

Groundwater Application Review Summary Form

Application # G- 18921

GW Reviewer Phillip I. Marcy Date Review Completed: 05/14/2020

Summary of GW Availability and Injury Review:

☐ Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

☐ There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

☐ The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

WATER RESOURCES DEPARTMENT

MEMO

May 14, 2020

TO: Application G- 18921

FROM: GW: Phillip I. Marcy
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☒ YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ NO

☒ YES Use the Scenic Waterway Condition (Condition 7J)

☐ NO

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below

☒ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 05/14/2020
 FROM: Groundwater Section Phillip I. Marcy
 SUBJECT: Application G- 18921 Supersedes review of _____
 Reviewer's Name
 Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: Hong Guang Liu and Wing Kin Ng County: Clackamas

A1. Applicant(s) seek(s) 0.22 cfs from 1 well(s) in the Willamette Basin,
Clackamas River subbasin

A2. Proposed use Irrigation (40.5 acres) Seasonality: April 1st – October 31st (214 days)

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	Proposed	1	Alluvium	0.22	2S/3E-35 NW-SE	105'S, 344'E fr NE cor, DLC 44
2						
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	346	NA	NA	NA	~150	Unk.	0-100	Unk.	50-100	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The applicant proposes to construct a well to produce a maximum rate of 0.22 cfs of groundwater for primary irrigation of 40.5 acres. The proposed POA well is situated on Clackamas River and Estacada Terrace Deposits of Madin (2012), mapped by Trimble (1963) as Estacada Formation deposits of bouldery cobbles, overlying cross-bedded sands and silts, named simply "Qs". The proposed construction makes it likely that the groundwater will be proposed from "Subterraces of the Estacada Terrace of the Clackamas River" of Madin (2012).

A5. ☒ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, or ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
 Comments: The proposed POA well is greater than ¼ mile from the nearest surface water source, therefore pertinent basin rules do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: _____
 Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

- a. ☐ **is** over appropriated, ☐ **is not** over appropriated, or ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. ☐ **will not** or ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. ☐ **will not** or ☐ **will** likely to be available within the capacity of the groundwater resource; or
- d. ☒ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. ☒ The permit should contain condition #(s) 7N; "Medium Water Use Reporting";
 - ii. ☒ The permit should be conditioned as indicated in item 2 below.
 - iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

- B2.
- a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;
 - b. ☒ **Condition** to allow groundwater production from no shallower than 100 ft. below land surface;
 - c. ☐ **Condition** to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
 - d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

- B3. **Groundwater availability remarks:** There are no nearby observation wells with significant period of record to establish any groundwater trends representative of the target aquifer at this location. Little groundwater development has been undertaken in this area, however, and the proposed use is not anticipated to lead to excessive declines or interference with nearby permitted users, with nearest permitted well is greater than one mile from the proposed POA location. The nearest located well is domestic exempt use well CLAC 5302, which is only ~200 feet from the proposed POA, though the horizontal error for this site is up to 1,000 feet. Assuming the well is 200 feet away, however, there appears the possibility that the proposed use may have significant seasonal impacts to CLAC 5302, assuming the two wells are well-connected hydraulically.

An evaluation of possible impacts to nearby CLAC 5302, with a maximum depth of 57 feet, was performed using a Theis time-drawdown model. A range of parameters were employed in model runs, initially derived from a nearby aquifer test involving wells CLAC 56492 and CLAC 54178. The results of these calculations predict between less than one foot to greater than 45 feet of drawdown at CLAC 5302 as a result of pumping at 0.22 cfs for a period of 214 days. These calculations are based on the two wells producing from the same homogenous aquifer zone, with no significant barriers to flow.

