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Greenville Transportation Activity Center – Greenville, NC

Project Manual

Addendum No. 6, June 30, 2016

Project Number L3005900

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Date	June 30, 2016
Project Name	Greenville Transportation Activity Center
Project Location	Greenville, NC
Project No.	L3005900

1.1 Definition

A. An Addendum is a modification to a Bid Issue. An Addendum is issued during the bidding period and supersedes previous documentation in the Bid Issue.

2.1 Bidder's Responsibility

A. The Bidder's proposal shall incorporate this Addendum to the same extent as though it was originally included in the Bid Issue.

B. The Bidder's proposal confirms receipt of the Addendum as provided in the Form of Proposal.

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3.1 Drawings

A. The following Drawings are revised as follows:

General

1. Drawing No. G-002
   Description of Revision:
   a. Change fire protection requirements for floor and roof construction from "HT" to "1 HR."

Architectural

1. Drawing No. A-413
   Description of Revision:
   a. Change the depth of storefront assemblies from 4 ½" to 6" near column lines 3, 4 and 5 in elevation 1/A-413.

Structural

1. Drawing No. S-101, S-102, S-103, S-200 and S-402
   Description of Revision:
   a. Drawing clarification: The lateral loads given on S-101 and S-102 are total shear in the walls at the first floor. Design intent is to use the CLT shear walls at the first floor only. That is why there are no shear loads called out for the shear walls on the Roof Framing Plan on S-103. The tapered glulam braces shown on S-200 are designed to take the total roof shear load.
   b. Drawing Clarification: The lateral loads shown on the drawings (S-101, S-102, S-200, & S-402) are service loads with the exception of the uplift forces shown for the holddowns. The 0.6DL factor has been incorporated into those uplift reactions (see note 2 under the schedule). Wind is typically governing.

4.1 Project Manual

A. The following Specification Sections are revised and reissued:

1. Section No. 000110 – Specifications List
   Description of Revision:
   a. Updated Specifications List.
2. Section No. 051200 – Structural Steel Framing
   Description of Revision:
   a. Added reference to high-performance coatings.
   b. Clarified finish for exterior exposed structural steel.
3. Section No. 051213 – Architecturally-Exposed Structural Steel Framing
   Description of Revision:
   a. Deleted reference to second floor railing support.
   b. Clarified finish on interior exposed architectural exposed structural steel.
   c. Clarified finish on exterior exposed architectural structural steel.

4. Section 084113 – Aluminum Entrances and Storefronts

Description of Revision:

a. Add 6 inch deep storefront system to basis of design.

END OF ADDENDUM NO. 6

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Greenville Transportation and Activity Center
SPECIFICATIONS LIST

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		Issue for Construction, May 10, 2016	Addendum No. 1, 5/26/16	Addendum No. 2, 06/09/16	Addendum No. 3, 06/16/16	Addendum No. 4, 06/21/16	Addendum No. 5, 06/23/16	Addendum No. 6, 06/30/16	
Procurement and Contracting Requirements									
000101	Project Title Page	O	REV	REV	REV	REV	REV	REV	
000107	Seals Page	O							
000110	Specifications List	O	REV	REV	REV	REV	REV	REV	
000115	List of Drawings	O							
001113	Advertisement for Bids	O					REV		
002113	Instructions to Bidders	O		REV			REV		
002513	Pre-Bid Meetings	O							
003126	Existing Hazardous Material and Removal Information	O							
003132	Geotechnical Data	O							
004113	Bid Form - Stipulated Sum Single-Prime Contract	O		REV		REV			
004313	Bid Security Forms	O							
004325	Substitution Request Form (During Procurement)	O							
005213	Owner-Contractor Agreement	O							
006000	Project Forms	O							
006113	Performance and Payment Bond Form	O							
006239	Disadvantaged Business Enterprise Program	O							
006276.13	Sales Tax Form	O							
008000	Supplementary Conditions	O							
008100	Special Conditions – FTA Terms & Conditions	O							
Division 01 - General Requirements									
010460	Chases, Openings and Inserts	O							
010490	Coordination Drawings	O							
011100	Summary of Work	O							
012200	Unit Prices	O							
012300	Alternates	O	REV						
012513	Product Substitution Procedures	O							
012600	Modification Procedures	O							
012973	Schedule of Values	O							
012976	Application for Payment	O							
013100	Project Coordination	O							
013119	Project Meetings	O							
013200	Progress Reports	O							
013216	Construction Schedules	O							
013300	Submittals	O							
013329	Sustainability Requirements	O							
013410	Submittal Register	O		REV					

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013543	Environmental Protection	O							
014100	Codes, Regulations and Standards	O							
014216	Definitions and Documentation Standards	O							
014523	Inspection and Testing Services	O							
014527	Inspection and Testing of Earthwork	O							
014533	Inspection and Testing of Cast-In-Place Concrete	O							
014535	Inspection and Testing of Masonry	O							
014537	Inspection and Testing of Asphaltic Concrete	O							
014551	Inspection and Testing of Structural Steel	O							
014570	Inspection and Testing of Exterior Enclosure	O							
014571	Inspection and Testing of Roofing and Waterproofing	O							
014900	Methods and Means Engineering	O							
015200	Construction Facilities	O							
015700	Construction Pollution Controls	O							
016000	Material and Equipment	O							
016610	Testing and Balancing of Mechanical Systems	O							
017123	Field Engineering	O							
017329	Cutting and Patching	O							
017400	Warranties and Bonds	O							
017419	Construction Waste Management	O							
017423	Final Cleaning	O							
017700	Project Closeout	O							
017823	Operation and Maintenance Data	O							
017839	Project Record Documents	O							
018120	Construction Indoor Air Quality (IAQ) Management	O							
019113	General Commissioning Requirements	O							
Division 02 - Existing Conditions									
024116.13	Building Demolition	O							
Division 03 - Concrete									
031000	Concrete Formwork	O							
032000	Concrete Reinforcement	O							
032500	Concrete Accessories	O							
033000	Cast-In-Place Concrete	O							
033543	Polished Concrete Finishing	O							
Division 04 - Masonry									
042000	Unit Masonry	O			REV				

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Division 05 - Metals									
050513	Fluoropolymer Coatings	O							
051200	Structural Steel Framing	O						REV	
051213	Architecturally Exposed Structural Steel Framing	O						REV	
055000	Metal Fabrications	O							
055213	Pipe and Tube Railings	O							
Division 06 - Wood, Plastic and Composites									
061000	Rough Carpentry	O							
061543	Cross Laminated Timber Panels	O			REV				
061600	Sheathing	O							
061800	Glue-Laminated Construction	O							
062000	Finish Carpentry	O							
064000	Architectural Woodwork	O							
Division 07 - Thermal and Moisture Protection									
070050	Exterior Enclosure, General	O							
071352	Modified Bituminous Sheet Waterproofing	O			REV				
072100	Thermal Insulation	O							
072600	Air/Vapor Barriers	O							
074233	Phenolic Wall Panels	O							
075000	Membrane Roofing (Single-Ply)	O			REV				
076000	Flashing and Sheet Metal	O							
077200	Roof Accessories	O							
077210	Fall Arrest Roof Anchors	O							
078400	Firestopping	O							
079200	Joint Sealants	O							
Division 08 - Openings									
081113	Standard Hollow Metal Doors and Frames	O							
081400	Wood Doors	O							
081500	Fiberglass-Reinforced Plastic Doors	O							
083100	Access Doors and Panels	O							
084113	Aluminum Entrances and Storefronts	O						REV	
084413	Glazed Aluminum Curtainwall	O							
087100	Door Hardware	O							
088000	Glazing	O							
088300	Mirrors	O							
089100	Louvers	O							

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Division 09 - Finishes									
092116	Gypsum Board Assemblies	O							
093013	Ceramic Tiling	O							
095100	Acoustical Ceilings	O							
096519	Resilient Tile Flooring	O							
096543	Linoleum Flooring	O		REV					
096813	Tile Carpeting	O							
099100	Painting	O							
099600	High Performance Coatings	O							
Division 10 - Specialties									
101400	Exterior Signs	O			REV				
101401	Interior Signs	O			REV				
102113	Compact Laminate (Solid Phenolic) Toilet Compartments	O							
102813	Toilet Accessories	O							
104413	Fire Extinguishers and Cabinets	O							
Division 11 - Equipment									
113113	Residential Kitchen Appliances	O							
Division 12 - Furnishings									
122113	Horizontal Louver Blinds	O							
124813	Entrance Mats and Frames	O							
129300	Site Furnishings and Structures	O							
Division 14 - Conveying Equipment									
142400	Machine Roomless Holesss Hydraulic Elevators	O							
Division 21 - Fire Suppression									
210517	Sleeves and Sleeve Seals for Fire-Suppression Piping	O							
210518	Escutcheons for Fire-Suppression Piping	O							
210523	General-Duty Valves for Water-Based Fire-Suppression Piping	O							
211100	Facility Fire-Suppression Water-Service Piping	O							
211313	Wet-Pipe Sprinkler Systems	O							
211316	Dry-Pipe Sprinkler Systems	O							

