# City of Sammamish

# Stormwater Management Comprehensive Plan

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ECONOMIC AND ENGINEERING SERVICES, INC.

# City of Sammamish Stormwater Management Comprehensive Plan

# Executive Summary

As a recently incorporated city, the City of Sammamish now has many additional regulatory and public responsibilities. One of these is the development of a Stormwater Management Comprehensive Plan, as mandated by the Puget Sound Water Quality Management (PSWQM) Plan. This Stormwater Management Comprehensive Plan has been developed to meet the regulatory requirements of the Growth Management Act, the National Pollutant Discharge Elimination System (NPDES) Phase II Rule, and the PSWQM Plan. This plan is also an important tool that the City can use for day-to-day operations and as a public reference document. In addition to addressing regulatory issues, this plan addresses protection of property from flooding and erosion, identifies health and safety issues related to water resources, and presents recommendations for the preservation of environmental and aesthetic benefits to the community. Discussions of system inventory needs and analysis of drainage and water quality issues are followed by a facilities maintenance program and a 6-year capital improvement program. A stormwater utility rate analysis and a system development charge determination were performed for this plan. The explanation of these analyses and recommendations are followed by a section that contains comprehensive stormwater management code and policy.

## Section 1: System Inventory and Drainage Network Basemap

Concurrent with the development of the City's Stormwater Management Comprehensive Plan, the Sammamish Plateau Water and Sewer District (SPWSD) began creating a drainage system inventory and drainage network basemap for the City. As of the completion date of this report, the system maps and database are still being developed. This section of the plan describes the inventory collection methodology and the final product that is expected from the SPWSD.

This section also includes a map that shows drainage subbasins and a map that shows sensitive areas. The sensitive areas map shows the approximate boundaries of floodplains, wetlands, erosion hazards, and landslide hazards.

An inventory of the constructed drainage system was conducted by the King County Surface Water Management (KCSWM) and Roads Maintenance Divisions in the mid 1990s. The data were collected using Global Positioning System (GPS) technology and copies of "as-built" storm drainage plans developed by consulting firms that performed work in the area. (The request for "as-built" plans did not yield much information.) The information from these sources covers approximately one-third of the current area of the City. To obtain more data, the City and SPWSD jointly hired a contractor to update the drainage inventory

information. The data are being collected using van-based videography techniques, in which a specially equipped van travels at normal traffic speed along designated roads using continuous S-VHS video recording to acquire data about the pavement surface and road shoulder. This method also allows for collection of coordinates data and identification of drainage structures within the roadway. SPWSD recently completed the fieldwork for this data collection effort and expects the processed data to be returned from the consultant in mid-March. After receiving the data, SPWSD will process the data and enter it into the ArcInfo geographic information system (GIS).

Field data from the contractor will be supplemented with information obtained from as-built plans, where available, from private engineering firms, and from King County. Using backpack-mounted receivers, SPWSD staff will inventory off-road facilities, such as easements, retention / detention facilities, streams, and culverts on foot.

A database of the constructed drainage system will be built within the ArcInfo environment to be used for modeling, maintenance tracking, in-field assessments, preliminary analysis and design, and general mapping purposes. It is estimated that the GIS database will be completed by the third quarter of 2001. Examples of the data that might be contained in the final database include: identification number; map section; data source; facility type; material type and size; rim elevation; invert elevation; pipe orientation; pipe length and diameter; orifice details; and overflow information.

The drainage network basemap and database will provide the City with the basis for an ongoing storm drain mapping program. As field maintenance operations continue, more detailed surveys of some areas might be necessary, and new development and capital improvement projects will provide additional information. Such information can easily be incorporated into the GIS map and database, especially when developers submit information in electronic format.

To ensure that field conditions are accurately represented, City and SPWSD staff time should be allocated specifically to update and maintain the GIS and database system. It is also recommended that personnel in the field use laptop or pocket-computer-based mapping applications to view or update databases. Some of the data, along with other City data sets (e.g., zoning and location of public services and facilities), can be made available to the public over the internet. Therefore, it is recommended that mapping of the drainage system be coordinated with other City information systems through a comprehensive information planning effort.

## Section 2: Evaluation of Surface Water Modeling Needs

Hydrologic analyses of four drainage basins within the City were conducted by KCSWM as part of the East Lake Sammamish Basin and Nonpoint Action Plan (KCSWM, 1992). The analyses covered the Inglewood, Thompson, Pine Lake, and Laughing Jacobs Basins. KCSWM also conducted an analysis of the Evans Creek Basin as part of the Bear Creek Basin Plan (KCSWM, 1990). No detailed modeling of the City portions of the Issaquah Creek Basin has been performed during the past decade.

The basin analyses performed by KCSWM used the U.S. Environmental Protection Agency's Hydrologic Simulation Program Fortran (HSPF) model, a continuous simulation tool. Data inputs to HSPF are rainfall and evaporation amounts, land-use information, subbasin

delineations, and channel and culvert characteristics. The analyses investigated pre-developed, current, and future land use conditions. Flood flow frequencies were computed for selected locations in each of the watersheds for the 1-year through 500-year return periods.

No new basinwide analysis is recommended at this time. Instead, the HSPF models developed by KCSWM should be updated to include rainfall data from the previous 10 years. This update is necessary to take into account the large flood events that occurred during the 1990s. The models should also be reviewed to determine if the original land use, channel characterization, and detention standard assumptions are valid. If warranted, the models should be updated based on the revised assumptions. The updated models could then be used as a design analytical tool.

In terms of modeling associated with the Capital Improvement Program (CIP) projects (described in Section 5), most of the projects on the CIP schedule require the determination of design flows and an investigation of culvert and channel backwater conditions. The following strategy was developed to determine these conditions:

- Hydrology—The updated HSPF model should be used for projects located on a study reach, although the HSPF model might need to be revised if the project is located in the middle of a study reach. If the project is not located in an area that has been modeled, then the King County Runoff Time-Series (KCRTS) model should be used. For study areas larger than 200 acres, HSPF is the model of choice.

- Hydraulics—A steady-state backwater program such as HEC-RAS, developed by the U.S. Army Corps of Engineers, should be used for projects that are intended to reduce the water surface elevations in stream reaches. This program should also be used for complex culvert improvement projects. Less sophisticated analytical tools can be used for simple conveyance or culvert improvement projects.

- Transportation Drainage Design—Drainage design for transportation projects should be completed during the roadway design process.

Section 2 also discusses relevant drainage design criteria, following the standards identified in the East Lake Sammamish Basin Plan. (See *King County Surface Water Design Manual*, KCSWM, 1998, for a comprehensive list of guidance.) Flow control standards are the main focus of this discussion, with an explanation of Level 1, Level 2, and Level 3 controls. It also notes that fish passage design criteria must be used for culvert improvements on Class 1 or 2 streams with salmonids, which is relevant to several streams within the City.

## Section 3: Environmental and Water Quality Problems

Section 3 of the plan documents potential pollution sources, surface water quality, erosion and sedimentation problems, habitat issues, and recommendations for the restoration of sensitive areas. It provides general guidelines the City can use in planning, policy-making, and implementation.

Nonpoint pollution sources are the most significant water quality issue for the City's surface waters. Point source (concentrated) discharges do not appear to pose a significant problem to the waters of the City. The City's most significant nonpoint sources include the

following: urbanization (typically results in increases of oil and grease, heavy metals, nitrogen, phosphorus, suspended sediment, and bacteria levels); land conversion (increased impervious surfaces); non-human coliform bacteria (usually from livestock and waterfowl); sewage (the result of deteriorating or unmaintained septic systems); and construction activities (typically results in increased erosion and sedimentation).

The City's surface waters and receiving waters were assessed based on water quality standards set by the Washington State Department of Ecology and King County. In general, the major water bodies in the City are facing erosion and sedimentation stresses, although a few show evidence of other water quality impairments such as fecal coliform and nutrients.

The Endangered Species Act (ESA) listing of regional salmon species has implications for the City's stormwater operations. Activities that alter patterns of runoff or water quality or that physically alter streams or riparian corridors have been identified as having harmful effects on fish. The City should institute practices that address these aquatic habitat issues. A complete list of the City's water bodies that contain fish passage barriers is provided in the plan. There are several Class 2 streams with salmonids within the City limits, and there are several natural and constructed fish passage barriers.

Recommendations for the protection and restoration of sensitive areas, surface water quality regulations, stormwater design practices, and operational practices are provided to address water resource pollution issues.

## Section 4: Stormwater Facilities Maintenance Program

Section 4 provides recommendations for the City's stormwater facilities maintenance program by evaluating the current and possible future maintenance service delivery programs. It examines and proposes standards for defining levels of service, costs, and implementation approaches.

The City's stormwater facilities consist of the following system elements:*

- 408,947 feet of stormwater conveyance pipe
- 3,519 catch basins
- 501,659 feet of open ditches
- 154 residential retention / detention stormwater facilities
- 34 commercial retention / detention stormwater facilities
- 18 oil / water separators
- 21 regional facilities (channels, pipes, enclosed drains)

**This information will be verified against the final geographic information system [GIS] inventory, which is being completed by the SPWSD.*

Maintenance standards are clearly defined in the Washington State Department of Ecology *Stormwater Management Manual for the Puget Sound Basin* (February 1992). This plan builds on these minimum standards with additional *King County Surface Water Design Manual* (1998) standards. It is recommended that the majority of the maintenance functions provided by King County continue to be implemented; however, to more fully comply with the recommended maintenance standards, the frequency of maintenance activities should be increased.

The following four alternatives for service delivery were explored:

- Alternative 1: Continue to contract with King County
- Alternative 2: Contract with a Utility District
- Alternative 3: Contract with a Neighboring City
- Alternative 4: Develop In-House Capability

During the development of this Stormwater Management Comprehensive Plan, Alternatives 1 and 2 appeared to be the most viable. Alternative 3 does not appear to be a viable option at this time, based on inquiries to five neighboring jurisdictions. Alternative 4 is part of the City's long-term vision, and is an option that is likely to be reconsidered as the City's staff and capabilities expand. It might be an option to develop some in-house capabilities in conjunction with the preferred alternative.

King County is currently the stormwater system maintenance service provider for the City, with the contract administered through two departments, the Department of Transportation and the Department of Natural Resources. Section 4 of this Stormwater Management Comprehensive Plan was completed early in the development of the plan to provide the City with a timely mechanism for evaluating its service delivery options. The City subsequently solicited proposals from three potential service providers: King County (both the Department of Transportation and the Department of Natural Resources), the Sammamish Plateau Water and Sewer District (SPWSD), and the Northeast Sammamish Sewer and Water District. Proposals were received from King County and the SPWSD; the Northeast Sammamish Sewer and Water District declined to participate.

These proposals were evaluated based on criteria that included cost effectiveness, customer service / responsiveness, compliance with environmental regulations, and safety. Both King County and the SPWSD appear to be qualified to perform the work and have written thorough, organized, responsive proposals that address the key criteria and provide additional qualifications. Some features favor selection of King County (e.g., institutional and specialty knowledge, compliance with environmental regulations, existing resources to perform services) as a service provider, while other features favor selection of the SPWSD (e.g., responsiveness and cost-effectiveness).

The City has selected a shared service provision contract, with some services provided by King County and others by the SPWSD. The proposed distribution of service provision elements results in an approximate total contract cost of $725,000 for the first year of service. This is an order-of-magnitude cost estimate and will be refined during contract negotiations. The King County Department of Natural Resources will complete its existing contract agreement for 2000 and begin the temporary contract recently negotiated with King County for 2001. The City will then negotiate the combined service provision contract in early 2001. The City should again discuss the need for additional equipment purchases with the SPWSD to verify that each of the recommended categories of service can be performed before the City contracts with the SPWSD. The City should also try to negotiate lower costs on some of the King County services.

Section 5 provides important background information about how the service provider decision was made and what maintenance services are necessary for optimal operation of the stormwater system. It also suggests a distribution of services for the first year of the

maintenance service provision contract. After the first year, additional resources might be available to the SPWSD, or King County might have demonstrated sufficient responsiveness to prompt a change in the City's distribution of the contracted services. The City might also be ready to provide some of the services in-house.

With a new facilities maintenance service provision program, King County's inventory of drainage facilities, descriptions, and maintenance records should be transferred to the City for review and incorporation into the City's record system. The current maintenance processes identified in this report should be modified to include the inspection and work authorization process agreed on by the Public Works Director and his staff.

Finally, the Endangered Species Act (ESA) must be considered in virtually all aspects of the City's operations. The ESA is designed to protect individual plant and animal species that are federally listed as endangered or threatened. Protection is defined in terms of "take," which means to harass, harm, pursue, shoot, wound, kill, capture, or collect or attempt to engage in any such conduct. If the City inadvertently violates "take" prohibitions, it could be subject to criminal or civil prosecution. The ESA also includes provisions for citizen lawsuits.

Maintenance activities potentially could harm a listed species by modifying or degrading the species habitat. For example, stormwater maintenance activities that expose soil to erosion or expose chemicals to the environment have the potential to degrade water quality. Currently, specific maintenance guidelines that address ESA compliance have not been developed; however, the City should be proactive in developing a strategy to prepare for and respond to the ESA. It is recommended that the City evaluate the maintenance activities provided in the plan appendices to determine their effects on endangered species habitat and to ensure that the service provider implements best management practices when performing the work.

## Section 5: Stormwater Capital Improvement Program

The Stormwater Capital Improvement Program (CIP) is a list of priority projects that shows the estimated costs and available funding for each project during the 6-year period from 2001 to 2006. Because this is the first stormwater CIP for the City, this program focuses initially on clearly identifiable localized problems. The CIP addresses future projects that require considerable analysis, design, and/or large amounts of funding. This plan includes recommendations to include King County Basin Study Projects that would have regional or significant local improvement benefits. The stormwater CIP also includes drainage elements of transportation projects identified in the City's Transportation Improvement Program (TIP).

A database of drainage complaints was created to include flooding, erosion, sedimentation, and water quality problems. The sources of the data in this database included King County files and studies, institutional knowledge of City staff and the two water and sewer districts serving the area (SPWSD and Northeast Sammamish Sewer and Water District), and several public meetings and newsletter announcements with contact numbers. From this database, which included more than 250 problems, repeat, related, and resolved issues were identified, allowing them to be consolidated into discrete issues. Most of these are clearly outside the definition of a stormwater CIP; however, the remaining 21 complaint-related

projects, 14 transportation-related projects, and 25 basin study recommendation projects was used as the basis for prioritizing complaints.

The CIP that was developed from the complaint database and TIP includes the following project types:

- Two "Quick Fix" projects. These projects can be pursued with minimal analysis or design and pose no obvious substantial risk to downstream property or resources. The projects do not require the mobilization of equipment larger than a backhoe or small dump truck, nor do they involve complicated permitting. The projects are not expected to exceed $40,000 each, but they will allow high-priority problems to be resolved quickly and will demonstrate that the City is improving its stormwater infrastructure. The CIP also recommends that $50,000 per year be set aside for as-yet unidentified "Quick Fix" projects that might result in the years following the initial improvements.
- One "Study" project. This project requires investigation before the capital needs can be determined.
- Eleven "Simple Design / Construction" or "Study" and "Simple Design / Construction" projects. These projects have a minimal degree of complexity and require a limited amount of analysis and / or design. Some permitting might be involved. It is not expected that the costs for these projects will exceed $100,000 (with the exception of one $120,000 project).
- Twenty "Study / Design / Construction" projects. These projects are complex and require a large amount of analysis and / or design. They might also have complex permitting issues. Anticipated costs of these projects range from $11,000 to $1,200,000.
- One "Construction Only" project. This transportation drainage project is currently under way; the design phase was completed before this CIP was developed.

The 25 CIP projects identified through the King County Basin Studies vary in type, but most involve analysis, design, and construction.

During the CIP development process, several non-CIP complaints that require follow-up were identified. There are 14 maintenance issues, 5 Roads Department issues, and 18 policy issues that are recommended for follow-up by City staff.

## Section 6: Stormwater Utility Financial Plan and System Development Charge

The effective implementation of a Stormwater Management Comprehensive Plan is dependent on developing a document that can be financially supported by the utility, will meet State and local regulatory requirements, and will provide the flexibility to deal with unforeseen changes. This section summarizes elements of the plan that address the financial issues facing the utility.

Section 6 of the plan provides a financial plan that projects operating and capital costs of the system for the 6-year projected time horizon of calendar years 2001 to 2006. Additionally this section documents the development of a system development charge (SDC) recommended as part of the revenue stream available to help fund capital improvements in the 6-year financial plan.

## Proposed System Development Charge

The rapid increase in the number of customers on many stormwater systems has increased the burden on utilities to finance the projects necessary to deal with this growth. The cost of developing conveyance and treatment systems that meet the requirements of the Clean Water Act, the NPDES, and the ESA can be quite large. To mitigate the cost of financing these new facilities, many utilities have implemented SDCs for new development. SDCs provide a way to balance the cost of the new utility infrastructure required to meet customer growth between existing and new customers. New utility connections, under SDCs, are required to "buy-in" to the system in terms of both existing capacity and future capacity in order to bear their equitable share of the cost of such systems.

There are several criteria that are used to develop SDCs for a stormwater utility:

- Number of equivalent residential units (ERUs)
- Existing facility value
- Future capital improvements
- Credits

These criteria are described below.

### ERUs

The first criterion is the number of ERUs. For this study 1 ERU is equivalent to 2,500 square feet of impervious surface area. The ERU for this plan was developed by averaging the number of ERUs in other nearby jurisdictions that have stormwater SDCs in place. When divided into the impervious area for a typical single-family development in the City (4,500 square feet), 1.8 ERUs is derived as the number of ERUs for the typical single-family development.

This information and the anticipated population at total build-out within the existing City limits (76,000) is used to generate the total number of ERUs at build-out. Typically, when developing total stormwater ERUs, land use assumptions and capacity (as provided in an entity's comprehensive plan) are used. Because the City's Comprehensive Plan is under development, another method was used to generate the ERU capacity of the system at total build-out.

The City's primary stormwater customer base and development type are single-family dwellings. Therefore, a single-family equivalent was generated to estimate the systemwide number of ERUs. This does not negate the fact that there are developments other than single-family dwellings within the City. This is just one method used to generate ERUs for the system by using available data. The methodology is described in the following.

A population of 30,793 (for 2000) was provided by the Planning Department. Dividing this population by the Washington State Office of Financial Management's estimate of 3.09 persons per household for the City, an estimate of 9,965 households is generated. A factor of 1.2 ERUs per dwelling was used to estimate the number of existing households served by the existing facilities. This factor was used as an average of existing housing, recognizing that some existing lots have less impervious area than those currently developed. Thus, a current single-family equivalent of 11,958 was generated.

The Planning Department anticipates that build-out for the City will occur by 2014. Beginning with 11,958 single-family equivalents served in 2000 and extrapolating to 2014 to a total population of 76,000, a projected number of single-family equivalents was generated using an estimate of construction activity. While the City's moratorium is in place, construction is limited. The estimated number of permits is 600 per year in 2001 and 2002. When the moratorium is lifted, in 2002, construction activity is expected to increase to final build-out in 2014. Each estimated permit represents one single-family equivalent. Therefore, the 1.8 ERUs per single-family dwelling is applied to the number of permits estimated each year, resulting in the total number of ERUs for the system (35,790). For example, in 2001, when there will be an estimated 600 permits, the estimated growth to the system will be 1,080 ERUs (600 permits x 1.8 ERUs).

This method was applied through build-out in 2014 to derive the additional ERUs expected on the system (23,832 ERUs). The SDC is charged per ERU. Therefore, the number of additional ERUs each year determines the estimated revenue from the SDC. The SDC revenue is then incorporated into the financial plan.

### Existing Facility Value

An SDC represents a cost-based charge to new customers connecting to the system. The SDC charge is composed of three elements: the existing facility value, future capital improvements, and credits. The first element of the SDC ($184.00) is the equity charge for connecting to the existing system, which is based on the value of the existing facility of $6.5 million. In essence, the new customers connecting to the system benefit from these facilities and should share in the cost. The value of the existing facility is estimated by using data from King County and the City stormwater CIP projects completed in 2000.

### Future Capital Improvements

The second element of the SDC ($391.90) represents the cost of future system improvements to meet the demands that result from growth. This is based on the Capital Improvement Program (CIP) presented in Section 5 of the plan, which totals $15 million for the 6-year period. The portion of the CIP that is attributed to growth ($9.3 million) comprises the second part of the charge.

### Credits

The third element of the SDC ($6.30) takes into account that some portion of past and future improvements are paid for through debt. Because debt is paid through rates, a credit is given in the SDC calculation. This calculation is performed to avoid double-charging customers for debt. The debt projections used are taken from the 6-year financial plan, which includes both the debt owed to King County for past projects and estimates of future debt based on the CIP. The financial plan assumes there will be $8 million of new revenue bonds issued over the 6-year period as part of the funding mechanism for the CIP.

Based on the criteria discussed above, the SDC, presented in Table ES-1, was calculated for the City's stormwater utility.

**TABLE ES-1. City of Sammamish Stormwater Utility Proposed System Development Charge**

| Description | Charge |
|---|---|
| Existing Facility | $184.00 |
| Future Facility | 391.90 |
| Debt Service Credit | (6.30) |
| Total | $569.60 |
| **Net System Development Charge per ERU** | **$570.00** |

The SDC is cost based and was generated using generally accepted SDC and rate-making methodologies. Economic & Engineering Services, Inc. (EES) makes the following recommendations regarding the SDC:

- Adopt the SDC as presented in this report
- Remove the interim SDC deposit and replace it with a newly developed SDC
- Update the SDC in 2 years, when the City's Comprehensive Plan is complete
- Update the SDC at least every 3 years after the initial update

For the initial update, the ERUs, population, and land use assumptions can be updated using the data developed for the City's Comprehensive Plan and using the GIS data that are being developed as part of this project.

The SDC revenue is included in the revenue projections in the financial plan. The SDC revenue is allocated for capital funding because, legally, it cannot be used to pay operating costs of the system. A description of the financial plan follows.

## Six-Year Stormwater Financial Plan

The 6-year financial plan reviews the sources of funds (revenues) and applications of funds (expenses) for the City's stormwater system. The basis of the operating costs is the projected 2001 stormwater system budget from the Facilities Maintenance Program recommendations. The capital costs contained within the financial plan use the CIP developed as part of Section 5 of this plan. The results of the financial plan (revenue requirements) outline the annual operating and capital needs of the stormwater system and determine if the current rate revenues are sufficient to cover costs.

The revenue requirement developed for the stormwater utility assumes that the utility will "stand on its own"; that is, it will not be subsidized by another utility or by City funds. The revenue requirement assumes no subsidies and identifies the full operating and capital costs required to operate the system in a financially stable manner. Table ES-2 presents the utility's 6-year financial plan for all operating and capital needs.

**TABLE ES-2. Summary of Stormwater Utility Revenue Requirements ($000)**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| **Sources of Funds** | | | | | | |
| Present Rate Revenues | $1,043 | $1,095 | $1,171 | $1,253 | $1,341 | $1,435 |
| Misc. Revenues | 48 | 45 | 8 | 8 | 8 | 8 |
| Total Sources of Funds | $1,091 | $1,140 | $1,179 | $1,261 | $1,349 | $1,443 |
| **Applications of Funds** | | | | | | |
| O&M Expenses | $725 | $747 | $769 | $792 | $816 | $841 |
| Taxes/Transfers | 165 | 171 | 177 | 182 | 189 | 195 |
| Debt Service | 174 | 246 | 285 | 464 | 706 | 794 |
| CIP from Rates | 160 | 176 | 219 | 264 | 328 | 410 |
| Total Applic. of Funds | $1,224 | $1,340 | $1,450 | $1,702 | $2,040 | $2,240 |
| Plus: Additional Taxes* | 2 | 3 | 4 | 7 | 10 | 12 |
| Balance/(Def.) of Funds | ($135) | ($203) | ($275) | ($448) | ($701) | ($809) |
| % Bal./(Defic.) of Funds | 13% | 19% | 23% | 36% | 52% | 56% |

*The additional taxes are incurred when the "%Bal./(Defic.) of Funds" is implemented as a rate adjustment. It is the State excise tax due on the additional revenue generated. The additional revenue is the amount shown as deficiency ($135,000 for 2001). The percent (13% in 2001) shown is the rate adjustment needed to generate the deficiency in revenue. For example, in 2001 there is a 13% rate adjustment needed to generate $135,000.

It is important to note that when interpreting Table ES-2 the deficiencies noted for each of the years are cumulative. That is, any additional adjustments during the initial years will reduce the deficiency in the following years. For example, if a 13 percent rate adjustment were implemented for 2001, a 6 percent adjustment would be needed in 2002.

An explanation of each of the elements listed in Table ES-2 follows. First, a projection of revenues at present rates was developed for the current budget year and projected forward based on an assumed growth factor. Present rate revenues include rate revenues from all customer classes. Revenue is estimated to increase 5 percent through 2002 and then 7 percent through 2006. These revenue estimates are based on population data (76,000 by the year 2014) obtained from City Planning staff.

Other miscellaneous revenues for the utility included primarily investment interest. It is anticipated that investment interest will generate approximately $48,000 in 2001. The assumed interest earnings were calculated based on a 5 percent return on the unrestricted reserves for each year. Investment interest would be reduced to $8,000 per year in 2003 after available reserves have been used for capital projects. An operating reserve equal to 45 days of operating costs (about 12 percent of O&M) is maintained for the remainder of the 6-year period.

After revenues have been established, the operating costs are developed. O&M expenses are incurred to operate and maintain the existing stormwater facilities in service. The costs incurred in this area are expensed during the current year and are not capitalized or depreciated over the life of the asset. Projected O&M expenses are based on the proposed Facilities Maintenance Program presented in Section 4 of this plan. The cost of the contract in 2001 is projected to be $725,300. Projections of O&M expenses were based on an annual escalation factor of 3 percent for future years. If the final negotiated contract has a different

total or escalation factor, the projected O&M expenses would change and should be evaluated for level of impact.

Other utility operating costs include taxes and transfers. The City pays a 1.5 percent state excise tax on rate revenues. Additionally, there is a transfer from the utility fund to the general fund of $150,000 beginning in 2001 to reimburse labor and direct costs incurred by general fund staff working on utility issues.

A major focus of this financial plan is the funding of capital improvements. Table ES-3 shows the total CIP costs, less outside funding sources, which result in the CIP from rates.

**TABLE ES-3. Summary of Stormwater CIP Project Funding ($000)**

| Funding Source | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Total Capital Project Expenses | $815 | $2,113 | $2,249 | $3,236 | $4,057 | $2,549 |
| **Less: Outside Funding:** | | | | | | |
| SDCs | $616 | $616 | $653 | $924 | $952 | $1,126 |
| Grants/Loans | 0 | 0 | 0 | 0 | 0 | 0 |
| Reserves | 39 | 500 | 0 | 0 | 0 | 0 |
| Revenue Bonds | 0 | 821 | 1,378 | 2,048 | 2,777 | 1,013 |
| Total Outside Funding | $655 | $1,937 | $2,031 | $2,972 | $3,729 | $2,139 |
| CIP from Rates | $160 | $176 | $218 | $264 | $328 | $410 |

Table ES-3 shows the capital costs (CIP from Rates) that are included in Table ES-2. This is the only portion of capital costs that remains when total capital expenses, less outside funding (including reserves, SDCs, grants, and loans), are calculated. This methodology complies with the cash basis of accumulating costs for the revenue requirement. The methodology is further explained in Section 6 of the plan. The funding is segregated in this way because many of these outside funding sources (grants, SDCs, revenue bonds) are authorized only for capital purposes; they cannot be used for operating costs. Therefore, the only capital cost that appears in the revenue requirements (Table ES-2) is the CIP from Rates. This balance of capital resources is required for funding the total CIP as presented in Section 5 of the plan.

Typically, CIP from Rates is targeted at renewal and replacement projects so that the facility is repaired and replaced, in part, with funds from existing customer rate revenues. This is important because failure to properly fund renewals and replacements from rates will ultimately lead to long-term financial problems. The beginning funding level, in 2001, of renewals and replacements, is based on 2 percent of the value of facilities. Each year it increases by 2 percent of the projected amount of capital projects in the prior year. The basis for this calculation is a “rule of thumb” that funding of renewals and replacements should be set at a level equal to approximately 1-2 percent of the facility value. As the projected capital improvements are completed and the plant value increases, the funding of renewals and replacements should also increase.

Debt Service is another cost for the utility. The utility's existing debt service is for County bond issues for projects that were constructed within the City limits prior to incorporation of the City. This debt ranges from $174,000 to $93,000 per year through the 6-year period. The financial plan indicates a need for new debt financing for capital projects beginning in 2002 ($821,000). Debt was assumed as the optimal funding source because the only other available source is rates. To fund $821,000 through rates would cause a significant increase in rates, nearly 80 percent. Without a rate increase, a revenue bond, or other outside funding sources, revenue is not sufficient to cover costs, and capital improvements or other expenses must be reduced or delayed.

The City anticipates that it will be ready to issue revenue bonds by 2003. To issue revenue bonds, the City must go through a rigorous process of initiating a bond rating with rating agencies. Thus, decisions must be made regarding the timing of projects because $821,000 is needed in 2002. If other outside funding, such as grant funding, cannot be obtained to cover this proposed amount of bonding for capital improvements in 2002, it then becomes a deficit. The probability of grant funding is minimal because competition is high for the few funding resources available. Therefore, the City might have to defer $821,000 of capital improvements in 2002. Use of other financing mechanisms (e.g., short-term financing until the City is ready for bonding) or deferral of some operational costs are also options to meet the financial requirements of the utility.

The results of the revenue requirements indicate that the stormwater utility requires a 13 percent rate adjustment in 2001 and, cumulatively, a 56 percent rate adjustment in 2006. If the rates are not adjusted, then capital or operational costs must be eliminated or deferred.

The majority of rate revenue in the utility currently comes from residential customers. A 13 percent increase equates to an additional $0.92 per month ($11.04 per year) for the typical residential customer. A survey of residential stormwater rates in other local jurisdictions was conducted as part of this study. Table ES-4 presents the stormwater rates for 2000 and the proposed rates for 2001 for the City and local jurisdictions.

**TABLE ES-4. Monthly Residential Stormwater Utility Rates of Local Jurisdictions**

| City | 2000 | 2001 |
|---|---|---|
| Bellevue* | $9.19 | $9.70 |
| Issaquah | $10.95 | $10.95 |
| Newcastle | $8.50 | $8.50 |
| Redmond | $11.50 | $11.50 |
| Woodinville | $7.09 | $7.09 |
| Sammamish | $7.09 | $7.09 |

* Based on a lot size of 8,000 to 10,000 square feet, with moderate development (40 percent).

No change to the structure of the rates or to the billing method is recommended at this time. The rates are based on impervious area, which is an equitable approach for stormwater rates. At this early stage in the development of the utility, it is most important to ensure financial stability through adequate funding. Therefore, it is recommended that rate adjustments of 13 percent be implemented across-the-board to all rate customer classes in 2001.

Even with a 13 to 20 percent rate adjustment, the City's stormwater rate will be less than the average residential rate of the surrounding jurisdictions. If the rate adjustments shown at the bottom of Table ES-2 are made as presented, then the programs, CIP projects, and operations described within the plan can be funded.

Table ES-5 presents the impact of various levels of rate adjustment on the single-family customer class.

**TABLE ES-5. Monthly Impact of Rate Adjustments on a "Typical" Residential Customer**

| Adjustment | Rate ($/month) | Increase per Month from Current Rate | Increase per Year from Current Rate |
|---|---|---|---|
| Current Rate | $7.09 | $0.00 | $0.00 |
| 5% Adjustment | $7.44 | $0.35 | $4.20 |
| 7% Adjustment | $7.58 | $0.49 | $5.88 |
| 10% Adjustment | $7.80 | $0.71 | $8.52 |
| 13% Adjustment | $8.01 | $0.92 | $11.04 |
| 18% Adjustment | $8.37 | $1.28 | $15.36 |
| 20% Adjustment | $8.50 | $1.41 | $16.92 |

Table ES-6 was developed to provide five funding options and scenarios as a framework for decisionmaking. The data in Table ES-6 were calculated using the following assumptions:

- No rate increase occurs in 2001.
- O&M expenses remain as shown in Section 4.
- SDC is adopted, as presented in the plan.
- SDC and other outside CIP funding sources remain as shown in Table ES-3.
- No new CIP projects are added during the 6-year period.

Table ES-6 presents the cumulative unfunded CIP for five rate adjustment scenarios. The unfunded CIP balances represent funding deficiencies, and, therefore, projects that must be delayed until future years. The first four funding options show the effects of no rate increase and of a 10, 20, and 30 percent rate adjustment implemented in 2002. The fifth option shows the effect of a 10 percent rate increase annually, which is just less than the 6-year total revenue requirement presented in Table ES-2. The fifth option is also the option that most closely funds the full CIP and operational obligations as outlined in the plan.

The variables that account for the differences in these scenarios are the stormwater rate, subsequent rate revenue, and the level of bonding for CIP projects.

Table ES-6 shows that if there is no rate increase during the 6-year period, there will a backlog of $8.6 million in unfunded CIP projects. If rates are increased 10 percent each year beginning in 2002, however, this backlog would be reduced to $0.7 million over the 6-year period (if no new projects are added).

**TABLE ES-6. Cumulative Unfunded CIP with Various Rate Adjustment Scenarios ($000)**

| Rate Adjustment | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| **No rate change** | **85.02** | **85.02** | **85.02** | **85.02** | **85.02** | **85.02** |
| Rate Revenue | 1,043 | 1,095 | 1,171 | 1,253 | 1,341 | 1,435 |
| Bonding for CIP | 0 | 0 | 0 | 0 | 0 | 0 |
| **Unfunded CIP** | **(136)** | **(1,086)** | **(2,544)** | **(4,664)** | **(7,520)** | **(8,630)** |
| **10% Increase in 2002** | **85.02** | **93.52** | **93.52** | **93.52** | **93.52** | **93.52** |
| Rate Revenue | 1,043 | 1,210 | 1,294 | 1,385 | 1,485 | 1,586 |
| Bonding for CIP | 0 | 0 | 0 | 0 | 700 | 0 |
| **Unfunded CIP** | **(136)** | **(971)** | **(2,306)** | **(4,294)** | **(6,371)** | **(7,393)** |
| **20% Increase in 2002** | **85.02** | **102.02** | **102.02** | **102.02** | **102.02** | **102.02** |
| Rate Revenue | 1,043 | 1,325 | 1,417 | 1,517 | 1,623 | 1,737 |
| Bonding for CIP | 0 | 821 | 1,078 | 0 | 0 | 400 |
| **Unfunded CIP** | **(136)** | **(108)** | **(410)** | **(2,434)** | **(5,176)** | **(5,790)** |
| **30% Increase in 2002** | **85.02** | **110.53** | **110.53** | **110.53** | **110.53** | **110.53** |
| Rate Revenue | 1,043 | 1,440 | 1,540 | 1,648 | 1,764 | 1,887 |
| Bonding for CIP | 0 | 821 | 1,078 | 1,750 | 0 | 0 |
| **Unfunded CIP** | **(136)** | **0** | **(172)** | **(470)** | **(3,226)** | **(4,207)** |
| **10% Increase per year** | **85.02** | **93.52** | **102.87** | **113.16** | **124.48** | **136.93** |
| Rate Revenue | 1,043 | 1,210 | 1,420 | 1,653 | 1,912 | 2,200 |
| Bonding for CIP | 0 | 821 | 1,078 | 1,750 | 1,900 | 2,000 |
| **Unfunded CIP** | **(136)** | **(223)** | **(522)** | **(815)** | **(1,690)** | **(705)** |

## Section 7: Comprehensive Stormwater Management Code and Policy

The plan presents a draft of the proposed new Section 9 of the Interim Sammamish Development Code (ISDC). It also includes a policy discussion and recommendations for further action by the City to enhance protection of its water resources. The municipal code, if adopted by ordinance by the City, will replace the existing Section 9 of the ISDC—Surface Water Management. This updated code section adopts the 1998 *King County Surface Water Design Manual* (KCSWM, 1998) and incorporates many of the requirements of the new Washington State Department of Ecology DRAFT *Stormwater Management Manual for Western Washington* (Ecology, 2000). Among the section's provisions are drainage review

requirements for projects in critical drainage and/or erosion areas; liability and financial guarantees for drainage facilities; criteria for drainage facility acceptance by the City for maintenance; inspection of drainage facilities; and enforcement of drainage requirements.

Along with the proposed Stormwater Management Comprehensive Code, Section 7 of the plan recommends City policies that would advance the protection and restoration of water resources. Many of these, such as the enforcement of Best Management Practices and Erosion and Sedimentation Controls, can be implemented directly. Other recommendations for innovative land use and development principles should be approached gradually, and in a manner consistent with the desired character of the City.

SECTION 1

# System Inventory and Drainage Network Basemap

A comprehensive record of the storm and surface water drainage system is an important element of a municipality's data and knowledge base. At the onset of this comprehensive planning process for the City of Sammamish (City), the City had no such comprehensive database. However, concurrent with the development of the City's Stormwater Management Comprehensive Plan, the Sammamish Plateau Water and Sewer District (SPWSD) began creating a drainage system inventory and drainage network basemap for the City. As of the completion date of this report, the system grid maps are still under development. This section of the report describes the inventory collection methodology and the final product that is expected from SPWSD. When SPWSD is finished developing the grid maps and database, this report should be updated to include the new information.

A map that shows sensitive areas is presented in Figures 1-1a and 1-1b. This map was developed using spatial data from the King County Geographic Information System (GIS) Center and it shows approximate boundaries for sensitive areas, including flood plains, wetlands, erosion hazards, and landslide hazards. Figure 1-2 shows the major drainage basins in the City of Sammamish. Figures 1-3a and 1-3b show a street system basemap that shows the drainage subbasins in the three major drainage basins within the City. The subbasin drainage boundaries for the Issaquah Creek and Bear Creek Basins were determined by King County and transferred to the basemap created by SPWSD. No subbasin delineations for the East Lake Sammamish Basin were available from King County; therefore, they were delineated by hand.

## Map and Database Development Methodology

An inventory of the constructed drainage system, including pipes and culverts, manholes and catch basins, and roadside ditches was conducted by the King County Surface Water Management and Roads Maintenance Divisions in the mid 1990s. The data were collected using Global Positioning System (GPS) technology and were stored in King County's ArcInfo GIS. The database files for the area encompassing the City were obtained by SPWSD in May 1998. Copies of "as-built" storm drainage plans were also solicited from consulting firms that performed work in the area encompassing the City prior to incorporation. Although the City offered to purchase copies of the plans, only one firm responded with plans and computer image files for 18 plats. These computer files can be used as a backdrop, allowing an analyst to trace drainage system improvements into the GIS system. Approximately 40 work hours will be required to input the spatial and attribute data into the GIS system, and perform quality control.

King County's data were collected to a positional accuracy of approximately 1 meter. The inventory covers approximately one-third of the current area of the City. In addi-

tion, several new development projects, County Roads Division maintenance projects, and utility construction projects have occurred in the area of the inventory, which requires an update to the original fieldwork.

The City and SPWSD have jointly hired a contractor to update the drainage inventory information. The locations of drainage facilities within roadway areas in the City were "premarked" by SPWSD staff to facilitate identification. The data are being collected using van-based videography techniques, in which a specially equipped van travels at normal traffic speed along the roads designated for this project while acquiring data through continuous S-VHS video recording of the pavement surface and road shoulder. In addition, a color video camera continuously records the "driver's view" of the roadway in front of the survey vehicle. Images of drainage system features in and adjacent to the pavement are recorded in stereo to allow the coordinates (representing the x and y values in the State Plane coordinate system) to be determined relative to the van. The position of the van is recorded using GPS receivers connected in real-time to a computer database.

The videotapes are analyzed by the contractor's personnel. Utility asset features on the videotape are viewed on a monitor and classified in a computer database. The position from the GPS database is also added at this time. Thus, each culvert opening, catch basin, and manhole within the roadway is identified and has coordinates assigned. The data will be formatted in comma-delimited ASCII files for delivery to SPWSD.

The fieldwork for this data collection was completed in December 2000, and the data are currently being reviewed by SPWSD. After receiving the data, SPWSD staff will perform additional processing and will enter the data into the ArcInfo GIS system.

Field data from the contractor will be supplemented with information obtained from as-built plans, where available, from private engineering firms, and from King County. Using backpack-mounted receivers, SPWSD staff will inventory off-road facilities, such as easements, retention/detention facilities, streams, and culverts on foot. The database from this inventory will be converted directly into an ArcInfo GIS database.

The above inventory methods will record the values for x and y coordinates for point features in the database, corresponding to nodes in a network model. The pipes, or links between the nodes, will be determined from as-built plans, where available, and by inspection of manholes and catchbasins to determine connectivity.

The elevation, or z-axis, values will not be determined using GPS methods. The elevation values have larger tolerance values than the horizontal coordinates when using GPS. Thus, for coordinates measured to 1 meter accuracy, the corresponding elevation would be within 3 meters of the actual location. Elevations will be determined from as-built plans. Additional survey work may be required to supplement the database for modeling.

A database representing the constructed drainage system will be built within the ArcInfo environment to be used for modeling, maintenance tracking, in-field assessments, preliminary analysis and design, and general mapping purposes. The GIS database should be completed during the second quarter of 2001. Basemaps of the SPWSD area of the City and some overlapping Northeast Sammamish Sewer and Water

District basemaps have already been developed. This mapping includes streets, lots, 5-foot elevation contours, water and sewer facilities, and other features. The City should consider completing the coverage by developing additional basemap information from existing orthophotographs of the unmapped areas. Where storm drainage system information is available, it will be added to the existing basemap by layering the storm features and other database layers to create maps. Examples of the data that might be contained in the final database include: identification number; map section; data source; facility type; material type and size; rim elevation; invert elevation; pipe orientation; pipe length and diameter; orifice details; and overflow information.

## Recommendations for Continued Development of Storm Drain Mapping

To effectively manage and maintain the storm drainage system, the City must have a complete inventory of the facilities within its boundaries. The system maps and database generated by SPWSD will provide the City with the basis for an ongoing storm drainage mapping program. As field maintenance operations continue, more detailed surveys of certain areas might occur, and this information can readily be incorporated into the GIS map and database. In addition, those who are responsible for new development and for capital improvement projects should be required to submit as-builts and other pertinent drainage information, preferably in electronic format for ease of inclusion in the database. If the mapping system is to accurately reflect field conditions, City and SPWSD staff time should be allocated so that these changes can be incorporated into the GIS database as they occur.

To accurately track the costs of maintaining a drainage system, there are software packages that interact with GIS-based inventory systems. These systems allow maintenance costs to be allocated to specific projects or facilities and can also be used to optimize maintenance operations.

The technology for distributing map information has undergone rapid change during the past decade. Paper map atlases are being replaced by laptop, or most recently, by pocket-computer-based mapping applications that allow personnel in the field to view or update databases. Using these applications in the field reduces the number of requests for information between field and office personnel because more information is available than on a paper map, thus reducing or eliminating the time required to update, print, and distribute updated information and allowing field personnel to directly update maintenance tracking system databases. In addition, some of the data, along with other City data sets (e.g., zoning, location of public facilities and services, and natural resources), can be made available to the public on the World Wide Web. Therefore, it is recommended that mapping of the drainage system be coordinated with other City information systems through a comprehensive information systems planning effort that would make drainage system and other data available to maintenance staff in the field, engineering and planning staff, and to the general public.

This integration effort should be accomplished by information systems consulting firms and could be expected to take 3 to 6 months and cost approximately $25,000. Tasks involved would include:

- Inventorying existing information systems and data used by City staff
- Inventorying information system hardware and software resources
- Projecting the demand for new services
- Recommending a strategy for integrating information resources

An additional recommendation is to continue the development of a GIS-based storm drainage inventory database. Remaining tasks include:

- Completing database design
- Completing field data collection
- Complete procedures and software tool
- Converting field data to GIS format
- Supplementing field data with “as-built” plan information
- Quality control
- Integrating data with an asset management system

This work should be completed by the third quarter of 2001.

Additionally, staff time should continue to be dedicated to ensure that the GIS database is updated as changes occur. Procedures and software tools developed for the initial data conversion will continue to be used during this maintenance phase.

159385.A1.09_W032001014SEA / City of Sammamish / F 1-1a: SensitiveAreas / 4/18/01 / RLyons / LW

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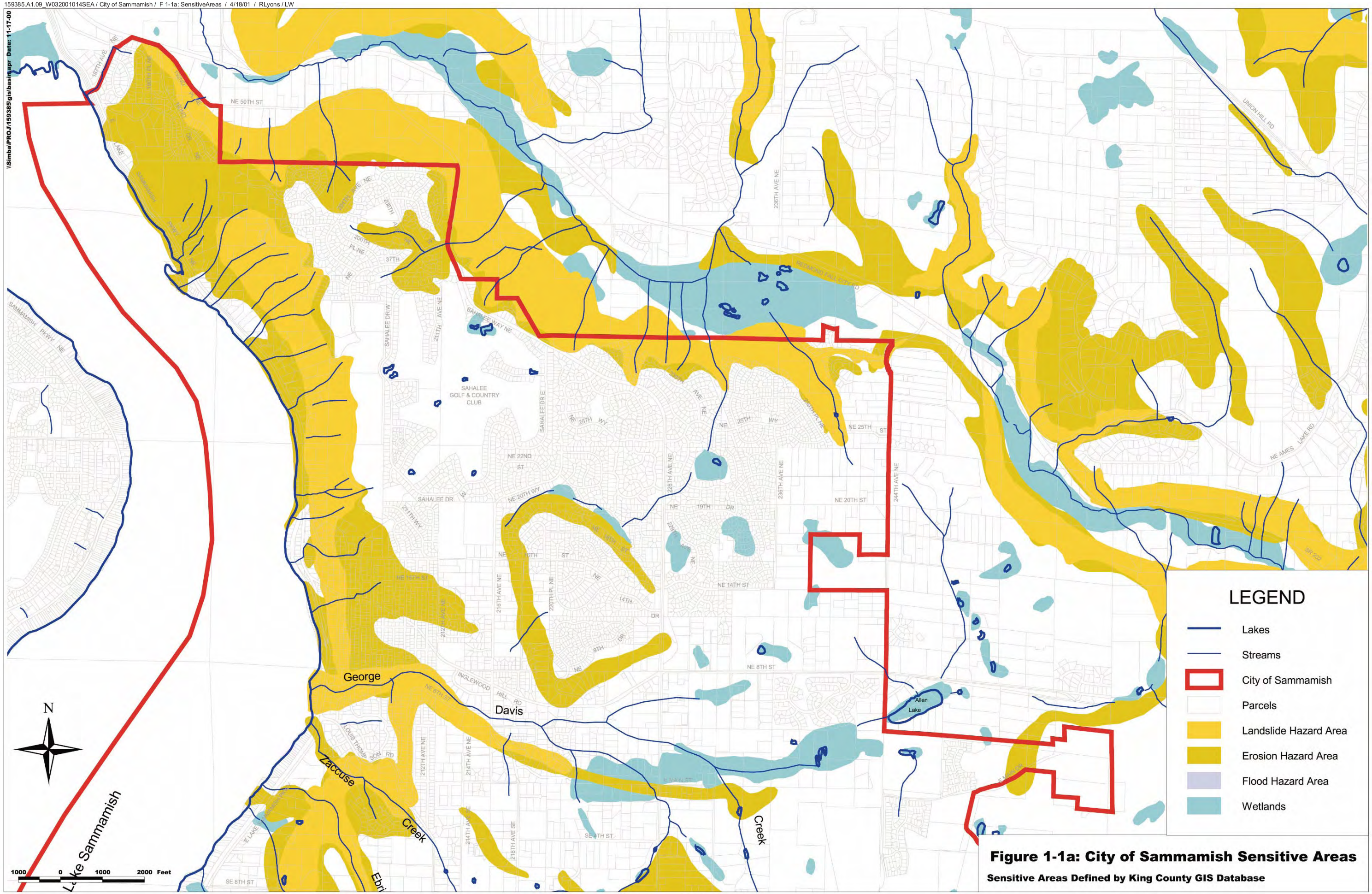



**Figure 1-1a: City of Sammamish Sensitive Areas**

**Sensitive Areas Defined by King County GIS Database**

159385.A1.09_W032001014SEA / City of Sammamish / F 1-1b: SensitiveAreas / 4/18/01 / RLyons / LW

\\Simba\PROJ\159385\gis\basin.apr Date: 11-17-00

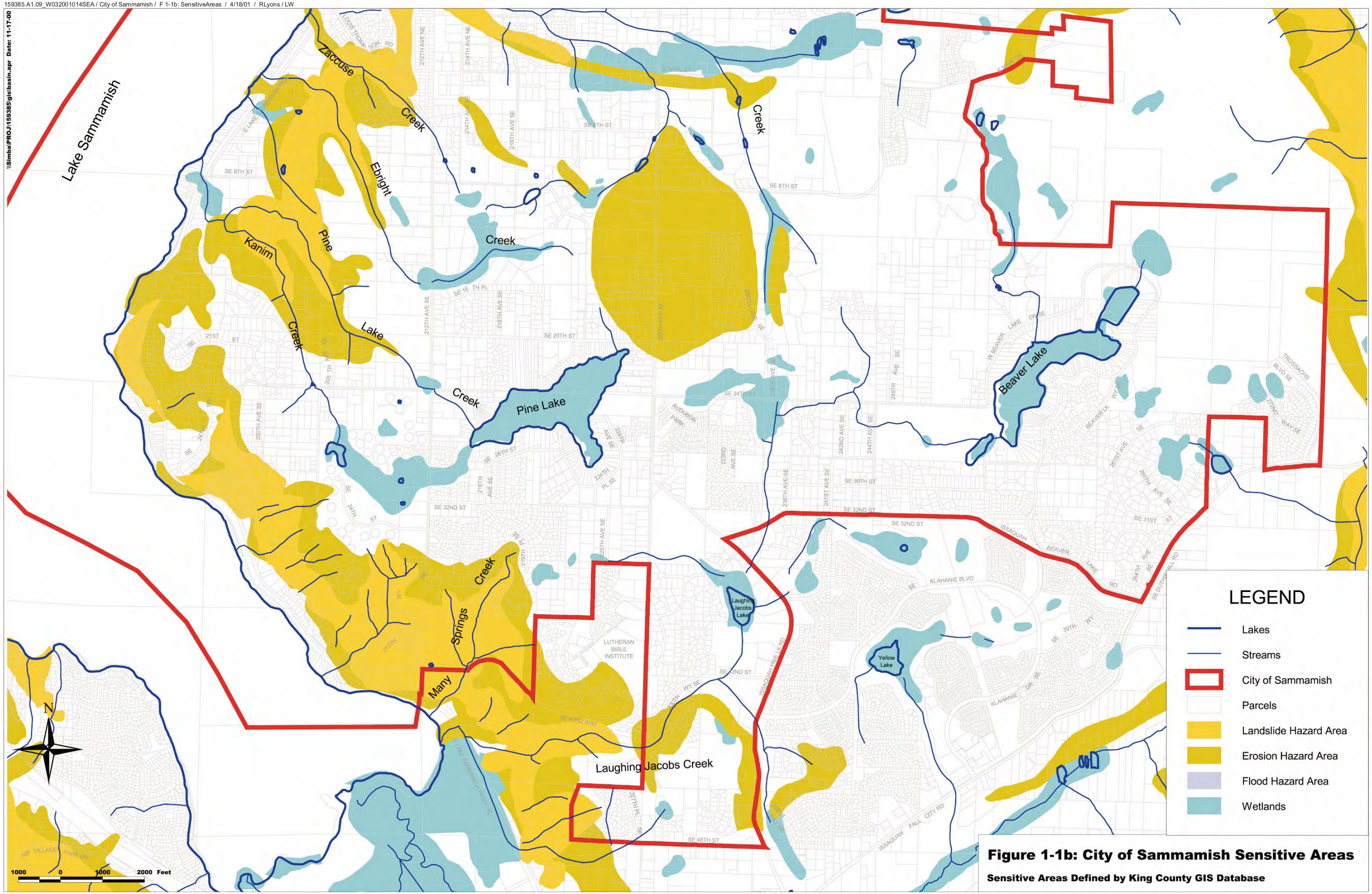
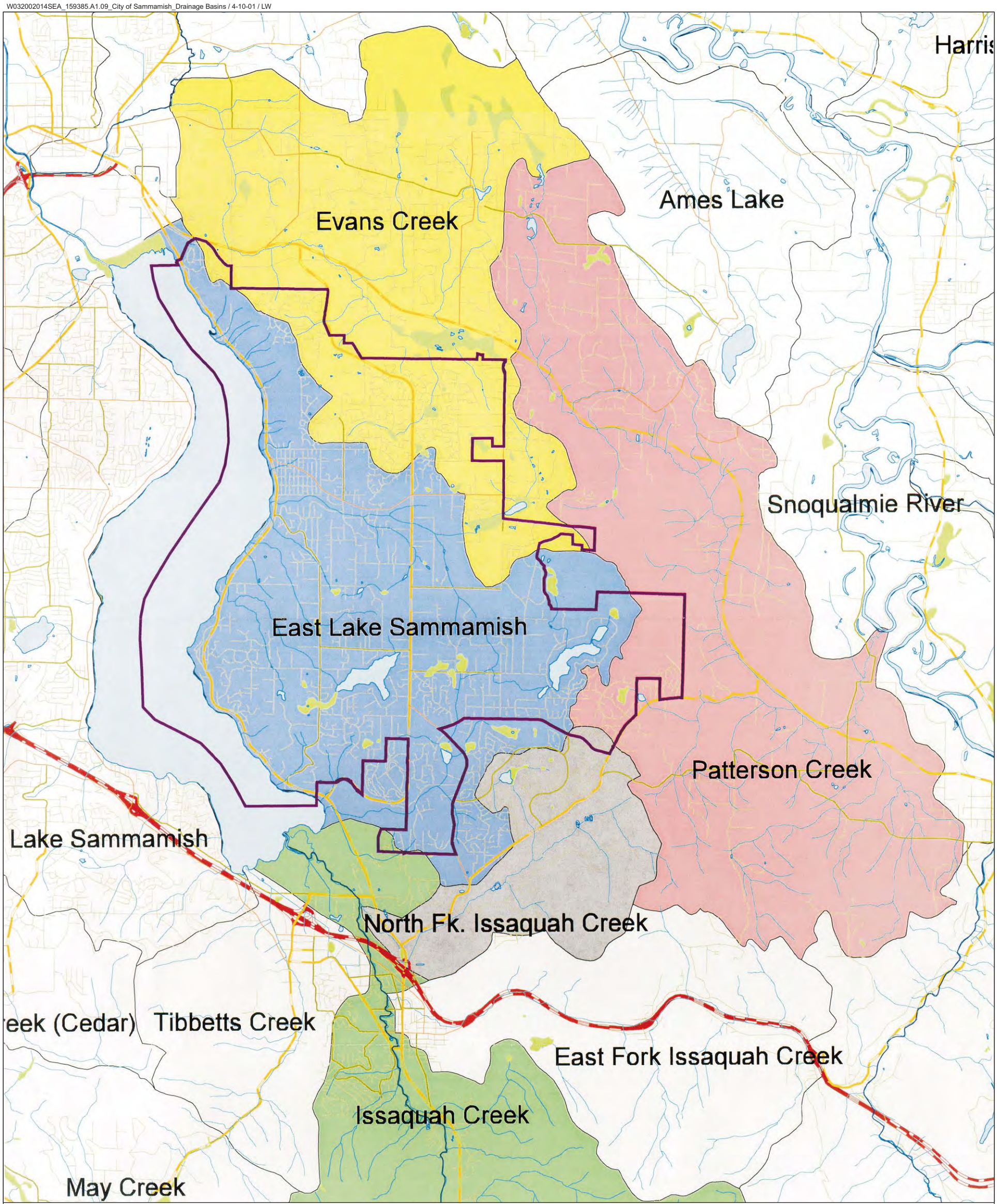



**Figure 1-1b: City of Sammamish Sensitive Areas**

**Sensitive Areas Defined by King County GIS Database**

W032002014SEA_159385.A1.09_City of Sammamish_Drainage Basins / 4-10-01 / LW




**Wtrbdy.shp**
- Open water
- Wetland
- Rivers
- Cartstrm.shp

**Kcsnstrt.shp**
- Freeway
- Primary
- Collector
- Minor
- Local

N

KING COUNTY
Department of Natural Resources

**Figure 1-2:**
**City of Sammamish**
**Major Drainage Basins**

159385.A1.09_W032001014SEA / City of Sammamish / F 1-3a: DrainageSubbasinDelineation / 4/18/01 / RLyons / LW

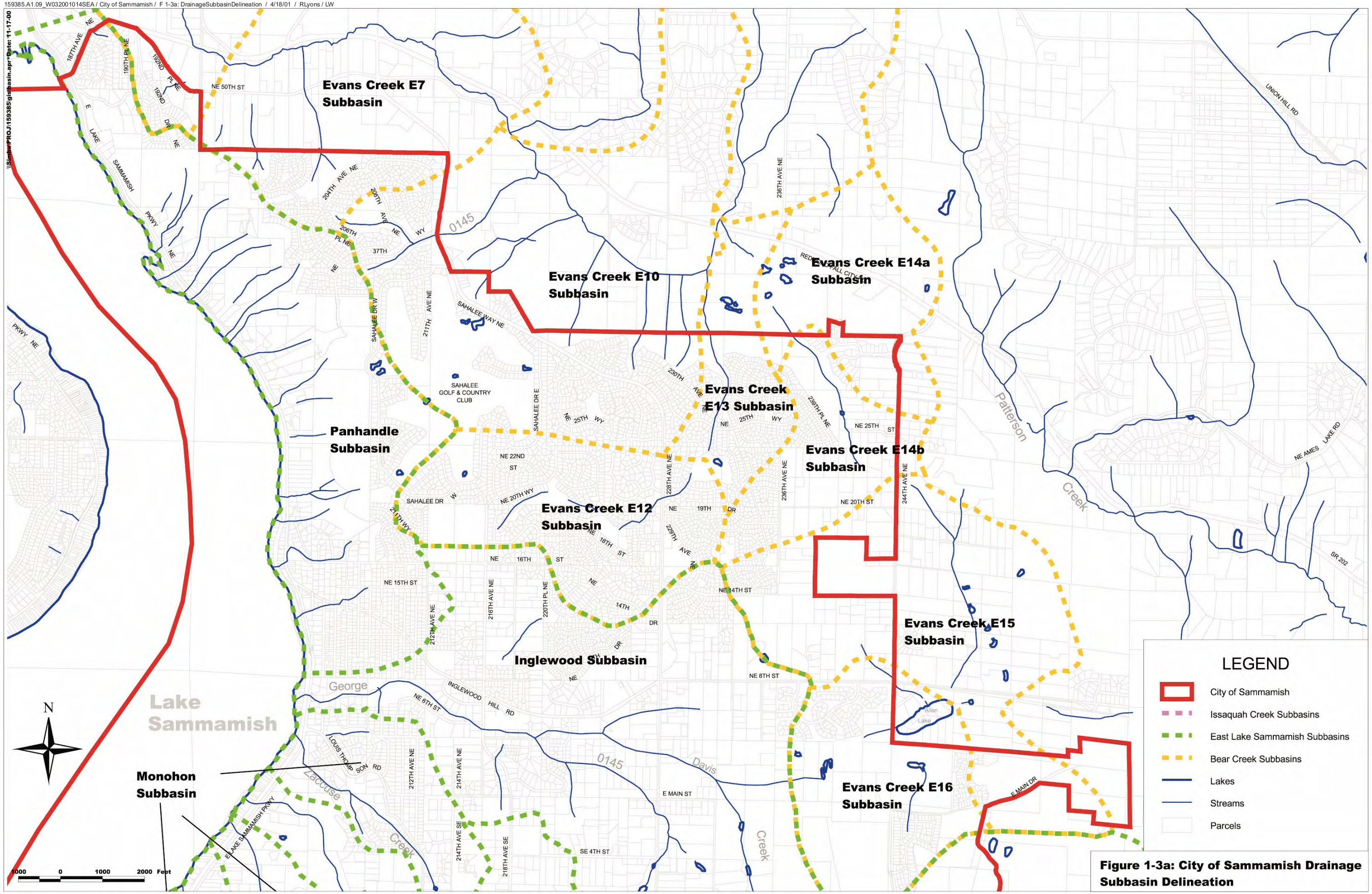



**Figure 1-3a: City of Sammamish Drainage Subbasin Delineation**

159385.A1.09_W032001014SEA / City of Sammamish / Fig 1-3b: DrainageSubbasinDelineation / 4/18/01 / RLyons /

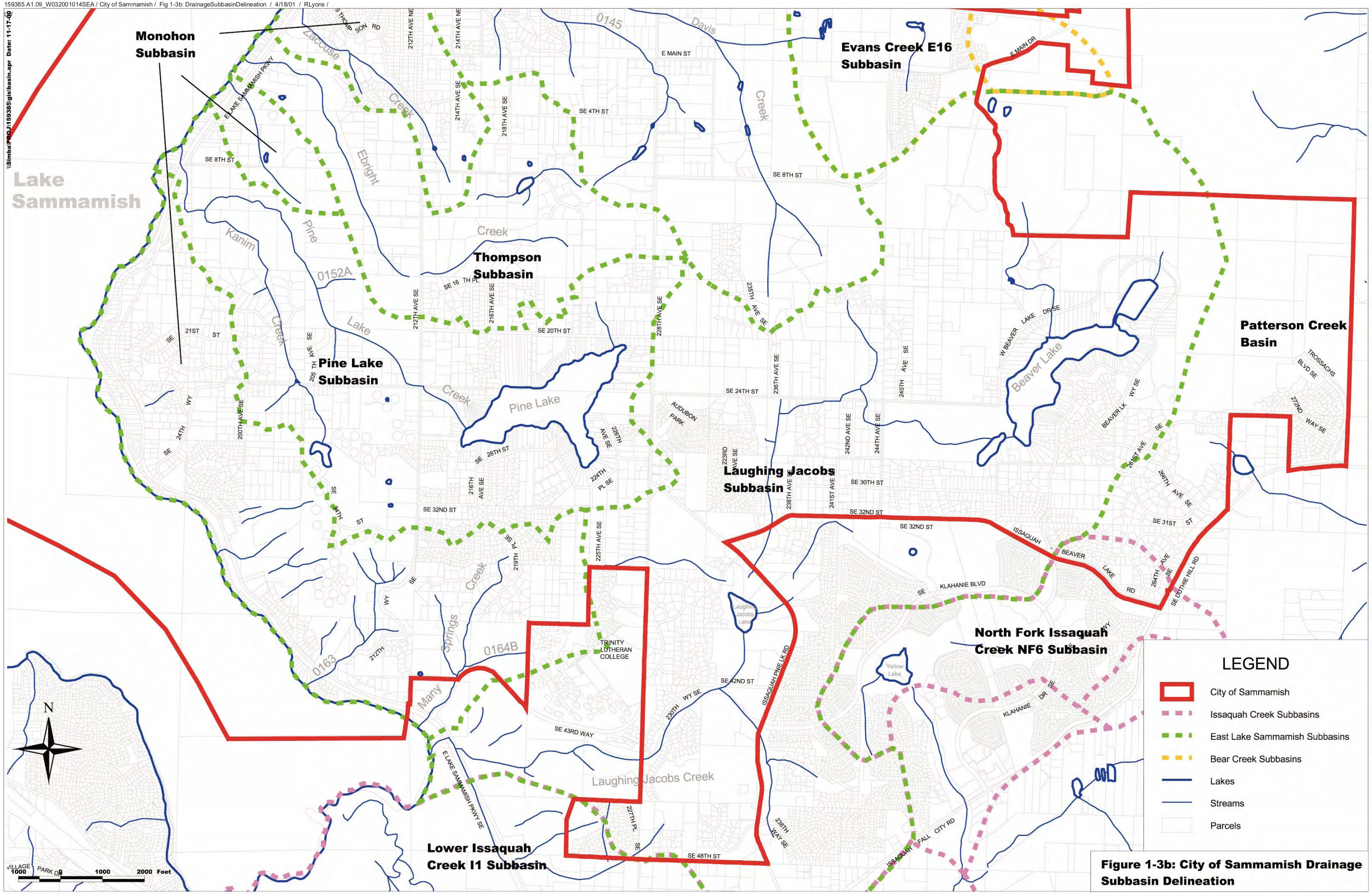



**Figure 1-3b: City of Sammamish Drainage Subbasin Delineation**

SECTION 2

# Evaluation of Surface Water Modeling Needs

## Existing Modeling

The King County Surface Water Management Division (KCSWM) conducted a hydrologic analysis of four basins as part of the East Lake Sammamish Basin and Nonpoint Action Plan (KCSWM, 1992). The analysis covered the Inglewood, Thompson, Pine Lake, and Laughing Jacobs Basins. KCSWM also conducted an analysis of the Evans Creek Basin as part of the Bear Creek Basin Plan (KCSWM, 1990). Figures 1-3a and 1-3b show the extent of these basins. The hydrology of these basins was analyzed using the U.S. Environmental Protection Agency's (EPA) Hydrological Simulation Program Fortran (HSPF) model (EPA, 1984). No detailed modeling of the City of Sammamish (City) portions of the Issaquah Creek Basin has been performed in the last decade.

