



ADDENDUM #1 February 11, 2016

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

**McEniry Building Chiller Replacement
University of North Carolina at Charlotte
9201 University City Blvd.
Charlotte, North Carolina 28223**

The following Addendum clarifies, revises, and takes precedence over Drawings and Specifications dated December 11, 2015. This addendum shall become a part of the Contract Documents for the above-mentioned. The following items are intended to revise and clarify the Drawings and Specifications and shall be included by the bidder in his proposal.

Each contractor shall be responsible for notifying his subcontractors of the contents of this addendum.

SPECIFICATIONS

1. Bid Acceptance Form

- A. The condenser water temperature entering chiller for 100% load in the chiller utilization profile and chiller part load performance tables for Alternate No. 1 and No. 2 has been revised from 80 deg F to 85 deg F.

DRAWINGS (Revision Date 12/30/14)

1. M002

- A. Additional factory witness test point added to specifications.

2. M003

- A. Condenser water entering and leaving temperatures revised to 85 and 95, respectively, for both Alternate No. 1 and No. 2 chiller schedules.
- B. Max. kW/Ton and max. N.P.L.V. kW/Ton revised for both Alternate No. 1 and No. 2 chiller schedules.
- C. Notes 3 and 6 revised.

End of Addendum Number 1

Acknowledge the receipt of this addenda on the bid form

STATE OF NORTH CAROLINA STANDARD FORM OF INFORMAL CONTRACT AND GENERAL CONDITIONS

FOR

The University of North Carolina at Charlotte
McEniry Building Chiller Replacement
Charlotte, NC

BID/ACCEPTANCE FORM

for

McEniry Building Chiller Replacement

The project scope includes the removal and replacement of an existing 550 ton water-cooled, centrifugal chiller and various controls upgrades in the mechanical room.

We are in receipt of Addendum _____1 _____2 _____3 _____4

The undersigned, as bidder, proposes and agrees if this bid is accepted to contract with the State of North Carolina through the University of North Carolina at Charlotte for the furnishing of all materials, equipment, and labor necessary to complete the construction of the work described in these documents in full and complete accordance with plans, specifications, and contract documents, and to the full and entire satisfaction of the University of North Carolina at Charlotte and McVeigh & Mangum Engineering for the sum of:

Base Bid: Provide all piping, controls, and associated accessories required to install new chillers as indicated on the drawings and specified herein. The equipment cost for the chiller shall be included as an alternate and not included in the base bid.

BASE BID: _____ **Dollars \$** _____

Alternate #	Add/Deduct	Alternate bid price	Accepted
1			
2			
3			
4			
5			

Alternate No. 1: Provide a 550-ton centrifugal chiller as indicated on the drawings and specified herein. This item will be purchased on a life cycle cost basis with an economic life of 23 years and an average cost of electricity of \$0.065/kWh. The following annual load profile shall be used for the life cycle cost analysis:

Chiller Utilization Profile			
Load %	Load (tons)	Hours per Year	Condenser Water Temperature Entering Chiller (deg F)
100	550	474	85
75	412.5	2125	75

50	275	788	65
25	137.5	425	60

Provide the following information for each manufacturer and/or model of equipment proposed:

Manufacturer: _____

Model: _____

Add Alternate Price: _____

_____ Dollars (\$ _____)

Provide the part load performance data for each manufacturer and/or model of equipment proposed:

Chiller Part Load Performance			
Load %	Load (tons)	Input Energy (kW)	Condenser Water Temperature Entering Chiller (deg F)
100	550		85
75	412.5		75
50	275		65
25	137.5		60

Alternate No. 2: Provide a 550-ton magnetic bearing centrifugal chiller as indicated on the drawings and specified herein. This item will be purchased on a life cycle cost basis with an economic life of 23 years and an average cost of electricity of \$0.065/kWh. The following annual load profile shall be used for the life cycle cost analysis:

Chiller Utilization Profile			
Load %	Load (tons)	Hours per Year	Condenser Water Temperature Entering Chiller (deg F)
100	550	474	85
75	412.5	2125	75
50	275	788	65
25	137.5	425	60

Provide the following information for each manufacturer and/or model of equipment proposed:

Manufacturer: _____

Model: _____

Add Alternate Price: _____

_____ Dollars (\$ _____)

Provide the part load performance data for each manufacturer and/or model of equipment proposed:

Chiller Part Load Performance			
Load %	Load (tons)	Input Energy (kW)	Condenser Water Temperature Entering Chiller (deg F)
100	550		85
75	412.5		75
50	275		65
25	137.5		60

Alternate No. 3: Remove existing Johnson Controls from cooling towers and chillers. Install new open protocol Bacnet MS/TP or Lon controls and tie into existing building controls. Replace existing standalone controls on pump packages with new open protocol Bacnet MS/TP or Lon controls and tie into existing building controls.

Alternate No. 4: Upgrade all chilled water differential pressure sensors in existing chilled water system. New sensors shall be Schneider EPW2104-LCD, 0-100 PSI, 0-24VDC with local LCD displays or equal.

Alternate No. 5: Remove existing 6" temporary chiller connection piping with new 8" piping.

Respectively submitted this _____ day of _____ 20____

(Contractor's Name)

Federal ID#: _____

By: _____

Witness: _____

Title: _____

(Owner, partner, corp. Pres. Or Vice President)

(Proprietorship or Partnership)

Address: _____

Attest: (corporation)

Email Address: _____

(Corporate Seal)

By: _____ License #: _____

Title: _____

(Corporation, Secretary./Ass't Secretary.)

ACCEPTED by the STATE OF NORTH CAROLINA

through the University of North Carolina at Charlotte

Total amount of accepted by the owner, included base bid and bid alternates: _____

(Agency/Institution)

