

Abstract

This project aimed to find solutions to the problem of unsustainable landscaping and high maintenance costs for the Museum of Russian Icons in Clinton, Massachusetts, a local non-profit cultural institution. Since the founding of the museum, energy conservation has been a primary focus of the museum staff. With a combination of solar panels covering a large area of the roof and a vegetative roof to conserve cooling costs in the summer, this goal has largely been achieved. However, there are issues with the current solutions which our team committed to address. Among these issues are excessive water use for the green space in front of the museum and high maintenance costs of the vegetative roof.

Through a series of sustainable landscaping innovations such as heat-reflective roofing, rainwater harvesting, and low-maintenance, native plants, we hope to simultaneously reduce the environmental impact and annual expenditure of the museum. With our solution, the museum stands to break even in 6 years, saving significantly for every year after that.

Objective

- Replace vegetative roof with more efficient alternative to eliminate maintenance fees.
- Lower overall costs of landscaping to create a more efficient method of maintaining green space.
- Implement a rainwater collection system to lower amount of total water consumption

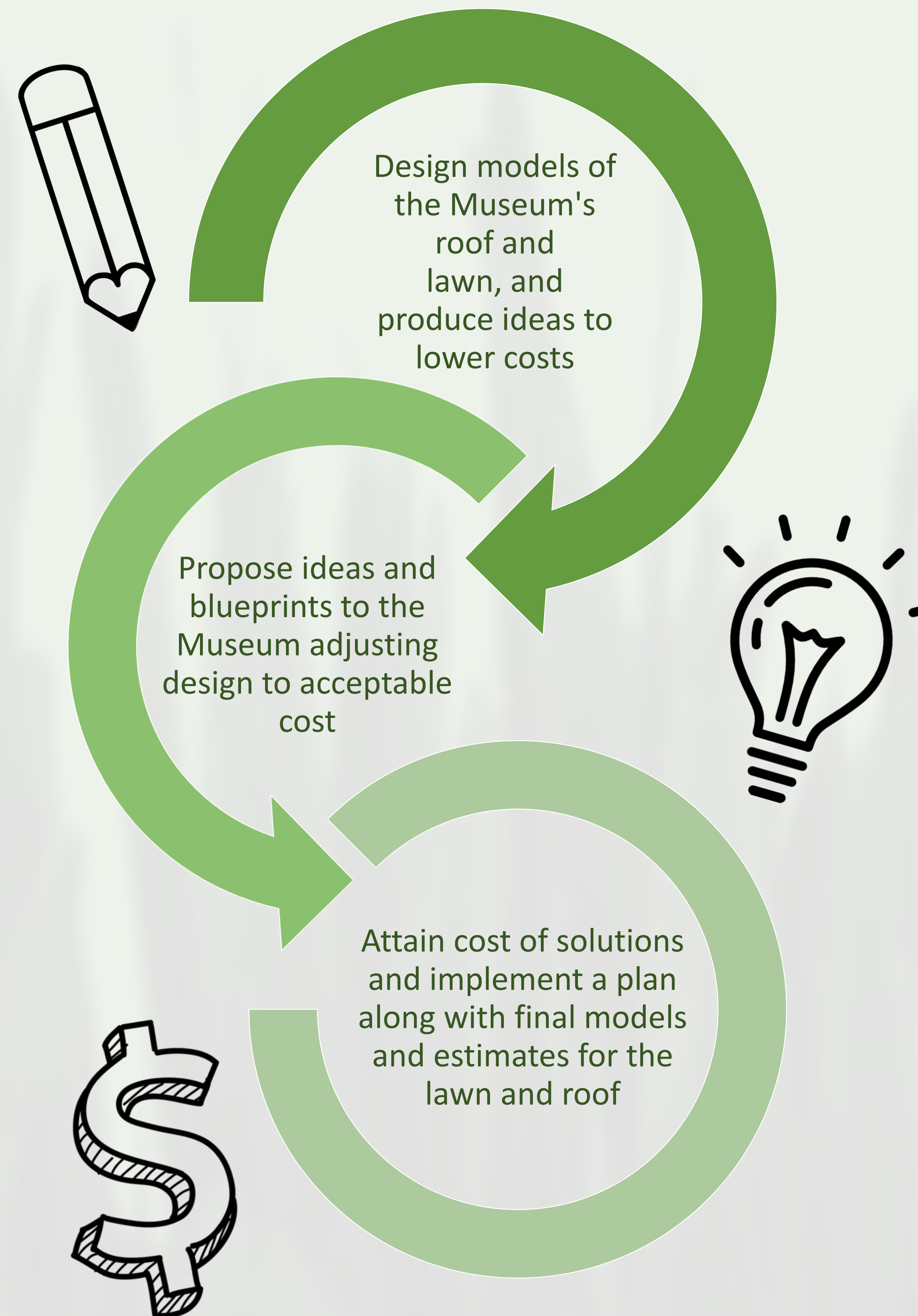
Acknowledgements

We would like to thank Lynn Philbin and Kent Russell for allowing our team to take on this project. We also would like to thank our advisor, Svetlana Nikitina, and our PLA, Isabelle Cordova, for guiding us throughout this project.

