

2021 - 2022 ANNUAL TRR WELL FIELD REPORT

Prepared for

Inscription Canyon Water Company

Prepared by

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PURPOSE OF THE REPORT

The purpose of this report is to provide an update on the current conditions of the Talking Rock Ranch (TRR) well field. This report is part of an annual series dating back to 2013 and includes information on pumpage, water levels, yields of individual wells, and the water demand and use of water by the subdivisions served by the well field. The report is intended to provide a comprehensive overview of the current state of the well field and its operations.

INSCRIPTION CANYON WATER COMPANY

The Inscription Canyon Water Company (ICWC) is a non-profit organization that supplies water to various subdivisions in the area, as well as the Talking Rock golf course. The ICR well field, consisting of two wells, supplies water to the Inscription Canyon Ranch, Whispering Canyons, and Preserve at the Ranch subdivisions. The TRR well field, consisting of three wells, supplies water to the Talking Rock Ranch subdivision and golf course. These two systems are not connected.

ICWC is regulated by the Arizona Corporation Commission and has seen an increase in residential customers in the Talking Rock Ranch subdivision. In 2022, the company served 386 residential customers in this area, which is an increase of 57 customers from 2020 and 170 more than in 2015 (see Table 1). In addition to residential customers, ICWC also serves commercial entities within the subdivisions and provides water for irrigation and construction purposes.

Table 1, Residential Customers served December 2015- 2022

Subdivision	2015	2016	2017	2018	2019	2020	2021	2022
TRR	216	222	230	255	291	329	361	390

TOTAL WELL FIELD DEMAND: 2015-2022

The total TRR annual well field demand and Talking Rock Golf Course annual water demand for 2015 through November 2022 is shown in table 2.

Table 2, TRR Annual Well Field Demand and Talking Rock Golf Course Annual Water Demand, 2015 - 2022, in gallons

Demand	2015	2016	2017	2018	2019	2020	2021	2022
TRR well field	94,270,000	103,893,000	111,343,000	118,216,388	119,569,150	139,829,975	124,779,229	110,043,256
TR golf course	81,941,000	84,581,000	88,782,000	94,805,000	90,569,000	103,711,000	81,514,000	73,862,600

The 2021 TRR annual well field demand was 124,779,229 gallons, the 2022 TRR well field demand (up to November) was 109,327,389 gallons. In 2021, out of the 124,779,229 gallons, Talking Rock Golf Course annual demand accounts for 81,514,000 gallons, representing 65 % of the total annual pumpage from the TRR well field. In 2022, out of the

109,327,389 gallons, Talking Rock Golf Course demand accounts for 72,346,800 gallons, representing 66 % of the total pumpage.

The TRR well field’s total demand has decreased 15,050,746 million gallons from 2021 to 2020 and the golf course demand has decreased by 22,197,000 million gallons over the same time period; furthermore, the percentage of golf course demand decreased by 10%, indicating that water demand from the well field in 2021/2022 for purposes other than the golf course has slightly increased during the last two years. This increase would reflect, at least in part, the increase of 57 residential units from 2020 to 2022.

2021 - 2022 RESIDENTIAL, COMMERCIAL, AND LANDSCAPE DEMAND

The monthly and annual water demands shown in table 3 and table 4 are for all major users served by the TRR well field, excluding construction purposes. The values are based on monthly billing records that run on a mid-month billing cycle rather than a calendar basis. The billing records date from December 16, 2020 to December 15, 2021, December 16 2021 to November 15, 2022. Column 2 in tables 3 and 4 reflects monthly residential water demand in gallons; column 3 shows the number of residential units served; columns 4 and 5 show monthly demand for commercial and landscape use in gallons; column 6 shows golf course demand, column 7 shows total water sold to customers and golf course, and column 8 shows total residential demand in gallons per day per residence (gpd/r) for each month and the average residential demand for the year.

These values demonstrate the significant variation of monthly demand, increasing during the drier, pre-monsoon months in response to increased drip irrigation of residential and common area landscape. The annual average use in gallons per day per residence in the TRR system increased from 239 gpd/r in 2020 to 302 gpd/r in 2021, and decreased to 275 gpd/r in 2022.

Table 3, 2021 TRR Groundwater System Residential, Landscape, and Commercial Water Demand, in gallons

Month	Residential Demand	Residential Customers	Commercial Demand	Landscape Demand	Golf Course Demand	Total Demand	Average Residential Use (gpd/r)
January	1,236,450	343	99,130	85,200	0	1,472,820	3,605
February	1,305,504	349	96,770	25,780	0	1, 207,380	2,969
March	1,189,707	351	94,720	22,740	3,185,000	4,579,887	3,389
April	1,809,900	355	128,290	100,000	6,442,000	8,547,614	5,098
May	2,370,600	365	152,330	469,980	13,889,000	17,115,960	6,495
June	3,245,130	362	219,640	652,000	14,172,000	18,422,490	8,964
July	3,308,100	365	261,980	550,150	12,656,000	16,959,660	9,063

August	2,613,840	362	258,220	486,710	9,299,000	12,920,100	7,221
September	2,664,290	362	289,810	518,390	8,311,000	11,881,110	7,360
October	2,392,310	365	293,620	450,180	6,914,000	10,094,530	6,554
November	2,092,230	371	300,330	288,880	4,459,000	7,226,970	5,639
December	1,560,150	376	282,820	190,480	2,187,000	4,257,150	4,149
Total	25,650,827	361 ¹	2,477,660	3,840,490	81,514,000	114,684,531	5,876 ¹

¹ average annual value.