HSPF is a continuous simulation model that includes all components of the hydrologic cycle. Continuous simulation modeling is superior to event-based modeling because it takes into account antecedent conditions (such as back-to-back storms) and uses historic precipitation and evaporation data. Data inputs to HSPF are rainfall and evaporation amounts, land-use information, subbasin delineation, and channel and culvert characteristics.

The KCSWM analysis investigated predeveloped, current, and future land-use conditions. The predeveloped land-use condition was assumed to be forested. Land-use conditions in 1985 were assumed to be the current land-use condition for the Evans Creek Basin; land-use conditions in 1989 were assumed to be the current land-use conditions for the East Lake Sammamish Basin Plan. Future land use conditions were based on the Bear Creek Community Plan in the Evans Creek Basin and the King County Comprehensive Plan (King County, 1989) for the remaining basins. The future land-use condition was also analyzed based on two separate detention standards, referred to as the 7-day standard and the Bear Creek standard. The 7-day standard controls the 2- and 10-year flows to corresponding pre-development levels. This standard is similar to the Level 1 flow control standard described below. The Bear Creek standard controls peak flows and durations to corresponding pre-development levels for all flows greater than one-half the 2-year and less than the 50-year event. This standard is similar to the Level 2 flow control standard described below. Both standards require detention facilities sized (using design event techniques such as SBUH) for a 7-day storm distribution and a 30 percent volumetric safety factor. Flood flow frequencies were computed for selected locations in each of the watersheds for the 1-year through 500-year return periods.

## Additional Analysis

No new basinwide analysis is recommended at this time. Instead, the HSPF models developed by KCSWM should be updated to include rainfall data from the previous

10 years. This update is necessary to include the large flood events that occurred in the 1990s. The models should also be reviewed to determine if the original land use, channel characterization, and detention standards assumptions are valid. If these assumptions are found to be invalid, then the models should be updated based on the revised assumptions. The updated model could then be used as a design analytical tool.

# Design Analysis

A design analysis modeling strategy was developed to assist with implementation of the Capital Improvement Program. Most of the projects on the CIP schedule (see Section 5) require the development of design flows and an investigation of culvert and channel backwater conditions. The strategy described below could be used to determine design discharge and backwater conditions.

## Hydrology

The updated HSPF model should be used for projects located on a study reach. The HSPF model might need to be revised if the project is located in the middle of a study reach. The future condition model should be used with the appropriate detention standard.

If the project is not located on a study reach or is in one of the unstudied basins, then the King County Runoff Time-Series (KCRTS) model should be used. For study areas larger than 200 acres, HSPF is the model of choice.

## Hydraulics

A steady-state backwater program, such as HEC-RAS, developed by the U.S. Army Corps of Engineers (COE, 1999), should be used for projects intended to reduce the water surface elevation in stream reaches. This program should also be used for complex culvert improvement projects.

Less sophisticated analytical tools such as HY-8, developed by the U.S. Federal Highway Administration, or KCBW, developed by KCSWM, can be used for simple conveyance or culvert improvement projects.

## Transportation Drainage Design

Drainage design for transportation projects should be completed during the roadway design process. Drainage facilities should be designed using the appropriate modeling tools, as described above, with the exception of storm drain and inlet design. A number of design tools are available for storm drain and inlet design, including spreadsheet analysis, add-ons to CAD packages, and proprietary models. Any of these tools are appropriate as long as the procedures described in the *King County Surface Water Design Manual* (KCSWDM, 1998) are followed.

## Relevant Design Criteria

Specific basinwide design criteria have been identified in the East Lake Sammamish Basin Plan and are described in detail below. A comprehensive list of all design standards is presented in the KCSWDM (1998).

## Flow Control Standards

Through its Core Requirements, the KCSWDM requires peak rate control (Level 1), duration control (Level 2), or a combination of the two (Level 3), depending on the needs of the downstream system. The following explanation of flow control is summarized from Section 3.1.2 Flow Control Standards in the KCSWDM.

### *Level 1 Flow Control*

Level 1 flow control is used to control flood flows at their current levels and to maintain peak flows for most storm events. Level 1 flow control matches the predeveloped site's peak discharge rates for the 2-year and 10-year runoff events.

While Level 1 is the default flow control standard according to the KCSWDM, the Washington State Department of Ecology's (Ecology) new Draft *Stormwater Management Manual for Western Washington* (Ecology, August 2000) recommends that the more stringent Level 2 standards serve as the default. The code and policy section of this stormwater management comprehensive plan (see Section 7) recommends using the Level 2 standard as the default in the City of Sammamish.

### *Level 2 Flow Control*

Level 2 flow control is used to control the duration of geomorphically significant flows in an attempt to ensure that channel and streambank erosion rates do not increase. A geomorphically significant flow is defined as a flow that moves channel bedload sediments.

Level 2 flow control matches the predeveloped site's discharge duration for the predeveloped peak discharge rates between 50 percent of the 2-year peak flow through the 50-year peak flow. This flow control standard is also referred to as the stream protection standard. Section 7 of this plan recommends that all proposed projects within the city limits be subject to Level 2 flow control requirements at a minimum, unless a more stringent Level 3 flow control standard is required.

### *Level 3 Flow Control*

Level 3 flow control is intended to mitigate water level changes in volume-sensitive water bodies (i.e., lakes, wetlands, closed depressions with severe flooding problems). The Level 3 standard provides additional storage and increases the detention time to minimize downstream impacts.

The Level 3 flow control standard meets the Level 2 criteria and also matches the predeveloped site's peak discharge rate for the 100-year return period. All proposed projects within the George Davis Creek (also known as Eden Creek), Ebright Creek, Pine Lake, and Beaver Lake Basins would be subject to Level 3 flow control requirements.

## Fish Passage Design

Fish passage design criteria must be used for culvert improvement projects on Class 1 or 2 streams with salmonids. These criteria specify limits on peak velocity, low-flow depth, and hydraulic drop through the structure based on the length of the culvert and on the fish species present in the stream.

# Recommendations

The extent of the HSPF surface water modeling performed for the East Lake Sammamish Basin Plan and the Bear Creek Basin Plan should generally be adequate for future modeling efforts. The basin models should be reviewed to determine if alterations to the flow regime have occurred and the future land-use assumptions have changed. The models should also be updated to include recent climatic data. The CIP schedule should be updated based on the results of the revised HSPF modeling.

The design of the projects on the CIP schedule should use the updated HSPF modeling in conjunction with the design analysis strategy for projects located on an HSPF study reach. Simplified analytical techniques, such as KCRTS, should be used for projects located in unstudied areas or for projects located away from an HSPF study reach.

SECTION 3

# Environmental and Water Quality Problems

## Purpose

The Stormwater Management Comprehensive Code and Policy proposed for the City of Sammamish (City) in Section 7 of this report addresses the City's goals for environmental and water quality maintenance and improvement. Specifically, the code and policy promote the comprehensive management of storm and surface waters through flood, erosion, and sedimentation controls, and the prevention of water quality degradation.

To achieve its environmental protection goals, the City can use the general guidelines provided in this section for planning, policy-making, and implementation. This report provides the following:

1. Identification of potential pollution sources
2. Identification of surface water quality problems in major water bodies
3. Identification of environmental issues including erosion and sedimentation problems, flooding, and effects on aquatic habitat
4. Review of fish passage conditions detailed in the East Lake Sammamish, Issaquah Creek, and Bear Creek Basin Plans
5. Explanation of major values and functions of key wetlands
6. Recommendations for design standards and surface water quality policies
7. Recommendations for protection or restoration of sensitive areas

The water bodies considered in this section are Pine Lake, Beaver Lake, Laughing Jacobs Lake, Lake Sammamish, George Davis Creek, Zaccuse Creek, Ebright Creek, Pine Lake Creek, Kanim Creek, Many Springs Creek, Laughing Jacobs Creek, and a number of unnamed tributaries.

## Pollution Sources

### Point Sources

The National Pollutant Discharge Elimination System (NPDES) is designed to protect human health and the environment by regulating pollutants that are discharged to surface water via point sources. The U.S. Environmental Protection Agency (EPA) defines point sources as discrete conveyances, such as pipes or manmade ditches. Polluted stormwater runoff, treated effluent, and untreated sewage are examples of point source pollution. Although stormwater runoff might not result in a discharge from a pipe, some land uses (e.g., industrial sites, construction activity, and the City's storm drain system) are or will be

regulated as point sources under the NPDES stormwater permit program. Facilities that discharge directly to surface water must obtain a permit and comply with NPDES regulations, which are discussed in this section of the report (see "Recommended Surface Water Quality Regulations").

There are no regulated point source discharges within the City of Sammamish according to the Washington State Department of Ecology (Ecology). There could be some NPDES point sources, but they are not regulated by Ecology. Discharges to major water bodies from proj??ects under construction will continue to occur and should be monitored. It is important that development regulations be enforced to ensure that proper protection is implemented. These protection measures include erosion and sediment controls (ESCs) and best management practices (BMPs), as detailed in the *King County Surface Water Design Manual* (KCSWDM, King County, September 1998).

## Nonpoint Sources

Nonpoint source pollution is pollution that does not originate from a specific point (i.e., from a pipe or ditch). Surface water runoff is a transport vehicle for nonpoint source pollution, a complex management issue because it can be very difficult to identify, isolate, and treat such a diffuse source of pollution. As shown on the basin maps (Figures 1-3a and 1-3b) in Section 1, there are three major drainage basins within the City: the East Lake Sammamish Basin, the Issaquah Creek Basin, and the Bear Creek Basin. All of these basins ultimately discharge to Lake Sammamish. A small portion of another basin lies east of Beaver Lake, but there are no basin studies that provide detailed information about this area. This area does not contain any major water bodies, although it does contribute runoff to one or more tributaries and a small lake just outside the City limits. Nonpoint pollution sources are the most important water quality issue for the City's surface water. The following discussion identifies the most significant nonpoint sources and the pollutants that accompany surface water runoff:

- **Urbanization**—The City is undergoing an urban transformation. The City currently has a moratorium in place to restrict new development. Development permits issued before the moratorium took effect, and some special waivers of the moratorium, have resulted in a constant, albeit restrained, change in land use. The moratorium expires on August 16, 2001, at which time it will undergo a review and possible re-instatement. If the moratorium is lifted or changed to allow new or re-development at a greater rate, impacts to water quality will require further mitigation. Development is typically accompanied by increases in vehicular traffic, street litter, fertilizer use, pesticide use, and construction debris. These are the primary nonpoint pollution sources. Oil and grease, asbestos from automobile brakes, copper and zinc from residential rooftops, lead, nitrogen, phosphorus, suspended sediment, and bacteria are typical contaminants found in urban surface water runoff.

- **Land Conversion**—Urbanization causes large losses of forested and riparian areas. This results in a shift from pervious surface to impervious surface, thus, greatly increasing the potential for runoff. This effect can rapidly become a notable problem for surface waters. Surface water runoff from newly developed impervious areas is both a quantitative and qualitative problem for the City's receiving waters. High stream flows result in streambed scouring, erosion, and deterioration of fish habitat. Surface runoff is the

primary transport for sediment and other contaminants. Diminished riparian vegetation also results in loss of shading and higher water temperatures during summer months.

- **Non-Human Source Coliform Bacteria**—High levels of fecal coliform bacteria, which can exceed EPA water quality criteria, characterize urban runoff during and after storm events. Livestock management areas that do not use BMPs often have animal densities that exceed the pastures' carrying capacity. Domestic pets and livestock with uncontrolled access to streams are sources of non-human fecal bacteria. Waterfowl, in large numbers, also can contribute significantly to fecal coliform levels in area streams and lakes.

- **Sewage**—Onsite sewage disposal systems can be sources of nonpoint pollution. Fecal coliform contamination is the primary water quality concern from onsite sewage systems. City and Sammamish Plateau Water and Sewer District (SPWSD) officials and health and environmental specialists at the Washington State Department of Health do not believe that there are any widespread malfunctions of septic systems within the City. There are occasional reports of system failures, but these have typically been repaired or replaced by sanitary sewer systems. It should be noted that onsite septic systems have a 20- to 40-year life span, with the likelihood of failure after 20 years if preventive maintenance and major repairs are not instituted. These systems could become a problem because many of the septic systems within the City were installed more than 20 years ago.

- **Construction Activities**—Urbanization and land-use conversion are accompanied by increased construction activities. Not using BMPs or not implementing ESCs can result in significant nonpoint source pollution. Common ESC practices that can reduce construction site runoff considerably include construction entrance stabilization, sedimentation or retention/detention ponds, silt fences, and hydroseeding of exposed areas.

- **Additional Sources**—Additional potential sources of nonpoint source pollution include pesticides and herbicides, hazardous and solid wastes, and underground storage tanks. Homeowners frequently use fertilizers, herbicides, and pesticides on their lawns and gardens. In areas with a large residential component such as that in the City, nonpoint source pollution from lawns and gardens can become a concern. Excess chemicals applied to properties can easily wash off and be carried into the local storm drainage system. This polluted water eventually reaches streams and lakes, harming aquatic habitats and resources.

# Surface Water Quality

## Standards

State and County water quality regulations were used as measures of water quality for the City's surface waters. Ecology established lake classifications in its *Water Quality Standards for Surface Waters of the State of Washington*, Chapter 173-201 WAC. All feeder streams to lakes are classified as Class AA, and all of the City's streams fall into this class. Standards for this class are summarized in Table 3-1. King County stream classifications are listed in Table 3-2. Ecology also recommended nutrient criteria for lakes, which are summarized in Table 3-3.

**TABLE 3-1. Washington State Lake Classification Standards for Class AA Freshwater Lakes**

| Parameters | Standards |
|---|---|
| Beneficial Uses | Water supply (domestic, industrial, agricultural), stock watering, fish and shellfish (migration, rearing, spawning, harvesting), wildlife habitat, recreation (primary and secondary contact, sport fishing, boating, aesthetics), commerce, and navigation |
| Fecal Coliform | Geometric mean ≤ 50 colonies/100mL and ≤10 percent of all samples exceeding 100 colonies/100mL |
| Dissolved Oxygen [a] | > 9.5 mg/L |
| Total Dissolved Gas | ≤ 110 percent of saturation |
| Temperature [b]<br>(Due to human activities) | ≤ 16.0°C |
| pH | 6.5-8.5<br>with a human-caused variation < 0.2 units |
| Turbidity | ≤ 5 NTU of background (when background ≤ 50 NTU) |
| | ≤ 10 percent increase above background (when background > 50 NTU) |
| Toxics/Radioactives | Concentrations below those with a potential, either singularly or cumulatively, to cause acute or chronic conditions to most sensitive biota or to adversely affect public health. |
| Aesthetics | Aesthetic values not impaired by presence of materials, excluding natural ones, which offend senses of sight, smell, touch, or taste. |

Source: *Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC*

[a]When natural conditions, such as upwelling, occur, causing the dissolved oxygen (DO) level to be depressed near or below standard, natural DO levels may be degraded by human activities by as much as 0.2 mg/L.
[b]When natural conditions exceed standard, no temperature increases will be allowed that raise the receiving water temperature by more than 0.3°C.

**TABLE 3-2. King County Stream Classifications**

| Stream Class | Definition |
|---|---|
| Class 1 | Class 1 streams are all streams inventoried as Shorelines of the State under King County's Shoreline Master Program, KCC Title 25, pursuant to RCW Chapter 90:58. |
| Class 2 | Class 2 streams are all streams smaller than Class 1 streams that flow year-round during years of normal rainfall, or those that are used by salmonids. |
| Class 3 | Class 3 streams are streams that are intermittent or ephemeral during years of normal rainfall and are not used by salmonids. |
| Unclassified | Includes streams for which a watercourse had been defined, but has not been categorized into any of the above stream classes. These streams will undergo further study to determine their steam class. |

Source: King County, December 1998a

**TABLE 3-3. Recommended Nutrient Criteria for Lakes in the Cascade Ecoregion**

| Trophic State | Ambient Total Phosphorus (µg/L) Range of Lake | Total Phosphorus Criteria (µg/L) |
|---|---|---|
| Ultra-oligotrophic (Ultra-low nutrient) | 0-4 | ≤ 4 |
| Oligotrophic (low nutrient) | > 4-10 | ≤ 10 |
| *Lake study may be initiated | > 10 | -- |

Source: *Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC*

## Assessment of City of Sammamish Surface Waters

Based on available data and information, water quality impacts to the major streams and lakes of the City of Sammamish are described below.

### George Davis Creek (WRIA 08-0144)

Livestock access to the headwaters of George Davis Creek has caused nutrient and bacteria levels to exceed state standards during storm events. Stormwater samples from commercial areas contain high concentrations of bacteria, suspended solids, and heavy metals that enter tributary 08-0144D during periods of heavy rainfall. A residential detention pond that drains to the same tributary provides minimal water quality benefit (King County, 1994). Fecal coliform, total phosphorus, and copper concentrations at a sampling point identified as ELSWQ2 exceeded water quality criteria or recommendations during the April 23, 1990, storm event on tributary 08-0144 at 228th Avenue, SE (King County, 1990). The final section 303(d) list included George Davis Creek as impaired by fecal coliform.

### Zaccuse Creek (WRIA 08-0146)

The area of Zaccuse Creek has easily erodible sand underlying much of the western slope. As a result, stream-channel incision is ubiquitous in this drainage (King County, 1994).

### Ebright Creek (WRIA 08-0149)

Problems in the Ebright Creek subbasin include bed and bank erosion in the upper and middle reaches of Ebright Creek, resulting in sedimentation of lower reach salmonid spawning and rearing habitat and of culverts under East Lake Sammamish Parkway. There are no major water quality problems in this subbasin, although elevated nutrient and turbidity levels have been recorded (King County, 1994).

Under future land-use conditions without mitigation, peak flows in Ebright Creek are predicted to increase by 100 to 150 percent, an absolute increase of between 20 and 40 cubic feet per second. Such increases will exacerbate existing erosion and sedimentation problems. Future land uses are expected to produce water quality problems far greater than those previously observed. Increases in turbidity, nutrients, metals, and organic pollutants are likely with projected urban uses (King County, 1994 ).

### Pine Lake Creek (WRIA 08-0152)

Water quality in the base flows of Pine Lake Creek was monitored monthly by King County Department of Metropolitan Services between May 1987 and April 1988 as part of the development of the *Final East Lake Sammamish Basin and Nonpoint Action Plan* (King County, 1994). These data showed that bacteria and phosphorus concentrations frequently exceeded water quality standards or recommended guidelines (King County, 1994).

Monitoring of water quality in storm flow samples from Pine Lake Creek showed bacteria and phosphorus concentrations were the highest recorded in the entire basin (during a May 2, 1990, event), exceeding standards or recommended guidelines by a factor of 157 (bacteria) and 7 (phosphorus). Small farms and residential land uses are the most probable sources of these pollutants (King County, 1994).

The final 1998 Section 303(d) list included Pine Lake Creek as impaired by fecal coliform. This will require the development of a total maximum daily load (TMDL) for Pine Lake Creek.

### Kanim Creek (WRIA 08-0153)

Available literature did not list any water quality information specifically for Kanim Creek. However, many of the conditions described for Pine Lake Creek also pertain to Kanim Creek, which is a tributary of Pine Lake Creek.

### Many Springs Creek (WRIA 08-0164)

The only water quality data available in the literature for Many Springs Creek showed minimal problems, except for a high suspended sediment load associated with upstream problems of stream incision and landslides (King County, 1994).

### Laughing Jacobs Creek (WRIA 08-0166)

Solids, nutrients, high temperatures, and bacteria associated with both urban and rural land uses are threatening water quality in the Laughing Jacobs Creek subbasin. Water quality criteria or recommendations were exceeded for fecal coliform, enterococcus, total phosphorus (TP), and total suspended solids (TSS) concentrations during storm flow and some base flow monitoring events (King County, 1994).

Even in the steepest reaches, past the lip of the Sammamish Plateau, Laughing Jacobs Creek is underlain by bedrock. As a result, erosion is less than would otherwise be expected. Unfortunately, ill-directed runoff from developed areas has resulted in the delivery of significant amounts of hill slope sediments to the channel. Downchannel transport of these sediments contributed to flooding of the East Lake Sammamish Parkway during a January 1990 storm. Both flooding and sedimentation problems will be severely exacerbated by the large projected increases in channel flows (King County, 1994).

Sediment from several active landslides in the Laughing Jacobs Creek ravine has settled in the flat lower reaches and caused flooding problems in East Lake Sammamish State Park and on East Lake Sammamish Parkway. These flooding problems are caused by discharge of runoff from cleared or developed land in the ravine edge. This situation is aggravated by the historic diversion of the lower channel route to Lake Sammamish, which has reduced the gradient and increased localized sediment deposition. Management of sediment in the

lower reach of Laughing Jacobs Creek is therefore a specific goal of the Basin and Nonpoint Action Plan. This ongoing problem can be addressed by constructing sediment traps in the form of logs and other diversity-fostering structures to the upper watershed (King County, 1994).

Flow increases associated with urbanization result in erosion and subsequent sediment transport, leading to higher concentrations of turbidity and suspended solids. These impacts to water quality become disturbance mechanisms for aquatic habitat through the deposition of fine sediment material that settles into the interstitial cavities of gravels. The intrinsic link between water quality and quantity cannot be ignored because the effects of water quantity are a continual focus of surface water problems in the subbasin (King County, 1994).

### Unnamed Tributaries (07-0111, 08-0143, 08-0145B, 08-0149A, 08-0152A, and 08-0163 systems)

Tributary 08-0152A has been partially channelized, and some diversion structures have been placed. A subdivision and extensive horse pasture contribute nutrient loading (King County, 1990).

Tributary 08-0163 has several possible fish barriers and numerous culverts, some of which appear to be too small to accommodate projected future flows (King County, 1990).

No water quality information was available for the remaining unnamed tributaries.

### Pine Lake

Pine Lake is an important recreational and aesthetic resource to the community. Water quality in Pine Lake has been historically poor, with high phosphorus concentrations, seasonal algal blooms, and medium water clarity. A water quality study was performed on Pine Lake in 1979-1980. Subsequently, diversion of the wetland flow was recommended because of its contribution to phosphorus loading. The surface water from Wetland 30 was diverted in 1988. Recent decreases in the winter phosphorus levels and the elimination of spring algal blooms in the lake suggest that the wetland diversity project resulted in improved lake water quality in the spring. However, water quality during the late summer and fall has worsened since 1979-1980, when the original diagnostic study was performed (King County, 1994).

Pine Lake was considered for listing on the 1998 Section 303(d) impaired waters list for total phosphorus and fecal coliform, but the lake was not included on the final 1998 list. The basis for consideration was a completed Federal Clean Lakes Restoration Project in 1982, which encountered problems with blue-green algae, turbidity, low dissolved oxygen, tributary nutrient inputs, low transparency, and sediment phosphorus recycling. The Phase II Project completed in 1991 implemented control measures and monitoring that meet EPA guidance for excluding the lake from the list.

### Laughing Jacobs Lake

The *1990 East Lake Sammamish Basin Conditions Report–Preliminary Analysis* (included in King County, 1994) found that the Laughing Jacobs Lake outfall had high fecal coliform concentrations (5,600 organisms / 100 ml) during an April 23, 1990, storm event. In addition,

TSS and TP concentrations were also relatively high during that event. These high fecal concentrations are probably related to agricultural activities in the subbasin.

The final 1998 Section 303(d) impaired waters list included Laughing Jacobs Creek fecal coliform impairment. A TMDL will be required for Laughing Jacobs Creek.

### Lake Sammamish

Lake Sammamish is located partially in the City of Sammamish, and is the receiving water body for the City's runoff and drainage. The minor contributions of multiple jurisdictions' basins can cumulatively cause major water quality problems, so it is important for the City to control and limit pollutant loading from its contributing watershed.

Lake Sammamish is the sixth largest lake in Washington and the second largest in King County. The basin of the lake is a long, uniform trough with steeply sloping sides and a maximum depth of 32 meters (105 feet). These characteristics are fjord-like, but the lake lacks the extreme depth of most fjord lakes. Annual average precipitation is approximately 90 centimeters, with about 75 percent of that occurring during extended periods of non-intensive rainfall events from October through March. Land use changes in the watershed alter the quantity, quality, and timing of rainfall runoff. As forests are cleared and the area of impervious (paved) surfaces increases, the water storage capacity of the soils decrease and the rate of runoff increases. These changes increase the high wet weather flows in the streams and reduce the summer low flows. The increased wet weather flows cause additional erosion and instability in the stream channels and carry sediment into the lake. Decreased dry weather flows in the same streams reduce the amount and quality of in-stream habitat. Lake Sammamish is subject to the cumulative impacts of all of the land use changes in the watershed and the alterations to the influent streams (see King County web site: http://dnr.metrokc.gov/wlr/waterres/lakes/samm.htm).

Lake Sammamish did meet the mean summer transparency goal of 4.0 meters in summer 1996 at mid-lake stations 611 and 612, but not at station 614, which is located offshore of the mouth of Issaquah Creek. The lake did not meet the mean summer chlorophyll-a goal of 2.8 mg/L in 1996 at stations 611, 612, and 614 (see the following King County web site: (http://dnr.metrokc.gov/wlr/waterres/lakes/samm.htm).

Lake Sammamish was placed on the 1998 Section 303(d) impaired waters list due to fecal coliform and will require a TMDL.

## Aquatic Habitats

In March 1999, the Puget Sound chinook salmon was listed as a "threatened" species under the Endangered Species Act (ESA). The Coastal Puget Sound bull trout was listed as threatened in November 1999. These listings carry with them restrictions on any activities that would significantly affect the aquatic habitat of these species. Activities that alter patterns of runoff, alter water quality, or that physically alter streams or riparian corridors will have harmful effects on fish. The City should institute practices that address aquatic habitat issues and seek to minimize the effects from stormwater runoff, particularly changes in water quantity and/or quality.

Using existing documents and studies, the major water bodies in the City were examined to identify salmon-bearing streams or lakes, and barriers to fish passage. The Issaquah Creek Basin Plan does not identify any salmon-bearing streams within the City limits. The Bear Creek Basin Plan states that "salmon and trout spawn and rear throughout all accessible reaches of this stream system." However, the map showing known salmonid spawning areas in the Bear Creek Basin does not show any such locations within the City limits (Evans Creek Tributaries 0111, 0111A, 0111B, 0111C, and 0111D). For this discussion, the primary source of information about fish habitat in the City's major water bodies is the *Final East Lake Sammamish Basin and Nonpoint Action Plan* (ELS Basin and Action Plan) (King County, 1994). This report cites the use of the September 1990 Conditions Report (See Attachment 3-A for Table 11 from this report). A more recent King County web site (http://dnr.metrokc.gov/WRIAS/8/chindist/distmap.htm) that includes information about chinook distribution is also cited. This information was supplemented by the draft "Greater Lake Washington Watershed Water Resource Inventory Area 8—Reconnaissance Assessment—Habitat Factors That Contribute to the Decline of Salmon Report" (Greater Lake Washington Technical Committee, 2001). The status of some fish passage barrier issues may require updating based on conditions in the past 10 years since the Conditions Report was written.

### George Davis Creek

George Davis Creek (WRIA 08-0144) is a Class 2 stream with salmonids downstream (west) of the confluence of tributaries at approximately 220th Place NE. Species identified in this creek are coho salmon, cutthroat trout, and rainbow trout. Upstream of this location, the mainstem and tributaries are categorized as Class 3 waters. Four impassable fish barriers are shown in the ELS Basin and Action Plan, three located near the mouth of George Davis Creek and the other downstream of the intersection of NE 6th Street and 216th Avenue NE.

### Zaccuse Creek

Zaccuse Creek (WRIA 08-0146) is a Class 2 stream with salmonids downstream (west) of 212th Avenue SE. Species identified in this creek are coho salmon and cutthroat trout. Upstream of 212th Avenue, the stream is categorized as Class 3. There is an impassable fish barrier at the culvert crossing beneath East Lake Sammamish Parkway.

### Ebright Creek

Ebright Creek (WRIA 08-0149) is a Class 2 stream with salmonids downstream (west) of 212th Avenue SE. Species identified in this creek are chinook salmon, sockeye salmon, coho salmon, kokanee salmon (spawning only), cutthroat trout, and rainbow trout. Although the creek is of minimal size for chinook salmon, a few have been sighted (Greater Lake Washington Technical Committee, 2001). The creek is unclassified east of 212th Avenue SE where the wetlands begin. There is an impassable fish barrier located north of SE 8th Street and west of 212th Avenue SE.

### Pine Lake Creek

Pine Lake Creek (WRIA 08-0152) is a Class 2 stream with salmonids. Species identified in this creek are coho salmon, sockeye salmon, kokanee salmon, cutthroat trout, and rainbow trout. The King County Water and Land Resources Division web site "Known Freshwater

Distribution of Chinook Salmon for Water Resource Inventory Area (WRIA) 8" (http://dnr.metrokc.gov/WRIAS/8/chindist/distmap.htm) lists a 1997 chinook salmon sighting in the lower 0.02 miles of Pine Lake Creek. This sighting was recorded through its Volunteer Salmon Watcher Program. There is an impassable fish barrier located west of 204th Avenue SE and south of SE 8th Street.

### Kanim Creek

Kanim Creek (WRIA 08-0153) is a Class 2 stream with salmonids. Species identified in this creek are coho salmon, cutthroat trout, and rainbow trout. There is an impassable fish barrier located at the culvert crossing beneath SE 19th Street.

### Many Springs Creek

Many Springs Creek (WRIA 08-0164) is a Class 2 stream with salmonids downstream (south) of SE 43rd Way (most just outside the City limits). Species identified in this creek are coho salmon and cutthroat trout. Upstream of SE 43rd Way, the mainstem and tributary are categorized as Class 3. There is an impassable fish barrier located upstream of SE 43rd Way.

### Laughing Jacobs Creek

Laughing Jacobs Creek (WRIA 08-0166) is a Class 2 stream with salmonids. Species identified in this creek are coho salmon, sockeye salmon, kokanee salmon, cutthroat trout, and rainbow trout. Chinook salmon have been sighted in several reaches of Laughing Jacobs Creek (likely all downstream of the City limits) between 1995 and 1998 (http://dnr.metrokc.gov/WRIAS/8/chindist/distmap.htm). These sightings were recorded through the County's Volunteer Salmon Watcher Program. There is an impassable fish barrier located outside the City limits (south of Trinity Lutheran College and SE 43rd Way).

### Unnamed Tributaries

Unnamed tributaries (WRIA 07-0111; WRIA 08-0145B, -0152A, -0163, -0164B, 0166D, -0166E) are primarily Class 2 streams without salmonids or Class 3 streams. Stream 08-0163 is a Class 2 with salmonids (coho salmon cutthroat trout, and rainbow trout); systems 08-0166D and 08-0166E both have rearing habitats for cutthroat trout. Many of these unnamed creeks and small tributaries have fish passage barriers, most notably in the lower reaches, near Lake Sammamish.

### Pine Lake

Pine Lake, the headwaters of Pine Lake Creek, is not accessible to anadromous salmonids. Rainbow trout are present in the lake because hatchery fish are stocked annually. The lake supports a put-and-take fishery. The lake was planted with kokanee salmon decades ago and a remnant population remains. Cutthroat trout are present as a natural unaugmented population.

### Laughing Jacobs Lake

Laughing Jacobs Lake is inaccessible to anadromous salmonids because of blockage that is present low in the system. The lake contains rainbow trout and cutthroat trout.

### Lake Sammamish

Lake Sammamish supports resident populations of rainbow trout, cutthroat trout, and kokanee salmon. The lake provides primary rearing habitat for juvenile sockeye salmon and potentially incidental or secondary rearing habitat for chinook and coho salmon. The lake serves as a migratory corridor for anadromous species such as chinook, coho, and sockeye salmon and for steelhead and sea-run cutthroat trout destined for spawning areas upstream of the lake. Kokanee salmon in Lake Sammamish are thought to be a discrete and currently depressed population.

## Wetlands

The EPA and U.S. Army Corp of Engineers (COE) define wetlands as ". . . areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions . . ." There are approximately 680 acres of wetlands (including lakes) in the City of Sammamish according to the SPWSD. Deforestation, filling, drainage, agriculture, or removal of buffers have disturbed almost all of the City's wetlands to some extent. Most new developments place wetlands in tracts, which then are dedicated to the public. Depending on the class of the wetland (e.g., 1, 2, or 3), a minimum buffer is typically required for the wetland (e.g., 100, 50, and 25 feet, respectively). Based on the need for mitigation, buffer dimensions may be negotiated to be larger than the minimum.

The Washington State Department of Ecology is the rule-making and enforcing authority for wetlands, and the City has jurisdiction over wetland development. Key points from Ecology's *Water Quality Guidelines for Wetlands* (Ecology, 1996) are summarized below:

- **Water Supply**—Wetlands benefit water supplies both qualitatively and quantitatively by acting as natural purification instruments. Suspended sediments can be settled before they are transported to a lake or stream. Organic soils in wetlands have the ability to combine with metals and toxins, thus removing them from solution. Denitrification and nitrogen fixation are biologic processes that occur in wetlands and remove nitrogen from water. Wetlands also maintain water quantity by augmenting stream flows during low flow periods and by retaining water during high flow periods.
- **Wildlife and Habitat**—Wetlands are sources of food and shelter for fish and shellfish. They also contribute to the diversity of Washington State's habitat and wildlife.
- **Groundwater Exchange**—Wetlands retain water, provide time for filtration and settling of suspended solids, and recharge groundwater supplies.
- **Stormwater Attenuation**—Wetlands moderate floodwaters via storage and conveyance.
- **Shoreline Stabilization**—Vegetative cover, native to wetlands, reduces erosion and anchors sediments to the wetland bank.
- **Wetland Antidegradation Policy**—Existing wetland beneficial uses will be maintained and protected according to Ecology's antidegradation rules, WAC 173-201A-070. If the natural conditions are less than the criteria assigned, the natural conditions are assumed to be the water quality criteria.

- **Wetland Mitigation**—Projects and activities first should attempt to avoid and second should minimize any adverse impacts to wetlands. If adverse impacts cannot be avoided, they should be rectified, reduced, or compensated. Mitigation is any action taken to eliminate or reduce impacts on wetlands.

The 1990 *King County Wetlands Inventory* (King County, March 1990) was the primary data source used to identify potential wetlands located in the City of Sammamish; these sites are listed in Table 3-4. Wetland water quality is subject to Ecology's *Water Quality Guidelines for Wetlands* (Ecology, 1996), which are based on the *Water Quality Standards for Surface Waters of the State of Washington*, Chapter 173-201A WAC (Table 3-3). King County wetland classifications are defined in Table 3-5.

**TABLE 3-4. Inventory of Wetlands Partially or Entirely Located in City of Sammamish**

| Name | Location (S,T,R) | Access | Acreage | Class[a] |
|---|---|---|---|---|
| **Evans Creek Subbasin** | | | | |
| Evans Creek 27 (Gazebo Bog) | NW-NW 27, 25N, 6E | 229th Avenue NE / NE 21st Street | 11.0 | 1 |
| Evans Creek 28 | NW-NE 28, 25N, 6E | 220th Place NE | 3.2 | 2 |
| Evans Creek 29 | SW-NE 28, 25N, 6E<br>SE-NE 28, 25N, 6E | 228th Avenue NE / NE 20th Street | 5.5 | 2 |
| Evans Creek 30 | SW-NE 27, 25N, 6E<br>NW-SW 27, 25N, 6E | 228th Avenue NE | 7.6 | 2 |
| Evans Creek 31 (Mystic Lake Wetland) | S-NE 27, 25N, 6E<br>NE-SE 27, 25N, 6E | 244th Avenue NE / NE 14th Street | 13.0 | 1 |
| Evans Creek 32 | SE-SW 27, 25N, 6E | NE 8th Street & Pipeline | 5.5 | 2 |
| Evans Creek 37 | NW 35, 25N, 6E | E Main Drive | 1.8 | 2 |
| Evans Creek 43 | SW-NW 35, 25N, 6E | 224th Avenue NE | 1.2 | 3 |
| Evans Creek 65a | NE-NE 18, 25N, 6E | 192nd Drive NE | 19.5 | Unclassified |
| Evans Creek 66b | N-N 20, 25N, 6E | Sahalee Way NE | 5.0 | Unclassified |
| Evans Creek 70b | NW 27, 25N, 6E | 244th Avenue NE / NE 20th Street | 10.8 | Unclassified |
| Evans Creek 71b | SE 27, 25N, 6E | 244th Avenue NE / NE 14th Street | 3.4 | Unclassified |
| **East Lake Sammamish Subbasin** | | | | |
| E. Lk. Samm. 2 | SW-SW 27, 25N, 6E | NE 8th Street | 1.8 | 2 |
| E. Lk. Samm. 9 | N 34, 25N, 6E | 228th Avenue SE & E. Main Street | 55.0 | 1 |
| E. Lk. Samm. 10 (Saddle Swamp) | S 35, 25N, 6E<br>NE 2, 24N, 6E | Beaver Lake Drive SE | 31.3 | 1 |
| E. Lk. Samm. 11 | SE-SW 34, 25N, 6E<br>SW-SW 34, 25N, 6E | 228th Avenue SE / SE 8th Street | 3.6 | 2 |
| E. Lk. Samm. 12 | SE-SE 33, 25N, 6E | 228th Avenue SE | 0.7 | 3 |
| E. Lk. Samm. 14 | NW-NW 4, 24N, 6E | SE 8th Street | 2.8 | 2 |
| E. Lk. Samm. 17 | SW-NW 4, 24N, 6E<br>SE-NW 4, 24N, 6E | 212th Avenue SE / SE 14th Street | 32.0 | 2 |
| E. Lk. Samm. 18 | SW-NE 3, 24N, 6E<br>NE-SE 3, 24N, 6E | 236th Avenue SE / SE 8th Street | 17.2 | 2 |
| E. Lk. Samm. 19 | SE-SW 35, 25N, 6E | NE 8th Street | 1.0 | 2 |
| E. Lk. Samm. 21 | NW-NW 1, 24N, 6E<br>SW-NW 1, 24N, 6E | Beaver Lake Road | 13.4 | 1 |
| E. Lk. Samm. 24 | SE-NW 11, 24N, 6E | SE 24th Street & Power lines | 0.9 | 2 |
| E. Lk. Samm. 26 | SE-SW 3, 24N, 6E<br>SW-SE 3, 24N, 6E | 236th Avenue SE / SE 24th Street | 37.0 | 1 |
| E. Lk. Samm. 29 | NE-NE 8, 24N, 6E | SE 24th Street | 2.5 | 2 |

**TABLE 3-4. Inventory of Wetlands Partially or Entirely Located in City of Sammamish**

| Name | Location (S,T,R) | Access | Acreage | Class[a] |
|---|---|---|---|---|
| E. Lk. Samm. 30 (Pine Lake) | SW-NW 9, 24N, 6E<br>NE 8, 24N, 6E | 212th Avenue SE | 155.0 | 1 |
| E. Lk. Samm. 32 | NW-SE 9, 24N, 6E<br>SW-SE 24N, 6E | 223rd Avenue SE | 0.8 | 3 |
| E. Lk. Samm. 33 | SE-SE 9, 24N, 6E | 225th Avenue SE | 1.2 | 2 |
| E. Lk. Samm. 35 | NE-NW 11, 24N, 6E<br>NW-NE 11, 24N, 6E | 252nd Avenue SE | 4.0 | 2 |
| E. Lk. Samm. 39 (Laughing Jacobs Lake) | SE-SW 10, 24N, 6E | Pine Lake-Issaquah Road | 21.0 | 1 |
| E. Lk. Samm. 57 (Beaver Lake) | SW-NW 1, 24N, 6E<br>SE-NE 2, 24N, 6E | W. Beaver Lake Drive SE | 65.0 | 2 |
| E. Lk. Samm. 58 | SW-SE 9, 24N, 6E | 219th Avenue SE / SE 37th Street | 3.7 | 1 |
| E. Lk. Samm. 59 | NE-NW 34, 25N, 6E<br>NW-NW 34, 25N, 6E | 223rd Avenue NE | 6.3 | 2 |
| E. Lk. Samm. 61 | NW-NE 4, 24N, 6E | 228th Avenue SE | 5.0 | 1 |
| E. Lk. Samm. 62 | SW-SE 33, 25N, 6E | 228th Avenue SE | 0.4 | 3 |
| E. Lk. Samm. 63 | SE-SE 5, 24N, 6E | 212th Avenue SE / SE 24th Street | 2.8 | 2 |
| E. Lk. Samm. 65 | NE-NE 6, 24N, 6E<br>NW-NW 5, 24N, 6E | E. Lake Sammamish Parkway / SE 8th Street | 7.5 | 2 |
| E. Lk. Samm. 66 | SW-SE 3, 24N, 6E<br>NW-SE 3, 24N, 6E | 236th Avenue SE | 2.1 | 2 |
| E. Lk. Samm. 74 | SW-SW 15, 24N, 6E | 227th Place SE / SE 48th Street | 0.7 | 3 |
| E. Lk. Samm. 76b | NE-NE 5, 24N, 6E | 212th Avenue SE | 3.3 | Unclassified |
| E. Lk. Samm. 77 | SE-NE 33, 25N, 6E | 228th Avenue NE / Main Street | 58.0 | 2 |
| E. Lk. Samm. 80b | SE 33, 25N, 6E | SE 4th Street | 2.3 | Unclassified |
| E. Lk. Samm. 81b | SE 34, 25N, 6E | SE 8th Street | 1.4 | Unclassified |
| E. Lk. Samm. 82b | SE-SE, 3, 24N, 6E | SE 24th Street | 2.4 | Unclassified |
| E. Lk. Samm. 91b | W 15, 24N, 6E | SE 42nd Street | 4.0 | Unclassified |
| **Patterson Creek Subbasin** | | | | |
| Patterson Crk. 15 | SW-SE 1, 24N, 6E<br>NW-SE 1, 24N, 6E | Beaver Lake Drive SE | 4.6 | 2 |
| Patterson Crk. 16 | SE-SE 1, 24N, 6E<br>SW-SE 1, 24N, 6E | SE 27th Street | 3.4 | 2 |
| Patterson Crk. 17 | SW-SW 1, 24N, 6E | East Beaver Lake Drive | 2.8 | 1 |
| Patterson Crk. 18 | NE-NW 12, 24N, 6E<br>SE-NW 12, 24N, 6E | Duth Hill Road | 10.1 | 1 |
| Patterson Crk. 24 | NE-NW 12, 24N, 6E | Duth Hill Road | 1.8 | 1 |
| Patterson Crk. 25 | SW-SW 1, 24N, 6E<br>SE-SW, 1, 24N, 6E | Beaver Lake Drive SE | 4.7 | 2 |
| Patterson Crk. 26 | SW-SW 1, 24N, 6E | Duth Hill Road | 3.0 | 2 |

Source: King County, March 1990 (further field studies required to confirm wetland delineation)

[a] See Table 3-5 for King County Wetland Classifications

**TABLE 3-5. King County Wetland Classifications**

| Wetland Class | Definition |
|---|---|
| Class 1 | Presence of species listed by the federal or state government as endangered or threatened, or the presence of critical or outstanding actual habitat for those species. |
| | Wetlands having 40 to 60 percent permanent open water in dispersed patches with two or more classes of vegetation. |
| | Wetlands equal to or greater than 10 acres in size and having three or more wetland classes, one of which is submerged vegetation in permanent open water. |
| | Presence of plant associations of infrequent occurrence. |
| Class 2 | Wetlands which meet any of the following criteria a) greater than 1 acre in size, b) equal to or less than 1 acre in size and having three or more wetland classes, c) equal to or less than 1 acre but larger than 2,500 square feet, d) presence of heron rookeries or raptor nesting trees. |
| Class 3 | Wetlands that are equal to or less than 1 acre in size and have two or fewer wetland classes, or are equal to or less than one acre but larger than 2,500 square feet and have two or fewer classes of vegetation. |

Source: King County, December 1998a (Chapter 21A.06.1415)

# Recommendations for Sensitive Area Protection, Surface Water Quality Regulations, Stormwater Design Standards, and Operation Practices

The City might consider adopting policies that state that it is the City's goal to protect and restore the City's aquatic resources. This would include adopting and enforcing regulations that protect the resources, provide for factors of safety, and address cumulative impacts. It also would include programs to manage and restore aquatic resources. Specifically, protection would mean that resources are not degraded from the condition at the time the City was incorporated. Restoration activities would stabilize stream banks, restore habitat structures, and address nutrient and sediment loading to Pine Lake, Laughing Jacobs Lake, and Lake Sammamish.

Implementation of a comprehensive stormwater program by itself cannot completely mitigate the effects of urban development on aquatic resources. Therefore, the City might consider exploring alternative approaches to development. Incorporating the concepts of sustainable development and livable communities could improve the quality of life in the City as well as provide additional protection for its aquatic resources. These concepts, highlighted below, are discussed in greater detail in Section 7 of this plan:

- Reducing street widths for residential areas and making provisions for alleys behind new homes to reduce on-street parking
- Requiring smaller lot sizes and allowing accessory units to increase densities, while maintaining the look and feel of single-family neighborhoods
- Limiting curbs and pipes that keep all drainage on the surface, and using open ditches that will slow the conveyance of water, provide filtration, and allow some infiltration

- Requiring pervious pavement except for regular travel lanes
- Allowing taller and narrower buildings and homes, which reduces impervious surfaces, and requiring all rooftop runoff to be infiltrated
- Requiring placement of at least 1 foot of organic material on all lawns and landscaped areas in new developments
- Limiting clearing and requiring infiltration wherever feasible

## Protection/Restoration of Sensitive Areas and Surface Waters

The City should establish an annual program and budget to restore degraded aquatic habitats. Buffers for streams and wetlands should be maintained at the City's increased width standard (150 feet for Class 1 and 2 (with salmonids) streams, and for Class 1 wetlands) and enforced for projects that have not already been through preliminary review and approval at the time of this report. Particularly important to this effort is enforcement of the City's regulation that streams that support salmonid species have at least a 150-foot buffer of natural vegetation on each side of the stream, with no clearing of trees or understory vegetation allowed. Variances from the buffers should not be granted unless there is no alternative and comparable protection is provided in another manner (such as purchasing development rights on other parcels of property). Basin Study Projects identified in Section 5 (Stormwater Capital Improvement Projects Program) should be reviewed and implemented during the CIP planning period. Many of these projects provide erosion and sedimentation control. Additional recommendations for protection or restoration of sensitive areas are listed below. The means for accomplishing these objectives are described in the following sections of this comprehensive plan:

- **Design Standards—**Review design standards and comprehensive plan policies to identify opportunities to reduce impervious surfaces.
- **Construction Sites**—Practice more stringent enforcement/adherence to ESC measures.
- **Zoning—**Enforce more stringent setback restrictions for construction in sensitive areas. Minimum setbacks are defined by the State Shoreline Act of 1971 as 20 feet for urban or rural areas and 50 feet for conservancy areas (natural and historic resources/historical areas). Although Lake Sammamish is the only water body in the City on the State of Washington's list of "Shorelines of the State," these setbacks can be used as minimum standards for all areas near surface waters and wetlands. Larger setbacks might be required under the City's Environmentally Sensitive Areas Ordinance (Chapter 21A.24) (King County, December 1998b), such as for wetlands or steep slopes at the edge of designated lakes.
- **Education**—Establish annual programs to address stream erosion and the need for enhanced habitats.

## Recommended Surface Water Quality Regulations

Along with the *Water Quality Standards for Surface Waters of the State of Washington*, the NPDES stormwater rules will serve as guidelines for the City's policies. The NPDES Phase I Stormwater Regulations apply to medium and large municipal storm sewer systems serving

populations of 100,000 or more, construction sites larger than 5 acres, and 10 different industrial source categories. The new Phase II rules expand the Phase I rule by including small municipal storm sewer systems in urbanized areas and construction sites between 1 and 5 acres in the NPDES permit program. In addition, any industrial facilities owned or operated by the City that were previously exempt from stormwater permit requirements (because of a provision in the 1991 Intermodal Surface Transportation Efficiency Act) will require permit coverage by March 2003. The City of Sammamish will be required to submit a Phase II permit application by March 10, 2003, and fully implement the permit within 5 years (i.e., 2008). The key points for these rules are summarized below:

- **Applicability**—Owners or operators of regulated small municipal separate storm sewer systems (MS4s). Regulated MS4s are defined by their location within "urbanized areas" (UAs) as determined by the U.S. Bureau of the Census. The City is in a UA and will be subject to NPDES Phase II regulations. City policies should state that current and future stormwater projects will achieve compliance with the Phase II NPDES rule.

- **Requirements**—The Phase II rule outlines six required measures (see §122.34(b) of the Phase II rule). The City should define how it will address these measures, including identifying BMPs and measurable goals, before the required compliance deadline. The six measures include the following:

  1. Public Education and Outreach—The City must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff.

  2. Public Participation / Involvement—The City must, at a minimum, comply with State and local public notice requirements. The City will also probably need to actively engage the public in the development and implementation of its stormwater program, by initiating local stormwater panels, holding public hearings, and providing other opportunities for the public to participate.

  3. Illicit Discharge Detection and Elimination—The City must develop, implement, and enforce a program to detect and eliminate illicit discharges into the MS4. This program must include a storm sewer map that shows all outfalls and receiving water bodies, an ordinance to prohibit illicit discharges, a plan to detect and address illicit discharges, and a program to inform people of the hazards associated with illegal discharges and improper disposal of waste.

  4. Construction Site Runoff—The City must develop, implement, and enforce a program to control construction activities that disturb more than 1 acre. This program must include an erosion and sediment control ordinance, requirements to implement construction site erosion and sediment control BMPs, requirements for construction operators to control other waste on site, and procedures for site plan review, receipt and consideration of information submitted by the public, and site inspection and enforcement measures.

  5. Post-Construction Runoff—The City must develop, implement, and enforce a program to address runoff from new development and redevelopment programs that disturb more than 1 acre. This program must include strategies to implement

structural and nonstructural BMPs, an ordinance to address post-construction runoff, and provisions to ensure adequate long-term operation and maintenance of BMPs.

6. Pollution Prevention / Good Housekeeping for Municipal Operations—The City must develop and implement an operation and maintenance program for municipal employees.

Three of the Phase II rule measures described above—illicit discharge detection and elimination, construction site runoff, and post-construction runoff—each require the City to develop an ordinance or other regulatory mechanism for that measure. The Comprehensive Stormwater Management Code and Policy (Section 7) largely address construction and post-construction, but an ordinance to prohibit illicit discharges will be needed.

To comply with the Phase II rule, the City must submit a notice of intent (NOI) to be covered under a general Phase II MS4 permit, scheduled to be issued by Ecology in December 2002. The City will then have 90 days from the issuance of the permit, or until March 2003, to submit the NOI. Ecology has stated that the Phase II permits will probably require cities to develop a program that is similar to the Puget Sound Water Quality Management Plan's comprehensive stormwater management program.

The City can develop a Phase II program on its own or it can cooperate with neighboring cities to develop a coordinated program. The cooperative approach can save resources; for example, developing one public education and outreach program for an entire region rather than a separate public education and outreach program for each city. The Phase II rule recognizes and encourages such relationships among neighboring cities.

## ESA Compliance Strategy

On July 10, 2000, the National Marine Fisheries Service (NMFS) published rules governing the "take" of 14 threatened salmon and steelhead species. "Take" means to harass, harm, pursue, shoot, wound, kill, capture, or collect or attempt to engage in any such conduct. This "4(d) Rule" establishes protective regulations that apply to species listed as threatened under the ESA. These rules are one of the mechanisms through which a local government (or other government entity or private party) may obtain assurance that activities it authorizes or conducts are legally permissible under the ESA and consistent with the conservation of listed species. Activities carried out in accordance with the 4(d) rule exceptions can help protect threatened species and their habitats while relieving local governments from liability for "take" that occurs incidentally to those activities. ESA "take" provisions could apply to City activities including stormwater management, development permitting, road and parks maintenance, and capital improvement projects.

The 4(d) rule describes 13 limits for which NMFS will not apply the "take" provisions. Two general types of limits are included in the rule. The first type includes specific programs NMFS has already reviewed and has determined will minimize adverse impacts on threatened fish or will contribute to their conservation. The second type includes general categories of programs that NMFS might evaluate in the future, such as programs for routine road maintenance or development projects. A local government that wishes to be considered for qualification under one of these limits (and, therefore, obtain assurance that

it will not be subject to the ESA "take" provisions) must submit a detailed application package to NMFS.

The two limits most likely to affect the City include limit number 10 on routine road maintenance and limit number 12 on municipal, residential, commercial, and industrial (MCIR) development and redevelopment The City can receive a limit on routine road maintenance by developing a program that complies substantially with the Oregon Department of Transportation's *Transportation Maintenance Management System Water Quality and Habitat Guide* (July 1999). The limit for MCRI development has 12 different elements that NMFS will apply when it considers whether a city's program adequately conserves listed fish. Meeting this limit will benefit both the City and developers by ensuring that their actions conserve listed salmon and steelhead.

The City of Sammamish should develop an ESA response strategy that includes a review and assessment of the City's programs with respect to the 4(d) limits, a comparison of the City's programs with programs of other local jurisdictions, and a recommended strategy to address ESA requirements along with estimated costs and implementation steps. The strategy should be presented to City Council along with a range of options for response and a discussion on risk management.

## 2000 Puget Sound Water Quality Management Plan

The *2000 Puget Sound Water Quality Management Plan* (see the following state web site http://www.wa.gov/puget_sound/Publications/manplan00/mp_index.htm), adopted December 14, 2000, describes a coordinated set of local, state, tribal, and federal actions to restore and protect the health of Puget Sound. A substantial revision to the stormwater management program was included in the plan, and requires every city and county to develop and implement a comprehensive stormwater management program. The City of Sammamish's comprehensive stormwater management program should include the following 13 elements:

a. *Stormwater Controls for New Development and Redevelopment*—Adopt ordinances that require the use of BMPs to control stormwater flows, provide treatment, and prevent erosion and sedimentation from all new development and redevelopment projects. Adopt and require the use of the Department of Ecology's stormwater technical manual.

b. *Stormwater Site Plan Review*—Review new development and redevelopment projects to ensure that stormwater control measures are adequate and consistent with local requirements.

c. *Inspection of Construction Sites*—Regularly inspect construction sites. Adopt ordinances and provide local inspectors with training.

d. *Maintenance of Permanent Facilities*—Adopt ordinances that require all permanent stormwater facilities be regularly maintained. Develop provisions to ensure that facilities on private lands are maintained.

e. *Source Control*—Develop and implement a program to control sources of pollutants from new development and redevelopment projects and from existing developed lands, using BMPs from Ecology's stormwater technical manual. Source control activities shall

include pollution from roadways and landscaping activities. Integrated pest management practices shall be used to manage road-side vegetation.

f. *Illicit Discharges and Water Quality Response*—Adopt ordinances to prohibit dumping and illicit discharges. Carry out activities to detect, eliminate and prevent illicit discharges, and respond to spills and water quality violations.

g. *Identification and Ranking of Problems*—Identify and rank existing problems that degrade water quality, aquatic species and habitat, and natural hydrologic processes. Local governments may choose to achieve this through watershed or basin planning or another process. Conduct a hydrologic analysis and map stormwater drainages, outfalls and impervious surfaces by watershed. Develop plans and schedules and identify funding to fix the problems.

h. *Public Education and Involvement*—Educate and involve citizens, businesses, elected officials, site designers, developers, builders and other members of the community to build awareness and understanding of stormwater and water quality issues. Provide practical alternatives to actions that degrade water quality and biological resources.

i. *Low Impact Development Practices*—Adopt ordinances that allow and encourage low impact development practices. These are practices that infiltrate stormwater (using proper safeguards to protect groundwater) on-site rather than collecting, conveying and discharging stormwater off site. Low impact principles include:

   1. Maintain the pre-developed, undisturbed stormwater flows and water quality;

   2. Retain native vegetation and soils to intercept, evaporate and transpire stormwater on the site (rather than using traditional ponds and conveyances);

   3. Emphasize a higher standard of soil quality in disturbed soils (by using compost and other methods) to improve infiltration, reduce runoff and protect water quality;

   4. Cluster development and roads on the site and retain natural features that promote infiltration; and

   5. Reduce impervious surface area and use permeable surfaces instead. Low-impact development projects should include methods to collect and reuse stormwater from rooftops for household reuse (e.g. toilets and washing machines) and for landscape watering.

j. *Watershed or Basin Planning*—Participate in watershed or basin planning processes, such as planning under Chapter 400-12 WAC or Chapter 90.82 RCW. Progress verification in achieving this goal shall include biological monitoring. Cities and counties may choose watershed or basin planning processes to identify and rank existing stormwater problems, develop a plan and schedule to fix the problems, and set goals for limiting effective impervious surfaces and preserving open spaces and forests. Basin planning should use continuous runoff modeling to simulate existing and potential impacts of land use and water management on natural hydrology. Basin plans shall address water quality, aquatic habitat, groundwater recharge and water re-use. Stormwater management measures in all basins shall at least meet the minimum requirements of Ecology's technical manual. Cities and counties shall incorporate recommendations

from watershed or basin plans and specific requirements from Total Maximum Daily Load (TMDL) Water Cleanup Plan processes into their stormwater programs, land use comprehensive plans and site development ordinances.

k. *Funding*—Create local funding capacity, such as a utility, to ensure adequate, ongoing funding for program activities and to provide funding to contribute to regional stormwater projects.

l. *Monitoring*—Monitor program implementation and environmental conditions and trends over time to measure the effectiveness of program activities. Periodically share monitoring results with local and state agencies, citizens and others.

m. *Schedule for Implementation*—Develop an implementation schedule with specific target dates and funding sources to help plan program activities.

## Recommended Stormwater Design Practices

The *King County Surface Water Design Manual* has been adopted by the City, but it has not been approved by Ecology. This manual should remain the standard for the City, but it should be amended as necessary to achieve compliance with Ecology. Ecology's key areas of concern with the King County manual are the requirements for retrofit and redevelopment. The City should draft amendments clarifying its policy to require retrofitting stormwater facilities for redevelopment projects and to institute a program to retrofit the City's public stormwater systems to meet Ecology standards. This, along with a demonstration to Ecology of a program to stabilize and enhance the City's aquatic resources and to address water quality issues City-wide, should be adequate to achieve Ecology's acceptance of the manual. Other key issues regarding the manual include:

- Understanding of the manual by those involved in development review activities and City CIP activities and maintenance. The manual is long, complex, and difficult to understand, resulting in a need for at least basic training.
- The manual by itself does not and cannot completely mitigate the effects of urban development on fish habitat. Therefore, City policies should acknowledge that some declines in fish habitat are inevitable.
- It is recommended by King County and Ecology that all jurisdictions map their flow control zones, rather than default to the Basic protection level. Area-specific flow control standards target the level of flow control performance to the protection needs of specific areas. King County has adopted three such designations for the *unincorporated* portions of the County. The updated Draft Ecology manual contains recommendations that Level 2 flow control be used for ALL areas in Western Washington (unless mapped more stringently). Pending mapping results, the City should use Level 2 as the default flow control standard, with a more stringent rating used where studies have been completed to indicate the need. Likewise, Water Quality Treatment Areas and Landslide Hazard Areas should be mapped.
- The manual requires no safety factors in sizing stormwater facilities and does not address the cumulative effect of back-to-back storms. Therefore, compensation for cumulative effects and safety factors should be required by amendments to the manual.

- All runoff from pollution-generating impervious surfaces should be treated before discharge to surface waters. Treatment options include, but are not limited to, natural vegetative buffers, retention/detention, infiltration, and oil/water separation.
- Erosion and sediment control (ESC) measures should be used and *enforced* at construction sites. These ESCs include, but are not limited to, establishment and adherence to clearing limits, temporary or permanent cover to protect disturbed areas, protection of adjacent properties from sediment deposition, stabilized entrances, properly installed silt fences and silt curtains, protection of existing storm drains, and sediment retention.

## Recommended Operational Practices

General procedures that protect runoff and water quality are described below. Section 4 of this report makes recommendations for specific maintenance standards:

- **Catch Basins, Manholes, and Vaults**—The City should establish a regular inspection and cleaning schedule for storm sewer facilities. The grates should be cleaned whenever debris or vegetation covers more than 20 percent of the opening. The usefulness of the covers (locking mechanisms and ease of removal) should be maintained. The structures should be cleaned when sediment accumulates to more than one-third the depth from the bottom to the lowest pipe invert.
- **Conveyance System (Pipes)**—The City should establish a regular inspection and cleaning schedule for conveyance systems. Pipes should be cleaned whenever sediment or debris blocks more than 20 percent of the pipe diameter.
- **Oil/Water Separators**—These structures should be checked frequently and cleaned at least annually. Structures that discharge to a surface water should be placed on a more frequent inspection and cleaning schedule.
- **Streets and Parking Lots**—The City should establish a scheduled street maintenance program. It should include street/parking lot sweeping using high-efficiency vacuum sweepers and street flushing.
- **Detention /Infiltration Ponds**—The functionality of these areas should be maintained. They should be checked frequently and kept free of trash, debris, poisonous/invasive vegetation, surface film, and tall grasses (taller than 6 inches). The slopes should be stabilized using appropriate control measures (e.g., rocks, grass, plastic sheeting). Sediment accumulation should not exceed 20 percent of the original designed depth.
- **Debris Barriers / Trash Racks**—The structures should be cleaned whenever debris or vegetation covers more than 20 percent of the opening. The spacing between bars (3 inches) and the condition of the bars should be maintained.
- **ESC**—All ESC measures should be reviewed and maintained during construction periods. An ESC supervisor should be identified by the permit applicants during the permitting process, and should be responsible for permit compliance and rapid response to ESC problems.

- **Animal Management**—The City should develop, implement, and enforce policies that prevent the introduction of feces into storm drains and surface waters. These policies should include pet pick-up laws for domestic animals, waste management and disposal laws for livestock, and disposal laws for larger animals. Riparian vegetation can be protected by fencing areas to prevent trampling by animals and by providing drinking water for animals so they do not have to enter the streams.
- **Regional Detention Systems**—The City might want to consider policies regarding regional detention systems rather than individual small facilities. The City also might want to pursue the retrofit of existing developments using the latest technology for treatment and detention.

# References

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Oregon Department of Transportation. July 1999. *Transportation Maintenance Management System Water Quality and Habitat Guide.*

Washington State Department of Ecology. 1996. *Water Quality Guidelines for Wetlands*.

SECTION 4

# Stormwater Facilities Maintenance Program

## Facilities Maintenance Program Purpose

The Washington State Growth Management Act requires the City of Sammamish (City) to implement a stormwater facilities (public and private) maintenance program. This section provides the results of an evaluation of current and alternative service delivery maintenance programs. In addition, this section includes recommendations for the City's storm and surface water facilities maintenance program that define the levels of service, costs, and implementation approaches.

