murraysmith

APPENDIX F
CROSS SECTION FIGURES AND SGA WATER RIGHTS TECH MEMO

FIGURE 1

Cross Section Overview

City of Gresham
WSMP Update

LEGEND

- Cross Section Well
- City of Gresham Well
- Cross Section Line

Gresham Service Levels

- Gabbert
- Grant Butte
- Hunters Highland
- Intermediate
- South Hills
- South Shores
- Wheeler

All Other Features

- City Boundary
- Railroad
- Major Road
- Watercourse

N

0 2,000 4,000 6,000
Feet

Date: September 21, 2021
Data Sources: USGS, ESRI, Aerial photo 2020

GSI Water Solutions, Inc.

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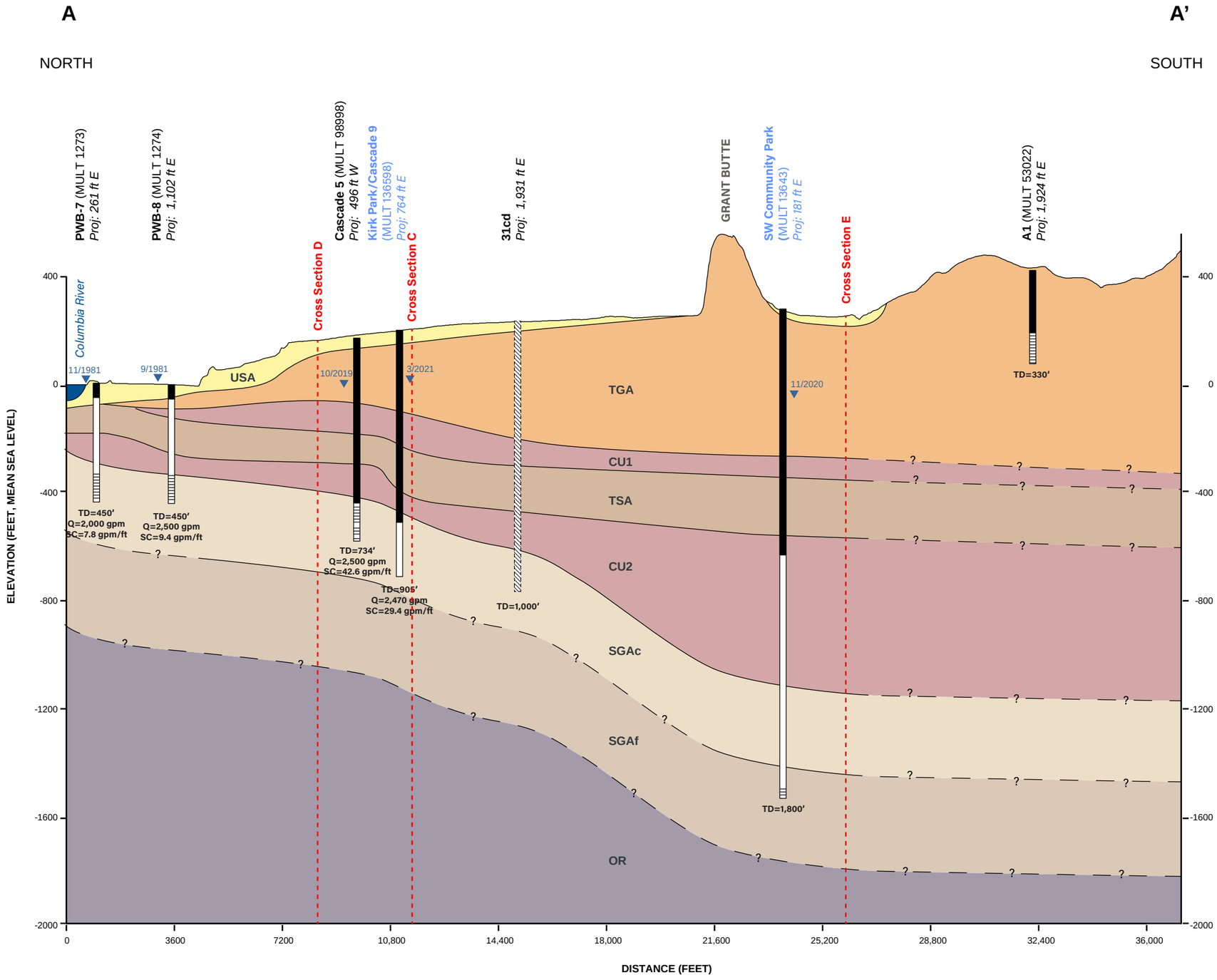
FIGURE 2

Cross Section A-A'

