



Biology , Engineering and Psychology Project

Project Summary
October 2018

Swarthmore College

Contents

- Design Overview
- Environmental Sustainability
- Landscape Design
- Construction Schedule
- Related Projects



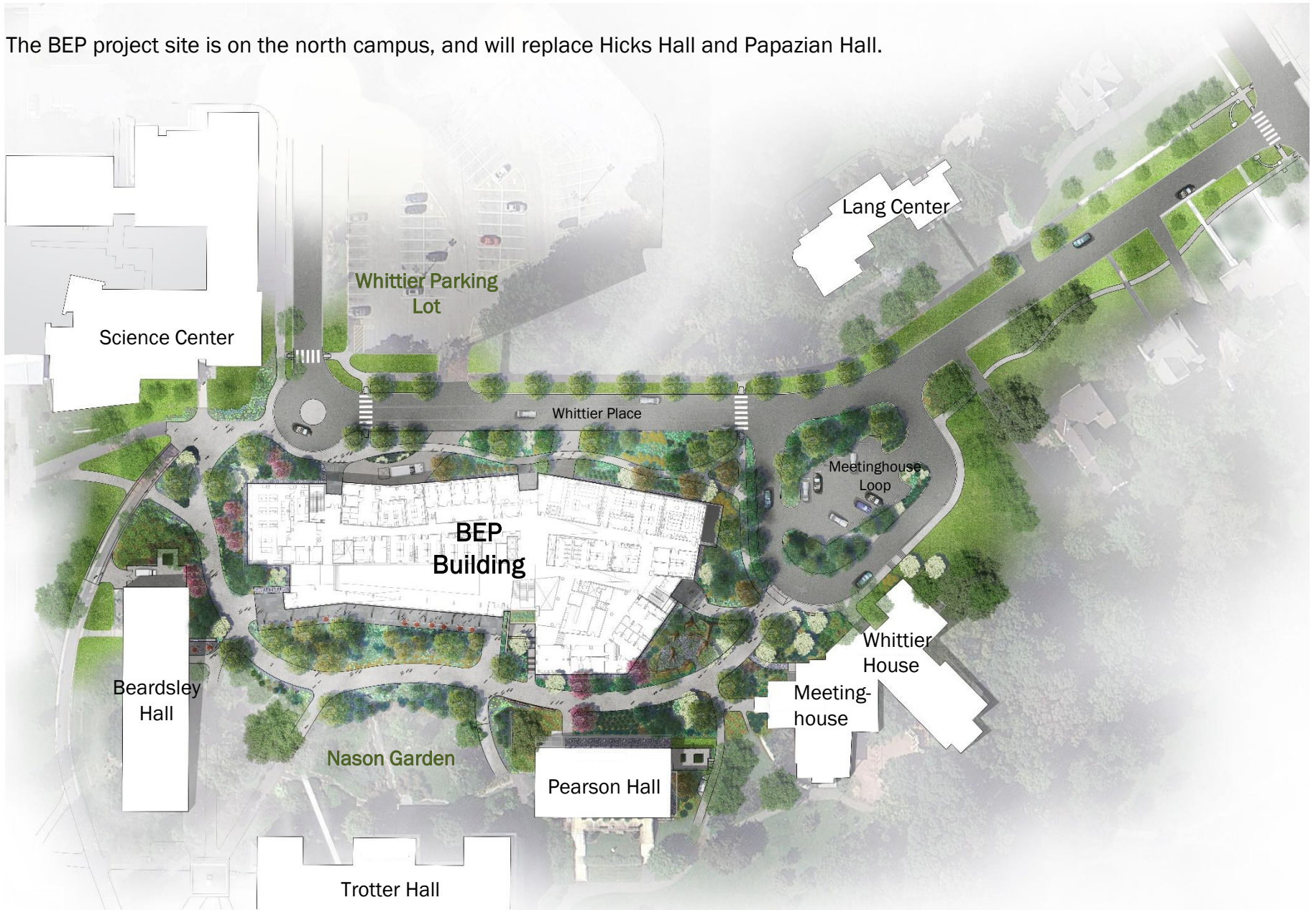
Design Overview



Aerial Photo of North Campus, 2015

Site Plan

The BEP project site is on the north campus, and will replace Hicks Hall and Papazian Hall.



Aerial View Looking Northeast



DuPont and Whittier Parking Lots

Science Center

Whittier House

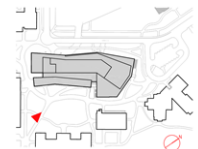
Meetinghouse

Pearson Hall

Nason Garden

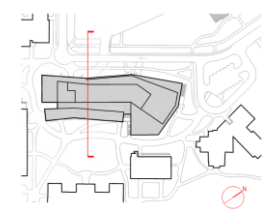
Beardsley Hall

Trotter Hall



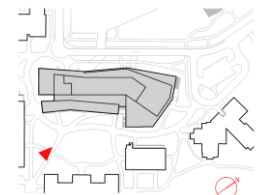
Site / Building Section

The larger, north-facing lab wing will house the Biology Department's research greenhouse on the roof of the third floor and the Engineering Department's solar lab on the roof of the fourth floor. The south-facing "garden pavilion" will be joined to the lab wing by a three-story atrium which houses the Commons.



