

**CLAIM OF  
BENEFICIAL USE  
for Transfer with Multiple  
Changes – Surface Water**



**Oregon Water Resources Department**  
725 Summer Street NE, Suite A  
Salem, Oregon 97301-1266  
(503) 986-0900  
[www.oregon.gov/OWRD](http://www.oregon.gov/OWRD)

**A fee of \$230 must accompany this form for any Transfer final orders including a water right with a priority date of July 9, 1987, or later.**

**Example – A transfer involves 5 rights and one of the rights has a priority date of July 9, 1987, or later, the fee is required.**

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**A separate form shall be completed for each transfer.**

This form is subject to revision. **Begin each new claim** by checking for a new version of this form at:

<https://www.oregon.gov/OWRD/Forms/Pages/default.aspx>

The completion of this form is required by OAR 690-014-0100(1) and 690-014-0110(4).

Please type or print in dark ink. If this form is found to contain errors or omissions, it may be returned to you. **Every item must have a response.** If any requested information does not apply to the claim, insert "NA." **Do not delete or alter any section of this form unless directed by the form.** The Department may require the submittal of additional information from any water user or authorized agent.

"Section 8" of this form is intended to aid in the completion of this form and should not be submitted.

A claim of beneficial use includes both this report and a map. If the map is being mailed separately from this form, please include a note with this form indicating such.

If you have questions regarding the completion of this form, please call 503-979-9103.

The Department has a program that allows it to enter into a voluntary agreement with an applicant for expedited services. Under such an agreement, the applicant pays the cost to hire additional staff that would not otherwise be available. This program means a certificate may be issued in about a month. For more information on this program see:

<https://www.oregon.gov/OWRD/programs/WaterRights/RA/Pages/default.aspx>

**SECTION 1**

**GENERAL INFORMATION**

**Type of Authorized Change**

This Claim is being submitted for a transfer involving multiple changes.

**YES NO**

Mark all that apply:

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Change in POD(s) or Additional POD(s) | 2. <input checked="" type="checkbox"/> Change in Place of Use      |
| 3. <input type="checkbox"/> Change in Character of Use                       | 4. <input type="checkbox"/> Change in Character of Use – Reservoir |

*A separate section will be completed for each type of change authorized in the transfer final order.*

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1. File Information

APPLICATION # <b>T-11948</b>
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2. Property Owner (current owner information)

APPLICANT/BUSINESS NAME <b>Otto and Fay Keller</b>		PHONE NO. <b>(503) 7025-9574</b>	ADDITIONAL CONTACT NO.
ADDRESS <b>13878 SE Mountain Crest Drive</b>			
CITY <b>Happy Valley</b>	STATE <b>OREGON</b>	ZIP <b>97086</b>	E-MAIL <b>fabfay@frontier.com</b>

If the current property owner is not the transfer holder of record, it is recommended that an assignment be filed with the Department. **Each** transfer holder of record must sign this form.

3. Transfer holder of record (this may, or may not, be the current property owner)

TRANSFER HOLDER OF RECORD <b>Otto and Fay Keller</b>		
ADDRESS <b>13878 SE Mountain Crest Drive</b>		
CITY <b>Happy Valley</b>	STATE <b>OREGON</b>	ZIP <b>97086</b>

4. Date of Site Inspection:

<b>June 19, 2020</b>
----------------------

5. Person(s) interviewed and description of their association with the project:

NAME	DATE	ASSOCIATION WITH THE PROJECT
<b>Otto Keller</b>	<b>June 19, 2020</b>	<b>Applicant (Owner)</b>

6. County:

<b>Crook County</b>
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7. If any property described in the place of use of the transfer final order is excluded from this report, identify the owner of record for that property (ORS 537.230(5)):

OWNER OF RECORD <b>N/A</b>		
ADDRESS		
CITY	STATE	ZIP

Add additional tables for owners of record as needed

**SECTION 2  
SIGNATURES**

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CWRE Statement, Seal and Signature

The facts contained in this Claim of Beneficial Use are true and correct to the best of my knowledge.



CWRE NAME <b>Kaid E. McKay</b>		PHONE NO. <b>(50.3) 648-6475</b>	ADDITIONAL CONTACT NO. <b>(503) 828-8831</b>
ADDRESS <b>205 SE 3<sup>rd</sup> Avenue, Suite 600</b>			
CITY <b>Hillsboro</b>	STATE <b>OREGON</b>	ZIP <b>97123</b>	E-MAIL <b>kaid.mckay@mckayconsultingllc.com</b>

Transfer Holder of Record Signature or Acknowledgement

**Each** transfer holder of record must sign this form in the space provided below.

The facts contained in this Claim of Beneficial Use are true and correct to the best of my knowledge. I request that the Department issue a water right certificate.

SIGNATURE	PRINT OR TYPE NAME	TITLE	DATE
	<b>Otto Keller</b>	<b>Owner</b>	<b>2/10/23</b>
	<b>Fay Keller</b>	<b>Owner</b>	<b>2/10/23</b>

**SECTION 3**  
**Changes Made**

**Note: The Claim only needs to describe the changes that were authorized in the transfer final order.**

**Change #1**

**New or Additional Point of Diversion**  
**Change in POD(s) or Additional POD(s)**

Did the transfer order authorize a change in the points of diversion or additional points of diversion?