City of Gresham
WSMP Update

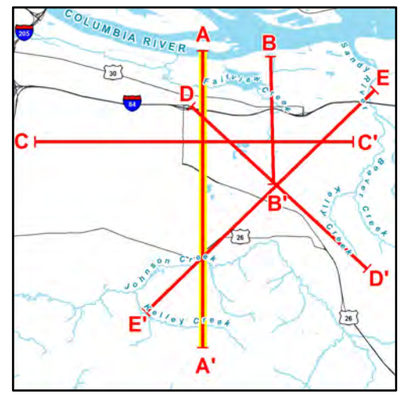


GEOLOGY LEGEND

- Unconsolidated Sediments (USA)
- Troutdale Gravel Aquifer (TGA)
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- Static Water Level (only shown for SGA wells)



NOTES

Vertical Exaggeration: 9x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

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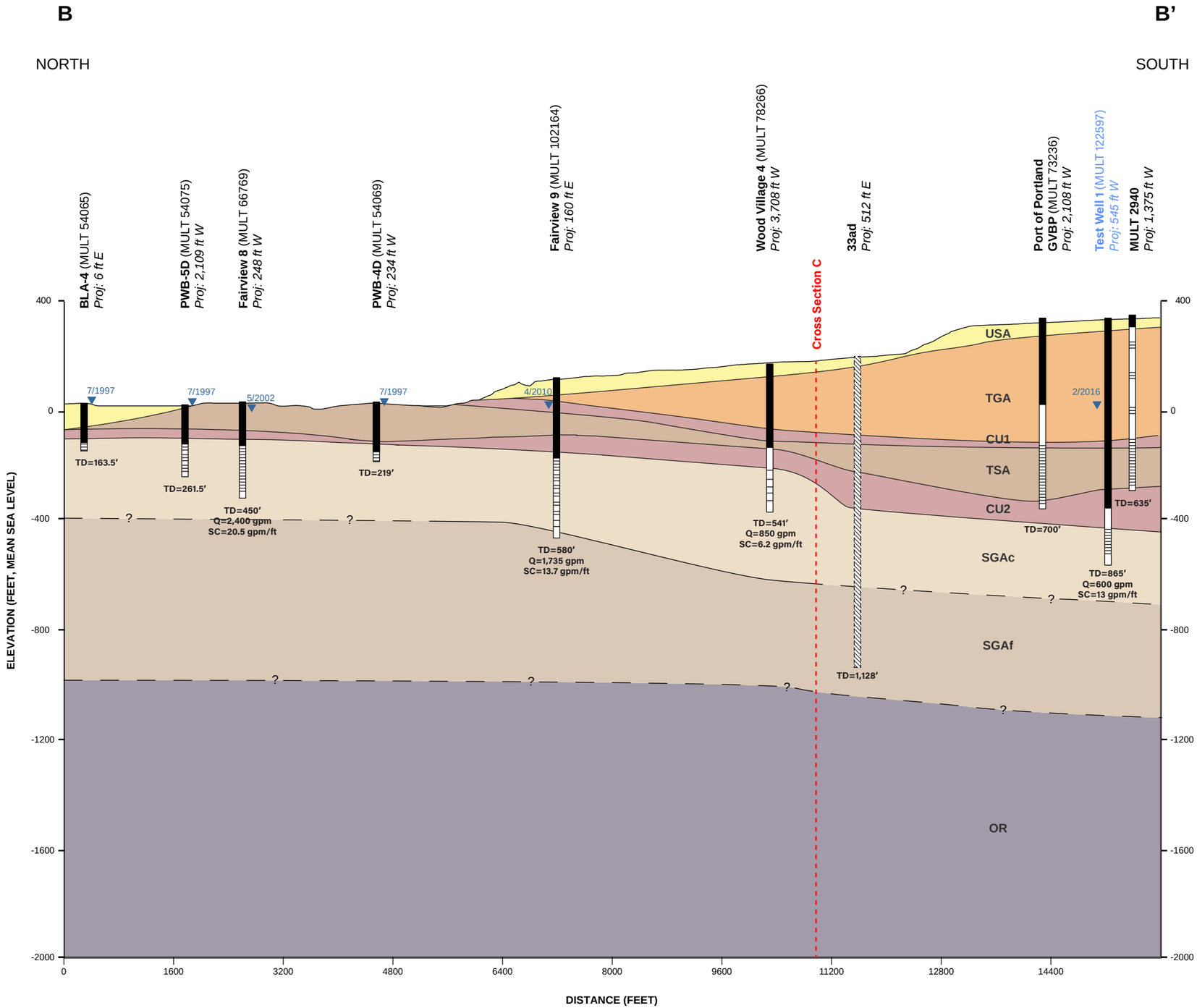
FIGURE 3

Cross Section B-B'

