CITY COUNCIL WORKSESSION
MEETING AGENDA

Online via Zoom and In Person at
Tumwater City Hall, the Sunset Room,
555 Israel Rd. SW, Tumwater, WA 98501

Tuesday, July 12, 2022
5:30 PM

1. Call to Order
2. Roll Call
3. LOTT Clean Water Alliance Reclaimed Water Study Update (Dan Smith)
4. Regional Fire Authority Remnant Funding (John Doan)
5. Mayor/City Administrator's Report
6. Executive Session:
    a. Collective Bargaining pursuant to RCW 42.30.140(4)(b)
7. Adjourn

Meeting Information
All Councilmembers will be attending remotely. The public are welcome to attend in person, by telephone or online via Zoom.

Watch Online
https://us02web.zoom.us/j/83276355087?pwd=WjdZdlF1NUVmTzJCMUtRdGVsT2hBZz09

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID 832 7635 5087 and Passcode 305061.

Public Comment
The public may submit comments by sending an email to council@ci.tumwater.wa.us, no later than 4:00 p.m. the day of the meeting. Comments are submitted directly to the Councilmembers and will not be read individually into the record of the meeting.

Post Meeting
Video recording of this meeting will be available within 24 hours of the meeting.
https://tcmedia.org/channels.php

Accommodations
The City of Tumwater takes pride in ensuring that people with disabilities are able to take part in, and benefit from, the range of public programs, services, and activities offered by the City. To request an accommodation or alternate format of communication, please contact the City Clerk by calling (360) 252-5488 or email CityClerk@ci.tumwater.wa.us. For vision or hearing impaired services, please

contact the Washington State Relay Services at 7-1-1 or 1-(800)-833-6384. To contact the City's ADA Coordinator directly, call (360) 754-4128 or email ADACoordinator@ci.tumwater.wa.us

TO: City Council

FROM: Dan Smith, Water Resources & Sustainability Director

DATE: July 12, 2022

SUBJECT: LOTT Clean Water Alliance Reclaimed Water Study Update

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1) Recommended Action:

None. Information only.

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2) Background:

Since 2012, LOTT has been conducting a study to review and address community questions and concerns about residual chemicals that may remain in reclaimed water and what happens to them when reclaimed water is infiltrated into the ground. The goal of the Reclaimed Water Infiltration Study is to provide local scientific data and community perspectives to help policymakers make informed decisions about future reclaimed water treatment and uses. LOTT staff will present an overview of the study, including key findings, proposed next steps, and opportunities for public engagement.

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3) Policy Support:

Be a leader in environmental sustainability.

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4) Alternatives:

- ❑ Not applicable.

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5) Fiscal Notes:

Staff have participated in the regional study since its inception. All study costs are funded by LOTT Clean Water Alliance through revenues derived from wastewater utility rates.

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6) Attachments:

A. Reclaimed Water Infiltration Study Fact Sheet (June 2022)
B. Task 1: Water Quality Characterization Fact Sheet (June 2021)
C. Task 2: Treatment Effectiveness Evaluation Fact Sheet (May 2022)
D. Task 3: Risk Assessment Fact Sheet (June 2022)

Reclaimed Water Infiltration Study

LOTT Clean Water Alliance
Lacey • Olympia • Tumwater • Thurston County

Introduction

LOTT is conducting a study to answer community questions and concerns about residual chemicals that may remain in reclaimed water, and what happens to them when reclaimed water is infiltrated into the ground.

The many household and personal care products we all use, such as medicines, soaps, shampoos, cleaning products, lawn care products, and even some foods, contain a broad variety of chemicals. Some of these chemicals end up in wastewater that gets sent to a treatment plant for cleaning before it is released back to the environment. Most of our wastewater from the Lacey-Olympia-Tumwater area is currently treated at LOTT's Budd Inlet Treatment Plant and discharged to Budd Inlet. Some is treated to reclaimed water standards and reused in the community or infiltrated into the ground where it mixes with groundwater, our region's source of drinking water. Infiltrating reclaimed water to groundwater is a key part of our communities' long-range plan for managing wastewater into the future.

Study Goal

The goal of the Reclaimed Water Infiltration Study is to provide local scientific data and community perspectives to help policymakers make informed decisions about future reclaimed water treatment and uses.

The key question that the Reclaimed Water Infiltration Study is intended to answer is:

What are the risks from infiltrating reclaimed water into groundwater because of chemicals that may remain in the water from products people use every day, and what can be done to reduce those risks?

Study Structure

The Reclaimed Water Infiltration Study is a dual track study focusing on science and public engagement.

- The scientific portion of the study will provide local data about potential risks from infiltrating reclaimed water into groundwater.
- Public engagement will encourage community conversations about what can be done to reduce those risks.

Both the scientific data and the community perspectives are essential for meeting the study's goal.

Oversight and Implementation

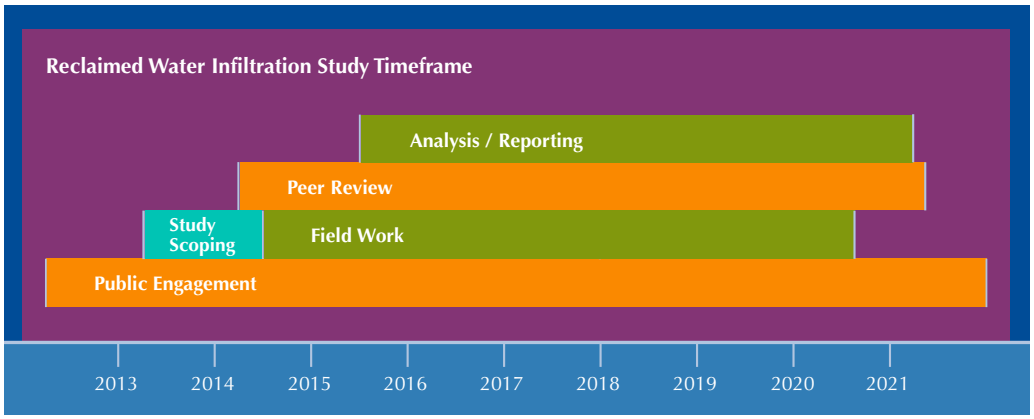
Several different groups and committees are involved in guiding and conducting the study:

- LOTT Board of Directors – The Board of Directors have directed staff to conduct a study that is objective, credible, transparent, and science-driven.
- LOTT Technical Sub-Committee – The Technical Sub-Committee consists of the Public Works Directors for each of LOTT's partner jurisdictions, as well as LOTT's Executive Director, Operations & Facilities Director, and Engineering Director, and the County's Environmental Health Division Director. This group serves as the Steering Committee for the study.

