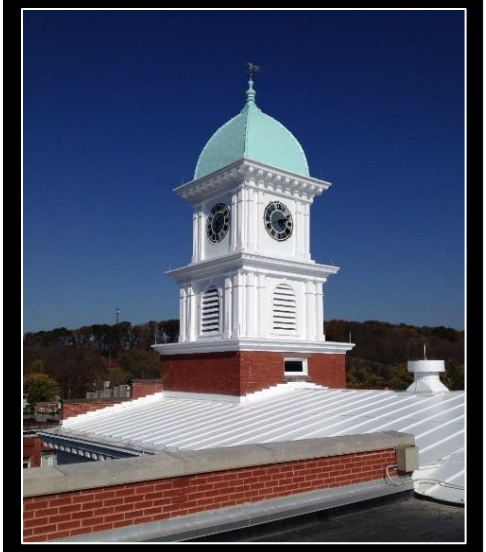
STAHL SHEAFFER ENGINEERING



Building Structural Engineering Qualifications

Presented by Stahl Sheaffer Engineering

a multi-discipline civil / structural engineering company

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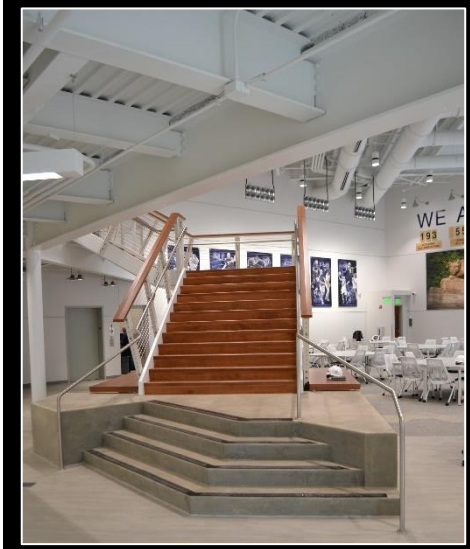

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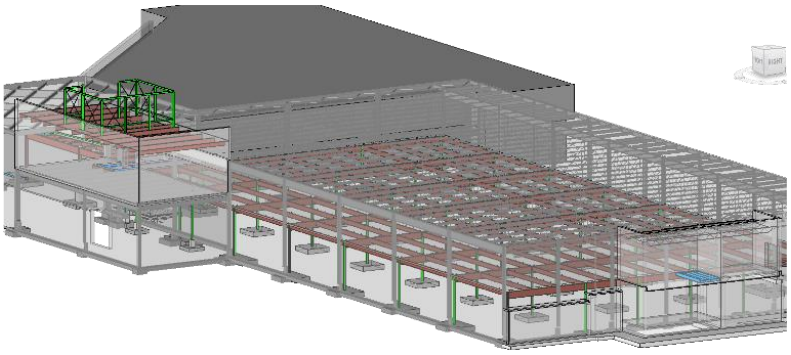
Building Structural Engineering

Stahl Sheaffer has completed building design services for industries, primary schools, higher education, research facilities, private residences, and government agencies. Our expertise in support of new construction and renovation encompasses a wide variety of building types, including labs, classrooms, housing, emergency facilities, parking garages, athletic facilities, and historic structures. Our engineers are experienced with materials from steel to wood to concrete to brick and limestone. Stahl Sheaffer's structural engineering department includes a staff of professional engineers dedicated to building structures, aided by designers who provide expertise in:

- Analysis of structural capacities
- Forensic investigation
- Historic preservation
- Retrofit of existing components
- Feasibility and planning studies
- Design of new facilities
- Rehabilitation design
- Construction shoring
- Construction administration
- Construction inspection
- BIM / 3D modeling
- Compliance upgrades
- Façade restoration
- Roof repair

Our value is in the upfront analysis to identify root problems and provide solutions that are the most relevant, cost effective, and sustainable. We develop bid documents that allow consistent bids for completing necessary work. We engineer the structural design, prepare construction documents, and provide construction administration services throughout the project. Stahl Sheaffer embraces Prevention through Design (PtD). Several Stahl Sheaffer engineers have formerly served as municipal staff engineers, and know the processes involved in moving engineering designs through municipal staff reviews, design review boards, and planning commission approvals. We facilitate collaboration and avoid conflicts with multiple stakeholders, including owner project managers, architects, municipal officials, MEP's, landscape architects, and others using Revit.



STAHL SHEAFFER ENGINEERING

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Structural Engineering for Renovation & Redesign
- **Size:**
  30,000 SF
- **Construction Cost:**
  $7,200,000
- **Year Completed:**
  2016

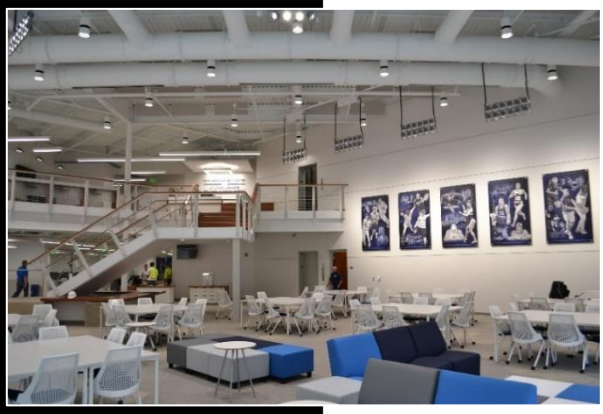
The Morgan Academic Center is a vital component in keeping Penn State's academic services and the academic performance of its 800 student-athletes from 31 programs at the forefront among the nation's premier Division I institutions.

