

# Campus RainWorks Challenge

A Green Infrastructure Design Challenge  
for Colleges and Universities



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**Cover Images:**

Excerpts from the winners of the 2013 Campus RainWorks Challenge.

## Introduction

The US EPA's Office of Water is pleased to announce the 3<sup>rd</sup> annual Campus RainWorks Challenge for college and university students. Once again, EPA is inviting student teams to design an innovative green infrastructure project for a location on their campus. Student teams will collaborate with a faculty advisor to develop design boards and a project narrative describing the project. Winning teams will be awarded a student prize to be divided evenly among student team members, as well as a faculty prize to support green infrastructure research or training.

The Campus RainWorks Challenge is designed to engage students in reinventing our water infrastructure. In most developed areas, stormwater is drained through engineered collection systems and discharged into nearby waterbodies. This stormwater carries trash, bacteria, heavy metals, and other pollutants from the urban landscape, degrading water quality. Higher flows can also cause erosion and flooding in nearby streams, damaging habitat, property, and infrastructure. As our cities and towns grow, more and more of our streams, lakes, and bays will be at risk. At the same time, these cities and towns will demand more and more clean water to meet household and industry needs.

Green infrastructure refers to systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or harvest stormwater at its source. While "gray" stormwater infrastructure is largely designed to convey stormwater away from the built environment, green infrastructure uses soils, vegetation, and rainwater harvesting to manage rainwater near to where it falls. By weaving natural processes into the built environment, green infrastructure can also provide many community benefits, including improving air quality, reducing urban heat island impacts, reducing energy consumption, enhancing wildlife habitat, and providing community amenities.

As communities develop and climate patterns shift, both urban stormwater impacts and urban water needs are expected to grow. Our nation and our planet need innovative planners, designers, and engineers to create resilient and affordable solutions. The Campus RainWorks Challenge is designed to encourage college and university students to become part of these solutions.

In the third year of the Campus RainWorks Challenge, EPA hopes to:

- Continue to engage students in assessing the technical and economic potential of green infrastructure solutions at a range of spatial scales and in a range of physical contexts;
- Provide a hands-on, interdisciplinary learning experience through which students and faculty can gain practical experience that may be applied in their future practice; and
- Promote the use of green infrastructure practices that provide multiple environmental, social, and economic benefits on college and university campuses.

# Calendar

## Registration:

September 2, 2014 – October 3, 2014

## Entries Due:

December 19, 2014

## Winners Announced:

April 2015

# Awards

EPA will award a total of \$16,000 to first and second place winners in each of two categories: a Demonstration Project category and a Master Plan category (see Submission Categories). Winning teams will earn both a student prize to be divided evenly among student team members, and a faculty prize to support green infrastructure research or training. Prizes will be distributed as follows:

	<i>Student Prize</i>	<i>Faculty Prize</i>
1 <sup>st</sup> Prize Demonstration Project	\$2,000	\$3,000
1 <sup>st</sup> Prize Master Plan	\$2,000	\$3,000
2 <sup>nd</sup> Prize Demonstration Project	\$1,000	\$2,000
2 <sup>nd</sup> Prize Master Plan	\$1,000	\$2,000

EPA is also considering whether to conduct a grant competition involving participants in the Campus RainWorks Challenge, or a subset thereof. Grant funding could be made available to help carry out green infrastructure demonstration projects based on the student designs. If EPA decides to pursue a grant competition, further information will be provided in the future.

Winners will be notified in April 2015 via email. After consultation with the winners, winning teams will be announced publicly, and winning entries will be posted on EPA's Green Infrastructure [website](#).

## Eligibility

To compete in the Campus RainWorks Challenge, student teams must meet all of the following eligibility requirements:

### Participating Institutions

Student teams must be affiliated with an academic institution that meets one of the following descriptions:

- a. A public nonprofit institution/organization (limited to degree-granting public institutions of higher education<sup>1</sup>) located in the U.S., state and local governments, Federally Recognized Indian Tribal Governments, and U.S. territories or possessions.
- b. A private nonprofit institution/organization (limited to degree-granting private institutions of higher education<sup>2</sup>) located in the U.S., state and local governments, Federally Recognized Indian Tribal Governments, and U.S. territories or possessions.

