



October 22, 2018

Carlos Cardoso
Beyer Blinder Belle Architects & Planners
120 Broadway
New York, NY 10271

Re: Pre-design Mechanical and Electrical Feasibility Study
Garden City, St. Paul's School Adaptive Reuse

Dear Carlos:

We are pleased to offer consulting engineering services for the proposed adaptive reuse of the St. Paul's School in Garden City, NY. The project involves preservation of portions of the exterior façade, relocation of portions of the exterior façade, preservation and restoration of interior components, and a new addition. The new addition will include a multipurpose STEM space and hockey arena on the lower level as well as an indoor soccer field under a tensile structure on the upper level. Photovoltaics will be integrated in the roof construction. Concessions, circulation, egress, bathroom facilities, locker rooms and other support spaces will be incorporated in both the existing and new construction.

The purpose of this study is to develop a mechanical and electrical scope of work that meets the unique needs of this project and will be cost effective to construct and economical to operate. Sustainable design principles, including passive house strategies, will be incorporated into this project to optimize performance and maximize energy usage.

A. BASIC SERVICES

Toward this end, we intend to perform the following tasks:

1. Review existing architectural, mechanical and electrical drawings that may be available, including site utility drawings.
2. Field survey the visually accessible existing systems and building conditions.
3. Meet with key project representatives to determine expectations for the project, discuss approaches and options for the mechanical and electrical systems in the proposed building and reach a consensus on the most favorable system or systems for further investigation, based on budget, performance and other easily determined factors.
4. Perform a code analysis as it relates to the mechanical and electrical systems.
5. Coordination with the site/civil engineer for available and required utilities to serve the proposed loads.
6. Prepare preliminary HVAC load calculations for typical occupancies and zones, as well as the overall building.
7. Prepare preliminary electrical load calculations, based on the various mechanical schemes.
8. Develop a preliminary conceptual energy model for us in optimizing system selection, and building envelope strategies. Iteration of the model to optimizing selected items only (up to 8 separate runs are included in this proposal)

9. Based on our meetings with the team, generate feasible options for the mechanical and electrical systems. For each option, provide a brief written description, list its advantages and disadvantages and provide sizing information sufficient to allow an outside cost estimator or contractor to generate a rough estimate of construction cost.
10. Meet with key project representatives to present the feasible options that have been generated, answer questions and assist the team in making an informed choice of mechanical and electrical systems for the building.
11. Based on clear decisions at the above meeting, prepare a Basis of Design (BOD) document, including sketch drawings as required, that will show proposed equipment and riser locations and will form the basis for the cost estimate developed by the construction manager and beginning the design phase of the project.
12. Participate in four (4) project team meetings at the BBB office.
13. Attend three (3) community meetings to present the proposed project and answer any questions regarding the proposed MEP solutions.

Our final report will be in electronic copy ready form, for inclusion in your feasibility study.

B. INFORMATION REQUIRED TO PERFORM OUR SCOPE OF WORK

1. As-built drawings for the original building and site utilities.
2. Access to the building with a maintenance person to assist in our survey work.
3. Information about the concession equipment, hockey rink ice makers, and other anticipated equipment with implications for MEP services.
4. Basic building envelope performance parameters and assumed occupancy patterns for use in the conceptual energy modelling.

C. FEE, DIRECT COSTS AND ADDITIONAL SERVICES

The basis of compensation for basic services is to be a fixed fee of Fifty-Five Thousand Dollars (\$55,000) and is to be paid monthly, net 30 days.

Additional services that may become necessary during the course of this study and when specifically approved by your office, are also available at the rates listed below:

Senior Principal	\$250
Principal	\$200
Lead Engineer	\$180
Project Manager	\$180
Senior Engineer	\$150
Project Engineer	\$125
Senior Designer	\$125
Staff Engineer	\$115
Designer	\$100
Jr. Designer	\$75
Clerical	\$65

Reimbursable expenses incurred for the duration of this project, including postage, expedited delivery services, courier services, document printing/reproduction, tolls, and travel will be reimbursed at cost. Mileage charge will be reimbursed at the current IRS rate.

D. EXCLUDED SERVICES

1. Abatement of asbestos, PCBs or other hazardous materials. If a building material suspected of being hazardous is encountered during a field survey, BBA will notify the owner, who will then assume responsibility for all testing and abatement.
2. Energy modelling for LEED baseline comparison, or other energy modelling beyond the conceptual model indicated above.
3. Extensive life cycle analysis and value engineering.
4. Attendance at planning board or zoning board meetings or hearings.
5. Negotiations with utility companies.
6. Architectural services. Site/civil engineering services. Structural engineering services.
7. Roof drainage systems for the tensile structure. Stormwater management.
8. Ice rink systems design. (coordination of heat rejection and heat reclaim concepts is included)
9. Building envelope analysis and design including moisture migration calculations, vapor barrier placement and interstitial assembly ventilation.
10. Preparation of construction drawings and specifications to obtain bids from contractors for the proposed work. A proposal for these services will be provided after the feasibility study is completed and approved by the owner.
11. Cost estimating.

We can assure you that we appreciate the opportunity of working with Beyer Blinder Belle and Garden City on this exciting project. If the above terms, as well as our attached Standard Terms and Conditions are satisfactory, please return an executed copy of this proposal to our office.

Sincerely,



F. Bradley Randall, P.E., LEED AP
Principal

Attachment: BBA Standard Terms and Conditions

ACCEPTED  DATE 1-10-19

Ralph V. Suozzi Village Administrator

/BBA-Garden City Study_Prop



STANDARD TERMS AND CONDITIONS

These Standard Terms and Conditions are incorporated and made part of the attached proposal from Bruce E. Brooks & Associates (BBA) to the Client.