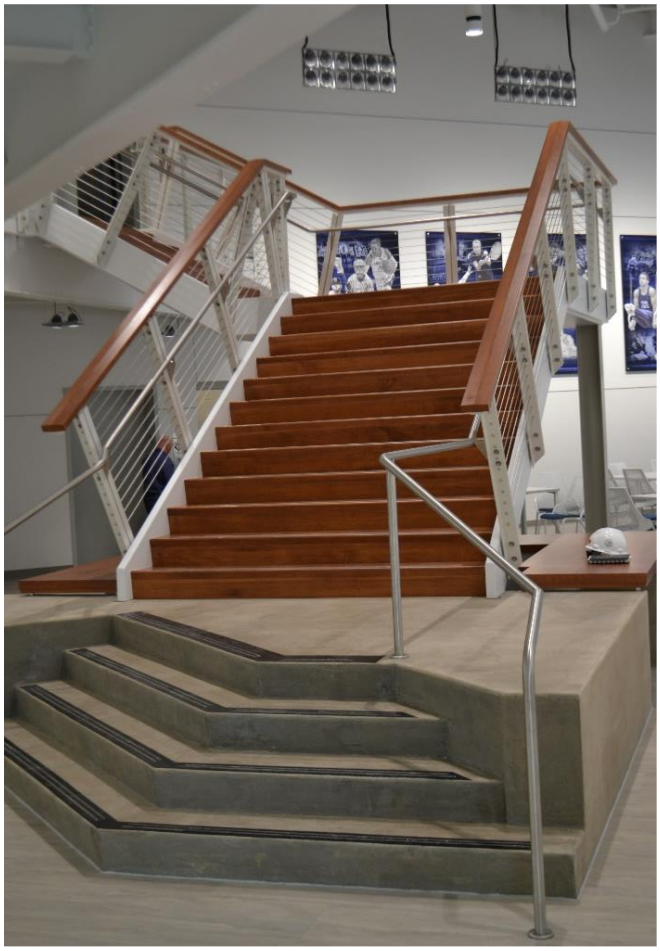
Morgan Academic Center Upfit

The Pennsylvania State University, University Park, PA

Following the addition of the second floor in the former Greenberg Indoor Sports Complex, the front-of-house and lower floor were upfitted into the new home for the Morgan Academic Center, providing a central academic hub for Penn State student-athletes. Stahl Sheaffer was a design consultant on the team for structural engineering services. The northwest corner of the building was selectively demolished and rebuilt with curtainwall. Stahl Sheaffer assisted with details of new assembly and review of building stability. Stahl Sheaffer also assisted with detailing a new ornamental stair within a two-story atrium space, and considerations for modifying the existing lateral force resisting system for the new intended use of the space. Stahl Sheaffer prepared contract drawings to be sealed for submittal as part of permit application to L&I, including an on-drawing specification for materials and construction pertinent to Stahl Sheaffer's scope.

Read more here:
http://www.centredaily.com/sports/college/article85256802.html#storylink=cpy





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STAHL SHEAFFER ENGINEERING

Courtyard by Marriott New Hotel

- **Owner:**
  Bears Creek Hershey Hotel, LLC
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Construction Cost:**
  $9,000,000
- **Year Completed:**
  2017

Courtyard by Marriott, Hershey, PA

SHANER HOTELS

Stahl Sheaffer was part of a design team providing structural engineering services for the design and construction of a four-story, 68,000-sf Courtyard by Marriott hotel. To minimize the overall footprint of the structure, 6” load bearing steel studs and precast hollow core floor and roof planks were designed and detailed. The lateral resisting system consisted of diagonal strap bracing over the 6” steel stud shear walls. A central elevator shaft and two end stair towers were also detailed using steel stud framing. Stahl Sheaffer also provided construction administration services for this project.

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STAHL SHEAFFER ENGINEERING

Fairfield Inn & Suites New Hotel

Harrisburg International Airport, Harrisburg, PA

- **Owner:**
  Shaner Corporation
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Construction Cost:**
  $ 14,000,000
- **Year Completed:**
  2018

Stahl Sheaffer provided structural engineering services for the new Fairfield Inn by Marriott, the first hotel at the Harrisburg International Airport. The four-story structure has a base footprint of 17,400 SF and was designed to have a total of 123 guest rooms. The structure consists of hollow core precast floor and roof planks supported on reinforced concrete masonry walls and structural steel framing. The radial profile of the main entry porte cochere was designed using pre-engineered wood to frame the canopy roof and a structural steel tube support structure.

The hotel is unlike a typical Fairfield Inn & Suites hotel, with a focus on soundproofing and a flight schedule in the hotel lobby for guests to keep track of their flights. The flight schedule is tied into the airports system, so hotel guests will conveniently be updated on whether their flights are on time or delayed. Features of the hotel also include a small market, business center, fitness center, and bar.

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STAHL SHEAFFER ENGINEERING

- **Owner:**
  Snyder County Commissioners
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Completed:**
  2014

“ Snyder County hired Stahl Sheaffer Engineering to design and prepare plans and bid specifications for a parapet project on the County courthouse. Ever since then, they have been the “go to” engineering firm for the County. ”

Joe Kantz, Chairman, Snyder County Commissioners

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Snyder County Courthouse Rehabilitation

Snyder County Courthouse, Middleburg, PA

Stahl Sheaffer Engineering provided numerous engineering services for the Snyder County courthouse with an emphasis on rooftop and parapet rehabilitation. Stahl Sheaffer performed an evaluation to determine and prioritize maintenance and renovation needs for the historic structure located in Middleburg, PA. The evaluation assessed the rooftop conditions, masonry façade, windows, exterior wood surfaces, space needs, adjacent structures, parking, exterior lighting, interior lighting, backup generator maintenance, and mechanical system maintenance. The project led to the following maintenance projects that were designed by Stahl Sheaffer:

- Exterior Woodwork Painting
- Metal Roof Repair & Coating
- Conversion of Library
- Security Enhancements
- Energy Efficient Lighting Project
- Roof Replacement
- Masonry Parapet Reconstruction
- Demolition of Adjacent Office Building
- Backup Generator Maintenance
- Parking Lot Paving & Lighting

Stahl Sheaffer also provided design and construction administration for the conversion of the County law library into a new meeting room.

STAHL SHEAFFER ENGINEERING

Juniata College
PENNSYLVANIA
• 1876 •

- **Owner:**
  Juniata College
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Completed:**
  2017

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Good Hall Structural Design

Juniata College, Huntingdon, PA

Stahl Sheaffer provided structural engineering and construction administration services for the code-based design of three-story, steel framed entry addition for Good Hall, including below grade basement level and full height elevator. Good Hall is Juniata College's center for social sciences, containing more than 30 classrooms, two computer facilities (including a Mac lab), the business department's case study room, the audio/visual department, and three instructional laboratories. It contains some of the college's most advanced classrooms with computerized overhead displays, surround sound speaker systems, and videoconferencing technology. Foundations were designed and analyzed to address concerns with expansive soils identified at site. The addition included composite concrete deck over steel framing. Due to large window openings and limited clearance for traditional steel cross bracing, custom truss style lateral braces were designed to distribute and resist lateral loading. The existing structure was wood stud framed; the addition was designed as an independent structure.

STAHL SHEAFFER ENGINEERING

American Refining Group Lab Addition

- **Owner:**
  American Refining Group
- **Services:**
  - Site Engineering
  - Structural Engineering
  - Construction Administration
- **Year Completed:**
  2017

American Refining Group Lab, Bradford, PA

Stahl Sheaffer Engineering was part of a Design-Build team in partnership for the approximately 7,500-sf lab addition.

The structure is a combination load bearing masonry structure (exterior walls) and steel frame (interior column line) supporting a traditional steel framed flat roof with metal deck and bar joists. A steel-framed exterior canopy bearing on steel columns created a secure location for exterior storage. The floor is slab-on-grade with standard shallow spread foundations. Slab-on-grade is designed to accommodate equipment and traffic for the processes planned within the space. Interior revisions to the existing facility included new wall openings for doors and ductwork, and the design of a jib crane supported on an existing elevated floor for material handling.

Original Structure

New Structure

Stahl Sheaffer provided site and structural engineering for this project. Site amenities included an underground storage tank for waste materials from the laboratory testing processes, site paving, and vehicular routing including tanker trucks on the restricted site area. The site was designed to accommodate the owner's needs and processes. Stahl Sheaffer designed the building structure to accommodate the local environmental loadings, equipment and process loading, and user-induced loads.

