CITY OF FORT WORTH

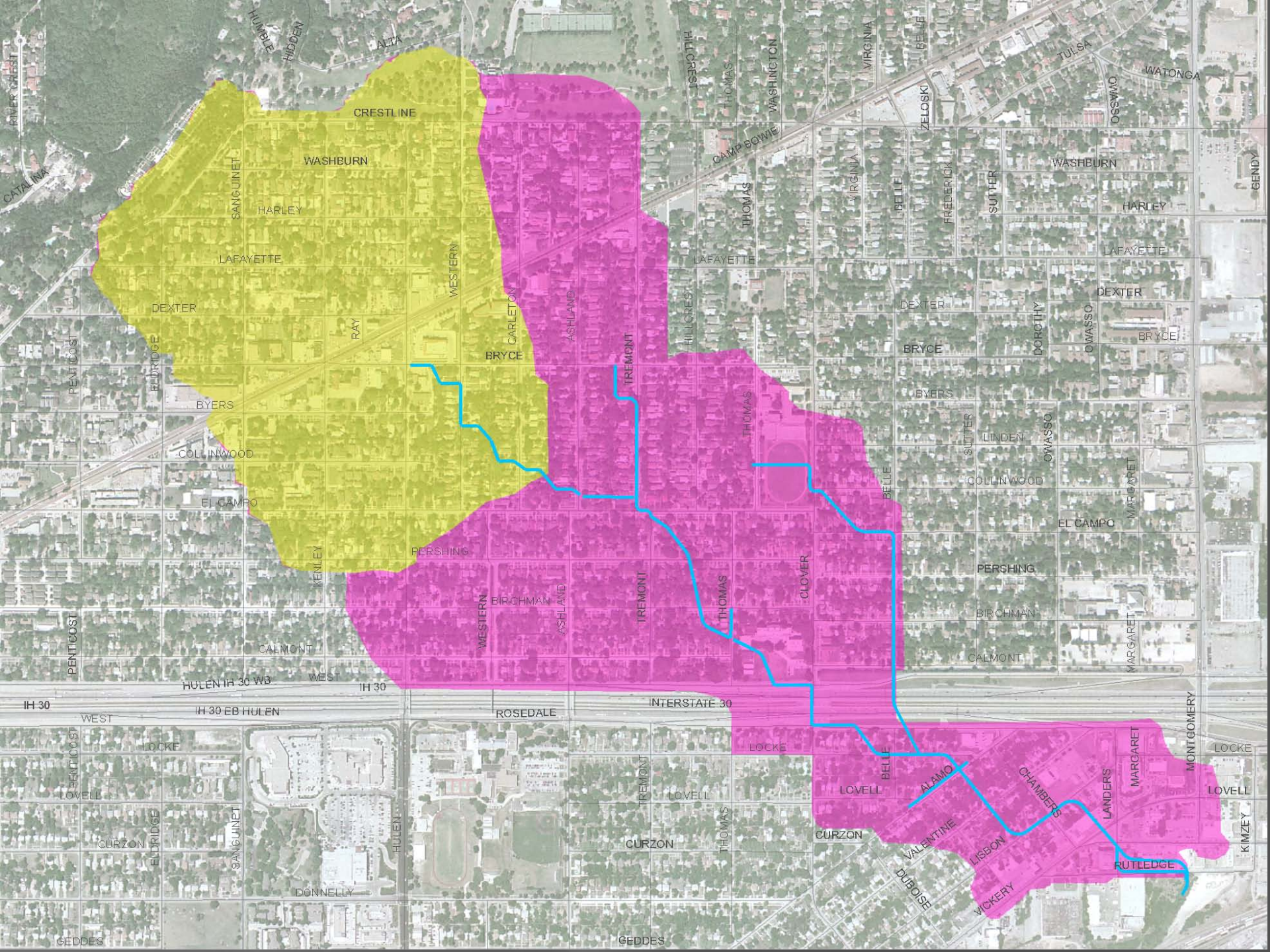
Feasible Options Study

Central Arlington Heights

Public Meeting
March 3, 2011

Tonight's Presentation

- Video from Carleton Street in 2004
- Study Update
- Discussions with Other Cities
- Public Participation


RIVER CREST
CATALINA
HUMBLE
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CRESTLINE
WASHBURN
SANGUINET
HARLEY
LAFAYETTE
DEXTER
RAY
WESTERN
CARLETON
ASHLAND
BRYCE
PENTECOST
ELDRIDGE
BYERS
COLLINWOOD
EL CAMPO
KENLEY
PERSHING
BIRCHMAN
CALMONT
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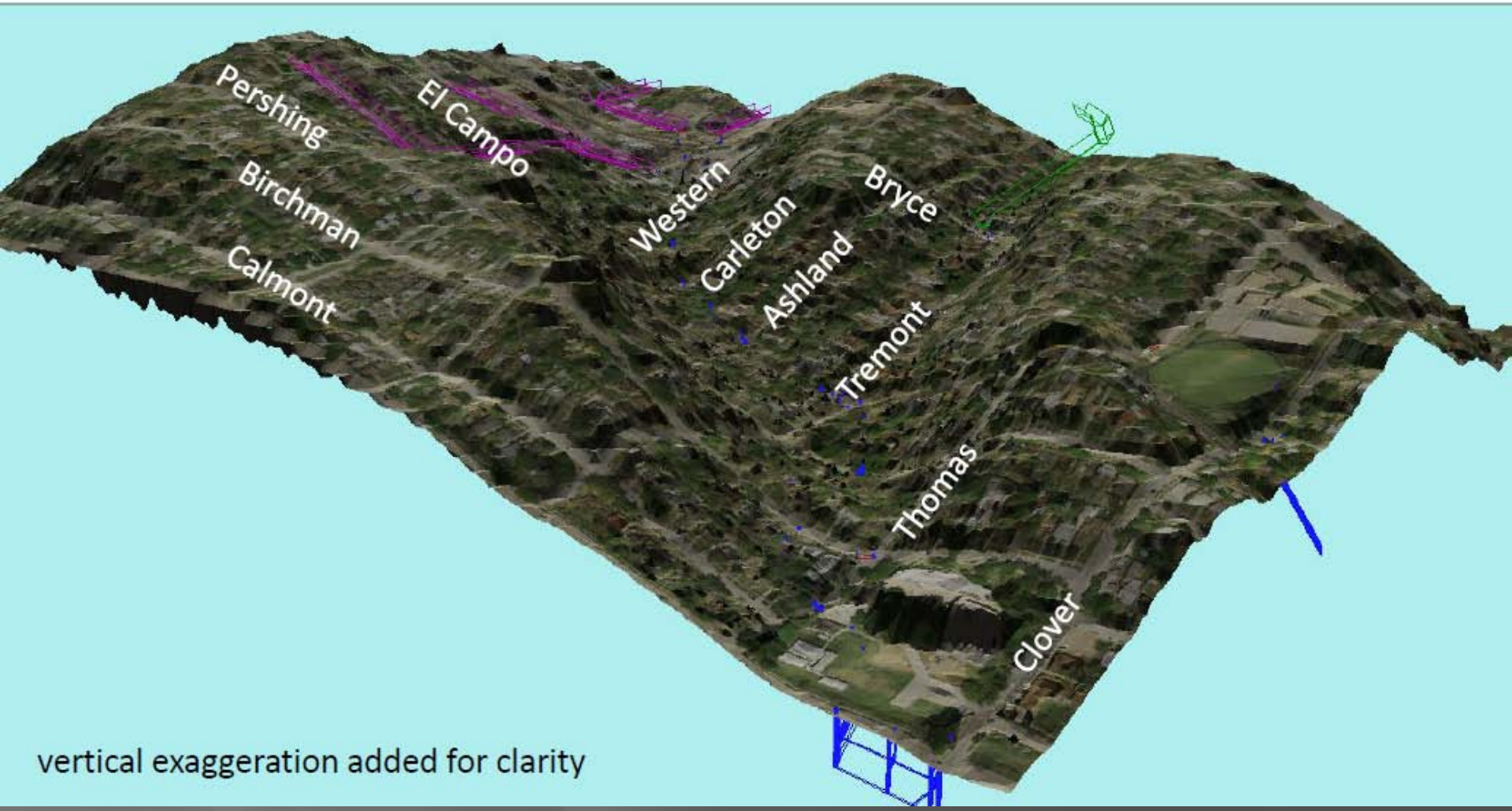
INTERSTATE 30
LOCKE
LOVELL
CURZON
DONNELLY
GEDDES
HULEN
HILLCREST
THOMAS
WASHINGTON
CAMP BOWIE
VIRGINIA
BELLE
ZELOSKI
FREDERICK
SUTTER
TULSA
WATONGA
OSSWO
GENDY
DOROTHY
OWASSO
LINDEN
CLOVER
MARGARET
MONTGOMERY
ALAMO
CHAMBERS
LANDERS
VALENTINE
LISBON
DUBOISE
VICKERY
RUTLEDGE
KIMZEY

3D View of Central Arlington Heights Watershed
Looking Northwest from Clover & I-30



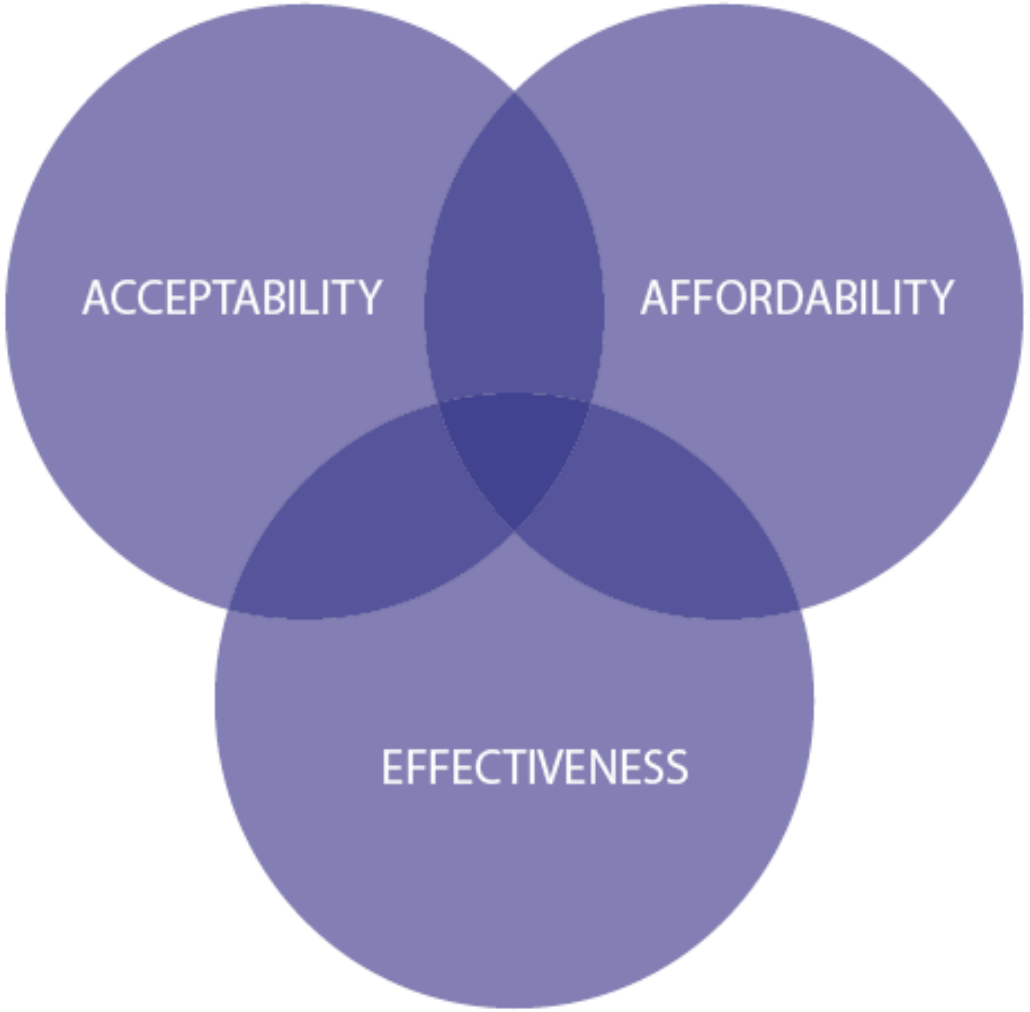
vertical exaggeration added for clarity

Video of Flooding – Carleton Street 2004

Video removed for filesize reasons. It may be viewed at the following:

http://www.youtube.com/watch?v=fJ51mFeZuP4

The Challenge



Original Schedule

	September	October	November	December	January	February	March	April
Public Meetings								
Stakeholder Committee Meetings								
Survey								
Investigate Other Communities								
Identify Objectives and Constraints								
Identify Alternatives								
Evaluate Alternatives								
Preliminary Recommendations								
Final Recommendations								
Report and Presentations								

