CLAIM OF BENEFICIAL USE for Groundwater Permits claiming more than 0.1 cfs

OREGON WATER RESOURCES DEPARTMENT

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

A fee of $230 must accompany this form for permits with priority dates of July 9, 1987, or later.

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:
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

SECTION 1

GENERAL INFORMATION

1. File Information:

APPLICATION #	PERMIT # (IF APPLICABLE)	PERMIT AMENDMENT # (IF APPLICABLE)
G-16959	**G-16476**	**T-11015**

2. Property Owner (current owner information):

APPLICANT/BUSINESS NAME		PHONE NO.	ADDITIONAL CONTACT NO.
Oregon Military Department		**503-584-3493**	**Chris Richardson, P.E.**
ADDRESS **P.O. Box 14350**			
CITY **Salem**	STATE **OREGON**	ZIP **97309-5047**	E-MAIL **christian.a.richardson8.nfg@mail.mil**

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

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

PERMIT HOLDER OF RECORD **Oregon Military Department**		
ADDRESS **P.O. Box 14350**		
CITY **Salem**	STATE **OREGON**	ZIP **97309-5047**

ADDITIONAL PERMIT HOLDER OF RECORD **N/A**		
ADDRESS		
CITY	STATE	ZIP

4. Date of Site Inspection:

August 25, 2021

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

NAME	DATE	ASSOCIATION WITH THE PROJECT
Conrad Tester	**August 25, 2021**	**Facilities Maintenance**

6. County:

Malheur

7. If any property described in the place of use of the permit is excluded from this report, identify the owner of record for that property (ORS 537.230(5)):

OWNER OF RECORD **N/A**		
ADDRESS		
CITY	STATE	ZIP

Add additional tables for owners of record as needed

SECTION 2

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.

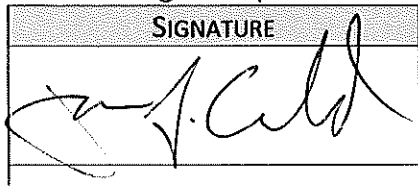
Seal and Signature

CWRE NAME **Brandon A. Mahon, P.E., CWRE**		PHONE NO. **541-963-8309**	ADDITIONAL CONTACT NO.
ADDRESS **1901 N. Fir Street/P.O. Box 1107**			
CITY **La Grande**	STATE **OREGON**	ZIP **97850**	E-MAIL **bmahon@andersonperry.com**

Permit Holder of Record Signature or Acknowledgement

Each *permit 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
	**James G. Arnold**	**Oregon Military Department; Installations Division (AGI); Chief, Environmental Branch**	7/20/21

SECTION 3

CLAIM DESCRIPTION

1. **Point of appropriation name or number:**

POINT OF APPROPRIATION (POA) NAME OR NUMBER (CORRESPOND TO MAP)	WELL LOG ID # FOR ALL WORK PERFORMED ON THE WELL (IF APPLICABLE)	WELL TAG # (IF APPLICABLE)
Well L-100201 (Production) (14a)	**MALH 53555**	**L-100201**
Well L-100207 (Injection) (16a)	**MALH 53625**	**L-100207**
Well L-100204 (Production) (15b)	**MALH 53568**	**L-100204**
Well L-100202 (Production) (15a)	**MALH 53556**	**L-100202**
Well L-100208 (Injection) (16b)	**MALH 53626**	**L-100208**
Well L-100209 (Injection) (16c)	**MALH 53627**	**L-100209**

Attach each well log available for the well (include the log for the original well and any subsequent alterations, reconstructions, or deepenings) **See Attachment A, Well Logs and Pump Test. The well tag numbers listed are those recorded with the Oregon Water Resources Department. Two wells are missing tags, and one is incorrectly labeled.**

2. **Point of appropriation source, if indicated on permit:**

POA NAME OR NUMBER	SOURCE BASIN LOCATED WITHIN	TRIBUTARY
Well L-100201 (Production) (14a)	**Snake River Basin**	**N/A**
Well L-100207 (Injection) (16a)	**Snake River Basin**	**N/A**
Well L-100204 (Production) (15b)	**Snake River Basin**	**N/A**
Well L-100202 (Production) (15a)	**Snake River Basin**	**N/A**
Well L-100208 (Injection) (16b)	**Snake River Basin**	**N/A**
Well L-100209 (Injection) (16c)	**Snake River Basin**	**N/A**

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

POA Name or Number	Uses	If Irrigation, List Crop Type	Season or Months When Water was Used	Actual Rate or Volume Used (CFS, GPM, or AF)
Well L-100201 (Production) (14a)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	40 gallons per minute (gpm)
Well L-100207 (Injection) (16a)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	N/A
Well L-100204 (Production) (15b)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	40 gpm
Well L-100202 (Production) (15a)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	39 gpm
Well L-100208 (Injection) (16b)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	N/A
Well L-100209 (Injection) (16c)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	Year-round	N/A
Total Quantity of Water Used (Assuming high demand period when all three wells are operating.)				119 gpm (0.27 cubic feet per second [cfs])

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

The three production wells are located south of the readiness center building. The three wells pump into a common header. This single pipe is routed through a geothermal heating and cooling system in the readiness center building. Prior to entering the heating and cooling system, the water flows through a single totalizing flowmeter. The system's computer and SCADA systems allow the Owner to track the flow from each individual well. The return water is then distributed to the north end of the readiness center building, where it is split into three injection wells. See Attachment B and Figure 1 for well locations. The heating and cooling system is an "on demand" system. During periods of low demand, a single well can generally provide enough flow to meet the system's needs. During high demand periods, multiple wells will operate. According to the Oregon Military Department staff, there have been times when all three wells were operating simultaneously to meet demands.

Reminder: The map associated with this claim must identify the location of the point(s) of diversion, Donation Land Claims (DLC), Government Lots (GLot), and Quarter-Quarters (QQ).

5. Variations:

Was the use developed differently from what was authorized by the permit, permit amendment final order, or extension final order? If yes, describe below. (YES) NO

(e.g. *"The permit allowed three points of appropriation. 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."*)

Due to sand concentrations within the production water, the rate of withdrawal was decreased from 2.0 cfs to 0.27 cfs.

6. **Claim Summary:**

POA NAME OR #	MAXIMUM RATE AUTHORIZED	CALCULATED THEORETICAL RATE BASED ON SYSTEM	AMOUNT OF WATER MEASURED	USE	# OF ACRES ALLOWED	# OF ACRES DEVELOPED
Well L-100201 (Production) (14a)	1.0 cfs	0.18 cfs	40 gpm (0.11)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Well L-100207 (Injection) (16a)	N/A	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Well L-100204 (Production) (15b)	0.5 cfs	0.18 cfs	39 gpm (0.10)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Well L-100202 (Production) (15a)	0.5 cfs	0.18 cfs	40 gpm (0.11)	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Well L-100208 (Injection) (16b)	N/A	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Well L-100209 (Injection) (16c)	N/A	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) NO

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100201 (Production) (14a)

A. Place of Use

1. Is the right for municipal use? YES (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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? (YES) NO

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? (YES) NO

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
Grundfos	45S30-7-BP	98998561	Submersible	2 inches	2 inches

3. Motor Information:

Manufacturer	Horsepower
Grundfos	3 horsepower

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)
3	32	25 feet	N/A	0.18

5. Provide pump calculations:

With current infrastructure, the facility is unable to measure a direct pumping pressure upstream of the heating/cooling equipment. The motors are also operated on a variable frequency drive (VFD) that varies the frequency to the motor based on demand. This demand is constantly fluctuating and is controlled by the heating/cooling computers. Therefore, standard theoretical pump capacity calculations are not expected to reflect actual pumping capacity.

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 minutes	0.09 cfs (instantaneous flowmeter)

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

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (GPM)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (CFS)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) NO

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100207 (Injection) (16a)

A. Place of Use

1. Is the right for municipal use? YES (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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? (YES) NO

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? YES (NO)

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (GPM)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (CFS)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) NO

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100204 (Production) (15b)

A. Place of Use

1. Is the right for municipal use? YES (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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? (YES) NO

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? (YES) NO

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
Grundfos	45S30-7-BP	98998561	Submersible	2 inches	2 inches

3. Motor Information:

Manufacturer	Horsepower
Grundfos	3 Hp

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)
3	32	25 feet	N/A	0.18

5. Provide pump calculations:

With current infrastructure, the facility is unable to measure a direct pumping pressure upstream of the heating/cooling equipment. The motors are also operated on a VFD that varies the frequency to the motor based on demand. This demand is constantly fluctuating and is controlled by the heating/cooling computers. Therefore, standard theoretical pump capacity calculations are not expected to reflect actual pumping capacity.

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 minutes	0.09 cfs (instantaneous flowmeter)

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

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (gpm)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (cfs)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) **NO**

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100202 (Production) (15a)

A. Place of Use

1. Is the right for municipal use? (YES) **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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? (YES) **NO**

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? (YES) NO

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
Grundfos	45S30-7-BP	98998561	Submersible	2 inches	2 inches

3. Motor Information:

Manufacturer	Horsepower
Grundfos	3 Hp

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)
3	32	25 feet	N/A	0.18

5. Provide pump calculations:

With current infrastructure, the facility is unable to measure a direct pumping pressure upstream of the heating/cooling equipment. The motors are also operated on a VFD that varies the frequency to the motor based on demand. This demand is constantly fluctuating and is controlled by the heating/cooling computers. Therefore, standard theoretical pump capacity calculations are not expected to reflect actual pumping capacity.

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 minutes	0.09 cfs (instantaneous flowmeter)

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

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (GPM)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (cfs)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) NO

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100208 (Injection) (16b)

A. Place of Use

1. Is the right for municipal use? YES (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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? YES (NO)

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? YES (NO)

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (GPM)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (CFS)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 4

SYSTEM DESCRIPTION

Are there multiple POAs? (YES) NO

If *"YES"* you will need to copy and complete a separate Section 4 for each POA.

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

Well L-100209 (Injection) (16c)

A. Place of Use

1. Is the right for municipal use? YES (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
18S	47E	WM	9	NE SE	N/A	N/A	Industrial Use (Geo-Thermal Heating and Cooling)	N/A	N/A
Total Acres Irrigated								N/A	N/A

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.

B. Groundwater Source Information (Well)

1. Is the appropriation from a well? (YES) NO

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

2. Describe the access port (type and location) or other means to measure the water level in the well:

Standard pitless adapter

3. If well logs are not available, provide as much of the following information as possible:

Casing Diameter	Casing Depth	Total Depth	Completion Date of Original Well	Completion Dates of Alterations	Who the well was drilled for	Well drilled by
N/A - See Attachment A, Well Logs and Pump Test						

4. In addition to the information requested in item "3" above, provide any other information which may help the Department locate any well logs associated with this appropriation.

N/A

C. Groundwater Source Information (Sump)

1. Is the appropriation from a dug well (sump)? YES (NO)

D. 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 appropriation to the place of use.

1. Is a pump used? YES (NO)

7. Is the distribution system piped? (YES) NO

If "NO" items 8 through item 13 may be deleted.

8. Mainline Information:

Mainline Size	Length	Type of Pipe	Buried or Above Ground
6-inch main line	450 feet	Unknown	Buried

9. Lateral or Handline Information:

Lateral or Handline Size	Length	Type of Pipe	Buried or Above Ground
N/A			

10. Sprinkler Information:

Size	Operating PSI	Sprinkler Output (GPM)	Total Number of Sprinklers	Maximum Number Used	Total Sprinkler Output (CFS)
N/A					

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

11. Drip Emitter Information:

Size	Operating PSI	Emitter Output (GPM)	Total Number of Emitters	Maximum Number Used	Total Emitter Output (CFS)
N/A					

12. Drip Tape Information:

Dripper Spacing in Inches	GPM per 100 Feet	Total Length of Tape	Maximum length of Tape Used	Total Tape Output (CFS)	Additional Information
N/A					

13. Pivot Information:

Manufacturer	Maximum Wetted Radius	Operating PSI	Total Pivot Output (GPM)	Total Pivot Output (CFS)
N/A				

E. Storage

1. Does the distribution system include in-system storage (e.g. storage tank, bulge in system / reservoir)? YES (NO)

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? YES (NO)

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 (NO)

SECTION 5

CONDITIONS

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

1. Time Limits:

Permits and 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 or permit extension order:

	DATE FROM PERMIT	DATE ACCOMPLISHED*	DESCRIPTION OF ACTIONS TAKEN BY WATER USER TO COMPLY WITH THE TIME LIMITS
ISSUANCE DATE	**April 23, 2009**		
BEGIN CONSTRUCTION (A)	**N/A**	**N/A**	**N/A**
COMPLETE CONSTRUCTION (B)	**N/A**	**N/A**	**N/A**
COMPLETE APPLICATION OF WATER (C)	**April 23, 2014**	**July 31, 2013**	**Prior to the "C-Date," the water user completed the construction of the wells and installed submersible pumps and motors, VFDs, and piping, as well as the geothermal heating and cooling equipment, which was installed during construction of the building in 2009-2010.**

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

2. Is there an extension final order(s)? YES (NO)

3. Initial Water Level Measurements:

a. Was the water user required to submit an initial static water level measurement? YES (NO)

4. Annual Static Water Level Measurements:

a. Was the water user required to submit annual static water level measurements? YES (NO)

5. Pump Test:

a. Did the permit require the submittal of a pump test? (YES) NO

Ground water permits with priority dates on or after **December 20, 1988**, require the submittal of a pump test prior to issuance of a certificate. In some cases, the permit holder may qualify for a multiple well exemption or an unreasonable burden exemption.

For additional information regarding pump tests see:
https://www.oregon.gov/OWRD/programs/GWWL/GW/Pages/PumpTestProgram.aspx

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

b. Has the pump test been previously submitted to the Department? YES (NO)

c. Is the pump test attached to this claim? (YES) NO

d. Has the pump test been approved by the Department? YES (NO)

e. Has a pump test exemption been approved by the Department? YES (NO)

**** Claims will not be reviewed until a pump test or exemption has been approved by the Department**

6. Measurement Conditions:

a. Does the permit, permit amendment, or any extension final order require the installation of a meter or 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 or appropriation.

b. Has a meter been installed? (YES) NO

c. Meter Information

POD/POA Name or #	Manufacturer	Serial #	Condition (working or not)	Current Meter Reading	Date Installed
All three pumps*	**Veris Industries**	**94473**	**Working**	**6,658,028**	**Unknown**

***All three pumps pump into a common header pipe that has a single totalizing flowmeter. The computer and SCADA systems allow the water user to track the flow from each individual well.**

7. 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.

b. Have the reports been submitted? (YES) NO

If the reports have not been submitted, attach a copy of the reports if available.