Table 4, 2022 TRR Groundwater System Residential, Landscape, and Commercial Water Demand, in gallons

Month	Residential Demand	Residential Customers	Commercial Demand	Landscape Demand	Golf Course Demand	Total Demand	Average Residential Use (gpd/r)
January	1,190,680	373	214,250	94,140	0	1,534,720	3,192
February	1,131,990	377	203,720	91,360	0	1,475,860	3,003
March	1,096,970	387	219,830	31,720	2,746,700	4,197,390	2,835
April	2,024,280	387	262,410	265,410	6,463,600	9,069,370	5,231
May	2,831,400	384	368,220	356,770	10,857,600	15,420,720	7,373
June	3,233,630	383	359,860	526,430	10,964,300	15,725,780	8,443
July	3,325,750	390	319,520	612,010	11,414,100	15,990,940	8,528
August	2,758,250	391	277,360	533,560	11,649,300	15,287,780	7,054
September	2,619,930	401	272,180	580,580	9,035,200	12,634,720	6,533
October	2,305,640	399	209,570	523,950	4,911,300	8,015,987	5,779
November	1,994,100	398	244,940	288,190	4,313,700	7,449,445	5,010
December	1,301,320	402	156,730	101,100	1,506,800	3,162,214	3,237
Total	25,851,990	390 ¹	3,108,590	4,007,450	73,862,600	110,043,256	4,931 ¹

THE TRR WELL FIELD

The Talking Rock Ranch (TRR) well field consists of three wells, TRR 1, 2, and 3. Construction of TRR 1 was completed on February 5, 2001; construction of TRR 2 was completed April 20, 2002; construction of TRR 3 was completed May 15, 2002. TRR 2 collapsed in May 2022; the construction of TRR 4, TRR 2's replacement, was completed June __, 2022. The wells are located at the eastern edge of the Mint Wash floodplain, immediately east of Williamson Valley Road. The well field services the Talking Rock subdivision and the Talk Rock Golf Course and is owned by the Inscription Canyon Water Company.

The aquifer tapped by the wells consists of medium-to-coarse intermixed with small amounts of gravel, layers of gravel and sand mixed with minor amounts of silt and clay, and interbedded with a layer of basalt occurring at depths ranging from 70 ft, 118 ft, and 108 ft below land surface at wells 1, 3, and 4 respectively. The base of the aquifer is confined by crystalline basement rock, occurring at a depth of 300 ft at well 1, 240 ft at well 3, and 262 ft at well 4.

The regional water table lies in the unconsolidated sands and gravel above the basalt. The water table elevation naturally fluctuates in response to seasonal patterns of precipitation. At the time of completion for each well, the measured depth to water was 20 ft, 57 ft, 23 ft, and 84 ft below land surface at wells 1, 2, 3, and 4 respectively. While wells 1 and 3 are at about the same elevation above sea level, wells 2 and 4 are about 10 ft higher. Because of this, non-pumping measurements at the well field indicate depth-to-water at well 2 and well 4 is 8-10 ft. greater than that at wells 1 and 3, consistent with the difference in elevation. Pumping from well 1 was ongoing during the completion of wells 2 and 4; therefore, measured depth to water at the time of completion does not reflect non-pumping measurements, which average about 62 ft below land surface at this time.

2021 - 2022 MONTHLY WELL FIELD DEMAND

Below, table 5 reflects the total pumpage at the TRR wells 1, 2, and 3 in 2021; table 6 below reflects the total pumpage at TRR wells 1, 2, 3, and 4 in 2022.

Total pumpage at well 1 for the year 2021 was 81,826,493 gallons, total pumpage at well 2 for the year was 31,127,473 gallons, and total pumpage at well 3 for the year was 12,540,263 gallons (table 5). Monthly demand on the well field in 2021 increased approximately 1,335,504 gallons in January to a high of 18,726,243 gallons in July when pumpage peaked. Demand then slowly decreased, falling to 5,628,734 gallons in December.

Total pumpage at well 1 for 2022 was 63,151,029 gallons, total pumpage at well 2 (January – May) was 7,297,365 gallons, total pumpage at well 4 (August – December) was 14,074,206 gallons, and total pumpage at well 3 for the year was 24,803,989 gallons (table 6). Monthly demand on the well field in 2022 increased approximately 1,335,504 gallons in February to a high of 18,726,243 gallons in June when pumpage peaked. Demand then slowly decreased, falling to 7,309,101 gallons in November.

