type: Bandera Weathered Granite
C. Size: 2-man (max 2.5ft dimension)

2.8 Pre-fabricated Planters

A. Manufacturer: Planters Unlimited, https://www.plantersunlimited.com/
B. Model Name: Modern Square Fiberglass Planter
C. Model #: F1-MOD-S4848
D. Size: 48” x 48” x 48” (ht)
E. Finish: Semi-gloss
F. Color: TBD

2.9 Swing Chair

A. Manufacturer: Kettal, https://www.kettal.com/en/particular/index/
B. Model: Maia Egg Swing (#65800)
C. Frame Finish: 726 chestnut maia
D. Legs Finish: 100 mahogany
E. Cushion Finish: TBD
F. Decorative Cushion Finish: TBD

2.10 Tree Grates

A. Manufacturer: Urban Accessories, https://urbanaccessories.com/

B. Frame Model: 4ft Square Type “S” Pedestrian Duty
   1. Material: Mild Steel ASTM A36 (standard)
   2. Finish: Powdercoat – Black
   3. Load Classification: Pedestrian

C. Grate Model: 4ft Square Cascade
   1. Material: Grey Iron ASTM A48 (standard)
   2. Finish: Brush – Bronze
   3. Integrated Tree Up lights – coordinate size, location and quality with Project Lighting Designer and Landscape Architect.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation.

3.2 INSTALLATION

A. Install in accordance with construction documents and manufacturer instructions. Where instructions differ, use manufacturer instructions.

B. Install furnishings at locations indicated on Drawings.

C. Install brackets in straight line, plumb, and level.

D. Anchoring Units: Securely anchor each unit in accordance with manufacturer’s instructions.

3.3 PROTECTION

A. Protect furnishings from damage and defacement until final acceptance. Replace damaged or defaced furnishings with new units prior to final acceptance.

END OF SECTION 129300

SECTION 129310

BICYCLE RACKS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior wall mounted bicycle racks.

B. Exterior bicycle racks.

1.02 SUBMITTALS

A. See Section 01 30 00 - Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Indicate size, shape, and dimensions, including clearances from adjacent walls, doors, and obstructions.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Handle racks with sufficient care to prevent scratches and other damage to the finish.

PART 2 PRODUCTS

2.01 INTERIOR BICYCLE RACKS

A. Provide DERO, Ultra Space Saver, or approved equal.

2.02 EXTERIOR BICYCLE RACKS

A. Provide Landscape Forms, Flo Bike Rack.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive bicycle racks.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Do not begin installation until unsatisfactory substrates have been properly repaired.

3.02 PREPARATION

A. Ensure surfaces to receive bicycle racks are clean, flat, and level.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install bicycle racks level, plumb, square, and correctly located as indicated on the drawings.

3.04 CLEANING

A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Description: Provide all labor, material, tools, machinery and equipment as necessary to provide a complete installation of the following as indicated on the drawings and specified herein.

1. Concrete unit pavers set on adjustable pedestals at on-structure locations.

1.2 RELATED SECTIONS

a. Division 7 – Thermal and Moisture Protections.

1.3 RELATED REQUIREMENTS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Provide characteristics of paver unit, dimensions, and special shapes.

C. Samples:

1. Submit sample of each paver, illustrating style, size, edge conditions color range and surface texture of units being provided.

2. Samples shall show full range of variations expected in these characteristics.

3. Submit sample of each pedestal type, illustrating style and size.

D. Manufacturer's Literature: Provide completely definitive manufacturer's literature for specified products indicated below. Include descriptive literature, test reports indicating compliance with ASTM requirements, color selection charts, written installation instructions, and written cleaning /maintenance instructions.

1. Precast Concrete Paver, 24" x 24".

E. Shop Drawings

1. Precast Concrete Pavers on pedestals on-structure:

a. Submit drawings indicating full system including pedestals, shims and other materials required for paver installation. Indicate means in which substrate materials will be protected during construction.

F. Manufacturer's warrantee against breakage, fading, and deformation for each specified paver.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility:

1. Precast Concrete Pedestal Pavers: To ensure sufficient quantity as well as consistent quality of material, appearance and performance, obtain pavers from one manufacturer for the entire project, unless otherwise acceptable to the Architect.

B. Tolerances:

1. Fabrication Tolerances:

a. Permissible variations in dimensions shall not differ by more than plus or minus one-sixteenth inch in width, height, length, thickness, concave or convex deflection.

2. Installation Tolerances:

1) Vertical: Do not exceed 1/8 inch in 10 feet in any direction from level or slopes indicated when tested with a 10-foot straightedge.

2) Horizontal:

a) Precast Concrete Pavers: Units shall be installed with the centerline of joints on a 1'-0" module in both directions where nominal twelve (12) inch pavers are employed or on a 2'-0" module in both directions where nominal twenty four (24) inch pavers are employed. Cumulative variances from the designated module shall not exceed one (1) inch in one hundred ninety (190) feet measured in any direction.

C. Acceptability of Unit Pavers

1. The following list of finish defects shall be considered as unacceptable and unit pavers displaying such defects shall be replaced with a new unit at no additional cost:

a. Unit pavers not within the approved color range

b. Unit pavers displaying non-uniform surface texture

c. Foreign material embedded in the face of unit pavers

d. Shrinkage cracks

e. Ragged or irregular edges

2. Minor defects incidental to the usual method of manufacture or slight chipping resulting from handling and delivery may be acceptable provided such defects are minor in scope, do not affect the overall appearance of the work, and are acceptable to the Architect.

1.5 PRECONSTRUCTION CONFERENCE:

A. Following submittal and approval of materials the Contractor shall convene a Pre-Construction Conference with the Architect, at the site, prior to further completing the work of this Section. The purpose of this Pre-Construction Conference shall be to review: the relationship between the work of this Section; methods and sequence of the work; special details and conditions; standards of workmanship; and other topics related to the work of this Section.

1. The Pre-Construction Conference shall occur after approval of required samples.

2. Attendance at the Pre-Construction Conference shall include: the Contractor, the Owners Representative, the unit paver installer, and others whose work, in the opinion of the Owners Representative, requires coordination with the work performed by those listed above.

3. The Contractor shall submit a written request for the Pre-Construction Conference at least one week prior to the day on which the meeting is requested.

4. To the maximum extent possible, the Contractor shall schedule simultaneous review of the mock-ups required below.

1.6 MOCK UPS:

A. Refer to Section 01 40 00 Quality Control.

B. General:

1. Prior to installation of unit pavers, construct a 8' x 8' mock-up Precast Concrete Unit Pavers to establish quality control requirements for the work of this Section, and to review special details and conditions associated with the work.

2. Mock-ups shall be the subject of review at the Preconstruction Conference described above.

3. Mock ups shall be constructed on the project site and shall demonstrate the appearance and quality of workmanship that will be produced in final unit of work.

C. Mock-ups shall be inspected and approved by the Architect prior to continuing the work of this section.

1. During construction, retain and maintain approved mock-ups in undisturbed condition as a standard for judging completed unit of work.

a. Accepted mock-ups in undisturbed condition at the time of Substantial Completion may become part of the completed unit of work.

2. If a specified mock-up is not approved by the Owners Representative or if necessary to further identify a specific type or level of finish, one additional mock-up may be required following inspection of the initial mock-up.

3. Demolish and remove unaccepted mock-ups from Project site.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. All Unit Pavers:

1. Deliver unit pavers on wood pallets, covered with non-staining waterproof membrane; allow air to circulate around unit pavers.

2. Use extreme care to prevent damage, staining or discoloration during storage. Store pavers off of the ground and cover pavers with polyethylene or other suitable plastic film to prevent contamination by mud, dust, and materials likely to cause staining and other defects as well as to provide protection from the elements and excessive temperature changes. Ensure pavers in contact with protective covering are completely dry.

B. Accessories:

1. Deliver packaged products to the project site in manufacturer's original packaging.

2. Protect materials from damage, moisture, weather, distortion, and from being coated with harmful substances.

1.8 PROJECT CONDITIONS

A. Coordinate with other supporting, adjacent, contiguous or otherwise related work as well as with other trades whose work will be affected by the work of this Section.

1.9 MAINTENANCE MATERIALS: CLEANING

A. Furnish manufacturer's written instructions regarding recommended cleaning and maintenance methods for the installed work of this Section. Include information regarding cleaning methods, stain removal methods and sealers.

