LEED Platinum Building Design & Construction (“BD&C”)

of a new School for Elizabethtown College

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Project Summary:

The LEED Platinum ND of a new school we have designed has been created to fit the current vernacular of Elizabethtown College, with similar and traditional materials used for regional construction, as well as creating a positive cultural environment and common area. The project has a total of six buildings, two of which are Residential Buildings, an Architecture and Engineering academic building, a place for EGR Labs and Architectural Studios, a library, and a mini mart similar to Jays Nest, and a beautiful Japanese Garden which will be in collaboration with Bower Center’s Health and Wellness program. This new campus's purpose is to educate and house skilled students as part of a 5-year Architecture Program and relocate the Engineering Department. As Elizabethtown College keeps growing more and more every day, so should the campus. As for our ideas for this project, we expect this extension of Etown to contain a similar vernacular as to what the school is now.

Figure 1: Campus

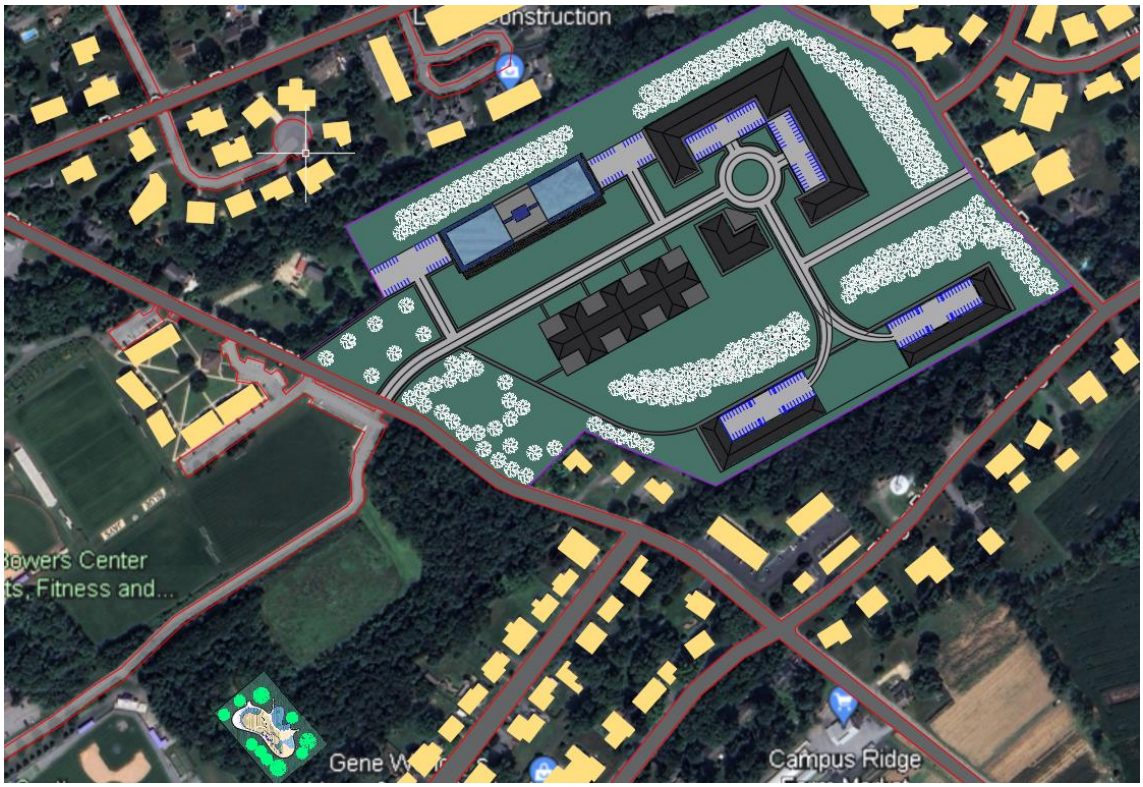


Figure 2: Residence Halls

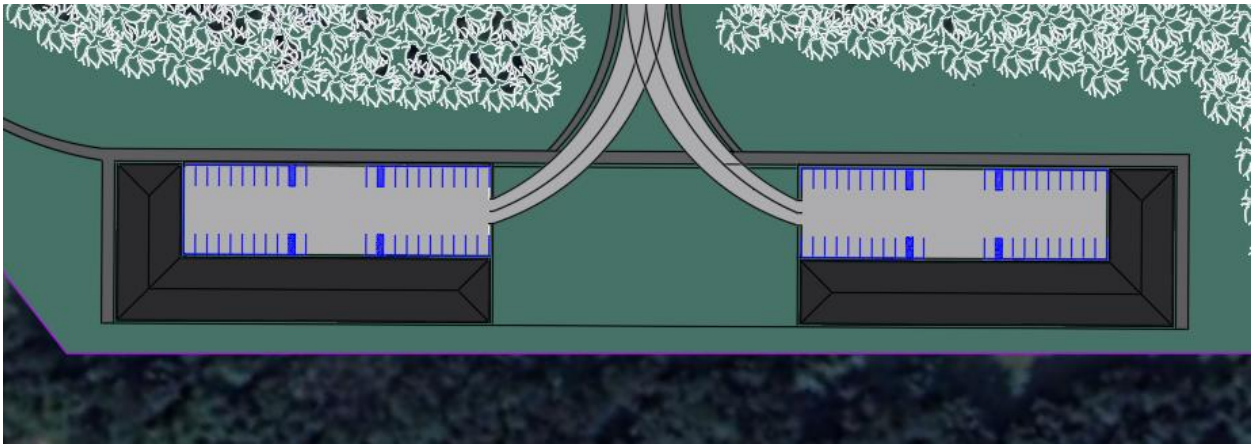


Figure 3: Academic Building

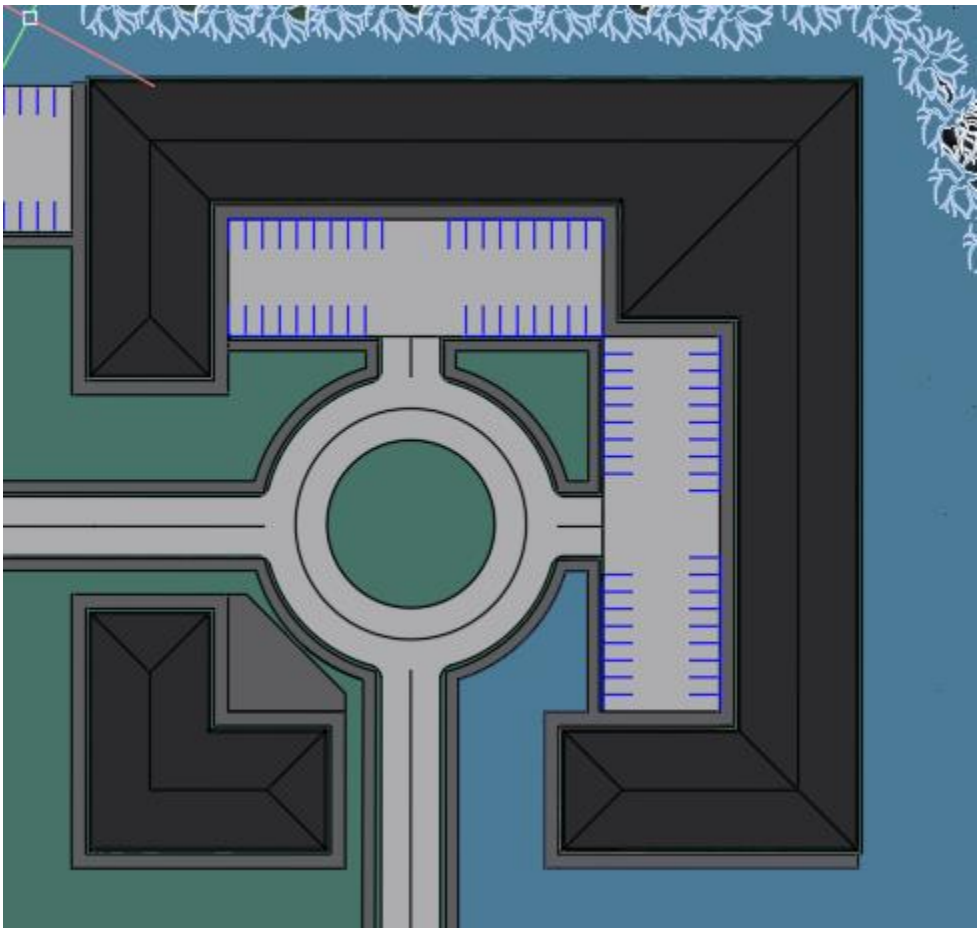


Figure 4: EGR Labs and Architecural Studios

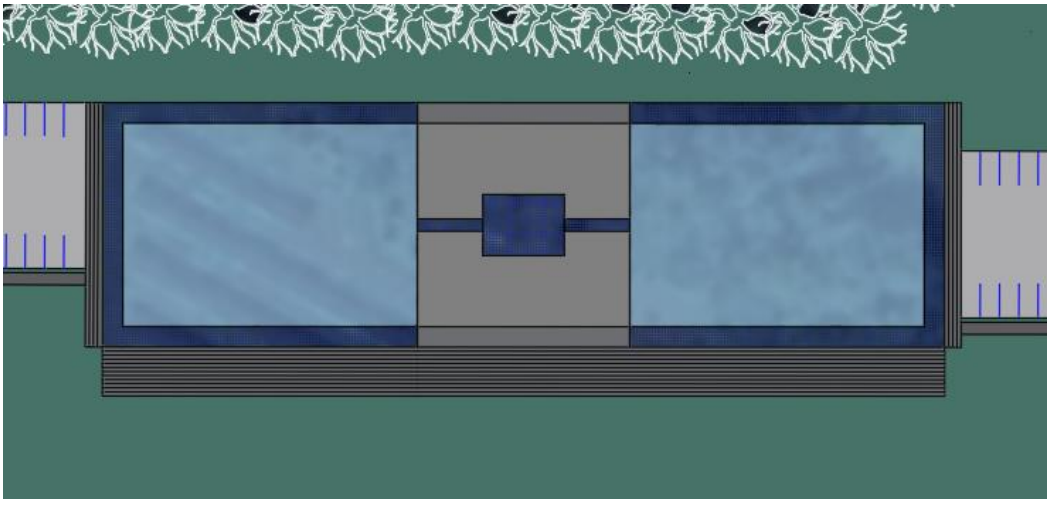


Figure 5: Library

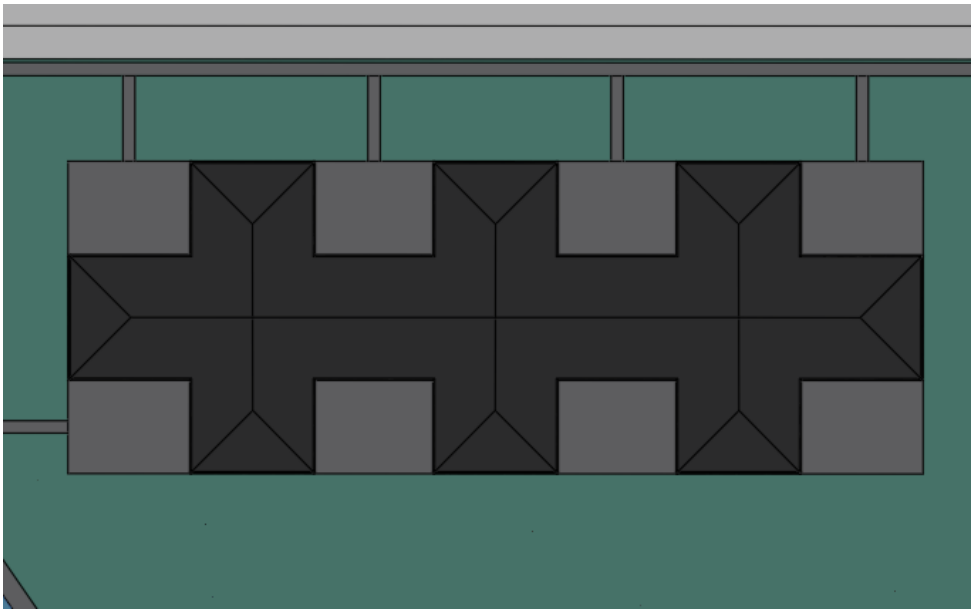
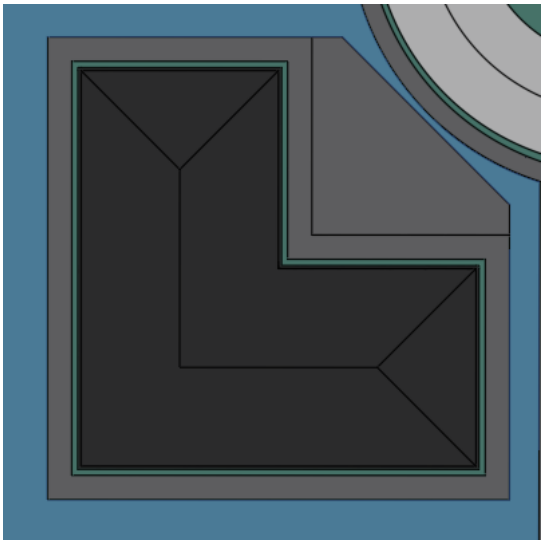


