TOPOCK WELL COMPLETION AND ACCEPTANCE REPORT - REMEDIATION WELLS

Well Name: TCS-01 (Note: Documentation referencing TCS-1 is in reference to TCS-01.)

Screen Zone (feet below ground surface [bgs]): 171 – 190 (Upper screen) and 214 – 268 (lower screen)

Dates Pilot Borehole Drilling: 3/31/2022 – 4/13/2022

Temporary Backfill of Pilot Borehole: 4/13/2022 –4/14/2022

Dates Pilot Borehole Overdrilling: 6/3/20222 – 6/22/2022

Well Installation: 6/24/2022 – 7/09/2022

Dates Well Head Completion: The well vault was installed on 7/28/22. The well casing stick up will be cut down it's final elevation during the installation of the well head flange at a later date.

Dates of Development: 8/3/2022 – 8/25/22

Note: Well Testing was completed successfully and in accordance with Well Specification 33 22 00 unless noted below.

Well Testing Conducted	Required (Y/N)	Dates	Comments
Alignment Test	Y	9/15/2022	The diameter of the dummy tool is acceptable based on Field Orders.
Specific Capacity Test	Y	9/1/2022 and 9/2/2022 (lower screen) 9/7/2022 (upper screen)	None
Injectivity Test	Y	9/11/2022 and 9/13/2022 (lower screen) 9/12/2022 and 9/13/2022 (upper screen)	None
Plumbness Test (Gyroscope)	N	--	--
Spinner Log	N	--	--
Downhole Video	Y	12/02/2022	None
Other	--	--	--

Acceptance Criteria

☒ **Meets Design Criteria for Construction** - Well installed in accordance with well specifications and final design.
Comments: As-built well construction consistent with the final well design (see Attached Logs).

☒ **Meets Design Criteria for Injectivity Rate**

Goal from 100% Design:	Upper: 6.5 gpm Lower: 6.5 gpm
Tested Rates (gallons per minute [gpm]):	Upper: 13.6, 27.0, 40.0, 54.0 Lower: 13.5, 27.0, 40.0, 52.0
Specific Injectivity: Upper Screen	6.41 gpm/ft per 2.12 ft of mounding at an injection rate of 13.6 gpm. 8.09 gpm/ft per 3.35 ft of mounding at an injection rate of 27.1 gpm 8.74 gpm/ft per 4.62 ft of mounding at an injection rate of 40.0 gpm 9.23 gpm/ft per 5.86 ft of mounding at an injection rate of 54.0 gpm
Specific Injectivity: Lower Screen	3.35 gpm/ft per 4.04 ft of mounding at an injection rate of 13.5 gpm. 2.88 gpm/ft per 9.44 ft of mounding at an injection rate of 27.0 gpm 4.15 gpm/ft per 9.74 ft of mounding at an injection rate of 40.0 gpm 4.15 gpm/ft per 12.45 ft of mounding at an injection rate of 52.0 gpm
Comments	The tested rates exceeded the proposed 100% design rate of 6.5 gpm per screen zone. Both screens exceed the design criteria for injection rates. See attached Well Testing Data Package.

☒ **Well Functions as Designed**

Comments: Well was free of blockages and meets the design criteria for the intended use.

☒ **Meets Design Criteria for Plumbness and Equipment Install** – The well was free of blockages and of sufficient plumbness and alignment to allow for well development, “Dummy Tool” alignment testing, well testing, and well sampling.

Comments: Downhole equipment has not been installed as of the submittal of this Completion Report. Installation is planned to be completed 2023.

☒ **Meets Design Criteria for Turbidity (Turbidity less than 50 NTU)**

Comments: Turbidity following well development meets the design criteria.

Final Turbidity at End of Well Development and SC Testing

Screen Zone	Turbidity (NTUs)
171 – 190’ and 214 – 268’ (no packer between screens)	0.96
171 – 190’ (end of SC test in upper screen)	2.67
214 – 268’ (end of SC test in lower screen)	8.08

☒ **Other Water Quality Parameters**

Water Quality Parameters at end of development

Screen Depths	Temp (C)	pH	ORP (mV)	Cond (u*S*/cm)	DO
171 – 190' and 214 – 268' (no packer between screens)	29.9	7.43	173.0	8132	67.8
171 – 190' (end of SC test in upper screen)	33.2	8.01	154.1	3494	7.08
214 – 268' (end of SC test in lower screen)	30.3	7.40	229.4	3393	6.53

ATTACHMENTS

- Final Well Design
- Boring Log
- Temporary Backfill Log
- Drilling Log
- Well Construction Log
- Well Development Log
- Specific Capacity Testing Package
- Specific Injectivity Testing Package
- Photo Logs
- Video Survey Report

NOTE: Field documentation for all phases of well installation, well development and testing are included in the Daily Well Construction Reports. The Daily Well Construction Reports and DoR Daily Well Construction Quality Control Reports are compiled and organized by date on *AutodeskBuild*. The parent folder for both daily reports are located on *AutodeskBuild* in the following location: Files/For the Field/DOR Drilling Quality Control/01 QC Documentation. Analytical reports are compiled and uploaded to *AutodeskBuild* in the same folder. The technical scopes were performed by or under the direct supervision of Designer of Record (DoR) Professional Geologists (see attached Certification Statement).

ACCEPTANCE APPROVAL

DoR Approver Name: Greg Foote

Approval Signature/Date:  DATE January 30, 2023

Attachment 1

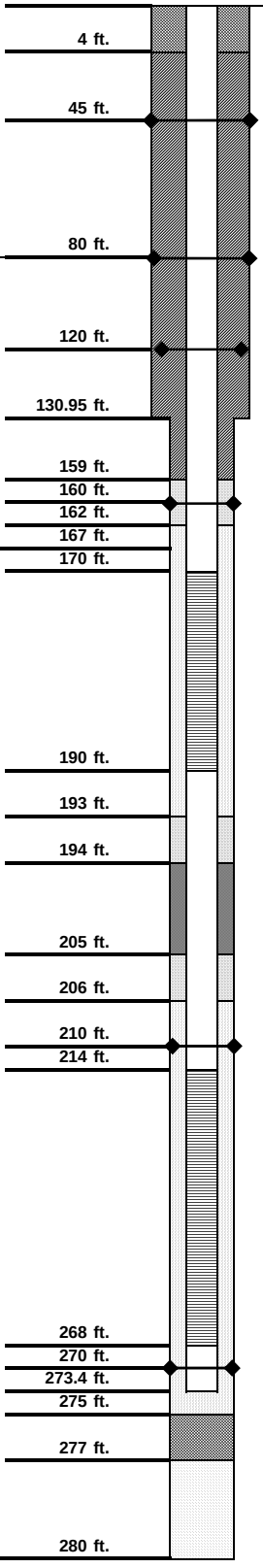
Final Well Design

Final Well Design
TCS-01 (06/21/22)

ARCADIS Design & Consultancy for natural and built assets

Well ID: TCS-01 **Well Purpose:** Remediation **Well Type:** Double Screened

Borehole Dia.: 18-16 in. **Well Diameters:** 10 in.



Backfill Volumes

Quantity	Material	Units
9.8	Temp Backfill Sand	Bags
1338.0	Neat Cement	Gallons
5.1	Transition Sand	Bags
52.7	Sand Pack	bags
1.7	Transition Sand	Bags
15.0	Bentonite Pellets	Buckets
1.7	Transition Sand	Bags
119.1	Sand Pack	bags
54.0		
270		
4.5		

Well Construction Materials

For upper screen 170-190 ft:
10" Suregrip SDR-17 Casing
10" 18-slot 316L SS Wire Wrap Screen
For lower screen 214-268 ft:
10" Suregrip SDR-17 Casing
10" 18-slot 316L SS Wire Wrap Screen

For upper transition sand 159-162 and 193-194 ft:
Cemex #60 (40x70) Mesh Lapis Lustre Sand
For upper primary filter pack 162-193 ft:
Cemex #1/20 Mesh (20 x 40) Lapis Lustre Sand

For lower transition sand 205-206 ft:
Cemex #60 (40x70) Mesh Lapis Lustre Sand
For lower primary filter pack 206-275 ft:
Cemex #1/20 Mesh (20 x 40) Lapis Lustre Sand

* Not to Scale

Legend
- Transition Sand
- Primary Filter Sand
- Bentonite Pellets or Chips
- Neat Cement
- Centralizers
- Suregrip SDR-17 casing
- 316L SS Wire Wrap Screen
- Backfill Sand
- Natural Collapse/Sand Backfill

0 ft.	
4 ft.	
45 ft.	
80 ft.	
120 ft.	
130.95 ft.	
159 ft.	
160 ft.	
162 ft.	
Approximate DTW 167 ft.	
170 ft.	
190 ft.	
193 ft.	
194 ft.	
205 ft.	
206 ft.	
210 ft.	
214 ft.	
268 ft.	
270 ft.	
273.4 ft.	
275 ft.	
277 ft.	
Pilot Borehole Total Depth 280 ft.	

164-170 ft bgs
Results: 1,100 ug/L

192-197 ft bgs
Results: <0.025 ug/l

221-226 ft bgs
Results: <0.025 ug/l

254-259 ft bgs
Results: <0.13 ug/l

266-271 ft. bgs
Results: <0.13 ug/l

Attachment 2

Boring Log

Boring Log

ARCADIS

Sheet: 1 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01 Pilot**
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1				Fill	N/A		(0-1.5 ft) Backfill used to grade drilling pad.	(0.0 - 1.5') Air-knifed for utility clearance. Logged from air-knifing observations.	(0.0 - 1.5') No drilling fluid used
2				Fill	N/A		(1.5-4.5 ft) Boulders, cobbles and pebbles supported in a sandy matrix.	(1.5 - 4.5') Air-knifed for utility clearance. Logged from air-knifing observations.	(1.5 - 4.5') No drilling fluid used
3									
4									
5	9.5			Fluvial Deposits	SM		(4.5-9 ft) Silty sand material that sloughed into hole creating large void.	(4.5 - 9.0') Air-knifed for utility clearance. Logged-from air knifing observations. Water added to help with sands sloughing into hole.	(4.5 - 9.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost
6									
7									
8									
9					NR		(9-9.5 ft) No Recovery.	(9.0 - 12.0') Completed air-knifing on 4/1/22. (9.5 - 17.0') Normal drilling	(9.0 - 12.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost (9.5 - 17.0') No drilling fluid used
10		No Sieve Samples Collected	No Groundwater Samples Collected	Fluvial Deposits	SW		(9.5-10.5 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to round; little small to very large pebbles, subangular to subround; dry. NOTE: Sample was disturbed due to air-knifing.		
11									
12				Fluvial Deposits	SP		(10.5-15 ft) Poorly graded sand (SP); very pale brown (10YR 7/3); fine to medium grained, trace very fine and coarse grained, subangular to subround; trace small to large pebbles, subround to round; trace granules, subangular to round; moist; NOTE: Top 1.5 ft disturbed by air-knifing.		
13	5.5								
14									
15				Fluvial Deposits	SW		(15-15.5 ft) Well graded sand with gravel (SW); light brownish gray (10YR 6/2); fine to very coarse grained, angular to subround; and small to very large, angular to subround; little granules, subangular to subround; dry.		
16				Fluvial Deposits	SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to round; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.		
17								(17.0 - 37.0') Soft drilling	(17.0 - 37.0') No drilling fluid used
18	7								
19									
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

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Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21–23				Fluvial Deposits	SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to round; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.		
23–24				Fluvial Deposits	SM		(23-24 ft) Silty sand (SM); light gray (10YR 7/2); very fine to fine grained, subangular to subround; little silt; trace clay; dry.		
24–27				Fluvial Deposits	SW-SM		(24-27 ft) Well graded sand with silt and gravel (SW-SM); light gray (10YR 7/2); very fine to very coarse grained, subangular to round; some small to large pebbles, subangular to round; little granules, subangular to round; little silt; trace clay; dry.		
27–34.5	7	No Sieve Samples Collected	No Groundwater Samples Collected		NR		(27-34.5 ft) No Recovery		
34.5–40	2.5 / 8			Fluvial Deposits	SM		(34.5-40 ft) Silty sand with gravel (SM); light gray (10YR 7/2); very fine to fine grained, subangular to subround; little silt; little small to large pebbles, subangular to subround; trace granules, subangular to subround; trace clay; dry.	(37.0 - 40.0') Soft drilling	(37.0 - 40.0') No drilling fluid used

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

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Sheet: 3 of 14

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41				Fluvial Deposits	CL		(40-41 ft) Lean clay with sand (CL); weak red (7.5R 5/3); medium plasticity, slow dilatancy; little silt; little very fine to very coarse grained sand, subangular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff; dry; NOTE: Compliance notified about presence of clay.		
42				Fluvial Deposits	SC		(41-42 ft) Clayey sand (SC); light yellowish brown (10YR 6/4); very fine to fine grained, subangular to subround; some clay; little silt; dry to moist; nodules and lens of Lean clay (CL); medium plasticity, slow dilatancy; throughout unit. NOTE: Compliance notified about presence of clay.	(41.0 - 47.0') Hard drilling	(41.0 - 47.0') No drilling fluid used
43				Fluvial Deposits	CH		(42-44 ft) Fat clay (CH); reddish brown (5YR 4/3); high plasticity, no dilatancy; little silt; very stiff; moist. NOTE: Compliance notified about presence of clay.		
44	8								
45				Fluvial Deposits	CL		(44-45 ft) Lean clay (CL); weak red (7.5R 5/3); low to medium plasticity, slow dilatancy; some silt; little very fine grained sand, subangular to subround; soft; dry; NOTE: Compliance notified about presence of clay.		
46				Fluvial Deposits	SM		(45-47 ft) Silty sand (SM); weak red (7.5R 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; dry.		
47									
48				Alluvium Deposits	SW		(47-55 ft) Well graded sand with gravel (SW); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; some small to large pebbles, angular to subround; little granules, angular to subround; little silt; dry.	(47.0 - 57.0') Hard drilling	(47.0 - 57.0') No drilling fluid used
49									
50		No Sieve Samples Collected	No Groundwater Samples Collected						
51									
52	8								
53									
54									
55									
56				Alluvium Deposits	CL		(55-56 ft) Sandy lean clay (CL); brown (10YR 5/3); low plasticity, rapid dilatancy; some silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff; dry; NOTE: Compliance notified about presence of clay.		
57				Alluvium Deposits	SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little silt; little granules, angular to subround; little clay; dry; trace clay nodules.	(57.0 - 67.0') Hard drilling	(57.0 - 67.0') No drilling fluid used
58									
59	9								
60									

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Boring Log

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Sheet: 4 of 14

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61									
62									
63									
64	9			Alluvium Deposits	SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little silt; little granules, angular to subround; little clay; dry; trace clay nodules. (64.5-65 ft) Moist		
65									
66				Alluvium Deposits	ML		(65-66 ft) Sandy silt with gravel (ML); grayish brown (10YR 5/2); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little small to large pebbles, angular to subround; little clay; trace granules, angular to subround; soft to stiff; dry; trace clay nodules.		
67				Alluvium Deposits	SW		(66-72 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little silt; little granules, angular to subround; little clay; dry; trace clay nodules.	(67.0 - 77.0') Hard drilling	(67.0 - 77.0') No drilling fluid used
68									
69									
70		No Sieve Samples Collected	No Groundwater Samples Collected				(69.5-70 ft) Moist		
71							(70.5-71.5 ft) Moist		
72	7.5			Alluvium Deposits	SW		(72-77 ft) Well grade sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; trace silt; trace clay; dry.		
73									
74							(74 ft) Large cobble		
75									
76									
77									
78	7.6			Alluvium Deposits	SM		(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; dry.	(77.0 - 87.0') Hard drilling	(77.0 - 87.0') No drilling fluid used
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

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Sheet: 5 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01 Pilot**
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81				Alluvium Deposits	SM		(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; dry. (80-81 ft) Moist		
82									
83	7.6			Alluvium Deposits	SC		(82-85 ft) Clayey sand with gravel (SC); light yellowish brown (10YR 6/4); very fine to very coarse grained, angular to subround; some clay; little small to very large pebbles, angular to subround; little silt; trace granules, angular to subround; dry.		
84									
85				Alluvium Deposits	SW-SM		(85-87 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry.		
86									
87				Alluvium Deposits	SC		(87-89.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little clay; little silt; little granules, angular to subround; dry; nodules of hard clay with in unit.	(87.0 - 97.0') Hard drilling	(87.0 - 97.0') No drilling fluid used
88									
89		No Sieve Samples Collected	No Groundwater Samples Collected						
90				Alluvium Deposits	CL		(89.5-91 ft) Gravelly lean clay with sand (CL); brown (10YR 5/3); low to medium plasticity, slow dilatancy; some small to very large pebbles, angular to subround; little silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; very stiff; dry; nodules of hard clay within unit.		
91				Alluvium Deposits	SM		(91-92 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little silt; little clay; trace granules, angular to subround; dry; nodules of hard clay within unit.		
92	7.8			Alluvium Deposits	CL		(92-93 ft)Gravelly lean clay with sand (CL); brown (10YR 5/3); low to medium plasticity, slow dilatancy; some small to very large pebbles, angular to subround; little silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; very stiff; dry; nodules of hard clay within unit.		
93									
94				Alluvium Deposits	SM		(93-97 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; little clay; trace granules, angular to subround; dry; nodules of hard clay within unit.		
95									
96									
97									
98	7.6			Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.	(97.0 - 107.0') Hard drilling	(97.0 - 107.0') No drilling fluid used
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101				Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.		
102									
103	7.6			Alluvium Deposits	SW-SM		(102-107 ft) Well grade sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry.		
104									
105									
106									
107									
108		No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SC		(107-109.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some clay; some silt; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry to moist. (109-112 ft) Moist	(107.0 - 117.0') Hard drilling	(107.0 - 117.0') No drilling fluid used
109									
110				Alluvium Deposits	SC		(109.5-110.5 ft) Clayey sand (SC); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some clay; little silt; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; moist.		
111				Alluvium Deposits	SC		(110.5-112 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some clay; some silt; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry to moist.		
112	8.1			Alluvium Deposits	SM		(112-114 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; some clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; moist.		
113									
114				Alluvium Deposits	SM		(114-119 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry.		
115									
116									
117									
118	7.8							(117.0 - 127.0') Hard drilling	(117.0 - 127.0') No drilling fluid used
119									
120				Alluvium Deposits	CL		(119-120 ft) Lean clay with sand (CL); brown (7.5YR 5/3); medium plasticity, slow dilatancy; some silt; little very fine to very coarse grained sand, subangular to subround; trace granules, subangular		

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Boring Log

ARCADIS

Sheet: 7 of 14

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121							to subround; trace small to medium pebbles, subangular to subround; very stiff; moist.		
122							(120-125.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry.		
123	7.8			Alluvium Deposits	SM				
124									
125									
126				Alluvium Deposits	ML		(125.5-127 ft) Silt with sand (ML); brown (7.5YR 5/3); and clay; no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; stiff; dry.		
127									
128		No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	ML		(127-130 ft) Sandy silt (ML); grayish brown (10YR 5/2); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; little small to very large pebbles, angular to subround; trace granules, angular to subangular; very soft; dry.	(127.0 - 137.0') Hard drilling	(127.0 - 137.0') No drilling fluid used
129									
130									
131				Alluvium Deposits	SM		(130-132 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry.		
132	6.9								
133				Alluvium Deposits	SW-SC		(132-135 ft) Well graded sand with clay and gravel (SW-SC); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little small to large pebbles, angular to subround; little clay; trace silt; trace granules, angular to subangular; dry.		
134									
135									
136				Alluvium Deposits	SM		(135-137 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little granules, angular to subangular; little silt; little clay; dry.		
137									
138				Alluvium Deposits	SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.	(137.0 - 142.0') Hard drilling	(137.0 - 142.0') No drilling fluid used
139	3.7								
140									

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Boring Log

ARCADIS

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	3.7	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
142								(142.0 - 152.0') Hard drilling	(142.0 - 152.0') No drilling fluid used
143							(143 ft) 2-inch lens with some clay, low-medium plasticity, rapid dilatancy.		
144									
145									
146									
147	7.8			Alluvium Deposits	SM		(147-152 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little silt; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
148									
149									
150									
151									
152				Alluvium Deposits	ML		(152-152.5 ft) Sandy silt (ML); grayish brown (10YR 5/2); low plasticity, rapid dilatancy; some clay; some very fine to very coarse grained sand, angular to subround; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; medium stiff; moist.	(152.0 - 162.0') Hard drilling	(152.0 - 162.0') No drilling fluid used
153				Alluvium Deposits	SM		(152.5-154.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
154									
155									
156	7.3			Alluvium Deposits	SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subangular; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
157									
158									
159									
160									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	7.3	TCS-1-SS-159-164 4/13/2022 14:30	No Groundwater Samples Collected	Alluvium Deposits	SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subangular; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
162								(162.0 - 170.0') Hard drilling	(162.0 - 170.0') No drilling fluid used
163									
164									
165				Alluvium Deposits	SM		(164-165 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little clay; trace granules, subangular to subround; trace small pebbles, subangular to subround; wet.		
166	6.5	TCS-1-SS-164-170 4/13/2022 15:10	TCS-1-VAS-164-169 (1100) 4/3/2022 10:50	Alluvium Deposits	SM		(165-166 ft) Silty sand with gravel (SM); brown (7.5YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to medium pebbles, angular to subangular; little clay; trace granules, angular to subround; dry.		
167				Alluvium Deposits	SM		(166-167 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; wet.		
168				Alluvium Deposits	SM		(167-167.5 ft) Silty sand (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; dry.		
169									
170							(167.5-170 ft) Silty sand (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; wet.		
171				Alluvium Deposits	ML		(170-171 ft) Silt with sand (ML); brown (7.5YR 5/3); and clay; low to medium plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; trace small pebbles, angular to subround; medium stiff; dry to moist.	(170.0 - 177.0') Hard drilling	(170.0 - 177.0') No drilling fluid used
172							(171-182 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist.		
173		TCS-1-SS-170-176 4/13/2022 15:18							
174	5								
175				Alluvium Deposits	ML		(175-179.5 ft) Moist		
176									
177									
178		TCS-1-SS-176-182 4/13/2022 15:25						(177.0 - 187.0') Normal drilling	(177.0 - 187.0') No drilling fluid used
179	7.6								
180									

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Boring Log

ARCADIS

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181				Alluvium Deposits	ML		(171-182 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist. (181-182 ft) Moist		
182									
183	7.6	TCS-1-SS-182-187 4/13/2022 15:33					(182-194.5 ft) Silty sand (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround, and silt; no plasticity, rapid dilatancy; little clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subround; medium stiff to very stiff; moist.		
184									
185									
186									
187									
188	3.7	TCS-1-SS-187-192 4/13/2022 15:39		Alluvium Deposits	SM			(187.0 - 192.0') Normal drilling	(187.0 - 192.0') No drilling fluid used
189									
190									
191									
192									
193	4.9	TCS-1-SS-192-197 4/13/2022 15:45	TCS-1-VAS-192-197-EB (<0.025) 4/4/2022 09:45					(192.0 - 197.0') Normal drilling	(192.0 - 197.0') No drilling fluid used
194									
195				Alluvium Deposits	SW		(194.5-195 ft) Well graded sand (SW); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; trace granules, angular to subround; trace small pebbles, subangular to subround; trace silt; trace clay; wet.		
196				Alluvium Deposits	ML		(195-196.5 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; and very fine to very coarse grained sand, angular to subround; trace small to medium pebbles, angular to subround; trace granules, angular to subangular; trace clay; medium stiff to very stiff; dry to moist.		
197				Alluvium Deposits	SW-SM		(196.5-197 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; trace small to medium pebbles, subangular to subround; trace granules, angular to subround; trace clay; wet.	(197.0 - 206.0') Normal drilling	(197.0 - 206.0') No drilling fluid used
198	7.2	TCS-1-SS-197-200.5 4/13/2022 15:48		Alluvium Deposits	ML		(197-200.5 ft) Sandy silt with gravel (ML); brown (10YR 5/3); low plasticity, rapid dilatancy; some clay; some very fine to very coarse grained sand, angular to subround; little small pebbles, angular to subangular; trace granules, angular to subangular; moist.		
199									
200									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	Client:	PG&E
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs		
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches		
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
					ML				
201				Alluvium Deposits	ML		(200.5-202 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; little clay; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.		
202									
203	7.2	TCS-1-SS-200.5-205.5 4/13/2022 15:51		Alluvium Deposits	ML		(202-206 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; trace small to large pebbles, angular to subround; medium stiff; moist.		
204									
205									
206									
207				Alluvium Deposits	ML		(206-207.5 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; some clay; little very fine to very coarse grained sand, subangular to subround; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.	(206.0 - 217.0') Normal drilling	(206.0 - 217.0') No drilling fluid used
208		TCS-1-SS-205.5-211 4/13/2022 15:54		Alluvium Deposits	ML		(207.5-214 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist. (209 ft) Color change to brown (10YR 5/3).		
209									
210									
211	8.8								
212									
213									
214		TCS-1-SS-211-217 4/13/2022 15:57		Alluvium Deposits	SM		(214-217 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, subangular to round; little clay; trace granules, subangular to subround; moist.		
215									
216									
217									
218	8.5	TCS-1-SS-217-221 4/13/2022 16:00		Alluvium Deposits	ML		(217-220 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/4); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; some clay; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.	(217.0 - 227.0') Normal drilling	(217.0 - 227.0') No drilling fluid used
219									
220									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

Sheet: 12 of 14

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221				Alluvium Deposits	ML		(220-221 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subangular; medium stiff; moist to wet.		
222									
223	8.5	TCS-1-SS-221-227 4/13/2022 16:03	TCS-1-VAS-221-226 (<0.025) 4/5/2022 10:45	Alluvium Deposits	SM		(221-225 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little silt; little small to large pebbles, angular to subround; little granules, angular to subround; little clay; wet.		
224									
225				Alluvium Deposits	SW		(225-225.5 ft) Well grade sand with gravel (SW); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little granules, angular to subround; little small to large pebbles, angular to subround; trace silt; trace clay; wet.		
226				Alluvium Deposits	SM		(225.5-227 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little silt; little small to large pebbles, angular to subround; little granules, angular to subround; little clay; wet.		
227									
228		TCS-1-SS-227-230 4/14/2022 07:50		Alluvium Deposits	ML		(227-230 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2); low plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; little small to medium pebbles, subangular to subround; little clay; trace granules, angular to subround; medium stiff; moist.	(227.0 - 230.0') Normal drilling	(227.0 - 230.0') No drilling fluid used
229									
230									
231	7			Alluvium Deposits	SM		(230-232 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to large pebbles, angular to subround; trace granules, angular to subround; moist.	(230.0 - 235.0') Hard drilling	(230.0 - 235.0') No drilling fluid used
232		TCS-1-SS-230-235 4/14/2022 07:55							
233				Alluvium Deposits	ML		(232-234 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2); low plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; little small to medium pebbles, subangular to subround; little clay; trace granules, angular to subround; medium stiff; moist.		
234									
235				Alluvium Deposits	SM		(234-235 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to large pebbles, angular to subround; trace granules, angular to subround; moist.		
236				Alluvium Deposits	ML		(235-237 ft) Gravelly silt with sand (ML); grayish brown (10YR 5/2); low plasticity, rapid dilatancy; some clay; little small to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subangular; medium stiff; moist.	(235.0 - 245.0') Hard drilling	(235.0 - 245.0') No drilling fluid used
237									
238	8.7	TCS-1-SS-235-240 4/14/2022 08:00		Alluvium Deposits	ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; little small to medium pebbles, subangular to subround; trace granules, angular to subround; medium stiff; moist.		
239									
240									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01 Pilot**
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
241									
242									
243	8.7	TCS-1-SS-240-245 4/14/2022 08:04		Alluvium Deposits	ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; little small to medium pebbles, subangular to subround; trace granules, angular to subround; medium stiff; moist.		
244									
245									
246								(245.0 - 257.0') Hard drilling	(245.0 - 257.0') No drilling fluid used
247									
248		TCS-1-SS-245-251.5 4/14/2022 08:08		Alluvium Deposits	ML		(245-251.5 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, subangular to subround; moist.		
249									
250									
251	9								
252				Alluvium Deposits	SM		(251.5-253 ft) Silty sand (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little clay; trace granules, angular to subround; trace small to medium pebbles, subangular to subround; dry.		
253									
254		TCS-1-SS-251.5-257 4/14/2022 08:13		Alluvium Deposits	ML		(253-254.5 ft) Gravelly silt with sand (ML); red (2.5YR 4/6); low plasticity, rapid dilatancy; little small to large pebbles, angular to subangular; little clay; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; moist.		
255									
256			TCS-1-VAS-254-259 (<0.13) 4/7/2022 11:40	Alluvium Deposits	SM		(254.5-257 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; little small to medium pebbles, subangular to subround; little silt; little clay; trace granules, angular to subround; wet.		
257									
258								(257.0 - 262.0') Hard drilling	(257.0 - 262.0') No drilling fluid used
259	3.8	TCS-1-SS-257-263 4/14/2022 08:18		Alluvium Deposits	SM		(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; some clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; moist to wet.		
260									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Sheet: 14 of 14

Boring No.: TCS-01 Pilot

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoeppner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	3.8	TCS-1-SS-257-263 4/14/2022 08:18		Alluvium Deposits	SM		(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; some clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; moist to wet.		
262							(262-268.5 ft) Wet	(262.0 - 275.0') Normal drilling	(262.0 - 275.0') No drilling fluid used
263		TCS-1-SS-263-268.5 4/14/2022 08:23							
264									
265									
266			TCS-1-VAS-266-271-EB (<0.13) 4/13/2022 09:20						
267									
268									
269	9.8	No Sieve Samples Collected		Weathered Bedrock - Conglomerate			(268.5-273.5 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained to medium grained, subangular to subround; highly weathered; soft; moist.		
270									
271									
272									
273									
274				Competent Bedrock - Conglomerate			(273.5-277 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained; moderately weathered; soft; friable; pulverized by drilling process; moist to dry.		
275			No Groundwater Samples Collected				(275 ft) NOTE: Color change to 2.5YR 4/4 - reddish brown.	(275.0 - 280.0') Hard drilling	(275.0 - 280.0') No drilling fluid used
276									
277	4.5			Competent Bedrock - Conglomerate			(277-280 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained to medium grained, subangular to subround; moderately weathered; soft; friable; pulverized by drilling process; dry.		
278									
279									
280							End of Boring at 280 ft bgs		

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Attachment 3

Temporary Backfill Log

Temporary Backfill Log

ARCADIS

Sheet: 1 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
0					(0.0 - 0.5') Steel plate; (0.0 - 38.0') 7" Diameter Borehole		Note: Steel plate used to mark pilot borehole
1		Fill	N/A				
2					(0.5 - 4.0') Cemex #60 (40x70) Lapis Lustre Sand	(0.5 - 4.0') 2.1 bags	(0.5 - 4.0') 3 bags (143%) Note: Surface sand seal, used >20% of the calculated volume due to potential voids that formed during drilling.
3		Fill	N/A				
4					(4.0 - 5.0') Cemex #3 (8x20) Lapis Lustre Sand	(4.0 - 5.0') 0.5 bags	(4.0 - 5.0') 0.5 bags (100%) Note: Surface sand seal
5		Fluvial Deposits	SM				
6							
7							
8							
9			NR				
10	No Groundwater Samples Collected	Fluvial Deposits	SW				
11							
12		Fluvial Deposits	SP		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
13							
14							
15		Fluvial Deposits	SW				
16							
17		Fluvial Deposits	SW				
18							
19							
20							

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Temporary Backfill Log

Sheet: 2 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21		Fluvial Deposits	SW				
23		Fluvial Deposits	SM				
24		Fluvial Deposits	SW-SM				
27			NR				
30	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
35		Fluvial Deposits	SM				
38					(38.0 - 274.0') 6" Diameter Borehole		
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

ARCADIS

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41		Fluvial Deposits	CL				
42		Fluvial Deposits	SC				
43		Fluvial Deposits	CH				
44		Fluvial Deposits	CL				
45		Fluvial Deposits	SM				
46							
47							
48							
49							
50	No Groundwater Samples Collected	Alluvium Deposits	SW		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
51							
52							
53							
54							
55							
56		Alluvium Deposits	CL				
57							
58		Alluvium Deposits	SM				
59							
60							

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Temporary Backfill Log

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61							
62		Alluvium Deposits	SM				
63							
64							
65		Alluvium Deposits	ML				
66							
67							
68							
69		Alluvium Deposits	SW				
70	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
71							
72							
73		Alluvium Deposits	SW				
74							
75							
76							
77							
78		Alluvium Deposits	SM				
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

Sheet: 5 of 14

Well ID: TCS-1 Pilot

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Client:	PG&E
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Project:	Final GW Remedy Phase 2A
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches		
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SM		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
82							
83		Alluvium Deposits	SC				
84							
85							
86		Alluvium Deposits	SW-SM				
87							
88		Alluvium Deposits	SC				
89							
90		Alluvium Deposits	CL				
91		Alluvium Deposits	SM				
92		Alluvium Deposits	CL				
93							
94		Alluvium Deposits	SM				
95							
96							
97							
98		Alluvium Deposits	SC				
99							
100							

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Temporary Backfill Log

ARCADIS

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Alluvium Deposits	SC				
102							
103		Alluvium Deposits	SW-SM				
104							
105							
106							
107							
108		Alluvium Deposits	SC				
109							
110		Alluvium Deposits	SC		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
111		Alluvium Deposits	SC				
112							
113		Alluvium Deposits	SM				
114							
115							
116		Alluvium Deposits	SM				
117							
118							
119							
120		Alluvium Deposits	CL				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

ARCADIS

Sheet: 7 of 14

Well ID: TCS-1 Pilot

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121		Alluvium Deposits	SM				
122							
123							
124							
125							
126		Alluvium Deposits	ML				
127							
128		Alluvium Deposits	ML				
129							
130	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
131		Alluvium Deposits	SM				
132							
133		Alluvium Deposits	SW-SC				
134							
135							
136		Alluvium Deposits	SM				
137							
138		Alluvium Deposits	SM				
139							
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

Sheet: 8 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141							
142							
143		Alluvium Deposits	SM				
144							
145							
146							
147							
148		Alluvium Deposits	SM				
149							
150	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
151							
152		Alluvium Deposits	ML				
153		Alluvium Deposits	SM				
154							
155							
156							
157		Alluvium Deposits	SM				
158							
159							
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

Sheet: 9 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
161	No Groundwater Samples Collected	Alluvium Deposits	SM				
162							
163							
164		Alluvium Deposits	SM				
165		Alluvium Deposits	SM				
166	TCS-1-VAS-164-169 (1100 ppb) 4/3/2022 10:50	Alluvium Deposits	SM				
167		Alluvium Deposits	SM				
168		Alluvium Deposits	SM				
169							
170		Alluvium Deposits	ML		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
171							
172		Alluvium Deposits	ML				
173							
174							
175							
176							
177							
178							
179							
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

ARCADIS

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
181		Alluvium Deposits	ML				
182							
183							
184							
185							
186							
187							
188		Alluvium Deposits	SM				
189							
190					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
191							
192							
193							
194	TCS-1-VAS-192-197 (<0.025 ppb) 4/4/2022 09:45						
195		Alluvium Deposits	SW				
196		Alluvium Deposits	ML				
197		Alluvium Deposits	SW-SM				
198		Alluvium Deposits	ML				
199							
200							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

ARCADIS

Sheet: 11 of 14

Well ID: TCS-1 Pilot

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl		
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
201		Alluvium Deposits	ML				
202							
203		Alluvium Deposits	ML				
204							
205							
206		Alluvium Deposits	ML				
207							
208		Alluvium Deposits	ML				
209							
210					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
211							
212							
213							
214		Alluvium Deposits	SM				
215							
216							
217		Alluvium Deposits	ML				
218							
219							
220							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

Sheet: 12 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
221		Alluvium Deposits	ML				
222		Alluvium Deposits	SM				
223	TCS-1-VAS-221-226 (<0.025 ppb) 4/5/2022 10:45						
224							
225		Alluvium Deposits	SW				
226		Alluvium Deposits	SM				
227							
228		Alluvium Deposits	ML				
229							
230					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
231		Alluvium Deposits	SM				
232							
233		Alluvium Deposits	ML				
234		Alluvium Deposits	SM				
235							
236		Alluvium Deposits	ML				
237							
238		Alluvium Deposits	ML				
239							
240							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Temporary Backfill Log

Sheet: 13 of 14

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-1 Pilot**	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
241		Alluvium Deposits	ML				
242							
243							
244							
245							
246		Alluvium Deposits	ML				
247							
248							
249							
250					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
251							
252		Alluvium Deposits	SM				
253							
254		Alluvium Deposits	ML				
255							
256	TCS-1-VAS-254-259 (<0.13 ppb) 4/7/2022 11:40	Alluvium Deposits	SM				
257							
258							
259		Alluvium Deposits	SM				
260							

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Temporary Backfill Log

ARCADIS

Sheet: 14 of 14

Well ID: TCS-1 Pilot

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Client:	PG&E
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs		
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches		
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
261							
262							
263					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
264		Alluvium Deposits	SM				
265							
266							
267							
268	TCS-1-VAS-266-271 (<0.13 ppb) 4/13/2022 09:40						
269							
270							
271		Weathered Bedrock - Conglomerate					
272					(267.0 - 277.0') Cemex #3 (8x20) Lapis Lustre Sand	(267.0 - 277.0') 2.1 bags	(267.0 - 277.0') 3 bags (143%) Note: Indicator sand, used >20% of the calculated volume due to potential voids that formed during drilling.
273							
274					(274.0 - 280.0') 4" Diameter Rathole		
275	No Groundwater Samples Collected	Competent Bedrock - Conglomerate					
276							
277							
278		Competent Bedrock - Conglomerate			(277.0 - 280.0') Formation Collapse/Settling of Mateial in the Casing		
279							
280							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Attachment 4

Drilling Log

Drilling Log

ARCADIS

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
1	(0.0 - 20.2) 2.23 mins/ft	N/A		(0-1.5 ft) Backfill used to grade drilling pad.	(0.0 - 0.5') Confirmed drill casing was lined up over pilot borehole. (0.1 - 20.2') Normal drilling, changed out drill bit and reamed out casing.	(0.1 - 20.2') 400 gallons of water used; 150 gallons of water recovered; 250 gallons of water lost
2						
3		N/A		(1.5-4.5 ft) Boulders, cobbles and pebbles supported in a sandy matrix.	(3.0') Observed trace amounts of Cemex #60 (40x70) Lapis Lustre Sand in drill cuttings.	
4						
5		SM		(4.5-9 ft) Silty sand material that sloughed into hole creating large void.		
6						
7						
8						
9		NR		(9-9.5 ft) No Recovery.		
10		SW		(9.5-10.5 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3)	(10.0') Observed some Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
11		SP		(10.5-15 ft) Poorly graded sand (SP); very pale brown (10YR 7/3)		
12						
13						
14						
15		SW		(15-15.5 ft) Well graded sand with gravel (SW); light brownish gray (10YR 6/2)		
16		SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3)		
17						
18						
19						
20						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 2 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21–22		SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3)	(19.9') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings. (20.2 - 40.2') Normal drilling	(20.2 - 40.2') 700 gallons of water used; 500 gallons of water recovered; 200 gallons of water lost
23		SM		(23-24 ft) Silty sand (SM); light gray (10YR 7/2)		
24–25		SW-SM		(24-27 ft) Well graded sand with silt and gravel (SW-SM); light gray (10YR 7/2)	(25.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
26–27		NR		(27-34.5 ft) No Recovery		
28–34	(20.2 - 40.2) 2.95 mins/ft					
35–40		SM		(34.5-40 ft) Silty sand with gravel (SM); light gray (10YR 7/2)	(35.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 3 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41	(40.2 - 60.2) 3.40 mins/ft	CL		(40-41 ft) Lean clay with sand (CL); weak red (7.5R 5/3)	(40.2 - 60.2') Normal drilling	(40.2 - 60.2') 600 gallons of water used; 400 gallons of water recovered; 200 gallons of water lost
42		SC		(41-42 ft) Clayey sand (SC); light yellowish brown (10YR 6/4)		
43		CH		(42-44 ft) Fat clay (CH); reddish brown (5YR 4/3)		
44		CL		(44-45 ft) Lean clay (CL); weak red (7.5R 5/3)		
45		SM		(45-47 ft) Silty sand (SM); weak red (7.5R 5/2)	(45.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
47		SW		(47-55 ft) Well graded sand with gravel (SW); grayish brown (10YR 5/2)		
55		CL		(55-56 ft) Sandy lean clay (CL); brown (10YR 5/3)	(55.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
56		SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)		
60						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