1.10 MAINTENANCE MATERIALS: EXTRA PAVING UNITS

A. In addition to paving units required to complete the work of this Section, furnish extra paving units, for future maintenance use by the Owner, in the following quantities:

1. Precast Concrete Pavers with Pedestals: 12 units.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE UNIT PAVERS

2.2 Precast Concrete Unit Pavers - Hydraulically pressed concrete paver.

1. Manufacturer: Abbotsford Concrete Products [1(800) 663-4091, https://www.pavingstones.com]., or approved equal.
2. Model: Texada HydraPressed
3. Size: 24” x 24” x 2” nominal.
4. Finish: Sealed.
5. Color: To be determined.
6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, pedestals, shims, and spacer tabs.
1. Manufacturer: Blackjack ScrewJack Pedestals or approved equal.
2. Substitutions: See Section 01 60 00 - Product Requirements.

C. Acoustic Pads: 1/4" thick 40 durometer neoprene pads.
1. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine all surfaces to receive the work of this Section. Verify that substrates and adjacent conditions are satisfactory for installation, comply with manufacturer's requirements, comply with the requirements of this Section and conform to tolerances specified in Section 03 30 00: Cast in Place Concrete. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
1. Verify that substrates and adjacent conditions are satisfactory for installation of the work of this section. This verification is to include, but not limited to:
a. Verify that substrate is level or to correct gradient, smooth, capable of supporting pavers and imposed loads, and ready to receive work of this Section.
b. Verify gradients and elevations of substrate are correct.
2. Ensure substrates and adjacent construction comply with the following:
a. Unit paver manufacturer's requirements
b. Requirements of this Section

B. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not proceed with the work of this section until unsatisfactory conditions have been corrected.

D. Installation of products specified in this Section constitutes acceptance of the existing adjacent and underlying construction.

3.2 INSTALLATION OF PEDESTAL PAVER UNITS

A. Pedestal-mounted pavers at on-structure locations:
1. Install pedestals and unit pavers on top of protection board per manufacturer's recommendations and specifications, per paving patterns indicated on the drawings and at gradients and elevations shown on the drawings. Ensure no efflorescence on concrete pavers.

a. Installation of pavers and pedestals shall be in conformance with the requirements of the waterproofing manufacturer and shall not impair the performance of any waterproofing materials be they flashing or otherwise.

b. Cut paver units at edges with masonry saw as required at edge conditions.

c. Cut pavers under one-quarter (1/4) the full paver size should be epoxied (provide concealed spaces as necessary) to the adjacent paver to prevent shifting. Maintain joint tolerance.

3.3 REPLACEMENT OF UNACCEPTABLE PAVERS

A. Prior to inspection for final acceptance, remove and replace precast concrete pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

3.4 CLEANING, PROTECTION AND CLEAN UP

A. Cleaning: Clean pavers and remove mortar stains and all other types of soiling from exposed surfaces of pavers per the manufacturer's written instructions. Do not use materials or methods that may damage the finish of the pavers or surrounding construction.

B. Protection: Provide final protection and maintain conditions as required to ensure the work of this Section will not be damaged at any time during or following the course of the work nor show deterioration at the time of Final Acceptance.

C. Clean up: Leave site clean and free of residue of the work of this Section.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE-OF-WORK

A. Furnish and install a complete and operational irrigation system, conforming to accepted industry standards consisting of subsurface drip irrigation complete and ready for operation. Irrigation system shall provide efficient and even irrigation of all planting areas shown on the Drawings.

B. Irrigation pipe, electrical and control wiring located under roadways and/or paving shall be encased in a pipe sleeve. Contractor shall coordinate locations and size of required pipe sleeving with the General Contractor.

C. The work includes but shall not be limited to the following: all labor, tools, materials, tests, permits and other related items necessary for the installation and operation of the irrigation system.

D. The term "Contractor" as used in this Specification section shall refer to the Underground Sprinkler System Contractor.

1.2 COORDINATION WITH OTHER TRADES

A. Mechanical Contractor

1. Coordinate irrigation water supply to over structure planters, elevated courtyard and green roofs with Mechanical Contractor.

2. Mechanical Contractor is responsible for routing piping between stub out and irrigation point of connection.

B. Electrical Contractor

1. Electrical Contractor is responsible for routing control valve wiring between automatic controller and waterproof junction box at control valve locations.

1. Irrigation Contractor is responsible for providing irrigation control valve wiring between waterproof junction box and irrigation control valve.

1.3 RELATED WORK DESCRIBED ELSEWHERE

1. 32 91 20 Soil Preparation

2. 32 93 00 Plants

1.4 REFERENCES

A. American Water Works Association (AWWA) – Applicable sections as specified.

B. American Society of Mechanical Engineers International (ASME) – Applicable sections as specified.

C. American Society of Testing and Materials (ASTM) – Applicable sections as specified.

D. Manufacturers Standardization Society of the Valve and Fittings Industry (MMS) – Applicable sections as specified.

E. National Fire Protection Association (NFPA) – Applicable sections as specified.

1.5 SUBMITTALS

A. Project Record Drawings

1. Contractor shall provide one (1) set of full-size prints showing irrigation work as designed under this Contract.
2. Contractor shall maintain the prints on site at all times during construction. Contractor shall make a daily record of all work installed.
3. On the prints, show actual location of valves, manual drains, risers, drainage piping and sleeving. Dimension from easily identified permanent features such as buildings, curbs, fences, walks or property lines.
4. Contractor shall make Drawings to scale with all notations neat in appearance.
5. After testing and approval of mainlines and laterals for backfill, transfer all information noted on prints to the record drawings in a neat orderly way.
6. Contractor shall submit the record drawings to the Landscape Architect for review, three (3) working days prior to the Preliminary Inspection.
7. At Final Inspection, submit record drawings, with all required changes, to the Landscape Architect. Record drawings must be approved prior to final payment.

B. Operations and Maintenance Manual: Three (3) working days prior to the Preliminary Inspection of the irrigation system, submit for approval Operations and Maintenance Manuals, PDF file on CD, to the Landscape Architect. At a minimum, the following information/items are required to be in the manual:

1. List of authorized distributors and service representatives for each item of irrigation equipment including names, address and phone numbers.
2. Guarantee/warranty certificates for all equipment used and the Contractor's written warranty for the entire system one (1) year guarantee.
3. Instruction Manuals for all equipment used.
4. Parts Lists for each item with exploded views of each item showing part number.
5. Complete troubleshooting guide to common irrigation problems.
6. Winterization and spring start-up procedures.
7. Chart of approximate length of operating times for programming controller zones for spring, summer and fall schedule.
8. Scanned PDF file of the approved record drawings.
9. Copies of all irrigation construction details for the irrigation installation.
10. Controller cabinet keys, three (3) sets.

1.6 QUALITY ASSURANCE

A. Contractor shall be a bonded sprinkler irrigation contractor. The sprinkler irrigation system shall be installed by an experienced sprinkler irrigation mechanic or journeyman plumber. All electrical service connection work shall be completed by a licensed Electrical Contractor.

1.7 QUALITY CONTROL AND INSPECTIONS

A. Where indicated on the Drawings and/or as specified in the Specifications that tests are to be witnessed by the Landscape Architect, the Contractor shall give advance notice of forty-eight (48) hours in writing to the Landscape Architect.

B. Pressure Test:

1. All system joints, connections, couplings, valves and all other junction points shall be left exposed until completion and acceptance of the pressure test. All leaks, however minor,

shall be repaired and corrected. The total sprinkler irrigation system shall be pressure tested for acceptance.

C. Operation and Performance Coverage Test:

1. At conclusion of pressure test the entire system shall be tested for operation and performance coverage under normal operating pressure. The operation and performance coverage test consists of operating the system through at least one complete programmed cycle for all areas to be sprinkled.

2. The Contractor shall pre-test for pressure, operation and performance coverage prior to the Landscape Architect's review of said tests to confirm that the sprinkler irrigation system will meet the requirements of the specified tests. SHOULD ADDITIONAL REVIEWS BE REQUIRED DUE TO THE FAILURE OF THE CONTRACTOR TO PERFORM PRE TEST, THE CONTRACTOR SHALL PAY TO THE LANDSCAPE ARCHITECT THE SUM OF ONE HUNDRED (100) DOLLARS PER HOUR AND THE ACTUAL COST OF EXPENSES FOR EACH ADDITIONAL TEST.

