Campus RainWorks Challenge
A Green Infrastructure Design Challenge for Colleges and Universities

EPA United States Environmental Protection Agency
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Cover Images:
Excerpts from the winners of the 2012 Campus RainWorks Challenge.
Introduction

The US EPA’s Office of Water is pleased to announce the 2nd annual Campus RainWorks Challenge for college and university students. Once again, EPA is inviting student teams to design an innovative green infrastructure project for their campus. Student teams will collaborate with a faculty advisor to develop design briefs and a short video describing their project. This year, EPA is pleased to introduce two design categories: a Master Plan category and a Site Design category. Winning teams in each category will be awarded cash prizes. Winning teams in the Site Design category may also be invited to apply for grant funding to help carry out a demonstration project based on their submission.

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 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 second year of the Campus RainWorks Challenge, EPA hopes 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:

Entries Due:
December 13, 2013

Site Design Winners Announced:
February, 2014

Invitations to Apply for Simplified Grant Competition Issued
(Subject to Availability of Funds):
February, 2014 (EPA anticipates that applications would be due in 30 days and awards made in summer)

Master Plan Winners Announced:
April, 2014

Awards

EPA will award a total of $6,000 in prizes to first and second place teams in the Master Plan and Site Design categories. Winning teams will earn a cash prize to be distributed evenly among student team members. First place teams will receive a prize of $2,000 and second place teams will receive a prize of $1,000.

Subject to the availability of funds and the nature and quality of the projects proposed, EPA hopes to invite selected colleges and universities in the Site Design category to compete for grant funding. Colleges and universities associated with the winners and honorable mentions in the Site Design category would be invited to apply for a simplified grant competition. Through this simplified grant competition, EPA hopes to award 2 to 4 schools $25,000 each to help carry out demonstration projects based on the student design submissions.

Winning and honorable mention teams will be notified via email in February, 2014 (Site Design category) and April, 2014 (Master Plan category). Subject to the availability of funds, invitations to apply for the simplified grant competition would be issued in February, 2014.

After consultation with the winners, winning teams will be announced publicly, and winning entries will be posted on EPA’s Green Infrastructure website. Winning entries in the Master Plan category will be posted in April 2014, while winning entries in the Site Design category will be posted after the simplified competition is completed and awards have been made. Winning entries may also be featured at professional conferences conducted by EPA’s cooperating organizations.
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\(^1\)) 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\(^2\)) 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:


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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\(^1\) See 20 USC 1001 for a definition of “institution of higher education”

\(^2\) Ibid
Participating Teams

Each student team must be sponsored by a faculty advisor. Teams participating in the Site Design category must also be sponsored by a facilities advisor (a representative from the department that provides facilities planning for the college or university).

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, 2013.

2. Have received a degree (undergraduate or graduate) from a participating institution within 12 months prior to August 31, 2013.

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, 2013.

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 9, 2013 and closes October 7, 2013. Once registration opens, the registration form will be posted on the Campus RainWorks website.

Master Plan Category

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 Master Plan category and a Site Design 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 that may result from climate change).
Master Plan Submissions
To compete in the Master Plan category of EPA’s Campus RainWorks Challenge, registered teams must submit one Design Brief and one Video Presentation.

Design Brief

Intent
The intent of the design brief is to present the design context, goals, elements, and outcomes in both visual and narrative form.

Content
Each team must prepare a Design Brief not exceeding twenty 8.5” x 11” pages, excluding cover page and references (note that pages in excess of twenty will not be reviewed). The Design Brief should balance visual and narrative components to provide a comprehensive summary of the team’s approach to addressing the Challenge criteria (see Master Plan Criteria). The narrative component of the Design Brief is not to exceed eight pages (excluding cover page, references, and captions).

Each entry must include:

• Registration number
• Project title
• Project location
• Names and disciplines of team members
• Name and discipline of faculty advisor
• Project abstract (250 words maximum)
• Site plan

Additional suggested elements include:

• Site cross section(s)
• Conceptual drawing(s)
• Site hydrologic analysis
• Capital costs
• Proposed implementation timeline
• Operation and maintenance plan
• Lifecycle costs
• Quantitative analysis of benefits

Format
Pages should be consecutively numbered, include 1” margins, and use standard 12-point font for narrative sections. Design Briefs must be provided in Adobe Acrobat PDF format, with file size not to exceed 10MB. Instructions on submitting project files are provided below.
Video Presentation

**Intent**
The intent of the video presentation is to supplement the design brief by providing students the opportunity to describe their project in a different medium. Student teams are encouraged to be creative in explaining the context and vision for their design. Note that videos will be viewed only in the final round of judging.

**Content**
Each team must prepare a video presentation not to exceed 3 minutes. The video title must include the registration number and project title.

**Format**
Teams must upload their video presentation to YouTube or a similar video-sharing website and provide a link with their submission (see Submission Instructions). Videos should be set as “unlisted” or “private” so that entries cannot be detected by search engines prior to the submission deadline. (Note that once the submission deadline has passed, teams should feel free to set their videos to “Public”). See below for instructions on uploading project videos via YouTube and setting videos as “Unlisted”:

*How to upload a video on YouTube*
*How to change a video's privacy settings on YouTube*

**Master Plan Criteria**
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 five criteria identified below. Based on the average score 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 entries.

