Incentivizing LID for Developers:

A Social Marketing Report

Department of Commerce | Puget Sound Regional Council | Cascadia Consulting Group | Hardwick Research | Herrera | BERK Strategy • Analysis • Communications

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Overview

BACKGROUND

Low Impact Development (LID) is a green infrastructure approach to stormwater management that integrates on-site natural features with distributed stormwater best management practices (BMPs). These LID BMPs provide infiltration, filtration, and storage of stormwater by mimicking natural hydrologic conditions. The **Washington State Department of Ecology (Ecology) requires LID BMPs** to be evaluated—and implemented if technically feasible—for new development and redevelopment in the majority of the cities and counties in Western Washington. Developers implement LID solutions throughout Washington State to address a variety of water quality and quantity issues related to stormwater runoff.

Washington's Puget Sound region is one of America's fastest growing areas. New development is planned to focus primarily in urban growth areas due to geographic constraints and Growth Management Act policies. While this growth brings many benefits to the region, it can also strain the environment, for example, by increasing the risk of polluted stormwater runoff that threatens local waterways. To protect the health of our streams, rivers, lakes, and the Sound, Washington must focus on building green cities that can more effectively manage stormwater runoff, while increasing density and livability for our growing population. Addressing stormwater impacts from only new development and redevelopment sites will not adequately address stormwater discharges from existing developed sites, nor protect areas providing ecological services for stormwater management.

While there have been significant contributions to advancing LID throughout the region, there is still much work to be done. Responding to this need, the Washington State Department of Commerce (Commerce) and Puget Sound Regional Council (PSRC) convened a Building Green Cities (BGC) Advisory Committee representing cities, counties, local developers, the environmental community, and state and federal agencies to develop strategies to **incentivize developers to utilize green stormwater infrastructure, thereby going beyond the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit requirements** for LID in urban centers. Commerce held a kickoff meeting on October 24, 2017 and hired Cascadia Consulting Group (Cascadia) in spring 2018.

This project was supported by Grant No. EG170205 awarded by United States Environmental Protection Agency (EPA), through the Washington State Department of Ecology (Ecology). The contents of this document do not necessarily reflect the views or policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

SOCIAL MARKETING RESEARCH PROJECT

Cascadia Consulting Group (Cascadia) was hired to help Commerce, PSRC, and the BGC Advisory Committee lead a robust social marketing research effort and develop guidance for local governments to incentivize developers to go "**above and beyond**" municipal stormwater permit requirements in urban centers. Above and beyond in this context refers to any of the following situations:

1. Using LID when a project is otherwise **under the size thresholds**.
2. Exploring options around **BMPs considered to be infeasible**, based on the technical infeasibility criteria included in the Stormwater Management Manual for Western Washington.
3. Using **optional BMPs** (e.g., vegetated roofs, rainwater harvesting, minimal excavation foundations).
4. Using bioretention or permeable pavement in a drainage basin that is **flow control exempt** (e.g., Puget Sound).[1]

The Cascadia team used a social marketing approach to:

- Conduct and produce a **literature review** on the effectiveness of, and barriers to, low impact development (LID) in urban centers.
- Conduct **social marketing research** through **interviews with Puget Sound municipal staff** to learn what they believe developers know about LID and use their feedback to inform creation of the developer interview guide.
- Conduct **social marketing research** through **interviews with Puget Sound developers** on barriers, motivators, and benefits to incorporating LID solutions in urban centers.
- Identify areas for **additional research** needed to fill gaps that emerged from the literature review and social marketing research.

Cascadia completed these research objectives with the help of three subconsultants. Hardwick Research conducted the developer interviews. Berk Consulting and Herrera Environmental Consultants (Herrera) provided technical oversight. The following social marketing report highlights the results of this research and will form the basis of a local government guidance document that provides incentives for developers and others to go above and beyond the municipal stormwater requirements for LID in new development and redevelopment projects in urban centers.

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[1] The municipal stormwater permit states that "*projects qualifying as flow control exempt … do not have to achieve the LID performance standard, nor consider bioretention, rain gardens, permeable pavement, and full dispersion if using List #1 or List #2. However, those projects must implement [post-construction soil quality and depth] BMP T5.13; [downspout full infiltration] BMPs T5.10A, [downspout dispersion] B, or [perforated stub-out connections] C; and [concentrated flow dispersion] BMP T5.11 or [sheet flow dispersion] T5.12, if feasible*."

LITERATURE REVIEW

In May and June 2018, Cascadia conducted a literature review regarding barriers, motivators, and opportunities to increase developer use of LID BMPs, following the process outlined below:

1. Reviewed an initial list of materials provided by Commerce.
2. Identified additional source materials during the literature review research and added these sources to the study.
3. Developed a document summary template (included in Appendix A) to capture key information in each source document.
4. Completed a document summary sheet for each of the 15 sources reviewed (included as links found in the bibliography).
5. Aggregated and coded document review data.
6. Summarized key findings on barriers, opportunities, and incentives related to LID adoption across four distinct themes, as well as example incentive programs used in other jurisdictions.

These findings informed the development of recruitment and interview guides for one-on-one interviews with municipal staff and developers to test these hypotheses and uncover additional insights (Appendices B and C). Key findings from the literature review will also be incorporated into the proposed guidance document for local governments for increasing developer adoption of LID.

KEY FINDINGS

We identified four key barriers to using LID solutions through the review of relevant literature:

- **Customer demand.** The lack of public awareness and lack of consumer appreciation for LID aesthetic.
- **Maintenance.** Uncertainty regarding ongoing maintenance causes hesitation.
- **Costs.** Lack of adequate funding sources for LID projects, cumbersome and time-consuming applications, and site-specific design requirements lead to uncertainty regarding costs.
- **Technical knowledge.** Developers need more long-term performance data and support to build expertise (e.g., demonstration projects, technical assistance with site-specific designs, toolkits, and information sharing across jurisdictions).
- **Policy.** Developers prefer LID stormwater codes separate from land use codes. Inconsistent codes and standards across jurisdictions can make it difficult to implement LID.

The literature also points to the strategies and incentives in Figure 1 for overcoming these barriers:

Figure 1. Strategies and incentives for overcoming barriers to using LID solutions.

- Reduced permitting fees
- Materials discounts
- Tax rebates
- Grants
- Public-private partnerships
- Incentivized LID adoption specifically in redevelopment projects

- Expedited or "fast-track" permitting
- Clearly defined guidelines
- Common rating system for LID (similar to LEED)
- Free or low-cost technical assistance
- LID education and outreach

- Increased consumer demand
- Awards and recognition
- Density bonuses
- Zoning variance

Refer to Appendix A for the detailed Literature Review.

SOCIAL MARKETING RESEARCH

The primary research question guiding this social marketing study was:

How can jurisdictions encourage developers to go above and beyond the current stormwater code requirements and install additional LID solutions?

To better understand the barriers and benefits developers face with implementing LID solutions, Hardwick Research conducted a **two-phase interview process** from September to November 2018 with **municipal staff from three local jurisdictions** and with **20 developers**, using the methodology outlined below.

Municipal Staff Interviews

Hardwick Research conducted the first phase of interviews with a representative from each of three municipalities (**secondary research target**), varying in size and geographic range throughout the Puget Sound region. Selected municipalities were **City of Lynnwood**, **City of Seattle**, and **Kitsap County**. Each participant was involved in day-to-day communication with developers, providing guidance on codes and plan review. Interview responses from municipal staff helped the consulting team **refine the developer interview guide**.

Municipal Interview Methodology

The consultant team's primary objectives for interviewing Puget Sound municipal staff were to (1) **learn what municipal staff believe developers know about LID** and (2) **use their feedback to support creation of the developer interview guide**. The consultant team developed the local government discussion guide presented in Appendix B. Interview topics within this guide included:

- Developers' current understanding and usage of LID.
- Current LID regulations and practices.
- Developers' primary barriers to using LID.
- Current incentives, programs, and funding offered to developers.
- Motivators and new incentives for using LID.
- Format for guidelines provided to municipalities.

Hardwick Research then conducted one-on-one telephone interviews with each municipality representative, summarized findings, and prepared recommendations for the developer interview guide.

Municipal Interview Findings

The following findings summarize the perceptions and perspectives of the three municipal staff we interviewed and do not represent feedback from developers.

Developers' current understanding and usage of LID

The municipal staff interviewed believed that in general, **developers are knowledgeable about LID and understand the stormwater code requirements** as they have had to adapt to the changing local stormwater code requirements. Developers rely on an educated design team (e.g., engineers and architects) to provide stormwater design recommendations. Interviewees from the City of Lynnwood and Kitsap County felt developers were considering LID early enough in the design process, but the City of Seattle interviewee did not.

Interviewed staff estimated that **10 to 20 percent of developers use optional or additional LID solutions** in their projects. In the City of Seattle, there are some market-driven incentives to go above and beyond the code requirements (e.g., people and tenants want green buildings), but the City is pushing hard for it as well via restrictive stormwater code requirements. In the City of Lynnwood, the geology results in the infeasibility of LID BMPs that rely on infiltration (e.g., bioretention, permeable pavement).

Current LID practices

Municipal staff interviewed from both Kitsap County and the City of Seattle noted their developers are required to **follow a prescribed list of LID BMPs**. Developers are required to start with the LID BMPs at the top of the list, and if they cannot incorporate a BMP, they must provide proof that it is not feasible before proceeding down the list. Although interviewed staff reported that they receive documentation of infeasibility, these claims are not tracked.

Developers' primary barriers to using LID

Municipal staff interviewed said that the primary barriers to using LID in their jurisdictions were:

- **City of Lynnwood:** geology.
- **City of Seattle:** cost and aesthetics.
- **Kitsap County:** cost, maintenance requirements, and return on investment.

Motivators and incentives for using LID

Municipal interviewees were **unaware of incentives offered to increase use of LID solutions** beyond what is required in the code. When asked for examples of incentives used in other regions of the United States, none came to mind. Interviewees offered new ideas for incentives, including:

- Reduce annual stormwater drainage fees.
- Provide education or create a design guide with products and examples of how to make LID design features more attractive.
- Showcase buildings that have incorporated LID BMPs well.
- Provide case studies showing the cost breakdown with and without LID.

Guidelines provided to municipalities

Interviewed staff did not indicate a strong preference regarding the dissemination method of the guidelines, but respondents did report they would prefer a **brochure or video to highlight key points**, especially if documentation is extensive.

The consulting team used the results of interviews with municipal staff above to develop the interview guide for the second phase of interviews with developers.

Developer Interviews

After completing preliminary interviews with municipal staff, Hardwick Research then conducted the second phase of interviews with 20 developers, representing a wide range of firms in the Puget Sound region (**primary research target**).

