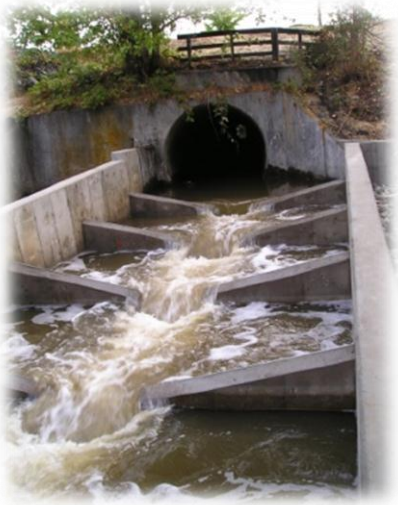

City of Bellevue
Stormwater Management Guide

January 2012

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Message from the Utilities' Director

Dear Reader:

It is with great excitement that the City of Bellevue's Utilities Department publishes this City of Bellevue Stormwater Management Guide.

We hope that this Guide will serve as a source of information and create a shared understanding concerning Bellevue's stormwater management system – both the public and private systems, the City's stormwater services, and areas of stormwater management that the City is often asked questions about.

We are fortunate to live in a region with gorgeous natural areas and an abundance of wildlife. The environment is extremely important to both the people who live and work in the City, as shown annually in the City's customer survey. Together the private and public sectors are partners in protecting Bellevue's natural resources and preserving the environment for generations to come.

This Guide is a work in progress, and we look forward to getting your feedback. Our goal is to improve it over the years so that it becomes a valuable resource to all who use it.

Best regards –
Nav Otal
Utilities' Director

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Introduction to Bellevue Stormwater Management

Purpose of this Guide

Managing stormwater effectively involves cooperative efforts from both the private and public sectors. This Stormwater Management Guide is designed to provide an overview of why and how stormwater is managed in the City of Bellevue, describe roles and responsibilities of private property owners and government jurisdictions, and serve as a resource directing the reader to where additional information can be obtained.

The City of Bellevue's Stormwater Mission Statement

- *Provide a storm and surface water system that controls damage from storms, protects surface water quality, supports fish and wildlife habitat, and protects the environment.*

Guide Organization

This Guide is organized into six sections that provide more information about the overall stormwater management system and the various roles and responsibilities we all have in ensuring that the system operates effectively and efficiently. The sections include:

- History and Overview of Bellevue's Stormwater System
- Bellevue's Stormwater Utility Operational and Financial Framework
- Briefing Papers
- Frequently Asked Questions
- Glossary of Terms
- Appendices

The first section delves into the history of Bellevue's stormwater system and components of the system. It also provides an overview of the various players involved in managing the system. The second section provides information about the framework, both operationally and financially, that the entire stormwater system must work within. Following are eight Briefing Papers that give a closer look at particular topics, a list of frequently asked questions with detailed answers, a glossary of terms to provide a common understanding, and appendices with a map of the City's stormwater drainage basins, an example of customer educational materials, and a list of contacts and references.

Why Stormwater Needs to be Managed

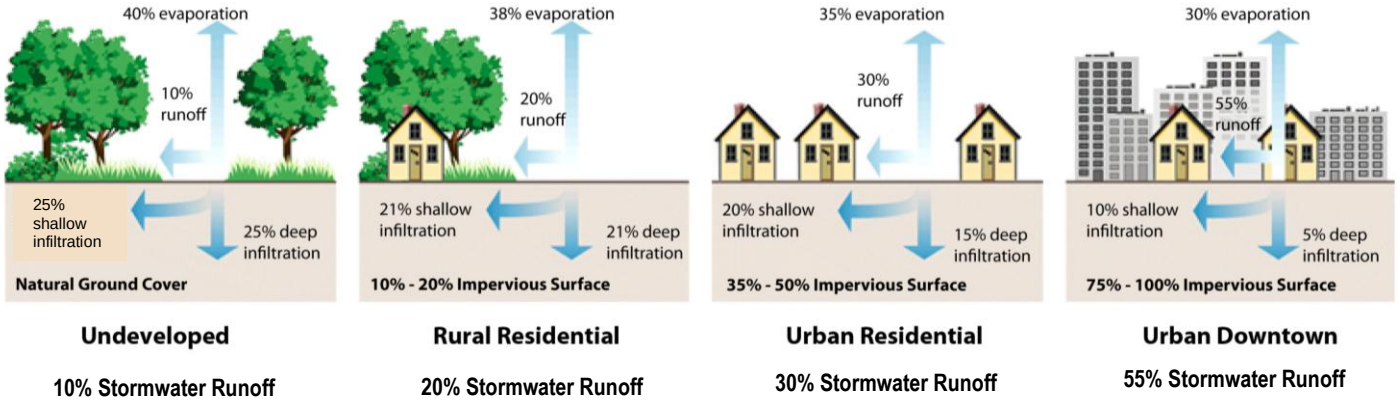
Urbanization increases stormwater runoff, the potential for flooding, and the flow of pollutants into streams, lakes, and wetlands. Stormwater quantity and quality issues are often intertwined. With urbanization comes the increase in hard, impervious surfaces such as sidewalks, streets, parking lots, patios, compacted gravel, and rooftops. Impervious surfaces prevent or hinder water from soaking into the ground and as a result, drastically increase stormwater runoff. As water from rain flows over rooftops, streets, and yards, it picks up and carries pollutants from human activity, such as fertilizers, soap, oil, dirt, metals, solvents, and pet waste. Such pollutants, often called "non-point source

pollution," are a leading cause of water pollution, and are hard to manage. It is often easier and more economical to control pollution at its source than to treat and cleanup waterways afterwards. Areas landscaped with pervious materials, such as native vegetation or grass, allow for water absorption, and as a result, reduce the amount of stormwater runoff and the amount of pollution flowing into local waterways.

Unlike wastewater, most stormwater is not treated to remove pollutants before flowing into local streams, lakes, and wetlands, resulting in pollution of the waterways. Stormwater management has evolved in response to the need to minimize flooding of roads and structures, and protect waterways from pollution.

The graphic below illustrates how urbanization alters the hydrologic cycle when it rains and increases the amount of stormwater runoff.

What Happens When It Rains



Overview of the Bellevue's Stormwater Utility

Bellevue's Stormwater Utility was one of the first established in the nation. The City's philosophy emphasizes maintaining and protecting existing streams, lakes, and wetland. This is accomplished in large part by requiring runoff controls (for both quality and quantity) for new land development to minimize the impacts of urbanization to the natural and constructed stormwater system. Bellevue adopted an ordinance in the mid-1980s that established significant land use protection and development restrictions on properties with streams, wetlands, steep slopes and flood plains. A series of regional runoff control facilities built in the 1970s and 1980s help protect properties located within Bellevue from urban flooding due to prior development, and continuing City capital programs address flooding and water quality issues as they are identified.

Bellevue's Stormwater Utility operates as an enterprise fund – meaning it operates similar to a private business funded primarily through rates and charges paid by customers. Bellevue provides stormwater utility service to and collects fees from all properties within the City limits, including property owned by other government entities such as the City's Parks and Community Services Department, City's Transportation Department, Bellevue School District, and Washington State Department of Transportation.

Why Do People Pay for Stormwater Management?

When their own property seems to drain just fine, people often wonder why they have to pay stormwater rates and charges (called "Drainage Charges" for "Storm and Surface Water Services" on a customer's bill). This Guide explains how money collected from customers is used to benefit everyone who lives and/or works in the City by ensuring a properly functioning stormwater management system. People benefit when they use roads that are not flooded, or when water from uphill areas is safely directed away from downhill properties to prevent flooding of those properties' structures or improvements. Everyone contributes in some way to the need for stormwater services and water pollution prevention. From roofs and driveways, to cars and buses, to yard maintenance and pets, everyone contributes runoff and pollutants to stormwater.

Major Issues Facing Bellevue

- The City's constructed stormwater system, such as pipes and culverts, is aging and most of the system is well past its mid-life and will need to be replaced.
- Compliance with federal and state regulations affects programs Citywide and will have significant long-term impacts on the way the City does business, likely increasing City expenses and possibly raising private development and operational costs.

Key Messages

- *The stormwater management system in Bellevue is a series of connected private and public systems that eventually drain into either Lake Washington or Lake Sammamish.*
- *All properties within the City, whether developed or undeveloped, contribute to stormwater runoff.*
- *All properties within the City benefit from the functions provided by Bellevue's Stormwater Utility.*
- *All properties within the City have the right to develop according to City codes and standards.*
- *Bellevue's Stormwater Utility was established to:*
    - *Provide flood control;*
    - *Protect water quality;*
    - *Provide safe conveyance of stormwater to streams, lakes, and wetlands;*
    - *Protect natural habitat; and,*
    - *Provide education to protect the environment.*
- *Stormwater rates are designed to be commensurate with the amount of stormwater runoff created by a property and vary with the degree of development.*
- *Current federal and state regulations that the City operates under do not require retrofitting of existing stormwater management systems. They provide opportunities for enhanced environmental benefit at the time of development or redevelopment.*

Stream Stabilization and Habitat Enhancement

History and Overview of Bellevue's Stormwater System

History of Stormwater Management in Bellevue

Prior to the 1970s, there was no organized approach to the management of stormwater in the City of Bellevue. Private property owners dug channels or installed pipes to direct the flow of water. When flooding happened or flows were diverted, disputes between neighbors were settled at the coffee shop or in the courtroom. The City did not get involved, and there was no coordinated oversight or rules.

Bellevue residents were vocal about their concerns in the late 1960s regarding increased flooding, water pollution, property damage, and stream bank erosion. In 1970, a citizen-initiated committee was formed in response to these public concerns. The work of this committee resulted in the formation of Bellevue's Stormwater Utility in 1974, the second such utility in the nation. The citizens' advisory committee, now known as the Environmental Services Commission, was formed to oversee the development of rules and regulations governing the management of stormwater. The work of this committee resulted in the development of the first Drainage Master Plan,[1] which was adopted in 1976.

The 1980s brought public stormwater capital improvements identified in the Drainage Master Plan and funded through stormwater rates and charges. These improvements were designed to connect privately-owned stormwater systems that had been developed over the years and minimize flooding. In the mid-1980s, the City Council established land use protections and development restrictions on properties with streams, wetlands, steep slopes, and floodplains (generally known today as "critical areas") by adopting a "Natural Determinants Element" in the City's Comprehensive Plan.

The 1990s brought growth in state and federal involvement with stormwater regulations as the state began to implement the water quality requirements in the Federal Clean Water Act. There was also growth in the regional approach to managing stormwater and aquatic habitat as a result of the Endangered Species Act and Growth Management Act. The state and federal involvement in stormwater regulations culminated with the issuance of the Phase II National Pollutant Discharge Elimination System Municipal Stormwater Permit in 2007, with which all private and public property owners must now comply.

Throughout this time, the City's vision has been to control flooding, preserve open streams, protect water quality, and preserve critical areas, including the protection of habitat. This vision has historically been supported by the residents of Bellevue, with 9 out of 10 respondents agreeing in a recent budget survey that careful and balanced stewardship of our natural environment and natural resources will result in a long-term increase in the quality of life and economic vitality of Bellevue.

> ***Excerpt from the City's "Bellevue 2025 Vision" –***
> *A dedicated steward of environmental quality, where key natural features are preserved and restored.*

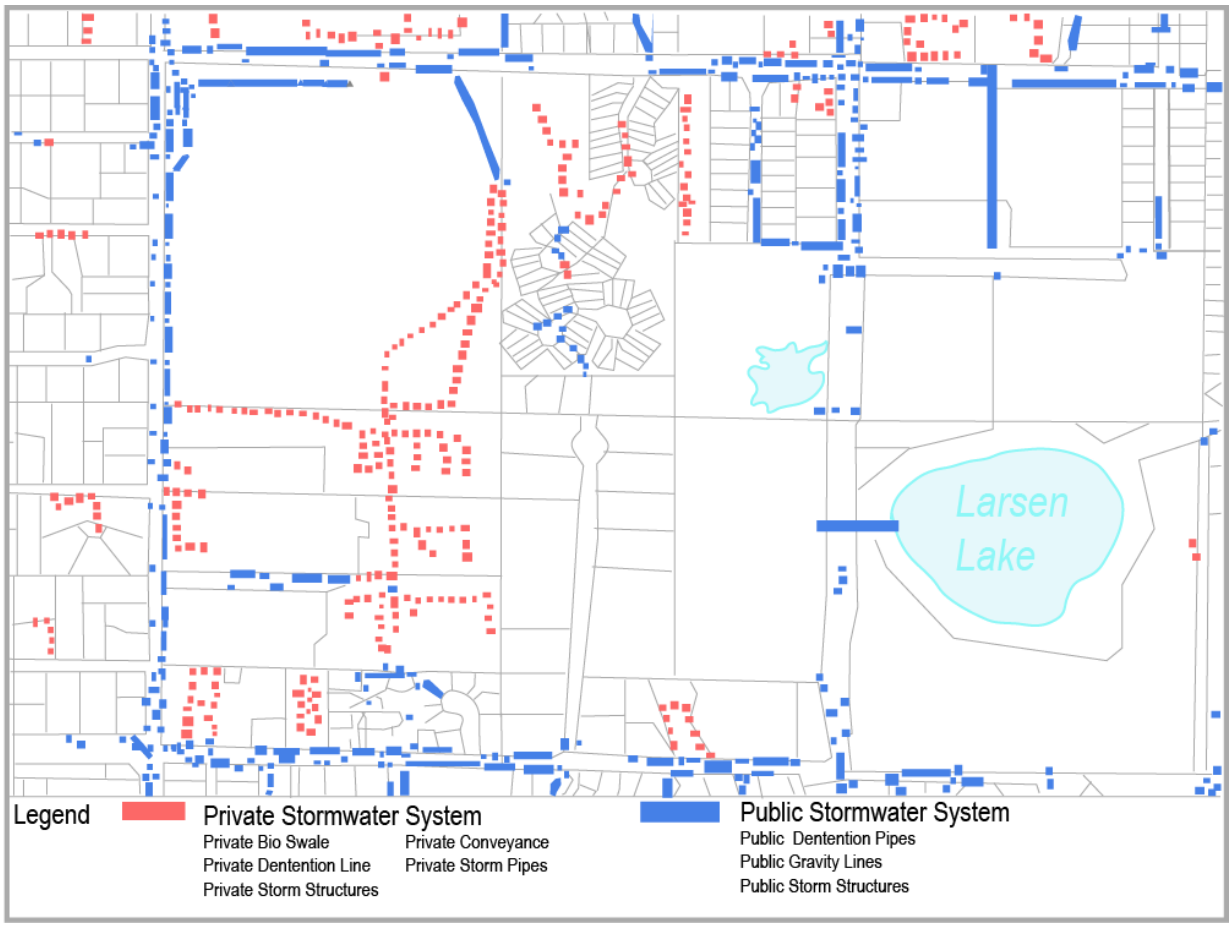
[1] The 1976 Drainage Master Plan has been updated over time and is now known as the Storm and Surface Water System Plan.

