



Meeting Objective

Identify existing challenges and potential improvements in Austin's code & criteria for structural flood & water quality controls.*

* Commonly known as stormwater "ponds." But not all have a pond form.

Meeting Agenda

- **Introductions** [5 min.]
- **Staff Presentation** [40 min.]
 - Structural Control History/Background
 - Lessons Learned/Potential Topics of Discussion
- **Small-Group Breakout Sessions** [60 min.]
 - Potential opportunities & challenges
- **Full Group Wrap-Up** [15 min.]
 - Summary of opportunities & challenges

Topics of Discussion

- 1. Today's Meeting**
 - General feedback: current code & criteria
- 2. February 17 Meeting**
 - Targeted Staff & Stakeholder topics: e.g., maintenance & regulatory challenges
- 3. March 2 Meeting**
 - Green Infrastructure

What are structural controls?

Devices designed to temporarily store or treat stormwater runoff in order to mitigate flooding, erosion, and/or pollution by:

- **Detention**
- **Filtration**
- **Retention**
- **Infiltration**

Watershed Protection Strategies for Land Development

- 1. Site Selection** [Where in Austin]
 - Watershed classifications
 - Drinking Water Protection vs. Desired Development Zones
- 2. Development Intensity** [How Much on Site]
 - Impervious Cover Limits; Zoning; Utility Service Extensions
- 3. Development Placement** [Where on Site]
 - Stream & CEF Setbacks*; Steep Slope Limits; Cut & Fill Limits; Tree Protections; Floodplain Rules
- 4. Hydrologic & Hydraulic Rate/Volume** [Runoff]
 - Structural Flood & Water Quality Controls

* CEF = Critical Environmental Feature (e.g., springs, wetlands, karst recharge features)

Development Impacts

- Addition of impervious cover (IC), compaction of soils, & greater drainage efficiency results in:
 - **Increase in runoff rates**
 - **Increase in runoff volumes**
 - **Increase in frequency of runoff events**
 - **Increase in pollutant exports**
 - **Decrease in baseflow volumes & aquifer recharge**

Impervious Cover and Runoff

Avg. Annual Conversion of Total Rainfall to Runoff

Imperv. Cover Pct.	Avg. Annual Runoff	Ratio to Undeveloped (5% IC)	Typical Land Use
5%	4%	1.0	Open/Preserve
20%	14%	3.3	Low-Density SFR
40%	29%	7.1	Single-Family Res.
60%	48%	11.4	Multifamily Res.
80%	69%	16.4	Commercial/Office

Source: Derived from Barrett et al., CRWR, 1998. | SFR = Single-Family Residential

Evolution of Structural Controls

- **No controls/Wild West**
- **Focus on flooding**
- **Focus on sediment in water**
- **Focus on additional pollutants**
 - especially nutrients & toxics
- **Focus on runoff volume**
- **Focus on stream channel stability**
- **Focus on mimicking hydrologic cycle**

Major Structural Stormwater Control Milestones

- **Flood Detention & Criteria (1974, 1977)**
- **Early WQ Controls (1980)**
- **Comprehensive Watershed Ordinance (1986)**
- **Environmental Criteria Manual (1988)**
- **Non-Degradation Controls (1991)**
- **Half-Inch-Plus WQ Control Sizing (1993)**
- **Innovative Water Quality Controls (2007)**

Types of Structural Controls

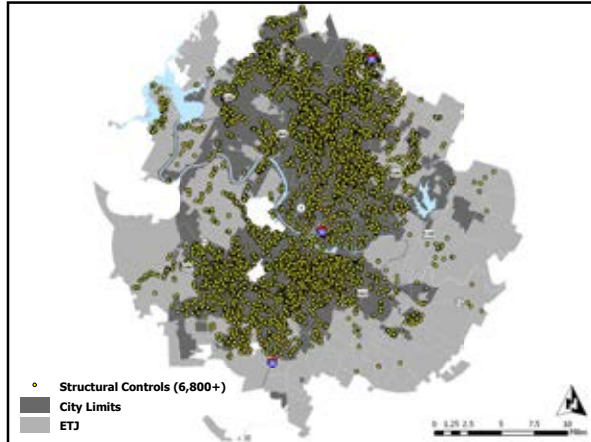
• Flood Detention	54%
• Sedim./Sand Filtration	38%
• Retention/Irrigation	3%
• Wet Ponds	3%
• Vegetative Filter Strips	1%
• New Innovative Controls	<1%

