



Alberta Lake Management Society Chestermere Workshop 2019

Equipping Albertans to build vibrant, ecologically functional landscapes within the built environment, through comprehensive stormwater management

Quarry Park
Bioswale
Calgary

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Partners

GOVERNMENT



NON-PROFIT



CORPORATE

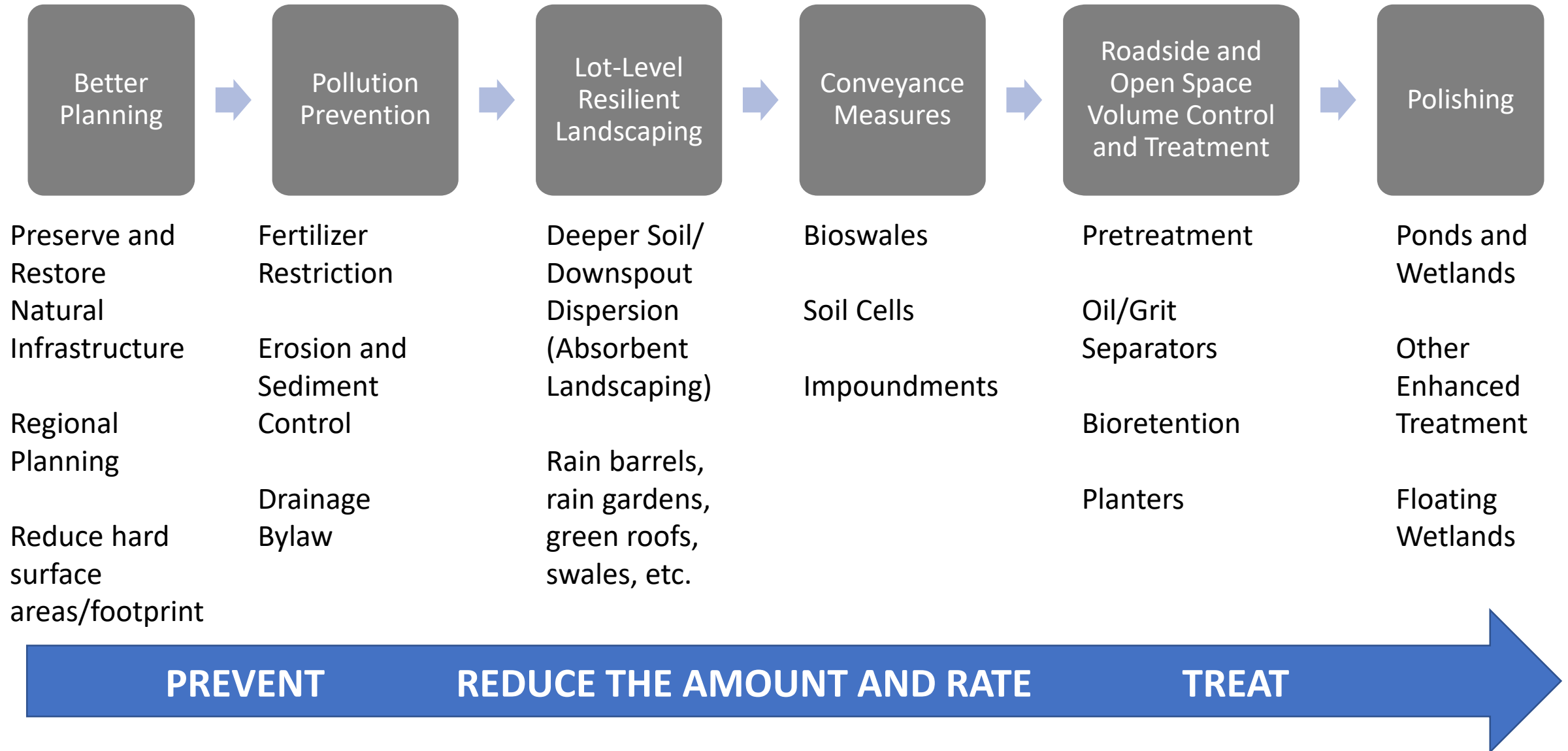


VENDOR





Stormwater Treatment Train



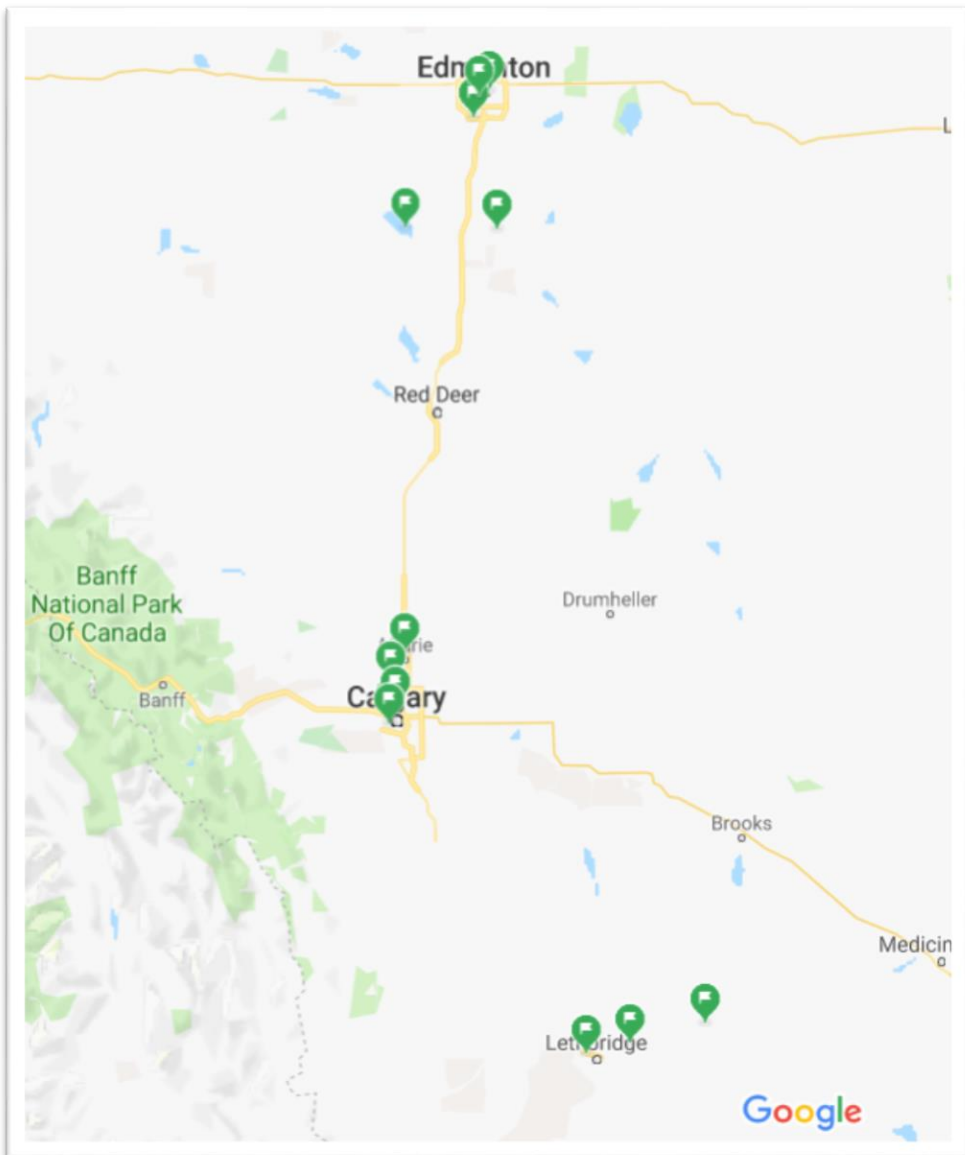


Lake Management is Largely Land Management





Rain Gardens 4 Resilience – Residential Demos



12 gardens built since 2017:

- 3 North Saskatchewan
- 2 Battle
- 3 Bow (monitored)
- 3 Oldman

4th monitored garden to be built in Calgary in 2019





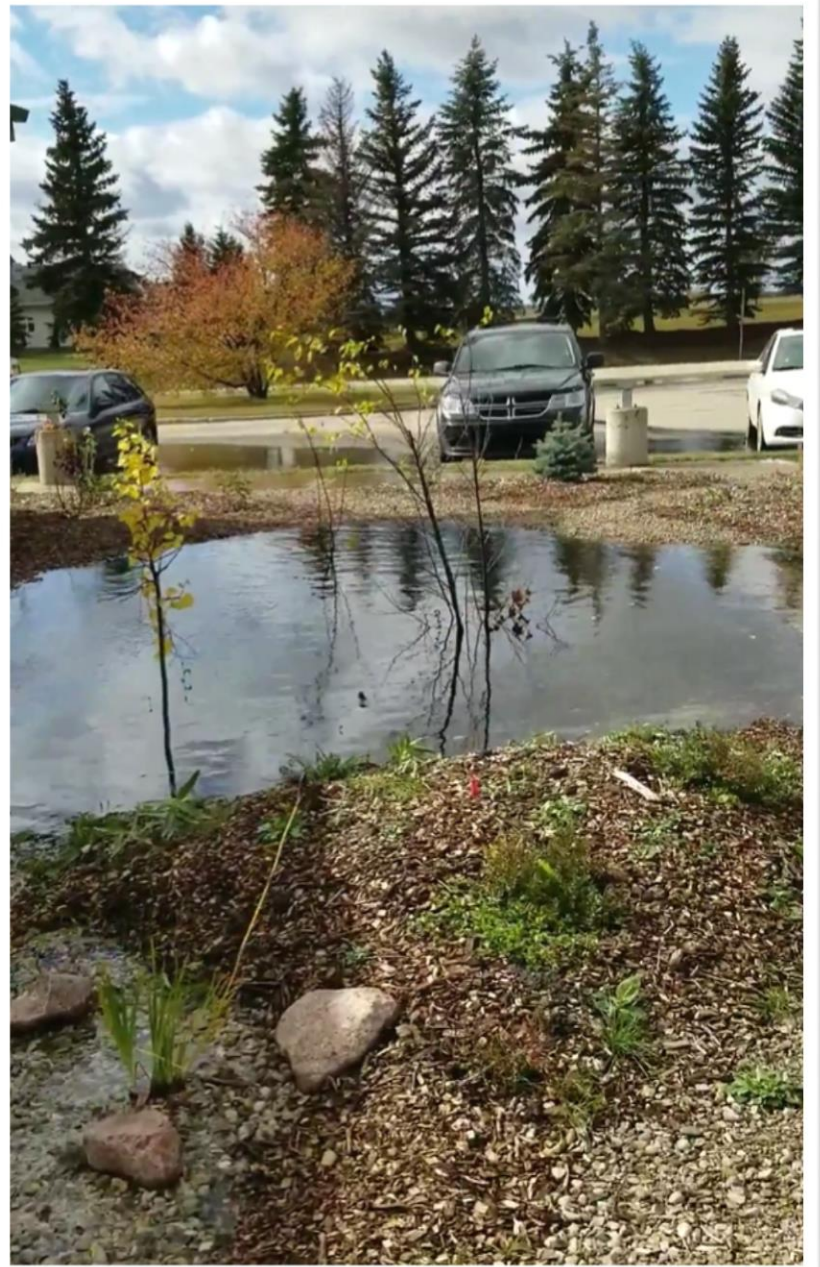














City of Wetaskiwin Bioretention and Soil Cells





Soil Cells



Image: Deeproot



Gravel Lanes Research – Rainfall/Runoff Simulator



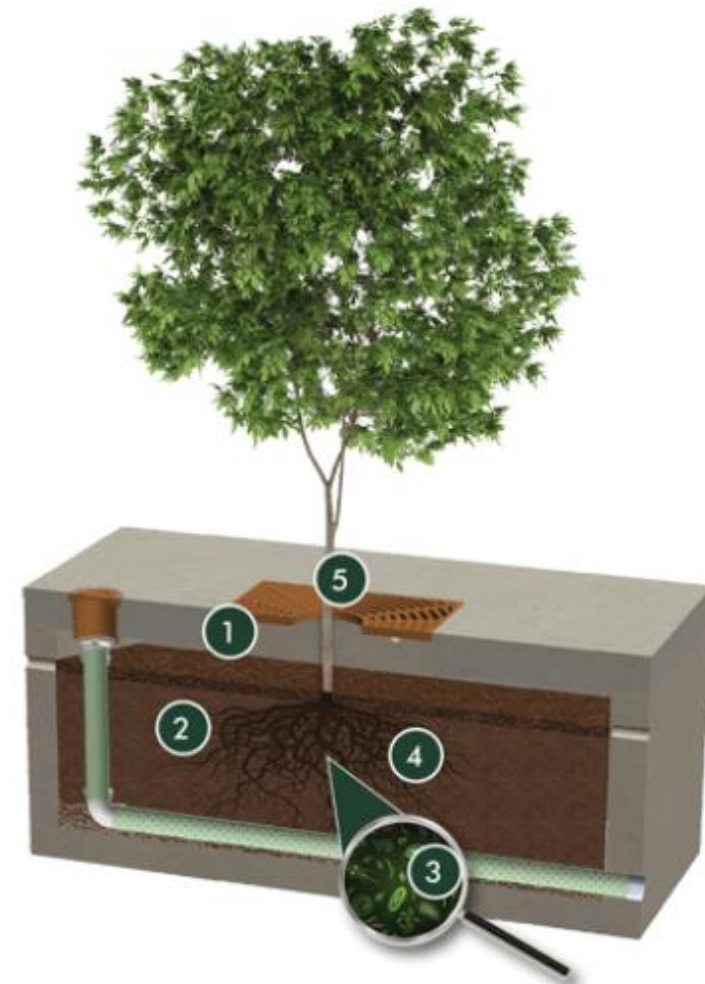


Box Planters

Table 3. Summary statistics for influent and effluent event mean concentrations for TSS and TP

Study Location	Water Quality Variable	N	Sampling Location	Min	Max	Median	Mean	SD	Mean 95% confidence interval - lower limit	Mean 95% confidence interval - upper limit
Bellingham, Washington	TSS	17	Influent (mg/L)	7.5	107	49	47.2	29.7	33.8	61.0
		17	Effluent (mg/L)	1.8	9.5	3.7	4.1	2	3.3	5.1
	TP	17	Influent (mg/L)	0.03	0.52	0.090	0.13	0.12	0.08	0.19
