Mitigating Tire Wear Toxicants & Other Contaminants from stormwater With Green Stormwater Infrastructure

Water Data & Dialogue – RDN DWWP Event

June 19, 2026

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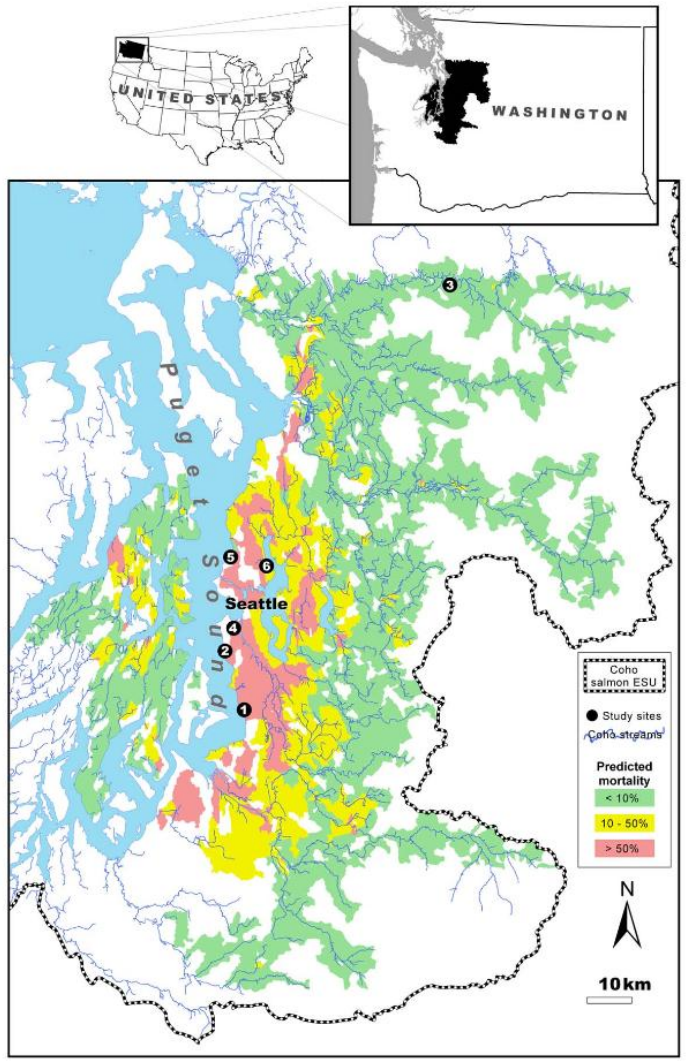
BRITISH COLUMBIA CONSERVATION FOUNDATION

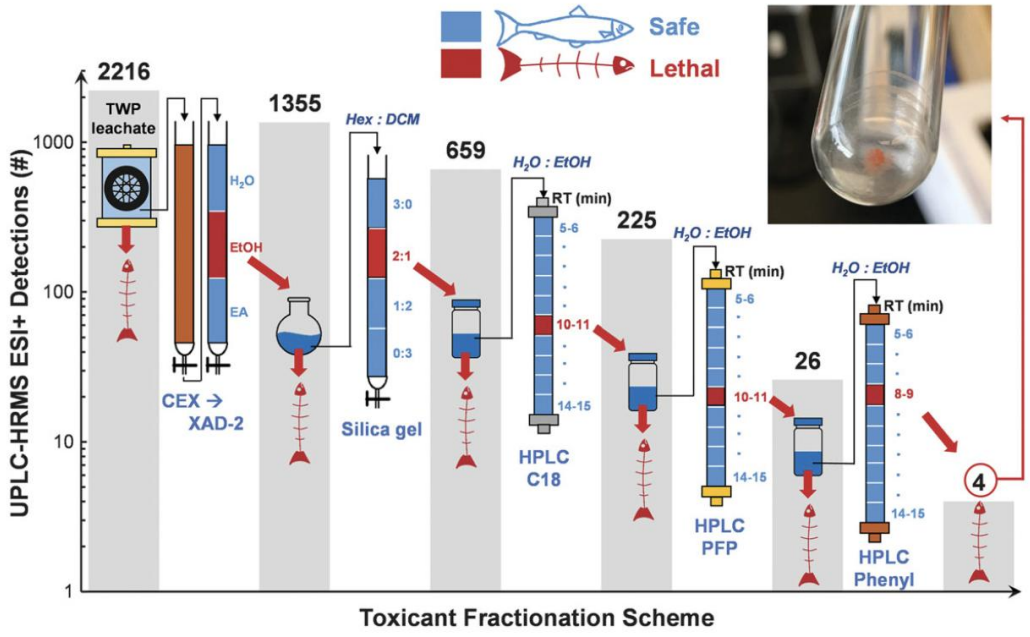
Tire Wear Toxicants & Stormwater Pollutants

Urban Runoff Mortality Syndrome



Mortality was related to 'urban cover' and proximity to roads.

Researchers ultimately linked mortality to chemicals from tires, ultimately narrowing it down to 6PPDQ.