City of Gresham
WSMP Update

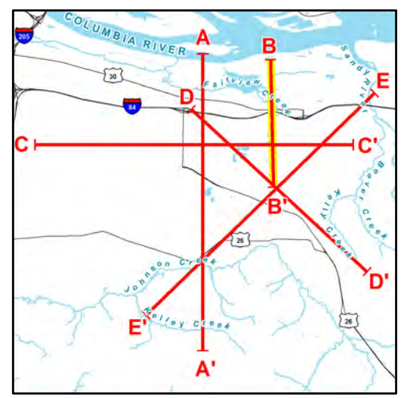


GEOLOGY LEGEND

- Unconsolidated Sediments (USA)
- Troutdale Gravel Aquifer (TGA)
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- Static Water Level (only shown for SGA wells)



NOTES

Vertical Exaggeration: 4x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

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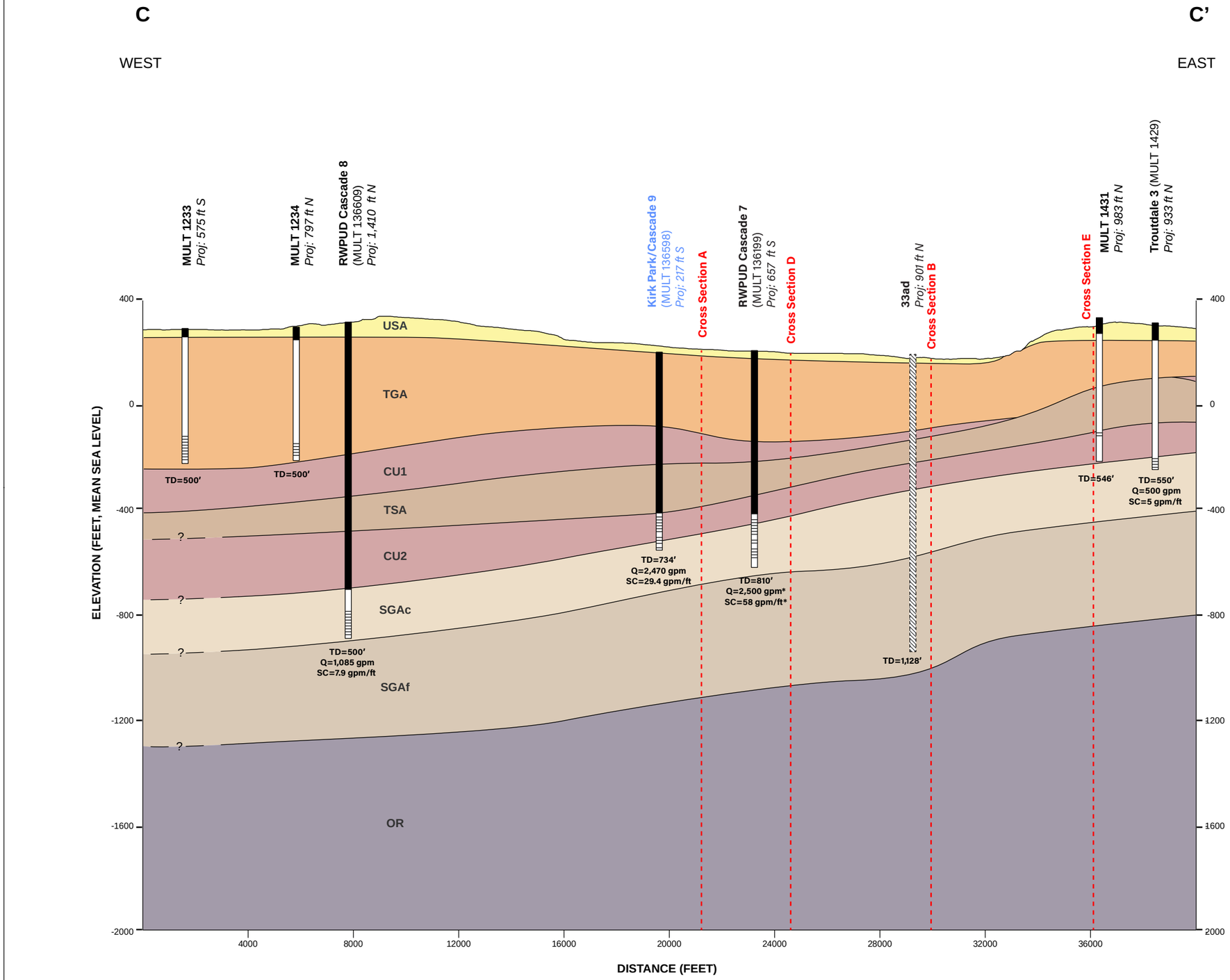
FIGURE 4

Cross Section C-C'

City of Gresham
WSMP Update

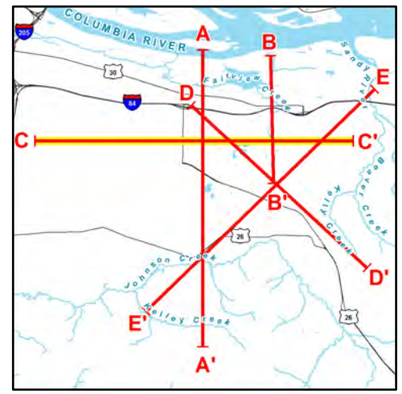


GEOLOGY LEGEND

- Unconsolidated Sediments (USA)
- Troutdale Gravel Aquifer (TGA)
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- Static Water Level (only shown for SGA wells)



NOTES

*Well yield and specific capacity for Cascade 7 are considered to be preliminary.
Vertical Exaggeration: 10x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

GSI Water Solutions, Inc.

