DEPARTMENT OF ECOLOGY
State of Washington

Addendum to Quality Assurance Project Plan

City of Othello ASR Phase II Pilot Testing

Aspect CONSULTING

EIM Study ID: WROCR-VER1-00005
Aspect Project No. 140207
Publication 23-12-009

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Contact Information

The authors for this QAPP addendum can be contacted as follows:

- Andrew Austreng, LHG, Aspect Consulting, (206) 838-5843, aaustreng@aspectconsulting.com
- Tim Flynn, LHG, Aspect Consulting, (206) 780-7730, tflynn@aspectconsulting.com

For more information contact:

Office of Columbia River

Scott Tarbutton
QAPP Coordinator – Office of Columbia River | Washington State Department of Ecology
4601 N Monroe Street
Spokane, WA 99205
Phone: 509-867-6534

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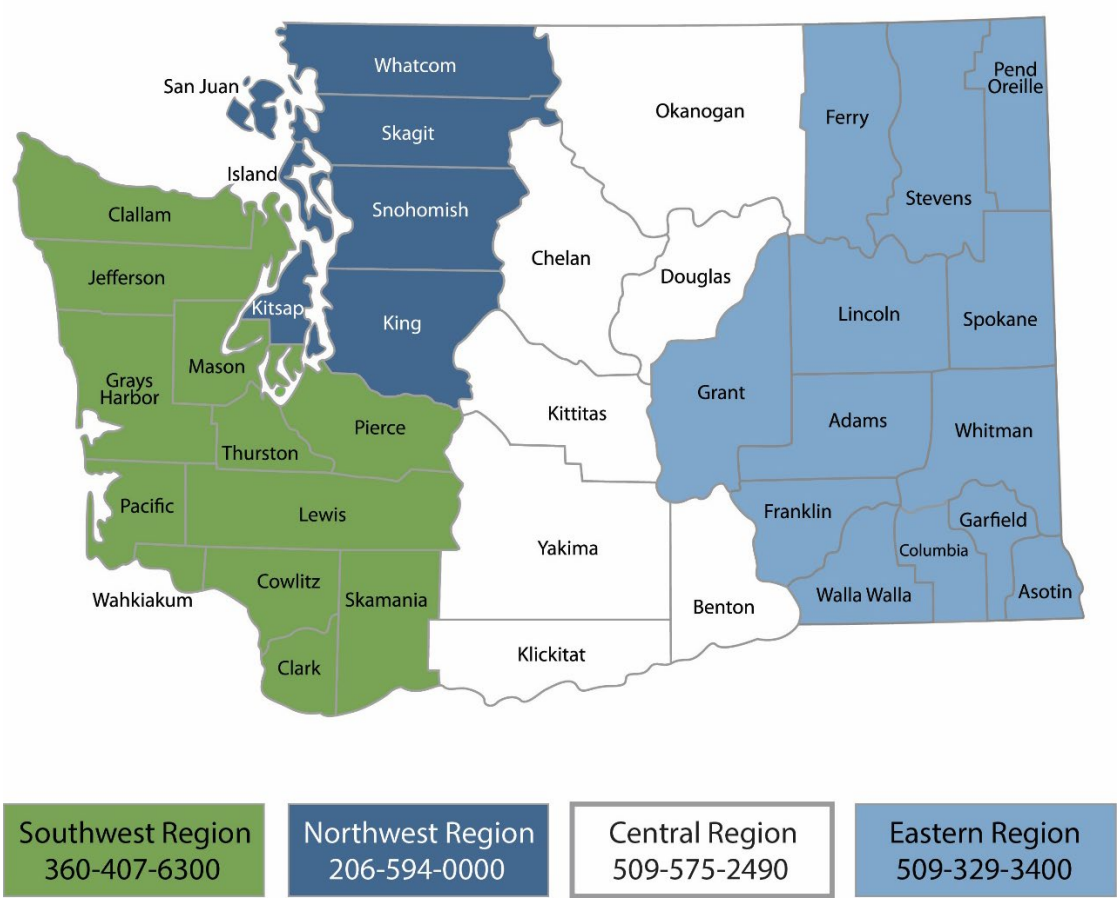
Department of Ecology's Regional Offices

Map of Counties Served



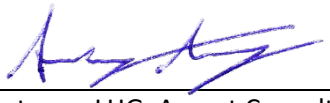
Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