- Community Advisory Group – This group of local citizens provides input to help ensure community questions are addressed by the study.
- Science Task Force – This group is made up of technical staff from LOTT, LOTT's partner jurisdictions, the Squaxin Island Tribe, and the State Departments of Ecology and Health.
- Peer Review Panel – The National Water Research Institute is an independent third party charged with leading study review by a team of nationally-recognized experts representing the fields of health, toxicology, hydrogeology, wastewater treatment, and more.
- Study Team – HDR Engineering serves as the primary consultant for the study, with a full suite of sub-consultants to assist with various specialties. LOTT staff members provide project support for the study and its associated public engagement efforts.

Timeframe

This study is an ambitious multi-year effort. The study is anticipated to be complete in 2021.



Community Questions and Concerns

One of the first steps of the study involved identifying questions and concerns that the community has regarding infiltration of reclaimed water to help guide study design. Through meetings of the Community Advisory Group, public opinion surveys and interviews, meetings of the Science Task Force, and other interactions with the public, a list of more than 85 questions was developed. These questions generally fall into one of four question areas that form the basis for the study framework. Objectives and activities relating to each of the four study components incorporate many of the community questions into the study framework.

Study Framework

Task 1: Water Quality Characterization

What is the current quality of our local waters: groundwater, surface waters, drinking water, wastewater, and reclaimed water?

Approach

- Analyze quality of area groundwater and surface water
- Analyze LOTT wastewater and reclaimed water for residual chemicals

Task 2: Treatment Effectiveness Evaluation

What happens to reclaimed water that is infiltrated to groundwater: where does it travel and how quickly, and how does the quality of the water change over time?

Approach

- Learn more about where reclaimed water infiltrated at the Hawks Prairie site goes, and how quickly
- Analyze groundwater at Hawks Prairie along reclaimed water flow paths to learn how water quality changes

Task 3: Risk Assessment

What are the relative risks of replenishing groundwater with reclaimed water?

Approach

- Determine the types and degrees of risk associated with infiltrating reclaimed water into local area groundwater
- Evaluate both human and ecological risks

Task 4: Cost/Benefit Analysis

What are the costs and benefits of various approaches for treating and using reclaimed water?

Approach

- Calculate long-term costs and benefits of various options for managing reclaimed water
- Consider various treatment levels and alternative uses of reclaimed water

Study Outcomes

Local data and community perspectives will help policymakers with decisions about future treatment and uses of reclaimed water. Possible outcomes include:

- Continuing infiltration of reclaimed water as currently planned
- Using additional or alternative treatment processes to improve water quality
- Investing in other uses of the water to reduce the need for more infiltration
- Making changes to how reclaimed water is infiltrated
- Investing in other actions to protect our local water resources

Learning More

LOTT welcomes public input about the study effort. To learn more about the Reclaimed Water Infiltration Study, visit www.lottcleanwater.org.

To share questions or comments, or if you would like to receive updates about the reclaimed water study and opportunities for public involvement, please send an email with your contact information to: reclaimedwaterstudy@lottcleanwater.org.

Your comments or requests for information can also be sent to:

Reclaimed Water Infiltration Study
LOTT Clean Water Alliance
500 Adams Street NE
Olympia, WA 98501

Reclaimed Water Infiltration Study Current Participants

LOTT Board of Directors

Carolyn Cox – City of Lacey Council Member
Lisa Parshley – City of Olympia Council Member
Leatta Dahlhoff – City of Tumwater Council Member
Tye Menser – Thurston County Commissioner

Steering Committee (LOTT Technical Sub-Committee)

Scott Egger – City of Lacey Public Works Director
Rich Hoey – City of Olympia Public Works Director
Dan Smith - City of Tumwater Water Resources & Sustainability Director
Jennifer Walker – Thurston County Public Works Director
Art Starry – Thurston County Environmental Health Division Director
Michael Strub – LOTT Executive Director
Terri Prather – LOTT Operations & Facilities Director
Brian Topolski – LOTT Engineering Director

Community Advisory Group

Maureen Canny
John Cusick
Holly Gadbaw
Karen Janowitz
Bill Liechty
Scott Morgan
Pixie Needham
Tina Peterson
Edward Steinweg
Richard Wallace

Science Task Force

Erik Iverson – City of Lacey Water Quality Analyst
Peter Brooks - City of Lacey Water Resources Manager
Erin Conine – City of Olympia Senior Water Resources Specialist
Dan Smith – City of Tumwater Water Resources & Sustainability Director
Carrie Gillum – City of Tumwater Water Resources Specialist
Art Starry – Thurston County Environmental Health Division Director
Kevin Hansen – Thurston County Hydrogeologist
Erica Marbet – Squaxin Island Tribe Water Resources Biologist
Hans Qiu – Department of Ecology Hydrogeologist
Mallory Little – Department of Health Toxicologist
James Watt – Department of Health Toxicologist

Peer Review Panel

Paul Anderson, Ph.D. – ARCADIS US, Risk Assessment Consultant
James Crook, Ph.D., P.E. – Environmental Engineering Consultant
Michael Dodd, Ph.D.– University of Washington Environmental & Occupational Health Sciences
Michael Kenrick, M.S. – GeoEngineers Hydrology Consultant
Edward Kolodziej, Ph.D. – University of Washington Civil & Environmental Engineering Professor
John Stark, Ph.D. – Washington State University Ecotoxicology Professor and
Washington Stormwater Center Director

Study Team

Jeff Hansen – HDR Engineering Project Engineer
Shane McDonald, P.G. – HDR Project Hydrologist
Michael Murray, Ph.D. – HDR Project Soil Scientist
Wendy Steffensen – LOTT Reclaimed Water Infiltration Study Project Manager
Lisa Dennis-Perez – LOTT Environmental Planning & Communications Director
Joanne Lind – LOTT Public Communications Manager

Reclaimed Water Infiltration Study

Task 1: Water Quality Characterization

LOTT Clean Water Alliance

Study Framework

The key question that the overall study is intended to answer is:

What are the risks from infiltrating reclaimed water into groundwater because of chemicals that may remain in the water from products people use every day, and what can be done to reduce those risks?

The overall study has four main tasks designed to answer specific questions.

Task 1: Water Quality Characterization
What is the current quality of our local waters: groundwater, surface water, drinking water, wastewater, and reclaimed water?

