ADDENDUM NUMBER TWO

August 24, 2015

PROJECT NAME: MECHANICAL CONSTRUCTION IDC 2015 (SEED PROJECT H51-N342-FW DATA CENTER CRAC)

PROJECT NUMBER: H51-D159-FW (Seed Project H51-N342/MUSC#50025)

1. MODIFICATIONS TO THE SPECIFICATIONS
   A. Insert new specification 051200 “Structural Steel Framing” included in this addendum into the base bid specifications.
   B. Insert new specification 264113 “Lightning Protection System” included in this addendum into the base bid specifications.

2. CHANGES TO DRAWINGS
   A. Replace drawing M011 in base bid set with drawing M011 included in this addendum.
   B. Replace drawing M100 in base bid set with drawing M100 included in this addendum.
   C. Replace drawing M101 in base bid set with drawing M101 included in this addendum.
   D. Replace drawing M105 in base bid set with drawing M105 included in this addendum.
   E. Replace drawing ED01 in base bid set with drawing ED01 included in this addendum.
   F. Replace drawing E101 in base bid set with drawing E101 included in this addendum.
   G. Replace drawing E201 in base bid set with drawing E201 included in this addendum.

3. QUESTIONS FROM CONTRACTORS
   A. Please supply Steel Specifications.
   Response: See specification 051200 included in this addendum.
   B. Please supply Welding Instructions
   Response: See Drawing M011 included in this addendum.
C. Please supply locations on the walls for the brackets for the piping—there are no dimensions on the brackets, connect details, etc.

Response: See Drawing M105 included in this addendum.

D. Please supply Roofing specifications. Also who is the original roofer (who is the warranty under for the roof)

Response: Carolina Roofing

E. Please supply Flashing details.

Response: See details on drawings.

F. Please assist with information on the Steel structures on the roof—what are the sizes, gauges, dimension, etc.

Response: See details on drawings. Sizes are a part of means and methods.

G. Please supply specification for Re-Fire proofing specifications for Fire protection on steel.

Response: The building is a 2 hour protected structure. Use Carboline's Southwest Type 7GP product or equal.

H. What needs to be painted and what type of paint?

Response: No painting will be required.

I. What is the brand name of the windows and the original installer?

Response: Unknown

J. Regarding Sheet E201, we looked for the Panels 3H2-B and 3H2-C with MUSC personnel during the prebid and no one could locate them. Are they on the 3rd floor or the 6th floor and in what location?

Response: Circuits for DCA-11, DCAC-13, ACC-7, and ACC-8 have been relocated to existing emergency panel 6H# as indicated drawings E101 and E201 included in this addendum.

K. Are we going to need to provide any electrical for any temporary cooling, during the process of the CRAC units being demoed and replaced?

Response: Temporary power will be provided by MUSC.

L. Regarding the controls, and VESDA, BAS, etc, are they handled by the mechanical contractor or MUSC on this project?

Response: Unit controls are provided by the manufacturer. Unit is compatible with JCI campus wide controls.
M. Who is the Fire Alarm vendor for this data center, we assume while we are installing new conduits under the floor, the FA will need to be disabled.

Response: Fire Alarm System vendor is L&S Electronics. The existing FACP is manufactured by Edwards and is located on the 1st floor behind the elevator lobby.

N. Sheet E201 has a note regarding extending the lightning protection system to the new ACC units, it states “see lightning protection extension notes, this sheet”, but did not see any notes. Can the LP system extension be clarified?

Response: To clarify the lightning protection system extension, E201 was changed to indicate the existing system and extension and Section 264113 was added to the specifications.

O. Is there any heat tape needed on the piping, and if so, where are those circuits being fed from?

Response: No

END OF ADDENDUM TWO
SECTION 05 12 00
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. Bearing Plates

B. Products furnished, but not installed under this Section:

1. Anchor rods and embed plates indicated to be built into masonry, installed under Division 04 Section "Unit Masonry".

C. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Post Installed Structural Anchors" for wedge, and adhesive anchors

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges" and as modified herein.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering design by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using AISC 360.
2. Use LRFD; data are given at factored-load level.
3. All bolted connections for bracing members shall be designed and fabricated as slip critical connections to allow for field reaming of holes to address fit up issues.

4. All bolted connections for axial loaded members shall be designed and fabricated as slip critical connection to allow for field reaming of holes to address fit up issues.

