PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES

PASSHE – WEST CHESTER UNIVERSITY

RENOVATIONS TO STURZEBECKER HEALTH SCIENCES CENTER

COMMISSIONING SERVICES

PROJECT# DGS C-0414-0072 PHASE 1

TECHNICAL SUBMISSION

FEBRUARY 18, 2022

RMF Engineering
Reliability. Efficiency. Integrity.

75 Acco Drive, Suite A-10
York, PA 17402

RMF Engineering
Reliability. Efficiency. Integrity.

February 18, 2022

Ms. Cara Desert
Bid Contact
Pennsylvania Department of General Services
401 North Street
Harrisburg, PA 17120

RE: **West Chester University of Pennsylvania | Renovations to Sturzebecker Health Science Center**
DGS 414-72 Phase 1 (Commissioning Services)

Dear Ms. Cara Desert and Members of the Selection Committee:

RMF Engineering, Inc., PC (RMF) is pleased to submit our proposal for design and construction phase commissioning services for the West Chester University – Sturzebecker Health Science Center located in West Chester, Pennsylvania.

Since our inception in the early eighties, RMF has been intimately involved in all aspects of engineering systems design, construction and commissioning in complex buildings. Our firm has over 30 years of commissioning experience with facility expansion, renovations and newly constructed facilities in various market sectors.

In addition, RMF is currently one of the first few firms in the entire country who have earned the Certified Commissioning Firm (CCF) designation through the Building Commissioning Association (BCA).

RMF has a dedicated team of commissioning staff members, with backgrounds and experience ranging across the board: Certified Commissioning Professionals, Agents and Technicians, Operating Engineers, Facility Managers, TAB Experts, Controls Specialists, Registered Professional Engineers and LEED Accredited Professionals. Our commissioning team strives to be a resource to the entire construction team, as well as an expert in the review and testing of utility and building systems to ensure they are functional and efficient.

RMF has extensive project experience working in laboratories, science centers, and mixed-use higher education facilities as well as professional stadiums such as Heinz Field and M&T Bank Stadium.

RMF is looking forward to the opportunity to partner with the Pennsylvania Department of General Services, as we are confident we can deliver successfully commissioned projects through this contract with the intended results. Please do not hesitate to contact me at **800.938.5760** or by email at **jeremy.bartlett@rmf.com** should you require additional information.

Sincerely,

Jeremy Bartlett, CCP, CxA, CQM
Project Manager | Commissioning Specialist
RMF Engineering, Inc., PC

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A.

CONTRACTOR PRIOR EXPERIENCE

NATIONALLY & LOCALLY RECOGNIZED

RMF Engineering, Inc. (RMF) has become nationally recognized for our quality analysis, planning, design, and commissioning of buildings, as well as campus utility generation and distribution systems. Over the last 30 years, commissioning services have grown to 15% of our overall business. RMF is certified as a commissioning firm by AABC Commissioning Group (ACG) and the Building Commissioning Certification Board (BCCB). RMF was among the first few Certified Commissioning Firms (CCF) as recognized by the Building Commissioning Association (BCxA).

- RMF's Rockville District Courthouse Retro-Cx Project won the MDE Maryland Green Registry Award 2020–2021 as the "Most Energy-Improved Building in the State!" – Maryland DGS Office of Energy & Sustainability
- RMF received an Honorable Mention in 2019 from the Building Commissioning Association (BCA) for commissioning services

RMF's role has included the complete commissioning process for higher education, laboratory, local and state government, federal government and military facilities, correctional facilities, healthcare, K-12, and commercial facilities.

HIGHLY QUALIFIED TEAM

RMF's dedicated commissioning team members have extensive experience as facility and plant operators, construction inspectors, equipment installation and programming controls systems specialists, licensed master electricians, master plumbers, code inspectors, etc., and are trained and accredited by organizations such as ASHRAE, BCxA, ACG, ASCE and ASME. The team routinely works within technically complex and mission critical facilities across the globe that incorporate intricate fire protection systems and ventilation requirements. The fact that RMF's work bridges assessment, design, and commissioning has allowed our team to become astute in both code and performance requirements of fire protection and life safety systems. In addition, RMF's LEED Accredited Professionals have assisted project teams in meeting all LEED commissioning requirements on multiple projects. Professionals from our team work with USGBC's Energy & Atmosphere Technical Advisory Committee, which is charged with writing LEED guidelines.

FLEXIBLE, EFFICIENT COMMISSIONING PROCESS

RMF's commissioning process is closely modeled after industry standards such as ASHRAE, PECI and BCA; the primary goal is to deliver a client's project on time, with energy efficient operational systems that satisfy the designer's intent and meet the owner's program requirements. It is understood that the commissioning process must be flexible to meet the ever-changing needs inherent in technologically complex systems.

RMF's corporate philosophy is founded on the energy efficient design of Infrastructure and building Mechanical, Electrical & Life Safety systems—this core value is demonstrated throughout our practice from the master planning stage, through design phases, and concluding with a concise commissioning process.

RELEVANT EXPERIENCE

RMF has commissioned projects with construction budgets up to $500 million. In the last ten years, RMF has provided commissioning services on over 250 renovation and new construction projects in Pennsylvania, Maryland, and New York, including for University of Pennsylvania, Penn State University, Temple University, Shippensburg University, Stony Brook University, the New York State Office of General Services, and many others. Below are detailed several of RMF's prior projects similar in scope, size and building type to the Sturzebecker Health Science Center Renovation Project.

PROJECTS SIMILAR IN SCOPE

Commissioning Services for the Andrew W. Breidenbach Environmental Research Center

US Environmental Protection Agency | Cincinnati, OH

RMF was contracted by the US Environmental Protection Agency (EPA) to commission critical mechanical and electrical systems in the Andrew W. Breidenbach Environmental Research Center for their Infrastructure Replacement Project. The building was built in 1975 in Cincinnati, a ten-story structure with a full mechanical equipment space on the basement level and a mechanical penthouse. All work was to be performed over five separate phases of construction, with a duration of seven years. The project scope was amended to include a campus steam

CONTRACTOR PRIOR EXPERIENCE CONT'D

distribution system and boiler efficiency study. The Breidenbach Research Center is approximately 356,000 GSF and houses laboratories, classrooms, and administrative office space.

RMF developed the overall commissioning plan and schedule for the commissioning services, provided technical review of the contract documents, and developed all commissioning pre-functional and functional testing checklist/procedures. The construction phase commissioning plan provided direction for the commissioning process during construction, particularly providing resolution for issues and providing details that cannot be, or were not fully developed during design. RMF developed a systematic commissioning plan to verify and ensure that all building and infrastructure systems perform interactively according to the design intent and the owner's needs. The overall commissioning process was designed to achieve the following owner objectives:

- Disseminate info & assist design & construction teams in completing construction process
- Maintain high level of quality assurance
- Observe & coordinate testing
- Document Cx process
- Assist with dispute resolution
- Provide technical expertise for correction of deficiencies
- Ensure equipment & systems are installed properly & receive adequate operational checkout by installing contractors
- Verify & document proper performance of equip./systems
- Provide acceptance of systems for start and warranty period
- Ensure O&M documentation delivered to Owner is complete
- Ensure Owner's operating personnel are adequately trained

Formally commissioned systems and equipment included:

- 5 Phases of building renovation
- Variable & Constant Volume Lab Supply & Exhaust Systems
- Fume Hoods and Hood Exhaust Systems
- Process Lab Gas & Water Systems
- Heating & Cooling Plant Expansion
- Direct Digital Automatic Temperature Controls
- Normal & Emergency Power Systems
- Integrated Fire Alarm Systems
- BSL-3 suite addition

