

**CLAIM OF
BENEFICIAL USE
for Permits claiming more
than 0.1 cfs and All Transfers**



Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

No fee is required for submitting this form for a transfer.

**A fee of \$150 must accompany this form to be accepted for permits
with a priority date of July 9, 1987, or later. (ORS 536.050(1))**

A separate form shall be completed for each permit.

In cases where a permit has been amended through the permit amendment process, a separate claim for the permit amendment is not required. Incorporate the permit amendment into the claim for the permit.

This form is subject to revision. **Begin each new claim** by checking for a new version of this form at:
http://www.wrd.state.or.us/OWRD/WR/cwre_info.shtml#.

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.

If you have questions regarding the completion of this form, please call 503-986-0900 and ask for the Certificate Section.

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
http://www.wrd.state.or.us/OWRD/mgmt_reimbursement_authority.shtml.

**SECTION 1
GENERAL INFORMATION**

1. File Information

APPLICATION # (G, R, S or T)	PERMIT # (IF APPLICABLE)	PERMIT AMENDMENT # (IF APPLICABLE)
T-7323		

2. Property Owner (current owner information)

APPLICANT/BUSINESS NAME Reatha Martin		PHONE NO. 541-324-1314	ADDITIONAL CONTACT NO. 541-956-8818
ADDRESS 4603 Rogue River Hwy.			
CITY Gold Hill	STATE OR	ZIP 97525	E-MAIL

If the current property owner is not the permit or transfer holder of record, it is recommended that an assignment be filed with the Department. **The COBU must be signed by each permit or transfer holder of record.**

RECEIVED

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

PERMIT OR TRANSFER HOLDER OF RECORD		
Melida Martin, Reatha Martin and Patti Martin Hice		
ADDRESS		
4603 Rogue River Highway		
CITY	STATE	ZIP
Gold Hill	OR	97525

ADDITIONAL PERMIT OR TRANSFER HOLDER OF RECORD		
ADDRESS		
CITY	STATE	ZIP

4. Date of Site Inspection: October 18, 2012

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

NAME	DATE	ASSOCIATION WITH THE PROJECT
Ted Birdseye	10/18/2012	Foreman

6. County: Jackson

7. If any property described in the place of use of the permit or transfer final order is excluded from this report, identify the owner of record for that property (ORS 537.230(4)):

**Mark "NA" if there are no owners of property not included in this claim

OWNER OF RECORD		
NA		
ADDRESS		
CITY	STATE	ZIP

ADDITIONAL OWNER OF RECORD		
ADDRESS		
CITY	STATE	ZIP

RECEIVED

OCT 17 2013

SECTION 2

SYSTEM DESCRIPTION

A. Points of Diversion/Appropriation

1. Point of diversion/appropriation name or number:

POINT OF DIVERSION/APPROPRIATION (POD/POA) NAME OR NUMBER (CORRESPOND TO MAP)	WELL LOG ID # FOR ALL WORK PERFORMED ON THE WELL (IF APPLICABLE)	WELL TAG # (IF APPLICABLE)
POD #1		
POD #2		
POD #3		

Attach each well log available for the well (include the log for the original well and any subsequent alterations, reconstructions, or deepenings)

2. Point of diversion/appropriation source and, if from surface water, the tributary:

POD/POA NAME OR NUMBER	SOURCE	TRIBUTARY
POD #1	Rogue River	Tributary of Pacific Ocean
POD #2	Rogue River	Tributary of Pacific Ocean
POD #3	Rogue River	Tributary of Pacific Ocean

3. Developed use(s), period of use, and rate for each use:

POD/POA NAME OR NUMBER	USES	IF IRRIGATION, LIST CROP TYPE	SEASON OR MONTHS WHEN WATER WAS USED	RATE OR VOLUME FOR USE (CFS, GPM, OR AF)
POD #1	Irrig. & Supplemental Irrig.	Alfalfa & Grass	March-October	0.668 CFS
POD #2	Irrig.	Alfalfa & Grass	March-October	0.570 CFS
POD #3	Supplemental Irrig.	Alfalfa & Grass	March-October	0.520 CFS
Total Quantity of Water Used				1.758 CFS

