WARREN VALLEY BASIN WATERMASTER

FOR

HI-DESERT WATER DISTRICT

VS.

YUCCA VALLEY COMPANY, LTD, ET AL

CASE NO. 172103 – COUNTY OF SAN BERNARDINO

ANNUAL REPORT

OF THE

WARREN VALLEY BASIN WATERMASTER

FOR THE PERIOD

OCTOBER 1, 2023, THROUGH SEPTEMBER 30, 2024

Hi-Desert Water District
Operations Department
55439 29 Palms Hwy.
Yucca Valley, CA 92284

WARREN VALLEY BASIN WATERMASTER

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VS.

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CASE NO. 172103 – COUNTY OF SAN BERNARDINO

December 2024

TO: Clerk of the San Bernardino Superior Court

Desert District, Department 4

14455 Civic Drive

Victorville, CA 92392

RE: Watermaster Report for Water Year (October 1, 2023, through September 30, 2024)

Pursuant to the judgement in the case of Hi-Desert Water District vs. Yucca Water Company, Ltd., and by Order of Judge Phillip Schaefer, February 10, 1992, submitted herewith is the Annual Report of the Warren Valley Basin Watermaster for Water Year 2023-24.

The boundary of the Warren Valley Groundwater Basin (the "Basin") and the five Hydro Geologic Subunits (HGU) described in this Annual Report of the Warren Valley Basin Watermaster, is based upon mapping and research conducted by the United States Geological Survey (USGS). In 2003, the USGS published its Water Resources Investigation Report 03-4009, "EVALUATION OF THE SOURCES AND TRANSPORT OF HIGH NITRATE CONCENTRATIONS IN GROUNDWATER, WARREN SUB-BASIN, CALIFORNIA" (the "Report") prepared in cooperation with Hi-Desert Water District and Mojave Water Agency. The Basin's boundary as shown within the Report, is essentially the same as delineated by Fox in August of 1991, however the Basin has been redefined as having five (5) Hydro Geologic Sub-units by the United States Geological Survey instead of three (3). These findings are based upon the knowledge of existing fault lines, which through extensive research, have been found to effectively compartmentalize each HGU within the Basin.

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WARREN VALLEY BASIN WATERMASTER

FOR THE PERIOD

OCTOBER 1, 2023, THROUGH SEPTEMBER 30, 2024

_____	_____
TONY CULVER	GLENN WARE
GENERAL MANAGER	PRODUCTION FOREMAN

HI-DESERT WATER DISTRICT

Operations Department

55439 29 Palms Hwy.

Yucca Valley, CA 92284

WATER MASTER SUMMARY OF FINDINGS

Watermaster findings for water year 2023-24 are as follows:

- The total amount of water pumped from within the Warren Valley Basin (the "Basin") is reported to be 2,736 acre-feet (AF). This reflects an increase from the 2022-23 water year production value of 2,181 AF. The total production is the sum of all producers that are considered "major" producers within the Basin for purposes of recording water use. This includes Hi-Desert Water District's (HDWD) water use of 2,403 AF, Joshua Tree Retreat Center [1](JTRC) of 5 AF, Hawks Landing at Blue Skies (HLBS) of 295 AF and Well 2W, leased by San Bernardino County of 33 AF.

- Deliveries of State Water Project (SWP) totaled 3,029 AF and were applied to the Basin via three (3) groundwater recharge basin locations. Adjusted for agreed upon losses due to evaporation of 2%, the amount accruing to the Basin was 2,968 AF. Wastewater also contributed to our recharge totals by recharging 783 AF into the East Sub-Unit.

- HDWD's production for 2023-24 was 2,403 AF. This was an increase of 532 AF from the previous year. This increase was directly related to a decrease in Well 24E production (Ames Basin). Water surface elevation in the Ames Basin has been decreasing.

- HLBS production from within the Basin totaled 295 AF, which was 290 AF below their total annual allotment of 585 AF per year. Last year's production was 266 AF.

- JTRC production from within the Basin totals 5 AF, which was 75 AF below their total annual allotment of 80 AF per year. Last year's production was 9 AF.

- Taking into consideration artificial recharge, (SWP deliveries, septic effluent, treated wastewater and large irrigated fields), natural recharge and total pumpage from within the Basin, the Watermaster estimates total available Basin storage within the West, Midwest, and Mideast Sub-basins to be 71,125 AF or 28 years of storage within the upper aquifer using a current production average from within the Warren Valley Basin of 2,515 AF.

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1 Joshua Tree Retreat Center is considered a minimal producer only for purposes of assessment.

- A combination of both the upper and middle aquifers is estimated to yield approximately 106,780 AF or 42 years of storage. The estimated values are based upon United States Geological Survey studies of the Warren Valley Groundwater Basin (Nishikawa and others; 2003) and HDWD records. A spreadsheet outlining cumulative storage is available within Appendix H.

- Eleven (11) wells within the District displayed an increase in water surface elevation (See Appendix E). Increases ranged between one (1) and eight (8) feet. Six wells had a decrease ranging between six (6) and fourteen feet (14). Three wells displayed no change in surface elevation.

Table 1 Production Wells within the Warren Basin

Well ID	AF	Percent of Warren Basin Total	Percent of HDWD Total
12E	705	25.76	29.33
9W	429	15.67	17.85
14E	391	14.29	16.27
HLBS-BS1	295	10.78	12.27
9E	205	7.49	8.53
17E	178	6.50	7.47
8W	133	4.86	5.53
6W	132	4.82	5.49
16E	120	4.38	4.99
20W	108	3.94	4.49
2W	33	1.20	1.37
JTRC	5	0.18	0.20

The Warren Valley Basin Watermaster continued its program to monitor water production and water levels pursuant to the judgement.

Respectfully submitted,

WARREN VALLEY BASIN WATERMASTER

By: _____
Scot McKone, President

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1.0 INTRODUCTION

Pursuant to the Judgment in the matter of Hi-Desert Water District vs. Yucca Water Company Ltd., Case Number 172103, San Bernardino, California, dated September 16, 1977, (Judgment) Hi-Desert Water District (HDWD) through its Board of Directors was appointed by the Court as Watermaster to administer the provisions of the judgment. The Watermaster was directed to formulate a proposal for a physical solution to the continuing overdraft of the Warren Valley Basin. The Judgment did not specifically require annual reporting of water levels or water production information, but instead required only that a solution to the overdraft be developed. A solution was formulated and presented by Kennedy/Jenks/Chilton as the Warren Valley Basin Management Plan, dated January 31, 1991, which was adopted by the Watermaster on May 10, 1991. Subsequently, on February 10, 1992, Judge Phillip Schaefer of the West District for the County of San Bernardino Superior Court ordered the Warren Valley Basin Watermaster to report to the Court on an annual basis the water levels in the basin and any matters that might impact the safe yield of the basin.

In December 1997, the Watermaster petitioned the Court to modify its Order of February 10, 1992, which required the annual determination of the safe yield of the Warren Valley Basin, and instead to require that the Watermaster report to the Court annually on conditions affecting water supply, use and disposal and implement a groundwater monitoring program for basin management. The Watermaster undertook this action because, in general, a safe yield determination is made for allocating water resources among competing claims of right. In this case, HDWD is solely responsible for purchasing supplemental water. Securing supplemental supplies and monitoring water levels to ensure that there is adequate water in storage to meet the demands of the Basin in consistent with good water management practices and is a better use of available funds than preparing safe yield determinations. The Court subsequently approved the requested change.

2.0 COMPILATION AND ANALYSIS OF BASIC DATA

The Annual Report of the Warren Valley Basin Watermaster for the water year 1992-93 established that the hydrologic reporting period for the initial and subsequent reports would be on a water year basis (i.e. October 1 through September 30 of the following year). Presented herein are data pertaining to the analysis of the following items of water supply and utilization for water year 2023-24.

- Precipitation
- Water Demand and Production
- Water Deliveries from Sources located outside the Warren Valley Basin
- Existing Water Levels and Trend
- Water Recharge and Storage
- Wastewater Discharge

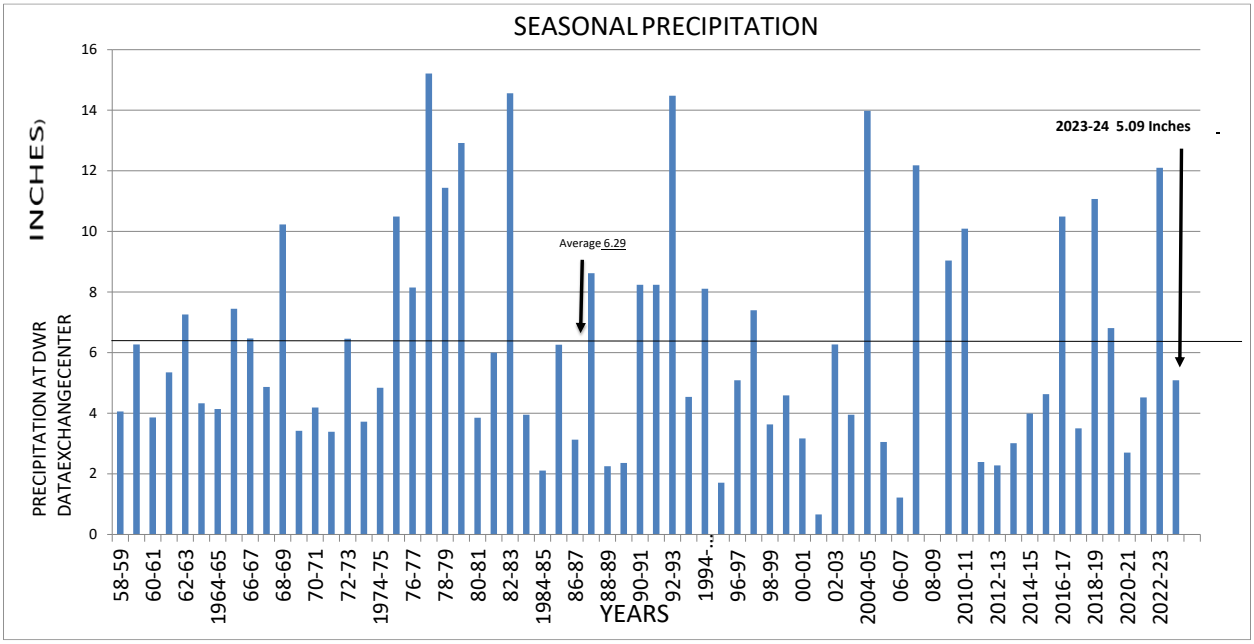
In preparation of this report, the Watermaster has considered information from various sources including the following:

- Records and data on file at the office of the Hi-Desert Water District (HDWD)
- Records and data on file at the office of the Mojave Water Agency (MWA)
- Records and data on file at the State Water Resources Control Board
- Climatological records from the Department of Water Resources, California Data Exchange Center
- United States Geological Survey (USGS)
- Records maintained at the Joshua Tree Retreat Center, Joshua Tree CA
- Wastewater

Water production and water level data are collected as part of the ongoing groundwater monitoring program administered by HDWD. The hydrographs included within this report are prepared using data collected from wells that are considered representative of the water level trends throughout the Warren Valley Basin.

3.0 PRECIPITATION

The average precipitation recorded at the California Department of Forestry (CAL FIRE) Yucca Valley station for water years 1957-58 through 2023-24 was 6.31 inches. This amount represents the Base Period average against which subsequent seasonal precipitation amounts are compared. Precipitation during 2023-24, shown on Table 1, was 5.09 inches which was 80.92% of the Sixty-six-year Base Period average. The heaviest precipitation (in inches) occurred within the month of February (1.64), followed by December (1.42), and March (0.87) accounting for 77% of the total for the year.



4.0 WATER DEMAND AND PRODUCTION

Other extractions from within the Basin totaled 333 AF. JTRC water production accounted for 5 AF of this value, the golf course (HLBS), accounted for 295 AF and San Bernardino County Well 2W, accounted for the remaining 33 AF. The County has a maximum usage of 50 AF at Well 2W per year, both JTRC and HLBS remained below their water allotments of 80 and 585 AF respectively. HLBS, considered a major producer by the Judgment, paid their applicable fees to the Watermaster for the extracted water. JTRC continues to be a minimal producer for purposes of assessment as it is not required to submit payment to the Watermaster for extracted water so long as such extraction does not exceed 80 AF per year.

4.1 WATER FROM SOURCES LOCATED OUTSIDE THE WARREN VALLEY BASIN

During water year 2023-24, deliveries distributed to the HDWD service area from outside the Warren Basin accounted for 412 AF. These deliveries were from the mainstream Well 24E, which is located within the Ames/Means Basin. Deliveries of the State Water Project (SWP) water to the Basin for groundwater recharge totaled 3,029 AF during the 2023-24 water year. Adjusted for agreed upon losses due to evaporation of 2%, the amount accruing to the Basin was 2,968 AF.

Table 2 below outlines water extractions and deliveries of those producers required to report to the Watermaster.

Table 2

Water Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Joshua Tree Retreat Center (AF)	67	39	35	18	26	9	5
Hawks Landing at Blue Skies (AF)	341	274	294	339	322	266	295
Hi-Desert Water District (AF)	2214	2547	2221	2174	2016	1871	2403
Well 2W - Pioneertown Leased County of San Bernardino	0	12	34	26	29	35	33
Subtotal Warren Valley Basin (AF)	2622	2872	2584	2557	2393	2181	2736
Bighorn Desert View Intertie (AF)	0	0	0	0	0	0	0
Mainstream Well 24E (AF)	680	240	709	779	861	934	412
Subtotal Ames Means Basin (AF)	680	240	709	779	861	934	412
Total All Basins (AF)	3302	3112	3293	3336	3254	3115	3148

5.0 STATE OF THE WARREN VALLEY BASIN

The Warren Valley Sub-basin (the "Basin") is compartmentalized by fault lines into five (5) hydrogeologic subunits (HGU) that make up the largest water bearing formations of the Basin. These HGU's are referred to as the west, mid-west, mid-east, east, and northeast HGU's. Major producers within the Basin include Hi-Desert Water District (HDWD), which currently extracts water from within the west, mid-west, and mid-east HGU's; Hawks Landing at Blue Skies (HLBS), positioned over the west HGU; and Joshua Tree Retreat Center (JTRC), which primarily extracts groundwater from within the east HGU. The location and approximate boundaries of these HGU's are shown on Plate 1 with groundwater well locations included.

Hydrographs of water surface elevations which include water quality analysis for nitrogen as (N03-N), total dissolved solids, (TDS), and water production data within each of the HGU's are shown within Appendix G. Each of these graph trend changes are associated with groundwater extractions and recharge within the Basin and are explained below. The locations of these wells are shown within Appendix C.

5.1 WEST HYDROGEOLOGIC SUB-UNIT

When compared to last year's data, seven (7) wells water levels within the West HGU increased on average of 4.57 feet (*2W, 3W, 5W, 6W, 9W, 10W, and 20W). Wells 8W and 11W had no change. BS #1, owned by HLBS, was sounded four times (Oct., Jan., April, and July) over the 2023-24 water year. It had an increase of one (1) foot. The staff at HLBS have been very cooperative and accommodating in providing HDWD staff access to the premises.

Table 3 outlines groundwater surface elevations taken from wells within the west HGU during 2023-24.

(*2W is leased to San Bernardino County)

Table 3

Well ID	Groundwater Surface Elevation (2023-24)	Groundwater Surface Elevations (2022-23)	Increase (ft.) 2021-22 / 2023-24	Groundwater Surface Elevation (1992)	Increase (ft.) 1992-93 / 2023-24
1W	NR	NR	NR	NR	NR
2W	3013	3006	+7	NR	NR
3W	3103	3098	+5	2944	159
5W	3119	3113	+6	2908	211
6W	3118	3116	+2	2942	176
8W	3107	3107	0	2957	150
9W	3108	3106	+2	2932	176
10W	3111	3109	+2	2944	167
11W	3090	3090	0	N/A	N/A
20W	3120	3112	+8	N/A	N/A

Water extractions from within the West HGU totaled 805 AF. The extracted water was replenished by State Water Project (SWP) deliveries to HDWD's Site 3 (groundwater recharge facility) totaling 1,710 AF. The West HGU gained 905 AF in 2023-24 when comparing extractions to replenishments.

All active production wells within the Warren Basin were analyzed for nitrate as Nitrogen (NO3-N) and Total Dissolved solids (TDS). HDWD tests all wells for Nitrate and TDS monthly. These wells were sampled once per semester throughout the water year, for the water master. Wells at our two blend facilities are sampled weekly throughout the year. Concentrations of each constituent within these wells remained below the SWRCB's and the Environmental Protection Agency's (EPA) primary and secondary maximum contaminant levels (MCL). In October of 2019 Well 11W NO3-N levels reached the MCL of 10 mg/L. Well 11w was made inactive as of 6/29/2023.