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STAHL SHEAFFER ENGINEERING

Penn Building Renovation

ALTOONA ▲ BLAIR COUNTY DEVELOPMENT CORPORATION

Altoona Blair County Redevelopment Corporation, Altoona, PA

- **Owner:**
  Altoona Blair Development Corporation
- **Services:**
  Structural Engineering
- **Completed:**
  2017

Stahl Sheaffer Engineering provided structural engineering services for the renovation of the Penn Building, constructed in 1922, to be commercially leased to The Pennsylvania State University. The basement of the structure extends outside of the footprint of the building above to the curb of the street. Steel framing supports cast-in-place concrete which forms the base for the sidewalk in front of the building. A large concrete beam supports the three-story façade wall above. Water infiltration led to severe corrosion of the steel framing as well as the reinforcing within the concrete beam.

The severity of corrosion was assessed, and a remediation plan was developed. New steel members were added to supplement the existing members which were corroded beyond repair and inaccessible in large part due to the construction detailing. The concrete beam reinforcing was cleaned and coated, and spalling concrete was patched with a repair mortar. Sequencing was provided to the contractor to ensure the integrity of the member was not jeopardized throughout the construction process. Reconfiguration of the basement space allowed the design team to locate a new bearing and footing directly below the deteriorated concrete beam to assure long-term stability of the exterior façade wall supported above the beam. Miscellaneous concrete defects throughout the slab were also identified for repair as part of the project.

STAHL SHEAFFER ENGINEERING

Covenant Woods Senior Living Design

- **Owner:**
  Covenant Woods
- **Services:**
  Structural Engineering
- **Construction Cost:**
  $27,400,000
- **Year Completed:**
  Design: 2016
  Construction: In Progress

Covenant Woods Continuing Care Retirement Community, Richmond, VA

COVENANT WOODS

Stahl Sheaffer provided structural engineering services for the design and renovation of the Covenant Woods Continuing Care Retirement Center. The project included two new building additions with slab-on-grade basement, with framed first and second floor added to the north end of wing C. A new slab on grade building addition with framed second floor was designed to replace an existing one-story section of building on the south end of Wing A. Each section is a steel frame supporting the floors and light-gauge steel roof trusses. Exterior walls are light-framed steel construction supporting siding or masonry veneer.

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STAHL SHEAFFER ENGINEERING

Ice Arena Conversion to Laboratory

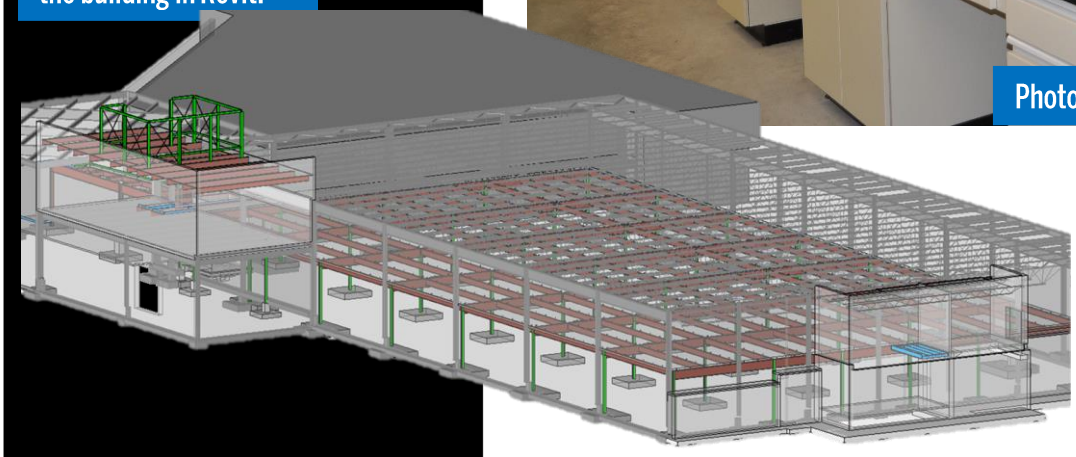
The Pennsylvania State University, University Park, PA

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Structural Engineering
- **Size:**
  90,000 SF
- **Construction Cost:**
  $9,000,000
- **Year Completed:**
  2015

Following the completion of Pegula Ice Arena, the former Penn State Greenberg Indoor Sports Complex was renovated for academic and laboratory use. Stahl Sheaffer provided engineering design for the conversion of the second floor to lab space, including a new composite steel framed floor over the existing one-story mechanical room and a screenwall around the exhaust fans on the roof. The design also included the addition of a new stair tower on the south end of the building and stabilization of the remaining south wall of the existing building, which was failing due to soil pressure and poor detailing in the original construction. The new floor, designed in a compact fashion to fit within the limited confines of the existing space, was laterally isolated from the existing structure with its own lateral force resisting system. Ductwork was coordinated within the existing truss space of the original roof. Stahl Sheaffer modeled the building in Revit.

Photo Credit: Hoffman-Leakey Architects

Stahl Sheaffer modeled the building in Revit.



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STAHL SHEAFFER ENGINEERING

Juniata College
PENNSYLVANIA
• 1876 •

- **Owner:**
  Juniata College
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Completed:**
  2017

Brumbaugh Academic Center Design

Juniata College, Huntingdon, PA

Stahl Sheaffer provided structural engineering and construction administration services for the code-based design of a two-story entry addition to the Brumbaugh Academic Center. The new steel framing and composite metal floor deck was constructed to match the existing curved radius of the existing building facade and incorporates new full height glass storefronts and a second level balcony and seating area. The facility houses renovated classrooms, seminar rooms and Alumni Hall within the circular rotunda, a 400-seat auditorium used for small concerts, large lectures, film viewing, workshops, and more.

Before (left) & After (below)

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Health Center New Entry Vestibule & Utility Room

- **Owner:**
  Geisinger
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Year Completed:**
  2017

Geisinger Hughes Center, Danville, PA

Stahl Sheaffer Engineering was part of a team to provide structural engineering services for the design and detailing of a new entry vestibule and utility room located at the main entrance of the Geisinger Hughes Center North located in Danville, PA.

The structure of the entry vestibule is designed as a combination of steel framing and concrete masonry bearing walls. The vestibule framing penetrates the exterior façade of the existing building and is coordinated to be supported by the existing building columns. The vestibule is laterally supported by the existing building and adjoining proposed utility room. The adjoining utility room, a three-story open volume relying on the existing building to provide lateral stability, consists of load bearing concrete masonry unit (CMU) walls with steel framed roof. The floors of both the vestibule and utility room are slab-on-grade with standard shallow spread foundations and CMU frost walls.

Stahl Sheaffer also provided construction administration services for this project during bidding and construction stages.

