Stormwater Management

Excerpts from February 13, 2013 presentation
to the Hinesburg Planning Commission

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Pros/Cons of Stormwater Treatment Practices

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Better Site Design

Wet Extended
Detention Ponds
2010/05/04

PROS

- Generally simple design (initially less design cost form most consultants)
- Can be designed to meet WQ, CPv, Qp10, Qp100
- Adaptable to most development projects

CONS

- Practice does not meet Groundwater Recharge and does not encourage infiltration and/or runoff reduction
- Impounded water is likely to warm and may result in additional temperature impacts to cold water habitat downstream.
- Costly construction
- Aesthetic impacts depending on location, landscaping, maintenance
- End of pipe treatment
- Takes up a lot of space

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 80
TP = 52

2010/05/04

Stormwater Wetlands

PROS

- More aesthetically pleasing than basic wet pond.
- Provides habitat for wildlife
- Can be designed to meet WQ, and in some cases with detention, CPv, Qp10, Qp100
- Adaptable to most development projects
- May be appropriate in areas adjacent to existing wetlands.

CONS

- Practice does not meet Groundwater Recharge and does not encourage infiltration and/or runoff reduction
- Impounded water is likely to warm and may result in additional temperature impacts to cold water habitat downstream, depending on design.
- Costly construction
- End of pipe treatment
- Takes up a significant amount of space
- Requires more design time by consultant driving up design cost.

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 72
TP = 48

2010/06/16

2010/06/16

2010/06/16

Infiltration

PROS

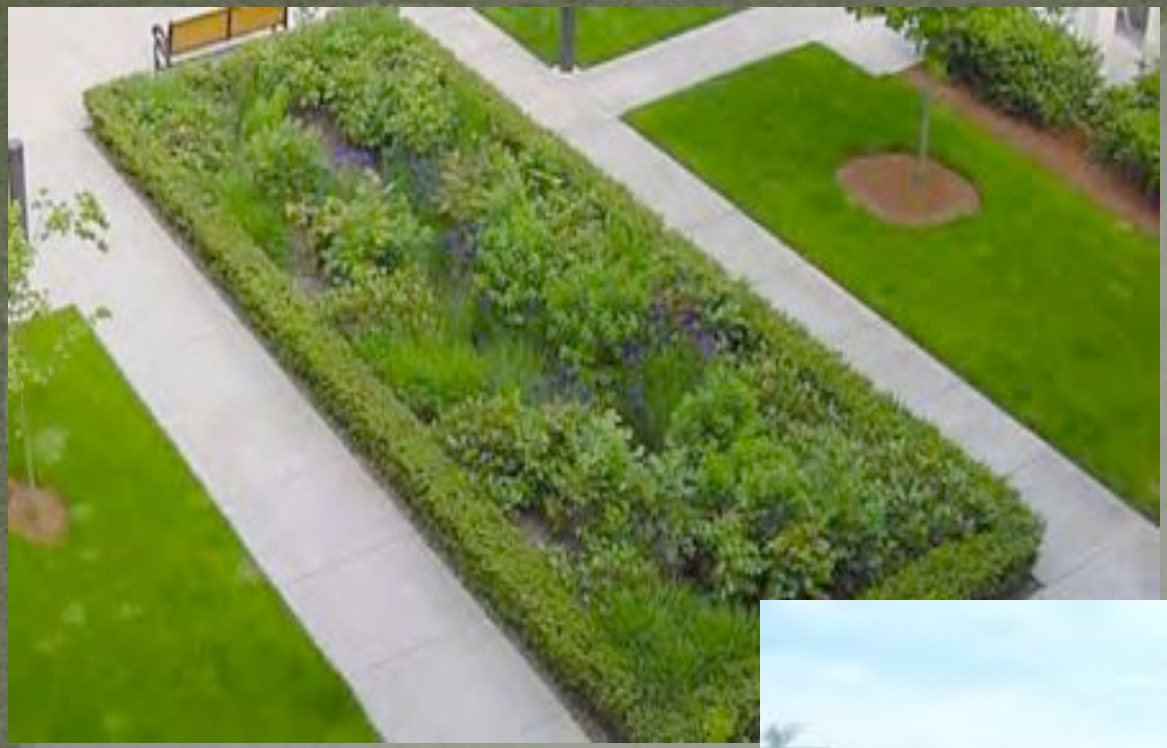
- Standing water for limited period of time, not impounded/no warm water discharge.
- Can be designed to meet WQ and Groundwater Recharge, and in some cases with good infiltration rates and/or overflow, CPv, Qp10, Qp100
- Adaptable to most development projects with infiltrative soils.
- Significantly reduces runoff leaving the site – Runoff Reduction
- Can be designed on surface or underground; basins, trenches, drywells.
- More potential for managing stormwater runoff at the source – LID.

