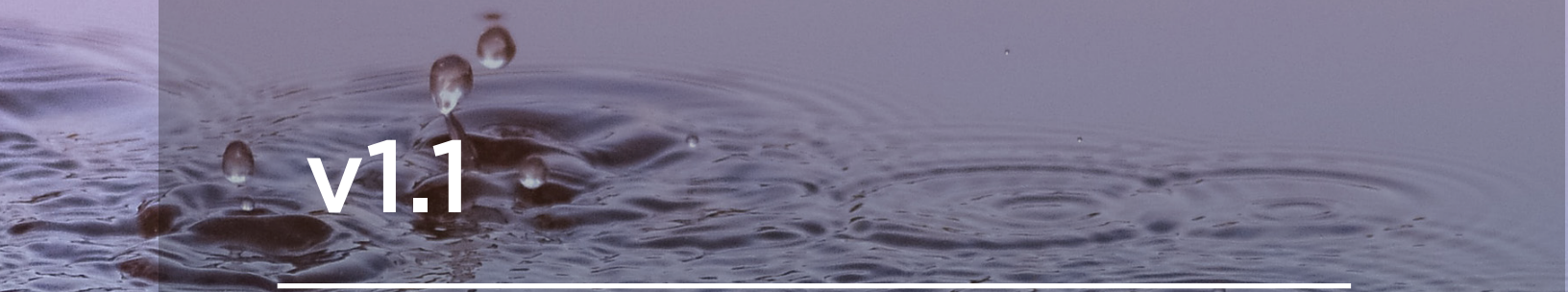
Opportunities for Achieving Next Generation Water Infrastructure in CA, WA, and OR



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ILFI + RECODE

Updated to include new solution pathways and resources

INTERNATIONAL LIVING FUTURE INSTITUTE℠

recode
recoding solutions for sustainability

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Preface

Native Land Acknowledgement

Recode is based in Portland, Oregon on the stolen land of the Multnomah and Chinook peoples. International Living Future Institute (ILFI) is based in Seattle, Washington on the stolen land of the Duwamish and the Puget Sound Salish peoples. We recognize that these and many other indigenous tribes not named here stewarded and thrived on this land since time immemorial. Our organizations aspire to support the leadership of indigenous people in our work.

Terminology

Recode and ILFI find some widely recognized terms run counter to our strategic goals to protect public health, to treat water as a valuable resource, and to use clear language that is not prejudiced. We thus refrain from using terms including "wastewater""wastewater," "blackwater," "greywater," "brown water," "yellow water," "white water" and others. The first time we use alternative terms, those terms are bolded. Find definitions of these in the glossary at the end of this document.

Document Accessibility

Recode and ILFI intend this document to be accessible to people with disabilities. To aid in accomplishing this goal, we have:

- Made the paragraph font size 14 point.
- Used 2 columns with a line between them.
- Avoided technical language and rare words when possible.
- Used short sentences when possible.
- Used words with less than 3 syllables when possible.
- Used high contrast colors.
- Used all capital letters sparingly, if at all.
- Followed formatting standards for screen readers (i.e. avoided tables when possible, avoided headers and footers, used standard heading styles).

Introduction

Recode and ILFI collaborated with diverse groups of stakeholders over the course of three years. Together, we identified barriers and possible solution pathways to "next generation water" systems. While this work focused on California, Oregon, and Washington, the findings and work products are nationally relevant.

Next Generation Water

Next generation water (NGW) systems are the water systems we need in order to live equitably and thrive in a healthy environment. They treat and supply an alternate source of water and nutrients for use locally.

For a system to be "next generation," it must:

- Protect public health
- Be just and fair
- Mimic and support the local region's natural water and nutrient cycle

To do all these things, systems and approaches are scaled appropriately from the building or site to the district level, taking into consideration the project context and climate. NGW systems reduce the embodied carbon impacts of widespread development and big centralized water systems. They reduce public infrastructure costs and improve environmental quality compared to the status quo.

Examples of next generation water systems specific to building systems and covered in this report include, but are not limited to:

- Harvesting rainwater
- Harvesting condensate (i.e. water from the air)
- Re-using **sullage** (i.e. water from sinks, tubs, & showers)
- Re-using **sewage** (i.e. water from toilets)
- Nutrient recovery
- Waterless urinals
- Composting toilets
- Urine diverting dry toilets

Other examples of next generation water systems not covered in this report (because they're fairly common and have few to no barriers) include, but are not limited to:

- Low impact development/ green stormwater infrastructure
- Amended soils
- Native plants

The Current State of Water and "Waste"water Systems

Because water exists at the juncture of public health and personal hygiene, water-related advances often meet great resistance. As we prepare for more people in urban areas, we need to improve and protect public health. Developing strategies to combat climate change and meeting global green building promises while applying equity and justice practices can improve public health, while also improving environmental health.

The nation's water supply and sewage systems are well beyond the life they were designed for. In too many places, they strain just to meet current demand.

The cost to run and maintain these systems grows as performance lags. Utility customers are used to paying less than the real cost for public water and sewage service. This deters investment in site or district scale water collection, re-use, and treatment, which tends to include (or internalize) that full cost.

Even at their best, standard large-scale water treatment and conveyance systems tend not to be very socially just or environmentally friendly. Most don't remove an ever-growing list of pollutants. Even fewer recover and re-use the priceless nitrogen and phosphorus (i.e. nutrients) in our sewage.

Organizations working to "legalize" sustainable and regenerative water infrastructure often work in isolation or—even worse—competition, making advocacy less effective.

All of this impacts our everyday lives. It poses serious threats to public health, drinking water quality, and environmental quality. We must change laws, policies, and regulations as we learn from cutting-edge projects, and communicate their successes to the public and those in the building sector. Our work must be informed by the lived experience of community members impacted by poor or no access to water or sanitation.