This year within the West HGU, NO3-N samples at Well 11W were taken both semesters with the well flushing into the wash, N03-N results were 8.4 the 1st semester and 8.5 the 2nd semester. Well 11W was made inactive in June 2023 per state recommendation. We will continue to monitor Well 11W NO3 each January and July for the watermaster, and our records. The elevated NO3-N levels at Well 11w are attributed to the solute transport of nitrates throughout the saturated zone of the aquifer due to seepage infiltration.

Well 8W displayed the most change for both semesters in NO3-N levels, with a slight decrease of 0.1 mg/L in the 1st semester, and a slight increase of .6 mg/L in the 2nd semester. Well 9w displayed an decrease of 1.1 mg/L in the 2nd semester. Well 9W was down last year for the 1st semester.

All other wells remained relatively consistent with the historical levels showing slight variations as seen in Table 4.

Table 4

Well ID	2023-24 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2022-23 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2005 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2
6W	1.1/.99	1.2/1.3	5.1 / 4.5
8W	3.0/4.1	3.1/3.5	2.4 / 2.4
9W	1.9/1.0	**/2.1	1.7 / 3.1
11W	8.4/8.5	8.9/**	5.4 / 8.3
20W	2.5/2.7	2.8/3.0	NA

** denotes average reduction for graphing purposes due to lack of data

TDS levels within the West HGU were consistent with those of historical records, compared to last year's numbers. There were slight increases / decreases at each well. Well 6W displayed the most change with a slight increase of 10 mg/L in the 1st semester, and a slight decrease of 20 mg/L in the 2nd semester.

Table 5 below displays the TDS results for those wells within the west HGU.

Table 5

Well ID	2023-24 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2022-23 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2005 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2
6W	260/250	250/270	160 / 170
8W	200/200	180/200	150 / 180
9W	230/220	**/220	190 / 180
11W	290/280	280/**	260 / 260
20W	200/190	190/200	NA

** denotes average reduction for graphing purposes due to lack of data

5.2 MID-WEST HYDROGEOLOGIC SUB-UNIT

Most sites monitored within the Mid-West HGU during the 2023-24 water year displayed a decrease in surface elevation. The average decrease was seven and three quarters (7.75) feet. Well 7E remained the same as last year.

Table 6 below displays groundwater surface elevation data along with historical information:

Table 6

Well ID	Groundwater Surface Elevation (2023-24)	Groundwater Surface Elevation (2022-23)	Increase (ft.) 2022-23 / 2023-24	Groundwater Surface Elevation (1992)	Increase (ft.) 1992-93 / 2023-24
7E	3072	3072	0	2793	279
9E	3069	3075	-6	2796	273
12E	3071	3078	-7	2786	285
16E	3098	3107	-9	2747	351
17E	3067	3076	-9	2799	268

Water extractions from within the Mid-West HGU totaled 1208 AF. The extracted water was replenished by State Water Project (SWP) deliveries totaling 719 AF. The Mid-West HGU lost 489 AF in 2023-24 when comparing extractions to replenishments.

Nitrate and TDS samples were taken from wells located within the Mid-West HGU on a semester basis. Nitrate levels within the Mid-West HGU remained relatively consistent throughout the 2023-24 water year.

Well 17E displayed the most change with a increase in NO3-N of 0.7mg/L in the 1st semester, and a increase of 0.5 mg/L in the 2nd semester. Well 17E has been consistently rising in NO3 and is now half the MCL. Well 9E showed an decrease of 0.3mg/L in the 1st semester, and a decrease of 0.4mg/L in the 2nd semester. Additional samples taken weekly remained relatively consistent to the previous year's readings.

Table 7

Well ID	2023-24 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2022-23 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2005 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2
9E	2.8/3.0	3.1/3.4	1.1 / 2.2
12E	2.3/2.6	2.2/2.9	6.1 / 6.8
16E	4.1/4.0	3.9/4.1	4.6 / 4.6
17E	5.1/5.3	4.4/4.8	NR / 7.7

TDS results within the Mid-West HGU displayed changes from 10 to 20 mg/L. Well 16E remained the most consistent with only an increase of 10 mg/L in the first semester when compared to the prior year.

Results have been provided within Table 8.

Table 8

Well ID	2023-24 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2022-23 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2005 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2
9E	280/320	300/310	160 / 170
12E	310/320	290/310	150 / 180
16E	240/240	230/240	190 / 180
17E	310/330	300/310	260 / 260

5.3 MID-EAST HYDROGEOLOGIC SUB-UNIT

During the 2023-24 water year, groundwater surface elevations displayed both an increase and decrease. Site 7 is being utilized within this report to track changes within the Mid-East HGU due to the low number of active production wells within this HGU. It increased three (3) feet. Well 14E decreased by fourteen (14) feet. Due to an obstruction at Well 18E, we are unable to obtain water sounding levels.

Table 9

Well ID	Groundwater Surface Elevation (2032-24)	Groundwater Surface Elevation (2022-23)	Increase (ft.) 2021-22 / 2023-24	Groundwater Surface Elevation (2007/08)	Increase (ft.) 2007/08 – 2023/24
Site 7	3069	3066	+3	3022	47
14E	3037	3051	-14	3002	35
18E	N/R	N/R	N/R	2982	52 (2017-18)

Water extractions from within the Mid-East HGU totaled 391 AF. The extracted water was replenished by SWP water deliveries to Site 7 (groundwater recharge facility) totaling 601 AF leaving a surplus of 210 AF.

Well 14e is the only active well in the Mid-East HGU. Nitrate sample results for Well 14E show a slight decrease of 0.3 mg/L in the 1st semester, and a slight decrease of 0.2 mg/L in the 2nd semester.

Sporadic high concentrations of Arsenic caused the District to remove Well 18e from service during the 2009-10 water year. Prior to Well 18e being taken offline, the Arsenic levels had historically ranged between 2 and 13 micrograms per liter (ug/L) and are regulated by state and federal MCL's of 10 ug/L. In 2024 HDWD began looking into the possibility of putting Well 18E back online. HDWD has been taking arsenic and NO3 samples throughout the year, NO3 levels are below the MCL, and arsenic levels have dropped below ½ the MCL. We are currently in the process of submitting samples and plans for this well to the State Water Resources Control Board.

Table 10

Well ID	2023-24 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2022-23 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2	2005 Nitrogen N03-N Results (mg/L) MCL = 10 Semester 1 / Semester 2
14E	1.2/1.6	1.5/1.8	2.2 / 3.2
18E	NR	NR	2.1 / 2.5

TDS samples within the Mid-East HGU taken from Well 14E showed a slight increase of 30 mg/L for the 1st semester.

Table 11

Well ID	2023-24 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2022-23 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2	2005 TDS Results (mg/L) Secondary MCL = 1000, Semester 1 / Semester 2
14E	280/240	250/240	NR / NR
18E	N/R	NR	160 / NR

5.4 NORTH-EAST HYDROGEOLOGIC SUB-UNIT

There are currently no major producers extracting water from within the North-East HGU. HDWD possesses one well that is monitored for groundwater surface elevations; Well 11E. Well 11E's groundwater surface elevation was recorded to be 2,946 feet above sea level for the 2023-24 water year. There was an increase of one (1) foot in the water surface elevation from the previous year.

Due to the lack of active production wells within the North-East HGU, water quality analyses have not been performed.

5.5 EAST HYDROGEOLOGIC SUB-UNIT

Due to the lack of historical information, HDWD staff continue to utilize groundwater surface elevations from a monitoring well referred to as Well 21E. A reading of 2,901 feet above sea level (obtained in September of 2024) represents a two (2) foot increase when compared to the 2,899-measurement recorded in September of 2023.

5.6 RECLAMATION FACILITY

In September 2019 the Reclamation Facility started recharging in the East Hydrogeologic Sub-Unit. During the 2023-24 water year, there was 783 AF recharged. In the future this water will be extracted and pumped to the west, where it will be recharged into basins with production wells.

Appendix A

PRECIPITATION AT YUCCA VALLEY

(INCHES)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP				TOTAL
1957-58	1.19	0.22	0.69	0.54	2.59	2.64	2.61	0.14	0.06	0.20	0.09	0.14	6.77	164.11%	100.00%	11.11
58-59	0.32	0.32	0.00	0.87	2.10	0.00	0.04	0.00	0.00	0.13	0.02	0.26	6.77	59.97%	100.00%	4.06
1959-60	0.37	1.83	1.36	1.26	0.15	0.00	0.59	0.00	0.00	0.05	0.00	0.66	6.77	92.61%	100.00%	6.27
60-61	0.17	0.78	0.45	0.50	0.00	0.01	0.00	0.00	0.00	0.00	1.95	0.00	6.77	57.02%	100.00%	3.86
61-62	0.00	0.58	1.26	0.90	1.97	0.45	0.00	0.19	0.00	0.00	0.00	0.00	6.77	79.03%	100.00%	5.35
62-63	1.02	0.00	0.27	0.66	1.13	0.02	0.02	0.00	0.00	0.00	1.30	2.84	6.77	107.24%	100.00%	7.26
63-64	1.40	1.04	0.04	0.41	0.01	0.97	0.19	0.00	0.00	0.20	0.05	0.02	6.77	63.96%	100.00%	4.33
1964-65	0.00	1.22	0.00	0.03	0.00	0.94	1.54	0.02	0.00	0.22	0.17	0.00	6.77	61.15%	100.00%	4.14
65-66	0.00	4.00	2.56	0.16	0.34	0.29	0.00	0.00	0.00	0.01	0.00	0.09	6.77	110.04%	100.00%	7.45
66-67	0.78	0.52	2.23	0.48	0.00	0.00	1.02	0.00	0.00	0.00	0.38	1.06	6.77	95.57%	100.00%	6.47
67-68	0.00	0.86	1.50	0.10	0.03	1.30	0.34	0.00	0.00	0.74	0.00	0.00	6.77	71.94%	100.00%	4.87
68-69	0.00	0.00	0.00	3.50	3.96	0.00	0.00	1.50	0.00	1.27	0.00	0.00	6.77	151.11%	100.00%	10.23
1969-70	0.00	0.96	0.00	0.00	1.48	0.76	0.00	0.00	0.00	0.22	0.00	0.00	6.77	50.52%	100.00%	3.42
70-71	0.22	1.03	1.24	0.00	0.21	0.05	0.20	0.37	0.00	0.18	0.69	0.00	6.77	61.89%	100.00%	4.19
71-72	0.27	0.08	2.12	0.00	0.00	0.00	0.12	0.00	0.22	0.00	0.57	0.01	6.77	50.07%	100.00%	3.39
72-73	0.43	1.81	0.07	0.32	1.80	1.91	0.00	0.00	0.00	0.00	0.12	0.00	6.77	95.42%	100.00%	6.46
73-74	0.00	0.14	0.00	2.88	0.00	0.64	0.00	0.06	0.00	0.00	0.00	0.00	6.77	54.95%	100.00%	3.72
1974-75	1.00	0.25	0.95	0.00	0.28	0.82	0.78	0.00	0.00	0.00	0.00	0.76	6.77	71.49%	100.00%	4.84
75-76	0.07	0.13	0.00	0.00	3.52	2.13	0.13	0.06	0.00	0.00	0.12	4.33	6.77	154.95%	100.00%	10.49
76-77	0.00	0.21	0.00	1.74	0.00	0.37	0.01	1.22	0.11	0.12	4.33	0.04	6.77	120.38%	100.00%	8.15
77-78	0.00	0.00	1.68	5.55	2.28	4.95	0.44	0.16	0.00	0.00	0.00	0.15	6.77	224.67%	100.00%	15.21
78-79	0.17	1.90	1.06	2.22	1.18	2.49	0.00	0.00	0.00	1.53	0.79	0.10	6.77	168.98%	100.00%	11.44
1979-80	0.10	0.00	0.01	3.91	5.91	1.85	0.18	0.70	0.11	0.15	0.00	0.00	6.77	190.84%	100.00%	12.92
80-81	0.33	0.00	0.00	1.11	0.48	1.51	0.00	0.24	0.00	0.00	0.00	0.18	6.77	56.87%	100.00%	3.85
81-82	0.00	0.47	0.00	0.23	1.47	1.52	0.55	1.21	0.00	0.00	0.35	0.20	6.77	88.63%	100.00%	6.00
82-83	0.00	1.42	2.67	1.60	2.50	1.25	0.16	0.00	0.00	0.00	4.27	0.69	6.77	215.07%	100.00%	14.56
83-84	0.79	0.02	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.33	0.86	6.77	58.35%	100.00%	3.95
1984-85	0.00	0.23	0.57	0.33	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.48	6.77	31.17%	100.00%	2.11
85-86	0.00	1.36	0.64	0.28	1.83	1.43	0.07	0.00	0.00	0.14	0.42	0.09	6.77	92.47%	100.00%	6.26
86-87	0.00	0.64	0.06	0.45	0.18	1.09	0.08	0.18	0.00	0.00	0.00	0.45	6.77	46.23%	100.00%	3.13
87-88	1.71	0.77	1.37	1.47	0.68	0.32	0.78	0.00	0.00	0.00	1.52	0.00	6.77	127.33%	100.00%	8.62
88-89	0.00	0.00	0.82	0.94	0.06	0.27	0.00	0.03	0.00	0.00	0.00	0.13	6.77	33.23%	100.00%	2.25
1989-90	0.02	0.00	0.37	0.44	0.93	0.13	0.20	0.00	0.00	0.00	0.27	0.00	6.77	34.86%	100.00%	2.36
90-91	0.01	0.00	0.03	0.00	2.75	4.53	0.00	0.00	0.00	0.79	0.00	0.13	6.77	121.71%	100.00%	8.24
91-92	0.00	0.00	0.90	0.40	3.65	2.34	0.33	0.32	0.00	0.05	0.25	0.00	6.77	121.71%	100.00%	8.24
92-93	0.46	0.00	2.05	6.27	5.61	0.08	0.00	0.00	0.01	0.00	0.00	0.00	6.77	213.88%	100.00%	14.48
93-94	0.02	0.31	0.15	0.18	2.41	0.87	0.27	0.02	0.00	0.00	0.31	0.00	6.77	67.06%	100.00%	4.54
1994-95	0.00	0.00	0.76	4.40	1.25	1.38	0.09	0.10	0.06	0.01	0.01	0.05	6.77	119.79%	100.00%	8.11
95-96	0.00	0.00	0.22	0.95	0.43	0.11	0.00	0.00	0.00	0.00	0.00	0.00	6.77	25.26%	100.00%	1.71
96-97	0.23	0.65	0.67	1.30	0.00	0.00	0.11	0.00	0.00	0.41	0.00	1.72	6.77	75.18%	100.00%	5.09
97-98	0.08	0.31	0.79	0.54	3.55	0.82	0.07	0.40	0.00	0.00	0.38	0.46	6.77	109.31%	100.00%	7.40
98-99	0.07	0.43	0.12	0.07	0.35	0.01	0.64	0.01	0.00	0.76	0.83	0.34	6.77	53.62%	100.00%	3.63
1999-00	0.00	0.00	0.00	0.00	2.03	1.93	0.23	0.00	0.00	0.00	0.18	0.22	6.77	67.80%	100.00%	4.59
00-01	0.06	0.00	0.00	1.01	1.43	0.24	0.43	0.00	0.00	0.00	0.00	0.00	6.77	46.82%	100.00%	3.17
01-02	0.00	0.20	0.34	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.05	6.77	9.75%	100.00%	0.66
02-03	0.00	0.35	0.36	0.14	1.50	1.32	0.39	0.01	0.00	0.40	1.74	0.06	6.77	92.61%	100.00%	6.27
03-04	0.00	1.18	0.70	0.18	1.47	0.33	0.06	0.00	0.00	0.03	0.10	0.00	6.77	58.35%	100.00%	3.95
2004-05	1.96	0.25	3.00	3.41	2.78	0.24	0.24	0.00	0.00	0.72	1.25	0.13	6.77	206.50%	100.00%	13.98
05-06	1.57	0.00	0.01	0.40	0.39	0.32	0.17	0.00	0.00	0.19	0.00	0.00	6.77	45.05%	100.00%	3.05

