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## Memorandum

*To: Chris Riddle, Ohio Lake Erie Commission*

*From: John Aldrich, Project Manager*

*Date: May, 27, 2010*

*Subject: Final Report -- Best Local Land Use Practice Case Studies*

This Memorandum represents the final report for Lake Erie Protection Fund Award – CS 01-09, titled “Best Local Land Use Practices Case Studies”. Included in this Report by reference are various documents and powerpoint presentations, delivered previously, that describe the case studies and were used at technical workshops conducted May 4<sup>th</sup> and 5<sup>th</sup> and General Workshops held on May 11<sup>th</sup> and 12<sup>th</sup>, 2010. This Memorandum provides a brief description of the project, how the case studies evolved, the case study materials, their use as part of training workshops, and recommendations for future activities (i.e., continued training, material revisions, additional topics, legislative issues, etc.).

### Project Objective

The objective of the Best Local Land Use Case Studies developed for the Ohio Lake Erie Commission is to *illustrate a “triple bottom line” (i.e., financial, social, and environmental) decision-making process for developing site plans for multi-objective land development projects*. These case studies are assembled in a format that can be distributed as well as used in case study workshops with developers, local governments, and their design and/or review professionals. Major objectives of this project include:

- Resolving real and perceived barriers to acceptance of best practices by developers, local governments, and buyers / tenants
- Illustrating how properly-applied best practices can reduce costs and enhance property values
- Providing adequate detail to support cost-effective implementation
- Being repeatable for on-going education
- Addressing post-construction regulatory compliance



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## **Project Summary**

The project involved three primary tasks:

- Engage stakeholders via a stakeholder committee to identify major opportunities and barriers to implement best local land use practices,
- Select case study sites and develop case study materials that illustrate how to implement best practices in a manner that capitalizes on site opportunities and minimizes real and perceived barriers,
- Reconvene the stakeholder committee to provide feedback on case study materials seeking to address these issues as part of the workshops,
- Conduct two workshops where development and community practitioners were provided guidance through the case studies on best local land use practice implementation.

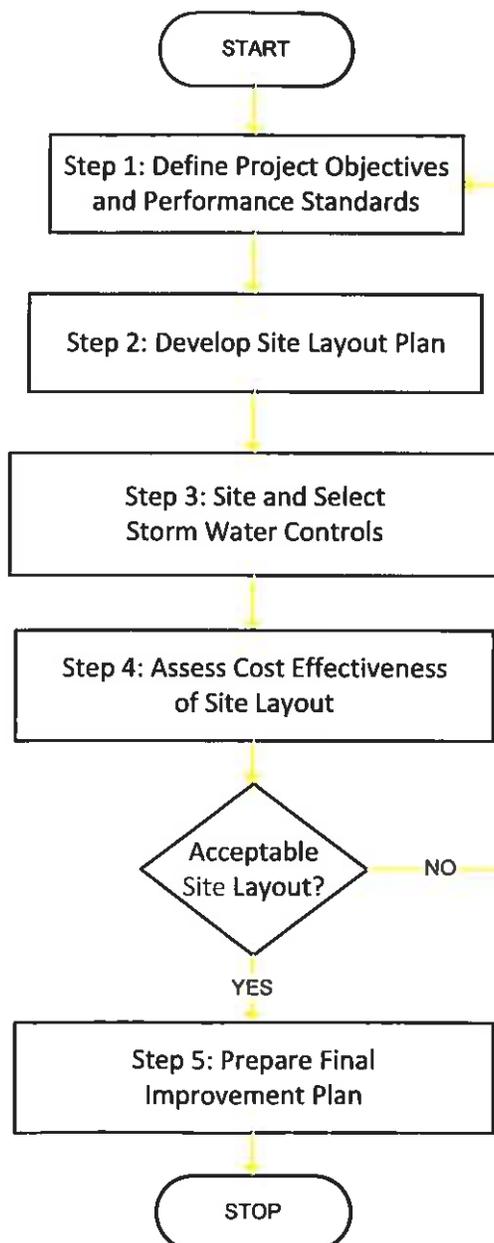
The following sections summarize major accomplishments under each of these tasks. Previous deliverables provided to the Commission provide additional detail.

