

Groundwater Transfer Review Summary Form

Transfer/PA # T- 13682 (RA)

GW Reviewer Travis Brown Date Review Completed: 6/22/2021

Summary of Same Source Review:

☒ The proposed change in point of appropriation is not within the same aquifer as per OAR 690-380-2110(2).

Summary of Injury Review:

☒ The proposed transfer will result in another, existing water right not receiving previously available water to which it is legally entitled or result in significant interference with a surface water source as per 690-380-0100(3).

Summary of GW-SW Transfer Similarity Review:

☐ The proposed SW-GW transfer doesn't meet the definition of "similarly" as per OAR 690-380-2130.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations.



Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Ground Water Review Form:

- ☒ **Water Right Transfer**
☐ **Permit Amendment**
☐ **GR Modification**
☐ **Other**

Application: T-13682

Applicant Name: Stratford Landscape Supply

Proposed Changes: ☒ POA ☐ APOA ☐ SW→GW ☒ RA
☐ USE ☐ POU ☐ OTHER

Reviewer(s): Travis Brown

Date of Review: 6/22/2021

Date Reviewed by GW Mgr. and Returned to WRSD: JTI 6/24/21

The information provided in the application is insufficient to evaluate whether the proposed transfer may be approved because:

- ☐ The water well reports provided with the application do not correspond to the water rights affected by the transfer.
- ☐ The application does not include water well reports or a description of the well construction details sufficient to establish the ground water body developed or proposed to be developed.
- ☐ Other _____

1. Basic description of the changes proposed in this transfer: Applicant proposes to change the POA used to irrigate authorized acreage under Certificates 63588*, 95125*, and 95126*.
The relevant details of each Certificate are summarized below:

Certificate	Subject Authorized Use	Authorized From-POA	Proposed To-POA
63588*	Nursery 12.8 ac / 64 af/yr / 0.409 cfs	Well 1 / CLAC 6664 Well 2 / CLAC 5383 Well 3 / CLAC 5365 Well 4 / CLAC 5364	Well 5 (Not Constructed) Well 6 (Not Constructed)
95125*	Nursery 8.0 ac / 40 af/yr / 0.028 cfs	Well 3 / CLAC 5365 (0.014 cfs) Well 4 / CLAC 5364 (0.014 cfs)	Well 5 (Not Constructed) Well 6 (Not Constructed)
95126*	Nursery 8.0 ac / 40 af/yr / 0.028 cfs	Well 1 / CLAC 6664 (0.014 cfs) Well 2 / CLAC 5383 (0.014 cfs)	Well 5 (Not Constructed) Well 6 (Not Constructed)

For proposed To-POA Well 5 and 6, there appears to be a discrepancy between the metes-and-bounds described locations (using the Department projection of the Public Land Survey System (PLSS)) and the locations visually indicated on the application map relative to the boundaries of Tax Lot 600 (using Clackamas County's projection of tax lot boundaries). For the purposes of this review, the mapped location relative to the tax lot boundaries are considered to be the most accurate; the corresponding metes-and-bounds for these locations are listed in the table below:

Proposed To-POA	Application Described Metes-and-Bounds	Department Projection Metes-and-Bounds
Well 5	T2S, R4E-S11 NW-NE 50' S, 40' E fr N ¼ cor S 11	T2S, R4E-S2 SE-SW 200' N, 80' W fr S ¼ cor S 2
Well 6	T2S, R4E-S11 NW-NE 50' S, 540' E fr N ¼ cor S 11	T2S, R4E-S2 SW-SE 180' N, 490' E fr S ¼ cor S 2

