

# **ADDENDUM NO. 1**

## **RIDGWAY FIRE STATION LOT 26-B1 RIDGWAY, CO 81432**

**June 2, 2014**

This Addendum is issued to inform the Bidders of Revisions and Clarifications to the Bid Documents. This Addendum forms part of the Contract Documents and modifies the original Project Manual and Bid Drawing Set dated May 9, 2014 and issued as "Ridgway Fire Station, Issue A Bid Documents". This Addendum consists of (161) 8-1/2 x 11 typed pages and (5) 24 x 36 drawings.

The Bid Date is unchanged by this addendum and remains **June 19, 2014 at 4:00 pm.**

You must acknowledge this addendum on your Bid Proposal.

### **DRAWING SHEETS**

C.1	EXISTIG CONDITIONS	Reissued
C.2	SITE LAYOUT & UTILITIES PLAN	New
C.3	GRADING AND DRAINAGE PLAN	New
C.4	DETAILS	New
A6.1	DOOR SCHEDULE	Reissued

### **SPECIFICATION SECTIONS**

000000	Issue Log	Updated
000000	Drawing Index	Updated
000000	Specification Index	Updated
013100	Project Management and Coordination	Updated
017419	Construction Waste Management	Updated

018113	Sustainable Design Requirements	New
019113	General Commissioning Requirements	New
033000	Cast-In-Place Concrete Updated	New
061000	Rough Carpentry	Updated
072726	Fluid Applied Air Barriers	New
074619	Metal Wall Panels	New
078413	Penetration Firestopping	New
081213	Hollow Metal Door Frames	New
081416	Flush Wood Doors	New
081436	Stile and Rail Wood Doors	New
083213	Sliding Aluminum Framed Glass Doors	New
083313	Fire Rated Coiling Counter Doors	New
083613	Sectional Doors	New
085113	Aluminum Windows	New
086300	Metal-Framed Skylights	New
087100	Door Hardware	New
088000	Glazing	New
089000	Louvers and Vents	New
092116	Gypsum Board Shaft Wall Assemblies	New
092900	Gypsum Board	New
093000	Ceramic Tiling	New
099000	Paints and Coatings	New
105113	Metal Lockers	New
122413	Roller Window Shades	Updated
123530	Residential Casework	New
328400	Planting Irrigation	New

**CLARIFICATIONS**

1. Civil – Extent of electrical service to be provided by GC? Primaries, Transformer, associated fees?

*Response: San Miguel will provide a transformer at approximately the location shown. The GC will provide secondary power to the building.*

2. Civil – Extent of gas service to be provided by GC? Trench, piping, backfill, meter and associated fees?

*Response: It is our understanding that the gas company will provide service to the meter on the building.*

3. Civil – Detail for Sand/Oil Separator

*Response: See revised detail sheet.*

4. Civil – Section for gravel paving.

*Response: 6" of class 6 or ¾" crushed rock.*

5. Civil – Generator Pad & Transformer Pad

*Response: Shown on the revised civil drawings.*

## **CONTRACTOR QUESTIONS**

### **CIVIL QUESTIONS**

- 1.1 Exterior concrete note indicates the sidewalks are 5" thick. A5.2 Type F4 indicates the sidewalks are 4" thick. Please clarify.

*Response: A5.2 Type F-4 has been revised to show 5" thick sidewalks.*

- 1.2 How is frost heave of the sidewalks and patios to be addressed, especially at locked in spaces and at exterior doors?

*Response: Plans indicate structural fill below concrete sidewalks and patios.*

- 1.3 What are the thicknesses for the asphalt paving and its base section?

*Response: Asphalt thickness is 3" and the aggregate base is 8". Please reference the Town of Ridgway Standard Specifications (street design and construction) for asphalt mix design requirements. An asphalt mix that is standard to the Town and area will be acceptable.*

- 1.4 A 6" curb is depicted at the edge of the sidewalk. What is its height? Reinforcing?

*Response: See revised C4 detail sheet.*

- 1.5 Since the parking drains against it, should it curb and gutter? Is the curb also around the rock filled peninsula?

*Response: See revised C4 detail sheet.*

- 1.6 Is the curb also on the west side of the heated concrete pad?

*Response: No, there is a flush transition to asphalt parking*

- 1.7 Are shut off valves to be installed on the 1" and 2" water service lines at the street?

*Response: See revised plan. Curb stops will be located just south of sidewalk in non traffic area.*

- 1.8 Is the snowmelt system to be on both sides of the trench drain?

*Response: Yes, the snowmelt system is intended for both sides of the trench drain.*

#### ARCHITECTURAL QUESTIONS

- 2.1 What is the source of water for the Design-Build irrigation system?

*Response: Supply water for irrigation will come off the domestic water line. The location of the tie-in is unknown at this time.*

- 2.2 Are the trash & recycling containers by the GC or Owner?

*Response: Trash and recycling containers will be provided by the Owner.*

- 2.3 Depicts 8 each low (evergreen) growth shrubs 4 each deciduous shrubs. A0.4 the schedule has 12 each evergreen shrubs and 4 each deciduous shrubs. Please clarify.

*Response: The correct number of plantings is shown on the Landscaping Plan. A0.4 has been revised to show the correct number of plantings.*

- 2.4 Room 112: Are the 8 each "lockers" by Owner?

*Response: The 8 EMS Lockers in Bunker Gear 128, the 4 Lockers in Ante 125, and the 4 locker in Ante 127A will be provided by the Contractor.*

- 2.5 Entry's #1 & #2 have a "CUH". What is a CUH? On A1.1 Entry #1 has a CUH but on A5.1 it has a 36" x 36" display case.

*Response: Cabinet Unit Heater. A number of items are arranged on the west wall of Entry 106 including an emergency phone, door bell and display case.*

- 2.6 Do we need to include snow & ice curbs?

*Response: No, not at this time.*

- 2.7 Do we need to include structural ice protection dams on the upper side of roof penetrations (I.E. waste vent pipes, exhaust vent pipes) to keep the ice from shearing them off?

*Response: No, not at this time.*

- 2.8 Does downspout drain on top of PCCP at the overhead door or is it to go underground?

*Response: Thank you. Yes, the heated downspout indicated on A1.3 at GL A & 12 will need to be routed below the concrete apron and discharged to the east of the building.*

- 2.9 Species of wood at the 1x6 T&G wood ceiling?

*Response: The species of the T&G wood ceiling can be western red cedar or Douglas fir. Select tight knot is preferred.*

- 2.10 Doors 008 & 009: Are the patio doors all aluminum framed or aluminum clad over wood?

*Response: The doors will be all aluminum. Please reference 083213 Sliding Aluminum Framed Glass Doors.*

- 2.11 Doors 012 to 015 indicate the doors are wood in aluminum frames. Is this correct?

*Response: Correct. Please reference 081436 Stile and Rail Wood Doors.*

- 2.12 Which doors get lites or vision panels?

*Response: Please reference the revised Door Schedule on Sheet A6.1.*

- 2.13 Does Door 014 & 015 get ADA auto openers? Not indicated on the electrical plans.

*Response: No ADA auto operators are required at this time.*

- 2.14 Data missing on Door 123 & size is listed as 3068 (all other doors are 3070)

*Response: The door label and dimension have been corrected on the Door Schedule. The height should be 7'-0".*

- 2.15 Door 005 could have a headroom issue on the low side as it appears to be about 3" +/-

*Response: Thank you. The track clearance at Door 005 is approximately 8 inches. The door will require a low-headroom track.*

- 2.16 Do you have a specific brand in mind for the skylights?

*Response: Please see 086300 Metal-Framed Skylights.*

- 2.17 Indicate the concrete pad for the future generator is to be poured now. Other plans do not depict the size, thickness or reinforcing.

*Response: Please see revised C.2 for the location of both the generator and transformer pads.*

- 2.18 Locker sizes? How many are ADA?

*Response: The lockers will be 18" by 18" and full height. At least one locker in each group will need to be ADA compliant.*

- 2.19 A7.1 describes 8 each Ante Room and 8 each Bunker Gear Lockers. A1.1 depicts 34 "Bunker Gear" lockers as being Owner Furnished. Please clarify.

*Response: The 8 EMS Lockers in Bunker Gear 128, the 4 Lockers in Ante 125, and the 4 locker in Ante 127A will be provided by the Contractor. The 34 Bunker Gear lockers are existing will be moved from the current facility.*

- 2.20 What windows get roller shades?

*Response: Please reference updated 12413 Roller Window Shades for a Window Shade Schedule.*

- 2.21 Which roller shades are motorized? There is not any indication of motorized shades on the electrical plans.

*Response: No motorized roller shades are required.*

- 2.22 All other wood sections indicate the product is to be FSC certified. There is no mention FSC in the truss specs, are they exempt?

*Response: No FSC certified wood will be required. Specification sections have been amended.*

- 2.23 W7 on the Interior Wall Legend does not match the W7 on A5.2 and W8 is missing.

*Response: The discrepancy has been corrected. W7 and W8 were mislabeled on A5.2. Wall Type W8 has been added to the Interior Wall Legend. Tags remain the same on the plans.*

- 2.24 Please confirm the wood stud component of the west & south walls of Shop 103 and south wall of SCBA 104 is supposed to be a Wall Type W5 or should it be a W7.

*Response: Yes, thank you. A W8 (corrected single-sided assembly) would be more appropriate in that location. 2x6 Framing members are required between GL 12 & 13 – this wall is a bearing wall for roof trusses. The plans have been revised to show this. Please reference the response to Structural Question 3.3.*

- 2.25 On Grid 5 between Grids C.5 & G should the W5 be a W2 (SIM)?

*Response: Yes, thank you. The labels have been changed. The wall type is an isolated incidence of 8" CMU with 1-1/2" furring.*

- 2.26 Please confirm the plumbing walls in Toilet Rooms 114 & 115 and Locker Rooms 126 & 127 are supposed to be Wall Type W8. None of these walls fall into the 2-hour requirement and a W7 seems to be more appropriate for the condition.

*Response: The wall types were incorrectly labeled on A5.2. The wall types have been relabeled; the labels on the plans in those locations will remain and are now correct.*

- 2.27 The north wall of Kitchen 131 should be W2 (SIM) and not W5.

*Response: Yes, thank you. The labels have been changed. The wall type is an isolated incidence of 8" CMU with 1-1/2" furring.*

- 2.28 Is the knee wall at the counter in Kitchen 131 supposed to be a W8?

*Response: Yes. The partial height wall under the kitchen island can be constructed of wood framing members.*

- 2.29 Under the stairs, is there supposed to be a W7 wall and a W8 wall?

*Response: Yes. The 2-Hour shaft wall is assembled first. The W8 wall provides the finished surface within the Mop Room.*

- 2.30 Between Grids L & M on Grid 11 should the W6 wall type go to the corner at Grid M?

*Response: Yes. The 2-Hour rated wall is indicated by a dash line on the Plans and Life Safety Plan.*

- 2.31 Could you provide a cross-section and specification for the expansion joint at Grid G? 8/SD3.1 doesn't show an expansion joint.

*Response: Thank you. There will be a parallel expansion joint in the standing seam metal roof along the deck material change on Grid Line G. It will consist of two legs with a sheet metal cap. A detail is forthcoming.*

- 2.32 May we put a gypsum ceiling in Mechanical 120 & Electrical 121 at an elevation of 10' +/-? Otherwise perimeter walls are 24' high.

*Response: Walls can be extended 4" above adjacent ceilings. No ceilings are required.*

- 2.33 Does Conf Room 109 get a roller shade?

*Response: Please reference updated 12413 Roller Window Shades for a Window Shade Schedule.*

- 2.34 Do roller shades go on patio doors 008 & 009?

*Response: No. Exposure in this area is a component of a minor passive solar design.*

- 2.35 Shouldn't the W5 wall be rated a 1-Hour in lieu of a 2-Hour?

*Response: Thank you – yes, you are correct. Wall Assembly detail note has been revised on A5.1.*

- 2.36 W8: the UL-U373 section I have has a 1/2" gypsum layer on the opposite side of the studs to the 1" layers.

*Response: Thank you – you are correct. Wall Assembly Detail has been revised on A5.2.*

- 2.37 How are the inside openings of the window to be finished?

*Response: Inside head and jamb of windows will be drywall return.*

- 2.38 What is the window sill material?

*Response: Window sill material is listed on A7.1 in the Finish Material Legend under "Solid Surfaces".*

- 2.39 Concrete details indicate the bottom of footer is 4'-0" below finished floor Elevation 96'-0". A3.1, A3.2 & A3.3 indicate the bottom of footer is 3'-10" below finished floor Elevation 96'-2".

*Response: Structural drawings shall govern; Architectural plans will be corrected.*

- 2.40 Specifications describe using at least 10 mil vapor retarder. A5.2 details indicate 6 mil.

*Response: Please see revised 033000 Cast-In-Place Concrete for revised language on the vapor barrier. Details on A5.2 have been revised to indicate 10 mil thickness.*



- 2.41 Type of fastener to be used for the metal rain screen system to the CMU?

*Response: Please see revised 074619 Metal Wall Panels.*

- 2.42 There is not a spec section for fluid applied membrane air barrier. Is fluid applied also to be installed on wood framed walls?

*Response: Please reference 072726 Fluid Applied Air Barriers. No, the fluid applied membrane will be installed on the CMU walls only.*

### STRUCTURAL QUESTIONS

- 3.1 Reinforced concrete: Exterior concrete is described as being 4,500 PSI. C2 indicates it is 4,000 PSI with fiber. Please clarify.

*Response: Structural Drawings shall govern in this instance.*

- 3.2 At Grids H.2 & 5, the Footing Schedule Mark is missing.

*Response: The footer in question is an F3.0.*

- 3.3 Between Grids 11 & 13 at approx. Grid H.2 the wall section 8/SD1.1 should continue up to Grid G to match the wall drawn on A1.1.

*Response: The footer condition in that location supports a 2X6 bearing wall for roof trusses above. The continuation of the wall is non-load bearing.*

- 3.4 The foundation at approx. Grid 12.25 should go from Grid G to approx. Grid H.5 to match the wall drawn on A1.1.

*Response: You are correct. A 3'-10" portion of foundation in that location will be added to the design*

- 3.5 On Grid A at Grids 6, 8 & 10 A1.1 depicts faux columns. S1.0 does not depict pilasters under the faux columns. Are they to bear on the 8" PCCP?

*Response: That detail is depicted on the Architectural Drawings. Please reference Detail 3/A6.3.*

- 3.6 Is a LSTA15 strap to be installed on each rafter at the ridge?

*Response: Yes.*

- 3.7 Please confirm that the truss detail is more in line with 1/SD4.0, that rigid insulation is only over metal trusses and CCSPF is at all wood trusses.

*Response: Ridge insulation is required for the main body of the Apparatus Bay. The metal roof deck and wood roof sheathing will be at same plane in this area. CCSPF will be used in all other truss and rafter locations.*

#### MECHANICAL, ELECTRICAL & PLUMBING QUESTIONS

- 4.1 According to Specification 231123 -1 Part 1.2 D and 1.3C, the mechanical contractor needs to have a qualified PE complete "comprehensive engineering analysis using performance requirements and design criteria indicated," as well as "analysis data signed and sealed by the qualified professional engineer." Will SGM be able to be the qualified PE in question and provide pricing for the analysis to the mechanical contractors or will this need to be overseen and approved by a 3rd Party PE.

*Response: The Delegated Design referenced in 231123 Facility Natural Gas Piping is unnecessary. Please consider the requirement removed from the scope of work.*

- 4.2 106 entry exterior is hard to read, it look as if it is marked W?

*Response: The fixture in question is an L5.*

- 4.3 Hallway wall sconces are not marked or on the fixture schedule.

*Response: The Hallway Sconces were not included on the Luminaire Schedule. They will be a LED Recessed Step Light.*

- 4.4 131 Kitchen cabinet fixtures are not marked in corners.

*Response: The under counter lights were not included in the Luminaire Schedule. There will be approximately (6) LED puck lights.*

- 4.5 114 lobby what is fixture P1?

*Response: P1 Fixture is a decorative, close to ceiling fixture selected by the Owner. At this time, please use an allowance of \$450 per fixture.*

- 4.6 130 Dayroom have L2 fixtures like corridor 122. Are they marked wrong?

*Response: The lights in question were incorrectly tagged. The (5) lights in the TV Room shall be L1 fixtures.*

- 4.7 Is there a site electrical drawing?

*Response: No. The only site lighting is listed on E-1.03; a flag pole light in the northwest corner.*

END OF ADDENDUM

## Issue Log

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*\* Items in Italics have not been issued.*

ISSUE NAME	DESCRIPTION	ISSUE SET	ISSUE DATE
Bidding Set	Drawings and Specifications	A	5/9/14

REVISION DOCUMENTS	DESCRIPTION	ISSUE SET	ISSUE DATE
Addendum #1		Add 1	6/2/14

END OF ISSUE LOG

# Drawing Index

*\* Items in Italics have not been issued.*

**\*Items in Bold have been revised.**

NUMBER	DRAWING NAME	ISSUE SET	ISSUE DATE
<b>GENERAL</b>			
A0.1	COVER SHEET	A	5/9/14
A0.2	LIFE SAFETY PLAN	A	5/9/14
<b>CIVIL</b>			
<b>C.1</b>	<b>EXISTING CONDITIONS</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>C.2</b>	<b>SITE LAYOUT &amp; UTILITIES PLAN</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>C.3</b>	<b>GRADING &amp; DRAINAGE PLAN</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>C.4</b>	<b>DETAILS</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>ARCHITECTURAL</b>			
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A0.4	SITE DETAILS	A	5/9/14
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A1.2	MEZZANINE PLAN	A	5/9/14
A1.3	ROOF PLAN	A	5/9/14
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A5.6	DETAILS	A	5/9/14
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A6.3	DOOR & WINDOW DETAILS	A	5/9/14

A7.1	FINISH SCHEDULE & DETAILS	A	5/9/14
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A7.3	INTERIOR ELEVATIONS	A	5/9/14
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SD4.0	WOOD DETAILS	A	5/9/14
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M5	MECH PIPING PLAN – LEVEL 1	A	5/9/14
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E1.03	LIGHTING PLAN - MAIN LEVEL	A	5/9/14
E1.04	LIGHTING PLAN - UPPER LEVEL	A	5/9/14
E1.05	LOW VOLTAGE PLAN - MAIN LEVEL	A	5/9/14
E5.01	POWER DETAILS AND SCHEDULES	A	5/9/14
E5.02	LIGHTING DETAILS AND SCHEDULES	A	5/9/14
E5.03	LOW VOLTAGE DETAILS AND SCHEDULES	A	5/9/14

END OF DRAWING INDEX

# Specification Index

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*\* Items in Italics have not been issued.*

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DIVISION 00 – PROCUREMENT AND CONTRACT REQUIREMENTS			
00	Project Title Page	A	5/9/14
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02	Advertisement for Bids	A	5/9/14
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04	Bid Form	A	5/9/14
05	Issue Log	A	5/9/14
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07	Specification Index	A	5/9/14
08	Geotechnical Data Summary	A	5/9/14
09	LEED 2009 NC Certification Checklist (Preliminary)	A	5/9/14
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012100	Allowances	A	5/9/14
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012300	Alternates	A	5/9/14
012500	Substitution Procedures	A	5/9/14
012600	Contract Modification Procedures	A	5/9/14
012900	Payment Procedures	A	5/9/14
<b>013100</b>	<b>Project Management and Coordination</b>	<b>Add 1</b>	<b>6/2/14</b>
013200	Construction Progress Documentation	A	5/9/14
013300	Submittal Procedures	A	5/9/14
014000	Quality Requirements	A	5/9/14
014200	References	A	5/9/14
015000	Temporary Facilities and Controls	A	5/9/14
016000	Product Requirements	A	5/9/14
017300	Execution	A	5/9/14
<b>017419</b>	<b>Construction Waste Management</b>	<b>Add 1</b>	<b>6/2/14</b>
017700	Closeout Procedures	A	5/9/14

017823	Operation and Maintenance Data	A	5/9/14
017900	Demonstration and Training	A	5/9/14
<b>018113</b>	<b>Sustainable Design Requirements</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>019113</b>	<b>General Commissioning Requirements</b>	<b>Add 1</b>	<b>6/2/14</b>
DIVISION 03 - CONCRETE			
<b>033000</b>	<b>Cast-In-Place Concrete</b>	<b>Add 1</b>	<b>6/2/14</b>
033543	Polished Concrete Finishing	A	5/9/14
DIVISION 04 – MASONRY			
042200	Concrete Unit Masonry	A	5/9/14
DIVISION 05 – METALS			
051200	Structural Steel Framing	A	5/9/14
052100	Steel Joist Framing	A	5/9/14
053100	Steel Decking	A	5/9/14
055000	Metal Fabrications	A	5/9/14
055113	Metal Pan Stairs	A	5/9/14
055213	Pipe and Tube Railings	A	5/9/14
DIVISION 06 – WOOD, PLASTICS, & COMPOSITES			
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061753	Shop-Fabricated Wood Trusses	A	5/9/14
061800	Glued-Laminated Construction	A	5/9/14
DIVISION 07 – THERMAL & MOISTURE PROTECTION			
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072100	Thermal Insulation	A	5/9/14
<b>072726</b>	<b>Fluid Applied Air Barriers</b>	<b>Add 1</b>	<b>6/2/14</b>
074113	Standing Seam Metal Roof Panels	A	5/9/14
<b>074619</b>	<b>Metal Wall Panels</b>	<b>Add 1</b>	<b>6/2/14</b>
075423	TPO Roofing	A	5/9/14
076200	Sheet Metal Flashing and Trim	A	5/9/14
077200	Roof Accessories	A	5/9/14