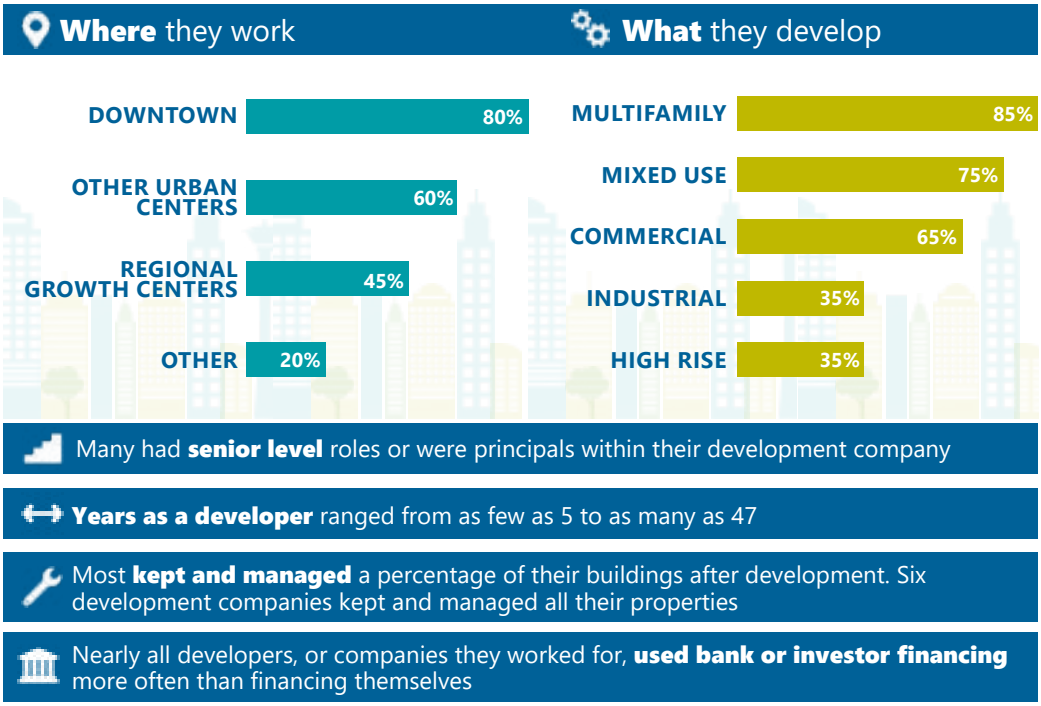
Developer Interview Methodology

The consultant team's primary objectives for interviewing Puget Sound developers were to (1) **understand how they implement LID solutions in new development projects** and (2) **learn what inspires them to go "above and beyond" stormwater code requirements**. The consultant team developed the Recruitment Guide provided in Appendix C. As outlined in this guide, the team identified developers ranging in terms of:

- Geographic diversity.
- Property types (commercial, mixed-use, multifamily, industrial).
- Properties built to "keep and manage" versus "develop and sell."
- Financing mechanism (self-financed versus bank or investor financing).
- Housing type, including some developers from housing authorities and non-profits.

The Recruitment Guide was also used to ensure that interviewed developers (1) made the final decisions on which LID BMPs are installed, (2) had worked as a developer for at least five years, and (3) developed buildings in urban or suburban areas. Using these parameters, the consultant team recruited **20 developers** representing a wide range of firms in the Puget Sound region, as shown in Figures 2 and 3. The project team offered developers who agreed to be interviewed a $200 incentive for participation. Some developers declined the incentive or chose to donate it to a charity of their choice.

Figure 2. Profile of interviewed developers



The consultant team then developed the interview guide provided in Appendix B, which included the following topics:

- Decision-making process for managing stormwater.
- Current LID regulations and practices.
- Barriers to using LID.
- LID incentives, programs, and funding.
- Motivators for using LID.

The team also developed the **LID handout** provided in Appendix D to aid the discussion and educate some of the developers on available BMPs. Hardwick Research **pre-tested the interview guide with three developers** and determined no significant changes to the interview guide were needed. Hardwick Research then conducted one-on-one telephone interviews with 20 developers and summarized interview findings

Figure 3. Locations of properties developed by interviewees.

Developer Interview Findings

The following findings summarize Hardwick Research's interviews with 20 Puget Sound region developers. Findings are presented in two main categories: (1) likes and dislikes by LID BMP category and (2) critical barriers and effective motivators.

Likes and Dislikes

Developers reviewed the LID handout and shared their experiences with each category of BMP, summarized below. In general, developers **prefer** LID solutions that (1) **increase site value**, (2) **create minimal disruption**, and (3) are **easy to install**. For these reasons, the most commonly used LID solutions are amended soils, rain gardens or bioretention, trees, and vegetated roofs in urban areas (Table 1).

Developers generally prefer to **avoid** installing features that (1) are **expensive**, (2) add **complexity** to a project, or (3) require **costly or complex maintenance**. Consequently, the least popular LID solutions are dispersion, permeable pavement, rainwater harvesting or using grey water, and minimal excavation foundations (Table 1).

Figure 4. Factors developers weigh when selecting LID BMPs.

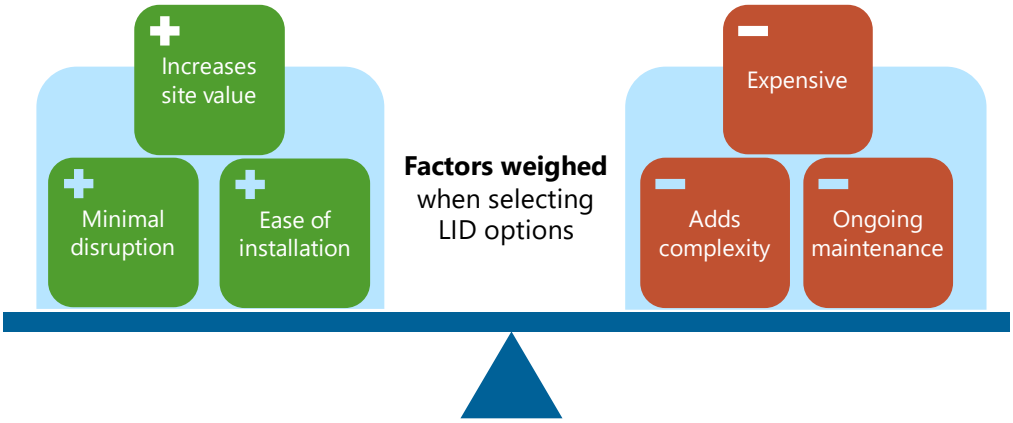


Table 1: Developer likes and dislikes by BMP.

Amended soil	+ Low-cost + Effective + Easy to implement	+ Standard practice for new landscape designs + Can be worked into most site landscapes	− Soil can get compacted and no longer function
Rain gardens / bioretention	+ Attractive architectural or landscape feature + Vaults or planters useful when not enough room for other practices		− Requires more land than detention vaults, which increases costs
New and retained trees	+ Adds value to property + Provides green space + Attractive feature	+ Already required by most jurisdictions (unrelated to stormwater management).	− Expensive to plant new trees
Vegetated roofs	+ Adds value to property + LEED points + Provides green space	+ Commonly used for urban offices and residential buildings + Attractive feature	− Extra engineering costs to accommodate the weight of the vegetation and water − Requires ongoing maintenance
Dispersion	+ Can incorporate into visible decorative feature		− Does not always work well − Often not applicable in larger developments
Permeable pavement	+ A good solution to meet requirements + Works better for sidewalks than roads, driveways, or parking lots		− Ongoing maintenance; does not wear well and difficult to keep clean − Not familiar with good quality products or experienced contractors for installation − Uncertain or poor long-term performance − Unattractive appearance
Rainwater harvesting and grey water	+ Can be marketed as a "green feature."		− Rarely used due to three months without rain in summer − Expensive to implement (requires dual piped water system) − Current technology does not produce a return on investment − Tanks can be unattractive − Complex installation
Minimal excavation foundation	+ Good solution for smaller buildings		− Not appropriate for larger commercial or multifamily developments

Additional research

The consultant team conducted additional research around the concerns with the least popular BMPs among developers. While Table 1 summarizes the perceptions and experiences of the developers interviewed, the findings below reflect information from literature, trade journals, case studies, guidance manuals, and other available resources. This research provides additional strategies and guidance for consideration as developers evaluate the feasibility of these BMPs.

- **Dispersion**: Although urban development space constraints typically prevent effective concentrated flow dispersion of driveway runoff, methods like sheet flow dispersion are still feasible. Sheet flow dispersion can be used for any runoff-generating surface that is graded to avoid concentrating flows [1].
- **Permeable pavement**: Performance issues often stem from improper design, construction, and maintenance. Permeable pavement should be used on sites with adequate infiltration and installed by certified and experienced contractors. It may not be feasible in areas with heavy traffic or where routine, heavy applications of sand occur in frequent snow zones. Pressure washing followed by vacuum sweeping or use of a regenerative air sweeper once or twice per year can be extremely effective for maintaining infiltration capacity by removing debris and clogs. Restoration of infiltration capacity may require specialized equipment and more intensive corrective maintenance [2, 3, 4].
- **Rainwater harvesting and grey water**: Designing rainwater harvest tanks to serve multiple functions (for example, using tanks as a privacy screen, fence, retaining wall, property wall, or supporting pillar for a covered porch) increases cost-effectiveness and can improve aesthetics [5]. Using a rainwater calculator helps size the system based on rainfall data in your area, roof size, and intended use of the harvested water [6].
- **Minimal excavation foundation**: While minimal excavation foundations are typically only feasible for structures up to three stories high, they can still be integrated successfully into secondary development structures such as elevated paths, foot-bridges, walkways, decks, and porches [7].

Additional research on these topics will be included in the guidebook for local governments.

Critical Barriers and Effective Motivators

Developers are more likely to go above and beyond stormwater code requirements to implement LID solutions that are **affordable**, **feasible**, and **provide a solid return on investment**. Developers explained the specific barriers and motivators to using LID solutions, summarized below.

Affordability. Developers see their role as **protector of the bottom line**, as they are ultimately responsible for each project's budget. Specific considerations include:

- Answering to external investors.
- Self-financing projects.
- Meeting profit-driven investment goals (if developer plans to sell the property).
- Supporting a long-term investment strategy (if developer plans to own the building).
- Keeping projects under a set spending limit (if developing for the housing authority).

Cost was the most commonly cited barrier to using LID solutions. Developers consider the costs beyond the initial installation fees (e.g., additional costs of maintenance) when deciding what solution to use and whether to go above and beyond a jurisdiction's stormwater code requirements. Some developers committed to environmentally friendly solutions mentioned they would like to incorporate more LID solutions, but they cannot justify the cost.

> "I will always gravitate to the lowest cost solution right off the bat. That's because the margin of error in what we do is razor thin."

The interviewed **developers were not aware of any financial incentives**, **programs**, or **funding** regarding LID solutions locally or around the country. Only one developer mentioned receiving a financial incentive (reduction in annual bills) when increasing permeable surface on a project in the City of Bellingham. Although currently lacking, **financial incentives were the most popular** among developers.

Barriers	Motivators
• *Expense*	• *Tax credits (e.g., property tax abatement)* • *Grants or refunds for innovation or "above and beyond"* • *Reduced stormwater utility rates* • *Reduced permit fees*

Feasibility. With the expertise of their consultants, stormwater management is among the first things developers consider when evaluating a project. Like electricity and potable water, **stormwater management is an integral part of the development and permitting process**. Most developers explained that there is a formal process in place for identifying and implementing stormwater solutions.

Determining which stormwater solution to install at a site often depends on:

- Issues specific to **site location** which can limit the feasibility of LID solutions, including soil drainage, surrounding geology and topography, and potential to connect to jurisdiction's existing stormwater drainage system.
- **Building and lot size**, which can determine how much space is available on the property for detention ponds, landscaping, and other features. **Building use** (type of tenant and their needs combined with the amount and type of vehicle traffic) can further limit stormwater management options.

Further, many **developers feel that meeting the current stormwater requirements is sufficient and paths to go above and beyond are limited**. These developers currently meet the jurisdiction's stormwater code requirements with the installation of a detention vault or bioretention system, or by connecting to an existing stormwater drainage system (based on the site). Many developers already amend the soil as well as plant or retain trees as part of the landscaping plan for the site. For these developers, dispersion and minimal excavation foundations don't apply in most cases due to space constraints and foundational requirements, respectively. This leaves developers with vegetated roofs (which are very expensive to install due to the additional structural support needed and required maintenance), permeable pavement (which requires routine maintenance and developers perceive degrades easily), or rainwater harvesting or grey water (which requires space for a tank, requires two separate water pipe systems, and is not functional for three months of the year due to lack of rainwater). Many developers noted they are **unable to choose between options as these site-specific variables essentially make the decision for them**.