Tian et al, *Science* **2021**, *371*, 185-189

Volunteer Video (https://tinyurl.com/URMS-Fish)

Impacted Species

Coho salmon

Coastal cutthroat trout

Rainbow trout/
steelhead

Chinook salmon

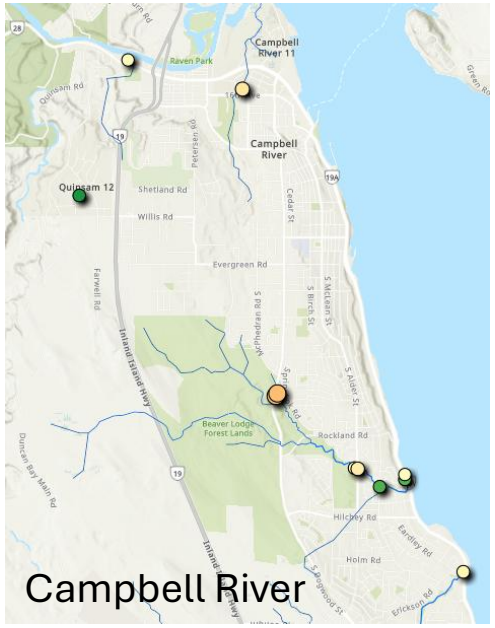
LC_{50} = lethal concentration to 50% of a population

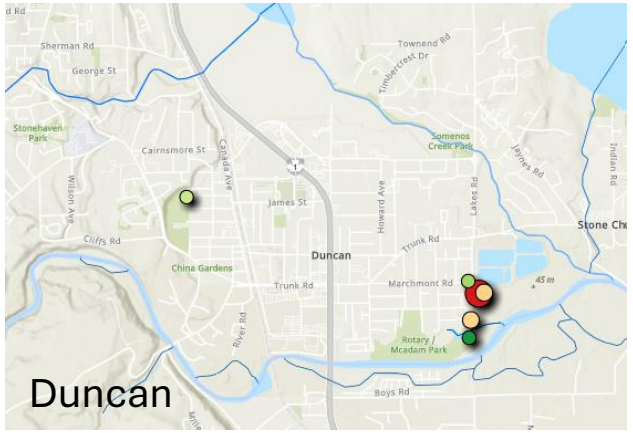
Species	**LC_{50}**
Coho salmon	41 - 95 ng/L
Coastal cutthroat trout	39 - 185 ng/L
Rainbow trout	470 ng/L
Lake trout	500 ng/L
Brook trout	590 ng/L
White sturgeon	> 12,000 ng/L
Chinook salmon	> 67,000 ng/L

Major sources of TWTs on Vancouver Island

Data Dashboard

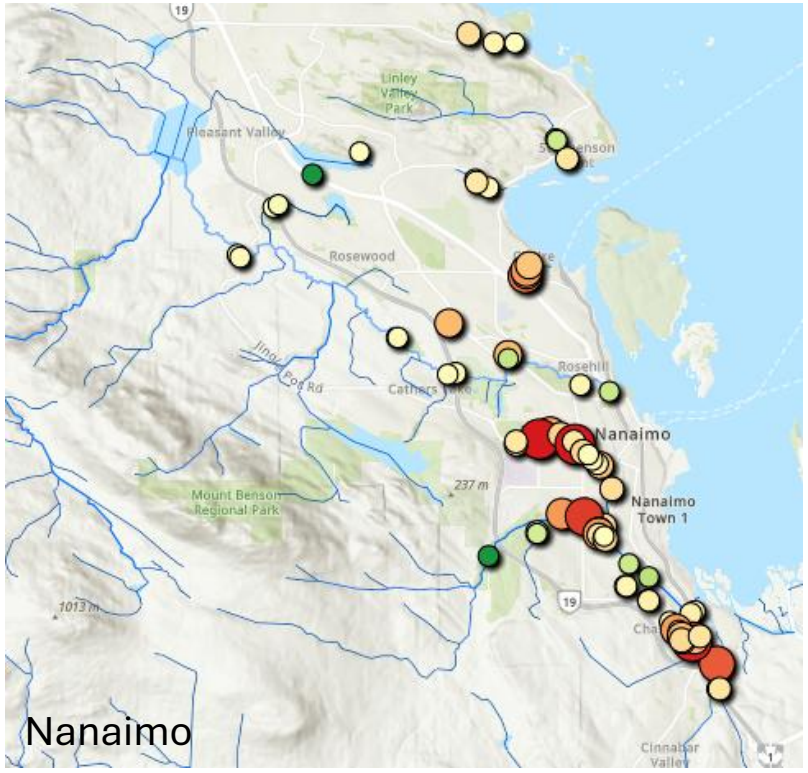
>7,000 samples collected across ECVI since Sept 2023 by 37 engaged groups