### **Stakeholder Committee Meetings**

The stakeholder committee convened to advise that the project team was comprised of watershed groups, developers, development engineers, and local government. The majority of the first half-day meeting, held in Vermilion, Ohio, consisted of a review of each best local land use practice and discussion about the real or perceived barriers that limit their use within the Ohio Lake Erie basins, along with identification of those practices that present the best opportunity to be incorporated into development projects to address water quality and hydrologic impacts to local streams and Lake Erie. The following major directives were received from the stakeholder committee at this time:

- Define procedures and protocol that allow best practices to be considered throughout the site layout and design process
- Focus case studies on typical residential / commercial development sites / practices
- Address “buyer” expectations of “good” development
- Reveal competitive advantages in alternative site layouts
- Illustrate commonly used control measures:

- Identify mechanisms for streamlining regulatory approvals:
  - Relocating / rebuilding / integrating streams and wetlands into development
  - Improving degraded streams / wetlands



Subsequent to this meeting, the project team learned that Ohio EPA, in coordination with Ohio DNR, is working toward modified water quality certification rules under Section 401 of the Clean Water Act. These rules seek to provide streamlined rules and expedited permit processing for projects seeking to restore hydrologic function to degraded headwater streams, including better integration of stream channels to their floodplains and incorporation of best practices within riparian areas that promote infiltration and attenuation of surface runoff and/or stream flow. Proposed methodologies for delineating stream setbacks and defining hydrologic function to protect or restore were incorporated into the case studies.

### Case Study Development

Based upon stakeholder feedback and project team experience, the case studies were structured to provide both a *site planning and design process* for identifying favorable opportunities to incorporate best practices within development projects, as well as illustrations of best practices that sited typical site development patterns and practices. First, several guiding principles were developed for the site planning and design process:

- Establish project objectives to guide site design
- Integrate existing water and terrestrial resources into site design
- Fix “dysfunctional” streams



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- Focus on controlling the flow – pollution control will follow
  - “Start at the Source” to manage runoff
  - Control all runoff per site conditions: infiltrate & evapotranspirate & detain
- Use “Triple bottom line” approach to identify multi-objective benefits: community & environment & financial

The accompanying figure shows the recommended site planning and design process. Numerous supporting flow charts and worksheets were prepared to support this process. These materials are incorporated within the training workbooks prepared for this project and delivered separately.

Two case studies were developed to help illustrate the proposed decision-making process: first, a typical medium-density single-family residential development and second, a high-density retail commercial development. Both developments are typical of development within the Lake Erie watershed. Case studies focus on existing developments that were built without use of best local land use practices, and used to illustrate how such best practices could be integrated into these sites while meeting other development objectives.

Best practices illustrated through these case studies were drawn from those recommended by OLEC’s balanced growth initiative and recommended for inclusion by a focus group of development industry representatives that convened on October 28, 2009:

- |  |  |
|--|--|
| ■ Imperviousness control (e.g., reduce, disconnect, permeable materials) | ■ Filters / underdrains (bioretention, soil amendments, sand, other) |
| ■ Enhanced inlets / manholes   | ■ Basins (dry, wet, wetland, vaults)                                 |
| ■ Vegetated Filter Strips and Swales                                     | ■ Stream, floodplain and wetland setbacks and enhancements           |
| ■ Infiltration practices (e.g., “rain gardens”, trenches, dry wells)     |  |

### Case Study Workshops

The case study workshops informed developers, local governments, and their design and/or review professionals about the best local land use practices and the site planning decision-making process, as illustrated through the case studies. Materials are adaptable for use with design professionals and other stakeholders in land development. The agenda included as Attachment 1, oriented toward a design professional audience, was used to conduct training workshops on May 4<sup>th</sup> (Cleveland) and 5<sup>th</sup> (Toledo), 2010. Training workbooks prepared for



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these workshops were previously delivered to the Commission and are incorporated into this Final Report. Feedback during the first training workshop led to minor modifications in the approach and delivery of the case study calculations. During the first workshop, participants were instructed to work as teams to fill out the various worksheets, some of which involved mathematical calculations that certain participants had difficulty with. To better engage all participants, the project team walked participants through completed versions of the worksheets during the second workshop, facilitating discussion and freeing time to allow participants to independently develop conceptual site layout drawings that define primary “conservation” and “development” areas for the case study site. These hand-drawn site layouts were collected for use during future meetings and workshops about best local land use practices.

