2017 ANNUAL MONITORING REPORT / PERFORMANCE REVIEW
FOR
HOMESTAKE'S GRANTS PROJECT
PURSUANT TO
NRC LICENSE SUA-1471 AND DISCHARGE PLAN DP-200

FOR:

U.S. NUCLEAR REGULATORY COMMISSION
AND
NEW MEXICO ENVIRONMENT DEPARTMENT

BY:

HOMESTAKE MINING COMPANY OF CALIFORNIA
GRANTS, NEW MEXICO

AND

HYDRO-ENGINEERING, LLC
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TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

APPENDICES

NOTE: TABLE OF CONTENTS IS PRESENTED AFTER THE TAB FOR EACH SECTION

SECTION 1

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 1

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT
FIGURES
(continued)

Page Number

1.0 EXECUTIVE SUMMARY AND INTRODUCTION

1.1 EXECUTIVE SUMMARY

Homestake Mining Company of California manages a groundwater restoration program as defined by Nuclear Regulatory Commission (NRC) License SUA-1471, and New Mexico Environment Department (NMED), DP-200 permit. The restoration program is a dynamic on-going strategy based on a restoration plan, which began in 1977.

Homestake's long-term goal is to restore the aquifer water quality to levels as close as practicable to the up-gradient site background levels. A groundwater collection area (see yellow shaded area on Figure 2.1-1, Page 2.1-15) has been established and is bounded by a down-gradient perimeter of injection/infiltration wells and trenches. Alluvial groundwater that flows beneath the tailings enters this collection area. All groundwater in the alluvial aquifer that is within the collection area is eventually captured by the collection well system. Once groundwater quality restoration within the zone is complete and approved by the agencies, the site is to be transferred to the U.S. Department of Energy, which will have the responsibility for long-term site care and maintenance.

The data reported within this document represent the results of the monitoring program during 2017. This is a yearly reporting requirement. A similar report has been submitted to the agencies each year since 1983 (see footnote list in Section 1.2 and report Section 9.0).

The restoration program is designed to remove target contaminants from the groundwater by flushing the alluvial and Chinle aquifers with deep-well supplied fresh water or treated water produced from the reverse osmosis (R.O.) plant or the zeolite treatment system. A series of collection wells is used to collect the contaminated water, which is currently pumped to the R.O. plant or zeolite for treatment or, alternatively, reported to the evaporation ponds.

Historically, the contaminants are found in two different aquifer systems. The aquifer system of primary concern is the alluvial system, which averages approximately 100 feet in depth, and extends generally north to south encompassing the San Mateo alluvial aquifer. In addition, a second aquifer system is found within the Chinle formation underlying the San Mateo alluvium. It is comprised of three separate aquifers designated as the Upper, Middle and Lower Chinle aquifers. The Updated Corrective Action Program (CAP, Homestake 2012) and Hydro-Engineering 2003b & 2010b reports should be reviewed for details of the geologic setting and aquifer conditions on the site. Two cross sections are included that present the hydrologic setting at the Grants site and their locations are shown on Figure 1.1-1. Figure 1.1-2 presents a typical cross section which is located from within the On-Site area and extends to the south-southwest into southern Felice Acres area (see Figure 1.1-1 for location of the cross section). This typical cross section shows the alluvial aquifer relative to the three Chinle aquifers and shows the Upper and Middle Chinle aquifers subcropped with the alluvium. Figure 1.1-3 presents Cross section B-B' which shows the alluvial, Upper and Middle Chinle aquifers just south of the Large Tailings Pile (LTP) and through the Small Tailings Pile (STP). A second cross section (D-D') that runs from Section 3 in the southwest through the LTP is presented in Figure 1.1-4. The Upper and Middle Chinle aquifers subcrop beneath the alluvial system near the project site. Slight to moderately elevated concentrations of constituents of concern have been observed in the Upper, Middle and Lower Chinle aquifers near their subcrops with the overlying alluvial system.

The restoration program, as described above, is made up of injection and collection well systems. A mixture of R.O. product water, zeolite treated and/or fresh water pumped from deep wells is injected in a series of wells or infiltration trenches arranged to form a continuous injection line across the site. The injection line creates a hydraulic barrier that results in containment of the contaminants within the collection area. The contaminated groundwater is pumped and collected from a series of wells within the collection area. The collected aquifer water from On-site is pumped to the R.O. plant or to three large lined evaporation ponds for passive and forced (spray) evaporation. The On-site collection is near the LTP and is located to the north of where Cross section B-B' runs between wells CW-6 and CW-4. This collection would also be south of the LTP on Cross section D-D'. Historically, the Off-site collection water has been used for irrigation. The Off-site collection water is processed through the zeolite system and the treated water flows to the PTT prior to being used for injection water. Collection and injection has started in the northeast portion of Section 3 with the R well field and Felice Acres with mainly the Q and Y well fields. The R well field is in the Middle Chinle subcrop area and the collection is occurring from both the alluvial and Middle Chinle aquifers. The Q and Y well fields are completed in the alluvial and Middle Chinle aquifers, respectively, just north of the Middle Chinle subcrop area. The injection also occurs in both the alluvial and Middle Chinle aquifers. The R well field is located east of well CW-29 on Cross section D-D' and was operated most of 2017 except for three months when the zeolite treatment was down. The Q and Y wellfields also operated during this period. Saturated alluvium exists above the Middle Chinle aquifer in this location. Timing of restoration of the alluvial aquifer in the R area is important to restoration of the Middle Chinle down gradient of this area.

In the years from 1977 to the present, the combination of injection wells and the up-gradient collection system has continued the withdrawal of the contaminated groundwater plume up-gradient of the current hydraulic barrier which assists in aquifer restoration of groundwater concentrations to or below site background levels. Selenium concentrations are used to present the progress that has been made in the groundwater restoration program. Selenium was the parameter of most concern in the early years of the corrective action program. Figure 1.1-5 presents the alluvial selenium concentrations for 1976 prior to the start of the corrective action program for the Grants site. The red pattern in this figure shows where selenium concentrations were greater than 5 mg/l in 1976 in the Large and Small Tailings areas. The blue pattern shows where concentrations are above 1 mg/l but less than 5 mg/l with areas On-site and in Broadview Acres. The detached zone of higher concentrations in the Broadview Acres area were caused by faster migration through the Upper Chinle aquifer that entered the alluvial aquifer in the Broadview Acres area. The cyan color shows where concentrations were between 0.32 and 1.0 mg/l in 1976. The 1988 alluvial selenium concentration patterns are presented in Figure 1.1-6 and show that selenium had been restored in all of the subdivisions by 1988. Figures 1.1-7 and 1.1-8 give the selenium patterns for 1999 and 2014, respectively, showing only a small area in the tailings area in 1999 with selenium concentrations above 5 mg/l while no concentrations are above this level in 2014. The area in Section 3 with elevated selenium concentration in 1999 was restored prior to 2014. Selenium patterns for 2017 are presented in Figure 1.1-9 and shows that selenium restoration is only needed in the tailings area and the L area southeast of the STP.

Uranium became the most important parameter for restoration at the Grants site after a large portion of selenium restoration and with the establishment of new uranium standards in the mid 2000's. Figure 1.1-10 presents the 1976 alluvial uranium concentrations with the red pattern showing where concentrations exceeded 10 mg/l in the area of the LTP and STP and in the western portion of Broadview Acres. The elevated concentrations in Broadview Acres migrated through the Upper Chinle aquifer to this area and then traveled into the alluvial aquifer. This figure also shows that there were additional areas in Broadview and Murray Acres where concentrations exceeded 1.0 and 0.5 mg/l levels in 1976. The cyan color shows where concentrations exceed 0.16 mg/l in 1976. Figure 1.1-11 shows the uranium concentrations that existed in the alluvial aquifer in 1988 with concentrations of 0.16 to 0.5 mg/l still present in Broadview and Felice Acres and concentrations above 1 mg/l in the northeast portion of Murray Acres. Uranium concentrations in the On-site area near the LTP and STP were greater than 10 mg/l. The uranium concentrations in 1999 were below the site standard in all of Broadview Acres except the southern area where concentrations were slightly above the site standard (see Figure 1.1-12). A small area in the northeast portion of Murray Acres also exceeded the site standard in 1999, but the maximum concentrations in this area were reduced to below 1.0 mg/l. Uranium concentrations in southern Felice Acres and the northeast portion of Section 3 exceeded 1 mg/l in 1999. Concentrations exceeded 0.5 mg/l in the central portion of Section 28 in the North area while the area of concentrations exceeding the site standard extended down to the west-center portion of Section 33. The 2014 uranium concentration patterns are presented in Figure 1.1-13 and show that concentrations in southern Felice Acres and the northeast portion of Section 3 have been reduced to below 1.0 mg/l with a much smaller area of concentrations greater than 0.5 mg/l left in southern Felice Acres and the northeast portion of Section 3. The area of concentrations greater than the site standard that extended into west-central portion of Section 33 has been pulled back approximately one mile to the western portion of Section 28. The On-site area of concentrations greater than 10 mg/l is also much smaller in 2014. The 2017 uranium concentration patterns are presented in Figure 1.1-14 which shows the extent of the uranium pattern in Section 28 approximately 1300 feet less in 2017.

The uranium concentrations for five different years are presented for the Upper Chinle aquifer in Figures 1.1-15 through 1.1-19. Collection in the Upper Chinle aquifer is mainly south of the Collection ponds in or near the Upper Chinle subcrop area and this area is shown on Cross section B-B' in the area of well CW-4.

Figures 1.1-20 through 1.1-25 give similar maps for the Middle Chinle aquifer and the sequence of measured concentrations showed some improvement in the South Felice Acres area with only a very small area with concentrations above 0.5 mg/l in 2017. Collection in the Middle Chinle in 2017 is mainly in the R and Y well fields in the South collection and one well west of the West Fault in the On-site collection. The hydrologic setting is shown on Cross section D-D' where the Middle Chinle sandstone subcrops with saturated alluvium in the R well field.

The elevated Lower Chinle uranium concentrations were first defined in 1996 and are presented in Figure 1.1-26. The collection of water for irrigation from the Lower Chinle reduced the higher concentrations in 1999 (see Figure 1.1-26) to lower levels in 2014 (see Figure 1.1-27). Figure 1.1-28 give a similar map for the Lower Chinle aquifer for 2017.

An average of 456 gallons per minute (gpm) was pumped into the On-site alluvial treated and/or fresh-water injection systems in 2017. An additional 70 gpm of treated and/or fresh water was injected into the On-site Upper and Middle Chinle aquifer systems. An average rate of 407 gpm of R.O. product water was pumped to the PTT and mixed with zeolite treated water and/or fresh water prior to injection onto the groundwater in 2017. Production of significant quantities of R.O. product water started in July of 1999 with consistent operation from 2000 through 2017 except during equipment repair periods.

In 2017, the average collection rate for the On-site alluvial aquifer was maintained at 364 gpm. No collection for re-injection of alluvial aquifer water was done in 2017. The On-Site Upper Chinle aquifer collection program consisted of pumping wells CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A and CE19 at an average composite rate of 100 gpm in 2017. The up-gradient alluvial aquifer collection system was not operated in 2017, while average rates of 10.4 and 1.3 gpm were pumped from the LTP toe drains and *in situ* tailings pile dewatering, respectively.

The continuing evaluation of the performance of the Grants restoration system, including the 2017 results, shows that sulfate, TDS, chloride, uranium, selenium and molybdenum are still the key constituents of interest at this site. Successful restoration of groundwater quality with respect to these key constituents will also accomplish restoration for other constituents. The monitoring program has shown that any low levels of nitrate, radium-226, radium-228, vanadium and thorium-230 are also reduced when the key constituents are restored in a particular area.

Data relating to key constituents currently being restored at the site have been reviewed and statistically evaluated to determine upgradient site back groundwater quality. These background water quality levels have been accepted by NRC, EPA and NMED; the NRC and NMED have set site standards based on the background water quality and accordingly amended the Radioactive Material license and DP-200 to reflect those standards. It should be noted that these site standards are utilized throughout this report for comparison purposes in discussing restoration progress.

Observed alluvial aquifer concentrations of key constituents at the Grants site were similar to those in previous years. The only areas where sulfate, TDS and chloride concentrations exceed the alluvial site standard are an area east of Valle Verde plus the large area in close proximity to the Large and Small Tailings Piles in the Grants Project area.

Uranium concentrations exceed the alluvial site standard of 0.16 mg/l within the collection area near the tailings. There is also one well in northern Felice Acres and several wells in southern Felice Acres subdivision that contain concentrations of uranium exceeding the site standard. Groundwater withdrawal for treatment was used to further reduce uranium levels that exceed the standard in an area southwest of Felice Acres in Section 3, in Felice Acres and in Section 28. Collection of water from one well in Murray Acres has reduced uranium concentrations in that area. Uranium concentrations in the northeast portion of Section 3 and South Felice acres were reduced in 2017 in the R and Q well fields.

Selenium concentrations also exceed the relevant site standard in the collection area near the LTP and southeast of the STP. None of the sampled subdivision wells contained selenium concentrations above the site standard.

None of the subdivision wells contain molybdenum concentrations above the site standard of 0.1 mg/l. The wells exhibiting elevated molybdenum concentrations are all located near the Large and Small Tailings Piles, to the southeast of the STP, and in an area in central Section 27. Migration of this constituent has been limited due to natural retardation within the alluvial aquifer.

Nitrate concentrations are compared to the alluvial site standard of 12 mg/l. An area between the LTP and STP contains higher nitrate concentrations above the site standard and is likely caused by tailings seepage. The nitrate standard is also exceeded in one well in Section 34. Water quality with respect to this constituent should easily be remediated through the ongoing restoration program.

All radium values in the alluvial aquifer outside of the tailings perimeter were less than the site standard except for two outliers. This demonstrates that radium is only a constituent of concern under the LTP.

No vanadium concentrations exceeded the alluvial site standard 2017except for wells in the LTP and STP. Concentrations of this constituent have been adequately restored to below the site standard except for levels in the LTP and STP.

Thorium levels observed in 2017 were less than the site standard except levels in the alluvium immediately under the LTP. One value near the STP slightly exceeded the site standard but this value may be an outlier. The mobility of this constituent has been very limited and elevated activities only occur in close proximity to the tailings. However, the analytical results for this constituent vary significantly at the low observed levels as they are approaching laboratory detection limits. Slightly higher values should not be considered significant until they are supported by additional monitoring. The monitoring records for thorium indicate that it is a minor constituent of concern at the Grants site.

Treated water and/or fresh-water injection into Upper Chinle wells CW13 and 944, (See Figure 5.1-2), east of the East Fault, continued in 2017. This injection has maintained higher water levels in the Upper Chinle aquifer east of the East Fault which in turn has allowed continued operation of the nearby Upper Chinle collection wells.

Treated water and/or fresh-water injection continued in 2017 in Upper Chinle well CW5 just north of Broadview Acres and also in Upper Chinle wells CW4R and CW25. This injection has resulted in gradient reversal within the Upper Chinle, thereby forcing groundwater from this area back to the north toward the tailings piles. Collection from Upper Chinle well CE2 was initiated in 1999 and continued through 2017. Collection in Upper Chinle wells CE5, CE6, CE11 and CE12 was started in 2006. Collection from Upper Chinle well CE7 started in late 2010 while collection in wells CE15, CE15A and CE19 started in 2017. This collection is used in conjunction with injection wells CW4R, CW5 and CW25 to restore groundwater quality in this area. Injection into well CW25 was started in 2000 and continued through 2017.

All sulfate, chloride and TDS concentrations in the Upper Chinle aquifer are below the site standards except for samples from wells near or on the LTP for all three constituents. Therefore, the Upper Chinle aquifer only requires restoration with respect to TDS, chloride and sulfate in a localized area near the LTP.

Uranium concentrations in numerous wells near the LTP and Collection ponds and four Upper Chinle wells north and in Broadview and Felice Acres exceeded the Upper Chinle site standard in 2017. Restoration of these elevated values should result from the existing and additional Upper Chinle collection wells and the CW4R, CW5 and CW25 well injection efforts.

Selenium concentrations in the Upper Chinle aquifer exceed the site standard in the mixing zone near the LTP and one well south of the Collection ponds. The site standards for selenium for the Upper Chinle mixing zone and the Upper Chinle non-mixing zone are 0.14 and 0.06 mg/l, respectively.

The concentrations of molybdenum exceeded the site standard in several wells near the tailings and south of the Collection Ponds in the Upper Chinle aquifer and one north of Broadview

Acres during 2017. Restoration for these locations should occur from continued additional and existing well collection and CW4R, CW5 and CW25 well injection activities.

All nitrate concentrations observed in 2017 for the Upper Chinle mixing zone were less than the nitrate site standard except for a small area in the LTP area. This indicates that nitrate is not a constituent of concern in this aquifer.

Only an area in the Upper Chinle aquifer in the western portion of the LTP contain a radium-226 plus radium-228 value above 5 pCi/l. All vanadium and thorium-230 results for the Upper Chinle in 2017 were less than the site standards. This is consistent with the low observed concentrations in the overlying alluvial aquifer.

The direction and rate of groundwater flow in the Middle Chinle aquifer in 2017 is very similar to that of past years except for the depression that exist in western South Felice Acres from the pumping in 2017. Fresh-water injection into well CW14 started in December of 1997. Fresh-water injection into wells CW30 and CW46 started in 2004 while injection into Middle Chinle well CW77 started in 2016. The fresh water is building up a mound of groundwater in this area, which will result in a reversal of the flow of Middle Chinle water back toward the alluvial subcrop. Well CW28 was added as a supply well for fresh-water injection in 2002 but was not used during 2017.

Water quality in the Middle Chinle aquifer is generally good and all sulfate concentrations are less than the site standards in 2017 except for one well west of the West Fault near collection well CW62. All TDS concentrations in the Middle Chinle aquifer are less than the standards except for two wells in Murray Acres and one well in Broadview Acres that are above the non-mixing zone background value. Chloride concentrations in the Middle Chinle aquifer did not exceed the site standard in 2017 except for one well in Murray Acres.

Uranium concentrations in the western portion of Felice Acres are above mixing zone site standards due to the alluvial recharge to the Middle Chinle aquifer just south of Felice Acres but the concentrations were decreased with the 2017 collection in this area. Continued pumping of this water by Homestake will reduce these elevated concentrations in Felice Acres and Broadview Acres. The uranium background is also exceeded in several wells west of the West Fault but the levels in these wells were reduced in 2017 with the CW62 collection. Continued pumping of well CW62 should reduce the uranium in the Middle Chinle west of the West Fault.

The non-mixing zone selenium site standard is slightly exceeded in well 493 in Felice Acres (See Figure 6.3-14). The mixing zone selenium site standard is exceeded in four wells west of the West Fault but were decreased in 2017. Molybdenum concentrations in several wells west of the West Fault in the Middle Chinle aquifer are above the mixing zone standard of 0.10 mg/l.

Nitrate, radium, vanadium and thorium-230 concentrations in the Middle Chinle aquifer are below levels of concern for each of the constituents. Hence, uranium, selenium and molybdenum are considered the important constituents relative to restoration needs for the Middle Chinle aquifer system.

Concentrations of major constituents in the Lower Chinle aquifer generally increase in the down-gradient direction due to the slow movement of water in the fractured shale. All sulfate, TDS and chloride concentrations are less than the site standards except in far-down-gradient areas, where natural concentrations exceed the non-mixing zone site standard. These exceedances are a result of the limited background data for the far-down-gradient areas of the Lower Chinle aquifer, and there is a naturally occurring deterioration of Lower Chinle water quality in the down-gradient direction.

The uranium site standards in the Lower Chinle aquifer are exceeded in several wells in Section 3. The wells where concentrations exceed the mixing zone site standard of 0.18 mg/l are located near the subcrop of the Lower Chinle aquifer with the alluvial aquifer. Concentrations in several non-mixing zone well exceed the site standard of 0.03 mg/l.

Concentrations of selenium do not exceed the standards in the two zones for the Lower Chinle aquifer. All molybdenum concentrations in the Lower Chinle aquifer are less than the site standard. None of the Lower Chinle nitrate concentrations exceed site standards or at levels of concern. All radium, vanadium and thorium-230 concentrations in the Lower Chinle aquifer in 2017 were at low levels.

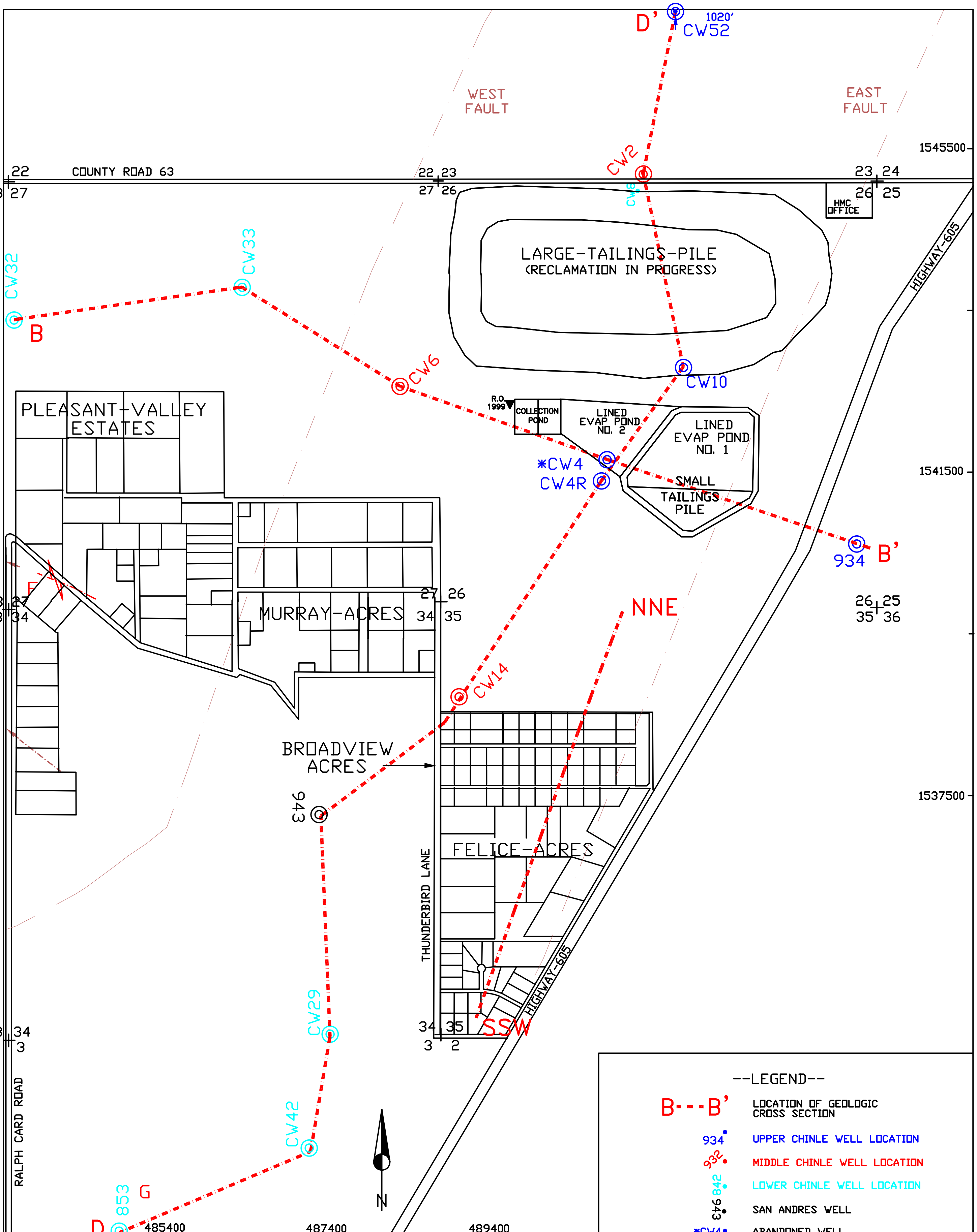

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FIGURE 1.1-1. LOCATIONS OF GEOLOGIC CROSS SECTIONS

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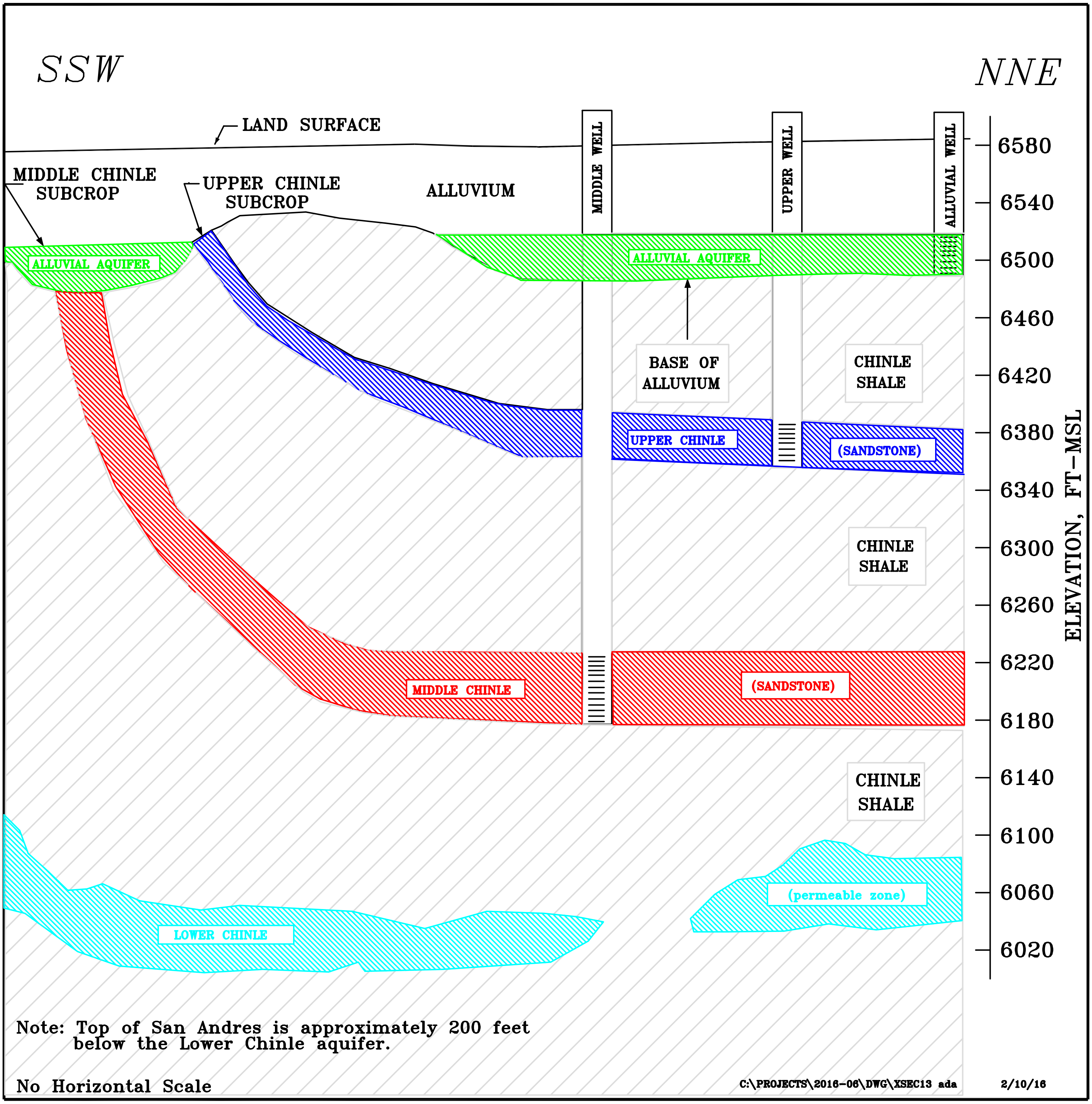