YES  NO

If "NO", this Section can be deleted.

**1. New or additional point of diversion name or number:**

POINT OF DIVERSION (POD) NAME OR NUMBER (CORRESPOND TO MAP)	SOURCE
POD #1	South Fork Crooked River
POD #2	South Fork Crooked River
POD #3	South Fork Crooked River

**2. Variations:**

Was the use developed differently from what was authorized by the transfer final order, or extension final?

YES  NO

If yes, describe below.

(e.g. "The order allowed three new/additional points of diversion. The water user only developed one of the points.")

The transfer approved a total of 3 PODs. POD #2 was the most upstream and POD #3 for the most downstream. POD #1 was between the other two. POD #1 was developed about 640 feet upstream from the approved location but was still between the other two PODs.

**3. Claim Summary:**

NEW OR ADDITIONAL POD NAME OR #	MAXIMUM RATE AUTHORIZED IN ORDER	CALCULATED THEORETICAL RATE BASED ON SYSTEM	AMOUNT OF WATER MEASURED
POD #1	0.27 CFS*	0.73 CFS	Not Measured
POD #2	0.27 CFS*	0.49 CFS	Not Measured
POD #3	0.27 CFS*	0.68 CFS	Not Measured

\* A single portable pump and fish is used at each POD so the full allowed rate for the water right of 0.27 CFS allowed at each POD.

**System Description**

Are there multiple new or additional Points of Diversion (POD)?

YES  NO

If "YES" you will need to copy and complete Sections A, B, or C in this Section for each POD.

POD Name or Number this section describes (only needed if there is more than one):

**POD #1**

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**A. POD System Information**

Provide the following information concerning the point of diversion. Information provided must describe the equipment used to appropriate water from the point of diversion.

**1. Pump Information**

MANUFACTURER	MODEL	SERIAL NUMBER	TYPE (CENTRIFUGAL, TURBINE OR SUBMERSIBLE)	INTAKE SIZE	DISCHARGE SIZE
<b>Berkeley</b>	<b>B3ZRM</b>	<b>001M09K</b>	<b>Centrifugal</b>	<b>3"</b>	<b>3"</b>

**2. Motor Information**

MANUFACTURER	HORSEPOWER
<b>Honda (GX630)</b>	<b>13 HP</b>

**3. Theoretical Pump Capacity**

HORSEPOWER	OPERATING PSI	LIFT FROM SOURCE TO PUMP	LIFT FROM PUMP TO PLACE OF USE	TOTAL PUMP OUTPUT (IN CFS)
<b>13</b>	<b>36 PSI</b>	<b>3 feet</b>	<b>7 feet</b>	<b>0.73 CFS</b>

**4. Provide pump calculations:**

**See Attached Calculations**

**5. Measured Pump Capacity (using meter if meter was present and system was operating)**

INITIAL METER READING	ENDING METER READING	DURATION OF TIME OBSERVED	TOTAL PUMP OUTPUT (IN CFS)
<b>Not Measured</b>			

**Reminder: For pump calculations use the reference information at the end of this document.**

**6. Additional notes or comments related to the system:**

POD #2

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### A. POD System Information

Provide the following information concerning the point of diversion. Information provided must describe the equipment used to appropriate water from the point of diversion.

#### 1. Pump Information

MANUFACTURER	MODEL	SERIAL NUMBER	TYPE (CENTRIFUGAL, TURBINE OR SUBMERSIBLE)	INTAKE SIZE	DISCHARGE SIZE
Berkeley	B3ZRM	001M09K	Centrifugal	3"	3"

#### 2. Motor Information

MANUFACTURER	HORSEPOWER
Honda (GX630)	13 HP

#### 3. Theoretical Pump Capacity

HORSEPOWER	OPERATING PSI	LIFT FROM SOURCE TO PUMP	LIFT FROM PUMP TO PLACE OF USE	TOTAL PUMP OUTPUT (IN CFS)
13	69 PSI	3 feet	6 feet	0.49 CFS

#### 4. Provide pump calculations:

See Attached Calculations

#### 5. Measured Pump Capacity (using meter if meter was present and system was operating)

INITIAL METER READING	ENDING METER READING	DURATION OF TIME OBSERVED	TOTAL PUMP OUTPUT (IN CFS)
Not Measured			

Reminder: For pump calculations use the reference information at the end of this document.

#### 6. Additional notes or comments related to the system:

POD #3

**A. POD System Information**

Provide the following information concerning the point of diversion. Information provided must describe the equipment used to appropriate water from the point of diversion.

