

EXHIBIT B – Scope of Work

INTENT:

In general, this Bid Package is comprehensive to specific CSI Division Work and related Work as referenced, indicated on, or implied by the Project Drawings, Specifications and Project Manual. Subcontractor acknowledges that the following Scope of Work detail is provided as a courtesy and must be used in conjunction with **all** Project Documents. Scope of Work detail listed is not intended to describe a complete and final work scope. It is provided as a summary overview only.

I. SCOPE OF WORK SUMMARY:

The Scope of Work shall include the furnishing and installation, complete, of the **HVAC – Water Side Work** as outlined in **The Contract Bidding Requirements** and in accordance with the **Contract Documents**. This shall include, but is not limited to all required, engineering, submittals (samples or mock-ups and shop drawings), materials, fabrication, labor, equipment and tools, supervision, hoisting, scaffolding, and transportation, burden and taxes as required for a complete installation.

II. GENERAL REQUIREMENTS

- A. Subcontractor has included all material, labor, supervision and administration for requirements outlined in the Exhibit C - Special Provisions. These are the standard expectations for all Balfour Beatty Construction projects.
- B. This Subcontractor shall obtain and pay for any additional permits, bonds, or fees as required to complete scope of work under this agreement including any required re-inspection fees / costs are responsibility of Subcontractor.
- C. Subcontractor understands that all work is being done on an active university campus. As such the following apply:
 - 1. Due to the Emergency Declaration associated with this project the guidelines present in Section 5 – Special Provisions, specifically Item No. 4 shall be strictly adhered to without exception. Coordinate ALL weekend work with the Site Superintendent as there are restrictions and guidance from UNCW that must be adhered to on Campus.
 - a. No noise making activities (including trucks backing or equipment prepping or music playing) prior to 7:00 AM or after 6:00 PM
 - b. No work will be permitted to start early without 48 hour written notification to UNCW Project Manager outlining specific tasks to be performed prior to 7:00 AM.
 - c. No afterhours work will be permitted without 48 hour written notification to UNCW Project Manager outlining specific tasks to be performed after 5:30 PM.
 - d. All gates will be locked after 6:00 PM.

2. Streets are to be clean all the time. Subcontractor is responsible for cleaning the roads should their specific activities track dirt or mud onto university streets.
3. No trucks are to be left on university roads.
4. All deliveries are to be accompanied by flagmen at the entry gates.
5. No work shall be performed outside the site fencing without UNCW authorization.
6. At no point are any construction personnel to interact (talk or look) with the students.

D. Employee Conduct:

1. All construction personnel shall be respectful to all University of North Carolina Wilmington staff and students. Any disrespect, harassment, unwelcome comments or advances from any construction personnel toward any staff member or student shall constitute sufficient grounds for University of North Carolina Wilmington to request removal of any specific individuals from this project.
 - a. Such Owner action shall not constitute grounds for a delay claim.
 - b. Owner will not be responsible for any delays caused to the project due to any individual being removed from this project.
 - c. Construction superintendents shall be held accountable for any incident of this nature.
2. All after normal hours work shall be scheduled a minimum of 48 hours for Interior Work and 7 Days for Exterior Work.
3. Special attention is required for traffic control in and out of the Construction Site so as to avoid the Student population as they move around on Campus.
4. Use of tobacco products and other controlled substances on the Project Site is not permitted.
5. No Lottering on campus is allowed at any time.

III. **TRADE SPECIFIC SCOPE OF WORK ITEMS:**

A. Subcontractor shall furnish, install, maintain and remove the following *Temporary Utilities*.

1. Subcontractor agrees to expedite the permanent mechanical systems and final hook-ups necessary to operate the permanent system for the purpose of temporary cooling and ventilation of the building(s) in accordance with the project schedule.
 - a. The Subcontractor will include any labor required to operate the mechanical portions of this system.
 - b. It shall not be excusable for any dust and/or dirt to enter the system.

