

Detention Ponds

*Care and Maintenance in
City of Lake Stevens*

Presenter: David Jackson



What We are Going to Cover Tonight...

- Part 1: The Stormwater Problem
- Part 2: Detention Pond Basics
- Part 3: Detention Pond Maintenance



WHAT IS A **DETENTION POND?**

June 22 Webinar

5:30 - 6:30 pm

Disclaimer

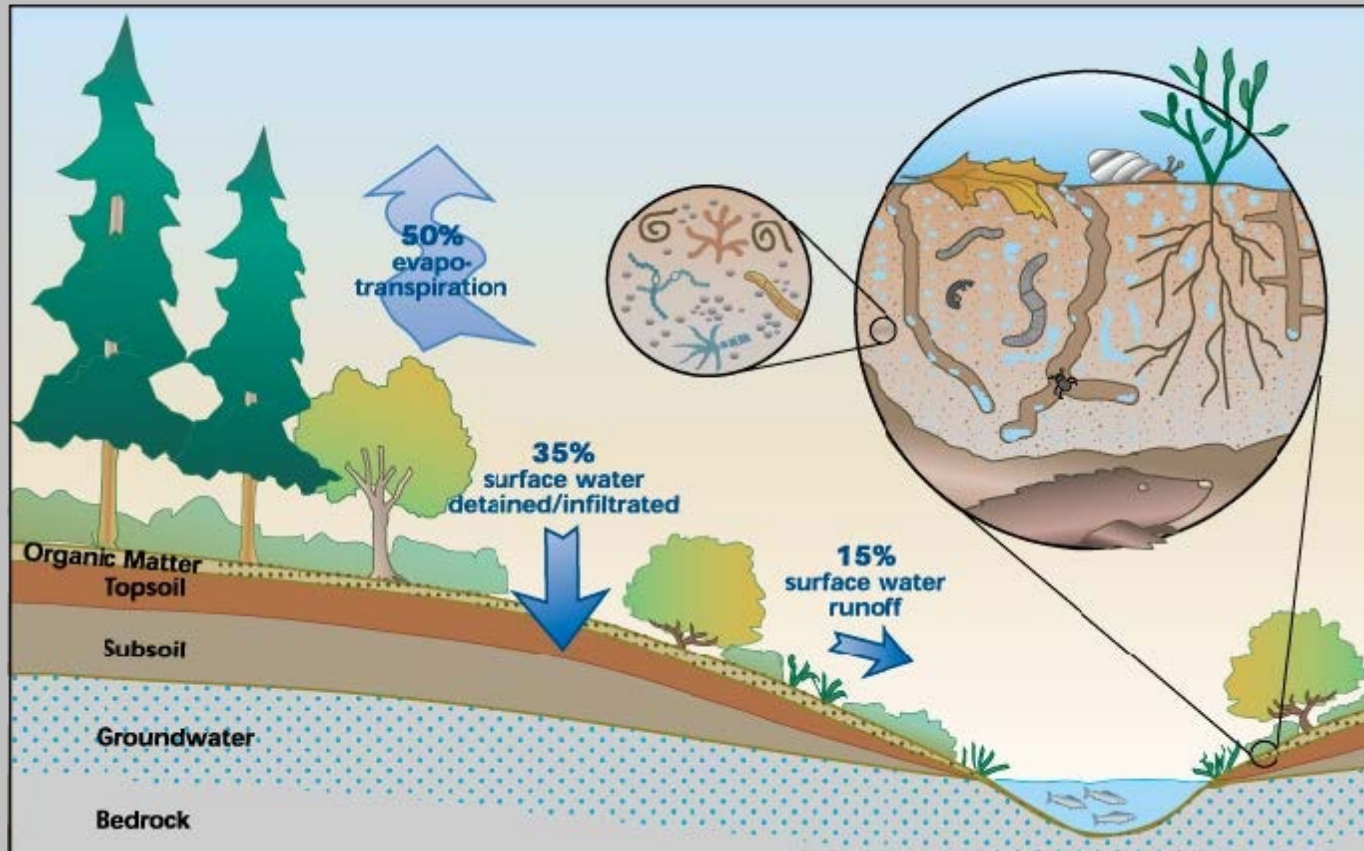
You Do Not Need to Memorize This

Part 1: The Stormwater Problem