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

a. Were there special well construction standards? YES (NO)

b. Was submittal of a ground water monitoring plan required? YES (NO)

c. Was submittal of a water management and conservation plan required? YES (NO)

d. Was a Well Identification Number (Well ID tag) assigned and attached to the well? (YES) NO

Well ID #	Date Attached To Well
L-100201	**Unknown (currently mislabeled)**
L-100207	**Unknown**
L-100204	**Unknown (currently missing)**
L-100202	**Unknown**
L-100208	**Unknown (currently missing)**
L-100209	**Unknown**

e. 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):

1 - Underground injection control (UIC) permitted through the Oregon Department of Environmental Quality - Yes UIC Number 13258.
2 - Documentation that all applicable Chapter 690 Division 230 Rules have been met - to the best of our knowledge the Chapter 690 Division 230 rules have been met by the Owner.
3 - Well tags are attached (see additional information in Attachment C).

SECTION 6

ATTACHMENTS

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

ATTACHMENT NAME	DESCRIPTION
Attachment A	**Well Logs and Pump Test**
Attachment B	**Site Plan**
Attachment C	**Well Tags**
Attachment D	**Pump Rate Calculations**
Figure 1	**Claim of Beneficial Use Map**

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.

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.

See attached Figure 1.

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) - See map scale waiver request
- ☒ 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

FIGURE

Jamie Grove

Subject: FW: COBU Map Waiver Request

From: Brandon Mahon <bmahon@andersonperry.com>
Sent: Friday, October 1, 2021 7:37 AM
To: Gerry Clark - OWRD (gerald.e.clark@wrd.state.or.us) <gerald.e.clark@wrd.state.or.us>
Cc: Dana Kurtz <dkurtz@andersonperry.com>
Subject: COBU Map Waiver Request

Good morning Gerry,

Per our conversation yesterday, we are preparing a Claim of Beneficial Use Map for the Oregon Military Department at their Ontario Readiness Center. We are proposing to provide the map at a scale of 1"=200' on 11x17 paper. Please let me know if this will be acceptable.

Also, we currently have an aerial photograph on the map in order to show the Place of Use more clearly, as it is a building. We have heard that historically OWRD didn't allow aerial photos on Claim maps, so I wanted to be sure to ask.

Thanks for all your help Gerry,

Brandon

EST. 1975

Brandon Mahon, P.E., C.W.R.E.
Project Engineer
Anderson Perry & Associates, Inc.
1901 N Fir Street/PO Box 1107
La Grande, OR 97850
541-963-8309 office / 541-963-5456 fax
541-263-1547 cell

Web Facebook LinkedIn

ATTACHMENT A
Well Logs and Pump Test

Well No. 2 - Deep

MALH 53555

(L-100201)

(14A)

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

WELL LABEL # L 100201

START CARD # 1006369

(1) LAND OWNER Owner Well I.D. _____

First Name _____ Last Name _____

Company STATE OF OREGON OREGON MILITARY DEPARTMENT

Address 1330 S.W. 4TH ST

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK [X] New Well [ ] Deepening [ ] Conversion [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD [ ] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud [X] Reverse Rotary [ ] Other _____

(4) PROPOSED USE [ ] Domestic [ ] Irrigation [ ] Community [X] Industrial/ Commercial [ ] Livestock [ ] Dewatering [ ] Thermal [ ] Injection [ ] Other _____

(5) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy

Depth of Completed Well 197 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
20	0	165	Cement	0	50	6	
18	165	200					

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E

[ ] Other _____

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from 50 ft. to 200 ft. Material SAND Size 12/20

Explosives used: [ ] Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
[X]	[ ]	10	[X]	2	78	.365	[ ]	[X]	[X]	[ ]
[X]	[ ]	10	[ ]	108	118	.365	[X]	[ ]	[X]	[ ]
[X]	[ ]	10	[ ]	128	133	.365	[ ]	[X]	[X]	[ ]
[X]	[ ]	10	[ ]	138	192	.365	[X]	[ ]	[X]	[ ]
[ ]	[ ]		[ ]				[ ]	[ ]	[ ]	[ ]

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s) _____

Temp casing [ ] Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method _____

Screens Type WIRE WRAP Material S.S.

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	10	78	108	.015			
Screen	Casing	10	118	128	.015			
Screen	Casing	10	133	138	.015			
Screen	Casing	10	192	197	.015			

(8) WELL TESTS: Minimum testing time is 1 hour

(•) Pump ( ) Bailer ( ) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
102	35	108	5

Temperature 58 °F Lab analysis [ ] Yes By _____

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Units

RECEIVED
JUN 16 2009
WATER RESOURCES DEPT
SALEM, OREGON

(9) LOCATION OF WELL (legal description)

County MALHEUR Twp 18 S N/S Range 47 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

(•) Street address of well ( ) Nearest address

1330 S.W. 4TH ST, ONTARIO, OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	05-12-2009			10.8

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 77

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
03-16-2009	8.3	25	102			10.8
03-17-2009	77	79	102			10.8
03-17-2009	80	82	102			10.8
03-17-2009	83	85	102			10.8
03-17-2009	95	108	102			10.8

(11) WELL LOG Ground Elevation _____

Material	From	To
TOP SOIL	0	7
SAND, GRAVEL	7	25
HARD BLUE CLAY	25	77
FINE SAND	77	79
HARD BLUE CLAY	79	80
FINE SAND	80	82
HARD CLAY	82	83
FINE SAND	83	85
HARD CLAY	85	90
SOFT SANDY CLAY W/ FINE SAND	90	95
FINE SAND	95	108
HARD BLUE CLAY	108	120
FINE SAND	120	127
GREY CLAY	127	134
FINE SAND	134	137
GREY CLAY	137	165
SILTSTONE, CLAYSTONE	165	167
GREY CLAY	167	182
SILTSTONE, CLAYSTONE	182	183

Date Started 04-16-2009 Completed 05-12-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Password : (If filing electronically) _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 06-08-2009

Password : (If filing electronically) _____

Signed _____

Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.89

FEB 08 2010

T 11015

MALH 53555

WATER SUPPLY WELL REPORT - continuation page

WELL I.D. # L 100201

START CARD # 1006369

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
03-17-2009	120	127	102			10.8
03-17-2009	134	135	102			10.8
03-18-2009	193	195	102			10.8

(11) WELL LOG

Material	From	To
GREY CLAY	183	193
SILTSTONE	193	195
GREY CLAY	195	200

Comments/Remarks

T 11015

Well No.3 - West Shallow

MALH 53556

MALH 53556

(L-100202)

(15A)

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

WELL LABEL # L 100202

START CARD # 1006499

(1) LAND OWNER Owner Well I.D. _____

First Name _____ Last Name _____

Company STATE OF OREGON MILITARY DEPARTMENT

Address 1330 SOUTH WEST 4TH ST

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK [X] New Well [ ] Deepening [ ] Conversion [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD [ ] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud [X] Reverse Rotary [ ] Other _____

(4) PROPOSED USE [ ] Domestic [ ] Irrigation [ ] Community [X] Industrial/ Commercial [ ] Livestock [ ] Dewatering [ ] Thermal [ ] Injection [ ] Other _____

(5) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy

Depth of Completed Well 31 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
20	0	31	Bentonite	0	10	5,000	P

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E

[X] Other DRY POUR

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from 10 ft. to 31 ft. Material 3/8 Size pea gravel

Explosives used: [ ] Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉		10	X	2	16	.365	◉		X	
◉		10		26	31	.365	◉		X	

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s) _____

Temp casing [ ] Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method _____

Screens Type WIRE WRAP Material S.S.

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	10	16	26	.1			

(8) WELL TESTS: Minimum testing time is 1 hour

[◉] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
70	11.1	23	4

Temperature 58 °F Lab analysis [ ] Yes By _____

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County MALHEUR Twp 18 S N/S Range 47 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

(•) Street address of well ( ) Nearest address

1330 SOUTH WEST 4TH ST ONTARIO, OR 97914

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	05-19-2009			8.3

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 8.3

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
04-21-2009	8.3	25	70			8.3

(11) WELL LOG Ground Elevation _____

Material	From	To
TOP SOIL	0	7
SAND, GRAVEL	7	25
HARD BLUE CLAY	25	31

RECEIVED
JUN 16 2009
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
JUL 17 2009
WATER RESOURCES DEPT
SALEM, OREGON

Date Started 04-21-2009 Completed 05-19-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Password : (if filing electronically) _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 06-10-2009

Password : (if filing electronically) _____

Signed _____

Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

RECEIVED

Form Version: 0.89

T 11015

FEB 08 2010

Well No. 4 - East Shallow

MALH 53568

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

09-02-2009
(L-100204)
(158)

WELL LABEL # L 100204

START CARD # 1007723

(1) LAND OWNER

Owner Well I.D. WELL 3

First Name _____ Last Name _____

Company STATE OF OREGON MILITARY DEPARTMENT

Address 1330 S.W. 4th STREET

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK

[X] New Well [ ] Deepening [ ] Conversion
[ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD

[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other _____

(4) PROPOSED USE

[ ] Domestic [ ] Irrigation [ ] Community
[X] Industrial/ Commercial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other _____

(5) BORE HOLE CONSTRUCTION

Special Standard [ ] Attach copy

Depth of Completed Well 24.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
12	0	18	Bentonite Chips	0	18	12	S
8	18	26					

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other DRY POUR

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

Explosives used: [ ] Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	8	☒	2	19	.322	◉	○	☒	☐
○	◉	6	☐	14	19	.280	○	◉	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe [X] Inside [ ] Outside [ ] Other Location of shoe(s) 19

Temp casing [ ] Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method _____

Screens Type WIRE WRAP Material S.S

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	7.5	19	24	1			8

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
62	6	22	48

Temperature 58 °F Lab analysis [ ] Yes By _____

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Malheur Twp 18.00 S N/S Range 47.00 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of well ○ Nearest address

1330 S.W. 4th STREET

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	08-13-2009			8

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 8

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
08-12-2009	8	24				8

(11) WELL LOG

Ground Elevation _____

Material	From	To
TOP SOIL	0	2
CLEACHY	2	8
GRAVEL	8	24
HARD BLUE CLAY	24	26

FEB 08 2010

Date Started 08-12-2009 Completed 08-13-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Electronically Filed

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 09-02-2009

Electronically Filed

Signed TERRY DAUGHERTY (E-filed)

Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

T 11015

WATER SUPPLY WELL REPORT - continuation page

MALH 53568

09-02-2009

WELL I.D. # L 100204

START CARD # 1007723

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To
RECEIVED		
FEB 0 8 2010		

Comments/Remarks

NOTE: 7"x 8" K-PACKER AT 14'

T 11015

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

MALH 53625

12-14-2009

(L-100207)
16A

Page 1 of 2

WELL LABEL # L 100207

START CARD # 1008831

(1) LAND OWNER Owner Well I.D. WELL # 4

First Name _____ Last Name _____

Company STATE OF OREGON, OREGON MILITARY DEPARTMENT

Address 1330 S.W. 4TH STREET

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK [X] New Well [ ] Deepening [ ] Conversion [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud [ ] Reverse Rotary [ ] Other

(4) PROPOSED USE [ ] Domestic [ ] Irrigation [ ] Community [X] Industrial/ Commercial [ ] Livestock [ ] Dewatering [ ] Thermal [X] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION Special Standard [ ] (Attach copy)

Depth of Completed Well 23.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
12	0	18	Bentonite	0	18	550	P
8	18	23					

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E

[X] Other DRY POUR

Backfill placed from ____ ft. to ____ ft. Material ____

Filter pack from ____ ft. to ____ ft. Material ____ Size ____

Explosives used: [ ] Yes Type ____ Amount ____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Std	Plstc	Wld	Thrd
[X]	[ ]	8	[X]	2	18	.332	[X]	[ ]	[X]	[ ]
[ ]	[X]	6	[ ]	13	18	.250	[ ]	[ ]	[X]	[ ]

Shoe [X] Inside [ ] Outside [ ] Other Location of shoe(s) 18

Temp casing [ ] Yes Dia ____ From ____ To ____

(7) PERFORATIONS/SCREENS

Perforations Method ____

Screens Type JOHNSON Material S.S.