Addendum to
Quality Assurance Project Plan

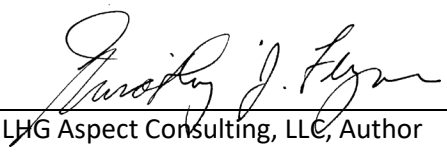
City of Othello ASR Phase II Pilot Testing

April 2023

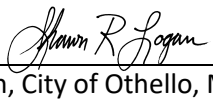
Approved by:

Signature:  Date: April 19, 2023

Andrew Austreng, LHG, Aspect Consulting, LLC, Author

Signature:  Date: April 19, 2023

Tim Flynn, LHG Aspect Consulting, LLC, Author

Signature:  Date: April 19, 2023

Shawn Logan, City of Othello, Mayor

Signature:  Date: April 20, 2023

Scott Tarbutton, LHG, Office of Columbia River, Project Manager and
Quality Assurance Coordinator

1.0 Table of Contents

Chapters

Tables

Note: The numbered headings in this document correspond to the headings in the original QAPP. Only relevant sections are included here; therefore, some numbered headings may be missing.

4.4 Tasks Required

All tasks from the original project QAPP will be retained. This addendum addresses a change to *Project Task 5: Conduct Test* as follows:

Task 5.5: The recovery phase of the test will occur approximately two years after the beginning of the recharge phase (see Section 5.4 for project schedule). The volume of water recharged under Project Task 5.2 will not be recovered. The recovery phase will consist of operating the City's Well No. 8 as described in Section 8.2.4, with discharge water directed to an adjacent infiltration ("pump-to-waste") pond. Water quality will be monitored as described in Section 7.2.1. Operation and withdrawal from Well No. 8 will be under existing City water rights.

5.4 Proposed Project Schedule

The final five rows of Table 3 have been changed under this addendum, as presented below.

Table 3. Tentative Schedule

Task	Completion Date	Note
Treatment System Design	Dec 2020	Completed by Aspect and Murraysmith, (not covered by OCR grant)
Water Service Contract Application	Dec 2020	Application completed in coordination with Reclamation and ECBID and is expected to be issued in March 2021
Submit Application for Temporary Reservoir Permit	March 2021	To be prepared in coordination with Ecology
Final QAPP	March 2021	Draft to be submitted to Ecology in February
City Well No. 8 Assessment	March/April 2021	--
Treatment System Lease and installation	April 2021	--
Construct Temporary Diversion	April 2021	Design will be approved in advance by ECBID
Shakedown Test	April/May 2021	--
Begin Recharge	May 2021	--
Begin Storage	October 2021	Storage begins near the end of the 2021 irrigation season when source water no longer available.
Begin Recovery	May 2023	Anticipate six months storage period (minimum of four months prior to recovery to meet City demand
Submit Draft Report	August 2023	--
Database uploaded to EIM	July 2023	--
Receive Ecology Comments	September / October 2023	--
Complete Final Report	November 2023	Following receipt and discussion of Ecology comments on the draft report.

7.2.1 Sampling Locations and Frequency

Changes to the water quality sampling schedule are limited to the *Recovery* phase of the test, as presented in revised Table 6 below.

Table 6. Water Quality Sampling Schedule

Test Phase	Weeks after Start of Test	Weeks after Start of Test Phase	*Sample Locations[1] and Analytical Suites*													
			EL-68 Raw Source Water				Treated Recharge Water					City Well No. 8 Wellhead				
			Gen Chem	SVOC[2]	Herb & Pest	Bact.	Gen Chem	SVOC[2]	Herb & Pest	Bact.	Rads	Gen Chem	SVOC[2]	Herb & Pest	Bact.	Rads
Pretest[3]	0	0	X	X	X	X	X	X	X	X	X[4]	X	X	X	X	X[4]
Recharge	0	0					X			X						
	1	1														
	2	2	X				X			X						
	3	3														
	4	4	X			X	X	X	X	X						
	6	6														
	8	8	X				X			X						
	10	10														
	12	12														
	14	14	X			X	X		X	X						
	16	16														
	18	18														
	20	20	X				X									
	24	24														
	26	26	X		X	X	X	X	X	X						
Storage	30	4										X	X[5]	X[5]	X	
	32	6										X				
	34	8										X				
	38	12										X			X	
	42	16										X				
	46	20										X			X	
	50	24										X				
	54	28										X			X	
Recovery[6]	104	0										X			X	
												X			X	
												X			X	
												X	X	X	X	

Field parameters will be measured during every sampling event. One field duplicate and DV sample will be collected from Well No. 8 or the treated source water during each test phase or every 10th sample. The DV sample for a trip blank will include the VOC, gen chem, and bacteria sample suites (not that no MS/MSD analyses will be completed for bacteria).