START & END DATES
10/2008–3/2015

SIZE
356,000 SF

COST
Construction: $36.5 Million
Commissioning: $120,000

RMF RESPONSIBILITY
Mechanical, Electrical, Commissioning

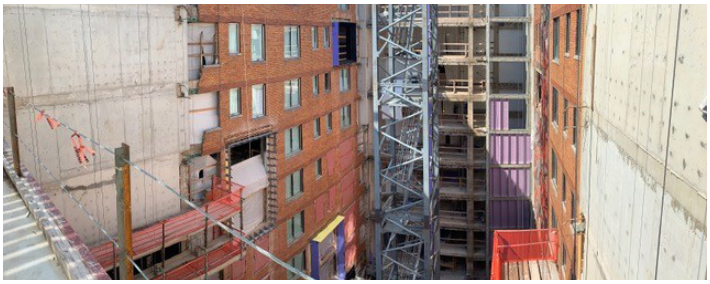
REFERENCE
Mr. Andy Franke
General Engineer
US Environmental Protection Agency
26 W. Martin Luther King Drive
Cincinnati, OH 45268
513.405.4033
franke.andy@epa.gov

Thurston Hall Renovation LEED® Enhanced Commissioning

George Washington University | Washington, DC

Thurston Hall is located on George Washington University's Foggy Bottom Campus in Northwest Washington, DC. Bounded by F Street and 22nd Street, the 1920's-era residential complex of approximately 207,800 SF is undergoing a major renovation and expansion. A new three-season atrium, student lounges and community spaces with natural light complete the interior renovation. The University contracted RMF to provide review of the Thurston Hall project design, develop commissioning requirements, monitor equipment installation and startup during construction, and review operations after occupancy. The project is seeking LEED Silver Certification. RMF is providing fundamental and enhanced LEED commissioning services for the following building systems:

- Building Automation System
- Chilled Water Systems
- Boiler Systems
- Heat Exchanger
- Air Handling Units
- Exhaust Fans
- Fan Coils
- Ductwork/Piping
- Electrical Systems (normal power)
- Emergency Power Systems
- Lighting Systems
- Domestic Hot Water System
- HVAC Hydronic Piping
- Oil and Gas Piping



START & END DATES
2/2020–12/2023 (est.)

SIZE
207,800 SF

COST
Construction: $80 Million
Commissioning: $265,000

RMF RESPONSIBILITY
Commissioning

REFERENCE
Mr. Gene Jornales
Assistant Director - Quality Assurance & Administration
George Washington University
2121 I Street, NW
Washington, DC 20052
202.994.9590
gjornales@email.gwu.edu

CONTRACTOR PRIOR EXPERIENCE CONT'D

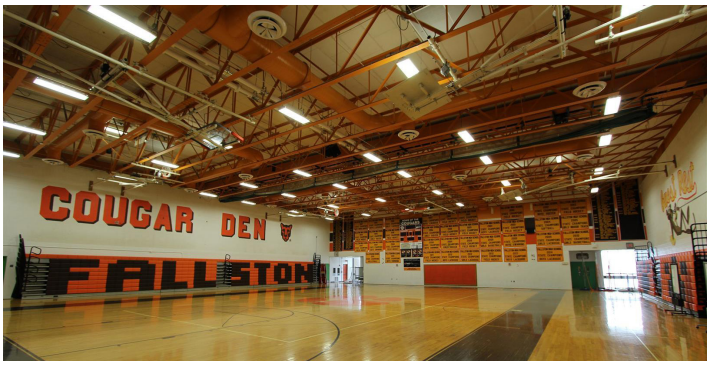
Fallston High School HVAC Commissioning

Harford County Public Schools | Fallston, MD

Fallston High School (FHS) is a three-story, 233,500 GSF building built in 1977. Harford County Public Schools (HCPS) sought to revitalize FHS's mechanical equipment, as most of it dated to original construction (approximately 36 years) and had reached end of expected life. The renovations increased the cooling capacity, provided proper climate control and increased operating efficiency.

RMF provided commissioning for all of FHS's systems, equipment and components related to HVAC. Commencing early during the project design, RMF conducted a formalized commissioning design review. RMF developed a commissioning plan, performed a detailed energy survey, identified system deficiencies and energy savings solutions and provided an implementation approach and plan for system upgrades and/or replacements. The commissioning services scope continued through construction and project turnover, following protocols to fulfill all requirements of fundamental Commissioning. The following systems, equipment and components were commissioned:

- Chilled Water system: Chillers, Cooling Tower and Pumps
- Variable Frequency Drives
- Heating Water System: Condensing Boilers and Primary-Secondary Pumps
- 17 Air Handling Systems
- Energy Recovery Unit
- Air Conditioning Systems & Ductless Split Systems



START & END DATES
11/2013–10/2016

SIZE
233,500 SF

COST
Construction: $18 Million
Commissioning: $40,000

RMF RESPONSIBILITY
Commissioning

REFERENCE
Mr. Harry Miller
Assistant Supervisor, Planning & Construction
Harford County Public Schools
102 S. Hickory Ave
Bel Air, MD 21014
410.809.6120
harry.miller@hcps.org

PROJECTS SIMILAR IN SIZE

New Science Building LEED® Enhanced Commissioning

Towson University | Towson, MD

The new building has the infrastructure to support world-class scientific research and discovery and supports the accelerated enrollment and research growth in the Fisher College of Science and Mathematics. A key feature of the facility is an outdoor classroom connecting to an adjacent arboretum to provide opportunities for experiential learning in biology and environmental science. The complex also includes a rain garden for storm water control, planetarium, observatory, rooftop greenhouse, museum and a vivarium. RMF provided commissioning services to all MEP and building controls systems. The new facility has the infrastructure to support modern teaching and research, plus space for all Towson students, who will take at least one course there to fulfill core requirements. RMF self-performed hands-on commissioning of the Automated Logic Corporation BAS Control system.

START & END DATES
6/2017–8/2021

SIZE
316,000 SF

COST
Construction: $144 Million
Commissioning: $340,000

RMF RESPONSIBILITY
Commissioning

REFERENCE
Mr. Timothy Rucinski, PE, CCP, CxA
Commissioning Manager
University of Maryland, Baltimore
620 W. Lexington St.
6th Floor, Rm 6124
Baltimore, MD 21201-1531
410.706.5876
trucinski@umaryland.edu

CONTRACTOR PRIOR EXPERIENCE CONT'D

Renovation of Building 307

US Department of Agriculture | Beltsville, MD

This total renovation to the interior of Building 307 at the Beltsville Agricultural Research Center (BARC) included replacement of all MEP systems, along with new architectural enhancements/ finishes and major building and fire code updates. The 1930's-era building had been abandoned for approximately 20 years; all interior architecture and MEP system renovations were designed in accordance with the Maryland Historic Trust to retain its historic characteristics. All MEP systems were replaced with state-of-the-art energy efficient systems, along with new water, sanitary sewer and electrical service. RMF provided civil, structural and MEP and fire protection design services and delivered design-build bridging documents, prepared a structural evaluation of the building, and designed new floor penetrations for additional stairs and elevator to meet current code requirements. RMF also provided LEED Enhanced Cx services for this project. Commissioned systems included:

- Air Handling Units
- General Exhaust Fans & Stairwell Pressurization Fans
- Chilled Water system
- Hot Water System
- Energy Recovery Ventilator
- Variable Refrigerant Flow Air Conditioning Units
- Fan Coil Units
- Air Terminal Units
- Domestic & Lab Hot Water Generation & Distribution System
- Packaged Laboratory Vacuum Pump System
- Power Distribution System
- Lighting Controls Systems
- Diesel Generator Set
- Automatic Transfer Switch & Docking Station
- Panelboards and Receptacles