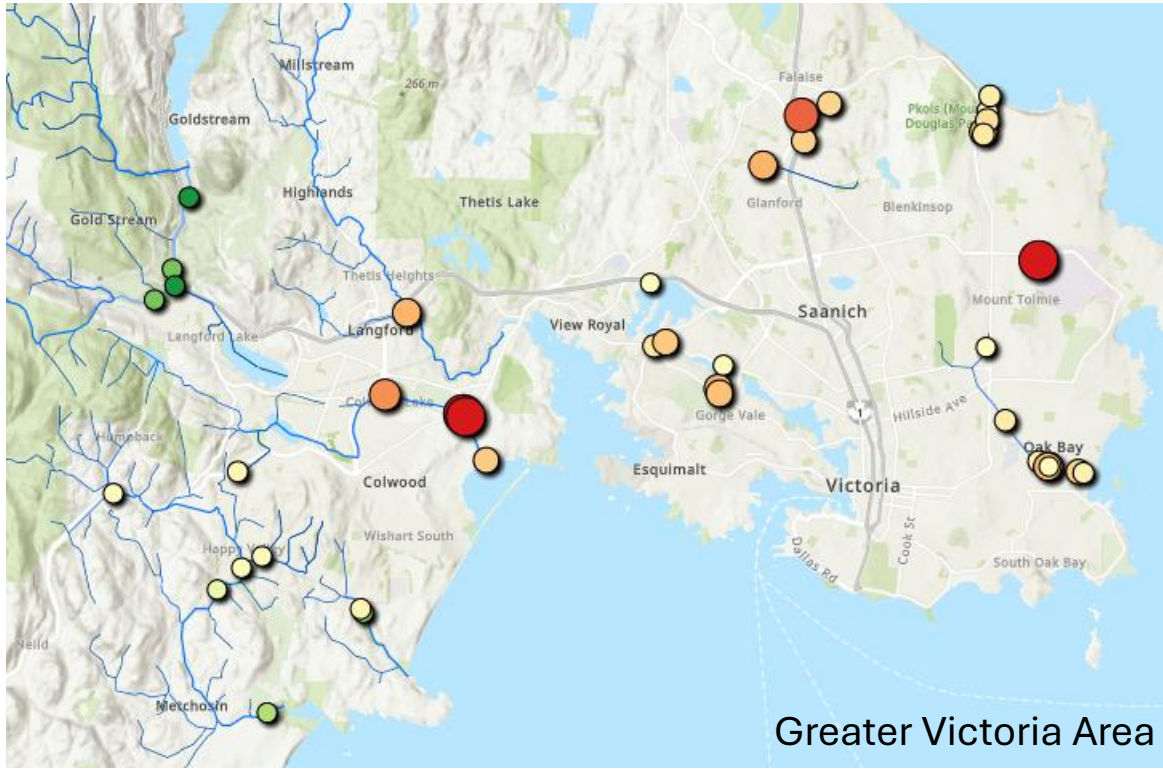




Streams that appear most impacted:

- Urban streams
- Smaller streams
- Large impervious surface/multiple stormwater inputs





Green Infrastructure (GSI)

GSI has shown to be very effective at treating stormwater runoff.

There are many types of GSI (not all have been tested for 6PPDQ treatment):

- Rain gardens
- Bioswales
- Permeable pavement
- Box-of-rain & other end-of-pipe solutions
- Constructed wetlands

Rain Gardens

A UBC study found that rain gardens are able to effectively mitigate >90% of 6PPDQ loadings under typical storm conditions (< 2 year rain event).