Task 2: Treatment Effectiveness Evaluation
What happens to reclaimed water that is infiltrated to groundwater: where does it travel and how quickly, and how does the quality of the water change over time?

Task 3: Risk Assessment
What are the relative risks of replenishing groundwater with reclaimed water?

Task 4: Cost/Benefit Analysis
What are the costs and benefits of various approaches for treating and using reclaimed water?

Overview of Task 1

The first task of the Reclaimed Water Infiltration Study was Water Quality Characterization. This fact sheet provides highlights of this task. For more details about Task 1 and the overall study, visit www.lottcleanwater.org.

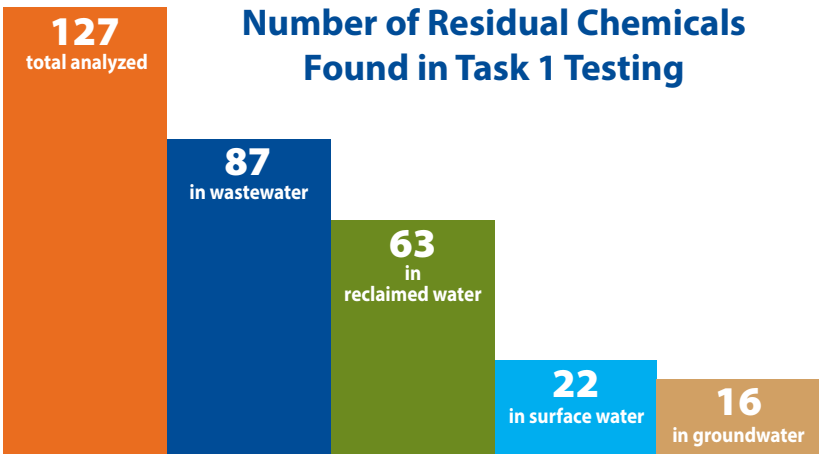
Task 1 of the study focused on two main questions:

- Are residual chemicals from household and personal care products found in our local groundwater, surface water, wastewater, and reclaimed water?
- How effective are LOTT's treatment processes at removing residual chemicals from wastewater?

Key Findings

- Residual chemicals were found at very low levels (parts per billion and parts per trillion) in all types of water tested.
- LOTT's treatment processes were found to be effective at removing many residual chemicals in wastewater and reclaimed water, but some chemicals remain after treatment.
- Residual chemicals were found in our environment – in areas where reclaimed water is infiltrated to replenish groundwater – and in areas where it is not.
- Findings are consistent with similar studies conducted in other places in the country and the world.

Number of Residual Chemicals Found in Task 1 Testing



Testing for Residual Chemicals

Groundwater, surface water, wastewater, and reclaimed water were tested for 127 residual chemicals. These chemicals come from household and personal care products people use every day, such as medicines, soaps, insect repellents, cleaning products, and some foods. These chemicals are not regulated in water, and wastewater treatment processes are not designed specifically to remove them. LOTT also tested for nutrients, bacteria, metals, and other chemicals that are regulated.

Budd Inlet Treatment Plant

Martin Way Reclaimed Water Plant

Sampling was done for four types of water:

1. **Untreated wastewater** at LOTT's Budd Inlet Treatment Plant and Martin Way Reclaimed Water Plant
2. **Reclaimed water** at the Budd Inlet Reclaimed Water Plant and Martin Way Reclaimed Water Plant
3. **Surface water** from the Deschutes River, Woodland Creek, and some smaller streams
4. **Groundwater** from municipal and private wells

Surface water and groundwater were sampled in two study areas: Hawks Prairie and Tumwater. The two study areas are similar, with mostly residential development – some served by the sewer system and some by onsite septic systems. The main difference between the two study areas is that reclaimed water is infiltrated into the ground to replenish groundwater in the Hawks Prairie study area, but not in the Tumwater study area.

Residual Chemicals in Wastewater and Reclaimed Water

At LOTT's Budd Inlet Treatment Plant, wastewater is treated to advanced secondary standards before it is discharged to Budd Inlet. At the Budd Inlet and Martin Way Reclaimed Water Plants, water is treated to even higher Class A Reclaimed Water standards. Reclaimed water can be used for almost all purposes except drinking. It is used locally for groundwater replenishment, irrigation, industrial processes, decorative water features, and toilet flushing.

Residual chemicals decrease in number and concentration as water advances through the treatment process from untreated wastewater, to advanced secondary water, to Class A Reclaimed Water. The number of different residual chemicals found in untreated wastewater was 87 and the number in reclaimed water was 63.

LOTT's treatment processes were highly effective at removing some common chemicals such as acetaminophen, ibuprofen, caffeine, and triclosan (antibacterial agent added to soaps) to levels too low to be detected in reclaimed water. Only 19 residual chemicals were consistently found in all untreated wastewater samples and only 14 residual chemicals were found in every reclaimed water sample. For the 14 chemicals consistently found in reclaimed water, some were removed by 85% or more through LOTT's treatment process, but others showed little to no removal.

Residual Chemicals in the Environment

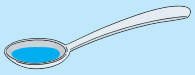
In the two study areas, a total of 22 different residual chemicals were found in surface water and 16 were found in groundwater, at levels in the parts per billion to parts per trillion range. These chemicals were found both in areas where infiltration of reclaimed water is occurring, and where it is not. The residual chemicals detected most frequently were of four types. The first three listed – artificial sweeteners, flame retardants, and antiseizure medications – were also found consistently in reclaimed water, but the last type, pesticides, was not.

1. **Artificial sweeteners** (sucralose and acesulfame-K): These were the residual chemicals found most frequently and at the highest concentrations. These chemicals are designed not to break down or be absorbed in the human body, so they also resist breaking down in the environment and in wastewater treatment processes.
2. **Flame retardants** (including TCPP and TCEP): These chemicals are added to many manufactured materials, including plastics and fabrics. Particles from furniture, building materials, and other products can be inhaled and excreted, or washed off fabric in the laundry, and end up in the wastewater system.

How small is a part per billion (PPB) or a part per trillion (PPT)?

In one Olympic-size swimming pool (660,000 gallons)

1 PPB = 1/2 teaspoon

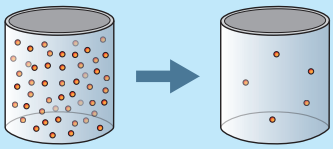


1 PPT = 1/2 drop

3. **Antiseizure medications** (such as carbamazepine): In other studies, this type of pharmaceutical is often found to resist breaking down in wastewater treatment processes.
4. **Pesticides** (including the herbicide cyanazine and the mosquito repellent DEET): There are many pathways by which pesticides enter the environment, including stormwater runoff and wastewater.