**1. Pump Information**

MANUFACTURER	MODEL	SERIAL NUMBER	TYPE (CENTRIFUGAL, TURBINE OR SUBMERSIBLE)	INTAKE SIZE	DISCHARGE SIZE
Berkeley	B3ZRM	001M09K	Centrifugal	3"	3"

**2. Motor Information**

MANUFACTURER	HORSEPOWER
Honda (GX630)	13 HP

**3. Theoretical Pump Capacity**

HORSEPOWER	OPERATING PSI	LIFT FROM SOURCE TO PUMP	LIFT FROM PUMP TO PLACE OF USE	TOTAL PUMP OUTPUT (IN CFS)
13	36 PSI	3 feet	17 feet	0.68 CFS

**4. Provide pump calculations:**

See Attached Calculations

**5. Measured Pump Capacity (using meter if meter was present and system was operating)**

INITIAL METER READING	ENDING METER READING	DURATION OF TIME OBSERVED	TOTAL PUMP OUTPUT (IN CFS)
Not Measured			

Reminder: For pump calculations use the reference information at the end of this document.

**6. Additional notes or comments related to the system:**

Water was taken from POD #3 by bucket for domestic use in the bunk house located in the SW1/4 of the SE1/4 of Section 1.

## B. Gravity Flow Pipe

(THE DEPARTMENT TYPICALLY USES THE HAZEN-WILLIAM'S FORMULA FOR A GRAVITY FLOW PIPE SYSTEM)

1. Does the diversion involve a gravity flow pipe?

YES  NO

If "NO", items 2 through 4 relating to this section may be deleted.

## C. Gravity Flow Canal or Ditch

(THE DEPARTMENT TYPICALLY USES MANNING'S FORMULA FOR CANALS AND DITCHES)

1. Does the diversion involve a gravity flow ditch or canal?

YES  NO

If "NO", items 2 through 4 relating to this section may be deleted.

### Change #2

#### Change in Place of Use

Did the transfer order authorize a change in the place of use?

YES  NO

If "NO", this Section can be deleted.

1. Claim Summary – Authorized Use:

If Irrigation or Nursery Use:

THE # OF ACRES ALLOWED	THE # OF ACRES DEVELOPED
22.0 Acres	22.0 Acres

2. Variations:

Was the use developed differently from what was authorized by the transfer final order?  YES  NO

If yes, describe below.

(e.g. "The order authorized a change in place of use for 40 acres. The water user only developed 38 acres.")

Final places of use (field location) differed slightly because final configurations of wheel irrigation systems purchased.

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**Change #3**

**Change in Character of Use**

Did the transfer order authorize a change in character of use?

*If "NO", this Section can be deleted.*

YES  NO

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**Change #4**

**Change in Character of Use – Reservoir**

Did the transfer order authorize a change in character of use for a reservoir?

*If "NO", this Section can be deleted.*

YES  NO

**SECTION 4  
CONDITIONS**

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All conditions contained in the transfer final order, or any extension final order shall be addressed. Reports that do not address all performance related conditions will be returned.

**1. Time Limits:**

Describe how the water user has complied with each of the development timelines established in the transfer final order and any extensions of time issued for the transfer:

	DATE FROM TRANSFER	DATE THE AUTHORIZED CHANGES WERE COMPLETED *THIS DATE MUST FALL BETWEEN THE "ISSUANCE DATE" AND THE "COMPLETENESS DATE"
ISSUANCE DATE	July 1, 2015	
COMPLETENESS DATE FROM ORDER (C)	October 1, 2017	July 2016

\* MUST BE WITHIN PERIOD BETWEEN TRANSFER FINAL ORDER, OR ANY EXTENSION FINAL ORDER ISSUANCE AND THE DATE TO COMPLETE THE CHANGE

**2. Is there an extension final order(s)?**  
If "NO", you may delete the following table.

YES  NO

**3. Measurement Conditions:**

a. Does the transfer final order, or any extension final order require the installation of a meter or other approved measuring device?

YES  NO

If "NO", items b through f relating to this section may be deleted.

Reminder: If a meter or approved measuring device was required, the COBU map must indicate the location of the device in relation to the point of diversion.

b. Has a meter been installed?

YES  NO

**c. Meter Information**

POD NAME OR #	MANUFACTURER	SERIAL #	CONDITION (WORKING OR NOT)	CURRENT METER READING	DATE INSTALLED
POD #1	McCrometer	00-6367-3*	Working	3185800 Gallons	July 2016
POD #2	McCrometer	00-6367-3*	Working	3185800 Gallons	July 2016
POD #3	McCrometer	00-6367-3*	Working	3185800 Gallons	July 2016

\* A single portable system is used at each POD so the pump, motor, meter and fish screen are the same for each POD.

If a meter has been installed, items d through f relating to this section may be deleted.

**4. Recording and reporting conditions**

a. Is the water user required to report the water use to the Department?

YES  NO

If "NO", item b relating to this section may be deleted.

5. Fish Screening

a. Are any points of diversion required to be screened to prevent fish from entering the point of diversion? **YES** NO **OWRD**

If "NO", items b through e relating to this section may be deleted.

Reminder: If fish screening devices were required, the COBU map must indicate their location in relation to the point of diversion.

b. Has the fish screening been installed? YES NO

c. When was the fish screening installed?