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- c. Maintain temporary conditioned air (air conditioning) through the permanent mechanical systems in accordance with project schedule (duration for start-up milestone through Owner acceptance of system).
 - d. The early start-up of the mechanical equipment shall in no way encroach upon any warranty requirements of the Specifications. Warranty period for the mechanical equipment will not begin until Final Project Inspection is received.
 2. Subcontractor is responsible for temporary strainers in all pumps. Subcontractor shall monitor and clean strainers to insure no damage occurs to permanent system.
- B. The following is a general outline of items included, but not limited to, under this agreement for all **HVAC – Water Side** per all specification sections under Division 23, etc. All Mechanical related work identified on mechanical drawings as well as inclusion of those items indicated on civil, site utility, plumbing, mechanical, and electrical drawings identified to be completed by this Subcontractor:
 1. All chilled water systems and condenser water systems including, but not limited to, all chillers, piping, insulation, pumps, valves, fittings, meters, air separators, expansion tanks, water treatment, chemical feed, variable frequency drives, commissioning, etc.
 2. All heating hot water systems including, but not limited to, all piping, insulation, meters, gauges, heat exchangers, air separators, pumps, expansion tanks, valves, fittings, dielectric unions, water treatment, chemical feed, commissioning, variable frequency drives, etc.
 3. All energy recovery piping systems, including but not limited to, piping, valves, pumps, expansion tanks, insulation, meters, gauges, etc. shall be included in this Scope of Work. The following components are shipped loose and are to be field installed under this scope of work:
 - a. (6) Balancing valves
 - b. Flow Control Valves (10 delivered loose - 4 are three-way valves)
 - c. Immersion pockets with PT1000 temperature sensors (10)
 4. The following is a list of the major equipment to be furnished and installed by this subcontractor. This by no means excludes other air side equipment not specifically listed below or in this scope of work:
 - a. Water-cooled Chiller (CH-1)
 - b. Condensing Boilers (B-#)
 - c. Pumps (CHWP-#, CWP-#, ERP-#, HWP-# and TCHWP-##)
 5. In addition to the piping installed under this scope of work, this Subcontractor shall furnish and install all insulation of existing piping being reused on the water systems. This

insulation was damaged and removed by others. This subcontractor will be responsible for 100% of the insulation of all HVAC water piping systems.

- a. Prior to insulation, subcontractor shall test all existing piping to the project specifications. All test reports shall be submitted with noted repairs necessary.
6. Subcontractor shall furnish and install all insulation within the HEERS-1 Hydronic Module.
7. Subcontractor shall install all in-line devices such as valves, dampers, air flow measuring stations, duct detectors etc. that be furnished by others.
8. All vibration and seismic controls, etc. for HVAC piping and equipment.
9. Subcontractor shall furnish and mount all variable frequency drives required for equipment furnished under this scope of work.
10. All disconnects, starters, switches, VFD overcurrent modules for equipment, furnished under this scope of work, shall be furnished and installed by the Electrical Subcontractor
11. The Electrical Subcontractor shall furnish and install all line and load side installation and connections to the equipment.
12. All power and control equipment and devices that are the responsibility of this subcontractor shall be provided and installed complete a minimum of 4 weeks prior to needing the power and/or controls to operate the associated equipment. This requirement is considered a minimum and may be more restrictive if the contract schedule, TAB, Controls Installation, and Commissioning are impacted in any way.
13. All VAV, Fan Coils, Unit Heaters, etc. shall include integral disconnect switch options that meet the code requirement to be "Service Disconnects", lockable in the OFF position. All voltage serving the equipment shall be disconnected by this device. If integral service disconnects are not available this subcontractor will be responsible for providing and installing complete all disconnect switches that meet this requirement
14. Furnish and install all secondary mechanical drain pans, and all primary and secondary p-traps and piping to nearest plumbing receptacle for condensate drains. Condensate piping shall be insulated as identified in the Specifications and Drawings.
15. Subcontractor shall provide all rough-in and final hook-up of all items requiring Mechanical service that are specified in any other section of the Specifications, or Owner furnished, and/or shown on the Drawings. All equipment or materials provided under other Specification sections which are to be installed by this Subcontractor will be identified and delivered to this Subcontractor's Project office and they shall inventory, store, schedule, handle, protect, and install the mechanical equipment as indicated in the Contract Documents.
16. Subcontractor is responsible for total coordination of all mechanical installations and for providing complete mechanical system. There will be no cost or time considerations given