Public Engagement

- Public Meeting 1 – September 22, 2010
- Stakeholder Meetings
  - October 27, 2010
  - December 9, 2010
  - February 24, 2011
- Neighborhood Tour – January 15, 2011
- Neighborhood Association Meetings
- Neighborhood Canvassing
- Website –
  - http://www.fortworthgov.org/tpw/stormwater/forestpark

Benchmarking Exercise
Review of Other Cities

- City of Tulsa Public Works
- Denver Urban Drainage and Flood Control District
- Metropolitan St. Louis Sewer District
- City of Atlanta Bureau of Watershed Protection
- Also
  - City of Houston
  - Harris County Flood Control District
  - City of Austin
  - San Antonio River Authority

Potential Mitigation Measures Overview

- Tonight – Review of mitigation measures
- Level of Detail
  - Feasible options study is a cursory review, using approximate engineering methods
  - Options deemed feasible will be evaluated by Freese and Nichols in much greater detail

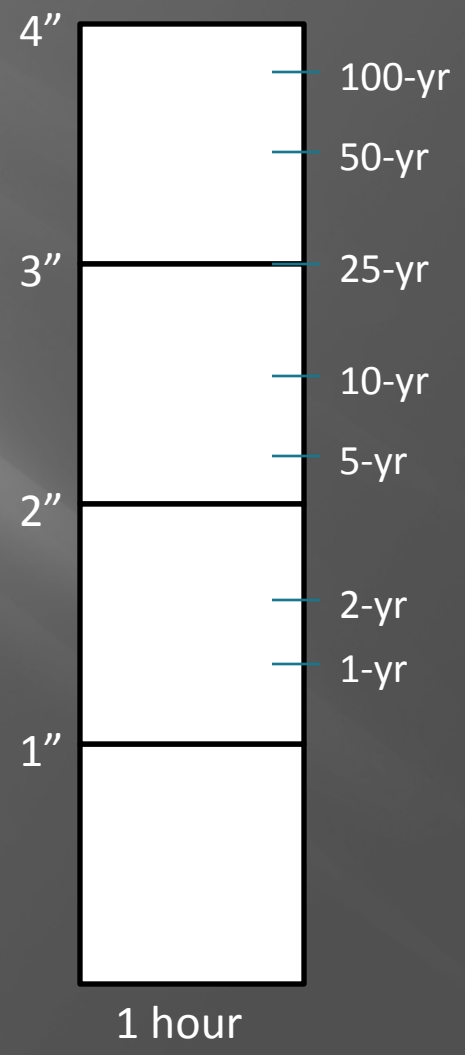
Order of Presentation

- Level of Service
- Economic impacts of flooding and flood damages
  - Based on Corps of Engineers Approach
- Previous Alternative from Freese & Nichols Study
- Other Alternatives
- Comparison

- We can evaluate effectiveness and affordability
- But we need help with acceptability

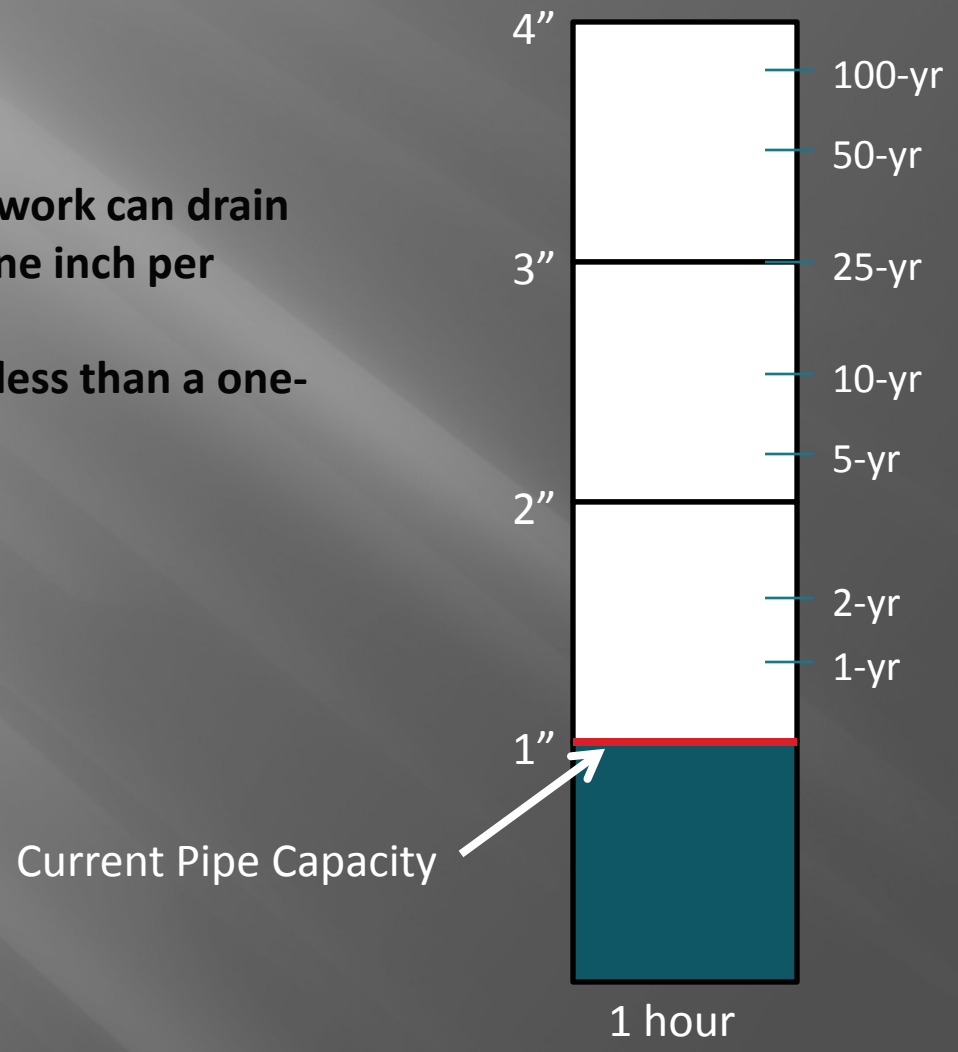
Level of Service: Let's Think in Terms of Inches of Rainfall…

- Not all rainfall becomes runoff, as some is lost to absorption, etc…
- The amount loss is smaller in urbanized areas
- And events are usually more than one hour long, and peak rainfalls typically occur after saturation

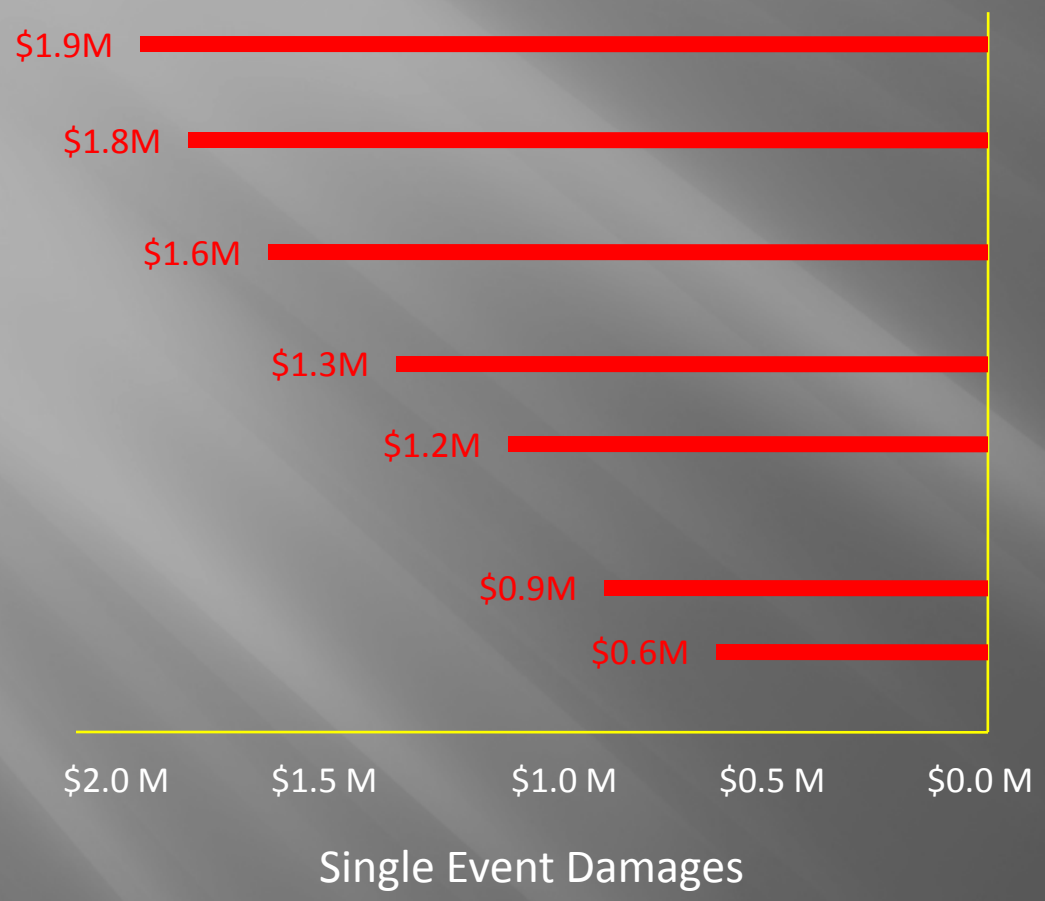


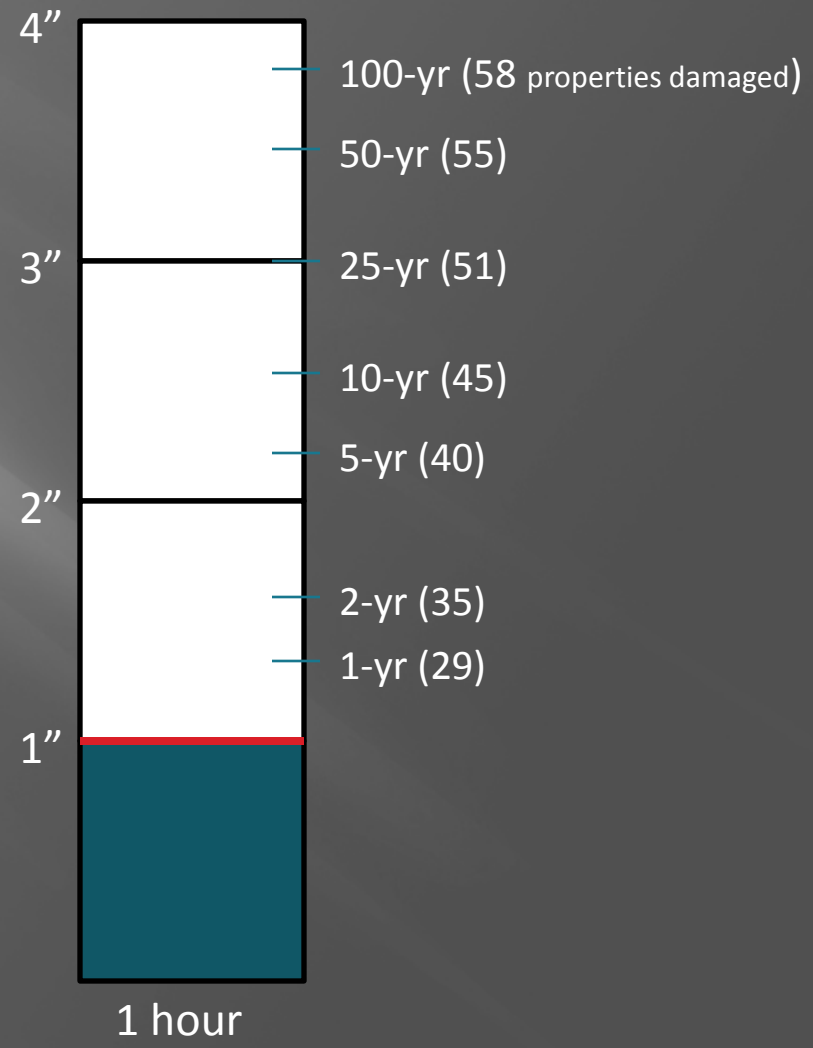
Current System Capacity

- **The current drainage network can drain the equivalent of about one inch per hour**
- **The resultant capacity is less than a one-year event**



What if it rains more than 1”?