Table 5, 2021 TRR Wells 1, 2, and 3 Monthly and Annual Pumpage, in gallons

Month	Well 1	Well 2	Well 3	Total
January	1,549,103	0	47,615	1,596,718
February	1,258,820	11,805	64,879	1,335,504
March	3,173,222	1,314,370	482,838	4,970,430
April	5,957,192	2,425,534	9	8,322,735
May	11,906,800	1,427,664	4,289,452	17,623,916
June	11,895,600	3,516,600	3,314,043	18,726,243
July	11,372,800	5,242,100	861,933	17,476,833
August	10,178,200	3,426,363	340,163	13,944,726
September	9,510,300	3,176,937	313,694	12,940,931
October	10,754,500	2,328,316	205,267	13,288,083
November	4,173,390	3,926,621	1,419,377	9,519,377
December	96,566	4,331,163	1,201,005	5,628,734
Total	81,826,493	31,127,473	12,540,263	125,494,229

Table 6, 2022 TRR Wells 1, 2/4, and 3 Monthly and Annual Pumpage, in gallons

Month	Well 1	Well 2/4	Well 3	Total
January	204,431	1,270,151	365,381	1,839,963
February	1,218,016	381,164	213,672	1,812,852
March	2,072,558	1,050,585	1,177,576	4,300,719
April	1,718,139	4,595,465	3,371,250	9,684,854
May	10,466,000	0	5,408,750	15,874,750
June	10,322,200	0	5,178,900	15,501,100
July	10,521,500	0	5,772,100	16,293,600
August	11,207,400	3,135,335	1,244,315	15,587,050
September	8,777,819	4,216,988	20,600	13,015,407
October	5,681,381	2,425,812	0	8,107,193
November	961,585	4,296,071	2,051,445	7,309,101
December	1,184,287	786,677	1,377,969	3,348,933
Total	63,151,029	21,371,571	24,803,989	112,675,522

2015-2022 MONTHLY WELL FIELD DEMAND

Table 5 shows the variation in monthly demand at the TRR well field from January 2015 to December 2022. Minimum demand occurs in the winter months, with the lowest generally occurring in January and February. The highest demand

occurs during the drier summer months, the highest typically occurring in July. The difference between maximum and minimum for a given year averages about 15,333,878 million gallons and has been as much as 21,231,020 million gallons.

The well field’s annual demand during this time period has ranged from a low of 647,000 gallons in February 2017 to a high of 22,520,975 gallons in July 2020. Assuming a 21-hour pumping day, this averages a high of 577 gpm and a low of 18 gpm. Historically, the capacity of TRR well 1 is approximately 325 gpm, well 2 is approximately 257 gpm, and well 3 is approximately 225 gpm; however, the pumping capacity for the TRR well field has dropped over the past 2 years. Currently, the capacity of TRR well 1 is approximately 278 gpm, well 4 is 216 gpm, well 3 is 188 gpm; a 15% reduction in pumping capacity since 2020. If the well field demand increases, the current pumping capacity may not be able to provide necessary yield to meet demand. Coupled with the collapse of Well 2 in May 2022, this data suggests the TRR well field is being over-pumped.

Table 7, Monthly and Annual TRR Well Field Water Demand, 2015 - 2022, in gallons.

Month	2015	2016	2017	2018	2019	2020	2021	2022
January	2,176,000	951,000	875,000	4,276,000	2,332,000	1,289,955	1,596,718	1,839,963
February	3,078,000	2,668,000	647,000	6,189,000	840,000	2,037,453	1,335,504	1,812,852
March	4,349,000	7,804,000	912,000	2,049,000	848,000	2,505,546	4,970,430	4,300,719
April	12,537,000	10,098,000	6,829,000	11,139,000	8,070,682	4,732,387	8,322,735	9,684,854
May	11,789,000	11,894,000	14,019,000	16,306,000	12,566,913	14,330,195	17,623,916	15,874,750
June	13,142,000	17,698,000	15,412,000	15,956,388	11,717,692	16,081,206	18,726,243	15,501,900
July	11,093,000	17,930,000	17,376,000	14,679,000	16,429,109	22,520,975	17,476,833	16,293,600
August	10,572,000	7,920,000	7,925,000	13,435,000	16,873,994	20,700,000	13,944,726	15,587,050
September	8,922,000	8,454,000	15,213,000	10,635,000	17,926,002	20,333,400	12,940,931	13,015,407
October	10,264,000	10,281,000	12,690,000	10,567,000	12,894,581	16,323,233	13,288,083	8,107,193
November	4,513,000	5,736,000	11,504,000	8,098,000	14,397,727	12,627,363	9,519,377	7,309,101
December	1,835,000	2,459,000	6,411,000	4,887,000	4,671,622	5,806,455	5,628,734	3,348,933
Total	94,270,000	103,893,000	109,813,000	118,216,388	119,568,322	139,288,168	125,494,229	112,675,522

MAXIMUM DAILY DEMAND

The maximum average daily residential demand for 2021 occurred in June at 3,308,100 gallons. There were 340 residences served during this time, with an average daily use equaling 291 gpd/r.

The July 2020 pumpage of 22,520,975 gallons exceeds that of all other months during the recorded time period. This demand equates to an average daily demand of approximately 726,483 gallons per day at an average rate of 550 gpm for a daily maximum run time of 22 hours.