079200	Joint Sealants	A	5/9/14
<b>078413</b>	<b>Penetration Firestopping</b>	<b>Add 1</b>	<b>6/2/14</b>
DIVISION 08 – OPENINGS			
<b>081213</b>	<b>Hollow Metal Door Frames</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>081416</b>	<b>Flush Wood Doors</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>081436</b>	<b>Stile and Rail Wood Doors</b>	<b>Add 1</b>	<b>6/2/14</b>
083113	Access Doors and Frames	A	5/9/14
<b>083213</b>	<b>Sliding Aluminum Framed Glass Doors</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>083313</b>	<b>Coiling Counter Doors</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>083613</b>	<b>Sectional Doors</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>085113</b>	<b>Aluminum Windows</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>086300</b>	<b>Metal-Framed Skylights</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>087100</b>	<b>Door Hardware</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>088000</b>	<b>Glazing</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>089000</b>	<b>Louvers and Vents</b>	<b>Add 1</b>	<b>6/2/14</b>
DIVISION 09 – FINISHES			
<b>092116</b>	<b>Gypsum Board Shaft Wall Assemblies</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>092900</b>	<b>Gypsum Board</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>093000</b>	<b>Ceramic Tiling</b>	<b>Add 1</b>	<b>6/2/14</b>
095123	Acoustic Tile Ceilings	A	5/9/14
096513	Resilient Base and Accessories	A	5/9/14
096813	Tile Carpeting	A	5/9/14
<b>099000</b>	<b>Paints and Coatings</b>	<b>Add 1</b>	<b>6/2/14</b>
099300	Staining and Transparent Finishing	A	5/9/14
<del>099600</del>	<del>High Performance Coatings</del>		
DIVISION 10 – SPECIALTIES			
101100	Visual Display Units	A	5/9/14
101200	Display Cases	A	5/9/14
101400	Signage	A	5/9/14
102113	Toilet Compartments	A	5/9/14
102800	Toilet Accessories	A	5/9/14
104400	Interior Signs	A	5/9/14

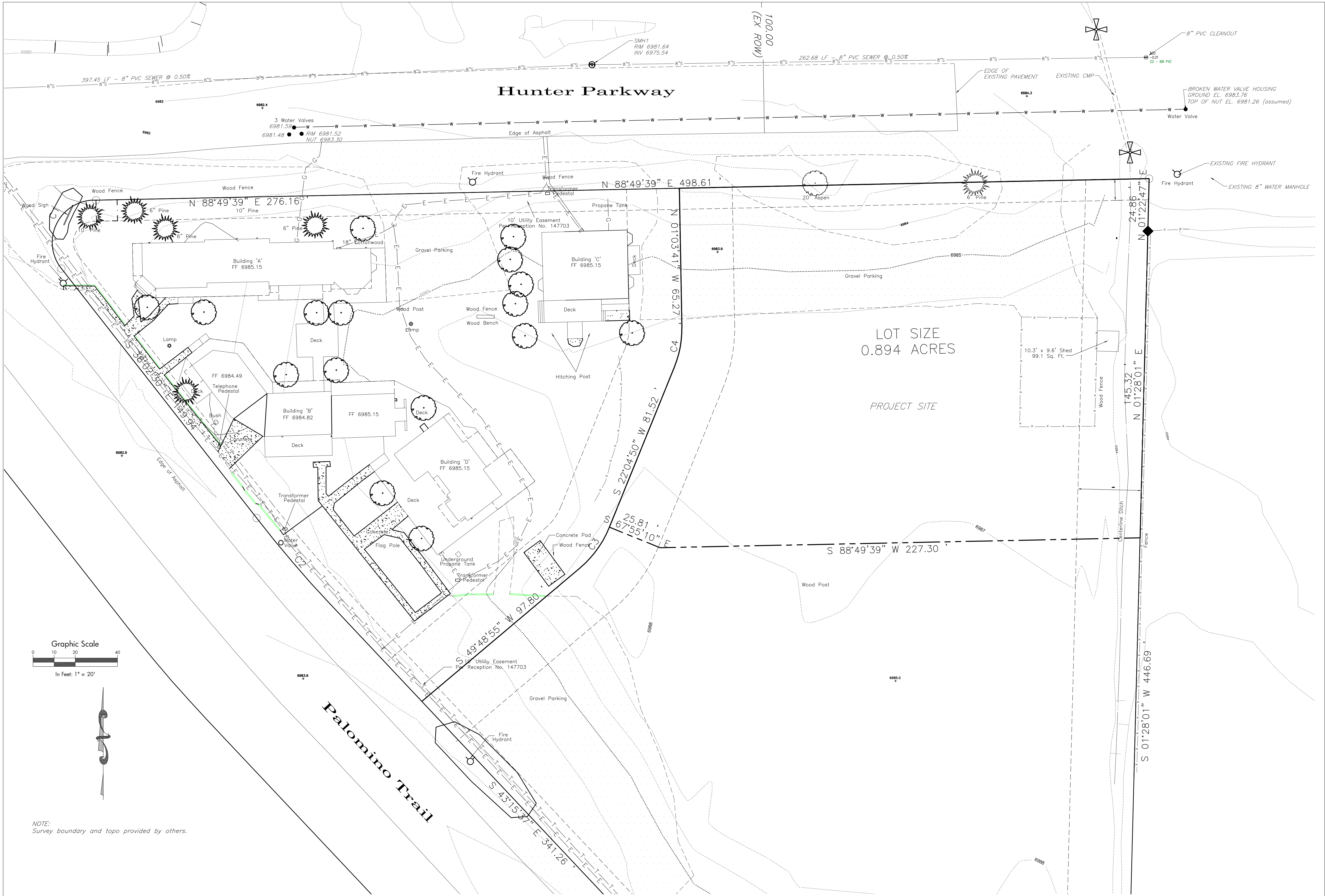
104413	Fire Protection Cabinets	A	5/9/14
104416	Fire Extinguishers	A	5/9/14
<b>105113</b>	<b>Metal Lockers</b>	<b>Add 1</b>	<b>6/2/14</b>
107500	Ground-Set Flag Poles	A	5/9/14
DIVISION 11 – EQUIPMENT			
115213	Projection Screens	A	5/9/14
DIVISION 12 – FURNISHINGS			
<b>122413</b>	<b>Roller Window Shades</b>	<b>Add 1</b>	<b>6/2/14</b>
<b>123530</b>	<b>Residential Casework</b>	<b>Add 1</b>	<b>6/2/14</b>
124816	Entrance Floor Grills	A	5/9/14
DIVISION 22 - PLUMBING			
220500	Common Work Results	A	5/9/14
220513	Common Motor Requirements	A	5/9/14
220516	Expansion Fittings and Loops	A	5/9/14
220519	Meters and Gauges	A	5/9/14
220523	General Duty Valves	A	5/9/14
220529	Hangers and Supports	A	5/9/14
220548	Vibration and Seismic	A	5/9/14
220553	Identification	A	5/9/14
220700	Plumbing Insulation	A	5/9/14
221113	Facility Water Distribution Piping	A	5/9/14
DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING			
230513	Common Motor Requirements	A	5/9/14
230516	Expansion Fittings and Loops	A	5/9/14
230519	Meters and Gauges	A	5/9/14
230523	General Duty Valves	A	5/9/14
230529	Hangers and Supports	A	5/9/14
230548	Vibration and Seismic	A	5/9/14
230553	Identification	A	5/9/14
230593	Testing and Balancing	A	5/9/14
230700	HVAC Insulation	A	5/9/14

230800	HVAC Commissioning	A	5/9/14
230900	Instruments and Controls	A	5/9/14
230993	Sequence of Operations	A	5/9/14
231123	Natural Gas Piping	A	5/9/14
23500	HVAC Water Treatment	A	5/9/14
23313	Metal Ducts	A	5/9/14
233116	Non-Metal Ducts	A	5/9/14
233119	HVAC Casings	A	5/9/14
233300	Air Duct Access	A	5/9/14
233416	Centrifugal HVAC Fans	A	5/9/14
233423	Power Ventilators	A	5/9/14
233600	Air Terminal Units	A	5/9/14
233713	Diffusers, Grilles, and Registers	A	5/9/14
234100	Particulate Air Filtration	A	5/9/14
235100	Breeches, Chimneys and Stacks	A	5/9/14
235113	Draft Control Devices	A	5/9/14
235216	Condensing Boilers	A	5/9/14
235700	Heat Exchangers	A	5/9/14
237433	Heating and Cooling Make-Up Air	A	5/9/14
238219	Fan Coil Units	A	5/9/14
238239	Unit Heaters	A	5/9/14
238316	Radiant Heating Hydronic Piping	A	5/9/14
DIVISION 26 - ELECTRICAL			
260500	Common Work Results	A	5/9/14
260519	Low Voltage	A	5/9/14
260523	Control Voltage	A	5/9/14
260526	Grounding	A	5/9/14
260533	Raceways and Boxes	A	5/9/14
260553	Identification	A	5/9/14
260923	Lighting Control	A	5/9/14
262416	Panel Boards	A	5/9/14
262726	Wiring Devices	A	5/9/14
262813	Fuses	A	5/9/14
262816	Enclosed Switches	A	5/9/14

264313	TVs	A	5/9/14
265100	Interior Lighting	A	5/9/14
283111	Digital, Addressable Fire Alarm System	A	5/9/14
DIVISION 32 – EXTERIOR IMPROVEMENTS			
<b>328400</b>	<b>Planting Irrigation</b>	<b>Add 1</b>	<b>6/2/14</b>
329200	Turf and Grasses	A	5/9/14
329300	Plants	A	5/9/14

END OF SPECIFICATION INDEX

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RIDGWAY FIRE STATION  
RIDGWAY FIRE PROTECTION DISTRICT  
LOT 26-B1, RIDGWAY, CO 81432

ISSUE LOG	
05/09/14	BID DOCUMENTS
06/02/14	ADDENDUM #1

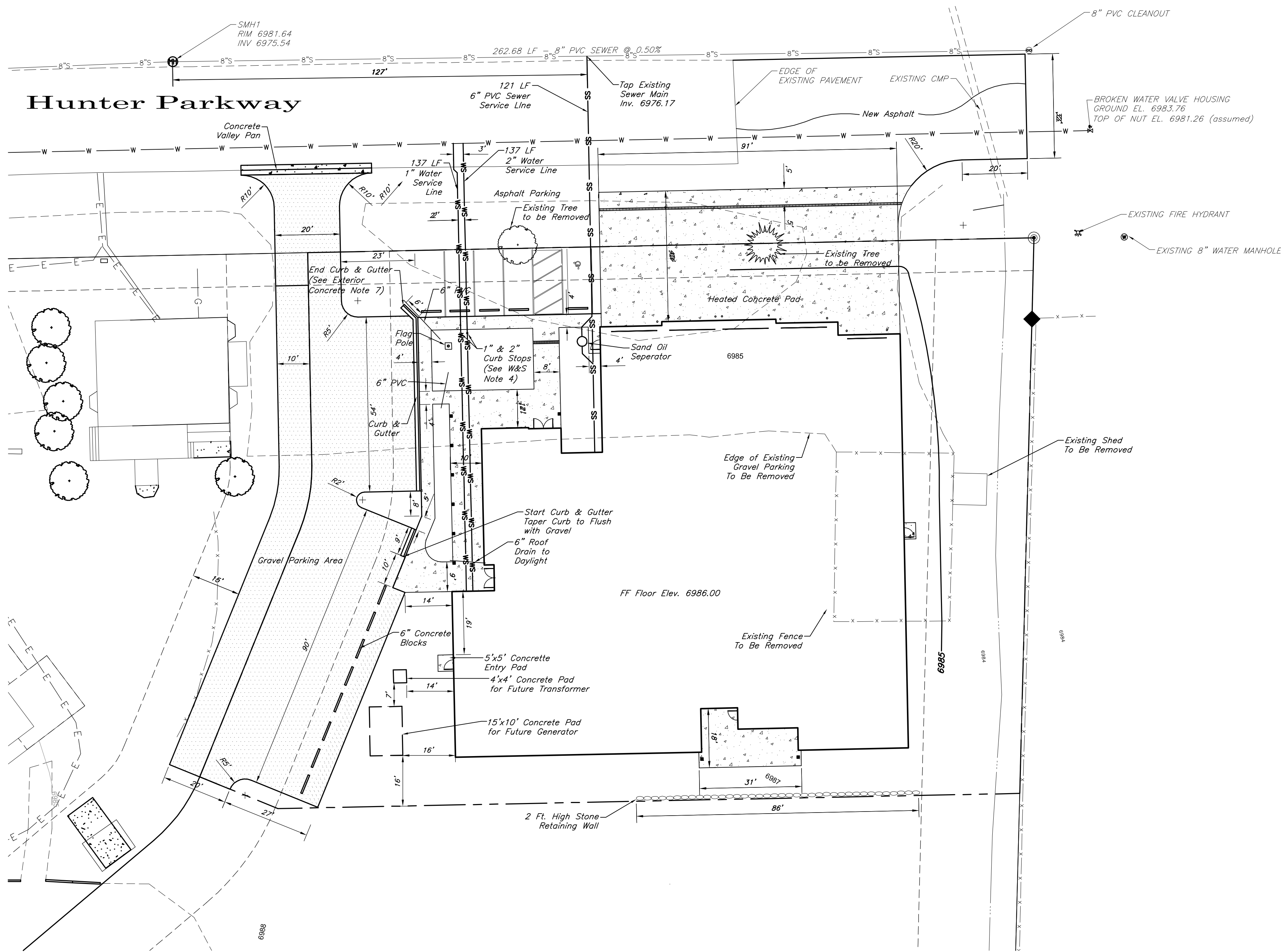
EXISTING CONDITIONS	

PROJ. No. 2013-247.001
PROJECT DATE: 05/09/14
SHEET NUMBER:

C1

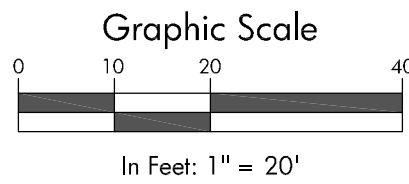


1/20/13/24/7.001 Ridgeway Fire Dept.H\_LDwgpa00 Working02\_RFS\_SitePlan.dwg Plotted: 5/30/2014 4:57 PM By: Tammy Warrick



Legend

- |         |                          |   |                       |
|---------|--------------------------|---|-----------------------|
| ---     | PROPERTY LINE            | ⊙ | EXIST. SEWER MANHOLE  |
| - - -   | EASEMENT LINE            | ⊗ | EXIST. WATER VALVE    |
| W       | EXIST. WATER LINE        | ⊗ | EXIST. FIRE HYDRANT   |
| 8"S     | EXIST. SEWER LINE & SIZE | ○ | WATER CURB STOP       |
| WS      | NEW WATER SERVICE        | — | SIGN                  |
| SS      | NEW SEWER SERVICE        | ⊙ | EXIST. SEWER CLEANOUT |
| —       | EXIST. CULVERT SIZE      |   |                       |
| →       | FLOW DIRECTION           |   |                       |
| x x     | FENCE LINE               |   |                       |
| o o o o | ROCK WALL                |   |                       |
| ---     | EXIST. EDGE OF PAVEMENT  |   |                       |
| ○       | DECIDUOUS TREE           |   |                       |
| ⊗       | EVERGREEN TREE           |   |                       |
| ⊙       | MONUMENT MARKER          |   |                       |



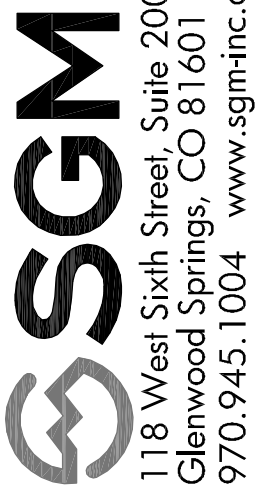
Exterior Concrete:

1. For all slabs exposed to elements concrete shall have a 4000 psi compressive strength after 28 days, 4% to 6% air entrainment and 1.5 lbs per cubic yard of fiber. Heated concrete paving shall have No. 5 reinforcing steel placed at 12" on center both directions in lieu of fiber.
2. Heated concrete slabs shall be separated from non heated concrete with 1/2" concrete expansion material.
3. Heated concrete pad shall be 8" thick and have #5 bars spaced @ 12" o.c. each way See Sheet M0.8 for snowmelt details.
4. Heated slab is on both side of trench drain.
5. Sidewalks shall be 5" thick, non-heated sidewalks do not require reinforcing steel. Sidewalk control joints shall be spaced a maximum of 10' apart. Sidewalks shall have 4" of 3/4" crushed rock or Class 6 Road Base below concrete.
6. Exterior concrete shall receive a light broom finish with tooled edges and control joints.
7. Concrete Curb & Gutter shall be placed along the length of sidewalk adjacent to the gravel parking area except where sidewalk edge is flush to gravel. At the point designated "Start Curb & Gutter" the curb shall taper to flush with gravel. At the point designated "End Curb & Gutter" the curb shall taper to flush with finished grade from a full 6" and flush with sidewalk at the northeast corner of the gravel parking area.

Water and Sewer Service

1. Follow all Town of Ridgway "Standard Specification and Typical Drawings for Infrastructure Construction". This document is available off the Town Website.
2. Prior to excavation, contact Utility Locating service for locates.
3. Public and employee safety is Contractor responsibility. Contractor shall fence, barricade and fully protect all excavations. No excavation shall be left open over night. Fencing and cover all excavations.
4. Place 1" & 2" Curb Stops at elevation of adjacent sidewalk. Locate curb stops 6" from edge of sidewalk.

