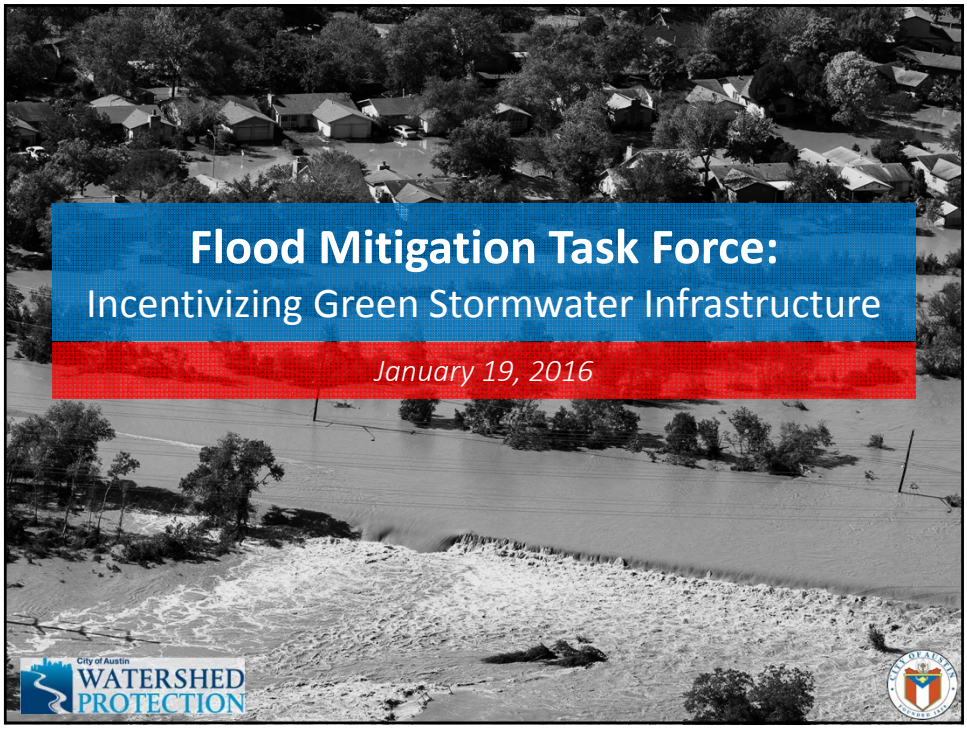
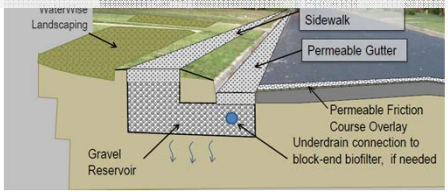


Presentation Outline

- Introduction to Green Stormwater Infrastructure (small-scale, decentralized stormwater controls)
- Case Study: Brentwood Neighborhood
- Discussion and Staff Recommendations: Incentives for On-Site Stormwater Control Measures

Green Stormwater Infrastructure

Green Stormwater Infrastructure (GSI) reduces impacts from built environments using landscape features and engineered systems that mimic natural processes to control the quantity and quality of runoff



Why Distributed Green Stormwater Infrastructure?

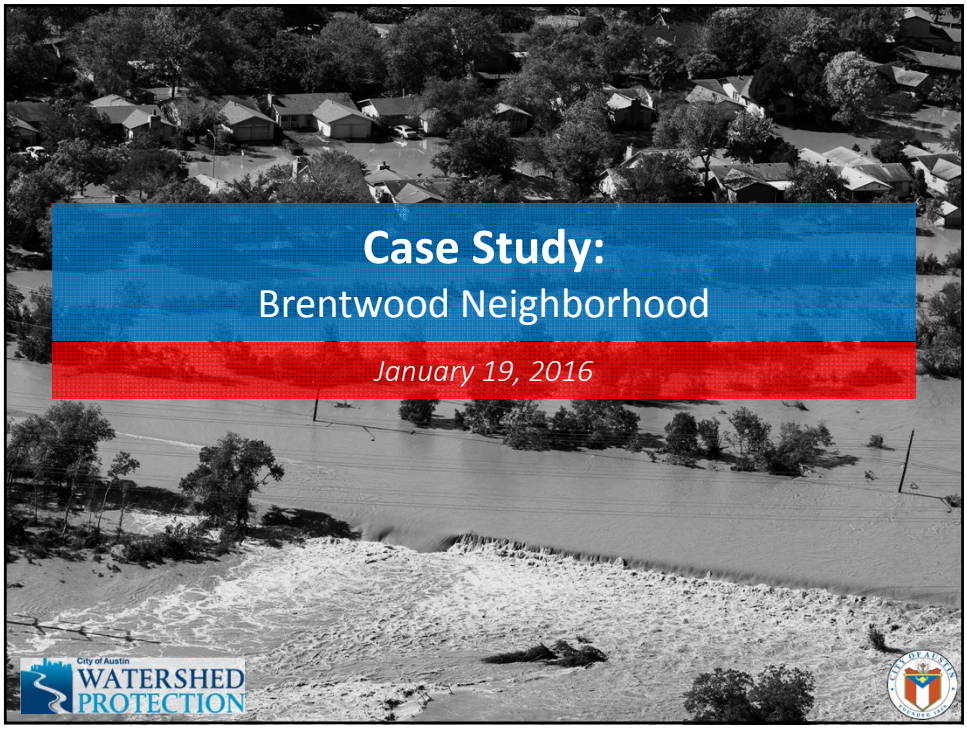
- Increased emphasis on sustainability, integration of nature into the City, and Low Impact Development (LID)
- Multiple benefits:
  - Water quality
  - Stream channel stability
  - Beautification
  - Heat island reduction
- Traditional "grey" approaches to stormwater management are:
  - Increasingly cost prohibitive
  - May cause adverse impacts (e.g., downstream flooding, erosion) that require mitigation