STAHL SHEAFFER ENGINEERING

Charter School Land Development & Structural Design

- **Owner:**
  Young Scholars Charters School
- **Services:**
  - Survey
  - Land Development Plan Preparation
  - Structural Design
- **Construction Cost:**
  $600,000
- **Year Completed:**
  2017

Young Scholars Charter School of Central PA, State College, PA

Stahl Sheaffer was responsible for the survey and site design for the construction of the Young Scholars Charter School, and subsequent second-story addition and parking expansion projects. Stahl Sheaffer teamed with a local architect to provide land development services, including site layout and grading, parking lot design, stormwater management, erosion and sedimentation control plan, landscaping, site lighting, and buffer yard landscaping designs.

Stahl Sheaffer also led the structural design of three phases of construction for the school. A variety of structural systems were used due to architectural requirements. Phase one included a single-story wing of classrooms and offices, as well as a large gymnasium that doubles as a cafeteria. Portions of the entry and offices consist of CMU bearing walls, while the remainder consists of wood framed bearing walls. These supported prefabricated wood trusses. Foundation consists of strip footings, CMU foundation walls and slab on grade. Phase two included a new wing for classrooms. Design and construction are similar to the original classroom wing. Stahl Sheaffer designed the structure to support adding a future second story on this wing. Phase three included the design of the second story using wood-framed construction, prefabricated wood trusses, and an elevator. Stahl Sheaffer worked with the project team to provide the structural design of load bearing walls, foundations, lintel and header beams, and a loading summary. A phased development was implemented to allow current operation and future expansion of the charter school.

In June 2016, Ferguson Township approved Stahl Sheaffer's land development plan to add the second-story building addition to provide new classrooms and administrative support, as well as the design of a new driveway to improve traffic circulation. As part of the municipal approval process, Stahl Sheaffer completed a transportation impact assessment for the expansion, which included data collection, transportation analysis, report preparation, and meetings. The final phase of the school and site improvements were completed in 2017.

STAHL SHEAFFER ENGINEERING

Charter School Addition

- **Owner:**
  Sugar Valley Charter School
- **Services:**
  - Structural Design
  - Site Design
  - Land Development Submission
  - Construction Administration
- **Year Completed:**
  2018

Sugar Valley Charter School, Loganton, PA

Stahl Sheaffer provided the structural design, site engineering, land development submission, and construction administration for the redesign of the Sugar Valley Charter School facility located along East Main Street in the Borough of Loganton, Clinton County. The project included the construction of a 31,200-SF independent building addition with an associated parking area.

Stahl Sheaffer provided structural design and construction administration for the building addition to the existing school. Our team worked with the design architect to develop an economic building structure that met the demands of the architecture and occupant function. A combination of load bearing masonry, steel frame, and load bearing light-gauge framing supports a wood framed floor and roof system. A combination of wood shear walls and masonry shear walls were provided to resist the lateral loads on the structure. The site accommodated a three-level building with grade access to the “first” floor on the high side and walk-out to grade at the “ground” floor on the low side. A structural retaining wall stepped around the building perimeter to accommodate the grade change. Where the new construction connected with the existing building, a free-standing 4-hour firewall was required and as-designed by the architect was required to penetrate through the gable roof and extend beyond the building on each side. The exposure to code-required wind loading increased the structural demand on the wall, which Stahl Sheaffer was able to meet by designing the wall as a cantilever section using doubly reinforced concrete masonry units.

Stahl Sheaffer provided site layout and grading, parking lot design and layout, stormwater management, Erosion and Sedimentation Control Plan, NPDES permit, site landscaping and site lighting to comply with ordinance requirements, and submission of the land development package. Construction administration was also included along with supplemental support for a temporary parking facility to manage the subcontractors.

STAHL SHEAFFER ENGINEERING

Penn Commons Redevelopment Design

- **Owner:**
  Union County Housing Authority
- **Services:**
  - Survey
  - Site Engineering
  - Structural Engineering
  - Environmental Assessment
- **Construction Cost:**
  $10 Million (approximate)
- **Year Completed:**
  2016

Penn Commons Redevelopment, Lewisburg, Union County, PA

Stahl Sheaffer provided surveying, site engineering, structural design, and environmental assessment for a 2.21-acre site located between North 12th Street and North 10th Street in East Buffalo Township. The project included the construction code-based design of seven multistory wood framed residential structures with 31 apartment units along with related parking and infrastructure improvements. Due to poor soil conditions, the foundations were designed with structural concrete grade beams and slabs. The lateral system consists of perforated shear walls to resist wind and seismic loading and the floor diaphragms were designed to distribute load around multistory openings. Stahl Sheaffer also performed Phase I Environmental Site Assessment due diligence review for existing or past hazardous material concerns on the property.

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STAHL SHEAFFER ENGINEERING

East Parking Deck Structural Design

The Pennsylvania State University, University Park, PA

- **Owner:**
  The Pennsylvania State University
- **Services:**
  - Structural Inspection
  - Renovation Design
  - Five-Year Maintenance Contract
- **Size:**
  400,000 SF
- **Construction Cost:**
  $740,000

Stahl Sheaffer provided initial visual inspection of the parking deck, documenting and quantifying deficiencies requiring repairs, developing programmatic upgrades into the facilities at the owner's request, creating an estimated probable cost of construction for documented repairs and upgrades, producing construction documents used for bidding with multiple bid-alternate breakouts to allow project construction budgets to be maximized, and managing the projects throughout construction. Facility upgrades have included the addition of fall protection elements for employee and user safety, incorporation of additional pedestrian entrance, parking and traffic phasing coordination during construction, parking reconfiguration, addition of bicycle storage, visual upgrades, drainage upgrades, full scale traffic coating surface protection, replacement of stair enclosures, and creation of secure storage spaces.

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STAHL SHEAFFER ENGINEERING

Oakwood Presbyterian Church Expansion

- **Owner:**
  Oakwood Presbyterian Church
- **Services:**
  - Feasibility Study
  - Site Design
  - Structural Design
- **Construction Cost:**
  $2,573,083
- **Year Completed:**
  2018

Oakwood Presbyterian Church, State College, PA

Stahl Sheaffer provided a feasibility study, site design, and structural design for the expansion of the existing Oakwood Presbyterian Church. Due to the church congregation's growth, the project scope included the addition of classrooms, main gathering space, restrooms, nursery, administrative space, and improved parking and pedestrian access.

Stahl Sheaffer was the site and structural engineer on the design team led by a local architect, and provided building structural design, site layout, grading, stormwater management, utility design, and municipal and regulatory permitting coordination. Stahl Sheaffer also provided construction administration assistance during bidding, construction, and project close-out.

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STAHL SHEAFFER ENGINEERING

Juniata College
PENNSYLVANIA
1876

- **Owner:**
  Juniata College
- **Services:**
  - Structural Engineering
  - Construction Administration
- **Completed:**
  2017

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Ellis Hall Structural Design

Juniata College, Huntingdon, PA

Stahl Sheaffer provided structural engineering and construction administration services for a two-story steel framed addition with an elevator to the entry of Ellis Hall. This facility houses several cafés, dining hall, ballroom, bookstore, broadcasting center, police department, student organizations, and various other student centers and departments.

The structural framing laterally braced the addition by tying into the existing steel framing of Ellis Hall as well as steel moment frames.