1.8 PERMITS, CODES AND REGULATIONS

A. The Contractor shall keep fully informed and shall comply with all existing laws, codes, ordinances and regulations which in any way affect the conduct of the work.

B. Contractor shall apply for and pay for all necessary permits and fees as required by Local Authority and prevailing ordinances and/or codes.

1.9 PROTECTION OF WORK, PROPERTY AND PERSONS

A. Take all necessary precautions to protect work in progress, all property, persons, walks, curbs, pavement and buildings from any damage that might be incurred arising from this Contract. Repair at Contractor's expense, any damage to the above and existing landscape.

B. The Contractor shall be responsible for the provisions of barricades and safety guards, any other structures or improvements necessary for the complete protection of the public.

1.10 CONDUCT OF THE WORK

A. The Contractor shall maintain continuously a competent superintendent or foreman during progress of the work, with the authority to act in all matters pertaining to the work. The Contractor shall give personal attention to the fulfillment of the Contract and shall keep the work under control. Subcontractors shall not be recognized and all persons engaged in the work shall be considered employees of the Contractor and their work shall be subject to the provisions of the Contract and these Specifications.

B. The Contractor shall progressively clean the work site of debris and rubbish.

C. The Contractor shall repair any damage to existing utilities. Existing known utilities have been shown on the Architectural, Engineering and/or Survey Drawings and will be made available from the Owner or Utility Companies. It will be the Contractor's responsibility to verify these locations on the ground with a pipe-finder or by other means. Should the trenching intercept and damage any existing utilities, all further work within said areas shall stop until the Owner is advised and the Owner can review a repair method and repair schedule.

D. Any of the Owner's property, including existing buildings, equipment, piping, pipe covering, sewers, sidewalks, landscaping, etc., damaged by Contractor shall be replaced or repaired by Contractor in a manner satisfactory to the Owner at the Contractor's expense before Final Payment is made.

1.11 WARRANTY

A. The system shall be guaranteed for all labor and material for a period of one (1) year from the date of acceptance of the system.

B. Should any trouble develop within one (1) year which, in the opinion of authorized Owner personnel, is due to inferior or faulty material and/or workmanship, the trouble shall be corrected, without delay, to the satisfaction of the authorized Owner's personnel and at the Contractor's expense.

C. Any settling of backfilled trenches shall be repaired by the Contractor at the Contractor's expense, including but not limited to, restoration of pavement, seeded, sodded and/or planted areas.

PART 2 – PRODUCTS

2.1 COPPER TUBING AND ASSOCIATED FITTINGS

A. Tubing shall conform to requirements of ASTM B 88M ASTM B 88, Type K. Fittings shall conform to ASME B16.22 and ASME B16.18, solder joint. Solder shall conform to ASTM B 32 95-5 tin-antimony. Flux shall conform to CID A-A-51145, Type I.

2.2 RED BRASS PIPE AND ASSOCIATED FITTINGS

A. Pipe shall conform to requirements of ASTM B 43, regular. Fittings shall be Class 250, cast bronze threaded conforming to the requirements of ASME B16.15.

2.3 POLYVINYL CHLORIDE (PVC) PIPE, FITTINGS AND SOLVENT CEMENT

A. All pipes shall be marked with manufacturer's name, class of pipe and NSF seal. Pipe shall be uniform, smooth and glossy. Pipe may be pre-belled or with individual solvent-weld couplings. All PVC pipe shall be delivered in at least twenty (20) foot lengths.

B. PVC Pipe Mainline: Conform to the requirements of ASTM D 1785, PVC 1120 Schedule 40.

C. PVC Pipe Lateral Lines: Conform to the requirements ASTM D 2241, PVC 1120 SDR 21, Class 200.

D. PVC Fittings: Solvent welded socket type fittings shall conform to requirements of ASTM D 2466, Schedule 40. Threaded type fittings shall conform to requirements of ASTM D 2464, Schedule 80.

E. Solvent Cement: Conform to the requirements of ASTM D 2564.

2.4 DIELECTRIC FITTINGS

A. Provide dielectric fittings between copper and ferrous metal piping materials. Dielectric fittings shall conform to ASTM F 441/F 441M, Schedule 80, CPVC threaded pipe nipples, 4 inch minimum length.

2.5 BACKFLOW PREVENTER

A. FEBCO or approved equal as approved by the controlling agency.

2.6 PRESSURE REDUCING VALVE

A. WILKINS or approved equal.

2.7 GATE VALVES

A. Gate valves two and one half (2-1/2) inches and smaller shall conform to the requirements of MSS SP-80, Type 1, Class 150, threaded ends.

2.8 DRAIN VALVES

A. Manual valves shall conform to requirements of MSS SP-80, Type 3, Class 150 threaded ends. All drain valves shall be three-quarter (3/4) inch valves with detachable key. Provide two (2) shut -off keys to Owner. Automatic drain valves will not be accepted. Drain valves shall be enclosed in two (2) inch PVC pipe with a Weathermatic 906L with locking cap, or approved equal.

2.9 QUICK COUPLING VALVES

A. Quick coupling valves shall have brass parts and shall be two-piece unit consisting of a coupler water seal valve assembly and a removable upper body to allow spring and key track to be serviced without shutdown of main. Lids shall be lockable vinyl with spring for positive closure on key

B. Shall be manufactured by RAINBIRD, TORO or WEATHERMATIC. Minimum size shall be one (1) inch diameter. Provide and install three (3) quick coupler valves, Landscape Architect to locate on Drawings.

C. Provide to Owner two (2) sets of couplers and swivel hose ells (three quarter (3/4) inch diameter).

2.10 DRIP TUBING

A. As noted on Drawings

B. Coordinate installation of Tray Drip Irrigation with applicable elements specified in this section.

2.11 AUTOMATIC SPRINKLER CONTROLLER

A. As noted on Drawing. Coordinate controller location with Owner's Representative.

B. Wiring and rigid conduit for electrical power from power source to automatic controller shall be in accordance with NFPA 70 and installed by Electrical Design Build Contractor.

2.12 ELECTRIC CONTROL VALVE AND CONTROL ZONE KITS

A. As noted on Drawings.

2.13 ACCESSORIES AND APPURTENANCES

A. Valve Boxes:

1. Unless otherwise specified, all backflow preventers shall be enclosed in Armor Jumbo Control Valve Box (including extensions) with locking lid or approved equal. Color: black
2. Unless otherwise specified, all automatic valves shall be enclosed in an Armor Standard 12" Box Assembly (including extensions) with locking lid or approved equal. Color: black.
3. Drain valves shall be enclosed in Armor Mainline Box with black control valve cover lid or approved equal.

B. Electrical tape shall be black plastic, three-quarter (3/4) inches wide and a minimum of 0.007 inches thick and the all weather type.

C. All electrical wire splices must be made watertight with sealing RAINBIRD ST-03UL/PT-55 Snap-tite.

2.14 CONTROL VALVE WIRING

A. Control wire must be insulated single strand copper designed for twenty (20) to fifty (50) volts and UL approved as Type U.F. (Underground Feeder).

B. Copper conductor must meet or exceed ASTM B-3 requirements.

C. Red and White colors must be available.

D.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Before proceeding with any work, the Contractor shall inspect the site, carefully check all grades and verify all dimensions and conditions affecting the work in order to proceed safely.

B. Sprinkler system shall be installed after site grading and installation of topsoil has been completed.

3.2 TRENCHING

A. Trenching around roots shall be hand excavated to pipe grade when roots of 2 inches diameter or greater are encountered. Trench width shall be 4 inches minimum or 1-1/2 times diameter of pipe, whichever is wider. All trenches shall be straight and not have abrupt changes in grade. Backfill shall be hand tamped over excavation. When rock is encountered, trench shall be excavated 4 inches deeper and backfilled with well-graded sand to pipe grade.

B. Existing concrete walks, drives and other obstacles shall be bored at a depth conforming to bottom of adjacent trenches. Pipe sleeves for bored pipe shall be two pipe diameters larger than sprinkler pipe.

3.3 PIPING SYSTEM COVER AND CLEARANCES

A. Cover:

1. On-grade Planting Areas: Trenches shall provide for minimum of eighteen (18) inches of cover for sprinkler lateral lines and minimum of twenty-four (24) inches of cover for main supply lines.
2. Over Structure Planting Areas: Trenches shall provide for minimum of eighteen (18) inches of cover for sprinkler lateral lines and minimum of eighteen (18) inches of cover for main supply lines.
3. Roof: as detailed.

