

Report of Findings  
Twisted Creek Ranch  
Groundwater Availability Certification for Platting:  
Comanche County, Texas

For:  
Lone Star Land Partners, LLC.  
P.O. Box 1987  
Marble Falls, TX 78654



**Wet Rock Groundwater Services, L.L.C.**  
**Groundwater Specialists**

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REPORT OF FINDINGS

WRGS 21-011

**Twisted Creek Ranch Subdivision  
Groundwater Availability Certification for Platting:  
Comanche County, Texas**

*for*



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P.O. Box 1987

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August 2021

WRGS Project No. 083-002-21



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The seal appearing on this document was authorized by Kaveh Khorzad, P.G. 1126 on August 20, 2021:



A handwritten signature in black ink, appearing to read "Kaveh Khorzad".

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Kaveh Khorzad, P.G.

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TBPG Firm Registration No. 50038



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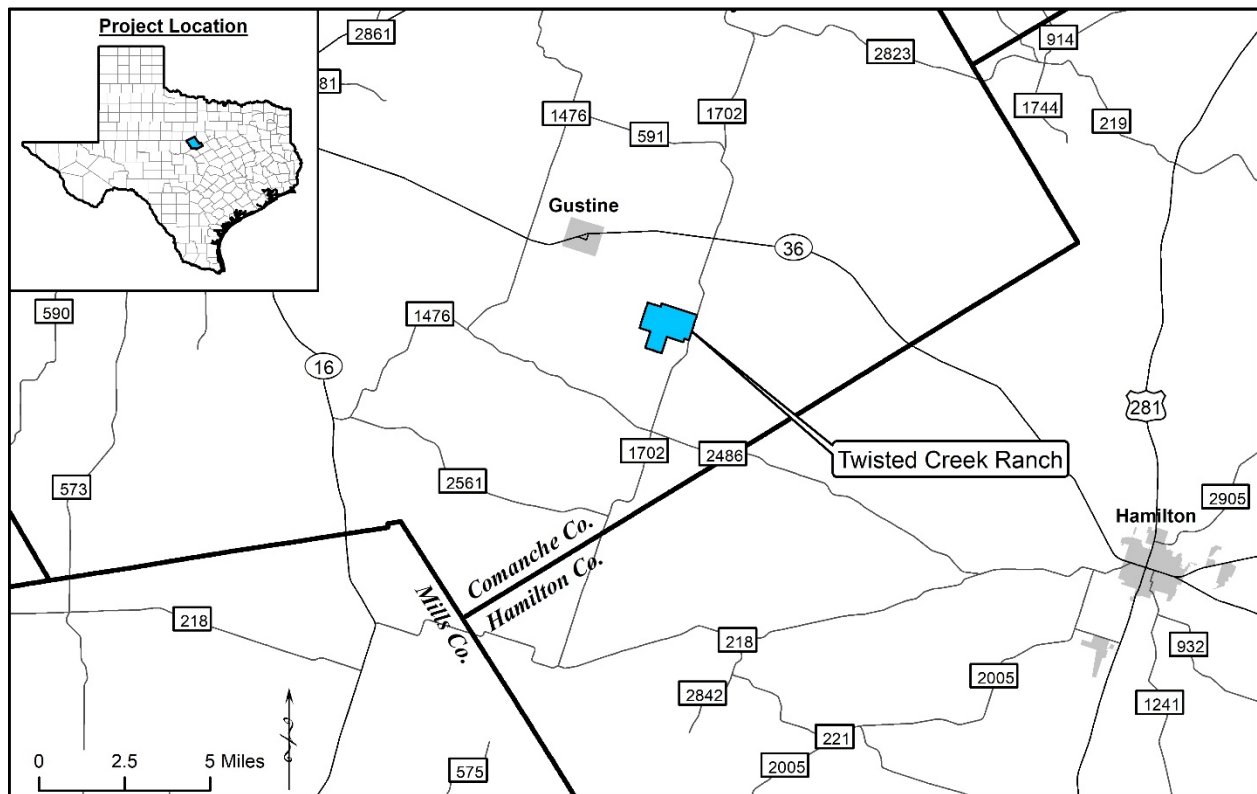
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## **Section I: Introduction**

This report details the results of a groundwater availability study for the proposed Twisted Creek Ranch Subdivision (Twisted Creek) to meet the requirements of the Certification of Groundwater Availability for Platting Form (*Title 30, Texas Administrative Code, Chapter 230, Sections 230.2 through and including 230.11*). Appendix A provides the completed Certification of Groundwater Availability for Platting Form.

Twisted Creek is located along Farm to Market (FM) 1702 approximately 3 miles southeast of the City of Gustine in southeastern Comanche County (Figure 1). The proposed subdivision is documented within the Comanche County Tax Assessor as Property IDs: 9827, 10359, 10360, 9565 and 10361. Lone Star Land Partners Twisted Creek Ranch, LLC (P.O. Box 1987, Marble Falls, TX 78654) is the plat applicant.



**Figure 1: Location map**

Lone Star Land Partners Twisted Creek Ranch, LLC proposes to develop the approximately 967.16 acre property as a subdivision including 117 single family residential lots. The average lot size is 8.3 acres; each lot will be served by an individual water well. The subdivision is located within the jurisdiction of the Middle Trinity Groundwater Conservation District (CTGCD). Figure 2 provides a map showing the general location of the subdivision with the county and groundwater district boundaries.

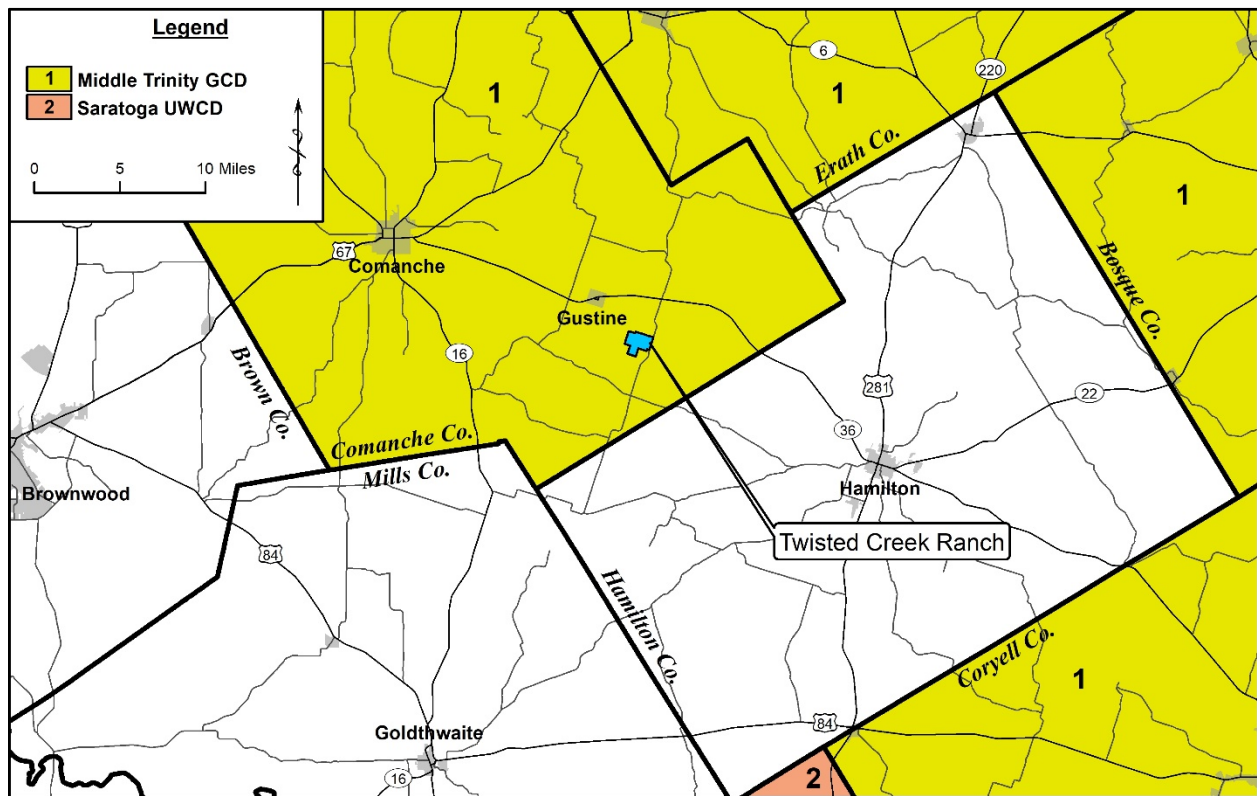


Figure 2: Groundwater Conservation District map

## **Section II: Projected Water Demand Estimate**

To estimate the water demand within the proposed subdivision, US Census data (2.43 persons per household) and per capita water use estimates (103 gallons per person per day; gpd) from the Texas Water Development Board (TWDB) were utilized.

### **Equation 1: Total Water Demand**

$$Q_s = n \times 2.43 \times 103 \times 365 \text{ days} = 10,688,634.45 \text{ gallons/year or } 32.8 \text{ acre-feet/year}$$

Where:

$Q_s$  = Total Water Demand at full build out for the subdivision;

$n$  = Number of lots (117 lots);

2.43 = Average number of persons per household; and

103 = The average per capita usage of water per day in gallons.

### **Equation 2: Water Demand per Housing Unit**

$$Q_h = 2.43 \times 103 \times 365 \text{ days} = 91,355.85 \text{ gallons/year or } 0.28 \text{ acre-feet/year}$$

Where:

$Q_h$  = Total Water Demand per house per year

Equation 1 assumes 2.43 persons per household using 103 gallons per person per day which results in a total water demand for the subdivision of 32.8 acre-feet/year. Equation 2 results in a water demand per housing unit of 0.28 acre-feet/year. There are no planned non-residential water demands.



## **Section III: General Groundwater Resource Information**

### **III.1. Introduction**

According to the Texas Water Development Board (TWDB), there is one (1) major aquifer (Trinity Aquifer) that supplies groundwater within the study area. The TWDB classifies major aquifers as aquifers that produce large amounts of water over large areas, and minor aquifers as aquifers that produce minor amounts of water over large areas or large amounts of water over small areas. The Trinity Aquifer is part of a thick and regionally extensive aquifer system composed of Cretaceous carbonates and clastics that were deposited throughout north, central and south Texas and is classified as a major aquifer.

### **III.2. Stratigraphy and Geologic History**

The surface geology consists of the Trinity and Fredericksburg Groups, which were deposited approximately 140 million years ago by a Cretaceous-aged sea that once dominated the interior of North America and the Gulf Coast region. For approximately 79 million years, this shallow sea deposited the sediments that now make up the property and its surrounding area. Figure 3 provides a geologic map and stratigraphic column illustrating the geology surrounding the proposed subdivision. In the study area, the Trinity Group is divided into three geologic formations from oldest to youngest: Twin Mountains Formation, Glen Rose Formation, and Paluxy Formation (Kelly and others, 2014).

The Twin Mountains Formation is mainly comprised of shale, sand, and limestone and is generally grouped as one formation. To the south and east, the formation is separated from oldest to youngest into the Hosston and Sligo members (Lower Trinity Aquifer), Hammett Shale (aquitard), and the Cow Creek Limestone and Hensell Sand (part of the Middle Trinity Aquifer). The older Hosston member of the Twin Mountains Formation was deposited around the same geologic time; however, its composition varies due to depositional localities. The Hosston Member was deposited in a fluvial coastal setting (Kelly and others, 2014).

Above the Twin Mountains Formation is the Glen Rose Limestone, which is separated into Upper and Lower members to the south and east of the study area (Figure 3). This limestone formation was deposited in a shallow marine shelf environment that was extensive in nature (Kelly and others, 2014). The Glen Rose Limestone generally consists of alternating layers of limestone and dolomite found at the top of the formation; massive limestone layers are found near the base. Above the Glen Rose Limestone is the Paluxy Sand, which is also part of the Upper Trinity Aquifer (Jones, 2003; Figure 3).

Above the Trinity Group lies the Fredericksburg Group that make up the Edwards Aquifer. The Fredericksburg Group is separated from the Paluxy Formation by the oldest member of the Fredericksburg Group known as the Walnut Formation (confining unit; Figure 3). The Comanche Peak Limestone, Edwards Limestone and Kiamichi Formation make up the Fredericksburg Group within the Edwards Aquifer. The Glen Rose Limestone Formation covers the majority of the surface at Twisted Creek; however, in the north central portion of the property, the alluvium are found (Figure 3).





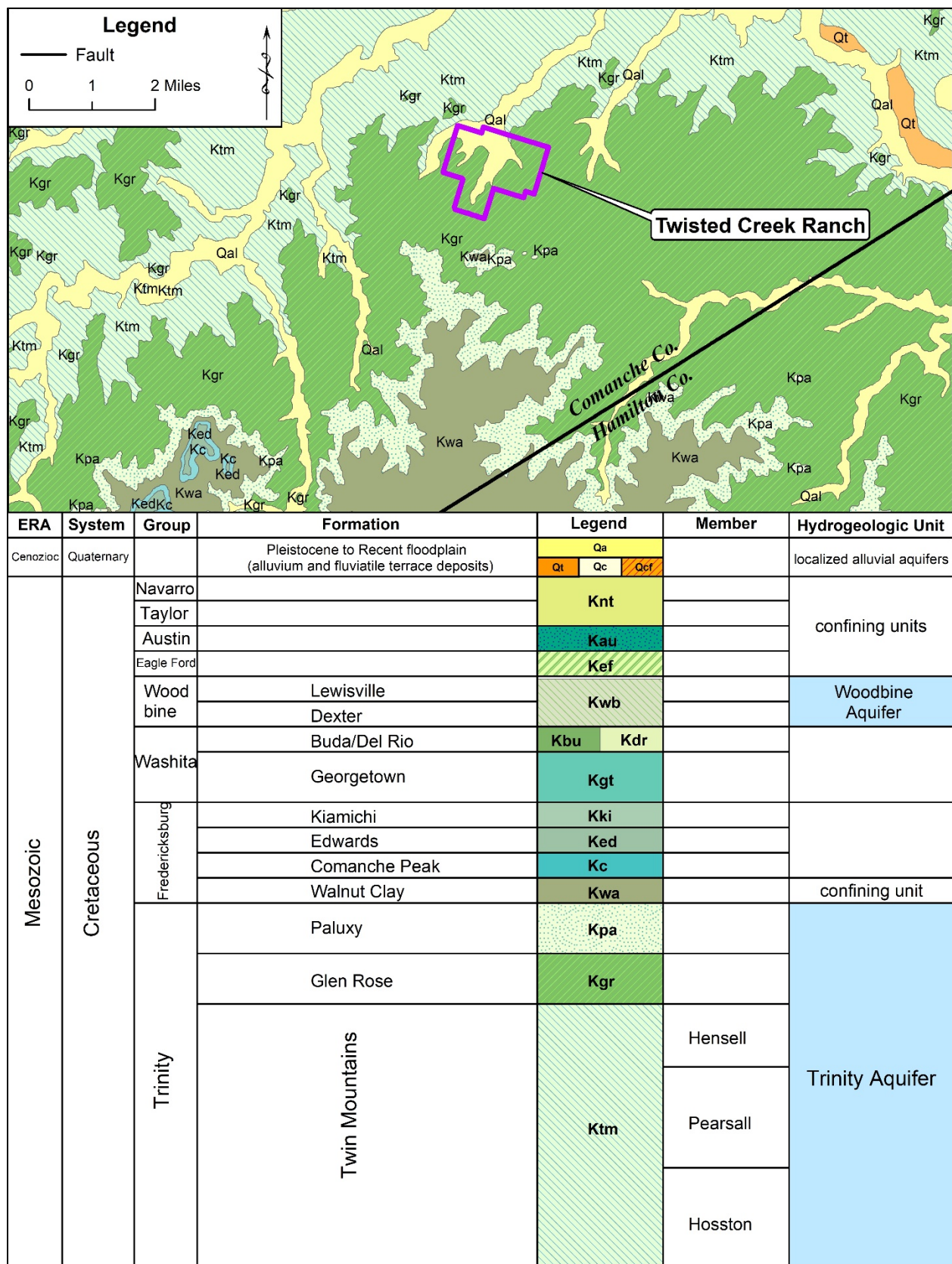


Figure 3: Geologic map (modified from Kelly and others, 2014)

### III.3. Hydrogeology

The main source of groundwater in the area near the proposed subdivision is the Trinity Aquifer. The formations comprising the Trinity Aquifer become thicker downdip (southeast) approaching the Balcones Fault Zone to the south (Ashworth, 1983). The Northern Trinity Aquifer spans from the south at the Colorado River up north into Oklahoma and Arkansas where fresh water can be produced. Figure 4 shows the location of the Trinity Aquifer with respect to other aquifers in the area. The solid green portion reflects the unconfined zone of the Trinity Aquifer where recharge occurs; the hatched green portion reflects the confined zone of the Trinity Aquifer.

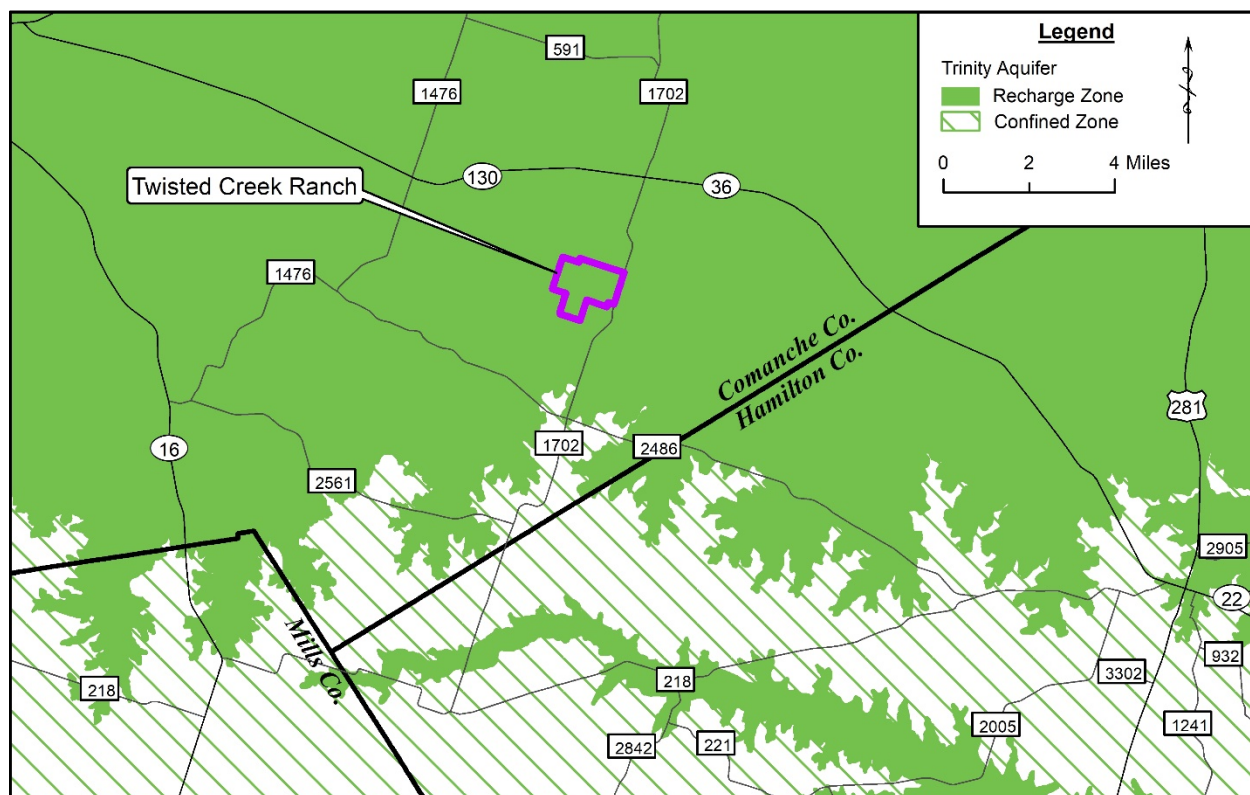


Figure 4: Aquifer map

The Trinity Aquifer exhibits variable yield and quality throughout the north and central Texas area. The quantity of water an aquifer yields depends upon its ability to store and transmit water. The water quality of a well completed within the Trinity Aquifer depends upon several factors, including the degree of fracturing, sand thickness and permeability, the amount of time the groundwater is in contact with the rock formation it is flowing through, and the minerals that compose the rock. For example, groundwater that flows through gypsum and anhydrite beds, which are composed of calcium sulfate ( $\text{CaSO}_4$ ), will typically contain elevated levels of sulfate (Ashworth, 1983).

The most permeable portions of the Trinity Aquifer near Twisted Creek are to the southeast near Waco (Baker and others, 1990). In these area, the sands within the aquifer are either less calcareous or have very large saturated thicknesses. Typically, the Hosston Member of the Twin Mountains Formation is the highest yielding strata of the Trinity Aquifer.

Most all of the wells in the area near Twisted Creek are completed in the Trinity Aquifer and completed within the Twin Mountains Formation due to the consistent supply of groundwater that generally meets drinking water standards. The Paluxy and Glen Rose formations typically produce lower quantities of water due to thinner sections of these formations in the area.





## Section IV: Aquifer Testing

### IV.1. Well Details

There are a total of eight (8) wells located within the proposed subdivision that were used in this study; Well No. 1 and No. 2 are existing wells and Well Nos. 3 through 8 are newly constructed wells by Texan Water within the Trinity Aquifer. Figure 5 provides a map showing the locations of the Twisted Creek wells along with all documented wells within one mile of the property boundary. Figures 6 through 9 provide well profiles displaying well construction and formation depths that were determined from the drill cuttings collected by Texan Water, state well reports and geophysical logs; Appendix B provides available state well reports. Table 1 provides a summary of the existing wells according to TWDB well data within 1-mile of the subdivision not used in testing; Table 2 provides a well construction summary for wells used in the testing.

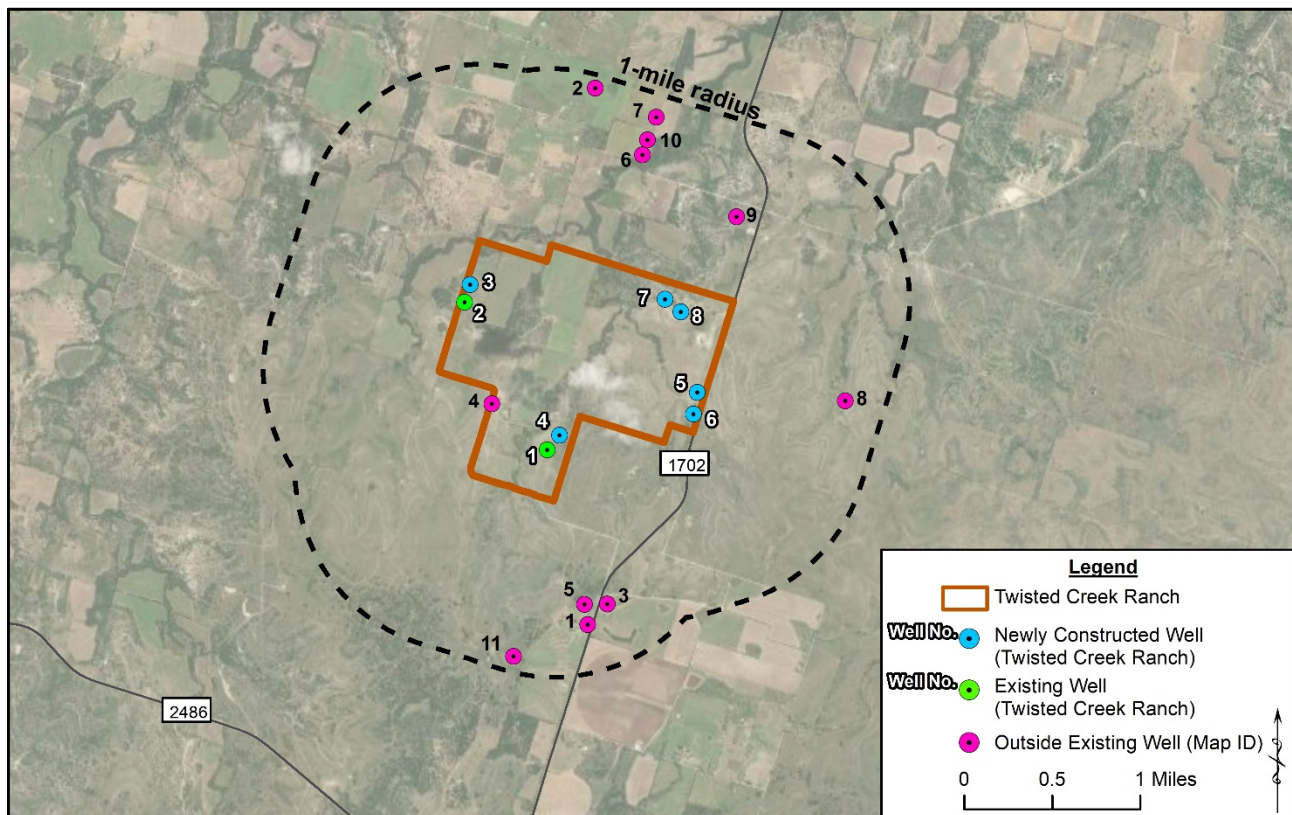


Figure 5: Well location map

Table 1: Summary of wells within 1-mile of the subdivision

Map ID	State Well ID	Owner	Well Depth (ft.)	Well Type
1	4114705	M.O. Dingler	260	Domestic
2	4114402	Russell Hayes	185	Irrigation
3	4114704	Mrs. Aamon Morgan	270	Stock

4	3876	Robert D. Collier	210	Domestic
5	3879	Robert D. Collier	330	Domestic
6	40230	Rufus J. Adcock	180	Irrigation
7	40231	Rufus J. Adcock	180	Irrigation
8	233120	Robert Collier	290	Stock
9	542103	Tony Willingham	285	Domestic
10	573858	Rufus Adcock	185	Irrigation
11	577466	Lone Star Land Partners	320	Domestic

To meet the guidelines for the Comanche County development rules and regulations and to adequately assess the availability of groundwater within the vicinity of the proposed subdivision, four (4) aquifer tests were conducted. The aquifer tests consisted of pumping one well for at least 24 hours followed by a recovery phase while measuring water levels in both the pumping and observation wells. This is in accordance with the testing procedures of the Texas Administrative Code (TAC) Title 30 Part 1 Chapter 230.8. Based on the state well reports, drillers' lithology logs, and geophysical logs conducted by GeoCam, Inc. on Well Nos. 3, 4, 5 and 7, all wells used in the aquifer testing are completed in the Trinity Aquifer. The following provides a summary of the well construction for the wells used in the aquifer tests.

### **Well No. 1**

According to the State Well Report (Tracking No. 577469; Appendix C), Well No. 1 was completed by Alderson Water Well Rescue, LLC on January 28, 2021. The well was drilled to a total depth of 205 feet below ground level (ft. bgl) with a 7 7/8-inch borehole from 0 to 205 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 145 ft. bgl, and 4 1/2-inch PVC screen from 145 to 205 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 20 gallons per minute (gpm) upon completion (Figure 6; Appendix C).

### **Well No. 2**

According to the State Well Report (Tracking No. 448871; Appendix C), Well No. 2 was completed by Dalton Drilling & Service on May 10, 2017. The well was drilled to a total depth of 150 ft. bgl with a 7 7/8-inch borehole from 0 to 20 ft. bgl and a 7 1/2-inch borehole from 20 to 150 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 110 ft. bgl, and 4 1/2-inch PVC screen from 110 to 150 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 15 gpm upon completion (Figure 7; Appendix C).

### **Well No. 3**

According to the State Well Report (Tracking No. 579261; Appendix C), Well No. 3 was completed by Texan Water on July 10, 2021. The well was drilled to a total depth of 160 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 160 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 100 ft. bgl, and 4 1/2-inch PVC screen from 100 to 160 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 40 gpm upon completion (Figure 7; Appendix C).



#### **Well No. 4**

According to the State Well Report (Tracking No. 579300; Appendix C), Well No. 4 was completed by Texan Water on July 10, 2021. The well was drilled to a total depth of 200 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 200 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 140 ft. bgl, and 4 1/2-inch PVC screen from 140 to 200 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 15-20 gpm upon completion (Figure 6; Appendix C).

#### **Well No. 5**

According to the State Well Report (Tracking No. 579263; Appendix C), Well No. 5 was completed by Texan Water on July 9, 2021. The well was drilled to a total depth of 200 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 200 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 140 ft. bgl, and 4 1/2-inch PVC screen from 140 to 200 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 15-20 gpm upon completion (Figure 8; Appendix C).

#### **Well No. 6**

According to the State Well Report (Tracking No. 579267; Appendix C), Well No. 6 was completed by Texan Water on July 21, 2021. The well was drilled to a total depth of 180 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 180 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 140 ft. bgl, and 4 1/2-inch PVC screen from 140 to 180 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 30 gpm upon completion (Figure 8; Appendix C).

#### **Well No. 7**

According to the State Well Report (Tracking No. 579264; Appendix C), Well No. 7 was completed by Texan Water on July 7, 2021. The well was drilled to a total depth of 200 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 200 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 140 ft. bgl, and 4 1/2-inch PVC screen from 140 to 200 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 15-20 gpm upon completion (Figure 9; Appendix C).

#### **Well No. 8**

According to the State Well Report (Tracking No. 579265; Appendix C), Well No. 8 was completed by Texan Water on July 8, 2021. The well was drilled to a total depth of 200 ft. bgl with a 9-inch borehole from 0 to 20 ft. bgl and a 6 3/4-inch borehole from 20 to 200 ft. bgl. The well was completed with 4 1/2-inch PVC casing set from +2 to 140 ft. bgl, and 4 1/2-inch PVC screen from 140 to 200 ft. bgl. According to the driller's lithology log and geophysical logs, the well was completed in the Twin Mountains Formation of the Trinity Aquifer. According to the well report, the well was jetted at an estimated rate of 20 gpm upon completion (Figure 9; Appendix C).





**Table 2: Summary of Twisted Creek Ranch well construction**

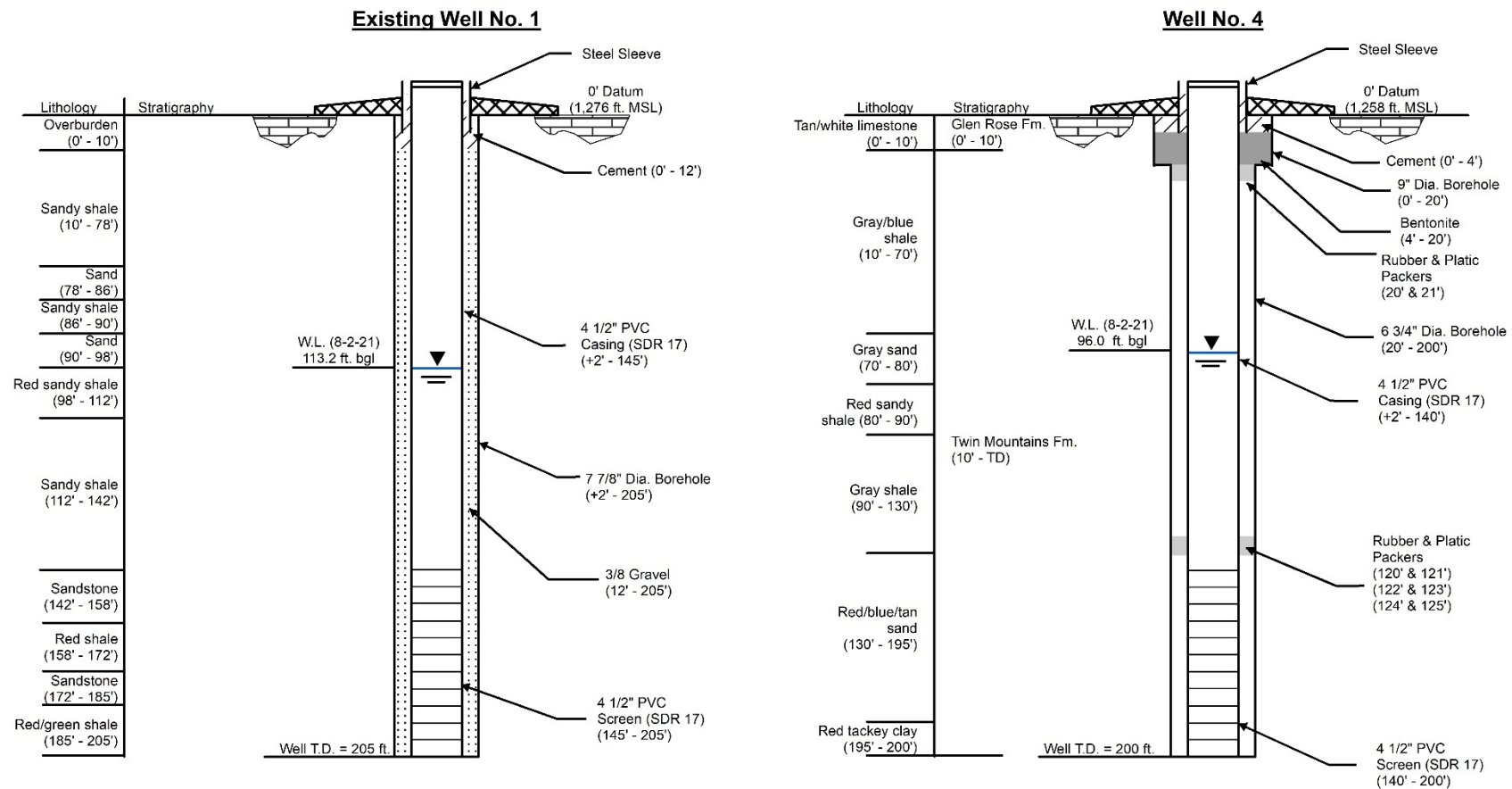
Well	Tracking No.	Latitude	Longitude	Elev. (ft. MSL)	Date Completed	Aquifer	Well Depth (ft. bgl)	Static Water Level (ft. bgl; date; ft. MSL)	Borehole (diameter; ft. bgl)	Casing (diameter; material; ft. bgl)	Screen (diameter; material; ft. bgl)
Well No. 1	577469	31° 48' 01" N	98° 21' 52" W	1,276	1-28-21	Trinity	205	113.2 (8-2-21) 1,162.8	7 7/8" (0-205)	4 1/2" PVC (+2-145)	4 1/2" PVC Screen (145-205)
Well No. 2	448871	31° 48' 45.2" N	98° 22' 19.8" W	1,229	5-10-21	Trinity	150	47.0 (7-28-21) 1,182.0	9" (0-20) 6 3/4" (20-150)	4 1/2" PVC (+2-110)	4 1/2" PVC Screen (110-150)
Well No. 3	579261	31° 48' 50.4" N	98° 22' 17.8" W	1,221	7-10-21	Trinity	160	45.3 (7-28-21) 1,175.7	9" (0-20) 6 3/4" (20-160)	4 1/2" PVC (+2-100)	4 1/2" PVC Screen (100-160)
Well No. 4	579300	31° 48' 5.28" N	98° 21' 49.04" W	1,258	7-10-21	Trinity	200	96.0 (8-2-21) 1,162.0	9" (0-20) 6 3/4" (20-200)	4 1/2" PVC (+2-140)	4 1/2" PVC Screen (140-200)
Well No. 5	579263	31° 48' 17.3" N	98° 20' 59.4" W	1,247	7-9-21	Trinity	200	61.1 (7-26-21) 1,185.9	9" (0-20) 6 3/4" (20-200)	4 1/2" PVC (+2-140)	4 1/2" PVC Screen (140-200)
Well No. 6	579267	31° 48' 10.84" N	98° 21' 0.85" W	1,232	7-21-21	Trinity	180	73.5 (7-26-21) 1,158.5	9" (0-20) 6 3/4" (20-180)	4 1/2" PVC (+2-140)	4 1/2" PVC Screen (140-180)
Well No. 7	579264	31° 48' 45" N	98° 21' 10.1" W	1,235	7-7-21	Trinity	200	70.0 (7-28-21) 1,165.0	9" (0-20) 6 3/4" (20-200)	4 1/2" PVC (+2-140)	4 1/2" PVC Screen (140-200)



**Table 3: Summary of Twisted Creek Ranch well construction continued**

Well	Tracking No.	Latitude	Longitude	Elev. (ft. MSL)	Date Completed	Aquifer	Well Depth (ft. bgl)	Static Water Level (ft. bgl; date; ft. MSL)	Borehole (diameter; ft. bgl)	Casing (diameter; material; ft. bgl)	Screen (diameter; material; ft. bgl)
Well No. 8	579265	31° 48' 41.2" N	98° 21' 4.6" W	1,252	7-8-21	Trinity	200	97.4 (7-8-21) 1,154.6	9" (0-20) 6 3/4" (20-200)	4 1/2" PVC (+2-140)	4 1/2" PVC Screen (140-200)

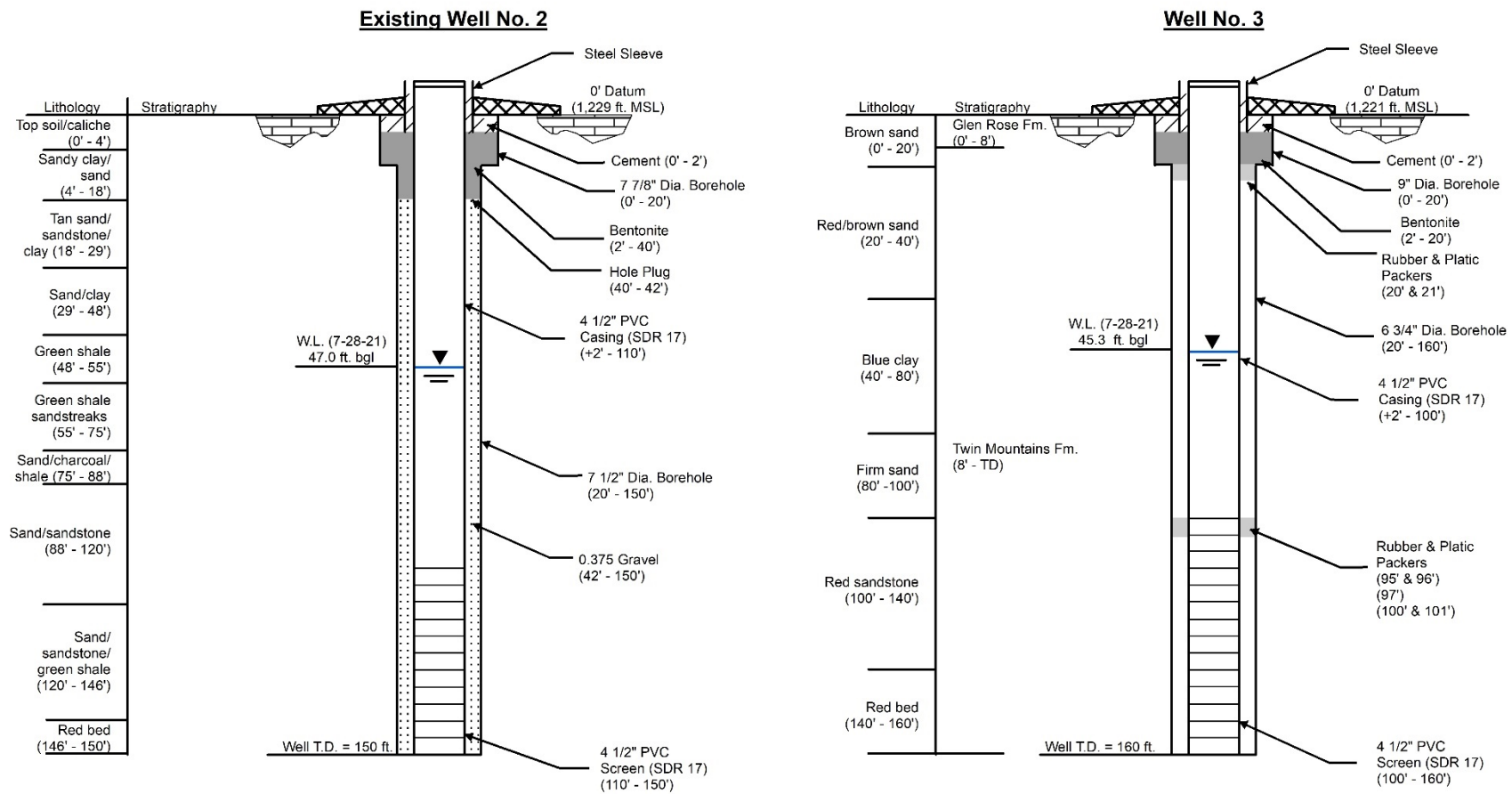




Notes:  
 - Well profiles created with information from State Well Reports, drill cuttings and geophysical surveys.  
 - Figure for schematic purposes; not drawn to scale.