ARCADIS

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61		SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)	(60.2 - 80.2') Normal drilling	(60.2 - 80.2') 1000 gallons of water used; 800 gallons of water recovered; 200 gallons of water lost
62						
63						
64						
65				(64.5-65 ft) Moist		
66		ML		(65-66 ft) Sandy silt with gravel (ML); grayish brown (10YR 5/2)	(65.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
67		SW		(66-72 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)		
68						
69						
70	(60.2 - 80.2) 4.80 mins/ft			(69.5-70 ft) Moist		
71				(70.5-71.5 ft) Moist		
72		SW		(72-77 ft) Well grade sand with gravel (SW); brown (10YR 5/3)		
73						
74				(74 ft) Large cobble		
75					(75.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
76						
77						
78		SM		(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)		
79						
80						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 5 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81		SM		(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2) (80-81 ft) Moist	(80.2 - 100.2') Normal drilling 80.2-87, hard drilling 87-95, normal drilling 95-100.2' bgs.	(80.2 - 100.2') 1100 gallons of water used; 900 gallons of water recovered; 200 gallons of water lost
82						
83		SC		(82-85 ft) Clayey sand with gravel (SC); light yellowish brown (10YR 6/4)		
84						
85						
86		SW-SM		(85-87 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2)	(85.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
87						
88		SC		(87-89.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3)		
89						
90	(80.2 - 100.2) 5.70 mins/ft	CL		(89.5-91 ft) Gravelly lean clay with sand (CL); brown (10YR 5/3)		
91		SM		(91-92 ft) Silty sand with gravel (SM); brown (10YR 5/3)		
92		CL		(92-93 ft) Gravelly lean clay with sand (CL); brown (10YR 5/3)		
93						
94		SM		(93-97 ft) Silty sand with gravel (SM); brown (10YR 5/3)		
95					(95.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
96						
97						
98		SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2)		
99						
100						

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Drilling Log

Sheet: 6 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101		SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2)	(100.2 - 114.0') Hard drilling, stop drilling due to replace seal on the gear box.	(100.2 - 114.0') 600 gallons of water used; 450 gallons of water recovered; 150 gallons of water lost
102						
103		SW-SM		(102-107 ft) Well grade sand with silt and gravel (SW-SM); brown (10YR 5/3)		
104						
105					(105.0') Observed little Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
106						
107	(100.2 - 114.0) 6.88 mins/ft	SC		(107-109.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3)		
108						
109				(109-112 ft) Moist		
110		SC		(109.5-110.5 ft) Clayey sand (SC); brown (10YR 5/3)		
111		SC		(110.5-112 ft) Clayey sand with gravel (SC); brown (10YR 5/3)		
112						
113		SM		(112-114 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)		
114						
115		SM		(114-119 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)	(114.0 - 120.2') Hard drilling	(114.0 - 120.2') 600 gallons of water used; 500 gallons of water recovered; 100 gallons of water lost
116						
117	(114.0 - 120.2) 8.23 mins/ft				(115.0') Observed some Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
118						
119						
120		CL		(119-120 ft) Lean clay with sand (CL); brown (7.5YR 5/3)		

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Drilling Log

Sheet: 7 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
121		SM		(120-125.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)	(120.2 - 131.0') Hard drilling	(120.2 - 131.0') 800 gallons of water used; 750 gallons of water recovered; 50 gallons of water lost
122						
123						
124						
125					(125.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
126	(120.2 - 131.0) 6.79 mins/ft	ML		(125.5-127 ft) Silt with sand (ML); brown (7.5YR 5/3)		
127						
128		ML		(127-130 ft) Sandy silt (ML); grayish brown (10YR 5/2)		
129						
130						
131		SM		(130-132 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)	(131.0 - 140.2') Normal drilling	(131.0 - 140.2') 600 gallons of water used; 300 gallons of water recovered; 300 gallons of water lost
132						
133		SW-SC		(132-135 ft) Well graded sand with clay and gravel (SW-SC); brown (7.5YR 5/3)		
134						
135	(131.0 - 140.2) 5.08 mins/ft					
136		SM		(135-137 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)	(135.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
137						
138		SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)		
139						
140						

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Drilling Log

Sheet: 8 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
141		SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)	(140.2 - 160.2') Normal drilling	(140.2 - 160.2') 600 gallons of water used; 500 gallons of water recovered; 100 gallons of water lost
142						
143				(143 ft) 2-inch lens with some clay, low-medium plasticity, rapid dilatancy.		
144						
145					(145.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
146						
147		SM		(147-152 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)		
148						
149						
150	(140.2 - 160.2) 3.60 mins/ft					
151						
152		ML		(152-152.5 ft) Sandy silt (ML); grayish brown (10YR 5/2)		
153		SM		(152.5-154.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2)		
154						
155		SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)	(155.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
156						
157						
158						
159						
160						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 9 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
161		SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)	(160.2 - 180.2') Normal drilling	(160.2 - 180.2') 650 gallons of water used; 600 gallons of water recovered; 50 gallons of water lost
162						
163						
164		SM		(164-165 ft) Silty sand with gravel (SM); brown (10YR 5/3)		
165		SM		(165-166 ft) Silty sand with gravel (SM); brown (7.5YR 5/2)	(165.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
166		SM		(166-167 ft) Silty sand with gravel (SM); brown (7.5YR 5/3)		
167		SM		(167-167.5 ft) Silty sand (SM); brown (7.5YR 5/3)		
168		SM		(167.5-170 ft) Silty sand (SM); brown (7.5YR 5/3)		
169						
170	(160.2 - 180.2) 3.00 mins/ft	ML		(170-171 ft) Silt with sand (ML); brown (7.5YR 5/3)		
171		ML		(171-182 ft) Sandy silt (ML); brown (10YR 5/3)		
172						
173						
174						
175		ML		(175-179.5 ft) Moist	(175.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
176						
177						
178						
179						
180						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 10 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
181		ML		(171-182 ft) Sandy silt (ML); brown (10YR 5/3) (181-182 ft) Moist	(180.2 - 200.2') Normal drilling 180.2-190.2' bgs, hard drilling 190.2-200.2' bgs	(180.2 - 200.2') 700 gallons of water used; 600 gallons of water recovered; 100 gallons of water lost
182				(182-194.5 ft) Silty sand (SM); brown (10YR 5/3)		
183						
184						
185					(185.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
186						
187						
188		SM				
189						
190	(180.2 - 200.2) 3.10 mins/ft					
191						
192						
193						
194						
195		SW		(194.5-195 ft) Well graded sand (SW); brown (7.5YR 5/3)		
196		ML		(195-196.5 ft) Sandy silt (ML); brown (10YR 5/3)	(195.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
197		SW-SM		(196.5-197 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3)		
198		ML		(197-200.5 ft) Sandy silt with gravel (ML); brown (10YR 5/3)		
199						
200						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 11 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
201		ML		(200.5-202 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3)	(200.2 - 220.2') Normal drilling	(200.2 - 220.2') 700 gallons of water used; 800 gallons of water recovered; 100 gallons of water gained
202		ML		(202-206 ft) Sandy silt (ML); brown (10YR 5/3)		
203						
204						
205					(205.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
206						
207		ML		(206-207.5 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3)		
208				(207.5-214 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3)		
209				(209 ft) Color change to brown (10YR 5/3).		
210	(200.2 - 220.2) 2.90 mins/ft					
211		ML				
212						
213						
214				(214-217 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4)		
215					(215.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
216		SM				
217						
218				(217-220 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/4)		
219		ML				
220						

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Drilling Log

Sheet: 12 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
221		ML		(220-221 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3)	(220.2 - 240.2') Normal drilling	(220.2 - 240.2') 750 gallons of water used; 1000 gallons of water recovered; 250 gallons of water gained
222		SM		(221-225 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3)		
223						
224						
225		SW		(225-225.5 ft) Well grade sand with gravel (SW); reddish brown (5YR 4/3)	(225.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
226		SM		(225.5-227 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3)		
227						
228		ML		(227-230 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2)		
229						
230	(220.2 - 240.2) 3.25 mins/ft					
231		SM		(230-232 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1)		
232						
233		ML		(232-234 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2)		
234						
235		SM		(234-235 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1)		
236		ML		(235-237 ft) Gravelly silt with sand (ML); grayish brown (10YR 5/2)	(235.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
237						
238		ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2)		
239						
240						

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Drilling Log

Sheet: 13 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
241		ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2)	(240.2 - 260.2') Normal drilling 240.2-252' bgs, soft drilling 252-260.2' bgs	(240.2 - 260.2') 450 gallons of water used; 600 gallons of water recovered; 150 gallons of water gained
242						
243						
244						
245						
246		ML		(245-251.5 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3)	(245.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
247						
248						
249						
250	(240.2 - 260.2) 2.10 mins/ft					
251						
252		SM		(251.5-253 ft) Silty sand (SM); reddish brown (5YR 4/3)		
253						
254		ML		(253-254.5 ft) Gravelly silt with sand (ML); red (2.5YR 4/6)		
255		SM		(254.5-257 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4)	(255.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
256						
257						
258		SM		(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4)		
259						
260						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 14 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
261		SM		(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4)	(260.2 - 280.0') Soft drilling	(260.2 - 280.0') 400 gallons of water used; 400 gallons of water recovered; 0 gallons of water lost
262				(262-268.5 ft) Wet		
263						
264						
265					(265.0') Observed trace Cemex #8 (8x16) Lapis Lustre Sand in drill cuttings.	
266						
267						
268						
269				(268.5-273.5 ft) Sedimentary Rock; reddish brown (5YR 4/4)		
270	(260.2 - 280.0) 1.57 mins/ft					
271						
272						
273						
274				(273.5-277 ft) Sedimentary Rock; reddish brown (5YR 4/4)		
275				(275 ft) NOTE: Color change to 2.5YR 4/4 - reddish brown.	(275.0') Observed trace Cemex #3 (8x20) Lapis Lustre Sand in drill cuttings.	
276						
277				(277-280.2 ft) Sedimentary Rock; reddish brown (5YR 4/4)		
278						
279						
280						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Drilling Log

Sheet: 15 of 15

Date Started:	06/03/2022	Surface Elevation:	622.31 ft amsl	**Boring No.:**	**TCS-01**
Date Completed:	06/22/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	280.2 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Foremost DR 24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles California
Driller Name:	J Saldana / A Lamon	Drill Casing Diameter:	16 inches		
Drilling Asst:	A Amezquita / D Aldona	Drill Bit:	15 5/8" & 17 5/8" Tricone	Project Number:	30126255
Tool-Pusher:	Arnold Lamon	Depth to First Water:	94.7 ft bgs		
Rig Geologist:	Ellen Redner	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
				End of Boring at 280.2 ft bgs.		
281						
282						
283						
284						
285						
286						
287						
288						
289						
290						
291						
292						
293						
294						
295						
296						
297						
298						
299						
300						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: Solid blue water table mark represents depth to water (ft. bgs.) depth to water measured during collection of the first VAS interval in the pilot borehole.

Attachment 5

Well Construction Log

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1		Fill	N/A		(0.0 - 4.0') Well Vault		Note: Well vault dimensions 4x5 feet by 4 feet deep.
2							
3		Fill	N/A				
4					(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing; (0.0 - 131.0') 18" Diameter Borehole		
5							
6		Fluvial Deposits	SM				
7							
8							
9			NR		(4.0 - 14.8') Portland Cement Grout with up to 6% bentonite hydrogel	(4.0 - 14.8') 91.3 gallons	(4.0 - 14.8') 143 gallons (157%) Note: Grout seal fourth lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling. Added 2 bags of bentonite chips (Holeplug 3/8", 50 lb. bags each) at 8.9 ft. bgs to fill potential void. Bentonite chips brought material up to 7.9 ft. bgs.
10	No Groundwater Samples Collected	Fluvial Deposits	SW				
11							
12		Fluvial Deposits	SP				
13							
14							
15		Fluvial Deposits	SW				
16							
17					(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
18		Fluvial Deposits	SW				
19							
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21		Fluvial Deposits	SW		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
22							
23		Fluvial Deposits	SM				
24							
25		Fluvial Deposits	SW-SM				
26							
27							
28							
29							
30	No Groundwater Samples Collected				(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
31			NR				
32							
33							
34							
35		Fluvial Deposits	SM				
36							
37							
38							
39							
40							

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Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Fluvial Deposits	CL		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
42		Fluvial Deposits	SC				
43		Fluvial Deposits	CH				
44		Fluvial Deposits	CL				
45		Fluvial Deposits	SM				
46							
47							
48							
49							
50					(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
51		Alluvium Deposits	SW				
52							
53							
54							
55							
56		Alluvium Deposits	CL				
57							
58		Alluvium Deposits	SM				
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61		Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
62							
63							
64							
65		Alluvium Deposits	ML				
66		Alluvium Deposits	SW				
67							
68							
69							
70	No Groundwater Samples Collected				(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
71							
72		Alluvium Deposits	SW				
73							
74							
75							
76							
77		Alluvium Deposits	SM				
78							
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
82							
83		Alluvium Deposits	SC				
84							
85							
86		Alluvium Deposits	SW-SM		(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel		
87							
88		Alluvium Deposits	SC				
89							
90		Alluvium Deposits	CL				
91		Alluvium Deposits	SM				
92		Alluvium Deposits	CL				
93		Alluvium Deposits	SM		(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
94							
95							
96							
97							
98		Alluvium Deposits	SC				
99							
100							

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Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Alluvium Deposits	SC		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
102							
103		Alluvium Deposits	SW-SM				
104							
105							
106							
107		Alluvium Deposits	SC				
108							
109							
110		Alluvium Deposits	SC		(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
111		Alluvium Deposits	SC				
112							
113		Alluvium Deposits	SM				
114							
115							
116		Alluvium Deposits	SM				
117							
118							
119							
120		Alluvium Deposits	CL				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121		Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
122							
123							
124							
125							
126		Alluvium Deposits	ML				
127							
128		Alluvium Deposits	ML		(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
129							
130	No Groundwater Samples Collected						
131		Alluvium Deposits	SM		(131.0 - 278.0') 16" Diameter Borehole		
132							
133		Alluvium Deposits	SW-SC				
134							
135							
136		Alluvium Deposits	SM				
137							
138		Alluvium Deposits	SM		(136.8 - 156.5') Portland Cement Grout with up to 6% bentonite hydrogel	(136.8 - 156.5') 111.9 gallons	(136.8 - 156.5') 123.5 gallons (110%) Note: Grout seal first lift
139							
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141		Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
142							
143							
144							
145							
146							
147							
148		Alluvium Deposits	SM		(136.8 - 156.5') Portland Cement Grout with up to 6% bentonite hydrogel	(136.8 - 156.5') 111.9 gallons	(136.8 - 156.5') 123.5 gallons (110%) Note: Grout seal first lift
149							
150	No Groundwater Samples Collected						
151							
152		Alluvium Deposits	ML				
153		Alluvium Deposits	SM				
154							
155							
156							
157		Alluvium Deposits	SM		(156.5 - 157.9') Wyoming Bentonite Chips - Holeplug 3/8"	(156.5 - 157.9') 1.5 bags	(156.5 - 157.9') 2 bags (133%) Note: Bentonite seal, used >20% of the calculated volume due to potential voids that formed during drilling.
158							
159					(157.9 - 160.9') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(157.9 - 160.9') 4.6 bags	(157.9 - 160.9') 5 bags (109%) Note: Transition sand
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

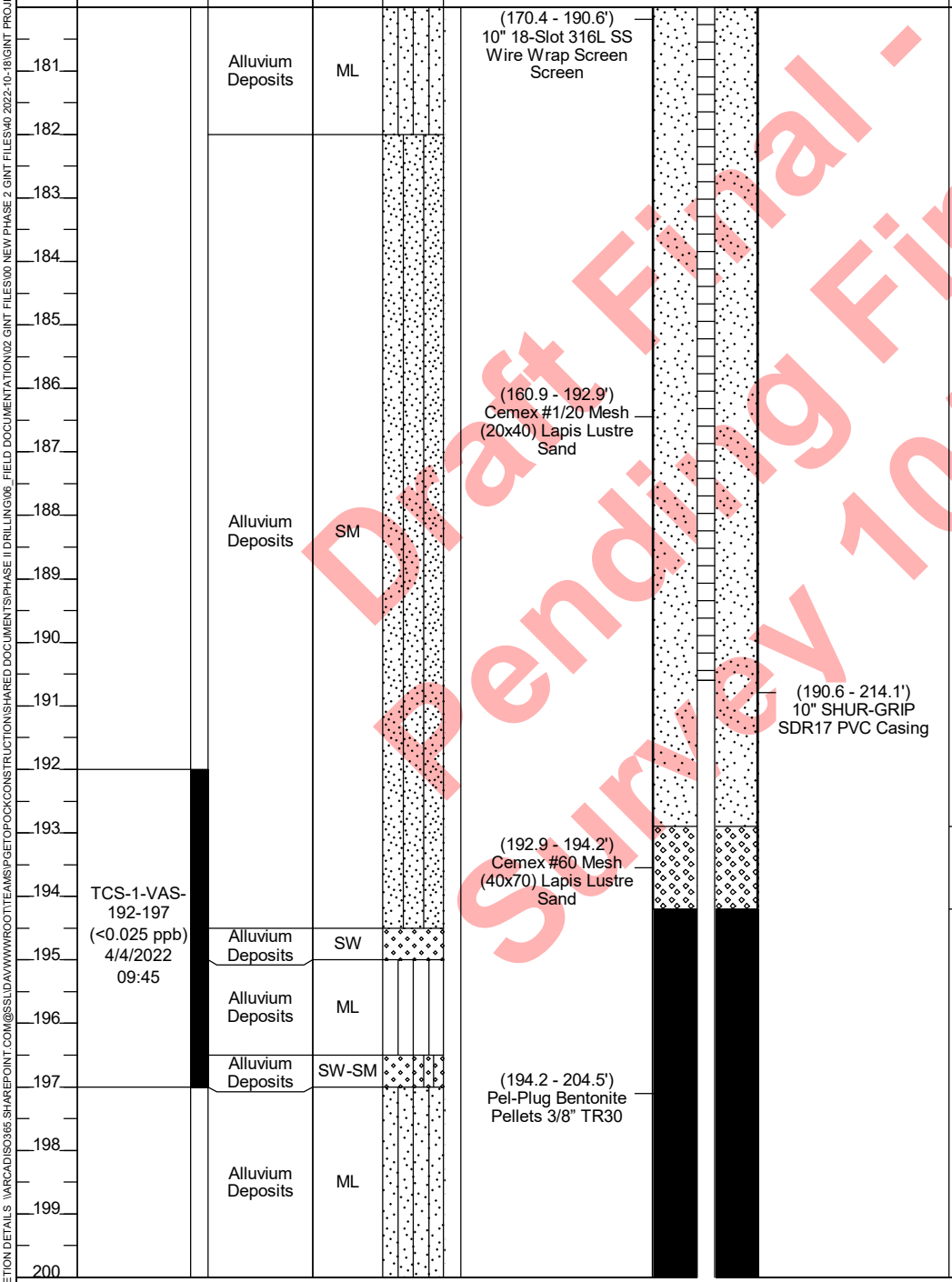
Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
161					(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing	(157.9 - 160.9') 4.6 bags	(157.9 - 160.9') 5 bags (109%) Note: Transition sand
162	No Groundwater Samples Collected	Alluvium Deposits	SM				
163							
164							
165		Alluvium Deposits	SM				
166	TCS-1-VAS-164-169 (1100 ppb) 4/3/2022 10:50	Alluvium Deposits	SM				
167		Alluvium Deposits	SM				
168		Alluvium Deposits	SM				
169							(160.9 - 192.9') 72.3 bags (149%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes prior to the installation of the bentonite seal. Approximately 4.7 bags of sand passed through the screen during swabbing was subtracted from the actual volume installed.
170		Alluvium Deposits	ML		(170.4 - 190.6') 10" 18-Slot 316L SS Wire Wrap Screen Screen	(160.9 - 192.9') 48.6 bags	
171							
172					(160.9 - 192.9') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand		
173							
174							
175		Alluvium Deposits	ML				
176							
177							
178							
179							
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

Sheet: 10 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		



Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
(160.9 - 192.9') 48.6 bags	(160.9 - 192.9') 72.3 bags (149%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes prior to the installation of the bentonite seal. Approximately 4.7 bags of sand passed through the screen during swabbing was subtracted from the actual volume installed.
(192.9 - 194.2') 2 bags	(192.9 - 194.2') 3 bags (150%) Note: Transition sand, used >20% of the calculated volume due to potential voids that formed during drilling.
(194.2 - 204.5') 12.5 buckets	(194.2 - 204.5') 20 buckets (160%) Note: Intermediate seal, used >20% of the calculated volume due to potential voids that formed during drilling.

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
201		Alluvium Deposits	ML		(190.6 - 214.1') 10" SHUR-GRIP SDR17 PVC Casing		
202					(194.2 - 204.5') Pel-Plug Bentonite Pellets 3/8" TR30	(194.2 - 204.5') 12.5 buckets	(194.2 - 204.5') 20 buckets (160%) Note: Intermediate seal, used >20% of the calculated volume due to potential voids that formed during drilling.
203							
204		Alluvium Deposits	ML				
205					(204.5 - 205.5') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(204.5 - 205.5') 1.5 bags	(204.5 - 205.5') 5 bags (333%) Note: Transition sand, used >20% of the calculated volume due to potential voids that formed during drilling.
206							
207		Alluvium Deposits	ML				
208							
209							
210							
211		Alluvium Deposits	ML				(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
212							
213					(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	
214							
215		Alluvium Deposits	SM		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
216							
217							
218		Alluvium Deposits	ML				
219							
220							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
221		Alluvium Deposits	ML		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
222							
223	TCS-1-VAS-221-226 (<0.025 ppb) 4/5/2022 10:45	Alluvium Deposits	SM				
224							
225		Alluvium Deposits	SW				
226		Alluvium Deposits	SM				
227							
228		Alluvium Deposits	ML				
229							
230					(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
231		Alluvium Deposits	SM				
232							
233		Alluvium Deposits	ML				
234							
235		Alluvium Deposits	SM				
236		Alluvium Deposits	ML				
237							
238		Alluvium Deposits	ML				
239							
240							

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Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

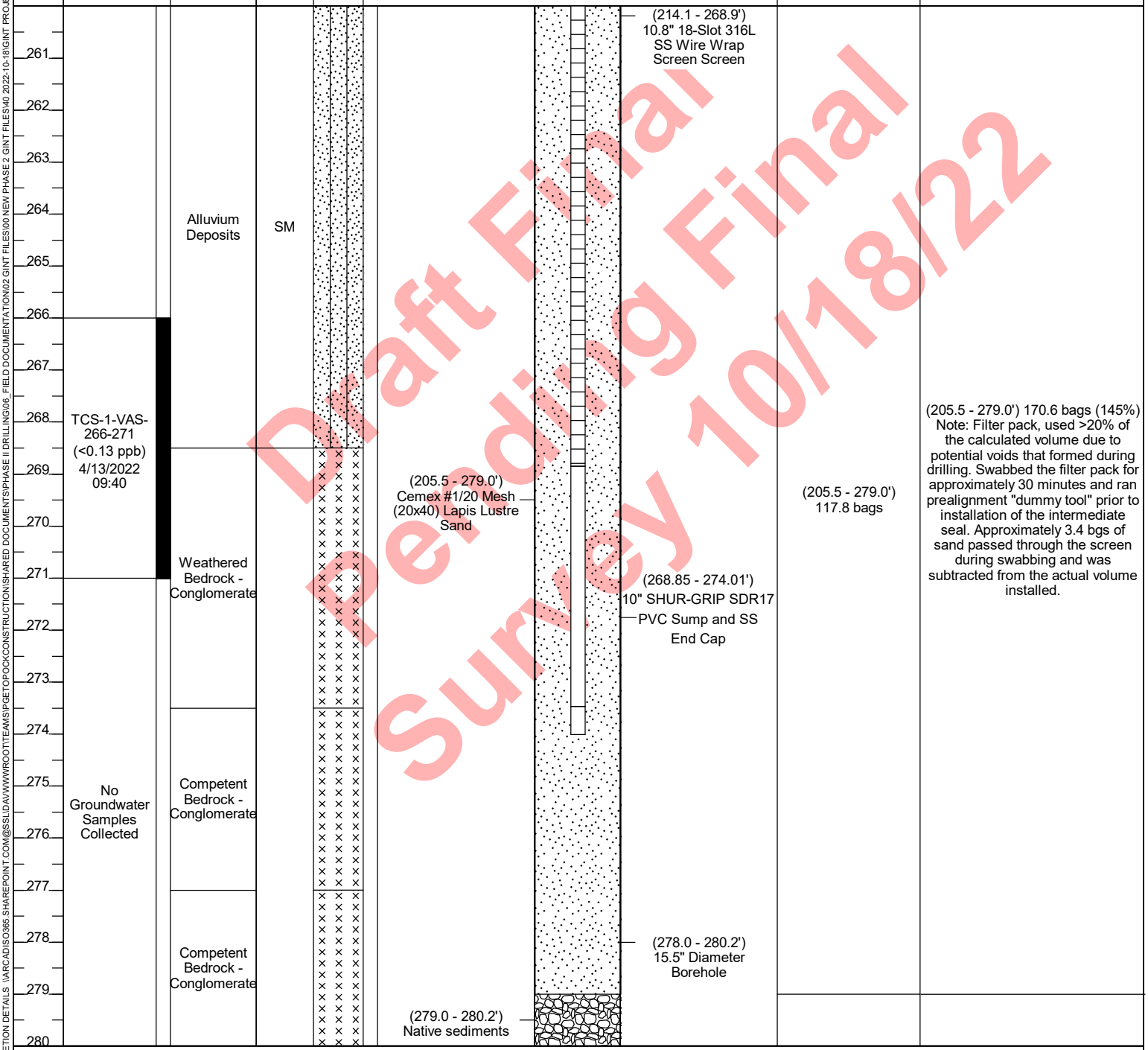
Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
241		Alluvium Deposits	ML		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
242							
243							
244							
245							
246		Alluvium Deposits	ML		(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
247							
248							
249							
250							
251							
252		Alluvium Deposits	SM				
253		Alluvium Deposits	ML				
254							
255		Alluvium Deposits	SM				
256	TCS-1-VAS-254-259 (<0.13 ppb) 4/7/2022 11:40						
257							
258		Alluvium Deposits	SM				
259							
260							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID:**	**TCS-01**
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		



Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Well Construction Log

ARCADIS

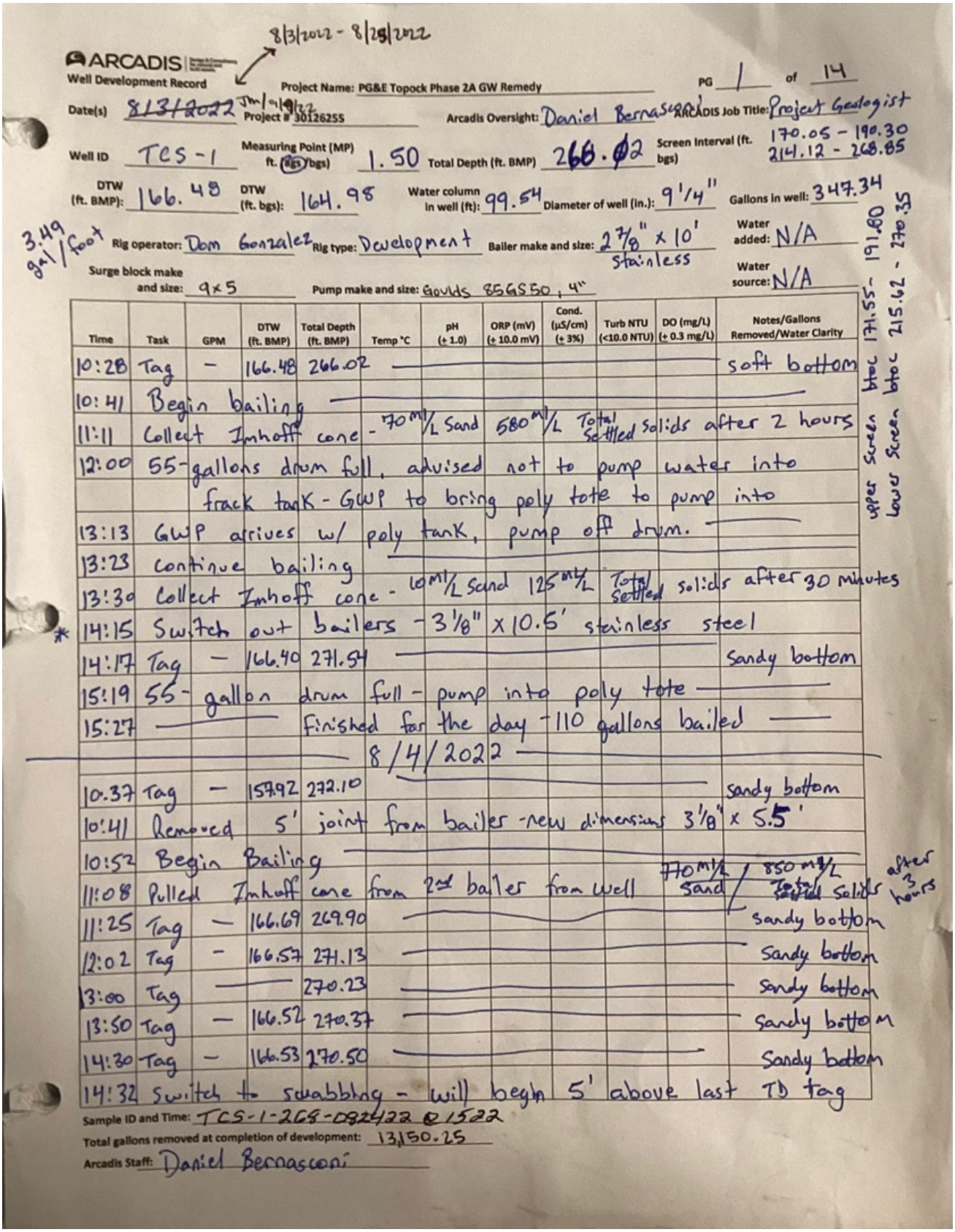
Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	**Well ID: TCS-01**	
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project:	Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location:	PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches		
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022		
Total Depth:	280.2 ft bgs	Well Completion:	☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
281							
282							
283							
284							
285							
286							
287							
288							
289							
290							
291							
292							
293							
294							
295							
296							
297							
298							
299							
300							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Attachment 6

Well Development Log



8/3/2022 - 8/29/2022

ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

PG 1 of 14

Date(s): ~~8/3/2022~~ JM 9/9/22

Project # 30126255

Arcadis Oversight: Daniel Bernasconi

ARCADIS Job Title: Project Geologist

Well ID: TCS-1

Measuring Point (MP) ft. (~~bgs~~/bgs): 1.50

Total Depth (ft. BMP): 266.02

Screen Interval (ft. bgs): 170.05 - 190.30, 214.12 - 268.85

DTW (ft. BMP): 166.48

DTW (ft. bgs): 164.98

Water column in well (ft): 99.54

Diameter of well (in.): 9 1/4"

Gallons in well: 347.34

3.49 gal/foot

Rig operator: Dom Gonzalez

Rig type: Development

Bailer make and size: 2 7/8" x 10' stainless

Water added: N/A

Surge block make and size: 9x5

Pump make and size: Goulds 85GS50, 4"

Water source: N/A

upper screen btoc 171.55 - 191.80

lower screen btoc 215.62 - 270.35

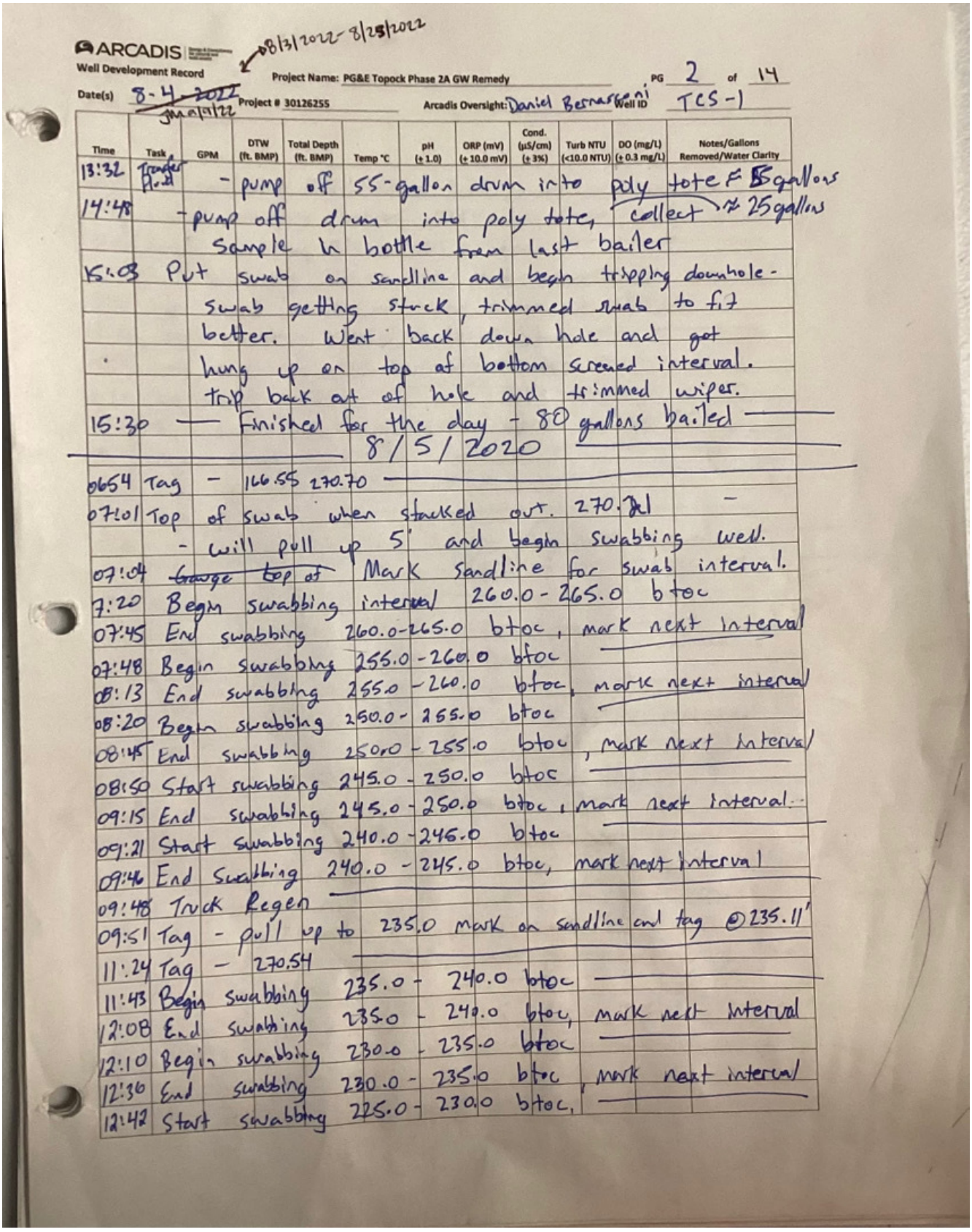
Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
10:28	Tag	-	166.48	266.02							soft bottom
10:41	Begin bailing										
11:11	Collect Imhoff cone - 70 ml/L Sand 580 ml/L Total Settled solids after 2 hours										
12:00	55-gallons drum full, advised not to pump water into frack tank - GWP to bring poly tote to pump into										
13:13	GWP arrives w/ poly tank, pump off drum.										
13:23	Continue bailing										
13:30	Collect Imhoff cone - 60 ml/L Sand 125 ml/L Total Settled solids after 30 minutes										
* 14:15	Switch out bailers - 3 1/8" x 10.5' stainless steel										
14:17	Tag	-	166.40	271.54							Sandy bottom
15:19	55-gallon drum full - pump into poly tote										
15:27	Finished for the day - 110 gallons bailed										
	8/4/2022										
10:37	Tag	-	157.92	272.10							Sandy bottom
10:41	Removed 5' joint from bailer - new dimensions 3 1/8" x 5.5'										
10:52	Begin Bailing										
11:08	Pulled Imhoff cone from 2nd bailer from well										770 ml/L Sand / 850 ml/L Total Settled solids after 3 hours
11:25	Tag	-	166.69	269.90							Sandy bottom
12:02	Tag	-	166.57	271.13							Sandy bottom
13:00	Tag			270.23							Sandy bottom
13:50	Tag	-	166.52	270.37							Sandy bottom
14:30	Tag	-	166.53	270.50							Sandy bottom
14:32	Switch to swabbing - will begin 5' above last TD tag										

Sample ID and Time: TCS-1-268-082422 @ 1522

Total gallons removed at completion of development: 13,150.25

Arcadis Staff: Daniel Bernasconi

TCS-1 - Well Development Record



ARCADIS
Well Development Record

8/3/2022 - 8/25/2022

Project Name: PG&E Topock Phase 2A GW Remedy

PG 2 of 14

Date(s) ~~8-4-2022~~ JM 8/9/22

Project # 30126255

Arcadis Oversight: Daniel Bernasconi

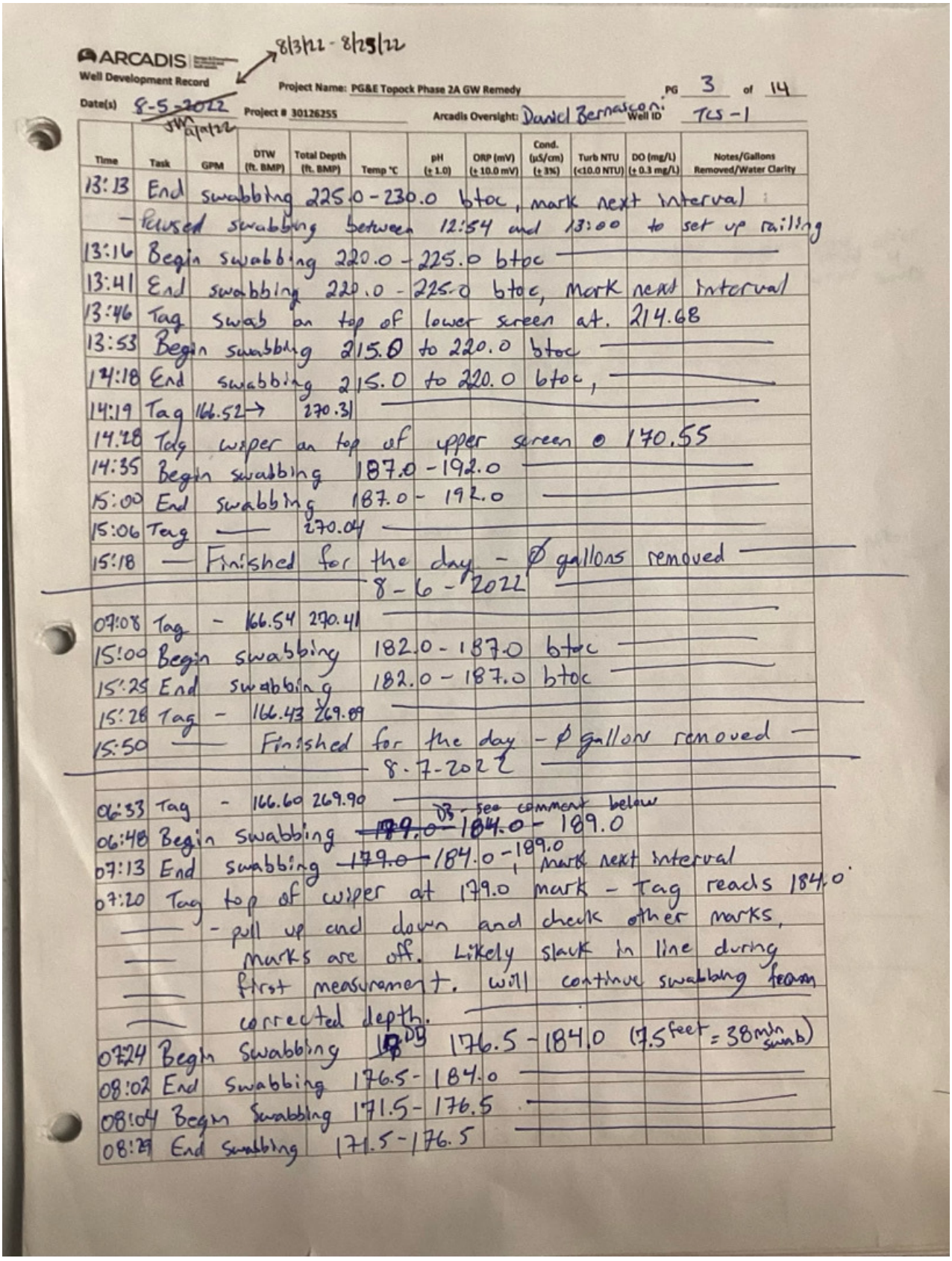
Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
13:32	~~Transfer~~ Purge	-									pump off 55-gallon drum into poly tote ≈ 55 gallons
14:48		-									pump off drum into poly tote, collect ≈ 25 gallons sample in bottle from last bailer
15:03											Put swab on sandline and begin tripping downhole - swab getting stuck, trimmed swab to fit better. Went back down hole and got hung up on top of bottom screened interval. trip back out of hole and trimmed wiper.
15:30											Finished for the day - 80 gallons bailed

