

8.3 Appendices

8.3 Project Checklist

The following project checklist includes recommended targets for all new construction, renovation, and interior-fit-out projects at Swarthmore College. Using this checklist as an internal benchmarking system will help the College achieve its sustainability targets and aid the process of analysis tracking and reporting. This checklist is not a stand-alone document, it is meant to be used with the [Sustainable Building Guidelines](#).

SUSTAINABLE SITE & LANDSCAPING						
ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
NATIVE/ADAPTIVE VEGETATION	NC R		Plant a minimum of 45% of the site vegetated area with native or adapted vegetation.	Native vegetation provides habitat for local fauna and promotes greater biodiversity. Native vegetation also requires less maintenance and irrigation than most non-native or non-adapted types of vegetation.	_____% VEGETATED AREA	
INCREASE SITE PERVIOUSNESS	NC R		Use pervious hardscape materials for 50% of the site area, or design green roofs to reduce peak stormwater runoff.	Pervious hardscape materials and some types of green roofs help reduce the rate of stormwater runoff. Increasing the site perviousness will also help recharge groundwater reserves.	_____% PERVIOUS HARDSCAPE _____% SITE PERVIOUSNESS	
REDUCE URBAN HEAT ISLANDS	NC R		Use light colored paving (SRI > 25) for site hardscape. Use vegetation to shade hardscape materials.	Using light colored paving materials will reduce the urban heat island effect and increase outdoor thermal comfort during the summer. As a complementary strategy, use vegetation to shade hardscape areas.	_____% SHADEDHARDSCAPE	
PROMOTE OUTDOOR THERMAL COMFORT	NC R		Provide shade during the summer for 50% of hardscape and all outdoor seating areas. Design landscapes to block cold winter winds.	Students actively use the outdoor space at Swarthmore College throughout the entire year. Design landscapes to promote outdoor comfort.		
MANAGE STORMWATER RUNOFF	NC R		Manage on-site runoff for the 98th percentile storm event using low-impact development techniques and green infrastructure.	Reducing excessive stormwater runoff will prevent soil erosion and protect receiving waters from pollution.		
REDUCE LIGHT POLLUTION	NC R		Reduce exterior lighting power densities to below ASHRAE 90.1 levels and use only full-cutoff luminaries to minimize light pollution. Weigh the environmental benefits against potential safety issues.	Reducing excessive light pollution helps to protect nocturnal species. Light trespass can also cause glare and disrupt circadian rhythms.	_____% SAVINGS OVER ASHRAE NO LIGHT TRESPASS	
SOIL STEWARDSHIP	NC R		Design landscapes that require low or no amounts of regular fertilization and employ buffer zones. During construction, remediate soils in-situ through green technologies or replace contaminated soils.	Employing buffer zones - areas of unfertilized vegetation - near drains, human use areas, or water bodies aids in reducing fertilizer loads that can affect environmental and human health. Remediating or replacing contaminated soils prevents toxins from leaching into groundwater and allows the opportunity to restore hydrologic health to the landscape.		
INTEGRATED PEST MANAGEMENT	NC R		Design landscapes to conform with best practices for pest management. Avoid design features of buildings and landscapes that lead to infestations.	Integrated pest management techniques reduce the need for toxic poisons and dangerous traps to control pests.		
LANDSCAPE WASTE MANAGEMENT	NC R		Divert landscape waste materials from landfills. Recycle or compost all land-clearing debris. Target 90% diversion from landfill.	Waste materials from landscape maintenance operations can be composted and reused as fertilizer on campus. Composting organic materials helps avoid methane and leachate production in landfills, and reduces the need for synthetic fertilizers.	_____% DIVERSIONS FROM LANDFILL	

BUILDING TYPE	SCOPE OF GOAL	GOAL REPORTING
NEW CONSTRUCTION	DESIGN GOAL	IMPLEMENTED
MAJOR RETROFITS	CONSTRUCTION GOAL	NOT IMPLEMENTED
INTERIOR RENOVATIONS	OPERATIONS GOAL	_____% ENTER VALUE ACHIEVED

8.3 Appendices

SUSTAINABLE SITE & LANDSCAPING (CONTINUED)

ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
LANDSCAPE MAINTENANCE DESIGN	NC R		Design landscapes that can be maintained by hand or electric tools.	Electrically powered tools and maintenance vehicles provide the opportunity to reduce fossil fuel consumption and localize air pollutant loads generated from exhaust. Provide convenient power sources in the landscape for tools and/or select plants that can be easily maintained with hand tools. If necessary, use gas-power tools at designated times to limit exposure of pollutants to campus students, staff, and visitors.		
MATERIALS SELECTION AND USE, AND RECYCLING	NC R	  	Select construction materials and site furnishings that are locally sourced and made with sustainable materials (> 30%). Provide receptacles for recycling and composting in the exterior environment at centralized locations on campus.	Providing convenient locations for recycling and composting containers alongside trash containers in the exterior (and interior) environment will help reduce post-consumer waste. Utilization of responsibly sourced materials has environmental and social benefits.		