> "A lot of it is just feasibility, like what works on the site. A lot of our sites are really tight, so there may only be a certain area where we can potentially infiltrate the site. So if that doesn't work, then we can't. It's really mostly about feasibility."

Nearly all developers have experienced situations where a particular stormwater management solution was deemed infeasible. In such cases, developers are required to provide **evidence of infeasibility** which includes reports from a geotechnical engineer, civil engineer, or other expert. This proof prevents developers from falsely claiming infeasibility, though jurisdictions do not typically push back once the documentation has been provided. Some jurisdictions can be more challenging for developers to work with due to **strict regulations or lack of flexibility** in considering creative LID solutions outside the stormwater code requirements that the developer believes would meet or exceed stormwater management requirements.

> "Sometimes the jurisdiction will have very set ideas about it and you can do nothing but conform to what they tell you to do. Other jurisdictions have a fairly loose idea and rely on you, the developer, and your consultants."

The slow process of permitting and uncertainty regarding whether their preferred options will be approved is another jurisdictional barrier for developers. Developers are interested in **expediting the permitting process** to save money on overall budget; however, they were unsure whether jurisdictions would be able to achieve expedited permit processing for everyone. Developers are also interested in **code variances**, for example, allowing developers to increase density in exchange for incorporating LID solutions when going above and beyond.

> "What would help all of us is if the regulatory process was easier, or more straightforward, or just quicker."

Managing uncertainty is one of the most important aspects of running a development business. Installation of many LID solutions diverts money away from the bottom line, and often inserts an additional layer of complexity and risk to projects. For example, developers avoid LID when they perceive it will:

- Extend or complicate the permitting process.
- Require installing new and unproven technology.
- Require burdensome maintenance.
- Involve sub-optimal (in terms of cost or complexity) installation procedures.

Finally, **developers rely heavily on their civil engineers** and other partners to help determine which stormwater solutions to install. Some also consult with a geotechnical engineer, architect, landscape designer, or LEED consultant. Training these key players (civil engineers, geotechnical engineers, landscape designers, architects) on proven and new LID solutions ensures developers have all options available to them. Developers suggested that forums like the Urban Land Institute (ULI), United States Green Building Council (USGBC), or Northwest EcoBuilding Guild can act as conduits to inform the developer community on the best LID solutions.

Barriers	Motivators
• *Building site limitations*	• *Expedited permitting process*
• *Site or jurisdiction requirements*	• *Code variances*
• *Jurisdictional staff or code inflexibility*	• *Training and resources*
• *Onerous permitting and approval process*	

Solid Return on Investment. The lack of knowledge on how to install some LID solutions properly and the **lack of "proven" (quality and correctly functioning) products** directly affect return on investment and influence whether developers would include LID solutions that go above and beyond. **Long-term costs** increase when lack of experience with a solution leads to mistakes, while maintaining LID solutions like permeable pavement or vegetated roofs requires **advanced expertise**.

Developers would be much more likely to incorporate LID solutions that go above and beyond the current code requirements if some of these risks could be mitigated; however, for some LID solutions such as grey water in toilets and porous asphalt, mitigating these risks requires technology to catch up. **Best practices are still evolving**, and developers are not as aware of proven LID solutions. As such, providing information on LID solutions that are tried and true (with problem-free installation and no or very minimal maintenance issues) is an incentive to developers.

Additionally, developers prefer to spend money on LID solutions that are **visible to tenants and aesthetically pleasing**, such as trees or vegetated roofs. Options like rainwater catchment systems pose barriers on both these fronts as the underground vaults are invisible costs to tenants and the above-ground tanks are unattractive. Some developers were interested in a brochure or booklet on LID solutions and aesthetically pleasing designs.

Many developers are already building **LEED or green-certified buildings**. Especially in the Puget Sound region, these certifications **attract tenants and investors**. Developers are concerned about getting enough points to be certified, and currently the certification requirements offer limited LEED points for going above and beyond the stormwater code requirements. As such, developers are more likely to invest additional money in LEED certification, which **typically enables buildings to recoup their investment through increased tenant rents**, than in LID solutions.

> "LID needs to show its value—whether that is higher rent or long-term [returns]."

Developers would like to receive some type of benefit or recognition for going above and beyond a jurisdiction's stormwater code requirements. Some developers liked the idea of **making LID solutions count towards LEED certification**. While not a hugely popular motivator, a **program structured like LEED that allows for points for LID solutions implemented** appealed to a few developers who are willing to go above and beyond. For a handful of developers, an award would be an incentive to go above and beyond stormwater code requirements; however, **most of the developers interviewed did not see awards or recognition as an incentive**.

"We are going above, not necessarily for the jurisdiction requirements, but because it gets us LEED points. We are always looking for the most cost-effective LEED points also and stormwater can get us some of those LEED points, so that's another driver."

Barriers	Motivators
• *Ongoing maintenance needs*	• *LEED or green certification*
• *Evolving technologies*	• *LID points program*
	• *Awards or recognition*

Strategies for Encouraging Developers to Go Above and Beyond

Based on the interview findings presented above, the recommendations most likely to "move the needle" and increase the use of LID solutions above and beyond current stormwater code requirements are those that center on providing a benefit for the developer. **Affordability**, site **feasibility** and **return on investment** are the primary factors that influence developers' decisions to incorporate additional LID solutions. The following strategies address one or more of these factors.

Offer financial incentives

Note: the consultant team identified a research gap around strategies to address affordability. ***All developers indicated financial benefits would be a motivator*** *to implement LID solutions in their projects or go above and beyond a jurisdiction's stormwater code requirements. As such, the team will work on identifying strategies to address affordability as part of our additional research on incentive strategies.*

Improve and communicate the reliability and durability of LID solutions

Developers feel that **ongoing, routine maintenance** (e.g., routine cleaning or sweeping of permeable pavement, regular landscaping of vegetated roofs or rain gardens) affects the annual profitability of their developments and creates issues with defining responsibilities. Developers see **long-term maintenance** (e.g., changing or amending soil, replacing pavement) as an expected expense regardless of which LID solution was installed. Jurisdictions should **provide information on LID solutions that are tried and true** (with problem-free installation and no or very minimal maintenance issues) to reduce developer uncertainty.

Emphasize value to developers

Developers would like to receive credit for incorporating LID solutions into their projects as a way to market their buildings to investors and tenants. Jurisdictions should **inform developers of available certification options**, including the Sustainable SITES Initiative. None of the developers mentioned the Sustainable SITES Initiative, but a few mentioned complying with the "Evergreen Standard" (Evergreen Sustainable Development Standard). Describing how various LID solutions can provide value (e.g., attracting tenants, earning certification points, or improving aesthetics) will help encourage developers to go above and beyond. Most developers referred to the LEED certification or green-building programs as reasons to include additional environmentally friendly features. Jurisdictions should **consider ways to have implementation of LID solutions count toward increased levels of LEED certification**.

Jurisdictions should also **consider ways to emphasize aesthetically pleasing LID solutions**. LID solutions that add the most value to a property are low cost and visible to the tenants. Usually tenants never see stormwater management happening; it goes on underground or out of sight. Those LID solutions that are more visible can typically be designed to be aesthetically pleasing. For example, bioretention and vegetated roofs can be **touted as amenities, in addition to providing stormwater management functions**. **Educational signage** for these features can help to convey their value to a property as well as the environment.

> "I think more training for the jurisdictions about how to make these things more attractive to developers would probably be the biggest benefit we could drive out of this."

Increase training opportunities for civil engineers

Developers rely heavily on their civil engineers, geotechnical engineers, landscape designers, and architects to be knowledgeable regarding local stormwater code requirements and to recommend which stormwater management solutions to

install. Jurisdictions should **train technical consultants to offer "above and beyond" options and highlight the benefits they will bring to the developer**. To be effective in encouraging developers to go above and beyond the current stormwater code requirements, this training must focus on providing consultants the information necessary to present the benefits, especially financial, of the various LID solutions.

> "If we don't know something, we don't even know if it's an option. Educate the design specialist so they can present it to us as an option."

Nearly all developers specifically stated that the **civil engineer** is the person they turn to when making decisions regarding stormwater management. This does not eliminate the other specialists' roles or their need for education; rather it points out which partner the developers appear to rely on most. Developers expect their civil engineer to be knowledgeable regarding the local stormwater code requirements and **rely on them to make recommendations** on how best to meet those code requirements and manage stormwater onsite. Civil engineer recommendations to developers need to include:

- Review of the **available LID solutions**.
- Realistic **benefits and drawbacks** of each approach.
- Detailed "how to" and **best practices** for installation and maintenance.
- Specifics on **long-term maintenance and associated costs**.
- **Tried-and-true products** that are high quality and effective.
- Recommendations for **aesthetically pleasing** products and approaches.
- Information on available **LID incentives**.
- **Cost-effective** solutions.

Explain costs and benefits of LID solutions

Although most developers are personally concerned about the environment, success in their job requires them to prioritize the economic bottom line. They are interested in incorporating LID solutions above and beyond stormwater code requirements, but only if it makes sense financially or provides some type of benefit. They want something that has a **known** cost with no issues or installation surprises. They want that cost to be reasonable, and they want to see some type of **benefit to the project, even if it is intangible**. Intangible benefits that appeal to developers include things that are desirable to tenants, look nice, and provide LEED points.

Explore opportunities for innovation and stronger partnerships between jurisdictions and developers.

Developers shared examples of how they felt the jurisdictions made unreasonable demands in order to meet arbitrary requirements. For example, one was required to

buy custom planters only a few inches taller than standard planters. This increased the cost of the planters ten-fold and added several months to the project timeline for manufacturing. In the developer's mind, money and time were wasted for no perceived benefit. Jurisdictions need to **determine which code requirements could be flexible and revise those to provide either a range of acceptable options or accept minor variances** such as height of a planter. Alternatively, jurisdictions could **better explain the rationale for the requirement** so that the developer fully understands why they need to comply.

Some developers reported having their innovations blocked by jurisdictions. When they have offered a new approach that they believed would work best—or wanted to make a minor tweak to save significant time or money—the jurisdiction would not consider it, even when the developer was willing to wait for the jurisdiction to evaluate the proposal. **Jurisdictions should work together with developers when opportunities arise to advance the knowledge base on LID solutions or to optimize the existing stormwater code requirements**.

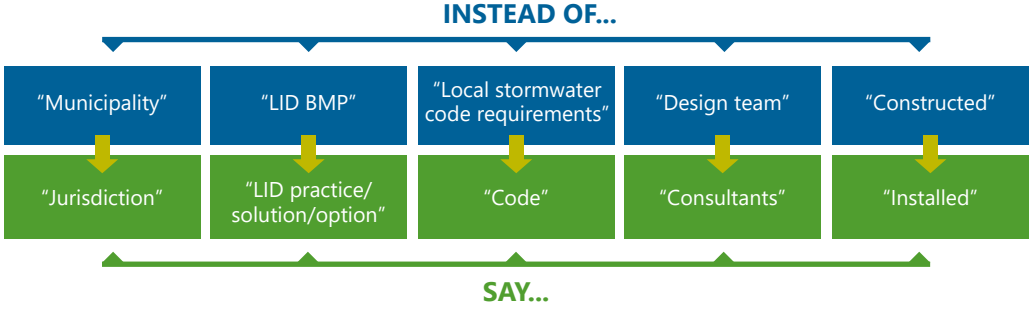
Jurisdictions should also **implement improved tracking methods to capture when developers are going above and beyond**. In cases where developers are incorporating a standard practice that is also a LID solution (e.g., planting trees or amending soil), they do not usually report these extras to the jurisdiction as part of meeting stormwater code requirements. In some cases, these LID solutions are required by a jurisdiction under non-stormwater code requirements. Jurisdictions should track these installations so that they count towards LID usage rates.

> "I never thought about trying to calculate the retained tree area and somehow reduce my overall stormwater obligation."