## Current Level of Maintenance

### Background

Stormwater facilities include the storm sewer conveyance system (i.e., stormwater pipe, ditches, catch basins, and other structures) and retention / detention facilities. After development of this plan, the Sammamish Plateau Water and Sewer District (SPWSD) will assist the City in researching and documenting current information to develop a map of the City's stormwater system inventory. An inventory of the City's residential and commercial stormwater facilities is included in Attachment 4-A. This inventory should be completed and kept current by the City upon adoption of this plan. The City's stormwater facilities consist of the following system elements*:

- 408,947 feet of stormwater conveyance pipe
- 3,519 catch basins
- 501,659 feet of open ditches
- 154 residential retention / detention stormwater facilities
- 34 commercial retention / detention stormwater facilities
- 18 oil / water separators
- 21 regional facilities (channels, pipes, enclosed drains)

**This information is to be verified against the final geographic information system (GIS) inventory, which is being completed by the SPWSD.*

### Existing Stormwater Facilities Maintenance Program

Before the City of Sammamish was incorporated in August 1999, King County owned and maintained the majority of the stormwater infrastructure in the area. In 1999, King County transferred ownership of the stormwater facilities to the City. The City currently has two interlocal agreements with King County for maintenance of stormwater facilities.

The two King County departments responsible for inspection and maintenance of the City's stormwater facilities are the Department of Transportation and the Department of Natural Resources. The Department of Transportation, Roads Services Division, is responsible for

inspecting and maintaining the stormwater conveyance system within the City's road right of way.

The Department of Natural Resources, Water and Land Resources Division (WLRD), is responsible for inspecting and maintaining all residential retention / detention facilities and for inspecting all commercial retention / detention facilities. Maintenance includes the retention / detention facilities and all structures (e.g., catch basins, pipes, fences) associated with the facility. If work is required on commercial property, the property owner is responsible for performing the work. The WLRD also performs some inspections and coordinates maintenance on facilities outside the right of way. For example, the WLRD inspects detention ponds to determine if mowing is necessary and the Roads Services Division performs the work. Figure 4-1 depicts the maintenance process for residential and commercial retention / detention facilities.

### Drainage Complaints and Other Citizen Inquiries

The majority of citizens' complaints about drainage are currently referred to King County. Figure 4-2 depicts the response process for stormwater complaints and inquiries for the City and King County.

Currently, King County maintains a central database of complaints and then routes the complaints to the proper County department. When appropriate, King County personnel meet with the property owner to investigate the complaint. County staff then coordinate with the City to determine the required action. King County performs the work if it is a maintenance issue. If the solution to the complaint requires construction, the City hires a contractor.

## Recommended Level of Maintenance

Stormwater facilities must be maintained if they are to function properly. The level of maintenance required is based on various standards for levels of maintenance and on experience. This section describes current and proposed maintenance standards and the frequency with which maintenance activities should be conducted.

### Maintenance Standards

Maintenance standards specify the maintenance activities that must be performed for each facility. The *Puget Sound Water Quality Management Plan* and the Growth Management Act require that jurisdictions adopt the Department of Ecology (Ecology) *Puget Sound Water Quality Manual* (PSWQM) or an equivalent manual. The City has adopted the *King County Surface Water Design Manual* (KCSWM) (September 1998). At this time, the KCSWM is considered equivalent to the PSWQM. Ecology is currently updating its surface water manual, which includes minimum maintenance standards. It is recommended that the City comply with the minimum standards provided by Ecology and supplement them with additional King County standards. Because Ecology's standards are being updated, the standards listed below were taken from Ecology's Draft *Stormwater Management in Washington State, Volume IV, Source Control BMPs* (August 1999). After Ecology has updated its surface water manual (planned to be completed in May 2001), this section of the City of Sammamish

Stormwater Comprehensive Plan should be updated to include any revisions to the draft minimum standards.

The maintenance standards are separated into activity-specific standards and general standards. Activity-specific maintenance standards developed for the City of Sammamish are shown in Attachment 4-B. These standards are based on the Department of Ecology's minimum requirements, with the addition of King County's supplemental standards.

General maintenance standards, as listed in the Draft *Stormwater Management in Washington State, Volume IV, Source Control BMPs*, are:

- *Inspect and clean treatment BMPs, conveyance systems, and catch basins annually, or as needed, and determine whether improvements in O&M are needed.*
- *Promptly repair any deterioration threatening the structural integrity of the facilities. These include replacement of clean-out gates, catch basin lids, and rock in emergency spillways.*
- *Ensure that storm sewer capacities are not exceeded and that heavy sediment discharges to the sewer system are prevented.*
- *Regularly remove debris and sludge from treatment technologies used for either peak-rate control, stormwater treatment, etc., and discharge to a sanitary sewer if approved by the sewer authority, or trucked to a local and state government approved disposal site.*
- *Maintain stormwater treatment facilities according to procedures presented in Volume V. (Maintenance requirements are detailed at the end of each BMP description.)*
- *Clean catch basins when the depth of deposits is equal to or greater than 1/3 the depth from the basin to the invert of the lowest pipe into or out of the basin. If deposition in a catch basin is found during the annual inspections to significantly exceed this standard, it shall be cleaned every 6 months, or more frequently if needed. If woody debris accumulates in a catch basin, it should be cleaned on a weekly basis, or as needed. Decant water and sediments removed during the cleaning operation must be properly disposed of.*
- *Post warning signs (e.g., "Dump No Waste – Drains to Ground Water," "Streams," "Lakes," etc.) or emboss on or adjacent to all storm drain inlets where appropriate. Repaint the signs as needed.*
- *Additional Required BMPs: Select additional applicable BMPs from this chapter depending on the pollutant sources and activities conducted at the facility including BMP S1.00-Erosion and Sediment and Control, S1.50-Container Storage of Liquids, S1.80-Emergency Spill Cleanup Plans, S2.10-Locating Illicit Connections to Storm Drains, and S2.20–Street Sweeping.*

## Current and Proposed Maintenance Frequency

King County currently inspects and maintains the City's conveyance system and 154 residential retention / detention stormwater facilities and inspects 34 commercial retention / detention stormwater facilities annually. Improper functioning of these facilities can usually be attributed to improper construction and maintenance. Therefore, conducting systematic maintenance is important to ensure that the facilities function as designed.

Maintenance frequency describes how often a maintenance function must be performed. The current maintenance schedule for the conveyance system and retention/detention facilities is shown in Table 4-1. It is recommended that most of the maintenance functions continue to be implemented in this manner; however, to more fully comply with the recommendations of the *Stormwater Management Manual for the Puget Sound Basin* would require an increase in the frequency of maintenance. The proposed level of service shown in Table 4-2 includes increased inspection and maintenance frequencies and activities. The City recently sent Table 4-2 to various service providers to obtain estimated costs and services for a comprehensive stormwater facilities maintenance program. The City has evaluated the proposals and is in the process of negotiating service provision contracts for the year 2001.

# Service Delivery Alternatives

The City currently contracts with King County for maintenance of the City's stormwater facilities; however, there are other service delivery options for facilities maintenance. This section identifies several maintenance service provider alternatives:

1. Continue to contract with King County
2. Contract with a utility district
3. Contract with a neighboring city
4. Develop in-house capability

## Alternative 1. Continue to Contract with King County

King County is prepared to continue maintaining the City's stormwater facilities. Continuation of the King County contract would require the least amount of short-term effort on the part of the City because the contract is in place, King County field staff are familiar with City facilities, and King County has adequate equipment and facilities. However, City staff have indicated that King County cannot always respond to the City's needs in a timely manner. King County's ability to tailor its overall maintenance operations to respond to the levels of service and costs that are specific to the City's needs is an issue that is currently being evaluated.

King County recently submitted two proposals, one from the King County Department of Transportation (DOT) and the other from the Water and Land Resources Division (WLRD) to continue as the City's stormwater facilities maintenance provider. WLRD would continue to perform inspections and prepare work authorizations for the stormwater facilities and DOT would continue to perform maintenance.

Attachment 4-C includes King County's Facilities Maintenance and Operation Proposal, which is based on the recommended level of service. The DOT proposal states that the following benefits would accrue to the City if it selected King County to provide maintenance services:

> *Road Services has extensive knowledge of roadways and infrastructure in the City…, has the resources required to match the City's demand for services as needed…, and offers extensive roadway expertise.*

**TABLE 4-1. Annual Operation and Maintenance Costs, Existing Level of Service**

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System [2]** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 9.99 | 1,069 | 15 | | | 71 | $31,719 | $34,877 | $1,336 | $1,711 | $69,643 |
| **Ditches** | | | | | | | | | | | | | |
| Hand Ditching | LF | 501659 | 0.001 | 351 | 200 | | | 2 | $1,027 | $86 | $66 | | $1,179 |
| Blade Ditching | LF | 501659 | 0.060 | 30,100 | 4500 | | | 7 | $19,749 | $10,315 | $77 | $2,595 | $32,736 |
| Bucket Ditching | LF | 501659 | 0.041 | 20,719 | 550 | | | 38 | $70,261 | $14,910 | $995 | $1,431 | $87,597 |
| Ditchmaster Ditch Cleaning | LF | 501659 | 0.029 | 14,648 | 2500 | | | 6 | $8,014 | $10,928 | | $182 | $19,124 |
| Hydroseeding/Mulcher | LF | 501659 | 0.056 | 28,093 | 2800 | | | 10 | $14,278 | $5,775 | $3,866 | | $23,919 |
| **Pipes** | | | | | | | | | | | | | |
| Repair/Replace Pipes | LF | 408947 | 0.003 | 1,227 | 40 | | | 31 | $55,611 | $10,796 | $9,831 | $16,317 | $92,555 |
| Cleaning Enclosed Drainage System (culverts) | EA | 4304 | 1.97 | 8,482 | 400 | | | 21 | $15,319 | $9,865 | $157 | | $25,341 |
| Hand Clean Drainage System (culverts) | EA | 4304 | 0.19 | *837* | 40 | | | 21 | $13,762 | $586 | $75 | | $14,423 |
| Repair/Replace Headters/Trash Racks | EA | 4304 | 0.01 | *23* | 3.5 | | | 7 | $4,919 | $609 | $121 | | $5,649 |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Clean Catch Basin/Manhole | EA | 3519 | 0.26 | *922* | 38 | | | 24 | $17,534 | $14,041 | $160 | $3,325 | $35,060 |
| Repair Catch Basins Type I & II | EA | 3519 | 0.01 | *34* | 2.5 | | | 14 | $11,679 | $1,914 | $2,641 | | $16,234 |
| Replace Catch Basins Type I & II | EA | 3519 | 0.004 | *14* | 0.9 | | | 16 | $35,962 | $5,937 | $13,450 | | $55,349 |
| Replace Catch Basins/Manhole Lids | EA | 3519 | 0.005 | *17* | 6 | | | 3 | $840 | $80 | $394 | | $1,314 |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Res. R/D Facilities Inspection and 2-Yr M/D Facilities Inspection [3,4] | EA | 165 | 1.00 | 165 | | 1 | p/u | | | | | | $20,512 |
| Commercial R/D Facilities Inspection [3,4] | EA | 35 | 1.00 | 35 | 3 | 1 | p/u | | | | | | $9,700 |
| Regional Storm Facility Inspection and Maintenance [4] | EA | 21 | varies | | | | | | | | | | $14,000 |
| Residential Facility Maint, incl. Mowing (includes all resi. Maint categories below) [4] | | | | | | | | | | | | | $124,882 |
| M43-Vegetation Control (ponds only) | SQYD | | 2.00 | 0 | | 15 | 3p/u,2Kutkwik, 2-10cyDT | | | | | | |
| M25-Sediment Removal (ponds only) | EA | | varies | | | 4 | 2p/u,BH,10cy DT,dozer | | | | | | |
| M25-Sediment Removal (tanks, vaults only) | EA | | varies | | | 5 | 2p/u,vactor | | | | | | |
| W04-Repair Pond | EA | | varies | | | | | | | | | | |
| W02-Clean Control Structure | EA | | varies | | | | | | | | | | |
| W03-Repair Control Structure | EA | | varies | | | | | | | | | | |
| W06-Repair Energy Dissipator | EA | unknown | varies | | | | | | | | | | |

**TABLE 4-1. Annual Operation and Maintenance Costs, Existing Level of Service**

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W23-Repair Debris Barrier | EA | unknown | varies | | | | | | | | | | |
| W15-Clean Conveyance CB/MH | EA | unknown | varies | | | | | | | | | | |
| W43-Repair Conveyance CB/MH | EA | unknown | varies | | | | | | | | | | |
| W06-Clean Pipe | LF | unknown | varies | | | | | | | | | | |
| W10-Repair/Replace Pipes | LF | unknown | varies | | | | | | | | | | |
| W16-Maintain Conveyance System | LF | unknown | varies | | | | | | | | | | |
| Miscellaneous Maintenance [5] | EA | varies | varies | | | | | | | | | | |
| **Drainage Investigation** [4, 6] | EA | varies | varies | 98 | 2 | 1 | p/u | 49 | $20,802 | $1,393 | | | $30,286 |
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7] | LS | | | | | | | | | | | | N/A |
| Disposal Fees - liquid | TON | | | | | | | | | | | | N/A |
| Disposal Fees - solid | TON | | | | | | | | | | | | N/A |
| Surface Water Billing [8] (@$1.41/year/account) | EA | 10889 | 1.00 | 10889 | | | | | | | | | $15,353 |
| Supervisory and Clerical Personnel Costs | LS | | | | | | | | | | | | |
| System Documentation | LS | | | | | | | | | | | | N/A |
| **Total** | | | | | | | | | | | | | $694,856 |

[1] Quantities obtained from 2000 King County Department of Transportation Work Program and Performance Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantity based on data from 2000 King County Department of Transportation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include retention/detention ponds, tanks, and vaults.

[4] Total costs are based on actual costs for the first three quarters of the year and estimates for the fourth quarter. Actual costs and work quantity will vary.

[5] Miscellaneous Maintenance includes repair ponds, access roads, fences, and signs. Actual cost will vary.

[6] Drainage investigation includes all drainage-related complaints.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of accounts billed for 2000. King County Department of Finance retains 1% of revenues collected as collection fee.

**TABLE 4-2. Annual Operation and Maintenance Costs, Proposed Level of Service**

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Quantity | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 12.00 | 1,284 | | | | | | | | | |
| Weed Control | LM | 107 | 0.40 | 43 | | | | | | | | | |
| **Ditches** | | | | | | | | | | | | | |
| Cleaning | LF | 501659 | 0.02 | 10,033 | | | | | | | | | |
| Vegetation Control (ditch mowing) | LF | 501659 | 1.50 | 752,489 | | | | | | | | | |
| **Pipes** | | | | | | | | | | | | | |
| Clean Drainage System (pipes and culverts) | LF | 408947 | 0.04 | 16,358 | | | | | | | | | |
| Repair/Replace Pipes [2] | LF | 408947 | varies | 1,227 | | | | | | | | | |
| Clean Out Culverts | Each | 4304 | 0.50 | 2,152 | | | | | | | | | |
| TV inspection | Hours | | | 80 | | | | | | | | | |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Inspect Catch Basin/Manhole | Each | 3519 | 1.00 | 3,519 | | | | | | | | | |
| Clean Catch Basin/Manhole | Each | 3519 | 0.25 | 880 | | | | | | | | | |
| Repair Catch Basins Type I & II [2] | Each | 3519 | varies | 34 | | | | | | | | | |
| Replace Catch Basins Type I & II [2] | Each | 3519 | varies | 14 | | | | | | | | | |
| Replace Catch Basins/Manhole Lids [2] | Each | 3519 | varies | 17 | | | | | | | | | |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | | |
| Facilities Inspection [3] | Each | 188 | 1.00 | 188 | | | | | | | | | |
| Vegetation Control (ponds only) | Each | 103 | 1.50 | 155 | | | | | | | | | |
| Sediment Removal | Each | 154 | 0.20 | 31 | | | | | | | | | |
| Clean Control Structure | Each | 154 | 0.50 | 77 | | | | | | | | | |
| Repair Control Structure [4] | Each | 154 | | 29 | | | | | | | | | |
| Repair Debris Barrier [4] | Each | unknown | | 18 | | | | | | | | | |
| Clean Conveyance CB/MH [4] | Each | unknown | | 55 | | | | | | | | | |
| Repair Conveyance CB/MH [4] | Each | unknown | | 18 | | | | | | | | | |
| Clean Pipe [4] | LF | unknown | | 215 | | | | | | | | | |
| Miscellaneous Maintenance [5] | Each | varies | varies | | | | | | | | | | $15,000 |
| **Oil/Water Separators** | | | | | | | | | | | | | |
| Facilities Inspection | Each | 18 | 1.00 | 18 | | | | | | | | | |
| Clean Separator | Each | 18 | 1.50 | 27 | | | | | | | | | |

**TABLE 4-2. Annual Operation and Maintenance Costs, Proposed Level of Service**

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Quantity | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Drainage Investigation** | | | | | | | | | | | | | |
| Conveyance System [2] | Each | varies | varies | 27 | | | | | | | | | |
| Retention/Detention Facilities [6] | Each | varies | varies | 98 | | | | | | | | | |
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7] | LS | | | | | | | | | | | | |
| Disposal Fees - liquid | Ton | | | | | | | | | | | | |
| Disposal Fees - solid | Ton | | | | | | | | | | | | |
| Surface Water Billing [8] | Each | 10889 | 2.00 | 21778 | | | | | | | | | |
| Supervisory and Clerical Personnel Costs | LS | | | | | | | | | | | | |
| System Documentation | LS | | | | | | | | | | | | |
| **Total** | | | | | | | | | | | | | |

[1] Quantities obtained from 2000 King County Department of Transportation Work Program and Performance Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantities based on data from 2000 King County Department of Transportation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include both commercial and residential retention/detention ponds, tanks, and vaults.

[4] Frequencies and annual work quantities based on 2000 King County SWM Summary of Maint/Repair Costs for each facility. At time of data collection, only 84 of the 154 facilities were inspected.
The annual work quantity was determined by multiplying quantity from SWM report by 154/84. Actual work quantity will vary annually.

[5] Miscellaneous maintenance includes repair of ponds, access roads, fences, energy dissipators, and signs. Assume $15,000 annually. Actual cost will vary.

[6] King County Drainage Complaints 1990-2000: Quantity includes 1997 to June 2000 (i.e., 3.5 years) normalized annually.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of people billed for 2000.

LF = linear foot
LM = linear mile
LS = lump sum

The WLRD proposal states:

> *WLRD is in a unique position to provide responsive and cost-effective drainage services to the City, including drainage problem response, evaluation and solution; facility inspection and maintenance, billing, collecting and disbursing surface water funds, and other surface water management related services.*

King County's total estimated cost for providing comprehensive storm sewer services for 2001 is approximately $1,036,500. The total cost was determined by adding the costs related to the conveyance system from DOT and the costs related to the retention / detention facilities from WLRD. The costs are for comparison of specific tasks only; actual costs will vary depending on the actual work performed.

King County also included a cost estimate for its suggested level of service, which includes recommendations for slightly different maintenance categories and / or annual work quantities.

In addition to the suggested level of service, WLRD detailed other services that it can provide:

- Urban Emergency Response Program, which is staffed 24 hours per day to respond to emergency situations arising from storm events, earthquakes, and other natural disasters
- Maintenance / defect bond services for developers of new residential and commercial projects within right-of-way improvements or drainage systems
- Services of a professional engineering staff for capital project management and design

## Alternative 2. Contract with a Utility District

The City sent a request for proposal (RFP) to SPWSD and to the Northeast Sammamish Sewer and Water District for stormwater facilities maintenance services. Attachment 4-D includes SPWSD's Facilities Maintenance and Operation Proposal, which is based on the recommended level of service. The Northeast Sammamish Water and Sewer District did not submit a proposal for the project.

The SPWSD office is located close to the City of Sammamish City Hall, which would allow the SPWSD to respond rapidly to the City's needs. The SPWSD currently owns, operates, and maintains a portion of water supply and sanitary sewage facilities within the City of Sammamish. Its billing systems could be expanded to bill residential and commercial stormwater customers and to collect storm drainage fees.

SPWSD submitted a Surface Water Services Proposal to become the City's stormwater facilities maintenance provider. This proposal states that the following benefits would accrue to the City if it selected the SPWSD to provide storm sewer services:

> *Detailed local knowledge, equipment and personnel based within the City limits, existing O&M programs, staff, and equipment, Geographic Information System and in-house staff to collect and analyze stormwater data; existing facilities management database (Cartegraph) for maintenance scheduling; existing billing system of Sammamish residents, utility services as an extension of City staff.*

The total estimated cost for SPWSD to provide comprehensive storm sewer services for 2001 is approximately $809,200. The costs are for comparison of specific tasks only; the actual costs will vary depending on the actual work performed.

A summary of the process used to evaluate these two service provision proposals and the subsequent recommendations are included in the following section, Process for Selecting Service Provider.

## Alternative 3. Contract with a Neighboring City

In some cases, cities partner with nearby jurisdictions to defray the capital and labor costs of a maintenance program. The City of Sammamish could contract with nearby cities. For example, the neighboring jurisdictions listed below were contacted to determine their level of interest in partnering with the City to secure a maintenance program:

- Glenn Boettcher, Surface Water and Environmental Issues Coordinator for the City of Mercer Island (206-236-5300). The City of Mercer Island is not interested in providing facilities maintenance service to other jurisdictions because it currently has sufficient equipment and staff to service only its jurisdiction. It contracts vactoring services to EconoVac and ditch maintenance services to King County Roads Services Division. Mr. Boettcher recommended both contractors highly.
- Pete Blane, Supervisor, Storm Drainage Maintenance for the City of Bellevue (425-452-7947). The City of Bellevue is not interested in contracting its facilities maintenance services to other municipalities.
- Greg Keith, Water Utility Manager for Issaquah (425-837-3470). Mr. Keith is the acting Manager of Operations and Maintenance for Bret Heath while Mr. Heath is on vacation. Issaquah does not perform maintenance work for other jurisdictions. It currently has a self-sufficient maintenance operation and is not in a position to provide services to other jurisdictions.
- Pat Osborne, Director of Public Works for the City of North Bend (425-888-0282). North Bend owns a street sweeper. Other work is performed by Ventilation Power and other contractors. It does not have the resources to provide work to other jurisdictions.
- Mel McCoy, Maintenance Operations Manager for the City of Redmond (425-556-2706). Mr. McCoy does not know the City Council's position on providing maintenance to other municipalities. He stated that the City of Redmond currently works with Bellevue (and soon will work with the City of Woodinville) to maintain shared facilities, which is the extent of working with other cities. Because the City of Redmond maintenance department has a workload beyond its capacity right now, he stated that the City of Redmond would have to create a policy and then build the capacity to do the work if it decided to market its maintenance services.

While the results of these contacts indicate that partnering with neighboring cities is not viable at this time, the situation might change. The City of Sammamish might want to consider a partnership with other "nearby" cities.

### Alternative 4. Develop In-House Capability

With staff dedicated to maintenance and with the necessary equipment, the City of Sammamish could maintain its own stormwater facilities. Developing an in-house, full-service stormwater management capability would provide the City with the greatest direct and immediate control over the quality of work products, costs, and levels of service.

The City currently has only basic tools (i.e., hand tools). At this time, it does not have the staff or equipment to provide maintenance services. However, the City could partner with a contractor on an interim basis to identify common storm drainage activities that could be delivered jointly. The advantage of this alternative is its ability to optimize activities that are best performed in-house, such as customer response, while taking advantage of the types of services that partnering can produce.

Initially, in-house capability could be limited to specific engineering and management staff functions, with capital-intensive work (e.g., large culvert replacement projects) performed by contractors (e.g., King County, SPWSD, or a nearby city). The City could obtain bids from commercial (private) vendors for specific drainage services, such as mowing, street sweeping, and vactoring. While there are potential savings associated with using vendors in this manner, the City must have a clear understanding of the exact level of service required and be able to write a good specification to use for competitive bidding. The process would require that the City request qualifications from vendors, write a clear specification for specific services, and then call for competitive bids.

The City could perform inspections and the contractor could perform most of the maintenance/repair work; therefore, the City would not need to purchase maintenance or construction vehicles and equipment.

The City would become the main contact for drainage complaints, including recording and documenting problems. The City would perform the inspections and coordinate with the contractor to determine the proper course of action. Additionally, the City would continue to develop the GIS system for stormwater facilities with maintenance and inventory information provided by the partnering agency or organization.

Over time, the City might want to transition into developing a complete in-house program. Other requirements and costs associated with this alternative eventually would include the following:

- Increase the number of in-house personnel
- Make a sizable capital investment to obtain vehicles, maintenance equipment, and tools
- Acquire space and facilities for personnel, vehicles, tools, and maintenance equipment storage

## Process for Selecting Service Provider

The City of Sammamish is currently acting on an opportunity to select and develop a mechanism to deliver services that benefits its citizens. A service delivery system that incorporates the City's objective of developing a comprehensive stormwater program to preserve and protect the environment, public and private property, and the health and welfare of its citizens will provide the most effective delivery of services.

The City recently sent RFPs to various service providers to obtain formal cost estimates and statements of qualifications pertaining to the criteria listed below to assist it in selecting an appropriate stormwater maintenance program service provider. Table 4-3 provides the City with a mechanism to rate each service provider on the basis of the criteria. The City received two proposals from King County (treated as one combined-services provision package) and one from the SPWSD. The evaluation of the service providers based on the criteria described below is discussed in the next section.

## Cost-Effectiveness

The stormwater facilities program must be cost-effective. The City asked each potential service provider to complete Table 4-2 so that the City could standardize the cost proposals and have a clear basis for cost comparison. To ensure consistency, it is recommended that the proposed cost estimates be compared on a per-task basis.

## General

The City asked each potential service provider to describe relevant experience in providing facilities maintenance services to municipalities. It was stated that if such experience is limited, then the service provider should document how its current program could be modified to perform the requested work for the City.

## Customer Service/Responsiveness

It is recommended that the service provider perform maintenance activities in a responsive manner. A service provider with familiarity and close proximity to the City would most likely allow for quick response and attentive customer service. The preferred service provider also must be able to tailor its services to the needs and schedule of the City of Sammamish. The City asked each potential service provider to address customer service and responsiveness.

## Compliance with Environmental Regulations

The service provider must have a proven record of compliance with environmental regulations. Additionally, it is recommended that the contractor develop and adopt Best Management Practices (BMPs) guidelines for each maintenance activity performed on the City's stormwater facilities. The City asked each potential service provider to discuss its methods for ensuring compliance with environmental regulations.

## Safety

It is recommended that the service provider adopt a safety program. Maintenance crews work in hazardous environments, which include working in proximity to heavy equipment, working in high-traffic areas, using heavy materials or toxic chemicals, and working in confined spaces that can contain poisonous gases. The safety program should discuss equipment, safety policies, and training. The City asked each potential service provider to address safety program requirements.

**TABLE 4-3. Example Service Provider Rating Table**

| | Cost-Effectiveness | Weight | General | Weight | Customer Service/ Responsiveness | Weight | Compliance with Environmental Regulations | Weight | Safety | Weight | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| King County | | 50% | | 20% | | 10% | | 10% | | 10% | |
| SPWSD | | 50% | | 20% | | 10% | | 10% | | 10% | |
| City or contractor | | 50% | | 20% | | 10% | | 10% | | 10% | |
| City or contractor | | 50% | | 20% | | 10% | | 10% | | 10% | |
| City or contractor | | 50% | | 20% | | 10% | | 10% | | 10% | |
| City or contractor | | 50% | | 20% | | 10% | | 10% | | 10% | |

Instructions: Rate each service provider on the criteria listed above. The rating definitions are listed below.

Rating Definitions:

1 = Does not meet expected results
2 = Meets and sometimes exceeds expected results
3 = Consistently exceeds expected results

# Evaluations

The criteria for evaluation were described in the previous section and form the basis for the evaluation. As explained previously, the City received proposals from King County and SPWSD.

Each proposal was rated based on the criteria; the results are summarized in Table 4-4. The King County (Roads Services Division and WLRD combined) proposal received 1.78 points out of a possible 3 points, and the SPWSD received 2.00 points out of a possible 3 points. While there is a slight difference in the ratings, the City evaluated other factors as well, as listed in Table 4-5. It is important to note that, in some cases, there was no specific request in the RFP to respond to these elements, they are simply noteworthy items that were discussed in the proposals.

# Recommendations

## Service Provider

Both King County and the SPWSD appear to be qualified to perform the work and have written thorough, organized, responsive proposals that address the key criteria and provide additional qualifications. Some features favor selection of King County (e.g., institutional and specialty knowledge, compliance with environmental regulations, existing resources to perform services) as a service provider, while other features favor selection of the SPWSD (e.g., responsiveness and cost-effectiveness).

The City could derive the most benefit from the potential service providers by contracting with both entities, selecting specific categories of service based on cost-effectiveness and the service provider's confirmation that the provider has the resources necessary to perform the tasks.

Provided in Table 4-6 is a suggestion for the distribution of services for the first year of a maintenance service provision contract. After the first year, additional resources might be available to SPWSD, or King County might have demonstrated sufficient responsiveness to prompt a change in the City's distribution of the contracted services.

The City should discuss the need for additional equipment purchases with SPWSD. The SPWSD manager has given verbal assurance that equipment and staff increases will occur as needed to meet the increased demand; however, the City should verify that each of the recommended categories of service can be performed before it contracts with SPWSD. The City could also try to negotiate lower costs on some of the selected King County services.

In its proposal, King County discussed additional aspects of a facilities maintenance program that could be of value to the City. It is likely that the SPWSD can also provide these additional services, and it is recommended that the City, if interested in these additional features, discuss them with both King County and the SPWSD.

## Obtain Maintenance Documentation

If the City selects a facilities maintenance service provider other than King County, King County's inventory of the City's drainage facilities, standardized information (e.g., type of

**TABLE 4-4. Service Provider Rating**

| Service Provider | Cost-Effectiveness[a] | Weight | General | Weight | Customer Service/ Responsiveness[b] | Weight | Compliance with Environmental Regulations | Weight | Safety | Weight | Total Weighted Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| King County | 1.6 | 50% | 2 | 20% | 1 | 10% | 3 | 10% | 2 | 10% | 1.78 |
| SPWSD | 2 | 50% | 2 | 20% | 2 | 10% | 2 | 10% | 2 | 10% | 2.00 |

Rating Definitions:

1 = Does not meet expected results
2 = Meets and sometimes exceeds expected results
3 = Consistently exceeds expected results

[a] Cost-effectiveness was determined using the lower estimate (a "2" rating) as the baseline, and then assigning the higher estimate a rating based on relative dollar amount (i.e., SPWSD Rating = 2; therefore, King County Rating = (SPSWD Cost/King County Cost) x 2.
[b] Although both proposals indicated a satisfactory degree of responsiveness to the City, experience of City staff with King County's actual responsiveness does not support a high rating. The City has indicated that SPWSD does have a history of responsiveness in other areas of service to the City.

**TABLE 4-5. Additional Evaluation Considerations**

| Element | King County Combined Services | Sammamish Plateau Water and Sewer District |
|---|---|---|
| Billing Services | Can provide. | Can provide. |
| Contracting Services | System in place through current contract. | Similar system in place through water and sewer contract work with City. |
| Institutional Knowledge of System | Current provider of stormwater maintenance services. Many years of experience providing services for City area. | Current provider of water and sewer services. 50 years of service to City area. Knowledge is more limited specific to stormwater system. |
| Ability to Perform Service In-House | Comprehensive. | Comprehensive, with exception of TV inspection, which would be subcontracted. |
| Responsiveness | Discussed positively in proposal, including "partnering approach with City." Actual past performance has not always met City's responsiveness standards. Does provide complaint response activities under current contract. | City's experience with SPWSD on other contracts (water and sewer) has been positive. Proximity (offices/staff/equipment located within City) would be a benefit. |
| Experience and Skills in Difficult Inspections (i.e., steep slopes) | Experienced. | No information provided. |
| GIS Database Development | No information provided. | Specialty GIS services provided in-house. Currently under contract with City to develop inventory of existing stormwater facilities. |
| Emergency Reponse Program | Program exists. | Program capabilities exist and are demonstrated for sewer and water. Program can be developed for stormwater. |
| ESA and Specialty Knowledge (e.g., KCRTS, KC Stormwater Design Manual) | Extensive. | No information provided, but some staff would be expected to have this background. This should be verified. |
| Optional Staff Person Dedicated to Work in the City of Sammamish | Offered. | No information provided. |
| Sufficient Resources to Meet City Demand | Already in place. | Promised, but there would need to be some expansion of City staff and some equipment purchases. |
| Safety | Program established. | Program established. |
| Additional Recommendations for More Comprehensive Services | Offered. Includes maintenance/defect bond activites, capital project management and design, and recommendations for more frequent maintenance (in an alternative cost table). | Offered. Includes snow removal and sanding, pothole repair and minor asphalt patching, and pavement contractor oversight. Also indicated willingness to discuss more frequent maintenance with City. |
| Compliance with Environmental Regulations | Excellent. Intimate knowledge of regulations and environmental issues. Uses BMPs. | Very good. Uses BMPs. Is subject to many of the same water and sewer regulations. |
| Total Cost (for basic proposal) | Approximately $1,036,500. | Approximately $809,200. |

**TABLE 4-6. Proposed Distribution of Stormwater Facilities Maintenance Service Provision**

| Service Category | King County | Sammamish Plateau Water and Sewer District | | Cost |
|---|---|---|---|---|
| Conveyance System | X | | | $74,584 |
| Ditches | | X | | $110,304 |
| Pipes [a] | X | | | $206,490 |
| Catch Basins and Manholes [a] | | X | | $76,517 |
| Retention/Detention Facilities | | X | | $147,953 |
| Oil/Water Separators | X | | | $9,101 |
| Drainage Investigation | X | | | $22,195 |
| Surface Water Billing | X | | | $15,353 |
| Miscellaneous [b] | X | X | For both: | $62,800 |
| **Total** | | | | **$725,297** |

[a] Because of the interrelated nature of these facilities, it might be logical to keep these services together. However, King County is much more cost-effective on "Pipes" than SPWSD, whereas, SPWSD is much more cost-effective on "Catch Basins and Manholes" than King County. This should be discussed with both service providers to determine a logical and cost-effective distribution of work.

[b] This category comprises management, supervisory, and clerical personnel costs (both providers) and disposal fees and system documentation (SPWSD only; these fees are rolled into other elements in King County's estimate). Because the basic service provision costs result in a roughly 50/50 split between King County and SPWSD, each "Miscellaneous" fee estimate given in the proposals was divided in half ($49,000 for King County, $13,800 for SPWSD).

facility, location, description, inspection date, condition, maintenance needs [to be entered after inspections]), and past maintenance records should be transferred to the City. The City must also determine if the maintenance records from King County are complete and accurate and incorporate them into the City's record system.

## Modify Maintenance Process

As mentioned above, the database of residential and commercial facilities is included in Attachment 4-B, and the current maintenance process is shown in Figure 4-1. The process includes steps to identify required maintenance work, initiate the work, and verify and rec??ord that the necessary maintenance activities have been completed. This process should be modified to fit the actual inspection and work authorization process agreed upon by the City's Public Works/Finance Director and staff.

## Implement Program for ESA Compliance

The Federal Endangered Species Act (ESA) is designed to protect individual plant or animal species federally listed as "endangered" or "threatened." Protection is defined in terms of "take," which means to harass, harm, pursue, shoot, wound, kill, capture, or collect or attempt to engage in any such conduct. If the City inadvertently violates "take" prohibitions, it could be subject to criminal or civil prosecution. The ESA also includes provisions for citizen lawsuits.

Along with seven other species, the Puget Sound chinook salmon recently was listed as a "threatened" species. Any of the City's projects that adversely affect the Puget Sound chinook could be delayed, terminated, or required to provide additional mitigation.

Any action that alters patterns of runoff or water quality or that directly changes the physical habitat of the stream or riparian corridors could harm fish. Maintenance activities could potentially harm a listed species by modifying or degrading the species habitat. For example, stormwater maintenance activities that expose soil to erosion or expose chemicals to the environment have the potential to degrade water quality.

Currently, specific maintenance guidelines addressing ESA compliance have not been developed; however, the City should be proactive in developing a strategy to prepare for and respond to the ESA. It is recommended that the City evaluate maintenance activities as provided in Attachment 4-C to determine the effects on endangered species habitat and compliance with the ESA. Additionally, it is recommended that the facilities maintenance provider implement BMPs when performing work. At the time of printing of this Stormwater Management Comprehensive Plan, the National Marine Fisheries Service (NMFS) is about to approve the Tri-County ESA Response program for road maintenance; there is also another document available that is widely accepted for road maintenance, the Oregon Department of Transportation's *Transportation Maintenance Management System Water Quality and Habitat Guide* (July 1999).

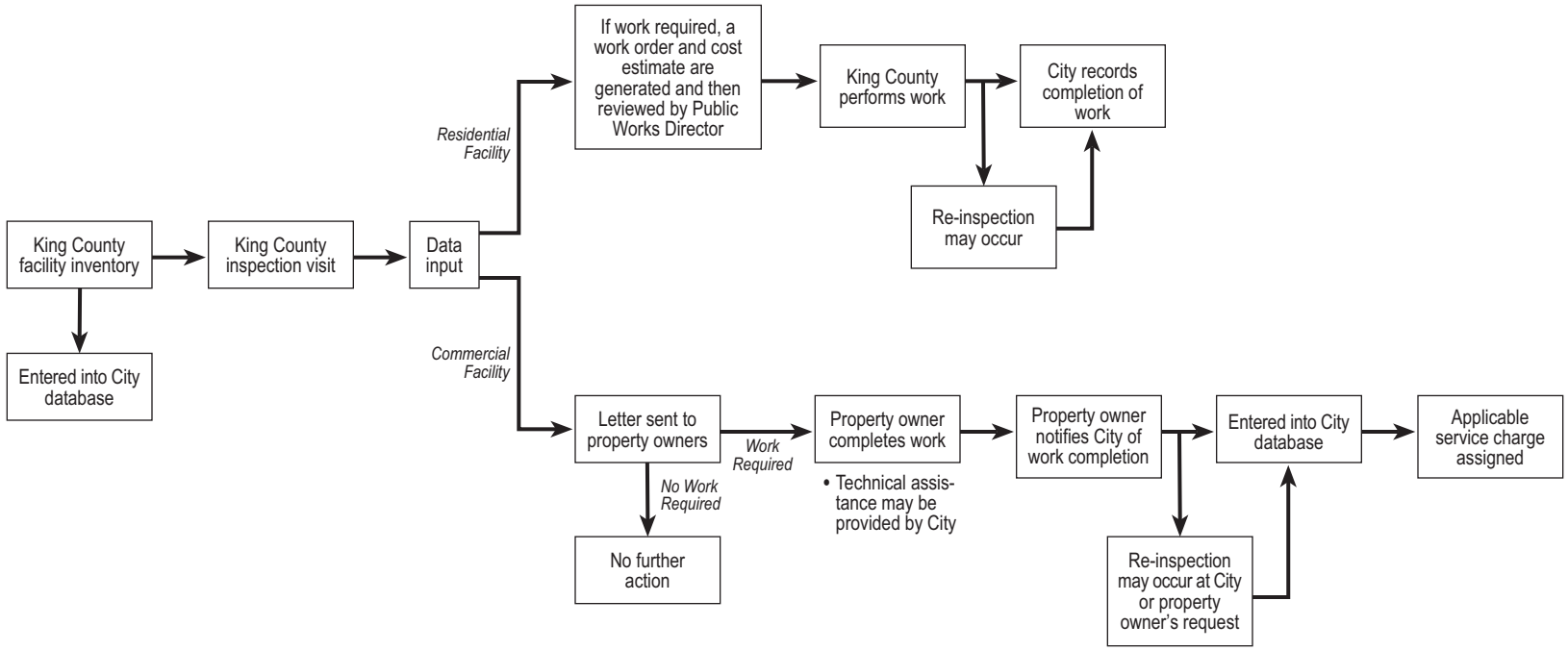


Figure 4-1

**Current Maintenance Process for Retention/Detention Stormwater Facilities for the City of Sammamish**

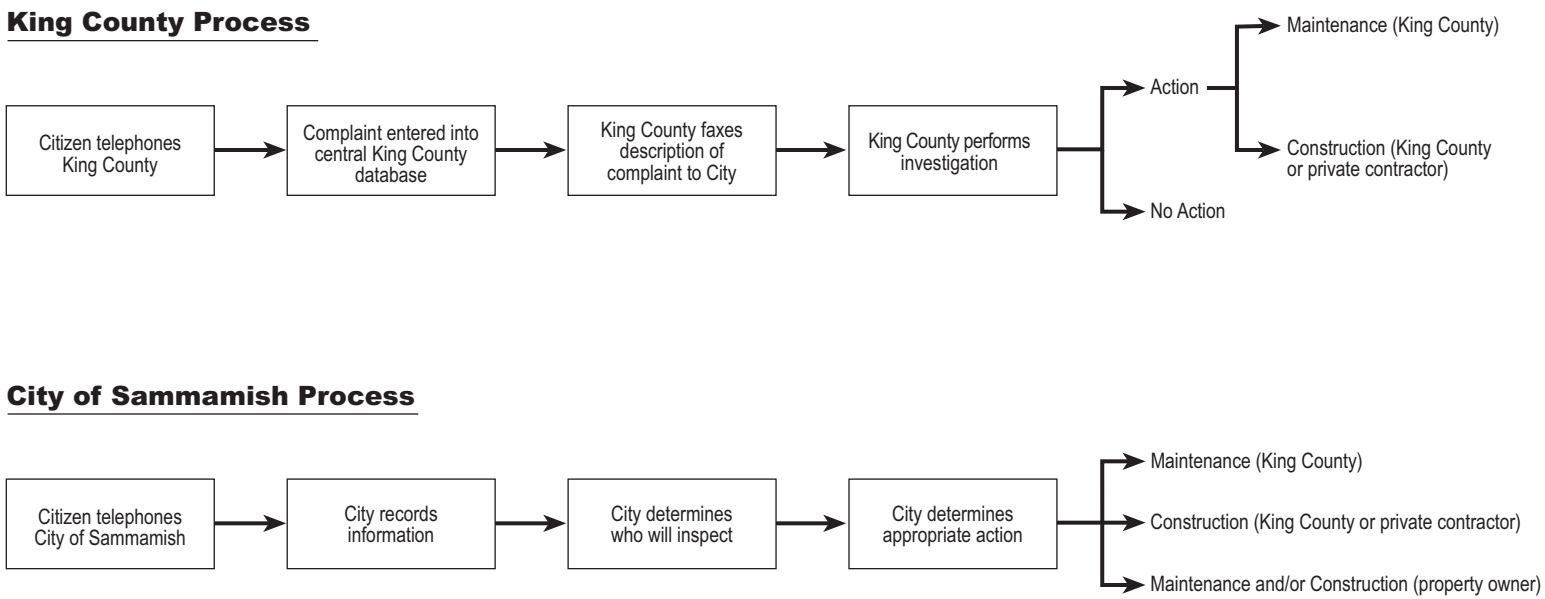


Figure 4-2

**King County and City of Sammamish Complaint Response Process**

| Facility Name<br>King County Regional System<br>Sammamish | Subbasin | Location | Facility Type | Date Accepted for Maintenance | Construction Plans on File | Operations and Maintenance Manual | Comments |
|---|---|---|---|---|---|---|---|
| 207th Avenue SE Drainage (Atkinson NDA) | E. Lake Sammamish | 2019 207th Ave. SE | Channel | 5/6/1993 | Yes | No | NDA (Atkinson 91-0340) |
| Crest of the Plateau (D91191) | Evans Creek | 3035 224th Ave. NE (1829300600) | HDPE | | See Res | | HDPE |
| Deerefield | Evans Creek | | Channel | 3/1/1999 | | | Assumed bioswale |
| Eden Creek Overflow Conveyance | E. Lake Sammamish | 700 E. Lake Sammamish Pkwy. | Sediment Pond | | | | 1995 CIP, pending lawsuit, do not maintain |
| Evans Creek Tributary 0111B | Evans Creek | 23100 NE 29th St. | HDPE | | Yes | No | CIP |
| Evans Creek Tributary 0111C | Evans Creek | 22600 Sahalee Way NE | HDPE | | Yes | No | CIP - HDPE |
| Evans Creek Tributary 0111D | Evans Creek | 22100 Sahalee Way NE | Enclosed Drain | | Yes | No | CIP - HDPE |
| Inglewood Drainage Improvement | E. Lake Sammamish | 1500 211th Ave. NE | Enclosed Drain | NDAP | Yes | No | Also includes channel and inlet structure |
| NE Inglewood Hill Road Drainage Improvement | E. Lake Sammamish | 20600 NE Inglewood Hill Rd. | Enclosed Drain | NDAP | Yes | No | Plans in 1994 W/A book |
| Montage Tract E (D91856) | E. Lake Sammamish | 207 209th Place SE | HDPE | | See Res | No | HDPE |
| Montage Tract F (D91857) | E. Lake Sammamish | 20703 SE 3rd Way | HDPE | | See Res | No | HDPE |
| Pacific Plateau Drainage Improvements | Evans Creek | 33100 NE 27th St. | Regional Pond | | | | CIP |
| Pine Lake Diversion | E. Lake Sammamish | 2800 213th Ave. SE | Enclosed Drain | | Yes | Yes | CIP |
| Pine Lake Bypass Structural Modifications | E. Lake Sammamish | 2600 214th Ave. SE | Enclosed Drain | | Yes | Yes | CIP |
| Pine Lake Creek Culvert Replacement | E. Lake Sammamish | 19400 E. Lake Sammamish Pkwy. | Enclosed Drain | | Yes | Yes | CIP |
| Pine Lake Drainage Improvements | E. Lake Sammamish | 22300 219th Ave. SE | Enclosed Drain | NDAP 1993 | Yes | Yes | CIP |
| Plateau Estates Bypass Pipe | E. Lake Sammamish | 229th Place NE | HDPE | | Yes | No | AKA Sahalee Plateau Rehab/Retrofit |
| Summer Ridge Division 2 Drainage | Evans Creek | 22400 NE 29th Place | HDPE | 3/1/2000 | Yes | | NDA (96-0283) |
| Tiburon Estates Drainage Improvement | E. Lake Sammamish | 21419 NE 6th St. | Enclosed Drain | 1/1/1997 | Yes | No | 96 FM-NDA Project |
| Timberline Channel Stabilization South | Evans Creek | 2300 NE 40th Ct. | Enclosed Drain | | Yes | | CIP |
| Tributary 143L Conveyance Improvements | E. Lake Sammamish | 20800 Inglewood Rd. | Enclosed Drain | | Yes | Yes | CIP |

| City of Sammamish<br>Storm and Surface Water Utility<br>Operation and Maintenance Standards | | |
|---|---|---|
| **Item** | **Condition** | **Required Action** |
| **No. 1–Detention Ponds/Infiltration Pond** | | |
| Trash and Debris | Any trash or debris that exceeds 2 $ft^3$ (this is about equal to a 15 gallon garbage can). Examples of trash and debris include: paper, plastic, fallen tree limbs, leaves. | Clear trash and debris from pond |
| Poisonous or Invasive Vegetation | Any poisonous or invasive vegetation that may constitute a hazard to City personnel or the public or that threatens the habitat of the pond. Examples of poisonous and invasive vegetation include: tansy ragwort, poison oak, stinging nettles, devils club, purple loosestrife, blackberry bushes, Scotch broom, Yellow iris, Reed canary grass | Remove vegetation. Contact Washington State Noxious Weed Control Board (872-2318) for assistance. |
| Pollution | Oil, gasoline, or other contaminants such as grease, fuel oil, heating oil, paint, pesticides, herbicides, fertilizers, sewage, chlorine, solvents, antifreeze of 1 gallon or more, or any amount found that could (1) cause damage to plant, animal, or marine life; (2) constitute a fire hazard; (3) be flushed downstream during rain storms; or (4) contaminate ground water. | Remove contaminants present other than surface film. Contact local health department regarding removal and disposal. |
| Unmowed Grass/Ground Cover | Private residential areas–grass exceeds 24" in height.<br><br>In nonresidential areas–ground cover to match adjacent ground cover and terrain unless it interferes with the function of the facility. | Mow to 6" (max.) height.<br><br>Mow to 6" (max.) height if ground cover interferes with the function of the facility. |
| Rodent Holes | Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes. | Contact local health department and/or pest control service regarding removal and disposal. Repair damage to dam or berm after rodents are removed. |
| Insects | When insects such as wasps and hornets interfere with maintenance activities. | Destroy insects or remove from pond. Herbicides and pesticides are prohibited within critical areas or buffers. Contact the County Cooperative Extension office for assistance. |
| Tree Growth | When tree grown interferes with access of maintenance activities.<br><br>When tree growth reduces designed capacity of pond by 10%. | Trim or remove trees to allow maintenance access for mowing, inspection, silt removal, vactoring.<br><br>Remove trees. |

| City of Sammamish<br>Storm and Surface Water Utility<br>Operation and Maintenance Standards | | |
|---|---|---|
| **Item** | **Condition** | **Required Action** |
| **No. 1–Detention Ponds/Infiltration Pond (continued)** | | |
| Erosion of Side Slopes | Where eroded surface exceeds 3" in depth. | Stabilize slopes using appropriate erosion control measures; e.g., rock reinforcement, planting grass, embankment fill, plastic sheeting, straw mulching. Correct cause of erosion |
| Storage Area | When accumulated sediment exceeds 20% of the designed pond depth. | Clean out sediment to designed pond shape and depth. Reseed if necessary to control erosion. |
| Emergency Overflow/ Spillway | When accumulated sediment exceeds 50% of the distance from the spillway to the top of the berm. | Remove sediment to designed elevation and replace rock, if necessary. |
| Debris Barrier/ Trash Rack | See Debris Barriers (Trash Racks), Standard No. 5. | |
| Fencing | Any defect in the fence or any erosion under the fence that permits easy entrance to the facility. | Repair to provide security. |
| | Any part of fence (including posts, top rails, and fabric) 1 foot or more out of design alignment. | Realign fence to design standards. |
| | Damaged, broken, or missing parts including barbed wire, tension wire, extension arm. | Replace or repair to design standards. |
| | Deteriorated paint or protective coating. | Repaint or replace protective coating. Replace any parts that are structurally inadequate as a result of rust. |
| Gates | Damaged, broken, or missing parts including locks, hinges, stretcher bars, and ties. | Replace or repair to design standards. Lube hinges and check that gate opens freely. |
| | Any defect in the gate or any erosion under the gate that permits easy entrance to facility. | Repair to provide adequate security. |
| Access Roads, Easements | Roadway is blocked. | Free roadway of trash, debris, weeds, and brush in such a way as to allow maintenance vehicle access. Clear roadway overhead to 14-foot-high clearance. Move obstructions to allow at least a 12-foot-wide access route. |
| | Surface defect prevents or hinders maintenance access. | Smooth road surface uniformly to allow maintenance vehicle access. |

| City of Sammamish<br>Storm and Surface Water Utility<br>Operation and Maintenance Standards | | |
|---|---|---|
| **Item** | **Condition** | **Required Action** |
| **No. 1–Detention Ponds/Infiltration Pond (continued)** | | |
| | Erosion within 1 foot of the roadway is 8 inches wide and 6 inches deep or greater. | Repair shoulder with riprap or embankment fill to match surrounding road. Correct cause of erosion. |
| Rock Filters (Infiltration Ponds) | By visual inspection, little or no water flows through filter during heavy rain storms. | Clear gravel filter of debris or replace rock. |
| **No. 2–Closed Detention Systems (Pipes/Tanks/Vaults)** | | |
| Air Vents | One half of the cross-section of a vent is blocked at any point with debris and sediment. | Free vents of debris and sediment. |
| Tank/Pipe Sections | Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault, or any point depth exceeds 15% of diameter. Example: 72" storage tank would require cleaning when sediment reaches a depth of 7" for more than 1/2 length of tank. | Remove all sediment and debris from storage area. |
| | Any crack in joint/pipe sections allowing material to be transported into facility. | Seal all joints between tank/pipe sections. |
| | Any part of tank/pipe is bent out of shape more than 10% of it's design shape. | Repair or replace pipe/tank to design. |
| Vaults | Accumulated sediment exceeds 1/3 the depth from the bottom of the vault to the invert of the lowest pipe. | Remove sediment from the vault. |
| Catch Basins/ Manholes | See "Catch Basins/Manholes," Standard No. 4. | |
| Control Structure | See "Control Structure/Flow Restrictor," Standard No. 3. | |
| **No. 3–Control Structure/Flow Restrictor** | | |
| Sediment, Trash, and Debris | Distance between debris build-up and bottom of orifice plate is less than 1.25'. | Remove all sediment, trash, and debris. |
| Restrictor/ Structure Damage | Restrictor is not securely attached to manhole wall. | Attach restrictor securely to wall and outlet pipe. |
| | Restrictor is more than 30 degrees from plumb. | Realign restrictor/structure. |
| | Connections at outlet pipe are not watertight and/or show signs of rust. | Replace outlet pipe if rusted or reseal. |

| City of Sammamish<br>Storm and Surface Water Utility<br>Operation and Maintenance Standards | | |
|---|---|---|
| **Item** | **Condition** | **Required Action** |
| **No. 3–Control Structure/Flow Restrictor (continued)** | | |
| Cleanout Gate | Cleanout gate is damaged, missing, or will not open. | Repair or replace to meet design standards. |
| | Chain is damaged or missing. | Repair or replace chain. |
| Orifice Plate | Plate is missing, out of place, bent, or damaged. | Repair or replace to meet design standards. |
| | Trash, debris, sediment, or vegetation is blocking the plate. | Free plate of all obstructions and assure operation per design. |
| Catch Basins/Manholes | See "Catch Basins/Manholes," Standard No. 4. | |
| **No. 4–Catch Basins/Manholes** | | |
| Sediment, Trash, and Debris | Trash, sediment, and/or debris is blocking more than 20% of the grate surface. | Remove trash, debris and sediment from grate. |
| | Trash, sediment, and/or debris in the basin exceeds 1/3 the depth from the bottom of the basin to invert of the lowest pipe. | Remove trash, debris and sediment from the basin. |
| | Dead animals or vegetation that could generate offensive odors and/or dangerous gases. | Remove vegetation. If dead animals are present, contact local health department and/or animal control regarding removal and disposal. |
| | Presence of trash, debris, or garbage exceeding 1 $ft^3$ that could attract insects or rodents. | Remove trash, debris, or garbage and dispose. |
| Structural Damage to Frame and/or Structure | Frame is separated from top slab by more than 1". | Repair or replace frame. |
| | There is evidence that soil particles are entering catch basin through cracks, or structure is unsound. | Repair or replace basin to design standards. |
| Vegetation | Vegetation growing across and blocking more than 20% of the basin opening. | Remove vegetation to clear basin opening. |
| | Vegetation that is more than 6" tall and less than 6" apart growing in inlet or outlet pipes. | Remove vegetation. |

| City of Sammamish<br>Storm and Surface Water Utility<br>Operation and Maintenance Standards | | |
|---|---|---|
| **Item** | **Condition** | **Required Action** |
| **No. 4–Catch Basins/Manholes (continued)** | | |
| Pollution | Oil, gasoline, or other contaminants such as grease, fuel oil, heating oil, paint, pesticides, herbicides, fertilizers, sewage, chlorine, solvents, antifreeze of 1 gallon or more, or any amount found that could (1) cause damage to plant, animal, or marine life; (2) constitute a fire hazard; (3) be flushed downstream during rainstorms or (4) contaminate groundwater.<br><br>Nonflammable chemicals of more than 1/2 $ft^3$ per 3 feet of basin length. | Remove chemicals other than a surface film. Contact local health department regarding removal and disposal. |
| Catch Basin/ Manhole Cover | Cover not in place and/or grate is missing or broken.<br><br>Locking mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread working.<br><br>Cover is difficult to remove. One maintenance person cannot remove lid after applying 80 lbs. of lift. | Replace cover and/or grate.<br><br>Repair or replace locking mechanism.<br><br>Correct cause and/or replace cover. |
| Ladder | Ladder is missing rungs, misaligned, rusted, cracked, or has sharp edges. | Repair or replace ladder to meet design standards. |
| **No. 5.–Debris Barriers (Trash Racks)** | | |
| Trash and Debris | Trash or debris is plugging 20% or more of the opening in the barrier. | Remove trash or debris to clear the barrier. |
| Bars | Bars are bent out of shape more than 3".<br><br>Bars or barrier are missing.<br><br>Bars are loose or deteriorated from rust | Straighten bars to less than 1" out of shape or replace.<br><br>Replace bars or barrier.<br><br>Repair or replace barrier to design standards. |
| **No. 6–Energy Dissipaters** | | |
| Rock Pad | Only one layer of rock exists above native soil in area 5 $ft^2$ or larger, or any exposure of native soil. | Replace rocks to design standards. |
| Dispersion Trench | Accumulated sediment exceeds 20% of the pipe diameter. | Clean and/or flush pipe. |

**City of Sammamish**
**Storm and Surface Water Utility**
**Operation and Maintenance Standards**

| Item | Condition | Required Action |
|---|---|---|
| **No. 6–Energy Dissipaters (continued)** | | |
| | Visual evidence of water discharging at concentrated points along trench (as opposed to "sheet flow"). | Redesign or rebuild trench to design standards. Intent is to prevent erosion damage. |
| | Over 1/2 of perforations in pipe are plugged with debris and sediment. | Clean or replace perforated pipe. |
| Manhole/Chamber | See "Catch Basins," Standard No. 4. | |
| **No. 7–Conveyance Systems** | | |
| Pipes | Accumulated sediment and/or debris is blocking more than 20% of the pipe's diameter. | Clean pipe of all sediment and debris. |
| | Vegetation reduces free movement of water through pipes. | Remove vegetation so water flows freely through pipes. |
| | Any dent that decreases cross-sectional area by more than 25%. | Repair or replace pipe. |
| Open Ditches | Accumulated sediment exceeds 25% of design depth. | Clean ditch of sediment. |
| | Trash and debris exceeds 2 $ft^3$ per 1,000 $ft^2$ of ditch. | Clear ditch of trash and debris. |
| | Vegetation reduces free movement of water through ditches. | Clear ditch of vegetation or mow. |
| | Rock lining is out of place or missing. | Replace rock lining to design standards. |
| Catch Basins | See "Catch Basins," Standard No. 4. | |
| Debris Barriers | See "Debris Barriers," Standard No. 5. | |

Notes:

1. Follow Washington State Department of Ecology and King County's Health Department guidelines for handling and disposal of sediment, vactor waste, or other potentially contaminated or hazardous materials.
2. Conform to WISHA and OSHA guidelines before entering a confined space.
3. The following material will not be allowed to enter any surface or subsurface part of the drainage system: petroleum products including, but not limited to oil, gasoline, grease, fuel oil, and heating oil; trash; animal waste; chemicals and paint; steam-cleaning waste; washing of uncured concrete for cleaning and or finishing purposes or to expose aggregate; laundry wastes or other soaps; pesticides, herbicides, or fertilizers; sewage; heated water; chlorinated water or chlorine; degreasers and/or solvents; bark or other fibrous material; antifreeze and/or other automotive products; lawn clippings, leaves or branches; animal carcasses; silt; acids or alkalis; dyes (unless prior permission has been granted by the City of Newcastle Department of Public Works Maintenance Superintendent); and construction materials.

