OREGON WATER RESOURCE DEPARTMENT
WATER CONSERVATON, REUSE AND STORAGE
FEASIBILTY STUDY GRANT PROGRAM

I. Grant Information

Study Name: *Sterling Park Stormwater Quality Facility Groundwater Recharge Feasibility Evaluation*

Type of Feasibility Study: ☐ Water Conservation ☒ Reuse ☐ Above-Ground Storage
☐ Storage Other Than Above-Ground [Including Aquifer Storage and Recovery (ASR)]

Program Funding Dollars Requested: $ $50,000
Note: Request may not exceed $500,000

Total Cost of Feasibility Study: $ $100,000

II. Applicant Information

Applicant Name: *Clean Water Services*	**Co-Applicant Name:**
Address: *2550 SW Hillsboro Highway*	Address:
Hillsboro, OR 97123	
Phone:	Phone:
Fax:	Fax:
Email:	Email:

Principle Contact: *Jadene Stensland*	
Address:	*2550 SW Hillsboro Highway*
	Hillsboro, OR 97123
Phone:	*(503) 681-3662*
Fax:	
Email:	*StenslandJ@CleanWaterServices.org*

Certification:

I certify that this application is a true and accurate representation of the proposed work for a project feasibility study and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant certifies that they are aware of the requirements of an Oregon Water Resources Department grant, have read and agree to all conditions within the sample grant agreement and are prepared to conduct the feasibility study if awarded.

Applicant Signature: Jadene Stensland Date: 1/30/2016

Print Name: Jadene Stensland Title: Sr. Engr

III. Feasibility Study Summary

Please give a brief summary of the feasibility study using no more than 150 words.

The feasibility study will evaluate the potential to re-use stormwater collected from impervious residential roads in the winter and stored in an aquifer storage and recovery (ASR) well for beneficial purposes in the summer. Reuse possibilities include benefitting instream flows, improving instream temperatures, and providing an alternative to drinking water for nonpotable uses. Other benefits of stormwater ASR include enhancing groundwater supply and managing urban stormwater runoff, but the feasibility has yet to be tested. Stormwater collected from residential roads in Beaverton, Oregon, that currently discharges into a stormwater detention (water quality) facility will be used to recharge an existing and currently unused municipal ASR test well located adjacent to the water quality facility. The study will involve collecting site-specific stormwater quality and quantity data, evaluating treatment technology to address potential well clogging, groundwater fate and transport modeling, assessing regulatory and permitting issues, and developing an implementation plan.

IV. Grant Specifics

Section A. Common Criteria

Instructions: Please answer all questions contained in this section. It is anticipated that completed applications will result in additional pages.

1. Describe your goal and how this study helps to achieve the goal.

   Our goal is to enhance the conservation and protection of water supply and aquatic resources, including listed fish species. This feasibility study will help to achieve this goal by testing the potential for re-using stormwater runoff from impervious urban areas in ASR. The water recovered using ASR will provide an alternative source of water for instream and nonpotable uses that otherwise would be derived from an existing municipal surface water diversion.

   In many parts of the Pacific Northwest, wintertime urban stormwater represents an ample, cool, clean source of water. In most locations, it is discharged to surface water at rates that are far higher than the natural (undeveloped) hydrologic regime, which can be detrimental to the stream channel and aquatic life. Runoff from impervious urban areas also reduces the natural groundwater recharge and cool base flow, which in turn can impair summertime instream flows. This project will assess the site-specific feasibility of using ASR to temporarily store residential stormwater (in times of low water demand) for reuse during the summertime (in times of high water demand) for nonpotable uses, such as irrigation and streamflow enhancement in Beaverton, Oregon. Clean Water Services will conduct the study in partnership with the City of Beaverton. Stormwater re-used to meet nonpotable needs would allow more water to remain instream during the summertime, when flows are the lowest. Application of this project concept beyond Clean Water Services' jurisdiction has the potential to provide an implementable and complementary mitigation strategy to tree planting and other stream enhancement measures for providing instream temperature relief and thermal refugia for stressed salmonids statewide.

   Based on results of preliminary research for this project, stormwater recharge at an existing City of Beaverton ASR test well (referred to as ASR 3) is expected to meet all regulatory requirements (in particular, groundwater quality criteria) and be feasible from a standpoint of source water availability and compatibility with native groundwater in the Columbia River Basalt Group (CRBG) aquifer. Specifically:

   - *Oregon regulations are not expected to provide any obstacles to permitting this project. Preliminary discussions with the Oregon Department of Environmental Quality (DEQ) indicate that the agency is interested in evaluating the feasibility of the technical and permitting aspects of this project.*

   - *We have reviewed representative stormwater data from extensive databases and do not anticipate that concentrations of pollutants in the stormwater stored in the Sterling Park Stormwater Quality Basin (stormwater quality facility in the City of Beaverton) will exceed applicable water quality standards. Water quality requirements for source water for ASR projects are based on drinking water quality standards that reference U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCL).*

   - *Based on attenuation rates for the most conservative microbiological constituents that may be present in stormwater and a preliminary assessment of groundwater time of travel, it is anticipated that any microbiological constituents present in stormwater would be inactive (4-log inactivation) within approximately 150 feet of ASR 3 and would meet drinking water requirements if stored water migrated beyond 150 feet from ASR 3. No water wells are located within 150 feet of ASR 3 and because the site is located in an Oregon Water Resources Department (OWRD)-designated Critical Groundwater Area, new wells in the vicinity are not possible. The nearest potential domestic well that could constitute a receptor is more than 1,000 feet from this site. We anticipate little to no risk of stormwater pathogens affecting nearby wells. If the feasibility study results indicate a potential impact, pre-treatment methods are available to inactivate microbiological constituents.*

   - *Temperature data indicate that wintertime stormwater used for recharge typically will range from 6.4 to 9.6°C. This cool water could be recovered during the summer and used to mitigate the temperature in nearby*

Summer Creek, providing streamflow enhancement to a flow- and temperature-impaired creek segment that discharges to Fanno Creek and ultimately to the Tualatin River.

- *Stormwater quality, with the exception of turbidity, is similar in character to treated surface water used successfully on many ASR projects hosted in the CRBG aquifer. As such, mixing stormwater with native groundwater is not anticipated to result in clogging caused by precipitation of constituents. Real-time water quality sampling will be completed as part of the next phase to assess the compatibility of mixing the two waters.*

- *The estimated annual stormwater flow available for recharge at the ASR 3 site is up to 29 million gallons from two subbasins that discharge to the Sterling Park Stormwater Quality Basin. The low range is about 17 million gallons available for recharge. These totals are for the recharge season from November through March.*

2. Describe the water supply need(s) that the proposed project addresses. Identify any critical local, regional, or statewide water supply needs that implementation of the project associated with the feasibility study will address. **Responses should rely upon solid water availability and needs data/analysis.** For examples of water supply needs see "Criteria and Evaluation Guidance Document."