Public and Private Stormwater Systems

The stormwater system is not like the drinking water and wastewater systems – which are entirely constructed and piped systems with no natural features, such as streams and lakes. With the drinking water and wastewater systems it is easier to determine private and public roles and responsibilities. Not so with the stormwater system.

The stormwater system is an open system – meaning that some of it is in pipes, but much of it is open and accessible, and consists of a combination of private and public elements. Stormwater can flow from private property to public property to private property to public property, all in the course of a short time and distance. Stormwater runoff doesn't recognize ownership or property lines.

Larsen Lake Area
Example of How Private and Public Stormwater Systems are Intertwined



As illustrated by the map of the private and public stormwater systems around Larsen Lake, stormwater management is a complex system of intertwined public and private systems working together to convey stormwater.

Property owners have a right to develop their property within certain parameters. Downstream property owners are obligated to receive and convey surface waters that are historically attributable to their property. The City indirectly manages stormwater on private property through regulation of development and activities on the land and through public education. The City manages stormwater within rights-of-way and on properties it owns or for which it has stormwater easements.

The waters of Washington State collectively belong to the public and cannot be owned by any one individual or group. Waters of the state include lakes, rivers, streams, creeks, sloughs, marine waters, and wetlands. The Washington State Department of Ecology has regulatory authority over waters of the state and establishes regulations to protect and manage these waters. The general public is responsible for complying with these regulations, as well as court rulings that have involved stormwater runoff issues, in order to protect waters of the state. However, the right to enjoy and/or access these waters depends on underlying property ownership. A significant portion of the waters of the state are located on private property, such as Phantom Lake, which is a privately-owned lake. The remainder of the waters of the state are located on property owned by local, state, federal, and tribal agencies, such as Larsen Lake, which is located on property owned by the City. The responsibility to manage and maintain waters of the state depends on underlying ownership of the land on which the various bodies of water are located. In the City, much of the stream shoreline and lake beds are privately owned.

Street Closure Due to Flooding

Customers Can Help Mitigate Flooding and Prevent Pollution by:

- *Cleaning leaves and sediment out of private stormwater systems.*
- *Incorporating natural drainage practices (also known as low impact development best management practices) where feasible.*
- *Using a commercial car wash.*
- *Practicing natural yard care – use less pesticides, herbicides, and fertilizers.*
- *Picking up and properly disposing of pet waste.*
- *Properly disposing of hazardous wastes.*

Natural vs. Developed

Bellevue has 26 stormwater drainage basins within its borders. Each stormwater drainage basin acts as a funnel by collecting all the water within an area and channeling it to a single point. In Bellevue, stormwater drainage basins convey water to either Lake Washington or Lake Sammamish. Local stormwater drainage systems are part of larger systems or drainage basins that drain to a common point either by themselves or together with other stormwater drainage basins. Bellevue also has over 70 miles of open streams and more than 800 acres of protected wetlands. A map of the City's stormwater drainage basins is included as Appendix A.

The photos below show how development has progressed in Bellevue. Over time, as the City developed, natural, pervious areas (those that allow stormwater to seep into the ground) have been replaced with hard, impervious surfaces such as streets, parking lots, and roofs that increase stormwater runoff. Urbanization has also brought increased human activities on land, which increases the potential for pollution to run off and get carried into local waterways.

Kelsey Creek Basin

1956 – Less than 26% Developed

2001 – Development Covered 42%

Components of the Stormwater Management System

As the City developed, the stormwater management system evolved to include numerous private and public components. These elements combine to establish a system that detains or delays the increased water flow from impervious surfaces. Today, the constructed stormwater management system components include:

City-owned

- Over 19,000 storm drains (also known as catch basins)
- Approximately 400 miles of storm drainage pipelines
- Approximately 85 miles of storm drainage ditches
- 11 regional detention facilities for runoff control and/or water quality[2]
- Approximately 350 stormwater quality treatment and flow control facilities

Privately-owned

- Over 13,000 storm drains (also known as catch basins)
- Over 800 stormwater quality treatment facilities
- Over 900 stormwater flow control facilities
- Numerous privately-owned pipelines (the number and total miles are unknown)

These facilities are used to manage both stormwater quantity (i.e., flooding) and quality (i.e., pollution). It takes a combined public and private effort to properly manage stormwater.

Bellevue covers 31 square miles and is bordered by two large lakes – Lake Washington and Lake Sammamish. Within the City there are three smaller lakes, two of which are privately owned. All the components described above are designed to facilitate stormwater's conveyance to one of these lakes in a way that minimizes flooding, limits stream erosion, and preserves water quality.

Stormwater Management Roles and Responsibilities

Because stormwater knows no boundaries, roles and responsibilities for its management often involve a variety of parties. Following is a brief description of each party's responsibility when it comes to managing stormwater in the City. More detail on roles and responsibilities can be found in Briefing Paper 2 – Public Roles and Responsibilities for Stormwater Management, and Briefing Paper 3 – Ways the Private Sector Manages Stormwater.

Private Property Owners

Private property owners, among other obligations, are responsible for receiving and conveying stormwater flows that historically have been attributed to their private property, maintaining stormwater drainage systems on their property, and making sure that pollutants are not being discharged into water flowing from their property.

Developers

Developers are responsible for controlling flooding and erosion and protecting water quality during land-clearing and grading, building facilities that minimize flooding and water quality impacts, and developing property in a way that is consistent with the codes and standards in place at the time of construction permit application.

[2] Most regional facilities in the City were built in the 1980s to manage stormwater from earlier development.

City of Bellevue

A number of branches of the City government are involved in stormwater management, including the City Council, the Environmental Services Commission, the City Manager's Office, and the Utilities, Development Services, Parks and Community Services, and Transportation Departments.

- **Bellevue City Council**
  The City Council establishes the policies of the City, adopts codes, budgets, and rates, and provides guidance for intergovernmental issues that are implemented by the City Manager and City Departments.

- **Environmental Services Commission (ESC)**
  The Environmental Services Commission is a seven-member citizens' advisory committee that reviews the Utilities Department's planning, budget, rates, and policy issues, and provides recommendations on these matters to the City Council.

- **City Manager's Office**
  The City Manager is the City's chief executive officer who reports directly to the City Council to carry out established policies. The City Manager oversees all City operations, including Utilities.

- **Utilities Storm and Surface Water Utility**
  Manages the City's stormwater system to:
  - Control flooding/minimize property damage;
  - Protect stormwater quality, ultimately protecting water quality;
  - Support fish and wildlife habitat; and,
  - Protect the environment.

Development Plan Review

- **Development Services**
  Manages the following activities that affect stormwater:
  - Oversees compliance with local land use codes and the State Environmental Policy Act;
  - Reviews and enforces critical area and shoreline regulations;
  - Reviews development proposals and inspects construction for consistency with regulations and policies; and,
  - Issues permits or approvals for proposed work, including Clearing and Grading permits.

- **Parks and Community Services**
  Manages large amounts of property, including parks, natural areas and open spaces, recreational areas and facilities, and the streams that cross these properties. The Parks and Community Services Department is the second largest Storm and Surface Water Utility customer.

- **Transportation**
  Maintains existing public streets, rights-of-way, and builds new stormwater facilities for streets. The Transportation Department is the largest Storm and Surface Water Utility customer.

Adjacent Cities and King County

Bellevue is bordered by numerous jurisdictions that also have a role in stormwater management. Neighboring cities and towns vary significantly in size, staffing, and composition, from jurisdictions that are primarily residential, such as Beaux Arts, Clyde Hill, Hunts Point, Medina, Newcastle, and Yarrow Point, to jurisdictions that have a broader mix of commercial and residential development, including Issaquah, Kirkland, Redmond, and Renton. King County has areas of unincorporated land located

within and contiguous to the City of Bellevue. Each of these jurisdictions is involved with issuing permits that deal with land use and environmental protection for projects located in their jurisdictions. Since stormwater does not observe political boundaries, jurisdictions work together where local streams flow into or out of Bellevue.

Washington State

Washington State has numerous departments involved in some way with the management of stormwater within Bellevue's boundaries, including:

- **Department of Ecology (DOE)**
  Responsible for water quality, wetlands, and groundwater, the administration of floodplain management through the National Floodplain Insurance Program, and the issuance and administration of the City's National Pollutant Discharge Elimination System (NPDES) Stormwater Permit, and other Federal Clean Water Act programs, as delegated from the Environmental Protection Agency.

Spawning Salmon in Bellevue Stream

- **Department of Fish and Wildlife (WDFW)**
  Responsible for the preservation, enhancement, and regulation of fish passage and habitat.

- **Department of Natural Resources (DNR)**
  Responsible as property owner for lake beds beyond private property lines, including Lake Washington and Lake Sammamish.

- **Department of Transportation (WSDOT)**
  Responsible as property owner and operator of several miles of limited access freeway rights-of-way and state routes within the City for managing stormwater originating on their properties.

Federal Government

Federal agencies involved in making sure stormwater within Bellevue is properly managed include:

- **Army Corps of Engineers (Corps)**
  Responsible for enforcement of Section 404 permits under the Clean Water Act, wetlands that are considered to be waters of the United States, lake dredging, navigation, and ensuring that storm capital improvement projects comply with any restrictions.

- **National Oceanic and Atmospheric Administration (NOAA) Fisheries Service**
  Responsible for compliance with the Endangered Species Act (ESA).

- **Environmental Protection Agency (EPA)**
  Responsible for Federal Clean Water Act (CWA) compliance and coordination of permit applications with other federal agencies and tribes; has delegated regulatory authority to enforce the CWA to the Washington State Department of Ecology.

- **Federal Emergency Management Agency (FEMA)**
  Responsible for floodplain development standards and the National Flood Insurance Program; oversees the Department of Ecology's administration of the State's program.

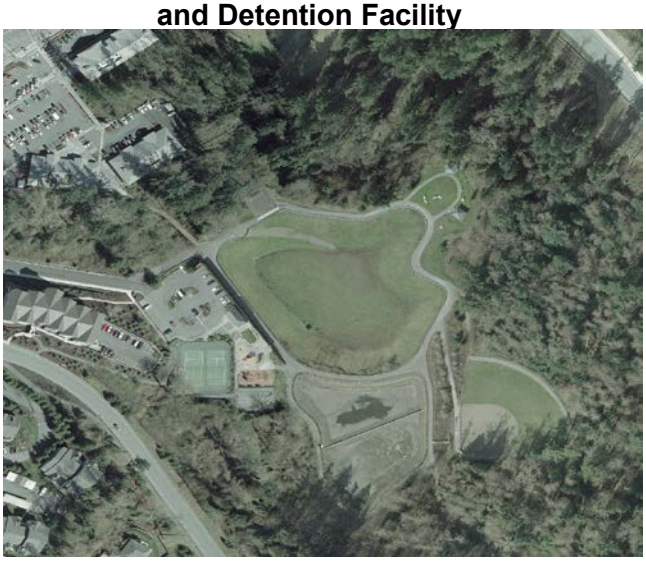
Tribes

Area tribes have an interest in the proper management of stormwater, since treaties provide fish harvest rights and allow tribes to influence federal permit conditions.

Bellevue's Stormwater Management Toolbox

Following are some of the tools used by the City to effectively and efficiently manage stormwater within Bellevue's boundaries:

Lakemont Stormwater Filtration and Detention Facility



- **Planning and Capital Improvement**
  Stormwater System Plans and targeted area studies identify stormwater project and program needs. Stormwater Capital Improvement Program projects fulfill some or all of the following:
  - Protect property from flooding or other stream-related damage;
  - Protect or improve water quality;
  - Maintain or improve the reliability, effectiveness, and/or integrity of the City's public system, such as pipes, catch basins, and underground detention vaults;
  - Promote fiscal stewardship through cost savings or reduced liability;
  - Promote resource stewardship by improving fish or wildlife habitat; and,
  - Respond to regulatory requirements or legal obligations.

- **Operations and Maintenance**
  The City's public stormwater system is operated and maintained to run effectively and efficiently. Activities include:
  - System installation and repair;
  - System structure location and capital project support;
  - Preventative maintenance, including system, water quality, and flow control inspection and cleaning; and,
  - City-wide emergency response, including flood and pollutant spill response and monitoring.

- **Development Regulation**
  City development regulations ensure that development occurs in a way that protects stormwater quality and minimizes flooding. Regulations apply to both private and public development projects. New stormwater quantity and quality regulations went into effect in January 2010 to comply with requirements of the City's NPDES Stormwater Permit, which affects all new development and redevelopment.

- **Monitoring**
  Stormwater quality and quantity monitoring carried out by the City changes over time according to identified needs, project requirements, and regulatory requirements. For example, water quality monitoring is necessary to conduct illicit discharge detection and elimination investigations required by the City's NPDES Stormwater Permit.

- **Property Acquisition**
  The City's acquisition of properties or easements can provide additional water storage during storms, helping to minimize flooding, preserve natural areas, such as steep slopes, wetlands and streams, and protect ecological habitats in critical areas.

- **Public Education and Outreach**
  For many years, the City's educational message for the general public has been "nothing but rain down the storm drain," and the City has relied primarily on education and voluntary compliance. The NPDES Stormwater Permit now requires that the City use an approach that includes escalating enforcement, including fines for violations of the City code. The City recognizes that it will probably take years and a great deal of effort to inform people and accomplish the societal changes necessary to reduce pollutants in the stormwater system. Therefore, the City has broadened its public education efforts, with the goal of protecting the environment, not penalizing citizens. "*Do You Want Clean Water in Your Community*," an example of a recent brochure developed to educate the public, is included as Appendix B.

  Similar to other conservation programs, success in making changes will require clear, consistent messaging over many years. Current stormwater public education and outreach programs target a variety of audiences, including homeowners, youth, businesses, and community and charitable groups. Programs include:
  - Volunteer stream restoration and fisheries monitoring;
  - Charity car wash kits and technical assistance;
  - Storm drain markers;
  - Natural yard care;
  - Household hazardous waste and used motor oil recycling;
  - Commercial Best Management Practices brochures; and,
  - School assemblies, workshops, and technical assistance.

  Utilities' Maintenance Inspection

  Studies have shown that it is cheaper to prevent pollution and minimize flooding than to clean up the after effects. The City makes significant efforts to educate and raise the public's awareness regarding what they can do to help.

- **Voluntary Compliance and Enforcement**
  Private systems are an integral part of the stormwater system. The City inspects private commercial stormwater systems every two years and requires cleaning and repair as appropriate. The inspections provide an opportunity to educate the private sector about stormwater management and the City's mission. Over 7,500 lids are pulled on private stormwater drainage facilities annually, so inspections can take place and deficiencies can be noted and fixed. Without properly maintained and functioning private systems, the public system cannot provide the level of protection expected.

- **Tree Canopy Coverage**
  The City's Tree Preservation Code supports the preservation of tree canopy coverage that is beneficial for stormwater retention and treatment.