2015-2022 GOLF COURSE DEMAND

The TRR well field’s highest demand, historically and for the foreseeable future, is the Talking Rock Golf Course. The monthly and annual golf course demand from 2015 through 2022 are shown below in table 8. The golf course demand has ranged from a high of 103,711,000 gallons in 2020 to a low of 81,941,000 gallons in 2015. The golf course demand for 2020 was 103,711,000 gallons, an increase of 13,142,000 gallons from 2019.

Table 8, Golf Course Demand 2015-2022, in gallons

Month	2015	2016	2017	2018	2019	2020	2021	2022
January	3,723,000	16,000	48,000	3,151,000	1,194,000	0	0	0
February	1,898,000	642,000	0	4,931,000	0	884,000	0	0
March	1,105,000	4,088,000	0	1,158,000	112,000	1,902,000	3,185,000	2,746,700
April	9,365,000	7,945,000	5,535,000	9,163,000	6,155,000	2,948,000	6,442,000	6,463,600
May	10,529,000	9,773,000	12,222,000	14,144,000	9,914,000	11,090,000	13,889,000	10,857,600
June	10,455,000	12,109,000	13,277,000	13,361,100	8,918,000	11,763,000	14,172,000	10,964,300
July	10,151,000	14,701,000	14,563,000	11,521,000	12,075,000	16,835,000	12,656,000	11,414,100
August	8,758,000	11,648,000	5,755,000	11,130,000	13,545,000	16,689,000	9,299,000	11,640,300
September	8,191,000	5,124,000	11,748,000	7,900,000	13,748,000	16,505,000	8,311,000	9,035,200
October	8,338,000	7,407,000	10,860,000	8,447,000	10,028,000	11,521,000	6,914,000	4,911,300
November	7,090,000	8,243,000	9,566,000	6,178,000	11,575,000	9,652,000	4,459,000	4,313,700
December	2,338,000	2,885,000	5,208,000	3,738,000	3,305,000	3,922,000	2,187,000	1,506,800
Total	81,941,000	84,581,000	88,782,000	94,822,100	90,569,000	103,711,000	81,514,000	73,862,600

WELL FIELD HOURS OF USE AND YIELD

TRR well 1 was pumped for approximately 4,249 hours during 2021 for an average daily use of about 12 hours per day, and 3,827 hours during 2022 for an average daily use of 10.5 hours per day. The 2021 maximum use occurred in September when the well was pumped for 618 hours for an average daily use of 20.6 hours, the 2022 maximum use occurred in August when the well was pumped for 679 hours for an average daily use of 22 hours per day. TRR well 2 was pumped for 2,083 hours during 2021 for an average daily use of about 6 hours per day, and 543 hours during 2022 (January – May) for an average daily use of 4 hours per day. The 2021 maximum use occurred in July when the well was pumped for approximately 351 hours for an average daily use of about 11 hours, the 2022 maximum use occurred in April when the well was pumped for approximately 342 hours for an average daily use of about 11 hours. TRR well 3 was

pumped for 963 hours during 2021 for an average daily use of about hours 3 per day, and 2,199 hours during 2022 for an average daily use of 6 hours. The 2021 maximum use occurred in May when the well was pumped for approximately 329 hours for an average daily use of 11 hours, the 2022 maximum use occurred in July when the well was pumped for an average daily use of 17 hours. TRR well 4 was pumped for approximately 1,147 hours during 2022 (August – December) for an average daily use of 6 hours. The maximum use occurred in November when the well was pumped for an average daily use of 11 hours.

Average annual yield for TRR well 1 was approximately 321 gpm for 2021, dropping to approximately 278 gpm for 2022. Average annual yield for TRR well 2 was approximately 249 gpm for 2021, dropping to approximately 224 gpm for 2022. Average annual yield for TRR well 3 was approximately 217 gpm for 2021, dropping to approximately 188 gpm for 2022. Average annual yield for TRR well 4 is 216 for 2022, slightly lower than well 2’s 2022 annual average. Average annual yields for TRR well 1, well 2, and well 3 over the last 5 years, as well as well 4’s 2022 average yield, are show below (table 7). The yields from the wells have remained relatively stable from 2018 to 2021; however, the annual yield for the well field dropped 15% in 2022.

Table 7, 2018-2022 Average Annual TRR Well Field Yields, in gpm

Well	2018	2019	2020	2021	2022
Well 1	326	340	322	321	278
Well 2	250	251	252	249	223
Well 3	219	233	220	217	188
Well 4	n/a	n/a	n/a	n/a	216

WELL FIELD WATER LEVELS

For practical reasons, it is best to maintain the pumping water level in the wells at approximately two-thirds of the original thickness of the aquifer at each well. This will maximize production relative to the decline in the pumping water level and to pumping cost. Under this consideration, the maximum depth to water at well 1 should be 185 ft. For well 4, the maximum depth should be 155 ft. For well 3, the maximum depth should be 145 ft.