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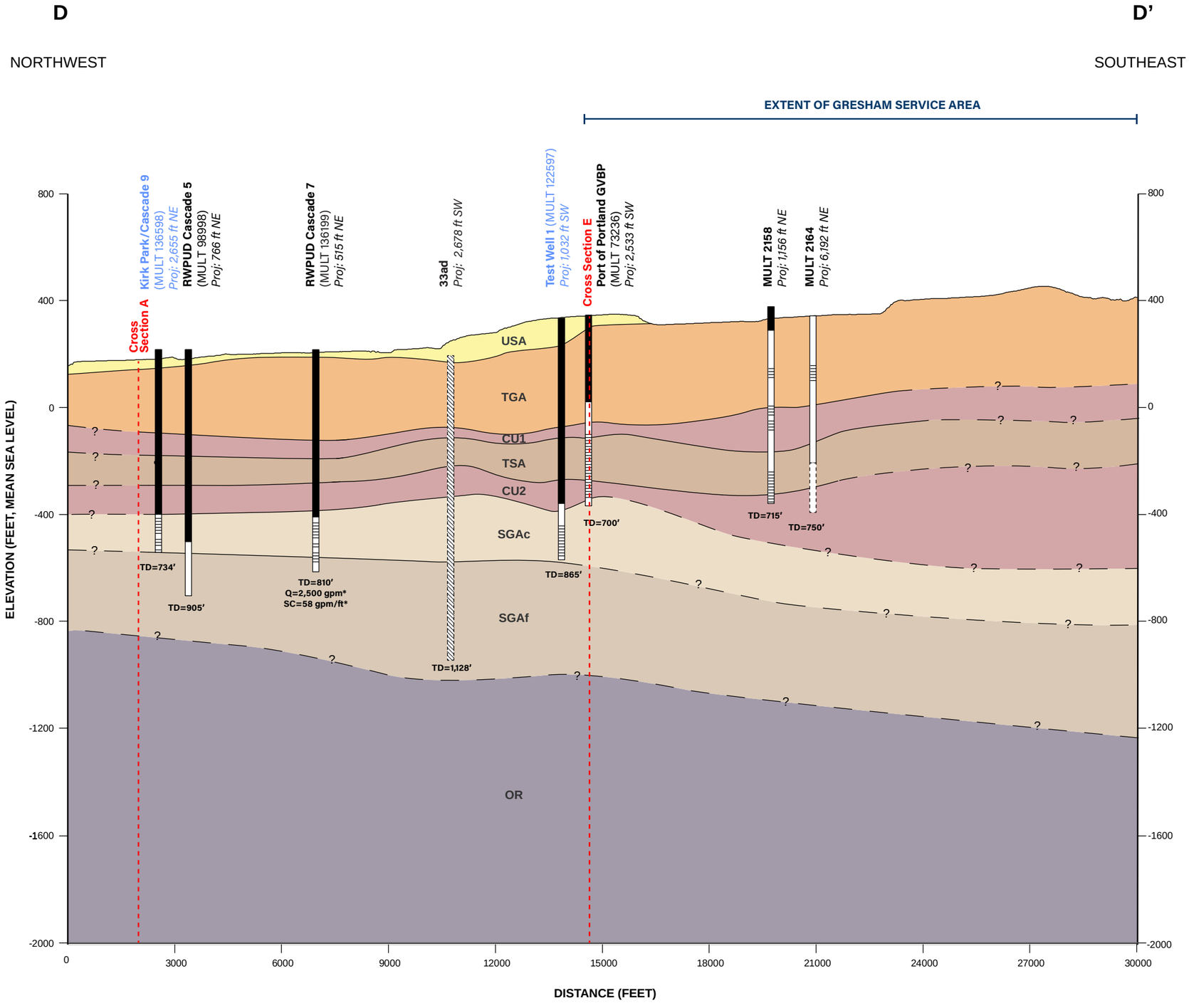
FIGURE 5

Cross Section D-D'

City of Gresham
WSMP Update



GEOLOGY LEGEND

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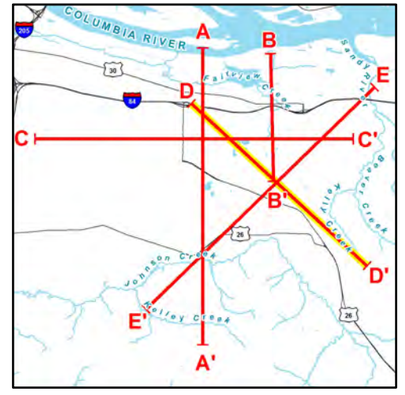
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- ▼ Static Water Level (only shown for SGA wells)