		17	Effluent (mg/L)	0.02	0.06	0.032	0.03	0.01	0.03	0.04
Fayetteville, North Carolina	TSS	28	Influent (mg/L)	20.00	730	67	120.6	139	75	174
		28	Effluent (mg/L)	1.2	16	4	5.4	3.7	4.1	6.9
	TP	32	Influent (mg/L)	0.03	0.59	0.095	0.13	0.12	0.09	0.17
		32	Effluent (mg/L)	0.012	0.14	0.040	0.05	0.03	0.03	0.06

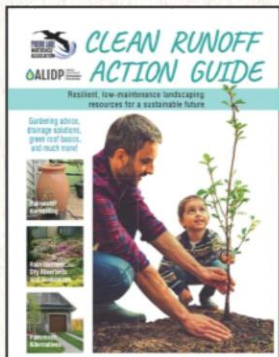
ETV Verification Statement excerpt for Filterra





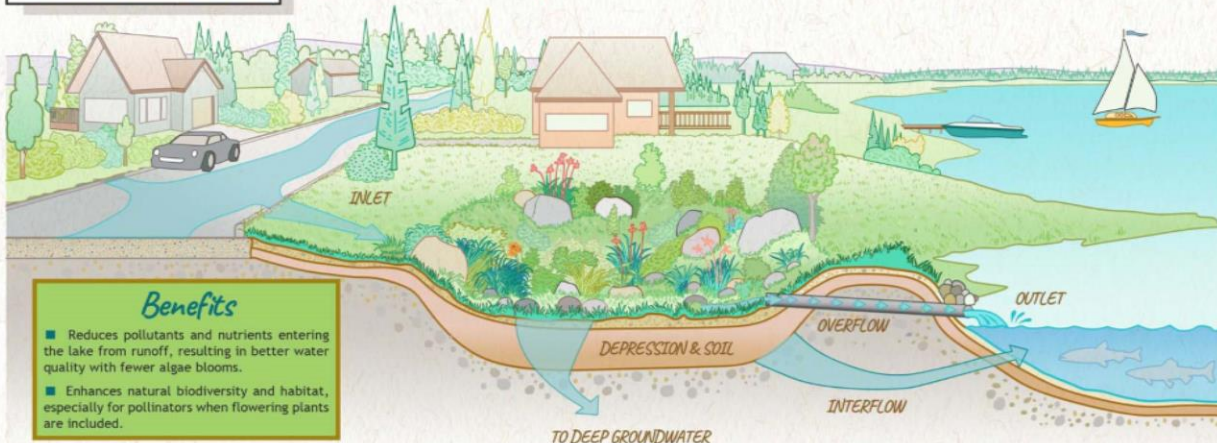


Pigeon Lake Watershed Association



LAKEWISE LANDSCAPING DEMONSTRATION SITE

Runoff that previously went straight from the street to the lake through a culvert, is now being slowed, filtered and cleaned up! Check out the Clean Runoff Action Guide at www.plwa.ca for LakeWise landscaping tips. Build your own rain garden!