DATE	By WHOM
July 2016	Otto Keller (Owner)

Reminder: If the permit or transfer final order was issued on or after February 1, 2011, the fish screen is required to be approved by the Oregon Department of Fish and Wildlife regardless of the rate of diversion.

d. If the diversion involves a pump and the total diversion rate of all rights at the point of diversion is less than 225 gpm (0.5 cfs) and the permit was issued prior to February 1, 2011:

- Has the self-certification form previously been submitted to the Department **NA** YES NO

If not, go to <https://www.oregon.gov/OWRD/Forms/Pages/default.aspx>, complete and attach a copy of the 'ODFW Small Pump Screen Self Certification' form to this claim, and send a copy of it to the Oregon Department of Fish and Wildlife (ODFW).

Reminder: Failure to submit evidence of a timely installed fish screen may result in an unfavorable determination. The ODFW self certification form needs to have been previously submitted or be attached to this form.

e. If the diversion does not involve a pump or the total diversion rate of all rights at the point of diversion is 225 gpm (0.5 cfs) or greater:

- Has the ODFW approval been previously submitted? **NA** YES NO

If not, contact and work with ODFW to ensure compliance. To demonstrate compliance, provide signed documentation from ODFW. A form is available at:

<https://www.oregon.gov/OWRD/Forms/Pages/default.aspx>

Reminder: Failure to submit evidence of a timely installed fish screen may result in an unfavorable determination. In order to receive a favorable approval, the ODFW/WRD "Fish Screen Inspection" form needs to have been previously submitted or be attached to this form.

6. By-pass Devices

a. Are any points of diversion required to have a by-pass device to prevent fish from entering the point of diversion? YES **NO**

If "NO", items b and c relating to this section may be deleted.

7. Other conditions required by the transfer final order or extension final order:

- a. Was the water user required to restore the riparian area if it was disturbed? YES  NO
- b. Was a fishway required? YES  NO
- c. Other conditions? YES  NO

If "YES" to any of the above, identify the condition and describe the water user's actions to comply with the condition(s):

N/A

**SECTION 5  
ATTACHMENTS**

Provide a list of any additional documents you are attaching to this report:

ATTACHMENT NAME	DESCRIPTION
Claim of Beneficial Use Map	Claim of Beneficial Use Map
Theoretical Flow Calculations	Theoretical Flow Calculations (9 sheets)
ODFW Fish Screen Approval	ODFW Fish Screen Approval

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## SECTION 6

### CLAIM OF BENEFICIAL USE MAP

The Claim of Beneficial Use Map must be submitted with this claim. Claims submitted without the Claim of Beneficial Use map will be returned. The map shall be submitted on polyester film at a scale of 1" = 1320 feet, 1" = 400 feet, or the original full-size scale of the county assessor map for the location.

For the purpose of this Claim, the map identifying the location of the place of use does not require a new survey. The location of the place of use identified on the Claim map should be based on the original right of record at the time the transfer final order was issued. In transfers approved for additional points of diversion, the original points must be identified the map based on the original right of record at the time the transfer final order was issued.

Provide a general description of the survey method used to prepare the map. Examples of possible methods include, but are not limited to, a traverse survey, GPS, or the use of aerial photos. If the basis of the survey is an aerial photo, provide the source, date, series and the aerial photo identification number.

Irrigation areas and Points of Diversion shown on the claim map were located using survey grade Global Navigation Satellite System (GNSS). Property lines are based on tax maps, the location of the South Fork Crooked River was determined using a Google Earth aerial photo dated July 2017.

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## Map Checklist

Please be sure that the map you submit includes ALL the items listed below.  
(Reminder: Incomplete maps and/or claims may be returned.)

- Map on polyester film
- Appropriate scale (1" = 400 feet, 1" = 1320 feet, or the original full-size scale of the county assessor map)
- Township, Range, Section, Donation Land Claims, and Government Lots
- If irrigation, number of acres irrigated within each projected Donation Land Claims, Government Lots, Quarter-Quarters
- Locations of fish screens and/or fish by-pass devices in relationship to point of diversion
- Locations of meters and/or measuring devices in relationship to point of diversion or appropriation
- Conveyance structures illustrated (pumps, reservoirs, pipelines, ditches, etc.)
- Point(s) of diversion or appropriation (illustrated and coordinates)
- Tax lot boundaries and numbers
- Source illustrated if surface water
- Disclaimer ("This map is not intended to provide legal dimensions or locations of property ownership lines")
- Application and permit number or transfer number
- North arrow
- Legend
- CWRE stamp and signature

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2022-12-27

KELLER WATER RIGHTS J.N. 13005

1/7

TRANSFER: T-11948

## PUMP / FLOW CALCULATIONS

THE OWNER HAS FOUR FIELDS THAT ARE IRRIGATED FROM THREE PODS. FIELD #1 IS IN THE NW  $\frac{1}{4}$  OF THE SE  $\frac{1}{4}$  AND THE SW  $\frac{1}{4}$  OF THE SE  $\frac{1}{4}$  OF SECTION 1, T18S, R22E. AND IRRIGATED FROM POD #3.

