



# Museum Fire Flood Projects

April 1, 2022

Welcome to the City of Flagstaff's Museum Fire Flood Projects eNews. Please email [info@museumfloodprojects.com](mailto:info@museumfloodprojects.com) with any questions. These eNews will be released regularly to provide updates on all the City's Museum Fire Flood Projects.

## BACKGROUND

On July 21, 2019, the Museum Fire broke out in the Dry Lake Hills area just north of Flagstaff within the Coconino National Forest. The fire ultimately charred 1,961 acres, including a significant portion of the Spruce Wash Watershed. Flood modeling subsequently showed potential flood risk to neighborhoods in Coconino County and the City of Flagstaff. Both the City of Flagstaff and Coconino County Flood Control District immediately took extensive measures and precautions to mitigate damage from flood events.

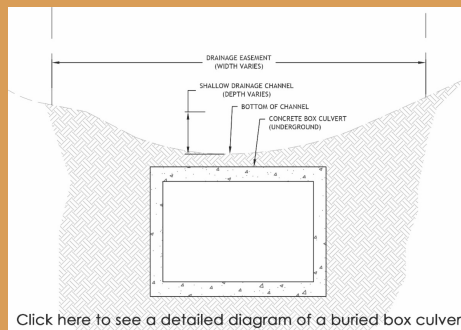
Throughout the summer of 2021, unprecedented rain events impacted the Museum Fire burn scar and caused multiple rounds of flash flooding in Flagstaff neighborhoods. The City of Flagstaff continues to collaborate with both the public and private partners to lessen the impact of flooding in the affected Flagstaff neighborhoods.

## SPRUCE WASH TECHNICAL FEASIBILITY STUDY OVERVIEW

A technical engineering feasibility study was conducted for flood mitigation improvements needed in areas impacted by flooding from the 2019 Museum Fire burn scar. The first task of the Technical Feasibility Study was to identify the size, type and location of drainage infrastructure that could be installed to maximize the capacity of Spruce Wash from its crossing at Linda Vista to Route 66. Currently, there are sections of Spruce Wash that are open channel (in the Grandview and North Sunnyside Areas) and other sections where a single underground large diameter pipe exists (in the Arroyo Seco and South Sunnyside areas). The existing stormwater infrastructure is undersized for unprecedented post-wildfire stormwater flows, which are ten to one hundred times greater than historical conditions. It is important to note that the Technical Feasibility Study analyzed only the technical feasibility of potential infrastructure improvements. Other elements of feasibility, such as financial feasibility, have not yet been evaluated.

The infrastructure improvements proposed by the Technical Feasibility Study include a series of concrete box culverts that vary in size to fit existing conditions. The concrete box culvert would begin just upstream of the Linda Vista crossing and extend the full length of Spruce Wash to Route 66. It would replace the pipe in 3<sup>rd</sup> Street, Spruce Avenue and First Street. Where there is currently open channel, the concrete box culvert would be installed at a depth to still allow for a shallow channel above. This design provides additional protection in the stormwater infrastructure system and creates more usable space. This would maintain localized drainage from adjacent properties and side streets to flow where it currently does today. There would also be pipes that connect to the concrete box culvert to allow street drainage from the neighborhoods to enter the system where it does today.

The estimated capacity of the concrete box culvert varies; there is greater capacity at the upstream end where the channel is steeper and there are fewer constraints. Capacity is most limited at the downstream end where West Street Wash joins Spruce Wash underground at Spruce Avenue and First Street. At this location, the size of the box is limited by gravity sewer



mains that serve a large area of Sunnyside, sewer services and buildings. It is also a flatter section of box culvert which limits how much stormwater can be conveyed. The estimated maximum capacity of a new concrete box culvert at this location is 1,100 cubic feet/second (cfs). Hence, improvements to enlarge capacity are being made to the greatest extent possible, however, due to physical constraints, these efforts will be unable to fully mitigate all flood events from occurring. The infrastructure improvements identified by the Technical Feasibility Study would work to lessen the damages caused by flooding but would not eliminate all flooding impacts.

Utilities such as water, sewer, gas and electric would need to be relocated in some areas to allow for the installation of the concrete box culvert. Drainage easements would need to be acquired in limited areas where the new infrastructure trespasses on private property.

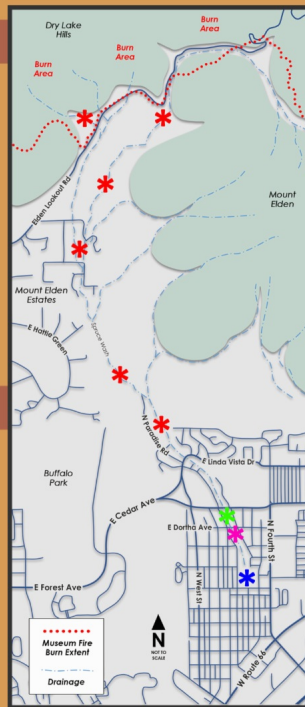
In addition to the Technical Feasibility Study, construction has begun on the Cedar to Dortha and Dortha Inlet project and will be completed before the 2022 monsoon season. The findings of the Technical Feasibility Study informed the size of this crossing to ensure that the design could work with future improvements.

Construction is also underway for new regional detention basins at Killip Elementary School. The addition of the detention basins would complement the long-term improvements proposed by the Technical Feasibility Study by holding back some of the water that would reach the downstream section where capacity is being increased to the greatest extent possible yet will be limited. The Killip School Regional Detention Basins are not large enough to hold back all of the flood waters from a large storm event but will help reduce the impact of large events as well as lessen the impact of the lesser, more frequent storm events. Both the Dortha Avenue crossing box culvert and the Killip School Regional Detention Basins complement the findings of the Technical Feasibility Study.

The next phase of the Technical Feasibility Study is the preparation of conceptual level design plans and construction cost estimates. The City is seeking funding opportunities for the system improvements identified in the Technical Feasibility Study, which could include general obligations bonds (if proposed and elected during the 2022 election cycle), federal grants, and/or changes to the stormwater utility rate fee. While the Technical Feasibility Study analyzes the technical and engineering feasibility of potential improvements, additional evaluations of feasibility, including financial feasibility, still need to be evaluated. Future tasks also include an analysis of possible alternate conveyance systems, detention opportunities within City limits where excess flood waters could be routed and analysis of potential property acquisitions. A timeline for potential installation and completion of the findings of the Technical Feasibility Study remains unknown.

[Click here to view the entire Spruce Wash Technical Feasibility Study.](#)

[Click here to view exhibits related to the Spruce Wash Technical Feasibility Study](#)



## Stay Connected

### Electronic Newsletters

The City will send out electronic newsletters (such as these) on a regular basis as these projects progress.

To receive eNewsletters, as well as notifications of Museum Flood Project updates scheduled at City Council meetings, send a request to: [info@museumfloodprojects.com](mailto:info@museumfloodprojects.com).

### Additional questions?

Please email: [info@museumfloodprojects.com](mailto:info@museumfloodprojects.com)

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City of Flagstaff

## Key Flood Projects

Key projects are identified by the corresponding colored asterisk on the map to the left:

-  Alluvial Fan Restoration and Sediment Reduction (Led by the Coconino County Flood Control District)
-  Spruce Wash Channel Improvements Project (Cedar Avenue to Dortha Avenue)
-  Spruce Wash Channel Improvements Project (Dortha Avenue Inlet)
-  Killip School Regional Detention Basins Project

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[Click here to view a larger version of this map.](#)

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For more information on these projects and important resources, visit [museumfloodprojects.com](http://museumfloodprojects.com)