

Stormwater Management Requirements

Public Works Committee

September 14, 2021

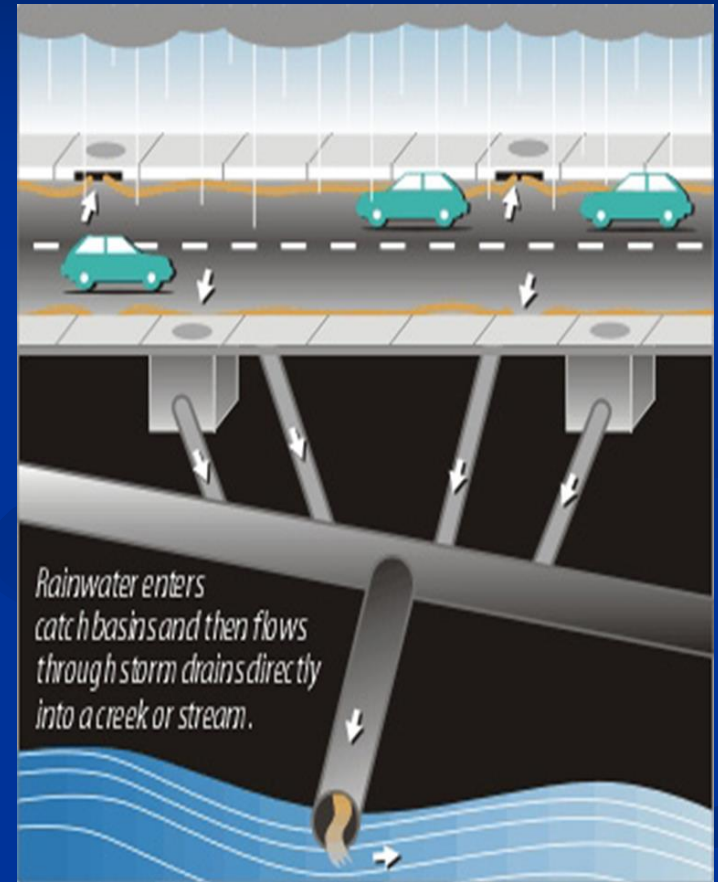


Presentation Outline

- Rational for Stormwater Ordinance
- Quality/Quantity requirements
- Climate Trends
- Development Site Observations
- Questions/Discussion

Federal and State Requirements

- NPDES Phase II Stormwater Regulations
- Session Law 2006-246 (Amends Post Construction Rules).
- EPA Audit of the City's Stormwater Management Program
- Total Maximum Daily Load's on Salem Creek and High Rock Lake.



Local Factors

- Antiquated policies for control of Stormwater runoff for new development and re-development projects (10 year pre/post).
- Localized flooding and erosion citywide.
- Priority for local elected officials.



THRESHOLDS FOR STORMWATER MANAGEMENT

- If a project disturbs more than 1 acre, or is less than 1 acre but is part of a larger common plan of development or sale which exceeds 1 acre then the project is subject to Quality Provisions.
- If Built Upon Area (BUA) is less than 24% or less than two dwelling units per acre the project is low density, projects that exceed 24% are considered high density.
- If a project creates 20,000 square feet of new impervious area, the project is subject to the Quantity provisions.



STANDARDS FOR STORMWATER QUALITY MANAGEMENT

Low-Density Projects (24% or less BUA)

- Stormwater runoff shall be transported by vegetated conveyances to the maximum extent practicable.
- All perennial and intermittent surface waters within the development will be preserved with buffers.

Development or Redevelopment Size	Required Landward Buffer Widths	Undisturbed Buffer Widths (Within Landward Buffer)
0-10 Acres	30 Feet	15 Feet
10-50 Acres	50 Feet	25 Feet
Greater than 50 Acres	100 Feet	50 Feet

STANDARDS FOR STORMWATER QUALITY MANAGEMENT

Development Standards for High-Density Projects (>24%)

- Stormwater Best Management Practices (BMP's) shall control and treat stormwater runoff volume leaving the project site for the first one inch of rain. Runoff volume drawdown time shall be 2-5 days.
- BMP's must discharge the storage volume at a rate equal to or less than the predevelopment discharge rate for the one-year, 24-hour storm.
- BMP's shall be designed to have a minimum of 85 percent average annual removal for total suspended solids.
- Riparian buffer rules apply (same as low density).

STANDARDS FOR STORMWATER QUANTITY MANAGEMENT

- *Peak discharge control.* Post construction peak discharge rates in the two-year, ten-year, and 25-year storm events shall be controlled so as not to exceed pre-development or pre-redevelopment peak discharge rates for the same storm events.
- *Volume control.* A stormwater runoff volume equal to the difference between the pre-development or pre-redevelopment and post construction volume for the 25-year event, six-hour duration, shall be detained on site so that the BMP, releases detained stormwater over a period of 2-5 days.
- *Protection of receiving channels and water bodies.* Receiving natural channels and water bodies (on-site and/or off-site) shall be evaluated to ensure that downstream conveyances are not eroded and/or degraded by altered stormwater flows.
- *Design of water impounding structures (dams).* Any proposed water impounding structure (dam) shall be designed in accordance with North Carolina Dam Safety standards.