4. Provide a general narrative description of the distribution works. This description must trace the water system from each point of diversion or appropriation to the place of use:

From POD #1, water is pulled from Rogue River through a Pump-Rite T-500 fish screen and through a Berkeley Model B3ZPL centrifugal pump (serial #M2428). Pump is run by Baldor JPM2516T 25HP electric motor (serial #2950). Pump & motor mounted on runners for easy removal from concrete pad. Out of pump water passes through a Micrometer Model M0306 Flowmeter (serial #12-07724-06). Pipe from river to pump is 6" PVC. 300' of 6" PVC pipe passing under highway and "T's" into buried 6" PVC main irrigation line. Approx every 100' is 4" riser that is connected to portable wheel lines to irrigate the various fields.

From POD #2 & #3 water is diverted from the river and gravity flows through the GHID canal to property where is diverted at various points along the canal to flood irrigate property.

RECEIVED

OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

SECTION 2

SYSTEM DESCRIPTION (B through H)

Are there multiple PODs or POAs?

YES

If "YES" you will need to copy and complete Sections 2B through 2H for each POD/POA.

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

POD #1

B. Place of Use

1. Is the right for municipal use?

NO

If "YES" the table below may be deleted.

TWP	RNG	MER	SEC	QQ	GLot	DLC	USE	IF IRRIGATION, # PRIMARY ACRES	IF IRRIGATION, # SUPPLEMENTAL ACRES
36S	4W	WM	27		11		Irrig.	0.40	0.25
36S	4W	WM	27	SE-NW			Irrig.	27.50	24.35
				SW-NE				1.20	1.20
				SW-NW				1.20	0.74
				NW-NW				0.40	0.40
				NE-NW				14.60	14.60
Total Acres Irrigated								45.30	41.54

Reminder: The map associated with this claim must identify Donation Land Claims (DLC), Government Lots (GLot), Quarter Quarters (QQ), and if for irrigation, the number of acres irrigated within each projected DLC, GLot, and QQ.

C. Diversion and Delivery System Information

Provide the following information concerning the diversion and delivery system. Information provided must describe the equipment used to transport and apply the water from the point of diversion/appropriation to the place of use.

1. Is a pump used?

YES

If "NO" items 2 through item 6 may be deleted.

2. Pump Information

MANUFACTURER	MODEL	SERIAL NUMBER	TYPE (CENTRIFUGAL, TURBINE OR SUBMERSIBLE)	INTAKE SIZE	DISCHARGE SIZE
Berkeley	B3ZPL	M2428	Centrifugal	4"	4"

3. Motor Information

MANUFACTURER	HORSEPOWER
Baldor JPM2516T	25

RECEIVED

OCT 17 2013

4. Theoretical Pump Capacity

HORSEPOWER	OPERATING PSI	LIFT FROM SOURCE TO PUMP *IF A WELL, THE WATER LEVEL DURING PUMPING	LIFT FROM PUMP TO PLACE OF USE	TOTAL PUMP OUTPUT (IN CFS)
25	60	10	35	0.837

5. Provide pump calculations:

$$Q=25(6.61)/10+35+152.4 = 0.837 \text{ CFS}$$

6. 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)
N/A	N/A	10 MIN	0.668

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

7. Is the distribution system piped?

YES

If "NO" items 8 through item 11 may be deleted.

8. Mainline Information

MAINLINE SIZE	LENGTH	TYPE OF PIPE	BURIED OR ABOVE GROUND
6"	1100'	PVC	Buried

9. Lateral or Handline Information

LATERAL OR HANDLINE SIZE	LENGTH	TYPE OF PIPE	BURIED OR ABOVE GROUND
4"	1100'	Aluminum	Above ground wheel line

10. Sprinkler Information

SIZE	OPERATING PSI	SPRINKLER OUTPUT (GPM)	TOTAL NUMBER OF SPRINKLERS	MAXIMUM NUMBER USED	TOTAL SPRINKLER OUTPUT (CFS)
7/32"	60	10.7	28	28	0.668

Reminder: For sprinkler output determination use the reference information at the end of this document.