Figure 6: New Jay's Nest



Air Quality and Health -

- In the realm of A&E Thermodynamics, Air Quality & Health, the relationship between environmental factors and human well-being unfolds with captivating complexity. At its core lies the dynamic interplay of thermodynamic principles governing energy transfer and air quality dynamics, intricately intertwined with the delicate balance of atmospheric composition. As students delve into the intricate mechanisms driving heat exchange, fluid flow, and energy transformation within built environments, they are simultaneously confronted with the profound implications for human health and ecological sustainability. From the microscale interactions of pollutant dispersion to the macroscopic effects of climate change, the interdisciplinary nature of this field demands a nuanced understanding of not only scientific principles but also societal implications. Through rigorous analysis and innovative solutions, students are empowered to navigate the intricate nexus of A&E Thermodynamics, Air Quality & Health, forging pathways towards a healthier, more sustainable future.

Comfort and Health -

- In the captivating world of Thermal Comfort & Health, the balance between our physical environment and our well-being takes center stage. From the cozy warmth of a sunlit room to the refreshing coolness of a shaded area, our comfort is intricately linked to the temperature, humidity, and airflow around us. Whether studying the impact of indoor air quality on respiratory health or the effects of extreme temperatures on cardiovascular function, students are challenged to grasp not only the scientific intricacies but also the real-world implications for individuals and communities. Armed with this knowledge, they embark on a journey to design spaces that prioritize human comfort and well-being, ultimately shaping a healthier and more sustainable future for all.

Climate and Site Design -

- In the dynamic landscape of college design, the fusion of Climate & Site Design emerges as a pivotal cornerstone, guiding architects and planners in crafting spaces that harmonize with their natural surroundings. From passive solar design to rainwater harvesting systems, each element is meticulously crafted to enhance comfort, reduce energy consumption, and foster a sense of connection to nature. By harnessing the power of interdisciplinary collaboration and cutting-edge technologies, students aspire to create campuses that not only inspire learning but also serve as beacons of environmental stewardship in an ever-changing world.

Solary Geometry -

- Solar Geometry emerges as a captivating puzzle that people eagerly unravel to shape sustainable and energy-efficient campuses. As they go into the intricate paths of the sun's path, angles, and solar altitude, students unlock the secrets of harnessing solar energy to illuminate and warm their creations. Through hands-on experimentation and modeling, they explore the optimal orientation and placement of buildings and outdoor spaces to maximize solar gain while minimizing heat loss. With a eye for detail and a passion for innovation, students strive to design environments where solar geometry is not just a concept but a guiding principle, illuminating pathways towards a brighter, more sustainable future for higher education institutions.

Passive Solar Heating -

- The concept of Passive Solar Heating emerges as a place of sustainability and innovation. With a blend of physics and creativity, students explore how to figure out the sun's energy to warm buildings naturally, reducing reliance on conventional heating systems. Through careful consideration of building orientation, window placement, and thermal mass, they uncover the art of maximizing solar gain during colder months while shading and ventilation techniques are employed to mitigate overheating in warmer seasons. As they immerse themselves in this interdisciplinary field, students are driven not only by the quest for energy efficiency but also by a vision of creating campuses that seamlessly integrate with their natural surroundings, fostering comfort, wellness, and environmental stewardship for generations to come.

Active Solar Heating -

- Active Solar Heating emerges as a dynamic force, propelling students towards sustainable and innovative solutions. With a blend of technology, students are going into the realm of using solar energy through active means to heat buildings efficiently. Through the integration of solar collectors, pumps, and storage systems, they explore how to capture and utilize solar radiation to provide warmth and comfort, even on the coldest days. As they immerse themselves in this exciting field, students are driven by the promise of reducing carbon footprints and promoting renewable energy adoption. Their designs not only embrace innovative technologies but also serve as beacons of inspiration, highlighting the transformative power of active solar heating in shaping a more sustainable future for college campuses and beyond.

Passive, Cooling, and Shading -

- Shading and passive cooling techniques are essential strategies for optimizing building performance comfort. Shading involves the strategic placement of elements like awnings, louvers, or vegetation to block direct sunlight from entering a building, thereby reducing heat gain. Passive cooling techniques utilize natural airflow, thermal mass, and ventilation to maintain comfortable indoor temperatures without relying on mechanical systems. By harnessing principles of physics and design, buildings can minimize reliance on energy-intensive cooling methods, thus reducing both energy costs and environmental impact. Understanding these strategies is crucial for architects and engineers to create sustainable, comfortable spaces that promote environmental sustainability and occupant well-being.