8/5/2020

0654	Tag	- 166.55 270.70
07:01	Top of swab when stacked out. 270.7	- will pull up 5' and begin swabbing well.
07:04	~~Gauge top of~~ Mark sandline for swab interval.	
7:20	Begin swabbing interval	260.0 - 265.0 btoc
07:45	End swabbing	260.0-265.0 btoc, mark next interval
07:48	Begin swabbing	255.0 - 260.0 btoc
08:13	End swabbing	255.0 - 260.0 btoc, mark next interval
08:20	Begin swabbing	250.0 - 255.0 btoc
08:45	End swabbing	250.0 - 255.0 btoc, mark next interval
08:50	Start swabbing	245.0 - 250.0 btoc
09:15	End swabbing	245.0 - 250.0 btoc, mark next interval
09:21	Start swabbing	240.0 - 245.0 btoc
09:46	End swabbing	240.0 - 245.0 btoc, mark next interval
09:48	Truck Regen	
09:51	Tag - pull up to	235.0 mark on sandline and tag @235.11'
11:24	Tag -	270.54
11:43	Begin swabbing	235.0 - 240.0 btoc
12:08	End swabbing	235.0 - 240.0 btoc, mark next interval
12:10	Begin swabbing	230.0 - 235.0 btoc
12:36	End swabbing	230.0 - 235.0 btoc, mark next interval
12:42	Start swabbing	225.0 - 230.0 btoc,

TCS-1 - Well Development Record



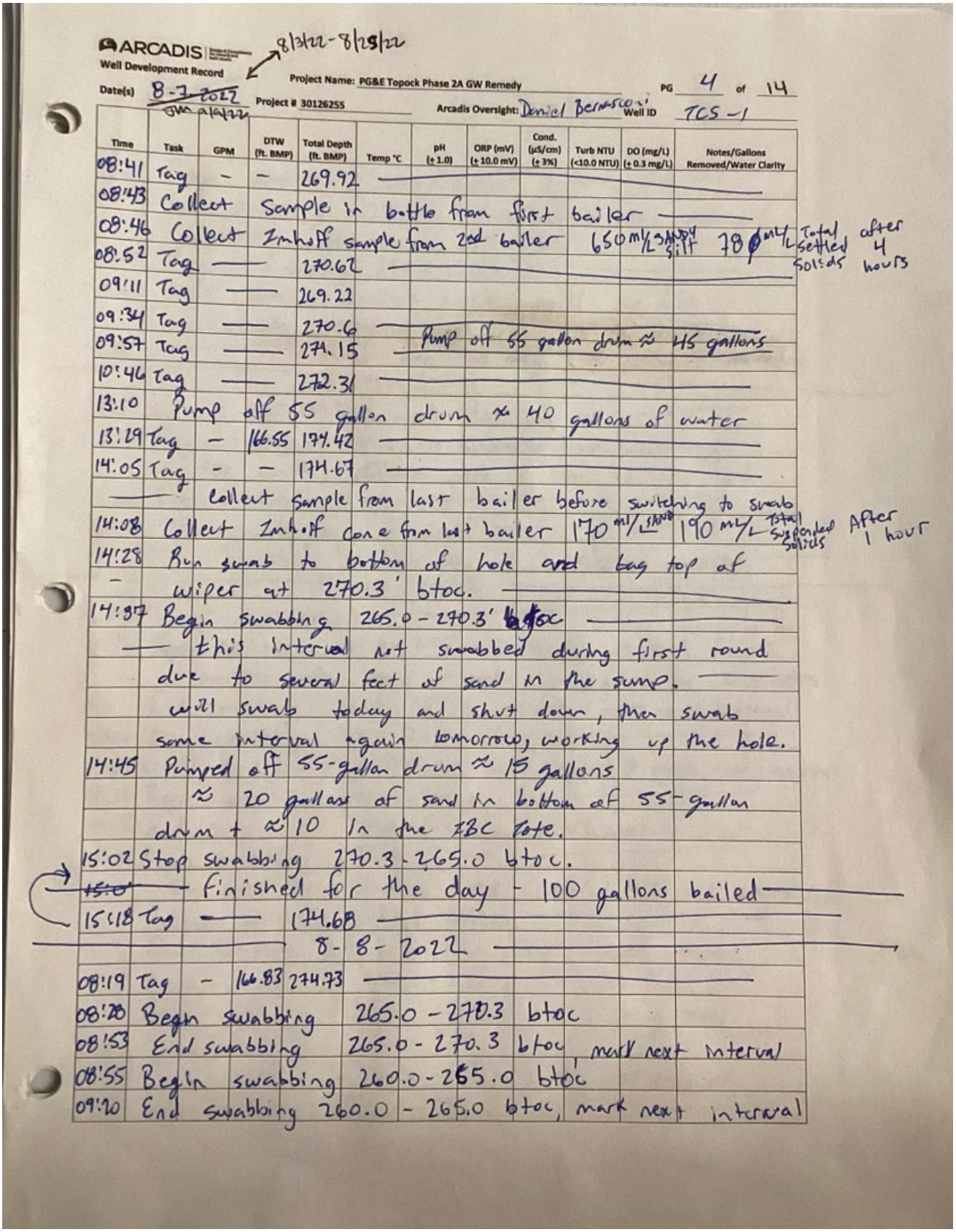
ARCADIS Well Development Record — 8/3/22 - 8/5/22

Project Name: PG&E Topock Phase 2A GW Remedy — PG 3 of 14

Date(s) ~~8-5-2022~~ 8/4/22 — Project # 30126255 — Arcadis Oversight: Daniel Bernasconi — Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
13:13	End swabbing 225.0 - 230.0 btoc, mark next interval										
	- Paused swabbing between 12:54 and 13:00 to set up railing										
13:16	Begin swabbing 220.0 - 225.0 btoc										
13:41	End swabbing 220.0 - 225.0 btoc, mark next interval										
13:46	Tag swab on top of lower screen at. 214.68										
13:53	Begin swabbing 215.0 to 220.0 btoc										
14:18	End swabbing 215.0 to 220.0 btoc,										
14:19	Tag 166.52 → 270.31										
14:28	Tag wiper on top of upper screen @ 170.55										
14:35	Begin swabbing 187.0 - 192.0										
15:00	End swabbing 187.0 - 192.0										
15:06	Tag — 270.04										
15:18	— Finished for the day - 0 gallons removed										
	8-6-2022										
07:08	Tag - 166.54 270.41										
15:00	Begin swabbing 182.0 - 187.0 btoc										
15:25	End swabbing 182.0 - 187.0 btoc										
15:28	Tag - 166.43 269.89										
15:50	— Finished for the day - 0 gallon removed										
	8-7-2022										
06:33	Tag - 166.60 269.90										
06:48	Begin swabbing ~~179.0~~ DB - see comment below ~~184.0~~ - 189.0										
07:13	End swabbing ~~179.0~~ - 184.0 - 189.0, mark next interval										
07:20	Tag top of wiper at 179.0 mark - Tag reads 184.0										
	- pull up and down and check other marks,										
	marks are off. Likely slack in line during										
	first measurement. Will continue swabbing from										
	corrected depth.										
07:24	Begin Swabbing ~~189~~ DB 176.5 - 184.0 (7.5 feet = 38 min swab)										
08:02	End Swabbing 176.5 - 184.0										
08:04	Begin Swabbing 171.5 - 176.5										
08:29	End Swabbing 171.5 - 176.5										

TCS-1 - Well Development Record



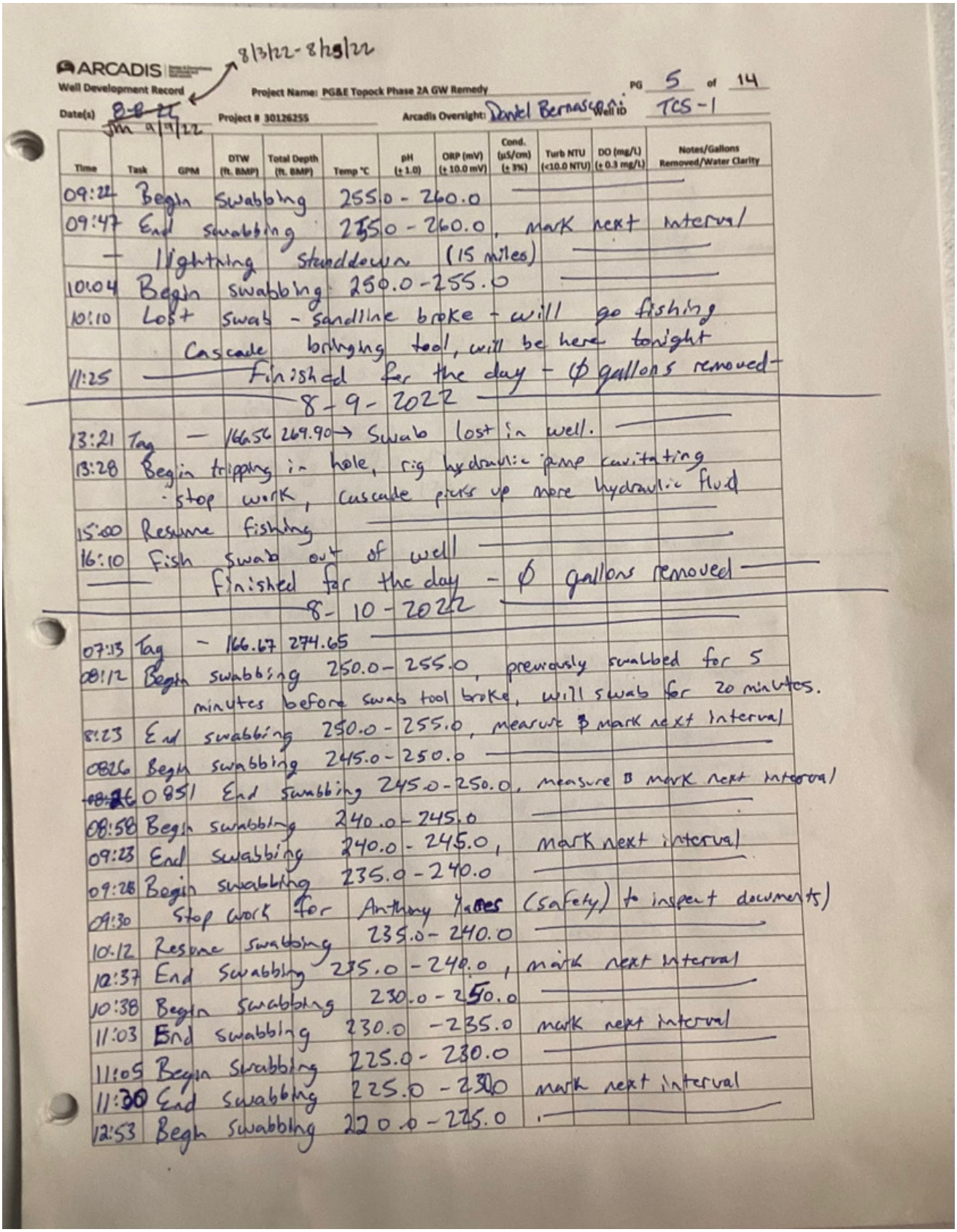
ARCADIS Well Development Record 8/3/22-8/25/22

Date(s) ~~8-7-2022~~ GW 8/4/22 Project Name: PG&E Topock Phase 2A GW Remedy PG 4 of 14

Project # 30126255 Arcadis Oversight: Daniel Bernasconi Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
08:41	Tag	–	–	269.92							
08:43	Collect sample in bottle from first bailer										
08:46	Collect Imhoff sample from 2nd bailer										650 ml/L SANDY SILT 780 ml/L Total settled solids after 4 hours
08:52	Tag	——		270.62							
09:11	Tag	——		269.22							
09:34	Tag	——		270.6							
09:57	Tag	——		271.15							Pump off 55 gallon drum ≈ 45 gallons
10:46	Tag	——		272.31							
13:10	Pump off 55 gallon drum ≈ 40 gallons of water										
13:29	Tag	–	166.55	174.42							
14:05	Tag	–	–	174.67							
——	Collect sample from last bailer before switching to swab										
14:08	Collect Imhoff cone from last bailer										170 ml/L SAND 190 ml/L Total Suspended Solids After 1 hour
14:28	Run swab to bottom of hole and tag top of wiper at 270.3' btoc.										
14:37	Begin swabbing 265.0 - 270.3' btoc										
——	this interval not swabbed during first round due to several feet of sand in the sump. will swab today and shut down, then swab some interval again tomorrow, working up the hole.										
14:45	Pumped off 55-gallon drum ≈ 15 gallons ≈ 20 gallons of sand in bottom of 55-gallon drum + ≈ 10 in the IBC tote.										
15:02	Stop swabbing 270.3 - 265.0 btoc.										
~~15:0~~	—— Finished for the day - 100 gallons bailed										
15:18	Tag	——		174.68							
——	8-8-2022										
08:19	Tag	–	166.83	274.73							
08:20	Begin swabbing			265.0 - 270.3 btoc							
08:53	End swabbing			265.0 - 270.3 btoc, mark next interval							
08:55	Begin swabbing			260.0 - 265.0 btoc							
09:20	End swabbing			260.0 - 265.0 btoc, mark next interval							

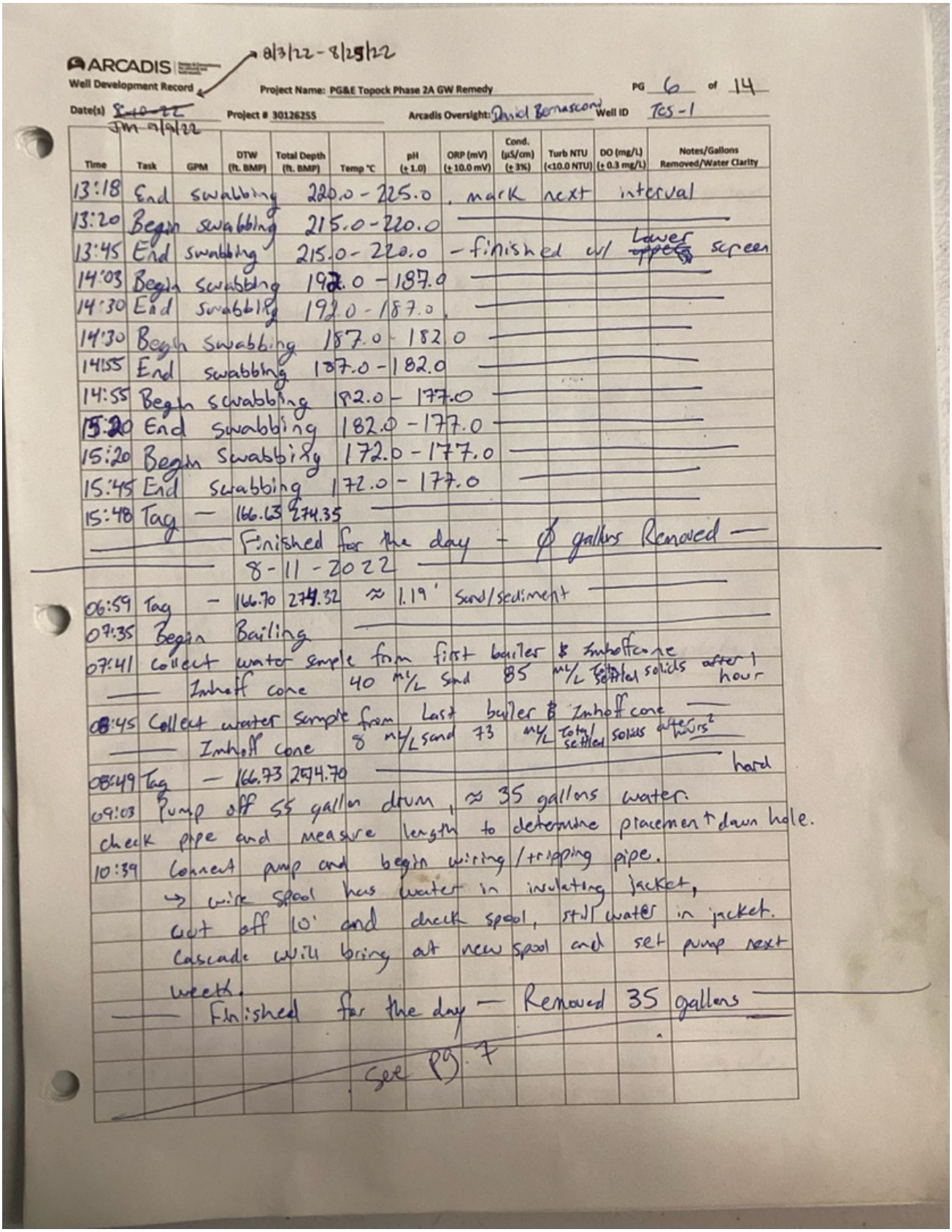
TCS-1 - Well Development Record



ARCADIS
Well Development Record
8/3/22 - 8/5/22
Project Name: PG&E Topock Phase 2A GW Remedy
PG 5 of 14
Date(s) 8-8-22 / JM 8/9/22
Project # 30126255
Arcadis Oversight: Daniel Bernasconi
Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
09:22	Begin swabbing				255.0 - 260.0						
09:47	End swabbing				255.0 - 260.0,						mark next interval
	Lightning Standdown (15 miles)										
10:04	Begin swabbing				250.0 - 255.0						
10:10	Lost swab - sandline broke - will go fishing										
	Cascade bringing tool, will be here tonight										
11:25	Finished for the day - Ø gallons removed										
	8-9-2022										
13:21	Tag - 166.56 269.90 → Swab lost in well.										
13:28	Begin tripping in hole, rig hydraulic pump cavitating - stop work, cascade picks up more hydraulic fluid										
15:00	Resume fishing										
16:10	Fish swab out of well										
	Finished for the day - Ø gallons removed										
	8-10-2022										
07:13	Tag - 166.67 274.65										
08:12	Begin swabbing				250.0 - 255.0,						previously swabbed for 5 minutes before swab tool broke, will swab for 20 minutes.
8:23	End swabbing				250.0 - 255.0,						measure & mark next interval
0826	Begin swabbing				245.0 - 250.0						
08:26 0851	End swabbing				245.0 - 250.0,						measure & mark next interval
08:58	Begin swabbing				240.0 - 245.0						
09:23	End swabbing				240.0 - 245.0,						mark next interval
09:28	Begin swabbing				235.0 - 240.0						
09:30	Stop work for Anthony Yates (safety) to inspect documents										
10:12	Resume swabbing				235.0 - 240.0						
10:37	End swabbing				235.0 - 240.0,						mark next interval
10:38	Begin swabbing				230.0 - 250.0						
11:03	End swabbing				230.0 - 235.0						mark next interval
11:05	Begin swabbing				225.0 - 230.0						
11:30	End swabbing				225.0 - 230.0						mark next interval
12:53	Begin swabbing				220.0 - 225.0						

TCS-1 - Well Development Record



ARCADIS
Well Development Record

8/3/22 - 8/25/22

Project Name: PG&E Topock Phase 2A GW Remedy

PG 6 of 14

Date(s) ~~8-10-22~~ JM 8/9/22

Project # 30126255

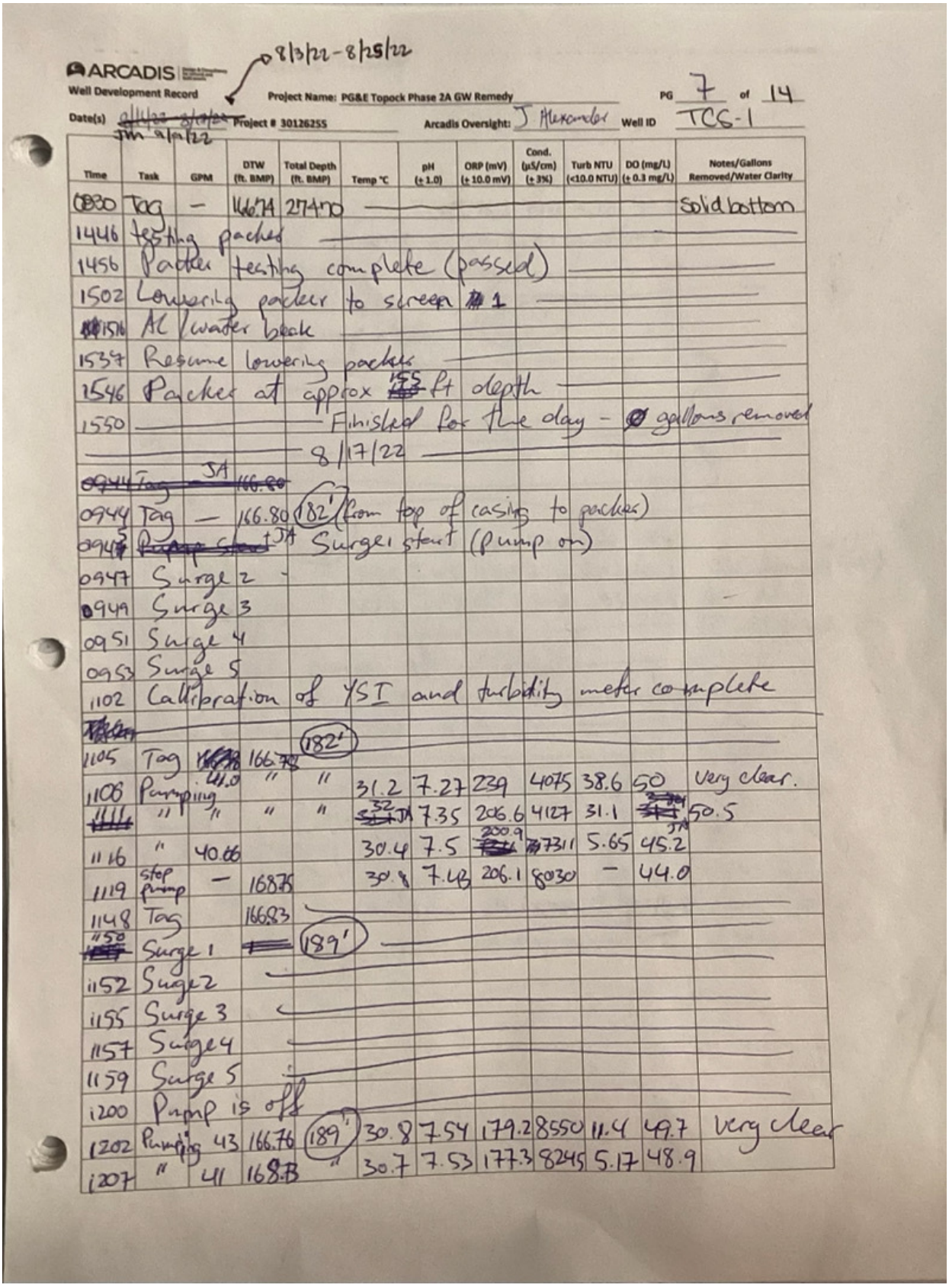
Arcadis Oversight: Daniel Bonascorsi

Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
13:18	End swabbing			220.0 - 225.0							mark next interval
13:20	Begin swabbing			215.0 - 220.0							
13:45	End swabbing			215.0 - 220.0							- finished w/ Lower screen
14:03	Begin swabbing			192.0 - 187.0							
14:30	End swabbing			192.0 - 187.0							
14:30	Begin swabbing			187.0 - 182.0							
14:55	End swabbing			187.0 - 182.0							
14:55	Begin swabbing			182.0 - 177.0							
15:20	End swabbing			182.0 - 177.0							
15:20	Begin swabbing			172.0 - 177.0							
15:45	End swabbing			172.0 - 177.0							
15:48	Tag			- 166.63 274.35							
	Finished for the day - Ø gallons Removed										
	8-11-2022										
06:59	Tag			- 166.70 274.32							≈ 1.19' Sand/Sediment
07:35	Begin Bailing										
07:41	Collect water sample from first bailer & Imhoff cone										
	Imhoff cone			40 mL/L Sand					85 mL/L Total settled solids		after 1 hour
08:45	Collect water sample from Last bailer & Imhoff cone										
	Imhoff cone			8 mL/L Sand					73 mL/L Total settled solids		after hours²
08:49	Tag			- 166.73 274.70							hard
09:03	Pump off 55 gallon drum, ≈ 35 gallons water.										
	check pipe and measure length to determine placement down hole.										
10:39	Connect pump and begin wiring/tripping pipe.										
	→ wire spool has water in insulating jacket,										
	cut off 10' and check spool, still water in jacket.										
	Cascade will bring out new spool and set pump next										
	week.										
	Finished for the day - Removed 35 gallons										

See Pg. 7

TCS-1 - Well Development Record



ARCADIS
Well Development Record

8/3/22 - 8/5/22

Project Name: PG&E Topock Phase 2A GW Remedy

PG 7 of 14

Date(s) ~~8/4/22 - 8/5/22~~ JM 8/9/22

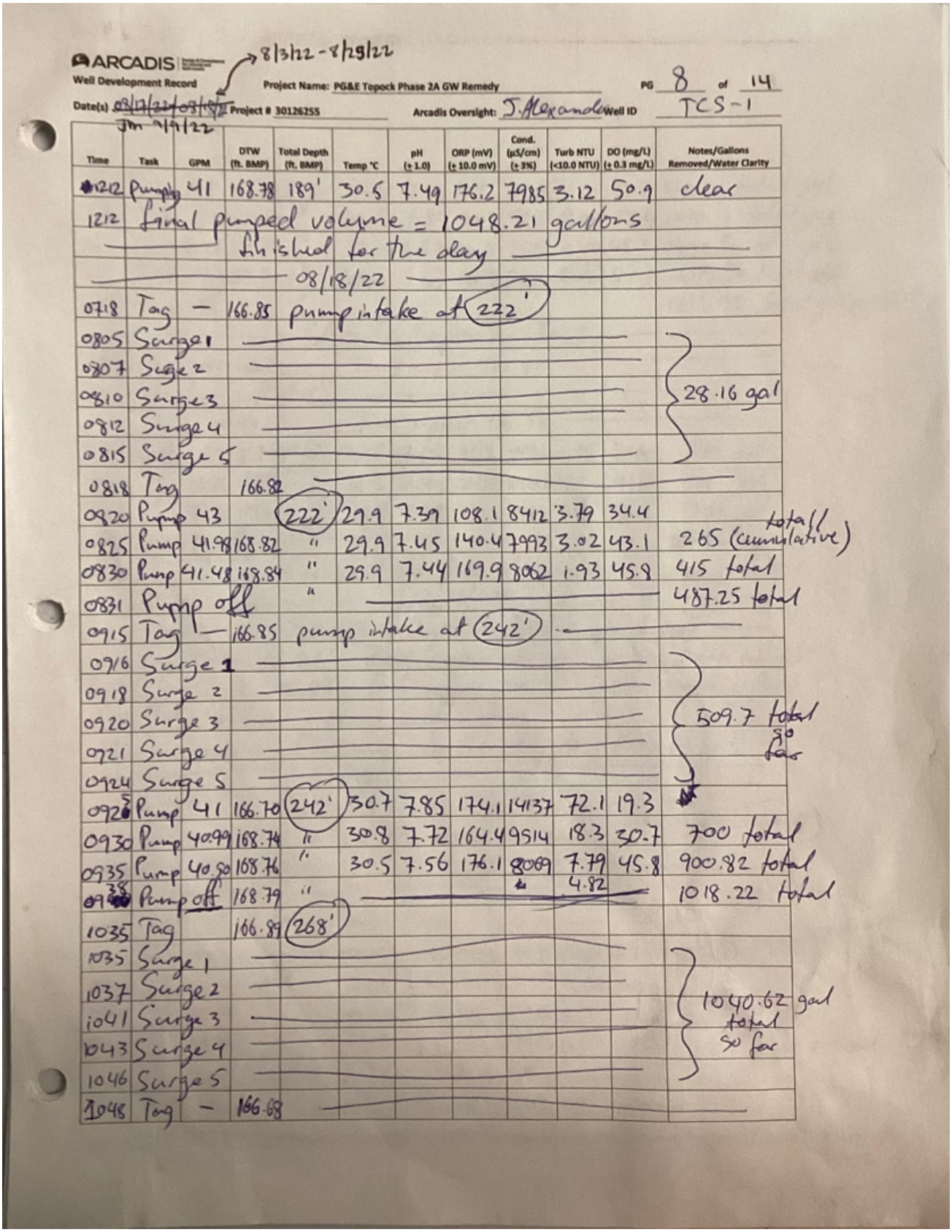
Project # 30126255

Arcadis Oversight: J Alexander

Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0830	Tag	–	166.74	274.70							solid bottom
1446	testing packer										
1456	Packer testing complete (passed)										
1502	Lowering packer to screen #1										
1516	AL / water leak										
1537	Resume lowering packer										
1546	Packer at approx 155 ft depth										
1550	Finished for the day - 0 gallons removed										
	8/17/22										
~~0944~~	~~Tag~~ JA		~~166.80~~								
0944	Tag	–	166.80	(182' from top of casing to packer)							
0945	~~Pump start~~ JA Surge 1 start (pump on)										
0947	Surge 2										
0949	Surge 3										
0951	Surge 4										
0953	Surge 5										
1102	Calibration of YSI and turbidity meter complete										
~~1103~~											
1105	Tag	~~41.0~~	166.78	(182')							
1106	Pumping	41.0	"	"	31.2	7.27	239	4075	38.6	50	very clear.
~~1111~~	"	"	"	"	~~32~~ JA	7.35	206.6	4127	31.1	~~34~~ 50.5	
1116	"	40.66			30.4	7.5	~~200.9~~	7311	5.65	45.2 JA	
1119	stop pump	–	168.75		30.8	7.48	206.1	8030	–	44.0	
1148	Tag		166.83								
~~1150~~	Surge 1			(189')							
1152	Surge 2										
1155	Surge 3										
1157	Surge 4										
1159	Surge 5										
1200	Pump is off										
1202	Pumping	43	166.76	(189')	30.8	7.54	179.2	8550	11.4	49.7	very clear
1207	"	41	168.88	"	30.7	7.53	177.3	8245	5.17	48.9	

TCS-1 - Well Development Record



ARCADIS Well Development Record

8/3/22 - 8/29/22

Project Name: PG&E Topock Phase 2A GW Remedy

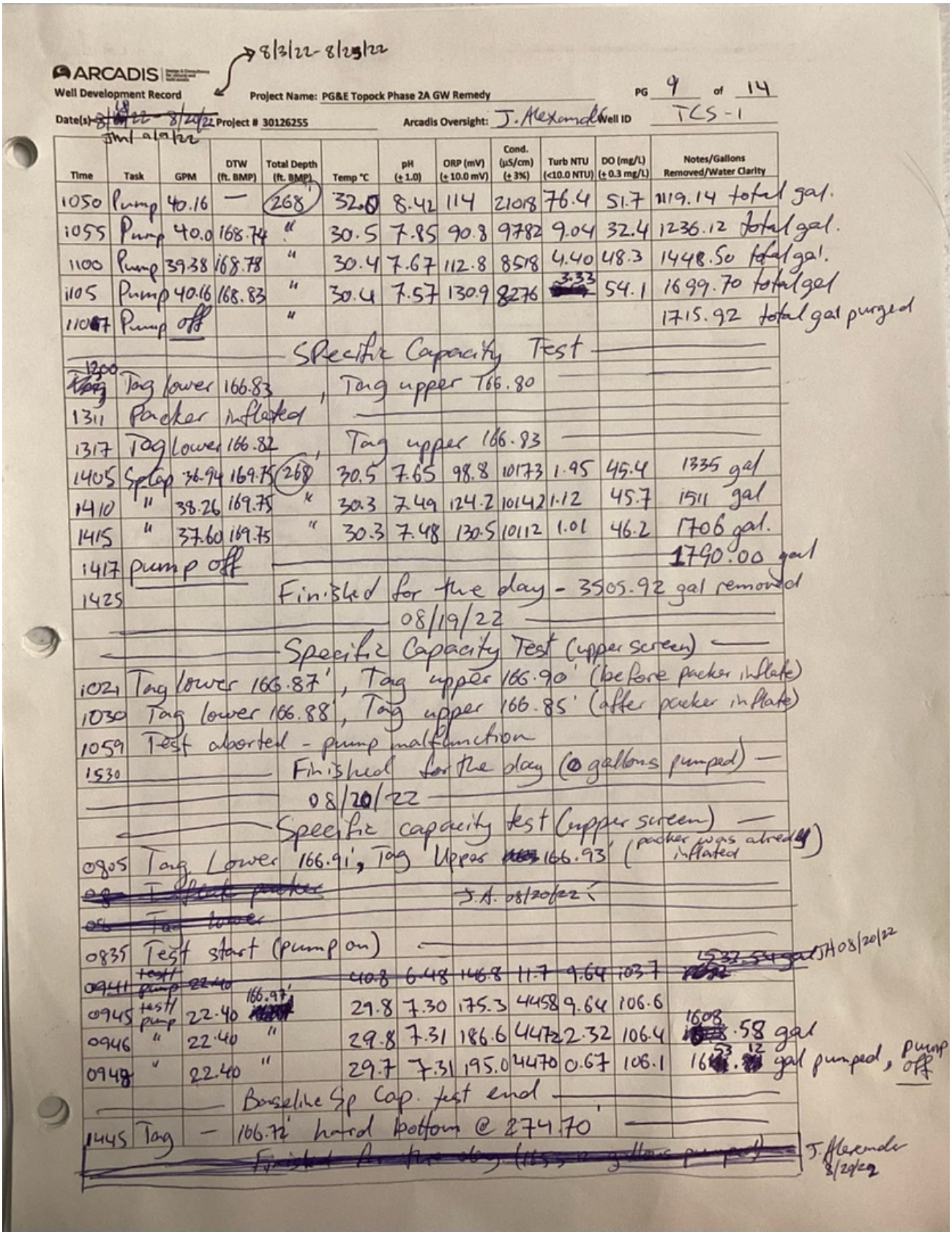
PG 8 of 14

Date(s) ~~08/17/22~~ ~~08/18/22~~ 8/29/22 Project # 30126255

Arcadis Oversight: J. Alexander Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1212	Pumping	41	168.78	189'	30.5	7.49	176.2	7985	3.12	50.9	clear
1212	final pumped volume = 1048.21 gallons										
	finished for the day										
	08/18/22										
0718	Tag	–	166.85	pump intake at 222'							
0805	Surge 1										28.16 gal
0807	Surge 2										
0810	Surge 3										
0812	Surge 4										
0815	Surge 5										
0818	Tag		166.82								
0820	Pump	43		222'	29.9	7.39	108.1	8412	3.79	34.4	
0825	Pump	41.98	168.82	"	29.9	7.45	140.4	7993	3.02	43.1	265 (cumulative) total
0830	Pump	41.48	168.84	"	29.9	7.44	169.9	8062	1.93	45.9	415 total
0831	Pump off			"							487.25 total
0915	Tag	–	166.85	pump intake at 242'							
0916	Surge 1										509.7 total so far
0918	Surge 2										
0920	Surge 3										
0921	Surge 4										
0924	Surge 5										
0928	Pump	41	166.70	242'	30.7	7.85	174.1	14137	72.1	19.3	
0930	Pump	40.99	168.74	"	30.8	7.72	164.4	9514	18.3	30.7	700 total
0935	Pump	40.80	168.76	"	30.5	7.56	176.1	8089	7.79	45.8	900.82 total
0938	Pump off		168.79	"					4.82		1018.22 total
1035	Tag		166.89	268'							
1035	Surge 1										1040.62 gal total so far
1037	Surge 2										
1041	Surge 3										
1043	Surge 4										
1046	Surge 5										
1048	Tag	–	166.68								

TCS-1 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

8/3/22 - 8/25/22

Project Name: PG&E Topock Phase 2A GW Remedy

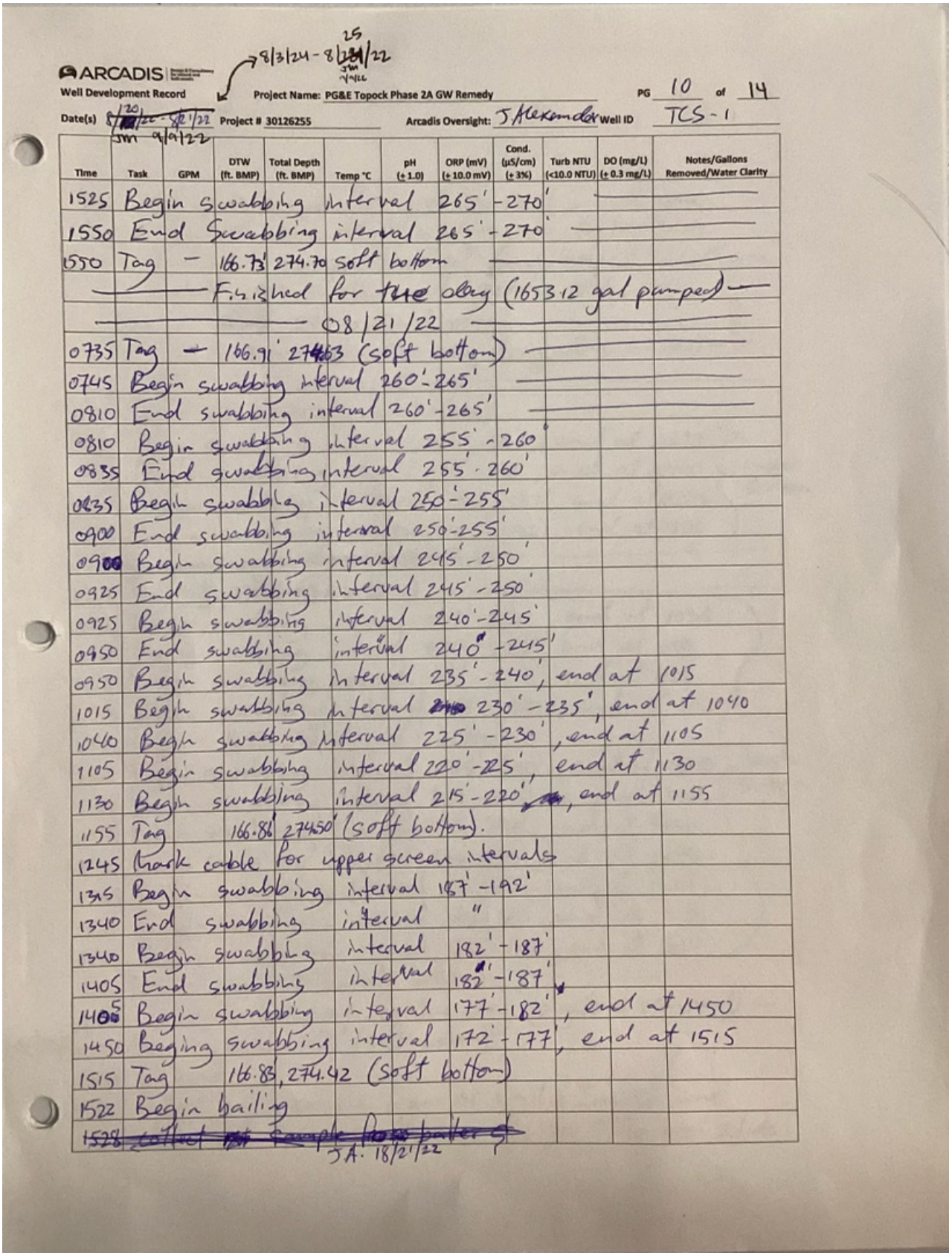
PG 9 of 14

Date(s): ~~8/18/22~~ 8/19/22 ~~8/24/22~~ Project # 30126255 Arcadis Oversight: J. Alexander Well ID TCS-1