- for adjustments of equipment or pipe runs due to conflicts arising from lack of coordination with adjacent other existing MEP installations, new or existing structures, or other Subcontractors.
17. Subcontractor shall furnish and install all required supports, including seismic constraints, for this Work in accordance with the Contract Documents, all applicable codes, and standard building practices. Any bridging between structural members to provide proper support spacing is the responsibility of the Subcontractor.
 18. All testing, certification tests, etc. under direction of Owner, Engineer, Inspectors, and governmental authority(s) having jurisdiction.
 19. Final cleaning of all exposed equipment, ductwork, fixtures, piping and piping insulation is included in this Scope of Work just prior to Final Project Inspection including removal of shipping stickers, etc.
 20. Subcontractor shall flush and clean all building mechanical piping systems.
 - a. Provide and maintain construction strainers in all pumps until Owner acceptance of buildings.
 - b. This subcontractor is responsible to flush and clean all site piping systems which are new to project to service new building at no cost to contractor as part of the building start-up/flushing activity even if the site piping was installed by another subcontractor.
 - c. This subcontractor is responsible for all costs to chemically balance the HVAC water systems to meet Owner requirements.
 21. All flushing, pressure testing, disinfection/bacteriological (chlorination) chemical flushing, certification tests, etc. under direction of Owner, Engineer, Inspectors, and governmental authority(s) having jurisdiction is included. Subcontractor shall dilute and properly dispose of heavily chlorinated water with Owner permission.
 22. Provide all sheaves, belts and other miscellaneous parts as necessary to accomplish the balancing requirements.
- C. Subcontractor shall furnish and install all necessary items required for concrete work related to the systems installed under this agreement including, but not limited to, the following per Division 03 specification sections including furnishing and installation of reinforcing steel:
1. All interior concrete housekeeping pads, etc.
 2. Exterior concrete equipment pads.
 3. All concrete backfill for piping systems location under building footings, etc.
 4. All grouting for equipment, etc.
 5. All equipment inertia pads, etc.

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6. Grouting of wall sleeves to building structure
- D. Subcontractor to provide and install complete ALL heat trace for all piping as required and include all appurtenances (i.e. splices, controllers, etc.). Electrical power to a single connection will be by others.
- E. Subcontractor is responsible for total coordination of all mechanical installations and for providing complete mechanical system. There will be no cost or time considerations given for adjustments of equipment or pipe runs due to conflicts arising from lack of coordination with adjacent other existing MEP installations, new or existing structures, or other Subcontractors.
1. Coordinate all elevated deck opening sizes and locations for ductwork/dampers with Steel Subcontractor and Concrete Subcontractor,
 2. Coordinate floor drain locations associated with mechanical equipment and footing/foundation locations with Concrete Subcontractor
 3. Coordinate electric stub ups with electrical subcontractor, etc.
 4. Subcontractor is responsible to coordinate work under this agreement with Fire Protection Subcontractor, Electrical Subcontractor, and Site Mechanical Utility Subcontractor since existing and/or future utilities exist on-site.
 5. Subcontractor is responsible for identifying all potential conflicts with building footing and foundation systems to insure sleeving, stepping, phasing, etc. of foundations is achieved without undermining footing installations.
 6. Coordinate with the Temperature Controls contractor and install pipe and duct mounted devices provided by the Temperature Controls contractor
- F. Subcontractors shall layout and install all required sleeves within elements of the structure for the installation of Subcontractor's work. Subcontractor shall seal, pack, fire safe, water seal, weather caulk, aesthetic caulk, etc. all of its sleeves/penetrations as required by the Contract Documents and as to maintain required ratings. Subcontractor to refer to Specification sections 07 8413 and 07 8446 respectively for Firestopping requirements. Formed openings in masonry and concrete walls are herein included.
1. Core drilling, cutting, and sleeving new penetrations at existing construction walls, foundations walls, and slabs locations is herein included. Subcontractor is responsible to clean-up all core drill slurry from walls and slabs as well as removing and patching all core drill machine anchors. Hammering of walls causing a blow-out or sprawling is not permitted and will be corrected at expense of Subcontractor. Subcontractor will provide barricade and a watch at floors below to avoid damage due to falling cores.
 2. Concrete saw cuts, removal, and concrete replacement as required to install Work within this Scope is included in this Scope of Work. No saw cuts or core drills are to be performed without written approval from Construction Manager and Architect/Engineer.