- **START & END DATES**
  12/2018–10/2022 (est.)
- **SIZE**
  80,000 SF
- **COST**
  Construction: $33 Million
  Commissioning: $120,000
- **RMF RESPONSIBILITY**
  Civil/Structural/MEP & FP Design, Bridging Documents, Structural Evaluation, Commissioning
- **REFERENCE**
  Ms. Sandra Sadler
  Program Analyst
  Capital Investment, Asset Mgmt. & Modernization Branch
  USDA, ARS, FD, CIAMB
  5601 Sunnyside Avenue
  GWCC-BLTSVL
  Beltsville MD 20705-5124
  301.504.1204
  sandra.sadler@usda.gov

New Residence Hall & Bookstore Commissioning

Bloomsburg University | Bloomsburg, PA

The objective of this project was to commission the orderly transfer of the new 163,000 SF residence hall and bookstore (renamed to Soltz Hall) building, components and systems to beneficial use by Bloomsburg University. RMF provided enhanced quality assurance to assist in the achievement of primary project goals. Commissioning was applied throughout construction, final acceptance and turnover phases for beneficial use by the University. The scope of commissioning work focused primarily on Mechanical, Electrical and Plumbing (MEP) systems. Systems commissioned included:

- Chiller
- Cooling Tower
- Chilled Water Pumps
- Condenser Water Pumps
- Steam to Water Heat Exchangers – Shell & Tube
- Steam to Water Heat Exchangers – Plate & Frame
- Fan Coil Units (qty. 68)
- Energy Recovery Units (ERU-1 & ERU-2)
- Single Zone VAV AHU (qty. 4)
- Multi Zone VAV AHU and 7 VAV Boxes
- Kitchen Exhaust Fans and Make-up Air Unit
- Ductless Split Systems (qty. 11)
- Finned Tube Radiator & Unit Heaters (qty. 10)
- Building Automation System
- Lighting Control System

- **START & END DATES**
  9/2016–8/2017
- **SIZE**
  163,000 SF
- **COST**
  Construction: $47.7 Million
  (RMF does not disclose fees negotiated directly with Owners)
- **RMF RESPONSIBILITY**
  Commissioning
- **REFERENCE**
  Mr. Ed Gunshore
  Project Manager, Planning & Construction
  Bloomsburg University of Pennsylvania
  400 E. Second Street
  A/P Waller Bldg, Room 18
  Bloomsburg, PA 17815-1301
  507.389.4000
  egunshore@bloomu.edu

PROJECTS SIMILAR IN BUILDING TYPE AND COMPLEXITY

Commissioning Services for Joppatowne High School Limited Renovation

Harford County Public Schools | Joppatowne, MD

Joppatowne High School was built in 1973 and had not received any major upgrades since. The project consists primarily of an HVAC renovation but also includes plumbing systems, emergency generator, electrical service upgrade, and a building automation system. Construction will be phased over two years. RMF's commissioning team will provide 3rd party verification of the building's MEP systems and a big picture view of HVAC building operations at completion of the renovations. The commissioning scope of work includes:

Design Phase

- Prepare design phase Cx plan
- Design Ph. Cx kickoff meeting
- Meet with owner, designer, & O&M staff to develop OPR
- Attend (3) design Ph. meetings
- Develop Cx specifications
- Review 50% design documents
- Review 95% design documents

Construction Phase

- Prepare design phase Cx plan
- Develop Prefunctional checklists (PFCs)
- Develop Functional performance tests (FPTs)
- Const. Ph. Cx kickoff mtg.
- Review submittals of Cx systems equipment
- Review final O&M training plan, HVAC system flushing plan, Duct Leakage test results, and Test & Balance work plan as submitted by contractor(s)
- Witness major equipment start-ups
- Review/Audit contractor completed PFCs
- Direct contractor demonstrations of FPTs
- Review of TAB report
- Periodic progress meetings

Commissioning Deliverables

- Project Owner's Project Requirements (OPR)
- Design & Const. Ph. Cx Plan
- Cx Specifications
- Project Specific PFCs
- Project Specific FPTs
- Cx Meeting Agenda & Minutes (as required)
- Cx Site Visit Memos (as required)
- Cx tracking Issues Log
- Cx Report

- **START & END DATES**
  11/2019–8/2022 (est.)
- **SIZE**
  126,045 SF
- **COST**
  Construction: $8 Million
  Commissioning: $39,750
- **RMF RESPONSIBILITY**
  Commissioning
- **REFERENCE**
  Mr. Chuck Grebe
  Assistant Supervisor
  Harford County Public Schools
  102 S. Hickory Ave
  Bel Air, MD 21014
  410.638.4211
  chuck.grebe@hcps.org

Science Center Retro-Commissioning

Oberlin College | Oberlin, OH

In support of Oberlin College's commitment to environmental sustainability and the reduction of energy consumption, the College contracted RMF to begin one of the first retro-commissioning projects on campus, the Science Center. A 229,000 SF academic building containing offices, laboratories, greenhouses and animal research labs, the Science Center was extensively renovated in 2000, when three existing buildings of different ages and a new addition were combined into one building. RMF's retro-commissioning scope included performing a detailed energy survey, identifying system deficiencies and energy savings solutions, and providing an implementation approach and plan for system upgrades and/or replacements. We also performed peer-review of Oberlin's 10-year carbon neutrality plan and reviewed HVAC operation of all buildings on campus including the Williams Field House, the Knowlton Athletics Complex, and the Philips Physical Education Center/ Heisman Field House. Systems commissioned included the following:

- Air handling systems
- Air terminal units, supply & exhaust
- All equipment of the heating, ventilating and air conditioning systems
- Fan coil units
- Exhaust air systems
- Chilled water systems
- Process cooling systems
- Laboratory fume hoods & exhaust systems
- Laboratory vacuum system pumps
- Animal room performance testing
- Heating hot water systems
- Domestic hot water heating systems
- Building automation systems (controlled devices, sensors, control loops, logic & graphical user interface)
- Plumbing systems (incl. rain water harvesting)
- Electrical systems
- Normal & emergency power

CONTRACTOR PRIOR EXPERIENCE CONT'D

- Testing, Adjusting & Balancing (TAB) review/verification
- Scheduled or occupancy sensor lighting controls
- Daylight dimming controls
- Lighting controls & dimming systems
- Decentralization of campus heating systems
- Domestic and process water pumping & mixing systems
- Indoor Air Quality (IAQ) – Ventilation & Air Change Rates (ACH)
- Smoke Exhaust/Control System

RMF completed the following commissioning tasks:

- Wrote commissioning plan
- Wrote functional test procedures
- Witnessed and documented functional tests
- Performed functional tests (hands-on)
- Used data loggers or trend logs for testing
- Developed staff training

- **START & END DATES**
  12/2015–4/2018
- **SIZE**
  229,000 SF
- **COST**
  Commissioning: $95,000
- **RMF RESPONSIBILITY**
  Commissioning

- **REFERENCE**
  Ms. Meghan Riesterer, CEM, LEED AP
  Assistant Vice President, Campus Energy & Sustainability
  Oberlin College
  Service Building 209
  173 W. Lorain St.
  Oberlin, OH 44074
  440.309.8872
  meghan1@alum.mit.edu

New Basketball Arena Commissioning

Auburn University | Auburn, AL

The new 243,792 SF Auburn University Basketball Arena, with an approximate capacity of 9,600 people, includes over 29,000 SF of student-athlete space, a two-court practice facility, coaches' offices, Athletic Ticket Office, AU Team Store, the relocated Lovelace Museum, and two food courts along with many other amenities. With over 12,000 SF of banquet/entertainment space, its design affords ready adaptation into a site for concerts and other events. On-campus student housing is being constructed adjacent to the new arena, creating a unique "student village" experience.