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Division 22 - Plumbing									
220513	Common Motor Requirements for Plumbing Equipment	O							
220517	Sleeves and Sleeve Seals for Plumbing Piping	O							
220518	Escutcheons for Plumbing Piping	O							
220519	Meters and Gages for Plumbing Piping	O							
220523	General-Duty Valves for Plumbing Piping	O							
220529	Hangers and Supports for Plumbing Piping and Equipment	O							
220553	Identification for Plumbing Piping and Equipment	O							
220716	Plumbing Equipment Insulation	O							
220719	Plumbing Piping Insulation	O							
220800	Commissioning of Plumbing Systems	O							
221113	Facility Water Distribution Piping	O							
221116	Domestic Water Piping	O							
221119	Domestic Water Piping Specialties	O							
221123	Domestic Water Pumps	O							
221313	Facility Sanitary Sewers	O							
221316	Sanitary Waste and Vent Piping	O							
221319	Sanitary Waste Piping Specialties	O							
221319.13	Sanitary Drains	O							
221413	Facility Storm Drainage Piping	O							
221423	Storm Drainage Piping Specialties	O							
221429	Sump Pumps	O							
223300	Electric, Domestic-Water Heaters	O							
224213.13	Commercial Water Closets	O							
224213.16	Commercial Urinals	O							
224216.13	Commercial Lavatories	O							
224216.16	Commercial Sinks	O							
224713	Drinking Fountains	O							
224723	Remote Water Coolers	O							
Division 23 - HVAC									
230513	Common Motor Requirements for HVAC Equipment	O							
230517	Sleeves and Sleeve Seals for HVAC Piping	O							
230518	Escutcheon for HVAC Piping	O							
230523	General-Duty Valves for HVAC Piping	O							
230529	Hangers and Supports for HVAC Piping and Equipment	O							
230553	Identification for HVAC Piping and Equipment	O							
230593	Testing, Adjusting, and Balancing for HVAC	O							
230713	Duct Insulation	O							
230800	Commissioning of Mechanical Systems	O							
230900	Instrumentation and Control for HVAC	O							
230901	Commissioning of Integrated Automation Systems	O							

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230993	Sequence of Operations for HVAC Controls	O							
232300	Refrigerant Piping	O							
233113	Metal Ducts	O							
233300	Air Duct Accessories	O							
233423	HVAC Power Ventilators	O							
233713	Diffusers, Registers, and Grilles	O							
234100	Particulate Air Filtration	O							
236200	Packaged Compressor and Condenser Units	O							
236313	Air-Cooled Refrigerant Condensers	O							
237433	Dedicated Outdoor-Air Units	O							
238219	Fan Coil Units	O							
238239	Unit Heaters	O							
Division 26 - Electrical									
260519	Low-Voltage Electrical Power Conductors and Cables	O							
260526	Grounding and Bonding for Electrical Systems	O							
260529	Hangers and Supports for Electrical Systems	O							
260533	Raceways and Boxes for Electrical Systems	O							
260543	Underground Ducts and Raceways for Electrical Systems	O							
260544	Sleeves and Sleeve Seals for Electrical Raceways and Cabling	O							
260553	Identification for Electrical Systems	O							
260572	Overcurrent Protective Device Short-Circuit Study	O							
260573	Overcurrent Protective Device Coordination Study	O							
260574	Overcurrent Protective Device Arc-Flash Study	O							
260800	Commissioning of Electrical Systems	O							
260913	Electrical Power Monitoring and Control	O							
260923	Lighting Control Devices	O							
260936	Modular Dimming Controls	O							
262416	Panelboards	O							
262713	Electricity Metering	O							
262726	Wiring Devices	O							
262813	Fuses	O							
262816	Enclosed Switches And Circuit Breakers	O							
265119	LED Interior Lighting	O							
265219	Emergency and Exit Lighting	O							
265613	Lighting Poles and Standards	O							
265619	Exterior Lighting	O							
Division 27 - Communications									
270000	Communications	O							
270526	Grounding and Bonding for Communications Systems	O							
270529	Hangers and Supports for Communications Systems	O							
270533	Conduits and Backboxes for Communications Systems	O							
270536	Cable Tray for Communications Systems	O							
270553	Identification for Communications Systems	O							

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270800	Commissioning of Communications	O							
271116	Communications Cabinets, Racks, Frames and Enclosures	O							
271119	Communications Termination Blocks and Patch Panels	O							
271519	Data Communications Horizontal Cabling	O							
271543	Communications Faceplates and Connectors	O							
275116	Public Address Systems	O							
Division 28 - Electronic Safety and Security									
280513	Conductors and Cables for Electronic Safety and Security	O							
281300	Access Control	O							
282300	Video Surveillance	O							
283111	Digital, Addressable Fire-Alarm System	O							
Division 31 - Earthwork									
312000	Earth Moving	O							
313116	Termite Control			O					
Division 32 - Exterior Improvements									
321216	Asphalt Paving	O							
321313	Concrete for Exterior Improvements	O							
321416	Brick Pavers, Mortar Bed	O							
321723	Pavement Markings	O							
329000	Planting	O							
Division 33 - Utilities									
331000	Water Utilities	O							
333000	Sanitary Sewerage Utilities	O							
334000	Storm Sewer Utilites	O							

END

Part 1 General

1.1 Summary (Non-inclusive)

A. Section Includes: Steel required for primary structural system as indicated.

1.2 Related Work Specified Elsewhere (Non-inclusive)

A. Applicable Sections: Division 01.

B. Architecturally-Exposed Structural Steel Framing: Division 05.

C. Pipe and Tube Railings: Division 05.

D. Painting: Division 09.

E. *[1] High-Performance Coatings: Division 09.

1.3 Submittals

A. Submit per requirements of Division 01.

B. Shop Drawings: Include fabrication and erection drawings. Fabrication detail drawings will not be processed until erection drawings showing size and member markings are submitted. Submit Shop Drawings for review in order required for proper execution of Work. Do not submit all at one time. Show framing work including miscellaneous pieces. Shop Drawings shall comply with the following:

1. Make erection drawings at minimum scale of 1/8 inch to the foot . Draw fabrication drawings at larger scale as required. Do not use Drawings as erection drawings.

2. Show connection design capacity on details and member elevations.

3. Include information necessary for fabrication and erection, including, but not limited to, the following:

   a. Base plate and anchor rod plans showing location, size and identification marks of base screws and bolts, grade of steel, and elevations.
   b. Erection plans showing type, size, weight and identification marks of members, dimensions locating members relative to column grid lines, elevations of members, and clear cross reference with other related Drawings. Erection plans shall include necessary information and instructions regarding field welds and field bolts including type, size and extent of field welds, types of electrodes, welding procedures, welding sequence, size and type of field bolts.

c. Detail drawings showing complete details of members and components including, but not limited to: identification marks, dimensions, size, type, weight and grade of steel, requirements for installation of other materials or parts of construction, such as punch or drilled holes, cleats, openings, type, size and extent of shop and field welds, type of electrodes, joint welding procedures, welding sequences: size and type of shop and field bolts, cleaning requirements prior to painting, type and dry thickness of paint. Use welding symbols used by American Welding Society.

4. Survey(s): Submit signed and sealed survey(s) as indicated.

C. Product Data: For manufacturer's standard products, including shop primer paint.

D. Calculations: Design calculations and details of proposed connections, before preparation of Shop Drawings.

1. Connections which have been fully detailed (including number and size of bolts, length and size of welds and size of plates) on Drawings need not be further substantiated by calculations produced by fabricator. Should fabricator request a substitute detail to detail indicated, Design Professional will provide design forces and fabricator shall perform and submit connection calculations for substitute detail to be designed in accordance with Paragraph 3 below. Review of substituted details and detail calculations will be performed in accordance with Division 01.

2. Should fabricator elect to use shear connections tabulated by AISC, sample calculations shall be submitted that indicate which AISC tables and procedures are being used and demonstrate compliance with design criteria and shear capacity requirements indicated.

3. For connections, other than those described in Paragraphs 1 and 2 above, complete calculations shall be submitted which substantiate compliance with capacities and other design criteria specified. Calculations shall be performed by (or under direct personal supervision of) and sealed by a registered Professional Structural Engineer, registered in North Carolina.

4. Regardless of types of connections used (or degree of calculations submitted) fabricator shall submit shop standards charts showing details of connection types and capacities, including weld, bolt, plate and angle information required to define connections and to facilitate review of detail Shop Drawings.

E. Quality Control Procedures:

1. Mill Test Reports: Certified Mill Test Reports for structural steel members and bolts, washers and nuts containing sufficient evidence of conformity with Contract Documents.

F. Certifications:

1. Certification of location of bolt, nut, and washer manufacturer.

2. Fabricator certification as indicated.

3. Erector certification as indicated.

4. Certification and test data as indicated.

1.4 Quality Assurance

A. Fabricators Qualifications: A qualified fabricator who participates in the AISC Certification Program and is designated an AISC Certified Plant, Category STD at time of Bid. A copy of fabricator's current certificate, or such certification, shall be provided with Bid.

1. Fabricator shall provide effective full time quality control over fabrication activities. Fabricated items shall be subject to inspection. Inspection and testing by Inspection and Testing Agency is not intended to be comprehensive or complete and full responsibility for quality control shall remain with fabricator.

B. Erector Qualifications: A qualified installer who participates in the AISC Certification Program and is designated an AISC Certified Erector, Category CSE at time of Bid. Submit erector's current certificate, or certification of compliance with corresponding AISC checklist.

1. Fabricator and erector shall have together, satisfactorily completed Work of similar scope and shall have necessary skill, equipment, facilities and capacity to fabricate and erect structural steel in accordance with requirements of Contract Documents.

2. Welder's Qualifications:

a. Welding procedures and qualifications of operators shall be as prescribed in "Structural Welding Code, Steel", AWS D1.1.
b. Welders shall be qualified to perform type of Work required.
c. Each welder working on Project shall be assigned an identification symbol or mark and shall mark or stamp his identification at each weldment he completes, both in shop and field.

C. Referenced Codes and Standards: Comply with following in accordance with Division 01.

1. American Institute of Steel Construction (AISC)

"Specification for Structural Steel Buildings"

"Code of Standard Practice for Steel Buildings and Bridges", with exception of Section 10, and as modified by Contract Documents

2. American Welding Society (AWS)

Structural Welding Code, Steel

3. Research Council on Structural Connections: "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts"

4. Society for Protective Coatings (SSPC)

Painting Manual, Volume 1, Good Painting Practices

Painting Manual, Volume 2, Systems and Specifications

D. Predetailing Conference: Prior to starting detailed development of Calculations and Shop Drawings, Contractor shall arrange a meeting to review approach to design and detailing of connections and procedures for fabrication and erection.

1. Meeting shall be attended by responsible representatives of each party concerned with structural steel work including, but not limited to, the following:

   a. Owner's Representative.
   b. Construction Manager.
   c. Contractor's Superintendent.
   d. Steel Inspection and Testing Agency.
   e. Steel Fabricator.
   f. Steel Detailer/Detailing Engineer.
   g. Steel Erector.

2. Design Professional will be present at meeting. Contractor shall give one (1) week written advance notice to Design Professional prior to scheduled conference date.

3. Minutes of meeting shall be recorded and typed by Contractor and distributed to concerned parties within five (5) days of meeting.

E. Inspection and Testing: Services of an independent Inspection and Testing Agency are required in conjunction with the Work of this Section. Facilitate Work of and cooperate with Agency. Refer to Division 01.

1. Furnish Inspection and Testing Agency with the following:

   a. A complete set of approved erection and fabrication drawings.
   b. Information as to time and place of shipment of material to fabrication shop.
   c. Representative pieces and bolts required for testing.
   d. Bolt tension measuring device in accordance with Specification for Structural Joints using ASTM A 325 or A 490 bolts.
   e. Full and ample means and assistance for inspection and testing material and proper facilities, including, for example, scaffolding and temporary work platforms for inspection of Work in shop and field.
   f. A list of qualified welders including each welder's identifying symbol or mark in accordance with AWS.
   g. A copy of each welder's qualifying papers.
   h. Cooperation to facilitate work of Agency during inspection and testing.

2. If, during progress of Work, inspection indicates that Work may not be in conformance with Contract Documents, Design Professional may order additional testing on portions of structure affected.

1.5 Handling

A. Exercise care in handling, storing and erecting Work to avoid damage to shop primer and galvanizing.

Part 2 Products

2.1 Intent

A. Drawings are intended only to indicate arrangements and materials of framing layout. Provide required minor pieces and connections necessary to make Work complete whether or not indicated. Materials and workmanship shall conform to AISC Code of Standard Practice for Steel Buildings and Bridges, as modified by Contract Documents.

2.2 Materials

A. Provide recycled content materials in accordance with Sustainability Action Plan specified in Sustainability Requirements: Division 01.

B. Provide regional materials in accordance with Sustainability Action Plan specified in Sustainability Requirements: Division 01.

C. Use field applied paints and coatings that comply with the VOC limits and chemical restrictions specified in Sustainability Requirements: Division 01.

D. Structural Steel:

1. Rolled Sections:

   a. W Shapes: Conform to requirements of ASTM A 992/A 992M.
   b. Channels: Conform to requirements of ASTM A 572/A 572M, Grade 50, unless otherwise indicated.
   c. Angles: Conform to requirements of ASTM A 36/A 36M, unless otherwise indicated.

2. Hollow Structural Sections: Conform to requirements of ASTM A 500, Grade B.

3. Structural Pipe: Conform to requirements of ASTM A 53, Grade B.

4. Miscellaneous Connection Materials: Conform to requirements of ASTM A 572/A 572M or A 36/A 36M.

E. Bolts:

1. Conform to requirements of ASTM A 490 or A 325.

2. Bolts shall be certified to be of domestic (North American) manufacturer.

F. Nuts:

1. Conform to ASTM A 563, grade to match bolt specified.

2. Nuts shall be provided by same supplier as bolts and shall be certified to be of domestic (North American) manufacturer.

G. Washers:

1. Conform to ASTM F 436.

2. Washers shall be provided by same supplier as bolts and shall be certified to be of domestic (North American) manufacturer.

H. Anchor Rods: ASTM F 1554, grade 55, meeting Supplementary Requirements S1, unless otherwise indicated.

I. Welding Equipment and Materials: Conform to requirements of the AWS D1.1 with the exception that E70XX electrodes shall be used for ASTM A 36/A 36M steel.

J. Shop Primer Paint:

1. Shop primer paint shall conform to applicable provisions regarding Volatile Organic Compounds (VOCs). Primer shall withstand the following tests without any change in adhesion, film integrity, hardness, color, blistering or cracking:

   a. Salt Spray Resistance: ASTM B 117, 500 hours.
   b. Light and Water Resistance: ASTM D 4585, 500 hours.

2. Concealed Structural Steel: Steel concealed within building enclosure, and not requiring fireproofing.

   a. Heavy-duty alkyd primer having not less than 50 percent solids by volume.
   b. Products of the following Manufacturers are acceptable: No substitutions.

      1) Carboline Company.

      2) M. A. Bruder.

      3) Sherwin Williams.

      4) Tnemec Company.

3. ∗[1] Exposed Structural Steel: Steel permanently outside controlled building enclosure, whether exposed or covered by subsequent construction, or otherwise exposed, interior or exterior, including rooftop surfaces. See High-Performance Coatings Division 09.

   a. ∗[1] Deleted.
   b. ∗[1] Deleted.

      1) ∗[1] Deleted.

      2) ∗[1] Deleted.

      3) ∗[1] Deleted.

      4) ∗[1] Deleted. .

4. Shop primer paint shall be compatible with finish coat systems specified in Painting: Division 09.

5. Field Touch-Up Paint for steel specified to be galvanized.

a. Products of the following manufacturers are acceptable: No substitutions.

1) Carboline Company.

2) M. A. Bruder.

3) Sherwin Williams.

4) Tnemec Company.

K. Direct Tension Indicators shall conform to requirements of ASTM F 959 and shall be by TurnaSure LLC, Langhorne, PA, Applied Bolting Technology Products, Inc., Ludlow, VT. Equivalent products of other manufacturer's will be evaluated as substitutions in accordance with requirements of Division 01.

L. Torque control bolts shall conform to applicable requirements of ASTM A 325 , A 490 and/or F 1852 and shall be certified to be of domestic (North American) manufacturer.

2.3 Design

A. Connections: Design and detail connections to resist loads and reactions indicated. Details submitted shall be consistent with intent of indicated. Proper account of eccentricity shall be taken in design of connections as indicated. Design of connections shall be subject to approval, however review and approval of calculations by Design Professional shall not relieve fabricator's engineer of responsibility for negligence in performance of their professional services.

1. Beam-to-Column Connections: Shall be such as to minimize eccentric loading on column. Unrestrained simple beam end connections shall be detailed and fabricated so as to minimize end restraint of beam. Parts of such connections (such as, welds, bolts and material) shall be designed taking eccentricity into account.

2. Beams shall be designed for an end shear reaction as indicated. Bracing connections shall be designed for forces indicated.

3. Except for moment connections and bracing, make bolted connections with high-strength bolts using bearing type connections. For moment connections and bracing, bolted connections shall be slip critical. Slip critical connections shall be detailed and erected utilizing direct tension indicator washers in conformance with manufacturer's written instructions. Bearing type connections shall be designed assuming threads included in shear plane.