BY: _____ TITLE: _____

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MECHANICAL SPECIFICATIONS

- PART 1 - GENERAL**
- 1.01 INSTRUCTIONS**
- A. SCOPE OF WORK SHALL INCLUDE ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY FOR A COMPLETE AND PROPERLY FUNCTIONING INSTALLATION IN ACCORDANCE WITH LOCAL AND STATE CODES, AND CONTRACT DRAWINGS AND SPECIFICATIONS.
- 1.02 LOCAL CONDITIONS**
- A. CONTRACTOR SHALL VISIT THE SITE AND OBSERVE ALL EXISTING LOCAL CONDITIONS WHICH WOULD AFFECT WORK UNDER THIS CONTRACT. CONTRACTOR SHALL EXAMINE ALL PLANS AND SPECIFICATIONS FOR THIS PROJECT AND CONSULT THEM FOR INSTRUCTIONS PERTAINING TO WORK OF THIS SECTION.
- 1.03 PERMITS AND FEES**
- A. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED TO WORK UNDER THIS CONTRACT AND PAY ALL CHARGES INCIDENTAL THERETO. DELIVER TO ARCHITECT ALL CERTIFICATES OF INSPECTION ISSUED BY AUTHORITIES HAVING JURISDICTION.
- 1.04 CODES AND STANDARDS**
- A. FURNISH AND INSTALL MECHANICAL SYSTEMS TO MEET ALL CURRENT REQUIREMENTS OF NATIONAL, STATE AND MUNICIPAL CODES, RULES REGULATIONS, LAWS, AND STANDARDS AS THEY ARE ADOPTED BY THE GOVERNING AGENCY AND AS THEY MAY APPLY.
- NORTH CAROLINA BUILDING CODE 2012
 - NORTH CAROLINA MECHANICAL CODE 2012
 - NORTH CAROLINA PLUMBING CODE 2012
 - NORTH CAROLINA FIRE CODE 2012
 - STANDARD FOR THE INSTALLATION OF A/C AND VENT SYSTEMS, NFPA 90A (2012 ED.) UNDERWRITERS LABORATORIES
- 1.05 SUBMITTALS**
- A. MATERIAL LIST: WITHIN TWENTY (20) DAYS OF AWARD OF CONTRACT, CONTRACTOR SHALL SUBMIT TO ENGINEER A COMPLETE LIST OF MATERIALS TO BE PROVIDED. THE LIST SHALL INCLUDE SUPPLIERS' NAMES AND MANUFACTURERS' NAMES AND NUMBER OR SERIES FOR EACH ITEM ON LIST.
- B. SHOP DRAWINGS: SUBMIT TO THE ENGINEER FOR APPROVAL, BEFORE COMMENCING WORK. SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT TO BE PROVIDED UNDER THIS CONTRACT. THE FOLLOWING APPLY TO THE SHOP DRAWINGS:
- CONTRACTOR SHALL SUBMIT WITHIN 30-DAYS AFTER AWARD OF CONTRACT, DRAWINGS AND/OR CUT SHEETS OF ALL MATERIALS, AND EQUIPMENT, AND 1/4" SCALE EQUIPMENT ROOM DRAWINGS FOR APPROVAL BY ARCHITECT-ENGINEER. SUCH SUBMITTALS MUST CONTAIN OUTLINE DIMENSIONS, OPERATING CLEARANCES, INSTALLATION, OPERATING AND MAINTENANCE INFORMATION AND SUFFICIENT ENGINEERING DATA TO INDICATE SUBSTANTIAL COMPLIANCE WITH SPECIFICATIONS. ALL SHOP DRAWINGS FOR ONE SECTION OF WORK OR ONE MECHANICAL SYSTEM SHALL BE SUBMITTED AT ONE TIME IN PDF FORMAT; NO APPROVAL WILL BE GIVEN IF SUBMITTED PIECEMEAL.
 - WHERE CONTRACTOR CONSIDERS ADDITIONAL DETAIL OR SHOP DRAWINGS ESSENTIAL TO PROPER FABRICATION OR INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING HE SHALL PREPARE AND SUBMIT WITH CURRENT INDUSTRY METHODS AND STANDARDS. ENGINEER RESERVES THE RIGHT TO DIRECT REMOVAL AND REPLACEMENT OF ANY ITEMS WHICH, IN HIS OPINION, DO NOT PRESENT AN ORDERLY AND REASONABLY NEAT AND WORKMANLIKE APPEARANCE, PROVIDED SUCH AN ORDERLY INSTALLATION CAN BE MADE USING CURRENT METHODS. REMOVAL AND REPLACEMENT SHALL BE DONE WHEN DIRECTED IN WRITING BY ENGINEER AT THE CONTRACTOR'S EXPENSE AND WITHOUT ADDITIONAL EXPENSE TO OWNER.
 - APPROVAL GRANTED ON SHOP DRAWINGS IS RENDERED AS A SERVICE ONLY AND SHALL NOT BE CONSIDERED AS GUARANTEE OF COURSEMENT OF BUILDING CONDITIONS; NOR SHALL IT BE CONSTRUED AS RELIEVING THE MECHANICAL CONTRACTOR OF BASIC RESPONSIBILITIES UNDER THIS CONTRACT.
 - CHANGES IN FOUNDATIONS, BASES, CONNECTIONS, PIPING, CONTROLS, STARTERS, ELECTRICAL EQUIPMENT, WIRING AND CONDUIT, SPACE OPENINGS, WALLS AND CEILINGS, AND VIBRATION ISOLATION IN ORDER TO ACCOMMODATE SUBSTITUTE EQUIPMENT SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER.
 - CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND RECEIVE ENGINEER'S APPROVAL BEFORE INSTALLING MATERIALS OR EQUIPMENT. ANY EQUIPMENT OR MATERIALS INSTALLED PRIOR TO RECEIPT OF APPROVED SHOP DRAWINGS FROM ENGINEER SHALL BE SUBJECT TO REMOVAL AND/OR ALTERATION AT THE DISCRETION OF THE MECHANICAL ENGINEER AT NO ADDITIONAL COST.
 - APPROVAL DATA OR SHOP DRAWINGS FOR MATERIALS, EQUIPMENT, APPARATUS DEVICES, ARRANGEMENTS AND/OR LAYOUTS WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY OF FURNISHING SAME OF PROPER DIMENSIONS, CAPACITIES, SIZES, QUANTITIES AND INSTALLATION DETAILS TO EFFICIENTLY PERFORM REQUIREMENTS AND INTENT OF CONTRACT. SUCH APPROVAL SHALL NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OF ANY SORT.
 - ANY ELECTRICAL DEVIATIONS BETWEEN THE CONTRACT DOCUMENTS AND THE FURNISHED EQUIPMENT MUST BE SEPARATELY ACKNOWLEDGED BY A SUBSTITUTION NOTICE AND ADDITIONAL NOTED ON THE SUBMITTAL ON THE DRAWINGS.
 - PROVIDE MECHANICAL SHOP DRAWINGS FOR: CHILLERS, PIPING, PIPE INSULATION, CONTROLS, VALVES, AND PIPING ACCESSORIES.
- 1.06 CONNECTING TO WORK OF OTHERS**
- A. BEFORE STARTING HIS WORK, AND FROM TIME TO TIME AS WORK PROGRESSES, MECHANICAL CONTRACTOR SHALL EXAMINE WORK AND MATERIALS INSTALLED BY OTHERS INsofar AS THEY APPLY TO HIS WORK AND NOTIFY ENGINEER IMMEDIATELY IN WRITING IF CONDITIONS EXIST WHICH WILL PREVENT SATISFACTORY RESULTS IN INSTALLATION OF SYSTEM.
- B. SHOULD CONTRACTOR START HIS WORK WITHOUT SUCH NOTIFICATION, IT SHALL BE CONSTRUED AS AN ACCEPTANCE BY HIM OF ALL CLAIMS OR QUESTIONS AS TO SUITABILITY OR WORK OF OTHERS TO RECEIVE HIS WORK. HE SHALL REMOVE AND REPLACE, AT HIS OWN EXPENSE, ALL WORK UNDER THIS CONTRACT WHICH MAY HAVE TO BE REMOVED ON ACCOUNT OF SUCH DEFECTS.
- 1.07 CONTRACT DRAWINGS**
- A. IT IS THE INTENT OF DRAWINGS AND SPECIFICATIONS TO OBTAIN A COMPLETE AND FULLY OPERATIONAL, AND SATISFACTORY INSTALLATION. AN ATTEMPT HAS BEEN MADE TO SEPARATE AND IDENTIFY WORK UNDER THIS CONTRACT. HOWEVER, SOME SEPARATE DIVISIONAL DRAWINGS AND SPECIFICATIONS SHALL NOT RELIEVE CONTRACTOR FROM FULL RESPONSIBILITY OF COMPLIANCE WITH WORK OF HIS TRADE WHICH MAY BE INDICATED ON ANY DRAWING OR IN ANY SECTION OF THE SPECIFICATIONS. CONTRACTOR SHALL CAREFULLY EXAMINE ALL DRAWINGS PRIOR TO SUBMITTING BID. CONTRACTOR WILL BE REQUIRED TO FURNISH, INSTALL AND CONNECT WITH APPROPRIATE SERVICES ALL ITEMS SHOWN ON ANY DRAWINGS WITHOUT ADDITIONAL EXPENSE TO OWNER. ARCHITECT SHALL BE NOTIFIED PRIOR TO BID DATE OF ANY DISCREPANCIES, OMISSIONS, CONFLICTS OR INTERFERENCES WHICH OCCUR BETWEEN DRAWINGS OR BETWEEN DRAWINGS AND SPECIFICATIONS. IF SUCH NOTIFICATION IS RECEIVED IN ADEQUATE TIME, ADDITIONAL DATA OR CHANGES WILL BE ISSUED BY ADDENDUM TO ALL BIDDERS. SUBMITTAL OF BID BY CONTRACTOR SHALL INDICATE THE CONTRACTOR'S ACKNOWLEDGEMENT AND ACCEPTANCE TO PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IN ACCORDANCE WITH ALL CODE REQUIREMENTS.
- B. MECHANICAL DRAWINGS ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS ACTUALLY CONSTRUCTION OF BUILDING AND WORK OF OTHER TRADES WILL PERMIT. CHANGES FROM DRAWINGS NECESSARY TO MAKE WORK OF CONTRACTOR CONFORM WITH BUILDING AS CONSTRUCTED AND TO FIT WORK OF OTHER TRADES OR RULES OF BODIES HAVING JURISDICTION SHALL BE MADE BY CONTRACTOR AT HIS OWN EXPENSE. SOME DRAWINGS MAY HAVE BEEN PREPARED FROM EXISTING DRAWINGS WITH INTENT OF PROVIDING THE CONTRACTOR WITH INFORMATION CONCERNING THE EXISTING CONDITIONS. DATA SHOWN HAS NOT BEEN COMPLETELY VERIFIED BY ENGINEER AND NO GUARANTEE OF ACCURACY OF THIS INFORMATION IS GIVEN OR INTENDED. IT SHALL BE THE RESPONSIBILITY OF CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS. DATA WHICH IS SHOWN BUT PROVES TO BE INCORRECT SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM INSTALLING HIS WORK WITHIN THE INTENT OF PLANS AND SPECIFICATIONS, NOR SHALL IT CONSTITUTE BASIS FOR A CHANGE ORDER UNLESS, IN THE OPINION OF THE ENGINEER IT IS DETERMINED TO BE AN EXTRA COST OVER AND ABOVE THE BASIC INTENT OF THESE PLANS AND SPECIFICATIONS.
- 1.08 DAMAGE TO OTHER WORK**
- A. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER PROTECTIVE MEASURES WHEN WORKING OVERHEAD OR IN FINISHED AREAS. HE/SHE SHALL REPAIR, REPLACE OR TOUCH-UP ALL FINISHED SURFACES WHICH MAY BE DAMAGED AS A RESULT OF HIS OPERATIONS.
- 1.09 STORAGE AND WORK AREAS**
- A. ALL EQUIPMENT AND MATERIALS SHALL BE PROTECTED FROM THE WEATHER, DAMAGE, MOISTURE, DIRT, DEBRIS, ETC. USE OF CARDBOARD, VISQUEEN, OR OTHER SIMILAR MATERIALS WHILE STORED OUTSIDE IS NOT ACCEPTABLE. DO NOT INSTALL DAMAGED EQUIPMENT.
- 1.10 APPROVAL OF MATERIAL**
- A. EQUIPMENT OTHER THAN SPECIFIED IN THE CONTRACT DOCUMENTS REQUIRES APPROVAL FROM ENGINEER 7 DAYS PRIOR TO BID DATE.
- B. WRITTEN REQUEST FOR PRIOR APPROVAL MUST BE RECEIVED IN ENGINEER'S OFFICE BY CLOSE OF BUSINESS NO LATER THAN 10 DAYS PRIOR TO SCHEDULED BID DATE. REQUEST SHALL CONTAIN DETAILED INFORMATION ON THE PROPOSED ITEM. THIS SHALL INCLUDE:
- CATALOG CUTS SHEETS
 - DETAILED SPECIFICATIONS
 - DESCRIPTION OF DEVIATION FROM SPECIFIED ITEM
- C. AN ADDENDA SHALL BE ISSUED LISTING PROSPECTIVE CONTRACTORS LISTING ALL PRIOR APPROVED MANUFACTURERS AND PRODUCTS.