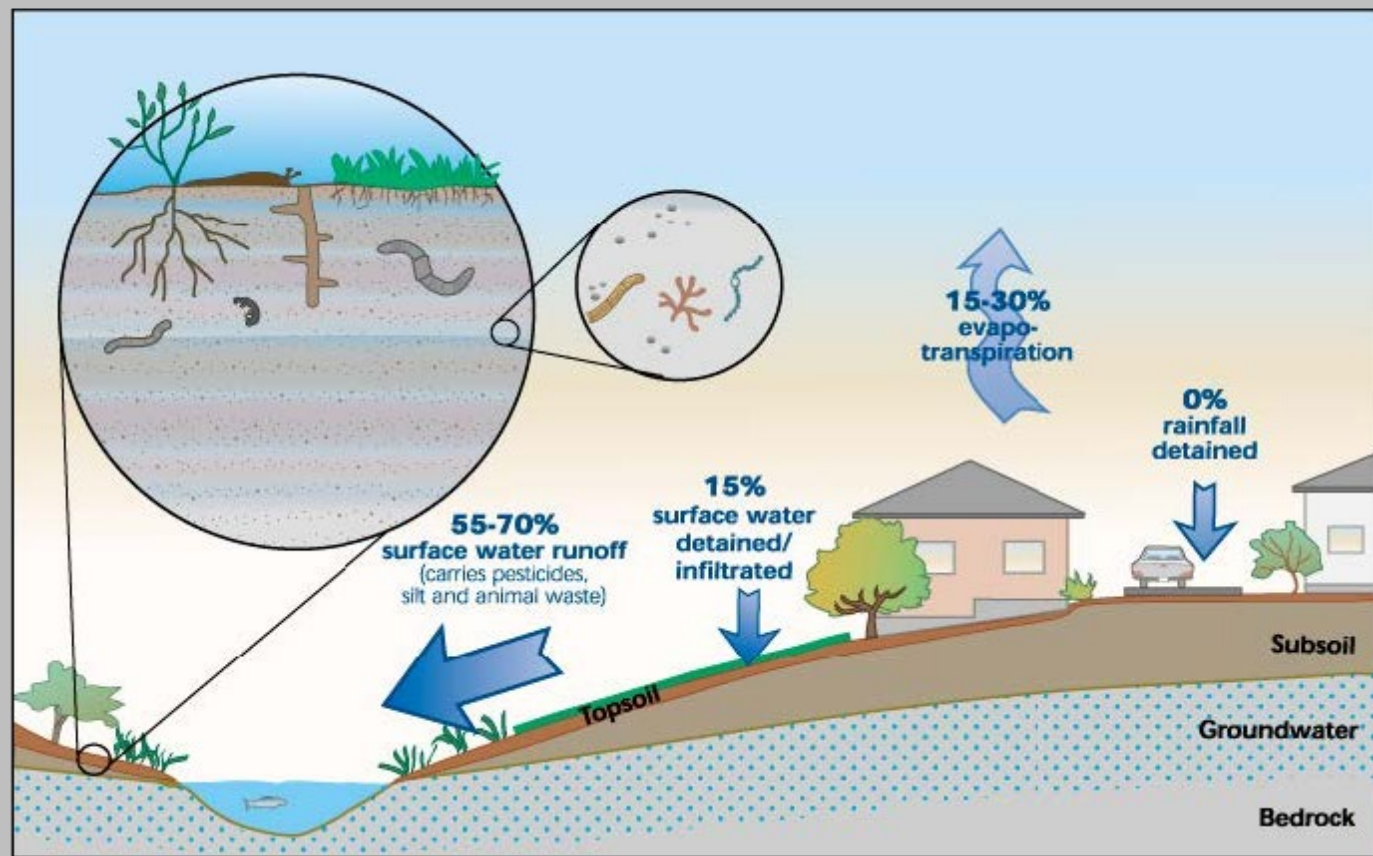


Pervious Forest





Impervious Development



The Stormwater Problem

- Flooding
- Erosion
- Pollution
- Depleted Groundwater



Part 2: Detention Ponds



Quick Facts

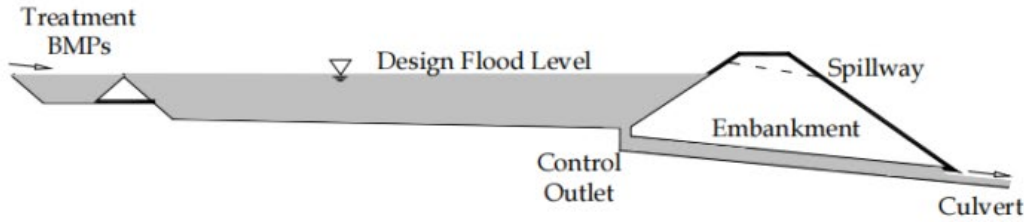
- Wet or Dry (Sometimes Both)
- Part of Environmental Protection
- Require Regular Maintenance
- Usually Privately Owned (HOA, Community Board, Apartment Complex Management)