View from Nason Garden

The Nason Garden will be enlarged as a result of the project. The existing garden will be retained and complimented by new landscape features. An outdoor grill area will support community-building for residents of the BEP and the adjacent buildings.



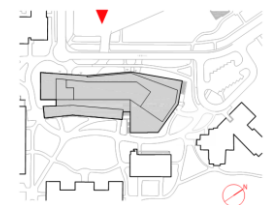
View From Meetinghouse and Whittier Place

The BEP building has stepped massing, in response to the smaller scale of nearby buildings. A two-story entrance will greet campus visitors and provide a convenient connection to the Lang Center for Civic and Social Responsibility and Whittier Hall.



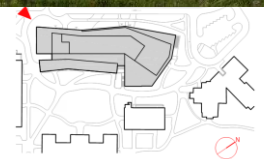
View From Whittier Parking Lot

The longest façade of the BEP building will face Whittier Parking Lot. The two-story high, glass-enclosed Engineering high bay project lab for the Engineering Department will provide an orienting feature with an ever-changing display of student and faculty research projects. A stair tower at the west end of the building will provide views into and out of the building on all floors.



View from North Quad

Biology and Engineering labs will face the North Quad, providing a visual connection to the heart of the academic campus. In the garden pavilion, seminar rooms for the Biology and Psychology departments will provide more intimately scaled views of the Nason Garden.

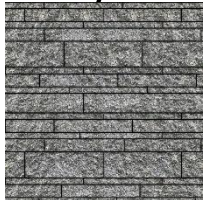


Commons and Adjacent Terrace

Sheltered outdoor seating and bicycle racks under the cantilevered garden pavilion will provide welcome amenities for residents of the BEP and adjacent buildings. The visual connection from the commons to the Nason Garden will be an enlivening feature as the gardens change and evolve through the seasons and over the years.



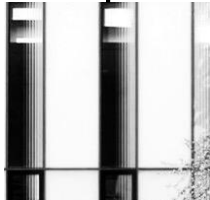
Exterior Materials Palette



Ashlar Granite



Granite Panel



Acid-Etched
Glass



Inner-Layer
Frit Glass



Aluminum
Sunshades



Perforated
Metal Panel
Screen Wall



Flat-Lock
Zinc Panels



Trespa
Internal Fascia

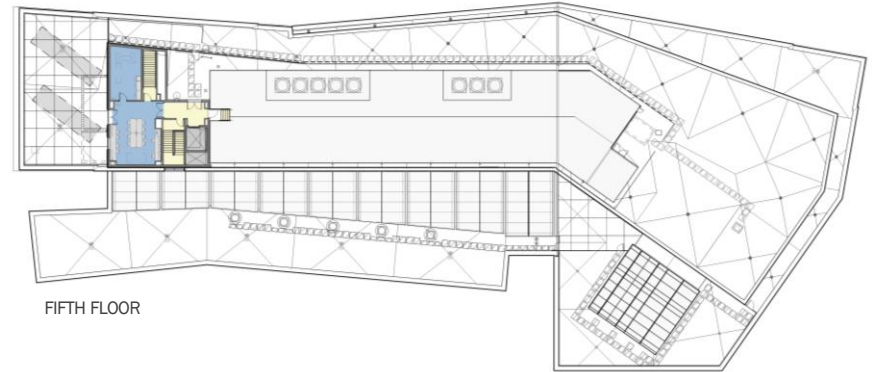
Ground Floor

All three academic departments will be represented on the main floor of the building. The commons will provide gathering space for Biology, Engineering and Psychology students, faculty and staff and will provide amenities for residents of nearby buildings and the broader campus community.



Other Floors

- Biology
- Psychology
- Engineering
- Shared Program Spaces



Commons

The commons will provide table seating for study groups and lounge seating for informal gatherings. It will complement the Eldridge Commons in the Science Center by providing writing surfaces for student study and additional flexibility to accommodate up to 125 attendees for community events and celebrations.



Introduction to Biology Laboratory

Teaching and research laboratories throughout the building will provide state of the art facilities to support the College's academic mission. Experiential learning, complemented by the opportunity for faculty and students to work closely together, are a hallmark of a Swarthmore College education.



Divisible Active Learning Classroom: 79 seats or 30/49 seats

As teaching and learning modalities continue to evolve, flexibility in classroom design has become paramount. This divisible classroom will support both traditional and peer-to-peer learning, with writing surfaces and audio-visual systems to support a variety of seating configurations and learning styles.



Tiered Classroom: 64 seats

Using height-adjustable seating, this room will allow students to work collaboratively in adjacent rows. The audio-visual system will support film screening, providing an opportunity for interdisciplinary collaboration with colleagues and students in the arts and humanities.



Typical Department Entrance

Informal gathering and work areas at the entrance to each department will provide a “front porch” experience to build community and provide additional opportunities for collaboration and relaxation.



Typical Corridor Environment

Corridors throughout the building will provide opportunities for posting to share the work of each department with the residents of the building and the broader community. All major corridors will terminate in views of the adjacent gardens to provide visual connections to nature as well as natural light.