- PART 2 - PRODUCTS**
- 2.01 CHILLED WATER AND CONDENSER WATER PIPE AND INSULATION**
- A. GENERAL:
- STEEL PIPE: BLACK STEEL, SEAMLESS OR THERMAL WELD FOR PIPE SIZES TWO (2) INCHES AND ABOVE, CONTINUOUS WELD BELOW TWO (2) INCHES, CONFORMING TO ASTM STANDARD SPEC. A53.
 - CHILLED WATER PIPE INSULATION: UNFACED, PREFORMED RIGID CELLULAR POLYISOCYANURATE MATERIAL, INTENDED FOR USE AS THERMAL INSULATION. COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. ACCEPTABLE: DOW CHEMICAL; TRIMER 2000XP, DUNA USA INC; CORAFORM, DYPLAST PRODUCTS; ISO-25, ELLIOTT COMPANY OF INDIANAPOLIS; ELFOAM.
 - CHILLED WATER JACKETING:
 - INDOOR CHILLED WATER PIPE: THE JACKET MATERIAL SHALL BE HIGH IMPACT PVC CLASS 15364 C, CONFORMING TO ASTM D 1784, ADHESIVE AS RECOMMENDED BY JACKET MATERIAL MANUFACTURER. COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. FACTORY FABRICATED FITTING COVERS TO MATCH JACKET. JACKETING SHALL BE COLORED PER UNCC DESIGN AND CONSTRUCTION MANUAL: SAFETY BLUE (DEVOE DC9800). ACCEPTABLE: JOHNS MANVILLE; ZESTON, P.I.C. PLASTICS, INC.; FG SERIES, PROTO CORPORATION; LOSMOKE, SPEEDLINE CORPORATION; SMOKESAFE.
 - INSULATION THICKNESS: INSULATION THICKNESS SHALL MATCH THE THICKNESS OF THE EXISTING PIPING INSULATION.
 - CONDENSER WATER PAINT COLOR: CAR BLUE (DC4035). APPLY 2 COATS OF PAINT TO PIPING.
 - PIPING IDENTIFICATION: IDENTIFY PIPING SERVICE AND FLOW DIRECTION.
- 2.02 JOINTS AND CONNECTIONS**
- A. GENERAL JOINTS AND CONNECTIONS SHALL BE MADE PERMANENTLY AIR, GAS, AND WATERTIGHT.
- B. WELDED JOINTS: ALL PIPE TWO AND ONE-HALF INCHES (2-1/2") AND LARGER SHALL BE WELDED. CUT PIPE SQUARE USING PIPE CUTTING TOOL AND CAREFULLY REAM PIPE TO REMOVE ALL BURRS. BEVEL ENDS OF PIPE, AND AFTER CAREFULLY ALIGNING AND SETTING OF PROPER WELD GAP, TACK WELD TO SECURE PIPE AND FITTINGS IN TRUE ALIGNMENT. ALL WELDS SHALL BE OF SOUND METAL WITH TACK WELDS REMOVED IN ADVANCE OF FINISH WELDS. ALL WELDING SHALL BE PERFORMED BY WELDERS CERTIFIED IN ACCORDANCE WITH ANSI B.31.1 WITH TEST CONDUCTED BY AN APPROVED TESTING LABORATORY. PROVIDE THERMAL WELD COUPLES.
- 2.03 ACCESSORIES**
- A. PRESSURE GAUGES
- GAUGES: 4-1/2" INCH DIAMETER WITH CAST ALUMINUM BLACK FINISHED FLANGELESS CASE. BOURDON TUBE. PHOSPHOR BRONZE SILVER SOLDERED TO SOCKET AND TIP. SOCKET: FORCED BRASS BOTTOM OUTLET TYPE. MOVEMENT: BRONZE ROTARY TYPE WITH DELRIN SECTOR AND BUSHINGS AND MICROMETER TYPE POINTER. ACCURACY: ONE-HALF OF 1% OVER MIDDLE RANGE. SCALE RANGE: 0-100 PSI. ACCEPTABLE: H. O. TRETRICE COMPANY 600Q, EQUIVALENT PRODUCT OF MARSHALLTOWN, OR PRIOR APPROVED EQUAL.
 - GAUGE COCKS: BRASS, NEEDLE VALVE, ROUND KNURLED HANDLE, 1/4 INCH FEMALE NPT. ACCEPTABLE: H. O. TRETRICE COMPANY 735-2, EQUIVALENT PRODUCT OF MARSHALLTOWN, OR PRIOR APPROVED EQUAL.
 - PRESSURE SNUBBERS: BRASS, 1/4 INCH MALE X 1/4 INCH FEMALE NPT. INCLUDE EXTENSION FOR USE ON INSULATED PIPING. ACCEPTABLE: H. O. TRETRICE COMPANY 872-2, EQUIVALENT PRODUCT OF MARSHALLTOWN, OR PRIOR APPROVED EQUAL.
- B. THERMOMETERS
- BIMETALLIC-ACTUATED THERMOMETERS: SEALED TYPE; STAINLESS STEEL WITH 5-INCH DIAL. DIAL: NONREFLECTIVE ALUMINUM WITH PERMANENTLY ETCHED SCALE MARKINGS IN DEG F. SCALE RANGE: 0-100 DEG F. STANDARD: ASME B40.200. CONNECTOR TYPE: UNION JOINT, ADJUSTABLE ANGLE, WITH UNIFIED-INCH SCREW THREADS. CONNECTOR SIZE: 1/2 INCH, WITH ASME B1.1 SCREW THREADS. STEM: 0.25 OR 0.375 INCH IN DIAMETER; STAINLESS STEEL. WINDOW: PLAIN GLASS. RING: STAINLESS STEEL. ELEMENT: BIMETAL COIL. POINTER: DARK-COLORED METAL. ACCURACY: PLUS OR MINUS 1 PERCENT OF SCALE RANGE.
 - THERMOWELLS: PRESSURE-TIGHT, SOCKET-TYPE FITTING MADE FOR INSERTION INTO PIPING TEE FITTING. MATERIAL FOR USE WITH STEEL PIPING: CRES. TYPE: STEPPED SHANK UNLESS STRAIGHT OR TAPERED SHANK IS INDICATED. INTERNAL THREADS: NPS 1/2, ASME B1.1 SCREW THREADS. BORE: DIAMETER REQUIRED TO MATCH THERMOMETER BULB OR STEM. INSERTION LENGTH: LENGTH REQUIRED TO MATCH THERMOMETER BULB OR STEM. STANDARD: ASME B40.200. LAGGING EXTENSION: INCLUDE ON THERMOWELLS FOR INSULATED PIPING AND TUBING. BUSHINGS: FOR CONVERTING SIZE OF THERMOWELL'S INTERNAL SCREW THREAD TO SIZE OF THERMOMETER CONNECTION.
 - MANUFACTURERS: H. O. TRETRICE COMPANY, WEISS INSTRUMENTS, OR APPROVED EQUAL.
- 2.04 VALVES, AIR CONTROL DEVICES, AND PIPING SPECIALTIES**
- A. BUTTERFLY VALVES: 200 CWP, IRON, SINGLE-FLANGE BUTTERFLY VALVES WITH EPDM SEAT AND ALUMINUM-BRONZE DISC. STANDARD: MSS SP-67, TYPE 1. BODY DESIGN: LUG TYPE; SUITABLE FOR BIDIRECTIONAL DEAD-END SERVICE AT RATED PRESSURE WITHOUT USE OF DOWNSTREAM FLANGE. BODY MATERIAL: ASTM A 126, CAST IRON OR ASTM A 536, DUCTILE IRON. STEM: ONE- OR TWO-PIECE STAINLESS STEEL.
- B. MOTORIZED BUTTERFLY VALVES: RESILIENT SEAT, ASME CLASS 125/150 FLANGED. BODY SHALL BE CAST IRON MEETING ASTM A126 CLASS B REQUIREMENTS AND SHALL BE FULLY LUGGED. SEAT SHALL BE EPDM. DISK SHALL BE DUCTILE IRON WITH NYLON 11 COATING. BUTTERFLY VALVE STEMS SHALL BE STAINLESS STEEL. FLOW CHARACTERISTICS SHALL BE EQUAL PERCENTAGE UP TO 70° OF DISK ROTATION. ALL VALVES SHALL BE RATED FOR SERVICE WITH HOT WATER, CHILLED WATER AND 50% GLYCOL SOLUTIONS. VALVES SHALL BE MAINTENANCE FREE AND SHALL BE PROVIDED WITH A 3 YEAR WARRANTY. VALVE ELECTRIC ACTUATORS SHALL BE UL-RECOGNIZED OR CSA-CERTIFIED.
- C. TRIPLE-DUTY VALVES: EACH VALVE SHALL INCORPORATE THE FOLLOWING THREE FUNCTIONS IN ONE BODY: TIGHT SHUT-OFF, SPRING-CLOSURE TYPE SILENT NON-SLAM CHECK, AND EFFECTIVE THROTTLING DESIGN CAPABILITY. THE VALVE BODY SHALL BE DUCTILE IRON (ASTM A536) AND THE DISC SHALL BE BRONZE (ASTM B584). THE SEAT SHALL BE EPDM. THE VALVE STEM SHALL BE STAINLESS STEEL. EACH VALVE SHALL BE FURNISHED WITH A PRE-FORMED, REMOVABLE PVC INSULATION JACKET WITH A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE SPREAD RATING OF 50 OR LESS. THERE WILL BE PROVIDED SUFFICIENT MINERAL FIBERGLASS INSULATION TO MEET ASHRAE 90.1.
- D. MANUAL AIR VENTS: BRONZE BODY, NONFERROUS INTERNAL PARTS, SCREWDRIVER OR THUMBSCREW OPERATION, NPS 1/2 INLET CONNECTION, NPS 1/8 DISCHARGE CONNECTION, CWP RATING: 150 PSIG, MAX. OPERATING TEMPERATURE: 225 DEG F.
- E. STAINLESS-STEEL BELLOW FLEXIBLE CONNECTORS: STAINLESS-STEEL BELLOWS WITH WOVEN, FLEXIBLE, BRONZE, WRE-REINFORCING PROTECTIVE JACKET. FLANGED ENDS. CAPABLE OF 3/4 INCH MISALIGNMENT. CWP RATING: 150 PSIG. MAX. OPERATING TEMPERATURE: 250 DEG F.
- F. ALL VALVES SHALL BE PROVIDED WITH 0.032" THICK POLISHED BRASS VALVE TAGS WITH STAMP-ENGRAVED PIPING SYSTEM ABBREVIATION AND SEQUENCED VALVE NUMBERS. ATTACH WITH BRASS CHAINS OR S-HOOKS.

