

EXECUTIVE SUMMARY BEYOND THE BACKYARD SEPTIC



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May 2026

PUGET SOUND INSTITUTE

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This summary presents highlights of a case study analysis designed to bridge knowledge gaps between local practitioners and state planners regarding aging onsite sewage systems.

Communities across Puget Sound are increasingly struggling to manage aging septic systems. Lessons from Fall City, Packwood, and Maple Grove show when Community Drainfields and Large Onsite Sewage Systems (LOSS) can be effective alternatives and demonstrate how agencies and local jurisdictions can help communities.

Aging septic systems threaten community health in Washington State

- Throughout Puget Sound thousands of homes and businesses rely on onsite sewage systems (OSS) – commonly known as septic systems—to safely and effectively treat wastewater.
- When designed and maintained properly, these systems can work reliably for 30+ years and are often the best option in rural areas.
- But many of Puget Sound’s OSS are aging. Older or failing systems can leak sewage and bacteria into waterways, wells, and buildings—threatening the environment and public health.
- In Puget Sound, failing systems are a leading cause of shellfish bed closures; as of January 2024, fewer than 60% of harvest areas were approved.

Community Drainfields and LOSS are practical alternatives when options are limited

- **Limited space and rising costs hinder OSS replacements:** Replacing a septic system costs ~\$34,000 per home. Small lots, sea level rise, and updated regulations often make finding a drainfield for septic replacements challenging.
- **Extending sewer lines to rural areas is often infeasible** due to high cost, insufficient density, Growth Management Act restrictions.
- **Community Drainfields and LOSS are not a silver bullet**, but serve multiple properties and can more effectively utilize drainfield space, especially with advanced treatment.

Communities can act now to address failures and protect long-term solutions

- Aging systems, sea-level rise, and stricter standards will continue to shrink options and raise costs.
- State and local agencies can help communities plan ahead and transition to Community Drainfields or LOSS, where appropriate, before options disappear by:
 - Helping to identify and protect suitable land for future drainfields—using tools like conservation easements, community land trusts, or targeted tax incentives.
 - Building community support through education, providing technical assistance, and fostering innovative partnerships that help communities plan ahead.

Download the full report at:

Evrard, R. (2025). [From OSS to LOSS: A case study analysis of Puget Sound community wastewater transitions](#). Puget Sound Institute, University of Washington Tacoma.



Reflections on Community Transitions

These key reflections emerged from the case studies and conversations with practitioners about transitioning from individual OSS, to LOSS or Community Drainfield systems:



The willingness to use enforcement actions like denying building permits can be one of the most effective ways to drive wastewater transitions.



Identifying priority geographies that are well-suited for wastewater transitions can allow for proactive support for those communities through education and permitting coordination.



Supporting local champions with funding, training, and/or technical assistance can help build and sustain buy-in for wastewater transitions.



Clarifying community values early helps keep the focus on workable solutions.



Finding a viable drainfield is often the greatest challenge—success depends on patience, flexibility, and creative partnerships.