   This project addresses the critical need to balance water demand locally in the City of Beaverton as growth continues while testing an innovative idea that could be applied statewide. We estimate that between 17 and 29 million gallons of annual stormwater flow are available for ASR 3 to meet water supply need. The immediate water supply need is for irrigation water, but some of the potential long-term water needs that this project addresses are listed below. By extension, if the ASR 3 stormwater recharge project is successful, these types of benefits could be realized in other areas. Water supply benefits include:
   - *Recharged and banked stormwater can be applied to other beneficial nonpotable uses that typically are met with municipal drinking water, thereby reducing the demand on surface water.*
   - *Infiltrating winter stormwater runoff may help flow and instream temperature issues if the recovered water is discharged during seasonal low-flow periods to a local stream, such as Summer Creek, near ASR 3. Such use would benefit listed and endangered fish and other aquatic species.*
   - *Infiltrating winter stormwater can reduce runoff from impervious surfaces to surface water during periods of high flow, reducing the potential for hydromodification and matching more closely to the natural hydrologic cycle.*
   - *Infiltrating winter stormwater from steep terrain reduces the potential for significant erosion. Many areas of current growth in this study area are on steep terrain where stormwater runoff has high potential to cause significant erosion (G. Pursinger, 2014 "Erosion Problems Cut Deep on Bull Mountain"; http://www.pamplinmedia.com/ttt/89-news/211646-69319-erosion-problems-cut-deep-on-bull-mountain).*
   - *Stormwater ASR will provide direct recharge to the CRBG aquifer.*

   This project also will address stormwater management issues applicable to the Tualatin Basin and beyond. As the land around ASR 3 is developed, infiltration of stormwater may preclude the need to install, or increase the capacity of, piped stormwater infrastructure in this area. ASR is a particularly promising approach at this location because the low-permeability sediments present in the Tualatin Basin have low natural infiltration rates that limit the amount of stormwater that can be infiltrated using more traditional means, such as underground injection control (UIC).

3. Explain how the proposed project will meet the water supply need(s), and indicate what percentage of that need will be met. (For example: If your water supply need is 20,000 acre-feet of additional water and the project will supply 10,000 additional acre-feet, 50 percent of your need will be met).

This project proposes to store the wintertime residential stormwater that currently discharges to Summer Creek, Fanno Creek, and the Tualatin River for recovery and re-use as a source of nonpotable irrigation water and streamflow enhancement during the summertime. The City of Beaverton supplies water to residential and commercial users near the project; the water is obtained through the Joint Water Commission's (JWC) regional water supply system and diverted from the Tualatin River at a location just south of the City of Forest Grove.

Currently, the City of Beaverton supplies approximately 8.6 million gallons of drinking water each summer to a water customer near the project site to maintain water levels in a residential pond. The drinking water used for this

purpose is supplied through the City's drinking water system, which is supplied from the Tualatin River. The City anticipates stored stormwater from this proposed project will replace the drinking water currently used for maintenance of pond water levels and potentially enable the City to retain 8.6 million gallons of water instream in the Tualatin River. Conceptually, the City is exploring the use of Summer Creek to convey stored stormwater to the pond to provide a potential benefit to the stream. Additionally, the City is planning to develop a nonpotable irrigation water supply system in this area to provide irrigation water to planned residential developments and a new high school near the project site (South Cooper Mountain). The irrigation demands from these uses is estimated to be approximately 3.6 million gallons. The City anticipates using stored stormwater to meet these irrigation demands, which also would reduce the amount of water diverted from the Tualatin River during months when instream flows are lowest and are most critical for fish.

In summary, the proposed stormwater recharge project is anticipated to supply more than the 14.9 million gallons of nonpotable water demand for irrigation and pond maintenance. That amount represents 100 percent of the current and future water supply that otherwise would be diverted from the Tualatin River through the JWC and the City's drinking water supply system or appropriated from the groundwater system to be used for these purposes.

4. Describe the technical aspects of the feasibility study and why your approach is appropriate for accomplishing the specific study goals and objectives.

We have conducted initial research to identify the general parameters and uncover any fatal flaws of the project. Results indicate this approach to stormwater ASR re-use is promising, but site-specific data, including data collected during pilot testing of the approach, and additional analysis are needed to fully assess its feasibility. This study is designed to provide all of the needed information so that the feasibility of stormwater ASR at the study site, and potentially in other areas, can be confirmed. The specific technical aspects of the study approach are described below.

a. Collection of site-specific stormwater quantity and quality data. For stormwater ASR to be feasible at the project site, the stormwater must meet applicable water quality standards, sufficient stormwater must be available for recharge, and the receiving well must be able to accommodate the rate of stormwater recharge. The following data will be collected to confirm that these criteria will be met:

a.(i).Water quality data. Stormwater to be used to recharge ASR is anticipated to meet applicable water quality standards, based on a review of representative residential stormwater data. However, collection of site-specific stormwater quality data is needed to characterize concentrations of potential pollutants to confirm that stormwater recharge will not adversely affect native groundwater quality and beneficial uses of the CRBG aquifer. Stormwater discharge from the Sterling Park Stormwater Quality Basin will be sampled and analyzed for all drinking water regulated constituents, including microbiological analysis. Results will be compared to EPA MCLs and also will be used as input for site-specific groundwater fate and transport modeling (see below). Additionally, an evaluation of microbiological inactivation within the CRBG aquifer, using the onsite monitoring well to collect samples during pilot testing (actual recharge testing), will be conducted. However, as noted, stored water recovered at ASR 3 is planned for nonpotable use, including irrigation and possibly streamflow enhancement, and does not have specific water quality requirements.

a.(ii).Mixing study. Mixing stormwater runoff with native groundwater has the potential to result in precipitation of constituents that could lead to clogging of the well. A chemical modeling study will be conducted to assess mixing of stormwater and native groundwater, and ensure that the two waters are compatible and will not result in clogging of ASR 3 or other unintended chemical reactions.

a.(iii).Stormwater flow rate and volume. Previous estimates of the rate and volume of stormwater, along with existing hydrogeologic data for ASR 3, indicate ASR 3 is capable of storing most, if not all, of the estimated stormwater discharging to the Sterling Park Stormwater Quality Basin. During the feasibility study, stormwater flow from the stormwater quality basin outfalls will be measured to confirm stormwater rates and volumes.

b. Groundwater fate and transport modeling to assess the potential for migration of recharged stormwater. Groundwater fate and transport modeling will be conducted to confirm that the stormwater ASR project will not adversely affect the aquifer or other wells. The modeling will be conducted using existing hydrogeologic

information available from multiple aquifer tests that have been completed in ASR 3, along with the stormwater quality data that will be collected during the feasibility study. DEQ is familiar with these stormwater data and the applicability of the modeling proposed.

c. Evaluation of stormwater treatment technology for suspended sediments that may clog the well during recharge. To reduce turbidity to acceptable levels and avoid clogging of ASR 3, options will be identified and evaluated for pre-treating the stormwater. Evaluation of the pretreatment options will take into account effectiveness, maintenance, and cost considerations.

d. Detailed and site-specific regulatory and permitting assessment. A preliminary review of applicable DEQ water quality regulations and permits, and OWRD ASR regulations indicates the existing regulatory framework provides a structure and process for permitting and operating a stormwater ASR system. Specifically, the project is anticipated to require ASR-specific permitting, a state Water Pollution Control Facilities (WPCF) permit (i.e., UIC permit), and a Municipal Separate Storm Sewer System/National Pollutant Discharge Elimination System (MS4/NPDES) permit (to discharge stored stormwater to surface water for streamflow augmentation or temperature mitigation). A more detailed feasibility evaluation is needed, based on site-specific data (e.g., stormwater quality and hydrogeologic assessment), to confirm that the project will meet all applicable criteria to receive and comply with state ASR and UIC permitting requirements.

e. Development of an implementation plan, including cost estimate. After the feasibility of the project has been determined, on the basis of the above study elements, a project implementation plan will be completed. The plan elements are: (1) a preliminary engineering pre-design that includes stormwater collection, treatment, and conveyance to the ASR 3 wellhead, and completing ASR 3 as an irrigation well; (2) a project construction timeline; and (3) a cost estimate for the stormwater recharge project.

5. Describe how the feasibility study will be performed. Include:
    a. General summary statement that describes the study progression.
    b. When the feasibility study will begin.
    c. Listing of key tasks to be accomplished with each task having:
        i. Title
        ii. Timeline for completion
        iii. Description of the activities to be performed in this key task
        iv. Description of the resources necessary for accomplishing the key task

    Example:

    (i) Streamflow measurement;
    (ii) September-April;
    (iii) Weekly streamflow measurements will be performed to gather hydrographic data for the hydrologic analysis to take place in May;
    (iv) A technician will be hired to perform the streamflow measurements.