## NO. 13- WATER QUALITY FACILITIES

### A.) Biofiltration Swale

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Biofiltration swale | Sediment Accumulation on Grass Layer | Sediment depth exceeds 2-inches | No sediment deposits on grass layer of the bio-swale, which would impede filtration of runoff. |
| | Vegetation | When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over. | Vegetation is mowed or nuisance vegetation is eradicated, such that flow not impeded. Grass should be mowed to a height between 4 inches and 9 inches. |
| | Inlet Outlet Pipe | Inlet/ outlet pipe clogged with sediment and/ or debris. | No clogging or blockage in the inlet and outlet piping. |
| | Trash and Debris Accumulation | Trash and debris accumulated in the bio-swale. | Trash and debris removed from bioswale. |
| | Erosion/ Scouring | Where the bio-swale has eroded or scoured the bottom due to flow channelization, or higher flows. | Bioswale should be re-graded and re-seeded to specification, to eliminated channeled flow. Overseeded when bare spots are evident. |

## NO. 13- WATER QUALITY FACILITIES (*CONTINUED*)

### B.) Grasslined Filter Strips

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Filter Strip | Sediment Accumulation on Grass Layer | Sediment depth exceeds 2 inches. | No sediment deposits on grass layer of the filter strip, which would impede filtration runoff. |
| | Vegetation | When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over. | Vegetation is mowed or nuisance vegetation is eradicated, such that flow not impeded. Grass should be mowed to a height between 4 inches and 9 inches. |
| | Trash and Debris Accumulation | Trash and debris accumulated on the filter strip. | Trash and Debris removed from filter. |
| | Erosion/ Scouring | Where the filter strip has eroded or scoured due to flow channelization, or higher flows. | Strip should be re-graded and re-seeded specification, to eliminate channeled flow. Overseeded when bare spots are evident. |
| | V-Notch Pipe Weir | When the V-Notch pipe becomes damaged or clogged with sediment/ debris. | Cleaned and properly functioning weir, such that flows uniformly spread. |

## C.) Wetponds

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Wetpond | Vegetation | Vegetation such as grass and weeds need to be mowed when it starts to impede aesthetics of pond. Mowing is generally required when height exceeds 18-inches. Mowed vegetation should be removed from areas where it could enter the pond, either when the pond level rises, or by rainfall runoff. | Vegetation should be mowed to 4 to 5 inches in height. Trees and bushes should be removed where they are interfering with pond maintenance activities. |
| | Trash and Debris | Accumulation that exceeds 1 CF per 1000-SF of pond area. | Trash and debris removed from pond. |
| | Inlet/ Outlet Pipe | Inlet/ Outlet pipe clogged with sediment and/ or debris material. | No clogging or blockage in the inlet and outlet piping. |
| | Sediment Accumulation in Pond Bottom | Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6-inches, usually the first cell. | Removal of sediment from pond bottom. |
| | Oil Sheen on Water | Prevalent and visible oil sheen. | Removal of sediment from pond bottom. |
| | Erosion | Erosion of the pond's side slopes and/ or scouring of the pond bottom, that exceeds 6-inches, or where continued erosion is prevalent. | Slopes should be stabilized by using proper erosion control measures, and repair methods. |
| | Settlement of Pond Dike/ Berm | Any part of these components that has settled 4-inches or lower than the design elevation, or inspector determines dike/ berm is unsound. | Dike/ berm is repaired to specifications. |
| | Rock Window | Rock window is clogged with sediment. | Window is free of sediment and debris. |
| | Overflow Spillway | Rock is missing and soil is exposed at top of spillway or outside slope. | Replace rocks to specifications. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### D.) Wetvaults

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| Wetvault | Trash/ Debris Accumulation | Trash and debris accumulated in vault, pipe or inlet/ outlet, (includes floatables and non-floatables). | Trash and debris removed from vault. |
| | Sediment Accumulation in Vault | Sediment accumulation in vault bottom that exceeds the depth of the sediment zone plus 6-inches. | Removal of sediment from vault. |
| | Damaged Pipes | Inlet/ outlet piping damaged or broken and in need of repair. | Pipe repaired and/ or replaced. |
| | Access Cover Damaged/ Not Working | Cover cannot be opened or removed, especially by one person. | Pipe repaired or replaced to proper working specifications. |
| | Vault Structure Damaged | Vault: Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound. | No cracks wider than 1/4-inch at the joint of the inlet/ outlet pipe. Vault is determined to be structurally sound. |
| | Baffles | Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection staff. | Repair or replace baffles to specifications. |
| | Access Ladder Damage | Ladder is corroded or deteriorated, not functioning properly, missing rungs, has cracks and/ or misaligned. | Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### E.) Sand Filters

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Above Ground | Sediment Accumulation on Grass Layer | Sediment depth exceeds 1/2-inch. | No sediment deposit on grass layer of sand filter which would impede permeability of the filter section. |
| | Trash and Debris Accumulations | Trash and debris accumulated on sand filter bed. | Trash and debris removed from sand filter bed. |
| | Sediment/ Debris in Yard Drains/ Clean-Outs] | When the yard drain CB's and clean-out become full or partially plugged with sediment and/ or debris. | Sediment, material from the CB's and clean-outs removed. |
| | Vegetation | When the grass becomes excessively tall (greater than 6-inches); when nuisance weeds and other vegetation starts to take over. | Vegetation is mowed or nuisance vegetation is eradicated, such that flow is not impeded. |
| | Sand Filter Media | Drawdown of water through the sand filter media, takes longer than 24-hours, and/ or flow through the overflow pipes occurs frequently. | Usually requires replacement of top 6 to 12-inches of media. May require replacement of entire sand filter section, depending on section. |
| | Prolonged flows | Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities. | Limit the low, continuous flows to a small portion of the facility by using a low wooden divider or slightly depressed sand surface. |
| | Short Circuiting | When flows become concentrated over the sand filter rather than dispersed. | Flow and percolation of water through the sand filter is uniform and dispersed across the filter section. |
| | Erosion Damage to Slopes | Erosion over 2-inches deep where cause of damage is prevalent or potential for continued erosion is evident. | Slopes should be stabilized by using proper erosion control measures. |
| | Rock Pad Missing or Out of Place | Soil beneath the rock is visible. | Replace or rebuild the rock pad to design specifications. |
| | V-Notch Pipe Weir | When the V-Notch pipe becomes damaged or clogged with sediment/ debris. | Clean and properly functioning weir, such that flows uniformly spread. |
| | Damaged Pipes | Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping. | Pipe repaired or replaced. |
| Below Ground Vault. | Sediment Accumulation on Sand Media Section | Sediment depth exceeds 1/2-inch. | No sediment deposits on sand filter section, which would impede permeability of the filter section. |
| | Sediment Accumulation in Vault | Sediment depth exceeds 6-inches in vault bottom. | No sediment deposit in the first chamber of the vault. |
| | Trash/ Debris Accumulation | Trash and debris accumulated in vault, or pipe inlet/ outlet, floatables and non-floatables | Trash and debris removed from vault, and inlet/ outlet piping. |
| | Sediment in Drain Pipes/ Yard Drains/ Cleanouts | When drain pipes, cleanouts, and yard drains become full with sediment and/ or debris. | Remove the material from the facilities. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### E.) Sand Filters (Continued)

| Maintenance Component | Defect | Conditions When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Below Ground Vault ( Continued) | Short Circuiting | When seepage/ flow occurs along the vault walls and corners. | Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. |
| | Vertical Riser Pipes | Plugged, failure due to cracking deformation. Flows tend to back-up in first chamber of the vault. | Clean out the riser pipe; replace pipe as needed. |
| | Damaged Pipes | Inlet or outlet piping damaged or broken and in need of repair. | Pipe repaired and/ or replaced. |
| | Access Cover Damaged/ Not Working | Cover cannot be opened, one person cannot open the cover, corrosion/ deformation of cover. | Cover repaired to proper working specifications or replaced. |
| | Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/ or Top Slab. | Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound. | Vault replaced or repaired to design specifications. |
| | | Cracks wider than 1/2-inch at the joints of any inlet/ outlet pipe or any evidence of soil particles entering the vault through the walls. | No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe. |
| | Baffles | Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection person. | Repair or replace baffles to specifications. |
| | Access Ladder Damaged | Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned. | Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### F.) Leaf Compost Filters

| Maintenance Component | Defect | Conditions When Maintenance is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Above Ground Open Swale | Sediment accumulation on Geo-Textile/ media | Sediment depth exceeds 0.25-inches. | No sediment deposits on fabric layer which would impede permeability of the fabric. |
| | Trash and debris accumulations | Trash and debris accumulated on compost filter bed. | Trash and debris removed from compost filter bed. |
| | Sediment/ debris in drain/ yard drains/ clean-outs. | When the yard drain CB's and clean-outs become full of sediment and/ or debris. | Remove the accumulated material from the facility. |
| | Vegetation | Vegetation impending flow through section, or encroaching into compost media. | Vegetation is mowed or eradicated such that flow is no longer impeded. |
| | Leaf Compost Media | Drawdown of water through the leaf compost, takes longer than 12-hours, and/ or flow through the overflow pipes occurs frequently. | Replace media with new to design specifications, in addition to replacing fabric. |
| | Short-Circuiting | When Channeled flow occurs over the leaf media; and where flow perks through the media at the baffles. | Flow is uniform over the entire width of the media section, and concentrated percolation does not occur at the baffle walls. Media needs to be graded and re-set at the baffles to form a seal. Weir plate may need to be adjusted in addition. |
| | Erosion Damage to Slopes | Eroded damage over 2-inches deep where cause of damage is prevalent or potential for continued erosion is prevalent. | Slopes should be stabilized by using proper erosion control measures. |
| | Damaged Geo-Textile Fabric. | When fabric is torn, deteriorated, raveled, etc. | Fabric replaced as necessary. |
| | Rock Pad Missing or out of place | Soil beneath the pad is visible. | Replace or rebuild the rock pad to design standards. |
| | Damaged Pipes | Any part of the pipe system that is crushed, damage due to corrosion, and/ or settlement. | Pipe repaired or replaced. |
| | V-Notch Weir Assemblies | Flow is not being uniformly spread over filter media. | Clean, repair or replace the weir systems. |
| Below Ground Vault | Sediment Accumulation on Geo-Textile/ Media. | Sediment depth exceeds 0.25-inches. | No sediment deposits on fabric layer which would impede permeability of the fabric and compost media. |
| | Sediment Accumulation in Vault | Sediment depth exceeds 6-inches in first chamber. | No sediment deposits in vault bottom of first chamber. |
| | Trash/ Debris Accumulation | Trash and debris accumulated on compost filter bed. | Trash and debris removed from the compost filter bed. |
| | Sediment in Drain Pipes/ Yard Drains/ Clean-Outs | When drain pipes, clean-outs, yard drains become full with sediment and/ or debris. | Remove the accumulated material from the facilities. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### F.) Leaf Compost Filter (Continued)

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Below Ground | Leaf Compost Media | Drawdown of water through the leaf compost, takes longer than 12-hours, and/ or overflow occurs frequently. | Replace media with new compost to specifications, in addition to replacing fabric. |
| | Short Circuiting | When seepage occurs along the vault wall and corners occur. | Percolation of water occurs along the walls and corners and not through the media section. Media needs to be re-set along the vault wall and corners to form a semi-seal. |
| | Plugged/ Damaged Elbows | Flow tends to backup unusually high in the first chamber of the vault. | Clean out the elbow fittings and/ or replace if damaged. |
| | Damaged Geo-Textile Fabric | Fabric is torn, deteriorated, raveled, etc. | Fabric replaced as necessary. |
| | Rock Pad Missing or Out of Place | Soil beneath the pad is visible. | Replace or rebuild the rock pad to design standards. |
| | Damaged Pipes | Any part of the pipes that are crushed, damaged due to corrosion and/ or settlement. | Pipe repaired and/ or replaced. |
| | Access Cover Damaged/ Not Working | Cover cannot be opened, one person cannot open the cover, corrosion/ deformation of cover. | Cover repaired to proper working specifications or replaced. |
| | V-Notch Weir Assemblies | Flow does not spread uniformly over filter media by weir section. | Clean, repair and/ or replace the weir plate section, or adjust height. |
| | Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/ or Top Slab | Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound. | Vault replaced or repaired to design specifications. |
| | Baffles | Baffles corroding, cracking warping, and/ or showing signs of failure as determined by maintenance/ inspection person. | Repair or replace baffles to specification. |
| | Access Ladder Damaged | Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned. | Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel. |
| | | Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls. | No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### G.) Infiltration Ponds

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Infiltration Pond | Vegetation | Vegetation such as grass and weeds needs to be mowed when it starts to impede infiltration function. Mowing is generally required when height exceeds 12 inches. | Vegetation should be mowed to 2-inches in height. Trees and bushes should be removed where they impact the infiltrating area of the pond. |
| | Sand Filter Layer | Sand filter layer has sediment deposits that exceeds 1/2-inch or the infiltration rate of the sand layer is less than 2 in/ hr. | Remove sediment and top layer of sand, and replace in kind per specification. |
| | Sediment Accumulation in Pond Bottom | Sediment accumulations in pond bottom that exceeds 1/2-inch in depth or percolation test of the pond indicates facility is only working at 90% of it's design percolation rate. | Removal of sediment from pond bottom. |
| | Trash and Debris | Accumulation that exceeds 1-CF per 1,000-SF of pond area. | Trash and Debris removed from pond. |
| | Inlet/ Outlet Pipe | Inlet/ outlet pipe clogged with sediment and/ or debris material. | No clogging or blockage in the inlet and outlet piping. |
| | Erosion | Erosion of the pond's side slope and/ or scouring of the pond bottom, that exceeds 2-inches, or where potential for continued erosion is prevalent. | Slopes should be stabilized by using proper erosion control measures and repair methods. |
| | Sediment of Pond Dike/ Berm | Any part of these components that has settled 4-inches or lower than the design elevation, or where potential for continued erosion is prevalent. | Slopes should be stabilized by using proper erosion control measures and repair methods. |
| | Rock Window | Rock window is clogged with sediment. | Window is free of sediment and debris. |
| | Overflow Spillway | Rock is missing and soil is exposed | Replace rocks to specifications. |
| Infiltration Vault/ Tank | Sediment Accumulation in Vault | Tanks: Sediment depth exceeds 6-inches in depth. | No sediment deposits in tank bottom. |
| | Trash and Debris Accumulation | Trash and debris accumulated in tank, vault or connecting pipe. Includes floatables and non-floatables. | Trash and debris removed from each facility. |
| | Access Cover Damaged/ Not Working | Cover cannot be opened or removed, especially by one person. | Cover repaired or replaced to proper working specifications or replaced. |
| | Tank or Vault Structure Damaged | Tank: Joints between tank sections failing, such that leakage occurs and. or material being washed through into facility; or maintenance/ inspection person determines the tank is not structurally sound. | Tank replaced or repaired to design specifications. |

## NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

### G.) Infiltration Ponds (*Continued*)

| Maintenance Component | Defect | Conditions When Maintenance is Needed | Results Expected When Maintenance Is Performed |
|---|---|---|---|
| Infiltration Vault/ Tank | Tank or Vault Structural Damage | Vault: Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance inspection personnel determines that the vault is not structurally sound. | Tank replaced or repaired to design specifications. |
| | Access Ladder Damaged | Ladder is corroded or deteriorated, not functioning properly, missing rungs, has cracks and/ or misaligned. | Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. |

## NO. 14 - OIL CONTROL FACILITIES

### A.) Oil/ Water Separators

| Maintenance Component | Defect | Condition When Maintenance Is Needed | Results Expected When Maintenance is Performed. |
|---|---|---|---|
| API Type OWS | Monitoring | Inspection of discharge water for obvious signs of poor water quality. | Effluent discharge from vault should be clear with out thick visible sheen. |
| | Sediment Accumulation | Sediment depth in bottom of vault exceeds 6-inches in depth. | No sediment deposits on vault bottom which would impede flow through the vault and separation efficiency. |
| | Trash and Debris Accumulation | Trash and debris accumulation in vault, or pipe inlet/ outlet, floatables and non-floatables. | Trash and debris removed from vault, and inlet/ outlet piping. |
| | Oil Accumulation | Oil accumulations that exceed 1-inch, at the surface of the water | Extract oil from vault by vactoring. Disposal in accordance with state and local rules and regulations. |
| | Damaged Pipes | Inlet or outlet piping damaged or broken and in need of repair. | Pipe repaired or replaced. |
| | Access Cover Damaged/ Not Working | Cover cannot be opened, one person cannot open the cover, corrosion/ deformation of cover. | Cover repaired to proper working specifications or replaced. |
| | Vault Structure Damage-Includes Cracks in Walls Bottom, Damage to Frame and/ or Top Slab | Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound. | Vault replaced or repaired to design specifications. |
| | Baffles | Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection person. | Repair or replace baffles to specifications. |
| | Access Ladder Damaged | Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned. | Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel. |
| | | Cracks wider than 1/2-inch at the joint of any inlet/ outlet pipe or any evidence of soil particles entering the vault through the walls. | No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe. |
| CPS-Type OWS | Monitoring | Inspection of discharge water for obvious signs of poor water quality. | Effluent discharge from vault should be clear with no thick visible sheen. |
| | Sediment Accumulation | Sediment depth in bottom of vault exceeds 6-inches in depth and/ or visible signs of sediment on plates. | No sediment deposits on vault bottom and plate media, which would impede flow through the vault and separation efficiency. |
| | Trash and Debris Accumulation | Trash and debris accumulated in vault, or pipe inlet/ outlet, floatables and non-floatables. | Trash and debris removed from vault, and inlet/ outlet piping. |
| | Oil Accumulation | Oil accumulation that exceeds 1-inch at the water surface. | Extract oil from vault by vactoring methods. Clean coalescing plates by thoroughly rinsing and flushing. Should be no visible oil depth on water. |

## NO. 14 - OIL CONTROL FACILITIES (*CONTINUED*)

### ') Oil/ Water Separators (Continued)

| ıintenance Component | Defect | Condition When Maintenance is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| | Damaged Coalescing Plates | Plate media broken, deformed, cracked and/ or showing signs of failure. | Replace that portion of media pack or entire plate pack depending on severity of failure. |
| | Damaged Pipes | Inlet or outlet piping damaged or broken and in need of repair. | Pipe repaired and or replaced. |
| | Baffles | Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection person. | Repair or replace baffles to specifications. |
| | Vault Structure Damage- Includes Cracks in Walls, Bottom, Damage to Frame and/ or Top Slab | Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance inspection personnel determines that the vault is not structurally sound. | Vault replaced or repaired to design specifications. |
| | Access Ladder Damaged | Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned. | Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel. |
| | | Cracks wider than 1/2-inch at the joint of any inlet/ outlet pipe or any evidence of soil particles entering the vault through the walls. | No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe. |

### .) Catch Basin Inserts

| Maintenance Component | Defect | Conditions When Maintenance is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| Catch Basin | Sediment Accumulation | When sediment forms a cap over the insert media of the insert and/ or unit. | No sediment cap on the insert media and it's unit. |
| | Trash and Debris Accumulation | Trash and debris accumulates on insert unit creating a blockage/ restriction. | Trash and debris removed from insert unit. Runoff freely flows into catch basin. |
| | Inspection | Inspection of media insert is required. | Effluent water from media insert is free of oils and has no visible sheen. |
| | Media Insert-Water Saturated | Catch basin insert is saturated with water, which no longer has the capacity to absorb. | Remove and replace media insert |
| | Media Insert-Oil Saturated | Media oil saturated due to petroleum spill that drains into catch basin. | Remove and replace media insert. |
| | General | Regular interval replacement due to typical average life of media insert product. | Remove and replace media at regular intervals, depending on insert product |

King County

Department of Natural Resources

Water and Land Resource Division

**RFP Response**
**Storm and Surface Water Operation and Maintenance Services**
**City of Sammamish**

## INTRODUCTION AND SERVICE OVERVIEW

King County Water and Land Resources (WLR) Division is pleased to provide a response to the City of Sammamish Request for Proposal to provide drainage and facility maintenance services. As described below, WLRD is in a unique position to partner with the City to provide responsive and cost-effective drainage services to the City, including: drainage problem response, evaluation and solution; facility inspection and maintenance, billing, collecting and disbursing surface water funds, and other surface water management related services.

WLR Division has provided drainage services to the City per interlocal agreement since the City's incorporation. Prior to incorporation, WLR Division managed the publicly-maintained drainage facilities in the City, responded to citizen requests and inquiries, and conducted all aspects of drainage related response programs including planning, capital improvement design and construction, and scientific and biological assessments of the City's natural drainage features. Through the continued service agreement arrangement, Sammamish is able to take advantage of WLR Division's body of knowledge of the City's drainage infrastructure, field conditions, and history to eliminate service "startup time" and the loss of data critical to providing services efficiently.

WLR Division, in coordination with King County Department of Transportation (DOT), currently manages and maintains a complex system of both publicly and privately owned flow control, water quality, and conveyance facilities. All work to complete facility inspections and prepare work authorizations is performed by WLR staff; actual maintenance work is performed to WLR specifications by the DOT. WLR's experience with facility assessment and DOT's experience with performing actual maintenance in Sammamish maximizes the City's ability to be a responsive and thorough service provider for its citizens.

WLR Division places particular emphasis on responsive customer service in providing drainage services to cities. Processes and procedures for all aspects of service provision, including customer response, timing of activities, authorization of work, communication protocols, and reporting are developed in conjunction with City staff. Once agreed-upon procedures are in place, WLR staff provide open lines of communication to ensure that services are being provided to the City's satisfaction and that necessary changes can be implemented. Service agreements provide specifically for a contract liaison who can act as a troubleshooter, and City representatives are also provided with a number of appropriate contacts for specific service issues.

WLR Division is currently providing, and can continue to provide, a wide array of surface water program services to the City. Below is a brief summary of programs identified in the RFP in addition to others WLR Division is now providing to the City.

The focus below is on activities presently administered by Division staff. Those activities identified in the Proposed Level of Service spreadsheet that are currently provided to the City directly by King County DOT (i.e. maintenance of road right-of-way drainage system components) will not be included in WLR's proposal. DOT will separately provide estimates for the services it now provides to the City.

RETENTION/DETENTION AND WATER QUALITY FACILITY SERVICES
*Note: the designations "city owned and maintained" and "privately owned and City inspected" are based on responsibilities as implemented in the City's drainage code.*

City owned and maintained facilities (residential drainage facilty category)
WLR Division staff have significant experience inventorying, tracking, assessing and maintaining flow control and water quality facilities within the City of Sammamish. The Division uses a Management Information System (MIS) database to identify appropriate timeframes for assessment activities, track work authorizations, inventory system components and identify completed work. In addition, paper files are maintained for each facility including plans, engineering calculations/TIRs, historical work authorizations, and other documents related to the facility's history and function. In addition, the paper files note special circumstances for managing each facility, such as protocols for accessing facilities on private properties per the propert owner's requests. The availability of facility historical data and circumstances allows WLR staff to work with Sammamish to provide facility inspection and maintenance services in a way which maximizes responsiveness both to the maintenance needs and the needs and preferences of the service's customers.

Flow control and water quality facilities are recommended to be assessed on an annual basis, but assessment frequency is determined by the City. During the inspection process, each facility component is compared to City-adopted maintenance standards as specified in Appendix A of the Surface Water Design Manual (part of the City's and King County's drainage code). Based on inspection results, work authorizations (W/A) are initiated through the Management Information System (MIS). Specific units of maintenance are identified and associated costs for each W/A are calculated. Draft W/As, along with a summary spreadsheet showing recommended work and total estimated cost, is provided to the City for approval before work is scheduled for completion. As work completion is tracked, updates and reports can be provided to the City in a variety of formats which best suit City needs.

City owned and maintained facilities (regional drainage facility category)
In addition to residential facilities, the City has maintenance responsibility for 20 Regional Storm Facilities. These facilities are sediment ponds, retention/detention ponds, and conveyance systems which have been constructed (often as King County capital improvement projects) to minimize or prevent the negative impacts of development. These impacts include flooding, erosion, habitat degradation, and structural damage to public and private property. King County recommends and can provide services for

annual facility inspection and can provide, for the City's review and approval, work authorizations for maintenance pursuant to the inspections. Depending on the critical nature of a facility, inspection services can be provided during or after any major storm to ensure proper functioning.

Typical Regional Storm facilities in Sammamish include long pipelines conveying water from the top of the plateau to lower ground to prevent erosion in natural ravines. These facilities are difficult to inspect and require expertise and experience to determine when and where problems exist. They are typically maintenance free but when damaged can be very difficult and expensive to repair. King County has the experience and skills to provide the most efficient inspection and repair of these facilities.

Privately owned, City-inspected facilities (commercial/multi-family facility category)
WLR strongly recommends annual inspection of privately owned commercial/multi-family facilities to identify maintenance needs, as City (and King County code) provide for a property owner discount on the annual SWM fee if property owners perform required maintenance. Once facility inspections to determine maintenance needs are performed, Maintenance Correction Letters (MCL) are sent to property owners on behalf of the City identifying maintenance work required to meet City standards. Once the property owners perform the maintenance, they return the MCLs to WLR certifying that the maintenance has been completed. WLR staff track assessments performed, MCLs issued, returned MCLs and work with WLR SWM fee billing staff to process the fee discounts. In addition, staff provides technical assistance to property owners who have questions or need information on City maintenance standards, maintenance options, bringing facilities to City maintenance standards.

DRAINAGE INVESTIGATION (COMPLAINT RESPONSE ACTIVITIES):
WLR Division responds to approximately 1000 drainage, water quality and facility complaints annually. Staff also provides responses to public inquires, historical drainage response activities, and general questions related to operating a surface water management program. Staff has significant experience responding to the public and providing responses and assisting citizens with clarification of drainage related activities and issues. WLR Division staff have a strong customer service response attitude, requesting customer feed back and tracking responses. Responses from unincorporated King County residents indicate over a 95% positive experience to our services. Adopted customer service standards are used by staff to ensure timely, clear, and concise response to customer requests. Typical complaint response action includes intake, tracking, and research. After initial activities investigation (site visit) is conducted to obtain complaint information. A sketch and a report with photographs are provided for each site visit. After investigation discussion/review is conducted with senior staff to determine resolution of the complaint. Average time spent processing, investigating, and clearing a complaint is 5.5 hours.

The following are brief descriptions of the types of drainage related complaints the City can expect to receive from citizens and how WLR's existing response program can address them.

- Drainage: Typically problems reported by citizens related to drainage affecting private property. Includes property impact as a result of uncontrolled flow, conveyance issues, and natural drainage feature conditions and impacts. Staff that will respond to complaints within the City have a strong background and understanding of drainage systems, public agency responsibility, and appropriate referral decisions.
- Water Quality: Typical problems reported are related to pollution spills, dumping, and lack of best management practices by business activities. Response staff is experienced with identifying pollutants, understand sampling procedures and test required. Investigators can determine if emergency response is required and how to initiate that action. They are also trained in the appropriate methods required to obtain samples and track chain of custody.
- Facility: Complaints related to public flow control, water quality, or conveyance facilities. Complaints typically are related to function, access, aesthetics, and condition. Complaints are investigated and if a maintenance issue is identified a work authorization is produced to rectify the problem.

WLR Division can also provide the City with advanced analysis and review of complex drainage and water quality problems. The Division has an engineering review and response program that provides professional level analysis of drainage, water quality, and facility problems that cannot be resolved at the complaint response level. The engineering staff posses comprehensive knowledge of the Surface Water Design Manual (adopted by the City and the County) and KCRTS modeling program. The engineering review can provide the City a cost effective method of problem determination, alternative resolutions, and associated costs. Because the investigation program and engineering review program are housed within the same section, coordination of staff and transferring of information required for resolution is cost effective. This process allows staff to take a problem from cradle to grave.

## Additional Services

### Emergency Response

WLR Division manages and staffs an Urban Emergency Response Program, entailing staff pre-assigned and scheduled to be available 24 hours to respond to emergency situations arising from extreme storm events, earthquakes, and other natural disasters. Staff is available to maintain the Division's complaint response line on a 24 hour schedule. Emergency Response initiates site visits to known sensitive facilities, resolves emergency drainage problems, and provides sand bagging guidance and expertise. Staff can also call in maintenance crews to resolve single incidents along with natural emergency situations. These services are available to the City as a way of providing prompt and effective emergency services.

Maintenance/Defect Bond Activities

For King County-vested developments, and for City developments should the City so choose, developers of new residential and commercial projects with right-of-way improvements or drainage systems are required to post a two-year bond to guarantee maintenance, workmanship, materials, and design. WLR Division's program to administer this bond process includes preparing facility inventories both (MIS and paper); providing initial assessment to determine facility function, and providing ongoing quarterly assessments to identify maintenance needs. Developers are notified of maintenance requirements through a Maintenance Correction Letter. After the two-year period has elapsed, a final assessment is conducted prior to bond release and acceptance of the facility for maintenance (residential facilities). Services under this program are available to the City and have proven over time to be a successful method for managing the introduction of facilities constructed by private developers per the County's and City's drainage code.

Capital Project Management and Design

WLR Division is able to provide the City, at its request and direction, with the services of a professional engineering staff with experience in design and construction for facility retrofits, small neighborhood drainage projects, and larger capital projects.

The text below provides information in categories as requested in the RFP.

**Cost-Effectiveness**

- *Provide the City with a cost estimate for services. Complete attached level of service table.*

Enclosed please find the following:

1) completed cost spreadsheet using frequency/annual work quantity parameters as provided in RFP
2) completed cost spreadsheet using frequency/annual work quantity parameters as estimated by WLR Division (with accompanying "Supplemental Attachment" sheet).
3) Table indicating estimated costs for residential facility maintenance based on residential facility inspections as of 7/28/00
4) King County maintenance performance standards showing cost and service parameters for units of service

- *Describe method by which you will inform City of any budgetary or scheduling overruns.*

  WLR Division will submit an annual estimated maintenance budget and provide a quarterly report detailing actual expenditures. Maintenance inspection scheduling will be approved annually by City of Sammamish. Maintenance work authorizations, with associated cost estimates, will be submitted to City for approval prior to work startup. Task completion status and expenditures will be monitored and reported during work progress. Deviations to agreed-upon scheduling and costs will be checked through the City.

- *Describe surface water billing and revenue collection options. Discuss timing and how the collected fees will be disbursed to the City.*
  Through King County, the City's annual surface water management fee for property owners is billed on the County property tax statement in February. Fees are payable entirely in April or in two parts in April and October. All fees collected are transmitted daily to the City via wire from the King County Department of Finance. The SWM fee billing system carries a multitude of parameters necessary to bill the correct SWM fee for the individual property owner based on characteristics (including total acreage, impervious acreage, senior citizen status, drainage facility status). In addition, the billing fee includes staff time to respond to customer inquiries regarding the City's SWM fee, respond to rate adjustment requests (including re-measuring of impervious surface in the field), perform daily system updates based on parcel splits and consolidations, and perform weekly maintenance of customer files to keep billings accurate.

**General**

- *Describe comparable experience providing full service utility maintenance to a municipality.*
  The WLR Division currently provides a range of drainage-related services, including retention/detention facility inspection and maintenance, drainage investigation and response, and surface water service charge billing, under contract to the cities of Burien,Woodinville, Covington, Lake Forest Park, Kenmore, and Sammamish. Services have been provided to these cities since the dates of their incorporations (Lake Forest Park excepted). WLRD also provides surface water service charge billing for the cities of Kirkland, Des Moines, Bothell, Federal Way, SeaTac, Shoreline, and a portion of Bellevue. Finally, WLRD provides or will be providing in the near future a variety of surface water related scientific/technical services to the cities of Bothell, Mercer Island, Black Diamond, and Issaquah.

- *Provide specific reference contacts for completed work of a similar nature.* Frank Zenk, Director of Public Services, City of Lake Forest Park, 206-368-5440. Andy Dempsey, City Engineer, City of Covington, 253-638-1110.

**Customer Service/Responsiveness to City's Needs**

- *Describe manner in which you intend to provide attentive customer service and quick response.*
  The *WLR Division* Drainage Services technician providing complaint response and facility inspection services to Sammamish has been assigned to the area for many years and knows the area's characteristics and problems thoroughly, so can work and answer inquiries efficiently. This technician can be assigned as the City's single point of contact for drainage-related issues and is experienced in acting as a City representative when present in the field during complaint response, facility inspections and maintenance activity. The technician also carries for distribution where appropriate a range of informational materials to answer citizens' questions on a range of issues. Technicians coordinate closely with City staff to update them on citizen inquiries, responses provided, and to consult on follow-up.

Additional Drainage Services engineering staff are available to the City for drainage-related inquiries and to work as a public liaison for any presentations or meetings dealing with drainage issues. WLRD provides an overall contract liaison for contract-related issues and questions and as an additional source of assistance on other questions.

WLRD provides the 296-1900 drainage problem hotline for public complaint/inquiry response and complete drainage complaint investigation response utilizing current Drainage Services response levels and services. WLRD also provides urban drainage emergency response program for problems arising after business hours. Signs on retention/detention facilities provide the public with a contact phone number for facility problems. WLRD's website may also be used as information source or a complaint intake venue.

Maintenance Correction Letters for private maintenance of commercial drainage facilities provide property owners with a complete, easy-to-understand list of maintenance tasks required to comply with City maintenance standards. Drainage Services staff provides an interface with the surface water service charge billing system to efficiently implement discounts for maintenance performed also provided for through City code.

Finally, Drainage Services Engineering staff act as a developer contact for newly constructed residential drainage facilities under the two-year maintenance/defect bond program prior to acceptance for ongoing maintenance by the City.

- *Describe methods or approaches through which you will integrate your services into the City's stormwater management program in such a manner that you are seen as an extension of City staff*

  Aside from coordination, scheduling and authorization issues as addressed above, the following are ways in which WLR Division staff can provide services to maximize seamlessness between County and City staff:
  - WLR staff initiate meetings with City staff to create agreed-upon service provision procedures and to ensure that such procedures are well understood.
  - Before services are provided, WLR staff will seek authorization from City staff according to agreed upon procedures.
  - WLR staff are versed in responding to questions from citizens living within contract cities in general and consult with Sammamish on City-specific responses.
  - In responding to Sammamish citizens and conducting maintenance activites, WLR staff make every effort to clarify service expectations and adhere to citizen preferences on response aspects such as timing of site visits
  - WLR provides a number of contacts available to City staff to answer questions, consult on issues of concern, and coordinate on services.
  - WLR staff make all practicable efforts to be flexible and responsive in providing services according to Sammamish preferences.

- *Explain how your service provision scheduling will interface with the City's schedule.*
  Current programs have been tailored to meet City scheduling needs, accounting for the fact that some maintenance activities are seasonally timed and/or restricted. Drainage Services staff works in close coordination with King County Department of Transportation Special Operations crews to maintain an available work force throughout entire year. Seasonal employees are retained to complete tasks during peak work season. Facility inspection scheduling remains flexible to meet City program requests.

- *Discuss mechanisms for keeping the City informed of the work scheduled and the work performed.*
  WLR Division staff notifies City staff prior to responding when a drainage complaint is received from a Sammamish citizen. WLR staff always contact City staff when within city limits to perform work or respond to an inquiry. All work authorizations and associated cost breakdowns are provided to the City for approval prior to work startup. A wide range of reports are available to document work status upon request. Expenditure reports, along with invoices, are provided quarterly. Staff maintains close contact with the City to report work status and to seek City's direction where indicated.

**Compliance with Environmental Regulations**

- *Provide a record of compliance with environmental regulations.*
  Staff maintains compliance with County, State, and Federal regulations, including procuring all necessary permits, associated with all work performed. WLRD staff works closely with other King County Department of Natural Resources staff to gain the most up-to-date information on relevant environmental issues and regulations. Staff also are experienced in providing Biological Assessments, application of Section 7 and 4d Rule requirements for the Endangered Species Act. Neither WLR staff nor projects have received environmental regulation violations or notices that required regulations had been violated.

- *Describe Best Management Practices you will apply to perform maintenance activities as outlined in the attached table.*
  All solid and liquid vactor waste is disposed of at County operated or approved sites, in compliance with applicable regulations. All current methods of erosion control are utilized at sensitive worksites. Staff are knowledgable of all City regulations applicable to work performed. All water quality facilities are maintained to current Best Management Practices guidelines. Work crews utilize Department of Transportation BMP guidelines.

**Safety**

- *Provide description of safety program for maintenance operators.*
  Inspectors receive training in CPR, first aid, defensive driving, traffic control, confined space entry, and other applicable workplace safety classes. Equipment operators are trained to comply with all equipment safe operation standards.

- *Describe or provide records of safety experience.*
  King County requires reporting of all accidents involving vehicle or property damage or personal injury during work shifts. These accident reports are submitted to management and the Safety Office which maintains records of the incidents. The accidents are reviewed by management, peers, the Safety Office and if applicable, the Equipment Maintenance supervisor. The Section, Roads Maintenance, keeps a database showing all pertinent training inclusive of safety classes. For all CDL holders in sensitive positions, the County participates in the federally mandated drug and alcohol testing program which requires records of all tests.

## SUPPLEMENTAL ATTACHMENT

The following are to be used to clarify costs and assumptions used to develop the proposed level of service data spreadsheet for residential facilities. WLR has completed the spreadsheet, as provided in the RFP, to facilitate an equitable comparison with other submittals. To supplement this attachment, enclosed are: 1) Performance Standards for all maintenance tasks performed. These standards provide a labor and equipment cost breakdown for each task, using daily costs and tasks performed daily. 2) Hourly rates for all personnel and equipment used to perform these tasks. 3) A unit cost sheet for each task performed. 4) An updated 2000 workload spreadsheet, showing work for residential facilities identified to date for 2000. Additionally we are providing a "revised" level of service spreadsheet. Some work quantities and frequency rates have been revised and some additional tasks have been added to better represent what we believe the City's actual workload, based on previous Sammamish work programs may be. Estimates for maintenance to be performed are presented to Sammamish for approval, prior to work startup.

- *FACILITY INSPECTIONS* Cost estimated using inventory of 188 residential and commercial *RID* facilities. Inspections require 2.8 hours of Engineering Technician (Tech) and vehicle time. Tech and vehicle combined cost is approximately *$56.62* per hour. Additional clerical and supervisory time (approximately 1.2 hours per inspection) is shown as a lump sum on the spreadsheet. Our revised proposal breaks inspections down into more specific categories, including 2-year MID inspections, which are performed quarterly.
- VEGETATION CONTROL Cost estimated using previous mowing program data. Sammamish mowing inventory provided is 103 facilities, of varying size. Crew cost shown on M43 task performance standard was used to estimate cost for 103 facilities being mowed 1.50 times annually at a daily production of 3, rather than using square yards. Our revised proposal uses square yards tabulated in our Sammamish database, and is based on being mowed twice per year
- SEDIMENT REMOVAL Sediment removal was calculated for pond cleaning using assumptions provided. Frequencies shown may differ, based on historical data from previous Sammamish work programs. The revised proposal uses actual facility inventories identifying ponds, tanks and vaults. See performance standards for M23 and M25 tasks.
- *CLEAN CONTROL STRUCTURE* Cost estimated using M21 performance standard. Frequency may vary.
- *REPAIR CONTROL STRUCTURE* Cost estimated using M35 performance standard. Frequency may vary.
- CLEAN CB/MH Cost estimated using M22 performance standard. Current Sammamish workload may differ from 55 indicated. Frequency may vary.
- *CLEAN PIPE* Cost estimated using M24 performance standard. Current Sammamish workload may differ from 215 feet shown. Frequency may vary.

- *DRAINAGE INVESTIGATION* Currently DS investigates drainage complaints for the City of Sammamish, resulting in appropriate referrals or response, as Sammamish requests. Complaint investigations require 4 hours of Tech and vehicle time. Tech and vehicle combined cost is approximately $56.62 per hour. Additional clerical and supervisory time (approximately 1.5 hours per investigation) is included as a lump sum. DOT staff, using different estimated costs, performs conveyance investigation.
- *DISPOSAL FEES* All disposal costs are included in performance standards for tasks involving material disposal.
- *SURFACE WATER BILLING* Cost estimates based on previous Sammamish invoices administered by Finance and Administration staff.
- *SUPERVISORY AND CLERICAL COST* Supervisory and clerical staff including but not limited to Senior Engineer, Engineer, and Engineering Aide provide support to inspection and investigation activities. Estimated costs are based on 1.2 hours per facility inspection and 1.5 hours per drainage complaint investigation.
- SYSTEM DOCUMENTATION System documentation including work authorizations, commercial property maintenance correction letters, reports and other data is included in clerical costs.

**TABLE 1**
Annual Operation and Maintenance Costs
Proposed Level of Service

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 12.00 | 1,284 | | | | | | | | | |
| Weed Control | LM | 107 | 0.40 | 43 | | | | | | | | | |
| **Ditches** | | | | | | | | | | | | | |
| Cleaning | LF | 501659 | 0.02 | 10,033 | | | | | | | | | |
| Vegetation Control (ditch mowing) | LF | 501659 | 1.50 | 752,489 | | | | | | | | | |
| **Pipes** | | | | | | | | | | | | | |
| Clean Drainage System (pipes & culverts) | LF | 408947 | 0.04 | 16,358 | | | | | | | | | |
| Repair/Replace Pipes [2] | LF | 408947 | varies | 1,227 | | | | | | | | | |
| Clean Out - culverts | EA | 4304 | 0.50 | 2,152 | | | | | | | | | |
| TV inspection | HR | | | 80 | | | | | | | | | |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Inspect Catch Basin/Manhole | EA | 3519 | 1.00 | 3,519 | | | | | | | | | |
| Clean Catch Basin/Manhole | EA | 3519 | 0.25 | 880 | | | | | | | | | |
| Repair Catch Basins Type I & II [2] | EA | 3519 | varies | 34 | | | | | | | | | |
| Replace Catch Basins Type I & II [2] | EA | 3519 | varies | 14 | | | | | | | | | |
| Replace Catch Basins/Manhole Lids [2] | EA | 3519 | varies | 17 | | | | | | | | | |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | | |
| Facilities Inspection [3,9] | EA | 188 | 1.00 | 188 | 3 | 1 | p/u | 62.6 | $26,576 | $1,780 | | | $28,355 |
| M43-Vegetation Control (ponds only) [9] | EA | 103 | 1.50 | 155 | 3 | 7 | 2p/u,Kutkwik,2 cyDT | 51.6 | $83,618 | $23,194 | $2,528 | | $109,340 |
| M25-Sediment Removal (ponds only) [9] | EA | 154 | 0.20 | 31 | 0.75 | 4 | 2p/u,BH,10cyD T,dozer | 41.3 | $41,176 | $38,905 | $16,644 | | $96,725 |
| M21-Clean Control Structure [9] | EA | 154 | 0.50 | 77 | 5 | 3 | 2p/u,vactor | 15.4 | $9,348 | $8,116 | $739 | | $18,203 |
| M35-Repair Control Structure [4,9] | EA | 154 | | 29 | 4 | 2.5 | 2p/u | 7.25 | $4,082 | $471 | $1,813 | | $6,366 |
| M40-Repair Debris Barrier [4,9] | EA | unknown | | 18 | 2 | 2.5 | 2p/u | 9 | $6,237 | $927 | $2,250 | | $9,414 |
| M22-Clean Conveyance CB/MH [4,9] | EA | unknown | | 55 | 8 | 3 | 2p/u,vactor | 6.8 | $4,128 | $3,584 | $360 | | $8,072 |
| M36-Repair Conveyance CB/MH [4,9] | EA | unknown | | 18 | 3 | 2.5 | 2p/u | 6 | $4,932 | $1,734 | $1,200 | | $7,866 |
| M24-Clean Pipe [4,9] | LF | unknown | | 215 | 250 | 3 | 2p/u,vactor | 0.86 | $632 | $409 | $127 | | $1,169 |
| Misc. Maintenance [5,9] | EA | varies | varies | | | | | | | | | | $15,000 |
| **Oil/Water Separators** | | | | | | | | | | | | | |
| Facilities Inspection [9] | EA | 18 | 1.00 | 18 | 3 | 1 | p/u | 6 | $2,547 | $171 | | | $2,718 |
| M21-Clean Control Structure [9] | EA | 18 | 1.50 | 27 | 5 | 5 | 2p/u,vactor | 5.4 | $3,278 | $2,846 | $259 | | $6,383 |
| **Drainage Investigation** | | | | | | | | | | | | | |
| Conveyance System [2] | EA | varies | varies | 27 | | | | | | | | | N/A |
| Retention/Detention Facilities [6] | EA | varies | varies | 98 | 2 | 1 | p/u | 49 | $20,802 | $1,393 | | | $22,195 |
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7,9] | LS | | | | | | | | | | | | N/A |
| Disposal Fees - liquid [9] | TON | | | | | | | | | | | | N/A |
| Disposal Fees - solid [9] | TON | | | | | | | | | | | | N/A |
| Surface Water Billing [8,9 (@$1.41/year/account)] | EA | 10889 | 1.00 | 10889 | | | | | | | | | $15,353 |
| Supervisory and Clerical Personnel Costs [9] | LS | | | | | | | | | | | | $18,615 |

KC_Roads_cost table 1.xls

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Documentation [9] | LS | | | | | | | | | | | | N/A |
| **Total** | | | | | | | | | | | | | $365,773 |

[1] Quantities obtained from 2000 King County Department of Transportation Work Program and Performance Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantity based on data from 2000 King County Department of Transportation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include both commercial and residential retention/detention ponds, tanks, and vaults

[4] Frequencies and annual work quantity based on 2000 King County SWM Summary of Maint/Repair Costs for each facility. At time of data collection, only 84 of the 154 facilities were inspected. The annual work quantity was determined by multiplying quantity from SWM report by 154/84. Actual work quantity will vary annually.

[5] Misc. Maintenance includes repair ponds, access roads, fences, energy dissipators and signs. Assume $15,000 annually. Actual cost will vary.

[6] King County Drainage Complaints 1990-2000: Quantity includes 1997-June 2000 (i.e. 3.5 years) and normalized annually.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of accounts billed for 2000. King County Dept. of Finance retains 1% of revenues collected as collection fee.

[9] See supplemental information attachments.

**TABLE 2 (proposed)**
Annual Operation and Maintenance Costs
Proposed Level of Service

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 12.00 | 1,284 | | | | | | | | | |
| Weed Control | LM | 107 | 0.40 | 43 | | | | | | | | | |
| **Ditches** | | | | | | | | | | | | | |
| Cleaning | LF | 501659 | 0.02 | 10,033 | | | | | | | | | |
| Vegetation Control (ditch mowing) | LF | 501659 | 1.50 | 752,489 | | | | | | | | | |
| **Pipes** | | | | | | | | | | | | | |
| Clean Drainage System (pipes & culverts) | LF | 408947 | 0.04 | 16,358 | | | | | | | | | |
| Repair/Replace Pipes [2] | LF | 408947 | varies | 1,227 | | | | | | | | | |
| Clean Out - culverts | EA | 4304 | 0.50 | 2,152 | | | | | | | | | |
| TV inspection | HR | | | 80 | | | | | | | | | |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Inspect Catch Basin/Manhole | EA | 3519 | 1.00 | 3,519 | | | | | | | | | |
| Clean Catch Basin/Manhole | EA | 3519 | 0.25 | 880 | | | | | | | | | |
| Repair Catch Basins Type I & II [2] | EA | 3519 | varies | 34 | | | | | | | | | |
| Replace Catch Basins Type I & II [2] | EA | 3519 | varies | 14 | | | | | | | | | |
| Replace Catch Basins/Manhole Lids [2] | EA | 3519 | varies | 17 | | | | | | | | | |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | | |
| Res. R/D Facilities Inspection [3,9] | EA | 165 | 1.00 | 165 | 3 | 1 | p/u | 55 | $23,351 | $1,562 | | | $24,913 |
| Commercial R/D Facilities Inspection [3,9] | EA | 35 | 1.00 | 35 | 3 | 1 | p/u | 11.6 | $4,925 | $329 | | | $5,254 |
| 2-Year M/D Facilities Inspection [3,9] | EA | 18 | 4.00 | 72 | 3 | 1 | p/u | 24 | $10,189 | $682 | | | $10,871 |
| M43-Vegetation Control (ponds only) [9] | SQYD | 152608 | 2.00 | 305216 | 8,724 | 15 | 3p/u,2Kutkwik, 2-10cyDT | 34.9 | $113,111 | $31,375 | $3,420 | | $147,871 |
| M25-Sediment Removal (ponds only) [9] | EA | 93 | 0.20 | 19 | 0.75 | 4 | 2p/u,BH,10cyDT,dozer | 25.3 | $25,224 | $23,833 | $10,195 | | $59,253 |
| M25-Sediment Removal (tanks, vaults only) [9] | EA | 61 | 0.20 | 12 | 2 | 5 | 2p/u,vactor | 6 | $6,816 | $3,162 | | | $10,782 |
| M21-Clean Control Structure [9] | EA | 154 | 0.50 | 77 | 5 | 3 | 2p/u,vactor | 15.4 | $9,348 | $8,116 | $739 | | $18,203 |
| M35-Repair Control Structure [4,9] | EA | 154 | | 29 | 4 | 2.5 | 2p/u | 7.25 | $4,082 | $471 | $1,813 | | $6,366 |
| M40-Repair Debris Barrier [4,9] | EA | unknown | | 18 | 2 | 2.5 | 2p/u | 9 | $6,237 | $927 | $2,250 | | $9,414 |
| M22-Clean Conveyance CB/MH [4,9] | EA | unknown | | 55 | 8 | 3 | 2p/u,vactor | 6.8 | $4,128 | $3,584 | $360 | | $8,072 |
| M36-Repair Conveyance CB/MH [4,9] | EA | unknown | | 18 | 3 | 2.5 | 2p/u | 6 | $4,932 | $1,734 | $1,200 | | $7,866 |
| M24-Clean Pipe [4,9] | LF | unknown | | 215 | 250 | 3 | 2p/u,vactor | 0.86 | $632 | $409 | $127 | | $1,169 |
| Misc. Maintenance [5,9] | EA | varies | varies | | | | | | | | | | $30,000 |
| Regional Storm Facility Maintenance | | | | | | | | | | | | | $10,000 |
| **Drainage Investigation** | | | | | | | | | | | | | |
| Retention/Detention Facilities [6] | EA | varies | varies | 98 | 2 | 1 | p/u | 49 | $20,802 | $1,393 | | | $22,195 |
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7,9] | LS | | | | | | | | | | | | N/A |
| Disposal Fees - liquid [9] | TON | | | | | | | | | | | | N/A |
| Disposal Fees - solid [9] | TON | | | | | | | | | | | | N/A |
| Surface Water Billing [8,9 (@$1.41/year/account)] | EA | 10889 | 1.00 | 10889 | | | | | | | | | $15,353 |
| Supervisory and Clerical Personnel Costs [9] | LS | | | | | | | | | | | | $18,615 |

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Documentation [9] | LS | | | | | | | | | | | | N/A |
| **Total** | | | | | | | | | | | | | $398,134 |

[1] Quantities obtained from 2000 King County Department of Transportation Work Program and Performance Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantity based on data from 2000 King County Department of Transportation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include both commercial and residential retention/detention ponds, tanks, and vaults

[4] Frequencies and annual work quantity based on 2000 King County SWM Summary of Maint/Repair Costs for each facility. At time of data collection, only 84 of the 154 facilities were inspected. The annual work quantity was determined by multiplying quantity from SWM report by 154/84. Actual work quantity will vary annually.

[5] Misc. Maintenance includes repair ponds, access roads, fences, energy dissipators and signs. Assume $15,000 annually. Actual cost will vary.

[6] King County Drainage Complaints 1990-2000: Quantity includes 1997-June 2000 (i.e. 3.5 years) and normalized annually.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of accounts billed for 2000. King County Dept. of Finance retains 1% of revenues collected as collection fee

[9] See supplemental information attachments.

King County

Department of Transportation

Roads Division

RECEIVED
JUL 2000
BY:

King County
Road Services Division
Department of Transportation
201 South Jackson Street
MS KSC-TR-0313
Seattle, WA 98104

July 28, 2000

Dick Thiel, P.E.
City Engineer, City of Sammamish
704 228th Ave. NE, PMB 491
Sammamish, WA 98074

Dear Mr. Thiel

Thank you for the opportunity to respond to the City of Sammamish Request for a Proposal to provide storm and surface water maintenance services. This proposal includes the major work categories cited in the request except facilities inspection and surface water billing.

The costs for services presented in the attached spreadsheet are based on estimated resources required to perform each task. The Road Services Division is required to bill based on actual costs which may vary from the estimate. Our proposal includes customer service features designed to promote a partnership with the City of Sammamish. Our intent in this partnership is to support the City by maintaining the infrastructure in a cost effective and efficient manner. We believe that Road Services is uniquely equipped to provide this service:

- Road Services has extensive knowledge of roadways and infrastructure in the City of Sammamish.
- Road Services has the resources (labor, equipment and materials) required to match the city's demand for services as needed. Maximizing these resources creates economies of scale that will allow Sammamish to take advantage of the latest state-of-the-art technology and methodology.
- Road Services offers extensive roadway expertise. The division plans, designs and builds transportation facilities. It also ensures that all transportation facilities under its responsibility are maintained properly. This includes applying best management practices to meet the requirements of federal, state and local environmental regulations.

We look forward to discussing our proposal with you further. If you have any questions, please contact me at (206) 296-8140.

Sincerely,

Rod E. Matsuno

Roderick E. Matsuno
Maintenance Operations Manager

cc: Linda Dougherty, Acting Manager, King County Road Services Division

**RESPONSE to CITY of SAMMAMISH**
Request for Proposal to provide
STORM AND SURFACE WATER OPERATION AND MAINTENANCE SERVICES
**July 28, 2000**

## SUMMARY OF PROPOSAL

The King County Road Services Division is pleased to respond to the City of Sammamish request for a proposal to provide road maintenance services. This proposal reflects Road Services' interest in working in partnership with the City of Sammamish to provide for the safe and efficient movement of goods, services and people to support a high quality of life.

This proposal includes the estimated costs to maintain the City's stormwater conveyance system,retention/detention facilities and street sweeping. This proposal does not include facilities inspection or surface water billing.
Road Services has provided road maintenance services for the City of Sammamish since its incorporation on August 31, 1999. Prior to incorporation, Road Services maintained these roads as part of unincorporated King County and has a thorough knowledge of the City's infrastructure. Continuing this relationship will provide Sammamish with an outstanding quality of service.

In submitting this proposal, Road Services is responding in part to the intent of the Interlocal Cooperation Act (RCW 35), whose purpose is, "to permit local governmental units to make the most efficient use of their powers by enabling them to cooperate with other localities on a basis of mutual advantage..." and allows public agencies to contract with other public agencies. The State of Washington further encourages such relations by allowing a city or town to "...enter into an agreement with the county in which it is located authorizing the county to perform all or any part of the construction, repair, and maintenance of streets in such city or town..." (RCW 34.77.020).

Contracting with Road Services for maintenance as described in this proposal offers the following benefits to the City of Sammamish:

- Road Services has extensive knowledge of roadways and infrastructure in the City of Sammamish.
- Road Services has the resources (labor, equipment and materials) required to match the city's demand for services as needed. Maximizing these resources creates economies of scale and will allow Sammamish to take advantage of state-of-the-art technology and methodology.
- Road Services offers extensive roadway expertise. The division plans, designs and builds transportation facilities. It also ensures that all transportation facilities under its responsibility are maintained properly. This includes applying best management practices to meet the requirements of the Endangered Species Act and other federal, state and local environmental regulations.
- Road Services provides administrative and managerial assistance in partnership with the City of Sammamish. Examples include budget preparation, regularly scheduled meetings to review workload and monitor expenditures, and technical expertise to assist in resolving specific maintenance problems.
- Road Services provides a flexible maintenance contract which allows City of Sammamish officials to negotiate a level of service to meet the specific needs of their city. For example, Road Services recommends a street sweeping frequency based on historical county-wide averages; however, Sammamish can modify frequencies to accommodate higher or lower levels of service.
- Road Services provides comprehensive solutions to road maintenance for Sammamish and Sammamish gains the simplicity of contracting with one service provider.
- Road Services provides 24 hour on call service for emergencies and citizen action requests.

## EVALUATION CRITERIA

### Cost effectiveness

**Cost estimate for services.** The attached table provides costs for services to be provided to the City of Sammamish. The costs include administrative overhead. These costs are for estimating and comparing the cost of doing specific tasks only. Road Services must recover the actual costs of work performed for the City of Sammamish. Actual costs may be higher or lower than the estimate and the city will be billed on the amount expended.

**Budget and scheduling.** Road Services staff will meet weekly with City of Sammamish staff to keep city staff apprised of expenditure, work program, and scheduling status.

Regular and ongoing communication will enable Road Services and Sammamish to develop and/or revise plans that will meet the city's goals and objectives.

**General**

**Comparable experience providing full service utility maintenance.** Road Services currently contracts with nine municipalities to provide roads maintenance services, including stormwater services.

**References.** Please see attached list.

**Customer Service/Responsiveness to City's needs**

**Customer service, scheduling service and keeping the city informed.** Road Services is committed to working with Sammamish to achieve the city's road maintenance goals and objectives. Our customer service model includes fostering ongoing relationships and holding regular meetings with city staff so we can anticipate work requirements and develop plans to meet them. Road Services provides this support through field staff and administrative/managerial staff. We also provide a 24 hour hotline for emergencies such as fallen trees on roadways.

Field support includes the following:

- Road Services crews work in Sammamish every day. We understand the area's maintenance needs as well as the expectations and interests of Sammamish residents and city staff. Daily contact fosters a partnership relationship between Sammamish and Road Services and encourages excellent customer service from field crew assigned to serve Sammamish.
- Weekly meetings provide close contact between city and county staff and promote an excellent working relationship between Sammamish public works staff and road maintenance supervisors. Road Services field staff will meet with city staff once a week to develop a mutually agreeable service schedule and communicate directly regarding work scheduled and performed.
- If the city chooses to pay for additional service, Road Services has the ability to provide a staff person dedicated to work in Sammamish.

In addition to ongoing attentiveness to customer service, Road Services staff are on call 24 hours a day to handle emergencies. This includes a 24 hour hotline, as well as contact with the lead supervisor in emergency situations.

Administrative and managerial staff are also available to deal with issues and concerns. For example, budget and field staff will work with city staff to identify levels of service, work programs for the coming year and develop strategies to accomplish the city's goals.

**Integrating services into city's stormwater management program.** King County Road Services Division will support the city's stormwater management program by working closely with city staff to maintain the city's conveyance system and retention/detention facilities. Road Services will integrate projects or tasks through a work order process.

## Compliance with Environmental Regulations

**Environmental regulations and Best Management Practices.** Road Services is in compliance with all new environmental regulations. We've taken a lead role in developing and implementing a best management practices manual, which describe best management practices in detail. The revised manual is near completion, and Road Services will provide a copy as soon as it is available.

## Safety

**Safety program and record.** Road Services staff meet monthly in documented safety meetings. Training is provided on an annual basis and consists of all required safety classes. Examples include first aid, CPR, and flagging. Road Services also provide staff with all necessary environmental and technical training.

# CITY OF SAMMAMISH

## KING COUNTY ROAD MAINTENANCE STORM AND SURFACE WATER OPERATION AND MAINTENANCE COSTS FOR 2000

| Facility/Activity | Units | Total Quantity | Freq | Annual Quantity | Daily Production | Crew Size | Crew Days | Labor Cost | Equip Cost | Mat'l Cost | Lump Sum | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | |
| Street Sweeping | LM | 107 | 12.00 | 1,284 | | | | | | | | |
| 260 Street Sweeping | | 107 | 12.00 | 1,284 | 15 | 1.00 | 85.2 | 30,783 | 35,651 | - | 1,711 | 68,155 |
| Weed Control | LM | 107 | 0.40 | 43 | | | | | | | | |
| 287 Shoulder Spraying | SH M | 153 | 0.40 | 61 | 22 | 1.88 | 2.88 | 1,953 | 424 | 744 | | 3,122 |
| 293 Roadside Spraying | SY | 270,631 | 0.02 | 4,871 | 2500 | 2.20 | 1.8 | 1,334 | 300 | 195 | | 1,828 |
| 295 Noxious Weed Control | SY | 270,631 | 0.01 | 1,754 | 1000 | 2.00 | 1.8 | 1,230 | 75 | 174 | | 1,479 |
| **Ditches** | | | | | | | | | | | | |
| Cleaning | LF | 501,659 | 0.02 | 10,033 | | | | | | | | |
| 234 Hand Ditching | LF | 501,659 | 0.001 | 351 | 150 | 2.50 | 2 | 1,540 | 114 | | | 1,654 |
| 288 Bucket Ditching | LF | 501,659 | 0.02 | 10,033 | 250 | 4.59 | 42 | 61,373 | 14,960 | 266 | | 76,598 |
| Vegetation Control (Mowing) | LF | 501,659 | 1.50 | 752,489 | | | | | | | | |
| 262 Slope/Shoulder Mowing | PM | 231 | 1.50 | 347 | 9 | 3.18 | 38.1 | 38,390 | 14,993 | 772 | | 54,155 |
| 267 Hand Brushing | | | | | 32 | 4.14 | 14 | 17,500 | 5,015 | 313 | | 22,828 |
| **Pipes** | | | | | | | | | | | | |
| Clean Drainage Systems | LF | 127,600 | 0.04 | 5,104 | | | | | | | | |
| 244 Cleaning Enclosed Systems | LF | 408,947 | 0.040 | 16,358 | 400 | 2.29 | 41 | 28,851 | 18,893 | 303 | 1,881 | 49,928 |
| Repair Repalce Pipes | LF | 127,600 | | 1,227 | | | | | | | | |
| 240 Repair/Replace Pipe | LF | 408,947 | 0.003 | 1,227 | 42 | 5.79 | 29 | 54,523 | 13,489 | 9,353 | 10,954 | 88,329 |
| Clean out Culverts | EA | 4,304 | 0.50 | 2,152 | | | | | | | | |
| 245 Hand Clean Drainage Systems | EA | 4,304 | 0.50 | 2,152 | 25 | 2.03 | 86.8 | 51,474 | 3,803 | 316 | | 55,593 |
| TV Inspection | HR | | | 80 | | | | | | | | |
| Contract CJ Construction | HR | | | 80 | | 3.00 | 10 | | | | 12,640 | 12,640 |
| **Catch Basins and Manholes** | | | | | | | | | | | | |
| Inspect Catch Basins/Manholes | EA | 3,519 | 1.00 | 3,519 | | | | | | | | |
| CB Inspection | EA | 3,519 | 1.00 | 3,519 | 32 | 1.00 | 110 | 37,090 | 3,079 | | | 40,169 |
| Clean Catch Basins/Manholes | EA | 3,519 | 0.25 | 880 | | | | | | | | |
| 241 Clean Catch Basin/Manhole | EA | 3,519 | 0.25 | 880 | 20 | 2.26 | 44 | 31,034 | 20,384 | 291 | 10,645 | 62,354 |
| Repair Catch Basins Type I&II | EA | 3,519 | varies | 34 | | | | | | | | |
| 253 Repair Catch Basin I&II | EA | 3,519 | 0.01 | 34 | 2.5 | 3.14 | 14 | 13,675 | 1,914 | 5,461 | 683 | 21,733 |
| Replace Catch Basins Type I&II | EA | 3,519 | varies | 14 | | | | | | | | |
| 291 Replace Catch Basin I&II | EA | 3,519 | 0.004 | 14 | 1.62 | 8.22 | 9 | 18,319 | 3,840 | 6,517 | | 28,676 |
| Replace Catch Basins Manhole Lids | EA | 3,519 | varies | 17 | | | | | | | | |
| 405 Replace CB/Manhole Lids | EA | 3,519 | 0.005 | 17 | 5.5 | 1.00 | 3 | 1,198 | 88 | 430 | | 1,716 |
| **Retention Detention Facilities** | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | |
| Facilities Inspection | EA | 188 | 1.00 | 188 | | | | | | | | |
| | | | | | | | | | | | | |
| Vegetation Control Ponds only | EA | 103 | 1.50 | 155 | | | | | | | | |
| W18 Veg Control & Deb Removal | SY | | | 79,958 | 8724 | 15.22 | 9 | 42,268 | 5,822 | 3,748 | | 51,838 |
| W12 Remove Trash/Debris | EA | | | 6 | 8 | 3.00 | 1 | 914 | 402 | 78 | | 1,394 |
| Sediment Removal | EA | 154 | 0.20 | 31 | | | | | | | | |
| W11 Sediment Removal | EA | | | 5 | 1 | 4.00 | 5 | 6,967 | 3,415 | 8,469 | | 18,851 |

# CITY OF SAMMAMISH

## KING COUNTY ROAD MAINTENANCE STORM AND SURFACE WATER OPERATION AND MAINTENANCE COSTS FOR 2000

| Facility/Activity | Units | Total Quantity | Freq | Annual Quantity | Daily Production | Crew Size | Crew Days | Labor Cost | Equip Cost | Mat'l Cost | Lump Sum | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clean Control Structure | EA | 154 | 0.50 | 77 | | | | | | | | |
| W02 Clean Control Structure | EA | | | 18 | 5 | 2.25 | 4 | 2,885 | 1,529 | 108 | | 4,522 |
| Repair Control Structure | EA | unknown | | 29 | | | | | | | | |
| W03 Repair Control Structure | EA | | | 13 | 4 | 2.67 | | 2,597 | 140 | 259 | | 2,996 |
| Clean Conveyance CB/MH | EA | unknown | | 18 | | | | | | | | |
| Repair Conveyance CB/MH | EA | unknown | | 55 | | | | | | | | |
| W43 Repair Conveyance Manhole | EA | | | 14 | 3 | 3.20 | 5 | 5,409 | 1,083 | 697 | | 7,189 |
| W04 Repair Pond | EA | | | 6 | 1.5 | 4.00 | 4 | 5,574 | 3,341 | 797 | | 9,712 |
| W23 Repair Debris Barrier | | | | 4 | 2 | 2.50 | 2 | 1,783 | 285 | 495 | | 2,563 |
| Clean Pipe | LF | unknown | | 18 | | | | | | | | |
| W06 Clean Pipe | LF | | | 492 | 250 | 3.00 | 2 | 2,021 | 1,197 | 79 | | 3,297 |
| Misc Maintenance | EA | varies | | 215 | | | | | | | | |
| W24 Misc Maintenance | EA | | | 32 | 40 | 4.00 | 1 | 1,388 | 522 | 176 | | 2,086 |
| **Oil/Water Separator** | | | | | | | | | | | | |
| Facilities Inspection | EA | 18 | 1.00 | 18 | | | | | | | | |
| Clean Separator | EA | 18 | 1.50 | 27 | | | | | | | | |
| W05 Clean Tank | EA | | | 1 | 2 | 2.00 | 0.5 | 800 | 417 | 1,128 | | 2,345 |
| **Drainage Investigation** | | | | | | | | | | | | |
| Conveyance System | EA | varies | | 27 | | | | | | | | |
| Retention Detention Facilities | EA | varies | | 96 | | | | | | | | |
| **Miscellaneous** | | | | | | | | | | | | |
| Management | LS | | | | | | | | | | | |
| Task Code 273 | LH | varies | varies | 1,082 | 8 | 1.00 | 135 | 63,112 | 3,924 | 12,696 | | 79,732 |
| Disposal Fees - Liquid | ENTY | | | | | | | | | | | |
| Disposal Fees - Solid | TON | | | | | | | | | | | |
| Surface Water Billing | EA | 10,889 | 2.00 | 21,778 | | | | | | | | |
| Supervisory and Clerical Personnel Costs | LS | | | | | | | | | | | |
| System Documentation | LS | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | |
| 1) Costs based on year 2000 labor and equipment rates. Costs for 2001 will vary depending on class comp settlements, bargaining agreements, and cost-of-living adjustments. Eqipments rates will change depending on gas prices and Equipment Rental and Rev | | | | | | | | | | | | |
| 2) Activities with multiple task codes adjusted to account for percentage of work performed by each work method. | | | | | | | | | | | | |

**RESPONSE to CITY of SAMMAMISH**
Request for Proposal to provide
STORM AND SURFACE WATER OPERATION AND MAINTENANCE SERVICES
**July 28, 2000**

## REFERENCES

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City of Covington
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# PROPOSAL TO THE CITY OF SAMMAMISH

# STORM AND SURFACE WATER OPERATION AND MAINTENANCE SERVICES

## INTRODUCTION

The City of Sammamish owns the existing storm sewer infrastructure within its corporate Boundaries. Historically, the majority of these facilities were owned and maintained by King County prior to cityhood. The City became the owner of the facilities in 1999 upon transfer from King County.

The City of Sammamish has continued to contract with King County for the maintenance of the City's storm sewer system. The purpose of this proposal is to provide the City of Sammamish with an alternative maintenance provider, the Sammamish Plateau Water and Sewer District, for operation and maintenance of the City's storm and surface water systems.

The principal benefits that the City would experience from selecting the District as the stormwater maintenance provider include:

- Detailed local knowledge
- Equipment and personnel based within the City limits
- Existing O&M programs, staff, and equipment
- Geographic Information System (GIS) and in-house staff to collect and analyze stormwater data
- Existing facilities management database (Cartegraph) for maintenance scheduling
- Existing billing system of Sammamish residents
- Utility services as an extension of City staff

The District's proposed approach to providing operation and maintenance services for the storm and surface water facilities is presented below. To facilitate your review, the proposal is organized in the same order as the selection criteria stated in the Request for Proposals, except that the Cost-Effectiveness portion is presented after an additional section entitled "Proposed Storm Water Programs". This Programs section presents more detailed discussions of the methods, personnel, and equipment necessary to maintain the storm water systems.