FIGURE 1.1-2. TYPICAL GEOLOGIC CROSS SECTION

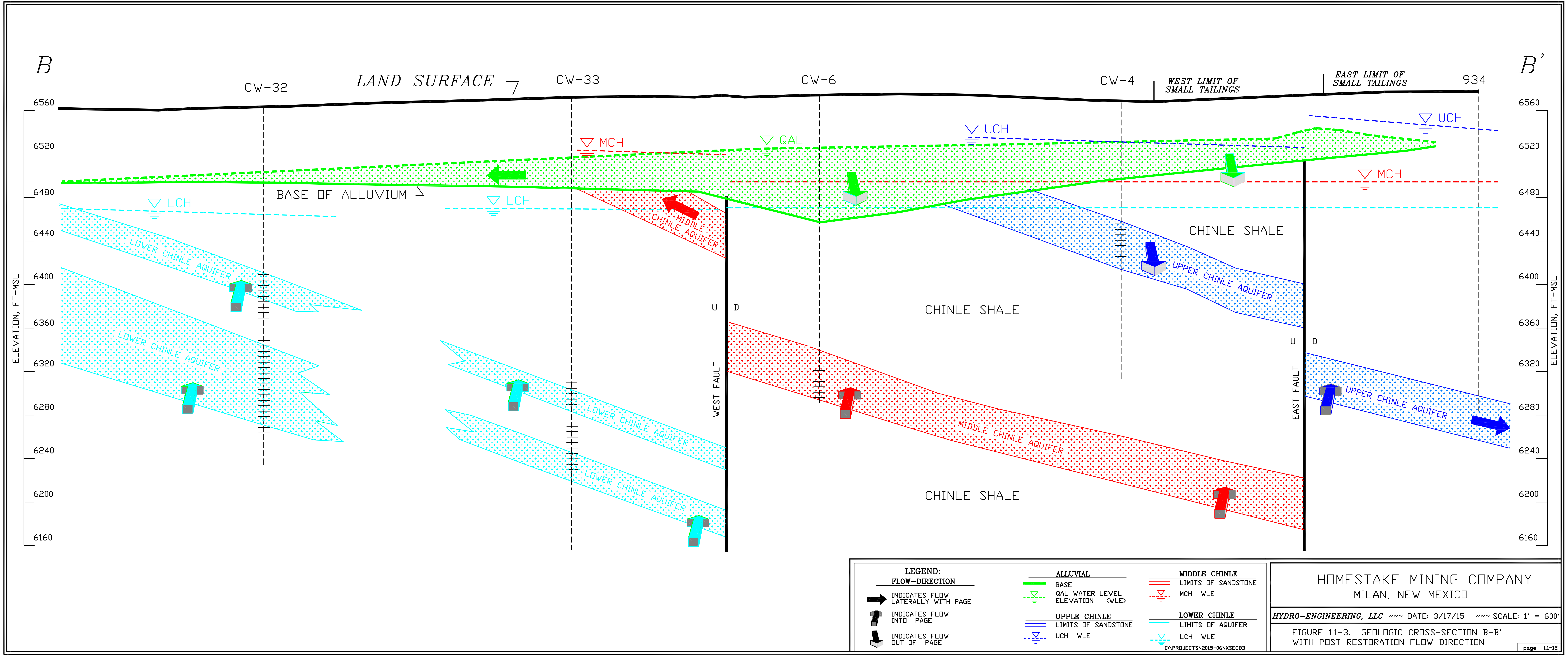

FIGURE 1.1-3. GEOLOGIC CROSS-SECTION B-B' WITH POST RESTORATION FLOW DIRECTION

FIGURE 1.1-4. GEOLOGIC CROSS-SECTION D-D' WITH POST RESTORATION FLOW DIRECTION

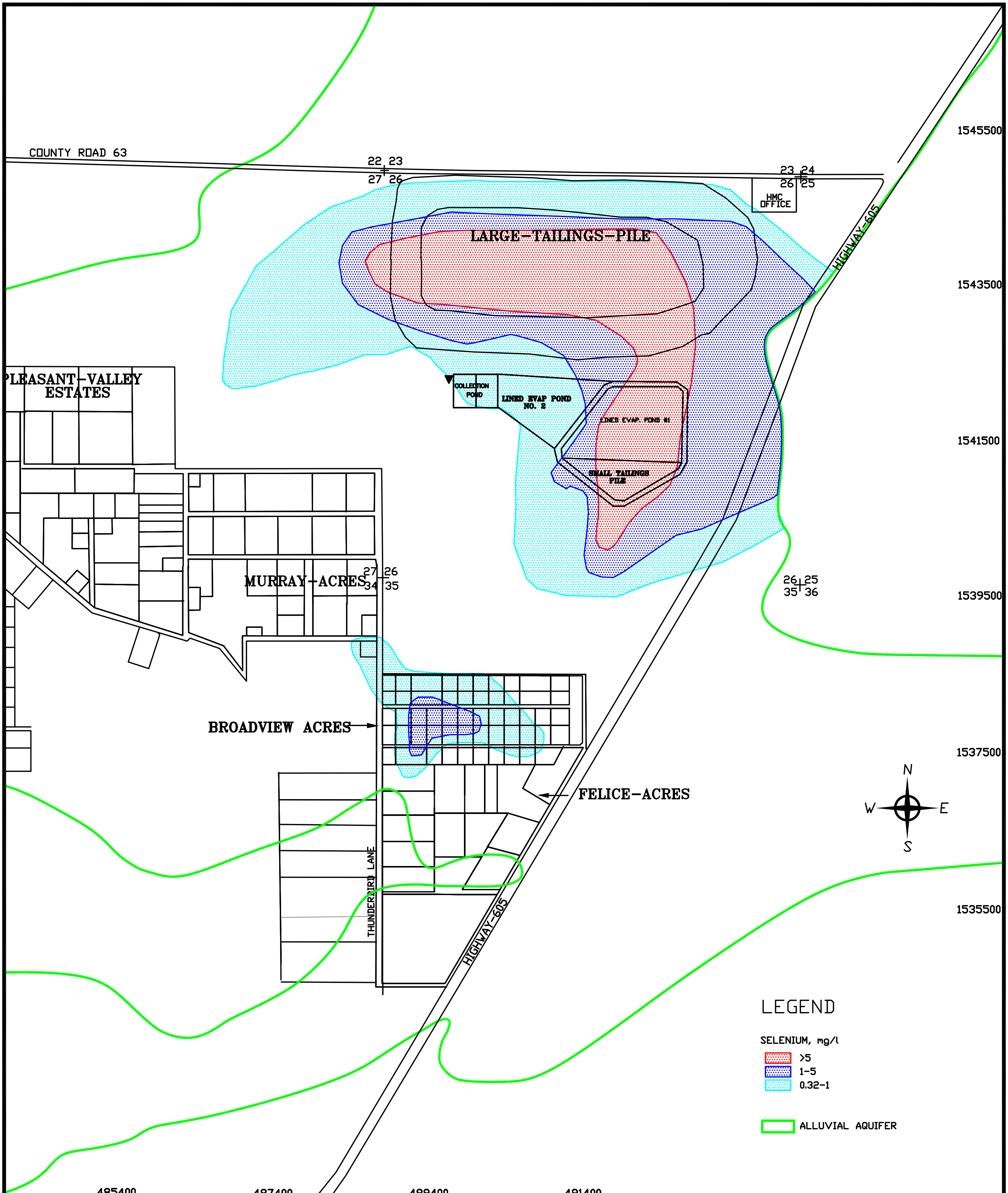

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FIGURE 1.1-5. ALLUVIAL SELENIUM CONCENTRATIONS, 1976

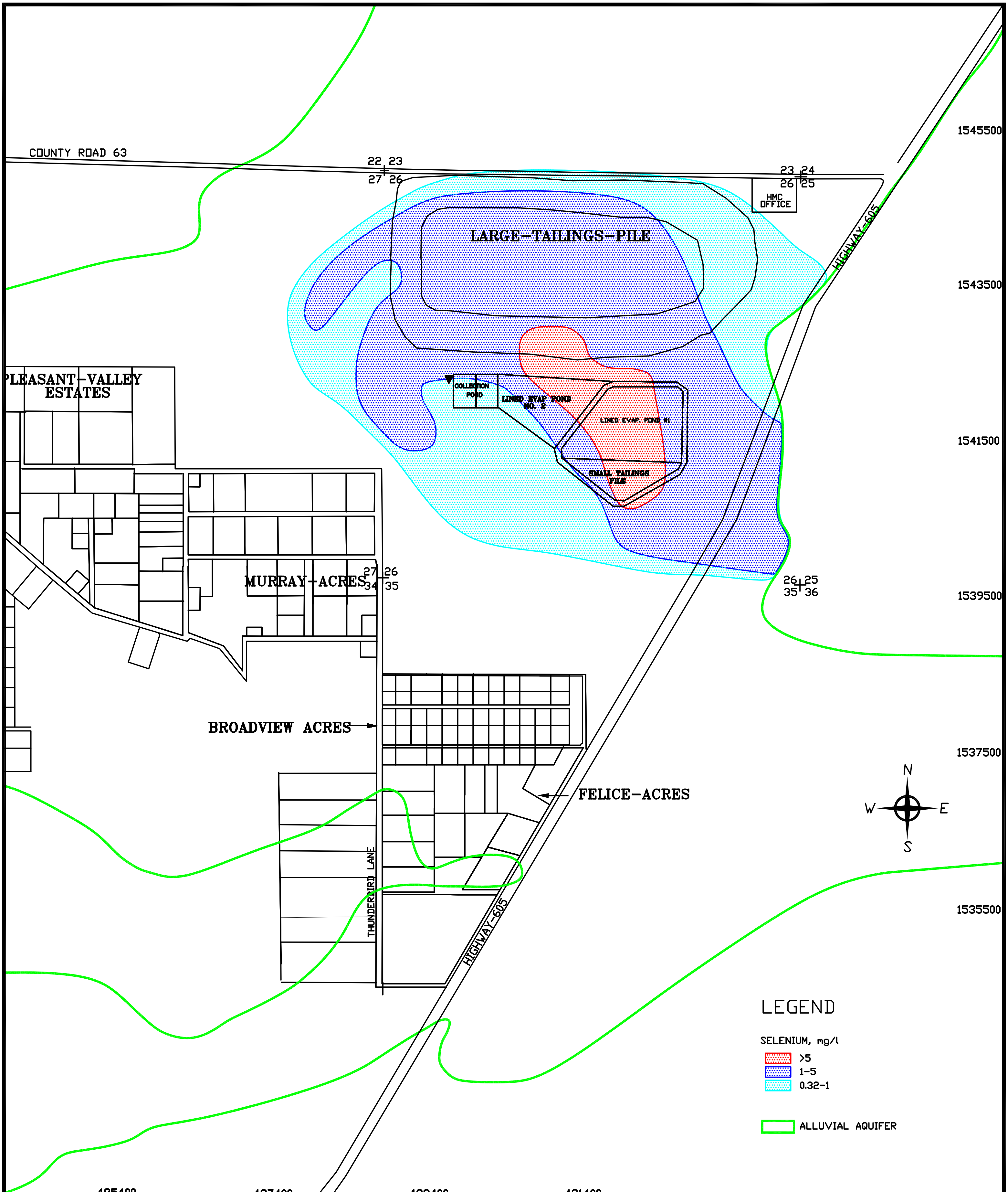

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FIGURE 1.1-6. ALLUVIAL SELENIUM CONCENTRATIONS, 1988

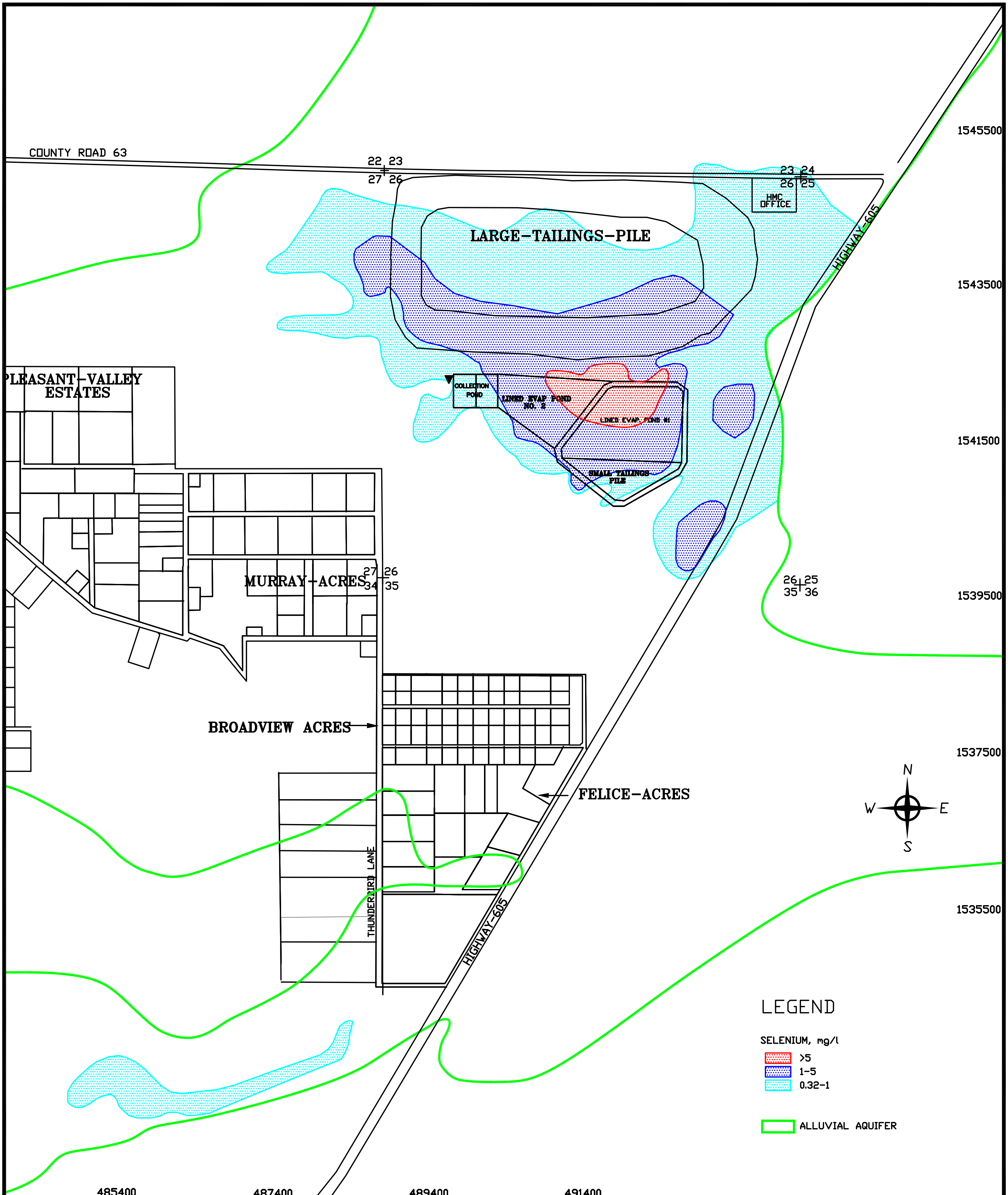

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FIGURE 1.1-7. ALLUVIAL SELENIUM CONCENTRATIONS, 1999

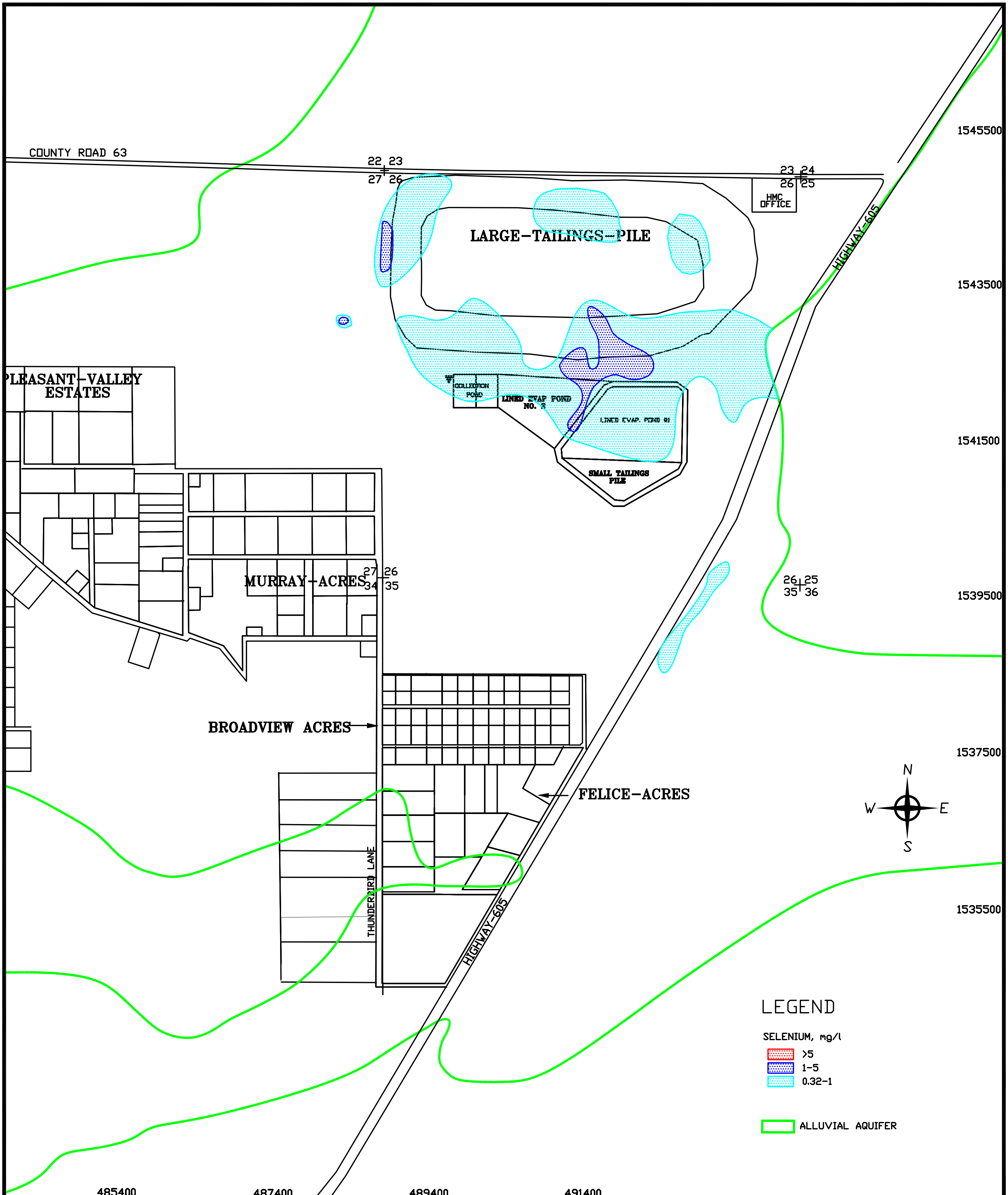

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FIGURE 1.1-8. ALLUVIAL SELENIUM CONCENTRATIONS, 2014

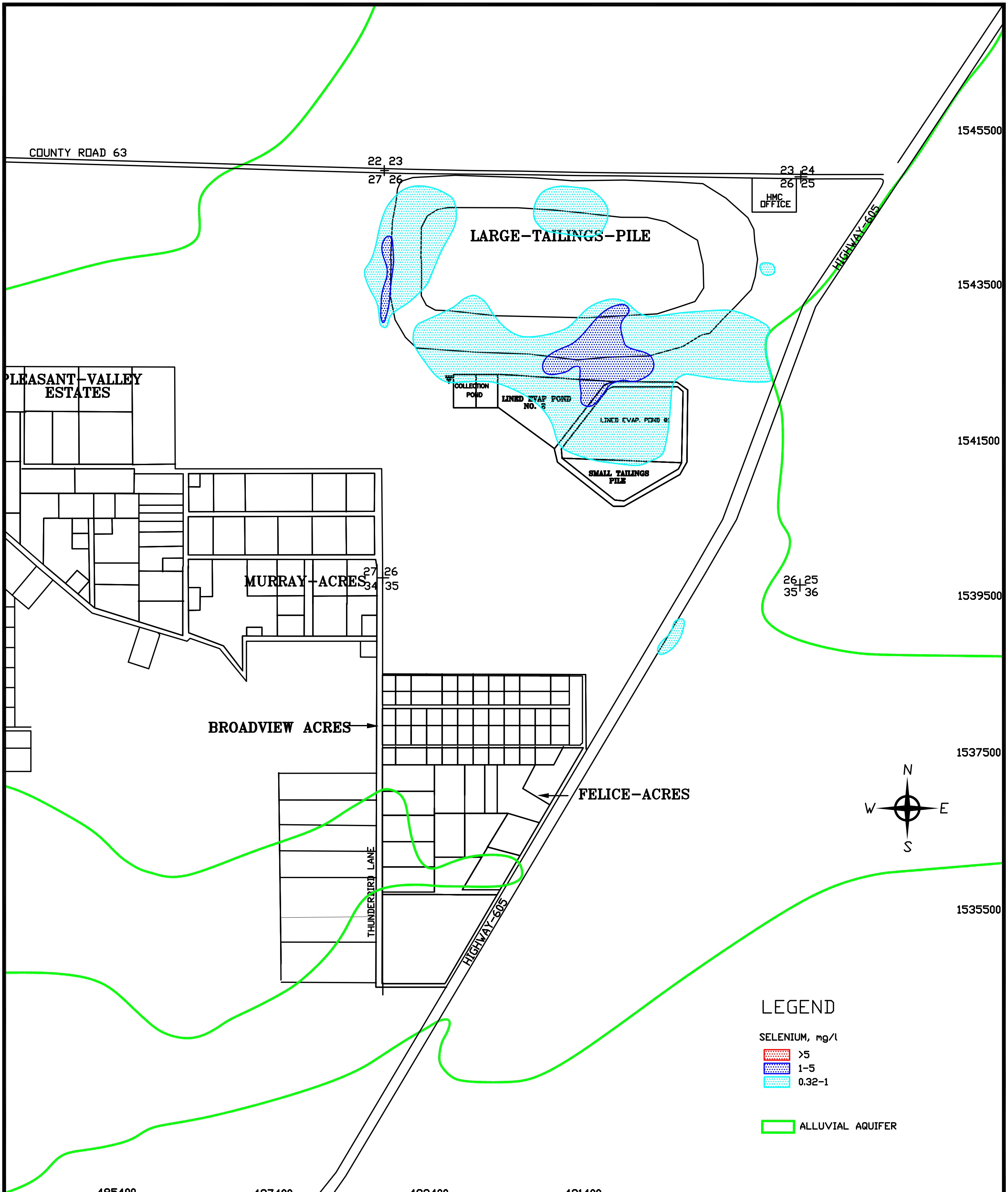

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FIGURE 1.1-9. ALLUVIAL SELENIUM CONCENTRATIONS, 2017

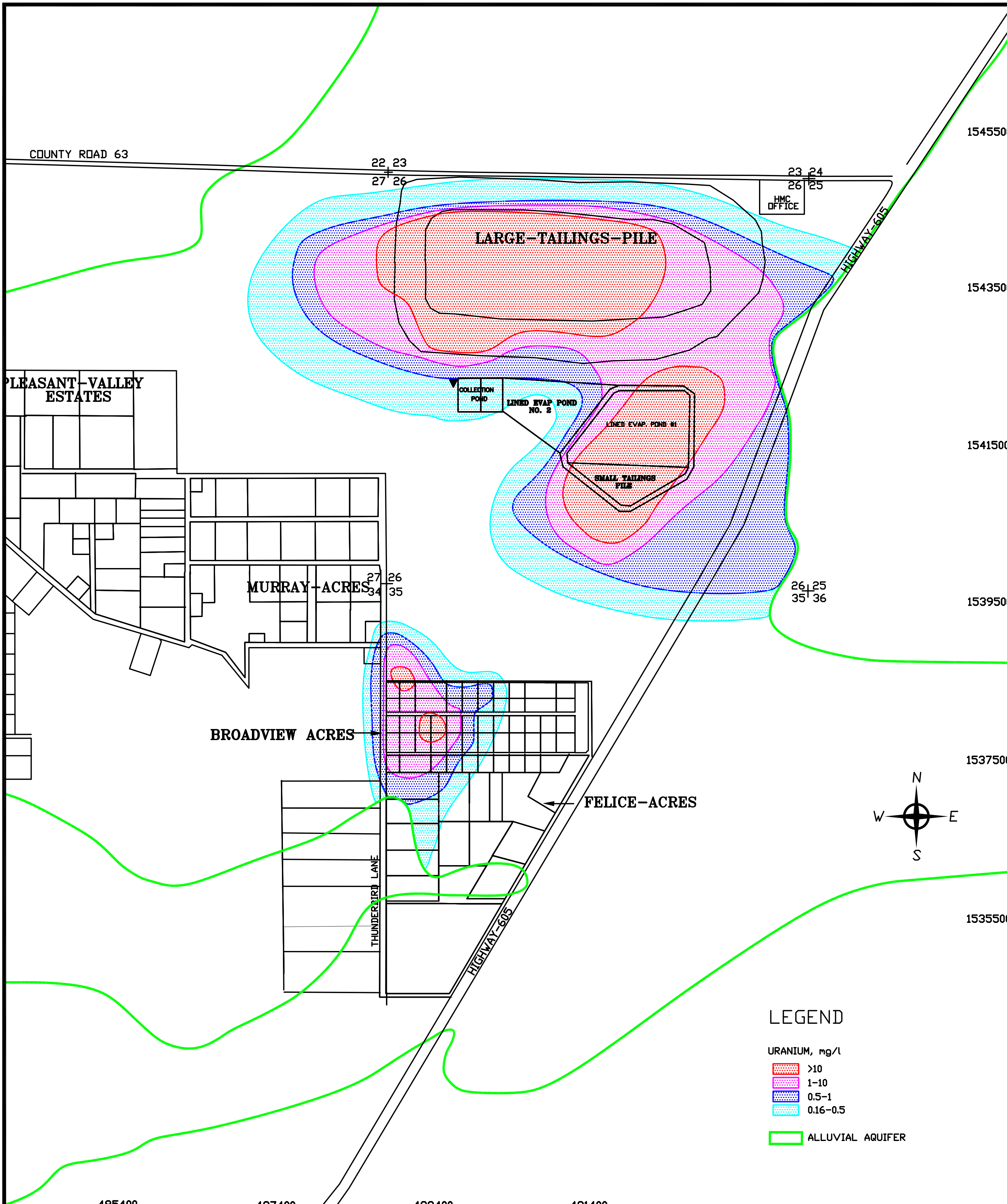

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FIGURE 1.1-10. ALLUVIAL URANIUM CONCENTRATIONS, 1976

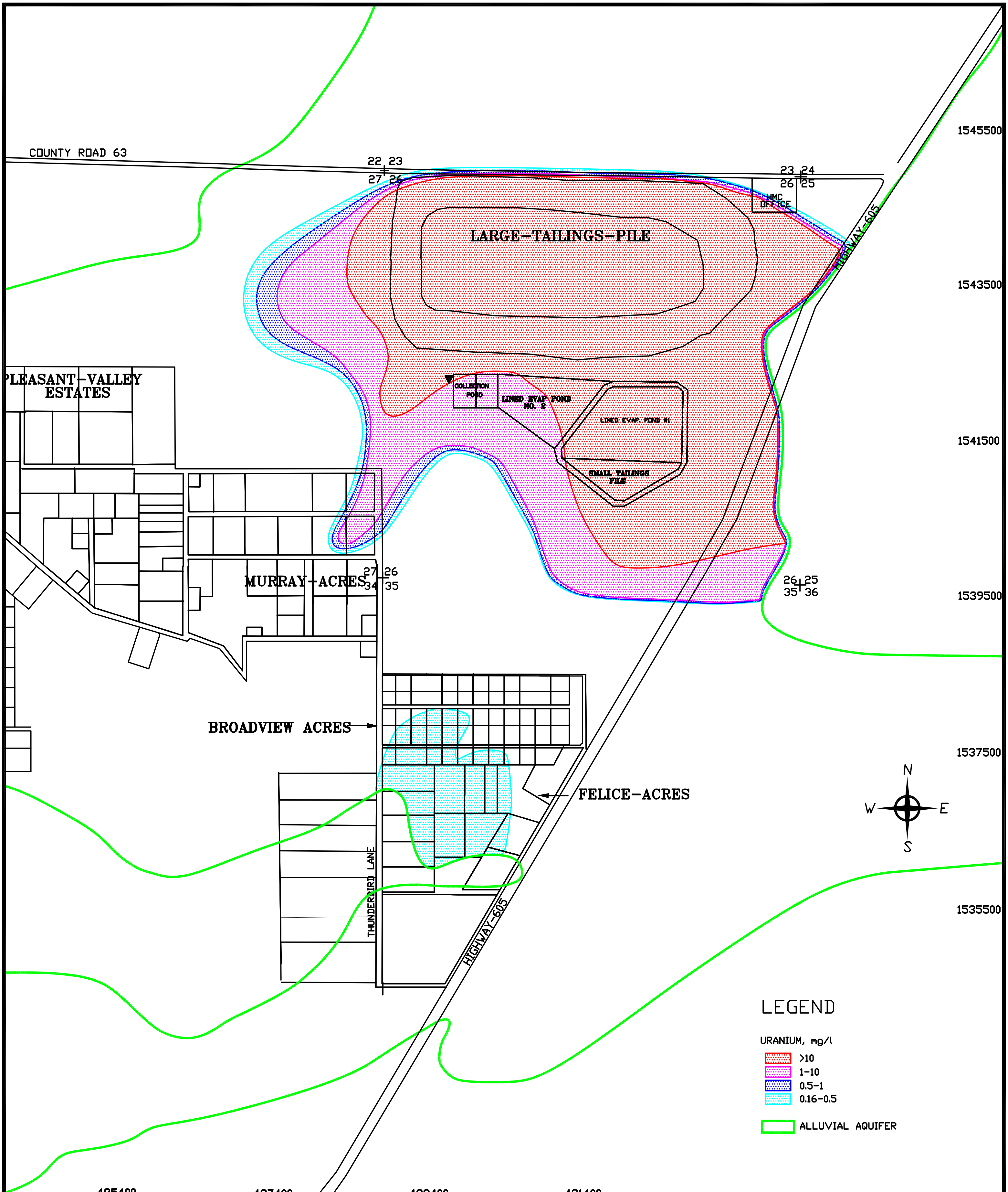

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FIGURE 1.1–11. ALLUVIAL URANIUM CONCENTRATIONS, 1988

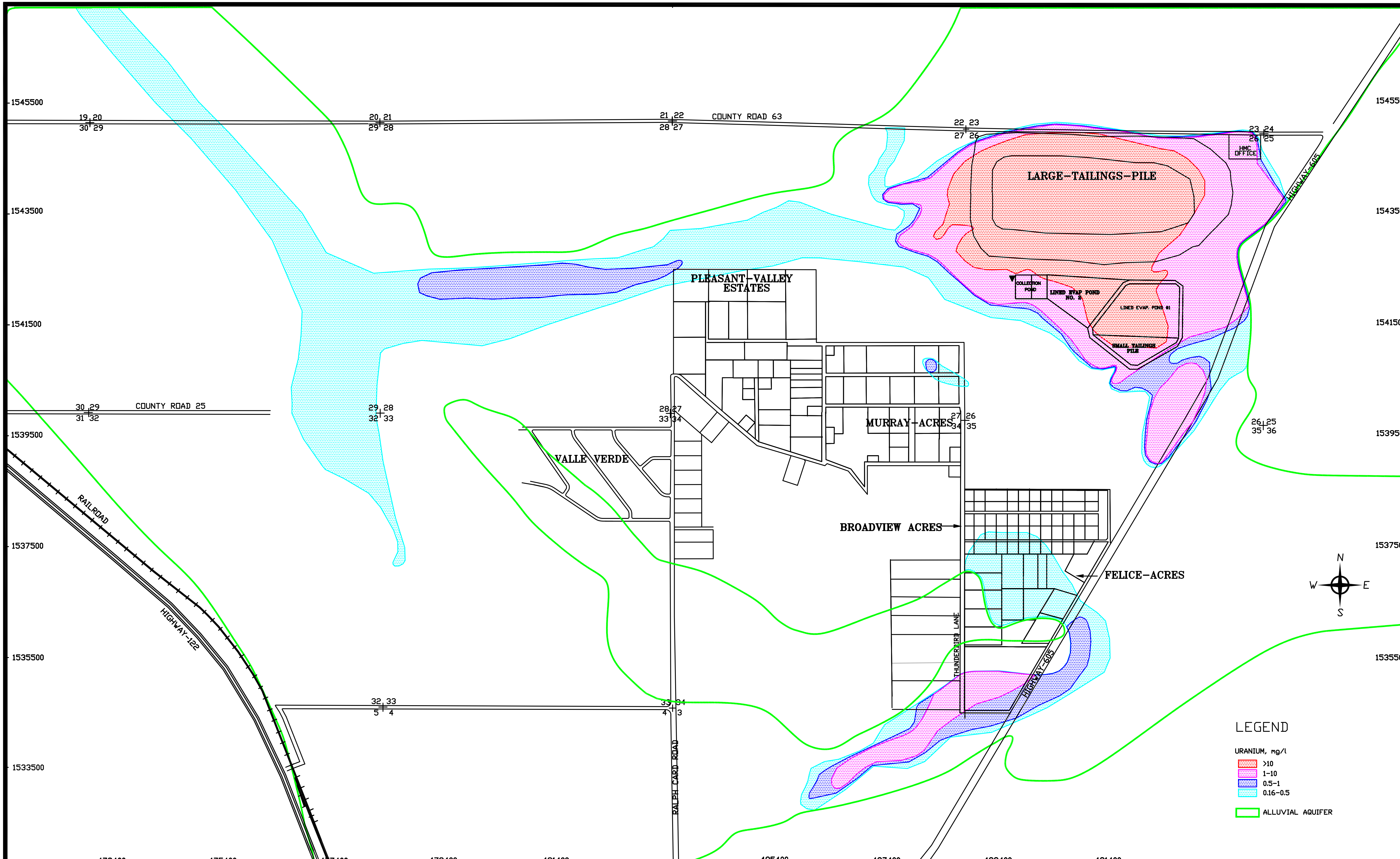

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FIG. 1.1-12. ALLUVIAL URANIUM CONCENTRATIONS, 1999

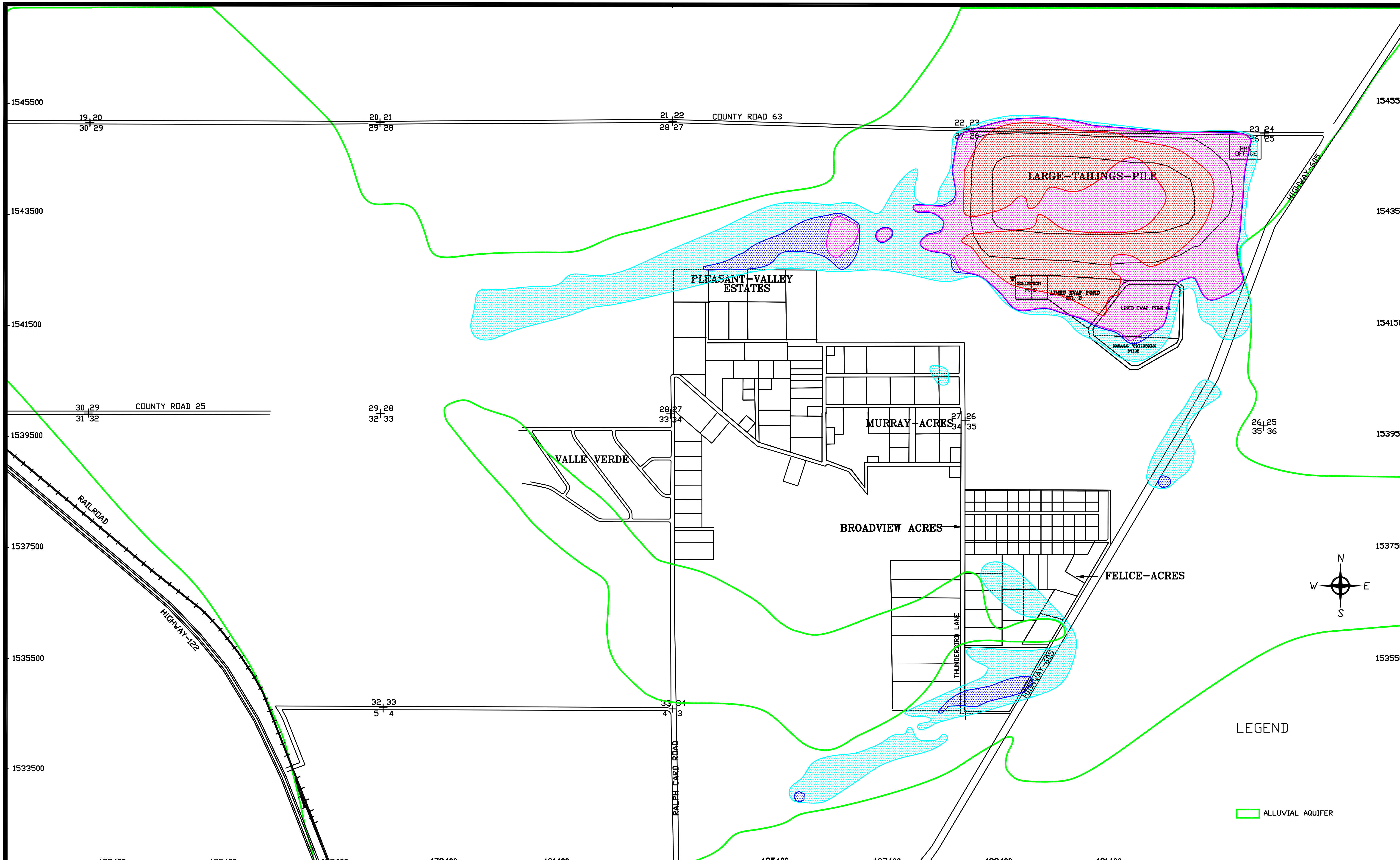

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FIGURE 1.1-13. ALLUVIAL URANIUM CONCENTRATIONS, 2014

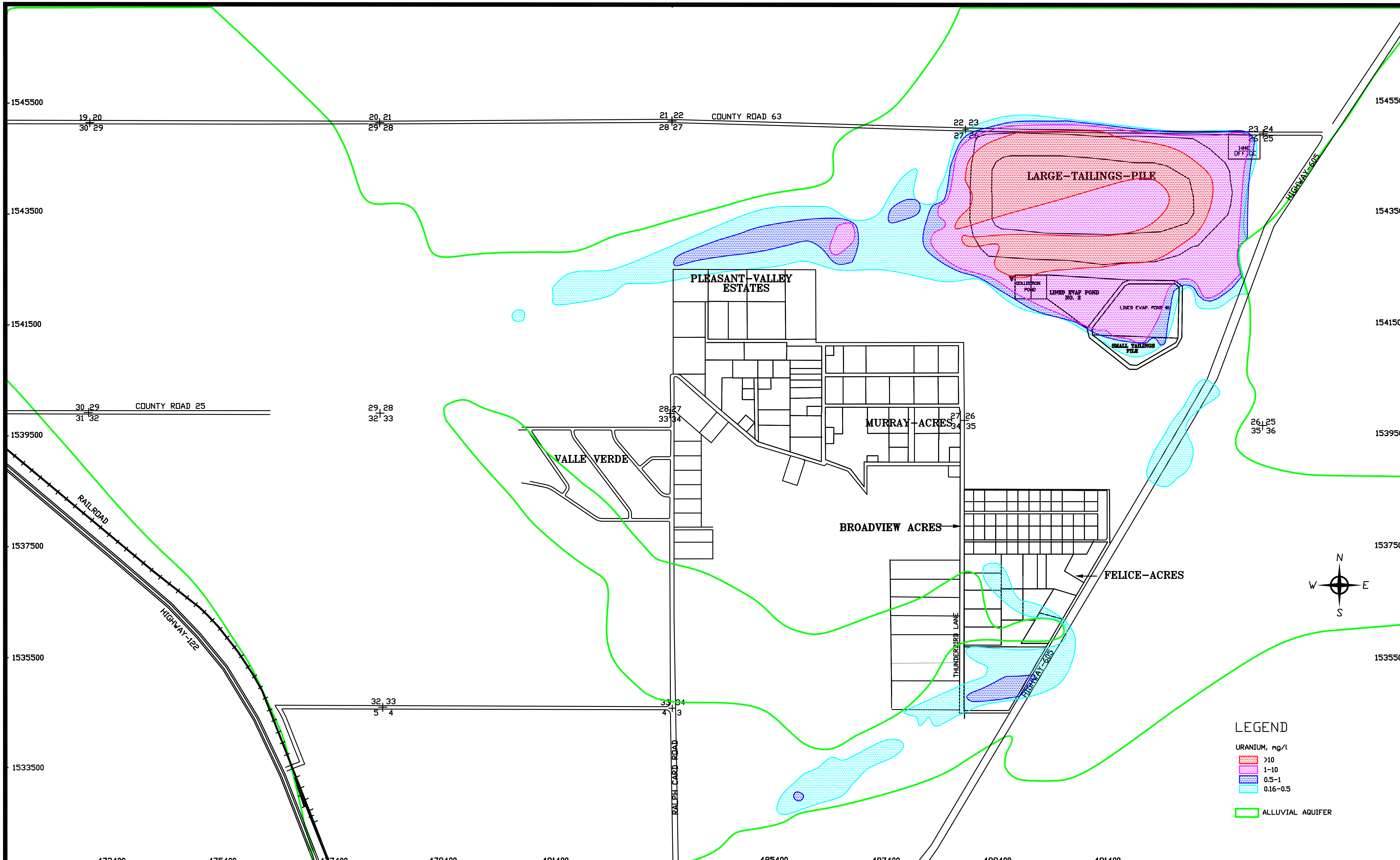

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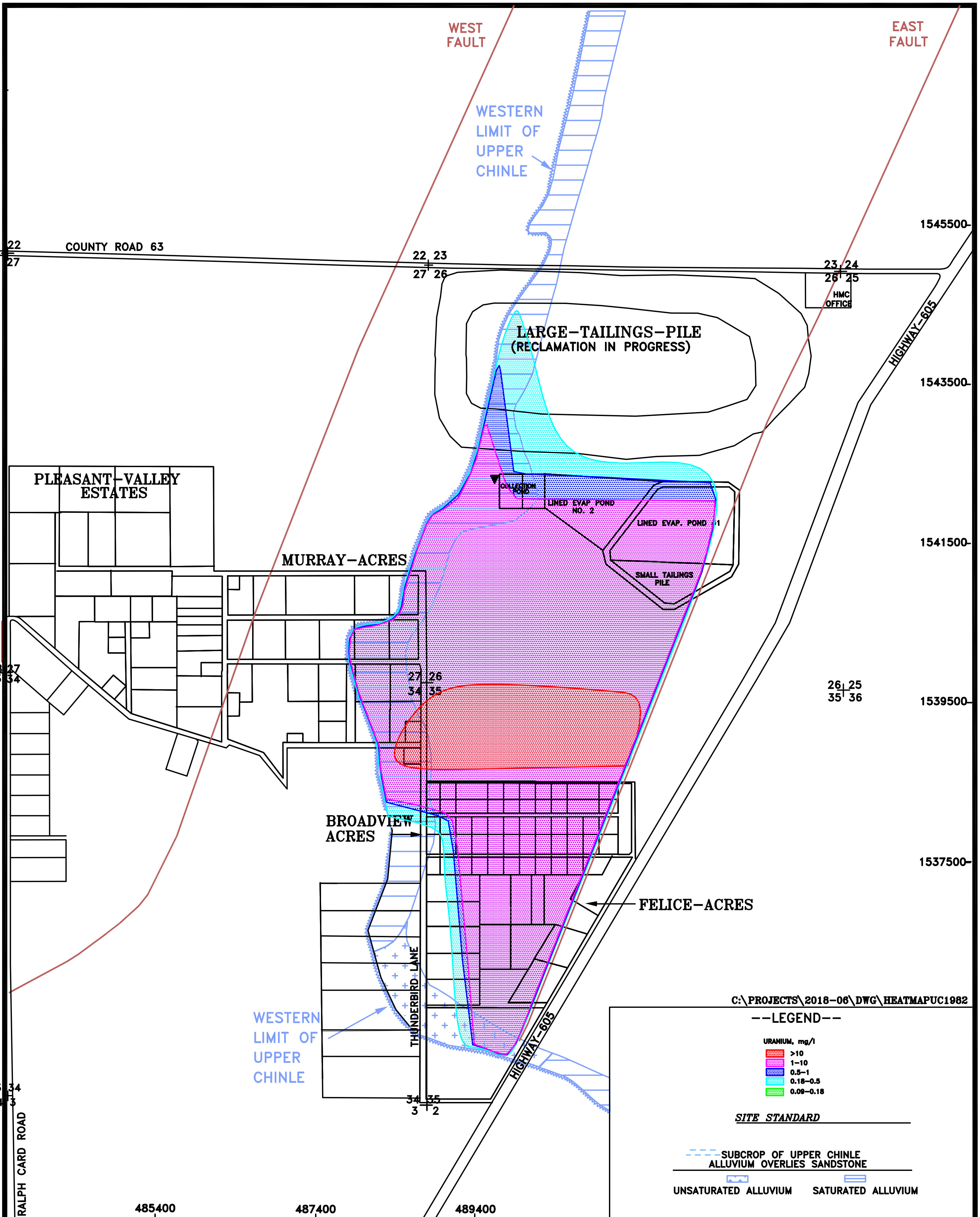
FIGURE 1.1-14. ALLUVIAL URANIUM CONCENTRATIONS, 2017