2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?
☐ Yes ☒ No Comments: The proposed To-POA Wells 5 and 6 would be completed in the Troutdale Formation alluvial aquifer system based on the proposed construction provided in Table 3 of the application (Swanson et al., 1993). Authorized From-POA Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365) are also completed in the Troutdale Formation alluvial aquifer system. However, authorized From-POA Well 4 (CLAC 5364) is completed in the underlying basalt aquifer system. (See Item 8 for discussion on the construction of Well 4 (CLAC 5364).) Water level data from the authorized POA clearly indicates that Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365) are completed in a separate aquifer from Well 4 (CLAC 5364) (see attached Hydrograph). The portion of use authorized under **Certificates 63588*** and **95125*** which is attributable to Well 4 (CLAC 5364) would be derived from a different source (alluvium rather than basalt) under the proposed transfer to Wells 5 and 6. In total, it is estimated that ~0.096 cfs of the proposed transfer is attributable to Well 3 (CLAC 5364) and thus should either not be approved, or should be deducted from the authorized amount appropriated under Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365).
3. a) Is there more than one source developed under the right (e.g., basalt and alluvium)?
☒ Yes ☐ No Comments: Authorized From-POA Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365) are completed in the alluvial aquifer system. Authorized From-POA Well 4 (CLAC 5364) is completed in the underlying basalt aquifer system. (See Item 8 for discussion on the construction of Well 4 (CLAC 5364).) Therefore, more than one source has been developed under **Certificates 63588*** and **95125***.
- b) If yes, estimate the portion of the right supplied by each of the sources and describe any limitations that will need to be placed on the proposed change (rate, duty, etc.): No water use reporting is available for the authorized From-POA. **Certificate 95125*** has well-specific rates for Well 3 (CLAC 5365) and Well 4 (CLAC 5364) of 0.05 cfs each. The portion of the well-specific rate that is subject to transfer was estimated based on the proportion of acreage proposed to be transferred to the new To-POA (8.0 acres, or ~28.5 percent) relative to the total acreage authorized under **Certificate 95125*** (28.1 acres); 28.5 percent of the well-specific rate for Well 4 (CLAC 5364) equals 0.014 cfs. **Because the proposed To-POA would be completed in a different source (alluvial aquifer system) than the authorized From-**

POA Well 4 (CLAC 5364), the 0.014 cfs of the proposed transfer attributable to Well 4 (CLAC 5364) should either not be approved or should be deducted from the total appropriation authorized for Well 3 (CLAC 5365) instead of Well 4 (CLAC 5364).

Certificate 63588* does not have well-specific rates but has a total rate of appropriation of 1.62 cfs which may be withdrawn from any or all of the 4 authorized POA. The portion of **Certificate 63588*** which is attributable to From-POA Well 4 (CLAC 5364) was estimated based on the estimated maximum yield of each of the 4 POA authorized under **Certificate 63588***. The estimated maximum yield was derived from the most recent static water level measurement, the total well depth, and estimated specific capacity from pumping tests conducted on each of the 4 authorized POA. All of the 4 authorized POA have overlapping water rights. Well 1 (CLAC 6664) is the sole authorized POA under **Certificate 42787***. Well 2 (CLAC 5383) is the sole authorized POA under **Certificate 63587***. Wells 1 (CLAC 6664), 2 (CLAC 5383), 3 (CLAC 5365), and 4 (CLAC 5364) all have well-specific rates under **Certificates 67909***, **95125***, and **95126***. Additionally, Wells 1 (CLAC 6664), 2 (CLAC 5383), 3 (CLAC 5365), and 4 (CLAC 5364) are authorized POA under **Certificate 84094*** for a combined rate of 1 cfs, from any or all of the wells in combination. A conservative estimate of the portion of **Certificate 63588*** which is attributable to Well 4 was derived by comparing the estimated maximum yields of Wells 1 (CLAC 6664), 2 (CLAC 5383), 3 (CLAC 5365), and 4 (CLAC 5364) with the authorized combined rate for each well under its various overlapping rights. The portion of the combined, rotatable rates under **Certificates 63588*** and **84094*** which could not be met by the combined yields of Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365) (minus the well-specific rates for each well) was attributed to Well 4 (CLAC 5364). This “remainder” rate (~0.5272 cfs) attributed to Well 4 (CLAC 5364) was compared to the overall combined rate under **Certificates 63588*** and **84094*** (2.62 cfs in total) to determine the relative proportion of the rate attributable to Well 4 (CLAC 5364) (~20 percent). Twenty percent (0.082 cfs) of the total proposed transferred rate (0.409 cfs) under **Certificate 63588*** would therefore be attributable to Well 4 (CLAC 5364). Because the proposed To-POA would be completed in a different source (alluvial aquifer system) than the authorized From-POA Well 4 (CLAC 5364), the 0.082 cfs of the proposed transfer attributable to Well 4 (CLAC 5364) should either not be approved or should be deducted from the total appropriation authorized for Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365) instead of Well 4 (CLAC 5364).

4. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another ground water right**?

☒ Yes ☐ No Comments: The proposed To-POA would be substantially closer to Clackamas County tax lots 24E11AB00400 and 24E11AB00300, which are presumed to rely upon exempt domestic wells in the alluvial aquifer system for their water supply. The residence at 24E11AB00300 was built in 1960, while the residence at 24E11AB00400 was built in 1971 per Clackamas County property records. It is therefore presumed that wells supplying these residences were completed around the same time, making them senior to the Certificates included in the proposed transfer. The reduced intervening distance between these properties and the proposed To-POA relative to the authorized From-POA would likely increase interference with exempt domestic wells on these properties.

b) If yes, would this proposed change, at its maximum allowed rate of use, likely result in another groundwater right not receiving the water to which it is legally entitled?

☒ Yes ☐ No If yes, explain: Specific well logs could not be correlated to tax lots 24E11AB00400 and 24E11AB00300, because of the presumed age of the exempt domestic wells and the incompleteness of well records from the 1960s and 1970s. Therefore, a Theis (1935) drawdown analysis was used to assess the likely radius around the proposed To-POA Well 5 and Well 6 within which a neighboring well would likely experience substantial or undue interference (SUI) as defined in OAR 690-008-0001(8)(c) (see Theis Drawdown Analysis, attached). Results of the analysis indicate that, at the maximum allowed rate of use (0.465 cfs), proposed To-POA Well 6 would likely result in SUI with a neighboring exempt domestic well on tax lot 24E11AB00400 (see attached Well Location Map for a depiction of the likely radius of SUI around proposed To-POA Well 5 and Well 6). The likelihood of SUI could be reduced by moving the location of proposed To-POA Well 6 to a point greater than ~350 ft from tax lot 24E11AB00400 or reducing the maximum rate from proposed To-POA Well 6 to less than 0.115 cfs (assuming that proposed To-POA Well 5 would pump the remaining 0.350 cfs of the total combined rate of 0.465 cfs which is the subject of this transfer).

5. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another surface water source**?

☒ Yes ☐ No Comments: The proposed To-POA are closer to both a spring-fed unnamed tributary of the Sandy River and the Sandy River itself, both of which are presumed to be hydraulically connected to the Troutdale aquifer system. Additionally, CLAC 5364 is completed in the underlying basalt aquifer system, which is not hydraulically connected to nearby surface water. Allowing the withdrawal of groundwater which was previously sourced from an aquifer with no hydraulic connection to nearby surface water to instead be sourced from an aquifer which is hydraulically connected to surface water would result in an increase in interference with nearby surface water.

b) If yes, at its maximum allowed rate of use, what is the expected change in degree of interference with any **surface water sources** resulting from the proposed change?

Stream: Unnamed tributary to Sandy River ☒ Minimal ☐ Significant

Stream: Sandy River ☒ Minimal ☐ Significant

Provide context for minimal/significant impact: Authorized From-POA Well 3 (CLAC 5365) is ~6,000 ft from the estimated point of hydraulic connection on the Unnamed tributary to the Sandy River; proposed To-POA Well 6 is only ~2,900 ft from the point of connection. Additionally, From-POA Well 3 (CLAC 5365) is ~5,700 ft from the nearest point on the Sandy River; proposed To-POA Well 6 is ~3,400 ft from the Sandy River. The unnamed tributary appears to originate from springs in the wall of the canyon carved by the Sandy River. The Sandy River has completely incised through the Troutdale Formation aquifer at this location but is most likely hydraulically connected via recent alluvial deposits and/or landslide deposits at the base of the canyon. Unfortunately, due to the lack of a readily available analytical model of stream depletion which can account for these stream and aquifer geometries, the change in degree of interference with these surface water sources could not be quantitatively estimated. However, given the significant distances between the proposed To-POA and the substantial amount of saturated, fine-grained material overlying the targeted water-bearing zone, the change in the degree of interference with both streams is expected to be minimal.