## GENERAL BACKGROUND

Sammamish Plateau Water and Sewer District has the experience to provide full service utility maintenance to a municipality. The District has been providing utility services to the Sammamish Plateau for over 50 years. During that time, the District has grown from a small community water system around Pine Lake to serving over 45,000 people today. In addition, the District has responded to requests from other water districts to assume the operation and maintenance of their facilities. In the case of the Cascade View Water District, the District began by providing operation and maintenance services; within 2 years, Cascade View requested

to be annexed to the District. Recently, the Union Hill Water Association asked the District to assume responsibility for on-call and emergency services within their water system. Similarly, the Dawnbreaker Water Association requested that the District assume operation and maintenance of their water system.

The District maintains state-of-the-art water and sewer systems completely with in-house staff. The District currently has a staff of over 40 people providing quality utility operation, maintenance, and administration services to the Sammamish community. The resource base of knowledge and training the District has to offer is superior. The District is proactive in education, encouraging its employees to take up-to-date and state-of-the-art courses improving the quality, efficiency, and reliability of the water and sewer systems. Our mission is to provide superior customer service, and all the District's team members take great pride in consistently achieving that goal.

## PROPOSED STORM WATER PROGRAMS

Brief overviews of programs that the District can offer the City are presented below. These programs focus on existing storm and surface water systems. It is assumed that others will inspect stormwater systems under construction in plats or commercial developments.

| Operation and Maintenance Programs | Proposed Scope of Services |
|---|---|
| Street Cleaning | Conduct street sweeping daily, with emphasis in September (to clean the streets before the fall rains sweep debris into the stormwater conveyance systems) and in December (after the leaves have fallen), or as directed by the City. A daily report will be completed indicating the street cleaned and the date of the cleaning. |
| Weed Control | Using a tractor with an articulating arm and mower, control brush, grass and tree branches in the roadside ditches and edges of rights-of-way. Unless requested by the City, use of herbicides or pesticides or removal of noxious weeds (such as purple loosestrife) is not included. District staff members are trained in the proper use of Personal Protection Equipment (PPE) for chemical handling. |
| Ditch Maintenance | In addition to controlling the vegetation in the ditches, use a backhoe to remove sediments that accumulate in the roadside ditches and to unblock culverts clogged with rocks, branches, and other debris. |
| Pipe Cleaning and Repair | Inspect culverts and pipes once every two years. With proper catch basin maintenance, pipe cleaning should be minimized. |
| Catch Basins | Inspect annually, noting the condition of the structure and the amount of debris into the Facilities Management (FM) Program (discussed below). Schedule more frequent maintenance on catch basins shown to have more debris than normal. The inventory of existing catch basins and other stormwater facilities will be completed Fall 2000 and entered into the GIS database, then transferred into the FM Program. |
| Residential/City-Owned Detention Systems | Clean all 154 existing retention/detention facilities annually. Work will involve vactoring, brush and tree removal, sediment removal, etc. Debris and liquid waste will be disposed of at approved disposal sites. Any repair work will be noted so that the City can authorize non-routine maintenance. |
| Commercial Retention/Detention Facilities | Annually inspect all 34 existing commercial facilities and notify property owners of any required maintenance. The City will obtain authorization from the property owners for District access to the facilities. Conduct follow-up inspection to ensure that maintenance is performed in a timely manner. |

| Operation and Maintenance Programs | Proposed Scope of Services |
|---|---|
| Oil/Water Separators | Annually inspect all 18 existing oil/water separators and notify property owners of any required maintenance. The City will obtain authorization from the property owners for District access to the facilities. Conduct follow-up inspection to ensure that maintenance is performed in a timely manner. This is especially important since poorly-maintained oil/water separators may discharge oils and grease to the City's storm system. |
| Drainage Investigations | Conduct drainage investigations as requested by the City, including reports of flooding, blocked catch basins, after-hours response, etc. |
| Management, Administration, and Documentation | Submit monthly reports to the City on the numbers and types of facilities inspected and maintained. Provide copies of work orders for facilities to be maintained in the upcoming month. Submit itemized invoice for monthly services (labor and direct or equipment costs). |

The District's field personnel are organized into self-directed work teams based on Deming's principles of continuous quality improvement. The District has found that the team concept results in high quality services and an esprit de corps that promotes employee work satisfaction and low turnover. An additional team for storm water services would be formed with new personnel, and would coordinate with the several existing District staff members with stormwater experience.

New equipment for the specialized storm water services would be acquired, either through purchase (by the District or by the City) or by leasing or renting. The District will work closely with the City to identify the most cost-effective option. Equipment would include street sweepers, a large vactor truck for catch basin and detention pond cleaning, backhoe for ditch maintenance, tractor with articulating arm and mower for brush removal, and dump trucks. While the District has some equipment already (vactor truck, jet truck, dump truck, backhoe), in many cases the equipment is undersized for the volume of work required in stormwater maintenance. However, existing District equipment could be provided as backup or additional equipment when needed. Furthermore, some of the equipment need for storm water maintenance would be useful in maintaining water and sewer facilities. District reimbursement to the City for the use of such equipment would help to defray the costs of the new equipment.

## COST-EFFECTIVENESS

An estimate of the level of service that the District proposes to provide is shown on the following level of service table. The equipment costs are based on the estimated cost to rent the equipment; purchasing the equipment may result in long-term cost-savings. The actual costs may vary based on modifications of the scope of work described herein.

Billing for storm and surface water maintenance would be handled through the District's existing billing system, which already includes nearly 45% of the property owners within the City of Sammamish. Additions for undeveloped property and property owners within Northeast Sammamish Sewer and Water District's boundaries could be made easily. The City would have the option of having the stormwater bill included with the water and sewer bill, which would

save administrative and mailing costs, and provide the convenience of one bill payment for the customers. Alternatively, a separate stormwater bill could be generated.

The stormwater fees would be disbursed to the City by periodic electronic deposit or voucher payment.

The District would submit to the City monthly invoices showing the budget status of various tasks (catch basin maintenance, oil/water separator inspections, etc.). Potential cost overruns would be identified, and a proposed course of action would be suggested (budget augmentation, adjustment of scope, etc.)

## CUSTOMER SERVICE/RESPONSIVENESS

The District proposes to establish a stormwater hotline/extension from City's phone system for residents to call in the event of a blocked catch basin, flooding, or other stormwater-related problem. Currently, the District's customer service representatives and field crew respond to a water or sewer emergency within 45 minutes or less, even after normal work hours. The location of the District's equipment near the geographic center of the City ensures rapid response time.

The storm water maintenance services would be provided as an extension of City staff. For example, one telephone number would connect the resident with the storm water maintenance staff. The vehicles would be identified as City storm water utility vehicles.

To ensure excellent communication and sharing of information resources, particularly with the large amount of data involved in stormwater systems, a high-speed data access network could be installed between the City and the District.

Regular meetings between the field crew and City stormwater personnel would identify maintenance needs and ensure that the City's stormwater management program was being accomplished efficiently and on schedule.

The stormwater team's schedule will be established by the City, and modified as needed for changing conditions. For example, routine maintenance might be deferred so that the stormwater team could thoroughly clean 228th Avenue for a City parade. Revisions to planned work activities would be identified at the regular meetings.

Monthly reports to the City will identify the facilities inspected, the results of such inspections, and repairs or maintenance of the facilities, using reports generated by the Facilities Management software.

## COMPLIANCE WITH ENVIRONMENTAL REGULATION

As a water and sewer utility, the District complies with a myriad of state and federal regulations. In addition, many of the District's projects involve temporary erosion and sedimentation control

and permanent stormwater handling facilities. We are proud of our record for safe water quality and infrequent sewage overflows. Staff maintains their operator certifications through continuous education.

The District already employs Best Management Practices (BMPs) in protecting the environment from sediments and other contaminants from construction projects. We are firmly committed to adopting BMPs in response to the Endangered Species Act (ESA) listing of salmon. Some of these BMPs include: silt fencing around repairs, street sweeping following ditch maintenance, street sweeping before the fall rains, inspection and maintenance of oil/water separators, and safe disposal of contaminated soils and debris or water at approved disposal sites.

## SAFETY

The District has an active safety program. It includes one staff member who participates actively in S.O.R.T. (Safety Operations Resource Team); a safety committee that investigates incidents and administers the District's safety program; and monthly staff safety meetings that include topics such as driving safety, equipment operation, chemical handling, protective gear, and traffic safety.

The District has an excellent safety record. The number of hours lost to job injuries is well below the industry average.

## ADDITIONAL SERVICES

The District wants the City to be aware that modifications to either increase or decrease the scope of work are acceptable, even expected. We look forward to working closely with the City to identify any additional needs to serve the residents of the City of Sammamish.

In addition to the stormwater maintenance services described above, the equipment and personnel could be cost-effectively used for snow removal. The dump truck used for hauling debris from the stormwater collection facilities could be fitted a plow blade and sanding mechanism. Crews could work continuous shifts to clear the roadways following the infrequent but paralyzing snowstorms that the Plateau experiences.

Also, our field crew is experienced in patching asphalt and could be utilized to repair potholes and perform minor patching jobs. They are also experienced in overseeing repaving by paving contractors.

TABLE

Annual Operation and Maintenance Costs

Proposed Level of Service

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 12.00 | 1,284 | 10 M | 1 | Sweeper | 128 | $30,720 | $36,000 | | | $66,720 |
| Weed Control | LM | 107 | 0.40 | 43 | 2 M | 3 | Pick Up Truck | 21 | $15,120 | $578 | | | $15,698 |
| **Ditches** | | | | | | | | | | | | | |
| Cleaning | LF | 501659 | 0.02 | 10,033 | 300 LF | 3 | Backhoe/Dump | 33 | $23,760 | $9,504 | | | $33,264 |
| Vegetation Control (ditch mowing) | LF | 501659 | 1.50 | 752,489 | 2 M | 1 | Trailer Mower | 71 | $17,040 | $13,440 | | | $30,480 |
| **Pipes** | | | | | | | | | | | | | |
| Clean Drainage System (pipes & culverts) | LF | 408947 | 0.04 | 16,358 | 1000 | 3 | Jet/Vac Truck | 16 | $11,520 | $5,600 | | | $17,120 |
| Repair/Replace Pipes [2] | LF | 408947 | varies | 1,227 | | | | | As Required | | | | Cost + 15% |
| Clean Out - culverts | EA | 4304 | 0.50 | 2,152 | 30 | 3 | Jet/Vac Truck | 71 | $51,000 | $24,850 | | | $75,850 |
| TV inspection | HR | | | 80 | | | | 10 | | | | | |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Inspect Catch Basin/Manhole | EA | 3519 | 1.00 | 3,519 | 50 | 1 | Pick[illegible] Truck | 70 | $16,800 | $1,925 | | | $18,725 |
| Clean Catch Basin/Manhole | EA | 3519 | 0.25 | 880 | 30 | 2 | [illegible] Truck | 30 | $14,400 | $7,200 | | | $21,600 |
| Repair Catch Basins Type I & II [2] | EA | 3519 | varies | 34 | | | [illegible]uck | 7 | $3,360 | $193 | $1,200 | | $4,753 |
| Replace Catch Basins Type I & II [2] | EA | 3519 | varies | 14 | | | [illegible] | 14 | $10,080 | $4,032 | $4,800 | | $18,912 |
| Replace Catch Basins/Manhole Lids [2] | EA | 3519 | varies | 17 | | | | 1 | $240 | $28 | $1,000 | | $1,268 |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | | |
| Facilities Inspection [3] | EA | 188 | | | | | [illegible] Up Truck | 5 | $1,200 | $138 | | | $1,338 |
| Vegetation Control (ponds only) | EA | 103 | | | | | Mower | 38 | $9,120 | $5,000 | | | $14,120 |
| Sediment Removal | EA | 154 | | | | 2 | Backhoe/Dump | 15 | $7,200 | $4,320 | | | $11,520 |
| Clean Control Structure | EA | 154 | | | 10 | 2 | Vac Truck | 8 | $3,840 | $1,920 | | | |
| Repair Control Structure [4] | EA | 154 | | [illegible] | | | | | $0 | | | $1,500 | $43,500 |
| Repair Debris Barrier [4] | EA | unknown | | 18 | | | | | $0 | | | | |
| Clean Conveyance CB/MH [4] | EA | unknown | | 55 | | | | | $0 | | | $75 | $4,125 |
| Repair Conveyance CB/MH [4] | EA | unknown | | 18 | 2 | 2 | Pick Up Truck | 9 | $4,320 | $248 | $1,200 | | $5,768 |
| Clean Pipe [4] | LF | unknown | | 215 | | | Jet/Vac Truck | | $0 | $350 | | $1,000 | $1,000 |
| Misc. Maintenance [5] | EA | varies | varies | | | | | | $0 | | | | $15,000 |
| **Oil/Water Separators** | | | | | | | | | | | | | |
| Facilities Inspection | EA | 18 | 1.00 | 18 | 30 | 1 | Pick Up Truck | 1 | $240 | $28 | | | $268 |
| Clean Separator | EA | 18 | 1.50 | 27 | 15 | 2 | Vac Truck | 2 | $960 | $480 | | | $1,440 |
| **Drainage Investigation** | | | | | | | | | | | | | |
| Conveyance System [2] | EA | varies | varies | 27 | 30 | 1 | Pick Up Truck | 1 | $240 | $28 | | | $268 |
| Retention/Detention Facilities [6] | EA | varies | varies | 98 | 30 | 1 | Pick Up Truck | 3 | $720 | $83 | | | $803 |

ORIGINAL PROPOSAL
THIS SPREADSHEET HAS BEEN
REVISED

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7] | LS | | | | | | | | | | | | $20,000 |
| Disposal Fees - liquid | TON | 80 ton | | | | | | | | | | $20/ton | $1,600 |
| Disposal Fees - solid | TON | 150 ton | | | | | | | | | | $50/ton | $7,500 |
| Surface Water Billing [8] | EA | 10889 | 2.00 | 2177 [2] | | | | | | | | | $18,000 |
| Supervisory and Clerical Personnel Costs | LS | | | | | | | | | | | | $7,500 |
| System Documentation | LS | | | | | | | | | | | | $3,600 |
| **Total** | | | | | | | | | | | | | $461,736 |

ORIGINAL PROPOSAL THIS SPREADSHEET HAS BEEN REVISED

[1] Quantities obtained from 2000 King County Department of Transportation W... Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantity based on data from 2000 King County L... ...ation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include both commercial and residential retention/detention ponds, tanks

[4] Frequencies and annual work quantity based on 2000 King County SWM Summary ... ...nt/Repair Costs for each facility. At time of data collection, only 84 of the 154 facilities were inspected.

The annual work quantity was determined by multiplying quantity from SWM report by 154/84. Actual work quantity will vary annually.

[5] Misc. Maintenance includes repair ponds, access roads, fences, energy dissipators and signs. Assume $15,000 annually. Actual cost will vary.

[6] King County Drainage Complaints 1990-2000: Quantity includes 1997-June 2000 (i.e. 3.5 years) and normalized annually.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of people billed for 2000.

**TABLE**

Annual Operation and Maintenance Costs

Proposed Level of Service

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conveyance System** | | | | | | | | | | | | | |
| Street Sweeping-Curb/Gutter | LM | 107 | 12.00 | 1,284 | 10 M | 1 | Sweeper | 128 | $35,840 | $36,000 | | | $71,840 |
| Weed Control | LM | 107 | 0.40 | 43 | 2 M | 3 | Pick Up Truck | 21 | $17,640 | $578 | | | $18,218 |
| **Ditches** | | | | | | | | | | | | | |
| Cleaning | LF | 501659 | 0.02 | 10,033 | 300 LF | 3 | Backhoe/Dump | 33 | $27,720 | $9,504 | | | $37,224 |
| Vegetation Control (ditch mowing) | LF | 501659 | 1.50 | 752,489 | 2 M | 3 | Trailer Mower | 71 | $59,640 | $13,440 | | | $73,080 |
| **Pipes** | | | | | | | | | | | | | |
| Clean Drainage System (pipes & culverts) | LF | 408947 | 0.04 | 16,358 | 1000 | 3 | Jet/Vac Truck | 16 | $13,440 | $5,600 | | | $19,040 |
| Repair/Replace Pipes [2] (per lineal foot) | LF | 408947 | varies | 1,227 | 30 | 5 | Backhoe/Dump | 2 | $93 | $19 | $40 | $153 | $187,731 |
| Clean Out - culverts | EA | 4304 | 0.50 | 2,152 | 30 | 3 | Jet/Vac Truck | 71 | $59,640 | $24,850 | | | $84,490 |
| TV inspection | HR | | | 80 | 8 | 3 | TV Truck | 10 | $8,400 | $2,400 | | | $10,800 |
| **Catch Basins and Manholes** | | | | | | | | | | | | | |
| Inspect Catch Basin/Manhole | EA | 3519 | 1.00 | 3,519 | 50 | 1 | Pick Up Truck | 70 | $19,600 | $1,925 | | | $21,525 |
| Clean Catch Basin/Manhole | EA | 3519 | 0.25 | 880 | 30 | 2 | Vac Truck | 30 | $16,800 | $7,200 | | | $24,000 |
| Repair Catch Basins Type I & II [2] | EA | 3519 | varies | 34 | 4 | 2 | Pick Up Truck | 8 | $4,480 | $1,760 | $1,200 | | $7,440 |
| Replace Catch Basins Type I & II [2] | EA | 3519 | varies | 14 | 1 | 3 | Backhoe/Dump | 14 | $11,760 | $4,032 | $4,800 | | $20,592 |
| Replace Catch Basins/Manhole Lids [2] | EA | 3519 | varies | 17 | 17 | 1 | Pick Up Truck | 1 | $280 | $28 | $2,652 | | $2,960 |
| **Retention/Detention Facilities** | | | | | | | | | | | | | |
| Residential/Commercial R/D Facilities | | | | | | | | | | | | | |
| Facilities Inspection [3] | EA | 188 | 1.00 | 188 | 4 | 2 | Pick Up Truck | 47 | $26,320 | $10,340 | | | $36,660 |
| Vegetation Control (ponds only) | EA | 103 | 1.50 | 155 | 4 | 1 | Mower | 38 | $10,640 | $5,000 | | | $15,640 |
| Sediment Removal | EA | 154 | 0.20 | 31 | 2 | 2 | Backhoe/Dump | 15 | $8,400 | $4,320 | | | $12,720 |
| Clean Control Structure | EA | 154 | 0.50 | 77 | 10 | 2 | Vac Truck | 8 | $4,480 | $1,920 | | | $6,400 |
| Repair Control Structure [4] | EA | 154 | 0.20 | 29 | | | | | $0 | | | $1,500 | $43,500 |
| Repair Debris Barrier [4] | EA | unknown | | 18 | 2 | 2 | | 9 | $5,040 | | | | $5,040 |
| Clean Conveyance CB/MH [4] | EA | unknown | | 55 | | | | | $0 | | | $75 | $4,125 |
| Repair Conveyance CB/MH [4] | EA | unknown | | 18 | 2 | 2 | Pick Up Truck | 9 | $5,040 | $248 | $1,200 | | $6,488 |
| Clean Pipe [4] | LF | unknown | | 215 | 107.5 | 3 | Jet/Vac Truck | 2 | $1,680 | $700 | | | $2,380 |
| Misc. Maintenance [5] | EA | varies | varies | | | | | | $0 | | | | $15,000 |
| **Oil/Water Separators** | | | | | | | | | | | | | |
| Facilities Inspection | EA | 18 | 1.00 | 18 | 6 | 1 | Pick Up Truck | 3 | $840 | $83 | | | $923 |
| Clean Separator | EA | 18 | 1.50 | 27 | 3 | 2 | Vac Truck | 9 | $5,040 | $2,160 | | | $7,200 |
| **Drainage Investigation** | | | | | | | | | | | | | |
| Conveyance System [2] | EA | varies | varies | 27 | 4 | 1 | Pick Up Truck | 7 | $1,960 | $1,540 | | | $3,500 |
| Retention/Detention Facilities [6] | EA | varies | varies | 98 | 4 | 1 | Pick Up Truck | 25 | $7,000 | $5,500 | | | $12,500 |

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ESTIMATE

| Facility/Activity | Units | Total Qty [1] | Frequency (units/total units) | Annual Work Qty | Daily Prod. | Crew Size | Equipment | Crew Days | Labor Cost | Equip. Cost | Mat. Cost | Lump Sum Cost | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Miscellaneous** | | | | | | | | | | | | | |
| Management [7] | LS | | | | | | | | | | | | $20,000 |
| Disposal Fees - liquid | TON | 80 ton | | | | | | | | | | $20/ton | $1,600 |
| Disposal Fees - solid | TON | 150 ton | | | | | | | | | | $50/ton | $7,500 |
| Surface Water Billing [8] | EA | 10889 | 2.00 | 21778 | | | | | | | | | $18,000 |
| Supervisory and Clerical Personnel Costs | LS | | | | | | | | | | | | $7,500 |
| System Documentation | LS | | | | | | | | | | | | $3,600 |
| **Total** | | | | | | | | | | | | | $809,214 |

[1] Quantities obtained from 2000 King County Department of Transportation Work Program and Performance Budget, and King County Water and Land Resources Division Drainage Services.

[2] Frequencies and annual work quantity based on data from 2000 King County Department of Transportation Work Program and Performance Budget. Actual work quantity will vary annually.

[3] Facilities include both commercial and residential retention/detention ponds, tanks, and vaults

[4] Frequencies and annual work quantity based on 2000 King County SWM Summary of Maint/Repair Costs for each facility. At time of data collection, only 84 of the 154 facilities were inspected. The annual work quantity was determined by multiplying quantity from SWM report by 154/84. Actual work quantity will vary annually.

[5] Misc. Maintenance includes repair ponds, access roads, fences, energy dissipators and signs. Assume $15,000 annually. Actual cost will vary.

[6] King County Drainage Complaints 1990-2000: Quantity includes 1997-June 2000 (i.e. 3.5 years) and normalized annually.

[7] Management/overhead can be included as a separate line item or included within costs of other items. Please note where item is included.

[8] Number of people billed for 2000.

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ESTIMATE

**Residential Retention/Detention Facilities--City of Sammamish**

| | DIV | Service Area | D9 | Facility Name | Facility Address | KROLL | TBROS | **GEO Area | Subbasin | Pond | Tank | Vault | INFIL | CONV | Oil/Water Separator | City | QTR | S | T | R | Parcel No. | ESMT | DED TR | ROW | Tract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | Y | D90111 | Loree Estates LT1 | 19716 SE 17th St | 574W | 597G1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 5 | 24 | 6 | 4403600200 | N | N | Y | |
| 2 | 2 | Y | D90113 | Loree Estates LT5 | 1803 203rd Ave SE | 547W | 597G1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 5 | 24 | 6 | 4403600250 | Y | N | N | |
| 3 | 2 | Y | D90114 | Loree Estates LT2 | 1616 198th Pl SE | 547W | 597G1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 5 | 24 | 6 | 4403600015 | N | N | Y | |
| 4 | 2 | Y | D90115 | Loree Estates LT4 | 20200 SE 19th St | 547W | 597G1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 5 | 24 | 6 | 4403600100 | N | N | N | |
| 5 | 2 | Y | D90118 | Country, The (PA) | 2108 227th Ave NE | 950E | 568A3 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 1785400820 | N | Y | N | A |
| 6 | 2 | Y | D90142 | Pinelake Meadows PA | 23809 SE 35th St | 577E | 598B3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 10 | 24 | 6 | 6791150250 | N | Y | N | A |
| 7 | 2 | Y | D90168 | Country, The (PC) | 2226 227th Ave NE | 950E | 568A3 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 1785400840 | N | Y | N | C |
| 8 | 2 | Y | D90169 | Country, The (PD) | 1925 224th Pl NE | 950E | 568A3 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 1785400850 | N | Y | N | D |
| 9 | 2 | Y | D90186 | Firstmark Addition #6 | 21522 NE 8th St | 954W | 567J5 | D | East Lake Sammamish | N | N | N | Y | Y | Y | Sammamish | NW | 33 | 25 | 6 | 2561350060 | Y | N | N | |
| 10 | 2 | Y | D90196 | Tree Farm, The (PA) | 431 239th Ave NE | 955E | 568C5 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 34 | 25 | 6 | 8677300940 | N | Y | N | A |
| 11 | 2 | Y | D90232 | Sahalee Hills Div 2 (PA) | 2701 228th Ave NE | 946E | 568B3 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SE | 21 | 25 | 6 | 7504110910 | N | Y | N | A |
| 12 | 2 | Y | D90247 | Ridge at Pine Lake (PA) | 21311 SE 37th St | 576W | 597H3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 9 | 24 | 6 | 7300200560 | N | Y | N | A |
| 13 | 2 | Y | D90251 | Ridge at Pine Lake (PB) | 3719 219th Pl SE | 576W | 597J3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 9 | 24 | 6 | 7300200560 | N | Y | N | B |
| 14 | 2 | Y | D90254 | Beaver Lake Woods | 2814 255th Ave SE | 961E | 598E2 | D | East Lake Sammamish | N | N | N | Y | Y | Y | Sammamish | NE | 11 | 24 | 6 | 0629600170 | Y | N | N | |
| 15 | 2 | Y | D90255 | Beaver Lake Woods | 25128 SE 28th St | 961E | 598E2 | D | East Lake Sammamish | N | N | N | Y | Y | Y | Sammamish | NE | 11 | 24 | 6 | 0629600040 | Y | N | Y | |
| 16 | 2 | Y | D90256 | Beaver Lake Woods | 25317 SE 29th Pl | 961E | 598E2 | D | East Lake Sammamish | N | N | N | Y | Y | Y | Sammamish | NE | 11 | 24 | 6 | 0629600090 | Y | N | N | |
| 17 | 2 | Y | D90303 | Shannonwood (PB) | 1621 209th Ave NE | 540E | 567H4 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 29 | 25 | 6 | 7715801380 | N | Y | N | B |
| 18 | 2 | Y | D90304 | Shannonwood (PC) | 1838 211th Pl NE | 540E | 567H3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 29 | 25 | 6 | 7715801380 | N | Y | N | C |
| 19 | 2 | Y | D90321 | Inglewood Acres (LT) | 21211 NE 13th Ct | 950W | 567H4 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 28 | 25 | 6 | 3575200010 | Y | N | N | |
| 20 | 2 | Y | D90343 | Timberline Div 2 (PB) | 4335 212th Ave NE | 573E | 567H1 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | SE | 17 | 25 | 6 | 8651515555 | N | N | N | |
| 21 | 2 | Y | D90344 | Timberline Div 2 | 4009 204th Ave NE | 573E | 567H1 | D | Evans Creek | N | N | N | N | Y | Y | Sammamish | SE | 17 | 25 | 6 | 8651515555 | N | N | Y | |
| 22 | 2 | Y | D90365 | Washington Park East (PB) | 328 217th Ave NE | 954W | 567J5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 33 | 25 | 6 | 9186300270 | N | Y | N | B |
| 23 | 2 | Y | D90374 | Timberline (PA) | 4001 208th Ave NE | 535E | 567H1 | D | Evans Creek | Y | N | N | Y | Y | N | Sammamish | NE | 20 | 25 | 6 | 8651501190 | N | Y | N | A |
| 24 | 2 | Y | D90375 | Timberline (PE) | 20800 NE 37th Wy | 535E | 567H1 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 20 | 25 | 6 | 8651501230 | N | Y | N | E |
| 25 | 2 | Y | D90376 | Timberline (PB) | 20512 NE 37th Wy | 535E | 567H1 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 20 | 25 | 6 | 8651501200 | N | Y | N | B |
| 26 | 2 | Y | D90377 | Green Acres (PA) | 22627 NE 19th Pl | 950E | 568A4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 2872900520 | Y | Y | N | A |
| 27 | 2 | Y | D90378 | Green Acres (PC) | 22706 NE 18th Pl | 950E | 568A4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 2872900540 | N | Y | N | C |
| 28 | 2 | Y | D90384 | Sammamish Crest | 1834 220th Pl NE | 950E | 568A4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NE | 28 | 25 | 6 | 7525000060 | Y | N | Y | |
| 29 | 2 | Y | D90391 | Eden Glen (NLT) | 314 205th Ct NE | 544E | 567G5 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NE | 32 | 25 | 6 | 2249850050 | Y | N | Y | |
| 30 | 2 | Y | D90392 | Eden Glen (SLT) | 20429 NE 3rd St | 544E | 567H5 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NE | 32 | 25 | 6 | 2249850100 | Y | N | Y | |
| 31 | 2 | Y | D90420 | Washington Park Estates Div 2 | 6 218th Ave NE | 954W | 567J6 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 33 | 25 | 6 | 9186510090 | N | Y | N | A |
| 32 | 2 | Y | D90421 | Timberline Div 5 | 21015 NE 36th St | 535E | 567H1 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | NE | 20 | 25 | 6 | 8651540150 | Y | N | Y | |
| 33 | 2 | Y | D90436 | Inglewood Glen (PC) | 22800 NE 12th St | 950E | 568A4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SE | 28 | 25 | 6 | 3578401790 | N | Y | N | C |
| 34 | 2 | Y | D90437 | Inglewood Glen (PA) | 1435 224th Ave NE | 950E | 568A4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SE | 28 | 25 | 6 | 3578401790 | N | Y | N | A |
| 35 | 2 | Y | D90452 | Sammamish Highlands Div 3 (P3) | 22916 SE 37th St | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 10 | 24 | 6 | 7525420060 | Y | N | N | |
| 36 | 2 | Y | D90453 | Sammamish Highlands Div 3 (P4) | 3680 232nd Ave SE | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 10 | 24 | 6 | 7525420010 | Y | N | N | |
| 37 | 2 | Y | D90458 | Sammamish Highlands Div 2 | 3838 231st Ave SE | 577W | 598B4 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 10 | 24 | 6 | 7525400700 | N | N | N | |
| 38 | 2 | Y | D90475 | Sammamish Firs | 22013 NE 18th St | 950E | 568A4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NE | 28 | 25 | 6 | 7525050150 | N | N | Y | |
| 39 | 2 | Y | D90498 | Sahalee Woods | 21600 NE 18th Pl | 950W | 567J4 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 28 | 25 | 6 | 7504400890 | Y | Y | N | C |
| 40 | 2 | Y | D90501 | Inglewood Ridge (PB) | 22300 Inglewood Hill Rd | 954E | 568A5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 33 | 25 | 6 | 3582500260 | N | Y | N | B |
| 41 | 2 | Y | D90502 | New Country Estates | 22100 NE 4th St | 954E | 567J5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 33 | 25 | 6 | 6054650100 | Y | N | N | |
| 42 | 2 | Y | D90507 | Washington Park East (PC) | 325 219th Ave NE | 954W | 567J5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 33 | 25 | 6 | 9186300010 | N | Y | N | C |
| 43 | 2 | Y | D90575 | Tree Farm, The (PB) | 750 244th Ave NE | 955E | 568C5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 34 | 25 | 6 | 8677300940 | N | Y | N | B |
| 44 | 2 | Y | D90646 | Rockmeadow Farm (T) | 3532 207th Ave SE | 551E | 597H3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SE | 8 | 24 | 6 | 7384707777 | N | N | Y | |
| 45 | 2 | Y | D90647 | Rockmeadow Farm (PE) | 3500 207th Ave SE | 551E | 597H3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 8 | 24 | 6 | 7384700000 | N | Y | N | E |
| 46 | 2 | Y | D90648 | Rockmeadow Farm (PF) | 2400 208th Ave SE | 551E | 597H2 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 8 | 24 | 6 | 7384700000 | N | Y | N | F |
| 47 | 2 | Y | D90755 | SP 0479135 | 25200 SE 18th Pl | 959E | 598E2 | D | East Lake Sammamish | N | N | N | Y | Y | N | Sammamish | SE | 2 | 24 | 6 | 0224067777 | N | N | Y | X |
| 48 | 2 | Y | D90757 | Timberline Div 4 (LT) | 20031 NE 39th St | 535W | 567G1 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | NW | 20 | 25 | 6 | 8651530530 | Y | N | N | |
| 49 | 2 | Y | D90785 | Rockmeadow Farm (PA) | 20606 SE 34th St | 551E | 597H3 | D | East Lake Sammamish | Y | N | N | N | Y | Y | Sammamish | NE | 8 | 24 | 6 | 7384700460 | N | Y | N | A (Wetland) |
| 50 | 2 | Y | D90809 | SP 0779045,046 | 19645 SE 8th St | 574W | 567G7 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 5 | 24 | 6 | 0524069112 | Y | N | N | |
| 51 | 2 | Y | D90961 | Woodcreek Acres (PA) | 22314 SE 18th Ct | 575E | 598A1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 4 | 24 | 6 | 9510950090 | N | Y | N | A |
| 52 | 2 | Y | D90986 | Inglemoor | 704 218th Pl NE | 954W | 567J5 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 33 | 25 | 6 | 3574700050 | Y | N | N | |
| 53 | 2 | Y | D90992 | Pine Lake Heights Div 2 (LT1) | 2901 218th Ave SE | 576W | 597J2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 9 | 24 | 6 | 6791015555 | N | N | Y | |
| 54 | 2 | Y | D90993 | Pine Lake Heights Div 2 (LT2) | 21819 SE 30th Pl | 576W | 597J3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 9 | 24 | 6 | 6791015555 | N | N | Y | |
| 55 | 2 | Y | D90997 | Sunridge Estates (PA) | 2400 239th Ave SE | 577E | 598C2 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 10 | 24 | 6 | 8120100220 | N | Y | N | A |
| 56 | 2 | Y | D90998 | Sunridge Estates (PB) | 23810 SE 28th St | 577E | 598C2 | D | East Lake Sammamish | Y | N | N | Y | Y | N | Sammamish | NE | 10 | 24 | 6 | 8120100230 | N | Y | N | B |
| 57 | 2 | Y | D91005 | Salal Ridge (PA) | 1335 232nd Pl NE | 951W | 568B4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SW | 27 | 25 | 6 | 7510700120 | N | Y | N | A |
| 58 | 2 | Y | D91017 | Tamee' Glen | 22710 NE 15th St | 950E | 568A4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | SE | 28 | 25 | 6 | 8562960010 | N | N | Y | |
| 59 | 2 | Y | D91042 | Summer Ridge Div 1 (PE) | 2655 233rd PL NE | 947W | 568B2 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SW | 22 | 25 | 6 | 8078400500 | N | Y | N | E |
| 60 | 2 | Y | D91053 | Tlingit Addition | 431 205th Ave NE | 544E | 567H5 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 32 | 25 | 6 | 8653605555 | N | N | Y | |
| 61 | 2 | Y | D91067 | Cimarron Div 1 (PB) | 1200 230th Ave NE | 951W | 568B4 | D | East Lake Sammamish | Y | N | N | Y | Y | N | Sammamish | SW | 27 | 25 | 6 | 1592001070 | N | Y | N | B |
| 62 | 2 | Y | D91095 | Simone Lane | 300 218th Ave SE | 954W | 567J6 | D | East Lake Sammamish | N | N | N | Y | Y | Y | Sammamish | SW | 33 | 25 | 6 | 7796580010 | Y | N | N | |
| 63 | 2 | Y | D91101 | Suffield Div 2 (PA) | 2050 236th Ave NE | 951W | 568C3 | D | Evans Creek | Y | N | N | N | Y | Y | Sammamish | NW | 27 | 25 | 6 | 8077210850 | N | Y | N | A |

| | DIV | Service Area | D9 | Facility Name | Facility Address | KROLL | TBROS | **GEO Area | Subbasin | Pond | Tank | Vault | INFIL | CONV | Oil/Water Separator | City | QTR | S | T | R | Parcel No. | ESMT | DED TR | ROW | Tract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 2 | Y | D91107 | Balmoral Div 1 (PB) | 641 222nd Pl SE | 954E | 568A7 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 33 | 25 | 6 | 0509000100 | N | Y | N | B |
| 65 | 2 | Y | D91109 | Summer Ridge Div 2 & 3 | 23400 NE 29th St | 947W | 568B2 | D | Evans Creek | N | N | Y | N | Y | N | Sammamish | SW | 22 | 25 | 6 | 8078410480 | N | Y | N | A |
| 66 | 2 | Y | D91134 | SP 0682078 & 1082011 | 24100 NE 27th Pl | 947E | 568C3 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | SE | 22 | 25 | 6 | 2225069038 | Y | N | Y | |
| 67 | 2 | Y | D91136 | Cedarwood Lane (PB) | 21220 SE 5th Pl | 954W | 567H6 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 33 | 25 | 6 | 1473150110 | N | Y | N | B |
| 68 | 2 | Y | D91147 | Timberline Park (PI) | 20154 NE 44th St | 573W | 537G7 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | SW | 17 | 25 | 6 | 8651580960 | N | Y | N | I |
| 69 | 2 | Y | D91149 | High Country Div 2 (PA) | 26100 SE 27th St | 962W | 598F2 | D | PATTERSON CREEK | Y | N | N | Y | Y | Y | Sammamish | NW | 12 | 24 | 6 | 3276930470 | N | Y | N | A |
| 70 | 2 | Y | D91160 | Timberline Highlands (WLT) | 3344 203rd Pl NE | 535W | 567G2 | D | Evans Creek | N | N | Y | Y | Y | N | Sammamish | NW | 20 | 25 | 6 | 7541480460 | N | N | Y | |
| 71 | 2 | Y | D91161 | Timberline Highlands (ELT) | 20605 NE 34th Pl | 535W | 567H2 | D | Evans Creek | N | N | Y | Y | Y | N | Sammamish | NW | 20 | 25 | 6 | 8651480140 | Y | N | Y | |
| 72 | 2 | Y | D91175 | Pine Acres | 2800 217th Ave SE | 576W | 597J2 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 9 | 24 | 6 | 0924065555 | Y | Y | N | A |
| 73 | 2 | Y | D91185 | High Country Div 1 | 26652 SE 31st St | 962W | 598F3 | D | PATTERSON CREEK | Y | N | N | N | N | N | Sammamish | NW | 12 | 24 | 6 | 3276925555 | N | Y | N | A |
| 74 | 2 | Y | D91186 | High Country Div 1 (PB) | 26600 SE Duthie Hill Rd | 962W | 598F3 | D | PATTERSON CREEK | Y | N | N | N | Y | Y | Sammamish | NW | 12 | 24 | 6 | 3276920710 | N | Y | N | A |
| 75 | 2 | Y | D91187 | High Country Div 1 (PC) | 3124 262nd Ave SE | 962W | 598F3 | D | PATTERSON CREEK | Y | N | N | Y | Y | Y | Sammamish | NW | 12 | 24 | 6 | 3276920720 | N | Y | N | C |
| 76 | 2 | Y | D91189 | Demery Hill Div 2 (LTA) | 1000 226th Ave NE | 950W | 568A4 | D | Evans Creek | N | N | Y | N | N | N | Sammamish | SE | 28 | 25 | 6 | 1954410010 | N | N | N | |
| 77 | 2 | Y | D91191 | Crest on the Plateau, The | 3035 224th Ave NE | 946E | 568A2 | D | Evans Creek | N | N | Y | N | Y | N | Sammamish | SE | 21 | 25 | 6 | 1829300600 | Y | N | N | F |
| 78 | 2 | Y | D91198 | Pine Hill (PA) | 1801 236th Ave SE | 958W | 598B1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 3 | 24 | 6 | 6790950240 | N | Y | N | A |
| 79 | 2 | Y | D91210 | Cimarron Div 1 (PE) | 22839 NE 14th St | 951W | 568B4 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 27 | 25 | 6 | 1592001090 | N | Y | N | E |
| 80 | 2 | Y | D91243 | Sammamish Glen fka SP 184018-19 | 20224 NE 18th Pl | 540W | 567G4 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 29 | 25 | 6 | 4123805555 | N | N | Y | |
| 81 | 2 | Y | D91248 | Suffield | 2100 232nd Pl NE | 951W | 568B3 | D | Evans Creek | N | N | N | Y | Y | Y | Sammamish | NW | 27 | 25 | 6 | 8077200000 | Y | Y | N | B |
| 82 | 2 | Y | D91269 | Hampton Woods Div 2 Vault 1 | 2012 223rd Pl NE | 950E | 568A4 | D | Evans Creek | N | N | Y | N | Y | N | Sammamish | NE | 28 | 25 | 6 | 3066415555 | N | N | Y | |
| 83 | 2 | Y | D91298 | Demery Hill Div 2 (LTB) | 800 225th Ct NE | 950E | 568A5 | D | East Lake Sammamish | N | N | Y | Y | Y | N | Sammamish | SE | 28 | 25 | 6 | 1954410350 | Y | Y | N | B |
| 84 | 2 | Y | D91316 | SP 0684048 | 19405 SE 14th St | 547E | 597F1 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 6 | 24 | 6 | 0624067777 | N | N | Y | |
| 85 | 2 | Y | D91327 | Deerfield Div 1 | 1900 228th Ave NE | 951W | 568A4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NW | 27 | 25 | 6 | 1939100640 | N | Y | N | A |
| 86 | 2 | Y | D91328 | Deerfield Div 2 | 1900 231st Ave NE | 951W | 568B4 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | NW | 27 | 25 | 6 | 1939110320 | N | Y | N | C |
| 87 | 2 | Y | D91336 | Plateau Estates Div 2 | 3030 229th Pl NE | 946E | 568A2 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SE | 21 | 25 | 6 | 6817810410 | N | Y | N | H |
| 88 | 2 | Y | D91337 | Sunrise Summit (ST) | 2303 205th Ave SE | 574E | 597G1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SE | 5 | 24 | 6 | 8123605555 | N | N | Y | |
| 89 | 2 | Y | D91349 | Demery Hill Div 1 (VA) | 900 221st Ave NE | 950E | 568A5 | D | East Lake Sammamish | N | N | Y | N | Y | N | Sammamish | SE | 28 | 25 | 6 | 1954400530 | N | Y | N | A |
| 90 | 2 | Y | D91350 | Hampton Woods Div 2 Vault 2 | 2313 223rd Ct NE | 950E | 568A4 | D | Evans Creek | N | N | Y | N | Y | Y | Sammamish | NE | 28 | 25 | 6 | 3066410120 | N | N | Y | |
| 91 | 2 | Y | D91351 | Hampton Woods Div 2 Inf | 2000 222nd Ave NE | 950E | 568A3 | D | Evans Creek | N | N | N | Y | N | N | Sammamish | NE | 28 | 25 | 6 | 3066411170 | N | Y | N | A |
| 92 | 2 | Y | D91393 | Kempton Downs Div 1 | 23300 SE 42nd St | 578W | 598B4 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 15 | 24 | 6 | 3814500300 | N | Y | N | D |
| 93 | 2 | Y | D91401 | Plateau Estates | 23036 NE 27th Pl | 947W | 568B3 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SW | 22 | 25 | 6 | 6817801490 | N | Y | N | K |
| 94 | 2 | Y | D91422 | Rosaia Estates | 808 218th Ave NE | 950W | 567J5 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 28 | 25 | 6 | 7412000120 | Y | N | N | |
| 95 | 2 | Y | D91423 | South Hampton Estates | 21501 NE 9th Pl | 950W | 567J5 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 28 | 25 | 6 | 7880900070 | Y | N | Y | |
| 96 | 2 | Y | D91443 | Sunrise Summit | 2128 205th Ave SE | 574E | 597G1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 5 | 24 | 6 | 8123600010 | N | Y | N | A |
| 97 | 2 | Y | D91456 | SP 1180016 | 1300 238th Ave SE | 958E | 598B1 | D | East Lake Sammamish | N | N | N | N | Y | N | Sammamish | NE | 3 | 24 | 6 | 0324069099 | N | N | Y | |
| 98 | 2 | Y | D91460 | SP 0383097 | 1600 218th Ave SE | 575E | 597J1 | D | East Lake Sammamish | N | N | N | Y | Y | N | Sammamish | SW | 4 | 24 | 6 | 0424069232 | N | N | Y | |
| 99 | 2 | Y | D91482 | SP 0484009 | 21926 SE 16th Pl | 575E | 597J1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SE | 4 | 24 | 6 | 0424069244 | N | N | Y | |
| 100 | 2 | Y | D91483 | SP 0484009 | 21832 SE 16TH PL | 575E | 597J1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 4 | 24 | 6 | 0424065555 | N | Y | N | A |
| 101 | 2 | Y | D91484 | SP 0485054-55 | 4126 196th Ave NE | 573W | 567F1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 17 | 25 | 6 | 1725069049 | N | N | N | |
| 102 | 2 | Y | D91517 | Sammamish Highlands Div 1 | 22914 SE 41st Pl | 578W | 598B4 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 15 | 24 | 6 | 7525400140 | Y | N | N | |
| 103 | 2 | Y | D91518 | Indian Acres | 21415 SE 19th St | 575W | 597J1 | D | East Lake Sammamish | N | N | N | Y | Y | N | Sammamish | SW | 4 | 24 | 6 | 3570000160 | Y | N | N | |
| 104 | 2 | Y | D91519 | SP 0286036 | 1000 238TH AVE NE | 951E | 568C5 | D | Evans Creek | Y | N | N | N | Y | N | Sammamish | SE | 27 | 25 | 6 | 2725069148 | N | Y | N | A |
| 105 | 2 | Y | D91520 | SP 0886040 | 21300 NE 1st St | 954W | 567H6 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 33 | 25 | 6 | 1240700014 | N | Y | N | X |
| 106 | 2 | Y | D91597 | Broadmoore Estates | 24212 NE 30th Pl | 947E | 568C2 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | SE | 22 | 25 | 6 | 1185055555 | Y | N | Y | |
| 107 | 2 | Y | D91598 | Broadmoore Estates | 23927 NE 31st Wy | 947E | 568C2 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | SE | 22 | 25 | 6 | 1118505555 | Y | N | Y | |
| 108 | 2 | Y | D91599 | Broadmoore Estates | 3132 240th Ave NE | 947E | 568C2 | D | Evans Creek | Y | N | N | N | Y | Y | Sammamish | SE | 22 | 25 | 6 | 1118505555 | N | Y | N | F |
| 109 | 2 | Y | D91605 | Tibbett's Station #1 | 26400 SE Duthie Hill Rd | 962W | 598F3 | D | PATTERSON CREEK | Y | N | N | N | N | N | Sammamish | SW | 12 | 24 | 6 | 1224065555 | N | Y | N | A |
| 110 | 2 | Y | D91606 | Tibbett's Station #1 | 3200 261st Pl SE | 962W | 598F3 | D | PATTERSON CREEK | Y | N | N | Y | N | N | Sammamish | NW | 12 | 24 | 6 | 8644200510 | N | Y | N | B |
| 111 | 2 | Y | D91619 | Pacific Estates | 2320 NE 23rd Ct | 941W | 568B3 | D | Evans Creek | Y | N | N | N | Y | Y | Sammamish | NW | 27 | 25 | 6 | 6600220840 | N | Y | N | D |
| 112 | 2 | Y | D91673 | Summer Ridge Div 5 & 6 (PD) | 23409 NE 24th Pl | 947E | 568B3 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | SE | 22 | 25 | 6 | 8078465555 | N | N | N | |
| 113 | 2 | Y | D91674 | Summer Ridge Div 6 (V1) | 2500 239th Pl NE | 947E | 568C3 | D | Evans Creek | N | N | Y | N | N | N | Sammamish | SE | 22 | 25 | 6 | 8078450180 | N | N | N | |
| 114 | 2 | Y | D91675 | Summer Ridge Div 6 (V2) | 2500 239th Pl NE | 947E | 568C3 | D | Evans Creek | N | N | Y | N | Y | N | Sammamish | SE | 22 | 25 | 6 | 8078450680 | N | Y | N | B |
| 115 | 2 | Y | D91676 | Sahalee South | 21401 NE 10th Pl | 950W | 567J5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 28 | 25 | 6 | 7504180180 | Y | Y | N | A |
| 116 | 2 | Y | D91681 | Lancaster Ridge | 800 223rd Wy SE | 575E | 568A7 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NE | 4 | 24 | 6 | 4178700150 | N | Y | N | D |
| 117 | 2 | Y | D91682 | Lancaster Ridge | 1017 221st Ave SE | 575E | 568A7 | D | East Lake Sammamish | Y | N | N | Y | N | N | Sammamish | NE | 4 | 24 | 6 | 4178700140 | N | Y | N | C |
| 118 | 2 | Y | D91683 | Lancaster Ridge | 1026 223rd Wy SE | 575E | 568A7 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NE | 4 | 26 | 6 | 4178700130 | N | Y | N | B |
| 119 | 2 | Y | D91690 | Cambria | 4715 229th Pl SE | 578W | 598A5 | D | East Lake Sammamish | N | N | N | Y | N | N | Sammamish | SW | 15 | 24 | 6 | 1310420210 | N | N | N | D |
| 120 | 2 | Y | D91762 | SP 048825 | 22606 SE 16th Pl | 575E | 598A1 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SE | 4 | 24 | 6 | 0424065555 | Y | N | Y | |
| 121 | 2 | Y | D91801 | Ponderosa Trails | SE 24 St & 245th Ave SE | 959W | 598D2 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 2 | 24 | 6 | 6843310010 | N | N | N | |
| 122 | 2 | Y | D91805 | Fir Tree Meadows | 2532 234th Pl SE | 577W | 598B2 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024069003 | N | N | N | |
| 123 | 2 | Y | D91823 | Deerfield 3 & 4 | 1816 236th Ave NE | 951W | 568C4 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | NW | 27 | 25 | 6 | 1939135555 | N | N | N | |
| 124 | 2 | Y | D91835 | Danbury Estates | 25701 SE 31st Pl | 961E | 598E3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NE | 11 | 24 | 6 | 1888100120 | N | N | N | |
| 125 | 2 | Y | D91856 | Montage | 207 209th Pl SE | 544E | 567H6 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | SE | 32 | 25 | 6 | 5581405555 | N | N | N | |
| 126 | 2 | Y | D91857 | Montage | 20703 SE 3rd Wy | 544E | 567H6 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | SE | 32 | 25 | 6 | 5581405555 | N | N | N | |

| | DIV | Service Area | D9 | Facility Name | Facility Address | KROLL | TBROS | **GEO Area | Subbasin | Pond | Tank | Vault | INFIL | CONV | Oil/Water Separator | City | QTR | S | T | R | Parcel No. | ESMT | DED TR | ROW | Tract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 127 | 2 | Y | D91869 | Summer Ridge 7 | 23739 NE 24th Pl | 947E | 568C3 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | NE | 27 | 25 | 6 | 8078465555 | N | N | N | |
| 128 | 2 | Y | D91970 | Carlton Heights | 2500 E Lk Sammamish Pkwy SE | 550E | 597F2 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NE | 7 | 24 | 6 | 1385100390 | N | Y | N | A |
| 129 | 2 | Y | D91978 | SP 0486019 (Clark) | 2414 234th Pl SE | 577W | 598B2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024065555 | N | N | Y | |
| 130 | 2 | Y | D92014 | Pine Lake Glen (tank) | 3109 214th Pl SE | 576W | 597J3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6790990090 | N | N | N | |
| 131 | 2 | Y | D92032 | Uplands on the Plateau | 23540 SE 48th St | 578W | 598B6 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 15 | 24 | 6 | 1524065555 | N | N | N | |
| 132 | 2 | Y | D92048 | SP 0888012 (Sutherland) | 3236 E Lake Sammamish Pkwy SE | 535W | 567G2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 20 | 25 | 6 | 2025069070 | Y | N | N | |
| 133 | 2 | Y | D92066 | SP S89S0315 (Ruden-Butler) | SE 8th St & 234th Ave SE | 955W | 568B7 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 34 | 25 | 6 | 3425065555 | Y | Y | N | |
| 134 | 2 | Y | D92076 | Timbercrest on the Plateau | 3200 235th Ave SE | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 8649900660 | N | Y | N | |
| 135 | 2 | Y | D92087 | SP 0688020 (Snider) | E Lake Samm Pkwy & SE 26th St | 550E | 597F2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 7 | 24 | 6 | 0724069107 | Y | N | N | |
| 136 | 2 | Y | D92109 | SP 1288012 (Willard) | Issaq Pine Lk & 234th Ave SE | 577W | 598B3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 10 | 24 | 6 | 1024065555 | Y | Y | N | |
| 137 | 2 | Y | D92135 | SP 1288012 (Willard) | 234th Ave SE & Issaq Pine Lk | 577W | 598B3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 10 | 24 | 6 | 3956805555 | Y | N | Y | |
| 138 | 2 | Y | D92139 | SP S89S0099 (Morken) | 831 228th Ave SE | 575E | 568A7 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 4 | 24 | 6 | 0426069127 | Y | N | N | |
| 139 | 2 | Y | D92154 | Field Rush | 2750 232nd Ave SE | 577W | 598B2 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | NW | 10 | 24 | 6 | 2537500200 | N | Y | N | A |
| 140 | 2 | Y | D92160 | Inglewood Station | 20300 E Lk Samm/Inglewood Hill | 540W | 567G4 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 29 | 25 | 6 | 3575300445 | Y | N | N | |
| 141 | 2 | Y | D92179 | Lac Riant | 3601 234th Ave SE | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 10 | 24 | 6 | 3956800240 | N | N | N | |
| 142 | 2 | Y | D92201 | SP 0387048 | 20705 SE 24th St | 551E | 597H2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 8 | 24 | 6 | 0824069091 | N | N | N | |
| 143 | 2 | Y | D92222 | Pine Lake Heights | 21721 SE 35th St | 576W | 597J3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NW | 9 | 24 | 6 | 6791000010 | Y | N | N | |
| 144 | 2 | Y | D92233 | Peregrine Point | 4246 212th Ave NE | 555W | 597H4 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | NE | 17 | 24 | 6 | 6710905555 | N | Y | N | A |
| 145 | 2 | Y | D92286 | Autumn Wind | 23390 NE 14th St | 551W | 568B4 | D | Evans Creek | Y | N | N | Y | Y | N | Sammamish | SW | 27 | 25 | 6 | 2725065555 | N | Y | N | A |
| 146 | 2 | Y | D92287 | Autumn Wind | 23200 NE 14th St | 551W | 568B4 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | SW | 27 | 25 | 6 | 0319500720 | N | Y | N | D |
| 147 | 2 | Y | D92318 | Pennington (tank 1) | 3500 212th Pl SE | 576W | 597H3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 9 | 24 | 6 | 6705955555 | N | N | Y | |
| 148 | 2 | Y | D92319 | Pennington (tank 2) | 3500 212th Ave SE | 576W | 597H3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 9 | 24 | 6 | 6705855555 | N | N | Y | |
| 149 | 2 | Y | D92320 | Pennington (tank 3) | 21500 SE 35th Wy | 576W | 597J3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6705855555 | N | N | Y | |
| 150 | 2 | Y | D92335 | AAA 2YR Bond Todd's Landing | SE 27th St & 228th Ave SE | 576E | 598A2 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NE | 9 | 24 | 6 | 8653900350 | Y | Y | N | |
| 151 | 2 | Y | D92375 | Brookemont | 21033 SE 28th Pl | 551E | 597H2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 8 | 24 | 6 | 1137500110 | N | N | N | |
| 152 | 2 | Y | D92405 | Lakefield Cul-de-Sac | 1515 205th Ct NE | 540E | 567H4 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NE | 29 | 25 | 6 | 3575300960 | N | N | N | |
| 153 | 2 | Y | D92406 | Hidden Ridge at Highpoint A | 5150 192nd Dr NE | 530E | 537F7 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | NE | 18 | 25 | 6 | 3275890910 | N | Y | N | A |
| 154 | 2 | Y | D92407 | Hidden Ridge at Highpoint G | 4600 1924th Ave NE | 530E | 537F7 | D | Evans Creek | Y | N | N | N | N | N | Sammamish | SE | 18 | 25 | 6 | 3275890920 | N | Y | N | G |
| 155 | 2 | Y | D92413 | AAA 2YR Bond Beaver Lake Estates Pond "E" | 25901 SE 27th St | 959E | 598E2 | D | East Lake Sammamish | Y | N | N | Y | N | N | Sammamish | NE | 11 | 24 | 6 | 0629400940 | N | Y | N | E |
| 156 | 2 | Y | D92417 | Sammamish View East | 20200 NE 16th St | 540W | 567G4 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NW | 29 | 25 | 6 | 2526750180 | N | Y | N | A |
| 157 | 2 | Y | D92419 | Hidden Ridge at Highpoint T | 19050 NE 51st St | 530E | 537F7 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NE | 18 | 24 | 6 | 3275890040 | N | N | Y | |
| 158 | 2 | Y | D92424 | AAA 2YR Bond Highland Creek Estates Phase I | 4220 230th Wy SE | 578W | 598B5 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NW | 15 | 24 | 6 | 3295600290 | N | Y | N | A |
| 159 | 2 | Y | D92425 | AAA 2YR Bond Highland Creek Estates "J" (to be) | 4500 229th PL SE | 578W | 598B5 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 15 | 24 | 6 | 3295610530 | N | Y | N | J |
| 160 | 2 | Y | D92433 | AAA 2YR Bond Pine Lake Estates Tr A | 3380 213th Pl SE | 576W | 597H3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6791050480 | N | Y | N | A |
| 161 | 2 | Y | D92434 | AAA 2YR Bond Pine Lake Estates Tr B | 3492 212th Ave SE | 576W | 597H3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6791060490 | N | Y | N | B |
| 162 | 2 | Y | D92435 | AAA 2YR Bond Pine Lake Estates Tr C | 21430 SE 34th Pl | 576W | 597J3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6791050500 | N | Y | Y | C |
| 163 | 2 | Y | D92437 | AAA 2YR Bond Moonshadow Estates | 23550 SE 28th Ct | 577W | 598B2 | D | East Lake Sammamish | N | N | Y | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 5611500280 | Y | Y | N | B |
| 164 | 2 | Y | D92442 | AAA 2YR Bond Caldwell SP L95S0029-30 | SE 16th Pl & 219th Pl SE | 575W | 597J1 | D | East Lake Sammamish | N | N | N | N | Y | N | Sammamish | SW | 4 | 24 | 6 | 0424069253 | N | N | Y | |
| 165 | 2 | Y | D92443 | Woodbridge Creek Tr I | 1649 242nd Ave SE | 958E | 597C1 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SE | 3 | 24 | 6 | 9510920210 | Y | N | N | I |
| 166 | 2 | Y | D92450 | Mountain Sun Estates | 23300 NE 8th St | 951W | 568B5 | D | East Lake Sammamish | Y | N | N | Y | N | Y | Sammamish | SW | 27 | 25 | 6 | 5706300010 | Y | Y | N | A |
| 167 | 2 | Y | D92465 | AAA 2YR Bond Pine Lake Estates | 3490 212th Ave SE | 576W | 597H3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 9 | 24 | 6 | 6791050490 | N | N | N | |
| 168 | 2 | Y | D92485 | AAA 2YR Bond Beaver Lake Estates Phase 2, Tr B | 2400 E Beaver Lk Dr SE | 959E | 598E2 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SE | 2 | 24 | 6 | 0629400930 | N | Y | N | B |

CONV = conveyance
DED TR = dedicated tract
ESMT = easement
INFIL = infiltration pond
N = no
ROW = right of way
Y = yes

| | DIV | Service Area | D9# | Facility Name | Facility Address | KROLL | TBROS | Tech Area | Subbasin | Pond | Tank | Vault | INFIL | CONV | Oil/Water Separator | City | QTR | Section | Township | Range | Parcel No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | Y | D95680 | Puget Sound Energy | 3520 Sahalee Way NE (?) | 946W | 567J2 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NW | 21 | 25 | 6 | 7504021571 |
| 2 | 2 | Y | D95681 | Sammamish Hills Lutheran Church | 22805 SE 8th St | 955W | 568A7 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | SW | 34 | 25 | 6 | 1241100045 |
| 3 | 2 | Y | D95682 | Sammamish Hills Lutheran Church | 22818 SE 8th St | 955W | 568A7 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 34 | 25 | 6 | 1241100045 |
| 4 | 2 | Y | D95827 | Sunny Hills Elementary School | SE 232nd & Issaquah-Pine Lk Rd | 577W | 598B3 | D | East Lake Sammamish | N | N | N | Y | N | N | Sammamish | SW | 10 | 24 | 6 | 1024069041 |
| 5 | 2 | Y | D95935 | Margaret Meade Elemenary | 1725 216th Ave NE | 950W | 567J4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NW | 28 | 25 | 6 | 2825069055 |
| 6 | 2 | Y | D95936 | Margaret Meade Elementary | 1725 216th Ave NE | 950W | 567J4 | D | Evans Creek | N | Y | N | N | Y | N | Sammamish | NW | 28 | 25 | 6 | 2825069055 |
| 7 | 2 | Y | D95937 | Ketcha Village Condos | 20827 NE 21st Ln | 540W | 567H3 | D | East Lake Sammamish | N | N | Y | N | N | Y | Sammamish | NW | 29 | 25 | 6 | 3847200010 |
| 8 | 2 | Y | D96053 | KC Water Dist 82 | NE 12th Pl & 220th Pl NE | 950E | 568A4 | D | East Lake Sammamish | N | N | N | N | Y | N | Sammamish | SE | 28 | 25 | 6 | 3578401800 |
| 9 | 2 | Y | D96509 | Sammamish Plaza | 3302 E Lk Sammamish Pkwy | 551W | 597G3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 8 | 24 | 6 | 6055500005 |
| 10 | 2 | Y | D96777 | Golden Wok - Pine Lake | 2904 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024069024 |
| 11 | 2 | Y | D96793 | La Petite Academy | 410 228th Ave NE | 955W | 568B5 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 34 | 25 | 6 | 7525460020 |
| 12 | 2 | Y | D96840 | Community Church of Joy | 233rd Ave NE & NE 8th St | 955W | 568B5 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 34 | 25 | 6 | 3425069005 |
| 13 | 2 | Y | D96854 | KC Fire District 222 | 1851 228th Ave NE | 950E | 568B4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NE | 28 | 25 | 6 | 2825069041 |
| 14 | 2 | Y | D96855 | KC Fire District 222 | 1851 228th Ave NE | 950E | 568B4 | D | Evans Creek | N | Y | N | N | N | N | Sammamish | NE | 28 | 25 | 6 | 2825069041 |
| 15 | 2 | Y | D96986 | Pine Lake Village | 2908 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 6791600050 |
| 16 | 2 | Y | D97162 | Wells Fargo Bank | 2942 228th Ave SE | 577W | 568A3 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 6791600050 |
| 17 | 2 | Y | D97176 | Connemara Apts (NW tanks) | 3070 230th Ln SE | 577W | 598B3 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024069018 |
| 18 | 2 | Y | D97177 | Connemara Apts (Pond "B") | 3070 230th Ln SE | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | Y | Y | N | Sammamish | NW | 10 | 24 | 6 | 1024069018 |
| 19 | 2 | Y | D97178 | Connemara Apts (Pond "A") | 3070 230th Ln SE | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 1024069018 |
| 20 | 2 | Y | D97179 | Pine Lake Plaza | 2830 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 1024069111 |
| 21 | 2 | Y | D97181 | Pine Lake Medical/Dental Center | 22727 SE 29th St | 576E | 598A2 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | NE | 9 | 24 | 6 | 6795100682 |
| 22 | 2 | Y | D97186 | Sammamish Community Church | 214 228th Ave SE | 955W | 568A7 | D | East Lake Sammamish | Y | N | N | N | Y | N | Sammamish | SW | 34 | 25 | 6 | 3425060010 |
| 23 | 2 | Y | D97188 | Sunny Hills Playshed | 23232 Issaquah-Pine Lk Rd SE | 577W | 598B3 | D | East Lake Sammamish | N | Y | N | Y | Y | N | Sammamish | SW | 10 | 24 | 6 | 1024069041 |
| 24 | 2 | Y | D97192 | Pine Lake Plaza | 2830 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024069111 |
| 25 | 2 | Y | D97193 | Pine Lake Plaza | 2830 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | Y | N | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 1024069111 |
| 26 | 2 | Y | D97261 | Samm Highlands/Inglewood Shopping Centers N | 800 228th Ave NE | 955W | 568B5 | D | East Lake Sammamish | Y | N | N | Y | Y | Y | Sammamish | NW | 34 | 25 | 6 | 3582300090 |
| 27 | 2 | Y | D97335 | Pinelake Plaza II | 2850 228th Ave SE | 577W | 598A2 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | NW | 10 | 24 | 6 | 1024069111 |
| 28 | 2 | Y | D97347 | Pine Lake Covenant Church | 1715 228th Ave SE | 575E | 598A1 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SE | 4 | 24 | 6 | 0424069036 |
| 29 | 2 | Y | D97373 | McAuliffe Elementary School | 23823 NE 22nd St | 951E | 568C3 | D | East Lake Sammamish | Y | N | Y | N | N | N | Sammamish | NE | 27 | 25 | 6 | 2725069102 |
| 30 | 2 | Y | D97475 | McDonalds of Pine Lake | 615 228th Ave NE | 954E | 568A5 | D | East Lake Sammamish | N | N | Y | N | N | N | Sammamish | NE | 33 | 25 | 6 | 3325069153 |
| 31 | 2 | Y | D97476 | Sammamish Highlands South | 228TH Ave NE & NE 8th St | 955W | 568B5 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | NW | 34 | 25 | 6 | 7525460010 |
| 32 | 2 | Y | D97532 | LDS Ward | 922 216th Ave NE | 950W | 567J5 | D | East Lake Sammamish | N | Y | N | N | N | N | Sammamish | SW | 28 | 25 | 6 | 1240100114 |
| 33 | 2 | Y | D97533 | LDS Ward | NE 10th St & 216th Ave NE | 950W | 567J5 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 28 | 25 | 6 | 1240100114 |
| 34 | 2 | Y | D97775 | KC Fire Station 223 | 3425 Issaquah-Pine Lake Rd | 577W | 598B3 | D | East Lake Sammamish | Y | N | N | N | N | N | Sammamish | SW | 10 | 24 | 6 | 1024069192 |
| 35 | 2 | Y | D98221 | Pine Lake Chevron | 3050 228th Ave SE | 577W | 598A3 | D | East Lake Sammamish | N | N | Y | N | Y | N | Sammamish | NW | 10 | 24 | 6 | 1024069007 |

CONV = conveyance
ESMT = easement
INFIL = infiltration pond
N = no
Y = yes

SECTION 5

# Stormwater Capital Improvement Program

## Purpose

The Capital Improvement Program (CIP) is a list of priority projects that shows the estimated costs and available funding for each project over the 6-year period from 2001 to 2006. This is the first stormwater CIP for the City of Sammamish (City), and it focuses initially on clearly identifiable local improvements. During the latter years of the planning period, the CIP addresses regional projects and/or projects that require considerable analysis, design, and/or large amounts of funding. Drainage elements of transportation projects identified on the City's Transportation Improvement Program are included in the stormwater CIP.