If communities are to be able to bounce back from natural disasters, climate change and other impacts, the consensus is in: **we need to integrate "next generation systems" into our existing centralized systems.**

Our Process

In early 2017, Recode and ILFI conducted over fifty interviews with people from across the country including green building practitioners, regulators, manufacturers, non-profit leaders, customers, and early adopters of next generation water approaches. We asked them what water-related barriers they met as they pursued ambitious water goals and how these were overcome as they permitted the projects.

Then, we collected feedback from participants of the Water Summit at the ILFI's 2017 Living Future unconference.

We assembled everyone's feedback into an initial report called "Opportunities for Achieving Next Generation Water Infrastructure in California, Oregon and Washington, v1.0."

Upon completing this earlier report, we felt that the justice and equity effects of the recommendations had not been properly informed by impacted community members. We had mistakenly limited our interviews to experts in water infrastructure and permitting without asking for help from community members, who are experts in their own lived experience.

To better inform ourselves, Recode analyzed specific ways people might be impacted by water systems depending on their identity, identity expression, and/or status. We also proposed unique solutions for each (https://www.recodenow.org/diversity-equity-inclusion-in-water-systems/). We based this work on research online and conversations with impacted community members. This is a resource that will keep growing over time as our own understanding grows.

The initial 2017 report included a table with the top ten strategies for achieving Next Generation Water infrastructure (see below). In this final report, we add an 11th barrier, which we rank first: Inequitable Water Systems. Here, we share the resources developed in response to what we learned from leaders of color and other impacted community members.

This report summarizes our findings and presents resources from our team and others, including several brand new resources created as a result of this effort.

What's Next

We believe that good ideas, like seeds, need to be spread. Our hope in sharing this document is that others will be inspired to work with us or take on different opportunities to achieve next generation water. Together, we can match passions and expertise with on-the-ground need to honor and protect the earth's precious water for all species.

Hassalo on 8th | Portland, OR

Top Eleven Barriers + Possible Solution Pathways

Barrier	Solution Pathway Idea(s)
1  **Inequitable Water Systems** At least 1.6 million people in the U.S. suffer from poor or total lack of access to clean water and/or sanitation. This affects some more than others depending on their identity, identity expression and status. (Riggs, Hughes, Irvin, & Leopard, 2017).	**Recognize the measurable differences** in health and wealth outcomes based on people's identity, identity expression, and/or status. Consult impacted community members about solutions geared towards solving their unique challenges. Resources: • "Diversity, Equity, and Inclusion in Water Systems" (https://www.recodenow.org/diversity-equity-inclusion-in-water-systems/) analyzes which identity, identity expression and/or statuses impact access to water. It includes the ways that these impacted groups may be affected and ideas for creating a more equitable system for each group. • "Choosing Standard Terms for Water Reuse" (https://www.recodenow.org/standard-water-terms/) outlines why some common water reuse terms are confusing and reinforce biases, both of which impact public health. • "Mapping the Water Crisis: The Dismantling of African-American Neighborhoods in Detroit" (We the People of Detroit, 2016, https://www.wethepeopleofdetroit.com/product-page/mapping-the-water-crisis-ebook) chronicles the decades-long path of water injustice and "the effects of austerity and its relationship to race in Detroit." This is a must-read for those who want to understand the Flint Water Crisis from the perspective of impacted community members. • "An Equitable Water Future" (http://uswateralliance.org/initiatives/water-equity) is a portal to resources on creating equitable water systems for municipalities and utilities.

Barrier	Solution Pathway Idea(s)
2  **Lack of Mapping** There is little guidance on when and where different water system technologies are most useful and can make the most positive impact.	**Map hotspots** where next generation water systems could be useful due to pressing water infrastructure issues like affordability, sewer overflows, drought, and overloaded municipal systems. Such a map would help municipalities and water utilities better communicate to owners and developers where and what kind of water technologies would help address local issues. Document and share the methods used to create a map of local hotspots in order to help educate and guide others in this important work.. Resource: • "Multi-benefits of Onsite Nonpotable Water Systems" (Recode, 2019) describes how NGW water systems solve social, environmental, and financial problems.
3  **Lack of Data** More data is needed on the operational performance of next generation water technologies (like building-scale non-potable water reuse systems).	**Create a database** to share performance data on new and existing water treatment technologies. Make this a living database which demonstrates the performance of all systems (conventional and next generation). This database will provide an effective, quantified approach to infrastructure planning. Resource: • The Resource Recovery Tracking Tool (Appendix A) is a database structure to compare performance data across onsite and centralized large-scale systems. Developed in collaboration with Colorado State University.

	Barrier	Solution Pathway Idea(s)
3	**Lack of Data cont.**	To Do: • Find and fund a trusted 3rd party to host this database (implement programming, collect data, analyze data, make data available in different forms for different users), followed by outreach to many more people to promote the use of the database. This is a great companion to the NBRC model codes and ordinances (see Solution Pathway Idea 5), which could require data entry into this tool as a condition of permitting systems.
4	**True Value of Water** Financial motivators for innovative water systems largely don't exist, and don't equitably distribute funds between stakeholders.	a. State Scale Solutions: **Enact policies and executive orders** that recognize the impacts of supplying water in an era of climate change. Resource: • Oregon Governor Kate Brown's Executive Order 17-20 "Accelerating Efficiency in Oregon's Built Environment to Reduce Greenhouse Gas Emissions and Address Climate Change" (https://www.oregon.gov/gov/Documents/executive_orders/eo_17-20.pdf) requires high efficiency water fixtures and water reuse for irrigation in all new buildings. **Create a community of water** that promotes a lifestyle around water culture and identity (includes a numerical goal, upward positive pressure, round table, supports innovation) Resource: • The Value of Water Campaign (http://bit.ly/re-tvw) educates the public about how much

Barrier	Solution Pathway Idea(s)
4 **True Value of Water (cont.)**	water is used in their everyday lives. Each year they host "Imagine A Day Without Water" (http://imagineadaywithoutwater.org/)

"Water is a major expense and an intensely variable one. Case studies would be helpful. Ultimately it would be good to demonstrate that water saving strategies should be a policy priority worth the extra expense up front."