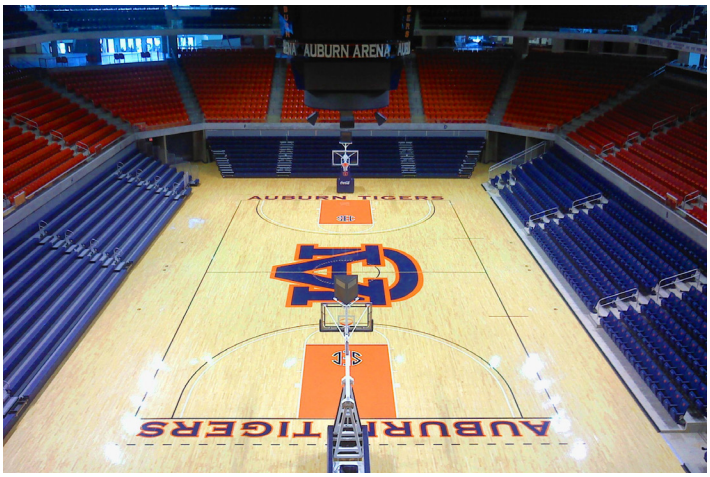
RMF performed formal commissioning services through the design and construction phases. The systems commissioned included:

Design Phase

- Central Building Automation System
- All Equipment for HVAC Systems
- Lighting Controls
- Emergency Power Generator & Automatic Transfer Switching
- Life Safety Systems (Fire Alarm, Egress Pressurization, Fire Protection)
- Domestic and Process Water Pumping and Mixing Systems
- Paging Systems
- Plumbing

Construction Phase

- Central Building Automation System
- All Equipment for HVAC Systems



- **START & END DATES**
  2/2008–9/2011
- **SIZE**
  243,792 SF
- **COST**
  Construction: $92.5 Million
  Commissioning: $208,000
- **RMF RESPONSIBILITY**
  Commissioning

- **REFERENCE**
  Mr. Dan Whatley
  Asst. VP, Facilities Operations
  Auburn University
  1161 West Samford Avenue
  Auburn, AL 36849-5514
  334.844.7411
  wdw0013@auburn.edu
  (The contact most familiar with the project has left AU)

B.

UNDERSTANDING PROJECT REQUIREMENTS

WEST CHESTER UNIVERSITY | STURZEBECKER HEALTH SCIENCES CENTER

The Pennsylvania Department of General Services is soliciting commissioning services for the renovation of the 209,000 SF building which houses most of the College of Health Sciences, offices of the Dean of the College, the departments of Nutrition, Health, Kinesiology, Sports Medicine, research areas and a portion of the University's Athletic Program. The project consists of building renovation and coordination with a campus electrical infrastructure project.

The project requires design and construction phase commissioning services. The total project construction duration is 20 months with a target completion month of February 2025.

The role for RMF as the commissioning provider is to work along with the design team and lead contractors to ensure that the facility is renovated per Owner Project Requirements (OPR), per design and that a functional and serviceable building is handed over to the owner on time and under budget.

A. DESIGN PHASE

The commissioning tasks and deliverables during the design phase are as follows:

- Facilitate an Owner's Project Requirements (OPR) workshop & develop a project OPR
- Design Reviews will be included on the DD and CD submissions and will include a back-check of all commissioning comments
- Develop and provide commissioning specifications

B. CONSTRUCTION PHASE

The commissioning tasks and deliverables during the construction phase are as follows:

- Perform submittal review
- Attend construction meetings
- Conduct commissioning meetings
- Conduct construction observations and witness testing
- Maintain a master commissioning issues & resolution log
- Develop a systems manual
- Develop pre-functional test forms
- Develop functional performance tests and direct testing
- Review training plans and records
- Develop an end of warranty commissioning report
- Develop a preliminary and final commissioning report
- Develop and administer a building occupant assessment to at least ten (10) occupants on each floor to survey comfort for (at least): Acoustics, Indoor Air Quality, Lighting, Thermal Comfort; provide a document with the survey results and develop an implementation plan to provide corrective action.

B | UNDERSTANDING PROJECT REQUIREMENTS

The objectives of the commissioning process during the construction phase are listed below:

- Building assembly systems including building shell, exterior wall assemblies and roof assemblies. This is likely limited to a new vestibule and a few wall penetrations
- Protective systems including fire suppression and fire alarm systems
- Plumbing systems including domestic hot water systems
- Heating, Ventilating, Air Conditioning and Refrigeration systems (HVAC) including geothermal/geo-exchange, heat generation, refrigeration, ventilation and HVAC control systems
- Electrical systems including power distribution, lighting and controls and emergency generator systems
- Electronic Safety & Security Systems including Security, Alarm and Detection Systems

C. PROJECT CHALLENGES – **COMMISSIONING SCHEDULE**

RMF's experience tells us that the commissioning provider must have a primary role in assisting the Contractors to develop a realistic project schedule. Often, enabling activities for Functional Performance Testing are not on everyone's radar. As a commissioning provider RMF understands all steps leading up to system readiness.

To assist the team in improvement of the scheduled project delivery to Pennsylvania DGS and West Chester University, RMF will incorporate the use of FPT Readiness Tracking documents as part of commissioning meetings to identify when a system is ready for testing as early as possible.

FPT Tracking Example

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BUILDING 30 - FPT Tracking Document

Color Key
Activity Not Started
Activity In Progress
Activity Complete
Not Applicable

Priority	Equipment	Description	Permanent Power	Startup	TAB - Air	TAB - Water	JCI Point-2-Point	3rd Party Calibration[1]	PFC	Ready for FPT
Mechanical Systems										
1	PCH-30A-N173-1	Air Cooled Chiller		07/29 - pre-start						No
2	RTU-30A-N173-1	Rooftop Unit	21-Jun	21-Jul						No
2	RTU-30A-N173-2	Rooftop Unit	21-Jun	21-Jul						No
3	EF-30A-N173-1	Exhaust Air Fan								Yes
3	Hydrogen Sensor	Hydrogen Sensor								
3	Oxygen Depletion Sensors	Oxygen Depletion Sensors								No
3	GF-30A-N173-1	Glycol Feeder								No
Electrical Systems										
1	DG1-30A-N1732[2]	Diesel Generator		4-Aug						No
1	ATS1-30A-N173	Automatic Transfer Switch	14-Jun	4-Aug						
3	UPS1-30A-N173	Uninterruptable Power Supply		4-Aug						No
2	MDP1-30A-N173	Panelboard	14-Jun							
2	NPLC-30A-N173	Panelboard	29-Jun							No
2	UPLC-30A-N173	Panelboard	29-Jun							
3	Lighting Controls	Lighting Controls								No
Specialty Test										
	Black-Out Test	Black-Out Test								

Note 1: Client utilizes a 3rd party agency to calibrate hydrogen and oxygen depletion sensors.
Note 2: Per NFPA 110, the generator needs to be load bank tested and run with building load. This typically cannot be completed at the same time and may require 2 separate days of testing.

D. PROJECT CHALLENGES – **SEASONAL TESTING**

The current project schedule has the majority of HVAC system completion occurring in heating season. Seasonal testing of systems will need to be conducted in the summer months to prove system performance.

When RMF is confronted with this challenge our approach is to test all systems to the extent possible when a system is ready. RMF will test cooling systems even in heating season to see how the equipment responds even when design conditions are not present. RMF will then address further testing requirements with the project team.

WHY RMF?

RMF's refined commissioning approach, philosophy and extensive range of experience will aid in the highest level of operational quality for the engineered systems critical to The Department of General Services' project at West Chester University's Sturzebecker Health Science Center.