1. BBA represents to the Client that it is a professional organization and that all professional and related services provided under this agreement will be performed using the degree of care and skill ordinarily exercised by members of the profession currently practicing under similar circumstances. No other warranty, either expressed or implied, is made in connection with the services rendered under this agreement.
2. BBA may utilize specialized sub-consultants of its choosing in the performance of its obligations under this agreement, subject to approval by the Client, whose approval shall not be unreasonably withheld.
3. BBA shall perform its services as expeditiously as is consistent with professional skill and care and the orderly progress of the project.
4. BBA shall comply with all known applicable laws and regulations in the performance of its obligations under this agreement.
5. BBA shall not at any time have authority over the Contractor nor be responsible for construction means, methods, techniques or job site safety.
6. BBA shall not be responsible for services related to the discovery or abatement of asbestos, PCBs or other hazardous materials. If a material suspected of being hazardous is encountered BBA will notify the Client, who will assume responsibility for all testing and abatement.
7. BBA shall be entitled to rely on reports, drawings, instructions and other information provided by the Client in connection with this project, unless specifically notified otherwise. BBA shall provide prompt notice to the Client if it becomes aware of any errors, omissions or inconsistencies in such information.
8. Drawings, specifications, reports and other documentation prepared by BBA related to this project, including those in electronic form, are instruments of service and shall remain the property of BBA. Upon the Client's fulfillment of all obligations under this contract, including prompt payment of all sums due, BBA shall grant to the Client a nonexclusive license to reproduce the documents for the sole purpose of construction and maintenance of this project and this project alone.
9. Any estimate of probable construction cost provided by BBA is made on the basis of BBA's professional judgment and experience. The Client acknowledges that BBA is not a Contractor, has no control over labor and material costs and makes no warranty, express or implied, that construction costs will not vary from the estimates provided.
10. BBA shall have the right to include photographs and written descriptions of the project in their promotional materials and on their website. Upon completion, BBA shall be given reasonable access to the project to professionally photograph it. BBA and the Client shall cite each other in all awards, award applications, publications and press releases related to the project.
11. Both BBA and the Client shall procure and maintain insurance coverage, in amount and form satisfactory to both parties, for the duration of the project and for a period of three years thereafter. Certificates of insurance evidencing the required coverage shall be provided to both parties. Insurance certificates shall include the provision that coverage may not be reduced or eliminated without 30-day prior written notice.
12. BBA shall submit invoices to the Client on a monthly basis. Invoices are due and payable within 30 days of receipt. An invoice shall be considered correct, conclusive and binding unless the Client provides BBA with written notice of any disputed charge, including specific objections, within 10 days of the date of the invoice. A monthly charge of one-and-one-half percent (1-1/2%) will be collected on all unpaid balances over 45 days. If the Client fails to make payment when due, BBA may suspend performance of services upon five calendar days' written notice. BBA shall have no liability whatsoever to the Client for any costs or damages as a result of such suspension.
13. In the event legal action is necessary to enforce the payment provisions of this agreement, BBA shall be entitled to collect from the Client any judgment or settlement sums due, reasonable attorneys' fees, court costs and expenses incurred by the BBA in connection therewith.



14. Changes in the scope of services or to design documents that have been substantially completed, may be accomplished under this agreement as additional services, with appropriate adjustments to BBA's schedule and compensation. Such additional services must be mutually agreed to in writing by BBA and the Client and would include revisions to the documents due to revised instructions provided to BBA from the Client, a failure on the part of the Client to perform in accordance with this agreement, or preparation for, or attendance at, any public hearing, conflict resolution proceeding or legal proceeding.
15. In an effort to resolve any conflicts that arise during the design and construction of the project or following the completion of the project, the Client and BBA agree that all disputes between them, arising out of or relating to this agreement or the project shall be submitted to nonbinding mediation. In the event that the parties to this agreement are unable to reach a settlement to a conflict through mediation, then such dispute may, with the consent of both parties, be settled by binding arbitration in accordance with Construction Industry Arbitration Rules of the American Arbitration Association currently in effect.
16. **LIMITATION OF LIABILITY:** In recognition of the relative risks and benefits of the project to both BBA and the Client, the Client agrees to the fullest extent permitted by law, to limit BBA's total liability to the Client for any and all causes to the fee amount received by BBA for services provided under this contract or \$100,000, whichever is greater. Under no circumstance will BBA be responsible for any cost or expense that provides betterment, or upgrades or enhances the value of the project.
17. Either party to this agreement may terminate the agreement for any reason after providing 14 calendar days written notice to the other party. Upon termination, the Client agrees to pay to BBA, the balance of any fees and reimbursable costs outstanding at the time of the termination.
18. Neither the Client nor BBA shall make any claim for incidental, indirect or consequential damages arising out of or connected to work performed under this agreement. This mutual waiver of consequential damages shall include, but is not limited to loss of use, profit, business, income or reputation.
19. If any term or provision of this agreement is held to be invalid or unenforceable under any applicable statute or rule of law, such holding shall be applied only to the provision so held, and the remainder of this agreement shall remain in full force and effect.
20. This agreement shall be binding upon the parties and their respective successors, assigns and personal representatives. Neither party shall assign its interest in this agreement without the written consent of the other.
21. This agreement, as well as those documents into which it is incorporated by reference, constitutes the entire and integrated agreement between BBA and the Client. This agreement may not be amended without the written consent of both parties. BBA's commencement of services with Client's acquiescence or approval constitutes the Client's acceptance of the proposal and these terms and conditions.
22. All legal causes of action between the parties to this agreement shall accrue and any applicable statutes of repose or limitation shall begin to run not later than the date of substantial completion of the project. In no event shall any statute of repose or limitation begin to run any later than the date that BBA's services are completed or terminated.
23. This agreement between BBA and the Client shall be governed by the laws of the Commonwealth of Pennsylvania.



