How do we deal with this?

• Flood Insurance Rate Maps only map rivers and major streams
• Many urban areas subject to local flooding which is not mapped
• Reactive: where did it flood this time?
• Need to identify other flood-prone areas
  – To be proactive
  – For better prioritization
  – To define need and benefit
Need for a Planning Tool

- Detailed inundation mapping of urban basins can be beneficial for individual projects, but too costly for citywide planning

- Are there products that can be developed to provide a broad overview of flooding?

- As a matter of fact...
Fort Worth’s “Screening Tool”

• First part is pipe grading, based on comparison of estimated pipe capacity vs. flow coming to that pipe.

• Second part is inundation mapping:
  – InfoWorks ICM models for major stream basins
  – Applies rainfall on the grid
  – Excluded pipe system
  – Special considerations at embankments, etc.
Pipe Grading Tool

• Use City’s GIS Asset Inventory
• GIS-based flow accumulation grid
• Compared to pipe hydraulic capacity
• Graded A to F
• Identifies most deficient pipes
Pipe Grading Tool

- Use City’s GIS Asset Inventory
- GIS-based flow accumulation grid
- Compared to pipe hydraulic capacity
- Factors in complaints and congestion
- Identifies basins with greatest need
Citywide Inundation Mapping
Citywide Inundation Mapping

- Apply to multiple basins
- Analyzes quickly
- No pipes
- Reduce hyetograph ½"
- LIDAR-only 2D Model
- Use rainfall on grid
- Shows flow accumulation
- Can add detail to refine
- Defer to FEMA for stream flooding (PINK)
Combined Tool

• Combine both tools for useful high-level planning tool.
• Shows both need and benefit
• Can use to prioritize by fix $/unit benefit
• Can quantify benefits for <100-year solutions
Fort Worth’s “Screening Tool”
Uses for the Tools

1. Identify fugitive overland flows, and areas of deep water and high velocities
2. Identify emergency access challenges
3. Identifying and scoping local studies and small projects
4. Coordination with other local projects.
Hazardous Depths
High Velocities
Fugitive Overflow between Systems
Emergency Vehicle Access

- Limited Access
- No Resident Access
- No Emergency Vehicle Access
Study Scoping
Project Coordination

• Road projects
• Water projects
• Flooding is not just inside FEMA floodplain!
Uses for the Tools

5. **Mitigation planning when funds not available for detailed studies**

- Identify drainage patterns for localized flooding problems
- Identify vacant tracts along flow paths for possible detention sites
- Broad strategic tool for planning charrettes and stakeholder discussions
Small Project Planning
Small Project Planning
Vacant Land Availability (Detention)
Vacant Land Availability (Detention)
Planning Charettes
Uses for the Tools

6. Criticality Assessment as part of Asset Management

- Business Risk Exposure = Probability of Failure x Consequence of Failure

- Pipe Capacity (Pipe Grades) is factor used for Probability of Failure
Pipe Grades
Probability of Failure
Business Risk Exposure
Uses for the Tools

7. Can make available to public as “Best Available Information”
   – With suitable disclaimers
   – Lower resolution so less lot-specific
   – Available to Planning & Development Department
Available to the Public

http://mapit.fortworthtexas.gov/Html5Viewer/?viewer=zoning
Conclusions

• Combining engineering modeling with GIS mapping to create a very useful tool

• City can be proactive in flood analyses and capital project planning

• Meaningful local flooding information now available to the public