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

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FIGURE 1.1–15. UPPER CHINLE URANIUM CONCENTRATIONS, 1982

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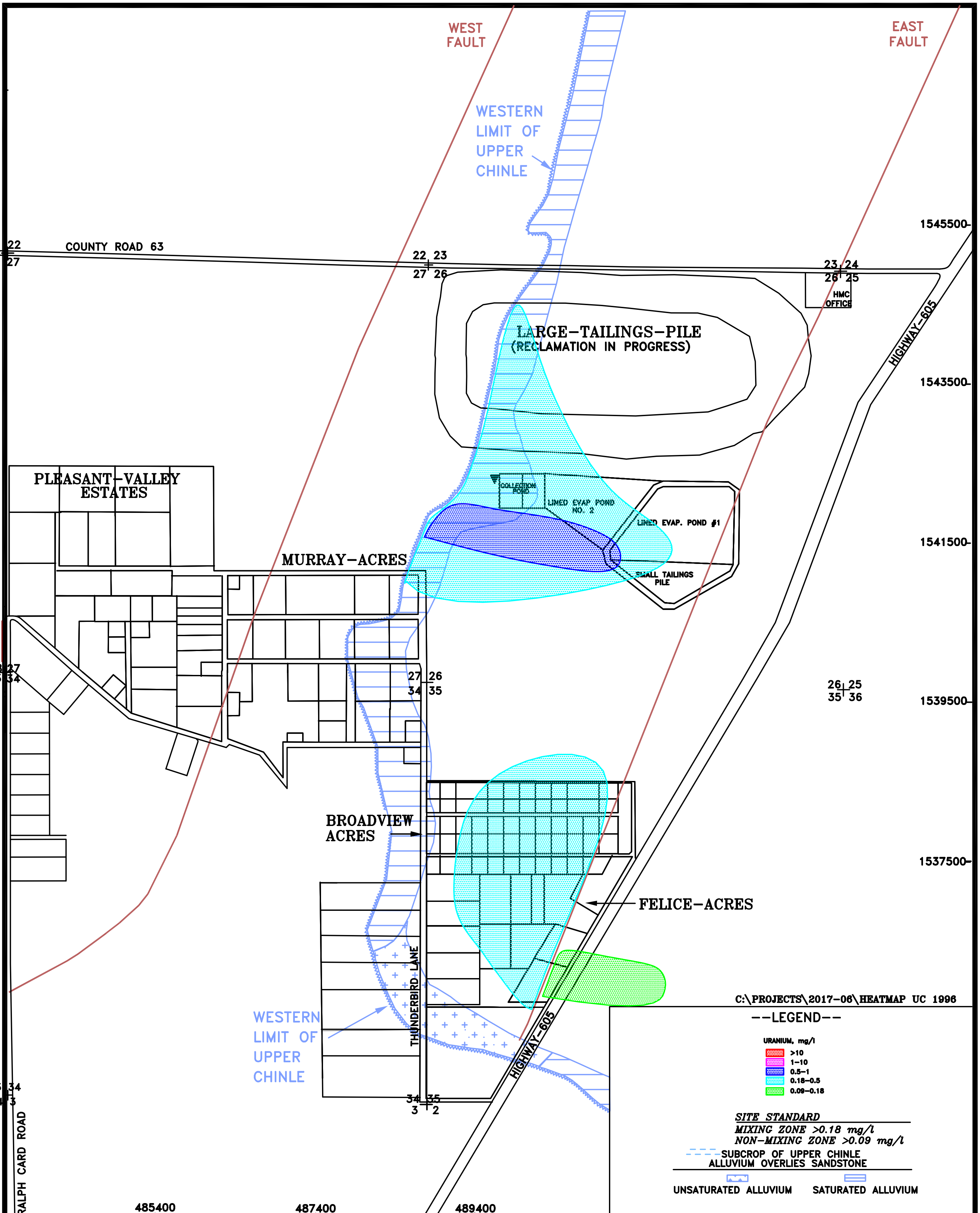

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FIGURE 1.1-16. UPPER CHINLE URANIUM CONCENTRATIONS, 1996

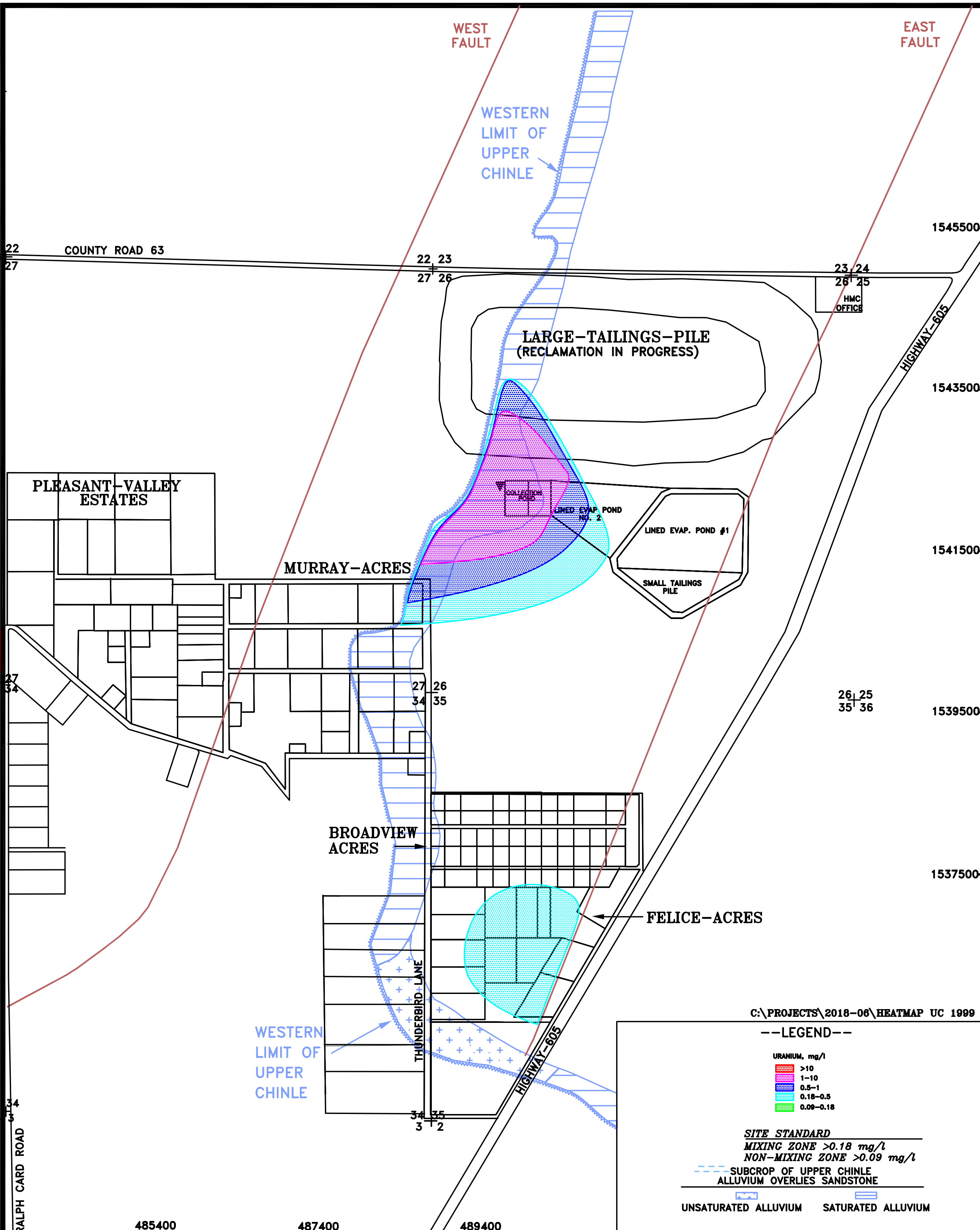

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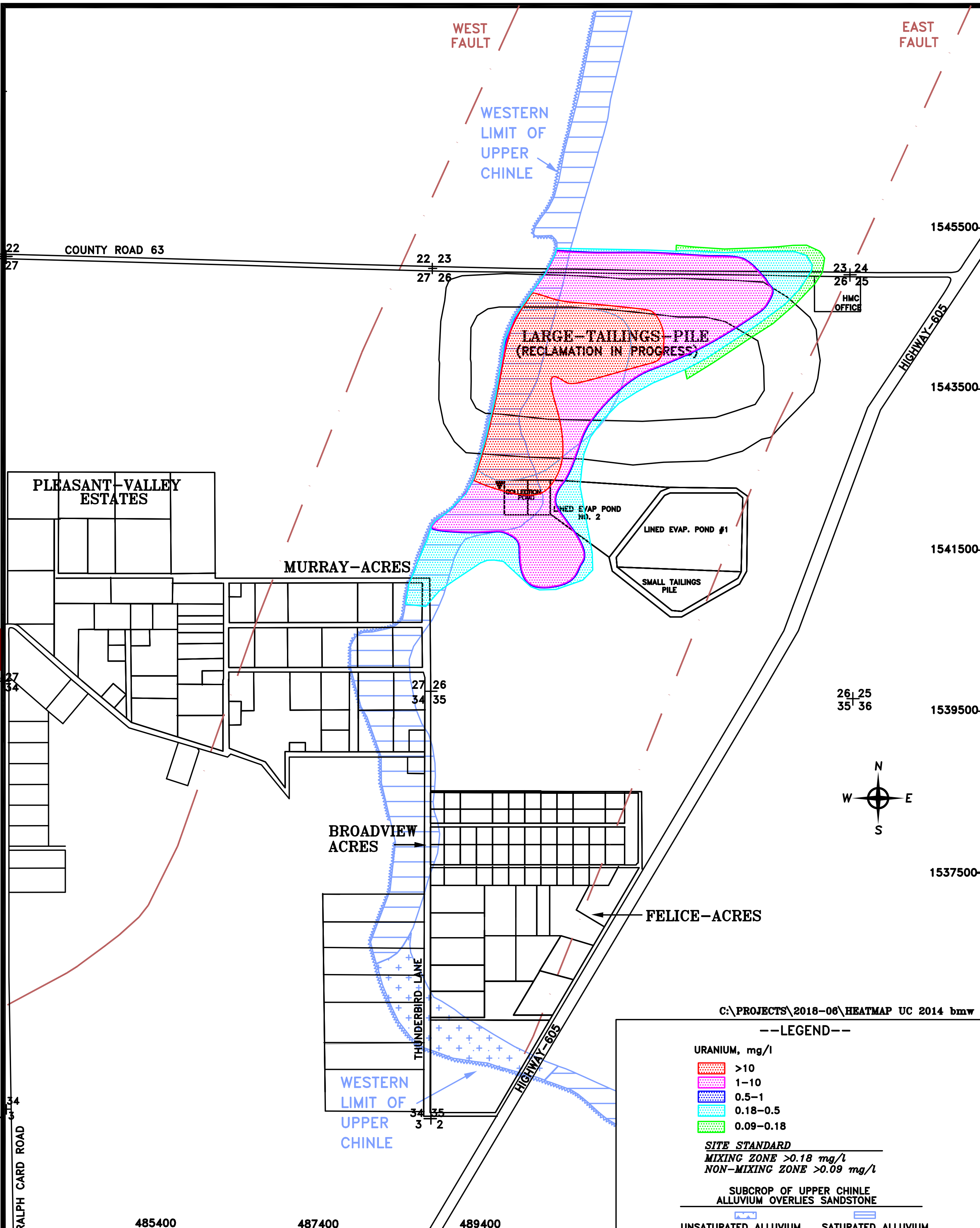
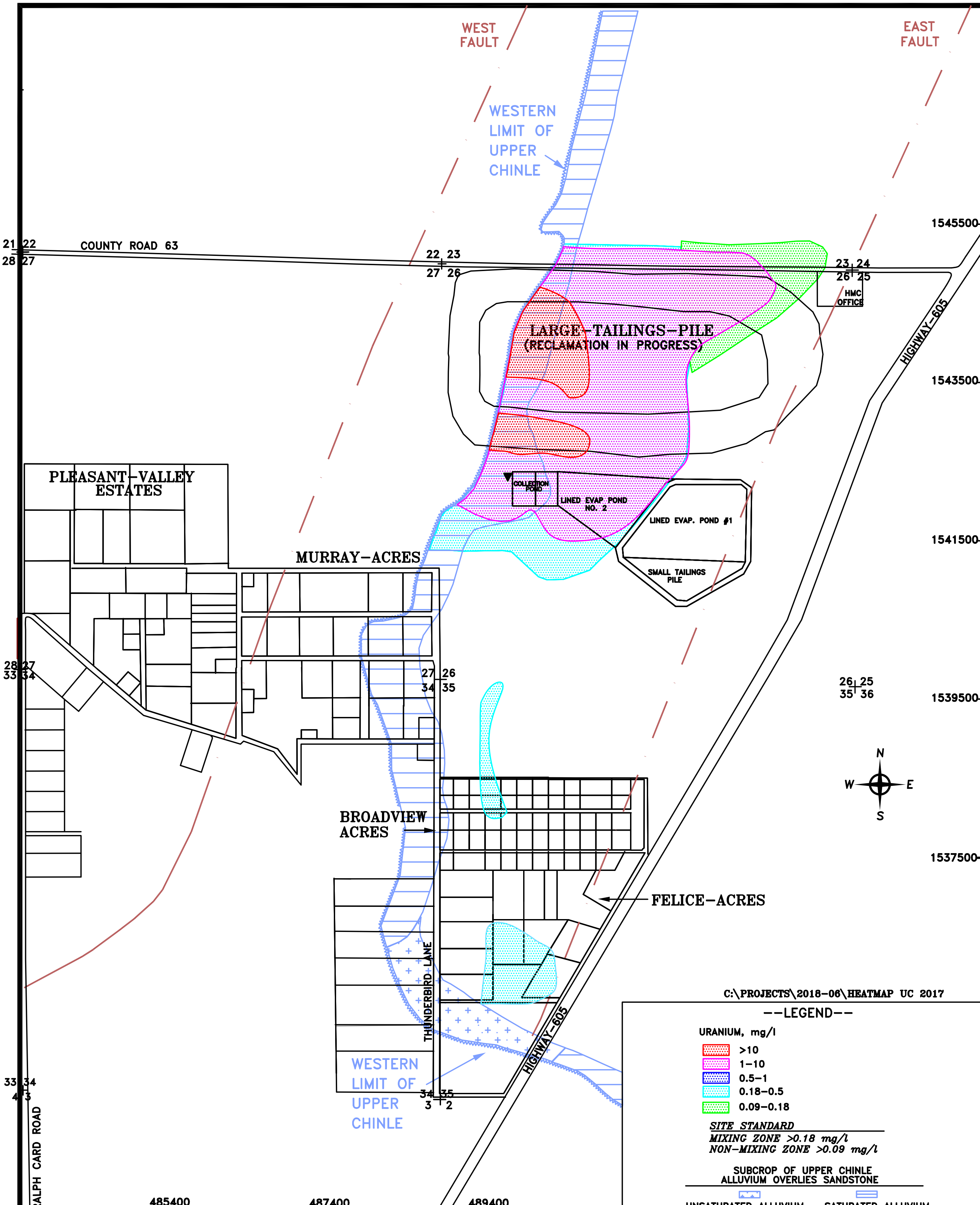
FIGURE 1.1–17. UPPER CHINLE URANIUM CONCENTRATIONS, 1999



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/20/18
FIGURE 1.1-18 UPPER CHINLE URANIUM CONCENTRATIONS, 2014	SCALE: 1"= 1600'
	PAGE: 1.1-27

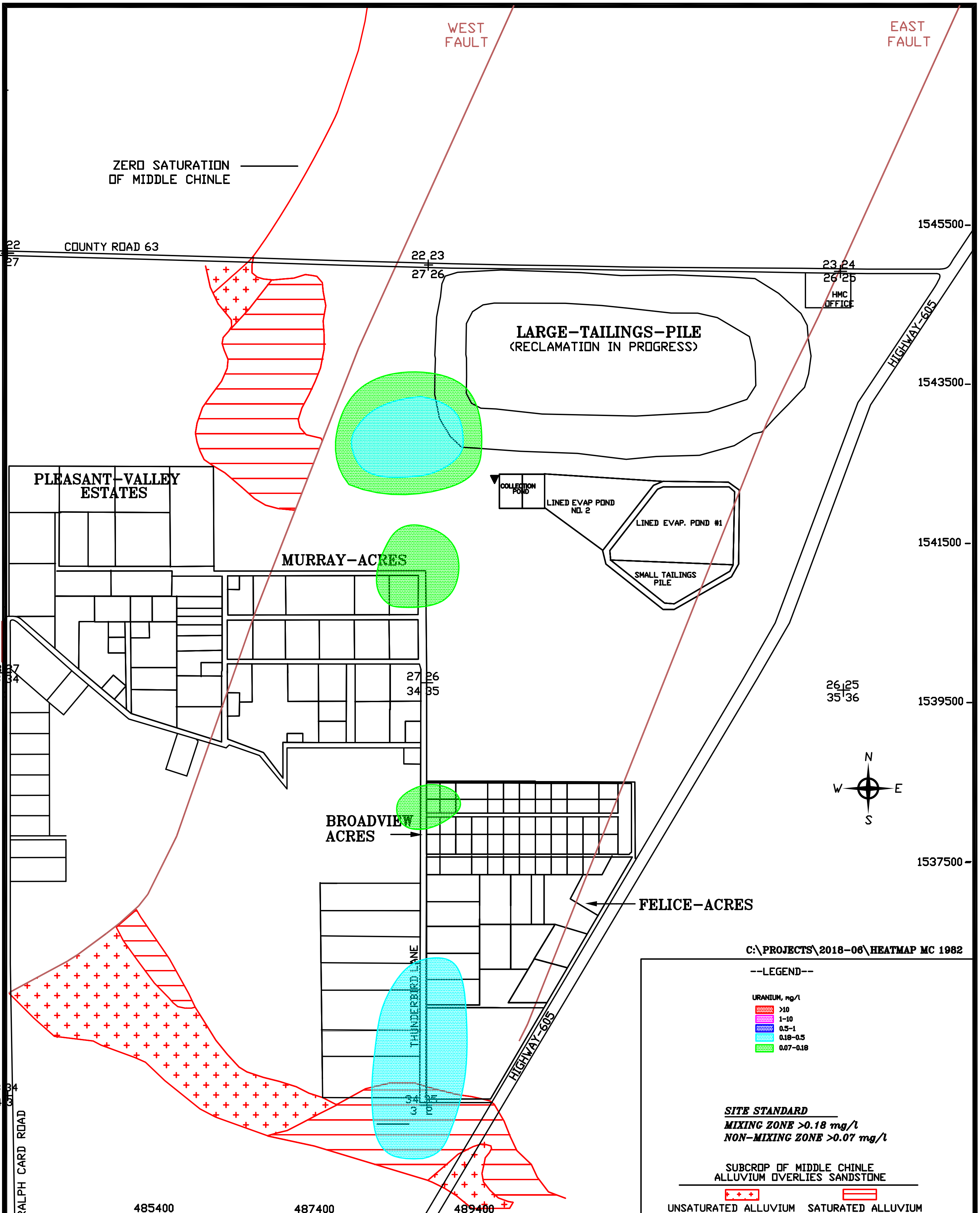


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/20/18

FIGURE 1.1-19. UPPER CHINLE URANIUM CONCENTRATIONS, 2017

SCALE: 1"= 1600'



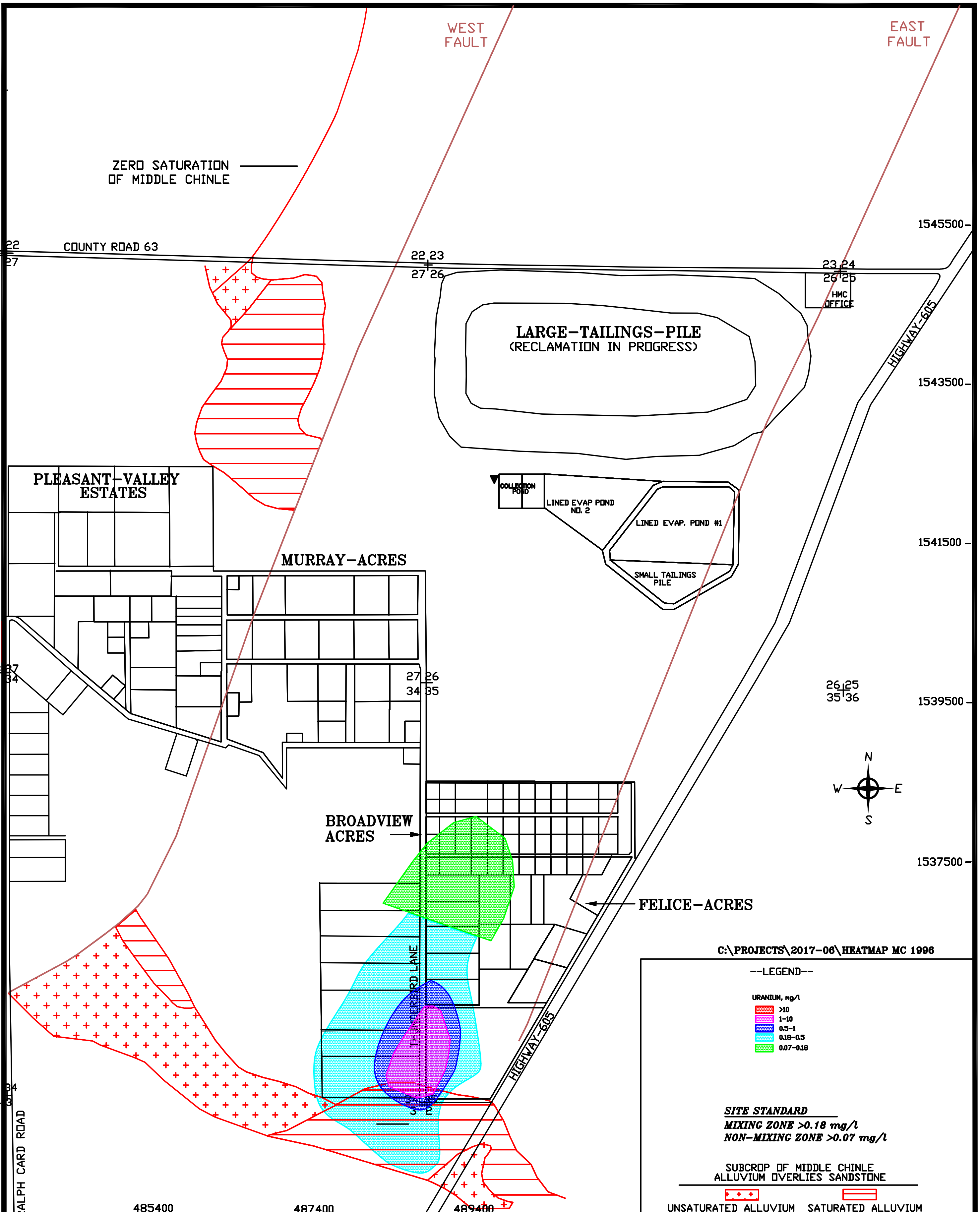
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/20/18

FIGURE 1.1–20. MIDDLE CHINLE URANIUM CONCENTRATIONS 1982

SCALE: 1"= 1600'

PAGE: 1.1–29



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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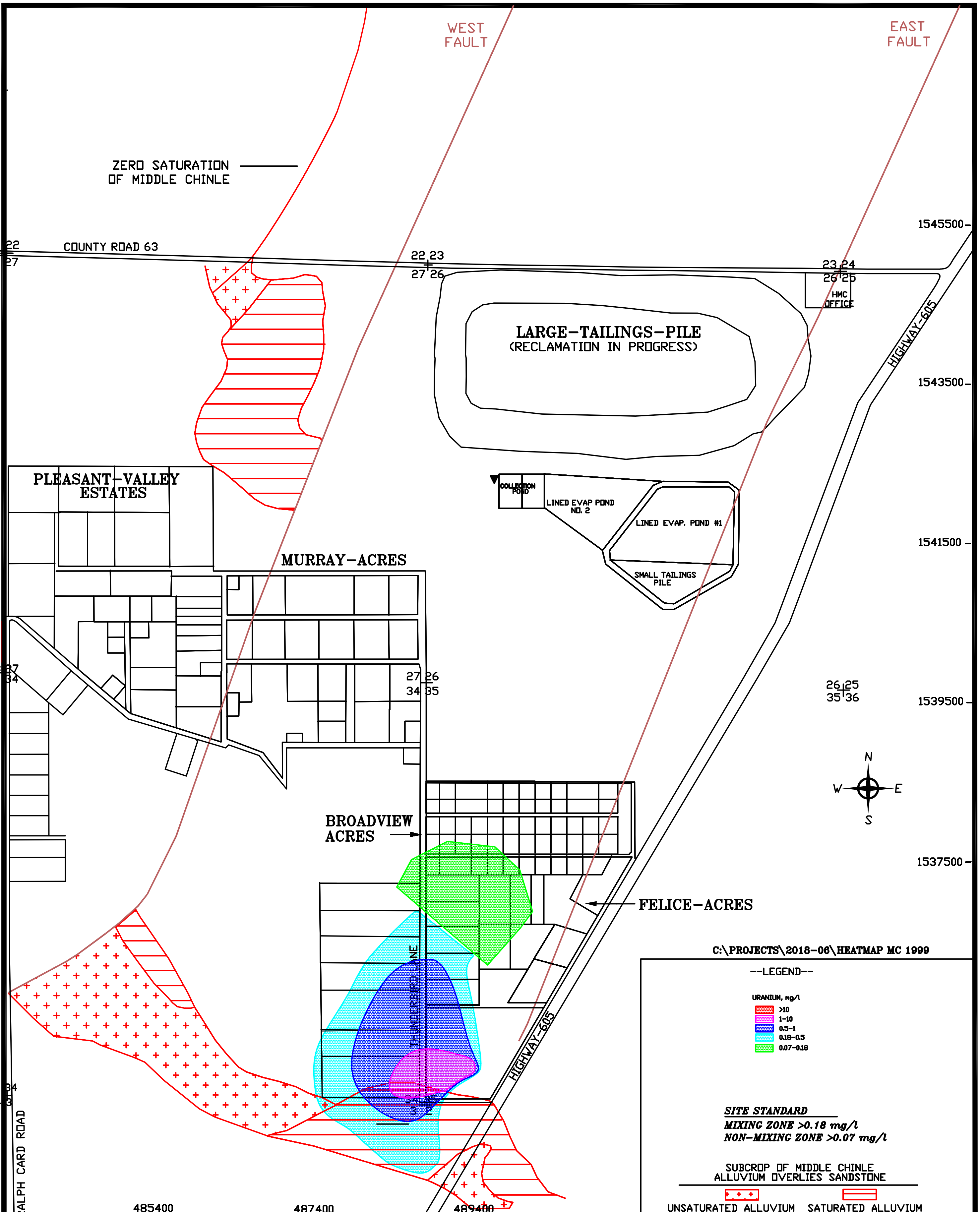
SCALE: 1"= 1600'

FIGURE 1.1-21. MIDDLE CHINLE URANIUM CONCENTRATIONS 1996



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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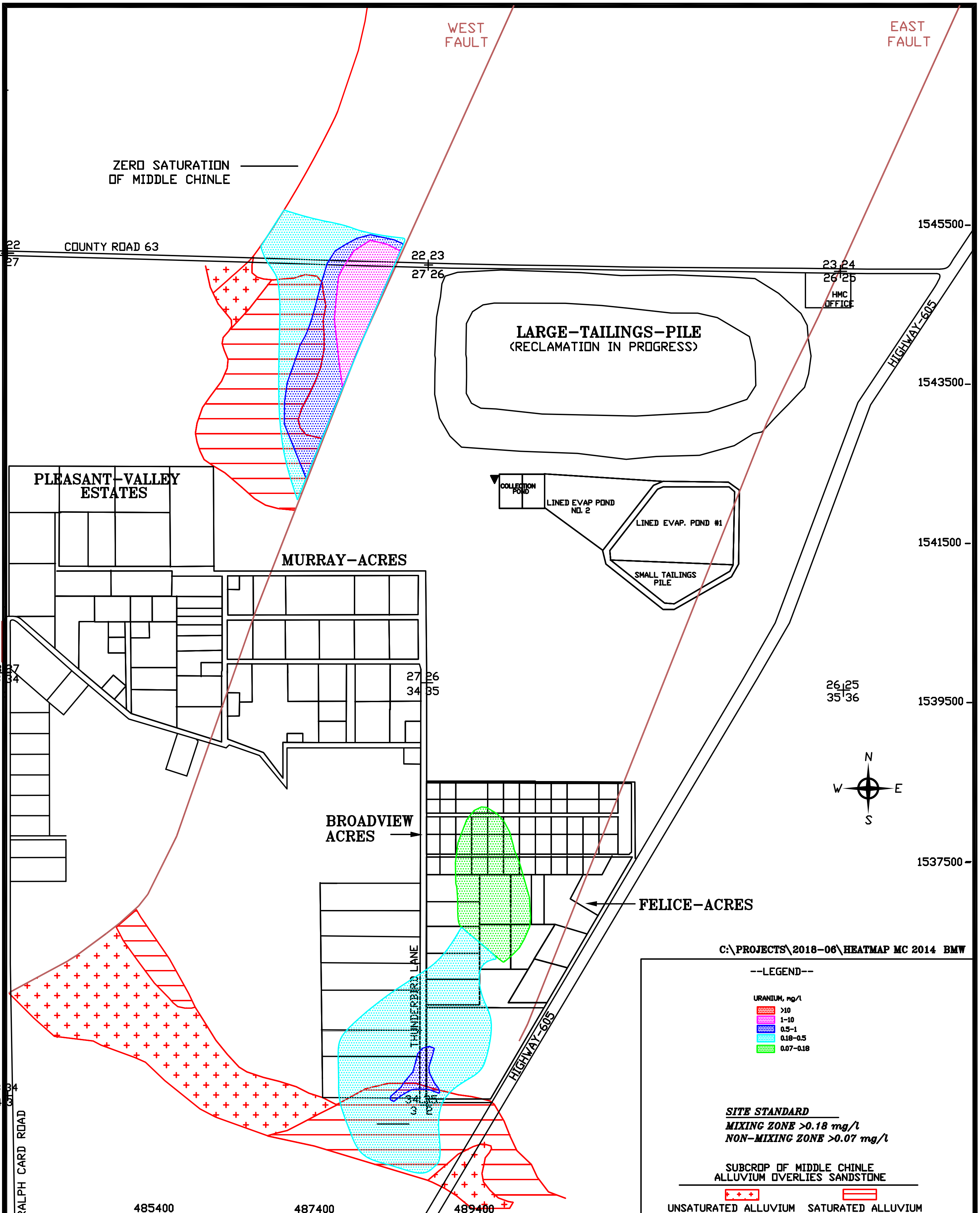
FIGURE 1.1-22. MIDDLE CHINLE URANIUM CONCENTRATIONS 1999

SCALE: 1"= 1600'

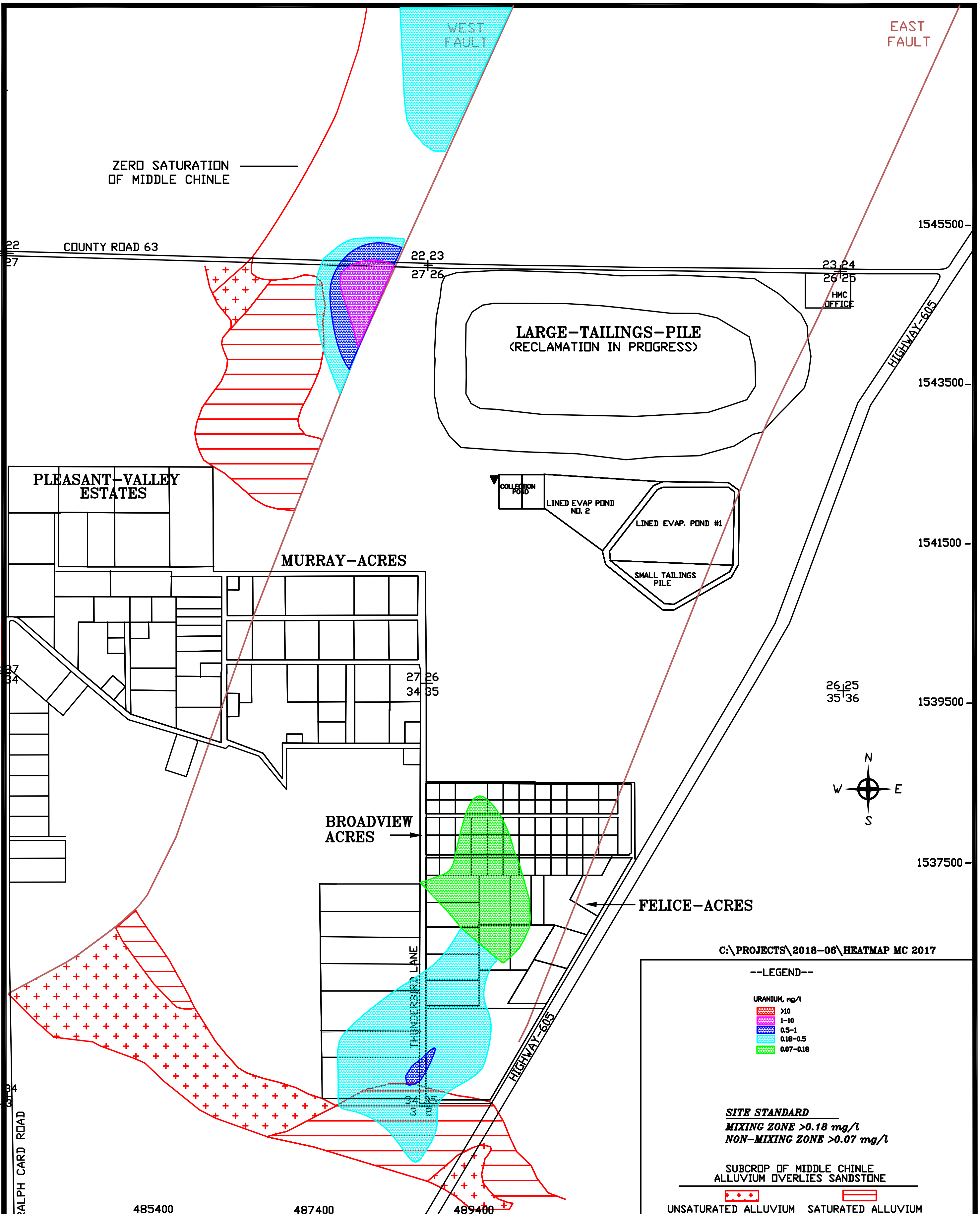


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/20/18

FIGURE 1.1-23. MIDDLE CHINLE URANIUM CONCENTRATIONS 2014

SCALE: 1"= 1600'