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RIDGWAY FIRE STATION  
RIDGWAY FIRE PROTECTION DISTRICT  
LOT 26-B1, RIDGWAY, CO 81432

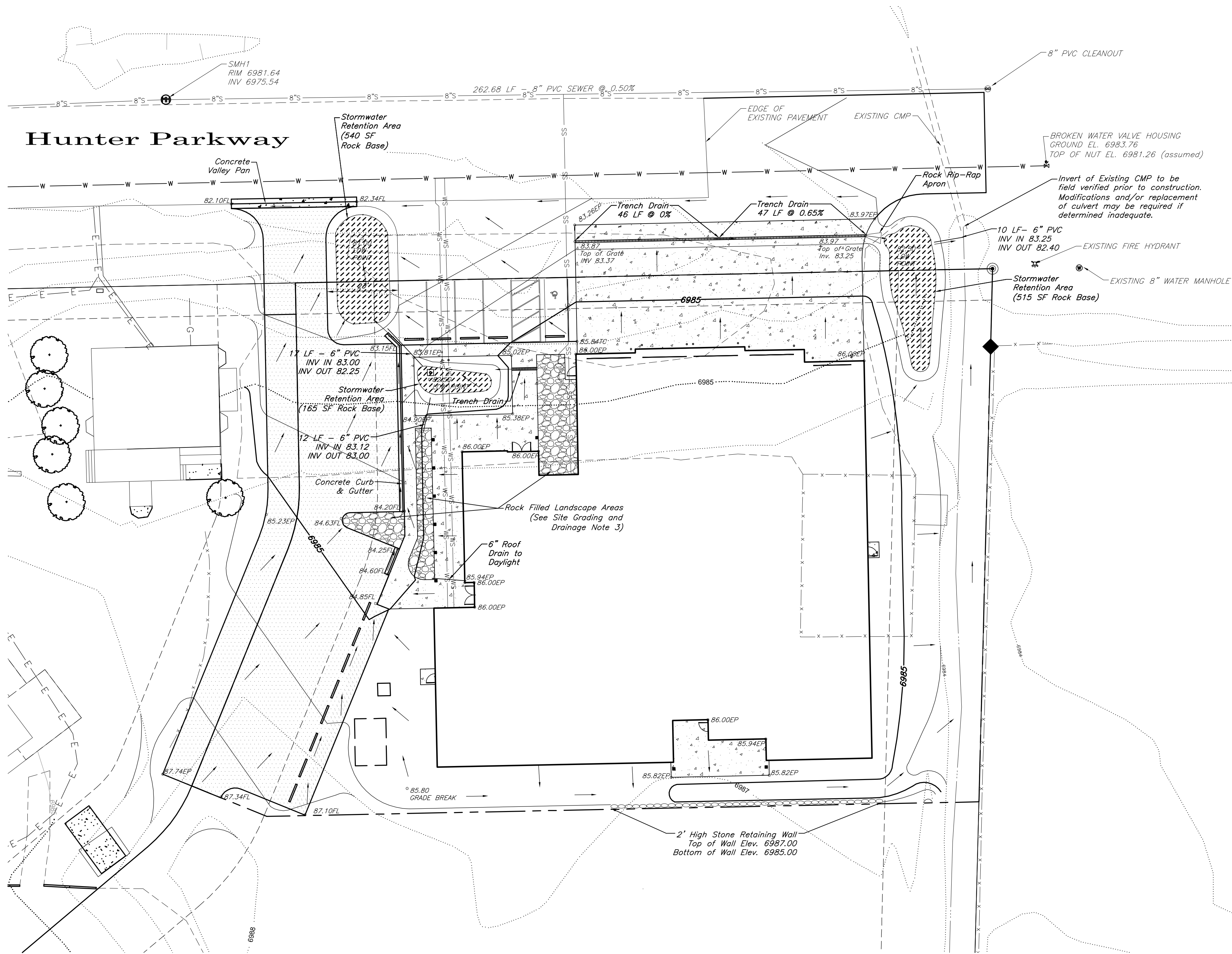
ISSUE LOG
05/09/14 BID DOCUMENTS
06/02/14 ADDENDUM #1

SITE  
LAYOUT &  
UTILITIES  
PLAN

PROJ. NO. 2013-247.001  
PROJECT DATE: 05/09/14  
SHEET NUMBER:

C2

I:\2013\247.001 Ridgeway Fire Dept\H\_LDwg\00 Working\03\_RFS\_GradingPlan.dwg Plotted: 5/30/2014 5:01 PM By: Tammy Wierick

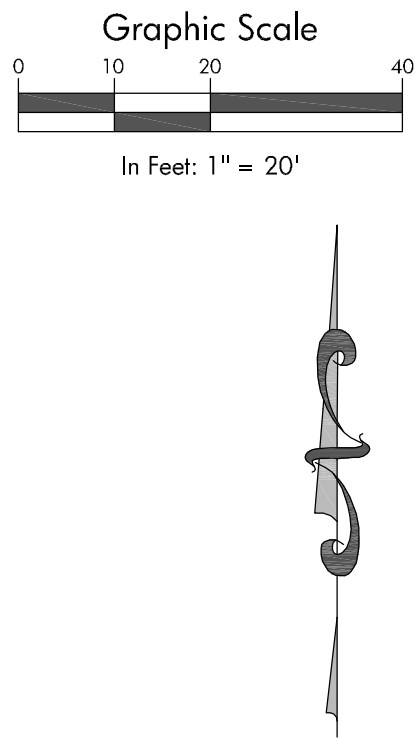


Site Grading and Drainage

1. Trench drain in concrete driveway shall be a McNichols "Pre-sloped" and standard section Heavy Duty Trench Drain system or approved equal. The intent is to place the west half of the trench drain bottom flat, the east half shall consist of the pre-sloped sections (0.65%). Contractor has the option to cast in place the trench drain box or use an equal product meeting H-20 wheel rating. If cast in place method is selected, the drain bottom shall slope 0.3' from west side to the east. Provide 8" concrete thickness around and below trench drain bottom.
2. Landscape Rock shall consist of 4" depth of 2" diameter river rock over weed barrier fabric. Create a smooth transition from asphalt or sidewalk to landscape area with crushed gravel slugh to top of paving for 12" width.
3. Storm Water Retention area shall be graded as shown. The gradation of aggregates below the retention area bottom (limits of rock) shall consist of a 18" depth of 3" to 6" river rock over Mirifi 140N separation fabric.
4. Native Grass Area shall be seeded with an approved mix design of dryland pasture species consisting of Crested Wheatgrass, Orchardgrass and Meadow Bromegrass.

Legend

- |     |                          |   |                       |
|-----|--------------------------|---|-----------------------|
| --- | PROPERTY LINE            | ⊙ | EXIST. SEWER MANHOLE  |
| --- | EASEMENT LINE            | ⊗ | EXIST. WATER VALVE    |
| W   | EXIST. WATER LINE        | ⊗ | EXIST. FIRE HYDRANT   |
| 8"S | EXIST. SEWER LINE & SIZE | ○ | WATER CURB STOP       |
| WS  | NEW WATER SERVICE        | + | SIGN                  |
| SS  | NEW SEWER SERVICE        | ⊙ | EXIST. SEWER CLEANOUT |
| CMP | EXIST. CULVERT SIZE      |   |                       |
| →   | FLOW DIRECTION           |   |                       |
| x x | FENCE LINE               |   |                       |
| ⊖   | ROCK WALL                |   |                       |
| --- | EXIST. EDGE OF PAVEMENT  |   |                       |
| ○   | DECIDUOUS TREE           |   |                       |
| ⊗   | EVERGREEN TREE           |   |                       |
| ⊙   | MONUMENT MARKER          |   |                       |



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RIDGWAY FIRE STATION  
RIDGWAY FIRE PROTECTION DISTRICT  
LOT 26-B1, RIDGWAY, CO 81432

ISSUE LOG
05/09/14 BID DOCUMENTS
06/02/14 ADDENDUM #1

GRADING &  
DRAINAGE  
PLAN

PROJ. NO. 2013-247.001  
PROJECT DATE: 05/09/14  
SHEET NUMBER:

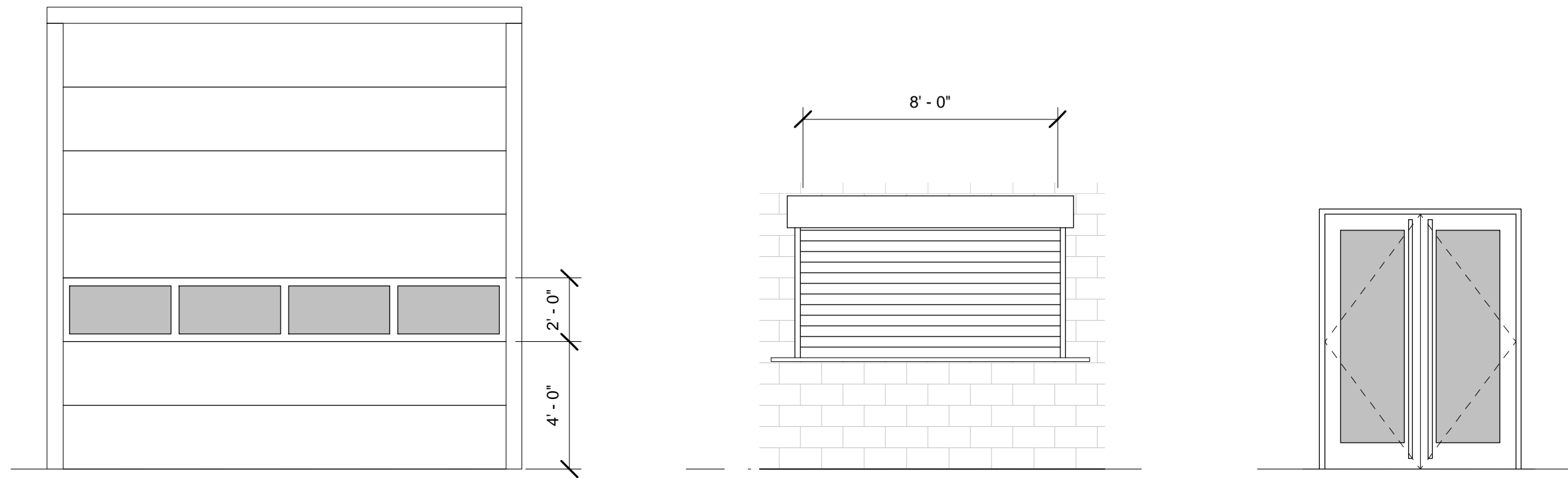
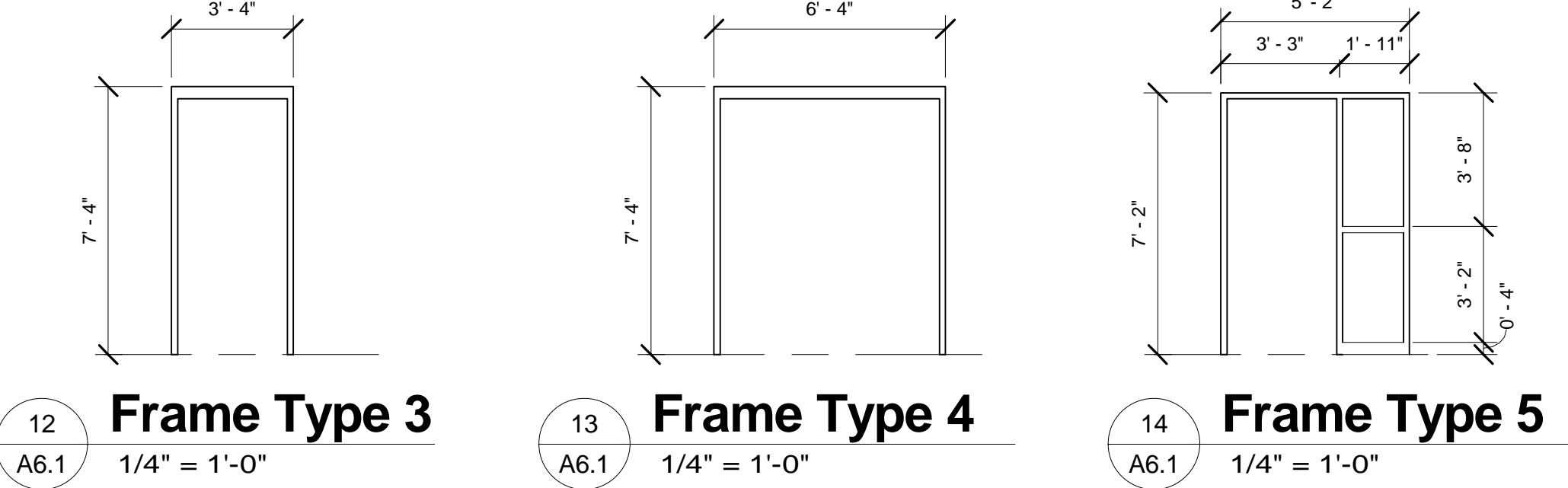
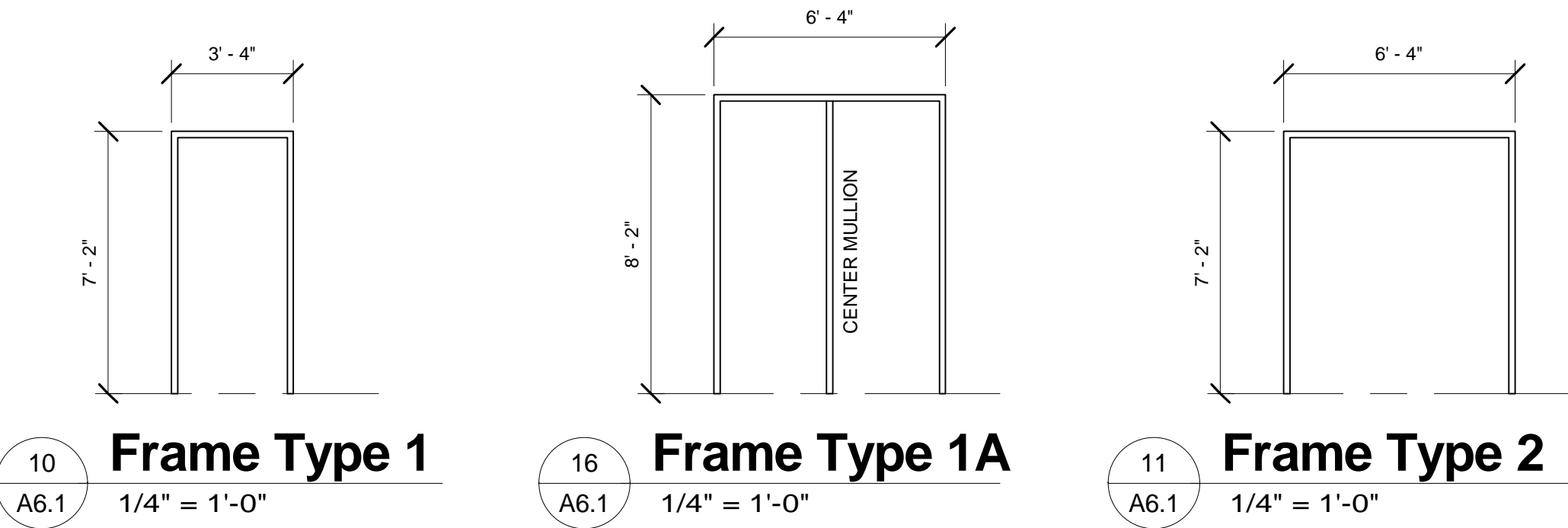
C3





## Door Schedule

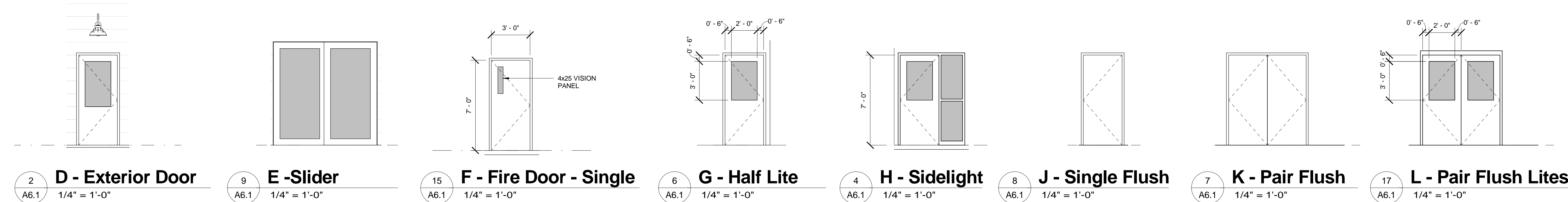
NO.	LOCATION 1	TO	LOCATION 2	TYPE	HEIGHT	WIDTH	DOOR MTRL	GLAZING	FIRE RATING	FUNCTION	FRAME TYPE	FRAME MTRL	SET	HEAD	JAMB	THRESHOLD
001	APPARTUS BAY 101	TO	EXTERIOR	A	14'-0"	14'-0"	STL	GL-4		SECTIONAL DOOR		STL				
002	APPARTUS BAY 101	TO	EXTERIOR	A	14'-0"	14'-0"	STL	GL-4		SECTIONAL DOOR		STL				
003	APPARTUS BAY 101	TO	EXTERIOR	A	14'-0"	14'-0"	STL	GL-4		SECTIONAL DOOR		STL				
004	APPARTUS BAY 101	TO	EXTERIOR	A	14'-0"	14'-0"	STL	GL-4		SECTIONAL DOOR		STL				
005	APPARTUS BAY 101	TO	EXTERIOR	A SIM	12'-0"	12'-0"	STL	GL-4		SECTIONAL DOOR		STL				
006	APPARTUS BAY 101	TO	EXTERIOR	B	4'-0"	8'-0"	STL			FIRE RATED COILING		STL				
007	APPARTUS BAY 101	TO	EXTERIOR	D	7'-0"	3'-0"	HM	GL-2	90 MIN	EXTERIOR EGRESS	3	HM	2.0			
008	DAYROOM 130	TO	EXTERIOR	E	8'-0"	8'-0"	ALUM	GL-2		SLIDING	UNIT	ALUM	3.0			
009	DAYROOM 130	TO	EXTERIOR	E	8'-0"	8'-0"	ALUM	GL-2		SLIDING	UNIT	ALUM	3.0			
010	DAYROOM 130	TO	EXTERIOR	D	8'-0"	3'-0"	HM	GL-2		EXTERIOR EGRESS	1 SIM	HM	2.0			
011	MULTI-PURPOSE 117	TO	EXTERIOR	D	7'-0"	3'-0"	HM	GL-2		EXTERIOR EGRESS	1	HM	2.0			
012	ENTRY #2 113	TO	EXTERIOR	C	8'-0"	6'-0"	WD	GL-2		MAIN ENTRY	1A	ALUM	1.1			
013	MAIN LOBBY 114	TO	ENTRY # 2 113	C	8'-0"	6'-0"	WD	GL-2		MAIN ENTRY	1A	ALUM	1.3			
014	ENTRY #1 106	TO	EXTERIOR	C	8'-0"	6'-0"	WD	GL-2		MAIN ENTRY	1A	ALUM	1.1			
015	LOBBY 107	TO	ENTRY #1 106	C	8'-0"	6'-0"	WD	GL-2		MAIN ENTRY	1A	ALUM	1.2			
016	APPARTUS BAY 101	TO	EXTERIOR	D	7'-0"	3'-0"	HM	GL-2		EXTERIOR EGRESS	3	HM	2.0			
101	APPARTUS BAY 101	TO	MAIN LOBBY 114	F	7'-0"	3'-0"	HM	GL-5	90 MIN	CONTROL DOOR	3	HM	4.1			
102	BUNKER GEAR 128	TO	APPARATUS BY 101	L	7'-0"	6'-0"	HM	GL-4		PAIR PASSAGE	4	HM	6.3			
103	APPARTUS BAY 101	TO	EMS STORAGE 102	J	7'-0"	3'-0"	HM			STORAGE	3	HM	4.2			
104	APPARTUS BAY 101	TO	DAYROOM 130	F	7'-0"	3'-0"	HM	GL-5	90 MIN	CONTROL DOOR	3	HM	4.1			
105	SHOP 103	TO	SCBA 104	J	7'-0"	3'-0"	HM			PASSAGE	3	HM	5.2			
106	APPARTUS BAY 101	TO	DECON/UTILITY 105	J	7'-0"	3'-6"	HM			PASSAGE	3 SIM	HM	5.2			
107	LOBBY 107	TO	CHIEF'S OFFICE 108	J	7'-0"	3'-0"	WD			OFFICE	1	HM	7.0			
108	LOBBY 107	TO	CONF RM 109	J	7'-0"	3'-0"	WD			OFFICE	1	HM	7.0			
109	LOBBY 107	TO	ASST CHIEF'S OFF 110	J	7'-0"	3'-0"	WD			OFFICE	1	HM	7.0			
110	LOBBY 107	TO	MAIN LOBBY 114	H	7'-0"	3'-0"	WD	GL-4		CONTROL DOOR	5	HM	4.1			
111	LOBBY 107	TO	STORAGE 112	J	7'-0"	3'-0"	WD			STORAGE	1	HM	4.2			
112	MAIN LOBBY 114	TO	TOILET 115	J	7'-0"	3'-0"	WD			PRIVACY	1	HM	8.0			
113	MAIN LOBBY 114	TO	TOILET 116	J	7'-0"	3'-0"	WD			PRIVACY	1	HM	8.0			
114	MULTI-PURPOSE 117	TO	MAIN LOBBY 114	G	7'-0"	3'-0"	WD	GL-4		CONTROL DOOR	1	HM	4.1			
115	TABLES 118	TO	MULTI-PURPOSE 117	K	7'-0"	6'-0"	WD			PAIR PASSAGE	2	HM	6.1			
116	CHAIRS 119	TO	MULTI-PURPOSE 117	J	7'-0"	3'-0"	WD			PASSAGE	1	HM	5.1			
117	MAIN LOBBY 114	TO	MECH 120	K	7'-0"	6'-0"	HM			STORAGE	2	HM	6.2			
118	ELEC / COMM 121	TO	MAIN LOBBY 114	J	7'-0"	3'-0"	HM			STORAGE	1	HM	4.2			
119	CORRIDOR 122	TO	MAIN LOBBY 114	H	7'-0"	3'-0"	WD	GL-4		CONTROL DOOR	5	HM	4.1			
120	CORRIDOR 122	TO	FITNESS 123	G	7'-0"	3'-0"	WD	GL-4		CONTROL DOOR	1	HM	4.1			
121	CORRIDOR 122	TO	LAUNDRY 124	G	7'-0"	3'-0"	WD	GL-4		PASSAGE	1	HM	5.2			
122	CORRIDOR 122	TO	ANTE 125	J	7'-0"	3'-0"	WD			PUSH / PULL	1	HM	9.1			
123	ANTE 125	TO	WOMEN'S LOCKER 126	J	7'-0"	3'-0"	WD			PUSH / PULL	1	HM	9.2			
124	CORRIDOR 122	TO	BUNKER GEAR 128	F	7'-0"	3'-0"	HM	GL-5	90 MIN	CONTROL DOOR	1	HM	4.1			
125	CORRIDOR 122	TO	ANTE 127A	J	7'-0"	3'-0"	WD			PUSH / PULL	1	HM	9.1			
126	ANTE 127A	TO	MEN'S LOCKER 127	J	7'-0"	3'-0"	WD			PUSH / PULL	1	HM	9.1			
127	MOP 129	TO	DAYROOM 130	J	7'-0"	3'-0"	HM		90 MIN	PASSAGE	3	HM	5.2			
128	DAYROOM 130	TO	HALL 132	J	7'-0"	3'-0"	WD		90 MIN	PASSAGE	1	HM	5.2			
129	HALL 132	TO	DORM #1 133	J	7'-0"	3'-0"	WD			DORM DOOR	1	HM	10.0			
130	HALL 132	TO	DORM #2 134	J	7'-0"	3'-0"	WD			DORM DOOR	1	HM	10.0			
131	HALL 132	TO	DORM #3 136	J	7'-0"	3'-0"	WD			DORM DOOR	1	HM	10.0			
132	HALL 132	TO	DORM #4 136	J	7'-0"	3'-0"	WD			DORM DOOR	1	HM	10.0			
133	HALL 132	TO	STORAGE 137	J	7'-0"	3'-0"	WD			PASSAGE	1	HM	5.1			



1 A6.1 A - Garage Door Elevation 1/4" = 1'-0"

5 A6.1 B - Coiling Door 1/4" = 1'-0"

3 A6.1 C - Main Entry 1/4" = 1'-0"



2 A6.1 D - Exterior Door 1/4" = 1'-0"

9 A6.1 E -Slider 1/4" = 1'-0"

15 A6.1 F - Fire Door - Single 1/4" = 1'-0"

6 A6.1 G - Half Lite 1/4" = 1'-0"

4 A6.1 H - Sidelight 1/4" = 1'-0"

8 A6.1 J - Single Flush 1/4" = 1'-0"

7 A6.1 K - Pair Flush 1/4" = 1'-0"

17 A6.1 L - Pair Flush Lites 1/4" = 1'-0"

Sheet Reissued for Addendum #1  
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ISSUE LOG	
A	5/9/14 BID DOCUMENTS
1	6/2/14 ADDENDUM #1

## DOOR SCHEDULE

PROJECT NO.: 130912  
PROJECT DATE: 10/31/13  
SHEET NUMBER:

A6.1

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination drawings.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.