- PART 3 - EXECUTION**
- 3.01 PIPING AND EQUIPMENT LABELING**
- A. MECHANICAL EQUIPMENT SHALL BE LABELED WITH NAME, NUMBER AS DESIGNATED ON CONTRACT DOCUMENTS, SERVICE AND OPERATIONAL REQUIREMENTS, DESIGN CAPACITY, AND OTHER DESIGN PARAMETERS SUCH AS PRESSURE DROP, ENTERING AND LEAVING CONDITIONS, RPM, ETC. CHILLERS SHALL ALSO BE IDENTIFIED WITH STENCIL PAINTING. PIPING LABELS SHALL BE PRINTED AND COLOR-CODED WITH LETTERING INDICATING SERVICE AND SHOWING FLOW DIRECTION. BACKGROUND COLOR SHALL BE SAFETY BLUE (DEVOE DC9800) AND LETTERING SHALL BE WHITE.
- 3.02 TESTS**
- A. TEST PIPING SYSTEMS PRIOR TO THE APPLICATION OF ANY INSULATION AND PRIOR TO THEIR BEING RENDERED INACCESSIBLE BY THE PROGRESS OF THE WORK. PRESSURE TEST THE PIPING AT ONE HUNDRED FIFTY PERCENT (150%) OF WORKING PRESSURE OR ONE HUNDRED PSIG (100), WHICHEVER IS GREATER. THE SYSTEM SHALL HOLD THE PRESSURE FOR SUCH TIME AS REQUIRED TO INDICATE ITS INTEGRITY TO THE SATISFACTION OF THE ENGINEER BUT IN NO CASE LESS THAN EIGHT (8) HOURS.
- B. GENERAL: AFTER THE PIPING SYSTEMS HAVE BEEN TESTED AND PROVED TIGHT, THE CONTRACTOR SHALL CLEAR THE VARIOUS SYSTEMS OF DIRT, SCALE, OIL, GREASE, WASTE AND OTHER FOREIGN SUBSTANCES WHICH MAY HAVE ACCUMULATED DURING THE PROCESS OF INSTALLATION.
- 3.03 REFRIGERANT MANAGEMENT**
- A. HANDLING OF REFRIGERANT MUST BE IN COMPLIANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS. CONTRACTOR MUST CARRY THE NECESSARY LICENSES AND RELATED EVIDENCE AT ALL TIMES.
- B. A REFRIGERANT COMPLIANCE STATUS REPORT SHALL BE EXECUTED EVERY TIME REFRIGERANT IS ADDED TO OR REMOVED FROM EXISTING/NEW CHILLER. ONE COPY OF EACH FORM SHALL BE GIVEN TO THE UNC-CHARLOTTE/ZONE-6 SUPERVISOR, ONE COPY LEFT ON THE JOBSITE IN CLOSE PROXIMITY OF THE CHILLER AND COPIES RETAINED AT THE CONTRACTOR'S OFFICE.
- C. REFRIGERANT COMPLIANCE FORMS: UNC-CHARLOTTE/PM MANAGER WILL PROVIDE ALL NECESSARY FORMS AND TEMPLATES AS UNC-CHARLOTTE STANDARD POLICY.
- 3.04 WITNESS TEST**
- A. THE OWNER AND A REPRESENTATIVE OF THE OWNER'S CHOOSING WILL, AT NO ADDITIONAL COST TO THE OWNER OR OWNER'S REPRESENTATIVE, WITNESS THE SPECIFIED CHILLER FACTORY PERFORMANCE TEST. OWNER AND OWNER'S REPRESENTATIVE EXPENSES TO INCLUDE TRAVEL, LODGING AND MEALS WILL BE A COST TO THE CHILLER VENDOR.
- B. FACTORY PERFORMANCE TEST CHILLERS, BEFORE SHIPPING, ACCORDING TO ARI 506/110 TO BE WITNESSED BY OWNERS.
- TEST THE FOLLOWING CONDITIONS:
 - DESIGN CONDITIONS INDICATED.
 - REDUCTION IN CAPACITY FROM DESIGN TO MINIMUM LOAD IN STEPS OF 25 WITH VARYING ENTERING CONDENSER-FLUID TEMPERATURE FROM DESIGN TO MINIMUM CONDITIONS. APPROX 100 F TO 40 F ENTERING CONDENSER WATER, 56 DEG F ENTERING CONDENSER WATER, 85 DEG F ENTERING CONDENSER WATER, 56 F ENTERING EVAPORATOR WATER, 42 F LEAVING EVAPORATOR WATER SETPOINT.
 - PROVIDE OWNER ACCESS TO PLACE WHERE CHILLERS ARE BEING TESTED.
 - PREPARE TEST REPORT INDICATING TEST PROCEDURES, INSTRUMENTATION, TEST CONDITIONS, AND RESULTS. SUBMIT COPY OF RESULTS WITHIN ONE WEEK OF TEST DATE.
- 3.05 TESTING, ADJUSTING, AND BALANCING FOR HYDRONIC PIPING SYSTEMS**
- A. QUALITY ASSURANCE
- TAB CONTRACTOR QUALIFICATIONS: ENGAGE A TAB ENTITY CERTIFIED BY AABC OR NEBB.
 - TAB FIELD SUPERVISOR: EMPLOYEE OF THE TAB CONTRACTOR AND CERTIFIED BY AABC OR NEBB.
 - TAB TECHNICIAN: EMPLOYEE OF THE TAB CONTRACTOR AND WHO IS CERTIFIED BY AABC OR NEBB AS A TAB TECHNICIAN.
- B. GENERAL PROCEDURES FOR TESTING & BALANCING
- PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE" OR NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS".
- C. SCOPE OF WORK
- PRIOR TO DEMOLITION, PERFORM PRELIMINARY MEASUREMENTS TO DETERMINE EXISTING SYSTEM FLOWS AND PRESSURES.
 - AFTER INSTALLATION IS COMPLETE, THE CONTRACTOR SHALL TEST AND BALANCE THE ENTIRE HYDRONIC PIPING SYSTEM WITHIN THE MECHANICAL ROOM. AT A MINIMUM THIS INCLUDES THE EVAPORATOR AND CONDENSER SIDES OF ALL CHILLERS, ALL CONDENSER WATER PUMPS, ALL PRIMARY CHILLED WATER PUMPS, AND ALL SECONDARY CHILLED WATER PUMPS.
- 3.06 REMOVAL AND DISPOSITION OF WASTE MATERIAL OR RUBBISH GENERATED BY WORK UNDER THIS CONTRACT.**
- 3.07 CLEANING AND ADJUSTMENTS**
- UPON COMPLETION OF WORK, CONTRACTOR SHALL PREPARE ALL RUNNING EQUIPMENT AND APPARATUS WHICH HE INSTALLS AND MAKE CERTAIN ALL SUCH APPARATUS AND MECHANISMS ARE IN PROPER WORKING ORDER AND READY FOR TEST.
- 3.08 AS-BUILT DRAWINGS**
- UPON COMPLETION OF INSTALLATION, THE CONTRACTOR SHALL FURNISH TO THE ARCHITECT A SET OF DRAWINGS, MARKED TO SCALE, INDICATING THE SIZE AND LOCATION OF PIPING AND DUCTS, AND NOTING ALL MAJOR CHANGES MADE DURING CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN THE DRAWINGS FROM THE ARCHITECT AND SHALL BEAR ALL COSTS IN OBTAINING THE DRAWINGS AND PROVIDING THE AS-BUILT DRAWINGS. THE CONTRACTOR SHALL DELIVER THE DRAWINGS PLUS TWO SETS OF AS-BUILT DRAWINGS TO THE ARCHITECT. EACH SHEET IN EACH SET SHALL BE SIGNED BY A PRINCIPAL REPRESENTATIVE OF THE CONTRACTOR, DATED AND HAVE "AS-BUILT" STAMPED NEAR THE SIGNATURE. DRAWINGS SHALL GIVE ACCURATE DIMENSIONS MEASURED FROM COLUMNS, WALLS, BEAMS AND OTHER FIXED PARTS OF THE BUILDING TO THE CONCEALED MATERIALS. THE CONTRACTOR SHALL MAINTAIN A SET OF DRAWINGS AT THE SITE AND EACH DAY SHALL RECORD INSTALLATION OF PIPE, DUCTS, ETC. TO INSURE ACCURATE "AS-BUILT" DRAWINGS. THE CONTRACTOR SHALL ALSO FURNISH A SET OF DRAWINGS AND TWO SETS OF CONTRACTOR SIGNED AND DATED AS-BUILT DRAWINGS OF THE CONTROLS.
- 3.09 GUARANTEE AND SERVICE**
- A. IN ADDITION TO THE GUARANTEE OF EQUIPMENT BY THE MANUFACTURER OF EACH PIECE OF EQUIPMENT SPECIFIED HEREIN, THE MECHANICAL CONTRACTOR SHALL ALSO GUARANTEE SUCH EQUIPMENT AND SHALL BE HELD RESPONSIBLE FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE FOR NECESSARY ADJUSTMENTS AND/OR REPLACEMENTS OF ALL DEFECTIVE EQUIPMENT, MATERIALS AND WORKMANSHIP WITHOUT EXPENSE TO THE OWNER. PROVIDE A LETTER TO THE OWNER STATING THE CONTRACTOR'S GUARANTEE AND DATES OF GUARANTEE COVERAGE.
- B. CLEANING OF PERMANENT TYPE FILTERS; LUBRICATION, AND CLEANING OF STRAINERS SHALL BE TO 30-DAYS AFTER THE FINAL ACCEPTANCE.
- C. THE CONTRACTOR SHALL PROVIDE FOR A REPRESENTATIVE OF HIS FIRM, THE CONTROL SYSTEM CONTRACTOR, AND THE OWNER'S REPRESENTATIVE TO RETURN TO THE JOB AT THE CHANGE OF SEASONS, (SUMMER TO WINTER OR WINTER TO SUMMER) FOR THE FIRST YEAR ONLY, TO ADJUST THE SYSTEMS AND RECHECK OR RECALIBRATE CONTROLS AS MAY BE REQUIRED OF THE SEASON CHANGE.
- 3.10 ACCEPTANCE**
- A. AS A PREREQUISITE TO REQUESTING FINAL INSPECTION, CONTRACTOR SHALL:
- TEST AND BALANCE EACH SYSTEM TO ASSURE DESIGN PERFORMANCE AND PROVIDE ARCHITECT AND ENGINEER WITH PRELIMINARY TEST RESULTS.
 - FURNISH LETTER FROM AUTHORIZED REPRESENTATIVE OF MANUFACTURER THAT ALL CONTROLS HAVE BEEN CHECKED OPERATION AND CALIBRATION AND THAT ALL SYSTEMS OPERATING AS INTENDED.
- B. ACCEPTANCE WILL BE MADE BY THE ARCHITECT-ENGINEER OR REPRESENTATIVE ON THE BASIS OF TESTS AND INSPECTION. CONTRACTOR SHALL FURNISH THE NECESSARY MECHANICS TO SYSTEMS, MAKE ANY NECESSARY ADJUSTMENTS AND ASSIST FINAL INSPECTION.