11. Pivot Information

MANUFACTURER	MAXIMUM WETTED RADIUS	OPERATING PSI	TOTAL PIVOT OUTPUT (GPM)	TOTAL PIVOT OUTPUT (CFS)
NA				

RECEIVED

OCT 17 2013

12. Additional notes or comments related to the system:

THE FOREMAN RAN THE SYSTEM AS HE NORMALLY DOES AND THE SYSTEM SUSTAINED 300 GPM.

D. Groundwater Source Information (Well and Sump)

1. Is the appropriation from ground water (well or sump)?

NO

If "NO", items 2 through 8 relating to this section may be deleted.

E. Storage

1. Does the distribution system include in-system storage (i.e. storage tank, bulge in system / reservoir)

NO

If "NO", item 2 and 3 relating to this section may be deleted.

F. Gravity Flow Pipe

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

1. Does the system involve a gravity flow pipe?

NO

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

G. Gravity Flow Canal or Ditch

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

1. Is a gravity flow canal or ditch used to convey the water as part of the distribution system?

NO

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

H. Reservoir

1. Does the claim involve a reservoir modified through a transfer?

NO

RECEIVED

OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

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

POD #2

B. Place of Use

1. Is the right for municipal use?

NO

If "YES" the table below may be deleted.

TWP	RNG	MER	SEC	QQ	GLOT	DLC	USE	IF IRRIGATION, # PRIMARY ACRES	IF IRRIGATION, # SUPPLEMENTAL ACRES
36S	4W	WM	27		11		Irrig.	0.40	
36S	4W	WM	27	SE-NW			Irrig.	27.50	
				SW-NE				1.20	
				SW-NW				1.20	
				NW-NW				0.40	
				NE-NW				14.60	
Total Acres Irrigated								45.30	

Reminder: The map associated with this claim must identify Donation Land Claims (DLC), Government Lots (GLOT), Quarter Quarters (QQ), and if for irrigation, the number of acres irrigated within each projected DLC, GLOT, and QQ.

C. Diversion and Delivery System Information

Provide the following information concerning the diversion and delivery system. Information provided must describe the equipment used to transport and apply the water from the point of diversion/appropriation to the place of use.

1. Is a pump used?

NO

If "NO" items 2 through item 6 may be deleted.

7. Is the distribution system piped?

NO

If "NO" items 8 through item 11 may be deleted.

12. Additional notes or comments related to the system:

THE CANAL USED TO DELIVER WATER TO PROPERTY IS OPERATED AND MAINTAINED BY THE GOLD HILL IRRIGATION DISTRICT. DISTRICT BOARD PRESIDENT INFORMED THAT THE CANAL IS DESIGNED TO CARRY 17 CFS. WATER IS DIVERTED INTO CANAL FROM THE ROGUE RIVER BY A DAM ACROSS RIVER.

D. Groundwater Source Information (Well and Sump)

1. Is the appropriation from ground water (well or sump)?

NO

If "NO", items 2 through 8 relating to this section may be deleted.

E. Storage

1. Does the distribution system include in-system storage (i.e. storage tank, bulge in system / reservoir)

NO

If "NO", item 2 and 3 relating to this section may be deleted.

RECEIVED

OCT 17 2013

F. Gravity Flow Pipe

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

1. Does the system involve a gravity flow pipe?

NO

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

G. Gravity Flow Canal or Ditch

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

1. Is a gravity flow canal or ditch used to convey the water as part of the distribution system?

YES

THE CANAL IS OPERATED AND MAINTAINED BY THE GOLD HILL IRRIGATION DISTRICT. DISTRICT BOARD PRESIDENT INFORMED THAT THE CANAL IS DESIGNED TO CARRY 17 CFS.