## 1.2 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

## 1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
  - 2. Preparation of Contractor's construction schedule.
  - 3. Preparation of the schedule of values.
  - 4. Installation and removal of temporary facilities and controls.
  - 5. Delivery and processing of submittals.
  - 6. Progress meetings.
  - 7. Preinstallation conferences.
  - 8. Project closeout activities.
  - 9. Startup and adjustment of systems.
  - 10. Project closeout activities.

#### 1.4 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility.

#### 1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.

2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Drawing number and detail references, as appropriate.
  9. Field dimensions and conditions, as appropriate.
  10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  11. Contractor's signature.
  12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: As acceptable to Architect and Contractor.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were dropped and not submitted.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.

## 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.
  - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Sustainable design requirements.
    - l. Preparation of record documents.
    - m. Use of the premises.
    - n. Work restrictions.
    - o. Working hours.
    - p. Owner's occupancy requirements.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.
    - w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. **Dedicated LEED Kick-Off Meeting: Schedule a LEED Coordination Meeting prior to start of construction at a location convenient for all parties. Meeting can be organized and lead by the A/E LEED Consultant. (Addendum #1)**

1. **Attendees:** Authorized representatives of Owner, A/E Design Team lead by the LEED Consultant; Contractor and other concerned parties shall attend the conference. Participants at the Kick-Off Meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. **Agenda:** Discuss items of significance that could affect progress, including the following:
    - a. LEED Requirements.
    - b. LEED Submittals and Submittal Process.
    - c. Construction Waste Management Plan.
    - d. Sediment and Erosion Control Plan
    - e. Indoor Air Quality Management Plan
    - f. LEED Agenda Items for Construction Progress Meeting.
    - g. Building Flush Out or IAQ testing.
  3. **Minutes:** Will be provided by the A/E LEED Consultant.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. **Attendees:** Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority, of scheduled meeting dates.
  2. **Agenda:** Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- E. Progress Meetings: Conduct progress meetings at biweekly or intervals as deemed appropriate by all parties.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.
      - 12) Field observations.
      - 13) Status of RFIs.
      - 14) Status of proposal requests.
      - 15) Pending changes.
      - 16) Status of Change Orders.
      - 17) Pending claims and disputes.
      - 18) Documentation of information for payment requests.
      - 19) **LEED Issues & Updates**
  3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100



## SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous construction waste.
  - 2. Recycling nonhazardous construction waste.
  - 3. Disposing of nonhazardous construction waste.

## 1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

## 1.3 PERFORMANCE GOALS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of a **minimum requirement of 50 percent and a goal of 75 percent by weight** of total waste generated by the Work.
- B. Salvage/Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible including the following materials:
  - 1. Ferrous and Non Ferrous Metal
  - 2. Cardboard
  - 3. Wood Scrap
  - 4. Concrete
  - 5. Whole Masonry
  - 6. Comingled Recycling

#### 1.4 SUBMITTALS

- A. Waste Management Plan: Submit 1 copy of plan within 30 days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit 1 copy of report. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, both estimated and actual in tons.
  - 5. Quantity of waste recycled, both estimated and actual in tons.
  - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for Substantial Completion, submit 1 copy of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- H. LEED Submittal: LEED letter template for Credit MR 2.1, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.

#### 1.5 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: LEED Accredited Professional by U.S. Green Building Council. Waste management coordinator may also serve as LEED coordinator.
- B. Waste Management Conference: Conduct conference at Project site.

#### 1.6 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

- B. Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Forms: Prepare waste management plan on forms included at end of Part 3.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by A/E LEED Consultant. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

### 3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:
  1. Waste Management 800-963-4776
  2. Recla Metals 970-249-7922
  3. SUNRISE Inc. 970-728-0134
  4. Habitat for Humanity ReStore 970-252-9304
  5. Montrose County Landfill 970-249-8078
  6. Montrose Recycle Center 970-240-8326
- C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
  1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  4. Store components off the ground and protect from the weather.
  5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

### 3.3 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch size.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
  1. Pulverize concrete to maximum 1-1/2-inch size.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
  1. Pulverize masonry to maximum 1-1/2-inch size.
  2. Clean and stack undamaged, whole masonry units on wood pallets.

- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
  - 1. Structural Steel: Stack members according to size, type of member, and length.
  - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
  - 1. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.
- I. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
  - 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- J. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- K. Plumbing Fixtures: Separate by type and size.
- L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- M. Lighting Fixtures: Separate lamps by type and protect from breakage.
- N. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- O. Conduit: Reduce conduit to straight lengths and store by type and size.

### 3.4 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

- C. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
  - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

### 3.5 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.
- D. Disposal: Transport waste materials and dispose of at designated spoil areas on Owner's property.
- E. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

## SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED **Silver** certification based on **LEED-NC, Version 2009**.

## 1.2 DEFINITIONS

- A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- B. LEED: Leadership in Energy & Environmental Design.
- C. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
- D. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
- E. Recycled Content: The recycled content value of a material assembly shall be determined by weight.
  - 1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
  - 2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.
- F. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
  - 1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
  - 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

## 1.3 SUBMITTALS

- A. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
1. Furniture.
  2. Plumbing.
  3. Mechanical.
  4. Electrical.
  5. Specialty items such as elevators and equipment.
  6. Wood-based construction materials.
- B. LEED Action Plans: Provide preliminary submittals within **30** days of date established for commencement of the Work indicating how the following requirements will be met:
1. Credit MR 2: Construction waste management plan that identifies the materials to be diverted from landfill by recycling or salvage to meet 75% diversion goal. Identify whether the materials will be sorted on site or comingled and dedicate site location for this activity. Identify whether the diversion amount will be measured by weight or volume. (note: soil, land-clearing debris, and hazardous material not to be included in calculations). See Specification section 017419 for more information.
  2. Credit MR 4: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
  3. Credit MR 5: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
- C. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans.
- D. LEED Documentation Submittals:
1. Credit EA 5: Product data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy-consumption performance over a period of time of not less than one year of postconstruction occupancy.
  2. Credit MR 4: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
  3. Credit MR 5: Product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
  4. Credit IEQ 3.1:
    - a. Construction indoor-air-quality management plan.
    - b. Product data for temporary filtration media.
    - c. Product data for filtration media used during occupancy.
    - d. Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the indoor-air-quality management measures, such as protection of ducts and on-site stored or installed absorptive materials.
  5. Credit EQ 3.2:



- a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
  - b. Product data for filtration media used during flush-out and during occupancy.
6. Credit EQ 4.1: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D.
7. Credit EQ 4.2: Product data for paints and coatings used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D.
8. Credit EQ 4.4: Product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

## PART 2 - PRODUCTS

### 2.1 RECYCLED CONTENT OF MATERIALS

- A. Credit MR 4: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20 percent of cost of materials used for Project.
  1. Cost of post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  2. Cost of pre-consumer recycled content of an item shall be determined by dividing weight of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  3. Do not include plumbing, mechanical and electrical components, and specialty items such as elevators and equipment in the calculation.

### 2.2 REGIONAL MATERIALS

- A. Credit MR 5: Provide a minimum of 20 percent of building materials (by cost) that are regional materials. Where possible, Contractor to source concrete, concrete masonry units, and drywall from 500 miles.

### 2.3 LOW-EMITTING MATERIALS

- A. Credit EQ 4.1: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D:
  1. Wood Glues: 30 g/L.
  2. Metal to Metal Adhesives: 30 g/L.
  3. Adhesives for Porous Materials (Except Wood): 50 g/L.
  4. Subfloor Adhesives: 50 g/L.
  5. Plastic Foam Adhesives: 50 g/L.
  6. Carpet Adhesives: 50 g/L.
  7. Carpet Pad Adhesives: 50 g/L.
  8. VCT and Asphalt Tile Adhesives: 50 g/L.

9. Cove Base Adhesives: 50 g/L.
  10. Gypsum Board and Panel Adhesives: 50 g/L.
  11. Rubber Floor Adhesives: 60 g/L.
  12. Ceramic Tile Adhesives: 65 g/L.
  13. Multipurpose Construction Adhesives: 70 g/L.
  14. Fiberglass Adhesives: 80 g/L.
  15. Contact Adhesive: 80 g/L.
  16. Structural Glazing Adhesives: 100 g/L.
  17. Wood Flooring Adhesive: 100 g/L.
  18. Structural Wood Member Adhesive: 140 g/L.
  19. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
  20. Top and Trim Adhesive: 250 g/L.
  21. Plastic Cement Welding Compounds: 250 g/L.
  22. ABS Welding Compounds: 325 g/L.
  23. CPVC Welding Compounds: 490 g/L.
  24. PVC Welding Compounds: 510 g/L.
  25. Adhesive Primer for Plastic: 550 g/L.
  26. Plastic Cement Welding Compounds: 350 g/L.
  27. ABS Welding Compounds: 400 g/L.
  28. CPVC Welding Compounds: 490 g/L.
  29. PVC Welding Compounds: 510 g/L.
  30. Adhesive Primer for Plastic: 650 g/L.
  31. Sheet Applied Rubber Lining Adhesive: 850 g/L.
  32. Aerosol Adhesive, General Purpose Mist Spray: 65 percent by weight.
  33. Aerosol Adhesive, General Purpose Web Spray: 55 percent by weight.
  34. Special Purpose Aerosol Adhesive (All Types): 70 percent by weight.
  35. Other Adhesives: 250 g/L.
  36. Architectural Sealants: 250 g/L.
  37. Nonmembrane Roof Sealants: 300 g/L.
  38. Single-Ply Roof Membrane Sealants: 450 g/L.
  39. Other Sealants: 420 g/L.
  40. Sealant Primers for Nonporous Substrates: 250 g/L.
  41. Sealant Primers for Porous Substrates: 775 g/L.
  42. Modified Bituminous Sealant Primers: 500 g/L.
  43. Other Sealant Primers: 750 g/L.
- B. Credit EQ 4.2: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D:
1. Flat Paints, Coatings, and Primers: VOC not more than 50 g/L.
  2. Nonflat Paints, Coatings, and Primers: VOC not more than 150 g/L.
  3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  4. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
  5. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
  6. Floor Coatings: VOC not more than 100 g/L.
  7. Shellacs, Clear: VOC not more than 730 g/L.
  8. Shellacs, Pigmented: VOC not more than 550 g/L.
  9. Stains: VOC not more than 250 g/L.
  10. Flat Interior Topcoat Paints: VOC not more than 50 g/L.
  11. Nonflat Interior Topcoat Paints: VOC not more than 150 g/L.
  12. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  13. Clear Wood Finishes, Varnishes and Sanding Sealers: VOC not more than 350 g/L.

14. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
15. Floor Coatings: VOC not more than 100 g/L.
16. Shellacs, Clear: VOC not more than 730 g/L.
17. Shellacs, Pigmented: VOC not more than 550 g/L.
18. Stains: VOC not more than 250 g/L.
19. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
20. Dry-Fog Coatings: VOC not more than 400 g/L.
21. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
22. Pretreatment Wash Primers: VOC not more than 420 g/L.

- C. Credit EQ 4.4: Do not use composite wood or agrifiber products or adhesives that contain urea-formaldehyde resin.

### PART 3 - EXECUTION

#### 3.1 MEASUREMENT AND VERIFICATION

- A. Credit EA 5: Implement measurement and verification plan consistent with **[Option B: Energy Conservation Measure Isolation] [Option D: Calibrated Simulation, Savings Estimation Method 2]** in the EVO's "International Performance Measurement and Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction," and as further defined by the following:

1. **<Insert measurement and verification plan design team submitted for credit>.**

- B. If not already in place, install metering equipment to measure energy usage. Monitor, record, and trend log measurements.
- C. Evaluate energy performance and efficiency by comparing actual to predicted performance.
- D. Measurement and verification period shall cover at least one year of post-construction occupancy.

#### 3.2 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. Credit EQ 3.1: Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."

1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 01 Section "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
2. Replace all air filters immediately prior to occupancy.

**B. Credit EQ 3.2:**

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 deg F and a relative humidity no higher than 60 percent.

a. <Insert operating requirements>.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu. ft./sq. ft. of outside air has been delivered to the space.

a. <Insert operating requirements>.

END OF SECTION 018113

## SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. OPR and BoD documentation are included by reference for information only.

## 1.2 SUMMARY

- A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.
- B. Related Sections:
  - 1. Division 23 Section "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.

## 1.3 DEFINITIONS

- A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- C. CxA: Commissioning Authority.
- D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

## 1.4 COMMISSIONING TEAM

- A. Members Appointed by Owner:
  - 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
  - 2. Representatives of the facility user and operation and maintenance personnel.
  - 3. Architect and engineering design professionals.

## 1.5 OWNER'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA and Contractor for information and use.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
- C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

## 1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
  - 1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
  - 2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
  - 3. Attend commissioning team meetings held on an as-needed basis.
  - 4. Integrate and coordinate commissioning process activities with construction schedule.
  - 5. Review and accept construction checklists provided by the CxA.
  - 6. Complete electronic construction checklists as Work is completed and provide to the Commissioning Authority.
  - 7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
  - 8. Complete commissioning process test procedures.

## 1.7 CxA'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Provide commissioning plan.
- C. Convene commissioning team meetings.
- D. Provide Project-specific construction checklists and commissioning process test procedures.
- E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
- F. Prepare and maintain the Issues Log.
- G. Prepare and maintain completed construction checklist log.
- H. Witness systems, assemblies, equipment, and component startup.
- I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 019113

## SECTION 033000 - CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. See Division 31 Section "Earth Moving" for structural fill under slabs-on-grade.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement.

## 1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

## PART 2 - PRODUCTS

## 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.



## 2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

## 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type II. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
  - 2. Blended Hydraulic Cement: ASTM C 595, Type MS cement.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch nominal maximum coarse-aggregate size.
  - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94 and potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## 2.4 VAPOR BARRIER

- A. Plastic Vapor **Barrier**: ASTM E 1745, **Class A**, ~~or polyethylene sheet, ASTM D 4397~~, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape. **(Addendum #1)**

## 2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating.
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

## 2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

## 2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not more than 25 percent.
- C. **LEED Requirement – Aggregate to be sourced within 500 miles. When possible, cement and flyash to be sourced within 500 miles. (Addendum #1)**
- D. Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 4000 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
  - 3. Slump Limit: 2 to 4 inches for concrete with verified slump of 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
  - 5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

## 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. **Chamfer** exterior corners and edges of permanently exposed concrete.

## 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

## 3.3 VAPOR BARRIER (Revised per Addendum #1)

- A. Plastic Vapor **Barrier**: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
  - 1. **Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.**
  - 2. **Seal vapor barrier to slab perimeter/edge and remove dirt, debris, and mud prior to concrete placement, or**
  - 3. **Seal vapor barrier to footing with double sided tape, termination bar, or both.**
  - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
  - 5. **Seal all penetrations (including pipes) per manufacturer's instructions.**
  - 6. **No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.**
  - 7. **Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.**

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

### 3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least **one-fourth** of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306R.
- D. Hot-Weather Placement: Comply with ACI 305R.

### 3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
  3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces within the Apparatus Bay.
  2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

### 3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306R for cold-weather protection and ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
  - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

### 3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
  - 1. Testing Services: Tests shall be performed according to ACI 301.

END OF SECTION 033000

## SECTION 061000 - ROUGH CARPENTRY

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Framing with dimension lumber.
  - 2. Framing with engineered wood products.
  - 3. Rooftop equipment bases and support curbs.
  - 4. Wood blocking and nailers.
  - 5. Wood furring.
  - 6. Wood sleepers.
  - 7. Plywood backing panels.

## 1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
  - 1. Wood-preservative-treated wood.
  - 2. Fire-retardant-treated wood.
  - 3. Engineered wood products.
  - 4. Power-driven fasteners.
  - 5. Powder-actuated fasteners.
  - 6. Expansion anchors.
  - 7. Metal framing anchors.

## 1.3 QUALITY ASSURANCE

- ~~A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":~~
  - ~~1. Dimension lumber framing.~~
  - ~~2. Laminated veneer lumber.~~
  - ~~3. Prefabricated wood I-joists.~~
  - ~~4. Rim boards.~~
  - ~~5. Miscellaneous lumber. (Not Required – Addendum #1)~~

## PART 2 - PRODUCTS

## 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat **items indicated on Drawings, and the following:**
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
  - 5. Wood floor plates that are installed over concrete slabs-on-grade.



### 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPAC20 (lumber) and AWPAC27 (plywood).
  - 1. Use Exterior type for exterior locations and where indicated.
  - 2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
  - 3. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

### 2.4 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent.
- B. Non-Load-Bearing Interior Partitions: Standard, Stud, or No. 3 grade of any species.
- C. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2 grade and the following species:
  - 1. Hem-fir (north); NLGA.
  - 2. Southern pine; SPIB.
  - 3. Douglas fir-larch; WCLIB or WWPAC.
  - 4. Mixed southern pine; SPIB.
  - 5. Spruce-pine-fir; NLGA.
  - 6. Douglas fir-south; WWPAC.
  - 7. Hem-fir; WCLIB or WWPAC.
  - 8. Douglas fir-larch (north); NLGA.
  - 9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPAC.
- D. Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,300,000 psi and an extreme fiber stress in bending of at least 1000 psi for 2-inch nominal thickness and 12-inch nominal width for single-member use.

### 2.5 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
- B. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
  - 1. Provide I-joists manufactured without urea formaldehyde.
  - 2. Web Material: Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.
  - 3. Structural Properties: Provide units with depths and design values not less than those indicated.

4. Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.
- C. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
1. Material: All-veneer product. Provide rim boards made without urea formaldehyde.
  2. Thickness: 1-1/4 inches.
  3. Provide performance-rated product complying with APA PRR-401, rim board plus grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

## 2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Cants.
  5. Furring.
  6. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and [any of ]the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
  2. Eastern softwoods, No. 2 Common grade; NeLMA.
  3. Northern species, No. 2 Common grade; NLGA.
  4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

## 2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.
- C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

## 2.8 METAL FRAMING ANCHORS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
  - 1. Alpine Engineered Products, Inc.
  - 2. Cleveland Steel Specialty Co.
  - 3. Harlen Metal Products, Inc.
  - 4. KC Metals Products, Inc.
  - 5. Simpson Strong-Tie Co., Inc.
  - 6. Southeastern Metals Manufacturing Co., Inc.
  - 7. USP Structural Connectors.
- D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- E. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

## 2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

- D. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- E. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- F. Do not splice structural members between supports, unless otherwise indicated.
- G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
  - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
  - 4. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
  - 5. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
  - 6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
  - 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.

### 3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

## SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Fluid-applied membrane air barrier, vapor permeable.

## 1.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated
- B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
- C. Product certificates.
- D. Qualification data.
- E. Product test reports.

## 1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Preinstallation Conference: Conduct conference at Project site.

## PART 2 - PRODUCTS

## 2.1 FLUID-APPLIED MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Synthetic Polymer Membrane:
    - 1) Henry Company; Air-Bloc.
    - 2) DuPont Tyvek Fluid Applied WB System.
    - 3) Carlisle Coatings & Waterproofing, Barritech VP.
    - 4) W.R. Meadows, Air-Shield LM.
    - 5) Grace Construction, Perm-A-Barrier Liquid.
2. Physical and Performance Properties:
  - a. Membrane Air Permeance: Not to exceed 0.004 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
  - b. Assembly Air Permeance: Not to exceed 0.04 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2357.