REVISIONS		DESCRIPTION
NO.	DATE	ISSUED FOR CONSTRUCTION
1	02/11/16	ADDENDUM #1


MCVEIGH & MANGUM
 ENGINEERING, INC.
 1610 East Morehead Street, Suite 100
 Charlotte, North Carolina 28202-9616
 Phone: (770) 486-8800
 email: info@mcveighmangum.com
 Lic. No.: 35080
 Eng. of Record: Larry P. McWilliams, No. 040327

MCCNERY BUILDING CHILLER REPLACEMENT
 UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
 9201 UNIVERSITY CITY BLVD, CHARLOTTE, NC 28223
 MECHANICAL SPECIFICATIONS

DRAWN	LFM
DESIGNED	LFM
CHECKED	SRC
DATE	10/16/2015
SCALE	AS NOTED
JOB NO	15593
SHEET	M002



X:\2015\15593 (McEntry Chiller)\15593.dwg\15593 M001 - Mechanical Schedules, Notes, and Legends.dwg, 02/11/2016 4:00 PM, mcwilliams
 © 2015 THIS DRAWING IS THE INSTRUMENT OF SERVICE AND PROPERTY OF McVEIGH & MANGUM ENGINEERING, INC. THE USE OF THIS DRAWING SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH IT WAS PREPARED. ANY USE OR REPRODUCTION WITHOUT THE EXPRESSED WRITTEN PERMISSION OF THIS CORPORATION IS PROHIBITED.
 © 2014 THIS DRAWING IS THE INSTRUMENT OF SERVICE AND PROPERTY OF McVEIGH & MANGUM ENGINEERING, INC. THE USE OF THIS DRAWING SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH IT WAS PREPARED. ANY USE OR REPRODUCTION WITHOUT THE EXPRESSED WRITTEN PERMISSION OF THIS CORPORATION IS PROHIBITED.

CHILLER PLANT SEQUENCE OF OPERATION:

CHILLER CONTROL:
 This system consists of two chillers. The chillers shall be controlled via their own internal controls to maintain a chilled water supply temperature. Each chiller will be staged on and off in order to maintain the differential setpoint between the supply and return temperatures. Chiller #1 shall be run as the lead chiller at all times, unless it is unable to run.

CHILLED WATER PUMP CONTROL:
 When enabled, a pump for each chiller will be started. After the chiller is commanded off, the pump will continue to run for a short time to allow the equipment to coast down. If the pump status does not match the command, an alarm will be generated and the pump will be stopped. Upon loss of status, the pump will restart after the system reset is activated.

CONDENSER WATER SYSTEM:
 Whenever a chiller is started, a CT cell shall be enabled. The CT fans will be staged on and off to maintain a condenser supply water temperature setpoint. The condenser water (CW) system consists of two individual cooling tower (CT) cells. The cooling towers, operating order shall be determined by, an operator rank number. If a device failure is detected, it will be shut down in an orderly manner and the next available device in the sequence shall be started.

CONDENSER WATER BYPASS:
 Upon a drop in tower water temperature below condenser water setpoint the condenser water bypass will be enabled and the bypass valve shall modulate to maintain this minimum water temperature. The minimum water temperature while Chiller #1 is operating alone shall be 55 F (adj.) and the minimum water temperature while both chillers are operating shall be 65 F (adj.).

INITIAL CHILLER START-UP:
 The following sequence applies to the specific case when the first chiller needs to start.