B. Clearances: Minimum horizontal clearances between lines shall be 4 inches for pipe 2 inches and less; 12 inches for pipe 2-1/2 inches and larger. Minimum vertical clearances between lines shall be 1 inch.

C. Minimum Slope: Minimum slope shall be 6 inches per 100 feet in direction of drain valves.

3.4 PIPING INSTALLATION

A. Polyvinyl Chloride (PVC) Pipe

1. Due to the nature of PVC pipe and fittings, the Contractor shall exercise care in handling, loading, unloading and storing to avoid damage. The pipe and fittings shall be stored under cover and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lie flat, so as not to be subject to undue bending or concentrated external load at any point. Any pipe that has been dented or damaged shall be discarded until such damage has been cut out and the pipe is rejoined with a coupling.
2. PVC pipe ends shall be cut to ninety (90) degrees to the pipe length and cleaned of all cutting burrs prior to cementing. Use approved reaming tool. Pipe ends shall be wiped clean with a rag lightly wetted with PVC thinner. Cement shall be applied with a light coat on the inside of the fitting and a heavier coat on the outside of the pipe. Pipe shall be inserted into the fitting and given a quarter turn to seat the cement. Excess cement shall be wiped from the outside of the pipe. Pipe will be tested as indicated elsewhere in these Specifications. No backfilling will be permitted other than at the centers of pipe length until the pressure test is complete.
3. Solvent welded joints shall be given fifteen (15) minutes set-up time before moving or handling. Pipe shall be partially center loaded to prevent arching and slipping. No water shall be permitted in the pipe until a period of at least ten (10) hours has elapsed for solvent setting and curing.

4. Pipe shall be installed in a serpentine (snaked) manner to allow for expansion and contraction in trench before backfilling. Pipes shall be installed at temperatures over 40 degrees F. Backfilling shall be done while the pipe is not in an expanded condition due to heat or pressure. Cooling of the pipe can be accomplished by operating the system for a short time prior to backfilling.
5. Before pressure testing, soluble weld joints shall be give twenty-four (24) hours curing time.
6. No PVC pipe may be threaded or connected to a threaded fitting without an adapter.
7. Great care must be taken to insure that the inside of the pipe is absolutely clean. Any pipe ends not being worked on must be protected and not left open.
8. All threaded joints are to have Teflon tape or pipe dope applied to male threads only.

B. Soldered Copper Tubing

1. Pipe shall be reamed and burrs removed. Contact surfaces of joint shall be cleaned and polished. Flux shall be applied to male and female ends. End of tube shall be inserted into fittings full depth of socket. After soldering, a solder bead shall show continuously around entire joint circumference. Excess acid flux shall be removed from tubing and fittings.

C. Threaded Brass Pipe

1. Prior to installation, pipe shall be reamed. Threads shall be cut in conformance with ASME B1.2. Pipe joint compound shall be applied to male end only.

3.5 INSTALLATION OF VALVES

A. Automatic Control Valves:

1. Before installation of any automatic control valve, the supply line must be thoroughly flushed.
2. All automatic control valves shall be enclosed in valve boxes set one (1) inch above finish grade. Valve box extensions rings may be required.
3.

B. Drain Valves:

1. Install at point-of-connection and at low points of mainline as required to completely drain system. Each drain shall have minimum six (6) cubic foot drain rock sump. System shall be winterized by compressed air blow-out through a quick coupler.

C. Quick Coupling Valves:

1. Locate all quick coupler in shrub and/or groundcover planting beds wherever possible and at points of easy access from paved and/or lawn areas.
2. Final locations shall be approved by Landscape Architect.

3.6 BACKFLOW PREVENTER

A. Install in accordance with local Plumbing Code.

B. For proper maintenance, the backflow preventer assembly shall be located with sufficient clearance from other materials and away from traffic patterns.

3.7 CONTROL WIRES AND CONDUIT

A. On-grade Planting Areas:

1. Control wires are to be taped together at 5-foot intervals; then this bundle is to be taped to the bottom of the supply line at 10-foot intervals with at least three (3) wraps of electrical

tape. Provide a 12-inch loop of wire at 20 feet on center for expansion and contraction. Wires shall be number tagged at key locations along main to facilitate service.

2. All splices must be made water-tight with sealing Rainbird /PT-55 Snap-Tite and contained in valve boxes. A 12-inch loop of wire shall be provided at each valve where controls are connected.

3. Splices will be permitted only at the valves and never between valves or valve and controller. There must be a separate lead or "hot" wire to each automatic valve. One (1) common wire will be acceptable.

B. Over Structure and Green Roof Planting Areas:

1. Conduit and wiring runs between automatic controller location and waterproof junction box shall be by Electrical Contractor. Coordinate control valve locations with Electrical Design Build Contractor.

C. Minimum size of wire is to be determined strictly be the wire sizing chart provided by Rainbird or approved equal.

D. The control wires shall be color coded as follows:
Ground Wire - White
Lead-In Wire – Red

3.8 DRIP IRRIGATION SYSTEM

A. Install as detailed and per manufacturers standard installation instructions.

3.9 AUTOMATIC CONTROLLER

A. Electrical wiring shall be installed according to local code.

B. A diagram or schedule shall be posted in the controller to facilitate the selection of the valves to be operated.

C. Controller location(s) and type of mounting of controller(s) shall be coordinated with Owner.

3.10 BACKFILL

A. In refilling trenches, the earth fill within a three (3) inch radius of the irrigation pipe shall be free of rocks and/or debris greater than one-half (1/2) inch in diameter and shall be well tamped. Provide washed sand for pipe bedding if clean on-site material is not available. Trenches shall be thoroughly water-settled. Trenches shall be backfilled uniform with surrounding grade, raked to a slight crown, then rolled with a two hundred fifty (250) pound roller, or compacted with a vibrator.

B. All roots, rocks and surplus excavation shall be removed from the site unless otherwise directed.

C. Before backfilling, all underground appurtenances including risers, valves, backflow preventers, drain valves, etc., must remain exposed so that they can be viewed during testing. It is suggested that the Contractor partially backfill the pipe as it is laid, leaving all joints exposed; then complete backfilling after flushing, pressure testing, inspection and preparation of "Record Drawings". The location, inspections and testing provisions of these specifications will be strictly adhered to. If, for any reason, any part of the irrigation system is backfilled before approved location, testing or inspection is authorized by Landscape Architect, it will be required to be completely uncovered and exposed until approved for backfilling by the Landscape Architect.

3.11 ADJUSTMENT

A. After grading, seeding, and rolling of planted areas, sprinkler heads shall be adjusted flush with finished grade. Adjustments shall be made by providing new nipples of proper length or by use of heads having an approved device, integral with head, which will permit adjustment in height of head without changing piping.

3.12 CLEANING OF PIPING

A. Prior to the hydrostatic and operation tests, the interior of the pipe shall be flushed with clean water until pipe is free of all foreign materials. Flushing and cleaning out of system pipe, valves, and components shall not be considered completed until witnessed and accepted by Landscape Architect.

3.13 FIELD TESTS

A. All instruments, equipment, facilities, and labor required to conduct the tests shall be provided by Contractor. Landscape Architect shall be present during all field tests.

B. Pressure Testing

1. Point of connection and irrigation mainlines: Before backfilling all new main lines shall be flushed and pressure tested at ninety (90) psi. The pressure shall be maintained until joints, fittings and pipes have been inspected. Correct any leakage and repeat test until the system is watertight. Maximum psi loss in a two (2) hour test shall be five (5) psi.
2. Irrigation lateral lines: Before backfilling all PVC lateral lines shall be flushed and pressure tested with the system exposed to static pressure. This pressure shall be maintained until all joints, fittings and pipes have been inspected. Correct any leakage and repeat test until the system is reasonably watertight.

C. Operation and Performance Test

1. Upon completion of the system installation and after the pressure tests are completed, the Contractor shall operate the system in the presence of the Landscape Architect. The automatic system shall be cycled to the satisfaction of the Landscape Architect.
2. The Landscape Architect shall determine if the water coverage and operation of the system is complete and satisfactory. If any part of the system is inadequate, it shall be repaired or replaced at the Contractor's expense and the test repeated until accepted.
3. The Contractor shall also adjust and balance the system for optimum and uniform coverage.