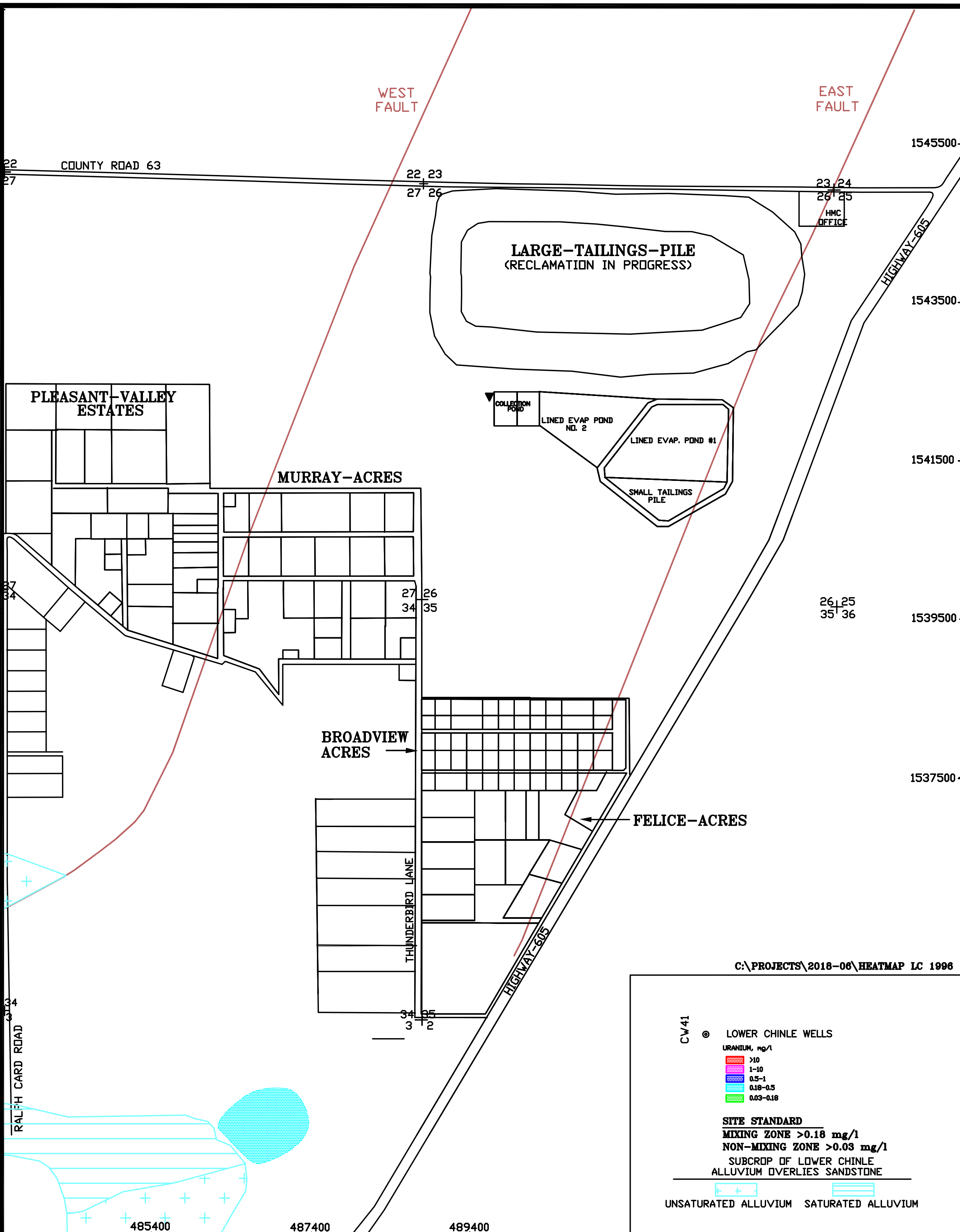


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/20/18

FIGURE 1.1–24. MIDDLE CHINLE URANIUM CONCENTRATIONS 2017

SCALE: 1"= 1600'

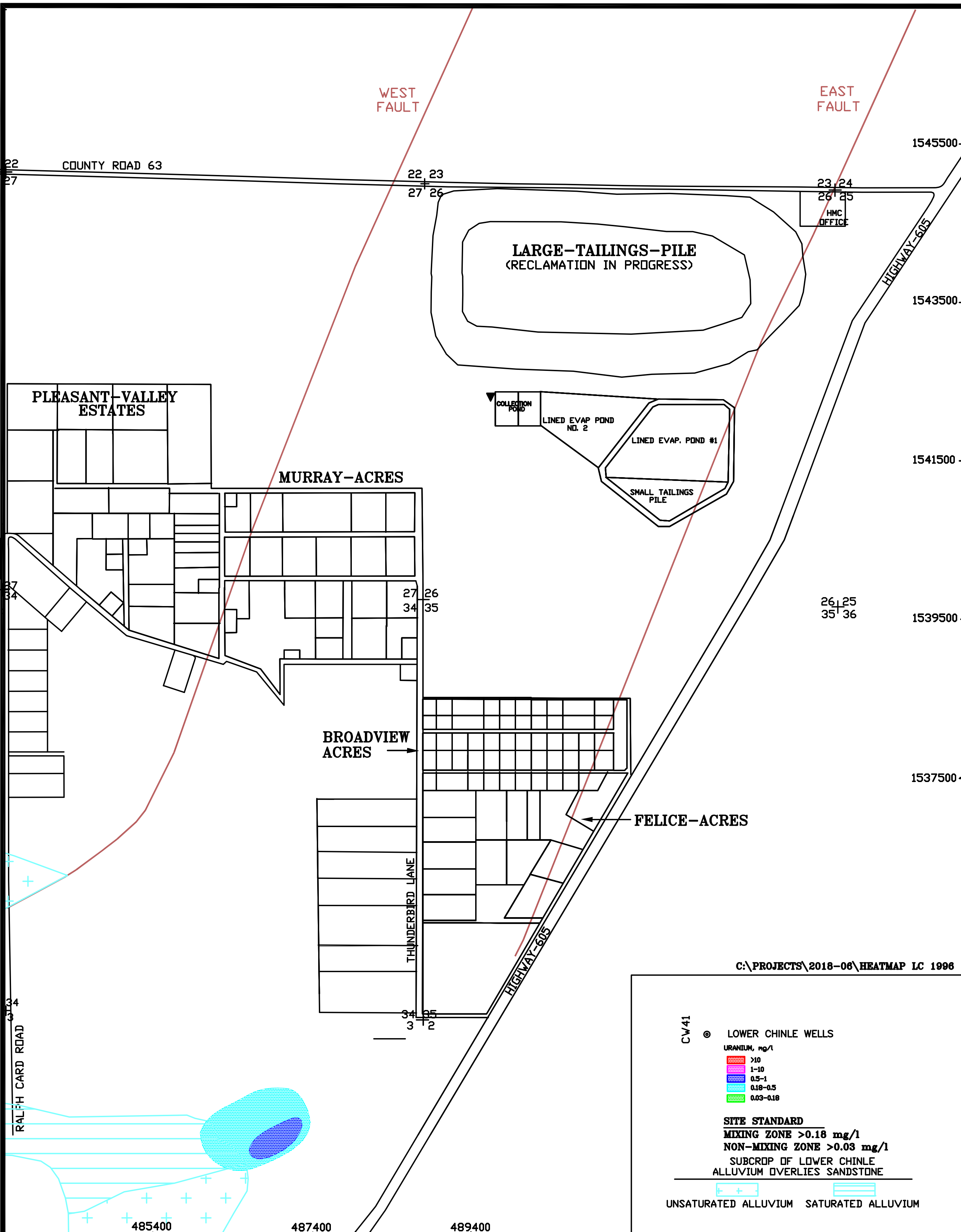


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-25. LOWER CHINLE URANIUM CONCENTRATIONS 1996

DATE: 2/20/18

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-26. LOWER CHINLE URANIUM CONCENTRATIONS 1999

DATE: 2/20/18

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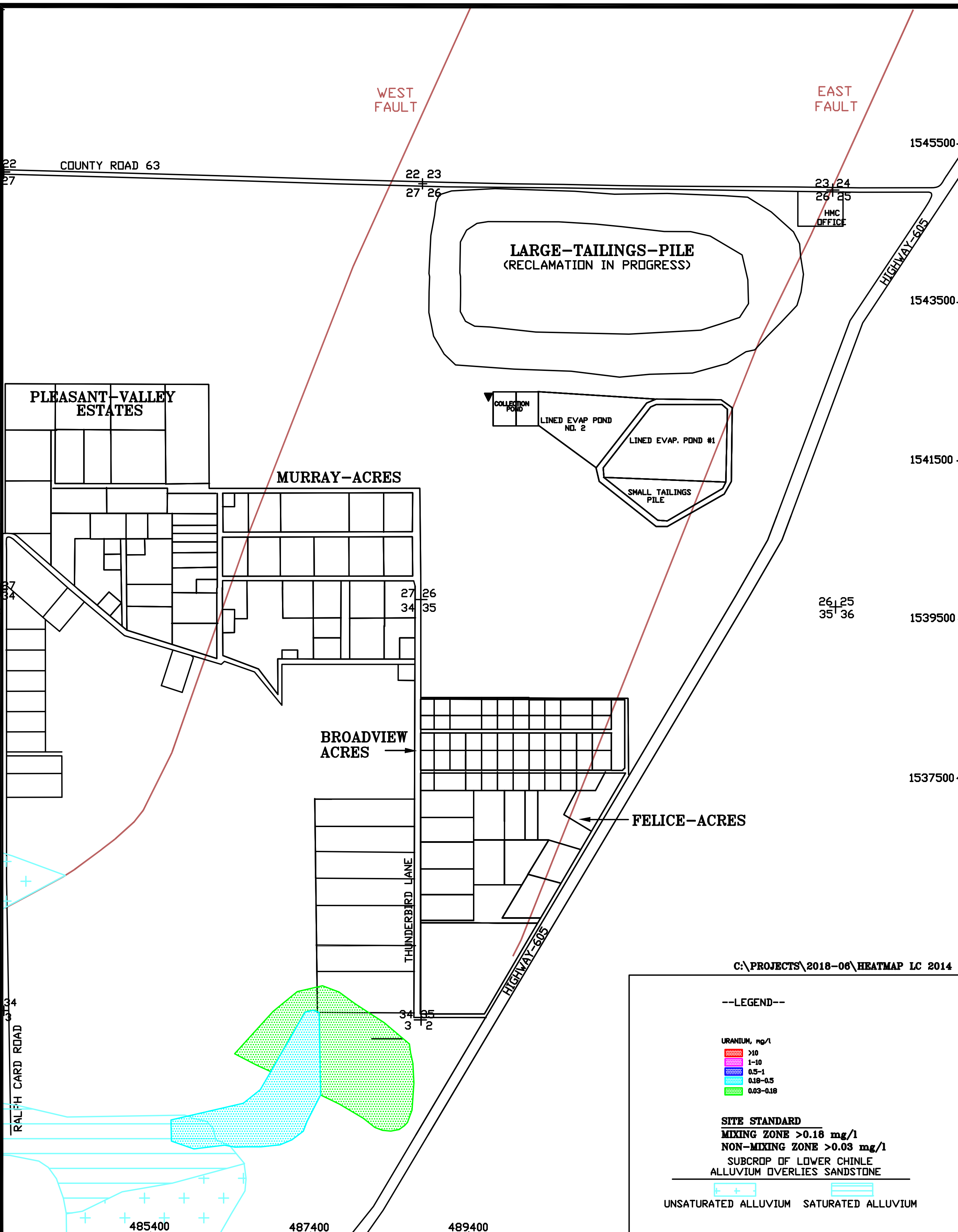

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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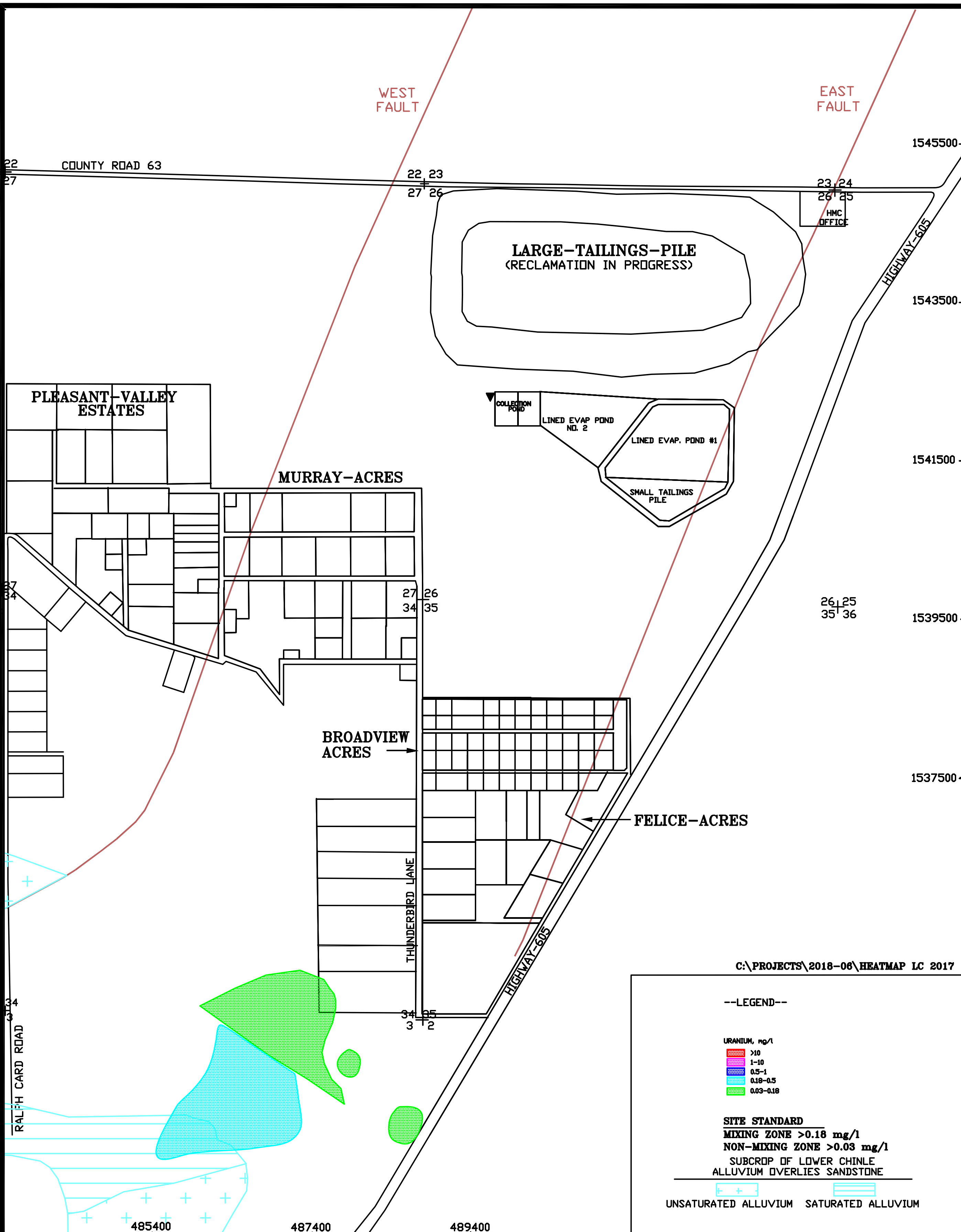
FIGURE 1.1-27. LOWER CHINLE URANIUM CONCENTRATIONS 2014



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/20/18

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FIGURE 1.1-28. LOWER CHINLE URANIUM CONCENTRATIONS 2017

PAGE: 1.1-37

1.2 INTRODUCTION

This report, as required by the New Mexico Environment Department (NMED) discharge plan DP-200 and the Nuclear Regulatory Commission (NRC) License SUA-1471, presents results of the 2017 annual groundwater monitoring program at Homestake's Grants Project. Homestake Mining Company (HMC) conducted uranium milling operations five miles northeast of Milan, New Mexico from 1958 to 1990 (see Figure 1.2-1). Referred to as the Grants Project or Grants site, HMC deposited uranium tailings from the alkaline leach (high pH) Grants mills into two unlined piles (Large and Small Tailings Piles) that overlie San Mateo alluvium. The San Mateo alluvium is simply referred to as the alluvium or alluvial aquifer in this report. In 1977, due to initial concerns about groundwater selenium levels, HMC installed a system of wells and pumps in order to inject fresh water into the alluvium at the property boundary and to withdraw contaminated water from the alluvium near the tailings. The groundwater restoration program has been divided into three areas: North Off-site, South Off-site and On-site. Figure 1.2-2 present limits of these three restoration areas.

Previous monitoring reports have been published in quarterly, semi-annual and annual reports[1], which were presented to the NMED and the NRC.

Four subdivisions, Broadview Acres, Murray Acres, Felice Acres and Pleasant Valley Estates, are adjacent to the HMC site. These subdivisions are shown on many of the various figures found in this report.

Monitoring data for groundwater west of the project site is included in the 1995 through 2017 reports (see Appendix A for water levels and Appendix B for water quality). This area has been designated the "West Area" and was so labeled on the figures in the annual reports prior to 2003. The 2003 through 2017 annual reports combine the project site and West Area figures on one 11 x 17 inch set of figures.

The annual ALARA audit, required as an NRC license condition, is presented in Appendix C. Additionally, a report of an annual inspection of the tailings piles and pond dikes must be submitted per license condition and is presented in Appendix D. Appendix E provides an annual land-use survey discussion for the immediate Grants site area; this was an added license condition

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1 See Hydro-Engineering 1983b, 1983c, 1984a, 1984b, 1984c, 1985a, 1985b, 1985c, 1985d, 1986a, 1986b, 1986c, 1987a, 1987b, 1988a, 1988b, 1990, 1991, 1992, 1993a, 1994, 1995, 1996, 1997, 1998, 1999, 2000a, 2001a, 2002, 2003a, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016 and 2017.

beginning in 2002. The annual radon flux survey report for the Large and Small Tailings Piles was presented in the Grants Semi-Annual Environmental Monitoring Report July-December 2016 and 2017 and therefore is not presented in this report as it was prior to the 2016 report. Appendix F presents the soil moisture content plots for the irrigation area instruments and Appendix G gives the meteorological data for the Grants site for 2017.

A detailed table of contents is included at the front of each report section including a list of associated section figures and tables.

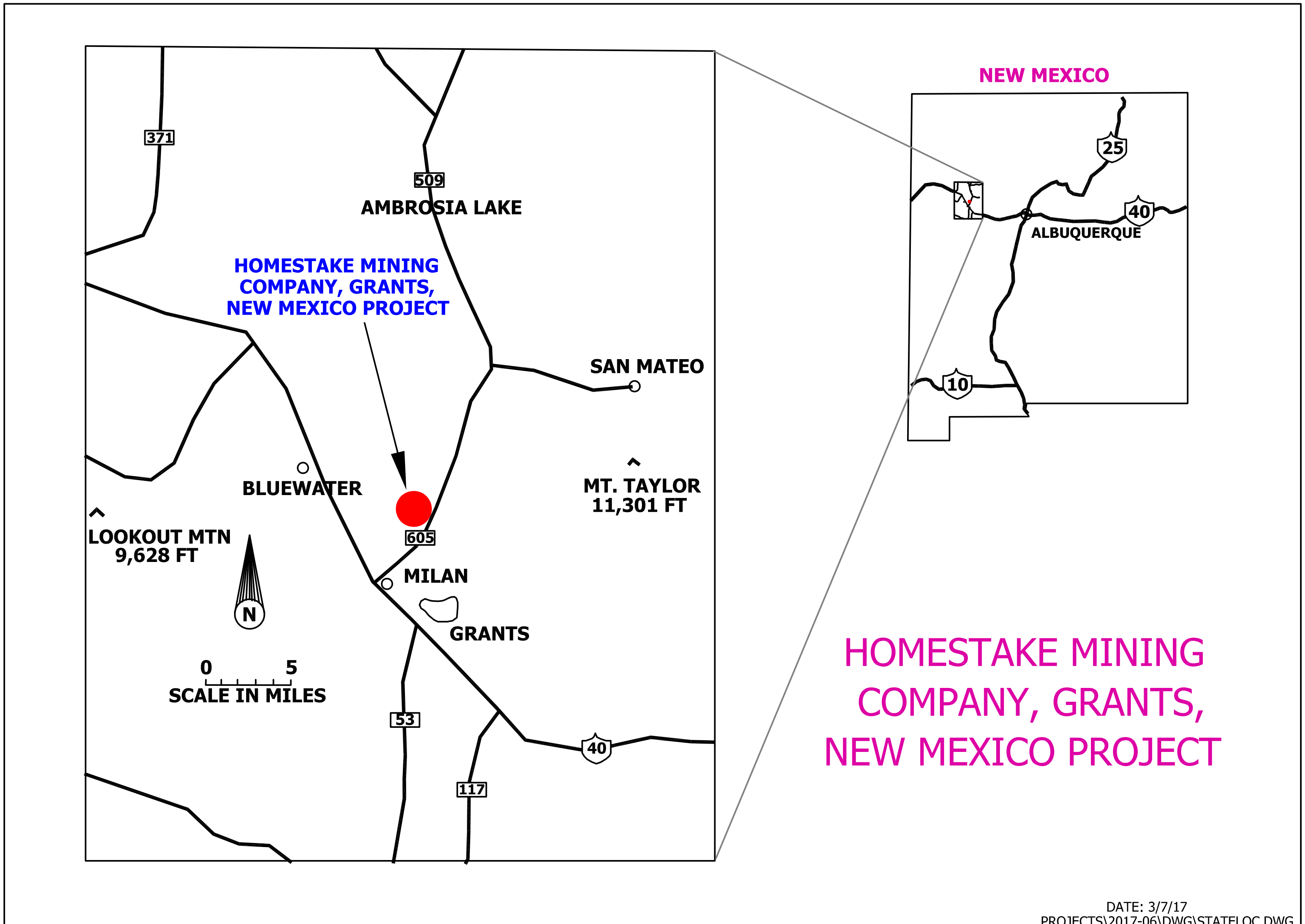

FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

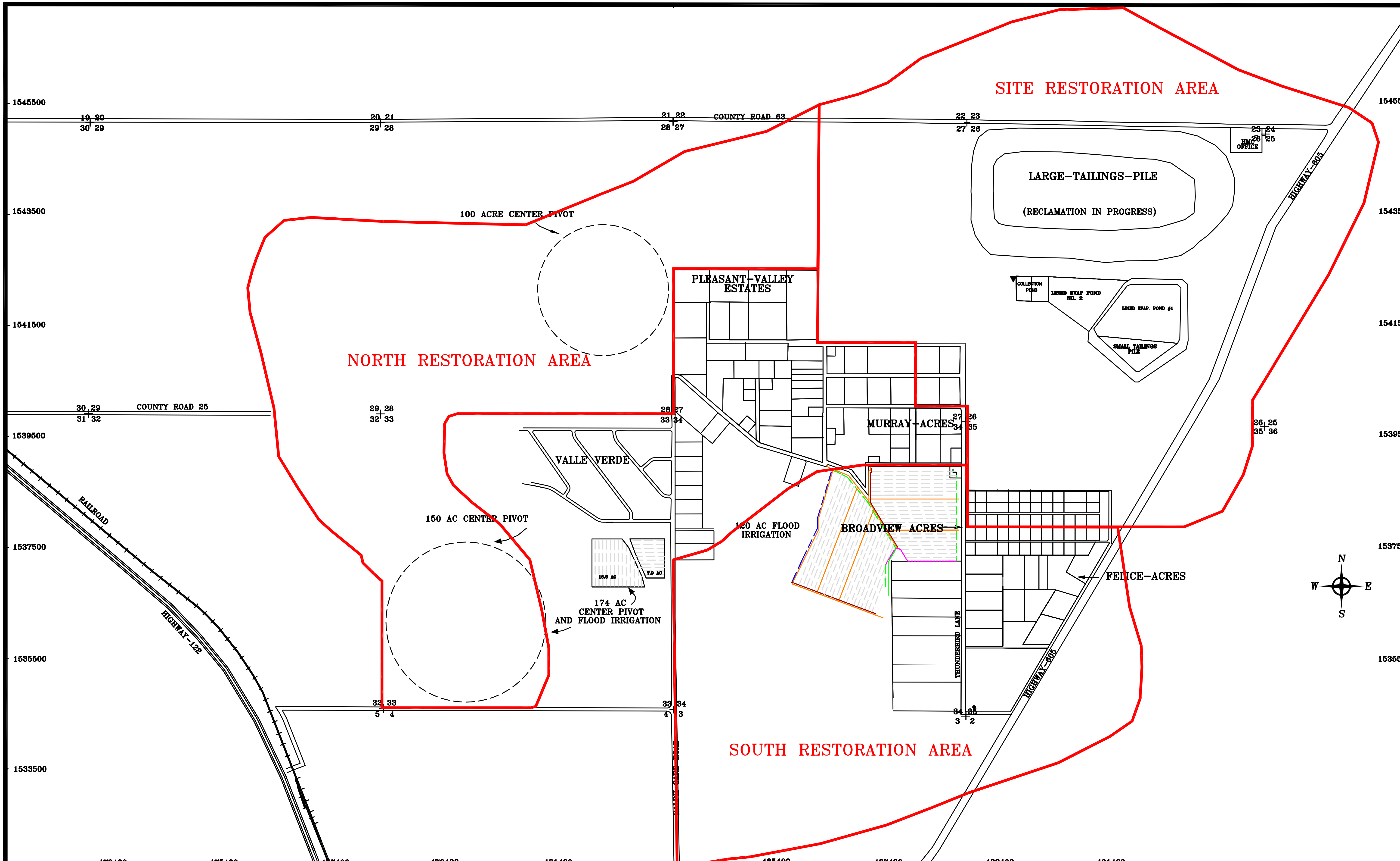

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FIGURE 1.2-2. RESTORATION AREAS DESIGNATION MAP

SECTION 2
TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 2
TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES
(continued)

SECTION 2
TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT
(continued)

Page Number

TABLES

2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 8.83 inches at the Grants Project site in 2017 is slightly below normal precipitation for Grants, New Mexico. This near normal condition would be expected to cause water levels at the Grants site to be fairly stable. Appendix G gives the meteorological data for 2017 for the Grants site including an annual wind rose plot.

The Grants Project groundwater remediation system consists of collection of contaminated groundwater near the tailings piles, collection of slightly contaminated groundwater Off-site and down-gradient injection of treated and/or fresh water. The treated water starting in late 2015 consisted of a mixture of R.O. product, zeolite treated and fresh water that was mixed in the post treatment tank (PTT). These collection and injection systems continued to operate in 2017, along with the reverse osmosis (R.O.) plant and the zeolite treatment of Off-site water, which are used to treat and manage the majority of collected groundwater. The R.O. plant produces product water that is of much better quality than the natural alluvial water, and it is used as injection water in most areas of the Grants Project restoration program. The zeolite treatment removes slightly elevated uranium concentrations from the Off-site water and is also used for injection water. Figure 2.1-1 on page 2.1-15 shows the location of the present (end of 2017) injection and collection systems along with their starting dates of operation. Water collected from the On-Site is pumped to the R.O. plant while water collected from the Off-site is pumped to the zeolite treatment or discharged into lined collection ponds or one of three lined evaporation ponds (light blue areas).

The area where groundwater flow is controlled by the treated and/or fresh-water injection and collection systems is called the "Collection Area" and is shown by the yellow cross-hatched pattern on Figure 2.1-1. All of the alluvial groundwater within the collection area converges to the collection wells.

2.1.1 R.O. PLANT

The R.O. plant utilizes a lime/caustic pre-treatment and clarification unit. Blowdown (sludge) from the pre-treatment unit discharges to the West Collection Pond with the treated water feeding the three R.O. units (two 300 gpm low-pressure R.O. units and a No. 3 600 gpm low-pressure unit). The brine from the No. 1 low-pressure unit feeds a 75-gpm high-pressure R.O. unit while the brine from all units feed a second high-pressure unit which was added in the middle of 2016. The No. 2 R.O. unit is a single stage, low pressure 300 gpm system. The No. 3 600 gpm R.O. low-pressure unit was installed in late 2015 with start of testing in December. The R.O. product water from the five units is discharged to the PTT and mixed with zeolite and/or fresh water prior to being injected into a series of injection wells. The brine from the R.O. plant is discharged to the evaporation ponds. Other miscellaneous flows and blowdown from the R.O. plant are pumped to the West Collection Pond for recycle to the R.O. plant. The R.O. plant inputs and output of R.O. product water for injection are listed in the following tabulation:

R.O. Plant Performance (GPM) (2000-2017)				
Year	Input		Output	
	Collection Wells	Tailings Collection	R.O. Injection	Brine
2000	274	0	204	70
2001	276	5	222	59
2002	383	5	288	100
2003	338	4	266	76
2004	293	12.2	249	64
2005	250	6.4	198	49
2006	257	2.1	184	48
2007	262	0	204	55
2008	264	3.1	194	60
2009	251	0.3	171	60
2010	240	0	166	59
2011	257	1.4	170	58
2012	267	0	182	50
2013	236	0	148	47
2014	235	0	165	47
2015	228	0	112	52
2016	584	8	449	141
2017	497	3	407	108

Aquifer restoration results continue to show that the treated water injection is much more effective than the fresh water in reducing the uranium and molybdenum concentrations within the alluvial aquifer. The RO plant was switched in mid-2015 from the use of sand filters to microfiltration.

2.1.2 COLLECTION

The alluvial and Upper Chinle aquifer collection rates to the R.O. plant were increased in 2016 while the Middle Chinle aquifer On-site collection was started. The R.O. plants were operated at an average rate of 553 gpm during 2017, slightly less than its 2016 rate.

Up-gradient alluvial aquifer collection north of County Road 63 from the P wells ceased after May of 2013. Collection from the South and North Off-site areas were treated with the zeolite process starting in 2016 and continued in 2017. Upper Chinle aquifer collection continued from wells CE2, CE5, CE6, CE7, CE11 and CE12 in 2017 (red X symbols located south of the collection ponds), and Upper Chinle wells CE15, CE15A and CE19 were added as input to the R.O. plant in 2017. The tailings dewatering and four of the tailings sumps (N-1, N-3 W-1 and W-2) were input to the R.O. plant in 2017.

2.1.2.1 ALLUVIAL AQUIFER COLLECTION

Figure 2.1-1 shows the locations of five lines of alluvial aquifer collection wells (red x symbols). The S and D-lines are adjacent to the LTP and the K and C-lines are adjacent to the Small Tailings Pile (STP). Alluvial wells M9 and MQ were added to the alluvial collection system in 2011 and continued to be used in 2017. The L-line south of the STP continued to operate in 2017 and includes collection wells 521, 522 and 639, which are located on the east side of Highway 605 (see Figure 4.1-1 for location). The L-line collection was switched to R.O. supply at the end of July 2016 and therefore stopping the collection for re-injection. Alluvial water is pumped from these lines of collection wells to the R.O. plant. Figure 2.1-2 on page 2.1-16 graphically presents collection rates for the last eighteen years at the Grants Project. The On-Site alluvial collection system operated at an average rate of 364 gpm in 2017.

2.1.2.2 UPPER AND MIDDLE CHINLE AQUIFER COLLECTION

Figure 2.1-2 shows the collection rate for Upper Chinle collection wells CE2, CE5, CE6, CE7, CE11, CE15, CE15A and CE19, which are located on the south and north sides of the collection ponds and just north of Broadview Acres. Collection from Upper Chinle well CE2 started in 1999 and is expected to continue for several years. Collection from wells CE5 and CE6 started in August 2006 while pumping from wells CE11 and CE12 was initiated in October of 2006. Upper Chinle wells CE15, CE15A and CE19 were initially pumped in 2017. These wells were used to supply water to the R.O. for 2017. Additionally, wells B15, B16, B31, B32, T25, T26, T27, T28, T30 and T32 were pumped in 2017. These wells are dual completed in the alluvial and Upper Chinle aquifers in the subcrop area. The yearly average collection rate from the Upper Chinle was 100 gpm.

Figure 2.1-2 also shows the collection rate for the Middle Chinle collection well CW62. Well CW62 was added to the On-Site collection system in May 2016 and continued in 2017. The yearly average collection rate from the Middle Chinle aquifer was 33 gpm.

2.1.2.3 OFF-SITE COLLECTION

None of the irrigation systems were operated in 2017 (see Figure 2.1-1 for locations of former irrigation areas). Some of the Section 3 and 35 South Off-site and Section 28 North Off-site collection wells were operated in 2017 to supply water for the zeolite treatment. Figure 2.1-1 shows the Off-site collection wells that were used in 2017. South collection wells 862, 866, Q2, Q3, Q5, Q11, Q18, Q23, R1, R2, R3, R4, R5, R10, R11, Y1, Y7, Y13 and Y23 were pumped for the zeolite treatment of this Off-site water. North Off-site collection wells 634, 659, 890, H1, H2A, H7, H7B, H12, H16, H17, H24 and H26 were pumped for the zeolite treatment of this Off-site water during 2017.

The cumulative volume of water applied to the former irrigation (land treatment) fields from 2000 through 2012 (blue line) and the Off-site collection for 2013 through 2017 (cyan) are presented in Figure 2.1-3 which shows that nearly 3.4 billion gallons of water have been pumped from the Off-site collection wells. The volume of water prior to 2013 was applied to land treatment while the 2013 through 2017 volumes of collection are shown differently because its water was removed from the Off-site areas. Figure 2.1-3 shows a comparison between the volumes of water pumped for the

Off-site collection versus the volume of collection water of the On-site collection to the R.O. plant since 2000. The volume of Off-site collection water is roughly 120 % of the volume of water collection On-site for the same period.

The 2013 Irrigation Report, ERG and Hydro-Engineering, LLC 2013, presents the monitoring results through 2013 for the irrigation areas while the groundwater monitoring results for 2017 in the irrigation areas is presented in this report. This data shows no effects on the uranium and selenium concentrations in the underlying groundwater from the HMC irrigation/land treatment program, except for possibly a small increase in uranium in the Section 34 groundwater which has returned to near the pre-irrigation concentration. Appendix F presents the plots of the soil moisture instruments. No soil moisture concentrations were measured in 2017 from the lysimeters because the early October attempt to collect samples from the lysimeters did not produce any water samples.