    (Key tasks listed here are to be placed in <u>Section VI. Project Feasibility Study Schedule</u> for a quick reference "graphical" representation of the schedule.)

a) The first part of the study will include additional and critical data collection (e.g., stormwater sampling and collection of stormwater flow data). Groundwater fate and transport modeling will be conducted using the stormwater analytical results. Options for stormwater treatment will be evaluated and a conceptual treatment design developed. After these aspects of the study are completed, the site-specific regulatory feasibility assessment will be completed, followed by development of an implementation plan and project costing.

b) The feasibility study will begin immediately upon receipt of grant funds, which is anticipated in July 2016.

c) The key tasks to be accomplished and schedule are listed below:

i. Task 1: Collection and analysis of site-specific data
ii. July 2016 to April 2017
iii. We will collect stormwater quality data and complete analysis, which includes the following: (1) Preparing a sampling and analysis plan (SAP). We anticipate that the SAP will include sampling of 6 storm events, with 2 to 3 samples collected per event, for a total of 10 to 15 samples. The samples will be submitted to a laboratory to complete analysis ranging from microbiological/particulate analysis to full-suite drinking water quality analysis. (2) Completing a chemical modeling mixing analysis of stormwater and native groundwater. Additionally, we will collect stormwater quantity (flow rate and volume) information, which is anticipated to be completed by installation and monitoring with automated flow measurement on stormwater outfalls into the Sterling Park Stormwater Quality Basin. We also will complete groundwater modeling to assess anticipated groundwater flow direction, fate and transport based on stormwater quality data, and time of travel estimates.
iv. Water resources professionals (identified in question #10) will be contracted to collect the stormwater samples and flow data, and perform the mixing analysis and groundwater fate and transport modeling. An analytical laboratory will be contracted to conduct the chemical analysis.

i. Task 2: Stormwater treatment evaluation/conceptual design
ii. January 2017 to August 2017
iii. Options for pretreatment of the stormwater to reduce turbidity to acceptable levels to avoid clogging of ASR 3 will be identified and evaluated, and a conceptual design developed. Other treatment options will be assessed on the basis of site-specific water quality data.
iv. Water resources professionals (identified in question #10) will evaluate potential pretreatment and treatment options.

i. Task 3: Regulatory assessment
ii. October 2016 to March 2017
iii. We will assess the site-specific feasibility for receiving and complying with state ASR, UIC, and MS4 permits.
iv. Water resources professionals will conduct a regulatory assessment.

i. Task 4: Project implementation plan and project costing
ii. April 2017 to August 2017
iii. We will develop a plan specifying the steps to implement the stormwater ASR project, and complete a Class 4 level cost estimate for project costing.
iv. Water resources professionals will prepare the implementation plan and cost estimate for the project.

i. Task 5: Project management, deliverables, and administration
ii. July 2016 to August 2017
iii. A report presenting results of the feasibility study will prepared at the end of the study. Project team meetings (consultant team, Clean Water Services, and City of Beaverton) will occur at key junctures during implementation of the project.
iv. Water resources professionals will prepare the feasibility study report and conduct project meetings.

6. Please provide the following data and information for the proposed project and the project's sources of water supply:

a. The location of the proposed project. Include the basin, county, township, range and section. Attach a **map** that identifies the project's implementation area to this application.

The project is located in Beaverton, Oregon, within the Tualatin River Basin, in Washington County, within Township 2 South, Range 1 West, Section 5, near the intersection of SW Loon Drive and SW Scholls Ferry Road. The target site for the stormwater ASR feasibility study is referred to as ASR 3 (State Well ID: WASH 57952), and is owned and operated by the City of Beaverton. ASR 3 was selected for this project because it has the basic elements that are needed for a detailed feasibility study, including a pilot study that would be anticipated to follow the feasibility study proposed in this grant application. Importantly, the ASR 3 site includes (1) a deep well that is not currently in use (and, therefore, is available as a point for stormwater injection), (2) a nearby small-diameter monitoring well (State Well ID: WASH 55816) that could be used for data collection during a pilot study, and (3) an onsite stormwater quality pond that receives runoff from residential neighborhoods and for which existing outfalls could easily be routed to ASR 3. Also, ASR 3 is located in a designated Critical Groundwater Area, where additional sources of groundwater recharge would prove especially beneficial. Additionally, the City intends to use ASR 3 as an irrigation well for planned nearby development and is interested in evaluating the use of retrieved stormwater recharge for irrigation purposes as an alternative to using instream flows. Finally, Summer Creek, located near the ASR 3 site, also could be used as a discharge point of stored stormwater to help mitigate summertime stream temperatures. The attached map shows the location of the project, including the stormwater drainage area, stormwater quality basin, and recharge well (ASR 3).

b. The name(s) and river mile(s) of the source water and what they are tributary to, if applicable.

Not applicable; the source water is stormwater runoff from impervious areas, not a river or other Water of the State.

c. Whether the project will be off-channel or on-channel (for above-ground storage only).

Not applicable; the source water is stormwater runoff from impervious areas.

d. Water availability to meet project storage. For above-ground storage the Department typically evaluates availability using a 50 percent exceedance water availability analysis.

The estimated annual stormwater flow available for recharge at the ASR 3 site is up to 29 million gallons from two subbasins that discharge to the Sterling Park Quality Basin. The low range is about 17 million gallons available for recharge. These totals are for the recharge season from November through March.

e. Proposed purposes and/or uses of conserved or stored water.

Stored stormwater would be recovered from ASR 3 for beneficial uses. Currently, the proposed ASR 3 stormwater recharge project proposes that the recovered water would be used for nonpotable uses. Potential identified uses include irrigation (nearby schools, residential parking strips, and ponds) and possibly streamflow enhancement and temperature mitigation into nearby Summer Creek.

f. Environmental flow needs and water quality requirements of supply source water bodies.

Not applicable; as noted, the source water is stormwater runoff from residential impervious areas, and stored water recovered at ASR 3 is planned for nonpotable use, including irrigation and possibly streamflow enhancement and temperature mitigation, and does not have specific water quality requirements. However, the aquifer in which ASR 3 is completed and that would be used for stormwater storage is considered a drinking water aquifer. Stormwater recharge into this aquifer would be designed to protect the highest beneficial uses of the aquifer, which is drinking water. Based on a review of representative stormwater data from extensive databases, it is not anticipated that concentrations of pollutants in the stormwater from the Sterling Park Quality Basin will exceed one-half of the MCLs. In addition, it is anticipated that any microbiological constituents present in stormwater would be attenuated within approximately 150 feet of ASR 3 and would meet drinking water requirements if stored water migrated beyond a distance of 150 feet from ASR 3. Based on an assessment of potential receptors, no water wells are located within 150 feet of ASR 3. The nearest domestic well that could constitute a receptor is more than 1,000 feet from this site and it is unknown if this well is used. Pathogens are unlikely to be present in stormwater based on available data and the risk of impacting nearby wells is likely extremely low, but additional assessment of any potential risk is proposed in this grant application. Finally, temperature data indicate that wintertime stormwater used for recharge typically will range from 6.4 to 9.6°C. This cool water could be recovered during the summertime and used to mitigate the temperature in Summer Creek and provide streamflow enhancement.

7. What local, state or federal project permitting requirements/issues/approvals do you anticipate in order for the feasibility study to be conducted? If approvals are required, indicate whether you have obtained them. If you have not obtained the necessary permits/governmental approval, describe the steps you have taken to obtain them. If no permits are needed, please provide explanation.

   None of the feasibility study tasks have been identified as requiring permits or approvals, or as raising significant local, state, or federal issues. As discussed in Question 5, the key tasks to be accomplished in the feasibility study are:

   i. Collection and analysis of site-specific stormwater quality and quantity data

   ii. Stormwater treatment evaluation/conceptual design

   iii. Regulatory assessment

   iv. Project implementation plan and project costing

   v. Project management, deliverables, and administration

   If feasible, regulatory and permitting requirements are anticipated for implementation of this project (and discussed later in this application). The City of Beaverton, owner of ASR 3 and the surrounding property, approves of the study and future use of ASR 3 for this project (please see the attached letter of support).