Pond Database project: over 6,800 Controls

Types of Structural Controls

• Flood Detention	3,714
• Sedim./Sand Filtration	2,575
• Retention/Irrigation	209
• Wet Ponds	184
• Vegetative Filter Strips	94
• New Innovative Controls	57

Pond Database project: 6,800+ Controls



COA Requirements for Stormwater Controls

- **Flood Detention**
 - Maintain post-development peak rates of discharge at existing pre-development peak rates for 2, 10, 25, and 100-year storm events
 - Design in accordance with Drainage Criteria Manual
- **Water Quality**
 - Capture, isolate, and treat half-inch-plus volume (or SOS volume in Barton Springs Zone)
 - Treatment level of sedimentation/filtration (or non-degradation in Barton Springs Zone)
 - Design in accordance with Environ. Criteria Manual

Pond Inspection & Maintenance

- **Single-family residential ponds accepted for maintenance by the City of Austin (~840)**
 - Inspected at least annually by COA
- **Commercial and multifamily ponds are maintained by the owner (~6,000)**
 - Inspected at least every 3 years by COA

Flood Detention

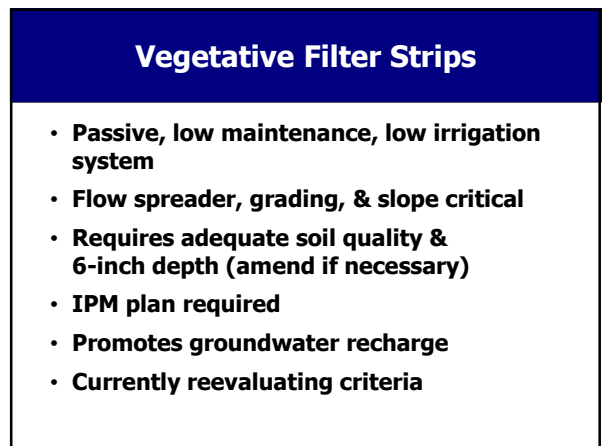
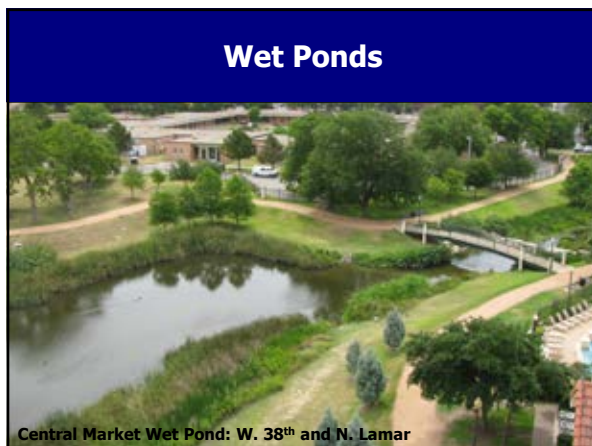
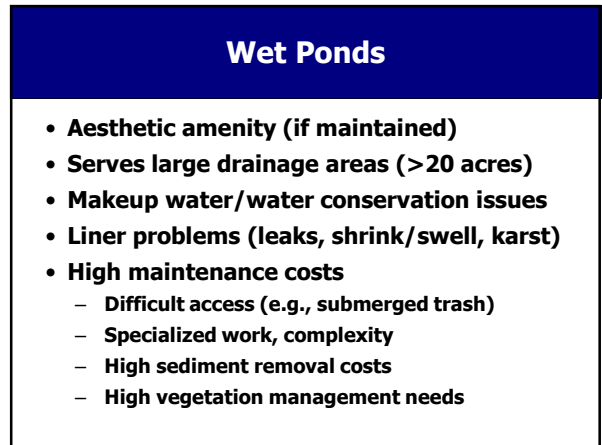
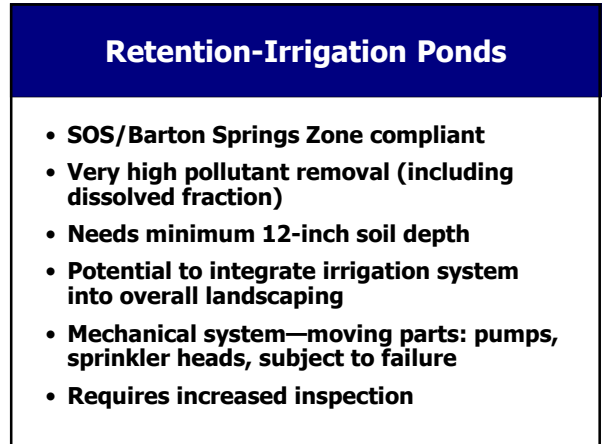
- Control flows from very large storms
- Standard criteria focus on rate, not volume
- Usually not designed for water quality
 - Can help with proper design
 - Wet ponds can “stack” detention on top of water quality storage
- Empty within 24 hours