FIELD #2 IS IN THE SW  $\frac{1}{4}$  OF THE SE  $\frac{1}{4}$  AND THE SE  $\frac{1}{4}$  OF THE SE  $\frac{1}{4}$  OF SECTION 1, T18S, R22E AND IS IRRIGATED FROM POD #1.

FIELD #3 IS IN THE SE  $\frac{1}{4}$  OF THE SE  $\frac{1}{4}$  OF SECTION #1, T18S, R22E AND GOVERNMENT LOT 7 OF SECTION 6, T18S, R23E. THE FIELD IS IRRIGATED FROM POD #1.

FIELD #4 IS IN GOVERNMENT LOT 7 OF SECTION #6, T18S, R23E AND IS IRRIGATED FROM POD #2.

THE OWNER USE THE SAME PORTABLE PUMP, METER AND FISH SCREEN AT EACH POD. THE PUMP IS CENTRIFUGAL PUMP AND IS DRIVEN BY A 13 HORSE POWER HONDA MOTOR. WATER IS PUMPED FROM THE SOUTH FORK OF THE CROOKED RIVER TO WHERE FIELDS ARE IRRIGATED BY WHEEL LINES.

THE FOLLOWING ARE THEORETICAL FLOW CALCULATIONS FOR EACH FIELD.

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KELLER WATER RIGHTS

J.N. 13005

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FIELD #1 (POD #3) FLOW CALCULATIONS

ELEVATION #1 (RIVER): 3768 ft  
ELEVATION PUMP : 3771 ft  
ELEVATION #2 (FIELD): 3788 ft

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PIPE FROM POD TO FIELD

SIZE (DIAMETER): 5"  
LENGTH : 228'  
MATERIAL : ALUMINUM  
ROUGHNESS COEFFICIENT: 130

WHEEL LINE

LENGTH : 1035'  
PIPE DIAMETER: 4"  
MATERIAL : ALUMINUM  
SPRINKLER HEADS: 27  
NOZZEL SIZE: 1/4"

PUMP

PUMP TYPE : CENTRIFUGAL  
EFFICIENCY CONSTANTS : 6.61  
POWER : 13 HORSE POWER

PER BERNOULLI'S EQUATION:

SPRINKLE HEAD = PH - PL - WL = ΔE (ELEVATION)

$$PH = \text{PUMP HEAD} = \frac{(\text{HORSE POWER}) (\text{PUMP EFFICIENCY})}{\text{FLOW RATE}}$$

$$PL = \text{PIPE LOSS} = \frac{4.784 Q^{1.852} L}{C^{1.852} d^{4.87}}$$

$$WL = \text{WHEEL LINE LOSS}^* = \frac{4.784 (Q/2)^{1.852} L}{C^{1.852} d^{4.87}}$$

NOTES

\* FLOW IN THE WHEEL LINE PIPE VARIES FROM THE FULL DESIGN CAPACITY AT THE ENTRANCE TO THE CAPACITY OF THE LAST SPRINKLER AT THE END. FOR THIS REASON I USED A FLOW OF ONE HALF THE DESIGN FLOW TO CALCULATE WHEEL LINE LOSSES



2022-12-27 KELLER WATER RIGHTS J.N. 13005

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TRANSFER: T-11948

FIELD #1 (POD#3) FLOW CALCULATIONS - CONTINUED

SPRINKLER PRESSURE ASSUMED: 36 PSI  
SPRINKLER FLOW: 11.24 GPM  
TOTAL FLOW =  $27 \times 11.24 \text{ GPM} = 303.48 \text{ GPM}$   
= 0.676 CFS ←

$$\text{PUMP HEAD} = \frac{(13 \text{ HP})(6.61)}{0.676 \text{ CFS}} = 127.1 \text{ ft} \leftarrow$$

$$\text{PIPE LOSS} = \frac{4.784 (0.676)^{1.852} (228 \text{ ft})}{(130)^{1.852} \left(\frac{5}{12}\right)^{4.87}} = 4.6 \text{ ft} \leftarrow$$

$$\text{WHEEL LINE LOSS} = \frac{4.784 \left(\frac{0.676}{2}\right)^{1.852} (1035 \text{ ft})}{(130)^{1.852} \left(\frac{4}{12}\right)^{4.87}} = 17.0 \text{ ft} \leftarrow$$

$$\begin{aligned} \text{SPRINKLER HEAD} &= 127.1 - 4.6 - 17.0 - (2788 - 3768) \\ &= 85.5 \text{ Feet} * 0.433 \text{ PSI/ft} \\ &= 37 \text{ PSI} \end{aligned}$$

O.K. CHECKS  
WITH IN 1 PSI

FIELD #1

PUMP FLOW = 0.68 CFS

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2022-12-27 KELLER WATER RIGHTS J.N.; 13005

TRANSFER: T-11948

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FIELD #2 (POD #1) FLOW CALCULATIONS