Before (left) & After (below) Photos of Ellis Hall

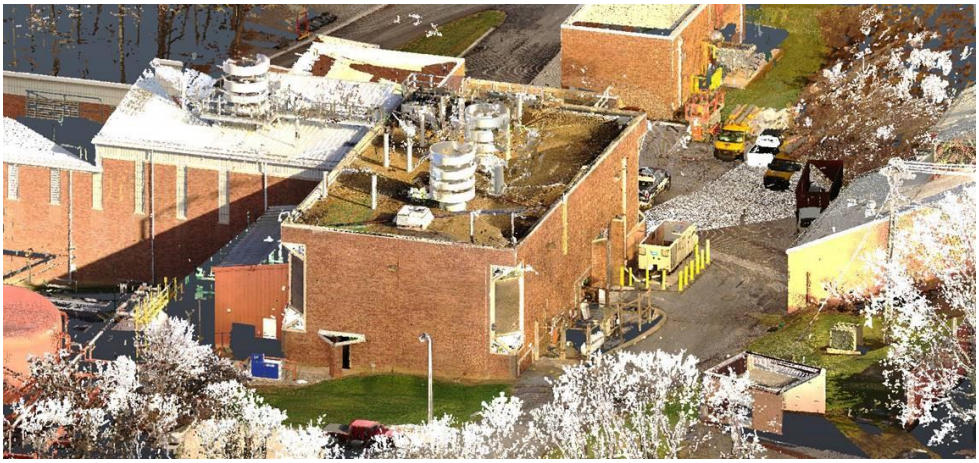
STAHL SHEAFFER ENGINEERING

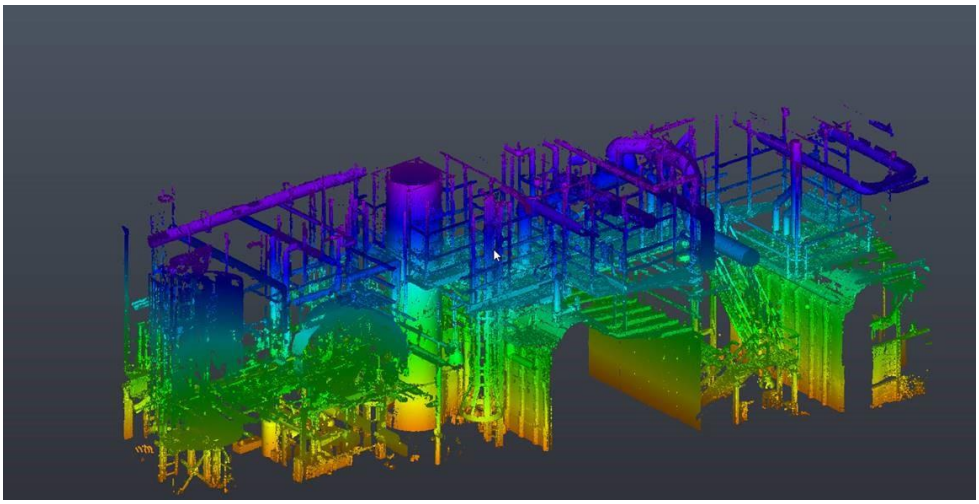
East Campus Steam Plant

The Pennsylvania State University, University Park, PA

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Structural Engineering
- **Year Completed:**
  Multi-phase project started in 2018. Ongoing.

Stahl Sheaffer performed 3D scanning and modeling on Penn State's East Campus Steam Plant (ECSP), including the interior, exterior, and roof of the facility, utilizing a FARO Focus 330X HDR phase-based laser scanner. The resulting 3D point clouds and 360° imagery were compiled into one dataset. Following unified point cloud compilation, the data was used to create a highly accurate 3D Building Information Model using Autodesk Revit of existing systems within the plant. The precision and accuracy of the scan and developed model were used simultaneously by our structural design staff to direct the placement of new support framing which was woven through the known obstructions to fit within open spaces where final construction tolerances were less than one inch in places. Using the accurate scan and model, a construction conflict was determined to be a result of a change made in the plant after design was complete, allowing a quick resolution to the conflict to be implemented keeping construction on schedule for a project which had a very short shut-down window to accommodate installation.





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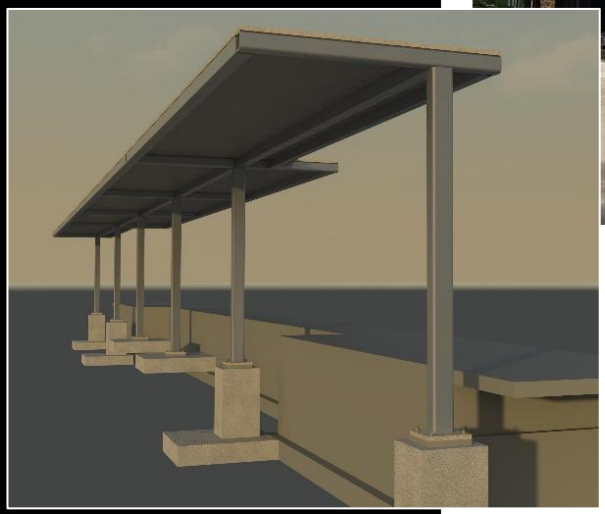
Rathbone Hall Structural Canopy

- **Owner:**
  Lehigh University
- **Services:**
  Structural Engineering for Canopy Design
- **Year Completed:**
  2017

Lehigh University, Bethlehem, PA

LEHIGH UNIVERSITY

Stahl Sheaffer provided structural engineering design for this project over the summer of 2017 with a quick design turn around to facilitate an expedited project completion prior to students returning from summer break. The design concept was developed in coordination with the architect to provide a new independent cantilevered canopy for the entrance to the Lehigh University Rathbone Hall. The canopy structure was modeled in Revit and designed to integrate with but also remaining structurally isolated from the existing building.



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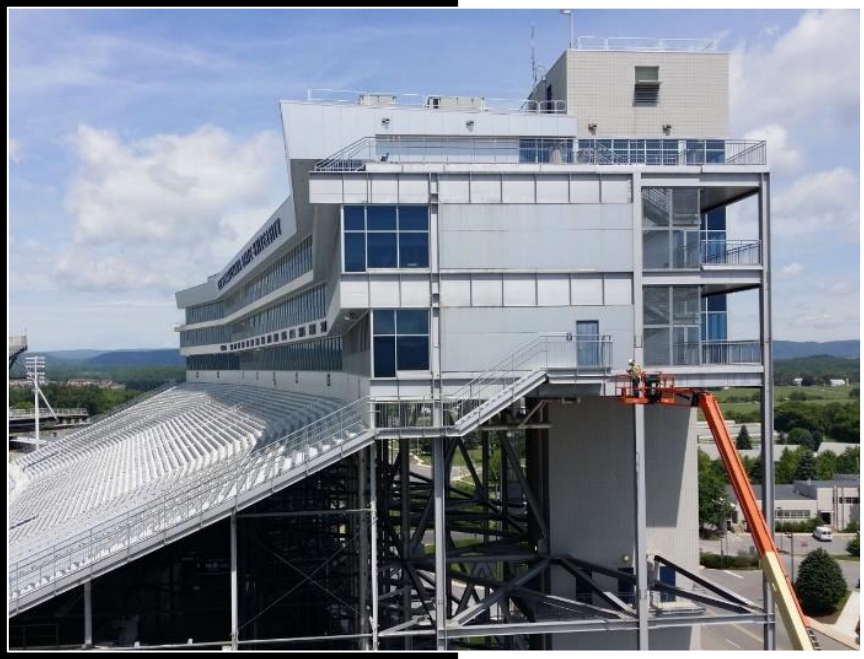
STAHL SHEAFFER ENGINEERING