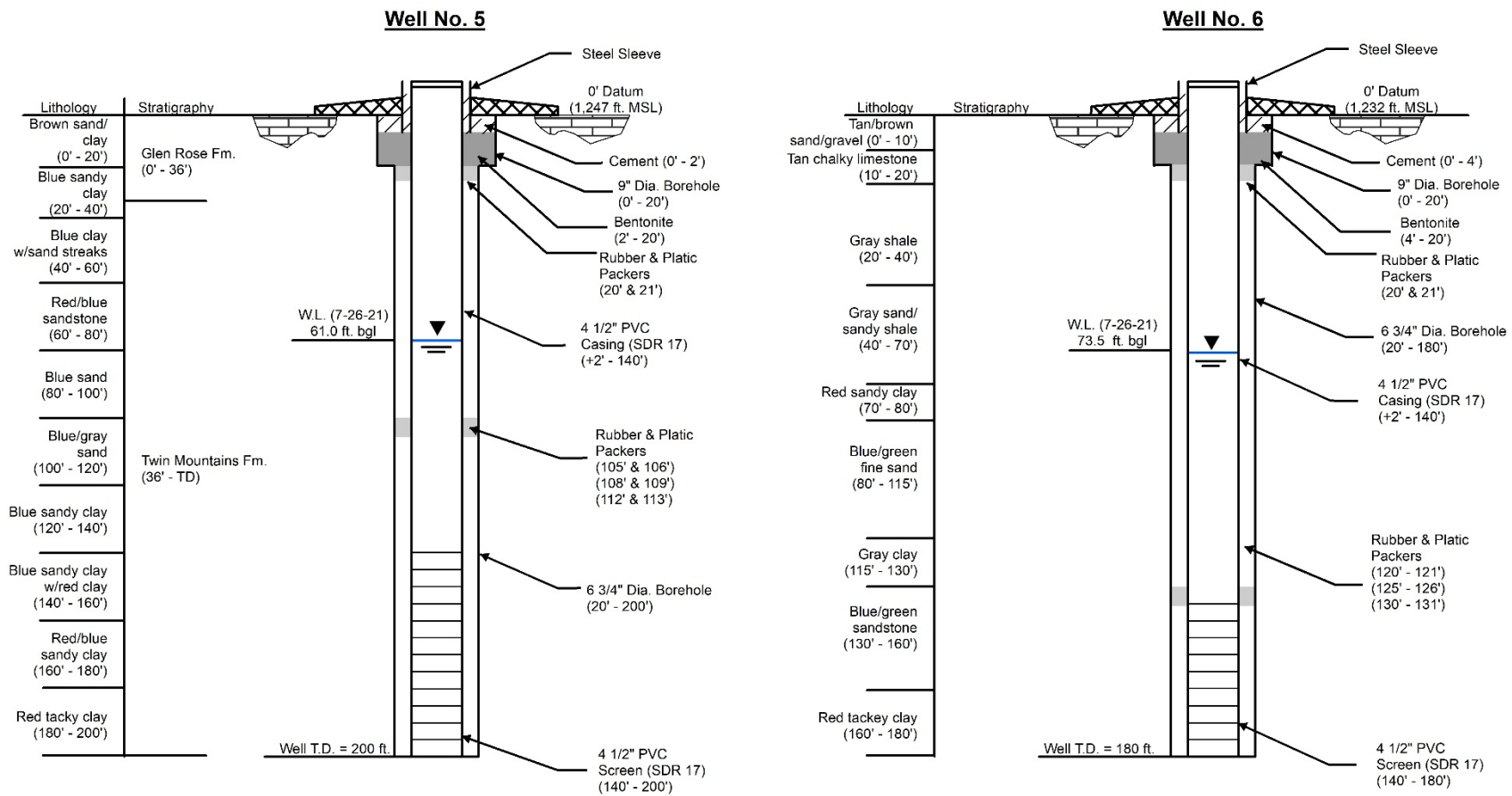
**Figure 6: Well construction profiles of Wells No. 1 and No. 4**





**Figure 7: Well construction profiles of Wells No. 2 and No. 3**

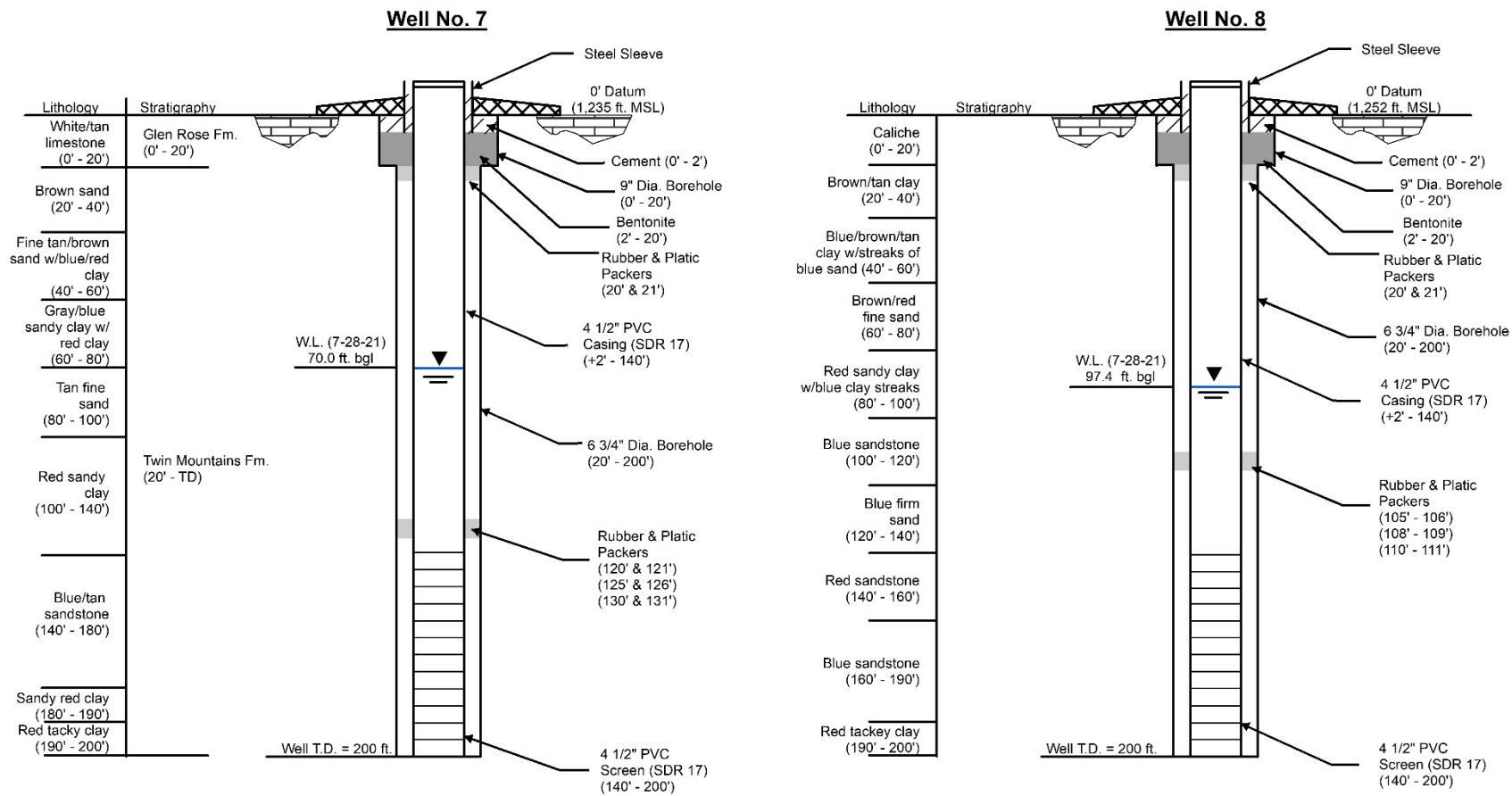




Notes:  
 - Well profiles created with information from State Well Reports, drill cuttings and geophysical surveys.  
 - Figure for schematic purposes; not drawn to scale.

**Figure 8: Well construction profiles of Wells No. 5 and No. 6**





Notes:  
 - Well profiles created with information from State Well Reports, drill cuttings and geophysical surveys.  
 - Figure for schematic purposes; not drawn to scale.

**Figure 9: Well construction profiles of Wells No. 7 and No. 8**





## **IV.2. Aquifer Testing**

Four (4) aquifer tests were performed utilizing 8 wells to assess the hydrogeologic properties of the Trinity Aquifer within the proposed subdivision. The objective was to perform each aquifer test with a 24-hour pumping phase followed by a recovery phase in which the pumping well achieved 90% recovery. For each aquifer test, Texan Water set a submersible pump within the pumping well that was capable of varying its discharge rate. Prior to the start of the aquifer test, pressure transducers capable of measuring the water level and temperature at one-minute intervals were placed in the pumping and observation wells to gather data for the duration of each test. Flow meter readings and water levels were taken prior to, during, and at the conclusion of the tests. Each aquifer test had at least a 24-hour pumping phase followed by a recovery phase. The data from the aquifer test were analyzed using the Cooper-Jacob method. Table 3 provides a summary of the aquifer testing results; Appendix D provides the results of the aquifer analysis; and Appendix E provides well efficiency calculations for each well.

### **IV.2.1. Aquifer Test of Well No. 6 (July 26, 2021)**

The aquifer test of Well No. 6 (pumping well) was conducted on July 26, 2021 with Well No. 5 serving as the observation well approximately 663 feet away. A 1 horsepower (HP) submersible pump was set in the pumping well on 160 feet of 1 1/4-inch PVC column pipe. The pump was started at 1:37 P.M. on July 26, 2021; the water level was monitored for 24.20 hours of pumping and 24.00 hours of recovery. Prior to the pumping phase of the aquifer test, the static water level of the pumping well was measured at 73.5 ft. bgl (1,158.5 ft. MSL) and the static water level of the observation well was measured at 61.1 ft. bgl (1,185.9 ft. MSL). Figure 10 provides a hydrograph of the pumping well and temperature over the duration of the aquifer test; Figure 11 provides a hydrograph of both the pumping and observation wells over the duration of the test.

Well No. 6 was pumped at an average rate of 15 gpm and the final measured pumping rate was 15 gpm with 26.49 feet of drawdown, resulting in a specific capacity of 0.57 gpm/ft. When compared to the theoretical specific capacity (0.52 gpm/ft.), Well No. 6 exhibited an efficiency of 110%. The Cooper-Jacob analysis resulted in a transmissivity of 138.7 ft<sup>2</sup>/day, and a hydraulic conductivity of 1.30 ft./day. A maximum drawdown of 1.94 feet was observed in Well No. 5, indicating a hydraulic connection between the two wells. Due to the observed hydraulic connection, we calculated a storativity value of  $2.1 \times 10^{-4}$  for Well No. 5.

Approximately 60% of the total drawdown was observed within the first two hours of the pumping phase (16.42 feet; Figure 10). Throughout the rest of the test the water level slowly declined by an additional 10 feet before pump shutoff (Figure 10). The water level in the observation well displayed a response to starting and stopping the pump in Well No. 6 (Figure 11). After the pump was shut off, recovery was measured in both wells; the water level in the pumping well recovered 75% in approximately 24 hours. After an initial response (rise in water level) to the pump being shutoff, the water level in the observation well (Well No. 5) continued to decrease during the recovery phase (Figure 11). There were no aquifer boundary conditions observed during the testing.

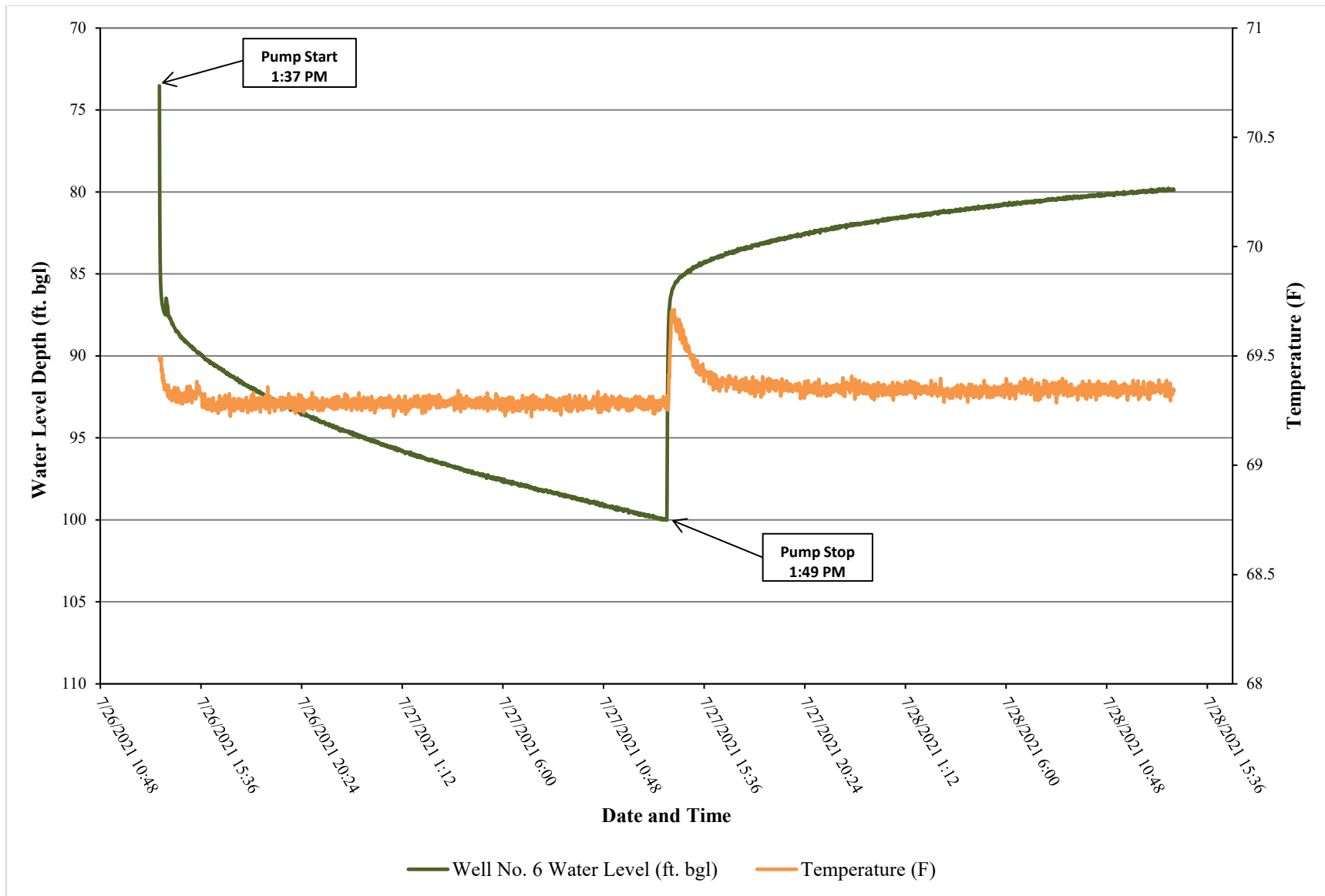


Figure 10: Aquifer test hydrograph of Well No. 6 (July 26, 2021)



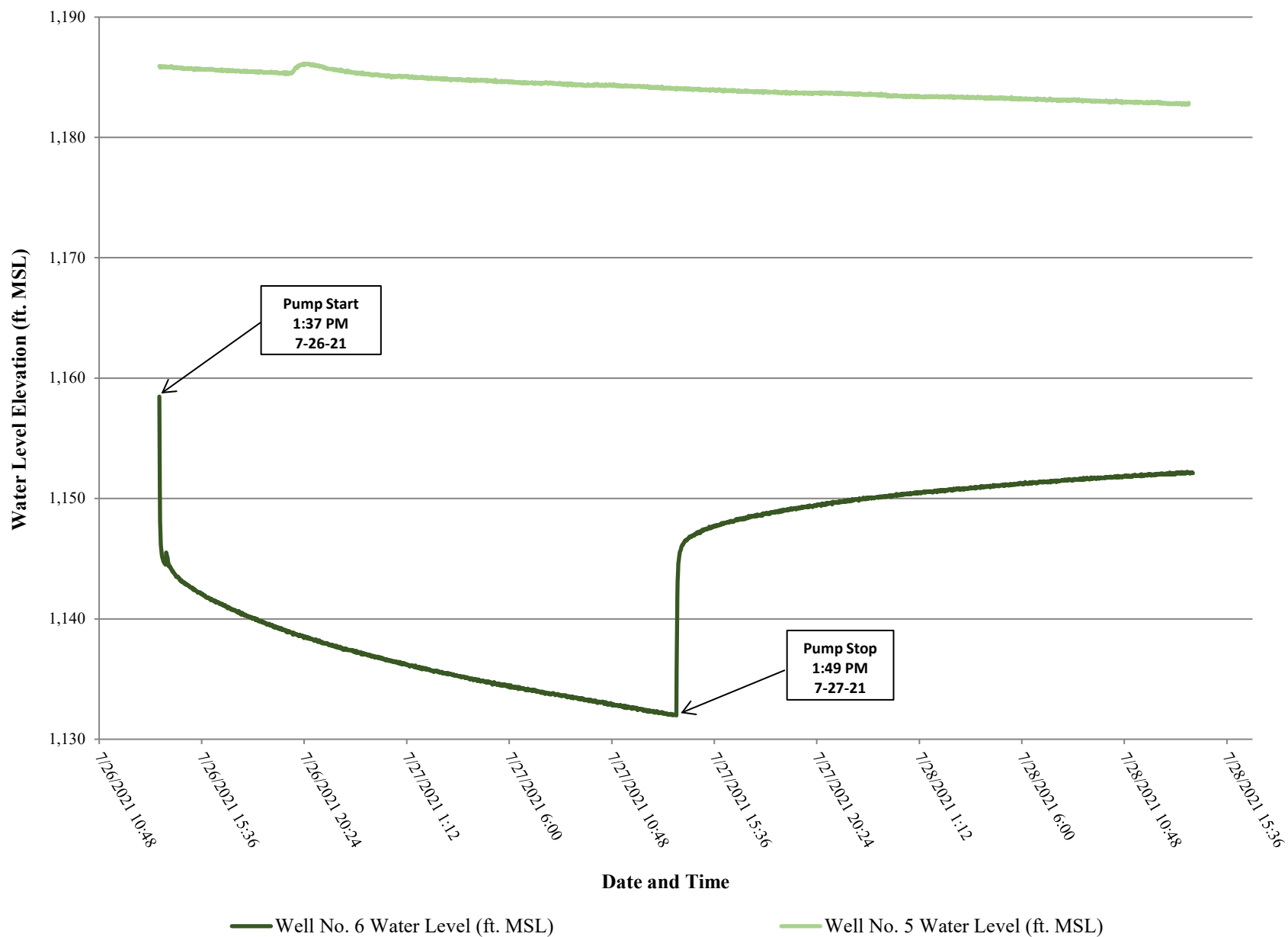


Figure 11: Aquifer test hydrograph of Well No. 6 and Observation Well No. 5 (July 26, 2021)



#### **IV.2.2. Aquifer Test of Well No. 8 (July 28, 2021)**

The aquifer test of Well No. 8 (pumping well) was conducted on July 28, 2021 with Well No. 7 serving as the observation well approximately 609 feet away. A 1 horsepower (HP) submersible pump was set in the pumping well on 180 feet of 1 1/4-inch PVC column pipe. The pump was started at 11:51 A.M. on July 28, 2021; the water level was monitored for 25.17 hours of pumping and 24.00 hours of recovery. Prior to the pumping phase of the aquifer test, the static water level of the pumping well was measured at 97.4 ft. bgl (1,154.6 ft. MSL) and the static water level of the observation well was measured at 70.0 ft. bgl (1,165.0 ft. MSL). Figure 12 provides a hydrograph of the pumping well and temperature over the duration of the aquifer test; Figure 13 provides a hydrograph of both the pumping and observation wells over the duration of the test.

Well No. 8 was pumped at an initial rate of 23 gpm; however, in order to prevent the pumping level from reaching the pump, the discharge rate was reduced to 20 gpm. The well was pumped at an average rate of 20 gpm over the 25-hour period and the final measured pumping rate was 20 gpm with 13.56 feet of drawdown, resulting in a specific capacity of 1.47 gpm/ft. When compared to the theoretical specific capacity (1.40 gpm/ft.), Well No. 6 exhibited an efficiency of 105%. The Cooper-Jacob analysis resulted in a transmissivity of 381.4 ft<sup>2</sup>/day, and a hydraulic conductivity of 3.70 ft./day. A maximum drawdown of 0.98 feet was observed in Well No. 7, indicating a hydraulic connection between the two wells. Due to the observed hydraulic connection, we calculated a storativity value of  $4.9 \times 10^{-4}$  for Well No. 7.

Approximately 90 minutes into the test, the pumping rate was adjusted to 20 gpm in Well No. 8 to prevent the water level from reaching the pump. After the pumping rate was adjusted, the water level slowly decreased by approximately 5 feet throughout the duration of the pumping phase (Figure 12). The water level in the observation well displayed a response to starting and stopping the pump in Well No. 8 (Figure 13). After the pump was shut off, recovery was measured in both wells; the water level in the pumping well recovered 87% in approximately 24 hours. There were no aquifer boundary conditions observed during the testing.



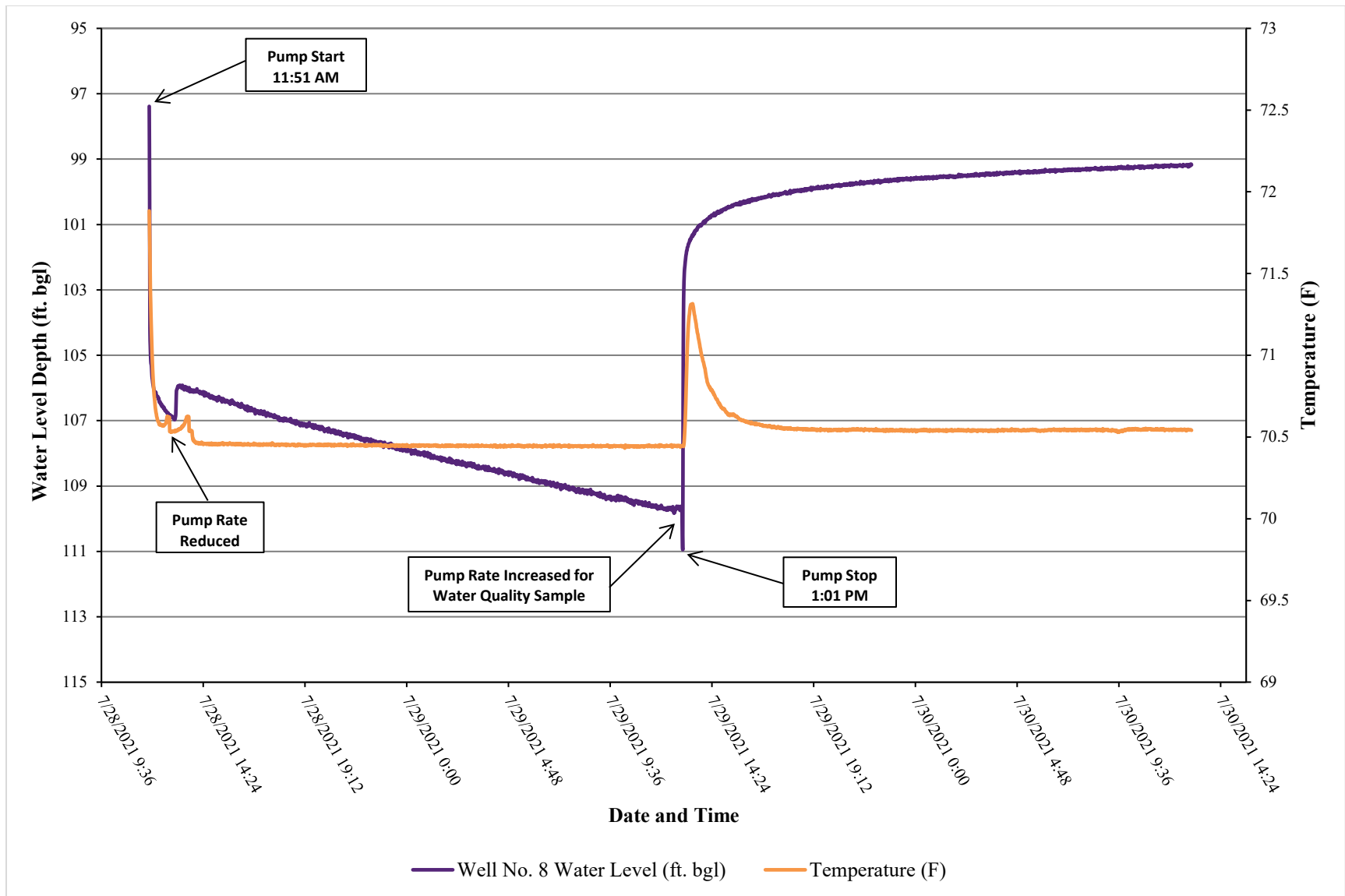


Figure 12: Aquifer test hydrograph of Well No. 8 (July 28, 2021)



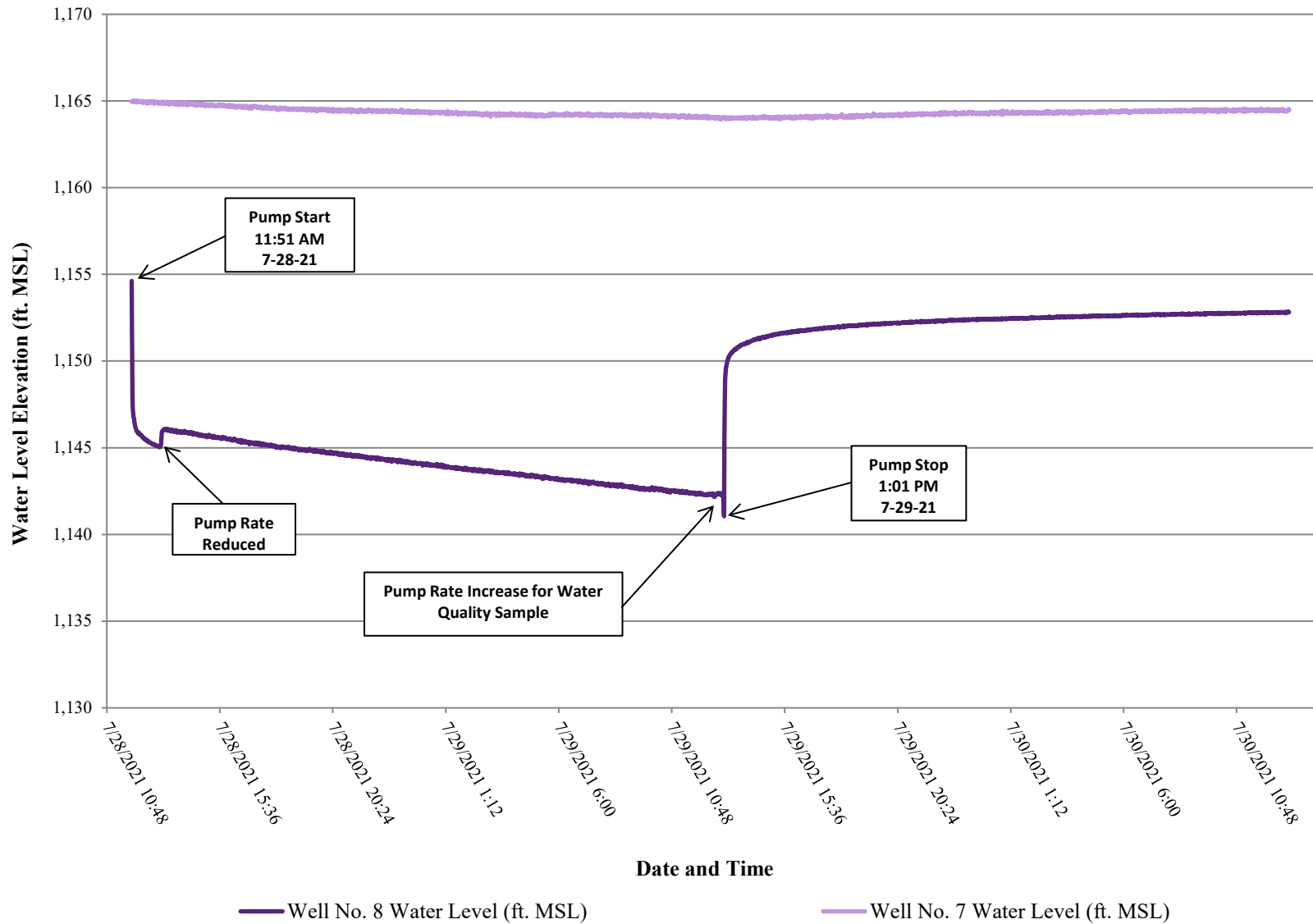


Figure 13: Aquifer test hydrograph of Well No. 8 and Observation Well No. 7 (July 28, 2021)





#### **IV.2.3. Aquifer Test of Well No. 3 (July 28, 2021)**

The aquifer test of Well No. 3 (pumping well) was conducted on July 28, 2021 with Well No. 2 serving as the observation well approximately 553 feet away. A 1 horsepower (HP) submersible pump was set in the pumping well on 180 feet of 1 1/4-inch PVC column pipe. The pump was started at 3:12 P.M. on July 28, 2021; the water level was monitored for 24.07 hours of pumping and 24.00 hours of recovery. Prior to the pumping phase of the aquifer test, the static water level of the pumping well was measured at 45.3 ft. bgl (1,175.7 ft. MSL) and the static water level of the observation well was measured at 47.0 ft. bgl (1,182.0 ft. MSL). Figure 14 provides a hydrograph of the pumping well and temperature over the duration of the aquifer test; Figure 15 provides a hydrograph of both the pumping and observation wells over the duration of the test.

Well No. 3 was pumped at an average rate of 16 gpm and the final measured pumping rate was 16 gpm with 15.62 feet of drawdown, resulting in a specific capacity of 1.03 gpm/ft. When compared to the theoretical specific capacity (0.86 gpm/ft.), Well No. 3 exhibited an efficiency of 120%. The Cooper-Jacob analysis resulted in a transmissivity of 244.9 ft<sup>2</sup>/day, and a hydraulic conductivity of 2.13 ft./day. A maximum drawdown of 1.75 feet was observed in Well No. 2, indicating a hydraulic connection between the two wells. Due to the observed hydraulic connection, we calculated a storativity value of  $1.5 \times 10^{-4}$  for Well No. 2.

The majority of drawdown for Well No. 3 was observed within the first two hours of the pumping phase (13.11 feet; Figure 14). Throughout the rest of the pumping phase, the water level remained stable, only decreasing by 2.5 feet before pump shutoff (Figure 14). The water level in the observation well displayed a response to starting and stopping the pump in Well No. 3 (Figure 15). After the pump was shut off, recovery was measured in both wells; the water level in the pumping well recovered 90% in approximately 8 hours. There were no aquifer boundary conditions observed during the testing.



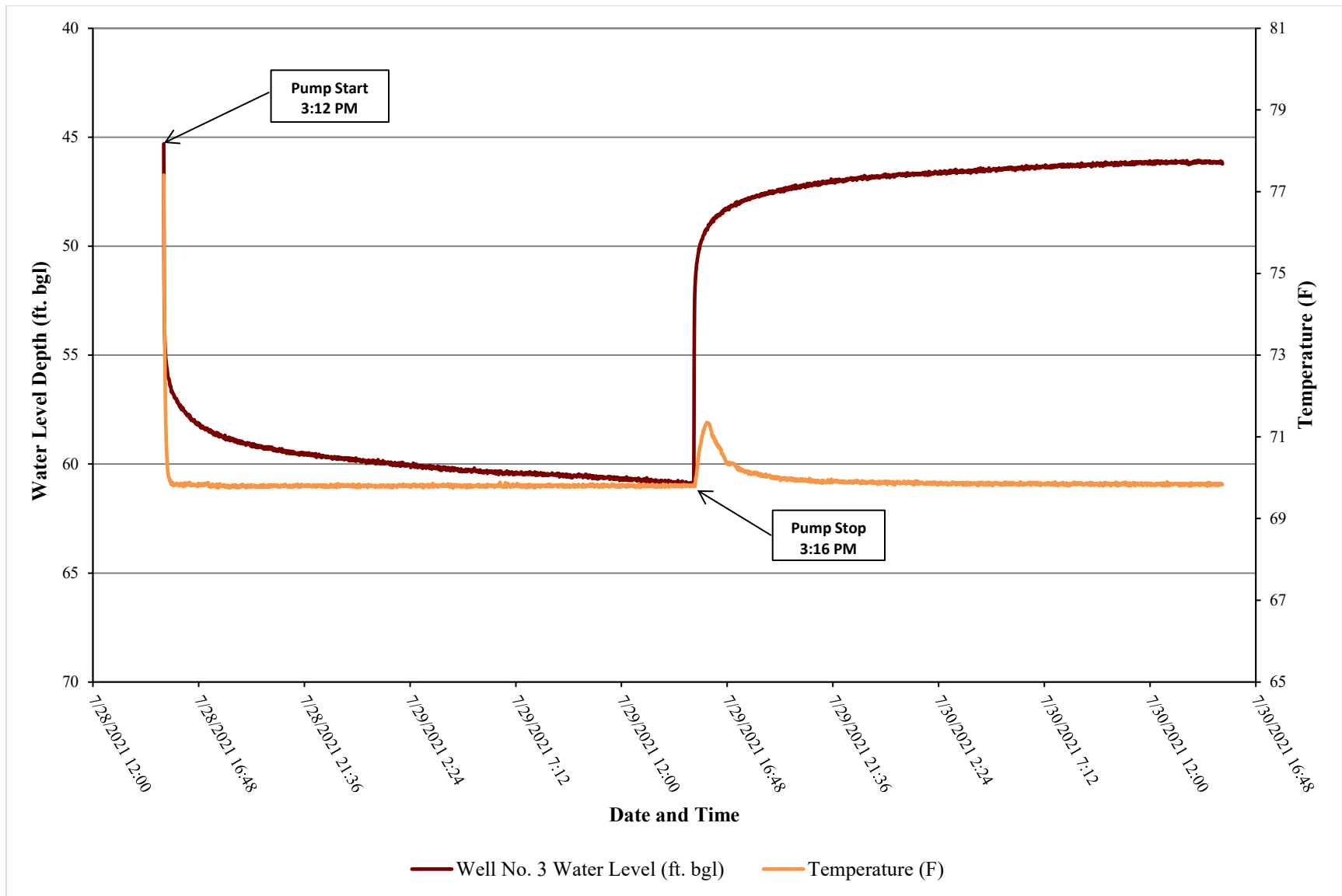
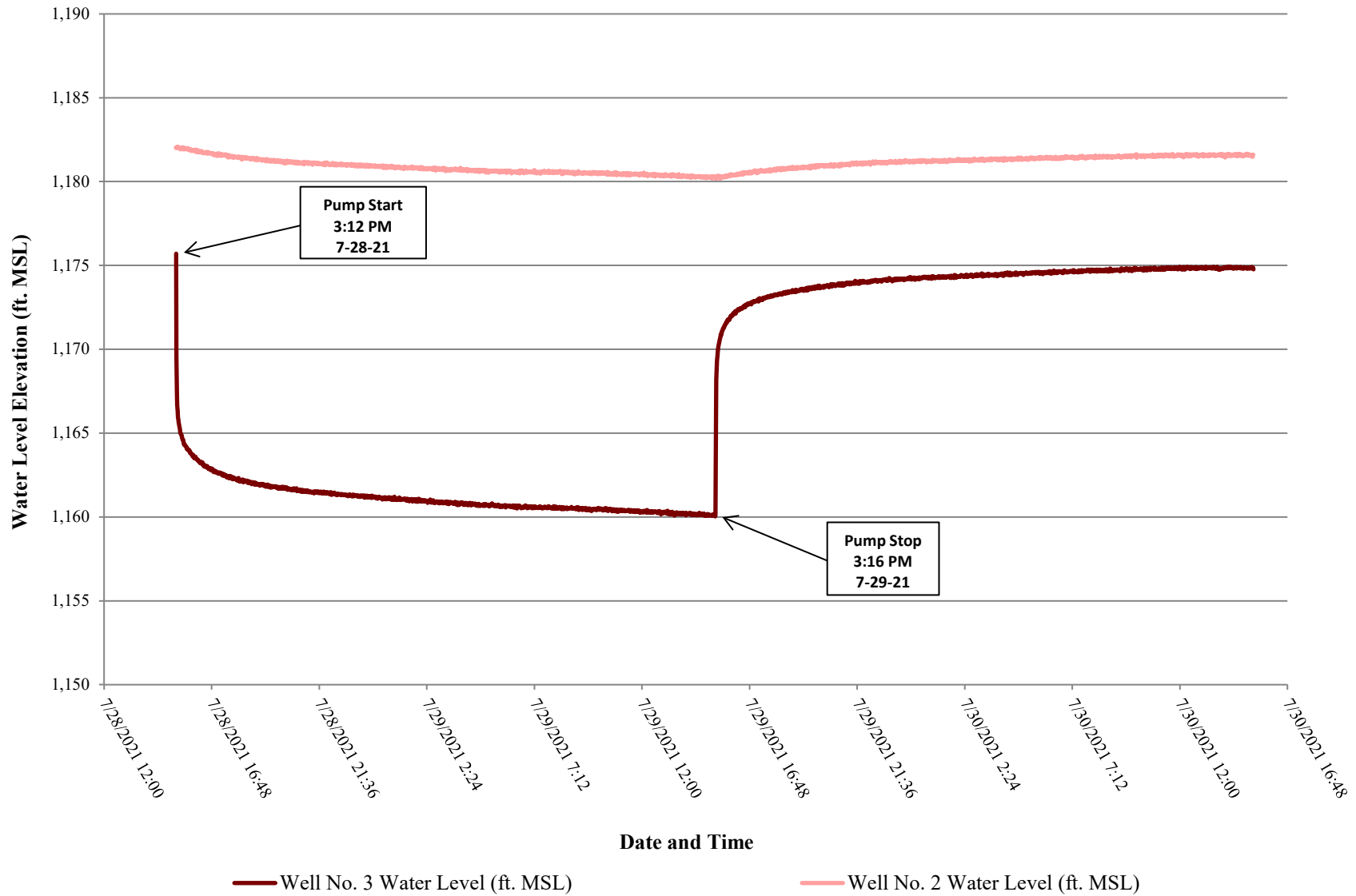


Figure 14: Aquifer test hydrograph of Well No. 8 (July 28, 2021)





**Figure 15: Aquifer test hydrograph of Well No. 3 and Observation Well No. 2 (July 28, 2021)**



#### **IV.2.4. Aquifer Test of Well No. 4 (August 2, 2021)**

The aquifer test of Well No. 4 (pumping well) was conducted on August 2, 2021 with Well No. 1 serving as the observation well approximately 500 feet away. A 1 1/2 horsepower (HP) submersible pump was set in the pumping well on 180 feet of 1 1/4-inch PVC column pipe. The pump was started at 9:58 A.M. on August 2, 2021; the water level was monitored for 20.65 hours of pumping and 24.00 hours of recovery. Prior to the pumping phase of the aquifer test, the static water level of the pumping well was measured at 96.0 ft. bgl (1,162.0 ft. MSL) and the static water level of the observation well was measured at 113.2 ft. bgl (1,162.8 ft. MSL). Figure 16 provides a hydrograph of the pumping well and temperature over the duration of the aquifer test; Figure 17 provides a hydrograph of both the pumping and observation wells over the duration of the test.

Well No. 4 was pumped at an average rate of 18 gpm and the final measured pumping rate was 18 gpm with 18.64 feet of drawdown, resulting in a specific capacity of 0.97 gpm/ft. When compared to the theoretical specific capacity (0.93 gpm/ft.), Well No. 4 exhibited an efficiency of 104%. The Cooper-Jacob analysis resulted in a transmissivity of 261.1 ft<sup>2</sup>/day, and a hydraulic conductivity of 2.51 ft./day. A maximum drawdown of 2.84 feet was observed in Well No. 1, indicating a hydraulic connection between the two wells. Due to the observed hydraulic connection, we calculated a storativity value of  $2.0 \times 10^{-4}$  for Well No. 1.

The majority of the total drawdown for Well No. 4 was observed within the first two hours of the pumping phase (12.80 feet; Figure 16). Throughout the rest of the pumping phase, the water level remained stable, only decreasing by 5.8 feet before pump shutoff (Figure 16). The water level in the observation well displayed a response to starting and stopping the well in Well No. 4 (Figure 17). After the pump was shut off, recovery was measured in both wells; the water level in the pumping well recovered 90% in approximately 22 hours. There were no aquifer boundary conditions observed during the testing.



