

Why does my Ditch Flood in Heavy Downpours?

When I speak at civic league meetings, I am sometimes asked why the City does not construct large enough ditches and piping systems to quickly remove even the heaviest downpours. Citizens often complain that after a heavy downpour, water quickly overwhelms the ditches in front of their homes and floods their streets and yards.

The short answer to this question is that in order to build ditches big enough to carry away all of the water generated by heavy downpours, the ditches in Chesapeake would have to be much wider than they are now. Instead of the relatively narrow ditches found in front of the average suburban home, the ditches would take up a large part of the front yards, and possibly a large portion of the back yards as well. Maintenance by the homeowner and by City crews would be very time consuming and expensive, which would translate into much higher taxes for homeowners and businesses.

So the designers of these drainage systems have to balance the need to remove as much stormwater as possible against the costs associated with land needed for the ditches & pipes, construction, and maintenance. They achieve this balance by using what is known as the “design storm” concept. The federal government has compiled charts that list the design storms for most areas of the country. These tables are based on historical rainfall data for all of the areas analyzed. Data is gathered on the intensity (inches of rain per hour) and the duration of rain events. By analyzing many years worth of rainfall intensity & duration data, government statisticians determine the frequency (how often over time) that a specific intensity/duration rain event will occur. If it is found that a rain event in which 2 inches per hour of rain falls for 2 consecutive hours only occurs once every 25 years, this would be known as the 25-year design storm. Another way to think about what these statistics tell us is that in any given year, the probability of getting a rain event of this particular intensity & duration is 4%. We may beat the odds (just like some lucky folks do with the lottery) and experience two 25-year events within a one-year period; however, over time, the average frequency stays fairly consistent.

Currently, drainage ditches in Chesapeake are required be designed to handle runoff from a 10-year storm. Older ditches that were subject to design review were only required to handle runoff generated by a 2-year design storm. Because many ditches in Chesapeake were constructed prior to the time when design review was a requirement, there are many under-sized ditches in the City. This is especially true where homes have sprouted up in previously agricultural areas. A farm field typically allows much less runoff of rainwater than a home or business. So a ditch that may have provided adequate drainage for years to a rural area would probably be under-sized if it was not widened or otherwise improved as new homes were built over the former farmlands.

To meet the current criteria for storm design and provide adequate drainage in new subdivisions, the City requires detention ponds (where needed) to control the flow of stormwater. The ponds provide additional storage and control the release of runoff, as well as help reduce suspended sediment and pollution in stormwater.