NOTES

*Well yield and specific capacity for Cascade 7 are considered to be preliminary.
Vertical Exaggeration: 7.5x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

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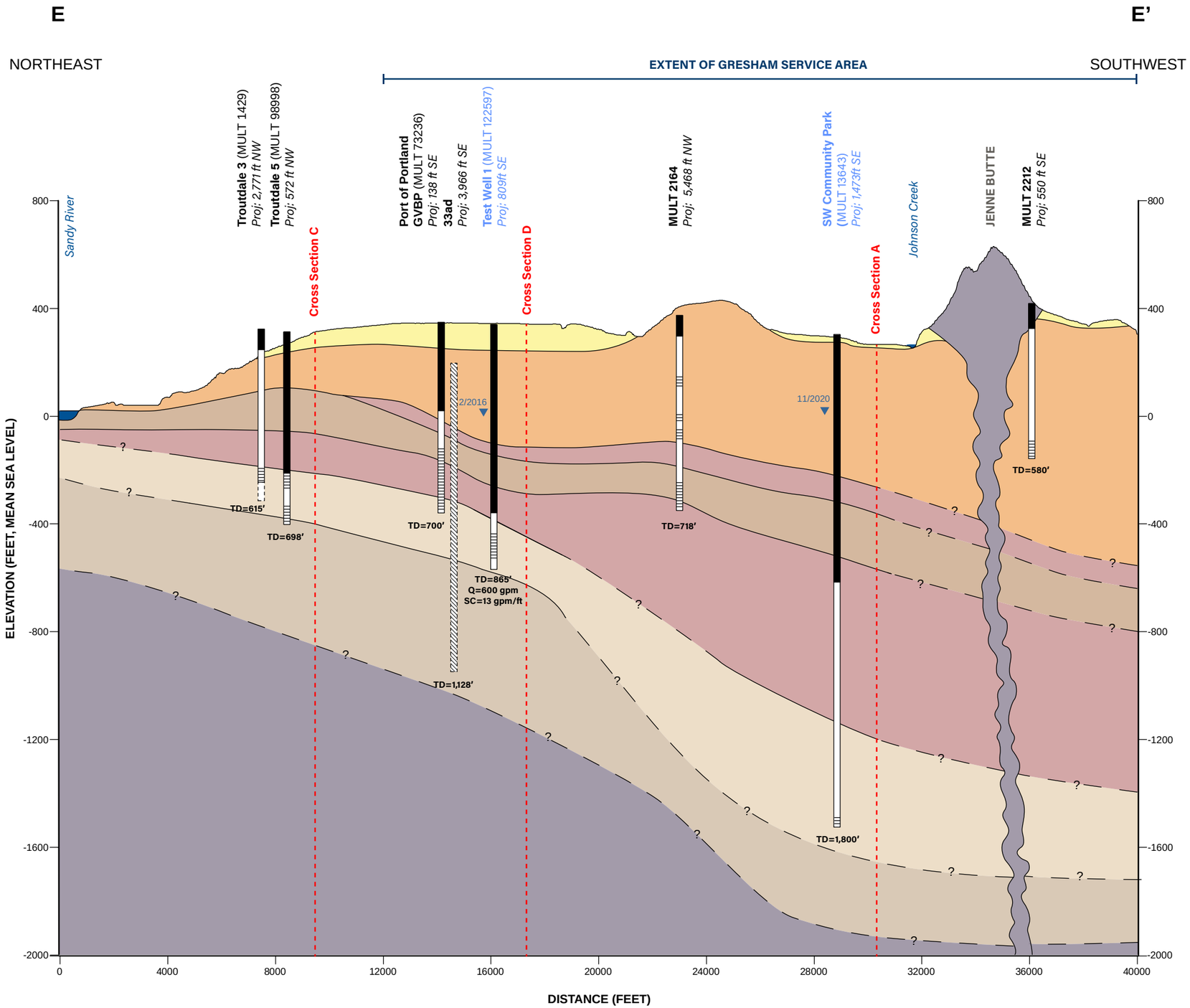
FIGURE 6

Cross Section E-E'

City of Gresham
WSMP Update



GEOLOGY LEGEND

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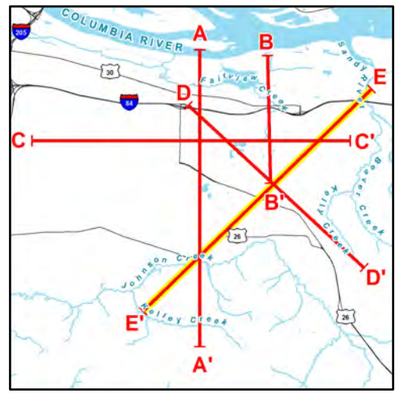
- Troutdale Gravel Aquifer (TGA)
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- ▼ Static Water Level (only shown for SGA wells)



NOTES

Vertical Exaggeration: 10x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

GSI Water Solutions, Inc.