B. Temporary Bracing: Contractor shall be fully responsible for design, strength, safety and adequacy of temporary bracing and methods of construction in accordance with Division 01. Specifying herein of requirements for bracing, approvals by Design Professional, or any other requirements of Contract Documents shall be construed as minimum acceptable, and shall not eliminate, lessen or restrict in any manner responsibility of Contractor for construction methods and for safety and stability of Work at stages of erection, until such time as permanent bracing system becomes effective.

2.4 Fabrication

A. Mill contact surfaces of column splices, bearing stiffeners and other components as indicated to meet ASTM A 6/A 6M, Table 23.

B. Accurately space holes to allow insertion of bolts. Drill or punch bolt holes. Drill holes in material thicker than 7/8 inch and material thicker than bolt diameter.

C. Contact surfaces at high-strength bolt groups shall be cleaned and free of burrs.

D. Shape re-entrant corners notch-free to a radius of at least 1/2 inch.

E. Provide holes in members to facilitate connection of Work of other Sections. Steel requiring adjustment to meet specified tolerances of connected Work shall be provided with slotted holes as required.

F. Provide camber indicated.

G. Do not cut holes or slots in structural steel other than those indicated on approved Shop Drawings, or as specifically authorized in writing by Design Professional.

H. Perform oxygen cutting only with mechanically guided torch. Cut shall be within 1/8 inch of finished dimension.

2.5 Shop Painting

A. Do not shop paint steel, unless otherwise indicated. Do not paint contact surfaces of welded connections and areas within 2 inches of field welds. Do not paint contact surfaces of slip critical bolted connections unless paint has been qualified for this use as required by “Specification for Structural Joints Using ASTM A 325 or A 490 Bolts”. Submit certification and test report prior to painting. Do not paint top flange of beams indicated to receive field installed shear studs.

B. Surface Preparation:

1. Exposed: SSPC-SP6 “Commercial Blast Cleaning”.

2. Concealed: SSPC-SP3 “Power Tool Cleaning”.

C. Where indicated, paint steel with one (1) shop coat of primer. Minimum dry film thickness on interior steel, 2.0 mils ; exterior steel, 3.0 mils .

D. Apply two (2) coats of primer to surfaces inaccessible after assembly.

E. Protect milled surfaces from primer by coating with linseed oil.

F. Do painting only when surface of metal is dry and at a temperature above dew point of surrounding air. Do not paint in freezing weather unless Work is properly protected. Spread paint evenly and work well into joints and open spaces.

2.6 Galvanizing

A. After fabrication, hot-dip galvanized steel exposed to weather, and as indicated, in conformance with ASTM A 123/A 123M.

Part 3 Execution

3.1 Erection

A. Verify anchor rod alignment, elevation, projection and size prior to erection. Notify Design Professional of any errors and propose remedial action. Obtain Design Professional's written approval of methods proposed for correction of errors prior to proceeding with correction and erection.

B. Set base plates and bearing plates level to correct elevations and temporarily support on steel leveling devices until corresponding supported member has been positioned, plumbed and bolted. Leave protruding leveling devices in place until after grout has been placed and has attained required strength, and then cut off flush with edges of base plate.

C. Align, level and adjust members accurately prior to final fastening and as required to provide specified connections of elements to be supported by structural frame. Clean bearing surfaces and surfaces that will be in permanent contact prior to final assembly of members.

D. Erection tolerances shall be as specified in above referenced AISC Code of Standard Practice based on standard temperature of 68 degrees F except as follows:

1. Exterior columns shall be within 3/4 inch of theoretical centerline either toward or away from building line.

2. Centerline of any two (2) adjacent exterior columns shall be within 1/2 inch of each other toward or away from building line.

3. Intermediate exterior columns shall be within 3/4 inch of a line between corner columns.

4. Steel provided to facilitate connection of Work of other Sections shall be erected within tolerances required by those trades. Adjustable connections shall be provided as required. Field weld required adjustable connections after final adjustment.

E. As erection progresses, securely connect Work to resist all dead loads, wind, and erection forces. Provide temporary bracing to resist all loads, including construction loads which structure may be subjected to.

F. Torch cutting in field shall not be done except with written permission of Design Professional. When permitted, execute cutting in accordance with requirements indicated.

G. Take precautions necessary to avoid damage to existing structures.

3.2 Bolted Connections

A. Bolts shall be installed and tightened by any method indicated in Specification for Structural Joints using ASTM A 325 or A 490 Bolts, Paragraph 8.

B. Tightening procedure, and capabilities of each bolting crew, shall be confirmed by Inspection and Testing Agency prior to production. If "Alternate Design Bolts" or "Direct Tension Indicators" are to be used, a qualified technical representative of proprietary manufacturer shall witness confirmation testing.

C. Assign each bolting crew an identification symbol or mark. Each crew shall mark this identification on each joint completed.

D. Make joints without use of erection bolts. Where proper fit-up cannot be obtained, provide additional plumbing, leveling or corrective work as required. Use not more than two (2) washers per bolt.

E. Before bolts are tightened, bring parts tightly together with high-strength bolts. Retighten these bolts as all bolts are finally tightened.

3.3 Welded Connections

A. Definitions: Terms herein relating to welds, welding and oxygen cutting shall be construed to be in accordance with standard definitions of welding terms and master chart of welding processes of American Welding Society, as amended to date.

B. Welding shall be performed by operators who have been qualified within preceding one (1) year period under AWS standard qualification procedures for type of Work required.

C. Begin no welding until joint elements are bolted in intimate contact or adjusted to dimensions established in certified welding procedure, or both, with allowance for any weld shrinkage expected.

D. No members shall be spliced without prior written approval by Design Professional.

E. Field moment connections on beams and girders shall have a minimum of 3/16 inch root opening for all flange preparations prior to welding.

F. Perform welding in a sequence which shall prevent excessive stress and distortion in parent material caused by shrinkage in welds. Repair or replace all defective work.

3.4 Survey

A. Make an accurate survey of actual column locations and column splice elevations immediately upon completion of every tier of steel and immediately submit same to Design Professional. Should column locations vary beyond allowable tolerances, take necessary corrective measures prior to proceeding to next tier and modify details and/or erection procedures as required.

3.5 Rejected Work And Corrections

A. Acceptance of Work at shop does not preclude its rejection at Project Site.

B. Members or assemblies having fabrication errors, or which have errors or deformations preventing proper assembly and fitting of parts shall be reported immediately to Design Professional. Errors shall not be incorporated in Finished Work. Such members or assemblies may be corrected if approved in writing by Design Professional. Such corrective work shall be in accordance with Contract Documents.

C. Work determined to be deficient shall, as directed by Design Professional, be repaired or removed and replaced, at Contractor's expense. Contractor shall reimburse Owner for direct salary costs multiplied by a factor of 3.0 and other expenses incurred by Design Professional for Work required to investigate or correct Work of questionable quality. Contractor shall also pay all additional Inspection and Testing costs incurred by Inspection and Testing Agency relative to investigating, testing and correcting non-complying construction.

D. Prior to corrective work, submit for approval, Drawings showing details of proposed corrections.

E. Remove or correct rejected Work within three (3) working days from Date of Notification.

3.6 Field Touch-Up Painting

A. After erection, touch-up shop finish where missing or damaged.

B. For shop prime-painted surfaces, use same paint as approved for shop coat.

C. Prior to touch-up, remove rust, dirt, and weld slag.

D. Touch-up shop-galvanized surfaces with specified paint to a minimum dry film thickness of 3 mils.

E. Touch-up paint shall extend a minimum of 2 inches onto undamaged finish.

F. Paint shall be uniformly applied to dry surfaces to a dry film thickness no less than that specified for shop coat.

END

Part 1 General

1.1 Summary (Non-inclusive)

A. *[1] Section Includes: Architecturally Exposed Structural Steel (AESS) required for exposed structural support for lateral support of curtainwall framing within main entry of building, bus canopy structure, exposed glulam connections and as indicated.

1.2 Related Work Specified Elsewhere (Non-inclusive)

A. Applicable Sections: Division 01.

B. Fluoropolymer Coatings: Division 05.

C. Structural Steel Framing: Division 05.

D. Pipe and Tube Railings: Division 05.

E. Exterior Enclosure, General: Division 07.

F. Glazed Aluminum Curtainwall: Division 08.

G. High-Performance Coatings: Division 09.

1.3 Submittals

A. Submit per requirements of Division 01.

B. Shop Drawings: Per Structural Steel Framing: Division 05.

1. For seamed tube and pipe, indicate seam orientation on Shop Drawings.

2. Show shop and field connection details at a minimum scale of 3/4 inch to the foot.

3. Survey(s): Signed and sealed survey(s) as indicated.

C. Product Data: Product Data for manufacturer's standard products, including shop primer paint.

D. Samples: Two (2) sets of each type of welded, bolted and rod anchor connection to establish basis for acceptance of Work. Sample welds and rod anchor connections shall be a minimum of 8 inches long. Bolted connection Samples shall show size, orientation and thread protrusion of bolts. Show finish, cleaning and shop primer required in finished Work.