JH 8/19/22

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (±1.0)	ORP (mV) (±10.0 mV)	Cond. (µS/cm) (±3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (±0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1050	Pump	40.16	—	268'	32.0	8.42	114	21108	76.4	51.7	1119.14 total gal.
1055	Pump	40.0	168.74	"	30.5	7.85	90.8	9782	9.04	32.4	1236.12 total gal.
1100	Pump	39.38	168.78	"	30.4	7.67	112.8	8518	4.40	48.3	1448.50 total gal.
1105	Pump	40.16	168.83	"	30.4	7.57	130.9	8276	~~3.33~~	54.1	1699.70 total gal
1107	Pump off			"							1715.92 total gal purged
				Specific Capacity Test							
~~1200~~ 1300	Tag lower 166.83', Tag upper 166.80'										
1311	Packer inflated										
1317	Tag lower 166.82', Tag upper 166.83'										
1405	Sp Cap	36.94	169.75	268'	30.5	7.65	98.8	10173	1.95	45.4	1335 gal
1410	"	38.26	169.75	"	30.3	7.49	124.2	10142	1.12	45.7	1511 gal
1415	"	37.60	169.75	"	30.3	7.48	130.5	10112	1.01	46.2	1706 gal.
1417	pump off										1790.00 gal
1425	Finished for the day - 3505.92 gal removed										
	08/19/22										
	Specific Capacity Test (upper screen)										
1021	Tag lower 166.87', Tag upper 166.90' (before packer inflate)										
1030	Tag lower 166.88', Tag upper 166.85' (after packer inflate)										
1059	Test aborted - pump malfunction										
1530	Finished for the day (0 gallons pumped)										
	08/20/22										
	Specific capacity test (upper screen)										
0805	Tag Lower 166.91', Tag Upper ~~166.93~~ 166.93' (packer was already inflated)										
~~08~~	~~Inflate packer~~										
~~08~~	~~Tag lower~~										J.A. 08/20/22
0835	Test start (pump on)										JH 08/20/22
~~0941~~	~~test pump~~	~~22.40~~	~~166.97'~~		~~40.8~~	~~6.48~~	~~146.8~~	~~11.7~~	~~9.64~~	~~103.7~~	~~1537.54 gal~~
0945	test pump	22.40	166.97'		29.8	7.30	175.3	4458	9.64	106.6	
0946	"	22.40	"		29.8	7.31	186.6	4472	2.32	106.4	1608.58 gal
0948	"	22.40	"		29.7	7.31	195.0	4470	0.67	106.1	1653.12 gal pumped, Pump off
	Baseline Sp Cap. test end										
1445	Tag - 166.72' hard bottom @ 274.70'										
	~~Finished for the day (1653.12 gallons pumped)~~										J. Alexander 8/20/22

TCS-1 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

8/3/24 - 8/25/22 JM 9/9/22

Project Name: PG&E Topock Phase 2A GW Remedy

PG 10 of 14

Date(s) ~~8/20/22~~ - 8/21/22 JM 9/9/22

Project # 30126255

Arcadis Oversight: J Alexander

Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1525	Begin swabbing interval 265'-270'										
1550	End swabbing interval 265'-270'										
1550	Tag -		166.73	274.70	soft bottom						
	Finished for the day (1653.12 gal pumped)										
	08/21/22										
0735	Tag -		166.91	274.63	(soft bottom)						
0745	Begin swabbing interval 260'-265'										
0810	End swabbing interval 260'-265'										
0810	Begin swabbing interval 255'-260'										
0835	End swabbing interval 255'-260'										
0835	Begin swabbing interval 250'-255'										
0900	End swabbing interval 250'-255'										
0900	Begin swabbing interval 245'-250'										
0925	End swabbing interval 245'-250'										
0925	Begin swabbing interval 240'-245'										
0950	End swabbing interval 240'-245'										
0950	Begin swabbing interval 235'-240', end at 1015										
1015	Begin swabbing interval 230'-235', end at 1040										
1040	Begin swabbing interval 225'-230', end at 1105										
1105	Begin swabbing interval 220'-225', end at 1130										
1130	Begin swabbing interval 215'-220', end at 1155										
1155	Tag		166.86	274.50	(soft bottom).						
1245	Mark cable for upper screen intervals										
1335	Begin swabbing interval 187'-192'										
1340	End swabbing interval "										
1340	Begin swabbing interval 182'-187'										
1405	End swabbing interval 182'-187'										
1405	Begin swabbing interval 177'-182', end at 1450										
1450	Begin swabbing interval 172'-177', end at 1515										
1515	Tag		166.83	274.42	(soft bottom)						
1522	Begin bailing										
~~1528~~	~~collect sample from bailer~~ JA 8/21/22										

TCS-1 - Well Development Record

8/3/22 - 8/29/22

ARCADIS
Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy **PG** 11 **of** 14

Date(s) [illegible] JM [illegible] **Project #** 30126255 **Arcadis Oversight:** J. Alexander **Well ID** TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1528	Collect water sample from 1st bailer & Imhoff cone.										
—	Imhoff cone 95 Ml/L sand, 150 ml/L total solids										
1540	Collect water sample from 4th (last) bailer & Imhoff cone.										
—	Imhoff cone 50 ml/L sand, 80 ml/L total solids										
1541	Tag	–	~~[illegible]~~ 166.86	274.70 hard bottom							
	— Finished for the day (10 gallons bailed) —										
	— 08/22/22 —										
0800	Tag		166.88	274.70 (hard bottom).							
0810	Begin swabbing interval 172'-177', end at 0835										upper screen
0835	Begin swabbing interval 177'-182', end at 0900										upper screen
0900	Begin swabbing interval 182'-187', end at 0925										upper screen
0925	Begin swabbing interval 187'-192', end at 0950										upper screen
~~[illegible]~~	~~Begin swabbing interval~~ JA 08/22/22										
0950	Tag		166.87'	270.60' (soft bottom)							
1010	Begin swabbing interval 215'-220', end at 1035										lower screen
1035	Begin swabbing interval 220'-225', end at 1100										lower screen
1100	Begin swabbing interval 225'-230', end at 1125										lower screen
1125	Begin swabbing interval 230-235, end at 1150										lower screen
1150	Tag	–	166.88	270.64' (soft bottom)							lower screen
1315	Begin swabbing interval 235'-240', end at 1340										lower screen
1340	Begin swabbing interval 240'-245', end at 1405										lower screen
1405	Begin swabbing interval 245'-250', end at 1430										lower screen
1430	Begin swabbing interval 250'-255', end at 1455										lower screen
1455	Begin swabbing interval 255'-260', end at 1520										lower screen
1520	Begin swabbing interval 260'-265', end at 1545										lower screen
1545	Begin swabbing interval 265'-270', end at 1610										lower screen
1610	Tag	–	166.77'	274.56' (soft bottom)							
	— Finished for the day (0 gallons removed) —										
(08/23/22) 0815	Tag	–	166.89'	274.55' (soft bottom).							
0836	1st bail										
0840	Collect water sample from 1st bail & Imhoff cone										
—	Imhoff cone 150 Ml/L sand, 400 ml/L total solids										

TCS-1 - Well Development Record

ARCADIS

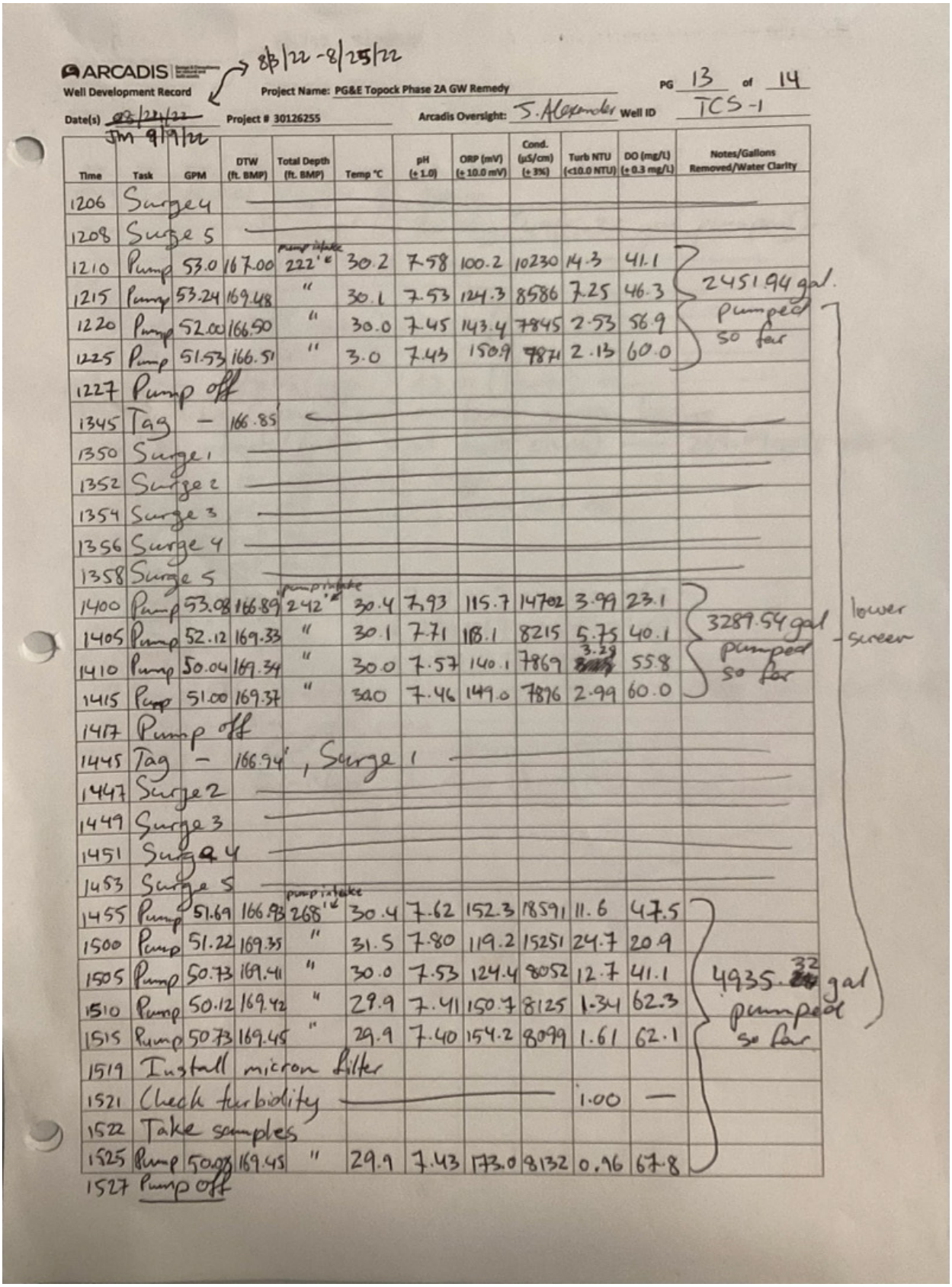
Well Development Record → 8/3/22 – 8/25/22

Project Name: PG&E Topock Phase 2A GW Remedy PG 12 of 14

Date(s) ~~08/23/22–08/24/22~~ JM 9/9/22 Project # 30126255 Arcadis Oversight: J. Alexander Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0915	last (8th) bail, Tag 166.90', 274.70 (hard bot)										20 gal bailed
0917	Collect water sample from last bail & Imhoff cone										
—	Imhoff cone 1 ml/L sand, 45 ml/L total solids										
1445	Packer tested										
—	Finished for the day (20 gallons bailed)										
—	08/24/22										
0825	Tag	—	166.94	pump intake at 182'							
0922	Surge 1										
0924	Surge 2										
0926	Surge 3										
0928	Surge 4										
0930	Surge 5										
0935	pump	56.00	[illegible]	pump intake 182'	29.8	7.44	289.7	5420	17.7	78.8	915.85 gal. pumped so far
0940	pump	55.00	166.96 169.58	"	29.9	7.56	268.7	7662	11.8	66.2	
0945	Pump	54.06	169.61	"	29.9	7.50	249.7	8205	5.21	54.3	
0950	Pump	53.00	169.64	"	29.9	7.44	238.7	7947	2.74	55.3	
~~0950~~ JA 08/24/22	~~Pump off~~										
0950	Tag	—	169.64'								
0951	Pump off										
1025	Surge 1 pump intake at 189'										upper screen
1027	Surge 2										
1029	Surge 3										
1031	Surge 4										
1033	Surge 5										
1035	Pump	54.08	167.08	(pump intake) 189'	30.0	7.48	188.0	7671	6.07	53.9	1554.2 gal pumped so far
1040	Pump	53.24	169.58	"	29.9	7.48	187.8	7631	3.21	56.05	
1045	Pump	53.59	169.64	"	29.9	7.46	183.6	7823	2.23	58.0	
1046	Pump off										
1157	Tag	—	166.96	pump intake 222'							
1200	Surge 1										
1202	Surge 2										
1204	Surge 3										

TCS-1 - Well Development Record



ARCADIS Well Development Record

8/8/22 - 8/25/22

Project Name: PG&E Topock Phase 2A GW Remedy

PG 13 of 14

Date(s) ~~8/24/22~~ JM 9/9/22

Project # 30126255

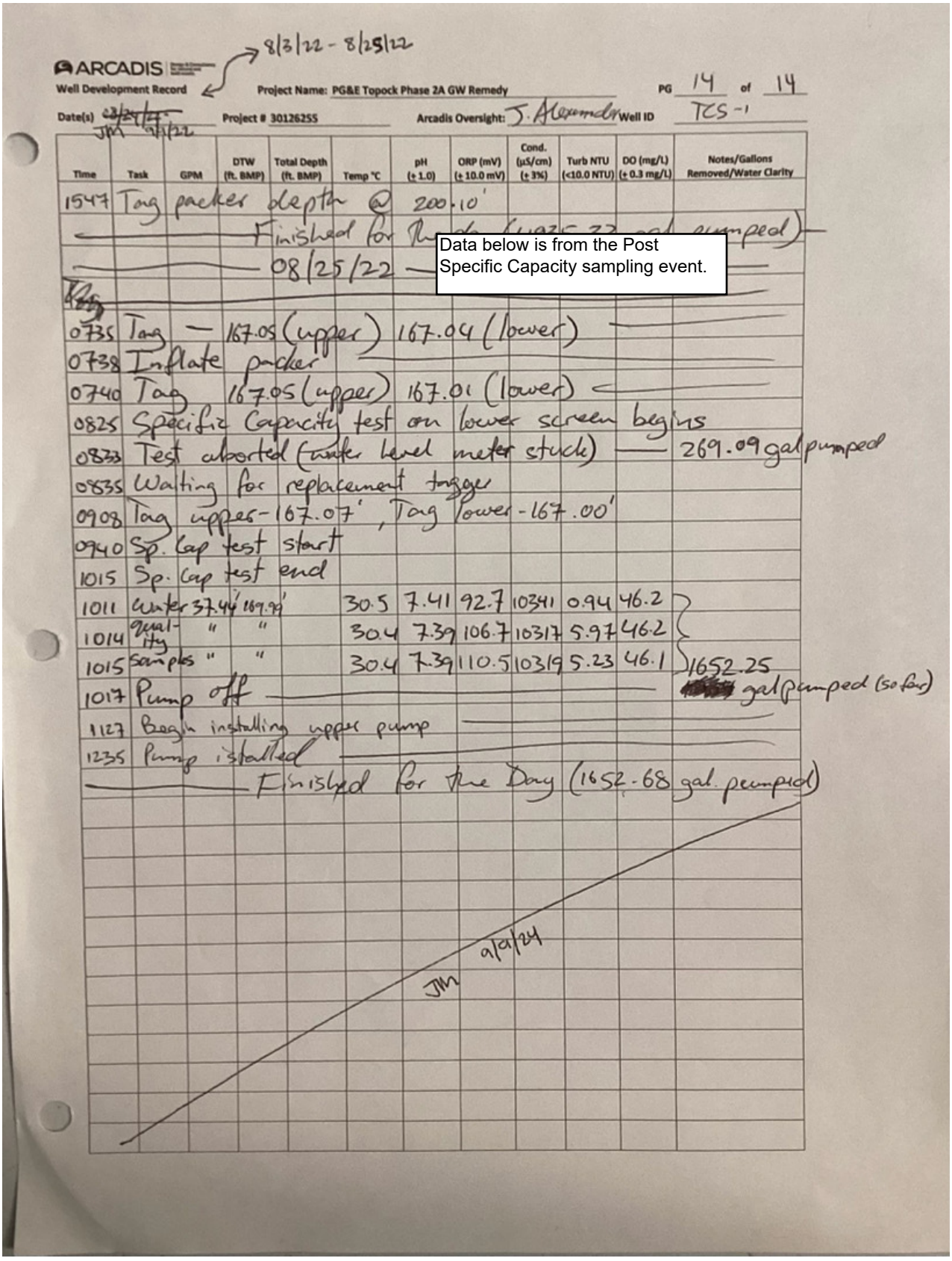
Arcadis Oversight: S. Alexander

Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1206	Surge 4										
1208	Surge 5										
1210	Pump	53.0	167.00	pump intake 222' "	30.2	7.58	100.2	10230	14.3	41.1	
1215	Pump	53.24	169.48	"	30.1	7.53	124.3	8586	7.25	46.3	2451.94 gal. pumped so far
1220	Pump	52.00	166.90	"	30.0	7.45	143.4	7845	2.53	56.9	
1225	Pump	51.53	166.51	"	3.0	7.43	150.9	7871	2.13	60.0	
1227	Pump off										
1345	Tag	—	166.85'								
1350	Surge 1										
1352	Surge 2										
1354	Surge 3										
1356	Surge 4										
1358	Surge 5										
1400	Pump	53.08	166.89	pump intake 242' "	30.4	7.93	115.7	14702	3.99	23.1	
1405	Pump	52.12	169.33	"	30.1	7.71	118.1	8215	5.75	40.1	3289.54 gal pumped so far
1410	Pump	50.04	169.34	"	30.0	7.57	140.1	7869	~~3.29~~	55.8	
1415	Pump	51.00	169.37	"	30.0	7.46	149.0	7876	2.99	60.0	
1417	Pump off										
1445	Tag	—	166.94'	, Surge 1							
1447	Surge 2										
1449	Surge 3										
1451	Surge 4										
1453	Surge 5										
1455	Pump	51.69	166.93	pump intake 268' "	30.4	7.62	152.3	18591	11.6	47.5	
1500	Pump	51.22	169.35	"	31.5	7.80	119.2	15251	24.7	20.9	
1505	Pump	50.73	169.41	"	30.0	7.53	124.4	8052	12.7	41.1	4935.~~24~~ 32 gal pumped so far
1510	Pump	50.12	169.42	"	29.9	7.41	150.7	8125	1.34	62.3	
1515	Pump	50.73	169.45	"	29.9	7.40	154.2	8099	1.61	62.1	
1519	Install micron filter										
1521	Check turbidity								1.00	—	
1522	Take samples										
1525	Pump	50.03	169.45	"	29.9	7.43	173.0	8132	0.96	67.8	
1527	Pump off										

lower screen

TCS-1 - Well Development Record



ARCADIS

Well Development Record

8/3/22 - 8/25/22

Project Name: PG&E Topock Phase 2A GW Remedy

PG 14 of 14

Date(s) ~~8/25/22~~ JM 9/1/22

Project # 30126255

Arcadis Oversight: J. Alexander

Well ID TCS-1

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1547	Tag packer depth @					200.10'					
	Finished for the day (1652.68 gal pumped)										
	08/25/22										
	Data below is from the Post Specific Capacity sampling event.										
0735	Tag — 167.05 (upper) 167.04 (lower)										
0738	Inflate packer										
0740	Tag 167.05 (upper) 167.01 (lower)										
0825	Specific Capacity test on lower screen begins										
0833	Test aborted (water level meter stuck)										269.09 gal pumped
0835	Waiting for replacement trigger										
0908	Tag upper-167.07', Tag lower-167.00'										
0940	Sp. Cap test start										
1015	Sp. Cap test end										
1011	water 37.44' 169.99'				30.5	7.41	92.7	10341	0.94	46.2	
1014	qual- " "				30.4	7.39	106.7	10317	5.97	46.2	
1015	samples " "				30.4	7.39	110.5	10319	5.23	46.1	1652.25
1017	Pump off										[redacted] gal pumped (so far)
1127	Begin installing upper pump										
1235	Pump installed										
	Finished for the Day (1652.68 gal. pumped)										

JM 9/9/24

TCS-1 - Well Development Record

Attachment 7

Specific Capacity Testing Log

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**TCS-01 (Lower Screen)**
Date	**9/1/2022-9/2/2022**
Screened Interval Tested	**214 - 268 ft bgs**
Packer Set Depth	**200.1**
Packer Seal Test	**Pass**
Tests Conducted	four-step specific capacity test (13.5, 27, 40.5, and 54 gpm)
Purpose	Lower Screen Specific Capacity test
Summary	Specific capacity results: 13.5 gpm = 13.02 gpm/ft, 27 gpm = 13.70 gpm/ft, 40.5 gpm = 13.63 gpm/ft, and 54 gpm = 12.47 gpm/ft.
Notes	During the 13.50 gpm test the generator stopped and the first step was complete and under the guidance of the QC manager the SC test would move onto the second step at 27 gpm. The Specific Capacity for the last step at 54 gpm was 414 gpm/ft based off the manual data so use the transducer data that shows a average pumping rate of 53.88 gpm and a drawdown of 4.36 ft. The specific capacity based off the transducer data for the last step is 12.36 gpm/ft. Step 4 was conducted independend from the other 3 steps after the team ran out of time on September 1. There is a time limit for how long the teams can work at the station. Step 4 was conducted approximately 15.5 hours after the end of Step 3. There was no transducer data recorded for MW-67-185 observation well during the Specific Capacity Test that was conducted at TCS-01.
Oversight Signature	
Date	11/7/2022

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/1/2022-9/2/2022
Screened Interval	214 - 268 ft. bgs
Pump Depth (ft btoc)	268 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	166.98
Initial Totalizer Reading (gal)	123771.00
Final Totalizer Reading (gal)	139177
Approx Pumped Volume (gal)	14823.06
Calculated Volume Purged (gal)	15406.00
Difference in Volume Pumped vs. Calculated	-582.94
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gp

Step 1 (13.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
9:50:00	0.00	0.00	13.77	0.00	167.36	0.38
9:50:15	0.25	0.25	13.77	3.44	167.43	0.45
9:50:30	0.25	0.50	13.77	6.88	167.45	0.47
9:50:45	0.25	0.75	13.77	10.33	167.47	0.49
9:51:00	0.25	1.00	13.77	13.77	167.50	0.52
9:52:00	1.00	2.00	13.44	27.21	167.52	0.54
9:53:00	1.00	3.00	13.44	40.65	167.99	1.01
9:54:00	1.00	4.00	13.44	54.09	167.99	1.01
9:55:00	1.00	5.00	13.44	67.53	168.00	1.02
9:56:00	1.00	6.00	13.77	81.30	168.02	1.04
9:57:00	1.00	7.00	13.89	95.19	168.04	1.06
9:58:00	1.00	8.00	14.00	109.19	168.04	1.06
9:59:00	1.00	9.00	14.26	123.45	168.04	1.06
10:00:00	1.00	10.00	13.94	137.39	168.04	1.06
10:02:00	2.00	12.00	13.94	165.27	168.04	1.06
10:04:00	2.00	14.00	13.94	193.15	168.04	1.06
10:06:00	2.00	16.00	13.94	221.03	168.04	1.06
10:08:00	2.00	18.00	13.94	248.91	168.04	1.06
10:10:00	2.00	20.00	13.94	276.79	168.04	1.06
Total Volume Pumped for Step 1 (gal)			**276.79**			
Average Pumping Rate (gpm)			**13.80**			
Specific Capacity (gpm/ft)			**13.02**			

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/1/2022-9/2/2022
Screened Interval	214 - 268 ft. bgs
Pump Depth (ft btoc)	268 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	166.98
Initial Totalizer Reading (gal)	123771.00
Final Totalizer Reading (gal)	139177
Approx Pumped Volume (gal)	14823.06
Calculated Volume Purged (gal)	15406.00
Difference in Volume Pumped vs. Calculated	-582.94
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gp

Step 2 (27 GPM) Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
12:25:00	0.00	20.00	27.00	276.79	168.91	1.93	20.00
12:26:00	1.00	21.00	27.88	304.67	168.84	1.86	21.00
12:27:00	1.00	22.00	28.04	332.71	168.93	1.95	22.00
12:28:00	1.00	23.00	27.88	360.59	168.93	1.95	23.00
12:29:00	1.00	24.00	27.88	388.47	168.93	1.95	24.00
12:30:00	1.00	25.00	27.54	416.01	168.93	1.95	25.00
12:31:00	1.00	26.00	27.88	443.89	168.93	1.95	26.00
12:32:00	1.00	27.00	27.38	471.27	168.93	1.95	27.00
12:33:00	1.00	28.00	27.21	498.48	168.93	1.95	28.00
12:34:00	1.00	29.00	27.04	525.52	168.93	1.95	29.00
12:35:00	1.00	30.00	27.04	552.56	168.93	1.95	30.00
12:37:00	2.00	32.00	26.88	606.32	168.94	1.96	32.00
12:39:00	2.00	34.00	26.71	659.74	168.95	1.97	34.00
12:41:00	2.00	36.00	26.88	713.50	168.95	1.97	36.00
12:43:00	2.00	38.00	26.71	766.92	168.95	1.97	38.00
12:45:00	2.00	40.00	26.71	820.34	168.95	1.97	40.00
12:47:00	2.00	42.00	26.88	874.10	168.96	1.98	42.00
12:49:00	2.00	44.00	26.88	927.86	168.96	1.98	44.00
12:51:00	2.00	46.00	27.04	981.94	168.96	1.98	46.00
12:53:00	2.00	48.00	26.71	1035.36	168.96	1.98	48.00
12:55:00	2.00	50.00	26.88	1089.12	168.96	1.98	50.00
13:00:00	5.00	55.00	26.71	1222.67	168.96	1.98	55.00
13:05:00	5.00	60.00	27.04	1357.87	168.96	1.98	60.00
13:10:00	5.00	65.00	26.71	1491.42	168.96	1.98	65.00
13:15:00	5.00	70.00	26.88	1625.82	168.96	1.98	70.00
13:20:00	5.00	75.00	26.88	1760.22	168.96	1.98	75.00
13:25:00	5.00	80.00	26.88	1894.62	168.96	1.98	80.00
13:35:00	10.00	90.00	27.04	2165.02	168.96	1.98	90.00
13:45:00	10.00	100.00	27.04	2435.42	168.96	1.98	100.00
13:55:00	10.00	110.00	27.04	2705.82	168.96	1.98	110.00
14:05:00	10.00	120.00	27.21	2977.92	168.96	1.98	120.00
14:15:00	10.00	130.00	27.39	3251.82	168.96	1.98	130.00
14:25:00	10.00	140.00	27.04	3522.22	168.96	1.98	140.00
Total Volume Pumped for Step 2 (gal)			**3245.43**				
Average Pumping Rate (gpm)			**27.12**				
Specific Capacity (gpm/ft)			**13.70**				

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/1/2022-9/2/2022
Screened Interval	214 - 268 ft. bgs
Pump Depth (ft btoc)	268 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	166.98
Initial Totalizer Reading (gal)	123771.00
Final Totalizer Reading (gal)	139177
Approx Pumped Volume (gal)	14823.06
Calculated Volume Purged (gal)	15406.00
Difference in Volume Pumped vs. Calculated	-582.94
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gp

Step 3 (40.5 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
14:40:00	0.00	155.00	0.00	3522.22	169.93	2.95	2.00
14:41:00	1.00	156.00	40.56	3562.78	169.93	2.95	3.00
14:42:00	1.00	157.00	40.66	3603.44	169.93	2.95	4.00
14:43:00	1.00	158.00	40.82	3644.26	169.94	2.96	5.00
14:44:00	1.00	159.00	40.82	3685.08	169.94	2.96	6.00
14:45:00	1.00	160.00	40.88	3725.96	169.95	2.97	7.00
14:46:00	1.00	161.00	40.82	3766.78	169.96	2.98	8.00
14:47:00	1.00	162.00	40.99	3807.77	169.98	3.00	9.00
14:48:00	1.00	163.00	40.99	3848.76	169.97	2.99	10.00
14:49:00	1.00	164.00	40.50	3889.26	169.97	2.99	11.00
14:50:00	1.00	165.00	40.99	3930.25	169.97	2.99	12.00
14:52:00	2.00	167.00	40.82	4011.89	169.97	2.99	14.00
14:54:00	2.00	169.00	40.82	4093.53	169.97	2.99	16.00
14:56:00	2.00	171.00	40.82	4175.17	169.97	2.99	18.00
14:58:00	2.00	173.00	40.66	4256.49	169.97	2.99	20.00
15:00:00	2.00	175.00	40.66	4337.81	169.97	2.99	22.00
15:02:00	2.00	177.00	40.82	4419.45	169.97	2.99	24.00
15:04:00	2.00	179.00	40.66	4500.77	169.97	2.99	26.00
15:06:00	2.00	181.00	40.66	4582.09	169.97	2.99	28.00
15:08:00	2.00	183.00	40.66	4663.41	169.97	2.99	30.00
15:10:00	2.00	185.00	40.82	4745.05	169.97	2.99	32.00
15:15:00	5.00	190.00	40.50	4947.55	169.97	2.99	37.00
15:20:00	5.00	195.00	40.82	5151.65	169.97	2.99	42.00
15:25:00	5.00	200.00	40.99	5356.60	169.97	2.99	47.00
15:30:00	5.00	205.00	40.66	5559.90	169.97	2.99	52.00
15:35:00	5.00	210.00	40.66	5763.20	169.97	2.99	57.00
15:40:00	5.00	215.00	40.82	5967.30	169.97	2.99	62.00
15:50:00	10.00	225.00	40.66	6373.90	169.97	2.99	72.00
16:00:00	10.00	235.00	40.50	6778.90	169.97	2.99	82.00
16:10:00	10.00	245.00	40.82	7187.10	169.97	2.99	92.00
16:20:00	10.00	255.00	40.82	7595.30	169.97	2.99	102.00
16:30:00	10.00	265.00	40.90	8004.30	169.97	2.99	112.00
16:40:00	10.00	275.00	40.82	8412.50	169.97	2.99	122.00
Total Volume Pumped for Step 3 (gal)			**4890.28**				
Average Pumping Rate (gpm)			**40.76**				
Specific Capacity (gpm/ft)			**13.63**				

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/1/2022-9/2/2022
Screened Interval	214 - 268 ft. bgs
Pump Depth (ft btoc)	268 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	166.98
Initial Totalizer Reading (gal)	123771.00
Final Totalizer Reading (gal)	139177
Approx Pumped Volume (gal)	14823.06
Calculated Volume Purged (gal)	15406.00
Difference in Volume Pumped vs. Calculated	-582.94
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gp

Step 4 (54 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
8:26:00	0.00	275.00	54.55	8412.50	168.30		0.00
8:27:00	1.00	276.00	54.55	8467.05	168.91		1.00
8:28:00	1.00	277.00	54.55	8521.60	168.90		2.00
8:29:00	1.00	278.00	54.06	8575.66	168.91		3.00
8:30:00	1.00	279.00	54.06	8629.72	168.91		4.00
8:31:00	1.00	280.00	50.80	8680.52	168.91		5.00
8:32:00	1.00	281.00	54.06	8734.58	168.91		6.00
8:33:00	1.00	282.00	54.06	8788.64	168.91		7.00
8:34:00	1.00	283.00	54.22	8842.86	168.91		8.00
8:35:00	1.00	284.00	53.90	8896.76	168.91		9.00
8:37:00	2.00	286.00	53.90	9004.56	171.15	4.17	11.00
8:39:00	2.00	288.00	53.74	9112.04	171.21	4.23	13.00
8:41:00	2.00	290.00	53.74	9219.52	171.21	4.23	15.00
8:43:00	2.00	292.00	53.74	9327.00	171.21	4.23	17.00
8:45:00	2.00	294.00	53.57	9434.14	171.21	4.23	19.00
8:47:00	2.00	296.00	54.20	9542.54	171.21	4.23	21.00
8:49:00	2.00	298.00	53.74	9650.02	171.21	4.23	23.00
8:51:00	2.00	300.00	54.06	9758.14	171.21	4.23	25.00
8:53:00	2.00	302.00	53.24	9864.62	171.24	4.26	27.00
8:55:00	2.00	304.00	53.57	9971.76	171.24	4.26	29.00
9:00:00	5.00	309.00	53.90	10241.26	171.24	4.26	34.00
9:05:00	5.00	314.00	54.01	10511.31	171.26	4.28	39.00
9:10:00	5.00	319.00	53.57	10779.16	171.26	4.28	44.00
9:15:00	5.00	324.00	53.90	11048.66	171.27	4.29	49.00
9:20:00	5.00	329.00	54.06	11318.96	171.27	4.29	54.00
9:25:00	5.00	334.00	56.06	11599.26	171.27	4.29	59.00
9:35:00	10.00	344.00	53.90	12138.26	171.27	4.29	69.00
9:45:00	10.00	354.00	53.41	12672.36	171.30	4.32	79.00
9:55:00	10.00	364.00	53.37	13206.06	171.30	4.32	89.00
10:05:00	10.00	374.00	53.90	13745.06	171.24	4.26	99.00
10:15:00	10.00	384.00	53.90	14284.06	171.30	4.32	109.00
10:25:00	10.00	394.00	53.90	14823.06	171.30	4.32	119.00
Total Volume Pumped for Step 4 (gal)			**6410.56**				
Average Pumping Rate (gpm)			**53.88**				
Specific Capacity (gpm/ft)			**12.47**				

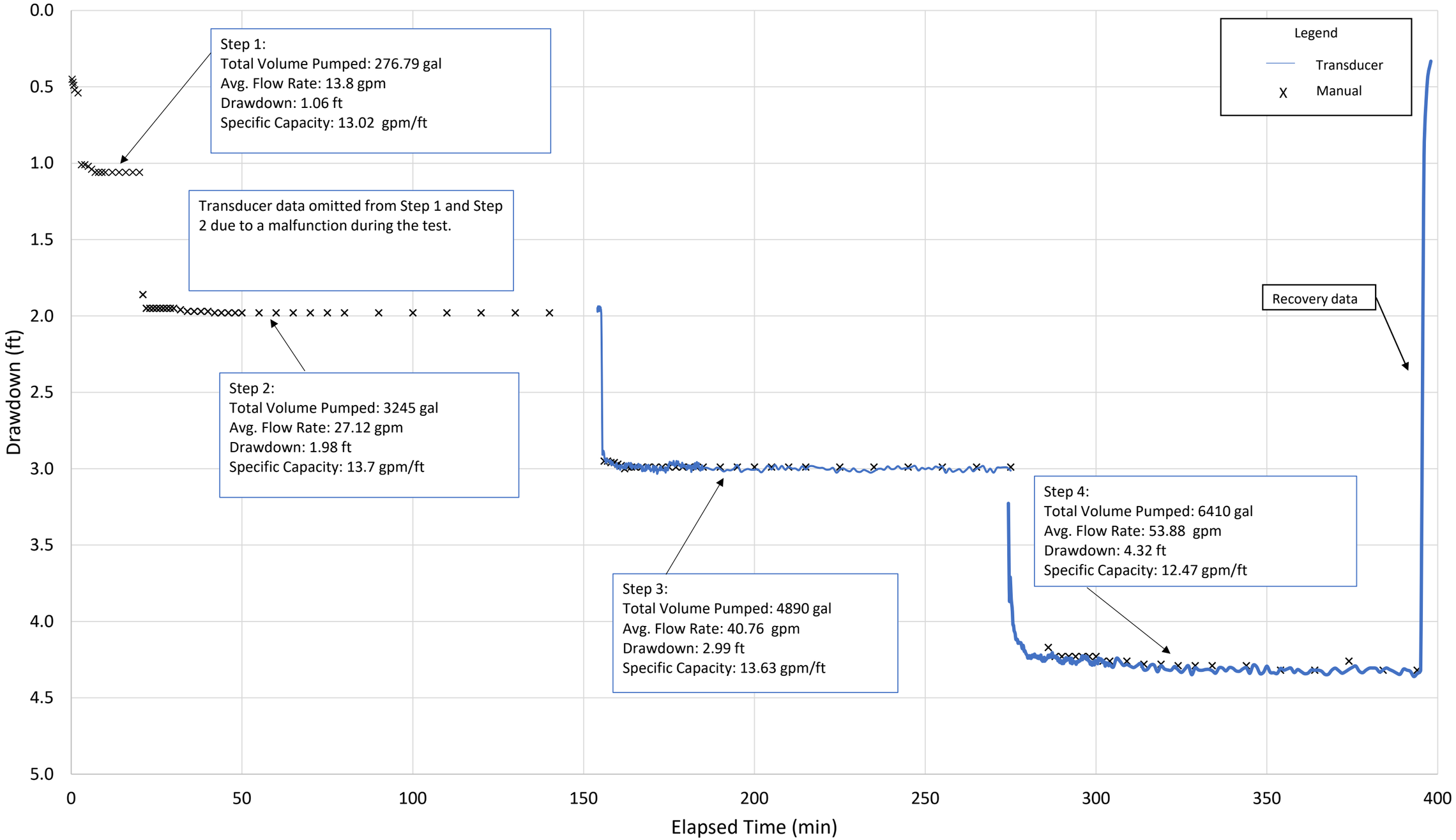
Specific Capacity Test

Location/Well ID	TCS-01
Date	9/1/2022-9/2/2022
Screened Interval	214 - 268 ft. bgs
Pump Depth (ft btoc)	268 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	166.98
Initial Totalizer Reading (gal)	123771.00
Final Totalizer Reading (gal)	139177
Approx Pumped Volume (gal)	14823.06
Calculated Volume Purged (gal)	15406.00
Difference in Volume Pumped vs. Calculated	-582.94
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gp

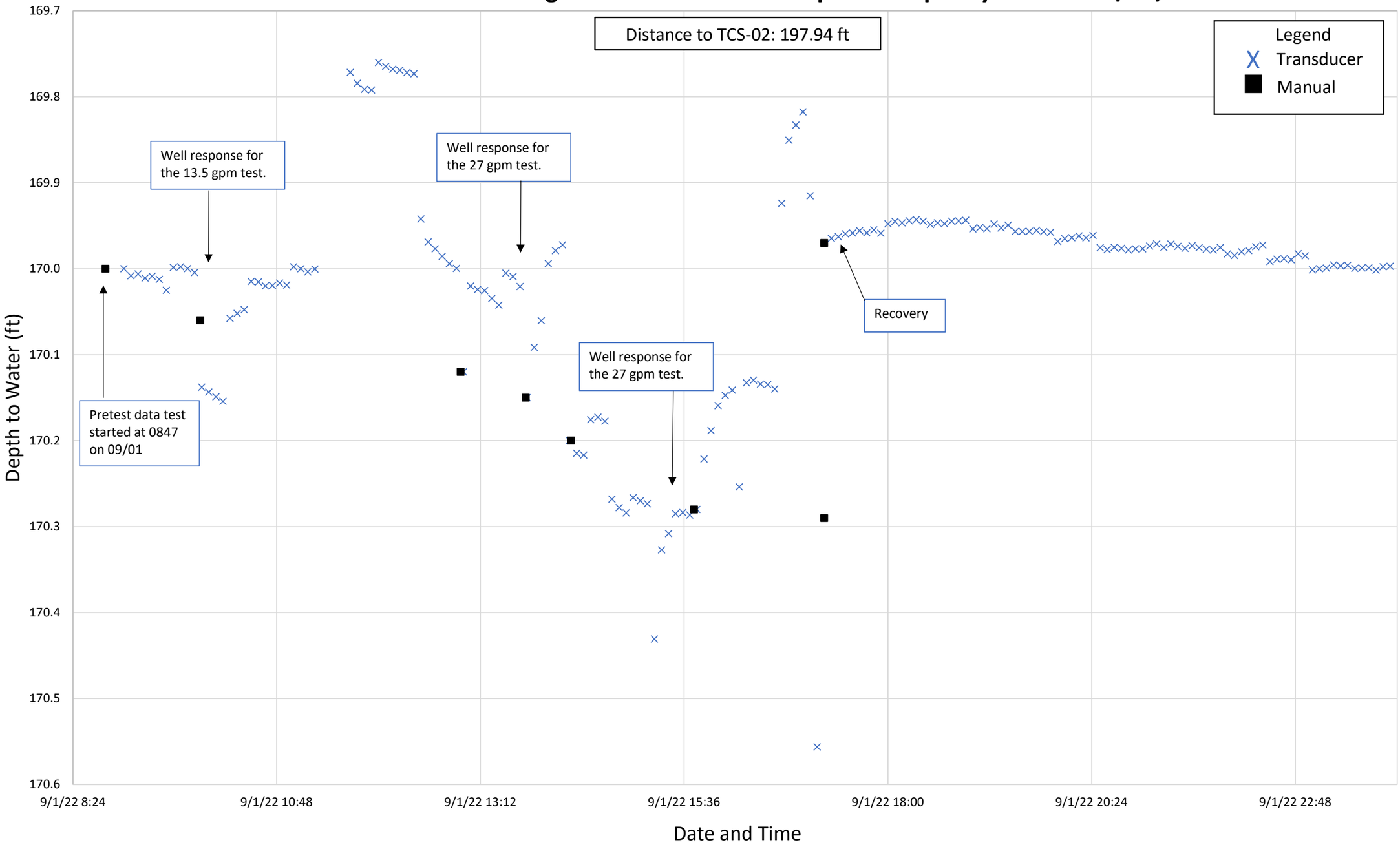
Acronyms & Abbreviations

bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

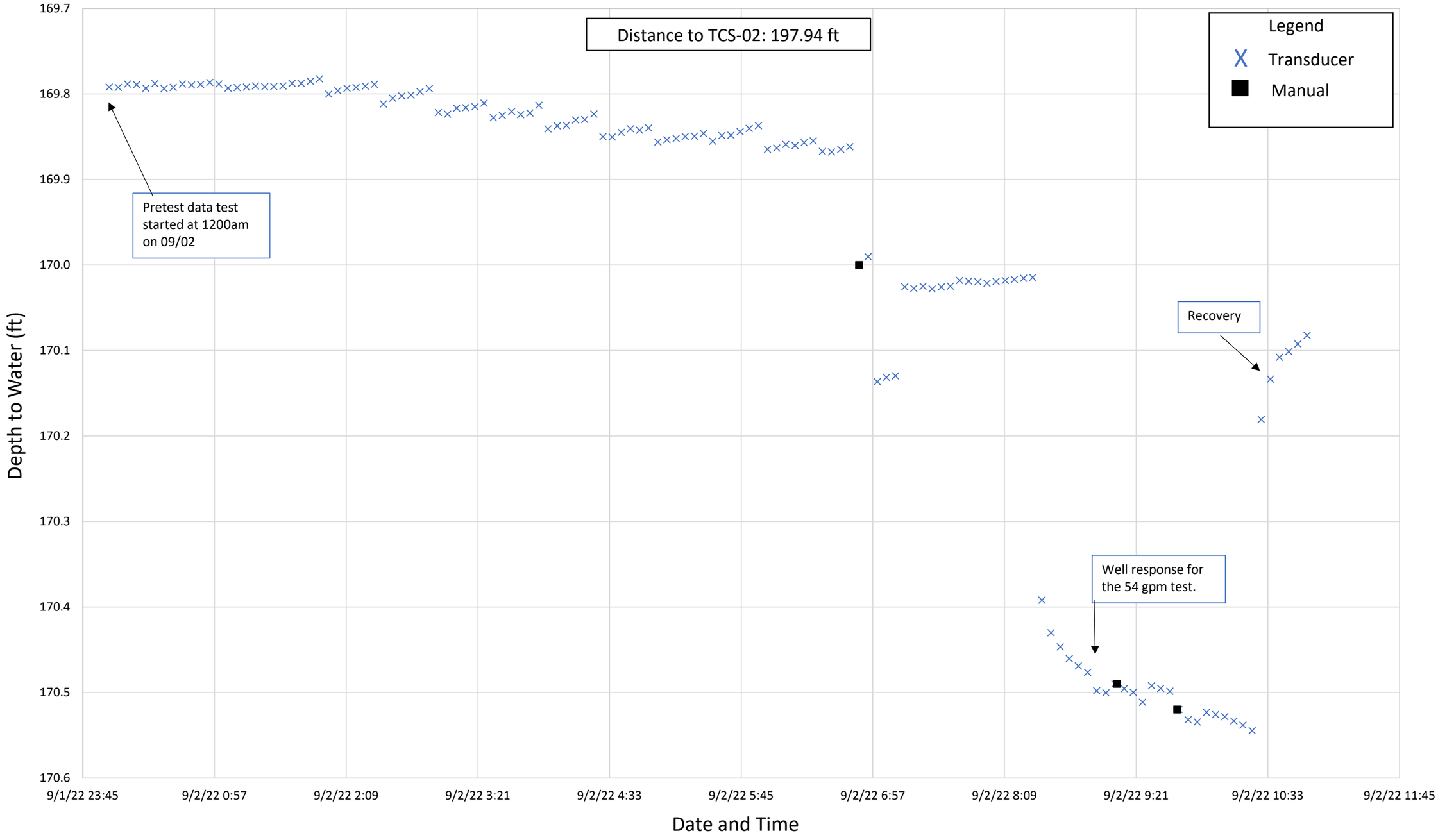
TCS-01 Lower Screen: Linear Drawdown Plot