Few construction details are given for the proposed well, excepting total depth (~150 feet) and casing interval (0-100 feet). To avoid the likelihood of significant hydraulic interference with nearby domestic wells, if a permit is issued it should be conditioned such that the POA well is constructed to produce from no less than 100 feet below land surface.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040**C1. 690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Terrace deposits of the Clackamas River	☒	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The proposed POA well targets Quaternary terrace deposits of the Clackamas River (Qst 2 of Madin, 2004), with the proposed location roughly 75 feet above the elevation of the Clackamas River to the east. Nearby well logs exhibit production from 5-10 foot thick horizons of sand and gravel both above and below the elevation of the river. Typically, reported static water levels are moderately above the elevation of respective water-bearing zones. This is representative of a zone of discharge in a locally dissected landscape, and it is anticipated that the piezometric surface here forms a gradient toward the Clackamas River. The presence of fine-grained sediments above the targeted production zone are responsible for the modest degree of local confinement observed above the elevation of the river.

C2. 690-09-040 (2) (3): Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Clackamas River	~275	184-210	4425	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The proposed POA well is likely to access zones well above the elevation of the nearby reach of the Clackamas River, which according to our conceptual model, likely discharge to springs and seeps at the margins of terrace deposits truncated by the Clackamas River, in addition to lower water-bearing zones near river level. The inevitable destination of groundwater discharged is the Clackamas River through overland or shallow subsurface flow, and is therefore hydraulically connected.

Water Availability Basin the well(s) are located within: Clackamas R > Willamette R – At Mouth

C3a. 690-09-040 (4): Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	☐	☐	MF80A	400	☐	822	☐	<<25%	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: There is no adequate analytical model available to properly predict timing of pumping impacts in a highly dissected aquifer system. The presence of fine-grained lithologies between water-bearing zones accessed by the proposed POA well and deeper zones directly connected to the river is anticipated to slow impacts of pumping to the Clackamas River.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: This section does not apply.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

- C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** _____

References Used:

Madin, I.P., 2004, Geologic Mapping & Database for Portland area fault studies: Final report, Clackamas, Multnomah & Washington Counties, OR, Open File Report O-04-02, Oregon Department of Geology and Mineral Industries, Portland, OR., map scale 1:24,000

Trimble, D.E., 1963, Geology of Portland, Oregon, and adjacent areas: U.S. Geological Survey Bulletin 1119, 119 p.

Ma, L., Madin, I.P., Duplantis, S., and Williams, K.J., Lidar-based surficial geologic map and database of the greater Portland, Oregon, area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries, Portland, OR., Open File Report O-2012-02, map scale 1:8,000.

Pump test files CLAC 56492 and CLAC 54178, OWRD well log database, OWRD Groundwater Information System (GWIS)

Theis, C.V., 1941, The effect of a well on the flow of a nearby stream: Am. Geophys. Union Trans., v. 22, pt.3, p. 734-738.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

D2. THE WELL does not appear to meet current well construction standards based upon:

- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

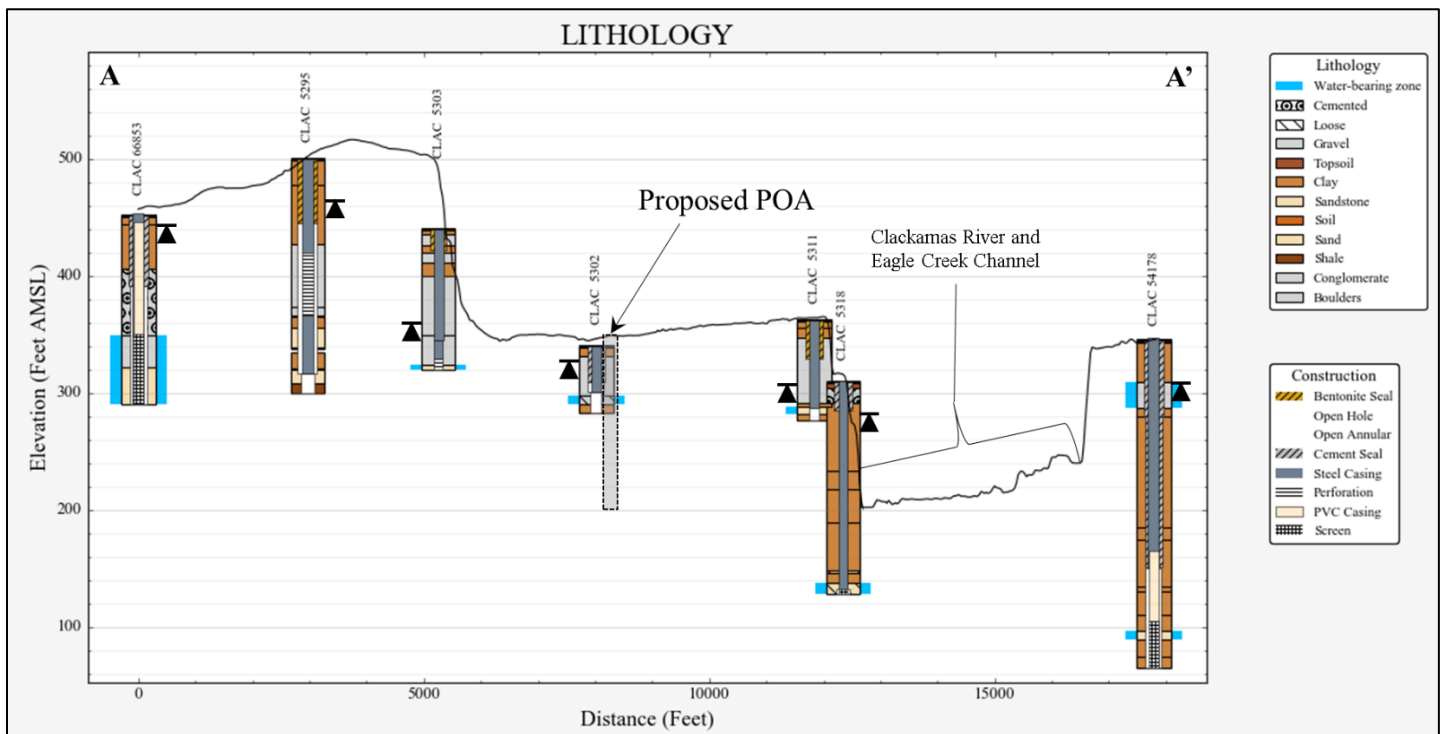
D3. THE WELL construction deficiency or other comment is described as follows: _____

D4. ☐ Route to the Well Construction and Compliance Section for a review of existing well construction.**Water Availability Tables**