07-08	0.00	1.85	0.53	2.61	0.59	0.00	0.00	6.52	0.00	0.01	0.04	0.03	6.77	179.91%	100.00%	12.18				
08-09	0.00	0.45	1.77	0.01	1.40	0.00	0.00	0.09	0.00	0.00	0.03	0.00	6.77	55.39%	100.00%	3.75				
09-10	0.00	0.20	1.30	5.47	0.84	0.03	0.11	0.00	0.00	0.02	0.97	0.10	6.77	133.53%	100.00%	9.04				
2010-11	0.76	0.02	5.43	0	2.43	0.48	0.04	0	0	0.87	0	0.06	6.77	149.04%	100.00%	10.09				
2011-12	0.00	0.24	0.18	0.00	0.30	0.72	0.42	0.00	0.00	0.29	0.24	0.00	6.77	35.30%	100.00%	2.39				
2012-13	0.01	0.04	0.19	0.64	0.08	0.06	0.00	0.01	0.00	0.57	0.60	0.08	6.77	33.68%	100.00%	2.28				
2013-14	0.12	0.21	0.34	0.00	1.30	0.40	0.13	0.00	0.00	0.05	0.25	0.21	6.77	44.46%	100.00%	3.01				
2014-15	0.00	0.00	0.95	0.70	0.73	0.41	0.00	0.00	0.01	0.78	0.00	0.41	6.77	58.94%	100.00%	3.99				
2015-16	0.58	0.02	0.02	2.07	0.65	0.06	0.61	0.00	0.05	0.00	0.00	0.57	6.77	68.39%	100.00%	4.63				
2016-17	0.25	0.16	2.95	4.78	1.36	0.00	0.00	0.00	0.00	0.01	0.46	0.52	6.77	154.95%	100.00%	10.49				
2017-18	0.00	0.00	0.07	1.60	0.04	0.49	0.00	0.23	0.00	1.07	0.00	0.00	6.77	51.70%	100.00%	3.50				
2018-19	2.03	0.18	0.48	1.86	4.59	0.44	0.03	0.58	0.00	0.03	0.00	0.85	6.77	163.52%	100.00%	11.07				
2019-20	0.00	0.87	1.91	0.00	0.07	1.96	1.90	0.00	0.00	0.00	0.10	0.00	6.77	100.59%	100.00%	6.81				
2020-21	0.00	0.35	0.33	1.06	0.06	0.00	0.00	0.00	0.08	0.41	0.00	0.41	6.77	39.88%	100.00%	2.70				
2021-22	0.18	0.00	2.57	0.00	0.07	0.11	0.06	0.00	0.00	0.02	0.90	0.61	6.77	66.77%	100.00%	4.52				
2022-23	0.84	0.83	0.49	3.03	1.09	2.37	0.00	0.04	0.00	0.10	2.76	0.55	6.31	191.76%	100.00%	12.10				
2023-24	0.00	0.35	1.42	0.81	1.64	0.87	0.00	0.00	0.00	0.00	0.00	0.00	6.29	80.92%	100.00%	5.09				

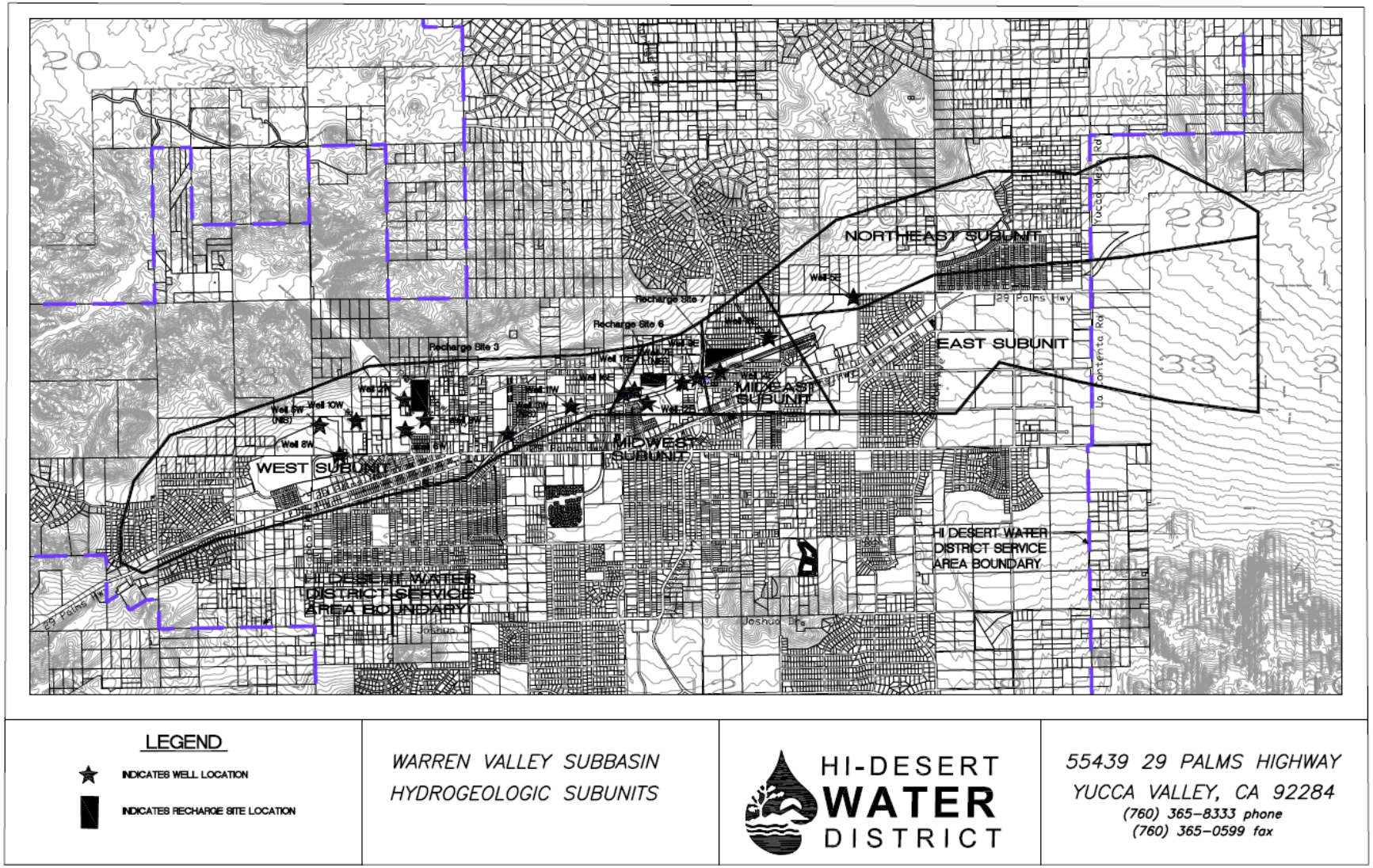
HI-DESERT WATER DISTRICT

Appendix B
SUMMARY OF WATER PRODUCTION
WATER YEAR 2023-24
(All Amounts in Acre-Feet)

Hi-Desert Water District Wells	TOTAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5E*	0	0	0	0	0	0	0	0	0	0	0	0	0
7E*	0	0	0	0	0	0	0	0	0	0	0	0	0
9E	205	7	11	12	13	13	14	16	20	24	28	26	22
12E	705	30	40	40	45	44	49	52	61	80	99	84	80
14E	391	38	23	25	26	25	28	31	34	39	45	42	36
16E	120	5	7	7	8	7	7	9	11	14	17	15	14
17E	178	8	10	10	12	11	13	13	16	20	25	21	20
18E*	0	0	0	0	0	0	0	0	0	0	0	0	0
3W*	0	0	0	0	0	0	0	0	0	0	0	0	0
5W*	0	0	0	0	0	0	0	0	0	0	0	0	0
6W	132	10	9	8	9	8	11	12	13	13	13	15	12
8W	133	11	10	9	8	8	10	11	13	13	14	14	13
9W	429	44	33	31	29	26	34	40	37	39	41	41	34
10W*	0	0	0	0	0	0	0	0	0	0	0	0	0
11W	0	0	0	0	0	0	0	0	0	0	0	0	0
20W	108	35	29	27	17	0	0	0	0	0	0	0	0
SUBTOTAL	**2,403**												
Well 2W Leased - S.B. County													
2W	33	3	2	2	2	2	2	3	2	3	3	3	4
SUBTOTAL	**33**												
MESA 10E*	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MAINSTREAM 24E	412	50	32	26	25	21	25	28	35	40	46	44	41
BIGHORN DESERT VIEW INTERTIE	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SUBTOTAL	**412**												
Hawks Landing													
BS #1 & #17	295	20	20	8	6	2	13	16	31	33	53	45	48
SUBTOTAL	**295**												
Joshua Tree Retreat Center													
JTRC #3	5	0	0	0	0	0	0	2	0	0	1	0	2
JTRC Farm	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SUBTOTAL	**5**												
Grand Total	**3,147**												

NOTES:
*Well is either inactive or a monitoring well.

Appendix C: Warren Valley Sub-Basin Map



HI-DESERT WATER DISTRICT

APPENDIX D

Annual Well Averages

Warren Valley Basin Watermaster

(Feet above Means Sea Level)

2005 - 2024

	WELL	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16-17	17-18	18-19	19/20	20-21	21-22	22-23	23-24	Total Water level increase in feet Oct 95/Sept 24
West Sub-unit	1W	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Recharge Site 3	2W	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	3W	3033.08	3035.08	3029.29	3038.00	3040.00	3049.00	3059.66	3066.92	3070.75	3067.50	3069.50	3077.50	3086.50	3095.83	3095.00	3093.83	3094.08	3092.83	3099.33	160.17
	4W	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5W*	2993.84	3022.84	3055.58	3078.00	3080.00	3099.00	3106.16	3107.75	3106.50	3098.50	3097.50	3103.50	3109.50	3105.50	3112.20	3113.33	3113.25	3113.42	3115.92	171.54
	6W*	3001.15	3029.15	3069.09	3079.00	3083.00	3092.00	3098.00	3100.08	3100.90	3092.90	3093.90	3101.90	3107.90	3103.90	3113.49	3112.90	3116.48	3116.40	3119.57	180.57
	7W	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	8W~	3003.04	3010.37	3015.28	3086.00	3074.00	3094.00	3103.83	3090.33	3093.71	3086.71	3086.71	3086.71	3095.71	3096.71	3103.96	3102.71	3102.63	3101.38	3105.54	167.93
	9W~	2984.31	2949.48	2944.66	2998.00	3066.00	3085.00	3093.50	3097.17	3097.65	3090.65	3090.65	3097.65	3104.65	3098.65	3103.74	3150.23	3106.40	3187.90	3106.15	157.33
	10W	2986.92	3021.18	3048.91	3063.00	3064.00	3086.00	3094.58	3098.00	3096.35	3089.35	3089.35	3094.35	3100.35	3095.35	3105.52	3103.68	3104.43	3103.85	3107.93	162.45
	11W	3016.95	2973.45	2944.83	2935.00	2960.00	2977.00	3013.75	3028.83	3022.29	3045.29	3054.29	3058.29	3048.29	3064.29	3086.79	3081.29	3080.46	3081.87	3089.54	191.05
	20W	NR	NR	NR	NR	NR	NR	NR	3106.25	3105.00	3097.00	3097.00	3105.00	3113.00	3107.00	3112.50	3114.17	3113.25	3133.00	3116.42	NR
Midwest Sub-unit	7E*	2949.68	2949.36	2951.72	2960.00	3000.00	3005.00	3006.83	3007.50	3013.78	3013.78	3025.78	3037.78	3044.78	3166.95	3080.78	3074.86	3066.78	3068.11	3074.78	218.04
Recharge Site 6	12E*	3124.89	3061.89	3023.16	3028.00	3026.00	3028.00	3036.83	3045.83	3051.81	3043.81	3048.81	3061.81	3071.81	3074.06	3075.21	3070.64	3065.81	3067.48	3074.64	210.9
	16E	3063.64	3044.47	3037.00	3048.00	3046.00	3043.00	3050.08	3056.25	3067.39	3062.39	3070.39	3083.39	3091.39	3096.89	3100.31	3097.56	3096.39	3098.72	3103.39	268.98
	17E	3052.16	3029.41	3019.41	3026.00	3026.00	3027.00	3032.75	3042.67	3049.91	3043.91	3048.91	3062.91	3070.91	3075.41	3075.25	3069.33	3065.91	3068.58	3072.33	189.92
	9E	3054.43	3036.93	3024.83	3021.00	3025.00	3030.00	3037.83	3045.33	3051.27	3048.27	3052.27	3063.27	3077.27	3079.02	3076.97	3070.35	3068.27	3083.52	3072.94	211.28
Mideast Sub-unit	14E~	2994.06	2997.00	3010.00	3044.00	3031.00	3042.83	3019.66	3036.83	3017.40	3017.40	3021.40	3030.40	3037.40	3045.40	3048.60	3040.15	3030.40	3039.98	3043.65	128.52
Recharge Site 7	18E*	2983.74	3016.08	3000.41	2973.00	3015.00	3039.00	3024.41	3030.67	3021.08	3023.08	3022.08	3036.08	NR	NR	NR	NR	NR	NR	NR	NR
Northeast Sub-unit	5E*~	2971.60	2995.10	2971.91	2954.00	3055.00	3058.00	3072.00	3072.58	3074.10	3074.10	3074.10	3074.10	NR	NR	2971.60	NR	NR	NR	NR	NR
No Recharge Site	11E	NR	NR	NR	NR	NR	NR	2941.00	2942.00	2943.00	2942.00	2942.00	2943.00	2944.00	2944.33	NR	2945.83	2945.00	2944.67	2945.33	NR
East Sub-unit	21E	NR	NR	NR	NR	NR	NR	2885.00	2884.83	2886.00	2885.00	2886.00	2887.00	2887.00	2888.33	NR	2891.25	2895.00	2897.17	2899.25	NR
Reclamation Recharge	Total 29 year well level average increase / In feet																				186.05
	Total 18 year well level average increase / In feet																				

Well 14E= Inconsistant Readings, Sept-18 only reliable month.

Well 18E= Unable to sound after Oct. 2017 due to obstuctions in well. Well is inactive.

NR = No Reading Available

HI-DESERT WATER DISTRICT

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2023-24													
Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Sep-24	Sep-23
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	3076	3073	3075	3079	3078	3076	3076	3076	3074	3074	3071	3072	3072
9E	3074	3074	3074	3074	3075	3075	3076	3076	3072	3064	3069	3069	3075
11E*	2945	2945	2945	2945	2945	2945	2945	2945	2946	2946	2946	2946	2945
12E	3075	3075	3075	3078	3078	3077	3077	3077	3073	3071	3071	3071	3078
14E	3040	3044	3044	3047	3047	3047	3047	3047	3042	3037	3040	3037	3051
16E	3107	3107	3104	3105	3105	3105	3105	3102	3100	3100	3098	3098	3107
17E	3075	3074	3073	3075	3075	3075	3075	3074	3070	3069	3067	3067	3076
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/A
21E*	2898	2898	2898	2899	2899	2899	2899	2899	2900	2900	2901	2901	2899
3W*	3098	3098	3098	3098	3098	3098	3098	3098	3105	3105	3103	3103	3098
5W*	3113	3114	3114	3114	3115	3115	3117	3118	3119	3119	3119	3119	3113
6W	3118	3116	3116	3123	3120	3125	3120	3120	3120	3120	3119	3118	3116
8W	3105	3105	3105	3105	3105	3105	3105	3105	3109	3107	3107	3107	3107
9W	3104	3104	3104	3106	3106	3104	3106	3106	3111	3108	3111	3108	3106
10W	3104	3104	3104	3107	3107	3107	3107	3107	3111	3111	3111	3111	3109
11W	3085	3087	3087	3090	3090	3090	3090	3090	3092	3090	3090	3090	3090
20W	3112	3114	3115	3116	3116	3116	3115	3117	3118	3118	3120	3120	3112
Site 3	3116	3117	3116	3118	3119	3119	3119	3119	3121	3120	3123	3122	3115
Site 6	3080	3079	3071	3070	3076	3073	3069	3068	3067	3059	3066	3056	3068
Site 7	3064	3066	3065	3066	3067	3068	3068	3069	3069	3066	3067	3069	3066
BS #1	3108	N/R	N/R	3110	N/R	N/R	3111	N/R	N/R	3110	N/R	N/R	N/R
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
2W - SB	3005	3007	3007	3006	3011	3011	3011	3012	3013	3013	3013	3013	3006
JTRC FA	2720	N/R	N/R	N/R	N/R	N/R	2729	N/R	N/R	2831	N/R	2735	N/R
JTRC #3	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R