## 2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by manufacturer of air barrier material.
- C. Butyl Strip: Vapor-retarding, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- D. Modified Bituminous Strip: Vapor-retarding, smooth-surfaced, self-adhering; consisting of rubberized asphalt laminated to a polyethylene film with release liner backing.
- E. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.
- F. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- H. Modified Bituminous Transition Strip: Vapor-retarding, smooth-surfaced, self-adhering; consisting of rubberized asphalt laminated to a polyethylene film with release liner backing.
- I. Adhesive-Coated Transition Strip: Vapor-permeable, self-adhering strip consisting of an adhesive coating over a permeable laminate.
- J. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
- K. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

## PART 3 - EXECUTION

## 3.1 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

## 3.2 TRANSITION STRIP INSTALLATION

- A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum coverage is achieved over both substrates.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

### 3.3 AIR BARRIER MEMBRANE INSTALLATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- B. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- C. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- D. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- E. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
- F. Apply strip and transition strip onto cured air membrane according to air barrier manufacturer's written instructions.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

### 3.4 FIELD QUALITY CONTROL

- A. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements.
- B. Remove and replace deficient air barrier components and retest as specified above.

### 3.5 PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
  - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 180 days.

END OF SECTION 072726



## SECTION 074213 - METAL WALL PANELS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Exposed-fastener, lap-seam metal wall panels.
  - 2. Concealed-fastener, lap-seam metal wall panels.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.
- C. Samples: For each type of exposed finish required.
- D. Delegated-Design Submittal: For metal wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Coordination Drawings: Exterior elevations drawn to scale and coordinating penetrations and wall-mounted items.
- F. Product test reports.
- G. Maintenance data.
- H. Warranties: Samples of special warranties.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Fire-Resistance Ratings: Where indicated, provide metal wall panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- C. Preinstallation Conference: Conduct conference at Project site.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 FIELD-INSTALLED THERMAL INSULATION

- A. Refer to Division 07 Section "Thermal Insulation."
- B. Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I (foil facing), Class 1 or 2, with maximum flame-spread index of 75 and smoke-developed index of 450, based on tests performed on unfaced core.
- C. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, with maximum flame-spread index of 75 and smoke-developed index of 450.

### 2.2 ATTACHMENT FRAMING SYSTEM

- A. Constructed system complies with ANSI/ASHRAE 90.1-2007 definition of continuous insulation (c.i.).
- B. Wind Load Performance – Attachment system must show the following results when tested in accordance with ASTM E330-02.
  - 1. 90 pound per square foot negative and positive pressure held for 60 seconds, system components shall not experience failure or gross permanent distortion.
  - 2. 135 pound per square foot negative and positive pressure held for 10 seconds, system components shall not experience failure or gross permanent distortion.
- C. Water penetration/Air Leakage Performance – Attachment system substrate fasteners must show the following results when tested in accordance with ASTM E331-00 and ASTM E283-04.
  - 1. No water leakage seen on tested attachment system, specifically including substrate fasteners when tested up to 20 pounds per square foot pressure differential.
  - 2. Less than 0.01 cubic feet per minute per square foot air leakage through entire tested system at 1.6 and 6.2 pounds per square foot.

- D. Wind cycling (air pressure cycling) performance – Attachment system must show conformance to the following results when tested in accordance with ASTM E1886-05.
  - 1. A total of 4,500 air pressure cycles. Cycles must include 50 cycles at a maximum pressure of 90 pounds both positive and negative. Average cycle time must not be less than 3.25 seconds for both negative and positive cycles. No damage or deformation must be seen at end of test.
- E. Material: ASTM A792, Commercial Steel (CS), Grade B, 50 ksi Yield, Minimum AZ55.
- F. Spacing to comply with applicable live and dead loads and any other requirements of the façade/panel and in accordance with approved engineering calculations.
- G. All framing components must be tested to AAMA TIR- A8-[04] – section 7.2 to determine structural performance and effective moment of inertia for each perforated component.
- H. Framing system to be comprised of the following:
  - 1. Vertical Box Girt: Minimum 0.0475-inch thick (18 gauge) cold-formed steel.
    - a. Depth: 0.75 inches
    - b. Attachment: Regularly spaced, pre-punched, centrally located holes to receive wall fasteners with thermally isolated washer assembly for attachment to substructure.
    - c. Basis of Design: CI-Girt™ by Knight Wall Systems
    - d. Or approved equal.
  - 2. Horizontal Rail: Nominal 0.0475 inch thick (18 gauge) cold-formed steel.
    - a. Profile: C channel with lips
    - b. Depth: 0.75 inches at flanges
    - c. Web (fastening face): 1.125 inches
    - d. Weep Drains: Full rail depth on flanges and regularly spaced along length to allow for free air flow and drainage. Vented area percentage: Minimum 13 percent
    - e. Attachment Holes: Regularly spaced along back to facilitate screw attachment to vertical girt. Oversize holes to allow for thermal contraction and expansion of rail.
    - f. Basis of Design: PanelRail or RS-Rail by Knight Wall Systems
    - g. Or equal.
- I. Accessories:
  - 1. Fasteners: Stainless steel as instructed by manufacturer.
    - a. Thermoset Polyester coating that exhibits 1,000 hours of salt spray resistance.

- b. Horizontal rail to vertical girt connection: Self-drill hex-head screw fasteners spaced and specified in engineering calculations.
  - c. Steel Studs: Self-drill hex-head screw fasteners of sufficient length to provide solid attachment through rigid insulation to substructure as indicated in engineering calculations.
  - d. Concrete and Masonry Wall Anchors: Mechanical and adhesive anchors, bolts, nuts and washers suited to use. Mechanical Anchors and adhesive anchors shall conform with the ICC.
- 2. Thermal Isolating Washers: Minimum 0.125 inch thick Polyoxymethylene copolymer (POM) washers with integral centering lip to act as a thermal break between wall anchor fastener and box girt.
  - a. Basis of Design: ThermaStop Isolator by Knight Wall Systems
  - b. Or equal.
- J. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals

## 2.1 MISCELLANEOUS MATERIALS

- A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

## 2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS – TYPE 1

- A. Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product:
    - a. **7/8" Corrugated A606 COR-TEN Panels**
  - 2. Profile: Corrugated
  - 3. Material: Cold Rolled steel sheet, 0.034-inch (22 gauge) nominal thickness.
    - a. Exterior Finish: Site Finished Rusted Patina
  - 4. Panel Coverage: 32 to 34 inches.
  - 5. Panel Depth: 7/8 inches
  - 6. Fasteners: Painted Screws "Brown" to match patina finish.
  - 7. Trim and Flashing: Cold Rolled, patina to match
  - 8. Warranty Exclusion: No warranty required for this product.

## 2.3 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS – TYPE 2

- A. Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product:
    - a. **Metal Sales Manufacturing Corporation, Flush Face Series, TL-17D**
  2. Profile: Flush.
  3. Material: Zinc-coated (galvanized) steel sheet, 0.034-inch (22 gauge) nominal thickness.
    - a. Exterior Finish: PVDF Kynar 500 or equal.
    - b. Color: As selected by Architect from manufacturer's full range.
  4. Panel Coverage: 12 inches.
  5. Panel Depth: 1-1/2 inches

## 2.4 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS – TYPE 3

- A. Provide factory-formed metal wall panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product:
    - a. **Metal Sales Manufacturing Corporation, Verti-Line Series, TL-10C**
  2. Profile: Flush.
  3. Material: Zinc-coated (galvanized) steel sheet, 0.034-inch (22 gauge) nominal thickness.
    - a. Exterior Finish: PVDF Kynar 500 or equal.
    - b. Color: As selected by Architect from manufacturer's full range.
  4. Panel Coverage: 30 inches.
  5. Panel Depth: 1-1/2 inches

## 2.5 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal wall panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-1/2 -inch- thick, flexible closure strips; cut or premolded to match metal wall panel profile.
- B. Flashing and Trim: Formed from 0.018-inch minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

## 2.6 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal wall panel joints with captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, and that will minimize noise from movements within panel assembly.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorages according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

### 3.2 THERMAL INSULATION INSTALLATION

- A. Board Insulation: Extend insulation in thickness indicated to cover entire wall. Comply with installation requirements in Division 07 Section "Thermal Insulation."

### 3.3 METAL WALL PANEL INSTALLATION

- A. Lap-Seam Metal Wall Panels: Fasten metal wall panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  1. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.

2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal wall panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Provide sealant tape at lapped joints of metal wall panels and between panels and protruding equipment, vents, and accessories.
6. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps; on side laps of nesting-type panels; on side laps of corrugated nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weathertight.
7. At panel splices, nest panels with end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

### 3.4 COLD-FORMED METAL FRAMING INSTALLATION

#### A. Preparation:

1. Verify vertical girt spacing and framing clearances relative to studs or other points of attachment.

#### B. Installation

1. Use laser or chalk line to mark starting height of vertical box girt.
2. Mount vertical box girts, fastened at 16, 24 or 32 inches on center (as determined by the manufactures engineering calculations) overtop of installed rigid insulation, using one self-tapping screw for each attachment hole or for every second attachment hole in box girt, as indicated by engineering calculations.
3. Mount first (lowest) horizontal rail with  $\frac{3}{4}$ " long hex-washer head screw fastener. Install next horizontal rail appropriately above first, no greater than maximum spacing indicated in engineering calculations, as required for proper panel attachment.
  - a. Check plumb of vertical girts and horizontal rails, both parallel and perpendicular to the structure.
  - b. Tighten screws that attach vertical girt through insulation to substructure to a snug tight condition and not stripped. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.
  - c. Where vertical obstructions are present and unavoidable (i.e. window openings), use laser or chalk line to restart vertical girt or horizontal rail.
  - d. The cavity must be clear and free from air flow and drainage obstructions.
  - e. Use shearing instruments (i.e. snips, nibbler, etc.) for cutting metal framing components. Saws are not recommended, as the sparks produced during cutting will damage the anti-corrosion coating. If sparks are generated during cutting, be sure the portion of the component to be installed on the building is protected from sparks and that any stockpile near the cutting station is also protected.

- f. The systems components should not be cut while installed on the building, unless using a shearing instrument.

### 3.1 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal wall panel assembly including trim, copings, corners, 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 weather resistant.

### 3.2 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.
- B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION 074213



## SECTION 078413 - PENETRATION FIRESTOPPING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Penetrations in fire-resistance-rated walls.
  - 2. Penetrations in horizontal assemblies.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product test reports.

## 1.3 QUALITY ASSURANCE

- A. Fire Resistant Joints in Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
  - 1. Smoke Barrier Joints Air Leakage: Maximum 5 cfm per foot 0.30 inches water gage pressure differential
- B. Surface Burning Characteristics: ASTM E84.
  - 1. Flame Spread Index: 25, maximum
  - 2. Smoke Developed Index: 450 maximum

## PART 2 - PRODUCTS

## 2.1 FIRESTOPPING

- A. Manufacturers:
  - 1. 3M Fire Protection Products.
  - 2. Specified Technologies, Inc.
  - 3. Hilti Corporation.
  - 4. Nelson FireStop Products.
  - 5. RectorSeal; Metacaulk Firestopping Products.
  - 6. Bio Fireshield Firestopping Products.
  - 7. Substitutions: Section 01600 - Product Requirements.

- B. Product Description: Listed as components of tested design, appropriate for the physical configuration of each penetration and as required by the fire resistance rating indicated and the provisions of Article: SYSTEM DESCRIPTION.
  - 1. Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
- C. Color: As selected from manufacturer's full range of colors.

## 2.2 FILL, VOID, AND CAVITY MATERIALS

- A. Fill, Void, and Cavity Materials: One or more of the following types, as appropriate for particular construction conditions:
  - 1. Silicone sealant material, except on finished surfaces to be painted.
  - 2. Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
  - 3. Caulk type material.
  - 4. Putty type material.
  - 5. Composite sheet type material, 1/4 inch nominal thickness, foil-faced.
  - 6. Wrap strip type material, 1/4 inch nominal thickness, intumescent elastomeric.
  - 7. Mortar as specified in Section 04065 where permitted by applicable code.
- B. Packing Materials: One or more of the following types, as appropriate for particular construction conditions:
  - 1. Ceramic fiber blanket, 4 lb/cu ft density.
  - 2. Ceramic fiber insulation, minimum 1 inch thick, 8 lb/cu ft minimum density.
  - 3. Mineral wool batt insulation, 6.0 lb/cu ft minimum density.
- C. Forming Materials: As required by tested design for particular construction conditions.

## 2.3 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
  - 1. Flat and Non-Flat Paints: Maximum volatile organic compound content in accordance with GS-11.
- B. Dam Material: Permanent:
  - 1. Mineral fiberboard.
  - 2. Mineral fiber matting.
  - 3. Sheet metal.
  - 4. Plywood or particle board.
  - 5. Composite Wood and Agrifiber Products: Contain no added urea-formaldehyde resins.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- D. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

## 3.2 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Penetration Firestopping - Do Not Disturb"

## 3.3 FIELD QUALITY CONTROL

- A. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- B. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION 078413

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Standard hollow metal doors and frames.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings or Published Details: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

## 1.3 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings as indicated on the Drawings.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Amweld Building Products, LLC.
  - 2. Ceco Door Products; an Assa Abloy Group company.
  - 3. Curries Company; an Assa Abloy Group company.
  - 4. Pioneer Industries, Inc.
  - 5. Steelcraft; an Ingersoll-Rand company.
  - 6. Substitutions: Section 01600 – Product Requirements

## 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I.
- H. Glazing: Division 08 Section "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

## 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Comply with ANSI/SDI A250.8.
  - 1. Design: Flush panel.
  - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
    - a. Fire Door Core: As required to provide fire-protection ratings indicated.
    - b. Thermal-Rated (Insulated) Doors: R-value of not less than R-8 when tested according to ASTM C 1363.
  - 3. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
  - 4. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).

## 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
  - 1. Fabricate frames with mitered or coped corners.
  - 2. Fabricate frames as welded unit unless otherwise indicated.

3. Frames for Level 3 Steel Doors: 0.053-inch- thick steel sheet.
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
  1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames as welded unit unless otherwise indicated.
3. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet..
- D. Hardware Reinforcement: ANSI/SDI A250.6.

## 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
  1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, same material as door face sheet.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, same material as frames.

## 2.7 FABRICATION

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:
  1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
  2. Glazed Lites: Factory cut openings in doors.

3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  6. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      - 5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
    - c. Compression Type: Not less than two anchors in each jamb.
    - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
    - a. Single-Door Frames: Three door silencers.
    - b. Double-Door Frames: Two door silencers.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical Sections.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Provide loose stops and moldings on inside of hollow metal work.
  5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: Bake-on Type.
- B. Factory-Applied Paint Finish: ANSI/SDI A250.3.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.



2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
  4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
  6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
  9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113

## SECTION 081416 - FLUSH WOOD DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Factory finishing flush wood doors.

## 1.2 SUBMITTALS

- A. Product Data: For each type of door indicated.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
- C. Samples: For factory-finished doors.

## 1.3 QUALITY ASSURANCE

- A. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
- B. Fire-Rated Wood Doors: Doors 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.

## 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. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.
  - 3. Graham; an Assa Abloy Group company.
  - 4. Marshfield Door Systems, Inc.
  - 5. Mohawk Flush Doors, Inc.; a Masonite company.
  - 6. Substitutions: Section 01600 – Product Requirements.

## 2.2 DOOR CONSTRUCTION, GENERAL

- A. Structural-Composite-Lumber-Core Doors: AWI Section 1300, Type SCLC - Structural Composite Lumber with grain direction parallel with door stiles.
- B. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated. 45 Minute Rating and Greater: AWI Section 1300, Type FD.
  - 1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  - 2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals.

## 2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors: **(Drawing Designation - WOOD)**
  - 1. Grade: Premium, with Grade A faces.
  - 2. Species: Red oak.
  - 3. Cut: Plain sliced (flat sliced).
  - 4. Match between Veneer Leaves: Slip match.
  - 5. Assembly of Veneer Leaves on Door Faces: Balance match.
  - 6. Pair and Set Match: Provide for doors hung in same opening.
  - 7. Core: Structural composite lumber.
  - 8. Facing Adhesive: Type II – Water Resistant.

## 2.4 LIGHT FRAMES

- A. Metal Frames:
  - 1. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
- C. Openings: Cut and trim openings through doors in factory.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 081416

## SECTION 081433 - STILE AND RAIL WOOD DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Exterior stile and rail wood doors.
2. Finishing stile and rail wood doors.
3. Fitting stile and rail wood doors to frames and machining for hardware.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and other pertinent data.
- C. Samples: Representing typical range of color and grain for each species of veneer and solid lumber required. Finish Sample with same materials proposed for factory-finished doors.

## 1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Safety Glass: Provide products complying with testing requirements in 16 CFR 1201, for Category II materials, unless those of Category I are expressly indicated and permitted.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. General: Use only materials that comply with referenced standards and other requirements specified. Assemble exterior doors with wet-use adhesives.

2.2 EXTERIOR STILE AND RAIL WOOD DOORS – **(Drawing Designation – WOOD ENTRY)**

- A. Exterior Stile and Rail Wood Doors: Exterior doors complying with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors."
  1. 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:
    - a. Belentry Doors LLC.

- b. International Door and Latch.
  - c. Jeld-Wen, Inc.
  - d. Karona, Inc.
  - e. McPhillips Manufacturing Company.
  - f. QSM Doors, Inc.
  - g. Simpson Door Company.
- 2. Finish and Grade: Transparent and Premium or Select.
  - 3. Wood Species: Manufacturer's standard softwood species and cut.
  - 4. Glass: Uncoated, clear, insulating-glass units made from two lites of 3.0-mm-thick, fully tempered glass with 1/4-inch interspace complying with Division 08 Section "Glazing."

## 2.3 STILE AND RAIL WOOD DOOR FABRICATION

- A. Fabricate stile and rail wood doors in sizes indicated for field fitting.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels unless otherwise indicated:
  - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/2 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide not more than 3/8 inch from bottom of door to top of threshold.
- C. Factory machine doors for hardware that is not surface applied.
- D. Glazed Openings: Trim openings indicated for glazing with solid wood moldings, with one side removable. Miter wood moldings at corner joints.
- E. Glazed Openings: Glaze doors at factory with glass of type and thickness indicated, complying with Division 08 Section "Glazing." Install glass using manufacturer's standard elastomeric glazing sealant complying with ASTM C 920. Secure glass in place with removable wood moldings. Miter wood moldings at corner joints.
- F. Exterior Doors: Factory treat exterior doors after fabrication with water-repellent preservative to comply with WDMA I.S.4.

## 2.4 FINISHING

- A. Finish wood doors at woodworking shop.
- B. For doors indicated to be shop finished, comply with AWI's "Architectural Woodwork Quality Standards," and with other requirements specified.
- C. Transparent Finish:
  - 1. Grade: Premium.
  - 2. Finish: Custom Finish
    - a. Stain Color: Selection by Architect from full product line.
    - b. Finish Coats: Low VOC Marine Grade Spar Varnish, Satin

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install door frames level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Countersink fasteners, fill surface flush, and sand smooth.
- B. Hardware: For installation, see Division 08 Section "Door Hardware."
- C. Install wood doors to comply with manufacturer's written instructions, AWI's "Architectural Woodwork Quality Standards," and other requirements specified.
- D. Field-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
  - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/4 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.

END OF SECTION 081433



SECTION 083213 - SLIDING ALUMINUM-FRAMED GLASS DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes sliding aluminum-framed glass doors for exterior locations.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide sliding aluminum-framed glass doors capable of complying with performance requirements indicated, based on testing manufacturer's sliding doors that are representative of those specified, and that are of minimum test size required by AAMA/WDMA/CSA 101/I.S.2/A440.
- B. Structural Performance: Provide sliding aluminum-framed glass doors capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA/CSA 101/I.S.2/A440, Uniform Load Structural Test:
  - 1. Design Wind Loads: Determine design wind loads under conditions indicated according to ASCE/SEI 7.
  - 2. Deflection Limits: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA/CSA 101/I.S.2/A440, Uniform Load Deflection Test, or structural computations.
- C. Windborne-Debris Resistance: Provide sliding aluminum-framed glass doors capable of resisting impact from windborne debris according to ASTM E 1886 and testing information in ASTM E 1996 or AAMA 506 and requirements of authorities having jurisdiction.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base calculations 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.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For sliding aluminum-framed glass doors. Include plans, elevations, sections, details, hardware, attachments to other work, and operational clearances.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Product test reports.
- E. Maintenance data.

- F. Sample warranty.

#### 1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.
- B. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.
- C. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sliding aluminum-framed glass doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements.
    - b. Structural failures including excessive deflection.
    - c. Water leakage or air infiltration.
    - d. Faulty operation of movable sash and hardware.
    - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - f. Deterioration of insulating glass[ **and laminated glass**] as defined in Division 08 Section "Glazing."
  2. Warranty Period:
    - a. Sliding Door: Two years from date of Substantial Completion.
    - b. Glazing: Five years from date of Substantial Completion.
    - c. Metal Finish: 10 years from date of Substantial Completion.