8. Describe the level of involvement, interest and/or commitment of local entities associated with the feasibility study. Describe how the feasibility study and/or proposed project will benefit/impact these entities. Attach letters of support if available.

The local entities most closely associated with this project are Clean Water Services and the City of Beaverton. As documented in the attached letters of support, both of these entities have committed to support this project by providing matching funds (Clean Water Services) and making the land available for the project (i.e., the City's Sterling Park Stormwater Quality Basin, and City-owned land on which ASR 3 is located and the proposed stormwater ASR infrastructure would be constructed). In addition, other entities that could benefit through evaluation and potential future implementation of stormwater ASR have expressed support for this project. Letters of support from these entities (City of Beaverton, Tualatin River Keepers, and Clackamas County Water Environment Services) also are attached to this application.

9. Identify when matching funds will be secured, from whom, and the dates of matching funds availability.
   Clean Water Services has committed to matching the funds awarded under this Water Conservation, Reuse and Storage Feasibility Study Grant to support this project. Half of the matching funds will be made available immediately upon award of the grant by OWRD and the remaining half will be made available in July, 2017.

10. Provide a description of the relevant professional qualifications and/or experience of the person(s) that will play key roles in performing the feasibility study. If the personnel have not been decided upon, include a description of the professional qualifications and/or experience of the person(s) you anticipate will play key roles in performing the feasibility study.

    GSI Water Solutions, Inc. (GSI), a specialized consulting firm that provides innovative solutions for groundwater, environmental contamination, and water resource challenges, will conduct a signficant portion of the work described in this feasibility study. Experienced GSI team members will coordinate with technical staff members from the City of Beaverton that lead the City's existing ASR and stormwater programs and will also work with CWS technical staff members that lead CWS's stormwater and watershed programs.

Key CWS personnel who will be involved in the project are:

Jadene Stensland, PE CSM – Water Resources Program Senior Engineer, Clean Water Services

Jadene is a senior engineer and an APWA-certified stormwater manager at Clean Water Services. She has 20 years of professional experience in municipal engineering, including prior work experience as the utilities engineer in Newberg, Oregon, and deputy city engineer in Wilsonville, Oregon. She has a master's degree in bioresource engineering with a minor in civil engineering from Oregon State University and a bachelor's degree in environmental engineering from California Polytechnic State University—San Luis Obispo. Additionally, she holds Operator Level 3 certifications in water and wastewater treatment and conveyance. She received Portland State University's River Restoration Certificate in 2011.

John Dummer, PE, CWRE – Watershed Management Principal Engineer, Clean Water Services

John is a principal engineer in the Watershed Management Department at Clean Water Services, where his responsibilities include implementation of water resources-related projects, including the Fernhill Natural Treatment System and the District's Long-Term Water Supply Plan. With a background that

includes engineering studies, design, and construction, John brings enthusiasm tempered by practical experience his project teams. He has been involved with many planning efforts, including stormwater computer modeling, bridge scour assessments, and fish passage evaluations. He has undertaken design assignments such as hydraulic design and general civil design for water treatment plants, pipelines, stormwater facilities, gravity sewers, fish ladders, and stream bank restoration projects. John also has served as a design team member or leader for preparation of plans, specifications and cost estimates. He has experience with many construction-related activities, such as field inspection, construction contract administration, working with contractors to resolve field issues, field layout, and organizing and managing work crews. John is a registered civil engineer (51005PE) and a certified water right examiner (51005CWRE) in the State of Oregon, and he has experience assisting with the OWRD permitting processes. He holds bachelor's and master's degrees in civil engineering from Oregon State University.

Key GSI personnel who will be involved with the project are:

Jason Melady, RG, CWRE – Senior Hydrogeologist

Jason has 14 years of experience in planning and executing hydrogeologic investigations in CRBG aquifers and is an expert in completing feasibility assessments and providing operational support for ASR systems. Jason has worked with the City of Beaverton on its ASR system since 2001, as well as ASR projects with the Tualatin Valley Water District, City of Tigard, City of Tualatin, and JWC. Additionally, he has provided support for ASR projects in the Umatilla Basin, City of Baker City, and South Korea, and has worked on project teams evaluating ASR projects for streamflow enhancement in the Catherine Creek and Upper Grande Ronde watersheds. Jason is a registered geologist (G1996) and a certified water right examiner (79557) in the State of Oregon and has extensive experience assisting clients with the OWRD permitting processes.

Rod Struck, RG – Principal Hydrogeologist

Rod has 30 years of experience managing water and environmental projects. His expertise in stormwater contaminants stems from his experience overseeing stormwater contamination source control and environmental cleanup, first with DEQ, then with the City of Portland (City), and currently with GSI. While at DEQ, Rod prepared the DEQ Cleanup Program's Framework for Portland Harbor Stormwater Screening Evaluations (2005) and the DEQ/ EPA Joint Source Control Strategy for Portland Harbor. Rod managed three elements of the City's stormwater UIC Program including: stormwater monitoring; UIC permit compliance; and a $10 million Capital Improvement Project (CIP) to evaluate, select, and implement stormwater solutions for noncompliant City-owned UICs. While at the City, Rod directed the development of the Groundwater Protectiveness Demonstration Framework to allow consistent, streamlined evaluations and decisions regarding potential adverse impacts to groundwater associated with the discharge of stormwater to UICs. He applied this framework to obtain

more than 500 No Further Action determinations from DEQ for noncompliant City UICs. This work and the City's stormwater data were used by DEQ and other municipalities to develop and negotiate a science-based statewide UIC permit template.

Rod continues to work on source control measures and environmental projects at GSI. His expertise includes strategic and innovative solutions to complex environmental issues; negotiations with regulatory agencies; collecting and evaluating soil, groundwater, sediment, and stormwater data; assessing contaminant fate and transport; and selecting and implementing remedial actions. He is knowledgeable and experienced in interpreting and applying local, state, and federal environmental regulations and has excellent working relationships with regulatory agencies.

Randy Pratt, PE – Principal Environmental/Civil Engineer

Randy has 31 years of experience in site evaluation, environmental remediation, groundwater investigation, and civil engineering. He has served as a project manager for numerous environmental evaluation and remediation projects. Randy conducts scoping and planning for environmental and civil engineering projects, conducts senior project reviews, and prepares reports, plans, and specifications. His engineering expertise has been applied to stormwater system evaluations and treatment, and environmental site cleanup work. Stormwater projects have included infiltration system designs, contaminant source evaluations, Tier II corrective measures reporting, and site-wide as well as targeted treatment media installations. His environmental cleanup work has includes remedial excavation, ex situ soil treatment and injection/extraction of groundwater and treatment fluids as part of soil and groundwater cleanup. Randy has provided civil and geotechnical engineering services on numerous projects throughout his career. These include deep foundations design and construction for docks, bridges and buildings, dam safety and rehabilitation, slope stability evaluations and repairs, excavation stability design and implementation, structure settlement evaluations and repairs, compacted soil and geosynthetic liner design and installation, and infiltration basin design and construction.

11. If the project concept is ultimately deemed feasible, describe how the project will be implemented. Response should include a tentative funding plan for project implementation (e.g. other state or federally sponsored grant or loan programs) and the project proponent's track record in implementing similar projects.