RMF offers unique qualifications & professional services for this project:

» **Over 30 years** of specialized experience in commissioning

» **Extensive Higher Education** & State Government Cx experience

» **Dedicated team** to perform commissioning

» **Highly qualified, accredited** commissioning professionals

» **Proven schedule adherence**–ability to meet the Occupancy Date

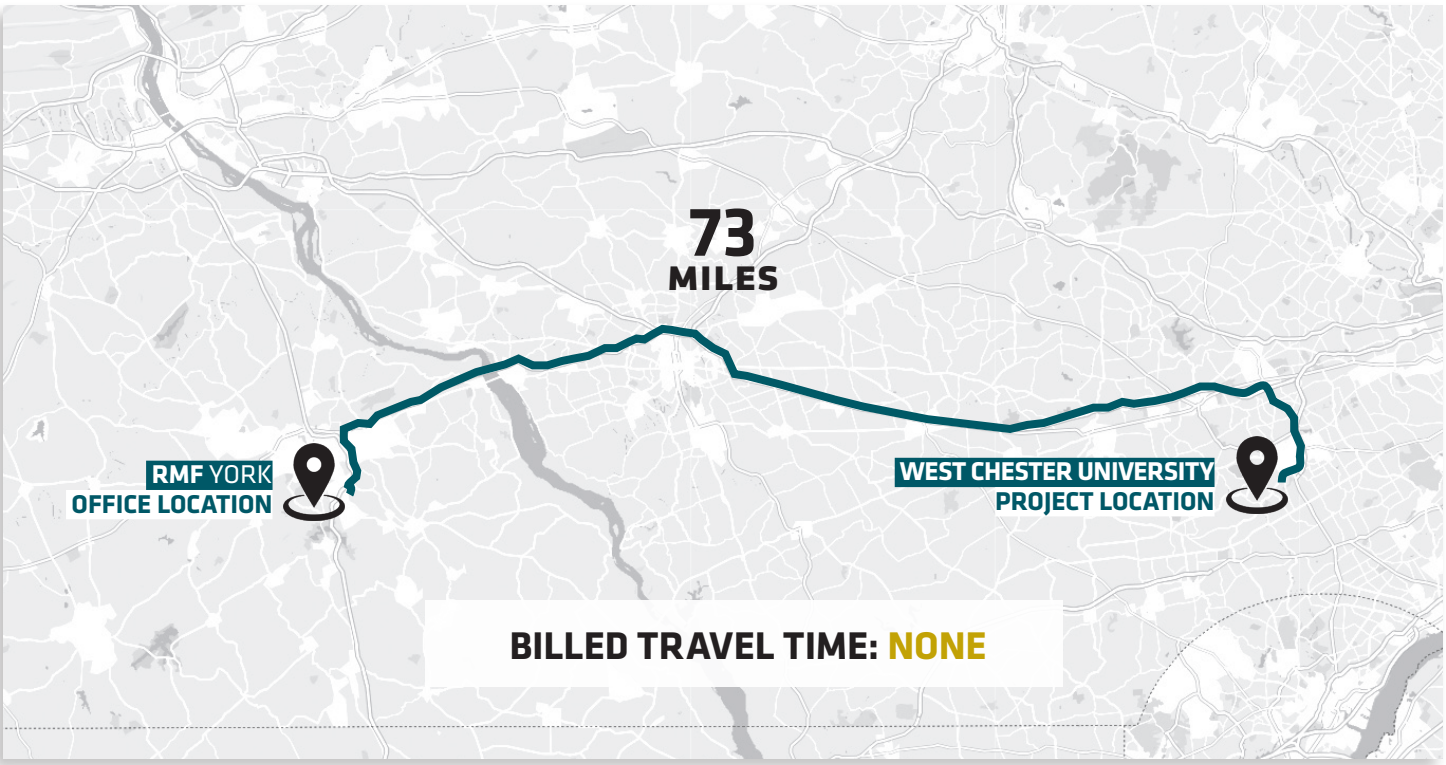
» **Focus on energy-efficiency** in commissioning

» **Total Quality Management/Assurance** that will benefit Pennsylvania Department of General Services & West Chester University

» **Computer aided documentation services** to provide enhanced training/record materials

C.

GEOGRAPHIC LOCATION



RMF's York Office is **73 miles** in proximity to West Chester University, which is 1.5 hours in travel time.

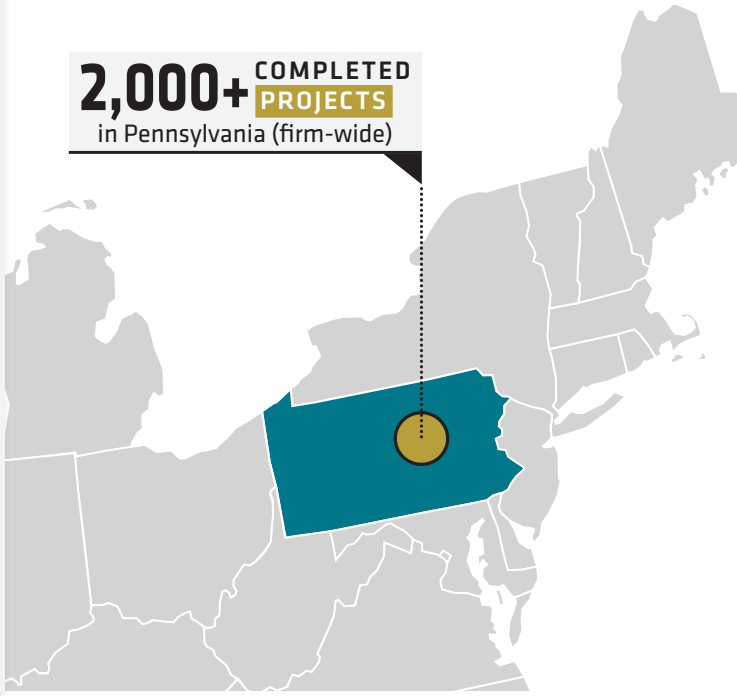
RMF's Baltimore Office is **91 miles** in proximity to West Chester University, which is also approximately 1.5 hours in travel time.

Our firm has a strong presence in Pennsylvania, with commissioning agents, engineers and designers having worked for:

- **Pennsylvania Department of General Services**
- **West Chester University**
- Bloomsburg University
- Shippensburg University
- Pennsylvania State University
- Pennsylvania State University Milton S. Hershey Medical Center
- University of Pennsylvania
- Franklin & Marshall College
- Indiana University of Pennsylvania
- Temple University
- Villanova University
- Widener University
- Millersville University
- Drexel University

RMF has provided commissioning & engineering services throughout Pennsylvania for over 30 years

2,000+ COMPLETED PROJECTS
in Pennsylvania (firm-wide)



D.

PROJECT WORK PLAN

COMMISSIONING PROCESS

The primary goal of the commissioning process is to deliver a client's project on time, with energy efficient operational systems that satisfy the designer's intent and meet the owner's program requirements.

It is understood that the commissioning process must be flexible to meet the ever-changing needs inherent in technologically complex systems. The commissioning plan is refined to respond to evolving, project specific requirements as the owner's program is being developed, as the project moves through the design phase and during the construction phase.

RMF's role in providing third-party commissioning is outlined within this qualifications package.

A. DESIGN PHASE

The design phase includes progressive reviews of design documents (SD, DD, CDs, etc.). The documents will be examined for completeness, constructability, systems integration and adherence to the OPR. The key objectives of the commissioning process during the design phase are to:

- Perform design review of construction documents
- Review Basis of Design (BOD) and OPR
- Develop commissioning specifications
- Provide design phase Commissioning Plan
- Attend pre-construction meeting

The commissioning specifications will be developed as part of the project technical specifications, to contractually implement the post-design phases of the process. The commissioning specification provides a detailed description of the scope and objective of the commissioning process during the construction, acceptance and post-acceptance phases of a project. It must specify the scope of work, roles, responsibilities and requirements of each commissioning team member. RMF will prepare this specification as part of the technical contract specifications, with review and input from the designer and owner. Specific commissioning specifications will be tailored to the individual contractor work packages.