## Identification and Prioritization of Proposed Projects

The City receives complaints about drainage, including flooding, water quality, and erosion/sedimentation problems. These complaints were used to create a City-wide database (see database in Attachment 5-A) from which potential CIP projects were identified. This section describes the sources of the drainage complaints database as well as the studies that were referenced to develop the comprehensive stormwater CIP.

Once identified as a CIP project, each case was evaluated using the prioritization rationale described later in this section.

### Sources of Information

The following sources of information were used to identify potential CIP projects:

- King County Water and Land Resources Drainage Services Section, *Drainage Complaints Received 1990-2000 Within the City of Sammamish*, June 6, 2000, pp. 1-31.
- King County Water and Land Resources Drainage Services Section, *City of Sammamish Complaint Response Activities: Drainage Investigation Reports*, March 31, 1998 – June 28, 1999.
- City of Sammamish and CH2M HILL, *Stormwater Management Workshop #1*, June 20, 2000.
- *East Lake Sammamish Project Descriptions (Projects 1521-1599r, Copy 3*).
- Institutional knowledge of City staff and SPWSD and NESS&WD staff.
- King County Surface Water Management Division, *Final Draft Estimated Unfunded Needs for Large Capital Improvement Projects*, August 1996.
- Tina Miller – King County Basin Steward for the Sammamish Basin, *East Lake Sammamish Basin Plan Recommendations*, June 2000.

- King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Final East Lake Sammamish Basin and Nonpoint Action Plan*, December 1994.
- ECONorthwest with Nesbitt Planning and Management, Norton Arnold Janeway, *Analysis of the Financial Feasibility of the Proposed City of Sammamish*, May 1998.
- King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Draft East Lake Sammamish Basin and Nonpoint Action Plan*, May 1992.
- King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Watershed Management Committee – Proposed East Lake Sammamish Basin and Nonpoint Action Plan, Volume 2: Response to Public Comments*, December 1992.
- King County Surface Water Management Division, *East Lake Sammamish Basin Conditions Report – Preliminary Analysis*, September 1990.
- King County Surface Water Management Division, Snohomish County Surface Water Management, City of Redmond Stormwater Division, *Bear Creek Basin Plan*, July 1990.
- *Draft ESA Review: Lake Sammamish Small Tributaries*, March 2000.
- King County Surface Water Management Division, City of Issaquah Department of Public Works, Washington State Department of Ecology, *Issaquah Creek Basin Current/Future Conditions and Source Identification Report*, October 1991.
- King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Issaquah Creek Watershed Management Committee Proposed Basin and Nonpoint Action Plan*, September 1994.
- City of Issaquah and King County Surface Water Management Division, *Final Issaquah Creek Basin and Nonpoint Action Plan*, December 1996.
- Tina Miller – King County Basin Steward for the Sammamish Basin, *Draft Lake Sammamish Small Tributaries*, March 2000.
- Tina Miller – King County Basin Steward for the Sammamish Basin, *Report Card – Laughing Jacobs Sub-basin*, June 2000.
- *Report Card – Inglewood Sub-basin*.
- City of Sammamish, *City of Sammamish Interim Capital Improvement Plan*, April 2000.

## Prioritization

The database of stormwater complaints includes more than 250 issues. Some of the complaints are related, some have already been addressed or are to be handled under maintenance, and some are outside the definition of a stormwater CIP (e.g., private property, policy, outside City limits). After careful deliberation, 35 discrete projects and 25 Basin Study Projects qualified as Drainage CIP Projects. These CIP projects are shown in Table 5-1, and are prioritized for the 6-year planning period. The Basin Study Projects are ranked and listed in order of priority in Table 5-2. Of the 35 discrete projects, 14 are related to transportation improvement projects (TIPs), and show completion dates that are tied directly to the transportation project schedules they support. The other 21 projects resulted mainly from citizen complaints or from City, County, and / or SPWSD observations. To prioritize these projects, the preliminary database was validated and refined by City staff based on field knowledge and experience. In the absence of apparent life-safety or major property damage issues, the CIP projects then were categorized according to estimated time

and effort it would take to complete them, as described below. Where possible, the CIP schedule was developed to optimize the use of City staff and financial resources. This was accomplished by limiting the number of projects scheduled for each year and trying to spread them out over the planning period. Because these projects are in response to active complaints, it is recommended that they be completed during the first half of the CIP period. It should be noted that the stormwater CIP is subject to schedule and cost changes, which result from the nature of the different projects, the variability in City funding sources, and the dynamic political climate of a newly incorporated city. When more detailed project scoping and cost estimates are developed, changes in the CIP can also be expected.

### Study

Study projects, identified in Table 5-1 by "Y," are improvements / solutions that have the following characteristics:

- Require investigation to determine capital needs.

### Quick-Fix

Quick-fix projects, identified in Table 5-1 by "QF," are improvements / solutions that have the following characteristics:

- Can be solved with minimal analysis or design, and there is no obvious substantial risk to downstream property or resources.
- Do not require the mobilization of large crews or large equipment (i.e., larger than a rubber-tired backhoe or a small dump truck).
- Do not exceed a predetermined minor capital projects cost ceiling (recommended ceiling is $40,000).
- Do not appear to require resolution of significant regulatory issues (i.e., permitting).
- Have high visibility (i.e., long-standing problem or if many in the community see or are affected by it).

Within the "QF" category, projects are designated as quick fixes for the year 2000 or 2001. City staff helped identify projects that are likely to be completed in 2000.

### Simple Design/Construction

Simple Design / Construction projects, identified in Table 5-1 by "S," are improvements / solutions that:

- Have minimal degree of complexity, but that will require analysis, permitting, and / or design.

### Study/Design/Construction

Study / Design / Construction projects, identified in Table 5-1 by "D," are improvements / solutions that:

- Have some degree of complexity that will require extensive analysis, permitting, and / or design.

## CIP Project Identification

The recommended CIP projects are shown in Table 5-1 and Figures 5-1a and 5-1b. Table 5-1 identifies the CIP projects for the years 2000 through 2006 and estimated project costs. More detailed project information is presented in Attachment 5-A, the Drainage Problem Database.

## Non-CIP Projects Requiring Follow-Up

During the development of the CIP, several non-CIP complaints that require follow-up actions by City staff were identified. Addresses and specific details are presented in Attachment 5-A. The projects are identified below by the numbers that appear in the second column from the left (entitled "ID #") in Attachment 5-A:

- Maintenance Issues: 8, 11, 17, 23, 99-0796, 00-0215, 00-0284, 98-0389, 99-0579, 99-0917, 00-0178, 97-0711, 98-0097, 98-0389.
- Roads Department Issues: 99-0706, 00-0076, 00-0085, 00-0126, 00-0190.
- Policy Issues: 1, 98-0578, 00-0034, 12, 00-0058, 00-0286, 00-0295, 00-0296, 00-0400, C, D, E, F, H-1, H-2, 99-0246, L-1, L-2.

**TABLE 5-1. Drainage CIP Projects: Annual Expenditures[1]**

| Project ID # | Project | Category[2] | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Beyond |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Erosion/Roadway Failure on 212th[3] | Y | | $50,000 | | | | | | |
| 2 | Erosion/Roadway Failure on ELSP & NE 22nd | D | $5,000 | $40,000 | | | | | | |
| 3 | Flooding at NE Sammamish S&WD Sewer Lift Station[4] | QF | $40,000 | | | | | | | |
| 4 | Flooding at 212th & SE 14th Place [5] | S | $100,000 | | | | | | | |
| 5 | Flooding/Erosion on Tributary to George Davis Creek | D | | $50,000 | $300,000 | | | | | |
| 6 | George Davis Creek Improvement Culvert | S | | $100,000 | | | | | | |
| 7 | Flooding at SE 24th St & 236th Ave SE | D | | $1,000 | $10,000 | | | | | |
| 8 | Allen Lake System Joint City/County Project | D | | $5,000 | $40,000 | | | | | |
| 9 | Erosion/WQ Problems at Spring (Eagle Crest) | D | | | $2,000 | $30,000 | | | | |
| 10 | Flooding at 2026 202nd Ave SE | Y,S | | $2,000 | $20,000 | | | | | |
| 11 | Flooding at Iss. Pine Lk Rd, btwn SE 48th St & SE 44th St | S[4] | | $40,000 | | | | | | |
| 12 | Trestle Projects | S | | $120,000 | | | | | | |
| 13 | George Davis Creek Habitat Improvements | QF | | $2,000 | | | | | | |
| 14 | Flooding on Trib 0167 at 4500 Block of Iss. Pine Lk Rd SE | S | | | $50,000 | | | | | |
| 15 | Flooding/WQ at NE 18th and 226th | Y,S | | | $5,000 | | | | | |
| 16 | Flooding at NE 20th and Outlet for Mystic Lake | Y | | | $5,000 | | | | | |
| 17 | Erosion/Flooding at 21509 NE 6th Place | Y,S | | $10,000 | | | | | | |
| 18 | R/D Facility Retrofit at 20200 NE 16th Street | D | | $5,000 | | $50,000 | | | | |
| 19 | Laughing Jacobs Creek Culvert Replacement | S | | $26,000 | | | | | | |
| 20 | Laughing Jacobs Creek Stream Enhancement | S | | $100,000 | | | | | | |
| 21 | Laughing Jacobs Water Quality Study and Revegetation | D | | $70,000 | $400,000 | | | | | |
| | Unplanned Emergency CIPs (Annual, miscellaneous) | Varies | | $20,000 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | Varies |
| | **Subtotal** | | **$145,000** | **$641,000** | **$882,000** | **$130,000** | **$50,000** | **$50,000** | **$50,000** | **Varies** |
| T1 | 228th Avenue Phase 1A[6] | C | $150,000 | | | | | | | |
| T2 | 228th Avenue Phase 1B | D | | | $650,000 | | | | | |
| T3 | 228th Avenue Phase 1C | D | | | | $1,200,000 | | | | |
| T4 | 224th Avenue Phase I | D | | | | | $600,000 | $600,000 | | |
| T5 | 224th Avenue Phase II | D | | | | | | $600,000 | $600,000 | |
| T6 | Sahalee Way NE Phase I | D | | | | $200,000 | | | | |
| T7 | Sahalee Way NE Phase II | D | | | | | $315,000 | | | |
| T8 | 212th Avenue Phase I | D | | | | $180,000 | $210,000 | $210,000 | | |
| T9 | 212th Avenue Phase II | D | | | | | $180,000 | $210,000 | $210,000 | |
| T10 | Trossachs Blvd. Extension | D | | | | | | $250,000 | | |
| T11 | Intersection Improvements | D | | $18,000 | $42,000 | | | | | |
| T12 | East Lake Sammamish Parkway Phase I | D | | | | | $120,000 | $280,000 | | |
| T13 | Issaquah Pine Lake Road Extension | D | | | | | $72,000 | $168,000 | | |
| T14 | Sidewalk Projects (drainage component) | S | $90,000 | $70,000 | $70,000 | $70,000 | $70,000 | $70,000 | $70,000 | $70,000 |
| | **Subtotal** | | **$240,000** | **$88,000** | **$762,000** | **$1,650,000** | **$1,567,000** | **$2,388,000** | **$880,000** | **Varies** |
| | | | | | | | | | | |
| | Basin Study Projects[7] | Varies | | $86,000 | $469,000 | $469,000 | $1,619,000 | $1,619,000 | $1,619,000 | 2,900,000+ |
| | **Subtotal** | | **$0** | **$86,000** | **$469,000** | **$469,000** | **$1,619,000** | **$1,619,000** | **$1,619,000** | **Varies** |
| | **Total** | | **$385,000** | **$815,000** | **$2,113,000** | **$2,249,000** | **$3,236,000** | **$4,057,000** | **$2,549,000** | **Varies** |

[1]All values are estimates and can be expected to change after detailed scopes and fees are developed.

[2]QF = Quick Fix; Y = Study; S = Simple Design/Construction; C = Construction only; D = Study/Design/Construction. The categories are explained in the document text (see "Prioritization").

[3]Additional CIP funds will be required to implement an interim solution prior to a permanent solution in conjunction with the 212th Roadway project (2003-2005).

[4]Year 2000 CIP completed.

[5]Year 2000 project completed; however, additional work might be required on the private road associated with this project, and costs might increase accordingly.

[6]Potential for cooperative funding solution with County Roads.

[7]Costs based on Basin Plan Information and Prioritized list from County (Tina Miller). Does not include all projects identified in Basin Plans. See Table 5-2 for prioritized, updated list of projects included in this CIP.

Priority 1a = roughly 86,000 --- handle in first year

Priority 1b = roughly 938,000 --- split between 2002 and 2003

Priority 2 = roughly 4,856,000 --- split among 2004, 2005, 2006

Priority 3 = roughly 2,848,000 --- handle in years after the 6-year CIP

**TABLE 5-2. East Lake Sammamish Basin Plan Recommendations--King County Basin Study Projects**
(modified for use in Drainage CIPs established through the City of Sammamish Stormwater Management Comprehensive Plan)

| Project # | | Project Description | Priority[1] | Year 2000 Cost Estimate[2] (dollars) | Status (7/98)[3] | Planned Completion |
|---|---|---|---|---|---|---|
| Plan # | CIP # | | | | | |
| 1532 & 155 | AB1005 | George Davis Lake & Beaver Lake Studies | 1a* | 86,100 | | |
| 1546 & 1599p | OL1005 | Lower Zaccuse Creek | 1b | 646,900 | | |
| 1588 | AB1005 | Water Quality Study Retrofits | 1b | 230,600 | S | 1997* |
| 1599c | In BW-10 | George Davis Fencing | 1b | 60,600 | | |
| 1599f, j | AK1005 | Small Revegetation | 2 | 38,000 | PC/NF | 1997* |
| 1533 | OX1005 | Infiltration Pond (0144) | 2 | 461,100 | | |
| 1547 & 1599z | OM1005 | Lower 0163 | 2 | 191,200 | | |
| 1549 & 1599r | OR1005 | Laughing Jacobs Creek Relocation | 2 | 164,300 | | |
| 1530 | OS1005 | Wetland 26 Trestle (SE 24th) | 2 | 521,600 | D | 1999* |
| 1540 | OU1005 | Wetland 30 Trestle @ 236th Ave. NE | 2 | 1,304,800 | | |
| 1537 | | Wetland 30 Trestle | 2 | 1,935,600 | | |
| 1521 & 1599k | OA1005 | Lower 0143A | 2 | 150,300 | | |
| 1531 & 1538 | AB1006 | Small Water Quality CIPs | 2 | 89,100 | | |
| 1526 | OF1005 | 0143G at Parkway | 3 | 264,600 | | |
| 1523 & 1599m | OC1005 | 0143C at Parkway | 3 | 266,800 | | |
| 1528 | OH1005 | 0143K RR Culvert | 3 | 98,800 | | |
| 1527 & 1599n | OG1005 | 0143H at Parkway | 3 | 275,800 | | |
| 1522 & 1599 [1] | OB1005 | 0143B at Parkway | 3 | 387,700 | | |
| 1524 & 1599a | OD1005 | 0143E above Parkway | 3 | 357,100 | | |
| 1525 | OE1005 | 0143F at Parkway | 3 | 417,700 | | |
| 1541 | AG1005 | Pine Lake Revegetation | 3 | 12,700 | | |
| 1552 | AE1005 | Laughing Jacobs Lake Outlet | 3 | 432,300 | | |
| 1539 | AA1005 | Pine Lake Creek Restoration | 3 | 419,300 | | |
| 1554 | | Beaver Lake Revegetating | 3 | 12,700 | PC/NF | 1996* |
| 1534 & 15ppl | | 0144 - 212th NE Culvert | X | - | | |

[1] Priority is highest for 1a, lowest for 3. X was not prioritized by the County.

[2] Year 2000 Cost Estimate is escalated cost based on information in the following documents: King County Surface Water Management Division, *Final Draft Estimated Unfunded Needs for Large Capital Improvement Projects,* August 7, 1996; *East Lake Sammamish Project Descriptions (Projects 1521-1599r, Copy 3); King County Surface Water Management Division, Issaquah/East Lake Sammamish Watershed Management Committee (WMC),* Final East Lake Sammamish Basin and Nonpoint Action Plan, December 1994; King County Surface Water Management Division, Issaquah/East Lake Sammamish Watershed Management Committee (WMC), *Draft East Lake Sammamish Basin and Nonpoint Action Plan,* May 11, 1992. (and 13, both documents will be referred to 11 in Drainage CIP Database); King County Surface Water Management Division, Issaquah/East Lake Sammamish Watershed Management Committee (WMC), *Watershed Management Committee - Proposed East Lake Sammamish Basin and Nonpoint Action Plan, Volume 2; Response to Public Comments,* December 1992 (and 11).

[3] Status Key: P = Pending; S = Study; D = Design; C = Under Construction; PC = Project Constructed; PD = Project Dropped; PC/NF = Partial Construction Only.

* Some work was done, but project incomplete.

**City of Sammamish Stormwater Management Comprehensive Plan**
**Drainage Problem Database**

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **POTENTIAL CAPITAL IMPROVEMENT PROJECTS** | | | | | | | | | | | | | |
| 11 | 2 | Issaquah/Pine Lake Rd., N of SE 48th St & S of SE 44th St | Flooding | Lots of high water and calls about flooding (2 properties known to flood) . In the County, but influences City. May want to do a cooperative effort soln. | | Tina Miller/KC | See 1 (Policy issue on NE 48th St. and Iss/Pine Lake Rd.) | | Culvert enlargements, roadway re-grade. May be on KC Roads CIP list --- potential cost share. | $30,000 to $50,000 | | | | |
| 14 | h23 | Trib. 0167 4500 Block of Issaquah-Pine Lake Road SE | Flooding | | | 11 | | | Culvert enlargements, roadway re-grade. | $50,000 | ELS Basin Plan Issue | | | |
| 7 | 4b | SE 24th St and 236th Ave SE (Part of Wetland 26 Trestle Improvement) | Flooding | Driveways flood. Some roadway flooding. | | Tina Miller/KC | | | Flooding problem may have been solved; however, investigate whether remnant channel improvements are needed. Because road effectively runs through a 40 acre wetland, there could still be flooding. City may need to allocate additional funds should flooding continue to occur. | Study = $1000. If necessary, channel improvements = $10,000. Long term monitoring of situation recommended. Additional CIP funds may be required | County raised the roadway in Spring 2000. May require more work. The trestle is east of 236th, and covers about150' of roadway. | | | |
| 12 | 7 | Trestle Projects | Flooding | Water across roadway. | | Tina Miller/KC | | | Raise roadway and/or improve culverts. | $100,000 = raise roadway; $10,000 to $30,000 = improve culverts | Wetland? Low spot? | | | |
| 4 | 9 | d/s from #10 | Flooding | Water over roadway. Periodic flooding. Downstream culvert problem? | | | 10, 00-0242 | Wetland 17 | City is currently putting two perforated relief pipes through old beaver dams to lower the water level. | $150,000 | HPA will be expedited, liability concerns because of traffic hazards. 20930 SE 14th Pl private problem, may benefit from solution; however, City is not going to raise private road. | | Eberhardt | |
| | 10 | Wetland 17 over 212th | Flooding | Water over roadway. Periodic flooding. 212th is at a lower elevation than wetland 17. | | Dick Thiel / Samm. | 9, 00-0242 | | NOT a large storm fix.. culvert invert elevations need to be adj. Road (212th) needs to be raised. Short term solution would include beaver | | | | | |
| 1 | 13 | Along 212th | Flooding/Erosion | Groundwater is causing roadway base to slip. Washouts and slides on 2 lenses of soil due to saturation. Results in erosion and roadway failure along 212th. | | Tina Miller/KC & Dick Thiel / Samm. | | | Need better drainage system on the road. Need to repair/strengthen the roadway. This would be an interim (but necessary) solution, as there is a TIP project scheduled for 212th in 2004 to 2006. | $50,000 Study; additional funding for Interim CIP (prior to 2004 TIP) | Interim CIP is not included in the CIP cost projections because the costs and funding sources are too variable. | | | |
| 3 | 14 &15 | NE Sammamish Sewer & Water District Sewer Lift Station (NE 28th/Sahalee Way NE & Trib to Evans Creek) | Flooding/Erosion | HDPE Pipe runs down on tributary. Pavement has been bermed up & water floods District's sewer lift station. Road flooding - ditch broke out and washes over road. Erosion problem also. Small events trigger. | | Art Primeau / NE Lake Samm. S&W District | 15 | | Pipe on east side of NE 28th could be insufficiently sized. Investigate and upgrade pipe if necessary. Berming may be temporary fix, but erosion at manhole needs to be addressed. | $30,000 to $50,000 | Saturated ground. Complainants report that high groundwater is a chronic problem in the area. | | | |
| 2 | 16 | East Lake Samm. Pkwy and NE 22nd (approx.) | Erosion | Landslide. Occurred during the last year. County has information from homeowner with related property flooding (2008 ELS Pkwy -- complaint #96-0301) and related NDAP assesment study. Flooding from wetland area goes west toward ELS Parkway Natural ravine jumps banks. There is a blocked culvert under the parkway (other culverts undersized?). Channel on undeveloped property has begun to downcut. The fog line/guard rail is starting to dip. | | Art Primeau/ NE Lake Samm. S&W District | | | In 1996, County recommended Neighborhood Drainage Assistance Program, with homeonwers installing 18-inch wide by 24-inch deep diversion ditch (w/fabric and rip-rap) south to north just east of their yards. Subsequently, it looks like problem has worsened and affects public road. Hence, design/fix recommended. | $5,000 study (for broader problem study to supplement County investigation); $30,000 to $50,000 for interim CIP (prior to 2005 TIP) | | | | |
| 5 | 20 | 228nd / NE 4th & Trib. to George Davis | Flooding/Erosion (neighborhood) | | | KC & Dick Thiel / Samm | h18, 1599i, 1534, Maybe 1533 | | | $50,000 Study; approx. $300,000 CIP | Llama Lake wetland drains down to this area (through City Hall mall). Housing development proposed (appealled) near Llama Landing. This plus 2 other developments east of 228th and on 228th "will compound problems." Continued... | History: When City Hall mall went in (1990), probs. really began (compounded by other developments?). Seems like undersized r/d facility (infiltr. tank?). | | |
| | h18 | Trib. 0144 22800 Block NE 4th St | Flooding | Trib. to George Davis goes underground and resurfaces. Upper wetlands all have hghr water levels. Large amt. of wetland area at high school was displaced. Neighborhood w/ dashed circle around (map) is on septic...stream runs through-prob! See comments. | | 11 | 20, 1534, 1599i | | | | | | | |
| | 21 | Llama Landing | Flooding | Small closed depression in Mystic Lake Basin is being diverted into George Davis Basin. Storage capacity is the issue. | | KC & Dick Thiel / Samm | | | Basin Plan identified doing a regional detention system for Probs. 20 & 21. Also "Developer should be required to put a culvert in." - from 6/8/00 mtg. | | | | | |
| | h15 | Trib. 0144 400 Block 221st Ave NE | Flooding | | | 11 | | | | | | | | |
| | h16 | Trib. 0144a, 0144 22300 Block NE 2nd St and 400 Block 223rd Ave NE | Flooding | | | 11 | | | | | | | | |
| 6 | 1534 | George Davis / 221st Ave NE (use Thomas Guide) | Flooding? | Culvert under 400 block of 221st Ave NE collapsed | | 11, 4, 9 | 1599i, 20, h18 | | Replace existing collapsed culvert under the 400 block of 221st Ave. NE with a precast bottomless box culvert. Adjust the channel grade as necessary to meet culvert invert and restore vegetation adjacent to the channel | $100,000 | Cost from 1992 report was escalated by 3% annually. | | | George Davis Culvert Replacement at 221st Ave. NE |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 1599i | George Davis Creek | Habitat | | | 11, 4, 9 | 1534, 20, h18 | | Revegetate banks through the residential area to restore native riparian vegetation. This project is proposed to be done by special County crews | $2,000 | Cost from 1992 report was escalated by 3% annually. | | | Geo. Davis Revegetation (1534) |
| 15 | 22 | NE 18th & 226th | Flooding/WQ | Problem is with wetland near this intersection - either house flooding, or maintenance, Dave can't recall. "No frogs" complaint must have something to do with water quality. | | Dave Hancock and Tina Miller / KC | | | | $5,000 Study | | | | |
| 16 | 24 | NE 20th and Outlet for Mystic Lake | Flooding | Outlet runs north. There have been some flooding issues on private driveway. 236th (west of system) - County required developers to put in detention and County did a retrofit at some point. | | Dave Hancock and Tina Miller / KC | | | | $5,000 Study | | | | |
| 8 | 26 | Allen Lake | Flooding/WQ | Outisde of City Jurisdiction, but City contributes. Flooding and sedimentation problem. Creek leading to it is flat, backs up. Inglewood Jr. High (has infiltr. facility) and tree farm sub-division contribute. Area has been developing fast - lots of drainage complaints. | | Dave Hancock and Tina Miller / KC | 00-0005, 00-0028, I | | | Policy Issue; $5,000 Study; $30,000 to $50,000 CIP | | | | |
| | 00-0005 | 413 239TH AVE NE | Flooding/Water Quality | Pond not draining, septic system contamination concern downstream, trail adjacent to wetland has been eroded due to outlet and partly flooded. | | 19 | 26, 00-0028, I | | | | Detailed Complaint Available | | Dana Heiser: 425 868 2227, 24235 NE 7th PL Sammamish, WA 98053 | |
| | 00-0028 | 242nd PL NE & NE 4th St | Flooding | Walking trail is getting washed out due to new construction south of site. R/D pond which appears to be overflowing | | 19 | 26, 00-0005, I | | | | | | Al Minnion: 425 868 0925, 24119 NE 6th PL, Sammamish, WA 98053 | |
| | I | NE 8th St East of 244th Ave | Flooding | Allen Lake Exit flood 3-8 times per year as deep as 18 inches and 40 yards long. Chronic problem - County needs to close road several times per year. | | 21 | 26, 00-0005, 00-0028 | Evans Creek | Better retention & flow control of SE 8th developments | | Water level fluctuation in Allen Lake has killed over 500 trees. More detail available from drainage problem information sheet. | | Gregory Allan: 425 868 7804, 530 254th Ave NE, Redmond, WA 98074 | |
| 9 | 27 | Downslope from Eagle Crest | Erosion/Water Quality | Erosion coming off Eagle Crest (small subdivision). Slumping hillside at spring producing large amount of sediment-laden water. Very muddy water at mouth. Goes into undeveloped property, ultimately Lake Sammamish. There was a sub-surface slide in the middle of summer (1999?). | | Dave Hancock and Tina Miller / KC | | | Stabilize slumping by installing one-man and smaller rocks around the spring to prevent the hillside from slumping. May require more extensive solution such as detailed by geologist in 10/23/98 memorandum (contain sediment "piping" at the spring source by installing engineered welpoint and manifold system to collect the water without allowing sediment to wash out of the hillside. | $2000 Study;$10,000 to $30,000 CIP (could be larger if study determines need for engineered wellpoint and manifold system) | Project was nominated for a KC small habitat restoration grant for WQ enhancement of Lake Sammamish. Tina Miller/KC has supporting documentation (now in this Comp Plan project file as well). | | | |
| 10 | 99-0824, 00-0196 | 2026 202nd Ave SE | Flooding | Overflowing Catch Basin on adjacent property, County never accepted the facility for maintainence. R/D facility overflowing. | | 19 | | | | $2000 Study; $10,000 to $30,000 CIP | Detailed Complaint Available | | Mike Dykeman: 206 6761, 425 392 3525, 2026 202nd Ave SE, Sammamish, WA 98029 | |
| 17 | M | 21509 NE 6th Place NE 6th 350 feet west of 216th | Erosion / Flooding | Stream infiltrates to the east and daylights in a spring north of 6th as opposed to flowing under 6th in culverts. | | 21 | | | Armor the ravine at the head of the stream (?) | $10,000 Study and CIP | More detail available from drainage problem information sheet. | | Charles Keller: 206 655 1096, 425 868 9577 | |
| 18 | 00-0455 | 20200 NE 16th St. | DDM | | | 19 | | | Study, and then likely retrofit/upgrade of retention/detention facility. | $5,000 Study and $50,000 CIP | Carter reviewed situation (10/4/00) | | | |
| 19 | | Laughing Jacob's Creek Culvert Replacemetn | Flooding | Laughing Jacob's Creek above the lake. | | Lanny Henoch/KC DDES | | | Needs lake overflow structure (48" smooth bore culver under SE 42nd St. with a 72 inch, Type 2 cb with rim elev. Set at 349.0. | $26,000 CIP | Steve Foley of KC WLRD may have more info. | | | |
| 20 | | Laughing Jacob's Creek Stream Enhancement | | Laughing Jacob's Creek above the lake. | | Lanny Henoch/KC DDES | | | In-stream mitigation to include the addition of large woody debris and large boulders, within public park land, to add complexity to the stream channel to enhance fish habitat and help control sediment transport and erosion within the channel. | $100,000 CIP | Steve Foley of KC WLRD may have more info. | | | |
| 21 | m4 | Laughing Jacob's | Water Quality | | | 3 | | | Study and Revegetation | $468,900 ($70,000 study; $400,000 reveg.) | Cost from 1996 report was escalated by 3% annually. | | | |
| | | | | | | | | | | | | | | |
| | **COMPONENT OF MAJOR ROAD PROJECTS (Stormwater CIP costs shown are estimates based on Total TIP costs)** | | | | | | | | | | | | | |
| | 20b | Near 20 | Flooding | Ground always wet. 1 house floods. It's near Baptist Church. | | KC & Dick Thiel / Samm | | | As part of the road widening, improvements are being made. Studies have been done. | | | | | |
| T1 | t1 | 228th Avenue Phase 1A | | | | 20 | | | | $150,000 | | | | |
| T2 | t1 | 228th Avenue Phase 1B | | | | 20 | | | | $650,000 | 2001 estimated start date on the 6 year plan | | | |
| T3 | t2 | 228th Avenue Phase 1C | | | | 20 | | | | $1,200,000 | 2001 estimated start date on the 6 year plan | | | |
| T4 | t3 | 244th Avenue Phase I | | | | 20 | | | | $1,200,000 | 2002 estimated start date on the 6 year plan | | | |
| T5 | t4 | 244th Avenue Phase II | | | | 20 | | | | $1,200,000 | 2003 estimated start date on the 6 year plan | | | |
| T6 | t6 | Sahalee Way NE Phase I | | | | 20 | | | | $200,000 | 2002 estimated start date on the 6 year plan | | | |
| T7 | t7 | Sahalee Way NE Phase II | | | | 20 | | | | $315,000 | 2003 estimated start date on the 6 year plan | | | |
| T8 | t9 | 212th Avenue Phase I | | | | 20 | | | | $600,000 | 2004 estimated start date on the 6 year plan | | | |
| T9 | t10 | 212th Avenue Phase II | | | | 20 | | | | $600,000 | 2005 estimated start date on the 6 year plan | | | |
| T10 | t11 | Trossachs Blvd. Extension | | | | 20 | | | | $250,000 | 2004 estimated start date on the 6 year plan | | | |
| T11 | t12 | Intersection Improvements | | | | 20 | | | | $60,000 | 2001 estimated start date on the 6 year plan | | | |
| T12 | t13 | East Lake Sammamish Parkway Phase I | | | | 20 | | | | $400,000 | 2005 estimated start date on the 6 year plan | | | |
| T13 | t14 | Issaquah Pine Lake Rd Extension | | | | 20 | | | | $240,000 | 2005 estimated start date on the 6 year plan | | | |
| T14 | t15 | Sidewalk Projects | | | | 20 | | | | Approx. $70,000 annually | 2001 estimated start date on the 6 year plan | | | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **BASIN STUDY ISSUES (Longer-term CIPs) - See prioritized list (developed by King County) for projects selected for City of Sammamish Stormwater CIP recommendations** | | | | | | | | | | | | | |
| | I1 | | | | Part Complete | 2 | | | Water Quality Study: Retrofits | | Project 1588, CIP # AB1005 | | | |
| | I2 | Lower 0163 | | | Not Funded | 2 | Maybe m16, Maybe 1547 | | | | Project 1547, 1599z, CIP #OM1005 | | | |
| | I3 | 0143B at Parkway | | | Not Funded | 2 | 1522, 1599l | | | | Project 1522, 1599[1], CIP #OB1005 | | | |
| | 1599l | Trib. 0143B | Habitat/Erosion | | | 4, 9 | 1522, I3 | | Revegetate streambanks and conduct minor channel reconstruction activities | $1,800 | | | | Trib. 0143B Revegetation (1522) |
| | 1522 | 0143B at East Lake Sammamish Parkway (ELSP) | | | Not Funded | 2, 4, 9, 3 | I3, 1599l | | Reconstruct the open channel upstream; relocate culvert crossing beneath parkway; increase culvert size beneath railroad; increase pipe capacity downstream; retrofit detention pond at NE 42nd St.; provide diversion of pond outlet | $387,738[1] | CIP #OB1005, $344,500 estimated cost from source 3 | | | Tributary 0143B Culvert Replacement, Channel Reconstruction, and R/D Pond Retrofit |
| | 1521 | Lower 0143A | | | Not Funded | 2, 4, 9, 3 | 1599k, See 1599 complaints | | Install control structure at wetland outlet; increase residence time and improve water quality | $147,554[1] | CIP #OA1005, $131,100 estimated cost from source 3 | | | Tributary 0143A Conveyance and Water-Quality Improvements (Panhandle) |
| | 1599k | Trib. 0143A | Habitat | | | 4, 9 | 1521 | | Revegetate wetland and its buffer | $2,200 | | | | Trib. 0143A Revegetation (1521) |
| | 1523 | 0143C South of 196th Ave NE | | | Not Funded | 2, 4, 9, 3 | 1599m | | Relocate crossing of ELS parkway into new culvert S. of 196th Ave. NE; abandon existing culvert at 196th; excavate channel east of railroad grade and join flow with tributary 0143B above railroad crossing. | $264,607[1] | CIP #OC1005, $235,100 estimated cost from source 3 | | | Tributary 0143C Culvert Replacement at 196th Ave. NE |
| | 1599m | 0143C at Parkway | Habitat/Erosion | | Not Funded | 2, 4, 9 | 1523 | | Revegetate streambanks and conduct minor channel reconstruction activities | $1,700 | CIP #OC1005 | | | Trib. 0143C Revegetation (1523) |
| | 1524 | 0143E above ELSP | | | Not Funded | 2, 4, 9, 3 | 1599a | | Reconstruct the open channel above ELS Parkway; relocate and expand culvert beneath parkway; expand culvert under railroad; increase channel capacity downstream to lake; add check dams or large woody debris to upstream channel to decrease sediment loading to downstream system. | $354,085[1] | CIP #OD1005, $314,600 estimated cost from source 3 | | | Tributary 0143E Channel Reconstruction and Stabilization at and above ELS Parkway |
| | 1599a | 0143E above Parkway | | | Not Funded | 2, 4, 9 | 1524 | | Revegetate streambanks and conduct minor channel reconstruction activities | $2,400 | CIP #OD1005 | | | Trib. 0143E Revegetation (1524) |
| | 1525 | 0143F at ELSP | | | Not Funded | 2, 4, 9, 3 | 1599b | | Reconstruct the open channel above ELS Parkway; relocate and expand culvert beneath parkway; expand culvert under railroad; increase channel capacity downstream to lake; add check dams or large woody debris to upstream channel to decrease sediment loading to downstream system (same as 1524). | $415,538[1] | CIP #OE1005, $369,200 estimated cost from source 3 | | | Tributary 0143F Channel Reconstruction and Stabilization at ELS Parkway |
| | 1599b | Trib. 0143L | | | | 4, 9 | 1529 | | Revegetate streambanks and conduct minor channel reconstruction activities | $1,700 | | | | Trib. 0143L Revegetation (1529) |
| | 1526 | 0143G at ELSP | | | Not Funded | 2, 4, 9, 3 | | | Expand and relocate culverts beneath driveways, parkway, and railroad (design in conjunction w/ drainage-system retrofit for Timberline Ridge and Timberline Highlands II) | $264,607[1] | CIP #OF1005, $23,5100 estimated cost from source 3 | | | Tributary 0143G Channel Reconstruction and Culvert Replacement at ELS Parkway |
| | 1527 | 0143H at ELSP | | | Not Funded | 2, 4, 9, 3 | 1599n | | Enlarge existing channel above and below railroad; expand culverts beneath parkway and railroad (design in conjunction with proposed tightline for Timberline Ridge development) | $273,949[1] | CIP #OG1005, $243,400 estimated cost from source 3 | | | Tributary 0143H Channel Reconstruction and Culvert Replacement at ELS Parkway |
| | 1599n | 0143H at Parkway | Habitat/Erosion | | Not Funded | 2, 4, 9 | 1527 | | Revegetate streambanks and conduct minor channel reconstruction activities | $1,500 | CIP #OG1005 | | | Trib. 0143H Revegetation (1527) |
| | 1528 | 0143k RR Culvert | | | Not Funded | 2, 4, 9, 3 | | | Install larger culvert beneath railroad to eliminate backwater flooding of residence. | $78,000 | CIP #OH1005, $127,100 estimated cost from source 3 | | | Tributary 0143K Culvert Replacement at Railroad |
| | 1529 | 208th Ave NE and 15th St to Inglewood Hill Rd NE | | | | 4, 9, 3 | 1599b | | Tightline road-ditch runoff from corner of 208th Ave. NE and 15th St. downslope to Inglewood Hill Road NE; add check dams or large woody debris to channel downstream to decrease erosion and sediment loading; increase culvert capacity beneath ELS parkway and railroad | 576,000** | $570,600 estimated cost from source 3 | | | Tributary 0143L Tightline |
| | 1599b | Trib. 0143L | | | | 4, 9 | 1529 | | Revegetate streambanks and conduct minor channel reconstruction activities | $1,700 | | | | Trib. 0143L Revegetation (1529) |
| | 1530 | Wetland 26 Trestle - SE 236th | | | Design, Part Complete | 2, 4, 9, 3 | | | To reduce flooding of 236th Ave. SE by Wetland 26, build a trestle to raise the roadway out of the future 25-yr floodplain and to restore natural hydrologic connections in Wetland 26 | $521,561[1] | CIP #OS1005, $106,000 estimated cost from source 3 | | | Wetland 26/236th Ave. SE Trestle (Laughing Jacobs) |
| | 1531 | Inglewood Glen Pond near 228th Ave NE and NE 12th PL | Water Quality | | | 11, 4, 9, 3 | 1538 | Inglewood | Retrofit the existing detention pond at plat of Inglewood Glen, located near 228th Ave. NE and NE 12th Place, to enhance water quality treatment capability | $67,000 | $339,000 estimated cost from source 3 | | | Inglewood Glen Pond Retrofit (Inglewood) |
| | 1538 | Tributary 0149 at SE 8th St | Water Quality | | Not Funded | 2, 4, 9 | 1531, BW-35 | | To reduce future dumping of garbage into the Tributary 0149 ravine at the east terminus of SE 8th Street, install barriers and "No Dumping" signs. Conduct a stream clean-up to remove historically dumped garbage as part of the Basin | $3,300 | CIP #AB1006 | | | Ebright Creek Dumping Prevention |
| | 1532 | George Davis Creek upstream of 228th Ave NE on Tributary 0144 | Flooding / Erosion | Flooding of houses | Not Funded | 2, 4, 9 | | | Protect existing residences from future flooding by constructing berms immediately upstream of 228th Ave. NE on Tributary 0144. The berms would be stabilized by hydroseeding and stream corridor vegetation | $68,000 | | | | George Davis Creek Flood Damage Reduction |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1533 | Sammamish Highlands near confluence of tributaries 0144 and 0144D | Water Quality | | | 11, 4, 9 | Maybe 20, Maybe 1534 | | Construct a regional infiltration pond near the confluence of tributaries 0144 and 0144D so as to reduce the water quality impacts of the commercial land uses upstream as well as reducing peak flows; (coordinate with the Water Quality Enhancement program recommendation (I-3) for source control of pollutants | $364,000 | | | | Sammamish Highlands Infiltration Pond |
| | 1536 | Elbright Creek at ELSP and BNRR | | | | 4, 9 | 1599e | | To reduce flooding and improve fish passage, the existing culverts at the ELS Parkway and BNRR should be replaced with bridges, the lower 75 ft. of Elbright Creek (tributary 0149) should be stabilized using bioengineering techniques and rock clusters added to improve stream habitat diversity | $400,000* | | | | Elbright Creek Conveyance Improvements (Thompson) |
| | 1599e | Ebright Creek | Erosion/Habitat | | | 4, 9 | 1536 | | Revegetate streambanks and conduct minor channel reconstruction activities | $3,100 | | | | Ebright Creek Revegetation (1536) |
| | 1537 | Wetland 17 Trestle at 212th Ave SE | | | Not Funded | 2, 4, 9 | | | As 212th Ave. SE is to be widened or significantly repaired, install a trestle or oversized culverts to raise the roadway above the flood elevation. This will restore more normal hydrological connectivity between portions of the wetland now separated by the roadway. In the near time, install "Water over Roadway" signs that can be displayed during periods when water over 212th Ave. SE is six inches deep or less; close the road when water exceeds that depth | $1,528,000 | CIP # | | | Wetland 17/212th Ave. SE Trestle |
| | 1539 | Pine Lake Creek | | | Not Funded | 2, 4, 9 | | | In areas where Pine Lake Creek is ditched adjacent to Wetland 63, the creek should be relocated into the wetland; remaining roadside ditches should be revegetated to reduce street flooding and restore wetland function | $331,000* | CIP #AA1005 | | | Pine Lake Creek/Wetland 63 Restoration (Pine Lake) |
| | 1540 | Wetland 30 Trestle - 236th Ave NE | | | Not Funded | 2, 4, 9 | m8 | | Construct a trestle bridge at 212th Ave. SE to eliminate road flooding and restore hydrologic connectivity within Wetland 30 | $1,030,000 | CIP #OU1005 | | | Wetland 30/212th Ave. SE Trestle |
| | m8 | Wetland 26/236th Ave SE Trestle | | | | 3 | 1540 | | | $451,000 | | | | |
| | 1541 | Pine Lake | | | Not Funded | 2, 4, 9, 3 | | | In conjunction with the lakeside education program, restore native vegetation buffers along lake edge | $10,000 | CIP #AG1005, $112,000 estimated cost from source 3 | | | Pine Lake Shoreline Native Vegetation Restoration |
| | 1542 | Tributary 0152 at ELSP and BNRR | | | | 4, 9 | | | Replace culverts where tributary 0152 crosses ELS Parkway and the BNRR right-of-way | $343,000* | | | | Pine Lake Creek Culvert Replacement |
| | 1543 | Kanim Creek | | | | 4, 9 | | | Enhance on-site detention and stabilize the stream channel to reduce in-stream erosion and channel incising | $463,000* | | | | Kanim Creek Channel Stabilization |
| | 1544 | Pine Lake | | | | 4, 9 | | | | $160,000 | | | | Pine Lake Subbasin Nonpoint Source Identification |
| | 1545 | Zaccuse Creek and Tributary 0145b also by 206th Ave NE | | | Completed 98/99 | 4, 9 | | | Control point discharges and erosion sites along road embankment and at pump-station overflow on 0145A; stabilize main channels of 0145A & B with large organic debris (LOD) and/or check dams. Potential need for additional channel stabilization along 0145B, between outfall of Montage and private drainage system beneath 206th Ave. NE, should be evaluated after the LOD/check-dam installation | $862,000* | | | | Channel Stabilization--Zaccuse Creek and Tributary 0145B (Monohon) |
| | 1546 | Lower Zaccuse Creek | | | | 2, 4, 9 | 1599p, m9 | | Remove pipe and replace with open channel between existing lakeshore residences to provide fish access to upstream stream habitat | $642,215[1] | | | | Lower Zaccuse Creek Channel Reconstruction |
| | 1599p | Lower Zaccuse Creek | Habitat | | Not Funded | 2, 4, 9 | 1546, m9 | | Revegetate Streambanks | $3,700 | CIP # OL1005 | | | Lower Zaccuse Revegetation (1546) |
| | m9 | Zaccuse Creek and Tributary 0145b | | | | 3 | 1546, 1599p | | Channel Stabilization & Tightline | $993,700 | | | | |
| | 1547 | Lower 0163 at ELSP | | | Not Funded | 2, 4, 9 | 1599q, m6, Maybe l2 | | Replace culverts upstream of ELS Parkway and make fish passage possible. In cooperation with streamside homeowners, add streamside vegetation and improve in-channel diversity in the lowermost 0.10 river miles through Alexander's on the lake | $132,000 | CIP #OM1005 | | | Tributary 0163 Culvert Replacement and Stream Enhancement |
| | 1599q | Trib. 0163 | Habitat/Erosion | | | 4, 9 | 1547, m6 | | Revegetate streambanks and conduct minor channel restoration activities | $18,900 | | | | Trib. 0163 Revegetation (1547) |
| | m6 | Tributary 0163 | | | | 3 | 1547, 1599q, Maybe l2 | | Culvert Replacement and Stream Enhancement | $255,500 | | | | |
| | 1548 | Many Springs Creek | | | | 4, 9 | | | Add to, and maintain, existing check dams in channel to stabilize upper reach. Reconstruct channel reach below major landslides at RM. 0.5 with engineering fill, non-erosive channel, and bank planting; construct new check dams below new channel reach. | $359,000* | | | | Many Springs Creek Channel and Ravine Stabilization |
| | 1549 | Lower Laughing Jacobs Creek at SE 24th St | | | Not Funded | 2, 4, 9 | 1599r | | To improve streamside habitat, relocate the channel to the north side of SE 24th St. Construct culverts that will allow for the passage of resident fish, construct swales to provide biofiltration for road runoff, and revegetate the realigned portions of the stream channel. | $100,000 | CIP #OR1005 | | | Laughing Jacobs Creek/SE 24th Street Stream Relocation (Laughing Jacobs) |
| | 1599r | Laughing Jacobs Creek/SE 24th | Habitat/Erosion | | Not Funded | 2, 4, 9 | 1549 | | Revegetate streambanks and conduct minor channel reconstruction activities. (Revegetation component of Project 1527 by county crews). | $29,700 | CIP #OR1005 | | | Laughing Jacobs/SE 24th Revegetation (1549) |
| | 1550 | Wetland 26/SE 24th Street | | | | 2, 9, 3 | | | To prevent flooding of SE 24th Street by Wetland 26, rebuild the trestle to raise the roadway one to two feet to provide sufficient clearance for a 25 yr. Level of protection against future water levels in the wetland. (Should be implemented as part of a proposed King County Roads Division project (Beaver Lake Trestle 422-A)). An additional road | (project 422-A) $920,000 / (expansion east) $228,000 | | | | Wetland 26/SE 24th Street Road Raising |
| | 1551 | Tributary 0166 | | | | 2, 4, 9 | | | Convert rock swale into biofilter; construct new road drainage outlet/swale. | $55,660 | | | | Tributary 0166 Water Quality Improvements |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1552 | Laughing Jacobs Lake Outlet | | | Not Funded | 2, 9, 3 | | | | $341,300 | CIP #AE1005 | | | Laughing Jacobs Lake Outlet Control |
| | 1553 | Laughing Jacobs Lake and tributary 0166 from the lake downstream to SE 42nd St | | | | 2, 9 | 1599h | | Construct a control structure to regulate lake stage on Laughing Jacobs Lake. Complete floodplain mapping for Laughing Jacobs Lake and tributary 0166 from the lake downstream to SE 42nd St. | $311,000 | | | | Lower Laughing Jacobs Creek Sed. Management |
| | 1599h | Laughing Jacobs Creek | Sedimentation | | | 4, 9 | 1553 | | Remove sediment from overbank area and active flood bars, during the summer months as needed immediately upstream of the footbridge at RM. 0.35 to 0.4. Maintain in accordance w/ periodic inspection by SWM Division geologist. | $2,000 | | | | Laughing Jacobs Sediment Removal |
| | 1554 | Beaver Lake | | | Partial Construction | 2, 4, 9 | | | (In conjunction w/the education program in LJ-2), purchase native vegetation to be planted on the shore of Beaver Lake by volunteer landowners. Establish the shore area as a demonstration site to reintroduce native flora. | $10,000 | | | | Beaver Lake Revegetation |
| | 1555 | Beaver Lake | | | | 2, 9 | | | Determine the feasibility of increasing the active storage capacity of Beaver Lake by about 40 acre-feet. This would increase peak lake stages by six inches. The study should consider the impacts on water-quality and to lakeside property owners. | $27,000* | | | | Beaver Lake Enhanced Detention Study (Laughing Jacobs) |
| | 1556 | Inglewood | | | | 2, 4, 9 | | | Identify discharges to the surface water system that do not meet current codes and regulations. Work in cooperation w/ the property owners to connect any discharges identified to the sanitary sewer system or to arrange for appropriate means of disposal. | $10,000 | | | | Inglewood Illicit Hookup Survey (Inglewood) |
| | 1557 | Wetland 30 | | | | 4, 9 | | | Conduct a detailed soil, vegetation, and hydrologic inventory of Wetland 30. Use the functional boundary approach to establish the interior buffer edge of the wetland. Perform an analysis to determine whether Wetland 30, and subcatchment P5a in particular, meets the requirements for LSRA designation and subcatchment management (as in Recommendation I-2). | $20,000 | | | | Wetland 30 Inventory Update |
| | 1558 | Laughing Jacobs | | | | 4, 9 | See BW-10 | | Water-quality monitoring should be conducted to identify specific areas of the subbasin for source-control strategies and to identify additional facilities for water-quality retrofits. | $40,000 | | | | Laughing Jacobs Water-Quality Study (Laughing Jacobs) |
| | 1588 | Basinwide | | | Some work is done but not complete | 2, 9 | | | Review existing retention/detention facilities in the basin, identify which may be amenable to modification or reconstruction to improve water-quality performance, and accomplish the retrofitting. | $182,000 | | | | Water Quality Retrofit Study (Basinwide) |
| | 1599c | George Davis Creek | Water Quality | Livestock waste contaminates the creek | | 11, 4, 9 | m3, BW-10 | | (If consistent w/ SAO rules for livestock), install fencing or other measures in pasture areas to exclude livestock from stream; educate residents on water quality improvement techniques. (Proposed to be completed by special County Crews). | $47,800 | | | | Geo. Davis Fencing & Enhance |
| | m3 | George Davis (Tributary 0144) | | | | 3 | 1599c | | Fencing and Enhancement | $78,600 | | | | |
| | m10 | Pine Lake | Water Quality | | | 3 | | | | $225,100 | Cost from 1996 report was escalated by 3% annually. | 10/5/00 Conversation with Glen Evans indicates that Sharon Walton/KC may be working on Phase I Study. Dick Thiel/Sammamish believes County would fund such studies. | | Pine Lake Water Quality Study |
| | 1599f | Wetland 38 | Habitat | | Parial Construction | 2, 4, 9 | 1599j | | Plant a vegetated buffer of western red cedar and western hemlock at least 15 ft. high along the southern boundary of Wetland 38. | $20,000 | CIP #AK1005 | | | Wetland 38 Buffer Restoration |
| | 1599j | Wetland 30 | Habitat | | Partial Construction | 2, 4, 9 | 1599f | | Fence wetland buffers along areas where residential and agricultural development has occurred. | $10,000 | CIP #AK1005 | | | Wetland 30 Buffer Restoration |
| | 1599g | Laughing Jacobs | Water Quality | | | 4, 9 | BW-10 | | Construct a biofiltration swale in existing roadside ditch. | $46,700 | | | | Laughing Jacobs WQ Improment |
| | 1815 (1) | Trib. 011E at Timberline | Flooding / Erosion / Water Quality / Sedimentation | Landslides as well. | | 8 | 1815 (2) | | Intercept & bypass flows along west ridge above stream channel (Divert flows entering the headwater channel of tributary 0111E to existing downstream detention pond and then into tightline.). | $597,000 | Capital Project Number 1815 | | | |
| | 1815 (2) | NE 44th Street and 212th Ave NE at Timberline | Flooding / Erosion | R/D Pond malfunction, flooding, and channel erosion. | | 8 | 1815 (1) | | Under 1990 design by King County SWMD modify outlet of existing R/D pond at NE 44th Street and 212th Ave. NE; reconstruct ravine downstream of overflow route. | | Capital Project Number 1815 | | | |
| | 1828 | Trib. 0111d | Erosion / Water Quality / Sedimentation | Channel Incision, landsliding | | 8 | | | Divert flows entering the headwater channel of tributary to existing downstream detention pond and then into tightline. | $318,000 | Capital Project Number 1828 | | | |
| | 1830 | Trib. 0111c | Erosion / Water Quality / Sedimentation | Channel Incision, landsliding | | 8 | | | Divert flows entering the headwater channel of tributary to existing downstream detention pond and then into tightline. | $312,000 | Capital Project Number 1830 | | | |
| | 1831 | Trib. 0111b | Erosion / Water Quality / Sedimentation | Channel Incision, landsliding | | 8 | | | Divert flows entering the headwater channel of tributary to existing downstream detention pond and then into tightline. | $430,000 | Capital Project Number 1831 | | | |
| | 1832 | Trib. 0111 | Erosion | | | 8 | | | Divert flows entering the headwater channel of tributary to existing downstream detention pond and then into tightline. | $339,000 | Capital Project Number 1832 | | | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1833 | Trib. 0111a North of Allen Lake at NW 18th St | Flooding | | | 8 | | | Perform hydraulic study of Allan Lake outlet at D/S system, expand existing Drainage Investigation Section's hydraulic analysis of tributary 0111A between Allan Lake and Northeast 18th Street, using flow modeling, to identify flooding causes and recommend conveyance improvements. | $8,000 | Capital Project Number 1833 | | | |
| | 1834 | Trib. 0111a NE 22nd St | Erosion | Hillslope failure | | 8 | | | Retrofit existing R/Ds for optimal control of erosive flows; enhance onsite R/D standards. (In subcatchments E15 and E16, enhance existing de facto detention behind road culverts to reduce present intensity of downstream incision in tributary 0111A and eliminate present flooding without impacting improved property.) | $100,000 | Capital Project Number 1834 | | | |
| | f1 | Laughing Jacobs Sub-basin | Flooding | Localized flooding around Laughing Jacobs Lake. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f2 | Laughing Jacobs Sub-basin | Habitat | Most of the system above the falls is significantly degraded by urbanization. System is being channelized. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f3 | Laughing Jacobs Sub-basin | Stream Stability | Less than 80% of the banks are stable. Urbanization is increasing the bedload. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f4 | Laughing Jacobs Sub-basin | Water Quality | Fecal Coliform, TP, and turbidity levels exceed acceptable range. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f5 | Pine Lake Sub-basin | Flooding | Localized flooding around Pine Lake. Flooding across roadways in this area. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f6 | Pine Lake Sub-basin | Habitat | Poor pool quality, poor LWD, Most of the system above the slope is significantly degraded due to urbanization. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f7 | Pine Lake Sub-basin | Stream Stability | Less than 80% of the banks are stable. Areas of severe bank failures along Kamin Creek. Urbanization is increasing the bedload. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f8 | Pine Lake Sub-basin | Water Quality | Pine lake is eutrophic with high TP, seasonal algal blooms, and medium clarity. Storm streams exceed fecal coliform, TP, and turbidity acceptable levels. | | 6 | | | New WQ ponds may help reduce the urban impact. | | Look for funding through Grants and Partnerships | | | |
| | f9 | Monohon Sub-basin | Flooding | Localized flooding. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f10 | Monohon Sub-basin | Habitat | Steep gradients and impassible culverts limit the fish use. Urban development impacting the system. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f11 | Monohon Sub-basin | Stream Stability | Less than 80% of the streams are stable. Stream channal incision and landslide is severe. Urbanization is causing the situation to worsen. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f12 | Monohon Sub-basin | Water Quality | High turbidity has been observed. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f13 | Panhandle Sub-basin along ELSP | Flooding | Localized along ELSP | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f14 | Panhandle Sub-basin | Habitat | Steep gradients and impassible culverts limit the fish use. Urban development impacting the system. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f15 | Panhandle Sub-basin | Stream Stability | Stream channel incision and landslide is severe due to urbanization. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f16 | Panhandle Sub-basin | Water Quality | No Information | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f17 | Inglewood Sub-basin around 221st and 228th | Flooding | Localized flooding around 221st and 228th Avenues and along ELSP. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f18 | Inglewood Sub-basin, East of 228th | Habitat | Most of the system above 228th is degraded by urban development, with channalization and bank erosion. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f19 | Inglewood Sub-basin | Stream Stability | Less than 80% of the banks are stable. Severe erosion over steep substrates, expected to worsen with increased development. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f20 | Inglewood Sub-basin | Water Quality | Storm stream flows are found to exceed acceptable levels of fecal coliform, TP, and turbidity. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f21 | Thompson Sub-basin | Flooding | Few issues. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f22 | Thompson Sub-basin | Habitat | Sedimentation is occuring | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f23 | Thompson Sub-basin | Stream Stability | Less than 80% of the banks are stable. Bank and bed erosion is occuring in the upper and mid-reaches, expected to worsen with increased development. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | f24 | Thompson Sub-basin | Water Quality | Storm stream flows are found to exceed acceptable levels of fecal coliform, TP, and turbidity. | | 6 | | | | | Look for funding through Grants and Partnerships | | | |
| | h1 | Trib. 0143A 5000 Block, ELSP NE | Flooding | Future Problem | | 11 | | | | | | | | |
| | h2 | Trib. 0143J 1800 Block, ELSP NE | Flooding | Future Problem | | 11 | | | | | | | | |
| | h3 | Trib. 0152 600 Block, ELSP SE | Flooding | Future Problem | | 11 | | | | | | | | |
| | h4 | Trib. 0166 23700 Block, SE 32nd Way | Flooding | Future Problem | | 11 | | | | | | | | |
| | h5 | Trib. 0166 24100 Block, SE 24th | Flooding | Future Problem | | 11 | | | | | | | | |
| | h6 | Trib. 0166 4100 Block, Issaquah Pine Lake Road SE | Flooding | Future Problem | | 11 | | | | | | | | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | h7 | Trib. 0143b, NE 42nd St and ELSP | Flooding | | | 11 | | | | | | | | |
| | h8 | Trib. 0143c, ELSP south of 196th Ave NE | Flooding | | | 11 | | | | | | | | |
| | h9 | Trib. 0143e 3400 Block ELSP NE | Flooding | | | 11 | | | | | | | | |
| | h10 | Trib. 0143f 3000 Block ELSP NE | Flooding | | | 11 | | | | | | | | |
| | h11 | Trib. 0143g ELSP at NE 30th Ct | Flooding | | | 11 | | | | | | | | |
| | h12 | Trib. 0143h 2620 ELSP NE | Flooding | | | 11 | | | | | | | | |
| | h13 | Trib. 0143k 1600 Block ELSP NE | Flooding | | | 11 | | | | | | | | |
| | h14 | Trib. 0143l, NE 15th St at 207th Ave NE & Inglewood Hill Rd west of 207th | Flooding | | | 11 | | | | | | | | |
| | h17 | Trib. 0144 600 Block ELSP NE | Flooding | | | 11 | | | | | | | | |
| | h19 | Trib. 0149 1500 Block 212th Ave SE | Flooding | | | 11 | | | | | | | | |
| | h20 | Trib. 0149 300 Block ELSP SE | Flooding | | | 11 | | | | | | | | |
| | h21 | Trib. 0166 SE 24th St between 228th Ave SE and 244th Ave SE | Flooding | | | 11 | | | | | | | | |
| | h22 | Trib. 0166 238th Ave SE south of SE 24th St | Flooding | | | 11 | | | | | | | | |
| | h24 | Trib. 0152 212th Ave SE and SE 24th St | Flooding | | | 11 | | | | | | | | |
| | h25 | North Headwaters of George Davis Creek | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h26 | Trib. 0144b | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h27 | Trib. 0149 | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h28 | Trib. 0152 and Pine Lake Creek | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h29 | Pine Lake | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h30 | Trib. 0166a | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h31 | Trib. 0166e | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h32 | Trib. 0166 | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h33 | Trib. 0164a | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | h34 | Trib. 0166 and Laughing Jacobs Creek | Water Quality | | | 11 | | | | | See Figure 52 of Document | | | |
| | [1]Estimated Cost $s have been escalated to Year 2000 $s | | | | | | | | | | | | | |
| | Note: All 1599 problems are related | | | | | | | | | | | | | |
| | * 1993 Dollars | | | | | | | | | | | | | |
| | ** 1993 Dollars including 5% inflation added over three years | | | | | | | | | | | | | |
| | **MAINTENANCE (Not CIPs)** | | | | | | | | | | | | | |
| | 8 | Flooding | Water in backyards, and occaisionally over roadway. | | Tina Miller/KC | Maybe 00-0016 | | | Maintenance: Tina's dept. is cleaning out clogs and trapping/moving beavers. | | | | | |
| | 11 | Flooding | House flooding. | | | | | | Maintenance: Beavers. | | | | | |
| | 17 | East Lake Samm. Pkwy NE and NE 27th (approx.) | Flooding | Minor roadway flooding. | | | | | Maintenance | | | | | |
| | 23 | Pacific Estates (Frog Bog) | Water Level Fluctuation | Infiltration stormwater system blew out… now big open water component. Water level gets high, but not a problem. Community group has done water level and wildife use inventories. | | Dave Hancock and Tina Miller / KC | 99-0796, 00-0215, 00-0284 | | KC WLRD says pond was retrofitted & new outlet installed about 2 years ago. In City's stormwater facilities inventory as regional facility. Specific complaints below suggest maintenance actions. | Maintenance: Costs covered in residential facilities maintenance program (part of overall contract cost) | | | | |
| | 99-0796 | 2003 231st Pl NE | Flooding | R/D facility flooding, blocked orifice | Work Authorized to repair | 19 | 23, 00-0284, 00-0215 | | Maintenance: Remove obstruction | | Detailed Complaint Available | | Nancy Schropp: 425 868 6676, 2003 231st PL NE | |
| | 00-0215 | 24235 NE 7th PL | Flooding | Pond outlet is plugged, water level in control structure is above outlet invert, may be influenced by surface water elevation in wetland | | 19 | 26, 99-0796, 00-0284 | | Maintenance: work authorized to expose outlet pipe | | Detailed Complaint Available | | Dana Heiser: 868 2227, 24235 NE 7th PL, Redmond, WA 98053 | |
| | 00-0284 | 2322 229th Ave NE | Flooding | Culvert must be blocked because an adjacent wetland is flooding and spilling onto owner's property | | 19 | 23, 99-0796, 00-0215 | | Maintenance: repair/replace failed culvert between two wetlands. | | Detailed Complaint Available | | Steve Wiese: 425 836 8233, 2322 229th Ave NE, Redmond, WA 98053 | |
| | 98-0389 | 2128 205th Ave SE | Maintenance | | | 19 | | | Maintenance | | | | Mik Malnerich | |
| | 99-0579 | 23225 NE 10th Pl | Maintenance | Obstruction in conveyance to R/D fac | | 19 | | | Maintenance | | | | Dave Hancock | |
| | 99-0917 | 21220 SE 5th Pl | Pond Vandalism | 4X4 use has damaged pond bottom and side | | 19 | | | Regular KC maintenance issue, alleged vandal identified | | Detailed Complaint Available | | Bob Nolan: 296 7161, 15020 SE 49th St, Bellevue, WA | |
| | 00-0178 | 3132 240th Ave NE | Fallen Tree | Tree has fallen into R/D pond | | 19 | | | | | Detailed Complaint Available | | Terry Ballenger: 425 868 3415, 24004 NE 31st Way, Sammamish, WA | |
| | 00-0178 | 24004 NE 31st Way | Fallen Tree | Tree fell in windstorm | | 19 | | | | | Work Authorized to remove tree, Detailed Complaint Available. | | Terry Ballenger: 425 868 3415: 425 868 3415, 24004 NE 31st Way, Sammamish, WA | |
| | 97-0711 | 20107 SE 20th PL | Flooding | Plugged Catch Basins | | 19 | | | | | Detailed Complaint Available | | Earle Stuard: 455 6894, 20107 SE 20th PL, Sammamish, WA 98029 | |
| | 98-0097 | 3052 224th Ave. NE | Flooding | Plugged storm drain. | | 19 | | | Maintenance. | | Carter could not reach complainant (Frank Stull). Thre is no additional information. | | | |
| | 98-0389 | 2128 205th Ave. SE | Undeclared | | | 19 | | | Maintenance. | | KC records list as "maint," and Carter confirmed. | | | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **ROADS DEPARTMENT ISSUES (Not Drainage CIPs)** | | | | | | | | | | | | | |
| | 99-0706 | 3939 202nd Pl SE | Erosion | Owners land is sloughing toward Lake Sammamish due to sheet flow from drainage along SE 40th St, part of road side ditch filled | Forwarded to Road Maintenance | 19 | | | | | Detailed Complaint Available | | Ed Wilder: 425 392 7350, 3939 202nd PL SE, Sammamish, WA 98029 | |
| | 00-0076 | 2020 W Beaver LK DR SE | Flooding | Ditch maintenance by Roads Maintenance redirected flow onto owners property. | Forwarded to Road Maintenance | 19 | | | | | Roads Maintenance waiting for Fisheries Permit, forwarded complaint to Roads maintenance, Detailed Complaint Available. | | Sherry Brooks: 425 392 9613, 2020 W Beaver Lake DR SE, Sammamish, WA 98029 | |
| | 00-0085 | 19815 SE 19th ST | Flooding | New construction in adjacent lot and an existing culvert is being clogged as a result flooding the road. See Comments. | Forwarded to Road Maintenance | 19 | | | | | Developer has extended an 8 in pipe with a 12 in pipe w/o CB. Detailed Complaint Available. | | Denis Gromala, 19815 SE 19th St, Sammamish, WA 98029 | |
| | 00-0126 | 1024 216th NE | Water Quality | Horse manure from adjacent property is not cleaned up and surface water may be contaminated. Trampled vegetation may result in a landslide problem. | | 19 | | | Referred to Roads Maintenance | | Detailed Complaint Available | | Miss Dee: 425 868 1808, 1024 216th NE, WA, 98053 | |
| | 00-0190 | 1900 228th Ave NE | Damage | Fence and gate at R/D facility are damaged | Forwarded to Road Maintenance | 19 | | | | | Work Authorized and sent to Roads Maintenance for Repair, Detailed Complaint Available. | | John VanBuskirk (Roads Maintenance): 206 296 8181, 1900 228th Ave NE | |
| | **POLICY ISSUES (Not CIPs)** | | | | | | | | | | | | | |
| | 1 | SE 48th - Issaquah/Pine Lake Rd. | Flooding | Future development to uplands (pending) is a complaint/concern. Lawsuits have been discussed. Goes East through Klahanie and Rainbow Lake. | | Tina Miller/KC | See 2 | | Policy, Developer Financed CIP | | | | | |
| | 98-0578 | 23023 NE 28th St | Oil Dump | Apparent dumping of motor oil in ditch | | 19 | | | Enforcement. May be closed. | | | | Cindy McGinty | |
| | 00-0034 | SE 34th & 212th SE | Erosion | | | 19 | 96-0442, 3, 98-0221, 00-0030, Maybe 7, 12 | | Policy | | Complaint Available | | | |
| | 12 | Pine Lake | Quantity and WQ | Development is impacting the "above and beyond" status of the lake. | | Tina Miller/KC | 00-0058 | | Policy | | Eileen Stall was the homeowner mentioned. | | | |
| | 00-0058 | 2610 214th Ave SE | Sedimentation | R/D is putting dirty water into Pine Lake, is due to construction nearby, no TESC. | | 19 | 12 | | Referred to DDES | | Detailed Complaint Available | | Mr. Pazaski: 425 444 1781, 2610 214th Ave SE, Sammamish, WA 98029 | |
| | 00-0286 | 2211 E Beaver Lk Dr SE | Aesthetic Complaint | Property owner dissapointed that vegetation was removed from a detention pond | | 19 | | | Policy | | Detailed Complaint Available | | G. G. Meinig: 425 684 0652, 2211 E Beaver Lake DR SE Sammamish, WA 98029 | |
| | 00-0295 | 15907 242nd Ave NE | Inq | Concern re kids in pond request fence or?? Slopes meet standards. Unauthorized use | | 19 | | | Policy/Enforcement. City encourages complainants to discuss with the | | | | Stewar Estes | |
| | 00-0296 | 1909 222nd AVE NE | Fallen Trees | Fallen trees in adjacent property, request for removal | Closed | 19 | | | Tract is Native Growth Protection Area, removal of trees will require city approval | | Detailed Complaint Available | | Julie Sheppard: 425 868 3982, 1909 222nd NE, Sammamish, WA | |
| | 00-0400 | 4325 212th Ave SE | | Private drainage system installation. No special use permit for accomplished work. | | 19 | | | Policy/Enforcement | | | | | |
| | C | Laughing Jacobs Creek by W creek water fall and W creek by Providence Point, 244th and SE 24th | Water Quality | Development has caused creeks to convey classic dirty foam bubbles into Beaver Lake and Laughing Jacobs Creek (Lake?). | | 21 | | | Policy | | Matt Mathes is running the EIS and has more information. More detail available from drainage problem information sheet. | | Scott Hamilton: 557 2367, 23410 SE 8th St Sammamish, WA, | |
| | D | Ebright Creek | Water Quality | White foam in creek, Kokane & Bull Trout Salmon in creek at mouth | | 21 | | | Policy | | More detail available from drainage problem information sheet. | | Scott Hamilton: 557 2367, 23410 SE 8th St Sammamish, WA, Vali Eberhardt: 868 1236, 704 228th NE #450, Sammamish, WA 98053 | |
| | E | 236th Ave SE 18th | Flooding | Proposed Development will increase current flooding | | 21 | | | Policy | | More detail available from drainage problem information sheet. See email from Anne Freeman June 19, 2000. | | Scott Hamilton: 557 2367, 23410 SE 8th St Sammamish, WA, Anne & Trevor Freeman: 425 392 6614, 2022 236th Ave SE, Sammamish, WA 98029 | |
| | F | George Davis Creek | Siltation | From new development, Skyline HS and Renaissance Ridge | | 21 | B, 19, 1599d, 1535, F, H-1, H-2, 99-0246 | | Enforcement/Policy | | More detail available from drainage problem information sheet. | | Scott Hamilton: 557 2367, 23410 SE 8th St Sammamish, WA, Rich Burkholder: 391 8559 | |
| | H-1 | George Davis / Eden Creek 222nd - 220th between 4th and 6th Streets | Flooding / Erosion | Homes and yards flooding, underground streams, erosion all the way down to the lake, silt and washout problem at lake. | | 21 | 19, 99-0246, B, F, H-2, 1599d, 1535 | Wetland 59 | Udate Basin Stormwater Policy, treat new developments cumulatively, determine mitigation fees to developers, keep wetlands as intended. Potential regional R/D ponds in headwaters of George Davis Creek east of 222nd in the confluence of trib.s was suggested. | | More detail available from drainage problem information sheet. | | Barbara Raabe: 21421 NE 6th PL, 98053, Nicky Beedle 868 9888, 20807 NE 8th St, Sammamish, WA 98053 | |
| | H-2 | 228th SE & SE 4th Street | Flooding | Crushed culvert on 228th causes George Davis Creek to flood on people's property. Complainant says that County moved trib after his 1979 purchase, and it ended up in his backyard. The County says he's in the 100-yr. Floodplain, but he feels singled out. | | 21 | 19, 99-0246, B, F, H-1, 1599d, 1535 | | Some policy issues, plus two culverts under road need repair - one is crushed, other may be crushed. May be ok to wait for TIP (Phase 1-c of 228th, with construction in 2002) . Dams from activists should be investigated/removed? Complainant (Larry Davidson) is willing to negotiate if his land is wanted for detention. | | Complainant concerned about his own attempts at platting and "blockage by regulatory taking of his land through wetland issues," yet says 5 neargby developments will dump more water on his property. See section 5.2 of ELS Basin Plan. More detail available from drainage problem information sheet. | | Larry Davidson: 425 868 8739, 22253 (1/2) NE Inglewood Hill Rd, Sammamish, WA 98074 | |
| | 99-0246 | 543 208th Ave NE | Erosion | New development has caused severe stream bank erosion in Eden Creek. Another new development is in process and owner is concerned. | | 19 | 19, B, F, H-1, H-2, 1599d, 1535 | | Policy | Part of Basin Plan | Detailed Complaint Available | | Val Eberhard: 425 868 1236, 543 208th Ave NE, Redmond, WA 98053 | |
| | L-1 | 21314 SE 37th St Near 212th | Ponding / Flooding | Concern that development is blocking GW aquifers, new development on the way / Drainage ditch on SE 37th floods, sedimentation during construction | | 21 | L-2 | | | | Sounds like a policy issue. More detail available from drainage problem information sheet. | | | |
| | L-2 | ZE 37th Drainage Ditch | Sedimentation | Size of drainage ditch. "Moat" in the winter, designed for 1 house/acre density. New development may be contributing. High sediment load during construction days. | | 21 | L-1 | | Policy Recommendation regarding TESC and Inspection/Enforcement | | More detail available from complaint notes. | | Nancy Brosenan: 21314 SE 37th St, Sammamish, WA 98029 | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PRIVATE PROPERTY ISSUES (Not CIPs)** | | | | | | | | | | | | | |
| | 3 | SE 42nd Street | Flooding | A couple times per year, neighbors can't cross driveway. Upslope development has enlarged their wetlands from 10 years ago. Folks d/s think Klahanie's water is problem, but Steve Foley did Laughing Jacob's Outlet Study showing not all KI. | | Tina Miller/KC | 96-0422, 98-0221, 00-0034, , 00-0030, Basin Plan shows parcels flagged as needing flooding analysis, Maybe 36 | | Private Problem | | See Steve Foley's LJ Outlet Rpt. Says deeper culverts won't fix, but raising driveways (private soln.) would. | | | |
| | 00-0030 | 23031 SE 41st PL | Drainage Concern | Water is filling in fence post holes that neighbor has dug, owner thinks it's sanitary sewer leakage. | No Problem | 19 | 96-0442, 3, 98-0221, 00-0034 | | | | Detailed Complaint Available. Seems to just be groundwater. | | Tom Podel: 425 392 6639, 23031 SE 41st PL, Sammamish, WA 98029 | |
| | 98-0221 | 4131 229th CT SE | High Water Table | Owner's yard and surrounding neighbors' yards are soggy. | | 19 | 96-0422, 3, 00-0034, 00-0030 | | | | Detailed Complaint Available | | Barbara Goetz: 425 313 9840, 4131 229th CT SE, Sammamish, WA 98029 | |
| | 98-0378 | 32108 NE 18th St. | Plg drn, possible NDA | Restricted conveyance private prop imp | | 19 | | | Private Problem (closed?) | | | | J. Bellflower | |
| | 98-0533 | 2019 E Lake Sammamish Pkwy | Drainage | Offsite flow sediment impact hist drng | | 19 | | | Private Problem | | | | Doug Thorpe | |
| | 99-0810 | 121 Louis-Thomson Rd | Flooding | Flooding due to construction up hill, private drainage system on site is not adequate to handle flow, development is draining onto owner's property. | | 19 | A, 27 | | | | Detailed Complaint Available | | Steve Koontz: 206 768 1297, 121 Louis-Thompson Road, Sammamish, WA 98053 | |
| | A | 119 Thompson RD NE | Flooding | Soil in back yard is saturated during the rainy season by the stream, water flow rate has increased dramatically in the last 17 years. Has lost a tree due to high water table and fears losing more. | | 21 | 27, 99-0810 | | Private Problem | | Owners power line was severed ten years prior when landscaper was cleaning out stream in backyard. Powerline goes right under the stream. More detail available from drainage problem information sheet. | | Karen Hall, 119 Thompson Rd NE, Sammamish, WA 98074 | |
| | J | ASR Wetland | Flooding | Water level fluctuation, aesthetics, vegetation dying, 40 acres of new development drainage now go to wetland, new development on the way | | 21 | K | | | | Developer has final plat approval to go ahead with construction. Suggestion that development (Quadrant) run some of the runoff along east side of property. See letter by complainant regarding surface water management policy dated June 20, 2000. Complainant intends to file a lawsuit against developer after construction for sub-basin diversion. More detail available from drainage problem information sheet. | | Gregory Allan: 425 868 7804, 530 254th Ave NE, Redmond, WA 98074 | |
| | K | Seasonal Creek on Complainant's property, 530 254th Ave NE | Erosion | Development (Quadrant) increased runoff from golf course and road, silty water during construction and erosion has persisted. | | 21 | J | | Private Problem | | More detail available from drainage problem information sheet. | | Gregory Allan: 425 868 7804, 530 254th Ave NE, Redmond, WA 98074 | |
| | N | 212th and SE 14th Wetland | Flooding / Sedimentation | 2-36 inch culverts from older platted development discharge onto complainants flat 10 acre pasture. A channel through property is flat and collecting sediment and discharges to a 12 inch culvert. Owner wants to put in 2 36 inch culverts. | | 21 | | | Private Problem | | One solution could be to install an overflow and some drainlines through pasture plus maintain ditch. | | Seifertson (Carter Has Address) | |
| | 99-0816 | 1917 222nd Ave NE | Fallen Trees | Trees from Private Property | Private Problem, Closed | 19 | | | | | Detailed Complaint Available | | Joe Strong: 425 868 3817, 425 936 7802, 1913 222nd Ave NE, Redmond, WA 98053 | |
| | 99-0831 | 2205 212th Ave SE | Sink Hole | Sink hole developing 60 feet from road possibly due to changed drainage as a result of utility project | Private Problem, Closed | 19 | Maybe 00-0241 | | | | Detailed Complaint Available | | Harry Clark: 425 392 0551, 2205 212th Ave SE, Sammamish, WA 98029 | |
| | 00-0029 | 20522 NE 32nd CT | Drainage Concern | SFR is encountering drainage problems not being addressed by developer, drainage not working | Closed | 19 | | | Private Problem | | Detailed Complaint Available | | Jennifer Senske: 425 836 5615, 20522 NE 32nd Ct Sammamish, WA 98053 | |
| | 00-0051 | 23951 SE 6th St | Flooding | Flooding in crawl space of house | Closed | 19 | | | KC closed as private problem, owner working it out with developer | | Detailed Complaint Available | | Stephanie Ballasistes: 206 205 5510, 425 557 9471, 23951 SE 6th St, Sammamish, WA 98053 | |
| | 00-0158 | 24130 NE 6th PL | Sink Hole | Sink hole along driveway culvert caused by collapse in the culvert | Closed | 19 | | | Owner's responsibility, closed as private | | Detailed Complaint Available | | Rachel Shannon: 425 868 3717, 24130 NE 6th PL, 98053 | |
| | 00-0175 | NE 8th St & 228th Ave NE | Flooding | Commercial site under development tied stormwater overflow into an existing storm drainage system. Overflow ties into Sammamish Highlands Shopping Ceneter (Safeway vault in City Hall shopping center). The system is backed up. | | 19 | | | Still waiting to hear from Darcelle Pageler/KC about the status of the facility. It appears to be under developer control still; therefore, developer will have to pay for the fix (enforcement and maintenance issue?). Directed by City to assume NOT a CIP for now. | | Detailed Complaint Available | | Jay Young (DDES Inspector): 6-7223, 800 228th St | |
| | 00-0181 | 5112 189th Ave NE | Flooding | Neighbors did landscaping and ever since, water has flooded onto the sidewalk - freezes in the winter | | 19 | | | Private Problem: Enforcement issue | | Detailed Complaint Available | | Mike Sigman, 5106 189th Ave NE, WA 98052 | |
| | 00-0241 | 210XX Main St and Louis Thompson Rd | Flooding | Drainage from lots above owners property is discharging in the backyard | Closed | 19 | A, 99-0810, Maybe 99-0831 | | | | Offsite drainage entering property part of site development. Closed as private. Detailed Complaint Available. | | Emmett Doyle: 206 730 6961, Louis-Thompson Rd NE, Sammamish, WA 98053 | |
| | 00-0242 | 20930 SE 14th PL | Flooding | Beavers dammed wetland, flooding over 212th and SE 14th PL | | 19 | 9, 10 | | Private Problem | | May benefit from solution to Wetland 17 over 212th and related problems. City won't raise this road since it is private. | Appears to be private problem (detailed complaint available) | Dan Defranco: 425 313 9912, 20930 SE 14th PL, Sammamish, WA 98029 | |
| | 00-0273 | 23710 SE 24th St | Flooding | Backed up wetland across the street is flooding owner's property. | Closed | 19 | | | No visable obstructions where access permits, possible restriction on private property, closed as private | | Detailed Complaint Available | | Patty Hamam: 425 392 2424, 23710 SE 24th St, Sammamish, WA 98029 | |
| | m5 | Pine Lake Creek | | Stream relocation, wetland restoration. | | 3 | | | Private Problem (reference 10/5/00 Conversation with Glen Evans/KC. | $225,200 | Cost from 1996 report was escalated by 3% annually. | | | |
| | | | | | | | | | | | | | | |
| | **OTHER (Not Drainage CIPs or Outside City Jurisdiction & No Influence on City)** | | | | | | | | | | | | | |
| | B | 23410 SE 8th | Flooding | Since development, flooding in the stream has caused a deep ravine to be formed. | | 21 | 19, 1599d, 1535, F, H-1, H-2, 99-0246 | | Study - to be handled in conjunction with Basin Plan Effort | Part of Basin Plan | More detail available from drainage problem information sheet. | | Scott Hamilton: 557 2367, 23410 SE 8th St Sammamish, WA, Vali Eberhardt: 868 1236, 704 228th NE #450, 98053 | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 19 | Mouth of George Davis Creek | Flooding | Stream goes through the Peter's house (under). Overflow was designed, but it doesn't work. The Peters had a lawsuit. '96/'97 storms filled their entire beach - makes a delta. | | Dave Hancock and Tina Miller / KC | 99-0246, B, F, H-1, H-2, 1599d, 1535 | | County is paying for $500,000 fix. | Not CIP: County paying for $500,000 fix. | At meeting, it was suggested that this stay as an inventory item, even though County is handling. Contact = Karen Goto/KC or Mike O'Neill/KC. | | | |
| | 1599d | George Davis Creek upstream of East Lake Sammamish Parkway | Erosion | | Complete | 11, 4, 9 | B, 19, 1535, F, H-1, H-2, 99-0246 | | Plant vegetation and place woody debris, rocks, and other elements to stabilize the stream channel upstream of ELS Parkway. (Proposed to be completed by special County Crews) | Not CIP: Project completed ($49,900 estimate in 1992 dollars) | | Project was complete in 1994 | | Geo. Davis Bank Stabilization (1535) |
| | 1535 | George Davis Creek at East Lake Sammamish Parkway and BNRR tracks | Conveyance? | | Complete | 11, 4, 9 | B, 19, 1599d, F, H-1, H-2, 99-0246 | | Construct a new 72 inch culvert under ELS Parkway and the BNRR tracks. Connect the culvert to a new channel constructed between the Parkway and BNRR tracks. This channel would outlet to LS approximately 400 ft. north of | Not CIP: Project completed ($268,000 estimate in 1992 dollars) | has been designed and was scheduled for construction by the Roads Division in 1992 | Project was complete in 1996 | | George Davis Creek Conveyance Improvements |
| | G | Lake Sammamish | Water Quality | General public concern for water quality | | 21 | | | Other: (not CIP) | | | | | |
| | 5 | Beaver Lake | Water Quality | Lake has own management plan. Once in a while, flooding complaint ("water level higher than used to be"), but real issue is WQ (phosphorus). Look at both. There is a control weir at the outlet (@ the gage) in the park. North area is on septic. | | | | | Developer's Responsibility. County said that facility was never turned over by developer. May have bond default issue. May need to be mucked out, over excavated, have fabric added, use more porous material. | $20,000 | Dave thinks there will be continued concerns w/infiltration system at Beaver Lake Estates. Doesn't seem to infiltrate at rate necessary (see purple dots). Policy? Special Lake Mgmt. District, expired but is trying to re-form. Self-taxing. Though private, City assistance would help public property (WQ) in lake. Report from Lake Mgmt. District requesting help should be reviewed. | | | |
| | 6 | | Other | | | Tina Miller/KC | | | Inter-agency (IAC) Grant is being written - looking to purchase land. Not really a complaint. | | Note: Laughing Jacobs Creek erosion issues within the City have been stabilized. | | | |
| | 25 | Mystic Lake | ? | Outside of City Jurisdiction | | Dave Hancock and Tina Miller / KC | | | | | | | | |
| | 98-0472 | 17XX West Lake Sammamish Pkwy SE | Sediment (Elmer Lawsuit) | Outside of City Jurisdiction | | 19 | | | Outside of City Limits | | | | | |
| | 99-0228 | 741 222nd PL NE | Algae | 50 feet of sidewalk and gravel across the east side of street covered in Algae | | 19 | | | Outside of City Limits | | Detailed Complaint Available | | Kim Christenson: 425 868 2678, 741 222nd PL NE, Redmond, WA 98053 | |
| | 99-0383 | 20703 SE 3rd Way | Fallen Tree | Fallen Tree, another one about to fall | | 19 | | | | | Detailed Complaint Available | | Kari & Denise: 425 868 9095, Stephanie Crinklaw: 425 836 8084, 20728 SE 3rd Way Redmond, WA 98053 | |
| | 99-0777 | 20200 NE 16th St | Bad Signage | Facility Identification Sign misidentified as D91388, should be D92417 | Developed Work Authorization | 19 | | | Not a drainage issue | | Detailed Complaint Available | | John Davis: 296 8178, 20200 NE 16th St | |
| | 99-0724 | 2208 207th Ave SE | Drainage Concern | Owner inquiring about the construction of a flow control facility discharging down a ravine | Forwarded to DDES Land Use Inspection | 19 | | | | | Detailed Complaint Available | | Ron Brood: 206 416 3273, 425 392 4675, 2208 207th Ave SE, Sammamish, WA | |
| | 99-0780 | 2500 East Lake Sammamish PKWY SE | Hole in Fence | Hole in Chain Link Fence | Work Authorized to repair | 19 | | | | | Detailed Complaint Available | | John Davis: 296 8178, 2500 E. Lake Sammamish Parkway SE | |
| | 00-0011 | 1827 East Lake Sammamish Parkway NE | Flooding ? | Water Ponding on driveway | | 19 | | | Other: To be corrected by King County Parks Department | | Detailed Complaint Available | | Don Stahl: 888 8761, 1827 E. Lake Sammamish Parkway NE, Sammamish, WA 98053 | |
| | 00-0093 | 19605 NE 33rd PL | Request | Owner requested to landscape in a R/W | Granted Permit | 19 | | | | | Detailed Complaint Available | | Karen Quick: 425 836 8242, 19605 NE 33rd PL, Sammamish, WA 98053 | |
| | 00-0149 | 22601 SE 16th PL | Electric Fence Proposal | Owner in the process of short platting, wants to install fence, must provide bioswale and conveyance | | 19 | | | | | Detailed Complaint Available | | Tim Burks: 206 910 8564, 22601 SE 16th PL, Sammamish, WA 98029 | |
| | 00-0161 | 3680 232nd Ave SE | Access Blockage | R/D Facility access road has been blocked | | 19 | | | Outside City Limits | | Outside City Limits, Detailed Complaint Available | | Mary Amundson: 489 1641 | |
| | 00-0225 | 192nd DR NE & NE 51st ST | Proposal Review Request | Request to review Eastmont Proposal | | 19 | | | | | Detailed Complaint Available | | Dick Thiel 425 898 0660 | |
| | | | | | | | | | | | | | | |
| | **RESOLVED COMPLAINTS** | | | | | | | | | | | | | |
| | 4a | SE 24th & SE 32nd | Flooding | Very flat run (was a constructed drainage ditch. Also constructed wetland.) 1 house on SE 32nd has had house damage (prior to culvert replacement). | | Tina Miller/KC | 4b | | Dick thinks may not be problem anymore (culvert under SE 32nd enlarged). Channel improvements may be needed. Was on Roads CIP? Verify notes and location with Dick/Tina. | | | | | |
| | 18 | East Lake Samm. Pkwy and 196th | Flooding | Roadway flooding. | | | | | Maintenance - already resolved | | | | | |
| | m7 | Wetland 17/212th Ave SE Trestle | Flooding | Road through wetland; flooding of road. Possible solution is bridge. | | 3 | | | Temporary fix completed in 2000. Permanent fix will be covered under TIP program (drainage component is shown in Drainage CIPs as Project T9). | $564,000 | Cost from 1996 report was escalated by 3% annually. | | | |
| | 98-0257 | NE 18th/244th Ave. NE | Filling | Pre-develop prob adj prop fill blk drng. | | 19 | | | Closed | | | | James Hutchens | |
| | 98-0381 | 21428 SE 34th Place | Saplings | R/D fac maint needs. Not invent. | | 19 | | | Closed | | | | Patty Hunter | |
| | 98-0495 | 20XX 236th Ave SE | RD Impact | Request to divert flows from R/D facility. | | 19 | | | Closed | | | | Jose Amedson | |
| | 98-0598 | 2215 224th Place NE | Ditch | Substandard pipe inst in R/S ditch | | 19 | | | Closed | | | | Mark Lofquist | |
| | 99-0382 | 20300 E Lk Sammamish / Ingelwood | Maintenance | Access to pond removed by new sfr consr | | 19 | | | Closed | | | | Jerry Tracy | |
| | 99-0547 | 3133 235th Ave SE | Paint (WQ?) | | | 19 | | | Closed | | | | Sharo Toamey | |
| | 99-0677 | 22706 NE 18th PL | Encroachment | Owner afraid adjacent clearing encroaching onto property | | 19 | | | Closed | | Detailed Complaint Available | | David Munno, 22706 NE 18th PL | |

