Responding to Freak Storms

CT Association of Flood Managers Conference
Wednesday October 24, 2018

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Fairfield, CT
STORM SANDY

- Community of 60,000
- Directly on Long Island Sound
- Approx. 10% of property & population in Hurricane/ Flood Zone

Response & recovery to Sandy has been major focus since 9/29/12
Yellow – Cat I, lowest elevations
Orange – Cat II, slightly higher growth
Blue – Cat III, even higher (Rt. 1, Trains)
Purple – Cat IV highest (I-95)

Wave heights also crash over barrier beach

Fairfield Hurricane Inundation Map
Calm before the storm
COMPLEX DRAINAGE NETWORK: LOWER 1/4 OF TOWN TIDAL INFLUENCED

Flap Gates &
Self Regulating Tide Gates
All shapes and sizes
Some not as formal, need upgrades
Sometimes system can’t keep up especially during high tide cycle monthly occurrence +/-
We know the drill....
Storm Sandy

Hartford Courant Photo

Connecticut Post Photo
Storm Sandy
Problems are so complex, even a Senator can’t figure it out….

Federal & State Grants have been very helpful in advancing solutions:

- Making advancements and Improvements:
  Fortify dikes (hardening), enlarge & modify tide gates, create infiltration, evaluate pumping
Storm of 9/25/18 has caused us to refocus on non-coastal flooding issues

Rooster River Watershed

- Majority of upper reaches in other communities
- Highly Developed Suburban/Urban watershed
- Watercourses mostly on private properties, easement are limited
- Private land owners have “improved” properties, encroach on river corridor
### Table 2-2. Distribution of Municipalities in the Rooster River Watershed

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Total Acreage of Municipality</th>
<th>Acreage in Watershed</th>
<th>% of Municipality in Watershed</th>
<th>% of Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridgeport</td>
<td>10,361</td>
<td>2,807</td>
<td>27.1%</td>
<td>28.8%</td>
</tr>
<tr>
<td>Easton</td>
<td>18,310</td>
<td>6</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Fairfield</td>
<td>19,432</td>
<td>4,441</td>
<td>22.9%</td>
<td>45.6%</td>
</tr>
<tr>
<td>Trumbull</td>
<td>15,099</td>
<td>2,490</td>
<td>16.5%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Watershed (Total)</td>
<td>63,202</td>
<td>9,744</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2-3. Population Densities in the Rooster River Watershed

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Bridgeport</td>
<td>44,823</td>
<td>10,218</td>
<td>144,329</td>
<td>8,828</td>
</tr>
<tr>
<td>Fairfield</td>
<td>27,211</td>
<td>3,922</td>
<td>59,305</td>
<td>1,953</td>
</tr>
<tr>
<td>Trumbull</td>
<td>8,418</td>
<td>2,163</td>
<td>35,982</td>
<td>1,525</td>
</tr>
<tr>
<td>Watershed (Total)</td>
<td>80,452</td>
<td>5,284</td>
<td>239,616</td>
<td>3,408</td>
</tr>
</tbody>
</table>

Note: Easton has only 2 households within the watershed, and is therefore not included in the table.
Because of nature of watershed development…

High density = Impervious surfaces, conveyance though piped systems

• Low Infiltration Rate
• Low Ground Water Recharge
• Low Base (Dry Weather) Flow

Conversely:

• High Peak Water Flow Volumes
• High Time of Concentration (water from the upper reaches of the watershed gets downstream quickly)
• High Stream Velocities
Typical Stream Cross-section
Dry Weather Base Flow is Substantial– Low Developed Watershed
Base flow Decreases – Increased Developed Watershed

False sense of security, lack of awareness of potential issues
Encroachment on Stream Corridor by property owners
Residents now want to “restore channel”, cycle continues.

Limited stream cross-section and peak high flows = overflows & flooding

“V” channel cross section becomes degraded “U” = unstable bank, more erosion
Brooklawn Parkway
Fairfield CT
What can we do about it:

General Ideas:

Sandy changed the way our shoreline residents viewed flooding;

Increased inland flooding may alter thinking

Educate - Use this event as evidence that old way of thinking is not working, change is necessary.

Take municipal responsibility of private steam matters, private issues are a public problem.

Can’t totally engineer our way out of this – careful not to further increase velocities, Tc, create additional downstream issues.
What can we do about it:

More Specifically:

1. Establish and maintain proper riverine corridors

2. Create more efficient inlets & outlets at crossings, reduces “backwater”, erosion, etc.

3. Storage – look for opportunities for detention / retention

4. Infiltration – look for opportunities to recharge GW table + decrease peak runoffs (works in both dry & wet conditions).
Inlet side:

Forest litter washes downstream,

(Other litter in the mix too),

Blocks culvert opening,

Backwater creates flooding,

Overtopping the road creates issues.

Bronson Rd
Fairfield, CT
Downstream sides:
Culvert doesn’t handle flow,
Flow overtops road,
Creates new channel,
Undermines road.

Hulls Farm Rd
Fairfield, CT
Informal headwalls subject to clogging,
Inefficient in conveying flows
Flared Ends
Funnel channel into opening
More efficient in conveying flows

Randy Rath,
Lake George Association Project Manager
Water doesn't enter culvert;

Overflows road

Eastgate & Cheshire St, Cheshire CT
Create better inlets & channels

Eastgate & Cheshire St, Cheshire CT
Improved channels and inlets
Improved channels & inlets

Moved street outlet to down stream side

South Brooksvale & Abrams, Cheshire CT
Improved channels & inlets

South Brooksvale & Abrams, Cheshire CT
Final product
all dressed up

South Brooksvale & Abrams, Cheshire CT
Infiltration:
Addresses stormwater quality & quantity

Penfield Beach

Future possibility at Train Station
Infiltration Candidates
Can we change things?

Every little bit helps,

Keep pushing in the right direction…
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THANK YOU

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