H. Reservoir

1. Does the claim involve a reservoir modified through a transfer?

NO

If "NO", items 2 through 9 relating to this section may be deleted.

If "NO", items 2 through 9 relating to this section may be deleted.

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

POD #3

B. Place of Use

1. Is the right for municipal use?

NO

If "YES" the table below may be deleted.

TWP	RNG	MER	SEC	QQ	GLOT	DLC	USE	IF IRRIGATION, # PRIMARY ACRES	IF IRRIGATION, # SUPPLEMENTAL ACRES
36S	4W	WM	27		11		Irrig.		0.25
36S	4W	WM	27	SE-NW SW-NE SW-NW NW-NW NE-NW			Irrig.		24.35 1.20 0.74 0.40 14.60
Total Acres Irrigated									41.54

Reminder: The map associated with this claim must identify Donation Land Claims (DLC), Government Lots (GLOT), Quarter Quarters (QQ), and if for irrigation, the number of acres irrigated within each projected DLC, GLOT, and QQ.

C. Diversion and Delivery System Information

Provide the following information concerning the diversion and delivery system. Information provided must describe the equipment used to transport and apply the water from the point of diversion/appropriation to the place of use.

1. Is a pump used?

NO

If "NO" items 2 through item 6 may be deleted.

RECEIVED

OCT 17 2013

7. Is the distribution system piped?

NO

If "NO" items 8 through item 11 may be deleted.

12. Additional notes or comments related to the system:

THE CANAL USED TO DELIVER WATER TO PROPERTY IS OPERATED AND MAINTAINED BY THE GOLD HILL IRRIGATION DISTRICT. DISTRICT BOARD PRESIDENT INFORMED THAT THE CANAL IS DESIGNED TO CARRY 17 CFS. WATER IS DIVERTED INTO CANAL FROM THE ROGUE RIVER BY A DAM ACROSS RIVER.

D. Groundwater Source Information (Well and Sump)

1. Is the appropriation from ground water (well or sump)?

NO

If "NO", items 2 through 8 relating to this section may be deleted.

E. Storage

1. Does the distribution system include in-system storage (i.e. storage tank, bulge in system / reservoir)

NO

If "NO", item 2 and 3 relating to this section may be deleted.

F. Gravity Flow Pipe

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

1. Does the system involve a gravity flow pipe?

NO

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

G. Gravity Flow Canal or Ditch

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

1. Is a gravity flow canal or ditch used to convey the water as part of the distribution system?

YES

THE CANAL IS OPERATED AND MAINTAINED BY THE GOLD HILL IRRIGATION DISTRICT. DISTRICT BOARD PRESIDENT INFORMED THAT THE CANAL IS DESIGNED TO CARRY 17 CFS.

H. Reservoir

1. Does the claim involve a reservoir modified through a transfer?

NO

If "NO", items 2 through 9 relating to this section may be deleted.

SECTION 3

CONDITIONS

All conditions contained in the permit, permit amendment, 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:

Permits, transfer final orders, and any extension final orders contain any or all of the following dates: the date when the actual construction work was to begin, the date when the construction was to be completed, and the date when the complete application of water to the proposed use was to be completed. These dates may be referred to as ABC dates. Describe how the water user has complied with each of the development timelines established in the permit, extension or transfer final order:

RECEIVED

	DATE FROM PERMIT OR TRANSFER	DATE ACCOMPLISHED*	DESCRIPTION OF ACTIONS TAKEN BY WATER USER TO COMPLY WITH THE TIME LIMITS
ISSUANCE DATE	03-09-2011		
BEGIN CONSTRUCTION (A)			
COMPLETE CONSTRUCTION (B)	10-01-2012	09-13-2012	Fish Screen and flow meter installed.
COMPLETE APPLICATION OF WATER (C)	10-01-2012	09-13-2012	Application of water to fields.