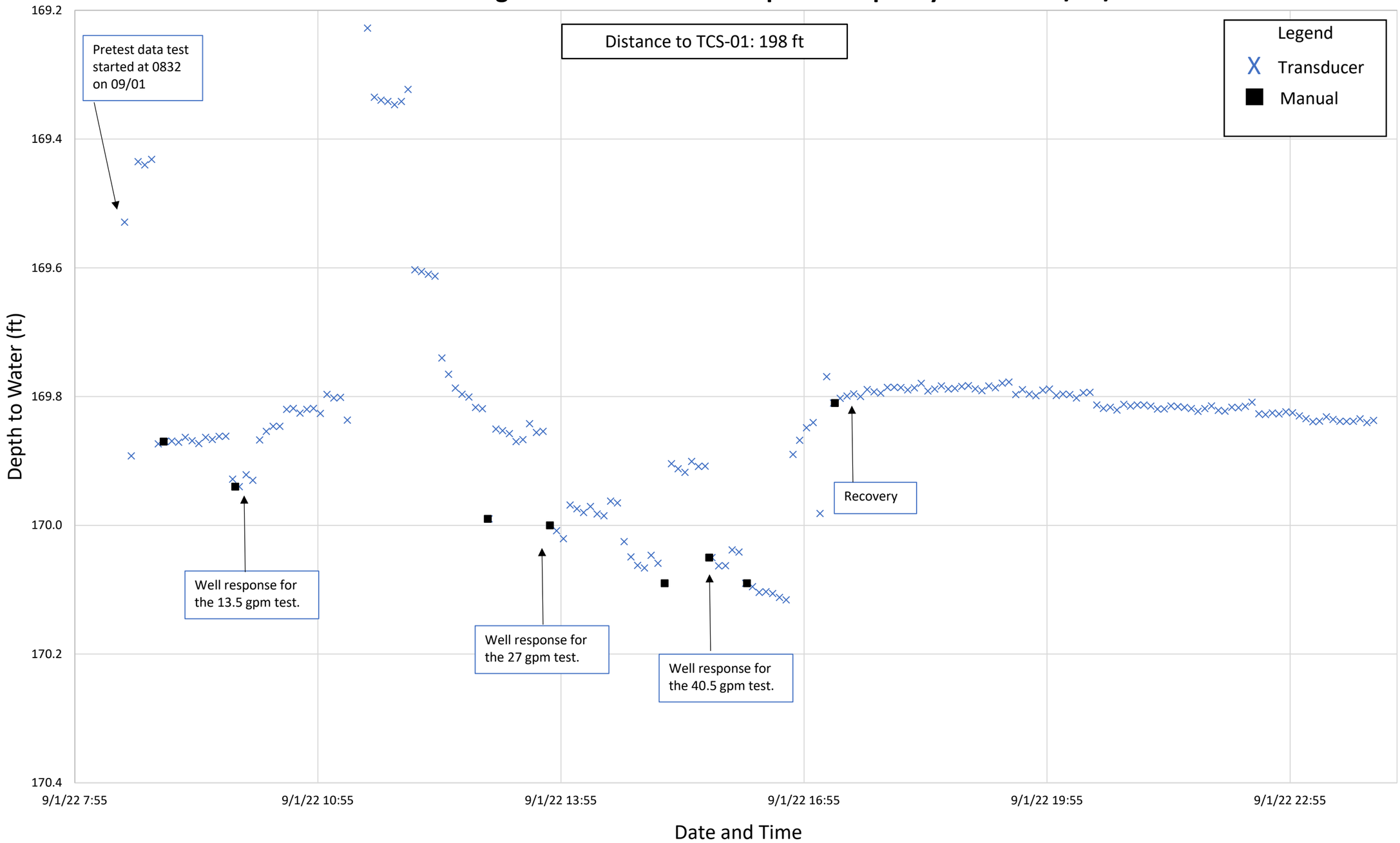
MW-67-260 During TCS-01 Lower Screen Specific Capacity Test On 09/01/22



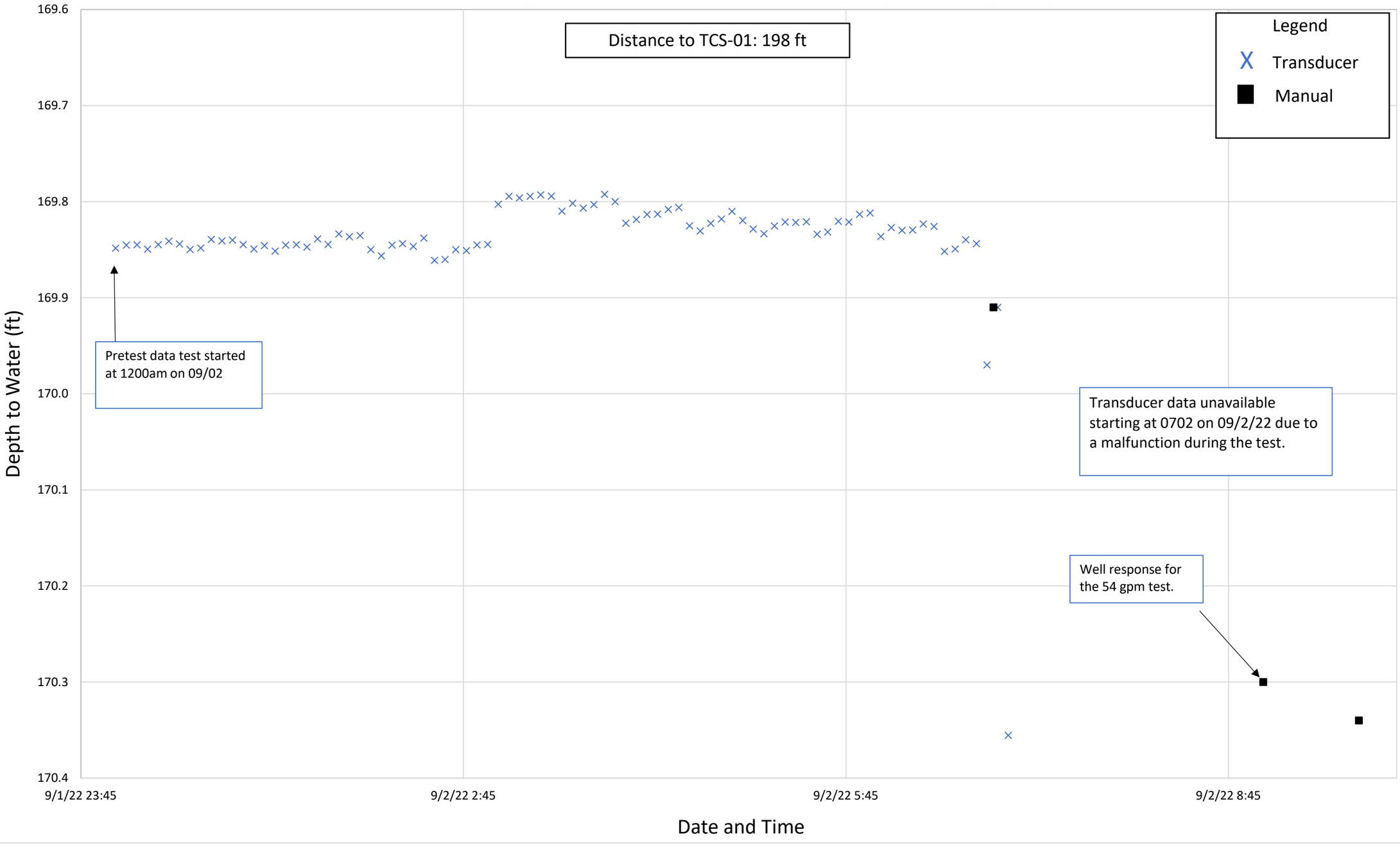
MW-67-260 During TCS-01 Lower Screen 54 GPM Specific Capacity Test On 09/02/22



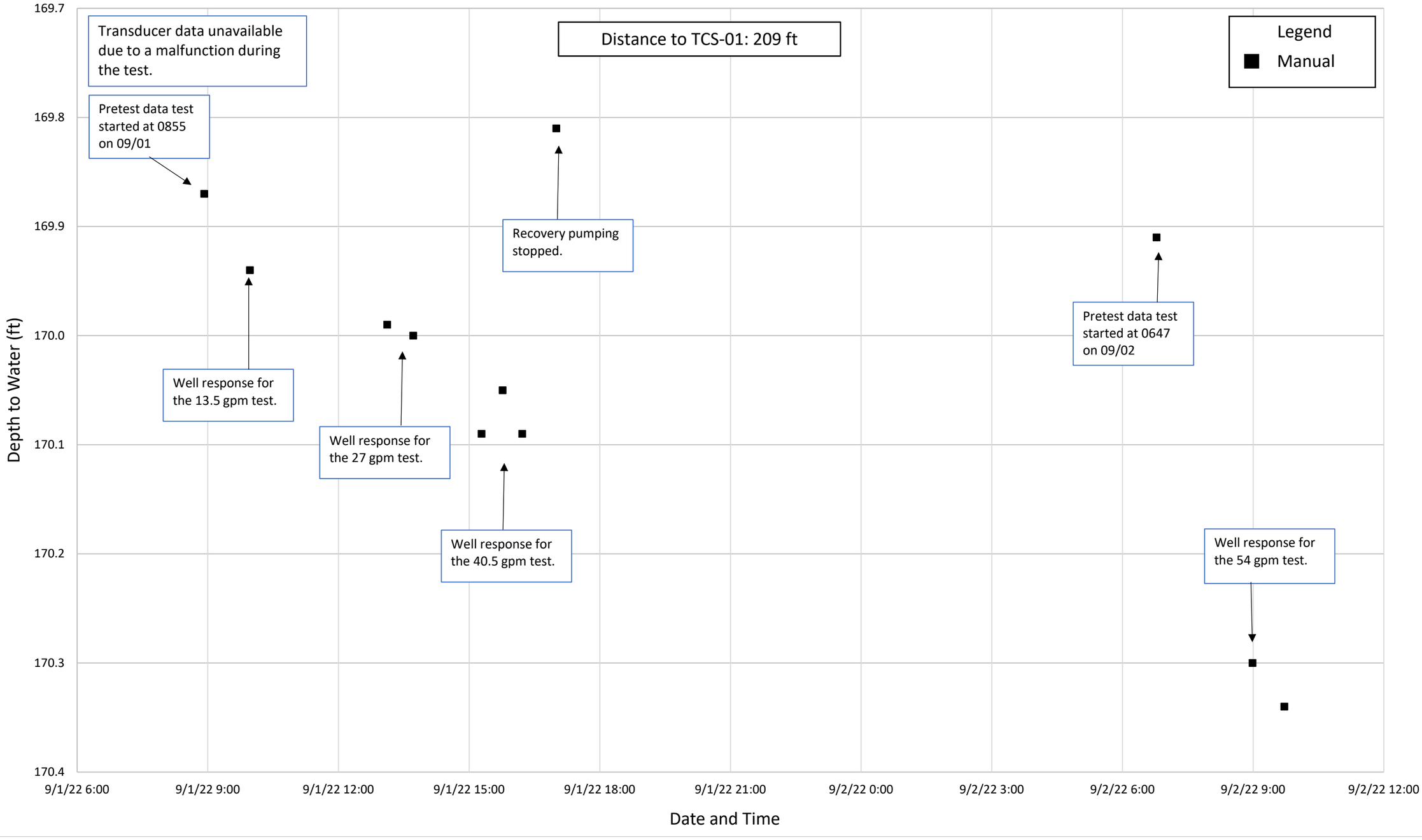
MW-67-225 During TCS-01 Lower Screen Specific Capacity Test On 09/01/22



MW-67-225 During TCS-01 Lower Screen 54 GPM Specific Capacity Test On 09/02/22



MW-67-185 During TCS-01 Lower Screen Specific Capacity Test



Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**TCS-01 (Upper Screen)**
Date	**9/7/2022**
Screened Interval Tested	**171 - 190 ft bgs**
Packer Set Depth	**200 ft bgs**
Packer Seal Test	**Pass**
Tests Conducted	three-step specific capacity test (13.5, 27, and 40.5 gpm)
Purpose	Well performance test
Summary	Specific capacity results: 13.5 gpm = 6.32 gpm/ft, 27 gpm = 5.94 gpm/ft, and 40.5 gpm= 4.92 gpm/ft.
Notes	Transducer was not set-up correctly. Test results are based on manual data.
Oversight Signature	
Date	10/3/2022

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/7/2022
Screened Interval	171 - 190 ft. bgs
Pump Depth (ft btoc)	189 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.07
Initial Totalizer Reading (gal)	140251.00
Final Totalizer Reading (gal)	151320
Approx Pumped Volume (gal)	10497.12
Calculated Volume Purged (gal)	11069.00
Difference in Volume Pumped vs. Calculated	-571.88
Number of Specific Capacity Steps	3
Pumping Rates (in order)	13.5, 27, and 40.5 gpm

Step 1 (13.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:24:00	0.00	0.00	0.00	0.00	167.07	0.00
9:30:00	0.00	0.00	13.50	0.00	168.40	1.33
9:30:20	0.33	0.33	13.50	4.50	168.57	1.50
9:30:40	0.33	0.67	13.50	9.00	168.57	1.50
9:31:00	0.33	1.00	13.60	13.53	168.55	1.48
9:32:00	1.00	2.00	13.60	27.13	168.63	1.56
9:33:00	1.00	3.00	13.60	40.73	168.87	1.80
9:34:00	1.00	4.00	13.60	54.33	168.96	1.89
9:35:00	1.00	5.00	13.60	67.93	169.00	1.93
9:36:00	1.00	6.00	13.60	81.53	169.03	1.96
9:37:00	1.00	7.00	13.50	95.03	169.04	1.97
9:38:00	1.00	8.00	13.50	108.53	169.06	1.99
9:39:00	1.00	9.00	13.60	122.13	169.07	2.00
9:40:00	1.00	10.00	13.60	135.73	169.08	2.01
9:42:00	2.00	12.00	13.60	162.93	169.10	2.03
9:44:00	2.00	14.00	13.60	190.13	169.12	2.05
9:46:00	2.00	16.00	13.60	217.33	169.12	2.05
9:48:00	2.00	18.00	13.60	244.53	169.10	2.03
9:50:00	2.00	20.00	13.50	271.53	169.11	2.04
9:52:00	2.00	22.00	13.50	298.53	169.12	2.05
9:54:00	2.00	24.00	13.50	325.53	169.13	2.06
9:56:00	2.00	26.00	13.50	352.53	169.14	2.07
9:58:00	2.00	28.00	13.50	379.53	169.15	2.08
10:00:00	2.00	30.00	13.50	406.53	169.16	2.09
10:05:00	5.00	35.00	13.60	474.53	169.15	2.08
10:10:00	5.00	40.00	13.60	542.53	169.17	2.10
10:15:00	5.00	45.00	13.60	610.53	169.16	2.09
10:20:00	5.00	50.00	13.70	679.03	169.17	2.10
10:25:00	5.00	55.00	13.70	747.53	169.18	2.11
10:30:00	5.00	60.00	13.70	816.03	169.18	2.11
10:40:00	10.00	70.00	13.70	953.03	169.20	2.13
10:50:00	10.00	80.00	13.70	1090.03	169.20	2.13
11:00:00	10.00	90.00	13.60	1226.03	169.22	2.15
11:10:00	10.00	100.00	13.60	1362.03	169.22	2.15
11:20:00	10.00	110.00	13.60	1498.03	169.22	2.15
11:30:00	10.00	120.00	13.60	1634.03	169.22	2.15
Total Volume Pumped for Step 1 (gal)			**1634.03**			
Average Pumping Rate (gpm)			**13.58**			
Specific Capacity (gpm/ft)			**6.32**			

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/7/2022
Screened Interval	171 - 190 ft. bgs
Pump Depth (ft btoc)	189 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.07
Initial Totalizer Reading (gal)	140251.00
Final Totalizer Reading (gal)	151320
Approx Pumped Volume (gal)	10497.12
Calculated Volume Purged (gal)	11069.00
Difference in Volume Pumped vs. Calculated	-571.88
Number of Specific Capacity Steps	3
Pumping Rates (in order)	13.5, 27, and 40.5 gpm

Step 2 (27 GPM) Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
11:32:00	0.00	120.00	27.04	1634.03	170.33	3.26	120.00
11:32:12	0.20	120.20	27.04	1639.44	170.33	3.26	120.20
11:32:24	0.20	120.40	27.04	1644.85	170.33	3.26	120.40
11:32:36	0.20	120.60	27.04	1650.26	170.33	3.26	120.60
11:32:48	0.20	120.80	27.04	1655.67	170.33	3.26	120.80
11:33:00	0.20	121.00	27.04	1661.07	170.40	3.33	121.00
11:34:00	1.00	122.00	27.04	1688.11	170.67	3.60	122.00
11:35:00	1.00	123.00	27.04	1715.15	170.85	3.78	123.00
11:36:00	1.00	124.00	27.04	1742.19	170.93	3.86	124.00
11:37:00	1.00	125.00	27.04	1769.23	171.01	3.94	125.00
11:38:00	1.00	126.00	27.21	1796.44	171.04	3.97	126.00
11:39:00	1.00	127.00	27.21	1823.65	171.06	3.99	127.00
11:40:00	1.00	128.00	27.21	1850.86	171.09	4.02	128.00
11:41:00	1.00	129.00	27.21	1878.07	171.12	4.05	129.00
11:42:00	1.00	130.00	27.21	1905.28	171.15	4.08	130.00
11:44:00	2.00	132.00	27.21	1959.70	171.18	4.11	132.00
11:46:00	2.00	134.00	27.21	2014.12	171.20	4.13	134.00
11:48:00	2.00	136.00	27.21	2068.54	171.22	4.15	136.00
11:50:00	2.00	138.00	27.21	2122.96	171.23	4.16	138.00
11:52:00	2.00	140.00	27.21	2177.38	171.24	4.17	140.00
11:54:00	2.00	142.00	27.01	2231.40	171.26	4.19	142.00
11:56:00	2.00	144.00	27.04	2285.48	171.27	4.20	144.00
11:58:00	2.00	146.00	27.04	2339.56	171.28	4.21	146.00
12:00:00	2.00	148.00	27.04	2393.64	171.28	4.21	148.00
12:02:00	2.00	150.00	27.04	2447.72	171.29	4.22	150.00
12:04:00	2.00	152.00	27.04	2501.80	171.31	4.24	152.00
12:12:00	8.00	160.00	26.88	2716.84	171.32	4.25	160.00
12:17:00	5.00	165.00	26.88	2851.24	171.34	4.27	165.00
12:22:00	5.00	170.00	27.04	2986.44	171.36	4.29	170.00
12:27:00	5.00	175.00	26.40	3118.44	171.44	4.37	175.00
12:32:00	5.00	180.00	27.21	3254.49	171.47	4.40	180.00
12:42:00	10.00	190.00	27.21	3526.59	171.50	4.43	190.00
12:52:00	10.00	200.00	27.04	3796.99	171.54	4.47	200.00
13:02:00	10.00	210.00	27.04	4067.39	171.54	4.47	210.00
13:12:00	10.00	220.00	27.04	4337.79	171.54	4.47	220.00
13:22:00	10.00	230.00	27.04	4608.19	171.55	4.48	230.00
13:32:00	10.00	240.00	27.21	4880.29	171.63	4.56	240.00
Total Volume Pumped for Step 2 (gal)			**3246.26**				
Average Pumping Rate (gpm)			**27.07**				
Specific Capacity (gpm/ft)			**5.94**				

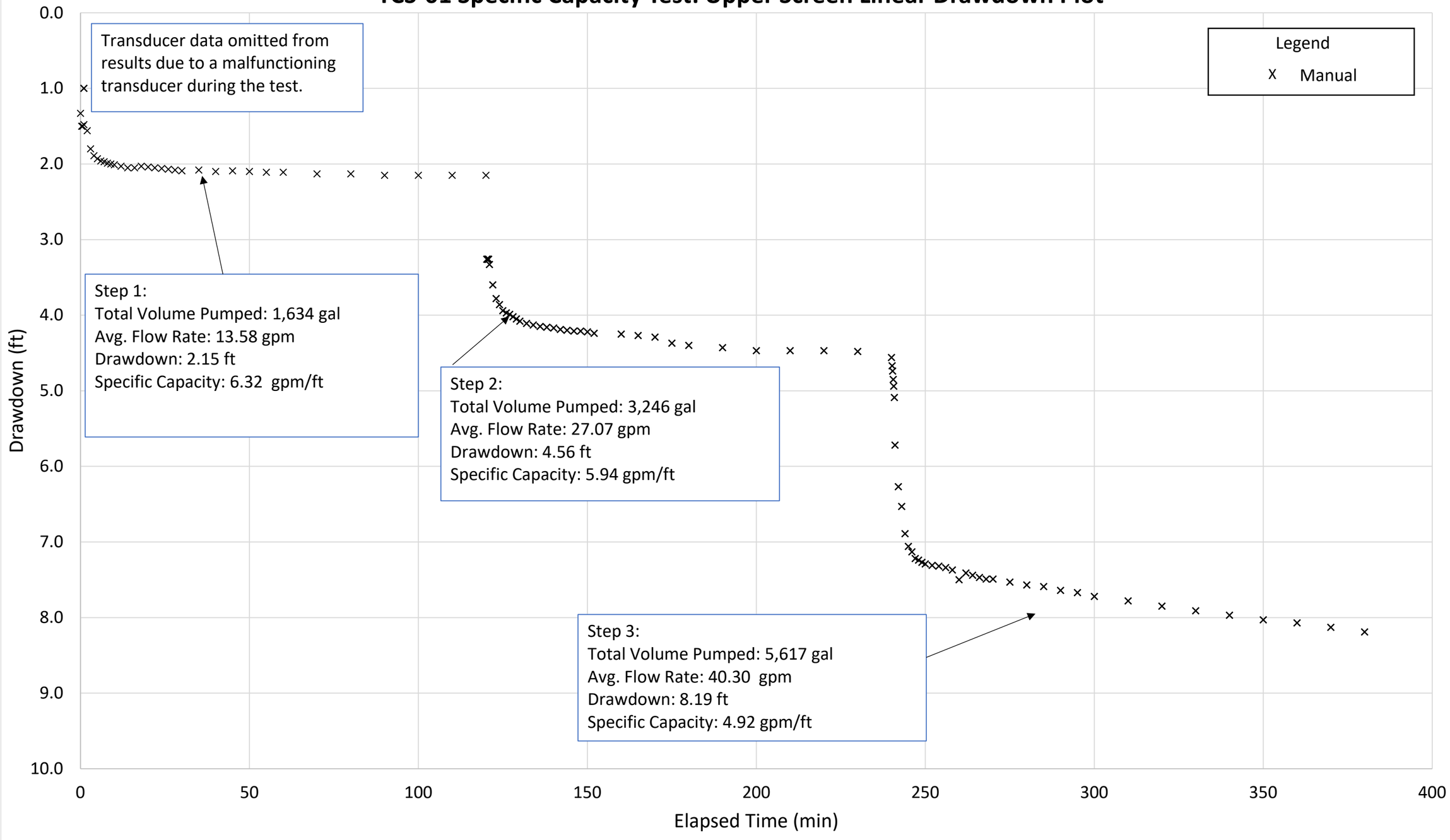
Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

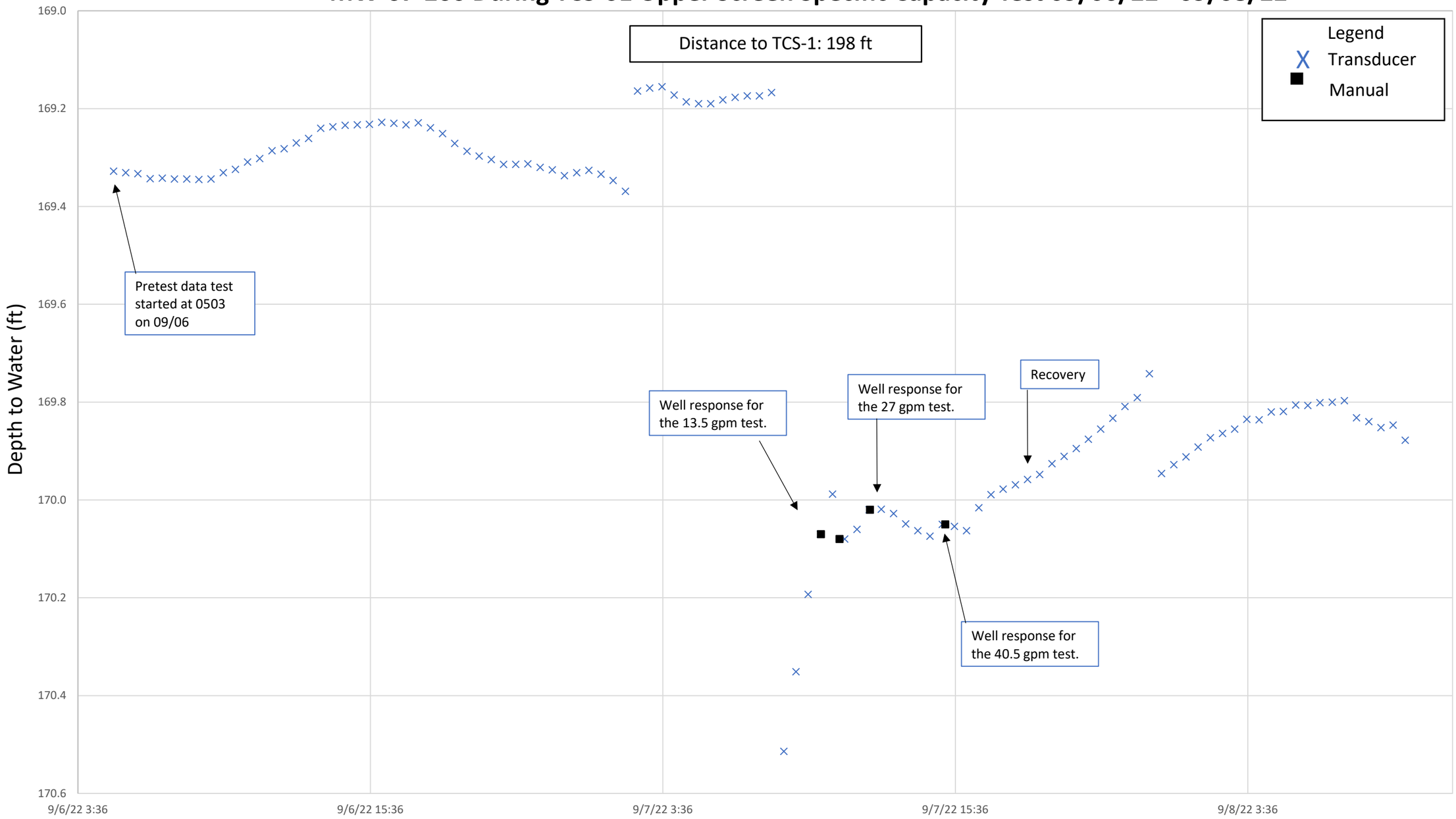
Location/Well ID	TCS-01
Date	9/7/2022
Screened Interval	171 - 190 ft. bgs
Pump Depth (ft btoc)	189 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.07
Initial Totalizer Reading (gal)	140251.00
Final Totalizer Reading (gal)	151320
Approx Pumped Volume (gal)	10497.12
Calculated Volume Purged (gal)	11069.00
Difference in Volume Pumped vs. Calculated	-571.88
Number of Specific Capacity Steps	3
Pumping Rates (in order)	13.5, 27, and 40.5 gpm

Step 3 (40.5 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
13:40:00	0.00	240.00	40.50	4880.29	171.65	4.58	2.00
13:40:10	0.17	240.17	40.50	4887.04	171.74	4.67	2.17
13:40:20	0.17	240.33	40.50	4893.79	171.81	4.74	2.33
13:40:30	0.17	240.50	40.50	4900.54	171.92	4.85	2.50
13:40:40	0.17	240.67	40.50	4907.29	172.01	4.94	2.67
13:40:50	0.17	240.83	40.50	4914.04	172.16	5.09	2.83
13:41:00	0.17	241.00	40.82	4920.85	172.79	5.72	3.00
13:42:00	1.00	242.00	40.50	4961.35	173.34	6.27	4.00
13:43:00	1.00	243.00	40.50	5001.85	173.60	6.53	5.00
13:44:00	1.00	244.00	40.66	5042.51	173.96	6.89	6.00
13:45:00	1.00	245.00	40.66	5083.17	174.13	7.06	7.00
13:46:00	1.00	246.00	40.50	5123.67	174.20	7.13	8.00
13:47:00	1.00	247.00	40.50	5164.17	174.29	7.22	9.00
13:48:00	1.00	248.00	40.50	5204.67	174.31	7.24	10.00
13:49:00	1.00	249.00	40.33	5245.00	174.34	7.27	11.00
13:50:00	1.00	250.00	40.33	5285.33	174.36	7.29	12.00
13:52:00	2.00	252.00	40.50	5366.33	174.38	7.31	14.00
13:54:00	2.00	254.00	40.33	5446.99	174.39	7.32	16.00
13:56:00	2.00	256.00	40.33	5527.65	174.41	7.34	18.00
13:58:00	2.00	258.00	40.16	5607.97	174.44	7.37	20.00
14:00:00	2.00	260.00	40.16	5688.29	174.57	7.50	22.00
14:02:00	2.00	262.00	40.33	5768.95	174.48	7.41	24.00
14:04:00	2.00	264.00	40.33	5849.61	174.51	7.44	26.00
14:06:00	2.00	266.00	40.16	5929.93	174.54	7.47	28.00
14:08:00	2.00	268.00	40.16	6010.25	174.56	7.49	30.00
14:10:00	2.00	270.00	40.16	6090.57	174.56	7.49	32.00
14:15:00	5.00	275.00	40.33	6292.22	174.60	7.53	37.00
14:20:00	5.00	280.00	40.16	6493.02	174.64	7.57	42.00
14:25:00	5.00	285.00	40.16	6693.82	174.66	7.59	47.00
14:30:00	5.00	290.00	40.00	6893.82	174.71	7.64	52.00
14:35:00	5.00	295.00	40.16	7094.62	174.74	7.67	57.00
14:40:00	5.00	300.00	40.00	7294.62	174.79	7.72	62.00
14:50:00	10.00	310.00	40.00	7694.62	174.85	7.78	72.00
15:00:00	10.00	320.00	40.00	8094.62	174.92	7.85	82.00
15:10:00	10.00	330.00	40.08	8495.42	174.98	7.91	92.00
15:20:00	10.00	340.00	40.16	8897.02	175.04	7.97	102.00
15:30:00	10.00	350.00	40.00	9297.02	175.10	8.03	112.00
15:40:00	10.00	360.00	40.16	9698.62	175.14	8.07	122.00
15:50:00	10.00	370.00	40.00	10098.62	175.20	8.13	132.00
16:00:00	10.00	380.00	39.85	10497.12	175.26	8.19	142.00
Total Volume Pumped for Step 3 (gal)			**5616.82**				
Average Pumping Rate (gpm)			**40.30**				
Specific Capacity (gpm/ft)			**4.92**				

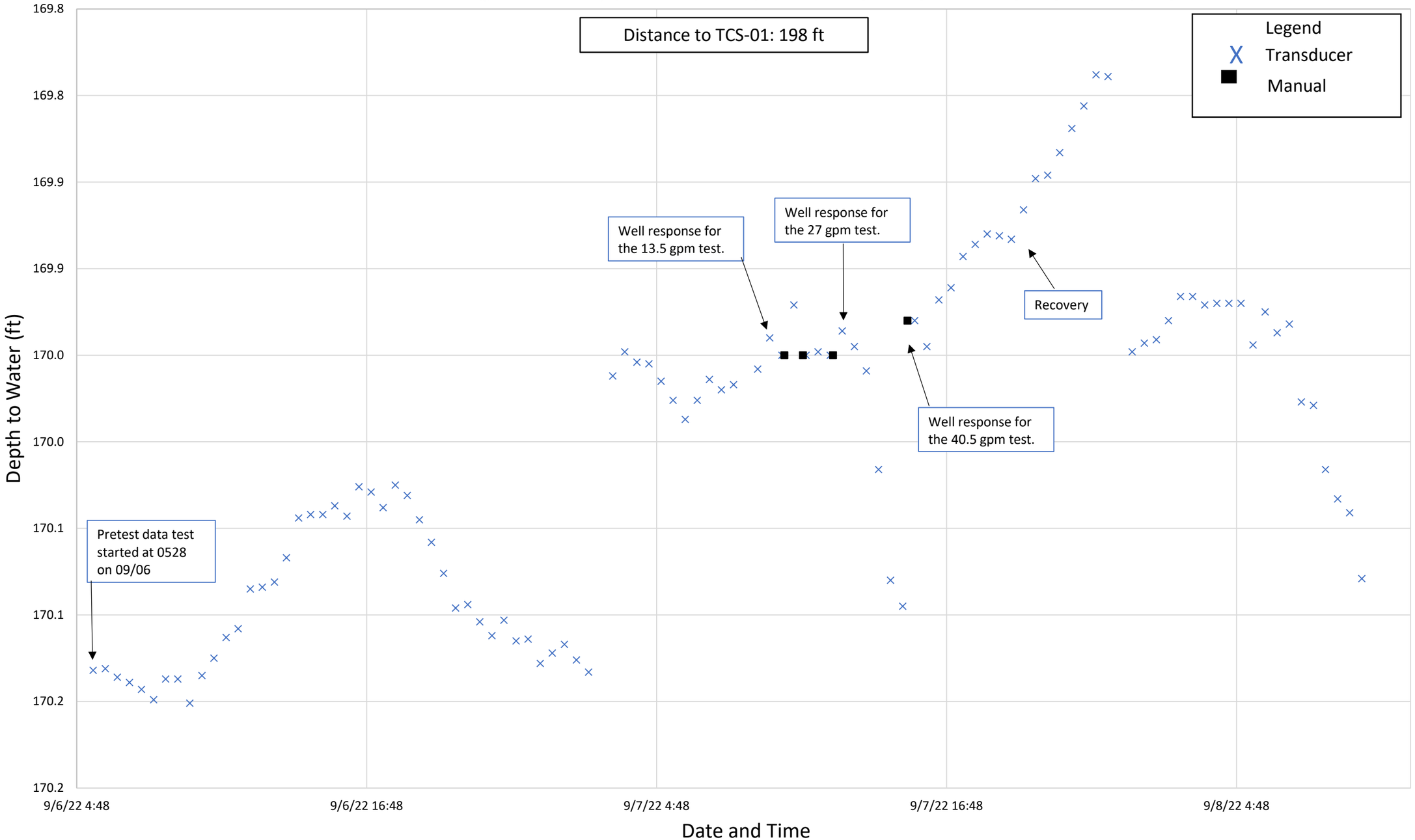
TCS-01 Specific Capacity Test: Upper Screen Linear Drawdown Plot



MW-67-260 During TCS-01 Upper Screen Specific Capacity Test 09/06/22 - 09/08/22



MW-67-225 During TCS-01 Upper Screen Specific Capacity Test 09/06/22-09/08/22



Attachment 8

Specific Injectivity Testing Package

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**TCS-01 (Lower Screen)**
Date	**9/11/2022 & 9/13/2022**
Screened Interval Tested	**214-268 ft bgs**
Packer Set Depth	**200 ft bgs**
Packer Seal Test	**Pass**
Tests Conducted	Four-step injectivity test (13.5, 27, 40.5, and 52 gpm)
Purpose	Well performance test
Summary	Specific injectivity results: 13.5 gpm = 3.35 gpm/ft, 27 gpm = 2.88 gpm/ft, 40.5 gpm= 4.15 gpm/ft, 54 gpm = 4.15 gpm/ft.
Notes	Water Level meter was swapped on 9/11/2022 at 9:29. Tried 3 different water level meter and the water level keeps flunctuating. Tested WL meter in upper screen and it is working properly. At 10:42 on 9/11/2022 the transducer relocated to a new depth of 211 ft bgs.
Oversight Signature	
Date	10/3/2022

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 1 (13.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Mounding (ft)
9:25:00	0.00	0.00	0.00	0.00	167.04	0.00
9:25:15	0.25	0.25	13.50	3.37	166.08	0.96
9:25:30	0.25	0.50	13.50	6.75	166.35	0.69
9:25:45	0.25	0.75	13.66	10.17	166.25	0.79
9:26:00	0.25	1.00	13.77	13.61	166.15	0.89
9:27:00	1.00	2.00	13.77	27.38	166.07	0.97
9:28:00	1.00	3.00	13.77	41.15	166.00	1.04
9:29:00	1.00	4.00	13.77	54.92		
9:30:00	1.00	5.00	13.44	68.36		
9:31:00	1.00	6.00	13.44	81.80		
9:32:00	1.00	7.00	13.60	95.40		
9:33:00	1.00	8.00	13.44	108.84		
9:34:00	1.00	9.00	13.44	122.28		
9:35:00	1.00	10.00	13.44	135.72		
9:37:00	2.00	12.00	13.44	162.60		
9:39:00	2.00	14.00	13.44	189.48		
9:41:00	2.00	16.00	13.27	216.02		
9:43:00	2.00	18.00	13.44	242.90		
9:45:00	2.00	20.00	13.44	269.78		
9:47:00	2.00	22.00	13.27	296.32		
9:49:00	2.00	24.00	13.27	322.86		
9:51:00	2.00	26.00	13.27	349.40		
9:53:00	2.00	28.00	13.77	376.94	163.25	3.79
9:55:00	2.00	30.00	13.27	403.48	163.55	3.49
10:00:00	5.00	35.00	13.10	468.98	163.51	3.53
10:05:00	5.00	40.00	13.77	537.83	162.70	4.34
10:10:00	5.00	45.00	13.60	605.83	162.25	4.79
10:15:00	5.00	50.00	13.60	673.83	162.91	4.13
10:20:00	5.00	55.00	13.60	741.83	162.55	4.49