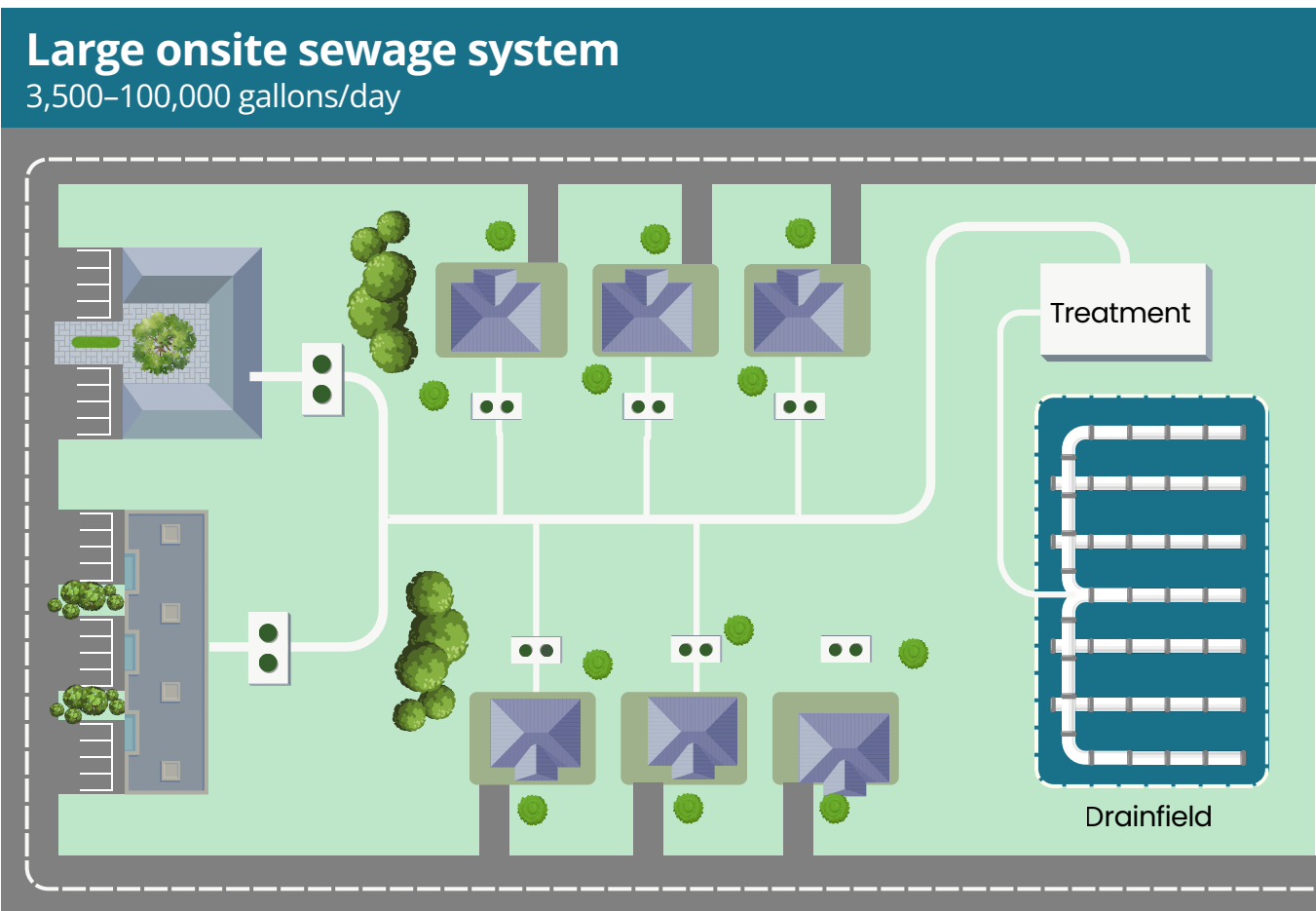
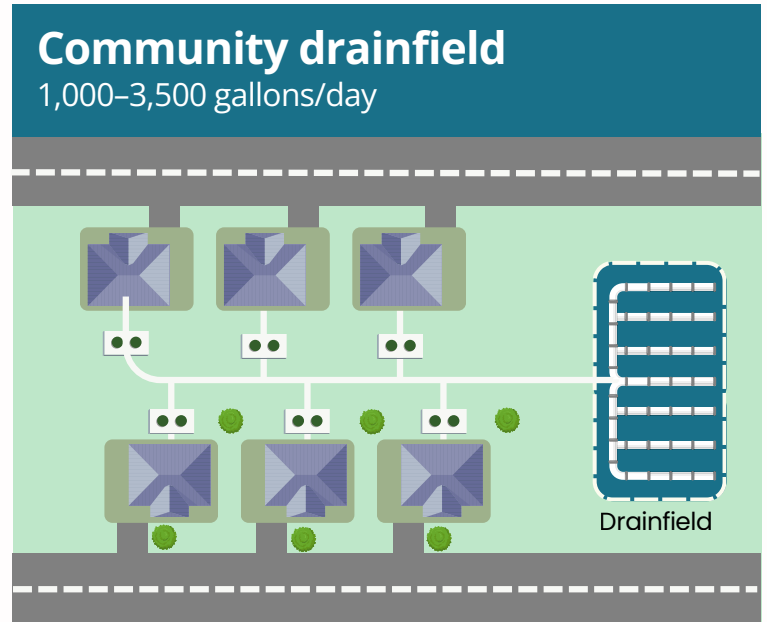
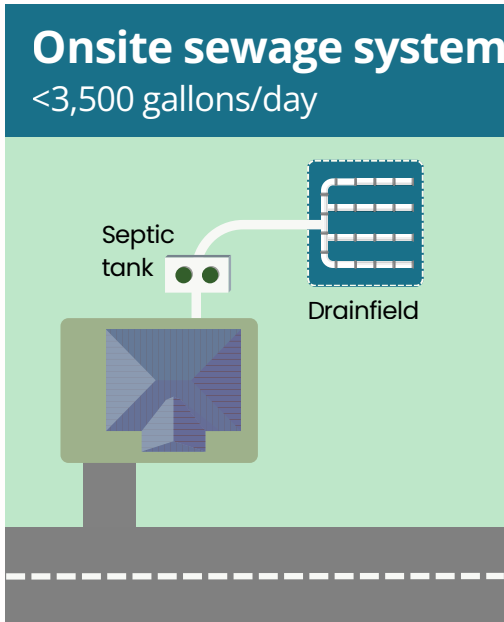
Access to diverse funding sources—and the staff and political support to secure it—is essential to upgrade wastewater treatment infrastructure.