Typical Student Lounge

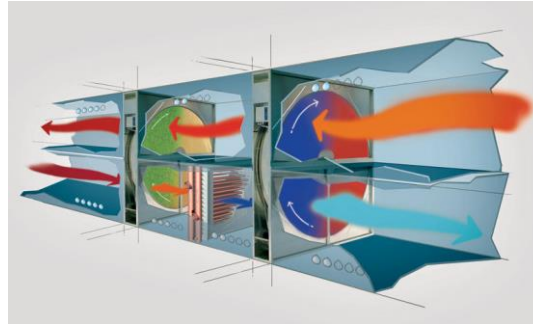
Each department will have a student lounge with work space and informal seating to allow students to host study groups and club meetings and to build informal connections within and across departments.



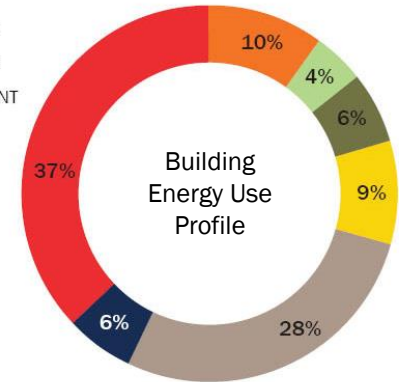
Environmental Sustainability: Comfort & Energy

High-Performance Heating, Ventilation and Air Conditioning Systems

Laboratory buildings typically use three to five times as much energy as other academic buildings. Ventilation requirements are a major contributor—both for air dilution (general exhaust) and for make-up air to replace air exhausted through fume hoods. The energy required to heat and cool ventilation air will be mitigated through the use of energy recovery coils in the building's penthouse, which will capture outgoing heating or cooling from exhaust air to pre-heat or pre-cool air to be circulated through the laboratories. Laboratory and vivarium spaces can be manually decommissioned when not in use to reduce energy consumption.

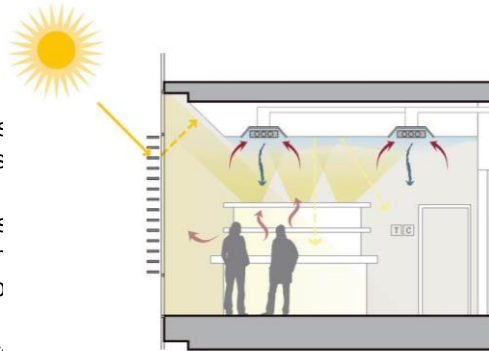


- SPACE HEATING
- SPACE COOLING
- MISC. EQUIPMENT
- AREA LIGHTS
- PUMPS & AUX.
- VENT. FANS
- HOT WATER



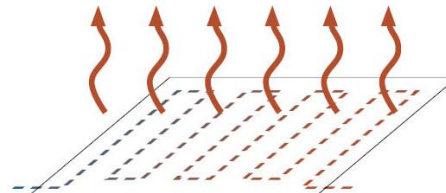
Chilled Beams

A convection-based heating and cooling system the laboratories will be coupled with sophisticated controls to modulate the amount of supply delivered to each space. This system relies on natural convection to circulate air, rather than a more energy-intensive fan system. Decoupled ventilation air from heating and cooling requirements eliminates drafts and improves comfort.



Radiant Flooring

A radiant floor in the three-story Commons will provide efficient, direct heat to the space. Radiant systems maximize thermal comfort while using less energy for heating and cooling than air-only systems.



Campus-Wide Steam System Replacement

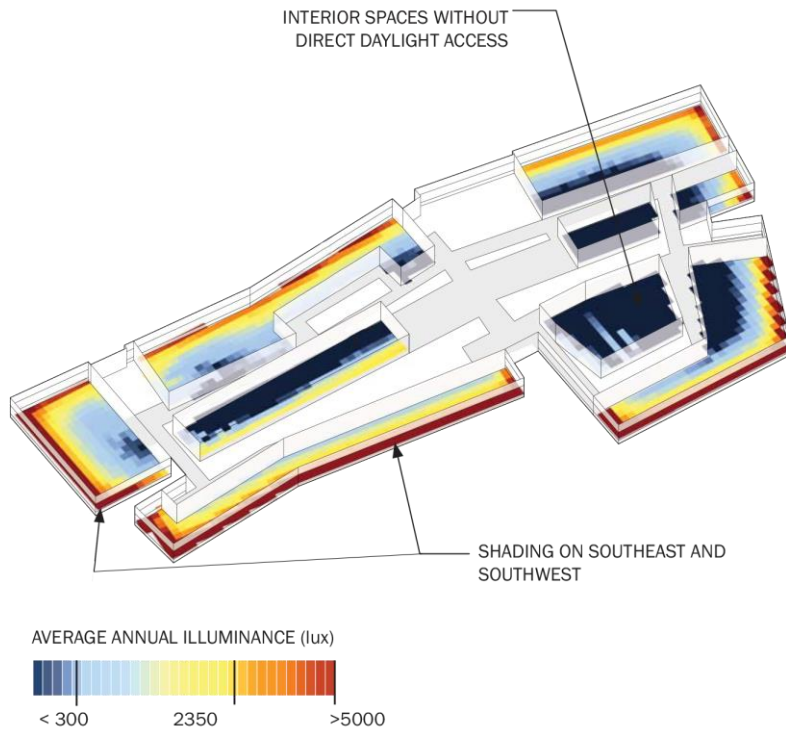
A new hot-water system will provide improved energy efficiency and resiliency and lower operating cost while contributing to the College's goals for carbon reduction. The College's existing Building Automation System (BAS) will be used to dynamically schedule the HVAC equipment to maximize energy savings.