### 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. Arcadia Architectural Products, Inc.
  2. EFCO Corporation.
  3. Fleetwood Aluminum Products, Inc.
  4. Graham Architectural Products.
  5. Hydro Aluminum North America.
  6. Kawneer North America; an Alcoa company.
  7. Milgard Windows.
  8. MI Windows and Doors, Inc.
  9. Peterson Architectural Products.
  10. Plaza Door Co., Inc.

11. Thermal Windows, Inc.

## 2.2 SLIDING DOORS – (Drawing Designation 008 & 009)

- A. AAMA Designation: Heavy Duty Aluminum Sliding Doors
  1. Performance Class and Grade: AW 60
  2. Frame Depth: 4 to 6 inches.
  3. Material: Reinforced Extruded aluminum with polyurethane thermal brake.
  4. Configuration: OX, Two Panel, Reference Drawings.
  5. Glazing: 1" Clear Insulated Glass Units with Low-E Coating.
  6. Bottom Track: Standard Adjustable Stainless Steel Ball Bearing Rollers.
  7. Hardware: Mortise Cylinder with Key & Thumbturn, Pulls Interior and Exterior.
- B. Thermal Transmittance: Provide sliding aluminum-framed glass doors with a maximum whole fenestration product U-factor indicated, when determined according to ASTM E 1423 determined according to NFRC 100.
  1. U-Factor: 0.35 Btu/sq. ft. x h x deg F.
- C. Solar Heat-Gain Coefficient (SHGC): Provide sliding aluminum-framed glass doors with a whole-fenestration product SHGC maximum of 0.60 , determined according to NFRC 200.

## 2.3 GLAZING

- A. Glass and Glazing System: Comply with Division 08 Section "Glazing" for safety glass, insulating-glass units, laminated glass, and glazing requirements applicable to glazed sliding aluminum-framed glass doors.
- B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

## 2.4 FABRICATION

- A. Fabricate sliding aluminum-framed glass doors that are reglazable without dismantling panel framing.
- B. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.

## 2.5 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  1. Color: Dark bronze.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.
- B. Install sliding aluminum-framed glass doors level, plumb, square, true to line, without distortion, warp or rack of frames and panels, or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Install sliding aluminum-framed glass doors and components to drain condensation, water penetrating joints, and moisture migrating within doors to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."
- F. Lubricate hardware and moving parts.
- G. Adjust operating panels and screens to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure.
- H. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
- I. Clean aluminum surfaces immediately after installing sliding doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes. Remove nonpermanent labels, and clean surfaces.
- J. Clean glass immediately after installing sliding aluminum-framed glass doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- K. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- L. Protect sliding door surfaces from contact with contaminating substances resulting from construction operations. During construction, monitor sliding door surfaces adjacent to and below exterior concrete and masonry surfaces for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact sliding door surfaces, remove contaminants immediately according to manufacturer's written instructions.
- M. Refinish or replace sliding aluminum-framed glass doors with damaged finishes.
- N. Replace damaged components.

END OF SECTION 083213

## SECTION 083313 – COILING COUNTER FIRE DOORS

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Fire-rated overhead coiling counter doors.

## 1.2 DESIGN / PERFORMANCE REQUIREMENTS

- A. Fire Rated Assemblies: Provide assemblies complying with NFPA 80.
- B. Manual Operation: Design counter door assembly to operate for not less than 20,000 cycles.

## 1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- 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. Details of construction and fabrication.
  - 4. Installation methods.
- C. Shop Drawings: Include detailed plans and elevations, details of framing members, anchoring methods, clearances, hardware, and accessories.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

## 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience.
- B. Installer Qualifications: Installer Qualifications: Company approved by manufacturer, specializing in performing Work of this section with minimum three years experience, with IDEA Certified Installers and service technicians on staff.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

## 1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.7 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

## 1.8 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's two year limited warranty.

# PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Cookson Company.
  - 2. Cornell Iron Works.
  - 3. McKeon Rolling Steel Door Company.
  - 4. Overhead Door Corporation.
  - 5. Substitutions: Section 01600 - Product Requirements.

## 2.2 OVERHEAD COILING COUNTER FIRE DOORS

- A. Overhead Coiling Counter Fire Doors:
  - 1. Label: Provide a certified 3 hour Class A rolling fire door for masonry fire wall.
  - 2. Curtain: 1-1/4 or 1-1/2 inch interlocking slats, structural steel sheet, minimum 22 gauge.
  - 3. Finish: Galvanized Steel, ASTM A653, G90 finished with a rust-inhibitive roll coating process, baked top coat.
    - a. Color: As selected by Architect from manufacturer's full range.
  - 4. Bottom Bar: Single black powder coated steel angle bottom bar with seal.
  - 5. Guides: Minimum 3/16 inch, galvanized steel conforming to ASTM A653/A653M, G90.
    - a. Roll-formed powder coated steel shapes.
    - b. Finish: Black.

- c. Fastening Guides to Masonry Fire Walls: UL listed expansion anchors.
- 6. Brackets: Black powder coated steel to support counterbalance, curtain and hood.
- 7. Counterbalance: Helical torsion spring type. Counterbalance shall be housed in a steel tube or pipe barrel.
- 8. Hood: Square shape, minimum 24 gauge galvanized steel with smoke seal.
- 9. Manual Operation: Manual push requiring 25 lb nominal force to operate.
- 10. Automatic Closure: Equip fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Testing for manually operated doors shall allow resetting by opening the door without retensioning the counter balancing mechanism. Automatic-closing device shall be design for activation by the following:
- 11. Manufacturer's standard UL-labeled smoke detector and door-holder release device.
- 12. Locking:
  - a. Two interior bottom bar slide bolts for manually operated doors.
- 13. Wall Mounting Condition:
  - a. Face-of-wall mounting.
- 14. Plastic Laminated Fire Rated Countertops: Provide counter fire doors with plastic laminated fire rated countertops.
  - a. Label: Plastic laminated fire rated countertops.
  - b. Shape: Provide shape as indicated on the Drawings.
  - c. Core: Interior core of high density particleboard.
  - d. Finish: Top, bottom and all edges shall be covered with plastic laminate.
  - e. Color: Top and all edges as selected by the Architect.
  - f. Mounting Hardware: Provide with all necessary mounting hardware.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.
- B. Verify substrates, supports, and other conditions before starting work.

#### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install rolling counter fire doors in compliance with requirements of NFPA 80. Test fire-release system and reset components after testing.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. Coordinate installation of electrical service. Complete wiring from disconnect to unit components.
- G. Install and test release device in accordance with the manufacturer's instructions and in compliance with applicable regulations and codes of the local authority having jurisdiction.
- H. Install perimeter trim and closures.

### 3.4 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Release device(s) shall be tested and witnessed for proper operation with the door manufacturer recommendations
- C. Adjust hardware and operating assemblies for smooth and noiseless operation.

### 3.5 CLEANING

- A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION



## SECTION 083613 - SECTIONAL DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes electrically operated sectional doors.

## 1.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Delegated Design: Design sectional doors, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Performance: Exterior sectional doors shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  - 1. Wind Loads: As indicated on Structural Drawings.
- D. Air Infiltration: Maximum rate not more than indicated when tested according to ASTM E 283 or DASMA 105.
  - 1. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph.

## 1.3 SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Delegated-Design Submittal: For sectional doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Seismic Qualification Certificates: For sectional doors, accessories, and components, from manufacturer.
- F. Maintenance data.
- G. Warranties: Sample of special warranties.

#### 1.4 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. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer. Provide secondary components from a source acceptable to the manufacturer of the primary components.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Standard for Sectional Doors: Fabricate sectional doors to comply with DASMA 102 unless otherwise indicated.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Three years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Fabricate from manufacturer's standard zinc-coated (galvanized), cold-rolled, steel sheet.
  - 1. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.
  - 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.
- C. Provide reinforcement for hardware attachments.
- D. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard insulation, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections that incorporate the following interior facing material, with no exposed insulation:

## 2.2 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's heavy duty, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances shown on Drawings. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track spaced 2 inches apart for door-drop safety device. Slope tracks at proper angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
- B. Track Reinforcement and Supports: Galvanized-steel track reinforcement and support members. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.
- C. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.
- D. Windows: Manufacturer's standard window units of type and size indicated and in arrangement shown. Provide removable stops of same material as door-section frames.

## 2.3 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Provide 3-inch- diameter roller tires for 3-inch- wide track and 2-inch- diameter roller tires for 2-inch- wide track.

## 2.4 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
- C. Cables: Galvanized-steel lifting cables.
- D. Cable Safety Device: Include, on each side-edge of door, a device designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

## 2.5 MANUAL DOOR OPERATORS

- A. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

## 2.6 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement 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.
  - 1. Comply with NFPA 70.
  - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit of type indicated, consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 11 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 115 V.
    - c. Hertz: 60.
  - 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  - 3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
  - 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
- E. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
  - 1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
- F. Red/Green Traffic Light: Equip motorized door with a flashing light kit to single the operator that the door is in the full-open position. Wall mount the traffic light per the manufacturer's instructions

- G. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."
  - 1. Interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- J. Radio-Control System: Consisting of three-channel universal coaxial receiver to open, close, and stop door; two per operator.

## 2.7 DOOR ASSEMBLY – (DOORS 001, 002, 003, 004 and 005)

- A. Steel Sectional Door: Sectional door formed with hinged sections.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Overhead Door Corporation.
    - b. Raynor Manufacturing.
    - c. Windsor Republic Doors.
    - d. Substitutions: Section 016000
- B. Operation Cycles: Not less than 50,000.
- C. Installed R-Value: R-7 Minimum
- D. Steel Sections: 20 gauge Zinc-coated (galvanized) steel sheet, formed into sections 2 inches thick with extruded polystyrene core.
  - 1. Exterior-Face Surface: Flat.
  - 2. Interior Facing Material: Zinc-coated (galvanized) steel sheet.
- E. Track Configurations:
  - 1. Doors 001, 002, 003, 4004 – Standard Lift Track
  - 2. Door 005 – Low Head Room Track, less than 8" clearance
- F. Interior Facing Material: Zinc-coated (galvanized) steel sheet
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door.
- H. Windows: Approximately 24 inches tall spanning an entire panel row, with square corners, with a sill height of approximately 4 feet ; installed with insulated glazing of tempered clear float glass.
- I. Manual Door Operator: Chain-hoist operator.

## J. Electric Door Operator:

1. Usage Classification: Heavy use.
2. Operator Type: Trolley.
3. Motor Exposure: Interior, clean, and dry.
4. Emergency Manual Operation: Chain type.
5. Obstruction-Detection Device: Automatic photoelectric sensor.
6. Remote-Control Station: Interior.
7. Other Equipment: Radio-control system.

## K. Door Finish:

1. Baked-Enamel or Powder-Coated Finish:
  - a. Basis of Design: Drylac Powder Coatings, RAL 3004, "Dark Red"
  - b. As selected by Architect from Manufacturer's full, custom selection
2. Factory Prime Finish: Manufacturer's standard color.
3. Finish of Interior Facing Material: Powder-Coated, Manufacturer's "White".

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks: Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment. Repair galvanized coating on tracks according to ASTM A 780.
- C. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion. Adjust doors and seals to provide weathertight fit around entire perimeter.

## 3.2 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

## SECTION 085113 - ALUMINUM WINDOWS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes fixed and operable aluminum-framed windows.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design pressure as calculated in accordance with applicable codes and ASCE 7 for window sizes and configurations indicated on the Drawings.
  - 1. Test Method: ASTM E330, Procedure A.
  - 2. Proof Load: 150 percent of design wind load.
  - 3. Member Deflection: Maximum of 1/175 of span measured at design pressure.

## 1.3 SUBMITTALS

- A. Product Data: For each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, and installation details
- C. Samples: For each exposed finish.

## 1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements.
    - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
    - c. Faulty operation of movable sash and hardware.
    - d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
    - e. Failure of insulating glass.
  - 2. Warranty Period:

- a. Window: Two years from date of Substantial Completion.
- b. Glazing: Five years from date of Substantial Completion.
- c. Metal Finish: 10 years from date of Substantial Completion.

## 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. Boyd Aluminum Manufacturing.
  - 2. Custom Window Company.
  - 3. EFCO Corporation.
  - 4. Kawneer;
  - 5. Traco.
  - 6. Wausau Window and Wall Systems.
  - 7. Winco Window Company.
  - 8. YKK AP America Inc.

### 2.2 WINDOW

- A. Window Type: Commercial Grade 4" inch frame depth aluminum windows in configurations and operations as indicated on the Window Schedule.
- B. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of not less than 66.
- C. Thermal Transmittance: U-Factor when measured in accordance with AAMA 1503 or NFRC 100 when tested with clear insulating glass.
  - 1. U-Factor: 0.50 Btu/sq. ft. x h x deg F or less.

### 2.3 HARDWARE

- A. Hinging Hardware: Heavy Duty 4 Bar Hinges
- B. Top-Projected Open-Out Windows: Roto Operator

### 2.4 INSECT SCREENS

- A. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, 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. Location: On the interior face of frame where practical.
  - 3. Finish: Match aluminum window members.



## 2.5 FABRICATION

- A. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- E. 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.
- F. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated on the drawings. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

## 2.6 ALUMINUM FINISHES

- A. Aluminum Anodic Finish: Class I, color anodic coating complying with AAMA 611.
  - 1. Color: Dark bronze.

## PART 3 - EXECUTION

## 3.1 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. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

- F. 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.
- G. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- H. 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.
- I. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085113

SECTION 086300 - METAL-FRAMED SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes skylights with metal framing.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish.
- D. Product test reports.
- E. Field quality-control reports.
- F. Warranties: Sample of special warranties.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of metal-framed skylights required for this Project.
- B. Preinstallation Conference: Conduct conference at Project site.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
  - 1. Warranty Period: 20 years from date of Substantial Completion.

## 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. CPI Daylighting, Inc.
  2. Exarc Skylights, Inc.
  3. Gammans Skylight Systems.
  4. GSI Glazed Structures, Inc.
  5. Kawneer North America.
  6. Major Industries, Inc.
  7. Skyline Sky-Lites, LLC.
  8. Sunglo Skylight Products.
  9. Super Sky Products, Inc.
  10. United Skys, Inc.
  11. Velux America Inc.
  12. Wasco Products, Inc.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Metal-framed skylights shall withstand the effects of the following without failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Structural loads.
  2. Thermal movements.
  3. Movements of supporting structure.
- B. Structural Loads:
1. Wind Loads: As indicated on Structural Drawings.
  2. Seismic Loads: As indicated on Structural Drawings.
- C. Structural-Test Performance: Provide metal-framed skylights tested according to ASTM E 330, as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
- D. Water Penetration under Static Pressure: Provide metal-framed skylights that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- E. Air Leakage: Maximum of 0.04 CFM/sf of total unit area measured at a differential pressure of 75 PA (1.57 psf) in accordance with ASTM E 283, per the NAFS standards.
- F. Thermal Movements: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculations 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.
- G. Energy Performance: Provide metal-framed skylights with performance properties specified, as indicated in manufacturer's published test data,
1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.50 Btu/sq. ft. x h x deg F.
  2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.40.

## 2.3 FRAMING SYSTEMS

- A. Aluminum: Alloy and temper recommended in writing 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/B 429M.
  4. Structural Profiles: ASTM B 308/B 308M.
- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
1. Include snap-on aluminum trim that conceals fasteners.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.
- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. At pressure caps, use ASTM A 193/A 193M stainless-steel screws.
  2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  3. Reinforce members as required to receive fastener threads.
- E. Anchor Bolts: ASTM A 307, Grade A, galvanized steel.
- F. Concealed Flashing: Manufacturer's standard, corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- G. Exposed Flashing and Closures: Manufacturer's standard aluminum components.
- H. Framing Gaskets: Manufacturer's standard.
- I. Framing Sealants: As recommended in writing by manufacturer.
- J. Corrosion-Resistant Coating: Cold-applied asphalt mastic.

## 2.4 FABRICATION

- A. Fabricate aluminum components before finishing.

- B. Fabricate aluminum components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
- C. Fabricate aluminum sill closures with weep holes and for installation as continuous component.
- D. Reinforce aluminum components as required to receive fastener threads.
- E. Factory-Glazed, Metal-Framed Skylights:
  - 1. Factory install glazing to comply with requirements in Division 08 Section "Glazing."
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.5 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints between aluminum components 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 and to prevent impeding movement of moving joints.
  - 6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum will contact dissimilar materials, protect against galvanic action by painting contact surfaces with protective coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install continuous aluminum sill closure with weatherproof expansion joints and locked and sealed corners. Locate weep holes at rafters.
- D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.

- E. Install components plumb and true in alignment with established lines and elevations.
- F. Install glazing as specified in Division 08 Section "Glazing."
- G. Erection Tolerances: Install metal-framed skylights to comply with the following maximum tolerances:
  - 1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
  - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet but no greater than 1/2 inch over total length.

### 3.2 FIELD QUALITY CONTROL

- A. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Prepare test and inspection reports.

END OF SECTION 086300

## SECTION 087100 - DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Commercial door hardware.
  - 2. Electrified door hardware.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Details of electrified door hardware, including wiring diagrams.
- C. Samples: For each exposed finish.
- D. Product certificates and test reports.
- E. Other Action Submittals:
  - 1. Door Hardware Sets: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.
    - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
    - b. Content: Include the following information:
      - 1) Identification number, location, hand, fire rating, and material of each door and frame.
      - 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
      - 3) Complete designations of every item required for each door or opening including name and manufacturer.
      - 4) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
  - 2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.
- B. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.



- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- D. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.
- E. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to Owner by registered mail or overnight package service.

#### 1.5 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Three years from date of Substantial Completion, except as follows:
    - a. Electromagnetic Locks: Five years from date of Substantial Completion.
    - b. Exit Devices: Three years from date of Substantial Completion.
    - c. Manual Closers: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Sets" Article.

2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

## 2.2 HINGES, GENERAL

- A. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Hinge Base Metal: Unless otherwise indicated, provide the following:
  1. Exterior Hinges: Stainless steel, with stainless-steel pin.
  2. Interior Hinges: Stainless steel, with stainless-steel pin.
  3. Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
- C. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
- D. Fasteners: Comply with the following:
  1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
  2. Wood Screws: For wood doors and frames.
  3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
  4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors. Finish screw heads to match surface of hinges.

## 2.3 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Available Manufacturers:
  1. Baldwin Hardware Corporation (BH).
  2. Cal-Royal Products, Inc. (CRP).
  3. Hager Companies (HAG).
  4. McKinney Products Company; an ASSA ABLOY Group company (MCK).
  5. PBB, Inc. (PBB).
  6. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

## 2.4 CONTINUOUS HINGES

- A. Standard: BHMA A156.26
- B. General: Minimum 0.120-inch- thick, fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a pin that extends entire length of hinge.
  1. Base Metal for Exterior Hinges: Stainless steel.

2. Base Metal for Interior Hinges: Stainless steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel.
4. Available Manufacturers:
  - a. Hager Companies (HAG).
  - b. Markar Architectural Products, Inc.; a Subsidiary of Adams Rite Manufacturing Co. (MP).
  - c. McKinney Products Company; an ASSA ABLOY Group company (MCK).
  - d. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
  - e. Zero International (ZRO).

## 2.5 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- D. Backset: 2-3/4 inches, unless otherwise indicated.
- E. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

## 2.6 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
  1. Bored Locks: BHMA A156.2.
  2. Mortise Locks: BHMA A156.13.
- B. Bored Locks: BHMA A156.2, Grade 1; Series 4000.
  1. Available Manufacturers:
    - a. Arrow USA; an ASSA ABLOY Group company (ARW).
    - b. Best Access Systems; Div. of The Stanley Works (BAS).
    - c. Cal-Royal Products, Inc. (CRP).
    - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
    - e. Falcon Lock; an Ingersoll-Rand Company (FAL).
    - f. Marks USA (MKS).
    - g. Medeco Security Locks, Inc.; an ASSA ABLOY Group company (MED).
    - h. PDQ Manufacturing (PDQ).
    - i. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
    - j. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
    - k. Security Door Controls (SDC).
    - l. Weiser Lock; a Masco Company (WEI).
    - m. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

- C. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13; Series 1000.

1. Available Manufacturers:

- a. Accurate Lock & Hardware Co. (ALH).
- b. Adams Rite Manufacturing Co. (ARM).
- c. Arrow USA; an ASSA ABLOY Group company (ARW).
- d. Best Access Systems; Div. of The Stanley Works (BAS).
- e. Cal-Royal Products, Inc. (CRP).
- f. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
- g. Folger Adam Security Inc.; an ASSA ABLOY Group company (FAS).
- h. Falcon Lock; an Ingersoll-Rand Company (FAL).
- i. Marks USA (MKS).
- j. PDQ Manufacturing (PDQ).
- k. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
- l. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
- m. Security Door Controls (SDC).
- n. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.7 STAND-ALONE ELECTRONIC SECURITY HARDWARE (KEY PAD ENTRY)

- A. Surface Mounted Electric Door Strike: Surface mounted electric strike to accommodate rim exit device. Fail secure function.

Base of Design Product or Approved Equal.

