AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0009	27-Apr-2016		

6. ISSUED BY CODE N40085	7. ADMINISTERED BY (If other than item 6) CODE
NAVFAC MID ATLANTIC MARINE CORPS IPT 9324 VIRGINIA AVE NORFOLK VA 23511	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. N40085-16-R-5500
	X	9B. DATED (SEE ITEM 11) 10-Dec-2015
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The purpose of this amendment is to provide an amendment to the specifications and drawings and to update the Small Business Goals to reflect the FY2016 goals. (See continuation pages)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED 27-Apr-2016

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:
AMENDMENT 0009

SECTION 01 78 23 – OPERATION AND MAINTENANCE DATA

Paragraph 1.2.4, First sentence: REVISE “Contractor’s” to read as “Government’s”.

PROJECT PROGRAM CHAPTER TWO:

Paragraph 2.4.8 REVISE last paragraph, second sentence to read as follows: The CxA shall be independent of the project's design and construction management, and will be hired under a separate contract by the Government.

PROJECT PROGRAM ESR D30:

REPLACE ESR D30 in its entirety with the attached D30.

PROJECT PROGRAM ESR G40:

REPLACE ESR G40 in its entirety with the attached G40.

Additional clarifications to Requests for Information.

1. Clarification to RFI #96 from amendment 0007: For purposes of bidding, follow the roof slope minimums as stated in the BEAP 2010 guidelines.

2. Clarification to RFI #97 from Amendment 0007: Provide furring and painted GWB over CMU in the following spaces: "Blackburn" area rooms in total, the RCD Training Room, the VTC Conference Room and its A/V Closet, Storage and Break Room, the Tech Room, Watiting Area/Scheduling and all Corridors. The Mech/Elec/Telecom Rooms and the Janitor's Closet do not need to be furred.

Small Business Goals have been updated to relfect FY2016. Please utilize the following goals for the Small Business Factor.

NAVFAC Small Business Targets FY 2016

FY2016	Subcontracting Goal
SB	65.00%
SDB	15.00%
WOSB	15.00%
HUBZone	6.00%
SDVOSB	5.00%

(End of Summary of Changes)

6. ENGINEERING SYSTEMS REQUIREMENTS

B30 ROOFING

B30 GENERAL SYSTEM DESCRIPTION

Roof systems shall be watertight and compatible with facility function, construction, and service conditions. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation, with deck-up warranty to a minimum of 20 years for steep-sloped systems.

Built-in gutter systems where drainage passes through an interior space or is concealed in the exterior cavity wall shall be prohibited. Slope at Simulator Center, Range Control Building and Supply & Boat Maintenance Building roofs shall be a minimum of 5:12; toward building perimeters and drain into continuous gutters at roof eaves or collect and discharge at scuppers into leader boxes and metal downspouts. Discharge downspouts at precast concrete splash blocks at finish grade.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Refer to UFC 3-110-03, *Roofing*, and UFC 3-100-10N, *Architecture*, for additional roofing requirements.

Coordinate roofing and attic design with layout of building HVAC systems and interior mechanical equipment mezzanines. Roofing shall meet the MCB Camp Lejeune wind uplift requirement of 130 mph.

The Blackburn portion of the Range Control Building shall be designed as an “Essential Facility,” occupancy Category IV. All roofing, roof decking, roof accessories, gutters and downspouts, and supporting roof trusses shall be completely independent of the remainder of the Range Control Building (the Building (the Category II occupancy portion). Roof expansion joints and expansion joint covers shall be provided at the perimeter of the Blackburn potion of the building to allow this portion of the building to” break away” from the remainder of the building.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Steep slope roofing systems are preferred over low slope roofing systems, where practical. Steep slope roofing systems shall include standing seam metal: asphalt shingles and other systems are not acceptable.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. Steel panels shall be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating; or aluminum-coated steel.

Sub-purlins for the Structural Metal Roof System shall be galvanized.

Finish shall be 70 percent minimum polyvinylidene fluoropolymer (PVDF) coating; color, Bone White/Parchment/Sandstone, or similar light-color to meet cool roof requirement of USGBC LEED Sustainable Sites Credit 7.2.

Structural SSMR Systems Warranty Certificate. At the completion of the project the Contractor shall furnish signed copies of the 20-year Manufacturer's Material Warranties, the manufacturer's 20-year system weather-tightness warranty, and the manufacturer's 10-year warranty from damage due to high wind. Wind warranty shall have no-dollar-limit up to the full value of a similar replacement roof, and shall warrant the roof for leaks, damage or other failure as a result of sustained winds exceeding 90 miles per hour.

B301002 LOW SLOPE ROOFING SYSTEMS

Not used.

B301003 ROOF INSULATION AND FILL

For fastening roof insulation on steep-slope roofs, fasteners shall be place to withstand and obtain an uplift pressure of 105 pounds per square foot (with a safety factor of 2) in the field of the roof and perimeter component and flashing attachment.

The minimum aged R-value of roof insulation shall be 30.0. The roof insulation system for all heated and occupied facilities shall consist of the following: one or two layers of rigid polyisocyanurate board, plus a top layer of rigid stone wool board (minimum thickness = 3/4-inch) fabricated from basaltic rock and recycled furnace slag. Insulation shall, at minimum, be mechanically fastened to substrate roof deck and may be part of an integrated, engineered roof deck assembly.

B301004 FLASHINGS AND TRIM

Flashing and sheet metal work shall include scuppers, splash pans, and sheet metal roofing. Flashings shall be Pre-Finished Aluminum. Finish shall be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils

Provide a self-adhering membrane roof underlayment of not less than 40 mils thickness, specifically made for high-temperature applications, in 1'-6" wide rolls, full length applied at all roof ridges, hips, valleys, rake edges and drip edges.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. Provide gutters, downspouts and hanger/support accessories of Pre-Finished Aluminum. Finish with baked-on factory applied color coating of polyvinyldiene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

Provide cast-aluminum downspout boots extending to a minimum height of 3 feet above exterior grade – or to align with the top of the split-face CMU water table. Connect boots securely and discretely to exterior wall with stainless steel fasteners. Boots shall discharge above grade into precast concrete splashblocks or be connected to an underground drainage collection system.

B301006 ROOF OPENINGS AND SUPPORTS

Not used.

B301090 OTHER ROOFING

Where indicated in the Project Program Facility Requirements and/or specified under ESR D50, Electrical, provide rooftop-mounted lightning protection system in accordance with details approved by the roofing manufacturer. Mounting of lighting grounding rods and cable penetrations will be covered by roofing warranties to the extent that such systems affect performance of the roofs.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D30 HVAC

Refer to Part 4 Section D30 for performance requirements of the building elements included in the HVAC system.

All design and installation shall be in accordance to the latest edition of MCB Camp Lejeune N.C. Mechanical Policies and the Camp Lejeune AE Design guide, (The 1.18.13 edition of MCB Camp Lejeune N.C. Mechanical Policies is included in PART 6 ATTACHMENTS, of this RFP package).

Provide HVAC and mechanical systems in accordance with UFCs listed for the facilities as well as UFC 3-401-01, Mechanical Engineering; and UFC 3-410-01, Heating, Ventilating, and Air Conditioning Systems. Please refer to section Z10 under the Performance Technical Specifications, specifically paragraph 1.2 – Design guidance.

All HVAC Refrigeration and Air Conditioning compressors must have full 5 year warranty including all parts and labor from time of Beneficial Occupancy.

All calculations, basis of design, and other design documents shall show and demonstrate how the design strategies will meet the sustainability requirements as set forth in paragraph 2.4.9 of Part 3, Chapter 2 of this RFP. All design submissions, including calculations, shall show the sustainability intent and how it can be met. Calculations shall include ASHRAE 90.1-2010 and EPACT-2005 analyses. In calculations, show the energy savings and efficiencies for the facilities. Calculations shall provide HVAC system design on psychometric charts to verify entering and leaving conditions, and final room conditions. Pressure drop calculations shall provide for allowances for dampers, grilles, balance dampers, coils, circuit setters, heat exchangers, safety factors, etc.

Provide heat transfer equipment with allowances for fouling factors. Calculations shall include energy analyses that show the new facilities will provide 30% energy use improvement over ASHRAE 90.1-2010, Appendix G baseline in compliance with the Energy Performance Act (EPACT 2005).

The new facilities shall comply with the Energy Policy Act of 2005 as codified under US Code 10 CFR 433 and 435, the Energy Independence Security Act of 2007 (EISA 2007), shall meet ASHRAE 90.1-2010, and shall have energy consumption levels 30% below the ASHRAE 90.1-2010 baseline building that is life cycle cost effective. Calculate the baseline building performance according to Appendix G of ASHRAE 90.1-2010 as modified by UFC 1-200-02. The analysis shall show the calculated baseline building performance and the proposed building performance on both an energy cost and an energy consumption basis to document compliance EPACT 2005. If required by sustainability goals, the calculations will show performance on an energy cost basis to show compliance with these goals. For Energy Policy Act of 2005 calculations, utilize the guidance provided in UFC 1-200-02 to account for process energy. If a 30% improvement over ASHRAE 90.1, Appendix G baseline is not life-cycle cost effective, the design of the proposed building shall be modified so as to achieve an energy consumption level at the maximum level of energy efficiency that is life cycle cost effective. Life cycle cost analysis shall be based on life cycle effective approach as required by 10 CFR 436 Subpart A. Life cycle cost analysis shall be based on 40 year life. All mechanical and HVAC system selections shall be justified by life cycle cost analyses. Fuel and electric costs shall be based on current costs from Camp Lejeune which can be provided by the Contracting Officer. An ASHRAE 90.1-2010 Certificate of Compliance shall be provided. The Designer of Record shall submit all pertinent calculations for approval.