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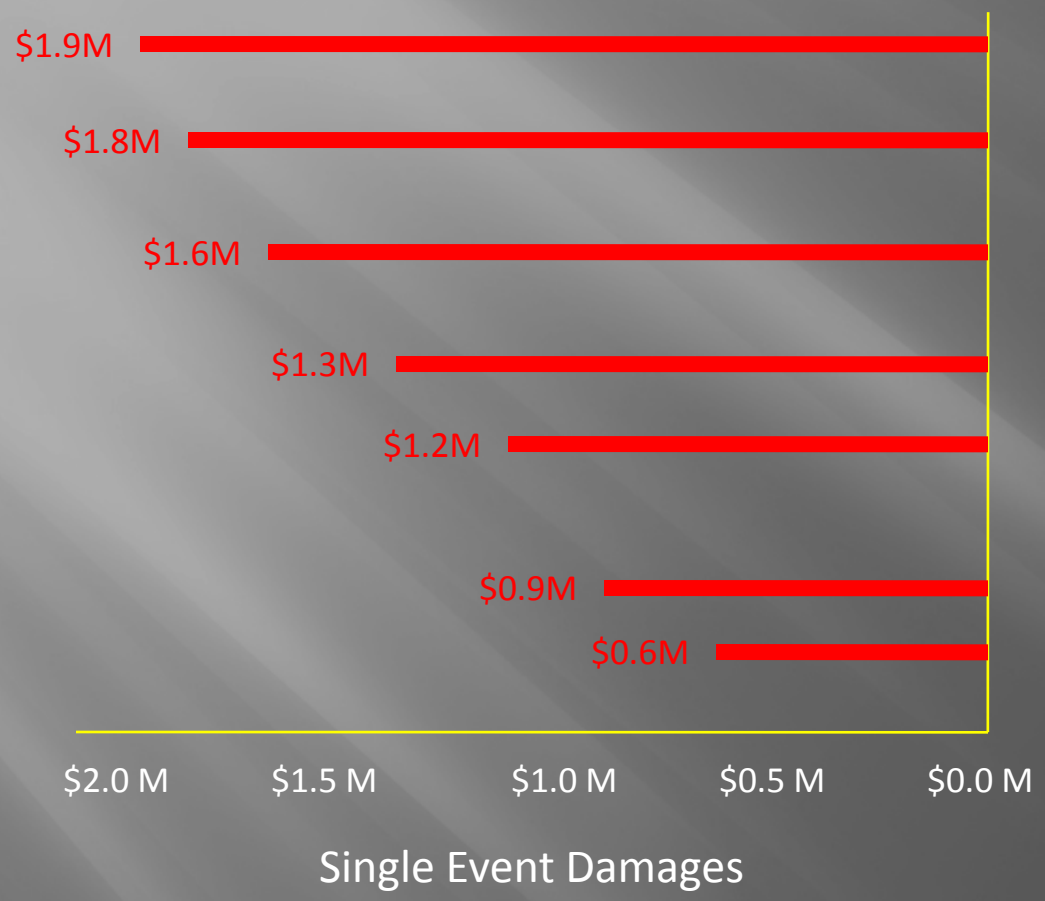
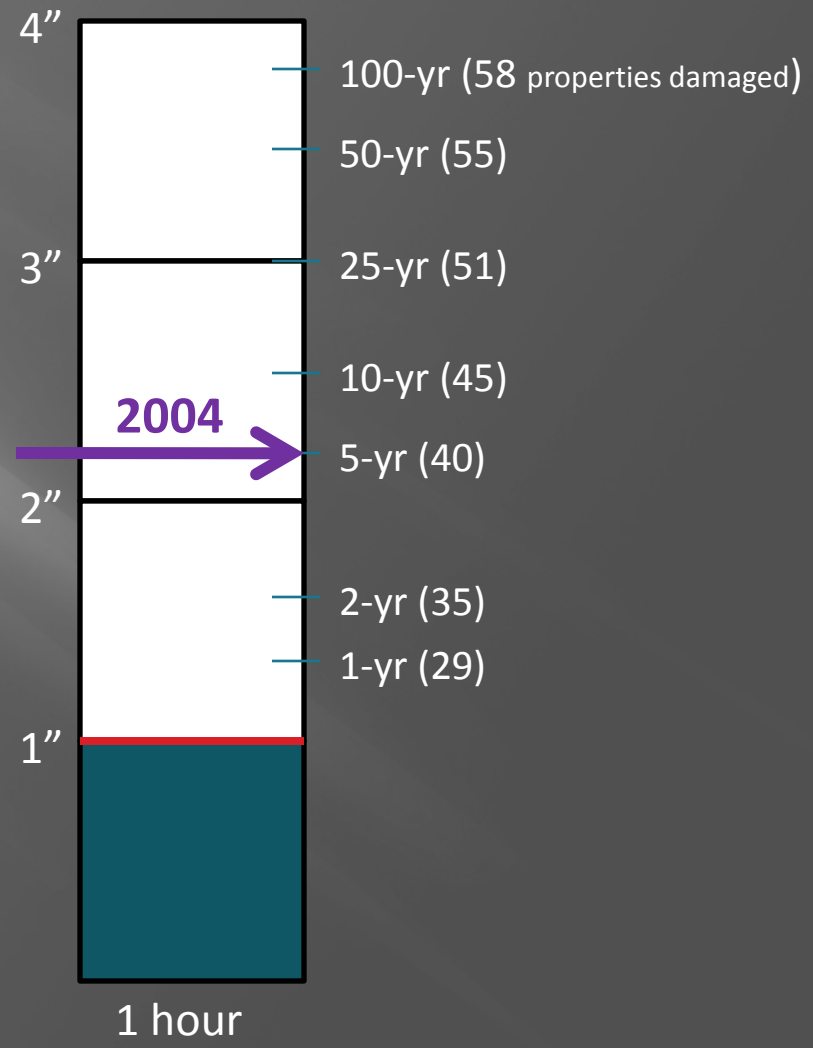
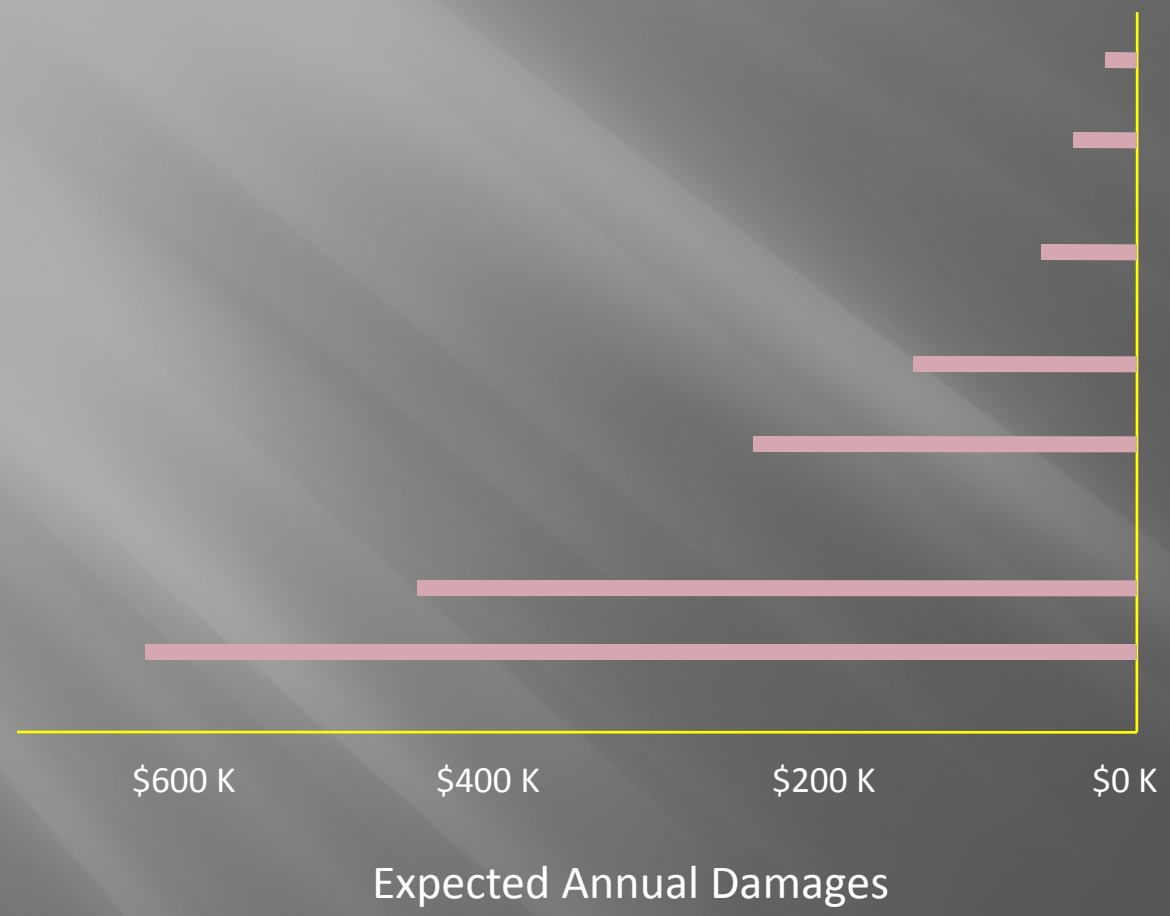
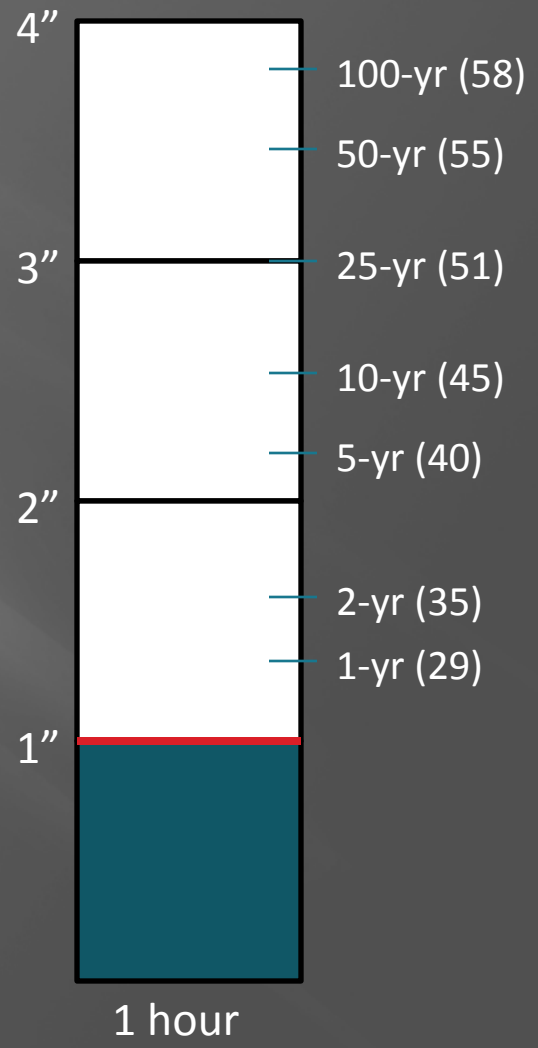




Expected Annual Damage (considers likelihood of event)





How Big is the Flooding Problem in Central Arlington Heights?

