

Executive Summary: Arch Annual Engineering Challenge

Proposal to design a Pathside Drainage System

by the St. Louis Arch National Monument

St. Louis, Missouri

At the request of the Arch Annual Engineering Challenge, the Parkway Central Drainage Design Team proposes a dependable drainage system at the fork of the Old Cathedral and the Arch's South leg on the grounds of the Gateway National Park.

Problem

In the absence of a proper drainage system at "the fork", during heavy precipitation events, water pools up at the fork of the sidewalk and up the southernmost sidewalk. Causing damage to both the park's appearance as well as 5 young London Plane trees. Also, pooling poses a safety hazard in the winter as ice forms.

Circumstances

At the request of the national park service, it was asked that the landscape of the grounds remain intact. The trees, utility lines, and sidewalks must stay in place in order to maintain the appearance of the park. The National Park Service also requested the system does not change the composition of the soil and only that union workers are employed.

Solution

Our team has done extensive research and paid multiple visits to the Gateway Arch National Park in different weather conditions. From our observations, a slot-drainage system design has proven to be effective, worthwhile, and blends with the landscape. Stainless steel-topped slot drains will be used as the main water collection sources. Along with this, catch

basins on either side of the dividing path near the Arch's South leg. The drainage system will wrap around the outside of the trees (red line in Figure 1), bordering the concrete pathway. The reason we chose to not put the drain on the side of the tree next to the grass (blue line in Figure 1) was because grass clippings would most likely enter the slots and clog the drains, requiring more maintenance to clean the drains manually.

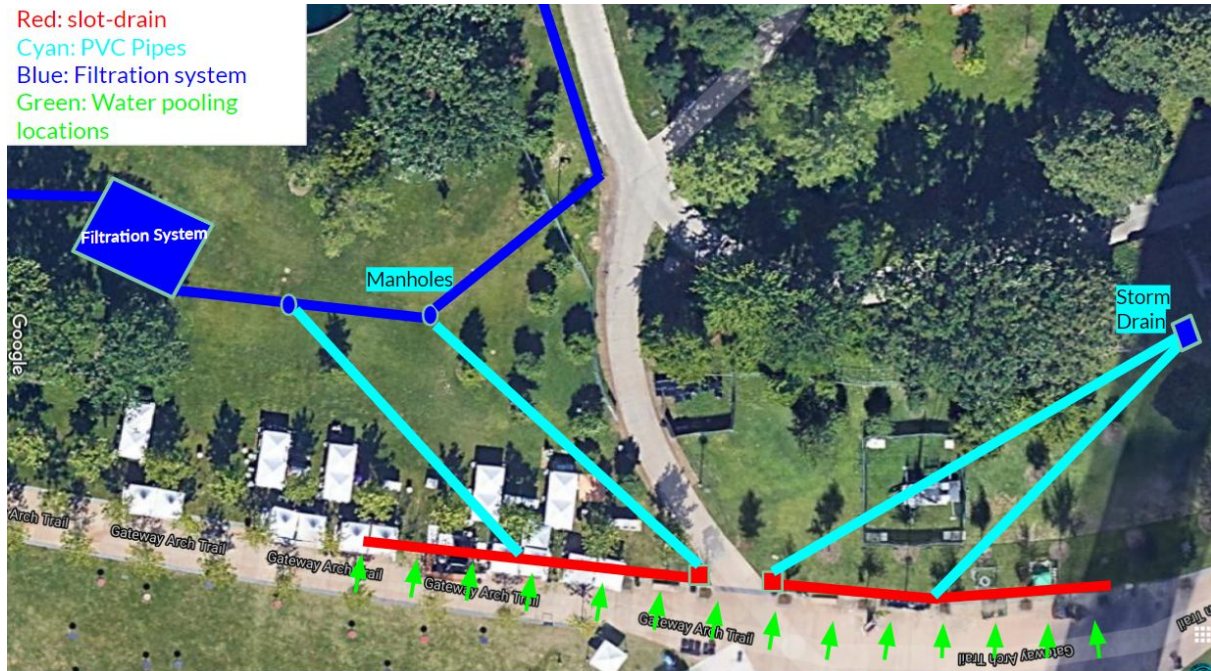
Along with this specific red-line route for the slot drains, a bird's-eye view is provided in figure 2 with a key. It maps out current water pooling locations, PVC drainage pipes, the current drainage systems in place, as well as the entire view of the slot-drainage system. Finally, figures 3 & 4 include the design of the slot drain being used for this project.

Timeline and Cost

The estimated time to complete this project is approximately 8-10 weeks, with two phases, the Planning Phase and the Construction Phase. The Planning Phase will take roughly 6 weeks, while the Construction Phase will take about 3 weeks. An investment of \$115,000-\$140,000 is adequate to renovate the area of concern. A time and material bid is suggested, which implies in the case of delays or unforeseen circumstances, extra labor and material costs must be paid for additionally.

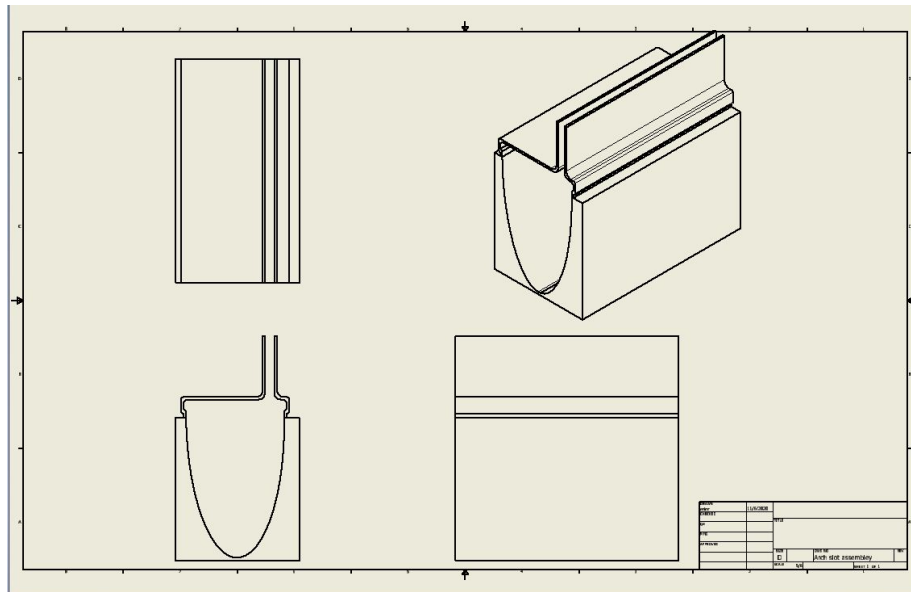


(Figure 1)

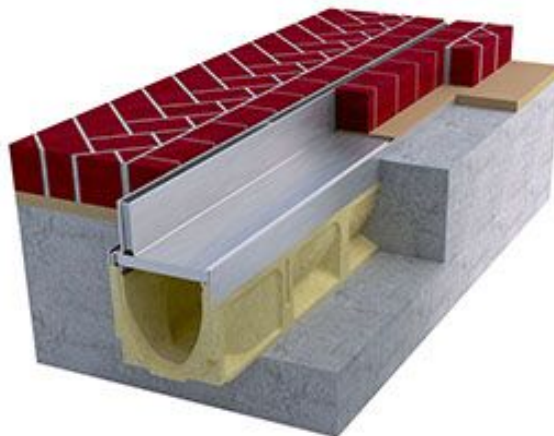


(figure 2 ^)

(figure 3)



(figure 4)



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