*Depicts inactive or monitoring well

1 Shaded data used to calculate water surface elevation increase/decrease

HI-DESERT WATER DISTRICT

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2022-23													
Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Sep-23	Sep-22
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	3068	3064	3064	3066	3071	3070	3070	3067	3068	3067	3073	3072	3067
9E	3068	3068	3068	3068	3068	3068	3071	3071	3071	3071	3232	3075	3068
11E*	2944	2944	2944	2944	2945	2945	2945	2945	2945	2945	2945	2945	2945
12E	3066	3064	3064	3064	3064	3064	3064	3069	3066	3071	3078	3078	3066
14E	3035	3035	3035	3035	3037	3037	3037	3040	3040	3042	3051	3051	3030
16E	3096	3096	3096	3096	3096	3098	3098	3096	3096	3098	3107	3107	3096
17E	3066	3067	3067	3068	3069	3069	3069	3066	3067	3067	3073	3076	3066
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/A	N/R
21E*	2895	2896	2896	2896	2898	2898	2898	2897	2896	2897	2900	2899	2895
3W*	3093	3091	3091	3091	3091	3091	3091	3096	3093	3096	3098	3098	3093
5W*	3112	3113	3114	3113	3115	3115	3116	3114	3114	3114	3114	3113	3111
6W	3116	3118	3116	3118	3120	3120	3116	3116	3113	3113	3116	3116	3116
8W	3100	3100	3100	3100	3100	3102	3100	3102	3100	3102	3107	3107	3100
9W	3106	3106	3357	3357	3357	3357	3110	3101	3101	3104	3106	3106	3104
10W	3102	3102	3102	3102	3102	3102	3102	3104	3104	3102	3109	3109	3102
11W	3078	3080	3078	3078	3078	3078	3078	3083	3083	3085	3090	3090	3080
20W	3115	3114	3112	3114	3350	3115	3115	3112	3112	3112	3113	3112	3112
Site 3	3116	3118	3118	3117	3119	3118	3118	3116	3116	3114	3116	3115	3115
Site 6	3070	3057	3053	3054	3073	3072	3070	3067	3055	3054	3071	3068	3069
Site 7	3059	3060	3059	3059	3060	3060	3060	3058	3062	3060	3063	3066	3055
BS #1	3104	N/R	N/R	3110	N/R	N/R	3111	N/R	N/R	3109	N/R	N/R	N/R
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
2W - SB	3008	3008	3007	3008	3000	3008	3007	3006	3006	3005	3005	3006	3001
JTRC FA	2710	N/R	N/R	2713	N/R	N/R	2716	N/R	N/R	2718	N/R	N/R	N/R
JTRC #3	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R

*Depicts inactive or monitoring well

1 Shaded data used to calculate water surface elevation increase/decrease

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2021-22 Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP[1]	Sep-21
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	3068	3069	3069	3072	3073	3072	3072	3072	3067	3068	3068	3067	3070
9E	3066	3066	3066	3066	3066	3066	3232	3064	3064	3064	3064	3068	3064
11E*	2945	2945	2945	2945	2945	2945	2944	2944	2945	2945	2945	2945	2946
12E	3066	3066	3066	3066	3069	3066	3066	3066	3064	3062	3059	3066	3066
14E	3035	3035	3035	3035	3035	3040	3035	3035	3033	3028	3028	3030	3030
16E	3091	3091	3093	3098	3098	3098	3091	3091	3089	3084	3084	3096	3086
17E	3067	3070	3070	3070	3070	3066	3064	3066	3209	3060	3060	3066	3061
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/A
21E*	2893	2893	2893	2893	2893	2894	2894	2894	2894	2896	2894	2895	2894
3W*	3098	3096	3096	3096	3096	3095	3093	3093	3093	3093	3093	3093	3098
5W*	3116	3117	3117	3116	3115	3115	3113	3112	3111	3111	3111	3111	3119
6W	3118	3118	3118	3120	3120	3118	3116	3116	3113	3113	3113	3116	3118
8W	3107	3107	3107	3105	3105	3102	3102	3100	3100	3100	3100	3100	3109
9W	3111	3111	3109	3109	3109	3106	3106	3104	3104	3104	3104	3104	3116
10W	3111	3107	3107	3104	3104	3104	3102	3102	3102	3102	3102	3102	3109
11W	3083	3083	3080	3080	3080	3080	3080	3080	3080	3078	3078	3080	3083
20W	3116	3116	3115	3114	3114	3114	3113	3112	3111	3111	3111	3112	3119
Site 3	3119	3119	3117	3116	3116	3117	3116	3115	3113	3114	3113	3115	3123
Site 6	3056	3056	3072	3071	3072	3072	3069	3066	3065	3066	3065	3069	3060
Site 7	3055	3055	3055	3055	3053	3053	3054	3053	3050	3054	3053	3055	3054
BS #1	3112			3107					3107			3109	3109
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
2W - SBC	3009	3007	3007	3007	N/R	3006	3004	3003	3004	3004	3005	3001	3010
JTRC FARM2*	0	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
JTRC #33	0	0	0	2706	0	0	2708	0	2711	0	0	2710	2705

*Depicts inactive or monitoring well

[1] Shaded data used to calculate water surface elevation increase/decrease

HI-DESERT WATER DISTRICT

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2020-21													
Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP[1]	9/1/2020
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	3076	3076	3076	3075	3075	3075	3075	3075	3075	3076	3076	3070	3077
9E	3073	3073	3073	3071	3071	3071	3071	3071	3068	3071	3064	3064	3073
11E*	2945	2946	2946	2946	2946	2946	2946	2946	2945	2946	2946	2946	2946
12E	3071	3073	3073	3071	3073	3073	3073	3073	3069	3071	3066	3066	3071
14E	3049	3047	3044	3037	3042	3042	3042	3040	3037	3037	3030	3030	3044
16E	3098	3100	3100	3100	3100	3100	3100	3100	3098	3098	3086	3086	3098
17E	3071	3072	3073	3071	3071	3071	3071	3071	3071	3070	3060	3061	3073
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/A	N/R
21E*	2890	2891	2891	2891	2891	2891	2891	2891	2891	2891	2892	2894	2890
3W*	3096	3093	3093	3092	3093	3093	3093	3093	3096	3094	3097	3098	3096
5W*	3110	3110	3111	3111	3112	3113	3114	3114	3117	3116	3119	3119	3110
6W	3109	3109	3109	3111	3111	3113	3113	3113	3116	3116	3118	3118	3109
8W	3100	3100	3100	3100	3100	3100	3100	3105	3105	3105	3112	3109	3102
9W	3101	3101	3101	3103	3103	3103	N/A	3129	N/A	3118	3118	3116	3103
10W	3102	3102	3102	3102	3102	3102	3102	3104	3102	3102	3109	3109	3102
11W	3083	3083	3080	3080	3080	3080	3080	3080	3083	3080	3080	3083	3085
20W	3108	3111	3111	3112	3113	3113	3114	3115	3117	3118	3119	3119	3108
Site 3	3112	3113	3114	3115	3116	3112	3119	3120	3121	3121	3123	3123	3111
Site 6	3074	3075	3076	3074	3074	3074	3074	3075	3056	3067	3066	3060	3065
Site 7	3072	3067	3070	3065	3063	3064	3063	3062	3062	3062	3053	3054	3073
BS #1	3103			3107					3105			3109	3105
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
2W - SB	3003	3004	3006	3005	3007	3009	3011	3012	3008	3012	3011	3010	3003
JTRC FA	2705	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
JTRC #3	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	N/R	N/R	#VALUE!	N/R

*Depicts inactive or monitoring well

[1] Shaded data used to calculate water surface elevation increase/decrease

HI-DESERT WATER DISTRICT

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2019-20													
Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP[1]	#######
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	3079	3079	3078	3081	3081	3080	3086	3084	3083	3082	3082	3077	3074
9E	3075	3075	3063	3080	3078	3080	3080	3080	3080	3078	3078	3073	3075
11E*	2945	2945	2945	2946	2945	2946	2945	2946	2946	2946	2946	2946	2944
12E	3071	3073	3075	3078	3077	3077	3077	3077	3078	3075	3075	3071	3069
14E	3047	3047	3051	3053	3056	3056	3054	3042	3040	3044	3044	3044	3049
16E	3096	3098	3098	3100	3100	3102	3105	3102	3100	3100	3100	3098	3086
17E	3068	3070	3068	3079	3077	3079	3082	3079	3078	3076	3075	3073	3070
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
21E*	2890	2890	2890	2894	2889	2889	2889	2890	2890	2890	2891	2890	2888
3W*	3094	3094	3095	3094	3095	3093	3093	3098	3098	3098	3098	3096	3093
5W*	3113	3115	3115	3115	3115	3113	3113	3112	3111	3110	3110	3110	3116
6W	3118	3116	3116	3116	3116	3116	3116	3111	3111	3109	3109	3109	3113
8W	3105	3105	3105	3105	3105	3105	3105	3102	3105	3105	3102	3102	3105
9W	3106	3108	3106	3106	3106	3103	3103	3103	3101	3101	3103	3103	3110
10W	3107	3107	3107	3107	3107	3107	3104	3104	3104	3104	3102	3102	3107
11W	3078	3083	3083	3085	3087	3087	3090	3090	3090	3090	3090	3085	3080
20W	3115	3115	3115	3115	3115	3115	3114	3111	3111	3108	3108	3108	3115
Site 3	3119	3120	3120	3120	3116	3115	3117	3214	3115	3108	3111	3111	3119
Site 6	3073	3075	3078	3079	3083	3074	3083	3081	3080	3064	3065	3065	3070
Site 7	3073	3081	3079	3081	3085	3084	3079	3080	3079	3077	3071	3073	3079
BS #1	3112	N/R	N/R	3112	N/R	N/R	3110	N/R	N/R	3105	N/R	N/R	N/R
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
2W - SBC	N/R	N/R	N/R	3007	3006	3002	3006	3004	3001	3000	3002	3003	3010
JTRC FARM2*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
JTRC #33	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R

*Depicts inactive or monitoring well

[1] Shaded data used to calculate water surface elevation increase/decrease

HI-DESERT WATER DISTRICT

APPENDIX E
Groundwater Surface Elevations

Hi Desert Water District Wells

2018-19													
Well ID	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP[1]	9/1/2018[1]
5E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7E*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	3085	3075	3074	3074	3074	N/R
9E	3075	3080	3080	3080	3080	3082	3080	3080	3080	3078	3075	3075	3075
11E*	2944	2944	2944	2944	2945	2945	2944	2944	2945	2945	2945	2944	2944
12E	3073	3073	3071	3078	3078	3078	3078	3078	3073	3071	3071	3069	3071
14E	3043	3043	3044	3055	3051	3060	3045	3045	3033	3028	3044	3049	3037
16E	3084	3102	3102	3100	3102	3098	3100	3100	3100	3093	3091	3086	3084
17E	3069	3080	3077	3209	3209	3078	3076	3078	3079	3075	3072	3070	3069
18E	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
21E*	2887	2887	2887	2888	2888	2888	2888	2888	2890	2889	2890	2890	2888
3W*	3091	3097	3096	3098	3099	3099	3099	3098	3098	3094	3094	3093	3091
5W*	3115	3117	3117	3117	3117	3116	3116	3116	3116	3116	3115	3116	3114
6W	3117	3118	3118	3118	3118	3116	3116	3116	3116	3113	3111	3113	3116
8W	3102	3102	3102	3105	3105	3107	3107	3107	3105	3105	3109	3105	3097
9W	3108	3108	3108	3108	3108	3108	3108	3108	3108	3108	3108	3110	3110
10W	3105	3105	3105	3104	3107	3107	3107	3107	3109	3107	3107	3107	3104
11W	N/R	N/R	N/R	3085	3085	3085	3085	3083	3080	3080	3080	3080	N/R
20W	3118	3119	3118	3219	3219	3117	3117	3117	3117	3117	3115	3115	3118
Site 3	3121	3122	3123	3122	3122	3120	3120	3120	3119	3119	3119	3119	3119
Site 6	3072	3083	3084	3083	3084	3078	3069	3078	3062	3066	3070	3070	3072
Site 7	3079	3088	3086	3085	3084	3084	3084	3085	3076	3075	3080	3079	3079
BS #1	3107			3112				3112		3107			NR
BS #17*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	NR
													Jul-2011
JTRC FARM2*	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	NR
JTRC #33	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	N/R	N/R	#VALUE!	2684

*Depicts inactive or monitoring well

[1] Shaded data used to calculate water surface elevation increase/decrease

HI-DESERT WATER DISTRICT

APPENDIX G

Table 3 - Semi Annual Nitrate and TDS Analysis of the Warren Valley Basin

Year	Semester	Well ID	Nitrate (as NO_{3-N})		Date Sampled	T.D.S.		Date Sampled
2024	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	1.1	mg/L	1/4/2024	260	mg/L	1/4/2024
	2		0.99	mg/L	7/2/2024	250	mg/L	7/2/2024
	1	8w	3	mg/L	1/4/2024	200	mg/L	1/4/2024
	2		4.1	mg/L	7/2/2024	200	mg/L	7/2/2024
	1	9w	1.9	mg/L	1/4/2024	230	mg/L	1/4/2024
	2		1	mg/L	7/2/2024	220	mg/L	7/2/2024
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	8.4	mg/L	1/4/2024	290	mg/L	1/4/2024
	2		8.5	mg/L	7/2/2024	280	mg/L	7/2/2024
	1	20w	2.5	mg/L	1/4/2024	200	mg/L	1/4/2024
	2		2.7	mg/L	7/2/2024	190	mg/L	7/2/2024
	1	9e	2.8	mg/L	1/4/2024	280	mg/L	1/4/2024
	2		3	mg/L	7/3/2024	320	mg/L	7/3/2024
	1	12e	2.3	mg/L	1/4/2024	310	mg/L	1/4/2024
	2		2.6	mg/L	7/3/2024	320	mg/L	7/3/2024
	1	14e	1.2	mg/L	1/4/2024	280	mg/L	1/4/2024
	2		1.6	mg/L	7/3/2024	240	mg/L	7/3/2024
	1	16e	4.1	mg/L	1/4/2024	240	mg/L	1/4/2024
	2		4	mg/L	7/3/2024	240	mg/L	7/3/2024
	1	17e	5.1	mg/L	1/4/2024	310	mg/L	1/4/2024
	2		5.3	mg/L	7/3/2024	330	mg/L	7/3/2024
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**

**denotes average reduction for graphing purposes due to a lack of data

Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2023	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w		mg/L			mg/L	
	2			mg/L			mg/L	
	1	8w		mg/L			mg/L	
	2			mg/L			mg/L	
	1	9w		mg/L			mg/L	
	2			mg/L			mg/L	
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	20w		mg/L			mg/L	
	2			mg/L			mg/L	
	1	9e		mg/L			mg/L	
	2			mg/L			mg/L	
	1	12e		mg/L			mg/L	
	2			mg/L			mg/L	
	1	14e		mg/L			mg/L	
	2			mg/L			mg/L	
	1	16e		mg/L			mg/L	
	2			mg/L			mg/L	
	1	17e		mg/L			mg/L	
	2			mg/L			mg/L	
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2022	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	1.2	mg/L	1/5/2022	250	mg/L	1/5/2022
	2		1.2	mg/L	7/7/2022	260	mg/L	7/7/2022
	1	8w	3.1	mg/L	1/5/2022	190	mg/L	1/5/2022
	2		3.6	mg/L	7/7/2022	190	mg/L	7/7/2022
	1	9w	2.2	mg/L	1/5/2022	210	mg/L	1/5/2022
	2		0.78	mg/L	7/7/2022	260	mg/L	7/7/2022
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	8.2	mg/L	1/5/2022	260	mg/L	1/5/2022
	2		8	mg/L	7/7/2022	280	mg/L	7/7/2022
	1	20w	3	mg/L	1/5/2022	200	mg/L	1/5/2022
	2		2.7	mg/L	7/7/2022	190	mg/L	7/7/2022
	1	9e	2.6	mg/L	1/6/2022	280	mg/L	1/6/2022
	2		2.9	mg/L	7/7/2022	300	mg/L	7/7/2022
	1	12e	Down	mg/L	1/6/2022	Down	mg/L	1/6/2022
	2		2.4	mg/L	7/7/2022	310	mg/L	7/7/2022
	1	14e	1.6	mg/L	1/6/2022	240	mg/L	1/6/2022
	2		1.7	mg/L	7/7/2022	230	mg/L	7/7/2022
	1	16e	4	mg/L	1/6/2022	230	mg/L	1/6/2022
	2		4.9	mg/L	7/7/2022	240	mg/L	7/7/2022
	1	17e	4.1	mg/L	1/6/2022	300	mg/L	1/6/2022
	2		4.6	mg/L	7/7/2022	320	mg/L	7/7/2022
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2021	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	0.86	mg/L	1/6/2021	240	mg/L	1/7/2021
	2		0.73	mg/L	7/7/2021	280	mg/L	7/8/2021
	1	8w	4.3	mg/L	1/6/2021	170	mg/L	1/7/2021
	2		4.2	mg/L	7/7/2021	180	mg/L	7/8/2021
	1	9w	0.9	mg/L	1/6/2021	290	mg/L	1/7/2021
	2		**	mg/L	**	**	mg/L	**
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	20w	2.9	mg/L	1/6/2021	170	mg/L	1/7/2021
	2		3.5	mg/L	7/7/2021	220	mg/L	7/8/2021
	1	9e	2.8	mg/L	1/7/2021	250	mg/L	1/7/2021
	2		3.2	mg/L	7/1/2021	310	mg/L	7/1/2021
	1	12e	2.3	mg/L	1/7/2021	300	mg/L	1/7/2021
	2		2.6	mg/L	7/1/2021	310	mg/L	7/1/2021
	1	14e	1.6	mg/L	1/7/2021	240	mg/L	1/7/2021
	2		1.9	mg/L	7/1/2021	240	mg/L	7/1/2021
	1	16e	4.1	mg/L	1/7/2021	260	mg/L	1/7/2021
	2		5.7	mg/L	7/1/2021	230	mg/L	7/1/2021
	1	17e	3.6	mg/L	1/7/2021	340	mg/L	1/7/2021
	2		4	mg/L	7/1/2021	320	mg/L	7/8/2021
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