Based on the engineering and economic analysis, flooding in Central Arlington Heights is a

$15 million problem

Mitigation Measures Involve One or More of…

- Increase conveyance (pipes, channels)
- Increase absorption (Low Impact Development)
- Increase storage (detention)
- Avoidance (floodproof, acquisition)
- Coping (flood insurance, flood warning)

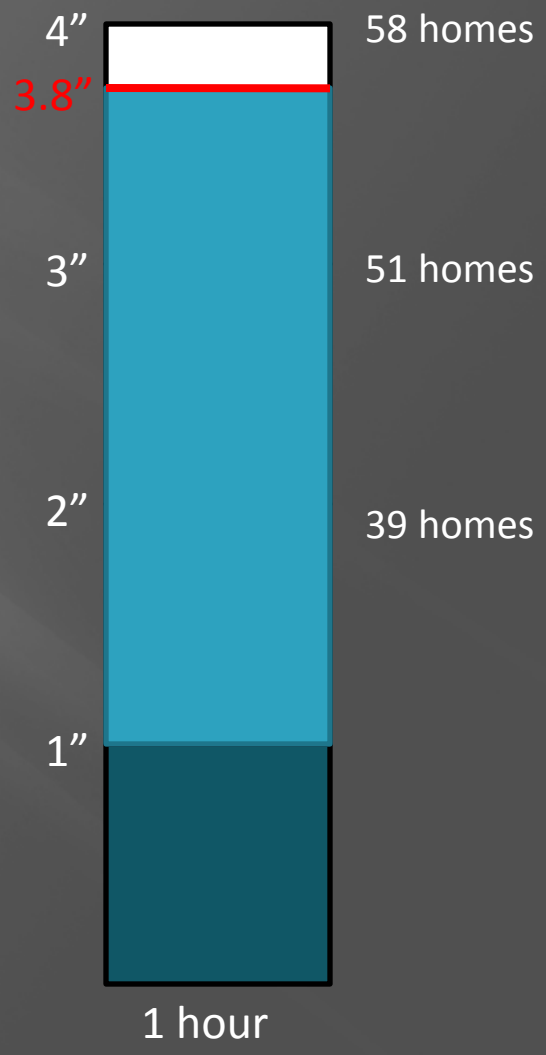
Suggestions/Input from Stakeholders

- Clean Pipes/Remove Obstructions
- French Drains
- More Drains in Street
- Zoning/Development Controls
- Detention on Vacant Tracts/Commercial Tracts
- Avoid Acquisition of Homes

Increase Pipe Capacity

Increase Pipe Capacity (Large)

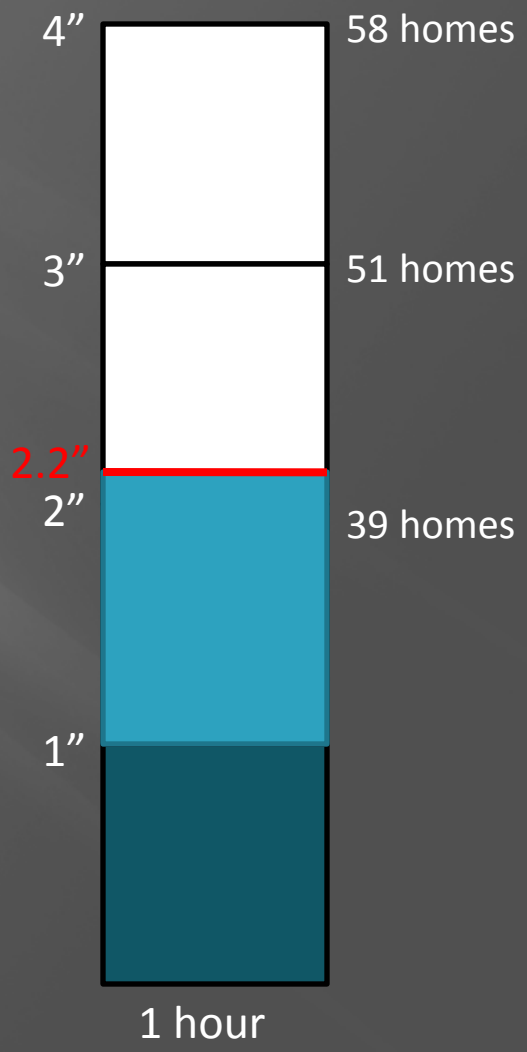
- Additional Pipes to Increase Level of Service to 3.8”
- Cost = $27,000,000
- Downstream Issues



Damage Reduction = $15,000,000

Increase Pipe Capacity (Medium)

- Additional Pipes to Increase Level of Service to 2.2”
- Cost = $21,000,000
- Downstream Issues

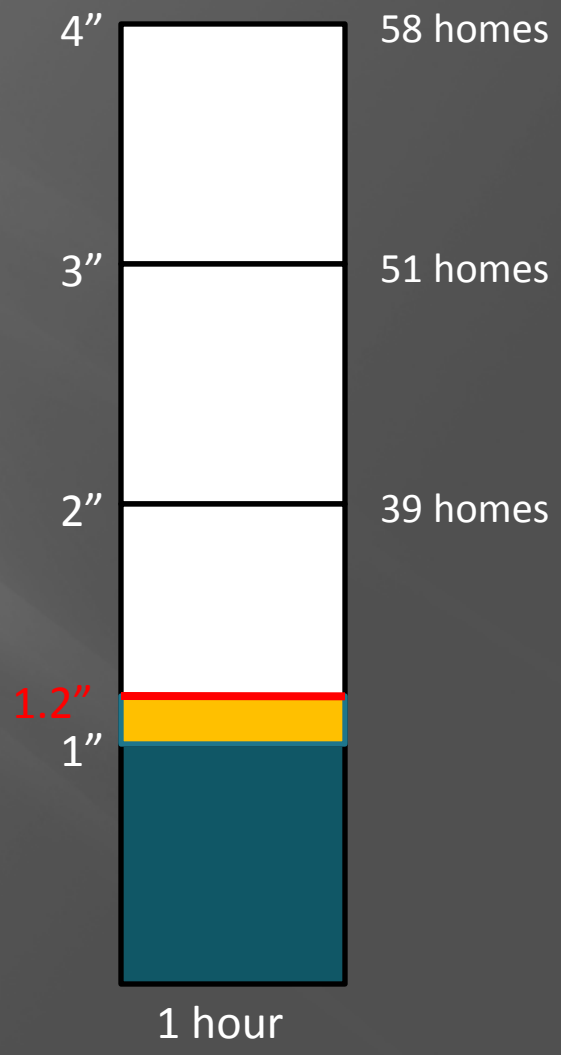


Damage Reduction = $9,500,000

Biodetention (Rain Gardens)

Bioretention (Rain Gardens)

- Depressed gardens with native vegetation that collect and retain runoff
- About 20 acres of rain gardens are needed to increase level of service by 0.2 inches
- Long Term (20 years)
- Estimated Cost = $4,700,000

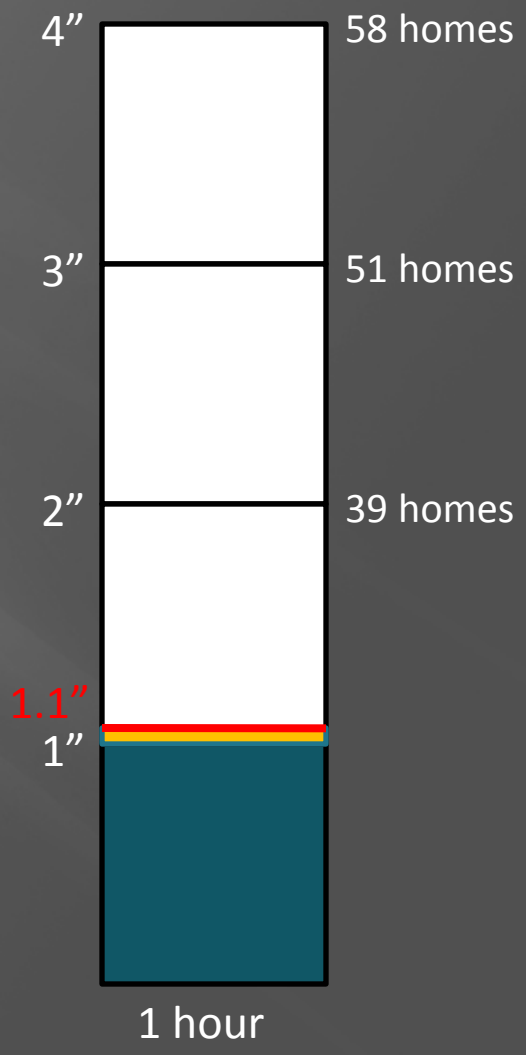


Damage Reduction = $700,000

Rain Barrels

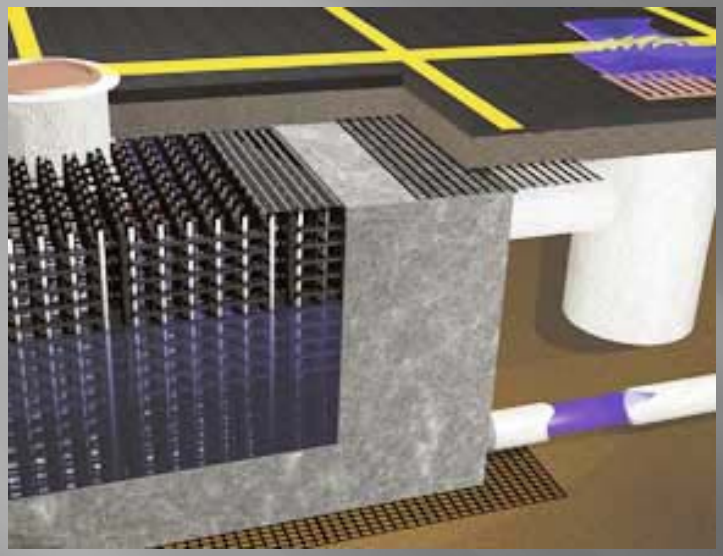
Rain Barrels

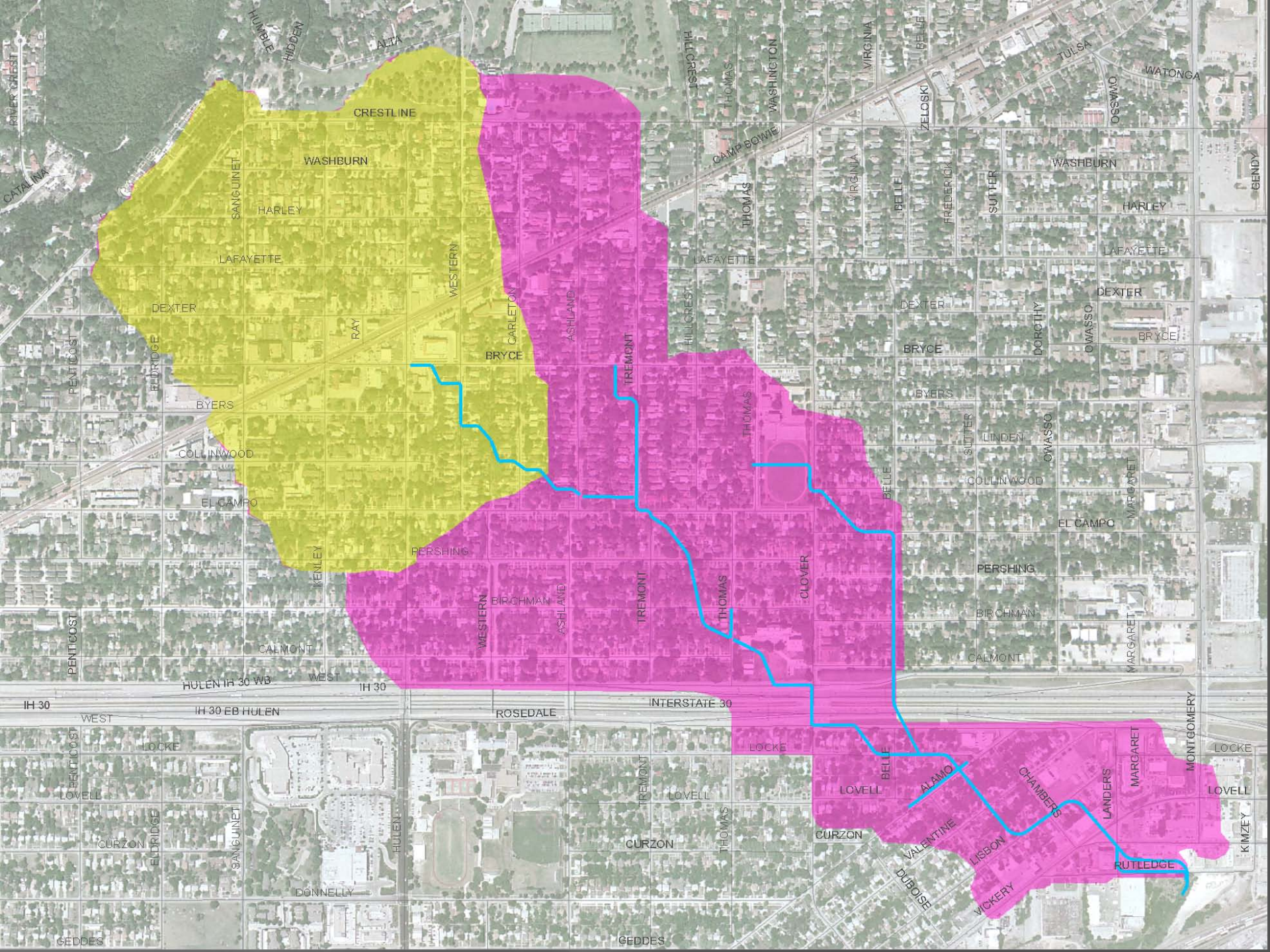
- City subsidizes rain barrels to consumers
- Assume 200 homes with rain barrels
- Large Cisterns required to capture 1” off of roofs
- Cost = $1 million