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	7	18	23	.1			

(8) WELL TESTS: Minimum testing time is 1 hour

[X] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
15	9	20	4

Temperature 60 °F Lab analysis [ ] Yes By ____

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Malheur Twp 18.00 S N/S Range 47.00 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number ____ Lot ____

Lat ____ ° ____ ' ____ " or 44.01573600 DMS or DD

Long ____ ° ____ ' ____ " or -116.97054700 DMS or DD

[X] Street address of well [ ] Nearest address

1330 S.W. 4TH STREET, ONTARIO, OREGON

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	12-09-2009			8

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 8

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL (ft)
12-01-2009	7	23				8

(11) WELL LOG Ground Elevation ____

Material	From	To
TOP SOIL	0	1
BROWN CLAY	1	7
GRAVEL	7	23
BLUE CLAY	23	23

FEB 08 2010

Date Started 11-30-2009 Completed 12-09-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number ____ Date ____

Electronically Filed

Signed ____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 12-14-2009

Electronically Filed

Signed TERRY DAUGHERTY (E-filed)

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

T 11015

WATER SUPPLY WELL REPORT - continuation page

MALH 53625

12-14-2009

WELL I.D. # L 100207

START CARD # 1008681

(5) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/Screen	Casing/Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

FEB 0 8 2010

Comments/Remarks

6"x8" K-PACKER LOCATED AT 13'

T 11015

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

MALH 53626

12-14-2009

(L-100208)
(168)

WELL LABEL # L 100208

START CARD # 1008832

(1) LAND OWNER

Owner Well I.D. WELL # 5

First Name _____ Last Name _____

Company STATE OF OREGON, OREGON MILITARY DEPARTMENT

Address 1330 S.W. 4TH STREET

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud ☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Community ☒ Industrial/ Commercial ☐ Livestock ☐ Dewatering ☐ Thermal ☒ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ Attach copy

Depth of Completed Well 24.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
12	0	18	Bentonite	0	18	550	P.
8	18	24					

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☒ Other DRY POUR

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

Explosives used: ☐ Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	8	☒	2	19	.322	◉	○	☒	☐
○	◉	6	☐	14	19	.250	○	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☒ Inside ☐ Outside ☐ Other Location of shoe(s) 19

Temp casing ☐ Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method _____

Screens Type JOHNSON Material S.S

Perf/S creen	Casing/Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	7	19	24	.1			

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
35	9.6	20	4

Temperature 60 °F Lab analysis ☐ Yes By _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Malheur Twp 18.00 S N/S Range 47.00 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number _____ Lot _____

Lat ° ' " or 44.01573600 DMS or DD

Long ° ' " or -116.97054700 DMS or DD

◉ Street address of well ○ Nearest address

1330 S.W. 4TH STREET, ONTARIO, OREGON

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	12-10-2009			7.1

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 8

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
12-01-2009	8	24				6

(11) WELL LOG

Ground Elevation _____

Material	From	To
TOP SOIL	0	3
BROWN CLAY	3	8
GRAVEL	8	24
BLUE CLAY	24	24

FEB 08 2010

Date Started 12-01-2009 Completed 12-10-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Electronically Filed

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 12-14-2009

Electronically Filed

Signed TERRY DALTOHERTY (E-filed)

Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

T 11015

WATER SUPPLY WELL REPORT - continuation page

MALH 53626

12-14-2009

WELL I.D. # L 100208

START CARD # 1008892

(5) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

FEB 08 2010

Comments/Remrks

6"X8" K-PACKER LOCATED AT 19'

T 11015

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

MALH 53627

12-14-2009

(L-100209)
(160)

WELL LABEL # L 100209

START CARD # 1008833

(1) LAND OWNER

Owner Well I.D. WELL # 6

First Name _____ Last Name _____

Company STATE OF OREGON, OREGON MILITARY DEPARTMENT

Address 1330 S.W. 4TH STREET

City ONTARIO State OR Zip 97914

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud ☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Community ☒ Industrial/ Commercial ☐ Livestock ☐ Dewatering ☐ Thermal ☒ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Well 25.00 ft.

BORE HOLE

Dia	From	To
12	0	25

SEAL

Material	From	To	Amt	sacks/ lbs
Bentonite	0	18	450	P

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☒ Other DRY POUR

Backfill placed from ____ ft. to ____ ft. Material ____

Filter pack from ____ ft. to ____ ft. Material ____ Size ____

Explosives used: ☐ Yes Type ____ Amount ____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	8	☒	2	20	.322	◉	○	☒	☐
○	◉	6	☐	18	20	.250	○	◉	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☒ Inside ☐ Outside ☐ Other Location of shoe(s) 20

Temp casing ☐ Yes Dia ____ From ____ To ____

(7) PERFORATIONS/SCREENS

Perforations Method ____

Screens Type JOHNSON Material S.S.

Perf/Screen	Casing/Screen Liner	Dia	From	To	Slot/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Casing	7	20	25	1			

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
45	6.5	20	4

Temperature 60 °F Lab analysis ☐ Yes By ____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Malheur Twp 18.00 S N/S Range 47.00 E E/W WM

Sec 9 NE 1/4 of the SE 1/4 Tax Lot 500

Tax Map Number ____ Lot ____

Lat ____ ° ____ ' ____ " or 44.01573600 DMS or DD

Long ____ ° ____ ' ____ " or -116.97054200 DMS or DD

◉ Street address of well ○ Nearest address

1330 S.W. 4TH STREET, ONTARIO, OREGON

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	12-11-2009			8.6

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 9

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
12-04-2009	9	25				8.6

(11) WELL LOG

Ground Elevation ____

Material	From	To
TOP SOIL	0	1
BROWN CLAY	1	9
GRAVEL	9	25
BLUE CLAY	25	24

FEB 08 2010

Date Started 12-04-2009 Completed 12-11-2009

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number ____ Date ____

Electronically Filed

Signed ____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1505 Date 12-14-2009

Electronically Filed

Signed TERRY DAUGHERTY (E-filed)

Contact Info (optional) ____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

T 11015

WATER SUPPLY WELL REPORT - continuation page

MALH 53627

12-14-2009

WELL I.D. # L 100209

START CARD # 1008833

(5) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/Screen	Casing/Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

FEB 0 8 2010

Comments/Remarks

6"X8" K-PACKER LOCATED AT 15'

T 11015

SPF WATER
ENGINEERING, LLC

TECHNICAL MEMORANDUM

To: Terry Daugherty - Riverside, Inc.

From: Terry Scanlan -- SPF Water Engineering

CC: Bob Tikker -- Tikker Engineering
Hal Maxey -- Maxey Tookey Architects

Subject: Analysis of Two-Day Hydronic Well Pumping Test and Recommendations for Additional Wells and Mechanical Equipment -- Ontario Readiness Center Project

Date: September 8, 2009

Project No.: 739.0010

Three hydronic system wells have been completed and test pumped at the Ontario Readiness Center project site. This memo provides analysis of a recent two-day pumping test of the third well. Recommendations for additional well construction are included. This memo builds on previous analyses presented by SPF Water Engineering in documents dated May 28, 2009 and September 12, 2008.

BACKGROUND

Existing Wells. There are currently a total of four wells on the property, including three wells drilled for the hydronic system in 2009 and a well drilled for irrigation purposes in 2005 for Treasure Valley Community College (TVCC).

Three of the wells tap the shallow aquifer and one well taps the deep aquifer. The shallow aquifer consists of sand and gravel and extends from a depth of approximately 7 feet to a depth of 20 to 25 feet. The deep aquifer extends from approximately 70 to more than 200 feet, and consists of intermittent fine sand layers between thicker layers of clay and shale. The deep aquifer has different water chemistry than the shallow aquifer. There is no direct hydraulic connection between the shallow and deep aquifers.

For purpose of this memorandum, the four wells are numbered and described as follows.

- **Well No. 1 (Construction Well or TVCC Well)** -- Well No. 1 was drilled using the cable-tool method in 2005 for TVCC. The well is completed with 10-inch diameter casing to 40 feet. The casing is perforated from 18.5 to 28 feet. The well taps the shallow aquifer. Well No. 1 is located in the northwest portion of the project site, approximately 300 to 400 feet from Wells 2, 3, and 4.

T 11015

300 E. Mallard Drive, Suite 350 · Boise, ID 83706 · 208.383.4140 · fax 208.383.4156 · www.spfwater.com

- **Well No. 2 (ORC Deep Well, ORC Hydronic Well 1)** – Well No. 2 was drilled to a total depth of 200 feet using the reverse-rotary method in April and May 2009 and is completed to a total depth of 197 feet. Well screen intervals are 78 to 108 feet, 118 to 128 feet, 133 to 138 feet, and 192 feet to 197 feet. The well taps the deep aquifer.

- **Well No. 3 (ORC Shallow West Well, ORC Hydronic Well 2)** – Well No. 3 was drilled using the reverse-rotary method in April and May 2009 to a total depth of 31 feet, and is completed with a single string of 10-inch casing and well screen from +2 to 31 feet. The screen is 0.100-inch slot pipe-size well screen placed from approximately 16 to 26 feet. The well taps the shallow aquifer, and is located a few feet adjacent to Well No. 2.

- **Well No. 4 (ORC Shallow East Well, ORC Hydronic Well 3)** – Well No. 4 was drilled using the air-rotary method in August 2009 to a total depth of 26 feet. The well is completed with 8-inch casing from +2 to 19 feet, with a separate string of 6-inch or 7-inch casing from 14 to 19 feet and 8-inch telescope well screen from 19 to 24 feet. A 7x8-inch neoprene packer at 14 feet is used to seal the two casing strings together. The well screen is 0.100-inch slot size. The well taps the shallow aquifer, and is located approximately 100 feet east of Wells Nos. 2 and 3.

Note that the well identification numbers used during this test differ from the well identifications numbers used to identify the wells in my previous memo of May 8, 2009. Well reports are provided as Attachment A.

PUMPING TEST DESCRIPTION

The test consisted of pumping Well No. 4 for 49.5 hours at an average rate of 64 gpm. Water levels were measured in the pumping well (Well No. 4), and in three observation wells (Well Nos. 1 through 3). Water levels were measured using electric-line well sounders in all four wells. In addition, the water level was monitored using a data logging pressure transducer in Well No. 3. Pumping equipment consisted of a 4-inch submersible pump with electric motor powered by a portable generator. Water from the pump was discharged to an adjacent agricultural field, approximately 200 feet to the south. Flow rate was monitored using a 2.5-inch x 4-inch circular orifice weir.

The pumping test began on August 19, 2009 at 12:40 pm, and was concluded on August 21, 2009 at 2:10 pm. Pumping rate was held constant between 62 and 66 gpm for the duration of the test except for short-periods of generator failure during the late evening of August 19 and early morning of August 20. The generator failure was apparently due to clogged fuel filters. Following replacement of the filters at approximately 9:00 am on August 20, the generator and pump operated continuously until the end of the pumping test.

Following the conclusion of pumping, water-level recovery was measured for 70 minutes in all four wells. The transducer was left in Well No. 3 for one additional week, after

which the transducer was removed and all four wells were measured with an electric-line well sounder. Test data are provided as Attachment B.

PUMPING TEST RESPONSES

Well No. 4. Static water level at the start of the test was 3.38 feet below ground surface in Well No. 4. Pumping water level at the end of the pumping period was 12.58 feet below ground surface, for a total drawdown of 9.2 feet. Specific capacity at 4 hours and again at 49.5 hours was 7.0 gpm per foot. This specific capacity is similar to the 6.3 gpm/ft capacity measured at Well No. 3 during the pumping test of that well in May 2009.

Pumping water levels after the first hour of pumping showed a total fluctuation of approximately 1.2 feet. This fluctuation was partially due to generator failure. However, much of the fluctuation is likely caused by barometric or other influences.

Although the pumping water level after four hours of pumping was equal to the pumping water level at 49.5 hours, the logarithmic trend suggests that water levels were declining over the test period. The apparent trend appears to be approximately 0.4 feet per log cycle. Therefore, continuous pumping of the well at 65 gpm for a period of two or more months would have likely resulted in total drawdown approaching 10 feet.

Analysis of the drawdown response of Well No. 4 indicates an apparent aquifer transmissivity of approximately 44,000 gpd/ft. Analysis of the recovery response of Well No. 4 indicates an apparent aquifer transmissivity of approximately 34,000 gpd/ft.

Well No. 3. Static water level in Well No. 3 was 4.58 feet below ground surface at the start of the test. Drawdown in the well after 49.5 hours was 1.56 feet.

The logarithmic trend suggests that continuous pumping of Well No. 4 for period of two or more months would have likely resulted in total interference drawdown of approximately 2.5 feet at Well No. 3.

Analysis of the drawdown response in Well No. 3 suggests a transmissivity of approximately 24,000 gpd/ft and a storage coefficient of 0.005. Analysis of the recovery response of Well No. 4 indicates an apparent aquifer transmissivity of approximately 34,000 gpd/ft for the first 6 hours of recovery, and a transmissivity of approximately 20,000 gpd/ft for the remainder of the recovery period.

Well No. 2. Well No. 2 is completed in a deep-aquifer zone that is not in direct hydraulic connection with the shallow aquifer tapped by the pumping well (Well No. 4). As a result, no response was anticipated in Well No. 2. However, monitoring during the test period showed fluctuations in excess of 3 feet. The cause of the fluctuation is unknown, but assumed to be related to barometric pressure changes, pumping of other deep-aquifer wells in the area, or other unidentified factors. There was no apparent direct water-level response to pumping of Well No. 4.

T 11015

During the test it was noted that gas could be seen bubbling to the surface of the well. The nature of this gas in not known, but could be methane or carbon dioxide. The presence of gas coming out of solution in the well should be noted in the design of mechanical equipment.

Well No. 1. The water-level response, if any, at Well No. 1 to pumping of Well No. 4 appears to be 0.25 feet or less. Therefore, pumping from shallow aquifer production wells is not anticipated to significantly reduce water levels in the vicinity of shallow aquifer injection wells.

DISCUSSION

Groundwater Production. Sustained pumping of Well No. 4 at approximately 65 gpm will result in approximately 2.5 feet of interference drawdown at Well No. 3. Similarly, simultaneous sustained pumping of Well No. 3 at 65 gpm should result in a minimum of 2.5 feet of interference drawdown at Well No. 4. The actual interference drawdown may be greater, because as the aquifer water level is lowered in the vicinity of the pumping wells, the saturated aquifer thickness decreases thereby decreasing the effective aquifer transmissivity.

Pumping of a third shallow well at 65 gpm, located equidistant from Well Nos. 3 and 4, will result in a minimum of 2.5 feet of additional interference drawdown at both Well Nos. 3 and 4. Therefore, the result of sustained pumping of three equidistant shallow-aquifer wells at 65 gpm each (195 gpm total) will be approximately 10 feet of pumping drawdown in each well and 5 feet of interference drawdown at each well. Assuming static water levels of 5 feet in each well, the calculated pumping water level will be 20 feet in each well (i.e., 10' pumping drawdown + 5' interference drawdown + 5 feet static depth to water). These wells are generally screened between 16 and 26 feet, and drawing down water levels to approximately 20 feet is probably not practical. Therefore, it will be necessary to pump at a lower rate in each well. Reducing the pumping rate to approximately 50 gpm per well (150 gpm total) appears to be feasible. Therefore, production of up a maximum of 150 gpm from the shallow aquifer is recommended.

As noted in the May 28, 2009 memo, two deep-aquifer wells spaced 100 feet or more apart should produce a total of 200 gpm. Therefore, three shallow-aquifer wells and two deep-aquifer wells should produce approximately 350 gpm, very close to the target capacity of 360 gpm. Note that this total capacity does not allow for any redundancy or for future declines in well productivity.