Environmental Sustainability: Solar Management

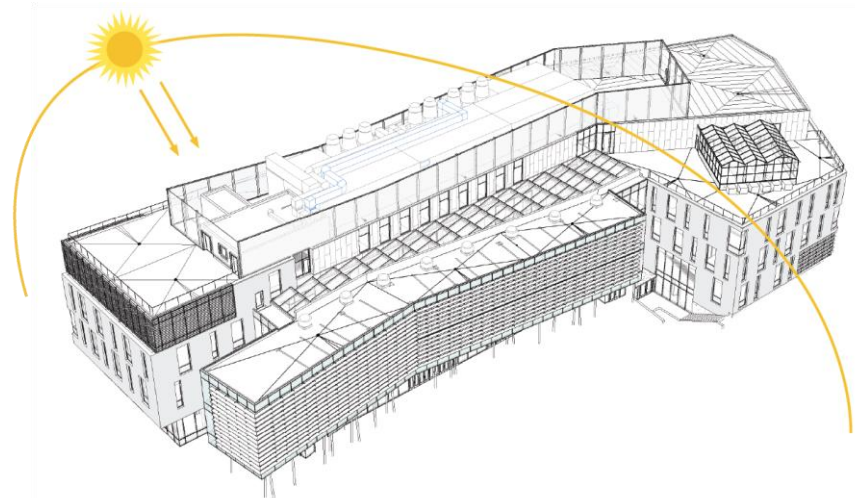
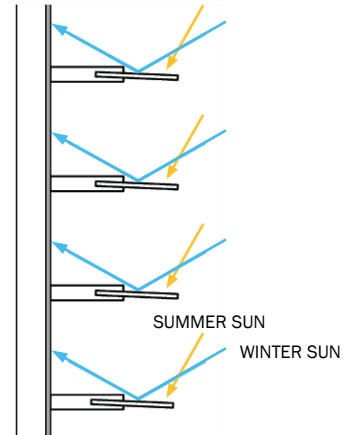
Daylight Distribution and Controls

The Commons and skylight will bring natural light deep into the building. Clerestory windows will draw light indirectly to the core of the building, and advanced lighting controls will enhance the quality of artificial lighting while conserving energy. Building support functions like elevators and restrooms fill the core of the building, while offices, classrooms and laboratories along the perimeter have natural light and views.



Optimized Building Envelope

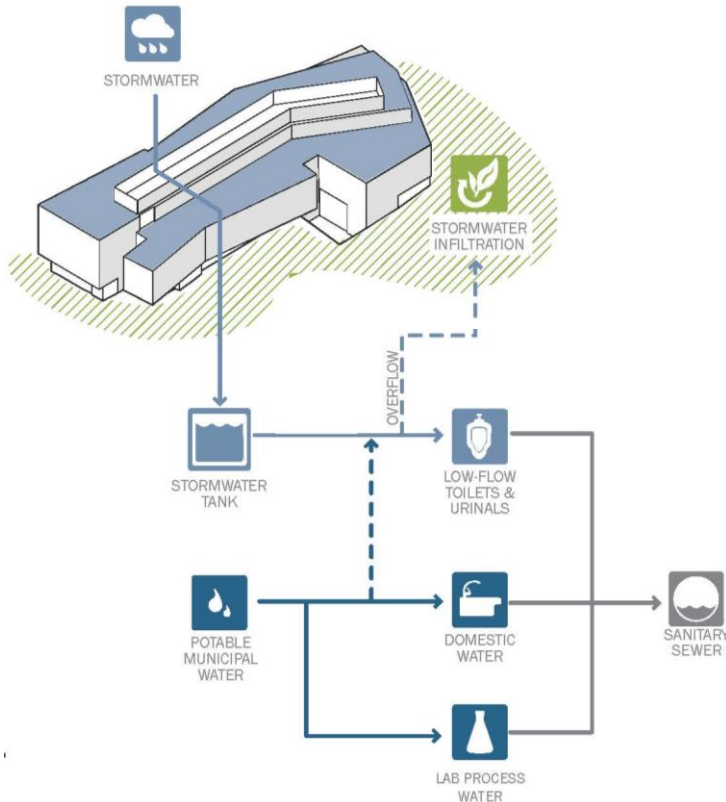
External shading will help reduce unwanted solar heat gain during the summer and enhance visual comfort by controlling daylight.