Benchmarking with Other U.S. Cities

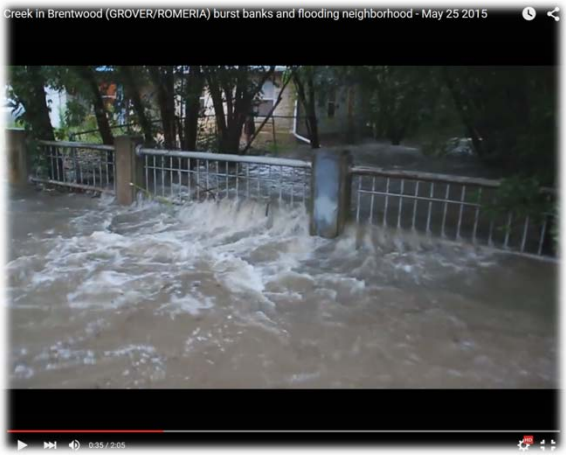
- GSI has become a common strategy for reducing Combined Sewer Overflows (CSOs):
  - Goal: reduce the volume of stormwater entering the combined sewer system
  - Managing peak flows during floods is not a priority
  - Many programs driven by regulatory action or the threat of such
- By contrast, Austin's separate storm drain system is designed to convey peak storm flows:
  - Magnitude of peaks much greater than in other areas
  - No regulatory compliance issue
  - Key question: to what extent can distributed GSI improve the level of service provided by existing stormwater infrastructure?

Engineering Analysis of the Effects of Green Stormwater Infrastructure

- WPD initiated a first-of-its kind study to evaluate the effects of distributed GSI on:
  - Magnitude of peak flows and the potential to reduce flooding
  - Volume of runoff and the volume of infiltration
  - Life-cycle costs of avoiding stormwater conveyance upgrades
  - Pollutant loads and stream erosion potential
  - Potable water use for landscape irrigation
  - Ability to avoid adverse downstream impacts on the base flood elevation of receiving streams