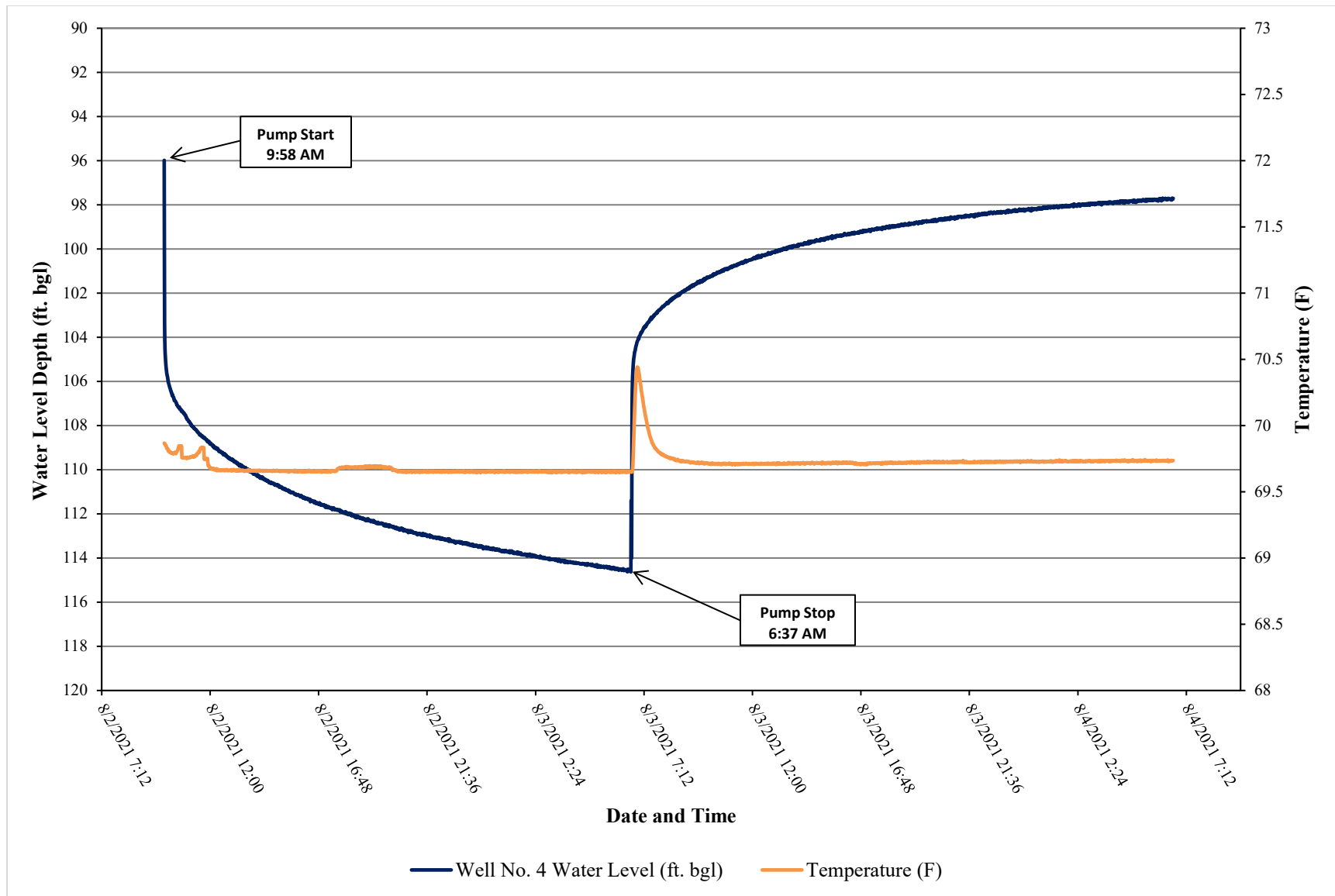


Figure 16: Aquifer test hydrograph of Well No. 4 (August 2, 2021)



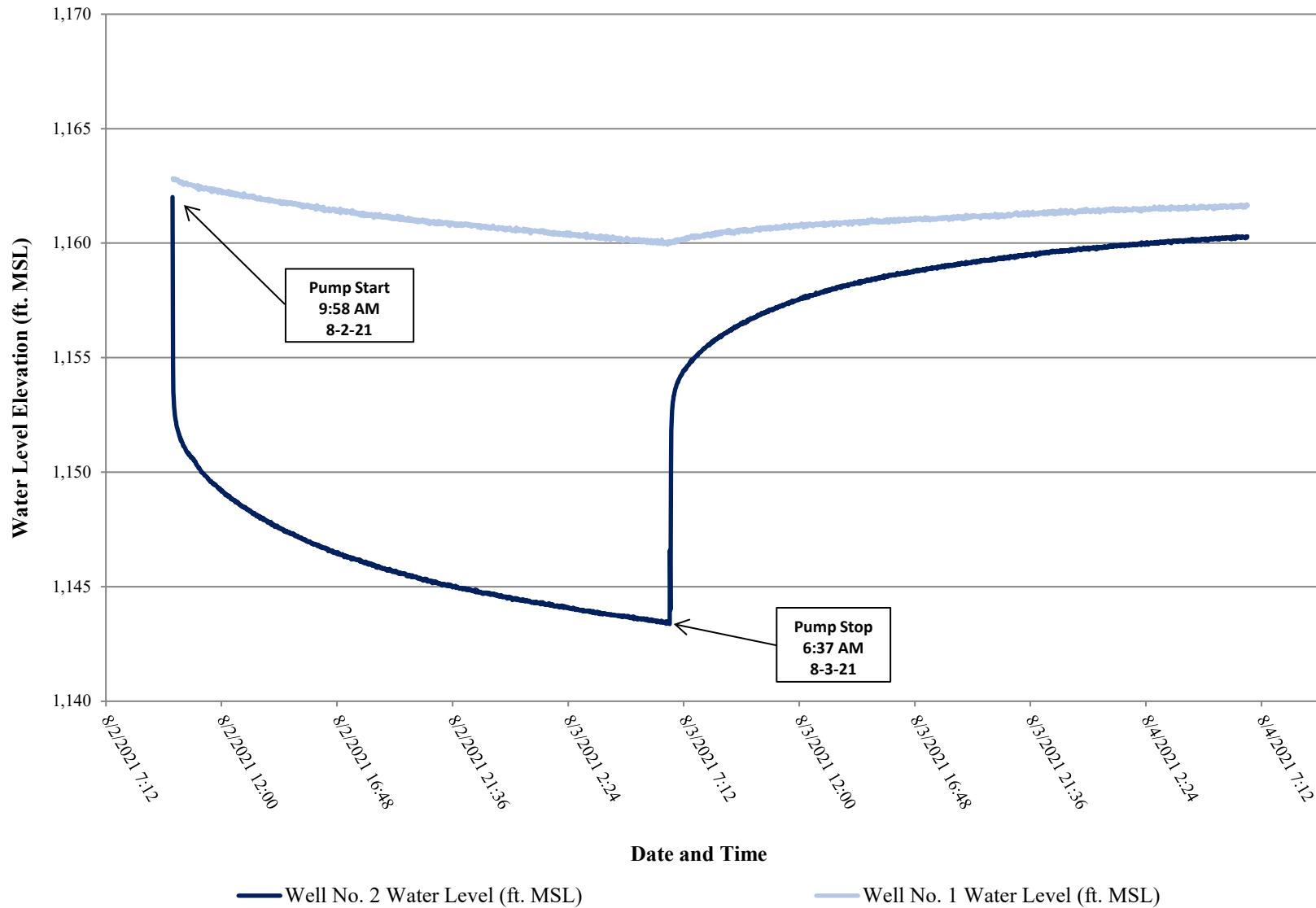


Figure 17: Aquifer test hydrograph of Well No. 4 and Observation Well No. 1 (August 2, 2021)





**Table 3: Summary of aquifer test results**

Date	Well	Average Pump Rate (gpm)	Final Pump Rate (gpm)	Drawdown (ft.)	Specific Capacity (gpm/ft.)	Transmissivity (ft <sup>2</sup> /d)	Storativity	Hydraulic Conductivity (ft./d)	Well Efficiency	Aquifer Thickness (ft.)	Aquifer Boundary Detected
7/26/2021	PW No. 6	15	15	26.49	0.57	138.7	-	1.30	110%	107	No
	OW No. 5	-	-	1.94	-	-	2.14E-4	-	-	139	No
7/28/2021	PW No. 8	20	20	13.56	1.47	381.4	-	3.70	105%	103	No
	OW No. 7	-	-	0.98	-	-	4.88E-4	-	-	130	No
7/28/2021	PW No. 3	16	16	15.62	1.03	244.9	-	2.13	120%	115	No
	OW No. 2	-	-	1.75	-	-	1.46E-4	-	-	103	No
8/2/2021	PW No. 4	18	18	18.64	0.97	261.1	-	2.51	104%	104	No
	OW No. 1	-	-	2.84	-	-	2.02E-4	-	-	92	No

Note: PW = Pumping Well; OW = Observation Well; ft. = feet; gpm = gallons per minute; d = day;



### IV.3. Water Quality

Water quality samples were collected from each pumping well at the end of the 24-hour pumping phase of each aquifer test. The samples were collected by Texan Water staff in sealed containers and stored on ice in a cooler. The samples for each of the wells were transported to Pollution Control Services and were tested in accordance with Texas Administrative Code 230.9 (Determination of Groundwater Quality). Appendix F provides a copy of the water quality reports.

Table 4 provides the water quality summary of the samples. The results were compared to Texas Commission on Environmental Quality (TCEQ) Maximum Contaminant Levels (MCL) and Secondary Contaminant Levels (SCL). The results show all samples met the TCEQ MCLs and SCLs.

The water samples were also tested for the presence or absence of total coliform and *E. coli*. Total coliform bacteria were found to be present in Wells No. 6, 3, and 4; *E. coli* was not present in any of the wells. Presence of total coliform bacteria within a well that has recently been drilled is not uncommon. With additional proper chlorination of the wells, we anticipate that future samples will indicate the absence of total coliform bacteria.

**Table 4: Summary of the water quality analysis results**

		Cl	Conductivity (mhos/cm)	F	Fe	NO3	Mn	pH	SO4	Hardness (as CaCO3)	TDS	TC/E. coli
Well	Sample Data	TCEQ MCLs & SCLs										
		300 <sup>2</sup>		4 <sup>1</sup> & 2 <sup>2</sup>	0.3 <sup>2</sup>	10 <sup>1</sup>	0.05 <sup>2</sup>	6.5-8.5 <sup>2</sup>	300 <sup>2</sup>		1000 <sup>2</sup>	Presence
6	7/27/2021	13	628	0.43	0.061	<0.2	0.01	7.7	24	119.6	320	Present/Absent
8	7/29/2021	10	635	0.61	0.022	2.0	<0.01	7.5	24	196.8	360	Absent/Absent
3	7/29/2021	11	582	0.44	0.031	2.0	<0.01	7.8	16	183.8	328	Present/Absent
4	8/5/2021	10	629	0.48	0.260	<0.2	0.016	7.7	20	160.1	308	Present/Absent

Note: 1 = TCEQ Maximum Contaminant Level; 2 = TCEQ Secondary Contaminant Level; Concentrations in red are above TCEQ SCLs; All units expressed in mg/L (except pH & E.C.);



#### IV.4. Groundwater Availability

Based upon the analyses of the aquifer tests, drawdown estimates were calculated after 10 years and 30 years of continuous production. Figures 18 through 21 provide distance-drawdown plots for a single pumping well producing at a rate of 15 gpm for 0.28 hours per day (251 gallons per day). This pumping volume represents the total water demand at full build out of the subdivision per housing unit (0.28 acre-feet/year for each housing unit).

Assumptions used in the drawdown calculations and overall groundwater availability to the proposed subdivision include inherent uncertainties such as:

- Future pumpage from the aquifer or from interconnected aquifers from area wells outside of the subdivision or any other factor that cannot be predicted that will affect the storage of water in the aquifer;
- Long-term impacts to the aquifer based on climatic variations; and/or,
- Future impacts to usable groundwater due to unforeseen or unpredictable contamination.

Drawdown estimates were calculated using the Theis equation. The Theis Equation has several assumptions used to derive the formula which include (Driscoll, 1986):

1. The water-bearing formation is uniform in character and the hydraulic conductivity is the same in all directions;
2. The aquifer is uniform in thickness and infinite in areal extent;
3. The aquifer receives no recharge from any source;
4. The well penetrates, and receives water from the full thickness of the aquifer;
5. The water from storage is discharged instantaneously when the head is lowered;
6. The pumping well is 100% efficient;
7. All water removed from the well comes from aquifer storage;
8. Laminar flow exists through the well and aquifer; and,
9. The water table or potentiometric surface has no slope.

It is important to note that several of the assumptions used to derive the Theis equation are not necessarily appropriate for the Trinity Aquifer. These include assumptions 3 and 7. The Theis assumptions that (i) the formation receives no recharge from any source and (ii) that all water removed from the well comes from aquifer storage may lead to inaccuracies in estimating drawdown. Driscoll (1986) states, “The assumption that an aquifer receives no recharge during the pumping period is one of the six fundamental conditions upon which the non-equilibrium formulas (Theis) are based. Therefore, all water discharged from a well is assumed to be taken from storage within the aquifer. It is known, however that most formations receive recharge. Hydrographs from long-term observation wells monitored by the US Geological Survey, various state agencies, and similar data-gathering agencies in other parts of the world show that most water-bearing formations receive continual or intermittent recharge.”

Furthermore, contrary to the Theis assumptions, Konikow and Leake (2014) note that with increased pumping time, (i) the fraction of pumpage derived from storage tends to decrease, and (ii) the



fraction derived from capture (recharge) increases. Eventually a new equilibrium will be achieved when no more water is derived from storage and heads, or water levels, in the aquifer stabilize. This result is achieved when the initial cone of depression formed by discharge reaches a new source of water, typically the recharge zone of the aquifer. The actual response time for an aquifer system to reach a new equilibrium is a function of the dimensions, hydraulic properties, and boundary conditions for each specific aquifer. For example, the response time will decrease as the hydraulic diffusivity of the aquifer increases (Theis 1940; Barlow and Leake 2012). The response time can range from days to millennia (Bredehoeft and Durbin 2009; Walton 2011). Since the Theis equation assumes (i) that all water is derived from storage and (ii) that the aquifer receives no recharge, the Theis equation may overestimate drawdown within a well that is located in an aquifer that receives recharge rapidly.

Table 5 provides a summary of the results from the distance-drawdown calculation. Estimates of drawdown are based on the following assumptions:

- Total daily water demand (entire subdivision) = 32.8 acre-feet/year
- Total daily water demand (per housing unit) = 0.28 acre-feet/year = 251 gpd;
- The individual well will be pumped at 15 gpm for 0.41 hours per day (Table 5); and
- Transmissivity and storativity values calculated from aquifer testing were used in the drawdown estimates.

The edge of the cone of depression was estimated by taking the distance from the pumped well where the drawdown flattened out or was minimal.

#### **IV.4.1. 15 gpm Production**

Based upon the drawdown calculated from the distance-drawdown projections, the drawdown after 10 years of production at 15 gpm and a well spacing of 100 feet results in an average of 1.3 feet. At a spacing of 250 feet, the well interference reduces to an average of 0.4 feet. At a spacing of 500 feet, the well interference reduces further to an average of 0.1 feet.

Based upon the drawdown calculated from the distance-drawdown projection, the drawdown after 30 years of production at 15 gpm and a well spacing of 100 feet results in an average of 1.3 feet. At a spacing of 250 feet, the well interference reduces to an average of 0.4 feet. At a spacing of 500 feet, the well interference reduces further to an average of 0.1 feet.

From the distance drawdown calculations, we recommend that the Twisted Creek Ranch Subdivision wells be spaced a minimum distance of 250 feet for wells pumped at rates up to 15 gpm. If landowners are able, we recommend spacing wells as far as possible to limit drawdown from well interference. Some well interference may be more pronounced in areas of the subdivision where the aquifer units are more strongly connected; conversely, well interference may not occur in some areas where the aquifer is either disconnected or where there is high permeability.



**Table 5: Summary of distance-drawdown calculation (15 gpm)**

	Drawdown at Pumped Well After 10-Years of Pumping	Drawdown at Pumped Well After 30-Years of Pumping	Drawdown at Nearest Property Boundary After 10-Years of Pumping		Drawdown at Nearest Property Boundary After 30-Years of Pumping		Dist. to Outer Edges of Cone of Depression - 10 years	Dist. to Outer Edges of Cone of Depression - 30 years
<b>Well</b>	<b>(ft)</b>	<b>(ft)</b>	<b>Property Boundary Distance (ft)</b>	<b>Drawdown (ft)</b>	<b>Property Boundary Distance (ft)</b>	<b>Drawdown (ft)</b>	<b>(feet)</b>	<b>(feet)</b>
Well No. 3	12.77	12.78	98	1.64	98	1.65	250	250
Well No. 4	11.74	11.75	200	0.65	200	0.66	250	250
Well No. 6	20.96	20.98	98	1.61	98	1.64	250	250
Well No. 8	7.74	7.74	77	1.03	77	1.04	100	100



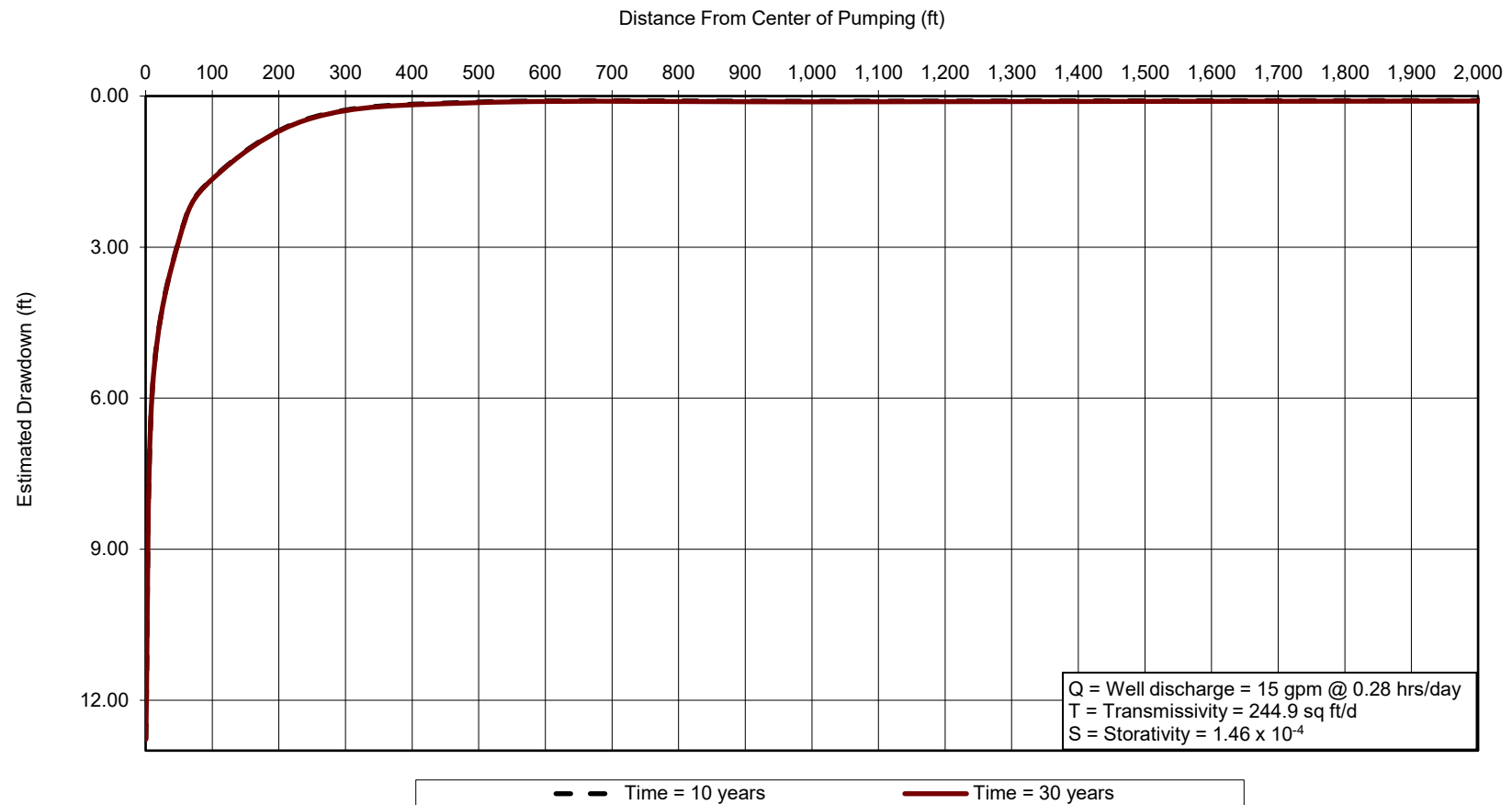


Figure 18: Distance drawdown plot for Well No. 3 (15 gpm)





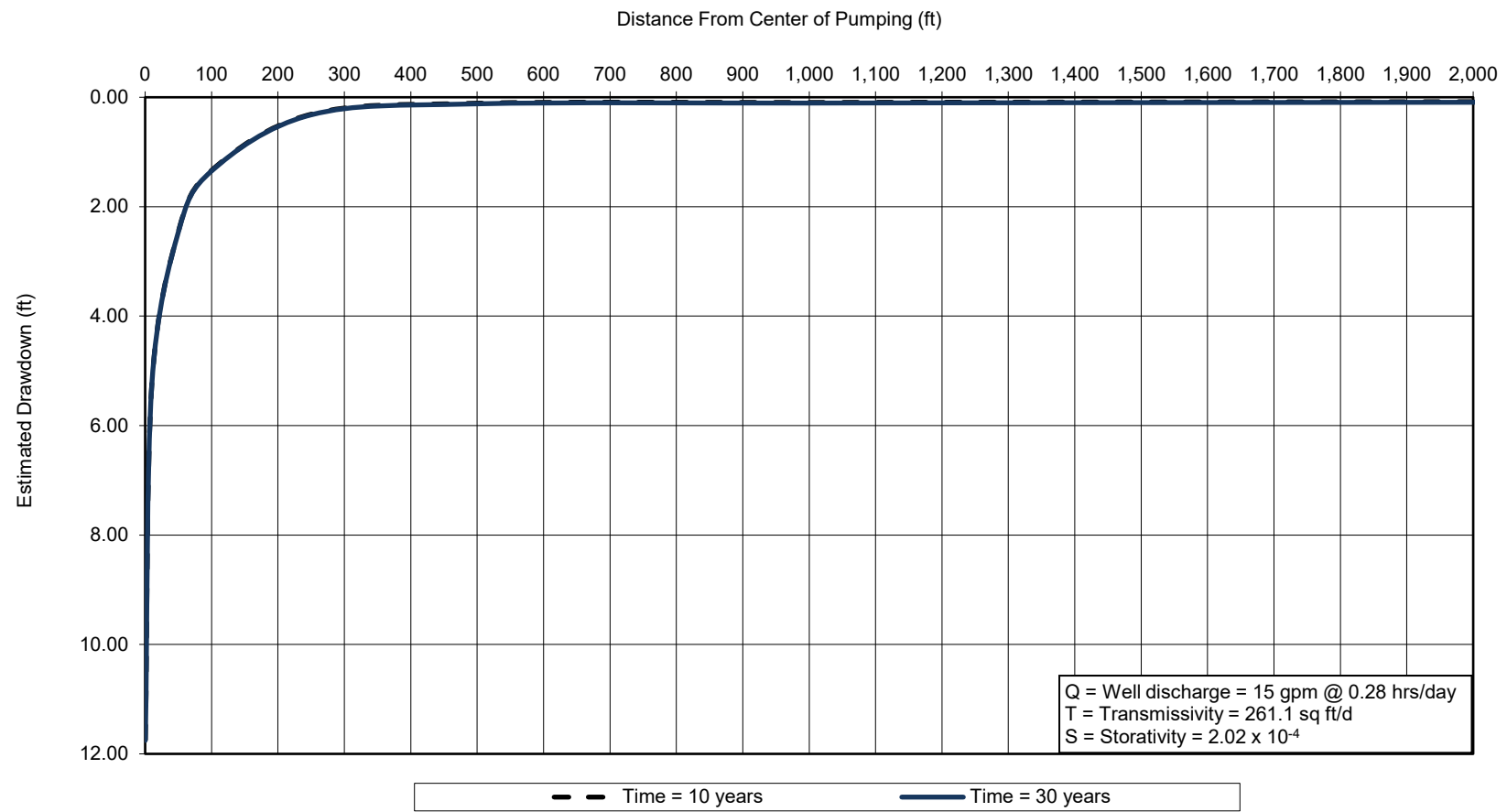


Figure 19: Distance drawdown plot for Well No. 4 (15 gpm)



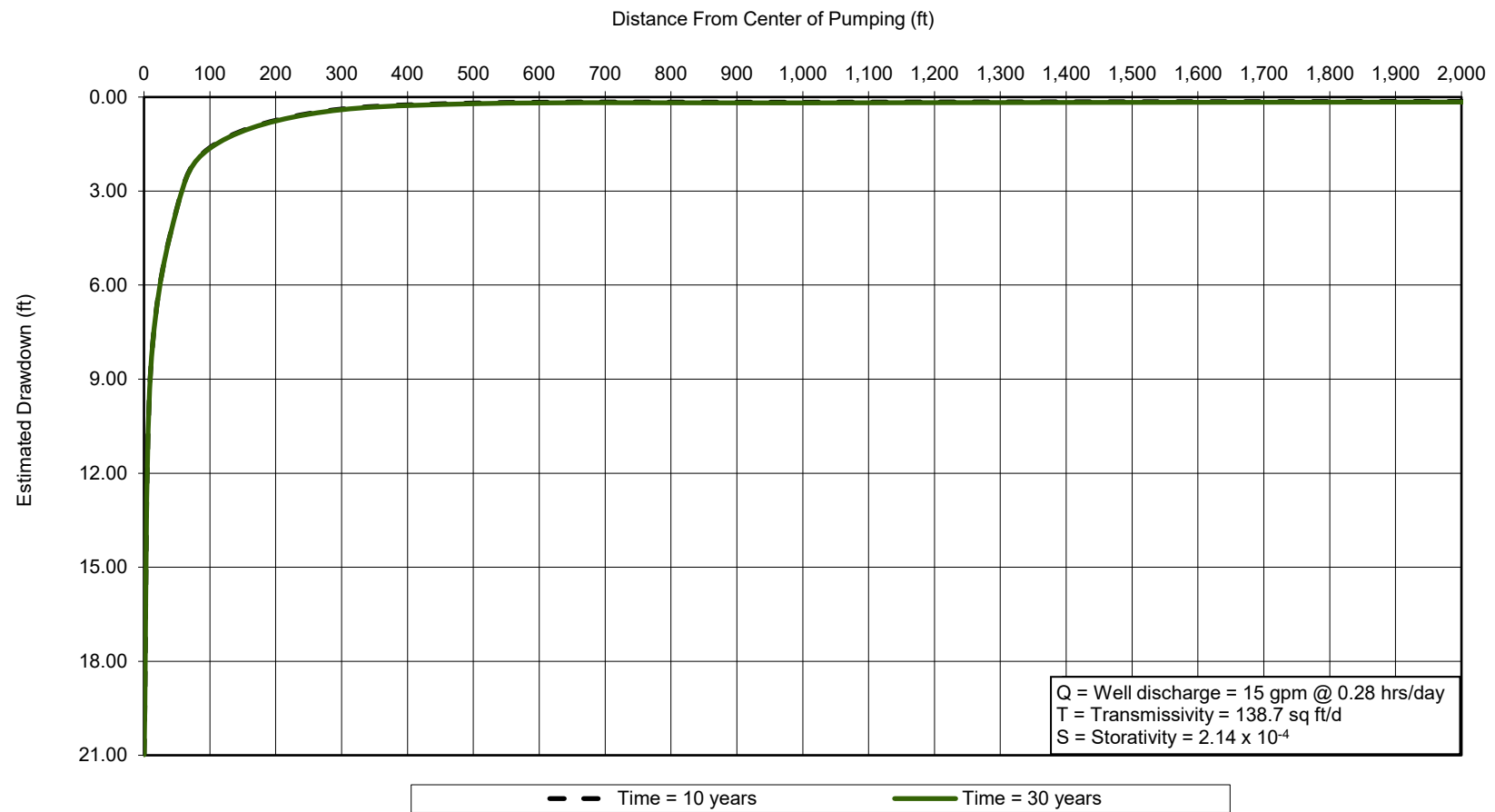


Figure 20: Distance drawdown plot for Well No. 6 (15 gpm)



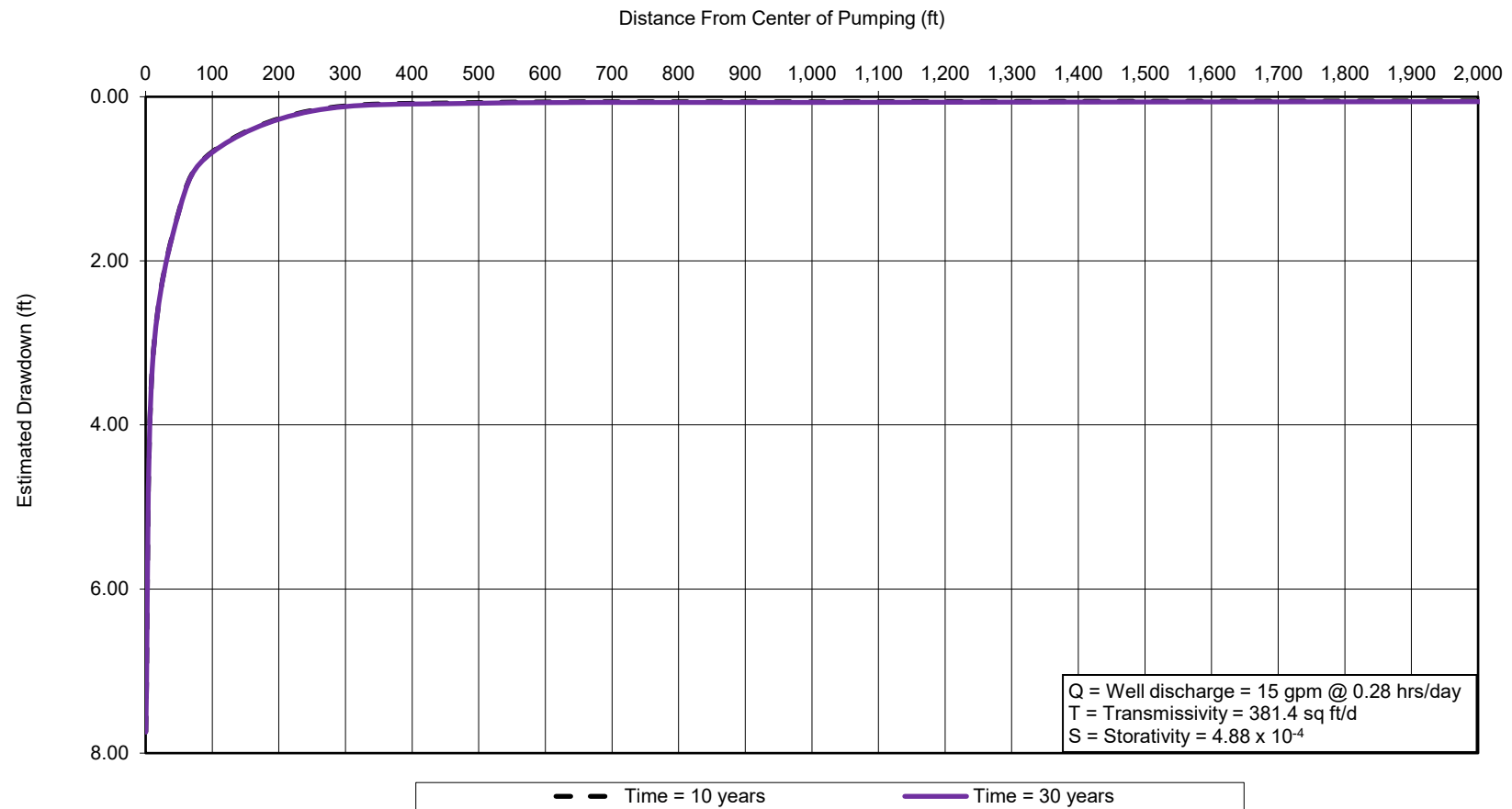


Figure 21: Distance drawdown plot for Well No. 8 (15 gpm)



#### IV.5. Groundwater Model

A groundwater model was utilized to determine the projected impacts from production at the proposed subdivision. A one-layer groundwater model, consisting of 370 rows and 370 columns for a total of 136,900 cells, was created to estimate drawdown under a normal production scenario for Twisted Creek. Each cell has dimensions of 100 feet by 100 feet; the entire grid represents an approximately 49.0 square mile portion of the Trinity Aquifer. The boundaries of the grid extend approximately 3.5 miles beyond the center of the subdivision in order to evaluate the potential regional impact from pumping (Figure 35).

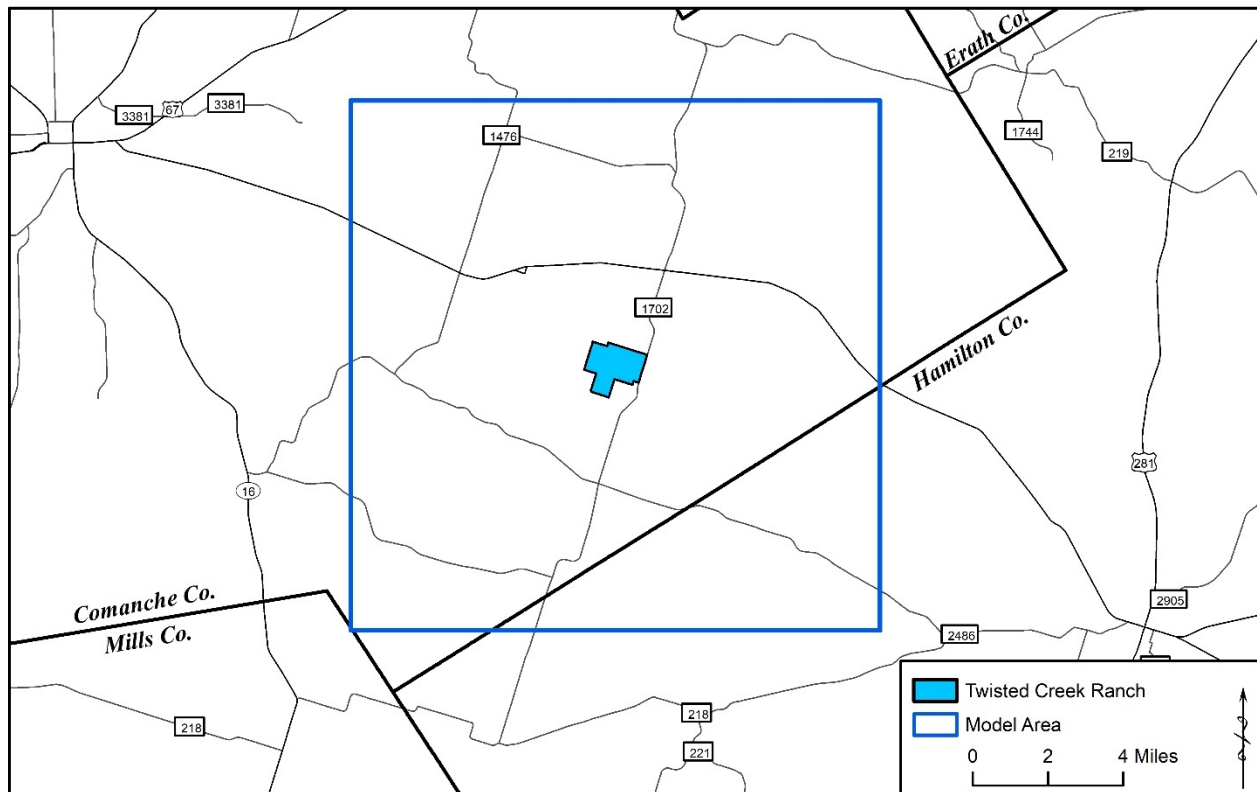


Figure 22: Groundwater model map

The model calculates drawdown at each cell using the Theis Equation,

$$s = \frac{Q}{4\pi T} W(u) \quad (\text{Equation 1})$$

where:

s = drawdown (feet);

Q = discharge (gallons per minute; gpm);

T = transmissivity (ft.<sup>2</sup>/day); and

W(u) = well function

The well function  $W(u)$  is estimated by:

$$W(u) = -0.5772 - \ln u + u - \frac{u^2}{2 \times 2!} + \frac{u^3}{3 \times 3!} - \frac{u^4}{4 \times 4} + \dots \quad (\text{Equation 2})$$

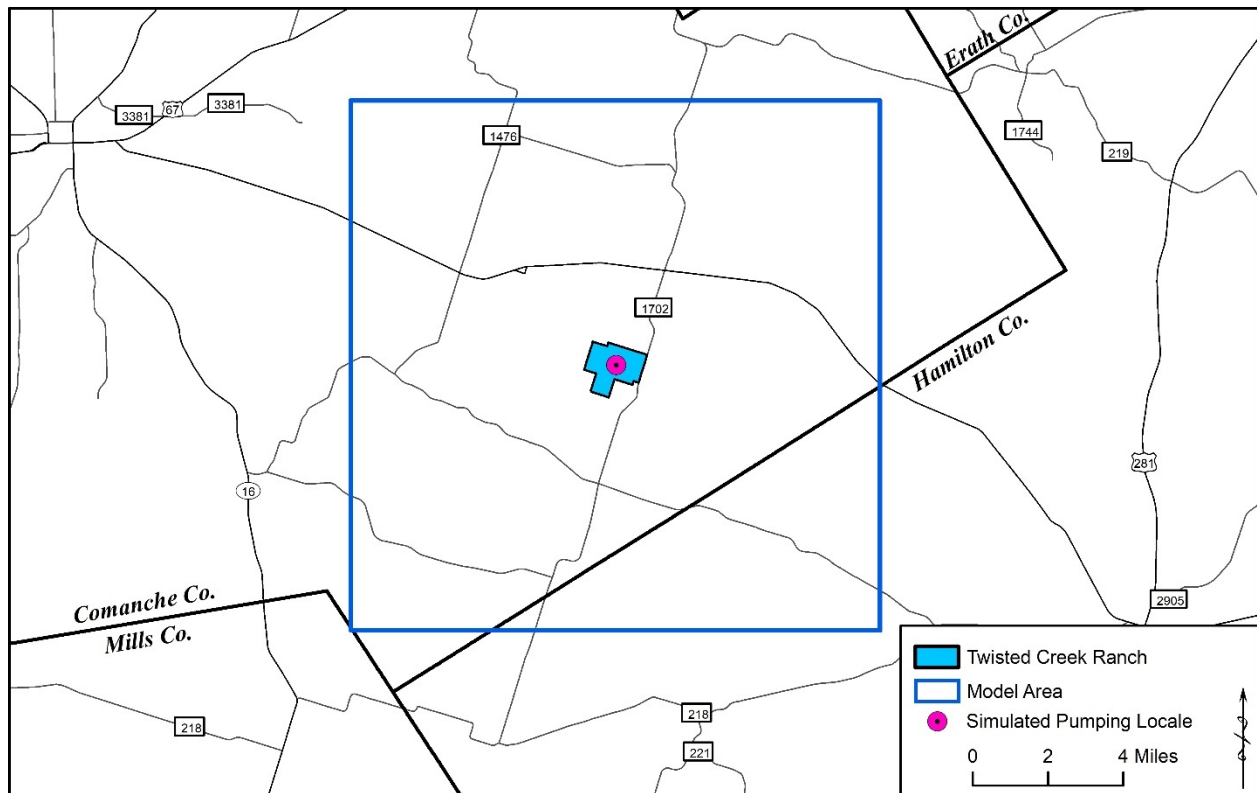
where:

$$u = \frac{r^2 S}{4Tt} \quad (\text{Equation 3})$$

$r$  = the radius at which drawdown is estimated (feet); and

$S$  = storativity (dimensionless).

The groundwater model was designed to estimate drawdown at full buildout (117 lots) after 10 and 30 years of continuous production at a rate of 251 gallons per day (0.17 gallons per minute (gpm) per well); the total production rate from the Trinity Aquifer equates to approximately 20.4 gpm. The groundwater model was simplified by concentrating pumping to one (1) central locale within the proposed subdivision (Figure 23).

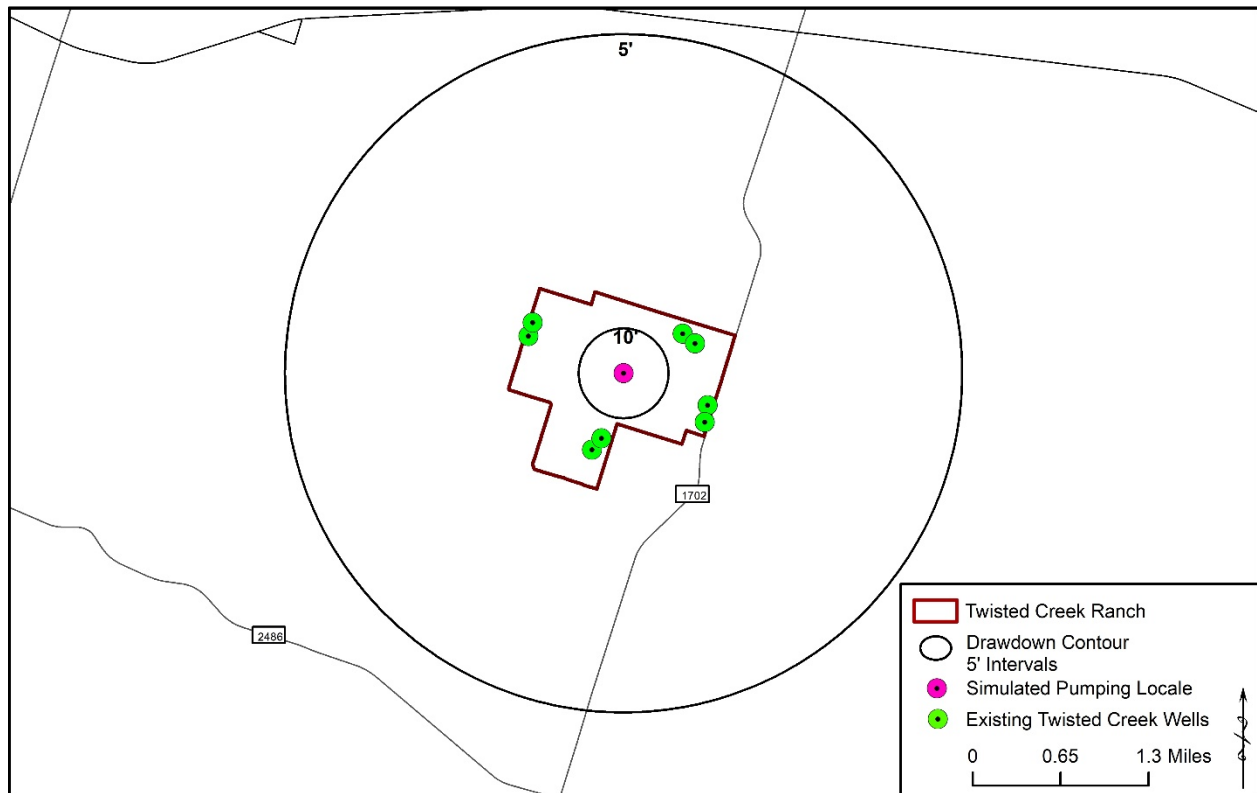


**Figure 23: Groundwater model**

In an effort to model the aquifer impacts from the proposed pumping, the following values calculated from the aquifer testing were utilized:

- Transmissivity: 253.0 ft.<sup>2</sup>/day (median value);
- Storativity:  $2.08 \times 10^{-4}$  (median value).

The results of the model runs after 10 years and 30 years of continuous pumping are summarized in Figures 24 and 25, with tabulated results in Tables 6 and 7. Static water levels, specific capacities measured during the aquifer tests, and projected water level above each pump are shown in Tables 6 and 7 along with an anticipated pump setting; these values are included to determine the available water column in each well after a given time period, even with active pumping. Each anticipated pump setting represents a depth of 20 feet above the bottom of the respective well.