Briefing Papers

The following Briefing Papers are relevant to Bellevue's Stormwater History and System:
- Briefing Paper 1 – Regulations Governing Stormwater Management
- Briefing Paper 2 – Public Roles and Responsibilities for Stormwater Management
- Briefing Paper 3 – Ways the Private Sector Manages Stormwater
- Briefing Paper 7 – Private Lakes
- Briefing Paper 8 – Natural Drainage Practices

Canoeing in Mercer Slough

Bellevue's Stormwater Utility Operational and Financial Framework

Bellevue's Guiding Policies, Codes, and Standards

The following Council-adopted documents guide stormwater management throughout the City:

- City's Comprehensive Plan – Utilities and Environmental Elements
- City's Comprehensive Drainage Plan (1994) (currently being updated and will be known as the Storm and Surface Water System Plan)
- Utilities Financial Policies
- Storm and Surface Water Code (BCC 24.06)
- Civil Violations Code (BCC 1.18)
- Clearing and Grading Code (BCC 23.76)
- Areas of Special Flood Hazard (BCC 20.25H.175)
- Storm and Surface Water Engineering and Maintenance Standards
- Clearing and Grading Development Standards

Bellevue's Stormwater Management Financial Policies and Principles

The City's financial policies, investments, and consistent commitment have placed Bellevue's Stormwater Utility in a solid financial position. The City's funding of stormwater management is accomplished primarily through the Utilities Department, which is a financially self-supporting enterprise operating within the City structure. The City's Stormwater Utility was established with the fiscal goals of financial stewardship, self-sufficient funding, and comprehensive planning. Stormwater rates paid by customers are the Utility's primary source of funding. Financial planning for the City's Stormwater Utility ranges from a short-term (6-year) budget forecast to a very long-term (75- to 100-year) capital funding forecast.

Bellevue's Stormwater Utility's Financial Policies

- *Plan for long-term investment in the stormwater system.*
- *Accumulate funds in advance of major expenses.*
- *Maintain existing levels of service by renewing and replacing systems.*
- *Keep rate increases gradual and uniform.*
- *Maintain equity – each generation should pay its fair share.*
- *Use debt sparingly and maintain financial flexibility.*

Stormwater Rates

All properties within the City contribute stormwater runoff and/or benefit from the functions of the City's Stormwater Utility. Each property owner pays a bi-monthly charge designed to recover a share of the costs of providing stormwater services in proportion to the costs imposed and the benefits received by their property. The City's Stormwater Utility benefits properties throughout Bellevue in the following ways:

- Provides stormwater systems for collection, conveyance, detention, treatment, and release;
- Reduces flooding hazards; and,
- Minimizes pollution, resulting in improved water quality.

Calculation of Stormwater Rates

Stormwater rates are based on the relative contribution of stormwater runoff from each property. The rates take into account each property's size and percentage of impervious surface, which together provides an estimate of stormwater runoff (even undeveloped property generates stormwater runoff). Customers are billed every other month. Their bill includes a billing charge (i.e., flat fee), plus a charge that is calculated based on the approximate percentage of impervious surface on their property. For example:

2012 Stormwater Rates

Type of Property	Typical Square Footage	Typical Impervious Surface	Typical Development Category	Billing Charge	Square Footage Charge (per 2000 ft.^{2})	Total Every Other Month Charge (with tax)
Average Single-family Residential	10,000 ft.^{2}	1% to 20%	Moderately Developed	$4.07	$6.12	$36.52
Large Single-family Residential	22,000 ft.^{2}	21% to 40%	Moderately Developed	$4.07	$6.12	$75.21
Average Commercial	44,000 ft.^{2}	41% to 70%	Heavily Developed	$4.07	$9.17	$216.82
Large Retail	470,500 ft.^{2}	Over 70%	Very Heavily Developed	$4.07	$12.21	$3,040

How Stormwater Funds are Used

The City's Stormwater Utility is an enterprise fund, which means that by state law, revenues from stormwater management rates and charges must be used for the benefit of the Stormwater Utility, and they cannot be used for general government purposes or to improve or maintain private drainage systems. Utilities relies almost entirely on rate revenue to pay for public stormwater system operations and maintenance expenses, capital improvement projects, and a contribution to long-term capital reserves for the eventual replacement of aging public systems.

Operations and maintenance expenses include:

- Inspection and preventative maintenance activities to meet the City's National Pollutant Discharge Elimination System (NPDES) Stormwater Permit requirements;
- System repair and installation to meet NPDES Stormwater Permit requirements;
- Customer service; and,
- Emergency response.

Capital improvement projects and programs are identified based on the Drainage Master Plan,[1] targeted basin and technical studies, and the Utility's asset management program. They address:

- Infrastructure rehabilitation;
- Environmental preservation; and,
- Flood control.

[1] The Drainage Master Plan is being updated, and will be known at the Storm and Surface Water System Plan once adopted.

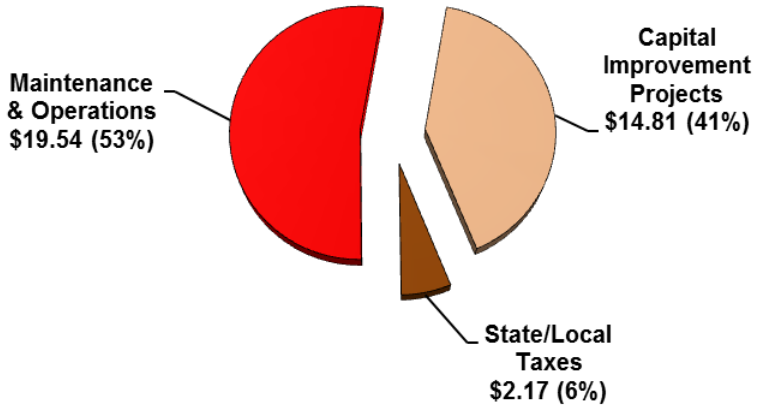
Contributions to reserves are based on a long-term funding strategy designed to provide adequate funds for replacing aging systems while minimizing rate impacts and maintaining an equitable distribution of costs among generations of customers.

The 2012 Stormwater Budget

The budget for stormwater in 2012 is $18.5 million and includes rate revenues of $16.3 million, $1.2 million in miscellaneous revenues (i.e., grant revenue, developer fees, and interest earnings), and the use of $1.0 million in operating reserves. These funds will pay for $11.0 million in operations and maintenance expenses, $6.0 million in capital improvements, and $1.5 million saved for system replacement.

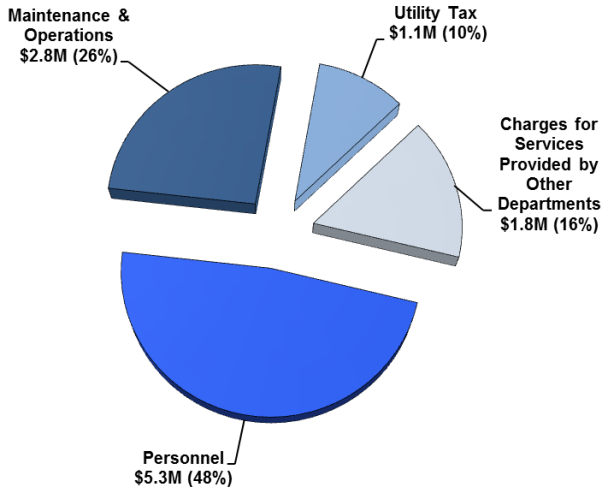
In 2012, the typical single-family resident is billed $36.52, including a City tax, every other month for stormwater services. The following graph shows a breakdown of what the typical customer's bill pays for over that two-month period:

Typical Single-Family Residential Bill
Every Other Month = $36.52

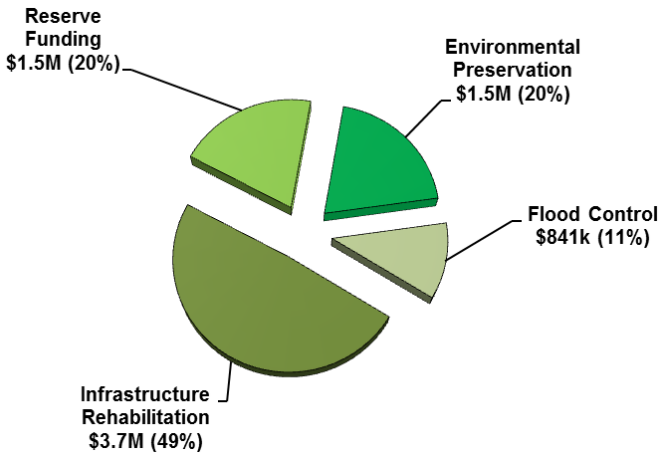


Rate revenue generated through billing customers and the other revenue sources noted above are used for these categories of operating expenses, capital improvements, and reserves:

Operating Expenses by Category
$11.0 Million



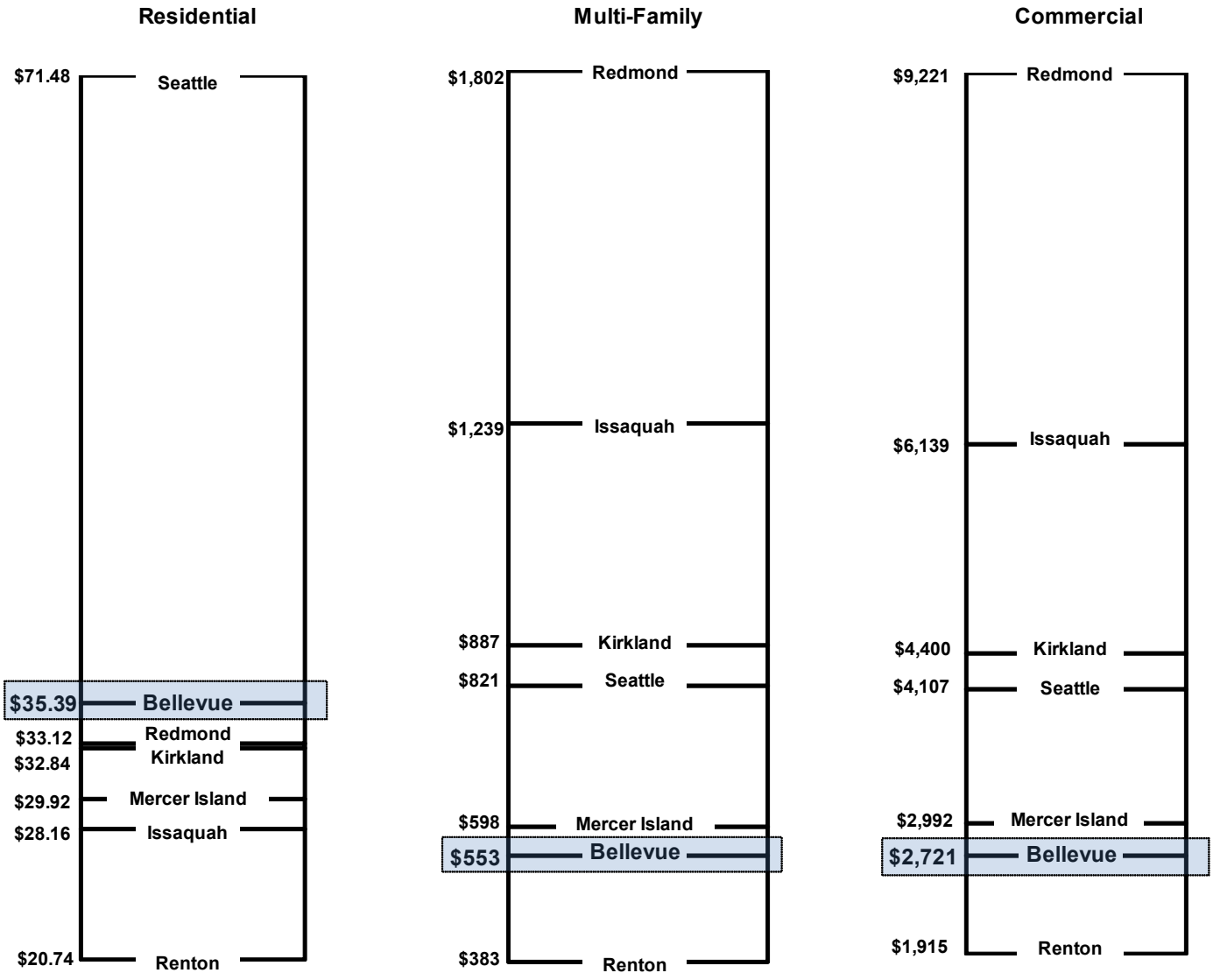
Capital Expenses by Category
$7.5 Million



Comparison of Stormwater Rates

Bellevue's stormwater rates are very competitive with those of other area utilities, as shown in the following graph. Bellevue's stormwater rates include contributions to a reserve fund to replace aging systems, where most other jurisdictions' rates do not. As other jurisdictions face the cost of replacing their aging systems by using debt or significantly increasing rates, Bellevue's rates should be even more competitive in the future.

Stormwater Utility
2011 Bi-Monthly Bill Comparison



Stormwater's Regulatory Environment

The following regulations directly affect how stormwater is managed within the City:

- **Federal Clean Water Act**
  The Environmental Protection Agency (EPA) has regulatory authority to enforce the Federal Clean Water Act, but has delegated the authority for municipal stormwater permits to the Washington State Department of Ecology (DOE).

- **Federal Endangered Species Act**
  The National Oceanic and Atmospheric Administration (NOAA Fisheries) and the US Fish and Wildlife Agency are involved with enforcement and ensure that the City complies with the Federal Endangered Species Act. Regionally, a Salmon Recovery Plan has been developed through the Washington Resource Inventory Area (WRIA 8) and Shared Strategy for Salmon Recovery programs.

- **National Flood Insurance Program**
  The Federal Emergency Management Agency (FEMA) has regulatory authority to enforce the National Flood Insurance Program (NFIP). The NFIP offers government subsidized flood insurance policies to businesses and residents of participating communities. Member communities agree to manage flood hazard areas (also known as floodplains) by adopting specific regulatory standards. In some circumstances, communities adopt regulatory standards that exceed the NFIP minimum standards, in which case, flood insurance premiums are discounted further.

- **State Initiatives**
  The Washington Department of Ecology (DOE) issued the 2005 Stormwater Management Manual, which the City has adopted. Under the terms of NPDES Stormwater Permit, the City is required to comply with the best management practices outlined in the Manual. State standards are more restrictive than those issued by the federal government. The State Legislature established the Puget Sound Partnership in an effort to restore the health of Puget Sound. The Puget Sound Recovery Plan that has been developed as part of this initiative includes stormwater as one element.

Legal Principles Governing Stormwater

- *Property owners have the right to develop their property, but must do so in accordance with local zoning and land use codes, current engineering standards, and other regulations.*
- *Developing property owners must discharge stormwater runoff in a manner and location consistent with conditions prior to development.*
- *Downstream property owners are obligated to receive and convey stormwater runoff from land that historically drained to their property.*
- *Local stormwater agencies have no duty to remedy drainage disputes between property owners.*
- *Government may act to protect its property as any other property owner.*

The Future of Stormwater Management

Stormwater management in the City is evolving due to the complex and changing nature of the regulatory framework governing stormwater. New development regulations have gone into effect and will change how development impacts stormwater. The NPDES Stormwater Permit's requirements may escalate, which will likely increase City expenses and may raise private development and operational costs. The City is ramping up to repair and/or replace major pieces of the City's stormwater system over the next few decades. The City's Storm and Surface Water System Plan is now being updated and will provide a roadmap for the future of stormwater management in the City.

