

**9/11 Memorial for the City of Hoboken
Project Specifications
Demetri Sarantitis Architects
9.30.16**

Division 1: General Requirements
Section 0100 General Conditions

1.1 GENERAL NOTES

- A. All works shall comply with the regulations of the governmental authorities having jurisdiction. The specifications shall be supplemental to all laws and codes of governmental regulating bodies relating to buildings and all applicable requirements specified in these regulations shall be followed as if specifically noted in these specifications or drawings. This shall not be construed to mean that any requirements set forth in the specifications can be modified because they are not specifically noted by such codes or laws.
- B. All Demetri Sarantitis Architects (DSA) drawing and construction notes are complimentary, and what is called for by one will be binding as if called for by all.
- C. Contractors shall notify the Construction Manager (CM) immediately if they cannot comply with all notes called for on this sheet and on other DSA drawings. The CM shall notify DSA.
- D. Contractors shall notify CM of any discrepancies between these drawings, notes, and field conditions to request clarification before submitting a proposal or commencing any work. The CM shall notify DSA.
- E. Contractors shall visit the premises to familiarize themselves with existing conditions and satisfy themselves as to the nature of the nature and scope of work and the difficulties that attend its executions before submitting any proposal.
- F. The submission of a proposal shall be construed as evidence that such an examination has been made and later claims for labor, equipment or material, or for difficulties encountered which could have been foreseen had such an examination been made, will not be recognized.
- G. The contractors agree to pay all vertical and horizontal transportation charges on his material or equipment to the point of use and shall be responsible for all unloading, checking and storing of same in connection with this contract.
- H. Contractors shall, at owner's discretion, utilize the AIA standard for requests for payment and follow all guidelines associated therewith.
- I. All correspondence shall be copied to all concerned parties
- J. Contractors, their subcontractors, and any other contractor involved in this project shall take note that any cost caused by defective or ill-timed work, as a result of, but not limited to, inferior workmanship or materials improper scheduling or delinquent ordering shall be borne by the party responsible therefore.

1.2 RELATED DOCUMENTS

- A. The general conditions of the contract for the construction of buildings standard form of the American Institute Of Architects, current edition, shall apply to all work in this contract, except as specifically modified under contract, or modified under supplementary conditions and/or by agreement.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. As per contract documents

1.4 DRAWINGS AND SPECIFICATIONS

- A. CM shall arrange for the maintenance of a current and complete set of construction drawings on site during all phases of construction for the use of all trades, at the owner's expense.

- B. Contractors, upon acceptance and approval of the drawing assumes full responsibility for the construction, materials and workmanship of the work described in these notes and drawings, and they will be expected to comply with the spirit as well as the letter in which they were written.

1.6 CONTRACTOR USE OF THE PREMISES

- A. Landlord / building owner requirements for all alterations shall apply to all work as required. It shall be the responsibility of the contractors to familiarize themselves with them.
- B. All contractors shall contact the City of Hoboken to determine the rules of the building to determine when deliveries can be made, what phases of construction can be done on regular or overtime, and in general, any special building requirements which will affect work. (If over-time work is required by any trade, approval must be obtained prior to the execution of any work.) The general intent is that most work shall be done on regular time.
- C. Each contractor shall make all required arrangements for delivery of equipment and/or materials. It shall be the responsibility of each contractor to check the rules and regulations governing work on the premises, including the following:
 - 1. Date and time of delivery shall be established in conjunction with the person having jurisdiction over the premises (overtime charges and/or any necessary expenses shall be paid by the contractor requiring services.)
 - 2. Conditions shall be checked by the contractors for all items being delivered.
 - 3. All charges involving the operation and/or operation of a hoist system, if required, shall be borne by the contractor using the system.
- D. The CM shall arrange for the removal of all rubbish and waste materials, from all contractors and subcontractors' employees, at the owner's expense.
- E. The CM is to arrange for all necessary protection for existing items to remain, at the owner's expense. The individual contractors will be held responsible for any damage incurred to said items, will be obligated to replace or restore to its original condition as determined by DSA.
- F. The CM shall arrange for all necessary protection and security the work and job site until turned over to the client, at the owner's expense.
- G. All required exits, ways of approach thereto, and ways of travel from the exit into the street shall be continuously maintained free from all obstructions and impediments for unobstructed egress in case of fire or other emergency. Fire extinguishers must be available on the site during construction.
- H. During the entire period of demolition and construction, all existing exits, exit lighting, fire protective devices and alarms shall be conspicuously posted.
- I. During the entire period of construction, the telephone numbers of the closest available physicians, hospitals or ambulances shall be conspicuously posted.
- J. One toilet for each sex shall be arranged for by CM, at the owner's expense.

