

# Flooding *and* Drainage



**GARY**

**WHITE**

*for* **MAYOR**

*We are One Lowcountry, One Community, One Charleston*

Thought Leadership

Position Paper

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# Contents

Abstract.....	3
Problem Statement.....	3
Background.....	4-5
Solution.....	6
Conclusion.....	6

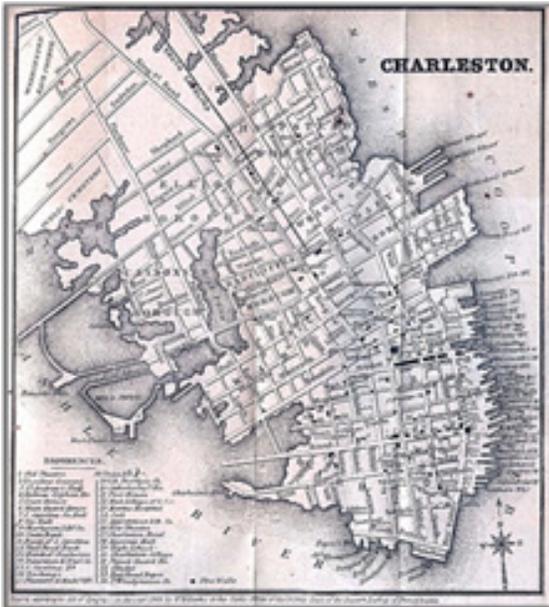


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## Abstract

The City of Charleston, South Carolina continues to experience numerous flooding issues. Unfortunately, due to limited financial resources combined with well-publicized inadequate planning, a myriad of disparate opinions from a multitude of commercial and environmental studies, and the inexperience of the current government administration, there remains no clear path on how to protect the critical infrastructure of the Holy City or its over one hundred thousand residents from this on-going and potentially catastrophic environmental dilemma.



1800's Map of Charleston

## Problem Statement

Flooding has been an issue in the Charleston area for many years. Over the last few years, Charleston has experienced more and more significant weather events that have compounded this on-going problem. Additionally, many areas in Charleston that have not experienced flooding in the past, are now starting to be affected by the very same flooding that the peninsula of Charleston is experiencing. Many areas of the City, including the peninsula of Charleston, have been developed on filled wetlands and marsh. Rapid development in the area has also contributed to more flooding. Moreover, sea level rise will present more flooding challenges long into the future. When one looks at a side by side comparison of the map of the peninsula from the 1800's and then the map of the Peninsula based on 3ft of sea level rise, the similarities are stark, (see illustrations below).

Furthermore, deferred maintenance has contributed and significantly exacerbated the City's flooding problem. The dilemma facing the citizens of Charleston now is that there are numerous flooding issues to address and currently not enough financial resources or experienced leadership to address them.