CONS

- Costly construction depending on design
- End of pipe treatment in some cases
- Can take up a significant amount of space if above ground
- Requires more design time by consultant driving up design cost; infiltration tests etc.
- Limited to sites with appropriate soil conditions.
- Not appropriate at "hot spots"

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 89
TP = 65



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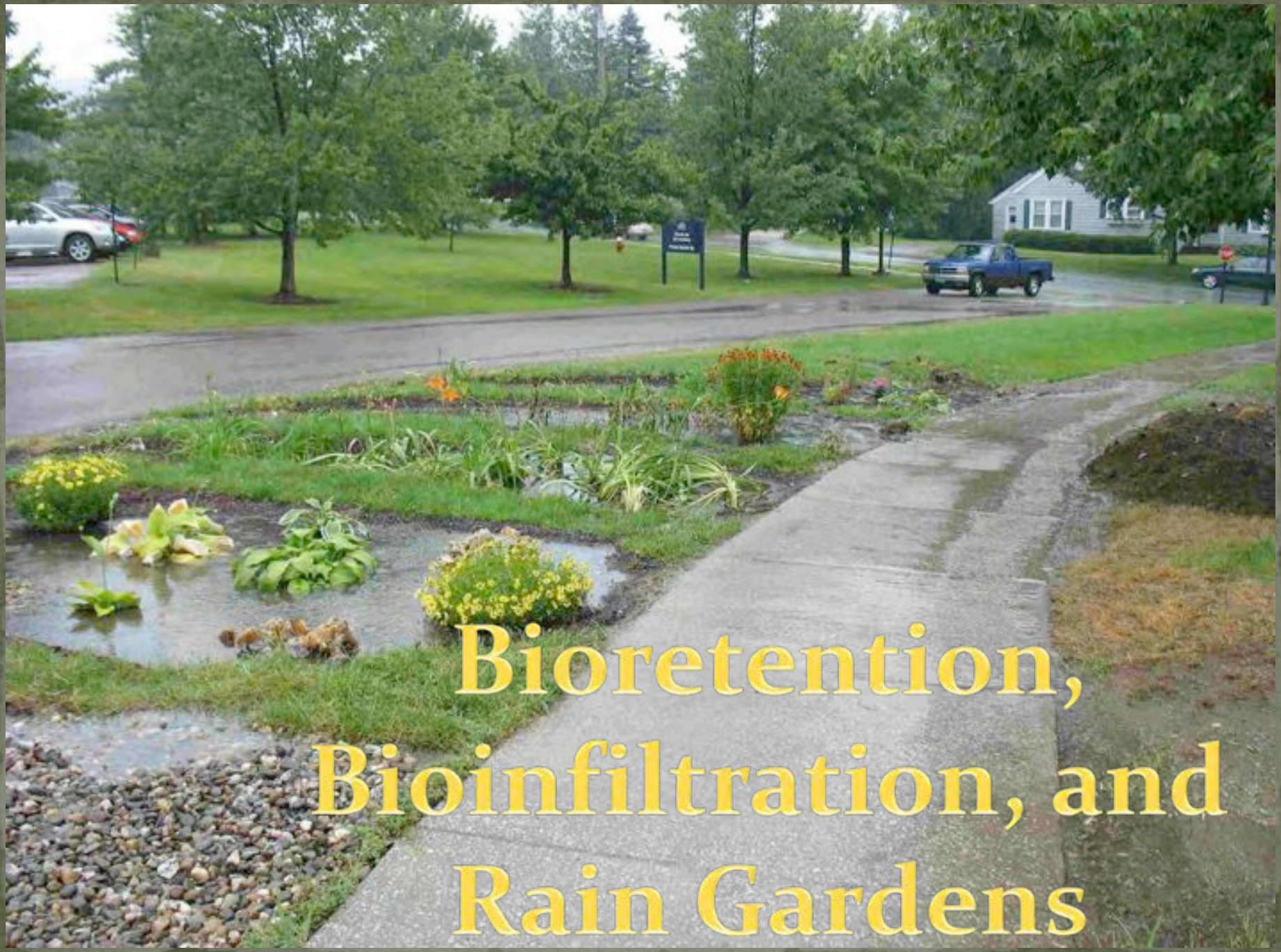
PETE'S REPAIR