| CIP # | ID # | Location | Type of Problem | Description | Status | Source | Connection | Basin | Possible Solution (?) | Estimated Cost ($) | Comments | History | Complainant | Project Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 99--0772 | SE 16th Pl / 219th | Access | Obstructed acces to R/D tank | | 19 | | | Closed | | | | Dave Hancock | |
| | 00-0034 | SE 34th / 212th Ave SE | BMPs | | | 19 | | | Closed | | | | Rock Meadow Farms | |
| | 00-0016 | 2450 215th Ave SE | Flooding | Water flows into yard from driveway from Cul-de-Sac | | 19 | Maybe 8 | | Closed | | Detailed Complaint Available | | Paula Gordon: 391 4584, 2450 215th Ave SE, WA 98027 | |
| | 00-0175 | 800 228th Ave | Drainage | | | 19 | | | Closed | | | | Fay Young | |
| | 98-0022 | 1535 235th Ave SE | Drainage | Pvt prop impact from upbasin area | | 19 | | | Closed | | | | Mamo Ford | |
| | 98-0070 | 19301 SE 16th St | Flooding | Offsite flow bypassing pvt rd drng sys | | 19 | | | Closed | | | | Sidilaicherif | |
| | 98-0106 | 1454 224th Ave NE | Drainage | Groundwatr involving 3-4 lots | | 19 | | | Closed | | | | Ray Dilaura | |
| | 98-0140 | 4221 206th Ave SE | Pollution | Sediment discharge natural situation?? | | 19 | | | Closed | | | | Keith Suppilee | |
| | 98-0162 | 3805 222nd Ave SE | Drainage | Dispersial trench concentrating flow | | 19 | | | Closed | | | | Ted Chepolis | |

# Drainage Document References for Capital Improvement Program
# City of Sammamish Stormwater Management Comprehensive Plan


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2. Tina Miller – King County Basin Steward for the Sammamish Basin, *East Lake Sammamish Basin Plan Recommendations*, June 8, 2000.

3. King County Surface Water Management Division, *Final Draft Estimated Unfunded Needs for Large Capital Improvement Projects*, August 7, 1996.

4. *East Lake Sammamish Project Descriptions (Projects 1521-1599r, Copy 3*)

5. Tina Miller – King County Basin Steward for the Sammamish Basin, *Draft Lake Sammamish Small Tributaries*, March 2000.

6. Tina Miller – King County Basin Steward for the Sammamish Basin, *Report Card – Laughing Jacobs Sub-basin*, June 8, 2000.

7. *Report Card – Inglewood Sub-basin*

8. King County Surface Water Management Division, Snohomish County Surface Water Management, City of Redmond Stormwater Division, *Bear Creek Basin Plan*, July 1990.

9. King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC*), Final East Lake Sammamish Basin and Nonpoint Action Plan*, December 1994.

10. ECONorthwest with Nesbitt Planning and Management, Norton Arnold Janeway, *Analysis of the Financial Feasibility of the Proposed City of Sammamish*, May 29, 1998.

11. King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC*), Draft East Lake Sammamish Basin and Nonpoint Action Plan*, May 11, 1992. (and 13, both documents will be referred to 11 in Drainage CIP Database)

12. King County Surface Water Management Division, *East Lake Sammamish Basin Conditions Report – Preliminary Analysis*, September 1990.

13. King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Watershed Management Committee – Proposed East Lake Sammamish Basin and Nonpoint Action Plan, Volume 2: Response to Public Comments*, December 1992. (and 11)

14. King County Surface Water Management Division, City of Issaquah Department of Public Works, Washington State Department of Ecology, *Issaquah Creek Basin Current/Future Conditions and Source Identification Report*, October 1991.

15. King County Surface Water Management Division, Issaquah / East Lake Sammamish Watershed Management Committee (WMC), *Issaquah Creek Watershed Management Committee Proposed Basin and Nonpoint Action Plan*, September 1994.

16. Entranco, Herrera Environmental Consultants, and Peter Moy and Associates, *Lake Sammamish Water Quality Management Plan – 1996*, December 1996.

17. King County Water and Land Resources Drainage Services Section, *Drainage Complaints Received 1990-2000 Within the City of Sammamish*, June 6, 2000, pp. 1-31.

18. King County Water and Land Resources Drainage Services Section, *City of Sammamish Facility Inquiries (Publicly Maintained Facilities)*, 1997–1999, 1 page.

19. King County Water and Land Resources Drainage Services Section, *City of Sammamish Complaint Response Activities: Drainage Investigation Reports*, March 31, 1998 – June 28, 1999.

20. City of Sammamish, *City of Sammamish Interim Capital Improvement Plan*, April 10, 2000.

21. City of Sammamish and CH2M HILL, *Stormwater Management Workshop #1*, June 20, 2000.

22. Draft ESA Review: Lake Sammamish Small Tributaries, March 2000.

SECTION 6

# Stormwater Utility Financial Plan and System Development Charge

The City of Sammamish (City) stormwater utility serves as one of its funding entities to address the myriad of problems and issues associated with storm and surface water runoff. A financial plan (revenue requirements) to address the operating and capital needs for the stormwater utility has been developed as part of this stormwater management comprehensive planning process. The documentation and results of the revenue requirement analysis for the City of Sammamish are presented below.

## Development of Revenue Requirements

Revenue requirements are determined by a review of the various sources and applications of funds for a utility. The revenue requirement analysis provides the City with a financial plan for a specified time horizon. This financial plan reflects proper levels of funding for operation and maintenance (O&M) activities, as well as for capital expenditure needs, and determines the overall level of adjustment required to rates.

### Methods of Accumulating Costs for Revenue Requirements

The first step in developing revenue requirements is to determine the method of accumulating costs. There are two generally accepted methods for accumulating costs: the "cash basis" approach and the "utility / accrual basis" approach. Most private or investor-owned utilities use the "utility / accrual" basis for setting rates, while most municipal utilities use the "cash basis" approach. The cash basis methodology conforms nicely to most public utility budgetary requirements, and is a straightforward and easily understood calculation. Table 6-1 summarizes and compares these two methodologies.

**TABLE 6-1. Cash versus Utility/Accrual Basis Comparison**

| | Cash Basis | | Utility/Accrual Basis |
|---|---|---|---|
| + | O&M Expense | + | O&M Expense |
| + | Taxes or Transfer Payments | + | Taxes |
| + | Capital Additions Financed with Operating Revenues (≥ Depreciation Expense) | + | Depreciation Expense |
| + | Debt Service (P+I) | + | Return on Investment |
| **=** | **Total Revenue Requirements** | **=** | **Total Revenue Requirements** |

For this study, the "cash basis" approach was used for revenue requirement analysis.

The revenue requirements developed for the City contain the four basic cost components of a "cash basis" methodology: operating and maintenance expenses, taxes/transfer payments, debt service, and capital improvement projects funded from rates. The primary financial inputs for development of the stormwater revenue requirements were the County's historical billing records and the City's year-to-date revenues, along with the current and future operating budgets and plan for stormwater capital improvement program projects. In developing the actual revenue requirements for the City, this approach has been "customized" to follow the City's budget conditions, as presented in Table 6-2.

**TABLE 6-2. "Cash Basis" Revenue Requirements**

| | | |
|---|---|---|
| + | Operation and Maintenance Expenses | |
| | ✓ | Facilities Maintenance Contract Cost |
| + | Taxes/Transfers | |
| + | Net Capital Improvements Funded from Rates [1] | |
| + | Debt Service (P+I) Existing and Future | |
| **=** | **Total Stormwater Revenue Requirements** | |
| *[1]* | *Net Capital Improvements Funded from Rates* | |
| + | Total Stormwater Utility Capital Improvements | |
| – | Funding Sources Other Than Rates | |
| | ✓ | System Development Charges |
| | ✓ | Grants/Loans |
| | ✓ | Existing Reserves |
| | ✓ | New Revenue Bond |
| **=** | **Net Capital Improvements Funded from Rates** | |

The revenue requirement developed for the stormwater utility assumes that the utility will "stand on its own"; that is, it will not be subsidized by another utility or by City funds. The revenue requirement assumes no subsidies and identifies the full operating and capital costs required to operate the system in a financially stable manner.

## Determination of Time Period

The revenue requirements reviewed the 6-year projected period from 2001 to 2006. This time period conforms to the capital improvement plan developed as part of the overall stormwater plan. The revenue requirements have been developed to identify both the immediate and future anticipated rate impacts in an attempt to minimize and levelize rates over the long-term. A more detailed discussion of the key assumptions is discussed below.

## Projection of Rate Revenues

The next step in developing the revenue requirements is to review the sources of funds, or revenues, of the utility. The first revenue source reviewed is revenue at present rates. A projection of revenues at present rates is developed for the current budget year and pro-

jected forward based on an assumed growth factor. In general, this process involved developing projected billing units for each customer class of service (e.g., residential, commercial) and then applying (multiplying) those billing units against the rates that are currently in effect.

The stormwater utility currently has several rate classifications, as established through the County. All single-family residences pay a yearly rate of $85.02, which equates to a $7.09 per month equivalent. More than 90 percent of the City's stormwater customers are residential. There are several other rate classifications that apply to nonresidential customers. They are listed in Table 6-3 with the residential rate.

**TABLE 6-3. City of Sammamish Current Annual Stormwater Rate**

| Description | % Impervious Surface | Rate |
|---|---|---|
| Residential (Very Light) | ≤ 10 | $85.02 per parcel |
| Light | 11 to 20 | $198.40 per acre |
| Moderate | 21 to 45 | $410.98 per acre |
| Moderately heavy | 46 to 65 | $793.60 per acre |
| Heavy | 66 to 85 | $1,006.16 per acre |
| Very heavy | 86 to 100 | $1,317.94 per acre |

Economic and Engineering Services, Inc. (EES) obtained historical billing information from the County, by class of service, to determine a base level of billing units for the present rate revenue calculation.

The revenue did not tie directly to the County information because customers with retention / detention facilities that the customers maintain to a specified standard are allowed one level reduction in their rate. The facilities are inspected each year to determine whether the reduction is allowed. Therefore, the total billings by number of customers and / or acres fluctuates each year. The revenue level used for 2001 is escalated 5 percent from the 2000 level, which was verified, based on the City's current revenue reports and by County Finance staff.

Customer revenue growth was assumed to be 5 percent per year until the moratorium is lifted, and 7 percent thereafter. This estimate is based on the total population estimate of 76,000 by 2014 ("build-out"), provided by the City. While this growth rate may appear conservative in light of the amount of development currently under way in the City, use of a more conservative estimate avoids the need to cut budgets and eliminate programs if overly optimistic growth factors are not realized. The City can adjust the growth rate annually as it gathers data relating to actual growth. At present rate levels, the stormwater utility is projected to have rate revenues of approximately $1,042,000 in calendar year 2001. With anticipated customer growth, rate revenues are anticipated to increase to approximately $1,435,000 by 2006.

## Projection of Miscellaneous Operating Revenues

The stormwater utility receives a minor amount of miscellaneous revenues. These miscellaneous revenues are used as an offset to the operating and maintenance costs of the system. The largest miscellaneous revenue source is investment interest and is anticipated to generate approximately $48,000 in 2001. The assumed interest earnings were calculated based on a 5 percent return on the unrestricted reserves for each year. There might be other minor miscellaneous revenues received in the future as the utility matures.

## Projection of Operation and Maintenance Expenses

O&M expenses are incurred to operate and maintain the existing stormwater facilities in service. The costs incurred in this area are expensed during the current year and are not capitalized or depreciated over the life of the asset.

EES projected O&M expenses based on the proposed facilities maintenance program from Section 4, Stormwater Facilities Maintenance Program, of this plan. The approximate cost of the contract, with services shared by the Sammamish Plateau Water and Sewer District and King County for 2001, is projected at $725,300. Projections of O&M expenses were based on an annual escalation factor of 3 percent for future years. This resulted in a total projected O&M expense for the utility of between $725,300 and $840,800 per year during this 6-year planning period. If the final negotiated contract has a different escalation factor, the projected O&M expenses would change and should be evaluated for level of impact.

## Tax and Transfer Payments

The City's tax payments include the State stormwater excise tax of 1.5 percent. The City is currently not charging the utility a City utility tax. The excise tax is calculated on the utility rate revenues received from customers. This tax is approximately $15,650 to $21,540 per year over the 6-year period. (Note: it is assumed for this projection that no new taxes or increased tax rates occur during this planning horizon.)

There is an administrative transfer from the utility fund to the general fund. This transfer is made to reimburse the general fund for the contribution of staff time, benefits, and supplies used to benefit the utility. This reimbursement is required because these costs are actually paid from the general fund. This cost is estimated to be $150,000 in 2001 and $195,400 in 2006.

## Projection of Capital Improvement Projects Funded from Rate Revenues

The importance of properly funding for capital improvements cannot be understated. In particular, failure to properly fund for renewals and replacements within rates will ultimately lead to long-term financial problems. In effect, a utility will either use cash reserves to finance these renewal and replacement projects in the short term or, worse yet, will not make the necessary replacements at all. The focus of this analysis is to ensure the proper funding level for capital improvements, and to ensure that a portion of these projects is funded from rate revenues.

As a general financial "rule of thumb" the City should, at a minimum, be funding renewals and replacements from rates at an amount equal to or greater than the annual depreciation expense. Annual depreciation expense reflects the current investment in a facility that is

being depreciated or "losing" its useful life. Therefore, this portion of facility investment needs to be replaced to maintain the existing level of infrastructure. The actual value of the City facility was not available from the County. Therefore, annual depreciation cannot be calculated at this time. When construction dates can be estimated for the inventory, facility value and depreciation can be calculated. This will be work that the utility must pursue in the future, as it develops and matures.

Another general rule that can be used to establish adequate funding levels of renewals and replacements is to use 1-2 percent of plant (facility) value. Existing facility value for the City was estimated based on capital improvements completed within the city limits by King County over the past 10 years. This information was available from the Financial Feasibility report produced for the Washington State Boundary Review Board of King County in May 1998. This report indicates a total of $6.2 million of improvements made within the City's boundaries during that time. The City has estimated it will complete another $385,000 of improvements in 2000. Therefore, current facility value is approximately $6.5 million. Experience indicates that plant (facility) value for a jurisdiction similar to that of the City would more typically be in the range of $10 million to $16 million. Applying 2 percent of facility value to $7 million of facility generates a target of $140,000. This was increased to $160,000 for 2001 because the stated value of the facility value appeared to be unreasonably low. A higher target was not established at this time because the utility is new and because capital improvement program (CIP) projects funded from rates have a direct, dollar for dollar, impact on rates. This target can be revised as more information is gathered on the facilities. If the City adopts a rate increase higher than the revenue requirement indicates is necessary, more CIP projects can be funded from rates, moving the utility closer to achieving these general rules.

In the stormwater financial plan, the amount being funded for renewals and replacements is termed "CIP from rates." CIP from rates is escalated each year by 2 percent of the CIP (shown as Total Capital Projects in Table 6-4) of the prior year. This is added to the CIP from rates "base" of the prior year. Therefore, the CIP from rates in 2001 is the base target of $160,000 and in 2006 increases to $410,000. This moves the utility to a reasonable level of funding renewals and replacements by the end of the 6-year period. Again, this target can be revised as the City obtains more information about the value of the existing facilities.

The stormwater utility's 6-year capital plan is presented in Section 5. It identifies three major types of projects: renewals and replacements, stormwater-related Transportation Improvement Plan (TIP) projects, and projects with more basin-wide implications. The first type of projects are renewals and replacements that address current flooding and localized surface water problems. The second type is the storm drainage portion of the TIP projects. The costs for these projects represent just the drainage portion of the transportation improvements. The third category of project relates to projects that were identified by basin planning studies conducted by King County. In the worst-case scenario, the planned capital projects discussed above are assumed to be funded solely from rate revenues. In the recommended option, there is future City debt included in the assumptions.

A summary of the general categories of stormwater CIP projects and the outside funding sources is provided in Table 6-4.

**TABLE 6-4. Summary of Stormwater CIP Projects ($000)**

| Category | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Local Flooding Projects | $641 | $882 | $130 | $50 | $50 | $50 |
| **TIP Projects** | | | | | | |
| 228th Avenue | 0 | 650 | 1,200 | 0 | 0 | 0 |
| 224th Avenue | 0 | 0 | 0 | 600 | 1,200 | 600 |
| Sahalee Way | 0 | 0 | 200 | 315 | 0 | 0 |
| 212th Avenue | 0 | 0 | 180 | 390 | 420 | 210 |
| Trossachs Ext. | 0 | 0 | 0 | 0 | 250 | 0 |
| Miscellaneous | 18 | 42 | 0 | 72 | 168 | 0 |
| E. Samm. P | 0 | 0 | 0 | 120 | 280 | 0 |
| Sidewalks | 70 | 70 | 70 | 70 | 70 | 70 |
| Basin Study Projects | 86 | 469 | 469 | 1,619 | 1,619 | 1,619 |
| **Total Capital Projects** | **$815** | **$2,113** | **$2,249** | **$3,236** | **$4,057** | **$2,549** |
| **Less: Outside Funding** | | | | | | |
| SDCs/Contribution | **$616** | **$616** | **$653** | **$924** | **$952** | **$1,126** |
| Grants/Loans | 0 | 0 | 0 | 0 | 0 | 0 |
| Reserves | 39 | 500 | 0 | 0 | 0 | 0 |
| Revenue Bonds | 0 | 821 | 1,378 | 2,048 | 2,777 | 1,013 |
| **Total Outside Funding** | **$655** | **$1,937** | **$2,031** | **$2,972** | **$3,729** | **$2,139** |
| **Total CIP from Rates** | **$160** | **$176** | **$219** | **$264** | **$328** | **$410** |

One of the assumptions used in Table 6-4 is that no grant funding will be available for this time period. Because there were no specific projections of grant funding for identified projects, this projection can be viewed as a worst-case scenario. It is likely that grant funding sources will become available to the City for some TIP and basin study projects , but at the time this report was prepared, there were no known sources. City staff realize that grant funding may become available and will pursue grants as they are available. Thus, there is a possibility that future grant funding will be available to reduce future debt obligations and ultimately, reduce utility rates generated to pay debt.

Another source of funding for capital improvements are reserves, when they are available. City budget documents show an existing fund balance of $650,000. Portions of this reserve are used as indicated above in Table 6-4. The balance is maintained as an operating reserve. Operating reserve levels are discussed in the section entitled Review of Reserve Levels.

In addition to outside funding through grants, low-interest loans, and reserves there is funding from system developer charges or from the fees customers pay when they connect to the utility system. These charges are described in the next section.

## System Development Charges for Stormwater Utility

The rapid increase in the number of customers on many stormwater systems has increased the burden on utilities to finance this growth. The cost of developing conveyance and treatment systems that meet the requirements of the Clean Water Act and the Endangered Species Act (ESA) can be quite large. To mitigate the cost of financing these new facilities, many utilities have implemented system development charges (SDCs) for new development. SDCs provide a way to balance the cost requirements for new utility infrastructure to meet customer growth between existing and new customers. New utility connections, under SDCs, are required to "buy-in" to the system in terms of both existing capacity and future capacity in order to bear their equitable share of the cost of such systems.

In an effort to generate additional revenue for capital improvements and to establish an SDC as soon as possible, the City adopted an Interim System Development Charge Deposit of $450 per equivalent residential unit (ERU) in August 2000. This action was the result of work done as part of this stormwater comprehensive planning effort. This effort included conducting a survey of local jurisdictions with SDCs in place. The deposit was set at an average of the surveyed SDCs, omitting those that were extreme on either the high or low end. Table 6-5 lists the jurisdictions that were surveyed and the charges they currently have in place.

A significant element in developing the SDC was the ERU. The City's ERU was based on the average from the survey and was determined to be 2,500 square feet of impervious area. For comparison, a typical single-family lot within the city limits is approximately 9,000 to 10,000 square feet, of which approximately 4,500 square feet are impervious. Therefore, an average single-family dwelling equates to 1.8 ERUs. That is determined by dividing 4,500 square feet of impervious area by the 2,500 square feet per ERU. This factor is used to develop the amount of SDC revenue that is generated each year.

When the deposit was adopted, it was intended to be adjusted based on the final SDC. If the final SDC were lower, portions of the deposits would be refunded. If the SDC were higher, additional charges would be made to those developments that came through the permitting process and had the deposit applied.

In addition to generating the SDC deposit, EES was retained to develop a more permanent SDC for stormwater as part of this Stormwater Management Comprehensive Plan. EES has calculated an SDC for the City that is cost based and is fair and equitable to both existing and new customers. The SDC becomes a part of the City's overall financial plan for stormwater. The details and theory involved in developing an SDC are presented in a subsequent section. For summary purposes, the proposed charge is presented in Table 6-6.

**TABLE 6-5. Comparison of City System Development Charges**

| City | 1999 Population | ERU | SDC | Comments |
|---|---|---|---|---|
| Anacortes | 14,370 | 2,000 | $1,126 | |
| Auburn | 38,980 | 2,600 | $400 | |
| Bellevue* | 106,200 | 2,000 | $372 | Converted to $4.65/month paid over 10 years |
| Bellingham | 64,070 | 3,000 | $400 | Proposal to change within 6 months |
| Burlington | 5,635 | 2,400 | $270 | Effective January 1997 |
| Des Moines | 27,160 | 2,400 | $570 | Effective January 2000 |
| Lynden | 8,910 | 10,000 | $200 | |
| Orting | 3,825 | Tenant | $450 | |
| Port Townsend | 8,400 | 3,000 | N/A | Rescinded; draft proposal in process** |
| Puyallup—North | 30,740 | 2,800 | $418 | |
| Puyallup—South | 30,740 | 2,800 | $814 | |
| Redmond | 43,610 | 2,000 | $400 | |
| Renton | 47,620 | 3,000 | $385 | Draft proposal to increase to $525 |
| Sumner*** | 8,495 | 2,400 | $2,005 | $20 per 1,000 s.f. or parcel credited to SDC |
| Average all | | 3,108 | $601 | |
| Adjusted Average**** | | 2,533 | $468 | |
| Median | | 2,600 | $400 | |

ERU = Equivalent residential unit, or unit basis, in square feet.

*The City of Bellevue revised this fee from $2.43/month beginning 1/1/2000. Total assumes 7 years at new fee.

**The proposed fee is $836; $373 for conveyance and $463 for detention.

***Upon issuing a grading, filling, excavating permit $20/1,000 square feet of parcel area is charged. This can then be credited toward the SDC fee if building permit is obtained within 12 months.

****Less the two highest and two lowest fees.

**TABLE 6-6. City of Sammamish, Stormwater Utility Proposed System Development Charge**

| Description | Charge |
|---|---|
| Existing Facility | $184.00 |
| Future Facility | 391.90 |
| Debt Service Credit | (6.30) |
| **Total** | **$569.60** |
| **Net System Development—per ERU** | **$570.00** |

## Debt Service

The final component of the stormwater revenue requirement is debt service. The City has three outstanding debt obligations from the County for which it owes a portion of the debt. Because these costs are part of the Interlocal Agreement with the County, they are included

in this financial plan. The City is currently investigating the benefits that the City receives from the projects these funds supported and the appropriateness of the payments. Any reduction in these costs will help offset revenue requirements. The three issues the City is paying on include 1993, 1996, and 1999 bond issues. Payments on the 1993 issue are $80,500 per year and end in 2002. Payments on the other issues total an additional $93,000 per year through the time period of this study, ending in 2016 (1996 issue) and 2019 (1999 issue).

The worst-case scenario is that the City does not issue any additional debt in this time period. In the recommended option, presented below, the City has a capital need to begin issuing debt in 2002 ($821,000). The City has indicated a probable readiness to issue revenue bonds in 2003. Decisions must be made for the year 2002 whether to defer some capital costs until the City is ready for bonding, to identify and pursue grant and/or low-interest loan funding for about $821,000 in 2002, or pursue a combination of additional rate increases (to fund more capital improvements from rates) and some capital deferral.

## Review of Reserve Levels

The Utility is newly established, and this is an appropriate time to develop financial policies that will help maintain the financial stability of the utility, properly fund capital projects from rates, and determine appropriate reserve levels for operations.

Because operating reserves are essential as a financial cushion to cover periods of cash flow irregularities, setting the appropriate level of reserves is critical. A generally accepted standard minimum level for operating reserves is based on 45 days of O&M expenses plus taxes. This equates to about 12 percent of operations and taxes. Using this simple rule, the City would need a minimum operating reserve of $110,000 in 2001. It is important to note that this amount is a “minimum” and, if possible, the City should target a slightly higher level. Based on City financial reports, there was a balance of $650,000 in the utility fund in 2000. The financial model uses the excess balance in 2001 and 2002 to fund capital improvements.

Capital reserves can be established at 1 year’s average capital expenditure. As the utility matures, it will become increasingly important to review and revise this parameter. At this time, establishing the reserve amount described above will require an additional rate increase beyond that shown in the revenue requirement. Establishing the reserve is a policy decision that the City should review in the future.

## Summary of Revenue Requirements

Given the above assumptions and projections of revenues and expenses for the stormwater utility, a summary of the revenue requirements can be developed. In developing the final revenue requirements, emphasis was placed on attempting to minimize rates while funding the needed capital projects. A brief summary of the stormwater revenue requirements is provided in Table 6-7.

**TABLE 6-7. Summary of Stormwater Utility Revenue Requirements ($000)**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| **Sources of Funds** | | | | | | |
| Present Rate Revenues | $1,043 | $1,095 | $1,171 | $1,253 | $1,341 | $1,435 |
| Miscellaneous Revenues | 48 | 45 | 8 | 8 | 8 | 8 |
| Total Sources of Funds | $1,091 | $1,140 | $1,179 | $1,261 | $1,349 | $1,443 |
| **Applications of Funds** | | | | | | |
| O&M Expenses | $725 | $747 | $769 | $792 | $816 | $841 |
| Taxes/Transfers | 165 | 171 | 177 | 182 | 189 | 195 |
| Debt Service | 174 | 246 | 285 | 464 | 706 | 794 |
| Capital Projects from Rates | 160 | 174 | 219 | 264 | 328 | 410 |
| **Total Applic. of Funds** | **$1,224** | **$1,340** | **$1,450** | **$1,702** | **$2,040** | **$2,240** |
| Plus: Additional Taxes* | 2 | 3 | 4 | 7 | 10 | 12 |
| Balance/(Deficiency) of Funds | ($135) | ($203) | ($275) | ($448) | ($701) | ($809) |
| Percent Balance/( Deficiency) of Funds | 13% | 19% | 23% | 36% | 52% | 56% |

*The additional taxes are expenses incurred when the rate of adjustment (referred to as "% Balance/(Deficiency) of Funds" is implemented. It represents the additional State excise tax due on the additional revenue generated by the rate adjustment. The additional revenue would equal the amount shown as deficiency in funds ($135 for 2001).

It is important to note that when interpreting Table 6-7, the deficiencies noted for each of the years is cumulative. That is, any additional adjustment in the initial years will reduce the deficiency in the following years. For example, if a 13 percent rate adjustment were implemented in 2001, a 6 percent adjustment would be needed in 2002. The results of the revenue requirements indicate that the stormwater utility revenue requirements are approximately 13 percent deficient in 2001, and cumulatively 56 percent deficient in 2006.

Detailed exhibits of the revenue requirement analysis are provided in the Stormwater Utility Technical Appendices.

## Rate Impacts of Revenue Requirements

Based on the results of the revenue requirements a 13 percent rate adjustment should be considered in order to meet the operating and capital needs of the utility in 2001. The City has the option of fully implementing the rate increase or deferring portions of the O&M contract, capital improvements, or general fund transfers to avoid or reduce the increase in 2001. This action would defer those costs to future years. If the rate adjustment were adopted, it would provide the additional revenue needed to meet the operating and capital needs of the stormwater utility in 2001. Additional decisions about deferrals for 2002 must be made if other sources of funding cannot be found for the $820,000 of capital improvements, which is being assumed to be funded from a debt issue.

A framework for the myriad of options available is presented in Table 6-8. Assuming that all O&M expenses, as presented in Section 4 and Table 6-7, remain constant, Table 6-8 presents the cumulative unfunded CIP for various rate adjustment scenarios. The unfunded

CIP balances represent funding deficiencies, and, therefore, projects that can be delayed to future years. The data presented in Table 6-8 assumes no rate increase in 2001. The first four scenarios show the effect of no rate increase, a 10 percent increase, a 20 percent increase, and a 30 percent increase if implemented in 2002. The last scenario shows the effect of a 10 percent rate increase annually, which is just less than the 6-year total revenue requirement presented in Table 6-7. The last scenario is the one that most nearly funds the entire CIP and operational obligations as outlined in the plan.

The annual variables presented in these scenarios are the stormwater rate, subsequent rate revenue, and the level of bonding for the CIP. Adoption of the SDC, as presented in the plan, is assumed for this table. The SDC and other outside CIP funding sources remain as the revenues shown in Table 6-4.

**TABLE 6-8. Cumulative Unfunded CIP with Various Rate Adjustment Scenarios ($000)**

| Rate Adjustment Scenario | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| **No Rate Change** | **85.02** | **85.02** | **85.02** | **85.02** | **85.02** | **85.02** |
| Rate Revenue | 1,043 | 1,095 | 1,171 | 1,253 | 1,341 | 1,435 |
| Bonding for CIP | 0 | 0 | 0 | 0 | 0 | 0 |
| **Unfunded CIP** | **(136)** | **(1,086)** | **(2,544)** | **(4,664)** | **(7,520)** | **(8,630)** |
| **10% Increase in 2002** | **85.02** | **93.52** | **93.52** | **93.52** | **93.52** | **93.52** |
| Rate Revenue | 1,043 | 1,210 | 1,294 | 1,385 | 1,485 | 1,586 |
| Bonding for CIP | 0 | 0 | 0 | 0 | 700 | 0 |
| **Unfunded CIP** | **(136)** | **(971)** | **(2,306)** | **(4,294)** | **(6,371)** | **(7,393)** |
| **20% Increase in 2002** | **85.02** | **102.02** | **102.02** | **102.02** | **102.02** | **102.02** |
| Rate Revenue | 1,043 | 1,325 | 1,417 | 1,517 | 1,623 | 1,737 |
| Bonding for CIP | 0 | 821 | 1,078 | 0 | 0 | 400 |
| **Unfunded CIP** | **(136)** | **(108)** | **(410)** | **(2,434)** | **(5,176)** | **(5,790)** |
| **30% Increase in 2002** | **85.02** | **110.53** | **110.53** | **110.53** | **110.53** | **110.53** |
| Rate Revenue | 1,043 | 1,440 | 1,540 | 1,648 | 1,764 | 1,887 |
| Bonding for CIP | 0 | 821 | 1,078 | 1,750 | 0 | 0 |
| **Unfunded CIP** | **(136)** | **0** | **(172)** | **(470)** | **(3,226)** | **(4,207)** |
| **10% Increase per Year** | **85.02** | **93.52** | **102.87** | **113.16** | **124.48** | **136.93** |
| Rate Revenue | 1,043 | 1,210 | 1,420 | 1,653 | 1,912 | 2,200 |
| Bonding for CIP | 0 | 821 | 1,078 | 1,750 | 1,900 | 2,000 |
| **Unfunded CIP** | **(136)** | **(223)** | **(522)** | **(815)** | **(1,690)** | **(705)** |

Table 6-8 shows that, for no rate increase over the 6-year period, there will be a backlog of $8.6 million in unfunded CIP projects. On the other hand, if rates are increased 10 percent each year beginning in 2002, this backlog would be reduced to $0.7 million over the 6-year period. All scenarios assume that no new CIP projects are added.

As the City approaches a decision regarding rate adjustments it is helpful to understand or quantify the impact that certain rate adjustment decisions will have on ratepayers. Table 6-8 shows the impacts of various rate adjustments and the additional monthly and annual cost to a typical residential customer.

**TABLE 6-9. Monthly Impact of Rate Adjustments to "Typical" Residential Customer**

| Adjustment | $/Month | Increase/Month from Current Rate | Increase/Year from Current Rate |
|---|---|---|---|
| Current Rate | $7.09 | $0.00 | $0.00 |
| 5% Adjustment | $7.44 | $0.35 | $4.20 |
| 7% Adjustment | $7.58 | $0.49 | $5.88 |
| 10% Adjustment | $7.80 | $0.71 | $8.52 |
| 13% Adjustment | $8.01 | $0.92 | $11.04 |
| 18% Adjustment | $8.37 | $1.28 | $15.36 |
| 20% Adjustment | $8.50 | $1.41 | $16.92 |

The City's stormwater rate structure, like King County's, is based on impervious surface and total area for non-residential customers, and uses assumptions of impervious area for residential. The County continues to provide billing and revenue collection service for the City. The County transfers revenues to the City, less fees for billing and collection. At this early stage in the development of the utility, it is important to prioritize issues relating to rates. It was determined most important to focus on adequate and stable funding for the utility, and to minimize rate impacts to customers. Any adjustment between customer classes, through a change in rate structure, typically has a larger impact on one or more customer class. Rate structure changes are not recommended at this time. In addition, with the County continuing to provide billing services for the City, it might be difficult to vary from the County rate structure for administrative and billing system reasons. Therefore, this study focused on the financial plan and development of revenues in the form of SDCs. Any rate adjustments should be applied uniformly across-the-board to the existing rate structure because it is based on impervious surface area generating runoff. A list of the monthly residential rates in surrounding jurisdictions is summarized in Table 6-10.

**TABLE 6-10. Monthly Residential Stormwater Utility Rates of Local Jurisdictions**

| City | 2000 | 2001 |
|---|---|---|
| Bellevue* | $9.19 | $9.70 |
| Issaquah | $10.95 | $10.95 |
| Newcastle | $8.50 | $8.50 |
| Redmond | $11.50 | $11.50 |
| Woodinville | $7.09 | $7.09 |
| Sammamish | $7.09 | $7.09 |

*Based on a lot size of 8,000 to 10,000 square feet, with moderate development (40 percent).

Even with a 13 percent to 20 percent rate adjustment, the City's stormwater rate will be less than the average rate of the surrounding jurisdictions. The sensitivity of rate changes to unfunded CIP levels is shown in Table 6-8.

# Proposed Stormwater System Development Charges (SDCs)

This section presents the detailed calculations for determination of SDCs for the City's stormwater system. EES's calculated SDC for the City's stormwater system is based on generally accepted SDC methodologies. The cost and timing for future capital improvements used in the calculations were developed as part of this comprehensive planning process, as discussed previously. Population, annual permitting, and total build-out projections were provided by City planning staff. Financial data used to develop the SDC are the same as those discussed in the section on revenue requirements. If the timing and cost of future capital improvements change, then the SDCs presented in this section will need to be updated to reflect these adjustments.

## Economic Theory

System development charges are generally imposed as a condition of service. The objective of an SDC is not only to generate money for the utility's capital improvements, but also to ensure that all customers seeking to connect to the City's stormwater system bear their equitable share of the cost of both the existing and future systems. Implementation of fair and equitable SDCs will ensure that customers will not be unduly burdened with the cost of new development.

## Components for Development of System Development Charge

There are a number of criteria that are used to develop the SDC:

- Equivalent residential unit (ERU)
- Existing facility value
- Future capital improvements
- Application of growth allocations
- Credits

Each of these criteria is described below.

**ERUs**. As a starting point, the number of ERUs currently in the system is established. For this study, it was determined that one ERU was 2,500 square feet of impervious area. As described above, this was determined through a survey of surrounding jurisdictions and their ERUs. As the City develops its geographic information system (GIS) database, more specific information and more relevant data can be used to confirm or adjust this value. The number of ERUs added during each year of the study period was based on the City's estimate of a population growth of 76,000. For this study it was determined there are currently 11,958 ERUs on the system. This was derived by taking the City's current population of 30,973, dividing by the Washington State Office of Financial Management's (OFM) estimate of 3.09 persons per household for the City, and applying a 1.2 ERU factor per dwelling for existing lots. Using the OFM factor of 3.09, a total number of households by build-out was

determined. There are projected to be 24,595 households (76,000 / 3.09 = 24,595) by total build-out in 2014.