ELEVATION #1 (RIVER) : 3776 FT  
ELEVATION PUMP : 3779 FT  
ELEVATION #2 (FIELD) : 3786 FT

PIPE FROM POD TO FIELD  
SIZE (DIAMETER) : 5"  
LENGTH : 1370 FEET  
MATERIAL : ALUMINUM  
ROUGHNESS COEFFICIENT : 130

WHEEL LINE  
LENGTH : 525 FEET  
PIPE DIAMETER : 4"  
MATERIAL : ALUMINUM  
ROUGHNESS COEFFICIENT : 130  
SPRINKLE HEADS : 14  
NOZZEL SIZE : 9/32"

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PUMP  
PUMP TYPE : CENTRIFUGAL  
EFFICIENCY CONSTANT : 6.61  
POWER : 13 HORSE POWER

SPRINKLER PRESSURE ASSUMED : 55 PSI  
FLOW PER SPRINKLER : 17.40 GPM  
TOTAL FLOW =  $14 \times 17.40 \text{ GPM} = 243.6 \text{ GPM} = 0.54 \text{ cfs}$  ←

$$\text{PUMP HEAD} = (13 \text{ HP}) (6.61) / (0.54 \text{ cfs}) = 158.3 \text{ ft}$$

$$\text{PIPE LOSS} = \frac{4.784 (0.54)^{1.852} (1370 \text{ ft})}{(130)^{1.852} \left(\frac{5}{12}\right)^{4.87}} = 18.1 \text{ ft} \leftarrow$$

$$\text{WHEEL LINE LOSS} = \frac{4.784 \left(\frac{0.54}{2}\right)^{1.852} (525 \text{ ft})}{(130)^{1.852} \left(\frac{4}{12}\right)^{4.87}} = 5.7 \text{ ft} \leftarrow$$

$$\text{SPRINKLER HEAD} = 158.3 - 18.1 - 5.7 - (3786 - 3776) = 124.5 \text{ ft} = \underline{54 \text{ PSI}} \quad \text{O.K.}$$

CHECK WITH IN 10 PSI

FIELD #2 PUMP FLOW = 0.54 cfs

2022-12-27

KELLER WATER RIGHTS J.N. 13005  
TRANSFER T-1194B

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FIELD #3 (POD #1) FLOW CALCULATIONS

ELEVATION #1 (RIVER) : 3776 ft  
ELEVATION @ PUMP : 3779 ft  
ELEVATION #2 (FIELD) : 3786 ft

PIPE FROM POD TO FIELD  
SIZE (DIAMETER) : 5"  
LENGTH : 30ft  
MATERIAL : ALUMINUM  
ROUGHNESS COEFFICIENT : 130

WHEEL LINE  
SIZE (DIAMETER) : 4"  
LENGTH : 1160 ft  
MATERIAL : ALUMINUM  
ROUGHNESS COEFFICIENT : 130  
SPRINKLER HEADS : 29  
NOZZEL SIZE : 1/4"

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PUMP  
PUMP TYPE : CENTRIFUGAL  
EFFICIENCY CONSTANT : 6.61  
POWER : 13 HORSE POWER

SPRINKLER PRESSURE ASSUMED : 36 PSI  
FLOW PER SPRINKLER : 11.24 GPM  
TOTAL FLOW = 29 X 11.24 GPM = 326 GPM = 0.726 cfs ←

PUMP HEAD = (13 HP X 6.61) / 0.726 cfs = 118.4 ft ←

PIPE LOSS =  $\frac{4.784 (0.726 \text{ cfs})^{1.852} (30 \text{ ft})}{(130)^{1.852} (\frac{5}{12})^{4.87}}$  = 0.7 ft ←

WHEEL LINE LOSS =  $\frac{4.784 (\frac{0.726}{2})^{1.852} (1160 \text{ ft})}{(130)^{1.852} (\frac{4}{12})^{4.87}}$  = 21.8 ft ←

SPRINKLER HEAD = 118.4 ft - 0.7 ft - 21.8 ft - (3786 - 3776)  
= 85.9 ft = 37 PSI OK

CHECKS WITHIN 1.0 PSI

FIELD #3 Pump Flow = 0.73 cfs

2022-12-27 KELLER WATER RENTS J.N. 13005

6/7

FIELD #4 (POD #2) FLOW CALCULATIONS

ELEVATION #1 (RIVER) : 3780 ft  
 ELEVATION @ PUMP : 3783 ft  
 ELEVATION #2 (FIELD) : 3789 ft

PIPE FROM POD TO FIELD  
 SIZE (DIAMETER) : 4"  
 LENGTH : 110 ft  
 MATERIAL : ALUMINUM  
 ROUGHNESS COEFFICIENT : 130

WHEEL LINE  
 PIPE SIZE (DIAMETER) : 4"  
 LENGTH : 520 ft  
 MATERIAL : ALUMINUM  
 ROUGHNESS COEFFICIENT : 130

PUMP TYPE : CENTRIFUGAL  
 EFFICIENCY CONSTANT : 6.61  
 POWER : 13 HORSE POWER

RECEIVED  
 FEB 22 2023  
 OWRD

SPRINKLER PRESSURE ASSUMED : 69 PSI  
 FLOW PER SPRINKLER : 15.58 GPM  
 TOTAL FLOW = 14 x 15.58 GPM = 218.1 GPM = 0.486 cfs