CONSULTING SERVICES AND DELIVERABLES
[Garden City - St. Paul's Adaptive Reuse]

BY BBA
 BY ARCHITECT
 BY OWNER
 BY SITE/CIVIL ENGINEER
 BY LANDSCAPE ARCHITECT
 BY ACOUSTIC CONSULTANT
 BY SUSTAINABILITY CONSULTANT
 BY FOOD SERVICE CONSULTANT
 BY LIGHTING DESIGNER
 BY CONTRACTOR

KEY

X = BASE SERVICES

A = ADDITIONAL SERVICES

N = NOT APPLICABLE

PREDESIGN PHASE SERVICES AND DELIVERABLES

MEP Systems Conditions Assessment Report
 Code Analysis

N
 X
 N

Simple Payback Analysis

Site Utility Master Plan

Concept Sketch Drawings

X

Written System Options for Consideration and Pricing

Basis of Design Document

Review Comments on Cost Estimates

X
 X
 X

SCHEMATIC PHASE SERVICES AND DELIVERABLES

A

DESIGN DEVELOPMENT PHASE SERVICES AND DELIVERABLES

A

CONSTRUCTION DOCUMENT PHASE SERVICES AND DELIVERABLES

A

BID NEGOTIATION PHASE SERVICES

A

CONSTRUCTION ADMINISTRATION PHASE SERVICES

A

POST PROJECT SERVICES

A

SPECIALIZED FIRE PROTECTION SERVICES

A

SPECIALIZED FIRE/SECURITY SYSTEMS

Design of VESDA System

A

Design of Beam Detection System

A

Computational Fluid Dynamic Smoke Modeling

N

SPECIALIZED LIGHTING DESIGN SERVICES

A

SPECIALIZED SUSTAINABILITY CONSULTING SERVICES

Preliminary LEED Scorecard

Attendance at Sustainability Workshop(s)

X
 X

Energy Modeling

A

Daylight Modeling

A

Life Cycle Cost Analysis

A

Design of Photovoltaic System

A

OTHER SPECIALIZED SERVICES

Food Service Design

Audio Visual System Design

Tele/Data System Design

Security System Design

Acoustic Consulting-MEP Systems Interior Spaces

Acoustic Consulting-MEP Systems Exterior

BIM Coordination

X
 X
 X
 X
 X
 X
 X
 N



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers

Bruce E. Brooks & Associates
MEP Engineering

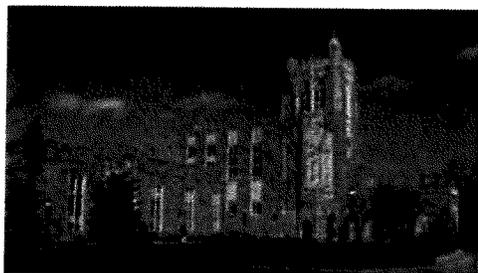
Experience with BBB

Mt. Cuba Center, Hockessin, DE

Since 1980, Bruce E. Brooks & Associates (BBA) has been providing engineering designs for mechanical, electrical, plumbing, fire protection, and life safety systems, along with lighting design, daylight and energy modeling, and energy audits. Principals Bruce Brooks, Brad Randall, John Hodos, and Chuck Argue lead a staff of 27 engineers and support personnel from BBA's office in Philadelphia.

Historic preservation and restoration have been at the heart of BBA's work from the beginning. The firm's extensive experience positions us to guide the owner in making choices about cost effective and efficient upgrades while protecting the historic integrity of the building.

BBA is green to their roots—early sustainability efforts resulted in the award-winning Cusano Environmental Education Center, which predates the development of the LEED rating system yet applies many of the same sustainable principles. BBA's common-sense solutions, utilizing systems such as geothermal, photovoltaics, rainwater harvesting, and solar thermal, have resulted in 30 LEED Platinum, Gold or Silver certified projects.



Princeton University Firestone Library Princeton, NJ

The Harvey S. Firestone Memorial Library opened in 1948, and for many years was the largest open stack library in the world. Following two major additions, the library encompasses roughly 420,000 SF of book stacks, reading areas, rare books vault, and support space. A ten-year, six-phase interior renovation, with the library remaining fully operational, is currently approaching completion. Significant upgrades were made to the mechanical, electrical, and fire protection systems to meet current sustainability standards and keep pace with the functional demands of a world-class research library. Additionally, the rare books vault has been fortified with the latest fire detection and protection system technology along with precise humidity and temperature controls.



Lehigh University Center Bethlehem, PA

Built in 1869, the University Center (UC) was renovated and expanded in 1958. The building currently provides about 110,000 SF in support of dining and student activities. The renovation and expansion, now underway, will act as a catalyst for developing an interactive community among students, faculty and staff. The program includes phased renovation to the historic part of the building, demolition of the 1958 addition, and a new addition to include administrative offices, student clubs and organizations, conference and meeting facilities, study areas, space for social and cultural discourse, and food service and dining facilities. In addition to designing HVAC, plumbing, fire protection, power, lighting and fire alarm systems, BBA is providing energy modeling and a life cycle cost analysis.