Natural and Man-Made Lighting -

- Natural and manufactured lighting are integral components of architectural design, influencing the ambiance, functionality, and energy efficiency of built environments. Natural lighting, derived from sunlight, not only enhances visual comfort but also promotes well-being by providing a connection to the outdoors and regulating rhythms. Architects often incorporate features such as large windows, skylights, and light shelves to maximize the penetration of natural light into interior spaces. On the other hand, manufactured lighting, including electric bulbs and fixtures, supplements natural light sources, ensuring consistent illumination regardless of external conditions. Effective lighting design considers factors such as intensity, color temperature, and distribution to create visually appealing and functional spaces while minimizing energy consumption. Balancing natural and artificial lighting effectively is essential for creating sustainable, comfortable, and aesthetically pleasing environments.

Natural Ventilation -

- Intelligent natural ventilation systems, equipped with automated windows and controls, represent solutions for enhancing indoor air quality and occupant comfort in buildings. These systems utilize sensors to monitor indoor and outdoor conditions, such as temperature, humidity, and air quality, to intelligently adjust window openings and ventilation rates. By integrating advanced algorithms and smart controls, these systems optimize airflow to maintain optimal conditions while minimizing energy consumption. Automated windows can open and close in response to environmental cues, facilitating natural ventilation and reducing reliance on mechanical HVAC systems. Additionally, these systems can be programmed to synchronize with building occupancy schedules, ensuring efficient operation throughout the day. Implementing intelligent natural ventilation with automated windows and controls not only improves indoor environmental quality but also contributes to energy savings and sustainable building practices.

Buildign Thermal Envelope -

- The thermal envelope is a critical component of building design, serving as a barrier between the interior and exterior environments to regulate temperature and energy transfer. Comprising elements such as insulation, windows, doors, and exterior walls, the thermal envelope plays a pivotal role in maintaining indoor comfort and energy efficiency. Professionally designed thermal envelopes prevent heat loss in cold climates and heat gain in warm climates, reducing the need for mechanical heating and cooling systems. Advanced materials and construction techniques enhance the performance of thermal envelopes, ensuring tight seals and minimizing air leakage. Architects and engineers prioritize the design of high-performance thermal envelopes to create buildings that are comfortable, sustainable, and cost-effective to operate.

HVAC Teqniques -

- HVAC techniques are crucial for creating comfortable indoor environments while optimizing energy efficiency. Heating systems, such as furnaces or boilers, provide warmth during wintry weather, while air conditioning units cool indoor spaces during hot seasons. Ventilation systems ensure proper airflow and indoor air quality by exchanging stale air with fresh outdoor air. Advanced HVAC techniques, such as variable refrigerant flow (VRF) systems and geothermal heating and cooling, maximize energy efficiency and reduce environmental impact. Additionally, smart HVAC controls and zoning strategies allow for precise temperature regulation in different areas of a building, further improving comfort and energy savings. Understanding and implementing effective HVAC techniques are essential for architects, engineers, and building managers to create sustainable, healthy, and comfortable indoor environments.

Acoustical -

- Acoustical architecture is a vital aspect of building design focused on controlling sound and optimizing auditory environments. Architects use various techniques to manage sound transmission, absorption, and reflection within buildings, ensuring optimal acoustics for different purposes such as performance venues, offices, and residential spaces. Elements like wall materials, ceiling treatments, and room shapes are carefully selected and arranged to minimize unwanted noise while enhancing speech clarity and musical quality. Acoustical consultants collaborate with architects to address specific acoustic challenges and achieve desired soundscapes, balancing aesthetics with functional requirements. By integrating acoustical principles into architectural design, professionals create spaces that promote communication, productivity, and overall well-being.

LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name:
Date:

Y	?	N			
			Credit	Integrative Process	1

0	0	0	Location and Transportation		16
16			Credit	LEED for Neighborhood Development Location	16
	1		Credit	Sensitive Land Protection	1
2			Credit	High Priority Site	2
5			Credit	Surrounding Density and Diverse Uses	5
5			Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

0	0	0	Sustainable Sites		10
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
2			Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
3			Credit	Rainwater Management	3
	1		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

0	0	0	Water Efficiency		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
	5		Credit	Indoor Water Use Reduction	6
2			Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

0	0	0	Energy and Atmosphere		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
6			Credit	Enhanced Commissioning	6
18			Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
2			Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2

0	0	0	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
5			Credit	Building Life-Cycle Impact Reduction	5
2			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

0	0	0	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
	1		Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
3			Credit	Daylight	3
1			Credit	Quality Views	1
1			Credit	Acoustic Performance	1

0	0	0	Innovation		6
5			Credit	Innovation	5
	1		Credit	LEED Accredited Professional	1

0	0	0	Regional Priority		4
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1

0	0	0	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110