[1] City Well No. 3 will be sampled for all constituent suites at the end of the recharge and storage phases.

[2] Pretest sampling will include VOCs and SOCs. Sampling for VOCs will not be continued of no detections are found in background groundwater (they will volatize from the surface water source).

[3] Pretest sampling will be conducted during the Task 1 and/or Task 4 characterization/Shakedown (see Section 4.4).

[4] Radionuclides will be measured in treated source water and background groundwater. If concentrations are detected, additional analysis will be completed every 4 weeks or as determined in coordination with DOH.

[5] Additional analysis of SOCs and herbicides/pesticides will be completed every four weeks during storage if detected in treated recharge water.

[6] Recovery will occur over a single day of pumping. Up to 3 samples will be collected, targeting the beginning, middle, and end of pumping. The duration of recovery will be dependent on infrastructure constraints (Section 8.2). The date of the recovery phase will be determined in coordination with City water system operations.

8.2.4 Aquifer and Well Testing

A baseline step-rate pumping test will be conducted at Well 8 prior to recharge to establish well performance and allow collection of water quality data. The final step-rate pumping test will be conducted prior to initiating recovery. If results of the final step-rate test indicate a reduction in well efficiency, additional step-rate testing will be conducted after the completion of recovery to assess whether efficiency was restored by extended pumping.

Well and aquifer testing will be performed in accordance with the EPA *Technical Guidance Manual for Hydrogeologic Investigations* (EPA, 1995) and as described in Ecology's *Aquifer Test Procedure* (Ecology, 2020), within the constraints of existing well infrastructure. A licensed hydrogeologist (Andrew Austreng and Tim Flynn) will oversee all testing activities by staff listed in Table 2 and ensure data collection is conducted in accordance with professional standards. Water level monitoring will be conducted as follows during the Test:

- At 1-minute intervals or less at City Well No. 8 during the Step-rate pumping and injection portions of the Test. Flow rates will be recorded at this same interval using the datalogger that is integrated into the DCV control panel.
- At 15-minute intervals at City Well No. 8 during the recharge portion of the Test. Flow rates will be recorded at this same interval using the datalogger that is integrated into the DCV control panel.
- At 15-minute intervals or less at City Well No. 3 (dedicated monitoring well) and City Well No. 2.
- At 1-hour intervals at all City wells.

During the recovery portion of the test, water pumped from Well No. 8 will be discharged to an adjacent "pump-to-waste" pond, rather than the City's distribution system. The duration of recovery will be limited by the infiltration rate and storage volume of the pump-to-waste pond. The wellhead configuration at Well No. 8 requires any in-line flow meter for Well No. 8 be located downstream of the pipeline that discharges to the pond, rendering the existing flowmeter useless for the recovery portion of the test. Therefore, a Soundwater Technologies Orcas T31-C7 ultrasonic flow meter will be installed and used to measure flow rates during recovery testing.

Step-Rate Pumping Tests

The City continuously monitors water level data at 1-hour intervals or less at Well 8 and all City wells via SCADA system. Baseline step-rate pumping test will be conducted prior to any other testing to determine baseline well production capacity and efficiency (a new dedicated transducer will be installed at Well 8 prior to conducting this test). The final step-rate pumping test will be conducted at rates up to the current maximum capacity of the existing pump and well yield. The anticipated duration and rates for the step-rate pumping test are summarized in Table 8.

Table 8. Step-rate Pumping Test Rates (30-minute duration per step)

Step No.	Pumping Rate (gpm)
1	200
2	500
3	600
4	*<800 (max rate)*

During the step-rate test, the lowest pumping rate will depend on the ability of existing infrastructure to restrict pumping rates and will be determined during the Task 1 efforts ahead of conducting the step-rate testing (Section 4.4). The final (maximum) pumping rate will be the maximum rate that is sustainable for approximately 30 minutes. A 30-minute duration is planned for each step to limit the amount of time necessary to significantly restrict the output of the City's existing pump during the initial step rates. The durations of each step will be approximately equivalent and ultimately be determined by the City's water system operators.