1.7 LABOR AND MATERIALS

- A. CM to provide for labor, materials, equipment, tools, utilities, transportation, hoisting, testing of new or altered systems, fire watch for welding, standby engineering services, and other facilities and services necessary for the execution and completion of the work, if said work does not fall under the contract of a specific contractor, at the owner's expense.
- B. The use of the term "approved equal" in connection with any item specified is intended to mean that such shall be of equal quality,
 - 1. Substitutions shall be submitted, in written form, to DSA for approval.
- C. The terms "provide" or "provided" in connection with any item specified is intended to mean that such shall be furnished, installed, and connected where so required.
- D. All approvals shall be for design appearance only. Contractor(s) shall be responsible for quantities, dimensions and compliance with contract documents, and for information pertaining to fabrication process or techniques of first class construction and for coordination with other trades.

1.8 APPLICABLE CODES

- A. CM shall secure all permits, licenses, controlled inspections, and signoffs necessary for the proper execution and completion of the work which are customarily secured after execution of the contract and which are legally required, at the owner's expense.
- B. The CM shall give all notices and comply with laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work and shall notify the architect, in writing, if any part of the contract documents is observed to be at variance with codes.
- C. The CM shall confirm that "volatile organic compound" content of coatings applied under all sections of these specifications is limited to the percentage prescribed for factory or field application by the authorities having jurisdiction in those areas.

1.9 CONSTRUCTION

- A. Prior to beginning any work, the CM shall furnish a construction schedule showing the chronological phases of the work and all related work for the completion of the project. This schedule shall indicate all ordering lead time, length of time for each phase, its start and completion, with a projected completion date.
- B. The contractors shall supply samples and/or cuts of all materials, fixtures and equipment called for on DSA drawings (i.e. light fixtures, hardware, etc.) For approval.
- C. The contractors shall submit all fabrication shop drawings to DSA for review. All shop drawings and cuts signed "no exceptions noted" shall supersede original drawings in design appearance only. Contractors shall assume responsibility for discrepancies in their drawings.
- D. The CM shall provide temporary utility services (lighting, heating, power, water, security, telephone, etc.) Including a schedule including implementation and termination of each temporary service, at the owner's expense.

1.10 RECORD DOCUMENT SUBMITTALS

- A. Record drawings: maintain a clean, undamaged set of reproducible prints of contract drawings and shop drawings. Mark the set to show the actual installation where it varies substantially from the work as originally shown, mark the drawing which is most capable of showing conditions fully and accurately. Where shop drawings are used, record a cross-reference at the corresponding location on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 1. Mark record sets with red, erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
 - 2. Mark information that is of importance to the owner, but was not shown on contract drawings or shop drawings, including equipment, ductwork, lighting, electrical circuitry work (including numbers, circuit panels) and other utility service items.
 - 3. Note related change-order numbers where applicable
 - 4. Organize record drawing sheets into manageable sets. Bind sets together with durable paper cover sheets. Print suitable titles, dates, and other identification on the cover of each set.
- B. Digital record drawings as described are acceptable.

1.11 TEMPORARY FACILITIES

- A. Establish reference line and benchmarks for use by all trades in setting out work and determining elevations

1.12 MAINTENANCE MANUAL

- A. Coordinate information giving recommendations for routine maintenance of finished surfaces.
- B. Include guarantees and warranties called for and operating
- C. Maintenance instructions submitted for equipment.
- D. Submit to owner in duplicate

1.13 APPROVALS

- A. The general contractor, subcontractors and tenants contractors shall submit certificates to DSA upon completion of work, including but not limited to the following:
 - 1. Fireproof wood test report (if required)
 - 2. Electrical, plumbing, air conditioning, and sprinkler sign-offs issued by:
 - a. Department of water supply, gas and electricity (or appropriate agency)
 - b. Board of fire underwriters

1.14 PERSONNEL SAFETY

- A. The contractor shall supply and maintain a current inventory of all chemicals in use at the construction site in a loose leaf binder containing one copy of a material safety data sheet (msds) at the job site.
- B. The contractor shall comply with all applicable OSHA, state and local regulations.
- C. The contractor shall maintain a current copy of his company's safety program, hazard communications and substance abuse program at the job site.