WATER

ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
REDUCE POTABLE WATER CONSUMPTION	NC R IR		Reduce potable water consumption by 40-50% compared to the baseline performance level outlined in Figures 5.13 and 5.14 of the Water section in this Sustainability Framework.	Reducing potable water helps conserve a valuable natural resource. Reducing potable water consumption also helps save energy by reducing the need for purification.	_____% POTABLE WATER REDUCTION	
	NC R IR		Purchased plumbing water fixtures must have WaterSense label. Appliances must have EnergyStar label.	Enable water conservation at point of use fixtures.		
METER WATER USE IN BUILDINGS	NC R IR		Install building-level water meter.	Track and assess water use on campus. Realize savings associated with water reuse strategies.		

BUILDING TYPE

-  NEW CONSTRUCTION
-  MAJOR RETROFITS
-  INTERIOR RENOVATIONS

SCOPE OF GOAL

-  DESIGN GOAL
-  CONSTRUCTION GOAL
-  OPERATIONS GOAL

GOAL REPORTING

-  IMPLEMENTED
-  NOT IMPLEMENTED
- _____% ENTER VALUE ACHIEVED

8.3 Appendices



INDOOR ENVIRONMENTAL QUALITY (CONTINUED)

ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
ACCESS TO VIEWS	NC R IR		Provide access to exterior views for 90% of regularly occupied spaces (for New Construction). Do not reduce existing views and assess opportunities for increasing views to 90% (for Retrofits).	Studies have shown that having access to outdoor views reduces stress and improves worker productivity.	_____% REG. OCC. SPACES WITH VIEWS	
DAYLIGHT ACCESS	NC R IR		Provide useful daylight for 75% of regularly occupied spaces (for New Construction). Strive to increase useful daylight to 75% of regularly occupied spaces (for Retrofit). Use Spatial Daylight Autonomy and Annual Sunlight Exposure as metrics to evaluate daylight quantity and quality.	Access to daylight has positive effects on the mental and physiological well-being of building occupants. Using natural daylight rather than electric lighting can also help reduce energy consumption during the day.	_____% REG. OCC. SPACES WITH DAYLIGHT	
ENHANCED LIGHTING CONTROLLABILITY	NC R IR		Provide lighting controls for 90% of individual workstations and all shared workspaces. Design lighting controls with at least three lighting levels (on, off, midlevel).	Enhance lighting controls allows building occupants to adapt to their environment, increasing occupant satisfaction. Multi-mode lighting controls help reduce energy consumption.	_____% LIGHTING CONTROLS	
LIGHTING QUALITY	NC R IR		Use light sources with a CRI of 80 or higher for all lighting fixtures.	Color Rendering Index (CRI) is the ability of a light source to highlight the colors of an object in a manner close to idealized natural lighting conditions. CRI is an important metric to consider when measuring the quality of artificial light.		
LIGHTING LONGEVITY	NC R IR		Use fixtures with a rated life of at least 24,000 hours for 75% of load.	Using lights with a long life-span, such as solid state lighting fixtures, helps reduce the amount of electronic waste.		
SUSTAINABLE MATERIALS	NC R IR		Specify materials and furniture with third-party certifications for 50% of material cost.	Third-party certifications provide a range of benefits and protections. Certified materials can indicate that the manufacturer follows environmental performance standards or that the material contains only healthy components.	_____% MATERIALS W/3 RD PARTY CERTIFICATION	
PRODUCT DECLARATIONS	NC R IR		Request and collect material HPDs (Health Product Declarations) or EPDs (Environmental Product Declarations) for all available material divisions.	HPDs and EPDs promote greater transparency in manufacturing, requiring manufacturers to declare potentially hazardous materials or manufacturing procedures.		
LOW-EMITTING MATERIALS	NC R IR		Meet LEED v4 Low-Emitting Material VOC thresholds.	Low-emitting materials protect indoor air quality, which helps prevent illnesses due to prolonged exposure to toxic chemicals in the built environment. High indoor air quality standards may also help improve productivity.		
ASHRAE 55 THERMAL COMFORT CRITERIA	NC R IR		Meet ASHRAE Standard 55-2010 Thermal Comfort Conditions for Human Occupancy (or ISO 7730:2005)	Adhering to ASHRAE 55 Thermal Comfort Standards will ensure that the majority of occupants are comfortable. ASHRAE 55 addresses a range of criteria and allows for all types of design solutions.		