* MUST BE WITHIN PERIOD BETWEEN PERMIT, TRANSFER FINAL ORDER, OR ANY EXTENSION FINAL ORDER ISSUANCE AND THE DATE TO COMPLETELY APPLY WATER

2. Is there an extension final order(s)?

NO

If "NO", you may delete item 3 in this section.

3. If for a transfer extension order, provide the following information:

VOLUME	PAGE	DATE EXTENDED TO
NA		

4. Initial Water Level Measurements:

a. Was the water user required to submit an initial static water level measurement?

NA

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

5. Annual Static Water Level Measurements:

a. Was the water user required to submit annual static water level measurements?

NO

6. Pump Test (Required for most ground water permits prior to issuance of a certificate)

a. Did the permit require the submittal of a pump test?

NO

If "NO", items 6b through 6e relating to this section may be deleted.

7. Measurement Conditions:

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

YES

If "NO", items 7b through 7f 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 or appropriation.

b. Has a meter been installed?

YES

c. Meter Information

POD/POA NAME OR #	MANUFACTURER	SERIAL #	CONDITION (WORKING OR NOT)	CURRENT METER READING	DATE INSTALLED
#1	Micrometer	M2428	Working	9703	09-13-2012

If a meter has been installed, items 7d through 7f relating to this section may be deleted.

8. Recording and reporting conditions

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

NO

If "NO", item 8b relating to this section may be deleted.

9. Fish Screening

a. Are any points of diversion required to be screened to prevent fish from entering the point of diversion?

NO

If "NO", items 9b through 9e 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.

10. 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?

NO

If "NO", items 10b and 10c relating to this section may be deleted.

11. Other conditions required by permit, permit amendment final order, extension final order, or transfer final order:

a. Were there special well construction standards?

NO

b. Was submittal of a ground water monitoring plan required?

NO

c. Was the water user required to restore the riparian area if it was disturbed?

NO

d. Was a fishway required?

NO

e. Was submittal of a letter from an engineer required prior to storage of water?

NO

f. Was submittal of a water management and conservation plan required?

NO

g. Other conditions?

YES

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

Condition 4 of the transfer final order required the water user to maintain and operate a fish screening and/or by-pass device. As part of this ongoing maintenance requirement, on September 13, 2012, the water user had a new screen installed by Valley Irrigation and Dirt Works, LLC, to replace the existing screen.

RECEIVED

OCT 17 2013

SECTION 4

VARIATIONS

Include a description of variations from the permit, permit amendment final order, extension final order, or transfer final order. (i.e. "The permit allowed three points of diversion. The water user only developed one of the points." or "The permit allowed 40.0 acres of irrigation. The water user only developed 10.0 acres.")

This transfer is to add a point of diversion point to the existing rights under C-72951 and C-72952. The existing diversion points are also being claimed. These diversion points feed the Gold Hill Irrigation Ditch and are currently controlled and maintained by the Gold Hill Irrigation District. District board president Scott Pederson informed me that canal is designed to carry 17 cfs. Water is diverted into canal from the Rogue River by a dam across river.

SECTION 5

ATTACHMENTS

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

ATTACHMENT NAME	DESCRIPTION
NA	

SECTION 6

CLAIM SUMMARY

POD / POA NAME OR #	MAXIMUM RATE AUTHORIZED	CALCULATED THEORETICAL RATE BASED ON SYSTEM	AMOUNT OF WATER MEASURED	USE	# OF ACRES ALLOWED	# OF ACRES DEVELOPED
DIV. PT. #1	1.09 CFS	0.837 CFS	0.668 CFS	Irrig & Suppl. Irrig	45.30	45.30
DIV PT #2	0.57 CFS			Irrig	45.30	45.30
DIV PT #3	0.52 CFS			Suppl. Irrig	41.54	41.54

SECTION 7

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 poly 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.

RECEIVED

OCT 17 2013

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.



Using Trimble GPS R6 receivers made ties to Government corners, structures, and water system components.