**Figure 24: Modeled drawdown after 10 years from production at the proposed Twisted Creek Ranch**

The drawdown calculated after 10 years of production at 251 gallons per day per well results in approximately 9.7 feet of drawdown near the subdivision boundary (Figure 24). Based upon the results of the aquifer tests coupled with the modeling results, future pumping water levels at the constructed Twisted Creek Ranch wells will remain between 52.1 and 72.2 feet above the anticipated pump settings (Table 6).



**Table 6: Summary of 10-year drawdown calculations**

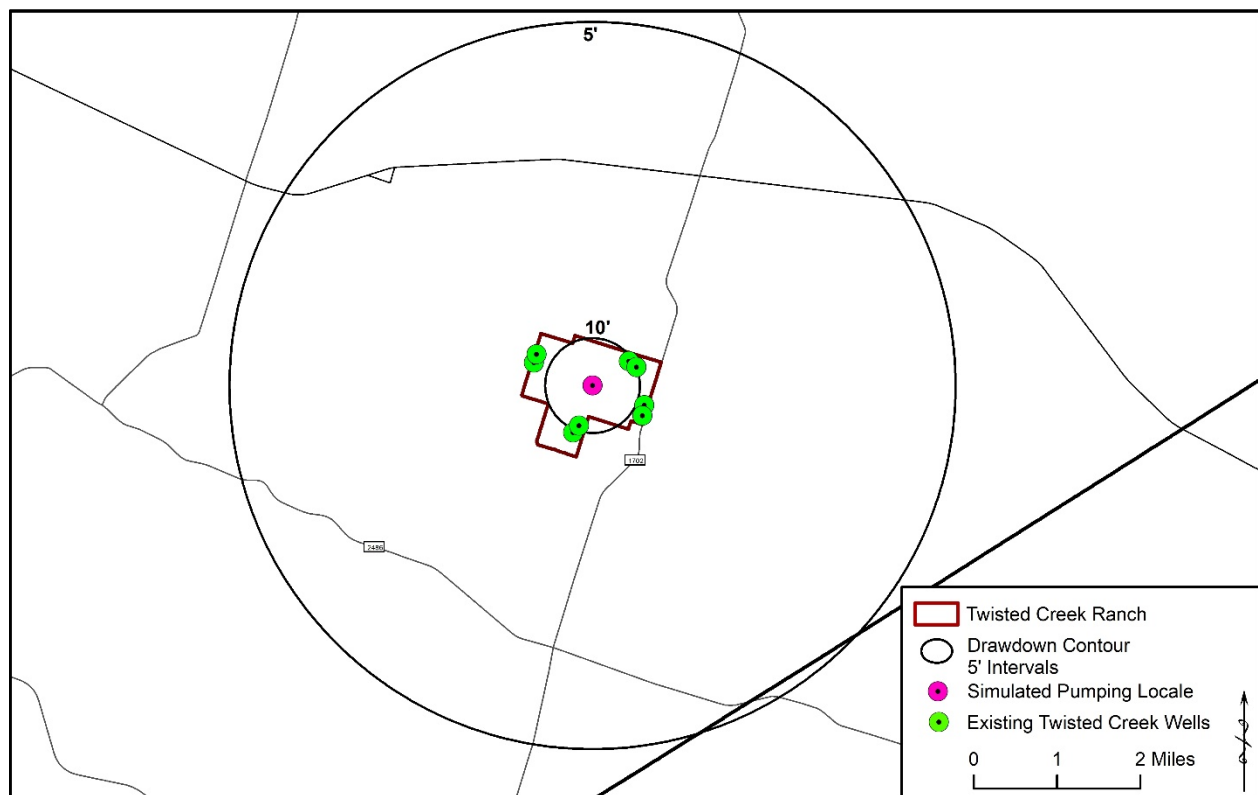
Well	Static Water Level (ft. bgl; present)	Static Water Level (ft. bgl; After 10 years)	Anticipated Pump Setting (ft. bgl)	Specific Capacity from each aquifer test (gpm/ft.)	Pumping Water Level @ 15 gpm (ft. bgl)	Water Level Above Pump (ft.)
No. 3	45.3	53.2	140	1.03	67.76	72.24
No. 4	96	104.9	180	0.97	120.36	59.64
No. 6	73.5	81.6	160	0.57	107.92	52.08
No. 8	92.3	101.0	180	1.47	111.20	68.8
Notes: Static water level recorded during each respective aquifer test; ft. = feet; bgl = below ground level; gpm = gallons per minute						

The drawdown calculated after 30 years of production at 251 gallons per day per well results in approximately 11.0 feet of drawdown near the subdivision boundary (Figure 25). Based upon the results of the aquifer tests coupled with the modeling results, future pumping water levels at the constructed Twisted Creek Ranch wells will remain between 50.7 and 70.8 feet above the anticipated pump settings (Table 7).

**Table 7: Summary of 30-year drawdown calculations**

Well	Static Water Level (ft. bgl; present)	Static Water Level (ft. bgl; After 10 years)	Anticipated Pump Setting (ft. bgl)	Specific Capacity from each aquifer test (gpm/ft.)	Pumping Water Level @ 15 gpm (ft. bgl)	Water Level Above Pump (ft.)
No. 3	45.3	54.6	140	1.03	69.16	70.84
No. 4	96	106.3	180	0.97	121.76	58.24
No. 6	73.5	83.0	160	0.57	109.32	50.68
No. 8	92.3	102.3	180	1.47	112.50	67.5
Notes: Static water level recorded during each respective aquifer test; ft. = feet; bgl = below ground level; gpm = gallons per minute						

**Table 8: Summary of 30-year drawdown calculations**



**Figure 25: Modeled drawdown after 30 years from production at the proposed Twisted Creek Ranch**

## **Section V: Certification**

I, Kaveh Khorzad, Texas Licensed Professional Geoscientist, certificate number 1126, based on best judgment, current groundwater conditions, and the information developed and presented in this form, certify that adequate groundwater is available from the underlying aquifer to supply the anticipated use of the proposed subdivision.

The Trinity Aquifer in Comanche County exhibits variable yield and water quality and is susceptible to reduction in yield during prolonged drought. For these reasons we recommend that each homeowner construct their well as deep as economically feasible within the Trinity Aquifer to provide the maximum possible yield and to set their pumps as deep as practical to protect from decreasing water levels during drought.



## **Section VI: References**

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## **Appendix A**

### Certification of Groundwater Availability for Platting Form



## CERTIFICATION OF GROUNDWATER AVAILABILITY FOR PLATTING FORM

Use of this form: If required by a municipal authority pursuant to Texas Local Government Code, §212.0101, or a county authority pursuant to §232.0032, Texas Local Government Code, the plat applicant and the Texas licensed professional engineer or Texas licensed professional geoscientist shall use this form based upon the requirements of Title 30, TAC, Chapter 230 to certify that adequate groundwater is available under the land to be subdivided (if the source of water for the subdivision is groundwater under the subdivision) for any subdivision subject to platting under Texas Local Government Code, §212.004 and §232.001. The form and Chapter 230 do not replace state requirements applicable to public drinking water supply systems or the authority of counties or groundwater conservation districts under either Texas Water Code, §35.019 or Chapter 36.

Administrative Information (30 TAC §230.4)
1. Name of Proposed Subdivision: Twisted Creek Ranch



Texas Commission on Environmental Quality  
Chapter 230 - Groundwater Availability Certification for Platting

2. Any Previous Name Which Identifies the Tract of Land:
3. Property Owner's Name(s): Lone Star Land Partners, LLC
Address: P.O. Box 1987 Marble Falls, Texas 78654
Phone: 800-511-2430
Fax:
4. Plat Applicant's Name: Lone Star Land Partners, LLC
Address: P.O. Box 1987 Marble Falls, Texas 78654
Phone: 800-511-2430
Fax:
5. Licensed Professional Engineer or Geoscientist:
Name: Kaveh Khorzad, P.G.
Address: 317 Ranch Road 620 S., Suite 203, Lakeway, Texas 78734
Phone: 512-773-3226
Fax:
Certificate Number: TBPG License No.: 1126
6. Location and Property Description of Proposed Subdivision: approximately 3 miles southeast of the City of Gustine, Texas located along Farm to Market 1702
7. Tax Assessor Parcel Number(s).
Book:
Map:
Parcel: Comanche County: 9827, 10359, 10360, 9565, and 10361

Proposed Subdivision Information (30 TAC §230.5)
8. Purpose of Proposed Subdivision (single family/multi-family residential, non-residential, commercial): single family
9. Size of Proposed Subdivision (acres): 967.16
10. Number of Proposed Lots: 117
11. Average Size of Proposed Lots (acres): 8.3
12. Anticipated Method of Water Distribution.

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Expansion of Existing Public Water Supply System?	Yes	<input checked="" type="radio"/> No
New (Proposed) Public Water Supply System?	Yes	<input checked="" type="radio"/> No
Individual Water Wells to Serve Individual Lots?	<input checked="" type="radio"/> Yes	No
Combination of Methods?	Yes	<input checked="" type="radio"/> No
Description (if needed):		
<p>13. Additional Information (if required by the municipal or county authority):</p> <p>Note: If public water supply system is anticipated, written application for service to existing water providers within a 1/2-mile radius should be attached to this form (30 TAC §230.5(f) of this title).</p>		

Projected Water Demand Estimate (30 TAC §230.6)
14. Residential Water Demand Estimate at Full Build Out (includes both single family and multi-family residential).
Number of Proposed Housing Units (single and multi-family): 117 single family housing units
Average Number of Persons per Housing Unit: 2.43 persons
Gallons of Water Required per Person per Day: 103 gallons per capita per day (gpcd)
Water Demand per Housing Unit per Year (acre feet/year): 0.28 acre feet
Total Expected Residential Water Demand per Year (acre feet/year): 32.8 acre feet
15. Non-residential Water Demand Estimate at Full Build Out.
Type(s) of Non-residential Water Uses: N/A
Water Demand per Type per Year (acre feet/year): 32.8
16. Total Water Demand Estimate at Full Build Out (acre feet/year): 32.8 acre-ft/year
17. Sources of Information Used for Demand Estimates: US Census data and TWDB

General Groundwater Resource Information (30 TAC §230.7)
--

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18. Identify and describe, using Texas Water Development Board names, the aquifer(s) which underlies the proposed subdivision: Trinity Aquifer

Note: Users may refer to the most recent State Water Plan to obtain general information pertaining to the state's aquifers. The State Water Plan is available on the Texas Water Development Board's Internet website at: [www.twdb.state.tx.us](http://www.twdb.state.tx.us)

Obtaining Site-Specific Groundwater Data (30 TAC §230.8)		
19. Have all known existing, abandoned, and inoperative wells within the proposed subdivision been located, identified, and shown on the plat as required under §230.8(b) of this title?	<input checked="" type="radio"/> Yes	No
20. Were the geologic and groundwater resource factors identified under §230.7(b) of this title considered in planning and designing the aquifer test required under §230.8(c) of this title?	<input checked="" type="radio"/> Yes	No
21. Have test and observation wells been located, drilled, logged, completed, developed, and shown on the plat as required by §230.8(c)(1) - (4) of this title?	<input checked="" type="radio"/> Yes	No
22. Have all reasonable precautions been taken to ensure that contaminants do not reach the subsurface environment and that undesirable groundwater has been confined to the zone(s) of origin (§230.8(c)(5) of this title)?	<input checked="" type="radio"/> Yes	No
23. Has an aquifer test been conducted which meets the requirements of §230.8(c)(1) and (6) of this title?	<input checked="" type="radio"/> Yes	No
24. Were existing wells or previous aquifer test data used?	<input checked="" type="radio"/> Yes	No
25. If yes, did they meet the requirements of §230.8(c)(7) of this title?	<input checked="" type="radio"/> Yes	No
26. Were additional observation wells or aquifer testing utilized?	Yes	<input checked="" type="radio"/> No
<p>Note: If expansion of an existing public water supply system or a new public water supply system is the anticipated method of water distribution for the proposed subdivision, site-specific groundwater data shall be developed under the requirements of 30 TAC, Chapter 290, Subchapter D of this title (relating to Rules and Regulations for Public Water Systems) and the applicable information and correspondence developed in meeting those requirements shall be attached to this form pursuant to §230.8(a) of this title.</p>		

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Determination of Groundwater Quality (30 TAC §230.9)		
27. Have water quality samples been collected as required by §230.9 of this title?	<input checked="" type="radio"/> Yes	No
28. Has a water quality analysis been performed which meets the requirements of §230.9 of this title?	<input checked="" type="radio"/> Yes	No

Determination of Groundwater Availability (30 TAC §230.10)		
29. Have the aquifer parameters required by §230.10(c) of this title been determined?	<input checked="" type="radio"/> Yes	No
30. If so, provide the aquifer parameters as determined.		
Rate of yield and drawdown: (See attached Table 3)		
Specific capacity: (See attached Table 3 & Appendix C)		
Efficiency of the pumped well: (See attached Table 3 & Appendix D)		
Transmissivity: (See attached Table 3 & Appendix C)		
Coefficient of storage: (See attached Table 3)		
Hydraulic conductivity: (See attached Table 3 & Appendix C)		
Were any recharge or barrier boundaries detected?	Yes	<input checked="" type="radio"/> No
If yes, please describe:		
Thickness of aquifer(s): 92 – 139 ft.		
31. Have time-drawdown determinations been calculated as required under §230.10(d)(1) of this title?	<input checked="" type="radio"/> Yes	No
32. Have distance-drawdown determinations been calculated as required under §230.10(d)(2) of this title?	<input checked="" type="radio"/> Yes	No
33. Have well interference determinations been made as required under §230.10(d)(3) of this title?	<input checked="" type="radio"/> Yes	No
34. Has the anticipated method of water delivery, the annual groundwater demand estimates at full build out, and geologic and groundwater information been taken into account in making these determinations?	<input checked="" type="radio"/> Yes	No
35. Has the water quality analysis required under §230.9 of this title been compared to primary and secondary public drinking water standards as required under §230.10(e) of	<input checked="" type="radio"/> Yes	No

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this title?		
Does the concentration of any analyzed constituent exceed the standards?	Yes	<input checked="" type="radio"/> No
If yes, please list the constituent(s) and concentration measure(s) which exceed standards:		

<b>Groundwater Availability and Usability Statements (30 TAC §230.11(a) and (b))</b>
36. Drawdown of the aquifer at the pumped well(s) is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period. <b>(See attached Tables 5 - 7)</b>
37. Drawdown of the aquifer at the property boundary is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period. <b>(See attached Tables 5 - 7)</b>
38. The distance from the pumped well(s) to the outer edges of the cone(s)-of-depression is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period. <b>(See attached Tables 5 - 7)</b>
39. The recommended minimum spacing limit between wells is <u>250</u> feet with a recommended well yield of <u>15</u> gallons per minute per well.
40. Available groundwater <input checked="" type="radio"/> is not (circle one) of sufficient quality to meet the intended use of the platted subdivision.
41. The groundwater availability determination does not consider the following conditions (identify any assumptions or uncertainties that are inherent in the groundwater availability determination): <b>(See Section IV.4 &amp; IV.5)</b>

<b>Certification of Groundwater Availability (30 TAC §230.11(c))</b> Must be signed by a Texas Licensed Professional Engineer or a Texas Licensed Professional Geoscientist.
42. I, <u>Kaveh Khorzad</u> , Texas Licensed Professional Engineer or <input checked="" type="radio"/> <u>Licensed Professional Geoscientist</u> (circle which applies), certificate number <u>1126</u> , based on best professional judgment, current groundwater conditions, and the information developed and presented in this form, certify that adequate groundwater is available from the underlying aquifer(s) to supply the anticipated use of the proposed subdivision.

Texas Commission on Environmental Quality  
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Date: 8/6/2021



Adopted July 9, 2008

Effective July 31, 2008

## **Appendix B**

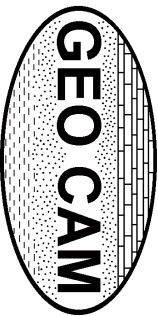
### Geophysical Logs



# **Geophysical Log**

**Well No. 3**





Borehole: TWISTED CREEK No.3  
Logs: GAMMA, SPR

Water Well Logging & Video Recording Services

Geo Cam, Inc. 17118 Classen Rd. San Antonio, TX 78247 877-495-9121

Project: TWISTED CREEK No.3 Date: 7/22/2021  
Client: TEXAN WW County: COMANCHE  
Location: N 31 48 50.6 W 98 22 18.0 State: TX

Drilling Contractor: TEXAN WW Driller T.D. (ft) : N/A  
Elevation: 1230' GPS Logger T.D. (ft) : 151'  
Depth Ref: TC + 3.4' Date Drilled: N/A

BIT RECORD				CASING RECORD			
RUN	BIT SIZE (in)	FROM (ft)	TO (ft)	SIZE/WGT/THK	FROM (ft)	TO (ft)	
1	7 7/8"	GL	TD	4.5" PVC	+3.4'	130'	
2							
3							

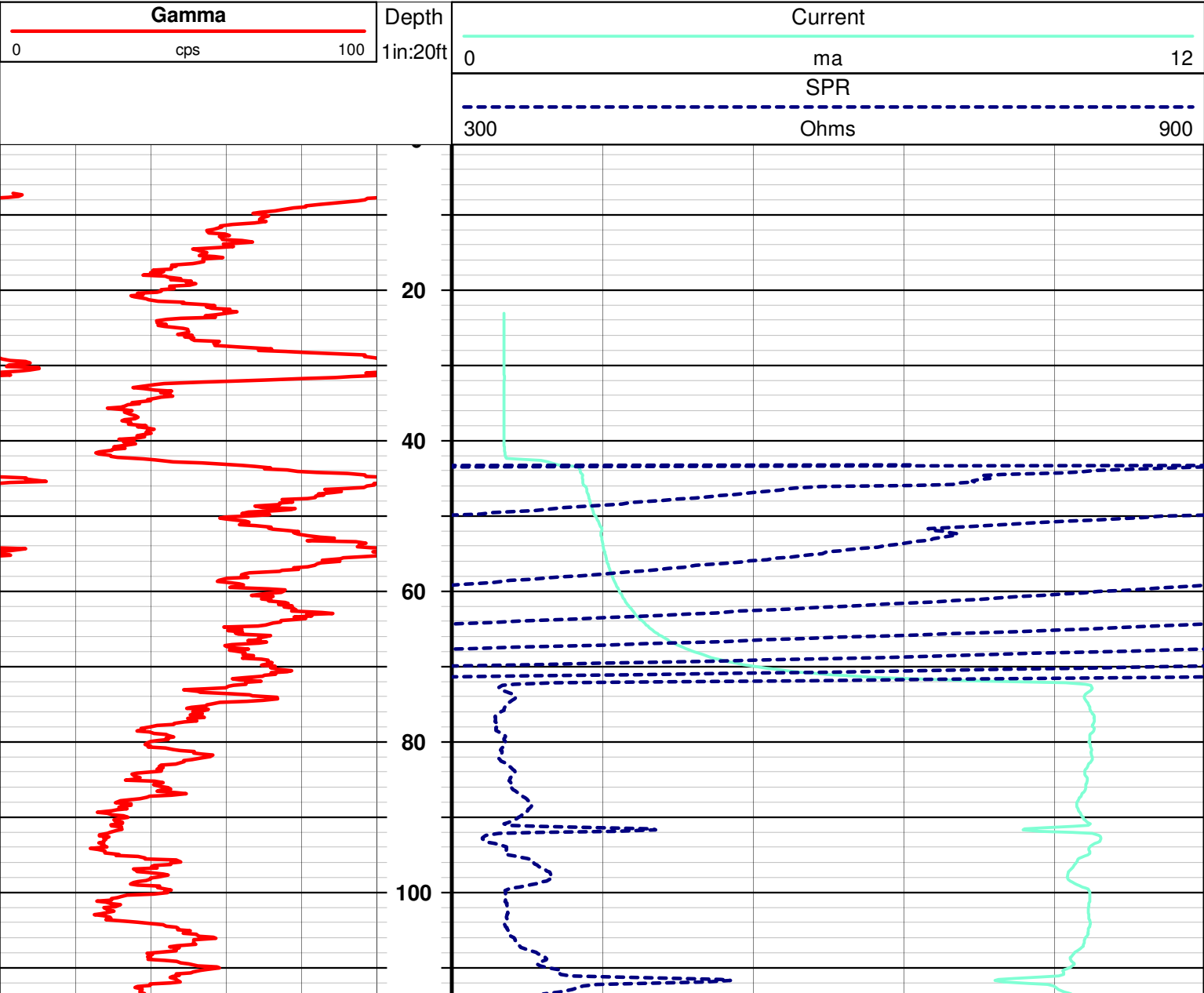
Drill Method: Weight: Fluid Level (ft) : 43  
Hole Medium: Mud Type: Time Since Circ:  
Viscosity: Rim: at: Deg C

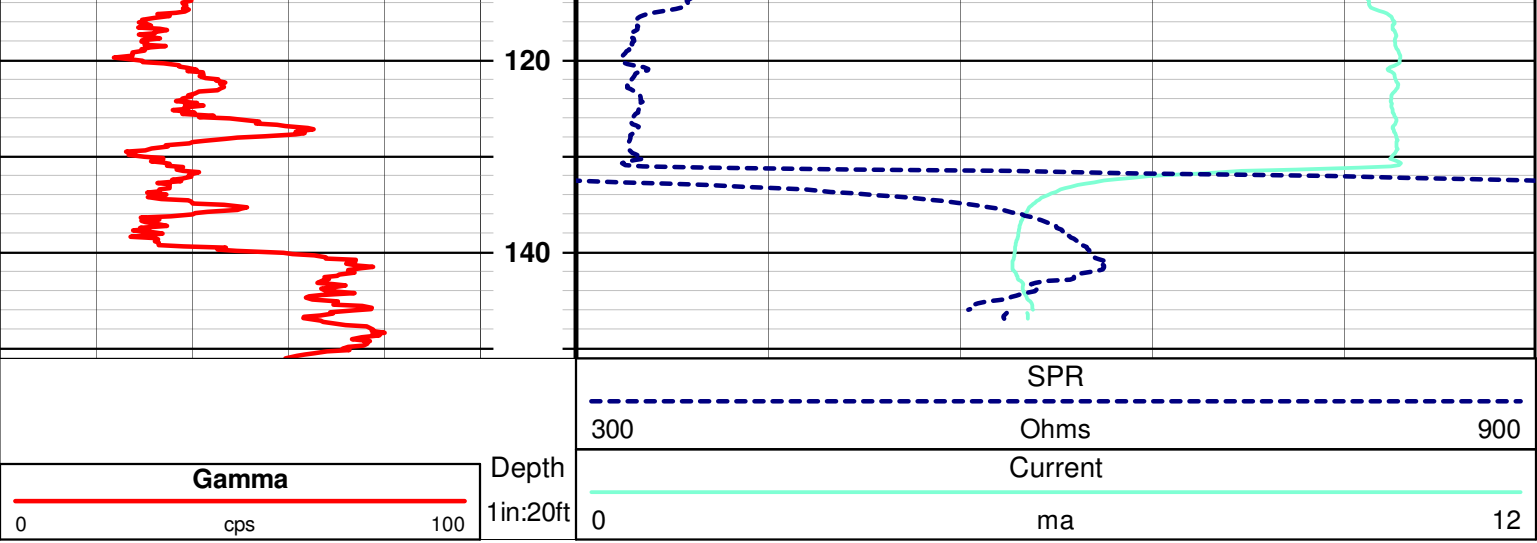
Logged by: Aaron Alvarez Unit/Truck: 06  
Witness:

LOG TYPE	RUN NO	SPEED (ft/min)	FROM (ft)	TO (ft)	FT./IN.
GAMMA	1	35	151'	7'	20
SPR	1	35	147'	43'	20

ALL MEASUREMENTS WERE TAKEN AT TC +3.4'

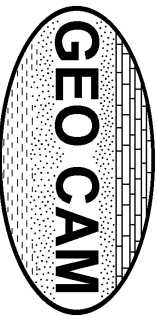
Comments:





# **Geophysical Log**

**Well No. 4**



**Borehole: TWISTED CREEK No. 4**

## Logs: GAMMA, SPR

## **Water Well Logging & Video Recording Services**

Geo Cam, Inc. 17118 Classen Rd. San Antonio, TX 78247 877-495-9121

Project: **TWISTED CREEK No. 4** Date: **7/22/2021**

Client: **TEXAN WW**

County: **COMANCHE**

**Location:** N 31 48 05.3 W 98 21 49.1 **State:** TX

BOREHOLE DATA

Drilling Contractor: **TEXAN WW**  
Driller T.D. (ft) : **N/A**

Elevation: 1253' GPS  
Logger I.D. (tt) : 194

Depth Ref: TC +3.7'      Date Drilled: N/A

RUN	BIT RECORD		CASING RECORD	
	BIT SIZE (in)	FROM (ft)	TO (ft)	SIZE/WGT/THK
1	7 7/8"	GL	TD	4.5" PVC
2				
3				

Drill Method: Weight: Fluid Level (ft) : 94

Hole Medium:	Mud Type:	Time Since Circ:
--------------	-----------	------------------

Viscosity: \_\_\_\_\_  
 Pm: \_\_\_\_\_ at: \_\_\_\_\_ Deg C \_\_\_\_\_

GENERAL DATA -

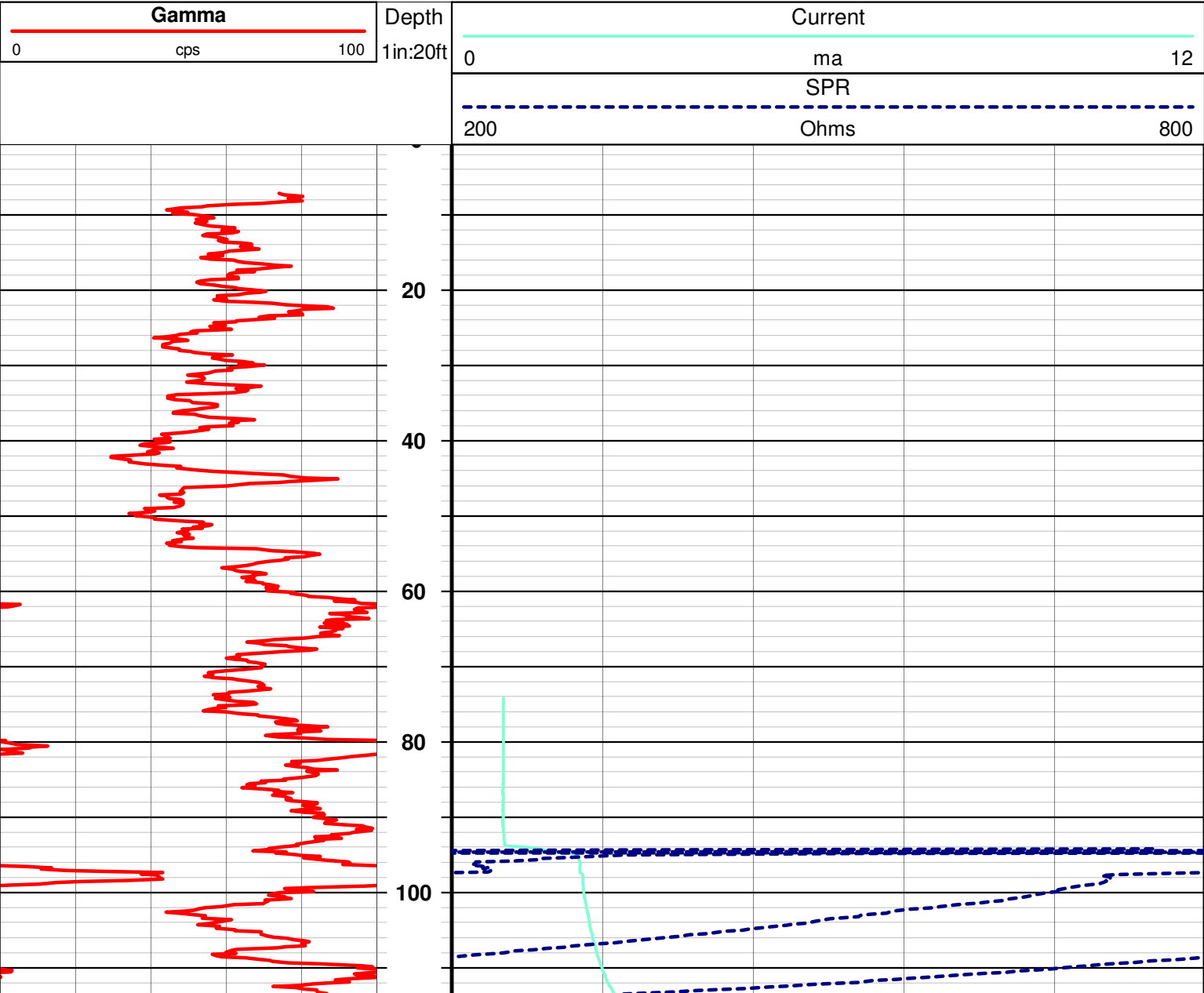
Unit/Truck: 06

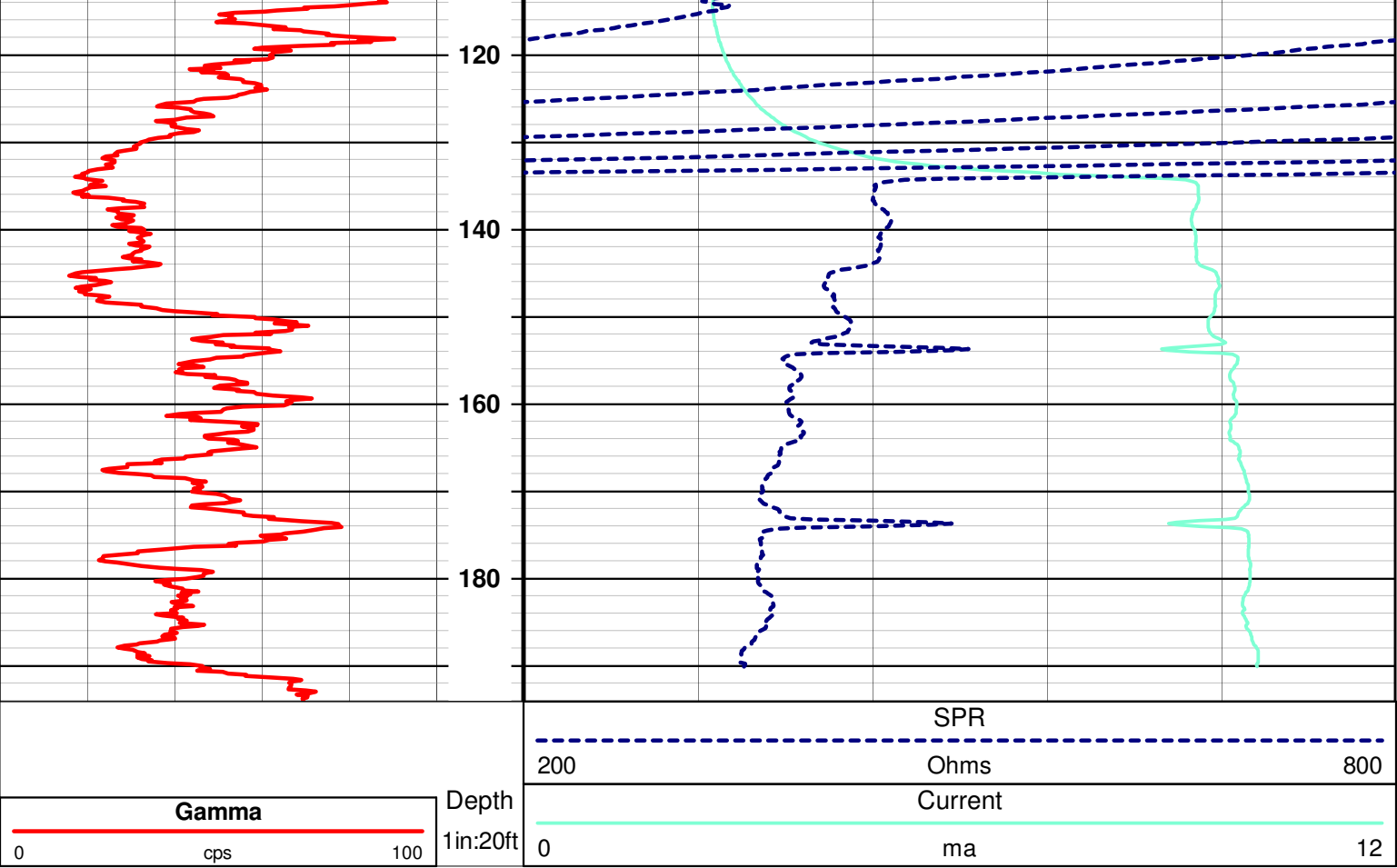
**Witness:**

LOG TYPE	RUN NO	SPEED (ft/min)	FROM (ft)	TO (ft)	FT. / IN.
GAMMA	1	35	194'	7'	20
SPR	1	35	190'	94'	20

ALL MEASUREMENTS WERE TAKEN AT TC + 3.7"

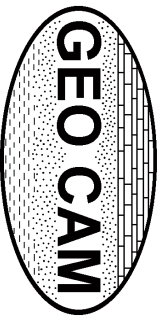
Comments:





# **Geophysical Log**

**Well No. 5**



Borehole: TWISTED CREEK No.5  
Logs: GAMMA, SPR

Water Well Logging & Video Recording Services

Geo Cam, Inc. 17118 Classen Rd. San Antonio, TX 78247 877-495-9121

Project: TWISTED CREEK No.5 Date: 7/22/2021  
Client: TEXAN WW County: COMANCHE  
Location: N 31 48 17.3 W 98 20 59.4 State: TX

BOREHOLE DATA

Drilling Contractor: TEXAN WW Driller T.D. (ft) : 200'  
Elevation: 1262' GPS Logger T.D. (ft) : 197'  
Depth Ref: TC + 3.5' Date Drilled: N/A

BIT RECORD				CASING RECORD			
RUN	BIT SIZE (in)	FROM (ft)	TO (ft)	SIZE/WGT/THK	FROM (ft)	TO (ft)	
1	7 7/8"	GL	TD	4.5" PVC	+3.5'	171'	
2							
3							

Drill Method: AIR ROTARY Weight: Fluid Level (ft) : 54'  
Hole Medium: Mud Type: Time Since Circ:  
Viscosity: Rim: at: Deg C

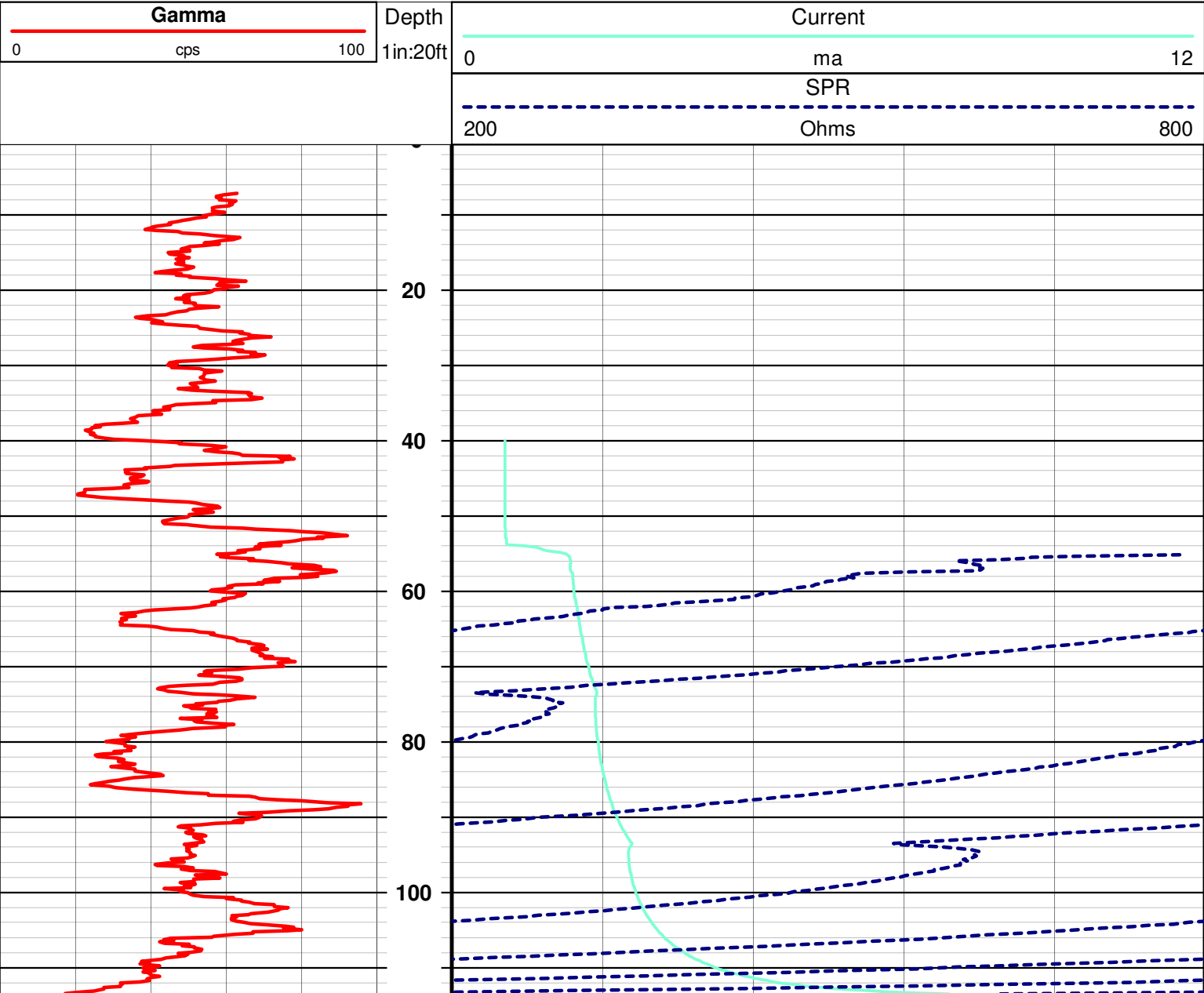
GENERAL DATA

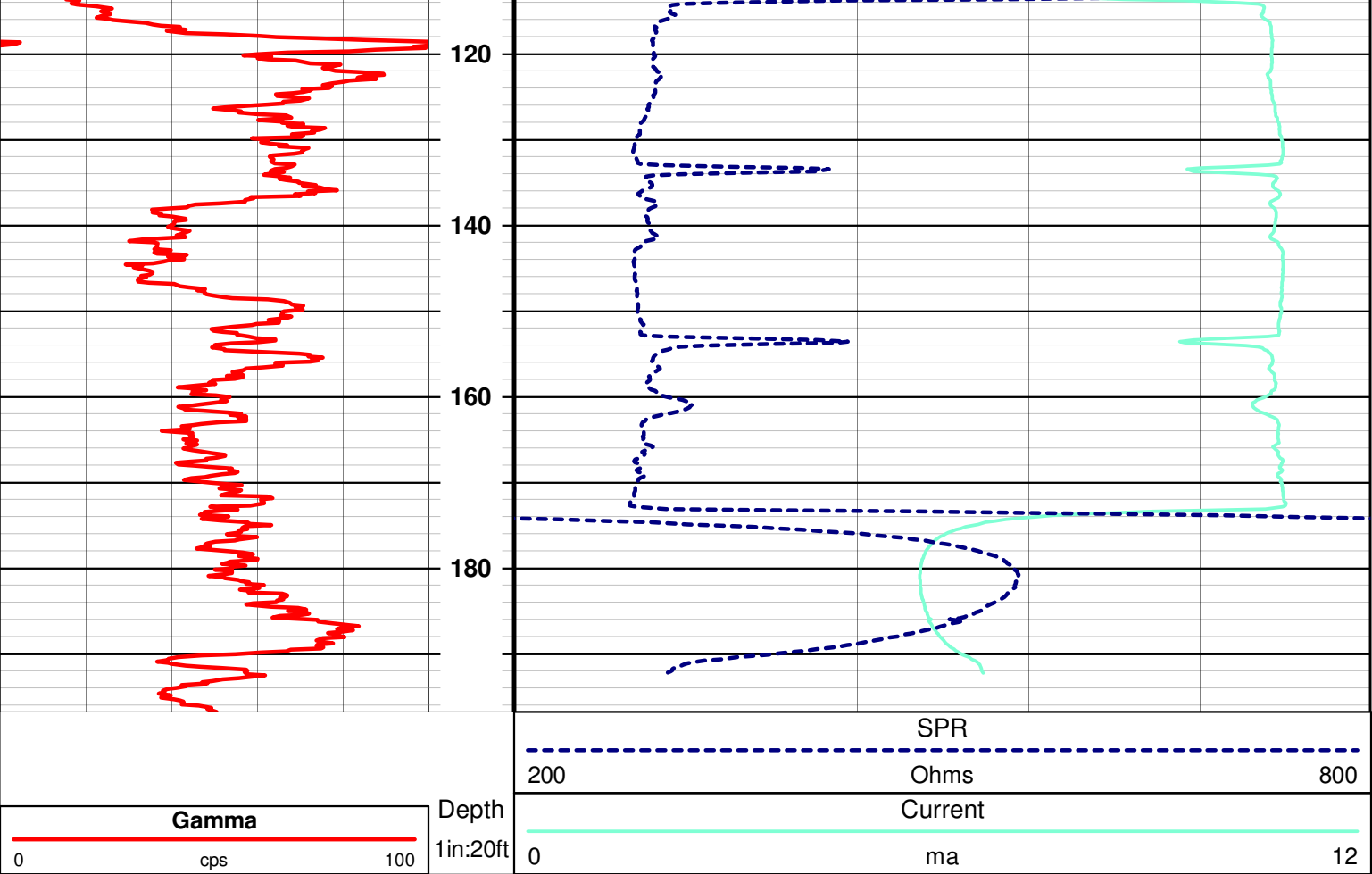
Logged by: Aaron Alvarez Unit/Truck: 06  
Witness:

LOG TYPE	RUN NO	SPEED (ft/min)	FROM (ft)	TO (ft)	FT./IN.
GAMMA	1	35	196'	7'	20
SPR	1	35	192'	55'	20

ALL MEASUREMENTS WERE TAKEN AT TC +3.5'

Comments:

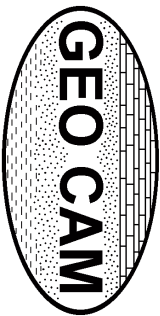






# **Geophysical Log**

**Well No. 7**



**Borehole: TWISTED CREEK No.7**

## Logs:

## Water Well Logging & Video Recording Services

Geo Cam, Inc. 17118 Classen Rd. San Antonio, TX 78247 877-495-9121

**Project: TWISTED CREEK No.7**

Date: 7/22/2021

Client: **TEXAN WW**

County: COMANCHE

**Location:** N 31 48 45.4 W 98 21 10.8

State: TX

## BOREHOLE DATA

Drilling Contractor: **TEXAN WW**

Driller T.D. (ft) =

Elevation: 1227 GPS

Logger T.D. (ft) : 213

Depth Ref: TC +1.1

Date Drilled: N/A

RUN	BIT RECORD			CASING RECORD		
	BIT SIZE (in)	FROM (ft)	TO (ft)	SIZE/WGT/THK	FROM (ft)	TO (ft)
1	N/A			4.5" PVC	+1.1'	213'
2						
3						

Drill Method: N/A

Weight:

**Fluid Level (ft) : 66'**

Hole Medium:

Mud Type:

Time Since Circ:

Viscosity:

Rm:

at:

Deg C

## GENERAL DATA

Logged by: Aaron Alvarez

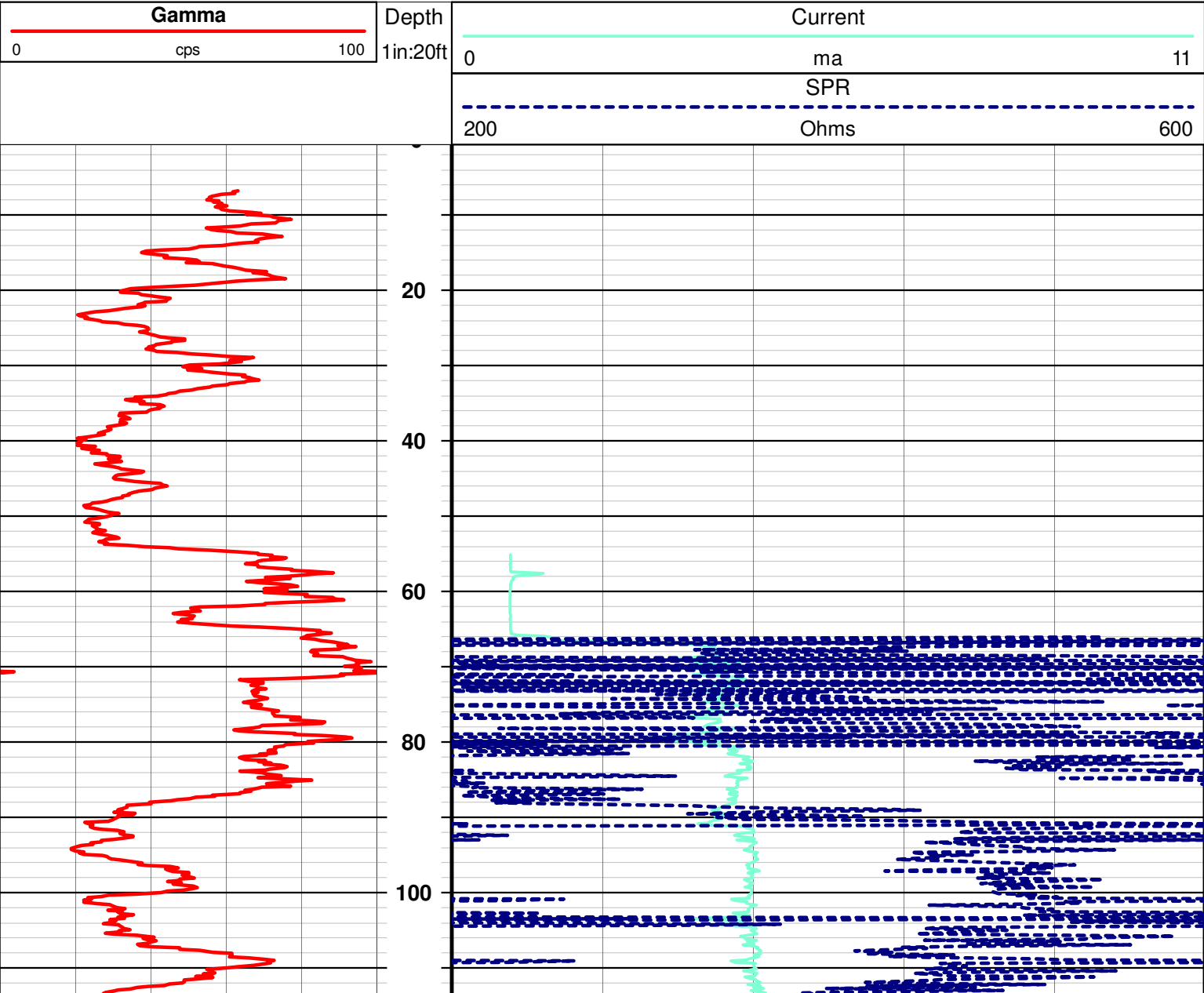
Unit/Truck: 06

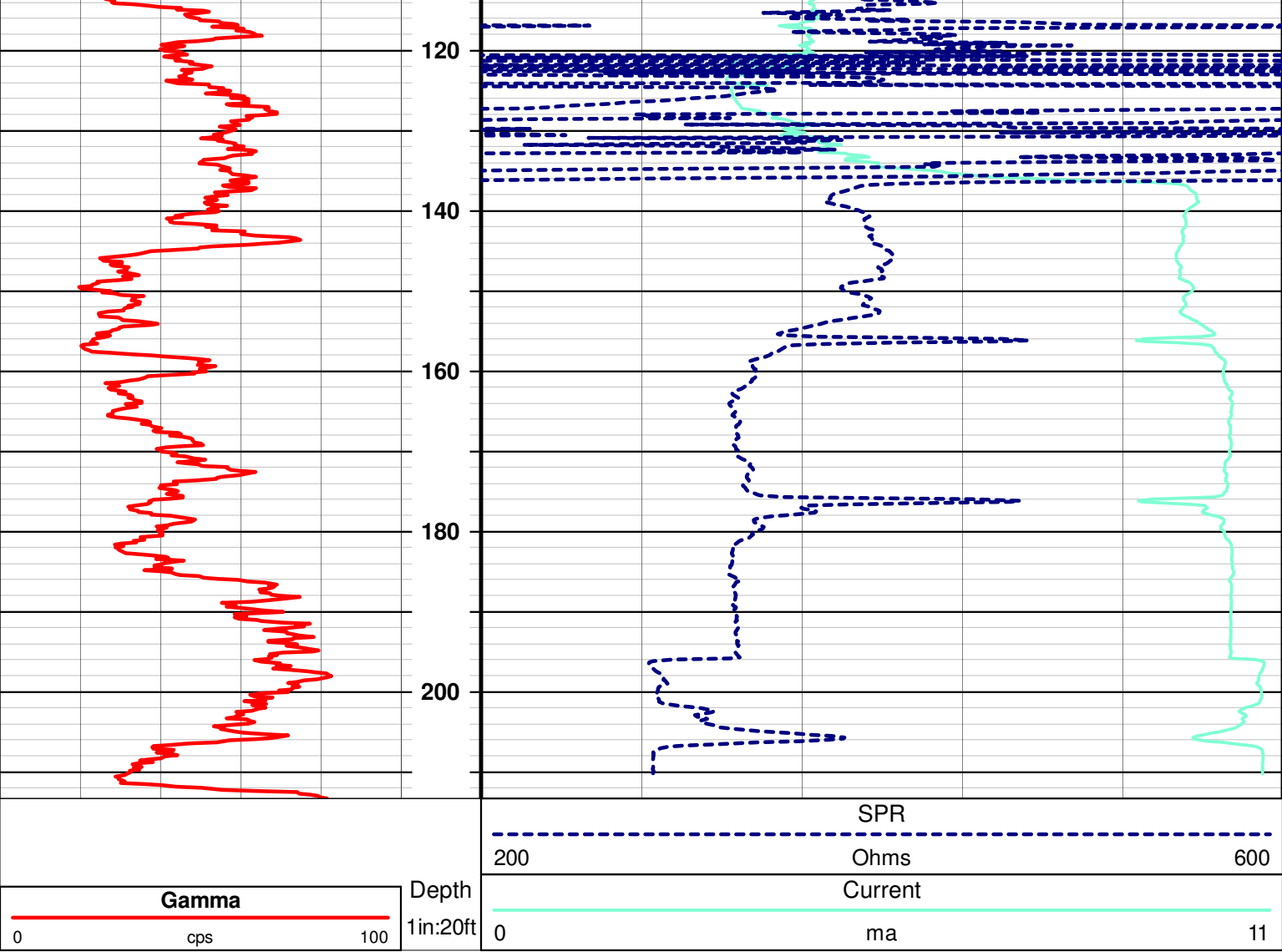
**Witness:**

LOG TYPE	RUN NO	SPEED (ft/min)	FROM (ft)	TO (ft)	FT. / IN.
GAMMA	1	35	213'	7'	20
SPR	1	35	210'	66'	20

ALL MEASUREMENTS WERE TAKEN AT TC +1.1<sup>1</sup>

Comments:





# **Appendix C**

## State Well Reports



# **Well Report**

**Well No. 1**

## STATE OF TEXAS WELL REPORT for Tracking #577469

Owner:	<b>Lone Star Land Partners</b>	Owner Well #:	<b>No Data</b>
Address:	<b>110 CR 250 Burnet, TX 76811</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>1240 CR 266 Gustine, TX 76455</b>	Latitude:	<b>31° 48' 01" N</b>
Well County:	<b>Comanche</b>	Longitude:	<b>098° 21' 52" W</b>
		Elevation:	<b>1280 ft. above sea level</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **1/28/2021**      Drilling End Date: **1/28/2021**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	<b>7.875</b>	<b>0</b>	<b>205</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	<b>12</b>	<b>205</b>	<b>Gravel</b>	<b>3/8</b>

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks &amp; material)</i>
Annular Seal Data:	<b>0</b>	<b>12</b>	<b>Cement 4 Bags/Sacks</b>

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other  
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**      **Surface Completion by Driller**

Water Level: **117 ft. below land surface on 2021-01-28**      Measurement Method: **Sonic/Radar**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **Jetted**      **Yield: 20 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>No Data</b>	<b>No Data</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **ALDERSON WATER WELL RESCUE, LLC**  
**PO BOX 366**  
**STAR, TX 76880**

Driller Name: **Caden Connolly**

License Number: **60094**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>10</b>	<b>Overburden</b>
<b>10</b>	<b>78</b>	<b>Sandy Shale</b>
<b>78</b>	<b>86</b>	<b>Sand</b>
<b>86</b>	<b>90</b>	<b>Sandy Shale</b>
<b>90</b>	<b>98</b>	<b>Sand</b>
<b>98</b>	<b>112</b>	<b>Red Sandy Shale</b>
<b>112</b>	<b>142</b>	<b>Sandy Shale</b>
<b>142</b>	<b>158</b>	<b>Sandstone</b>
<b>158</b>	<b>172</b>	<b>Red Shale</b>
<b>172</b>	<b>185</b>	<b>Sandstone</b>
<b>185</b>	<b>205</b>	<b>Red/Green Shale</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>	<b>SDR-17</b>	<b>0</b>	<b>145</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>SDR-17 0.020</b>	<b>145</b>	<b>205</b>

---

**IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY**

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation  
P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**



**Well Report**  
**Well No. 2**

## STATE OF TEXAS WELL REPORT for Tracking #448871

Owner:	<b>Bob Collier</b>	Owner Well #:	<b>No Data</b>
Address:	<b>P.O. Box 15 Energy , TX 76452</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>CR 266 1 mile of 120 CR 266 Gustine, TX</b>	Latitude:	<b>31° 48' 45.2" N</b>
Well County:	<b>Comanche</b>	Longitude:	<b>098° 22' 19.8" W</b>
		Elevation:	<b>1224 ft. above sea level</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Stock</b>

Drilling Start Date: **5/9/2017**

Drilling End Date: **5/10/2017**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	<b>7.875</b>	<b>0</b>	<b>20</b>
	<b>7.5</b>	<b>20</b>	<b>150</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	<b>42</b>	<b>150</b>	<b>Gravel</b>	<b>.375</b>

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks &amp; material)</i>
Annular Seal Data:	<b>0</b>	<b>2</b>	<b>Cement 1 Bags/Sacks</b>
	<b>2</b>	<b>40</b>	<b>Ben Seal 3 Bags/Sacks</b>
	<b>40</b>	<b>42</b>	<b>Hole Plug 1 Bags/Sacks</b>

Seal Method: **Pumped**

Distance to Property Line (ft.): **120 Feet**

Sealed By: **Driller**

Distance to Septic Field or other  
concentrated contamination (ft.): **NA**

Variance Number: **NA**

Distance to Septic Tank (ft.): **NA**

Method of Verification: **tape measure**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **50 ft. below land surface on 2017-05-11** Measurement Method: **Sonic/Radar**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **100**

Well Tests: **Jetted** **Yield: 15 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>43 - 146</b>	<b>1st Trinity</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Dalton Drilling & Service**

**P.O. Box 208  
Hamilton, TX 76531**

Driller Name: **Tom Dalton**

License Number: **2850**

Comments: **No Data**

**Report Amended on 4/17/2018 by Request #24865**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>4</b>	<b>Top Soil and caliche</b>
<b>4</b>	<b>18</b>	<b>sandy clay and sand</b>
<b>18</b>	<b>29</b>	<b>tan sandstone and sand and clay</b>
<b>29</b>	<b>48</b>	<b>sand and clay</b>
<b>48</b>	<b>55</b>	<b>green shale</b>
<b>55</b>	<b>75</b>	<b>green shale and sandstreaks</b>
<b>75</b>	<b>88</b>	<b>sand and charcoal and shale</b>
<b>88</b>	<b>120</b>	<b>sand and sandstone</b>
<b>120</b>	<b>146</b>	<b>sand and sandstone and green shale</b>
<b>146</b>	<b>150</b>	<b>red bed</b>

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>	<b>SDR 17</b>	<b>2</b>	<b>110</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>SDR 17 0.020</b>	<b>110</b>	<b>150</b>

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**IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY**

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P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**

**Well Report**  
**Well No. 3**

## STATE OF TEXAS WELL REPORT for Tracking #579261

Owner:	<b>Lonestar Land Partners, LLC</b>	Owner Well #:	<b>3</b>
Address:	<b>110 Co Rd 250 Burnet, TX 78611</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>FM 1702 Gustine, TX Twisted Creek #3</b>	Latitude:	<b>31° 48' 50.4" N</b>
		Longitude:	<b>098° 22' 17.8" W</b>
Well County:	<b>Comanche</b>	Elevation:	<b>No Data</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **7/9/2021**

Drilling End Date: **7/10/2021**

Borehole:	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>160</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
	<b>0</b>	<b>2</b>	<b>Cement 2 Bags/Sacks</b>
	<b>2</b>	<b>20</b>	<b>Bentonite 9 Bags/Sacks</b>

Seal Method: **Poured**

Distance to Property Line (ft.): **50+**

Sealed By: **Driller**

Distance to Septic Field or other  
concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **NA**

Method of Verification: **owner**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **No Data**

Packers:

- Rubber at 20 ft.**
- Plastic at 21 ft.**
- Rubber at 95 ft.**
- Plastic at 96 ft.**
- Plastic at 97 ft.**
- Rubber at 97 ft.**
- Rubber at 100 ft.**
- Plastic at 101 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 40 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>100 - 160</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>20</b>	<b>Brown sand</b>
<b>20</b>	<b>40</b>	<b>Red and brown sand</b>
<b>40</b>	<b>80</b>	<b>Blue clay</b>
<b>80</b>	<b>100</b>	<b>Firm sand</b>
<b>100</b>	<b>140</b>	<b>Red sandstone</b>
<b>140</b>	<b>160</b>	<b>Redbed</b>

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>100</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>100</b>	<b>160</b>

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P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**



**Well Report**  
**Well No. 4**

## STATE OF TEXAS WELL REPORT for Tracking #579300

Owner:	<b>Lonestar Land Partners, LLC</b>	Owner Well #:	<b>4</b>
Address:	<b>110 Co Rd 250 Burnet, TX 78611</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>FM 1702 Gustine, TX Twisted Creek #4</b>	Latitude:	<b>31° 48' 05.28" N</b>
		Longitude:	<b>098° 21' 49.04" W</b>
Well County:	<b>Comanche</b>	Elevation:	<b>No Data</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **7/10/2021**      Drilling End Date: **7/10/2021**

Borehole:	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>200</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks &amp; material)</i>
	<b>0</b>	<b>4</b>	<b>Cement 2 Bags/Sacks</b>
	<b>4</b>	<b>20</b>	<b>Bentonite 18 Bags/Sacks</b>

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other  
concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **NA**

Method of Verification: **Owner**

Surface Completion: **No Data**      **Surface Completion by Driller**

Water Level: **No Data**

Packers:

- Rubber at 20 ft.**
- Plastic at 21 ft.**
- Rubber at 120 ft.**
- Plastic at 121 ft.**
- Rubber at 122 ft.**
- Plastic at 123 ft.**
- Rubber at 124 ft.**
- Plastic at 125 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 15-20 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>124 - 200</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>10</b>	<b>Tan and white limestone</b>
<b>10</b>	<b>70</b>	<b>Grey and blue shale</b>
<b>70</b>	<b>80</b>	<b>Grey sand</b>
<b>80</b>	<b>90</b>	<b>Red sandy clay</b>
<b>90</b>	<b>130</b>	<b>Grey shale</b>
<b>130</b>	<b>195</b>	<b>Red, blue, and tan sand</b>
<b>195</b>	<b>200</b>	<b>Red tacky clay</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>140</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>140</b>	<b>200</b>

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**(512) 334-5540**

**Well Report**  
**Well No. 5**

## STATE OF TEXAS WELL REPORT for Tracking #579263

Owner: **Lonestar Land Partners, LLC**

Owner Well #: **5**

Address: **110 Co Rd 250  
Burnet, TX 78611**

Grid #: **41-14-4**

Well Location: **FM 1702  
Gustine, TX  
Twisted Creek #5**

Latitude: **31° 48' 17.3" N**

Longitude: **098° 20' 59.4" W**

Elevation: **No Data**

Well County: **Comanche**

Type of Work: **New Well**

Proposed Use: **Domestic**

Drilling Start Date: **7/8/2021**

Drilling End Date: **7/9/2021**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>200</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks &amp; material)</i>
Annular Seal Data:	<b>0</b>	<b>2</b>	<b>Cement 2 Bags/Sacks</b>
	<b>2</b>	<b>20</b>	<b>Bentonite 9 Bags/Sacks</b>

Seal Method: **Poured**

Distance to Property Line (ft.): **100+**

Sealed By: **Driller**

Distance to Septic Field or other  
concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **NA**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **No Data**

Packers: **Rubber at 20 ft.  
Plastic at 21 ft.  
Rubber at 105 ft.  
Plastic at 106 ft.  
Rubber at 108 ft.  
Plastic at 109 ft.  
Rubber at 112 ft.  
Plastic at 113 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 15-20 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>120 - 200</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>20</b>	<b>Brown sand and clay</b>
<b>20</b>	<b>40</b>	<b>Blue sandy clay</b>
<b>40</b>	<b>60</b>	<b>Blue clay with sand streaks</b>
<b>60</b>	<b>80</b>	<b>Red and blue sandstone</b>
<b>80</b>	<b>100</b>	<b>Blue sand</b>
<b>100</b>	<b>120</b>	<b>Blue and grey sand</b>
<b>120</b>	<b>140</b>	<b>Blue sandy clay</b>
<b>140</b>	<b>160</b>	<b>Blue sandy clay with red clay</b>
<b>160</b>	<b>180</b>	<b>Red and blue sandy clay</b>
<b>180</b>	<b>200</b>	<b>Red tacky clay</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>140</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>140</b>	<b>200</b>

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(512) 334-5540**



**Well Report**  
**Well No. 6**

## STATE OF TEXAS WELL REPORT for Tracking #579267

Owner:	<b>Lonestar Land Partners, LLC</b>	Owner Well #:	<b>6</b>
Address:	<b>110 Co Rd 250 Burnet, TX 78611</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>FM 1702 Gustine, TX Twisted Creek #6-2</b>	Latitude:	<b>31° 48' 10.84" N</b>
		Longitude:	<b>098° 21' 00.85" W</b>
Well County:	<b>Comanche</b>	Elevation:	<b>No Data</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **7/21/2021**      Drilling End Date: **7/21/2021**

Borehole:	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>180</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
	<b>0</b>	<b>4</b>	<b>Cement 2 Bags/Sacks</b>
	<b>4</b>	<b>20</b>	<b>Bentonite 18 Bags/Sacks</b>

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other  
concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **100+**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**      **Surface Completion by Driller**

Water Level: **No Data**

Packers:

- Rubber at 20 ft.**
- Plastic at 21 ft.**
- Rubber at 120 ft.**
- Plastic at 121 ft.**
- Rubber at 125 ft.**
- Plastic at 126 ft.**
- Rubber at 130 ft.**
- Plastic at 131 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 30 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>130 - 180</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>10</b>	<b>Tan and brown sand with gravel</b>
<b>10</b>	<b>20</b>	<b>Tan chalky limestone</b>
<b>20</b>	<b>40</b>	<b>Grey shale</b>
<b>40</b>	<b>43</b>	<b>Grey sand</b>
<b>43</b>	<b>70</b>	<b>Grey and red sandy shale</b>
<b>70</b>	<b>80</b>	<b>Red sandy clay</b>
<b>80</b>	<b>115</b>	<b>Blue and green fine sand</b>
<b>115</b>	<b>130</b>	<b>Grey clay</b>
<b>130</b>	<b>160</b>	<b>Blue and green sandstone</b>
<b>160</b>	<b>180</b>	<b>Red tacky clay</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>140</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>140</b>	<b>180</b>

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(512) 334-5540**

**Well Report**  
**Well No. 7**

## STATE OF TEXAS WELL REPORT for Tracking #579264

Owner:	<b>Lonestar Land Partners, LLC</b>	Owner Well #:	<b>7</b>
Address:	<b>110 Co Rd 250 Burnet, TX 78611</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>FM 1702 Gustine, TX Twisted Creek #7</b>	Latitude:	<b>31° 48' 45" N</b>
		Longitude:	<b>098° 21' 10.1" W</b>
Well County:	<b>Comanche</b>	Elevation:	<b>No Data</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **7/7/2021**

Drilling End Date: **7/7/2021**

Borehole:	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>253</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
	<b>0</b>	<b>2</b>	<b>Cement 2 Bags/Sacks</b>
	<b>2</b>	<b>20</b>	<b>Bentonite 9 Bags/Sacks</b>

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other  
concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **100+**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **No Data**

Packers:

- Rubber at 20 ft.**
- Plastic at 21 ft.**
- Rubber at 120 ft.**
- Plastic at 121 ft.**
- Rubber at 125 ft.**
- Plastic at 126 ft.**
- Rubber at 130 ft.**
- Plastic at 131 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 15-20 GPM**

Plug Information:

<i>Description (number of sacks &amp; material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
<b>Bentonite</b>	<b>200</b>	<b>253</b>

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>130 - 200</b>	<b>Good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>20</b>	<b>White and tan chalky limestone</b>
<b>20</b>	<b>40</b>	<b>Brown sand</b>
<b>40</b>	<b>60</b>	<b>Fine tan-brown sand with blue and red clay</b>
<b>60</b>	<b>80</b>	<b>Grey and blue sandy clay with red clay</b>
<b>80</b>	<b>100</b>	<b>Tan fine sand</b>
<b>100</b>	<b>140</b>	<b>Red sandy clay</b>
<b>140</b>	<b>180</b>	<b>Blue and tan sandstone</b>
<b>180</b>	<b>190</b>	<b>Sandy red clay</b>
<b>190</b>	<b>200</b>	<b>Red tacky clay</b>
<b>200</b>	<b>210</b>	<b>Tan sandstone</b>
<b>210</b>	<b>240</b>	<b>Red sandstone</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>140</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>140</b>	<b>200</b>

240	253	yellow clay
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**IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY**

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation  
P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**



**Well Report**  
**Well No. 8**

## STATE OF TEXAS WELL REPORT for Tracking #579265

Owner:	<b>Lonestar Land Partners, LLC</b>	Owner Well #:	<b>8</b>
Address:	<b>110 Co Rd 250 Burnet, TX 78611</b>	Grid #:	<b>41-14-4</b>
Well Location:	<b>FM 1702 Gustine, TX Twisted Creek #8</b>	Latitude:	<b>31° 48' 41.2" N</b>
		Longitude:	<b>098° 21' 04.6" W</b>
Well County:	<b>Comanche</b>	Elevation:	<b>No Data</b>
Type of Work:	<b>New Well</b>	Proposed Use:	<b>Domestic</b>

Drilling Start Date: **7/8/2021**

Drilling End Date: **7/8/2021**

Borehole:	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
	<b>9</b>	<b>0</b>	<b>20</b>
	<b>6.75</b>	<b>20</b>	<b>200</b>

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks &amp; material)</i>
	<b>0</b>	<b>2</b>	<b>Cement 2 Bags/Sacks</b>
	<b>2</b>	<b>20</b>	<b>Bentonite 9 Bags/Sacks</b>

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other  
concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **NA**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **No Data**

Packers:

- Rubber at 20 ft.**
- Plastic at 21 ft.**
- Rubber at 105 ft.**
- Plastic at 106 ft.**
- Rubber at 108 ft.**
- Plastic at 109 ft.**
- Rubber at 110 ft.**
- Plastic at 111 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 20 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
<b>110 - 200</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which  
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**  
**161 Industrial Loop**  
**Fredericksburg, TX 78624**

Driller Name: **Brice Bormann**

License Number: **54855**

Apprentice Name: **James Caleb Virdell**

Apprentice Number: **59342**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>20</b>	<b>Caliche</b>
<b>20</b>	<b>40</b>	<b>Brown and tan clay</b>
<b>40</b>	<b>60</b>	<b>Blue, brown, and tan clay with streaks of blue sand</b>
<b>60</b>	<b>80</b>	<b>Brown and red fine sand</b>
<b>80</b>	<b>100</b>	<b>Red sandy clay with blue clay streaks</b>
<b>100</b>	<b>120</b>	<b>Blue sandstone</b>
<b>120</b>	<b>140</b>	<b>Blue firm sand</b>
<b>140</b>	<b>160</b>	<b>Red sandstone</b>
<b>160</b>	<b>190</b>	<b>Blue sandstone</b>
<b>190</b>	<b>200</b>	<b>Red tacky clay</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>4.5</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>140</b>
<b>4.5</b>	<b>Screen</b>	<b>New Plastic (PVC)</b>	<b>0.032</b>	<b>140</b>	<b>200</b>

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Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation  
P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**

## **Appendix D**

### Aquifer Test Data and Analysis



## **Aquifer Test**

**Well No. 3**

Twisted Creek Ranch Well No. 3 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 3 Temperature (F)	PW Well No. 3 Water Level (ft bgs)	PW Well No. 3 Water Level (ft MSL)	PW Well No. 3 Drawdown (ft)	PW Well No. 3 Pump Rate (gpm)	PW Well No. 3 Specific Capacity (gpm/ft)	Comments	OW Well No. 2 Water Level (ft MSL)	OW Well No. 2 Drawdown (ft)
7/28/21 3:12 PM	0		77.41	45.30	1,175.70	0.00			Pump Start	1,182.02	0.00
7/28/21 3:13 PM	1		75.59	51.42	1,169.58	6.11	16	2.62	Meter: 122,693.4 gallons	1,182.04	-0.02
7/28/21 3:14 PM	2		74.09	53.57	1,167.43	8.27	16	1.94		1,182.01	0.01
7/28/21 3:15 PM	3		72.99	54.31	1,166.69	9.01	16	1.78		1,182.06	-0.04
7/28/21 3:16 PM	4		72.23	54.71	1,166.30	9.40	15	1.60		1,182.01	0.01
7/28/21 3:17 PM	5		71.64	55.04	1,165.96	9.74	16	1.64		1,182.03	-0.01
7/28/21 3:18 PM	6		71.21	55.23	1,165.77	9.92	15	1.51		1,182.07	-0.05
7/28/21 3:19 PM	7		70.86	55.38	1,165.62	10.08	16	1.59		1,182.04	-0.02
7/28/21 3:20 PM	8		70.62	55.54	1,165.46	10.24	16	1.56		1,182.02	0.00
7/28/21 3:21 PM	9		70.44	55.63	1,165.37	10.33	16	1.55		1,182.03	-0.01
7/28/21 3:22 PM	10		70.28	55.78	1,165.22	10.48	16	1.53		1,182.00	0.02
7/28/21 3:23 PM	11		70.18	55.96	1,165.04	10.66	16	1.50		1,182.00	0.02
7/28/21 3:24 PM	12		70.08	56.02	1,164.98	10.72	16	1.49		1,181.92	0.10
7/28/21 3:25 PM	13		70.03	56.06	1,164.94	10.76	16	1.49		1,182.01	0.01
7/28/21 3:26 PM	14		70.01	56.10	1,164.90	10.80	16	1.48		1,181.96	0.06
7/28/21 3:27 PM	15		69.98	56.15	1,164.85	10.84	16	1.48		1,182.02	0.00
7/28/21 3:32 PM	20		69.84	56.54	1,164.46	11.24	16	1.42	pH: 7.32/ EC: 0.75	1,182.04	-0.02
7/28/21 3:37 PM	25		69.81	56.78	1,164.22	11.47	16	1.39	pH: 7.16/ EC: 0.78	1,181.93	0.09
7/28/21 3:42 PM	30		69.84	56.92	1,164.08	11.62	16	1.38	pH: 7.24/ EC: 0.80	1,181.93	0.09
7/28/21 3:47 PM	35		69.87	57.00	1,164.00	11.70	16	1.37	pH: 7.26/ EC: 0.80	1,181.92	0.10
7/28/21 3:52 PM	40		69.83	57.23	1,163.77	11.93	16	1.34	pH: 7.27/ EC: 0.81	1,181.82	0.20
7/28/21 3:57 PM	45		69.85	57.29	1,163.71	11.99	16	1.33	pH: 7.25/ EC: 0.81	1,181.83	0.19
7/28/21 4:12 PM	60		69.84	57.69	1,163.31	12.38	16	1.29	pH: 7.29/ EC: 0.80	1,181.86	0.16
7/28/21 4:27 PM	75		69.81	57.99	1,163.01	12.69	16	1.26	pH: 7.29/ EC: 0.78	1,181.74	0.28
7/28/21 4:42 PM	90		69.82	58.10	1,162.90	12.80	16	1.25	pH: 7.23/ EC: 0.76	1,181.72	0.30
7/28/21 4:57 PM	105		69.82	58.25	1,162.75	12.95	16	1.24	pH: 7.22/ EC: 0.75	1,181.61	0.41
7/28/21 5:12 PM	120		69.87	58.41	1,162.59	13.11	16	1.22	pH: 7.17/ EC: 0.74	1,181.61	0.41
7/28/21 5:42 PM	150		69.78	58.73	1,162.27	13.42				1,181.46	0.55
7/28/21 6:12 PM	180		69.76	58.82	1,162.18	13.52				1,181.44	0.58
7/28/21 6:42 PM	210		69.82	59.06	1,161.95	13.75				1,181.33	0.69
7/28/21 7:12 PM	240		69.79	59.10	1,161.90	13.79				1,181.21	0.81
7/28/21 8:12 PM	300		69.81	59.30	1,161.70	14.00				1,181.15	0.87
7/28/21 9:12 PM	360		69.79	59.51	1,161.49	14.21				1,181.13	0.89
7/28/21 10:12 PM	420		69.81	59.63	1,161.37	14.33				1,181.11	0.91
7/28/21 11:12 PM	480		69.79	59.70	1,161.30	14.39				1,181.01	1.01

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 HP  
MSL = Mean Sea Level      Pump Setting = 140 ft      EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 3 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 3 Temperature (F)	PW Well No. 3 Water Level (ft bgs)	PW Well No. 3 Water Level (ft MSL)	PW Well No. 3 Drawdown (ft)	PW Well No. 3 Pump Rate (gpm)	PW Well No. 3 Specific Capacity (gpm/ft)	Comments	OW Well No. 2 Water Level (ft MSL)	OW Well No. 2 Drawdown (ft)
7/29/21 12:12 AM	540		69.79	59.85	1,161.15	14.54				1,180.92	1.10
7/29/21 1:12 AM	600		69.82	59.99	1,161.01	14.69				1,180.88	1.14
7/29/21 2:12 AM	660		69.78	60.00	1,161.00	14.69				1,180.82	1.20
7/29/21 3:12 AM	720		69.82	60.15	1,160.85	14.85				1,180.79	1.23
7/29/21 4:12 AM	780		69.82	60.30	1,160.70	15.00				1,180.64	1.38
7/29/21 5:12 AM	840		69.78	60.33	1,160.67	15.03				1,180.60	1.42
7/29/21 6:12 AM	900		69.82	60.36	1,160.64	15.06				1,180.56	1.46
7/29/21 7:12 AM	960		69.82	60.37	1,160.63	15.06				1,180.68	1.34
7/29/21 8:12 AM	1,020		69.81	60.51	1,160.49	15.20				1,180.61	1.41
7/29/21 9:12 AM	1,080		69.82	60.48	1,160.53	15.17				1,180.48	1.54
7/29/21 10:12 AM	1,140		69.82	60.52	1,160.48	15.22				1,180.45	1.57
7/29/21 11:12 AM	1,200		69.79	60.59	1,160.41	15.29				1,180.50	1.52
7/29/21 12:12 PM	1,260		69.77	60.73	1,160.27	15.43				1,180.41	1.60
7/29/21 1:12 PM	1,320		69.81	60.73	1,160.27	15.43				1,180.33	1.69
7/29/21 2:12 PM	1,380		69.83	60.78	1,160.22	15.48				1,180.34	1.68
7/29/21 3:12 PM	1,440		69.80	60.92	1,160.08	15.62				1,180.27	1.75
7/29/21 3:16 PM	1,444	0	69.79	60.86	1,160.14	15.56	16	1.03	Pump Stop	1,180.30	1.72
7/29/21 3:17 PM	1,445	1	69.81	55.39	1,165.61	10.08			Meter: 145,638.0 gallons	1,180.25	1.77
7/29/21 3:18 PM	1,446	2	69.79	52.80	1,168.20	7.50			Avg. Pump Rate: 16	1,180.18	1.83
7/29/21 3:19 PM	1,447	3	69.78	52.05	1,168.95	6.74				1,180.26	1.75
7/29/21 3:20 PM	1,448	4	69.85	51.67	1,169.33	6.36				1,180.22	1.80
7/29/21 3:21 PM	1,449	5	69.96	51.36	1,169.64	6.06				1,180.23	1.79
7/29/21 3:22 PM	1,450	6	70.02	51.15	1,169.85	5.85				1,180.24	1.78
7/29/21 3:23 PM	1,451	7	70.04	50.98	1,170.02	5.67				1,180.35	1.67
7/29/21 3:24 PM	1,452	8	70.13	50.78	1,170.23	5.47				1,180.25	1.77
7/29/21 3:25 PM	1,453	9	70.19	50.71	1,170.29	5.40				1,180.20	1.82
7/29/21 3:26 PM	1,454	10	70.23	50.57	1,170.44	5.26				1,180.26	1.76
7/29/21 3:27 PM	1,455	11	70.37	50.47	1,170.53	5.17				1,180.34	1.68
7/29/21 3:28 PM	1,456	12	70.47	50.35	1,170.66	5.04				1,180.29	1.73
7/29/21 3:29 PM	1,457	13	70.52	50.28	1,170.72	4.98				1,180.28	1.74
7/29/21 3:30 PM	1,458	14	70.62	50.10	1,170.90	4.79				1,180.18	1.84
7/29/21 3:31 PM	1,459	15	70.66	50.16	1,170.84	4.86				1,180.30	1.72
7/29/21 3:36 PM	1,464	20	70.88	49.77	1,171.23	4.46				1,180.32	1.70
7/29/21 3:41 PM	1,469	25	71.12	49.53	1,171.47	4.23				1,180.33	1.69
7/29/21 3:46 PM	1,474	30	71.25	49.43	1,171.57	4.12				1,180.36	1.66

Note: bgs = below ground surface  
MSL = Mean Sea Level

Column Pipe Diameter = 1 1/4 inches  
Pump Setting = 140 ft

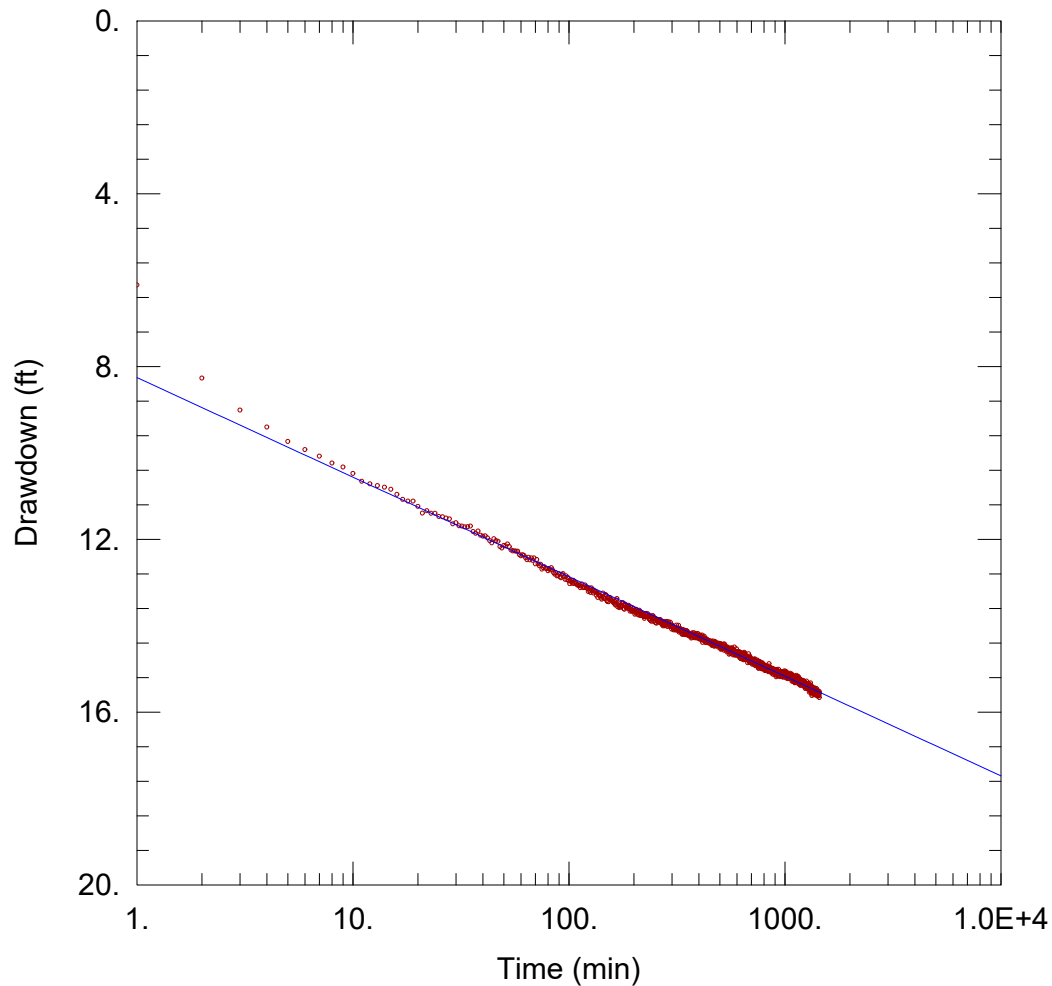
Horsepower = 1 HP  
EC=Electrical conductivity (mS/cm)