BUILDING TYPE

- NEW CONSTRUCTION
- MAJOR RETROFITS
- INTERIOR RENOVATIONS

SCOPE OF GOAL

- DESIGN GOAL
- CONSTRUCTION GOAL
- OPERATIONS GOAL

GOAL REPORTING

- IMPLEMENTED
- NOT IMPLEMENTED
- _____% ENTER VALUE ACHIEVED

8.3 Appendices

OPERATIONS AND MANAGEMENT

ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
MEASUREMENT AND VERIFICATION	NC R	 	Create and follow a Measurement and Verification plan for all buildings for at least 5 years after building completion. Design retrofits to be easily monitored and tied in to a building monitoring system.	Measurement and verification helps validate design assumptions and identify less-than optimal performance so building operators can take proper corrective action. This process saves money and increases energy efficiency.		
PREVENTIVE MAINTENANCE PROGRAM	NC R		Continue to add new equipment to the current preventative maintenance program as buildings are constructed.	A well-structured and written preventive maintenance program helps ensure the longevity of systems and consistent levels of performance.		
DESIGN FOR MAINTENANCE	NC R IR		Design for easily accessible and maintainable buildings. Comply with manufacturers' recommended maintenance areas. Show access requirements on design documents and in O&M manuals.	Designing easy access to mechanical equipment will facilitate preventive maintenance programs and ensure that ongoing maintenance and repairs do not disrupt occupants.		
OCCUPANT SATISFACTION	NC R IR		Administer surveys to ensure that occupants are satisfied with the building space.	Occupant surveys can help identify less-than optimal performance of mechanical systems and inform operational strategies to improve energy efficiency.		
WASTE AND RECYCLING	NC R IR	 	Implement a waste management plan during construction, and integrate recycling and composting in the operation of the building.	Diverting waste from landfills reduces the environmental impact, while also reducing embodied energy of materials that use recycled content.		

BUILDING TYPE

-  NEW CONSTRUCTION
-  MAJOR RETROFITS
-  INTERIOR RENOVATIONS

SCOPE OF GOAL

-  DESIGN GOAL
-  CONSTRUCTION GOAL
-  OPERATIONS GOAL

GOAL REPORTING

-  IMPLEMENTED
-  NOT IMPLEMENTED
- _____% ENTER VALUE ACHIEVED

8.3 Appendices

ENERGY						
ENVIRONMENTAL ELEMENT	PROJECT TYPE	SCOPE OF GOAL	DESCRIPTION	BENEFITS	GOAL REPORTING	NOTES
NET ZERO CARBON	NC		Strive to design all new construction to be net-zero carbon. A net zero carbon building is defined as having no associated on or off-site emissions.	Reducing carbon emissions is a primary goal at Swarthmore College. This goal addresses myriad concerns over global climate change and air pollution, among others.		
ENERGY PERFORMANCE (% REDUCTION)	NC		Demonstrate a 50% reduction in energy consumption from an ASHRAE 90.1-2010 baseline case.	To achieve carbon neutrality, new construction and major renovation projects will need to realize significant energy savings.	_____% ENERGY REDUCTION	
	R		For Science Labs, Residence Halls, Athletic Facilities, and Student Centers, demonstrate a 35% reduction in energy consumptions from an ASHRAE 90.1-2010 baseline case. For Classrooms and Offices, demonstrate a 40% reduction. For Libraries, demonstrate a 30% reduction.		_____% ENERGY REDUCTION	
ENERGY PERFORMANCE (EUI TARGET)	NC		As an alternative to demonstrating a percentage reduction from an ASHRAE 90.1-2010 baseline, meet the following targets for energy-use intensity (EUI): Science (Labs): 90 kBtu/sf/yr Classroom / Office: 65 kBtu/sf/yr Library: 70 kBtu/sf/yr Residence Hall: 50 kBtu/sf/yr Athletics: 80 kBtu/sf/yr Student Center: 70 kBtu/sf/yr	Designing for a specific energy use intensity (EUI) target is an excellent strategy to ensure new construction projects use as little energy as possible. Having a specific target is also helpful for the measurement and verification process, as it streamlines benchmarking actual performance against anticipated performance. Area weight EUI targets for mixed use buildings.	_____ PROJECT TYPE _____ EUI	
INCORPORATE BUILDING ENERGY METERS	NC R		Meter all buildings for electricity, steam, chilled water, and natural gas (where applicable). Sub-meter lighting and equipment loads.	The data collected from building energy meters is invaluable in terms of its ability to identify sub-optimal performance and facilitate efficient systems operation.	ELECTRICITY MAIN ELECTRICITY SUB STEAM CHILLED WATER NATURAL GAS	

BUILDING TYPE	SCOPE OF GOAL	GOAL REPORTING
NC NEW CONSTRUCTION	DESIGN GOAL	IMPLEMENTED
R MAJOR RETROFITS	CONSTRUCTION GOAL	NOT IMPLEMENTED
IR INTERIOR RENOVATIONS	OPERATIONS GOAL	_____% ENTER VALUE ACHIEVED