Bioswales

No studies found specific to 6PPDQ removal

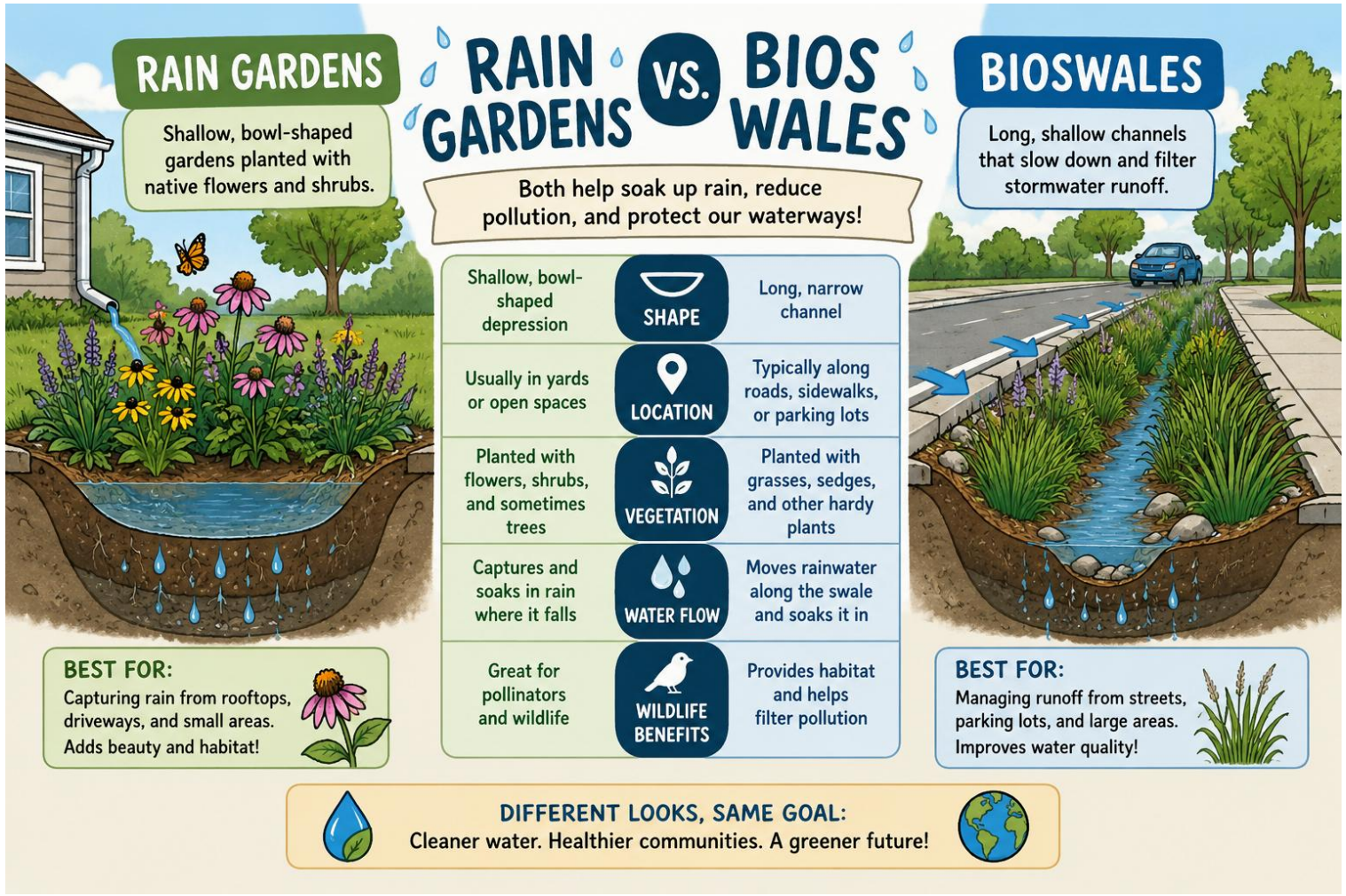
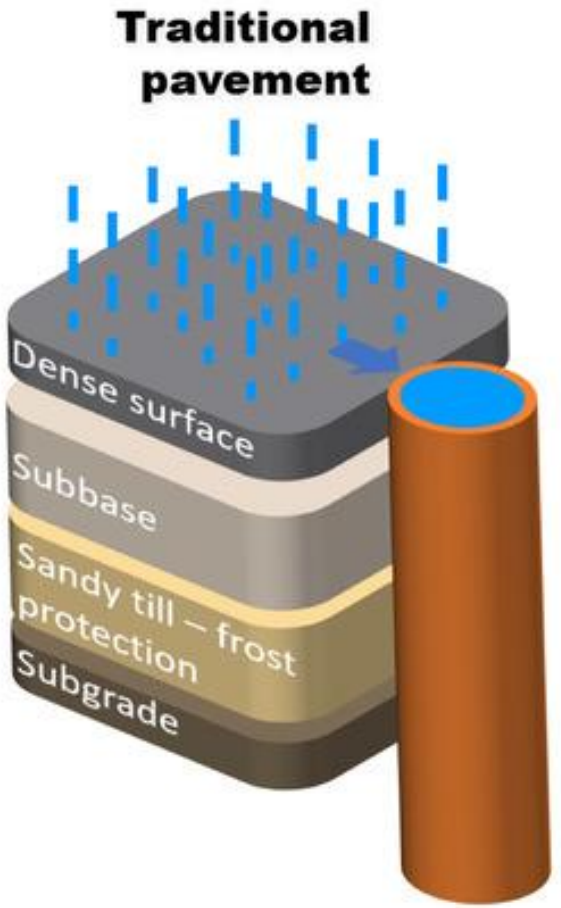


Image: USEPA

Permeable Pavement

Retained >96% of deposited tire particle mass & 68% of leachable 6PPDQ

Image: Stormwater Partners (SW Wash)



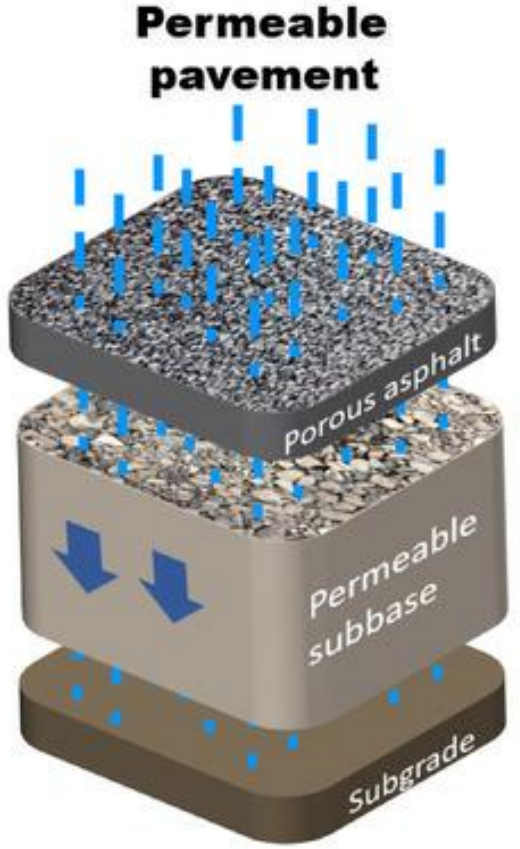


Image: Muttuvelu, Wyke & Vollertsen (2022)