    Presuming overall feasibility of the project concept, additional tasks necessary to implement the project are anticipated to include the following:

- *Project permitting for pilot testing with OWRD for ASR and with DEQ for UIC*
- *Engineering design and construction of necessary stormwater pre-treatment based on conceptual design completed as part of the feasibility study proposed in this grant application*
- *Design and construction of stormwater conveyance from the existing system to the ASR wellhead*
- *Design and construction of wellhead improvements necessary for aquifer recharge*

Funding to complete implementation tasks is anticipated to be derived from contributions provided by Clean Water Services with matching funds from OWRD's Water Supply Development Account (SB 839). Clean Water

Services and the project partner, the City of Beaverton, have a strong track record in planning and developing progressive and ecologically sound projects, such as the project proposed in this grant application. Specifically, Clean Water Services has evaluated and implemented numerous streamflow enhancement and flow augmentation projects, wetland improvement projects, and water reuse projects throughout the Tualatin River Watershed. The City of Beaverton has planned and implemented numerous ASR feasibility studies, ASR well construction and testing projects, and ASR pump station design and construction projects, both independently and in partnerships with the City of Hillsboro, Tualatin Valley Water District, and JWC.

Section B. Unique Criteria

Instructions: Address the set of items below that applies to the type of feasibility study that this grant will fund.

☐ Water Conservation or ☒ Reuse

1. Water Conservation or Reuse projects that are identified by the Department in a statewide water assessment and inventory receive a preference in the scoring process. Contact the Department's Grant Specialist to include your project on the inventory.

This project was submitted for the statewide water assessment and inventory list on January 21, 2016. The inventory form is also attached to this application.

2. Explain how the associated project will either: (a) mitigate the need to develop new water supplies and/or (b) use water more efficiently. Reference documentation and/or examples of the success of similar or comparable water conservation/reuse projects that would be available upon request.

   If results of the study indicate stormwater ASR is feasible at this location, this project will mitigate the need to develop new water supplies to meet the growing demand and result in the more efficient use of existing potable water sources (surface water) by reusing stored wintertime stormwater runoff from urban impervious areas for irrigation during summer months. This approach will reduce use of potable municipal water derived from the Tualatin River for irrigation by using stormwater that otherwise would discharge to the river during winter months, when such discharges are less beneficial (and/or capable of detrimental hydromodification of the stream channel).

3. Provide a description of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area. If permitting or other approvals are not needed please indicate and provide an explanation.

   (a) Anticipated regulatory and permitting requirements for this project before implementation are described below. Part of the feasibility study will be conducting a detailed, site-specific, feasibility evaluation to confirm that the project will meet all applicable criteria to receive and comply with the required permits. No permits will be required for the work proposed in this grant application.

   Future Permitting Requirements
   Although the work proposed in this grant application does not require specific permitting, future work will required permits from state agencies. ASR is administered by OWRD in consultation with DEQ and the Oregon Health Authority. OWRD's rules governing ASR are described in Oregon Administrative Rules (OAR) 690-350-0010. General requirements include authorization of recharge source water, typically through a water right; recharge source water quality requirements; and hydrogeologic assessments necessary to evaluate the viability of a proposed project and the potential for injury to other groundwater users.

Authorization of recharge source water for this project is different than most ASR projects because OWRD does not require a water right for use of stormwater, which is defined as "precipitation collected from an artificial impervious surface" under Oregon Revised Statute (ORS) 537.141 (h). Water quality requirements for source water for ASR projects are based on drinking water quality standards that reference EPA MCLs. Specifically, allowable concentrations are limited to one-half the MCL for most constituents, with the exception of analytes with a secondary maximum contaminant limits (SMCL) and disinfection by-products, which allow recharge water with concentrations up to the MCL contaminant limit. Microbiological constituents in recharge source water also are regulated on the basis of drinking water requirements of 4-log inactivation.

Federal and state rules prohibit the construction, operation, maintenance, conversion, plugging, or abandonment of any type of injection system or activity that would allow the direct or indirect movement of contaminated fluids into groundwater if the presence of the contamination exceeds Safe Drinking Water Act (SDWA) MCLs or fails to comply with the Groundwater Act requirements in OAR 340-040. The Groundwater Act requires discharges to meet existing background water quality at the site.

Before operating the proposed system, DEQ would require the owner/operators of the injection system to register the injection system and gain written DEQ approval to operate either by qualifying as a rule-authorized UIC or applying for a state UIC permit.

Given the characteristics of ASR 3, DEQ is expected to require a WPCF permit to manage the use of stormwater for aquifer recharge. The proposed recharge system would be regulated under DEQ's UIC rules. (Note: An underground injection system places fluids—mainly stormwater, but also septic effluent, treated drinking water, and other fluids—below the ground.) DEQ regulates the UIC Program under OAR Chapter 340, Division 44; these rules regulate groundwater as a potential source of drinking water. Under these rules, DEQ can require owners to add pre-treatment, sample and monitor, acquire a permit, or close a system to prevent groundwater contamination. Depending on the number of UICs owned and operated by Clean Water Services or the City of Beaverton and the level of risk they pose, there are two permit options: Individual Permit or General Permit. Permit requirements are similar for high-risk UICs, with the General Permit having fewer requirements for lower-risk UICs.

Additionally, if the stored stormwater is withdrawn and discharged to Summer Creek, this discharge likely would fall under Clean Water Services' MS4/NPDES permit. Significant water quality differences between stormwater already discharging to Summer Creek (and authorized under Clean Water Services' existing MS4/NPDES permit) and recovered stormwater are not anticipated, based on observations at other municipal ASR systems, but we recommend assessing recovered stormwater during pilot testing to confirm it meets existing MS4/NPDES permit requirements.

(b)Property Ownership
The City of Beaverton owns the land where all project components are located.

☐ Above-Ground Storage

Please answer the following three questions **BEFORE** proceeding:

Will the project divert more than 500 acre-feet of surface water annually?	☐ Yes	☐ No
Will the project impound surface water on a perennial stream?	☐ Yes	☐ No
Will the project divert water from a stream that supports sensitive, threatened or endangered species?	☐ Yes	☐ No

If you answered "Yes" to any of these questions, by signature on this application, you are committing to include the following required elements in your feasibility study.

Describe how you intend to address the required elements in your feasibility study:

a) Analyses of by-pass, optimum peak, flushing and other ecological flows of the affected stream and the impact of the storage project on those flows.

b) Comparative analyses of alternative means of supplying water, including but not limited to the costs and benefits of water conservation and efficiency alternatives and the extent to which long-term water supply needs may be met using those alternatives.

c) Analyses of environmental harm or impacts from the proposed storage project.

d) Evaluation of the need for and feasibility of using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life and any other ecological values.

Is the proposed storage project for municipal use?

☐ Yes ☐ No

If "Yes," then please describe how you intend to address the following required element in your feasibility study:

e) For a proposed storage project that is for municipal use, analysis of local and regional water demand and the proposed storage project's relationship to existing and planned water supply projects.

Proceed in addressing the following items:

1. Describe to what extent the project associated with the feasibility study includes provisions for using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life or other ecological values. Projects that include the above provisions receive preference in the scoring process.

2. Provide a review of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area.

☐ Storage Other Than Above-Ground [Including Aquifer Storage and Recovery (ASR)]

Please answer the following three questions **BEFORE** proceeding:

Will the project divert more than 500 acre-feet of surface water annually?	☐ Yes	☒ No
Will the project impound surface water on a perennial stream?	☐ Yes	☒ No
Will the project divert water from a stream that supports sensitive, threatened or endangered species?	☐ Yes	☒ No

If you answered "Yes" to any of these questions, by signature on this application, you are committing to include the following required elements in your feasibility *study.*

Describe how you intend to address the required elements in your feasibility study:

a) Analyses of by-pass, optimum peak, flushing and other ecological flows of the affected stream and the impact of the storage project on those flows.

b) Comparative analyses of alternative means of supplying water, including but not limited to the costs and benefits of water conservation and efficiency alternatives and the extent to which long-term water supply needs may be met using those alternatives.

c) Analyses of environmental harm or impacts from the proposed storage project.

d) Evaluation of the need for and feasibility of using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life and any other ecological values.