Catch Basins & Conveyance



Detention vs Retention

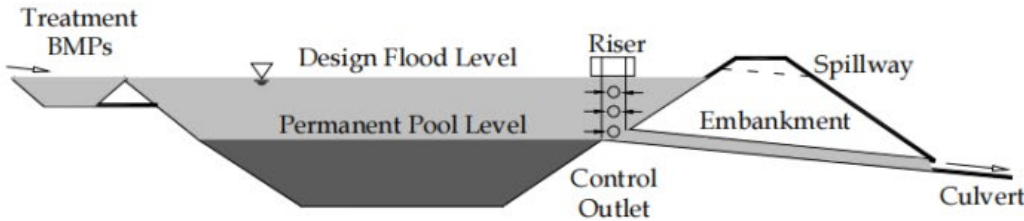


Concept



Completion

(a) Dry Type - Kemaman



Concept

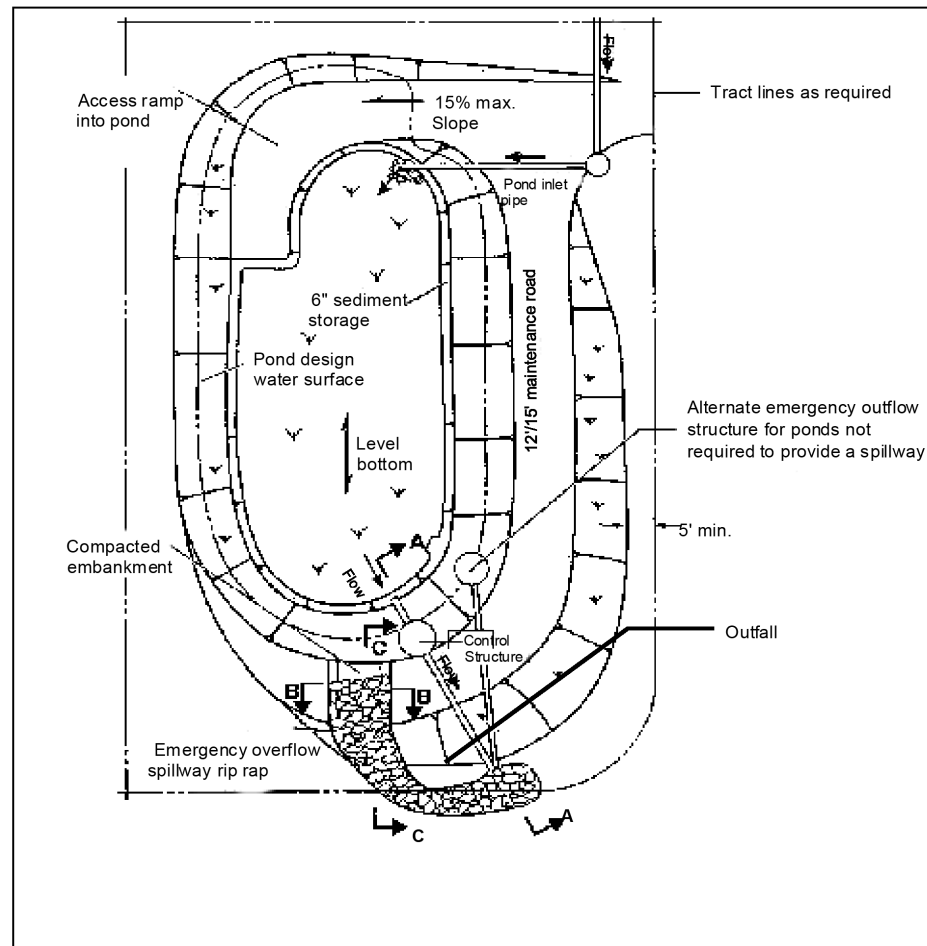


Completion

(b) Wet Type - Malacca

Detention pond element

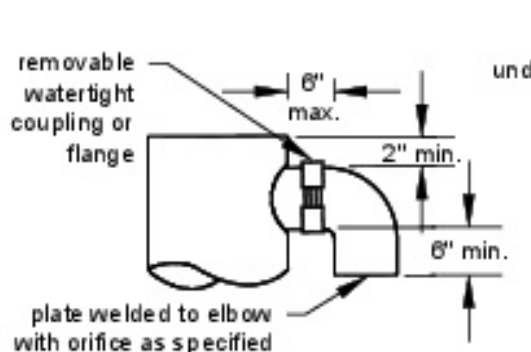
- Access Ramp
- Inlet
- Outlet
- Pond bottom (Wet vs. Dry)
- Emergency overflow (And Potentially Control Structure)
- Berms dividing cells