### **Identified Opportunities and Barriers to Best Practices**

One major objective of this project involved identifying major barriers to implementing best practices and seeking acceptance of opportunities to implement these practices cost-effectively. Attachment 2 lists opportunities and barriers identified through discussion groups during the training workshops. Some of the most frequently reported barriers to best practices implementation include:

- Regulatory – conflicting processes, delays, inconsistent review, overlapping regulations, requirement of duplication
- Perception of impact on site developability
- Public perception of density, water on site
- Late integration of BMPs into design process
- Lack of education on BMPs and their effectiveness
- Perception of increased cost
- Perception of increased maintenance

The most significant topics identified by stakeholders that should be explored to facilitate best practice implementation are:

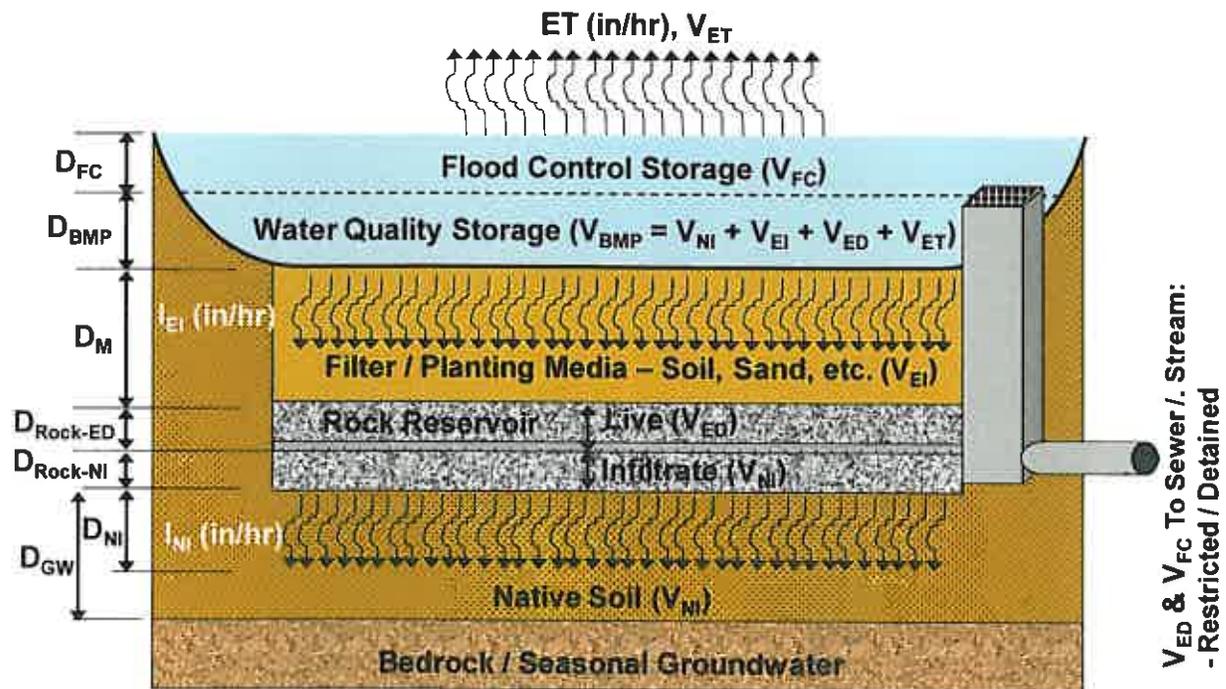


Figure 1. Schematic representation of an integrated storm water control facility incorporating infiltration, evapotranspiration, and detention

- An improved design process that incorporates water resource considerations into early site planning, design calculations for integrated storm water control facilities (Figure 1) focused on accounting for water quantities, and a triple bottom line evaluation of community, environmental, and financial considerations of a development project
- Exploration of regulatory and other mechanisms to facilitate work within a stream, mutually benefiting both the hydrology of the stream and the feasibility of the development
- Mythbusters research summarizing documented evidence about the effectiveness and/or limited impacts of best practices
- Cost analyses - comparisons



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## Description of Case Study and Training Materials

The case studies developed under this project provide tools that facilitate best practice implementation that can be used to illustrate how to address real and perceived barriers to their use. The case studies include the following materials:

- An overview stating the objectives of best local land use practices and how to use the case studies and supporting material.
- Three versions of the development site plan for each site: predevelopment, existing development, existing development with best local land use practices, accompanied by a triple bottom line comparison of each development practice.
- A documented, step-by-step decision-making process for site planning, supported by flow charts, work sheets, assessment forms, and cost-estimating tools, with annotated examples of its application to the two case study sites.
- “Fact sheets” for the best local land use practices relevant to these case studies, providing selection criteria (i.e., opportunities, barriers), sizing criteria, maintenance requirements, and typical costs, supported by photographs, design drawings, costs, and other pertinent information about previously-installed best practices within or near the Lake Erie basin.
- Summary of pertinent state and national regulations, along with typical local regulations, relevant to the use of best practices for land development.
- A “mythbusters” fact sheet about current development and local land use practices that present real and/or perceived barriers to the use of “best” practices.