The project shall be evaluated by the designer of record in view of meeting EPACT 2005 and UFC 1-200-02 requirements for the project. A life cycle cost analysis shall be performed, prepared, and submitted for the following. These items shall be included if life cycle cost effective.

1. Radiant barriers in the exterior wall system and in the attic/roof system.

2. Radiant barriers on mechanical systems and equipment.

3. Heat recovery for domestic hot water using heat recovery from the chiller. Heat exchangers shall be rated for domestic use and be the double wall type.

CORROSION PROTECTION FOR COASTAL INSTALLATIONS (All of the Base is in "Coastal Installation Zone")

Specify corrosion protection for ALL exterior HVAC equipment, including air handling units, heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather within 5 miles of a sea (salt) water coast. The corrosion protection shall meet or exceed the requirements of a 3000 hour salt spray test in accordance with ASTM B117. The specified capacities on the plans and specifications shall be the capacities after the required corrosion protection coatings are applied.

At these coastal locations, this corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (excluding louvers) met by the outside air in the supply air ductwork system.

Specify the manufacturer's standard off-the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Psychrometric analyses shall be included with mechanical calculations that clearly show entering and leaving air conditions and final room conditions.

Pressure drop calculations shall be included with allowances for dampers, grilles, balance dampers, coils, circuit setters, heat exchangers, safety factors, etc. Further energy use reduction strategies are included in the "ML Design Strategies for Energy Use Reduction" in part 6, Chapter E of this RFP.

Heat transfer equipment shall include allowances for fouling factors.

SYSTEM DESCRIPTION

Provide a heating, ventilating, and air conditioning (HVAC) system for the MCB Camp Lejeune, P1346 Simulator Center & Range Control Building that attains the following objectives: Occupant comfort, Indoor air quality, Acceptable noise levels, Energy efficiency, Reliable operation, and Ease of maintenance. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels. Refer to Room Requirements Section for additional specific HVAC requirements for spaces. System type shall be determined based on energy efficiency and life cycle cost analysis. Design and installation shall be in accordance with IMC AND UFC 3-401-01, Mechanical Engineering and UFC 3-410-01 Heating, Ventilating, and Air Conditioning Systems.

All facilities shall be designed in conformance with the latest edition of ASHRAE Standard 90.1-2010: Energy Standard for Buildings except Low-Rise Residential Buildings; ASHRAE 62.1-2010: Ventilation for Acceptable Indoor Air Quality; American Conference of Governmental Industrial Hygienists (ACGIH), Industrial Ventilation Manual; International Mechanical Code (IMC); North Carolina Mechanical Code; and the International Plumbing Code (IPC). All equipment provided shall have the ENERGY STAR ® Label.

Direct expansion multizone systems, direct expansion variable air volume systems, and thru-the-wall units are not acceptable. Rooftop equipment shall not be used.

The new facilities shall not utilize rooftop HVAC equipment. All major HVAC equipment shall be located in mechanical rooms. Consider attic and above ceiling placement of air handling unit equipment only when absolutely necessary. Stairs are required for any above ceiling or attic located air handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6'0" wide stairway with double doors for maintenance purposes. Ceiling placed equipment with cooling coils shall have secondary drain pans with approved gravity drainage piping. Coordinate with architect for a minimum clearance of 39 inches between the ceiling of the 1st floor and the floor of the 2nd in which to place mechanical equipment.

Locate each control for the terminal unit in each room the terminal unit serves. All terminal units shall be accessible for maintenance. Access to terminal units located above ceilings shall be through locked and hinged ceiling access panel(s) of sufficient size to allow removal of mechanical equipment without damage or demolition of ceiling. Cooling for the terminal units shall be provided by constant temperature ducted conditioned air from the chilled water central station to the VAV air handling unit(s) located in the mechanical room(s). All cooling coil condensate from the VAV air handling unit(s) shall be routed to a floor drain in the mechanical room and each such drain shall be insulated all the way from the outside of the drain in the floor slab to where the condensate just enters the first floor slab.

Provide a manually operated volume (capable of being permanently marked "in position") damper at each VAV supply air discharge and a locked (approved) access door to each damper location. Return air ducts equipped with filter/grille shall be used. Outside ventilation air for the facility shall be delivered through the VAV air handling unit(s) and shall comply with ASHRAE 62.1-2010.

Use of ceiling plenums shall not be used for any HVAC systems.

Terminal units for the Room Plans, Offices, Public spaces, Lobbies, and Corridors shall be the series fan powered type. Return air back to the terminal boxes shall be ducted through filter grilles and these filter grilles and filters will be accessible from inside each room the unit serves. Return air back to the terminal boxes shall be ducted through return filter grilles.

Provide a separate and dedicated outdoor air system for the Simulator Center & Range Control Building with total enthalpy heat wheel for energy recovery. All heating and cooling equipment will be sized such that it disregards any recovery from the total enthalpy heat wheel. Alarms to be sent both locally and to the ECMS system if wheel stops and/or other appropriate alarms and /or temperature limits of exhaust and outside air delta temperatures are either exceeded or under their limits.

Provide heat energy recovery from chiller to domestic hot water system. Heat exchangers shall be rated for domestic use and be the double wall type.

Provide building air tightness by reducing the air infiltration through the envelope to 0.25 CFM per building envelope square foot at 0.3 inches water gauge pressure. See D309090 for Building Air Tightness Requirements.

Provide Radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2010.

Provide highest efficiency motors, chillers, and boilers and optimize the HVAC system.

Provide demand control ventilation.

Provide Seal Class 'A' on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and utilize radiant barriers to reduce thermal losses.

In view of meeting EPACT 2005, ASHRAE 90.1-2010 and UFC 1-200-02 for this project, a life-cycle cost analysis shall also be prepared for at least three HVAC systems. The Designer of Record shall select an HVAC system based upon fully meeting EPACT 2005 and UFC 1-200-02 requirements, and favoring the most life-cycle cost effective system. The life cycle cost shall be based on first cost, yearly maintenance cost, energy costs, operating costs, and system/equipment replacement costs. The systems chosen for the LCCA should include the systems listed below::

- VAV Systems: Three variations of VAV systems are proposed:

  - VAV with air-cooled chiller and high-efficiency, condensing gas boilers: Four-pipe chilled water-hot water system with high efficiency air-cooled chiller(s) and high-efficiency condensing gas boilers. Chilled water system must be separate from the hot water heating system. Hot water loops will be primary only or primary/secondary pumping.

  - VAV with DX cooling using a high efficiency condensing unit and high efficiency condensing gas boilers: Direct expansion (DX) cooling system with two-pipe hot water heating system using high-efficiency condensing gas boilers. Hot water loops will be primary only or primary/secondary pumping.

  - VAV with geothermal with water-to-water heat pump chiller: Water-to-water heat pump with heat recovery capable of providing both hot and chilled water simultaneously. Four pipe chilled water-hot water system with the chilled water system must be separate from the hot water heating system. Hot water loops will be primary only or primary/secondary pumping. Provide geothermal well field sized to handle the building load. Provide a dry type cooler in the geothermal system capable of rejecting excess heat in the cooling season to prevent overheating of the well field.

NOTE: All VAV systems, if utilized, will consist of VAV air handling units serving VAV fan powered terminal units throughout the facility and a dedicated outdoor air system with 100% exhaust air energy recovery using total enthalpy heat wheel. All terminal units must be provided with hot water reheat coils that will operate independently and be controlled by wall-mounted adjustable temperature controllers. Hot water reheat coil will provide reheat to prevent over-cooling of the spaces and for controlling humidity. The hot water reheat coil must also provide space heating during morning warm-up and when space heating is required.

In addition to the VAV options, the following system is offered:

- 4-pipe fan coil units with chilled and hot water coils and a dedicated outdoor air system (DOAS) using chilled and hot water coils. Chilled water shall be generated via air-cooled chiller(s) and meeting the minimum part load IPLV in accordance with Federal Energy Management Program (FEMP) or Energy Star efficiency requirements. Heating system hot water shall be generated via natural gas-fired boilers. Supply air from the DOAS shall be delivered at neutral conditions between 68 to 76 degrees Fahrenheit and have a maximum relative humidity of 50%.

(NOTE: As an option, the dedicated outdoor air system (DOAS) used with the 4-pipe fan coil system can be provided by a direct expansion (DX) packaged or split system unit with a minimum SEER of 14.1 for the DX coil. Supply air from the DOAS shall be delivered at neutral conditions between 68 to 76 degrees Fahrenheit with a maximum relative humidity of 50%.)

Provide chemical shot feeders, air separators, and diaphragm expansion tanks for hydronic systems. Base mounted centrifugal pumps shall be provided with inlet suction diffusers, isolation valves, discharge check valves, balancing valve, drain valve, differential pressure gauge, and flexible pipe connectors and coupling guard.