Pennsylvania Housing Finance Agency Harrisburg, PA

The Pennsylvania Housing Finance Agency (PHFA) occupied an eight-story building at 211 N. Front Street. In 2007, it purchased the historic, 7,500 SF Hickok Mansion at the adjacent 201 N. Front Street. A seven-story addition now connects the two buildings, seamlessly blending old and new. BBA designed the mechanical, electrical, and fire protection systems to service both, while preserving the historic integrity of the mansion. Design is to LEED Platinum and Passive House standards. Like USGBC's LEED program, Passive House advances a rigorous standard of design to attain a high level of energy efficiency. Its principles include an airtight building envelope, high-performance windows and doors, and solar heating and cooling. Although passive building costs approximately five- to ten-percent more than conventional building, the agency has used it in several of its developments for its quality-of-life and cost-saving benefits.



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



F. Bradley Randall

P.E., LEED AP

Principal in Charge

Brad has performed analysis, engineering, and construction administration at Bruce E. Brooks & Associates for 31 years. Project experience includes renovation and new construction of a wide variety of projects for educational, institutional, developer, corporate, commercial, and government clients.

As Principal-in-Charge for the MEP portion of a project, Brad structures BBA's portion of the engagement and oversees its project team for compliance with the terms of the contract relative to services and deliverables, milestone dates, and billing. He attends key project meetings and is a resource for pivotal project decisions.

Education

Cornell University, Bachelor of Science in Engineering, 1987

Registration

Registered Professional Engineer:
Pennsylvania, Virginia

LEED Accredited Professional

Lehigh University Center Bethlehem, PA

Phased renovation to the 1869 part of the building, demolition of the 1958 addition, and a new addition to include administrative offices, student clubs and organizations, conference and meeting facilities, study areas, space for social and cultural discourse, and food service and dining facilities. In addition to designing mechanical (HVAC, plumbing and fire protection) and electrical (power, lighting and fire alarm) systems, BBA is providing energy modeling and a life cycle cost analysis.

University of Pennsylvania Richards Towers A, B, C & D Philadelphia, PA

Built in 1961, these Louis I. Kahn towers, totaling 51,500 SF, are a National Historic Landmark. Towers A and B are now undergoing a full renovation and upgrade of infrastructure. Design of tenant fitouts for several floors of Towers C and D are now complete and have been certified LEED Silver. Towers A & B are currently under construction with estimated completion in 2018.

Swarthmore College Palmer, Pittenger and Roberts Apartments Swarthmore, PA

This \$22 million, 55,000 SF, three-building living/learning community adds 23 apartment-style student units with 128 beds. BBA supplied full MEP and fire protection services, designing to LEED Platinum standards, under the new Swarthmore College sustainability framework. The project incorporates a dedicated outdoor air system (DOAS) unit with energy recovery wheels and two-pipe valance units to deliver heating and cooling; a 40-well geothermal system; rainwater reclamation for non-potable uses; photovoltaic panels powering the electrical system; and solar thermal plate-and-frame collectors to heat domestic water.

George School Athletic Center Newtown, PA

A \$25 million, 100,000 SF renovation to natatorium with new field house, performance gymnasium, locker rooms, classrooms, and fitness areas. LEED certified.

Agnes Irwin School, Rosemont PA

Full MEP and fire protection services for renovations and additions to the Upper/Middle School, new gymnasium, dining facilities, and main entrance. This \$27 million, 80,000 SF, three-story project is LEED Silver certified.

Westtown School Science Center Westtown, PA

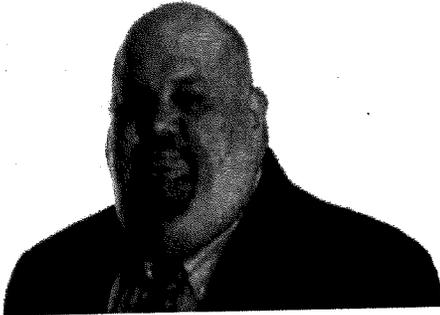
MEP and fire protection engineering design services were provided for 21,300 SF of renovated space in the existing science building and middle school, as well as 14,100 SF of new construction. Additional laboratory space and resources for active student engagement in hands-on investigation and experimentation were realized as a result of this project.

Haverford College Integrated Athletic Center, Haverford, PA

The 100,000 SF, LEED Gold certified Gardner Integrated Athletic Center features fitness, exercise, and training facilities including court space, locker and shower rooms, offices, and other support spaces.



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



John Hodos, Jr.

PE, LEED AP

Principal / Project Manager

John has more than 28 years of experience in the analysis, design, and construction of building electrical systems. Project experience includes renovation and new construction for colleges and universities, cultural institutions, municipal facilities, schools, and large commercial/utility companies.

As project manager for the MEP portion of a project, John structures BBA's portion of the engagement and oversees its project team for contract compliance relative to services and deliverables, milestone dates, and billing. He attends key project meetings and is a resource for pivotal project decisions.

Education

Pennsylvania State University, Bachelor of Science in Electrical Engineering, 1990

Registration

Registered Professional Engineer: CT, DE, FL, KY, MD, NC, NJ, NY, PA, VA

LEED Accredited Professional

Anticipated availability for the project is 10%

Eastern State Penitentiary Cellblock #4, Philadelphia, PA

Eastern State Penitentiary is more than 200 years old. It functioned as a state prison until the 1970s and reopened in the 1990s as a museum that focuses on issues in the United States criminal justice system. Prior to our work, the cellblock had no heat or air conditioning. BBA designed new systems to be both unobtrusive and removable to restore the building to its original state if needed. Lighting was designed to be energy efficient while providing for the unique needs of general light levels and display illumination.