An estimate of the projected construction permits per year was made to calculate the number of ERUs per year. An important criterion used to estimate the ERUs is the anticipated growth of the system. This estimate was based on a construction limit until an assumed lifting of the moratorium in 2002. The moratorium limit is estimated to be about 600 permits per year by City planning staff. City staff indicated that in subsequent years, after the moratorium is lifted, there would be a gradual increase in construction. The ERUs are spread throughout the time period, (2000 to 2014) in a bell-shaped curve, with peak construction estimated to occur between 2006 and 2009. The City should update the SDC as additional construction activity data, which may vary from these estimates, become available.

Because the typical single-family lot in the City has about 4,500 square feet of impervious area, there are approximately 1.8 ERUs (4,500 / 2,500) per single-family lot. When multiplied times the number of construction permits projected for each year, the ERUs for each year were derived. Details of the calculations and the projection of ERUs are provided in Attachment 6-B, Exhibit 1.

**Existing and Future Stormwater Facility.** Typically, the original facility cost is used to determine the value of the existing system. Then the original facility cost is adjusted for the associated interest cost borne by the existing users who are financing the infrastructure. Because there are no specific records of when the facility was constructed or the original costs, an alternative method was used. As described above in the SDC summary, existing facility value for the City was estimated based on capital improvements completed within the city limits by King County during the past 10 years. The Financial Feasibility for the City of Sammamish report, produced for the Washington State Boundary Review Board of King County, indicates there were $6.2 million of improvements made within the City's boundaries during the past 10 years. The City estimates that it will complete another $385,000 of improvements in 2000. Therefore, current facility value is estimated as $6.585 million. Experience indicates that facility value for a jurisdiction similar to the City of Sammamish would more typically be in the range of $10 million to $16 million. It will be of substantial benefit to the utility to develop this facility cost data so the SDC can be revised to reflect the full value of the existing facility . This total value of $6.585 million for the existing facility is included in the SDC calculation as the newcomer's "buy-in" to the existing system, resulting in an existing facility allocation of $184 / ERU for the cost of "buy-in" to the system.

**Allocation of Growth-Related Capital Costs.** A review of future capital was conducted to determine what portion of the total is growth related. The capital improvement plan developed for this project was used to determine the cost of future capacity improvements. As presented previously, this plan totals $15 million through 2006. For the localized flooding problems, it was assumed that most of the cost was due to existing conditions. However, as the solution for the problem goes through the planning and design process, projections of the impacts of future growth upstream will be included in the ultimate design solution. Therefore, it was determined that 25 percent of these project costs, totaling $1.8 million, should be attributed to growth.

The TIPs are planned in part for existing traffic flow problems, but the bulk of these project costs are to address problems related to projected growth. City staff determined that 80 percent of these project costs, totaling $7.3 million, should be attributed to growth.

The Basin Planning projects, which reflect some existing problems, will also be designed to solve projections of impacts from future development. These projects are allocated to growth by dividing the existing ERUs by the total ERUs. The result is an allocation of 51 percent of the costs ($5.8 million) to growth.

The growth-related capital projects are allocated by taking the total cost and dividing through by the growth-related ERUs. This calculation results in $392/ERU allocated as a result of the CIP portion of the SDC attributed to growth.

**Credits.** The City must reflect in the calculation of the SDC a credit for future debt service payments for retirement of the City's revenue bonds. The credit for retirement of the revenue bond is associated with debt service payments included as rates for retirement of the loan. The City pays the County on three outstanding loans. These were described previously in the section entitled Debt Service. As shown in detail in the attachments, the only time debt credit is generated is when the debt service payment is higher than SDC revenue generated in a given year. This calculation is completed because the SDC revenue can be used to pay the debt service. When debt service is higher than SDC revenue a credit is applied because customers will be paying for that portion through their rates. The credit ensures that customers are not double charged. Any credit is divided by the total number of ERUs to determine the credit per ERU. The credit for this planning period was determined to be $6.30/ERU.

### Net System Development Charge

The net SDC for the stormwater system is determined based on the component costs calculated for the stormwater SDC. These costs and the calculations are summarized in Table 6-6. They total $569.60. For ease in administration, the net SDC is rounded to $570.00 per ERU.

## Legal Aspects of System Development Charges

There are specific Washington State regulations pertaining to how a City can establish SDCs. RCW 90.03.500 addresses rates and charges for stormwater systems. A summary of the legislation is presented in the attachments. The SDCs were designed to comply with the requirements of these regulations. EES, in its calculation of the SDCs presented in this report, used generally accepted engineering and rate-making principles. This should not be construed as a legal opinion with respect to Washington State law. If a legal opinion is required, EES would recommend that the City have the SDCs, as provided in this report, reviewed by legal counsel to determine if they comply with Washington State law.

# Recommendations for SDC Implementation

Based on our review and analysis in determining SDCs for the City, EES recommends the following:

- That the City adopt a stormwater SDC no greater than that set forth in this report
- That the City eliminate the SDC deposit and replace it with this SDC
- That the City update the SDC in 2 years, after the City's Comprehensive Plan is completed and possibly the moratorium is lifted
- That the City update the SDC at least once every 3 years after the initial update

**Washington State Legislation Pertaining to Stormwater System Development Charges**

With respect to Washington law for imposition of storm drainage system development charges, the enabling legislation is found in RCW 90.03.500, which states as follows:

> *"Storm water control facilities -Imposition of rates and charges - Legislative findings. The legislature finds that increasing the surface water or storm water accumulation on or flow over real property, beyond that which naturally occurs on the real property, may cause severe damage to the real property and limit the gainful use or enjoyment of the real property, resulting in a tort, nuisance, or taking. The damage can arise from activities increasing the point or nonpoint flow of surface water or storm water over the real property, or altering or interrupting the natural drainage from the real property. The legislature finds that it is in the public interest to permit the construction and operation of public improvements to lessen the damage. The legislature further finds that it is in the public interest to provide for the equitable imposition of special assessments, rates, and charges on real property to fund that reasonable portion of the public improvements that alleviate the damage arising from activities that are the proximate cause of the damage on other real property. Except as otherwise provided in RCW 90.03.525, these special assessments, rates, and charges may be imposed on any publicly-owned, including state-owned, real property that causes such damage. [1986 c 278 § 62; 1983 c 315 § 8.]"*

Additionally, it is useful to look at the provisions under the Growth Management Act with respect to conditions imposed for system development charges in the State. Specifically, Title 82, Section 82.02.060 states as follows:

> *"Impact fees - Local ordinances - Required provisions. The local ordinance by which impact fees are imposed:*

*Shall include a schedule of impact fees which shall be adopted for each type of development activity that is subject to impact fees, specifying the amount of the impact fee, specifying the amount of the impact fee to be imposed for each type of system improvement. The schedule shall be based upon a formula or other method of calculating such impact fees. In determining proportionate share, the formula or other method of calculating impact fees shall incorporate, among other things, the following:*

*The cost of public facilities necessitated by new development; An adjustment to the cost of the public facilities for past or future payments made or reasonably anticipated to be made by new development to pay for particular system improvements in the form of user fees, debt service payments, taxes, or other payments earmarked for or proratable to the particular system improvement;*

*The availability of other means of funding public facility improvements; The cost of existing public facilities improvements; and The methods by which public facilities improvements were financed;*

*2). May provide an exemption for low-income housing, and other development activities with broad public purposes, from these impact fees, provided that the impact fees for such development activity shall be paid from public funds other than impact fee accounts;*

*3). Shall provide a credit for the value of any dedication of land for, improvement to, or new construction of any system improvements provided by the developer, to facilities that are identified in the capital facilities plan and that are required by the county, city, or town as a condition of approving the development activity;*

*Shall allow the county, city, or town imposing the impact fees to adjust the standard impact fee at the time the fee is imposed to consider unusual circumstances in specific cases to ensure that impact fees are imposed fairly;*

*Shall include a provision for calculating the amount of the fee to be imposed on a particular development that permits consideration of studies and data submitted by the developer to adjust the amount of the fee;*

*Shall establish one or more reasonable service areas within which it shall calculate and impose impact fees for various land use categories per unit of development;*

> *May provide for the imposition of an impact fee for system improvement costs previously incurred by a county, city, or town to the extent that new growth and development will be served by the previously constructed improvements provided such fee shall not be imposed to make up for any system improvement deficiencies [1990 1st ex.s. c 17 § 44.]"*

While Section 82.02.060 applies to streets, parks, schools, and fire facilities, it is useful for the City to review these guidelines in the development of stormwater system development charges.

SECTION 7

# Comprehensive Stormwater Management Code and Policy

This section of the Stormwater Management Comprehensive Plan presents a draft of the proposed new Section 9 of the Interim Sammamish Development Code (ISDC). It also includes a policy discussion and recommendations for further action by the City to increase protection of its water resources. The new code section, if adopted by ordinance by the City, will replace the existing Section 9 of the ISDC–Surface Water Management. This updated code section adopts the 1998 *King County Surface Water Design Manual* and incorporates many of the surface water standards included in the manual. It also strives to meet the anticipated requirements of the new Washington State Department of Ecology Draft *Stormwater Management Manual for Western Washington.* Among the section's provisions are drainage review requirements for all proposed new and redevelopment projects; enhanced drainage requirements for projects in critical drainage and/or erosion areas; liability and financial guarantees for drainage facilities; criteria for drainage facilities acceptance by the City for maintenance; inspection of drainage facilities; and enforcement of drainage requirements.

The City of Sammamish will need to draft an ordinance for consideration by City Council to adopt this code.

## Stormwater Management Comprehensive Code

### Sections


9.10.010 Scope
9.10.020 Purposes
9.10.030 Definitions
9.10.040 Surface Water Design Manual Adopted
9.10.050 Copy to be Available
9.10.060 Drainage Review
9.10.070 Drainage Review - Requirements
9.10.080 Critical Drainage and/or Erosion Areas
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9.10.100 Construction Timing and Final Approval
9.10.110 Notification to Tribes
9.10.120 Liability Insurance Required
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9.10.140 Drainage Facilities Accepted for Maintenance
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9.10.160 Hazards
9.10.170 Administration
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9.10.190 Liberal Construction

## 9.10.010 Scope

Compliance with the standards in this chapter and the King County Surface Water Design Manual does not necessarily mitigate all probable and significant environmental impacts to aquatic biota. Fishery resources and other living components of aquatic systems are affected by a complex set of factors. While employing a specific flow control standard may prevent stream channel erosion or instability, other factors affecting fish and other biotic resources (such as increases in stream flow velocities) are not directly addressed by the King County Surface Water Design Manual. Thus, compliance with the King County Surface Water Design Manual should not be construed as mitigating all probable and significant stormwater impacts, and additional mitigation may be required to protect aquatic biota in streams and wetlands.

## 9.10.020 Purposes

The Council finds this chapter is necessary in order to promote the public health, safety and welfare by providing for the comprehensive management of storm and surface waters and erosion control, especially that which preserves and utilizes the many values of the City's natural drainage system including open space, fish and wildlife habitat, recreation, education and urban separation. The Council also finds that the City shall conduct programs to reduce flooding, erosion, and sedimentation; prevent and mitigate habitat loss; enhance groundwater recharge; and prevent water quality degradation through the implementation of comprehensive and thorough permit review, construction inspection, enforcement, and maintenance in order to promote the effectiveness of the requirements contained in this chapter.

## 9.10.030 Definitions

The following definitions shall apply in the interpretation and enforcement of this chapter:

A. "Adjustment" means a department approved variation in the application of the requirements of ISDC 9.10.070 and the Surface Water Design Manual to a particular project in accordance with ISDC 9.10.070C. The term adjustment replaces "variance" which had been used in prior editions of the Surface Water Design Manual.

B. "Applicant" means a property owner or a public agency or public or private utility which owns a right-of-way or other easement or has been adjudicated the right to such an easement in an eminent domain proceeding, or any person or entity designated or named in writing by the property or easement owner to be the applicant, in an application for a development proposal, permit or approval.

C. "Basin" means a drainage area which drains either to Lake Sammamish, Bear Creek, or Issaquah Creek.

D. "Basin Plan" means a plan and all implementing regulations and procedures including, but not limited to, capital projects, public education activities and land use management adopted by ordinance for managing storm and surface water management facilities and features within individual subbasins.

E. "Closed depression" means an area which is low-lying and either has no, or such a limited, surface water outlet that during storm events the area acts as a retention basin, with more than 5,000 square feet at overflow elevation.

F. "Construct or modify" means to install a new drainage pipe or ditch or make improvements to an existing drainage pipe or ditch (other than routine maintenance, repair, or emergency modifications, and excluding driveway culverts installed as part of single-family residential building permits) that either serves to concentrate previously unconcentrated storm and surface water runoff, or serves to increase, decrease and/or redirect the conveyance of storm and surface water runoff.

G. "Conveyance system" means the drainage facilities and features, both natural and constructed, which collect, contain and provide for the flow of storm and surface water from the highest points on the land down to a receiving water. The natural elements of the conveyance system include swales and small drainage courses, streams, rivers, lakes and wetlands. The constructed elements of the conveyance system include gutters, ditches, pipes, channels and most flow control and water quality treatment facilities.

H. "Department" means the department of public works.

I. "Development" means any activity that requires a permit or approval, including, but not limited to, a building permit, grading permit, shoreline substantial development permit, conditional use permit, special use permit, zoning variance or reclassification, subdivision, short subdivision, urban planned development, binding site plan, site development permit or right-of-way use permit.

J. "Director" means the director of the Department of Public Works, or any duly authorized representative of the City of Sammamish.

K. "Drainage" means the collection, conveyance, containment and/or discharge of storm and surface water runoff.

L. "Drainage facility" means a constructed or engineered feature that collects, conveys, stores or treats storm and surface water runoff. Drainage facilities shall include, but not be limited to, constructed or engineered streams, pipelines, channels, ditches, gutters, lakes, wetlands, closed depressions, flow control or water quality treatment facilities, erosion and sediment control facilities and other structures and appurtenances that provide for drainage.

M. "Drainage review" means an evaluation by City staff of a proposed project's compliance with the drainage requirements in the King County Surface Water Design Manual.

N. "Erosion and sediment control" means any temporary or permanent measures taken to reduce erosion, control siltation and sedimentation and ensure that sediment-laden water does not leave the site.

O. "Financial guarantee" means a form or financial security posted to ensure timely and proper completion of improvements, to ensure compliance with this chapter, and/or to warranty materials, workmanship of improvements and design. Financial guarantees include assignments of funds, cash deposit, surety bonds and/or other forms of financial security acceptable to the director. For the purposes of this chapter, the terms perform-

ance guarantee, maintenance guarantee and defect guarantee are considered sub-categories of financial guarantee.

P. "Flow control facility" means a drainage facility designed to mitigate the impacts of increased storm and surface water runoff generated by site development pursuant to the drainage requirements in this chapter. Flow control facilities are designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration and/or infiltration into the ground or to hold runoff for a short period of time and then release it to the conveyance system.

Q. "Full drainage review" means the basic evaluation required by ISDC 9.10.060 for any proposed project that:

1. Adds 5,000 square feet or more of new impervious surface.

2. Is located in a landslide hazard area or erosion hazard area as mapped in the King County Department of Development and Environmental Services Geographic Information Systems and as defined in ISDC 21A.24 and ISDC 21A.24 or as defined by special studies and adds 2,000 square feet or more of new impervious surface.

3. Is a redevelopment project which creates 5,000 square feet or more of contiguous pollutant-generating impervious surface through any combination of new and/or replaced impervious surface, and whose valuation of proposed improvements – including interior improvements – exceeds 50 percent of the assessed value of the existing site.

R. "High-use site" means a commercial, industrial or road intersection site that generates a higher than average number of vehicle turnovers or has other characteristics that generate the potential for chronic oil accumulation. High use sites include:

1. Commercial or industrial sites subject to:

   a. An expected daily traffic count greater than 100 vehicles per 1,000 square feet of gross building area

   b. Petroleum storage or transfer in excess of 1,000 gallons per year, not including routine fuel oil storage or transfer

   c. Use, storage or maintenance of a fleet of 25 or more diesel vehicles each weighing over 10 tons

2. Road intersections with average daily traffic counts of 25,000 vehicles or more on the main roadway and 15,000 or more vehicles on any intersecting roadway (excluding pedestrian or bicycle use improvement projects).

S. "Hydraulically connected" means connected through surface flow or water features such as wetlands or lakes.

T. "Impervious surface" means a hard surface area which either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development, and/or a hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions

prior to development. Common impervious surfaces include, but are not limited to, roofs, walkways, patios, driveways, parking lots, storage areas, areas which are paved, graveled or made of packed or oiled earthen materials or other surfaces which similarly impede the natural infiltration of storm and surface water. Open uncovered flow control or water quality treatment facilities shall not be considered as impervious surfaces.

U. "Improvement" means streets (with or without curbs or gutters), sidewalks, crosswalks, parking lots, water mains, sanitary and storm sewers, drainage facilities, street trees and other appropriate items.

V. "Lake management plan" means a plan describing the lake management recommendations and requirements adopted by public rule for managing water quality within individual lake basins.

W. "Large site drainage review" means the evaluation required by ISDC 9.10.060 for any proposed project that:

1. Has an planned urban development (PUD) land use designation
2. Would, at full buildout of the project site, result in fifty acres or more of new impervious surface within a drainage subbasin or a number of subbasins hydraulically connected across subbasin boundaries
3. Is on a site of fifty acres or more within the recharge area of a sole-source aquifer designated by the federal Environmental Protection Agency and depicted as such on King County's areas highly susceptible to groundwater contamination map

X. "Licensed civil engineer" means a person registered with the State of Washington as a professional engineer in civil engineering.

Y. "Master drainage plan" means a comprehensive drainage control plan intended to prevent significant adverse impacts to the natural and constructed drainage system, both on- and offsite.

Z. "New impervious surface" means the addition of a hard or compacted surface such as pavement, gravel, dirt, or roofs, or the addition of a more compacted surface such as the paving of pre-existing dirt or gravel.

AA. "Pollution-generating impervious surface" means an impervious surface considered to be a significant source of pollutants in storm and surface water runoff. Such surfaces include those subject to vehicular use or storage of erodible or leachable materials, wastes or chemicals and which receive direct rainfall or the run-on or blow-in of rainfall. Thus, a covered parking area would be included if runoff from uphill could regularly run through it or if rainfall could regularly blow in and wet the pavement surface. Metal roofs are also considered pollution-generating impervious surface unless they are treated to prevent leaching.

BB. "Pollution-generating pervious surface" means a nonimpervious surface with vegetative ground cover subject to use of pesticides and fertilizers. Such surfaces include, but are not limited to, the lawn and landscaped areas of residential or commercial sites, golf courses, parks and sports fields.

CC. "Preapplication" means the meeting(s) and/or form(s) used by applicants for some development permits to present initial project intentions to the Department of Community Development or its successor agency. Preapplication does not mean application.

DD. "Predeveloped" means undeveloped forested conditions for any proposed new development project. For any redevelopment project, existing site conditions depend on what, if any, land conversion activity has occurred on the site since May 1979, when King County first required flow control on developments adding more than 5,000 square feet of new impervious surface. IF a drainage plan has been approved by the County since May 1979 for any land conversion activity which includes the addition of more than 5,000 square feet of new impervious surface, THEN *existing site conditions* are those created by the site improvements and drainage facilities constructed per the approved engineering plans. OTHERWISE, *existing site conditions* are those that existed prior to May 1979 as determined from aerial photographs and, if necessary, on knowledge of individuals familiar with the area. The intent is to mitigate unaddressed impacts created by site alterations or improvements, such as clearing, which have occurred since May 1979.

EE. "Project" means any proposed action to alter or develop a site which may also require drainage review.

FF. "Project site" means the portion of a site subject to proposed project activities, alterations and improvements including those required by this chapter.

GG. "Redevelopment project" means a project that proposes to add, replace and/or alter impervious surface for purposes other than routine maintenance, resurfacing, regrading, or repair on a site that is already substantially developed (35 percent or more existing impervious surface coverage).

HH. "Replaced impervious surface" means any existing impervious surface proposed to be removed down to bare soil or base course, and replaced with pollution-generating impervious surface, excluding impervious surface removed for the sole purpose of installed utilities.

II. "Runoff" means water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes and wetlands as well as shallow ground water.

JJ. "Shared facility" means a drainage facility designed to meet one or more of the requirements of ISDC 9.10.070 for two or more separate projects contained within a basin. Shared facilities usually include shared financial commitments for those drainage facilities.

KK. "Small site drainage review" means a simplified alternative to full drainage review required by ISDC 9.10.060 allowed for sites with less than one acre of land-disturbing activity with proposed single-family residential projects or small subdivision projects that add or replace 10,000 square feet or less of new impervious surface.

LL. "Site" means the legal boundaries of the parcel or parcels of land for which an applicant has or should have applied for authority from the City to carry out a development activity including any drainage improvements required by this chapter.

MM. "Subbasin" means a drainage area which drains to a water course or water body named and noted on common maps and which is contained within a basin.

NN. "Storm and surface water" means water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes and wetlands as well as shallow ground water.

OO. "Surface Water Design Manual" means the King County Surface Water Design Manual (and supporting documents as appropriate) describing storm and surface water design and analysis requirements, procedures and guidance which has been formally adopted by the City under ISDC 9.10.040.

PP. "Targeted drainage review" means an abbreviated evaluation required by ISDC 9.10.060 for certain types of proposed projects which are not subject to full or large site drainage review. Targeted drainage review may be required for some projects in small site drainage review.

QQ. "Water quality treatment facility" means a drainage facility designed to reduce pollutants once they are already contained in storm and surface water runoff. Water quality treatment facilities are the structural component of best management practices (BMPs). When used singly or in combination, water quality facilities reduce the potential for contamination of surface and/or ground waters.

## 9.10.040 Surface Water Design Manual Adopted

The City adopts the 1998 King County Surface Water Design Manual, as currently existing and as may be subsequently amended, as the surface water design manual for the City. The City may create and adopt amendments to the Manual as necessary. If any inconsistencies exist between the requirements in this Chapter and the Surface Water Design Manual, the requirements in this Chapter shall apply.

## 9.10.050 Copy to be Available

One copy of the 1998 King County Surface Water Design Manual, as amended, shall be available in the office of the city clerk for use and examination by the public.

## 9.10.060 Drainage Review

A. When required. A drainage review is required when any proposed project is subject to a City development permit or approval and the proposed project:

1. Would add or replace 5,000 square feet or more of impervious surface

2. Would construct or modify a drainage pipe/ditch that is 12 inches or more in size or depth or receives storm and surface water runoff from a drainage pipe/ditch that is 12 inches or more in size or depth

3. Contains or is adjacent to a floodplain, stream, lake, wetland or closed depression, or a sensitive area as defined in ISDC 21A.24 excluding seismic, coal mines and volcanic hazard areas

4. Is located within a landslide hazard area or erosion hazard area as mapped in the King County Department of Development and Environmental Services Geographic Information Systems and as defined in ISDC 21A.24 and ISDC 21A.24 or as defined by special studies and would add 2,000 square feet or more of new or replaced impervious surface

5. Is located within a critical drainage area

6. Is a project site of a single-family residence, or a small subdivision, with less than one acre of land-disturbing activity that adds or replaces less than 5,000 square feet of impervious surface. These projects shall comply with the following Small Parcel Requirements, as detailed in the Washington Department of Ecology's *Stormwater Management in Washington State, Volume 1, Technical Requirements*, August 1999 (Draft):

    a. These projects shall develop and implement a Construction Stormwater Pollution Prevention Plan (SWPPP).

    b. These projects shall apply Small Site Requirements for water quality treatment and flow control.

7. Is a non-residential project site with less than one acre of land-disturbing activity that adds or replaces less than 5,000 square feet of impervious surface. These projects shall comply with the following Small Parcel Requirements, as detailed in the Washington Department of Ecology's *Stormwater Management in Washington State, Volume 1, Technical Requirements*, August 1999 (Draft):

    a. These projects shall develop and implement a Construction Stormwater Pollution Prevention Plan (SWPPP).

    b. All known, available and reasonable source control BMPs shall be applied to these projects.

    c. These projects shall apply Small Site Requirements for water quality treatment and flow control.

8. Is a project site of a single-family residence, or a small subdivision, with less than one acre of land-disturbing activity that adds or replaces 5,000 square feet or more of impervious surface. These projects shall comply with the following Small Parcel Requirements, as detailed in the Washington Department of Ecology's *Stormwater Management in Washington State, Volume 1, Technical Requirements*, August 1999 (Draft):

    a. These projects shall prepare a stormwater site plan for local government review.

9. Is a redevelopment project in which the total of *new plus replaced* impervious surfaces is 5,000 square feet or more, and whose valuation of proposed improvements – including interior improvements – exceeds 50 percent of the assessed value of the

existing site. These projects shall comply with the following Large Parcel Minimum Requirements, as detailed in the Washington Department of Ecology's *Stormwater Management in Washington State, Volume 1, Technical Requirements*, August 1999 (Draft):

a. All new redevelopment shall develop and implement a Construction Stormwater Pollution Prevention Plan (SWPPP).

b. All known, available and reasonable source control BMPs shall be applied to these projects.

10. Is a redevelopment project that would create 5,000 square feet or more of new impervious surface, and whose valuation of proposed improvements – including interior improvements – exceeds 50 percent of the assessed value of the existing site. These projects shall comply with the following Large Parcel Minimum Requirements, as detailed in the Washington Department of Ecology's *Stormwater Management in Washington State, Volume 1, Technical Requirements*, August 1999 (Draft):

a. All new redevelopment shall develop and implement a Construction Stormwater Pollution Prevention Plan (SWPPP).

b. Natural drainage patterns shall be maintained, and discharges from the site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downgradient receiving waters.

c. All known, available and reasonable source control BMPs shall be applied to these projects.

d. Treatment BMPs shall be sized to treat runoff from the water quality design storm, defined as the 24-hour rainfall amount with a 6-month return frequency.

e. Stormwater discharges to streams shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the 2-year peak flow up to the full 50-year peak flow. In addition, the developed peak discharge rates shall not exceed the predeveloped peak discharge rates for 2- and 10-year return periods.

f. Discharges to wetlands shall maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses.

g. Development projects subject to this subsection shall submit an offsite analysis report that assesses the potential off-site water quality, erosion, and drainage impacts associated with the project and that proposes appropriate mitigation of those impacts.

h. Adopted and implemented watershed-based plans may be used to require equivalent or more stringent minimum requirements for source control,

treatment, and wetlands protection, and alternative requirements for flow control.

i. An operation and maintenance schedule that is consistent with City standards shall be provided for all proposed stormwater facilities and BMPs, and the party (or parties) responsible for maintenance and operation shall be identified.

B. Type of drainage review. The drainage review for any proposed project shall be targeted to the scope of the project's size, type of development and potential for impacts to the regional surface water system to facilitate preparation and review of project applications. If drainage review for a proposed project is required by ISDC 9.10.060A, the department shall determine which of the following drainage reviews apply as specified in the Surface Water Design Manual:

1. Small site drainage review
2. Targeted drainage review
3. Full drainage review
4. Large site drainage review

## 9.10.070 Drainage Review - Requirements

A. Core requirements. Every permit or approval application with drainage review required by ISDC 9.10.060 must meet each of the following core requirements which are described in detail in the Surface Water Design Manual.

1. Core requirement #1: Discharge at the natural location. All storm and surface water runoff from a project shall be discharged at the natural location so as not to be diverted onto, or away from, downstream properties. The manner in which runoff is discharged from the project site shall not create a significant adverse impact to downhill properties or drainage systems as specified in the discharge requirements of the Surface Water Design Manual.

2. Core requirement #2: Offsite analysis. The initial application submittal for proposed projects shall include an offsite analysis report that assesses potential offsite drainage impacts associated with development of the proposed site and proposes appropriate mitigations to those impacts. This initial submittal shall include, at minimum, a Level One downstream analysis as described in the Surface Water Design Manual. If impacts are identified, the proposed projects shall meet any applicable problem-specific requirements as specified in the Surface Water Design Manual.

3. Core Requirement #3: Flow control. Proposed projects shall provide flow control facilities to mitigate the increased storm and surface water runoff generated by the addition of 5,000 square feet or more of new or replaced (meeting the drainage review threshold for redevelopment projects in ISDC 9.10.060) impervious surface and any related land-cover conversion. These facilities shall meet the area-specific flow control requirements and the flow control implementation requirements applicable to the project site as specified in the Surface Water Design Manual. Projects subject to area-specific flow control requirements shall meet one of the performance criteria listed below as directed by the Surface Water Design Manual:

a. Level One: match the predeveloped site's peak discharge rates for the two-year and ten-year return periods

b. Level Two: match the predeveloped site's discharge durations for the pre-developed peak discharge rates between 50 percent of the two-year peak flow through the 50-year peak flow

c. Level Three: meet Level Two criteria and also match the predeveloped site's peak discharge rate for the 100-year return period

All proposed projects within the city limits would be subject to Level Two flow control requirements at a minimum, as specified in the Surface Water Design Manual, unless a more stringent Level Three flow control standard is required. All proposed projects within the George Davis (a.k.a. Eden) Creek, Ebright Creek, Pine Lake, and Beaver Lake basins would be subject to Level Three flow control requirements. Further studies may indicate that another flow control standard is more appropriate.

4. Core requirement #4: Conveyance system. All engineered conveyance system elements for proposed projects shall be analyzed, designed and constructed to provide the minimum level of protection against overtopping, flooding, erosion and structural failure as specified by the conveyance requirements for new and existing systems and conveyance implementation requirements described in the Surface Water Design Manual.

5. Core requirement #5: Erosion and sediment plan. All proposed projects that will clear, grade, or otherwise disturb the site shall provide erosion and sediment control (ESC) that prevents, to the maximum extent possible, the transport of sediment from the site to drainage facilities, water resources and adjacent properties. Erosion and sediment controls shall be applied in accordance with Chapter 16.82 of this code.

6. Core requirement #6: Maintenance and operation. Maintenance of all drainage facilities in compliance with City maintenance standards is the responsibility of the applicant/property owner as described in the Surface Water Design Manual, except those facilities for which the City is granted an easement or covenant and assumes maintenance and operation as described in the Surface Water Design Manual.

7. Core requirement #7: Financial guarantees and liability. All drainage facilities constructed or modified for projects, except downspout infiltration and dispersion systems for single-family residential lots, must comply with the liability requirements of ISDC 9.10.120 and the financial guarantee requirements of ISDC 9.10.130.

8. Core requirement #8. Water quality. Proposed projects shall provide water quality treatment facilities to treat polluted storm and surface water runoff generated by the addition and/or replacement of 5,000 square feet or more of pollution-generating impervious surface or one acre or more of pollutant-generating pervious surface; however, pervious surfaces are specifically excluded if there is a good faith agreement with the King Conservation District to implement a farm management plan for agricultural uses, and pervious areas for other uses are specifically excluded if the Department of Community Development or its successor agency approves a

landscape management plan that controls pesticides and fertilizers leaving the site. These facilities shall meet the area-specific water quality treatment requirements and the water quality implementation requirements applicable to the project site as specified in the Surface Water Design Manual. At a minimum, the facilities shall reduce pollutant loads by meeting the applicable annual average performance goals listed below for 95 percent of the annual average runoff volume:

a. Basic water quality: remove 80 percent of the total suspended solids

b. Sensitive lake protection: remove 50 percent of the total phosphorus

c. Resource stream protection: remove 50 percent of the total zinc

d. Sphagnum bog protection: remove 50 percent of the total phosphorus and 40 percent of the total nitrate plus nitrite. The discharge shall maintain a pH of less than 6.5 and an alkalinity of less than 10 milligrams per liter.

All proposed projects in the George Davis (a.k.a. Eden) Creek and Ebright Creek basins shall meet resource stream protection performance goals and all projects draining to Lake Sammamish, Pine Lake, and Beaver Lake shall meet sensitive lake protection performance goals, as specified in the Surface Water Design Manual. Further studies may indicate that another water quality standard is more appropriate.

B. Special Requirements. Every proposed project required by ISDC 9.10.060 to have drainage review shall meet all of the following special requirements which apply to the site and which are described in detail in the Surface Water Design Manual. The department shall verify if a proposed project is subject to and meets any of the special requirements.

1. Special Requirement #1: Other adopted area-specific requirements. If a proposed project is in a designated critical drainage area, or is in an area included in an adopted master drainage plan, basin plan, lake management plan or shared facility plan, then the proposed project shall meet the applicable drainage requirements of the critical drainage area, master drainage plan, basin plan, lake management plan or shared facility plan.

2. Special Requirement #2: Floodplain/floodway delineation. If a proposed project contains or is adjacent to a stream, lake, wetland or closed depression, or if other City regulations require study of flood hazards, then the 100-year floodplain boundaries (and floodway if available or if improvements are proposed within the one hundred year floodplain), based on an approved flood hazard study as described in the Surface Water Design Manual, shall be delineated on the site improvement plans and profiles, and on any final subdivision maps prepared for the proposed project.

3. Special Requirement #3: Flood protection facilities. If a proposed project contains or is adjacent to a Class 1 or 2 stream that has an existing flood protection facility (such as levees, revetments and berms), or proposes to construct a new, or modify an existing, flood protection facility, then the flood protection facilities shall be analyzed and/or designed as specified in the Surface Water Design Manual to

conform with the Federal Emergency Management Administration regulations (44 Code of Federal Regulations [CFR]).

4. Special Requirement #4: Source Control. If a proposed project requires a commercial building or commercial site development permit, then water quality source controls shall be applied to prevent rainfall and runoff from coming into contact with pollutants to the maximum extent possible. Water quality source controls shall be applied in accordance with the King County stormwater pollution control manual. All structural source controls shall be identified on the site improvement plans and profiles or final maps prepared for the proposed project.

5. Special Requirement #5: Oil control. If a proposed project is a high-use site or is a redevelopment project proposing $100,000 or more of improvements to an existing high-use site, then oil control shall be applied to all runoff from the high-use portion of the site as specified in the Surface Water Design Manual.

C. Adjustment.

1. An adjustment to the requirements contained in this section and/or other requirements in the Surface Water Design Manual may be proposed provided that the resulting development shall be subject to all of the remaining terms and conditions of this chapter and provided that granting the adjustment shall:

   a. Produce a compensating or comparable result in the public interest.

   b. Meet this chapter's objectives of safety, function, appearance, environmental protection and maintainability based upon sound engineering judgment.

2. If meeting the provisions of ISDC 9.10.070C.1.a will deny reasonable use of a property, the best practicable alternative shall be obtained as determined by the director according to the adjustment process defined in the Surface Water Design Manual.

3. Requests for adjustments which may be in conflict with the requirements of any other city department shall require review and concurrence with that department.

4. Requests for adjustments shall be processed in accordance with procedures specified in the Surface Water Design Manual. (Note that the adjustment concept has been termed "variance" in earlier editions of the Surface Water Design Manual).

5. The City may require monitoring of experimental designs and technology or untested applications proposed by the applicant in order to determine compliance with ISDC 9.10.070C.1.a and the approved plans and conditions.

6. The applicant may appeal an adjustment decision by following the appeal procedures as specified in the Surface Water Design Manual.

## 9.10.080 Critical Drainage and or Erosion Areas

Development in areas where the department has determined that the existing flooding, drainage and/or erosion conditions present an imminent likelihood of harm to the welfare and safety of the surrounding community shall meet special drainage requirements set by

the director until such time as the community hazard is alleviated. Areas within the City limits draining directly to Lake Sammamish, George Davis (a.k.a. Eden) Creek, Ebright Creek, Pine Lake, and Beaver Lake shall be subject to such requirements. Such conditions may include the limitation of the volume of discharge from the subject property to predevelopment levels, preservation of wetlands or other natural drainage features or other controls necessary to protect against community hazard. Where alternate facility designs or methods will produce a compensating or comparable result in the public interest and which will meet this section's objectives of safety, function, appearance, environmental protection and maintainability, based upon sound engineering judgment, an adjustment to the special drainage requirements promulgated under this section may be proposed, provided that the resulting development shall be subject to all of the remaining terms and conditions of this chapter.

Where application of this section will deny all reasonable use of a property and a facility or design that produces a compensating or comparable result cannot be obtained, then a best practicable alternative may be obtained, to be determined by the director according to the adjustment process defined in the Surface Water Design Manual.

## 9.10.090 Engineering Plans for the Purposes of Drainage Review

A. Where to submit.

1. All engineering plans shall be submitted to the Department of Community Development or its successor agency for review in accordance with the Surface Water Design Manual for either storm and surface water capital improvement, repair, maintenance or restoration projects or other government agency projects that are linear in shape, such as roadways, railways, pipelines, utility lines and trails. If engineering plans are returned for any reason, they shall be returned to the applicant.

2. All master drainage plans, if required, shall be submitted to the Department of Community Development or its successor agency for review in accordance with the specifications in the Surface Water Design Manual. The master drainage plan process should commence at the same time as the State Environmental Policy Act (SEPA) process.

3. Project applicability and compliance with ISDC 9.10.070 shall be documented in writing and made available for review.

B. Expiration. The expiration time frames as specified in the Surface Water Design Manual shall apply to all permit and approval applications.

C. Processing. All plans shall be processed in accordance with the review procedures specified in the Surface Water Design Manual.

D. Contents. All submittal procedures, definitions and specifications for the required contents of engineering plans are presented in the Surface Water Design Manual.

## 9.10.100 Construction Timing and Final Approval

A. No work for a permitted development related to permanent or temporary storm drainage control shall proceed without the approval of the director.

B. Erosion and sediment control measures associated with both the interim and permanent drainage systems shall be:

   1. Constructed in accordance with the approved plan prior to any grading or land clearing other than that associated with an approved erosion and sediment control plan

   2. Satisfactorily sequenced and maintained until all improvements, restoration, and landscaping associated with the permit and/or for the project are completed, and the potential for onsite erosion has passed

C. Prior to the construction of any improvements and/or buildings on the site, those portions of the drainage facilities necessary to accommodate the control of storm and surface water runoff discharging from the site shall be constructed and in operation.

## 9.10.110 Notification to Tribes

The City recognizes that many actions undertaken pursuant to this chapter may impact treaty fishing rights of federally-recognized tribes. In order to honor and prevent interference with these treaty fishing rights and to provide for water quality and habitat preservation, the City shall provide notice to any federally-recognized tribes whose treaty fishing rights would be affected by an action undertaken pursuant to this title whenever review of such actions is required under the State Environmental Policy Act (SEPA).

## 9.10.120 Liability Insurance Required

The applicant required to construct the drainage facility pursuant to this chapter shall maintain a combined single limit per occurrence liability policy in the amount established annually by the City, which shall name the City as an additional insured and protect the City from liability relating to the construction or maintenance of the facility until construction approval or acceptance for maintenance, whichever occurs last. Proof of this required liability policy shall be provided to the director prior to commencing construction of any drainage facility. If this liability insurance is not kept in effect as required, the City may initiate enforcement action pursuant to Chapter 23 of this code.

## 9.10.130 Financial Guarantees Authorized

The department is authorized to require all applicants issued permits or approvals under the provisions of this chapter to post financial guarantees consistent with the provisions of this section.

A. Drainage Facilities Restoration and Site Stabilization Bond. Prior to commencing construction, the person required to construct the drainage facility pursuant to this chapter shall post a drainage facilities restoration and site stabilization bond in the amount sufficient to cover the cost of corrective work on or off the site which is necessary to provide adequate drainage, stabilize and restore disturbed areas, and remove sources of

hazard associated with work which has been performed and is not completed. After determination by the director that all facilities are constructed in compliance with approved plans, the drainage facilities restoration and site stabilization bond shall be released. The City may collect against the drainage facilities restoration and site stabilization bond when work is not completed in reasonable fashion and is found to be in violation of the conditions associated with the permit and/or approval. It is the director's discretion to determine whether the site is in violation of the requirements of this chapter, and whether the bond shall be collected to remedy the violation. Prior to final approval and release of the drainage facilities restoration and site stabilization bond, the department shall conduct a comprehensive inspection for the purpose of observing that the retention/detention facilities and other drainage facilities have been constructed according to plan, applicable specifications and standards.

B. Defect and Maintenance Bond. After satisfactory completion of the drainage facility or final plat approval, whichever occurs last, the person required to construct the facility pursuant to this chapter shall post a defect and maintenance bond warranting the satisfactory performance and maintenance of the drainage facility and guaranteeing the workmanship and materials used in the construction of the facility for a period of 2 years. For drainage facilities for which the City may assume maintenance, the defect and maintenance bond shall be posted for a period of 2 years or until the City assumes maintenance, whichever is longer. The director shall not release the defect and maintenance bond until all inspection fees are paid.

C. Failure to complete proposed work. In the event of failure to comply with all the conditions and terms of the permit and/or approval covered by this chapter, the director shall notify the permittee and surety in writing, and to obtain response within seven days from the receipt of notification may order the work required to be satisfactorily completed or perform all necessary corrective work to stabilize and restore disturbed areas and eliminate hazards caused by not completing the work. The surety executing such bond shall continue to be firmly bound up to the limits of the bond, under a continuing obligation for the payment of all necessary costs and expenses that may be incurred or expended by the City in causing any and all such required work to be done. In no event shall the liability of the surety exceed the amount stated in the bond regardless of the number of years the bond remains in force.

## 9.10.140 Drainage Facilities Accepted for Maintenance

A. The City is responsible for the maintenance, including performance and operation, of drainage facilities which have formally been accepted for maintenance by the director.

B. The City may assume maintenance of privately maintained drainage facilities only if the following conditions have been met:

1. All necessary easements or dedications entitling the City to properly maintain the drainage facility have been conveyed to the City.

2. The director has determined that the facility is in the dedicated public road right-of-way or that maintenance of the facility will contribute to protecting or improving the health, safety and welfare of the community based upon review of the existence of or potential for:

a. Flooding
b. Downstream erosion
c. Property damage due to improper function of the facility
d. Safety hazard associated with the facility
e. Degradation of water quality or in-stream resources, or
f. Degradation to the general welfare of the community

3. The director has declared in writing acceptance of maintenance responsibility by the City. Copies of this document will be kept on file in the department.

C. The director may terminate the department's assumption of maintenance responsibilities in writing after determining that continued maintenance will not significantly contribute to protecting or improving the health, safety and welfare of the community based upon review of the existence of or potential for:

1. Flooding
2. Downstream erosion
3. Property damage due to improper function of the facility
4. Safety hazard associated with the facility
5. Degradation of water quality or in-stream resources
6. Degradation to the general welfare of the community

Copies of this document will be kept on file in the department.

D. A drainage facility which does not meet the criteria of this section shall remain the responsibility of the applicant required to construct the facility and persons holding title to the property for which the facility was required.

## 9.10.150 Drainage Facilities Not Accepted for Maintenance

A. The person or persons holding title to the property and the applicant required to construct a drainage facility shall remain responsible for the facility's continual performance, operation and maintenance in accordance with the standards and requirements of the department and remain responsible for any liability as a result of these duties. This responsibility includes but is not limited to maintenance of a drainage facility which is:

1. Under a maintenance guarantee or defect guarantee

2. A private road conveyance system

3. Located within and serving only one single-family residential lot

4. Located within and serving a multi-family or commercial site unless the facility is part of an approved shared facility plan

5. Located within or associated with an administrative or formal subdivision which handles runoff from an area of which less than two-thirds is designated for detached or townhouse dwelling units located on individual lots unless the facility is part of an approved shared facility plan

6. Previously terminated for assumption of maintenance responsibilities by the department in accordance with ISDC 9.10.140

7. Not otherwise accepted by the City for maintenance

B. Prior to the issuance of any of the permits and/or for any multifamily or commercial project required to have a flow control or water quality treatment facility, the applicant shall record a declaration of covenant as specified in the Surface Water Design Manual. The restrictions set forth in such covenant shall include, but not be limited to, provisions for notice to the persons holding title to the property of a City determination that maintenance and/or repairs are necessary to the facility and a reasonable time limit in which such work is to be completed.

1. In the event that the titleholders do not effect such maintenance and/or repairs, the City may perform such work upon due notice. The titleholders are required to reimburse the City for any such work. The restrictions set forth in such covenant shall be included in any instrument of conveyance of the subject property and shall be recorded with the King County department of records.

2. The City may enforce the restrictions set forth in the declaration of covenant provided in the Surface Water Design Manual.

C. Prior to the issuance of any of the permits and/or approvals for the project or the release of financial guarantees posted to guarantee satisfactory completion, the person or persons holding title to the subject property for which a drainage facility was required shall pay a fee as determined by the department to reasonably compensate the City for costs relating to inspection of the facility to ensure that it has been constructed according to plan and applicable specifications and standards.

D. The duties specified in this section with regard to payment of inspection fees and reimbursement of maintenance costs shall be enforced against the person or persons holding title to the property for which the drainage facility was required.

E. Where not specifically defined in this section, the responsibility for performance, operation and maintenance of drainage facilities and conveyance systems, both natural and constructed, shall be determined on a case by case basis.

## 9.10.160 Hazards

Whenever the director determines that any existing construction site, erosion and sedimentation problem, and/or drainage facility poses a hazard to life and limb, endangers any property, and/or adversely affects the condition or capacity of other drainage facilities, the safety and operation of City right-of-way, utilities, and/or other property owned or maintained by the City, the director shall notify in writing the applicant/person to whom the permit was issued pursuant to ISDC 9.10.060, the owner of the property within which the drainage facility is located, the applicant/person responsible for maintenance of the facility, and/or other person or agent in control of said property. Said person, upon receipt of notice in writing from the director and within the period specified therein, shall repair or otherwise address the cause of the hazardous situation in conformance with the requirements of this chapter.

Should the director have reasonable cause to believe that the situation is so adverse as to preclude written notice, the director may take the measures necessary to eliminate the

hazardous situation; provided that the director shall first make a reasonable effort to locate the owner before acting. In such instances the applicant of whom a drainage plan was required pursuant to ISDC 9.10.060, the owner of the property and/or the person responsible for the maintenance of the facility shall be obligated for the payment of all costs incurred. If costs are incurred and a financial guarantee pursuant to this chapter or other City requirement has been posted, the director shall have the authority to collect against the financial guarantee to cover costs incurred.

## 9.10.170 Administration

A. Administration.

1. The director is authorized to promulgate and adopt administrative rules for the purpose of implementing and enforcing the provisions of this chapter. Adopted administrative rules are available to the public from the department.

2. The director is authorized to develop procedures for applying adopted rules and regulations during the review of permit applications for the development of land. These procedures may also be contained in the Surface Water Design Manual.

B. Inspections. The director is authorized to make such inspections and take such actions as may be required to enforce the provisions of this chapter.

C. Right of entry. Whenever necessary to make an inspection to enforce any of the provisions of this chapter, monitor for proper function of drainage facilities or whenever the director has reasonable cause to believe that violations of this chapter are present or operating on a subject property or portion thereof, the director may enter such premises at all reasonable times to inspect the same or perform any duty imposed upon the director by this chapter; provided that, if such premises or portion thereof is occupied, the director shall first make a reasonable effort to locate the owner or other person having charge or control of the premises or portion thereof and demand entry.

D. Access. Proper ingress and egress shall be provided to the director to inspect, monitor or perform any duty imposed upon the director by this chapter. The director shall notify the responsible party in writing of failure to comply with this access requirement. Failing to obtain a response within seven days from the receipt of notification the director may order the work required completed or otherwise address the cause of improper access. The obligation for the payment of all costs that may be incurred or expended by the City in causing such work to be done shall thereby be imposed on the person holding title to the subject property.

## 9.10.180 Enforcement

The director is authorized to enforce the provisions of this chapter pursuant to the enforcement and penalty provisions of Chapter 23 of this code. Violations shall be punished pursuant to the City's general criminal or civil penalty provisions.

## 9.10.190 Liberal Construction

This chapter is exempted from the rule of strict construction and shall be liberally construed to give full effect to the objectives and purposes for which it was enacted.

# Policy Recommendations for Comprehensive Stormwater and Surface Water Management

The City of Sammamish (City) should adopt policies that state that it is the City's goal to protect and restore the City's aquatic resources. This will include adopting and enforcing regulations that protect water and natural resources, provide factors of safety, and minimize cumulative impacts to these resources. It will also include specific programs to manage and restore aquatic resources. Protection of resources means that resources are not degraded from their condition at the time of incorporation. Restoration activities should include stabilizing stream banks, restoring habitat structures, and addressing nutrient and sediment loading to sensitive streams, lakes, and wetlands.

## Protection / Restoration of Sensitive Areas

The following are examples of surface water management policies that the City might consider adopting to protect and restore its aquatic resources:

- The *King County Surface Water Design Manual* has been adopted by the City, but it has not been approved by the Washington State Department of Ecology (Ecology). This manual should remain the standard for the City, but it should be amended as necessary to achieve Ecology approval. Ecology's key areas of concern with the King County manual are the requirements for retrofit and redevelopment. The proposed surface water management code (Interim Sammamish Development Code Section 9) references the August 1999 draft *Ecology Stormwater Management Manual* in the sections on drainage review for small sites and redevelopment projects. Applying the standards contained in the *King County Surface Water Design Manual* alone does not and cannot completely mitigate the impacts of urban development on fish habitat. Therefore, City policies should acknowledge that some declines in fish habitat are inevitable.

- All future development and stormwater management projects should ensure compliance with the federal National Pollutant Discharge Elimination System (NPDES) Phase II rule. The City is within a designated Urban Area (UA) and will be subject to NPDES Phase II regulations.

- The City should revise its stormwater policies and programs to ensure compliance with the NPDES Phase II regulations, the *2000 Puget Sound Water Quality Management Plan*, and applicable provisions of the Endangered Species Act. Section 3 of this Storm and Surface Water Comprehensive Plan provides detailed information about compliance with these regulations and plans.

- The City should designate the entire area within the City limits as a Level 2 Flow Control Area, unless a more stringent Level 3 standard is warranted in specific areas of the City. The Level 2 Flow Control Area requirement is more stringent than the current default of a Basic Flow Control Area. Indications are that Ecology will begin requiring all areas that are unmapped, in terms of flow control requirements, to meet the Level 2 standard in the future.

- The City should work with King County to conduct a program for comprehensive local flow control mapping of surface waters, wetlands, and other sensitive resource areas. A sensitive areas map could be used in the adoption of area-specific standards for storm and surface water management regulations. Such mapping would allow the City to tailor its regulations and programs to specific sensitive resources and problem areas.
- The City should purchase and protect from development existing healthy salmon habitat and riparian systems, both small and large. Critical habitats and riparian lands can be purchased outright or by acquiring development rights. Preserving the condition of "healthy" lands should take priority over improving degraded riparian habitat because protection is more cost-effective and ecologically important than restoration.
- The City should establish an annual program and budget to restore degraded aquatic habitats. Such a program would identify the capital improvement projects and funding sources necessary to improve instream and riparian habitat. Projects could include stream bank stabilization, placement of large woody debris, installation of instream flow control and habitat structures, and planting native plants and trees as buffers between riparian areas and developed areas.
- The City's Comprehensive Land Use Plan should take into consideration the effects of urban development on surface water resources. The plan should be designed to encourage new growth in areas that are already under development. This would reduce urban sprawl and minimize the development patterns that create increased volumes of surface water runoff and that contribute to degradation of the City's streams, lakes, and wetlands.
- The City should require that municipal zoning ordinances be consistent with the Sammamish Comprehensive Land Use Plan and the King County Comprehensive Plan.
- The City should enforce existing development and growth management laws and revise development regulations to close exceptions and loopholes that could allow activities that would be harmful to the City's surface water resources. Any person who violates the provisions of any ordinance of the City shall be punished pursuant to the general penalty provisions of the City, as established in Chapter 23 of the Interim Sammamish Development Code.
- The City should implement and enforce critical areas ordinances and standards to protect streams, lakes, wetlands, groundwater recharge areas, erosion hazard areas, and landslide hazard areas within the City limits. Sensitive habitat areas should be protected through effective and fair land use and zoning laws.
- The City should expand and enforce buffer areas for streams, lakes, and wetlands where applicable. In particular, streams that support salmonid species should have at least a 150-foot buffer of natural vegetation on each side of the stream, with no clearing of trees or understory vegetation allowed. This 150-foot width is necessary to provide adequate shade, sediment and erosion control, pollutant retention, large wood recruitment, and wildlife habitat. Variances from the buffer requirement should not be granted unless there are no alternatives available and comparable protection is provided in another manner (e.g., purchasing development rights on other parcels of property).

- The City should expand and enforce limits on clearing to protect natural vegetation and to reduce surface water runoff that affects local aquatic resources.
- The City should ensure that all stormwater runoff is treated before being discharged to surface waters. Treatment options include, but are not limited to, natural vegetative buffers, retention / detention ponds, infiltration, and oil / water separation.
- The City should develop best management practices (BMPs) for storm sewer maintenance, including inspections, catch basin cleaning and maintenance, and debris removal from surface basins; street maintenance, including street / parking lot sweeping (using high-efficiency vacuum sweepers); and street flushing. Using BMPs helps prevent clogging and malfunctioning of stormwater facilities, extends the life of these facilities, reduces system replacement costs, and maintains an efficient stormwater management system.
- The City should institute a program to retrofit the public stormwater systems. This would include conducting an inventory of all stormwater conveyance systems, flow control facilities, and water quality facilities, and selecting qualitative or quantitative criteria for retrofitting needs. Undersized or malfunctioning pipes and facilities should be replaced with approved BMPs to meet flow control and water quality requirements.
- The City should use and enforce temporary erosion and sediment control (TESC) measures at construction sites. These measures include stabilized entrances, cover of exposed soils (hydroseeding), properly installed silt fences, silt curtains, storm drain inserts, check dams, and straw bales. Properly installed, maintained, and enforced TESC BMPs will ensure that adjacent streams, wetlands, and properties are protected from sediment deposition.
- The City should ensure that construction sites are inspected regularly and that fines are issued, without exception, for violations of existing regulations and ordinances.
- The City should limit / reduce the use of fertilizers, pesticides, and harmful household chemicals through public education programs and offering incentives for using alternatives to these substances.
- The City should develop a stormwater management policy and BMPs for animal management areas. Animal wastes contribute large amounts of non-point source pollutants to stormwater runoff. Capturing and treating these pollutants helps prevent nutrient loading to surface waters that contributes to water quality degradation.
- The City should create an on-call Basin Steward position for the Lake Sammamish, Bear Creek, and Issaquah Creek Basins. The Basin Steward would lead public education and involvement efforts for stormwater and surface water management issues in these sensitive basins. The Basin Steward would educate citizens about non-point source pollution and how their actions affect local surface water resources and fish habitat.
- The City should participate in Water Resource Inventory Area (WRIA) planning committees and in Inter-Local Agreements (ILAs) with other local jurisdictions to share the costs of regional surface water management and salmon conservation planning.

- The City should ensure enforcement activities are carried out by dedicating at least one staff person to compliance and enforcement of development codes and stormwater practices. Enforcement of zoning restrictions, growth management laws, critical areas ordinances, clearing limits, stormwater facilities maintenance activities, and construction site temporary erosion and sedimentation controls has been identified as a priority concern by the City. Enforcement training should be provided to staff, including a summary of the technical aspects of stormwater practices, City development codes and standards, and the legal mechanisms and processes available for enforcement. City planning staff should be consistent in reviewing development applications for enforcement of City development regulations. City field staff should enforce permit conditions and stormwater controls on construction sites, and issue fines for violations consistent with the provisions of Section 23 of the Interim Sammamish Development Code. Any violations shall be subject to criminal or civil penalties, including fines and/or imprisonment. All violations shall be considered separate offenses for each and every day that the violation is committed, and shall be subject to the City's penalty provisions for each offense. These enforcement activities must have the support of the City Council and City officials to be effective.

## Alternative Development Standards/Sustainable Development Alternatives

Implementation of a comprehensive stormwater program cannot by itself completely mitigate the impacts of urban development on aquatic resources. Development at lower densities increases urban sprawl, increases the costs and burdens of providing infrastructure, and results in longer commutes, higher gas consumption, and more air pollution. Therefore, the City should explore alternative approaches to development. Incorporating the concepts of sustainable development and livable communities could improve the quality of life within the City, manage growth within the City, and provide additional protection for its aquatic resources. Alternatives include such concepts as:

- Allowing construction of taller and narrower buildings and homes, which would reduce the "footprint" of impervious surfaces. Research from the University of Washington's Center for Urban Water Resources Management suggests that fish populations begin to decline in a watershed when as little as 10 percent of the surface area becomes impervious. For comparison, conventional low-density suburban development has approximately 40 to 50 percent impervious surface. If taller buildings were allowed, single-family structures could be built up and not out, thereby reducing a home's "footprint," reducing its effective impervious area, and allowing for increased densities in new developments.

- Requiring smaller lot sizes and allowing accessory dwelling units to increase densities, but maintaining the look and feel of single-family neighborhoods. This type of development is consistent with sustainable urban planning principles known as "new urbanism" or "traditional neighborhood development." The City's zoning code could be revised to increase densities in predominantly single-family neighborhoods by as much as three or four times what is allowed under existing regulations. New developments could be designed with narrow lot sizes of approximately 35' x 100' (about 1/2 to 1/8 the size of typical suburban lots), maximum (rather than the standard minimum) setbacks, one to three detached dwelling units per lot (including accessory

dwellings), and outdoor green space for each unit. Different dwelling types could be built in the same neighborhood and even on the same street. Reducing front yard setbacks and requiring sidewalks on both sides of the street would improve aesthetics, promote walking, and improve communication among neighbors. Applying these requirements would preserve the "look and feel" of a single-family neighborhood (i.e., it would be similar to that of an older, "traditional" residential neighborhood), while managing growth by maximizing densities in the City's developing areas and minimizing the effects on its surface water resources. In commercial districts, "mixed-use" buildings that combine commercial uses on the street level and residential units above would be allowed. Increasing the densities of development could accommodate population growth without perpetuating sprawling land use patterns that degrade critical natural resources.

- Limiting clearing of undeveloped lands. Most conventional developments involve clearing and grading land to maximize the amount of space available for building. Vegetation and soil that would normally absorb precipitation are stripped and replaced with impervious surfaces, which increases the volume of stormwater runoff that degrades surface water resources. City regulations should be revised to reduce the amount of land that can be cleared in new development, and, thus, to preserve areas of valuable open space that have native trees and plants.

- Requiring infiltration wherever feasible. Research suggests that the only way to protect natural stream hydrology and fish habitat in urban environments is through infiltration. All rooftop runoff should be infiltrated and retention/infiltration BMPs should be implemented in new development wherever feasible. Conventional developments typically route roof runoff into gutters and downspouts and onto driveways or other impervious surfaces. Infiltrating rainfall directly into the ground from rooftops reduces the volume of runoff that enters local stormwater management systems and is discharged to local surface waters. Retention facilities can be constructed in an aesthetically acceptable manner and in a location to capture stormwater and reduce the effect of surface water runoff on stream hydrology. Community open spaces and ballfields could be graded to allow surface drainage to infiltrate into the soil, rather than be piped into local streams.

- Requiring placement of at least 1 foot of organic material on all lawns and landscaped areas in new developments. A sufficient layer of organic material helps retain rainfall, not only allowing it to return to the atmosphere through evaporation and transpiration, but also increasing infiltration of stormwater into suitable soils.

- Limiting the area of new impervious surfaces by reducing street width in residential areas and making provisions for alleys behind homes to reduce on-street parking. Eighteen-foot-wide residential streets create attractive, safe neighborhoods, reduce the area of impervious surface, and generate less stormwater runoff than conventional streets. Narrow streets are consistent with traditional neighborhood designs and provide the additional benefits of improving safety by promoting low speeds and cautious driving. Streets should be designed to be only as wide as needed for low-speed traffic. Alleys behind homes would allow street widths to be reduced because they would eliminate the need for many on-street parking spaces and allow more space for

planting strips and trees adjacent to the street. The alleys would be used for access to individual homes, car parking, and services, minimizing the need for individual residential driveways, which would eliminate even more impervious surfaces. In addition, alleys could be constructed of crushed stone to reduce runoff and to allow some infiltration of stormwater into the ground.

- Limiting curbs and pipes that keep all drainage on the surface, and using open ditches that slow the conveyance of water, provide filtration, and allow some infiltration. Conventional stormwater management systems remove runoff from local streets by using curbs to contain stormwater within the roadways, and then draining runoff from the surface through a system of catch basins and underground pipes that discharge eventually to streams. This stormwater is usually discharged into the streams at much greater velocities and at much higher volumes than is normal, which can ruin fish habitat. A goal for the City should be to prohibit any new drainage discharges to local surface waters from new developments. Eliminating curbs and subsurface stormwater sewer systems and implementing natural drainage systems, including pervious parking strips along streets and alleys, would allow rainfall to infiltrate back into permeable soils. "Lighter, greener, cheaper, smarter infrastructure" can include specially configured areas of greenspace that would soak up rain, replacing the need for storm sewers. Open-graded street pavements, soft shoulders, common driveway lanes, and wet roofs (roof systems with a soil/vegetation cover) to hold rainfall and let it evaporate back into the atmosphere can also be used. Infiltration of surface water would nearly eliminate water pollution and stream disturbances. Infiltration can cost less than conventional drainage and no extra land is required for water retention ponds.

- Requiring pervious pavement except for regular travel lanes. Narrow local streets could be built using permeable pavement wherever practicable, and grass swales could be used instead of curbs for stormwater conveyance. These practices would allow as much stormwater as possible to infiltrate back into the soil, reduce direct discharges to local surface waters, which degrades habitat, and increase groundwater recharge of low stream flows.

- Limiting construction of new roads and reducing automobile contributions to non-point source pollution by requiring all new residential units in developing parts of the City to be within a 5-minute walk of transit and/or shopping. Developing parts of the City should include different types of dwellings and mixed-use and residential communities with densities of more than 10 units per acre. This type of development would reduce dependence on automobiles by allowing residents to access neighborhood services and shopping by walking, by bicycling, or by connecting with transit services. Automobiles and an expanding network of roads are major contributors of the pollutants in stormwater runoff, contributing to degradation of surface water and aquatic habitat. Residents in these developing areas who own cars may no longer need them. By reducing the need for automobile trips (40 percent reduction in vehicle miles traveled per person per day), the number of single-occupant vehicles, the proliferation of multiple-vehicle households, and the need for new roads would ultimately decline.

- Establishing a grid street system to reduce traffic volume and speed would provide quieter, safer streets. A grid system of interconnected streets in new developments

would ensure that all trips, whether by foot, bicycle, or automobile, could be by the shortest possible route. Public transit routes and connections would be easily accessible to allow riders to travel to other areas of the City and throughout the region. A grid system helps reduce congestion because residents have several alternative avenues through the minor streets of such an interconnected system. (Traffic congestion is more pronounced in suburbs where there are four dwelling units per acre than in established urban areas where densities are three times as high.) Narrow streets should be part of a dense, interconnected transportation network that also includes sidewalks, walking paths, and bicycle lanes, which together create a safe environment for pedestrians and bicyclists. Planting strips adjacent to the street help create shaded streets, promote walking, and slow traffic.

The City would receive multiple social, economic, and ecological benefits by increasing densities and applying sustainable planning and development principles, including:

- Increased protection of aquatic habitats and water quality
- More efficient land use
- Detached dwellings that impart a traditional feel to the neighborhood
- 35 to 40 percent reduction in the cost of a typical dwelling unit
- 75 percent reduction in cost per dwelling unit for neighborhood streets and utilities
- Economically viable neighborhoods and transit systems
- Safer streets with 40 percent fewer cars and slower traffic
- Community open spaces and playfields for passive and recreational uses
- Preserved access to natural streams and wildlife habitat corridors along bicycle and pedestrian paths

The City of Sammamish is developing rapidly and is approaching build-out conditions. The City's development design review process should allow flexibility for developers to incorporate the above sustainable planning/livable community concepts. Applying these recommendations in new developments throughout the City will help the City manage urban growth and protect valuable water resources by minimizing further effects to the watershed.

## Suggested Next Steps

Implementing these recommendations will include the following steps:

- The City must agree to pursue these recommendations and concepts
- The City will refine these concepts as appropriate
- The City will identify specific code amendments or program actions needed to implement these concepts
- The City will adopt and implement new codes and programs to incorporate these concepts