Another consideration is the requirement to maintain the pumping water level in a well above the intakes to limit risk of air entrainment. The pump intake at TRR well 1 is set at 262 ft. below land surface. Maintaining a pumping level of 165 ft. or less at well 1 assures at least 97 ft. of water above the pump intake. The pump intake at TRR well 4 is set at 242 ft. below land surface; maintaining a pumping level of 155 ft or less at well 4 assures at least 87 ft of water above the intake while meeting the two-thirds rule. The pump intake at well 3 is set at approximately 230 ft. below land surface, maintaining a pumping level of 145 ft assures at least 85 ft of water above the intakes. Although these pumping levels do not maximize production relative to pumping cost, it reduces the risk of pump failure. Long-term viability of the well requires a pumping level above these depths.

TRR WELL 1

Static (non-pumping) depths to water at TRR well 1 during 2021 ranged from a low of 77 ft below land surface to a high of 44 ft below land surface (figure 1). The static water levels averaged about 54 ft below land surface during 2021. Static depths to water during 2022 ranged from a low of 88 ft below land surface to a high of 46 ft below land surface (figure 2), averaging about 59 ft below land surface.

Pumping depths to water at the well during 2021 ranged from a low of 178 ft below land surface to a high of 100 ft below land surface depending on the time of year and presence or absence of pumpage from the other wells. Pumping depths to water at the well during 2022 ranged from a low of 216 ft below land surface to a high of 112 ft below land surface.

Although pumping depths have decreased by an average of 10 ft during summer months, TRR well 1 is consistently above the 165 ft below land surface required to preclude air entrainment. Pumping and non-pumping depths are consistent with continued viability of the well.

- While TRR well 2 was offline, well 1's pumping depth dropped to 218 ft below land surface, considerably lower than the recommended depth. During this time, well rotation of wells 1 and 2 was halted and wells 1 and 3 were over-pumped, risking pump failure at both wells 1 and 3.

Figure 1.

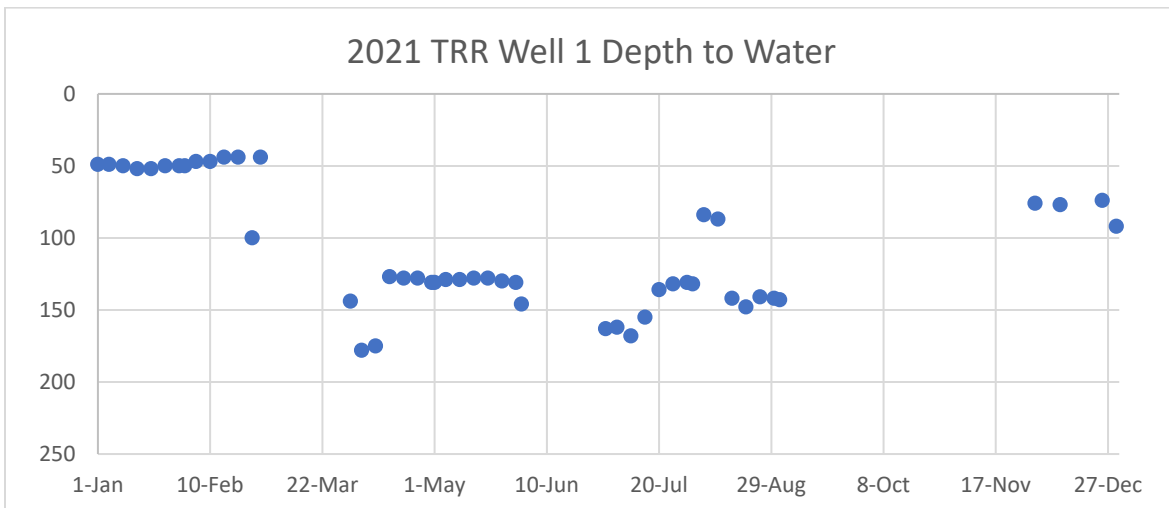
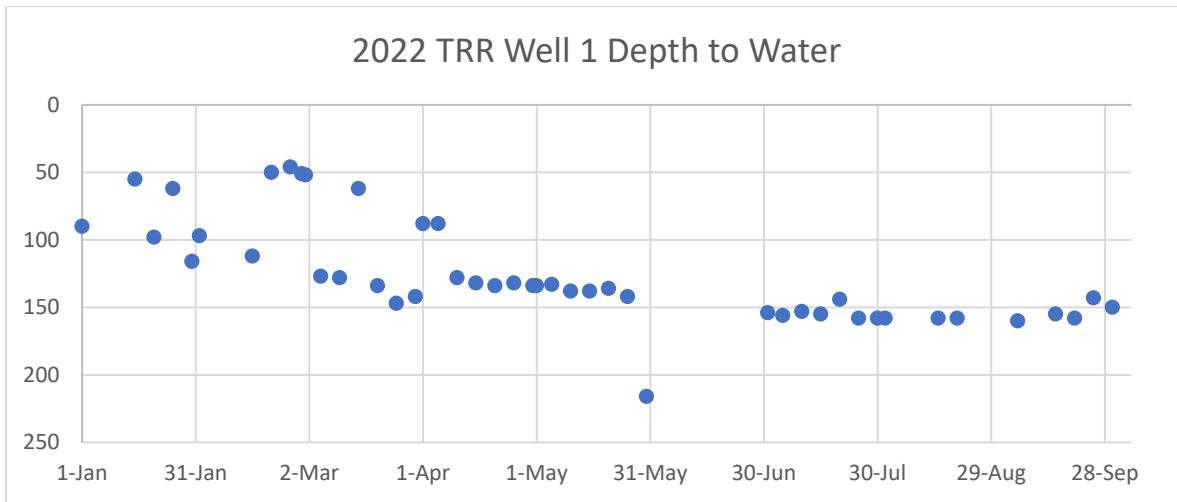


Figure 2.