D. Water Audit

1. If required by the local governing agency, a water audit shall be performed to meet the following and any additional requirement of the local agency.
2. Prior to substantial completion, a water audit conducted by an Irrigation Association Certified Landscape Irrigation Auditor shall be completed on the irrigation system.
3. The audit shall be conducted using an industry accepted procedure such as The Irrigation Association’s Certified Landscape Irrigation Audit Program or equivalent.
4. In general, the water audit shall test the distribution uniformity of the irrigation system by means of a low uniformity test. Plastic catchments shall be arranged in a grid pattern over the zone to be tested. The zone valve is operated for a timed duration and the water caught in the catchments is recorded. The average water amount caught is then divided by the average caught in the lowest 25% of the catchments to achieve a low quarter uniformity percentage. Each zone shall be tested and the results recorded. All zones shall meet or exceed a minimum distribution uniformity of 0.625%. Zones not meeting the above minimum shall be repaired and adjusted as required, and retested to meet the required minimum. All zones shall meet the required minimum distribution uniformity prior to Final Acceptance be issued.

E. To be valid, the Pressure Test and Operation and Performance Coverage Test must be witnessed by the Landscape Architect.

3.14 SYSTEM FAMILIARIZATION

A. Upon acceptance of the system by the Owner, the Contractor shall provide the Owner the necessary keys and/or other tools necessary to operate/drain/activate the system.

B. A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of 2 hours normal working time and shall start after the system is functionally complete but prior to final acceptance tests. Field training shall cover all of the items contained in the operating and maintenance manuals.

3.15 SYSTEM PROTECTION

A. As a part of the Guarantee under this Contract, the Contractor shall be responsible for the deactivating and draining of the system prior to the onset of the freezing season and for reactivating the system at the onset of the spring growing season; each task must be accomplished once during the one (1) year Guarantee period. In the event the system is completed in a season when the system will not be in use, the Contractor will winterize the system upon completion of testing (and approval by the Landscape Architect) and reactivate the system in the spring. The Contractor shall, upon completion of the winterizing phase, submit a letter to the Owner and the Landscape Architect certifying that the system was winterized and drained and indicate the date which such action was accomplished. The Contractor shall notify the Owner and the Landscape Architect forty-eight (48) hours prior to the work so that an Owner's Representative can be present during the winterizing and reactivating phases of the work.

3.16 CLEAN UP

A. Clean all work areas of debris generated by work on this project, or any part of this project, on completion of operations and prior to watering. All hard surface areas shall be washed clean. Daily clean up shall be required on all areas used for circulation, parking or other daily use.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section shall include but not be limited to the following:
   1. Furnishing and installation of new trees, shrubs, perennials, ornamental grasses, and groundcovers in tree pits, planting beds, and landscape planters in at-grade and on-structure locations.
   2. Cobble Mulch.
   3. Mulch and Fertilizer.
   4. Aluminum Edging.
   5. Maintenance for time periods specified.
   6. Tree pruning of new and existing trees.

1.2 RELATED SECTIONS

A. Section 32 91 20 - Soil Preparation.

B. Section 32 84 00 - Planting Irrigation

1.3 REFERENCES

A. ANSI Z60.1 - "American Standard for Nursery Stock"; 2004 Edition, published by American Nursery & Landscape Association (ANLA).

B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2001.

C. USDA, NRCS. 2008. The PLANTS Database (http://plants.usda.gov, 30 June 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

1.4 DEFINITIONS

A. Weeds: All perennial and herbaceous material, foreign, broadleaf and grassy weeds not otherwise scheduled or specified under Part 2 of this Section. Includes seeds and roots.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.5 SUBMITTALS

A. See Section 01 33 00 - Submittals for submittal procedures.

B. Product Data: Submit product literature or tear sheets giving name of product, manufacturer's name and compliance with specifications. Include manufacturer's written installation instructions or recommendations.
   1. Tree Anchors.
   2. Commercial Fertilizers: Include guaranteed analyses.
   3. Maintenance Fertilizer: Include guaranteed analysis.
   4. Planting Tablets: Include guaranteed analysis.

C. Certifications: Submit with certificate names of materials and manufacturer.
   1. Commercial Fertilizers: Include guaranteed analyses.
   2. Maintenance Fertilizer: Include guaranteed analysis.
   3. Planting Tablets: Include guaranteed analysis.
   4. Plant Material: Furnish certificates of inspection as may be required by Federal, State or other authorities that plant material is free of disease or hazardous insects.

D. Schedule and Work Plan: Submit detailed Schedule and Work Plan, indicating location and installation dates for planting.

E. Source of Supply for plants: Within ten (10) days after Notice to Proceed, submit the proposed sources (s) of supply for all specified plant material. For each source, provide nursery name, location and telephone number and the plant material, size and quantity proposed to be found at each source. Provide photographs of all trees for review by the Architect during submittal process.
   1. Submit a comprehensive list of all suppliers for all plant materials specified. 60 days prior to commencement of planting operations, or thirty (30) days prior to the end of digging season for trees, whichever date comes first, submit written confirmation from supplier (s) that all specified materials have been secured.

F. Samples for Verification: Deliver samples, in large size Ziploc bags to Architect. Include a list of sources. Include laboratory test results and amendment recommendations with planting soil samples. Samples shall be unaltered and of quantity sufficient to allow for proper inspection and review. For each of the following:
   1. Cobble Mulch labeled in a plastic bag. 2 lb sample.
   2. Landscape Edging. Material data and sample.

1.6 QUALITY ASSURANCE

A. Landscape Contractor Qualifications.
   1. Landscape Contractor shall hold a contractor certificate of registration with the Washington State Department of Labor and Industries as a specialty contractor with a "Landscaping" classification and shall have a minimum of five years landscape construction experience.
   2. Submit copy of registration.
   3. Contractor must have at least five years prior experience on similar scope projects.
   4. Submit names, addresses and dates of previous projects, owners, and locations if requested by Architect.

B. Nursery Qualifications.
   1. Company specializing in growing and cultivating the plants with three years documented experience.

C. Plant Material: Meet or exceed applicable ANLA standards.
   1. Plant List: Investigate sources of supply prior to submitting bid. Confirm that size, variety and quantity of plant material specified on Plant List can be supplied. Failure to take this precaution will not relieve the successful bidder from his responsibility for furnishing and installing plant material in strict accordance with the Contract requirements and without additional expense to the Owner.
   2. Nomenclature: Agree with SPN or as accepted in the nursery trade for varieties not listed therein. Clonal types shall be true.
   3. Provide quantity, size, genus, species, cultivar and variety shown and specified, complying with recommendations and requirements of ANSI Z60.1 latest edition, published by ANLA.
   4. Trees and shrubs larger than specified may be used if acceptable to Architect and if sizes of roots or balls are increased proportionately.
   5. Plants shall have a healthy well-developed root system and shall have no cuts over 3/4” in diameter that have not completely healed over. A dominant growth leader shall be present and intact on all trees and shrubs.

6. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock of uniform height and spread.

D. Import Soils Testing (if directed by Architect): The purpose of the test is to determine actual amendment and organic fertilizer requirements as well as verify adequate distribution. Test shall be provided as follows:
   1. Provide after installation of soil but prior to fertilization of soil mix. Adjust amendments and conditioners (6 random sample test total).
      a. Tests shall include but not be limited to recommendations on chemical distribution, organic content, pH factors and sieve analysis as necessary. Install organic fertilizers as recommended by chemist.
      b. Contractor shall coordinate, obtain and pay for all soil tests. Locations of test samples to be determined by Architect.

E. Plant Observation: Architect may observe trees and shrubs either at place of growth, via photographs or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

G. All plant material shall be nursery grown under climate conditions similar to or hardier than at the site and meet or exceed applicable American Nursery & Landscape Association (ANLA) Standards.

H. Plants shall be of normal habit of growth, healthy, vigorous, and free of disease, insects, insect eggs and larva.

I. Measurements shall be taken with all branches in their normal growing position.

J. Prune no plants prior to delivery to site.

K. Trees shall not be broken, nor bark bruised or cut in any manner.

1.7 STANDARDS

A. Measurements, caliper, branching, grading, quality, balling, and burlapping shall follow the American National Standards as defined by the American Nursery & Landscape Association in the American Standard for Nursery Stock latest edition.