-ERIK PATTISON, HOUSING DEVELOPER FOR ROSE COMMUNITY DEVELOPMENT

Offer incentives to developers like capital offsets, extra density, or area allowances for incorporating next generation water systems as part of their green building.

Resources:

- Living Building Challenge Pilot Program in Seattle, WA
- Shoreline Deep Green Building Incentive Program in Shoreline, WA
- Miami Beach Sustainability Fee in Miami Beach, FL

Consider incentives not associated with a specific structure so that people not associated with a building are inspired to install next-generation systems. For instance, a non-profit could get a grant and install a water treatment system in a public right-of-way for the benefit of an adjacent building.

b. Utility Providers:

Monetize the cost of water while providing every person/household with a subsistence/baseline volume of water for free.

Reduce water meter size for residential applications to reduce system development charges.

Meter wastewater so that sewer bills are based on discharge, not potable water use. Adjust the wastewater tap fee based on metering.

Barrier	Solution Pathway Idea(s)
4 **True Value of Water (cont.)**	**Provide non-potable water at slightly reduced fees.** Case Study: Hassalo on 8th in Portland Oregon has a mixed-use district scale treatment system that treats and reuses sewage water to flush toilets and irrigate the landscape. Residents are charged the same rate for their non-potable water bill as the city charges for their potable water, but residents get a free month of non-potable water. **Require different forms of water be separated in new buildings.** Dual plumbing is considered the single best future-proofing for a building and turns out to be a very small percentage of the cost of a new building. **Charge large users more** instead of giving them a discount for using a lot of water. c. Developers and Owners: **Create financial case studies** for next generation water precedents. How have other projects made the case, what has been the actual return on investment? Resource: • ILFI Financial Case Studies **Create grant programs** to incentivize infrastructure and water systems investments. **Report on how other cities' (like San Francisco PUC) grant programs have benefited their area.** Resource: • Commercial Equipment Retrofit Grant Program Completed Project List, San Francisco Public Utilities Commission

Barrier	Solution Pathway Idea(s)
4 **True Value of Water (cont.)**	**Create funding streams that are tied to the title of the home**, similar to PACE for solar, low flow water fixtures, and energy upgrades. Depending on the market, this can either raise or reduce the value of a home. Either way, address this in a way that won't cause increased taxes that lead to involuntary displacement for the homeowner or their neighbors. d. Practitioners: **Develop professional education and trainings** for the building industry and evaluate how these systems can help their bottom line. Resource: • The Urban Fabrick Collaborative has published the "Onsite Non-potable Water Reuse Practice Guide" (https://www.collaborativedesign.org/water-reuse-practice-guide), a free resource that provides guidance to plan, permit, design, construct, operate, and message about these systems. e. Public/Private Partnerships for Research and Development (R&D): **Quantify and standardize costs** for new technologies and systems to speed up innovation and demonstrate a regulation path. f. Building Appraisers, Real Estate Professionals, and Lending and Banking Institutions: **Create targeted education about the added value of on-site water systems** so that they create funding to support water reuse.

"There's a social justice aspect to water utilities having the same ongoing costs; those who can't afford to upgrade to these new on-site systems are footing the bill for maintaining the municipal infrastructure. No city I know of has ever separated out these services they're providing for users."

-COLLEEN MITCHELL, HERRERA ENVIRONMENTAL CONSULTANTS

Barrier	Solution Pathway Idea(s)
5  **Lack of Regulation** Some jurisdictions lack a management and/or regulatory structure for water provisioning and wastewater treatment at scales smaller than city scale but larger than single-family residential. When jurisdictional water "champions" leave, institutional knowledge is lost.	**Draft a template for a reasonable management model and regulatory pathway** for projects between single-family residential and municipal water works while maintaining reasonable costs per user. Resources: • San Francisco PUC Non-potable Water Program requires onsite water reuse for commercial, multi-family, and mixed use developments over 250,000 square feet. • Model codes and ordinances from the Blue Ribbon Commission for Onsite Nonpotable Water Systems [Bibliography References] **Draft an Ordinance Memorandum of Understanding** that identifies and records responsibilities and who has what authority. **Create a systems approach** to coordinate central utilities and decentralized systems. Use lessons learned from mainstreaming green infrastructure. **Provide "roadmaps" that explain the regulatory process for different thresholds** (e.g. number of units or project size). Resource: • Onsite Water Reuse Permit Maps show which onsite water reuses are allowed, not allowed, or uncertain and can provide high level insight on what systems will be easier to permit. **Support adoption of a performance code** to replace or sit alongside the current prescriptive regulations. Resource: • With support from ILFI, Bainbridge Island City Council approved Ordinance No. 2019-

Barrier	Solution Pathway Idea(s)
5  **Loack of Regulation (cont.)**	05 on March 13, 2019. It will allow 100 pilot projects on the island to use low-energy, natural treatment water reuse systems. (See Appendix B). **Develop an operations, maintenance, and monitoring metric scaled to the project size.** It should be practical and cost-effective to implement such as a "Miniscale Operator License" for daily/weekly activities with support from more highly trained individuals for monthly and more technical activities. **Make the case to jurisdictions** that includes compelling value propositions related to resilience, public health, combined sewer overflow, flood damage, downstream waste cost. Resources: • Making the Utility Case for Onsite Non-potable Water Systems: The National Blue Ribbon Commission developed this report to help water and wastewater utilities, local government agencies, and other interested stakeholders understand the benefits and drivers behind onsite non-potable reuse, how other utilities have addressed potential challenges, and best practices for the ongoing operation of these systems. • Multi-benefits of Onsite Non-potable Water Systems: This resource from Recode describes the multiple benefits of implementing the actual water systems. **Remove the "undue hardship" regulatory requirement during the permit process**, opening up the permit pathway for those that want to opt into NGW systems but are still able to connect to the municipality.