2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM GROUNDWATER

Table 2.1-1 (page 2.1-28) presents the quantities of chemical constituents extracted from the On-site groundwater system, the tailings piles and the toe drains. The groundwater collection system has produced an average pumping rate of 270 gpm for the entire period between 1978 and 2017. The portion of the collection water that has been re-injected into the alluvial aquifer is not included in the values in Table 2.1-1. The quantity of constituents removed in 2017 was computed by multiplying the average concentration of a particular constituent for each source of water (groundwater, toe drains and tails collection) by the volume of water pumped for each during that year. The quantities of constituents collected by aquifer and area are presented in Table 2.1-2 for 2017 with 23,000 and 37,000 pounds of uranium and molybdenum removed from the Grants groundwater in 2017. This table lists the total for the On-site and the sum of the Off-site quantities for 2015 through 2017, showing that the On-site collection the last three years has been 2.2 times the Off-site collection.

Figure 2.1-4 presents the volume of water and the pounds of uranium removed by the On-site and Off-site collection systems from 2000 through 2017. The light blue, purple and green bars show the comparison of the volumes for area for each year while the red, brown and gold bars present the pounds of uranium removed respectively by the Off-site land treatment, Off-site collection and On-site collection. The figure shows that the volume of water collected from the Off-site wells is very important and was generally larger than the On-site collection during the irrigation period but the pounds of uranium are small in this Off-site collection compared to the pounds removed by the On-site collection. The volume of water collected On-site has been more than the Off-site collection since 2010.

2.1.2.5 QUALITY OF TREATED WATER

Table 2.1-3 presents the water quality results for the Post Treatment Tank injection monitoring point, SP2 (monitors mixture of R.O. product, fresh water and zeolite treated water prior to injection). Monitoring point SP2 is the monitoring of compliant water prior to it being injection into the groundwater. The site standards are listed at the top of Table 2.1-3 and all compliant water were less than the site standards in 2017 except for nitrate concentrations on July 28 and September 27 that were very large. An investigation of these values indicate the samples were mistakenly preserved with nitric acid and these values are not indicative of the concentrations that were injected into the groundwater.

Field and weekly samples have been used to aid in the tracking of the SP2 compliant water quality. Table 2.1-4 presents the SP2 data including the field and weekly water quality data for 2017. This table shows that weekly samples were collected during April through July to better define the variations in SP2 water quality during this time period.

Table 2.1-5 presents the R.O. feed water and the R.O. product (SP1) water quality for 2017 and all of the SP1 water quality is less than the site standard concentrations except for the two very large nitrate values where the samples were mistakenly preserved with nitric acid and three molybdenum values. The higher molybdenum SP1 values did not result in exceedance in the SP2 compliant water. The blue highlighted data shows the values that exceed the standard.

The zeolite treated water is monitored at three locations prior to being discharged to the PTT to be mixed with the R.O. product and/or fresh water. Table 2.1-6 gives the treated zeolite water quality for these three locations. The treated water is monitored from the 300 zeolite, the 1200 zeolite for Trains 1&2 and the 1200 zeolite for Trains 3&4. The blue highlighted concentration in Table 2.1-6 shows which values exceed the site standards. Uranium concentrations from the zeolite exceeded the site standards from the 300Z for the March 15 sample with a value of 0.249 mg/l. The site Kinetic Phosphorescence Analyzer (KPA) uranium value 0.062 mg/l and other parameters did not indicate a problem. The uranium concentration for the SP2 March integrated sample of the water that was injected into the groundwater was small at 0.0189 mg/l showing that the higher value from the 300 zeolite was likely a laboratory error.

The molybdenum, selenium, chloride, sulfate and TDS concentrations were below the site standard for all zeolite samples taken during 2017. The radium226 plus radium228 activity site standard was slightly exceeded in the May 15th 300Z and 1200Z Trains 3&4 samples. The Off-Site collection water does not contain significant radium levels and it has been demonstrated that significant levels of radium only exist very near the tailings pile. These two exceedances are thought to be laboratory outliers**.**

2.1.3 INJECTION

The treated and/or fresh-water injection systems, which aid in the reversal of the groundwater gradients back toward the collection wells, consist of lines of injection wells and infiltration lines, which are oriented generally along the east, south and west perimeter of the two tailings piles and evaporation pond (see green circles and infiltration lines on Figure 2.1-1).

In 2003, approximately 2100 feet of four-inch corrugated slotted polyethylene pipe was installed at a depth of approximately 6 feet below land surface west of the Large Tailings Pile to serve as a horizontal infiltration line (see green line on Figure 2.1-1). A filter sock was placed over the pipe thus negating the need for a sandpack. Water is currently being injected into this injection line (S injection line) at three locations. The 2017 injection rate for this horizontal injection line is included in the On-site alluvial injection rates, and was 117 gpm for the year.

In July 2004, two 250 foot sections of injection line (EBA1 and EBA2) were added south of collection well 522 east of Highway 605 (see Figure 2.1-1 for location). The average injection rate for these two lines is estimated at 20 gpm and is included in the On-site alluvial injection rate.

A 400-foot extension to the S injection line was added on the north end of this line in 2005. Five EMA injection lines were added southwest of the Large Tailings while three ETA injection lines were added east of the Large Tailings in 2005 (see Figure 2.1-1).

2.1.3.1 ON-SITE ALLUVIAL INJECTION

The Broadview Acres injection system started in 1977 with the G line on the north side of this subdivision. Injection into the majority of the G-line wells was discontinued in mid-April of 2000 in order to supply more water to injection wells near the collection area. The J-line, wells X1 through X10, and wells X28 through X31 are also considered part of the Broadview Acres injection system. Alluvial fresh-water injection wells 523 and 524 were added to the Broadview Acres injection system in 2002 (see Figure 4.1-1).

All wells adjacent to the northeast corner and to the north and east of Murray Acres are included in the Murray Acres injection system. This system includes all of the M and WR series injection wells. The M line of the Murray Acres injection system was initially used in 1983. Injection into the M-line west of well WR1R was discontinued at the end of September of 2000, and injection into the WR-line, north of WR10, began at this time. The horizontal injection line, west of the Large Tailings Pile, (S. Inj. Line) was added to this system on August 25, 2003. Fresh-water injection into lines ETA1, ETA2 and ETA3 started in July of 2005 but were not used in 2016. Injection into EMA1 with fresh water started in December, 2005 and continued with treated and/or fresh water in 2017.

Figure 2.1-5 (page 2.1-19) presents treated and/or fresh-water injection rates for the last eighteen years. An average of 456 gpm, or a total of 239 million gallons, was injected during 2017 into the On-site alluvial aquifer.

2.1.3.2 R.O. PRODUCT

The R.O. product water mixed with fresh water had supplied water to the EMA2 through EMA5 infiltration lines to the south and west of the collection ponds. Until October, 2005, R.O. product water was discharged into the X line and injected into wells X1 through X10, X28 through X31 and into wells K2, K6, KA through KE, KM, KN, C4, C13, C5, C3R and PM. Fresh-water injection was commenced after that date for these wells. R.O. product and fresh water was switched to injection lines EMA2 through EMA5 in October 2005. Treated and/or fresh water supplied injection water from the Post Treatment Tank in 2017. Figure 2.1-5 shows the rates of R.O. product water produced, which averaged 407 gpm in 2017 for a total of 213 million gallons. Table 2.1-3 presents the water quality results for the Post Treatment Tank injection monitoring point, SP2 (monitors mixture of R.O. product, fresh water and zeolite treated water prior to injection) while Table 2.1-4 presents the weekly and field water quality for SP2. Table 2.1-5 presents the R.O. feed water and R.O. product (SP1) water quality for 2017.

2.1.3.3 UPPER CHINLE AQUIFER INJECTION

Hydro-Engineering 2003b and the Updated Corrective Action Program 2012 should be reviewed for a detail discussion of the geologic setting for the Chinle aquifers. From 1984 through early 1995, the Upper Chinle injection system consisted of injecting fresh water into Upper Chinle well CW5, located on the north side of Broadview Acres. This effort restored most of the area in the Upper Chinle aquifer between the two faults. Injection into well CW5 was resumed in April of 1997 and continues at present to complete the restoration of this aquifer.

In order to maintain head in the Upper Chinle aquifer east of the East Fault, injection of fresh water into well CW13, an Upper Chinle well, was begun in June, 1996. Injection into Upper Chinle well CW25, located on the western edge of the Upper Chinle outcrop east of Murray Acres, began in 2000. Injection into CW25 will increase the head in the Upper Chinle aquifer and force flow in the Upper Chinle back toward collection well CE2. Injection into Upper Chinle well 944 started in June of 2002, and injection into well CW4R started in 2003. The red squares on Figure 2.1-5 present monthly average injection rates into Upper Chinle wells 944, CW4R, CW5, CW13 and CW25, with an overall 2017 average of 23 gpm.

2.1.3.4 MIDDLE CHINLE AQUIFER INJECTION

Injection of San Andres fresh water into Middle Chinle well CW14 was started in December of 1997. This injection was initiated to prevent northward movement of alluvial water that recharges the Middle Chinle on the south side of Felice Acres. The injection rate averaged 5 gpm in 2017 (see Figure 2.1-5). This injection has prevented the movement of constituents further to the north and allows up-gradient collection from the well field.

2.1.3.5 SECTIONS 28 AND 29 INJECTION

The fresh-water injection in Sections 28 and 29 was initiated in March of 2002 to impede movement of groundwater with modest contaminant concentrations in Section 28 until

North Off-site water extraction can reduce these low concentrations. Eight infiltration lines were added in 2005 in Sections 27 and 28 to replace the injection wells and adjust the location of this injection. Injection into lines NPV1 through NPV5 (5 of the 8 infiltration lines) was started on July 27, 2005 while injection into NPV6 was started in December 2005. Fresh water injection into alluvial wells 633 and 655 was restarted in June of 2010. Three additional fresh water infiltration lines (NPV9, NPV10, and NPV11) were added in 2011 to better contain the front of the Section 28 uranium plume. San Andres well 951 was replaced by San Andres well 951R as the fresh water supply in April of 2012. PTT water was also used to supply this injection starting in 2016. The injection rate averaged 342 gpm for 2017 with a total injected volume of 179 million gallons. Figure 2.1-5 presents the monthly injection rates into wells and infiltration lines located in Sections 28 and 29.

2.1.3.6 SECTIONS 35 AND 3 INJECTION

Fresh-water injection in the southwestern quarter of Section 35 was initiated in late 2002 utilizing production from Upper Chinle well CW18 and Middle Chinle well CW28. This water was injected into alluvial wells 641, 642, 848 and 868 (see Figure 4.1-1 for location).

Fresh-water injection into alluvial wells 643, 863, 865 and 866, located in the northeast portion of Section 3 was initiated in 2003. Injection into Middle Chinle wells CW30 and CW46 was added to this program in 2004 (see Figure 2.1-1). Seven infiltration lines in Section 3 and two infiltration lines in Felice Acres were also added in 2004. Two additional infiltration lines, FA1 in central Felice Acres and WFA1 west of Felice Acres, were added in 2005. These injection wells and lines were supplied with water from the PTT and San Andres well 943 in 2017. San Andres well 943 was ceased to be used as a fresh water supply well on May 18, 2017. No pumping from well CW28 occurred in 2017 to supply injection water for wells 848 and 868. Injection into three additional infiltration lines (FA2, RCR8, and RCR9) was started in 2011 while injection into infiltration lines FA3 and FA4 were started in 2013.

Figure 2.1-5 presents the combined monthly injection rates for Sections 34, 35 and 3 treated and/or fresh-water injection lines and wells (see brown diamond symbols on Figure 2.1-5). This injection effort is associated with the groundwater restoration of the Sections 3 and 35 areas. Water collected from wells in Sections 3 and 35 was used in the zeolite treatment systems. During 2017, the yearly average injection rate in Sections 34, 35 and 3 was 208 gpm.

2.1.4 RE-INJECTION

Alluvial water containing relatively low concentrations of contaminants had been collected and injected into areas of the alluvial aquifer near the Large Tailings Pile but this collection water was an input to the R.O. plant starting in August 2016. This water was re-injected into higher concentrations of contaminants in order to enhance restoration near the LTP area. This aspect of the restoration plan at the Grants sites is referred to as the collection for re-injection program. The lower-concentration water was effective (see sulfate, uranium, selenium and molybdenum concentrations in plots for wells T and TA – see report Sec. 4.3) as fresh water during the initial stages of restoration, and therefore, re-injection was a beneficial use of this slightly contaminated groundwater. Water collected from the L-line to the south of the Small Tailings Pile and wells 521, 522 and 639 was used for re-injection into the alluvial aquifer through July in 2016. No collection for re-injection occurred in 2017. The monthly re-injection rates are depicted on Figure 2.1-2 as collection for re-injection use (COL/RE-INJ).

2.1.5 TAILINGS CONDITIONS

Tailings wells were installed in the Large Tailings Pile beginning in 1994, and wells have been periodically added through 2014. No additional tailings injection or dewatering wells were drilled in 2017. Data collected from tailings wells has been used to estimate the amount of drainable water in the re-contoured, stabilized tailings. The tailings wells are also a primary component of the tailings dewatering program. With the exception of some testing of dewatering options in 1999, no dewatering of the tailings occurred in 1998 and 1999 due to limited available capacity in the evaporation ponds. The complete dewatering program was restarted in 2000 and operated through mid-April 2002. Dewatering rates were reduced through the remainder of 2002 and 2003 due to limited available storage in the evaporation ponds. The dewatering wells were operated near capacity starting in April of 2004 and throughout 2005 and 2006. Dewatering rates were restricted in 2007, 2008, 2009 and 2010 due to limited available storage in the evaporation ponds. The dewatering wells were operated near their capacity in 2011 and 2012 and reduced for a portion of 2013 due to evaporation capacity. Rates of tailings dewatering wells in 2014 through 2017 were limited by the numbers of dewatering wells that were operational.

Figure 2.1-6 (page 2.1-20) shows the locations of tailings wells that existed in 2017. This figure also shows the locations of the 147 tailings wells that were abandoned in 2017. The cumulative volume of tailings water pumped from 1995 through 2017 is presented on Figure 2.1-7. A total volume of 507 million gallons of water had been removed from the tailings via dewatering wells by the end of 2017. Of that total, 0.7 million gallons were pumped from the tailings in 2017. The yearly average collection rate from the tailings wells was 1.3 gpm in 2017.

No injection into the Large Tailings Pile occurred in 2016 or 2017. The injection into the tailings allowed larger extraction rates from the tailings dewatering wells and reduced the contaminant concentrations in the tailings. The tailings flushing ceased in early July of 2015.

The volume of water collected from the tailings dewatering wells (light blue bars) and the toe drains (green bars) are also presented on Figure 2.1-8 to show the variations of the collection water each year. This figure also shows the pounds of uranium removed with the tailings dewatering wells (red bars) and the toe drains (gold bars) for each year. The pounds of uranium removed from the toe drains are expected to continue to decrease, as they have the last couple of years, as the concentration from the toe drains decline due to the flushing program. The annual pounds of uranium removed are also expected to decline with time due to the ceasing of the flushing program.

Table 2.1-1 presents the quantity of constituents collected from the tailings wells since dewatering began in 1995. Tables B.1-1 and B.1-2 of Appendix B present chemical analyses of tailings well water during 2017. Uranium is a key water quality parameter for the tailings solution. Four uranium figures are presented to convey the changes in uranium in the LTP with time. Figure 2.1-9 presents the uranium concentrations in the tailing solution in 2000 shortly after the start of the flushing program. The red pattern shows where uranium concentrations were greater than 40 mg/l while the magenta gives the area where 30 to 40 mg/l concentration existed. The green pattern shows the area of 20 to 30 mg/l and the cyan color shows where uranium concentrations are less then 10 mg/l. Figures 2.1-10, 2.1-11 and 2.1-12 present the tailings uranium solution concentrations for additional times in 2004, 2008 and 2017, respectively. These figures show the decline in uranium concentrations with time. The 2017 contours generally show declining concentrations in the outer sand dikes from the flushing activities that ceased in early July of 2015. Declines in uranium concentrations in the slime core area also occurred in 2017. The area where the tailings uranium concentrations are less than 2 mg/l is shown with a white pattern.

2.1.6 TOE DRAIN CONDITIONS

A series of toe drains have been installed around the Large Tailings Pile to intercept perched groundwater seeping from the tailings into the alluvium. The locations of the toe drains and their associated sumps are shown on Figure 2.1-6. Nine sumps are located around the perimeter of the Large Tailings Pile that are utilized for collection of toe seepage. Two of these sumps are tied to the old tailings decant towers (East and West reclaim sumps).

Figure 2.1-7 shows that 408 million gallons of water have been pumped from the toe drains. An average rate of 10.4 gpm of water was collected from the toe drains in 2017, which is less than the 2016 rate. This decline in rate is due to the ceasing of injection into the tailings in 2015.

Table 2.1-1 also presents the 2017 quantity of constituents collected from the toe drains (see Tables B.2-1 and B.2-2 of Appendix B for toe drain sump water-quality results for 2017).

2.1.7 LINED EVAPORATION PONDS

The use of lined evaporation collection ponds (East Collection Pond and West Collection Pond) began in October of 1986 when the two ponds were constructed and are presently used to contain water that can be recycled to the R.O. plant. The No. 1 Evaporation Pond, located on the Small Tailings Pile, began receiving water in November of 1990. Usage of the No. 2 Evaporation Pond began in March of 1996. The No.3 Evaporation pond began operation in December of 2010.

The water from the well collection system and some water from the tailings dewatering wells and toe drains are pumped to the R.O. plant as feed water. The majority of the extracted tailings water prior to 2017 was pumped directly to the No. 2 Evaporation Pond for subsequent evaporation. Excess water is transferred from the East Collection Pond to the No. 2 Evaporation Pond. When necessary, water is transferred from the No. 2 Evaporation Pond to the No. 1 Evaporation Pond. This transfer is mainly through the turbo mister forced evaporation spray system. The No. 1 and No.2 Evaporation ponds use spray systems to enhance evaporation while two turbo misters were added to the No. 3 Evaporation Pond in 2013 but were removed in 2014 due to maintenance required. A total of 99 million gallons (average rate of 188 gpm) of water was delivered to the evaporation pond system in 2017 in addition to the 18 million gallons (average rate of 33 gpm) of natural precipitation added to the pond. The net evaporation from the evaporation system averaged 225 gpm in 2017, compared to 168 gpm in 2016.

Water quality samples results collected from the No. 1 and No. 2 Evaporation Ponds, the East Collection Pond (E COLL POND), and the West Collection Pond (W COLL POND) are presented in Tables B.3-1 and B.3-2 of Appendix B.

2.1.8 YEARLY OPERATIONAL RATES

A tabulation of yearly operational rates and volumes is presented below, and a summary of the yearly operational rates is also presented in Figure 2.1-13. This figure gives the average yearly rates for each aquifer on the left side and shows where the quantity of water was pumped in 2017. A rate of 3.3 gpm in 2017 was pumped to the RO plant from the LTP while 8.4 gpm was discharged to the evaporation ponds. A combined rate of 12 gpm for the toe drain and dewatering rates from the LTP supplied this water under the source control. Estimated seepage and change in saturated storage are also given for the LTP. The RO plant and zeolite inputs and discharges and the input and removal rates from the Collection Ponds rates are presented in Figure 2.1-13.

Major Collection and Injection Flows and Volumes During 2017

Aquifer System	Injection		Collection		Seepage from LTP	
	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Alluvial	979	512,995,000	614	321,887,000	17	8,911,000
Upper Chinle	44	23,063,000	100	59,154,000	--	--
Middle Chinle	54	28,305,000	62	32,341,000	--	--
Lower Chinle	--	--	0	0	--	--
San Andres	--	--	440	230,840,000	--	--
Tailings	--	--	12	6,133,000	--	--

Major Treatment and Disposal Flows and Volumes During 2017

Treatment/Disposal System	Feed/Input Rate		Treated Water Discharge		Evap/Disposal Discharge	
	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Reverse Osmosis	553	289,703,000	407	213,438,000	108	56,504,000
Zeolite	279	146,083,000	229	124,085,000	50	25,998,000
Evaporation Ponds	188	98,752,000	--	--	225	117,936,000
Collection Ponds	53	27,833,000	--	--	23	11,846,000

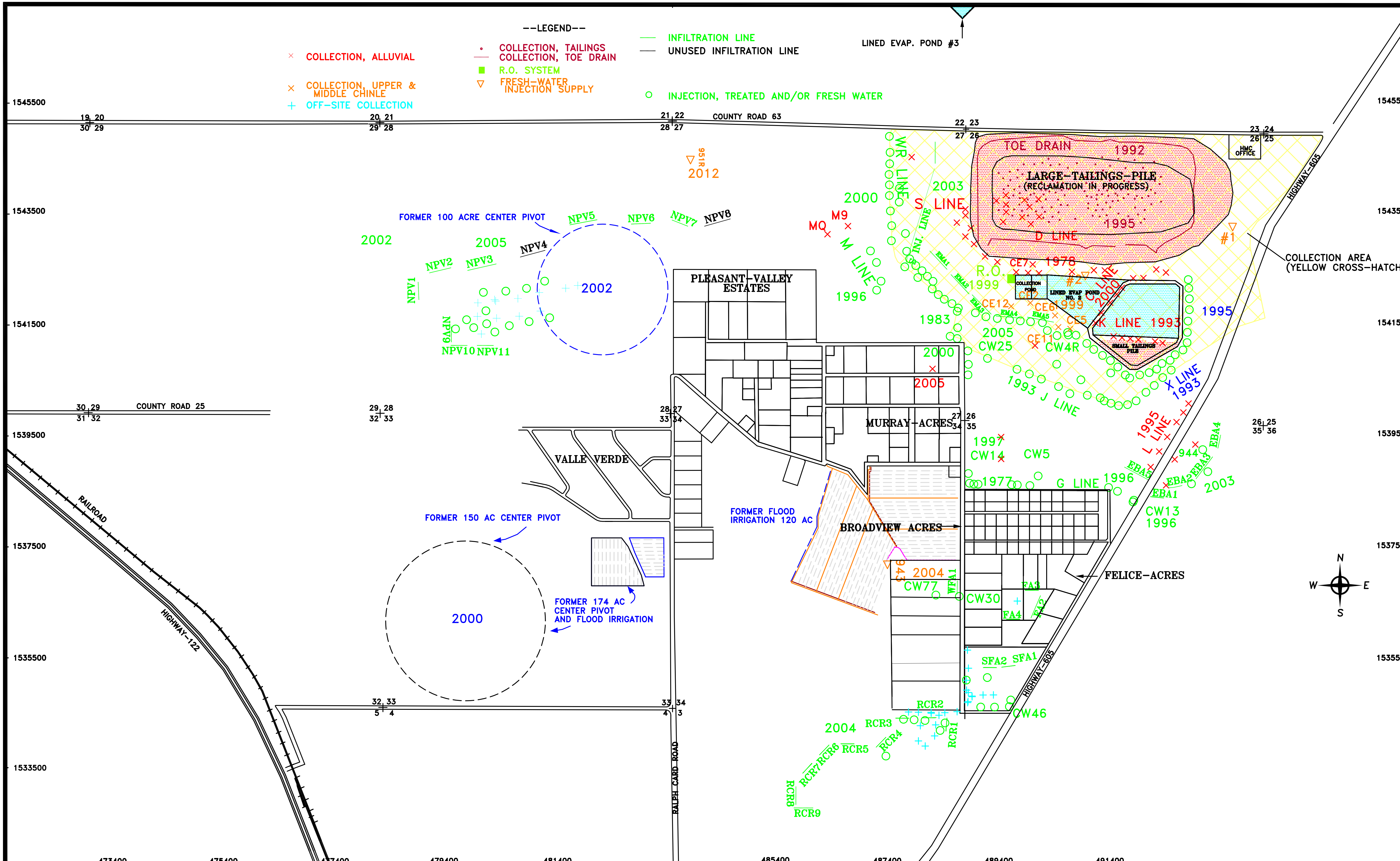

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FIGURE 2.1-1. LOCATION OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES, 2017

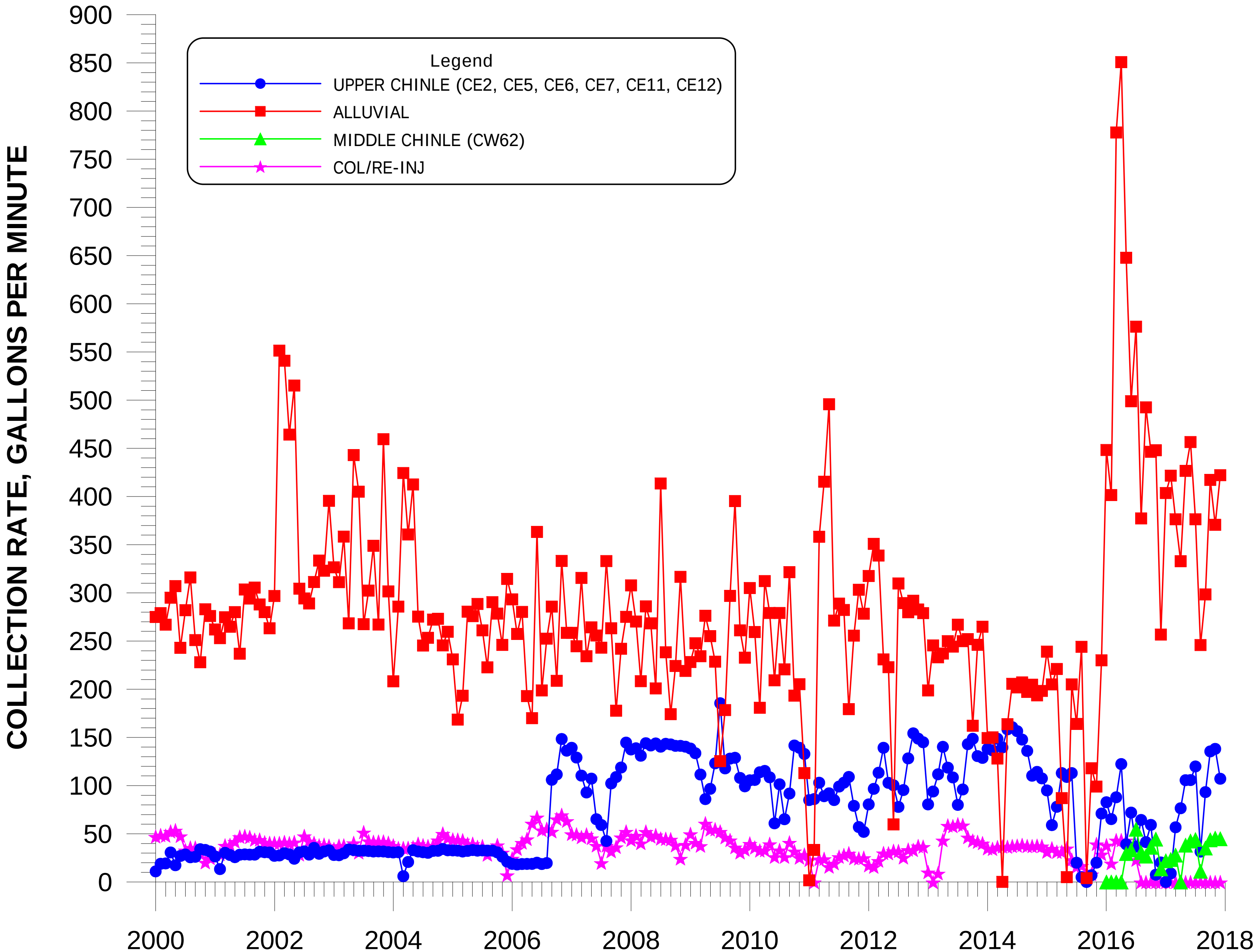


FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

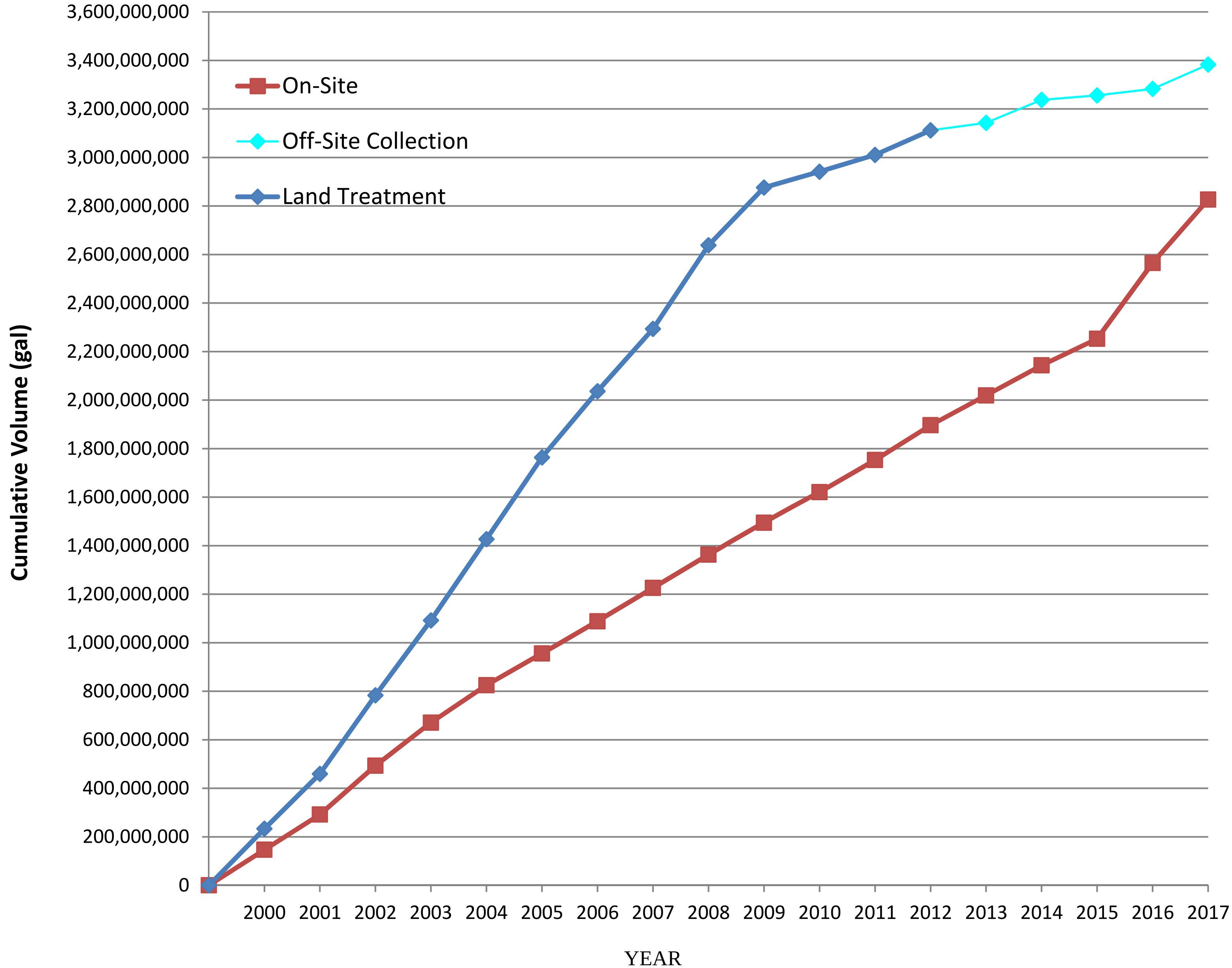


Figure 2.1-3. Cumulative Volume of Land Treatment, On-Site and Off-Site Collection from 2000 to Present

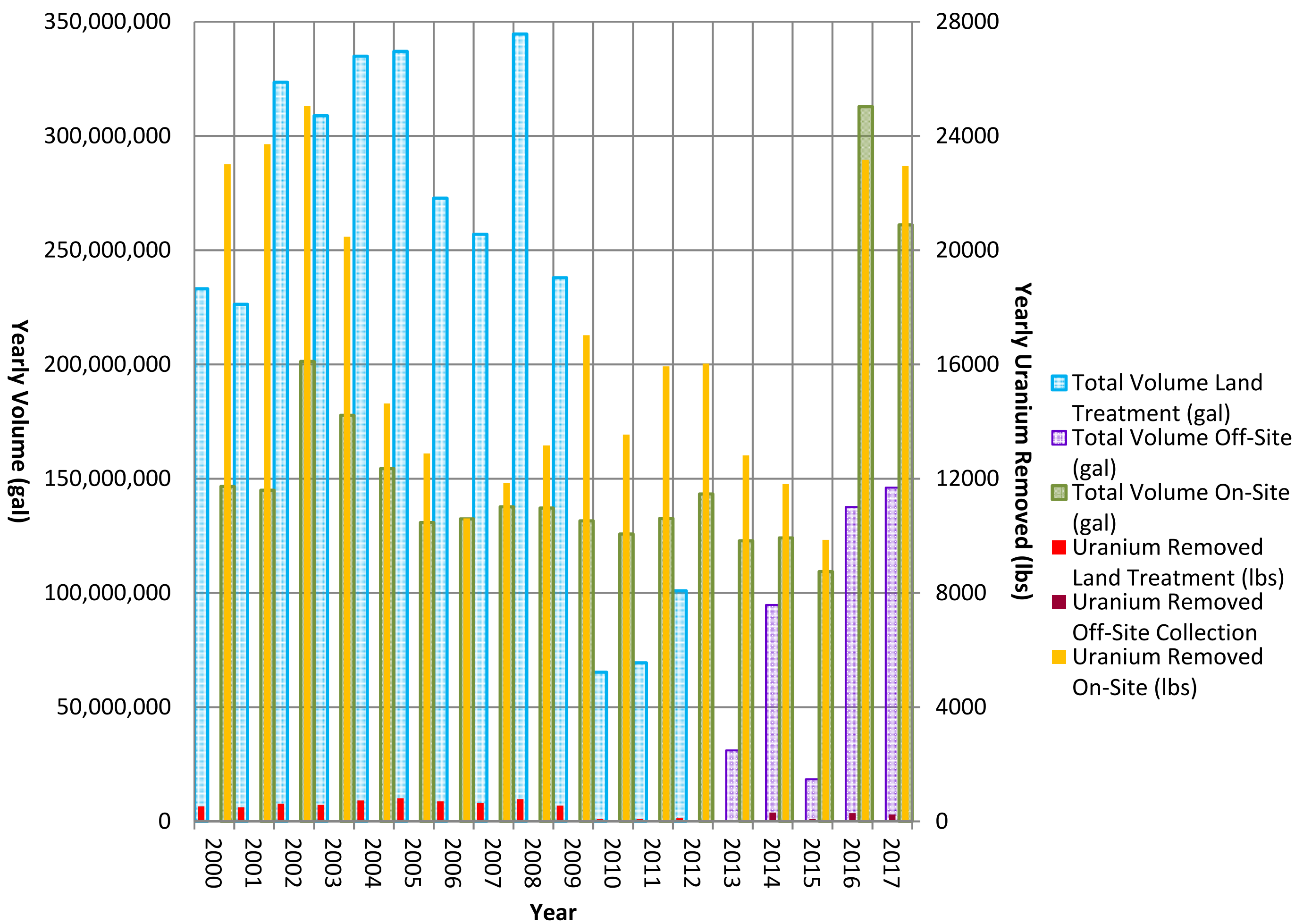


Figure 2.1-4. Yearly Quantity of Water and Uranium Removed

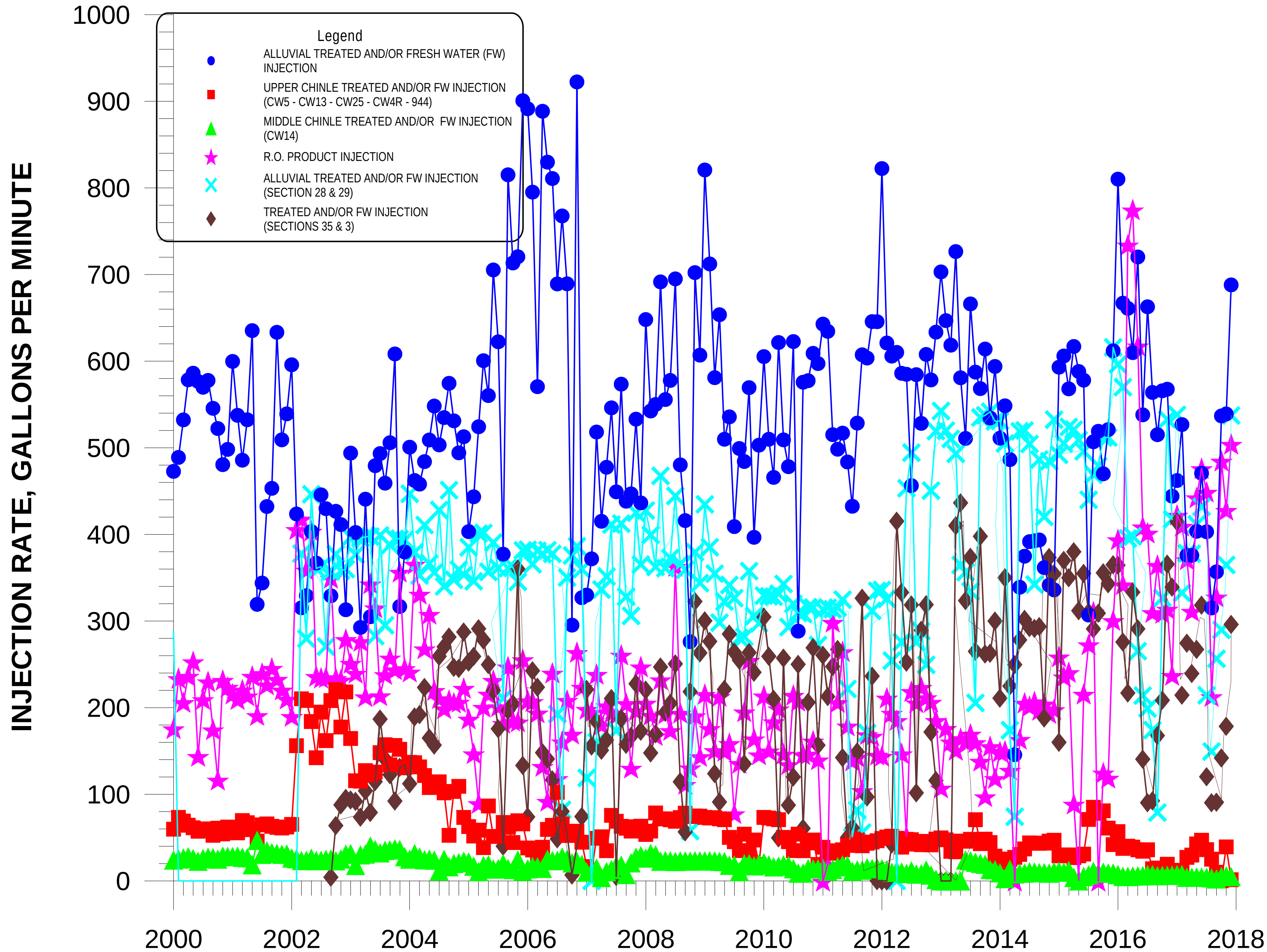


FIGURE 2.1-5. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.