1.8 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of plants, fertilizer and herbicide mixture for landscape planting in public right-of-way.

C. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in clearly marked containers showing net weight, guaranteed analysis and name of manufacturer. Specified requirements for packaged materials apply to build shipments. Protect materials from deterioration during delivery and during storage at site.

B. Soil Mix: Within two (2) days of delivery and placement, submit invoices for Soil Mix and Mulch.

C. Plant Material:
1. Deliver trees and shrubs only after preparation of planting areas has been completed and approved by the Architect.
2. Notify the Architect seven (7) days in advance of any delivery of plant materials to the site. Architect will approve plant material once all material has been delivered to the site. Partial shipments will not be reviewed unless previously agreed upon.
3. For Owner-provided material, Landscape Contractor to provide verbal acceptance of plant material at delivery. Accepting delivery of plant material will be understood as contractor's acceptance of the material's quality.
4. Owner-provided material to be protected by Contractor until installation. Coordination to be undertaken as required between General Contractor, Landscape Contractor and Owner.
5. Provide freshly dug trees and shrubs.
6. Plants shall be balled and burlapped or container grown as shown on the Plant Schedules.
7. Water plants thoroughly prior to digging from ground.
8. Dig and handle plants with care to prevent injury to trunks, branches and roots. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape.
9. Do not prune prior to delivery.
10. Pack and ship to insure arrival at site in good condition. Provide protective covering during delivery.
11. No plants will be accepted if ball is dried out, cracked or broken and/or bark of trunk is damaged prior to or during process of planting.
12. No plants will be accepted when identification labels have been displaced prior to acceptance. Leave labels on all plants. Replace as directed.
13. Protect root systems from drying out. Species with fleshly root systems shall be handled with extreme care, and specially protected in transit.
14. Deliver trees and shrubs after preparation of planting areas has been completed and approved by Architect. Plant immediately.
    a. If planting is delayed more than twenty four (24) hours after delivery, set balled and burlapped plants on the ground well protected with soil, wet peat or other acceptable material. Adequately cover all roots of bare root material with soil, wet peat or other acceptable material. Protect balls and roots and container grown material from freezing, sun, drying winds, and/or mechanical damage. Contractor to water as necessary until planted. If water is not available, contractor to provide.
    b. Do not heel in plants for more than one (1) week.
15. Where possible, provide a single, secure, irrigated on-site staging area. Architect may approve plant material from staging area.
16. Immediately remove rejected plant material from the site.

D. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

E. Protect and maintain plant life until planted. Take care to prevent damage, including that due to wind and temperature exposure. Tie Back branches as necessary and protect bark from chafing with burlap bags. Do not drag plant material along ground without proper protection of roots and branches.

F. Trees over three (3) inches in caliper:
1. Lift all trees by rootball only. Secure on pallet to avoid breaking root ball.

2. No bark scars will be accepted. Protect bark from cables and lines with burlap cover or rubber mat. Tie back branches as necessary to avoid breakage during installation.

1.10 PROJECT CONDITIONS

A. Environmental Requirements: Do not plant when the soil is frozen, excessively wet or otherwise in an unsatisfactory condition for planting. Do not plant during periods of excessive heat, drought, moisture and cold. Installation not permitted during the following conditions unless otherwise approved:
   1. Cold weather: when temperature is less than 32 degrees F.
   2. Hot weather: when temperature is greater than 90 degrees F.
   3. Wet weather: when ground becomes saturated.
   4. Windy weather: when wind velocity is greater than 30 mph.

B. Existing Conditions:
   1. Carefully examine the site before submitting a bid. All areas shown to be planted are to be cleared and grubbed and have soil prepared as part of base contract, unless otherwise noted for preservation. Be informed as to the nature and location of the Work, general and local conditions including climate, utilities, conformation of the ground, the nature of subsurface conditions, the character of equipment and facilities needed prior to and during execution of the Work.
   2. The Contractor shall consult the Architect immediately if any of the following are identified in the course of work: a) discrepancies between the drawings and physical conditions, b) omissions or errors in the drawings, and c) omissions or errors in the layout furnished or approved by the Architect. Work done after such discovery, unless authorized by the Architect, shall be done at the Contractor's risk.
   3. Execute all work in an orderly and careful manner with due consideration for surrounding areas or structures to remain. Protect adjacent property and improvements from work damage. Repair any damage as acceptable to Architect.
   4. Protect adjacent property, adjacent improvements and the work of other trades from damage during the performance of the work. Repair any damage as required by the Architect.

1.11 REVIEWS

A. Request reviews by Architect seven (7) days in advance. The following are required:
   1. Soil preparation review: Architect will review soil preparation and finish grading prior to installation of plant material. Adjust all defects as directed.
   2. Plant material - location and facing review: Architect will review tree and shrub placement and adjust plant locations prior to installation. Make location and facing adjustments as requested by Architect. Do not install plant material without approval from Architect.
   3. Installation review: At time of Completion Inspection, Architect will review installation of all work of this Section. Installation review will not occur until completion of entire area planting as defined by Architect.

B. Coordinate all reviews to coincide with regularly scheduled meetings when possible.

1.12 SEQUENCING AND SCHEDULING

A. Coordinate Work of this Section with Work of all other Sections of the Specification.

B. Provide following notices to the Architect:
   1. 48 hours in advance of plant material delivery so plants can be inspected upon site delivery.
   2. Before owner is to assume maintenance responsibility: seven (7) days.
   3. Before time requested for inspection for substantial Completion: seven (7) days in writing.

1.13 RECORD DOCUMENTS

A. Produce, maintain and submit a clean set of record documents showing all adjustments in installation. Comply with the requirements of Section 01 78 39, Project Record Documents.

1.14 REVIEW FOR SUBSTANTIAL COMPLETION

A. Refer to Division 1 - Conditions of the Contract for provisions regarding guarantees for the Work.

B. The Architect will review the project for Substantial Completion of the Work of this Section. The Contractor shall furnish full and complete written program for maintenance of the planting for review by the Architect at the time of the request for acceptance.
   1. Submit a written request for review at least two (2) weeks prior to the day on which the review is requested.
   2. All planting shall be alive, healthy and installed as specified to be accepted. Protect lawn areas with low fencing.
   3. The Contractor shall prepare a list (Punch List) of items to be completed or corrected for review by the Architect.

C. Upon completion of the review, the Architect shall amend the list of items to be completed or corrected (Punch List,) and indicate the time period for their completion or correction. This shall constitute Substantial Completion and Provisional Acceptance shall be granted at this time.

1.15 REVIEW FOR FINAL ACCEPTANCE

A. Final Acceptance shall not be granted until all of the items of the Punch List have been completed to the satisfaction of the Architect.
   1. Submit a written request for final review at least seven (7) days prior to the day on which the review is requested.
   2. Contractor to water plants until final acceptance. If irrigation system is not operable prior to installation of plants, contractor to water plants manually until irrigation system is operable.
   3. Planted areas will be accepted provided all requirements have been complied with and plant materials are alive and in a healthy, vigorous condition. Remove lawn protection fencing.
   4. At this time, the Architect shall certify in writing the Final Acceptance of the Work.
   5. The thirty (30 day) day maintenance period shall begin at final acceptance.

1.16 GUARANTEE

A. The Guarantee Period will not begin until the Architect, after site review, has certified in writing the Final Acceptance of the Work.

B. These guarantees shall be in addition to and not in lieu of all other liabilities which manufacturers, Contractor and the Trade Contractor may have by law or by other provisions of the Contract Documents.

C. Contractor shall not be held responsible for acts of vandalism occurring after the beginning of Guarantee Period, nor shall Contractor be held responsible for deleterious effects caused by maintenance procedures performed by the Owner without the concurrence of the Contractor.

D. During the Guarantee Period the Owner shall maintain all plant materials and lawn; however, during the Guarantee Period it shall be the Contractor's responsibility to inspect the plant materials to satisfy himself that the areas are receiving proper care throughout the Guarantee Period. If the Contractor is of the opinion that the care being given the plants by the Owner is insufficient or may

cause them to die prematurely, the Contractor shall immediately, and in sufficient time to permit the condition to be satisfactorily rectified, notify the Owner in writing. No consideration will be given such claims at a later date or in the absence of required written communication.