3ft Sea Level Rise Map of Charleston

FIGURE 2: SEA LEVEL RISE PROJECTIONS FOR CHARLESTON<sup>(2)</sup>

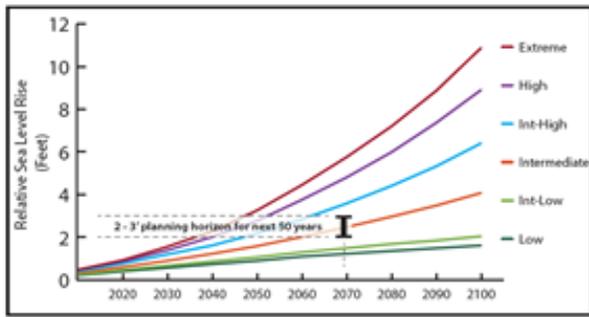


FIGURE 1: OBSERVED SEA LEVEL RISE IN CHARLESTON HARBOR<sup>(3)</sup>

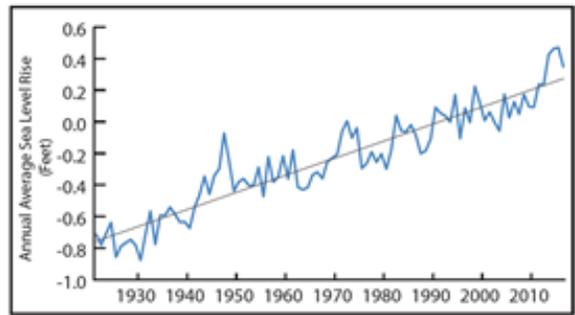
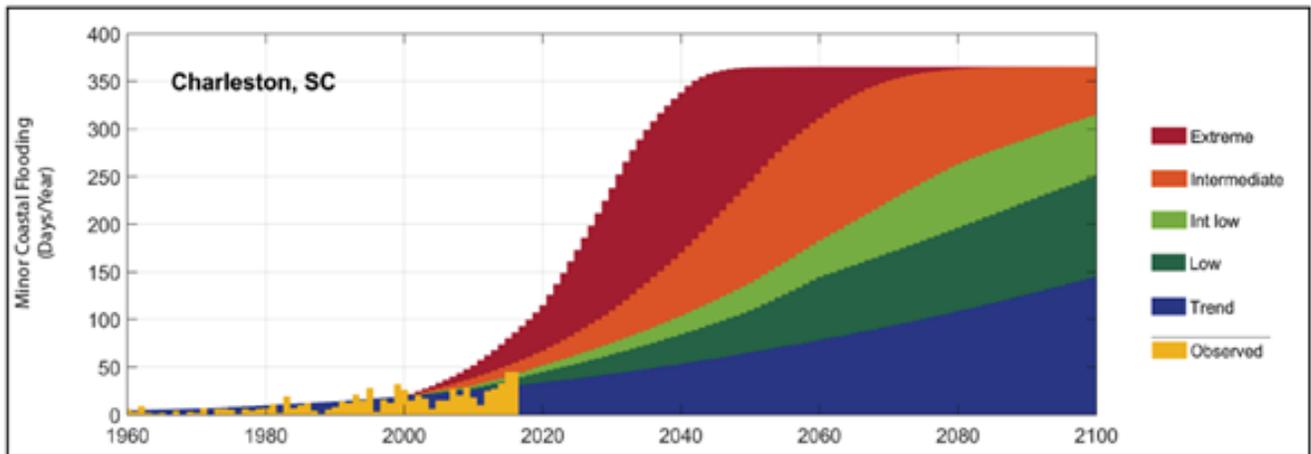


FIGURE 3: OBSERVED AND PREDICTED "MINOR COASTAL FLOODING" IN CHARLESTON<sup>(3)</sup>



## Background

The City of Charleston currently has two specific funding sources dedicated to providing resources to address flooding, (1) the Drainage Fund and (2) Storm Water Fund. The Drainage fund is funded every year by 4 mills in property taxes and creates an estimated \$4.8 million annually. The drainage fund also receives approximately \$700,000 every year in funding from business licenses, permits, and fees.

The second source is the Storm Water Fund, which is funded by storm water fees that are charged on business and consumer's water bills. The current storm water fee is \$10 per equivalent residential unit, which generates an estimated \$11.36 million annually.

The City has received funding from other governmental entities in the past, such as the State Infrastructure Bank, Department of Transportation, Charleston Water Systems and the Federal Emergency Management Agency. These funds are tied to specific capital projects and are normally received via a competitive grant processes and therefore are not considered guaranteed sources of revenue.

The current expenditures that are funded from the two recurring sources of revenue are the operating expenses for storm water operations, which are projected at \$7.38 million for 2019, and \$3.5 million in annual debt services payments, associated with the 2012 Storm Water Revenue Bonds, that will continue annually until 2033.