LOTT Treatment Process Removal Efficiencies

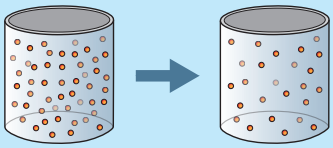
Good Removal Over 85%



Before Treatment — **After** Treatment

- Acesulfame-K – sweetener
- Atenolol – beta blocker
- Continine – nicotine degradate
- Metformin – antidiabetic

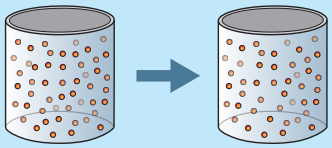
Moderate Removal 85-33%



Before Treatment — **After** Treatment

- Carbamazepine – antiseizure
- Fluoxetine – antidepressant
- Iohexal – x-ray contrast
- Lopressor – beta blocker
- Primidone – anticonvulsant
- Sucralose – sweetener
- TCPP – flame retardant

Poor to No Removal Under 33%



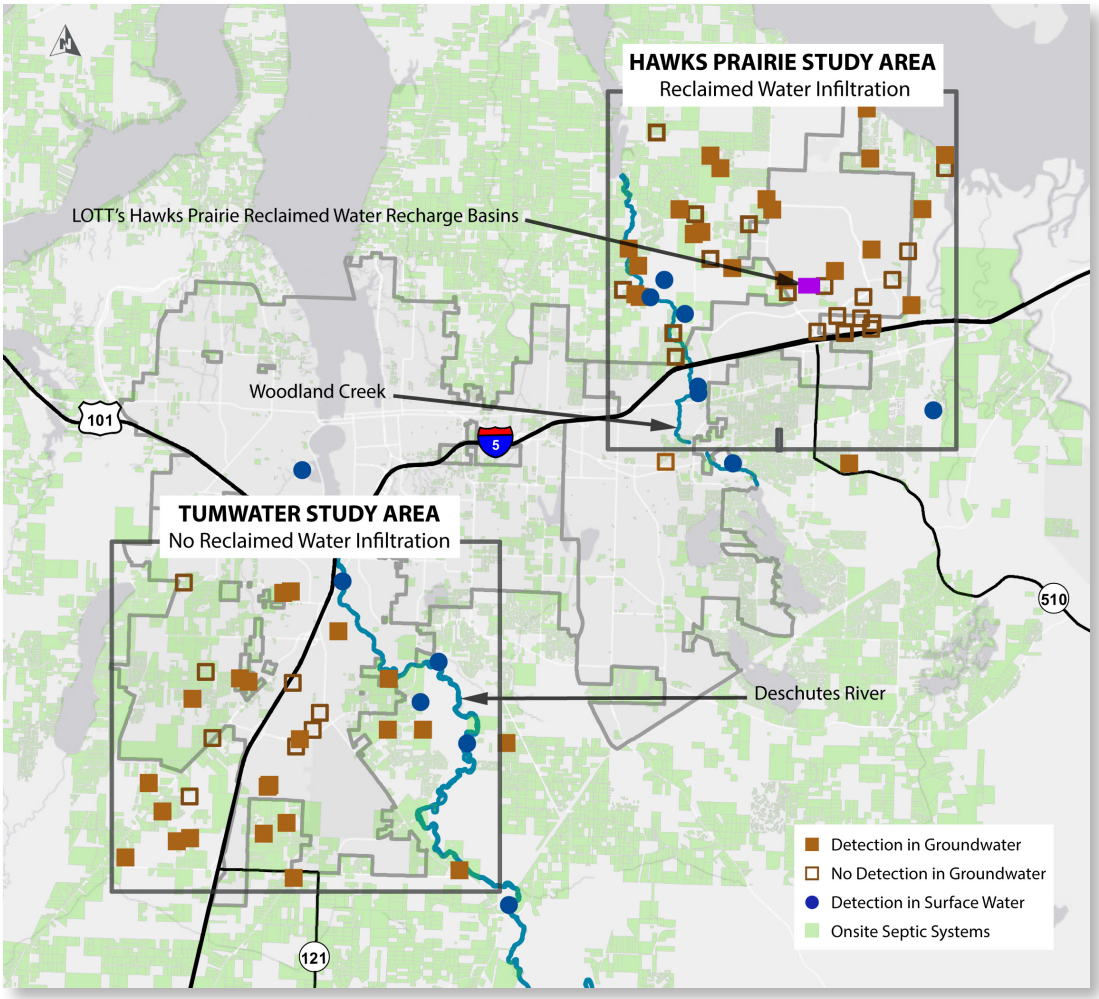
Before Treatment — **After** Treatment

- 1.4-Dioxane – solvent
- Iopromide – x-ray contrast
- TCEP – flame retardant

Summary

Findings from Task 1, Water Quality Characterization, show that residual chemicals are present in local wastewater, reclaimed water, surface water, and groundwater, usually at very low levels. They are found in our environment in areas where reclaimed water is used for infiltration and in areas where it is not, indicating there are multiple sources of these chemicals. Water Quality Characterization is just the first step in the overall reclaimed water infiltration study.

Test Locations and Residual Chemical Detections



What's Next?

Task 2 of the study includes a tracer test and water sampling to "follow" the reclaimed water as it infiltrates into the ground to determine where it flows, how quickly, and if residual chemicals decrease over time.

Task 3 will build on the results of Tasks 1 and 2 to consider if there are any risks to human health or the environment from using reclaimed water to replenish groundwater.

Task 4 will examine how risks might be addressed, including the costs and benefits of various options for treating and using reclaimed water.

The study is anticipated to be completed in 2021. Community conversations about study results will help inform decisions about future reclaimed water treatment and use.

Get Involved!

- Learn more or sign up to receive email updates about the study:
  www.lottcleanwater.org
- Share questions or comments by email:
  reclaimedwaterstudy@lottcleanwater.org
- Give us a call:
  (360) 664-2333
- Send comments or questions by mail:
  Reclaimed Water Infiltration Study
  LOTT Clean Water Alliance
  500 Adams Street NE
  Olympia, WA 98501

Reclaimed Water Infiltration Study

Task 2: Treatment Effectiveness Evaluation

LOTT Clean Water Alliance

Study Framework

The key question that the overall study is intended to answer is:

What are the risks from infiltrating reclaimed water into groundwater because of chemicals that may remain in the water from products people use every day, and what can be done to reduce those risks?

The overall study has four main tasks designed to answer specific questions.

