STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE PROPOSAL FORM

Part I- General Information:

Name of Student Organization	**UAP 3354 - Introduction to EPP**
Contact/Responsible Person	**Ben Clark**
Contact Office Held/Title	**Scott Douglas**
Contact Email Address	**cben4@vt.edu**
Contact Telephone Number	**(571) 266 –9148**

Part II- Project Cost Information

Estimated Cost of this Proposal	$2200	See III.C. below
Estimated Savings -	$137.16 annually	See III.D. below
Net Cost of this Proposal =	Payback period of 16 years	

A. Please describe your sustainability initiative and attach supporting documentation.

Our sustainability project focuses on the Hahn Horticulture garden. We would like to alter the gutters alongside the pavilion and install a 500-gallon cistern to catch rainwater to water the vegetable garden and other plants. As the cistern fills up, the water will be stored for future use watering plants in the vegetable garden and annual beds around the garden. Overflow in the case of an intense rain event of greater than 2 inches, or less if the cistern is partially full, will be diverted to an existing dry stream bed that is the existing terminal point of all gutters running off the building. This cistern will decrease the dependency of the center on municipal water and diversifies their water sources. The water running off of the entire roof currently collects to one area behind the horticulture center through an underground piped network, which flows into a dry riverbed, as mentioned before, and then into stormwater infrastructure. Using the rain cistern will reduce some of the impacts of water that will go into the riverbed and will reduce stress on the stormwater infrastructure in precipitation events. It is important to note that the roof drainage is not the only source of water for the dry riverbed and that taking water from the parking lot will minimize ecological impacts. This project will be a part of the curriculum for CEE 4114, Fundamentals of Public Health Engineering (taught by Peter Vikesland), where students will explore surface area of the roof to volume of water ratios given certain weather events, the use of screens to prevent mosquito propagation, how to calculate pressure head given the height of the rain cistern or water level, the theoretical design of a cistern, water quality monitoring, as well as many other public health initiatives.

Location

B. How does this initiative help to achieve the goals of the Virginia Tech Climate Action Commitment Resolution and Sustainability Plan?

The installation of a rainwater cistern in the Hahn Horticulture garden would help Virginia Tech become a leader in campus sustainability and as the university pursues enhanced environmental stewardship (Goal 1). This initiative would also engage students, faculty, and staff through education and involvement in the implementation of a strategy to use water more efficiently and sustainably in the Hahn Horticulture garden (Goal 4). Lastly, funding this initiative would satisfy the university's goal of supporting sustainability programs (Goal 14).

C. What is the cost of your proposal? Please describe in adequate detail the basis for your cost estimate.

As for the supplies for our project, there needs to be one 500-gallon cistern, assorted hardware for assembly or extra cistern fittings, a hose, and leveling sand. The individual cost of each material is listed at the bottom of this proposal, additional hardware for assembly is estimated to be about $100, and the overall one-time cost is projected to be **$475.09**. There will be no labor costs because all labor will be student volunteers and/or students in Public Health Engineering.

$2060 + $100 + $15.47 + $23.28 = **$2198.75** in one-time costs.

D. Will your proposal produce cost savings for the University? If so, how much? Please describe in adequate detail the basis for your savings estimate.

This project will pay for itself 16 years after installation, and then continue to generate savings annually in water use bills. Based on rainfall averages in Blacksburg and a rough estimate of the Peggy Lee Hahn Pavilion roof area, the rain cistern would collect and save 10,800 gallons of rain annually. Considering the University pays the town of Blacksburg $6.90 and $5.80 (total of $12.70) for water and sewage respectively for every 1,000 gallons of water, the University would be saving **$137.16 annually**, at current prices. There are also the unseen benefits due to education and relief of storm water infrastructure.

Estimated roof surface area for desired location = **400 ft^2 draining into cistern**
average annual total rain/snowfall amounts = **43.5 in**
43.5 in / 12 in = 3.6 ft * 400 ft^2 = **1,440 ft^3 of rainfall collected by the cistern in a year**
1,440 ft^3 * 7.5 gal = 10,800 gal annually / 500 gal = **21.6 cisterns collected annually**
10,800 / 1,000 = 10.8 * $12.70 = **$137.16 annually**
Savings after 2 years: **$274.32**
Savings after 5 years: **$685.80**
Savings after 10 years: **$1371.60**
Savings after 16 years: **$2194.56**

E. Is this funding request for a One-Time need or an Ongoing need (**please check one**)?

x One-time ☐ **Ongoing**

F. Is funding available for this request from another source? If yes, describe the funding (source, amount, etc.)

No.

STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE PROPOSAL FORM (Continued)

Allison Magnant, Ben Clark, Delaney Peterson, and Paighton Vanzant

Prepared By (Name of Contact for Student Organization) Date 10/29/18

Scott Douglas

Reviewed By (Name of Appropriate University Official)

Date

Reviewed By (Name of Office of Energy and Sustainability Representative)

Date

Examples

Rainwater barrels installed at the visitor center of Belle Isle State Park; used for inspiration

http://www.sassafrasfarmnatives.com/design-projects.html

Costs

⅝ in. diameter x 25 feet Heavy Duty Hose
https://www.homedepot.com/p/Neverkink-5-8-in-Dia-x-25-ft-Heavy-Duty-Water-Hose-8605-25/100661323
Price: $15.47

500-gallon Cistern
https://rainwatermanagement.com/collections/packages-designs/products/500-gallon-rainwater-kit
Price: $2060.00

Cubic Yard of Leveling Sand
https://www.homedepot.com/p/0-5-cu-ft-Leveling-Sand-98000/100343385
Price: $23.28

Additional Fittings and Materials
Price: $100
The addition of 100 dollars is cover additional miscellaneous materials during the construction of the project. Screws and other small construction materials add up in cost quickly, so we added this additional amount to cover unforeseen material needs.

STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE FUNDING PROPOSAL
CONTACT LIST

In the preparation of your Green RFP form, we encourage student organizations to seek input and guidance from the following list of university employees. These individuals are familiar with the form and the process. They can address the feasibility of your proposal, can provide a technical review, and can evaluate the cost & potential savings.

Area of Expertise	Name	Title	Email Address
Energy Management	Ruben Avagyan	Campus Energy Manager	rubena@vt.edu
Facilities: Housing & Residence Life	Todd Pignataro	Associate Director of Facilities	ptodd@vt.edu
Facilities: Buildings & Grounds Water Bottle Refill Stations	Jim McDaniel	Project Coordinator	jmcdani@vt.edu
Exterior Lighting	Bob Dellinger	Assoc. Director, Utilities	rdelling@vt.edu
Student Engagement & Campus Life	Eric Margiotta	Association Director	margiotta@vt.edu
Dining Services	Anthony Purcell	Assistant Director	purcella@vt.edu
Alternative Transport (Bike, Bus, Walk, etc.)	Jeri Baker	Director, Parking & Transportation	jab518@vt.edu
Landscape Architect	Bob Massengale	Site Planner	rnmassen@vt.edu
Hahn Horticulture Garden	Scott Douglas	Director/Instructor	dsd1@vt.edu
Recycling	Denny Cochrane	Sustainability Program Manager	denniscc@vt.edu
Miscellaneous	Karlee Siepierski	Campus Sustainability Planner	Skarlee3@vt.edu