The City has a list of priority drainage projects currently underway that represent funding needs of over \$177 million. However, of that \$177 million, \$123 million is associated with the Spring- Fisburne Drainage Project. That project is currently \$40 million over budget and there are currently no identified funding sources to be able to complete the 5th and final phase of the project. Only roughly \$4.5 million of that is associated with maintenance, such as the installation of check valves. In order to fund these projects, the City will have to use all of its current funding resources available, and therefore not be able to fund any other projects until 2025.

Additionally, there are numerous other drainage projects currently identified. Three examples of such projects are the Calhoun West Project that is estimated to cost in excess of \$200 million, the Lower Battery Project, that is estimated to cost \$50 million and the Church Creek Drainage Basin Project, that is projected to cost \$50 million.

During my extensive research, I have also identified what I will refer to as the City's "Funnel Effect". After meeting with several very well-regarded local engineers, I've identified that there are numerous situations where new developments are actually draining their storm water off their site and into storm water pipes that lead to several choke points. For example, there is a recent project that is under development where it was identified that their site was going to drain into (3) 48" pipes, which is certainly sufficient for their runoff. However, the problem is that they further discovered that those (3) 48" pipes connected into (1) 18" pipe, hence the "Funnel Effect". When I further explored how often this occurred across the City, it was determined that on the peninsula, this happens almost 100% of the time. And off the peninsula in other areas of the City, this happens roughly 70% of the time. Imagine what would happen if trying to fill 48 ounces of milk into an 18 ounce bottle.

Looking forward, in order to provide any significant level of financial resources, the City would have to raise Storm Water Fees. However, even if the City increased its Storm Water fees by 80%, it would only be able to create \$120 million in funding. This creates an additional and cascading problem which would negatively impact the City's bond rating. Furthermore, in doing so, would mean that no funding would be available for any new projects until 2033. Clearly the City will not be able to solely rely on these funding sources to complete these large drainage projects. It will need to seek additional funding sources from the Federal, State and County governments. Those funding sources are future and uncertain. So necessary to have an immediate impact, I propose a more structured approach to maintaining our current drainage infrastructure which will result in an immediate effect on these flooding issues. Additionally, I propose developing a long term strategic plan that outlines very specific actionable items that are financially obtainable with measurable and sustainable outcomes.

## Solution

A twenty- year strategic plan is necessary to address Charleston’s immediate to long-term issues of flooding and drainage. The plan will start by addressing our immediate opportunity, maintenance AKA ‘the low hanging fruit’. Part of the maintenance plan must include developing a complete inventory of every outfall, pipe, storm drain and ditch that currently exist in the City of Charleston. Once an accurate accounting of the City’s current storm drain system is complete then an annual inspection and maintenance schedule can be completed to ensure that our current storm drainage infrastructure is maintained properly so that it can operate at its fullest potential. Additionally part of the maintenance schedule will include ensuring that every outfall is inspected and cleaned out at the beginning of every hurricane season.

Maintenance easements must be identified, and a schedule developed as necessary for obtaining new easements to ensure the City has access to all the areas necessary to maintain our drainage system. Additionally, the City must work with the South Carolina Department of Health and Environmental Control to provide a more efficient permitting process for granting permits to the City for the maintenance of our drainage outfalls. Lastly City Council must create a fiscal policy that prioritizes and mandates annual funding for maintenance of all the City’s drainage infrastructure.

The City is currently updating its Storm Water Manual and to ensure a proper outcome it must get input from our local engineering community. Moreover, moving forward the City must work closely with private developments to ensure that each new project provides a detailed plan showing storm water runoff from its development site and tracks the water flow to the final outfall. When choke points are identified, the City must prioritize the improvements that must be completed to ensure the drainage system continues to function properly.

As a going concern, the best management policies must be implemented including fiscal responsibility, cost benefit analysis, and implementation of value engineering. The City has a number of very large projects that will required hundreds of millions of dollars in funding to be completed. To ensure the City has adequate resources to complete these projects, work on funding sources must be started immediately and be combined with building strong relationships with Federal, State, and County governments.

## Conclusion

***No more studies, it’s time for action.***