The withdrawal of groundwater from the alluvial aquifer system which was previously sourced from the basalt aquifer system should not be allowed under the same source limitations discussed in Items 2 and 3, above. Therefore, the change in degree of interference with the surface water system has not been assessed.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly (as per OAR 690-380-2130) to the authorized point of diversion specified in the water use subject to transfer?
☐ Yes ☐ No Comments: N/A
7. What conditions or other changes in the application are necessary to address any potential issues identified above: _____
8. Any additional comments: Authorized From-POA Well 4 (CLAC 5364) is completed in a basalt aquifer which underlies the alluvial aquifer system exploited by From-POA Wells 1 (CLAC 6664), 2 (CLAC 5383), and 3 (CLAC 5365). The construction of Well 4 (CLAC 5364) as reported on the water well report does not appear to comply with current well construction standards (OAR 690-210). The indicated seal ("cement & 4% bent.") only extends to 60 ft bls, whereas the top of the basalt ("volcanic rock") is identified as 850 ft bls. Because Well 4 (CLAC 5364) is not indicated as a proposed To-POA for any rights covered by this transfer application, it is not recommended that this proposed transfer be denied or conditioned on the basis of the inadequate construction of Well 4 (CLAC 5364). However, any future applications seeking to add Well 4 (CLAC 5364) as a POA should be conditioned on alteration of Well 4 (CLAC 5364) to comply with current well construction standards (OAR 690-210). Well 4 (CLAC 5364) has been flagged as having a construction deficiency in the Groundwater Information System.

References

Application File: T-13682

Certificates: 42787*, 63587*, 63588*, 67909*, 84094*, 95125*, 95126*

Pumping Test Reports: CLAC 60, 5360, 5365, 5383, 5689, 6664, 19304, 51552

Domenico, P.A. and Mifflin, 1965, Water from low-permeability sediments and land subsidence: Water Resource Research, v. 1, no. 4, p. 563-576.

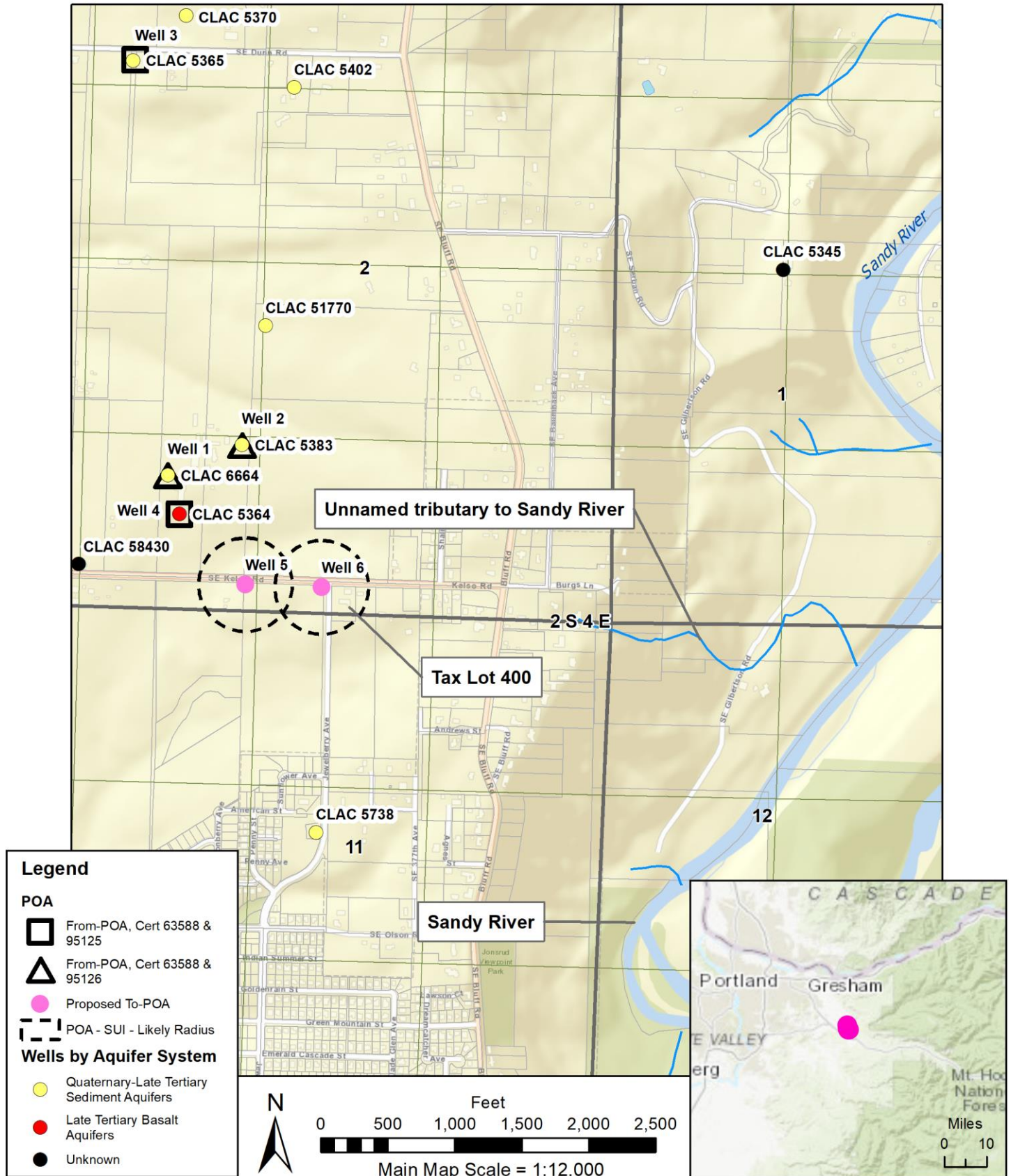
Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice Hall, Englewood Cliffs, New Jersey, 604 p.