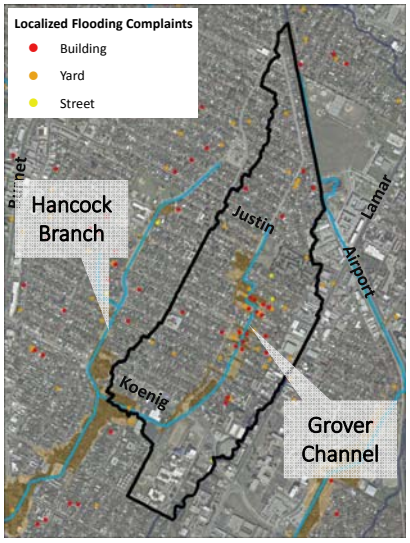
Case Study – Brentwood Neighborhood



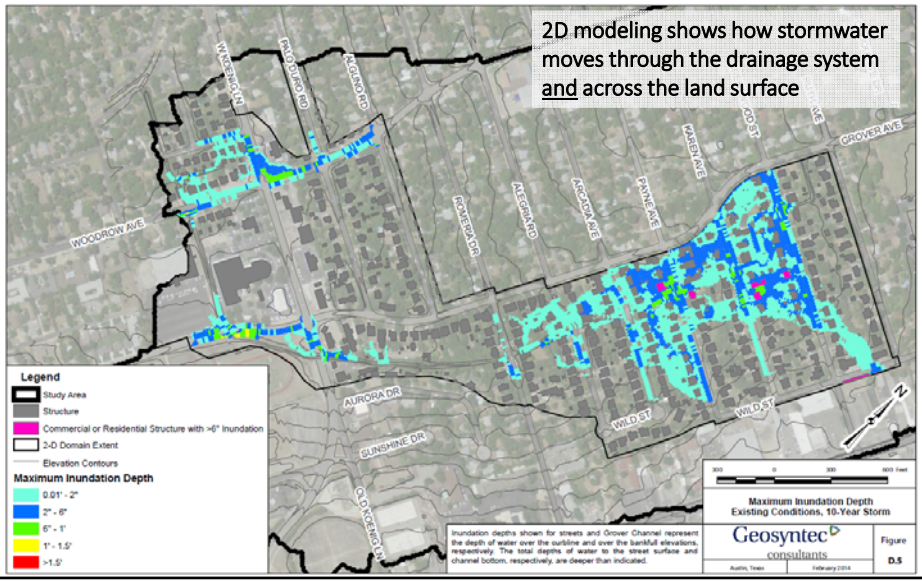
Grover Channel of Shoal Creek at Romeria Drive
Memorial Day 2015

Case Study – Brentwood Neighborhood

- Fully developed single-family subdivision that pre-dates detention requirements and DCM standards
- Drains to the eroded Grover Channel tributary – conveyance capacity exceeded in 2-year storm
- Conventional solution (storm drain upgrade) would have adverse downstream impacts
- Cost of conventional solution approximately $192 million



Case Study – Brentwood Neighborhood

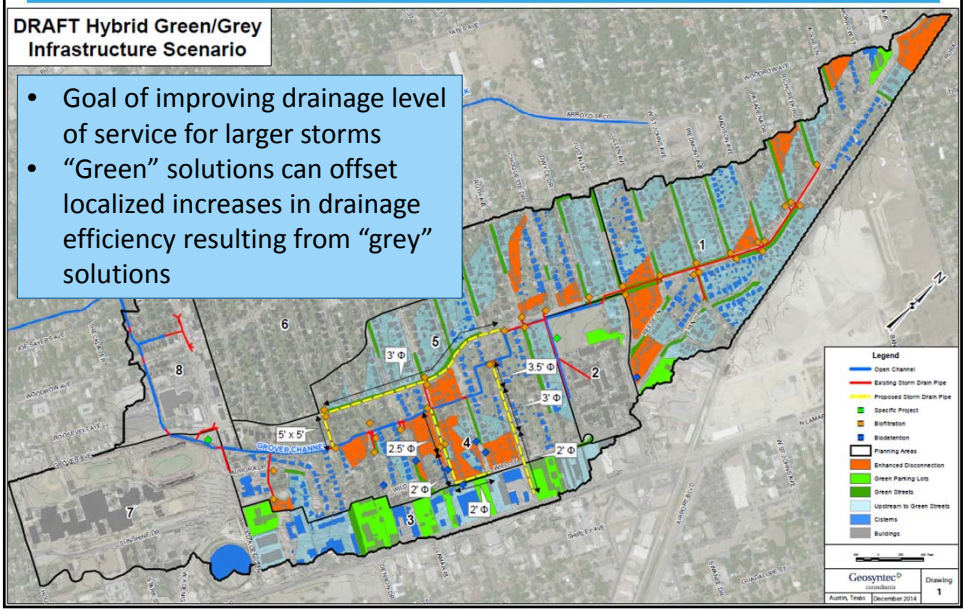


Case Study – Brentwood Neighborhood

- Modeled large-scale application of distributed green controls to assess impacts on flooding and water quality
- Identified opportunities for the application of green infrastructure in COA-sponsored retrofits, private development, and voluntary homeowner projects
- Evaluated effects and life-cycle costs of various scenarios for comparison with each other and with conventional solution

Grover channel at Brentwood St.