- **Storm and Surface Water System Plan**
  The Storm and Surface Water System Plan is a system-wide planning and management strategy document that supports the City's Utilities Department operations. The Plan does not define specific regulatory or capital programs, which are defined in the City's biennial budget, policies, code and standard update processes, and NPDES Permit requirements. The Plan includes policies that govern system management and operation and establishes goals for the types of services to be offered. It also summarizes known system data, including hydraulic and hydrologic models of streams and pipes, flooding and floodplain information, basin statistics, water quality and biological information, and structural components. It identifies data gaps and proposes strategies for resolution, and it identifies deficiencies and recommends and prioritizes improvements to the public stormwater system.

Briefing Papers

The following Briefing Papers are relevant to the City's Operational Framework for Stormwater:

- Briefing Paper 1 – Regulations Governing Stormwater Management
- Briefing Paper 2 – Public Roles and Responsibilities for Stormwater Management
- Briefing Paper 3 – Ways the Private Sector Manages Stormwater
- Briefing Paper 4 – Flood Control
- Briefing Paper 5 – Stormwater Impacts on Fish and Habitat
- Briefing Paper 6 – Stormwater Impacts on Surface Water Quality
- Briefing Paper 7 – Private Lakes
- Briefing Paper 8 – Natural Drainage Practices

Best Management Practice – Rock Ditch Filter for Runoff

Briefing Paper 1 – Regulations Governing Stormwater Management

Key Messages

- *The regulatory framework governing stormwater is complex.*
- *Many regulatory programs come into play from all levels of government, and local governments providing stormwater management services are directed by federal and state requirements.*
- *Federal, state, and local regulations direct individual citizens and the City of Bellevue to work together to effectively minimize stormwater impacts.*
- *The City strives to use resources effectively and efficiently to comply with current stormwater regulations.*

City's Objective

To comply with federal, state, and local mandates while using resources effectively and efficiently.

Background

The City's stormwater management efforts are significantly shaped by three federal laws: the Clean Water Act, the National Flood Insurance Act, and the Endangered Species Act. These Acts establish specific roles and requirements for federal, state, and local agencies, as well as for private property owners. The federal requirements are modified from time to time, typically increasing stormwater management requirements and costs for both private property owners and local governments. In addition, states have their own water pollution control laws.

Counties and cities implement the federal and state mandates as well as their own community-driven policies and regulations. These mandates inform the stormwater management regulations and policies contained in Bellevue's City Codes, stormwater engineering and maintenance standards, clearing and grading development standards, and the City's Comprehensive Plan policies, including the Storm and Surface Water System Plan.

Federal Clean Water Act

This Act contains several regulatory programs aimed at protecting water quality and restoring surface water for "fishable, swimmable uses." Local stormwater management programs across the country are required to obtain permits from the Environmental Protection Agency (EPA) to discharge stormwater runoff. In Washington, the EPA has delegated authority for water quality regulatory programs to the state Department of Ecology (DOE).

The EPA's National Pollutant Discharge Elimination System (NPDES) permits require cities to implement permit-specified best management practices (BMPs) to reduce the discharge of stormwater pollutants to the "maximum extent practicable" and to help protect water quality. The permit-specified BMPs are collectively referred to as the Stormwater Management Program and require actions by private property owners as well as local government. NPDES permits are typically revised and reissued by DOE every five years.

The Clean Water Act includes several other regulatory programs that affect local government stormwater management efforts and private property owners. These programs require site-specific NPDES permits for construction, as well as industrial activities and aquatic pesticide application. The

regulatory programs set water quality standards for surface water, identify impaired surface waters, and develop waterbody-specific water quality cleanup plans that direct stormwater management actions of property owners and local governments. The federal programs also require permits for restoring and/or dredging streams, lakes, and wetlands.

Local governments are charged with meeting federal and state requirements, as well as ensuring that private property owners meet their NPDES stormwater management obligations. While implementing new federal and state requirements, the City is required to continue existing stormwater management efforts. Adding new services while continuing existing services creates a challenge for the City when it comes to holding down costs.

Federal Endangered Species Act

This Act contains programs aimed at the conservation of endangered or threatened species, as well as the ecosystems on which those species depend. The U.S. Fish and Wildlife Services and the National Oceanic and Atmospheric Administration (NOAA) administer these programs. In addition, Native American Tribes and the state Department of Fish and Wildlife co-manage state fish, shellfish, and wildlife resources. In 2005, the Bellevue City Council adopted the Lake Washington/Cedar/ Sammamish Watershed Chinook Salmon Conservation Plan to assist in the recovery of federally protected Chinook salmon. The City also participates in the Regional Roads Maintenance Forum to reduce impacts to salmon habitat from operations and maintenance activities. Development that may affect salmon or salmon habitat requires consultation with federal agencies to demonstrate “no harm” to federally protected species, requiring additional documentation, time, and cost. Federal agencies must also consult with the National Marine Fisheries to show that their regulations and programs do not adversely affect salmon or salmon habitat. These consultations result in Biological Opinions that may identify necessary changes to federal programs to avoid harming salmon.

Federal National Flood Insurance Act of 1968

This Act contains programs administered by the Federal Emergency Management Agency (FEMA) aimed at minimizing flood damage, including mapping regulatory floodplains; setting minimum floodplain management requirements; and, enabling property owners to purchase insurance against flood losses if local municipalities adopt and enforce floodplain management regulations. Bellevue’s participation in this federal program and evaluation through the Community Rating System (CRS) reduces flood insurance premium rates for policy holders by up to 25%. The City’s floodplain management program was recertified by FEMA in 2010 and ranks among the top 5% of communities across the country.

In 2008, National Marine Fisheries conducted a consultation under the Federal Endangered Species Act and delivered a Biological Opinion that determined the National Flood Insurance Program had the potential to impact Chinook salmon or their habitat. Local jurisdictions participating in the program are currently evaluating their floodplain regulations and permit requirements to comply with new minimum standards to assure that development within floodplains does not adversely affect Chinook salmon.

Topics to Note

- *Federal and state regulations are evolving, and while intended to improve water quality, continue to add significant requirements and cost to stormwater management over time.*
- *City stormwater managers must find ways to fund efforts to comply with new requirements while continuing to provide local stormwater services.*
- *Compliance with the City’s NPDES Permit may have significant long-term impacts on the way the City does business, likely increasing City expenses and possibly raising private development and operational costs.*

Briefing Paper 2 – Public Roles and Responsibilities for Stormwater Management

Key Messages

- *Stormwater systems are complicated combinations of private and public systems that work together to convey stormwater, control flooding, and protect water quality.*
- *System ownership generally determines roles and responsibilities for stormwater management actions.*
- *The City manages stormwater systems within public rights-of-way and on properties it owns or for which it has easements.*
- *The City provides emergency response services for flooding and pollution events.*
- *The City indirectly manages stormwater on private property through regulation of development and activities, maintenance inspections, and public education and outreach.*
- *Stormwater rates and charges revenue may be used only for public stormwater system management.*
- *By state law, private stormwater systems are maintained and managed by the private property owners.*

City's Objective

To partner with property owners within the City to provide a stormwater management system that controls damage from storms, protects surface water quality, supports fish and wildlife habitat, and protects the environment.

Background

The stormwater system is a complicated interplay between private and public drainage systems. Stormwater flows freely between the private and public systems, and responsibility for management of that water shifts accordingly. A single pipe or stream may begin as private property; transfer to public ownership as it crosses a road right-of-way, drainage easement, or dedicated drainage tract; then transfer to yet another private property owner as it routes water downhill.

Stormwater management differs from other City-provided utility services such as drinking water and wastewater services. Some unique stormwater management characteristics include:

- The stormwater system developed over time in response to people's demands and evolving regulations to manage stormwater runoff and accommodate incremental land use changes. Older parts of the system were not the result of a unified planning effort; nor were they designed or constructed to specific standards since no standards existed at the time.
- The resulting stormwater system has been inherited by current private and public property owners who are responsible for various parts of the system.
- Significant portions of the stormwater system are owned and managed by private interests, while other portions are owned and managed by the City.

In large part, City stormwater management services are directed by federal and state requirements. Local stormwater management policies are set by the City Council with advice from the Environmental Services Commission. Stormwater rates and charges are set to meet federal and state requirements, as well as community-driven levels of service and local policies. By long-standing City policy, all

property owners contribute to the maintenance and operation of the City-wide public stormwater system.

The City's stormwater management program:

- Provides emergency response services for flooding and pollution events;
- Manages stormwater systems within public rights-of-way and on properties it owns or for which it has easements; and,
- Indirectly manages stormwater systems on private property through regulation of development and activities, maintenance inspections, and public education and outreach.

The City manages, operates, and maintains the public stormwater system to federal and state standards, and permits and inspects new development and redevelopment to assure that flow control and water quality treatment systems comply with these standards. The City also plans for new public systems and improvements, manages finances, administers stormwater management programs, designs and constructs projects for new and/or refurbished public stormwater systems to resolve problems, and manages districts providing special benefits to property owners within the district area, such as Local Improvement Districts and Lake Management Districts. The City inspects and advises private property owners on operation and maintenance of their stormwater systems. Finally, the City responds to emergency flooding and pollution events.

All stormwater systems, both private and public, must operate together to minimize flooding and protect water quality. Federal, state, and city regulations provide this protection by requiring systems to be maintained to established standards. Insufficient maintenance of one system or group of systems can cause severe flooding or water quality problems for many others.

Providing cost-effective stormwater management service is a balance between avoiding risk and minimizing costs:

- Elimination of all risk from storms or pollution events would be unaffordable even if possible.
- Federal and state mandates are significant cost drivers for local stormwater programs.
- Good stormwater management is often measured by an absence of problems, such as flood damage or fish kills.
- Stormwater service is often not thought about by the general public until there is a problem.

State law requires that revenues from stormwater rates and charges be used only for specific public purposes; the City cannot spend public stormwater funds to maintain or improve private stormwater systems.

Topics to Note

- *The stormwater system is a combination of public and private stormwater systems.*
- *The City may only maintain or improve the publicly-owned stormwater system. Private property owners must maintain or improve their components of the stormwater system.*
- *Providing cost-effective stormwater management services involves a balance of risk avoidance against cost. Elimination of all risk would be unaffordable even if possible.*
- *The City's stormwater management program is charged with meeting its objectives in a manner that is:*
  - *Equitable among customers and generations;*
  - *In compliance with regulatory requirements; and,*
  - *Affordable and within funding levels approved by the community.*

Briefing Paper 3 – Ways the Private Sector Manages Stormwater

Key Messages

- *Stormwater systems are complicated combinations of private and public systems that work together to convey stormwater, control flooding, and protect water quality.*
- *System ownership generally determines roles and responsibilities for stormwater management actions.*
- *Similar to most other jurisdictions in the region, over half of the stormwater systems in Bellevue are private.*
- *Private property owners must manage the systems on their property.*
- *The City of Bellevue indirectly manages stormwater on private property through regulation of development and activities, maintenance inspections, and public education and outreach.*
- *Federal, state, and local regulations charge both individual property owners and the City with working together to effectively minimize stormwater impacts.*

City's Objective

To help private property owners develop and manage their stormwater systems to comply with local, state, and federal regulations and protect surface water.

Background

The stormwater system is a complicated interplay between private and public drainage systems. Stormwater flows freely between these systems, and responsibility for management of the water shifts accordingly. A private-public partnership is necessary to manage the stormwater system because of the unique characteristics of stormwater management, including:

- The stormwater system developed over time in response to people's demands and evolving regulations to manage stormwater runoff and accommodate incremental land use changes. Older parts of the system were not the result of a unified planning effort; nor were they designed or constructed to specific standards since no standards existed at the time.
- The resulting stormwater system has been inherited by the current private and public property owners responsible for various parts of the system.
- Some very significant portions of the stormwater system are owned and managed by private interests, while other portions are owned and managed by the City.

From a stormwater management perspective, the City is a property owner just like others, and all property owners must manage stormwater runoff according to some basic principles:

- Property owners have the right to develop their property, but must do so in accordance with local zoning and land use codes, current engineering standards, and other regulations.
- Developing property owners must discharge stormwater runoff in a manner and location consistent with conditions prior to development.
- Downstream property owners are obligated to receive and convey stormwater runoff from land that historically drained to their property.
- Local stormwater agencies have no duty to remedy drainage disputes between property owners.
- Government may act to protect its property as any other property owner.

People are often confused about who owns a particular segment of the stormwater system. Property owners are sometimes unaware of their responsibilities for a portion of the stormwater system because:

- System ownership of what may be seen as a continuous, single stormwater system, such as a pipe or stream, may change based on where the system segment is located.
- Many owners may be responsible for different segments of what appears to be a single stormwater system. For example, at the top of a hill, a single pipe or stream may begin under one ownership on private property and transfer to public ownership as it crosses a road right-of-way, stormwater easement, or dedicated stormwater tract, and then transfer to yet another different private property as it continues to flow downhill.
- All types of stormwater components may be under private ownership and responsibility, including roof gutters, yard drains and pipes, large storm drainage pipes, lakes, streams, and wetlands.
- All of these types of drainage systems may also be under public ownership and responsibility if they are located within a public road right-of-way, a public easement or tract of land specifically dedicated for stormwater purposes, or on property owned by the City. *If a drainage system is not located in one of these public areas it is most likely a private facility.*
- Private property owners manage the many privately-owned stormwater systems that make up over half of the total City-wide system.
- Most people think of lakes as publicly-owned, but two lakes in Bellevue are under private ownership – Lake Bellevue and Phantom Lake.

All stormwater systems must operate together to provide overall flood protection and preserve water quality. Federal, state and city regulations provide this protection by requiring systems to be maintained to established standards. Insufficient maintenance of one system or group of systems can cause serious flooding or water quality problems for many others.

The City does not maintain or improve privately-owned stormwater systems because state law requires that the revenues from stormwater management rates and charges be used only for specific purposes and the City generally may not spend public stormwater funds to maintain or improve private stormwater systems.

The City works with private property owners to help them manage their stormwater systems by:

- Providing programs to help owners develop and/or manage their stormwater systems as required by local, state, and federal regulations. City staff perform on-site inspections and give advice about system maintenance and operations, as well as providing other public education and outreach services on how to prevent flooding and protect water quality;
- Providing emergency response to flooding of roadways and structures and pollution events; and,
- Supporting development and management of districts created to achieve specific beneficial outcomes such as Local Improvement Districts and Lake Management Districts.