## Next Steps

The Best Local Land Use Practices Case Studies project summarized in this Memorandum provides a focal point for resolving barriers to implementing development practices that mutually achieve community, environmental, and financial objectives of developers, local jurisdictions, and ultimate property owners. Discussions among these interests that began during stakeholder meetings and training workshops reveal a strong desire to work together to remove barriers to achieve desired best practices. The following measures/activities are recommended to continue the dialog initiated during this project:

- *Track National Trends – Changes are Coming!* USEPA recently announced its intent to develop new regulations that increase the number of jurisdictions covered by storm water permits, require additional regulation of storm water at the local level, and define national



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performance standards that address both the hydrologic and pollutant impacts of storm water to receiving water bodies. At the same time, ongoing research into best practices design is providing new insights into technologies that merge flow and pollution control processes into an integrated system able to address hydrologic and pollutant impacts, as well as other research oriented toward gaining a better understanding of methods for protecting and restoring streams and riparian areas. The best practices introduced in this project provide a platform for Ohioans to proactively address these national trends in a manner that defines performance standards and regulatory responses appropriate for climatic, hydrologic, and economic conditions in Ohio.

- ***Support Proposed 401 Certification Revisions – Address “Dysfunctional” Streams.*** The best practices case studies introduced methods under development by Ohio DNR to quantify hydrologic functions of streams and support local and site-specific stream protection and restoration initiatives. Stakeholders engaged during this project expressed a strong willingness to employ best practices for stream protection / restoration if accompanied by clear, straightforward, and expedited regulatory approvals. The project team suggests that this dialog be integrated with the ongoing rulemaking in Ohio on this topic, achieving regulations that both promote development and address stream impairment.
- ***Resolve Barriers and Inconsistencies with Statewide Regulations and Guidance.*** Ohio EPA’s existing construction general permit, while incorporating a performance standard that is generally consistent with the best practices examined in this project, includes several prescriptive design criteria that inhibit innovation among local designers in developing storm water controls that optimize storm water control processes and seek to incorporate hydrologic controls. Such barriers have been passed to local jurisdictions subject to Ohio EPA storm water permits, which require the local jurisdictions to implement these same performance standards and design criteria into local regulations. At the same time, Ohio EPA intends to incorporate enhanced pollutant and hydrologic performance standards into emerging watershed specific construction general permits responding to TMDL recommendations. Ohio EPA and Ohio DNR are encouraged to work together with the regulated community to interpret these rules in a manner that promotes the technological innovation imperative to defining cost-effective ways to meet these hydrologic performance standards, particularly within areas of the State where soils with relatively low infiltration rates are predominant. Design methods that support development of technologies that incorporate an appropriate combination of infiltration, evapotranspiration, and detention, similar to those described in the best local land use practice case studies, should be developed while regulations are under development and



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incorporated into Statewide guidance manuals (i.e., ODNR's Rainwater and Land Development Manual) as permits are issued and regulations are promulgated.

- ***Resolve Barriers and Inconsistencies with Local Zoning, Code, Land Use Policies.*** Stakeholders and workshop participants clearly identified local zoning code and land use policies, along with planning commissions, zoning boards, and others responsible for their enforcement, as significant barriers to best practice implementation. Many local communities are also subject to Ohio EPA permits that require them to develop regulations requiring use of best practices for development projects. Model regulations (similar to those developed by the Commission), pragmatic examples of alternative zoning / land use practices (proven to spur economic development and achieve acceptance by homebuyers in similar Ohio communities), and outreach to communities using materials developed by this project, are recommended for overcoming these barriers.
- ***Seek Statewide Coordination.*** The Commission is encouraged to provide leadership in addressing the initiatives recommended in this section. Partners able to assist with this effort, in addition to the staff of agencies represented on the Commission, include professional associations (e.g., the Ohio Storm Water Association, the County Engineers Association of Ohio), development trade groups (e.g., homebuilders association), and prominent watershed groups and/or local jurisdictions that have already implemented similar regulations.