Task 1: Water Quality Characterization
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Task 3: Risk Assessment
What are the relative risks of replenishing groundwater with reclaimed water?

Task 4: Cost/Benefit Analysis
What are the costs and benefits of various approaches for treating and using reclaimed water?

Overview of Task 2

This fact sheet provides highlights of the second task of the Reclaimed Water Infiltration Study: Treatment Effectiveness. For more details about the study, visit www.lottcleanwater.org.

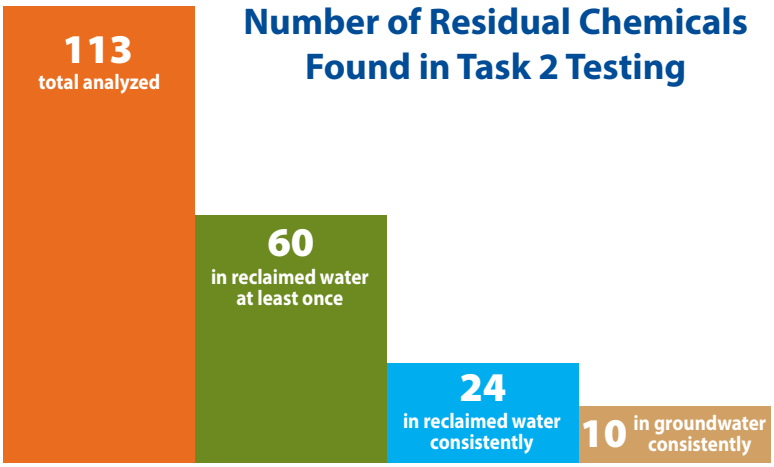
Task 2 of the study focused on three main questions:

- Which direction does groundwater flow in underground aquifers near the Hawks Prairie Basins site?
- Do residual chemicals decrease as reclaimed water travels through unsaturated soil, mixes with groundwater, and moves away from the site?
- Are there residual chemicals that people or wildlife might be exposed to from groundwater and creeks influenced by reclaimed water?

Key Findings

- Reclaimed water infiltrated at the Hawks Prairie site flows south and west in the shallow aquifer and some flows into the deeper aquifer, which flows east.
- Microorganisms in the soil help break down some residual chemicals – this is referred to as soil aquifer treatment.
- Most residual chemicals decrease with time and distance as reclaimed water mixes with groundwater and moves away from the site.
- Some residual chemicals remain at low concentrations in water that may be used by people or wildlife.

Number of Residual Chemicals Found in Task 2 Testing



Gathering Scientific Data

Monitoring Wells

Task 2 involved extensive field work to sample groundwater at LOTT's Hawks Prairie Recharge Basins site and at numerous locations offsite. To do this, LOTT established a network of monitoring wells, including onsite wells owned by LOTT and existing offsite wells owned by others. An additional 14 new wells were drilled to complete the initial monitoring network of 43 wells in the shallow and deep aquifers. Lysimeters installed at varying depths directly below the recharge basins allowed for water sampling in the unsaturated soil. Once computer modeling was underway, an additional six wells were drilled to fill in data gaps and refine the model.

A monitoring network of wells was established

Tracer Test

LOTT conducted a tracer test to track the movement of reclaimed water up to a half mile from the Hawks Prairie Recharge Basins site. Two non-toxic, inert chemicals were added to the reclaimed water before it entered the recharge basins: potassium bromide and sulfur hexafluoride. 26 monitoring wells were sampled for tracers over a 10 month period. Data gathered was used to determine the flow path and travel time of reclaimed water and groundwater. That information was then used to refine the computer model and predict groundwater movement at greater distances from the site.

The tracer test tracked movement of reclaimed water

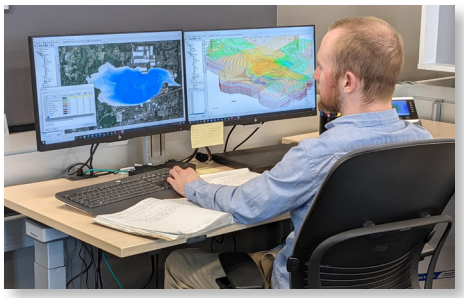
Water Quality Sampling

Quarterly water quality samples were taken from reclaimed water and 13 wells to determine if residual chemical concentrations decrease over time or distance from the recharge site. This is referred to as attenuation. Samples were tested for water quality indicators like nitrate and for 113 residual chemicals.

Water samples were tested for water quality indicators

Computer Modeling

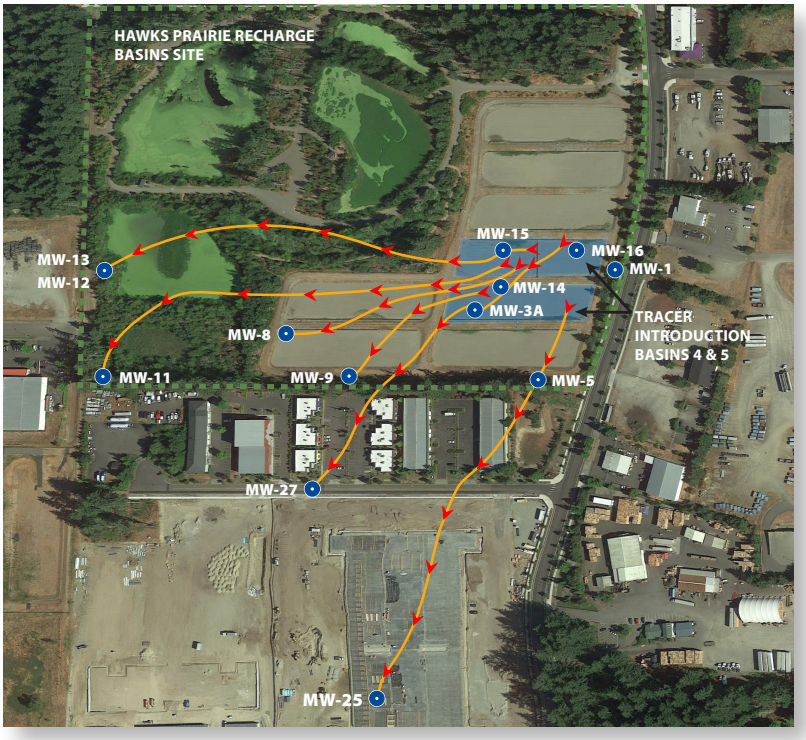
Computer modeling was used to estimate reclaimed water flow paths and residual chemical concentrations within a 30 square mile area, up to 100 years into the future. The model was developed from an existing groundwater model, updated with more recent regional hydrogeologic information and field data gathered from well drilling, tracer testing, and water quality sampling. Model runs were conducted for each year from 2007 through 2020 using the actual infiltration rate for those years. The 2020 model run confirmed that model results were consistent with actual field results from the tracer test and sampling effort. Additional model runs were conducted for the years 2021 through 2121, using estimated future reclaimed water infiltration rates.