1. **DOCUMENTATION** (10)
   - Are the graphics and descriptions of sufficient quality to enable the judges to evaluate the design?

2. **FUNCTIONALITY** (25)
   - Will the design retain and treat stormwater runoff on-site (e.g. through infiltration, evapotranspiration, or harvest and use) to improve water quality?
   - Does the design address multiple water resource goals (e.g., groundwater recharge, water conservation, flood mitigation)?
   - Will the design protect and improve ecosystem services provided by soil and vegetation?
• Does the design address the potential impacts of climate change and enhance campus resiliency?

3. INNOVATION AND INTERDISCIPLINARY COLLABORATION (25)
   • Were any unique approaches used to solve engineering design challenges?
   • Were any unique approaches developed to simultaneously address environmental, social, and/or economic sustainability?
   • Does the design demonstrate collaboration between different disciplines (e.g., landscape architecture, architecture, engineering, environmental science, biology, economics, business administration)?

4. VALUE TO CAMPUS (25)
   • Will the design serve as an artful amenity, instilling a sense of place and encouraging people to convene, reflect, or linger?
   • Does the design engage students and visitors in prominent location(s) on campus and expose them to the concepts of green infrastructure?
   • Does the design include interpretive elements that communicate the intent of the green infrastructure design?

5. FEASIBILITY (15)
   • Does the design consider existing site conditions?
   • Does the design consider existing master plans and long-term campus planning?
   • Does the design represent a practical use of campus space?
   • Does the design describe how the project would be phased?
   • Does the design consider how the project would be maintained?

Site Design Category

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 Master Plan category and a Site Design category. For submissions in the Site Design 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 project, and should reflect extensive consultation with the facilities planning department to assess project feasibility. As stated in the Awards section, winning teams in the Site Design category may be invited to apply for grant funding to help carry out a demonstration project based on their submission.
Site Design Submissions

To compete in the Site Design category of EPA’s Campus RainWorks Challenge, registered teams must submit one Design Brief, one Letter of Support, and one Video Presentation.

Design Brief

Intent
The intent of the design brief is to present the design context, goals, elements, and outcomes in both visual and narrative form.

Content
Each team must prepare a Design Brief not exceeding twenty 8.5” x 11” pages, excluding cover page and references (note that pages in excess of twenty will not be reviewed). The Design Brief should balance visual and narrative components to provide a comprehensive summary of the team’s approach to addressing the Challenge criteria (see Site Design Criteria). The narrative component of the Design Brief is not to exceed eight pages (excluding cover page, references, and captions).

Each entry must include:

- Registration number
- Project title
- Project location
- Names and disciplines of team members
- Name and discipline of faculty advisor
- Name of facilities advisor
- Project abstract (250 words maximum)
- Site plan

Additional suggested elements include:

- Site cross section(s)
- Conceptual drawing(s)
- Site hydrologic analysis (including drainage areas, soil types, land cover types, infiltration rates)
- Stormwater control design (including overflow or bypass elements)
- Materials list
- Plant list
- Capital costs
- Summary of review process (identifying all committees, departments, and state or municipal agencies that must be involved in the project review and approval)
- Proposed review and implementation timeline
- Operation and maintenance plan
- Lifecycle costs
• Quantitative analysis of benefits

**Format**
Pages should be consecutively numbered, include 1" margins, and use standard 12-point font for narrative sections. Design Briefs must be provided in Adobe Acrobat PDF format, with file size not to exceed 10 MB. Instructions on submitting project files are provided below.

**Letter of Support**

**Intent**
The intent of the letter of support is to demonstrate that the team consulted with the facilities planning department to develop a feasible site design that could be constructed as a campus demonstration project.

**Content**
Each team must submit a letter from a member of the college or university’s facilities planning department demonstrating support for the proposed site design and for the proposed review and implementation timeline. The letter of support must include the registration number and project title. Letters of support are not to exceed two 8.5” by 11” pages (note that pages in excess of two will not be reviewed). Letters of Support do not count towards the Design Brief page limit.

**Format**
Letters of Support must be provided in Adobe Acrobat PDF format. Instructions on submitting project files are provided below.

**Video Presentation**

**Intent**
The intent of the video presentation is to supplement the design brief by providing students the opportunity to describe their project in a different medium. Student teams are encouraged to be creative in explaining the context and vision for their design. Note that videos will be viewed only in the final round of judging.

**Content**
Each team must prepare a video presentation not to exceed 3 minutes. The video title must include the registration number and project title.

**Format**
Teams must upload their video presentation to YouTube or a similar video-sharing website and provide a link with their submission (see Submission Instructions). Videos should be set as “unlisted” or “private” so that entries cannot be detected by search engines prior to the submission deadline. (Note that once the submission deadline has passed, teams should feel free to set their videos to “Public”). See below for instructions on uploading project videos to YouTube and setting videos as “Unlisted” on YouTube:
Site Design Criteria

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 six criteria identified below. Based on the average score 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 entries.