Beaver Stadium Maintenance Evaluation & Design

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Structural Design for Ongoing Maintenance
- **Construction Cost:**
  $17,000,000
- **Year Completed**
  2015-2020

The Pennsylvania State University, University Park, PA

Stahl Sheaffer conducted a top-to-bottom evaluation of Beaver Stadium and developed a custom interactive asset management tool to be used for tracking, planning, and estimating the repair of identified structural deficiencies. The team reviewed conditions in and around the stadium to identify any required maintenance to repair deficiencies to the structure, mechanical, electrical, or fire protection systems as well as the roofing and building finishes.



Stahl Sheaffer customizes the asset tool for each project to include line items for designated repair or replacement and associated costs, and anticipated year of repair. A comprehensive maintenance/repair plan was presented to Penn State Athletics for incorporation into a master plan of building maintenance, repairs and upgrades. Based on this evaluation, Stahl Sheaffer has been selected as the design engineer for a five-year contract for the engineering design of ongoing maintenance and safety upgrades and enhancements. This includes establishing a scope of maintenance tasks, assisting with integrating upgrade projects, performing feasibility studies, and developing construction documents.

SAMPLE STRUCTURAL REPAIR PLANNING AND BUDGET TOOL

[Project]	Current Planning Year	2015	
Comprehensive Maintenance Re	Est. Inflation Rate	4%	
Cost Planning Estimate Workbook			
Prepared for:	Construction Cost Modifier	30%	
[Client]	Design Fee Modifier	25%	
[Address]			

Cost Value Descriptions	Estimated Construction Costs by Year 2015	2016	2017	Document Links
Base Unit Cost - No Adjustments	$51,085	$52,000	$54,080	Zone I
Construction Cost - 30% Project Contingency	$15,325	$15,600	$16,224	Zone II
Design Fees - 25% Distributed Professional Fees	$16,602	$16,900	$17,576	Zone III
Total Estimated Maintenance Cost	$83,012	$84,500	$87,880	Zone IV

Building Area	Maintenance /Planning	Deficiency/ Issue	Applies to	Material	Repair Type	Corrective Action	Unit Price	Quan.	Unit	Cond. Rate	Current Year	Next Year	Within 2 Years	Year Planned
Example 1	Maintenance	Annual Repair	DywiDag Reinforcement	Post-Tensioning Steel	Maintenance	Maintenance	$ 50,000.00	1	ea	6	$50,000	$52,000	$54,080	2014
Example 2	Maintenance	Damaged and rusting door lock	RTU-10C02	Steel/Plastic	Gen Maint./Repair	Replace Lock	$ 30.00	1	Task	5	$30			2014
Example 3	Maintenance	secured within the panel	ZBA Panel	Steel	Gen Maint.	Secure Wires	$ 85.00	1	Task	5	$85			2014
Example 4	Maintenance	Dents/Damage	EFN-1	Aluminum	Gen Maint./Repair	Paint with rust	$ 100.00	1	Task	8	$100			2015
Example 5	Maintenance	Material Failure	Roofing	Covering	Repair	Covering Repair	$ 2.70	45	sq ft	8	$122			2014
Example 6	Maintenance	Rusty and Old	Speaker	Aluminum	Replace	Replace Speaker	$ 124.00	1	Task	5	$124			2015
Example 7	Maintenance	Old and rusty	Junction Box	Aluminum	Replace	Replace Junction Box	$ 124.00	1	Task	5	$124			2015
Example 7	Maintenance	Broken door handle	Panel HAF	Steel	Replace	Replace Door Handle	$ 125.00	1	Task	5	$125			2014
Example 8	Maintenance	Missing breaker spacers	Panel PPCCA	Steel	Repair	spacer	$ 125.00	1	Task	5	$125			2014
Example 9	Maintenance	Rusted	Piping	Steel	Gen Maint./Replace	Paint with rust	$ 125.00	1	Task	5	$125			2015
Example 10	Maintenance	Rusted in some spots	Conduit	Aluminum	Gen Maint.	Remove Rust	$ 125.00	1	Task	5	$125			2014

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STAHL SHEAFFER ENGINEERING

Hershey Medical Center Façade Rehabilitation

PENNSTATE HERSHEY
Milton S. Hershey Medical Center

- **Owner**
  Penn State Hershey Medical Center
- **Services:**
  Structural Engineering
- **Year Completed:**
  2017

Penn State Hershey Medical Center, Hershey, PA

Stahl Sheaffer teamed with a façade renovation specialty contractor at Penn State's Hershey Medical Center for the design of a roof top davit system to facilitate a project to rehab portions of the building façade. As part of this project, Stahl Sheaffer surveyed the facility, including limited investigative demolition, to understand the existing building structure and designed the roof top davits to support façade access equipment (swing stages). The design was made more complex due to the lack of existing drawings and the need to minimize impact on the surrounding building to maintain operations in the controlled hospital environment. Stahl Sheaffer coordinated the davit design with field survey data and analysis of impact on the existing structure. Installation of the new davit design met project schedules and accommodated the OSHA required applied load to the roof top while minimizing impact on the surrounding structure and allowing building operations to continue without impact.