	Barrier	Solution Pathway Idea(s)
5 	**Lack of Regulation (cont.)**	**Provide staff with incentives** to adopt regulations, such as checklist tools. Resource: • Installation and inspection checklists, which will be included in IAPMO's 2020 WeStand Plumbing Standard. **Use a "safety valve" approach** so small cities can send to state for review and approval.
6 	**Paradigm Shift** We lack a larger vision for next generation water.	**Create high-level (possibly state level) goals** to support and catalyze local initiatives. For example, "5% of all urban water is generated from on-site reuse." • Universal Basic Water would guarantee a minimum level of water per person per day for personal and public health to everyone in the U.S. for free. This includes people supplying their own water via wells, harvesting, surface water, etc. The quality of this water must be fit to drink. **Re-value the true cost of water** to quantify the cost impact that development projects have on downstream pollution and upstream treatment. Resource: • In a report entitled Optimizing Urban Ecosystem Services: The Bullitt Center Case Study, a team from Autopoiesis LLC and Ecotrust evaluated the ecosystem services generated by the Bullitt Center, a Living Building. The building will generate $18 million dollars worth of ecosystem services over the course of its 250 year lifecycle. The water systems alone accounted for $1.5 million of that sum.

Barrier	Solution Pathway Idea(s)
6 **Paradigm Shift (cont.)**	**Encourage paradigm shifts across all public agencies** (e.g. US Water Alliance; 'One Water' movement) grounded in public health, watershed health and sustainability. Shift from a waste management to a resource management attitude and approach. Resource: • Opportunities for Achieving Next Generation Water Infrastructure in California, Oregon and Washington (Recode, International Living Future Institute, 2017) **Clarify the comparative long-term public health risk** of on-site treatment compared to municipal treatment. **Develop regional alliances.** Share local level successes. **Set higher level goals** appropriate for bioregions and, if possible, the entire world. **Provide incremental goals** to achieve paradigm shift, breaking up the actions that need to be taken by local jurisdictions. Rank and prioritize code changes. **Set targets and enforce and regulate these.** **Increase public awareness** regarding the consequences of maintaining the status quo as it relates to water use (e.g. ad campaign exposing the dangers of water resource depletion showing examples of other countries or communities who have failed to address the issues and the result of inaction.) Match a small dose of fear with a big dose of hope to create an action that's do-able.

"Decentralized water reuse and centralized water infrastructure practitioners need to start thinking collaboratively at a watershed scale. We need to discover the optimal scale and integration for both decentralized and centralized water reuse while recognizing that it will likely differ from watershed to watershed throughout the state."

-DEBBIE FRANCO, CALIFORNIA GOVERNOR'S OFFICE OF PLANNING AND RESEARCH

Barrier	Solution Pathway Idea(s)
7  **Lack of National Standard** We lack a national standard for treatment and reuse of non-potable water adopted by all states.	**Create a national standard and framework** for reuse of non-potable waterto be adopted by all states. Resource: • The EPA has released a draft Water Reuse Action Plan, which could result in a national standard in the future. This should be based on the Risk-Based Framework and model codes and ordinances described elsewhere in this document. **Develop a task force** to track federal government actions and organize "watchdog" efforts by the community as appropriate and timely.
8  **Conflicting Codes** Jurisdictions inconsistently interpret existing rules due to a lack of consistent regulations for different sources of water and nutrient reuse.	**Work with regulators to create state-specific roadmaps** to next generation water systems. Include links to additional resources to help agencies explain how current regulations work and save time and frustration for the project team. Resources: • Onsite Water Reuse Permit Maps show which onsite water reuses are allowed or not allowed (or unclearly explained) and can provide high level insight on what systems will be easier to permit. • ILFI Water Petal Permitting Guidebook has suggestions for how to create a permit map and how to use it in order to permit a next generation system.

	Barrier	Solution Pathway Idea(s)
8	**Conflicting Codes (cont.)**	**Create and normalize terms for different types of water** across jurisdictions (plumbing, environmental health, etc.). Resource: • "Choosing Standard Terms for Water Re-Use to Protect Public Health" **Create consistent permit pathways** for water collection, treatment, and reuse projects at all scales. Resource: • See Risk-Based Framework and model codes and ordinances described elsewhere in this document.
9	**Outreach** The public lacks confidence in water and wastewater treatment systems and possesses overarching misconceptions around health and sanitation.	**Share ways to address the public health concerns** related to water and nutrient reuse systems. For example, a webinar on how to address the most common concerns about composting toilets. Resources: • Water Reuse & Environment Foundation provides health guidelines that can serve as a resource in addressing public health concerns in "Risk Based Framework for the Development of Public Health Guidance for Decentralized Non-potable Water System." This framework is more protective of public health than current EPA standards for conventional water and sewage systems.