1. Von Duprin 6300 Series
2. HES 9600 Surface Mounted

- B. Self-Contained Digital Keypad: Fully programmable, recessed wall mounted keypad. Tamper resistant mounting, with optional backlit numbers. Lifetime warranty.

Basis of Design Product or Approved Equal:

1. Alarm Controls Corporation, Model KP-100
2. Securitron, Model DK-12
3. Linear LLC, 212i

2.8 DOOR BOLTS

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors.

- B. Dustproof Strikes: BHMA A156.16, Grade 1.

- C. Surface Bolts: BHMA A156.16, Grade 1.

1. Flush Bolt Heads: Minimum of 1/2-inch-diameter rods of brass, bronze, or stainless steel with minimum 12-inch-long rod for doors up to 84 inches in height. Provide longer rods as necessary for doors exceeding 84 inches.
2. Available Manufacturers:
  - a. Burns Manufacturing Incorporated (BM).
  - b. Don-Jo Mfg., Inc. (DJO).
  - c. Door Controls International (DCI).

- d. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
- e. Hager Companies (HAG).
- f. IVES Hardware; an Ingersoll-Rand Company (IVS).
- g. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
- h. Trimco (TBM).

## 2.9 EXIT DEVICES

- A. Exit Devices: BHMA A156.3
- B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- F. Removable Mullions: BHMA A156.3.
- G. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.
- H. Available Manufacturers:
  - 1. Adams Rite Manufacturing Co. (ARM).
  - 2. Arrow USA; an ASSA ABLOY Group company (ARW).
  - 3. Cal-Royal Products, Inc. (CRP).
  - 4. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
  - 5. Detex Corporation (DTX).
  - 6. Door Controls International (DCI).
  - 7. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
  - 8. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
  - 9. Locknetics; an Ingersoll-Rand Company (LSE).
  - 10. Monarch Exit Devices & Door Hardware; an Ingersoll-Rand Company (MON).
  - 11. Precision Hardware, Inc. (PH).
  - 12. Rutherford Controls Int'l. Corp. (RCI).
  - 13. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
  - 14. Von Duprin; an Ingersoll-Rand Company (VD).
  - 15. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

## 2.10 LOCK CYLINDERS

- A. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
  - 1. Number of Pins: Seven.
- B. Permanent Cores: Manufacturer's standard; finish face to match lockset; with interchangeable cores.
- C. Manufacturer: Same manufacturer as for locks and latches.
- D. Available Manufacturers:
  - 1. ABLOY Security, Inc.; an ASSA ABLOY Group company (ABL).
  - 2. Arrow USA; an ASSA ABLOY Group company (ARW).
  - 3. ASSA, Inc.; an ASSA ABLOY Group company (ASA).
  - 4. Best Access Systems; Div. of The Stanley Works (BAS).
  - 5. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
  - 6. Falcon Lock; an Ingersoll-Rand Company (FAL).
  - 7. Medeco Security Locks, Inc.; an ASSA ABLOY Group company (MED).
  - 8. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
  - 9. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
  - 10. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

## 2.11 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into grand master key system.
- B. Number of Keys: Provide (2) copies of each key for each cylinder.

## 2.12 OPERATING TRIM

- A. Standard: BHMA A156.6.
- B. Materials: Fabricate from stainless steel, unless otherwise indicated.
- C. Available Manufacturers:
  - 1. Burns Manufacturing Incorporated (BM).
  - 2. Don-Jo Mfg., Inc. (DJO).
  - 3. Forms + Surfaces (FS).
  - 4. Hager Companies (HAG).
  - 5. Hiawatha, Inc. (HIA).
  - 6. IVES Hardware; an Ingersoll-Rand Company (IVS).
  - 7. Rockwood Manufacturing Company (RM).
  - 8. Trimco (TBM).

## 2.13 CLOSERS

- A. Accessibility Requirements: Comply with the following maximum opening-force requirements:

1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
  2. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
- C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- D. Surface Closers: BHMA A156.4 Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
1. Available Manufacturers:
    - a. Arrow USA; an ASSA ABLOY Group company (ARW).
    - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
    - c. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
    - d. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
    - e. LCN Closers; an Ingersoll-Rand Company (LCN).
    - f. Norton Door Controls; an ASSA ABLOY Group company (NDC).
    - g. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
    - h. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
    - i. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
    - j. Insert manufacturer's name.
- E. Coordinators: BHMA A156.3.

#### 2.14 PROTECTIVE TRIM UNITS (KICK PLATE)

- A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height specified in door hardware sets.
- B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
1. Material: 0.050-inch- thick stainless steel.
  2. Available Manufacturers:
    - a. American Floor Products Co., Inc. (AFP).
    - b. Baldwin Hardware Corporation (BH).
    - c. Burns Manufacturing Incorporated (BM).
    - d. Don-Jo Mfg., Inc. (DJO).
    - e. Hager Companies (HAG).
    - f. Hiawatha, Inc. (HIA).
    - g. IPC Door and Wall Protection Systems, Inc.; Div. of InPro Corporation (IPC).
    - h. IVES Hardware; an Ingersoll-Rand Company (IVS).
    - i. Pawling Corporation (PAW).
    - j. Rockwood Manufacturing Company (RM).
    - k. Trimco (TBM).

## 2.15 STOPS AND HOLDERS

- A. Stops and Bumpers: Gray resilient rubber bumpers with stainless steel base material
  - 1. Where wall stops are not appropriate, provide overhead holders.
- B. Overhead Stops and Holders: BHMA A156.8, Grade 1
- C. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilled-in application to frame.
- D. Available Manufacturers:
  - 1. Architectural Builders Hardware Mfg., Inc. (ABH).
  - 2. Baldwin Hardware Corporation (BH).
  - 3. Burns Manufacturing Incorporated (BM).
  - 4. Cal-Royal Products, Inc. (CRP).
  - 5. Don-Jo Mfg., Inc. (DJO).
  - 6. Door Controls International (DCI).
  - 7. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
  - 8. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
  - 9. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
  - 10. Hager Companies (HAG).
  - 11. HES, Inc.; an ASSA ABLOY Group company (HES).
  - 12. Hiawatha, Inc. (HIA).
  - 13. IVES Hardware; an Ingersoll-Rand Company (IVS).
  - 14. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
  - 15. Rockwood Manufacturing Company (RM).
  - 16. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
  - 17. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
  - 18. Trimco (TBM).
- E. Kick Down Door Stop: BHMA A156.16, 5" arm with Grey vinyl rubbers stop.

## 2.16 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
  - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
  - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
  - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
  - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.



- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
- G. Available Manufacturers:
  - 1. Hager Companies (HAG).
  - 2. M-D Building Products, Inc. (MD).
  - 3. National Guard Products (NGP).
  - 4. Pemko Manufacturing Co. (PEM).
  - 5. Reese Enterprises (RE).
  - 6. Sealeze; a unit of Jason Incorporated (SEL).
  - 7. Zero International (ZRO).

## 2.17 THRESHOLDS

- A. Standard: BHMA A156.21.
- B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.
- D. Available Manufacturers:
  - 1. Hager Companies (HAG).
  - 2. M-D Building Products, Inc. (MD).
  - 3. National Guard Products (NGP).
  - 4. Pemko Manufacturing Co. (PEM).
  - 5. Reese Enterprises (RE).
  - 6. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
  - 7. Sealeze; a unit of Jason Incorporated (SEL).
  - 8. Zero International (ZRO).

## 2.18 SLIDING DOOR HARDWARE

- A. General: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
  - 1. Exterior Door Hardware: By Door Manufacturer.

## 2.19 DOOR PULLS

- A. General: Post Mounted Bar Door Pull; consisting of a pair of straight 84" bar door pulls; square ends; mid-post support; mount with single thru bolts.
  - 1. Basis of Design: Rockwood Manufacturing RM3302MP
  - 2. Finish: Brass

## 2.20 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
- E. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  - 2. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

## 3.2 DOOR HARDWARE SETS ARTICLE

- A. As Follows:

## SECTION 088000 - GLAZING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Windows.
  - 2. Doors.
  - 3. Glazed entrances.
  - 4. Skylights.
  - 5. Interior borrowed lites.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Structural Design: Design glass, including comprehensive engineering analysis according to ICC's 2006 International Building Code, using the following design criteria:
  - 1. Design Wind Pressures: As indicated on Drawings.
  - 2. Design Snow Loads: As indicated on Drawings.
  - 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
  - 4. Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass to resist each of the following combinations of loads:
    - a. Outward design wind pressure minus the weight of the glass. Base design on glass type factors for short-duration load.
    - b. Inward design wind pressure plus the weight of the glass plus half of the design snow load. Base design on glass type factors for short-duration load.
    - c. Half of the inward design wind pressure plus the weight of the glass plus the design snow load. Base design on glass type factors for long-duration load.
  - 5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
  - 6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

## 1.3 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

#### 1.4 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

#### 1.5 WARRANTY

- A. Manufacturer's Special Warranty: Provide a **five** year warranty to include coverage for sealed glass units from failure, inner-pane dusting or misting, and replacement work.
- B. Manufacturer's Special Warranty on Laminated Glass: Provide a **five** year warranty to include coverage for delamination of laminated glass and replacement work.

### PART 2 - PRODUCTS

#### 2.1 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
  - 1. Furnish annealed glass except where heat strengthened or tempered glass is required to meet specified performance requirements.

#### 2.2 LAMINATED GLASS

- 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. AFG Industries, Inc.
  - 2. Guardian Industries Corp.
  - 3. Oldcastle Glass.
  - 4. Viracon
  - 5. Substitutions: Section 016000
- B. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
  - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements, minimum 0.030 inches thick.
  - 3. Interlayer Color: Clear unless otherwise indicated.

## 2.3 INSULATING GLASS

- 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. PPG Industries.
  2. AFG Industries, Inc.
  3. Guardian Industries Corp.
  4. Oldcastle Glass.
  5. Viracon
  6. Substitutions: Section 016000
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
1. Sealing System: Dual seal.
  2. Spacer: Manufacturer's standard spacer material and construction.

## 2.4 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.
1. Products: Subject to compliance with requirements,:
- a. Pilkington.
  - b. Technical Glass Products.
  - c. SAFTI First.
  - d. Vetrotech Saint-Gobain North America, Inc.
  - e. Substitutions: Section 01600 - Product Requirements.
- B. Fire Rating: Ratings as listed in UL Building Materials Directory and approved by applicable authorities for applications indicated.
- C. Wired Glass: ASTM C1036, Type II wired flat, Class 1 clear, polished both sides, Quality Q6 glazing; Mesh M1 diamond or Mesh M2 square of woven stainless steel wire, manufacturer's standard grid size.
1. Clear Wired Glass (FRG-CW): Polished both sides.
  2. Minimum Thickness: 1/4 inch unless otherwise indicated.
  3. Safety Glass: Conform to CPSC 16 CFR 1201 Category II.
- D. Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 3/16-inch nominal thickness; faced on one surface with a clear glazing film; complying with testing requirements in 16 CFR 1201 for Category II materials.
1. Thickness: Manufacturer's Standard.
  2. Products:
    - a. Technical Glass Products, Firelite NT.
    - b. SAFTI, Superlite C/S

## 2.5 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
  - 1. Neoprene complying with ASTM C 864.
  - 2. EPDM complying with ASTM C 864.
  - 3. Silicone complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM or silicone gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
  - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

## 2.6 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

## 2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800.

## 2.8 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

## 2.9 INSULATED GLASS TYPE

- A. Glass Type **GL-1**: Low E coated, clear insulated glass.
  - 1. Overall Unit Thickness: 1 inch
  - 2. Thickness of Each Glass Lite: 1/4 inch.
  - 3. Outdoor Lite: Glass Type Clear Low E, heat strengthened as required.
  - 4. Interspace Content: Air.
  - 5. Indoor Lite: Glass Type Clear, heat strengthened as required.
  - 6. Winter U-Factor: 0.32 maximum.
  - 7. Summer U-Factor: 0.31 maximum.
  - 8. Solar Heat Gain Coefficient: 0.40 maximum.
  - 9. Visible Light Transmittance: 68 percent minimum.

## 2.10 INSULATING-LAMINATED-GLASS TYPES

- A. Glass Type **GL-2**: Low-e-coated, clear insulating laminated glass.
  - 1. Overall Unit Thickness: 1 inch
  - 2. Thickness of Each Glass Lite: 1/4 inch.
  - 3. Outdoor Lite: Glass Type Clear Low E, tempered.
  - 4. Interspace Content: Air.
  - 5. Indoor Lite: Laminated heat strengthened PVB interlayer, clear heat strength.
  - 6. Winter U-Factor: 0.32 maximum.
  - 7. Summer U-Factor: 0.31 maximum.
  - 8. Solar Heat Gain Coefficient: 0.40 maximum.
  - 9. Visible Light Transmittance: 64 percent minimum.
  - 10. Provide safety glazing labeling.
- B. Glass Type **GL-3**: Low-e-coated, clear insulating laminated glass, translucent.
  - 1. Overall Unit Thickness: 1 inch
  - 2. Thickness of Each Glass Lite: 1/4 inch.
  - 3. Outdoor Lite: Glass Type Clear Low E, tempered.
  - 4. Interspace Content: Air.
  - 5. Translucent PVB Interlayer: 80% Light Transmittance
  - 6. Indoor Lite: Laminated, clear heat strength.
  - 7. Winter U-Factor: 0.50 maximum.
  - 8. Summer U-Factor: 0.50 maximum.
  - 9. Solar Heat Gain Coefficient: 0.40 maximum.
  - 10. Visible Light Transmittance: 10 to 50 percent.

11. Provide safety glazing labeling.

## 2.11 LAMINATED-GLASS TYPES

- A. Glass Type **GL-4**: Clear laminated glass with two plies of tempered glass.
  1. Thickness of Each Glass Ply: 1/4 inch
  2. Interlayer Thickness: 0.030 inch
  3. Provide safety glazing labeling.

## 2.12 FIRE-PROTECTION-RATED GLAZING TYPES

- A. Glass Type **GL-5**: Type II wired flat, Class 1 clear, quality Q6 glazing; Mesh M1 diamond or Mesh M2 square woven, stainless steel wire.
  1. Clear Wired Glass (FRG-CW): Polished on both sides.
  2. Minimum Thickness: 1/4 inch
  3. Safety Glass: Conform to CPS 16 CFR 1201 Category II.

## PART 3 - EXECUTION

### 3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

### 3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.



- E. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Delete paragraph below if not applicable or revise; it assumes fixed stop is located on exterior.

### 3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.5 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

## SECTION 089000 - LOUVERS AND VENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Fixed, formed-metal louvers.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following 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.
- B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

## 1.3 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 frame profiles and blade profiles, angles, and spacing.
- C. Samples: For each type of metal finish required.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 zinc coating, mill phosphatized.
- B. Fasteners: Use types and sizes to suit unit installation conditions.
  1. For color-finished louvers, use fasteners with heads that match color of louvers.

## 2.2 FABRICATION, GENERAL

- A. 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.

## 2.3 FIXED, FORMED-METAL LOUVERS

A. Horizontal, Nondrainable-Blade Louver, **M-1**

1. 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:
  - a. Air Balance Inc.; a Mestek company.
  - b. Air Flow Company, Inc.
  - c. Airolite Company, LLC (The).
  - d. American Warming and Ventilating, Inc.; a Mestek company.
  - e. Arrow United Industries; a division of Mestek, Inc.
  - f. Cesco Products; a division of Mestek, Inc.
  - g. Construction Specialties, Inc.
  - h. Dowco Products Group; Safe-Air of Illinois, Inc.
  - i. Greenheck Fan Corporation.
  - j. Industrial Louvers, Inc.
  - k. Metal Form Manufacturing Inc.
  - l. NCA Manufacturing, Inc.
  - m. Ruskin Company; Tomkins PLC.
  - n. United Enertech Corp.
  - o. Vent Products Company, Inc.
2. Louver Depth: **6 inches**.
3. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, 16 gauge  
Louver Performance Ratings:
  - a. Free Area: **Not less than 9 square feet or 45%**

## 2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
- B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.
- C. Louver Screening: Bird Screening.

## 2.5 GALVANIZED-STEEL SHEET FINISHES

- A. Finish louvers after assembly.
- B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780.
- C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

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

### PART 3 - EXECUTION

#### 3.1 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. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.
- E. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

END OF SECTION 089000

## SECTION 092116 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes: Gypsum board shaft wall assemblies.

## 1.2 ACTION SUBMITTALS

- A. Product Data: For each component of gypsum board shaft wall assembly.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

## 2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire-Resistance Rating: 2 Hours
- B. Studs: "H" Shaped Flanges with overall depth of 2-1/2 inches and flange width of 1-1/2 inches.
  - 1. Minimum Base-Metal Thickness: No. 25 MSG galvanized steel.
- C. Firestop Tracks: 2-3/16" wide channel shaped with 1 inch long legs. Provide at top and bottom of wall.
  - 1. Minimum Base-Metal Thickness: No. 25 MSG galvanized steel.
- D. Room-Side Finish: Gypsum shaftline, Tape and Mud, Level 2 Finish
- E. Shaft-Side Finish: Gypsum shaftliner board, Type X
- F. Insulation: Sound attenuation blankets full depth.

## 2.3 PANEL PRODUCTS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Gypsum Shaftliner Board, Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with paper faces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. American Gypsum; Shaft Liner.
  - b. CertainTeed Corp.; ProRoc Shaftliner.
  - c. Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; ToughRock Fireguard Shaftliner.
  - d. Lafarge North America, Inc.; Firecheck Type X Shaftliner.
  - e. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner.
  - f. PABCO Gypsum; Pabcore Shaftliner Type X.
  - g. Temple-Inland Inc.; Fire-Rated SilentGuard Gypsum Shaftliner System.
  - h. USG Corporation; Sheetrock Brand Gypsum Liner Panel.
2. Thickness: 1 inch.
3. Long Edges: Double bevel.

## 2.4 NON-LOAD-BEARING STEEL FRAMING

- A. Steel Framing Members: Comply with ASTM C 645 requirements for metal.
- B. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated.

## 2.5 AUXILIARY MATERIALS

- A. Trim Accessories: Material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written recommendations for application indicated.
- B. Attachment Clips: Aluminum angle, 0.062 inch thick, minimum 2 inch wide and 2-1/2 inch legs.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions.
- E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and ASTM C 754 other than stud-spacing requirements.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

- C. Penetrations: Install supplementary steel framing around perimeter of penetration behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- D. Isolate perimeter of gypsum panels from building structure, while maintaining continuity of fire-rated construction.
- E. Firestop Tracks: Install to maintain continuity of fire-resistance-rated assembly indicated.
- F. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
- G. Sound-Rated Shaft Wall Assemblies: Install Sound Attenuation Blankets full depth in open spaces. Seal with acoustical sealant at perimeter of each assembly and at joints and penetrations.
- H. Cant Panels: At projections into shaft exceeding 4 inches, install 5/8-inch- thick gypsum board cants covering tops of projections.
- I. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.
- J. Remove and replace panels that are wet, moisture damaged, or mold damaged.

END OF SECTION 092116.23

## SECTION 092900 - GYPSUM BOARD

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Tile backing panels.

## 1.2 SUBMITTALS

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

## 1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

## PART 2 - PRODUCTS

## 2.1 RECYCLED CONTENT OF GYPSUM PANELS

- A. Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum goal of 20 percent by weight.

## 2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Gypsum Co.
    - b. BPB America Inc.
    - c. G-P Gypsum.
    - d. Lafarge North America Inc.
    - e. National Gypsum Company.
    - f. PABCO Gypsum.
    - g. Temple.



h. USG Corporation.

B. Type X: Thickness: 5/8 inch.

## 2.3 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.1.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Custom Building Products; Wonderboard.
- b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
- c. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch.

## 2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Hot-dipped galvanized steel; with or without paper facing.  
2. Shapes:

- a. Cornerbead.
- b. Edge Beads: profile to suite application.
- c. Expansion joint.

## 2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

- 1. Interior Gypsum Wallboard: Paper.
- 2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

D. Joint Compound for Tile Backing Panels: 2 inch wide, coated alkali-resistant fiberglass mesh tape intended for use with tile backer board.

## 2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: ASTM C919, type recommended for use in conjunction with gypsum board.
  1. Type: Paintable, non-shrinking and non-cracking where exposed, non-drying, non-skinning, non-staining, and non-bleeding where concealed.
- F. Electrical Box Pads: Provide at outlet, switch and telephone boxes in acoustically sensitive walls between Dorm Rooms, Restrooms, and Multi-Purpose Room.

## 2.7 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Wall Texture Finish, Exposed to View: Light Orange Peel, approved by Architect on a minimum 4 foot by 4 foot site mock-up.

## PART 3 - EXECUTION

### 3.1 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

### 3.2 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Type X: Vertical surfaces, unless otherwise indicated.
  - 2. Ceiling Type: Ceiling surfaces.