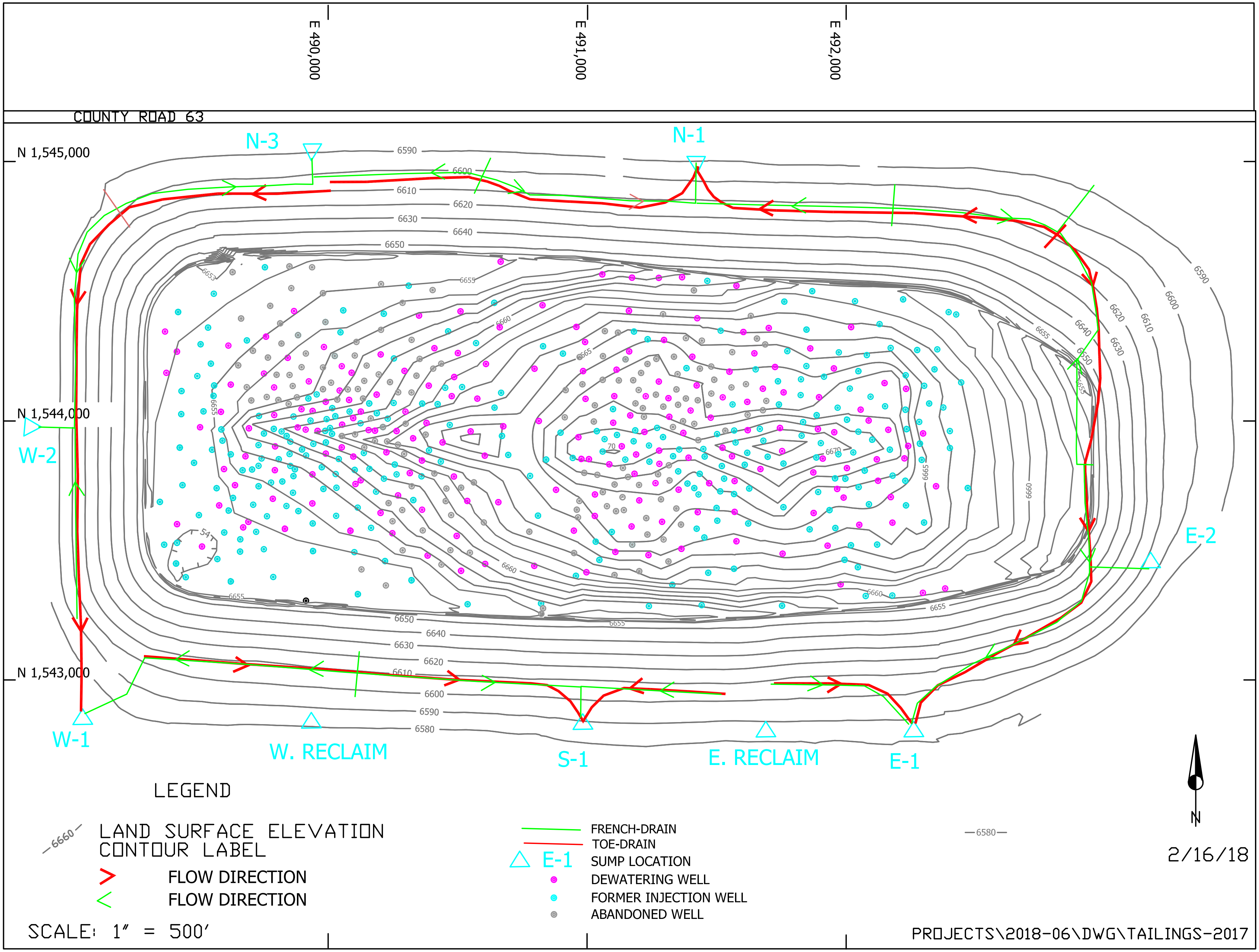


FIGURE 2.1-6. LOCATIONS OF TAILINGS DEWATERING WELLS, TOE DRAINS AND SUMPS

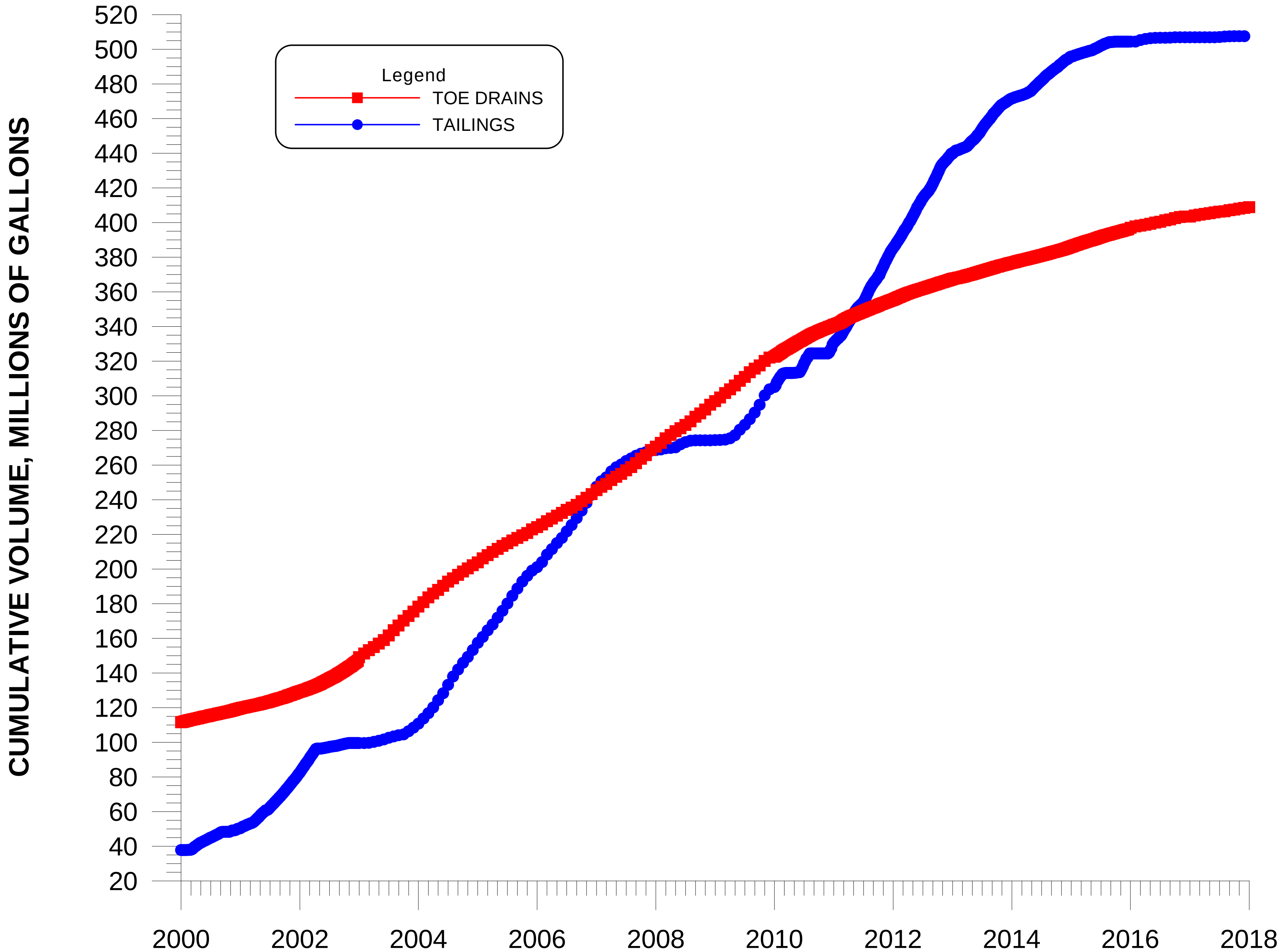


FIGURE 2.1-7. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

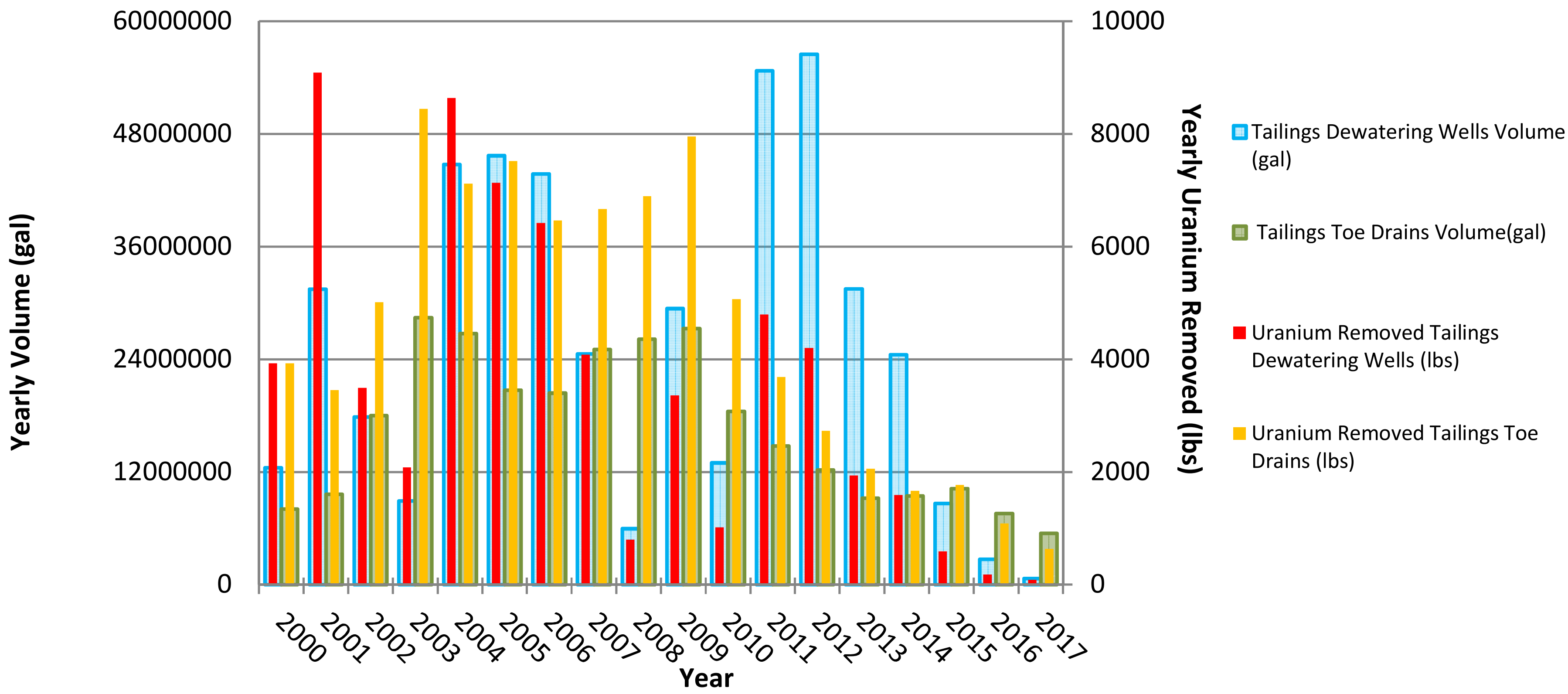


Figure 2.1-8. Yearly Quantity of Tailings Water and Uranium Removed

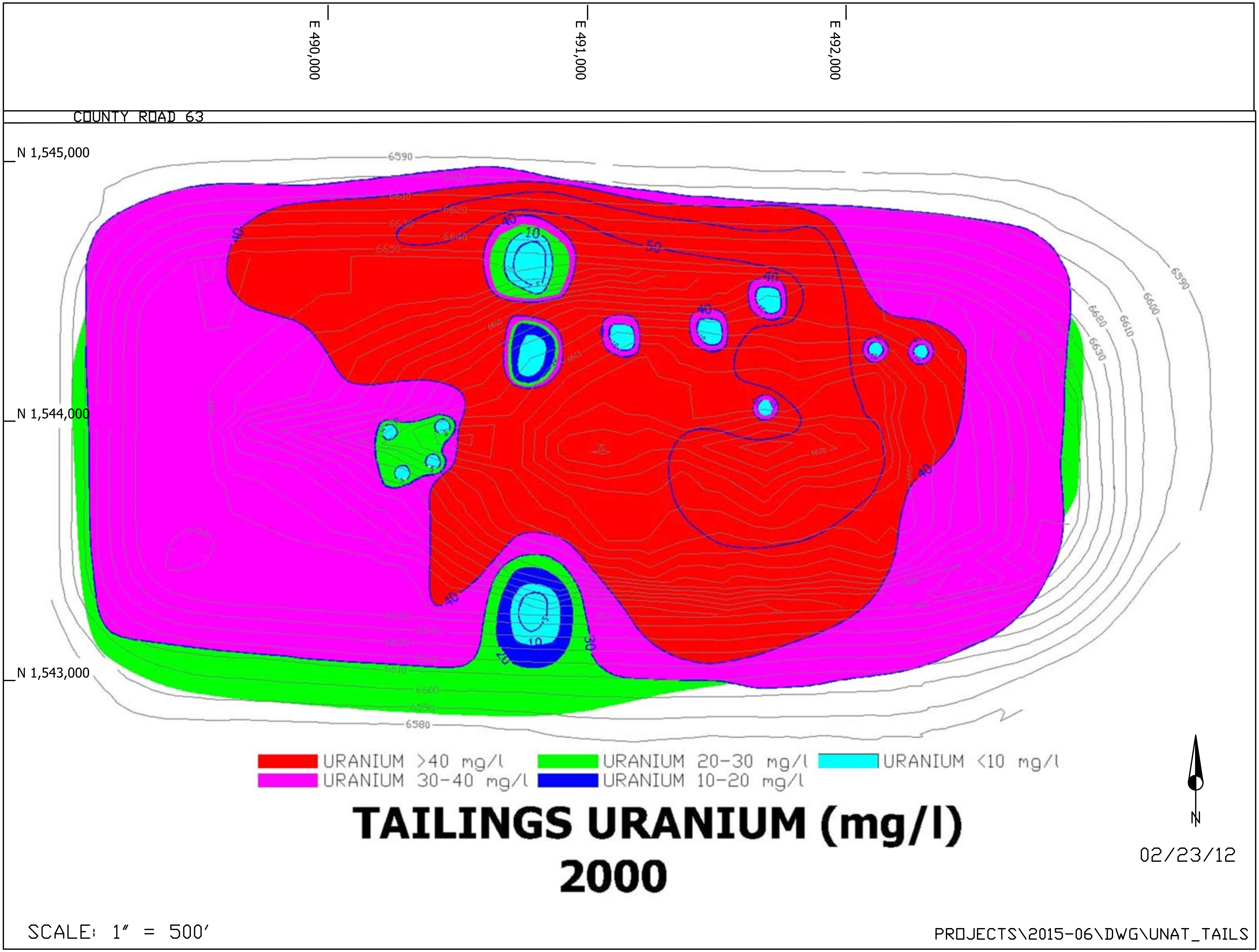


FIGURE 2.1-9. TAILINGS SOLUTION URANIUM CONCENTRATION, 2000

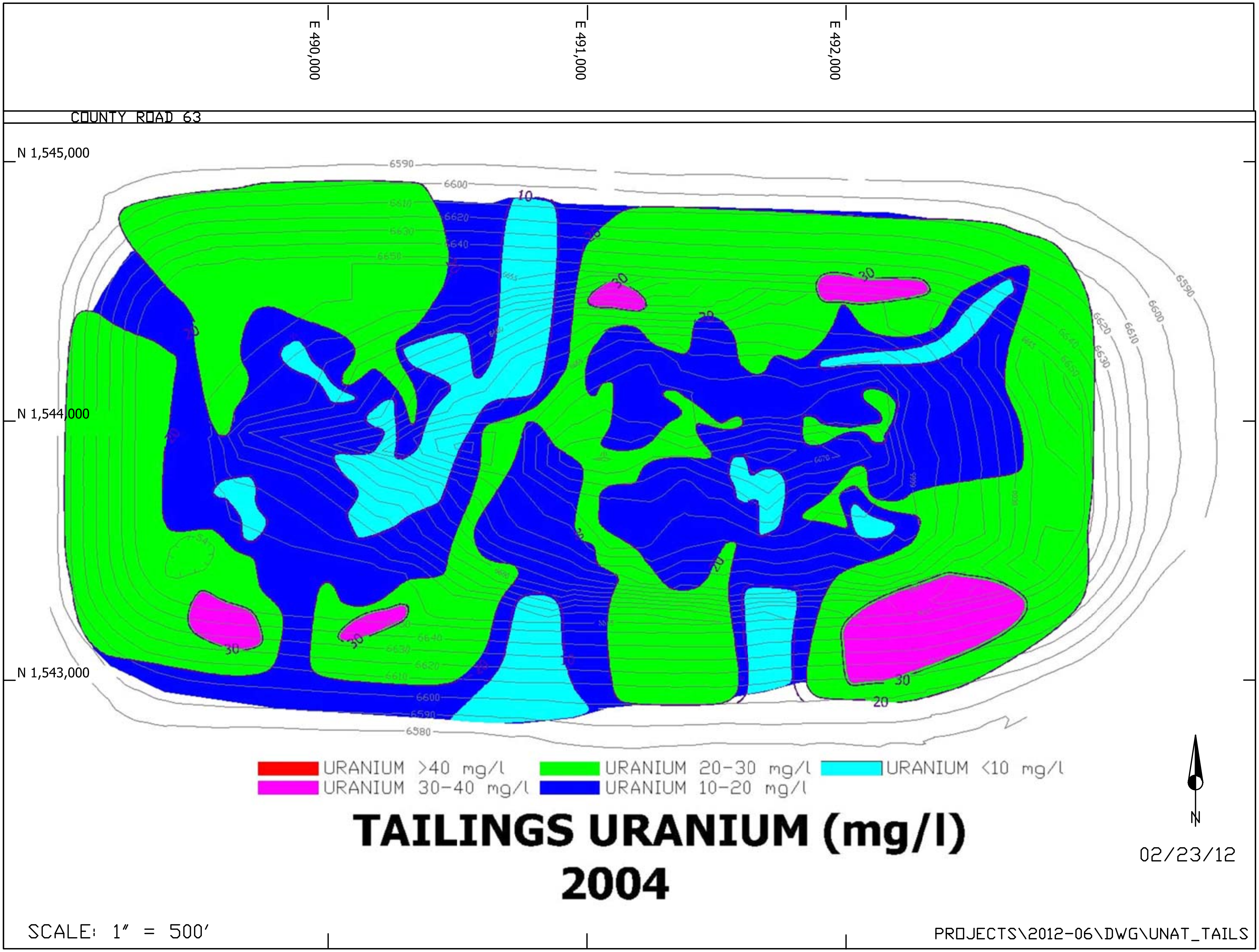
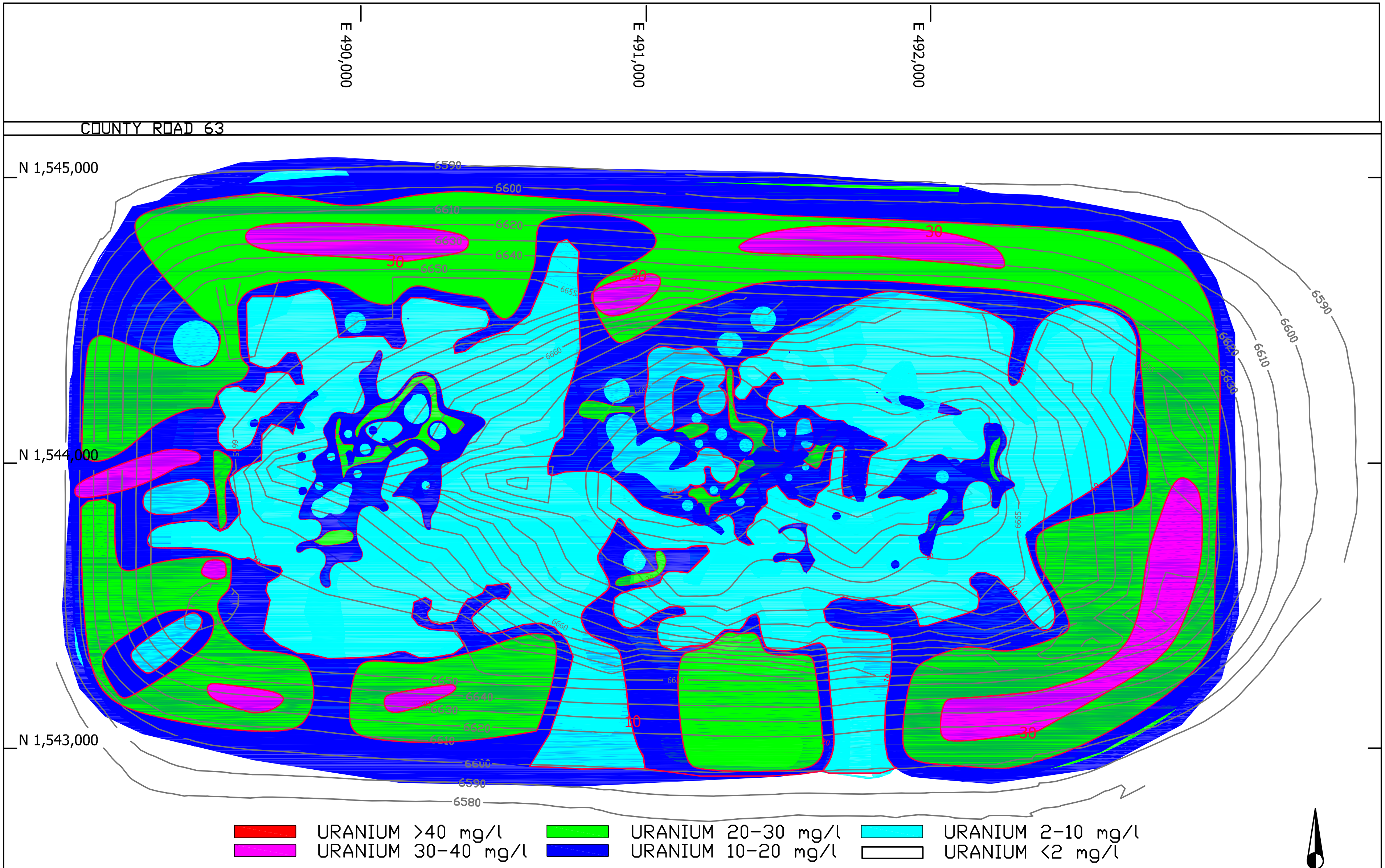


FIGURE 2.1-10. TAILINGS SOLUTION URANIUM CONCENTRATION, 2004



TAILINGS URANIUM (mg/l) 2008

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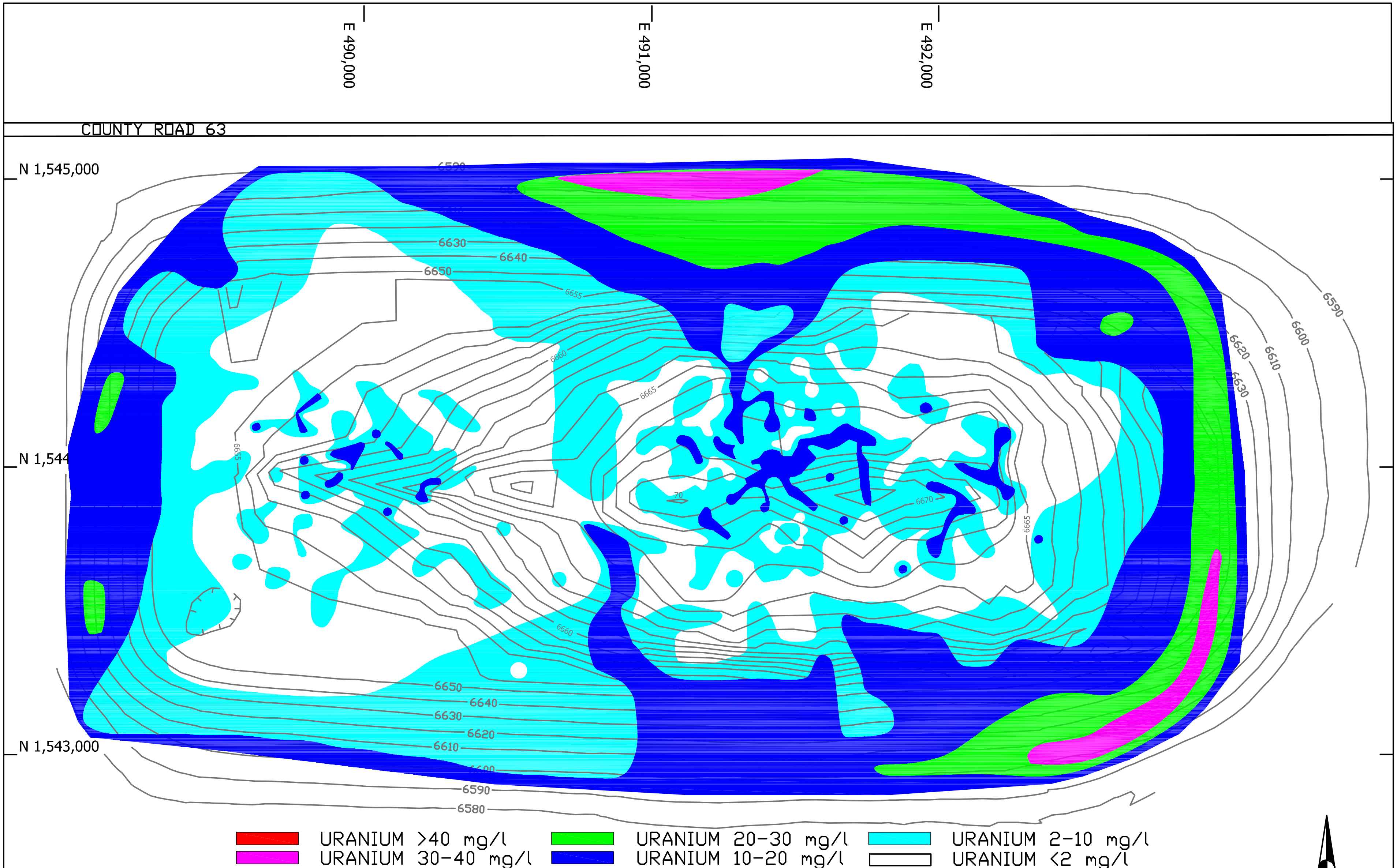
FIGURE 2.1-11. TAILINGS SOLUTION URANIUM CONCENTRATION, 2008



TAILINGS URANIUM (mg/l)
2017

2/12/18

SCALE: 1" = 500'

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FIGURE 2.1-12. TAILINGS SOLUTION URANIUM CONCENTRATION, 2017

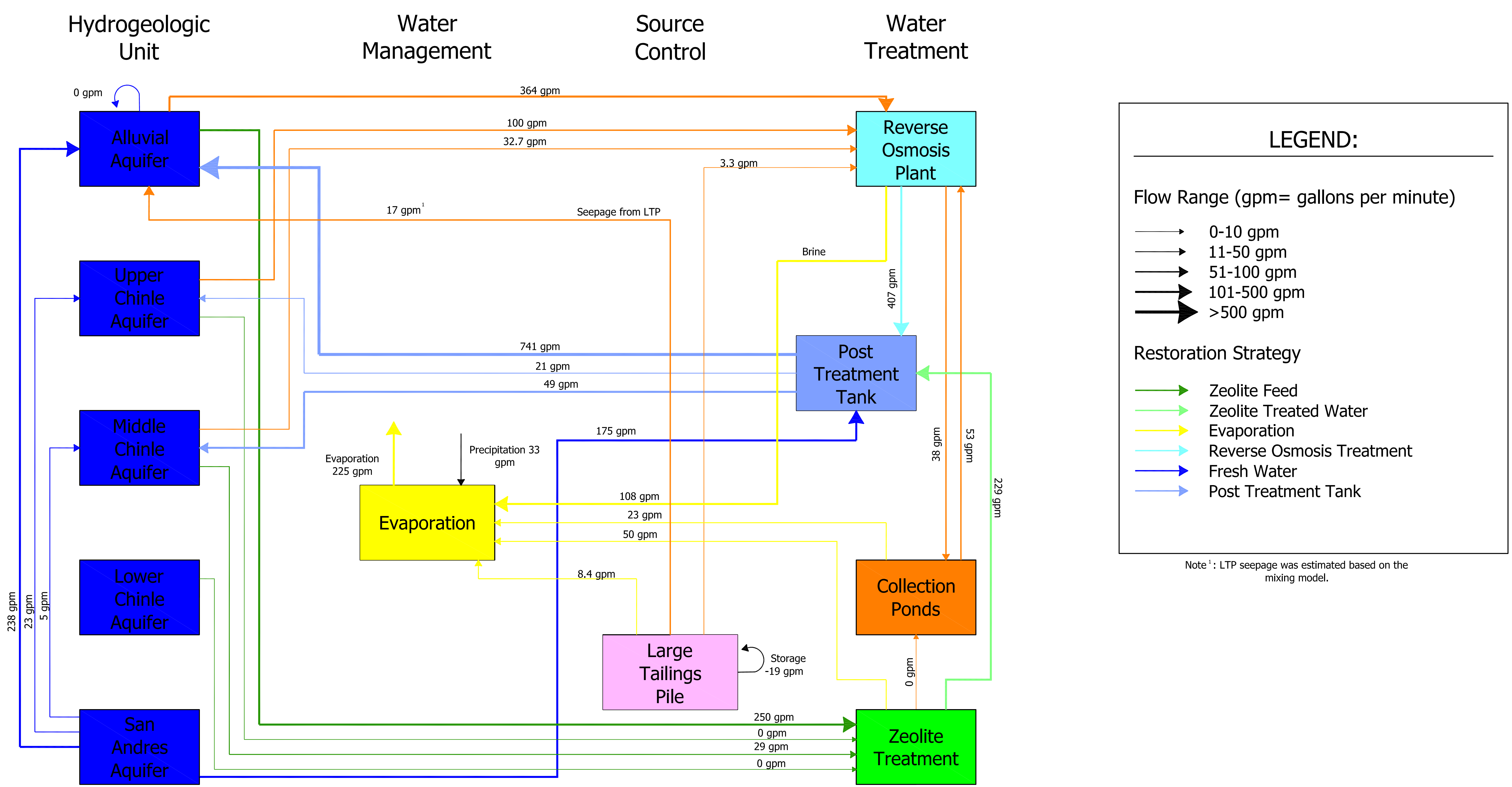

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FIGURE 2.1-13. 2017 MAJOR OPERATIONAL FLOWS

TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED.