Is the proposed storage project for municipal use?

☐ Yes ☐ No

If "Yes," then please describe how you intend to address the following required element in your feasibility study:

e) For a proposed storage project that is for municipal use, analysis of local and regional water demand and the proposed storage project's relationship to existing and planned water supply projects.

Proceed in addressing the following items:

1. Underground storage projects that are identified by the Department in a statewide water assessment and inventory receive a preference in the scoring process. Contact the Department's Grant Specialist to include your project on the inventory.

2. Provide a review of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area.

V. Match Funding Information

Applicants must demonstrate a minimum dollar-for-dollar match based on the total funding request. The match may include a) secured funding commitment from other sources, b) pending funding commitment from other sources, and/or c) the value of in-kind labor, equipment rental, and materials essential to the feasibility study. For secured funding, you must attach a letter of support from the match funding source that specifically mentions the dollar amount shown in the "Amount/Dollar Value" column. For pending resources, documentation showing a request for the matching funds must accompany the application.

In the "type" column below matching funds may include:	**In the "status" column below matching funds may have the following status:**
• **Cash** - Cash is direct expenditures made in support of the feasibility study by the applicant or partner*.	• **Secured** - Secured funding commitments from other sources.
• **In-Kind** - The value of in-kind labor, equipment rental and materials essential to the feasibility study provided by the applicant or partner.	• **Pending** - Pending commitments of funding from other sources. In such instances, Department funding will not be released prior to securing a commitment of the funds from other sources. Pending commitments of the funding must be secured within 12 months from the date of the award.

*"Partner" means a non-governmental or governmental person or entity that has committed funding, expertise, materials, labor, or other assistance to a proposed project planning study. OAR 690-600-0010.

Match Funding Source (if in-kind, briefly describe the nature of the contribution)	**Type** (✓ One)	**Status** (✓ One)	**Amount/ Dollar Value**	**Date Match Funds Available** *(Month/Year)*
Clean Water Services	☐ cash ☒ in-kind	☒ secured ☐ pending	*$25,000*	*July 16*
Clean Water Services	☒ cash ☐ in-kind	☒ secured ☐ pending	*$25,000*	*July 17*
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		
	☐ cash ☐ in-kind	☐ secured ☐ pending		

VI. Feasibility Study Schedule

Estimated Study Duration: <u>July 1, 2016</u> to <u>August 31, 2017</u>

Place an "X" in the appropriate column to indicate when each Key Task of the project will take place.

	2016			2017				2018 & Beyond
Feasibility Study Key Tasks	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	
Task 1. - Collection and Analysis of Site Specific Stormwater Quality and Quantity Data		X	X	X	X	X		
Task 2. - Stormwater Treatment Evaluation/Conceptual Design				X	X	X		
Task 3. - Regulatory Assessment			X	X				
Task 4. - Project Implementation Plan and Project Costing					X	X		
Task 5. - Project Management, Deliverables, and Adminstration		X	X	X	X	X		

- **Please Note**: Successful grantees must include all invoices and identify which key tasks are associated with each invoice when requesting financial reimbursement.

VII. Feasibility Study Budget

Section A

Please provide an estimated line item budget for the proposed feasibility study. Examples would include: labor, materials, equipment, contractual services and administrative costs.

Line Items	Number of Units* (e.g. # of Hours)	Unit Cost (e.g. hourly rate)	In-Kind Match	Cash Match Funds	OWRD Grant Funds	Total Cost
Staff Salary/Benefits	*200*	*$100.00*	*$20,000*			*$20,000*
Contractual/Consulting	*600*	*$125.00*		*$25,000*	*$50,000*	*$75,000*
Equipment (must be approved)						
Supplies						
Other:						
Administrative Costs**	*50*	*$100.00*	*$5,000*			*$5,000*
Total for Section A			*$25,000*	*$25,000*	*$50,000*	*$100,000*
Percentage for Section A			***25%***	***25%***	***50%***	***100%***

** Note: The "Unit" should be per "hour" or "day" – not per "project" or "contract."* *Units x Unit Costs = Total Cost*
*** Administrative Costs may not exceed 10 percent of the total funding requested from the Department*

Section B

If grant amount requested is $50,000 or greater, you MUST complete Section B. Key Tasks in Section B should be the same as the Key Tasks in Section VI (Feasibility Study Schedule).

Feasibility Study Key Tasks	In-Kind Match	Cash Match Funds	OWRD Grant Funds	Total Cost
Task 1. - Collection and Analysis of Site Specific Stormwater Quality and Quantity Dataa	*$15,000*		*$30,000*	*$45,000*
Task 2. - Stormwater Treatment Evaluation/Conceptual Design	*$2,500*	*$2,500*	*$5,000*	*$10,000*
Task 3. - Regulatory Assessment	*$2,500*	*$2,500*	*$5,000*	*$10,000*
Task 4. - Project Implementation Plan and Project Costing		*$5,000*	*$5,000*	*$10,000*
Task 5. - Project Management, Deliverables, and Adminstration	*$5,000*	*$15,000*	*$5,000*	*$25,000*
Total for Section B	*$25,000*	*$25,000*	*$50,000*	*$100,000*

Totals in Section B must match the totals in Section A

APPLICATION CHECKLIST

Instructions: Use this checklist to ensure that your application is complete. An incomplete application will jeopardize your application's review. **<u>This form does not need to be included in your application packet.</u>**

General

If submitting electronically, the preferred format is either a Microsoft word or Adobe pdf

- ☒ Only one application is included with the packet (other applications must be sent separately).

Paper submissions only

- ☐ The application and attachments are on 8 ½" x 11" paper.
- ☐ The application and attachments are single-sided.
- ☐ The application and attachments are not stapled or bound.

Section I – Grant Information

- ☒ All questions in this section have been answered.
- ☒ The Grant Dollars Requested and the Total Project Cost mirror the totals shown in Section VII.

Section II – Applicant Information

- ☒ All contact information for the applicant(s) and fiscal officer is complete and current.
- ☒ The certification is signed by an authorized signer.

Section III – Feasibility Study Summary

- ☒ A brief summary, of no more than 150 words, is complete.

Section IV – Grant Specifics

- ☒ All questions in Section A have been answered.
- ☒ If the type of feasibility study is water conservation, reuse or storage other than above-ground, you have contacted the Department and requested project be added to the Oregon Water Resources Department's statewide water assessment and inventory.
- ☒ All applicable questions for the type of grant requested have been answered.

Section V – Match Funding Information

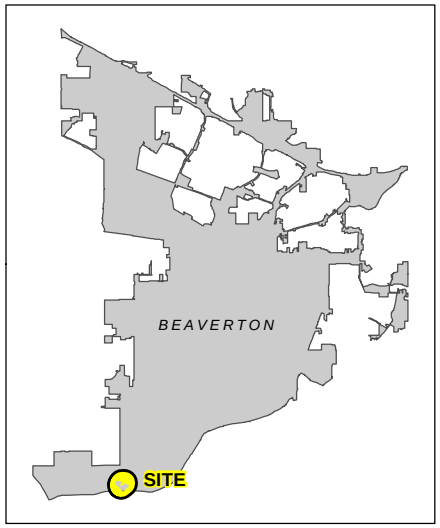
- ☒ Applicant has identified that at least 50 percent match has been sought, secured or expended.
- ☒ Letters of support are included for "secured" match funding sources.
- ☒ Documentation is included for "expended" match funds.
- ☒ Documentation is included for "pending" match funds.