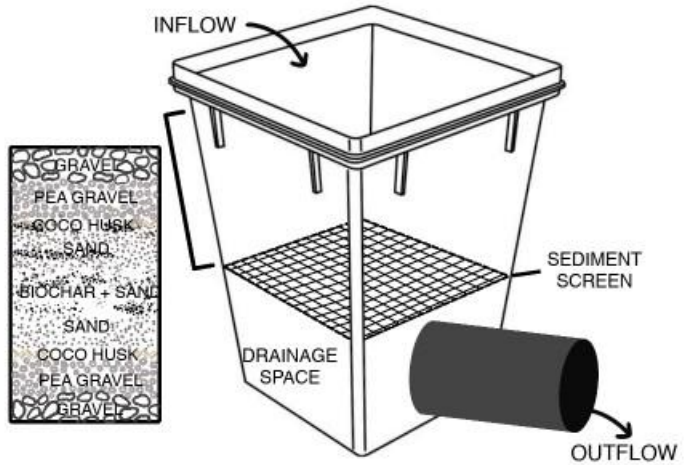
‘Box-of-Rain’ or Downspout Planters

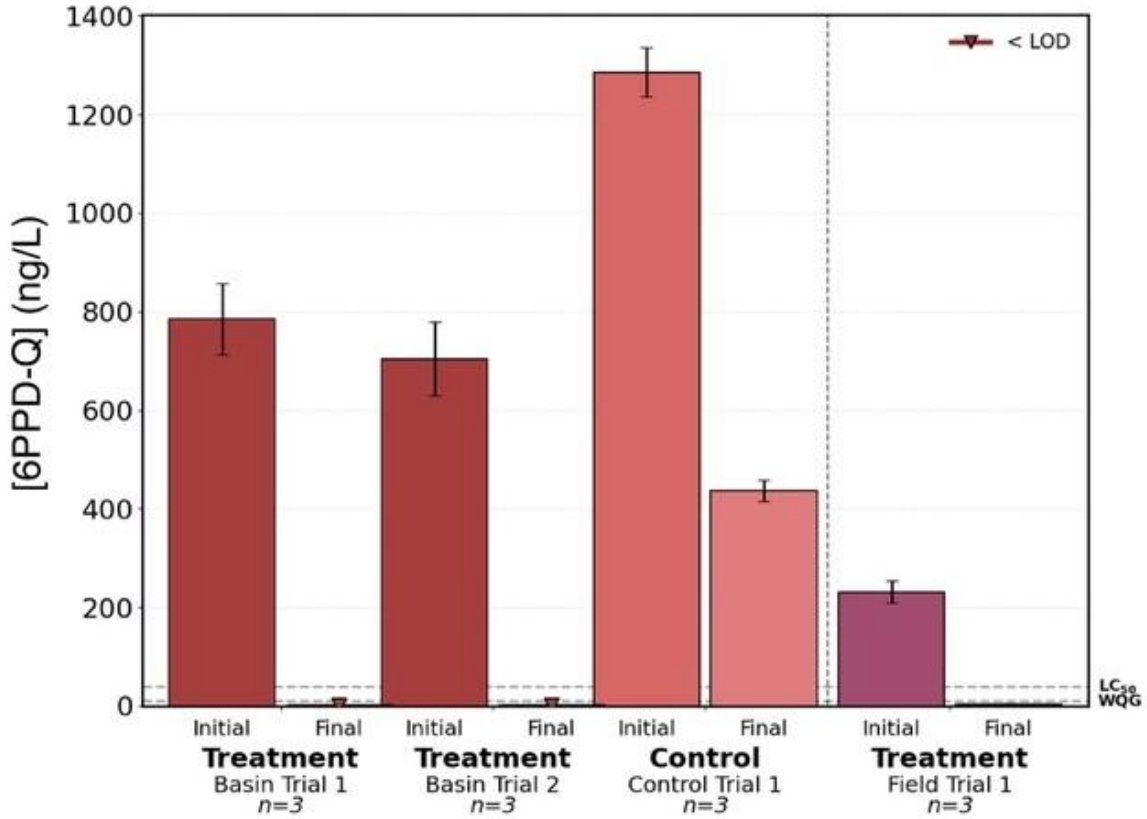
~75% removal of 6PPDQ dependent on media type


Image: Stewardship Partnership (Washington)

Image: Port of Vancouver USA

Other End-of-Pipe Solutions





Constructed Wetlands

Wetlands operate closer to a pond than a bioretention system with regards to 6PPDQ; no known testing on constructed wetlands.