Scenario 2: Hybrid Green/Grey Infrastructure



Case Study – Brentwood Neighborhood

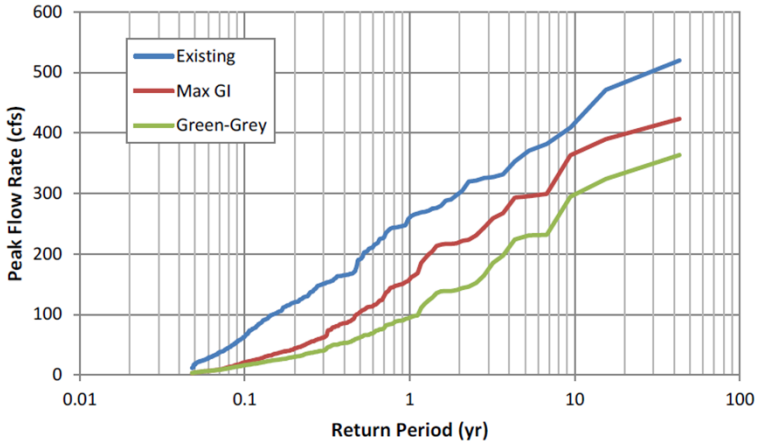


Figure 5. 1D Continuous Simulation Flow-Frequency Plot at J-1846 (Grover Channel North of Arcadia Ave)

Case Study – Brentwood Neighborhood

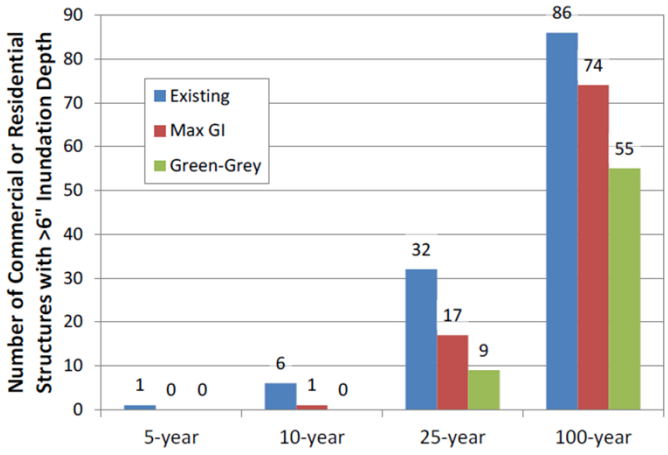


Figure 8. Number of Commercial or Residential Structures with Greater Than or Equal To Six Inches of Inundation Depth

Case Study – Brentwood Neighborhood

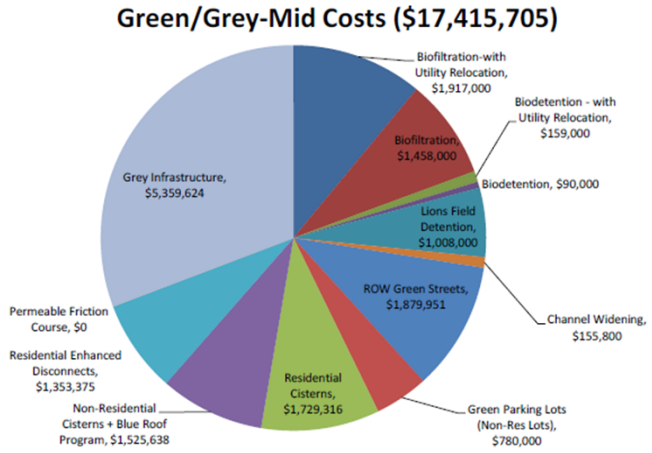
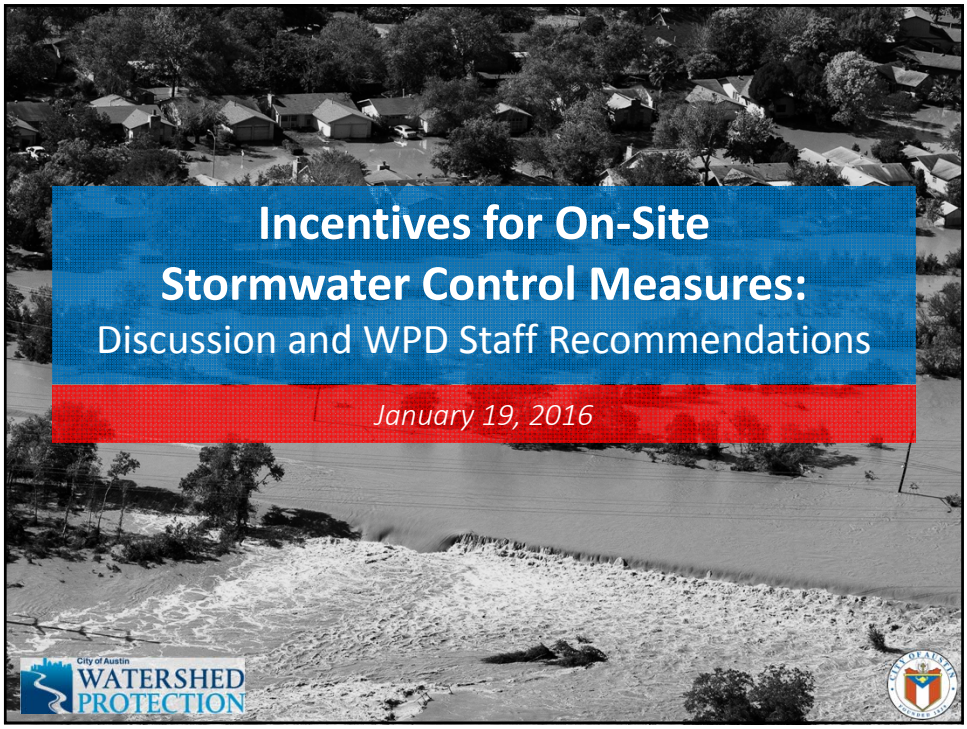