TRR WELL 2, 4

Static depths to water at TRR well 2 during 2021 ranged from a low of 92 ft below land surface to a high of 71 ft below land surface (figure 3). From data collected, the static water levels averaged about 84 ft below land surface during 2021. Static depths to water during 2022 ranged from a low of 83 ft below land surface to 87 ft below land surface (figure 4), averaging about 85 ft below land surface.

Pumping depths to water at the well during 2021 ranged from a low of 166 ft below land surface to a high of 107 ft below land surface depending on the time of year and presence or absence of pumpage from the other wells. Pumping depths to water at the well during 2022 ranged from a low of 167 ft below land surface to a high of 132 ft below land surface.

Non-pumping depths and stable well yields are consistent with the viability of the well; however, pumping depths are exceeding 155 ft below land surface required to preclude air entrainment. As you can see in figure 2, the lowest pumping depths are between 160-168 ft below land surface, which are inconsistent with long-term viability of the well. However, the lowest pumping depths typically occurred when well 2 and well 3 are running simultaneously. By running the two wells separately, the risk of well 2’s pumping depth falling below 155 feet below land surface is reduced. Standard protocol was established in 2020, suggesting well 3 to be offline during summer months to mitigate interaction between well 2 and 3 and subsequent risk of air entrainment and pump failure. However, data suggests the well field would benefit from starting the summer protocol earlier due to spring pumping depths falling below maximum depth to water (see figures 3, 4, 5, 6).

Figure 3.

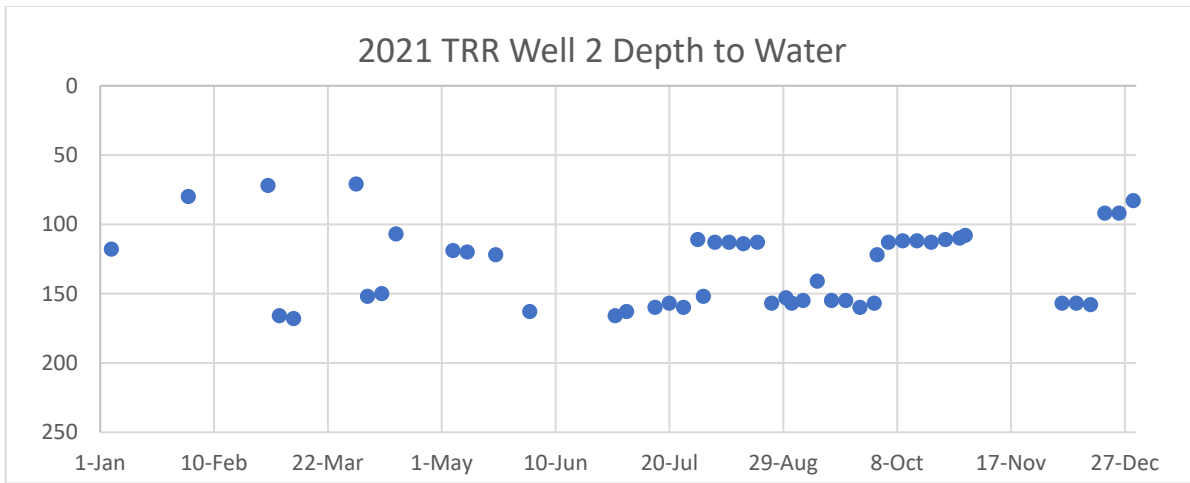
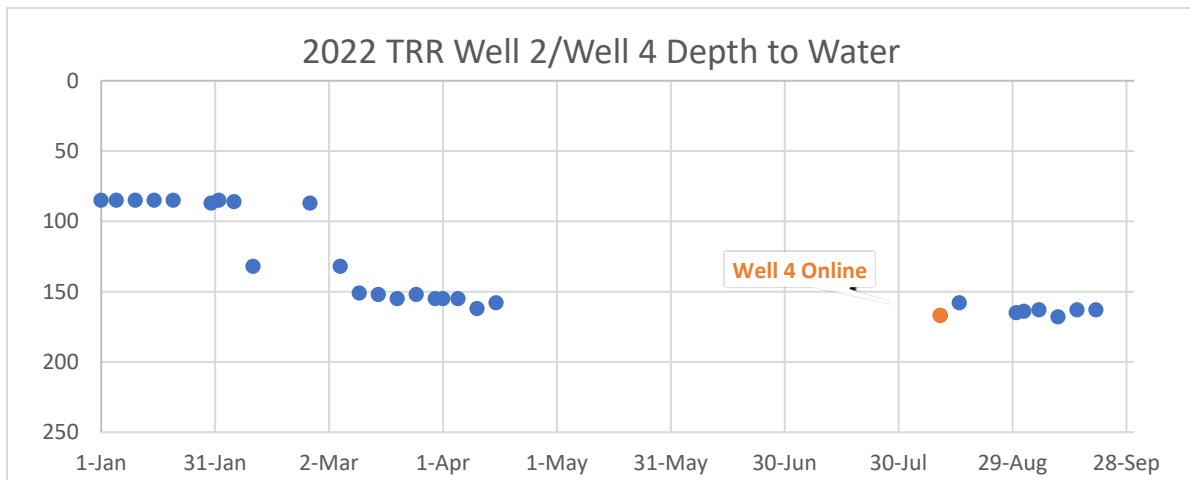


Figure 4.