PUMP HEAD =  $(13 \text{ H.P.} \times 6.61) / 0.486 \text{ cfs} = 176.8 \text{ ft}$

PIPE LOSS =  $4.784 (0.486)^{1.852} (110 \text{ ft}) / (1.30)^{1.852} (4.87)^{1.852} = 3.5 \text{ ft}$

WHEEL LINE LOSS =  $4.784 (0.486)^{1.852} (520 \text{ ft}) / (1.30)^{1.852} (4.87)^{1.852} = 4.6 \text{ foot}$

SPRINKLER HEAD =  $176.8 \text{ ft} - 3.5 \text{ ft} - 4.6 \text{ ft} - (3789 - 3780) = 159.7 \text{ ft} = 69 \text{ PSI OK}$

CHECK GOOD

FIELD # 4 Pump Flow = 0.486 cfs

2022-12-27

KELLER WATER RIGHTS  
TRANSFER: T-11948

J.N: 13005

7/7

PUMP FLOW CALCULATION SUMMARY

POD #1  
FIELD #2 - FLOW = 0.54 cfs  
FIELD #3 - FLOW = 0.73 cfs ← Max

POD #2  
FIELD #4 FLOW = 0.49 cfs

POD #3  
FIELD #1 FLOW = 0.68 cfs

RECEIVED

FEB 22 2023

OWRD

RECEIVED

FEB 22 2023

OWRD

Nozzle Discharge in G.P.M. at 100% Efficiency

P.S.I.	Nozzle Diameter in Inches												
	1/16"	5/64"	3/32"	7/64"	1/8"	9/64"	5/32"	11/64"	3/16"	13/64"	7/32"	1/4"	9/32"
20	0.52	0.81	1.17	1.59	2.09	2.65	3.26	3.92	4.69	5.51	6.37	8.35	10.50
25	0.58	0.90	1.31	1.78	2.34	2.96	3.64	4.38	5.25	6.16	7.13	9.34	11.80
30	0.64	1.00	1.44	1.96	2.56	3.26	4.01	4.83	5.75	6.80	7.85	10.20	13.00
35	0.69	1.08	1.55	2.11	2.77	3.50	4.31	5.18	6.21	7.30	8.43	11.10	13.90
40	0.74	1.15	1.66	2.25	2.96	3.74	4.61	5.54	6.64	7.80	9.02	11.80	14.90
45	0.78	1.22	1.76	2.40	3.13	3.99	4.91	5.91	7.03	8.30	9.60	12.50	15.90
50	0.83	1.28	1.85	2.52	3.30	4.18	5.15	6.19	7.41	8.71	10.10	13.20	16.60
55	0.87	1.36	1.94	2.63	3.46	4.37	5.39	6.48	7.77	9.12	10.50	13.80	17.40
60	0.90	1.40	2.03	2.76	3.62	4.50	5.65	6.80	8.12	9.56	11.05	14.50	18.30
65	0.94	1.47	2.11	2.86	3.77	4.76	5.87	7.06	8.45	9.92	11.45	15.10	19.00
70	0.98	1.53	2.19	2.98	3.91	4.96	6.10	7.34	8.78	10.32	11.95	15.70	19.80
75	1.01	1.58	2.27	3.08	4.05	5.12	6.30	7.58	9.08	10.66	12.32	16.20	20.40
80	1.05	1.64	2.35	3.18	4.18	5.29	6.52	7.84	9.39	11.02	12.74	16.70	21.10
85	1.08	1.68	2.42	3.28	4.31	5.45	6.71	8.07	9.67	11.35	13.11	17.30	21.70
90	1.11	1.73	2.49	3.38	4.43	5.61	6.91	8.31	9.95	11.69	13.51	17.70	22.30
95	1.14	1.78	2.56	3.46	4.56	5.76	7.09	8.53	10.20	11.99	13.86	18.20	22.90
100	1.17	1.83	2.63	3.56	4.67	5.91	7.29	8.76	10.50	12.32	14.23	18.70	23.50

(On a 100% delivery)

Handy Water Equivalents

1 Cubic Foot..... 7.48 Gallons (per min.).....62.4 Lbs of Water

43,560 Cubic Feet..... 325,900 Gallons..... 1 Acre-Foot

(an acre-foot covers one acre of land, one foot deep)