The commissioning specifications will detail the acceptance phase procedures for verification and functional performance testing, as well as other required acceptance phase procedures. It must include a list of equipment and systems to be evaluated, along with checklist formats and sample test forms to clarify requirements. These forms are intended to be furnished by RMF.

The scope of work in the commissioning specification will identify the required skills and qualifications of the commissioning team, including operation and maintenance personnel. It will include a section for each trade involved in the construction of the building systems, detailing their scope of work in the process as defined in the division one commissioning specification.

B. CONSTRUCTION PHASE

The objectives of the commissioning process during the construction phase are listed below:

- Perform commissioned systems submittal reviews
- Conduct construction phase commissioning kickoff meeting with the contractor
- Integrate commissioning milestones into construction schedule
- Develop and deliver Pre-functional checklists (PFC)
- Perform site visits and progress inspections
- Witness start-up of key commissioning equipment
- Maintain commissioning issues log tracking document for identified commissioning action items
- Perform verification of installation progress & PFC status review
- Conduct commissioning meetings as needed

D | PROJECT WORK PLAN

C. ACCEPTANCE PHASE

During the acceptance phase of the commissioning process, verification, functional performance tests and other acceptance procedures will take place. RMF will be present for systems' functional performance tests and on critical equipment checks and tests. The objectives are to:

- Review TAB Report
- Perform functional performance testing of commissioned systems demonstrated by the contractor
- Conduct commissioning meetings as needed
- Perform Building Automation System (BAS) graphics review
- Monitor and report on training for O&M staff
- Review submission of O&M manuals
- Provide commissioning record/report

Functional performance testing will include tests of individual components of the central equipment and systems. "Dynamic Testing" of these systems will be performed to challenge the system against the intended operation. The primary goal of dynamic testing is to demonstrate how systems will function during real world conditions not just strategic operation. As each individual check or test is accomplished, physical responses of the system will be observed and compared to the specified requirements in order to verify the test results. During functional performance testing of the MEP systems, a failure in performance of a part of the system or of a component may be revealed. Any performance deficiencies will be documented on the commissioning issues log and assigned to the responsible parties' attention.

At the end of the acceptance procedures, the system will have been proven and documented to be operational and performing in accordance with the contract documents, including all normal operational modes and abnormal or emergency conditions. While the bulk of the effort will fall to RMF as the commissioning agent during this period, it is recommended that the designers be present and provide input at the critical stages, including the functional performance tests of the main energy production and distribution systems. This will aid in completing the testing in a timely manner, providing immediate feedback in some cases, should questions arise during the work.

Theory of operation

- Basic concept
- Energy efficiency
- Seasonal modes of operation
- Emergency conditions & procedures
- Types of systems
- System operations
- Operating parameters

Use of control system

- Sequence of operation
- Problem indicators
- Diagnostics
- Corrective actions
- Modification procedures
- Use of reports and historian
- Service, maintenance, diagnostics & repair

D. POST ACCEPTANCE PHASE

Post acceptance phase commissioning is the continued adjustment, optimization and modification of the building and utility systems to meet specified requirements. It includes updating documentation to reflect minor adjustments, system maintenance and calibration, major system modifications and provisions for ongoing training of operations and maintenance personnel. The objective of warranty phase commissioning is to maintain the performance of the systems throughout the useful life of the facility. RMF will offer recommendations for this work, as part of the final Commissioning Report.

- Perform any required seasonal testing
- Perform 10-month review and facility staff interview/meeting
- Review systems building performance trend data
- Identify any problems or warranty issues
- Determine if staff needs additional training
- Provide supplement to final commissioning record/report

ANTICIPATED HOURS REQUIRED FOR SCOPE OF WORK

DESIGN PHASE	HRS
Owner's Project Requirements (OPR)	10
Commissioning Plan	6
Design Reviews & Meetings	40
Commissioning Specifications	8
CONSTRUCTION PHASE	**HRS**
Final Commissioning Plan	4
Commissioning Kick-off Meeting	8
Commissioning Coordination	4
Submittal Reviews	48
Preliminary O&M Review	8

CONSTRUCTION PHASE	HRS
Commissioning Meetings	70
Construction Meetings	30
Commissioning Issues Log	8
Pre-functional Checklists	16
Pre-functional Testing	16
Equipment Start-up	16
Start-up Documentation Review	8
Functional Performance Procedures	40
Functional Performance Testing	80
Retesting of Failed Systems	16

TRAINING PHASE	HRS
Verify Owner Training	24
WARRANTY PHASE	**HRS**
End of Warranty Cx Report	32
FINAL DOCUMENTATION	**HRS**
Create Commissioning Report	64
Generate Systems Manual	48
TOTAL	**604**

D | PROJECT WORK PLAN

MILESTONE SCHEDULE

DESIGN PHASE: COMMISSIONING SERVICES AWARD THRU 04/2023

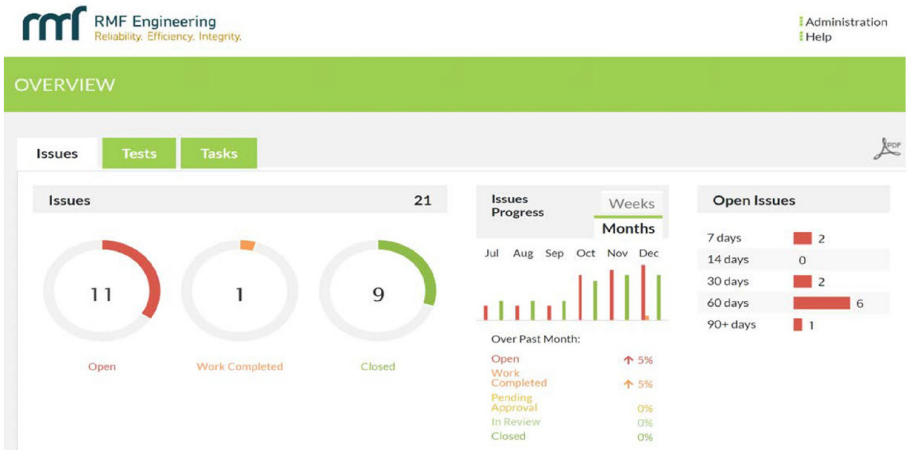
1. Perform design review of construction documents
2. Review basis of design and OPR to ensure commissioned systems meet intent
3. Develop full commissioning specifications
4. Provide commissioning plan
5. Coordinate design phase controls integration meeting
6. Conduct design phase commissioning meeting and integrate commissioning milestones into construction schedule

CONSTRUCTION PHASE: 07/2023 THRU 02/2025

1. Perform commissioned systems submittal reviews
2. Conduct Construction Phase commissioning kickoff meeting with the contractors
3. Develop and provide Pre-functional Checklists (PFC) commissioning documents for contractor use
4. Perform site visits and progress inspections
5. Witness start-up efforts of commissioned systems
6. Maintain commissioning issues log tracking document for identified commissioning action items
7. Perform verification of installation progress and PFC status review
8. Conduct commissioning meetings as needed

ACCEPTANCE PHASE: 09/2024 THRU 02/2025 (coincides with the later part of the construction phase)

1. Perform Functional Performance Testing (FPT) of commissioned systems
2. Conduct commissioning meetings as needed
3. Perform Building Automation System (BAS) graphics review
4. Perform O&M review
5. Monitor and report on training of O&M staff
6. Provide final Building Maintenance Plan deliverable
7. Provide Commissioning Report



FACILITY GRID

Facility Grid Commissioning Management software allows complete commissioning process transparency to the project team 24/7. Each team member is granted permission to access the shared site for documents transfer, pre-functional checklist development and execution, functional performance testing and issues log tracking.