1. Full size sample of a typical column and beam connection at curtain wall support.

*[1] Addendum No. 6, 06/30/16

2. Full size sample of a typical column and beam connection at bus canopy.

3. Full size sample of beam to beam connection at bus canopy.

E. Calculations: Design calculations per Structural Steel Framing: Division 05. Comply with indicated loading and force criteria.

F. Quality Control Procedures:

1. Mill Test Reports: Per Structural Steel Framing: Division 05.

G. Certifications: Per Structural Steel Framing: Division 05.

H. Sustainability Submittals: Provide the following in accordance with Sustainability Requirements: Division 01.

1. Materials Sustainability Documentation Form.

2. Product data, certification letter, and costs for materials with recycled content.

3. Product data and costs for regional materials.

4. Product data for paints and coatings indicating VOC content and chemical composition.

1.4 Quality Assurance

A. Fabricator's and Erector's Qualifications:

1. Fabricator shall be currently certified in Category STD of AISC Quality Certification Program or shall certify to compliance with AISC Category STD requirements. A copy of fabricator's current AISC certificate, or such certification, shall be provided with Bid.

2. Erector shall be currently certified as an AISC Certified Steel Erector or shall demonstrate or certify to compliance with AISC Certified Steel Erector checklist. Submit erector’s current AISC certificate, or such certification, with Bid.

3. Fabricator and erector shall have together, satisfactorily completed work of similar scope and shall have necessary skill, equipment, facilities and capacity to fabricate and erect architecturally exposed structural steel in accordance with requirements of Contract Documents.

4. Fabricator shall provide effective full time quality control over fabrication activities. Fabricated items shall be subject to inspection. Inspection and testing by Inspection and Testing Agencies are not intended to be comprehensive or complete and full responsibility for quality control shall remain with fabricator.

5. Welder's Qualifications:

   a. Welding procedures and qualifications of operators shall be as prescribed in "Structural Welding Code, Steel", AWS D1.1.
   b. Welders shall be qualified to perform type of work required as determined by Design Professional based on Samples submitted.
   c. Each welder working on Project shall be assigned an identification symbol or mark and shall mark or stamp his identification at each weldment completed, in mock-up, in shop and in field.

B. Referenced Codes and Standards: Comply with following in accordance with Division 01.

1. American Institute of Steel Construction (AISC)

   "Specification for Structural Steel Buildings"

   "Code of Standard Practice for Steel Buildings and Bridges", including Section 10, and as modified by Contract Documents

2. American Welding Society (AWS)

   D1.1 Structural Welding Code, Steel

3. Research Council on Structural Connections: "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts, Load and Resistance Factor Design"

4. Society for Protective Coatings (SSPC)

   Painting Manual, Volume 1, Good Painting Practices

   Painting Manual, Volume 2, Systems and Specifications

C. Mock-up:

1. Provide full size mock-up as indicated.

2. Do not initiate construction of mock-up prior to approval of connection calculations, details and Samples.

3. Welders producing "field" welds in mock-up shall be same welders to perform Work at Project Site.

4. Mock-up shall be representative of finished Work in all respects. Replace unsatisfactory work as directed. Mock-up shall be provided at fabricator's plant. Mock-up assembly will be used as a standard for judging acceptability of Work on Project.

5. Apply finished paint system specified in Fluoropolymer Coatings: Division 05 to exposed surfaces of mock-up.

D. Pre-detailing Conference: Prior to starting detailed development of calculations and Shop Drawings, Contractor shall arrange a meeting to review approach to design and detailing of connections and procedures for fabrication and erection.

1. Coordinate with requirements of Exterior Enclosure, General: Division 07.

2. Meeting shall be attended by responsible representatives of each party concerned with structural steel work including, but not limited to, the following:

   a. Owner's Representative.
   b. Construction Manager.
   c. Contractor's Superintendent.
   d. Steel Inspection and Testing Agency.
   e. Exterior Enclosure Installers.
   f. Architecturally Exposed Structural Steel Fabricator.
   g. Architecturally Exposed Structural Steel Detailer/ Detailing Engineer.
   h. Architecturally Exposed Structural Steel Erector.
   i. Structural Steel Fabricator.
   j. Structural Steel Detailer/Detailing Engineer.
   k. Structural Steel Erector.

3. Design Professional will be present at meeting. Contractor shall notify Design Professional at least five (5) days prior to proposed date of conference.

4. Minutes of meeting shall be recorded and typed by Contractor and distributed to concerned parties within five (5) days of meeting.

E. Independent Inspection and Testing: Services of an independent Inspection and Testing Agency are required in conjunction with the Work of this Section. Facilitate work of and cooperate with Inspection and Testing Agency. Comply with Structural Steel Framing: Division 05. Refer to Division 01.

1.5 Handling

A. Exercise care in handling, storing and erecting Work to avoid damage to fabricated members and to shop primer.

Part 2 Products

2.1 Intent

A. Drawings are intended to indicate only arrangements and materials of framing layout. Materials and workmanship shall conform to AISC Code of Standard Practice for Steel Buildings and Bridges, including Section 10, as modified by Contract Documents.

B. Maintain dimensions, sight lines, jointing, and profiles. Minor variation is allowable only with written approval of Design Professional and if variations are identified on submittals.

C. Details given for connections are to indicate design intent only. Contractor may submit other details if design intent is maintained. Primary intent of connection details is to eliminate any extra plates, gussets or reinforcement and to allow for clean sharp corners and flush surfaces at welds, making them invisible. Use of body filler to mask welds is acceptable. Details require written approval of Design Professional.

2.2 Materials

A. Provide recycled content materials in accordance with Sustainability Action Plan specified in Sustainability Requirements: Division 01.

B. Provide regional materials in accordance with Sustainability Action Plan specified in Sustainability Requirements: Division 01.

C. Use paints and coatings that comply with the VOC limits and chemical restrictions specified in Sustainability Requirements: Division 01.

D. Steel Materials: Comply with Structural Steel Framing: Division 05, unless otherwise indicated.

E. Stainless Steel Rods, Fittings and Connections:

1. Rods: Conform to ASTM A 276 and AISI Type 304 or 316, mill finish.

F. Bolted Connections: Direct tension indicators and torque control bolts shall not be used.

G. Shop Primer Paint: As specified in Fluoropolymer Coatings: Division 05.

H. Shop Primer Paint:

1. Shop primer paint shall conform to applicable provisions regarding volatile organic compounds (VOCs). Primer shall withstand the following tests without any change in adhesion, film integrity, hardness, color, blistering or cracking:

   a. Salt Spray Resistance: ASTM B 117, 500 hours.
   b. Light and Water Resistance: ASTM D 4585, 500 hours.

2. Interior Architecturally Exposed Structural Steel: Steel exposed within building enclosure and indicated as Architectural Exposed Structural Steel.

   a. Heavy-duty alkyd primer having not less than 50 percent solids by volume.
   b. The following products are acceptable:

      1) GP 818 by Carboline Company.

      2) Series FD 88 by Tnemec Company, Inc.

      3) Series B 50 by Sherwin Williams.

      4) Glidden Professional: Devguard 4360 by Devoe Coatings.

   c. Other products will be considered only if certified test reports demonstrate compliance with above performance requirements.
   d. ∗[1] Shop primer paint shall be compatible with finish coat systems specified in Painting: Division 09. Color shall be as selected by Design Professional from manufacturer's standards.

3. ∗[1] Exterior Architecturally Exposed Structural Steel: See Section 099600 High-Performance Coatings.

   a. ∗[1] Deleted.

b. *[1] Deleted.

1) *[1] Deleted.

2) *[1] Deleted.

3) *[1] Deleted.

4) *[1] Deleted.

c. *[1] Deleted.

I. Fairing Compound and Filler: Epoxy type, rated for exterior application, compatible with top-coats, compound and filler by same manufacturer.

1. Spray-applied Fairing Compound: AlphaCoat Surfacing System by ITW Spraycore or equivalent.

2. Filler: Spot-Lite by FibreGlass-Evercoat, a Division of ITW, Inc., or equivalent.

2.3 Design

A. Connections: Design and detail connections to resist loads and forces indicated. Details submitted shall be consistent with intent indicated. Design of connections shall be subject to approval, however review and approval of calculations by Design Professional shall not relieve fabricator's engineer of responsibility for negligence in performance of their professional services.

1. Make bolted connections with high-strength bolts using slip-critical type connections.

2. Welded Connections: Continuously weld joints.

B. Temporary Bracing: Comply with Structural Steel Framing: Division 05.

2.4 Fabrication

A. For members adjacent to wall plane, fabricate seamed members with seam facing wall. Other seamed members shall be fabricated with seam facing up. Indicate seam orientation on Shop Drawings.