End of section 0100

Division 05: Metals
Section 051200: Structural Steel Framing

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Prefabricated building columns.
 - 3. Field-installed shear connectors.
 - 4. Grout.
- B. Related Requirements:
 - 1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.

1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Fabricator: contractor responsible for fabrication, assembly and installation of all glass and above grade stainless steel.

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 CO-DESIGN PHASE

- A. Fabricator is to work with and coordinate with Architect to finalize elements of the design and assembly process prior to acceptance of final design. This phase will require the fabricator to produce a written assembly process to be approved by architect. This phase will require that the Fabricator produce a full size mock-up as described in the contract documents to develop and demonstrate the approved assembly sequence, as well as demonstrate required quality of work, finishes, alignments etc. The final approved design to be fabricated may be minimally different as a result of this process, as compared to the Bid Documents.

1.6 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: CM to conduct conference at Project site
- 1.7 ACTION SUBMITTALS
- A. Product Data: For each type of product.
 - B. Shop Drawings: Show fabrication of structural-steel components.
 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 2. Include embedment Drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical, high-strength bolted connections.
 - B. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
 1. Power source (constant current or constant voltage).
 2. Electrode manufacturer and trade name, for demand critical welds.
 - C. Analysis Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer Licensed in the state of NJ and responsible for their preparation.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, fabricator, testing agency.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural steel, including chemical and physical properties.
- E. Product Test Reports: For the following:
 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 2. Non-shrink grout.
- F. Survey of existing conditions.
- G. Source quality-control reports.
- H. Field quality-control **[and special inspection]** reports.

1.9 QUALITY ASSURANCE

- A. The Fabricator shall be required to provide and be responsible for all the glass fabrication as well as the above grade stainless steel. The pre-assembly of all the fifty-eight (58) elements of the memorial shall be entirely in-shop, i.e. all elements will be finally assembled and crated in the Fabricator's shop prior to shipping to site for installation. The Fabricator will also be responsible for the installation of all the above grade material on site.
- B. Fabricator Qualifications: The following certifications may be required at the Architect's discretion.
 1. A qualified fabricator that participates in the AISC Quality Certification Program and is designated an **AISC-Certified Plant**.
 2. Fabricator is to have the ability to collaborate on design issues and is to have significant experience both fabricating and collaborating on design of similar projects.
 3. Fabricator is to have completed a minimum of four (4) memorial projects and is to have a minimum of two (2) available for Architect's inspection.
- C. Installer Qualifications: The following certifications may be required at the Architect's discretion.
 1. A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- D. Welding Qualifications: The following certifications may be required at the Architect's discretion.
 1. Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel." Welders and welding operators performing work shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M.

- E. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 4. ASTM A276.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS: SEE SECTION 051213 - AESS.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
- B. Channels, Angles: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
- C. Plate and Bar: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
- D. Pipe: ASTM A 276 SS316 (Fu=75 ksi, Fy=30ksi).
- E. Welding Electrodes: Comply with AWS requirements. Use rods appropriate for stainless steel.

2.3 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: see section 051213 - AESS.
- B. Unheaded Anchor Rods: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
 - 1. Configuration: as shown in drawings.
 - 2. Nuts: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
 - 3. Plate Washers: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).
 - 4. Washers: ASTM A276 SS316 (Fu=75 ksi, Fy=30ksi).

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Fabricate beams with rolling camber up.
 2. Mark and match-mark materials for field assembly.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to section 051213 - AESS.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified, and modified for stainless material.
1. Joint Type: Pretensioned, modified for stainless material.
- B. Weld Connections: Comply with AWS D1.1/D1.1M [**and AWS D1.8/D1.8M**] for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SOURCE QUALITY CONTROL

- A. Testing Agency: CM will engage a qualified testing agency to perform shop tests and inspections, at owner's expense.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.
- D. Prepare test and inspection reports.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 MOCKUP: SEE SECTION 051213 – AESS.