Mechanical system for the Administrative, Classrooms, Offices, Lounges, Restrooms, and Shop Areas, etc. shall (if selected as the approved Life Cycle Cost Analysis based system) consist of several variable air volume (VAV) air handling systems (one air handling system per Major Area) consisting of filter section hot water preheat coil, chilled water cooling coil, UV disinfection system and variable frequency drive controlled supply fan. Outside air shall be preconditioned by an energy (enthalpy) recovery system in the air handling system to exchange energy between the exhaust/relief air and the incoming ventilation air. The energy recovery system shall use facility exhaust air to precondition the outside ventilation air. In the event of the failure of an energy recovery wheel, the air handling unit shall be sized and capable of providing all required cooling, dehumidification, reheat, heating, etc. Coils shall be freeze protected where necessary. Use of antifreeze is prohibited.

Restrooms, toilet and locker areas shall be continuously exhausted at all times that the building is occupied. All exhaust shall pass through the energy recovery unit located at the air handling unit systems. Restrooms, toilets, and locker rooms shall be served by VAV terminal units consisting of shut-off (with minimum settings) VAV terminal units with hydronic reheat capability. No restroom or locker room air shall be recirculated. The VAV terminal units shall be pressure independent and shall maintain a minimum airflow for proper air circulation.

Administration areas, offices, classrooms, shop areas, tool rooms, equipment maintenance areas, storage areas, labs, restrooms, etc. shall be served by series fan powered pressure independent VAV terminal units with hydronic reheat coils. The VAV terminal units shall maintain the air flow through the space while the primary air to the space is varied based on the cooling demand.

Hot water reheat coils at the VAV terminal units shall provide reheat to prevent over-cooling of the spaces and for controlling humidity. The coils shall also provide morning warm-up and space heating as required.

Cooling shall be provided by a high efficiency, air cooled chiller system which shall produce chilled water for distribution to the chilled water cooling coils in each of the air handling units. The chilled water temperature shall be selected to provide maximum efficiency, cooling and dehumidification.

Industrial exhaust systems shall be provided as required in compliance with the recommendations of the latest edition of the ACGIH Industrial Ventilation Manual.

Bottom of the Intake air louvers for ventilation systems shall be located at least 10 feet above the outside grade level.

Administrative Areas:

These are areas which required heating, ventilating and cooling and include but not necessarily limited to the following representative spaces: Administrative areas, offices, shops, maintenance control, quality assurance, ready room, conference rooms, flight equipment, training rooms, tool room, toilets, lockers, elevator lobby, break room, corridors, project room. Refer to the Room Requirements section for identification of where special exhaust systems are required.

Ventilation Systems:

Outside air ventilation air for the Maintenance Training Facility shall be provided through the VAV Air Handling Unit(s) and shall comply with the latest edition of ASHRAE 62.1- 2010. Provide outside air to each classroom and to all other spaces in accordance with the demand controlled ventilation requirement. Each Room shall be provided with a minimum of 40 CFM of continuous ventilation air. Ventilation air to the building shall exceed room exhaust air by a minimum of 15%.

In all conference and training rooms, etc. of the facility, ventilation shall be provided through the VAV system. It shall be controlled via CO_2 sensor(s). The VAV system shall be designed to account for

minimum envelope loads and all ASHRAE 62.1-2010 required ventilation requirements. A dedicated and independently controlled Heat Pump System shall be used to account for all occupancy and equipment loads.

Locate mechanical equipment room(s) in the Facility to best facilitate the best use of incoming utilities and water and HVAC distribution. Attic space may be used for mechanical equipment if there is suitable access for maintenance purposes. If equipment is placed in the attic, stairs (normal stairways and no ladders) to the attic must be provided. All cooling coil condensate from the dedicated ventilation system(s) shall be routed via insulated piping the entire way to a first floor drain.

The Telecommunication/Data/ Server room(s) shall be cooled and heated via a ductless split heat pump. Provide minimum base ventilation rates as defined by the latest edition of ASHRAE 62.1-2010. The minimum base ventilation rate for this space shall be provided by an adjacent air system from another space.

All utility rooms (mechanical, elevator machine room, electrical, pump, fire protection equipment, etc) shall be provided with unit heaters and inline direct-drive exhaust fans to maintain room conditions as required in this section. Air-cooled chiller(s) system shall be provided for chilled water to the chilled water coils, and a hot water boiler system with forced draft blowers shall be provided for the hot water to the hot water coils. Mechanical rooms with combustion units (boilers, hot water heaters, etc.) shall be provided supply fans vice exhaust fans as required in UFC 3-410-01.

Exhaust Systems:

Provide continuous exhaust air from the Room Plan Bathrooms, Janitor's Room, Toilet Rooms, Locker Rooms, Copy Rooms, and Storage Rooms as required by ASHRAE 62.1-2010. The exhaust air from these spaces shall be part of a central exhaust system that shall route all exhaust air through an energy recovery wheel to exchange heat between the outgoing exhaust air and the incoming ventilation air. Static pressures for these spaces shall be negative as compared to adjacent spaces.

Energy Recovery System:

Provide total energy (enthalpy) type energy recovery wheels (heat wheels) aka ERU, in the air handling system for recovering energy between the outgoing exhaust air and the incoming ventilation air. The total enthalpy heat wheel(s) shall be located in the mechanical room or the attic space, and shall be easily accessible for maintenance. The intent of the pre-conditioned outside air is to remove moisture, and control humidity, therefore prevent mold and mildew in rooms. Every ERU shall have approved Air Monitoring Stations (AMS) on both the Exhaust air side and the Supply air side of the ERU with the required straight lengths before and after each AMS. All ductwork from each bathroom and ductwork from every other exhaust pick-up will be properly insulated all the way to the ERU and the exhaust ductwork will be insulated to the exhaust Louver. All ductwork from the Supply air inlet Louver to the ERU and Supply air ductwork from the ERU to points of use at devices and air handling equipment will be properly insulated completely.

Mold and Mildew:

Each building of the project shall have no evidence of mold or mildew due to condensate or other moisture on any indoor or interior surfaces after one year of service or facility operation. The contractor shall provide a one year warranty for no mold or mildew after the facility has been accepted. This facility must comply with the requirements in ITG FY05-2, NAVFAC Humid Area HVAC Design Criteria; a copy of this document can be found in PART 6 ATTACHMENTS, Chapter E Mechanical of this RFP.

Requirements for Specific Facilities:

Provide ductless DX split heat pump system for Telecommunications/Data/Room(s)/Elevator machine rooms. Provide exhaust and make air to sprinkler room with electric unit heater.

ECMS: Connect to Installation Energy Control Monitoring System (ECMS).

Refer to **Section D 3060 Controls and Instrumentation**

Mechanical Rooms:

Mechanical rooms shall be air conditioned to 78 degree F in summer and conditioned to 68 degrees F in winter. A separate Mechanical Room is required if boiler and/ or water heating is provided via combustion air (fired) units and ventilated by inline direct-drive supply fans which are thermostatically controlled and heated by water heated hot water. Relief louvers and/or combustion air louvers (if required for boiler or water heater combustion air) shall be provided to relieve over pressurization in that mechanical room. Provide dehumidifier with gravity drain of condensate for mechanical rooms that are not air conditioned.

Electrical Rooms:

Electrical rooms shall be heated with electric unit heaters and ventilated by inline centrifugal exhaust fans which are thermostatically controlled. The exhaust shall be ducted directly to the exterior at a wall louver. A dedicated ductless, mini-split heat pump system may be provided instead if it is determined that there are components or electronics that require closer control of upper end temperatures.

Communication Rooms:

Communications rooms shall be heated and cooled by a dedicated ductless, mini-split heat pump system. NMCI/Telecom Room shall have outside air ventilation provided through the primary HVAC system in addition to a separate split system.

Elevator Machinery Room:

Provide heating, ventilating, and air conditioning to maintain the design temperature limits indicated below and as recommended by elevator equipment manufacturer. The design shall meet the requirements of *ITG 2013-01 NAVFAC Elevator Design Guide 01 August 2013*. Provide dedicated ductless, mini-split heat pump.

Stairways and Vestibules:

Stairways and vestibules shall be heated with hot water unit heater or cabinet unit heaters.

Requirements for Specific Facilities:

Blackburn Computer Area: Provide computer room air conditioning unit(s). Provide N+1 redundancy for this area. Provide sensors in the computer room to measure and record the cooling effectiveness of the HVAC system.

CSS Area(s): Provide a dedicated ductless split system for each individual computer rack.

RTISS Warehouse: Provide a separate dedicated exhaust fan for this area.

Provide a heating, ventilating and air conditioning (HVAC) system for the Range Control, Simulator Center and the Supply and Boat Maintenance Buildings that attains the following objectives:

Occupant comfort, Indoor air quality, Acceptable noise levels, Energy efficiency, Reliable operation, and Ease of maintenance. Design and installation shall be in accordance with IMC and UFC 3-400-10N, Mechanical Engineering. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

SAVT

Provide 15 tons of cooling for the SAVT Classroom and SAVT dome area equipment. The temperature of this area should be maintain between 65-75 F and 50-70% RH non-condensing. An audible and visual alarm shall be provided if the temperature in the SAVT dome area exceeds 80 F or 70% RH. This alarm shall be reported to the BAS system.