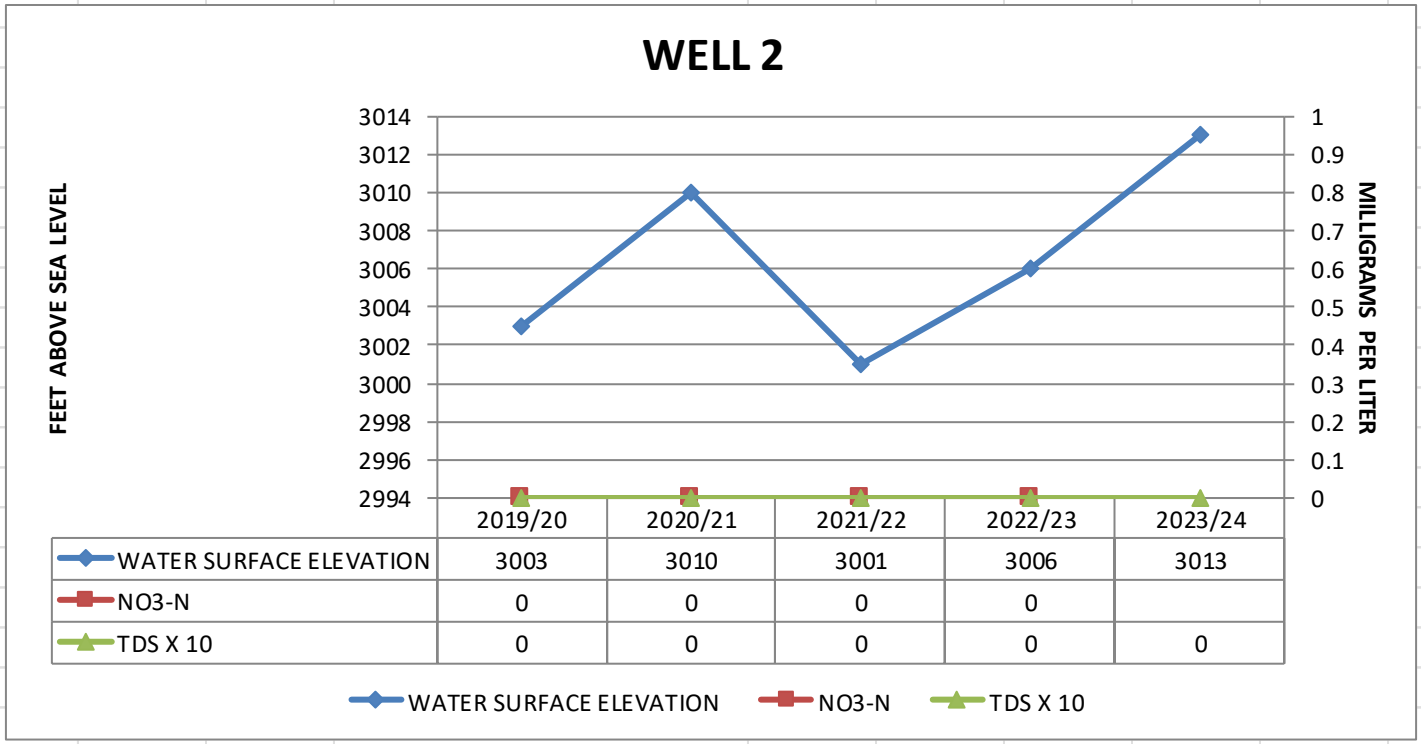
Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2020	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	0.74	mg/L	1/9/2020	300	mg/L	1/9/2020
	2		1.5	mg/L	7/1/2020	280	mg/L	7/1/2020
	1	8w	4.3	mg/L	1/9/2020	180	mg/L	1/9/2020
	2		4.9	mg/L	7/1/2020	180	mg/L	7/1/2020
	1	9w	2	mg/L	1/9/2020	240	mg/L	1/9/2020
	2		2.6	mg/L	7/1/2020	210	mg/L	7/1/2020
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	20w	3.5	mg/L	1/9/2020	200	mg/L	1/9/2020
	2		3.5	mg/L	7/1/2020	190	mg/L	7/1/2020
	1	9e	3.1	mg/L	1/2/2020	300	mg/L	1/2/2020
	2		3	mg/L	7/2/2020	310	mg/L	7/2/2020
	1	12e	2.3	mg/L	1/2/2020	310	mg/L	1/2/2020
	2		2.8	mg/L	7/2/2020	300	mg/L	7/2/2020
	1	14e	1.2	mg/L	1/2/2020	260	mg/L	1/2/2020
	2		1.6	mg/L	7/2/2020	220	mg/L	7/2/2020
	1	16e	8	mg/L	1/2/2020	240	mg/L	1/2/2020
	2		5.7	mg/L	7/2/2020	220	mg/L	7/2/2020
	1	17e	3.3	mg/L	1/2/2020	300	mg/L	1/2/2020
	2		3.9	mg/L	7/2/2020	290	mg/L	7/2/2020
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2019	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	1	mg/L	1/10/2019	340	mg/L	1/10/2019
	2		0.85	mg/L	7/3/2019	330	mg/L	7/3/2019
	1	8w	5.5	mg/L	1/10/2019	180	mg/L	1/10/2019
	2		**	mg/L	**	**	mg/L	**
	1	9w	2.5	mg/L	1/10/2019	220	mg/L	1/10/2019
	2		2	mg/L	7/3/2019	260	mg/L	7/3/2019
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	8	mg/L	1/10/2019	290	mg/L	1/10/2019
	2		7.8	mg/L	7/3/2019	270	mg/L	7/3/2019
	1	20w	3.7	mg/L	1/10/2019	210	mg/L	1/10/2019
	2		3.9	mg/L	7/3/2019	220	mg/L	7/3/2019
	1	9e	3	mg/L	1/10/2019	300	mg/L	1/10/2019
	2		2.9	mg/L	7/3/2019	300	mg/L	7/3/2019
	1	12e	2.9	mg/L	1/10/2019	310	mg/L	1/10/2019
	2		2.7	mg/L	7/3/2019	330	mg/L	7/3/2019
	1	14e	1.8	mg/L	1/10/2019	240	mg/L	1/10/2019
	2		1.5	mg/L	7/3/2019	240	mg/L	7/3/2019
	1	16e	4.5	mg/L	1/10/2019	240	mg/L	1/10/2019
	2		6	mg/L	7/3/2019	240	mg/L	7/3/2019
	1	17e	2.4	mg/L	1/10/2019	310	mg/L	1/10/2019
	2		2.8	mg/L	7/3/2019	330	mg/L	7/3/2019
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

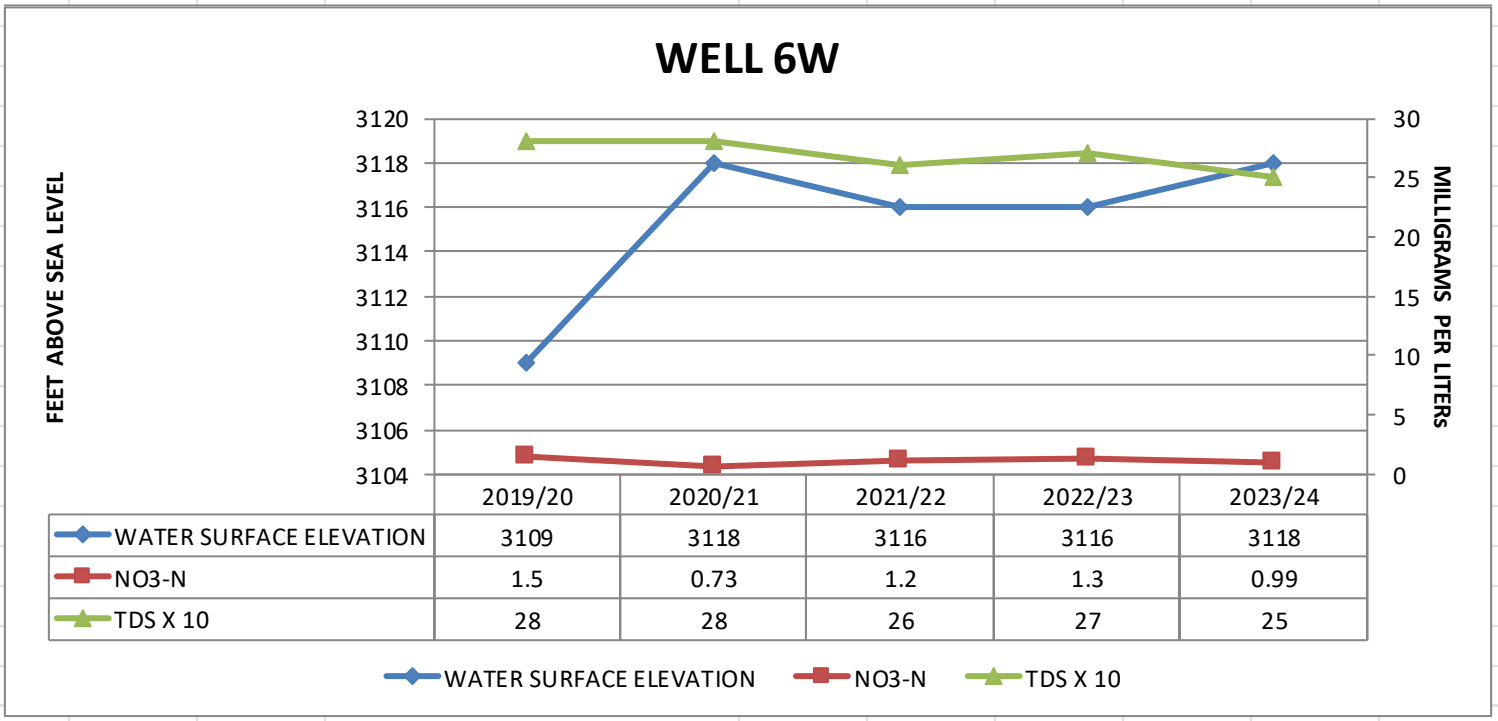
Year	Semester	Well ID	Nitrate (as $NO_{3\text{-}N}$)		Date Sampled	T.D.S.		Date Sampled
2018	1	2w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	6w	1.3	mg/L	1/8/2018	320	mg/L	1/8/2018
	2		0.95	mg/L	7/2/2018	330	mg/L	7/2/2018
	1	8w	4.3	mg/L	1/8/2018	180	mg/L	1/8/2018
	2		5	mg/L	7/2/2018	180	mg/L	7/2/2018
	1	9w	1.6	mg/L	1/8/2018	260	mg/L	1/8/2018
	2		1.6	mg/L	7/2/2018	270	mg/L	7/2/2018
	1	10w	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	1	11w	8.7	mg/L	1/8/2018	290	mg/L	1/8/2018
	2		6.8	mg/L	7/2/2018	270	mg/L	7/2/2018
	1	20w	3.2	mg/L	1/8/2018	200	mg/L	1/8/2018
	2		3.4	mg/L	7/2/2018	200	mg/L	7/2/2018
	1	9e	3	mg/L	1/11/2018	290	mg/L	1/11/2018
	2		3.3	mg/L	7/5/2018	320	mg/L	7/5/2018
	1	12e	2.8	mg/L	1/11/2018	280	mg/L	1/11/2018
	2		3.3	mg/L	7/5/2018	300	mg/L	7/5/2018
	1	14e	1.5	mg/L	1/11/2018	250	mg/L	1/11/2018
	2		1.1	mg/L	7/5/2018	280	mg/L	7/5/2018
	1	16e	4	mg/L	1/11/2018	240	mg/L	1/11/2018
	2		4.3	mg/L	7/5/2018	250	mg/L	7/5/2018
	1	17e	2.7	mg/L	1/11/2018	300	mg/L	1/11/2018
	2		2.1	mg/L	7/5/2018	330	mg/L	7/5/2018
	1	18e	**	mg/L	**	**	mg/L	**
	2		**	mg/L	**	**	mg/L	**
	**denotes average reduction for graphing purposes due to a lack of data							

Appendix G

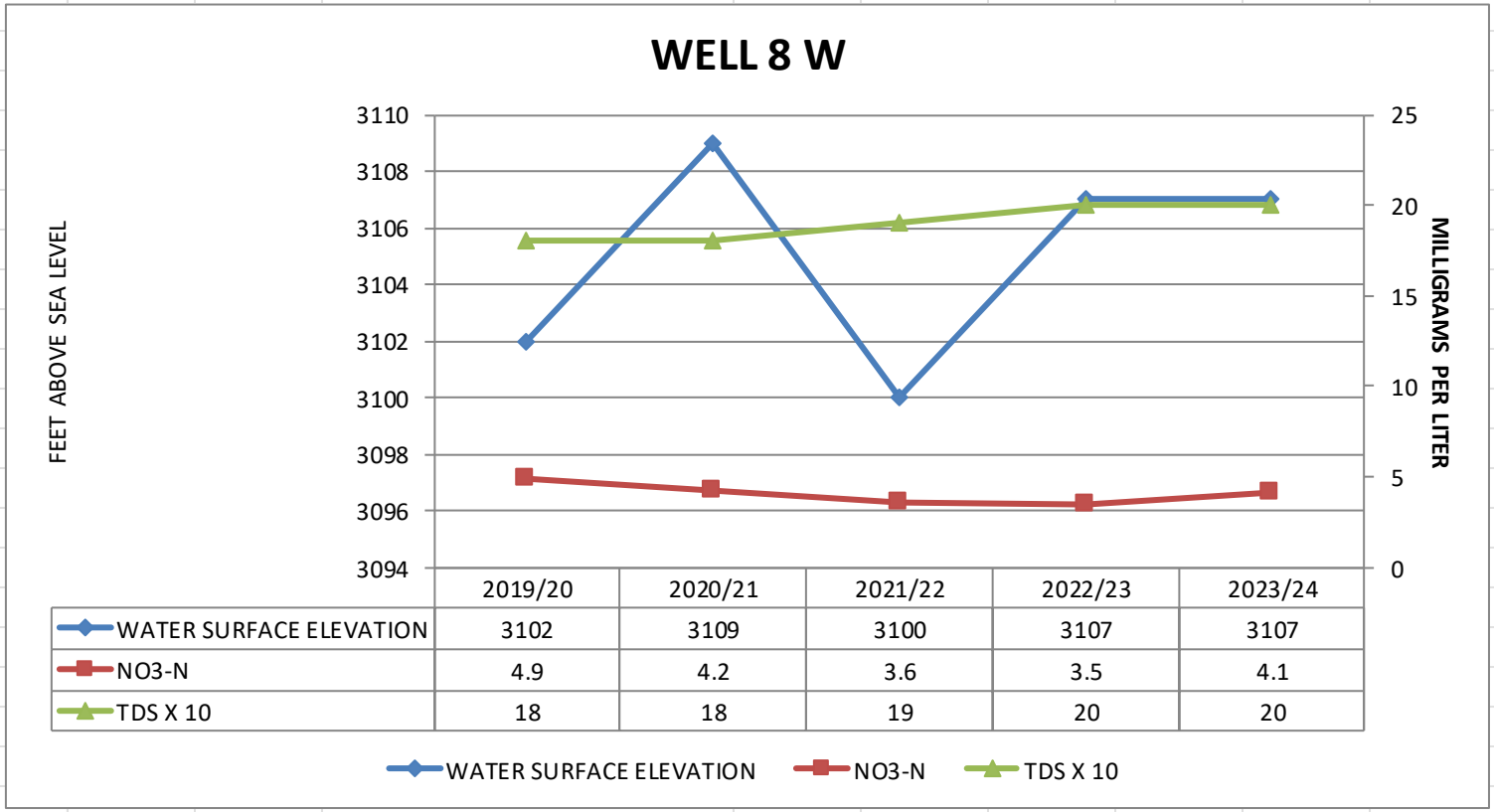
	WELL 2				
DATE	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3003	3010	3001	3006	3013
NO3	0	0	0	0	0
NO3-N	0	0	0	0	0
TDS X 10	0	0	0	0	0