cc: Kirby Date  
Mark McCabe



## Attachment 1

### Agenda

#### Best Local Land Use Practices Workshop for Design Professionals

- 8:00 – 8:30 Registration / Discussion Group Ice Breaker
- 8:30 – 9:00 Introductions / Objectives
- Overview of Ohio Balanced Growth Program
  - Purpose of Case Studies and Workshop
  - Introduction to Best Local Land Use Practices
- 9:00 – 10:00 Major Considerations Affecting Development Decisions
- Developer’s Perspective
  - Local Government Perspective
  - Commonly-Accepted Development Practice “Mythbusters”
  - Discussion Group Topic #1: “Opportunities and Barriers to Best Practices”
- 10:00—10:15 Break
- 10:15—10:25 “Triple Bottom Line” Site Planning Process
- Introduction to Process / Tools
  - Introduction to Case Study Sites
- 10:25 – 11:15 Step 1: Defining Project Objectives and Performance Standards
- Social (e.g., density, traffic, utilities, “quality of life”)
  - Environmental/Water Resource (e.g., pollution, erosion, flooding, habitat)
  - Financial (e.g., Life Cycle Costs, Sales Prospective)
  - Discussion Group Topic #2: “Selecting and Weighing Project Objectives”
- 11:15 – 12:00 Step 2: Developing a Site Layout Plan
- Assessing Existing Site Conditions (e.g., terrain / drainage, soils, land use, land cover, water resources)
  - Key Considerations for Conservation and Development Areas
  - Imperviousness controls
  - Discussion Group Topic #3: “Site Layout Best Practices”
- 12:00 – 12:30 Lunch
- 12:30 – 2:30 Step 3: Siting and Sizing Storm Water Controls
- Identify and Characterize Available Sites and their catchments
  - Delineate Intra-catchment drainage systems
  - Sizing Storm Water Controls for Varying Site Conditions
  - Delineate Inter-catchment drainage systems
  - Discussion Group Topic #4: “Storm Water Control Siting and Sizing”
- 2:30 – 2:45 Break
- 2:45 – 3:45 Step 4: Developing a “Triple Bottom Line” Business Case
- Financial
  - Community
  - Environmental (Water Resource)
  - Discussion Group Topic #5: “Business Case Evaluation of Best Practices”
- 3:45 – 4:45 Wrap Up
- Discussion Group Reports
  - Summary of Conclusions
- 4:45 Adjourn



## Attachment 2.

### Opportunities and Barriers to Implementing Best Local Land Use Practices

Opportunities	Barriers
<ul style="list-style-type: none"> <li>• Educate public, clients on practices</li> <li>• Restore habitat</li> <li>• Cost savings – Green infrastructure to reduce infrastructure costs</li> <li>• Meet EPA MS4 requirements</li> <li>• Natural area buffer between development &amp; agriculture</li> <li>• Conservation Development is an amenity for a development</li> <li>• Provides recreation area in a development</li> <li>• Pervious pavement &amp; reduction in parking spaces</li> <li>• Parking lot islands – infiltration vs. raised sites</li> <li>• Stream/wetland setback ordinances</li> <li>• Better site design</li> <li>• Long-term costs could be lower (municipal and owner)</li> <li>• Time is money</li> <li>• Development from an aesthetic viewpoint – attractive to buyers</li> <li>• Changes in perspective</li> <li>• Zoning opportunities – incentives</li> <li>• Stormwater credits</li> <li>• Showcase excellent projects (builder/community PR)</li> <li>• Improve state planning regulations</li> <li>• Preserve good farmland</li> <li>• Education of multiple stakeholder groups</li> <li>• Streamlining approvals</li> <li>• Cost savings</li> <li>• Reduces permit appeal process</li> <li>• Looks better</li> <li>• Marketing “green”</li> <li>• Woodland areas preserved – \$ values</li> <li>• Education opportunities from community to homeowners</li> <li>• Athletic fields, etc. double as stormwater areas</li> <li>• Reuse/recycle urban environment</li> <li>• Fast track for new practices – incentivize them.</li> <li>• Demos/ pilot projects – grant funding, PR</li> <li>• Stormwater utility fees</li> <li>• Integration of practices in development (streams)</li> <li>• Opportunities for Townships to make decisions/ influence practices</li> <li>• Lifecycle costs</li> <li>• Additional choices for developers</li> </ul>	<ul style="list-style-type: none"> <li>• No zoning in some areas</li> <li>• Multiple jurisdictions</li> <li>• Regional cooperation</li> <li>• Inadequate or nonexistent zoning</li> <li>• Soils (clay)</li> <li>• Nonexistent outlet for stormwater</li> <li>• No incentives</li> <li>• Maintenance in general</li> <li>• Local government development requirements limit the ability of the engineer to innovate</li> <li>• Reduce density concerns – profit impacts</li> <li>• Incentives to do LID</li> <li>• Education of contractor building design</li> <li>• Concerns of cost</li> <li>• Municipal requirements for water quantity control</li> <li>• Development – maximizing lots/development area</li> <li>• Maintenance concerns</li> <li>• Standing water concerns</li> <li>• New product – not clear understanding of it/ widespread use and experience</li> <li>• More time spent on end product/ plan review</li> <li>• Code requirements prohibitive</li> <li>• Clear design path/ process</li> <li>• Permits</li> <li>• No cookbook recipe</li> <li>• Lack of regulatory incentive</li> <li>• Review liability for community – (i.e., if it fails)</li> <li>• Lower property values (perception, i.e., higher density)</li> <li>• Low perceived value of waterways (i.e., it’s just a ditch)</li> <li>• Townships’ lack of understanding of the opportunities</li> <li>• Uncertainty of federal regulations (future changes)</li> <li>• Installation costs are higher</li> <li>• Current codes (i.e., high parking space requirements)</li> <li>• Government regulations</li> </ul>