Damage Reduction = $200,000

Underground Storage Units

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EL CAMPO
KENLEY
PERSHING
BIRCHMAN
CALMONT
HULEN IH 30 WB
WEST
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IH 30 EB HULEN
ROSEDALE
INTERSTATE 30
LOCKE
LOVELL
CURZON
DONNELLY
GEDDES
HULEN
HILLCREST
THOMAS
WASHINGTON
CAMP BOWIE
VIRGINIA
BELLE
ZELOSKI
FREDERICK
SUTTER
TULSA
WATONGA
OSSWO
GENDY
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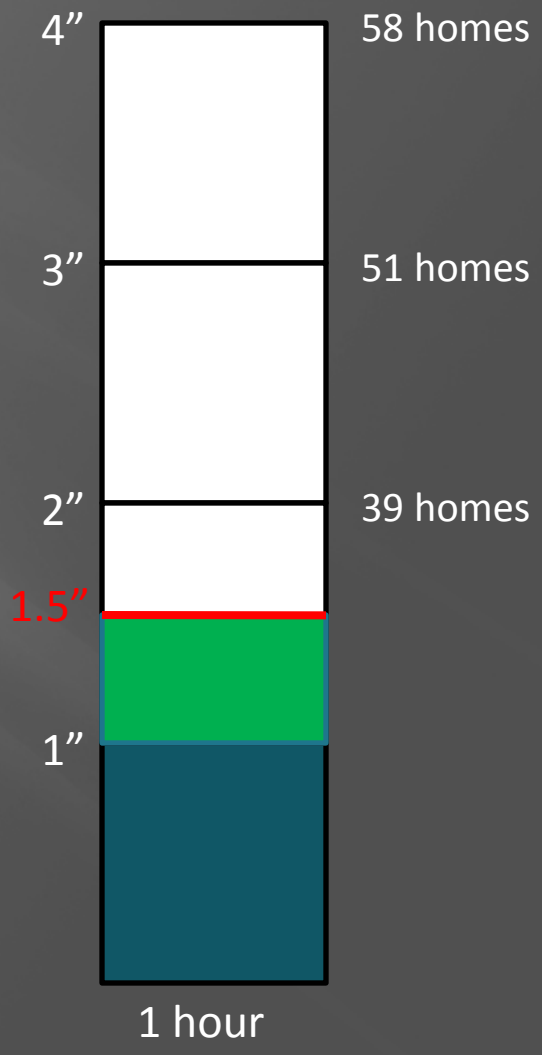
RUTLEDGE
KIMZEY

Underground Storage Units

- Modular units that can be installed below pavement or athletic fields
- Not recommended for heavy traffic
- Could be installed under parking areas, edge of streets, or athletic fields
- $275-$400 per cubic yard of storage
- Assume installation in roads as part of road maintenance
- Cost to get to 1.5” = $9 million
- Long Term (20 years)



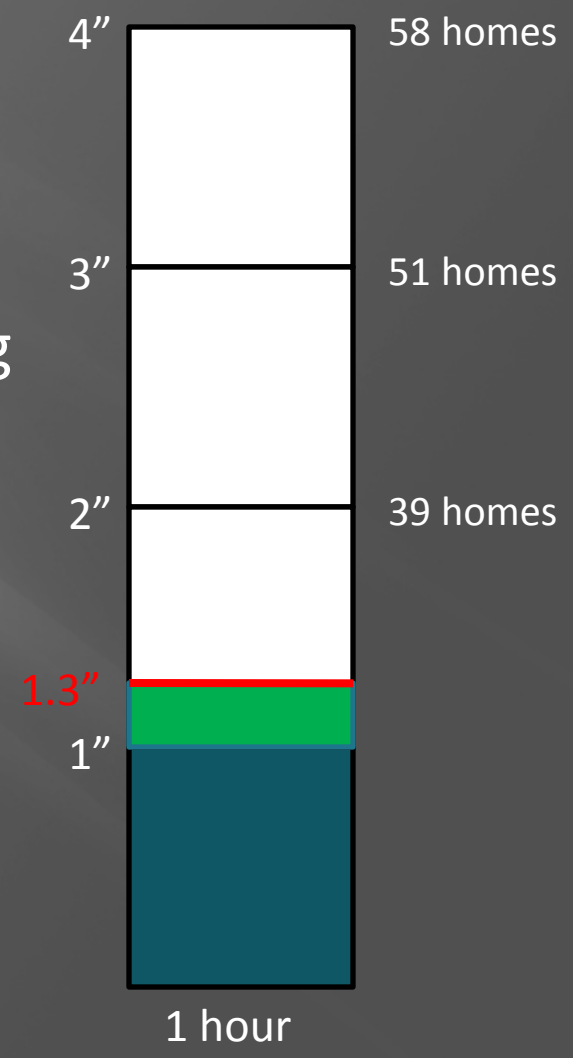
Damage Reduction = $3,800,000

Non-Residential Detention (Small)

Non-Residential Detention (Small)

- Detention basin on existing vacant tracts and select commercial tracts south of Camp Bowie
- Detention will intercept runoff coming from north
- Basins would be constructed as an amenity to local landscape
- Risk of filling from initial runoff (before flood flows)
- Cost = $3.3 million

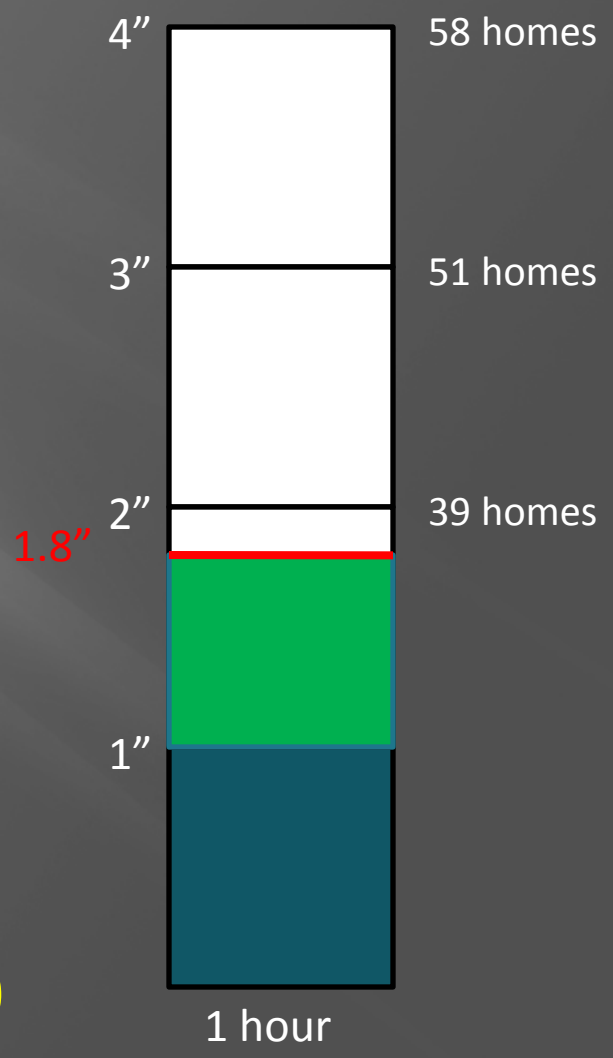
Damage Reduction = $2,100,000



Non-Residential Detention (Large)

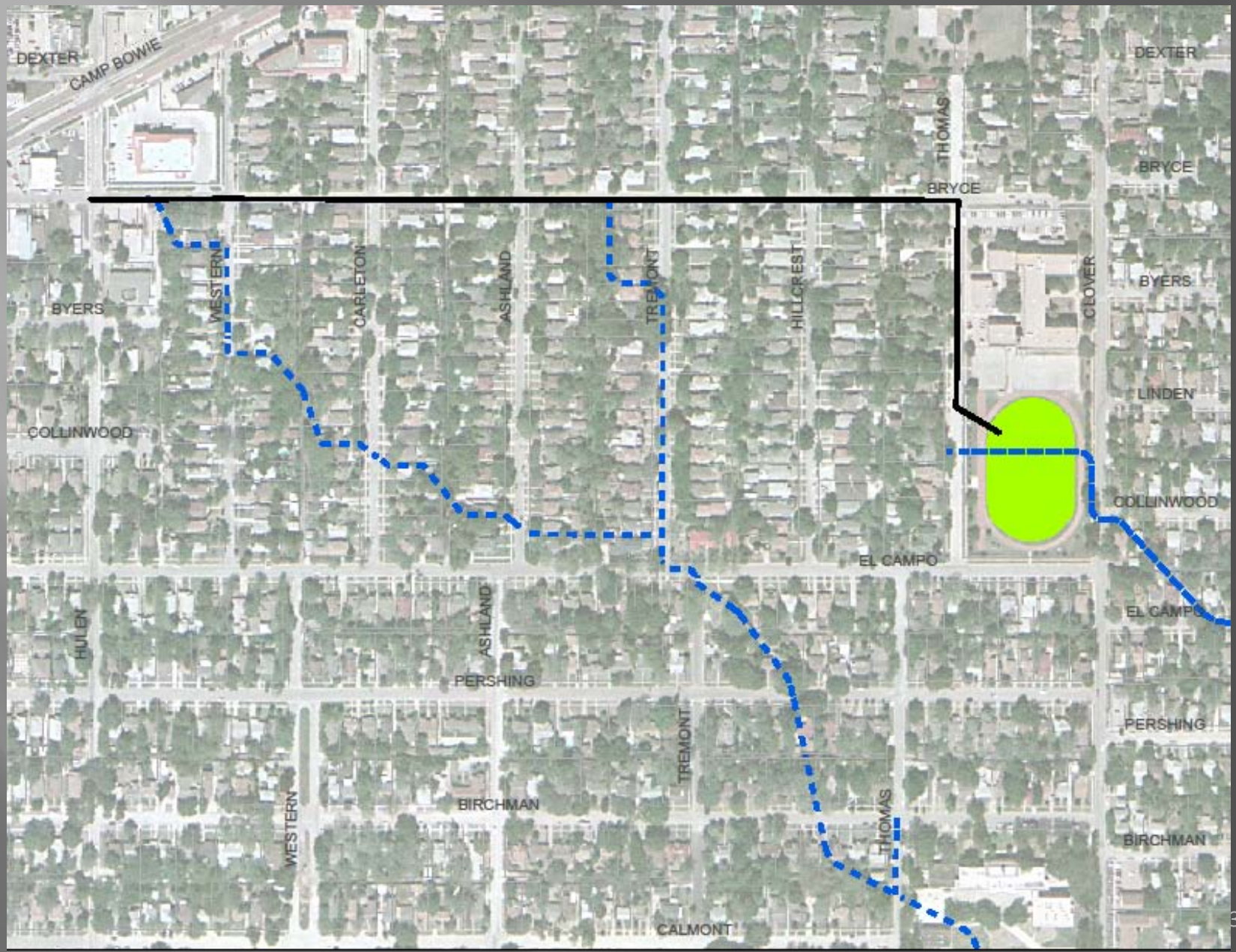
Non-Residential Detention (Large)

- Detention basin on existing vacant tracts and select commercial tracts south of and along Camp Bowie
- Detention will intercept runoff coming from north
- Basins would be constructed as an amenity to local landscape
- Cost = $12.4 million