5. The minimum number of bolts for any connection shall be two.

6. All steel to steel connections shall extend at least two thirds of the depth of the supported member being connected.

B. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360

1.5 SUBMITTALS

A. Product Data:

1. Primers

2. Paints

3. Electrodes
   a. Indicate what welding process will be used with each electrode
   b. Submit electrodes for both shop and field welding
   c. Provide manufacturer's standard certificate of conformance indicating compliance with the requirements for H15 as tested in accordance with AWS A4.3

4. Post installed structural anchors: See specification section 050520

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 showing plan location and elevation of all embedded items.

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. Include scale drawings of all gusset plates.

5. Provide minimum 1/4" thick cap plates at the ends of all exposed HSS members, and at the top of all HSS columns.

6. Equally space filler beams or joists between columns and/or other dimensioned beams unless noted otherwise. Identify members and connections of the seismic-load-resisting system.

C. Delegated-Design Submittal:

1. For structural steel connections indicated to comply with design loads provide structural design data signed and sealed by the qualified professional engineer responsible for their preparation.

   a. Each individual calculation shall be clearly labeled in coordination with erection drawings such that it identifies the member(s) that the connection applies to.

2. Professional Engineer's Statement: A written statement indicating that the fabrication shop drawings incorporate all the connection requirements included in the calculations submitted for approval inclusive of any corrections required in response to shop drawing review comments. The statement shall be prepared by, and signed and sealed by the professional engineer that completed the calculations submittal.

D. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

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

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

C. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category SBD (Conventional Steel Building Structures)

D. Fabricator Responsibility

1. The structural steel fabricator shall be responsible for enlisting the Cold Formed Steel Purlin fabricator as a direct subcontractor.

2. The structural steel fabricator shall be responsible for enlisting the steel erector as a direct subcontractor.
E. Structural Steel and Architectural Structural Steel Installer Qualifications: The erector shall be experienced in installing structural steel equal in material, design and scope to the structural steel required for this project.

F. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

   1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

H. Comply with applicable provisions of the following specifications and documents:

   1. AISC 303.
   2. AISC 341 and AISC 341s1.
   3. AISC 360.
   4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

I. Preinstallation Conference: Conduct conference at Project site.

   1. Review special inspection and testing and inspecting agency procedures for field quality control.
   2. Review items requiring special inspection and testing that must be tested and inspected prior to installation of decking, concrete slabs, or other items that might limit access to the item to be tested or inspected
   3. Review welding requirements
   4. Review electrode storage requirements
   5. Review pre-construction bolt installation verification
   6. Review bolt installation calibration requirements

1.7 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.
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.

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 relubricate 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.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. 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.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes and Tees: ASTM A 992.

B. Channels, Angles-Shapes:
   1. ASTM A 36 unless noted otherwise
   2. ASTM A 572/A 572M, Grade 50 where indicated.

C. Plate and Bar:
   1. ASTM A 36 unless noted otherwise
   2. ASTM A 572/A 572M, Grade 50 where indicated.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
   1. Square or Rectangular HSS: Fy=46 KSI
   2. Round HSS: Fy=42 KSI

E. Welding Electrodes: Comply with AWS requirements.
1. All weld filler metal shall meet the requirements of H16 as tested in accordance with AWS A4.3 per AISC 341-05 Appendix W.

2. All weld filler metal shall have a minimum CVN toughness of 20 ft-lbs at 0 degrees Fahrenheit.

3. Demand Critical Welds: All weld filler metal shall have a minimum CVN toughness of 20 ft-lbs at minus 10 degrees Fahrenheit per AWS and 40 ft-lbs at 70 degrees Fahrenheit per AISC 341-05 Appendix X.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish:
   a. Plain for primed or painted steel

2. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.
   a. Finish:
      1) Plain for unprimed steel or steel receiving standard shop primer.
      2) Mechanically deposited zinc coating, ASTM B 695, Class 50 for hot galvanized steel or steel to receive high performance top coating.

B. Threaded Rods: ASTM A 36 unless noted otherwise.


3. Finish:
   a. Plain for unprimed steel or steel receiving standard shop primer.
   b. Hot-dip zinc coating, ASTM A 153/A 153M, Class C for hot galvanized steel or steel to receive high performance top coating.

C. Post Installed Structural Anchors: See specification section 055020 for products

2.3 PRIMER

A. Standard Primer: Fabricator’s standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
1. Typical all primed steel unless noted otherwise

2.4 PAINT

A. Galvanizing Repair Paint: ASTM A 780.

2.5 FABRICATION

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

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

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, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
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.