Environmental Sustainability: Water Conservation and Management

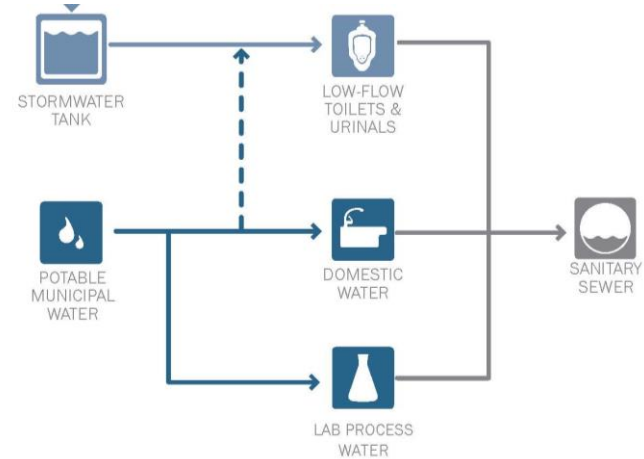
Stormwater Management

The stormwater management strategy focuses on both the harvesting of rainwater and restoration of groundwater. An underground collection tank will receive rainwater collected from the building's roofs to mitigate surface flow from those impervious surfaces. Vegetated and pervious surfaces around the building will facilitate infiltration to support the gardens and restore groundwater. The project will manage stormwater to the 98th percentile storm event, exceeding the requirements of local regulatory agencies.



Water Re-Use and Conservation

Stormwater will be re-used for toilet flushing throughout the building. The installation of high-efficiency Water Sense plumbing fixtures will help conserve water.



Groundwater Monitoring

Permanent bore holes in bioswales and bioretention basins will allow for sampling and measurement of groundwater to facilitate teaching and research.



Future Green Roofs / PV Systems

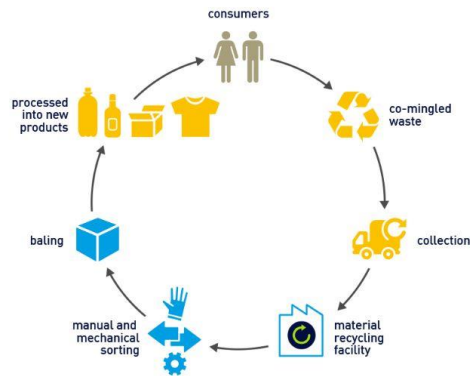
Over 4,500 SF of roof area on the building is designed to accept intensive or extensive green roofs or lightweight PV panels. BEP will be the first building on campus where the green roofs will be available for academic use.

Environmental Sustainability: Building Materials and Integration with Nature

Environmentally Responsible Materials

Structural and architectural materials will emphasize environmental responsibility and low emissions of volatile organic compounds (VOCs) in high-volume and high-visibility areas of the project. Over 95% of the demolished materials from Hicks Hall and Papazian Hall will be recycled or repurposed rather than sent to landfills. All wood used in the project will be FSC-certified and interior finishes and furniture with recycled and recyclable content will be selected for the project.

In the demolition of Hicks Hall and Papazian Hall, care will be taken to preserve and reuse exterior materials. The granite on Hicks Hall, which matches the College's oldest buildings and came from a now-depleted quarry, will be salvaged and stored for reuse on a future project. Sections of sandstone from Papazian Hall will be reused in site features.



Bird-Safe Window Glazing

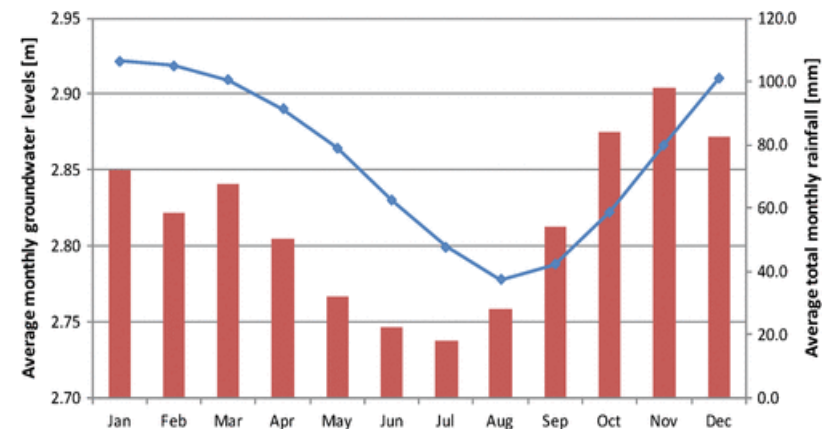
Large windows, including those at corners of the building, will have bird-safe window glazing to help prevent bird impacts. While clear glazing can confuse birds who see reflections of themselves or trees, fritted glass is perceived as a solid material, reducing accidental impacts. Several buildings on campus use fritted glass in various patterns, and BEP will provide another opportunity to test the effectiveness of this strategy.

Indoor/Outdoor Connections

One of the defining characteristics of the Swarthmore College campus is the integration of indoor and outdoor spaces. The commons terrace, Nason Garden grill area, skylit atrium, and access to exterior views throughout the building will enliven spaces with an awareness of solar orientation, seasonal changes in the adjacent gardens, and visual respite.