Haverford College Visual Culture, Arts and Media Center, Haverford, PA

Design for the adaptive reuse of Ryan Gymnasium and the squash court addition as the college's new Virtual Culture Arts and Media (VCAM) facility. The VCAM, which occupies 25,000 SF on three floors, features a 144-seat multimedia screening and performance room. LEED Gold certification is targeted.

Woodlands Mansion & Stable Restoration, Philadelphia, PA

This 18th century mansion is a National Historic Landmark, residing within a 54-acre cemetery and parklands. Following a 2006 master plan and conditions assessment of MEP systems, careful restoration gave new life to the cryptoporticus—a series of subterranean service tunnels—and the north terrace, followed by electric service upgrade and stable renovation. The project received a 2016 Grand Jury Award from the Preservation Alliance for Greater Philadelphia.

Nemours Mansion & Gardens, Wilmington, DE

Conditions assessment, master plan and design for restoration a 46,500 SF museum and the largest formal gardens in the U.S. This 200-acre estate was the turn-of-the-century residence of Alfred I. DuPont. A new mist-type fire protection system limits the amount of water used to extinguish a fire in order to protect the irreplaceable objects in the museum collection from fire and water damage.

Cranberry Fields, Parsippany, NJ

Design of site lighting and electrical service and distribution for a new soccer field.

Veterans Memorial Park, Parsippany, NJ

Design of site lighting and electrical service and distribution for a war memorial, parking lot, walkways, and athletic fields, as well as construction of a band shell and restroom buildings.

Haverford College Integrated Athletic Center, Haverford, PA

The 100,000 SF, LEED Gold-certified Gardner Integrated Athletic Center features fitness, exercise, and training facilities including court space, locker and shower rooms, offices, and other support spaces.



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



Charles S. Argue, Jr.

P.E.

Principal / Lead Mechanical Engineer

Chuck has over 26 years of experience as a mechanical engineer and has been with BBA for 16 years. His project experience includes renovation and new construction of educational, commercial, corporate, industrial, and medical facilities. In his role as lead mechanical engineer, Chuck performs all mechanical-system evaluations and oversees and coordinates the engineering, design, and construction administration of the mechanical systems.

Education

Rutgers University, Bachelor of Science in Mechanical Engineering, 1996

Registration

Registered Professional Engineer:
CO, CT, DE, DC, KY, MD, NC, NJ, NY, PA, TN, TX,
VA, WV

Glencairn Museum Bryn Athyn, PA

The original project scope encompassed a feasibility study and subsequent design of a new boiler plant in a highly secure and historic 65,000 SF masonry-bearing museum owned by The Academy of the New Church (completed in 2012). A second project encompasses a feasibility study and subsequent design for the replacement of the electrical system and the addition of air conditioning throughout.

Eastern State Penitentiary Cellblock #4 Philadelphia, PA

Eastern State Penitentiary is more than 200 years old. It functioned as a state prison until the 1970s and reopened in the 1990s as a museum that focuses on issues in the United States criminal justice system. Prior to our work, the cellblock had no heat or air conditioning. BBA designed new systems to be both unobtrusive and removable to restore the building to its original state if needed. Lighting was designed to be energy efficient while providing for the unique needs of general light levels and display illumination.

George School Athletic Center Newtown, PA

A \$25 million, 100,000 SF renovation to natatorium with new field house, performance gymnasium, locker rooms, classrooms, and fitness areas. LEED certified.

Agnes Irwin School Rosemont, PA

Full MEP and fire protection services for renovations and additions to the Upper/Middle School, new gymnasium, dining facilities, and main entrance. This \$27 million, 80,000 SF, three-story project is LEED Silver certified.

Bryn Athyn Cathedral Bryn Athen, PA

Feasibility study and design for replacement of the 27,000 SF building's HVAC system, encompassing the entry hall, main nave, chapel, choir hall, book room, undercroft, practice rooms, and support spaces. The new system features a ground-coupled heat pump loop on a quarter acre comprising 40 wells at 500 feet deep. The cathedral resides in a National Historic Landmark District.

Temple University Pearson & McGonigle Hall Philadelphia, PA

Energy modeling and engineering design for renovations and upgrades to existing fitness facilities by adding a 100,500 SF third story to the Pearson and McGonigle Halls complex. The new space is dedicated to student activities, academics and retail.

University of Pennsylvania Joe's Café @ Wharton Philadelphia, PA

This 4,000 SF project at Steinberg-Dietrich Hall encompassed renovations to the first floor public areas and the ground floor hallways as well as the café and reprographics area. Joe's Café received LEED Gold certification.



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



Tami A. Knopp

P.E., LEED AP, L.C.

Associate / Lead Electrical Engineer

Tami, who joined BBA in 2001, has performed electrical engineering, design, analysis, and construction administration services since 1998. Her areas of expertise include power distribution, life-safety systems, lighting design and controls, and daylight modeling for use in lighting-quality studies and integrated-energy analysis. In her role as lead electrical engineer, Tami performs the building electrical system evaluations and oversees and coordinates the engineering, design, and construction administration of the electrical systems.