B. Members shall not be spliced between connections.

C. Shape re-entrant corners notch-free to a minimum radius of 1/2 inch and as indicated.

D. Provide holes in members to facilitate Work of other Sections. Do not cut holes or slots other than those indicated on approved Shop Drawings, or as specifically authorized by Design Professional.

E. Exposed Welds:

1. Welds shall be ground and/or otherwise treated as required to blend with adjacent parent material without impairing structural integrity of connection.

2. Welds shall have a smooth and consistent cross-section and appearance.

3. Dress welds with filler to provide smooth finish, blended invisibly with adjacent surfaces.

4. Welds shall be free of defects visible from a distance of 10 feet under normal lighting conditions.

F. Surface Repair and Dressing:

1. Dress exposed surfaces to a smooth and uniform appearance by grinding, blasting and filling, followed by fairing compound and sanding.

2. Remove mill identification or other marking.

3. Grind and fill seams in pipes and tubes to be invisible in finished Work.

4. Remove, grind or fill dents or other imperfections.

5. Condition of exposed surfaces is subject to approval by Design Professional.

2.5 Shop Painting

A. Comply with requirements of Fluoropolymer Coatings: Division 05.

Part 3 Execution

3.1 Erection

A. Verify anchor rod alignment, elevation, projection and size prior to erection. Notify Design Professional in writing of any errors and propose remedial action. Obtain Design Professional's written approval of methods proposed for correction of errors prior to proceeding with correction and erection.

B. Set base plates level to correct elevations and temporarily support on steel leveling devices as indicated and until corresponding supported member has been positioned, plumbed and connected.

C. Align, level and adjust members accurately prior to final fastening and as required to provide connections of elements to be supported by structural frame within specified tolerances. Clean bearing surfaces and surfaces that will be in permanent contact prior to final assembly of members.

D. Rolling and Fabrication Tolerances: As specified in AISC Code of Standard Practice, Section 10 except as follows:

1. Out-Of-Square, Surface Flatness and Outside Dimension Tolerances: One-half of tolerances in ASTM A 6, ASTM A 53 and ASTM A 500, as applicable.

E. Erection Tolerances: As specified in AISC Code of Standard Practice, Section 10 based on a standard temperature of 68 degrees F except as follows:

1. Comply with Structural Steel Framing: Division 05.

2. AESS framing system shall comply with tolerance requirements of exterior enclosure and shall be erected, surveyed and accepted by exterior enclosure erectors prior to enclosure erection.

F. As erection progresses, securely connect Work to resist gravity loads, wind, and erection forces. Provide temporary bracing to resist loads, including construction loads which structure may be subjected to.

G. Torch cutting in field shall not be done except with written permission of Design Professional. When permitted, execute cutting in accordance with requirements indicated.

3.2 Bolted Connections

A. Bolts shall be installed and tightened by “turn-of-the-nut” method.

B. Capabilities of each bolting crew shall be confirmed by Inspection and Testing Agency prior to production.

C. Make joints without use of erection bolts. Where proper fit-up cannot be obtained, provide additional plumbing, leveling or corrective Work as required. Do not use more than number, size and location of bolts indicated on approved Shop Drawings.

D. Before bolts are tightened, bring parts tightly together. Retighten these bolts as bolts are finally tightened.

E. Connections are subject to Design Professional review and acceptance based on approved Shop Drawings, Samples and Mock-up. Connections shall not be “touch-up” painted in field prior to Design Professional’s acceptance.

3.3 Welded Connections

A. Definitions: Terms herein relating to welds, welding and oxygen cutting shall be construed to be in accordance with standard definitions of welding terms and master chart of welding processes of American Welding Society, as currently amended.

B. Welding shall be performed by operators who have been qualified within preceding one (1) year period under AWS standard qualification procedures for type of work required.

C. Begin no welding until joint elements are adjusted to dimensions established in certified welding procedure with allowance for any weld shrinkage that is expected and are within tolerances specified.

D. Perform welding in a sequence which shall prevent excessive stress and distortion in parent material caused by shrinkage in welds. Repair or replace defective Work.

E. Field-welded connections are subject to Design Professional review and acceptance based on approved Samples and Mock-up. Connections shall not be “touch-up” painted in field prior to Design Professional’s acceptance.

3.4 Survey

A. Make an accurate survey of actual framing locations immediately upon completion of framing and immediately submit to Design Professional.

3.5 Rejected Work And Corrections

A. Comply with Structural Steel Framing: Division 05.

3.6 Field Touch-Up Painting

A. Comply with requirements of Fluoropolymer Coatings: Division 05.

B. After erection, touch-up shop finish where missing or damaged.

C. For shop prime-painted surfaces, use same paint as approved for shop coat.

D. Prior to touch-up, remove rust, dirt, and weld slag.

E. Touch-up paint shall extend a minimum of 2 inches onto undamaged finish.

F. Paint shall be uniformly applied to dry surfaces to a dry film thickness no less than that specified for shop coat.

END

Part 1 General

1.1 Summary (Non-inclusive)

A. Section Includes:

1. Aluminum entrance doors.
2. Vestibule doors match entrance doors.
3. Storefront framing.

1.2 Related Work Specified Elsewhere (Non-inclusive)

A. Applicable Sections: Division 01.

B. Fluoropolymer Coatings: Division 05.

C. Exterior Enclosure, General: Division 07.

D. Joint Sealants: Division 07.

E. Glazing: Division 08.

F. Door Hardware: Division 08, refer to for hardware by Finish Hardware Section for installation by this Section.

1.3 Submittals

A. Submit per the requirements of Division 01.

1. Submittals will not be reviewed until satisfactory completion of mock-up testing. Submittals forwarded prior to completion of testing will be returned “Revise and Resubmit” or placed on hold until completion of testing. Allowable time period for Design Professional review of submittals will not begin until after completion of testing.

B. Shop Drawings: Show materials, gauges, finishes, anchorage, flashing, hardware preparation, trim and closures. Show how system complies with specified criteria including, but not limited to, accommodation of structural movement, thermal cycling and control of water penetration, air infiltration and vapor migration.

1. Elevations: Minimum 1/4 inch equals 1 foot scale elevations of each storefront frame and door.

2. Details: Minimum 3 inch equals 1 foot scale details of each assembly including heads, sills, mullions, corners, relationships with abutting construction attachments to adjacent construction and joints in system.

3. Show sufficient information to trace continuity of inner and outer line of seals, (rain screen and air barrier) and to trace continuity of vapor retarder if location differs from inner seal.

4. Schedule: Show each door and opening, unique for actual location, showing room number, and sub number if more than one door or opening per room. Show, as a minimum, the same information as on schedule included herein. Show hardware group on schedule.

   a. Where doors or opening are indicated by generic type instead of unique mark for actual location, list all doors and openings by unique mark under each heading for the generic type indicated.
   b. Provide one schedule for the entire project, coordinate schedule for doors and openings of materials specified in other sections.

C. Product Data: On framing system, doors, door hardware and accessories. Include structural capacity information showing product complies with indicated criteria. Submit test reports showing compliance with air and water infiltration criteria.

1. Condensation Resistance: Submit adequate data to establish compliance with specified criteria.

D. Samples:

1. Finish Samples: Three (3) sets of Samples, each piece 8 1/2 inches by 11 inches, demonstrating full range of variation in color, texture and finish.

E. Calculations: Performed by, or under direct personal supervision of, Manufacturer's Design Engineer. Shop Drawings will not be reviewed without associated calculations. Calculations shall demonstrate compliance with design criteria indicated. Submit the following calculations:

1. Member section properties, stresses, deflections and rotations.

2. Member to member connection detail forces and stresses.

3. Building anchorage detail forces and stresses.

4. Thermal movements.

F. Qualifications: Manufacturers, Designers and Installers qualifications.

G. Sustainability Submittals: Provide the following in accordance with Sustainability Requirements: Division 01.

1. Materials Sustainability Documentation Form.

2. Product data, certification letter, and costs for materials with recycled content.

3. Product data and costs for regional materials.

4. Product data for adhesives and sealants indicating VOC content.

5. Product data for paints and coatings indicating VOC content and chemical composition.

H. Closeout Submittals:

1. Special Warranty: As indicated.

2. Maintenance Data: For operable hardware.

1.4 System Description

A. Design: Engineer system to perform in compliance with indicated criteria and to comply with indicated design intent.

1. Maintain basic dimensions of system, sight lines, jointing, and profiles. Minor variation is allowable only with approval of Design Professional and if variations are identified on submittals.

2. Engineer components of system not fully detailed within a reasonable inference of design intent.

B. Structural Requirements: Withstand loading and deflection criteria in accordance with Exterior Enclosure, General: Division 07.

C. Movement: Accommodate movement criteria in accordance with Exterior Enclosure, General: Division 07.

D. Air and Water Requirements: Comply with criteria per Exterior Enclosure, General: Division 07 and the following.

1. Limit air infiltration at doors to 1.0 cfm per lineal foot of crack at a pressure differential of 10 psf as measured in accordance with ASTM E 283.