Benefits

- Reduces pollutants and nutrients entering the lake from runoff, resulting in better water quality with fewer algae blooms.
- Enhances natural biodiversity and habitat, especially for pollinators when flowering plants are included.

Inlet

Large debris and sediment are trapped where they can be easily removed, rather than ending up in the lake.

Plants

Deep-rooted plants are selected that tolerate a wide range of moisture conditions, to enhance habitat for pollinators and to provide an attractive park amenity.

Depression

A place for temporary ponding which allows time for runoff to soak in, get cleaned up, and flow the way it naturally would before land was developed.

Deep, Living Soil

Healthy soil is alive! Everything from plant roots, to worms and fungi are at work to lock-up nutrients and pollutants. Deeper soil works best.

Outlet

After being cleaned up in the depression, runoff flows through the remaining culvert to the lake.



Photo: PLWA



Maintenance



<https://www.jjei.com/new-equipment/vactor-2100i-combination-sewer-cleaner/#&gid=1&pid=2>

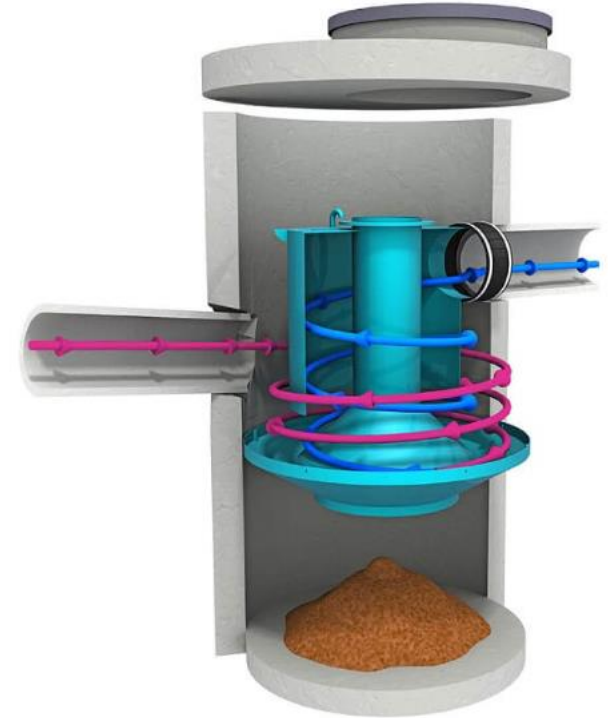
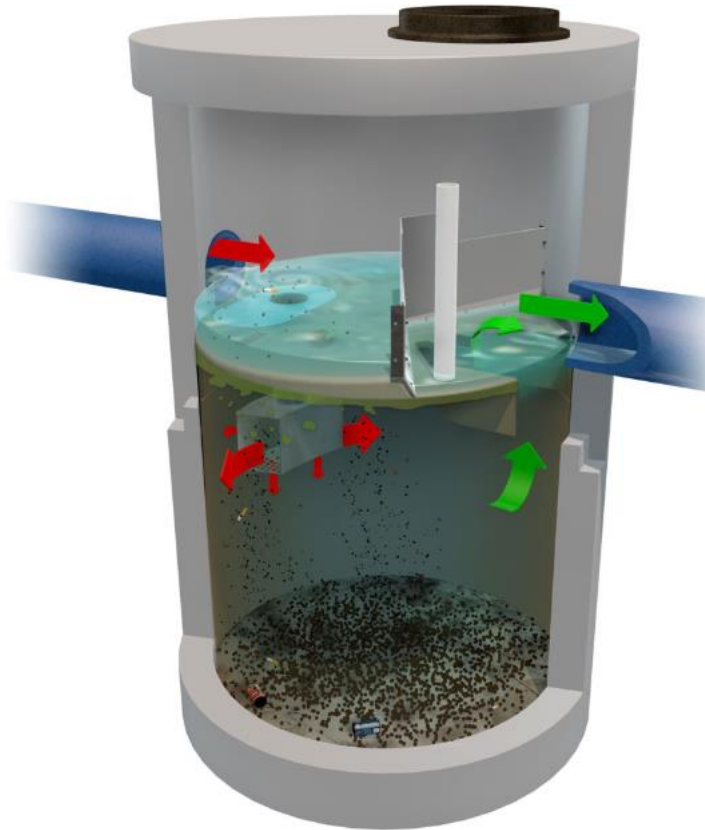