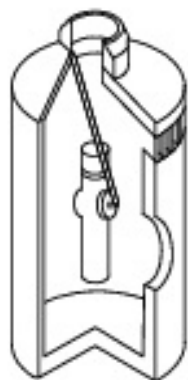
Note:

This detail is a schematic representation only. Actual configuration will vary depending on specific site constraints and applicable design criteria.

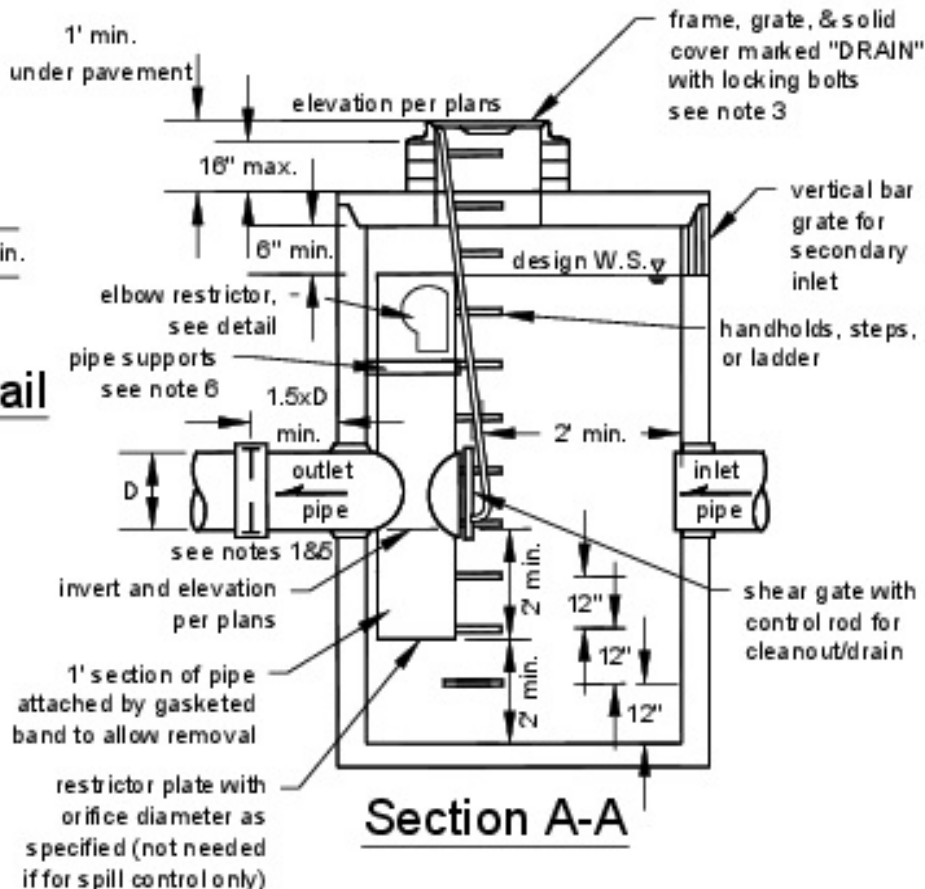
Control Structure



Elbow Restrictor Detail



Isometric



Fencing and security

- When is a fence required?
- Liability and Dangers
- Fence drawbacks
- Steepness and Depth



Plants

- Grass
- Trees & Shrubs
- Invasive species
- Maintenance

Snohomish County Drainage Manual
 Volume VI Stormwater Facility
 Maintenance July 2020 Ecology Review
 DRAFT
 (https://www.snohomishcountywa.gov/DocumentCenter/View/74901/Drainage-Manual-Vol-VI-July-2020-Ecology-Review-Draft_61620_TOCwtrcorr)