1.5 Quality Assurance

A. Manufacturer's Qualification: Manufacturer shall have minimum five (5) years experience producing products similar to those required for this Project. Manufacturer shall have documented experience of successfully providing products for three (3) projects of scope, schedule and complexity similar to this Project within last two (2) years.

1. Company marketing primary products specified for this Section shall also be manufacturer. Companies marketing products which are manufactured by third parties for private labeling by marketing company will not be allowed.

2. Manufacturer's Design Engineer: Professional Engineer, licensed in the State of North Carolina and having a minimum of five (5) years experience designing systems similar to those required for this Project. Design Engineer shall sign and seal calculations.

3. Submit qualifications on manufacturers letterhead. Include project descriptions with Owner and Design Professional contacts for previous experience.

B. Installer's Qualifications: Installer shall have minimum five (5) years experience installing products similar to those required for this Project. Installer shall have documented experience of successfully completing three (3) projects of scope, schedule and complexity similar to this Project within last two (2) years.

1. Welding shall be performed by certified welders, qualified or licensed in accordance with local building regulations and shall conform to recommended practices of American Welding Society.

2. Submit qualifications on Installer's letterhead. Include project descriptions with Owner and Design Professional contacts for previous experience.

C. Single Source Requirements: All primary products required for Work of this Section shall be supplied by one (1) manufacturer. Accessory products including, for example, fasteners, sealants and anchors may be from other than primary manufacturer if approved in writing by primary manufacturer.

D. Regulatory Requirements:

1. Comply with ANSI A 117.1.

E. Certifications: Comply with Exterior Enclosure, General: Division 07.

F. Mock-ups: Provide entrances and storefronts required for mock-up in accordance with Exterior Enclosure, General: Division 07.

G. Preinstallation Meeting: Refer to Exterior Enclosure, General: Division 07 prior to commencing this Work per requirements of Division 01.

H. Inspection and Testing: Services of and independent Inspection and Testing Agency are required in conjunction with Work of this Section: Refer to Division 01.

1.6 Delivery, Handling And Storage

A. Protect prefinished surfaces with wrapping or strippable coating. Do not use adhesives which bond or leave a residue.

1.7 Project Conditions

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

B. Verify that field measurements are as indicated on Shop Drawings.

1.8 Sequencing

A. Do not cover Work which is to be inspected or tested until directed.

1.9 Special Warranty

A. Provide three (3) year Warranty under provisions of Division 01 and Contract.

B. Warranty: Include coverage for complete system for failure to meet specified requirements.

Part 2 Products

2.1 Manufacturers

A. Products of indicated manufacturers are acceptable, contingent upon meeting all indicated requirements. No substitutions.

1. Basis of design: YKK YES 45TU.
2. Kawneer Company, Inc.
3. Oldcastle Glass Architectural Products.

2.2 Materials

A. Use adhesives and sealants that comply with the VOC limits specified in Sustainability Requirements: Division 01.

B. Use paints and coatings that comply with the VOC limits and chemical restrictions specified in Sustainability Requirements: Division 01.

C. Aluminum alloy and temper to suit intended purpose.

1. Extruded Shapes and Tubes: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Structural Shapes: ASTM B 308.
4. Drawn Seamless Tube: ASTM B 210.
5. Castings: ASTM B 26, B 108, B 85.
6. Welding Rod: AWS A 5.10.

D. Galvanized Steel Sheet: ASTM A 653, grade to suit intended purpose, galvanized per ASTM A653/A653M to coating designation G60.

E. Steel Sections: ASTM A 36, galvanized after fabrication per ASTM A 123.

F. Structural Steel Tubing: ASTM A 500, Grade B, galvanized after fabrication per ASTM A 123.

G. Anchorage Clips and Fabrications: High-strength aluminum or nonmagnetic stainless steel.

H. Concrete Inserts: Cast-iron, malleable iron or steel hot dip galvanized after fabrication per ASTM A 123.

I. Continuous Adjustable Concrete Inserts: stainless steel channels with welded anchor legs with special "tee" head bolts. Cap ends of channel or fill with foam to keep out wet concrete. Manufactured by Unistrut or Halfen.

J. Insulation: As specified in Thermal Insulation: Division 07.

K. Fasteners:

1. Contacting aluminum and dissimilar metals: Stainless steel, ASTM F 593 and F 594 Alloy Group 1, finish to match adjacent surface if exposed.

2. Contacting steel or galvanized steel only: Hot dip galvanized steel conforming with ASTM B 633, SC4 or ASTM A 153.

L. Coatings:

1. Shop primer for steel: SSPC-Paint 20.

2. Touch-up primer for galvanized steel: Primer with minimum 80 percent zinc in dry film complying with SSPC 20.

3. Dissimilar Metal Coating: Cold-applied asphalt mastic or other non-conductive, non-absorptive material.

M. Foam Tape: Nine (9) pcf density, self-adhesive, foam tape with flame retardants to meet FMVSS 302 flammability standard. Norton V 780 or approved substitution. Provide tape 1 inch wide, unless otherwise indicated, by the following thickness.

1. Provide 1/8 inch thick at metal panels, concrete or other smooth substrate.

2. Provide 1/4 inch thick at masonry or similar rough substrate.

N. Butyl Coated Foam Tape: Soft, compressible PVC foam core encapsulated with 100 percent solids butyl. "Norex" by Norton or approved substitution. Provide 1/8 inch by 1/2 inch tape, unless otherwise indicated.

2.3 Storefront

A. *[1] System design is based on YES 45TU and YES 600 as manufactured by YKK, subject to conformance to specified criteria. Modify standard system as required to comply.

B. Two (2) Stage Weatherproofing: System shall provide redundant weatherproofing (both internal to system and at interface of system with adjacent construction) to control infiltration of water and air which may bypass outer weatherseal and to maintain continuity of vapor retarder.

1. System shall be weathertight at interior face of glazing and interior face of glazing pocket. Water which may penetrate outer glazing seal shall be weeped to exterior.

*[1] Addendum No. 6, 06/30/16

2. Systems which require blind seals, seals that cannot be tooled in their final location, or other seals which do not comply with SWRI recommendations and which are required to maintain the performance of the air barrier, even if such conditions have adequately passed laboratory testing, will not be allowed.

3. Do not allow water to puddle or stand. Surfaces shall be pitched towards drains or weeps.

4. System shall be capable of accepting an inner line of membrane flashing at the rear of the glazing pocket and sheet metal flashing or metal panel system trim at the outer face of the glazing pocket.

5. Sills shall have watertight sub-sills to direct water penetrating outer glazing seal or primary exterior sealant to exterior.

   a. No penetrations are allowed in horizontal portions of sub-sill.
   b. Sub-sill shall have watertight enddams which intercept downward flow of water from space between inner and outer seals at jambs.

C. Vapor Retarder: Inner glazing forms a portion of vapor retarder for building envelope. Provide continuity of vapor retarder across inner face of glazing pocket. Where vapor retarder is at a location other than the inside face of glass, detail system to maintain continuity of vapor retarder across framing members. Detail system and connection to adjacent vapor retarder materials.

D. Frame: Tubular and channel shaped extruded aluminum sections with minimum wall thickness of 0.080 inches for main members.

1. Furnish accessories, clips, stops, fillers.

2. Reinforce internally for structural performance and hardware.

3. Steel embedded within any portion of curtainwall which may be exposed to moisture shall be galvanized.

E. Exterior frames shall be thermally improved to meet specified criteria. Interior frames need not be thermally improved if dimensions and profiles exactly match exterior frames.

F. Glazing System:

1. Stops shall be removable from exterior.

2. Glazing shall be located as indicated.

G. Accessories:

1. Provide filler panels to allow for back-up of full depth of sealant and backer rod where sealant is indicated or required to meet specified criteria.

2. Receivers: Provide extruded aluminum thermally broken head and jamb receiver channels with weatherstripping.

3. Sub-Sills: Provide extruded aluminum thermally broken sub-sills below sill member of each frame.

2.4 Doors

A. Standard duty extruded aluminum tubular frames with minimum wall thickness of 0.125 inch and depth of 1 3/4 inch.

B. Heavy duty extruded aluminum tubular frames with minimum wall thickness of 0.188 inch and depth of 2 inches.

C. Thermal extruded aluminum frame with minimum wall thickness of 0.125 inch and depth of 2 inches. Exterior aluminum shall be separated from interior aluminum with a rigid, structural thermal barrier.

D. Profiles:

1. Medium:

a. Stiles: 3 1/2 inches.
b. Head: 3 1/2 inches.
c. Bottom Rail: 12 inches minimum for ADA requirements.

