



## A-21 - SUSTAINABILITY

Design and construction of capital projects play a role in moving towards the University's sustainability goals. As of February 2020, these long-term goals are summarized as the "Three Zeros," which are:

- Net Zero Water
- Zero Waste to Landfills
- Net Zero Greenhouse Gases

### 1. Net Zero Water

To move towards net zero water, the University has defined two sub-goals:

- Reduce potable water use, calculated as both total water use and building water use intensity.
- Reduce the amount of untreated stormwater discharged to downstream creeks.

#### 1.1 Potable water use reduction

The following metrics should be used to measure the building and site progress towards net zero water:

- Water use is subject to North Carolina General Statute 143 135.37. "Energy and water use standards for public major facility construction and renovation projects; verification and reporting of energy and water use."
- LEED v.4

Potable water conservation should be achieved through a combination of the following strategies:

- Use of water efficient plumbing fixtures. Detailed design guidance should be sought in the Plumbing section of this document. [LINK TO BE ADDED]
- Use of chilled water for process cooling water. See the Chilled Water guidelines in this document for further information. [LINK TO BE ADDED]
- Use of non-potable water for toilet flushing and irrigation. The University is served by reclaimed water and by harvested rainwater from cisterns. Buildings will be dual plumbed for use of non-potable water for toilet flushing. Non-potable irrigation is expected for all sites. See the Non-Potable Water design guidance in this document for further information. [B-22 – Non-Potable Water](#)

#### 1.2 Stormwater

As a State entity within the Jordan Lake watershed, the University is subject to stringent stormwater requirements. See the Stormwater section of this document for details. [B-27 - Stormwater](#)

### 2. Zero Waste to Landfills

The University seeks to reduce waste from demolition and construction activities as well as from routine operations. Consult the Waste Sections of this document. [A-25 – Waste Management & Recycling](#)

### 3. Net Zero Greenhouse Gases

The University is subject to both voluntary and mandated metrics related to energy use and greenhouse gases.

- As a signatory of the American College and University Presidents' Climate Commitment, the University has pledged to be greenhouse gas neutral in the next 15 years. The Climate Action Plan presents the strategies to achieve this goal.



- In response to NC GS 143-135, all “Major State Facilities” must meet the performance goals for energy and indoor and outdoor water set forth in the Sustainable, Energy Efficient Buildings Advisory Committee report (<http://www.nc-sco.com/documents/guidelines/EEREPORT.pdf>).
- Energy models developed for NC GS 143-135 must comply with state construction office guidance (<http://www.nc-sco.com/documents/guidelines/EnergyBldg.pdf>) and with UNC Chapel Hill’s Energy Policy (<https://policies.unc.edu/files/2013/04/Energy-Use-Policy.pdf>) for occupied hours, temperatures and relative humidity. Designers should contact UNC Chapel Hill’s Energy Management department (<http://facilities.unc.edu/engineering/energy-management/>) for the current utility rates to use in modeling. The designer must provide month by month energy consumption figures for each utility in the model. This will allow UNC Chapel Hill to compare actual and predicted performance of the building. In addition, the designer must provide complete revised/updated energy model files in electronic format so that UNC Chapel Hill can re-run the energy model.

Greenhouse gas reduction or minimization should be achieved through a combination of the following strategies:

- During advance planning, building orientation should be analyzed with the goal of minimizing solar heat gain and glare, and optimizing opportunities for day lighting.
- Programming should adhere to campus space standards and seek opportunities for multiple-use spaces.
- Lighting must comply with UNC Chapel Hill’s Lighting Policy (<http://policies.unc.edu/files/2013/05/Energy-Efficient-Lighting.pdf>) prohibiting the use of incandescent lighting except in special circumstances.
- All new buildings and additions that affect the HVAC system shall incorporate commissioning of the MEP systems.
- Building envelope commissioning should be undertaken when appropriate.
- Buildings are required to have metering for performance verification of energy and water use to comply with NC GS 143-135 ([http://www.nc-sco.com/documents/guidelines/Bldg\\_Perf\\_Verification.pdf](http://www.nc-sco.com/documents/guidelines/Bldg_Perf_Verification.pdf)).
- Building projects are encouraged to incorporate renewable energy systems when possible and appropriate. Consult the Solar Electric Generation Policy in the Electric Distribution Systems section of these guidelines. B-23 – Electrical Distribution Systems

#### 4. Other Sustainability Areas

We recognize the USGBC’s LEED rating system as the most widely accepted standard for evaluating sustainability of the built environment. Individual building projects are encouraged but not required to seek LEED certification. However, each project is expected to incorporate measures that would enable it to be certified at a minimum silver level whether or not it is applying for certification.

#### 5. Design Process

Design teams are expected to conduct a charrette early in the design process to involve stakeholders in planning for energy efficiency, water efficiency, solid waste reduction, land preservation and other aspects of sustainable development. Ideas will be evaluated by the project team for feasibility within the constraints of project program, budget and schedule.