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.)

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

RECEIVED

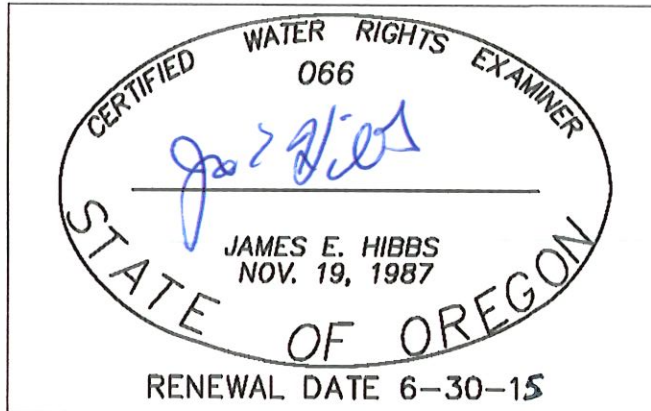
OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

SECTION 8 SIGNATURES

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 JAMES E. HIBBS		PHONE No. 541-772-2782		ADDITIONAL CONTACT No.	
ADDRESS P.O. BOX 1947					
CITY PHOENIX	STATE OR	ZIP 97535	E-MAIL JAMES@LJFRIAR.COM		

Permit or Transfer Holder's of Record Signature or Acknowledgement

This Claim of Beneficial Use must be signed by each permit or transfer holder of record.

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	DATE
<i>Reatha Martin</i>	REATHA MARTIN	8/29/13
<i>Melinda Martin</i>	MELINDA MARTIN	8/29/13
<i>Patti Martin Hice</i>	PATTI MARTIN	8/29/13

RECEIVED

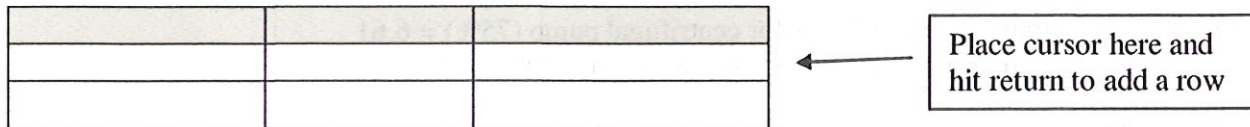
OCT 17 2013

SECTION 9
REFERENCE INFORMATION FOR CWRE USE
(Please DO NOT submit these pages.)

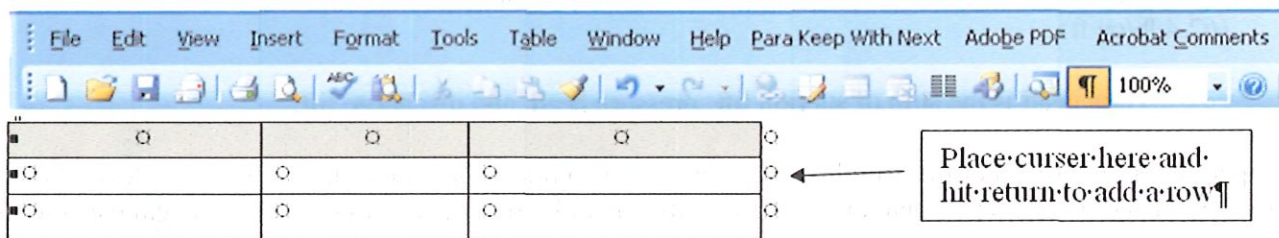
Additional information is available at: http://www.wrd.state.or.us/OWRD/WR/cwre_info.shtml

MS Word Hints

To add rows to a table, click outside the table on the far right and hit enter.



If you are having difficulty placing the cursor outside the table, click on the Show/Hide (Paragraph) icon ¶. This is found on the Standard toolbar (View => Toolbars => Standard) of some versions of Word.



To resolve page numbering issues, go to print preview. Page through the entire document (while in print preview), then print from print preview.