Use language that is familiar to developers

As shown in Figure 5, the developers we interviewed used language that differs from the prevailing technical language. Any educational or marketing materials produced will be perceived as more tailored and approachable if it uses this language.

Figure 5: Preferred LID language among developers



CONCLUSION

Interviews with developers and relevant literature suggest that in general, developers prefer LID BMPs that (1) **increase site value**, (2) create **minimal disruption**, and (3) are **easy to install**. Developers generally prefer to avoid installing LID solutions that (1) are **expensive**, (2) add **complexity or uncertainty** to a project, or (3) require **ongoing or long-term maintenance**. Consequently, the recommendations most likely to increase the usage of LID solutions above and beyond current stormwater code requirements center on **affordability**, site **feasibility** and **return on investment**.

NEXT STEPS

The findings from the literature review and social marketing report will serve as the foundation of Cascadia's next steps:

Additional Research

Cascadia will supplement the findings in this report with the following additional research:

1. Research the **validity of developer concerns with LID solutions** (e.g., long-term performance of permeable pavement).
2. Identify relevant case studies on **effort required to maintain functionality of LID solutions** over the long-term.
3. Survey jurisdictions throughout Washington to summarize the **performance of incentive programs**, supplemented with additional literature review of national or international LID incentive programs.

Guidebook for Local Governments

Drawing on the research results and potential strategies and incentives identified in this social marketing report, combined with the additional research outlined above, the consulting team will develop a draft guidebook for local governments and dissemination plan for the guidebook. The guidebook will outline clear action plans for local governments to help them **select and implement the recommended strategies and incentives** for increasing LID in urban development.

The guidebook will present information on each strategy regarding benefits, limitations, implementation considerations, and case studies on similar existing programs (where available) and **incorporate relevant key findings from the literature review and social marketing research**. The guidebook will also provide a reference listing of **example tools**, **policies or ordinances**, and **programs** that local governments can use to promote LID use among developers.

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Low Impact Development Literature Review Summary (Task 2)

METHODOLOGY

In May and June 2018, Cascadia Consulting Group conducted a literature review regarding barriers, motivators, and opportunities to increase developer adoption of Low Impact Development (LID) best management practices (BMPs). This research will inform the development of a social marketing study that will research the barriers and motivators by using the COM-B behavior change interventions model. The literature review findings will guide development of a recruitment and interview guide for one-on-one interviews with 20 to 25 developers to test these hypotheses and uncover additional insights. Key findings from the literature review will also be incorporated into the study results and in proposed guidance to local governments for increasing developer adoption of LID.

To conduct the literature review, the project team reviewed an initial list of materials provided by the Department of Commerce. We submitted the list to Herrera Environmental Consultants, who added some additional source materials. We also identified additional source materials in the course of the literature review research and added these to the study.

We developed a **document summary template** (included in Attachment 1) to capture key information in summarizing each source document. We have completed a **document summary sheet** for each of the 15 sources reviewed (included at links found in the bibliography).

This document presents key findings on barriers, opportunities, and incentives related to LID adoption across five distinct themes, as well as example incentive programs used in other jurisdictions.

Following the summary of key findings, the **bibliography** of works cited contains links to the original source files and to the project summary documents.

KEY FINDINGS FROM LITERATURE REVIEW

The following summarizes common threads in the reviewed literature that were emphasized in one or more documents. The numbers listed in parentheses following findings refer to the numbered items in the bibliography. The bibliography of sources and document summaries are included later in the document.

THEME 1: DEVELOPERS ARE MOTIVATED TO BUILD WHAT CUSTOMERS WANT

> *"Consumer demand and market conditions matter to developers above all other factors." [5]*

Several sources stated that developers are motivated to provide what the market demands, especially if it decreases time to sale, increases sale price, or reduces costs while helping developers adhere to stronger stormwater controls.

BARRIER #1: LACK OF CUSTOMER AWARENESS OR APPRECIATION FOR LID IN PRIVATE

SECTOR

- The public may not appreciate aesthetics of LID. [4]
- "Lack of awareness or appreciation of LID by potential buyers can deter builders from using the technology." [10]

BARRIER #2: LACK OF FUNDING FOR LID IN PUBLIC SECTOR PROJECTS

- "It can be difficult to develop, increase, and enforce stormwater fees that can serve as revenue to implement green infrastructure." [4]
- "Local jurisdictions do not have the staff or funding to develop, revise, and enforce new codes or regulations, or to educate builders and developers on LID techniques." [7]

OPPORTUNITIES

- "Provide developers and the public "brochures, pamphlets, mailings illustrating the benefits provided by LID, the uses of LID, and the types of LID." [3]
- "Fund and provide developer technical assistance for demonstration projects. "Share information about nearby demonstration projects." [3]
- "Identify local champions (e.g. developers, contractors, consultants, planners) of LID techniques and use them in seminars to familiarize builders, the public, and community officials on LID techniques and encourage demonstration projects." [7]
- "Educate the public that land use is directly linked to Puget Sound health. Promoting greater densities in urban areas to reduce sprawl is good LID. These messages could be shared in printed education materials, on the internet, or in workshops." [3]
- "Creating an easier application process, lengthening grant cycle time, and reducing potential for funding gaps would be helpful." [6]
- "Stormwater grants should be continued and expanded. Municipalities rely heavily on these grants to go above and beyond permit requirements." [6]

INCENTIVES

- Incentives referenced in the literature that can increase both customer demand and developer revenue included:
  - Rewards and recognition
  - Density bonuses
  - Zoning variances
  - Grants for demonstration projects

THEME 2: DEVELOPERS ARE MOTIVATED TO MINIMIZE COSTS AND UNCERTAINTY WHILE MEETING STORMWATER STANDARDS

> *"Developers are supportive of incentives that offset costs and ease the transition to stronger stormwater standards." [5]*

While developers are motivated to meet stronger stormwater controls, several sources cited developer costs and uncertainty around items such as cost, approvals, or performance as a primary barrier for adoption of LID BMPs. Barriers and corresponding opportunities relating to this theme are outlined in the below sections.

BARRIER #3: INCREASED DEVELOPER COSTS

- "Of the four cost categories typically found in a developer pro forma, soft (design, permitting) and hard (construction) costs are most likely to be impacted by stronger stormwater controls." [5]
- "Construction materials for LID can be more expensive (transportation costs of pervious pavement, for example, especially in more rural areas with fewer suppliers in proximity)." [3]
- "In general, stronger stormwater standards increase the costs of implementing stormwater controls…however…using LID controls has helped offset some of the increased cost, compared to using conventional controls." [5]
- "Financial barriers include increase maintenance cost, need for professional training or educational development cost (Roy et al. 2008), and lack of funding incentives (La Badie, 2007; Clean Water Alliance America 2011). A recent survey conducted in Alberta by AUMA stated that financial barriers become the highest primary barrier of LID adoption (AUMA 2012)." [8]
- "Construction costs for LID technologies are site specific…Assessing a site and designing LID technologies that will function on the site may also increase a builder's design costs." [10]

BARRIER #4: INCREASED DEVELOPER UNCERTAINTY

- "Professional engineers struggle with signing off on plans including LID because LID is not as tested and proven as conventional stormwater management methods." [3]
- "Skepticism regarding the ability or consistency with which practices deliver the level of benefits expected, and uncertainty that investing in green infrastructure will deliver better returns than more traditional practices." [4]

OPPORTUNITIES

Other than financial incentives, the most commonly cited opportunity to reduce developer costs and uncertainty is providing greater access to technical resources, including performance and cost data. Examples of LID technical resources include the following:

- "Create a database for costs of various LID practices, materials, and elements by region to allow for better costing of LID and promotion of the cost-savings. Increasing the awareness and knowledge of developers and permit review staff regarding LID to decrease the cost (or the perception of higher cost) of LID. This effort would streamline the permit review process and make it cheaper." [3]
- "Do more to advertise regional achievements and lessons learned from mistakes. Specify methods, successes, and lessons learned for each project as well as contacts for more information. This online tool could utilize GIS and have photographs and other information. This resource could be used by governments, elected officials, developers, and the public to learn what has and has not worked for LID. An example LID Inventory in Rhode Island is

accessible at the following website: http://www.uri.edu/ce/wq/RESOURCES/STORMWATER/LID_tour.htm." [3]

- Provide a "developer toolkit with 'off the shelf' LID designs, ready-to-use in a design and to submit for permit review. Provide tutorial on sizing, type, and applicability of different LID methods; developers could use in order to implement LID without an engineer. Could have set of methods for water quality and water quantity, or both." [3]
- Create a "central repository of best management practices, designs, and specifications would be helpful to provide manuals and design standards for local developers, planners, and engineers. Without [these]…local design professionals and engineers are less likely to deviate from familiar approaches involving gray infrastructure." [4]
- Conduct "a study of the effectiveness of on-the-ground LID/GSI projects after 5, 10, and 15 years would be a useful resource." [6]
- "Identify the LID options that work best given local soil permeability, slope, aspect, and other factors. Limiting the range of LID options to those that work best under local conditions will also help reduce some of the uncertainty that developers face when designing projects." [10]

INCENTIVES

- The majority of incentives referenced in the literature are designed to offset or reduce developer costs, including:
  - Construction grants, subsidies, cost shares, and rebates
  - Stormwater fee discounts
  - Tax credits and exemptions

THEME 3: LACK OF TECHNICAL KNOWLEDGE ACROSS STAKEHOLDER GROUPS LEADS TO INEFFICIENCIES AND COSTS

> *"Planning department counter staff, permit reviewers, inspectors, and enforcement staff lack adequate training to provide guidance, review permit applications, and inspect LID facilities." [2]*

Several sources attributed cumbersome approval processes to a lack of sufficient knowledge of LID across stakeholder groups.

BARRIER #5: LACK OF GENERAL KNOWLEDGE

- "General public and elected officials lack working knowledge of LID." [3]
- "This lack of education occur [sic] not only in the public sector but also in the local utility staff, the development, and consulting industries (Clean Water American Alliance, 2011; Katherine, 2010)." [8]

BARRIER #6: APPROVAL PROCESSES CAN BE CUMBERSOME

- "Developers that are more knowledgeable produce better products for review (during permit review process)." [3]

- "Technical impediments to instituting LID practices included a basic unfamiliarity with low impact techniques and designs, and a difficulty in shepherding these designs through the local government approval processes." [7]
- "Regulators unfamiliar with LID must be convinced of the effectiveness of these techniques, increasing a builder's design and regulatory costs." [10]

OPPORTUNITIES

- "Educate other involved parties such as civil and site development engineers, contractors, municipal permit application plan reviewers, municipal field staff, municipal managers, and council members or commissioners." "[P]rovide funding or technical assistance to local governments to conduct their own education programs. This could be 'incentive-based,' in that technical assistance and funding is given to those who demonstrate interest and capability to conduct the education programs." [2]
- "Provide developer LID design training to increase quality of permit applications." [3]
- "Process to help developers navigate the permitting process more efficiently if they propose to implement LID beyond what current regulations require." [5]
- "Establish a known, streamlined process for approving LID designs." [7]

INCENTIVES

- The primary incentive cited for alleviating cumbersome approval processes was expedited permitting, which "may require reorganization of jurisdiction or have some initial upfront costs, but most of the benefits will be realized very quickly. Building permitting bodies must have knowledgeable, trained professionals at all levels of review. These permitting professionals should be trained in LEED and/or other green rating systems used in the community." [1]

THEME 4: OUTDATED AND CONFLICTING CODES ARE A BARRIER

- "Municipal codes and ordinances often favor gray over green infrastructure." [4]

BARRIER #7: CODES ARE NOT ALWAYS ALIGNED WITH LID

- "LID is difficult to implement via land use codes; separate LID from land use codes and instead make LID a stormwater issue that is best addressed through clear and simple stormwater requirements (more engineering than planning)." [3]
- "At the state level, water and land use policies and property rights can be complicating factors. For example, downstream water rights may be impacted if upstream water management practices reduce the quantity of water to downstream users." [4]
- "Staff pointed out that the rules are primarily oriented towards new development, not redevelopment." [6]
- "Some cities are in the process of updating their code to include maximum impervious coverage. At this time [2016] a number of cities do not have maximum impervious surface limits in their codes. We did not investigate current code limits but the lowest limit we

learned about was a maximum of 20% impervious lot coverage." [6]

- "Most codes emphasize conventional methods of managing stormwater. In many cases, developers interested in using LID must file for variances from established building codes. Such a process may require additional design and engineering studies, take more time, which increases the developer's uncertainty and interest charges, and include the risk that the variance will not be granted. In some cases, LID approval depends on also installing conventional controls, thus defeating the purpose of filing for the variance." [16]

OPPORTUNITIES

- "Conduct a study of how well stormwater, zoning, and building codes are working on redevelopment." [6]
- "Encourage consistent codes, standards, and enforcement among adjacent jurisdictions, e.g., street and highway design." [7]
- "Develop LID-friendly building codes and inspection standards." [10]

INCENTIVES

- No incentives specifically related to revising outdated codes were cited in the literature.

