**TEN SUSTAINABILITY MEASURES

Measure 1: DESIGN FOR INTEGRATION**Sustainable design is an inherent aspect of design excellence. Projects should express sustainable design concepts and intentions and take advantage of innovative programming opportunities.

**Narrative:** Describe how sustainability strategies are incorporated into the overall design. What are the major environmental issues and goals? How does the building respond to the local climate, site and occupant comfort?

May include:

* Key environmental issues; how and why they became important priorities
* Key ecological goals and concepts for your project and how they were expressed in the design
* How sustainability measures led to a better overall project design
* Process of program analysis; resource efficiencies realized by innovative programming
* Efforts to “right size” the project and to reduce unnecessary square footage
* Project response to local climate, sun path, prevailing breezes, soil, hydrology, and seasonal and daily cycles through passive design strategies
* Description of internal versus external building loads with regard to building massing, orientation, fenestration/shading related to the sun’s path and prevailing winds
* Design strategies that reduce/eliminate the need for non-renewable energy resources
* How these strategies specifically shaped the plan, section, and massing

**Suggested Graphics:** Building section, or other appropriate diagram that demonstrates bioclimatic strategies and concepts. A profile of local climate that illustrates appropriate design strategies, or summary sustainability diagram (for building operations)

**Metric:** Percent of the year that occupants will be comfortable using passive systems
 **Measure 2: DESIGN FOR COMMUNITY**Sustainable design values the unique cultural and natural character of a given region.

**Narrative:** How does the design respond to the region where it’s located? How does the design promote regional and community connectivity? What steps are taken to encourage alternative transportation?

May include:

* How the design relates to the local context and to larger regional issues
* How the design promotes regional and community connectivity
* How the design promotes a sense of place, public space and community interaction
* How the design educates its users about the environmental strategies it employs
* Efforts to provide for those using transportation alternatives
* Site selection criteria to reduce automobile use and parking requirements.

**Graphic:** Open

**Metric:**  Walk score: (from Walkscore.com) and/or urban networks diagram (walk, transport, etc.)
 **Measure 3: DESIGN FOR ECOLOGY**Sustainable design protects and benefits ecosystems, watersheds, and wildlife habitat in the presence of human development.

**Narrative:** How does the development of the site respond to its ecological context? Consider water, air, plants, and animals at different scales.

May include:

* How the development of the site and program responds to its ecological context, including the watershed, air, and water quality at different scales from local to regional level
* How the design accommodates wildlife habitat preservation and creation
* How the design protects or creates on-site ecosystems
* How the design responds to local development density or conditions
* How the design encourages local food networks

**Suggested Graphic:** Natural systems diagram (on-site, context) and/or Native Landscape Profile (flora, fauna)

**Metric:** % site area designed to support vegetation
 **Measure 4: DESIGN FOR WATER**Sustainable design conserves water and protects and improves water quality.

**Narrative:** How does the design manage storm water? How does the design conserve potable water? How is the project innovative in the way that it uses and treats water?

May include:

* How building and site design strategies manage site water and drainage
* Design strategies that capitalize on renewable water sources (i.e. precipitation) on site
* Water-conserving landscape and building design strategies
* Reuse strategies for water including use of rainwater, graywater, and wastewater

**Suggested Graphic:** Diagram representing how water arrives onto the site, how it is used or reclaimed, and how it leaves the site.

**Metric:** Percent of storm water that is managed onsite: (2 year, 24-hour event. Use supplied spreadsheet to calculate)
 **Measure 5:  DESIGN FOR ECONOMY**Sustainable design celebrates affordable solutions around true economy—good first costs, good long term operations cost, and true benefits for occupant health and productivity.

**Narrative:** What do you think your project might cost to build?  How would this construction cost compare with ‘typical’ buildings of the same building type? How does your design represent true economy by providing more value for what it costs?

May include:

* An approach that uses less total area comprised of multi-use areas, instead of many single-use areas
* How savings are achieved for operating costs (energy, water…)
* How the design promotes occupant health, leading to lower absenteeism in the workplace and lower health care costs

**Suggested Graphic:** Lifecycle cost or value diagram

 **Measure 6:  DESIGN FOR ENERGY**Sustainable design conserves energy and resources and reduces the carbon footprint while improving building performance and comfort. Sustainable design anticipates future energy sources and needs.

**Narrative:** How does the design seek to decrease the total energy use and carbon footprint of the building? Emphasize strategies to reduce heating and cooling loads, reduce electricity demand, reduce plug loads, and generate on-site carbon free energy.. Describe your approach towards achieving carbon neutrality.

May include:

* How the design reduces energy loads for heating, cooling, lighting, and water heating
* How the design and integration of building systems contributes to energy conservation and reduced use or elimination of fossil fuels, reduces green house gas emissions and other pollution, and improves building performance and comfort.
* Use of on-site renewable and alternative energy systems.
* Strategies to reduce peak electrical demand.
* How the design remains functional during power outages or interruptions in fuel supply

**Graphic:** Open

**Metric:** Total energy use intensity (EUI) in kBtu/sf/yr: (build a simple energy model to calculate EUI using DesignBuilder, ArchSim, HoneyBee, eQuest, Sefaira, Autodesk® Insight 360, or another energy modeling program); Energy generation (if any) in kWh/yr: (use PVWatts® Calculator or solar-estimate.org for solar or wind); Net EUI (with renewables if applicable).
 **Measure 7:  DESIGN FOR WELLNESS**Sustainable design creates comfort, health, and wellness for people who inhabit or visit buildings.

**Narrative:** Discuss design strategies for optimizing daylight, indoor air quality, connections to the outdoors, and thermal, visual, and acoustical comfort.