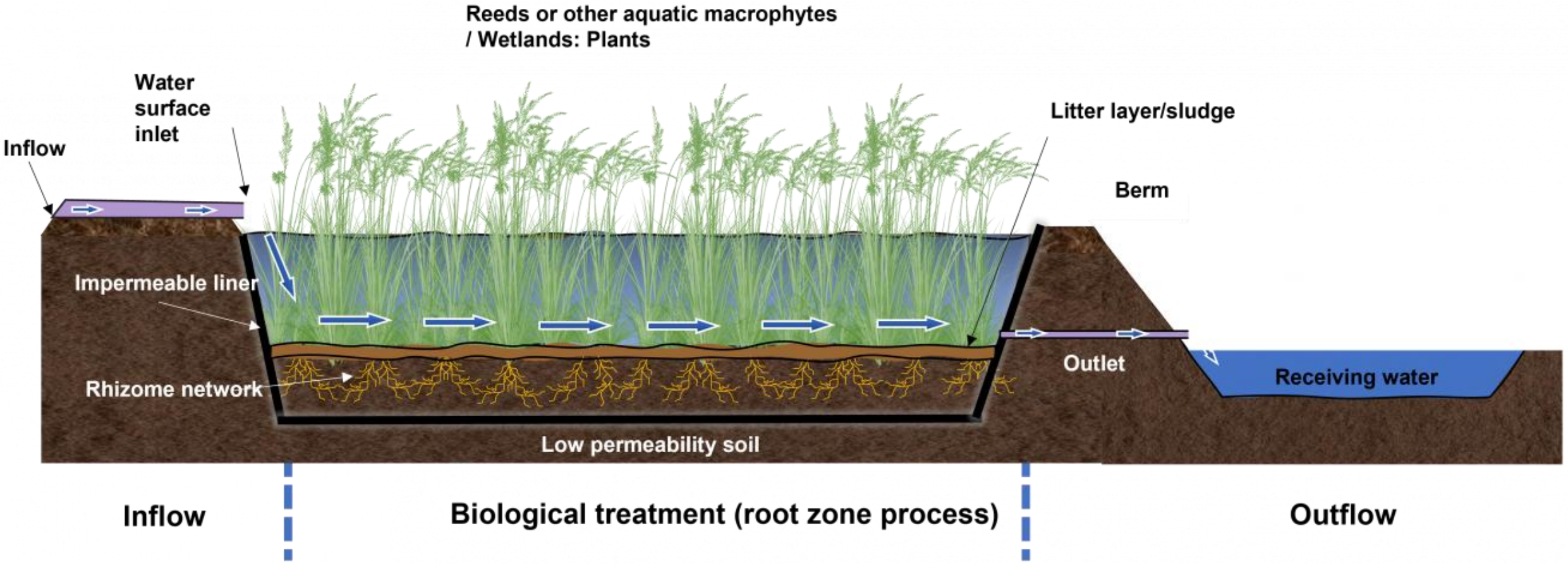
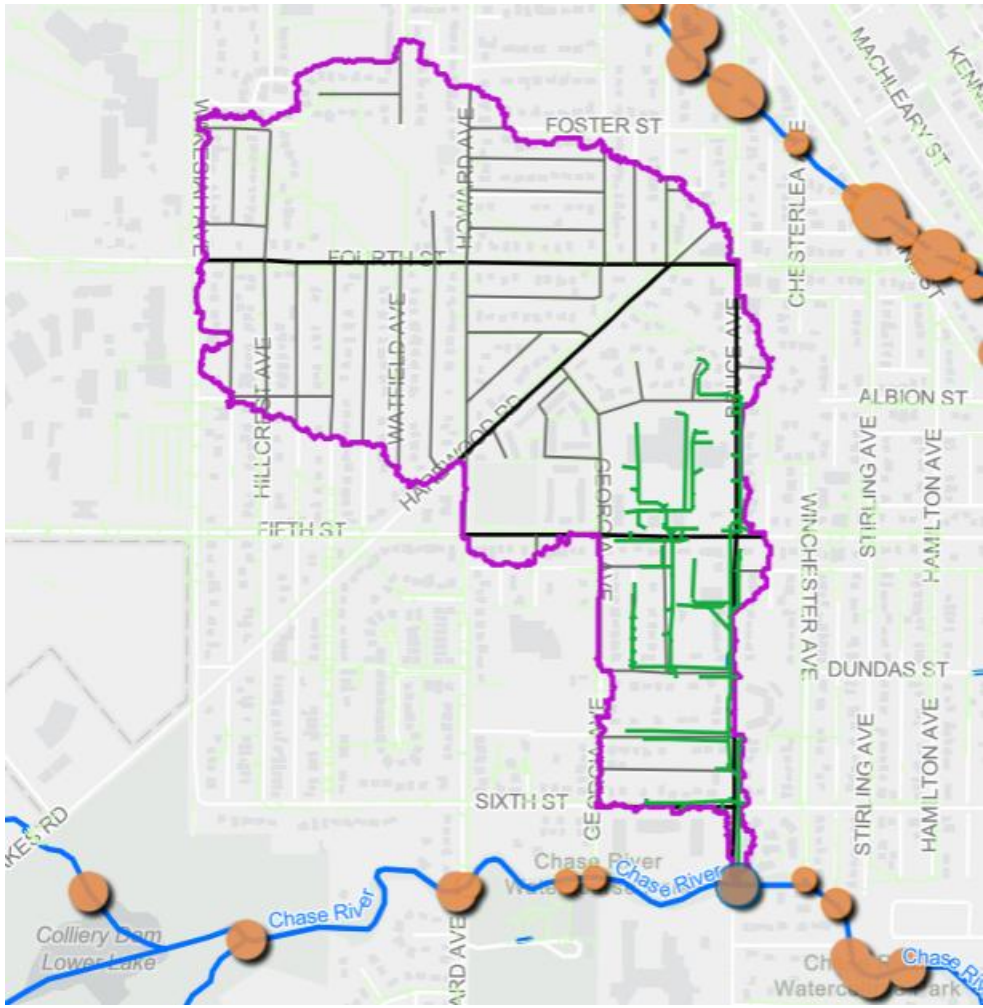