Even the best-designed and funded wastewater solutions depend on **individual property owners' willingness to participate**.

All septic systems have septic tanks, a conveyance line, and a drainfield. In Puget Sound, these systems can range in capacity and size, with the largest systems treating 100,000 gallons/day. The capacity will affect the state requirements and dictate the regulatory agency.

Three Types of Septic Systems



State and Local Regulatory Requirements for Septic Systems


	Onsite sewage system (OSS)	Community Drainfield	Large onsite sewage system (LOSS)
Description	Typically serves one property with drainfield onsite.	Serves multiple properties that share a drainfield, typically offsite.	Serves multiple properties to rural towns that share a drainfield, typically offsite.
Capacity	< 3,500 gallons / day	1,000–3,500 gallons / day	3,500–100,000 gallons /day
Implementing Agency	Local Health Jurisdictions		State Department of Health (DOH)
Regulatory Code	Chapter 246-272A WAC	Chapter 246-272A WAC with some counties electing to use Chapter 246-272B WAC	Chapter 246-272B WAC
Maintenance Requirements	Requires inspections every 1 to 3 years.	<ul style="list-style-type: none"> • Requires inspections every 1 to 3 years. • May require monthly system monitoring reports to Local Health Jurisdictions. • Counties with sole-source aquifers may require additional quarterly groundwater monitoring reports. 	<ul style="list-style-type: none"> • 1-2 annual inspections required by DOH. • Monthly monitoring reports. • Quarterly sample of dose tank • Annual renewal of the Operating Permit.
Designer	Can be licensed OSS designer or Professional Engineer		Requires a Professional Engineer
Management	Managed by property owner	Depending on local code, may require a public management entity	Requires public / private management entity
Treatment	Must meet product level standards set by DOH		Generally, more stringent than OSS or Community Drainfields.
Waiver Approval	Approved through Local Health Jurisdiction		Approved through DOH


Case Study Highlights

OSS to LOSS: Fall City, WA


Timeline

1990	Building Permits Denied
2002 to 2013	Wastewater studies conducted
2021	LOSS Funded
2025	Construction Starts
2025	Construction Ends

 **Background:** Community surrounded by two major rivers. Aging and space limited septic systems in many downtown parcels

 **Solution:** a 24,000 gallon / day drip irrigation LOSS with membrane bioreactor treatment

 **Est. Project Cost:** \$10 million

 **Project Funding:**

- \$6.5 million American Rescue Plan Act Grant
- \$3.5 million other (i.e. grants, bonds, state capital budget)

Aligning Wastewater with Community Values



Wastewater planning in Fall City has repeatedly stalled, largely because earlier proposals favored costly treatment plants which carried high O&M estimates and risked encroaching on homes unwilling to connect to sewer. Within Fall City, residents strongly wished to retain rural character through limiting the potential for growth that comes from wastewater treatment plants.

King County Zoning Considerations

Fall City, designated as a Rural Town. A Rural Town is zone type known as a Limited Area of Intense Rural Development (LAMIRD). LAMIRDs may be used across Puget Sound to allow for sewer in rural areas. While the LOSS aligns with the community's desire to preserve rural character, it has a limited drainfield capacity that can support most—but not all—future downtown growth in Fall City unless zoning and system capacity are expanded.



Drainfield Site Selection



After decades of failed attempts to find a feasible drainfield site, Fall City secured as site in 2020 when the Metropolitan Parks Department offered the new Bernard Memorial Park—an environmentally suitable location close to downtown with workable soils and outside the Wellhead Protection Area. The park is viewed as a pragmatic compromise, the site passed all required engineering and environmental reviews however it has a limited reserve capacity, weight restrictions, and carries potential future flooding risks.

Finding Capital Funding

King County Local Services secured \$10 million from various sources for the Fall City LOSS. The Fall City downtown community had a strong supporter in a King County councilmember who helped the project obtain funding from the state legislature and through the federal COVID-19 American Rescue Plan Act.