Topics to Note

- *The storm and surface water system is a combination of public and private drainage systems.*
- *Private property owners must manage their own portions of the stormwater system.*
- *Federal and state requirements charge all property owners, whether individual citizens or the City of Bellevue, with working together to effectively minimize stormwater impacts, which includes effectively managing high stormwater flows, as well as mitigating impacts from pollutants affecting stormwater quality.*

Briefing Paper 4 – Flood Control

Key Messages

- *The City's stormwater management system collects and manages rainfall runoff to minimize flooding.*
- *The City and its citizens work together to help prevent flooding by keeping storm drains and other drainage areas clear of leaves, rocks, or other debris.*
- *Stormwater management includes an operations and maintenance program with routine inspections and repairs as necessary to prevent emergencies.*
- *The City also provides emergency response services during storm events to minimize flooding and human safety impacts, such as closing unsafe roads and providing the public with sandbags and pumps.*
- *The City's regulations limit development in FEMA mapped floodplains, which protects the public by minimizing flooding and human safety risks and also provides a discount on flood insurance premiums.*

City's Objectives

- To protect the City from flooding through the management of the stormwater system.
- To regularly inspect, maintain, and replace the components of the stormwater system as needed.
- To immediately respond to flood emergencies and provide essential assistance for public safety.
- To operate at a high standard as established by federal regulatory bodies.

Background

Stormwater runoff is collected by a network of drains, catch basins, pipes, and ditches. The collected water is then detained before flowing to streams, lakes, and wetlands. To minimize flooding, the City maintains and operates the public system, regulates the private stormwater management system, and restricts development within floodplains. The City has a capital program to control flooding, with projects that enlarge pipes or culverts to convey more stormwater, re-route drainage to pipes with more capacity, add detention or infiltration facilities, and implement other runoff control strategies. The City also regularly repairs or replaces aging or damaged pieces of the stormwater management system.

One of the best flood control minimization strategies is routine inspection and maintenance of the stormwater system. In the drier, summer months, the City performs maintenance on and repairs of public stormwater detention facilities, such as removing sediment from detention ponds. During the rainy season, the City patrols known trouble spots weekly from October 1 through May 1 and daily during heavy rain events.

Citizens contribute to the management of the stormwater drainage system by checking and clearing storm drains of debris, sediment, and other impediments. The City also requires maintenance of private drainage systems to prevent blockages that could seriously impact the entire stormwater management system.

During major rain storms, the City operates a 24-hour emergency helpline and protects public safety through various emergency response services. Bellevue's flood warning system monitors real-time rain and water conditions to provide advance warning and allow the City time to prepare for potential flooding. In the event of a threat to public health, safety, public resources, or significant property

damage, the City provides emergency response and will undertake emergency protective measures as needed. City crews are prepared to respond to road flooding emergencies by placing barricades, cones, and signage to close unsafe roads and detour traffic. Utility vehicles are equipped with supplies such as sandbags, straw bales, shovels, and first aid supplies. Although the City loans pumps to the public on a first-come, first-serve basis, supplies are limited, and private property owners are encouraged to have pumps on hand for emergencies. The public is also responsible for taking preventative measures on their property, such as placing sandbags.

Bellevue was one of the first cities in the country to implement a comprehensive approach to address preservation and enhancement of streams and the reduction of flooding. In 1978, the City joined the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). Membership requires adoption of ordinances that restrict development within floodplains to reduce the risk of flooding. These ordinances have been incorporated into the City Code and the City's Land Use Code. In 2010, the NFIP program recertified the City's floodplain management program. Bellevue ranks among the top 5% of communities in the United States for floodplain management practices. As a result, Bellevue property owners save up to 25% on federally-backed floodplain insurance premiums.

Bellevue is also a member of the King County Flood Control District. The District collects ten cents per $1,000 of assessed property value to fund the activities and capital projects of the District. The City receives a portion of this assessment each year to supplement local rates that partially fund projects in the City's Flood Control Capital Program.

Topics to Note

- *Citizens share responsibility with the City to keep drains clear and to report any cases where drains, ditches, or other drainage structures are impeded.*
- *Even though the City conducts regular maintenance, the City's public stormwater system continues to age. Aging infrastructure combined with continued development and population increases contribute to increased stress on the stormwater management system, which can increase the risk for flooding.*
- *Funds for regular repair and replacement of system components are needed to keep the City's flood control at its current high standards.*
- *The City's NFIP certification shows that the City operates at a very high standard, and citizens benefit with few flooding problems and by saving money on their flood insurance premiums.*

Briefing Paper 5 – Stormwater Impacts on Fish and Habitat

Key Messages

- *The City of Bellevue has a wealth of streams, lakes, and wetlands that add to the quality of life for the people who live and work within the City.*
- *Bellevue streams support Chinook, coho, and sockeye salmon, kokanee (land-locked sockeye), peamouth minnows, as well as non-migratory fish, such as cutthroat and rainbow trout.*
- *The impacts from development affect physical, chemical, and biological conditions that reduce survival of sensitive aquatic life.*

City's Objective

To improve stream quality and assist in regional recovery of Chinook salmon and locally comply with the Endangered Species Act and Fish Passage requirements (WAC 220-110-070).

Background

Bellevue's stormwater system is a direct result of the topography, current and historic land uses and regulations, and geology of the areas that drain to the natural and built stormwater collection and conveyance features. The City covers approximately 31 square miles and is part of the greater Cedar/Lake Washington watershed, which drains into Puget Sound. Bellevue has approximately 13 miles of shoreline on two large lakes--Lake Washington and Lake Sammamish--and also has three small lakes (Lake Bellevue, Larsen Lake, and Phantom Lake). There are over 70 miles of open streams within the City limits, divided into 26 drainage basins, all of which ultimately drain to either of the large lakes.

Bellevue streams support Chinook, coho, kokanee, and sockeye salmon. These fish are affected by multiple factors, including habitat, hatcheries, harvest, and hydropower (dams). The Lake Washington/Cedar/ Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan has been adopted by local governments and by federal resource agencies to address Endangered Species Act requirements. In addition, all stream crossings are required to allow fish passage under state regulations (WAC 220-110-070). The City has a capital program designed to repair or replace culverts so they comply with these regulations and to provide unencumbered access to upstream habitat.

Development increases the amount of stormwater runoff that flows into streams, lakes, and wetlands. Since impervious surfaces don't absorb water, the water reaches the stream much faster than in an undeveloped area where much of the water soaks into the ground instead of running off. The increased stormwater run-off results in dramatically increased flows in streams.

After a storm, water levels in the stream can drop off quickly. This fluctuation is due largely to changes in the infiltration rates of the land, which is paved, covered, and compacted so that water is less able to soak in and slowly seep towards the streams after each storm. Significant changes to stream habitat are generally observed when the impervious area (i.e., areas of hard surfaces directly connected via pipes and conveyance systems) in a basin reaches 10% or more. Bellevue stream basins are between 20-70% impervious and show impacts similar to other urban areas. These impacts include increased erosion, impairment of spawning areas, increased fine sediment, and a

general reduction of habitat within the streams. The timing of increased flows during the year also makes a difference to the health of aquatic life.

Increased volume and speed of water into streams reduces available habitat, including erosion of stream banks, washing out of fallen trees, and filling in pools with sediment. Fallen trees are especially important in streams and shorelines. They provide aquatic organisms cover from predators, places for spawning, and bugs to eat. These fallen trees can also provide protection along stream banks to slow erosion. Although in the 1970s, log jams in streams were thought to harm salmon, research has since shown a direct relationship between the amount of wood in streams and salmon survival. In most places in Western Washington, stream habitat restoration includes replacing wood.

As stormwater increases, plants play an even more important role in the health of streams, lakes, and wetlands. The roots of shrubs and trees help reduce erosion of streams and shorelines. Overhanging plants provide cover, food, and spawning areas for amphibians and other aquatic life, in addition to providing cooling shade to the water. Dense plants slow the speed of the water and help filter sediment and pollutants from the water.

Pollutants are washed from the air and off natural, landscaped, and impervious surfaces during rain events, poured or washed down storm drains ("non-point source pollution"), and discharged from industrial sites ("point source pollution"). During storms, pollutants that have built up on roads and landscaped areas are often washed into storm drains and streams. Common pollutants include pesticides, heavy metals, toxins, nutrients, and others. These pollutants can directly kill aquatic life or cause conditions that impair aquatic life, such as major algae blooms or degraded spawning areas. Another factor having a negative impact on aquatic life and habitat is temperature. During the summer when stormwater flows across pavement and other impervious surfaces, it heats up, quickly increasing the temperature of stormwater runoff and the streams, lakes, and wetlands to which it drains.

There are many actions that people can take to improve fish and wildlife habitat, including:

- Make sure that nothing but rain goes down storm drains;
- Help volunteer in restoration activities, such as Stream Team events;
- Allow shrubs and trees to grow along streams and lake shores to provide excellent habitat, shade, and food for aquatic life;
- Plant trees in yards to help intercept rain and stabilize soil; and,
- Use natural yard care techniques to reduce the potential for chemicals to wash off yards into storm drains or streams.

Topics to Note

- *Developed areas, such as Bellevue, have constant impacts to aquatic life that have occurred over many decades. These impacts include reduced abundance and diversity of salmon and aquatic invertebrates that fish eat, as well as reduced habitat through more uniform and simplified stream habitat.*
- *The science of restoring urban aquatic health is not well developed.*
- *The City is working with regional partners to prioritize and address needs to recover federally protected salmon and restore the ecological health of Puget Sound.*
- *Healthy streams, lakes, and wetlands are dependent on both public and private actions.*

Briefing Paper 6 – Stormwater Impacts on Surface Water Quality

Key Messages

- *As stormwater flows across the land, it picks up and carries away natural and human-made pollutants, depositing them into local streams, lakes, and wetlands.*
- *Local streams, lakes, and wetlands are at risk from pollution as a result of everyday activities.*
- *Some very significant factors affecting storm and surface water quality, such as weather and ocean conditions, are beyond the City's control.*
- *Some of the most effective storm and surface water quality improvements have come as a result of federal and state regulatory controls on pollution sources.*
- *The private and public sectors need to work together to protect surface water quality to continue to enjoy the environmental, recreational and aesthetic benefits local streams, lakes, and wetlands provide.*

City's Objective

To protect Bellevue's surface water (local streams, lakes, and wetlands) from stormwater pollution.

Background

People often think of water pollution as impurities coming from a distinct location, such as a pipe from an industrial site or a sewage treatment plant. When pollution comes from an easily identified source such as an industry, it is called point source pollution. This type of pollution is usually managed by identifying and eliminating the source of pollutants. Non-point source pollution, a more common cause of pollution, comes from a variety of sources and is difficult to trace and eliminate. As stormwater flows over the land, it picks up and carries away natural and human-made non-point source pollutants, depositing them into streams, lakes, and wetlands. Non-point source pollution in urban runoff may include:

- Sediment from poorly managed construction sites and eroding stream banks;
- Oil, grease, heavy metals, and toxic chemicals from numerous sources, including vehicles and building materials;
- Nutrients and pesticides from landscaped areas and gardens;
- Bacteria from livestock, pet wastes, wildlife, and faulty septic systems; and,
- Increased water temperatures from water running off sun-heated roofs and roadways, and loss of vegetation providing shade.

States across the country report that non-point source pollution is a leading cause of water quality problems. The effects of non-point source pollutants on specific waterways vary and may not always be fully assessed. However, the assessments completed demonstrate that these pollutants harm storm and surface water quality and aquatic organisms. Non-point source pollution results from a wide variety of human activities, and most people contribute to the problem without even realizing it. The cumulative effects resulting from the staggering number of very small bits of pollution that enter stormwater and flow to local waterways add up over time. These small bits of pollution, from lawn fertilizer, car washing, pet waste, and other activities, all contribute to serious water pollution.

Stormwater management is an evolving discipline and is benefitting from increased scientific research. The City's understanding of how best to construct and manage stormwater systems has

improved with scientific advances. Water clarity, odors, and presence of fish, wildlife, or certain plants provide some information about pollution levels in local waterways, but can be misleading. Science-based numeric measurements are another way to assess pollution.

Some very significant factors affecting the quality of surface water are beyond the City's local control, such as:

- Weather – the intensity and frequency of storms can significantly affect stormwater systems, cause dirty water, and contribute to damage by eroding stream banks and moving sediment.
- Ocean conditions and fisheries and hatchery management – all impact salmon survival, which is sometimes used as a measure of stormwater management success.

The stormwater system is not the only source of surface water pollution. Other potential sources of pollution include atmospheric deposition from air pollution; legacy pollutants trapped in soils long ago and now released; natural pollutant sources, including wildlife waste and those found in eroding geologic and soil materials, such as arsenic and copper; and, naturally-occurring peat soils that can release unwanted nutrients into streams, lakes, and wetlands.

Federal and state regulations for some widespread pollutants may be the best way to reduce their impact on water quality. For example, lead was commonly found above acutely toxic levels in the City's stormwater in the 1980s, when leaded gasoline was commonly used. Federal regulation restricted the use of lead in gasoline, and by the 1990s, the amount of lead in the City's stormwater was dramatically reduced--a trend confirmed by national studies. Similar regulations limiting the use of copper in car brake pads were recently passed. As they go into effect over the next several years, the amount of copper found in stormwater runoff should be reduced.

Many actions can be taken to prevent such pollution, including:

- Maintaining and cleaning stormwater systems regularly.
- Using natural yard care products rather than chemical pesticides, herbicides, and fertilizers.
- Applying lawn and garden chemicals sparingly, according to directions, or not at all.
- Cleaning up pet waste, reducing disease causing organisms and unwanted excess nutrients.
- Washing cars at commercial car washes where the wastewater is recycled and ultimately goes to a sewage treatment plant.
- Keeping litter, leaves, and debris out of street gutters and storm drains.
- Disposing of used oil, antifreeze, paints, and other household hazardous waste properly—not in storm drains or areas that drain to them.
- Cleaning up spilled brake fluid, oil, grease, and antifreeze, and not hosing them into the street where they can eventually be washed into local streams, lakes, and wetlands.
- Controlling soil erosion by planting ground cover and stabilizing erosion-prone areas.
- Making sure that only rain goes down the storm drain.

Topics to Note

- *Everyone in modern society contributes something to storm and surface water pollution.*
- *The small bits of pollution that occur across the City add up over time and pollute local waterways.*
- *Private and public interests must work together to protect surface water quality to continue to enjoy the environmental, recreational, and aesthetic benefits local streams, lakes, and wetlands provide.*

Briefing Paper 7 – Private Lakes

Key Messages

- *While most local lakes are publicly owned and managed, two lakes in the City of Bellevue are privately owned and managed – Phantom Lake and Lake Bellevue.*
- *Private lake owners are responsible for the proper management of their lakes, and the formation of a Lake Management District can help facilitate management efforts.*
- *Federal, state, and local regulations direct individual citizens and the City to work together to effectively minimize stormwater impacts to lakes.*
- *Stormwater systems are complicated combinations of private and public systems that work together to convey stormwater, minimize flooding, and protect water quality.*
- *Lakes, whether public or private, are an important part of the stormwater management system.*
- *The City indirectly protects private lakes through regulation of development and activities, stormwater maintenance activities, public education, and emergency flooding and pollution event response.*

City's Objective

To facilitate private property owners managing their lakes in a manner that complies with federal, state, and local regulations and protects surface waters within the City of Bellevue.