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
1978	G.W.	27670033	5200	1200620	35	8081	40	9236	2	462
1979	G.W.	46371629	5200	2012095	35	13543	40	15478	2	774
1980	G.W.	39385860	5200	1708978	35	11503	40	13146	2	657
1981	G.W.	91613183	5200	3975155	35	26756	40	30578	2	1529
1982	G.W.	159848025	5200	6935910	35	46684	40	53353	2	2668
1983	G.W.	167018540	5200	7247043	35	48778	40	55746	2	2787
1984	G.W.	203258522	5200	8819519	35	59362	40	67842	2	3392
1985	G.W.	194074421	5200	8421015	35	56680	40	64777	2	3239
1986	G.W.	199326030	5200	8648886	35	58214	40	66530	2	3326
1987	G.W.	180881740	5200	7848576	35	52827	40	60374	2	3019
1988	G.W.	166460826	5200	7222843	35	48615	40	55560	2	2778
1989	G.W.	175780800	5200	7627243	35	51337	40	58671	2	2934
1990	G.W.	164378919	5200	7132508	35	48007	40	54865	2	2743
1991	G.W.	171497720	5200	7441397	35	50086	40	57242	2	2862
1992	G.W.	128398849	4925	5276234	27.2	29134	35.9	38419	1.60	1718
1992	TOE	8544670	12117	864006	53.2	3793	106.5	7595	1.73	123
1993	G.W.	115795020	5011	4841203	28.1	27130	45.4	43885	1.47	1425
1993	TOE	18357680	12117	1856262	53.2	8150	106.5	16315	1.73	265
1994	G.W.	98294087	4423	3624762	26.0	21146	27.3	22349	1.42	1162
1994	TOE	18337680	12117	1854240	53.2	8141	106.5	16299	1.73	264
1995	G.W.	108306398	3256	2942827	16.1	14553	19.2	17355	1.65	1491
1995	TOE	17711370	11370	1680500	54.6	8069	94.4	13952	2.25	332
1995	TAILS	5905740	8191	403680	36.1	1778	89.7	4420	0.15	7
1996	G.W.	122064160	3899	3967919	20.9	21225	26.8	27259	1.92	1950
1996	TOE	15431810	11537	1484295	46.4	5970	105.0	13509	1.29	166
1996	TAILS	9181390	9434	722129	40.2	3077	108.0	8236	0.18	14
1997	G.W.	94465562	4955	3836678	26.9	20892	33.4	25887	3.17	2456
1997	TOE	12029390	11094	1113808	41.8	419	100.0	10040	0.81	81
1997	TAILS	21292900	10284	1827575	45.8	8139	92.4	16420	0.14	25
1998	G.W.	74459130	5088	3161866	29.6	18385	34.8	21625	1.85	1151
1998	TOE	10321780	9870	850257	42.5	3665	95.2	8203	0.73	63
1999	G.W.	117752408	3363	3305027	16.6	16314	14.8	14545	2.06	2024
1999	TOE	8809890	11560	849976	54.3	3993	106.0	7794	0.46	34
1999	TAILS	120550	9420	9478	40.9	41	111.5	112	0.19	0
2000	G.W.	146609842	3358	4108868	18.8	23004	20.6	25206	1.94	2374
2000	TOE	8032870	9734	652590	58.6	3929	118.0	7911	0.34	23
2000	TAILS	12446810	9710	1008685	37.8	3927	127.0	13193	0.30	31
2001	G.W.	144925056	2770	3350438	19.6	23707	21.4	25884	1.65	1996
2001	TOE	9606280	9935	796529	43.1	3455	95.7	7673	0.78	63
2001	TAILS	31465370	8688	2281555	34.6	9086	89.2	23425	0.19	50
2002	G.W.	201357360	2748	4618092	14.9	25040	16.7	28065	1.23	2067
2002	TOE	17975520	9210	1381718	33.4	5011	88.7	13307	0.76	114
2002	TAILS	17817840	7670	1140588	23.5	3495	40.8	6067	0.12	18
2003	G.W.	177727419	2417	3585168	13.8	20470	15.5	22991	0.73	1083
2003	TOE	28418871	9457	2243048	35.6	8444	78.9	18714	4.35	1032
2003	TAILS	8890076	9800	727126	28.0	2078	92.0	6826	0.30	22
2004	G.W.	154422720	2272	2931913	11.3	14633	16.6	21386	0.79	1017
2004	TOE	26720928	8007	1787722	31.9	7115	67.6	15102	2.78	622
2004	TAILS	44745696	6360	2377848	23.1	8637	60.9	22769	0.20	75
2005	G.W.	130810679	2478	2705346	11.8	12883	15.5	16922	0.59	644
2005	TOE	20704320	8228	1421784	43.5	7517	87.5	15120	2.63	454
2005	TAILS	45685786	4389	1673497	18.7	7130	56.3	21467	0.18	69
2006	G.W.	132406109	1990	2199072	9.6	10609	14.3	15802	0.73	807
2006	TOE	20374782	7432	1263796	38.0	6462	76.2	12958	1.09	185
2006	TAILS	43707760	4278	1560550	17.6	6420	51.9	18932	0.14	51
2007	G.W.	137707200	2420	2781316	10.3	11838	16.7	19193	0.52	598
2007	TOE	25037779	6829	1427024	31.9	6666	67.3	14063	1.20	251
2007	TAILS	24561680	4130	846616	19.9	4079	61.1	12525	0.15	31
2008	G.W.	137145174	2672	3058408	11.5	13163	16.5	18886	0.61	698
2008	TOE	26140850	7847	1711992	31.6	6894	68.5	14945	1.58	345
2008	TAILS	5950324	4671	231968	16.0	795	42.8	2126	0.24	12
2009	G.W.	131564160	3145	3453318	15.5	17020	19.1	20660	0.85	933
2009	TOE	27238830	7792	1771396	35.0	7957	69.9	15891	0.81	184
2009	TAILS	29403070	3850	944782	13.7	3362	38.6	9472	0.24	59
2010	G.W.	125785118	2793	2932099	12.9	13542	16.6	17427	0.64	672
2010	TOE	18444330	6848	1054156	32.9	5065	52.1	8020	0.51	79
2010	TAILS	12953960	3018	326287	9.4	1016	33.5	3622	0.19	21
2011	G.W.	132573855	2908	3217590	14.4	15933	22.5	24895	1.23	1361
2011	TOE	14777020	6747	832101	29.9	3688	53.2	6561	0.44	54
2011	TAILS	54713150	2887	1318308	10.5	4795	33.5	15297	0.18	82
2012	G.W.	143304728	3070	3671785	13.4	16027	16.8	20093	0.62	742
2012	TOE	12201316	6476	659465	26.8	2729	48.9	4980	0.43	44
2012	TAILS	56486600	2632	1240823	8.9	4196	26.2	12352	0.17	80
2013	G.W.	122813790	2793	2862836	12.5	12813	16.2	16605	0.73	748
2013	TOE	9211575	6453	496105	26.7	2053	53.3	4098	0.35	27
2013	TAILS	31489800	2448	643368	7.5	1958	23.6	6202	0.12	32

TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED. (cont'd)

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
2014	G.W.	124070324	2570	2661212	11.4	11805	15.8	16361	0.63	652
2014	TOE	9427490	5683	447149	21.2	1668	46.0	3619	0.15	12
2014	TAILS	24487100	2788	569782	7.8	1594	27.1	5538	0.16	33
2015	G.W.	109360371	3100	2829437	10.8	9857	14.1	12869	0.83	758
2015	TOE	10222310	5252	448076	20.7	1766	41.2	3515	0.30	26
2015	TAILS	8644000	2891	208565	8.2	592	28.0	2020	0.11	8
2016	G.W.	312653024	2590	6758352	8.2	21397	14.5	37836	0.45	1174
2016	TOE	7553090	4756	299809	17.2	1085	36.7	2310	0.15	9
2016	TAILS	2678400	2891	64625	8.2	183	28.0	626	0.11	2
2017	G.W.	261047358	2104	4583987	10.5	22876	17.1	37256	0.66	1438
2017	TOE	5455170	3305	150473	13.9	633	26.9	1225	0.21	10
2017	TAILS	674300	4918	27677	14.7	83	32.5	183	0.70	4
SUM G.W.		5,673,386,149		179,507,542		1,045,867		1,273,061		66,309
SUM TOE		407,087,601		29,398,278		124,335		263,717		0
SUM TAILS		492,628,002		20,155,515		76,460		211,831		725
COMBINED SUM		6,573,101,752		229,061,335		1,246,662		1,748,609		67,033

NOTE: Average concentrations for 1978 to 1991 were used in calculating the quantities of constituents removed.
Concentrations from the collection wells have gradually decreased from 1978 through 1991.
G.W. = Ground water; TOE = Toe drains on edge of tailings; TAILS = Large tailings collection wells

TABLE 2.1-2. QUANTITIES OF CONSTITUENTS COLLECTED BY AQUIFER

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
				ON-SITE						
2015	ALLUVIAL	102,369,081	3311	2,828,827	11.53	9,851	15.05	12,858	0.65	555
2015	UPPER CHINLE	6,991,488	3483	203,236	15.29	892	17.06	995	0.55	32
2015	MIDDLE CHINLE	0	0	0	0	0	0	0	0	0
2016	ALLUVIAL	252,263,429	2988	6,290,907	10.71	22,549	17.62	37,097	0.63	1,326
2016	UPPER CHINLE	31,671,500	789	208,557	1.64	434	1.31	346	0.07	19
2016	MIDDLE CHINLE	11,874,100	1500	148,652	1.77	175	1.62	161	0.3	30
2017	ALLUVIAL	191,759,248	2508	4,014,348	13.9	22,296	22.86	36,585	0.85	1,361
2017	UPPER CHINLE	52,140,210	794	345,424	1.1	481	1.05	455	0.07	29
2017	MIDDLE CHINLE	17,147,900	1567	224,216	1.1	164	0.84	120	0.27	39
				OFF-SITE						
2015	SOUTH ALLUVIAL	9,579,680	737	58,925	0.65	52	0.03	2	0.04	3
2015	SOUTH UPPER CHINLE	0	0	0	0	0	0	0	0	0
2015	SOUTH MIDDLE CHINLE	8,852,320	727	53,712	0.5	37	0.03	2	0.06	4
2015	SOUTH LOWER CHINLE	0	0	0	0	0	0	0	0	0
2015	NORTH ALLUVIAL	0	0	0	0	0	0	0	0	0
2016	SOUTH ALLUVIAL	51,861,620	694	300,389	0.344	149	0.03	13	0.037	16
2016	SOUTH UPPER CHINLE	1,665,970	683	9,497	0.075	1	0.03	0	0.017	0
2016	SOUTH MIDDLE CHINLE	12,307,920	670	68,824	0.316	32	0.03	3	0.041	4
2016	SOUTH LOWER CHINLE	423,300	604	2,134	0.155	1	0.03	0	0.033	0
2016	NORTH ALLUVIAL	71,335,211	702	417,945	0.18	107	0.03	18	0.04	24
2017	SOUTH ALLUVIAL	60,739,450	690	349,594	0.31	155	0.03	14	0.03	16
2017	SOUTH UPPER CHINLE	0		0		0		0		0
2017	SOUTH MIDDLE CHINLE	15,175,960	699	88,524	0.30	38	0.03	4	0.04	5
2017	SOUTH LOWER CHINLE	0		0		0		0		0
2017	NORTH ALLUVIAL	70,145,000	724	423,829	0.14	84	0.03	18	0.03	20
SUM ON-SITE		666,216,956		14,264,166		56,842		88,617		3,391
SUM OFF-SITE		302,086,431		1,773,371		656		74		93
COMBINED SUM		968,303,387		16,037,537		57,498		88,692		3,483

Table 2.1-3 Compliant (SP2) Water Quality Data

Sample Point Name	Date	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Ue (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard		250	1500	2734	0.16		0.1	0.32
SP2	1/25/2017				0.0369	0.00596	<0.03	
	2/28/2017	90	427	948	0.0414	0.00667	<0.03	0.011
	3/24/2017	79	319	758	0.0189	0.00305	<0.03	0.005
	4/28/2017	146	530	1290	0.0154	0.00248	<0.03	0.009
	5/30/2017	99	436	885	0.021	0.00334	<0.03	0.011
	6/30/2017	44	256	517	0.050	0.00825	0.07	0.011
	7/28/2017	59	214	792	0.032	0.00512	0.05	0.006
	8/22/2017	112	347	977	0.029	0.00471	0.04	<0.005
	9/27/2017	84	260	1800	0.024	0.0039	0.04	<0.005
	10/25/2017	94	304	760	0.022	0.00352	0.05	<0.005
	11/28/2017	99	374	863	0.020	0.00327	0.02	0.007
	12/19/2017	111	589	1160	0.073	0.0118	0.056	0.020

Concentrations greater than site standards are in **bold**.

Table 2.1-3 Compliant (SP2) Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra226e (pCi/l)	Ra228 (mg/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		12					5	0.3		0.02
SP2	1/25/2017			0.1		0.8			0.1	
	2/28/2017	1.4	0.07	0.1	2	1.1	2.1	0.1	0.1	<0.01
	3/24/2017	1.4	0.15	0.1	2.1	1	2.3	0.04	0.1	<0.01
	4/28/2017	1.6	0.2	0.1	0.7	1.3	0.9	0.08	0.1	<0.01
	5/30/2017	1.4	0.2	0.1	0.6	1.1	0.8	0.020	0.100	<0.01
	6/30/2017	0.9	0.06	0.1	0.4	1.2	0.46	0.010	0.080	<0.01
	7/28/2017	***590**	0.2	0.1	0.05	1.3	0.25	0.05	0.100	<0.01
	8/22/2017	1.7	0.1	0.1	0.5	1.2	0.6	0.200	0.100	<0.01
	9/27/2017	***1660**	0.07	0.1	3.2	1	3.3	0.040	0.090	<0.01
	10/25/2017	1.3	0.2	0.1	-0.6	1.3	0.2	<0.03	0.200	<0.01
	11/28/2017	1.4	0.09	0.2	0.9	1.6	1	0.060	0.100	<0.01
	12/19/2017	1.6	0.3	0.2	1.2	0.8	1.5	0.020	0.200	<0.01

Concentrations greater than site standards are in **bold**.

Note: * These elevated nitrate concentrations were due to the samples being preserved mistakenly with nitric acid.

Table 2.1-4 Weekly and Field Water Quality Data

Sample Point Name	Date	Field Parameters pH(f) (units)	Temp. (°C)	Cond. (µmhos/cm)	KPA U (mg/l)	Lab Data Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Ue (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard						**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
SP2	1/25/2017								0.0369	0.00596	<0.03	
	2/28/2017	8.02	12.2	1121	0.014	90	427	948	0.0414	0.00667	<0.03	0.011
	3/24/2017	7.6	6.8	1599	0.036	79	319	758	0.0189	0.00305	<0.03	0.005
	4/14/2017	7.15	20.3	1072	0.016	177	602	1610	0.0196	0.00316	<0.03	0.009
	4/28/2017	6.86	11.6	1298	0.02	146	530	1290	0.0154	0.00248	<0.03	0.009
	5/5/2017	5.56	18.4	304	0.013	123	430	999	0.012	0.00199	<0.03	0.006
	5/12/2017	6.44	20.1	867		82	262	660	0.013	0.0021	<0.03	<0.005
	5/19/2017	5.14	17.7	730		137	728	1350	0.039	0.00631	<0.03	0.025
	5/30/2017	6.9	9.8	376	0.011	99	436	885	0.021	0.00334	<0.03	0.011
	6/9/2017	5.96	21	491	0.008	105	575	1090	0.016	0.00265	<0.03	0.02
	6/16/2017	5.8				102	630	1190	0.052	0.00498	<0.03	0.026
	6/30/2017	6.08	20.8	896		44	256	517	0.050	0.00825	0.07	0.011
	7/10/2017				0.046	91	296	822	0.019	0.00309	0.03	<0.005
	7/14/2017					114	373	1010	0.0346	0.00559	0.05	0.006
	7/21/2017	6.56	12.8	1364		82	330	797	0.0376	0.00607	0.05	0.009
	7/28/2017					59	214	792	0.032	0.00512	0.05	0.006
	8/22/2017	7.15				112	347	977	0.029	0.00471	0.04	<0.005
	9/27/2017	6.69	17.5	549	0.037	84	260	1800	0.024	0.0039	0.04	<0.005
	10/25/2017	5.78		18		94	304	760	0.022	0.00352	0.05	<0.005
	11/28/2017					99	374	863	0.020	0.00327	0.02	0.007
	12/19/2017	6.53	13.9			111	589	1160	0.073	0.0118	0.056	0.020

Concentrations greater than site standards are in **bold**.

Table 2.1-4 Weekly and Field Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra226e (pCi/l)	Ra228 (mg/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.3**		**0.02**
SP2	1/25/2017			0.1		0.8			0.1	
	2/28/2017	1.4	0.07	0.1	2	1.1	2.1	0.1	0.1	<0.01
	3/24/2017	1.4	0.15	0.1	2.1	1	2.3	0.04	0.1	<0.01
	4/14/2017	1.7	0.3	0.1	3.6	1	3.9	0.1	0.08	<0.01
	4/28/2017	1.6	0.2	0.1	0.7	1.3	0.9	0.08	0.1	<0.01
	5/5/2017	1.5	0.2	0.2	0.7	1.2	0.9	0.030	0.100	<0.01
	5/12/2017	1.2	2.1	0.5	1.1	1	3.2	0.040	0.100	<0.01
	5/19/2017	2	2.4	0.5	-2	0.8	2.4	0.050	0.060	<0.01
	5/30/2017	1.4	0.2	0.1	0.6	1.1	0.8	0.020	0.100	<0.01
	6/9/2017	1.8	0.2	0.1	2.5	1.2	2.7	-0.020	0.200	<0.01
	6/16/2017	2	-0.01	0.1	0.05	0.9	0.04	0.040	0.080	<0.01
	6/30/2017	0.9	0.06	0.1	0.4	1.2	0.46	0.010	0.080	<0.01
	7/10/2017	1.2	0.3	0.1	-0.5	0.8	0.3	0.070	0.090	<0.01
	7/14/2017	1.2	0.3	0.2	0.1	1.1	0.4	0.020	0.09	<0.01
	7/21/2017	1.5	0.5	0.2	2.5	1.1	3	0.05	0.08	<0.01
	7/28/2017	***590**	0.2	0.1	0.05	1.3	0.25	0.05	0.100	<0.01
	8/22/2017	1.7	0.1	0.1	0.5	1.2	0.6	0.200	0.100	<0.01
	9/27/2017	***1660**	0.07	0.1	3.2	1	3.3	0.040	0.090	<0.01
	10/25/2017	1.3	0.2	0.1	-0.6	1.3	0.2	<0.03	0.200	<0.01
	11/28/2017	1.4	0.09	0.2	0.9	1.6	1	0.060	0.100	<0.01
	12/19/2017	1.6	0.3	0.2	1.2	0.8	1.5	0.020	0.200	<0.01

Concentrations greater than site standards are in **bold**.

Note: * These elevated nitrate concentrations were due to the samples being preserved mistakenly with nitric acid.

Table 2.1-5 RO Clarifier Feed and RO SP1 Water Quality Data

		Field Parameters				Lab Data						
Sample Point Name	**Date**	**pH(f) (units)**	**Temp. (°C)**	**Cond. (µmhos/cm)**	**KPA U (mg/l)**	**Cl (mg/l)**	**SO4 (mg/l)**	**TDS (mg/l)**	**U (mg/l)**	**Ue (mg/l)**	**Mo (mg/l)**	**Se (mg/l)**
Site Standard						**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
RO CLAR FEED	2/10/2017	7.07	14.1	4998		279	1960	3760	5.92	0.956	10.3	0.382
	5/3/2017	7.6	13.3	6252		351	2380	4310	9.7	1.56	14.7	0.508
	6/21/2017					264	1860	3740	5.14	0.829	8.19	0.208
	8/17/2017					344	2520	4700	25.9	4.19	43	1.72
	9/11/2017					279	1800	3560	5.99	0.966	9.09	0.461
	11/29/2017	8.02	9.2	4411		299	2140	4000	7.07	1.14	11.9	0.437
RO SP1	1/31/2017					-	-	-	0.012	0.002	<0.03	-
	1/31/2017					-	-	-	0.009	0.001	<0.03	-
	2/28/2017	7.71	11.9	1364	0.048	75	267	693	0.012	0.002	<0.03	<0.005
	3/24/2017	8.3	6.7	1180	0.023	122	472	1090	0.032	0.005	<0.03	0.008
	4/7/2017	6.94	17.5	1157	0.015	44	140	372	0.013	0.002	<0.03	<0.005
	4/14/2017	6.84	20.4	4052	0.018	75	234	629	0.017	0.000	<0.03	<0.005
	4/21/2017	6.72	17.7	2205	0.014	177	585	1530	0.021	0.003	<0.03	0.006
	4/28/2017	6.51	13	1831	0.017	102	325	892	0.018	0.003	<0.03	<0.005
	5/5/2017	678	19.5	1501	0.014	23	54	144	0.010	0.002	<0.03	<0.005
	5/12/2017	6.83	20	1015		59	182	480	0.022	0.004	<0.03	<0.005
	5/19/2017	6.04	17.3	1867		7	6	26	0.007	0.001	<0.03	<0.005
	5/30/2017	6.92	14.7	1307	0.02	30	81	226	0.011	0.002	<0.03	<0.005
	6/9/2017	6.29	20.9	1473	0.017	26	82	195	0.006	0.001	<0.03	<0.005
	6/16/2017	6.27				16	67	124	0.019	0.003	0.13	<0.005
	6/21/2017					10	63	143	0.118	0.019	0.24	0.006
	6/30/2017	5.92	21	1337		49	308	592	0.054	0.009	0.1	0.014
	7/10/2017				0.021	54	352	671	0.040	0.006	0.12	0.016
	7/14/2017					5	11	29	0.020	0.003	0.05	<0.005
	7/21/2017	4.63	10.8	130.4		9	27	79	0.045	0.007	0.09	<0.005
	7/28/2017					11	59	270	0.025	0.004	0.06	<0.005
	8/22/2017					208	667	1880	0.016	0.003	<0.03	0.006
	9/27/2017	7.51	18.1	1151	0.023	7	13	1000	0.036	0.006	0.05	<0.005
	10/25/2017	7.9	16.6	1080		9	5	31	0.010	0.002	0.03	<0.005
	11/28/2017					9	6	36	0.015	0.002	0.026	<0.001
	12/19/2017	6.53	13.9			3	9	37	0.008	0.001	0.039	0.001
LPRO #2 Product	8/10/2017								0.0027	0.0004	0.02	
HPRO #1 Product	8/10/2017								0.0128	0.0021	0.040	

Concentrations greater than site standards are in **bold**.

Table 2.1-5 RO Clarifier Feed and RO SP1 Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra226e (pCi/l)	Ra228 (mg/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.30**		**0.02**
RO CLAR FEED	2/10/2017	4.7	1.5	0.37	-3	1.4	-1.5	1.80	0.30	<0.01
	5/3/2017									
	6/21/2017									
	8/17/2017									
	9/11/2017	6.9	0.6	0.2	2.4	1	3	0.00	0.07	<0.01
	11/29/2017									
RO SP1	1/31/2017									
	1/31/2017									
	2/28/2017	1.1	0.28	0.1	1.1	0.8	1.38	0.30	0.20	<0.01
	3/24/2017	1.6	0.14	0.1	0.4	1.4	0.54	0.04	0.08	<0.01
	4/7/2017									
	4/14/2017	1.2	0.2	0.1	-0.3	1.1	-0.1	0.03	0.10	<0.01
	4/21/2017	1.7	0.3	0.1	-0.08	1	0.22	0.02	0.09	<0.01
	4/28/2017	1.3	0.2	0.1	1.2	1.2	1.4	0.06	0.10	<0.01
	5/5/2017	1	0.02	0.1	1.8	0.9	1.82	0.09	0.10	<0.01
	5/12/2017	1.1	1.4	0.4	-0.4	1.3	1	0.03	0.09	<0.01
	5/19/2017	0.7	0.1	0.1	-2	1.2	-1.9	0.02	0.06	<0.01
	5/30/2017	0.9	0.3	0.1	1.2	0.8	1.5	0.04	0.06	<0.01
	6/9/2017	0.9	0.2	0.1	4.1	1.2	4.3	-0.01	0.10	<0.01
	6/16/2017	0.7	0.08	0.1	0.1	1	0.18	0.07	0.10	<0.01
	6/21/2017									
	6/30/2017	0.9	0.1	0.1	0.9	1.2	1	0.06	0.10	<0.01
	7/10/2017	1.1	0.06	0.1	0.2	1.1	0.26	0.08	0.10	<0.01
	7/14/2017	0.4	0.1	0.1	0.1	0.8	0.2	-0.01	0.06	<0.01
	7/21/2017	0.6	0.2	0.1	1	0.9	1.2	0.04	0.07	<0.01
	7/28/2017	***500**	0.1	0.1	3.7	1.5	3.8	0.20	0.10	<0.01
	8/22/2017	1.8	0.3	0.1	1.4	0.8	1.7	0.10	0.10	<0.01
	9/27/2017	***1490**	0.1	0.1	0.8	0.9	0.9	0.07	0.08	<0.01
	10/25/2017	1.1	0.1	0.1	-0.7	1.2	-0.6	0.10	0.10	<0.01
	11/28/2017	0.8	0.1	0.2	0.04	1	0.14	0.05	0.09	<0.01
	12/19/2017	0.3	0.05	0.1	1	0.7	1.05	0.07	0.08	<0.01

Concentrations greater than site standards are in **bold**.

Note: *= These evelvated nitrate concentrations were due to the samples being preserved mistakenly with nitric acid.

Table 2.1-6 Zeolite Treated Water Quality Data

		Field Parameters				Lab Data						
Sample Point Name	Date	pH(f) (units)	Temp. (°C)	Cond. (µmhos	KPA U (mg/l)	U (mg/l)	Ue (mg/l)	Mo (mg/l)	Se (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)
Site Standard						**0.16**		**0.1**	**0.32**	**250**	**1500**	**2734**
	1/5/2017					0.0488	0.00788	<0.03	0.038	156	1040	1790
	1/9/2017					0.136	0.0219	<0.03	0.037	172	1070	1880
	1/23/2017					0.0682	0.011	<0.03	0.043	176	1170	2040
	3/15/2017				0.062	**0.249**	0.0401	<0.03	0.037	196	1380	2050
	3/20/2017	4.60	20.6	2597	0.03	0.0926	0.0149	<0.03	0.042	182	1170	2000
	4/8/2017	5.02	19.1	2653	0.03	0.0743	0.012	<0.03	0.036	171	1170	2070
	4/12/2017	4.67	18.9	2460	0.075	0.108		<0.03	0.038	172	1140	2020
	4/24/2017	5.37	17.6	2547		**no**	**sample**					
	5/15/2017	3.50	19.1	2515	0.119	0.132	0.0212	<0.03	0.042	185	1120	1890
	5/22/2017	3.98	20.6	2486	0.084	0.0762	0.0123	<0.03	0.037	177	1070	1980
	6/15/2017	4.05	22.2	3059	0.081	0.113	0.0182	<0.03	0.042	190	1260	2250
300Z	7/17/2017				0.1	0.129	0.0209	<0.03	0.041	166	973	1860
	7/24/2017	3.50			0.07	0.0714	0.0115	<0.03	0.036	153	921	1820
	8/31/2017				0.051	0.059	0.00898	<0.03	0.031	169	915	1870
	10/26/2017				0.05	0.05	0.00807	0.05	0.045	181	1110	2030
	10/31/2017	5.56	12.9	5458	0.076	0.0559	0.00902	0.03	0.042	172	1080	2010
	11/20/2017				0.045	0.0176	0.00284	0.044	0.035	178	1140	1970
	11/28/2017					0.0903	0.0146	0.07	0.034	171	983	1790
	12/6/2017					0.0256	0.00414	0.037	0.031	160	985	1850
	12/11/2017				0.023	0.0212	0.00342	0.029	0.036	165	1010	1850
	12/18/2017	6.66	16.0	2090	0.054	0.0538	0.00869	0.039	0.032	161	970	1760
	12/26/2017	6.78	16.2	2188	0.033	0.0538	0.00869	0.039	0.032	161	970	1760
	1/16/2017				0.11	0.0942	0.0152	<0.03	0.039	161	1070	1780
	1/16/2017				0.114	0.0914	0.0148	<0.03	0.038	168	1090	1800
	1/23/2017				0.04	0.0266	0.00429	<0.03	0.035	169	1100	1850
	1/31/2017				0.033	0.0264	0.00005	<0.03	0.037	167	1100	1900
	2/7/2017				0.032	0.0237	0.00005	<0.03	0.037	162	1060	1820
	3/23/2017					0.0251	0.00405	<0.03	0.036	173	1250	2160
1200Z Trains 1&2	3/27/2017	5.67	17.2	2570	0.017	0.0167	0.00269	<0.03	0.038	162	1060	1850
	4/6/2017	6.56	9.8	2416		0.0207	0.00333	<0.03	0.047	166	1100	1870
	4/20/2017	5.21	18.3	2503	0.01	0.0043	0.0007	<0.03	0.038	172	1130	2020
	4/24/2017	5.37	17.6	2547	0.022	0.0179	0.00289	<0.03	0.034	168	1000	1900
	6/6/2017	5.10	22.9	2790	0.02	0.0182	0.00294	<0.03	0.046	184	1230	2110
	6/14/2017	5.54	20.8	2320	0.031	0.0266	0.00429	<0.03	0.035	162	1000	1780
	6/28/2017					0.101	0.0163	<0.03	0.038	162	1030	1750
	1/5/2017					0.108	0.0175	<0.03	0.038	175	1090	1890
	1/9/2017				0.083	0.0814	0.0131	<0.03	0.038	153	1020	1810
	1/16/2017				0.093	0.0799	0.0129	<0.03	0.037	152	1000	1760
	1/23/2017				0.08	0.0756	0.0122	<0.03	0.04	159	1080	1850
	1/31/2017				0.121	0.113	0.00005	<0.03	0.039	155	1070	1850
	4/9/2017				0.138	0.131	0.0212	<0.03	0.041	167	1240	1980
	4/12/2017	4.97	19.0	2235	0.079	0.083		<0.03	0.038	161	1100	1820
	5/15/2017	4.24	19.2	2341	0.033	0.0362	0.00584	<0.03	0.038	163	1000	1760
	5/22/2017	4.51	20.5	2534	0.084	0.0468	0.00755	<0.03	0.038	164	1060	1920
1200Z Trains 3&4	6/1/2017	5.29	20.8	2724	0.025	0.0193	0.00312	<0.03	0.043	175	1150	1930
	6/6/2017	5.46	22.3	2443	0.027	0.0203	0.00328	<0.03	0.047	162	1050	1840
	6/14/2017	5.50	20.8	2432	0.025	0.022	0.00354	<0.03	0.038	159	1010	1820
	6/28/2017				0.054	0.0537	0.00867	<0.03	0.038	144	955	1830
	11/20/2017				0.046	0.0248	0.004	0.007	0.033	161	999	1790
	11/28/2017					0.0085	0.0014	0.01	0.035	157	988	1800
	12/6/2017					0.0118	0.00191	0.01	0.033	152	961	1790
	12/11/2017				0.012	0.0158	0.00255	0.009	0.039	145	920	1670
	12/18/2017	5.99	15.7	2076	0.019	0.0153	0.00247	0.008	0.037	147	947	1730
	12/26/2017	6.55	17.3	2264	0.02	0.0156		0.005	0.038	149	965	1740

Concentrations greater than site standards are in **bold**.

Table 2.1-6 Zeolite Treated Water Quality Data (cont.)

Sample Point Name	Date	NO3	Ra226	Ra226e	Ra228	Ra228e	Ra226 + Ra228	Th230	Th230e	V
		(mg/l)	(pCi/l)	(pCi/l)	(pCi/l)	(pCi/l)		(pCi/l)	(pCi/l)	(mg/l)
Site Standard		**12**					**5**	**0.3**		**0.02**
300Z	1/5/2017	2.4	0.16	0.13	1.6	0.8	1.76	0.1	0.1	<0.01
	1/9/2017	2.5	0.3	0.14	0.7	1.1	1	0.1	0.1	<0.01
	1/23/2017	2.8	0.07	0.13	0.6	0.7	0.67	0.1	0.1	<0.01
	3/15/2017	2.8	0.41	0.18	0.6	1.1	1.01	0.2	0.1	<0.01
	3/20/2017	3.1	0.25	0.12	1.2	0.9	1.45	0.1	0.1	<0.01
	4/8/2017	2.9	0.58	0.19	-1	1	0.2	0.1	0.2	<0.01
	4/12/2017									<0.01
	5/15/2017	2.9	6.4	1.3	0.06	1.3	**6.5**	0.1	0.1	<0.01
	5/22/2017	2.8	0.2	0.1	-2	1.1	0.2	0.04	0.06	<0.01
	6/15/2017	2.6	0.3	0.2	-0.6	1	0.2	0.04	0.03	<0.01
	7/17/2017	3	0.3	0.2	0.5	0.8	0.8	0.06	0.08	<0.01
	7/24/2017	2.3	0.3	0.1	2.4	0.9	2.7	0.1	0.1	<0.01
	8/31/2017	2.6	0.2	0.1	2.6	1	2.8	0.005	0.06	<0.01
	11/20/2017	3.1	0.04	0.1	0.6	1.3	0.6	0.05	0.09	<0.01
	11/28/2017	2.7	0.2	0.2	1.8	1.2	2	0.2	0.2	<0.01
	12/6/2017	2.4	-0.03	0.2	0.7	1	0.7	0.3	0.2	<0.01
	12/11/2017	2.4	0.1	0.1	0.5	0.9	0.6	0.03	0.08	<0.01
	12/18/2017	2.2	0.08	0.1	2.6	1	2.7	0.06	0.1	<0.01
	12/26/2017	2.2	0.2	0.1	-0.3	1	-0.1	-0.1	0.2	<0.01
1200Z Trains 1&2	1/16/2017	2.2	0.23	0.13	0.1	0.9	0.33	0.2	0.1	<0.01
	1/16/2017	2.3	0.30	0.14	-0.20	0.90	0.14	0.1	0.1	<0.01
	1/23/2017	2.7	0.14	0.13	0.7	0.7	0.84	0.04	0.08	<0.01
	1/31/2017	2.6	0.1	0.13	3.8	1.3	3.9	0.02	0.1	<0.01
	2/7/2017	2.3	0.18	0.15	3.3	1.1	3.48	0.2	0.1	<0.01
	3/23/2017	2.7	0.55	0.16	0.7	1.2	1.4	0.07	0.1	<0.01
	3/27/2017	2.7	0.11	0.09	4.8	1.6	4.9	-0.001	0.1	<0.01
	4/6/2017	2.6	0.72	0.24	0.9	1.6	1.6	0.05	0.1	<0.01
	4/20/2017	2	0.61	0.19	0.6	1.1	1.2	0.06	0.1	<0.01
	4/24/2017	2.4	0.2	0.1	0.2	1.1	0.4	-0.06	0.1	<0.01
	6/6/2017	2.8	0.2	0.1	1.9	0.9	2.1	0.08	0.09	<0.01
	6/14/2017	2.5	0.2	0.1	0.8	1	1	0.3	0.2	<0.01
	6/28/2017	2.3	0.2	0.1	0.4	0.9	0.6	0.06	0.1	<0.01
1200Z Trains 3&4	1/5/2017	2.5	0.71	0.2	0.2	0.8	0.91	0.1	0.1	<0.01
	1/9/2017	2.2	0.15	0.15	1.5	0.9	1.65	0.1	0.1	<0.01
	1/16/2017	2.2	0.18	0.13	0.02	0.9	0.2	0.05	0.1	<0.01
	1/23/2017	2.6	0.12	0.13	0.9	0.7	1.02	0.1	0.2	<0.01
	1/31/2017	2.6	0.16	0.14	3.5	1.3	3.66	0.06	0.1	<0.01
	4/9/2017	2.4	1.3	0.33	0.3	1	1.6	0.04	0.1	<0.01
	4/12/2017									<0.01
	5/15/2017	2.7	2.7	0.6	2.8	1.2	**5.5**	0.05	0.07	<0.01
	5/22/2017	2.5	0.1	0.1	-2	1.1	0.1	-0.02	0.06	<0.01
	6/1/2017	2.5	0.3	0.1	2.9	1.1	0.05	0.09	0.1	<0.01
	6/6/2017	2.4	0.4	0.1	1.9	0.9	2.3	0.02	0.1	<0.01
	6/14/2017	2.4	0.1	0.1	1.9	1	2	0.06	0.09	<0.01
	6/28/2017	2.4	0.1	0.1	0.6	1	0.7	0.09	0.1	<0.01
	11/20/2017	2.8	0.3	0.2	0.5	1.2	0.8	0.05	0.09	<0.01
	11/28/2017	2.9	0.06	0.1	0.6	0.1	0.66	-0.04	0.07	<0.01
	12/6/2017	2.5	-0.08	0.2	-0.4	1	0	0.2	0.1	<0.01
	12/11/2017	2.4	0.2	0.2	1.4	0.8	1.6	0.02	0.08	<0.01
	12/18/2017	2.3	0.1	0.1	2.2	0.9	2.3	0.2	0.2	<0.01
	12/26/2017	2.5	0.1	0.1	0.3	1.3	0.4	0.04	0.07	<0.01

Concentrations greater than site standards are in **bold**.