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 1 (13.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Mounding (ft)
10:25:00	5.00	60.00	13.77	810.68	163.18	3.86
10:35:00	10.00	70.00	13.77	948.38	162.99	4.05
10:45:00	10.00	80.00	13.77	1086.08	162.67	4.37
10:55:00	10.00	90.00	13.60	1222.08	162.39	4.65
11:05:00	10.00	100.00	13.77	1359.78	162.91	4.13
11:15:00	10.00	110.00	13.60	1495.78	163.00	4.04
Total Volume Pumped for Step 1 (gal)			**1495.78**			
Average Pumping Rate (gpm)			**13.54**			
Specific Injectivity (gpm/ft)			**3.35**			

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 2 (27 GPM) Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
11:15:00	0.00	110.00	13.60	1495.78	163.00	4.04	0.00
11:25:20	10.33	120.33	18.20	1683.84	162.98	4.06	10.33
11:25:40	0.33	120.67	22.80	1691.44	163.10	3.94	10.67
11:26:00	0.33	121.00	27.38	1700.57			11.00
11:27:00	1.00	122.00	27.38	1727.95	163.00	4.04	12.00
11:28:00	1.00	123.00	27.54	1755.49			13.00
11:29:00	1.00	124.00	27.21	1782.70			14.00
11:30:00	1.00	125.00	27.21	1809.91			15.00
11:31:00	1.00	126.00	27.21	1837.12			16.00
11:32:00	1.00	127.00	27.21	1864.33			17.00
11:33:00	1.00	128.00	27.21	1891.54			18.00
11:34:00	1.00	129.00	27.21	1918.75			19.00
11:35:00	1.00	130.00	27.21	1945.96			20.00
11:37:00	2.00	132.00	27.38	2000.72			22.00
11:39:00	2.00	134.00	27.21	2055.14	157.30	9.74	24.00
11:41:00	2.00	136.00	27.38	2109.90	157.51	9.53	26.00
11:43:00	2.00	138.00	27.54	2164.98	158.10	8.94	28.00
11:45:00	2.00	140.00	27.21	2219.40			30.00
11:47:00	2.00	142.00	27.21	2273.82	155.10	11.94	32.00
11:49:00	2.00	144.00	27.04	2327.90			34.00
11:51:00	2.00	146.00	27.04	2381.98			36.00
11:53:00	2.00	148.00	27.21	2436.40			38.00
11:55:00	2.00	150.00	27.21	2490.82	154.40	12.64	40.00
12:00:00	5.00	155.00	27.04	2626.02	157.94	9.10	45.00
12:05:00	5.00	160.00	27.04	2761.22	157.40	9.64	50.00
12:10:00	5.00	165.00	27.04	2896.42	157.35	9.69	55.00
12:15:00	5.00	170.00	27.21	3032.47	157.13	9.91	60.00
12:20:00	5.00	175.00	27.21	3168.52	158.00	9.04	65.00
12:25:00	5.00	180.00	27.38	3305.42	157.21	9.83	70.00

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 2 (27 GPM) Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
12:35:00	10.00	190.00	27.21	3577.52	159.25	7.79	80.00
12:45:00	10.00	200.00	27.04	3847.92	157.70	9.34	90.00
12:55:00	10.00	210.00	27.21	4120.02	157.04	10.00	100.00
13:05:00	10.00	220.00	27.38	4393.82	157.34	9.70	110.00
13:15:00	10.00	230.00	27.04	4664.22	157.60	9.44	120.00
Total Volume Pumped for Step 2 (gal)			**3168.44**				
Average Pumping Rate (gpm)			**27.23**				
Specific Injectivity (gpm/ft)			**2.88**				

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 3 (40.5 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
13:15:00	0.00	230.00	27.04	4664.22	157.60	9.44	0.00
13:25:00	10.00	240.00	33.36	4997.77	158.00	9.04	10.00
13:25:20	0.33	240.33	39.67	5010.99	158.40	8.64	10.33
13:25:40	0.33	240.67	40.00	5024.33	157.95	9.09	10.67
13:26:00	0.33	241.00	40.33	5037.77	157.50	9.54	11.00
13:27:00	1.00	242.00	40.66	5078.43	151.71	15.33	12.00
13:28:00	1.00	243.00	40.66	5119.09	148.17	18.87	13.00
13:29:00	1.00	244.00	40.60	5159.69	152.84	14.20	14.00
13:30:00	1.00	245.00	40.50	5200.19	151.41	15.63	15.00
13:31:00	1.00	246.00	40.60	5240.79	153.65	13.39	16.00
13:32:00	1.00	247.00	40.50	5281.29	155.38	11.66	17.00
13:33:00	1.00	248.00	40.50	5321.79	155.19	11.85	18.00
13:34:00	1.00	249.00	40.50	5362.29	154.30	12.74	19.00
13:35:00	1.00	250.00	40.50	5402.79	156.52	10.52	20.00
13:37:00	2.00	252.00	40.50	5483.79	155.98	11.06	22.00
13:39:00	2.00	254.00	40.50	5564.79	155.50	11.54	24.00
13:41:00	2.00	256.00	40.33	5645.45	155.55	11.49	26.00
13:43:00	2.00	258.00	40.33	5726.11	156.00	11.04	28.00
13:45:00	2.00	260.00	40.33	5806.77	155.65	11.39	30.00
13:47:00	2.00	262.00	40.33	5887.43	155.20	11.84	32.00
13:49:00	2.00	264.00	40.33	5968.09	156.40	10.64	34.00
13:51:00	2.00	266.00	40.33	6048.75	155.56	11.48	36.00
13:53:00	2.00	268.00	40.33	6129.41	155.56	11.48	38.00
13:55:00	2.00	270.00	40.50	6210.41	156.67	10.37	40.00
14:00:00	5.00	275.00	40.33	6412.06	155.58	11.46	45.00
14:05:00	5.00	280.00	40.33	6613.71	156.45	10.59	50.00
14:10:00	5.00	285.00	40.33	6815.36	155.41	11.63	55.00
14:15:00	5.00	290.00	40.33	7017.01	156.29	10.75	60.00
14:20:00	5.00	295.00	40.33	7218.66	156.60	10.44	65.00

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 3 (40.5 gpm) Time (HR:MN:SEC)	**Change in Time Between Measurements (min)**	**Elapsed Time from Test Start (min)**	**Pumping Rate (gpm)**	**Total Volume Pumped (Gallons)**	**Depth to Water (ft)**	**Drawdown (ft)**	**Elapsed Time from Step 3 Start (min)**
14:25:00	5.00	300.00	40.33	7420.31	155.63	11.41	70.00
14:35:00	10.00	310.00	40.33	7823.61	156.80	10.24	80.00
14:45:00	10.00	320.00	40.33	8226.91	156.37	10.67	90.00
14:55:00	10.00	330.00	40.33	8630.21	157.65	9.39	100.00
15:05:00	10.00	340.00	40.33	9033.51	156.59	10.45	110.00
15:15:00	10.00	350.00	40.16	9435.11	156.90	10.14	120.00
15:25:00	10.00	360.00	40.35	9838.61	157.30	9.74	130.00
Total Volume Pumped for Step 3 (gal)			**5174.39**				
Average Pumping Rate (gpm)			**40.41**				
Specific Injectivity (gpm/ft)			**4.15**				

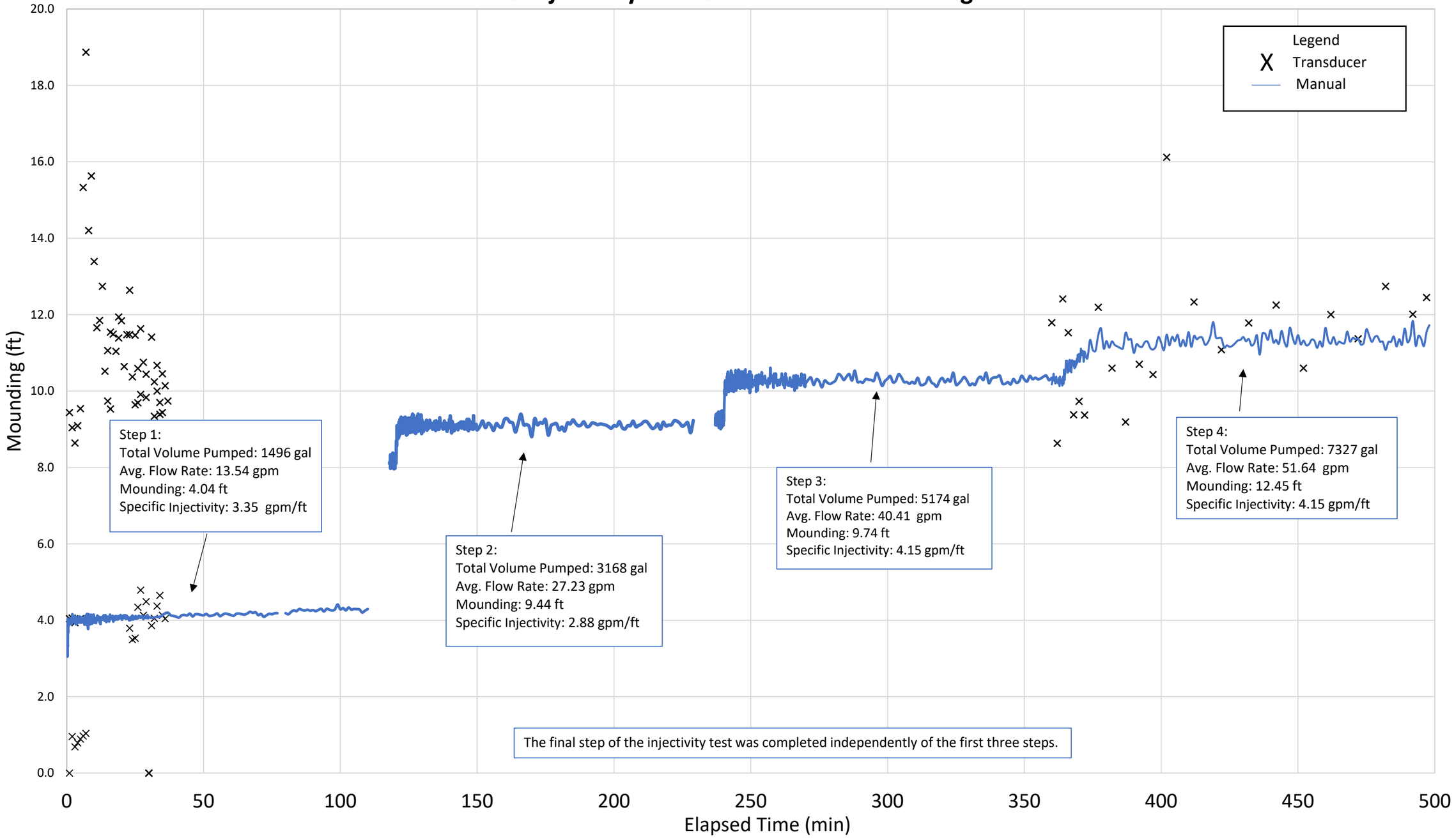
Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

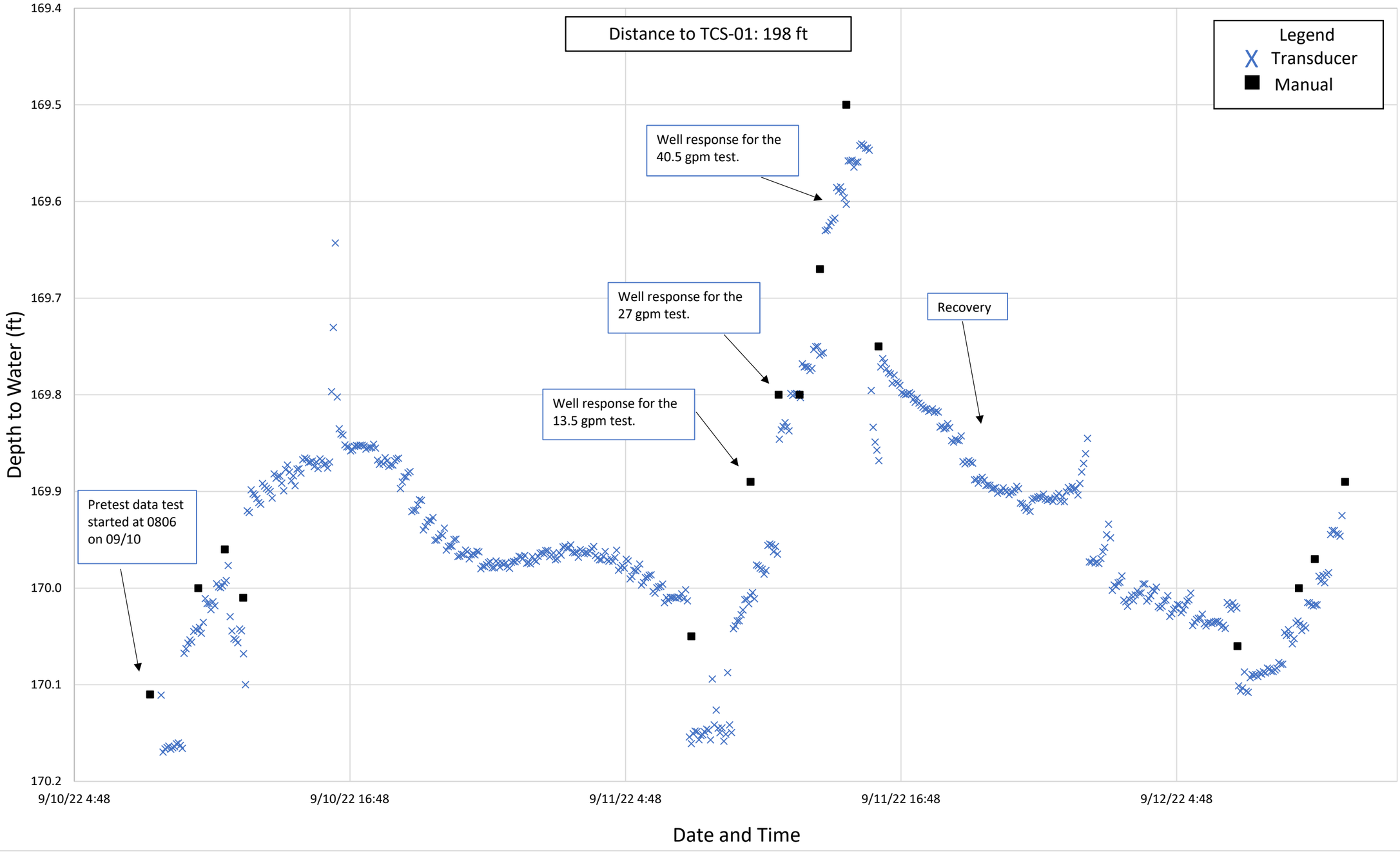
Location/Well ID	TCS-01
Date	9/11/2022 & 9/13/2022
Screened Interval	214 - 268 ft. bgs
Injection Outlet Depth (ft btoc)	266 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.04
Initial Totalizer Reading (gal)	157846.00
Final Totalizer Reading (gal)	167585
Approx Pumped Volume (gal)	17165.64
Calculated Volume Purged (gal)	9739.00
Difference in Volume Pumped vs. Calculated	7426.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27,40.5 and 52 gpm

Step 4 (54.0 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
13:23:00	0.00	360.00	41.81	9838.61	155.25	11.79	0.00
13:25:00	2.00	362.00	42.27	9923.15	158.41	8.63	132.00
13:27:00	2.00	364.00	42.12	10007.39	154.63	12.41	134.00
13:29:00	2.00	366.00	47.22	10101.83	155.51	11.53	136.00
13:31:00	2.00	368.00	47.38	10196.59	157.66	9.38	138.00
13:33:00	2.00	370.00	50.05	10296.69	157.31	9.73	140.00
13:35:00	2.00	372.00	50.05	10396.79	157.67	9.37	142.00
13:40:00	5.00	377.00	54.39	10668.74	154.85	12.19	147.00
13:45:00	5.00	382.00	54.39	10940.69	156.44	10.60	152.00
13:50:00	5.00	387.00	54.39	11212.64	157.85	9.19	157.00
13:55:00	5.00	392.00	54.22	11483.74	156.34	10.70	162.00
14:00:00	5.00	397.00	54.22	11754.84	156.61	10.43	167.00
14:05:00	5.00	402.00	54.06	12025.14	150.92	16.12	172.00
14:15:00	10.00	412.00	54.06	12565.74	154.71	12.33	182.00
14:25:00	10.00	422.00	54.06	13106.34	155.96	11.08	192.00
14:35:00	10.00	432.00	54.22	13648.54	155.26	11.78	202.00
14:45:00	10.00	442.00	54.06	14189.14	154.79	12.25	212.00
14:55:00	10.00	452.00	54.22	14731.34	156.44	10.60	222.00
15:05:00	10.00	462.00	54.22	15273.54	155.04	12.00	232.00
15:15:00	10.00	472.00	54.06	15814.14	155.67	11.37	242.00
15:25:00	10.00	482.00	54.06	16354.74	154.30	12.74	252.00
15:35:00	10.00	492.00	54.06	16895.34	155.03	12.01	262.00
15:40:00	5.00	497.00	54.06	17165.64	154.59	12.45	267.00
Total Volume Pumped for Step 3 (gal)			**7327.03**				
Average Pumping Rate (gpm)			**51.64**				
Specific Injectivity (gpm/ft)			**4.15**				

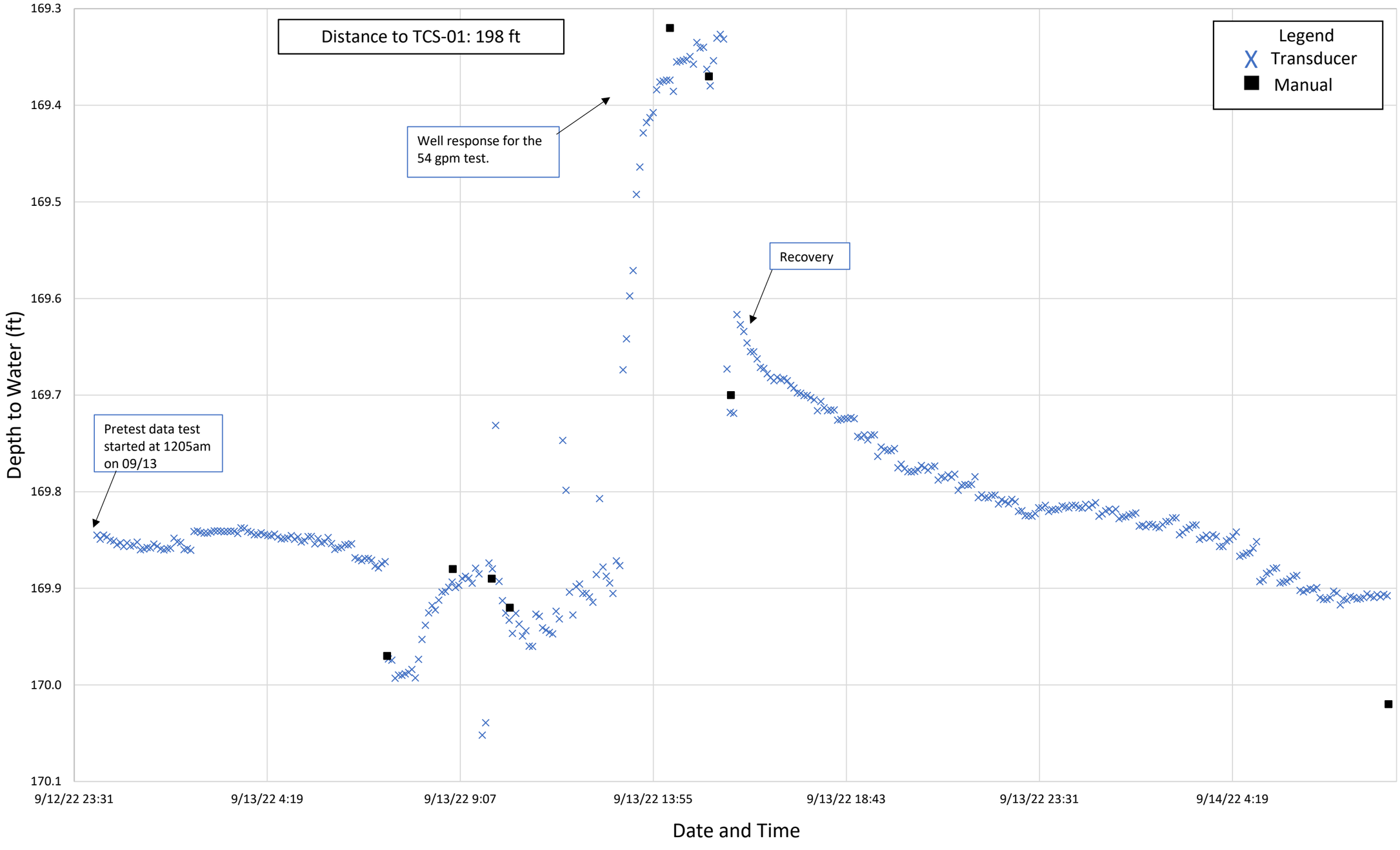
TCS-01 Injectivity Test: Lower Screen Mounding Plot



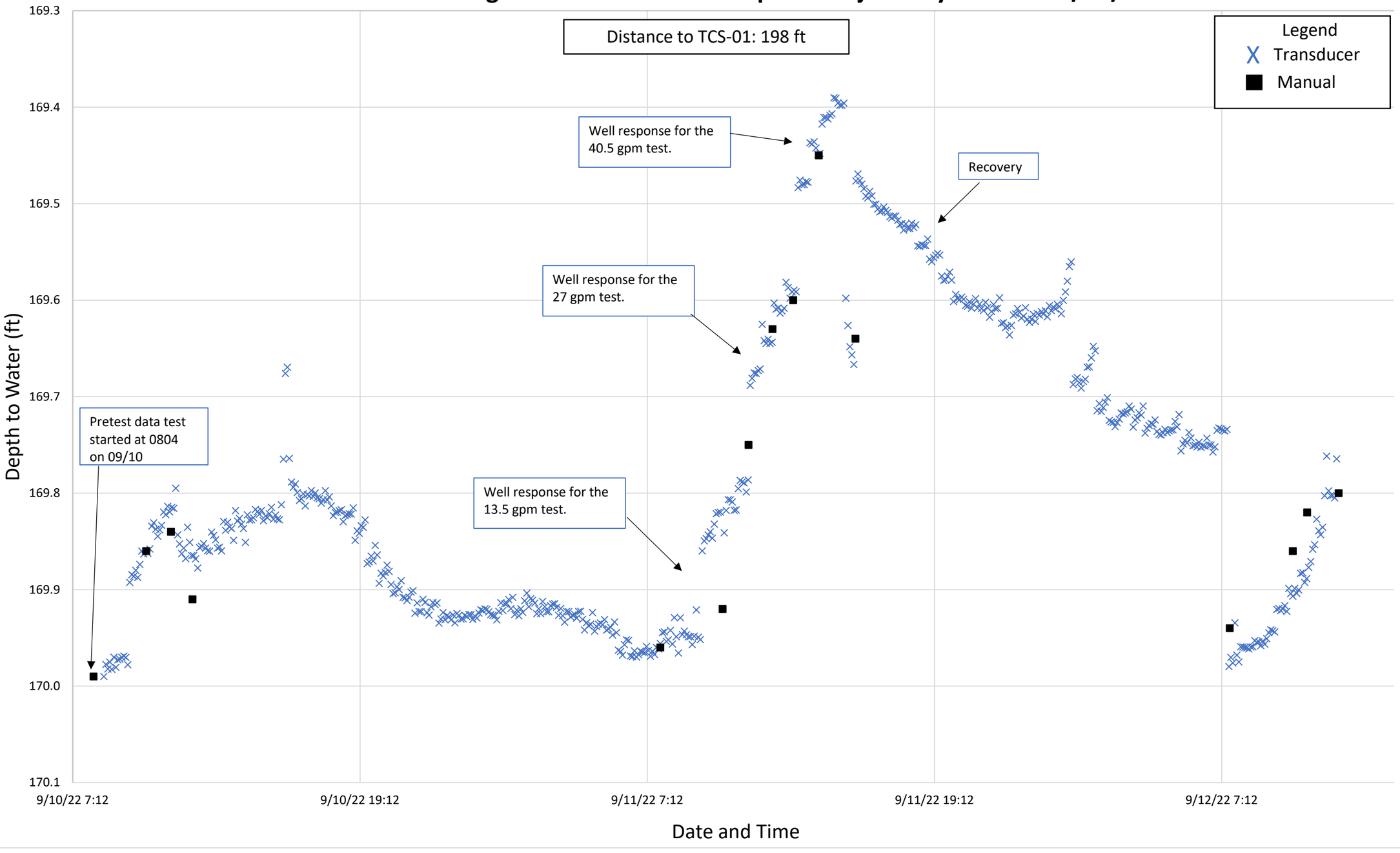
MW-67-260 During TCS-01 Lower Screen Specific Injectivity Test On 09/11/22



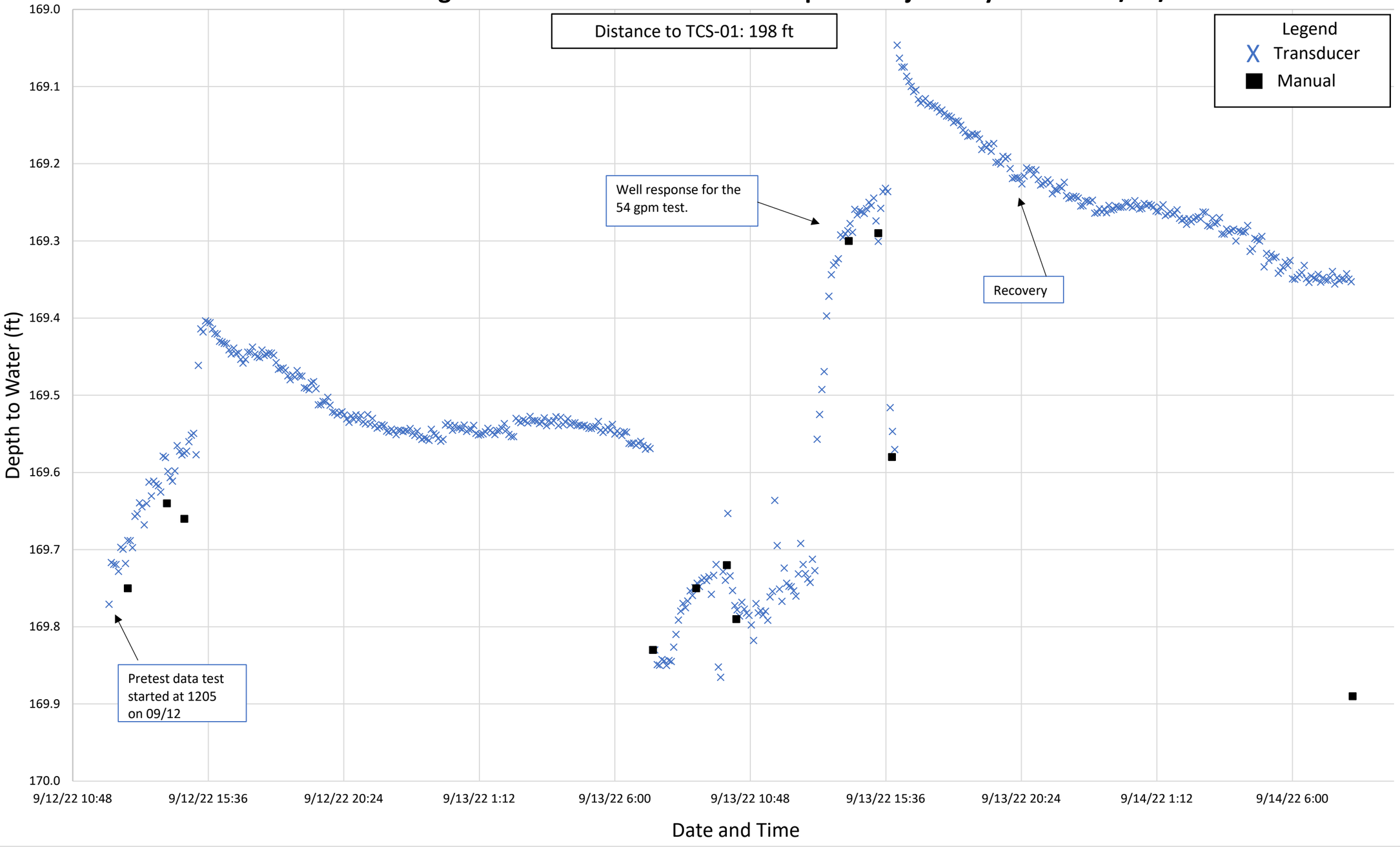
MW-67-260 During TCS-01 Lower Screen 54 GPM Specific Injectivity Test On 09/13/22



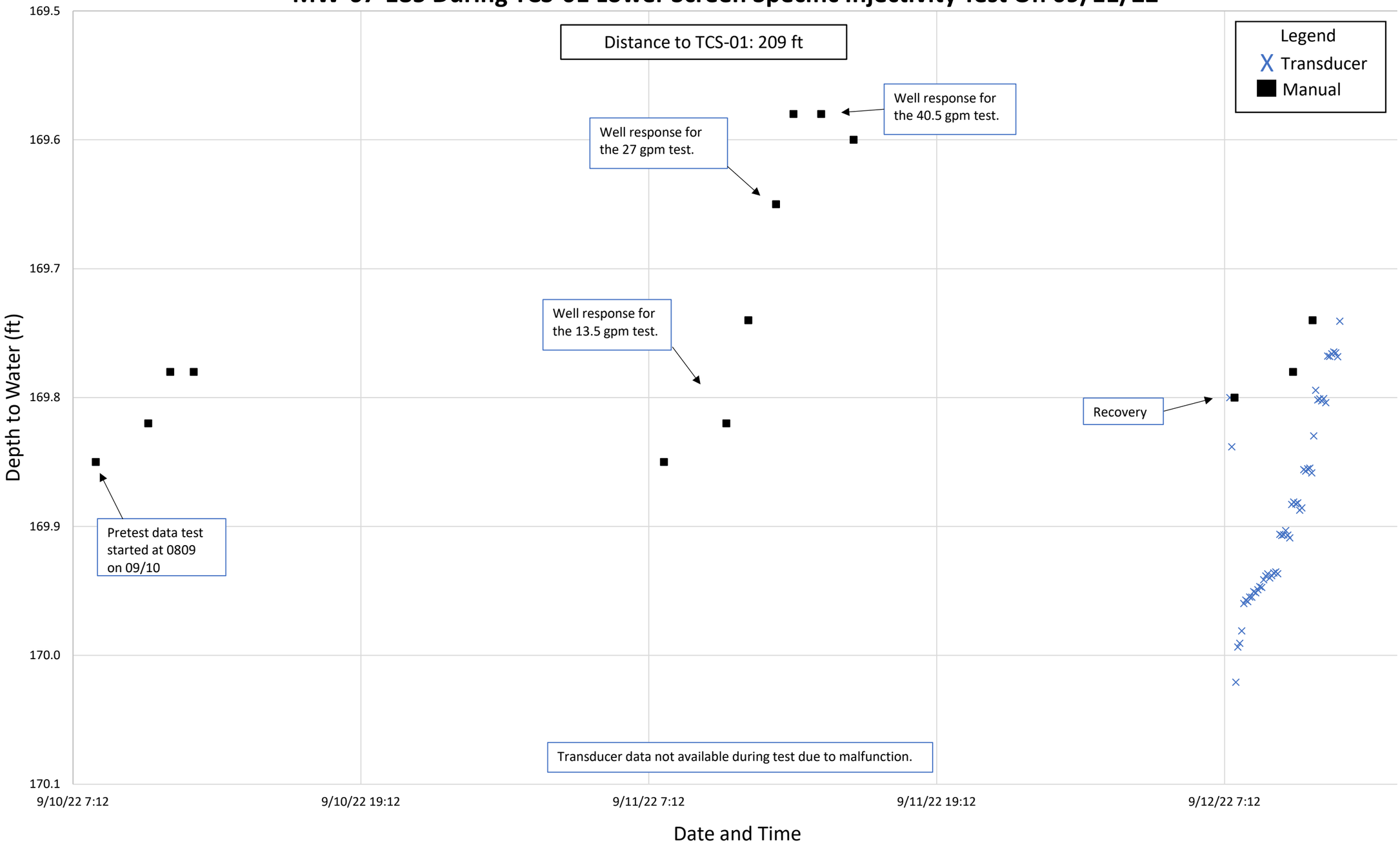
MW-67-225 During TCS-01 Lower Screen Specific Injectivity Test On 09/11/22



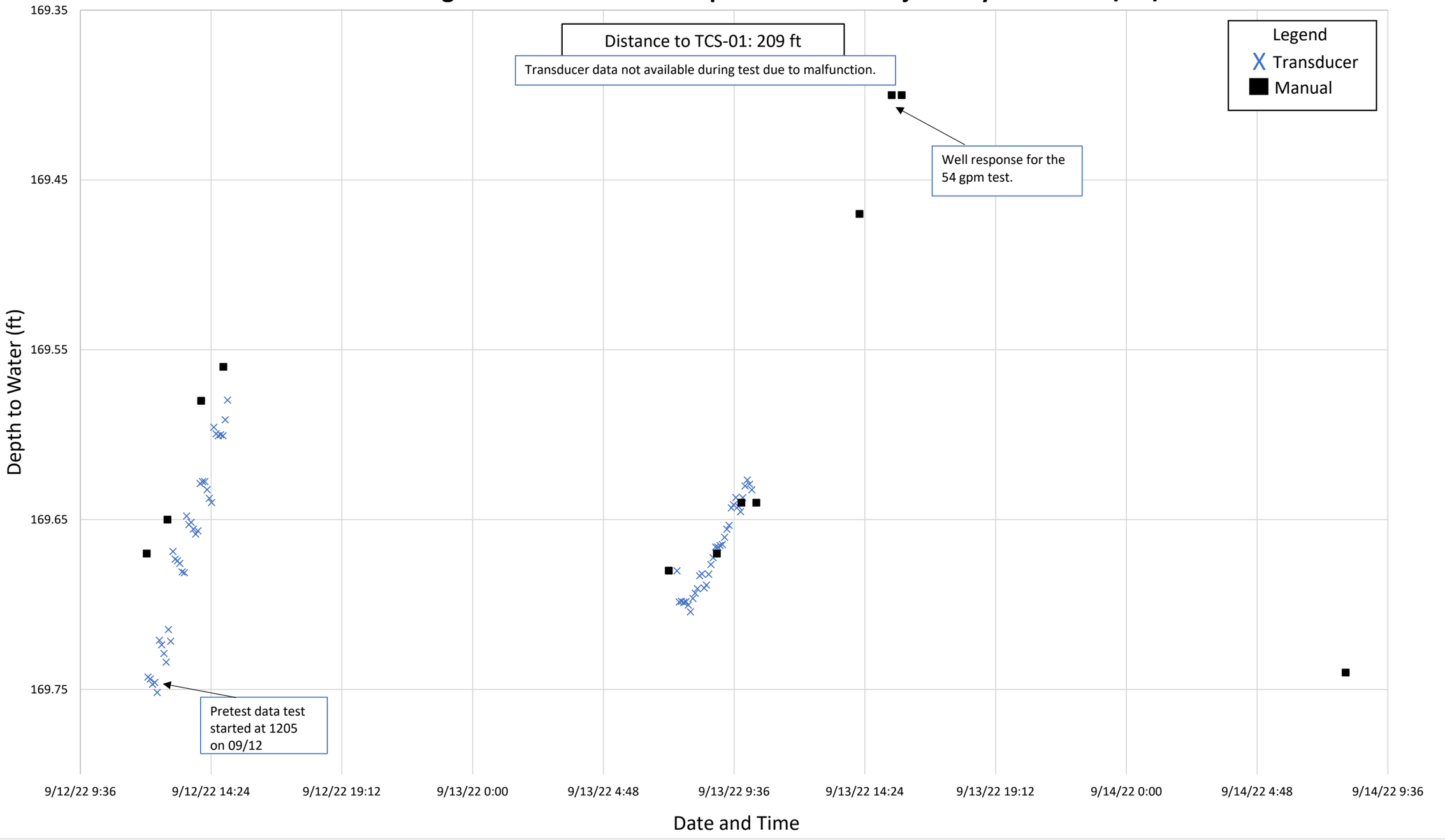
MW-67-225 During TCS-01 Lower Screen 54 GPM Specific Injectivity Test On 09/13/22



MW-67-185 During TCS-01 Lower Screen Specific Injectivity Test On 09/11/22



MW-67-185 During TCS-01 Lower Screen Specific 54 GPM Injectivity Test On 09/13/22



Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**TCS-01 (Upper Screen)**
Date	**9/12/2022 to 9/13/2022**
Screened Interval Tested	**171 - 190 ft bgs**
Packer Set Depth	**200 ft bgs**
Packer Seal Test	**N/A**
Tests Conducted	four-step injectivity test (13.5, 27, 40.5, and 54 gpm)
Purpose	Well performance test
Summary	Specific injectivity results: 13.5 gpm = 6.41 gpm/ft, 27 gpm = 8.09 gpm/ft, 40.5 gpm= 8.74 gpm/ft, 54 gpm = 9.23 gpm/ft.
Notes	The transducer used during this test was not set-up correctly. The test results are based on the manual data.
Oversight Signature	
Date	10/3/2022

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/12/2022 - 9/13/2022
Screened Interval	171 - 190 ft. bgs
Injection Outlet Depth (ft btoc)	187 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.00
Initial Totalizer Reading (gal)	167585.00
Final Totalizer Reading (gal)	177470
Approx Pumped Volume (gal)	15829.15
Calculated Volume Purged (gal)	9885.00
Difference in Volume Pumped vs. Calculated	5944.15
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gpm

Step 1 (13.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Increase in Water Level (ft)
9:00:00	0.00	0.00	0.00	0.00	167.00	0.00
9:00:30	0.50	0.50	13.50	6.75	165.88	1.12
9:01:00	0.50	1.00	13.25	13.38	165.48	1.52
9:02:00	1.00	2.00	13.60	26.97	165.19	1.81
9:03:00	1.00	3.00	13.60	40.57	165.04	1.96
9:04:00	1.00	4.00	13.60	54.18	164.92	2.08
9:05:00	1.00	5.00	13.60	67.77	164.90	2.10
9:06:00	1.00	6.00	13.60	81.37	164.85	2.15
9:07:00	1.00	7.00	13.60	94.97	164.33	2.67
9:08:00	1.00	8.00	13.60	108.57	164.80	2.20
9:09:00	1.00	9.00	13.77	122.35	164.70	2.30
9:10:00	1.00	10.00	13.60	135.94	164.75	2.25
9:12:00	2.00	12.00	13.60	163.15	164.75	2.25
9:14:00	2.00	14.00	13.60	190.35	164.74	2.26
9:16:00	2.00	16.00	13.77	217.89	164.75	2.25
9:18:00	2.00	18.00	13.60	245.09	164.74	2.26
9:20:00	2.00	20.00	13.59	272.27	164.74	2.26
9:22:00	2.00	22.00	13.71	299.69	164.74	2.26
9:24:00	2.00	24.00	13.60	326.89	164.75	2.25
9:26:00	2.00	26.00	13.60	354.09	164.75	2.25
9:28:00	2.00	28.00	13.60	381.29	164.75	2.25
9:30:00	2.00	30.00	13.60	408.49	164.76	2.24
9:35:00	5.00	35.00	13.60	476.49	164.79	2.21
9:40:00	5.00	40.00	13.60	544.48	164.80	2.20
9:45:00	5.00	45.00	13.44	611.68	164.84	2.16
9:50:00	5.00	50.00	13.60	679.68	164.88	2.12
9:55:00	5.00	55.00	13.60	747.68	164.85	2.15
10:00:00	5.00	60.00	13.60	815.68	164.88	2.12
10:10:00	10.00	70.00	13.44	950.08	164.90	2.10
10:20:00	10.00	80.00	13.60	1086.09	164.91	2.09
10:30:00	10.00	90.00	13.60	1222.09	164.92	2.08
10:40:00	10.00	100.00	13.60	1358.09	164.95	2.05
10:50:00	10.00	110.00	13.60	1494.09	164.97	2.03
11:00:00	10.00	120.00	13.60	1630.09	164.88	2.12
Total Volume Pumped for Step 1 (gal)			**1630.09**			
Average Pumping Rate (gpm)			**13.59**			
Specific Injectivity (gpm/ft)			**6.41**			