Computer modeling was used to estimate future flow paths and residual chemical concentrations

Reclaimed Water Movement

Groundwater flow direction was determined using water level data from the monitoring well (MW) network. Tracer test data confirmed where infiltrated reclaimed water traveled after mixing with groundwater, and provided information about how quickly it moved away from the site. In general, water in the shallow aquifer flows south and west, while the deeper aquifer flows east. Some water from the shallow aquifer flows into the deeper aquifer. The glacial history of this area led to irregular geologic layers and soil conditions that vary widely, which is why there is a wide range of reclaimed water travel times in the study area. While it typically takes 30-40 days for reclaimed water to move through the unsaturated zone prior to entering the shallow aquifer, some reclaimed water can reach the deeper aquifer in about 30 days.



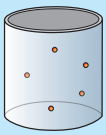
Tracer test data confirmed where infiltrated reclaimed water traveled after mixing with groundwater

Residual Chemical Attenuation

Reclaimed water prior to recharge was tested for 113 residual chemicals – 60 were detected, though only 24 of these were detected in all quarterly samples. Water quality testing just below the recharge basins showed evidence that microorganisms were likely at work breaking down some of the residual chemicals in the infiltrated water. Water quality sampling at monitoring wells showed that as the reclaimed water mixed with groundwater and traveled away from the recharge site, concentrations of many residual chemicals decreased along the flow paths. This indicated attenuation was occurring as chemicals were broken down by microorganisms, adhered to soil particles, or dispersed. The degree of attenuation varied by chemical, showing that chemicals degrade and adhere to soil at different rates.

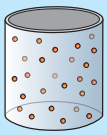
Residual Chemical Attenuation Over Time and Distance

Good Attenuation



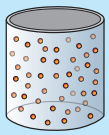
- Atenolol
- Carisoprodol
- DEET
- Dilantin
- Diuron
- Fluoxetine
- Iohexol
- Lopressor
- TCPP
- TDCPP

Moderate Attenuation



- Butalbital
- Meprobamate
- Metformin
- TCEP

Poor Attenuation



- 1,4- Dioxane
- Acesulfame-K
- Carbamazepine
- PFHxA
- PFBS
- PFBS acid
- PFOA
- PFPeA
- Primidone
- Sucralose

These 24 chemicals were detected in each quarter of sampling.

Predicting Future Conditions

Computer modeling was used to predict reclaimed water and residual chemical concentrations likely to occur in groundwater at different distances from the recharge site. This information helped identify which residual chemicals people and wildlife might be exposed to from contact with groundwater or surface water. The amount of residual chemical that they might be exposed to is called the "exposure point concentration" or EPC. The EPC is a key piece of information that was used in Task 3 of the study to assess any potential risks to human or ecological health.

Modeled Extent of Reclaimed Water in Shallow Aquifer

Modeled extent of reclaimed water in the shallow aquifer ranged from 100% (deep blue) to 0% (white).

Summary

Findings from Task 2, Treatment Effectiveness Evaluation, show that some residual chemicals in reclaimed water reach both the shallow and deep aquifers. The number and concentrations of residual chemicals generally decrease with time and distance from the recharge site.

What's Next?

Task 3 will build on the results of Tasks 1 and 2 to consider if there are any risks to human health or the environment from using reclaimed water to replenish groundwater.

Task 4 will examine how risks might be addressed, including the costs and benefits of various options for treating and using reclaimed water.

The study is anticipated to be completed in 2022. Community conversations about study results will help inform decisions about future reclaimed water treatment and use.

Get Involved!

- Learn more or sign up to receive email updates about the study:
  www.lottcleanwater.org
- Share questions or comments by email:
  reclaimedwaterstudy@lottcleanwater.org
- Give us a call:
  (360) 664-2333
- Send comments or questions by mail:
  Reclaimed Water Infiltration Study
  LOTT Clean Water Alliance
  500 Adams Street NE
  Olympia, WA 98501

Reclaimed Water Infiltration Study

Task 3: Risk Assessment

LOTT Clean Water Alliance

Study Framework

The key question that the overall study is intended to answer is:

What are the risks from infiltrating reclaimed water into groundwater because of chemicals that may remain in the water from products people use every day, and what can be done to reduce those risks?

The overall study has four main tasks designed to answer specific questions.

Task 1: Water Quality Characterization
What is the current quality of our local waters: groundwater, surface water, drinking water, wastewater, and reclaimed water?

Task 2: Treatment Effectiveness Evaluation
What happens to reclaimed water that is infiltrated to groundwater: where does it travel and how quickly, and how does the quality of the water change over time?

Task 3: Risk Assessment
What are the relative risks of replenishing groundwater with reclaimed water?

Task 4: Cost/Benefit Analysis
What are the costs and benefits of various approaches for treating and using reclaimed water?

Overview of Task 3

This fact sheet provides highlights of the third task of the Reclaimed Water Infiltration Study: Risk Assessment. For more details about the study, visit lottcleanwater.org.

Task 3 assessed potential risks to human health and the environment, using these questions for a step-wise analysis.

- Of the residual chemicals found in reclaimed water, which might be of concern to human or ecological health?
- Are any of the chemicals at a level of concern in reclaimed water?
- After reclaimed water is used to replenish groundwater, are any of the chemicals estimated to occur at a level of concern in groundwater or surface water?
- How might people or animals be exposed to the chemical in water, and would their level of exposure cause potential risk?

Key Findings

- Risks to human health from using reclaimed water to replenish groundwater are quite low. Out of 134 chemicals analyzed, 132 were found to be below levels of concern. Two were slightly above the minimum level of concern, though the risk level for both was very low.
- No risks to ecological health were identified. None of the residual chemicals were predicted to pose a risk to wildlife in watersheds influenced by reclaimed water.
- The Peer Review Panel, a group of national experts who have reviewed each step of the study, indicated the assessments were well designed and protective of human and ecological health.

Number of Residual Chemicals Identified in Task 3 Analysis

Human Health Risk Assessment

The human health risk assessment followed a step-wise process according to accepted protocols. The assessment began with a broad list of residual chemicals and gradually narrowed the focus to chemicals with potential human health effects.