### 3.3 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.1, behind all tile locations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

### 3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Cornerbead: Use at outside corners.

### 3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
  - 1. Level 1: Ceiling plenum areas, areas concealed from view.
  - 2. Level 2: Wall surfaces to receive tile finish.
  - 3. Level 4: Wall and ceiling surfaces exposed to view.
- E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.6 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

### 3.7 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

## SECTION 093000 - TILING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Ceramic tile.
  - 2. Waterproof membrane.
  - 3. Metal edge strips.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
  - 1. Each type and composition of tile and for each color and finish required.

## 1.3 EXTRA MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

## PART 2 - PRODUCTS

## 2.1 TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. Tile Type **CT-1**: Glazed ceramic subway tile.
  - 1. 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:
    - a. American Olean; Division of Dal-Tile International Inc.
    - b. Crossville, Inc.
    - c. Daltile; Division of Dal-Tile International Inc.
    - d. Deutsche Steinzeug America, Inc.
    - e. Interceramic.
    - f. Lone Star Ceramics Company.
    - g. Grupo Porcelanite.

- h. Portobello America, Inc.
  - i. Seneca Tiles, Inc.
- 2. Module Size: 2 by 6 inches.
- 3. Thickness: 1/4 inch.
- 4. Face: Plain with cushion edges.
- 5. Surface: Slip-resistant, with abrasive admixture.
- 6. Tile Color and Pattern: As selected by Architect from manufacturer's full range. (Gray)
- 7. Grout Color: Dark Gray.
- 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Base Cove: Sanitary Cove, module size 2 by 6.
  - b. External Corners: Cove module size 2 by 6.
  - c. Internal Corners: Quarter cove beak/cove base, inside corner

C. Tile Type **CT-2**: Polished Glass Tile – Accent Row

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
  - a. Voguebay
  - b. Reflections in Glass
- 2. Face Size: 1 by 6 inches
- 3. Thickness: 1/4 inch.
- 4. Tile Color and Pattern: Red
- 5. Grout Color: Dark Gray.

D. Tile Type **CT-3**: Glazed ceramic tile.

- 1. 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:
  - a. American Olean; Division of Dal-Tile International Inc.
  - b. Crossville, Inc.
  - c. Daltile; Division of Dal-Tile International Inc.
  - d. Deutsche Steinzeug America, Inc.
  - e. Interceramic.
  - f. Lone Star Ceramics Company.
  - g. Grupo Porcelanite.
  - h. Portobello America, Inc.
  - i. Seneca Tiles, Inc.
- 1. Module Size: 2 by 2 inches.
- 2. Thickness: 1/4 inch.
- 3. Face: Plain with cushion edges.
- 4. Surface: Slip-resistant, with abrasive admixture.
- 5. Tile Color and Pattern: As selected by Architect from manufacturer's full range. (Gray)
- 6. Grout Color: Dark Gray.

## 2.2 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated.
- B. Chlorinated-Polyethylene-Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Noble Company (The); Nobleseal TS.
- C. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Schluter Systems L.P.; KERDI.

## 2.3 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
  - 1. 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:
    - a. Custom Building Products.
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation.
    - d. Merkrete.
    - e. Substitutions per Section 01600
  - 2. Prepackaged, dry-mortar mix combined with liquid-latex additive.
  - 3. For wall applications, provide nonsagging mortar.

## 2.4 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10.
- B. Sanded and Unsanded Polymer-Modified Tile Grout: ANSI A118.7.
  - 1. Manufacturers: Subject to compliance with requirements,:
    - a. Custom Building Products.
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation.
    - d. Merkrete.

e. Substitutions per Section 01600

2. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.

## 2.5 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
- B. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
- C. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

## 2.6 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, stainless steel, ASTM A 666, 300 Series exposed-edge material.
- C. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.



- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### 3.3 INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths: 1/8"
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Metal Edge Strips: Install at the top of tile wainscot and on all vertical corners from the terminus of the tile to the top of the base tile.
- H. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- I. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- J. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

### 3.4 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F121: Cement mortar bed (thickset) on waterproof membrane; TCA F121.
  - a. Tile Type: CT-3.
  - b. Thin-Set Mortar for Cured-Bed Method: Latex- portland cement mortar.
  - c. Grout: Polymer-modified sanded grout.
- B. Interior Wall Installations, Wood Studs or Furring:
  1. Tile Installation W244: Thin-set mortar on cementitious backer units or fiber cement underlayment over cleavage membrane; TCA W244.
    - a. Tile Type: CT-1 and CT-2.
    - b. Thin-Set Mortar: Latex- portland cement mortar.
    - c. Grout: Polymer-modified unsanded grout.
- C. Shower Receptor and Wall Installations, Wood Studs or Furring:
  1. Tile Installation B421: Thin-set mortar on waterproof membrane over cementitious backer units/fiber cement underlayment; TCA B421.
    - a. Tile Type: CT-1 and CT-2.
    - b. Thin-Set Mortar: Latex-portland cement mortar.
    - c. Grout: Polymer-modified unsanded grout.

END OF SECTION 093000

## SECTION 099000 – PAINTS AND COATINGS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems and other coatings on the following substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMU).
  - 3. Steel.
  - 4. Galvanized metal.
  - 5. Wood.
  - 6. Gypsum board.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.

## 1.3 QUALITY ASSURANCE

- A. MPI Standards:
  - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
  - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
  - 3. Final approval of color selections will be based on benchmark samples.
    - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

## 1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
  - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

## PART 2 - PRODUCTS

## 2.1 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content of Field-Applied Paints and Coatings: Provide products that comply with the LEED limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop.
- C. Chemical Components of Field-Applied Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- D. Colors: As indicated in a color schedule.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMU): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Gypsum Board: 12 percent.

5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Mechanical and Electrical Work: Paint items exposed in occupied spaces including, but not limited to, the following:
  1. Mechanical Work:
    - a. Uninsulated metal piping.
    - b. Uninsulated plastic piping.
    - c. Pipe hangers and supports.
    - d. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- E. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.3 PAINTING AND COATING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
  1. Water-Based Clear Sealer System: Natural Look, No Sheen, Max Stain Protection
    - a. Broadcast manufacturer's recommended aggregate into coating for slip resistant finish.
    - b. First Coat: Interior/exterior clear concrete floor sealer (water based).
    - c. Topcoat: Interior/exterior clear concrete floor sealer (water based).

## B. CMU Substrates:

## 1. Exposed Interior CMU - High-Performance Architectural Epoxy System:

- a. Prime Coat: Epoxy block filler,
- b. Intermediate Coat: Epoxy, cold cured, semigloss,
- c. Topcoat: Epoxy, cold cured, semigloss,

## C. Steel Substrates:

## 1. Exposed Steel Structure &amp; Deck - Alkyd Dry-Fall System:

- a. Touch-up shop primer on ferrous metal surfaces.
- b. Prime Coat: Quick-drying alkyd metal primer.
- c. Prime Coat over Galvanized Metal Deck & Pipes: Remove mill oils. Waterborne galvanized-metal primer.
- d. Topcoat: Interior alkyd dry fog/fall.

## 2. Shop-Primed Ferrous Metal - Acrylic Enamel

- a. Prime Coat: Rust Inhibiting metal primer.
- a. Intermediate Coat: Acrylic Semigloss Enamel
- b. Topcoat: Acrylic Semigloss Enamel

## D. Galvanized-Metal Substrates:

## 1. Exposed Galvanized Metal - Acrylic Enamel

- a. Prime Coat: Waterborne galvanized-metal primer.
- b. Intermediate Coat: Acrylic Semigloss Enamel
- c. Topcoat: Acrylic Semigloss Enamel

## E. Glue-Laminated Beams &amp; Columns, Exterior Wood Trim:

## 1. Transparent Finished Wood – Satin rubbed sheen.

- a. Prime Coat: Wood Stain
- b. Intermediate Coat: Sanding Sealer
- c. Topcoat: Acrylic Modified urethane rubbing varnish.

## F. Gypsum Board Substrates: Eggshell (satin) sheen on walls, flat sheen on ceilings, semigloss in toilet rooms, kitchen, laundry.

## 1. Latex System:

- a. Prime Coat: Interior latex primer/sealer.
- b. Intermediate Coat: Interior latex matching topcoat.
- c. Topcoat: Interior latex

END OF SECTION 099000

## SECTION 105113 - METAL LOCKERS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Metal lockers.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.
- C. Warranty: Sample of special warranty.

## 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1.

## 1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. **Warranty Period for All-Welded Metal Lockers: 2 Years from date of Substantial Completion. (Addendum #1)**

## PART 2 - PRODUCTS

## 2.1 STANDARD METAL LOCKERS

- A. Locker Arrangement: Single tier
- B. Material: steel sheet.
- C. Body and Shelves: Assembled by riveting or bolting body components together. Fabricate from unperforated 0.024-inch nominal-thickness steel sheet.
- D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.

- E. Doors: One piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
- F. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
  - 1. Continuous Hinges: Manufacturer's standard, steel, full height.
- G. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry and vandal resistant.
  - 1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
- H. Finish: Baked enamel or powder coat.
  - 1. Color(s): Black

## 2.2 FABRICATION

- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
- B. All-Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.
- C. Accessible Lockers: Fabricate as follows:
  - 1. Locate bottom shelf no lower than 15 inches above the floor.
  - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
- D. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- E. Coat Rods: Fabricated from 1-inch- diameter steel;
- F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
- G. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
- H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

## 2.3 STEEL SHEET FINISHES

- A. Baked-Enamel Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.



- B. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard, baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  - 1. Anchor single rows of metal lockers to walls near top and bottom of lockers.
- B. All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  - 1. Attach hooks with at least two fasteners.
  - 2. Attach door locks on doors using security-type fasteners.
  - 3. Attach recess trim to recessed metal lockers with concealed clips.
  - 4. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
  - 5. Attach sloping-top units to metal lockers, with closures at exposed ends.

END OF SECTION 105113

## SECTION 122413 - ROLLER WINDOW SHADES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes roller shades.
- ~~B. See Division 26 Sections for electrical service and connections for motorized shade operation.~~  
**(Note removed Addendum #1.)**

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, details of installation, operational clearances, and relationship to adjoining Work.
  - 1. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
- C. Coordination Drawings: Drawn to scale and coordinating penetrations and ceiling-mounted items.
- D. Samples: For each exposed finish and for each color and texture required.
- E. Window Treatment Schedule: Use same designations indicated on Drawings.
- F. Maintenance data.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Fire-Test-Response Characteristics: Provide products passing flame-resistance testing according to NFPA 701 by a testing agency acceptable to authorities having jurisdiction.
- C. Comply with WCMA A 100.1.

## PART 2 - PRODUCTS

## 2.1 ROLLER SHADES

- A. Shade Band Material: PVC-coated fiberglass.
  - 1. Colors: As indicated in a window treatment schedule
  - 2. Material Openness Factor: Reference Drawings

- B. Mounting: Inside.

## 2.2 ROLLER SHADE FABRICATION

- A. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
  - 1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
- B. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting fascia, headbox, roller, and operating hardware and for hardware position and shade mounting method indicated.
- C. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

## PART 3 - EXECUTION

### 3.1 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

### 3.2 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades. Refer to Division 01 Section Demonstration and Training."

### **3.3 WINDOW SHADE SCHEDULE**

**A. Provide 100% Opaque Blackout Shades, Color “Black” for the following windows & doors:**

- 1. Multi-Purpose Room: Window E1 and Door 011**
- 2. Dorm Room #1: Window L1**
- 3. Dorm Room #2: Window L2 and L3**
- 4. Dorm Room #3: Window L4**
- 5. Dorm Room #4: Window L5**

**B. Provide 5% Open Roller Shades, Color “Beige” for the following windows:**

- 1. Reception & Watch 111: A1**
- 2. Chief’s Office 108: D1**
- 3. Conference Room 109: D2**
- 4. Assistant Chief’s Office 110: D3**
- 5. Day Room: K1**
- 6. Fitness Room: H1, G1, F1**
- 7. Laundry Room: G2**

END OF SECTION 122413

## SECTION 123530 - RESIDENTIAL CASEWORK

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Kitchen cabinets.
  - 2. Plastic-laminate countertops.
  - 3. Solid-surfacing-material countertops.

## 1.2 SUBMITTALS

- A. Product Data: For cabinets, countertop material, and cabinet hardware.
- B. Shop Drawings: For cabinets and countertops. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, methods of joining countertops, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

## PART 2 - PRODUCTS

## 2.1 CABINET MATERIALS

- A. General:
  - 1. Adhesives: Do not use adhesives that contain urea formaldehyde.
  - 2. Hardwood Lumber: Kiln dried to 7 percent moisture content.
  - 3. Softwood Lumber: Kiln dried to 10 percent moisture content.
  - 4. Hardwood Plywood: HPVA HP-1, made without urea formaldehyde.
  - 5. Particleboard: ANSI A208.1, Grade M-2, made without urea formaldehyde.
  - 6. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made without urea formaldehyde.
  - 7. Hardboard: AHA A135.4, Class 1 Tempered.
- B. Exposed Materials:
  - 1. Exposed Wood Species: Oak.
    - a. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
    - b. Staining and Finish: As selected by Architect from manufacturer's full range.
  - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
  - 3. Plywood: Hardwood plywood with face veneer of species indicated, with Grade A faces and Grade C backs of same species as faces.
  - 4. Plastic Laminate: Particleboard faced with high-pressure decorative laminate complying with NEMA LD 3, Grade VGS.

- a. Colors, Textures, and Patterns: As selected by Architect from cabinet manufacturer's full range.
- C. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility; particleboard; medium-density fiberboard; or hardboard.

## 2.2 CABINETS

- A. Face Style: Flush overlay.
- B. Cabinet Style: Frameless.
- C. Door and Drawer Fronts: Solid-wood, 3/4 inch thick, with 1/4-inch- thick, veneer-faced plywood center panels.
- D. Drawer Bottom, Sides and Backs: Thermoset decorative overlay with PVC or polyester edge banding; Color: White
- E. Exposed Shelves: Thermoset decorative overlay with eased edges; Color White
- F. Exposed Cabinet End Finish: Wood veneer.
- G. Toe Kick Backing: Fabricate from exterior grade plywood or pressure treated wood.

## 2.3 CABINET HARDWARE

- A. Wire Pulls: Back-Mounted, satin stainless steel.
- B. Hinges: Surface-Mounted European-style self-closing hinges, satin stainless steel.
- C. Full-Height Door Hinges: Surface-Mounted concealed heavy duty, satin stainless steel.
- D. Catches: Magnetic catches
- E. Cabinet Locks: 7/8 inch pin tumbler, stainless steel.
- F. Drawer Guides: Side-mounted, full extension, zinc plated steel drawer slides with steel ball bearing, BHMA A156.9, B05091 and rated for 100 lbf.
- G. Grommets for Cable Passage: 2 inch OD molded plastic grommets and matching plastic caps; Color: Black

## 2.4 COUNTERTOP MATERIALS

- A. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
  - 1. Grade: HGS.
  - 2. Colors, Textures, and Patterns: As selected by Architect from plastic-laminate manufacturer's full range.
- B. Particleboard: ANSI A208.1, Grade M-2.

- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- D. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
    - a. Avonite, Inc.
    - b. E. I. du Pont de Nemours and Company.
    - c. Formica Corp.
    - d. Nevamar Company, LLC.
    - e. Swan Corporation (The).
  - 2. Colors and Patterns: As selected by Architect from manufacturer's full range.

## 2.5 PLASTIC-LAMINATE COUNTERTOPS

- A. Configuration: Provide countertops with the following front, cove (intersection of top with backsplash), backsplash, and endsplash style:
  - 1. Front: Rolled.
  - 2. Cove: Cove molding (one-piece postformed laminate supported at junction of top and backsplash by wood cove molding).
  - 3. Backsplash: Curved or waterfall shape.
  - 4. Endsplash: None.

## 2.6 SOLID-SURFACING-MATERIAL COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
  - 1. Front: 1-1/2-inch laminated bullnose.
  - 2. Backsplash: Straight, slightly eased at corner.
  - 3. Endsplash: None.
- B. Countertops: 1/2-inch- thick, solid-surfacing material with built-up edges.
- C. Backsplashes: 1/2-inch- thick, solid-surfacing material.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.

- C. Install casework level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten cabinets to adjacent units and to backing.
  - 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
- E. Fasten plastic-laminate countertops by screwing through corner blocks of base units into underside of countertop. Form seams using splines to align adjacent surfaces, and secure with glue and concealed clamping devices designed for this purpose.
- F. Fasten solid-surfacing-material countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces, and form seams to comply with manufacturer's written instructions using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- G. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION 123530



## SECTION 328400 - PLANTING IRRIGATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Piping.
  - 2. Automatic control valves.
  - 3. Sprinklers.
  - 4. Quick couplers.
  - 5. Controllers.
  - 6. Boxes for automatic control valves.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Location of Sprinklers and Specialties: Design shall be Design/Build by General Contractor.
- C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
  - 1. Irrigation Main Piping: 200 psig.
  - 2. Circuit Piping: 150 psig.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Zoning Chart: Show each irrigation zone and its control valve.
- D. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- E. Field quality-control reports.
- F. Operation and maintenance data.
- G. Record Drawings of the installed system.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications - Installer shall have had considerable experience and demonstrate ability in the installation of irrigation systems in a neat, orderly, and responsible manner in accordance with recognized standards of workmanship.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## PART 2 - PRODUCTS

### 2.1 PIPES, TUBES, AND FITTINGS

- A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
- B. PVC Pipe: Class 200 PVC BE.
- C. PVC Pipe, Pressure Rated: Class 200 PVC BE.

### 2.2 PIPING JOINING MATERIALS

- A. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

### 2.3 AUTOMATIC CONTROL VALVES

- A. Automatic Control Valves:
  - 1. 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:
    - a. Buckner; a division of Storm Manufacturing Group Inc.
    - b. Ceres Products Company.
    - c. Champion Irrigation Products.
    - d. Dig Corporation.
    - e. Greenlawn Sprinkler Company.
    - f. Hit Products Corporation.
    - g. Hunter Industries Incorporated.
    - h. Irritrol Systems.
    - i. Nelson, L. R. Corporation.
    - j. Netafim USA.
    - k. Olson Irrigation Systems.
    - l. Orbit Irrigation Products, Inc.
    - m. Rain Bird Corporation.
    - n. Superior Controls Co., Inc.
    - o. Toro Company (The); Irrigation Division.
    - p. Weathermatic.

## 2.4      SPRINKLERS

- A.    General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

## 2.5      QUICK COUPLERS

- A.    Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

## 2.6      CONTROLLERS

- 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.    Buckner; a division of Storm Manufacturing Group Inc.
  - 2.    Champion Irrigation Products.
  - 3.    Hit Products Corporation.
  - 4.    Hunter Industries Incorporated.
  - 5.    Irritrol Systems.
  - 6.    K-RAIN Manufacturing Corporation.
  - 7.    Nelson, L. R. Corporation.
  - 8.    Netafim USA.
  - 9.    Orbit Irrigation Products, Inc.
  - 10.   Rain Bird Corporation.
  - 11.   Superior Controls Co., Inc.
  - 12.   Toro Company (The); Irrigation Division.
  - 13.   Weathermatic.

## 2.7      BOXES FOR AUTOMATIC CONTROL VALVES

- A.    Plastic Boxes:
  - 1.    Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
- B.    Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

# PART 3 - EXECUTION

## 3.1      EARTHWORK

- A.    Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.
- B.    Provide minimum cover over top of underground piping.

### 3.2      PIPING INSTALLATION

- A.    Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
- B.    Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- C.    Install piping free of sags and bends.
- D.    Install groups of pipes parallel to each other, spaced to permit valve servicing.
- E.    Install fittings for changes in direction and branch connections.
- F.    Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.
- G.    Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
- H.    Install underground thermoplastic piping according to ASTM D 2774.
- I.    Install expansion loops in control-valve boxes for plastic piping.
- J.    Lay piping on solid subbase, uniformly sloped without humps or depressions.
- K.    Install ductile-iron piping according to AWWA C600.
- L.    Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

### 3.3      JOINT CONSTRUCTION

- A.    Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B.    Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C.    Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1.    Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2.    Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D.    Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- E.    Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.
- F.    Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.

- G. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.
- H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.
- I. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  - 3. PVC Nonpressure Piping: Join according to ASTM D 2855.

### 3.4 VALVE INSTALLATION

- A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.
- B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
  - 1. Install valves and PVC pipe with restrained, gasketed joints.
- C. Aboveground Valves: Install as components of connected piping system.
- D. Throttling Valves: Install in underground piping in boxes for automatic control valves.
- E. Drain Valves: Install in underground piping in boxes for automatic control valves.

### 3.5 SPRINKLER INSTALLATION

- A. Install sprinklers after hydrostatic test is completed.
- B. Install sprinklers at manufacturer's recommended heights.
- C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

### 3.6 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

- A. Equipment Mounting: Install interior controllers on wall.
  - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.7      FIELD QUALITY CONTROL

- A.    Perform tests and inspections.
- B.    Tests and Inspections:
  - 1.    Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2.    Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
  - 3.    Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C.    Any irrigation product will be considered defective if it does not pass tests and inspections.
- D.    Prepare test and inspection reports.

3.8      ADJUSTING

- A.    Adjust settings of controllers.
- B.    Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C.    Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

END OF SECTION 328400