Image: Sustainable Technologies Evaluation Program (2025)

Identifying Potential Locations for GSI Locally

- Reviewed point source data & stormwater infrastructure
- Identified the highest point sources and associated stormwater infrastructure ‘watersheds’ in each major municipality
- Met with stakeholders in Campbell River, Courtenay, Parksville, Nanaimo, Duncan, and Victoria to discuss potential GSI locations
- Generated a short list of locations & began contacting property owners to begin approval process



Projects To Date – Millstream at Highway 1

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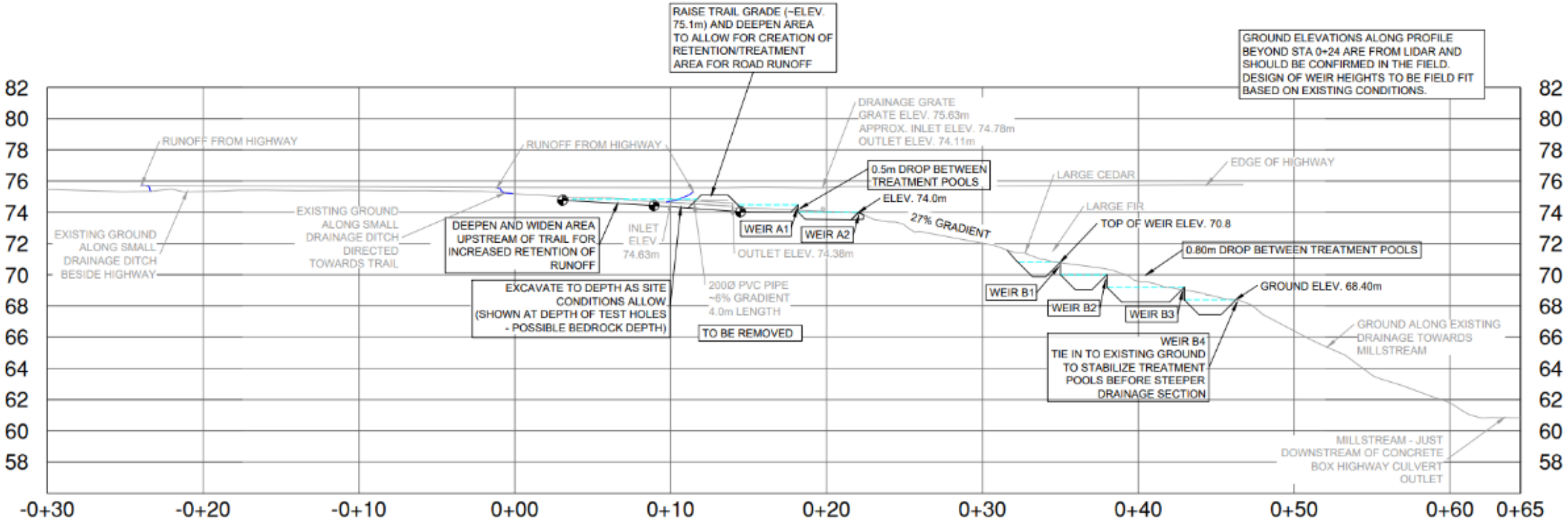
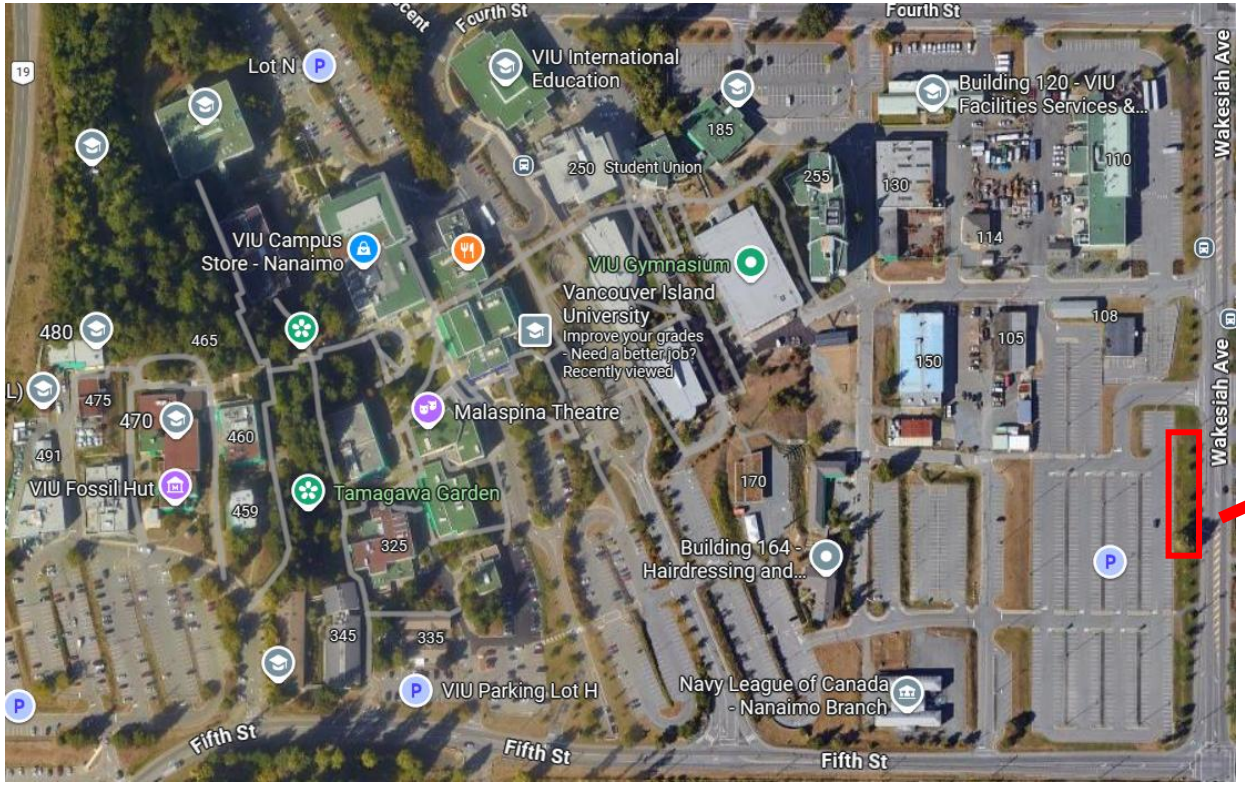
