

Focus on Stormwater

Ohio Lake Erie Commission
Best Local Land Use Practices

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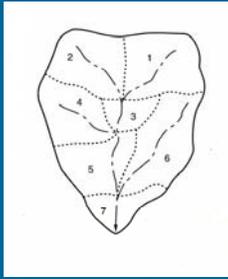
Stormwater Topics

- Water Quality
- Water Quantity
- Stream and Ditch Restoration and Management
- Low Impact Development
- Developed vs. Developing Communities

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The Basics – Concepts: Water Quantity

- Runoff: amount of precipitation and infiltration
- Travel time: slope, flow depth/length, and roughness
- Peak Discharge: Runoff, Travel Time, Watershed Size, Development Location, Timing of Rainfall, Storage Effect
- Time of Concentration: Time from farthest reach to output point



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Water Quantity ctd.

- Impervious Surface: surface with minimal infiltration



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Water Quantity ctd.

- Bank Storage: storage and release within stream or ditch bank
- Connection to floodplain is best
- Flat subwatersheds are more sensitive to stormwater increases than those with terrain



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Recommended Practices: Water Quantity

Increase Infiltration, Reduce Speed, and Increase Storage (increase travel time) (mimic pre-development conditions):

- Reduce impervious surface, increase perviousness
- Improve storage and release on-site
- Increase roughness
- Decentralize/reduce concentration of flow
- Take advantage of bank storage
- Connect stream to floodplain

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The Basics – Concepts: Water Quality

- Sediments: construction runoff, soil disturbance, stream erosion
- Nutrients: fertilizers, septic/animal wastes
- Bacteria: sewer overflows, septic/animal wastes
- Debris: dumping, sewer overflows
- Hazardous wastes: poor storage, poor separation, inappropriate use of materials



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Water Quality ctd.

- BOD – Biological Oxygen Demand
- Nutrients in water ABSORB oxygen as they break down
- Aquatic life suffers



Recommended Practices: Water Quality

- Minimize soil disturbance
- Minimize water quantity increases in streams and ditches
- Filter and settle out sediments and contaminants
- Vegetate stream and ditch corridors
- Improve storage and separation of materials
- Maintain septic systems
- Prevent illicit discharges and dumping

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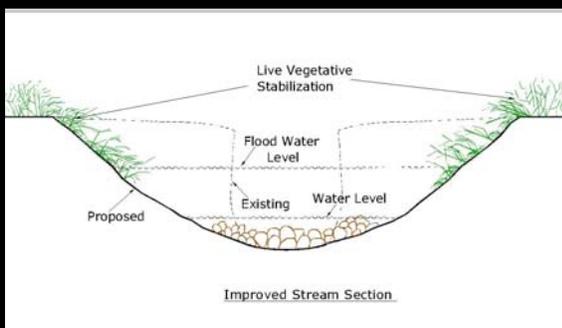
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Stream/Floodplain Restoration

- Habitat: vegetation, temperature, hydrology, water quality
- Stream hydrology: meanders, pools, riffles, floodplain
- Engineering: stream section, relationship to flow patterns of drainage area, floodplain