RECEIVED

OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

WR

Common Calculations

The Department typically uses the following calculations to determine system capacities; many of which are available to download from the Department's Web Site.

Pumps:

$$Q \text{ Pump} = \frac{(\text{horsepower})(\text{pump efficiency})}{(\text{total head in feet})} = Q \text{ in cfs}$$

Efficiency factors:

NOTE: Pump efficiency factor for centrifugal pump (75%) = 6.61

Pump efficiency factor for turbine pump (80%) = 7.04

$$\text{Centrifugal Pump, 75\% eff. } \frac{(550 \text{ ft lb/sec/Hp})(.75)}{(62.4 \text{ lb/cu ft})} = 6.61 \text{ ft}^4/\text{sec/Hp}$$

$$\text{Turbine \& Submersible Pumps, 80\% eff. } \frac{(550 \text{ ft lb/sec/Hp})(.80)}{(62.4 \text{ lb/cu ft})} = 7.04 \text{ ft}^4/\text{sec/Hp}$$

Total head is the sum of suction lift, pressure head, and discharge lift.

If the operating pressure is not measured, varying the assumed operational pressure in the above formulas until the calculated outputs are equal, or nearly so, will generally give the most correct theoretical capacity of the system.

Efficiencies have been assumed to be 75% for centrifugal pump installations and 80% for turbine or submersible pumps. See the list below of converted psi's to feet of head. These figures account for minor friction losses. If the system involves unusually long pipelines friction losses should be accounted for by using standard charts and formulas.

Refer to the conversion table below to compute PSI to head for pump pressure in feet.

$$[(\text{psi}/.433)(1.1)] = \text{head (in feet/psi)} = 2.54 \text{ feet head/psi}$$

PSI	HEAD	PSI	HEAD
25	63.5	55	139.7
30	76.2	60	152.4
35	88.9	65	165.1
40	101.6	70	177.8
45	114.3	75	190.5
50	127.0	80	203.2

RECEIVED

OCT 17 2013

Ditches/Canals:

Manning's Formula:

$$v = \frac{1.486}{n} r^{2/3} s^{1/2}$$

v = mean velocity of flow in feet per second

r = hydraulic radius in feet

s = slope of the energy gradient

n = coefficient of roughness

Type of Conduit and Description Pipe	Coefficient of Roughness	
	Minimum	Maximum
Cast Iron, Coated	0.01	0.014
Cast Iron, Uncoated	0.011	0.015
Wrought Iron, Galvanized	0.013	0.017
Wrought Iron, Black	0.012	0.015
Steel, Riveted and Spiral	0.013	0.017
Corrugated	0.021	0.0255
Wood Stave	0.01	0.014
Neat Cement Surface	0.01	0.013
Concrete	0.01	0.017
Vitrified Sewer Pipe	0.01	0.017
Clay, Common Drainage Tile	0.011	0.017
Lined Channels		
Metal, Smooth Semicircular	0.011	0.015
Metal, Corrugated	0.0228	0.0244
Wood, Planed	0.01	0.015
Wood, Unplaned	0.011	0.015
Neat Cement-Lined	0.01	0.013
Concrete	0.012	0.018
Cement Rubble	0.017	0.03
Vegetated, Small Channels, Shallow Depths		
Bermuda Grass; Long - 13", Green	0.042	
Bermuda Grass; Long - 13", Dormant	0.035	
Bermuda Grass; Short - 3", Green	0.034	
Bermuda Grass; Short - 3", Dormant	0.034	
Unlined Channels		
Earth; Straight and Uniform	0.017	0.025
Dredged	0.025	0.033
Winding and Sluggish	0.0225	0.03
Stoney Bed, Weeds on Bank	0.025	0.04
Earth Bottom, Rubble Sides	0.028	0.035
Rock Cuts; Smooth and Uniform	0.025	0.035
Rock Cuts; Jagged and Irregular	0.035	0.045