Pretreatment

Oil/Grit Separators

Curb Inlet Filter

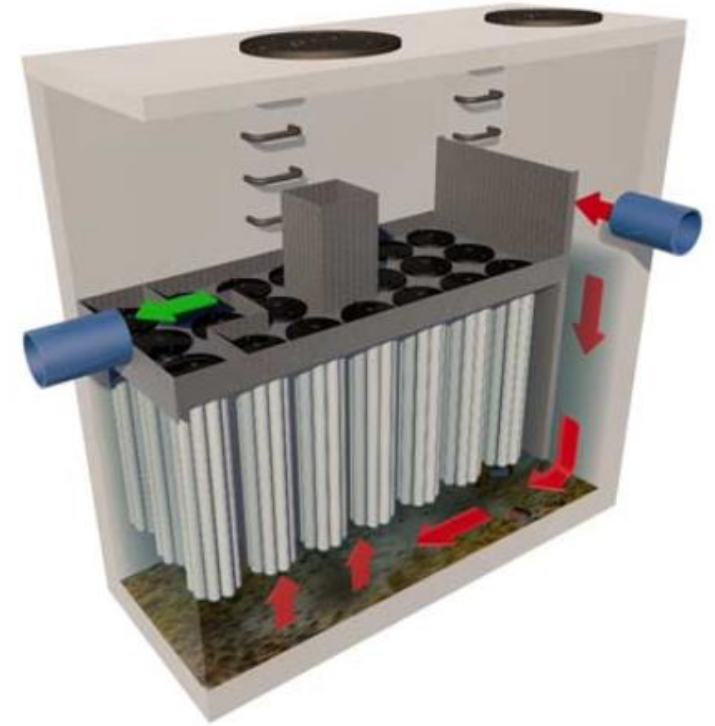
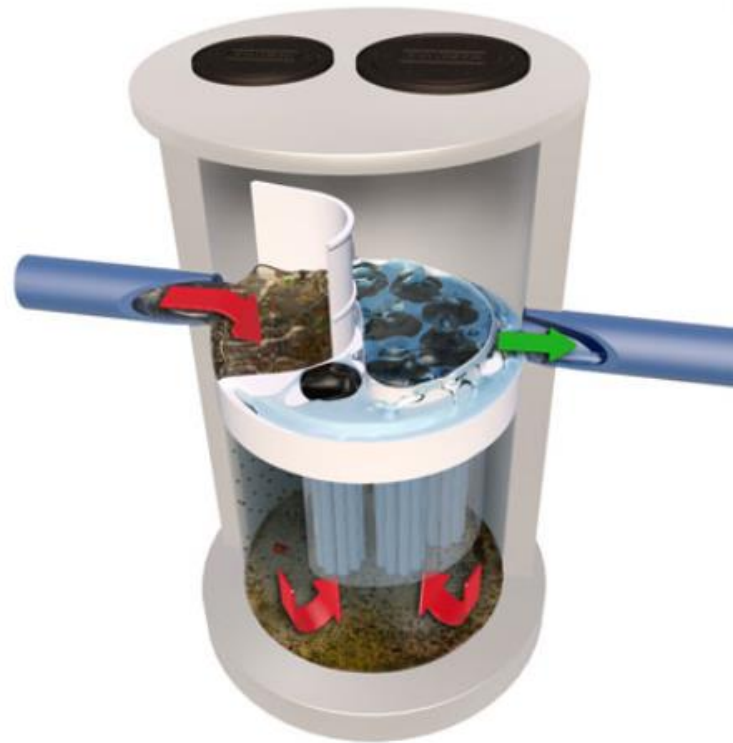


Oil/Grit Separators have a protocol under
Environmental Technology Verification ISO 14034

<https://etvcanada.ca/home/verify-your-technology/current-verified-technologies/>



Cartridge filtration enhancement





EPCOR Eastgate Bioretention Research





Okotoks Bioretention Research





Okotoks Bioretention Research – 8 of 24 cells





Simulating a rain event





Okotoks Bioretention Research – P Sorbing Amendments

	Product	Active Ingredient
	Eggshells	Calcium
	Drywall	Calcium
	Water Treatment Residuals	Alum
	PAC	Polyaluminum Chloride (liquid)
1	SorbtiveMEDIA (Imbrium)	Al/Fe? proprietary granule
2	Ultra-Phos Filter	From Iron Oxide Recovery -proprietary
3	Delta Adsorbents AA400G	Aluminum proprietary granule