## Attachment 2 (Continued).

### Opportunities and Barriers to Implementing Best Local Land Use Practices

Opportunities	Barriers
<ul style="list-style-type: none"> <li>• Incentivize practices and decisions (i.e., proper location, lower parking space #s)</li> <li>• Creative zoning/ government regulations</li> <li>• Utilize greenspace (multi-use)</li> <li>• Eliminate source problems</li> <li>• Innovative design (financial opportunities)</li> <li>• Urban retrofitting</li> <li>• Utilize site specific conditions</li> <li>• Reduce size of ponds and other infrastructure</li> <li>• Creates amenities</li> <li>• Parking lot design (too many spaces, islands are opportunities for BMPs, ordinances)</li> <li>• Open space (create)</li> <li>• Funding</li> <li>• Conservation development</li> <li>• Regional basin</li> <li>• Publically owned properties</li> <li>• Education</li> <li>• Preservation of open space</li> <li>• Incorporate site assessment up front</li> <li>• Use good design</li> <li>• Design incentives</li> <li>• Comprehensive watershed planning</li> <li>• Riparian setbacks</li> <li>• Conservation zoning</li> <li>• Prioritize stormwater development process</li> <li>• Regional stormwater facility</li> <li>• More attractive to buyers</li> <li>• Change of zoning requirements to allow LID</li> <li>• Adjacent lands could work together for economy of scale</li> <li>• Reduction/ incorporation into required stormwater detention</li> <li>• Pr/sales for developer</li> <li>• Developer – partner with agencies</li> <li>• Grant funding/ tax incentives</li> <li>• Reduce downstream pollution</li> <li>• Aid flood control</li> <li>• Help reduce flood zones for insurance</li> </ul>	<ul style="list-style-type: none"> <li>• Owner/developer perception/ lack of understanding</li> <li>• Zoning</li> <li>• Priority of stormwater management in planning process (low)</li> <li>• Addressing redevelopment or existing conditions</li> <li>• Education (public, public officials)</li> <li>• Conventional zoning (lack of flexibility)</li> <li>• Long-term maintenances</li> <li>• Local limiting conditions (i.e., soils)</li> <li>• Local vs. regional</li> <li>• Number of lots (due to setbacks)</li> <li>• Easements</li> <li>• Homeowners association (maintain BMPs)</li> <li>• Local government – code changes, administrative level problems</li> <li>• Dense development</li> <li>• Education</li> <li>• Not publically popular topic</li> <li>• Poor construction of good designs</li> <li>• Costs unknown</li> <li>• Better design guidance needed</li> <li>• EPA approval of credits</li> <li>• Fear of regulatory interference</li> <li>• Existing regulations do not allow flexibility</li> <li>• Additional design costs due to revisions required by government agencies</li> <li>• Costs more than traditional design</li> <li>• Development could be directed to areas without LID requirements</li> <li>• Benefits are uncertain</li> <li>• Clay soils – lack of infiltration</li> <li>• Loss of lots to conservation</li> <li>• Homeowner association – increased costs</li> <li>• Perception of “unkempt” lawn</li> <li>• Increased design costs</li> <li>• Lack of incentive to try new approaches</li> <li>• Lack of design criteria</li> <li>• Lack of SW credit from OEPA</li> </ul>