At any point in time, the Owner as well as all project team members have full read access to the progress dashboard to know the status of the commissioning process and the individual tasks associated within. Contractors have access to complete PFC's, perform pre-verification testing (PVT) of systems, as well as reading and responding to action items assigned to them. This seamless approach reduces delays and documents communication for all to see.

E.

CONTRACTOR PERSONNEL + QUALIFICATIONS

TEAM ORGANIZATION

Our team will be led by Jeremy Bartlett. Mr. Bartlett brings the unique ability to quickly understand a project's complexity, the site constraints and the impacts.

Cx PRINCIPAL IN CHARGE
JAMES GIVENS, CxA, EMP, CQM

Cx PROJECT MANAGER / MECHANICAL Cx SPECIALIST
JEREMY BARTLETT, CxA, CCP, CQM

MECHANICAL DESIGN REVIEWER
DAVID BROWN, PE, CxA, BCxP

ELECTRICAL Cx SPECIALIST
JONATHAN LOGUE, CxT, BCxP, CQM

Cx TECHNICIAN
STEVEN PETTIE, CQM

A partnership you can rely on

The fastest-growing sector of our business has been commissioning and operator training and assistance. RMF has provided expanded construction phase services to enhance the commissioning phase on numerous projects. RMF's role has included the complete commissioning process for local and state government, educational, healthcare, and commercial clients.

2021 International Energy Conservation Codes

RMF's commissioning team is very familiar with the 2021 International Energy Conservation Code and has designed as well as commissioned systems in accordance with this program.

JAMES GIVENS, CxA, EMP, CQM

Cx PRINCIPAL-IN-CHARGE

Mr. Givens leads RMF's Field Services Division and has over 28 years of practical experience providing building construction and commissioning services on renovation projects and new construction for higher education, laboratory, commercial, government, healthcare and industrial facilities. In addition, he maintains active membership with several organizations within the commissioning services industry and recently served as a Board Member for his local BCA chapter.

MEP systems integration and condition assessment is a primary area of focus for Mr. Givens. His background in commissioning services and extensive field experience enable him to effectively evaluate system performances and provide opportunities for improvement and optimization with regard to engineered principles, energy audits and retro/re-commissioning scopes. He has dedicated his career to the design, construction and commissioning of state-of-the-art laboratory and research facilities.

» YEARS EXPERIENCE

With Current Firm: 24

Total: 28

» CERTIFICATIONS

Certified Commissioning Authority (ACG) **(Registration # 1009-565)**

Energy Management Professional

Construction Quality Management (USACE)

» EDUCATION

Technical education in the trades with over 28 years of collective experience

» PUBLICATIONS

"Ten Considerations for Conducting a Health Care Facility Assessment" *Health Facilities Management*, 2014

IECC INTERNATIONAL ENERGY CONSERVATION CODE

As our project team's certified Energy Management Professional, Mr. Givens routinely reviews system designs against the requirements of the International Energy Conservation Code (IECC). He then evaluates system operation during Construction and Acceptance phases to ensure systems operate efficiently and per design.

RELEVANT PROJECT EXPERIENCE

New Residence Hall & Bookstore Commissioning
Bloomsburg University

Science Center Renovation Retro-commissioning
Oberlin College

New Science Center Commissioning
Towson University

Thurston Hall Commissioning
The George Washington University

Commissioning Services for the Andrew W. Breidenbach Environmental Research Center
US Environmental Protection Agency

New Visual Arts Building Commissioning
Franklin & Marshall College

Kehr Union Building Commissioning
Bloomsburg University

Health Science Campus ULAR Commissioning
Temple University

Enhanced Commissioning Services for the New Science Technology Building
State University of New York at Fredonia

New Medical Research & Translation Building/Support Tower Commissioning
State University of New York at Stony Brook

New Paltz & Warrensburg Regional Office Re-Commissioning
New York State Office of General Services

Enhanced Commissioning Services for Walsh Medical Center G Wing Addition
New York State Office of General Services

City Office Building Commissioning
City of Schenectady

New School of Pharmacy Addition Commissioning
Notre Dame of Maryland University

Center for Advanced Research in Biotechnology Commissioning
University of Maryland Biotechnology Institute

Enhanced Commissioning for New College of Liberal Arts Building
Towson University

Corcoran School of Arts Commissioning
The George Washington University

New Academic Building Commissioning
Radford University

New Bioinformatics Institute Commissioning
Virginia Polytechnic Institute and State University

JEREMY BARTLETT, CxA, CCP, CQM

Cx PROJECT MANAGER / MECHANICAL Cx SPECIALIST

Mr. Bartlett is a controls engineer with over 19 years of experience working with building automation systems (Automated Logic and Johnson Controls). He is experienced with new construction and renovation controls installation projects, with a focus on higher education and state/local government facilities. His experience includes controls programming and maintenance, creating functional punch lists, performing functional performance tests, troubleshooting building control systems and testing and balancing issues that arise during testing of building systems.

Mr. Bartlett has a vast knowledge of the automated temperature controls (ATC) process and hands-on experience in the verification of ATC work including the review of controls programming logic and functional operation. He has excelled in performance testing and commissioning of engineered systems such as HVAC, laboratory, fume hood, fire protection, life safety, plumbing and process systems. He routinely is tasked with the point-to-point verification and calibration of control systems as well as the spot-checking of TAB readings. While with Johnson Controls, he created a customized database for the Penn State Hershey Medical Center to track not only testing records, but operation of fire alarm and smoke control systems for the entire campus. This database was used to review system operation during the accreditation renewal process with The Joint Commission.

RELEVANT PROJECT EXPERIENCE

New Residence Hall & Bookstore Commissioning
Bloomsburg University

New Science Building LEED® Enhanced Commissioning
Towson University

Fallston High School HVAC Commissioning
Harford County Public Schools

Thurston Hall Commissioning
The George Washington University

Science Center Renovation Retro-Commissioning
Oberlin College

Commissioning Services for the Andrew W. Breidenbach Environmental Research Center
US Environmental Protection Agency

Kehr Union HVAC Renovation Commissioning
Bloomsburg University

Health Science Campus ULAR Commissioning
Temple University

New Visual Arts Building Commissioning
Franklin & Marshall College

New Medical Research & Translation Building/Support Tower Commissioning
State University of New York at Stony Brook

Enhanced Commissioning Services for the New Science Technology Building
State University of New York at Fredonia

New Paltz & Warrensburg Regional Office Re-Commissioning
New York State Office of General Services

Enhanced Commissioning Services for Walsh Medical Center G Wing Addition
New York State Office of General Services

Corcoran School of Arts Commissioning
The George Washington University

Mr. Bartlett worked with Pennsylvania Department of General Services facilities for six (6) years while a contractor with Johnson Controls (JCI) in Central Pennsylvania.

» YEARS EXPERIENCE

With Current Firm: 10
With Other Firms: 9
Total: 19

» CERTIFICATIONS

Certified Commissioning Authority (ACG) **(Registration # 515-1312)**

Certified Commissioning Professional (CCP) **(Registration # 609)**

Construction Quality Management (USACE) **(Registration # NAO-07-20-00952)**

» EDUCATION

Certification, 2002, Network Administration, Brick Computer Science Institute

» TRAINING

Automated Logic Corporation WebCTRL

Tridium Niagara AX Certification

Eaton/Cutler Hammer – Certified VFD Startup Technician

» PUBLICATIONS & PRESENTATIONS

"Oberlin College Re-commissions Four-Building Fusion Project During Occupancy", *RetroFit Magazine,* March 12, 2018

"CX & the Impact on District Energy", IDEA, 2017

"Effective Building Automation Controls Integration", CxEnergy, 2017

"Existing Building Commissioning of the Oberlin College Science Center", NCBC High-Five, 2017

DAVID BROWN, PE, CxA, BCxP

MECHANICAL Cx ENGINEER

Mr. Brown is a mechanical engineer with 24 years of experience with mechanical systems design, construction administration and commissioning services. His experience includes HVAC, plumbing/fire protection, and utility systems for a variety of building types. He has worked on numerous educational projects ranging from colleges and universities to K-12 and teaching labs, as well as local and state government, federal government, and dining and recreation facilities. He routinely performs detailed field investigation to verify existing conditions and constructability of new work. His experience as a design professional and construction services administrator yields a keen understanding of the required commissioning effort and as such, he has been a key member of RMF's inspection and commissioning team.