Barrier		Solution Pathway Idea(s)
9	**Outreach (cont.)** The public lacks confidence in water and wastewater treatment systems and possesses overarching misconceptions around health and sanitation.	• "Marketing Non-potable Recycled Water: A Guidebook for Successful Public Outreach & Customer Marketing by the Water Reuse Foundation" **Targeted education campaign** about the safety of water reuse for a specific jurisdiction to show where the low hanging fruit projects are for that area and explain the local supply and treatment issues. Glorify the process of water reuse as "Purified Water" and make the concept sound more attractive to the public.
10	**Jurisdictional Authority** Agencies lack the organizational capacity for program management.	If jurisdictions lack the financial resources, staff or other internal components to effectively adopt new building codes for health, safety or sustainability, then they need to have the ability to adopt or delegate their authority (e.g. to the state or federal government) to a responsible party that allows change to occur. Resource: • For onsite non-potable water sources covered by the Risk-Based Framework, model codes and ordinances (mentioned above) provide language that can be adapted and adopted for local and/or state agencies.

Barrier	Solution Pathway Idea(s)
11  **Technology** Technology and industry need further development in the application of actual on-site systems. These systems need a method for monitoring, research and development as they relate to real world conditions.	**Need more NSF certified products.** Many jurisdictions require that materials included in a NGW treatment train receive NSF certification under NSF 61, NSF 350, and others. There are very few small-scale certified products available. **Performance standards are needed** to allow alternative treatment methods. Resource: • See the Risk-Based Framework described elsewhere, as well as the code change on Bainbridge Island, WA, described elsewhere in this report. **Develop an expert practitioner database** so that project teams and building owners can easily source out and hire water consultants to help solve design challenges within their region. Resource: For Californians looking to reuse sullage, see Greywater Action's Business Directory. **Support the development of off-the-shelf solutions** that have been tested and approved by brand name manufacturers to reduce risk at all scales, similar to buying an off-the-shelf water delivery system such as a faucet, toilet, shower head, water dispensing refrigerator, etc.

Lessons Learned

Water reuse technology is proven; emphasis on pilot projects is no longer a priority. One desired outcome of the original grant proposal was to help pilot projects succeed in their deep water conservation goals by creating permit pathways. Interviews with water experts across the country informed us that there are many technologies in place already, and they are exceeding the performance of more conventional systems. This information was supported by our own experience. The most ripe opportunities to advance permitting pathways took the form of doing outreach, creating tools, and advancing legislation—not generating new pilot projects.

Databases are expensive but important. During this grant, we created the foundation for two tools critical to advancing next generation water systems that both lend themselves to a database structure. Sybil Sharvelle of the Colorado State University estimated that development of the Resource Recovery Tracking Tool (Barrier 3) would cost $80,000. We are currently seeking additional partnerships and funding in order to support the creation of this database.

The primary driver for decentralized systems are the stacked benefits, not cost savings. While water is being privatized and profited from at the district scale, many smaller-scale projects have upfront and ongoing costs that are prohibitive to the average consumer. Things that can improve cost outcomes include:

- Charging consumers for the true value of water (see Barrier 5 above).

- Not charging Sewer Development Charges (SDCs) to projects that will not have sewer discharges, though this must be done in an equitable way. For instance, private companies who will profit from operating a small utility and whose return on investment is reasonable (e.g. less than 10 years over a 20 year maintenance contract) should not receive this benefit. Equity is impacted when some customers are removed from the public system and no longer pay into it. This leaves more expenses for fewer and fewer utility customers, most of whom will be impacted community members without the opportunity to take advantage of the cost savings of district-scale projects.

- Jurisdictions should adopt a "One Water"-shed approach. The concept of "One Water," promoted by the U.S. Water Alliance, is that jurisdictions with an impact on water systems should strategically plan their water resources together, even to the point of combining their bureaus.

  In studying some of the "One Water" efforts, we found that even when jurisdictions did this, they still continued to harm ecosystems by not prioritizing watershed health. For instance, San Diego's process resulted in a plan that still imported a significant portion of their drinking water from another watershed. Taking water from one watershed dries it out. Moving it far distances impacts the wildlands between places with development and has a high energy demand not in line with addressing climate change. Discharging that water in another watershed after it has been used can cause flooding.

  Therefore, our team proposes the next evolution of the "One Water" concept: the "One Watershed" Approach. Once jurisdictions adopt the One Watershed Approach, they can plan for each kind of next generation water system to be placed where it will do the most good environmentally, socially, and financially, accounting for their specific infrastructure challenges and needs. For World Water Day 2019, themed "Leaving no one behind," Recode wrote an Op Ed on this subject for the Oregonian that is reprinted in Appendix C.

  Resource: OneWaterSF

- Shifting the cost of municipal connection to those that are actually using it. For example, people in Portland, Oregon who want to install a composting toilet in their home are still required to connect to the municipal system and pay system development charges. The reason for this given by permitting staff is that the next person who buys the home may want to install a regular

toilet. To which we say: If the next person wants to install a regular toilet, let them shoulder the cost of installing the sewer pipe.

A very effective policy change is happening at the large municipal scale. States and large cities are very supportive of advancing on-site water regulations. Many people in positions of power were eager to support and be supported by our work. An unrelated organization in Oregon is hiring a lobbyist for the 2020 legislative session to support the legislative work our team started there in 2019.

There's a lot more momentum behind non-potable water reuse than potable water. The National Blue Ribbon Commission for Onsite Non-potable Water Systems was able to get funded for two years to create the model codes and ordinances. This work has been completed and they are ready to continue their effort to create model codes and ordinances for potable water now, but lack the funding. The "ick factor" of reusing water seems unlikely to go away any time soon, so potable supply of reused water is still a difficult topic. Utilizing "fit for purpose" water (water treated to the required functional level of treatment and not more), even if reliable non-potable standards are all that we have to work with at the time, still has the potential to protect a significant portion of water supply needs for a lot of communities.