1. **DOCUMENTATION (10)**
   - Are the graphics and descriptions of sufficient quality to enable the judges to evaluate the design?

2. **FUNCTIONALITY (20)**
   - Is the design effective, efficient, and practical in its engineering approach?
   - Will the design retain and treat stormwater runoff on-site (e.g. through infiltration, evapotranspiration, or harvest and use) to improve water quality?
   - Does the design address multiple water resource goals (e.g., groundwater recharge, water conservation, flood mitigation)?
   - Will the design protect and improve ecosystem services provided by soil and vegetation?

3. **INNOVATION AND INTERDISCIPLINARY COLLABORATION (15)**
   - Were any unique approaches used to solve engineering design challenges?
   - Were any unique approaches developed to simultaneously address environmental, social, and/or economic sustainability?
   - Does the design demonstrate collaboration between different disciplines (e.g., landscape architecture, architecture, engineering, environmental science, biology, economics, business administration)?

4. **VALUE TO CAMPUS (15)**
   - Will the design serve as an artful amenity, instilling a sense of place and encouraging people to convene, reflect, or linger?
   - Is the design for a site in a prominent, central location that engages students and visitors and exposes them to the concept of green infrastructure?
   - Does the design include interpretive elements that communicate the intent of the green infrastructure design?

5. **FEASIBILITY (20)**
   - Could the design reasonably be expected to be built within a 1 – 2 year timeframe?
   - Did the team collaborate with the facilities department in developing the site design?
   - Did the team present a plan for navigating the review process?
• Could the design reasonably be expected to be built within the proposed project budget?
• Did the team describe the source of any proposed matching funds?

6. RELIABILITY (20)
• Does the design allow for easy and effective maintenance?
• Did the team develop an operation and maintenance plan to maintain the system function?
• Did the team collaborate with the facilities department in developing the operation and maintenance plan?

Documentation Guidelines

For both the Master Plan and Site Design categories, functionality is a very important criterion. The following table provides examples of metrics that teams may include in their submissions to document how their design meets this criterion. 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 technical aspects 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.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Example Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Water Management</td>
<td>Reduction in impervious area (square feet, %)</td>
</tr>
<tr>
<td></td>
<td>Reduction in directly connected impervious area (sq ft, %)</td>
</tr>
<tr>
<td></td>
<td>Change in annual runoff depth from existing and/or natural condition (inches/year, %)</td>
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<tr>
<td></td>
<td>Change in annual stormwater pollutant load from existing condition (pounds/acre/year)</td>
</tr>
<tr>
<td></td>
<td>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, %)</td>
</tr>
<tr>
<td></td>
<td>Reduction in landscape water requirement (may be attributed to change in plant species or change in irrigation efficiency) (gallons/year, %)</td>
</tr>
<tr>
<td></td>
<td>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, %)</td>
</tr>
<tr>
<td>Soil and Vegetation Management</td>
<td>Reduction in potable water use for indoor uses (gallons/yr, %)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Area of protected soils (acres, sq ft)</td>
</tr>
<tr>
<td></td>
<td>Area of restored soils (acres, sq ft)</td>
</tr>
<tr>
<td></td>
<td>Area of protected native plant communities (acres, sq ft)</td>
</tr>
<tr>
<td></td>
<td>Area of restored native plant communities (acres, sq ft)</td>
</tr>
<tr>
<td></td>
<td>Increase in canopy cover (10 years after installation) (% of site area)</td>
</tr>
<tr>
<td></td>
<td>Increase in roof area shaded by vegetation (% of roof area)</td>
</tr>
<tr>
<td></td>
<td>Increase in hardscape area (roads, sidewalks, parking lots, courtyards) shaded by vegetation (% of hardscape area)</td>
</tr>
<tr>
<td></td>
<td>Map showing locations of windbreak vegetation relative to buildings</td>
</tr>
<tr>
<td></td>
<td>Reduction in energy consumption associated with indoor climate control due to vegetation/shading (%)</td>
</tr>
<tr>
<td></td>
<td>Air pollutant removal by trees (lbs/yr)</td>
</tr>
<tr>
<td></td>
<td>Change in plant diversity (plant list before and after project)</td>
</tr>
<tr>
<td></td>
<td>Change in pollinator diversity (list of pollinators supported by plants before and after project)</td>
</tr>
</tbody>
</table>

**Submission Instructions**

EPA will collect submissions to the Campus RainWorks Challenge via email. Participating teams must email their submissions to RainWorks@epa.gov by Friday, December 13 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:

<table>
<thead>
<tr>
<th>Master Plan Category</th>
<th>Site Design Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design Brief (saved as “###-Design Brief.pdf”)</td>
<td>1. Design Brief (saved as “###-Design Brief.pdf”)</td>
</tr>
<tr>
<td>2. The URL for the team’s video presentation</td>
<td>2. Letter of Support (saved as “###-Letter.pdf”)</td>
</tr>
<tr>
<td></td>
<td>3. The URL for the team’s video presentation</td>
</tr>
</tbody>
</table>
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 Design Brief and video 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. Winning entries may also be displayed at a design exhibit at a professional conference.

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