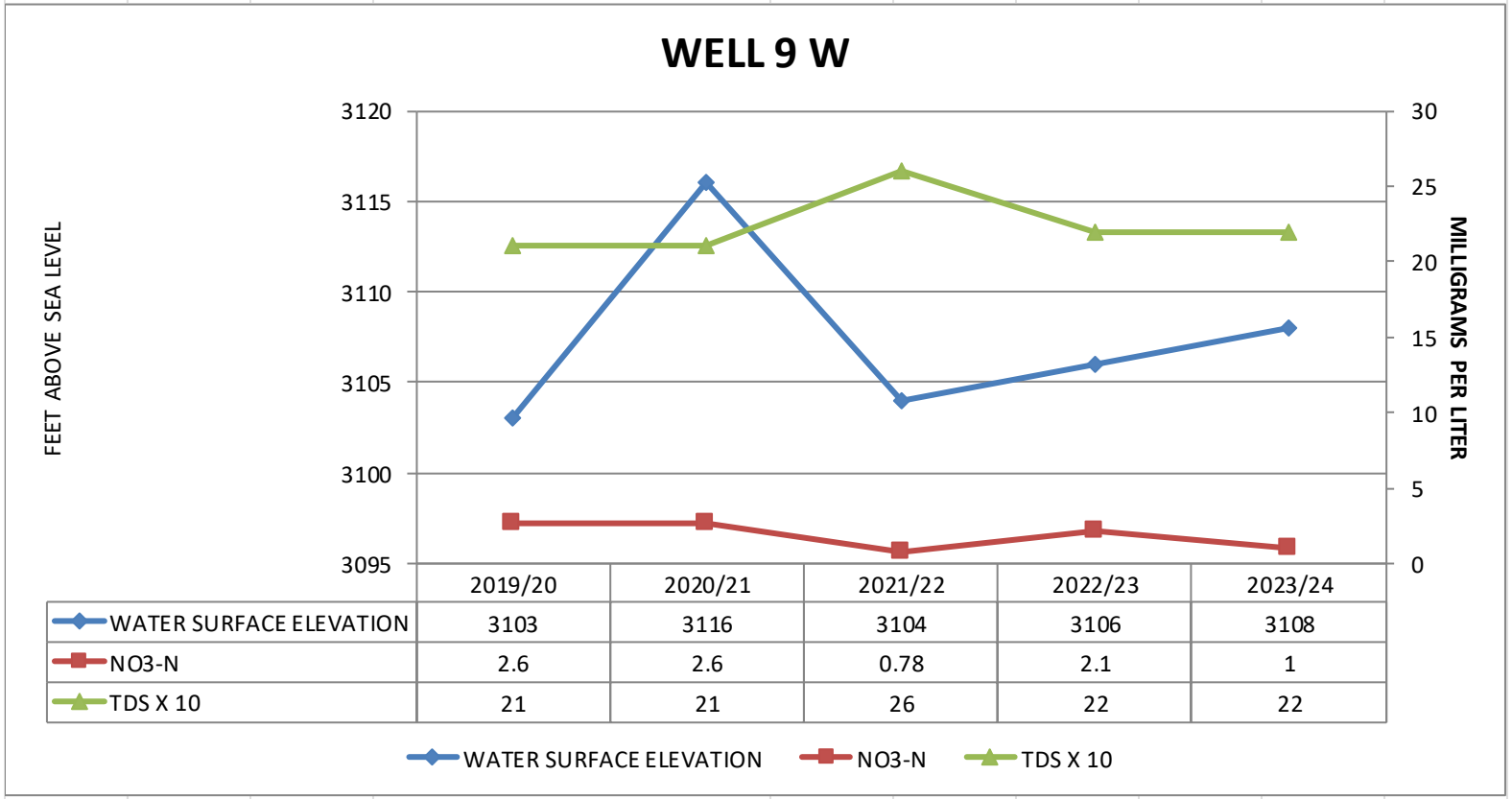
	WELL 6				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3109	3118	3116	3116	3118
NO3-N	1.5	0.73	1.2	1.3	0.99
TDS X 10	28	28	26	27	25



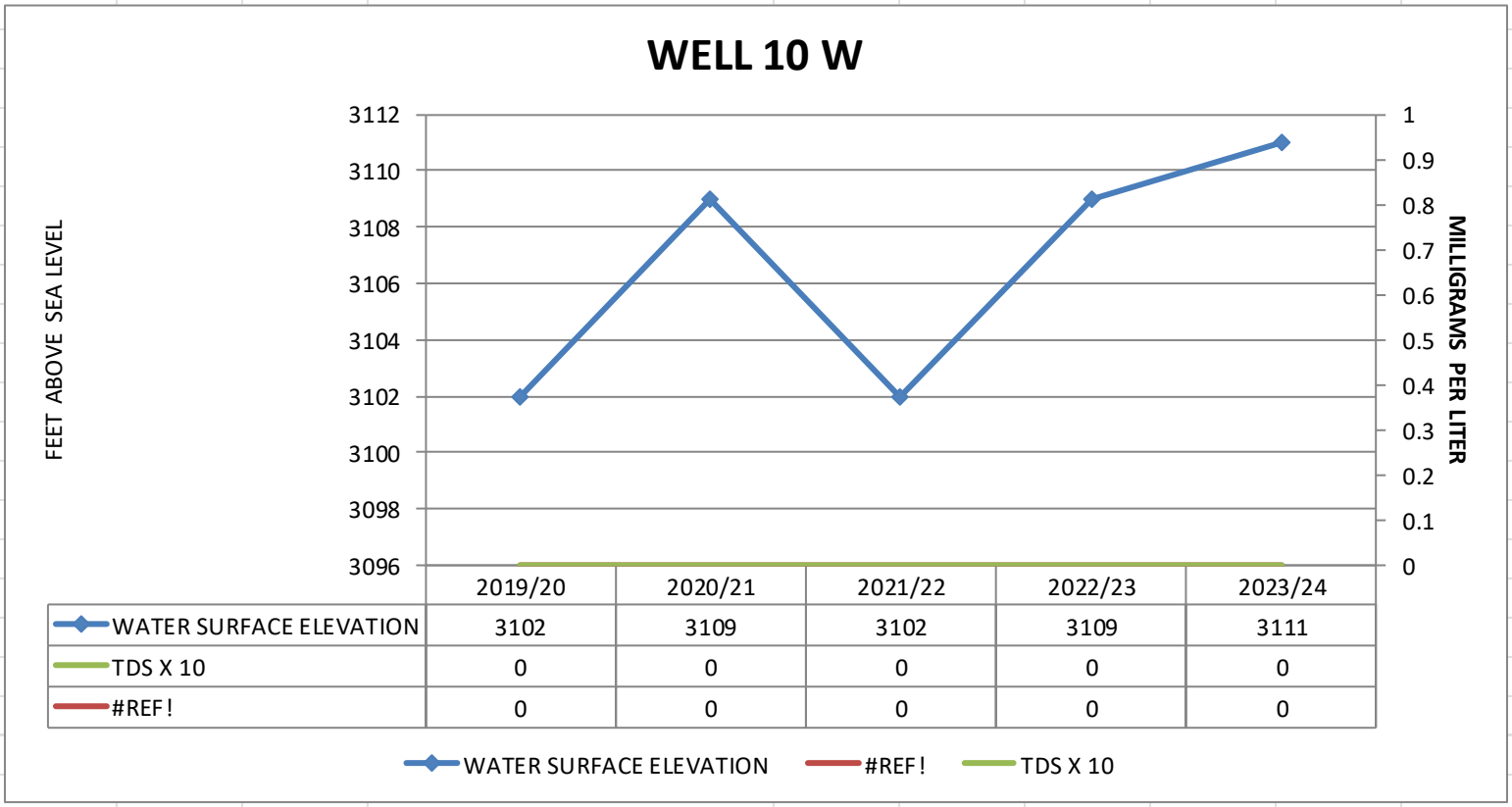
	WELL 8 W				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3102	3109	3100	3107	3107
NO3-N	4.9	4.2	3.6	3.5	4.1
TDS X 10	18	18	19	20	20



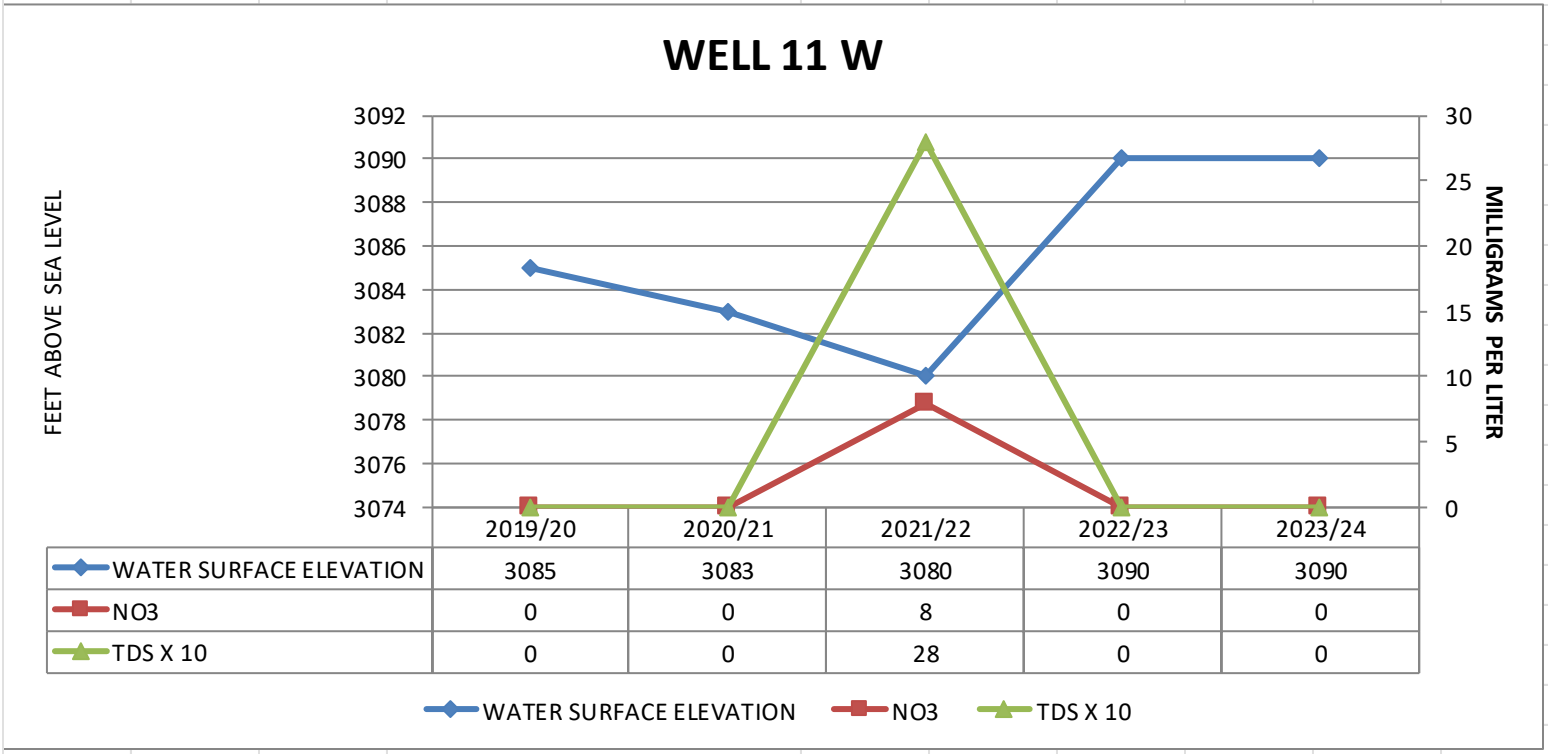
	WELL 9W				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3103	3116	3104	3106	3108
NO3-N	2.6	2.6	0.78	2.1	1
TDS X 10	21	21	26	22	22

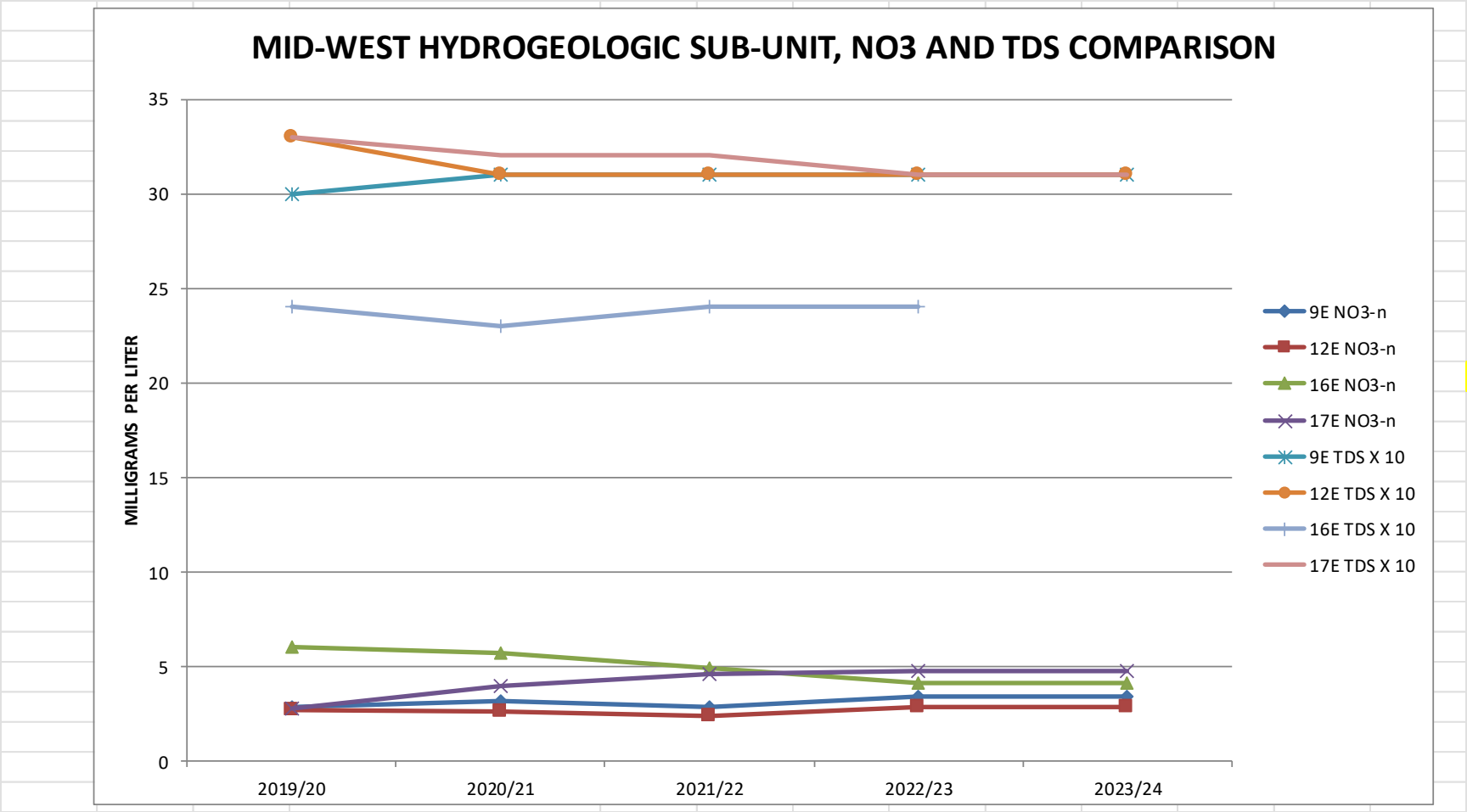


	WELL 10W				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3102	3109	3102	3109	3111
NO3	0	0	0	0	0
TDS X 10	0	0	0	0	0