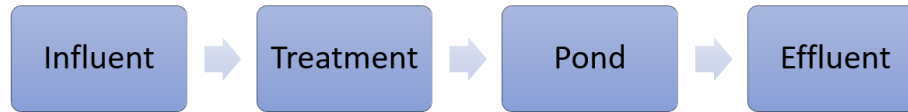
Emergent Wetland Plant Species Recommended for Wetponds			
Species	Common Name	Notes	Maximum Depth
INUNDATION TO 1-FOOT			
<i>Agrostis exarata</i> ⁽¹⁾	Spike bent grass	Prairie to coast	to 2 feet
<i>Carex stipata</i>	Sawbeak sedge	Wet ground	
<i>Eleocharis palustris</i>	Spike rush	Margins of ponds, wet meadows	to 2 feet
<i>Glyceria occidentalis</i>	Western mannagrass	Marshes, pond margins	to 2 feet
<i>Juncus tenuis</i>	Slender rush	Wet soils, wetland margins	
<i>Oenanthe sarmentosa</i>	Water parsley	Shallow water along stream and pond margins; needs saturated soils all summer	
<i>Scirpus atrocinctus</i> (formerly <i>S. cyperinus</i>)	Woolgrass	Tolerates shallow water; tall clumps	
<i>Scirpus microcarpus</i>	Small-fruited bulrush	Wet ground to 18 inches depth	18 inches
<i>Sagittaria latifolia</i>	Arrowhead		
INUNDATION 1 TO 2 FEET			
<i>Agrostis exarata</i> ⁽¹⁾	Spike bent grass	Prairie to coast	
<i>Alisma plantago-aquatica</i>	Water plantain		
<i>Eleocharis palustris</i>	Spike rush	Margins of ponds, wet meadows	
<i>Glyceria occidentalis</i>	Western mannagrass	Marshes, pond margins	
<i>Juncus effusus</i>	Soft rush	Wet meadows, pastures, wetland margins	
<i>Scirpus microcarpus</i>	Small-fruited bulrush	Wet ground to 18 inches depth	18 inches
<i>Sparganium emmersum</i>	Bur reed	Shallow standing water, saturated soils	
INUNDATION 1 TO 3 FEET			
<i>Carex obnupta</i>	Slough sedge	Wet ground or standing water	1.5 to 3 feet
<i>Beckmania syzigachne</i> ⁽¹⁾	Western sloughgrass	Wet prairie to pond margins	
<i>Scirpus acutus</i> ⁽²⁾	Hardstem bulrush	Single tall stems, not clumping	to 3 feet

Detention vaults

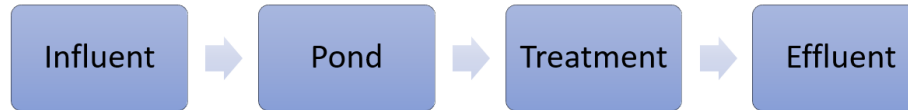


Types of Treatment Stream

Upstream Treatment Chain



Downstream Treatment Chain



Filter Treatment



Treatment-Bioswale



Part 3: Detention pond maintenance



Legal Requirements

- What do you own?
- What condition is it in?
- What jurisdiction are you in?
(City or County)
- When was it last maintained?
- What agreements do you have?

Maintenance Responsibility

Understanding the responsibilities and restrictions related to maintenance of your stormwater facility is important. For example, stormwater facilities in residential developments may be located on separate tracts that serve multiple lots with shared maintenance responsibility. Please review your development's plat documents, drainage maintenance covenants, as-built engineering plans, and other relevant documents to better understand your stormwater facility maintenance responsibilities. One source of some of these documents may be PDS's Interactive web map portal. <http://gismaps.snoco.org/Html5Viewer/Index.html?viewer=pdsmapportal>

Do I need a Permit?

Before performing maintenance, it's important to understand whether or not the planned activities require any permits. Many stormwater facilities are near critical areas, and therefore knowledge of your facility site boundaries is important. Depending on the type of work, location, and circumstances, permits may be required. For information on permits, please contact Snohomish County- Planning and Development Services (PDS) at 425-388-3311.

Safety Precautions

It is important to understand potential hazards when accessing a stormwater facility. Inspecting a stormwater facility can require walking up and down steep slopes, being near standing or fast-moving water, or lifting heavy access lids. There can be uneven terrain, dense vegetation, and slippery surfaces. Catch basins and vaults are confined spaces and cannot be entered safely without specialized equipment and training

Professional Contractors

For most private stormwater facility owners, the best approach to completing the required maintenance is to hire a professional contractor that specializes in stormwater systems. SWM maintains a list of local stormwater service providers (direct link: [storm drainage facility cleaning contractors \(PDF\)](#), also found at

Snohomish County Drainage Manual Volume VI Stormwater Facility Maintenance July 2020 Ecology Review DRAFT

(https://www.snohomishcountywa.gov/DocumentCenter/View/74901/Drainage-Manual-Vol-VI-July-2020-Ecology-Review-Draft_61620_TOCwtrcorr)

What things do you need a contractor for?