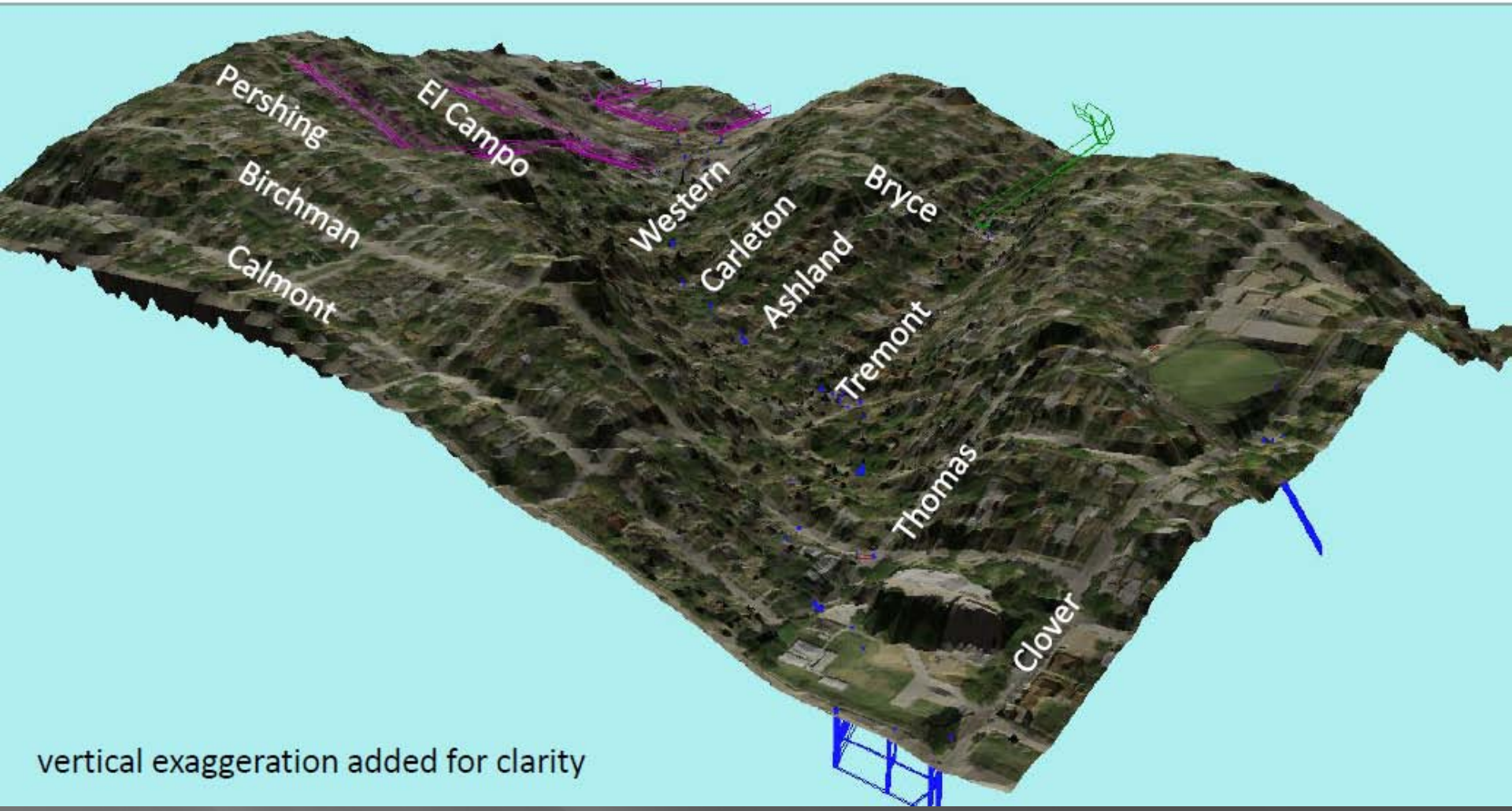
Damage Reduction = $7,300,000

Stripling Surface Detention



Bryce – Looking East from Ashland

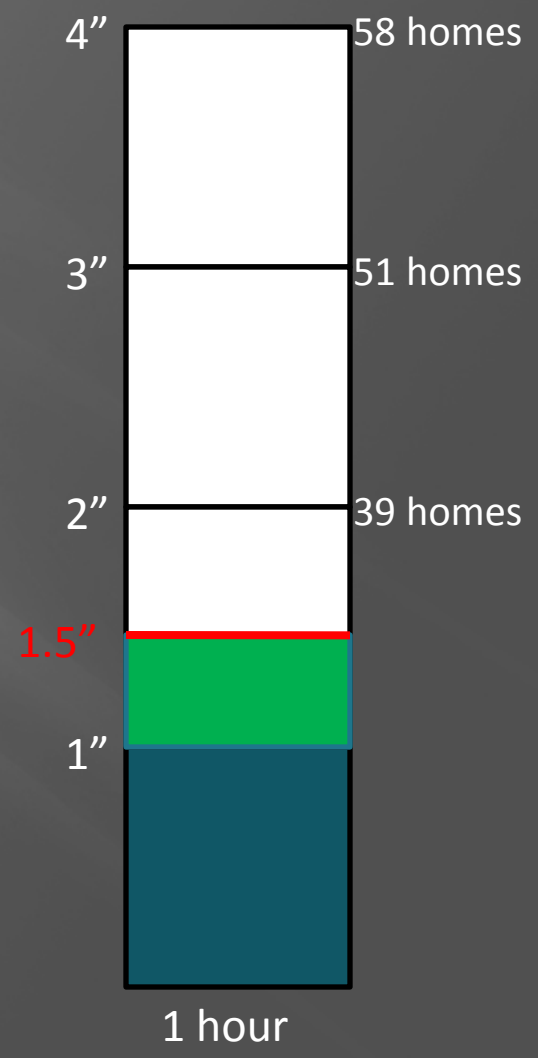
3D View of Central Arlington Heights Watershed
Looking Northwest from Clover & I-30



vertical exaggeration added for clarity

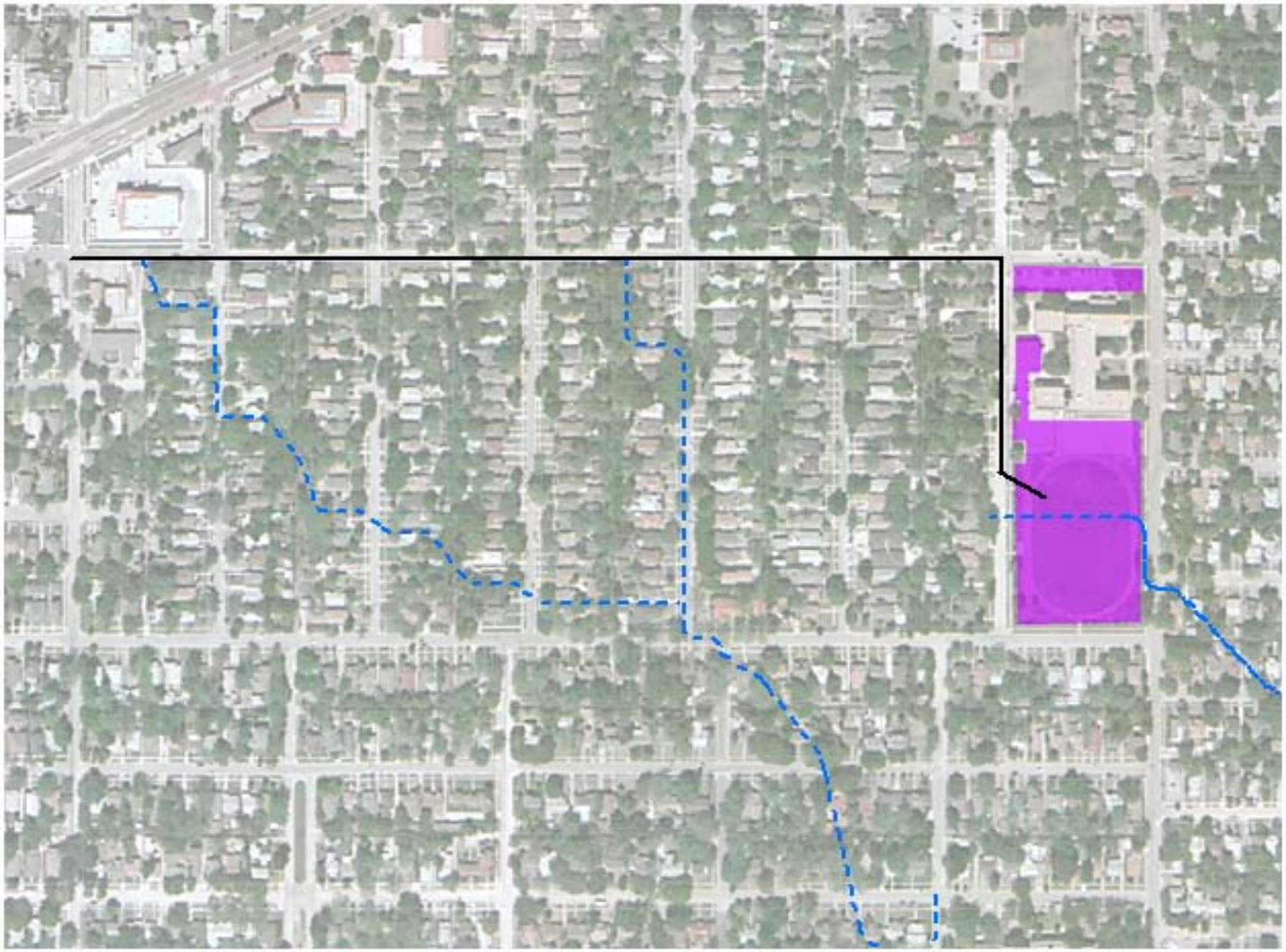
Stripling Surface Detention

- Construct basin inside of track
- Requires pipe (tunnel) under Bryce to deliver excess flow from Western Ave and Carleton
- Outfall to new pipe that drains to existing pipe near Hi Mount
- Estimated Cost = $6,200,000



