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June 13, 2021

Susan Milliken  
Commissioner  
James Island Public Service District  
James Island, South Carolina  
E-mail: [sbmilliken@aol.com](mailto:sbmilliken@aol.com)

Dear Commissioner Milliken,

I am writing to respond to your mail of June 13, 2021. In the e-mail you informed me that your rain gauge measured 4.5 inches since the previous day, that James Island was badly flooded, and that local governmental staff and elected officials were saying the following: **“The drainage system will NEVER be able to handle these rain bombs that are coupled with high tides in Charleston County. We will flood”** (emphasis in the original).

It was not clear from your e-mail whether the above was a literal quote or how local governmental staff and elected officials have reached the conclusion that flooding is inevitable. However, more information about that quote will not affect my response.

First, I would like to point out that 4.5 inches of rain in 24 hours is not an extreme event in Charleston. The return period for that storm is 2.6 years, so that, in any given year, such a storm has an annual probability of exceedance of 38%. The methodology for reaching that conclusion is given in my report entitled “Potential Impact of New Urban Development on Flooding on James Island, Charleston, South Carolina,” which is available at this link:

[https://thrivingearthexchange.org/wp-content/uploads/2020/08/James\\_Island\\_Report\\_Emerman.pdf](https://thrivingearthexchange.org/wp-content/uploads/2020/08/James_Island_Report_Emerman.pdf)

Second, I would like to draw your attention to the 2013 and 2020 Charleston Stormwater Design Standards Manuals that are available at these links:

<https://www.charleston-sc.gov/DocumentCenter/View/25681/January-2020-Draft-Manual?bidId=>

<https://www.charleston-sc.gov/DocumentCenter/View/5972/Stormwater-Design-Standards-Manual-August-2014-Updates?bidId=>

The critical passage in the 2013 stormwater manual is the following:



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“Flooding exists in many locations around the City where development densities have increased to the point that stormwater controls have become overwhelmed ... The following design criteria shall be used for projects discharging to receiving waters within these areas: The post-development, peak discharge rates are restricted to ½ the pre-development rates for the 2 and 10-year 24-hour storm event **or to the downstream system capacity, whichever is less ...**” (emphasis added).

The passage is repeated almost verbatim in the 2020 stormwater manual:

“Flooding occurs in many locations around the City where development has increased stormwater runoff to the point that stormwater conveyance systems have become overwhelmed. The following design criteria shall be used for projects discharging to receiving waters within these special protection areas: For non-SFR [Single-Family Residence] sites of 0.5 acres or more, the post-development, peak discharge rates are restricted to one-half the pre-development rates for the 50 percent and 10 percent AEP [2-year and 10-year], 24-hour storm events **or to the downstream system capacity, whichever is less.**” (emphasis added)

In other words, the downstream system capacity sets a lower limit on the permissible peak discharge rate from a new development. It does not matter if the post-development discharge rate would be one-half or one-third or one-tenth of the pre-development discharge rate. If the post-development discharge rate would exceed the downstream system capacity for either a 2-year or 10-year 24-hour storm event, the new development cannot be permitted.

Now, based on the quote that you provided, the local governmental staff and elected officials have informed us that the downstream stormwater system (presumably any portion of the stormwater system in Charleston) will **NEVER** (emphasis in the original) be able to accommodate 4.5 inches of rain in 24 hours, which is a 2.6-year event, corresponding to an annual exceedance probability of 38%. If that is the case, then certainly the downstream stormwater system will never be able to accommodate the stormwater generated by a 10-year storm and probably not even a 2-year storm. The logical conclusion is that no new development can be permitted in a Special Protection Area ever again.

In summary, these are my recommendations for the City of Charleston:

- 1) Require any new developments to comply with the Charleston Stormwater Design Standards Manual.
- 2) Do not permit any new developments in Special Protection Areas.

Note that, based on the quote from local governmental staff and elected officials, the second recommendation follows logically from the first recommendation.



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I know that I have not addressed the question as to how to fix the flooding problem. However, there is no way to talk about fixing the problem, while the local governmental staff continue to make the problem worse by permitting new developments in Special Protection Areas in violation of the Charleston Stormwater Design Standards Manual.

Please let me know if I can help with anything else.

Best wishes,

A handwritten signature in black ink that reads "Steven H. Emerman". The signature is written in a cursive, slightly slanted style.

Steven H. Emerman