Case Study Highlights

OSS to LOSS: Packwood, WA


Timeline

1990	Wastewater working group forms
2002 to 2013	Wastewater studies conducted
2021	LOSS Funded
2025	LOSS work paused

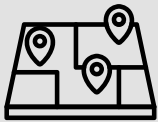
 **Background:** Downtown Packwood has aging OSS and limited space to adapt, risking town's drinking water aquifer

 **Solution:** A 81,000 gallon / day pressure LOSS with a membrane bioreactor treatment facility

 **Est. Project Cost:** \$26 million

 **Project Funding:** \$8 million American Rescue Plan Act Grant

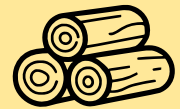
Lewis County Zoning Considerations



Packwood proposes shifting the town from a LAMIRD to a Small Town UGA. This change would enable long-term development. However, a UGA requires sewer. The LOSS fulfills this requirement. A UGA concentrates growth to the downtown and enables mixed-use and residential development. This better positions Packwood to meet rural county needs once the plan is adopted by supporting affordable housing and allowing the community to plan for an expected population growth.

Drainfield Site Selection

The Packwood Sewer Project struggled for years to secure a viable drainfield site until recent evaluations showed that portions of a previously overlooked former Lumber Mill property were suitable. The new site offers co-benefits between the town and the parcel owners, a development company. The city leases a portion of the land for the LOSS, while the proposed rezoning allows for mixed housing for the developer.



Low Capacity, Small Community



Packwood's small population, low-income levels, and rising housing costs make it difficult to fund major infrastructure like the LOSS, while limited county staffing further constrains the ability to pursue and manage complex state and federal grants. These financial and administrative challenges hinder the community's ability to secure large grants or meet matching requirements, slowing progress on the Packwood Sewer Project.

Finding Capital Funding

High and continually rising costs have repeatedly stalled the Packwood Sewer Project, with earlier LOSS proposals failing largely due to inadequate funding. The latest LOSS project's estimated price went up from the original \$8 million to roughly \$26 million. The new cost caused the legislature to re-obligate remaining grants funds. The loss of funds caused the project to pause, leaving the Packwood Sewer project dependent on securing new state or federal funding.





Case Study Highlights

OSS to Community Drainfield: Maple Grove, WA


Timeline

2012	High pollution found along coastline
2015 to 2022	Design team hired and permits acquired
2021	Construction starts
2025	Construction ends

 **Background:** Small coastal community of 40 homes, many with failing OSS

 **Solution:** A 3,000 gallon / day pressure Community Drainfield with gravelless treatment beds. To serve 11 homes.

 **Est. Project Cost:** > \$1 million

 **Project Funding:**

- \$33,000 buy-in fee from local property owners
- \$250,000 loan from Craft3 OSS Loan Program.

Regulatory Requirements



Island County Code 8.07D.210 requires Community Drainfields to meet LOSS Code WAC 246-272B, meaning additional site evaluations, soil and hydrogeologic studies, and an approved pre-design are required. Meeting these standards proved challenging for this community-led project and resulted in delayed permitting, repeated design revisions, and reliance on County staff for technical support. Additionally, because the site is within 200 feet of the shoreline, the project required a shoreline development permit.

Non-Conforming Elements

The Maple Grove Community septic met the requirements under WAC 246-272A-0280 for an emergency non-conforming repair. A non-conforming repair occurs when the new system does not meet all regulatory requirements but is a better alternative than the current system. For Maple Grove, the new system has an additional effluent treatment unit and strict capacity limits (gallons / day) that prevent future home expansions, requiring ongoing monitoring. The non-conforming elements included tank setbacks, easements, and vertical separation from groundwater.



Project Costs



The Maple Grove Community Septic project cost over \$1 million, with homeowners paying buy-in fees of \$33,000 each to cover most design, permitting, and construction expenses, including required archaeological oversight. When these fees fell short, the community secured a \$250,000 loan from Ecology's On-Site Sewage Regional Loan Program, the first time it had funded a Community Drainfield, with repayment covered through association dues.

Pollution Remains, But Reduced

Pollution monitoring in Maple Grove paused during the construction of the Community Drainfield and resumed in early 2023. Results from the monitoring found elevated levels of E. coli, which was traced to a failing septic tank from a house not connected to the new system. This prompted further inspections in the area. While water quality remains poor, the Community Drainfield appears to be having a positive impact, as the percentage of E. coli exceedances decreased significantly between 2023 and 2024.