Economizer cycles shall not be used.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment which meets the requirements of OSHA. Working space shall allow space to perform maintenance functions as well as to pull all coils, pumps, heat transfer surfaces, valves, valve operation, dampers, damper operation, pipes, wiring and conduit, controls, fans, motors, etc. Provide all required fittings, connections, and accessories required for a complete and usable system. All equipment shall be installed per the criteria in Part 4 Section D30 and the manufacturer's recommendations. Where the word "should" is used in manufacturer’s instructions, substitute the word "shall". Unions (and dielectric unions, where mandatory) must be utilized so that to all coil removals are without having to weld or braze or solder.

Provide heating, ventilating, and air-conditioning for spaces as indicated and for the following Design conditions:

Outside Conditions (Hot Summer Day)

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	32.8	Degrees C dry bulb		-3.3	Degrees C
	77	Degrees F wet bulb			
	25	Degrees C wet bulb			
	87	Degrees F dry bulb, mean coincident (average) value			
	30.6	Degrees C dry bulb, mean coincident (average) value			

Outside Conditions (Humid Summer Rainy Day)

Summer	87	Degrees F dry bulb, mean coincident (average) value			
	30.6	Degrees C dry bulb, mean coincident (average) value			
	79	Degrees F dry bulb			
	26.1	Degrees C dry bulb			
	133 gr/lb	Humidity Ratio			

Outside Conditions (Spring Rainy Day)

Spring	84	Degrees F dry bulb, mean coincident (average) value			
	28.8	Degrees C wet bulb, mean coincident (average) value			
	78.7	Degrees F dry bulb, mean coincident (average) value			
	25.9	Degrees C wet bulb, mean coincident (average) value			
	140 gr/lb	Humidity Ratio			

Inside Conditions

Summer	75	Degrees F dry bulb	Winter	68	Degrees F
	23.8	Degrees C dry bulb		20	Degrees C
	50	%RH			

Outside Design Conditions for Air Cooled Equipment

Summer	95	Degrees F dry bulb			
	35	Degrees C dry bulb			

Heating & Ventilating Inside Conditions

Summer	10	Degrees F above the dry bulb ambient temperature	Winter	60	Degrees F
	5.6	Degrees C above the dry bulb ambient temperature		15.6	Degrees C

Provide Ventilation rates and systems per the latest edition of ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*.

Precondition (heat, cool, and dehumidify to room conditions) all outside air prior to admission into occupied spaces. Provide supply (positive pressure) ventilation for the mechanical room if it contains fuel-fired equipment, and exhaust ventilation for the electrical room to limit the temperature to no more than 10 degrees F above ambient or 15 air changes per hour, whichever has the higher ventilation rate. Provide supply or exhaust ventilation for the mechanical room if there is no fuel-fired combustion equipment present. Ventilation for the mechanical room shall also be in accordance to ASHRAE 15, Refrigeration Standards for Refrigeration Systems where required.

In addition to the requirements of ASHRAE 62.1-2010, provide the following minimum ventilation to the spaces indicated:

Toilet rooms: 75 cfm per water closet or urinal.

Locker and Dressing Rooms: .5 cfm/sf.

Provide exhaust rates as required by ASHRAE 62.1-2010 and the IMC. Of the two standards, use the one with the highest rate.

Outside air requirements: The outside air requirements in addition to that described above shall be based on matching the exhaust rates, and those exhaust rates shall be such that the ventilation air to the building shall exceed building exhaust by a minimum of 15%.

The facility shall be designed to have balanced HVAC systems, i.e., the air leaving and entering each space and zone shall be balanced. Calculations and drawings shall be provided to show the facility air balance. All bathrooms will be negative to surrounding rooms per calculations and drawings.

Zone circulation: Provide a minimum of 4 air changes per hour in each space or zone. Some spaces and zones may require more air circulation depending on the design.

The HVAC system shall provide each zone with the choice of heating or cooling year round unless otherwise indicated. Each zone shall have its own limited range of control, as allowed by the control system central workstation.

Zone the HVAC system as follows:

Each room in the Administration, Classroom, multi-purpose room, or Lounge areas shall be a separate zone, heated and cooled with the proviso that any of these less than 175 sf to be grouped into a single zone.

Each office greater than 175 sf should have its own zone.

Corridors shall not be on separate zones. Locate thermostats for corridors in separate occupied space.

The Telecommunication/Data/NMCI room shall be a separate zone.

Public Restrooms shall be separate zones.

The Mechanical room, Fire Pump room, and the Electrical room shall each be a separate zone, heated and ventilated only.

Special Zoning Requirements:

HVAC cooling capacities shall handle all sensible and latent space loads, including but not limited to coffee machines, human occupants, printers, fax machines, personal computers, audio equipment, laptops, and televisions.

Noise levels shall comply with the requirements for Schools in the ASHRAE Applications Handbook.

Equipment Requirements:

Material and Equipment Qualifications: All materials and equipment shall have been in satisfactory commercial or industrial use for 2 years prior to the bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period.

Vestibules and stairways shall be heated only spaces.

Mechanical and Electrical rooms shall be heated and air conditioned.

Each Communications Room shall be a separate zone, cooled only with duct-less split systems**.** Hangar Maintenance Bays shall be air conditioned year-round and separately heated by natural gas fired infrared heating system which shall be shut-off when the Hangar Bay doors are open. The Hangar Bay ventilation system shall be designed to meet the most restrictive requirements of the following:

1. Air change method: 6 air changes per hour.

2. Exhaust air flow rate per floor area: 1.5 cfm/sf.

3. Ventilation airflow to maintain 10 degrees F above the dry bulb ambient space conditions.

4. ASHRAE 62.1-2010 latest edition.

5. Latest edition of the ICC International Mechanical Code.

Noise levels shall comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design shall provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings shall specify the maximum equipment noise level. Classrooms shall not be adjacent to mechanical rooms.

Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to primary air inlet of VAV terminal is not permitted.

Provide ceiling located filter return grilles for each series powered fan terminal unit to allow filter change out without having to access above the ceiling.

Motors: Single-phase fractional horsepower alternating current motors shall be high efficiency types corresponding to the applications listed in NEMA MG 11. Select polyphase motors based on high efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium induction motors with continuous ratings shall meet or exceed energy efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for 3 phase motors rated 1 hp and above with phase voltage monitors designed to protect motors from phase loss and over/under-voltage. All motors 1 hp and larger shall be premium efficiency motors. Provide means to prevent automatic restart by a time adjustable restart relay. For packaged equipment, the manufacturer shall provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

VAV fan terminal units shall be provided with electronically commutated motors (ECM) in lieu of conventional induction motors. ECM motors have efficiencies of 70% or better across the entire operating range of the motor which will save significant energy over conventional motors. In addition these motors with their unique fan speed control provide capability for remote adjustment of fan speed from facility DDC system.

Provide minimum 4-inch thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment. Secure all floor mounted mechanical equipment to the concrete housekeeping pads.

All exterior mechanical equipment shall have painted finishes that pass a salt-spray test conducted per ASTM B117 for duration of at least 3000 hours. On all coils, provide aluminum fins on copper tubes with an equipment manufacturer approved coating system that passes the 3000 hour salt spray resistant test using the ASTM B117 procedure**.** All Louvers, grills, registers, and diffusers are to be Aluminum.

The facility shall have a complete air and water balanced HVAC system. Calculations shall be provided and show the air and water systems are balanced. Drawings shall also show balanced air and water systems.

All equipment shall be installed per the manufacturer’s recommendations and meet or exceed the ASHRAE 90.1-2010 requirements, Energy Star or Federal Energy management Program (FEMP) recommended efficiencies.

Pressed type, extruded type, and groove type and tube fittings shall not be used on any HVAC piping system.

Complete HVAC commissioning per ESR D307003 HVAC Commissioning.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

Not used.

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas shall be the energy source for all the equipment in the "heating" Mechanical rooms for the water heating boiler and domestic hot

water system. Natural gas will also be used for heating the Hangar Maintenance Training Bays through the use of a gas fired infrared heating system. Provide a complete natural gas supply system as detailed in the specification in accordance to NFPA 54 and North Carolina Building Code, North Carolina Mechanical Code requirements, and natural gas supplier requirements. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the requirements of natural gas for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used.

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used.

D301005 SOLAR ENERGY SUPPLY SYSTEMS

Design a solar hot water system to provide 30% of the domestic hot water heating load of the facility per EISA 2007 and provide calculations and Life Cycle Cost Analysis before proceeding with Final Design. NAVFAC to verify LCCA before design proceeds further.

If the solar domestic hot water system is located on the roof, provide a coordinated design of the roof elements and sustainable systems. Organize the roof space necessary to accomplish the functions the roof has to provide, avoid roof penetrations, and plan the roof to facilitate future reroofing of the facility. The roof type solar hot water selection can be integrated under the roof surface. The design of the roof must minimize the need for routine maintenance.

Use the solar hot water system calculator found here:

http://apps1.eere.energy.gov/femp/solar_hotwater_system/index.cfm

D3020 HEAT GENERATING SYSTEMS

A minimum of two gas-fired, high efficiency condensing boilers shall be provided in the Heating Mechanical Room. Each boiler shall be sized for a minimum of 60% of the load.