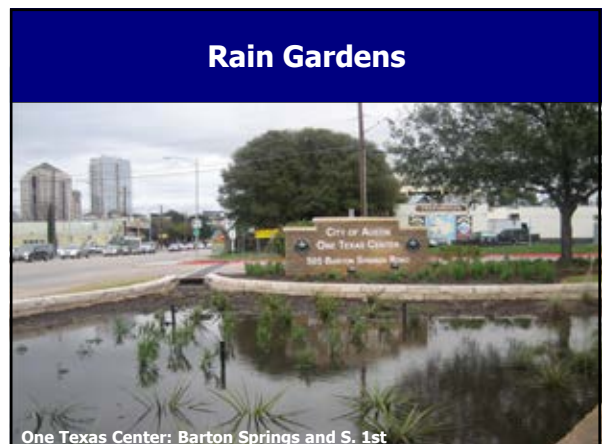
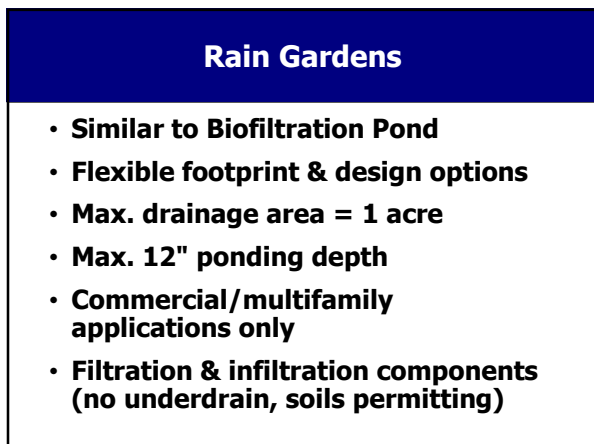
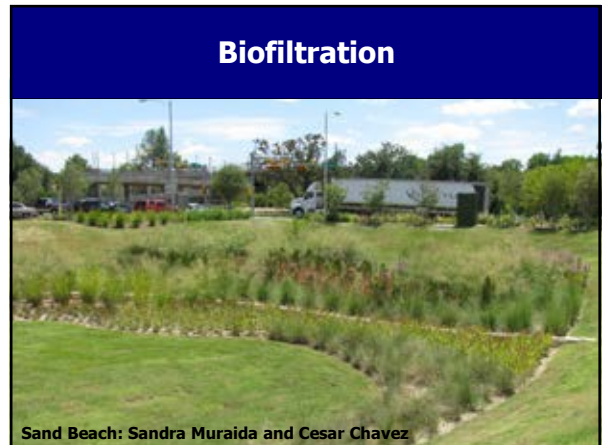
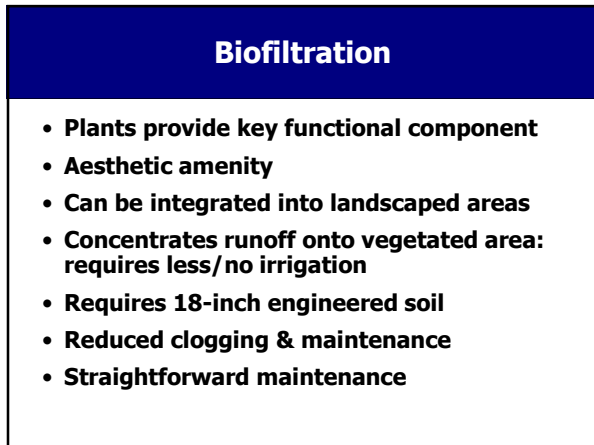
Flood Detention