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GSI Water Solutions, Inc.

TECHNICAL MEMORANDUM

SGA Water Rights and the Regulation of Groundwater

To: Brian Ginter, Murraysmith, Inc.

From: Kimberly Grigsby, GSI Water Solutions, Inc.
Ted Ressler, GSI Water Solutions, Inc.

Attachments: Attachment 1 – Table of SGA Municipal Water Rights

Date: January 4, 2022

1. Background

The Rockwood Water People's Utility District (Rockwood) and the City of Gresham (City) are in the process of expanding their shared water system, which provides groundwater from the Sand and Gravel Aquifer (SGA). As part of this process, Rockwood and the City seek to understand the relative priority of their water rights compared to other municipal water providers that appropriate water from the SGA, and the process for regulation of groundwater rights.

2. Relative Priority of Water Rights Held by Rockwood and Gresham.

The water system shared by Rockwood and the City obtains groundwater under two water rights: Certificate 83629 and Permit G-16917. These water rights authorize the use of 63.50 cubic feet per second (cfs) of groundwater from the SGA for municipal purposes. As shown in **Attachment 1**, Certificate 83629 has a priority date of January 9, 1976, and Permit G-16917 has a priority date of December 21, 1977.

GSI identified a total of 20 water rights for the use of up to 194.72 cfs of groundwater from the SGA for municipal use by other water providers in the east Portland area, including the City of Fairview, Interlachen People's Utility District, the City of Troutdale, the City of Wood Village, the City of Portland/Portland Water Bureau, and the Port of Portland. The water rights held by these other municipal water providers are summarized in **Attachment 1**. Of the 20 water rights identified, ten are senior in priority to the Rockwood/the City Permit G-16917 for 53.5 cfs (these ten senior rights authorize use of up to a total of 171.37 cfs). Rockwood and the City's 10 cfs Certificate 83629 is, however, senior to all but eight water rights (these eight senior rights authorize use of up to a total of 38.37 cfs).

3. Regulation of Water Rights

The State of Oregon uses the prior appropriation system to regulate the use of water. Under this system, the water right with the most senior (oldest) priority date receives all of the water to which it is entitled before the next most senior water right is entitled to receive water.

While this process is relatively straight-forward for the regulation of surface water, it is more complex for the regulation of groundwater rights. If a holder of a water right for the use of groundwater complains to the Oregon Water Resources Department (OWRD) that it is not receiving the water to which it is entitled, the agency will first determine whether the water right holder's well fully penetrates the thickness of the source aquifer for the water right. OWRD will not require junior water rights to curtail their water use if a senior

water right holder has a well that does not fully penetrate the subject aquifer. Rather, the water right holder is first required to "chase the resource" by deepening their well to a depth that will give them access to the entire thickness of the aquifer for appropriation of groundwater.

Regulation of municipal water rights would likely become even more complex. OWRD would likely not regulate by priority if it was an aerially extensive aquifer decline issue that involved multiple municipal water providers. Instead, it is expected that the agency would first gather data and attempt to resolve the problem comprehensively and cooperatively with the municipal water providers. If the agency was unable to develop an agreed upon solution between the water providers (reduced use, aquifer recharge, etc.), OWRD could begin regulation by requiring water right holders with water level drawdown conditions stated on their water rights to curtail their water use; however, that is only 2 of the 20 rights identified. (The water rights table in Attachment 1 shows which of the municipal water rights in the SGA have water level drawdown conditions.) Alternatively, OWRD could establish a groundwater management area (e.g., critical groundwater area or a groundwater area of concern) and establish a sustainable annual yield (SAY) for the aquifer (i.e., a volume of annual groundwater use that can be withdrawn from the aquifer without causing an excessive decline in the water level of the aquifer). Under a typical critical groundwater area designation, the municipal water providers would then receive a portion of the SAY and would need to manage their groundwater use to not exceed their allotted annual volume. In other critical groundwater areas, OWRD has allocated the SAY according to priority date with the most senior water rights receiving their allocations before more junior water rights receiving an allocation.

Finally, the use of groundwater from the SGA by municipal water suppliers in Washington, namely Clark Public Utilities, make potential regulation even more complex. Any regulation or management of groundwater withdrawals from the SGA by OWRD would apply only to Oregon water right holders. Regulation or management of groundwater withdrawals from the SGA in Washington would be implemented by Washington Department of Ecology (Ecology). In this scenario, interstate cooperation between OWRD and Ecology would likely be necessary.