D302001 BOILERS

Provide packaged natural gas fired condensing boilers. Provide 90% (minimum) efficiency boilers. All heating equipment boilers shall have the ENERGY STAR® Label. Provide packaged gas fired high efficiency hot water boilers. Provide pre-manufactured, stainless steel, multi-wall insulated boiler stack. The stack shall be pre-engineered and pre-manufactured, UL listed and shall meet NFPA 211. Boilers shall be forced draft fired. Fuel for boilers shall be natural gas. Condensing type boilers shall be provided with a condensate neutralization tank/kit. Boiler size parameters shall be in accordance to the MCB Camp Lejeune, N.C. Mechanical Base policy on boiler sizes.

All vents on gas control valves shall be routed outdoors as required by NFPA 54. All gas lines serving gas fired equipment shall be fitted with U.L. or Factory Mutual (F.M.) approved gas trains suitable for the gas being provided. Refer to 3.0 Site Analysis, Paragraph 3.2.18 Permits, for Air Emission Permits. Air

Emission permit is required for each combustion device provided.

The boilers shall have positive forced air draft system.

Provide boiler controls in compliance with ASHRAE 135 BACnet - A Data Communication Protocol for Building Automation and Control Networks.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302002 FURNACES

Not used.

D302003 FUEL-FIRED UNIT HEATERS

Provide gas-fired unit heaters, indirect-fired infrared heaters.

D302004 AUXILIARY EQUIPMENT

Not used.

D302005 EQUIPMENT THERMAL INSULATION

Provide for piping exposed to outdoor ambient temperatures; provide heat tracing to insure freeze protection down to 10 degrees F

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

Provide high efficiency air-cooled chillers. Provide primary/secondary pumping systems on multiple building chiller systems and on systems larger 150 tons. Keep flow thru the chiller constant. Do not use variable primary flow (2.22.10). Ensure primary loop has sufficient thermal inertia. Two chillers shall be provided each sized for 50% of the total facility cooling load. The two chillers shall be located outside the Mechanical Room and properly spaced from each other and other equipment and provide chilled water to the air handling units. that are associated

The chillers shall be located in an Equipment Yard Area adjacent to the air compressors and away from building perimeter. The air-cooled chiller(s) shall be located outside on a 150 mm (6 inch) thick reinforced concrete housekeeping pad. Provide heat tape for freeze protection of chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the requirements for phase and voltage protection requirements for
chillers.

Low ambient capability shall be provided to allow chillers to operate in temperatures down to 15 degrees F (-9.4 degrees C).

All coils shall have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide approved quantity, size, spacing, material, and height of bollards around all yard equipment including the Air Compressors, Chilled Water System chillers, and Natural Gas metering.

Provide insulation and vapor barrier on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points and provide chemical treatment equipment for chilled water piping system.

Start-up to include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled direct expansion (DX) ductless split system cooling only unit for the NMCI/Telecom space.

Provide vertical ground-coupled heat pump units with ducted air distribution and controls to serve the heating and cooling requirements of the facility. One vertical ground-coupled heat pump unit shall be provided for each zone and shall be located within a mechanical closet. The mechanical closet shall be lockable and allow adequate space for maintenance. Provide each ground-coupled heat pump with a return filter grille to ease maintenance. If space does not allow for a vertical heat pump unit, provide horizontal heat pump units in the overhead with a means for removal and maintenance of the system through lockable access panels. Install flexible stainless steel piping connections (hose kits) between ground-coupled heat pumps and piping. Install vibration isolators on heat pumps.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide insulated, galvanized steel ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards.

Provide a Variable Air Volume (VAV) system using ducted returns. VAV units shall be located above ceilings and allow for maintenance and removal of units through lockable access panels.

Direct expansion variable air volume systems are not acceptable.

Provide VAV Units.

Provide grilles, registers, and diffusers. Provide filter grilles for return air. Provide linear slot diffusers including boot.

D304002 STEAM DISTRIBUTION SYSTEMS

Not used.

D304003 HOT WATER DISTRIBUTION SYSTEMS

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. The hot water distribution system shall be configured in a reverse return piping arrangement.

Provide insulated steel or copper hot water supply and return piping (Single pipe system is not acceptable) to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Two base mounted, hot water pumps shall be provided in Mechanical space(s) where the hot water heating plants shall be located. One hot water pump shall be a 100% standby. Variable frequency drives shall be provided for each hot water pump.
Provide valves and related hot water system appurtenances.

Provide air vents at all terminal equipment and system high points and provide chemical treatment equipment for hot water piping system.

Provide an expansion tank for the hot water piping system.

Provide system flushing and start-up for the hot water piping system.

Provide complete start-up and operational testing of all hot water systems.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

Not used.

D304005 GLYCOL DISTRIBUTION SYSTEMS

Not used.

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For exterior buried chilled water distribution systems, see Section G30.

Provide primary/secondary pumping systems on multiple building chiller systems and on systems larger 150 tons. Keep flow thru the chiller constant. Do not use variable primary flow (2.22.10). Ensure primary loop has sufficient thermal inertia.

Provide a dedicated primary pump and condenser water pump for each chiller. Provide piping and valve configuration that allows each chiller to operate with any primary pump and with any condenser water pump. The optimum supply and return water temperature differential must be determined by life cycle cost analysis.

Three base mounted, chilled water pumps located in the Mechanical Room and each pump is to have either aluminum or coated metal, insulated, removable (with quick clamps for ease of opening and reinstallation) box-frame around the pump and up to pump flanges and connections. One of the three chilled water pumps shall act as spare and be rotated monthly through the base-wide ECMS system to equalize running hours to provide a 100% standby for either pump.

Provide valves and related chilled water system appurtenances. "Triple duty" or "multi- purpose" valves which combine a check valve, throttling valve, and shut-off valve must not be used for chilled water systems.

Provide steel and copper chilled water supply and return piping to specifications to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control and chemical treatment equipment for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of

chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to insure stability of operation and temperature-setpoint control. Total chilled water system volume shall be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide an expansion tank for the chilled water piping system.

Provide for piping exposed to outdoor ambient temperatures and provide heat tracing to ensure freeze protection down to 10 degrees F.

Provide system flushing and start-up for the chilled water piping system.

Provide complete start-up and operational testing of all chilled water systems.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards. Ducts shall have leakage Class “A”. Perform DALT testing on all ducts.

Provide ducted exhaust ventilation systems and exhaust fans to serve all ventilated zones of the facility. Provide in-line or ceiling centrifugal exhaust fan(s). Provide continuous exhaust in all restrooms, housekeeping areas, utility spaces, and other spaces as required.

D304008 AIR HANDLING UNITS

Provide central station variable volume air handlers to provide air distribution for the Administration/Shop Areas and all other areas. Air handling systems shall consist of two stage filtration (MERV 8 (30%) and MERV 13 (85%) filters), ahead of hot water preheat coils, chilled water cooling coils, etc.; ultraviolet disinfection systems, and variable frequency drive controlled supply fans are required.

Outside ventilation air shall be preconditioned by a wheel-type (enthalpy) energy recovery system which must have both MERV 8 AND MERV 13 Filters BOTH UPSTREAM of where the outside air enters the wheel and both filters UPSTREAM of where the exhaust air enters the wheel.

D304090 OTHER DISTRIBUTION SYSTEMS

Provide in-line circulating pumps with variable frequency drives for domestic hot water.

Provide chemical treatment systems for hot and chilled water systems.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas-fired infrared heaters to serve the heating requirements of the warehouse areas of the facility.

Provide hot water cabinet unit heaters and hot water unit heaters to serve the heating requirements of the facility where indicated.

D305003 FAN COIL UNITS

Not used.

D305005 ELECTRIC HEATING

Not used.

D305006 PACKAGE UNITS

Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump for telecomm rooms, communications rooms, elevator equipment rooms, and elsewhere indicated or required.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS (DDC)

Provide a complete Direct Digital Control (DDC) system for the facility compatible with the existing Energy Management System (EMCS) at MCB Camp Lejeune. The existing EMCS consists of two servers, 1) Johnson Controls Incorporated (JCI) Metasys Expanded Architecture Engine (NAE) system (ADX server), and 2) Niagra AX web supervisor (JCI FX web supervisor). The building supervisory controller shall be compatible with either. In addition, provide a Loytec Router to connect the BACnet MS/TP bus directly to the Metasys ADX server. Each communicates with the EMCS over the MRAN Ethernet. The Direct Digital Control system shall comply with all requirements contained herein and with the requirements of specification section 23 09 23 13 22, BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC, located in Part 6 ATTACHMENTS, for more information. The DDC system shall be capable of controlling and monitoring all the spaces,all of the HVAC systems, gas-fired domestic water heaters, and solar domestic water heating systems. The DDC system shall be provided with two laptop computer workstations; one of which shall be dedicated to the MCB Camp Lejeune maintenance staff for diagnosing mechanical system issues and making control system changes. The EMCS at /Camp Lejeune is an enterprise system that actively receives energy and building condition information from multiple sources and provides load shedding, electric metering, alarming, trending, scheduling, set point adjustment, device communication status of all SBC and TCU for maintenance personnel. This EMCS receives Real Time Pricing utility data and automatically manages to this site's profile.

