BETWEEN A ROCK AND HISTORIC HOMES:
Underground Detention in a Historic Fort Worth Neighborhood
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AGENDA
Background
Decision Process
Design Considerations
Public Outreach
Construction Process
Lessons Learned
THE CHALLENGE

NEW CRITERIA

Provide recommendations to the City to **significantly increase the level of service** of the drainage system in order to reduce risks and frequency of flooding in the study area.

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**Decision Process**

1. Do the projects increase the level of service of the drainage system?

2. Are the projects cost-beneficial?
**DECISION PROCESS**

1. Do the projects increase the level of service of the drainage system?

2. Are the projects cost-beneficial?

*Use our available tools (2D model) to drive the decision process*

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**MODELED FLOOD REDUCTION**

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**PROPERTIES AT RISK OF FLOODING**

<table>
<thead>
<tr>
<th>Storm</th>
<th>Existing</th>
<th>Post-Project</th>
<th>Properties Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-year</td>
<td>18</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>2-year</td>
<td>29</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>5-year</td>
<td>42</td>
<td>33</td>
<td>9</td>
</tr>
<tr>
<td>100-year</td>
<td>92</td>
<td>92</td>
<td>0</td>
</tr>
</tbody>
</table>
DECISION PROCESS

1. Do the projects increase the level of service of the drainage system?

Yes

2. Are the projects cost-beneficial?

Yes

BCA FOR PLANNED DETENTION PROJECTS

<table>
<thead>
<tr>
<th></th>
<th>Damages</th>
<th>Cumulative Benefits</th>
<th>Cumulative Cost</th>
<th>Cumulative BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Conditions</td>
<td>$36,503,254</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Ashland Detention</td>
<td>$35,220,075</td>
<td>$1,283,180</td>
<td>$975,000</td>
<td>1.32</td>
</tr>
<tr>
<td>Ashland Detention + Western Detention</td>
<td>$32,332,898</td>
<td>$4,170,356</td>
<td>$4,177,284</td>
<td>1.31</td>
</tr>
<tr>
<td>Ashland Detention + Western Detention + Hulen/Bryce Detention</td>
<td>$30,759,546</td>
<td>$5,743,708</td>
<td>$4,084,284</td>
<td>1.41</td>
</tr>
</tbody>
</table>

DECISION PROCESS

1. Do the projects increase the level of service of the drainage system?

Yes

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Yes
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UNDER STREET DETENTION

Inlet Arch
Outlet Arch

UNDER STREET DETENTION

Inlet Arch
Outlet Arch
UNDER-STREET DETENTION

2-12'x9' RCB

UNDER-STREET DETENTION

2-12'x7' RCB

UNDER-STREET DETENTION

Total Storage ~ 1 ac-ft
UNDER-STREET DETENTION

Parallel Water Lines

Very Hard Weathered Limestone

Historic Homes
Inlet Arch

Outlet Arch

Precast Boxes
Cost

- Total cost: $975,000
- Box price: $1100/LF
  - Rock construction
  - Time limitations
  - Constrained working space
  - Mismatched work scopes
- Diversion Structure: $172,000
  - Geometry and steel
  - Contingency for rework
PUBLIC OUTREACH

- Communicated early and often
  - Multiple public meetings, personal calls and emails
- Typical neighborhood street issues
  - Trees, Driveways, Sidewalks
- Residential access during construction
- Concrete vs Asphalt street
- **Measured expectations for flood control**
- Historic concrete stamps

HISTORIC CONCRETE STAMPS
LESSONS LEARNED

• Prices
• Skewed junction box
• Vibration monitoring

VIBRATION MONITORING
VIBRATION MONITORING

OVERALL TIMELINE

• 2004: Major flood event
• 2006: Storm Water Utility created
• 2008–2011: Study Phase
• 2012–2013: Design Phase
• 2013–2014: Construction Phase

THE SOLUTION