CSA Green Infrastructure for Stormwater Committee

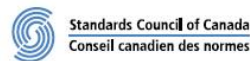


CAN/CSA-W200-18
National Standard of Canada



Design of bioretention systems

BALLOT DRAFT – NOT FOR FURTHER DISTRIBUTION
ÉBAUCHE : TOUTE DISTRIBUTION INTERDITE



CAN/CSA-W201-18
National Standard of Canada



Construction of bioretention systems

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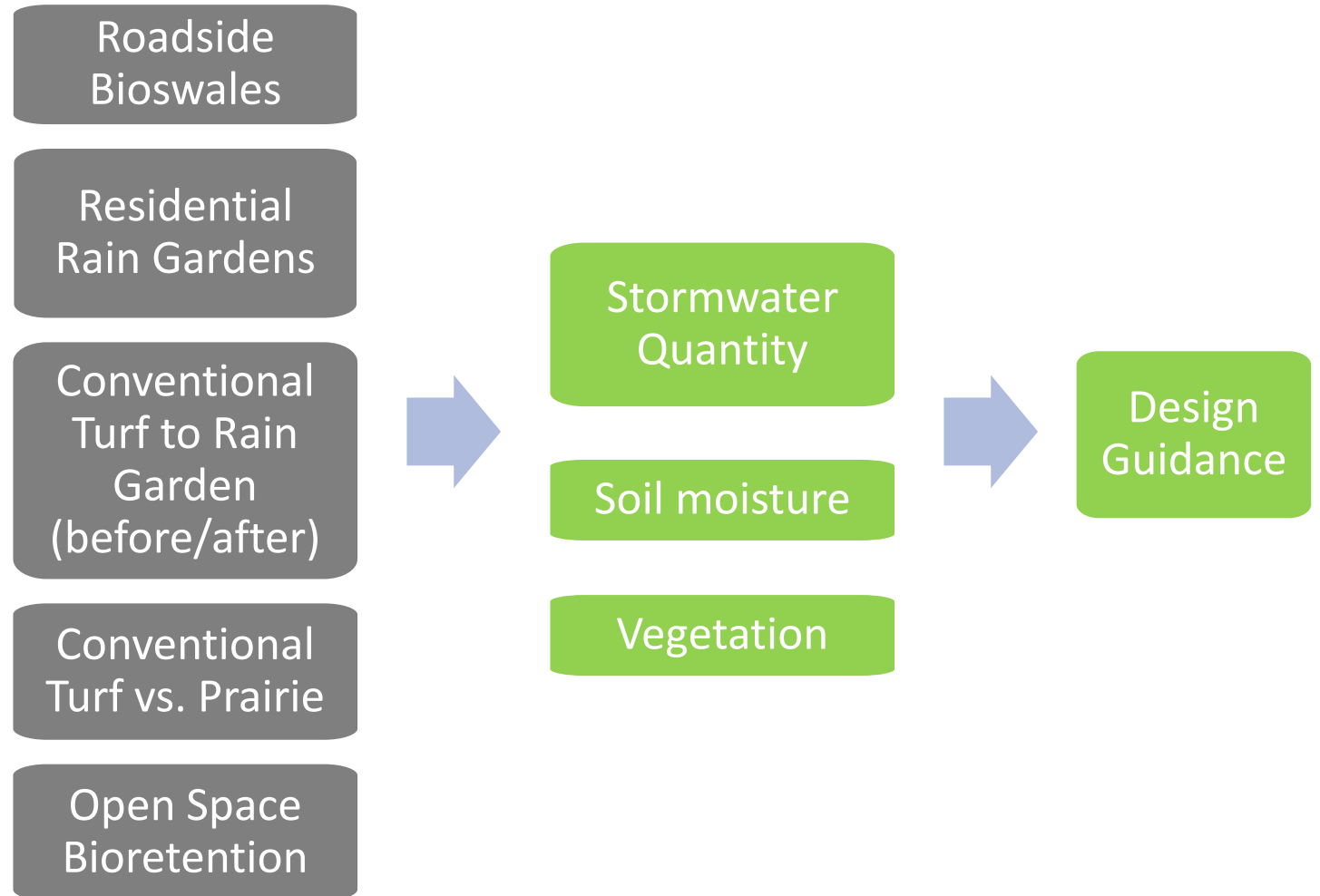
Albertans played a major role in drafting these standards

Kudos to Chair Bert van Duin (City of Calgary), Leta van Duin (ALIDP), Jim Laidlaw (Stantec), Mohd Gazi (City of Calgary), Nathan Gill (Eagle Lake Landscaping), Kenneth Clogg-Wright (MPE at time of publication) and Craig Kipkie (Kerr Wood Leidal)...all ALIDP partners!