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- G. All access panels and covers specified, shown, or required for this scope of work are furnished and installed by this Subcontractor. This Subcontractor is responsible for coordinating the locations and sizes of required framed openings with respective trades during the construction of walls, ceilings, and floors. Including the following, but not limited to:
1. All fire dampers, smoke/fire dampers, etc.
 2. All volume or control dampers for ductwork
 3. All valves, gauges, circuit setters, strainers, PRV's, and filters
 4. All water valves
 5. All control valves
- H. Subcontractor shall furnish required starters, fuses, heaters (thermal overloads), and combination starter/disconnects as indicated to be provided for specific equipment by the specifications.
- I. Verify site utility piping inverts prior to preparing for installation work under this agreement. Inverts indicated on the document are for information purposes only. All information shall be field verified and all invert elevations shall be coordinated with other trades, etc.
- J. Subcontractor shall provide all necessary and required materials, management and field labor, ladders, lifts, radios, safety devices (PPE) for all commissioning activities.
1. Commissioning documentation to include but not limited to, all complete and correct pre-function test reports, all training records-audio, video, and written, coordination meetings, all assistance necessary to accomplish a complete and Final Commissioning Activity per the contract documents. Be advised that should for any reason this activity require premium time and or night/weekend/holiday scheduling this requirement shall be met without any additional cost to the project.
 2. Be advised that pre-function and or final Commissioning Activities that are confirmed to be deficient and or delinquent by cause of this subcontractor will be subject to responsibility assessment and subsequent cost to be paid by this subcontractor.
- K. Surfaces of equipment and materials are to be thoroughly cleansed and left ready for painting in accordance with Architectural Painting Specifications. All damage to paint primers or applied factory finishes which has incurred during installation shall be repaired by this Subcontractor. All dents or surface damages shall also be repaired.
- L. Subcontractor shall allow walls to be primed and finish painted prior to installation of surface mounted piping and setting of equipment within six (6) inches of a painted surface. This Subcontractor will be responsible for repaint costs if damages occur while installing work under this agreement.
- M. All rough-in work included in this Scope of Work is to be concealed within wall cavity unless approved otherwise by Owner and Architect.
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- N. Subcontractor understands ceiling grid is to be protected by this Subcontractor and this Subcontractor shall be responsible for costs to make any repairs or a portion thereof of unidentifiable damage caused jointly with other MEP trades.
- O. The following is a general outline of items included, but not limited to, under this agreement for ***Testing, Adjusting and Balancing for HVAC*** per specification section **01 45 20** and in accordance with the contract documents:
1. Subcontractor to perform a complete Test and Balance (TAB) process of the HVAC Water Side System per the contract documents. This TAB is to be coordinated with the HVAC- Air Side Test and Balance process. Both TAB processes shall fully coordinate and support the Commissioning activities through to completion and acceptance. All Reports are to be completed and presented to the Cx prior the Commissioning activity starting. Subcontractor will need to return during seasonal changes if full loading of a system operational cannot be simulated during final TAB season at no cost to Contractor.
 - a. Subcontractor shall perform all testing, adjusting and balancing of HVAC hot water and air systems.
 - b. Subcontractor shall perform all testing, adjusting and balancing of Domestic Hot Water System.
 2. Coordinate all testing, inspections, and punchlist with commissioning agent hired by the Owner for this Project at no additional cost to Contractor.
 3. Coordination with HVAC and HVAC Controls subcontractors is included in this Agreement. Prior to commencing of this work, this subcontractor shall inspect all equipment to be tested and advise Contractor of any deficiencies.
 4. Cutting, patching and sealing of insulation, ductwork and piping required for the installation of test probes is included in this Agreement.
 5. Subcontractor shall advise Construction Manager in writing of any problems they encounter with the system that causes a delay in the work of this agreement. Direct contact with engineer and subcontractor without the Construction Manager's written approval will not be allowed.
 6. Subcontractor shall provide all ladders, manlifts, scaffolds etc, as per OSHA safety standards, to allow for completion of subcontractors scope of work.
 7. All testing, certification tests, etc. under direction of Owner, Engineer, Inspectors, and governmental authority(s) having jurisdiction.
 8. Subcontractor will coordinate their work with the other subcontractors providing equipment and services that are part of the systems to be tested and balanced. Construction Manager shall provide Subcontractor with approved submittals from the other trades. This Subcontractor shall review and advise Construction Manger that the submittals provided are compatible with the TAB process and the building design. Failure to identify any