↑ Cubic Foot per Second (CFS).....450 Gallons per Minute

1 CFS.....646,360 Gallons per Day

For 24 Hours..... 1,983 Acre-feet

For 30 Days..... 59.5 Acre-feet

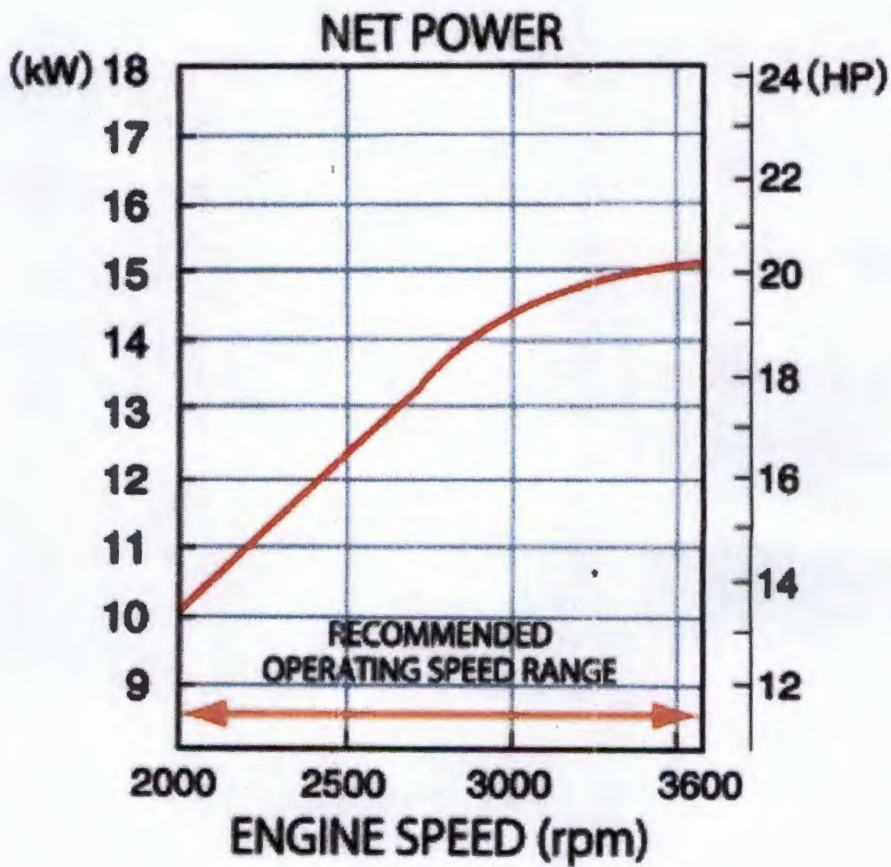
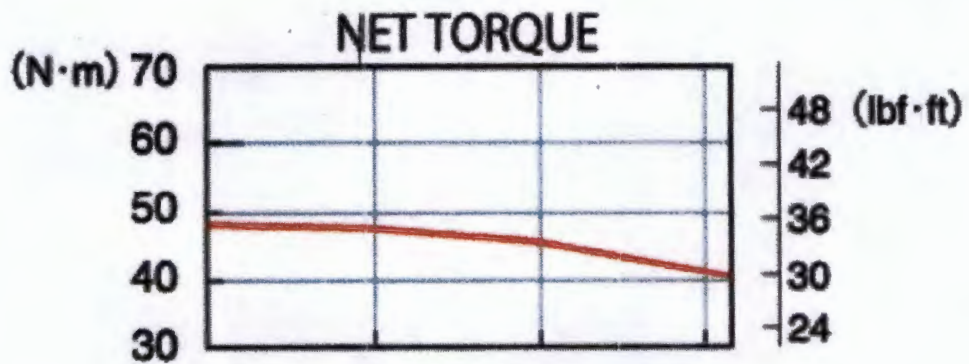
For 1 Year..... 724 Acre-feet

1 Million Gallons..... 3.07 Acre-feet

1,000 Gallons per Minute (GPM)..... 2.23 CFS

1,000 GPM..... 4.42 Acre-feet per Day

# GX630 output comparison





# Oregon

Kate Brown., Governor

Department of Fish and Wildlife  
The Dalles Screen Shop  
3561 Klindt Drive  
The Dalles, OR 97058  
(541) 296-8026  
FAX (541) 296-7889  
odfw.com

June 12, 2018

Oregon Water Resources Department  
725 Summer St NE, Suite A  
Salem, OR 97301

RE: Transfer Application T-11948

To Whom It May Concern,

This letter is in regards to fish screening requirements set forth in the Oregon Water Resources Department Transfer Application T-11948. This transfer changes the point of diversion and place of use indicated in Certificate 87644 and includes water rights in the amount of 0.27 cfs from the South Fork Crooked River, east of Post, Oregon, to Mr. and Mrs. Otto Keller.

Included in the application is the requirement for the installation of a fish screen meeting the Oregon Department of Fish and Wildlife's (ODFW) state and federal fish screen criteria. In November of 2015, Mr. Keller purchased and installed (through the ODFW fish screen cost share program) a fish screen meeting ODFW standards for the water diversion associated with T-11948. The screen installed was a Pump Rite ML-130 pump screen, which was determined to be the best screen type for the diversion location. This screen is also sized appropriately for the amount of water diverted to ensure that resident fish species are protected from impingement and entrapment.

If there are further questions in regards to the verification that fish screen requirements associated with T-11948 are met, please contact me at 541-296-8026, or through my email: [Hilary.A.Doulos@state.or.us](mailto:Hilary.A.Doulos@state.or.us).

Sincerely,

Hilary A. Doulos  
Fish Screens and Passage Coordinator

CC: Kaid McKay- McKay Consulting LLC, Otto Keller



RECEIVED  
FEB 22 2023  
OWRD