3.4 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Baseplates: Clean concrete-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Erection tolerances: see section 051213 – AESS.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.5 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Pretensioned, modified for stainless steel material

3.6 PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

3.7 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: CM will engage a qualified testing agency to perform tests and inspections, at owner's expense.
- C. Bolted Connections: Inspect [**and test**] bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

3.8 REPAIRS AND PROTECTION: SEE SECTION 051213 – AESS.

End of Section 051200

Section 051213 – Architecturally Exposed Structural Steel Framing

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes architecturally exposed structural-steel (AESS).
 - 1. Requirements in Section 051200 "Structural Steel Framing" also apply to AESS.
- B. Related Requirements:
 - 1. Section 051200 "Structural Steel Framing" for additional requirements applicable to AESS.

1.3 DEFINITIONS

- A. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.
- B. Category 1 AESS: AESS that is within 96 inches (2400 mm) vertically and 36 inches (900 mm) horizontally of a walking surface and that is visible to a person standing on that walking surface or is designated as "Category 1 architecturally exposed structural steel" or "AESS-1" in the Contract Documents. All stainless steel above grade is considered Category 1 AESS.
- C. Fabricator: contractor responsible for fabrication, assembly and installation of all glass and above grade stainless steel.

1.4 CO-DESIGN PHASE

- A. Fabricator is to work with and coordinate with Architect to finalize elements of the design and assembly process prior to acceptance of final design. This phase will require the fabricator to produce a written assembly process to be approved by architect. This phase will require that the Fabricator produce a full size mock-up as described in the contract documents to develop and demonstrate the approved assembly sequence, as well as demonstrate required quality of work, finishes, alignments etc. The final approved design to be fabricated may be minimally different as a result of this process, as compared to the Bid Documents.

1.5 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: CM to conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided item of AESS are specifically identified and requirements below are met for AESS.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections. Indicate orientation of bolt heads.
5. Indicate exposed surfaces and edges and surface preparation being used.
6. Indicate special tolerances and erection requirements.

- B. Samples: Submit Samples of AESS to set quality standards for exposed welds for Category 1 AESS.
1. Stainless steel plate, 3/8 by 8 by 8 inches (9.5 by 200 by 200 mm), with one end of a plate, 4 by 8 by 3/8 inches (100 by 100 by 9.5 mm), fastened to plate as shown in structural drawings.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, fabricator.

1.8 QUALITY ASSURANCE

- A. The Fabricator shall be required to provide and be responsible for all the glass fabrication as well as the above grade stainless steel. The pre-assembly of all the fifty-eight (58) elements of the memorial shall be entirely in-shop, i.e. all elements will be finally assembled and crated in the Fabricator's shop prior to shipping to site for installation. The Fabricator will also be responsible for the installation of all the above grade material on site.
- B. Fabricator Qualifications: The following certifications may be required at the Architect's discretion.
1. A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).
 4. Fabricator is to have the ability to collaborate on design issues and is to have significant experience both fabricating and collaborating on design of similar projects.
 5. Fabricator is to have completed a minimum of four (4) memorial projects and is to have a minimum of two (2) available for Architect's inspection.
- C. Installer Qualifications: The following certifications may be required at the Architect's discretion.
1. A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- D. Mockups: Build mockups of AESS to set quality standards for fabrication and installation.
1. Build mockup of typical portion of AESS as shown on Drawings.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. All stainless steel surfaces and finishes are subject to the approval of the Architect.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials for corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.10 FIELD CONDITIONS

- A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

PART 2 – PRODUCTS

2.1 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolt-Nut-Washer Assemblies: SS316 Cold-Worked, Fu=100ksi (min), Fy=75ksi (min).
 - 1. Finish: Plain.