4. Summary

Rockwood and the City hold a sizeable percentage (33 percent) of the rate of appropriation authorized by existing Oregon water rights for use of groundwater from the SGA that are held by municipal water providers in East Portland. Certificate 83629 for 10 cfs, held by Rockwood and the City, is senior in priority to all but 8 of the 20 identified SGA municipal water rights, including the largest right held by City of Portland/Portland Water Bureau for up to 130.8 cfs. Permit G-16917 for 53.50 cfs, held by Rockwood and the City is junior in priority to 10 of the identified 20 water rights.

Although the State of Oregon uses the prior appropriation system to regulate the use of water, the potential regulation by OWRD of groundwater use from the SGA (an aquifer source utilized by multiple municipal providers) would likely entail more than consideration of priority date alone. It is likely that OWRD would attempt to facilitate a comprehensive solution between the municipal providers to cooperatively manage groundwater use from the aquifer, or alternatively, establish a groundwater management area, such as a critical groundwater area within which OWRD would establish a sustainable annual yield and allocate water use among the SGA users, likely in proportional shares based on priority date. .

An added complication to the management of groundwater use from the SGA is that there are municipal water providers in Washington that also utilize the SGA; hence effective management of the SGA resource would likely require interstate cooperation between OWRD and Ecology.

Attachment 1 - Municipal Use Water Rights for the Sand and Gravel Aquifer

Application	Permit	Certificate / Transfer	Claim	Priority Date	POA(s)	Authorized Rate [cfs]	Beneficial Use	Unit	Completion Date	Drawdown Condition[s]	Comments
Rockwood Water People's Utility District and City of Gresham											
G-7217	G-6639	83629	-	1/9/1976	Cascade Well 3 [MULT 70128], Cascade Well 4 [MULT 72119]	10.00	Municipal	SGA	N/A	-	-
G-8585	~~G-8719~~ G-16917	T-10554 (permit amendment)	-	12/21/1977	Well 1 (Cascade 5) [MULT 98998], Well 2, Well 3 (Cascade 6), Well 4, Well 5, Well 6 (Cascade 3) [MULT 70128], Well 7, Well 8 (Cascade 8), Cascade 4 [MULT 72119]	53.50 cfs Currently have access to 33.50 cfs	Municipal	SGA	10/1/2047	-	T-13274 (pending, Proposes to add: Cascade 7, Well 9, and Well 10)
City of Fairview											
G-529	G-443	~~74802~~ ~~T 9809~~ 87103	-	12/19/1956 for 0.11 cfs and 2/7/1957 for 0.89 cfs	Well 9 [MULT 102164]	1.00	Municipal	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights
G-5857	G-5594	T 9808 87104	-	8/1/1972	Well 5, Well 9 [MULT 102164]	2.20	Municipal	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights
G-7563	~~G-7029~~ T-12894 G-18289	-	-	10/27/1976	Well 6 [MULT 3104], Well 10	2.20	Municipal	SGA	10/1/2040	-	Senior in priority to RWPUD/Gresham permit
G-14121	G-15029	88274	-	6/30/1995	Well 8 [66769]	2.67	Municipal	SGA	N/A	If any well listed on right displays total static water level decline of 25 or more feet over any period of years compared with the reference level, then the user shall discontinue use of, or reduce the rate or volume of withdrawal until the water level recovers above the 25-foot decline level	-
Interlochen People's Utility District											
-	-	-	GR 3915	4/1/1942	Well 2 [MULT 1298/1304]	0.07	Municipal	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights
G-4114	G-3862	82633	-	10/18/1967	Well 1 [MULT 1303]	0.10	Domestic	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights
G-8890	~~G-8292~~ G-5594	~~82574~~ T-11311	-	7/14/1978	Well 1 [MULT 1303], Well 2 [MULT 1298/1304], Well 3 [MULT 1295], Well 5	0.45	Municipal	SGA	10/1/2032	-	
G-11909	G-10921	85453	-	4/13/1989	Well 1 [MULT 1303]	0.03	Domestic	SGA	N/A	-	-
City of Troutdale											
G-2512	G-2320	~~34708~~ ~~T 3119~~ 93556	-	12/26/1962	Drinker Well [MULT 1446]	0.81	Municipal	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights. Period of water use limited to the irrigation season of each year and a maximum use volume of 162.25 AF
G-6627	G-6881	93557	-	8/19/1974	Well 5 [MULT 90881]	1.60, limited to 0.75 during irrigation season	Municipal	SGA	N/A	-	Senior in priority to both RWPUD/Gresham water rights. Different rate of use during the irrigation season
G-9291	G-8655	93558	-	6/26/1979	Well 3 [MULT 1429]	1.10	Municipal	SGA	N/A	-	-
G-9714	G-17842	93765	-	5/1/1980 for 2.2 cfs and 12/16/1981 for 2.2 cfs	Well 5 [MULT 90881], Well 6 [MULT 67091], Well 7 [MULT 1444], Well 8 [MULT 4372]	4.40	Municipal	SGA	N/A	-	2.2 cfs from wells 5, 6, and 8 and 2.2 cfs from wells 5, 7, and 8
G-9583	G-9866	93559	-	7/17/1981 for 1.11 cfs and 9/20/1982 for 1.10 cfs	Well 4 [MULT 93369]	2.21	Municipal	SGA	N/A	-	-
G-13565	G-11761	93560	-	11/26/1993	Well 8 [MULT 4372]	2.23	Municipal	SGA	N/A	-	-