Our team discovered the different priorities of different entities. Utilities are more interested in resilience. City governments are most interested in resilience, disaster preparedness, and climate change mitigation and adaptation. Developers are most interested in cost and marketing. Advocates are most interested in social equity and justice. We learned to speak directly to these specific concerns, and used Urban Fabrick's Water Reuse Practice Guide to develop a more targeted communication approach.

Utilities must radically reimagine their systems and business models. Most utilities are still relying on large infrastructure projects. They are not considering how onsite and district scale reuse could be used to

drive down municipal potable use enough that the current capacity of those systems (infrastructure and water source) could be significantly extended. How they work together needs to be radically reconceptualized by utilities. As a result, utilities will be left with a diversified water supply and an opportunity to support new green jobs.

The permit maps worked. Permit pathway mapping was very popular with permittees, designers, and regulators. Our team sent the Washington permit map out to a layperson seeking more info on permitting onsite systems there. They said it was just what they needed, a sentiment that has been echoed by all.

We're all using concepts that are too big. How do we make this message less about onsite water systems, and more about something people feel invested in, like access and environmental quality? We need many paradigm shifting concepts. One simple one is the Universal Basic Water program described above. Other environmental metrics are still needed.

Our industry needs "trauma-informed care" language that is accessible. People with visual or cognitive disabilities and people experiencing trauma may have difficulty reading and understanding large and overly complicated descriptions of next generation water systems. See Preface of this document for some limited guidance on what our team has done to make this document accessible.

Non-technical language is a risk to public health. Terminology that uses colors to describe water has caused confusion with regulatory staff and perpetuated racism, which is in itself a threat to public health. We suggest using technical language as needed and clearly defining water quality using accessible principles of communication.

We need to include impacted community members. Impacted community members have critical experience that needs to be heard and incorporated into every policy, law, regulation, code, and ordinance. Without them, we don't know what we don't know.

As soon as we met Monica Lewis-Patrick of We the People of Detroit, our focus shifted significantly. Portland Harbor Community Coalition and other diverse organizations contributed greatly to our understanding of the impacts our work could have. Just focusing on the environmental benefits, even when those are holistic and broad, is silo-thinking that may exclude impacted community members.

Including impacted community members in processes will take extra time; however, impacted community members —when all their identities, identity expressions and statuses are taken into account— are a large portion of our population. Once we are truly working to benefit them, implementing environmentally beneficial practices will be much easier and faster, because we will have more people clamoring for good governance.

Definitions

Impacted Community Members: People who are impacted by lack of or poor access to water and sanitation systems. Measurable differences in access vary depending on identity, identity expression and status. Impacted community members include (but may not be limited to) people of color; indigenous and Native American people; people who are living on a low income, female-bodied and/or women, houseless, immigrants, transgender, young, senior, lesbian, gay, bisexual, and/or queer; people whose second language is English; people who rent their housing; people with a physical, cognitive, visual, or auditory disability; immigrants; people who live in rural areas and on the coast; and people who are not college educated. Find an analysis of impacts and antidotes at https://www.recodenow.org/diversity-equity-inclusion-in-water-systems/.

Sewage: Water that comes from toilets and other high nutrient plumbing fixture sources (commonly called "blackwater")

Sullage: Water that comes from sinks, tubs, and similar plumbing fixture sources (commonly called "greywater" or "graywater")

Contributors to our 3-Year Efforts

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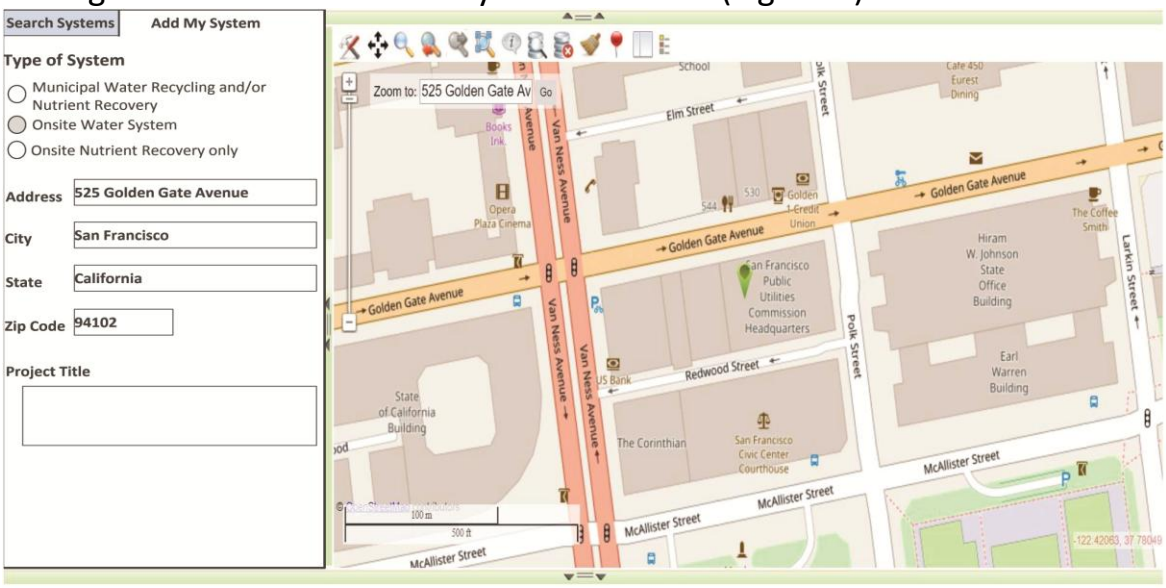
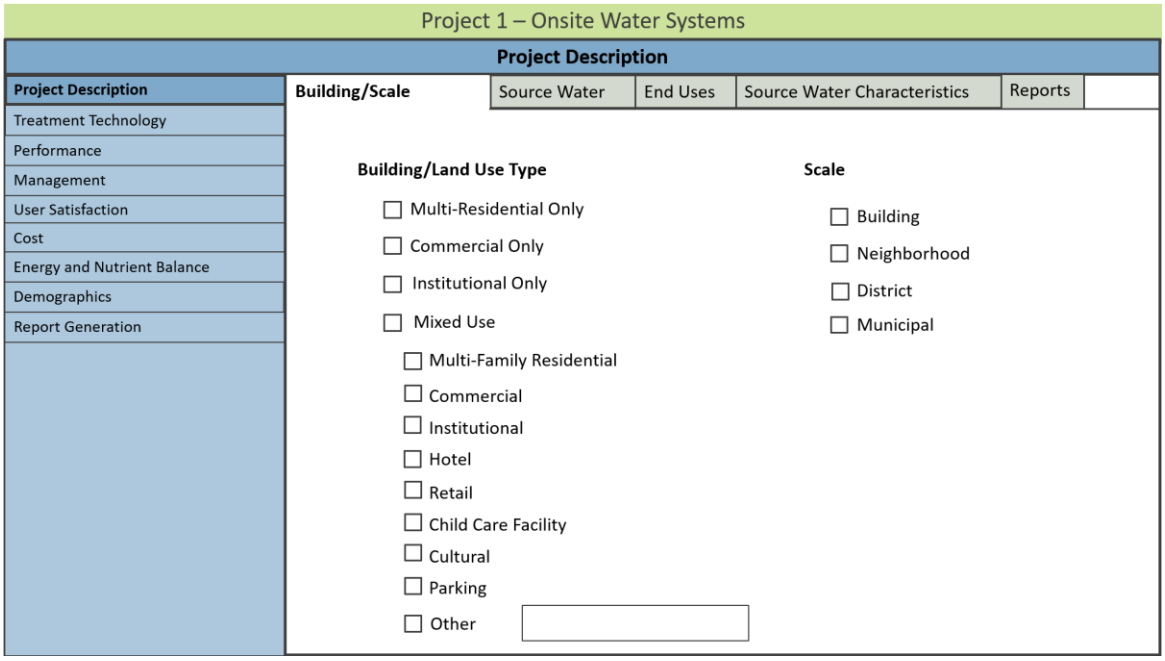
- Patti Southard, GreenTools Program Manager, King County, WA
- John Kiess, Kitsap Public Health District, Kitsap County, WA
- Todd Vogel, Loom Foundation, Bainbridge, WA