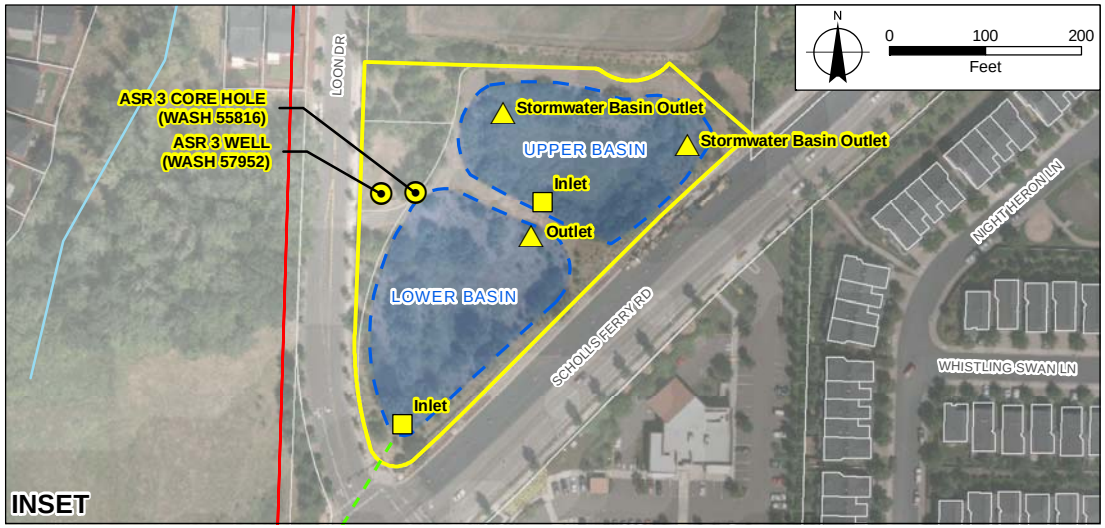
Section VI – Feasibility Study Schedule

- ☒ Estimated project duration dates have been supplied.
- ☒ All Key Tasks of the project are listed.

Section VII – Feasibility Study Budget

- ☒ Section A is complete.
- ☒ Administration costs do not exceed 10 percent of the requested OWRD Grant Funds.
- ☒ If grant amount requested is $50,000 or greater, Section B has been completed.
- ☒ All Key Tasks listed in Section B mirror the Key Tasks listed in Section VI.





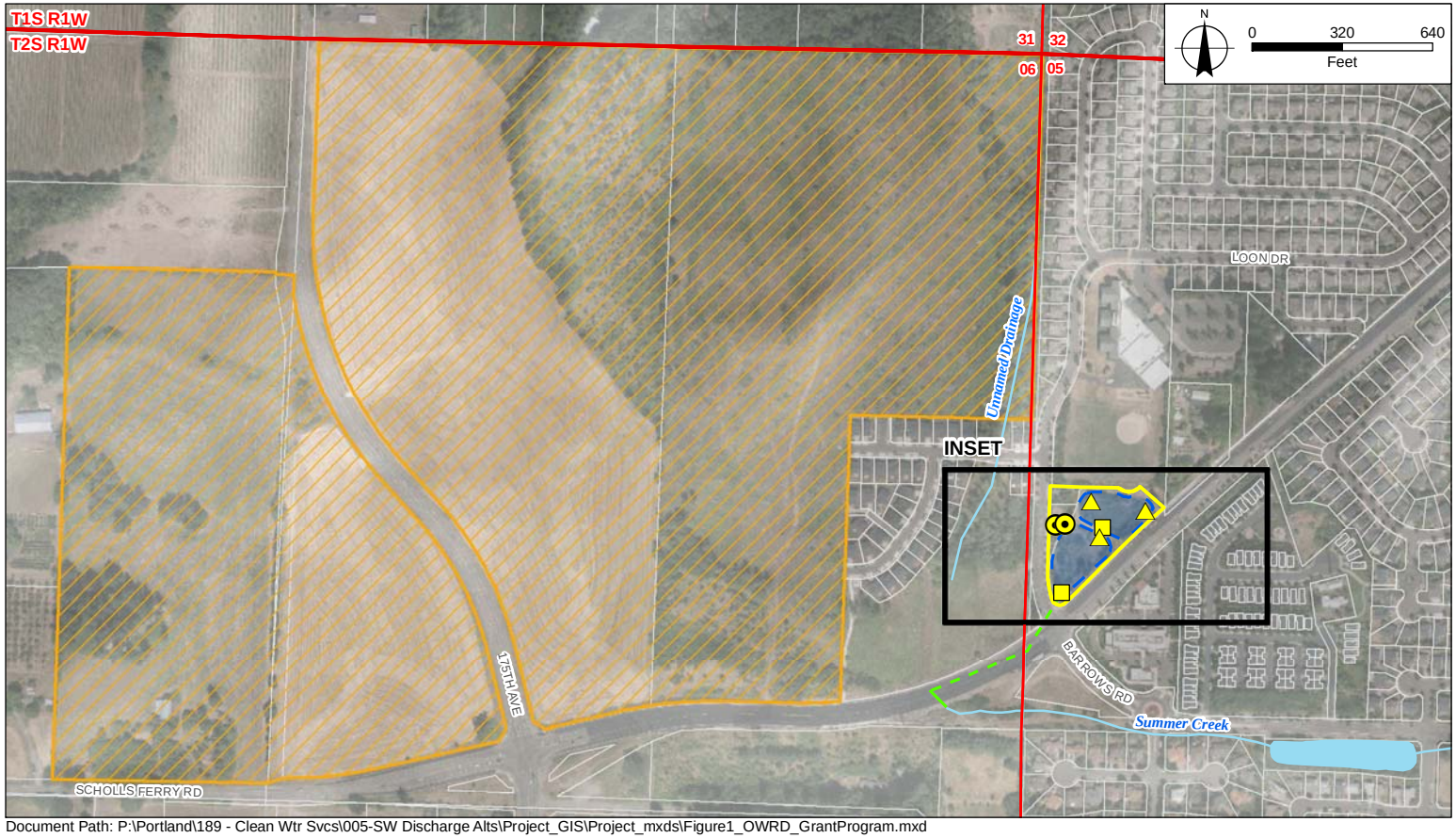


FIGURE 1

Sterling Park Stormwater Quality Basin Location Map

Oregon Water Resources Department
Water Conservation, Reuse, and
Storage Feasibility Study Grant Program

LEGEND

- ASR 3
- Outfall
- Inlet
- Site
- Stormwater Conveyance, Dashed where Inferred
- Stormwater Quality Basin
- Proposed South Cooper Mountain Development Area
- Tax Lot
- Watercourse
- Waterbody

MAP NOTES:
Date: Janaury 19, 2016
Data Sources: CWS, METRO, Aerial Photo taken Summer 2014 by COP

Document Path: P:\Portland\189 - Clean Wtr Svcs\005-SW Discharge Alts\Project_GIS\Project_mxds\Figure1_OWRD_GrantProgram.mxd

Beaverton
OREGON

January 28, 2016

Jon Unger
Grant Specialist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Re: City Support for OWRD Grant

Dear Mr. Unger, Jon

The City of Beaverton (City) would like to express its support for Clean Water Services' (CWS) application to the Oregon Water Resources Department's (OWRD) Water Conservation, Reuse and Storage Feasibility Study Grant Program for funding to evaluate the use of stormwater at our Sterling Park Stormwater Detention Facility. The City has been in discussion with CWS staff for some time about potential groundwater storage and recovery, and the City has two unused Aquifer Storage and Recovery (ASR) test wells at this site that are ideally suitable for testing if this project is determined to be feasible. The detention facility and ASR wells are all located on City owned parcels. The project concept includes the use of stored stormwater to meet non-potable demands in this growing area of the City.

The area surrounding this site, as well as other parts of Beaverton, are expected to experience significant development in the coming years and the City is interested in innovative and sustainable ways to manage stormwater and provide additional water supply to meet increasing demands. Specifically, the concept proposed by this feasibility study has the potential to diminish stormwater discharge to area streams during periods of already high flows and reallocate that water source for beneficial purposes that does not increase the City's demands for drinking water in the summertime.