Groundwater Injection. Within an aquifer, injection of groundwater generally results in the opposite hydraulic response as production of groundwater. Thus, if sustained shallow-aquifer pumping of 65 gpm results in 2.5 feet of water-level drawdown at a distance of 100 feet, injection of 65 gpm will result in 2.5 feet of water-level rise at a distance of 100 feet. Furthermore, the water-level rise should be proportional to injection rate. Therefore, if 130 gpm (i.e., double the 65 gpm rate) is injected into the shallow aquifer, water-level rise at a radius of 100 feet will be about 5 feet (i.e., double the water-

T 11015

level rise at 65 gpm). Water-level rise at a distance of less than 100 feet from the injection well will be more than 5 feet, while the water-level rise at a distance of more than 100 feet from the injection well will be less than 5 feet. This magnitude of water-level rise is significant at the ORC because the depth to the water table ranges from 6.34 feet below ground surface at Well No. 1 to 3.38 feet below ground surface at Well No. 4. Therefore, water logging of soils in the vicinity of a shallow injection well is possible at injection rates of more than about 75 gpm.

Given the issues associated with water table rise, shallow injection wells should be spaced as widely as possible within the site. Furthermore, shallow injection wells should be operated such that the average injection rate is limited to prevent water logging of surrounding soils. The maximum rate can likely be determined through operation, and will depend on spacing of the wells. However, assuming two wells spaced 200 feet apart, maximum average injection rates of approximately 50 to 100 gpm per well should be assumed

Injection into the deep aquifer does not pose the issues associated with water-table rise that occur with the shallow aquifer. The clay layers located between the shallow and deep aquifer zones are adequate to prevent deep-aquifer injection activities from raising the water table in the shallow aquifer. It is reasonable to assume that the deep aquifer can accept the full 360 gpm target flow rate with initial injection pressures of less than 100 psi. Two deep injection wells, spaced a minimum of 200 feet apart, are recommended.

Injection Well Plugging. A common problem with injection wells is plugging. Although all wells have a tendency to lose capacity over time due to various physical and biochemical mechanisms, injection wells are especially problematic in this regard because fluids are forced into the well which tends to promote plugging. At the ORC, plugging is more likely to occur in deep-aquifer injection wells due to the low-permeability, fine-grained sands that comprise the deep aquifer. Conversely, all other things being equal, plugging of shallow-aquifer injection wells should be less likely to occur due to the coarser, more permeable, sands and gravel that form the shallow aquifer.

To combat plugging, it is strongly recommended that each injection well be equipped with a high-capacity submersible pump for periodic flushing of each well to waste. Reversing the flow by pumping tends to unplug an injection well. Although loss of injection capacity will likely still occur over time, the rate of loss will be diminished by frequent flushing. The pumps should be automated to flush at intervals.

Water Chemistry Issues. It is not known if the chemistry of the deep-aquifer water is compatible with the chemistry of the shallow-aquifer water, and vice versa. As a result, mixing of the two waters within the injection wells and surrounding aquifer zones could result in undesirable chemical reactions, resulting in precipitation of inorganic compounds or release of dissolved gasses. Such chemical reactions may cause plugging of a well that cannot be cured simply by flushing. For this reason, it may be

best to minimize mixing of the different water chemistries to the extent possible. This is an operational and design issue, and may not be practical if flow rates in excess of 150 gpm are required by the hydronic system.

Injection Well Mechanical Issues. Mechanical equipment required for proper operation of the injection wells include individual flow meters, pressure gages, pressure sustaining valves, flushing pumps, injection tubes, isolation valves (manual and solenoid controlled), and throttling valves. Well heads must be configured for injection operations.

- Flow meters and pressure gages at each injection well are needed for assessing well performance.
- Pressure sustaining valves are needed to maintain pressure within the hydronic system. Without pressure sustaining valves (or a similar device), there is the potential for the injection piping from the building to drain each time the pumps cycle off.
- Flushing pumps are necessary to minimize well plugging.
- Injection tubes are useful to prevent cascading and air entrainment in the wells. At this project site, static water levels are relatively high so that injection tubes can be short (i.e., 10 feet or less).
- Manual isolation valves allow wells to be serviced while the system is operational.
- Solenoid controlled isolation valves are needed to allow automatic flushing.
- Throttling valves or other flow control devices are needed to prevent excessive injection into the shallow-aquifer zone.
- Well heads must be configured to accept injection pressures of up to 100 psi. To do so may require flanged casing, air and vacuum release valves, and sealed electrical penetrations. In addition, freeze protection may be required.

RECOMMENDATIONS

Production Wells

1. Drill one additional shallow production well and one additional deep production well to maximize groundwater production at this site. The two wells can be located side-by-side, but the well pair should be located as far as practical from the existing wells, and in no case should the well pair be less than 100 feet from existing wells. Estimated maximum production from five wells is 350 gpm.

2. Equip the shallow production wells with nominal 50 gpm pumps. Assuming pumping water levels of approximately 15 feet, and typical injection pressures of 25 psi, nominal 2 hp pump motors are required. To allow for higher injection pressures (in the event of well plugging), 3 hp pumps could be considered if the hydronic system pressure sustaining valve is set for 40 to 50 psi. Grundfos 40S pump are applicable for this purpose. Pump setting depths of at least 20 feet are recommended.

3. Equip the deep production wells with nominal 100 gpm pumps. Assuming pumping water levels of 70 feet and injection pressures of 50 psi, 7.5 hp pump motors are required. Grundfoss 85S pumps are applicable for this purpose. Pump setting depths of approximately 110 feet are recommended.

4. Pumps should be equipped with motor shrouds for cooling purposes. Flow switches (or other devices) should be provided for low-flow rate protection. Pumps should be equipped with check valves. Isolation valves should be provided for each well.

5. Reserve space and stub piping for future production wells if the two additional production wells are insufficient or if the five wells lose productivity over time.

Injection Wells

6. Construct two shallow and two deep injection wells. The deep and shallow injection well pairs should be spaced a minimum of 200 feet apart. In addition, it may be possible to equip Well No. 1 for injection purposes.

7. Provide pumps and flush lines in each injection well.
   - Deep injection well pumps should be 150 gpm, 5 hp. Grundfos 150S pumps are applicable for the deep wells.
   - Shallow injection well pumps should be 75 gpm, 1.5 hp or 2 hp. Grundfos 75S or Sta-Rite 70 Series pumps are applicable for the shallow wells. These pumps may need to be throttled to prevent overpumping.

8. Set up the injection well pumps for automated flushing to waste. Control wires between the mechanical room and well sites are recommended to provided start and stop signals to pumps and valves. Solenoid valves can be used to open flush lines.

9. Provide the necessary mechanical equipment (flow meters, pressure gages, pressure sustaining valves, injection tubes, isolation valves, throttling valves, and air and vacuum venting, freeze protection) to allow operation of the injection wells.

T 11015

General Recommendations

10. Attempt to reconfigure the design or operation of the hydronic system to reduce the water demand. A maximum system demand of 150 gpm is much more practical at this location than a maximum system demand of 360 gpm. If maximum hydronic water system demands are reduced to 150 gpm, well operational and maintenance problems will be reduced and redundancy will be provided. Shallow wells can be operated with deep wells as back up (and vice versa). Alternatively, a maximum demand of 150 gpm could reduce the number of wells required (although redundancy will be limited).

11. Significant monitoring of injection well and production well water levels, pressures, and flow rates will be necessary during initial operation of the system. Modifications in operations will likely be necessary based on system responses to pumping and injection. Long-term monitoring will be necessary to detect and remedy well plugging or other issues.

FEB 08 2010

T 11015

48-Hour Pumping Test Data

T 11015

T 11015

Ontario Readiness Center - Shallow East Well Test, Q~64gpm																	
Tests Performed By:	SPF and Riverside Inc.																
Test Pump:	Grundfos , 75 gpm, 8 bowls																
Measurements Taken By:	SPF and Riverside Inc.																
Flow Measurement:	2.5" x 4" orifice																
Shallow East Well MP:	1.67 feet ags				1.72 toc - feet ags					WL measurements with riverside powers sounder							
Shallow West Well MP:	3.08 feet ags									WL measurements with 150' white waterline sounder							
Deep Well MP:	1.52 feet ags									WL measurements with 300' orange waterline sounder							
Construction Well MP:	2.68 feet ags @ electrical junction box				2.43 feet ags @ welded coupler					WL measurments with 300' blue waterline sounder							
					Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			
Date	Time	t (min)	t' (min)	t/t'	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	Comments
8/19/2009					4.75	3.38		7.66	4.58		14.03	12.51		9.02	6.34		Static WLs
8/19/2009	12:40																pump on
8/19/2009	12:41	1			15.98	14.61	11.23										adjusting valve
8/19/2009	12:42	2			13.23	11.86	8.48										
8/19/2009	12:43	3			13.10	11.73	8.35										
8/19/2009	12:43:30	3.5						7.84	4.76	0.18							
8/19/2009	12:44	4			13.08	11.71	8.33										
8/19/2009	12:44:30	4.5									14.01	12.49	-0.02				
8/19/2009	12:45	5			13.16	11.79	8.41										clear
8/19/2009	12:45:30	5.5						7.86	4.78	0.20							
8/19/2009	12:46	6			13.21	11.84	8.46										
8/19/2009	12:47	7			13.24	11.87	8.49	7.89	4.81	0.23							Q~63-65gpm
8/19/2009	12:48	8			13.24	11.87	8.49	7.90	4.82	0.24							
8/19/2009	12:49	9			13.22	11.85	8.47	7.93	4.85	0.27							
8/19/2009	12:50	10			13.22	11.85	8.47	7.93	4.85	0.27							Q~65-66gpm
8/19/2009	12:51	11						7.95	4.87	0.29							
8/19/2009	12:52	12			13.22	11.85	8.47	7.96	4.88	0.30							
8/19/2009	12:53	13						7.96	4.88	0.30							
8/19/2009	12:54	14									13.99	12.47	-0.04				
8/19/2009	12:55	15			13.23	11.86	8.48	7.97	4.89	0.31							
8/19/2009	12:57	17												9.02	6.34	0.00	
8/19/2009	12:58	18			13.27	11.90	8.52										
8/19/2009	13:00	20			13.30	11.93	8.55										
8/19/2009	13:01:30	21.5						7.99	4.91	0.33							
8/19/2009	13:04	24			13.32	11.95	8.57										
8/19/2009	13:05	25						7.98	4.90	0.32							
8/19/2009	13:06	26									13.93	12.41	-0.10				
8/19/2009	13:07	27															removed junction box and conduit @ construction well, mp changed to welded coupler
8/19/2009	13:08	28			13.36	11.99	8.61										
8/19/2009	13:09	29						8.03	4.95	0.37							
8/19/2009	13:11	31			13.38	12.01	8.63							8.75	6.32	-0.02	
8/19/2009	13:13	33						8.06	4.98	0.40							
8/19/2009	13:16	36			13.40	12.03	8.65										
8/19/2009	13:17	37						8.06	4.98	0.40							
8/19/2009	13:18	38									13.90	12.38	-0.13				
8/19/2009	13:21	41						8.08	5.00	0.42							
8/19/2009	13:23:30	43.5												8.75	6.32	-0.02	
8/19/2009	13:24	44			13.48	12.11	8.73										Q~65gpm

T 11015

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/19/2009	13:26	46						8.10	5.02	0.44							
8/19/2009	13:27	47									13.87	12.35	-0.16				
8/19/2009	13:28	48						8.10	5.02	0.44							
8/19/2009	13:30	50						8.12	5.04	0.46							
8/19/2009	13:33	53												8.74	6.31	-0.03	
8/19/2009	13:34	54			13.50	12.13	8.75										
8/19/2009	13:42	62			13.55	12.18	8.80										
8/19/2009	13:42:30	62.5						8.15	5.07	0.49							
8/19/2009	13:43:30	63.5									13.81	12.29	-0.22				noticed cascading water or gas in deep well
8/19/2009	13:49	69												8.73	6.30	-0.04	
8/19/2009	13:50	70															Riverside nomenclature: construction-1, deep-2, shallowwest-3, shalloweast-4 Q~64gpm
8/19/2009	14:05	85															
8/19/2009	14:16	96			13.69	12.32	8.94										
8/19/2009	14:19	99						8.45	5.37	0.79							
8/19/2009	14:20	100									13.88	12.36	-0.15				
8/19/2009	14:23	103												8.82	6.39	0.05	Riverside to measure WLs, Well No. 4 from toc
8/19/2009	14:36	116			13.79	12.37	8.99										
8/19/2009	14:38	118						8.38	5.30	0.72							
8/19/2009	14:40	120									14.15	12.63	0.12				
8/19/2009	14:45	125.0												8.95	6.52	0.18	
8/19/2009	15:10	150.0			13.92	12.50	9.12										
8/19/2009	15:12	152						8.60	5.52	0.94							
8/19/2009	15:13	153									14.35	12.83	0.32				
8/19/2009	15:17	157.0												8.85	6.42	0.08	
8/19/2009	15:30	170			13.92	12.50	9.12										
8/19/2009	15:40	180.0						8.47	5.39	0.81							
8/19/2009	15:43	183									14.53	13.01	0.50				
8/19/2009	15:47	187												8.80	6.37	0.03	
8/19/2009	16:15	215			13.92	12.50	9.12										
8/19/2009	16:17	217						8.48	5.40	0.82							
8/19/2009	16:20	220									14.50	12.98	0.47				
8/19/2009	16:23	223												8.86	6.43	0.09	Q between 62 & 66 mark
8/19/2009	16:35	235			14.00	12.58	9.20										
8/19/2009	16:37	237						8.52	5.44	0.86							
8/19/2009	16:38	238									14.39	12.87	0.36				
8/19/2009	16:43	243												8.81	6.38	0.04	
8/19/2009	17:00	260			14.00	12.58	9.20	8.56	5.48	0.90							Q~64gpm
8/19/2009	17:05	265									14.25	12.73	0.22				
8/19/2009	17:08	268												8.83	6.40	0.06	
8/19/2009	17:24	284			14.00	12.58	9.20										
8/19/2009	17:28	288						8.54	5.46	0.88							
8/19/2009	17:29	289									14.25	12.73	0.22				
8/19/2009	17:32	292												8.83	6.40	0.06	
8/19/2009	18:04	324			14.00	12.58	9.20										
8/19/2009	18:06	326						8.69	5.61	1.03							
8/19/2009	18:08	328									14.01	12.49	-0.02				