Twisted Creek Ranch Well No. 3 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 3 Temperature (F)	PW Well No. 3 Water Level (ft bgs)	PW Well No. 3 Water Level (ft MSL)	PW Well No. 3 Drawdown (ft)	PW Well No. 3 Pump Rate (gpm)	PW Well No. 3 Specific Capacity (gpm/ft)	Comments	OW Well No. 2 Water Level (ft MSL)	OW Well No. 2 Drawdown (ft)
7/29/21 3:51 PM	1,479	35	71.35	49.23	1,171.77	3.93				1,180.33	1.69
7/29/21 3:56 PM	1,484	40	71.34	49.03	1,171.97	3.72				1,180.37	1.65
7/29/21 4:01 PM	1,489	45	71.23	48.96	1,172.05	3.65				1,180.36	1.66
7/29/21 4:16 PM	1,504	60	70.91	48.62	1,172.38	3.31				1,180.48	1.54
7/29/21 4:31 PM	1,519	75	70.62	48.45	1,172.55	3.15				1,180.43	1.59
7/29/21 4:46 PM	1,534	90	70.37	48.28	1,172.72	2.98				1,180.54	1.48
7/29/21 5:01 PM	1,549	105	70.36	48.16	1,172.84	2.86				1,180.56	1.46
7/29/21 5:16 PM	1,564	120	70.23	48.08	1,172.92	2.78				1,180.61	1.41
7/29/21 5:46 PM	1,594	150	70.11	47.82	1,173.18	2.52				1,180.71	1.31
7/29/21 6:16 PM	1,624	180	70.05	47.67	1,173.33	2.37				1,180.80	1.22
7/29/21 6:46 PM	1,654	210	69.99	47.58	1,173.42	2.27				1,180.81	1.21
7/29/21 7:16 PM	1,684	240	69.99	47.39	1,173.61	2.09				1,180.87	1.15
7/29/21 8:16 PM	1,744	300	69.92	47.17	1,173.83	1.87				1,180.95	1.07
7/29/21 9:16 PM	1,804	360	69.88	47.12	1,173.88	1.82				1,180.96	1.06
7/29/21 10:16 PM	1,864	420	69.88	46.94	1,174.06	1.64				1,181.14	0.88
7/29/21 11:16 PM	1,924	480	69.90	46.83	1,174.17	1.53				1,181.17	0.85
7/30/21 12:16 AM	1,984	540	69.88	46.79	1,174.21	1.49				1,181.22	0.80
7/30/21 1:16 AM	2,044	600	69.88	46.71	1,174.29	1.41				1,181.17	0.84
7/30/21 2:16 AM	2,104	660	69.86	46.61	1,174.39	1.31				1,181.25	0.76
7/30/21 3:16 AM	2,164	720	69.85	46.61	1,174.39	1.31				1,181.24	0.78
7/30/21 4:16 AM	2,224	780	69.87	46.52	1,174.48	1.22				1,181.36	0.66
7/30/21 5:16 AM	2,284	840	69.86	46.43	1,174.57	1.13				1,181.39	0.63
7/30/21 6:16 AM	2,344	900	69.83	46.43	1,174.57	1.13				1,181.43	0.59
7/30/21 7:16 AM	2,404	960	69.87	46.32	1,174.68	1.02				1,181.46	0.56
7/30/21 8:16 AM	2,464	1,020	69.85	46.25	1,174.75	0.94				1,181.48	0.54
7/30/21 9:16 AM	2,524	1,080	69.81	46.28	1,174.72	0.97				1,181.56	0.46
7/30/21 10:16 AM	2,584	1,140	69.85	46.22	1,174.78	0.91				1,181.52	0.50
7/30/21 11:16 AM	2,644	1,200	69.88	46.14	1,174.86	0.84				1,181.50	0.52
7/30/21 12:16 PM	2,704	1,260	69.81	46.16	1,174.84	0.86				1,181.64	0.38
7/30/21 1:16 PM	2,764	1,320	69.83	46.15	1,174.85	0.84				1,181.52	0.50
7/30/21 2:16 PM	2,824	1,380	69.83	46.13	1,174.87	0.82				1,181.52	0.50
7/30/21 3:16 PM	2,884	1,440	69.83	46.23	1,174.77	0.92				1,181.60	0.41

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 HP  
MSL = Mean Sea Level      Pump Setting = 140 ft      EC=Electrical conductivity (mS/cm)



### WELL TEST ANALYSIS

Data Set: \...\PW Well 3.aqt

Date: 08/11/21

Time: 12:20:02

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 3

Test Date: 7-28-21

### AQUIFER DATA

Saturated Thickness: 115. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 3	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
• Well No. 2	553	0

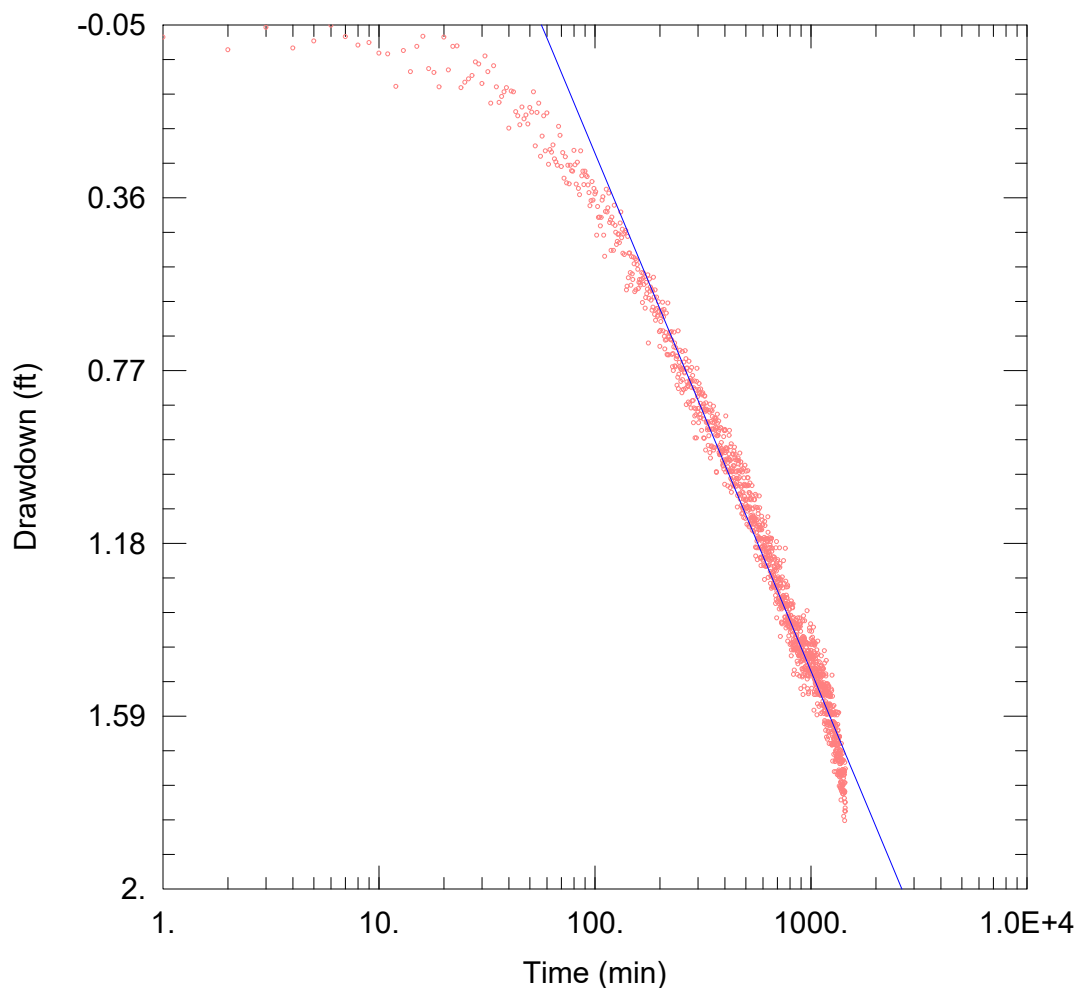
### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 244.9 ft<sup>2</sup>/day

K = 2.13 ft/day



### WELL TEST ANALYSIS

Data Set: \...\OW Well 2.aqt

Date: 08/11/21

Time: 12:20:55

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 3

Test Date: 7-28-21

### AQUIFER DATA

Saturated Thickness: 115. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 3	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 2	553	0

### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 459.3 ft<sup>2</sup>/day

S = 0.0001455

## **Aquifer Test**

**Well No. 4**

Twisted Creek Ranch Well No. 4 - Aquifer Test (August 2, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 4 Temperature (F)	PW Well No. 4 Water Level (ft bgs)	PW Well No. 4 Water Level (ft MSL)	PW Well No. 4 Drawdown (ft)	PW Well No. 4 Pump Rate (gpm)	PW Well No. 4 Specific Capacity (gpm/ft)	Comments	OW Well No. 1 Water Level (ft MSL)	OW Well No. 1 Drawdown (ft)
8/2/21 9:58 AM	0		69.87	95.99	1,162.01	0.00			Pump Start	1,162.83	0.00
8/2/21 9:59 AM	1		69.87	103.33	1,154.67	7.34	17	2.32	Meter: 145,638.5 gallons	1,162.75	0.07
8/2/21 10:00 AM	2		69.86	104.50	1,153.50	8.52	18	2.11		1,162.79	0.03
8/2/21 10:01 AM	3		69.86	104.88	1,153.12	8.89	18	2.02		1,162.80	0.03
8/2/21 10:02 AM	4		69.85	105.16	1,152.85	9.17	18	1.96		1,162.75	0.08
8/2/21 10:03 AM	5		69.84	105.37	1,152.64	9.38	18	1.92		1,162.83	0.00
8/2/21 10:04 AM	6		69.84	105.52	1,152.48	9.53	18	1.89		1,162.81	0.02
8/2/21 10:05 AM	7		69.83	105.66	1,152.34	9.68	18	1.86		1,162.74	0.09
8/2/21 10:06 AM	8		69.83	105.74	1,152.26	9.75	18	1.85		1,162.78	0.05
8/2/21 10:07 AM	9		69.83	105.83	1,152.17	9.84	18	1.83		1,162.77	0.06
8/2/21 10:08 AM	10		69.82	105.94	1,152.06	9.96	18	1.81		1,162.77	0.06
8/2/21 10:09 AM	11		69.81	106.04	1,151.96	10.05	18	1.79		1,162.74	0.09
8/2/21 10:10 AM	12		69.81	106.11	1,151.90	10.12	18	1.78		1,162.78	0.05
8/2/21 10:11 AM	13		69.81	106.16	1,151.84	10.17	18	1.77		1,162.72	0.10
8/2/21 10:12 AM	14		69.80	106.23	1,151.77	10.24	18	1.76		1,162.69	0.14
8/2/21 10:13 AM	15		69.80	106.29	1,151.71	10.30	18	1.75	pH: 7.64/ EC: 0.90	1,162.70	0.13
8/2/21 10:18 AM	20		69.79	106.53	1,151.47	10.54	18	1.71	pH: 7.07/ EC: 0.98	1,162.62	0.20
8/2/21 10:23 AM	25		69.79	106.73	1,151.27	10.74	18	1.68	pH: 7.08/ EC: 0.87	1,162.64	0.19
8/2/21 10:28 AM	30		69.80	106.91	1,151.09	10.92	18	1.65	pH: 7.08/ EC: 0.75	1,162.60	0.23
8/2/21 10:33 AM	35		69.81	107.10	1,150.90	11.11	18	1.62	pH: 7.05/ EC: 0.70	1,162.62	0.20
8/2/21 10:38 AM	40		69.85	107.16	1,150.84	11.17	18	1.61	pH: 7.04/ EC: 0.68	1,162.55	0.28
8/2/21 10:43 AM	45		69.85	107.31	1,150.69	11.32	18	1.59	pH: 7.03/ EC: 0.67	1,162.56	0.27
8/2/21 10:58 AM	60		69.75	107.70	1,150.30	11.71	18	1.54	pH: 7.00/ EC: 0.65	1,162.46	0.36
8/2/21 11:13 AM	75		69.77	108.04	1,149.96	12.06	18	1.49	pH: 6.95/ EC: 0.64	1,162.35	0.48
8/2/21 11:28 AM	90		69.79	108.31	1,149.69	12.32	18	1.46	pH: 6.92/ EC: 0.63	1,162.40	0.43
8/2/21 11:43 AM	105		69.83	108.56	1,149.44	12.57	18	1.43	pH: 6.94/ EC: 0.62	1,162.36	0.47
8/2/21 11:58 AM	120		69.69	108.78	1,149.22	12.80	18	1.41	pH: 6.93/ EC: 0.61	1,162.25	0.57
8/2/21 12:28 PM	150		69.66	109.18	1,148.83	13.19				1,162.14	0.69
8/2/21 12:58 PM	180		69.66	109.51	1,148.49	13.53				1,162.09	0.73
8/2/21 1:28 PM	210		69.66	109.85	1,148.15	13.86				1,161.91	0.92
8/2/21 1:58 PM	240		69.66	110.16	1,147.84	14.17				1,161.82	1.01
8/2/21 2:58 PM	300		69.66	110.67	1,147.33	14.68				1,161.69	1.14
8/2/21 3:58 PM	360		69.66	111.17	1,146.83	15.18				1,161.49	1.34
8/2/21 4:58 PM	420		69.66	111.62	1,146.39	15.63				1,161.42	1.41
8/2/21 5:58 PM	480		69.69	111.96	1,146.05	15.97				1,161.18	1.64

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 1/2 HP  
MSL = Mean Sea Level      Pump Setting = 180 ft      EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 4 - Aquifer Test (August 2, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 4 Temperature (F)	PW Well No. 4 Water Level (ft bgs)	PW Well No. 4 Water Level (ft MSL)	PW Well No. 4 Drawdown (ft)	PW Well No. 4 Pump Rate (gpm)	PW Well No. 4 Specific Capacity (gpm/ft)	Comments	OW Well No. 1 Water Level (ft MSL)	OW Well No. 1 Drawdown (ft)
8/2/21 6:58 PM	540		69.69	112.24	1,145.76	16.25				1,161.14	1.68
8/2/21 7:58 PM	600		69.68	112.57	1,145.43	16.58				1,161.04	1.79
8/2/21 8:58 PM	660		69.65	112.83	1,145.17	16.84				1,160.87	1.96
8/2/21 9:58 PM	720		69.65	113.08	1,144.93	17.09				1,160.85	1.98
8/2/21 10:58 PM	780		69.66	113.26	1,144.74	17.27				1,160.75	2.08
8/2/21 11:58 PM	840		69.65	113.51	1,144.49	17.52				1,160.62	2.21
8/3/21 12:58 AM	900		69.66	113.70	1,144.30	17.71				1,160.52	2.31
8/3/21 1:58 AM	960		69.66	113.87	1,144.13	17.88				1,160.39	2.43
8/3/21 2:58 AM	1,020		69.65	114.01	1,143.99	18.02				1,160.37	2.46
8/3/21 3:58 AM	1,080		69.66	114.20	1,143.80	18.22				1,160.31	2.51
8/3/21 4:58 AM	1,140		69.65	114.35	1,143.65	18.36				1,160.10	2.73
8/3/21 5:58 AM	1,200		69.65	114.49	1,143.51	18.50				1,160.06	2.77
8/3/21 6:37 AM	1,239	0	69.65	114.63	1,143.37	18.64	18	0.97	Pump Stop	1,159.99	2.84
8/3/21 6:38 AM	1,240	1	69.65	111.40	1,146.60	15.42			Meter: 168,175.3 gallons	1,160.05	2.78
8/3/21 6:39 AM	1,241	2	69.65	114.01	1,144.00	18.02			Avg. Pump Rate: 18	1,160.03	2.79
8/3/21 6:40 AM	1,242	3	69.65	107.88	1,150.12	11.89				1,160.00	2.82
8/3/21 6:41 AM	1,243	4	69.66	106.21	1,151.79	10.22				1,160.05	2.77
8/3/21 6:42 AM	1,244	5	69.68	105.66	1,152.34	9.67				1,160.04	2.79
8/3/21 6:43 AM	1,245	6	69.75	105.33	1,152.67	9.34				1,160.03	2.80
8/3/21 6:44 AM	1,246	7	69.84	105.08	1,152.92	9.09				1,160.02	2.80
8/3/21 6:45 AM	1,247	8	69.93	104.93	1,153.07	8.94				1,160.09	2.73
8/3/21 6:46 AM	1,248	9	70.02	104.82	1,153.18	8.83				1,160.01	2.82
8/3/21 6:47 AM	1,249	10	70.12	104.67	1,153.33	8.69				1,160.10	2.73
8/3/21 6:48 AM	1,250	11	70.19	104.63	1,153.37	8.64				1,160.08	2.74
8/3/21 6:49 AM	1,251	12	70.26	104.54	1,153.46	8.55				1,160.02	2.80
8/3/21 6:50 AM	1,252	13	70.32	104.45	1,153.55	8.46				1,160.02	2.81
8/3/21 6:51 AM	1,253	14	70.37	104.38	1,153.62	8.40				1,160.15	2.67
8/3/21 6:52 AM	1,254	15	70.41	104.32	1,153.68	8.33				1,160.10	2.72
8/3/21 6:57 AM	1,259	20	70.42	104.05	1,153.95	8.06				1,160.05	2.78
8/3/21 7:02 AM	1,264	25	70.33	103.89	1,154.11	7.90				1,160.16	2.67
8/3/21 7:07 AM	1,269	30	70.23	103.72	1,154.28	7.74				1,160.18	2.65
8/3/21 7:12 AM	1,274	35	70.14	103.58	1,154.42	7.59				1,160.21	2.61
8/3/21 7:17 AM	1,279	40	70.06	103.50	1,154.50	7.52				1,160.17	2.66
8/3/21 7:22 AM	1,284	45	69.98	103.34	1,154.66	7.35				1,160.18	2.64
8/3/21 7:37 AM	1,299	60	69.85	103.05	1,154.95	7.07				1,160.29	2.53

Note: bgs = below ground surface  
MSL = Mean Sea Level

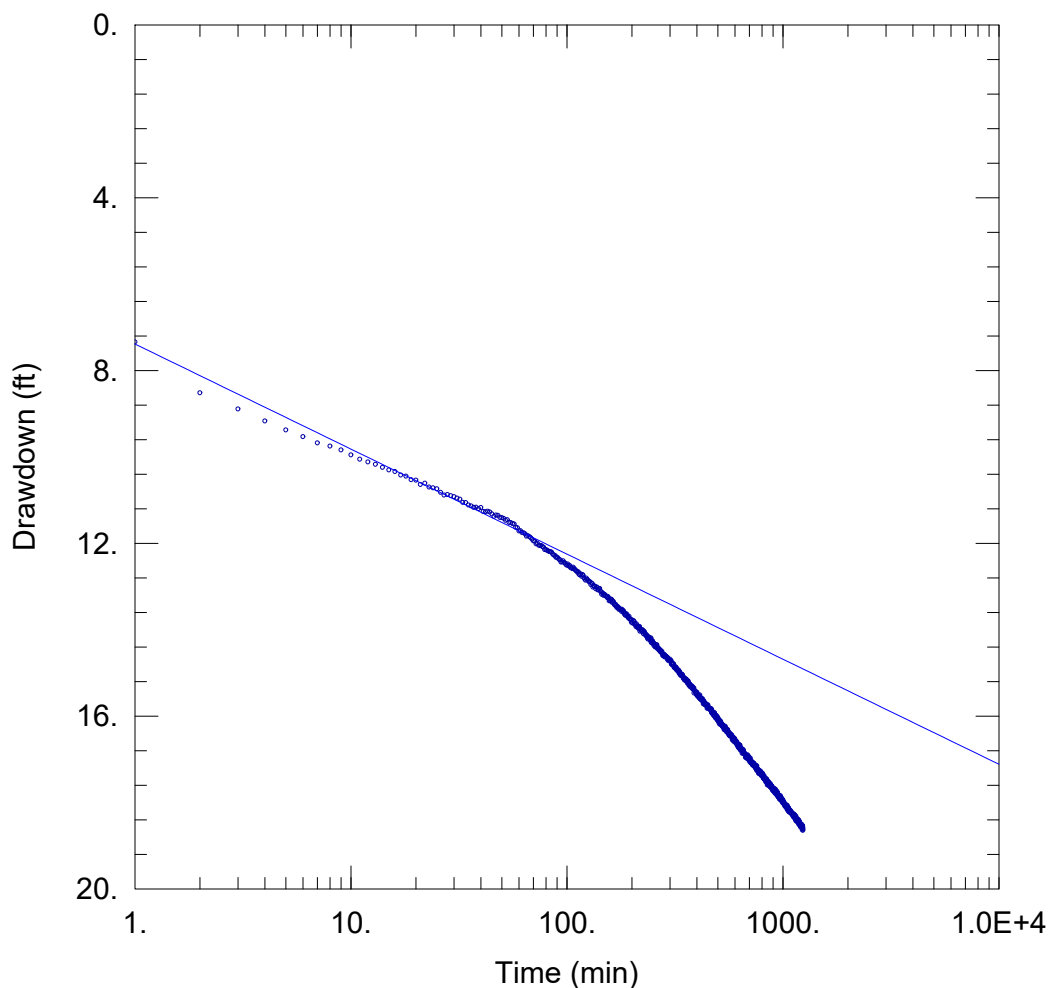
Column Pipe Diameter = 1 1/4 inches  
Pump Setting = 180 ft

Horsepower = 1 1/2 HP  
EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 4 - Aquifer Test (August 2, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 4 Temperature (F)	PW Well No. 4 Water Level (ft bgs)	PW Well No. 4 Water Level (ft MSL)	PW Well No. 4 Drawdown (ft)	PW Well No. 4 Pump Rate (gpm)	PW Well No. 4 Specific Capacity (gpm/ft)	Comments	OW Well No. 1 Water Level (ft MSL)	OW Well No. 1 Drawdown (ft)
8/3/21 7:52 AM	1,314	75	69.80	102.77	1,155.23	6.78				1,160.27	2.56
8/3/21 8:07 AM	1,329	90	69.77	102.54	1,155.46	6.55				1,160.36	2.46
8/3/21 8:22 AM	1,344	105	69.75	102.30	1,155.70	6.31				1,160.37	2.46
8/3/21 8:37 AM	1,359	120	69.74	102.15	1,155.85	6.16				1,160.49	2.34
8/3/21 9:07 AM	1,389	150	69.73	101.82	1,156.19	5.83				1,160.47	2.36
8/3/21 9:37 AM	1,419	180	69.72	101.49	1,156.51	5.50				1,160.56	2.27
8/3/21 10:07 AM	1,449	210	69.71	101.25	1,156.76	5.26				1,160.59	2.24
8/3/21 10:37 AM	1,479	240	69.71	101.04	1,156.96	5.05				1,160.69	2.13
8/3/21 11:37 AM	1,539	300	69.71	100.62	1,157.38	4.63				1,160.73	2.09
8/3/21 12:37 PM	1,599	360	69.71	100.26	1,157.74	4.27				1,160.79	2.04
8/3/21 1:37 PM	1,659	420	69.71	99.93	1,158.07	3.94				1,160.86	1.96
8/3/21 2:37 PM	1,719	480	69.72	99.69	1,158.31	3.70				1,160.91	1.92
8/3/21 3:37 PM	1,779	540	69.72	99.45	1,158.55	3.46				1,160.99	1.84
8/3/21 4:37 PM	1,839	600	69.71	99.28	1,158.72	3.29				1,160.98	1.84
8/3/21 5:37 PM	1,899	660	69.72	99.08	1,158.92	3.09				1,161.04	1.79
8/3/21 6:37 PM	1,959	720	69.72	98.92	1,159.08	2.93				1,161.12	1.71
8/3/21 7:37 PM	2,019	780	69.73	98.75	1,159.25	2.76				1,161.18	1.65
8/3/21 8:37 PM	2,079	840	69.73	98.67	1,159.33	2.68				1,161.20	1.63
8/3/21 9:37 PM	2,139	900	69.72	98.53	1,159.47	2.54				1,161.28	1.54
8/3/21 10:37 PM	2,199	960	69.72	98.36	1,159.64	2.38				1,161.37	1.45
8/3/21 11:37 PM	2,259	1020	69.73	98.22	1,159.78	2.23				1,161.44	1.39
8/4/21 12:37 AM	2,319	1080	69.73	98.20	1,159.80	2.21				1,161.41	1.42
8/4/21 1:37 AM	2,379	1140	69.73	98.07	1,159.93	2.08				1,161.44	1.39
8/4/21 2:37 AM	2,439	1200	69.73	97.96	1,160.04	1.98				1,161.48	1.35
8/4/21 3:37 AM	2,499	1,260	69.73	97.90	1,160.10	1.91				1,161.56	1.26
8/4/21 4:37 AM	2,559	1,320	69.74	97.87	1,160.13	1.88				1,161.61	1.21
8/4/21 5:37 AM	2,619	1,380	69.73	97.78	1,160.22	1.80				1,161.57	1.26
8/4/21 6:37 AM	2,679	1,440	69.74	97.71	1,160.29	1.72				1,161.64	1.18

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 1/2 HP  
MSL = Mean Sea Level      Pump Setting = 180 ft      EC=Electrical conductivity (mS/cm)



### WELL TEST ANALYSIS

Data Set: \...\PW Well 4.aqt

Date: 08/11/21

Time: 13:07:49

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 4

Test Date: 8-2-21

### AQUIFER DATA

Saturated Thickness: 104. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 4	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 1	500	0

### SOLUTION

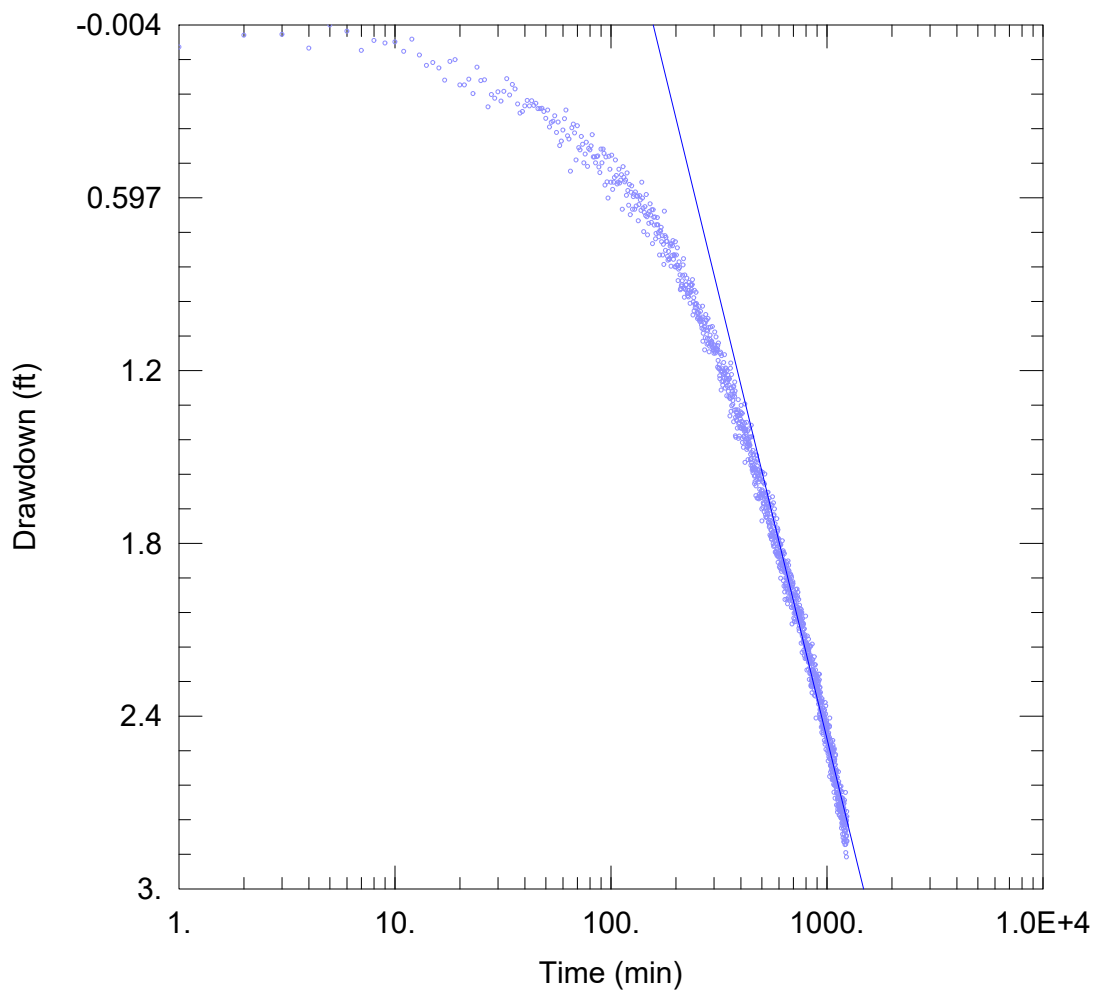
Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 261.1 ft<sup>2</sup>/day

K = 2.51 ft/day





### WELL TEST ANALYSIS

Data Set: \...\OW Well 1.aqt

Date: 08/13/21

Time: 14:35:27

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 4

Test Date: 8-2-21

### AQUIFER DATA

Saturated Thickness: 104. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 4	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 1	500	0

### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 205.8 ft<sup>2</sup>/day

S = 0.0002021

## **Aquifer Test**

**Well No. 6**

Twisted Creek Ranch Well No. 6 - Aquifer Test (July 26, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 6 Temperature (F)	PW Well No. 6 Water Level (ft bgs)	PW Well No. 6 Water Level (ft MSL)	PW Well No. 6 Drawdown (ft)	PW Well No. 6 Pump Rate (gpm)	PW Well No. 6 Specific Capacity (gpm/ft)	Comments	OW Well No. 5 Water Level (ft MSL)	OW Well No. 5 Drawdown (ft)
7/26/21 1:37 PM	0		69.49	73.53	1,158.47	0.00			Pump Start	1,185.93	0.00
7/26/21 1:38 PM	1		69.48	81.10	1,150.90	7.58	14	1.85	Meter: 100,496.4 gallons	1,185.93	0.00
7/26/21 1:39 PM	2		69.49	83.91	1,148.10	10.38	15	1.45		1,185.84	0.09
7/26/21 1:40 PM	3		69.48	85.17	1,146.83	11.64	15	1.29		1,185.80	0.13
7/26/21 1:41 PM	4		69.47	85.83	1,146.17	12.30	15	1.22		1,185.87	0.06
7/26/21 1:42 PM	5		69.49	86.24	1,145.76	12.71	15	1.18		1,185.85	0.08
7/26/21 1:43 PM	6		69.43	86.45	1,145.55	12.92	15	1.16		1,185.91	0.02
7/26/21 1:44 PM	7		69.44	86.70	1,145.31	13.17	15	1.14		1,185.85	0.08
7/26/21 1:45 PM	8		69.43	86.86	1,145.14	13.33	15	1.13		1,185.83	0.09
7/26/21 1:46 PM	9		69.39	86.98	1,145.02	13.45	15	1.11		1,185.90	0.03
7/26/21 1:47 PM	10		69.42	87.04	1,144.96	13.51	15	1.11		1,185.85	0.08
7/26/21 1:48 PM	11		69.38	87.20	1,144.81	13.67	15	1.10		1,185.83	0.10
7/26/21 1:49 PM	12		69.39	87.20	1,144.80	13.67	15	1.10		1,185.87	0.06
7/26/21 1:50 PM	13		69.37	87.32	1,144.68	13.79	15	1.09		1,185.92	0.01
7/26/21 1:51 PM	14		69.35	87.37	1,144.63	13.84	15	1.08		1,185.92	0.01
7/26/21 1:52 PM	15		69.37	87.38	1,144.62	13.85	15	1.08	pH: 7.18/ EC: 0.51	1,185.83	0.09
7/26/21 1:57 PM	20		69.35	86.54	1,145.46	13.02	15	1.15	pH: 7.02/ EC: 0.68	1,185.86	0.07
7/26/21 2:02 PM	25		69.37	87.36	1,144.64	13.83	15	1.08	pH: 6.99/ EC: 0.68	1,185.84	0.09
7/26/21 2:07 PM	30		69.34	87.65	1,144.35	14.12	15	1.06	pH: 7.05/ EC: 0.67	1,185.81	0.12
7/26/21 2:12 PM	35		69.30	87.93	1,144.07	14.41	15	1.04	pH: 7.11/ EC: 0.66	1,185.85	0.07
7/26/21 2:17 PM	40		69.31	88.16	1,143.84	14.64	15	1.02	pH: 7.05/ EC: 0.65	1,185.84	0.09
7/26/21 2:22 PM	45		69.31	88.36	1,143.64	14.84	15	1.01	pH: 7.06/ EC: 0.65	1,185.86	0.07
7/26/21 2:37 PM	60		69.29	88.82	1,143.18	15.29	15	0.98	pH: 7.06/ EC: 0.64	1,185.77	0.16
7/26/21 2:52 PM	75		69.31	89.08	1,142.92	15.55	15	0.96	pH: 7.03/ EC: 0.64	1,185.71	0.22
7/26/21 3:07 PM	90		69.34	89.43	1,142.57	15.91	15	0.94	pH: 7.06/ EC: 0.64	1,185.72	0.21
7/26/21 3:22 PM	105		69.33	89.71	1,142.29	16.18	15	0.93	pH: 7.08/ EC: 0.63	1,185.68	0.25
7/26/21 3:37 PM	120		69.32	89.95	1,142.05	16.42	15	0.91	pH: 7.04/ EC: 0.64	1,185.64	0.29
7/26/21 4:07 PM	150		69.25	90.43	1,141.57	16.91				1,185.66	0.27
7/26/21 4:37 PM	180		69.29	90.91	1,141.10	17.38				1,185.53	0.40
7/26/21 5:07 PM	210		69.30	91.31	1,140.69	17.78				1,185.52	0.41
7/26/21 5:37 PM	240		69.29	91.67	1,140.33	18.15				1,185.53	0.40
7/26/21 6:37 PM	300		69.29	92.36	1,139.64	18.83				1,185.43	0.49
7/26/21 7:37 PM	360		69.26	93.05	1,138.95	19.53				1,185.35	0.58
7/26/21 8:37 PM	420		69.28	93.57	1,138.43	20.04				1,186.08	-0.15
7/26/21 9:37 PM	480		69.28	94.15	1,137.85	20.62				1,185.66	0.27

Note: bgs = below ground surface    Column Pipe Diameter = 1 1/4 inches    Horsepower = 1 HP  
MSL = Mean Sea Level    Pump Setting = 160 ft    EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 6 - Aquifer Test (July 26, 2021)

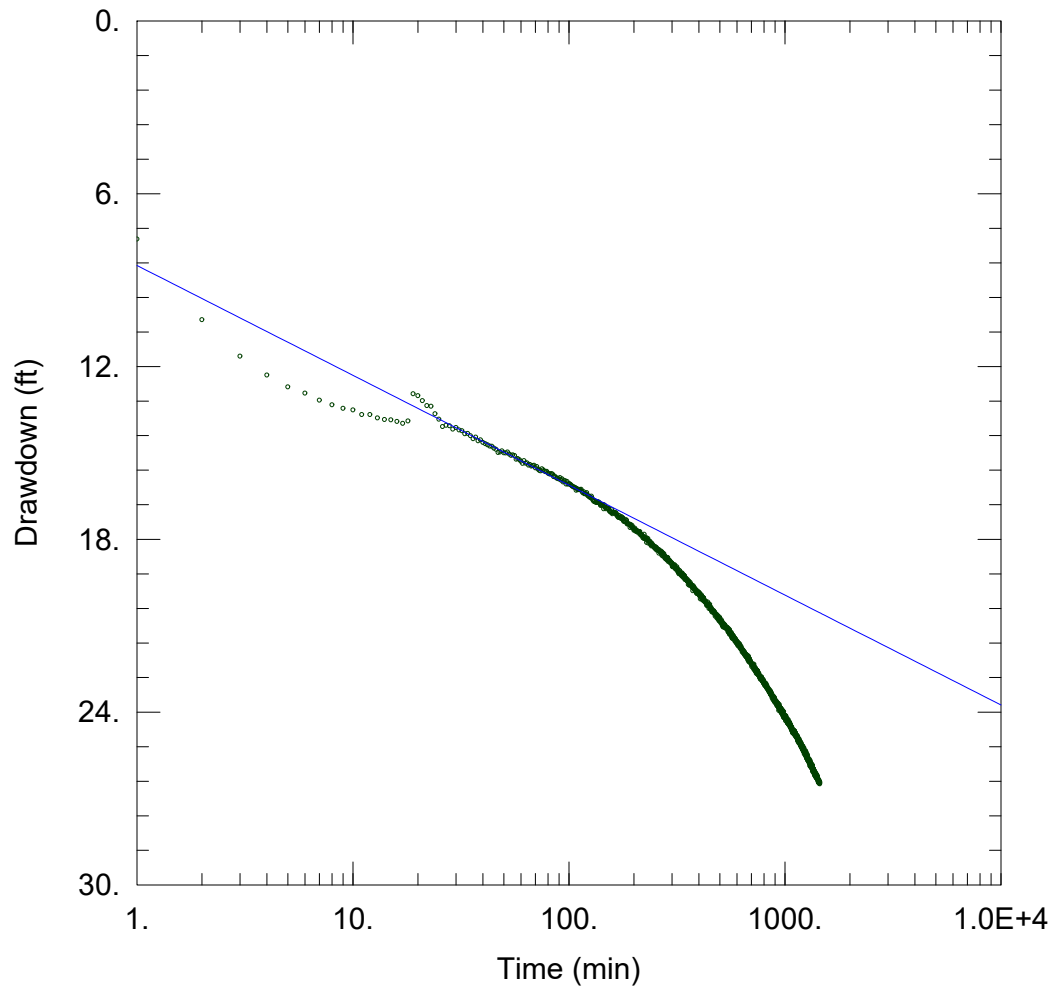
Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 6 Temperature (F)	PW Well No. 6 Water Level (ft bgs)	PW Well No. 6 Water Level (ft MSL)	PW Well No. 6 Drawdown (ft)	PW Well No. 6 Pump Rate (gpm)	PW Well No. 6 Specific Capacity (gpm/ft)	Comments	OW Well No. 5 Water Level (ft MSL)	OW Well No. 5 Drawdown (ft)
7/26/21 10:37 PM	540		69.30	94.65	1,137.35	21.13				1,185.42	0.51
7/26/21 11:37 PM	600		69.28	95.09	1,136.91	21.56				1,185.19	0.73
7/27/21 12:37 AM	660		69.31	95.52	1,136.48	21.99				1,185.06	0.87
7/27/21 1:37 AM	720		69.29	95.93	1,136.08	22.40				1,185.05	0.88
7/27/21 2:37 AM	780		69.30	96.31	1,135.70	22.78				1,184.86	1.07
7/27/21 3:37 AM	840		69.30	96.76	1,135.24	23.23				1,184.82	1.11
7/27/21 4:37 AM	900		69.29	97.16	1,134.84	23.63				1,184.77	1.16
7/27/21 5:37 AM	960		69.30	97.46	1,134.54	23.93				1,184.59	1.34
7/27/21 6:37 AM	1,020		69.26	97.78	1,134.22	24.25				1,184.56	1.37
7/27/21 7:37 AM	1,080		69.27	98.09	1,133.91	24.56				1,184.54	1.39
7/27/21 8:37 AM	1,140		69.27	98.37	1,133.63	24.84				1,184.39	1.54
7/27/21 9:37 AM	1,200		69.31	98.76	1,133.24	25.23				1,184.30	1.63
7/27/21 10:37 AM	1,260		69.27	99.04	1,132.96	25.51				1,184.32	1.61
7/27/21 11:37 AM	1,320		69.28	99.37	1,132.63	25.84				1,184.30	1.63
7/27/21 12:37 PM	1,380		69.27	99.68	1,132.32	26.15				1,184.19	1.74
7/27/21 1:37 PM	1,440		69.28	99.92	1,132.09	26.39				1,184.03	1.90
7/27/21 1:49 PM	1,452	0	69.27	100.02	1,131.98	26.49	15	0.57	Pump Stop	1,183.99	1.94
7/27/21 1:50 PM	1,453	1	69.29	96.32	1,135.68	22.80			Meter: 122,673.6 gallons	1,184.10	1.83
7/27/21 1:51 PM	1,454	2	69.32	92.36	1,139.64	18.83			Avg. Pump Rate: 15	1,184.01	1.91
7/27/21 1:52 PM	1,455	3	69.25	90.14	1,141.86	16.61				1,184.14	1.79
7/27/21 1:53 PM	1,456	4	69.28	88.90	1,143.10	15.38				1,184.02	1.91
7/27/21 1:54 PM	1,457	5	69.30	88.06	1,143.95	14.53				1,184.02	1.91
7/27/21 1:55 PM	1,458	6	69.42	87.40	1,144.60	13.88				1,184.05	1.88
7/27/21 1:56 PM	1,459	7	69.40	87.11	1,144.90	13.58				1,184.07	1.86
7/27/21 1:57 PM	1,460	8	69.48	86.91	1,145.09	13.38				1,184.02	1.91
7/27/21 1:58 PM	1,461	9	69.51	86.62	1,145.38	13.09				1,184.03	1.90
7/27/21 1:59 PM	1,462	10	69.56	86.48	1,145.53	12.95				1,184.04	1.89
7/27/21 2:00 PM	1,463	11	69.59	86.36	1,145.64	12.83				1,184.07	1.86
7/27/21 2:01 PM	1,464	12	69.66	86.29	1,145.71	12.77				1,184.06	1.87
7/27/21 2:02 PM	1,465	13	69.70	86.23	1,145.77	12.70				1,184.00	1.93
7/27/21 2:03 PM	1,466	14	69.70	86.05	1,145.95	12.53				1,184.07	1.86
7/27/21 2:04 PM	1,467	15	69.71	85.98	1,146.02	12.45				1,184.04	1.89
7/27/21 2:09 PM	1,472	20	69.66	85.75	1,146.25	12.22				1,184.05	1.88
7/27/21 2:14 PM	1,477	25	69.67	85.50	1,146.50	11.97				1,184.07	1.86
7/27/21 2:19 PM	1,482	30	69.61	85.41	1,146.59	11.89				1,184.07	1.86