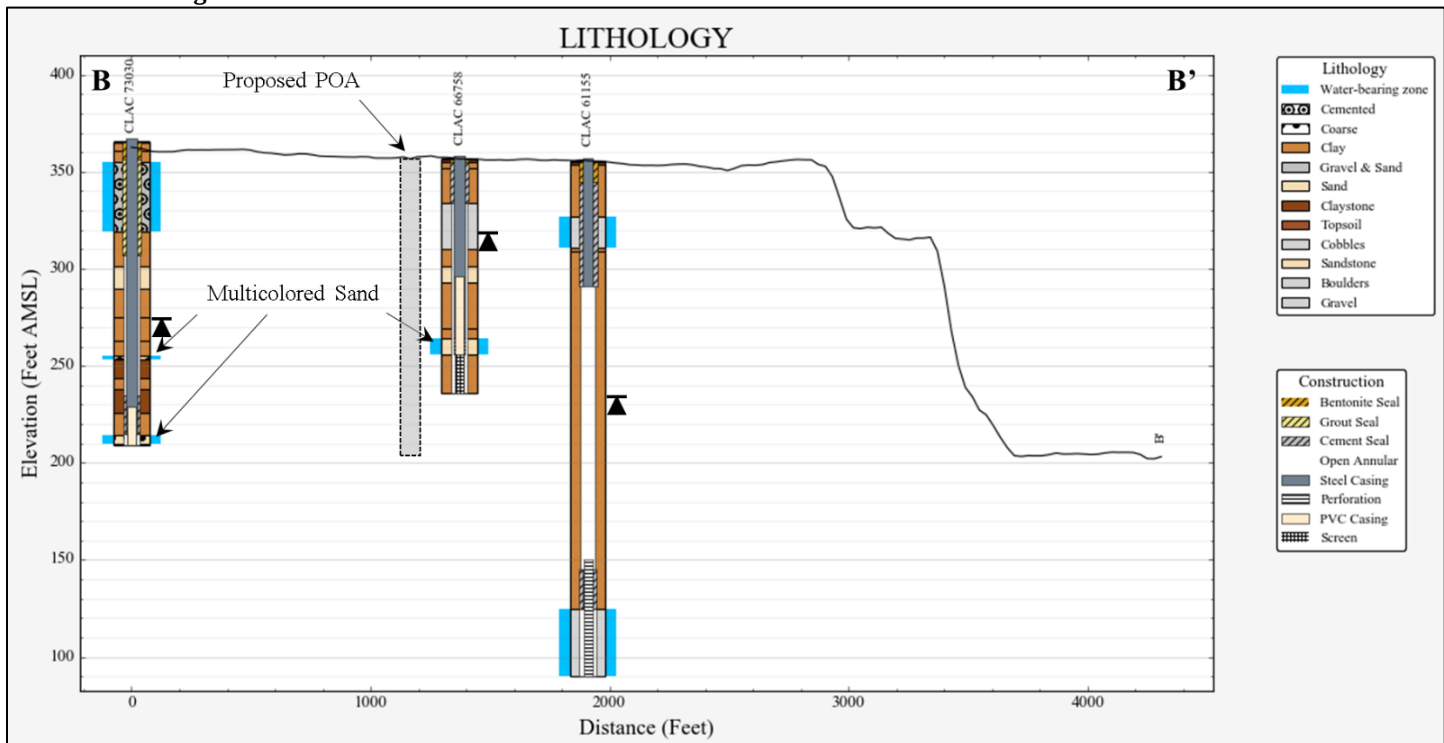
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 80		CLACKAMAS R > WILLAMETTE R - AT MOUTH			Exceedance Level: 80	
Time: 10:33 AM		Basin: WILLAMETTE			Date: 05/13/2020	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	2,670.00	326.00	2,340.00	0.00	1,000.00	1,340.00
FEB	2,900.00	362.00	2,540.00	0.00	1,000.00	1,540.00
MAR	2,800.00	330.00	2,470.00	0.00	1,000.00	1,470.00
APR	3,010.00	399.00	2,610.00	0.00	1,000.00	1,610.00
MAY	2,740.00	398.00	2,340.00	0.00	1,000.00	1,340.00
JUN	1,620.00	309.00	1,310.00	0.00	1,000.00	311.00
JUL	980.00	309.00	671.00	0.00	1,000.00	-329.00
AUG	822.00	294.00	528.00	0.00	890.00	-362.00
SEP	833.00	283.00	550.00	0.00	890.00	-340.00
OCT	882.00	276.00	606.00	0.00	1,000.00	-394.00
NOV	1,630.00	324.00	1,310.00	0.00	1,000.00	306.00
DEC	2,650.00	328.00	2,320.00	0.00	1,000.00	1,320.00
ANN	2,110,000	238,000	1,870,000	0	711,000	1,200,000

DETAILED REPORT OF INSTREAM REQUIREMENTS														
Watershed ID #: 80		CLACKAMAS R > WILLAMETTE R - AT MOUTH										Basin: WILLAMETTE		
Time: 10:34 AM												Date: 05/13/2020		
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Monthly values are in cfs.														
MF80A	CERTIFICATE	640.0	640.0	640.0	640.0	640.0	640.0	400.0	400.0	640.0	640.0	640.00	640.0	
SY90206A	SWW	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	890.0	890.0	1000.0	1000.00	1000.0	
MAXIMUM		1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	890.0	890.0	1000.0	1000.0	1000.0	

[illegible]



Section A-A': CLAC 5302, in addition to many other nearby domestic wells, produces groundwater from shallow zones of the Estacada Formation of Trimble (1963). Reported driller's measurements at each site suggest that groundwater elevations somewhat mimic land surface elevations, flowing east toward the Clackamas River in the area of interest. To avoid the likelihood of excessive interference with nearby wells, the POA well shall produce only from deeper zones within this sequence, from 100 feet or greater below land surface.



Section B-B': Three wells of various completion depths, whose positions are nearly perpendicular to the hydraulic gradient, display significantly different water levels, with each successive water-bearing zone having a lower head. POA well are completed into three distinctly different water-bearing zones, which all report significantly different groundwater elevations.