

# Stormwater Management

## RECURRENCE INTERVALS

## DRIVE DESIGN

According to the U.S. Environmental Protection Agency, stormwater runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. In the City of St. Charles, runoff is primarily generated by rain, and as we all know, sometimes a *lot* of it. This type of runoff can lead to stormwater flooding of businesses, roadways and homes.

In an effort to gain a better understanding of the issues and potential legislation surrounding stormwater management, the City of St. Charles formed a Stormwater Taskforce in August of last year. This Taskforce is evaluating options and scenarios for stormwater management through policy recommendations to City Council.

Stormwater management systems are designed based on the probability of having a set amount of rain, in a set amount of time, to cause a set amount of runoff. These probabilities are measured by what engineers call a “recurrence interval”. The recurrence interval expresses probability, but inverted. It becomes the more familiar term of a “number”-year storm, for example, a 100-year storm. This is not a storm with a likelihood of occurring every 100 years as many people believe. Instead, it is a 1% annual chance storm.

To illustrate, visualize a bag of 100 marbles. Now imagine 99 of the marbles are white and one is blue. The likelihood of having a 1% annual chance storm (100-year storm) is the same as the likelihood of pulling that one blue marble out of the bag of 100. But remember, this is the *annual* chance. Every year, you will return to the bag and withdraw one marble. Attempting to pull the blue marble every year will obviously increase the chances it will actually be drawn. Over 30 years (the typical residential mortgage), we’ll return to the bag 30 times. Thus, if you owned a house over an entire 30-year mortgage, there is actually a 26% chance of that house experiencing a 100-year storm. That’s over a one in four chance!

Your input is valuable, and this year citizens will have an opportunity to comment on stormwater and many other issues through the city-wide survey that comes out in April.

Most local storm sewers and inlets are designed with the capacity to accommodate a 15-year, 20-minute storm. So, using our marble example above, envision a bag full of 15 marbles, 14 white and one blue, which we pull from every year to design our storm sewers. The relation of the storm to the capacity of the stormwater drainage system is directly related. For example, if storm sewers are designed for a 15-year storm and a 50-year storm occurs, local flooding will most certainly happen.

As several unusually intense storms have hit the area over the last few years, the City of St. Charles has sustained damage in various forms from stormwater flooding. Damage has been known to affect roadways, real

estate, land erosion, water quality and local streams. The City Council and its Stormwater Task Force are working to provide comprehensive management of the stormwater systems intended to protect the community and the environment. Your input is valuable, and this year citizens will have an opportunity to comment on stormwater and many other issues through the city-wide survey that comes out in April.

If you have questions pertaining to stormwater management, we encourage you to review the City’s long-range plan [www.stcharlescitymo.gov/571/Long-Range-Stormwater-Plan](http://www.stcharlescitymo.gov/571/Long-Range-Stormwater-Plan). You may also call the Department of Public Works at 636-949-3237.



*These homeowners near Elm Street and Marie Drive were housebound for a short time when an intense storm caused Cole Creek to overflow its banks and cover the road with almost 10 inches of water.*

## CITY OFFICIALS PRESENT AT APWA CONFERENCE

During a recent Missouri American Public Works Association (APWA) conference in Columbia, MO, Marc Eshelman of M3 Engineering Group alongside Kevin Corwin, City Engineer, and John Reeves, City Project Manager, presented results of the St. Charles Stormwater Management Plan. The presentation, “A Sensible Approach to Flood Mitigation, Stream Restoration and Water Quality” described an approach to developing and prioritizing stormwater projects based on acceptable risks and costs to the City of St. Charles.

“Being located at the confluence of the Mississippi and Missouri Rivers, the City of St. Charles will always face challenges associated with stormwater,” said Reeves. “The Public Works Department of St. Charles has chosen to address the challenges associated with stormwater management by using a managed-risk approach to create integrated solutions.”

The long-range stormwater plan was accomplished using a variety of technologies, including modeling and analytical tools that, when combined, can address flooding, stream degradation and water quality problems.

“The APWA offered the City of St. Charles a tremendous opportunity to present their findings and share knowledge to a captive audience,” stated Marc Eshelman. “We were pleased to be a part of their efforts to address water quality concerns within the community.”