- Command isolation valves to fully open position.
- Once valve positions have been proven fully open, command corresponding pump to start.
- Prove pump running status. After a 60 second (adj.) Stabilization delay, command 1st chiller to start.

ADDING ADDITIONAL CHILLERS:
 The minimum number of chillers will operate. Chiller #2 will only be added when Chiller #1 is operating at or exceeding maximum design capacity. Maximum capacity will be calculated in real time based on the entering CW temperature and CHW setpoint using manufacturer's data for the specific model of installed chillers. Or - if the CHW supply temperature rises 3 deg F (adj.) above the setpoint for an adjustable period (typ. 20 minutes).

- After an adjustable period (typ. 1 minute), the next available CHW pump, if needed, and CW pump shall be commanded to start.
- Once the status of the pumps has been proven, the respective CHW and CW isolation valves shall be commanded to open. The CHW valve shall be commanded to open slowly, over 90 seconds (adj.) to avoid nuisance trips of operating chillers. After the valve positions are verified open, the chiller shall be commanded to start. The operating chillers' current-limit-setpoints shall be released, allowing them to load-up as required.

STOPPING ADDITIONAL CHILLERS AND CHILLER PLANT SHUTDOWN:
 When the building automation system determines that the operating chillers have a part load ratio of less than 30% (adj.), Chiller #2 shall be shutdown, unless shutting down a chiller will cause flow rates in remaining chillers to exceed their maximum values. The chiller shall receive a stop command, and the CHW and CW pumps will continue to run for an additional 2 minutes (adj.). After the 2 min. Period expires, isolation valves shall be commanded to close. Once the isolation-valve positions are verified closed, the CHW pump, if needed, and CW pump with the highest operator ranking or run-time shall be shutdown. After the CW pump has been proven off, the CT isolation valve shall be commanded to close.

NOTE: TUNING PARAMETERS ON NEW DDC CONTROLS VALVES SHALL BE ADJUSTABLE FROM BAS CONTROL SCREEN.

BASE BID: REPROGRAM EXISTING JOHNSON CONTROLS FOR COOLING TOWERS AND CHILLERS TO PERFORM SEQUENCE AS LISTED ABOVE.

ALTERNATE #3: REMOVE EXISTING JOHNSON CONTROLS FROM COOLING TOWERS AND CHILLERS. INSTALL NEW OPEN PROTOCOL BACNET MS/TP OR LON CONTROLS AND TIE INTO EXISTING BUILDING CONTROLS. REPLACE EXISTING STANDALONE CONTROLS ON PUMP PACKAGES WITH NEW OPEN PROTOCOL BACNET MS/TP OR LON CONTROLS AND TIE INTO EXISTING BUILDING CONTROLS.

NOTE: ALL CONTROLS MUST BE COMPATIBLE WITH EXISTING TRIDIUM JACE AND HONEYWELL CONTROLS IN BUILDING. CONTROLS GRAPHICS SHOULD BE UPDATED AS REQUIRED. CONTRACTOR MUST BE AX CERTIFIED AND HAVE EXPERIENCE WITH EXPORT TAGGING.

ALTERNATE #1 WATER-COOLED CHILLER SCHEDULE

UNIT DESIGNATION	CH-1
NOMINAL TONS	550
MANUFACTURER	CARRIER
MODEL NUMBER	19XR6767
REFRIGERANT TYPE	R-134a
REFRIGERANT CHARGE (LBS.)	1632
OPERATING WEIGHT (LBS.)	30,153
EVAPORATOR:	
ENTERING WATER TEMP. (F)	52
LEAVING WATER TEMP. (F)	42
FLOW RATE (GPM)	1318
PASSES	2
PRESSURE DROP (FT.)	11.3
FOULING FACTOR	0.0001
WORKING FLUID	WATER
CONDENSER:	
ENT. WATER TEMP. (F)	85
LVG. WATER TEMP. (F)	95
FLOW RATE (GPM)	1650
PASSES	2
PRESSURE DROP (FT.)	11.3
FOULING FACTOR	0.00025
WORKING FLUID	WATER
ELECTRICAL DATA	
UNIT VOLTAGE/PHASE	460/3
MCA/MOCP	549/700
PRIMARY L.R.A.	439
MAX. KW/TON	0.588
MAX N.P.L.V. KW/TON	0.381

NOTES:

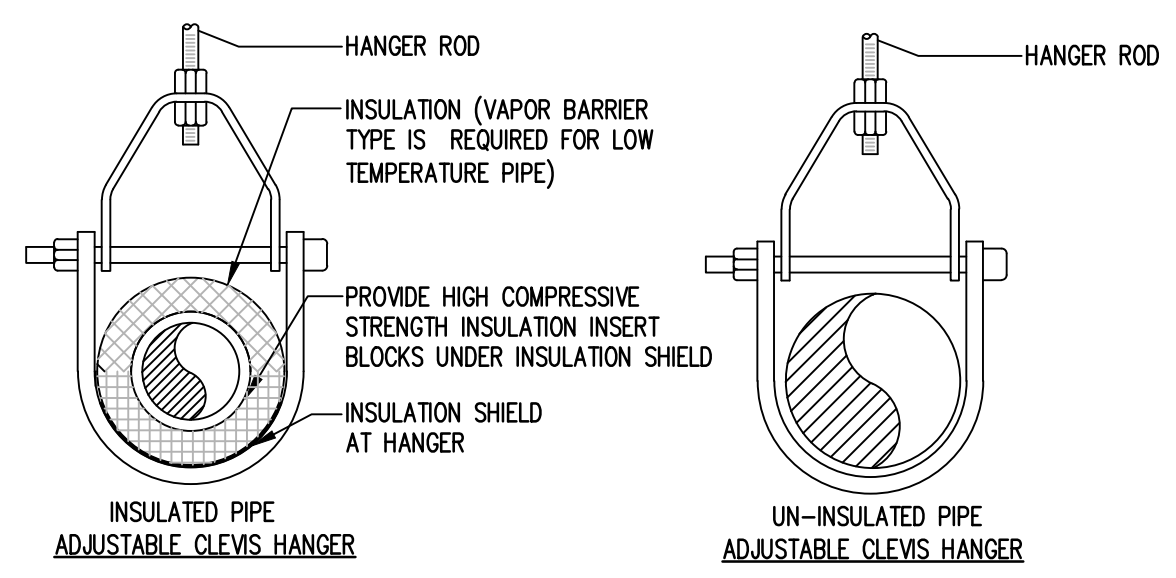
1. Provide 3/4" Armaflex Factory insulation on all cold parts
2. Chiller shall turn down to 20% at constant 85F condenser water temp w/o hot gas bypass
3. Provide VFD starter and factory installed IEEE 519 filter. Performance ratings shall include filter.
4. Chiller shall be provided with chiller controller and tied into existing building automation system
5. See specifications for owner witness test requirements
6. 5 year extended warranty on unit, including parts, labor and refrigerant
7. Soft interlock chiller w/ primary pump through flow or pressure switch
8. Approved manufacturers: Carrier, Trane, York.

ALTERNATE #2 WATER-COOLED CHILLER SCHEDULE

UNIT DESIGNATION	CH-1
NOMINAL TONS	550
MANUFACTURER	YORK
MODEL NUMBER	YMC2-S1934AB
REFRIGERANT TYPE	R-134a
REFRIGERANT CHARGE (LBS.)	1396
OPERATING WEIGHT (LBS.)	25,102
EVAPORATOR:	
ENTERING WATER TEMP. (F)	52
LEAVING WATER TEMP. (F)	42
FLOW RATE (GPM)	1320
PASSES	2
PRESSURE DROP (FT.)	17.5
FOULING FACTOR	0.0001
WORKING FLUID	WATER
CONDENSER:	
ENT. WATER TEMP. (F)	85
LVG. WATER TEMP. (F)	95
FLOW RATE (GPM)	1650
PASSES	2
PRESSURE DROP (FT.)	10.3
FOULING FACTOR	0.00025
WORKING FLUID	WATER
ELECTRICAL DATA	
UNIT VOLTAGE/PHASE	460/3
MCA/MOCP	522/800
PRIMARY L.R.A.	417
MAX. KW/TON	0.573
MAX N.P.L.V. KW/TON	0.329