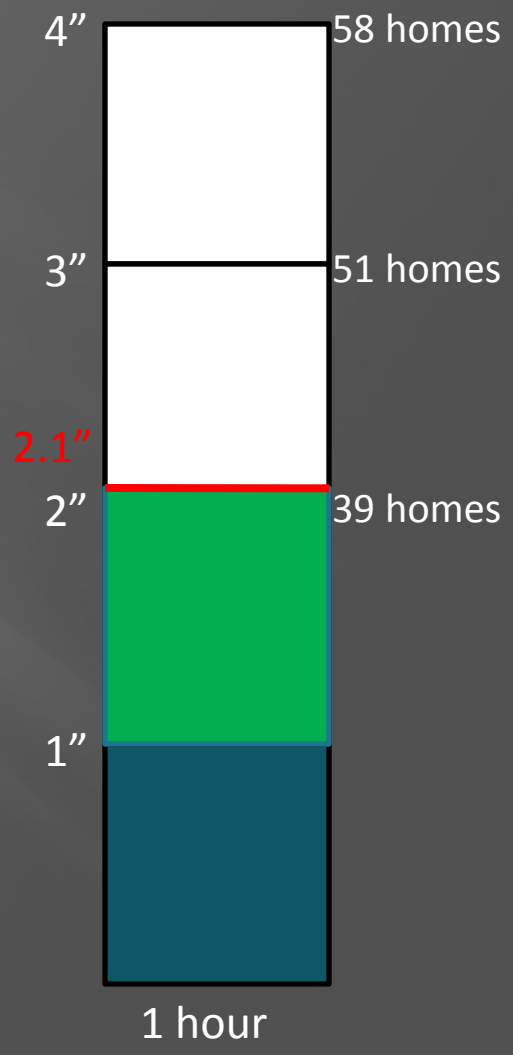
Damage Reduction = $3,800,000

Stripling Underground Detention



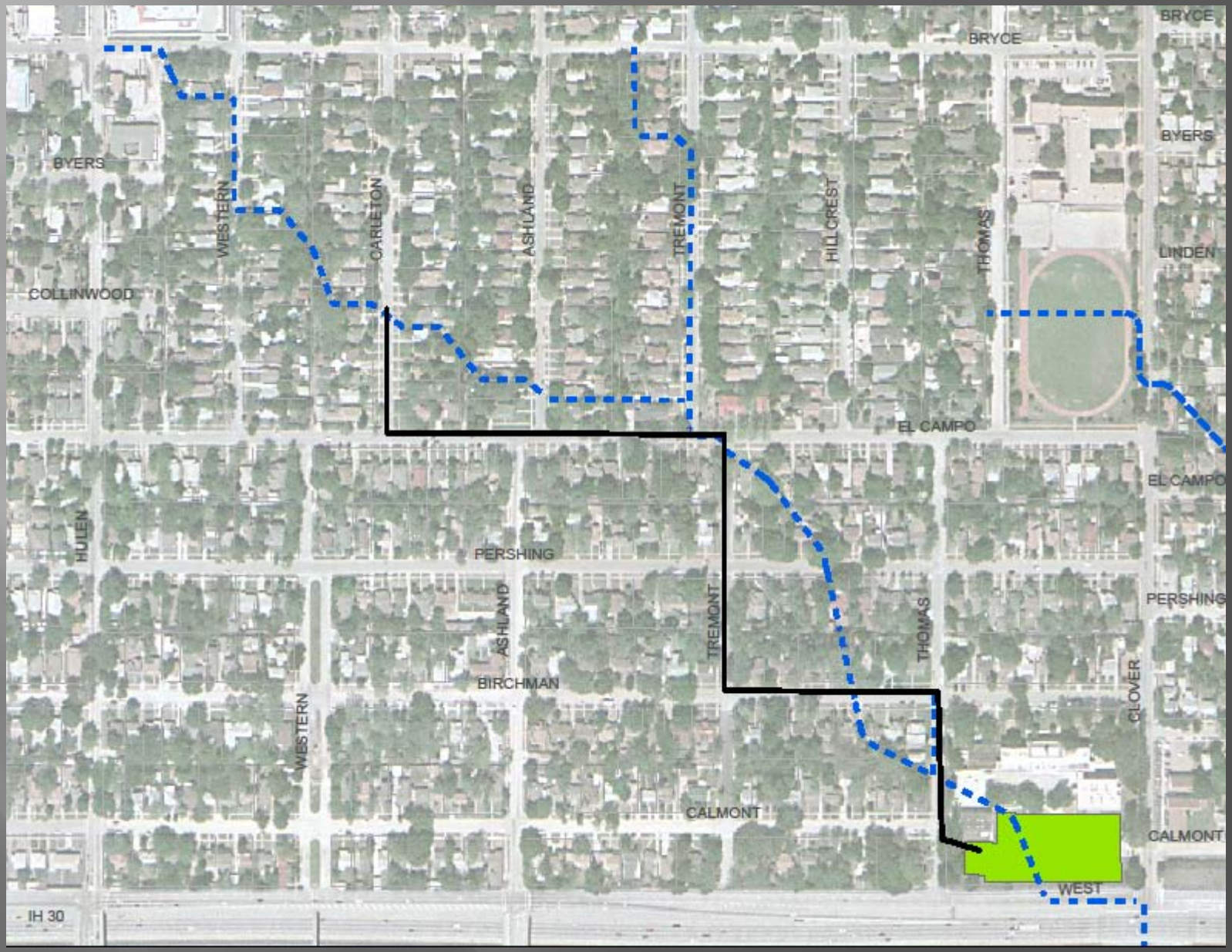
Stripling Underground Detention

- Modular underground detention
- Requires pipe (tunnel) under Bryce to deliver excess flow from Western Ave and Carleton
- Estimated Cost =$16,200,000



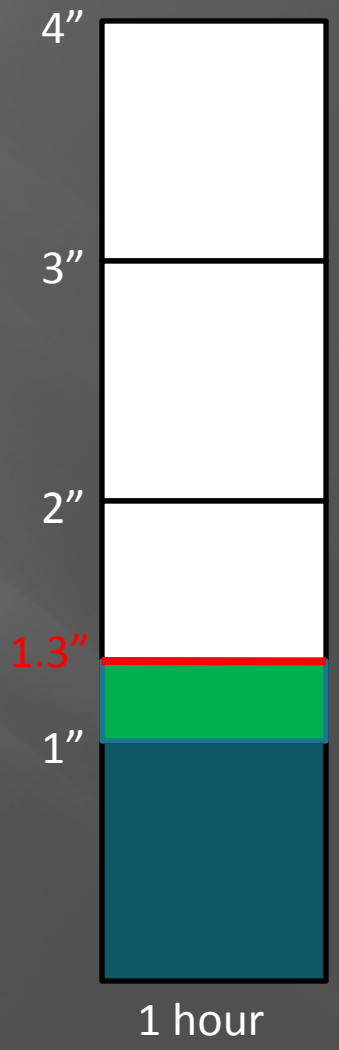
Damage Reduction = $9,100,000

South High Mount Detention



South High Mount Detention

- Modular underground detention
- Construct along path of pipe network
- Estimated Cost = $5,700,000

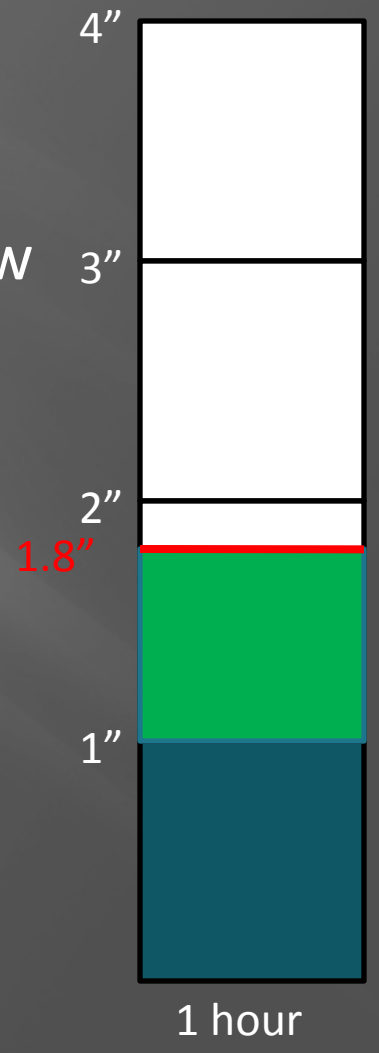


Damage Reduction = $2,100,000

Stripling & High Mount Detention

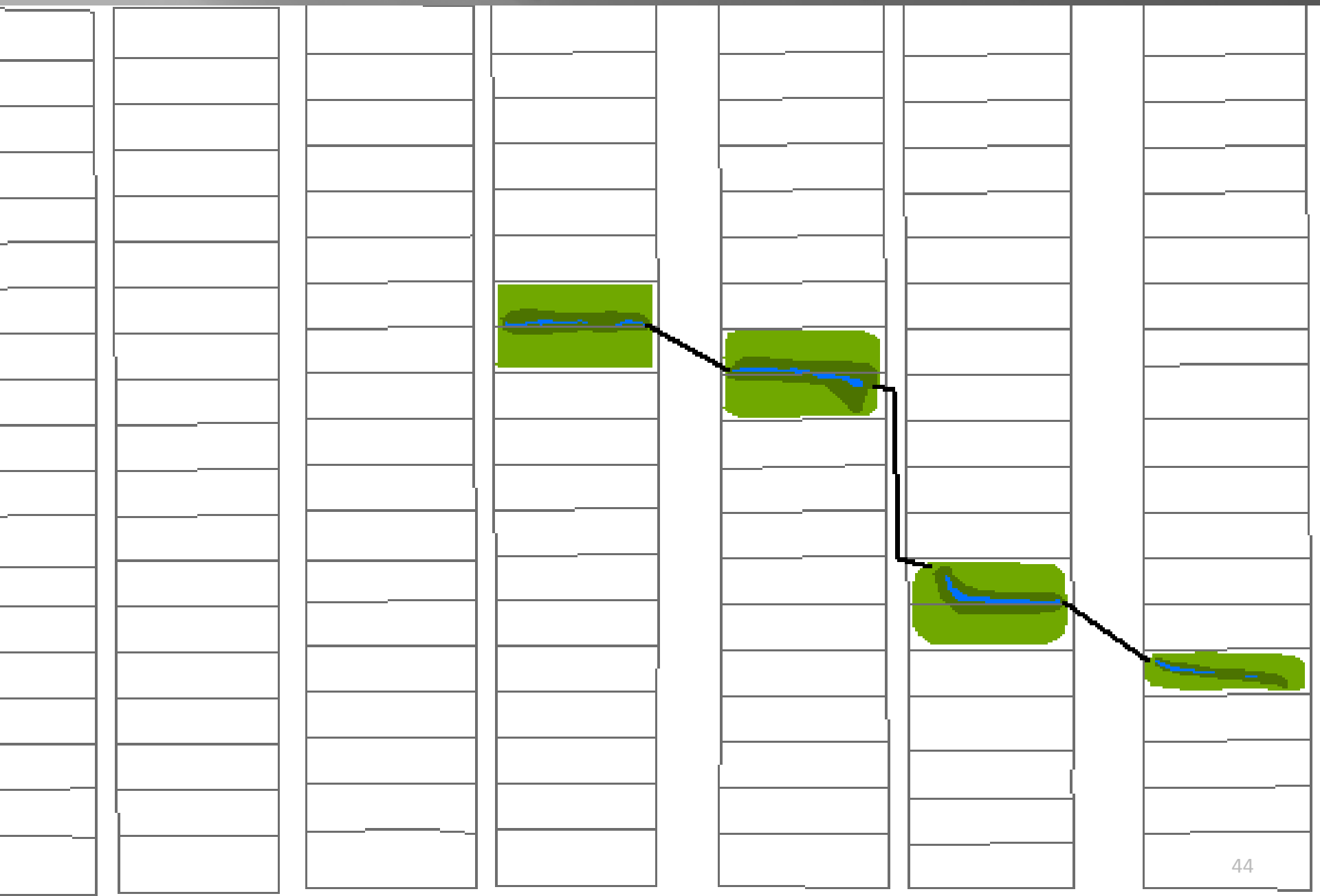
Stripling & High Mount Detention

- Tunnel along Bryce to Stripling
- Surface detention at Stripling
- Stripling detention drains through new pipe to Hi Mount detention
- Estimated Cost = $10,800,000



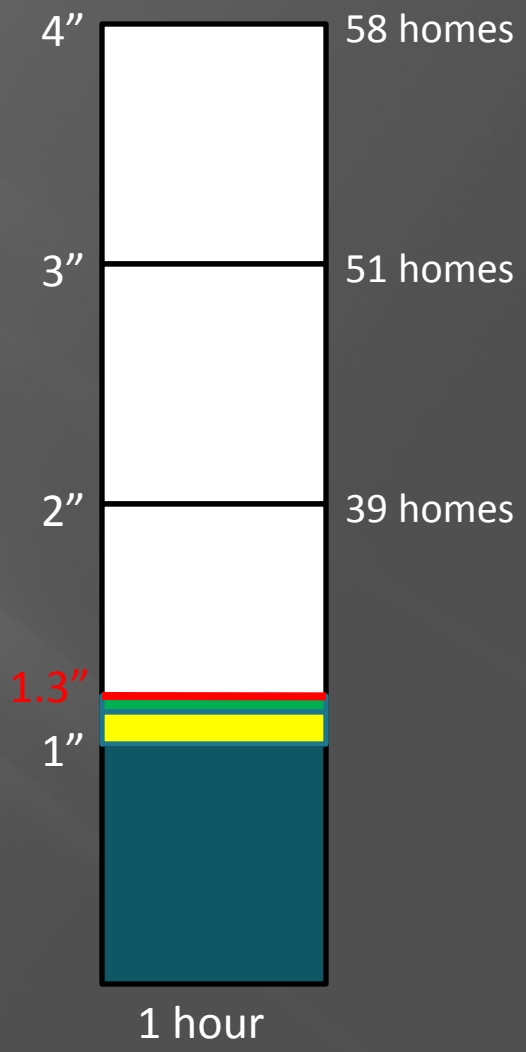
Damage Reduction = $6,700,000

Greenway Detention (Small)