Halford, K.J., and Kuniansky, E.L., 2002, Documentation of Spreadsheets for the Analysis of Aquifer-Test and Slug-Test Data, Open File Report 02-197, 51 p: U. S. Geological Survey, Reston, VA.

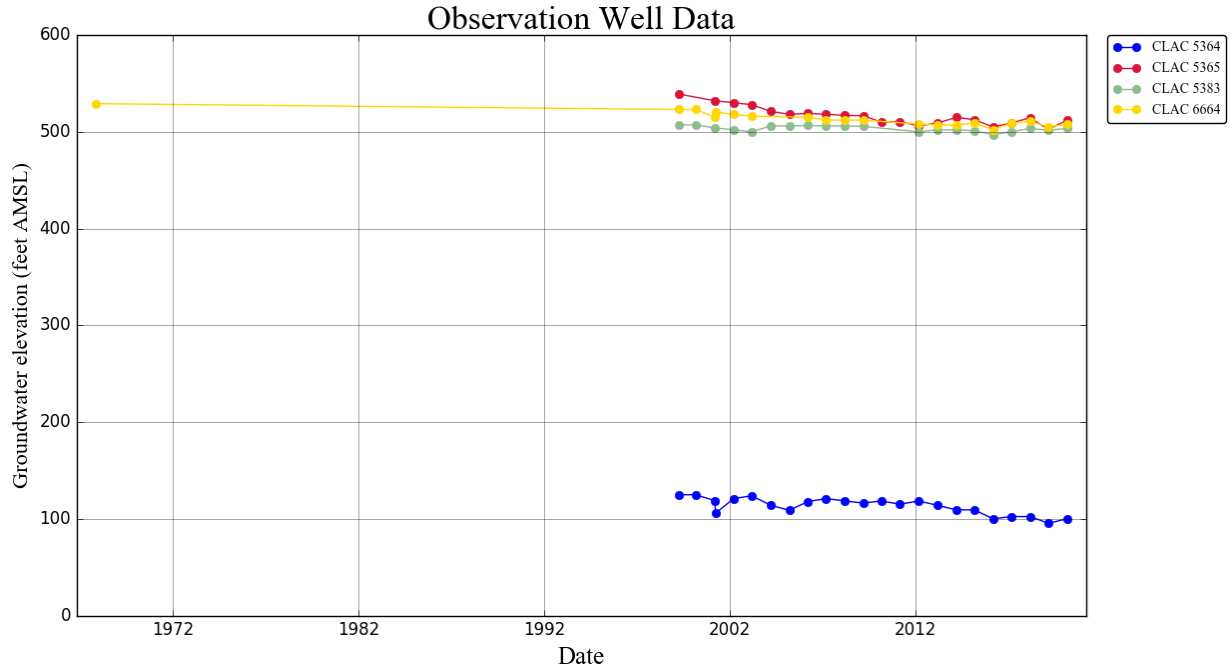
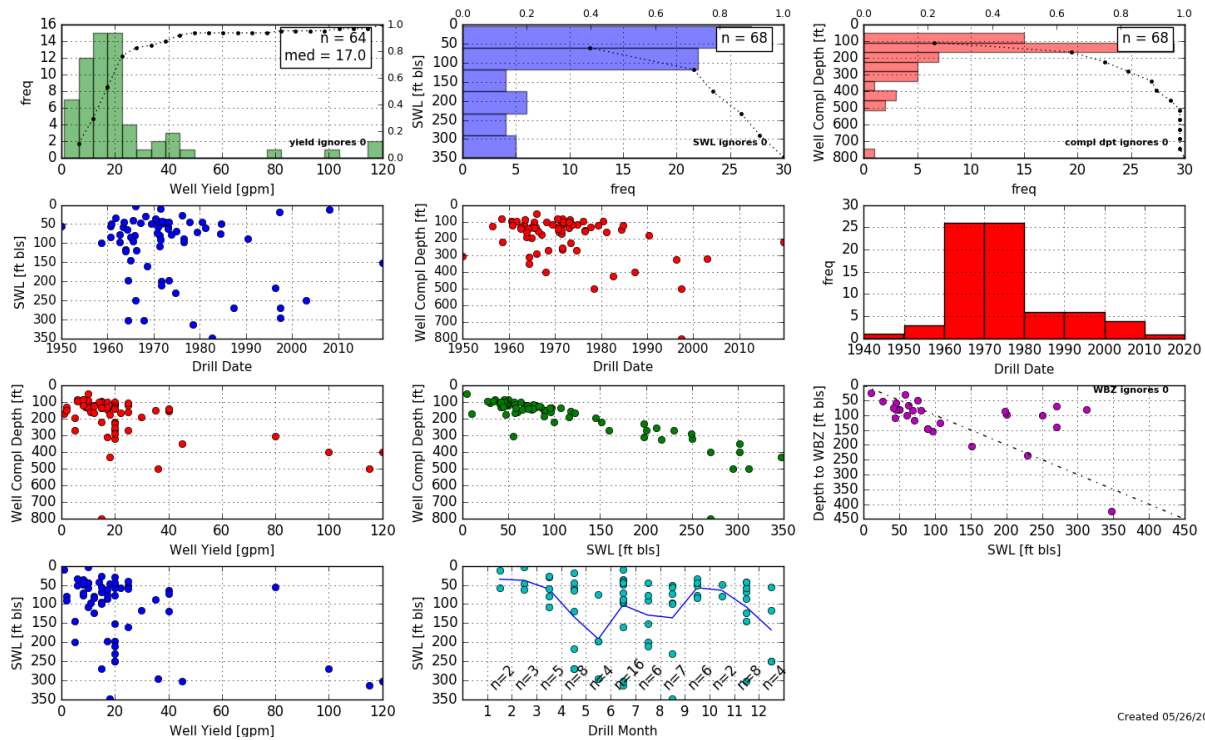
McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.