T 11015

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/20/2009	2:06	806						8.63	5.55	0.97							
8/20/2009	2:07	807									15.50	13.98	1.47				
8/20/2009	2:09	809												8.83	6.40	0.06	
8/20/2009	2:59	859			13.67	12.25	8.87										
8/20/2009	3:00	860						8.67	5.59	1.01							
8/20/2009	3:01	861									16.00	14.48	1.97				
8/20/2009	3:05	865												8.83	6.40	0.06	
8/20/2009	4:00	920			13.33	11.91	8.53										
8/20/2009	4:03	923						8.67	5.59	1.01							
8/20/2009	4:04	924									16.54	15.02	2.51				
8/20/2009	4:07	927												8.81	6.38	0.04	
8/20/2009	5:00	980			13.50	12.08	8.70										
8/20/2009	5:01	981						8.63	5.55	0.97							
8/20/2009	5:03	983									16.83	15.31	2.80				
8/20/2009	5:06	986												8.83	6.40	0.06	
8/20/2009	6:00	1040			13.33	11.91	8.53										
8/20/2009	6:02	1042						8.58	5.50	0.92							
8/20/2009	6:03	1043									17.13	15.61	3.10				
8/20/2009	6:06	1046												8.83	6.40	0.06	
8/20/2009	7:00	1100			13.33	11.91	8.53										
8/20/2009	7:04	1104						8.63	5.55	0.97							
8/20/2009	7:06	1106									16.75	15.23	2.72				
8/20/2009	7:08	1108												8.83	6.40	0.06	
8/20/2009	8:00	1160			13.21	11.79	8.41										
8/20/2009	8:03	1163						8.75	5.67	1.09							
8/20/2009	8:04	1164									16.25	14.73	2.22				
8/20/2009	8:07	1167												8.85	6.42	0.08	
8/20/2009	8:58	1218			13.17	11.75	8.37										changed fuel filters on generator, pump off
8/20/2009	8:59	1219						8.67	5.59	1.01							
8/20/2009	9:00	1220									15.92	14.40	1.89				
8/20/2009	9:03	1223												8.85	6.42	0.08	
8/20/2009	9:16	1236			13.33	11.91	8.53										
8/20/2009	9:17	1237						8.71	5.63	1.05							
8/20/2009	9:18	1238									15.79	14.27	1.76				
8/20/2009	9:21	1241												8.88	6.45	0.11	
8/20/2009	9:31	1251			13.29	11.87	8.49										
8/20/2009	9:32	1252						8.75	5.67	1.09							
8/20/2009	9:33	1253									15.71	14.19	1.68				
8/20/2009	9:35	1255												8.85	6.42	0.08	
8/20/2009	9:47	1267			13.25	11.83	8.45										
8/20/2009	9:48	1268						8.75	5.67	1.09							
8/20/2009	9:49	1269									15.63	14.11	1.60				
8/20/2009	9:51	1271												8.85	6.42	0.08	
8/20/2009	10:02	1282			13.23	11.81	8.43										
8/20/2009	10:03	1283						8.75	5.67	1.09							
8/20/2009	10:04	1284									15.54	14.02	1.51				
8/20/2009	10:07	1287												8.85	6.42	0.08	
8/20/2009	11:00	1340			13.08	11.66	8.28										
8/20/2009	11:02	1342						8.71	5.63	1.05							

T 11015

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/20/2009	11:03	1343									15.25	13.73	1.22				
8/20/2009	11:05	1345												8.88	6.45	0.11	
8/20/2009	12:00	1400			13.83	12.41	9.03										
8/20/2009	12:04	1404						8.71	5.63	1.05							
8/20/2009	12:06	1406									15.08	13.56	1.05				
8/20/2009	12:08	1408												8.89	6.46	0.12	
8/20/2009	13:02	1462			13.83	12.41	9.03										
8/20/2009	13:06	1466						9.14	6.06	1.48							
8/20/2009	13:07	1467									14.83	13.31	0.80				
8/20/2009	13:09	1469												8.88	6.45	0.11	
8/20/2009	14:01	1521			13.88	12.46	9.08										
8/20/2009	14:03	1523						8.98	5.90	1.32							
8/20/2009	14:05	1525									14.50	12.98	0.47				
8/20/2009	14:10	1530												8.90	6.47	0.13	
8/20/2009	14:35	1555															SPF meas., Q~63gpm
8/20/2009	14:37	1557			13.69	12.27	8.89										SPF meas.
8/20/2009	14:41	1561						9.03	5.95	1.37							SPF meas.
8/20/2009	14:42	1562									14.50	12.98	0.47				SPF meas.
8/20/2009	14:46	1566												8.88	6.45	0.11	SPF meas.
8/20/2009	14:50	1570															increase Q~65-66gpm, 58 with spf thermometer
8/20/2009	14:51	1571			14.00	12.58	9.20										
8/20/2009	15:00	1580						9.21	6.13	1.55							
8/20/2009	15:01	1581									14.54	13.02	0.51				
8/20/2009	15:03	1583												8.88	6.45	0.11	
8/20/2009	15:59	1639			14.08	12.66	9.28										
8/20/2009	16:01	1641						9.17	6.09	1.51							
8/20/2009	16:04	1644									14.46	12.94	0.43				
8/20/2009	16:06	1646												8.89	6.46	0.12	
8/20/2009	17:00	1700			14.13	12.71	9.33										
8/20/2009	17:02	1702						9.17	6.09	1.51							
8/20/2009	17:03	1703									14.42	12.90	0.39				
8/20/2009	17:06	1706												8.90	6.47	0.13	
8/20/2009	17:56	1756			14.08	12.66	9.28										
8/20/2009	17:58	1758						9.15	6.07	1.49							
8/20/2009	18:00	1760									14.10	12.58	0.07				
8/20/2009	18:04	1764												8.96	6.53	0.19	
8/20/2009	18:57	1817						9.15	6.07	1.49							
8/20/2009	19:00	1820			14.13	12.71	9.33				14.17	12.65	0.14				
8/20/2009	19:02	1822												8.96	6.53	0.19	
8/20/2009	19:59	1879			14.08	12.66	9.28										
8/20/2009	20:00	1880						9.17	6.09	1.51							
8/20/2009	20:01	1881									14.25	12.73	0.22				
8/20/2009	20:03	1883												8.98	6.55	0.21	
8/20/2009	21:06	1946			14.10	12.68	9.30										
8/20/2009	21:08	1948						9.19	6.11	1.53							
8/20/2009	21:09	1949									14.63	13.11	0.60				
8/20/2009	21:11	1951												8.98	6.55	0.21	
8/20/2009	22:01	2001			14.21	12.79	9.41										
8/20/2009	22:03	2003						9.19	6.11	1.53							

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/20/2009	22:04	2004									14.96	13.44	0.93				
8/20/2009	22:06	2006												8.96	6.53	0.19	
8/20/2009	23:05	2065			14.19	12.77	9.39										
8/20/2009	22:06	2006						9.21	6.13	1.55							
8/20/2009	22:07	2007									14.88	13.36	0.85				
8/20/2009	22:09	2009												8.98	6.55	0.21	
8/21/2009	0:00	2120			14.33	12.91	9.53										
8/21/2009	0:01	2121						9.17	6.09	1.51							
8/21/2009	0:02	2122									14.47	12.95	0.44				
8/21/2009	0:09	2129												8.99	6.56	0.22	
8/21/2009	1:01	2181			14.33	12.91	9.53										
8/21/2009	1:03	2183						9.17	6.09	1.51							
8/21/2009	1:04	2184									15.08	13.56	1.05				
8/21/2009	1:08	2188												8.98	6.55	0.21	
8/21/2009	2:01	2241			14.29	12.87	9.49										
8/21/2009	2:02	2242						9.21	6.13	1.55							
8/21/2009	2:03	2243									15.63	14.11	1.60				
8/21/2009	2:06	2246												8.98	6.55	0.21	
8/21/2009	3:00	2300			14.25	12.83	9.45										
8/21/2009	3:01	2301						9.21	6.13	1.55							
8/21/2009	3:03	2303									16.21	14.69	2.18				
8/21/2009	3:05	2305												8.98	6.55	0.21	
8/21/2009	4:01	2361			14.25	12.83	9.45										
8/21/2009	4:02	2362						9.21	6.13	1.55							
8/21/2009	4:03	2363									16.67	15.15	2.64				
8/21/2009	4:07	2367												9.00	6.57	0.23	
8/21/2009	5:01	2421			14.21	12.79	9.41										
8/21/2009	5:02	2422						9.21	6.13	1.55							
8/21/2009	5:03	2423									17.00	15.48	2.97				
8/21/2009	5:07	2427												8.98	6.55	0.21	
8/21/2009	6:02	2482			14.23	12.81	9.43										
8/21/2009	6:04	2484						9.19	6.11	1.53							
8/21/2009	6:05	2485									16.75	15.23	2.72				
8/21/2009	6:08	2488												8.98	6.55	0.21	
8/21/2009	7:02	2542			14.21	12.79	9.41										
8/21/2009	7:04	2544						9.27	6.19	1.61							
8/21/2009	7:05	2545									16.08	14.56	2.05				
8/21/2009	7:08	2548												8.98	6.55	0.21	
8/21/2009	8:01	2601			14.17	12.75	9.37										
8/21/2009	8:02	2602						9.25	6.17	1.59							
8/21/2009	8:03	2603									15.96	14.44	1.93				
8/21/2009	8:07	2607												8.98	6.55	0.21	
8/21/2009	9:01	2661			14.17	12.75	9.37										
8/21/2009	9:02	2662						9.21	6.13	1.55							
8/21/2009	9:03	2663									15.63	14.11	1.60				
8/21/2009	9:08	2668												8.98	6.55	0.21	
8/21/2009	10:02	2722			14.08	12.66	9.28										
8/21/2009	10:03	2723						9.25	6.17	1.59							
8/21/2009	10:04	2724									15.33	13.81	1.30				
8/21/2009	10:07	2727												9.00	6.57	0.23	