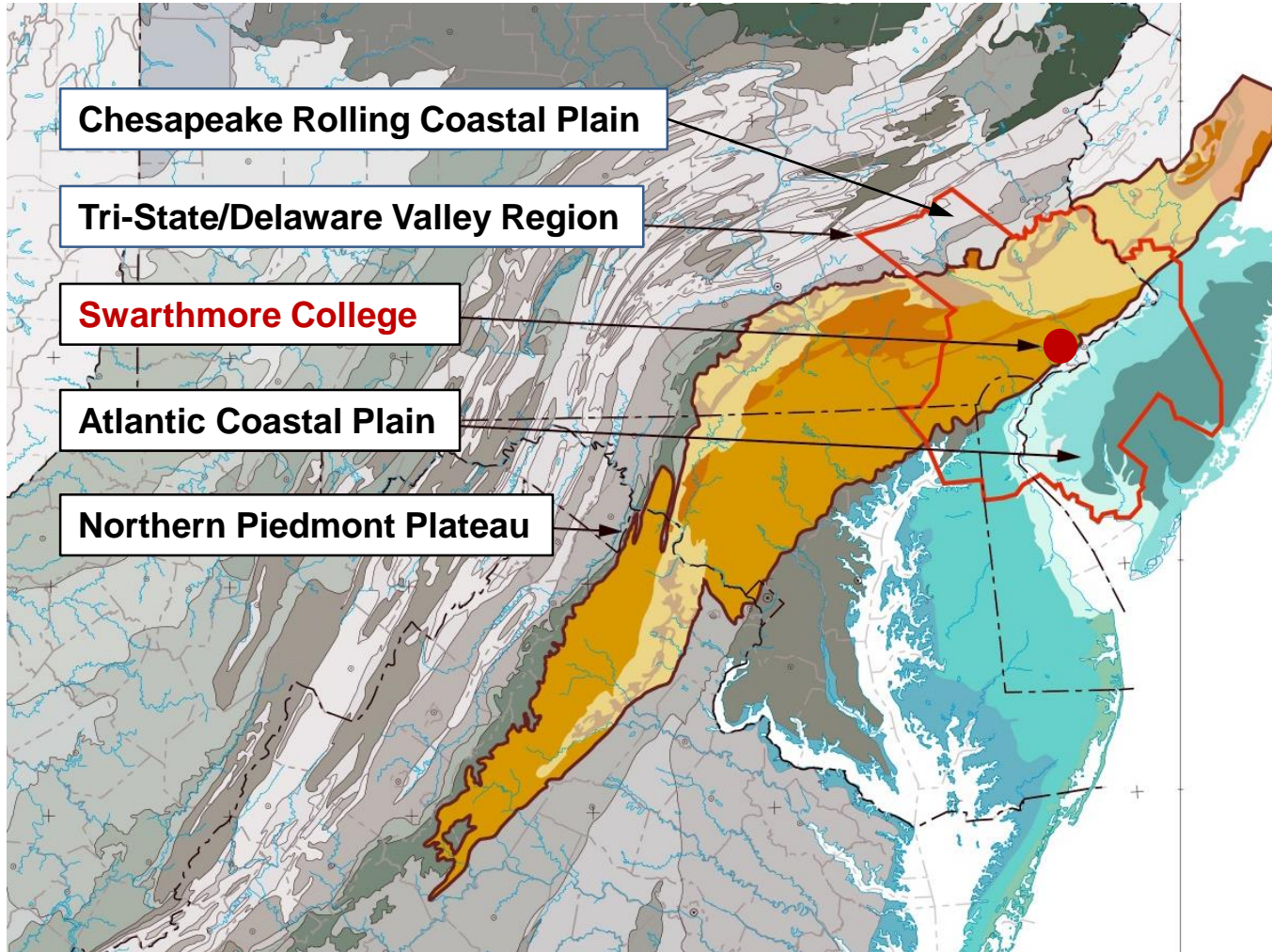
A Building and Gardens for Teaching and Research

The building will support the College's academic mission by allowing the study of energy and resource utilization throughout the academic year and over time. Meters for building inputs (electricity, hot and chilled water, domestic cold water and natural gas) will provide data which can be compared to the design criteria and monitored in real time. Sub-metering of airflow, fan energy and energy recovery will provide data for student and faculty research. The gardens surrounding the building will provide an outdoor laboratory for research on wildlife and ecological succession in native plants.



Landscape Design Concept

The Tri-State/Delaware Valley region offers a broad palette of native plants for study and research. These typologies range from the Pine Barrens of the New Jersey shore to Appalachian hardwood forest. At the BEP site, the north, east and west landscapes will showcase the Coastal Plain. The gardens on the south side of the building will incorporate plants from the Piedmont Plateau.



Expressing Regional Typologies at a Campus Scale

The translation of regional typologies to the microcosm of a single site relies on careful replication of a broad range of soil and light conditions. Constructed planting beds will vary in sand and loam to replicate the soil types found in each region. Fallen leaves will remain in place, rather than be removed, to help build healthy soil and provide a more accurate replication of the typologies and a more environmentally sustainable habitat and campus.