The DDC system shall be a fully BACnet Open Protocol with no other programming language protocol, interface, or gateways utilized, except as required by the Project documents. Manufacturer's products, including design, materials, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1 and NFPA 70, except as modified herein or indicated otherwise.

Provide the DDC systems to maintain stable temperature control and all other conditions as indicated. The end-to-end accuracy of the system, including temperature sensor error, wiring error, A/D conversion, and display shall be 1 degree F or less.

Provide a site building controller (SBC) and license files that allows communication between the DDC system and the station's existing EMCS system. Provide for the SBC either a JCI Network Automation Engine (NAE) or a JACE (Niagra AX platform) based on the Tridium 600 with expanded memory and

embedded “workplace” software. Minimum software version for the JACE is 3.8.38 and the limit per trunk is 64 devices. Provide all necessary hardware, drivers, software, material, and equipment, which shall allow communication and control between the SBC and DDC upper level controllers. Provide a SBC that communicates via BacNET MS/TP to TCU controller When the SBC is disconnected from the enterprise system for maintenance, access to the SBC shall be via Windows Internet Explorer and not require any proprietary licensed software or license key. The database shall reside within the SBC and not require the files to be resident to the service laptop computer.

Provide sufficient quantity of digital controllers to perform all climate control, energy management, and alarm functions. All material used shall be new and currently in production. The contractor shall fully test and verify all levels of control and communication of all the DDC system controllers. The contractor shall provide 40 hours of onsite assistance during government integration of building DDC to the base EMCS.The entire DDC system shall be designed in accordance with the EMCS Equipment and Points Nomenclature for MCAS/Camp Lejeune.

In addition, the following requirements shall be met for the new facility: Locate the SBC in the temperature-controlled telephone equipment room. All DDC controllers, CPU’s, servers, workstations, and interface devices provided shall comply with and communicate using the ASHRAE Standard 135, BACnet Protocol for Building Automation and Control Networks. The DDC system shall use BACnet objects and properties for all physical inputs and outputs, and BACnet read and write services for all network communications and device-to-device algorithms. Coordinate the BACnet network and device addressing with the Government BAS owner to ensure unique addresses. Provide BACnet Product Information Conformance Statements (PICS) for each DDC controller and BACnet device. The controls sub-contractor for this project shall be regularly engaged in the design and installation of BACnet DDC systems (for building HVAC systems) similar to the size and scope of this project, shall have been a representative of the proposed control system manufacturer for a minimum of two years, have a staffed office within a 50-mile radius of the project location, and shall have performed design and installation of DDC systems for a minimum of 5 years. The controls sub-contractor shall ensure that their installing electricians have a copy or, read, and understand the mechanical sheets of the contract’s design construction drawings, in addition to the control drawings prepared by the subcontractor. Provide the DDC programming and graphics using standard English units of measure, not metric.

The control system shall be completely electric/electronic, no pneumatics. Provide DDC programming to view, modify, alarm, trend, schedule, and override device parameters via direct connection, and remotely via LAN connection. Provide DDC programming routines in simple, easy-to follow logic. Provide detailed text comments describing each routine.

In addition, provide each routine screen with its applicable as-built written sequence of operation.

Design control drawings shall include the following:

1. Detailed control system scope-of-work and installation notes describing the various components that will be provided (controllers, sensors, valves, dampers, etc.).

2. A diagram of the control system communication architecture, including network and device addressing.

3. Control valve and control damper schedules, including actuators and linkages.

4. DDC point schedule including point description, point type (BI, BO, AI, AO), alarm requirements, trend requirements, and additional information such as type of sensor, location, etc.

5. A detailed control diagram for each piece of HVAC equipment receiving DDC. Diagrams shall show all related control components in their respective locations, valve and damper normal positions, fluid flow directions, and point types.

6. A detailed written sequence of operation for each piece of HVAC equipment. Fully describe every operating routine (occupied operation, night setbacks, optimal start, etc.).

Show floor plans in the DDC graphic to scale. Where feasible, use the project's AutoCAD design drawings, purged of extraneous detail. Each piece of HVAC equipment shall be controlled by the DDC. Do not provide hard-wire interlocks between fans or pumps. Provide software interlocks instead. However, freeze protection thermostats, duct smoke detector, or other safety type devices shall be hard-wire interlocked with their associated pieces of HVAC equipment.

Provide each piece of HVAC equipment with a hand-off-auto switch. The hand position shall energize the equipment directly under all conditions except activation of a freeze protection thermostat, duct smoke detector, or other safety device. Ensure safety conditions also de-energize equipment in the auto position. Where feasible provide terminal units with discharge/supply air temperature sensors.

Operate the building circulating pumps serving hot and chilled water loops whenever the outdoor air temperature is below 35 deg. F. Provide control routines to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Rotate primary and back-up HVAC equipment monthly with a lead/lag control routine. Start/stop pumps via the DDC, not the chiller controller. Provide reset routines (based on outdoor air temperature or zone demand) for hot and chilled water loop temperature setpoints. Provide meters monitored by DDC on the building's incoming natural gas, water, and electric utilities. Set up trend reports to record data daily and store values in the front-end DDC computer. Provide flow rate meters monitored by the DDC for central hot water and chilled water flows and central air handling unit air flows. When not used for direct control, provide wall mounted carbon dioxide and relative humidity sensors in strategic occupied spaces for monitoring purposes.

Provide hot water and chilled water valve actuators that fail open to the coil via a spring return. Provide each actuator with a self-locking male/female quick-connect type plug in the wiring serving each valve operator, for emergency use, to allow manually disconnecting power to the device, sending it to its fail position (without disrupting any other unit control). Locate each plug exposed in plain view. Provide chilled water control valve actuators and linkages that can be easily and fully insulated and vapor sealed at the valve connection. Provide alarms for the DDC points. Provide point cross-referencing, time delays and differentials to prevent nuisance alarms. Analyze the alarms after the system is in operation and make additional adjustments to reduce/eliminate nuisance alarms. Trend all possible data points. Where possible, provide trends based on change-of-value for sensor readings, motor status, and actuator positions.

Once the trend buffer is full, the oldest data will be purged from the list when new data is added. Store the maximum amount of data feasible. Provide trend reports for each DDC point after the system has been in operation and collected its buffer of data points. Analyze the trends for anomalies, inconsistencies, and operating problems such as equipment running when it is not supposed to, valve hunting, inability to maintain setpoint, and incorrect start-up or shutdown sequences. The final DDC system Operation & Maintenance manuals shall include as-built drawings of the DDC communication wiring in the building showing the exact installed configuration/routing of the communication wiring daisy chain, including LAN's, switches, routers, and addressing exactly as installed.

Provide at least one registered copy (on mfr's original CD) of the control system software. If a hardware key is required, provide the manufacturer's largest capacity "master" key, allowing full access to the maximum number of controllers. Provide a minimum of six additional "technician level" hardware keys for distribution among the MCAS mechanics and their laptop computers. If the control manufacturer uses software keys or registered "seats" instead of hardware keys, provide a minimum of six registered software seats, in lieu of keys. Regardless of the control manufacturer and its software license protection method, the Government shall receive the manufacturer's complete software, at least one full-access capability, and at least six limited-access capabilities.

For the DDC system provided under this contract, include at no additional cost to the Government, all firmware and system software upgrades (including patches and updates) as they become commercially available for a minimum of two years starting from contract acceptance. In the submitted control system O & M manuals, provide an itemized list of the firmware and system software. Include original release dates, version numbers, part numbers, serial numbers, and beginning and ending warranty dates. Provide a statement that firmware and system software upgrades shall be provided without cost during the two-year period. Provide and additional statement that the manufacturer's telephone technical support shall be provided without cost for five years from the contract acceptance. The control system manufacturer shall provide toll-free telephone technical support at no additional cost to the Government for a minimum of five years from contract acceptance. Technical support shall be furnished by highly experienced service technicians of the controls manufacturer, and be available during normal weekday working hours. Include the toll-free technical support telephone number in the contract's control submittals. Absence of toll-free post-acceptance telephone technical support shall be sufficient reason for disapproval of a proposed control system manufacturer.

The points of contact for existing DDC systems atMCB Camp Lejeune are: Public Works Department, EMCS; Bill Schrader, (910) 450-7846.

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air and water distribution systems and HVAC equipment. TAB shall be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. DOR shall provide a duct construction and leak testing schedule on the drawings. The DOR's mechanical representative shall be present at Duct Air Leakage Tests (DALT), Performance Verification Tests (PVT), all HVAC Controls Verfications, all mechanical acceptance tests, and any other tests/inspections related to commissioning as ROICC Camp Lejeune warrants. This representative shall provide a report that he/she has verified that all equipment is installed and operating in accordance with the design

D307003 HVAC COMMISSIONING

Refer to Project Program section 2.4.8 for Building Commissioning requirements. Mechanical systems to be commissioned will be all systems provided and include but not limited to the following, if provided: include HVAC systems and controls, refrigeration systems and controls, renewable energy systems, compressed air systems, Rainwater systems and domestic hot water systems.

Coordinate with the HVAC commissioning requirements of Specification Sections 01 91 13.00 22 GENERAL COMMISSIONING REQUIREMENTS FOR CONSTRUCTION and 23 08 00.00 22 COMMISSIONING OF HVAC SYSTEMS for commissioning requirements for all HVAC systems.