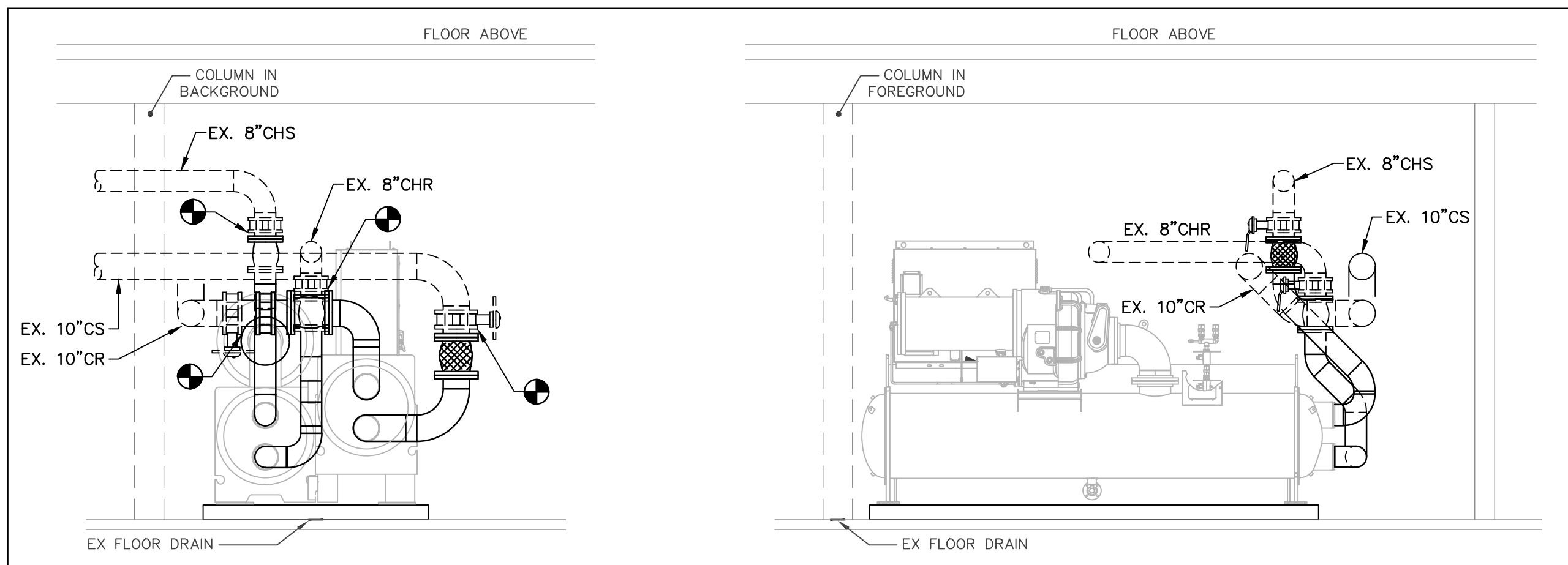
NOTES:

1. Provide 3/4" Armaflex Factory insulation on all cold parts.
2. Chiller shall turn down to 20% at constant 85F condenser water temp w/o hot gas bypass
3. Provide VFD starter and factory installed IEEE 519 filter. Performance ratings shall include filter.
4. Chiller shall be provided with chiller controller and tied into existing building automation system.
5. See specifications for owner witness test requirements
6. 5 year extended warranty on unit, including parts, labor and refrigerant.
7. Soft interlock chiller w/ primary pump through flow or pressure switch.
8. Approved Manufacturers: York, Daikin, Smardt.

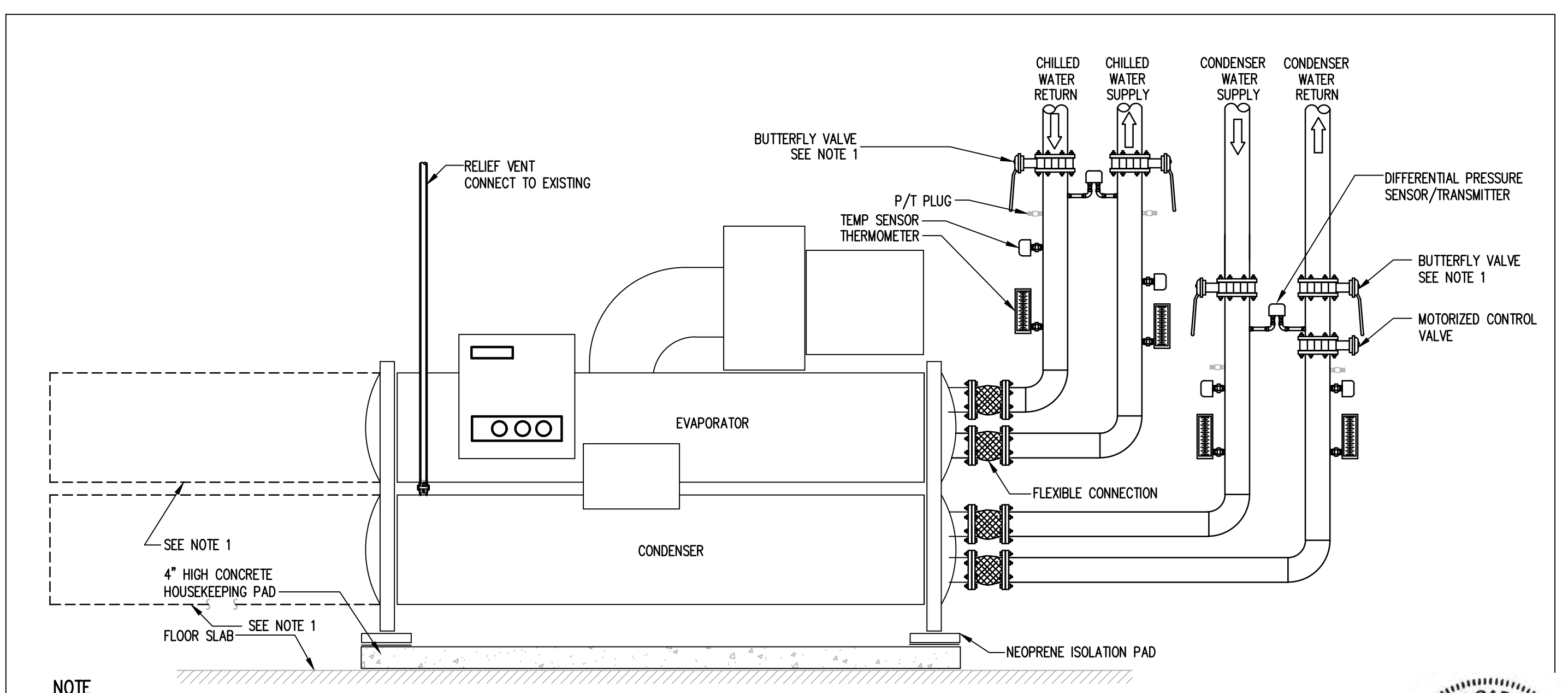


NOTE: ALL PIPE HANGERS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH THE NORTH CAROLINA BUILDING CODE 2012 - MECHANICAL.

2 TYPICAL PIPE HANGERS
MO02 NTS



3 SECTIONS AT CHILLER PIPING
MO02 SCALE: 1/4" = 1'-0"



NOTE:
 1. LOCATE ISOLATION VALVES SO THAT PIPING BETWEEN VALVES AND CHILLER CAN BE REMOVED FOR TUBE SERVICING.

1 CHILLER INSTALLATION DETAIL
MO02 NTS



REVISIONS	
NO.	DATE
1	12/11/15
	02/11/16
DESCRIPTION	ISSUED FOR CONSTRUCTION
	ADDENDUM #1

McVEIGH & MANGUM
ENGINEERING, INC.

1610 East Morehead Street, Suite 100
 Charlotte, North Carolina 28226
 Phone: (770) 586-1610
 Email: mail@McVeighMangum.com
 Eng. of Record: Larry P. McWilliams, No. C-33203

MCENERY BUILDING CHILLER REPLACEMENT
 UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
 9201 UNIVERSITY CITY BLVD, CHARLOTTE, NC 28223
 MECHANICAL DETAILS

DRAWN	LPM
DESIGNED	LPM
CHECKED	SRG
DATE	10/16/2015
SCALE	AS NOTED
JOB NO	15593
SHEET	M003

UNC Charlotte
“Good Faith Effort” Requirements
McEniry Chiller Project

This information is provided as a guide for firms who may be new to UNC Charlotte and may not be familiar with our expectations regarding minority business participation on Formal (\$500,000 and above) construction projects. Bidders should be familiar with the ***Guidelines for Recruitment & Selection of Minority Businesses for Participation in State Construction Contracts*** as well as the applicable bid forms;

Identification of HUB Certified/Minority Business Participation form – Only list minority firms that you will use as construction subcontractors, vendors, suppliers or professional service providers on this project. The bidder cannot list himself on this form as he cannot subcontract to himself. **Note:** This form should be submitted with your bid, even if left blank.

Affidavit A – Listing of Good Faith Efforts – the bidder is certifying that he has made a good faith effort to comply under those areas checked on the form. Do not check a Good Faith Effort item unless you can provide the following;

1. Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists **at least 10 days before the bid or proposal date** and notifying them of the nature and scope of the work to be performed.

Example: Copies of written (emailed or faxed) notification to minority businesses and copies of quotes/proposals received for work solicited to minority businesses. Notification should include, at a minimum, project location, location where plans and specifications may be obtained or viewed, trade or scopes of work for which subcontracts are being solicited, contact person within the prime contractor organization.