TRR WELL 3

Static depths to water at TRR well 3 during 2021 ranged from a low of 83 ft below land surface to a high of 49 ft below land surface (figure 5). The static water levels average about 75 ft below land surface during 2021. Static depths to water during 2022 ranged from a low of 86 ft below land surface to a high of 70 ft below land surface (figure 6), averaging about 80 ft below land surface in 2022.

Pumping depths to water at the well during 2021 ranged from a low of 192 ft below land surface to a high of 175 ft below land surface depending on the time of year and presence or absence of pumpage from the other wells. Pumping depths to water during 2022 ranged from a low of 198 ft below land surface to a high of 165 ft below land surface.

Non-pumping depths and stable well yields are consistent with the viability of the well; however, pumping depths are significantly below the 155 ft below land surface required to preclude air entrainment and inconsistent with long-term viability of the well. These low pumping depths are occurring year-round. While the well’s pumping depths are lower than the recommended 155 ft, the lowest depths, ranging from 180-196 ft below land surface, occur when well 3 is running simultaneously with either of the other two wells. However, well 3’s depth to water during the annual pumping test dropped to 156 ft below land surface after 100 minutes of constant-rate pumping, a foot below the maximum required depth to water. It is recommended to keep well 3 offline year-round while well 1 or well 2 is operating, and offline during the summer months regardless of wells 1 and 2.

- Annual pumping tests are performed individually on each well and require the well field to rest 24 hours prior to pumping.

Figure 5.

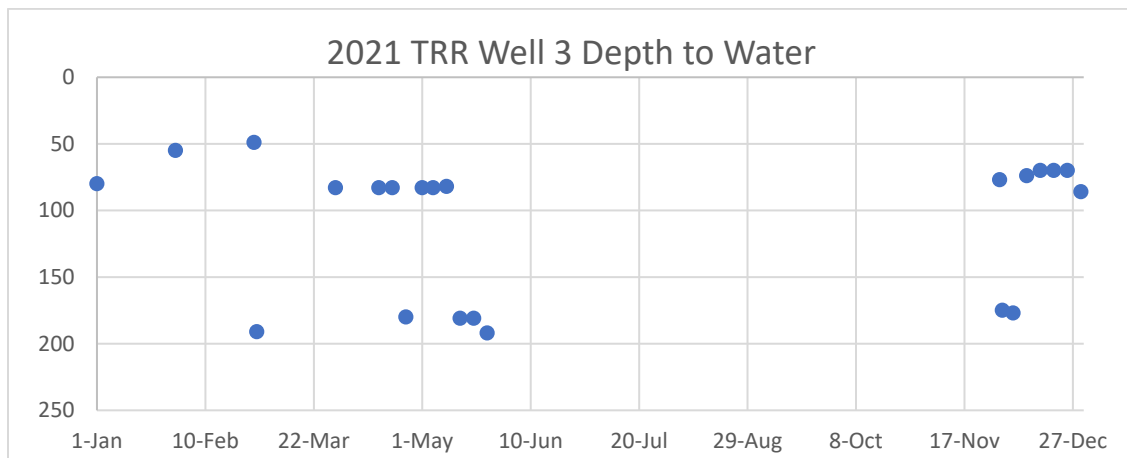
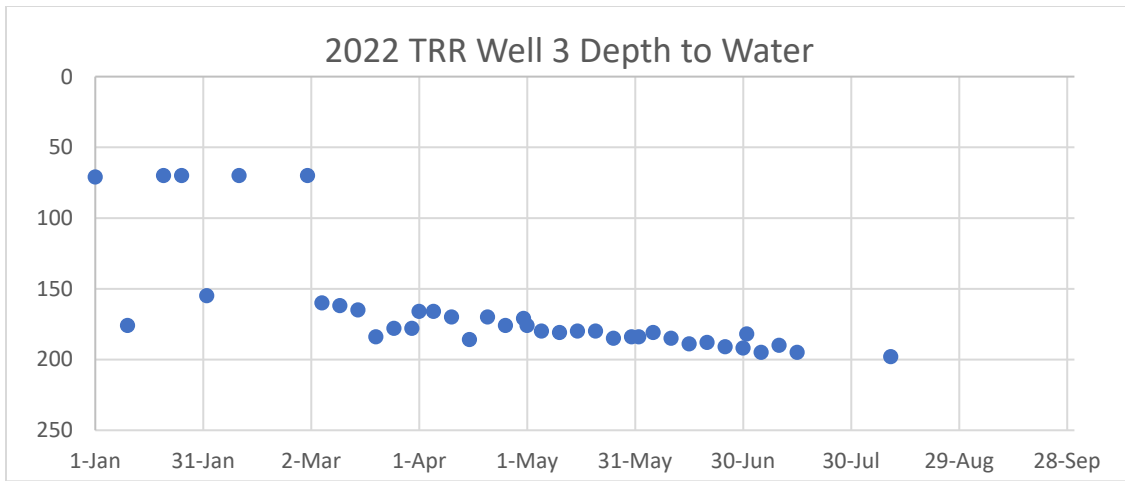


Figure 6.