Experiences from both the City of Calgary Design Bioretention and Bioswale Module and the Okotoks Research Site are reflected in these CSA standards!

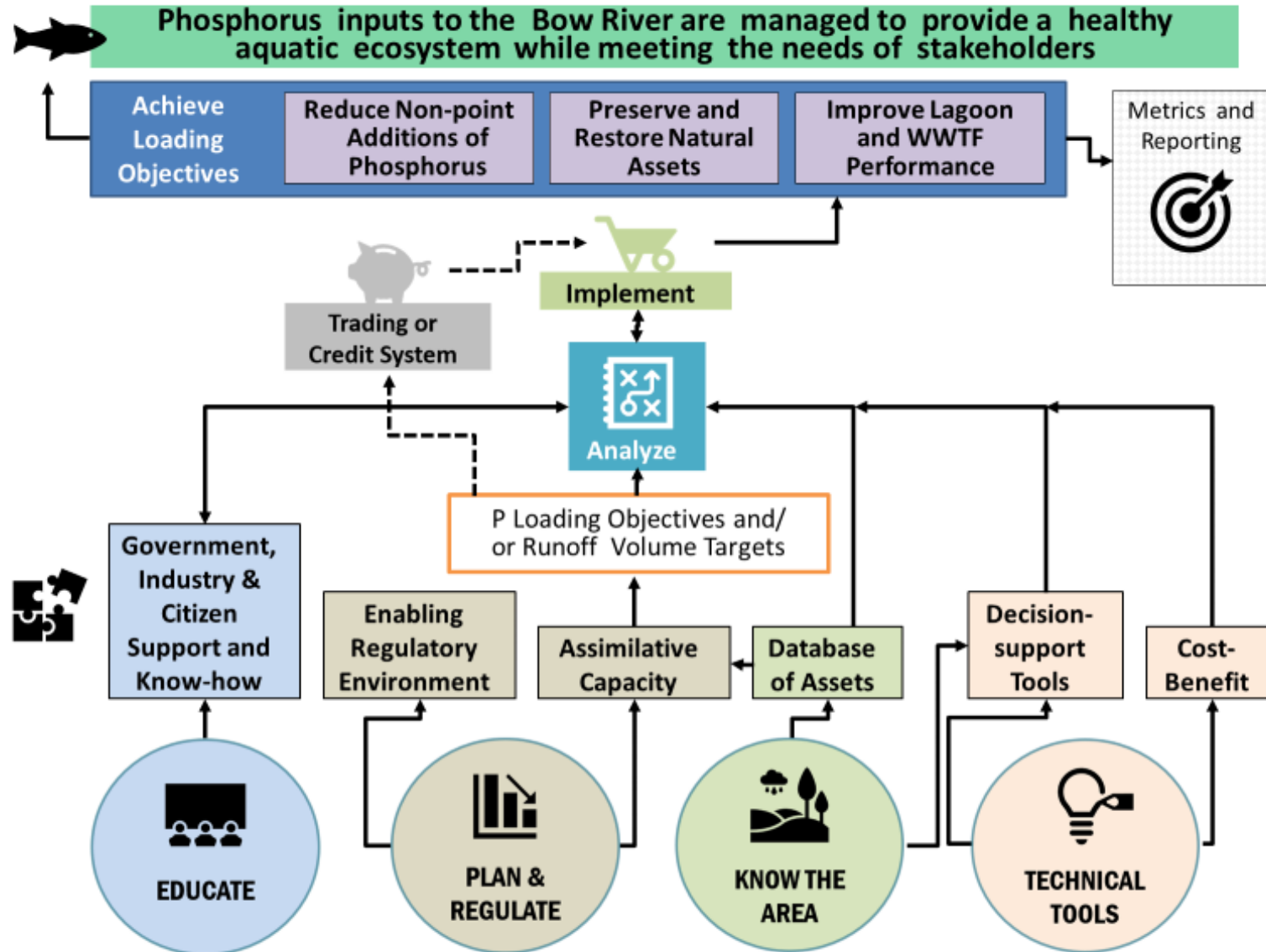


Calgary Vegetated Practices Quantity Monitoring





Bow River Phosphorus Management Plan





Thank you!



**Leta van Duin, B.Sc.
Executive Director**

**Alberta Low Impact
Development
Partnership**

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