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/12/2022 - 9/13/2022
Screened Interval	171 - 190 ft. bgs
Injection Outlet Depth (ft btoc)	187 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.00
Initial Totalizer Reading (gal)	167585.00
Final Totalizer Reading (gal)	177470
Approx Pumped Volume (gal)	15829.15
Calculated Volume Purged (gal)	9885.00
Difference in Volume Pumped vs. Calculated	5944.15
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gpm

Step 2 (27 GPM) Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Increase in Water Level (ft)	Elapsed Time from Step 2 Start (min)
11:00:00	0.00	120.00	27.00	1630.09	164.88	2.12	0.00
11:00:30	0.50	120.50	27.00	1643.59	164.80	2.20	0.50
11:01:00	0.50	121.00	27.21	1657.19	163.68	3.32	1.00
11:02:00	1.00	122.00	27.04	1684.23	163.62	3.38	2.00
11:03:00	1.00	123.00	27.04	1711.27	163.59	3.41	3.00
11:04:00	1.00	124.00	27.21	1738.48	163.50	3.50	4.00
11:05:00	1.00	125.00	27.21	1765.69	163.48	3.52	5.00
11:06:00	1.00	126.00	27.21	1792.90	163.45	3.55	6.00
11:07:00	1.00	127.00	27.21	1820.11	163.44	3.56	7.00
11:08:00	1.00	128.00	27.21	1847.32	163.43	3.57	8.00
11:09:00	1.00	129.00	27.38	1874.70	163.42	3.58	9.00
11:10:00	1.00	130.00	27.21	1901.91	163.40	3.60	10.00
11:12:00	2.00	132.00	27.04	1955.99	163.40	3.60	12.00
11:14:00	2.00	134.00	27.04	2010.07	163.44	3.56	14.00
11:16:00	2.00	136.00	27.04	2064.15	163.44	3.56	16.00
11:18:00	2.00	138.00	27.04	2118.23	163.44	3.56	18.00
11:20:00	2.00	140.00	27.04	2172.31	163.45	3.55	20.00
11:22:00	2.00	142.00	27.04	2226.39	163.47	3.53	22.00
11:24:00	2.00	144.00	27.04	2280.47	163.47	3.53	24.00
11:26:00	2.00	146.00	27.21	2334.89	163.45	3.55	26.00
11:28:00	2.00	148.00	27.04	2388.97	163.45	3.55	28.00
11:30:00	2.00	150.00	27.04	2443.05	163.50	3.50	30.00
11:35:00	5.00	155.00	27.04	2578.25	163.51	3.49	35.00
11:40:00	5.00	160.00	27.04	2713.45	163.52	3.48	40.00
11:45:00	5.00	165.00	27.04	2848.65	163.55	3.45	45.00
11:50:00	5.00	170.00	27.04	2983.85	163.59	3.41	50.00
11:55:00	5.00	175.00	27.04	3119.05	163.59	3.41	55.00
12:00:00	5.00	180.00	27.04	3254.25	163.58	3.42	60.00
12:10:00	10.00	190.00	27.04	3524.65	163.60	3.40	70.00
12:20:00	10.00	200.00	27.04	3795.05	163.62	3.38	80.00
12:30:00	10.00	210.00	27.04	4065.45	163.64	3.36	90.00
12:40:00	10.00	220.00	27.04	4335.85	163.69	3.31	100.00
12:50:00	10.00	230.00	27.04	4606.25	163.65	3.35	110.00
13:00:00	10.00	240.00	27.04	4876.65	163.65	3.35	120.00
Total Volume Pumped for Step 2 (gal)			**3246.56**				
Average Pumping Rate (gpm)			**27.09**				
Specific Injectivity (gpm/ft)			**8.09**				

Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	TCS-01
Date	9/12/2022 - 9/13/2022
Screened Interval	171 - 190 ft. bgs
Injection Outlet Depth (ft btoc)	187 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.00
Initial Totalizer Reading (gal)	167585.00
Final Totalizer Reading (gal)	177470
Approx Pumped Volume (gal)	15829.15
Calculated Volume Purged (gal)	9885.00
Difference in Volume Pumped vs. Calculated	5944.15
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gpm

Step 3 (40.5 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Increase in Water Level (ft)	Elapsed Time from Step 3 Start (min)
13:00:00	0.00	240.00	40.50	4876.65	163.65	3.35	0.00
13:00:20	0.33	240.33	40.50	4890.15	163.65	3.35	0.33
13:00:40	0.33	240.67	40.50	4903.65	163.00	4.00	0.67
13:01:00	0.33	241.00	37.77	4916.24	162.95	4.05	1.00
13:02:00	1.00	242.00	39.06	4955.30	162.79	4.21	2.00
13:03:00	1.00	243.00	40.16	4995.46	162.54	4.46	3.00
13:04:00	1.00	244.00	40.66	5036.12	162.40	4.60	4.00
13:05:00	1.00	245.00	40.66	5076.78	162.34	4.66	5.00
13:06:00	1.00	246.00	40.66	5117.44	162.32	4.68	6.00
13:07:00	1.00	247.00	40.50	5157.94	162.34	4.66	7.00
13:08:00	1.00	248.00	40.50	5198.44	162.32	4.68	8.00
13:09:00	1.00	249.00	40.66	5239.10	162.30	4.70	9.00
13:10:00	1.00	250.00	40.50	5279.60	162.29	4.71	10.00
13:12:00	2.00	252.00	40.50	5360.60	162.25	4.75	12.00
13:14:00	2.00	254.00	40.50	5441.60	162.25	4.75	14.00
13:16:00	2.00	256.00	40.66	5522.92	162.25	4.75	16.00
13:18:00	2.00	258.00	40.50	5603.92	162.25	4.75	18.00
13:20:00	2.00	260.00	40.50	5684.92	162.25	4.75	20.00
13:22:00	2.00	262.00	40.66	5766.24	162.25	4.75	22.00
13:24:00	2.00	264.00	40.66	5847.56	162.26	4.74	24.00
13:26:00	2.00	266.00	40.50	5928.56	162.26	4.74	26.00
13:28:00	2.00	268.00	40.66	6009.88	162.27	4.73	28.00
13:30:00	2.00	270.00	40.50	6090.88	162.28	4.72	30.00
13:35:00	5.00	275.00	40.33	6292.53	162.29	4.71	35.00
13:40:00	5.00	280.00	40.33	6494.18	162.28	4.72	40.00
13:45:00	5.00	285.00	40.50	6696.68	162.30	4.70	45.00
13:50:00	5.00	290.00	40.16	6897.48	162.32	4.68	50.00
13:55:00	5.00	295.00	40.33	7099.13	162.32	4.68	55.00
14:00:00	5.00	300.00	40.50	7301.63	162.32	4.68	60.00
14:10:00	10.00	310.00	40.66	7708.23	162.32	4.68	70.00
14:20:00	10.00	320.00	40.66	8114.83	162.34	4.66	80.00
14:30:00	10.00	330.00	40.50	8519.83	162.35	4.65	90.00
14:40:00	10.00	340.00	40.33	8923.13	162.37	4.63	100.00
14:50:00	10.00	350.00	40.33	9326.43	162.38	4.62	110.00
Total Volume Pumped for Step 3 (gal)			**4449.78**				
Average Pumping Rate (gpm)			**40.38**				
Specific Injectivity (gpm/ft)			**8.74**				

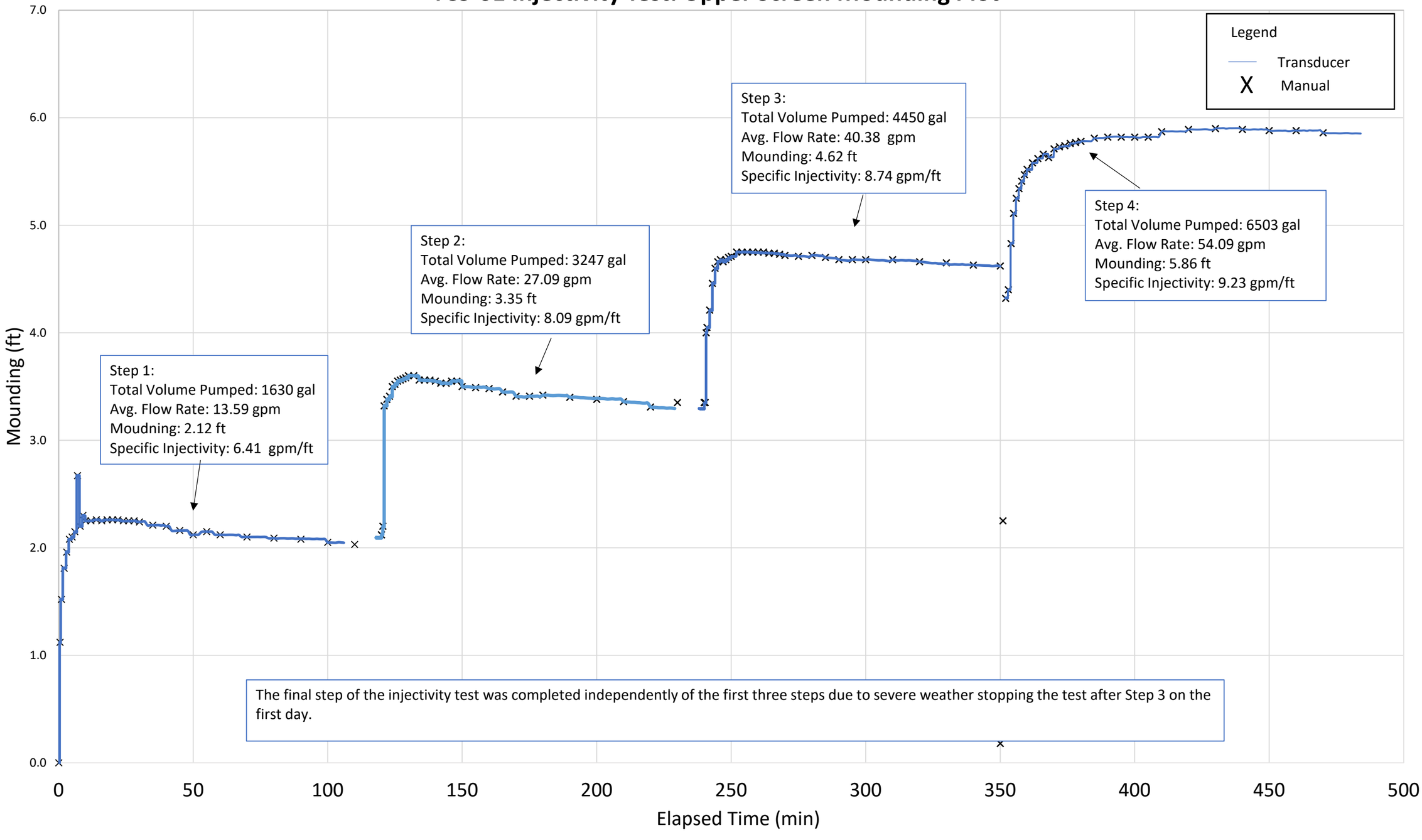
Specific Injectivity Test

ARCADIS Design & Consultancy for natural and built assets

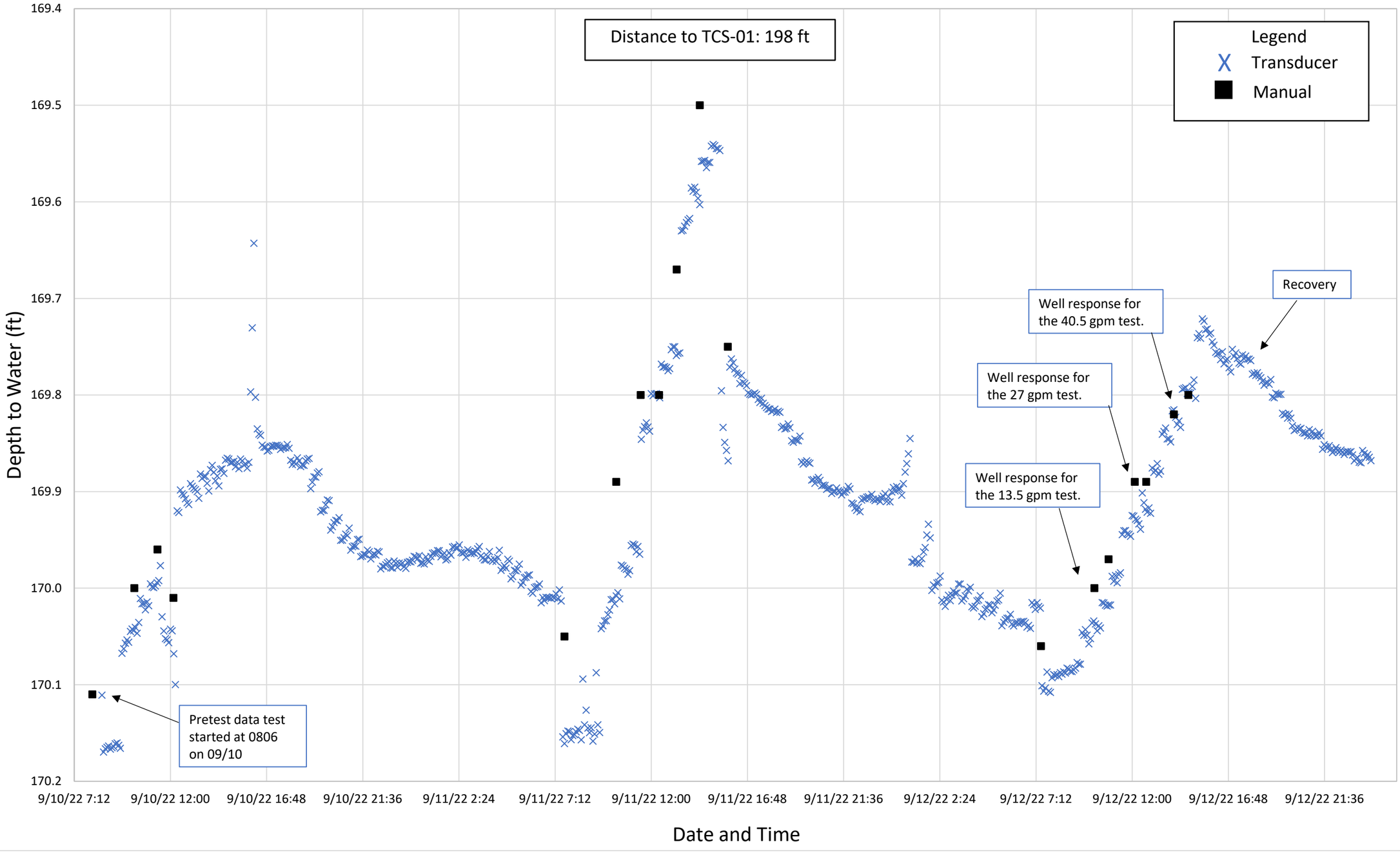
Location/Well ID	TCS-01
Date	9/12/2022 - 9/13/2022
Screened Interval	171 - 190 ft. bgs
Injection Outlet Depth (ft btoc)	187 ft bgs
Packer Depth (ft btoc)	200 ft bgs
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level (ft btoc)	167.00
Initial Totalizer Reading (gal)	167585.00
Final Totalizer Reading (gal)	177470
Approx Pumped Volume (gal)	15829.15
Calculated Volume Purged (gal)	9885.00
Difference in Volume Pumped vs. Calculated	5944.15
Number of Specific Capacity Steps	4
Pumping Rates (in order)	13.5, 27, 40.5 and 54 gpm

Step 4 (54.0 gpm) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Increase in Water Level (ft)	Elapsed Time from Step 3 Start (min)
8:00:00	0.00	350.00	0.00	9326.43	166.82	0.18	0.00
8:01:00	1.00	351.00	53.24	9379.67	164.75	2.25	111.00
8:02:00	1.00	352.00	53.14	9432.81	162.68	4.32	112.00
8:03:00	1.00	353.00	53.04	9485.85	162.60	4.40	113.00
8:04:00	1.00	354.00	54.12	9539.97	162.17	4.83	114.00
8:05:00	1.00	355.00	54.06	9594.03	161.89	5.11	115.00
8:06:00	1.00	356.00	54.06	9648.09	161.75	5.25	116.00
8:07:00	1.00	357.00	54.22	9702.31	161.66	5.34	117.00
8:08:00	1.00	358.00	54.06	9756.37	161.59	5.41	118.00
8:09:00	1.00	359.00	54.22	9810.59	161.53	5.47	119.00
8:10:00	1.00	360.00	54.22	9864.81	161.48	5.52	120.00
8:12:00	2.00	362.00	54.22	9973.25	161.42	5.58	122.00
8:14:00	2.00	364.00	54.06	10081.37	161.38	5.62	124.00
8:16:00	2.00	366.00	54.22	10189.81	161.34	5.66	126.00
8:18:00	2.00	368.00	54.22	10298.25	161.37	5.63	128.00
8:20:00	2.00	370.00	54.39	10407.03	161.29	5.71	130.00
8:22:00	2.00	372.00	54.06	10515.15	161.27	5.73	132.00
8:24:00	2.00	374.00	54.22	10623.59	161.26	5.74	134.00
8:26:00	2.00	376.00	54.22	10732.03	161.24	5.76	136.00
8:28:00	2.00	378.00	54.22	10840.47	161.23	5.77	138.00
8:30:00	2.00	380.00	54.39	10949.25	161.22	5.78	140.00
8:35:00	5.00	385.00	54.06	11219.55	161.19	5.81	145.00
8:40:00	5.00	390.00	54.02	11489.65	161.18	5.82	150.00
8:45:00	5.00	395.00	54.06	11759.95	161.18	5.82	155.00
8:50:00	5.00	400.00	53.90	12029.45	161.18	5.82	160.00
8:55:00	5.00	405.00	54.06	12299.75	161.18	5.82	165.00
9:00:00	5.00	410.00	54.22	12570.85	161.13	5.87	170.00
9:10:00	10.00	420.00	54.22	13113.05	161.11	5.89	180.00
9:20:00	10.00	430.00	54.39	13656.95	161.10	5.90	190.00
9:30:00	10.00	440.00	54.39	14200.85	161.11	5.89	200.00
9:40:00	10.00	450.00	54.39	14744.75	161.12	5.88	210.00
9:50:00	10.00	460.00	54.22	15286.95	161.12	5.88	220.00
10:00:00	10.00	470.00	54.22	15829.15	161.14	5.86	230.00
Total Volume Pumped for Step 3 (gal)			**6502.72**				
Average Pumping Rate (gpm)			**54.09**				
Specific Injectivity (gpm/ft)			**9.23**				

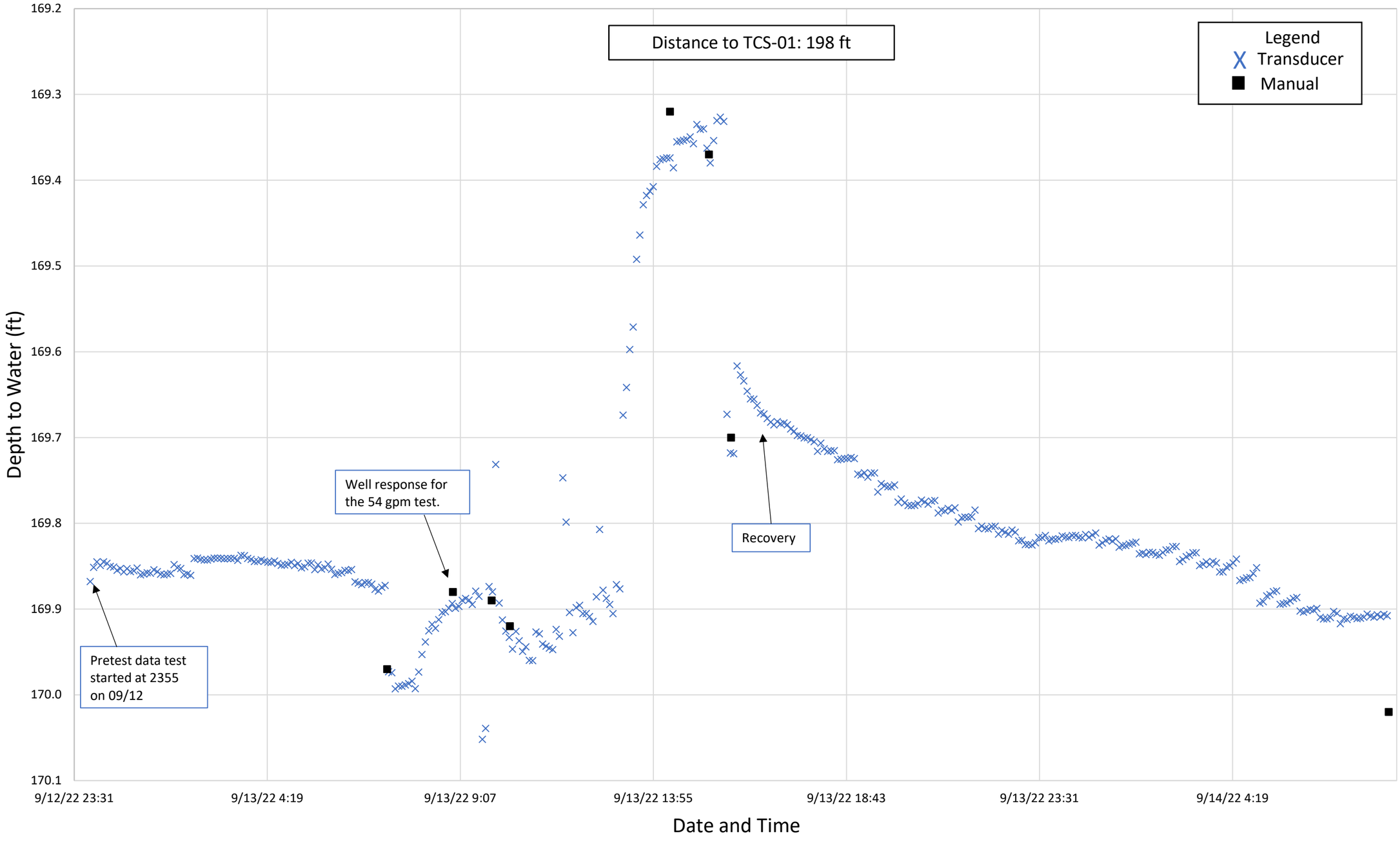
TCS-01 Injectivity Test: Upper Screen Mounding Plot



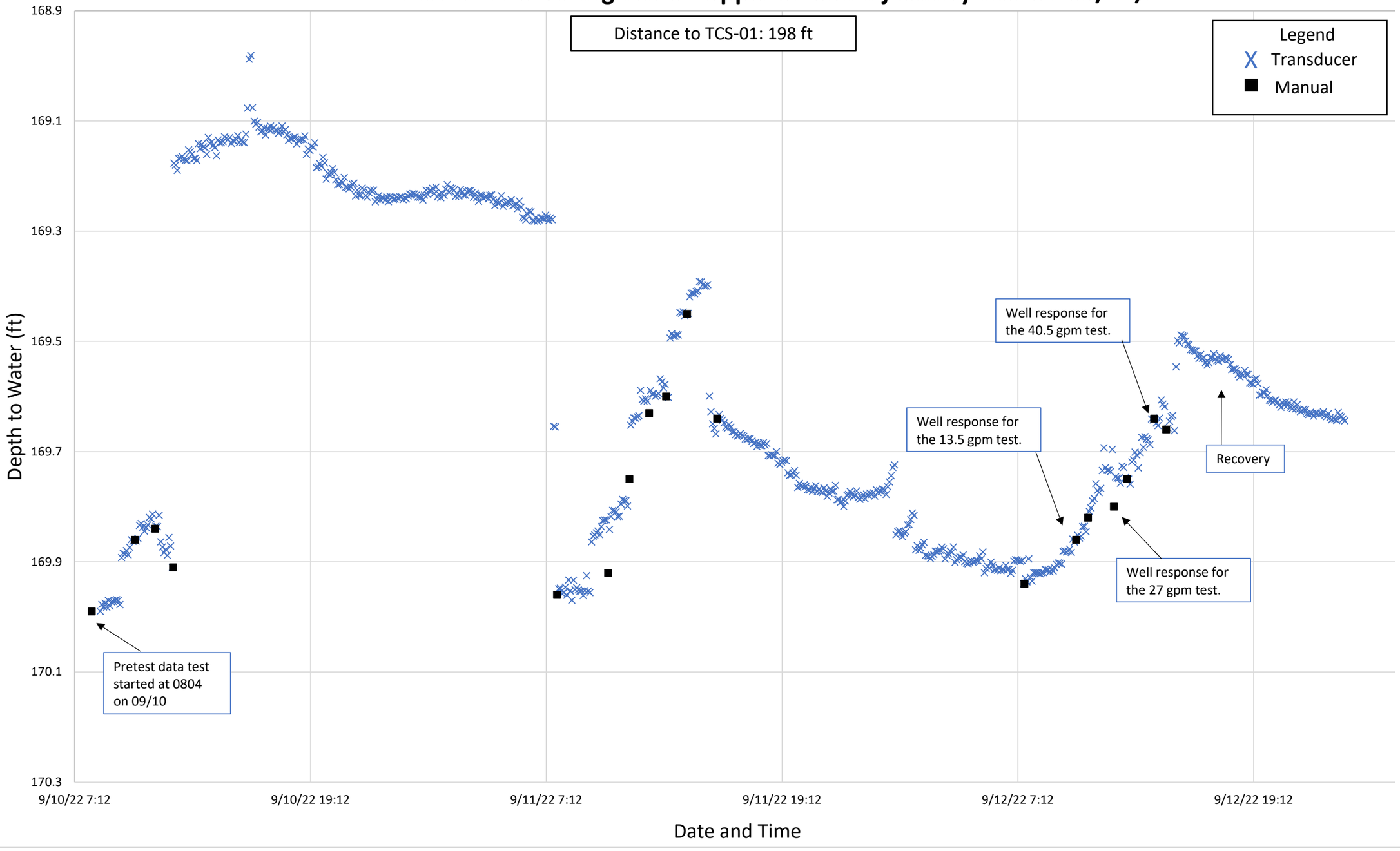
MW-67-260 During TCS-01 Upper Screen Injectivity Test On 9/12/22



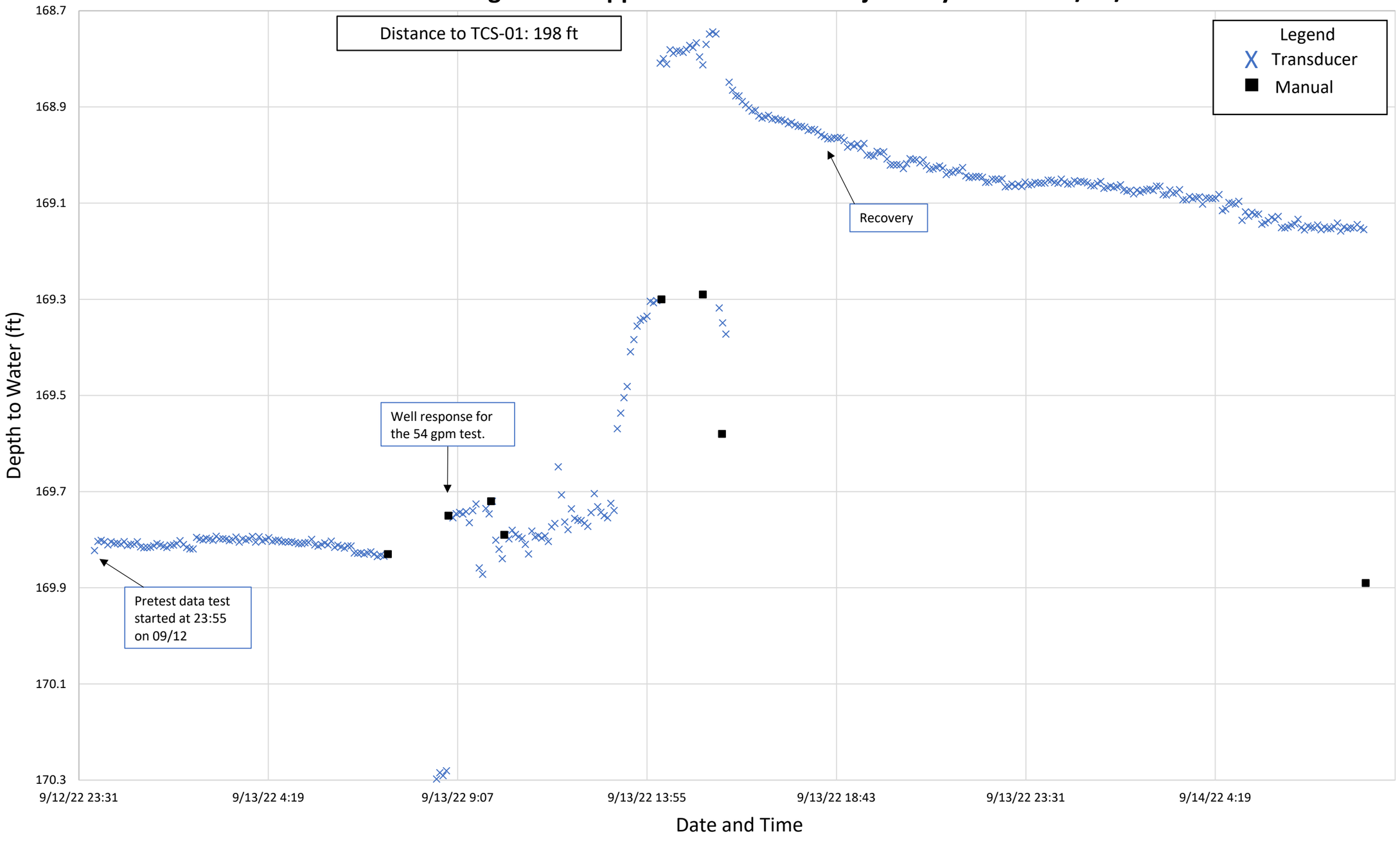
MW-67-260 During TCS-01 Upper Screen 54 GPM Injectivity Test On 09/13/22



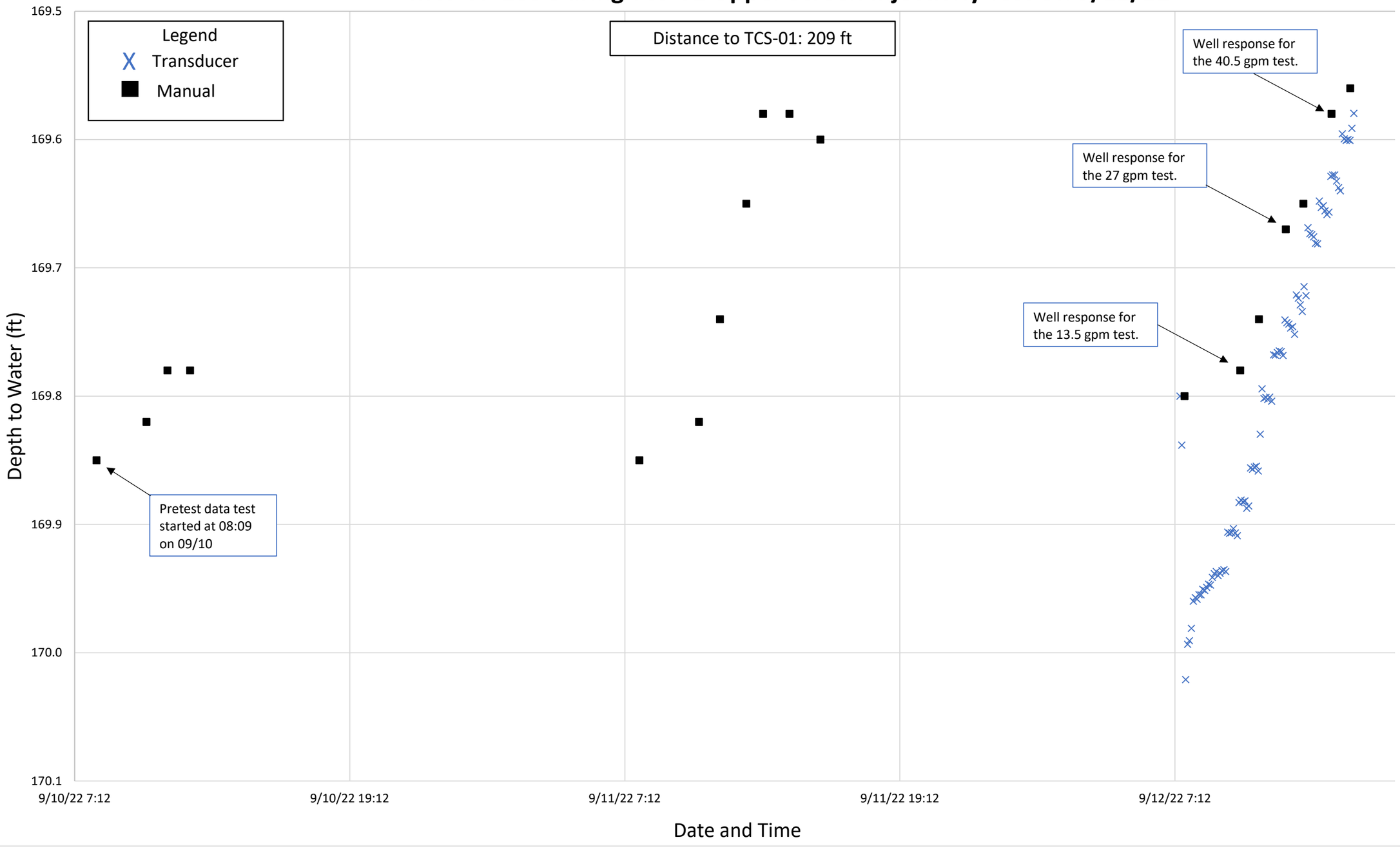
MW-67-225 During TCS-01 Upper Screen Injectivity Test On 09/12/22



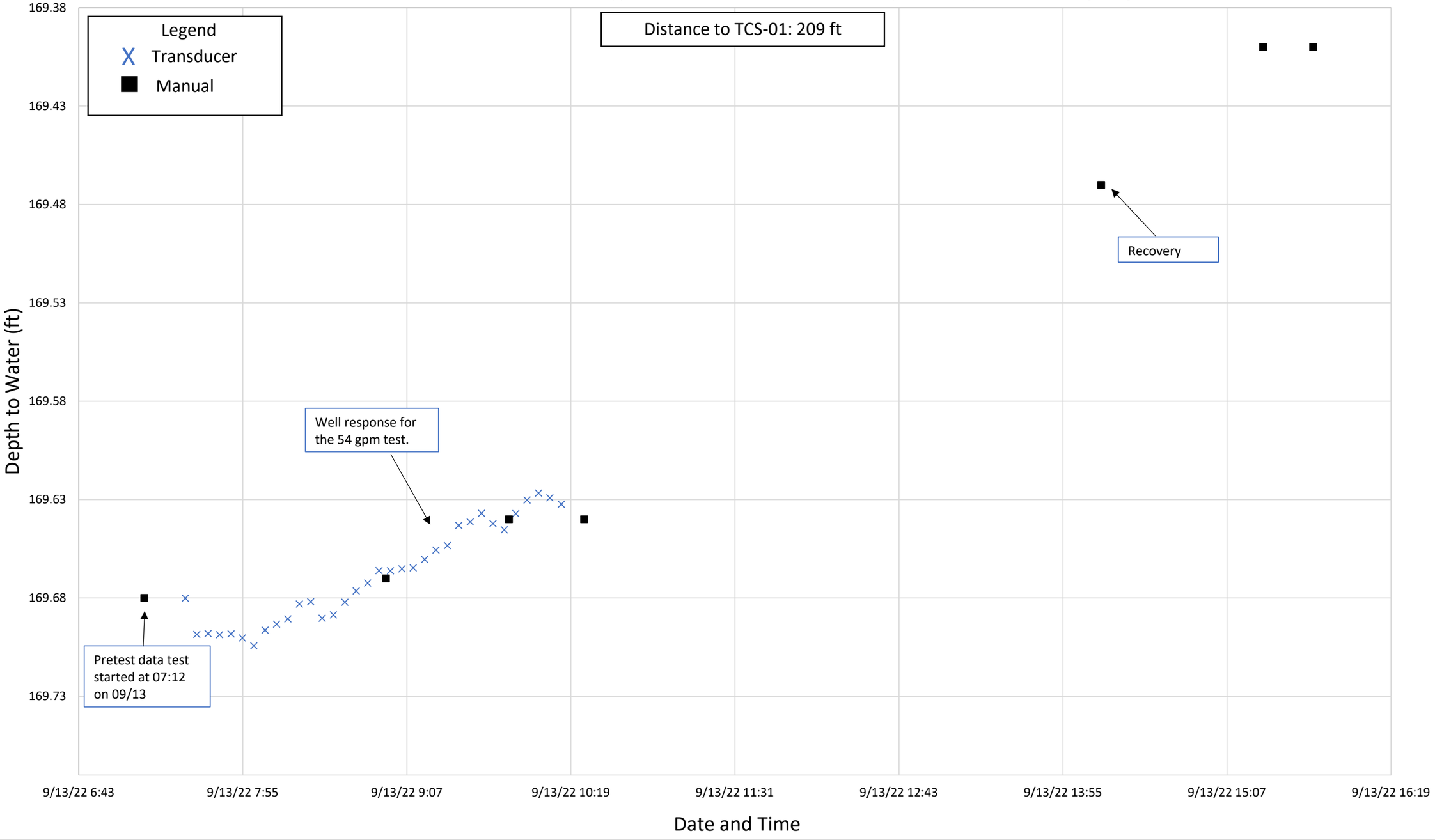
MW-67-225 During TCS-01 Upper Screen 54 GPM Injectivity Test On 09/13/22



MW-67-185 During TCS-01 Upper Screen Injectivity Test On 9/12/22



MW-67-185 During TCS-01 Upper Screen Injectivity Test On 9/13/22



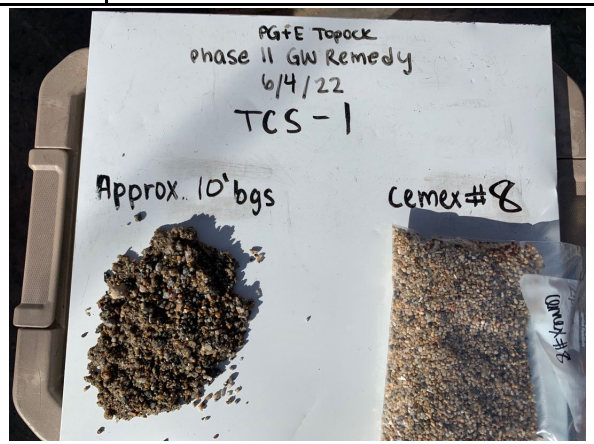
Attachment 9

Photo Logs

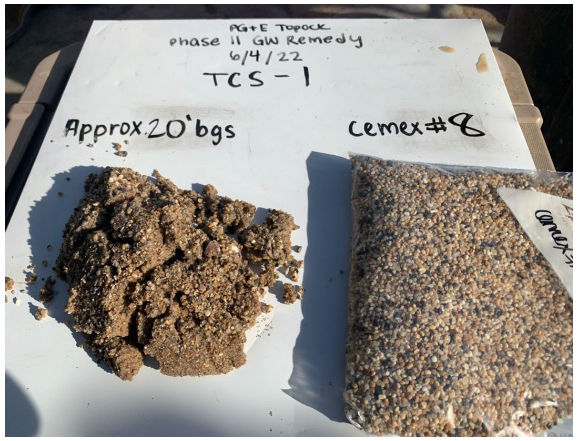
ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE OVERDRILL: TEMPORARY BACKFILL REMOVAL VERIFICATION PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 0 to 280 ft**	**PHOTOS LAST ADDED:** 6/22/2022

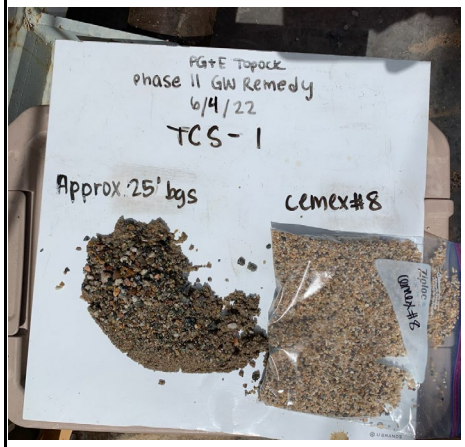
Drill Cuttings Depth: Approx. 3' bgs
Description: Confirmation of Cemex #60 Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022



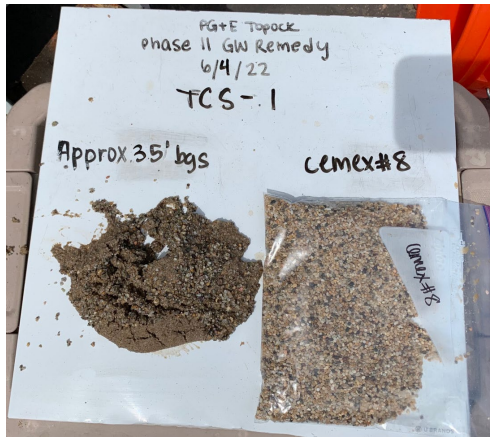
Drill Cuttings Depth: Approx. 10' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022