Background

Most lakes, such as Lake Washington and Lake Sammamish, are publicly owned and managed. However, two lakes located within the City are privately owned and managed – Lake Bellevue and Phantom Lake.[1] Communities place a high value on lakes, which provide beneficial uses such as swimming, boating, and fishing, and aesthetic appeals, such as attractive vistas. Private lakes provide the general public a smaller range of benefits than for those who live along the shore and own the lake.

Regardless of who owns a lake, most people value healthy lakes and want to protect the recreational and aesthetic benefits a lake provides. Concerns include:

- Lake water levels – High waters can cause flooding and make it difficult to maintain lakeside facilities, such as dock and boat lifts; low water levels may affect recreational opportunities, such as boating and swimming, and lake ecosystems.
- Water clarity – Cloudy water may be a result of water quality issues and may be associated with unpleasant effects, such as foul smelling algae blooms and potentially toxic bacteria.
- Wildlife – Fish and other wildlife provide lake recreational opportunities, and also serve as indicators of lake water quality.
- Aquatic weeds – Invasive plant species such as milfoil can limit boating, swimming, and other activities, contribute to unpleasant odors, and crowd out native aquatic plants.

The stormwater system within Bellevue impacts all lakes and is a complicated interplay of private and public stormwater drainage systems. Stormwater flows freely between the private and public systems,

[1] When is a lake a private lake? When the underlying lake bed is owned by its shoreline property owners (e.g., property owners' lots extend into the lake). State law treats this ownership as private property (including shoreline properties owned by local or state governments) as confirmed for Phantom Lake by the Washington State Supreme Court in *Botton v. State*, 69 Wn.2d 751,420 P.2d 352 (1966).

and responsibility for management of that water shifts accordingly. Both public and private stormwater flows to private lakes, and the private lakes discharge to private and public stormwater systems.

Urbanization affects all local streams, lakes, and wetlands, including private lakes. As land develops, vegetation, trees, and soil are replaced with new roads, rooftops, and other impervious surfaces (hard surfaces that prevent or retard water from soaking into the ground). As a result, rain is no longer filtered by vegetation or soil before reaching streams, lakes, and wetlands, and may collect nutrients and other pollutants that can negatively impact lakes and their uses. The volume of water rushing downhill can increase dramatically because rain runs off hard surfaces and is unable to soak into the ground. Rapid flows can cause lake levels to rise and result in shoreline flooding, generally in areas that historically served as natural storage areas for flood waters. Any shoreline development encroaches on low lying areas prone to flooding in their natural state.

Stormwater management techniques are used to lessen potential flooding. Local governments are charged with developing stormwater drainage standards and must strike a balance between allowing for reasonable development of property while also providing adequate flood control to protect downstream areas. The City has adopted the new State Stormwater Management Manual, which requires onsite drainage control for new development and redevelopment, and is intended to dramatically reduce runoff rates and improve water quality over time. As areas uphill of lakes redevelop under these requirements, the Department of Ecology expects lake water quality to improve and the frequency and height of maximum lake levels in the urban area to be reduced over time to more closely resemble levels found within forested lands.

By law, the City cannot spend public stormwater funds to maintain or improve private facilities, including private lakes; however, lakes often require and/or people often want water quality and flood control management beyond that provided by City programs. State law authorizes property owners to form Lake Management Districts (LMD), which provide a mechanism for private lake residents to fund their lake management efforts. Special assessments or rates and charges may be imposed on the property included within an LMD to finance lake improvement and maintenance activities, including: (1) controlling or removing aquatic vegetation; (2) improving water quality; (3) controlling water levels; (4) treating and diverting stormwater; (5) controlling agricultural waste; (6) studying lake water quality problems and solutions; (7) cleaning and maintaining ditches and streams entering the lake or leaving the lake; (8) monitoring air quality; and, (9) running the LMD, such as related administrative costs.

Many small lakes are managed through LMDs, and the City's long-standing lake management policy (since 1988) is consistent with state legislation. Specifically, the lake management policy in the Storm and Surface Water System Plan states that the Utilities Department will take a lead role in lake management for water quality and flood control purposes only and that maximum use should be made of outside funding sources such as grants and the financial cooperation of benefitted lake property owners. The City has consistently used or supported pursuit of grants and/or pursued development of LMDs to study and/or perform lake management improvements and maintenance.

Topics to Note

- *Both public and private lakes can be found within the City of Bellevue borders.*
- *Private lake owners enjoy benefits from private lakes that the general public does not.*
- *Private lake owners or those enjoying special uses of private lakes must fund the management of private lakes beyond what services are provided commonly to the general public.*
- *Lake Management Districts are available to private lake owners as a mechanism to fund lake management efforts.*

Briefing Paper 8 – Natural Drainage Practices

Key Messages

- *Natural Drainage Practices (NDPs), often referred to as Low Impact Development Best Management Practices, are stormwater management tools.*
- *The intent of NDPs is to keep rainwater where it falls and return the stormwater to where it would flow naturally.*
- *Examples of NDPs include rain gardens, pervious pavement, and vegetated roofs.*
- *Feasibility of many NDPs depends on site-specific conditions.*
- *In some cases, NDPs can provide benefits over more traditional stormwater tools.*
- *Research and pilot projects are providing information to address the many questions regarding the use of NDPs.*
- *Appropriate use of NDPs in an urban environment must take into account site, engineering, and cost considerations while accommodating growth and density.*

City's Objective

To encourage and promote the appropriate use of Natural Drainage Practices where feasible.

Background

Natural Drainage Practices (NDPs), often referred to as Low Impact Development Best Management Practices, are stormwater management tools intended to mimic more closely the way water moves in the natural environment prior to development. Trees, plants, and soil are part of the natural environment that help capture rainfall where it falls instead of flowing off-site. An example is an old growth forest, which allows water to infiltrate into the soil and groundwater, absorb into leaf and root systems, or evaporate into the air. These processes reduce the amount of stormwater runoff and pollutants that leave a site and drain into nearby streams and lakes.

Urban development significantly impacts natural stormwater drainage patterns. Clearing vegetation, grading and compacting soil for development, and increasing impervious surfaces for roads, buildings, parking lots, and sidewalks reduces the potential benefits that the natural environment provides for managing stormwater.

NDPs are an alternative to traditional end-of-pipe stormwater management tools such as vaults, ponds, and pipes that collect and slowly release water off-site to streams and lakes. The NDPs strategy is to use smaller-scale, on-site measures to control stormwater runoff at its source; however, generally a combination of NDPs and traditional tools is necessary to meet stormwater flow control development standards and provide flood protection. Examples of NDPs include rain gardens, pervious pavement, vegetated roofs, rain recycling systems, and amended soils.

The feasibility of many NDPs depend on site-specific conditions such as the soil type and infiltration rate of the native soil, depth to groundwater, and proximity to steep slopes. The City has analyzed the feasibility of NDPs in Bellevue. The technical analysis concluded that the feasibility of many NDPs are limited in Bellevue due to soils, slopes, and wetlands. However, even with these limitations, NDPs can provide benefits for water quality and reduction of peak flow discharges. NDPs facilities may reduce detention pond sizes required of new and redevelopment projects.

Because NDPs are relatively new, there is limited experience nationally and locally with implementation of NDPs facilities, especially large scale use over an extended time. Research and pilot projects are providing information to address the many questions about the use of NDPs, including feasibility criteria, design, construction, performance and life safety issues, operation and maintenance requirements, and life cycle costs.

The opportunity to use NDPs and their effectiveness are more limited in developed areas due to competing urban density. Appropriate use of NDPs in an urban environment must take into account site, engineering, and cost considerations while accommodating growth and density.

Topics to Note

- *Feasibility of Natural Drainage Practices (also known as Low Impact Development Best Management Practices) varies depending on site-specific conditions, such as slope, soil type, infiltration rates, and depth of groundwater.*
- *Because Natural Drainage Practices are relatively new, research and pilot projects are needed to answer the many questions and concerns about their use.*
- *The continued maintenance and function of Natural Drainage Practices is uncertain on private property after a period of time or property exchange.*

Frequently Asked Questions

Bellevue Utilities responds to hundreds of customer questions each year. Some of the more frequently asked questions about stormwater, together with answers, are grouped by topic below.

Emergency Services

Q1: Where do I call to report flooding and to get help?

A1: Call the Utilities 24-hour emergency response line at 425-452-7840.

Q2: Where do I call to report dead fish, unusually discolored water, or unusual odors coming from streams or storm drains?

A2: *Do not touch or come into contact with the water.* Call the Utilities 24-hour emergency response line at 425-452-7840. Dead fish should be reported to the Department of Ecology at 425-649-7000.

Q3: Where do I call to report a pollutant spill?

A3: *Do not touch, come into contact with, or breathe the spilled material.* Call the Utilities 24-hour emergency response line at 425-452-7840.

Stormwater Services and Drainage Rates and Charges

Q4: What does the stormwater drainage charge on my utility bill pay for?

A4: Revenue from stormwater drainage rates and charges pay for City projects and programs that help control damage from storms, prevent flooding, protect surface water quality, support fish and wildlife habitat, and protect the environment. Some specific stormwater services include:

- Operating and maintaining the public stormwater system;
- Responding to emergency flooding and pollution events;
- Inspecting and advising owners on operations and maintenance practices, and potential solutions to their stormwater system problems;
- Planning for new systems and improvements, and mapping the stormwater system;
- Designing and constructing stormwater system capital projects;
- Permitting development according to regulations;
- Complying with federal and state regulations;
- Managing finances;
- Providing customer service;
- Educating the public and providing outreach opportunities; and,
- Developing policy and coordinating with other governmental entities.

Q5: Why do I have to pay stormwater drainage charges when my property drains just fine by itself?

A5: Everyone receives benefits from a properly functioning stormwater system. People benefit when they drive on roads that are not flooded or when water from uphill areas is safely directed away from downhill property. Everyone contributes in some way to the need for stormwater services and water pollution protection. From roofs and driveways, to cars and

buses, to yard maintenance and pets, everyone contributes runoff and pollutants to stormwater in some way.

Q6: Why am I being asked to keep the storm drains clear; can't the City do it for me?

A6: In the fall, when leaves clog storm drains and prevent rain from draining, neighborhood flooding can occur throughout the City. Although City crews clean storm drains as part of routine maintenance, it's hard to get to the nearly 20,000 public storm drains during the fall months. The City of Bellevue, like most cities in the Puget Sound area, asks citizens to help protect against seasonal flooding by clearing leaves and debris from both public and private storm drains near their property.

Q7: Can the City help me take care of the stormwater system on my property?

A7: The stormwater system in Bellevue is a combination of many small systems on private properties together with the public system owned and operated by the City. The City operates the road drainage system, as well as flow control and other drainage facilities throughout the City that are in the public right-of way, within easements, or on specific public properties.

Stormwater rates and charges must by state law be used for specific public purposes and the City cannot spend public stormwater funds on private stormwater systems. Stormwater drainage bills would increase dramatically if the City were to be responsible for and maintain all the private drainage systems, as well as the public system.

All of these stormwater systems, both public and private, must work properly to protect against flooding and water pollution. The City works with private property owners to show them how to manage their own stormwater systems by providing on-site inspections and advice on system maintenance and operation. For questions or help with a private system call 425-452-7840.

Q8: Do I have to clean the stormwater system on my commercial property; what authority gives the City the right to make me do it?

A8: All drainage systems, public and private, must be working properly to protect against flooding and water pollution. City staff inspects and works with commercial, multifamily and property development customers to ensure that the stormwater systems on their property are cleaned and working properly. Authority to do so comes from a combination of federal, state and local regulations. In Bellevue, authority is provided in the Storm and Surface Water Utility Code (Chapter 24.06 BCC) and Civil Violations Code (Chapter 1.18.075 BCC). The codes are available at http://www.ci.bellevue.wa.us/doc_library.htm.

Q9: Can the City help me with the problem on my property from erosion, sedimentation, beaver damage, in-stream debris, wet crawlspace, damp soils, etc.?

A9: While the City cannot maintain private stormwater systems, it can help by providing on-site inspections and advice on stormwater issues. For advice on a stormwater issue call 425-452-7840.

Fish, Habitat, and the Environment

Q10: Can someone come out and tell me what kind of fish/plants/bugs I'm seeing in the stream on my property?

> **A10:** Although the City doesn't come out to private streams to identify plants and animals, it does respond to emergencies such as fish kills and pollutant spills. If you see dead fish, unusually discolored water, or unusual odors coming from the stream, *do not touch or come into contact with the water!* Report the event to the City at 425-452- 7840.
>
> To find out what kinds of fish have been identified in your area, see the Fish Use report under Bellevue's Stormwater Basin Fact Sheets at http://www.bellevuewa.gov/drainage-basins.htm. For information on how to identify fish, stream bugs, and aquatic plants, check out the information provided by the Bellevue Stream Team at http://www.bellevuewa.gov/stream_team.htm or contact Stream Team at streamteam@bellevuewa.gov or 425-452-5200.

Q11: How do I manage weeds and pests without using chemicals that run off with watering or rain and cause pollute streams and other surface waters?

> **A11:** Even when we don't live directly on a stream, wetland or lake, the runoff from our property enters the storm drain and eventually drains to those surface waters. The most effective strategy for controlling weeds and pests is an approach called integrated pest management (IPM). IPM starts with prevention through sound gardening practices, including building healthy soil, choosing the right plants, smart watering, and natural lawn care. By working with nature and creating a healthy lawn and garden, you can reduce many problems before they arise. When problems do occur, learn about the pest or weed before taking action. Then select the best control methods to manage the problem with the least effect to people, pets, beneficial garden life, and the environment. Weeds, for example, can be greatly reduced by adding a layer of mulch to garden beds each year. Traps, barriers, or repellants may work for some pests. Less toxic products like soaps and horticultural oils are now available.
>
> For tips on planning and caring for natural lawn and garden and more information about weed and pest control, see http://www.bellevuewa.gov/natural_lawn_intro.htm or call 425-452-4127.

Q12: What can I do to improve the drainage of the soil in my yard?

> **A12:** Healthy soil is essential to healthy gardens and to protecting our waterways and salmon. Healthy soil is alive and the billions of organisms in the soil are fueled by soil organic matter. They create soil structure and pore spaces, which provide stormwater infiltration, drainage, and moisture-holding capacity. They also create soil fertility and resistance to erosion, protect plants against diseases, and break down urban pollutants like oil, grease, metals, fertilizers, and pesticides. Adding compost and mulch to soil is the best way to improve soil health.
>
> For information on building healthy soil and creating a natural lawn and garden, see http://www.bellevuewa.gov/natural_lawn_intro.htm and http://www.bellevuewa.gov/pdf/Utilities/DRAINAGE_AROUND_YOUR_HOME.pdf or call 425-452-4127.

Q13: What is a watershed or drainage basin?

A13: Watersheds are areas of land that drain to a single point. They have natural boundaries defined by the shape of the land and the flow of water. Drainage basin is just another term for a watershed. Together with other drainage basins they may become part of even larger drainage basins. An example is the Lewis Creek Basin, which drains to Lake Sammamish Basin. See Appendix A for a map of the drainage basins located within Bellevue.