SUMMARY

The Inscription Canyon Water Company is a private, non-profit water company providing water to the Inscription Canyon Ranch, Whispering Canyons, Preserve at the Ranch, and Talking Rock subdivisions as well as the Talking Rock golf course. The first three subdivision obtain water from the ICR well field which consists of two wells while the Talking Rock subdivision and Talking Rock golf course obtain water from the TRR well field which consists of three wells.

The 2021 TRR annual well field demand was 114,684,531 gallons. Out of the 114,684,531 gallons, Talking Rock Golf Course annual demand accounts for 81,514,000 gallons, representing 71% percent of the total annual pumpage from the TRR well field. The annual average use in gallons per day per residence in the TRR system, including commercial and landscape demand, increased from 239 gpd/r in 2020 to 252 gpd/r in 2021. The 2022 annual well field demand was 110,043,256. Out of the 110,043,256 gallons, Talking Rock Golf Course annual demand accounts for 73,862,600 gallons, representing 67% percent of the total annual pumpage from the TRR well field. The annual average use in gallons per day per residence in the TRR system, including commercial and landscape demand, increased from 252 gpd/r in 2021 to 254 gpd/r in 2022.

The 2021 maximum daily demand occurred in June with pumpage equaling 18,726,243 gallons. This demand equates to an average daily demand of approximately 624,208 gallons per day at an average rate of 473 gpm for a daily maximum run time of 22 hours. The maximum average daily residential demand for 2021 occurred in July at 3,308,100 gallons. There were 365 residences served during this time, with an average daily use equaling 302 gpd/r. The 2022 maximum daily demand occurred in July with pumpage equaling 16,293,600 gallons. This demand equates to an average daily demand of approximately 525,600 gallons per day at an average rate of 398 gpm for a daily maximum run time of 22 hours. The maximum average daily residential demand for 2022 occurred in September at 3,325,750 gallons. There were 390 residences served during this time, with an average daily use equaling 275 gpd/r.

The Talking Rock Ranch well field consists of three wells: TRR 1, 3, and 4. The well field historically has been managed so that wells are called up sequentially as demand increases; only one well is initially in service until demand

requires an additional well. However, standard operating procedure was determined to be inadequate during the recent dry seasons. In August 2020, the standard operating procedure changed to pumping wells 1 and 2 simultaneously while keeping well 3 offline for months April through September. This change to the standard operating procedure enabled the system to provide sufficient yield to meet the 2021 dry season and increased demand; however, due to a decrease in yield and potential risks associated with over-pumping in response to a decrease in yield, the standard operating procedure may no longer provide sufficient yield to meet near-future dry seasons and increased demand.

TRR 1 was used for a total 4,249 hours during 2021, equaling an average daily use of approximately 12 hours per day. The average annual yield for the well was approximately 321 gpm. Total production from the well was 81,826,493 gallons. TRR 1 was used for a total 3,827 hours during 2022, equaling an average daily use of approximately 10.5 hours per day. The average annual yield for the well was approximately 278 gpm. Total production from the well was 63,151,029 gallons.

TRR 2 was used for a total of 2,083 hours during 2021 for an average daily use of about 6 hours per day. The average annual yield for the well was approximately 249 gpm. Total production from the well was 31,127,473 gallons. TRR 2 was used for a total of 543 hours during 2022 (January – May) for an average daily use of about 4 hours per day. The average annual yield for the well was approximately 224 gpm. Total production from the well was 7,297,365 gallons.

TRR 3 was used for 963 hours during 2021 for an average daily use of about 3 hours per day. The average annual yield for the well was approximately 217 gpm. Total production from the well was 12,540,263 gallons. TRR 3 was used for 2,199 hours during 2022 for an average daily use of about 6 hours per day. The average annual yield for the well was approximately 188 gpm. Total production from the well was 24,803,989 gallons.

TRR 4 was used for 1,147 hours during 2022 (August – December) for an average daily use of about 6 hours a day. The average annual yield for the well was 216 gpm. Total production from the well was 14,860,883 gallons.

Until 2022, average yields for the TRR wells have remained relatively stable. In 2022, collected data showed an overall 15% drop in the TRR well field's average yield. While well 1's pumping and non-pumping depths are consistent with long-term viability of the well, pumping depths for well 2 and well 3 are consistently below the recommended maximum pumping depth of 155 ft below land surface required to preclude air entrainment. The lowest pumping water levels occur when both wells are online at the same time. Because of this, it is recommended to run well 3 separately; in addition, it is recommended to leave well 3 offline during the dry summer months.