

## Presenter

Robert Horner - Weston & Sampson Engineering

## Additional Authors

Pete Singhofen – Streamline Technologies, Inc.

## Using Hydraulic Models to Plan for Flood Prevention in Charleston SC

The Church Creek drainage basin in Charleston South Carolina is a 15,000-acre area which includes residential and commercial development, several major transportation corridors, expansive wetland systems and large tracts of undeveloped property. Charleston is also a coastal community with tidally affected creeks and rivers adjacent to the referenced drainage basin. Recent storm events have caused major flooding, significant property damage and impacts to transportation. The basin is primarily located within the corporate limits of the City of Charleston who owns and maintains most of the major stormwater drainage infrastructure. Based on flooding, the City implemented a moratorium on development until the drainage issues were better understood. The City commissioned a study to evaluate the existing conditions and to develop solutions to prevent future flooding to enable the area to continue to grow while protecting transportation corridors and private property. ICPR4 was used as a modeling tool based on its ability to simulate the complex hydraulic interactions between the numerous wetland areas and the various stormwater systems, ponds and conveyance channels. A combined 1D/2D modeling approach with a flexible triangular computational mesh was utilized. A host of significant improvement projects were screened to determine their effectiveness in the prevention of future flooding from storms while accounting for outfall impacts due to tidal events. The model provided graphic visualizations that were instrumental in leading the team to effective solutions while keeping the evaluation project on schedule. This is enabling the City to develop a funding structure for those projects while also allowing the development of new policies which protect and mitigate floodplain impacts and protect the drainage capacity restored by the projects that were developed through the hydraulic modeling process.