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- coordination issues may result in this Subcontractor having to perform additional work at no cost to the Construction Manager or Owner to redo any testing and balancing once corrections have been made as necessary by others.
9. Included in this Subcontract is all required to assist the Owners Commissioning Agent, the Building Automation and Controls Subcontractor and the HVAC Subcontractor as required by the Contract Documents on the commissioning process as required by the Contract Documents. This includes providing all personnel required during the Commissioning process to verify the TAB report and demonstrate the equipment performs as the TAB report indicates.
 10. Subcontractor understands that multiple mobilizations are required and has included all cost.
 - a. This subcontractor shall make no less than 4 visits to the jobsite at the Construction Managers request to inspect the progress of the work to ensure that adequate installation practices are being adhered to and that the work will have no adverse effects on the subcontractor's ability to perform his work. Each visit will be documented by the subcontractor with a written report for each system detailing any deficiencies in the work.
 - b. Attendance of weekly progress meeting to monitor job progress at least 5 weeks prior to initial mobilization.
 - c. Subcontractor shall start his work after receipt of the manufacture's startup reports for all equipment on a system that is to be tested under this agreement.
 - d. Subcontractor will need to pre-balance the system based on design information during start-up and provide Engineer with preliminary report.
 - e. Subcontractor will then provide final balancing report upon 100% completion of the project which will need to occur prior to scheduled Beneficial Occupancy inspection.
 - f. Subcontractor may need to return during seasonal changes if full loading of a system operational cannot be simulated during final TAB season at no cost to Contractor.
 11. Subcontractor understands that the need to work other than normal work hours and overtime may be needed to meet project schedule. This will not constitute a change order for the Subcontractor. Subcontractor shall verify prior to bid that the included Project Schedule incorporates enough days to complete Test and Balance work. Include as part of the Subcontractors bid a manpower loading calculation that shows how many work crews and technicians will be needed to complete the work within the Project Schedule.
 12. This Subcontractor acknowledges that the Project will have phased turnover in accordance with the Project Schedule and that there is no limitation to the mobilizations which will be required to complete this Scope of Work. For each phase, Subcontractor shall submit a Final Air Balance Report and a Preliminary Water Balance Report. At the end of the project, this Subcontractor shall submit the FINAL Certified Air and Water Balance Report.

