What?
Why?
How?
Drainage Projects
Maintenance
Why Need a Utility?
WARNING
UNSAFE
FOR
SWIMMING
AND
DRINKING

WARNING
Health advisory on eating fish

Eating some fish from this location may be harmful to your health. These fish may contain chemicals called PCBs. Eating fish that contain PCBs may increase your risk for cancer.

Women who are pregnant or may become pregnant, nursing mothers and young children should not eat the fish listed in the table. Others should follow the directions in the table on the type and amount of fish to eat.

For more information: Virginia Department of Health 804-864-8663 vdh.virginia.gov

The warning applies to the fish listed below:

No more than two muscle pieces per month:

- Carp
- Redbreast Sunfish
- Largemouth Bass
- Rock Rais
- Bluehead Chub

VADEQ MS4 Permit
Caretaker of the Roanoke River
1+13
1 + 11
Sediment TMDL:
1. Roanoke River
2. Back Creek
3. Barnhardt Creek
4. Mason Creek
5. Mudlick Creek
6. Murray Run
7. Peters Creek
8. Tinker Creek

PCB TMDL:
1. Roanoke River
2. Peters Creek
3. Tinker Creek

Bacteria TMDL:
1. Roanoke River
2. Back Creek
3. Carvin Creek
4. Glade Creek
5. Lick Run
6. Mason Creek
7. Mudlick Creek
8. Murray Run
9. Ore Branch
10. Peters Creek
11. Tinker Creek
The River is “Listed” - Who Cares?
Signs are gone = Safe, Right?
Caretaker of the Roanoke River
What?
Why?
How?
REMODELING ROANOKE

Report to the Committee on Civic Improvement by John Nolen, Landscape Architect
CAMBRIDGE, MASSACHUSETTS
“... Roanoke has a golden opportunity, one that any city in the land might envy. Its rivers, hills, and rural country, its creeks and the views of its surrounding mountain ridges are singularly available and beautiful beyond description.”
1 + 11
“Transform the Roanoke River into a community asset, focal point, and source of pride for those that live, work, learn, and play in its watershed.”
“Rivers have always been a big part of our DNA”
3
1. **Maximize** watershed resiliency and sustainability;

2. **Minimize** watershed hazard to public health, safety, and property;

3. **Connect** citizens, businesses, students, and others to their watershed
1. Maximize Watershed Resiliency & Sustainability

A. Green Infrastructure
B. Riparian Buffers/Disconnected Impervious
C. Stream Restorations
2. Minimize watershed hazards

A. CIP Drainage Projects also Improve W.Q.
B. Community Rating System (CRS)
C. Septic Systems and Pet Waste
3. Connect citizens to their watershed

A. Life-Long Learning Opportunities
B. Outdoor Rec & Stewardship
C. Connect Daily Actions & Water Quality
“Be Part of the Solution, Not the Pollution”
Create a Clean Water Legacy for the Citizens of Tomorrow
Downtown Roanoke Floodplain
4% Chance Rain Event

AUGUST 15, 2016 – WEATHER STATION @ HURT PARK ELEMENTARY SCHOOL

<table>
<thead>
<tr>
<th>TIME RANGE</th>
<th>RAIN DURING RANGE</th>
<th>CUMULATIVE RAINFALL</th>
<th>RAINFALL RATE/HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30-1:45 PM</td>
<td>.61”</td>
<td>.61”</td>
<td>2.45”/hour at 1:35 PM</td>
</tr>
<tr>
<td>1:45-1:55 PM</td>
<td>.58”</td>
<td>1.19”</td>
<td></td>
</tr>
<tr>
<td>1:55-2:05 PM</td>
<td>.74”</td>
<td>1.93”</td>
<td>5.65/hour at 2:00 PM</td>
</tr>
<tr>
<td>2:05-2:20 PM</td>
<td>.66”</td>
<td>2.26”</td>
<td></td>
</tr>
</tbody>
</table>

- 2.26” of rain fell within 50 minutes.
- Translates to a 25-year storm (4% chance/yr)
- 2.45”/hr period being >50-year (2% chance/yr)
- 5.65”/hr period being >1000-year (0.1% chance)
Unusual Precipitation?

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>ST</th>
<th>2016 VALUE</th>
<th>1981-2010 AVERAGE</th>
<th>JUN-AUG DEPARTURE</th>
<th>UNUSUALNESS</th>
<th>JUN-AUG RANK</th>
<th>#YRS IN RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norfolk</td>
<td>VA</td>
<td>20.14&quot;</td>
<td>14.92&quot;</td>
<td>+5.22&quot;</td>
<td>+1.1σ</td>
<td>10th Wettest</td>
<td>71 yrs</td>
</tr>
<tr>
<td>Richmond</td>
<td>VA</td>
<td>12.81&quot;</td>
<td>13.10&quot;</td>
<td>-0.29&quot;</td>
<td>-0.2σ</td>
<td>32nd Driest</td>
<td>75 yrs</td>
</tr>
<tr>
<td>Roanoke</td>
<td>VA</td>
<td>16.04&quot;</td>
<td>11.43&quot;</td>
<td>+4.61&quot;</td>
<td>+1.2σ</td>
<td>8th Wettest</td>
<td>69 yrs</td>
</tr>
<tr>
<td>Washington (Reagan National)</td>
<td>VA</td>
<td>9.61&quot;</td>
<td>10.44&quot;</td>
<td>-0.83&quot;</td>
<td>-0.5σ</td>
<td>26th Driest</td>
<td>71 yrs</td>
</tr>
</tbody>
</table>

- NOAA Overview: June-August 2016
- 8th Wettest of 69 year records
Hurricane Matthew

- ROA Airport: 4.26" ; Hurt Park Elem: 5.06"
- Mill Mountain iFlows: $3.28 + 1.96 = 5.24"$
- More typical 5 to 10 year storm event
- Only 7 street closures due to flooding, None CBD
Moving Forward:

1. Ensure system flowing to full capacity through routine maintenance;

3. Review priority of 18 downtown projects in relation to 192 other Citywide CIP projects;

4. Encourage Green Infrastructure (slow the flow) both downtown and upstream;

5. During 2017, create a Watershed Master Plan (WMP) for the Trout Run watershed.
Trout Run WMP

1. Reestablish watershed vegetative cover to slow, store, and evaporate runoff;
2. Construct new flood mitigation and storage facilities;
3. Improve hydraulic function of existing stormdrain infrastructure;
4. Develop policies and incentive systems that help work towards watershed goals on private land; and
5. Install monitoring tools needed to evaluate the outcomes of these recommendations.