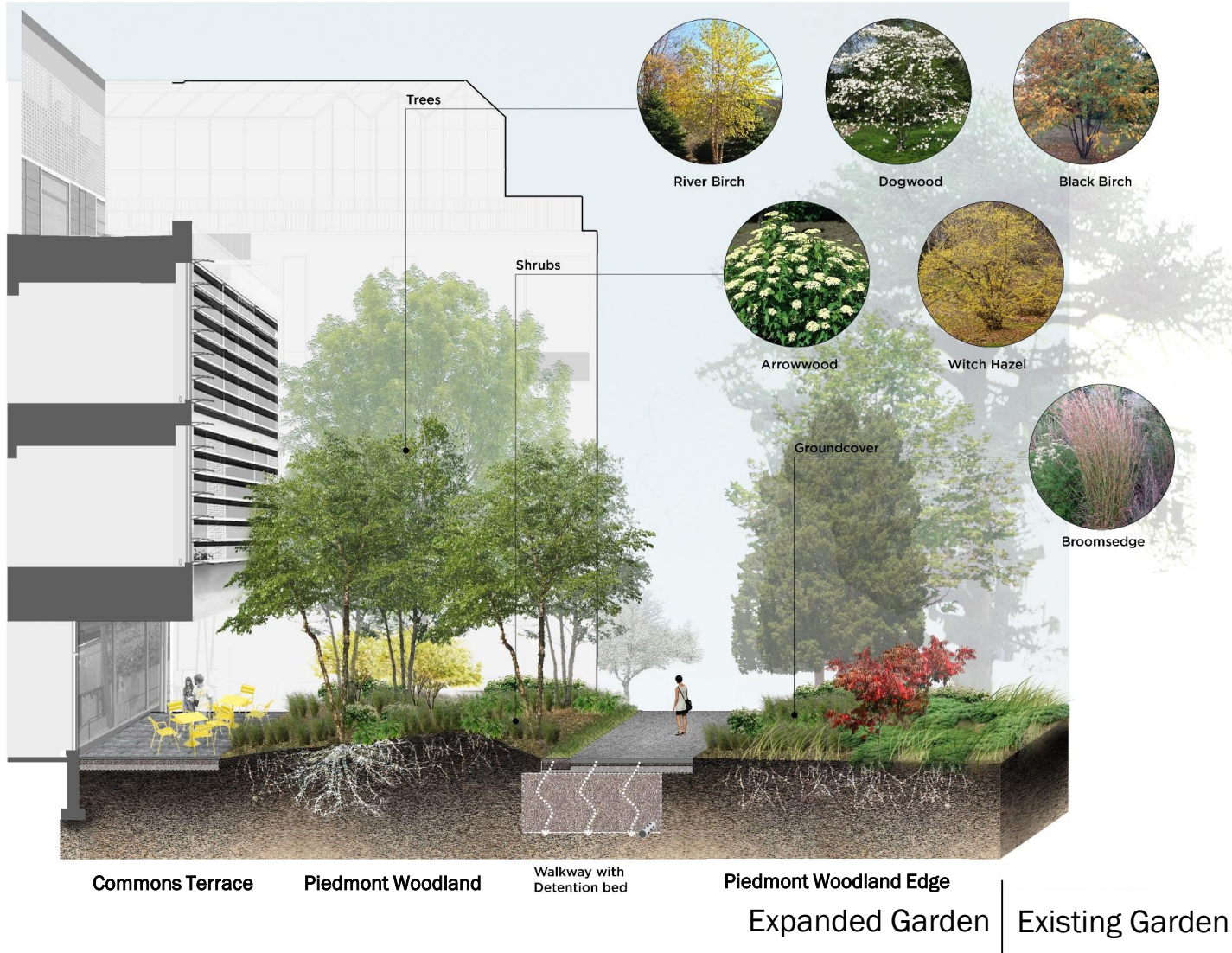
Stormwater Management Strategy

A combination of surface bioswales and bioretention basins and underground infiltration beds will manage stormwater on the site. Rainwater will be collected from the building roofs to restore groundwater and for use in the building's graywater system.



Integrating the New and Existing Gardens

The Piedmont Woodland garden will transition through the use of woodland edge plants to join and complement the textural Nason Garden, with its dramatic cutback trees and sweeping beds of ornamental grasses. Low plantings near the Commons Terrace will provide longer views from inside the building and a more seamless transition to the mature existing garden.