E. Owner and landscape contractor shall close the guarantee as mutually agreed.

F. Guarantee for all Plants, including Owner-provided plant material: Replace at no additional cost for a period of one (1) years after the establishment of the beginning date of Guarantee Period, any plants that have died or that are, in the opinion of the Architect, in unhealthy or unsightly condition, or that have lost their natural shape due to dead branches, or excessive pruning, excessive defoliation.
   1. Replace unacceptable plants no later than the next succeeding planting season.
   2. Replace unacceptable plants in accordance with original specification. Cost is considered to be included in the Bid and Contract price. Guarantee all replaced material for a period of one (1) year from date of replacement.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. Trees and Shrubs: Provide freshly dug trees and shrubs, nursery grown, in accordance with good horticultural practice, for at least two years under climatic conditions and soil similar to those at job site.
   1. Trees: unless otherwise specified, trees shall have a straight single leader, with leader intact, undamaged and uncut. Trees shall have full even branches, grafts at ground level, and well-developed root systems. Trunks shall be free of discolored, swollen or sunken areas.
   2. Appearance to be typical of species or variety with normal growth habit, in accordance with ASNS.
      a. Free from disease, insect pests, eggs or larvae, and with healthy well-developed root system.
      b. Nomenclature: Agree with SPN or as accepted in the nursery trade for varieties not listed therein.
         1) Clonal types shall be true.
   3. Conform to measurements specified on Plant List. Dimension plants in their natural position. Plants larger than specified may be used, without increasing Contract Price, if approved by the Architect. Large plants cut back to sizes specified will not be accepted.
      a. Measure height or spread and quality in accordance with standards specified in ASNS (unless otherwise specified).
   4. Provide balled and burlapped stock (B&B) with a compact natural ball of earth, firmly wrapped and tied in burlap so that upon delivery the soil in the ball is still firm and compact about the small feeding roots. Root ball sizes shall be in accordance with standards specified in ASNS. Burlap shall be biodegradable; twine at root ball top shall be biodegradable.
   5. Container stock may be substituted for B&B or BR stock at any time. Container grown material shall be in accordance with Standards specified in ASNS.
   6. Cold storage stock is unacceptable.

B. Ground cover: Furnish in size (s) indicated on the plant list and conform to ASNS standards for species and size (s).

2.2 SOIL MATERIALS, MULCH, AND SOIL AMENDMENTS

A. As specified in Section 32 9120.

2.3 DRAINAGE MATERIALS

A. As specified in Section 32 9120.

2.4 ALUMINUM EDGING

A. Manufacturer: Permaloc Corporation or approved equal
   1. Model: Permaloc GeoEdge

B. Design: Commercial-grade aluminum landscape edging
   1. Dimensions:
      a. Size: 5.5" tall x 6.5" wide with slotted wall.
      b. Length: 8'-0” sections with integral interlocking connection system.
   2. Color: Black.

2.5 COBBLE MULCH

A. As noted on Drawings.

B. Uniform composition, dry, and free flowing with the following chemical analysis: 10% nitrogen, 6% available phosphoric acid, 4% soluble potash.

2.6 MAINTENANCE FERTILIZER

A. Timed release fertilizer with 14-12-14 chemical analyses. Wood Ace or approved equal.

2.7 PLANTING TABLETS

A. 10 or 12-gram compressed plugs with 20-15-5 chemical analysis.
   1. Acceptable Products / Manufacturers.
      a. Sierra Chemical 'Agriform'.
      b. The Scotts Company 'Agriform'.
      c. Remke Enterprises, Inc.

2.8 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Tree stakes and ties (at-grade): two (2) inch square hardwood Tree Stakes; 12-gauge galvanized steel tie wire; and 3/4" black hose chaffing guard.

C. Sub-surface tree anchor system (on-structure locations): 2x4 PT wood used to stabilize root ball and guy system to 2x10 PT deadman at base of planter. See Landscape Details.

D. Cable, Wire, Eye Bolts: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life. Eight (8) or twelve (12) gauge as appropriate. Or Arbor Tie Tree Staking & Guying Material - AT2G.

E. Plant Protectors: Rubber sleeve hoses over cable to protect plant stems, trunks, and branches or Arbor Tie Tree Staking & Guying Material - AT2G.

PART 3 - EXECUTION

3.1 FINISH GRADING

A. After natural settlement and light rolling, the complete work shall conform to the lines, grades and elevations indicated. Allow natural settlement to occur prior to planting installation. Supply additional soil as needed to give the specified depths and grade under the Contract without additional cost to the Owner. Soil in lawn areas on structure shall be rolled thoroughly to insure soil has been completely settled.

3.2 EXAMINATION OF SITE

A. Ascertain the location of all electric cables, conduits, irrigation systems, under-drainage systems and utility lines. Take proper precautions so as not to disturb or damage sub-surface elements. If sub-surface elements are uncovered, promptly notify the Architect, who will relocate the plant material. If Contractor fails to follow this procedure, he is responsible for making requisite repairs to damaged utilities at his own expense.
   1. Verify that required underground utilities are available, in proper location and ready for use. Coordinate with other trades.

3.3 INSPECTION OF TREES AND SHRUBS

A. The Architect may visit nursery location with the Contractor to select and tag all specimen plant materials or review selected plant materials on site. This may include trees over two and one half (2 ½) inch in caliper, shrubs over thirty-six (36) inches in height and any other plant designated as "specimen" in plant list. Contractor shall pay for Architect's travel expenses if the nursery is greater than one hundred fifty (150) miles from project site.

B. If nursery visits are required, the Contractor shall locate specimen plant materials and be present for inspection of plants at source. Request the visit at least two (2) weeks in advance of the desired inspection date.

C. Inspection and acceptance of all plants, prior to planting is mandatory and the Architect reserves the right to reject any or all plant material at any time until final inspection and acceptance.

3.4 INSTALLATION

A. Confirm drainage mat is installed and that positive drainage is provided.

B. Install filter fabric and soil per specification section 32 93 20.

C. Excavation: Excavate plant beds and pits in accordance with the Planting Details after approval of staked locations by the Architect.
   1. Excavate pits and beds with vertical sides and with the pit bottoms level. Sides and bottoms shall be loosened by scarifying.
   2. Exercise extreme caution during excavation to avoid damaging or interrupting underground electrical utilities or adjacent tree roots or water proofing.

D. Placement of Plants:
   1. Do not plant until material and locations have been approved by the Architect at site.
   2. Do not pull burlap out from under balls. Remove platforms, wire and surplus binding from top and sides of ball.

3. Clip wire baskets at top and base of root ball and remove wire basket from top and sides of rootball.
4. Cleanly cut off all broken or frayed roots. Tease out existing roots on perimeter of root ball without disturbing structure of root ball.
5. Remove plants from containers by cutting or inverting the container.
6. Set plants in center of pits plumb and straight, in accordance with the planting details, and faced to give best appearance and relationship to adjacent plants and structures.
7. Plant to such depth that the finished grade level of the plant, after settlement, will be the same as that at which the plant was grown.

E. Coordination with Irrigation Installation:
1. Contractor to water plants until final acceptance. If irrigation system is not operable prior to installation of plants, contractor to water plants manually until irrigation system is operable.

F. Planting in Pots:
1. If pots are not irrigated, contractor to hand water plants until final acceptance.

G. Fertilization:
1. Apply Commercial Fertilizer to groundcover areas per the manufacturer's written instructions.
2. Place Planting Tablets in tree and shrub pits per the manufacturer's written instructions prior to backfilling.

H. Backfilling:
1. Plant pits shall not be backfilled until they have been approved by the Architect.
2. Remove all non-biodegradable materials from the plant pit.
3. Planting Soil Mixture shall be backfilled in layers of not more than six (6) inches and each layer shall be thoroughly compacted by hand and watering. Soil shall be free of voids before the next layer is placed.
4. Work the backfill soil around and underneath the root ball, leaving no air pockets. Compact the Planting Soil Mixture around root balls as required to fill all voids. Heel tamping is not permitted.
5. Continue adding and tamping soil until the plant pit is half full. Add water to partially fill the plant pit. Let the water soak into the soil and finish backfilling as specified above.

I. Guying and Staking: Stake or guy trees as detailed immediately after planting. Trees shall stand plumb after staking or guying.

J. Installation of Tree Anchors:
1. Install Tree Anchors per the manufacturer's written instructions.
2. Trees shall stand plumb after guying.