- Confined Space Work
- Dense or tall vegetation removal
- Steep Slopes
- Deep Water
- Heavy Equipment
- Vactoring

Snohomish County Drainage Manual

(<https://snohomishcountywa.gov/DocumentCenter/View/7397/Storm-Drainage-Facility-Cleaning-Contractors-PDF?bidId=>)



Rules and regulations

- Stormwater Management Manual for Western Washington
- County Code
- Snohomish County Drainage Manual
- City Municipal Code

Chapter 7.54

MAINTENANCE OF CONSTRUCTED STORMWATER CONTROL FACILITIES



Sections:

7.54.010	Title.
7.54.020	Purposes and objective.
7.54.030	Applicability.
7.54.040	Public nuisance.
7.54.050	Administration - Authority of directors.
7.54.060	Snohomish County Drainage Manual.
7.54.070	Definitions.
7.54.080	Maintenance and repair of constructed stormwater control facilities.
7.54.090	Inspections.
7.54.100	Notice and order to cease violation.
7.54.110	Warning notice as alternative to notice and order.
7.54.120	Monetary penalties and costs.
7.54.130	Response to a notice and order.
7.54.140	Revised notice and order.
7.54.150	Hearing examiner process for appeal of notice and order.
7.54.160	Appeal under LUPA.
7.54.170	Final order.
7.54.180	Failure to comply with final order.
7.54.190	Criminal prosecution.
7.54.200	Reduction of monetary penalties.
7.54.210	No county liability.
7.54.220	Immunity from suit.
7.54.230	Compliance with other laws.
7.54.600	Sunset.