EPA particularly encourages Minority Academic Institutions (MAIs) to apply. For purposes of this Challenge, the following are considered MAIs:

1. Historically Black Colleges and Universities, as defined by the Higher Education Act (20 U.S.C. Sec. 1061). A list of these schools could be found at <http://www.ed.gov/edblogs/whhbcu/one-hundred-and-five-historically-black-colleges-and-universities/>
2. Tribal Colleges and Universities, as defined by the Higher Education Act (20 U.S.C. Sec. 1059(c)). A list of these schools could be found at <http://www.ed.gov/edblogs/whiaiane/tribes-tcus/tribal-colleges-and-universities/>
3. Hispanic-Serving Institutions (HSIs), as defined by the Higher Education Act (20 U.S.C. Sec. 1101a(a)(5)). There is no list of HSIs. HSIs are institutions of higher education that, at the time of application submittal, have an enrollment of undergraduate full-time equivalent students that is at least 25% Hispanic students at the end of the award year immediately preceding the date of application for this Challenge; and
4. Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs), as defined by the Higher Education Act (20 U.S.C. Sec. 1059g(a)(2)). There is no list of AANAPISIs. AANAPISIs are institutions of higher education that, at the time of application submittal, have an enrollment of undergraduate students that is not less than 10 % students who are Asian American or Native American Pacific Islander.

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<sup>1</sup> See 20 USC 1001 for a definition of “institution of higher education”

<sup>2</sup> *ibid*

## Participating Teams

Each student team must be sponsored by a faculty advisor.

Team composition and size is at the discretion of the team submitting an entry. However, interdisciplinary teams are strongly encouraged. Relevant disciplines include but are not limited to: landscape architecture, architecture, planning, engineering, conservation biology, landscape ecology, hydrology, soil science, economics, and business administration.

## Participating Students

All team members must meet one or more of the following criteria:

1. Be enrolled in a degree program (undergraduate or graduate) at a college or university eligible to participate in the U.S. Environmental Protection Agency's Campus RainWorks Challenge (participating institution) as of August 31, 2014.
2. Have received a degree (undergraduate or graduate) from a participating institution within 12 months prior to August 31, 2014.
3. Have received a degree (undergraduate or graduate) from a participating institution within the past 24 months and be enrolled in at least one class (live or online) at a participating institution as of August 31, 2014.

## Registration

To compete in EPA's Campus RainWorks Challenge, student teams must first complete an online registration form. The intent of the registration form is to allow EPA to confirm the eligibility of each team. Once a team has submitted a registration form, the team will receive a registration number via email.

Registration opens September 2, 2014 and closes October 3, 2014. Once registration opens, the registration form will be posted on the Campus RainWorks website.

## Submission Categories

To encourage participating teams to assess the environmental, economic, and social benefits of green infrastructure at a range of spatial scales, EPA is accepting submissions in two design categories: a Demonstration Project category, and a Master Plan category.

### Demonstration Project Category

For submissions in the Demonstration Project category, EPA is seeking proof-of-concept level designs that examine how green infrastructure could be integrated into a particular site on the team's campus to meet multiple environmental, educational, and economic objectives. Entries in

this category should include detailed information on the design and performance of the proposed demonstration project, and should reflect extensive consultation with the facilities planning department to assess project feasibility.

### **Master Plan Category**

For submissions in the Master Plan category, EPA is seeking conceptual designs that examine how green infrastructure could be integrated into a broad area of the team's campus. Entries in this category should be coordinated with existing campus plans and should describe how green infrastructure could be used to enhance the long-term sustainability of the campus and mitigate long-term risks (i.e. risks posed by climate change).

## **Submission Requirements**

To compete in EPA's Campus RainWorks Challenge, registered teams must submit one Project Narrative, two Design Boards, and one Letter of Support describing an innovative green infrastructure project for a location on their campus. Submissions should provide information of sufficient quality to enable the judges to evaluate the design. Submissions should describe the project context within the campus or watershed, existing conditions, proposed green infrastructure approaches, and expected outcomes.

### **Project Narrative**

- The intent of the Project Narrative is to provide a summary of each team's approach to addressing the challenge criteria (see Judging).
- Each team must prepare a Project Narrative not exceeding ten 8.5" x 11" pages (including images, graphics, and tables; excluding cover page, abstract, and references). Note that pages in excess of ten will not be reviewed. Pages should be consecutively numbered with 1" margins, and text should be single-spaced in standard 12-point font.
- The Project Narrative must include a cover page (including registration number, project title, names and disciplines of team members, and name and discipline of faculty advisor) and a project abstract (250 word maximum).
- Teams must provide 1 electronic copy of the Project Narrative in Adobe Acrobat® PDF format. Instructions on submitting deliverables are provided below.