Attachment 1 - Municipal Use Water Rights for the Sand and Gravel Aquifer

Application	Permit	Certificate / Transfer	Claim	Priority Date	POA(s)	Authorized Rate [cfs]	Beneficial Use	Unit	Completion Date	Drawdown Condition[s]	Comments
City of Wood Village											
G-16373	G-16068	-	-	1/24/2005	Well 4 [MULT 78266]	1.87	Municipal	SGA	8/8/2026	Water user shall discontinue use or reduce rate and volume of withdrawal if: -Annual water level declines average 3 or more feet per year for 5 consecutive years -Water level declines 15 or more feet in fewer than 5 consecutive years -Water level decline of 25 or more feet -Hydraulic interference leading to decline of 25 feet or more in neighboring well with senior priority -Hydraulic interference leading to decline of 10 or more feet below "pumping level" of any "Fairview well" with senior priority date (as defined in July 24, 2006 settlement agreement)	-
Port of Portland											
		T-11395	GR-462	1/31/1942	Well 1 [MULT 1308] Well 2 [MULT 1322] Well 3 [MULT 1323] Well 4 [MULT 1328/55342] Well 5 [MULT 1331] Well 6 [MULT 1331/55344] Well 7 [MULT 1329] Well 8 [MULT 1330] Well 9 [MULT 1324/55341] Well 10 [MULT 1320] Well 11 [MULT 1325/55346] Well 12 [MULT 1319/1326/55343] Well 13 [1327/78821] Well 14 [MULT 1310] Well 15 [MULT 1312]	31.73	Municipal	SGA	N/A		Senior in priority to both RWPUD/Gresham water rights. 'The Port's use of these water rights is currently restricted by law because of ongoing remedial actions to address fluoride contamination. Groundwater remediation is in progress by the former owner, under oversight from Oregon DEQ and EPA Region 10. This groundwater remediation pumping occurs from wells under groundwater claim GR-462.
		T-11396	GR-1441	12/31/1943	Well FF-4 [MULT 1318]	0.86	Municipal	SGA	N/A		

Attachment 1 - Municipal Use Water Rights for the Sand and Gravel Aquifer

Application	Permit	Certificate / Transfer	Claim	Priority Date	POA(s)	Authorized Rate [cfs]	Beneficial Use	Unit	Completion Date	Drawdown Condition[s]	Comments
Portland Water Bureau and City of Portland											
G-11354	G-10479	-	-	3/1/1985	Well 34 [MULT 1131]	1.10	Municipal (emergency and supplemental supply)	SGA	10/1/2085	-	-
G-11355	G-10479	89117	-	3/1/1985	Well 34 [MULT 1131]	7.30	Municipal (emergency and supplemental supply)	SGA	N/A	-	-
G-7578	G-8755	T-10489 (permit amendment)	-	11/12/1976	30 Wells SGA Wells* PW-1 [MULT 1883/1190] PW-2 [MULT 1184/1189 PW-4 [MULT 1264/1186] PW-6 [MULT 1118] PW-7 [MULT 1273] PW-8 [MULT 1274] PW-9 [MULT 1259]** PW-11 [MULT 1122] PW-14 [MULT 1268] PW-16 [MULT 1335] PW-35 [MULT 62834]*** PW-36 [MULT 63853]*** PW-37 [MULT 62835]*** PW-38 [MULT 73084]****	390 Total 130.8 from SGA 13.9 13.9 13.9 16.7 8.4 8.4 13.9 16.7 11.1 13.9 N/A N/A N/A up to 130.8 cumulative	Municipal (emergency and supplemental supply)	SGA	10/1/2085	-	Senior in priority to RWPUD/Gresham permit

Notes

*Identified as SRMA aquifer in Portland Water Bureau (PWB) WMCP. The Sandy River Mudstone Aquifer (SRMA) is equivalent to the Sand and Gravel Aquifer (SGA)

**Identified as SGA by PWB. Construction depth and screened interval are consistent with SGA completion vs. TSA as identified in PWB WMCP (assumed to be a typo)

***Identified as POA for permit by PWB WMCP, but does not appear to be APOA formally added to permit.

****Added to permit by T-10489

888 SW 5TH AVENUE, SUITE #1170

PORTLAND, OR 97204

www.murraysmith.us