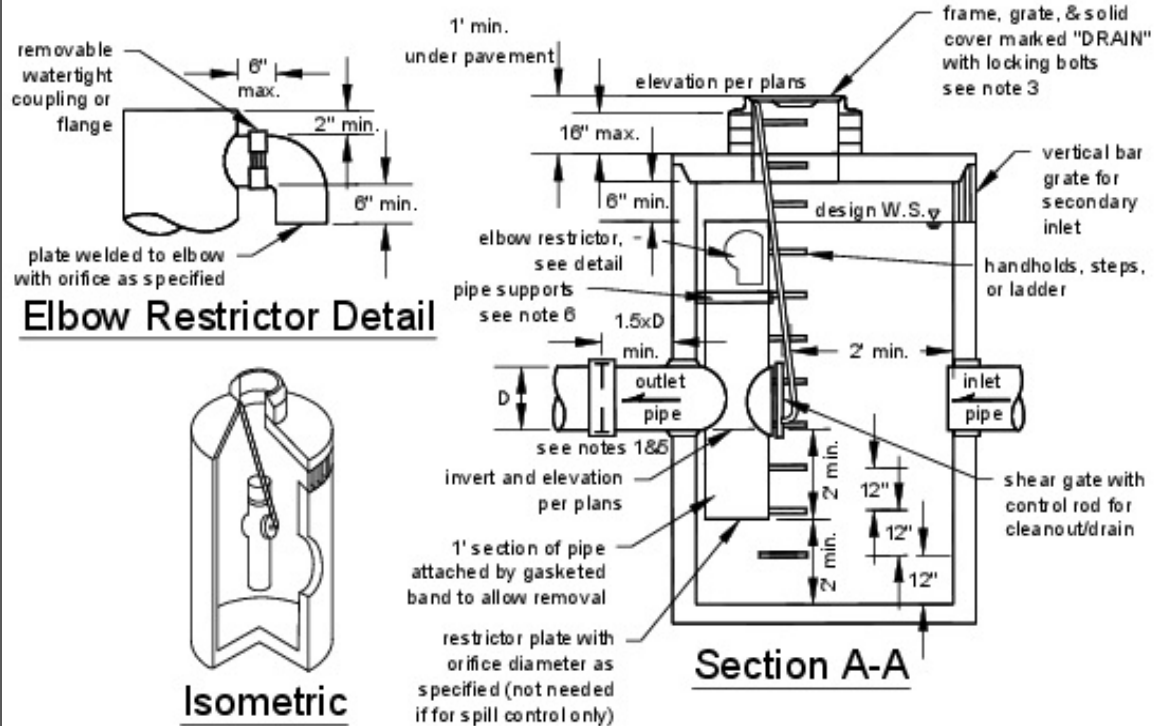
Vegetation

- **Trimming and Mowing**
- **Invasive**
- **Green Waste**
- **Debris**



Control structure

- Manhole Lid
- Manhole Structure
- Orifices or Notches
- Weirs
- Gate Valves & Gate Valve Handle
- Ladder
- Bottom Orifice
- Overflow
- Sediment and Debris



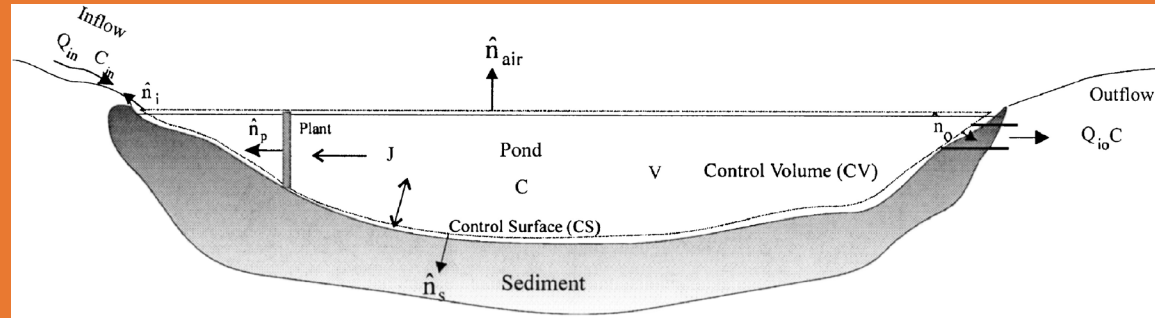
Trash and Debris

- Clogged Pipes
- Plant Debris and
Choosing Species
- Sediment
- Erosion



Failed systems

- Flooding
- Pollution
- Over Vegetation
- Sedimentation (Loss of Volume)
- Slope Failure
- Short Circuiting
- No Ponding



Inspection, Reporting, and Documentation

- Contact the City
- Maintain Schedule
- Keep notes
- Photos
- Existing reports and plans