May include:

* How does design promote the health of the occupants?
* How does design promote activity or exercise, access to healthy food choices, etc.
* Outline of material health strategies, including selection strategies
* Design strategies for daylighting, task lighting, and views
* Design strategies for ventilation, indoor air quality, and personal control systems
* How the project’s design enhances users’ connectedness to nature
* Design team approach to integration of natural systems and appropriate technology

**Suggested Graphic:** Model photos, drawings or diagrams of daylight and ventilation strategies; test models.

**Metric:** Percent of the building that can be daylit (only) during occupied hours; Percent of floor area with views to the outdoors; Percent of floor area within 15 ft. of an operable window. Daylight performance using the following concepts: Daylight Availability, or Annual Sunlight Exposure along with Spatial Daylight Autonomy: % of regularly occupied area achieving at least 300 lux at least 50% of the annual occupied hours.
 **Measure 8:  DESIGN FOR RESOURCES**Sustainable design includes the informed selection of materials and products to reduce product life-cycle embodied energy and carbon, and environmental impacts while enhancing building performance and optimizing occupant health and comfort. Adaptive reuse and renovation/preservation dramatically reduces a buildings material consumption and carbon footprint.

**Narrative:** Describe the project’s construction, material selection criteria, considerations and constraints. What efforts were made to reduce the amount of material used and waste and the environmental impact of materials over their lifetime? Discuss specific materials used.

May include:

* Efforts to reduce the amount of material used on the project
* Materials selection criteria, considerations, and constraints for: optimizing health, durability, maintenance, and energy use reducing the impacts of extraction, manufacturing, and transportation
* Enclosure performance in relation to air, moisture, water and thermal characteristics
* Consideration of life cycle embodied energy and carbon impacts and results of life-cycle assessment if available
* Construction waste reduction plans; strategies to promote recycling during occupancy

**Suggested Graphic:**  Wall section of the building envelope design and either a hygro-thermal analysis or life cycle assessment.

**Metric:** Estimated carbon emissions associated with building construction (lbs CO2/sf, using [The Construction Carbon Calculator](http://buildcarbonneutral.org/), [Athena Impact Estimator for Buildings](https://calculatelca.com/software/impact-estimator/), Tally®, or other)
 **Measure 9:  DESIGN FOR CHANGE**Sustainable design anticipates adapting to new uses, climate change, and resilient recovery from disasters.

**Narrative:** Describe how the design promotes long-term flexibility, re-use, adaptability, and resilience.

May include:

* How the project was designed to promote long-term functionality and adaptability
* Anticipated project service life; description of components designed for disassembly
* Materials, systems, and design solutions developed to enhance versatility, durability, and adaptive reuse potential
* How does the design anticipate restoring or adapting function in the face of stress or shock, such as natural disasters, blackouts, etc.?
* How does the project address passive survivability (providing habitable conditions in case of loss of utility power or water)?
* How the project anticipates and celebrates weathering over time
* How does design for address adaptive climate: conditions in 2030 and in fifty years

**Suggested Graphic:** Specific hazard and climate analysis for project.

 **Measure 10: DESIGN FOR DISCOVERY**Sustainable design strategies and best practices evolve over time through documented performance and shared knowledge of lessons learned.

**Narrative:** What steps would you take to ensure that the building performs the way that it is designed? What lessons have you learned from this project that you will apply to the next project? What lessons have you learned from past projects that were applied to this project?

May include:

* Modeling and evaluation of the design during the programming and design phases
* Collaborative efforts between design team, consultants, client, and community
* Lessons learned during the design of the building
* How these lessons would change your approach to this project or future projects
* A question that would be investigated in a post-occupancy evaluation of this project

**Graphic:** Open

 **SUBMISSION MATERIALS & REQUIREMENTS**The COTE Top Ten for Students Competition seeks compelling design submissions that meaningfully address the future impacts of climate change well into the second half of this century. Emphasis is to be placed on achieving zero emissions, adapting to projected climate impacts, and designing for resilience.

The ten sustainability measures shall serve to inform the design process and guide the required graphics and written narratives/abstract. Students or student teams must submit the following materials online:

**1.  Graphics**: No more than four (4) digital boards at 20” x 20” (PDF or JPEG files), to include the following:
Documentation must adequately convey the project’s relationship to topography and physical context, formal and programmatic organization, circulation patterns, and experiential qualities. All drawings should be labeled; indicate scale and orientation where necessary.At minimum, include the following:
    - Site or context plan
    - Floorplans
    - Building / site sections
    - Perspective or isometric view (digital rendering or model photograph)
Present diagrams or images that best display how the project meets the three design criteria by considering the ten measures of sustainability. Some measures may require a specific graphic or calculation; others are open-ended. Where applicable, provide labels and notes on how calculated metrics are obtained (basis, method, program used, and assumptions).

**2.    Abstract/Narrative**: (100 words maximum for each sustainability measure for a total of 1,000 word maximum). Project/concept statement (approach/ program/intentions/strategies). The narratives should answer questions posed in the ten measures. The specific questions for each measure are meant to be a guide; each question does not need to be answered.
*\*During submission, simply copy/paste this text into the “Abstract” text field.*

**3.  Program Brief:**(500 words maximum) Submissions should include a brief description the building type, gross square footage, project location & climate zone. (500 words maximum).
***\*****During submission, simply copy/paste this text into**the “Program” text field.*

Incomplete or undocumented entries will be disqualified. All drawings should be presented at a scale appropriate to the design solution and include a graphic scale and north arrow.
 **Project authorship must remain anonymous. The names of student participants, their schools, or faculty sponsors, must NOT appear on the boards, abstract/ narrative, program or studio brief. If authorship is revealed on any submission materials the entry will be disqualified.**
All metrics should include a short description of key assumptions used in the analysis and where the numbers came from and reliability.