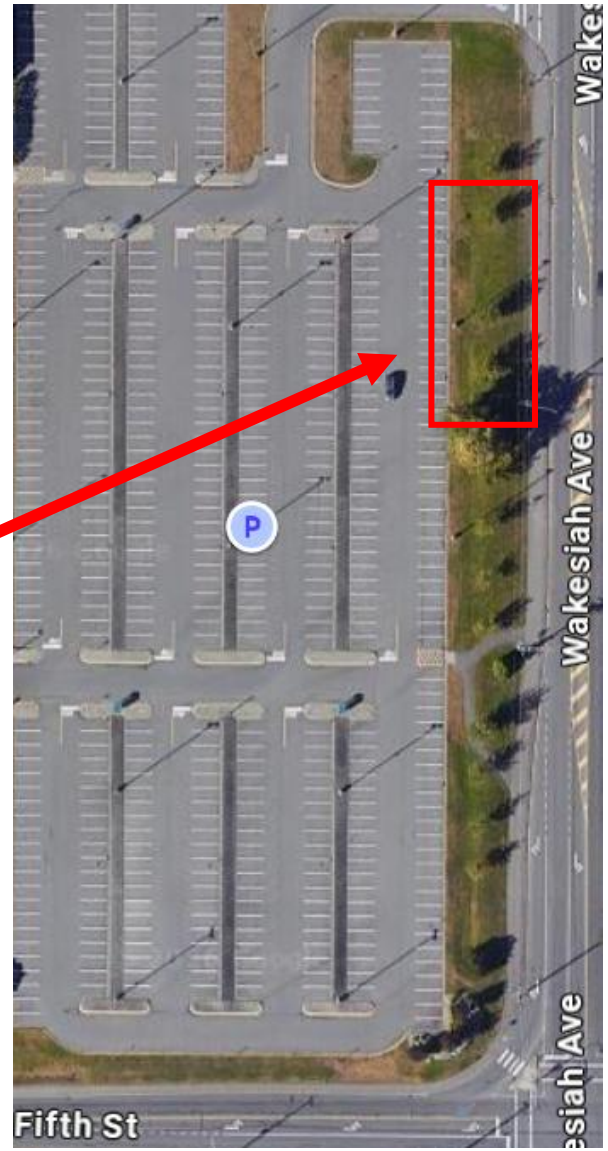


Current Sites of Consideration in the RDN – Beck Creek Constructed Wetland

Current Sites of Consideration in the RDN – Georgia Avenue Elementary School

Current Sites of Consideration in the RDN – Vancouver Island University





Preliminary Lessons Learned

- GSI needs to be site specific to be most effective.
- Utilizing biochar and other high efficiency sorbents is recommended.
- Further sampling/testing is required to determine efficiency of recent and previously constructed sites.
- When finding sites, having strong partnerships and undertaking longer-term planning is key, as approvals take months to years.

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