Note: bgs = below ground surface    Column Pipe Diameter = 1 1/4 inches    Horsepower = 1 HP  
MSL = Mean Sea Level    Pump Setting = 160 ft    EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 6 - Aquifer Test (July 26, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 6 Temperature (F)	PW Well No. 6 Water Level (ft bgs)	PW Well No. 6 Water Level (ft MSL)	PW Well No. 6 Drawdown (ft)	PW Well No. 6 Pump Rate (gpm)	PW Well No. 6 Specific Capacity (gpm/ft)	Comments	OW Well No. 5 Water Level (ft MSL)	OW Well No. 5 Drawdown (ft)
7/27/21 2:24 PM	1,487	35	69.67	85.28	1,146.72	11.75				1,184.09	1.84
7/27/21 2:29 PM	1,492	40	69.65	85.14	1,146.86	11.61				1,184.00	1.93
7/27/21 2:34 PM	1,497	45	69.56	85.06	1,146.94	11.53				1,184.04	1.89
7/27/21 2:49 PM	1,512	60	69.52	84.87	1,147.14	11.34				1,183.96	1.97
7/27/21 3:04 PM	1,527	75	69.46	84.56	1,147.44	11.03				1,183.99	1.94
7/27/21 3:19 PM	1,542	90	69.45	84.46	1,147.54	10.93				1,183.95	1.97
7/27/21 3:34 PM	1,557	105	69.42	84.33	1,147.67	10.80				1,183.98	1.95
7/27/21 3:49 PM	1,572	120	69.41	84.19	1,147.81	10.67				1,183.91	2.01
7/27/21 4:19 PM	1,602	150	69.37	83.97	1,148.03	10.45				1,183.88	2.05
7/27/21 4:49 PM	1,632	180	69.41	83.69	1,148.32	10.16				1,183.85	2.08
7/27/21 5:19 PM	1,662	210	69.39	83.49	1,148.51	9.97				1,183.80	2.13
7/27/21 5:49 PM	1,692	240	69.38	83.35	1,148.66	9.82				1,183.77	2.16
7/27/21 6:49 PM	1,752	300	69.37	83.01	1,148.99	9.49				1,183.76	2.17
7/27/21 7:49 PM	1,812	360	69.34	82.69	1,149.31	9.16				1,183.66	2.27
7/27/21 8:49 PM	1,872	420	69.33	82.45	1,149.56	8.92				1,183.68	2.25
7/27/21 9:49 PM	1,932	480	69.35	82.25	1,149.75	8.73				1,183.60	2.33
7/27/21 10:49 PM	1,992	540	69.36	81.96	1,150.04	8.43				1,183.65	2.28
7/27/21 11:49 PM	2,052	600	69.35	81.74	1,150.27	8.21				1,183.43	2.49
7/28/21 12:49 AM	2,112	660	69.38	81.64	1,150.36	8.11				1,183.41	2.52
7/28/21 1:49 AM	2,172	720	69.35	81.50	1,150.50	7.97				1,183.36	2.57
7/28/21 2:49 AM	2,232	780	69.33	81.30	1,150.70	7.77				1,183.35	2.58
7/28/21 3:49 AM	2,292	840	69.31	81.03	1,150.97	7.51				1,183.32	2.61
7/28/21 4:49 AM	2,352	900	69.34	80.97	1,151.03	7.44				1,183.22	2.71
7/28/21 5:49 AM	2,412	960	69.34	80.77	1,151.23	7.24				1,183.13	2.80
7/28/21 6:49 AM	2,472	1,020	69.36	80.61	1,151.39	7.08				1,183.15	2.78
7/28/21 7:49 AM	2,532	1,080	69.33	80.51	1,151.49	6.98				1,183.05	2.88
7/28/21 8:49 AM	2,592	1,140	69.34	80.46	1,151.54	6.93				1,183.10	2.82
7/28/21 9:49 AM	2,652	1,200	69.35	80.28	1,151.72	6.75				1,183.00	2.92
7/28/21 10:49 AM	2,712	1,260	69.35	80.14	1,151.86	6.62				1,182.95	2.97
7/28/21 11:49 AM	2,772	1,320	69.33	80.05	1,151.95	6.52				1,182.86	3.07
7/28/21 12:49 PM	2,832	1,380	69.31	79.95	1,152.05	6.42				1,182.77	3.16
7/28/21 1:49 PM	2,892	1,440	69.38	79.84	1,152.16	6.31				1,182.86	3.07

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 HP  
MSL = Mean Sea Level      Pump Setting = 160 ft      EC=Electrical conductivity (mS/cm)



### WELL TEST ANALYSIS

Data Set: \...\PW Well 6.aqt

Date: 08/11/21

Time: 09:58:59

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 6

Test Date: 7-26-21

### AQUIFER DATA

Saturated Thickness: 107. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 6	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 5	663	0

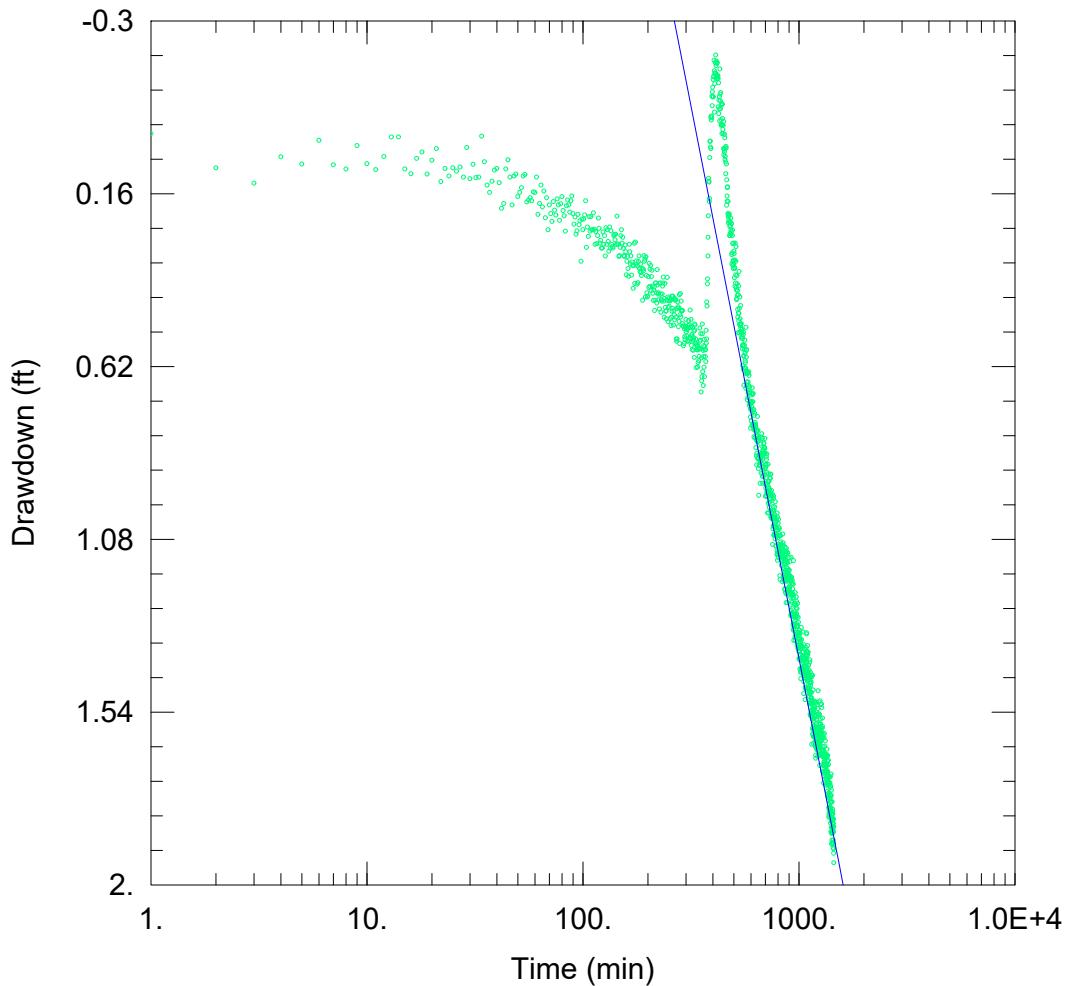
### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 138.7 ft<sup>2</sup>/day

K = 1.30 ft/day



### WELL TEST ANALYSIS

Data Set: \...\OW Well 5.aqt

Date: 08/11/21

Time: 09:24:56

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 6

Test Date: 7-26-21

### AQUIFER DATA

Saturated Thickness: 107. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 6	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 5	663	0

### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 179.8 ft<sup>2</sup>/day

S = 0.0002139

## **Aquifer Test**

**Well No. 8**



Twisted Creek Ranch Well No. 8 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 8 Temperature (F)	PW Well No. 8 Water Level (ft bgs)	PW Well No. 8 Water Level (ft MSL)	PW Well No. 8 Drawdown (ft)	PW Well No. 8 Pump Rate (gpm)	PW Well No. 8 Specific Capacity (gpm/ft)	Comments	OW Well No. 7 Water Level (ft MSL)	OW Well No. 7 Drawdown (ft)
7/28/21 11:51 AM	0		71.88	97.39	1,154.61	0.00			Pump Start	1,164.97	0.00
7/28/21 11:52 AM	1		71.75	100.00	1,152.01	2.61	23	8.82	Meter: 92,356.0 gallons	1,164.99	-0.02
7/28/21 11:53 AM	2		71.63	104.17	1,147.84	6.78	24	3.54		1,164.95	0.01
7/28/21 11:54 AM	3		71.43	104.72	1,147.28	7.33	23	3.14		1,165.01	-0.04
7/28/21 11:55 AM	4		71.33	105.08	1,146.93	7.69	23	2.99		1,164.96	0.00
7/28/21 11:56 AM	5		71.23	105.25	1,146.75	7.86	23	2.92		1,164.94	0.03
7/28/21 11:57 AM	6		71.15	105.30	1,146.70	7.91	23	2.91		1,165.03	-0.06
7/28/21 11:58 AM	7		71.08	105.50	1,146.51	8.11	23	2.84		1,164.99	-0.02
7/28/21 11:59 AM	8		71.01	105.66	1,146.34	8.27	23	2.78		1,164.99	-0.03
7/28/21 12:00 PM	9		70.95	105.75	1,146.25	8.36	23	2.75		1,164.95	0.02
7/28/21 12:01 PM	10		70.90	105.84	1,146.16	8.46	23	2.72		1,164.94	0.03
7/28/21 12:02 PM	11		70.85	105.91	1,146.09	8.53	23	2.70		1,165.03	-0.06
7/28/21 12:03 PM	12		70.82	105.98	1,146.02	8.59	23	2.68		1,164.92	0.05
7/28/21 12:04 PM	13		70.78	106.04	1,145.96	8.65	23	2.66		1,164.95	0.02
7/28/21 12:05 PM	14		70.75	106.08	1,145.92	8.69	23	2.65		1,164.99	-0.03
7/28/21 12:06 PM	15		70.73	106.11	1,145.89	8.72	23	2.64		1,165.01	-0.04
7/28/21 12:11 PM	20		70.64	106.24	1,145.76	8.85	23	2.60	pH: 7.13/ EC: 0.65	1,164.95	0.02
7/28/21 12:16 PM	25		70.60	106.28	1,145.72	8.89	23	2.59	pH: 6.92/ EC: 0.65	1,164.96	0.01
7/28/21 12:21 PM	30		70.57	106.43	1,145.58	9.04	23	2.55	pH: 6.95/ EC: 0.66	1,164.90	0.06
7/28/21 12:26 PM	35		70.57	106.50	1,145.50	9.11	23	2.52	pH: 6.96/ EC: 0.66	1,164.92	0.05
7/28/21 12:31 PM	40		70.57	106.60	1,145.40	9.22	23	2.50	pH: 7.01/ EC: 0.67	1,164.98	-0.02
7/28/21 12:36 PM	45		70.58	106.70	1,145.30	9.31	23	2.47	pH: 7.00/ EC: 0.68	1,164.92	0.04
7/28/21 12:51 PM	60		70.54	106.84	1,145.16	9.45	23	2.43	pH: 7.16/ EC: 0.71	1,164.90	0.06
7/28/21 1:06 PM	75		70.54	106.81	1,145.19	9.42	21	2.23	pH: 7.08/ EC: 0.70	1,164.87	0.10
7/28/21 1:21 PM	90		70.55	105.93	1,146.07	8.55	20	2.34	pH: 7.06/ EC: 0.68	1,164.86	0.10
7/28/21 1:36 PM	105		70.61	106.05	1,145.95	8.66	20	2.31	pH: 7.06/ EC: 0.67	1,164.86	0.11
7/28/21 1:51 PM	120		70.54	106.07	1,145.93	8.68	20	2.30		1,164.93	0.04
7/28/21 2:21 PM	150		70.46	106.13	1,145.88	8.74				1,164.82	0.15
7/28/21 2:51 PM	180		70.46	106.26	1,145.74	8.88				1,164.79	0.18
7/28/21 3:21 PM	210		70.45	106.34	1,145.66	8.95				1,164.72	0.25
7/28/21 3:51 PM	240		70.46	106.49	1,145.51	9.10				1,164.73	0.24
7/28/21 4:51 PM	300		70.45	106.79	1,145.21	9.41				1,164.57	0.40
7/28/21 5:51 PM	360		70.45	106.89	1,145.11	9.50				1,164.58	0.38
7/28/21 6:51 PM	420		70.45	107.05	1,144.95	9.66				1,164.49	0.48
7/28/21 7:51 PM	480		70.45	107.23	1,144.77	9.84				1,164.54	0.43

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 HP  
MSL = Mean Sea Level      Pump Setting = 180 ft      EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 8 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 8 Temperature (F)	PW Well No. 8 Water Level (ft bgs)	PW Well No. 8 Water Level (ft MSL)	PW Well No. 8 Drawdown (ft)	PW Well No. 8 Pump Rate (gpm)	PW Well No. 8 Specific Capacity (gpm/ft)	Comments	OW Well No. 7 Water Level (ft MSL)	OW Well No. 7 Drawdown (ft)
7/28/21 8:51 PM	540		70.46	107.43	1,144.57	10.04				1,164.47	0.50
7/28/21 9:51 PM	600		70.45	107.58	1,144.42	10.19				1,164.45	0.52
7/28/21 10:51 PM	660		70.45	107.72	1,144.28	10.33				1,164.44	0.53
7/28/21 11:51 PM	720		70.44	107.89	1,144.11	10.50				1,164.33	0.64
7/29/21 12:51 AM	780		70.45	108.07	1,143.93	10.68				1,164.35	0.62
7/29/21 1:51 AM	840		70.44	108.22	1,143.78	10.83				1,164.24	0.73
7/29/21 2:51 AM	900		70.45	108.32	1,143.68	10.93				1,164.24	0.73
7/29/21 3:51 AM	960		70.45	108.41	1,143.59	11.02				1,164.18	0.78
7/29/21 4:51 AM	1,020		70.44	108.57	1,143.43	11.19				1,164.17	0.79
7/29/21 5:51 AM	1,080		70.45	108.82	1,143.18	11.43				1,164.22	0.74
7/29/21 6:51 AM	1,140		70.44	108.95	1,143.05	11.56				1,164.18	0.79
7/29/21 7:51 AM	1,200		70.44	109.04	1,142.96	11.65				1,164.17	0.80
7/29/21 8:51 AM	1,260		70.45	109.23	1,142.77	11.84				1,164.21	0.76
7/29/21 9:51 AM	1,320		70.44	109.40	1,142.60	12.02				1,164.17	0.79
7/29/21 10:51 AM	1,380		70.44	109.47	1,142.53	12.08				1,164.10	0.87
7/29/21 11:51 AM	1,440		70.45	109.63	1,142.37	12.24				1,164.05	0.92
7/29/21 12:51 PM	1,500		70.45	109.67	1,142.33	12.28				1,164.03	0.94
7/29/21 1:01 PM	1,510	0	70.45	110.95	1,141.05	13.56	20.0	1.47	Pump Stop	1,163.99	0.98
7/29/21 1:02 PM	1,511	1	70.45	106.45	1,145.55	9.06			Meter: 122,441.6 gallons	1,164.01	0.96
7/29/21 1:03 PM	1,512	2	70.44	103.83	1,148.17	6.44			Avg. Pump Rate: 20	1,164.01	0.96
7/29/21 1:04 PM	1,513	3	70.45	102.97	1,149.03	5.59				1,164.06	0.90
7/29/21 1:05 PM	1,514	4	70.47	102.61	1,149.39	5.22				1,163.96	1.00
7/29/21 1:06 PM	1,515	5	70.51	102.38	1,149.62	4.99				1,164.05	0.92
7/29/21 1:07 PM	1,516	6	70.55	102.27	1,149.73	4.89				1,163.96	1.01
7/29/21 1:08 PM	1,517	7	70.61	102.15	1,149.85	4.76				1,163.99	0.98
7/29/21 1:09 PM	1,518	8	70.67	102.05	1,149.95	4.66				1,164.02	0.94
7/29/21 1:10 PM	1,519	9	70.74	101.95	1,150.05	4.56				1,164.00	0.97
7/29/21 1:11 PM	1,520	10	70.83	101.90	1,150.10	4.51				1,164.01	0.96
7/29/21 1:12 PM	1,521	11	70.91	101.81	1,150.19	4.42				1,164.04	0.92
7/29/21 1:13 PM	1,522	12	70.99	101.79	1,150.21	4.41				1,163.97	1.00
7/29/21 1:14 PM	1,523	13	71.05	101.71	1,150.29	4.32				1,163.97	1.00
7/29/21 1:15 PM	1,524	14	71.10	101.69	1,150.31	4.30				1,163.95	1.01
7/29/21 1:16 PM	1,525	15	71.15	101.66	1,150.34	4.27				1,163.99	0.98
7/29/21 1:21 PM	1,530	20	71.28	101.47	1,150.53	4.08				1,164.01	0.95
7/29/21 1:26 PM	1,535	25	71.31	101.39	1,150.62	4.00				1,164.06	0.91

Note: bgs = below ground surface  
MSL = Mean Sea Level

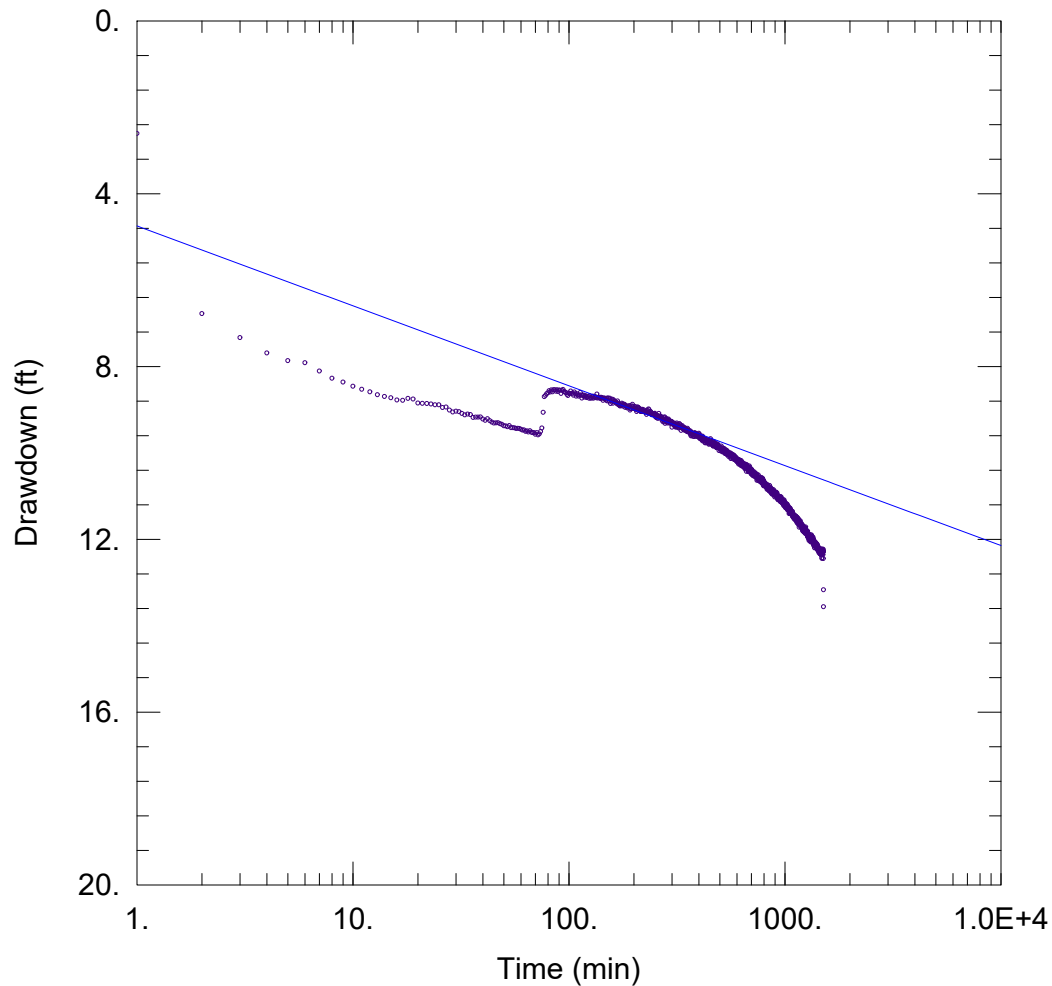
Column Pipe Diameter = 1 1/4 inches  
Pump Setting = 180 ft

Horsepower = 1 HP  
EC=Electrical conductivity (mS/cm)

Twisted Creek Ranch Well No. 8 - Aquifer Test (July 28, 2021)

Date and Time	Time Since Pump Start (min)	Time Since Pump Stop (min)	PW Well No. 8 Temperature (F)	PW Well No. 8 Water Level (ft bgs)	PW Well No. 8 Water Level (ft MSL)	PW Well No. 8 Drawdown (ft)	PW Well No. 8 Pump Rate (gpm)	PW Well No. 8 Specific Capacity (gpm/ft)	Comments	OW Well No. 7 Water Level (ft MSL)	OW Well No. 7 Drawdown (ft)
7/29/21 1:31 PM	1,540	30	71.30	101.29	1,150.71	3.91				1,164.01	0.95
7/29/21 1:36 PM	1,545	35	71.22	101.21	1,150.79	3.82				1,164.03	0.94
7/29/21 1:41 PM	1,550	40	71.16	101.17	1,150.83	3.79				1,164.02	0.95
7/29/21 1:46 PM	1,555	45	71.10	101.05	1,150.95	3.66				1,163.98	0.98
7/29/21 2:01 PM	1,570	60	70.94	100.91	1,151.09	3.52				1,164.07	0.90
7/29/21 2:16 PM	1,585	75	70.81	100.80	1,151.20	3.41				1,164.00	0.97
7/29/21 2:31 PM	1,600	90	70.76	100.72	1,151.28	3.33				1,164.06	0.91
7/29/21 2:46 PM	1,615	105	70.69	100.64	1,151.37	3.25				1,164.03	0.93
7/29/21 3:01 PM	1,630	120	70.66	100.52	1,151.48	3.13				1,164.02	0.95
7/29/21 3:31 PM	1,660	150	70.63	100.36	1,151.64	2.98				1,164.06	0.90
7/29/21 4:01 PM	1,690	180	70.59	100.29	1,151.71	2.90				1,164.01	0.96
7/29/21 4:31 PM	1,720	210	70.58	100.20	1,151.80	2.82				1,164.14	0.83
7/29/21 5:01 PM	1,750	240	70.56	100.14	1,151.86	2.75				1,164.10	0.87
7/29/21 6:01 PM	1,810	300	70.55	100.02	1,151.98	2.63				1,164.23	0.74
7/29/21 7:01 PM	1,870	360	70.55	99.92	1,152.08	2.53				1,164.14	0.82
7/29/21 8:01 PM	1,930	420	70.54	99.84	1,152.16	2.45				1,164.15	0.81
7/29/21 9:01 PM	1,990	480	70.55	99.76	1,152.24	2.37				1,164.28	0.69
7/29/21 10:01 PM	2,050	540	70.55	99.70	1,152.30	2.31				1,164.21	0.76
7/29/21 11:01 PM	2,110	600	70.54	99.62	1,152.38	2.23				1,164.29	0.68
7/30/21 12:01 AM	2,170	660	70.53	99.56	1,152.44	2.17				1,164.26	0.71
7/30/21 1:01 AM	2,230	720	70.54	99.56	1,152.44	2.18				1,164.28	0.68
7/30/21 2:01 AM	2,290	780	70.54	99.51	1,152.50	2.12				1,164.37	0.59
7/30/21 3:01 AM	2,350	840	70.54	99.47	1,152.53	2.09				1,164.25	0.71
7/30/21 4:01 AM	2,410	900	70.54	99.43	1,152.57	2.04				1,164.40	0.57
7/30/21 5:01 AM	2,470	960	70.54	99.43	1,152.57	2.04				1,164.33	0.63
7/30/21 6:01 AM	2,530	1,020	70.54	99.38	1,152.62	1.99				1,164.37	0.60
7/30/21 7:01 AM	2,590	1,080	70.55	99.31	1,152.69	1.93				1,164.34	0.63
7/30/21 8:01 AM	2,650	1,140	70.55	99.30	1,152.70	1.91				1,164.44	0.52
7/30/21 9:01 AM	2,710	1,200	70.54	99.31	1,152.70	1.92				1,164.37	0.60
7/30/21 10:01 AM	2,770	1,260	70.54	99.26	1,152.75	1.87				1,164.42	0.55
7/30/21 11:01 AM	2,830	1,320	70.55	99.23	1,152.78	1.84				1,164.46	0.50
7/30/21 12:01 PM	2,890	1,380	70.54	99.20	1,152.80	1.81				1,164.41	0.56
7/30/21 1:01 PM	2,950	1,440	70.541	99.18	1152.82	1.79				1,164.48	0.49

Note: bgs = below ground surface      Column Pipe Diameter = 1 1/4 inches      Horsepower = 1 HP  
MSL = Mean Sea Level      Pump Setting = 180 ft      EC=Electrical conductivity (mS/cm)



### WELL TEST ANALYSIS

Data Set: \...\PW Well 8.aqt

Date: 08/11/21

Time: 09:55:01

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 8

Test Date: 7-28-21

### AQUIFER DATA

Saturated Thickness: 103. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 8	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 7	609	0

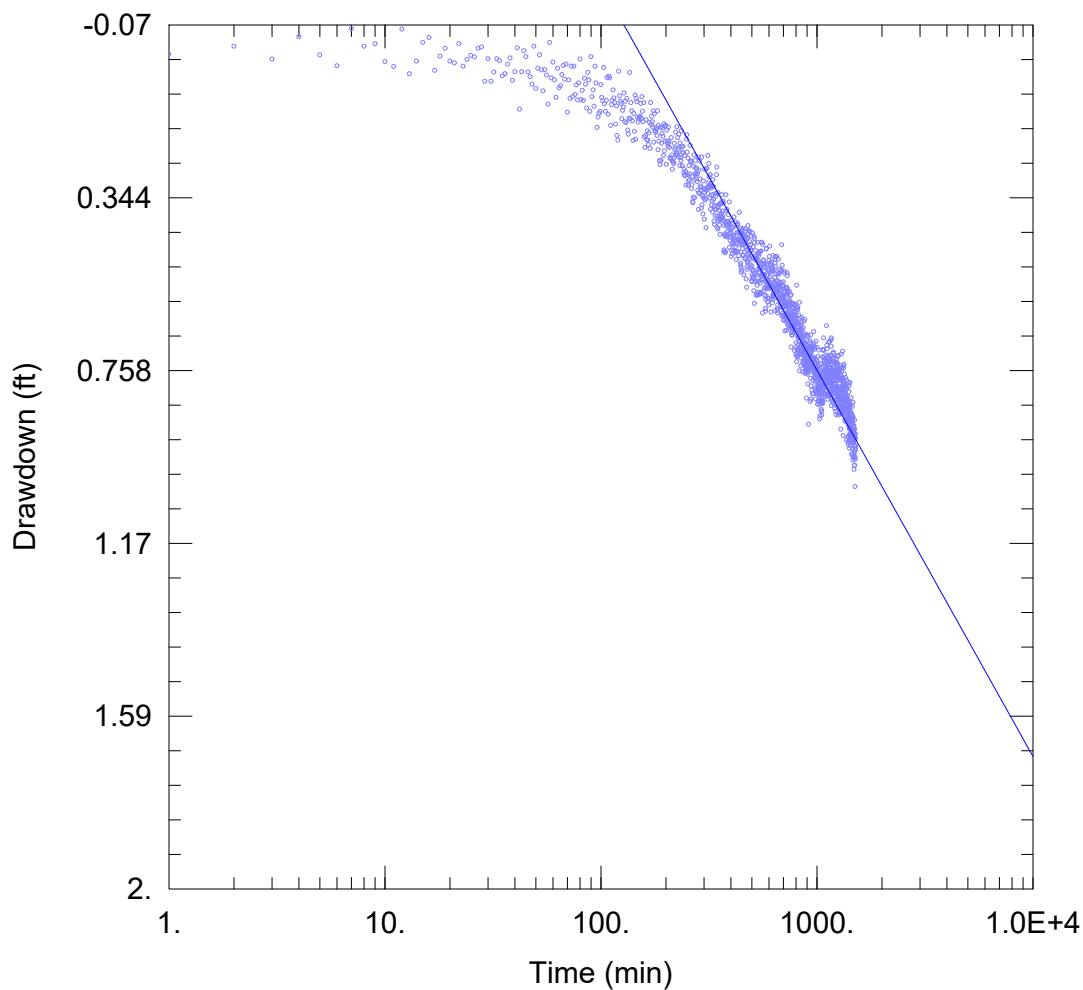
### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 381.4 ft<sup>2</sup>/day

K = 3.70 ft/day



### WELL TEST ANALYSIS

Data Set: \...\OW Well 7.aqt

Date: 08/11/21

Time: 10:01:38

### PROJECT INFORMATION

Company: WRGS

Client: Lone Star Land Partners

Project: 083-001-21

Location: Comanche County

Test Well: Well No. 8

Test Date: 7-28-21

### AQUIFER DATA

Saturated Thickness: 103. ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA

#### Pumping Wells

Well Name	X (ft)	Y (ft)
Well No. 8	0	0

#### Observation Wells

Well Name	X (ft)	Y (ft)
Well No. 7	609	0

### SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 762.1 ft<sup>2</sup>/day

S = 0.0004876

## **Appendix E**

### Well Efficiency Calculation



## **Well Efficiency**

**Well No. 3**



**Wet Rock Groundwater Services, L.L.C.**  
*Groundwater Specialists*  
TBPB Firm No: 50038  
317 Ranch Road 620 South, Suite 203  
Austin, Texas 78734 • Ph: 512-773-3226  
[www.wetrockgs.com](http://www.wetrockgs.com)

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### **Well Efficiency Calculations Well No. 3**

From: *Driscoll, F.G., 1986: Groundwater and Wells: second Ed. Pp.575-579*

Well Efficiency = (Actual specific capacity / Theoretical specific capacity)

Actual Specific Capacity = Q/s

Where: Q = Discharge of well, in gpm; and  
s = drawdown, in feet

**Actual Specific Capacity = 16 gpm / 15.56 ft = 1.03 gpm/ft**

$$\text{Theoretical Specific Capacity} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{T}{2000}$$

Where: T = Transmissivity, in gpd/ft  
t = Time of pumping, in days  
S = Storage Coefficient, =  $1.46 \times 10^{-4}$   
r = radius of well, in ft.

$$\text{Theoretical Specific Capacity} = \frac{1,832.09}{264 \log \frac{0.3(1,832.09)(1)}{0.1875^2 (1.46 \times 10^{-4})}} = \mathbf{0.86}$$

**Efficiency = Actual Specific Capacity / Theoretical Specific Capacity = 1.03 / 0.86 = 120%**



## **Well Efficiency**

**Well No. 4**



**Wet Rock Groundwater Services, L.L.C.**  
*Groundwater Specialists*  
TBPB Firm No: 50038  
317 Ranch Road 620 South, Suite 203  
Austin, Texas 78734 • Ph: 512-773-3226  
[www.wetrockgs.com](http://www.wetrockgs.com)

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### **Well Efficiency Calculations** **Well No. 4**

From: *Driscoll, F.G., 1986: Groundwater and Wells: second Ed. Pp.575-579*

Well Efficiency = (Actual specific capacity / Theoretical specific capacity)

Actual Specific Capacity = Q/s

Where: Q = Discharge of well, in gpm; and  
s = drawdown, in feet

**Actual Specific Capacity = 18 gpm / 18.64 ft = 0.97 gpm/ft**

$$\text{Theoretical Specific Capacity} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{T}{2000}$$

Where: T = Transmissivity, in gpd/ft  
t = Time of pumping, in days  
S = Storage Coefficient, =  $2.02 \times 10^{-4}$   
r = radius of well, in ft.

$$\text{Theoretical Specific Capacity} = \frac{1,953.28}{264 \log \frac{0.3(1,953.28)(1)}{0.1875^2 (2.02 \times 10^{-4})}} = \mathbf{0.93}$$

**Efficiency = Actual Specific Capacity / Theoretical Specific Capacity = 0.97 / 0.93 = 104%**

## **Well Efficiency**

**Well No. 6**



## Wet Rock Groundwater Services, L.L.C.

*Groundwater Specialists*

TBPG Firm No: 50038

317 Ranch Road 620 South, Suite 203

Austin, Texas 78734 • Ph: 512-773-3226

[www.wetrockgs.com](http://www.wetrockgs.com)

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### Well Efficiency Calculations

#### Well No. 6

From: *Driscoll, F.G., 1986: Groundwater and Wells: second Ed. Pp.575-579*

Well Efficiency = (Actual specific capacity / Theoretical specific capacity)

Actual Specific Capacity =  $Q/s$

Where:  $Q$  = Discharge of well, in gpm; and  
 $s$  = drawdown, in feet

**Actual Specific Capacity = 15 gpm / 26.49 ft = 0.57 gpm/ft**

$$\text{Theoretical Specific Capacity} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{T}{2000}$$

Where:  $T$  = Transmissivity, in gpd/ft  
 $t$  = Time of pumping, in days  
 $S$  = Storage Coefficient, =  $2.14 \times 10^{-4}$   
 $r$  = radius of well, in ft.

$$\text{Theoretical Specific Capacity} = \frac{1,037.61}{264 \log \frac{0.3(1,037.61)(1)}{0.1875^2 (2.14 \times 10^{-4})}} = 0.52$$

**Efficiency = Actual Specific Capacity / Theoretical Specific Capacity = 0.57 / 0.52 = 110%**

## **Well Efficiency**

**Well No. 8**



**Wet Rock Groundwater Services, L.L.C.**  
*Groundwater Specialists*  
TBPB Firm No: 50038  
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Austin, Texas 78734 • Ph: 512-773-3226  
[www.wetrockgs.com](http://www.wetrockgs.com)

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### **Well Efficiency Calculations** **Well No. 8**

From: *Driscoll, F.G., 1986: Groundwater and Wells: second Ed. Pp.575-579*

Well Efficiency = (Actual specific capacity / Theoretical specific capacity)

Actual Specific Capacity = Q/s

Where: Q = Discharge of well, in gpm; and  
s = drawdown, in feet

**Actual Specific Capacity = 20 gpm / 13.56 ft = 1.47 gpm/ft**

$$\text{Theoretical Specific Capacity} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{T}{2000}$$

Where: T = Transmissivity, in gpd/ft  
t = Time of pumping, in days  
S = Storage Coefficient, =  $4.88 \times 10^{-4}$   
r = radius of well, in ft.

$$\text{Theoretical Specific Capacity} = \frac{2,853.24}{264 \log \frac{0.3(2,853.24)(1)}{0.1875^2 (4.88 \times 10^{-4})}} = 1.40$$

**Efficiency = Actual Specific Capacity / Theoretical Specific Capacity = 1.47 / 1.40 = 105%**

# **Appendix F**

## Water Quality Report



**Water Quality**


**Well No. 3**



# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name:</b> Twisted Creek <b>Sample ID:</b> R #3 <b>Matrix:</b> Drinking Water <b>Date/Time Taken:</b> 7/29/2021 1500	<b>PCS Sample #:</b> 644281 <b>Page 1 of 3</b> <b>Date/Time Received:</b> 7/30/2021 11:26 <b>Report Date:</b> 8/4/2021  <b>Approved by:</b>  <b>Chuck Wallgren, President</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
pH	1, I	7.8	S.U.	N/A	7/30/2021 18:00	SM 4500-H+ B	CRM
Chloride		11	mg/L	2	7/30/2021 15:48	EPA 300.0	JAS
Conductivity, Specific		582	µmhos/cm at 25° C	1	7/30/2021 14:45	SM 2510B	CML
Nitrate-N		2.0	mg/L	0.2	7/30/2021 15:51	EPA 300.0	JAS
Nitrite-N		<0.2	mg/L	0.2	7/30/2021 15:51	EPA 300.0	JAS
Sulfate		16	mg/L	2	7/30/2021 15:48	EPA 300.0	JAS
Total Dissolved Solids		328	mg/L	10	7/30/2021 13:50	SM 2540C	CML
Fluoride		0.44	mg/L	0.20	7/30/2021 15:48	EPA 300.0	JAS

Test Description	Quality Assurance Summary								
	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit	
pH	N/A	N/A	N/A			N/A			
Chloride	<1	10	95	98	98	103	93	85 - 115	
Conductivity, Specific	N/A	N/A	N/A			N/A			
Nitrate-N	1	20	70	96	95	130	93	85 - 115	
Nitrite-N	<1	10	93	95	95	113	92	85 - 115	
Sulfate	<1	10	94	96	95	102	99	85 - 115	
Total Dissolved Solids	2	10	N/A	N/A	N/A	N/A			
Fluoride	<1	10	93	105	106	109	106	85 - 115	

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

<sup>1</sup> Not NELAP Certifiable Parameter

<sup>1</sup> Informational purposes only - pH outside hold time

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name:</b> Twisted Creek <b>Sample ID:</b> R #3 <b>Matrix:</b> Drinking Water <b>Date/Time Taken:</b> 7/29/2021 1500	<b>PCS Sample #:</b> 644281 <b>Page 2 of 3</b> <b>Date/Time Received:</b> 7/30/2021 11:26 <b>Report Date:</b> 8/4/2021

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
Alkalinity, Total	!	282	mg/L	10	7/30/2021 17:30	SM 2320 B	CRM
Arsenic/ICP MS		0.0005	mg/L	0.0005	8/3/2021 12:32	EPA 200.8	DJL
Copper/ICP (Total)		<0.005	mg/L	0.005	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Calcium Hardness as CaCO3		183.8	mg/L	N/A	8/4/2021 09:55	SM 2340B (Calc)	DJL
Calcium/ICP (Total)		73.6	mg/L	1.00	8/4/2021 09:55	EPA 200.7 / 6010 B	DJL
Lead/ICP MS		0.0007	mg/L	0.0005	8/3/2021 12:32	EPA 200.8	DJL
Aluminum/ICP (Total)		0.036	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Iron/ICP (Total)		0.031	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Alkalinity, Total	<1	10	95	99	99	107	100	85 - 115
Arsenic/ICP MS	<1	20	70	106	106	130	105	85 - 115
Copper/ICP (Total)	<1	20	75	100	100	125	100	85 - 115
Calcium Hardness as CaCO3	N/A	N/A	N/A			N/A		
Calcium/ICP (Total)	<1	20	75	*N/C	*N/C	125	101	85 - 115
Lead/ICP MS	2	20	70	111	113	130	110	85 - 115
Aluminum/ICP (Total)	10	20	75	106	97	125	105	85 - 115
Iron/ICP (Total)	<1	20	75	97	97	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4  
 ! Not NELAP Certifiable Parameter

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits  
 \*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: R #3</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1500</b>	<b>PCS Sample #: 644281</b> <b>Page 3 of 3</b> <b>Date/Time Received: 7/30/2021 11:26</b> <b>Report Date: 8/4/2021</b>

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
Sodium/ICP (Total)	11.0	mg/L	1.00	8/4/2021 09:55	EPA 200.7 / 6010 B	DJL
Manganese/ICP (Total)	<0.010	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Zinc/ICP (Total)	0.014	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL

Test Description	Quality Assurance Summary							
	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Sodium/ICP (Total)	2	20	75	101	103	125	98	85 - 115
Manganese/ICP (Total)	1	20	75	97	96	125	105	85 - 115
Zinc/ICP (Total)	1	20	75	97	96	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits

# POLLUTION CONTROL SERVICES

Chain of Custody Number

6 4 4 2 8 1

## MULTIPLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Stamp 1<sup>st</sup> sample and COC as same number

CUSTOMER INFORMATION				REPORT INFORMATION															
Name: <u>A. Noah Texan Water</u>				Attention:						Phone:				Fax:					
SAMPLE INFORMATION				Requested Analysis						Instructions/Comments:									
Project Information: <u>TWISTED CREEK</u>				Collected By:															
Report "Soils" <input type="checkbox"/> As Is <input type="checkbox"/> Dry Wt.				Field Chlorine Residual mg/L						Matrix						Container		Preservative	
Client / Field Sample ID				Collected		Composite or Grab		Type		Number		Type		Number					
TZ #3				Start: <u>7/24</u>		End: <u>3:00</u>		<input type="checkbox"/> C <input type="checkbox"/> G		<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other		<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE					
				Date		Time													
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				Start:		End:		<input type="checkbox"/> C <input type="checkbox"/> G		<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other		<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE					
				Start:		End:		<input type="checkbox"/> C <input type="checkbox"/> G		<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other		<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE					
				Start:		End:		<input type="checkbox"/> C <input type="checkbox"/> G		<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other		<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O							

# Pollution Control Services

## Sample Log-In Checklist

PCS Sample No(s) 6 4 4 2 8 1 COC No. 6 4 4 2 8 1

Client/Company Name: Texan Water Checklist Completed by: LMW

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐  
Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐  
Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐  
Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☐ Broken ☐  
COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐  
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☒ No: ☐  
Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐  
Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes ☒ No ☐  
All Samples Received before Hold Time Expiration? Yes ☒ No ☐  
Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐  
Zero Headspace in VOA Vial if Present? Yes ☐ No ☐

### Sample Preservation:

\* Cooling: Not Required ☒ or Required ☐

If cooling required, record temperature of submitted samples Observed/Corrected 5 / 3 °C  
Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No Samples received same day as collected? ☐ Yes ☒ No ☐  
Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

### Acid Preserved Sample - If present, is pH <2?

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☒ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub>  
Other Preservation: Yes ☐ No ☐ NaOH ☐

If Present, Meets Requirements? Yes ☐ No ☐

Sample Preservations Checked by: LMW Date: 7-30-21 Time: 1145

pH paper used to check sample preservation (PCS log #): 20-212 (HEM pH checked at analysis).