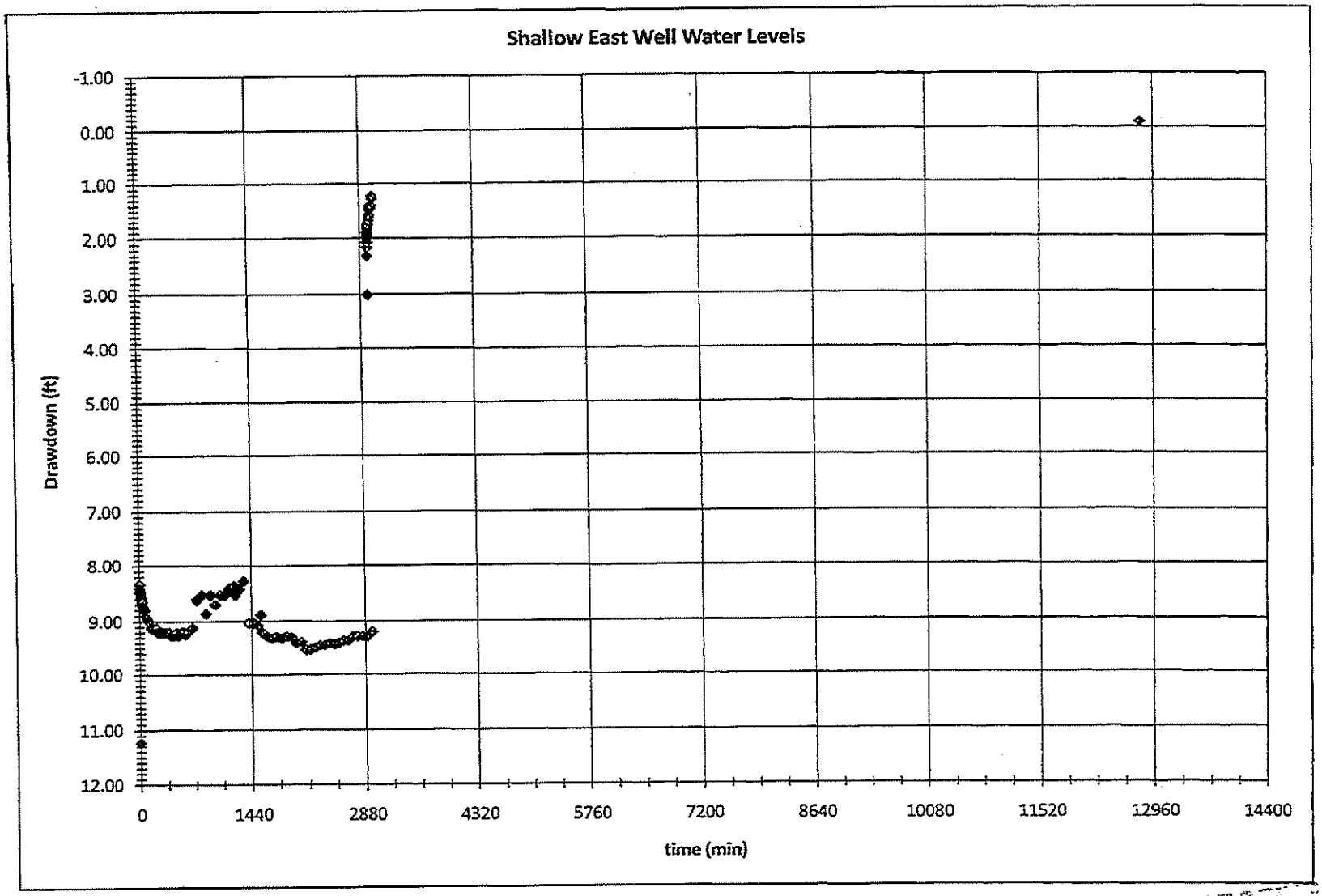
T-1015

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/21/2009	11:02	2782			14.08	12.66	9.28										
8/21/2009	11:04	2784						9.29	6.21	1.63							
8/21/2009	11:05	2785									15.13	13.61	1.10				
8/21/2009	11:07	2787												9.00	6.57	0.23	
8/21/2009	12:04	2844			14.08	12.66	9.28										
8/21/2009	12:05	2845						9.29	6.21	1.63							
8/21/2009	12:06	2846									14.92	13.40	0.89				
8/21/2009	12:08	2848												9.00	6.57	0.23	
8/21/2009	13:04	2904			14.08	12.66	9.28										
8/21/2009	13:06	2906						9.17	6.09	1.51							
8/21/2009	13:07	2907									14.75	13.23	0.72				
8/21/2009	13:09	2909												9.00	6.57	0.23	
8/21/2009	13:56	2956			14.00	12.58	9.20										
8/21/2009	13:59	2959						9.29	6.21	1.63							
8/21/2009	14:00	2960									14.67	13.15	0.64				
8/21/2009	14:04	2964												8.97	6.54	0.20	SPF meas.
8/21/2009	14:06	2966									14.51	12.99	0.48				
8/21/2009	14:07	2967						9.22	6.14	1.56							
8/21/2009	14:09	2969			14.00	12.58	9.20										
8/21/2009	14:10	2970															pump off
8/21/2009	14:10:30	2970.5	0.5	5941	7.81	6.39	3.01										
8/21/2009	14:11	2971	1	2971	7.10	5.68	2.30										
8/21/2009	14:11:30	2971.5	1.5	1981	6.95	5.53	2.15										
8/21/2009	14:12	2972	2	1486	6.86	5.44	2.06										
8/21/2009	14:13	2973	3	991	6.79	5.37	1.99										
8/21/2009	14:14	2974	4	744	6.75	5.33	1.95										
8/21/2009	14:15	2975	5	595	6.72	5.30	1.92										
8/21/2009	14:16	2976	6	496	6.69	5.27	1.89										
8/21/2009	14:17	2977	7	425	6.65	5.23	1.85										
8/21/2009	14:18	2978	8	372	6.62	5.20	1.82										
8/21/2009	14:19	2979	9	331	6.60	5.18	1.80										
8/21/2009	14:20	2980	10	298	6.57	5.15	1.77										
8/21/2009	14:21	2981	11	271				9.06	5.98	1.40							
8/21/2009	14:22	2982	12	249	6.54	5.12	1.74										
8/21/2009	14:24	2984	14	213	6.57	5.15	1.77										
8/21/2009	14:25	2985	15	199				9.01	5.93	1.35							
8/21/2009	14:26	2986	16	187	6.57	5.15	1.77										
8/21/2009	14:28	2988	18	166	6.56	5.14	1.76										
8/21/2009	14:30	2990	20	150	6.50	5.08	1.70										
8/21/2009	14:31	2991	21	142				9.00	5.92	1.34							
8/21/2009	14:32	2992	22	136							14.46	12.94	0.43				
8/21/2009	14:33:30	2993.5	23.5	127										8.98	6.55	0.21	
8/21/2009	14:36	2996	26	115	6.48	5.06	1.68										Riverside pulled pump, Powers sounder end 149.70
8/21/2009	14:38	2998	28	107				8.95	5.87	1.29							
8/21/2009	14:40	3000	30	100	6.41	4.99	1.61										
8/21/2009	14:42	3002	32	94	6.37	4.95	1.57										
8/21/2009	14:44	3004	34	88				8.91	5.83	1.25							
8/21/2009	14:45	3005	35	86							14.42	12.90	0.39				
8/21/2009	14:47	3007	37	81										8.99	6.56	0.22	

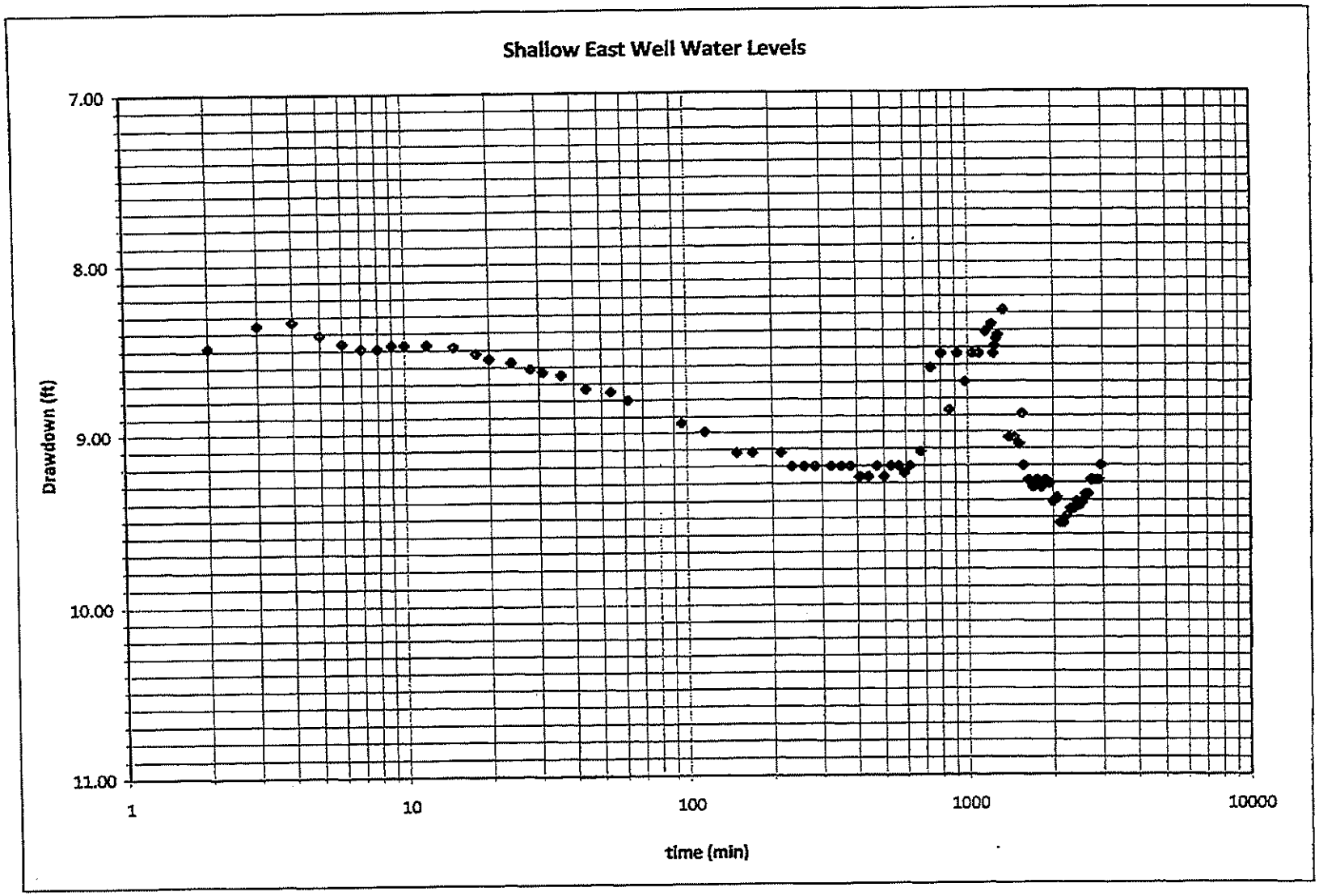
1 1015

Date	Time	t (min)	t' (min)	t/t'	Shallow East Well (Well No. 4)			Shallow West Well (Well No. 3)			Deep Well (Well No. 2)			Construction Well (Well No. 1)			Comments
					DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	DTW from top of mp (ft)	DTW bgs (ft)	DD (ft)	
8/21/2009	14:50	3010	40	75	6.27	4.85	1.47										
8/21/2009	14:53	3013	43	70	6.25	4.83	1.45										
8/21/2009	14:56	3016	46	66	6.24	4.82	1.44										
8/21/2009	14:57:30	3017.5	47.5	64				8.85	5.77	1.19							
8/21/2009	14:58:30	3018.5	48.5	62							14.39	12.87	0.36				
8/21/2009	15:00:30	3020.5	50.5	60										9.00	6.57	0.23	
8/21/2009	15:03	3023	53	57	6.19	4.77	1.39										
8/21/2009	15:04	3024	54	56				8.82	5.74	1.16							
8/21/2009	15:09	3029	59	51				8.82	5.74	1.16							
8/21/2009	15:11:30	3031.5	61.5	49							14.35	12.83	0.32				
8/21/2009	15:16:30	3036.5	66.5	46										9.02	6.59	0.25	
8/21/2009	15:19	3039	69	44	6.07	4.65	1.27										
8/21/2009	15:20	3040	70	43	6.32	4.60	1.22										white 150' sounder
8/28/2009	10:03	12803	9833	1.3	5.00	3.28	-0.10										white 150' sounder, from toc
8/28/2009	10:04	12804	9834	1.3				7.75	4.67	0.09							white 150' sounder, from toc
8/28/2009	10:05	12805	9835	1.3							16.07	14.55	2.04				white 150' sounder, from toc
8/28/2009	10:08	12808	9838	1.3										8.75	6.32	-0.02	white 150' sounder, from toc
8/28/2009	10:12	12812	9842	1.3													pulled solinst levelogger, found broken wire