Education

Pennsylvania State University, Bachelor of Architectural Engineering, Lighting/Electrical Emphasis, 1998

Registration

Registered Professional Engineer:
Pennsylvania

LEED Accredited Professional

Lighting Certified (L.C.) National Council on Qualifications for the Lighting Professions (NCQLP)

West Chester University Old Library Renovation, West Chester, PA

The Old Library, built in 1904, is undergoing renovation of approximately 17,200 SF to provide a visitor's center to the university and a centrally located admissions center. After participating in a 2016 feasibility study, BBA is addressing the particular challenges of upgrading electrical, mechanical, plumbing, and fire protection and adding HVAC to this historic building.

Glencairn Museum, Bryn Athyn, PA

The original project scope encompassed a feasibility study and subsequent design of a new boiler plant in a highly secure and historic 65,000 SF masonry-bearing museum owned by The Academy of the New Church (completed in 2012). A second project encompasses a feasibility study and subsequent design for the replacement of the electrical system and the addition of air conditioning throughout.

Lehigh University Center, Bethlehem, PA

Phased renovation to the 1869 part of the building, demolition of the 1958 addition, and a new addition to include administrative offices, student clubs and organizations, conference and meeting facilities, study areas, space for social and cultural discourse, and food service and dining facilities. In addition to designing mechanical (HVAC, plumbing and fire protection) and electrical (power, lighting and fire alarm) systems, BBA is providing energy modeling and a life cycle cost analysis.

Princeton University Firestone Library, Princeton, NJ

Conditions assessment and major renovations to the 420,000 SF central campus library, resulting in all new MEP systems. Construction is in six phases over ten years while the library remains fully operational. The project, designed 100 percent in Revit, embraces the principles of sustainable design and integrated project delivery.

Haverford College Visual Culture, Arts and Media Center, Haverford, PA

Design for the adaptive reuse of Ryan Gymnasium and the squash court addition as the college's new Virtual Culture Arts and Media (VCAM) facility. The VCAM, which occupies 25,000 SF on three floors, features a 144-seat multimedia screening and performance room. LEED Gold certification is targeted.

Temple University Pearson & McGonigle Hall, Philadelphia, PA

Energy modeling and engineering design for renovations and upgrades to existing fitness facilities by adding a 100,500 SF third story to the Pearson and McGonigle Halls complex. The new space is dedicated to student activities, academics and retail.

Sidwell Friends School, Washington, DC

Master plan for all campuses resulted in multiple projects to Upper and Lower Schools, plus renovation of the 33,000 SF c. 1950 Middle School building and a 39,000 SF addition. MEP services included daylight modeling, lighting controls, and analysis of instructional spaces in support of sustainable design. LEED Platinum certified. Won the 2007 AIA Committee on the Environment Top Ten Green Projects award.



Stephen Wayland

EIT, LEED AP, BD+C, CPHC
Mechanical Project Engineer

Steve has over four years of experience in the analysis, design, and construction of mechanical systems for new projects and building renovations. His interest in sustainability led him to pursue certification as a Passive House Consultant. Steve provides our clients with LEED model certification, existing building energy modeling, and life cycle cost analysis. His responsibilities as a project engineer include design, load calculations and analysis, and client meetings.

Education

Drexel University
Bachelor of Science in Civil Engineering and Architectural Engineering, 2013

Registration

Engineer in Training
LEED Accredited Professional BD + C
Certified Passive House Consultant (CPHC)

Glencairn Museum Renovations, Bryn Athyn, PA

Design and construction administration services for the renovation of mechanical and electrical systems, based on recommendations of our 2017 MEP systems feasibility study. The project involves most of this seven story, 65,000 SF building.

Lehigh University Center, Bethlehem, PA

Phased renovation to the 1869 part of the building, demolition of the 1958 addition, and a new addition to include administrative offices, student clubs and organizations, conference and meeting facilities, study areas, space for social and cultural discourse, and food service and dining facilities. In addition to designing mechanical (HVAC, plumbing and fire protection) and electrical (power, lighting and fire alarm) systems, BBA is providing energy modeling and a life cycle cost analysis.

Pennsylvania Housing Finance Agency, Harrisburg, PA

Expansion of PHFA's offices at 211 N. Front Street following the purchase of a historic 7,500 SF building. A seven-story, 27,000 SF addition connect both. The historic building was renovated and, with the addition, is targeted for Passive House and LEED Platinum.

Eastern State Penitentiary Administration Building, Philadelphia, PA

Eastern State Penitentiary, designated a National Historic Landmark, is more than 200 years old. It functioned as a state prison until the 1970s and reopened in the 1990s as a museum that focuses on issues in the United States criminal justice system. This phase is for the renovation of the administration building and construction of a new audio-tour kiosk. The scope of work includes renovated retail and exhibit spaces, storage rooms, staff lounge, new toilet room facilities and ticketing, and multi-purpose and office areas. The total area is approximately 8,500 SF.

Eastern State Penitentiary Cellblock 7 Creative Lab, Philadelphia, PA

Renovation of historic Cellblock 7 will add a creative lab space for the wildly successful tourist attraction, Terror Behind the Walls. HVAC includes VRF systems similar to the recently renovated Cellblock 4 for costume and make-up rooms, offices, administration, and storage locations. BBA is using an industrial ventilation system for the spray booth, vacuum and dust collection systems for the wood shop, and a fume hood for the metal shop.