INCENTIVE STRATEGIES

Below is a list of incentive strategies cited in the literature, including example programs. Unless otherwise specified in the sections below, the literature did not comment on the relative effectiveness of different types of incentives.

DIRECT FINANCING

HOW IT WORKS

- "Some municipalities offer rebates or financing for installation of specific practices. The types of financing help may include grants, matching funds, low-interest loans, tax credits, or reimbursements." [4]

EXAMPLE PROGRAMS

- Santa Monica, CA, offers rebates on rain barrels and redirecting rain gutter downspouts to permeable surfaces, such as landscaped areas. Other cities that offer financing or rebates for rain barrels and rain gardens include Palo Alto, CA; Rock Island, IL; Chicago; and Minneapolis." [4]
- "The City of Lake Forest Park [WA] provides 50% reimbursement through mini-grants with a simple application: up to $500 for single-family non-rain garden projects, up to $1,500 for community organizations or multiple property owner non-rain garden projects, up to $1,000 for single-family rain garden installations, up to $2,000 for community organization rain garden, installations. The program can be used for installation of permeable pavement patios." [6]

- "Some cities pay builders a direct monetary subsidy when they install a green roof:
  - Portland, OR: $5.00/SF
  - Washington, D.C.: $3.00/SF (pilot project)
  - Chicago, IL: $5,000 grant
  - Toronto, ON: $5.00/SF" [11]
- "New York's Green Improvement Fund provides grant funding to commercial properties that install green infrastructure practices in specific sewer districts. The program is part of a larger CSO abatement program that seeks to eliminate 946,353 m3 (250 million gal) of CSOs by 2018." [14]

EXPEDITED PERMITTING

HOW IT WORKS

- "Streamlining the permitting process for building, plan, and site permits can save green developers substantial time and money. This may require the reorganization of municipal staff or initially cost the jurisdiction in other indirect ways, but, overall, such a program can result in great cost savings to both the jurisdiction and the architects and developers involved in a project." [1]

EXAMPLE PROGRAMS

- "Santa Monica Ordinance 8.108.050 provides an expedited permitting process for new buildings and major renovations (more than 50 percent) that receive LEED certification." [1]
- "Chicago Green Permit Program reduces the permitting process for developers and owners who build green to less than 30 business days and, in some cases, less than 15 days. The length is determined by the number of green building elements, the LEED certification level, and the project complexity." [1] [4]
- "King County, WA provides a dedicated "Green Track" for LID projects, assigned to permitting staff with expertise in LID." [11]
- "Ashburnham, MA has created a simplified permit process for residential projects using LID." [11]

EFFECTIVENESS

- "The development community has expressed a concern that many communities need to enhance and augment their permitting staff in order for these programs to work at their full potential. In order for expedited permitting programs to be successful, staff should also have a comprehensive understanding of the green rating systems utilized within a city/county. Building permitting bodies must have knowledgeable, trained professionals at all levels of review. These permitting professionals should be trained in LEED and/or other green rating systems used in the community. Unfortunately, one of the problems faced by many smaller permitting agencies is that they do not have the time or money to adequately staff their existing responsibilities, let alone additional requirements, and therefore solutions need to be found." [1]

- "Developers generally responded favorably to these efforts and said that they took advantage of them. Developers responded favorably to incentives that reduce the uncertainty associated with the permitting, to the extent that these incentives reduce the time (and associated costs) of getting approval to implement LID. Developers identified these techniques that help with the permitting process: streamlined or fast-track permitting, guaranteed permit review times, and access to permitting staff for collaborative problem solving early in the process." [5]
- "Philadelphia guarantees plan review for redevelopment projects that disconnect 95 percent of impervious area and don't increase the burden on public infrastructure within 5 business days. Developers expressed mixed opinions about how well these fast-track processes actually work in practice." [5]
- "According to one staff person with experience in Snohomish County, expedited review there is worth a lot to developers. Time is money, and faster permitting can be very motivating for the developer. In small cities, however, "there is no such thing as expedited review. We need city staff trained in LID/GSI to have expedited review." [6]

CAPACITY CHARGES

HOW IT WORKS

- Some municipalities collect development fees according to the amount of impervious service on a project. [6]

EXAMPLE PROGRAMS

- "The City of Sammamish collects [in 2016] surface water system development charges: $1,491 for new residential dwelling units or commercial buildings with ≤2,500 sq. ft. impervious coverage, $149.10 for other structures or additions with ≤250 sq. ft. impervious coverage, $149.10 for each additional 250 sq. ft. impervious coverage in both categories." [6]

EFFECTIVENESS

- "These general capacity charges motivate developers to minimize impervious surface." [6]

FEE DISCOUNTS AND REBATES

HOW IT WORKS

- "Many communities that charge stormwater fees also offer a fee discount or credit if a property owner decreases the site's impervious cover or adds other green infrastructure practices to reduce the amount of stormwater runoff that leaves the property. The concept underlying such arrangements is that private businesses, institutions, and homeowners will experience financial benefits sufficient to support on-site green infrastructure." [4]
- "Municipalities might offer to waive or reduce permit fees, expedite the permit process, allow higher density development, or provide exemptions from local stormwater permitting

requirements." [4]

EXAMPLE PROGRAMS

- "Philadelphia's stormwater utility fee system offers fee discounts to commercial property owners who reduce impervious area or otherwise manage runoff onsite. The incentive to property owners comes in the form of a credit against future stormwater fees for properties that install stormwater retrofits. Under the credit structure, the property owner receives a reduction in the monthly stormwater fee proportional to the amount of impervious area from which the entire first inch of runoff is managed onsite, up to 100% of the fee for management or retention of the first inch of stormwater over 100% of the impervious area of the site (a monthly minimum charge prevents stormwater fees from being reduced entirely). The plan provides that once a stormwater fee credit is approved by the Philadelphia Water Department, the fee reduction is fixed for a four-year period, at which point the property owner may reapply for the credit, based on a showing that the retrofit has been properly inspected and maintained and remains fully functional." [4]
- "Developers we interviewed who work in Philadelphia indicated they were aware of these incentives and, in some cases, they had taken advantage of them. Many interviewees expressed their support of stormwater credit and off-site mitigation programs to address the reality that on-site stormwater retention may not be physically possible in every project and may not be economically feasible in some projects." [5]
- Knox County, Tennessee, offers a credit to developers when impervious areas are disconnected from the stormwater control system via filtration/infiltration zones that are designed to receive runoff." [4]
- "The City of Shoreline's Soak It Up rebate program provides funding for LID/GSI retrofits including rain gardens and native vegetation landscaping on private property. Rebates are $2 per square foot of contributing area treated and/or hard surface converted, minimum 400 square feet and maximum. 800 square feet, up to $1,600 per property. Requirements to receive a rebate include: initial site visit, design and installation criteria compliance, signed covenant, final inspection." [6]
- "The City of Kirkland, in an effort to reduce runoff from single-family homes, offers an incentive program for homeowners. Selected homeowners receive a free site visit that measures how much runoff a property produces, recommendations for reducing runoff, and sizing/location guidance for potential LID/GSI. Homeowners that receive a site visit are eligible for a retrofit rebate for installation of these approved practices (recommended by the site visit for the specific site): downspout disconnection, tree planting, soil amendments, pavement removal, conservation landscaping, permeable pavers, cisterns, rain garden. [6]
- "The City of Seattle's RainWise rebate program provides education materials for homeowners as well as rebates averaging $4,000 for rain gardens or cisterns in targeted sewer overflow basins." [6]

EFFECTIVENESS

- "Developers and engineers in Philadelphia indicated that the City's fee reduction program was becoming a useful tool to get buy-in from customers on including BMPs that would quality for the credit." [5]

INSURANCE

HOW IT WORKS

- "Insurers can play a powerful role in communicating the benefits of green buildings and homes that deliver energy and environmental efficiency, are more resilient to storm damage, and are safer and healthier for their occupants." [1]

EXAMPLE PROGRAMS

- "Fireman's Fund Insurance Company's Green-Gard suite of commercial building coverages provides tangible incentives including:
  - Green Upgrade Coverages cover costs to rebuild and replace standard buildings that have a loss with specified green alternatives
  - Green Certified Building Coverages to protect investments in a vegetated roof, alternative water system, or green power generating equipment in the case of a loss. The coverage also covers the cost to hire a Leadership in Energy and Environmental Design (LEED®)-accredited professional to oversee the repairs, and even reimburses loss of income incurred through the use of alternative power generating equipment.
  - Building Commissioning Coverages that cover the cost to hire a commissioning engineer to ensure that building systems (HVAC, electric and plumbing) operate at peak performance and in alignment with one another." [1]

LOANS

HOW IT WORKS

- "States and municipalities can establish a loan fund to be used specifically for green improvements. This type of program requires an initial investment and start-up costs, but generally these incentives have proven profitable in the long run." [1]

EXAMPLE PROGRAMS

- "The New York State Energy Research and Development Authority Program provides low interest loans (four percent below market rates) for energy efficiency measures and building materials that meet New York green building standards." [1]
- "Harvard University's Green Campus Loan Fund provides capital for high performance campus design, operations, maintenance, and occupant behavior projects. Basic project eligibility guidelines state that projects must reduce the University's environmental impacts and have a payback period of 5-10 years or less." [1]

TAX CREDITS AND ABATEMENTS

HOW IT WORKS

- "Tax incentives are one of the most robust and widely used forms of incentives to promote beneficial practices. They are particularly suited to green building projects because they can be offered for specific levels of green certification and for both short- and long-term goals. These incentives can be offered in any of the following areas:
  - Corporate Tax (tax levied on the profits made by companies or associations)
  - Gross Receipts Tax (tax levied on the total gross revenues of a company – charged to the seller of goods)
  - Income Tax (tax levied on the financial income of persons, corporations, or other legal entities)
  - Property Tax/Ad Valorem Tax (tax levied on the value of property)
  - Sales Tax (tax levied on goods and services – charged at the point of purchase)
  - Local Tax (tax levied from cities and counties)" [1]

EXAMPLE PROGRAMS

- "Income Tax: Maryland Tax-General Code Ann. §10-722. An income tax credit provided to owners or tenants of green buildings and green building components. The credit equals eight percent of the allowable costs ($120 per square foot of the base building/$60 per square foot of the tenant space) for green buildings. It provides that the Administration shall adopt standards for a building to qualify as a green building that are consistent with the criteria set forth by the USGBC." [1]
- "Property Tax: Cincinnati Tax Abatement. Any homeowner in Cincinnati may be eligible for property tax abatement if they have renovated their home or purchased a newly constructed home that was built to LEED® standards. Multi-unit housing (four or more units), mixed-use development, and commercial development, both rehabilitation and new construction, are subject to program criteria such as gap analysis, cost/benefit analysis, and relation to other city subsidy." [1]
- "Property Tax: Honolulu Temporary Tax Exemption. This bill provides a one-year real property tax exemption for commercial, industrial, and resort development that earns LEED certification." [1]
- "Multipurpose Tax: New York State CLS Tax § 19. This is a tax credit for owners/tenants of buildings that meet certain green standards. The tax can be applied against corporate taxes, personal income taxes, insurance corporation taxes, and banking corporation taxes. New buildings receiving the credit must not exceed 65 percent of the permitted energy usage (75 percent for rehabilitated buildings)." [1]
- "Other Tax: Oregon Business Energy Tax Credit ORS § 469.185. This tax credit is designed to offset the cost to businesses that build sustainable commercial buildings meeting the LEED Silver rating. The credit is refunded from the Oregon Department of Energy and is based on the square footage of the entire building." [1]
- "County Tax Exemption: Chatham County, Georgia, Ordinance. The exemption provides a five-year full property state and county tax abatement for commercial buildings that receive LEED Gold certification. It also provides a reduced abatement for the next five years (a reduction of 20 percent each year)." [1]
- "City Tax Exemption: Cincinnati, Ohio, Ordinance. A 100 percent tax exemption for LEED certified buildings, not to exceed $500,000 over 15 years for new buildings and over 10 years for renovations, is offered by the city. If the building receives LEED certification, there

is no maximum exemption." [1]

EFFECTIVENESS

- "It is important to remember that many developers/owners have different priorities depending on whether they are small developers, large developers, short-term investors, developers who want to maintain several properties, building owners, corporate building tenants, or residential building tenants. These parties have divergent interests and needs, and tax incentives should be available to entice each group." [1]
- "On the whole, tax credit programs work as a positive incentive for green development. However, some programs remain complicated in nature, and builders and owners often find the effort to complete the application process for these programs to be time consuming and, as a result, not cost-effective. Streamlining the application process will ensure that the credits are used more and thus more effective." [1]

DENSITY BONUSES AND OTHER CODE INCENTIVES

HOW IT WORKS

- "Jurisdictions have implemented height bonuses, floor/area ratio (FAR) bonuses, reductions in landscaping requirements, and the counting of green roof space as landscaping/open space in return for achieving levels of green building ratings." [1]

EXAMPLE PROGRAMS

- Portland, Oregon's, Floor Area Ratio Bonus increases a building's allowable area in exchange for adding a green roof on 60% of roof. Builders may add 3 square feet of floor area per 1 square foot of greenroof. [4] [11]
- "The City of Auburn's current code lays out a point-based incentive program for alternative development techniques to encourage developers to go "above and beyond" the requirements. LID/GSI are each worth 5 points, and water quality, habitat, and natural vegetation also provide points. Development projects that have 100 points can have:
  - Alternate lot dimensions (required setbacks, frontages)
  - Alternate parking lot landscaping
  - Alternate engineering design
  - Expedited permitting process
  - Increased density
  - Other bonuses including increased impervious and increased maximum height." [6]
- Sammamish, WA Density Bonus: "LID techniques earn points that builders can use to increase site development density or building height." [11]

EFFECTIVENESS

- "These programs can be particularly attractive to developers and owners in cities and counties that have capacity shortfalls. Additional space allowances increase profits for

developers and building owners and reductions in transfer costs can translate into incentives for the buyer. Bonus density programs are valuable because developers want to increase floor space on projects in order to enhance profitability. In order for these programs to be effective, bonus density must maintain comprehensive green requirements and therefore preserve the exclusivity of the incentive. As green building becomes more commonplace, municipalities may need to reexamine the stringency of the requirements for density bonuses and increase them concordantly." [1]

- "In 2008, one city updated zoning code for mixed use and residential use. A new section provided opportunities for flexible alternatives, including LID/GSI for developers using incentives. LID/GSI Incentives included expedited processing and density bonuses. To date [2016], no one has taken advantage of this LID/GSI incentive [density bonuses]. Staff felt that that the incentive program was not successful and perhaps it didn't make sense to developers." [6]

FEE-IN-LIEU

HOW IT WORKS

- "Many developers mentioned that a fee-in-lieu or credit-offset program for stormwater would be an effective way for dealing with exceptionally difficult sites where LID is physically impossible or too costly. Such programs may serve a useful role in a LID regulatory scheme, but they would have to be designed carefully to maximize the environmental benefits that are achievable on-site and collect a payment that is sufficient to actually implement controls off-site that can address the remaining stormwater-related effects." [5]

EXAMPLE PROGRAMS

- "Philadelphia has a fee-in-lieu program. Permitting officials suggested that this fee-in-lieu program is designed as a useful way to force developers to take a harder look at their site when considering the feasibility of implementing stormwater controls." [5]

EFFECTIVENESS

- "Permitting officials said that it is rarely used, because the fee is set such that it is usually cheaper for developers to implement stormwater controls on-site." [5]

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Attachment 1. Document Summary Template

BIBLIOGRAPHICAL INFORMATION

Title	
Author & Organization	
Contact Information	
Date	
Pages	
URL	
FileName on SharePoint	
Full Citation	
Abstract	

AUDIENCES

Geographic Scope	
Community Type(s)	☐ Urban ☐ Suburban ☐ Exurban ☐ Rural ☐ Other/Not Specified (ONS)
Project Type(s)	☐ Single-family residential ☐ Multifamily residential ☐ Commercial ☐ ONS
Development Type	☐ New development ☐ Redevelopment ☐ ONS
Audience(s) Addressed	

DATA SOURCES OR METHODS

RESULTS

CURRENT PRACTICES RELATED TO LID

Key Points	Notes	Pages

BARRIERS TO USING LID

Key Points	Notes	Pages

BENEFITS OF USING LID

Key Points	Notes	Pages

INCENTIVES OR MOTIVATORS FOR USING LID

Key Points	Notes	Pages

OPPORTUNITIES OR RECOMMENDATIONS

Key Points	Notes	Pages

SPECIFIC SUCCESS STORIES FROM EFFECTIVE MODEL PROGRAMS OR PRACTICES

Key Points	Notes	Pages

LESSONS LEARNED FROM LESS SUCCESSFUL PROGRAMS AND PRACTICES

Key Points	Notes	Pages

LID TOOLS AND RESOURCES

Key Points	Notes	Pages

OTHER NOTABLE INSIGHTS

Key Points	Notes	Pages

APPENDIX B: INTERVIEW GUIDES

BUILDING GREEN CITIES

LOCAL GOVERNMENT INTERVIEW DISCUSSION GUIDE

Notes:

- Timing provided is meant to be a best guess.
- This is a discussion GUIDE. Questions will not be read verbatim and at times may be asked out of order.
- Any text in light grey is background information for the moderator and will not be read to or shared with respondents

Note to Advisory Committee: The information learned during these local government interviews will be used to inform the final developer interview discussion guide. We are interviewing representatives from 3-5 local governments who work directly with developers and are responsible for overseeing/reviewing permits.

Thank you for agreeing to speak/meet with me. As you know, we are contacting you on behalf of the Washington State Department of Commerce and Puget Sound Regional Council. We will be conducting research with developers regarding their inclusion of Low Impact Development (LID), also known as Green Stormwater Infrastructure (GSI), principles and best management practices (BMPs) in their projects. Before we speak with them, we wanted to talk with you to gather any insights you can share on developers. It's my understanding that you work closely with developers on LID stormwater practices/regulations. I'd like to learn about your experience working with them.

DEVELOPER'S CURRENT UNDERSTANDING OF LID (5 MINUTES)

Questions Goal: Learn from local government permit review staff what their impressions are of the level of knowledge developers have when it comes to LID principles and BMPs. We are aware that the architects and engineers are very knowledgeable in this area. We assumed that developers are not nearly as knowledgeable, but is this really the case? We want to understand what, if any, knowledge gaps the developers have.

- How much do you think developers know about stormwater management, specifically LID principles and BMPs? What makes you say that?
  - What do you think they need to know that they don't?
  - Do most of them understand the local stormwater code requirements?
  - At what point in the process do you think developers are thinking about LID for stormwater management?
  - At what point in the process are you asking developers about LID for stormwater management?
  - Do they also understand that there are some optional LID BMPs that they can also

implement?

- What percentage of developers in your jurisdiction have chosen to use optional LID BMPs or design principles? _____%

LID PROGRAMS – CURRENT PRACTICES (5 MINUTES)

Questions Goal: Learn which optional LID BMPs are typically being installed and which LID options they are shying away from.

- One of the goals of this research with developers is to understand what needs to be done to encourage developers to implement more LID, including both LID design principles and BMPs. Which LID design principles and optional LID BMPs are developers in your jurisdiction installing most often? (IF RESPONDENT SAYS "NONE," THEN REFRAME TO ASK ABOUT LID IN GENERAL.)

  In their response, we will listen for them to talk about LID principles and BMPs such as:

  LID Principles:
  - Optimize development envelope
  - Reduce impervious surfaces as part of the road layout design
  - Reduce impervious surfaces for buildings by clustering and reducing footprints
  - Preserve open space and native vegetation (BMP T5.40)

  LID BMPs required *by Washington State for evaluation include (NOTE: some local governments such as Seattle and King County have stricter requirements):*
  - Amended Soils (BMP T5.13)
  - Dispersion (BMP T5.10B, BMP T5.11 BMP T5.12) (Note: Full dispersion (BMP T5.30) is most likely not feasible in the urban and suburban areas that are included in this study)
  - Rain Gardens (BMP T5.14A)
  - Bioretention (BMP T5.14B, BMP T7.30) (Note: Planters don't count towards MR5, but could be used to provide water quality treatment)
  - Permeable Pavement (BMP T5.15)
  - Perforated stub-out connections (BMP T5.10C)

  Optional LID BMPs:
  - Trees (retained and newly planted) (BMP T5.16) (Note that Tree protection during construction is covered in the construction volume of the SWMMWW)
  - Vegetated/Green Roofs (BMP T5.17) Note: green roofs may not be as effective as other measures in the Puget Sound climate.
  - Minimal Excavation Foundations (BMP T5.19) Note: sometimes called "pin" foundations.
  - Reverse Slope Sidewalks (BMP T5.18)
  - Rainwater Harvesting / Re-use (BMP T5.20) Notes: the Hirst decision may limit harvesting, and double-plumbing for reuse add substantial costs.
- What makes those LID design principles and BMPs the most popular?
- What's going on that the other options are not being installed?

BARRIERS TO USING LID (10 MINUTES)

Questions Goal: Understand where developers are running into issues and how, if at all, local government staff are pushing back/assisting them.

- I'd like to get an idea of what you are hearing from developers. What do you think are the most common barriers that developers face when it comes using LID to manage stormwater?

  We will listen for barriers such as:
  - Confused about local stormwater code requirements
  - Insufficient cost data from other projects
  - Site constraints (geology, hydrology, existing paving systems)
  - Development costs
  - Current LID incentives don't help offset the development cost
  - Lack of access to properly trained staff
  - Additional design time/effort
  - Increased permit review time/complexity
  - Developers don't have time to obtain the geotechnical information that is required to be obtained in the rainy season
  - Inspection takes longer
  - Municipal codes require conventional stormwater system as backup anyway
  - Municipal inspectors don't understand LID technologies
  - Municipal codes not aligned with LID methods
  - Client won't pay more or don't want LID
  - Client doesn't want to deal with LID maintenance
  - Concerns about private property LID maintenance
  - Client doesn't understand LID
  - Lack of familiarity with LID methods/options and which are most effective
- When developers cite infeasibility criteria or request exemptions, what are the most common reasons they give?
  - Do you think the developers are usually telling you the real reason? If not, what do you think is the real reason?
  - How often do you question with skepticism the infeasibility criteria or reasons they have cited?
  - Do you ever counter their requests with alternative suggestions, offers of incentives, or technical assistance? Tell me more about that. How do developers respond?