A LEED checklist is to be included with each design submittal indicating current performance objectives. Supporting documentation outlining the strategies that will be employed to achieve energy and water efficiency should also be included. A campus-specific checklist, showing which points are attainable through adherence to the Design Guidelines, may be found in the Appendix.



**LEED v4.1 for BD+C: New Construction and Major Renovation**

Project Checklist

Project Name: UNC-###

Date:

**KEY:**

DESIGN CREDITS

CONSTRUCTION CREDITS

Sustainability Meeting Occurred On:

Project Information			Possible Points:	Notes
			Project information Form	UNC/Arch # of FTEs, transients, occupancy schedule, LEED Project Boundary

Y	?	N				
			Credit1	Integrative Process	1	UNC/Arch Perform simple box energy modeling and preliminary water budget analysis prior to Schematic Design

8	6	2	Location and Transportation		Possible Points:	16	Notes
1			LTc2	Sensitive Land Protection		UNC	
		2	LTc3	High Priority Site (Ex Perf combine option 1 with either Option 2 or 3)	2	UNC	
5			LTc4	Surrounding Density and Diverse Uses	5	UNC	
1	4		LTc5	Access to Quality Transit (Ex Perf double transit services)	5	UNC	Chapel Hill Transit routes
1			LTc6	Bicycle Facilities (showers, 2.5% of visitors bike rack & 5% of FTE bike storage)	1	Arch	Emphasis around bicycle storage under overhang of building
	1		LTc7	Reduced Parking Footprint	1	UNC	Parking only for service vehicles
	1		LTc8	Electric Vehicles	1	Arch	Level 2 EV charging stations for at least 2 spaces; EV ready raceway/conduit

5	5	0	Sustainable Sites		Possible Points:	10	Notes
Y			SSp1	Construction Activity Pollution Prevention	REQ	Civil	
1			SSc1	Site Assessment (site assessment, vegetation, climate, and soils)	1	Civil	Work this credit with Integrative process
	2		SSc2	Protect or Restore Habitat	2	LA	
1			SSc3	Open Space	1	UNC/LA	Preference for native/adapted/pollinator friendly/edible plants
	3		SSc4	Rainwater Management	3	Civil	Emphasis on LID on site
2			SSc5	Heat Island Reduction	2	Arch/LA	Avoid asphalt. Utilize high SRI materials, vegetated roofs, PV canopies
1			SSc6	Light Pollution Reduction	1	MEP	Projects to have a B-U-G rating of at least = 4-2-2

7	4	0					
Y			WEp1	Outdoor Water Use Reduction	REQ	LA	
Y			WEp2	Indoor Water Use Reduction	REQ	UNC/MEP	Water sense products; Energy* certified ice machines; water bottle refill stations
Y			WEp3	Building-Level Water Metering	REQ	MEP	5 years usage data to USGBC
			WEc1	Outdoor Water Use Reduction	2	LA	
			WEc2	Indoor Water Use Reduction (Ex Perf Achieve 55% reduction)	6	UNC/MEP	GOAL: Min 40% reduction, CW for equipment cooling, double plumb, WaterSense fixtures, use AHU condensate, specify autoclave setback software enabled, 75% RO water recovery; vacuum pumps
			WEc3	Optimize Process Water Use	2	MEP	Cooling tower and evaporative condenser cycles of concentration; applies to district heating and cooling system
			WEc4	Water Metering (min 2 sub-meters for irrigation, plumbing fixtures, reclaim, or process)	1	UNC/MEP	

17	7	9	Energy and Atmosphere		Possible Points:	33	Notes
Y			EAp1	Fundamental Commissioning and Verification	REQ	Cx	CRITICAL PATH: Get the CM at risk and CxA onboard ASAP; min MEP and RE
Y			EAp2	Minimum Energy Performance	REQ	MEP	Based on ASHRAE 90.1-2016; Recommend using IESVE software for modeling purposes. (UF) (UNC?)
Y			EAp3	Building-Level Energy Metering	REQ	MEP	5 years usage data to USGBC
Y			EAp4	Fundamental Refrigerant Management	REQ	MEP	
6			EAc1	Enhanced Commissioning	6	Cx	Envelope Cx; Daylighting Cx, MEP and RE Cx, monitoring-based Cx for trends, operator and occupant training, 1 year energy perf audit (?)
8	5	5	EAc2	Optimize Energy Performance (re ASHRAE/IESNA 90.1-2016, cost and GHG)	18	MEP	Net zero analysis, ECM list, AHU zones based on program, daylighting and bldg shading, PV ready, occupancy response
1			EAc3	Advanced Energy Metering (whole bldg & any energy end use with >10% usage)	1	MEP	Tie into BAS and EMCS graphics, electricity consumption and demand, design for minimal submeters
1	1	1	EAc4	Grid Harmonization	2	UNC/MEP	DR ready, 10% of peak, include in Cx plan; utility incentives for satellite sites
	2	3	EAc5	Renewable Energy	5	UNC	Solar-ready design - see NREL guidance; RESPC funding?
1			EAc6	Enhanced Refrigerant Management	1	MEP	No or low-impact refrigerants; or mgmt plan