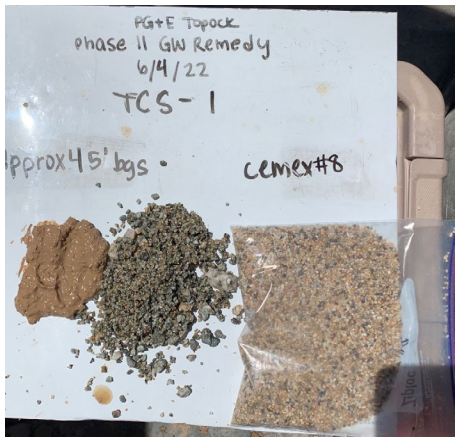
Drill Cuttings Depth: Approx. 20' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022



Drill Cuttings Depth: Approx. 25' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022



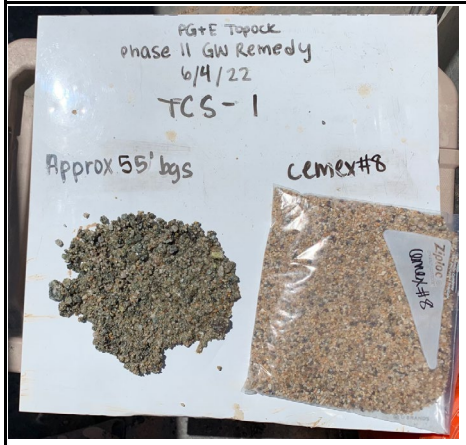
Drill Cuttings Depth: Approx. 35' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022



Drill Cuttings Depth: Approx. 45' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022

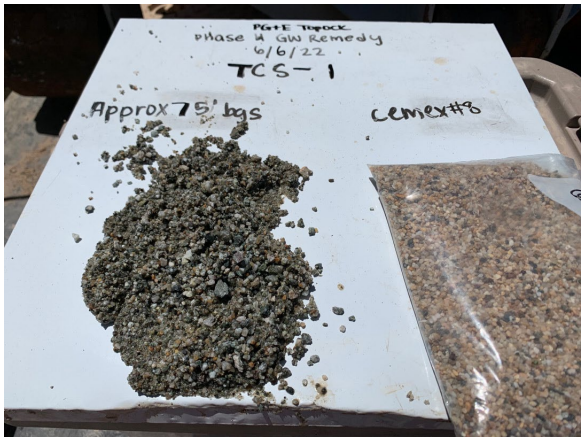
ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE OVERDRILL: TEMPORARY BACKFILL REMOVAL VERIFICATION PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 0 to 280 ft**	**PHOTOS LAST ADDED:** 6/22/2022

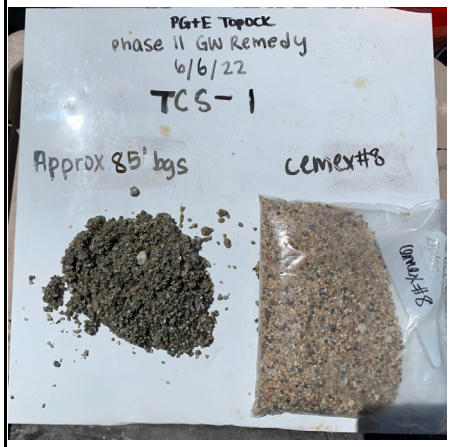


Drill Cuttings Depth: Approx. 55' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/4/2022

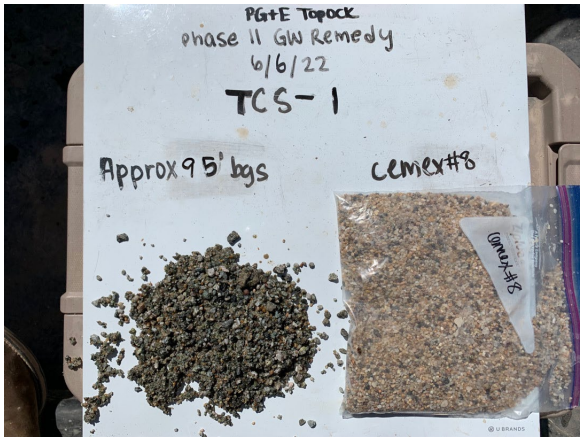
Drill Cuttings Depth: Approx. 65' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/6/2022



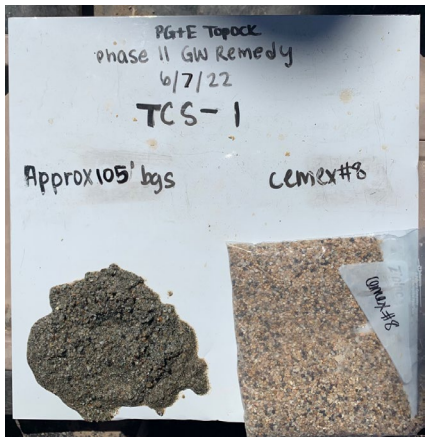
Drill Cuttings Depth: Approx. 75' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/6/2022



Drill Cuttings Depth: Approx. 85' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/6/2022



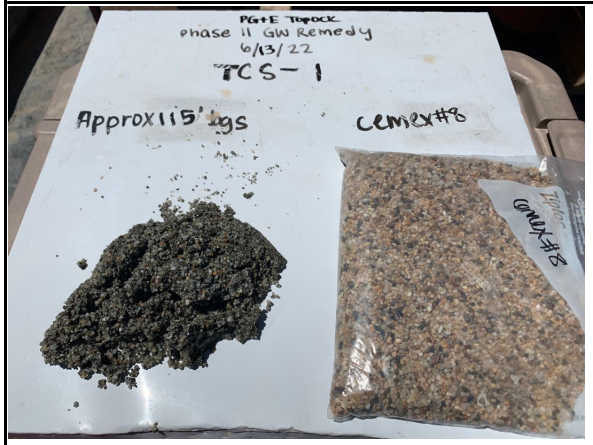
Drill Cuttings Depth: Approx. 95' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/6/2022



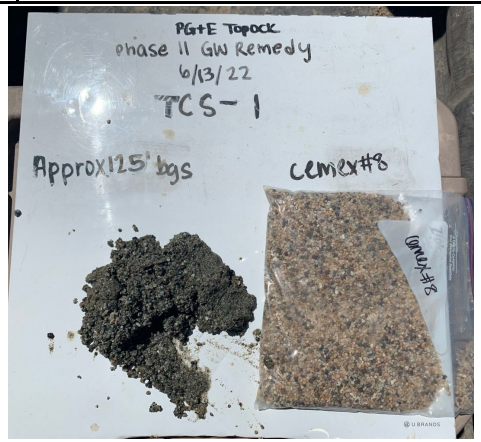
Drill Cuttings Depth: Approx. 105' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/7/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE OVERDRILL: TEMPORARY BACKFILL REMOVAL VERIFICATION PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 0 to 280 ft**	**PHOTOS LAST ADDED:** 6/22/2022



Drill Cuttings Depth: Approx. 115' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/13/2022

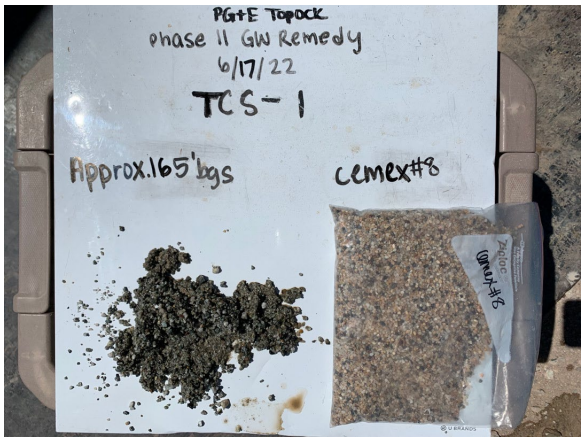


Drill Cuttings Depth: Approx. 125' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/13/2022

Drill Cuttings Depth: Approx. 135' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/17/2022

Drill Cuttings Depth: Approx. 145' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/17/2022

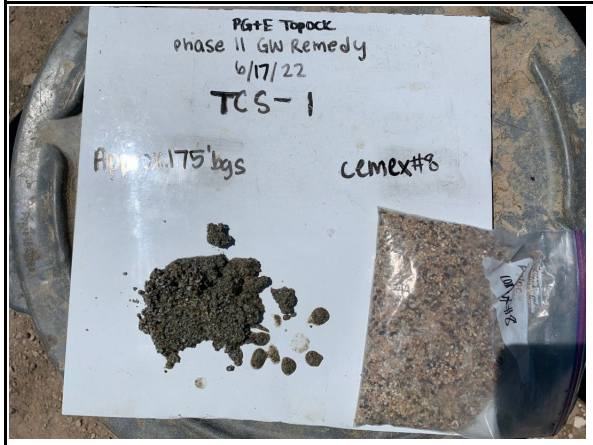
Drill Cuttings Depth: Approx. 155' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/17/2022



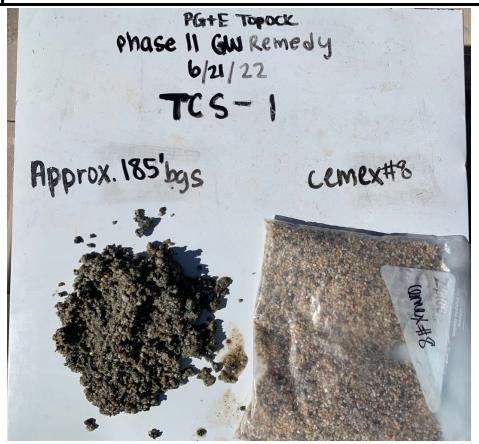
Drill Cuttings Depth: Approx. 165' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/17/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE OVERDRILL: TEMPORARY BACKFILL REMOVAL VERIFICATION PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 0 to 280 ft**	**PHOTOS LAST ADDED:** 6/22/2022



Drill Cuttings Depth: Approx. 175' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/17/2022



Drill Cuttings Depth: Approx. 185' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

Drill Cuttings Depth: Approx. 195' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

Drill Cuttings Depth: Approx. 205' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

Drill Cuttings Depth: Approx. 215' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

Drill Cuttings Depth: Approx. 225' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

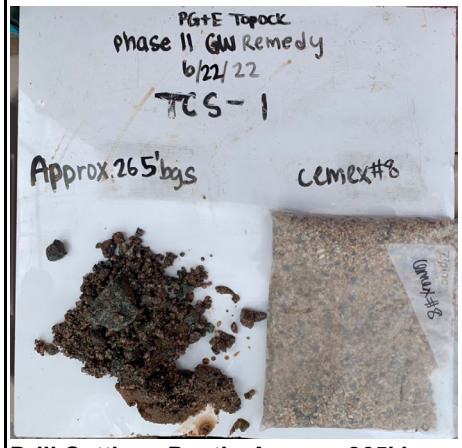
ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE OVERDRILL: TEMPORARY BACKFILL REMOVAL VERIFICATION PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 0 to 280 ft**	**PHOTOS LAST ADDED:** 6/22/2022

Drill Cuttings Depth: Approx. 235' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/21/2022

Drill Cuttings Depth: Approx. 245' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/22/2022

Drill Cuttings Depth: Approx. 255' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/22/2022



Drill Cuttings Depth: Approx. 265' bgs
Description: Confirmation of Cemex 8 Mesh Lapis Lustre Sand in drill cuttings.
Date: 6/22/2022

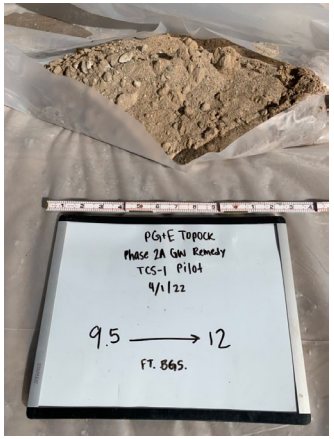
Drill Cuttings Depth: Approx. 275' bgs
Description: Confirmation of Cemex #3 Lapis Lustre Sand in drill cuttings.
Date: 6/22/2022

ARCADIS

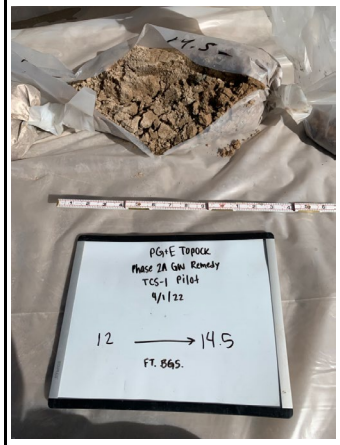
CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 0 to 12
Description: Samples (0-7' bgs) previously collected for logging during air knifing activities.
Date: 4/1/2022

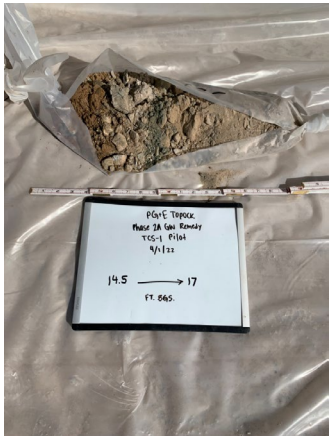
Core Depth: 0 to 12
Description: Samples (0-7' bgs) previously collected for logging during air knifing activities.
Date: 4/1/2022



Core Depth: 9.5 to 12
Description:
Date: 4/1/2022



Core Depth: 12 to 14.5
Description:
Date: 4/1/2022



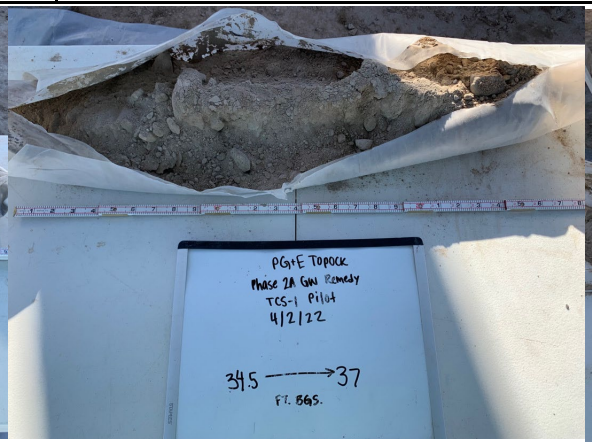
Core Depth: 14.5 to 17
Description:
Date: 4/1/2022

Core Depth: 17 to 22
Description:
Date: 4/2/2022

ARCADIS

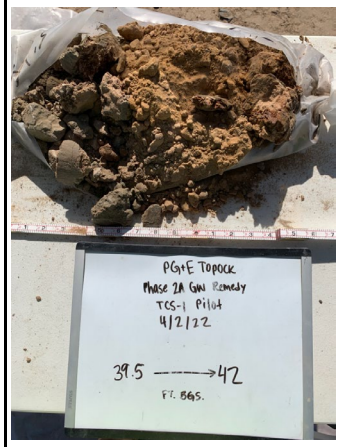
CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 22 to 27
Description:
Date: 4/2/2022



Core Depth: 34.5 to 37
Description: No recovery 27 to 34.5' bgs.
Date: 4/2/2022

Core Depth: 37 to 42
Description:
Date: 4/2/2022



Core Depth: 39.5 to 42
Description:
Date: 4/2/2022

Core Depth: 42 to 47
Description:
Date: 4/2/2022

Core Depth: 47 to 52
Description:
Date: 4/2/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 52 to 57
Description:
Date: 4/2/2022

Core Depth: 57 to 62
Description:
Date: 4/2/2022

Core Depth: 62 to 67
Description:
Date: 4/2/2022

Core Depth: 67 to 72
Description:
Date: 4/2/2022

Core Depth: 72 to 77
Description:
Date: 4/2/2022

Core Depth: 77 to 82
Description:
Date: 4/2/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 82 to 87
Description:
Date: 4/2/2022

Core Depth: 87 to 92
Description:
Date: 4/2/2022

Core Depth: 92 to 97
Description:
Date: 4/2/2022

Core Depth: 97 to 102
Description:
Date: 4/4/2022

Core Depth: 102 to 107
Description:
Date: 4/4/2022

Core Depth: 107 to 112
Description:
Date: 4/2/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 112 to 117
Description:
Date: 4/2/2022

Core Depth: 117 to 122
Description:
Date: 4/2/2022

Core Depth: 122 to 127
Description:
Date: 4/2/2022

Core Depth: 127 to 132
Description:
Date: 4/2/2022

Core Depth: 132 to 137
Description:
Date: 4/2/2022

Core Depth: 137 to 142
Description:
Date: 4/2/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 142 to 147
Description:
Date: 4/2/2022

Core Depth: 147 to 152
Description:
Date: 4/2/2022

Core Depth: 152 to 157
Description:
Date: 4/2/2022

Core Depth: 157 to 162
Description:
Date: 4/2/2022

Core Depth: 162 to 167
Description:
Date: 4/2/2022

Core Depth: 167 to 170
Description:
Date: 4/2/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 170 to 174.5
Description:
Date: 4/3/2022

Core Depth: 174.5 to 177
Description:
Date: 4/3/2022

Core Depth: 177 to 182
Description:
Date: 4/4/2022

Core Depth: 182 to 187
Description:
Date: 4/3/2022

Core Depth: 187 to 192
Description:
Date: 4/3/2022

Core Depth: 192 to 197
Description:
Date: 4/3/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 192 to 194.5
Description:
Date: 4/3/2022

Core Depth: 194.5 to 196
Description:
Date: 4/3/2022

Core Depth: 196 to 197
Description:
Date: 4/3/2022

Core Depth: 197 to 202
Description:
Date: 4/4/2022

Core Depth: 202 to 206
Description:
Date: 4/4/2022

Core Depth: 206 to 212
Description:
Date: 4/4/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

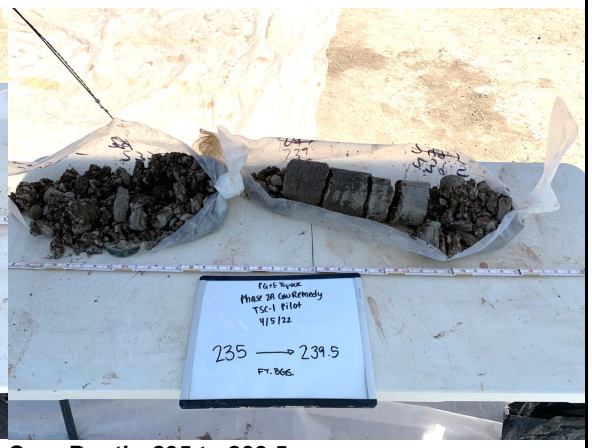
Core Depth: 212 to 217
Description:
Date: 4/4/2022

Core Depth: 217 to 222
Description:
Date: 4/4/2022

Core Depth: 222 to 227
Description:
Date: 4/4/2022

Core Depth: 227 to 232
Description:
Date: 4/5/2022

Core Depth: 232 to 235
Description:
Date: 4/5/2022



Core Depth: 235 to 239.5
Description:
Date: 4/5/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 239.5 to 245
Description:
Date: 4/5/2022

Core Depth: 245 to 252
Description:
Date: 4/5/2022

Core Depth: 252 to 257
Description:
Date: 4/5/2022

Core Depth: 257 to 262
Description:
Date: 4/5/2022

Core Depth: 262 to 264.5
Description:
Date: 4/12/2022

Core Depth: 264.5 to 269.5
Description:
Date: 4/12/2022

ARCADIS

CLIENT NAME: PG&E	**PILOT BOREHOLE CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**TCS-01 Pilot 0 to 280 ft**	**PHOTOS LAST ADDED:** 4/13/2022

Core Depth: 269.5 to 275
Description:
Date: 4/12/2022

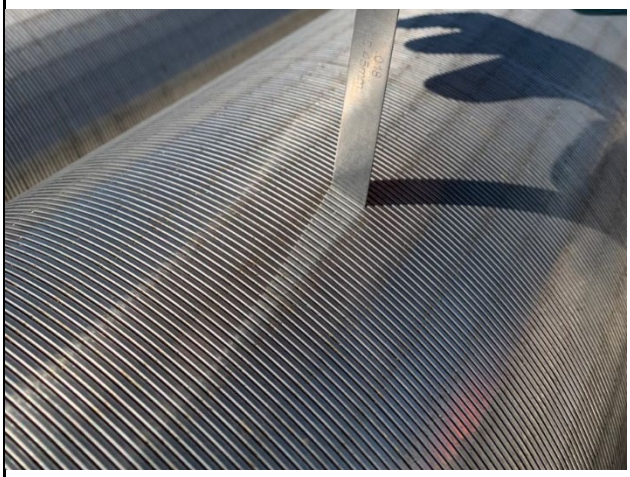
Core Depth: 275 to 277.5
Description:
Date: 4/13/2022

Core Depth: 277.5 to 280
Description:
Date: 4/13/2022

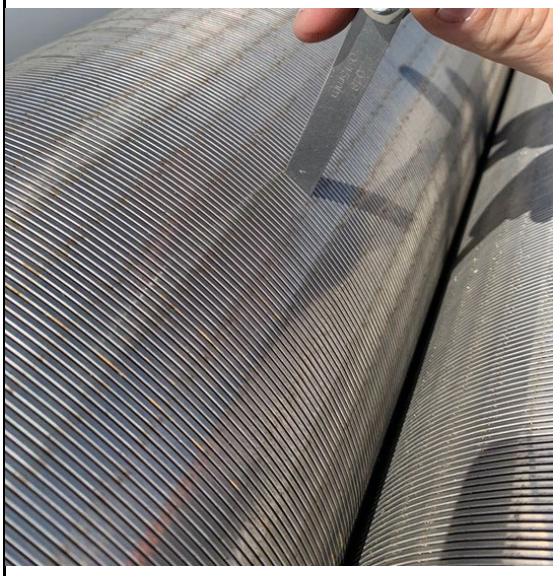
Core Depth: 275 to 280
Description:
Date: 4/13/2022

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
Well materials being dropped off



6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen slot size confirmation



6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen slot size confirmation

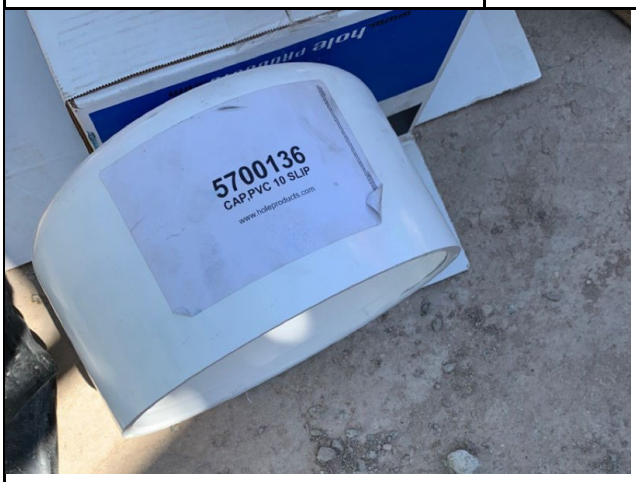
CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
18-slot stamp on 316L Stainless Steel Wire Wrap Screen

6/24/2022 – TCS-01:
18-slot stamp on 316L Stainless Steel Wire Wrap Screen

6/24/2022 – TCS-01:
Kwik-Zip Centralizers

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01



6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC

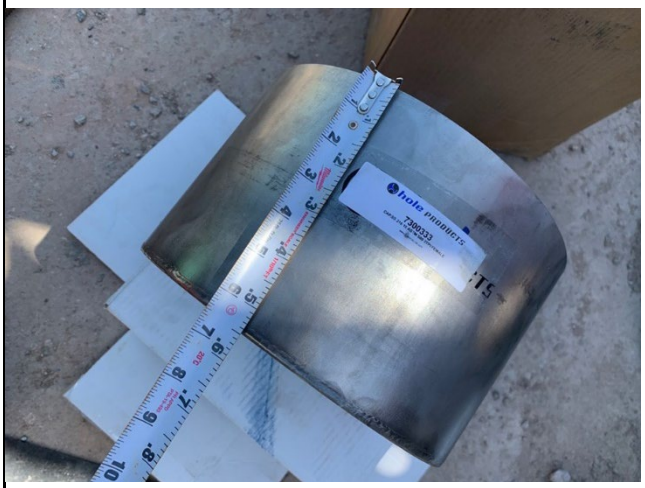
6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing outer diameter (10.80-inches)

6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing inner diameter (9.24-inch)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing

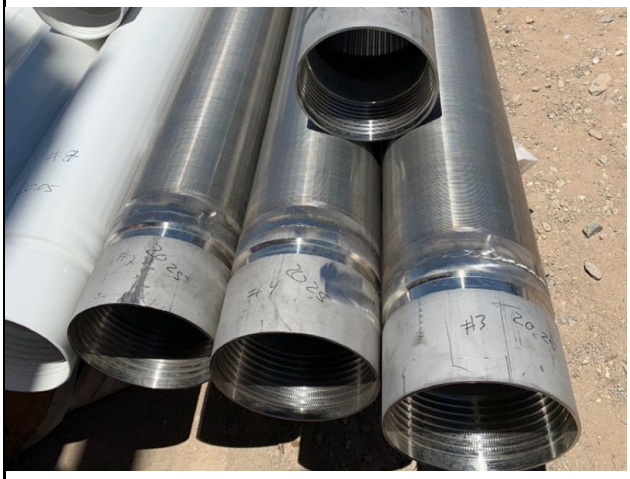
6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing



6/24/2022 – TCS-01:
10-inch 316L Stainless Steel End Cap

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
10-inch 316L Stainless Steel End Cap



6/24/2022 – TCS-01:
10-inch 18-slot, 316L Stainless Steel Wire Wrap Screen

6/24/2022 – TCS-01:
End cap and sump with centralizer set at approximately 272’ bgs (#1)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen installation (#2)

6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen installation (#3)

6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen installation (#4)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

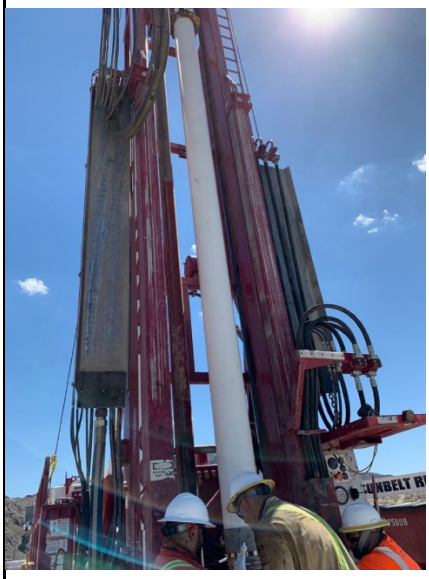
6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#5)

6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation with centralizer set at approximately 210’ bgs, (#5)

6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#6)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/24/2022 – TCS-01:
10-inch 18-slot Stainless Steel 316L Wire Wrap Screen installation (#7)

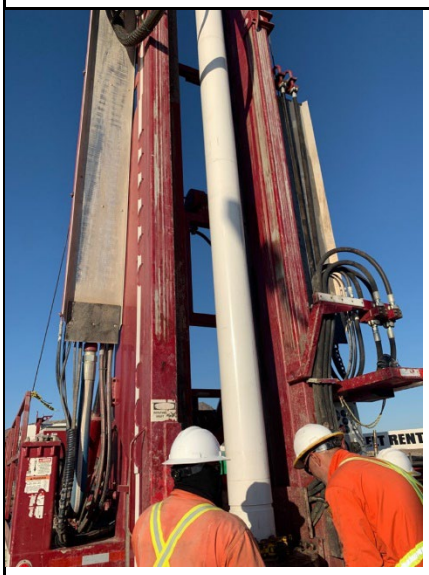


6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#8)

6/24/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation with centralizer set at approximately 160’ bgs (#8)

ARCADIS

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01



6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#9)

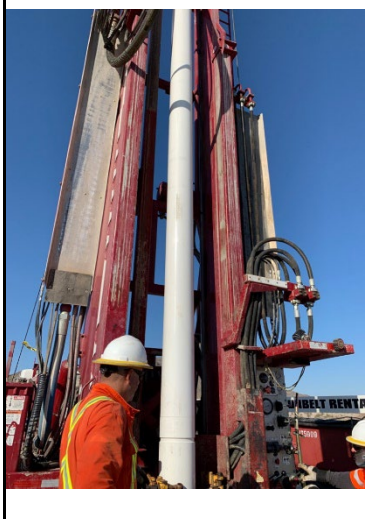
6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#10)

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation centralizer set at approximately 120’ bgs (#10)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#12)

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation with centralizer set at approximately 80’ bgs (#12)

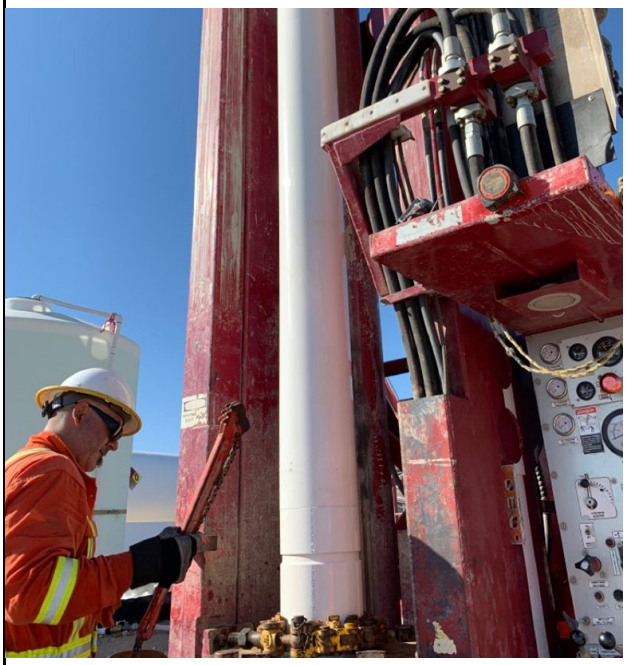


6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#13)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#14)

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation with centralizer set at approximately 45' bgs (#14)

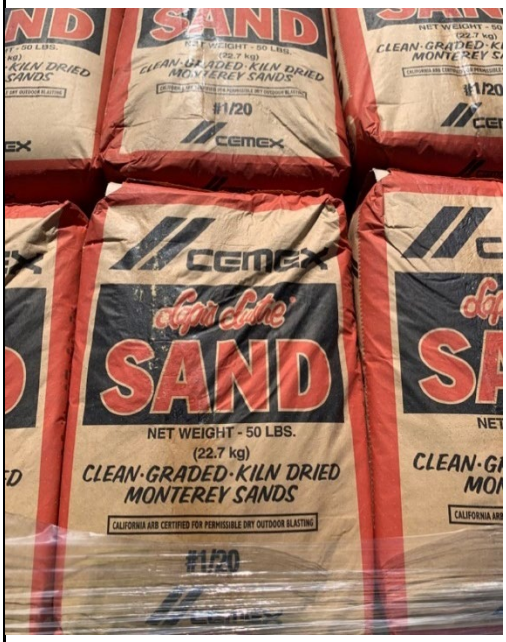


6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#15)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

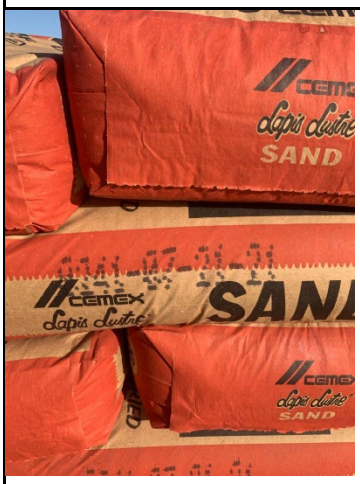
6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing installation (#16)

6/25/2022 – TCS-01:
10-inch Shur-Grip SDR-17 PVC casing stickup installation (#17)



6/26/2022 – TCS-01:
Cemex #1/20 Mesh (20x40) Lapis Lustre Sand used for upper and lower filter pack

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01



6/26/2022 – TCS-01:
Batch number stamped on Cemex #1/20 Mesh (20x40) Lapis Lustre Sand used for upper and lower filter pack

6/28/2022 – TCS-01:
Outside diameter of alignment tool (8.75-inches)

6/28/2022 – TCS-01:
Inner diameter of alignment tool (7.5-inches)

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/28/2022 – TCS-01:
Hoisting "Dummy Tool" for preliminary alignment test

6/28/2022 – TCS-01:
Installing "Dummy Tool" for preliminary alignment test

6/28/2022 – TCS-01:
Swabbing tool used to surge upper and lower screen to promote filter pack settling

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

6/29/2022 – TCS-01:
Cemex #60 Mesh (40x70) Lapis Lustre Sand used for transition sand

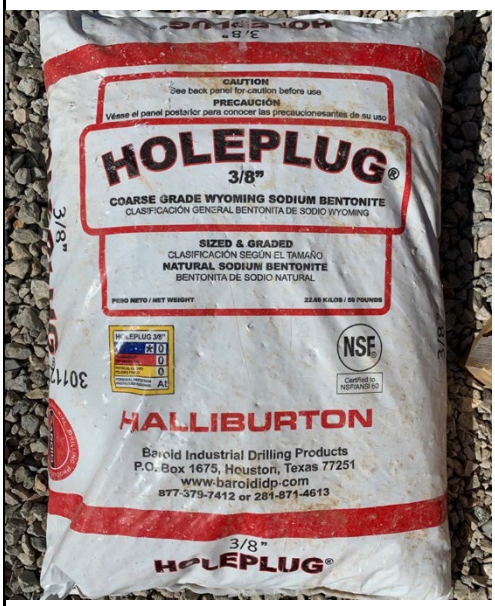
6/29/2022 – TCS-01:
Cemex #60 Mesh (40x70) Lapis Lustre Sand used for transition sand

6/29/2022 – TCS-01:
Pel-Plug Bentonite Pellets 3/8” TR30 used for intermediate seal

CLIENT NAME: PG&E	**WELL CONSTRUCTION PHOTO LOG**	**PROJECT NAME / LOCATION:** Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		**WELL ID: TCS-01**

6/29/2022 – TCS-01:
Cemex #1/20 Mesh (20x40) Lapis Lustre Sand used for upper and lower filter pack

6/29/2022 – TCS-01:
Cemex #1/20 Mesh (20x40) Lapis Lustre Sand used for upper and lower filter pack



7/6/2022 – TCS-01:
Holeplug 3/8" Wyoming Bentonite used for intermediate bentonite seal

CLIENT NAME: PG&E	**WELL CONSTRUCTION PHOTO LOG**	**PROJECT NAME / LOCATION:** Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		**WELL ID: TCS-01**

7/6/2022 – TCS-01:
Holeplug 3/8" Wyoming Bentonite used for intermediate bentonite seal

7/6/2022 – TCS-01:
Portland Cement Type I, II and V, used for cement grout

7/6/2022 – TCS-01:
Wyoming Bentonite Hydrogel used for cement grout

CLIENT NAME: PG&E	**WELL CONSTRUCTION PHOTO LOG**	**PROJECT NAME / LOCATION:** Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		**WELL ID: TCS-01**

7/9/2022 – TCS-01:
Samples of cement grout used during well installation, after it has hardened

7/9/2022 – TCS-01:
Cemex #0/30 Mesh (30x50) Lapis Lustre Sand used for temporary backfill

7/9/2022 – TCS-01:
Cemex #3 Mesh Lapis Lustre Sand used for temporary backfill

CLIENT NAME: PG&E	**WELL CONSTRUCTION PHOTO LOG**	**PROJECT NAME / LOCATION:** Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		**WELL ID: TCS-01**

7/9/2022 – TCS-01:
After removing casing, boulder fell into well at approximately 2.7 ft. bgs. Well appears undamaged

7/9/2022 – TCS-01:
Inside of well checked after boulder fell into borehole, no issues/damage observed

7/9/2022 – TCS-01:
Inside of well checked after boulder fell into borehole, no issues/damage observed

ARCADIS

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: TCS-01

7/9/2022 – TCS-01:
Well completed with backfill sand. Temporary 1-foot stickup added to well along with cap

7/9/2022 – TCS-01:
Well completed with temporary backfill sand. Temporary 1-foot stickup added to well along with cap

7/9/2022 – TCS-01:
Well completed with temporary backfill sand. Temporary 1-foot stickup added to well along with cap

Attachment 10

Video Survey Report

Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	Cascade Drilling	**Date:**	02-Dec-22
Well:	TCS-01	**Run No.**	One
Field:	Topock	**Job Ticket:**	30505
State:	Arizona	**Total Depth:**	273.1 ft
Location:	145453 National Trails Hwy.	**Water Level:**	166.1 ft
		Oil on Water:	No
GPS:	34.715554,-114.4936028	**Operator:**	Conner
Zero Datum:	Ground Level	**Tool Zero:**	Side-Scan
Reason for Survey:	New Well Construction	**Guides Set**	9 in

Truck PS-6

SWL **Amount:** N/A

Dead Space 1.25 ft

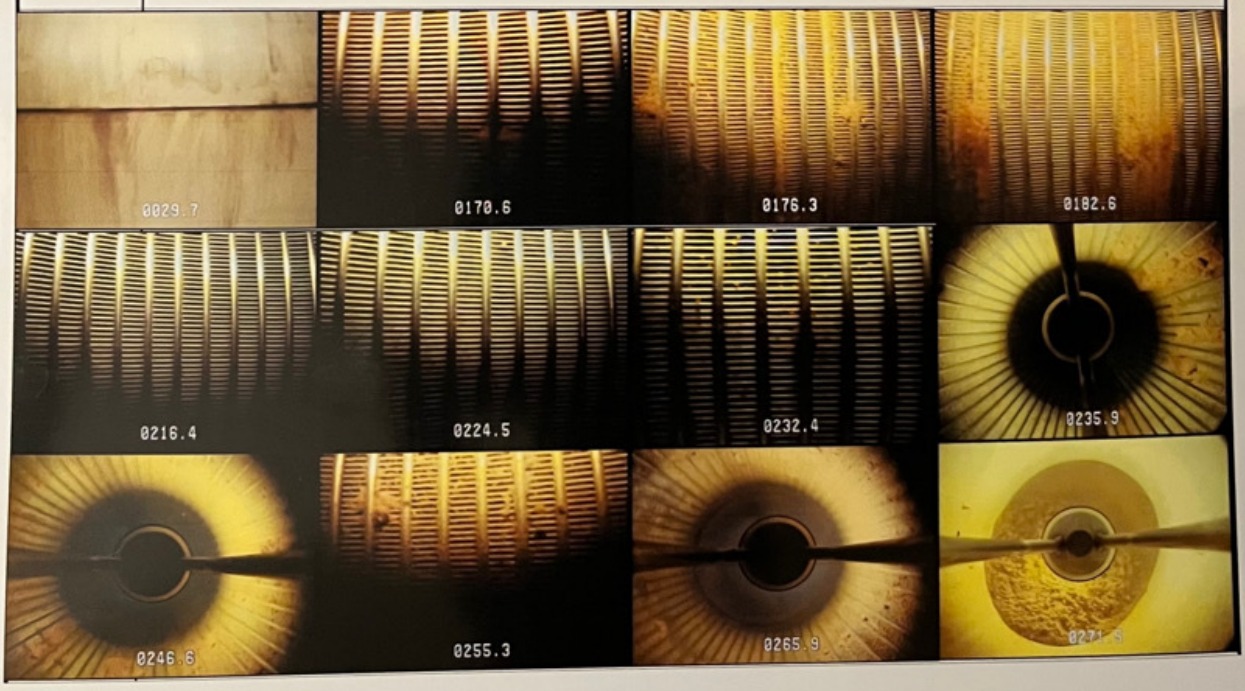
Depth	Observations
0.0 ft	Began survey at ground level.
9.6 ft	First joint in casing; appears to be tight and uniform.
29.7 ft	Second joint in casing; appears to be tight and uniform.
49.7 ft	Third joint in casing; appears to be tight and uniform.
166.1 ft	SWL; water is clear.
169.8 ft	Top of screened interval; appears to be open.
190.1 ft	Bottom of screened interval.
213.6 ft	Top of screened interval; appears to be open.
268.3 ft	Bottom of screened interval.
272.7 ft	Top of soft fill material.
273.1 ft	Camera light bar tags bottom.
	Survey ends.

Well Details

Perforation:	**From Survey**
Wire-Wrap	170.00 ft to 190.00 ft
	214.00 ft to 268.00 ft

Casing Size (in)		**From Survey**
OD	ID	
10.000	N/A	0.00 ft to 273.40 ft

Casing Material	PVC
Screen Material	Stainless Steel



800.919.7555
909.625.6262

1785 w. arrow rte., bdlg. d, ste. 3,4
upland, ca 91786
www.pacificsurveys.com

fax: 909.399.3180

TCS-1 - Pacific Surveys video log description