Refer to PART 3, Chapter 2, Paragraph 2.4.8 Building Commissioning, for commissioning requirements.

Mechanical Systems to be commissioned, if provided, include HVAC systems and controls, refrigeration systems and controls, renewable energy systems, and domestic hot water systems. Commission the HVAC systems per the Commissioning Plan in accordance with Section 15995NDW "Commissioning of HVAC Systems". Commissioning will include testing, adjusting, and modifying of the HVAC systems as well as training of personnel as required to ensure that the HVAC systems operation conforms to the requirements of this section.

After acceptance by the Contracting Officer, modify OMSI manuals as required, including providing all Commissioning Reports, and submit the Final OMSI manuals per the requirements of Section 01782, "Operation and Maintenance Data".

Develop and submit a Enhanced Commissioning Plan per the SMACNA HVAC Commissioning Manual with the exceptions noted below to define the on-site activities for commissioning the HVAC systems.

The Commissioning Plan shall incorporate all requirements of this section of the RFP and include the following:

The commissioning agent will be appointed by the Government and the commissioning authority will be the ROICC or his appointed representative for the project.

Provide a schedule of inspections during construction that includes periodic Inspections by the system designer. Specify a minimum of 3 inspections. One of the visits shall coincide with item 3 below.

Provide a schedule for verification and functional performance tests. System designer shall be present for the functional performance tests.

Provide a schedule detailing training sessions for Government personnel. Training sessions are to address maintenance and operation of HVAC equipment, control system components, and overall sequence of operation for the HVAC system.

Define the sequence for starting and balancing air distribution systems to ensure construction materials, such as architectural finishes, are installed under the appropriate environmental conditions.

Also address the procedure that will be used to "dry out" the structure.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide anti-terrorism/force protection (seismic) restraints for HVAC equipment and comply with the Force Protection Criteria. Provide outside air intakes at least ten feet above finish grade.

Provide anti-terrorism/force protection switch at a duty office or other location to be determined by the Contracting Officer. The ATFP switch shall be a fire alarm type, two position mushroom style push button, which shall shut down all air distribution and exhaust systems throughout the building and close all dampers leading to the outside (intake, exhaust, and relief).

These items are required to meet the AT/FP requirements of UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings.

Comply with UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Provide seismic restraints and Comply with all Anti-Terrorism and Force Protection Criteria. Locate all air intake

systems a minimum of 10 feet above ground elevation. . Per UFC 4-010-01, the ATFP switch shall shut down the equipment even if the local hand/off/auto switch is in the hand position. The ATFP switch should be hard wired interlocked (utilizing a 120V circuit) with the HVAC equipment and dampers and should not be dependent on the DDC. The DDC system shall monitor the status of the shutdown switch and generate an alarm.

All design and installation of HVAC and piping systems shall meet the seismic requirements of Seismic Design for Mechanical Systems dated May 2002, located in Part 6 ATTACHMENTS of this RFP package.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide Total Energy (enthalpy) Wheel-type Energy Recovery in the air handling system as a packaged heat recovery unit to exchange energy from the facility exhaust with the outside make-up air. 100% of the exhaust and outdoor ventilation air shall be passed through the heat recovery unit. In the event of a failure of the heat recovery system, the air handling unit, boilers and chillers shall be sized and capable of providing all required cooling, dehumidification, reheat, heating, etc.

D309090 1.1 Direct Expansion (DX) cooling and Heating systems

Roof top equipment shall not be provided. If used, High Efficiency DX shall be designed and provided for Cooling. Systems shall utilize multiple compressors, multiple evaporators, and complex oil and refrigerant management and control systems. DX shall have multiple compressors with oil separators and oil accumulators, in each condensing unit with one compressor being variable speed. Each DX system shall provide wide capacity modulation. The expected pipe lengths or height differences between outdoor units and indoor units, vertical distance between two indoor units and actual piping lengths between outdoor and the furthest indoor units shall not exceed those required by manufacturer requirements and catalogs. Outdoor units shall not be oversized and shall have a capacity of 100% maximum of the combined indoor unit capacities. The DX systems shall be load matched to the building load profile. The building profile and the DX systems shall be designed using software, including energy modeling software, specifically designed to simulate this system type. DX systems shall be sized for maximum efficiency and sustainability. DX systems shall be provided with condensate drain pumps. Installation of DX systems: Refrigerant pipes and piping systems shall remain clean, dry, and leak free. Prior to installation, all refrigerant pipes shall be sealed. The manufacturer's recommendations shall be followed. During installation and prior to filling systems, nitrogen shall be used to maintain cleanliness, and to prevent oxidation of pipe interior during brazing. Maintain a nitrogen blanket on the system prior to filling. Each DX system shall be designed and installed to provide for proper oil return. Refrigerant tubing shall be copper, ACR type, ASTM B 280. All joints shall be brazed. No flareless, threaded, expanded type, sleeve coupled, any novel joint, or compression type joints shall be used. Flared is acceptable only if recommended by DX Manufacturer. All thicknesses of piping shall remain the same throughout the system – no changing wall thickness allowed. Each refrigerant circuit shall be individually pressure tested and commissioned. Pressure testing shall be performed using nitrogen and shall meet 1-1/2 time the system operation pressure. Each system shall be designed to meet Refrigeration piping and Heat Transfer Components ASME B31.9, Building Services Piping Code and shall be designed for contraction and expansion. Field tests shall be performed during the commissioning to check and verify system operation and efficiency with the simulation software. Comply with ASHRAE 15.

D309090 1.2 Building Air Tightness

Provide a building envelope continuous air sealing barrier to reduce infiltration. Perform pressure test on completed construction to verify building envelope air tightness is .25 cfm/ft2 of envelope area at 0.3

in wg (75Pa) or less. Perform thermography on completed construction to verify the envelope integrity.

D309090 1.3 Building Envelope Sealing Performance Requirement

Design and construct the building envelope for with a continuous air seal barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections, and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all joints. The air seal barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3” wg [0.02 L/s.m2 @ 75 Pa] when tested in accordance with ASTM E2178. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components. Support the air seal barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure. Seal all penetrations of the air seal barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly. The air seal barrier must be durable to last the anticipated service life of the assembly. Do not install lighting fixtures with ventilation holes through the air barrier.

Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers such as at elevator shafts.

Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods. Compartmentalize crawl spaces under buildings by providing airtight vestibules at building access points, if accessed from exterior. Compartmentalize spaces under negative pressure such as boiler/mechanical rooms and provide make-up air for combustion.

Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25 cfm/ft2 at a pressure differential of 0.3” w.g. (75 Pa) in accordance with ASTM E779 or ASTM E1827. Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3” w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3” w.g. (L/s.m2 @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air seal barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(b) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781 and ASTM C1060. Determine air leakage pathways using ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Seal barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in above.

(c) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests."

Provide industrial ventilation system in accordance with UFC 3-401-01, UFC 3-410-01, and ACGIH Industrial Ventilation Manual.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

G40 SITE ELECTRICAL UTILITIES

SYSTEM DESCRIPTION

The site electrical utility system consists of all power and telecommunications and fiber optic cabling throughout the site serving the new facilities including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet (1.5 meters) of new building locations.

NEW CONSTRUCTION

This project includes the construction of several new buildings and.

New buildings and structures include those listed below. Refer to site civil plans for building locations.

Simulator Center
Range Control Building
Supply/Boat Maintenance Building

TEMPORARY CONSTRUCTION

Provide temporary power for site construction from existing power distribution system.

GENERAL SYSTEM REQUIREMENTS

Provide an Electrical System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. All equipment shall be installed per the criteria of PTS Section G40 and the manufacturer’s recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "shall".

G4010 ELECTRICAL DISTRIBUTION

Connect to the new ~~existing~~ overhead 13.2kV, three phase, four-wire, 60 Hertz electrical power system. The connection point shall be overhead at Pole. Power will be distributed to the new buildings via new underground ductbank/Pad Mounted Transformer.

Upgrade approximately 2500 LF of existing overhead copper conductors and all associated poles. New poles shall be 45 FT class 3 and shall be installed with all associated guy wires, insulators, etc. per base standards and the NEC.

Upon completion of this upgrade, the existing system shall be demolished. Coordinate with the base regarding disposal of demolished materials.

The available fault current at the point of connection shall be assumed to be an infinite bus.

G401001 SUBSTATIONS

Not used.

G401002 TRANSFORMERS

Provide a separate three-phase, pad mounted transformer to feed each new building.

Note: Maximum size, for pad mounted transformers that the base allows is 1500 kVA.

Provide the following features:

1. Dead-Front Design with ANSI specific front plate spacing.
2. Radial feed loadbreak oil rotating (LBOP) switch.
3. Feed-through inserts.
4. Three surge arresters.
5. Wells with feed through inserts for loop switching capability.
6. Biodegradable less-flammable liquid-insulated.
7. Twenty percent (20%) spare capacity.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide above ground cable terminating sectionalizing cabinets configured with underground portion of the medium voltage distribution system. Provide concrete ground sleeves for all above ground cabinets.

G401004 OVERHEAD ELECTRIC CONDUCTORS

~~Not used~~. New overhead copper electrical conductors shall be approximately 2500 LF: (4) type 394.5 AAAC with narrow profile construction.