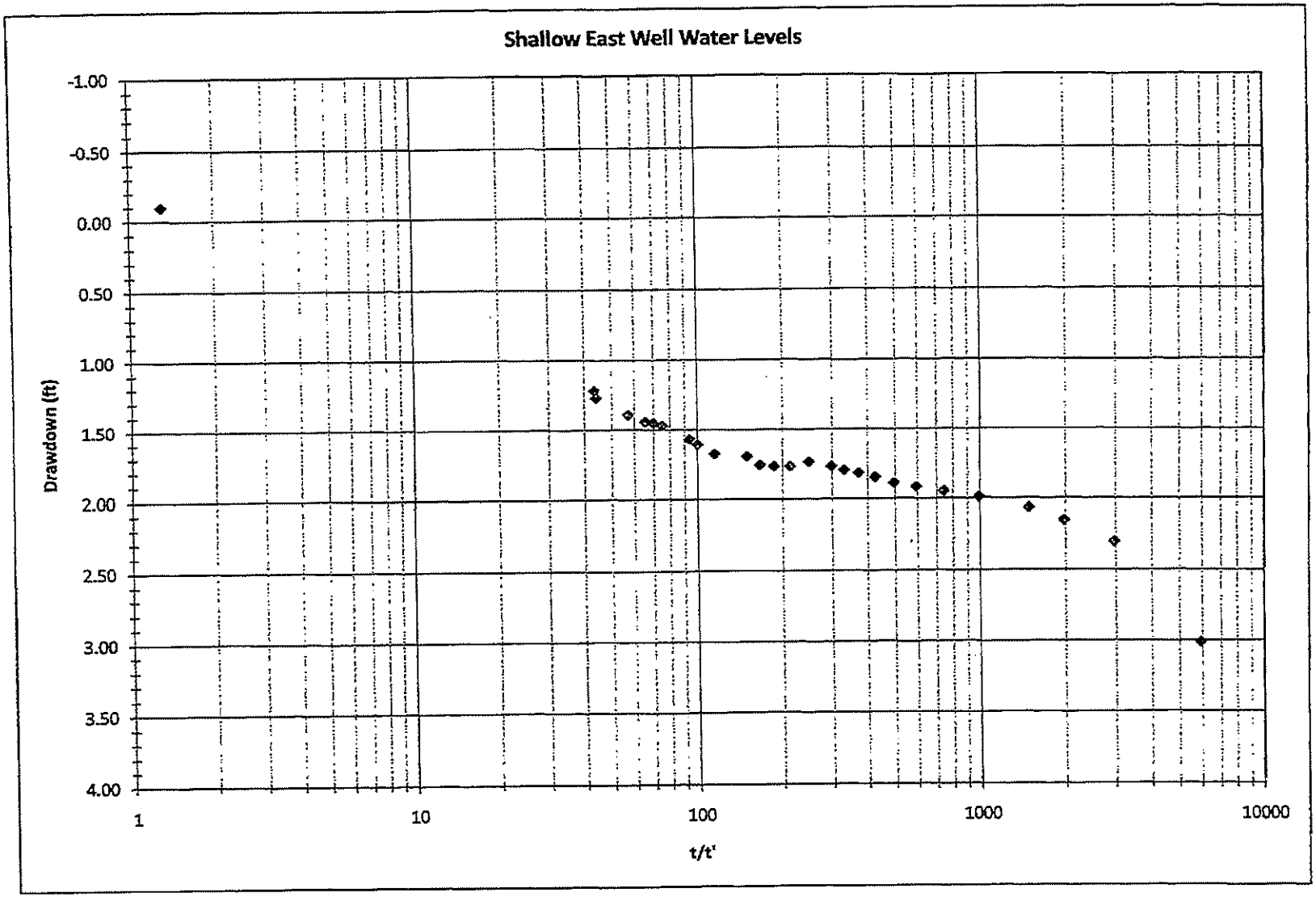
11015



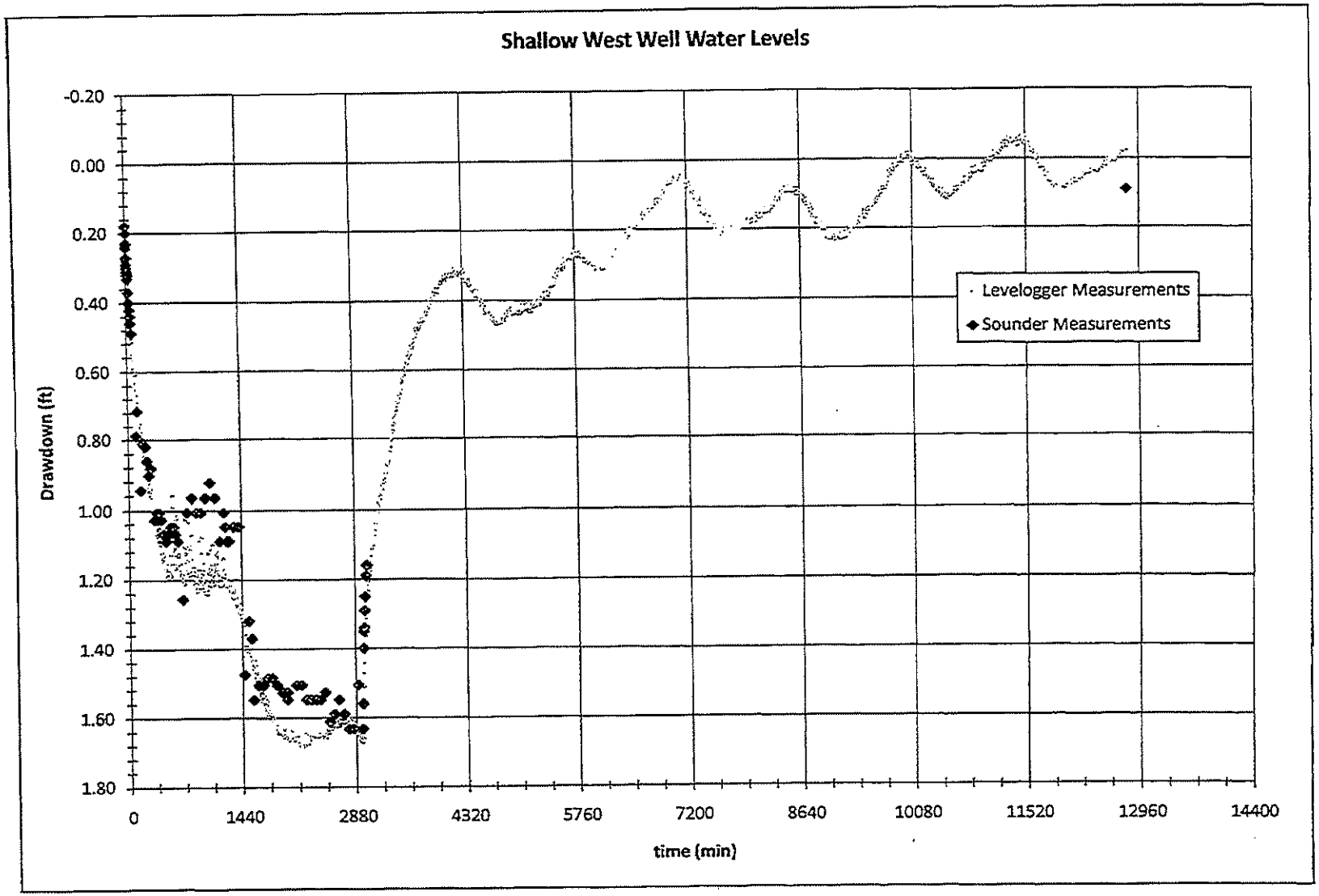
11015



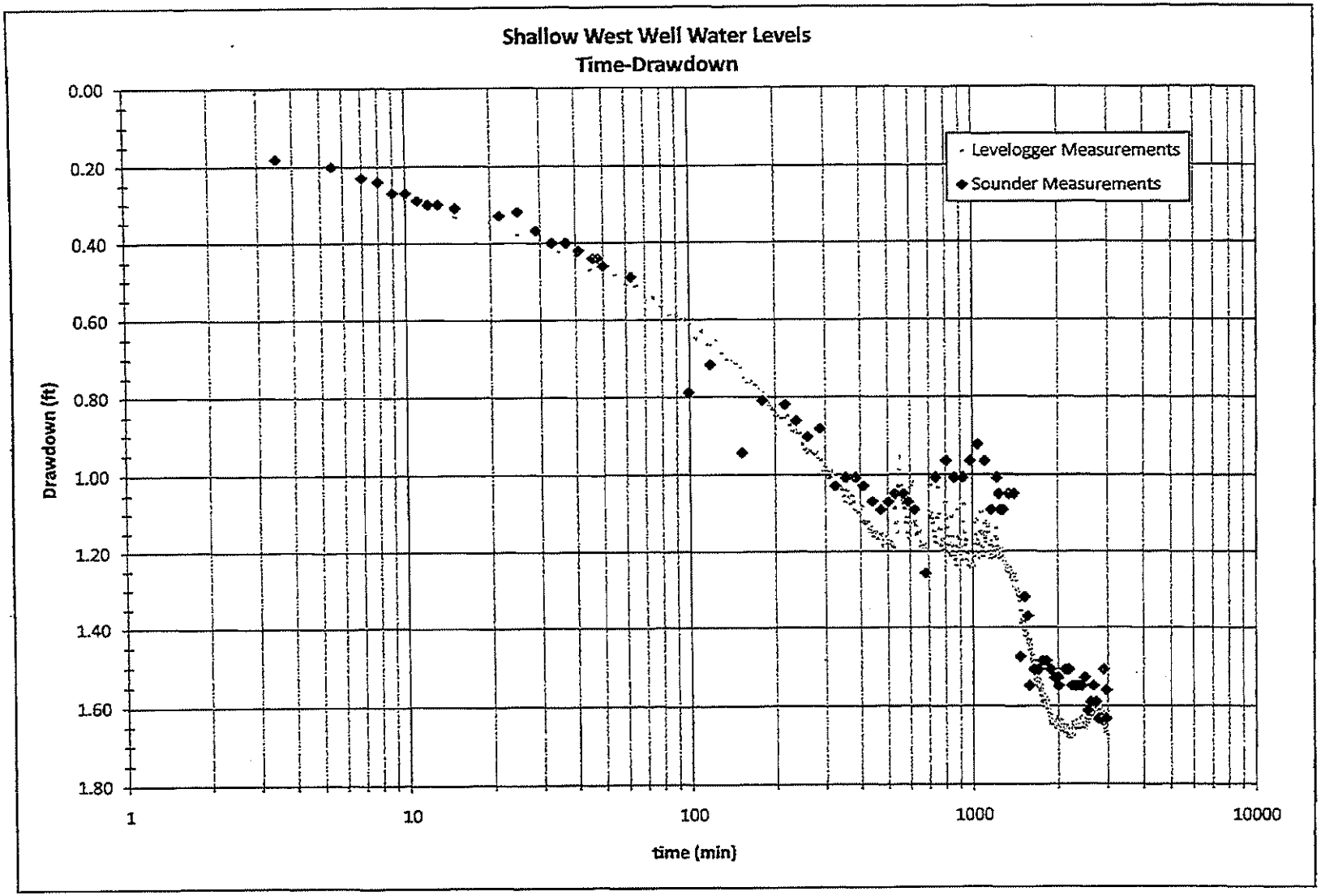
T 11015



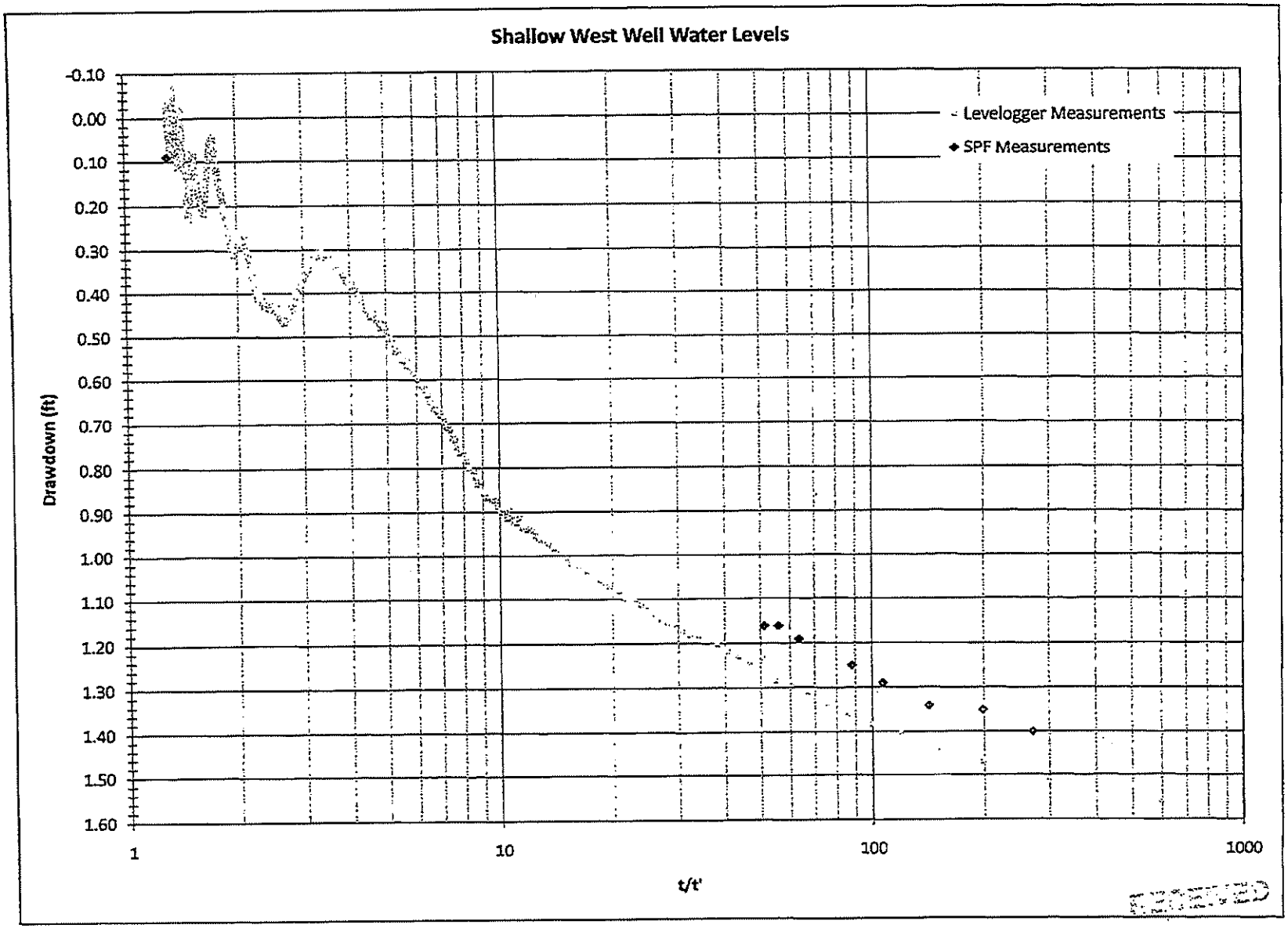
T 11015

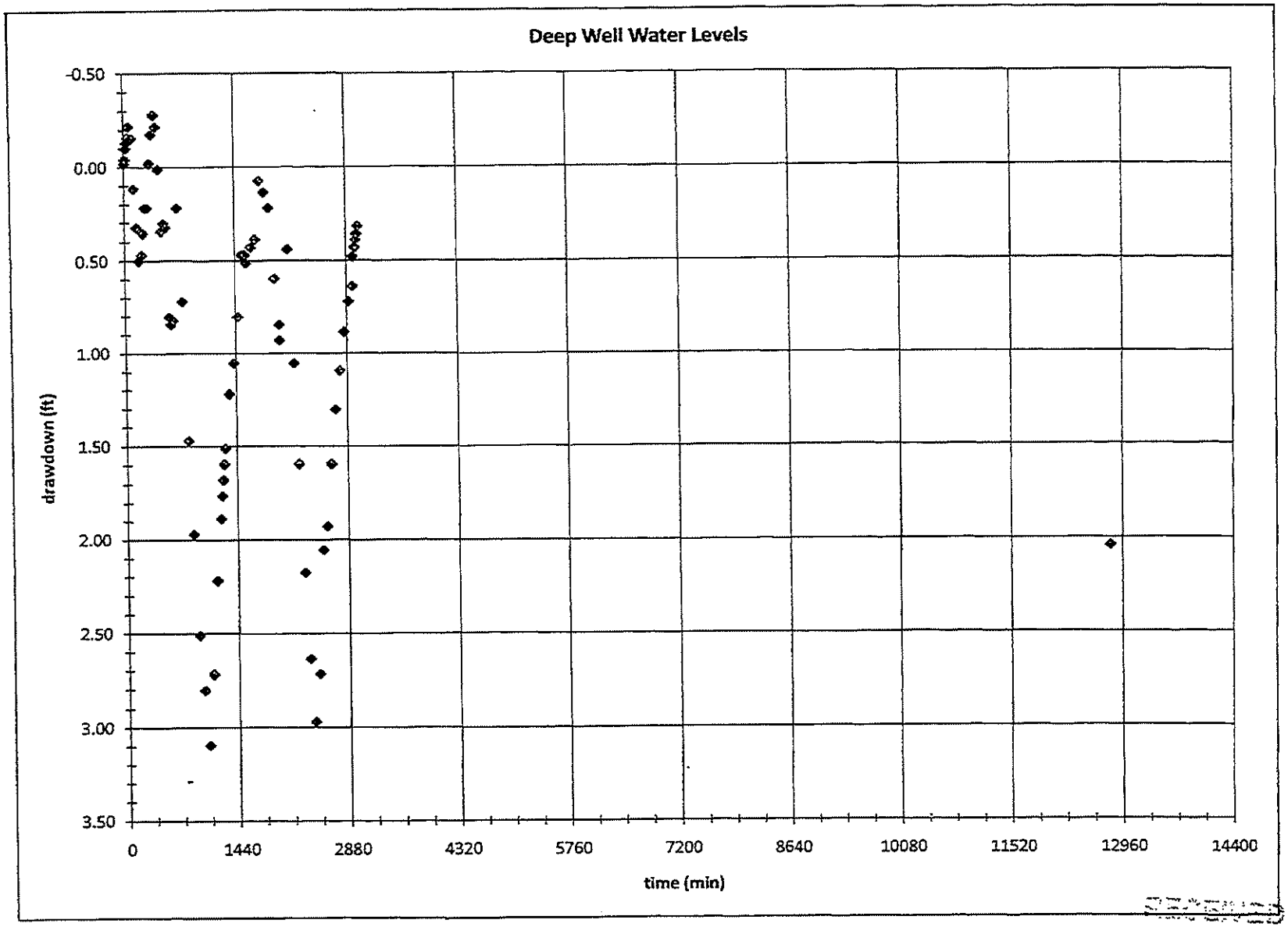


T 11015

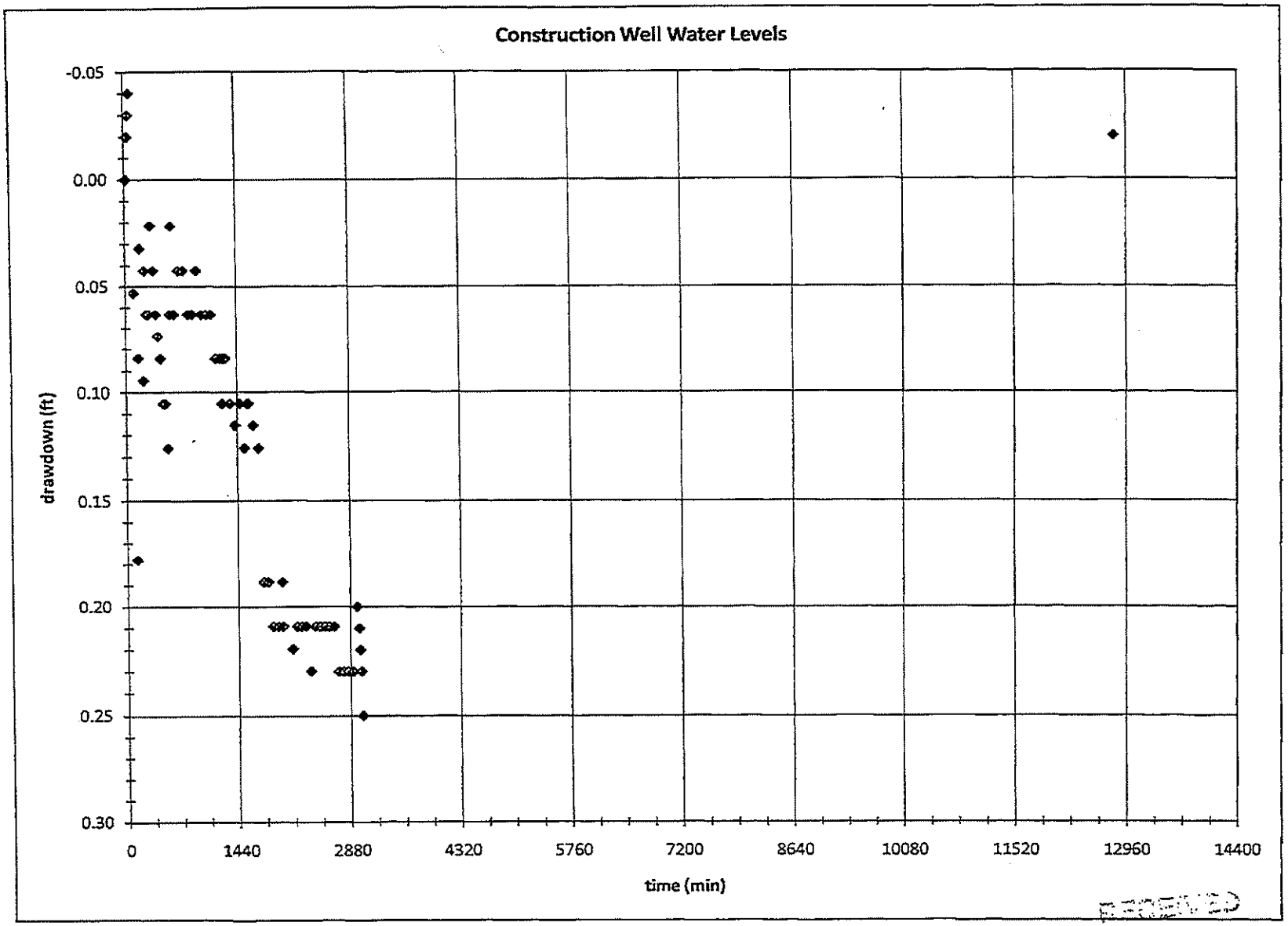


1 11015

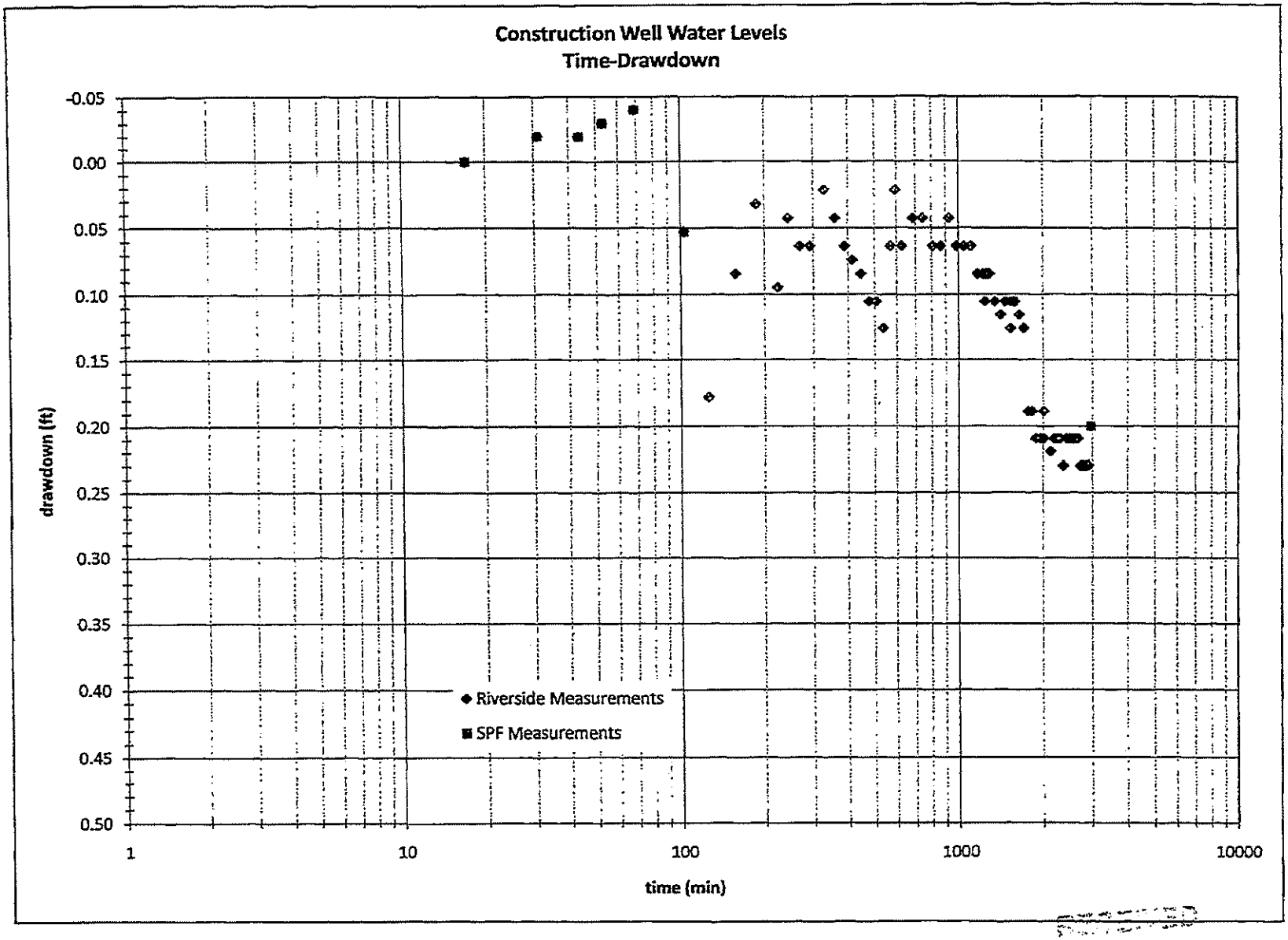



Deep Well Water Levels
drawdown (ft)
-0.50
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
0
1440
2880
4320
5760
7200
8640
10080
11520
12960
14400
time (min)

1 10.15

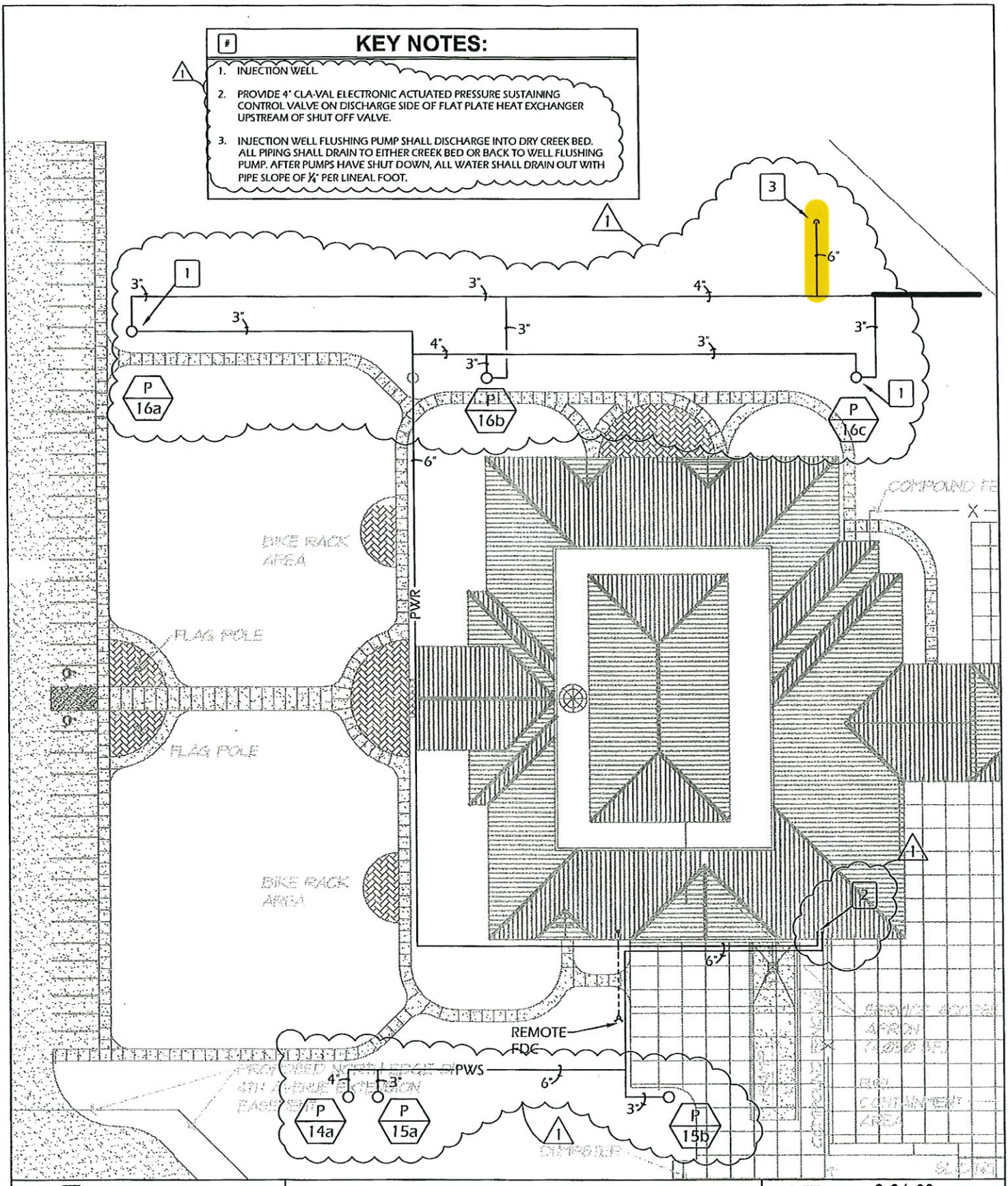


T 11015



FEB 08 2010

ATTACHMENT B
Site Plan



TIKKER ENGINEERING	
A MECHANICAL CONSULTING FIRM	
9384 W. Overland Rd. Boise, ID 83709	Phone: (208) 658-0218 Fax: (208) 658-0219

ONTARIO OREGON ARMORY

REVISIONS

DATE:	8-31-09
DRAWN:	AG
TE JOB#	07062
SKETCH NUMBER:	SHEET REFERENCE:
R1	M1.0

ATTACHMENT C
Well Tags

Jamie Grove

Subject: FW: OMD water rights map

From: Brandon Mahon <bmahon@andersonperry.com>
Sent: Wednesday, September 29, 2021 1:58 PM
To: Dana Kurtz <dkurtz@andersonperry.com>
Subject: RE: OMD water rights map

Ok, just another weird nuance that we need to note in the COBU. I was trying to document which wells had the Well ID Tags missing. Here is what I came up with:

L100207 (Injection) attached, have a picture
L100208 (Production) is missing a tag, no picture
L100209 (Injection) attached, have a picture

L100201 (Production) has a tag, have a picture, but the tag reads L106328, which doesn't even show up in OWRD's Well Log Database
L100202 (Production) has a tag, have a picture
L100204 (Production) is missing a tag