RECEIVED

OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

Gravity flow pipe systems

Hazen-William's Formula:

$$v = 1.31(c)(r^{0.63})(s^{0.54})$$

v = mean velocity of flow in feet per second

c = coefficient of roughness

r = hydraulic radius in feet

s = slope of energy gradient

Material	Coefficient of Roughness
Asbestos Cement	140
Brass	135
Brick sewer	100
Cast-Iron - new unlined (CIP)	130
Cast-Iron 10 years old	110
Cast-Iron 20 years old	95
Cast-Iron 30 years old	82
Cast-Iron 40 years old	74
Concrete	130
Copper	135
Ductile Iron Pipe (DIP)	140
Galvanized iron	120
Glass	140
Lead	135
Plastic	145
PVC, CPVC	150
Smooth Pipes	140
Steel new unlined	145
Steel	130
Steel riveted	110
Tin	130
Wood Stave	120

RECEIVED

OCT 17 2013

WATER RESOURCES DEPT
SALEM, OREGON

WR

SPRINKLER CAPACITIES BY NOZZLE SIZE IN GALLONS PER MINUTE

This chart is comprised of information gathered from a number of sources and may differ slightly from the manufacturer's specifications.

$$Q \text{ Sprinklers} = \frac{(\text{number of heads})(\text{rate in gallons per minute})}{448.8 \text{ gpm per cfs}} = Q \text{ in cfs}$$

		P.S.I. ("*" designates computed capacity)																	
NOZZLE SIZE		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
	3/32				1.1	1.3	1.4	1.5	1.6	1.7	1.8								
	7/64				1.5	1.7	1.9	2	2.2										
	1/8				1.9	2.2	2.4	2.7	2.9	3	3.2								
	9/64				2.3	2.6	2.9	3.1	3.4	3.7	4								
	5/32				3	3.4	3.8	4.1	4.4	4.7	5								
	11/64	1.9	2.7	3.3	3.7	4.2	4.6	5	5.4	5.7	6	6.3	6.6						
	3/16	2.2	3.2	3.9	4.3	5	5.5	6	6.4	6.8	7.2	7.5	7.8						
	13/64	2.9	3.6	4.5	5.1	5.9	6.5	7.1	7.6	8.1	8.5	8.9	9.2						
	7/32		4.1	5.1	5.8	6.8	7.6	8.3	8.9	9.4	9.9	10.3	10.6						
	15/64							8.8		10		11.2		12.4					
	1/4		5.2	6.4	7.4	8.9	9.8	10.6	11.4	12.1	12.8	13.4	13.9	14.8*	15.3*	15.9*	16.4*	16.9*	17.4*
	17/64								12.5		14		15.6		17.1				
	9/32					11.2	12.3	13.3	14.3	15.2	16	16.8	17.5	18.1	18.9	19.7	20.7*	21.4*	22*
	19/64									16.6		18.3		19.9		21.4			
	5/16					13.1	15.2	16.5	17.7	18.9	20	21	22	23	23.9	24.8	25.7	26.4*	27.1*
	21/64										20.8		22.7		24.6		26.4		
	11/32					16.5	18	19.7	21.1	22.5	23.8	25	26.2	27.4	28.5	29.6	30.6	31.9*	32.8*
	23/64										24.5		26.8		29.1		31.4		
	3/8					19	21	22.8	24.4	26	27.5	29.1	30.6	32	33.2	34.5	35.7	38*	39*
	13/32								29*	30.9*	32.7*	34.5*	36.2*	37.4*	38.9*	40.4*	41.9*	43.3*	44.7*
	7/16								33.5*	35.6*	37.7*	39.7*	41.7*	43.6*	45.3*	46.9*	48.4*	50.1*	51.6*
	1/2								42.5*	45.2*	47.7*	50.2*	52.5*	54.7*	56.8*	58.6*	60.6*	63.6*	66.7*

NOTE: Use the maximum number heads operating at any one time.

Rate per head in gpm comes from either manufacturer's specifications using orifice size and operating pressure or from OWRD chart.

RECEIVED