G401005 ANTENNAS, TRANSMISSION CABLES, ANTENNA STRUCTURE,

Coordinate requirements with antenna manufacture.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage 600-volt secondary underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 "Electrical Distribution".

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks, handholes and manholes for all underground power wiring.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide advanced metering in accordance with UFGS 26 27 14.00 20 for each Pad Mounted Transformer.

G401010 CATHODIC PROTECTION SYSTEMS

Not used.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior, including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Site Lighting
Area and Parking Lighting

Provide LED type lighting fixtures.

Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, time switches, and photocell switches such that lighting will automatically turn "ON" at dusk and turn "OFF" per a time schedule.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Not used.

G402003 OTHER AREA LIGHTING

Not used.

G402004 LIGHTING POLES

Provide direct set concrete poles for secondary street and area/parking site lighting. All poles located in areas subject to vehicle damage shall be protected with precast concrete pole guards. Provide composite/fiberglass handholes located as close as practical to poles where pole guards prevent access to pole handholes.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems and Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system.

G403001 TELECOMMUNICATIONS SYSTEMS

All outside plant telecommunications shall be governed by the Bases Telecom Specifications 33 82 00 (included in Part 6 Attachments). This specification shall hold highest level of precedence.

The connection point for the site telecommunications systems consists of two locations. The physical ductbank extension to the site and the location of the cable splicing. There is a current project that is providing a new ductbank up Birch Street from Gonzalez. The tie in point for the P-1346 project will be at the intersection of Birch Street and the new roadway that connects Birch to the P-1346 site. The estimated distance for this connection is 850'. The second tie in point for the P-1346 project is the cable splicing location. This location will be at the corner of the new Birch Street Extension and Gonzalez Blvd. The estimated distance for this connection is 6,900'. The new ductbank from Birch to the project site shall consist of six 4" conduits encased in concrete. A new manhole shall be placed every 450' in the new ductbank. The cable requirements shall be three (3) 24-strands of Single Mode Fiber and 500-pairs of copper. Each new building on the project site shall get one (1) 24-strand single mode fiber cable. Provide 200 pairs copper to Boat Supply and Range Control buildings. Provide 100 pairs copper to the Simulator Building.

All cable for the project shall be as specified in the Camp Lejeune version of specification Section 33 82 00 *Telecommunications Outside Plant (OSP)*. This specification is an attachment in Part 6 of this RFP.

The security systems will utilize the telecom fiber backbone to be routed to the central monitoring facility.

G403002 CABLE TV SYSTEMS (CATV)

The connection point for the site CATV system shall be a 2" conduit stub 5' out from each building into a hand hole. See the ESR D50 section for more information.

G403003 CABLES AND WIRING

Cables and wiring for site telecommunications and security systems shall be as indicated in their respective categories. Outside plant copper shall be coordinated with OSP supervisor of

Telecommunications Division G-6 MCIEAST-MCB CAMLEJ.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of ductbanks, manholes, and handholes for site telecommunications and security.

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

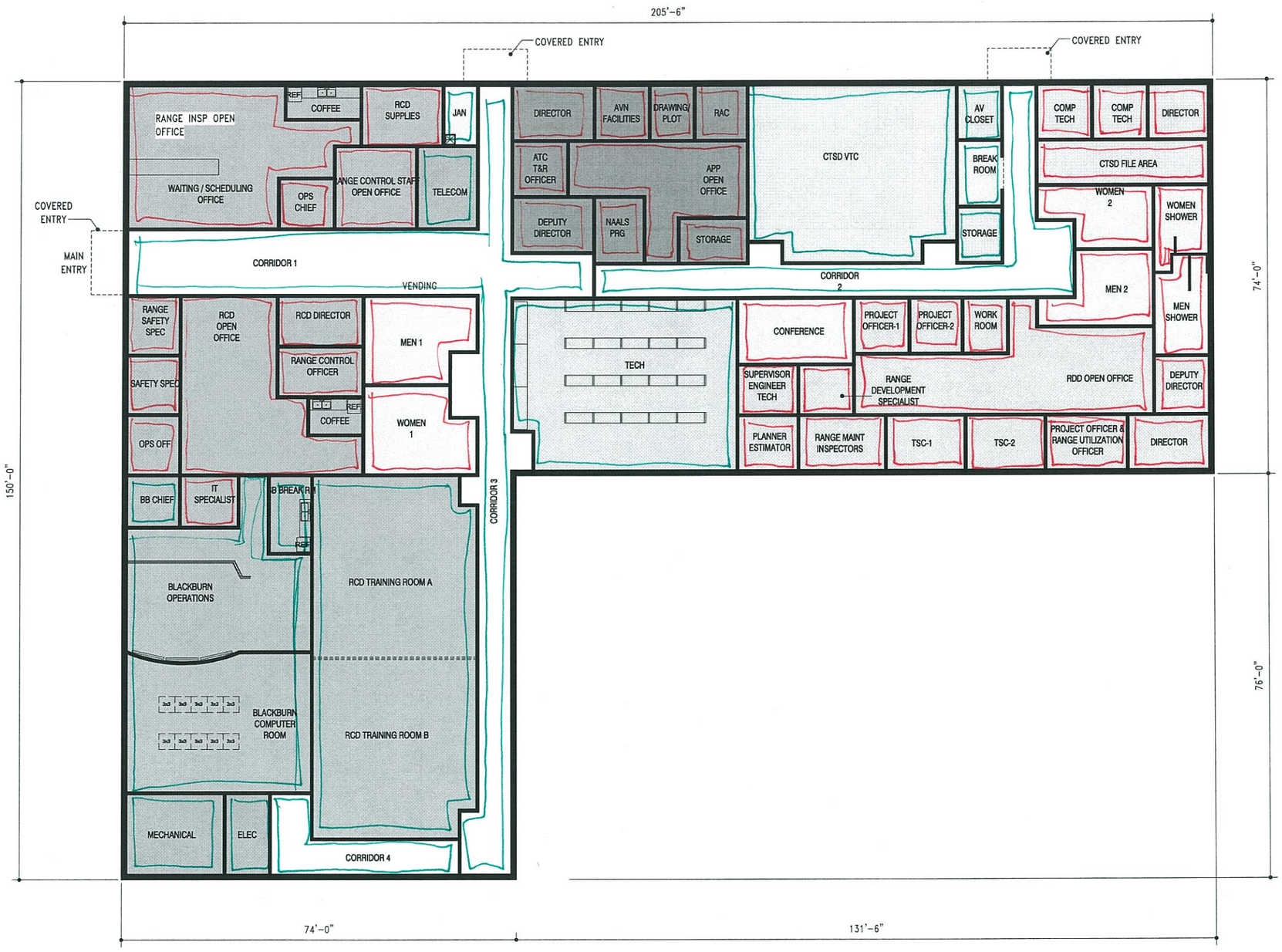
G4090 OTHER SITE ELECTRICAL UTILITIES

Washracks/Pads
Provide a single 208Y/120 Volt, three-phase, four-wire branch circuit from Supply/Boat Maintenance Building to serve washracks/pads. Circuit shall be routed underground and sized to accommodate all loads at washracks/pads. Provide 208 Volt, three phase outlets to serve portable hot water high pressure cleaner. Receptacles for cleaners shall be weatherproof, NEMA type to match cleaner's plug. Provide quantity of such receptacles, spaced as required to allow portable cleaner to service entirety of each pad area.

Covered Boat Storage at the Supply/Boat Maintenance Building
Provide four single 120 Volt, single-phase branch circuits from Supply/Boat Maintenance Building to serve Covered Boat Storage. Receptacles shall be weatherproof, NEMA type to match plug. Circuit shall be routed underground.

Covered Storage at Simulator Center
Provide four 60A, 208Y/120 Volt, three-phase, four-wire branch circuits with separate disconnect switches for each from Simulator Building to serve Simulator Center Covered ODS Trailers / RTISS Equipment. Disconnects shall be NEMA type to match environmental conditions. Circuits shall be routed underground.

-- End of Section --



RANGE CONTROL

3/32" = 1'-0"

NORTH

LEGEND

- RANGE CONTROL DIVISION (RCD)
- RANGE DEVELOPMENT DIVISION (RDD)
- AIR PLANS & POLICY (APP)
- CIVILIAN TRAINING & SUPPLY DIVISION (CTSD)
- SHARED
- SUPPORT
- CIRCULATION

GROSS SQUARE FOOTAGE

RANGE CONTROL BUILDING	20,895 SF
DD-1391	19,171 SF

CMU CONSTRUCTION

MTL STUD / GWB CONSTRUCTION

SCALE: 3/32" = 1'-0" 0 6' 12' 24'

SYM	DESCRIPTION	DATE	APPR.

NAVFAC

FINAL SUBMITTAL

OCTOBER 13, 2015

HBA H&A

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES JB | DRW DS | CHK DE

PM

BRANCH MANAGER

CHIEF ENG/ARCH

FIRE PROTECTION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION – NORFOLK, VIRGINIA
NDIPT
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

P-1346
SIMULATOR CENTER AND RANGE CONTROL

RANGE CONTROL BUILDING – FLOOR PLAN – BUILDING 'B'

SCALE: GRAPHIC

EPROJECT NO. 1168092

CONSTR. CONTR. NO. N40082-10-D-5301

NAVFAC DRAWING NO.

SHEET 1 OF

A-102