5	4	4	Materials and Resources		Possible Points:	13	Notes
Y			MRp1	Storage and Collection of Recyclables	REQ	UNC/Arch	See OWRR guidelines
?	1	4	MRC1	Building Life-cycle Impact Reduction	5		Reuse; or LC material assessment impact from structure and enclosure. Consider Embodied Carbon and ODP in Construction Calculator and either eutrophication or tropo O3; See UWCLF for embodied carbon data EC3
1	1		MRC2	BPDO Environmental Product Declarations	2	CM/Arch	Encourage CM to utilize Green Badger for documentation purpose
1	1		MRC3	BPDO Sourcing of Raw Materials	2	CM/Arch	Encourage CM to utilize Green Badger for documentation purpose
1	1		MRC4	BPDO Material Ingredients	2	CM/Arch	Encourage CM to utilize Green Badger for documentation purpose
2			MRC5	Construction and Demolition Waste Management (Ex Perf Opt 1 & 2)	2	CM	GOAL: 75% waste diversion

13	3	0	Indoor Environmental Quality		Possible Points:	16	Notes
Y			IEQp1	Minimum Indoor Air Quality Performance	REQ	MEP	

Y		IEQp2	Environmental Tobacco Smoke Control	REQ	UNC	Smoking is prohibited w/in bldgs and w/in 100 ft of bldgs; EHS policy
2		IEQc1	Enhanced Indoor Air Quality Strategies	2	MEP	IB along with walk-off mats, ventilation, MERV 13 filters, CO2 sensors
3		IEQc2	Low-Emitting Materials (Ex Perf Reach 100% of products)	3	CM/Arch	paints, coatings, adhesives, sealants, flooring, furniture, insulation (avoid VCT?)
1		IEQc3	Construction Indoor Air Quality Management Plan	1	CM	
2	?	IEQc4	Indoor Air Quality Assessment	2	CM	IAQ testing prior to occ. VOC, particulate matter and inorganic gases
1	?	IEQc5	Thermal Comfort - ASHRAE 55-2017	1	MEP	Comfort control for at least 50% of occupants
1	1	IEQc6	Interior Lighting - Opt 1 - task lighting, dimmability, multi-control in shared areas	2	MEP	Encourage strategies B, C, E, F, G for option 2
2	1	IEQc7	Daylight	3	Arch	Simulate Spatial Daylight Autonomy, Annual sunlight exposure & Illuminance
1		IEQc8	Quality Views (Ex Perf obtain 90% views to all occupied spaces)	1	Arch	75% of occupied areas have views to the outdoors
	1	IEQc9	Acoustic Performance - HVAC background noise, Sound Transmission, Reverberation	1	Arch	Hire an acoustician?

2	4	0	Innovation	Max of 5 pts for IDc1 - In, P, ExP	Possible Points:	6	Notes
1			IDc1	Innovation - Green Cleaning & Integrated Pest Management	1	TEAM	Housekeeping and Grounds
	1		IDc1	Innovation - Bird Friendly Design/Bird Collision Deterrence	1	Arch/UNC	
	1		IDc1	Innovation - Social Equity within the project team	1	TEAM	20% (by contract fees) of team achieved JUST certification or other social responsibility recognition
	1		IDc1	Innovation - Green Building Education	1	TEAM	
	1		IDc1	Innovation - Design for Flexibility	1	TEAM	
			IDc1	Innovation - Intelligent Building Design		TEAM	
			IDc1	Innovation - WELL Features		TEAM	
			IDc1	Innovation - Occupant comfort survey		TEAM	
			IDc1	Innovation - PBT Source reduction - mercury		TEAM	No mercury-containing products - thermostats, switches, lamps
			IDc1	Innovation - PBT Source reduction - lead, cadmium, and copper		TEAM	Pipes, solder, flashing, wire, paints
			IDc1	Innovation - Fume hood Cx - ex perf		TEAM	
1			IDc2	LEED Accredited Professional	1	UNC/Arch	

3	1	0	Regional Priority	Possible Points:	4	Notes	
1			RPc	Regional Priority: LTc4 - Surrounding Density and Diverse Uses	1	UNC	Requires at least 3 points
1			RPc1	Regional Priority - LTc7 - Reduced Parking Footprint	1	UNC	Requires 1 point
	1		RPc3	Regional Priority: SSc4 - Rainwater Management	1	UNC/LA	Requires at least 2 points
1			RPc4	Regional Priority: WEc1 - Outdoor Water Use Reduction	1	UNC/LA	Requires 2 points
			RPc5	Regional Priority: EA2 - Optimize Energy Performance		UNC/MEP	Requires at least 9 points
			RPc6	Regional Priority: EA - Renewable Energy		UNC/MEP	Requires at least 1 point

61	34	15	<b>Total</b>	<b>Possible Points:</b>	<b>110</b>	
Certified 40 to 49 points   Silver 50 to 59 points   Gold 60 to 79 points   Platinum 80 to 110						