### **Design Boards**

- The intent of the Design Board is to provide a visual explanation of the site context, design elements, and design performance.
- Each team must prepare two 24" x 36" design boards. Each board must include the team's registration number (see Registration section) in the upper right hand corner.

- The design boards must include a site plan. Additional elements might include cross sections, conceptual drawing(s), or graphics representing anticipated benefits.
- Teams must provide electronic copies of each design board in Adobe Acrobat® PDF format. Instructions on submitting deliverables are provided below.

### Letter of support

- The intent of the letter of support is to demonstrate consultation with the facilities planning department to develop a feasible design.
- Each team must submit a letter from a member of the college or university's facilities planning department demonstrating support for the proposed design. Letters of support are not to exceed two 8.5" by 11" pages. Note that pages in excess of two will not be reviewed.
- The letter of support must be on appropriate letterhead, must be signed by a member of the facilities planning department, and must include the registration number and project title.
- Letters of Support must be provided in Adobe Acrobat PDF format. Instructions on submitting project files are provided below.

## Submission Instructions

EPA will collect submissions to the Campus RainWorks Challenge via email. Participating teams must email their submissions to [RainWorks@epa.gov](mailto:RainWorks@epa.gov) by Friday, December 19, 2014 at 11:59 PM EST.

Email submissions must include the registration number (###) in the email subject and in attached file names. Email submissions must include the following components. Note that the total size of all files must not exceed 15 MB:

1. Project Narrative (saved as "###-Project Narrative.pdf")
2. Design Boards (saved as "###-Design1.pdf" and "###-Design2.pdf")
3. Letter of Support (saved as "###-Letter.pdf")

## Judging

### Judges

Submissions will be judged by a panel of reviewers that may include EPA staff, landscape architects, engineers, public officials, and/or academics from noncompeting colleges or universities. Judges will score submissions on a scale of 0 to 100 using the criteria identified below. Based on the average of all scores for each submission, the top submissions will be recommended to a Lead Judge in EPA's Office of Water. The Lead Judge will assess the top submissions using the criteria below and select the first and second place winners in each category.



## Demonstration Project Criteria

### 1. DOCUMENTATION (10)

- Are the documents well-written and free of errors?
- Are the documents of sufficient quality to enable the judges to evaluate the design?
- Does the project include a description of the project context, existing conditions, proposed green infrastructure approaches, and expected outcomes?

### 2. PERFORMANCE (25)

- Will the design retain and treat stormwater runoff on-site (e.g. through infiltration, evapotranspiration, or harvest and use) to improve water quality?
- Will the design address multiple water resource goals (e.g., water conservation, flood mitigation, groundwater recharge)?
- Is the predicted performance quantified and supported by appropriate modeling and calculations? Calculations should include the design storm managed and/or the annual reduction in runoff volume.

### 3. INNOVATION AND VALUE TO CAMPUS (25)

- To what extent were innovative approaches developed to simultaneously address campus environmental, social, and/or economic objectives?
- Will the design protect and improve ecosystem services (e.g., those provided by soil and vegetation)?
- Does the project describe how the design will be integrated into campus life and how the design will serve to benefit the campus community (e.g., by providing educational or recreational opportunities)?
- Are the predicted benefits quantified and supported by appropriate assumptions?

### 4. INTERDISCIPLINARY COLLABORATION (15)

- Does the project demonstrate collaboration between different disciplines (e.g., landscape architecture, architecture, engineering, environmental science, biology, economics, business administration, communication)?
- Does the project cohesively communicate the functionality and value of the design from both an engineering and design perspective?

### 5. LIKELIHOOD OF IMPLEMENTATION (15)

- Did the team collaborate with the Facilities department in developing the design?
- Does the design complement existing master plans or serve as a model for new long-term planning efforts?
- Does the project include a description of how the design would be phased/implemented?
- Does the team present a reasonable timeframe and cost estimate?

### 6. MAINTENANCE (10)

- Does the design allow for easy and effective maintenance?
- Did the team develop an O&M plan to maintain the system performance and aesthetics?
- Did the team collaborate with the Facilities department in developing the O&M plan?

## Master Plan Criteria

### 1. DOCUMENTATION (10)

- Are the documents well-written and free of errors?
- Are the documents of sufficient quality to enable the judges to evaluate the design?
- Does the project include a description of the project context, existing conditions, proposed green infrastructure approaches, and expected outcomes?