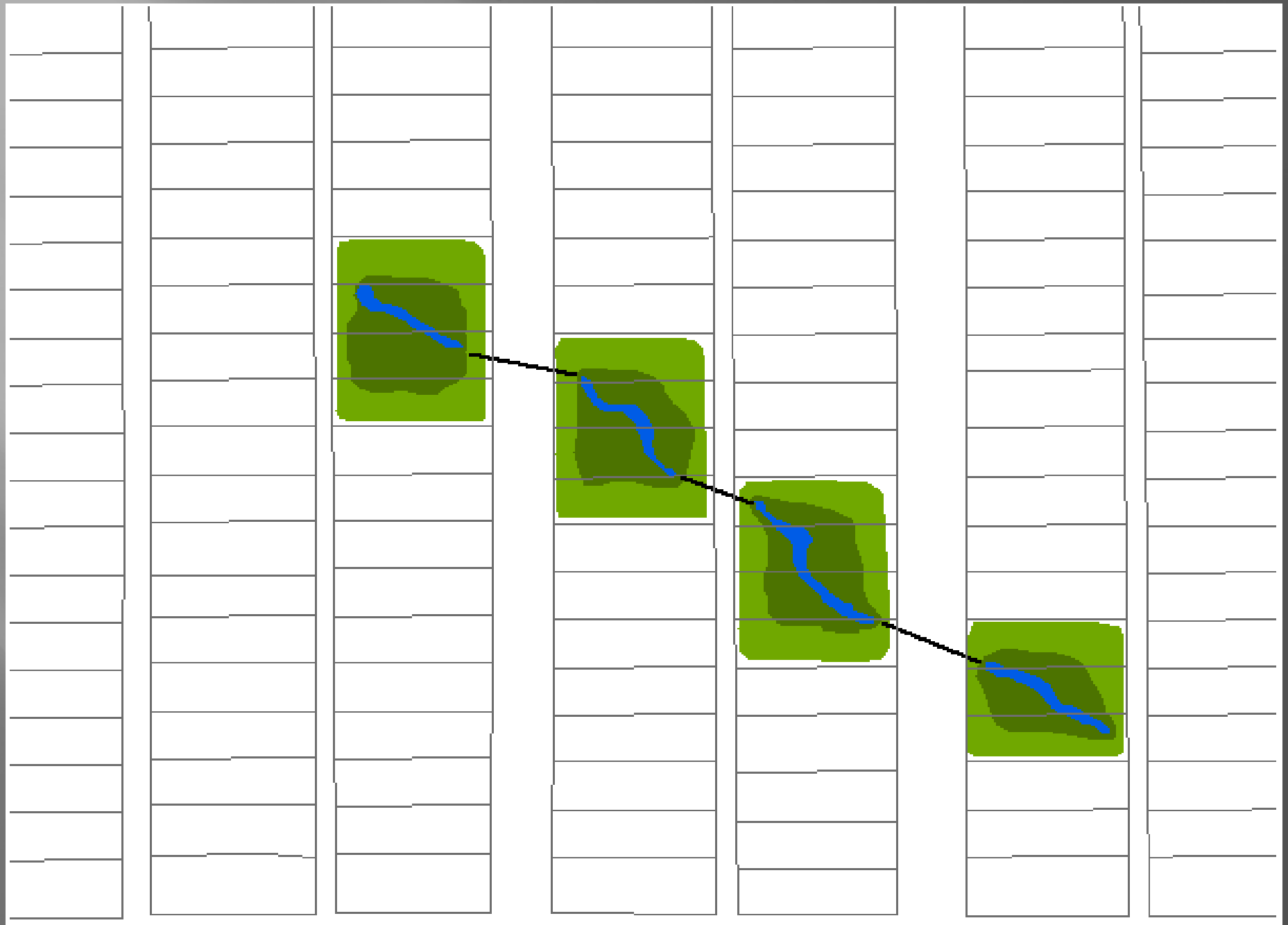
Greenway Detention (Small)

- Acquire 7 of the most flood prone homes
- Construct greenway corridor detention
- Cost = $2,400,000



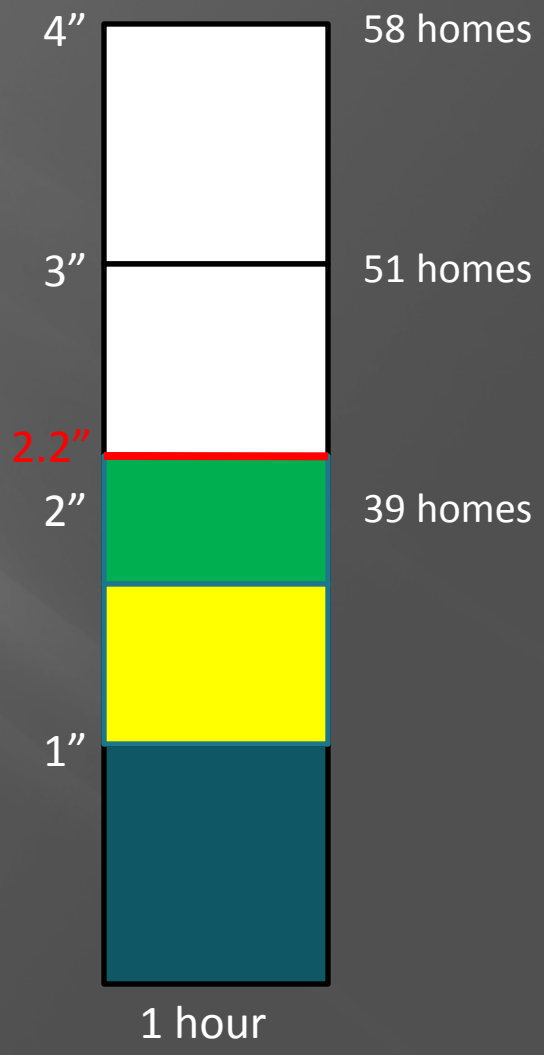
Damage Reduction = $2,100,000

Greenway Detention (Medium)



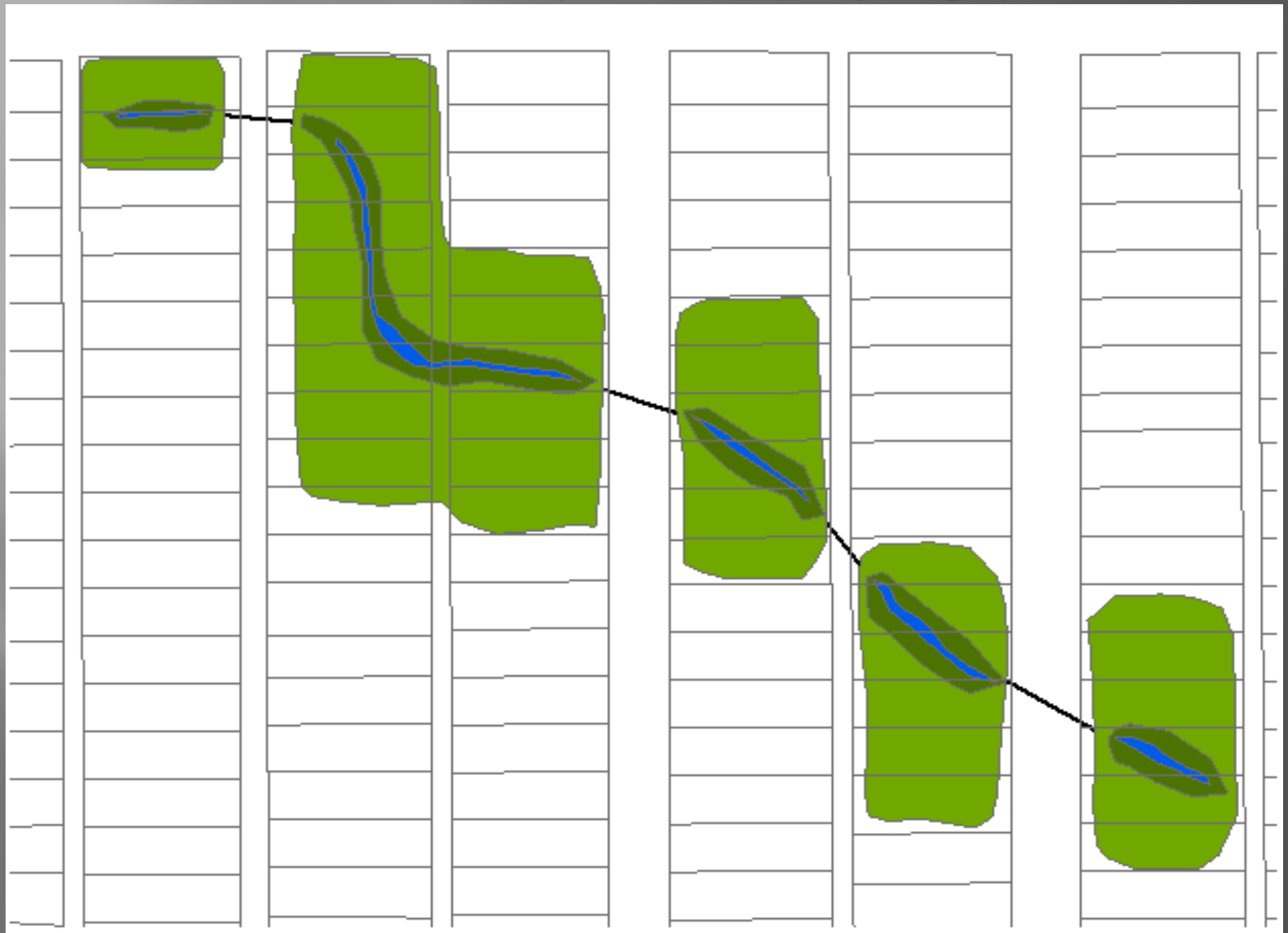
Greenway Detention (Medium)

- Acquire 15 of the most flood prone homes
- Construct greenway corridor detention
- Cost = $5,800,000



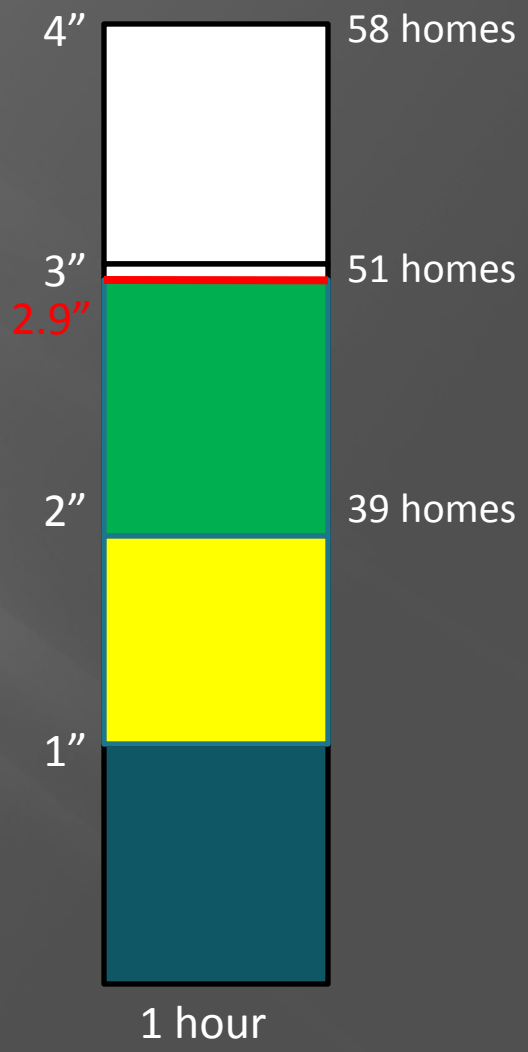
Damage Reduction = $8,700,000

Greenway Detention (Large)



Greenway Detention (Large)

- Acquire 30 of the most flood prone homes, plus 2 commercial tracts, and apartment building and vacant tract
- Construct greenway corridor detention
- Cost = $13,400,000



Damage Reduction = $12,900,000

SUMMARY COMPARISON

Summary of Measures

Measure	Level of Service (in/hr)	Cost ($M)	Damage Reduction ($M)	Time	Phasable Benefits
Increase Pipe Capacity (Large)	3.8	27.0	15.0	Long	N
Increase Pipe Capacity (Small)	2.2	21.0	9.5	Long	N
Biodetention (Rain Gardens)	1.2	4.7	0.7	Long	Y
Rain Barrels	1.1	1.0	0.2	Medium	Y
Underground Storage Units	1.5	9.0	3.8	Long	Y
Non-Residential Detention (Small)	1.3	3.3	2.1	Small	Y
Non-Residential Detention (Large)	1.8	12.4	7.3	Medium	Y
Stripling Surface Detention	1.5	6.2	3.8	Short	N
Stripling Underground Detention	2.1	16.2	9.1	Short	N
South High Mount Detention	1.3	5.7	2.1	Short	N
Stripling & High Mount Detention	1.8	10.8	6.7	Short	Y
Greenway Detention (Small)	1.3	2.4	2.1	Short	Y
Greenway Detention (Medium)	2.2	5.8	8.7	Medium	Y
Greenway Detention (Large)	2.9	13.4	12.9	Medium	Y

DISCUSSION