Bioretention, Bioinfiltration, and Rain Gardens

PROS

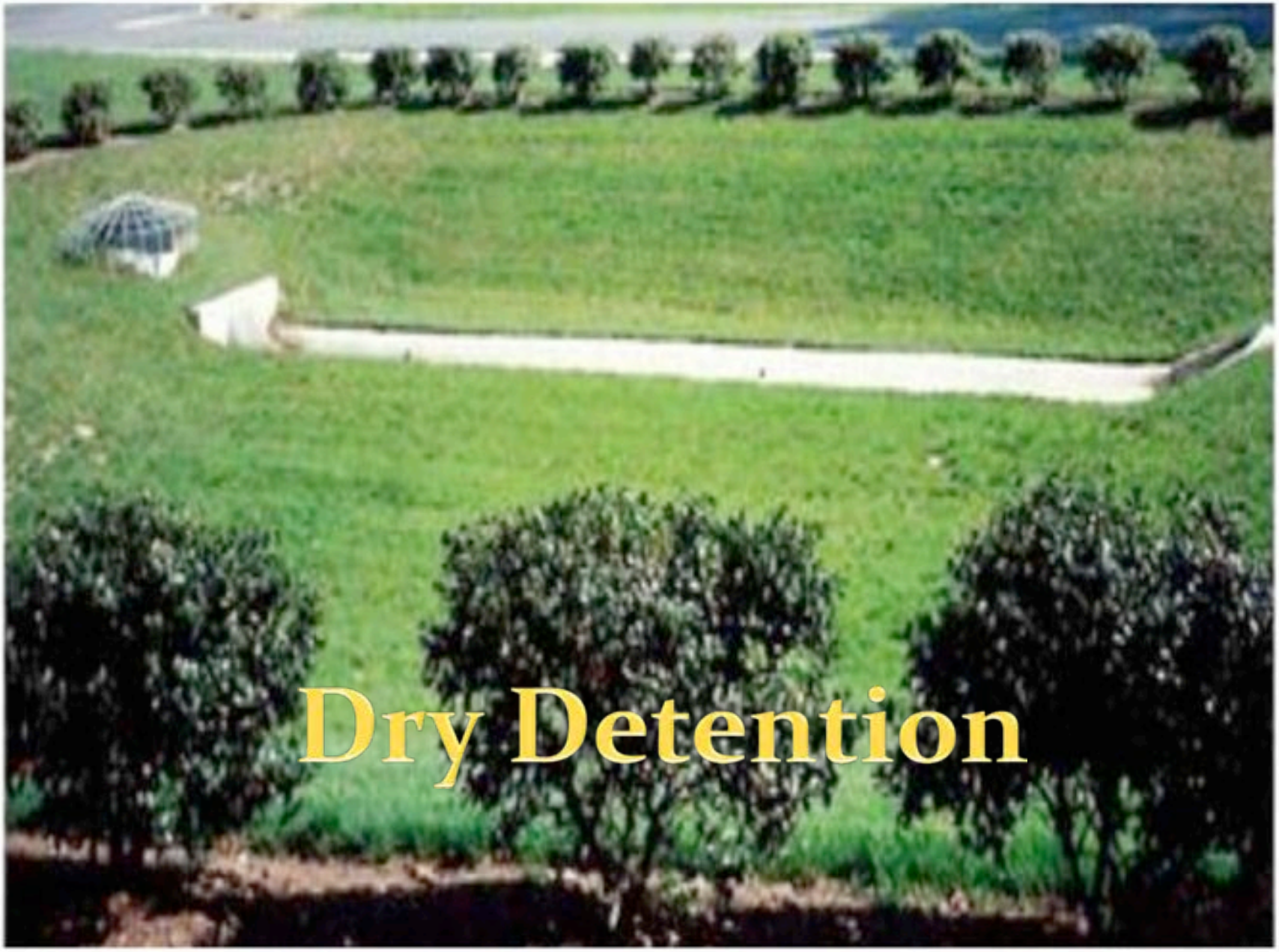
- Standing water for limited period of time, not impounded/no warm water discharge.
- Aesthetically pleasing designs which also encourage maintenance
- Can be designed to meet WQ and in some cases with good infiltration rates and/or overflow, Groundwater Recharge, CPv, Qp10, Qp100
- Adaptable to most development projects with both infiltrative and non-infiltrative soils.
- Significantly reduces runoff leaving the site – Runoff Reduction
- More potential for managing stormwater runoff at the source – LID.