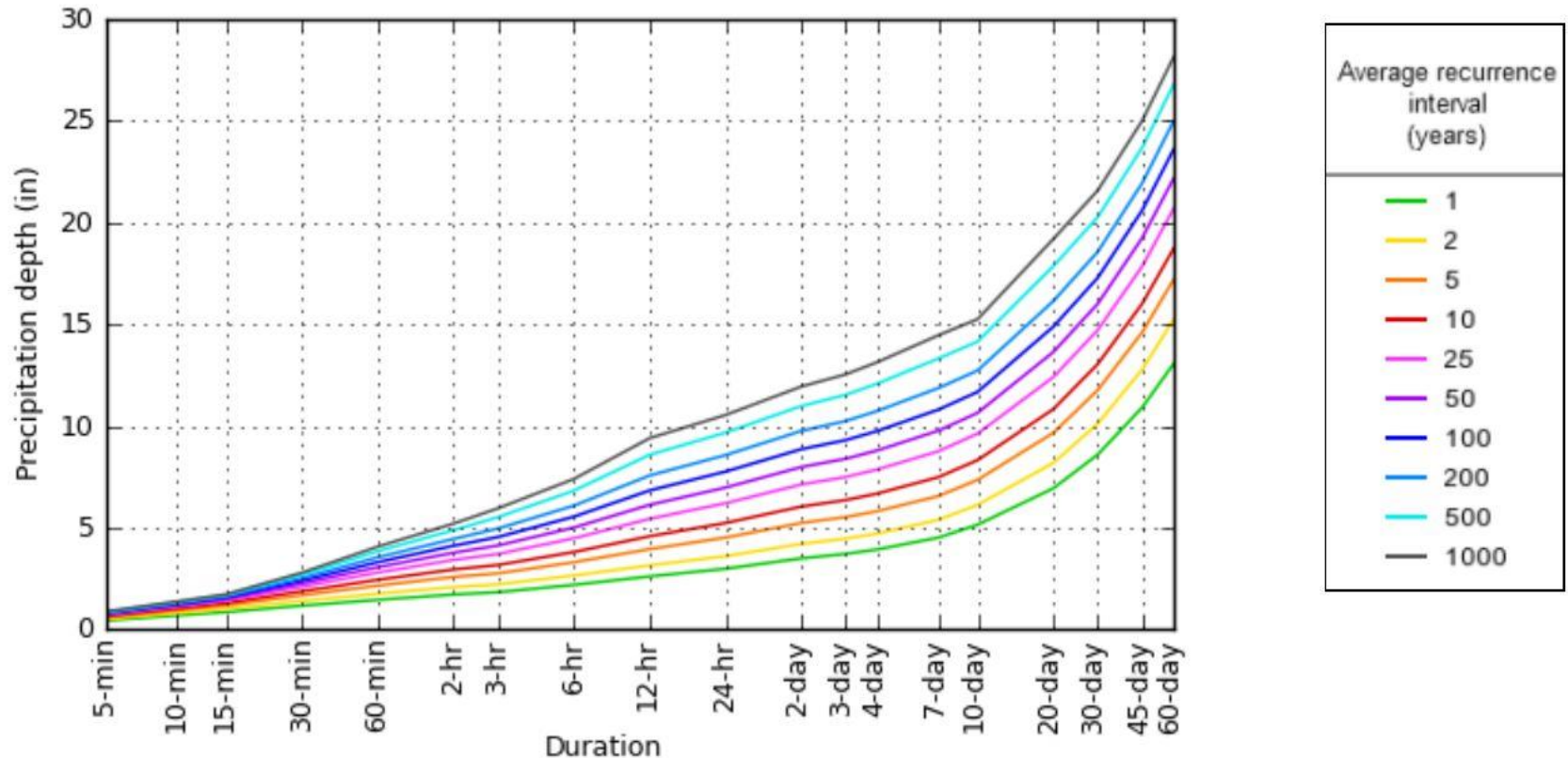
Climate Trends

- In recent years, the rainfall events in our community have been shorter in duration but much higher in intensity.
- These events can overwhelm our drainage conveyances and cause large amounts of stream erosion citywide.
- Our stormwater control measures manage the 2yr, 10yr and 25yr storm events.
- Is this enough when these strong storms come every year??



Climate Trends

PDS-based depth-duration-frequency (DDF) curves
Latitude: 35.5000°, Longitude: -79.6000°



Development Site Observations

- Development sites today are more challenging (i.e. we are developing sites now that we would not develop 20 years ago).
- Steep topography, existing utilities and other constraints make site planning more difficult.
- Runoff from newly developed sites often drain directly into pre-existing developments which may already have flooding/erosion issues.
- Can result in citizen complaints to the city/county and private property owner disputes.



Development Site Observations

- Should the design storm standards be updated to match today's climate conditions (i.e., require management of the 50-year design storm)?
- Who should be responsible for addressing existing down stream deficiencies?
- In general, stormwater controls are practices used to lessen the quality and quantity impacts of stormwater runoff, however, they can not mimic the original hydraulic and hydrologic conditions of the development site.



Questions?