Sediment/Filtration Ponds

- Principal structural WQ control in Austin
- Excellent sediment control
- Modest dissolved pollutant control
- Straightforward maintenance
- Erosion control/channel stability benefit
- Usually not aesthetic, relegated to unseen corner of site





Rainwater Harvesting

- Stores water in tanks for irrigation
- Partial WQ credit possible
- 2 Design Options: retention-irrigation (pumps, valves, etc.) vs. vegetative filter strip (gravity)
- Max. 72-hour drawdown time (for WQ storage)
- May discharge to indoor or outdoor use
- May be upsized to provide water conservation function
- Requires active maintenance by owner

Rainwater Harvesting



Porous Pavement

- Pedestrian applications only
- Must meet design criteria:
 - Min. pavement thickness
 - Gravel/rock media specs
 - No off-site run-on to pavement.
- WQ credit since counts as pervious
- Cooler surface temperatures
- Better for plants, trees

Porous Pavement



Lessons Learned (1 of 3)

1. Nonstructural controls are essential to complement structural controls
2. Significant progress to date in developing & implementing structural controls
 - Need to continue to encourage innovation, creativity
3. Non-degradation controls are especially challenging & are not yet perfected
4. Potential for failure (due to poor design, lack of maintenance, etc.) is Achilles heel

Lessons Learned (2 of 3)

5. Site-specific factors (incl. operator ability) critical in selecting control type.
6. Proper maintenance is critical.
7. Integrate controls into site as positive, visible features (amenity, landscaping, water source, educational element).
 - Out-of-sight-out-of-mind is NOT a good strategy
 - Trying to replicate benefits of systems (soil, plant & animal communities) built over generations of time

Lessons Learned (3 of 3)

8. Design to include & benefit from natural systems (gravity, soils, plants).
9. Minimize complexity & active operation elements.
10. Sharing of best practice insights can advance the quality and usefulness of future controls.

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Breakout Groups

- What is/is not working currently with Austin's structural stormwater control requirements?
- Assume a blank slate: no existing code & criteria. What stormwater control strategy would you use to achieve watershed goals?
 - Erosion control
 - Flood mitigation
 - Water quality protection
 - Sustainable maintenance

Adoption Schedule

Stakeholder Meetings	Sep 2011 – April 2012 <small>(Meetings approx. every two weeks)</small>
1. Creek Protection	Sep 9, 23, Oct 7
2. Floodplain Protection	Oct 21, Nov 18, Dec 2
3. Development Patterns & Greenways	Dec 16, Jan 6, 20
4. Improved Stormwater Controls	Feb 3, 17, Mar 2
5. Mitigation Options (DDZ) + Rule Simplification & Flexibility	Mar/Apr
6. Draft Ordinance	Apr/Jun
Boards & Commissions	July – September 2012
City Council	October/November 2012
Travis County Commissioner's Court	Fall/Winter 2012/13

Contact Information

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www.austintexas.gov/page/watershed-protection-ordinance-0