CONS

- More costly construction depending on design
- End of pipe treatment in some cases
- Can take up a significant amount of space if above ground and designed for large drainage area.
- May require more design time initially by unfamiliar consultant driving up design cost; infiltration tests etc.

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 59
TP = 5


Dry Detention

PROS

•Generally simple design, with creative applications
• Standing water for limited period of time, not impounded/no warm water discharge.
• Utilized to provide CPv, Qp10, Qp100
• Adaptable to most development projects with both infiltrative and non-infiltrative soils; underground storage.
• Can manage stormwater for large drainage areas or small drainage areas.
• Can be combined with WQ treatment practices and WQ/Recharge credits for minimizing structural footprints.
• Dry detention areas can often be multi-purpose (i.e. recreational area/open space)

CONS

• End of pipe stormwater management
• Can take up a significant amount of space if above ground and designed for large drainage area.
• Does not provide for WQ or Groundwater Recharge treatment
• Aesthetics

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 49
TP = 20

Filters

PROS

•Standing water for limited period of time, not impounded/no warm water discharge.
•Adaptable to most development projects with both infiltrative and non-infiltrative soils; underground storage.
• Can be combined with underground storage/treatment for minimizing structural footprints.

CONS

• End of pipe stormwater management
• Can take up a significant amount of space if above ground and designed for large drainage area.
• Does not provide for CPv, Qp10, or Qp100
• Aesthetics
• Can be costly

total suspended solids & total phosphorus

Median Removal Efficiency (%)
TSS = 86
TP = 59

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STORMWATER TREATMENT SOLUTIONS
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Open Channels
and Swales

PROS

- Limited standing water, dry structures not impounded/no warm water discharge.
- Adaptable to most development projects with both infiltrative and non-infiltrative soils.
- Can be designed as wet or dry structures and vegetated for aesthetically pleasing results.
- Can be combined with underground storage/treatment or dry detention for minimizing structural footprints.
- Can be designed for infiltration
- Can eliminate the need for "curb/gutter"
- Cost effective

CONS

- Most designs do not provide for CPv, Qp10, or Qp100
- Aesthetics – "ditch"
- Many designs may provide limited treatment

total suspended solids & total phosphorus

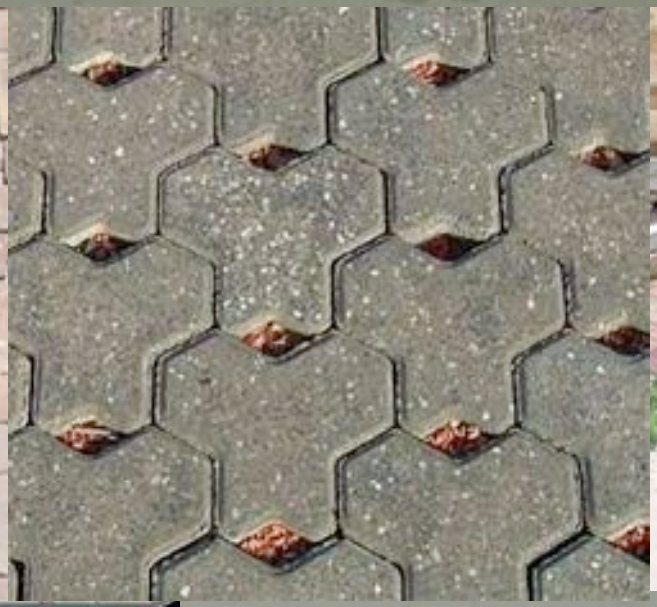
Median Removal Efficiency (%)
TSS = 81
TP = 24

Rainwater Harvesting/Green Roofs/Permeable Surfaces

PROS

- Runoff Reduction, resulting in overall pollutant load reduction.
- Manages stormwater runoff at the source
- Reuse provides additional benefits
- Green roofs may reduce energy costs
- Aesthetics
- Pervious pavers, concrete, asphalt in most cases depending on design, is not state jurisdictional impervious surface – and may not require permit.

CONS

- Most designs do not provide for CPv, Qp10, or Qp100
- Aesthetics
- Many designs may provide limited treatment
- Rain harvesting does not currently meet state WQ or detention standards.
- Often requires a change in human behavior, making it difficult to implement

Rain Barrel