

Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: Salem

Project Title: Green Infrastructure for Stormwater Management in City Projects

Award Year (FY): FY19/20 (extended to FY21)

Grant Award: \$ 320,861

Match: \$ 107,563.79

Match Source: Cash and in-kind labor

One or Two Year Project: Two (extended to a third year)

Municipal Department Leading Project: Planning & Community Development

Project Website URL: NA

Community Overview:

The City of Salem has a total population of 43,226. A substantial portion of the city's geography is designated by the Executive Office of Energy & Environmental Affairs as Environmental Justice Areas. Many of these areas are subject to coastal flood risk and experience urban heat island effects. Salem has a robust hospitality industry that largely employs lower wage restaurant and retail employees. The City is also home to large institutional employers, including Salem State University, Salem Hospital, and state government.

Although Salem is most well known for its association with the infamous 1692 Witch Trials, its later industrial history permanently shaped the terrain. Nineteenth Century builders expanded the waterfront, channelized the rivers, and filled wetlands to construct factories and railroads. Low-lying filled areas have an elevated flood risk and few wetland areas remain to naturally absorb flood waters.

Project Description and Goals:

The project included three components across the city: tree plantings downtown, sustainability infrastructure at Bertram Field, and green stormwater treatment at Gallows Hill Park. Tree plantings at all three sites serve to reduce the worsening urban heat island effect in Salem. In the downtown, pervious pavement material in the tree pits provides a stable and accessible surface that protect the tree root system from the harsh urban environments. The green stormwater systems at Gallows Hill Park (rain gardens and pervious pavement) and Bertram Field (new drainage system and pervious pavement) capture and treat stormwater, helping to reduce the burden of increasing precipitation on the local stormwater infrastructure. Interpretive signage at Gallows Hill promote understanding of green infrastructure's role in mitigating climate change impacts.

The City led a robust public engagement process for the Bertram Field and Gallows Hill projects that each included a series of direct meetings with key stakeholders as well as public forums to engage the larger public. The City promoted the public meetings in both English and Spanish and made interpreters available at the events. Although the downtown trees project did not

include direct public engagement, the work was undertaken in the content of renewed public interest in tree plantings and was discussed at public meetings of Salem’s new Tree Commission. Overall, the activities funded by the grant were planned and implemented with meaningful participation from the community. This engagement helped to cultivate the city’s partnership with the diverse populace of the community’s Environmental Justice Areas.

Because downtown Salem is a cultural destination and regional employment center, the new street trees benefit visitors from the region and beyond. Gallows Hill Park’s new skatepark draws skaters from the North Shore and beyond who area able to see the green infrastructure and the signage explaining how it works. Upgrades to Bertram Field will result in it being used for regional athletic events. The stormwater improvements reduce the pollutant levels in Salem Sound, which is a regional economic and ecological asset.

Salem secured an extension to accommodate the delayed start of work at Bertram Field. The delay resulted from the City having to modify the project design after construction bids came in over budget. A similar issue delayed the downtown tree plantings. Throughout the early phase of the COVID-19 pandemic, specialty concrete workers were unable to travel from out of state to complete the skatepark, and this delayed the final landscaping work. All work has been completed within the extended grand deadline.

Results and Deliverables:

* = Not specified

	Project	Grant application	Implemented
Sq. ft. pervious pavement (approx.)			
	Gallows Hill Park	*	2,000
	Bertram Field	*	21,178
	Downtown trees	*	496
Acres treated by green stormwater infrastructure (approx. acres):			
	Gallows Hill Park	*	4.7
	Bertram Field	*	0.63
	Downtown trees	*	NA
New trees:			
	Gallows Hill Park	35	46
	Bertram Field	*	10
	Downtown trees	33	32

As noted in the above table, the project resulted in approximately 5.3 acres of land treated with green infrastructure, 23,674 square feet of pervious pavement, and 88 new trees.

Lessons Learned:

Several lessons were learned as a result of the project. First, the City must always be prepared for the unpredictable nature project costs. No matter how refined a designer's cost estimate, no one can fully anticipate the availability of contractor, fluctuations in materials costs, and the level of competition among bidders. Both the Bertram Field and downtown trees project were delayed in order to address the unexpectedly high initial bids. Another lesson is that the functionality of rain gardens and swales depends on precise grading. The Gallows Hill grading had to be adjusted based on observations following major rain storms. The best way for other communities to learn from these projects is to contact City staff directly.

Partners and Other Support:

Salem Sound Coastwatch: Salem Sound Coastwatch's Executive Director provided content for the educational signage at Gallows Hill Park. provided content for the educational signage at Gallows Hill Park.

Salem Public Schools: Witchcraft Heights Elementary School hosted one of the public forums to solicit input on the Gallows Hill Park project.

Project Photos:

