LOW IMPACT DEVELOPMENT LOCAL REGULATION ASSISTANCE PROJECT
2006 PROJECT SUMMARY

INTRODUCTION

The purpose of this project was to work with teams Puget Sound local government staff to prepare and/or revise existing local government regulatory language related to stormwater management and land development to increase the use of low impact development (LID) practices within the local jurisdictions participating in the project.

Following a competitive process, Puget Sound Action Team staff selected eight local governments within Puget Sound to receive technical assistance in 2006:

- Edmonds
- Kirkland
- Lacey
- Mason County
- Normandy Park
- Port Angeles
- Port Orchard
- Woodinville

The ultimate goal for the project (that extends beyond the life of this project) is for staff and managers at the eight local governments to present the draft regulatory changes and other recommendations related to LID to elected officials at the local governments for adoption, thereby removing regulatory hurdles and encouraging the increased use of LID within the jurisdictions.

SCOPE OF SERVICES

To implement the project, staff from the Puget Sound Action Team (PSAT) and AHBL designed the project to occur in each community with the following general steps:

- Initial Kickoff Meeting: PSAT and AHBL staff met with local government staff and a few elected officials from the eight jurisdictions on May 3, 2006. This meeting, held at the Seattle Arboretum, introduced how the project would work and sought to provide the consultant team with an understanding of local political, economic, and environmental conditions that might influence the success of the project for each jurisdiction.

- Scope of Review: After the initial kickoff meeting, the staff of each local government identified the scope of the existing regulations that would be reviewed by AHBL. The scope of services generally identified the regulations that would be reviewed, specific chapters that would be substantially changed or created anew, and other standards such as stormwater best management practices or road details that the jurisdiction wanted prepared.

- Policy Review Meeting: At the policy review meeting, AHBL presented the findings of the policy review and provided local government with initial comments and preliminary materials. From the findings of the policy review, the local government staff, PSAT staff, and AHBL determined the appropriate scope of services that would be provided by AHBL for the regulatory amendments meeting.

- Draft Regulatory Materials: Prior to the regulatory amendments meeting, AHBL prepared regulatory materials that included amendments to existing local regulations, new ordinances, studies and additional information where requested. Draft amendments to existing local regulations were provided where adequate regulations were already in place; where an

equivalent local government regulation could not be reasonably amended to facilitate LID, new ordinances or standards were prepared for review by the local government.

- Regulatory Amendments Meeting: At the regulatory amendments meeting, AHBL presented the draft regulatory materials and additional information as requested by the local government. Local government staff reviewed the documents and provided further input to AHBL staff.

- Regulatory Language Final Draft: AHBL staff prepared final drafts of the regulations and standards consistent with comments provided during regulatory amendments meetings and with other discussion with staff from PSAT, WSU Cooperative Extension, and the Department of Ecology.

COMMON THEMES AND LESSONS

General:

The eight participants in the 2006 local government assistance program consisted of seven municipalities and one county. In general, many jurisdictions were interested in LID implementation that were urban in nature – even more than during the 2005 program. Cities such as Kirkland and Port Orchard showed a noticeable interest in best management practices that could achieve LID objectives through retrofitting existing development or incorporated in urban settings.

Significant interest was shown by most jurisdictions towards new research and studies on green roofs and pervious drivable surfaces. One of the more common concerns was of the load bearing capacity and durability of pervious pavement materials. While this information was eventually obtainable, it took a fair amount of coordination and research to acquire. There are currently a number of permeable pavement providers in the region; however, there are limited formal studies on the long-term capabilities of local applications.

During the code review process, the consultant team discovered that several jurisdictions had yet to establish requirements for certain zoning and public works topics. A few jurisdictions had little to no requirements for clearing, grading or filling; most jurisdictions did not include minimum standards for tree preservation and replanting beyond local heritage or significant tree conservation standards. One implication of the difference in existing codes was that the scope of technical assistance differed greatly between jurisdictions that requested specific amendments to their codes and jurisdictions that requested entire new chapters.

There were only a limited number of occurrences where portions of a jurisdiction's existing code posed obvious hindrances to LID implementation. Much of the review and analysis of existing code therefore centered on optimizing the use of LID regulations and incentives within existing documents and identifying deficiencies in basic standards. All but one package of deliverables included amendments to or new clearing and grading standards. All jurisdictions also requested some form of low impact development standards for projects that would apply under regulations separate from existing subdivision or development code.

Like the participants of the 2005 technical assistance project, many of the jurisdictions expressed considerable gratitude that the deliverables consisted of "ready-for-adoption" ordinances and standards rather than other forms of technical advice. Select code portions were amended in legislative underline/strikeout format to include additional or eliminate specific language or regulations.

Common Themes:

Project Scope

After scheduling kick-off meetings and engaging in telephone calls with the grant participants, the scope of modifications and additions to the local government regulations generally included one or more of the following:

1. Zoning Code
   a. Amendments to the existing impervious surface maximum limits,
   b. Landscape and native vegetation requirements within existing codes,
   c. Transfer of residential density credit standards.
2. Planned Low Impact Development Chapter
   Each jurisdiction requested standards for low impact development projects, with thresholds for defining an LID project and references to the integrated management practices from the *Low Impact Development Technical Guidance Manual for Puget Sound (January 2005)*.
3. Clearing and Grading Chapter
   Washington State Department of Community Trade and Economic Development (CTED) Model Clear and Grade chapter was either integrated into existing codes or adapted per the jurisdiction's request for six of the local governments.
4. Public Works Standards
   a. Road standards allowing for more narrow rights-of-way, reductions in impervious surface, alternative surfacing methods for shoulders and walkways, and bioretention facilities in roadside swales,
   b. Stormwater management regulations allowing the recognition and application of the integrated management practices (IMPs) found in the *Low Impact Development Technical Guidance Manual for Puget Sound (January 2005)* and the best management practices (BMPs) found in the latest *Department of Ecology Stormwater Management Manual for Western Washington,*
   c. LID tree box filter details showing preferred and alternative tree box placement and the tree box in section view.

Jurisdictions tailored their specific requests to problems or inconsistencies existing within their code or current development practices. Every local government requested some form of a stand-alone low impact development chapter, and most governments requested additional zoning LID regulations. A common theme among the majority of governments was interest in LID standards for right-of-ways.

What constitutes an LID Project?

Jurisdictions within both the 2005 and 2006 projects expressed concern that project proponents might call a project "LID," seek incentives or other benefits; yet provide only limited LID techniques. During the 2005 regulation assistance project, the consultant team paid close attention to defining the criteria and expectations of a low impact development project for the participants.

During the 2005 project, the consultant team, working with staff from PSAT, WSU Extension Pierce County, UW, and the Department of Ecology developed premises and expectations for low impact development projects, along with defining LID features. The consultant team refined the definitions of what constitutes an LID project for 2006 by defining the "baseline project" from which LID performance would be measured.

The 2006 project, therefore, focused on taking the previous definition and requirements of an LID project and refining them according to new research provided by outside groups and the insights of the consultant team.

Meetings and Document Review

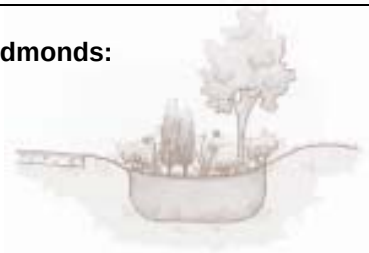
PSAT staff orchestrated a kickoff meeting on May 3, 2006 to introduce staff from the eight local governments to the consultant team and to ensure everyone began the project with a similar understanding of LID at the start of the project. Following the introductory meeting, two working meetings were held with teams of staff from each participating local government. The consultant team then prepared all final deliverables.

Meetings with participating jurisdictions included engineers, planners, and natural resource staff. In the case of Edmonds, Kirkland, and Lacey, meetings were primarily led by engineering staff. This trend was contrary to the turnout during the 2005 technical assistance project, where most jurisdictions were led by planning staff.

Consequently, the consultant team saw a noticeable difference between the requests of the 2005 and 2006 participating local governments. Most of the 2005 technical assistance recipients requested review and amendments to their zoning or municipal codes, such as impervious surface limitations and native vegetation regulations. In addition to zoning requests that resembled the technical assistance provided in 2005, most 2006 technical assistance recipients also requested amendments to road standards, clear and grade chapters, the preparation of entirely new standards for the retention of native vegetation and tree canopy coverage. The biggest addition in 2006 might be the much more developed recommendations on tree canopy coverage.

Special thanks are also in order to Ed O'Brien of the Washington State Department of Ecology and Curtis Hinman of the Washington State University Pierce County Extension for reviewing draft documents developed under this project.

City of Edmonds:



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Scope of Assistance:

Prior to the policy review meeting, the City of Edmonds staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the tasks that the County staff directed the consultant team to complete:

- Review Planned Residential Development Chapter, ECDC 20.35
- Review ROW Standards, ECDC 18.80 & Details
- Review Vegetation Retention, Street Trees & Landscaping, ECDC 18.85 & 20.12
- Review Density Allowances & Incentives, ECDC 16.20
- Prepare Memo Outlining Current Status and Potential Code Challenges
- Prepare Native Vegetation & Impervious Surface Package for Discussion

This direction resulted in the review of the following City codes and standards by the consultant team:

- ECDC 18.45 – Land Clearing and Tree Cutting
- ECDC 18.85 – Street Trees
- ECDC 20.12 – Landscaping Requirements
- ECDC 20.35 – Planned Residential Development
- ECDC 16.20 – RS – Single-Family Residential
- ECDC 18.80 – Streets and Driveways

The policy review meeting with City of Edmonds staff occurred on June 26, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on September 12, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. Draft Native Vegetation Retention Chapter

The City staff indicated during the policy review meeting that they would like to adopt language within the municipal code emphasizing the benefits of trees and vegetation in development. Replanting standards, a tree management plan, and standards for vegetation maintenance were also identified as desirable additions to the Edmonds code. The consultant team prepared a draft Native Vegetation Retention Chapter that specifies requirements for protected native vegetation areas to be set aside in all development projects. The Chapter also furnishes the requested requirements for tree standards within the native vegetation areas, including replanting standards, management plan specifications and maintenance requirements.

2. 18.45 – Land Clearing and Tree Cutting

In order to preserve the environmental amenities of the City of Edmonds, and to encourage less harmful development practices, the City requested revisions to ECDC Chapter 18.45 – Land Clearing and Tree Cutting. The consultant team proposed amendments to ECDC 18.45 that attempt to preserve the existing goals and overall language of the chapter, while reflecting the goals, standards and minimum requirements of the CTED Clearing and Grading Example Code.

3. Planned Low Impact Development Chapter

As mentioned in the initial Municipal Code Review Memo, Chapter 20.35 – Planned Residential Developments already establishes language that reflects the potential for usage of LID in residential projects. The City indicated during the first meeting that the majority of the applications for residential development within Edmonds are short subdivisions; the provision of a Planned Low Impact Development chapter should, therefore, provide benefits for and prevent hindrances to short subdivision development. In the creation of the attached PLID Chapter we excluded any language specifying a minimum development size and included a density benefit specifically for short subdivisions.

4. LID Road Standards and Details

During the policy review meeting the City indicated an interest in examples of road standards featuring LID components and the application of pervious surfaces. The consultant team in turn provided an LID road section and examples of tree filter details for the regulatory amendment meeting. The LID road standards and details include the following:

a. E-LID-1, LID Right-of-Way Section – shows the transition between the existing standard ROW and the proposed LID road section (E-LID-2)
b. E-LID-2, Bioretention Detail – shows the minimum standards for a bioretention swale, with requirements for soil depth and type, maximum slopes, and swale depths

c. E-LID-3, Bioretention Detail
d. E-LID-4, Curb Inlet Detail
e. E-LID-5, Bulbed Tree Box – features a bulbed tree box in which surface water runoff flows into the tree box and either filtrates into the tree root system or is conveyed into the existing storm drainage system
f. E-LID-6, Recessed Tree Box – features a recessed tree box in which surface water runoff is either directed toward the tree box via contoured paving or is conveyed into the existing storm drainage system
g. E-LID-7, LID Tree Box Section – shows a standard tree box at from a section view
h. E-LID-8, Road Transition

5. Additional Work Products – City staff requested for additional research on three different topics, as outlined below:
   a. 18.30.020 Stormwater best management practices (BMPs) – an amendment to existing public works standards, requiring BMPs to be used to control stromwater runoff.
   b. LID Roof Credit Option – a memo to Steve Bullock noting the floor area ratio bonuses for green roofs used by the City of Portland.
   c. PSAT Impervious Surface Comparison – a spreadsheet prepared by AHBL that compares the established impervious surface maximum limits across all eight 2006 participating local governments.

6. Supplementary Information – The consultant team obtained the following additional documents as requested by City staff:
   a. Road Improvement Covenant – an example covenant that provided for access, long-term maintenance, and penalties for the failure to maintain private road improvements and that would include LID drainage improvements.
   b. Green Roofs – a combination of four separate documents: contact information regarding green roof design; Portland's Ecoroof Program Questions and Answers package; "Stormwater Monitoring Two Ecoroofs in Portland, Oregon, USA" – an evaluation of two green roofs in Portland; and "Vegetated Roof Cover" – a summary from the Environmental Protection Agency addressing a vegetated roof in Philadelphia, Pennsylvania.

Findings:

Edmonds Municipal Code establishes a promising platform for LID implementation by establishing regulations for land clearing and grading, planned residential developments, and landscaping that can potentially serve as platforms for further LID implementation. The City of Edmonds' existing municipal codes did not outright preclude or inhibit the use of LID techniques for developers. Edmonds primarily expressed interest in LID techniques that were urban in nature, such as pervious pavement applications, road improvements, and retrofitting existing development.

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Scope of Assistance:

Prior to the policy review meeting, the Kirkland staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the areas of emphasis that the City staff directed the consultant team to pursue:

- Review Chapter 95 – Tree Management and Required Landscaping
- Review Chapter 105 – Parking and Parking Areas
- Review Chapter 110 – Required Public Improvements
- Review Chapter 125 – Planned Unit Developments
- Review Title 22 – Subdivisions
- Review the package of pre-approved plans (street sections)
- Prepare memo outlining current status and potential code challenges
- Prepare guidelines for establishing native vegetation thresholds

This direction resulted in review of the following Kirkland codes and standards by the consultant team:

- Chapter 95 – Tree Management and Required Landscaping
- Chapter 105 – Parking and Parking Areas
- Chapter 110 – Required Public Improvements
- Chapter 125 – Planned Unit Developments

The policy review meeting with the City of Kirkland staff occurred on June 27, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on November 8, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. Public Works Standards – City staff requested new standards drawings reflecting LID objectives and thresholds. The consultant team provided eight new standard drawings that include the following:
   a. LID Detail 60' Right-of-Way CK-LID1
   b. LID Detail Neighborhood Access CK-LID2
   c. LID Detail Curb Inlet CK-LID3
   d. LID Detail Bulb Out Parking CK-LID4
   e. LID Detail Recessed Tree Box CK-LID5
   f. LID Detail Bulbed Tree Box CK-LID6
   g. LID Detail Parking Standards CK-LID7
   h. LID Planter Bed Section CK-LID8
   i. LID Tree Box Section Detail CK-LID9
   j. LID Bioretention Driveway Crossing CK-LID 10

2. Low Impact Development Standards – During the policy review meeting the City expressed interest in the possible addition of a Low Impact Development (LID) Chapter to the Kirkland Municipal Code. The consultant team prepared a LID Chapter for the November 8th meeting that established objective design requirements for projects applying for LID status. The included standards contain minimum requirements for native vegetation preservation ad replanting, impervious surface reduction, and native soil preservation/amendment. As requested by City staff, the final document prepared by the consultants does not include the structure or defining features of a formal ordinance.

3. Additional Work Products
   a. LID incentives – The package includes a table displaying various LID incentives. Many jurisdictions are choosing to offer one or more of these options for projects meeting the PLID standards.
   b. PSAT Impervious Surface Comparison – a spreadsheet prepared by AHBL that compares the established impervious surface maximum limits across all eight 2006 participating local governments.

4. Supplementary Information – The nature of development in Kirkland is such that opportunities for developers to provide for LID stormwater management techniques such as vegetation preservation sometimes conflict with individual objectives to maximize development opportunities. In particular, two LID Best Management Practices (Green Roofs and Pervious Pavement), are effective LID techniques in dense urban areas. The consultant team included additional information on each of these topics.

Green Roof Research:

- "Ecoroof: Questions & Answers" (2000, City of Portland Environmental Services)
  Portland's Ecoroof Program Questions and Answers package is designed for interested parties in either the building field or the general public. While this document does not contain detailed sample information it does provide a general overview of green roof information.

- "Stormwater Monitoring Two Ecoroofs in Portland, Oregon, USA" (2003, Hutchinson, Abrams, et. al.)
  The second packet of information is an evaluation of two green roofs in Portland, Oregon. The study confirmed that ecoroofs can be an effective tool in efficient urban stormwater management.

- "Vegetated Roof Cover" (2000, Environmental Protection Agency)
  The third packet is a brief summary from the EPA addressing a vegetated roof in Philadelphia, Pennsylvania. This document gives a brief summary of the green roof as well as some general conclusions.

Pervious Surface Projects:
The consultant team provided the City with a list of projects throughout the Puget Sound that utilize pervious pavement on elements of their sites. The list was intended to provide Kirkland staff with built examples of pervious surface materials and technologies that can be viewed and examined in person.

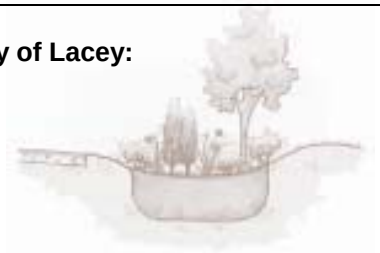
Findings:

The City of Kirkland primarily expressed interest in LID practices that could be achieved through new infill and retrofitting existing development. Initial topics addressed by the consultant team per Kirkland's request were adapting LID techniques to infill, redevelopment within specific locations throughout the city, and adapting existing standard road drawings to include LID features, and addressing the concerns of LID opponents regarding possible negative impacts of residential LID projects.

Kirkland's initial request was for the consultant team to review the general layout of subdivisions, streets, and parking areas; find ways to adapt existing street sections to create new LID road sections; and review

Chapters 18 and 22 from the Kirkland Municipal Code and Chapters 105 and 110 from the Kirkland Zoning Code.

City of Lacey:



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Scope of Assistance:

Prior to the meeting, the City staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the tasks that the City staff directed the consultant team to complete:

- Review 14.31 – Zero Effective Drainage Discharge
- Review information on the City of Olympia's stormwater manual (Lacey will be adopting a similar manual – 2001 DOE w/ some 2005 equivalency updates)
- Review residential ROW sections
- Contact the City of Tumwater about successes with zero discharge ordinance

This direction resulted in a comprehensive review of Lacey codes and standards, along with a detailed review and analysis of Lacey's Zero Effective Drainage Discharge chapter by the consultant team.

The policy review meeting with the City of Lacey staff occurred on June 29, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on September 8, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. 14.31 – Planned Low Impact Development (PLID)

During the first meeting the City indicated interest in the possible addition of a Planned Low Impact Development (PLID) Chapter to the Lacey Municipal Code as a replacement to the zero effective drainage ordinance (Chapter 14.31 LMC). The consultant team prepared a PLID Chapter that establishes objective design requirements for projects applying for LID status.

2. 16.60 – Planned Residential Development

At the request by the City, the consultant team amended the existing Chapter 16.60 LMC to extend planned residential development (PRD) provisions to LID projects. The amendments allow for LID projects that concurrently qualify for PRD status to benefit from the 20 percent density incentive of a PRD.

3. Roadway Sections and Details

The consultant team provided the following six new standard drawings:

- LID Street Design Major Local Residential (Dwg. No. 4-4L.1) – Super elevated local road with sidewalks on each side, 54' ROW

- LID Street Design Minor Local Residential (Dwg. No. 4-4L.2) – Super elevated local road with sidewalks on each side, 50' ROW
- LID Street Design Minor Local Residential (Dwg. No. 4-4L.3)
- Bulb-Out LID Parking For Residential (Dwg. No. 4-4L.4) – Placement of tree filter boxes within street parking scenario
- LID Tree Box for Residential (Dwg. No. 4-4L.5) – Detail for tree box placement
- LID Curb Inlet Detail (Dwg. No. 4-4L.6) – Curb cut allowing stormwater to enter bioretention area
- LID Parking Standards (Dwg. No. 4-4L.7) – Provides for bioretention areas within parking lots
- LID Parking Details (Dwg. No. 4-4L.8A & 4-4L.8B) – Shows bioretention sections to be used within parking lots
- Bioretention Detail (Dwg. No. 4-4.L9) – Shows the minimum standards for a bioretention swale, with requirements for soil depth and type, maximum slopes, and swale depths
- LID Tree Box Section Detail (Dwg. No. 4-4L.10) – Section for a standard tree box planting

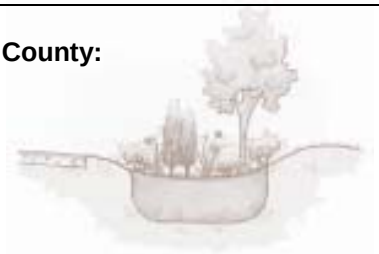
4. Supplemental Information

City staff requested additional information on the maintenance of Gravelpave^2 and Grasspave^2 pervious surfacing products. Maintenance guides for both products were provided by Invisible Structures, Inc. and added to "Maintenance of Low Impact Development Facilities" – a document prepared by the consultant team for the 2005 LID technical assistance grant program.

Findings:

The City of Lacey adopted regulations in 1999 that delivered an opportunity for developers to utilize low impact development techniques and alternative development practices. Zero Effective Drainage Discharge Chapter 14.31 was evidence to the efforts of City staff to implement LID practices throughout the community, however the regulations established within the chapter could be improved through clearer design objectives, more specific requirements, and flexibility within native vegetation retention requirements.

Mason County:



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Scope of Assistance:

Prior to the policy review meeting, Mason County staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the areas of emphasis that the County staff directed the consultant team to pursue:

- Review the Draft Master Development Plan (17.60 – 17.61)
- Review the Small Parcel Stormwater Site Plan Requirements
- Review the appropriate portions of the Development Regulations relating to vegetation and impervious surfaces
- Propose a system of application of LID that could be used in MDPs
- Prepare draft thresholds for native vegetation
- Prepare a memo discussing a variety of LID protection levels

This direction resulted in review of the following Mason County codes and standards by the consultant team:

- MCC 14.44 – Excavation and Grading
- MCC 11.04 – Forest Practices Moratorium
- Draft MCC 17.60 & 17.61 – Master Development Plans
- MCC 16.21 – Performance Subdivisions
- MCC 16.23 – Cluster Subdivisions
- Title 17 – Zoning

The policy review meeting with Mason County staff occurred on June 29, 2006. Present at the meeting were representatives from Taylor Shellfish Farms and Otak, in addition to Mason County staff. At the meeting, County staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the County at the regulatory amendments meeting on September 13, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. Clear and Grade Ordinance

The consultant team prepared a draft Clear and Grade Ordinance for Mason County, based on the CTED Model, that included references to Best Management Practices found in the Washington State Department of Ecology's Stormwater Management Manual (2005) and the various Integrated Management Practices found in the Puget Sound Action Team's Low Impact Development Technical Guidance Manual (2005). The draft Clear and Grade Ordinance, Title 18, was intended to replace the existing MCC 14.44 Excavation and Grading and contains a number of the exemptions allowed under MCC 14.44.

2. 17.31 – Landscaping in the Belfair UGA

During the policy review meeting, the County requested additional native vegetation requirements that would be applicable only to urban areas. The consultant team identified MCC 17.31 as the most appropriate section to place stand alone native vegetation requirements for the Belfair UGA, and MCC 17.17 for the Allyn UGA. The new amendments include a table that provides a minimum amount of native vegetation needed for each zoning designation. This table includes minimum amounts that do not necessarily increase the stringency of regulations for each zone, but rather a format for future LID regulations within the Belfair UGA.

3. 17.17 – Landscaping in the Allyn UGA

As noted above, additional native vegetation requirements were added to the existing Chapter 17.17. Applicable regulations adapted from the Chapter 17.31 were also included in the amendments of MCC 17.17, since this chapter does not yet contain requirements for landscaping. Establishing landscaping and native vegetation codes for the Allyn UGA will hopefully lead to the creation of a framework for development within the Allyn UGA that requires consideration for vegetation and promotes LID goals and objectives.

4. Draft 17.70 –Low Impact Development Chapter

In order to achieve consistency in low impact development standards throughout Mason County, the consultant team prepared a LID chapter that will establish general requirements for LID projects. These requirements were intended to be placed so that they will be applicable to projects within the variety of Mason County urban and rural growth areas. The LID chapter contains thresholds for native vegetation

and impervious surfaces and emphasizes the preservation of pre-development hydrologic conditions. This document is also referenced within the proposed amendments to MCC 16.25 and 17.60.

5. Draft 16.25 – Low Impact Development Subdivisions

The consultant team found through the initial review process that the higher levels of flexibility and creativity that are often necessary to complete a successful LID project appear to be present within the existing MCC 16.21 Performance Subdivisions and MCC 16.23 Cluster Subdivisions. Additionally, Title 16 – Plats and Subdivisions creates a platform for a wide variety of subdivision types, including developments with designs and characteristics that differ from traditional development. In order for LID projects to utilize the benefits of alternative subdivision design, as found in MCC 16.21 and 16.23, the consultant team prepared LID Subdivisions MCC 16.25. As where MCC 16.21 and MCC 16.23 emphasize the provision of open space preservation and creative site design, MCC 16.25 provides density benefits and flexibility in dimensional requirements in exchange for LID design components and strategies. The proposed MCC 16.25 contains basic administrative and procedural regulations and directs the applicant to other sections of the code for most other specific standards.

6. Draft 17.60 – Master Development Plans

The County staff requested review and analysis of the draft MCC 17.60, with the intent of implementation of stronger LID standards and objectives throughout the chapter. At the time of review, the draft Master Development Plans (MDP) Chapter was being reviewed by the Planning Commission. To that end, the consultant team did not formally propose additional amendments to the MDP Chapter. Per the suggestion of the County staff, the consultant team prepared amendments to the MDP Chapter for the possibility of "sunsetting" the LID provisions of the MDP Chapter and replacing them with the draft Low Impact Development Chapter prepared for the regulatory amendments meeting. This was done with the intentions of resulting in a wholesale replacement of the LID provisions with quantifiable design standards that would be easily understood by both the development/engineering community and County staff charged with administering the code.

7. Public Benefit Tax Analysis

The Mason County staff directed the consultant team to research the extent to which the County might be able to provide a tax benefit to LID projects. The consultant team prepared a summary of the tax benefits made available through RCW 84.34. The summary is imbedded in a memo dated September 13, 2006.

Findings:

Mason County's existing development regulations are predominantly organized by zoning designation and the County's five urban/rural growth areas. Fragmentation of development regulations between zones is logical when the variety of land uses requires a broad spectrum of standards; however, it serves as a possible hindrance to regulations such as LID that are applicable for a variety of development types. The consultant team has placed a number of the proposed LID standards in separate, new chapters rather than within specific zones, in order to eliminate redundancy of standards within development regulations and inconsistencies between development types.

MCC 17.60 Master Development Plans has potential to be an appropriate implementation tool of LID for Mason County. The overall integration of LID into the requirements and planning of an MDP, as well as the reiteration of LID principles throughout the Chapter, create a set of regulations that will allow for a strong application of LID. One area of concern, as the chapter is currently written, is the minimum area of 100 acres in urban areas and 250 acres in rural areas required for MDP approval. Although these minimum area requirements are likely intended to limit the chapter's applicability, they may also potentially limit the applicability of the chapter's LID components to only

significantly large projects. The MPD ordinance should not, therefore, be the only vehicle for encouraging and/or requiring LID in Mason County. As a remedy, Mason County is considering language that would establish LID standards for projects of any size.

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Scope of Assistance:

Prior to the meeting, the Normandy Park staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the tasks that the City staff directed the consultant team to complete:

- Review codes pertaining to subdivisions and Planned Residential Developments (PRDs)
- Review existing ROW Standards
- Review codes pertaining to vegetation retention & landscaping
- Prepare draft thresholds for native vegetation
- Prepare memo outlining current status with LID and potential code challenges
- Prepare an example Planned LID package

This direction resulted in review of the following Normandy Park codes and standards by the consultant team:

- Title 10 – Streets and Sidewalks
- Title 17 – Subdivisions and Plats
- Title 18 – Zoning
- Chapter 13.20 NPMC – Land Clearing, Grading, and Filling
- Chapter 18.58 NPMC – Planned Residential Development

The policy review meeting with Normandy Park staff occurred on June 27, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on August 29, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. Land Clearing, Grading and Filling

The consultant team found that Normandy Park's Clearing, Grading, and Filling Chapter 13.20 had strong language encouraging the protection of trees within the intent section of the chapter. In response to that, the consultant team utilized the CTED/DOE Model Clearing and Grading Ordinance in the revisions of Chapter 13.20 of the City's Municipal Code. The draft ordinance not only provides strong provisions for the retention of native vegetation, but also coordinates activities such as Forest Practices. Moreover, the ordinance provides direct citations to the Best Management Practices found in the Washington State Department of Community Trade and Economic Development's Technical Guidance Document for Clearing and Grading in Western Washington (2005).

2. Impervious Surfaces

The consultant team provided draft amendments to City's zoning district dimension chart (Chart 18.15.020 NPMC) and added the definition of impervious surfaces to Chapter 18.08. These amendments include provisions of maximum impervious surface standards that can be applied throughout all zoning designations and standards for maximum impervious surface bonuses for green roofs.

3. Site Landscaping & Tree Retention

The City of Normandy Park does not currently have a landscape chapter in its zoning code. With the exception of provisions for parking lots, planned residential districts (which occur infrequently), signs, and cell towers, the City has no landscape requirements. City staff requested a landscape code that would incorporate tree conservation throughout the City's various land use designations and that would ensure that landscaping is required as development and redevelopment throughout the City occurs. The consultant team provided the City with a draft landscape chapter that addresses both of the above requests.

4. Planned Low Impact Development (PLID) Chapter

During the first meeting City staff and the consultant team discussed the possible addition of a Planned Low Impact Development (PLID) Chapter to the Normandy Park Municipal Code. The consultant team prepared a draft PLID Chapter for the regulatory amendments meeting establishing objective design requirements for projects applying for LID status. The standards contain minimum requirements for native vegetation preservation and replanting, impervious surface, native soil preservation and amendment, and design standards for stormwater systems.

5. Additional Work Documents and Supplemental Information

a. PSAT Impervious Surface Comparison – a spreadsheet prepared by AHBL that compares the established impervious surface maximum limits across all eight 2006 participating local governments.
b. Pervious Concrete Pavement Performance – a letter addressed to Scott Erickson from Willamette Engineering and Earth Science discussing the results of their tests on the load capacity of Stoney Creek Materials' pervious concrete system.
c. StoneyCrete Pervious Concrete Pavement System – general specifications for the pavement system from Stoney Creek Materials.

6. LID Road Standards

Findings:

Like many other local governments in the grant program, Normandy Park requested information on retrofitting existing roads and development and broader urban LID redevelopment techniques. Much of Normandy Park's existing code was similar to other reviewed local governments in the stringency and intensity of regulation. Chapters within the Normandy Park Municipal Code contain language encouraging such LID techniques as vegetation preservation, but the associated engineering standards tend to circumvent direct protection of trees and natural site features.

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Scope of Assistance:

Prior to the policy review meeting, the City of Port Angeles staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the tasks that the City staff directed the consultant team to complete:

- Review Title 17 – Zoning
- Briefly review Title 15 – Environmental Protection & 16 – Subdivisions
- Review the Port Angeles Standards and Guidelines manual, if necessary beyond the road sections
- Review the Draft LID Techniques package
- Prepare Memo outlining current status with LID and potential code challenges
- Prepare Native Vegetation & Impervious Surface Package for Discussion
- Evaluate alternative ROW sections that could be used for LID projects

This direction resulted in review of the following City of Port Angeles codes and standards by the consultant team:

- PAMC 15.24 – Wetlands Protection
- PAMC 15.28 – Clearing, Grading, Filling and Drainage Regulations
- PAMC Title 16 – Subdivisions
- PAMC Title 17 – Zoning
- Road sections and details, provided by the City of Port Angeles

The policy review meeting with Port Angeles staff occurred on June 23, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on September 29, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. 15.28 – Clearing, Grading, Filling and Drainage Regulations

The consultant team prepared revisions to the existing clearing, grading, filling and drainage regulations, Chapter 15.28 PAMC, that preserve the definitions, basic standards, and the overall language and format of the existing chapter and includes elements of the CTED/DOE Model Clearing and Grading Ordinance. Notable elements of the draft chapter are the provisions for native vegetation retention, clarification of exemptions and the coordination of activities such as Forest Practices. The chapter also includes direct citations to the Best Management Practices found in the Washington State Department of Community Trade and Economic Development's Technical Guidance Document for Clearing and Grading in Western Washington (2005)

2. 17.44 – Planned Low Impact Development Chapter

The consultant team prepared LID regulations in the form of a draft planned low impact development (PLID) chapter. The PLID chapter integrates key LID strategies and design criteria with typical

components that might be found in development requirements. Port Angeles requested that the consultant team prepare the design criteria as a separate section, independent from the rest of the PLID. The resulting work product is in two parts: one PLID chapter that references a separate section for design criteria and a stand-alone design criteria section.

3. Right-of-Way Standards and Parking Lot Details

The consultant team provided LID transition plans and details as requested by the City in the policy review meeting. Additional details for LID tree box filters and LID parking planter beds were also provided. The sections and details contained LID functions and features, in addition to basic impervious surface and/or dimensional reductions. Included in the final materials were the following standards and details:

a. LID ROW Section – shows the standard LID street section, including perforated or rolled curbs, a 10 foot utilities easement, bioretention facilities and parking on one side of the street
b. LID Road Transition Plan – shows a transition between the proposed low impact development ROW and the existing standard ROW
c. LID Pervious Paving Details – shows a variety of pervious paving applications
d. LID Parking Planter Bed Section – illustrates bioretention areas within parking lots in section view
e. LID Parking Planter Bed Plan – shows detail of bioretention facilities within parking lots
f. LID Recessed Tree Box Detail – shows preferred tree box placement
g. LID Bulbed Tree Box Detail – shows alternative tree box placement within existing ROWs
h. LID Bioretention Driveway Crossing

4. LID Incentives

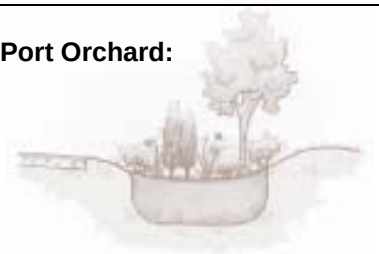
A table outlining various LID incentives was included in the provided documents as requested by City staff.

Findings:

Upon the initial review, the consultant team noticed that the existing Port Angeles zoning regulations do not provide standards regarding vegetation or impervious surfaces. Standard limits for minimum vegetation and maximum impervious surfaces are being implemented across a number of communities, and can often provide a general platform for further LID implementation.

There did not appear to be any specific regulations that would inhibit a development from using LID techniques. Revisions to the existing clearing and grading regulations were an apparent priority for City staff, and hence were provided by the consultant team during the second meeting.

City of Port Orchard:



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Scope of Assistance:

Prior to the meeting, the Port Orchard staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the tasks that the City staff directed the consultant team to complete:

- Review of Port Orchard Zoning Ordinance
- Review of Road Construction Standards
- Review of Title 16 POMC – Subdivisions
- Prepare a memo outlining current status and potential code challenges

This direction resulted in review of the following Port Orchard codes and standards by the consultant team:

- Port Orchard Zoning Ordinance – emphasis on Landscaping, Tree Retention & Parking Lot Standards
- Developers Handbook – emphasis on Road Construction Standards
- Title 16 POMC – Subdivisions

The policy review meeting with the City of Port Orchard staff occurred on July 7, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on November 17, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. ROW and Parking Details

The consultant team prepared the following eight new standard drawings for the City of Port Orchard:

a. LID1, LID Private Road Standard – 20' drivable surface within a 28' ROW
b. LID2, LID Bioretention Detail – LID ROW bioretention facility showing requirements for depths and soils
c. LID3, LID Pervious Paving Detail – Variety of pervious paving applications
d. LID4, Tree Box Parking – Alternative for installation of tree boxes in parking strip
e. LID5, LID Recessed Tree Box – Detail for preferred tree box placement
f. LID6, LID Bulbed Tree Box – Alternative tree box placement for existing ROWs
g. LID7, LID Parking Options – Detail of bioretention areas within parking lots
h. LID8, LID Parking Bed – Bioretention facilities within parking lots in section view
i. LID 9, LID Curb Inlet Detail – Section detail of curb inlet from LID road standards
j. LID10, LID Tree Box Detail – Detail of tree box filter in section view

2. Title 18 – Clear and Grade Ordinance

The City requested during the policy review meeting that the consultant team prepare draft regulations for clearing and grading that would be based on the CTED Model Clearing and Grading Ordinance. The consultant team prepared a Clearing and Grading Ordinance for the City of Port Orchard based on the CTED Model, including references to:

a. Best Management Practices found in the Washington State Department of Community Trade and Economic Development's Technical Guidance Document for Clearing and Grading in Western Washington (2005)
b. Various Integrated Management Practices found in the Puget Sound Action Team's Low Impact Development Technical Guidance Manual (2005)

3. Tree Canopy Standards

City staff expressed an interest in tree canopy preservation options during the July 7th meeting. The consultant team prepared tree canopy standards that require all sites to provide specific canopy coverage within a reasonable number of years. By requiring a certain threshold of tree canopy coverage, rather than requiring a certain number of trees, the City can more accurately achieve its goal of creating canopy coverage to reduce stormwater runoff. These standards were tailored not only for LID projects, but for less progressive developments as well. The final work products associated with tree canopy standards for the City of Port Orchard include a series of tables and graphs illustrating the proposed canopy credit system; memos explaining the contents of the tables; and a final tree canopy conservation chapter.

4. Planned Low Impact Development Chapter

During the first meeting City staff and the consultant team discussed the possible addition of a Planned Low Impact Development (PLID) Chapter to the Port Orchard Municipal Code. The consultant team prepared a draft PLID Chapter for the regulatory amendments meeting that establishes objective design requirements for projects applying for LID status. The included standards contain minimum requirements for native vegetation preservation and replanting, impervious surface, native soil preservation and amendment, and design standards for stormwater systems. The chapter allows developers to use the LID Technical Guidance Manual (Puget Sound Action Team, 2005) and to meet the standards of the current edition of the Department of Ecology's Stormwater Management Manual for Western Washington.

5. Transfer of Residential Density Credits for Low Impact Developments

The City of Port Orchard requested for the consultant team to provide a draft chapter establishing standards for the transfer of density credits (TDC) for LID projects. Included in the chapter are requirements for the sending and receiving sites, as well as guidelines for the transfer. Unlike transfer of residential density credit chapters found in other jurisdictions, this chapter would pertain only to low impact development projects.

6. Additional Work Products
    a. LID incentives – The package includes a table displaying various LID incentives. Many jurisdictions are choosing to offer one or more of these options for projects meeting the PLID standards.
    b. PSAT Impervious Surface Comparison – a spreadsheet prepared by AHBL that compares the established impervious surface maximum limits across all eight 2006 participating local governments.

7. Supplemental Information

a. Green Roofs – The City staff requested further information on three specific areas of low impact development: green roofs, pervious pavement, and recommended native tree species. The consultant team provided the following studies:

- "Ecoroof: Questions & Answers" (2000, City of Portland Environmental Services) Portland's Ecoroof Program Questions and Answers package is designed for interested parties in either the building field or the general public. While this document does not contain detailed sample information it does provide a general overview of green roof information.
- "Stormwater Monitoring Two Ecoroofs in Portland, Oregon, USA" (2003, Hutchinson, Abrams, et. al.)
  The second packet of information is an evaluation of two green roofs in Portland, Oregon. The study confirmed that ecoroofs can be an effective tool in efficient urban stormwater management.
- "Vegetated Roof Cover" (2000, Environmental Protection Agency)
  The third packet is a brief summary from the EPA addressing a vegetated roof in Philadelphia, Pennsylvania. This document gives a brief summary of the green roof as well as some general conclusions.

b. LID Cost Research – In 2004, AHBL evaluated the relative construction costs between eight conventional development systems and their respective LID Best Management Practices. The report illustrates that the difference in installation cost between the techniques, and was made with the best available cost information at the time. The consultant team provided this report to the City of Port Orchard.

Findings:

Port Orchard staff have plans to update both their zoning codes and stormwater management standards. Currently, standards for zoning and land use have not been codified and are still in an ordinance form. This posed a challenge for the consultant team in that sections proposed to be amended or changed by the consultant team may be altered in the near future anyway.

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Scope of Assistance:

Prior to the policy review meeting, the Woodinville staff, PSAT staff and AHBL agreed on a scope of services for the regulations to be reviewed. The following are the areas of emphasis that the City staff directed the consultant team to pursue:

- Review WMC Chapters:
  - 20.02 – Subdivisions
  - 21.12 – Density and Dimensions
  - 21.14 – Design Requirements
  - 21.16 – Tree Retention and Landscaping
  - 21.18 – Parking and Circulation
  - 21.34 – Residential Density Incentives
  - 21.36 – Transfer of Residential Density Credits
  - 21.38 – Property Specific Development Standards
- Prepare a memo outlining current status and potential code challenges
- Prepare a native vegetation and impervious surface package for discussion

This direction resulted in review of the following Woodinville codes and standards by the consultant team:

- 20.02 – Subdivisions
- 21.12 – Density and Dimensions (specifically the R-1 zone)
- 21.14 – Design Requirements
- 21.16 – Tree Retention and Landscaping
- 21.18 – Parking and Circulation
- 21.34 – Residential Density Incentives
- 21.36 – Transfer of Residential Density Credits
- 21.38 – Property Specific Development Standards

The policy review meeting with the City of Woodinville staff occurred on June 20, 2006. At the meeting, City staff directed the consultant team on the content of the desired technical assistance. This direction resulted in the preparation of several work products to be reviewed by the City at the regulatory amendments meeting on August 29, 2006. An outline of these work products is presented below in a topical manner with the full text of the updates attached separately.

Work Products:

1. 21.12 – Density and Dimensions

During the policy review meeting, the City staff directed the consultant team to update the existing density and dimension standards with impervious surface standards for low impact development projects. Draft revisions were added to the table in Section 21.12.030 WMC that reflected a compromise between "typical" LID impervious surface maximums and the existing Woodinville maximums required for each

zone. Also included was a note to the added section that tied the impervious surface requirements to the proposed LID Chapter 21.37 WMC.

2. 21.16 – Tree Retention and Landscaping

City of Woodinville staff made a request during the policy review meeting for the consultant team to create tree credit standards that would allow development projects to emulate typical LID tree canopy coverage standards. For the regulatory amendments meeting, the consultant team drafted tables showing tree canopy coverage calculations, recommended revisions to Chapter 21.16 WMC, and a memo explaining our findings from the calculations and our recommended tree credit distribution.

3. 21.34 – Residential Density Incentives

During the policy review meeting the City expressed interest in the use of residential density incentives (RDIs) for LID projects. Amendments to the City code include the addition of LID projects to the list of public benefits available for RDIs to Chapter 21.34 LMC. The consultant team also integrated a reference to the proposed LID Chapter 21.37 within Chapter 21.34. These additions and their references establish a premise for LID projects to utilize the benefits granted to other publicly-valuable developments. The consultant team also included a statement allowing developments under R-1 through R-6 zoning designations to utilize RDIs, in addition to denser residential designations.

4. 21.36 – Transfer of Residential Density Credits

The consultant team added a statement to allow the transfer of density credits (TDC) for LID projects to Section 21.36.030 WMC in order to facilitate the TDC for low impact development projects. The consultant team also added references to the new draft of Chapter 21.37 in regards to the standards required for the application of density incentives to LID projects.

5. 21.37 – Low Impact Development Chapter

During the policy review meeting the City staff and consultant team discussed the possible addition of a Low Impact Development (LID) Chapter to the Woodinville Municipal Code. For the August 29th meeting, the consultant team prepared a LID Chapter in order to establish requirements for projects applying for LID status. The included standards contain minimum requirements for native vegetation preservation and replanting, impervious surface reduction, and native soil preservation/amendment. The chapter also requires compliance with specific portions of the 2005 LID Technical Guidance Manual for Puget Sound and current edition of the Department of Ecology's Stormwater Management Manual for Western Washington.

6. Roadway Sections and Details

The consultant team prepared road sections and details that applied a low impact development roadway section within the right-of-way for the City's "low density residential street" classification. Additional details for grass paving, pervious concrete sidewalks, and pervious concrete shoulders were provided. These road sections contained LID functions and features, in addition to basic dimensional reductions.

a. 103C – Low Impact Design Residential Streets
b. 103D – Low Impact Design Residential Streets
c. 103E – Low Impact Design Bioretention Facilities
d. 103F – Low Impact Design Pervious Paving

7. Supplemental Information

The City staff requested further information on three specific areas of low impact development: green roofs, pervious pavement, and recommended native tree species. The consultant team provided the following studies:

- "Ecoroof: Questions & Answers" (2000, City of Portland Environmental Services)
  Portland's Ecoroof Program Questions and Answers package is designed for interested parties in either the building field or the general public. While this document does not contain detailed sample information it does provide a general overview of green roof information.

- "Stormwater Monitoring Two Ecoroofs in Portland, Oregon, USA" (2003, Hutchinson, Abrams, et. al.)
  The second packet of information is an evaluation of two green roofs in Portland, Oregon. The study confirmed that ecoroofs can be an effective tool in efficient urban stormwater management.

- "Vegetated Roof Cover" (2000, Environmental Protection Agency)
  The third packet is a brief summary from the EPA addressing a vegetated roof in Philadelphia, Pennsylvania. This document gives a brief summary of the green roof as well as some general conclusions.

- Additional information provided for the City included pervious pavement research from the Low Impact Development Technical Guidance Manual for Puget Sound (Appendix 7). This document consists of a summary of recent research on porous asphalt, permeable pavers, pervious concrete, and maintenance. Some key information included in these studies are initial and late stage infiltration rates, success of maintenance techniques at restoring infiltration capacities, and the generally lower infiltration rates of permeable pavers than poured products.

- The consultant team provided an example tree species table taken from Title 18H Pierce County Code. The table shows a list of tree species that are suited to Pacific Northwest climate conditions.

Findings:

The primary contact for City of Woodinville was Sarah Ruether, Transportation and Environmental Planner. During the initial conversations between city staff and the consultant team, city staff expressed interest in encouraging the use of LD techniques within the Woodinville Municipal Code (WMC) and within their general development practices. The existing WMC includes regulations that both indirectly and directly allow for LID implementation. Basic standards that the consultant team encouraged for all jurisdictions, such as maximum impervious surface limits and tree conservation, were already established. As a result, the consultant team proposed amendments to existing standards to make them "more LID friendly" rather than introducing the concepts anew.