### 2. PERFORMANCE (25)

- Will the design retain and treat stormwater runoff on-site (e.g. through infiltration, evapotranspiration, or harvest and use) to improve water quality?
- Will the design address multiple water resource goals (e.g., water conservation, flood mitigation, groundwater recharge)?
- Is the predicted performance quantified and supported by appropriate modeling and calculations? Calculations should include the design storm managed and/or the annual reduction in runoff volume.

### 3. INNOVATION AND VALUE TO CAMPUS (25)

- To what extent were innovative approaches developed to simultaneously address campus environmental, social, and/or economic objectives?
- Will the design protect and improve ecosystem services (e.g., those provided by soil and vegetation)?
- Does the project describe how the design will be integrated into campus life and how the design will serve to benefit the campus community (e.g., by providing educational or recreational opportunities)?
- Are the predicted benefits quantified and supported by appropriate assumptions?

### 4. INTERDISCIPLINARY COLLABORATION (20)

- Does the project demonstrate collaboration between different disciplines (e.g., landscape architecture, architecture, engineering, environmental science, biology, economics, business administration, communication)?
- Does the project cohesively communicate the functionality and value of the design from both an engineering and design perspective?

### 5. LIKELIHOOD OF IMPLEMENTATION (20)

- Did the team collaborate with the Facilities department in developing the design?
- Does the design complement existing master plans or serve as a model for new long-term planning efforts?
- Does the project include a description of how the design would be phased/implemented?

## Documentation Guidelines

For both the Demonstration Project and Master Plan categories, the design performance and value to campus are very important criteria. The following table provides examples of metrics that teams may use to document how their projects meets these criteria. These metrics are not required, and not all of these metrics may be relevant to a particular design. To the extent that these metrics are relevant, however, quantitative information on the anticipated outcomes of a team’s design will be more compelling to the judges than narrative descriptions. Teams that opt to present any of the metrics listed below are encouraged to use the suggested units to facilitate the judging process. Teams are also encouraged to describe the methodologies used and to provide references, as appropriate.

<b>Outcomes</b>	<b>Example Metrics</b>
Stormwater Management	Reduction in impervious area (sq ft, %)
	Reduction in directly connected impervious area (sq ft, %)
	Reduction in runoff depth from existing and/or natural condition (in/year, %, or size of design storm managed)
	Change in annual stormwater pollutant load from existing condition (pounds/acre/year)
	Change in stormwater peak flow from existing and/or natural condition (based on 1-year, 24-hour design storm and expressed as cubic feet/second/acre, %)
Integrated Water Management	Reduction in landscape water requirement (may be attributed to change in plant species or change in irrigation efficiency) (gallons/year, %)
	Reduction in potable water use for irrigation (may be attributed to reduction in landscape water requirement or use of captured rainwater or recycled gray water) (gallons/yr, %)
	Reduction in potable water use for indoor uses (gallons/yr, %)
	Annual groundwater recharge (gallons/year)
Other Ecosystem Services	Area of protected soils (acres, sq ft)
	Area of restored soils (acres, sq ft)
	Area of protected native plant communities (acres, sq ft)
	Area of restored native plant communities (acres, sq ft)

Outcomes	Example Metrics
	Increase in canopy cover (10 years after installation) (% of site area)
	Increase in roof area shaded by vegetation (% of roof area)
	Increase in hardscape area (roads, sidewalks, parking lots, courtyards) shaded by vegetation (% of hardscape area)
	Map showing locations of windbreak vegetation relative to buildings
	Reduction in energy consumption associated with indoor climate control due to vegetation/shading (%)
	Air pollutant removal by trees (lbs/yr)
	Change in plant diversity (plant list before and after project)
	Change in pollinator diversity (list of pollinators supported by plants before and after project)

## Copyright

You represent and warrant that the work submitted is your own original work and that it does not infringe upon the intellectual property rights of any other person.

By submitting your work, you grant EPA a royalty-free license to copy, distribute, modify, publicly display, and otherwise use and authorize others to use, your Project Narrative and Design Boards for any educational purpose and in any media.

## Privacy

The information collected for this Challenge will only be used to contact student teams in direct relation to the competition.

After consultation with the winners, winning teams will be announced publicly, and winning entries will be posted on EPA's Green Infrastructure [website](#).

## Contact Us

To sign up for email updates or ask a question about the Campus RainWorks Challenge, please send an email to [RainWorks@epa.gov](mailto:RainWorks@epa.gov).