    We will listen for responses such as:
    - Improving perviousness of the site outside of footprint
    - Redesign assistance by staff or call in a third party
    - Engineering support by staff or call in a third party
    - Technical assistance by staff or call in a third party
    - Use of BMPs on other portions of existing site not being redeveloped
- When they cite infeasibility criteria or request exemptions, how often does your jurisdiction agree and allow them to move forward with their design?

- I realize you are not required to track what's infeasible, only what's installed. However, do you have a tracking system that records the cited infeasibility criteria or requested exemption? (look for Yes/No response)

LID PROGRAMS – CURRENT INCENTIVES/PROGRAMS/FUNDING (10 MINUTES)

Questions Goal: Delve into the details surround incentive offered to developers and which developers find most appealing.

- (IF INCENTIVES NOT DISCUSSED/NOT DISCUSSED IN ENOUGH DETAIL IN PREVIOUS SECTION, ASK) What, if any, incentives/programs/funding are you using to help encourage developers to increase use of LID above and beyond code?

  We will listen for factors incentives/programs/funding such as:
  - Direct financial incentives (reduced fees charged during development, tax credits or rebates, grants or cost-share) NOTE: permit fees are already very low and typically cannot be reduced because they directly pay for permit staff time.
  - Reduced fees charged after development (e.g., ongoing annual stormwater fees)
  - Expedited permitting/reduced review periods
  - Project design changes (zoning variance, ability to build more units, add height)
  - Ability to stage in right-of-way
  - Ability to cluster development in one area
  - Ability to modify parking
  - Adjusting street landscaping standards and setbacks
  - Ability to pay into fund to install LID off site (e.g., credit trading, fee-in-lieu)
  - Technical assistance (e.g., to work through design)
  - Incentives from non-government entities (e.g., Salmon Safe, 2030 District)
  - Public recognition/awards
  - Grants for demonstration projects
  - Public-private partnerships (e.g., Seattle Dept of Transportation/Parks) to integrate LID with street improvements or park development
  - Training
  - Training for financers and insurance companies
- What's your impression regarding how well these incentives/programs/funding are working?
  - What percent of the time are they effective?
  - How long have the incentives/programs/funding been available?
  - How are the incentives/programs/funding advertised / promoted?
  - Are the incentives/programs/funding used?
- What feedback have you received from developers regarding the incentives/programs/funding?
  - In your jurisdiction, which incentives/programs/funding do developers find most appealing? What do you think makes those incentives/programs/funding particularly appealing to them?

MOTIVATORS AND NEW INCENTIVES FOR USING LID (5 MINUTES)

Questions Goal: Learn from local government staff what incentives/programs/funding they think might motivate developers.

- What suggestions do you have regarding your jurisdiction's LID incentives/programs/funding? What makes you say that?
  - What changes would you make if you could to the incentives/programs/funding?
- What other incentives/programs/funding could your jurisdiction offer to encourage developers to use more LID? IF SAYS THEIR JURISDICTION COULDN'T OFFER ANYTHING: Even if you can't offer it, what do you think would motivate developers?

  We will listen for incentives/programs such as:
  - Incentives listed above
  - Other non-LID incentives
  - Through existing or new policies
  - Through existing or new programs (what specifically)
  - Help with the removal of barriers (what specifically)
  - Add incentives (what specifically)
  - Star ratings, certifications, recognition
  - Dedicated LID construction inspector(s) (trained in LID);
  - A clear and streamlined process for approving LID designs and installations
  - Technical assistance (access to permitting for collaborative problem solving early in the process; personalized site assessment with list of options suitable for site conditions)
  - Information (database of more general site info [soil permeability, slope, aspect] with list of options suitable for site conditions; database of LID costs, LID inventory, ready-to-use LID designs); project design changes, such as zoning variance, ability to build more units, add height, density bonus)
  - Information on LID principles and BMPs
  - Provide LID design templates
  - Stormwater Credit Trading (be sure that this is defined before asking)
  - Provide cost estimates for methods
  - Facilitating partnerships with other developers/nonprofits/brokers
  - Help create market demand (how many and what type of customers asking for LID?)
  - Help change cultural norms among developers

WHAT DO LOCAL GOVERNMENTS NEED? (2 MINUTES)

- At the end of this research, we will be developing guidance for jurisdictions on effective incentives/programs/funding that can be used to increase the use of LID by developers. What format for that guidance would be most helpful for your jurisdiction?

  Guidebook / report

Case studies

SUGGESTIONS FOR TALKING WITH DEVELOPERS (2 MINUTES)

- Finally, I'd appreciate any suggestions you would have for me as I try to contact and recruit developers to speak with me about LID for stormwater management.
  - What would you suggest I keep in mind?
  - Do you have any suggestions for developers I should reach out to?
  - Do you have any good examples of projects that go above-and-beyond in using LID?

BUILDING GREEN CITIES

DEVELOPER INTERVIEWS DISCUSSION GUIDE

Notes:

- Timing provided is meant to be a best guess.
- This is a discussion GUIDE. Questions will not be read verbatim and at times may be asked out of order.
- Any text in light grey is background information for the moderator and will not be read to or shared with respondents

Note to Advisory Committee: The information learned during these developer interviews will be used to inform the final deliverable (guidance to help municipalities develop incentives to encourage developers to use more LID).

Thank you for agreeing to speak (or meet) with me. As you know, today we will be talking about stormwater management and LID site design, specifically related to buildings your company is developing in urban areas and city centers around Puget Sound.

DECISION MAKING PROCESS – MANAGING STORMWATER (10 MINUTES)

Questions Goal: Set the stage understand how they think about and approach stormwater management in general (later questions focus on LID).

- Tell me about the process you go through when deciding how to manage stormwater (rainwater) at your sites…
  - At what point in the development process do you first consider stormwater management? (prior to purchase, while evaluating site feasibility, just prior to submitting for permits, later in the process)
  - How do you involve your team members (engineers, architects, consultants) in decisions about stormwater management?
    - When does that happen in the process?
    - What, if anything, would you change about this process if you could?
  - There are many different options for managing stormwater. How do you decide which

option to use?

- What factors do you consider? Which is the most important factor?

  We will listen for factors such as:

  - Regulatory requirements?
  - Site constraints [location, project size, building type, land type]?
  - Costs? Does LID cost you more or less?
  - Permit review periods? Does LID increase or decrease permit review periods?
  - Incentives? What incentives motivate you to use LID?
  - Market demand? How many and what type of customers are asking for LID?
  - My team's familiarity with management methods/options
  - Proven methods to avoid concerns around long-term performance risks (e.g., permeable pavement)
  - Other?

- Do you think about stormwater integrated with other water management systems (e.g., irrigation, drinking water) on your site?
  - IF SO, in what way?
  - IF NOT, why is that?

Questions Goal: Begin to explore how they think about and approach LID as part of stormwater management

- PROVIDE HANDOUT: I'd like you to think specifically about LID for stormwater management. Some local jurisdictions use the term Green Stormwater Infrastructure (or GSI) which is synonymous with LID. I have a handout to share with you regarding LID for stormwater management.
  - If additional explanation is needed: LID incorporates managing stormwater on site, cleaning and reducing the amount of water that overflows into storm drain systems and streams.

    To provide background and ensure we are on the same page about LID practices during the interview, we will share with the participant a handout with different LID options grouped into three categories (LID principles, LID BMPs required to be evaluated, and optional LID BMPs).
  - Looking at the handout, which LID options for stormwater management do you use that you haven't already mentioned?
    - IF DIFFERENT FROM STORMWATER MANAGEMENT PREVIOUSLY MENTIONED AS BEING USED MOST FREQUENTLY, ASK: What is it about that option that you don't use it more often?
    - IF LID FOR STORMWATER MANAGEMENT HAS NOT BEEN MENTIONED UP TO THIS POINT THEN ASK WHICH THEY USE AND WHAT MAKES THEM CHOOSE THOSE.

      In their response, we will listen for them to talk about LID principles and BMPs such as:

      LID Principles:

      - Optimize development envelope
      - Reduce impervious surfaces as part of the road layout design
      - Reduce impervious surfaces for buildings by clustering and reducing

footprints
- Preserve open space and native vegetation (BMP T5.40)

LID BMPs required by Washington State for evaluation include (NOTE: some local governments such as Seattle and King County have stricter requirements):
- Amended Soils (BMP T5.13)
- Dispersion (BMP T5.10B, BMP T5.11 BMP T5.12) (Note: Full dispersion (BMP T5.30) is most likely not feasible in the urban and suburban areas that are included in this study)
- Rain Gardens (BMP T5.14A)
- Bioretention (BMP T5.14B, BMP T7.30) (Note: Planters don't count towards MR5, but could be used to provide water quality treatment)
- Permeable Pavement (BMP T5.15)
- Perforated stub-out connections (BMP T5.10C)

Optional LID BMPs:
- Trees (retained and newly planted) (BMP T5.16) (Note that Tree protection during construction is covered in the construction volume of the SWMMWW)
- Vegetated/Green Roofs (BMP T5.17) Note: green roofs may not be as effective as other measures in the Puget Sound climate.
- Minimal Excavation Foundations (BMP T5.19) Note: sometimes called "pin" foundations.
- Reverse Slope Sidewalks (BMP T5.18)
- Rainwater Harvesting / Re-use (BMP T5.20) Note: the Hirst decision may limit harvesting, and double-plumbing for reuse adds substantial costs.

- Do you regularly build LEED or other green-certified buildings?
  - Yes/No Answer needed

CURRENT LID REGULATIONS AND PRACTICES (10 MINUTES)

Questions Goal: Assess whether they understand the baseline regarding regulations to be able ask about voluntarily going above and beyond. Understand whether the regulations made any difference on the ground.

- I understand that you may rely on team members, including your architect or project engineer, to help keep track of local codes and regulations. In your role, how familiar are you with state and local stormwater code requirements related to using LID in urban and suburban areas of Puget Sound?
  - In what way does using LID to manage stormwater affect your projects?

    We will listen for comments such as:
    - Length of design process (including timing of infiltration testing—must be performed in rainy season)
    - Design costs
    - Construction costs
    - Permit review time
    - Market/client demand
    - Project profitability

    Note: If a developer starts to complain at length about the current codes, they will be politely redirected and told that the ultimate goal of the today's discussion is to learn what suggestions they have for incentives.
  - Do local stormwater code requirements affect where you decide to build? In which cities/jurisdictions you build?
  - How, if at all, have local stormwater code requirements changed which stormwater

management options you choose?

Questions Goal: Understand how often and begin to understand the consideration factors that motivate or demotivate them to implement additional LID principles or BMPs.

- On what percentage of projects do you use LID principles or BMPs that are not required as part of the local stormwater code requirements?
  - Tell me about those projects where you used LID that was not required as part of the local stormwater code requirements. What caused you to do that?

    We will listen for project factors such as:
    - Target customer (luxury/high end, market rate, affordable/subsidized, government) wants LID
    - Financing or future ownership type (investor- vs. self-financed, build-and-sell versus build-and-own) support LID
    - LID actually costs less
    - Shorter permit review periods
    - Incentives
    - Market demand (how many and what type of customers asking for LID?)
    - Building types (commercial, multifamily, mixed use, schools) better for LID
    - Project size
    - Land type (new vs. redevelopment)
    - Green certification included LID
  - I'm assuming there are costs associated with using more LID than by the local stormwater code requirements. What business case were you able to come up with that helped to make that worthwhile?
  - What about the situations where you met just the local stormwater code requirements, what was in the way of you using more LID in those situations? IF SAYS THEY ALWAYS IMPLEMENT LID ABOVE AND BEYOND CODE: What about a situation where you couldn't use as much LID as you normally do or as much as you wanted to?