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STAHL SHEAFFER ENGINEERING

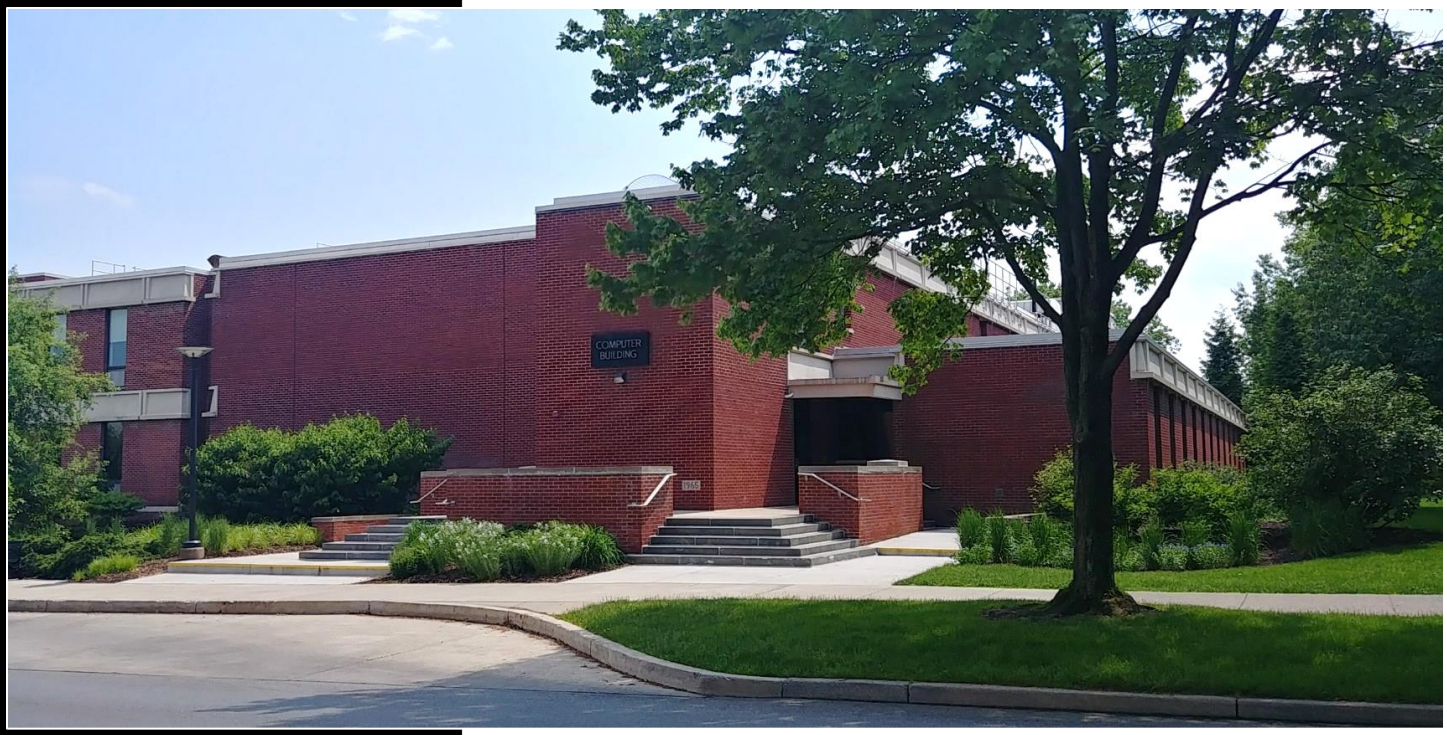
Computer Building Expansion

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Structural Engineering
- **Construction Cost:**
  $9,000,000
- **Year Completed**
  2008

The Pennsylvania State University, University Park, PA

Stahl Sheaffer Engineering served as the structural engineer for The Pennsylvania State University Office of Physical Plant's project to expand the Computer Building. The structural system included steel framing with composite decking and masonry sheer walls where applicable. Special consideration was required around the existing foundations to avoid influencing or undermining the existing structure.

Stahl Sheaffer designed isolated foundations for the large emergency generators to reduce vibration transmission to computer servers and other IT equipment. Stepped footings were incorporated as necessary to coordinate with the variable depth existing foundations. A design to reinforce selected structural members in the existing building was also performed to support new rooftop mechanical equipment.



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STAHL SHEAFFER ENGINEERING

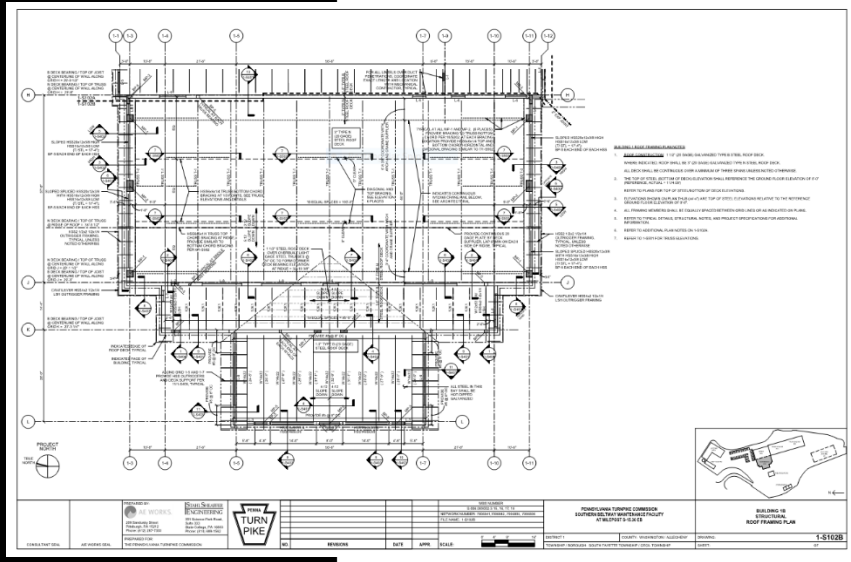
New Maintenance Facility Design

- **Owner:**
  The Pennsylvania Turnpike Commission
- **Services:**
  - Structural Engineering
  - Site Engineering
  - Stormwater Management Design
- **Construction Cost:**
  $17,000,000
- **Year Completed:**
  Design: 2019
  Construction: 2020 (anticipated)

The Pennsylvania Turnpike Commission, South Fayette, PA

The Pennsylvania Turnpike Commission's new maintenance facility project included the design of all buildings and infrastructure necessary to construct a fully-functional, highly-efficient, and sustainable highway maintenance and vehicle maintenance facility. Stahl Sheaffer provided structural engineering services for a multi-building maintenance operation, including office, warehouse/storage, salt storage, emergency generator, and support facilities.

As part of a team, Stahl Sheaffer also managed the design effort for the site engineering, including the County and Township land development submissions. The project involved site layout, grading, stormwater management, landscaping, and utility service design for the nine-acre maintenance facility.



Work also included coordinating with the Pennsylvania Turnpike Commission to complete facility layout, grading, drainage design, utility connections, erosion control, and contract administration.

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STAHL SHEAFFER ENGINEERING

Design Build Rooftop Access & Fall Protection

- **Owner:**
  The Pennsylvania State University
- **Services:**
  Rooftop Fall Protection

"Poole Anderson Construction has teamed with Stahl Sheaffer Engineering to complete the design-build services for the 'campus roof fall protection' project for an initial count of (14) buildings, which eventually expanded to include additional buildings through spring of 2016. Stahl Sheaffer Engineering's professionalism and approach to completing this project was impeccable. Their attention to detail was key in surveying existing building conditions and incorporating feasibility, practicality, and architectural aspects into their design in an effort to meet the safety, budgetary, and architectural constraints of the project. Stahl Sheaffer Engineering's role played a significant part in ensuring the overall success of the project. It has been a pleasure working with Stahl Sheaffer Engineering and we are looking forward to continue to do so on the next round of campus roof fall protection, which is currently underway."

Jason Sheffield, Project Executive,
Poole Anderson Construction

The Pennsylvania State University, PA

Stahl Sheaffer was teamed as the designer on this 2014 Design-Build team competitively selected to design and construct fall protection systems on 14 buildings to meet OSHA and Penn State standards for safe access required for preventative maintenance activities. The original set of buildings were evaluated and designed based on a coordinated assessment between Penn State and Stahl Sheaffer. Upon completion of the original grouping of buildings, additional buildings were selected over the next two years.