3537 Locust Walk, Philadelphia, PA

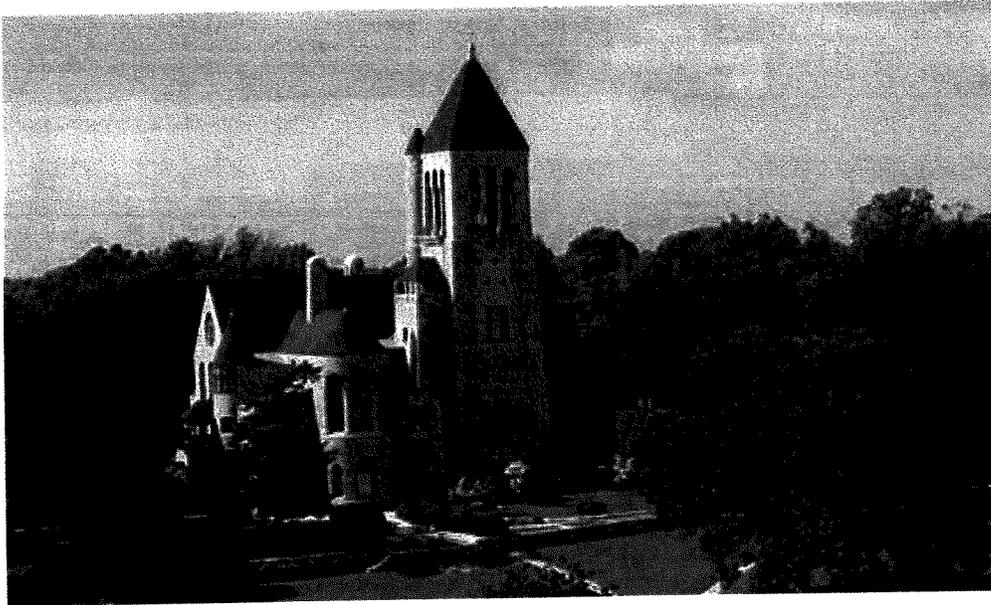
Renovation of a 5,622 SF historic (1913) building and a 1,600 SF addition to better accommodate the dual-degree Management & Technology program. BBA completed a study addressing exterior envelope, code and accessibility compliance, building system infrastructure, circulation and room layout, and interior finishes and subsequent design of MEP systems for the \$3.6 million project.

Eastern State Penitentiary Cellblock 4, Philadelphia, PA

Prior to our work, the cellblock had no heat or air conditioning. BBA designed new systems to be both unobtrusive and removable to restore the building to its original state if needed. Lighting was designed to be energy efficient while providing for the unique needs of general light levels and display illumination.



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



Bryn Athyn Historic District

BRYN ATHYN, PENNSYLVANIA

In 2009, BBA evaluated the heating, ventilation and electrical systems serving the Bryn Athyn Cathedral complex located within a National Historic Landmark District. The report documented the age and condition of the components of the heating system.

Based on the goals of this report and BBA's recommendations, a ground-coupled heat-pump system was selected as having both the lowest annual operating and lowest 40-year lifecycle costs. It also provided the smallest carbon footprint, least visual impact, and lowest mechanical-equipment and piping-space requirement.

In 2011, when the underground steam mains which provided heat to the Glencairn Museum started to fail, BBA was engaged to study the feasibility of installing a standalone steam boiler plant to serve the 50,000 SF museum containing 8,000 religious artifacts from around the world. The new plant, installed in 2012, incorporated steam boilers that could be converted to hot water use when the rest of the systems in the building were upgraded.

In 2016, BBA prepared a mechanical and electrical systems master plan that would replace systems dating back to the building's 1939 construction, adding air conditioning and better environmental control throughout the facility. This master plan recommended a hybrid system incorporating a ground-coupled geo-thermal wellfield with variable refrigerant flow (VRF) technology.

In 2018, BBA is moving into design and construction administration services for the next phase, the renovation of mechanical and electrical systems at Glencairn Museum.

Client Academy of the New Church

Size 72,000 SF

Completion Date 2012-2019



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



Cellblock 4

PHILADELPHIA, PENNSYLVANIA

Eastern State Penitentiary is more than 200 years old. It functioned as a state prison until the 1970s and reopened in the 1990s as a museum that focuses on issues in the United States criminal justice system. BBA took part in a master plan for renovation of the facilities in 2008.

In preparation for the three-year exhibition on mass incarceration, "Prisons Today," BBA renovated a series of inmate workshops that are part of Cellblock 4. Prior to our work, the cellblock had no heat or air conditioning. We designed the new systems in the most unobtrusive manner possible. The design is also reversible: all mechanical and electrical systems can be removed and the building restored to its original state using demolished materials, which were carefully labeled and stored.

Light fixtures for the exhibit utilize a high-color rendering and high-efficiency source for optimal energy conservation. BBA also designed a dimmable LED-track-lighting system for displays to provide sufficient illuminance while maintaining comfortable light levels for the public and staff. Narrow-beam LED lamps accent exhibits, while wide-beam LED lamps provide general lighting.

Projects at Eastern State Penitentiary are ongoing, including space for collections storage, Cellblock 7 creative labs, and the renovation of the administration building.

