Assessing Low Impact Developments Using a Benefit-Cost Approach

Ed MacMullan
Senior Economist
ECOnorthwest

Adopting LID Stormwater Controls

Technically Feasible?
Regulatory Approved?
Economic Evaluation
LID Adoption

The Economic Evaluation

Stormwater-management options:
Pipe Alternative vs. LID Alternative

Most economic evaluations of LIDs emphasize costs
A typical economic evaluation:
installation cost vs. installation cost
for the pipe option for the LID option

There’s costs, and then there’s costs
A better—but not best—economic evaluation:
installation cost + operation & maintenance cost vs. installation cost + operation & maintenance cost
for the pipe option for the LID option

What about economic benefits?
A cost comparison assumes away economic benefits.
With LIDs, economic benefits matter

- Reduced flooding costs
- Reduced CSO control costs
- Reduced filtration costs
- Reduced cooling costs
- Increased amenity values

We can better promote LID adoption by looking beyond costs

- Installation costs give an incomplete economic evaluation.
- Adding in operations and maintenance costs is an improvement.
- But, if economic benefits matter, use a different approach…

The benefit-cost approach

A benefit-cost evaluation:

installation cost + O & M cost + economic benefits vs. installation cost + O & M cost + economic benefits
total benefits + costs for the pipe option total benefits + costs for the LID option

A more complete picture of the full range of costs

- LIDs can help reduce system-wide operations and maintenance costs.
- LIDs can help extend the useful life of pipe infrastructure as populations increase.

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Example
One study estimated that adopting LID practices throughout a watershed would reduce downstream flooding, resulting in $54 - $343 in benefits per developed acre. (Johnston et al., 2004)

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Example
Portland’s downspout disconnection program eliminates an estimated 1.2 billion gallons of stormwater runoff each year from the city’s combined sewer system. (City of Portland, 2007)
Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
**Reduced filtration costs**
Reduced cooling costs
Increased amenity values

Example

Instead of using sand filters and storm drain structures to treat stormwater along a seawall on the Anacostia River, a bioretention filter strip was installed, saving $250,000. (Weinstein, 2002)

Example

Reduced pavement area and natural vegetation in the Village Homes LID development in Davis, CA help reduce home energy bills by 33-50% compared to surrounding neighborhoods. (PMM, 2006)

Example

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Example

Our preliminary analysis of properties on streets redeveloped by Seattle’s Natural Drainage Systems Program indicate these modifications can add 6% to the value of the property.

Example

LIDs can benefit developers

**Increased number of buildable lots**
Grassy swales, no curbs or gutters
Green streets increase property values
Reduced permitting fees

Example

By using LID techniques, a developer eliminated the need for stormwater retention ponds, which made room for six additional home sites. (WBDG, 2007)

Example

Impacts On Developers

Increased number of buildable lots
**Grassy swales, no curbs or gutters**
Green streets increase property values
Reduced permitting fees

Example

Replacing curbs, gutters, and storm sewers with roadside swales in one residential subdivision saved the developer $70,000 per mile, or $800 per residence. (Dreher and Price, 1997)

Example

Impacts On Developers

Increased number of buildable lots
**Grassy swales, no curbs or gutters**
**Green streets increase property values**
Reduced permitting fees

Example

A developer that used LID techniques in a residential subdivision sold lots for $3,000 more than lots in competing areas that did not use LID. (NRDC, 1999)
Impacts On Developers

Increased number of buildable lots
Grassy swales, no curbs or gutters
Green streets increase property values
Reduced permitting fees

Example

In Dane County, WI, permit fees for development are calculated based on the amount of impervious area in a site, providing an incentive to use LID.
(Dane County, 2007)

A Los Angeles County Example

A USC study estimated that collecting and treating stormwater flows would cost $44 billion.

A USC-UCLA study estimated that alternative stormwater controls, including LID, would be cheaper:
» Costs estimated at $2.8 to $7.4 billion
» Benefits estimated at $5.6 to $18 billion

Economic Evaluation of LIDs

» Cost comparisons not always the best way to promote LID adoption.
» A benefit-cost approach can give stakeholders and decision-makers more reasons to choose LIDs.

Ed MacMullan
Senior Economist, ECONorthwest
541-222-6060
macmullan@portland.econw.com
www.econw.com