2.2 FABRICATION

- A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- B. In addition to special care used to handle and fabricate AESS, comply with the following:
 - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
 - 2. Grind sheared, punched, and flame-cut edges of Category 1 AESS to remove burrs and provide smooth surfaces and edges.
 - 3. Fabricate Category 1 AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
 - 4. Fabricate Category 1 AESS with exposed surfaces free of seams to maximum extent possible.
 - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, and treating.
 - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
 - 7. Fabricate **Category 1** AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
 - 8. Seal-weld openings between adjacent steel plates/bars.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Holes and Connections: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
 - 4. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
 - 5. Provide continuous, sealed welds where AESS is exposed to weather.
 - 6. Provide continuous welds of uniform size and profile where AESS is welded.
 - 7. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus zero inch (plus 1.5 mm, minus zero mm) for AESS.
 - 8. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 - 9. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
 - 10. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.3 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Pretensioned, modified for stainless steel bolts.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete-bearing surfaces and locations of anchor rods bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
 - 1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
- B. Do not use thermal cutting during erection. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- C. Install all components plumb, level, and true so that all components (including top of glass) is within 1/4" from intended position in any direction.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength stainless bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" modified for stainless material.
 - 1. Joint Type: pretensioned, modified for stainless steel bolts.
 - 2. Orient bolt heads as indicated on Drawings.
- D. Weld Connections: No field welding allowed.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: CM will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Section 051200 "Structural Steel Framing", at owner's expense. The testing agency is not responsible for enforcing requirements relating to aesthetic effect.
- B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

- A. Repair any abrasions to stainless to the satisfaction and approval of Architect.

End of Section 051213

Division 8: Openings
Section 088000 - Glazing

PART 1 – GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Glass and glazing required throughout Project and not specified as a part of other Sections.

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
- B. "Glazing Manual" published by Flat Glass Marketing Assn.
- C. "Safety Standard for Architectural Glazing Materials (16 CFR 1201) CI and CII issued by the Consumer Product Safety Commission.
- D. ANSI Z 97.1, "Safety Glass Test Requirements".
- E. ASTM International.
 - 1. ASTM C864 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
 - 2. ASTM C158 Standard Test Methods for Strength of Glass by Flexure (Determination of Modulus of Rupture)

1.3 DEFINITIONS

Fabricator: contractor responsible for fabrication and assembly of all glass and above grade stainless steel

1.4 CO-DESIGN PHASE

- A. Fabricator is to work with and coordinate with Architect to finalize elements of the design and assembly process prior to acceptance of final design. This phase will require the fabricator to produce a written assembly process to be approved by architect. This phase will require that the Fabricator produce a full size mock-up as described in the contract documents to develop and demonstrate the approved assembly sequence, as well as demonstrate required quality of work, finishes, alignments etc. The final approved design to be fabricated may be minimally different as a result of this process, as compared to the Bid Documents.

1.5 SYSTEM DESCRIPTION

- A. Install each piece of glass watertight and airtight. Each installation shall withstand local, normal temperature changes, wind loading, impact loading without failure of any kind, including loss or breakage of glass, failure of sealants or gaskets to remain watertight, deterioration of glazing materials, and other defects of work.

- B. Borosilicate Glass material will be provided by Owner, and shall be assembled, finished, and installed by the according the requirements explained herein.
- C. Names for engraving will be full length names, varying in length.
- D. (2) Introduction panels will contain text multiple paragraphs in length and graphics to be determined.

1.6 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements."
- B. Product Data: Manufacturer's product data, material safety data sheets, and specifications for installations indicated, listing specific materials proposed. Indicate completely, recommendations for use of primers, joint preparation and sealant dimensions, and shall state shelf life (from date of shipment by manufacturer to expiration date for use on a project) for the material. Provide necessary information required to translate batch number code into date of manufacture and to thereby determine the latest date of usage from manufacturer's shelf life requirements.
- C. Samples:
 - 1. Glass unit laminated, engraved, polished and chamfered at edges as is intended to be installed on site, minimum size 9 by 9 inches (300 by 300 mm).
 - 2. Glass unit as described in item #1 above, fully assembled with the stainless support angles, as is intended to be installed on site.
- D. Certifications:
 - 1. Certification that all sealants are fully compatible with the surfaces and finishes with which they are in contact.
 - 2. Certification that all lamination materials are fully compatible with the surfaces and finishes with which they are in contact.
- E. Test data providing evidence that the glass, as it will be prepared for this Project (seamed, polished, engraved, and with and without chamfered or arrised edges), provides a safety factor of 4 (minimum) for the design loads prescribed by code.
- F. Closeout Submittals: Material Safety Data: Sealant and adhesive quantity use for in accordance with requirements of BAAQMD Regulation 8-51.