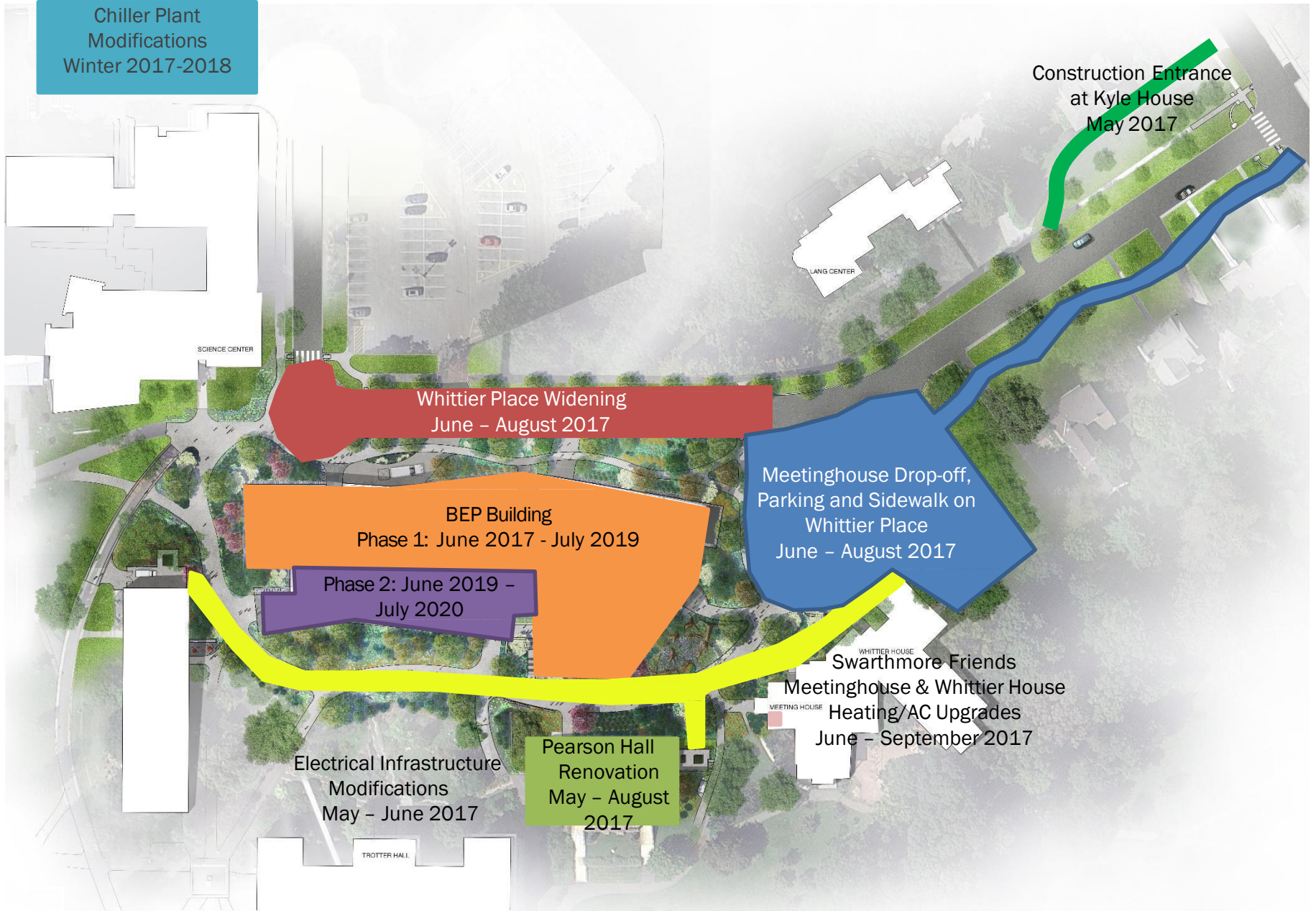


Sensory Grove

This garden will celebrate the structure of trees as an invitation to enter the Nason Garden. It will provide educational opportunities for children who visit the Psychology Department's Child Development Laboratory and for those enrolled in Swarthmore Friends Nursery School through hands-on experience with tree roots, bark and branches.



Construction Schedule



Related Projects

Whittier Hall

New academic building with temporary space for Engineering and Psychology functions displaced by the demolition of Papazian Hall. The building is designed for its subsequent, permanent use as studios and seminar rooms for the Art and Art History Department.



Pearson Hall, Garden Level Renovation

Classroom and seminar room to replace comparable spaces in Papazian Hall. Support space and storage for the Biology and Engineering departments.



Cunningham Fields South Parking Lot

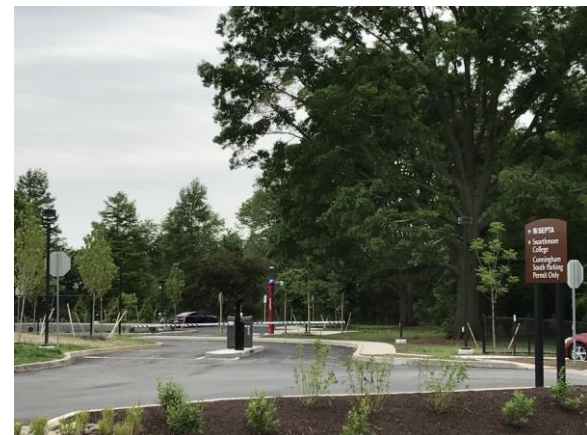
New student parking lot to facilitate redistribution of parking on the north campus.

Swarthmore Friends Meetinghouse & Whittier House, Heating Systems Replacement

New systems independent of the central campus system, and a new central air conditioning system for the Meeting Room.

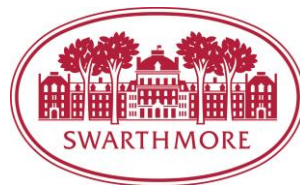
Campus-Wide Steam Heating System Replacement

Infrastructure conversion project to support the College in meetings its goals for energy efficiency and carbon reduction. The BEP project includes Phase 1 of this multi-phase, multi-year project.



Additional Information

Additional information about the Biology, Engineering and Psychology Project is available at www.bep@swarthmore.edu



Swarthmore College
500 College Avenue
Swarthmore, PA 19081
www.swarthmore.edu