    We will listen for responses such as:
    - Site not suitable for LID (steep slopes, poor infiltration capacity of soils, proximity to drinking water wells, shallow ground water)
    - Cost is prohibitive (how much more?)
    - Customers not willing to pay more
    - Permit inspection issues/risks
    - Local stormwater code requirements were already stricter than state requirements
  - How often are you doing a project where you determine all or most LID options are infeasible?
    - What would it take to make them feasible? (Note: Question is being asked to determine if developers perceive there is wiggle room, rather than to have a list of reasons are infeasible and what changes need to be made to fix the issue.)
  - Are there any LID options for stormwater management that are more challenging to use than others? Which options, and what makes them more challenging?

BARRIERS TO USING LID (5 MINUTES)

Questions Goal: Dig deeper into the barriers that keep them from using more LID.

- Tell me about what you consider to be the biggest barriers to using more LID for stormwater management than you do now on your projects. (PROBE FOR MORE)

  We will listen for barriers such as:
  - Site constraints (existing soils, existing utilities, size, lot coverage) PROBE FOR MORE BEYOND THIS BARRIER
  - Timing of infiltration testing (must be done in wet season)
  - Lack of time/takes more time
  - Costs to develop
  - Lender not familiar with LID, financing limits LID
  - Additional design time/effort
  - Concerns about flood hazard or liability (site is in a flood hazard zone)
  - LID increases permit review time/complexity
  - Inspection takes longer
  - Local stormwater plan review staff require conventional stormwater structures and pipes as backup
  - Local stormwater plan review staff don't understand proposed LID
  - Local stormwater code requirements do not allow the proposed LID
  - Client won't pay more and doesn't want LID
  - Client doesn't want to deal with LID maintenance
  - Client doesn't understand or value LID/benefits of LID
  - Lack of industry standards
  - Lack of familiarity with LID methods/options and which are most effective
  - Lack of information regarding what's possible on the site
- Do certain projects have barriers that others don't? Tell me more about that?
- What specifically would help you overcome these barriers?
- What about retrofit projects or redevelopment, what barriers are there to adding LID when doing those types of projects?

INCENTIVES/PROGRAMS/FUNDING (5 MINUTES)

Questions Goal: Learn about any existing incentives/programs/funding that developers like and how they can be improved. Begin to elicit ideas for other types of incentives or programs that might motivate using more LID.

- What stormwater development incentives/programs/funding are you aware of to increase the use of LID?
  - Which city/county/entity offers this incentive?
  - Can you describe the incentive?
  - Have you used this specific incentive/program/funding?
    - IF YES:
      - What worked well?
      - What needs to be improved?

    - IF NO:
        - What about it do you find appealing?
- What other types of stormwater development information/incentives/programs/funding could be offered to encourage you to use more LID? (PROBE)

  We will listen for incentives such as:
  - Direct financial incentives (reduced fees charged during development, tax credits or rebates, grants or cost-share)
  - Reduced fees charged after development (e.g., ongoing annual stormwater fees)
  - Expedited permitting/reduced review periods
  - Project design changes (ability to build more units, add height)
  - Ability to stage in right-of-way
  - Ability to cluster development in one area
  - Ability to modify parking
  - Adjusting street landscaping standards and setbacks
  - Ability to pay into fund to install LID off-site (e.g., credit trading, fee-in-lieu)
  - Technical assistance
  - Funding source for maintenance
  - Better soil and geology maps and information
  - Provide standard LID designs
  - Performance-based design
  - Incentives from non-government entities (e.g., Salmon Safe, 2030 District)
  - Public recognition/awards
  - Grants for demonstration projects
  - Public-private partnerships (e.g., Seattle Dept of Transportation/Parks) to integrate LID with street improvements or park development
  - Training
  - Training for financers and insurance companies
- What about that incentive/program do you find appealing?
- IF NEEDED: If you had to choose the top three incentives/programs/funding what would they be?

MOTIVATORS FOR USING MORE LID (10 MINUTES)

Questions Goal: Dig deeper into the motivators and incentives/programs/funding that would encourage them to use more LID.

- Which LID options do you find give the most value to the property? (If needed: benefit for the cost spent). For whom? What makes you say that?
  - Which do you feel provide the best features for the building?
  - Which create the best "place" for people to gather, interact, work and play?
  - How do appraisers value LID?
- What would motivate you to use more LID than you do now?

- Would the motivation vary by the type of project? (If needed: In other words, would the project size, location, type, or new vs. retrofit have a role in what incentive would work?)
- Which of the incentives/programs/funding or motivators you mentioned are most attractive to you?
    - Being specific as possible, what would you suggest for a program that would incorporate incentives/programs/funding to encourage you to manage all, or almost all, of your stormwater using LID?
    - What else would encourage your organization to use more LID to manage stormwater?

APPENDIX C: RECRUITMENT GUIDE

LID In-Depth Interviews

#2802

Inty name_____ Date letter sent_____

Date CM_____ Confirmation call made____

Hold (why)_____

Date and Time recruited for:

DATE:_____ TIME:_____

Name_____

Title_____

Company Name_____

Address_____

City/Zip_____

Phone_____

Email_____

Hello, my name is _____ from _____. May I speak with the owner or a project manager who is responsible for making decisions regarding to what extent green stormwater management techniques will be incorporated in to the properties your company develops?

(INTERVIEWER NOTE: WE DO NOT WANT ENGINEERS OR ARCHITECTS. WE WANT THE DECISION MAKER.)

We have been asked to speak with Seattle-area real estate developers to learn about the current challenges they face in our region. These interviews are a way for developers to have a say in upcoming LID tools and incentive programs that will affect their businesses. The interview would last no longer than 30 minutes and to honor your time, we are providing a $200 cash honorarium on completion of the interview. I'd like to ask you a few questions and see if you qualify to participate.

Note: Recruiting guidelines are as follows:

Recruit a mix of:

- Geographic diversity (Q3)
- Type of properties (commercial, mixed-use, multifamily, industrial) (Q4)
- Keep and manage vs. develop and sell (Q5)
- Own financing vs. bank/investor financing (Q6)
- Include developers from the housing authority and non-profits (will determine before call to screen/recruit)

To keep the screener short, we will not be addressing:

- Size of firm – because it is not as critical as the financing and ownership
- Development vs redevelopment – because of the focus on urban/city centers, they will all be doing redevelopment

We heard that the focus of this project is on the hardest places to do LID: in regional growth centers. If we can understand what incentives would motivate developers to go above and beyond with LID in regional growth centers and on commercial and multifamily projects, then those incentives should also work in areas where it is easier to do LID (small towns, rural areas, single-family projects)

Screener Goal: Focus on the decision maker (the developer). While others are involved (architects, engineers, etc.), the developer makes the final decisions about projects and, if motivated to go above and beyond with LID, will direct those others to do so.

Q1. Are you the person who considers recommendations from your team and makes the final decision on what LID storm water management option are put in place on the properties where you build or retrofit buildings?

❑ Yes

❑ No – Can you refer me to the person who is responsible for this role in your organization

❑ No – We do not build the buildings, we just deal with the land before the building goes in → TERMINATE

❑ No – I'm a consultant, my company doesn't build buildings, we only advise people who are building buildings

Note: Interviewer instructions are in all caps and bold.

Q2. How long have you been working as a developer?

_____ (MINIMUM 5 YEARS, PREFER 10 YEARS OR LONGER)

Q3. Do you usually develop buildings in…? (READ LIST) (MARK ALL THAT APPLY) (RECRUIT A MIX FROM THESE CATEGORIES)

- ❑ Downtowns or city centers (in urban or suburban communities)
- ❑ Other urban centers in Seattle like Capitol Hill or the University District
- ❑ Other regional growth centers like Northgate, Tacoma Mall, Southcenter Mall, Puyallup South Hill
- ❑ Other regional growth centers in rural areas like Bremerton or Silverdale
- ❑ Outside city centers of urban or suburban cities
- ❑ Small towns → TERMINATE IF ONLY
- ❑ Rural areas THESE AREAS

Q4. Do you usually work on …? (READ LIST) (MARK ALL THAT APPLY) (RECRUIT A MIX FROM THESE CATEGORIES)

- ❑ Commercial properties
- ❑ Mixed-use properties (i.e. "five over two" aka 7 story building)
- ❑ Multifamily residential properties
- ❑ Single-family residential properties – TERMINATE IF ONLY SINGLE-FAMILY EXCEPT FOR BREMERTON AND SILVERDALE WHERE IT IS OKAY (RECRUIT A FEW)
- ❑ High-rise buildings (RECRUIT A FEW)
- ❑ Industrial (RECRUIT ONE OR TWO)
- ❑ Other (specify) _____
- ❑ (DO NOT READ) None of the above TERMINATE

Q5. I understand that some developers keep the building and manage it, some sell the building after they develop it, and others do both depending on the project. What percent of your projects do you… (FILL IN PERCENTAGE FOR EACH) (RECRUIT A MIX)

Keep and manage the building _____%

Develop the building and then sell it _____%

(DO NOT READ, BUT IF APPLICABLE) Other (specify) _____%

Q6. What percentage of your projects does your organization finance versus obtaining bank or investor financing? (FILL IN PERCENTAGE FOR EACH) (RECRUIT A MIX)

Your organization finances _____% of the buildings you build

The bank or an investor finances _____% of the buildings build

(DO NOT READ, BUT IF APPLICABLE) Other (specify) _____%

IF QUALIFY: (ONLY ONE PARTICIPANT PER COMPANY)

I would like to invite you to participate in a one-on-one research interview to get your thoughts about issues facing developers in the Seattle area. During the discussion, you will have a chance to share your thoughts about LID tools and incentive programs. At the end of the interview, you will receive $200 to compensate you for your time and opinions.
At no time will we attempt to sell you anything. The information you share will us will remain confidential and your identity anonymous.

The meeting will be held at a time that is convenient for you, and we can either speak over the phone or come to your office or other location.

Are you available on _____ (day) at _____ (time)? (IF NO, ASK WHAT TIME WORKS FOR THEM AND TRY TO ACCOMMODATE) (WRITE DOWN AGREED UPON DATE AND TIME)

DATE: _____

TIME. _____

What location would work best for you?

- ❑ At their office (ENTER ADDRESS _____)
- ❑ On the phone [ENTER PHONE NUMBER_____]
- ❑ Other location [ENTER LOCATION NAME/ADDRESS_____)

[IF NOTHING WORKS, THANK AND TERMINATE.]

Thank you and I look forward to speaking with you on _____ (day) at _____ (time), at _____ (location/phone number).

So we can send you a confirmation, can I have your full name, email address and phone number?
[INSERT ON FIRST PAGE OF SCREENER]

APPENDIX D: LID HANDOUT

LID Site Assessment and Design Principles

Site planning and assessment strategies to reduce hard surfaces, integrate natural features into site designs, and preserve native vegetation.

Optimize development envelope
- Smaller lot size
- Reduced setbacks
- Shared driveways

Road layout
- Narrower streets
- Clustered parking
- Bike lanes & paths

Buildings
- Clustering
- Reduced footprints

Preserve open space and native vegetation
- Riparian protection areas
- Passive recreation open space
- Protection of individual trees

What is low impact development?

Constructed facilities that capture and manage stormwater with vegetation and soils.

LID Best Management Practices *(Required for evaluation)*

Amended soils

Dispersion
- Downspout splashbock
- Downspout trench
- Concentrated flow
- Sheet flow

Rain gardens or bioretention

Permeable pavement
- Pervious concrete
- Porous asphalt
- Permeable pavers
- Grass/gravel grids

LID Best Management Practices *(Optional)*

New and retained trees
- Refer to local code requirements

Vegetated roofs

Rainwater harvesting

Minimal excavation foundations