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- P. Subcontractor shall provide all necessary and required materials, management and field labor, ladders, lifts, radios, safety devices (PPE) for all commissioning activities.
1. Subcontractor is to provide fully trained and capable personnel to perform all coordination and support of the controls installation and Commissioning activities. These personnel shall be present on site as required to support all Commissioning activities. These personnel are not to be limited by any reason to perform on this project, work load on “Other” projects will not be an acceptable reason for non-performance and on-site presence.
 2. Commissioning documentation to include but not limited to, all complete and correct pre-function test reports, all training records-audio, video, and written, coordination meetings, all assistance necessary to accomplish a complete and Final Commissioning Activity per the contract documents. Be advised that should for any reason this activity require premium time and or night/weekend/holiday scheduling this requirement shall be met without any additional cost to the project.
- Q. Be advised that pre-function and or final Commissioning Activities that are confirmed to be deficient and or delinquent by cause of this subcontractor will be subject to responsibility assessment and subsequent cost to be paid by this subcontractor.
- R. Schedule: {Description of Critical Patch, requirements and crew logic}
1. Cost for expediting shop drawings and material to the site is included to avoid delays. All material dates shall meet or exceed the project schedule. Subcontractor shall include all overnight shipping costs, “quick ship” fabrication, alternate manufacturer(s), etc. This shall include, but not limited to, all fixtures, valves, equipment, dampers, grilles, pipes and fittings, etc.
 2. Subcontractor understands that multiple mobilizations are required and has included all cost.
 3. Subcontractor understands that multiple crews, supervisors, and equipment are required to start and complete work in each of the buildings or floors simultaneously in accordance with the schedule.
 4. Subcontractor is responsible to verify all equipment furnished under this agreement can be installed without leaving building architectural and structural elements out specifically at the lower level mechanical room. This Subcontractor will be responsible for all costs to expedite equipment or breakdown equipment to access building in its finish state.
 5. Subcontractor will evaluate access to the basement area and penthouse area for installation of any equipment. If it is necessary to set equipment prior to basement roof structure or penthouse roof structure being installed due to lack of access, this subcontractor will expedite the delivery of such equipment in accordance with the project schedule and will set equipment with no additional costs incurred by the construction manager.
 6. Install hangers prior to **fireproofing** when possible and patch otherwise at the expense of this package.

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7. Subcontractor is responsible to expedite all vertical shaft work in order to complete enclosure of shafts on each floor level. Shaft work shall proceed from ground level to roof level non-stop as structure progress and shall not be construed to follow each floor level. All vertical shaft work shall be completed, tested, and insulated prior to progressing with floor level work. Failure to provide priority to this work will make this Subcontractor responsible for all costs to re-mobilize trades to in-fill openings provided temporary enclosures, etc. as deemed by Contractor.

IV. SCOPE ALLOWANCES

- A. The subcontractor shall include the following allowance(s) in the base bid amount for work above and beyond the work outlined in the bid package scope of work sections.
 1. Subcontractor shall include 2% of the contract value for general clean-up. This will be deducted from the contract and managed by CMAR. Once credited, this Subcontractor shall continue to perform their daily clean-up as required by the Special Provisions.
 2. Subcontractor shall provide labor and material to patch duct insulation for 5% of duct surface are for unidentifiable damage.
 3. Subcontractor shall provide labor and material to patch pipe insulation for 5% of duct surface are for unidentifiable damage.
- B. These allowances are intended to cover the cost of work for the scope described. It is understood that all overhead, profit, insurance or other direct or indirect expense of the Subcontractor are included in the base bid amount and thus will not be accounted for when reconciling these allowances.
- C. Verification of any allowance usage must be signed off on by the Contractor to be validated for billing purposes.
- D. All unused portion(s) of these item(s) will be reconciled based on the unit prices provided on the bid form at the completion of the project via deductive change order.
- E. Any work in excess of the allowance amount(s) will be paid via change order based on the unit prices provided on the bid form.

V. RECAP OF CONTRACT AMOUNT

The Total Subcontract Amount is arrived at and recorded as follows:

BP-## – Bid Amount	\$ #,###,###
Additions / Deletions	\$ ###,###
TOTAL SUBCONTRACT AMOUNT	\$ #,###,###