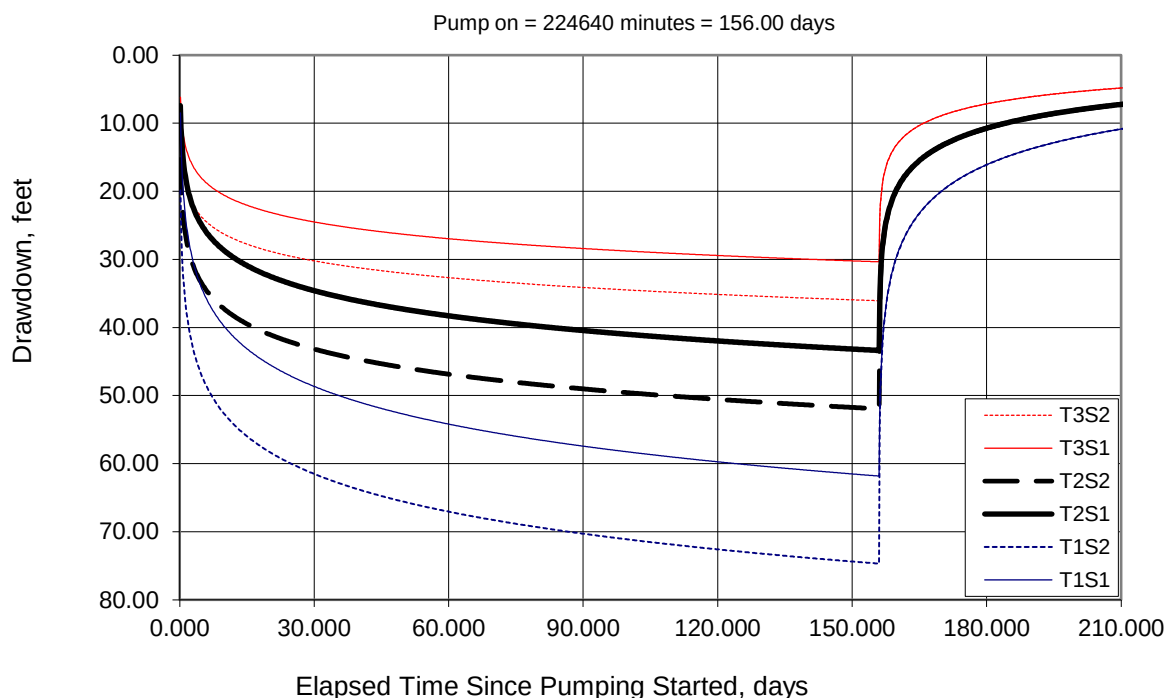
Swanson, R. D., McFarland, W. D., Gonthier, J. B., and Wilkinson, J. M., 1993, A description of hydrogeologic units in the Portland Basin, Oregon and Washington, Water-Resources Investigations Report 90-4196, 56 p.: U. S. Geological Survey, Reston, VA.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, American Geophysical Union Transactions, vol. 16, p. 519-524.

Well Location Map **T-13682 Stratford Landscape Supply**

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Hydrograph**Well Statistics – T2S/R4E S2 & S11**

Theis (1935) Drawdown AnalysisTheis Drawdown and Recovery at $r = 350$ ft From Pumping Well**T1 = 400 ft²/day | T2 = 600 ft²/day | T3 = 900 ft²/day [Local pumping test data]****S1 = 0.0005 | S2 = 0.0001 [McFarland and Morgan (1993) S = 0.00024 for Troutdale Sandstone]****Total pumping time = 156 days [Time to max allotment under max rate]****Pumping rate = 0.465 cfs [Proportional estimate based on application]****Radial distance from pumped well = 350 ft [Iteratively-estimated radius of SUI for majority of analyzed parameter space]****Substantial or Undue Interference (SUI) Estimate**

SWL Elevation	505 ft amsl	CLAC 6664 & CLAC 5383 measurements
Well Bottom Elevation	440 ft amsl	Local bottom of Troutdale sandstone aquifer per USGS WRI 90-4196
Water Column	65 ft	[SWL] - [Well Bottom Elevation]
Pump Above Bottom	5 ft	Estimate
NPSHa	5 ft	Estimate
Pump Rate	17 gpm	Median reported yield for area wells
Sp Cap	1.5 gpm/ft	Estimated from transmissivity per Driscoll (1989) w/ 70% efficiency
Pump Drawdown	11 ft	[Pump Rate]/[Sp Cap]
Min Available Drawdown	21 ft	[Pump Above Bottom] + [NPSHa] + [Pump Drawdown]
Estimated SUI	44 ft	[Water Column] - [Min Available Drawdown]