Health Effect Thresholds

The first step was determining if a chemical posed potential health effects and at what level, or concentration. Assessors used best available science to set a health effect threshold for each chemical detected in reclaimed water sampling. Thresholds were based on state and U.S. EPA water quality standards if available, or were derived from published toxicity criteria, toxicity data, or therapeutic doses.

Screening Evaluation

For each of the residual chemicals detected in reclaimed water, the maximum concentration detected was compared to the health effect threshold for that chemical. If the chemical concentration was equal to or greater than 10% of its threshold, it was included in the next step for further evaluation as a chemical of interest. To err on the side of caution, all the hormones and PFAS chemicals were included in the next step as entire categories of interest, even though most did not exceed 10% of their threshold.

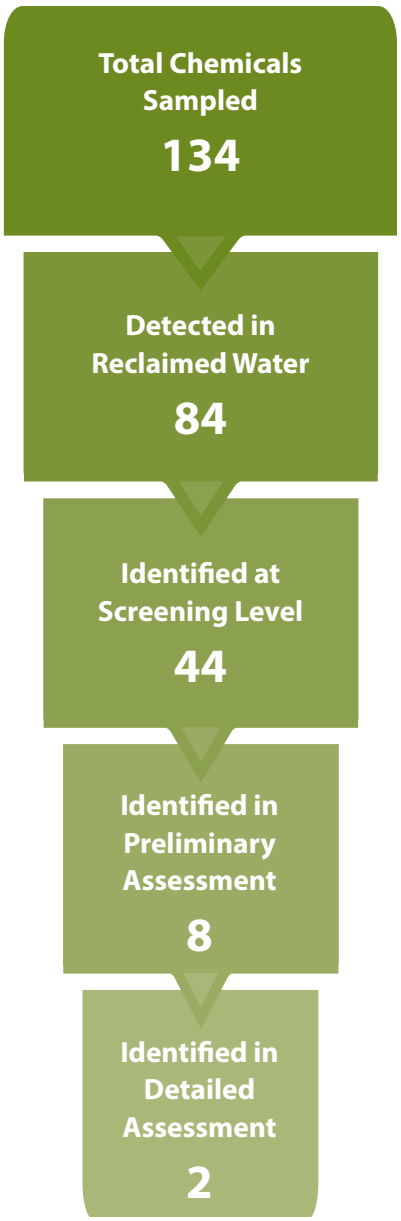
Preliminary Assessment

For each chemical of interest, groundwater modeling and field data were used to predict the exposure point concentration – the amount of the chemical to which people or animals might be exposed. The predicted concentration for each chemical was then compared to its health effect threshold. If the concentration was equal to or greater than 10% of the threshold, the chemical was included in the next step of evaluation.

Detailed Assessment

In this step, assessors considered how much of a residual chemical a person or animal in various scenarios might take in through drinking, breathing, and skin contact. The assessors considered children and adult residents living in the area, landscape workers, children playing at a park or water feature, children and adults recreating at local creeks, and people who might consume fish from local creeks. For the resident scenarios, two levels of exposure were considered per U.S. EPA methods – a maximum exposure level and a more likely average-level exposure. Chemical exposures did not exceed levels of concern in any of the scenarios considered, except for the maximum exposure level for residents. Under that scenario, two chemicals were identified as a potential concern.

Residual Chemicals of Potential Concern



Findings

Of the 134 chemicals analyzed, 132 were found to be below levels of concern for human health. Two chemicals were identified as a potential concern in one scenario, though the risk level for both chemicals was quite low. There were multiple layers of protective assumptions built into the risk assessment, meaning the assessors erred on the side of caution when making decisions about the health effect thresholds used, to what degree chemicals break down or disperse in the soil or aquifer, and how people might be exposed (like how much water they may drink from one source over a lifetime). For these reasons, the findings are more likely to overestimate risk than to underestimate it.

Perfluoropentanoic acid (PFPeA) is one of the chemicals that slightly exceeded the level of concern for one scenario. Under a maximum exposure resident scenario, a child drinks one liter of water daily, 350 days a year, for at least 6 years, from the same household water source. This results in a noncancer risk of 1.3, slightly above the threshold of 1.0. At this risk level, adverse health effects are considered unlikely. This chemical did not rise to a level of concern for the more likely exposure resident scenario or for any of the other scenarios considered.

PFPeA is a by-product from the breakdown of other per- and polyfluoroalkyl compounds, commonly referred to as PFAS chemicals. Sources include stain and water resistance carpets, clothes, furniture, food packaging, personal care products, and fire-fighting foams.

N-Nitrosodimethylamine (NDMA) also slightly exceeded the level of concern for one scenario. Under a maximum exposure resident scenario, an individual drinks approximately one liter of water a day as a child and 2.6 liters of water per day as an adult, 350 days per year for a period of 32 years, from the same household water source, and also bathes daily and breathes the air in the home during that time frame. This results in an estimated lifetime excess cancer risk of 2.9 in 1,000,000. This is slightly above the threshold for negligible risk of 1 in 1,000,000, and is within the range of risks considered acceptable by U.S. EPA. NDMA was not consistently found in samples of reclaimed water or groundwater. However, to err on the side of caution, assessors assumed it was present consistently at a concentration near the average of detections.

Sources of NDMA include cured meats, beer, fish, cheese, tobacco, shampoo, cleansers, detergents, pharmaceuticals, cosmetics, solvents, and as a by-product of some water disinfection processes.

Assessors considered children and adult residents living, working, and playing in the area.

Ecological Risk Assessment

This assessment considered potential impacts from residual chemicals based on their concentration in water and their potential to accumulate over time in living animals (bioaccumulate). Fish, birds, and fish-eating mammals in McAllister and Woodland Creeks, two water bodies where groundwater containing reclaimed water might mix with surface water, were considered in this step-wise assessment.

Screening Evaluation

Concentrations of chemicals detected in reclaimed water were compared to ecological health screening thresholds for water. If concentrations were greater than the threshold or if the chemical was potentially persistent or bioaccumulative, the chemical was included in the next step for further evaluation.