Appendix A: Resource Recovery Database Tool

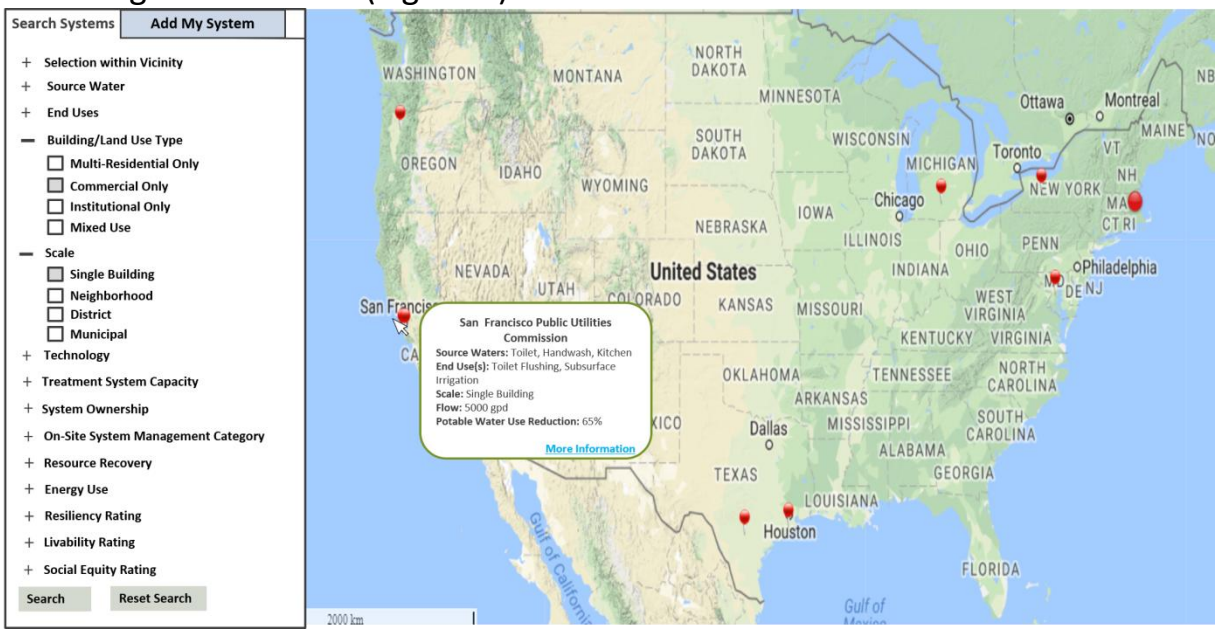
Adding Water Treatment Facility into Database (Figure 1)



Adding Water Treatment Facility into Database (Figure 2)

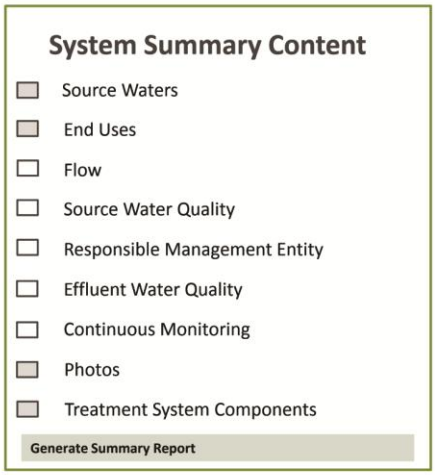


Searching the Database (Figure 3)



National Standard for Annual Jurisdictional Reporting (Figure 4)

Annual Reporting: Registered projects have easy reporting by selecting system items to be included in the report.