   1. Joint Type:

      a. Snug tightened unless noted otherwise

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 will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

   2. Remove backing bars and runoff tabs, back gouge, and grind steel smooth.

2.7 CLEANING AND SHOP PRIMING

A. Cleaning:

   1. Clean and prepare steel surfaces that are to remain unprimed according to SSPC-SP 2, "Hand Tool Cleaning."

   2. Clean and prepare steel surfaces that are to receive standard primer according to SSPC-SP 3, "Power Tool Cleaning."

   3. Clean and prepare steel surfaces that are to receive special primer according to the associated painting specification. When not specifically noted the minimum cleaning shall be SSPC-SP 6, "Commercial Blast Cleaning."

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

   1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

   2. Galvanize loose and hung lintels, shelf angles, all exposed exterior steel and all steel located in exterior masonry walls unless noted otherwise. Coordinate with drawings and specifications.

      a. Galvanized elements to be top coated shall not be quenched, and shall be swept blast to ensure proper adhesion of top coats.
2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. All source quality control shall be completed by the fabricator’s personnel unless noted otherwise and shall be in accordance with the certified fabricator’s quality control manual, AISC Code of Standard Practice, and AWS D1.1.

C. Testing Agency: Fabricator will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports as required.

D. Special inspections are not required at the source of fabrication based on the requirement for an AISC certified fabricator.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

F. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

G. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M.

H. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.

2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified as-built survey of 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.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

   1. Where ungrouted anchor rod sleeves are required caulk the annular surface between the sleeve and the anchor rod to prevent grout from entering the sleeves.
   2. Set plates for structural members on wedges, shims, or setting nuts as required.
   3. Weld plate washers to top of baseplate as indicated.
   4. 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.
   5. 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.
      a. Use grout forms and grout surcharging as required to ensure that grout completely fills the space below bearing or base plate, and no voids remain.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

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 will be 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. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

G. Shelf Angles anchored to steel frame:
    1. Sequencing of shelf angle installation shall be as indicated in drawings
    2. Unless noted otherwise do not permanently attach shelf angles until concrete slabs have been poured and cured.
    3. Once slabs have been poured and cured coordinate final elevation of shelf angle with contract documents and masonry contractor and permanently fasten.
    4. Do not located based on local member geometry.

3.4 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: As indicated on shop drawings.

B. Finger Tight Bolts: All joints noted as finger tight shall be hand tightened as required to install elements. Do not tighten by mechanical means
    1. Provide jam nuts to prevent nut from backing off.
    2. After initial tightening turn nut and jam nut in opposite direction to bind them against one another.

C. 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. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
    2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

D. Post Installed Structural Anchors: See specification section 055020 for products
3.5 FIELD PAINTING

A. Field painting of structural steel for finished appearance in exposed conditions or for high performance coating systems is specified in Division 09 painting sections.

3.6 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: At all exterior and exposed interior conditions promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.

2. Apply a primer of same type as shop primer used on adjacent surfaces. Coordinate with Part 2 priming requirements

END OF SECTION 05 12 00
SECTION 26 41 13

LIGHTNING PROTECTION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The following apply to the work under this section:
   1. Section 26 05 00, Electrical, General
   2. Section 26 20 00, Interior Wiring Systems

1.02 SCOPE

A. Provide a complete, Master Labeled lightning protection system.
   B. Pay for and obtain UL Master Label inspection service and label "C." Requires SPD’s on all incoming lines. Affix label to building in a location directed by Architect and in compliance with UL requirements.

1.03 APPLICABLE CODES AND STANDARDS

A. The latest editions of the following codes and standards apply to this work:
   1. LPI-175 - Lightning Protection Institute Standard
   2. NFPA 780 - Lightning Protection Code
   3. UL 96/96A - Master Labeled Lightning Protection Systems

1.04 SUBCONTRACTORS

A. The lightning protection equipment and equipment shall be furnished and installed by a subcontractor or manufacturer whose principal business is the provision of lightning protection systems and who is a franchised or authorized dealer representative of a recognized manufacturer of lightning protection equipment and systems, as approved by the Engineer.
   B. System components shall be by Thompson Lightning Protection Company, Heary Brothers, Harger or approved equal.

1.05 DRAWINGS

A. The drawings accompanying these specifications are diagrammatic only and do not represent detailed requirements for the system.
B. Provide complete, labeled system including all hardware and appurtenances and perform detailed design based on complete plans and specifications for all trades.

C. Consult drawings of all trades for requirements and coordinate with construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Air Terminals: Solid copper, bronze, or aluminum, minimum 1/2-inch diameter; lengths and bases to suit mounting conditions and to comply with Master Label requirements.

B. Conductors: Stranded, minimum AWG #15 strand, copper; minimum weight 375 pounds per 1000 feet, or equivalent aluminum.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Bonding: Bond all metal structures, equipment, structural metal and piping on roof.

END OF SECTION