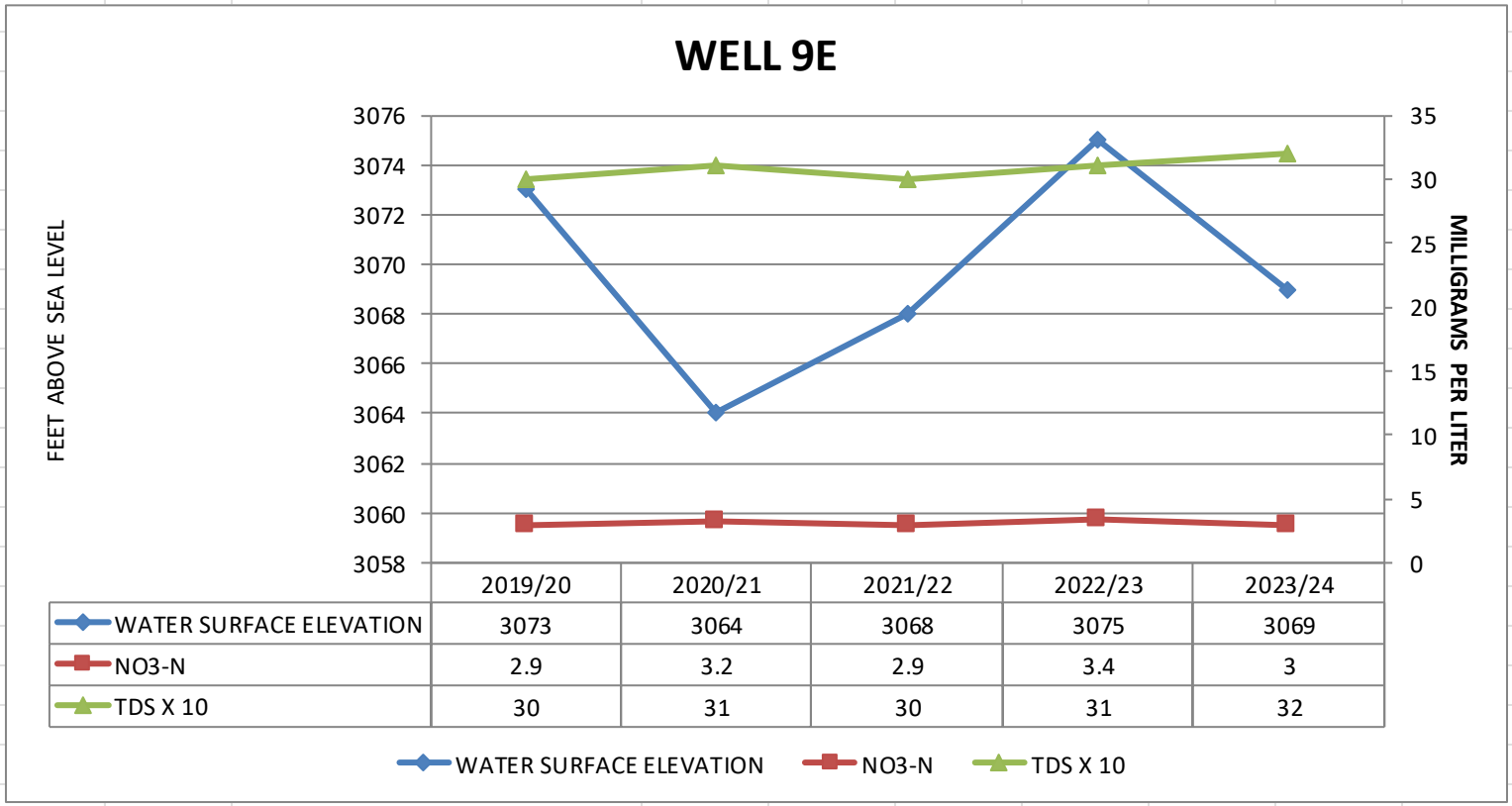


	WELL 11W				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3085	3083	3080	3090	3090
NO3	0	0	8	0	0
TDS X 10	0	0	28	0	0

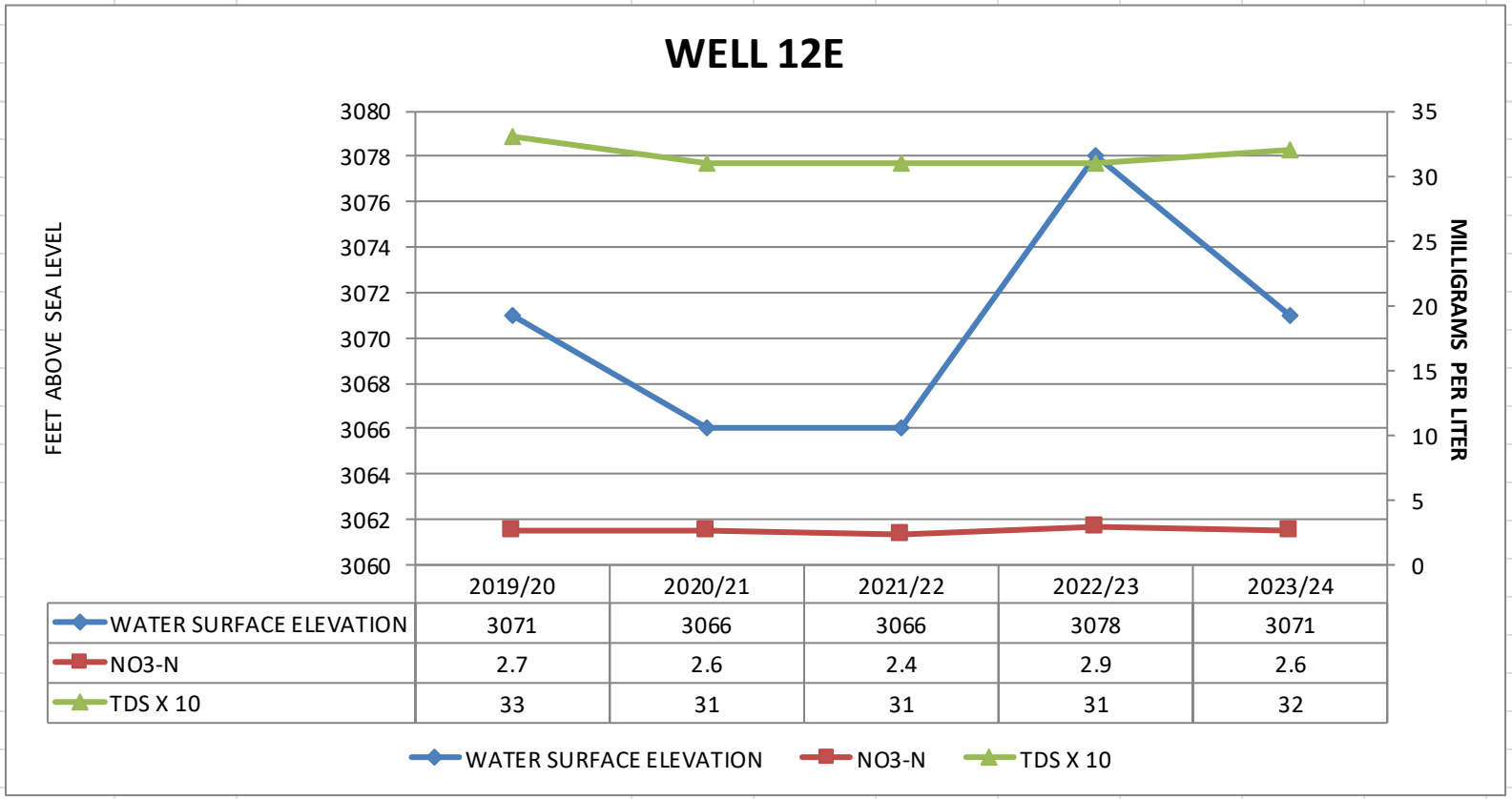



MID-WEST HYDROGEOLOGIC SUB-UNIT, NO3 AND TDS COMPARISON
MILLIGRAMS PER LITER
35
30
25
20
15
10
5
0
2019/20
2020/21
2021/22
2022/23
2023/24
9E NO3-n
12E NO3-n
16E NO3-n
17E NO3-n
9E TDS X 10
12E TDS X 10
16E TDS X 10
17E TDS X 10

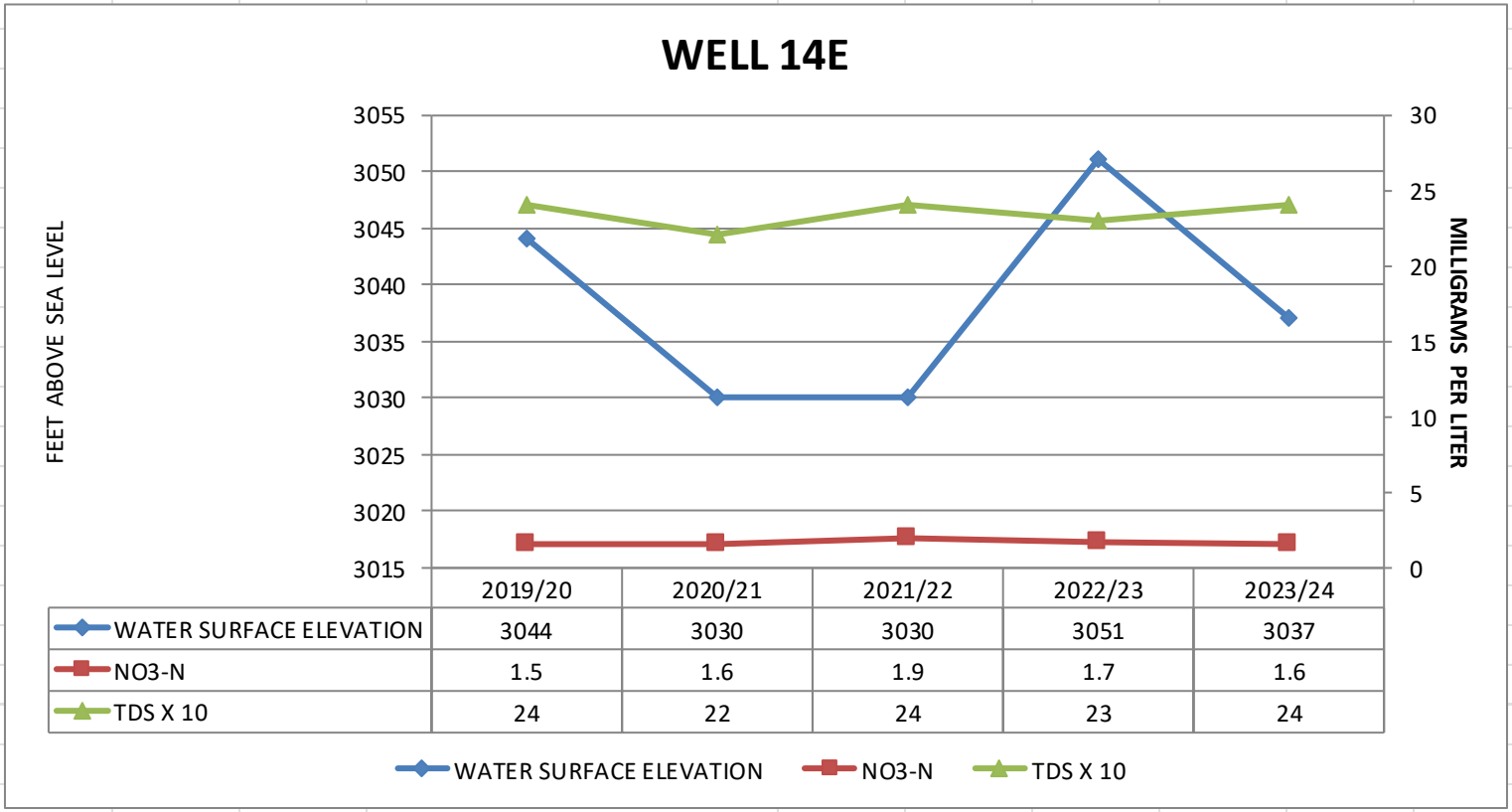
	WELL 9E				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3073	3064	3068	3075	3069
NO3-N	2.9	3.2	2.9	3.4	3
TDS X 10	30	31	30	31	32



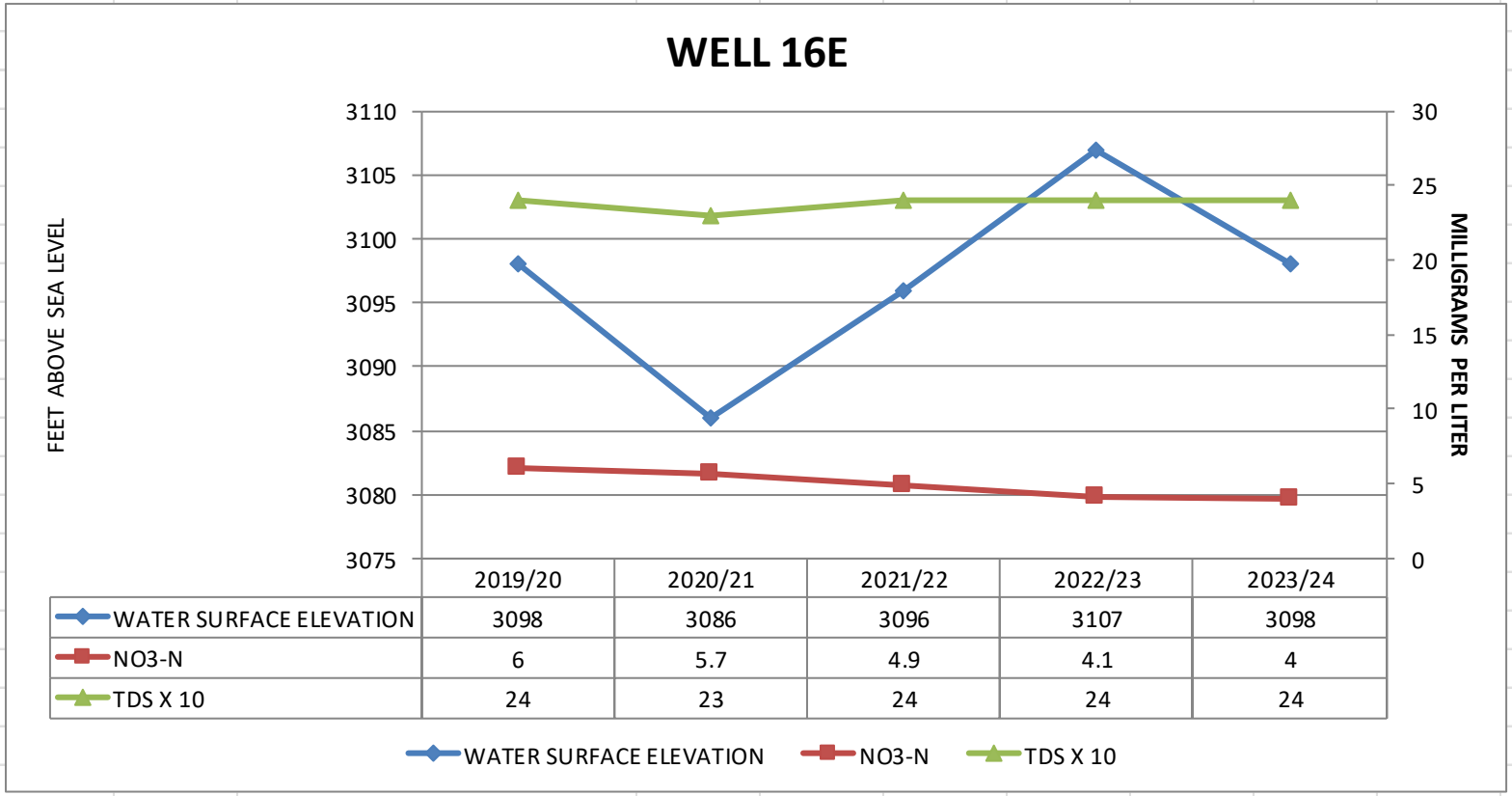
	WELL 12E				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3071	3066	3066	3078	3071
NO3-N	2.7	2.6	2.4	2.9	2.6
TDS X 10	33	31	31	31	32