1.7 QUALITY ASSURANCE

- A. The Fabricator shall be required to provide and be responsible for all the glass fabrication as well as the above grade stainless steel. The pre-assembly of all the fifty-eight (58) elements of the memorial shall be entirely in-shop, i.e. all elements will be finally assembled and crated in the Fabricator's shop prior to shipping to site for installation. The Fabricator will also be responsible for the installation of all the above grade material on site.
- B. Process and requirements for names to be etched: Fabricator is not to engrave names until full list and spellings have been certified by The City of Hoboken.
- C. At each step of fabrication, fabricator is to provide clear visual documentation of work completed and to make the units available for inspection by the architect and owner.
- D. Fabricator is to provide clear visual documentation that no units re broken prior to shipment, each unit to be clearly tagged.
- E. Fabricator Qualifications:
 - 1. Fabricator is to have the ability to collaborate on design issues and is to have significant experience both fabricating and collaborating on design of similar projects.
 - 2. Fabricator is to have completed a minimum of four (4) memorial projects and is to have a minimum of two (2) available for Architect's inspection.
- F. Glazing materials shall comply with expectations of Architect/Owner. And as a minimum:
 - 1. Shall be laminated flush (all plies of glass and lamination material) on all edges
 - 2. Assembly corners shall be slightly (1/16") chamfered
 - 3. Middle ply of glass shall be engraved on the edge at a size and font approved by Architect
 - 4. Lamination shall be free of imperfections including but not limited to:
 - a. air gaps
 - b. bubbles
 - c. edge inconsistencies such as protruding from the glass edge, or edge deletions
 - d. delamination
 - e. discoloration

- G. Cutting of Borosilicate Glass is to be done on a high performance Water Jet Cutting Machine, certified for cutting glass of the types required, located in the glass fabricator's facility.
- H. Borosilicate Glass is to be cut only by personnel with experience cutting Borosilicate Glass 25mm thick in a similar application.
- I. Glass for lamination is to be washed, sterilized, have the lamination applied, bagged and wrapped in a clean room facility, minimum of class 10000
- J. Glass laminator is to be certified by Kuraray or equal, for glass of this type and thickness, using the required interlayer, to be done at Fabricators facility.
- K. Glass lamination is to be done in an Autoclave certified for laminated glass of the types required; autoclave is to be located in the Fabricator's facility.
- L. Engraving of glass is to be done on a 5-axis CNC machine, capable of engraving in Borosilicate Glass, located in the Fabricator's facility. Borosilicate Glass is to be etched only by personnel with experience etching Borosilicate Glass 25mm thick in a similar application.
- M. Fabricator's facility is to be made available for Architect's inspection to confirm availability of required machines.
- N. Fabricator is to be made available for an interview by Architect to confirm required experience and knowledge.
- O. Submit list of all equipment in house that will be utilized for this project.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Glass is not to be transported outside of fabricator's facility during fabrication process.
- B. Borosilicate Glass is currently stored within 20 miles of job site and will be crated and delivered to fabricator's facility by owner, at owner's expense.
- C. Package and deliver glass units individually in sealed crates suitable for transport, surrounded by Styrofoam, fully identified.
- D. Protect glass from damage and store in accordance with manufacturer's recommendations. Keep handling to a minimum. Protect edges of laminated glass from damage.
- E. Glazing Sealants:
 1. Deliver sealants and related accessories to the job site in factory sealed, unopened containers bearing manufacturer's name, product designation and batch number.
 2. Store in unopened containers. Follow manufacturer's recommendations for storage temperatures and shelf life (see "Submittals" above).
 3. Follow manufacturer's recommendations for handling products containing toxic materials. Keep flammable material away from heat, sparks and open flame. Use recommended solvents and cleaning agents for cleaning tools, equipment and skin.

1.9 ENVIRONMENTAL CONDITIONS

- A. Perform no glazing operations when ambient temperature is at or below 40 deg F (4.4 deg C).

1.10 WARRANTIES

- A. Installation: Warrant for 1 year from date of acceptance of Project. Warranty shall certify that installation will perform as per design specifications.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Glass Manufacturers: Schott Glass, glass is being provided by Owner.
- B. Sealants: structural silicone by Dow Corning or approved equal.

- C. Lamination: Ionoplast interlayer by Kuraray or approved equal.