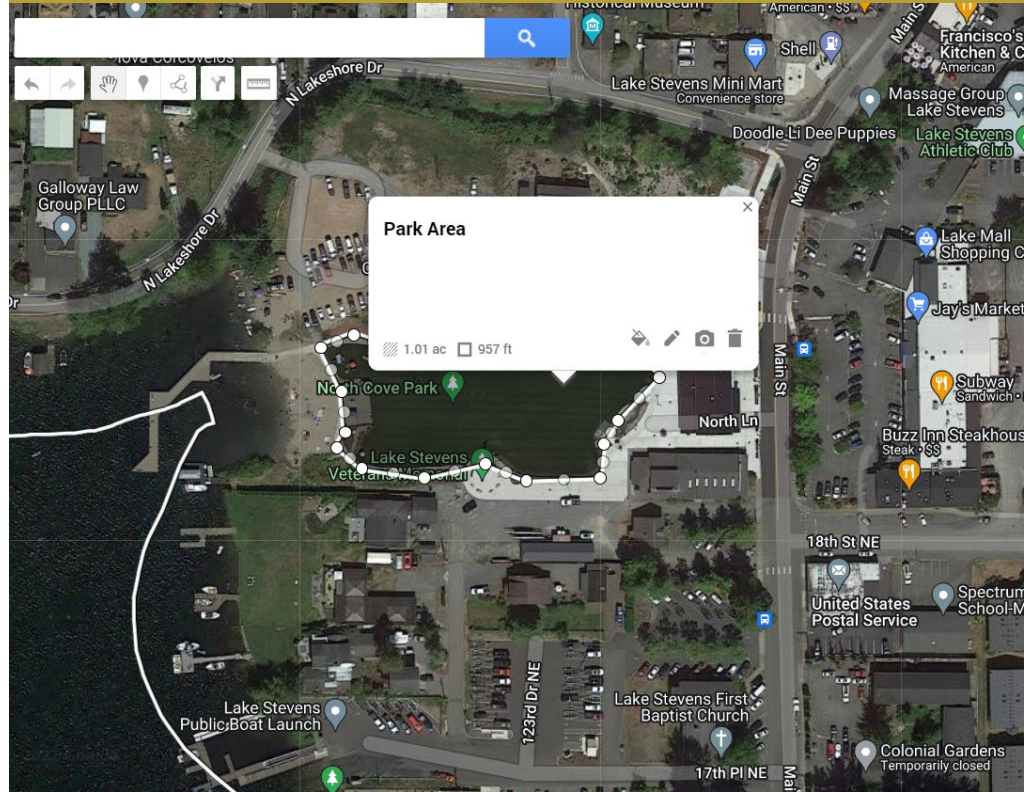
Budgeting: Typical Costs

- **Wet Ponds**
 - \$17.50-\$35 per Cubic Meter
 - \$0.50-\$1.00 per cubic foot
- **Dry**
 - \$10 per square meter for smaller ponds (\$0.30 per cubic foot)
 - \$5 per square meter for larger pond(\$0.15 per cubic foot)



What is the Size of Your Pond?

- Google Maps
- As-Built or County Records
- Previous Maintenance Reports



Budgeting: Routine Maintenance

- **Routine maintenance can be estimated at 3-5% of the construction cost annually.**
- **Mowing can be \$200-600 per visit. Intensive maintenance can be upwards of \$1,000 annually.**
- **Good planting and regular maintenance can reduce these costs.**

Budgeting: Non-Routine Maintenance &

Repairs

- Removing sediment can cost from \$50-100 per cubic yard, including dredging and disposal. Mobilization for dredging work can cost around ~\$4,000.
- Repairing structures is highly variable and will require a quote.
- Repairing and dredging may require permits from local municipalities, those costs should also be included in your estimates.

Budgeting: Hiring a contractor

- May need to hire different contractors for different jobs
- Licensed and Insured
- Previous Experience
- References
- Budgeting

Storm Drainage Facility Cleaning Contractors *(last updated 2/28/22)*

The following contractors operate in Western Washington and may be equipped to maintain storm drainage facilities. This list is intended for informational purposes only and should not be construed as an endorsement of any particular company or a guarantee of work quality. Since this is not a complete list of cleaning contractors, owners may wish to conduct their own search using key words such as “drainage contractors” in order to compile cost estimates from several companies. Facility owners should confirm that a given company can provide the specific services that are needed.

Budgeting Resources

<https://www.rdanorthwest.com/mt-content/uploads/2016/04/detention-basin-retrofits-and-maintenance.pdf>

[http://nrcsolutions.org/floodwater-detention/#:~:text=According%20to%20the%20EPA%2C%20typical,cubic%20foot\)%20for%20larger%20basins](http://nrcsolutions.org/floodwater-detention/#:~:text=According%20to%20the%20EPA%2C%20typical,cubic%20foot)%20for%20larger%20basins)

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Working with the municipality

- Identify your inspector
 - Jon Stevens
- Keep things simple
- Keep good records
- Knowing who to talk to
 - Shannon Farrant

<https://snohomishcd.org/detention-ponds-lake-stevens>



Resources

- City or County Records
- City and County GIS (IMAP, SCOP, etc)
- Drainage Report
- Drainage Plans
- DOE Stormwater Management Manual for Western Washington
- Maintenance Agreement
- Auditor and Inspector Files
- Google Maps
- Snohomish Conservation District

Technical Resources

Further information on stormwater regulations and stormwater management in Snohomish County can be found at the following sources:

1. Snohomish County Drainage Manual <https://snohomishcountywa.gov/1130/Drainage-Manual>
2. Snohomish County Engineering Design and Development Standards (EDDS) <https://snohomishcountywa.gov/492/Design-Standards-EDDS>
3. Snohomish County Code (SCC):
 - 7.53–Water Pollution Control <https://snohomish.county.codes/SCC/7.53>
 - 7.54 –Maintenance of Constructed Stormwater Control Facilities <https://snohomish.county.codes/SCC/7.54>
 - 30.63A-Drainage <https://snohomish.county.codes/SCC/30.63A>
 - 30.63B– Land Disturbing Activities <https://snohomish.county.codes/SCC/30.63B>
4. Surface Water Management information on programs and services www.surfacewater.info.
5. Washington Administrative Code (WAC) <https://apps.leg.wa.gov/wac/>
6. Revised Code of Washington (RCW) <https://apps.leg.wa.gov/rcw/>

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**Thank You to
Our Partners!**



Questions?

Thanks for Joining Us!

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