Bellevue's drainage basins are within the City for the most part, but all eventually drain to either Lake Washington or Lake Sammamish and therefore are "sub-basins" of the much larger Cedar/Lake Washington watershed. For more information on Bellevue's drainage basins see http://www.bellevuewa.gov/drainage-basins.htm.

Q14: Why does the City put logs and stumps into streams, lakes, and wetlands, when it looks so messy?

A14: Fallen trees are a natural feature of streams, lakes and wetlands. Fallen wood, often called "large woody debris" by biologists, helps create features in streams like pools, eddies, and side channels. In lakes and streams, the wood also helps slow the water or waves, reducing erosive energy across the system, even though some erosion may occur immediately around the wood. Insects and other organisms also use wood as habitat, providing additional food for fish and amphibians. Snags, rootwads, and trees all provide excellent cover and rearing areas. Fishermen know to cast under fallen logs, as that is a common area for fish to be hiding.

Q15: Why are we supposed to plant native plants along a shoreline instead of lawns?

A15: Plants play an important role in the health of streams and lakes. The roots of shrubs and trees help reduce erosion of stream banks and shorelines. Overhanging plants provide cover, food, and spawning areas for amphibians and other aquatic life, in addition to providing cooling shade to the water. Dense plants slow the speed of the water, allow water to evaporate or soak into the ground, and help filter sediment and pollutants from the water. Native plants are preferred over traditional landscaping plants because they typically require less fertilizer, water, and pesticides, which could wash into adjacent streams, lakes, and wetlands.

Q16: Why are trees dying or falling over by the lake or beaver pond?

A16: Many things affect the health and survival of trees along a lake or beaver pond, including animal damage, disease, bugs, lightning, wind damage, or changes in growing conditions. Water levels in lakes and ponds naturally fluctuate by season and may be influenced by a number of factors such as rainfall, runoff, outlet channel condition, and soils. Mature trees are susceptible to changes in water levels and may become stressed, more susceptible to disease, or die. While some people think they are unsightly, snags and fallen trees within the shoreline provide abundant habitat for animals and birds and are protected from removal by regulations. If a tree dies or falls over from high winds, saturated soils, disease, or some combination of these within landscaped areas, then the tree can be removed. No permits are required to remove a fallen or dying tree from a landscaped area. If a tree has become a hazard or has fallen within the lake or shoreline in a non-landscaped area, call 425-452-4898 to learn more about requirements and permits.

Q17: Why doesn't the City do something about the water that is ponding in my yard?

A17: Rainwater will pond in low areas if it cannot runoff and soils cannot quickly absorb the volume. The stormwater system is a combination of public and private responsibilities, as discussed in the Public and Private Roles and Responsibilities section and Briefing Paper 2. The City is responsible for stormwater systems within the public right of way and on properties it owns or for which it has easements. Work on private property is restricted except in cases of public safety, such as structural flooding (e.g., houses, businesses). However, the City's Utilities Department can provide technical assistance to homeowners regarding water ponding in their yard. For technical assistance, call 425-452-7840.

Flood Insurance

Q18: What is the floodplain elevation on my property and does the City have a floodplain elevation certificate for my property?

A18: For information about your property and floodplains, see the floodplain maps at http://www.bellevuewa.gov/floodplain_map.htm. Elevation certificates are issued only for developments that are within the 100-year floodplain boundary. For further assistance, call Utilities Engineering at 425-452-5206.

Permits and Development Services

Q19: Why do I have to build a stormwater flow control system on my property that is so big (and expensive) that the water flowing off my property is like what would flow out of a forest?

A19: Bellevue's stormwater development standards are required by the State of Washington, and are intended to achieve a forested flow rate from developing or redeveloping sites. Since increased runoff causes damaging erosion and sedimentation in streams, the requirement is intended to stop that damage caused by new development. As lands that were developed under earlier standards are redeveloped, they too will be required to meet the new standard, further reducing stream damage and flooding over time. There are a number of ways to potentially reduce the size and cost of the required on-site flow control systems. Information on various low impact development techniques and natural drainage practices can be found at http://www.bellevuewa.gov/pdf/Utilities/SurfWaterEngStds_2011.pdf or call 425-452-4187.

Q20: Where can I get a copy of Bellevue's stormwater development standards?

A20: The Storm and Surface Water Engineering Standards can be found at http://www.bellevuewa.gov/pdf/Utilities/SurfWaterEngStds_2011.pdf or call 425-452-4187.

Q21: How do I ask for a deviation from the Standards?

A21: Adjustment and deviation criteria and processes can be found in section D2-02 of the Storm and Surface Water Engineering Standards available at http://www.bellevuewa.gov/pdf/Utilities/SurfWaterEngStds_2011.pdf or call 425-452-4187.

Q22: How do I get a specific question answered about the Bellevue Storm and Surface Water Engineering Standards?

A22: You can email utilityreview@bellevuewa.gov, call 425-452-4187, or come to the Utilities Permit Center counter in the lobby at Bellevue City Hall.

Q23: Why do we need a pollution prevention plan for our construction work?

A23: The pollution prevention plan is a state requirement and is intended to protect against pollution generated from construction activities. Potential pollution can occur with erosion and sedimentation from land clearing, leaking oils and grease from equipment and spills of concrete, paint, fuel or other hazardous materials. The state requirement is based on the Federal Clean Water Act, which is intended to give us fishable, swimmable waters by reducing pollution from many sources, including construction sites.

Storm Size and Flooding

Q24: Why do we have “100 year” storms so often?

A24: The often misused term “100-year storm” has a very specific meaning – that the particular storm event in question has a one in a hundred probability of occurring in a given year. It is not necessarily the biggest storm that will occur every 100 years and one 100-year storm could immediately follow another.

Statistically speaking, there are many kinds of 100-year storm events. The probability of a storm occurring is a function of both how hard it rains and for how long. A very short duration, high intensity thunderstorm may have the same one-in-a-hundred chance of happening as a long, steady, day-and-a-half long rainfall. Both of these storm types can cause problems with the thunderstorm causing localized flooding because the rain is too much for drainage pipes in the street and the day-and-a-half long soaker getting through the street system, but causing streams to rise out of their banks causing general flooding.

To make matters more complicated, rainfall can also vary throughout an area and so a 100-year storm may make the news, but it may have occurred in only a portion of Bellevue or in another Puget Sound community. Also there are times when a 100-year stream flow may occur when the rainfall was something less that 100 year, but was accompanied by other factors such as snow melt or saturated soil conditions prior to the storm.

Water Pollution

Q25: Does the water that goes down the storm drain get treated at the sewage treatment plant?

A25: No. The storm and sewer, or wastewater, systems are separate. Like most other communities in the Pacific Northwest, Bellevue’s storm drains discharge directly into the local streams, wetlands and lakes. Because stormwater flows can be so large, the costs to build a plant big enough to treat them would be enormous and unaffordable. The result is that in other cities where the storm drains are connected to the sewer system, treatment plant capacity is overwhelmed during storms and huge volumes of raw sewage are discharged during rain storms. Also, removing the stormwater to a treatment facility would deprive local water ways of water needed for their ecosystems. To avoid this pollution, the federal government has required that communities with combined sewer and stormwater systems invest billions of dollars across the country to separate the two systems. Bellevue does not have any of these combined sewer systems.

Q26: How does stormwater cause pollution?

A26: Everyday activities add pollutants to stormwater and all of the very small individual bits of pollution that occur across the City eventually get caught up in stormwater runoff. Everyone in modern society is contributing something to water pollution through cars, pet waste, yard care products, and many other everyday activities. These small bits of pollution add up over time. Stormwater systems need to be maintained and cleaned to remove pollutants that can contaminate local streams, lakes, and wetlands, and destroy aquatic life over time. Using natural yard care products rather than chemical pesticides, herbicides and fertilizers can reduce dangerous pollutant build-up. Cleaning up after pets helps reduce disease causing organisms and unwanted excess nutrients.

Q27: How can I wash my car without causing pollution?

A27: Take it to a commercial car wash. Their wastewater goes to a sewage treatment plant and they even recycle it so less water is used. If you must wash your car at home, wash it on the grass so the soil can filter out pollutants before the water gets to the storm drain.

Q28: Do fundraising car washes cause pollution?

A28: Yes. Car washes seem like an easy fundraiser, but they can cause a tremendous amount of pollution if the soapy dirty waste water is allowed to go down a storm drain. Other options include:

- Selling tickets from either Brown Bear or Puget Sound Car Wash Association (commercial car washes recycle water and send dirty water to the sewage treatment plant).
- Checking out a free car wash kit from the City that will keep dirty, soapy water out of surface waters, or hold the charity car wash at a site that already has a car wash kit.
- Consider other fundraising options!

Q29: There's something nasty in the stream, lake, or storm drain. What should I do?

A29: When there is unusually discolored water or unusual odors coming from the stream, or you see dead fish or other creatures dying from causes other than natural spawning, do *not touch or come into contact with the water!* Report the event to the City at 425-452-7840.

Q30: How do I know what's safe to put down a storm drain?

A30: In general, only rain water should go down the storm drain. A small amount of tap water is usually safe; however, tap water is chlorinated and treated to ensure public health is protected from harmful bacteria, and these practices can kill aquatic life. Also, swimming pool water usually contains chemicals hazardous to the environment. If you aren't sure, it probably isn't okay. The rule of thumb is, "Only rain down the storm drain!"

Illicit Discharge into Swale

Glossary of Terms

Following are explanations of terms used in this Guide:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, capital improvements, maintenance procedures, and other management practices that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to stormwater. BMPs also include, but are not limited to, treatment requirements, operating procedures, and practices to control stormwater runoff, spillage or leaks, sludge or wastewater disposal, or drainage from raw material sludge.

Capital Improvement Project: A funded project intended to improve the stormwater management system, the performance of that system, and/or reduce site specific or cumulative adverse stormwater impacts.

Conveyance Capacity: A term generally referring to the maximum capability of the physical stormwater management system to safely transport water (from a hydraulic perspective).

Critical Areas: Areas required to be protected under the Washington State Growth Management Act, Chapter 37.70A, RCW. These areas, which include riparian corridors, wetlands, floodplains, coal mines, and steep slopes, are designated by the City as ecologically sensitive or hazard areas. They are regulated to protect their functions and values and the public health, safety, and welfare, and to allow the reasonable use of private property.

Detention or Flow Control: The act of temporarily detaining stormwater runoff in a pond, tank, or vault, and releasing it back into the stormwater system at a pre-determined rate that is slower than what would otherwise be expected.

Development: Two possible definitions - 1) All structures and modifications of the natural landscape above and below ground or water, on a particular site; or, 2) Any land altering activity creating impervious surfaces or otherwise modifying site hydrologic response, generally requiring a permit or approval.

Erosion: The group of natural processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is worn away from the earth's surface.

Enterprise Fund: A fund operated to account for revenue received for services and goods offered to members of a community on a continuing basis, operating similar to a private business funded primarily through rates and charges paid by customers.

Flooding or Erosion Impacts: Includes impacts such as flooding of septic systems, crawl spaces, living areas, and outbuildings; increased ice or algal growth on sidewalks/roadways; earth movement and settlement; increased landslide potential; and, erosion and other potential damage.

Habitat: The location where a particular species or identified subspecies of plant or animal lives and its surroundings, both living and non-living. Habitat includes the presence of a group of particular environmental conditions surrounding an organism, including air, water, soil, mineral elements, moisture, temperature, and topography.

Hydrologic Cycle: The continuous process by which water is circulated on and below the surface of the Earth and within its atmosphere.

Impervious Surface: A hard surface area that either prevents or hinders water from soaking into the ground at the rate that was common under natural conditions prior to development, and as a result, causes water to run off the surface in greater quantities and at an increased rate of flow. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots, storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, or other surfaces that similarly impede the natural infiltration of stormwater runoff.

Low Impact Development BMPs (also known as Natural Drainage Practices): Low Impact Development includes stormwater management and land development strategies applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-developed hydrologic functions. The Low Impact Development BMPs are designed to incorporate open space preservation techniques, such as rain gardens, pervious pavements, cluster residential developments, rooftop runoff management, foundation design, and vegetation enhancement, which reduce hydrological impacts of development or redevelopment as compared to more traditional practices. In the City, Low Impact Development BMPs are often referred to as "Natural Drainage Practices."

Mitigation: Methods used to compensate for impacts to critical areas. Options include:

a) Avoiding the impact by not taking a certain action or parts of an action.
b) Minimizing impacts by limiting the degree of magnitude of the action and its implementation.
c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
e) Compensating for the impact by replacing or providing substitute resources or environments.

National Pollutant Discharge Elimination System (NPDES): The Federal Clean Water Act requires the City of Bellevue to obtain a NPDES Phase II Municipal Stormwater Permit. The NPDES Stormwater Permit provides a platform from which local governments work toward protecting water quality and reducing the discharge of pollutants to the maximum extent practicable. It's one tool for the protection and restoration of local streams, lakes, and wetlands, and Puget Sound. Many of the City's long-established programs are consistent with the Permit, and the Permit's additional requirements build on the City's tradition of environmental stewardship. The Permit is City-wide, affecting a broad range of programs and activities. The initial City Permit became effective in February of 2007, and a new Permit will be issued in 2012.

Native Vegetation: Vegetation comprised of plant species that are indigenous to the Puget Sound region and that reasonably could have been expected to naturally occur on the site. Examples include trees such as Douglas fir, western hemlock, western red cedar, alder, big-leaf maple, and vine maple; shrubs such as willow, elderberry, salmonberry and salal; and, herbaceous plants such as sword fern, foam flower, and fireweed.

Natural Determinants: Existing topography, geology, soils, hydrology, water quality, climate, air quality, noise, vegetation, wildlife, marine life, and natural resources recognized as important in determining the types and forms of development that are allowed.

Natural Drainage Practices (also known as Low Impact Development BMPs): BMPs approved for use in the City of Bellevue to manage stormwater on developed sites to more closely mimic natural hydrologic conditions. Practices include bioretention, such as rain gardens, pervious pavement, amended soils, rain recycling, vegetated roofs, reverse-slope sidewalks, and minimal excavation foundations.

Nutrient: Nourishing substances necessary to life and growth, such as nitrogen and phosphorus.

Practicable: Available and capable of being done, after taking into consideration cost, existing technology, and logistics in light of overall project and/or program purposes.

Public Stormwater Facility: Any stormwater system or portion thereof that is owned or operated by a public entity.

Public Stormwater System: Those elements of the stormwater management system maintained and operated by the City of Bellevue Utilities Department, which includes elements located on property owned by the Utilities Department or in public right-of-way except to the extent that private ownership is indicated as a matter of record or by law and elements located on property on which the City has an easement, license, or other right of use for utility purposes. (Storm and Surface Water Utility Code, 24.06.040 Definitions)

Redevelopment: Any land altering activity, except routine maintenance, or change in use on an already developed site that requires a permit or approval and that creates new impervious surface or cleared area, replaces existing impervious surface, modifies existing cleared area, or has a potential to increase runoff or release new pollutants from the site. New pollutants means a pollutant that was not discharged from the site immediately prior to a change in use, as well as a pollutant that was discharged in less quantities prior to a change in use.

Revenue: All the income produced by a particular source.