Mr. Brown has written commissioning specifications, commissioning plans, installation checklists, functional testing procedures, prepared commissioning systems manuals, compiled system concept/O&M manuals, and energy resource management plans. He routinely submits project documents and has also provided operator systems training to client staff.

» YEARS EXPERIENCE

With Current Firm: 21

Total: 24

» CERTIFICATIONS

Professional Engineer **(MD: 45521)**

Certified Commissioning Authority (ACG) **(Registration #518-1649)**

Building Commissioning Professional (ASHRAE)

» EDUCATION

Bachelor of Science, 1993, Mechanical Engineering, University of Maryland, College Park

RELEVANT PROJECT EXPERIENCE

New Residence Hall & Bookstore Commissioning
Bloomsburg University

Andrew W. Breidenbach Environmental Research Center Commissioning
US Environmental Protection Agency

New Science Building LEED® Enhanced Commissioning
Towson University

Thurston Hall Commissioning
The George Washington University

New Visual Arts Building Commissioning
Franklin & Marshall College

New Medical Research & Translation Building/Support Tower Commissioning
State University of New York at Stony Brook

Campus Utility Capacity & Condition Plan
State University of New York at Stony Brook

Enhanced Commissioning Services for the New Science Technology Building
State University of New York at Fredonia

Enhanced Commissioning Services for Walsh Medical Center G Wing Addition
New York State Office of General Services

Mohawk Correctional Facility Commissioning & Construction Ph. Services
New York State Office of General Services

Sing Sing Prison Commissioning
New York State Office of General Services

Enhanced Commissioning for the New College of Liberal Arts Building
Towson University

Fallston Hall Renovation Commissioning
Harford Community College

Harriet Tubman Underground Railroad Visitors Center Commissioning
Maryland Department of General Services

Maryland Public TV Studio A Commissioning
Maryland Department of General Services

Corcoran School of Arts Commissioning
The George Washington University

New Academic Building Commissioning
Radford University

JONATHAN LOGUE, CxT, BCxP, CQM

ELECTRICAL Cx SPECIALIST

Mr. Logue has provided construction phase and commissioning services for universities, colleges, state and local governments, biotech, laboratory, healthcare, industrial, commercial and military facilities. He has a vast knowledge of the automated temperature controls (ATC) process and hands-on experience in the installation and verification of the ATC systems, as well as testing, adjusting and balancing (TAB) protocol. He has excelled in performance testing and commissioning of engineered systems such as HVAC, fume hood, fire protection, life safety, plumbing and process systems. He is routinely tasked with the point-to-point verification and calibration of control systems, as well as the spot-checking of TAB readings.

Mr. Logue's commissioning experience includes large HVAC systems for laboratory and healthcare occupancies with both constant and variable air volume systems. He provides the functional testing of space design conditions including temperature, humidity and pressurization. Mr. Logue has also provided detailed commissioning services and thermographic imaging on chemical fume hoods, uninterrupted power supply units, radiant heating systems, snow melt systems and computer room air conditioning units.

» YEARS EXPERIENCE

With Current Firm: 12

Total: 17

» CERTIFICATIONS

Certified Commissioning Technician (ACG) **(Registration # 083-1211)**

Building Commissioning Professional (ASHRAE) **(Registration # 8380762)**

Construction Quality Management (USACE)

Tridium Niagara 4 Technical Certification **(Certification # R-8087)**

» EDUCATION

Over 15 years of technical experience in the field

RELEVANT PROJECT EXPERIENCE

New Residence Hall & Bookstore Commissioning
Bloomsburg University

New Science Building LEED® Enhanced Commissioning
Towson University

Fallston High School HVAC Commissioning
Harford County Public Schools

Commissioning Services for Joppatowne High School Limited Renovation
Harford County Public Schools

Thurston Hall Commissioning
The George Washington University

Science Center Renovation Retro-commissioning
Oberlin College

Renovation of Building 307, Beltway Agricultural Research Center
US Department of Agriculture

Health Science Campus ULAR Commissioning
Temple University

Kehr Union Building Commissioning
Bloomsburg University

New Paltz & Warrensburg Regional Office Re-Commissioning
New York State Office of General Services

Enhanced Commissioning Services for Walsh Medical Center G Wing Addition
New York State Office of General Services

City Office Building Commissioning
City of Schenectady

Enhanced Commissioning for the New College of Liberal Arts Building
Towson University

Enoch Pratt Central Library Renovation Commissioning
Maryland Department of General Services

Retro/Re-Commissioning of Plant Sciences Institute 10A, Beltway Agricultural Research Center
US Department of Agriculture

Corcoran School of Arts Commissioning
The George Washington University

New Academic Building Commissioning
Radford University

STEVEN R. PETTIE, CQM
ELECTRICAL Cx TECHNICIAN

Mr. Pettie is a commissioning technician providing construction administration and commissioning services for numerous renovations and new construction projects serving higher education, K-12, state and local government, federal, laboratory, healthcare and commercial facilities.

Mr. Pettie performs testing and commissioning of engineered systems such as HVAC, laboratory exhaust systems, fire protection, life safety, plumbing and electrical systems. His responsibilities regularly involve design review, equipment submittal review, functional performance test development, system functional testing, troubleshooting of system issues, participation in coordination meetings and facilitating project team communication.

» YEARS EXPERIENCE

With Current Firm: 3
Total: 3

» EDUCATION

Bachelor of Science, 2017,
Electrical Engineering,
Frostburg State University

RELEVANT PROJECT EXPERIENCE

New Science Building LEED® Enhanced Commissioning
Towson University

Commissioning Services for Joppatowne High School Limited Renovation
Harford County Public Schools

Science Center Renovation Commissioning
Oberlin College

Thurston Hall Commissioning
The George Washington University

Renovation of Building 307, Beltway Agricultural Research Center
US Department of Agriculture

Medical Research & Translation Building/Support Tower Commissioning
Stony Brook University Hospital

Commissioning for George D. Lisby Elementary School
Harford County Public Schools

Commissioning for Roye-Williams Elementary School
Harford County Public Schools

Fallston Hall Renovation Commissioning
Harford Community College

Rockville District Courthouse Retro-Commissioning
Maryland Department of General Services

Enoch Pratt Central Library Renovation Commissioning
Maryland Department of General Services

Replacement of Arundel Elementary School Commissioning
MSA/Baltimore City Public Schools

Renovation & Addition of Dorothy I. Heights Elementary School Commissioning
MSA/Baltimore City Public Schools

Renovation & Addition of Robert Poole Middle School Commissioning
MSA/Baltimore City Public Schools

Maryland Public TV Studio A Commissioning
Maryland Department of General Services

Sandymount Elementary School HVAC Replacement Commissioning
Carroll County Public Schools

Commissioning for Applied Physics Lab HVAC Renovation
Johns Hopkins University

HVAC Commissioning
Advanced Biotechnologies, Inc.

RMF Engineering
Reliability. Efficiency. Integrity.