K. Mulching: Mulch within two (2) days of planting. Cover planting areas with a two (2) inch layer of mulch leaving the top of mulch to be 1” below the top of adjacent walls.

L. Pruning and Repair:
1. Do no pruning without approval of Architect. Neatly prune and/or clip plants to preserve their natural character, and in a manner appropriate to the particular requirements of each plant, and at the time designated by, and to the satisfaction of, the Architect.
2. Remove broken or badly bruised branches with a clean cut. Perform pruning with clean, sharp tools.
3. Accidental damage to trees and shrubs occurring during the course of planting operation which is not so great as to require removal of a branch or the replacement of the plant shall be promptly traced and treated in accordance with recognized horticultural practices as directed by the Architect.

M. Watering: Upon completion of planting operation, water plant material thoroughly. Apply water slowly so as to penetrate the entire root system and at a rate which will prevent saturation of the soil bed. Water lawn areas per instructions from lawn installer.

N. Installation of Aluminum Edging:
1. Install Aluminum Edging, per the manufacturer's written instructions, at locations shown on the drawings.
2. Layout and install Aluminum Edging in a manner that ensures provision of straight horizontal and vertical lines and proper vertical relationship to adjacent finish grades.

O. Installation of Cobble Mulch:
1. Install Cobble Mulch at locations shown on the drawings. Ensure coordination / protection of waterproofing prior to install.
2. Provide minimum 4" depth layer of Cobble Mulch.

3.5 MAINTENANCE PRIOR TO FINAL ACCEPTANCE

A. Maintenance shall begin immediately after each plant is planted.

B. Contractor shall water, mulch, weed, prune, spray, fertilize, cultivate and otherwise maintain and protect plants until Provisional Acceptance.

C. Maintenance tasks shall also include the following:
1. Removal of dead plant material from the project site.
2. Correction of defective work as soon as possible after it becomes apparent and as weather and season permit.
3. Resetting of settled plants to proper grade and position.
4. Application of Maintenance Fertilizer.
5. Tightening and repair of tree stakes and Tree Anchor installations as required.

D. Plants shall not be pruned without approval of the Architect.

E. Following completion of planting operations, and prior to Final Acceptance, remove excess soil and debris from the site and repair all damage resulting from planting operations.

3.6 MAINTENANCE DURING THE GUARANTEE PERIOD

A. Prior to Final Acceptance of the work, the Contractor shall arrange a meeting with the Architect and Client maintenance personnel to review and approve a maintenance program to be executed by Client maintenance personnel during the Guarantee Period.

3.7 ADJUSTING AND CLEANING

A. Maintain the site in an orderly condition during the course of the work. At a minimum, perform or provide the following:
1. Keep walkways and driveways clear.
2. Store materials and equipment where directed by the Architect.
3. Immediately remove rejected and dead plant materials from the site.
4. Continuously and promptly remove excess materials, equipment and waste throughout the course of the work.
5. Upon completion of the work, and prior to Final Acceptance, remove equipment, surplus materials, debris, and trash resulting from the work of this section.
6. Leave the site neat and clean.

END OF SECTION

SECTION 329500

VEGETATED ROOF ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preassembled vegetated roof trays.

1.2 DEFINITIONS

A. Captured Water: Water that is retained in the drainage layer of a vegetated roof assembly after new water additions have ceased and that cannot escape the roof except through evaporation or plant transpiration.

B. Extensive Green Roof -- Low maintenance landscaping consisting of shallow soil depths < 4 inches with plant varieties restricted to primarily mosses, herbs, succulents and hardy perennials capable of withstanding harsh growing conditions.

1.3 SUBMITTALS

A. Submit in accordance with requirements of Division 01 Section Submittal Procedures.

B. Conform to submittal requirements of Division 01 Section Sustainable Design Requirements.

C. Product Data: For each vegetated roof assembly and each component, including each growing medium.

D. Shop Drawings: For vegetated roof assembly. Include roof plans and drain locations; details of vegetated roof assembly accessories and attachments to other work.

E. Samples: For each exposed product and for each color and texture specified.

F. Product certificates:
   1. Certification showing that all components of the green roof assembly are being supplied and warranted by a single-source manufacturer.
   2. Certification from the roof membrane manufacturer that the Vegetated Roof Assembly does not void or otherwise impact the roofing membrane assembly warranty.

G. Product test reports.

H. Field quality-control reports.

I. Manufacturer’s installation instructions.

J. Maintenance data.

K. Warranty: Sample of System Warranty

1.4 QUALITY ASSURANCE

A. Installer Qualifications:
   1. A firm that is approved, authorized and licensed by the roofing system manufacturer and is eligible to receive standard roofing manufacturer's warranty.
   2. List of at least three (3) projects, satisfactorily completed within the past five (5) years, of similar scope and complexity to this project. Previous experience submittal shall correspond to specific membrane system proposed for use by applicator.

B. Source Limitations: Obtain vegetated roof assembly components from single source from single manufacturer.

C. Pre-Construction Conference: The manufacturer shall meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the roofing assembly.

D. Pre-installation Conference: Conduct conference at Project site.

1.5 WARRANTY

A. Special Warranty for Vegetated Roof Assembly: Installer agrees to repair or replace vegetated roof assembly and components that fail in materials or workmanship within specified warranty period.
   1. Failure includes, but is not limited to, ponding water or prolonged wetness of the growing medium caused as a result of failure of the assembly to properly drain.
   2. Warranty Period: 20 years from date of Substantial Completion.

1.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Provide maintenance by skilled employees of vegetated roof assembly Installer approved by membrane roofing manufacturer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than the following maintenance period:

PART 2 - PRODUCTS

2.1 VEGETATED ROOF ASSEMBLY

A. Manufacturer: LiveRoof

B. Module size: Standard 1' x 2' x 3-1/4"

C. Module color: gray

2.2 WATERPROOF MEMBRANE

A. See Section 075216 SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

2.3 IRRIGATION

A. See section 328400 Planting Irrigation.

2.4 EXTRUDED POLYSTYRENE INSULATION

A. See Section 072100 THERMAL INSULATION

2.5 VEGETATION

A. Manufacturer: Green Feathers, https://greenfeathers.info/
   1. Mix: Crater Lake Mix

2.6 INSPECTION CHAMBER

A. Manufacturer: Soprema, or approved equal.
   1. Model: 18” x 18” x 4.75”
   2. Color: black.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Examine each area to receive vegetated roof assembly.
   1. Verify that roof insulation over membrane roofing is in place, secure, and flush along all seams.
   2. Verify that perimeter and other flashings are in place and secure along entire lengths where they will be covered by vegetated roof assembly.
      a. Protection Course: Cover membrane roofing with extruded polystyrene insulation and or approved protection course with butted and fully taped joints before membrane roofing is subject to vegetated roof assembly installation work.

B. Install vegetated roof assembly according to manufacturer's written instructions.

C. Shim modules to level with Roof Deck finish floor, with structural foam.

D. Cut Modules to required forms of Landscape areas, per plans, and per manufacturer recommendations.

E. Small Plant Stabilization: Install erosion-control fabric over planting area to secure small plants according to manufacturer's written instructions.

F. Inspection Chambers: Install accessible inspection chambers at each drain, valve, and switch beneath the finish elevation of growing medium and at locations shown on Drawings.

3.2 PLANTING

A. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in the growing medium within a planting area.

B. Pre-planted Vegetative Tiles: Install in full contact with growing medium and secure in position.

C. Planting Individual Plants: Perform planting as specified in Division 32 Section "Plants." except as otherwise indicated on Drawings and required by vegetated roof assembly manufacturer's written instructions. Perform digging carefully so as to prevent damage to membrane roofing below the vegetated roof assembly.

3.3 SOIL-RETAINER / EDGE RESTRAINT INSTALLATION

A. Install soil retainer where indicated according to manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage Division 07 membrane roofing manufacturer's authorized service representative to provide inspection of vegetated roof assembly installation and prepare inspection reports.

B. Correct deficiencies in work that do not comply with requirements.

3.5 PLANT MAINTENANCE

A. General: During maintenance period, maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing devices, resetting plants to proper elevations or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

1. Provide environmentally friendly operations and maintenance plan for review prior to substantial completion.

B. Replace growing medium that becomes displaced or eroded because of settling or other processes.

C. Use only products and methods acceptable to membrane roofing manufacturer.

END OF SECTION 329500