Right-of-way (ROW): All public streets and property granted or reserved for, or dedicated to, public use for street purposes, together with public property granted or reserved for, or dedicated to, public use for walkways, sidewalks, bikeways, and horse trails, whether improved or unimproved, including the air rights, sub-surface rights, and easements related thereto.

Riparian Corridor: A perennial or intermittent water body, its lower banks and upper banks, and the vegetation that stabilizes the slopes, protects the waterway from erosion and sedimentation, provides cover and shade, and maintains fish and wildlife habitat.

Runoff: Water that travels across the land surface and discharges to water bodies either directly or through a collection and conveyance system. Also see “Stormwater.”

Salmonid: Any member of the taxonomic family Salmonidae, which includes all species of salmon, trout, and char (Salmon and Steelhead Stock Inventory).

Stormwater: Runoff during and following precipitation and snowmelt events, including surface runoff and drainage.

Stormwater Drainage Basin: An area drained by a single stream or river system or the drainage areas that drain directly to a particular water body or Puget Sound.

Stormwater System or Stormwater Management System: The phrase “stormwater system” or “stormwater management system” used throughout this Guide is meant to include both the public and private components unless specified otherwise. When the phrase “the City’s stormwater management system” is used, it is referring to the publicly-owned portion of the overall stormwater system. The stormwater system generally includes a combination of facilities (e.g., ditches, pipes, conduits, storage facilities, trenches, etc.) and natural features (e.g., open streams, ponds, etc.) that operate together, to convey stormwater from the point of origin to an ultimate discharge point. However, facilities directly associated with buildings or structures such as foundation drains, rockery/retaining wall drains, gutters and downspouts or groundwater under-drains are not considered parts of the stormwater system.

Stream: Any aquatic area where surface water produces a channel, not including a wholly artificial channel, unless the artificial channel is: 1) used by salmonids; or, 2) used to convey a stream that occurred naturally before construction of the artificial channel.

Surface Water: The phrase “surface water,” which refers to the streams, lakes, and wetlands located within the City, encompasses the overall stormwater system for purposes of this Guide – and what applies to “stormwater,” applies to “surface water.”

Undeveloped: Property generally in a state approaching being native or natural, covered with living, mature vegetation.

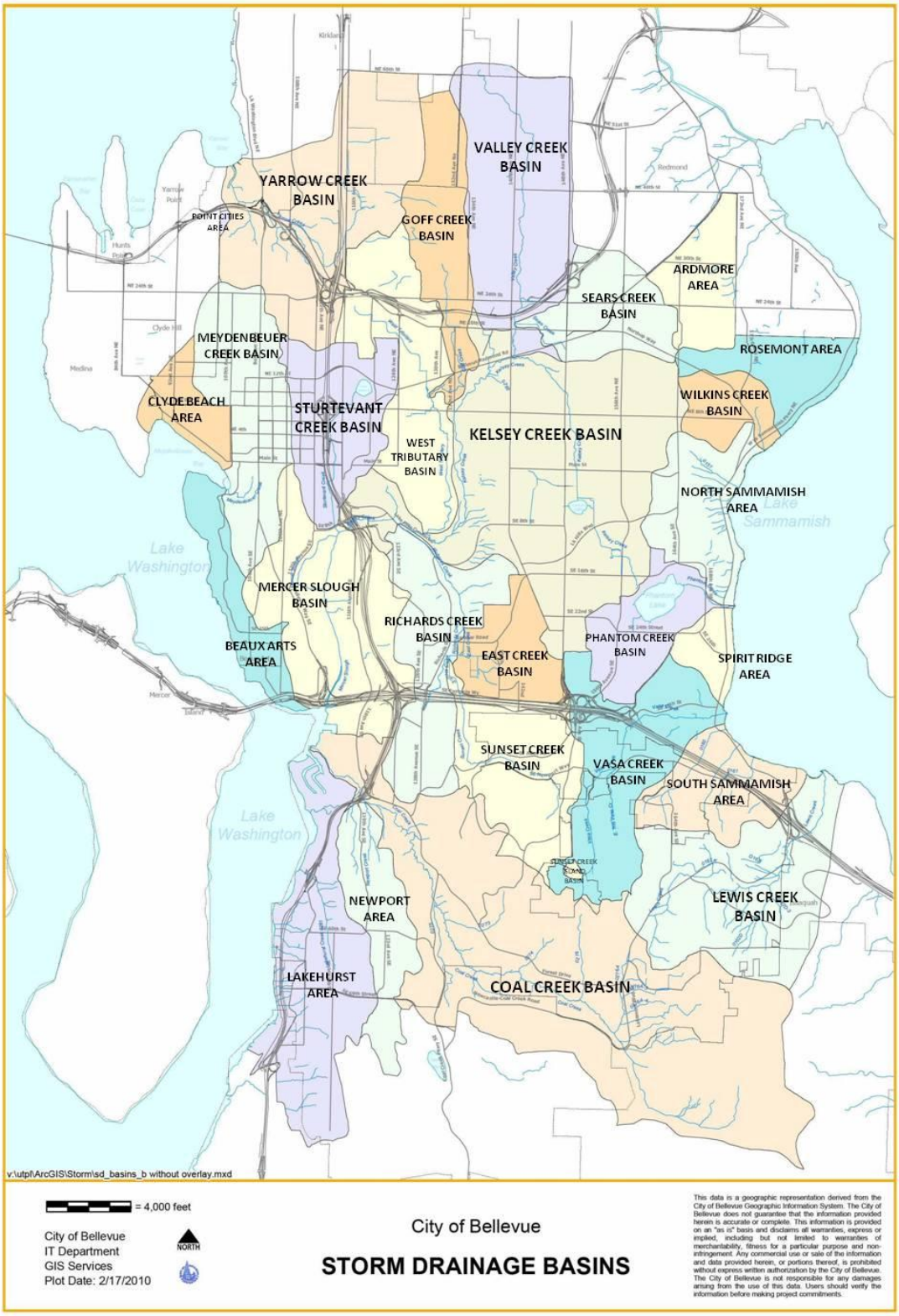
Water Quality Treatment Facility: A stormwater facility designed to reduce pollutants once they are already contained in stormwater runoff. Water quality treatment facilities are the structural component of best management practices (BMPs); when used singly or in combination, water quality treatment facilities reduce the potential for contamination of storm or surface water, and/or ground water.

Watershed: A geographic region within which water drains into a particular river, stream, or body of water as identified and numbered by the State of Washington Water Resource Inventory Areas, as defined in Chapter 173-500 WAC.

Wetland: A habitat that is characterized by soils that are saturated with water, or has shallow standing water, for part of the growing season.

Stormwater System Infrastructure Replacement

Appendix A – City's Stormwater Drainage Basins



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Appendix B –
Do You Want Clean Water in Your Community?

Nothing But Rain Down the Storm Drain!

Everything that washes into a storm drain flows untreated to the nearest stream, lake, or wetland. Fertilizers, pesticides, soap, oil, pet waste, and other pollutants wash off lawns and streets and end up in local waterways. By making small changes, you can be the solution to water pollution!

DON'T POLLUTE
NO DUMPING
CITY OF BELLEVUE
DRAINS TO
KELSEY CREEK

Clean Water Healthy Community

City of Bellevue
Natural Yard Care 425-452-6932
Car Wash Kits Loaned for Fundraisers 425-452-6166
Report Water Pollution 425-452-7840
Stream Team Volunteers 425-452-5200

Puget Sound Starts Here
www.pugetsoundstartshere.org

Discount Fundraising Car Wash Coupons
www.brownbear.com
www.pscarwash.org

Household Hazardous Waste
Factoria Transfer Station
13800 SE 32nd St.
Call for hours 206-296-4466

You Can Be The Solution to Water Pollution

Take your car to a commercial car wash

About 60 percent of the water at commercial car washes is recycled, and dirty water drains to the sanitary sewer for treatment. When you wash your car at home, soap, oils, and other toxics wash into a storm drain and flow untreated to a stream, lake, or wetland. Even biodegradable soap pollutes water!

Instead of holding a fund-raising car wash, sell car wash coupons, check out a car wash kit from the City of Bellevue (or use a site that has one), or consider other fundraising options.

Have car oil leaks fixed

Motor oil is a problem in local waterways, and it stays around for a long time. To see if your vehicle is leaking, place clean cardboard on the ground under your engine and check the next day. If you change your own motor oil, take the used oil to a business that recycles it.

Scoop the poop, bag it, and put it in the garbage

Pet waste contains harmful bacteria, which can contaminate water and make people sick. Composting or burying pet waste does not destroy the harmful organisms. Do not put pet waste in yard debris carts.

Practice Natural Yard Care

Avoid using pesticides and chemical fertilizers. They wash off lawns and pollute waterways. Prevent problems instead by practicing Natural Yard Care. Enrich soil with compost. Pull weeds or spot spray instead of spreading weed and feed products. Choose a variety of pest and disease-resistant plants and encourage "good" bugs to control pests naturally. If pests persist, use least toxic controls first. Use chemical pesticides sparingly only as a last resort.

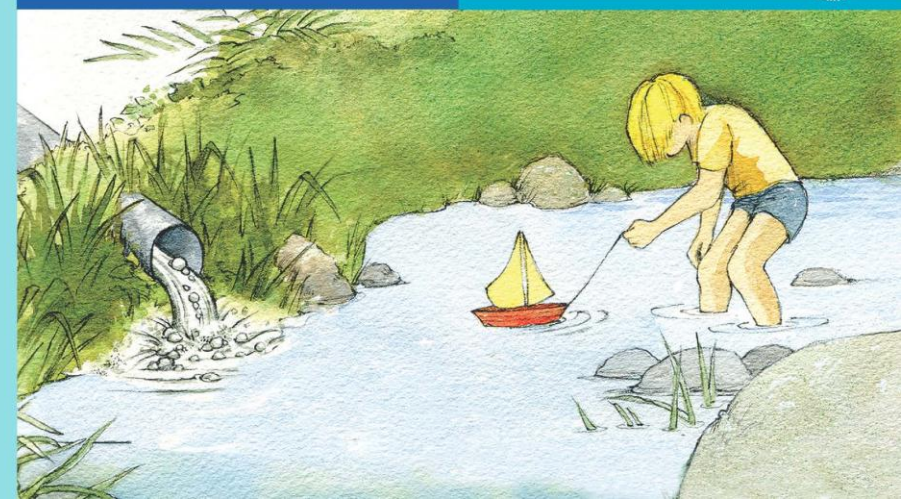
Do You Want *Clean Water* in Your Community?

BELLEVUE STREAM TEAM

Puget Sound Starts Here.org

Making simple choices prevents water pollution

CITY OF BELLEVUE WASHINGTON



Everyday activities can lead to water pollution.

When water from irrigation and rain washes over yards and streets, it collects fertilizers, pesticides, soap, oil, pet waste, and other pollutants. The runoff flows into storm drains untreated and ends up polluting the nearest stream, lake, or wetland.

For clean water in your community, make these simple choices:

- Take your car to a commercial car wash.
- Have car oil leaks fixed and recycle used motor oil.
- Scoop the poop, bag it, and put it in the garbage.
- Practice Natural Yard Care, and avoid using pesticides and chemical fertilizers.

Remember, it's *illegal* to pollute waterways in Washington State.

Thank you for keeping our shared waters healthy for people, fish, and wildlife.

Puget Sound Starts Here.org

Bellevue Stream Team

City of Bellevue Washington

Design: Vivitiv.com Illustration: Joyce Bergen

Appendix C – Where to Go & Who to Call (References)

Bellevue Personnel
- Nav Otal, Utilities Director, 425-452-2041 or notal@bellevuewa.gov

City of Bellevue Contacts
- City Council, 425-452-7810 or council@bellevuewa.gov
- City Manager's Office, 425-452-7228 or ssarkozy@bellevuewa.gov
- Environmental Services Commission, 425-452-4887 or esc@bellevuewa.gov
- Utilities Department, 425-452-6932 or utilities@bellevuewa.gov
- Development Services Center Department, 425-452-6800
- Parks & Community Services Department, 425-452-6885 or parksadmin@bellevuewa.gov
- Transportation Department, 425-452-6856
- Stream Team, 425-452-5200 or streamteam@bellevuewa.gov
- Bellevue Utilities 24-hour Emergency Response, 425-452-7840

City of Bellevue Codes, Regulations and Policies
- City of Bellevue's Home Page, www.bellevuewa.gov/
- Bellevue City Document Library, www.bellevuewa.gov/doc_library.htm

State of Washington Contacts
- Washington State Department of Ecology, 360-407-6000 or www.ecy.wa.gov
- Washington Department of Fish & Wildlife, 360-902-2200 or www.wdfw.wa.gov
- Department of Natural Resources, 360-902-1000 or www.dnr.wa.gov
- Department of Transportation, 360-705-7438 or www.wsdot.wa.gov

Relevant Washington State Laws, Regulations and Documents
- Washington State Environmental Policy Act, www.ecy.wa.gov/programs/sea/sepa/e-review.html
  - SEPA Unit, 360-407-6922 or email sepahelp@ecy.wa.gov
- Fish Passage Act (WAC 220-110-070), apps.leg.wa.gov/wac/default.aspx?cite=220-110-070
  - *Fish Passage Design At Road Culverts,* www.fws.gov/midwest/fisheries/streamcrossings/images/PDF/FishPassage.pdf
- Stormwater Management Manual for Western Washington (revised 2005), www.ecy.wa.gov/programs/wq/stormwater/manual.html
- Puget Sound Partnership, www.psp.wa.gov
-

Federal Contacts
- U.S. Army Corps of Engineers, 202-761-0011 or hq-publicaffairs@usace.army.mil
- NOAA Fisheries Service, Partnerships & Communications, www.nmfs.noaa.gov
- Environmental Protection Agency, Region 10, 206-553-1200, 800-424-4372, epa-seattle@epa.gov or www.epa.gov
- Federal Emergency Management Agency, 202-646-2500 or www.fema.gov

Relevant Federal Laws or Regulations

- Clean Water Act, www.epa.gov/lawsregs/laws/cwa.html
- Endangered Species Act, www.epa.gov/lawsregs/laws/esa.html
- National Pollution Discharges Elimination System (NPDES), http://cfpub.epa.gov/npdes/
- National Flood Insurance Act of 1968 & Flood Disaster Protection Act of 1973, www.fema.gov/library/viewRecord.do?id=4430
- National Flood Insurance Program, Floodplain Management, www.fema.gov/plan/prevent/floodplain/index.shtm

Other Relevant Documents or References

- Lake Washington/Cedar/Sammamish Chinook Salmon Conservation Plan (WRIA-8), www.govlink.org/watersheds/8/planning/chinook-plan/volumeII/01_Front_Materials.pdf
- Local Improvement Districts, www.mrsc.org/subjects/pubworks/lidpg.aspx
- Lake Management Districts, www.mrsc.org/subjects/environment/water/spd-lake.aspx
- King County Flood Control District, www.kingcounty.gov/environment/waterandland/flooding/flood-control-zone-district.aspx

Chism Beach Park Swimming Area

Printed on paper with post-consumer recycled-content.

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