Client Eastern State Penitentiary

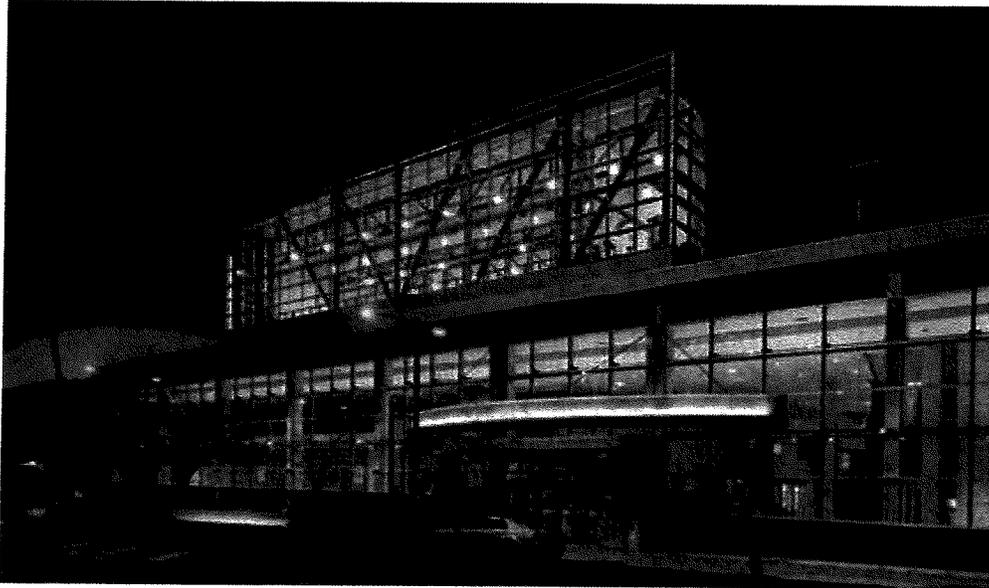
Size 2,500 SF

Completion Date 2017 – ongoing

Awards First Place, Excellence in Exhibitions Award, American Alliance of Museums (2017)



BRUCE E. BROOKS & ASSOCIATES
Consulting Engineers



Pearson & McGonigle Halls

PHILADELPHIA, PENNSYLVANIA

The \$48 million modernization of Pearson and McGonigle halls, at Broad Street and Montgomery Avenue, created an additional 140,000 SF of space and features intramural and club sport courts, exercise space, a climbing wall, classrooms, faculty and coaching staff offices, upgraded dance studios, new men's and women's basketball practice courts, and a new atrium for retail opportunities on North Broad Street.

A highlight of the renovation is a basketball practice facility built atop the current structure. The nearly 26,000 SF complex contains separate men's and women's practice courts, locker rooms, recruiting lounges, coaches' office, film study area, sports medicine center, and weight room. New HVAC systems were also designed for the existing natatorium.

BBA provided MEP and fire protection design services, energy modeling, and building systems commissioning on the project, which is registered with the U.S. Green Building Council for LEED certification

Client Temple University

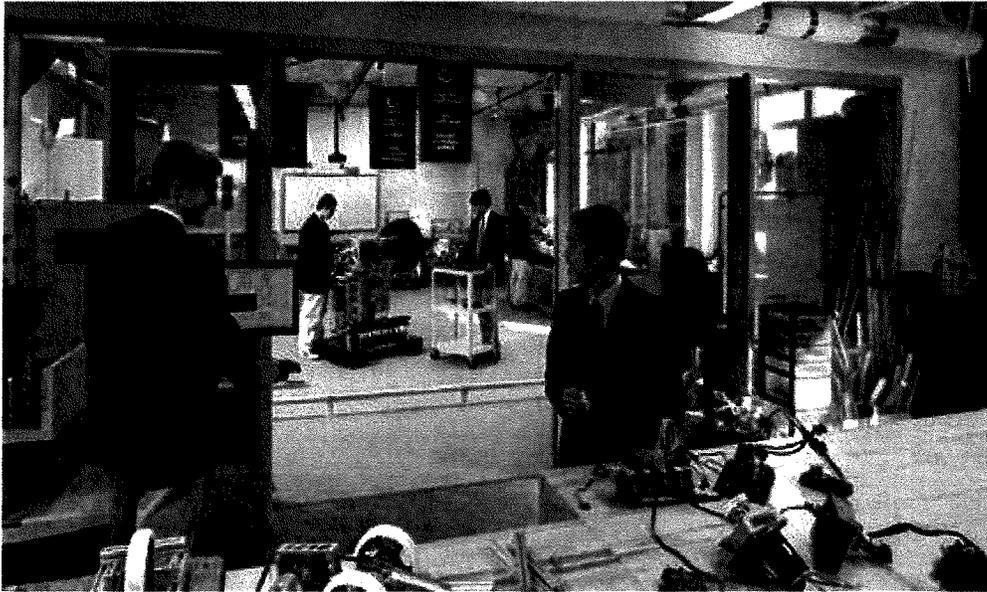
Size 140,000 SF

Completion Date 2012

Construction Cost \$48 million

Certification LEED

Photo by Fentress Photography



Rorer Center for Science and Technology

PHILADELPHIA, PENNSYLVANIA

The Rorer Center for Science and Technology at Springside Chestnut Hill Academy is a vibrant learning center that serves as an active teaching tool for environmental responsibility.

The high performance building envelope features superior insulating value, air and vapor barriers, and double glazed low-E window units. The glass lobby serves as a large scale vestibule and transition zone from the outdoors.

The HVAC system shares the boiler and chiller plant with the adjacent campus buildings, and utilizes variable speed control of pumps and air handling unit fans. To accommodate the point source exhausts and fume hoods, the ventilation air and building pressurization are carefully controlled to minimize energy consumption while maintaining safe classroom laboratories. In addition, the photovoltaic panels, wind turbine, rainwater collection system, and real-time display in the main lobby are some of the more visible elements of sustainable design.

Client Springside Chestnut Hill Academy

Size 23,000 SF

Completion Date 2008

Construction Cost \$6 million

Certification LEED Gold

Photo by Jeffrey Totaro Architectural Photographer