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Appendix B: Bainbridge Updated Code

ORDINANCE NO. 2019-05

AN ORDINANCE of the City of Bainbridge Island, Washington, relating to sewer connection requirements and amending Section 13.12.010 of the Bainbridge Island Municipal Code.

WHEREAS, City policy states that property owners within the City's sewer service area, as identified in the City's Comprehensive Plan requiring sewer service, shall not be allowed to install a septic system if the distance from the property to an existing sewer main with capacity to serve the property is 300 feet or less; and

WHEREAS, the City Council revised the established policy in 2014 to allow an exception for composting toilets; and

WHEREAS, the City's Comprehensive Plan Water Resources Policy WR 5.3 allows alternative sewage treatment systems such as sand filters, aerobic treatment, composting toilets, and living systems when approved by the Kitsap Public Health District; and

WHEREAS, the City Council desires to continue to support sustainability, and one way to help accomplish this is to revise the established policy to allow an exception for a limited number of onsite sewage treatment systems in the City's sewer service area that meet higher treatment standards; and

WHEREAS, the City Council desires to allow an option for such blackwater onsite treatment systems until such time that the City can determine the effectiveness of the systems, at which time the City can revisit this activity and determine if further changes are warranted via a future City ordinance

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF BAINBRIDGE ISLAND, WASHINGTON, DOES ORDAIN AS FOLLOWS:

Section 1.Section 13.12.010.D. of the Bainbridge Island Municipal Code is hereby amended to read as follows:

D. The owner of property that meets the criteria set forth in subsection A of this section shall be allowed to install an on-site sewage system, if the project meets the following requirements:

1. The ~~P~~property owner will install a composting toilet and gra~~e~~y water system approved by the Kitsap County Health District that requires no on-site toilet ~~fluid~~liquid disposal, or the property owner will install a blackwater onsite treatment system that provides BOD5, TSS, and nitrogen reduction equivalent to NSF 40 and NSF 245 performance standards approved by the Kitsap County Health District; and

~~3. Gray water disposal must be handled through an onsite sewage systemapproved by the Kitsap County health district;~~

~~4~~3. The property owner will be required to record a notice to property title with the Kitsap County auditor that mandates connection to the city's sewer system in the event the owner, or any future owner, fails to maintain

the water treatment system to the performance requirements described above or decides to revert back to a flush toilet system; and connected to the municipal sewer; and

~~5~~4. The property owner will be required to pay any required sewer system participation fees and connection fees that apply at the time of required connection.

~~6~~5. The number of blackwater onsite treatment systems allowed in the City's sewer service area will be limited to ten (10) equivalent residential units.

Section 2. This ordinance shall take effect and be in force five (5) days from its passage, approval, and publication as required by law

Appendix C: Recode's Op Ed in the Oregonian

Reprinted with permission from Maria Cahill

Proposed Title: **Resilience and Affordability with Onsite Nonpotable Water Systems**

Title as it appeared in the Oregonian: "Opinion: Innovations in saving Oregon water"

By: Maria Cahill, Program Manager, recode March 22, 2019

Everywhere in Oregon, water is used by a variety of species – from iconic wild salmon to ranch animals to the farmlands that feed us. Increasingly, algae blooms, droughts, and record floods are in our annual news cycle and water infrastructure costs are increasing, too.

The University of Michigan predicts that by 2022, at least 35% of people in the U.S. won't be able to afford their water bills. Numerous urban areas along the I-5 corridor and a big area in South Central Oregon are rated "High Risk", and at least half the state is rated "At Risk" for poor affordability.

On World Water Day, let's explore options to give water supplies and economies across the state a boost.

Onsite water reuse systems treat rainwater, stormwater, and "waste" water so it can be used immediately in the proximity of where treatment occurs. These systems increase resiliency for disasters by diversifying a community's water portfolio and improve environmental quality by leaving more water in natural systems. One of the most important benefits, though, is their unique position to address water affordability.

Onsite water reuse systems turn "wastes" into resources that drive economic opportunities and reduce (or hold steady) the cost of consumer water and sewer bills. These benefits accrue at a variety of scales in settings from rural to urban.

In John Day, a proposed wastewater treatment facility plays a pivotal role in the 80-acre Innovation Center, reclaiming 80 million gallons of water per year for onsite hydroponic agriculture and other uses. This will grow cash crops for local use and export, in a place where the cost of a head of lettuce is at a premium. Supporting both these systems will be a co-generation plant powered by locally harvested woody biomass. “Waste” water and other “waste” products are jump-starting John Day’s economy.

In Portland, Hassalo on 8th, a mixed-used development, has a privately-operated small utility that treats and reuses sewage onsite. This system is so cost-effective that the utility operator contracted to manage it will profit from it for at least 12 of its 20-year contract and still give households and businesses there a month of free utilities annually, charging the same rates as the city.

What if all public utilities adopted a similar intense water conservation business model? Unlike private developers, municipal agencies could optimize a variety of water and wastewater systems at the ideal scale for each type of system, seamlessly integrating them into existing infrastructure.

Because these systems are intentionally integrated, savings could be spread across all ratepayers to help ensure ongoing affordability. This strategy would create new jobs at a variety of education levels. Excess income, when it comes, could be invested in additional cost-savings systems, boosting resilience for emergencies and further supplementing the water supply.

For those Oregonians depending on a municipal water supply, onsite water reuse systems have the potential to ensure that our water systems meet our needs – and the needs of all species – at a price we can afford for years to come.

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