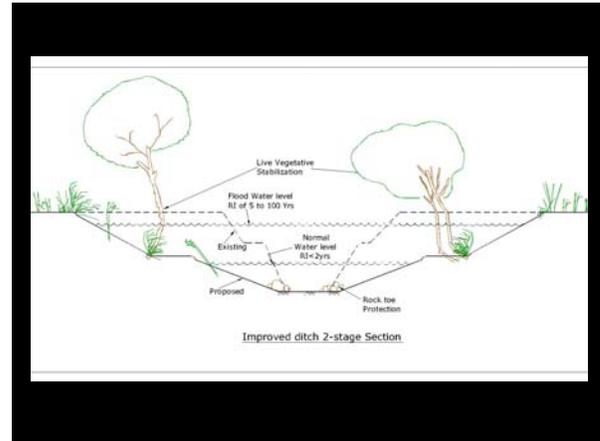
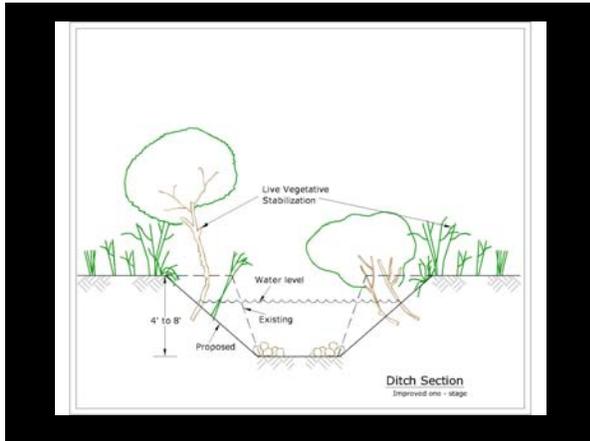


Oxbow River and Stream Restoration



Agricultural Ditch Enhancement

- Approximate stream morphology: 2-stage or hybrid section
- Minimize “maintenance”
- Vegetate



Stormwater Management BMPs

- Require Stormwater Pollution Prevention Plans on development sites
- Require developers to control the volume, rate, and quality of stormwater coming off sites
- Require good quality installation, and use of low-maintenance facilities
- Decentralize stormwater collection and conveyance
- Minimize stream crossings
- Retain and restore natural stream function
- Enhance function of existing agricultural ditches

Roles in Storm Water Regulation

- Ohio EPA: Water quality: If disturbing > 1 acre, EPA requires SWPPP
- Local government must address water quantity issues
- SWCDs and watershed groups may be involved in erosion/sediment control, storm water management plan reviews

Low Impact Development (LID)

- Rain Garden
- Vegetated filter strip

LID

- Bioretention filters/strips
- Catch basin insert

LID

- Disconnect downspouts
- Eliminate curb/gutter



LID

- Pervious pavements



LID

- Natural drainage basins (wet ponds with natural edge)



LID

- Green roofs



Examples of LID Projects in Ohio

- Ladue Trails, Geauga County: Bio-retention
- Nottingham Woods, Geauga Co.: rain gardens
- Sunset Ridge, Geauga: filter strip
- Best Buy, Lorain: sand filter
- Dollar General Store, Lorain: dry swales
- Deer Valley, Lucas County: bio-retention

Advice for Developed Communities

- Update and implement codes for low impact site design options (conservation development, compact development, riparian setbacks)
- Update and implement codes for innovative stormwater techniques (LID, restore stream section, two-stage ditch section, bioretention, grass swales, rain gardens, etc)
- Require provisions for management/maintenance
- Improve control of illicit discharges

Advice for Developing Communities

- Plan and map priority conservation areas, priority development areas, riparian and floodplain protection corridors
- Implement codes for innovative site design
- Implement codes for innovative stormwater management
- Require management provisions

Incentives for Implementation

- Involve all decision-making bodies at the beginning of application process so all parameters are known
- Provide lot flexibility to accommodate wetlands and riparian setbacks (conservation development)
- Set clear priorities and make them available (comprehensive plan)
- Avoid requirements for duplication: reviews, engineering, practices
- Be consistent with nearby communities whenever possible

Incentives ctd.



- Do analysis ahead of time so mapped riparian corridors are reasonably accurate
- Be consistent, efficient, and timely in review processes
- Ensure that staff are trained to administer best practices codes

Watershed Groups Involved in Pilot Programs

- Chagrin River Watershed Partners www.crwj.org
- Maumee RAP and TMACOG (Swan Creek) www.maumeeRAP.org, www.TMACOG.org
- Medina County SWCD (Upper West Branch Rocky River) www.medinacswcd.org
- Cuyahoga River RAP (Cuyahoga River) www.cuyahogariverRAP.org

Questions?