To provide these services, our structural engineers completed OSHA 30-hour and OSHA 40-hour training to assist in identification of safety needs and requirements during field views of project locations and the design development process. They have also undergone the following required training to safely access rooftops and confined areas during design, inspections, and construction administration:

- Confined Space Entry Training
- Fall Protection Training
- Aerial Lift Training

In 2016 Stahl Sheaffer was selected under a new contract for 20 additional buildings.

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STAHL SHEAFFER ENGINEERING

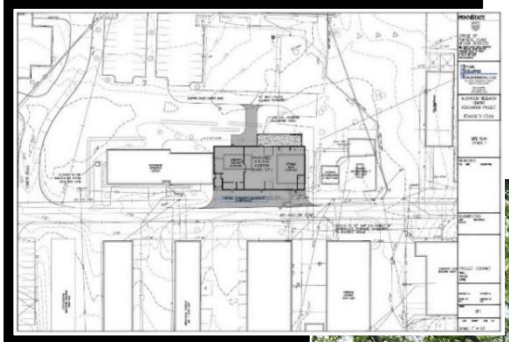
Mushroom Research Center Expansion

- **Owner:**
  The Pennsylvania State University
- **Services:**
  - Structural Engineering
  - Site Engineering
  - Feasibility Study
- **Construction Cost:**
  $2,000,000
- **Completed:**
  2016

Penn State Mushroom Research Center, University Park, PA

Stahl Sheaffer conducted a feasibility study and analysis of the site proposed for the expansion of the Mushroom Research Center. The existing mushroom research and growing operations were originally conducted in two different locations, and Penn State wanted to combine the process in one facility. The analysis included site layout, access, utility connections, permitting requirements, and stormwater management.

The Mushroom Research Center is one of the few facilities in the world dedicated to mushroom research. It supports studies and applied research aimed at improving commercial mushroom production. Stahl Sheaffer site and structural engineers worked with the design team and the owner to coordinate the building design with equipment specific to the process of mushroom farming, including tunnels and bunkers with specialized growing conditions. The structural system used an innovative composite masonry system with structural block, insulation, and thin veneer. Both wall and roof systems were selected based on durability and economy while maintaining a continuous thermal envelope. Stahl Sheaffer coordinated the location of the mechanical equipment, ductwork and fire-suppression system with the MEP contractor to fit within the roof truss profiles while supported by truss bottom chords.



Expansion and renovations at Penn State's Mushroom Research Center are helping to ensure that the University's legacy in mushroom science and technology will endure into the future.
https://news.psu.edu/story/452356/2017/02/22/new-facility-spawns-enhancements-penn-state-mushroom-research

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STAHL SHEAFFER ENGINEERING

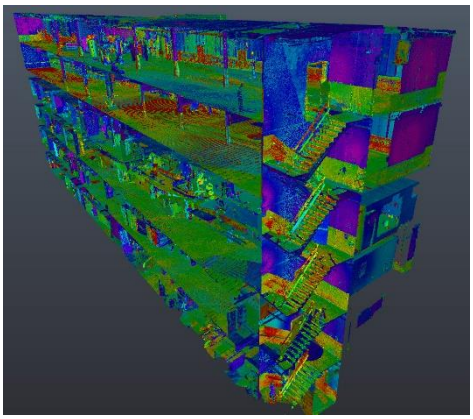
Building Scan for Upfit

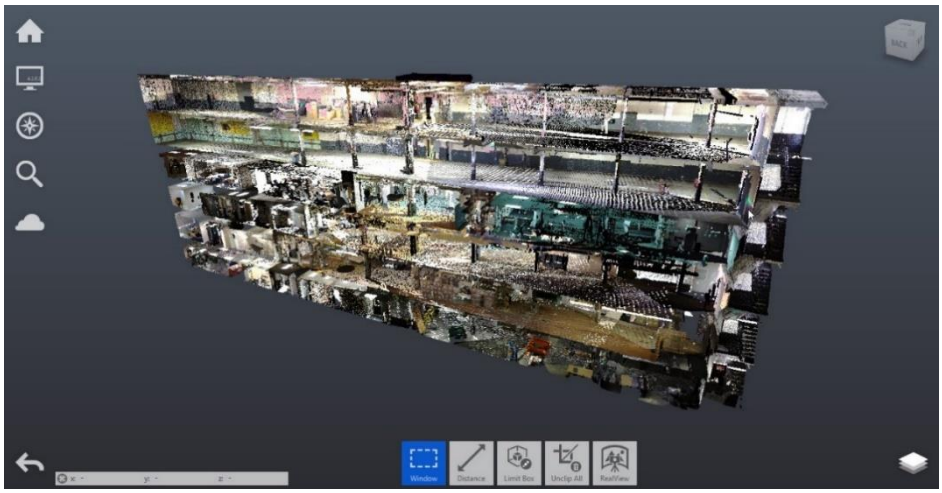
Rubberlite, Inc., Huntington, WV

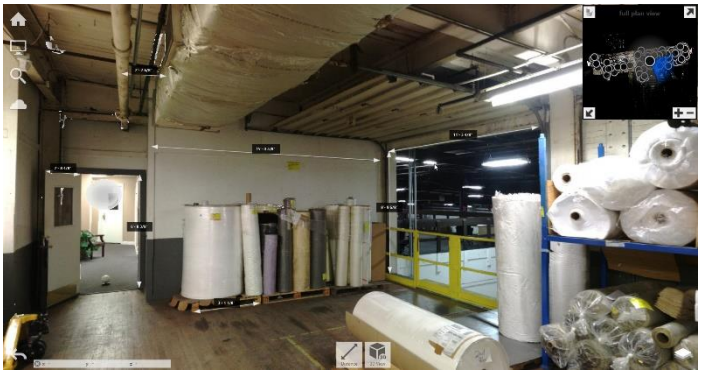
Rubberlite Incorporated

- **Owner:**
  Rubberlite, Inc.
- **Client:**
  ET Scanning
- **Services:**
  3D Scanning
- **Year Completed:**
  2017

Stahl Sheaffer scanned a six-story commercial building and provided point cloud data to be used for an architect fit-out. The 3D model created from the point cloud enabled development of an online “fly-through” as well as the ability to view photos of the building’s interior.







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STAHL SHEAFFER ENGINEERING

Panzer Stadium New Facility Design

The Pennsylvania State University, University Park, PA

- **Owner:**
  The Pennsylvania State University
- **Services:**
  - Site Engineering Design
  - Structural Engineering Design
- **Construction Cost:**
  $6,800,000
- **Year Completed:**
  2018

Stahl Sheaffer completed the full site and structural design for the upgrades to the lacrosse facility including pressbox, seating, and other stadium amenities. Design aspects for the facility include retaining walls to form terraced seating, a state-of-the-art building that will house television and radio broadcast spaces, concessions, restrooms, and an elevated VIP seating/terrace area. Building features include two-way cantilevers, long-span deck, and structural elements designed as architectural features.

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