The ones without tags I think we can just note that the tag is missing and needs to be replaced. The one that I highlighted seems odd, but we should make note of it.

Brandon

-----Original Message-----
From: Dana Kurtz <dkurtz@andersonperry.com>
Sent: Wednesday, September 29, 2021 12:46 PM
To: Brandon Mahon <bmahon@andersonperry.com>
Subject: RE: OMD water rights map

I found here: https://hdcgcx1.deq.state.or.us/Html5viewer291/?viewer=FacilityProfilerLite

That there is a UIC on site UIC Number 13258. Would there only be 1 number for the UIC? I guess I was expecting 3. No additional info from the website. I copied it into the form with a note for us. Maybe verify with Gerry,

Figure is back in drafting with Friday deadline. I will turn in form now to secretarial and C C you.,

-----Original Message-----
From: Brandon Mahon <bmahon@andersonperry.com>
Sent: Wednesday, September 29, 2021 10:38 AM
To: Dana Kurtz <dkurtz@andersonperry.com>
Subject: RE: OMD water rights map

Cool. One other thing that Gerry brought up in this voicemail that I've attached is the requirement for the injection wells to be permitted through DEQ, and that they need to meet all the rules associated with that. It might be easiest to just start with DEQ and see if they are permitted. Is that something you'd have time to chase down?

Brandon

ATTACHMENT D
Pump Rate Calculations

Pump Capacity Calculation Sheet

using Department designed formula:

(hp)(efficiency) / (lift + psi head) = capacity in cfs

Efficiency:

Centrifugal = 6.61
Turbine = 7.04

Data Entry (fill in underlined blanks)

HP =	3
Efficiency =	7.04
Lift =	25
PSI =	36

Results Calculated

(hp)(efficiency) =	21.12
Head based on psi =	91.5
Total dynamic head = (head + lift)	116.5

Pump Capacity = 0.18 feet per second