2.2 MATERIALS

- A. Glass types, thicknesses and fabricated assemblies are scheduled in the Glass Schedule included in PART 3. EXECUTION of this Section.
 - 1. Laminated Glass: Fabricated as recommended by manufacturers with Kuraray, or approved equal, clear SentryGlass sheet interlayer, configuration of assembly as per Glass Schedule.
 - 1. Laminated glass shall conform to requirements of Reference Standard 1.2.B.
- B. Structural Silicone – Color to be determined, assume standard color.

2.3 FABRICATION

- A. Cut glass to full fit and play, consistent with glass and glazing material manufacturers' recommendations and the requirements of the Drawings and References, Codes and Standards Article.
- B. Follow code requirements and glass manufacturer's recommendations for minimum bite and edge and face clearances.
- C. Cut glass to smooth straight edges, clean, free of nicks and flares; nipping not permitted. Maximum tolerance of .01 mm permitted on cut edges.
- D. Where glass edges are required to be exposed, grind smooth and polish to a mirror finish, minimum of 1600 grit, flat cuts and arises.
- E. All elements of glass fabrication are to be done in a single facility; glass is not to be transported outside of Fabricator's facility until it is fabricated, bonded to its stainless steel supporting base and crated for delivery to the job site for final field installation. .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect surfaces to receive glazing materials and report defects which might adversely affect the glazing work. Commencing work implies acceptance of surfaces as satisfactory.
- B. Weep systems shall be open.
- C. Surfaces shall be free of condensation and moisture.
- D. Steel surfaces shall be prepared according to 051213 – Architecturally Exposed Structural Steel Framing.

3.2 PREPARATION

- A. Clean rebates and glazing reveals free of foreign matter, special coatings, dust, grease, projections and irregularities prior to setting glass. Solvents used for cleaning shall not etch or damage glass or metal surfaces.
- B. Wipe glass free of dust and oil.
- C. Shop assemble glass to stainless steel angles supporting base of glass, including all components (bearing pads, side blocks, structural silicone, etc.). Fully assemble glass units so that field installation requires only adjusting for installation tolerances and installing bolts to the supporting steel beam.
- D. Fully assembled glass and stainless steel units are to be allowed to fully cure, as per engineer's requirements regarding structural silicone, prior to removal of any temporary clamping.

3.3 INSTALLATION

- A. Conform to recommendations of glass manufacturer where such covers points not shown on Drawings or specified herein.
- B. Remove "loose" stops furnished with the units and reinstall as a part of the glazing operation.

- C. Handle lites so as to prevent nicks and flares on glass edges.
- D. Close and tightly seal all partly used sealant containers, and store protected in well-ventilated area at temperature recommended by sealant manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Fabricator shall notify Architect/Owner/Engineer with 24 hours (minimum) notice of anticipated completion of cutting and lamination of first glass unit. Architect's approval shall be granted before continuing fabrication.
- B. Glazing contractor shall notify Architect/Owner/Engineer with 24 hours (minimum) notice of anticipated completion of installation of first glass unit. Architect's approval shall be granted before continuing installation.
- C. All glass units shall meet with the approval of Architect based on standards established during submittal process, mockup, and initial approval on site.

3.5 WASTE MANAGEMENT

- A. Separate corrugated cardboard in accordance with the approved Waste Management Plan in Division 01 Section "Construction Waste Management", and place in designated containers for recycling.
- B. Place used sealant containers in designated containers for legal disposal.

3.6 CLEANING

- A. Initial cleaning of glass surfaces is a part of this Section. Follow glass manufacturer's directions exactly for cleaning Borosilicate. Do not use abrasive cleaners or sharp instruments. Contractor shall provide final cleaning.
- B. Periodic cleaning is recommended to avoid etching, and shall be coordinated by Owner.

3.7 PROTECTION

- A. Protect installed glass from damage due to subsequent construction operations.
- B. Identification or caution markers shall not be applied to glass surfaces nor shall they be applied to metal surfaces in any way which would damage or stain the metal.
- C. Replace glass broken or damaged prior to acceptance of Project. Costs occasioned by replacement shall be borne by those causing the damage. Supply of owner provided glass is very limited and replacement pieces will have to be obtained directly from manufacturer.

3.8 GLASS SCHEDULE

- A. Glass types are indicated on Drawings.

<u>Glass Type</u>	<u>Material or Assembly</u>
1	Laminated glass fabricated with three layers of 1" (25 mm) thick Borosilicate glass and two layers of 0.060" (1.52 mm) SentryGlass Interlayer.

End of Section 088000