If deemed feasible, we believe this unique application of managing and repurposing stormwater could be used in many other areas to better utilize our limited water resources throughout the State. In closing, we are hopeful that OWRD will support this grant application.

Sincerely,

Randy Ealy
Mayor Pro Tem

TUALATIN RIVERKEEPERS®
11675 SW Hazelbrook Road • Tualatin, Oregon 97062
phone 503-218-2580 • fax 503-218-2583
www.tualatinriverkeepers.org

January 20, 2016

Jon Unger
Grant Specialist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Dear Mr. Unger,

The purpose of this letter is to express support for an Oregon Water Resources Department's (OWRD) Water Conservation, Reuse and Storage Feasibility Study Grant application to evaluate the use of Aquifer Storage and Recovery (ASR) for management of stormwater in the Tualatin River Basin. This project is of interest to the Tualatin Riverkeepers because it has the potential to reduce the volume and rate of stormwater discharged to local streams, which in many areas of the basin are located in steep terrain that causes excessive erosion. We understand this project also is evaluating the use of stored stormwater via ASR to offset municipal demands from the river for irrigation purposes, and where recovered stormwater may also be used for streamflow enhancement. Both of these actions we believe represent a significant benefit to surface water in the watershed.

The Tualatin Riverkeepers supports the evaluation of innovative and sustainable ideas that benefit the waters of the Tualatin River Watershed and waters throughout the State. For this reason we encourage OWRD to approve this grant application. Specifically, if the results of the feasibility study are proven viable, it can be used as a unique tool to benefit stormwater management in urban watersheds.

Sincerely,

Brian Wegener

Brian Wegener
Tualatin Riverkeeper

WATER ENVIRONMENT SERVICES

Water Quality Protection
Surface Water Management
Wastewater Collection & Treatment

Gregory Geist
Director

January 28, 2016

Jon Unger, Grant Specialist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Dear Mr. Unger,

I am writing to express support for an application currently under consideration by Oregon Water Resources Department (OWRD) for a Water Conservation, Reuse and Storage Feasibility Study Grant. This "Stormwater ASR" grant will evaluate the potential to reuse stormwater collected from impervious residential streets in the winter and stored within an Aquifer Storage and Recovery (ASR) well for beneficial purposes in the summer.

We envision a number of potential benefits of stormwater storage through ASR, if determined feasible, including reducing the amount of stormwater entering surface water during high flow events, enhancing groundwater supply, providing an alternative to drinking water for non-potable uses, benefitting instream flows during summer, improving instream temperatures, and managing urban stormwater runoff. Compared to creeks in undeveloped areas, urban creeks typically have elevated and un-natural levels of water pollution and flow in winter, so diverting some stormwater runoff into a deep aquifer for future use will actually be beneficial to the creek. Urban stormwater runoff is a valuable resource. Using this resource to replenish depleted groundwater levels would be prudent as long as groundwater quality is protected. This project is an innovative idea that could be applied statewide, potentially addressing the significant issue of hydromodification faced by many stormwater management agencies and at the same time providing a range of long-term water supply benefits. We are hopeful this application is successful in securing a grant from OWRD to complete the work necessary to assess the viability of this concept.

Sincerely,

Ron Wierenga
Surface Water Manager

Serving Clackamas County, Gladstone, Happy Valley, Johnson City, Milwaukie, Oregon City, Rivergrove and West Linn.
150 Beavercreek Road, Oregon City, Oregon 97045 Telephone: (503) 742-4567 Facsimile: (503) 742-4565
www.clackamas.us/wes/

Clean Water Services

February 1, 2016

Jon Unger
Grant Specialist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Dear Mr. Unger,

This letter serves as documentation of funding security for the Sterling Park Stormwater Quality Facility Groundwater Recharge Feasibility Evaluation project. Clean Water Services has secured $25,000 in in-kind labor services and $25,000 in cash funds to support this project and is seeking matching funds of $50,000 through Oregon Water Resources Department Water Conservation, Reuse and Storage Feasibility Study Grant Program to complete the feasibility work proposed in this grant application.

Sincerely,

Jadene Stensland

Jadene Stensland, PE
Senior Engineer
Clean Water Services

2550 SW Hillsboro Highway • Hillsboro, Oregon 97123
Phone: (503) 681-3600 • Fax: (503) 681-3603 • cleanwaterservices.org

Request to be added to the Oregon Water Resources Department's

Inventory of Potential Conservation Opportunities

The purpose of this inventory is to catalogue potential conservation projects that water users themselves have identified but not yet pursued because of financial, institutional, or other barriers. For the purpose of this application, water storage other than above-ground are included as conservation opportunities and are most likely capital conservation projects.

As a water provider or user, you know your water demands and water conservation opportunities better than anyone. We would appreciate your assistance with this important data collection effort by completing this survey. Your participation will help provide the building blocks we need to begin to identify and achieve potential future water supplies. Please answer the questions as completely as possible, to the best of your ability. We appreciate your help with this important effort.

This inventory of already-identified, potential conservation projects includes both capital and programmatic projects. Capital projects are defined as one-time, large investments resulting in water savings. Examples include reclaimed water plants, reservoir covering, transmission line upgrades reducing leaks, or industrial engineering modifications to re-use process water. Programmatic projects are defined as ongoing investments resulting in water savings. Examples include facilitating upgrades to more efficient water using devices (e.g., distributing free showerheads, toilet rebates) and distribution system leak detection programs. The conservation inventory is primarily intended to include "planned" projects rather than projects that are currently being implemented. However, currently active programmatic projects may be listed if they will continue or expand in future years. The inventory of projects submitted will be compiled by county or basin.

Examples are provided below.

	Example **Capital Conservation Project**	**Example** **Programmatic Conservation Project**
Project Description Provide brief sentence	Line 3 miles of unlined ditch.	Toilet rebate program for residential customers
Estimated Future Savings Provide brief sentence, including information regarding savings seasonality.	20 acre feet of water per year	If we spend our full budget each year, we estimate 50,000 gallons of water save per year
Seasonality Indicate what part of the year savings are generated (e.g. year-round; summer only; etc.).	Peak (irrigation) season savings.	Savings should occur throughout the year.
Estimated Future Costs Provide brief sentence.	$500,000 total project costs.	$40,000 a year.
Implementation Schedule Provide brief sentence.	Not set. Have conducted cost and savings estimate, but still seeking funding.	We started the program in 2005 and plan to implement until 2015.
Project Funded? Designate either "yes", "no", or provide brief sentence if necessary	No. Pursuing grant funding.	Yes. IN our CIP through the next 5 years.

To add a project to the inventory of potential conservation opportunities, please provide the following information for each conservation project.

This is a ☒ Capital Conservation Project ☐ Programmatic Conservation Project	
Project #/Name	**Sterling Park Stormwater Quality Facility Recharge Feasibility Evaluation**
Project Description	This study will evaluate the potential to re-use stormwater collected from impervious residential roads in the winter and stored within an Aquifer Storage and Recovery (ASR) well for beneficial purposes in the summer.
Estimated Future Savings	The proposed project is anticipated to supply in excess of 14.9 million gallons of non-potable water demand.
Seasonality	Water savings will be stored for re-use in the summer.
Estimated Future Costs	The total feasibility study cost is $100,000. The total cost for project implementation will be prepared as part of the feasibility study.
Implementation Schedule	The feasibility study can begin as soon as grant funding is received, and is expected to be completed by August 31, 2017.
What are the barriers to implementation, e.g. funding?	Clean Water Services will provide $50,000 of the feasibility study cost. Funding for the remaining $50,000 is requested in this grant application.
This is a ☐ Capital Conservation Project ☐ Programmatic Conservation Project	
Project #/Name	
Project Description	
Estimated Future Savings	
Seasonality	
Estimated Future Costs	
Implementation Schedule	
What are the barriers to implementation, e.g. funding?	

- Include this form with your application -