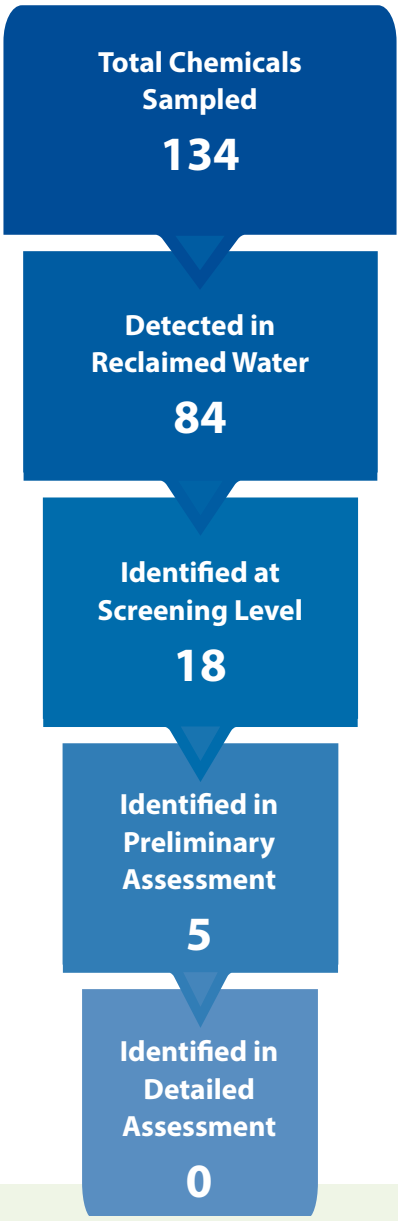
Preliminary Assessment

Groundwater modeling and field data were used to predict exposure point concentrations in Woodland and McAllister Creeks for each chemical of interest. Concentrations were then compared to the screening thresholds. If the concentration was equal to or greater than the threshold or considered persistent or bioaccumulative, the chemical was included in further evaluation.

Detailed Risk Assessment

Toxicity thresholds (below which adverse effects are not expected to occur) were set for each chemical based on existing standards and toxicity data for surface water, fish tissue, and wildlife dietary doses. These values were used along with the exposure point concentrations to calculate the potential for adverse effects. None of the residual chemicals were predicted to harm wildlife in either ecosystem studied. Residual chemicals in these systems were far below any levels of concern.

Residual Chemicals of Potential Concern



Summary

Findings from Task 3, Risk Assessment, show that risks to human health from using reclaimed water to replenish groundwater are quite low, and no risks to ecological health were identified. The Peer Review Panel stated that both the human health and ecological risk assessments are well designed, follow accepted practices, and are conservative, meaning they are more likely to overestimate than underestimate potential risk.

What's Next?

Task 4 will examine how risks identified in Task 3 might be addressed, including the costs and benefits of various options for treating and using reclaimed water.

The study is anticipated to be completed in 2022. Community conversations about study results will help inform decisions about future reclaimed water treatment and use.

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  LOTT Clean Water Alliance
  500 Adams Street NE
  Olympia, WA 98501

TO: City Council

FROM: John Doan, City Administrator

DATE: July 12, 2022

SUBJECT: Regional Fire Authority Remnant Funding

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1) Recommended Action:

Provide input to staff on the potential investment of residual property tax resulting from the potential formation of the Regional Fire Authority (RFA). The Public Health and Safety Committee will be discussing the topic at their meeting today and formulating a potential recommendation for Council direction.

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2) Background:

See the attached memo.

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3) Policy Support:

Strategic Priority: Provide and Sustain Quality Public Safety Services

- Explore regional fire and emergency medical services
- Maintain public safety staffing for police and the two fire stations
- Implement the Emergency Management Plan for City operations and the community

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4) Alternatives:

- ❑ Modify the list of funded programs
- ❑ Do not take the $0.13/$1,000
- ❑ Reduce the $0.13/$1,000
- ❑ Bank some or all of the $0.13/$1,000

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5) Fiscal Notes:

The memo describes the fiscal implications and recommendation for action. $0.13/$1,000 amounts to $52/year.

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6) Attachments:

A. Memo: Remnant Property Tax Investment Resulting from the Regional Fire Authority (RFA) Formation

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

MEMORANDUM

Date: July 12, 2022

To: Mayor Debbie Sullivan
Tumwater City Council

From: John Doan, City Administrator

Subject: Remnant Property Tax Investment Resulting from the Regional Fire Authority (RFA) Formation

The Regional Fire Authority Planning Committee is developing a proposal for the potential formation of a Regional Fire Authority (RFA) to provide fire and emergency medical services in Tumwater and Olympia. The current proposal is to fund the RFA with three primary revenue sources: a $1.00/$1,000 property tax, a Fire Benefit Charge, and the Medic One services contract. The operating assumption is that the City would lower its property tax by the corresponding $1.00/$1,000. With this change, the City's property tax rate for General Government would be approximately $1.26/$1,000 in 2022.

Although that $1.00 would be reduced, the City currently spends approximately $1.13 in general property tax revenue on the Fire Department. This excludes the revenue from Medic One. The result is that there is an approximate $0.13/$1,000 "savings" to the City from the transfer of fire and emergency medical responsibilities to the RFA. The decision of how to invest these remnant funds is a decision of the City Council, not the RFA. There are some options:

1. Reduce the property tax by the 13 cents. This enhances the fiscal appearance of the RFA to the public, but puts a burden on the City's General Fund to provide services, including some remnant fire- related services.

2. Bank some or all of the property tax. This would require the City to take an action to bank the 13 cents of taxing capacity and the City could go back and pursue it at a future time. The City could do this in part or in total.

3. Immediately utilize the 13 cents for any General Fund purpose.

4. Immediately utilize the 13 cents but limit the uses to public safety purposes. See the detail below.

Public Safety Funding Proposal (12 years starting 2024)

Revenue:	$660,000/year

Expenditures: (showing 12-year total)

LEOFF 1 – Fire Obligations	$3,185,000
Police Radio Replacement	$1,526,000
Sustainable Police Vehicle Upgrades	$785,000
Emergency Management Staffing w/Olympia	$412,000
Emergency Management Supplies/Training	$177,000
Fire Engine #2 Payments	$408,000
Police Officer and Equipment	$3,365,000
Additional Police Personnel (after 2031)	$1,313,000

Staff's recommendation is Option #4 because it provides for the remnant fire costs that the City is obligated to pay (LEOFF, Emergency Management, and the Fire Engine). It also invests additional funding in improvements to public safety through the Police Department.

Later in this timeframe, the City will need to determine how to invest the LEOFF costs which eventually go to zero. The City will also have to determine how to best use the additional police personnel funds. Those could be used in the future to pay for body cameras or other major expenditures.

However the Council decides to proceed with these funds, the Council would be asked to adopt a resolution indicating the intent of how to address the City property tax following adoption of the RFA. Should the RFA be approved by voters, there would be a budget amendment to implement this additional revenue.