Samples Preserved/Adjusted by Lab: Lab # Metals Preservative Used HNO3 Log # 01601801

Adjusted by Tech/Analyst: LMW Date: 7-30-21 Time: 1145

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision Comments

Person Notified: ☐ Contacted by: ☐

Notified Date: ☐ Time: ☐

Method of Contact: At Drop Off: ☐ Phone ☐ Left Voice Mail ☐ E-Mail ☐ Fax ☐

Unable to Contact ☐ Authorized Laboratory to Proceed: ☐ (Lab Director)  
Regarding / Comments: ☐

Actions taken to correct problems/discrepancies: ☐

Receiving qualifier needed (requires client notification above) Temp. ☐ Holding Time ☐ Initials: ☐

Receiving qualifier entered into LIMS at login Initial/Date: ☐

Revision Comments: ☐


\* Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.



# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: TC #3</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1500</b>	<b>PCS Sample #: 644283</b> <b>Page 1 of 1</b> <b>Date/Time Received: 7/30/2021 11:23</b> <b>Report Date: 8/2/2021</b>  Approved by:  Chuck Wallgren, President

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
E. coli. (Enumeration-MPN) 18	0	CFU/100ml	1	7/30/2021 16:00	9223 IDEXX Quanti-Tray	CML
Total Coliform (Enumeration) 18	11	CFU/100ml	1	7/30/2021 16:00	9223 IDEXX Quanti-Tray	CML

Sample passed / failed criteria for bacteriological test.  
 Sample of satisfactory bacteriological quality should be free from Coliform organisms.  
 Coliform Organisms    ☒ Not Found  
                                   ☒ Found  
                                   ☐ Total  
                                   ☐ Fecal (E.Coli)  
                                   ☐ Repeat Samples Required / Recommended (Circle One)  
                                   ☐ Unsuitable - See Below  
                                   ☐ Other reason: \_\_\_\_\_

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

	These analytical results relate only to the sample tested. All data is reported on an 'As Is' basis unless designated as 'Dry Wt'. RL = Reporting Limits
--	--

# POLLUTION CONTROL SERVICES

Chain of Custody Number

1644283

## MULTIPLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Stamp 1<sup>st</sup> sample and COC as same number

CUSTOMER INFORMATION				REPORT INFORMATION																		
Name: <u>A. NOAH</u>				Attention:						Phone:				Fax:								
SAMPLE INFORMATION				Requested Analysis																		
Project Information: <u>TWISTED CREEK</u>				Collected By:						<div style="float: right; text-align: right;">           Instructions/Comments:  <u>unable to contact</u>  <u>left message on</u>  <u>8/2/21 @ 0930 or</u>  <u>5pm to Joe @ 1040</u>  <b>PCS Sample Number</b>  <u>644283</u> </div>												
Report "Soils" <input type="checkbox"/> As Is <input type="checkbox"/> Dry Wt.																						
Client / Field Sample ID	Collected		Field Chlorine Residual mg/L	Composite or Grab	Matrix		Container		Type	Number	Preservative											
	Date	Time			DW-Drinking Water; NPW-Non-potable water; WW-Wastewater; LW-Liquid Waste																	
<u>TC # 3 B</u>	Start: <u>7/24</u>	Start: <u>3:00pm</u>		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>			<div style="position: absolute; left: -40px; top: 50px; transform: rotate(-90deg); font-weight: bold;">BACT</div>											
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
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	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														
	Start:	Start:		<input type="checkbox"/> C	<input type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P		<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>														
	End:	End:		<input type="checkbox"/> G	<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G		<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH														

Required Turnaround: ☐ Routine (6-10 days) ☒ EXPEDITE: (See Surcharge Schedule) ☐ < 8 Hrs. ☐ < 16 Hrs. ☐ < 24 Hrs. ☐ 5 days ☐ Other:

Sample Archive/Disposal: ☐ Laboratory Standard ☐ Hold for client pick up

Relinquished By: [Signature] Date: 7/30 Time: 11:25 Received By: [Signature] Date: 7-30-21 Time: 1125

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Rev. Multiple Sample COC 20120201

1532 Universal City Blvd., Ste. 100, Universal City, Texas 78148  
 P (210) 340-0343 or (800) 880-4616 - F (210) 658-7903

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Login at [www.pcslab.net](http://www.pcslab.net)  
 TCEQ NELAP T104704361-TX

# Pollution Control Services

## Sample Log-In Checklist

PCS Sample No(s) 6 4 4 2 8 3

COC No. 6 4 4 2 8 3

Client/Company Name: Texas Water

Checklist Completed by: LMW

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐  
Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐  
Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐  
Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☐ Broken ☐  
COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐  
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☒ No: ☐  
Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐  
Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes ☒ No ☐  
All Samples Received before Hold Time Expiration? Yes ☒ No ☐  
Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐  
Zero Headspace in VOA Vial if Present? Yes ☐ No ☒

### Sample Preservation:

\* Cooling: Not Required ☒ or Required ☐

If cooling required, record temperature of submitted samples Observed/Corrected 5 / 3 °C

Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No ☐ Samples received same day as collected? ☐ Yes ☒ No ☐  
Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

### Acid Preserved Sample - If present, is pH <2?

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☒ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub>  
Other Preservation: Yes ☐ No ☐ NaOH ☐

Sample Preservations Checked by: ☐ Date ☐ Time ☐ If Present, Meets Requirements? Yes ☐ No ☐

pH paper used to check sample preservation (PCS log #): ☐ (HEM pH checked at analysis).  
Samples Preserved/Adjusted by Lab: ☐ Lab # ☐ Parameters Preserved ☐ Preservative Used ☐ Log # ☐

Adjusted by Tech/Analyst: ☐ Date: ☐ Time: ☐

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision/Comments

Person Notified: ☐ Contacted by: ☐

Notified Date: ☐ Time: ☐

Method of Contact: At Drop Off: ☐ Phone ☐ Left Voice Mail ☐ E-Mail ☐ Fax ☐

Unable to Contact ☐ Authorized Laboratory to Proceed: ☐ (Lab Director)  
Regarding / Comments: ☐

Actions taken to correct problems/discrepancies: ☐

Receiving qualifier needed (requires client notification above) Temp. ☐ Holding Time ☐ Initials: ☐

Receiving qualifier entered into LIMS at login Initial/Date: ☐

Revision Comments: ☐

\* Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.




## **Water Quality**

**Well No. 4**

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #4</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 8/5/2021 1301</b>	<b>PCS Sample #: 645049</b> <b>Page 1 of 3</b> <b>Date/Time Received: 8/6/2021 08:25</b> <b>Report Date: 8/16/2021</b>  Approved by:  Chuck Wallgren, President

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
pH	!, I	7.7	S.U.	N/A	8/9/2021 13:15	SM 4500-H+ B	CRM
Chloride		10	mg/L	2	8/6/2021 15:15	EPA 300.0	JAS
Conductivity, Specific		629	µmhos/cm at 25° C	1	8/6/2021 10:10	SM 2510B	JAS
Nitrate-N		<0.2	mg/L	0.2	8/6/2021 15:15	EPA 300.0	JAS
Nitrite-N		<0.2	mg/L	0.2	8/6/2021 15:15	EPA 300.0	JAS
Sulfate		20	mg/L	5	8/9/2021 13:33	EPA 300.0	JAS
Total Dissolved Solids		308	mg/L	10	8/9/2021 16:00	SM 2540C	CFS
Fluoride		0.48	mg/L	0.20	8/6/2021 15:15	EPA 300.0	JAS

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
pH	N/A	N/A	N/A			N/A		
Chloride	1	10	95	97	96	103	95	85 - 115
Conductivity, Specific	N/A	N/A	N/A			N/A		
Nitrate-N	1	20	70	96	95	130	95	85 - 115
Nitrite-N	<1	10	93	93	93	113	93	85 - 115
Sulfate	<1	10	94	96	97	102	108	85 - 115
Total Dissolved Solids	3	10	N/A	N/A	N/A	N/A		
Fluoride	1	10	93	106	105	109	108	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

<sup>1</sup> Not NELAP Certifiable Parameter

<sup>1</sup> Informational purposes only - pH outside hold time

These analytical results relate only to the sample tested.  
All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
RL = Reporting Limits

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #4</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 8/5/2021 1301</b>	<b>PCS Sample #: 645049</b> <b>Page 2 of 3</b> <b>Date/Time Received: 8/6/2021 08:25</b> <b>Report Date: 8/16/2021</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
Alkalinity, Total	!	286	mg/L	10	8/9/2021 13:15	SM 2320 B	CRM
Arsenic/ICP MS		0.0005	mg/L	0.0005	8/12/2021 11:00	EPA 200.8	DJL
Copper/ICP (Total)		<0.005	mg/L	0.005	8/13/2021 14:54	EPA 200.7 / 6010 B	DJL
Calcium Hardness as CaCO <sub>3</sub>		160.1	mg/L	N/A	8/12/2021 15:03	SM 2340B (Calc)	DJL
Calcium/ICP (Total)		64.1	mg/L	1.00	8/12/2021 15:03	EPA 200.7 / 6010 B	DJL
Lead/ICP MS		<0.0005	mg/L	0.0005	8/12/2021 11:00	EPA 200.8	DJL
Aluminum/ICP (Total)		0.440	mg/L	0.010	8/13/2021 14:54	EPA 200.7 / 6010 B	DJL
Iron/ICP (Total)		0.260	mg/L	0.010	8/13/2021 14:54	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Alkalinity, Total	<1	10	95	98	98	107	102	85 - 115
Arsenic/ICP MS	<1	20	70	105	104	130	105	85 - 115
Copper/ICP (Total)	<1	20	75	100	100	125	105	85 - 115
Calcium Hardness as CaCO <sub>3</sub>	N/A	N/A	N/A			N/A		
Calcium/ICP (Total)	3	20	75	*N/C	*N/C	125	101	85 - 115
Lead/ICP MS	<1	20	70	111	110	130	109	85 - 115
Aluminum/ICP (Total)	<1	20	75	111	111	125	105	85 - 115
Iron/ICP (Total)	<1	20	75	103	103	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4  
 ! Not NELAP Certifiable Parameter

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits  
 \*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #4</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 8/5/2021 1301</b>	<b>PCS Sample #: 645049</b> <b>Page 3 of 3</b> <b>Date/Time Received: 8/6/2021 08:25</b> <b>Report Date: 8/16/2021</b>

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
Sodium/ICP (Total)	22.4	mg/L	1.00	8/12/2021 15:03	EPA 200.7 / 6010 B	DJL
Manganese/ICP (Total)	0.016	mg/L	0.010	8/13/2021 14:54	EPA 200.7 / 6010 B	DJL
Zinc/ICP (Total)	0.016	mg/L	0.010	8/13/2021 14:54	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Sodium/ICP (Total)	3	20	75	*N/C	*N/C	125	100	85 - 115
Manganese/ICP (Total)	2	20	75	96	98	125	105	85 - 115
Zinc/ICP (Total)	1	20	75	97	98	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4


These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits

\*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek # 4-1</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 8/5/2021 1301</b>	<b>PCS Sample #: 645050</b> <b>Page 1 of 1</b> <b>Date/Time Received: 8/6/2021 08:25</b> <b>Report Date: 8/10/2021</b>  Approved by: <u></u> Chuck Wallgren, President

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
E. coli. (Enumeration-MPN)	0	CFU/100ml	1	8/6/2021 10:00	9223 IDEXX Quanti-Tray	EMV/CFS
Total Coliform (Enumeration)	>2,419	CFU/100ml	1	8/6/2021 10:00	9223 IDEXX Quanti-Tray	EMV/CFS

Sample passed / failed criteria for bacteriological test.

Sample of satisfactory bacteriological quality should be free from Coliform organisms.

Coliform Organisms

☐ Not Found

☒ Found

☒ Total

☐ Fecal (E.Coli)

☐ Repeat Samples Required / Recommended (Circle One)

☐ Unsuitable - See Below

☐ Other reason: \_\_\_\_\_


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These analytical results relate only to the sample tested.  
All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
RL = Reporting Limits

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek # 4-2</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 8/5/2021 1302</b>	<b>PCS Sample #: 645051</b> <b>Page 1 of 1</b> <b>Date/Time Received: 8/6/2021 08:25</b> <b>Report Date: 8/10/2021</b>  Approved by: <u></u> Chuck Wallgren, President

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
E. coli. (Enumeration-MPN)	0	CFU/100ml	1	8/6/2021 10:00	9223 IDEXX Quanti-Tray	EMV/CFS
Total Coliform (Enumeration)	>2,419	CFU/100ml	1	8/6/2021 10:00	9223 IDEXX Quanti-Tray	EMV/CFS

Sample passed / ~~failed~~ criteria for bacteriological test.  
 Sample of satisfactory bacteriological quality should be free from Coliform organisms.  
 Coliform Organisms    ☒ Not Found  
                                   ☒ Found  
                                   ☒ Total  
                                   \_\_\_ Fecal (E.Coli)  
                                   \_\_\_ Repeat Samples Required / Recommended (Circle One)  
                                   \_\_\_ Unsuitable - See Below  
                                   \_\_\_ Other reason: \_\_\_\_\_

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

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 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits



615049

Stamp 1<sup>st</sup> sample and COC as same number

Rev. Multiple Sample COC 20180628

Login at [www.pcslab.net](http://www.pcslab.net)

# Pollution Control Services

## Sample Log-In Checklist

6 4 5 0 4 9

6 4 5 0

6 4 5 0 4 9

COC No.

PCS Sample No(s)

Client/Company Name: Texas H&D

Checklist Completed by: gwr

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐  
Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐  
Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐  
Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☐ Broken ☐  
COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐  
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☐ No: ☒  
Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐  
Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes ☒ No ☐  
All Samples Received before Hold Time Expiration? Yes ☒ No ☐  
Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐  
Zero Headspace in VOA Vial if Present? Yes ☐ No ☒

### Sample Preservation:

\* Cooling: Not Required ☒ or Required ☐  
If cooling required, record temperature of submitted samples Observed/Corrected 4 / 2 °C  
Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No Samples received same day as collected? ☐ Yes ☒ No  
Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

Acid Preserved Sample - If present, is pH <2? Yes ☐ No ☒ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub> ☐

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☒ NaOH ☐

Other Preservation: ☐ If Present, Meets Requirements? Yes ☐ No ☐

Sample Preservations Checked by: ☐ Date ☐ Time ☐

pH paper used to check sample preservation (PCS log #): ☐ (HEM pH checked at analysis).

Samples Preserved/Adjusted by Lab: Lab # ☐ Parameters Preserved ☐ Preservative Used ☐ Log # 01601407

Adjusted by Tech/Analyst: gwr Date: 8/6/21 Time: 0830

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision Comments

Person Notified: ☐ Contacted by: ☐

Notified Date: ☐ Time: ☐

Method of Contact: At Drop Off: ☐ Phone ☐ Left Voice Mail ☐ E-Mail ☐ Fax ☐

Unable to Contact ☐ Authorized Laboratory to Proceed: ☐ (Lab Director)

Regarding / Comments: ☐

Actions taken to correct problems/discrepancies: ☐

Receiving qualifier needed (requires client notification above) Temp. ☐ Holding Time ☐ Initials: ☐

Receiving qualifier entered into LIMS at login Initial/Date: ☐

Revision Comments: ☐

\* Samples submitted for Metals Analysis (except: Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.




**Water Quality**

**Well No. 6**

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #6</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/27/2021 0951</b>	<b>PCS Sample #: 644136</b> <b>Page 1 of 3</b> <b>Date/Time Received: 7/29/2021 09:20</b> <b>Report Date: 8/3/2021</b>  Approved by:  <b>Chuck Wallgren, President</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
pH	!, I	7.7	S.U.	N/A	7/30/2021 18:00	SM 4500-H+ B	CRM
Chloride		13	mg/L	2	7/29/2021 17:41	EPA 300.0	JAS
Conductivity, Specific		628	µmhos/cm at 25° C	1	7/29/2021 12:55	SM 2510B	CML
Nitrate-N	H	<0.2	mg/L	0.2	7/29/2021 17:41	EPA 300.0	JAS
Nitrite-N	H	<0.2	mg/L	0.2	7/29/2021 17:41	EPA 300.0	JAS
Sulfate		24	mg/L	2	7/29/2021 06:10	EPA 300.0	JAS
Total Dissolved Solids		320	mg/L	10	7/30/2021 13:25	SM 2540C	CML
Fluoride		0.43	mg/L	0.20	7/29/2021 17:41	EPA 300.0	JAS

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
pH	N/A	N/A	N/A			N/A		
Chloride	<1	10	95	97	97	103	93	85 - 115
Conductivity, Specific	N/A	N/A	N/A			N/A		
Nitrate-N	<1	20	70	96	96	130	93	85 - 115
Nitrite-N	<1	10	93	*90	*91	113	92	85 - 115
Sulfate	<1	10	94	94	*93	102	102	85 - 115
Total Dissolved Solids	6	10	N/A	N/A	N/A	N/A		
Fluoride	<1	10	93	100	100	109	104	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4

<sup>1</sup> Not NELAP Certifiable Parameter

<sup>H</sup> Sample analysis started outside hold time, see Sample Log-In Checklist Comment

<sup>I</sup> Informational purposes only - pH outside hold time

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RL = Reporting Limits

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #6</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/27/2021 0951</b>	<b>PCS Sample #: 644136</b> <b>Page 2 of 3</b> <b>Date/Time Received: 7/29/2021 09:20</b> <b>Report Date: 8/3/2021</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
Alkalinity, Total	!	286	mg/L	10	7/30/2021 17:30	SM 2320 B	CRM
Arsenic/ICP MS		<0.0005	mg/L	0.0005	7/30/2021 10:50	EPA 200.8	DJL
Copper/ICP (Total)		<0.005	mg/L	0.005	7/30/2021 12:46	EPA 200.7 / 6010 B	DJL
Calcium Hardness as CaCO <sub>3</sub>		119.6	mg/L	N/A	7/30/2021 12:03	SM 2340B (Calc)	DJL
Calcium/ICP (Total)		47.9	mg/L	0.50	7/30/2021 12:03	EPA 200.7 / 6010 B	DJL
Lead/ICP MS		<0.0005	mg/L	0.0005	7/30/2021 10:50	EPA 200.8	DJL
Aluminum/ICP (Total)		0.011	mg/L	0.010	7/30/2021 12:46	EPA 200.7 / 6010 B	DJL
Iron/ICP (Total)		0.061	mg/L	0.010	7/30/2021 12:46	EPA 200.7 / 6010 B	DJL

Test Description	Quality Assurance Summary							
	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Alkalinity, Total	<1	10	95	99	99	107	100	85 - 115
Arsenic/ICP MS	2	20	70	105	106	130	103	85 - 115
Copper/ICP (Total)	1	20	75	97	96	125	100	85 - 115
Calcium Hardness as CaCO <sub>3</sub>	N/A	N/A	N/A			N/A		
Calcium/ICP (Total)	<1	20	75	*N/C	*N/C	125	98	85 - 115
Lead/ICP MS	1	20	70	110	111	130	108	85 - 115
Aluminum/ICP (Total)	<1	20	75	99	99	125	100	85 - 115
Iron/ICP (Total)	<1	20	75	94	94	125	100	85 - 115

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\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4

! Not NELAP Certifiable Parameter

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\*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: Twisted Creek #6</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/27/2021 0951</b>	<b>PCS Sample #: 644136</b> <b>Page 3 of 3</b> <b>Date/Time Received: 7/29/2021 09:20</b> <b>Report Date: 8/3/2021</b>

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
Sodium/ICP (Total)	30.0	mg/L	0.50	7/30/2021 12:03	EPA 200.7 / 6010 B	DJL
Manganese/ICP (Total)	0.010	mg/L	0.010	7/30/2021 12:46	EPA 200.7 / 6010 B	DJL
Zinc/ICP (Total)	0.013	mg/L	0.010	7/30/2021 12:46	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary						
		Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Sodium/ICP (Total)	<1	20	75	*N/C	*N/C	125	91	85 - 115
Manganese/ICP (Total)	1	20	75	94	93	125	100	85 - 115
Zinc/ICP (Total)	<1	20	75	94	94	125	100	85 - 115

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\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4

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RL = Reporting Limits

\*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES

Chain of Custody Number

644136

## MULTIPLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Stamp 1<sup>st</sup> sample and COC as same number

CUSTOMER INFORMATION				REPORT INFORMATION													
Name: <u>Texas Water</u>				Attention: <u>Chris Knox</u>						Phone: <u>512-943-5646</u>			Fax:				
SAMPLE INFORMATION				Requested Analysis													
Project Information: <u>Twisted Creek</u>				Collected By: <u>JOE D</u>						ICEQ MEN			Instructions/Comments:				
Report "Soils" <input checked="" type="checkbox"/> As Is <input type="checkbox"/> Dry Wt.																	
Client / Field Sample ID	Collected		Field Chlorine Residual mg/L	Composite or Grab	Matrix		Container		Type	Number	Preservative						
	Date	Time			DW-Drinking Water; NPW-Non-potable water; WW-Wastewater; LW-Liquid Waste												
<u>Twisted Creek #6</u>	Start:	Start:		<input type="checkbox"/> C <input checked="" type="checkbox"/> G	<input checked="" type="checkbox"/> DW <input type="checkbox"/> NPW	<input type="checkbox"/> P	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub>										PCS Sample Number <b>644136</b>
	End:	End:			<input type="checkbox"/> WW <input type="checkbox"/> Soil	<input type="checkbox"/> G	<input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH										
					<input type="checkbox"/> Sludge <input type="checkbox"/> LW	<input type="checkbox"/> O	<input type="checkbox"/> ICE <input type="checkbox"/>										<input type="checkbox"/> S <input checked="" type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> Other												<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:
					<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/>									<input type="checkbox"/> S <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> HEM Other:

Required Turnaround: <input type="checkbox"/> Routine (6-10 days) <input checked="" type="checkbox"/> EXPEDITE: (See Surcharge Schedule)		<input type="checkbox"/> < 8 Hrs. <input type="checkbox"/> < 16 Hrs. <input type="checkbox"/> < 24 Hrs. <input checked="" type="checkbox"/> 5 days <input type="checkbox"/> Other: _____		Rush Charges Authorized by: _____	
Sample Archive/Disposal: <input type="checkbox"/> Laboratory Standard <input type="checkbox"/> Hold for client pick up		Container Type: P = Plastic, G = Glass, O = Other		Carrier ID: _____	
Relinquished By: <u>[Signature]</u>	Date: <u>7/29/21</u>	Time: <u>9:20am</u>	Received By: <u>[Signature]</u>	Date: <u>7/29/21</u>	Time: <u>09:10</u>
Relinquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____

Rev. Multiple Sample COC\_20180628

1532 Universal City Blvd., Ste. 100, Universal City, Texas 78148  
P (210) 340-0343 or (800) 880-4616 - F (210) 658-7903

Login at [www.pcslab.net](http://www.pcslab.net)



# Pollution Control Services

## Sample Log-In Checklist

PCS Sample No(s) 6 4 4 1 3 6 COC No. 6 4 4 1 3 6

Client/Company Name: Texas H<sub>2</sub>O Checklist Completed by: Gur

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐

Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐

Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐

Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☒ Broken ☐

COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐

Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☒ No: ☐

Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐

Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes ☒ No ☐

All Samples Received before Hold Time Expiration? Yes ☒ No ☐

Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐

Zero Headspace in VOA Vial if Present? Yes ☐ No ☒

### Sample Preservation:

\* **Cooling:** Not Required ☒ or Required ☐

If cooling required, record temperature of submitted samples Observed/Corrected 3 / 1 °C ☒

Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No ☐ Samples received same day as collected? ☐ Yes ☒ No ☐

Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

### Acid Preserved Sample - If present, is pH <2?

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☐ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub> ☐

Other Preservation: ☐ If Present, Meets Requirements? Yes ☐ No ☐

Sample Preservations Checked by: ☐ Date ☐ Time ☐

pH paper used to check sample preservation (PCS log #): ☐ (HEM pH checked at analysis).

Samples Preserved/Adjusted by Lab: ☐ Lab # ☐ Parameters Preserved ☐ Preservative Used ☐ Log # 01601801

Adjusted by Tech/Analyst: Gur Date: 7/29/21 Time: 0925

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision Comments

Person Notified: Chris Contacted by: Gur

Notified Date: 7/29/21 Time: 0925

Method of Contact: At Drop Off: ☒ Phone ☒ Left Voice Mail ☐ E-Mail ☐ Fax ☐ (Lab Director)

Unable to Contact ☐ Authorized Laboratory to Proceed: ☐

Regarding / Comments: Called Chris about NO<sub>2</sub>, NO<sub>3</sub> and other short

hold time, 7/29/21 Gur

Actions taken to correct problems/discrepancies: ☐

Receiving qualifier needed (requires client notification above) Temp. ☐ Holding Time ☒ Initials: Gur

Receiving qualifier entered into LIMS at login Initial/Date: LMW 7.29.2021

Revision Comments: ☐

\* Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements. "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.



# TCEQ Microbial Reporting Form

TCEQ Form 10525

08/2017

## Water System Identification & Sample Collection Information (Please type or use block print)

Public Water System ID: TX

Public Water System Name: County:

Name: Texen Water

Address: 161 Industrial Loop

City: Fredericksburg

State: TX Zip Code: 78624

Phone #: 512-943-5646

Relinquished By (Sampler):

Relinquished By (Courier, if applicable):

Relinquished By (Courier):

Date / Time: 7/27/21 14:25

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Signature: Joseph Battarino

Operator License #:

Owner

Operator

Other:

Falsification of this form or tampering with water samples is a crime punishable under state and/or federal law. (Texas Penal Code, Title 8, Chapter 37.10) By signing this form, the sampler acknowledges that samples were collected according to the systems established sample collection procedures, and that all information is accurate.

Chlorine Residual

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Circle "F" for Free Chlorine (mg/L) or "T" for Total Chlorine (mg/L)

Sample Identification Location identified in Sample Siting Plan

Sample Type: (✓ one)

Sample Type: (✓ one)

Sample Type: (✓ one)

Sample Type: (✓ one)

Sample Type: (✓ one)

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Raw Wells - Use Source ID for Well Sampled (Example: G1234567A)

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Twisted Creek #11

## **Water Quality**


**Well No. 8**



# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: TC #8</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1500</b>	<b>PCS Sample #: 644284</b> Page 1 of 3 <b>Date/Time Received: 7/30/2021 11:26</b> <b>Report Date: 8/4/2021</b>  Approved by:  <b>Chuck Wallgren, President</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
pH	!, I	7.5	S.U.	N/A	7/30/2021 18:00	SM 4500-H+ B	CRM
Chloride		10	mg/L	2	7/30/2021 08:33	EPA 300.0	JAS
Conductivity, Specific		635	µmhos/cm at 25° C	1	7/30/2021 14:45	SM 2510B	CML
Nitrate-N		2.0	mg/L	0.2	7/30/2021 16:44	EPA 300.0	JAS
Nitrite-N		<0.2	mg/L	0.2	7/30/2021 16:44	EPA 300.0	JAS
Sulfate		24	mg/L	2	7/30/2021 08:33	EPA 300.0	JAS
Total Dissolved Solids		360	mg/L	10	7/30/2021 13:50	SM 2540C	CML
Fluoride		0.61	mg/L	0.2	7/30/2021 08:33	EPA 300.0	JAS

Test Description	Precision	Quality Assurance Summary Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
pH	N/A	N/A	N/A			N/A		
Chloride	<1	10	95	98	98	103	93	85 - 115
Conductivity, Specific	N/A	N/A	N/A			N/A		
Nitrate-N	1	20	70	96	95	130	93	85 - 115
Nitrite-N	<1	10	93	95	95	113	92	85 - 115
Sulfate	<1	10	94	96	95	102	99	85 - 115
Total Dissolved Solids	2	10	N/A	N/A	N/A	N/A		
Fluoride	<1	10	93	105	106	109	106	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

<sup>1</sup> Not NELAP Certifiable Parameter  
<sup>1</sup> Informational purposes only - pH outside hold time

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: TC #8</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1500</b>	<b>PCS Sample #: 644284</b> <b>Page 2 of 3</b> <b>Date/Time Received: 7/30/2021 11:26</b> <b>Report Date: 8/4/2021</b>

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Method	Analyst
Alkalinity, Total	!	300	mg/L	10	7/30/2021 17:30	SM 2320 B	CRM
Arsenic/ICP MS		<0.0005	mg/L	0.0005	8/3/2021 12:32	EPA 200.8	DJL
Copper/ICP (Total)		<0.005	mg/L	0.005	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Calcium Hardness as CaCO <sub>3</sub>		196.8	mg/L	N/A	8/4/2021 09:55	SM 2340B (Calc)	DJL
Calcium/ICP (Total)		78.8	mg/L	1.00	8/4/2021 09:55	EPA 200.7 / 6010 B	DJL
Lead/ICP MS		<0.0005	mg/L	0.0005	8/3/2021 12:32	EPA 200.8	DJL
Aluminum/ICP (Total)		<0.010	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Iron/ICP (Total)		0.022	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Alkalinity, Total	<1	10	95	99	99	107	100	85 - 115
Arsenic/ICP MS	<1	20	70	106	106	130	105	85 - 115
Copper/ICP (Total)	<1	20	75	100	100	125	100	85 - 115
Calcium Hardness as CaCO <sub>3</sub>	N/A	N/A	N/A			N/A		
Calcium/ICP (Total)	<1	20	75	*N/C	*N/C	125	101	85 - 115
Lead/ICP MS	2	20	70	111	113	130	110	85 - 115
Aluminum/ICP (Total)	10	20	75	106	97	125	105	85 - 115
Iron/ICP (Total)	<1	20	75	97	97	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

\*Approved for release per QA Plan, Exception to Limits - QAM Section 13-4  
 ! Not NELAP Certifiable Parameter

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits  
 \*N/C = Not Calculated, Sample Concentration Greater than 5 times the Spike Level

# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: TC #8</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1500</b>	<b>PCS Sample #: 644284</b> <b>Page 3 of 3</b> <b>Date/Time Received: 7/30/2021 11:26</b> <b>Report Date: 8/4/2021</b>

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
Sodium/ICP (Total)	14.8	mg/L	1.00	8/4/2021 09:55	EPA 200.7 / 6010 B	DJL
Manganese/ICP (Total)	<0.010	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL
Zinc/ICP (Total)	0.013	mg/L	0.010	8/3/2021 14:39	EPA 200.7 / 6010 B	DJL

Test Description	Precision	Quality Assurance Summary Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Sodium/ICP (Total)	2	20	75	101	103	125	98	85 - 115
Manganese/ICP (Total)	1	20	75	97	96	125	105	85 - 115
Zinc/ICP (Total)	1	20	75	97	96	125	105	85 - 115

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAP unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

These analytical results relate only to the sample tested.  
 All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
 RL = Reporting Limits

# POLLUTION CONTROL SERVICES

Chain of Custody Number

6 4 4 2 8 4

## MULTIPLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Stamp 1<sup>st</sup> sample and COC as same number

CUSTOMER INFORMATION				REPORT INFORMATION			
Name: <u>R. NOAH TEXAN WATER</u>				Attention: <u>C. L. NOX</u>		Phone:	
SAMPLE INFORMATION				Fax:			
Project Information: <u>TWISTED CREEK</u>			Collected By:			Requested Analysis	
Report "Soils" <input type="checkbox"/> As Is <input type="checkbox"/> Dry Wt.							
Client / Field Sample ID	Collected		Field Chlorine Residual mg/L	Composite or Grab	Matrix	Type	Preservative
	Date	Time				Number	
<u>TC #8</u>	Start: <u>7/24</u>	Start: <u>3:00 AM</u>		<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/> _____
	End:	End:					
	Start:	Start:		<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/> _____
	End:	End:					
	Start:	Start:		<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/> _____
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	End:	End:					
	Start:	Start:		<input type="checkbox"/> C <input type="checkbox"/> G	<input type="checkbox"/> DW <input type="checkbox"/> NPW <input type="checkbox"/> WW <input type="checkbox"/> Soil <input type="checkbox"/> Sludge <input type="checkbox"/> LW <input type="checkbox"/> Other	<input type="checkbox"/> P <input type="checkbox"/> G <input type="checkbox"/> O	<input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>3</sub> PO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> ICE <input type="checkbox"/> _____
	End:	End:					

Required Turnaround: ☐ Routine (6-10 days) ☒ EXPEDITE: (See Surcharge Schedule)

Sample Archive/Disposal: ☐ Laboratory Standard ☐ Hold for client pick up

☐ < 8 Hrs. ☐ < 16 Hrs. ☐ < 24 Hrs. ☒ 5 days ☐ Other: \_\_\_\_\_

Container Type: P = Plastic, G = Glass, O = Other

Rush Charges Authorized by: \_\_\_\_\_

Carrier ID: \_\_\_\_\_

Relinquished By: <u>[Signature]</u>	Date: <u>7/30/21</u>	Time: <u>11:20</u>	Received By: <u>[Signature]</u>	Date: <u>7/30/21</u>	Time: <u>11:20</u>
Relinquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____

Rev. Multiple Sample COC 20120201

1532 Universal City Blvd., Ste. 100, Universal City, Texas 78148  
P (210) 340-0343 or (800) 880-4616 - F (210) 658-7903

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Login at [www.pcslab.net](http://www.pcslab.net)  
TCEQ NELAP T104704361-TX

# Pollution Control Services

## Sample Log-In Checklist

PCS Sample No(s) 6 4 4 2 8 4 COC No. 6 4 4 2 8 4

Client/Company Name: Texas Water Checklist Completed by: LMW

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐  
Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐  
Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐  
Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☐ Broken ☐  
COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐  
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☒ No: ☐  
Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐  
Does COC agree with Sample Bottle Information, Bottle Type, Preservation, etc.? Yes ☒ No ☐  
All Samples Received before Hold Time Expiration? Yes ☒ No ☐  
Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐  
Zero Headspace in VOA Vial if Present? Yes ☐ No ☒

### Sample Preservation:

\* **Cooling:** Not Required ☒ or Required ☐  
If cooling required, record temperature of submitted samples Observed/Corrected 5 / 3 °C  
Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No Samples received same day as collected? ☐ Yes ☒ No  
Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

### Acid Preserved Sample - If present, is pH <2?

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☒ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub> ☐  
Other Preservation: Yes ☐ No ☐ NaOH ☐

If Present, Meets Requirements? Yes ☐ No ☐

Sample Preservations Checked by: LMW Date 7-30-21 Time 1145

pH paper used to check sample preservation (PCS log #): 20-212 (HEM pH checked at analysis).

Samples Preserved/Adjusted by Lab: Lab # Metals Preservative Used HNO3 Log # 010001801

Adjusted by Tech/Analyst: LMW Date 7-30-21 Time: 1150

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision Comments

Person Notified: \_\_\_\_\_

Contacted by: \_\_\_\_\_

Notified Date: \_\_\_\_\_ Time: \_\_\_\_\_

Method of Contact: At Drop Off: \_\_\_\_\_ Phone \_\_\_\_\_ Left Voice Mail ☐ E-Mail ☐ Fax \_\_\_\_\_

Unable to Contact \_\_\_\_\_ Authorized Laboratory to Proceed: \_\_\_\_\_ (Lab Director)

Regarding / Comments: \_\_\_\_\_

Actions taken to correct problems/discrepancies: \_\_\_\_\_

Receiving qualifier needed (requires client notification above) Temp. \_\_\_\_\_ Holding Time \_\_\_\_\_ Initials: \_\_\_\_\_

Receiving qualifier entered into LIMS at login Initial/Date: \_\_\_\_\_

Revision Comments: \_\_\_\_\_


\* Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.



# POLLUTION CONTROL SERVICES



## Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
<b>Brice Bormann</b> <b>Texan Water</b> <b>161 Industrial Loop</b> <b>Fredericksburg, TX 78624</b>	<b>Project Name: Twisted Creek</b> <b>Sample ID: TC #8</b> <b>Matrix: Drinking Water</b> <b>Date/Time Taken: 7/29/2021 1516</b>	<b>PCS Sample #: 644285</b> <b>Page 1 of 1</b> <b>Date/Time Received: 7/30/2021 11:25</b> <b>Report Date: 8/2/2021</b>  Approved by:  Chuck Wallgren, President

Test Description	Result	Units	RL	Analysis Date/Time	Method	Analyst
E. coli. (Enumeration-MPN) 18	0	CFU/100ml	1	7/30/2021 16:00	9223 IDEXX Quanti-Tray	CML
Total Coliform (Enumeration) 18	0	CFU/100ml	1	7/30/2021 16:00	9223 IDEXX Quanti-Tray	CML

Sample passed / failed criteria for bacteriological test.  
Sample of satisfactory bacteriological quality should be free from Coliform organisms.

Coliform Organisms ☒ Not Found  
☐ Found

☐ Total

☐ Fecal (E.Coli)

☐ Repeat Samples Required / Recommended (Circle One)

☐ Unsuitable - See Below

☐ Other reason: \_\_\_\_\_

**Quality Statement:** All supporting quality data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request.

These analytical results relate only to the sample tested.  
All data is reported on an 'As Is' basis unless designated as 'Dry Wt'.  
RL = Reporting Limits

# POLLUTION CONTROL SERVICES

Chain of Custody Number

6 4 4 2 8 5

## MULTIPLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Stamp 1<sup>st</sup> sample and COC as same number

### CUSTOMER INFORMATION

Name: A. NOAH TEXAN WATER

### REPORT INFORMATION

Attention: C. KNOX

Phone:

Fax:

### SAMPLE INFORMATION

#### Project Information:

TWISTED CREEK

Report "Soils" ☐ As Is ☐ Dry Wt.

#### Collected By:

Field Chlorine  
Residual mg/L

Composite or  
Grab

Matrix  
DW-Drinking  
Water; NPW-Non-  
potable water;  
WW-Wastewater;  
LW-Liquid Waste

Type

Number

#### Container

Preservative

#### Requested Analysis

Instructions/Comments:

PCS Sample Number

6 4 4 2 8 5

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

☐ S ☐ B ☐ N ☐ HEM Other:

Required Turnaround: ☐ Routine (6-10 days)

EXPEDITE: (See Surcharge Schedule)

☐ < 8 Hrs. ☐ < 16 Hrs. ☐ < 24 Hrs. ☐ 5 days ☐ Other:

Rush Charges Authorized by:

Sample Archive/Disposal: ☐ Laboratory Standard ☐ Hold for client pick up

Container Type: P = Plastic, G = Glass, O = Other

Carrier ID:

Relinquished By:

Date:

Time:

Received By:

Date:

Time:

Relinquished By:

Date:

Time:

Received By:

Date:

Time:

Rev. Multiple Sample COC 20120201

1532 Universal City Blvd., Ste. 100, Universal City, Texas 78148

P (210) 340-0343 or (800) 880-4616 - F (210) 658-7903

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Login at [www.pcslab.net](http://www.pcslab.net)

TCEQ NELAP T104704361-TX

# Pollution Control Services

## Sample Log-In Checklist

PCS Sample No(s) 6 4 4 2 8 5 COC No. 6 4 4 2 8 5

Client/Company Name: Texas Water Checklist Completed by: LMW

### Sample Delivery to Lab Via:

Client Drop Off ☒ Commercial Carrier: Bus ☐ UPS ☐ Lone Star ☐ FedEx ☐ USPS ☐  
PCS Field Services: Collection/Pick Up ☐ Other: ☐

### Sample Kit/Coolers

Sample Kit/Cooler? Yes ☒ No ☐ Sample Kit/Cooler: Intact? Yes ☒ No ☐  
Custody Seals on Sample Kit/Cooler: Not Present ☒ If Present, Intact ☐ Broken ☐  
Sample Containers Intact; Unbroken and Not Leaking? Yes ☒ No ☐  
Custody Seals on Sample Bottles: Not Present ☒ If Present, Intact ☐ Broken ☐  
COC Present with Shipment or Delivery or Completed at Drop Off? Yes ☒ No ☐  
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: ☒ No: ☐  
Has COC been properly Signed when Received/Relinquished? Yes ☒ No ☐  
Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes ☒ No ☐  
All Samples Received before Hold Time Expiration? Yes ☒ No ☐  
Sufficient Sample Volumes for Analysis Requested? Yes ☒ No ☐  
Zero Headspace in VOA Vial if Present? Yes ☐ No ☒

### Sample Preservation:

\* **Cooling:** Not Required ☒ or Required ☐

If cooling required, record temperature of submitted samples Observed/Corrected 5 / 3 °C  
Is Ice Present in Sample Kit/Cooler? ☒ Yes ☐ No ☐ Samples received same day as collected? ☐ Yes ☒ No ☐  
Lab Thermometer Make and Serial Number: Vaughan 1807009583 Other: ☐

### Acid Preserved Sample - If present, is pH <2?

Base Preserved Sample - If present, is pH >12? Yes ☐ No ☒ H<sub>2</sub>SO<sub>4</sub> ☐ HNO<sub>3</sub> ☐ H<sub>3</sub>PO<sub>4</sub>  
Other Preservation: Yes ☐ No ☒ NaOH ☐

If Present, Meets Requirements? Yes ☐ No ☒

Sample Preservations Checked by: ☐ Date ☐ Time ☐

pH paper used to check sample preservation (PCS log #): ☐ (HEM pH checked at analysis).

Samples Preserved/Adjusted by Lab: Lab # ☐ Parameters Preserved ☐ Preservative Used ☐ Log # ☐

Adjusted by Tech/Analyst: ☐ Date: ☐ Time: ☐

### Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ Revision Comments

Person Notified: ☐ Contacted by: ☐

Notified Date: ☐ Time: ☐

Method of Contact: At Drop Off: ☐ Phone ☐ Left Voice Mail ☐ E-Mail ☐ Fax ☐

Unable to Contact ☐ Authorized Laboratory to Proceed: ☐ (Lab Director)  
Regarding / Comments: ☐

Actions taken to correct problems/discrepancies: ☐

Receiving qualifier needed (requires client notification above) Temp. ☐ Holding Time ☐ Initials: ☐

Receiving qualifier entered into LIMS at login Initial/Date: ☐

Revision Comments: ☐

\* Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). \*\* Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt - however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.