E. Stops shall be square

2.5 Glass And Glazing

A. In accordance with Glazing: Division 08.

2.6 Flashing And Brake Metal

A. Flashing concealed with system shall be aluminum.

B. Concealed flashing where system abuts dissimilar materials shall be minimum 20 gage stainless steel.

C. Exposed flashing shall be aluminum, finished to match system, minimum 0.062 inch.

D. Brake metal and other similar formed sheet fillers and trim shall be minimum 0.125 inch aluminum, finished to match system. At joints in brake metal, fold back edges or weld on concealed 1/8 inch aluminum angles to provide minimum 1 1/2 inch deep support for sealants backer.

2.7 Sealants

A. Sealants within system shall be ASTM C 920 silicone or epoxy as recommended in writing by manufacturer.

B. Sealants for use in field shall be in accordance with Joint Sealants: Division 07.

2.8 Hardware (Refer To Hardware Specification For Additional Requirements)

A. Provide hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended in writing by manufacturer for service required; finished to match door, unless otherwise indicated.

B. Automatic door operators in accordance with Division 08. Coordinate requirements for operators with Work of this Section.

C. Hanging Devices:

1. Offset Pivot Sets: Comply with ANSI A156.4, Grade 1. Provide exposed parts of cast aluminum alloy. Provide an intermediate pivot for doors over 7 feet 6 inches high.

D. Closers:

1. Single-Acting, Independently Hung, Concealed Overhead Closers: Comply with ANSI A156.4, Grade 2. Provide concealed arm and track. Comply with manufacturer's written recommendations for closer size, depending on door size, exposure to weather and anticipated frequency of use.

E. Holders:

1. Concealed Overhead Holders: Adjustable, shock-absorbing type concealed overhead holders; comply with ANSI A156.8.

F. Cylinders are supplied under Door Hardware: Division 08.

G. Deadlocks: Mortised maximum security deadlock, with minimum 1 inch long pivoted bolt and stainless steel strike box: comply with ANSI A156.5, Grade 1.

H. Panic Devices:

1. Panic Hardware: Rim-type, center latch bolt type panic exit device activated by a full-width crash bar. Comply with UL 305.

I. Push/Pulls:

1. Pull: Offset solid round pull, 3/4 inch diameter, 2 1/2 inch projection, 3 inch offset and 12 inch center-to-center base, no escutcheons or roses, align top with push bar on opposite side of door.

2. Push-solid round push bar, 3/4 inch diameter, 2 1/4 inch projection, full width of door, no escutcheons or roses align with top of pull on opposite side of door

J. Thresholds: Extruded aluminum, one (1) piece per opening, ADAAG compliant, ribbed, non-slip,

K. Weatherstripping:

1. Jambs and heads to have continuous nylon pile weatherstripping at stops. Bottom of floor shall have a concealed mounted nylon pile weather-strip in bottom channel.

2. Double acting doors shall have nylon pile weatherstripping mounted to doors on all four (4) sides. Door head and sill weatherstripping shall be concealed mounted in door channels. Stiles shall have an integral groove in frame member to accept weatherstripping.

2.9 Fabrication

A. Fabricate entrance and storefront components to designs, sizes and thicknesses indicated and as required to comply with specified performance requirements. Match approved Samples mock-ups. Comply with approved submittals.

B. Prefabrication: Complete fabrication, assembly, finishing, hardware application and preparation and other Work to greatest extent possible before shipment to Project Site. Disassemble components only as required for shipment and installation. Shipping of stock lengths of frame member components for cutting to length on Project Site is not acceptable.

C. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces.

D. Welding: Comply with AWS recommendations. Exposed welds are not acceptable. Welding behind finished surfaces shall be performed to avoid distortion or discoloration of finish.

E. Reinforcing: Install reinforcing as required for hardware and performance requirements.

F. Weathertightness: Fabricate so that sealant is not foremost or only means to furnish a watertight assembly and to direct water out of system through weepholes.

G. Dissimilar Metals: Separate dissimilar metals with SSPC 20 paint, sealant or gasket.

H. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.

I. Uniformity: Abutting members shall not have an integral texture or color variation greater than half the range indicated in approved Samples.

J. Anchorage: Prepare members for attachment to adjacent structure and each other. Fabricate, for example, anchors, clips and cleats.

K. Fasteners: Fasteners shall be concealed from eye level view in Finished Work.

L. Receivers and Sub-sills: Fabricate to required dimensions. Weld on end dams at all sub-sills. Fabricate joints to allow for movement without affecting water-tightness.

M. Flashing: Fabricate in accordance with Flashing and Sheet Metal: Division 07.

N. Doors: Fabricate with mechanical joints using heavy inserted reinforcing plate and concealed tie rods or J-bolts. Fabricate to facilitate replacement of glass without disassembly of door frame using removable interior stops and concealed fastened exterior stops.

2.10 Finishes

A. General:

1. Shop finish Work including priming of surfaces not to be exposed to view in Final Work.

2. Finish aluminum entrance and storefront to match other adjacent aluminum curtainwall components.

3. Finish: Refer to Fluoropolymer Coatings: Division 05.

2.11 Source Quality Control

A. Comply with applicable tolerances listed under written installation instructions of this Section for shop fabrication.

B. Comply with Exterior Enclosure, General: Division 07.

Part 3 Execution

3.1 Examination

A. Examine existing and new substrates and supports, with Installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of aluminum entrances and storefronts.

B. Do not proceed with installation until unsatisfactory conditions are corrected. Proceeding with installation constitutes acceptance of substrates and supports.

3.2 Preparation

A. Isolation: Separate substrates and supports which could cause corrosion or electrolytic action with aluminum storefront by painting, gaskets or similar method.

3.3 Installation

A. General: Comply with manufacturer's written instructions and recommendations for installation. Comply with approved submittals and Mock-up.

1. Installation of coating system components shall comply with requirements of all applicable local, state and national code jurisdictions.

B. Sub-Sill: Set sub-sill flashing in a triple row of sealant. Anchor sub-sill using clips or anchors without penetrating horizontal portion of sub-sill. Seal watertight. Provide foam tape between sub-sill and frame.

C. Receivers: Set receiver channels with concealed anchors to adjacent construction. Seal all penetrations and anchorage points.

D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

E. Provide alignment attachments and shims to permanently fasten system to building structure.

F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

G. Provide thermal isolation where components penetrate or disrupt building insulation.

H. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

1. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.

2. Paint dissimilar metals where drainage from them passes over aluminum.

3. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.

4. Paint wood and similar absorptive material in contact with aluminum and exposed to elements or otherwise subject to wetting, with two (2) coats of aluminum house paint. Seal joints between materials with sealant.

I. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's written instructions and template requirements. Use concealed fasteners wherever possible. Set thresholds in a bed of mastic and secure.

J. Glazing: Refer to Glazing: Division 08.

K. Sealants: Refer to Joint Sealants: Division 07.

3.4 Erection Tolerances

A. Limit variations from plumb, level or dimensioned angle to the following:

1. 1/8 inch maximum deviation in any story height, or in any 10 feet vertical or angular run, or in any 20 foot horizontal run, non-cumulative.

2. 1/4 inch maximum deviation in any 40 foot run, any direction, non-cumulative.

B. Limit variations from ideal location (theoretical calculated positions in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to the following:

1. 1/4 inch total maximum deviation for any element at any location, non-cumulative.

2. 1/4 inch maximum change in deviation for any element for any 10 foot run, any direction, non-cumulative.

C. Limit offset in end-to-end or edge-to-edge alignments of adjoining consecutive elements indicated to be flush, continuous or planar to the following:

1. Interior: 1/32 inch.

2. Exterior: 1/16 inch.

D. Limit variation from indicated position in end-to-end or edge-to-edge alignments of adjoining consecutive elements indicated to be less than 1/2 inch out-of-plane or are separated by a maximum 2 1/2 inch wide member to the following:

1. Interior: 1/16 inch.

2. Exterior: 1/8 inch.

E. Limit variation from indicated position in end-to-end or edge-to-edge alignments of adjoining consecutive elements indicated to be 1/2 inch or more out-of-plane or are separated by a member wider than 2 1/2 inches to the following:

1. Interior: 1/8 inch.

2. Exterior: 3/16 inch.

F. Limit maximum width of a hairline joint as follows:

1. Interior: 0.020 inch.

2. Exterior: 0.050 inch.

G. Limit maximum variation is width of a hairline joint as follows:

1. Interior: 0.005 inch.

2. Exterior: 0.020 inch.

H. Limit difference in diagonal measurements to 1/8 inch.

I. Comply with stricter tolerances if required for glazing or to meet specified performance criteria.

3.5 Field Quality Control

A. Comply with Exterior Enclosure, General: Division 07.

3.6 Adjusting

A. Adjust operating hardware to function properly, for smooth operation without binding, and for weather tight closure.

3.7 Cleaning

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down new surfaces including refinished frames and doors (after curing of field applied coating system)with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method approved in writing by sealant manufacturer.

3.8 Protection

A. Institute protective measures required throughout remainder of Construction Period to ensure that interior aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at Date of Substantial Completion.

END