Figure 2. Estimated Green/Grey Scenario Costs (Using Mid-Level GI Costs)

Brentwood "Re-Study" Results

- Virtually eliminates local flooding for smaller (< 10 year) storms with no adverse impact to downstream floodplain
- Significant reduction in number of structures flooded by larger (> 10 year) storms
- WQ load reductions of 50,000 lb. of TSS per year at $12/lb (consistent with COA experience)
- Expected construction cost of $15 - $20 million for 10-year level of service vs. $200 million for 100-year level of service
- However, $15-20 million is a significant investment relative to available funding
- Effective for small storm water quality, not cost-effective, and unable to solve flooding problems



Incentives for On-site Stormwater Control Measures

§ 15-2-10 - ANNUAL REPORT.

The director shall provide an annual report of the drainage utility revenues, expenses, and programs to the city council. The annual report shall include findings on the impact of green infrastructure on drainage and recommended strategies that could allow utility customers to reduce the drainage charge by reducing their property's impact on drainage. The recommended strategies shall address the potential for credits or discounts for innovative stormwater controls that exceed land development requirements and/or detention and water quality treatment minimum requirements.

- Current Single Family Discount:
  - Expires Nov 2016
  - Caps drainage fee increase from FY15-FY16 to 50%. So, $20 increase in FY16 is only $10.
  - With this expiration, what can properties do to reduce their drainage fees?

Incentives for On-site Stormwater Control Measures

- Benchmarking with peer cities:
  - Most have Combined Sewer Overflow (CSO) problems
  - San Antonio, Houston, Chicago, New York, Philadelphia, Phoenix, Portland, Seattle, Tucson
- Roughly half of communities reviewed have credits/incentives:
  - Development Incentives (e.g. density bonus, landscaping, IC)
  - Grants / Rebates / Installation financing
  - Award & Recognition Programs
  - Drainage Fee Discounts:
    - Impervious Cover Reduction
    - Fixed or Percent Dollar Discount
    - Sometimes only to commercial customers
- Inspection/enforcement on private property is irregular and maintenance is responsibility of property owner

Incentives for On-site Stormwater Control Measures

Technical Considerations:

- Flood, Water Quality, Erosion
  - Peak flow vs Volume
- Regional vs small-scale distributed SCMs (or combination)

Regulatory Considerations:

- Meet vs Exceed Regulatory requirements
- Green Stormwater Infrastructure Working Group / CodeNEXT recommendations
- Incentives available to all land uses
- Potential Code Change for FY17, if fee discount proposed

Incentives for On-site Stormwater Control Measures

Operational and Administrative Considerations:

- Maintenance / Inspection / Enforcement
- Administration and billing – determining eligibility and record-keeping / tracking

Cost-of-Service Considerations:

- Distributed GSI will not reduce capital costs of drainage systems unless part of an area-wide program (e.g., Brentwood)
- Distributed GSI not likely to affect drainage system O&M costs
- Added cost-of-service for inspection, enforcement, administration
- Cost of discounts passed on to non-participating rate payers
- Basis of fee discount (if not supported by reduced cost-of-service)

Incentives for On-site Stormwater Control Measures

Options

Educate on reducing Impervious Cover (basis for new rate structure):

- Driveway strips
- Permeable pavers
- Pervious decks/patios

Grants/Rebates:

- Participate in AWU's existing Rainwater Harvesting and WaterWise Rainscape rebate programs
- Expand cost-sharing for detention/WQ retrofits where benefits can be quantified and valued

Fee Discounts (if to be considered further):

- Only provide fee discounts for SCMs that exceed regulatory requirements
- Apply as a part of an area-wide solution (e.g., Brentwood)
- Limit participation (cap on value of fee reductions)
- Establish SCM size/capacity threshold


Questions?
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