Be sure to maintain a telephone log to confirm that minority firms received your IFB. The log should contain the date contacted, telephone number, and name of the individual representing the minority firm who acknowledged receipt of your IFB. ***Also maintain a telephone log to confirm that minority firms acknowledged a “bid/no bid” to your IFB.*** The log should contain the date contacted, telephone number, and name of the individual representing the minority firm who acknowledged “bid/no bid” to your IFB.

2. Making the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.

Example: Copies of written (emailed or faxed) notification to minority businesses should include, at a minimum, project location, location where plans and specifications may be obtained or viewed, trade or scopes of work for which subcontracts are being solicited, contact person within the prime contractor organization.

3. Breaking down or combining elements of work into economically feasible units to facilitate minority participation.

Example: Document steps taken to segment elements of work into economically feasible units to meet minority business availability. Identify sub-contractors/suppliers/consultants and scope of work involved in segmenting.

Be sure that you are soliciting quotes from **at least** three (3) minority firms in scopes of work that typically have adequate numbers of minority firms available that can perform the work required (hauling, concrete, flooring, masonry, painting, electrical suppliers, etc.). Do not solicit quotes

from minority firms in those scopes of work that typically do not have minority firms available that can perform the work required (elevators, fire suppression systems, roofing, etc.). If there are minority firms that you typically use on your projects then by all means, feel free to use them, if you are sure you are receiving reasonable pricing and quality work.

4. Working with minority trade, community or contractor organization identified by the Office for Historically Underutilized Businesses (HUB) and included in the bid documents that provide assistance in recruitment of minority businesses. **Note:** Minority plan rooms are not applicable.
Example: Provide a copy of meeting minutes between prime contractor and minority trade, community or contractor organization. At minimum the following topics should be discussed/reviewed during the meeting: project location; location where plans and specifications may be obtained or viewed; trade or scopes of work for which subcontracts are being solicited; bonding requirements; insurance requirements; prime contractor's contact person; minority trade, community or contractor organization contact person; strategies to segment elements of the work into economically feasible units to meet minority business availability; strategies to increase minority business utilization through joint ventures and/or partnerships; notification that the meeting will be counted toward the contractor's good faith effort.
Example: Maintain a copy of the request, and have the date, telephone number and name of the individual who acknowledged receipt of your request and information regarding any/all assistance provided by the organization
5. Attending any pre-bid meetings scheduled by the public owner.
Example: Attendance will be verified by conference sign-in sheet.
6. Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
Example: Documentation describing the type of assistance provided or offered to minority businesses. Provide names and contacts of minority businesses to which assistance was offered and names of the contact person of bonding companies or financial institutions offering assistance.
7. Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
Example: Document number of bids received from minority businesses in the trade or scopes of work for which subcontracts are being solicited, the number of minority businesses that submitted low bids or proposals, the number of minority businesses the bidder has offered to negotiate prices or services, and the number of minority businesses the bidder has agreed to utilize on the project, outline steps taken.
8. Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required or assisting minority businesses in obtaining the same unit pricing with the bidders supplier.
Example: Document names, addresses and telephone numbers of minority businesses to which assistance was offered, outline steps taken. Give dates assistance was offered and document outcome.
9. Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
Example: Provide a copy of joint venture or partnership arrangements between bidder and minority business.

10. Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

Example: Provide a copy of quick pay agreements and/or policies and document the number of minority businesses that will utilize the quick pay agreement. Provide a copy of the quick pay agreement between bidder and minority business.

Note: *Referencing the Good Faith Efforts listed above in your IFB is not enough. You must be able to document your efforts.*

Affidavit B – Intent to Perform Contract with Own Workforce – In making this certification the bidder is stating that he does not customarily subcontract elements of this type project and normally performs and has the capability to perform and will perform all elements of the work on this project with his own current workforce. The bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible. “**Self-performing**” means the contractor has all equipment, personnel and supplies on hand to perform the contract. If the contractor needs to purchase supplies or rent equipment and operators to perform the work, then the contractor **is not** self-performing and should make efforts to purchase supplies or equipment, or temporary labor from minority firms. **Note:** No other Affidavits are required if the Bidder meets this criteria.

Affidavit C – Portion of the Work to be Performed by HUB Certified/Minority Businesses – This form is to be submitted only by the apparent lowest responsible, responsive bidder with equal to or greater than 10% minority participation.

Affidavit D – Good Faith Efforts – This form is to be submitted only by the apparent lowest responsible, responsive bidder with less than 10% minority participation along with their backup documentation.

Minority-owned Pre-qualified Bidders – **must also** meet the minority participation goals set for the project. Work performed by the minority-owned pre-qualified bidder will be counted towards the minority participation goal **only if** the minority contractor is **self-performing** and submitted Affidavit B.

Certification Requirements – Ensure the minority firms you contact for subcontracting opportunities are listed in the Statewide Uniform Certification (SWUC) Vendor database as **only firms** listed in the SWUC Vendor database, at the time of contract award, **will be counted** towards the minority participation goal for this project. Go to <https://www.ips.state.nc.us/vendor/searchvendor.aspx?t=h> for access to the SWUC Vendor database.

Assistance:

General Contractors will need to contact minority subcontractors by Monday, February 22, 2016 in order to meet the ten day requirement per item 1 above. Included is a list of HUB certified firms who have worked on other UNC Charlotte projects. If you require contact information for HUB firms in other trades, email the UNC Charlotte HUB Coordinator, Dorothy Vick (704-687-0527), no later than 12:00 Noon Thursday, February 18, 2016 at dlvick@uncc.edu (Email Subject: McEniry Chiller) for the following;

1. **Assistance in finding certified minority firms who have worked on UNC Charlotte projects and who can perform the scopes of work (site work, concrete, electrical, etc.) you are seeking, and/or**
2. **A list of minority trade, community or contractor organizations** identified by the Office for Historically Underutilized Businesses that provide assistance in recruitment of minority businesses.

Potential HUB certified subcontractors:

Electrical Contractors:

1. Adams Electric Company (W) – Don Young, 336-349-6283, donyoung@adams-electric.com
2. Besco Electric (H/W) – Mayra Caylor, 704-892-4200, m.caylor@bescoelectrical.com
3. Chavis' Inc. (A/DBE) – Fitzgerald Chavis, 910-844-2000, fitz.chavis@chavisinc.com
4. Major Contractors, Inc. (W) – Lisa Jackson, 704-392-3133, ljackson@majorcontractors.com
6. Watson Electric Company (W) – Kathy Kiser, 704-947-5151, Kathy@watsonelectric.com
7. PAGE Power Systems, Inc. (W) – Pamela Dills, 704-864-7390, pam@pagepowersystems.com

Testing, Adjusting, and Balancing Contractors:

1. Airflow Experts (W) – Candy Clarke, 336-229-1470, candyclarke@airflowexperts.com
2. Belle, LLC (W) – Liza Sippe, 704-770-0834, liza@belleproperties.com
3. Industrial Tool & Equipment Leasing, Inc. (W) – Catherine Quate, 919-596-5963, cquate@quateindustrial.com
4. Mullinax TAB Inc. (W) – Ed Mullinax, 864-649-1091 – ed@mtabinc.com
5. Palmetto Air & Water Balance (W) – Penny Hinton, 704-587-7073, phinton@palmettoairbalance.com

Insulation Contractors:

1. A1 Quality Inc (AI) – Christy Senior, 704-331-9294 – seniorc@bellsouth.net
2. Industrial & Commercial Insulation, Inc. (W) – Nancy Burcham, 336-274-1605, nsburcham@ic-insulation.com
3. Industrial Tool & Equipment Leasing, Inc. (W) – Catherine Quate, 919-596-5963, cquate@quateindustrial.com
4. Superior Mechanical Systems, Inc. (B) – Leonard Burch, 704-335-1942, prossell@superiormsinc.com

Sound, Vibration, and Seismic Control Contractor:

Seismic Control & Isolation, Inc. (W) – Nancy Meckstroth, 704-504-8780, nancy@seismiccontrol.com

Demolition:

GDC Supplies & Equipment Contracting (B) – Gregory Camp, 704-996-1578, gregoryhdm@bellsouth.net
Abatemaster Inc. (W) – Angela Tesh, 336-731-4396, angela_abatemaster@yahoo.com
Abatement Pros, Inc. (H) – Anselmo Salas, 336-442-8030, asalas@abatementpros.net
Demolition & Asbestos Removal, Inc. (W) – Benita Mitchell, 888-336-3366, bgmitchell@daricorp.com or elainer@daricorp.com or jllondon@daricorp.com
The Linda Construction Company (W) – Linda Holden, 704-333-7120, tammitk@lindaconstruction.com
W&W Trucking & Demolition Services, LLC (B) – Broderick Williams, 336-462-7696, BWbuckone@aol.com
Siteworks LLC (W) - Melissa Bovit, 704-588-3055, mbovit@siteworks-llc.com