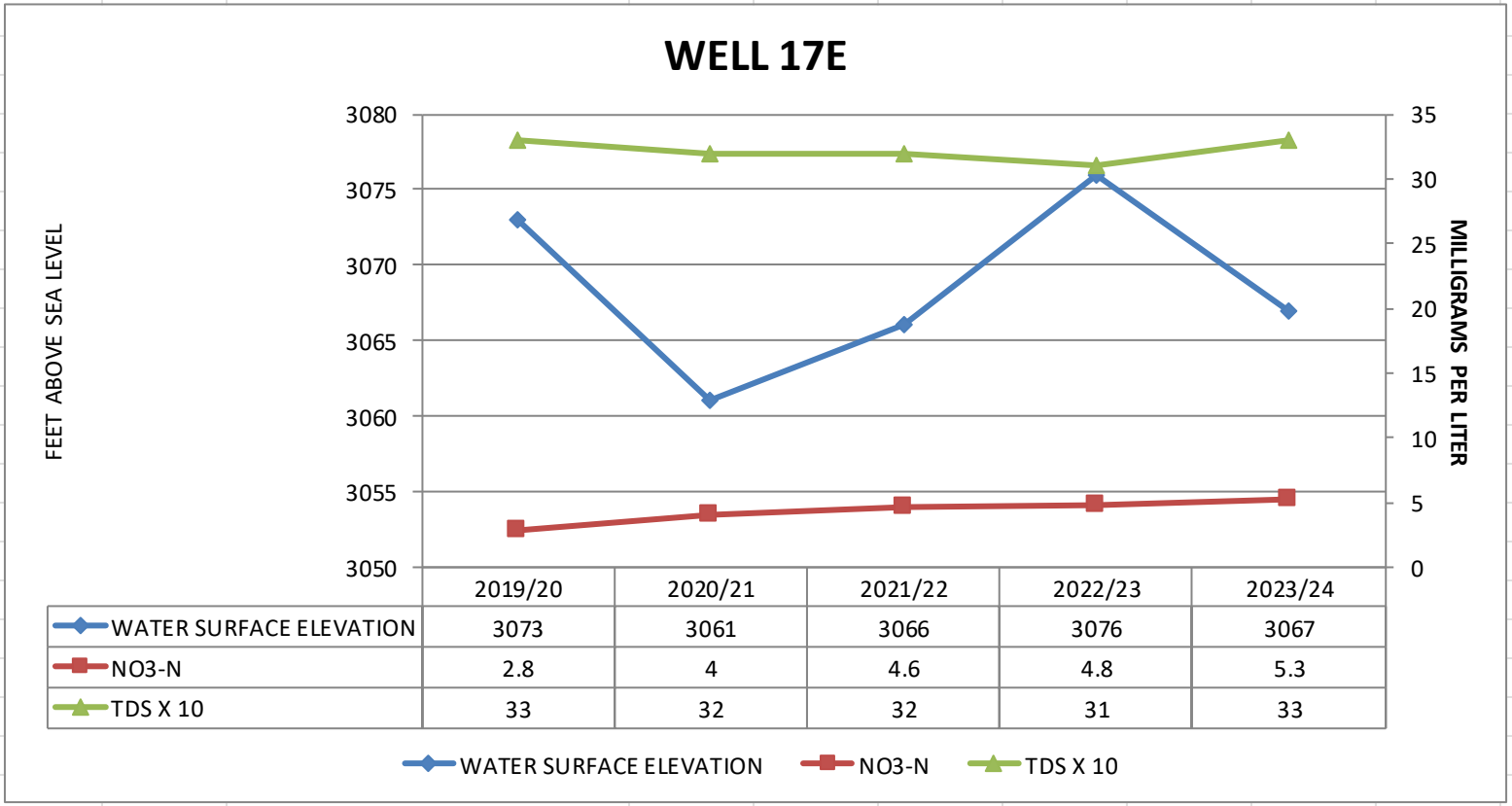
	WELL 14E				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3044	3030	3030	3051	3037
NO3-N	1.5	1.6	1.9	1.7	1.6
TDS X 10	24	22	24	23	24



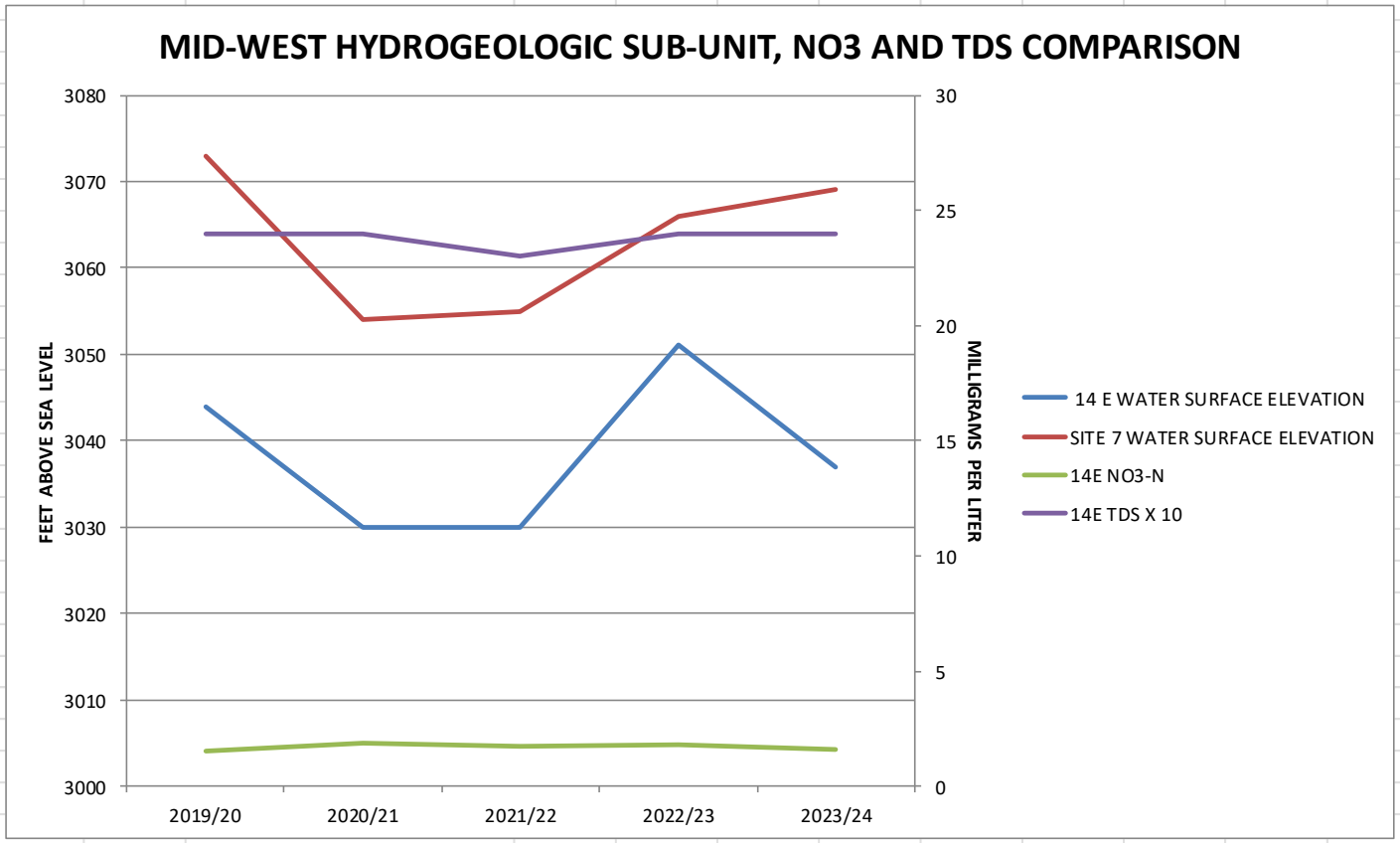
	WELL 16E				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3098	3086	3096	3107	3098
NO3-N	6	5.7	4.9	4.1	4
TDS X 10	24	23	24	24	24



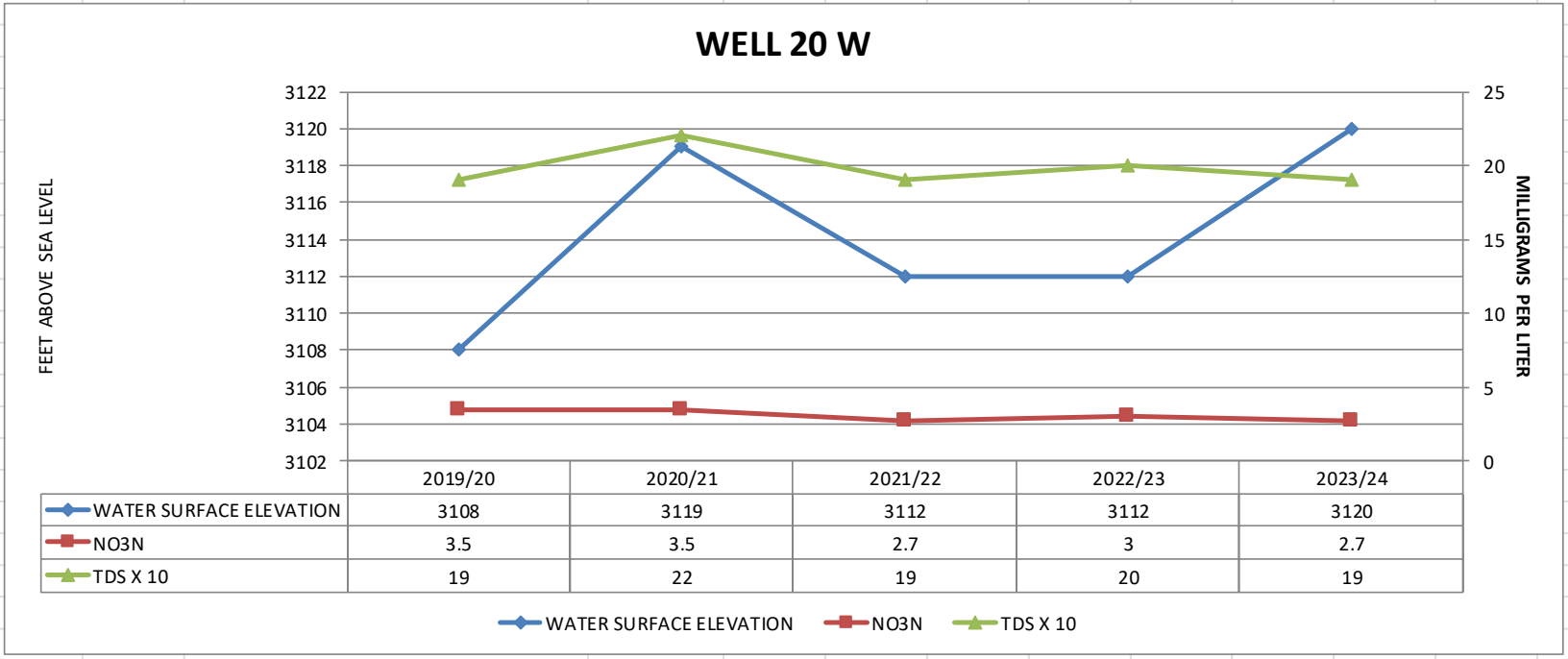
	WELL 17e				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3073	3061	3066	3076	3067
NO3-N	2.8	4	4.6	4.8	5.3
TDS X 10	33	32	32	31	33



	2019/20	2020/21	2021/22	2022/23	2023/24
14 E WATER SURFACE ELEVATION	3044	3030	3030	3051	3037
SITE 7 WATER SURFACE ELEVATIOI	3073	3054	3055	3066	3069
14E NO3-N	1.5	1.9	1.7	1.8	1.6
14E TDS X 10	24	24	23	24	24



	WELL 20W				
	2019/20	2020/21	2021/22	2022/23	2023/24
WATER SURFACE ELEVATION	3108	3119	3112	3112	3120
NO3N	3.5	3.5	2.7	3	2.7
TDS X 10	19	22	19	20	19



APPENDIX H - WARREN BASIN WATER STORAGE AND BALANCE

1/8/2025

Water Year Oct. - Sept.	State Water Recharge	USGS Nat Recharge	Wastewater Recharge	USGS Septic & Golf Course	Warren Basin Total Recharge	HDWD Pumpage Total	HLBS Golf Course Pumpage	USGS Groundwater Underflow	Warren Basin Outflow Total	Warren Basin Inflow - Outflow	Warren Basin Cumulative added storage	Cummulative Storage Upper Aquife	Years of Reserve	Cummulative Storage Upper and Middle Aquifer	Years of Reserve
BASIN RESERVE BALANCE												23,120	9	59,560	**23**
1994/95	1,909	49		2,131	4,089	1,644	319	41	2,004	2,085	2,870	25,990	10	61,645	**24**
1995/96	2,800	49		2,131	4,980	1,356	300	41	1,697	3,283	6,153	29,273	11	64,928	**25**
1996/97	5,072	49		2,131	7,252	2,140	394	52	2,586	4,666	10,819	33,939	13	69,594	**27**
1997/98	3,153	49		2,131	5,333	1,669	323	59	2,051	3,282	14,101	37,221	14	72,876	**28**
1998/99	1,900	49		944	2,893	1,884	312	29	2,225	668	14,769	37,889	15	73,544	**29**
1999/00	3,916	49		942	4,907	2,323	228	27	2,578	2,329	17,098	40,218	16	75,873	**29**
2000/01	3,459	49		925	4,433	2,179	300	34	2,513	1,920	19,018	42,138	16	77,793	**30**
2001/02	2,491	49		940	3,480	2,336	473	39	2,848	632	19,650	42,770	17	78,425	**30**
2002/03	2,635	49		974	3,658	2,577	226	43	2,846	813	20,462	43,582	17	79,237	**31**
2003/04	3,647	49		925	4,621	2,465	301	45	2,811	1,810	22,273	45,393	18	81,048	**32**
2004/05	2,932	49		901	3,882	2,507	106	48	2,661	1,221	23,494	46,614	18	82,269	**32**
2005/06	4,682	49		901	5,632	3,004	104	47	3,155	2,477	25,970	49,090	19	84,745	**33**
2006/07	4,743	49		901	5,693	2,959	106	49	3,114	2,579	28,549	51,669	20	87,324	**34**
2007/08	4,070	49		901	5,020	2,636	2	51	2,689	2,331	30,879	53,999	21	89,654	**35**
2008/09	2,091	49		880	3,020	2,672	0	50	2,722	297	31,177	54,297	21	89,952	**35**
2009/10	3,446	49		880	4,375	2,598	0	50	2,648	1,739	32,916	56,036	22	91,691	**36**
2010/11	2,816	49		880	3,745	2659	0	50	2,709	1,036	33,952	57,072	22	92,727	**36**
2011/12	2,468	49		880	3,397	2431	0	50	2,481	916	34,868	57,988	23	93,643	**36**
2012/13	2,982	49		880	3,911	2342	0	50	2,392	1,519	36,387	59,507	23	95,162	**37**
2013/14	889	49		880	1,818	2270	311	50	2,631	-813	35,574	58,694	23	94,349	**37**
2014/15	2,673	49		880	3,602	2161	227	50	2,438	1,164	36,738	59,858	23	95,513	**37**
2015/16	2,508	49		880	3,437	2196	274	50	2,520	917	37,655	60,775	24	96,430	**37**
2016/17	4,274	49		880	5,203	2153	341	50	2,544	2,659	40,314	63,434	25	99,089	**39**
2017/18	4,739	49		880	5,668	2214	341	50	2,605	3,063	43,377	66,497	26	102,152	**40**
2018/19	2,125	49		880	3,054	2535	274	50	2,859	195	43,572	66,692	26	102,347	**40**
2019/20	1,479	49		880	2,408	2187	294	50	2,531	-123	43,449	66,569	26	102,224	**40**
2020/21	2,745	49	421	573	3,788	2200	339	50	2,589	1,199	44,648	67,768	26	103,423	**40**
2021/22	2,156	49	633	499	3,337	2045	322	50	2,417	920	45,568	68,688	27	104,343	**41**
2022/23	1,971	49	666	436	3,122	1906	266	50	2,222	900	46,468	69,588	27	105,243	**41**
2023/24	3,029	49	783	457	4,318	2436	295	50	2,781	1,537	48,005	71,125	28	106,780	**42**
Total 1994-2024	**89,800**	**1,469**	**2,503**	**30,304**	**124,076**	**68,684**	**6,778**	**1,406**	**76,868**	**47,220**	**48,005**	**71,125**	**28**	**106,780**	**42**
Storage prior to start of Recharge															

Notes:

1) All Water volumes are Acre-Feet

Total storage (yrs) recharge - production only = **5.57**

2) Recharge water reflects agreed upon adjustment of 2% loss due to evaporation

3) JTRC production not included - extractions not part of recharged basins

4) Well 2W is included in column HDWD Pumpage Totals

5) Years of reserves = reserves within upper and middle aquifer divided by a running average of pumpage

Appendix I Sounding Chart / Recharge since 1991

YEAR	WELL 9E	WELL 12E	WELL 14E	WELL 16E	WELL 8W	WELL 6W	WELL 9W	WELL 11W
1991	2797.00	2805.00	2842.00	2757.00	2951.00	2930.00	2948.00	2941.00
2007	3024.83	3023.16	3010.00	3037.00	3015.28	3069.09	2944.66	2944.83
2024	3072.94	3074.64	3043.65	3103.39	3105.54	3119.57	3106.15	3089.54