Home Drainage & Causes of Basement Flooding
There are two separate sewer systems.
How Does my House Connect to the City Sewers?

Household plumbing should connect to sanitary sewer only.
How Does my House Connect to the City Sewers?

Historically, roof drains (downspouts) connected underground to storm sewer.
How Does my House Connect to the City Sewers?

Weeping tiles (foundation drains) connected to either storm or sanitary sewer
How Does my House Connect to the City Sewers?

- Newer homes no longer connect weeping tiles to the sewer, instead a sump pump discharges to surface
- Also, downspouts now flow to surface
How Are Sewers Sized?

- **Sanitary Sewers** - sized to take all wastewater from contributing homes, businesses and industries + an allowance for extraneous water

- **Storm Sewers** - sized to take average frequent rainfall events only; surface to take remainder

- Cannot be sized to capture every possible rainfall

- Drainage system generally operates as intended under normal conditions and average rainfalls
What is Source of Problem?

• Extreme Events
What is Source of Problem?

- Extreme Events
- Sewer physical structural problems
Sewer Physical Structural Problems

- Cracks
- Root Mass
- Encrustation at Joint
- Broken Pipe
- Debris Buildup
- Protruding Lateral
- Grease Buildup
What is Source of Problem?

• Extreme Events
• Sewer physical structural problems
• Surface flooding
What is Source of Problem?

• Extreme Events

• Sewer physical structural problems

• Surface flooding

• Excess storm water entering sanitary sewer
Excess Stormwater Entering Sanitary Sewer

• Sources of high flows to sanitary sewers:
  – Illegal cross-connections
  – Foundation drains
  – Infiltration
    • Joints and pipe connections
    • Broken pipes
    • Cracks in the sewer system and maintenance holes
  – Inflow
    • Holes in maintenance covers (low areas)
    • Stormwater-flooded basement (floor drain)
Typical Causes of Basement Flooding

- Flooded street
- Blocked street catch basin
- Downspout to storm sewer
- Property line
- Foundation drain to sanitary or storm sewer
- Cracked Basement Wall
- Surface Water Into Basement
  - poor lot drainage
  - eavestrough overflow
  - plugged downspout
  - leaky windows & doors
- City’s storm sewer
- City’s sanitary sewer
- Blockage in sewer or house lateral
- Cracked MH or sewer
- Surface water through MH top
- City’s storm sewer
- Leaky laterals
- Poor Lot Grading
- Reverse-slope Driveway
- Cracked Sewer
- Sewer Blockage
- Sewer Protrusion
What Happens When It Rains?

Rainwater on the Surface
Storm Drainage System

- Extreme rainfall events are not supposed to enter storm sewer, instead flow overland to outlet (creeks, ponds, lakes, etc).

- Where no outlet exists (road low points), excess surface water will pond which can enter the sanitary sewer system.
Examples of Surface Conditions
Overland Flow Paths & Cause of Surface Flooding

Under extreme events & once sewer capacity is reached, if no overland outlet, ponding will occur on the surface.
Examples of Surface Conditions
What Happens When It Rains?

Interaction of Surface Water with the Sewer Systems Resulting in Basement Flooding
Water Street Flooding Animation
Elsewhere Along the Sewer System
Thank You

Staff are available tonight to discuss this information further
Understanding Drainage