Public Information Session

Hydrologic and Hydraulic Evaluation of the Lower South River

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Issues and Concerns

- Insufficient understanding of existing conditions to make informed decisions

- Hydrology and hydraulics on river are not well documented

- Hydrology and hydraulics are complex
  - Chandler Pond Dam has two outlets
  - Low-gradient channel
  - Backwater effect from Veteran’s Memorial Park Dam
Project Goals

- Obtain a better understanding of the hydrology and hydraulics of the river
- Evaluate the changes in river hydrology and hydraulics resulting from various hypothetical scenarios
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Precipitation Data

- Evaluated each scenario for 5, 10 and 100-year storm events
- Study uses rainfall using current data set

<table>
<thead>
<tr>
<th>Frequency</th>
<th>24-hour Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-year</td>
<td>4.19 inches</td>
</tr>
<tr>
<td>10-year</td>
<td>4.97 inches</td>
</tr>
<tr>
<td>100-year</td>
<td>8.79 inches</td>
</tr>
</tbody>
</table>
Putting the Model Together

- Land Use Cover
- Watershed Storage
- Bridges Dams Culverts
- Channel Geometry
- Channel Roughness
- Channel Slopes
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Backwater effect associated with Veteran’s Memorial Park Dam extends to near Old Ocean Street (east)
Existing Conditions

- Backwater effect associated with Veteran’s Memorial Park Dam extends to Cross Street
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Closure of West Spillway

- West Spillway would be closed to prevent flow over the spillway
- East Spillway would remain operational
- Existing culvert crossings and bridges would remain unaltered
- No channel improvements
# Closure of the West Spillway

<table>
<thead>
<tr>
<th>Potential Benefits</th>
<th>Key Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Flood elevations reduced along western reach (2 to 11 inches for 100-year event)</td>
<td>• Dam overtops for 100-year event, additional dam modifications may be required</td>
</tr>
<tr>
<td>• No conversion of existing pond uses</td>
<td>• Western reach of river dewatered</td>
</tr>
<tr>
<td>• Improvement in flooding conditions at 60 Cross Street</td>
<td>• Water surface elevations increased along eastern reach (2 to 3 inches for 100-year event)</td>
</tr>
<tr>
<td></td>
<td>• Ecological function of the river not restored</td>
</tr>
<tr>
<td></td>
<td>• Flooding conditions at 60 Cross Street not eliminated</td>
</tr>
<tr>
<td></td>
<td>• West spillway owner retains ownership responsibility</td>
</tr>
</tbody>
</table>
West Spillway Closure – 5 Year
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Remove West Spillway

- Spillway would be removed in its entirety with no material put back in its place

- Bridge would be needed to maintain access to private property

- No changes to East Spillway, Veteran’s Memorial Park Dam, stream channels
# Remove West Spillway

## Potential Benefits

- Reduces flood elevations on east reach of river
- Ecological function of west reach restored
- West spillway owner relieved of dam ownership responsibility

## Key Considerations

- Dewatering of east reach of river
- Increase in flood elevations along west reach of river (1 to 2 feet)
- Exceedance of downstream structure capacity
- Conversion of pond to river uses
- Bridge crossing required
Remove West Spillway 5-Year
Remove West Spillway 10-Year
Remove West Spillway 100-Year
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Removal of Chandler Pond Dam

- Dam would be removed in its entirety
- Flow would be split proportionately based on existing channel widths
- Existing culvert crossings and bridges would remain unaltered
- No channel improvements
Removal of Chandler Pond Dam

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>• Restores natural and ecological function of river</td>
<td>• Increase in water surface elevations for 100-year storm event (up to 15 inches)</td>
</tr>
<tr>
<td>• Water surface elevations decreased for a 5-year storm event (1 to 3 inches on average)</td>
<td>• Conversion of pond to river uses</td>
</tr>
<tr>
<td>• West spillway owner relieved of dam ownership responsibilities</td>
<td>• Splitting of the incoming flow of the South River differently than assumed would alter the flow and water surface elevations</td>
</tr>
</tbody>
</table>
Chandler Pond Dam Removed 10-Year
Chandler Pond Dam Removed 100-Year
Scenarios Evaluated

1. Existing Conditions
2. Close the West Spillway
3. Remove West Spillway
4. Remove Chandler Pond Dam
5. Remove Chandler Pond and Veteran’s Memorial Park Dams
Removal of Both Dams

- Dams would be removed in their entirety
- Flow from former Chandler Pond Dam would be split proportionately based on existing channel widths
- Existing culvert crossings and bridges would remain unaltered
- No channel improvements
## Removal of Both Dams

### Potential Benefits

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>• Reduces flood elevations for 5 and 10 year events by up to one foot.</td>
</tr>
<tr>
<td>• Eliminates backwater effect at Plain Street culverts</td>
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<td>• Eliminates barrier to natural sediment transport</td>
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### Key Considerations

<table>
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<td>• Dam is a focal point for an important community park</td>
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<tr>
<td>• Conversion of pond to river uses</td>
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Remove Both Dams 5-Year
Remove Both Dams 10-Year
Remove Both Dams 100-Year
Impact of Climate Change

- Precipitation values used in modeling are based upon historical climatic data
- Precipitation depth has been trending upward
- Sea levels have been increasing
Impact of Climate Change

- Analyzed mid-range scenarios to middle of century for 100-year storm event
- Projected 100-year 24 hour rainfall depth = 9.54 inches
- Water surface elevations increase for all scenarios
Summary

- Veteran’s Park Dam exerts a backwater effect that significantly affects the 5 and 10-year water surface elevations.

- All scenarios have benefits and key considerations which must be carefully weighed.

- No scenario prevents 100-year flooding at 60 Cross Street, some scenarios reduce flood height.

- Ellis Bog contributes to flooding at 60 Cross Street.
Thank you!

Questions?