Selected Bibliography

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2. "Cost to Install a Rainwater Collection System: Rain Harvesting Cost." Fixr.com, 22 Aug. 2018.
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4. "The Cool Roof Phenomenon." Green Building Solutions, 8 Jan. 2017.
5. Winmore, Findsome &. "Energy Efficient Roofing." Eagle Roofing.
6. "Rainwater Harvesting Methods." Akurthi Enviro Solutions Top Rainwater Harvesting Methods

Methods



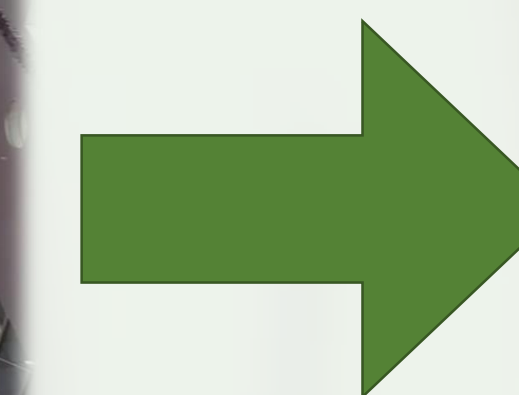
Green Roof Solution

Take the vegetative roof out completely and replace with more of the heat reflecting tiles that are already in use

\$5000 = Estimated total for new tiles and installation.



Current Roof

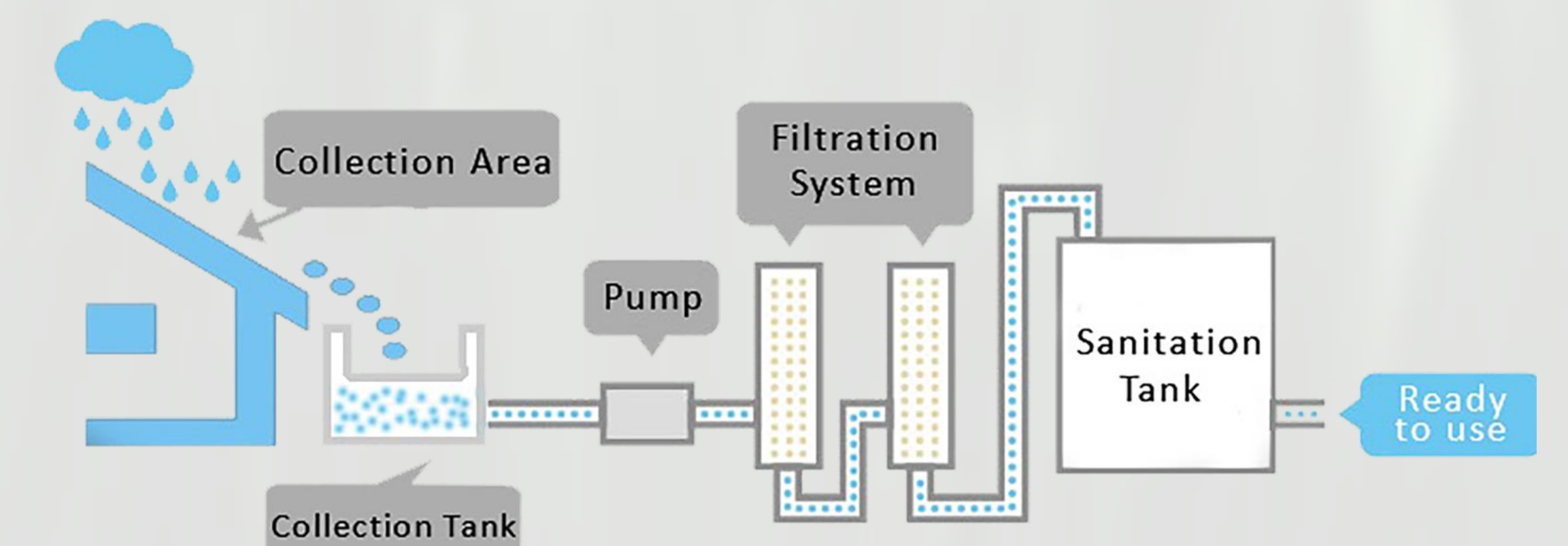


Projected 3D Model

Courtesy of Tile Tech Inc.

Rainwater Collection Solution

Invest in a rainwater collection and storage for the sprinklers to use **\$600** = Estimated total for rainwater collection tank and installation



Courtesy of Cardinal Plumbing and Heating

Results & Projections

	Current Cost of Maintenance	Initial Investment	Cost of Maintenance	Years Until Breaking Even
Green/Cool Roof	\$372.00	\$5,051.20	\$0.00	14
Front Lawn Redesign	--	\$488.00	\$0.00	--
Rainwater Harvesting (basic setup)	\$600.00	\$750.00	\$0.00	1
TOTAL	\$972.00	\$6,289.20	\$0.00	6

Landscaping Solution

Leave the grass on the side yard and replace the semi-circle grass patch with mulch, a commemorative stone and shrubs



Current Front Lawn



Projected 3D Model