2.2 FUTURE OPERATION

Groundwater quality restoration in 2018 will continue as a combination of fresh-water, zeolite treated water, and R.O. product injection to maintain the overall piezometric gradient reversal between the lines of injection (M Line, WR Line, J Line and X Line) and contaminated water collection near the tailings piles. The reverse osmosis (R.O.) plants are rated at a capacity of 1200 gpm but is projected to operate at approximately 700 gpm averaged over the entire year in 2018 with the new plant addition. The sand filters in the R.O. plant were replaced with microfiltration in the first half of 2015. The second 600 gpm R.O. unit was added at the end of 2015. A second high pressure R.O. was added in the middle of 2016, which uses the brine from all of the other units as its input. When the plants are operated at full capacity, approximately 970 gpm of R.O. product would be produced for injection into the alluvium and approximately 120 gpm of brine reject would be discharged to the evaporation ponds. A larger collection rate and use of the high quality R.O. product for injection will continue to enhance the restoration progress. Additional alluvial collection wells near the tailings are planned to be added in 2018.

Water collected from the alluvial and Chinle aquifers, where there are relatively low levels of selenium and uranium, is not planned to be selectively collected and used for re-injection in the initial phase of restoration of some areas because the increased R.O. capacity enables this low concentration water to be treated. For the purpose of this document, the reversal zone is called the collection area.

Collection from Upper Chinle wells CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A and CE19 will continue to intercept contaminants in this aquifer in 2018. Injection into Upper Chinle wells 944, CW4R, CW5, CW13 and CW25 is planned to continue to control the direction of flow in these areas of the Upper Chinle aquifer.

Collection from Middle Chinle well CW62 will continue in 2018. Injection into well CW14 will be continued in order to build the head in this area of the Middle Chinle aquifer. This will prevent alluvial water from flowing into this portion of the Middle Chinle aquifer.

Off-site collection of water from Sections 3, 27, 28 and 35 is planned to be continued in 2018. Operation of the South collection and injection in the northeast portion of Section 3 and South Felice Acres should continue in 2018. The addition of a few additional collection wells in central Section 3 should be added in 2018. The North Off-site operation of collection and injection should continue in 2018 with collection being shifted to the east in Section 28. Treated and fresh-water injection will mainly be into linear lines of injection wells but some injection into other injection wells and infiltration lines will continue to be utilized in 2018 to restore these areas of low level aquifer contamination. Treated and fresh-water injection will be continued in Sections 35 and 3 in 2018 to complement the collection of water with elevated uranium concentrations and assist in final aquifer restoration in this area.

Water treated with alternative technologies (e.g. zeolite) that meets all the site standards is expected to reduce reliance on San Andres water for injection. The zeolite treatment capacity has been expanded and will provide water treatment for increased collection rates from Off-site areas. The zeolite treatment may also be used for treatment of selected collection waters from the On-site area. Zeolite treated water will be combined with R.O. product water and fresh water for injection into the alluvial and Chinle aquifers. Other alternative restoration technologies (pump and treat and *insitu*) for managing contaminated water with small concentrations will continue to be evaluated in 2018. *Insitu* treatment will be tested to evaluate the treatment of groundwater in the aquifer; phosphate precipitation will be tested to evaluate the removal of small concentrations from the groundwater.

SECTION 3

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

TABLES

3.0 SITE STANDARDS AND BACKGROUND CONDITIONS

3.1 ALLUVIAL SITE STANDARDS

Ten water-quality site standards (U, Se, Mo, SO4, Cl, TDS, NO3, Ra226 + Ra228, Th230 and V) have been set for the alluvial aquifer at the Homestake site by the United States Nuclear Regulatory Commission (NRC) and the New Mexico Environmental Department (NMED) and the site Radioactive Materials License was amended accordingly. These site standards were established on the basis of defining the full range in alluvial aquifer background concentration values for these constituents. The site standards and background values, as well as the procedures used to establish them were reviewed and approved by the NRC, the EPA and NMED, 2008. Adjustment of the site standards to account for the full range in natural background concentrations was important in assuring that appropriate site standards are set in relation to background concentrations.

The NRC and NMED alluvial aquifer site standards are shown in Table 3.1-1. Alluvial site standards for the Grants Project are for all of the alluvial aquifer at the Grants Project.

TABLE 3.1-1. GRANTS PROJECT ALLUVIAL SITE STANDARDS.

Constituents	NRC License Site Standards	New Mexico Site Standards*
Uranium	0.16	0.16
Selenium	0.32	0.32
Molybdenum	0.10	1.0**
Vanadium	0.02	-----
RA-226 + Ra-228	5	30
Thorium-230	0.3	-----
Sulfate	1500	1500
Chloride	250	250
TDS	2734	2734
Nitrate	12	12

NOTE: All concentrations are in mg/l except: Ra-226 + Ra-228 and Th-230, which are in pCi/l.
* = NMED renewal of DP-200 Discharge Plan
** = New Mexico Irrigation Standard

3.2 ALLUVIAL BACKGROUNDWATER QUALITY

Background alluvial aquifer water-quality conditions at the Grants site are those found up-gradient or north of the Large Tailings Pile (see Figure 3.2-1). These conditions in the San Mateo alluvium have been monitored since 1976. Groundwater flow in the San Mateo alluvial system is generally from the northeast to the southwest. Lobo Creek joins San Mateo Creek in the Felice Acres subdivision area at the Homestake site, although neither creek has a well-defined surface flow channel in this area. Surface-water flow occurs only after extreme precipitation events and then generally only within some reaches of the channels.

Hydrographs of up-gradient wells that have been used to define the background hydrologic conditions of the alluvial aquifer are presented in Section 4 of this report. Wells DD, DD2, P, P1, P2, P3, P4, Q, R and ND, located just north of the Large Tailings Pile, have been used for monitoring alluvial background water quality and are called the near up-gradient wells. Additional near up-gradient wells, DD3, DD4, DD5, DD6 and DD7 were drilled in 2017 with wells DD6 and DD7 on the southwest side of EP3 being dry, as expected. Well DD3 was drilled on the northeast and up-gradient side of EP3 while well DD4 was drilled on the southeast side and northeast of well DD2. Well DD5 was drilled on the southwest side of EP3 but near the southern corner where the alluvium is saturated. Wells DD6 and DD7 were drilled on the southwest side of EP3 and to the northwest of well DD5.

Additional alluvial background wells located farther north have also been sampled (wells 914, 920, 921, 922 and 950, see Figure 3.2-1 for locations). Information gathered from these wells has been used to further define the piezometric surface and water-quality conditions in the up-gradient alluvial aquifer and these wells are referred to as the far up-gradient wells.

Figure 3.2-1 presents the latest 2017 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. The upgradient monitoring wells DD2, DD4 and DD5 have the highest near upgradient uranium concentrations and would have resulted in a higher site standard if their values had been used in setting the standard. Concentration versus time plots for near up-gradient wells DD, DD2, P, P3, Q and R are presented later in Section 4.3 of this report.

The patterns on Figure 3.2-2 show where the selenium concentrations in the alluvial aquifer exceeded background in 1980, 1990, 2000, 2010 and 2017 from the mine discharge water.

Movement of selenium concentrations in this area are not thought to be retarded and therefore moving essentially at the groundwater velocity. Similar patterns for uranium concentrations show that the uranium in the alluvial aquifer from the mine discharge is moving at a much slower rate (see Figure 3.2-3). Uranium concentrations in well DD also were close to the background level over all of this period but are not from the mine discharge because well DD is located two more miles farther down gradient. Wells R and Q between well DD and the far upgradient wells do not show any effects on their uranium concentrations from the mine discharge.

The 95th percentile of the historical background alluvial aquifer water-quality data for the Grants site was defined by ERG (1999a and 1999b). These documents, along with a hydrologic support document (Hydro-Engineering 2001c), were submitted to the NRC in 2001 with a request to adjust some of the site standards based on the full range of natural background conditions. The 95th percentile was used to define the upper limit of background. Background data for a ten year period of 1995 through 2004 was used to determine the 95th percentile values. The cumulative database for all of the background wells more adequately defines background concentrations, and this expanded database, based on near-up-gradient wells, was utilized in the two ERG (1999a and 1999b) studies. A tabulation of alluvial standards for the Grants Project area constituents is included in Figure 3.2-1.

The concentrations in the alluvial up-gradient wells[1] sampled during 2017 are tabulated in Table 3.2-1 with a list of the site standards that were established from data from the near up-gradient wells[2]. As shown by the present data, there is a large natural areal variability in the background water quality.

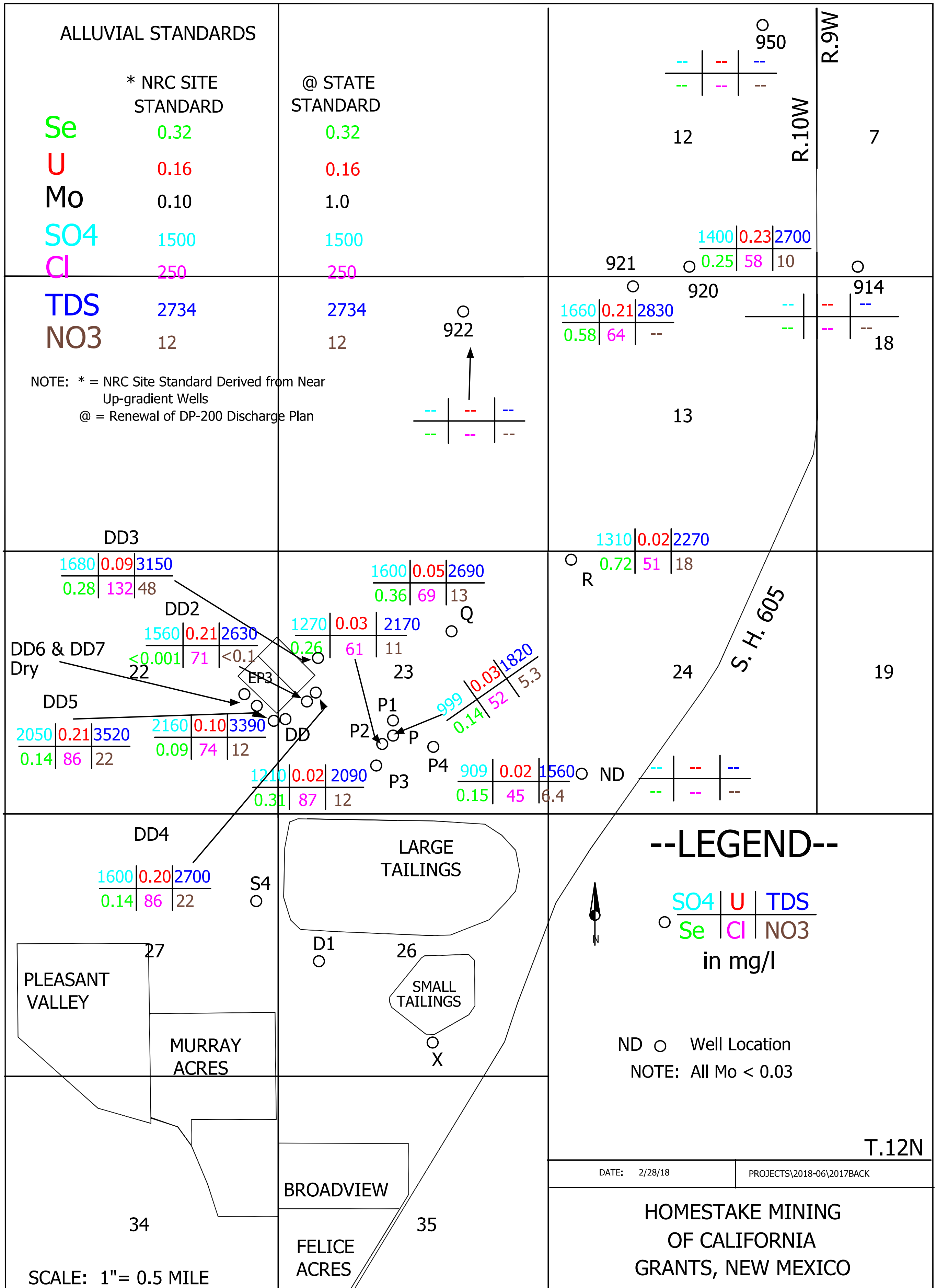


FIGURE 3.2-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2017

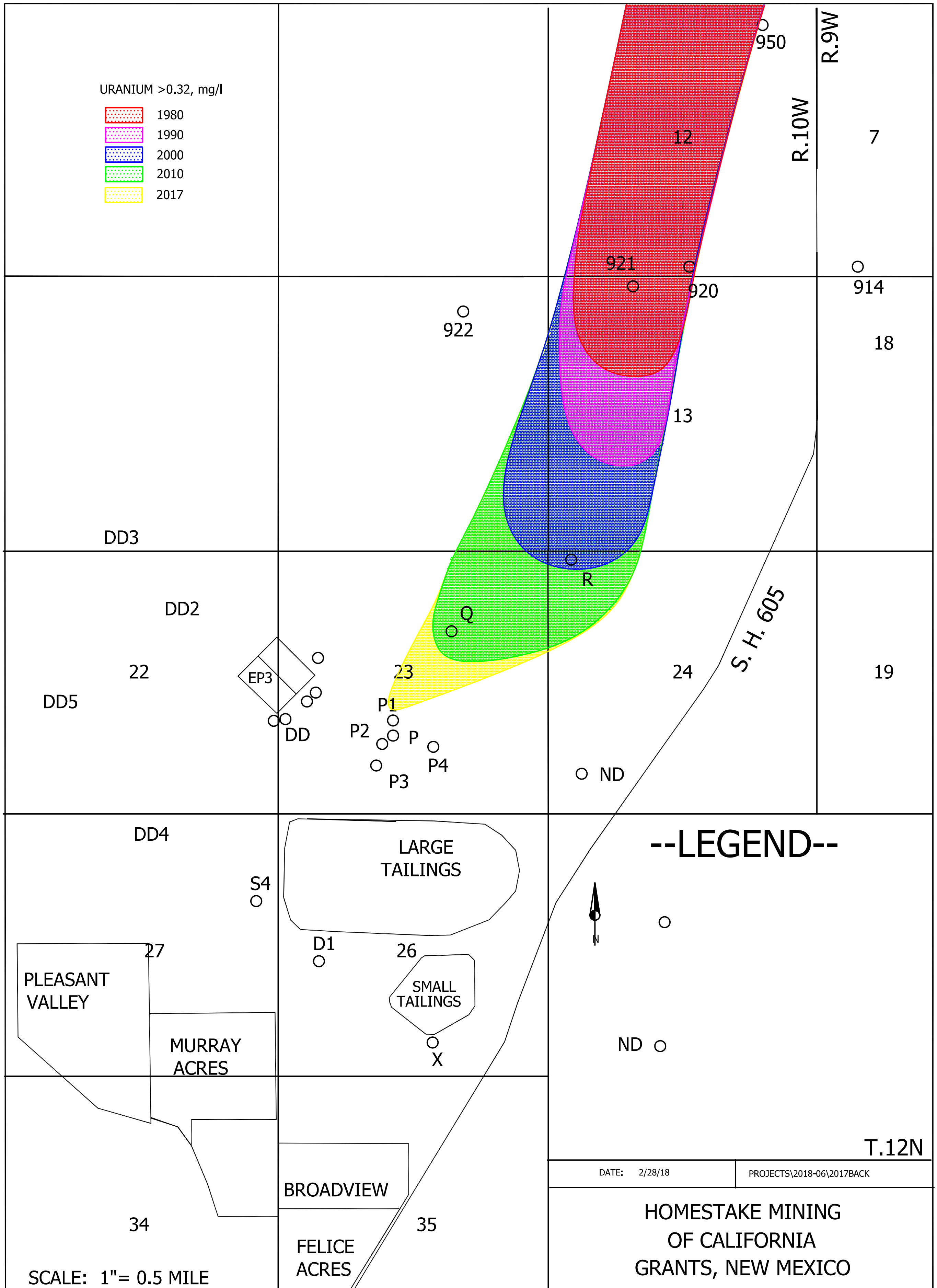


FIGURE 3.2-2. EXTENT OF ALLUVIAL SELENIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR

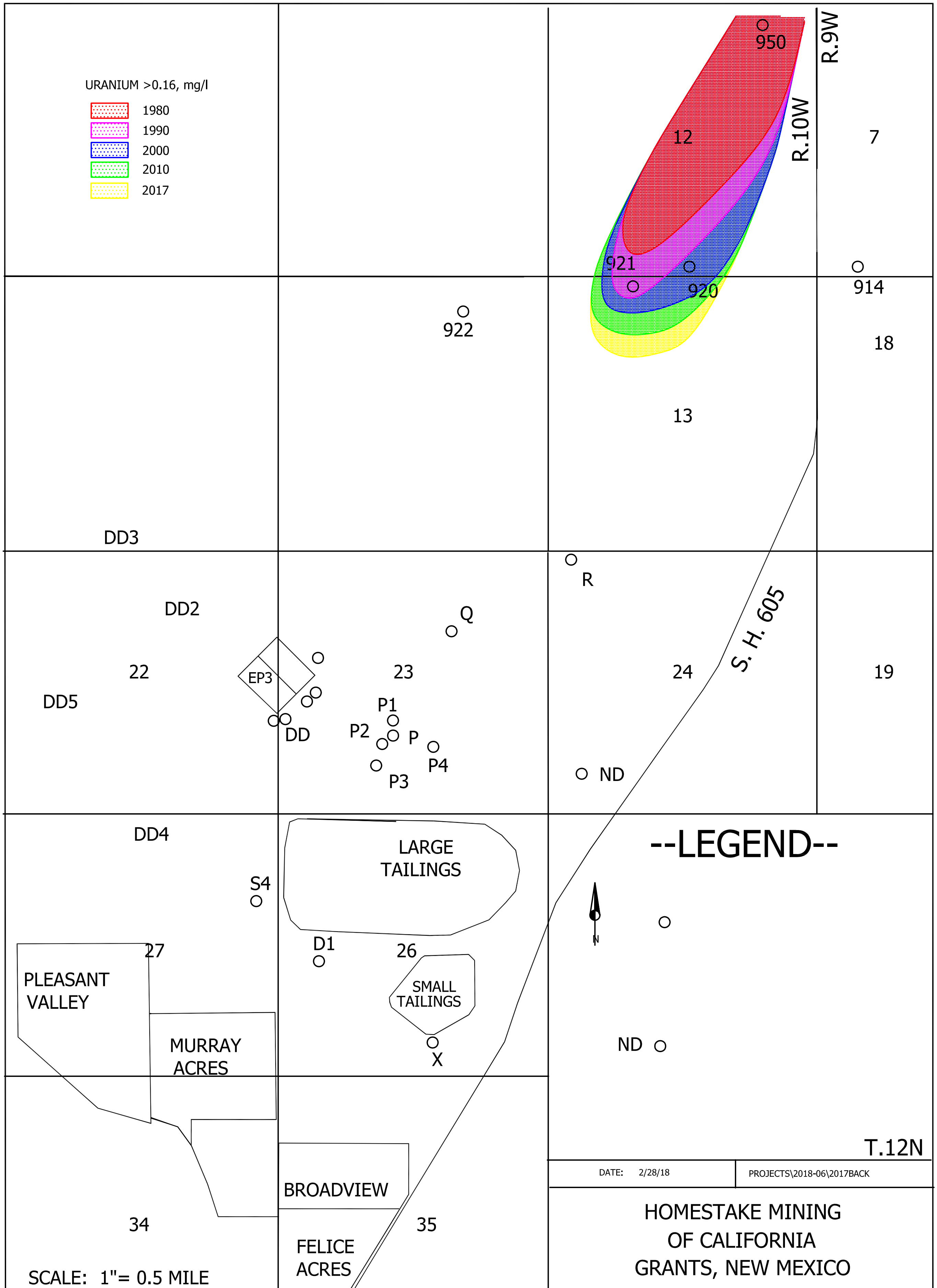


FIGURE 3.2-3. EXTENT OF ALLUVIAL URANIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR

TABLE 3.2-1 2017 BACKGROUND WELL DATA - ALLUVIUM							
	PARAMETERS						
	Se	U	Mo	SO4	Cl	TDS	NO_3
NRC Site Standard	0.32	0.16	0.10	1500	250	2734	12
NMED Site Standard	0.32	0.16	1.0	1500	250	2734	12
NEAR UP-GRADIENT WELLS							
DD	0.11	0.08	<0.03	2150	75	3560	6.8
DD2	<0.005	0.20	<0.03	1540	71	2630	<0.1
DD3	0.28	0.09	<0.03	1680	132	3150	48
DD4	0.01	0.20	0.002	1600	65	2700	0.3
DD5	0.17	0.21	0.02	2050	86	3520	22
ND	-	-	-	-	-	-	-
P	0.16	0.03	<0.03	980	52	1780	5.3
P2	0.26	0.03	<0.03	1270	61	2170	11
P3	0.31	0.02	<0.03	1210	87	2090	12
P4	0.15	0.02	<0.03	909	45	1560	6.4
Q	0.36	0.05	<0.03	1600	69	2690	13
R	0.72	0.02	<0.03	1310	51	2270	18
FAR UP-GRADIENT WELLS							
914	-	-	-	-	-	-	-
920	0.25	0.23	<0.03	1400	58	2700	10
921	0.58	0.21	<0.03	1660	64	2830	-
922	-	-	-	-	-	-	-
950	-	-	-	-	-	-	-

[1] Wells DD, DD2, DD3, DD4, DD5, P, P2, P3, P4, Q, R, 920 and 921 are up-gradient wells sampled in 2017.
[2] Wells DD, ND, P, P1, P2, P3, P4, Q and R were used to establish site standards.

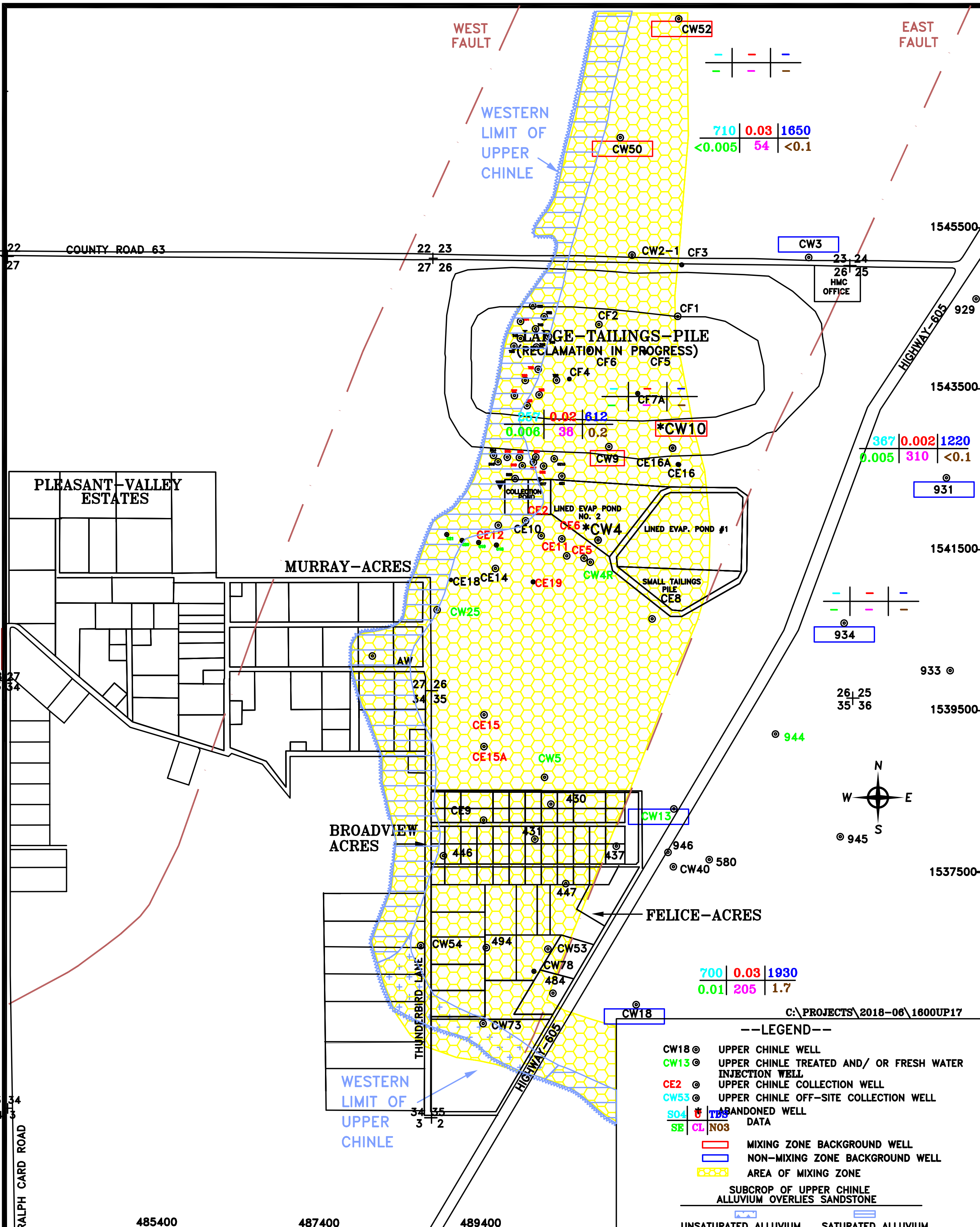
3.3 CHINLE SITE STANDARDS

Eight water quality site standards (U, Se, Mo, SO4, Cl, TDS, NO3, and V) have been set for the Chinle aquifers at the Homestake site by the NRC and NMED. The site standards were also established based on the full range of background concentrations in the Chinle aquifers for these constituents. The procedures accepted and used to establish these site standards can result in a minor amount of observed natural concentrations exceeding the site standards.

Site standards have been established for the Chinle mixing zone, Upper Chinle non-mixing zone, Middle Chinle non-mixing zone and Lower Chinle non-mixing zone. Separate site standards exist for each of these four Chinle aquifer zones. Figures 3.3-1 through 3.3-3 show the Upper Chinle, Middle Chinle and Lower Chinle aquifers with the portion of the aquifer in the mixing zone and the remainder that is in the non-mixing zone. Figure 3.3-1 presents the location of the Upper Chinle mixing-zone (yellow pattern) and the wells used in the analysis of background values. Wells within the mixing zone that were used in the mixing-zone background calculations have a red box around the well name. Wells used to define the Upper Chinle non-mixing zone are indicated by a light blue rectangular box around their name.

The mixing zone is the area in and near the subcrop area where alluvial water has entered the Chinle aquifer and changed the type of water in the mixing zone. The mixing zone has a higher calcium concentration and is similar to the alluvial aquifer calcium concentration. The Chinle formation still has the ability to change the water type as the alluvial water moves farther down gradient into the non-mixing zone.

Table 3.3-1 below presents the Chinle site standards for the four Chinle aquifer zones.



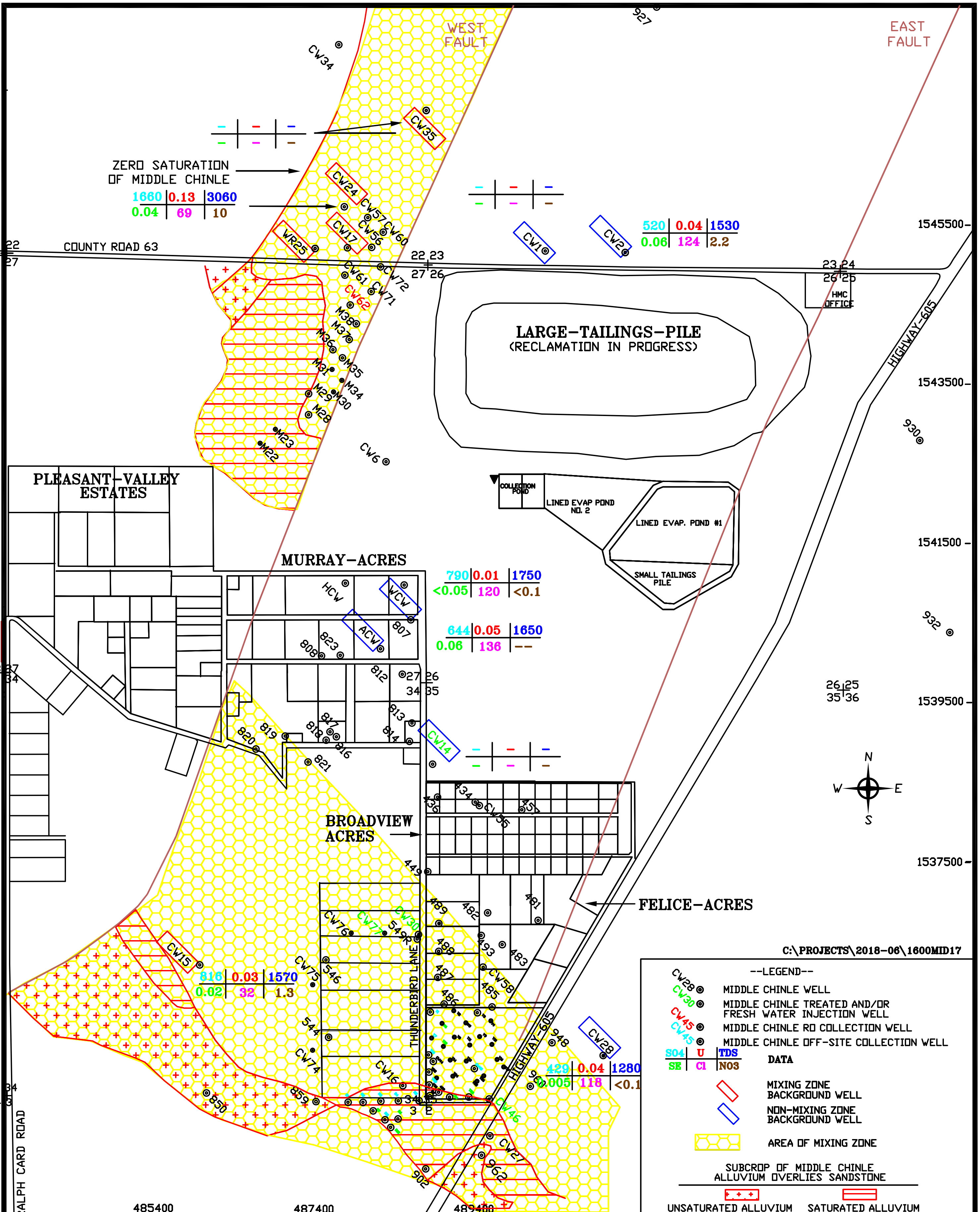
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 3.3-1. UPPER CHINLE MIXING ZONE AND 2017 GROUND WATER QUALITY

DATE: 12/18/2017

SCALE: 1"= 1600'

PAGE: 3.3-2

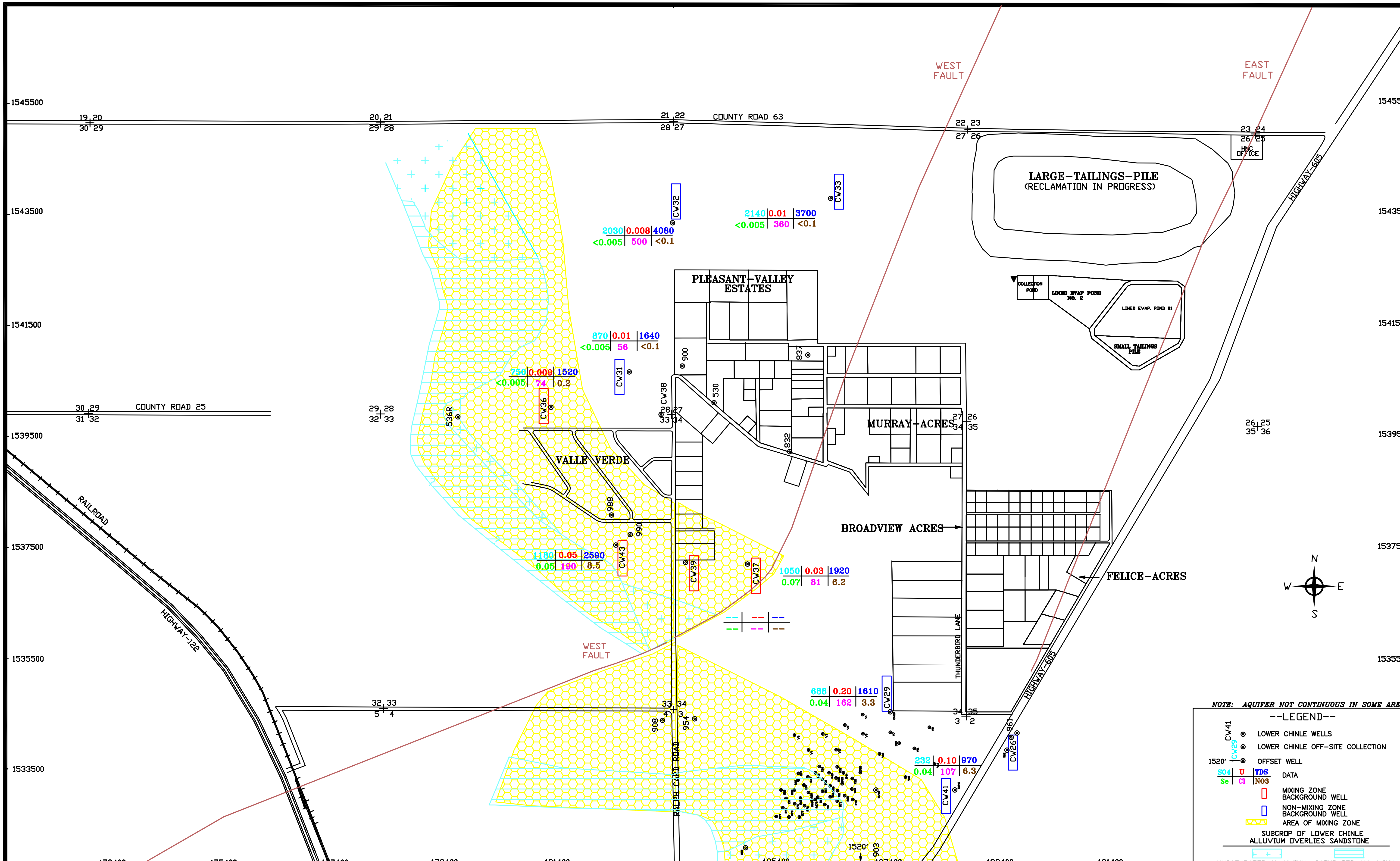


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 12/12/17

FIGURE 3.3-2. MIDDLE CHINLE MIXING ZONE AND 2017 GROUND WATER QUALITY

SCALE: 1"=1600'



SCALE: 1" = 1600'
C:\PROJECTS\2018-06\1600LOW17
DATE: 1/19/2018

FIGURE 3.3-3. LOWER CHINLE MIXING ZONE AND 2017 GROUND WATER QUALITY

PAGE: 3.3-4

TABLE 3.3-1. GRANTS PROJECT - CHINLE SITE STANDARDS

Aquifer Zone	CONSTITUENT, concentrations in mg/l except Thorium-230 and Ra226+Ra228 in pCi/l.									
	Selenium	Uranium	Molybdenum	TDS	Sulfate	Chloride	Nitrate	Vanadium	Thorium-230	Ra-226 +Ra-228
Chinle Mixing	0.14	0.18	0.10	3140	1750	250	15	0.01	*	*
Upper Chinle Non-Mixing	0.06	0.09	0.10	2010	914	412	*	0.01	*	*
Middle Chinle Non-Mixing	0.07	0.07	0.10	1560	857	250	*	*	*	*
Lower Chinle Non-Mixing	0.32	0.03	0.10	4140	2000	634	*	*	*	*

* Background water quality analyses for constituent determined that site standard is not necessary.

3.4 CHINLE BACKGROUND WATER QUALITY

The Chinle aquifer background water quality has been analyzed and presented to the NRC and NMED in Hydro-Engineering 2003b and ERG 2003. The background concentrations for the mixing zones in the Upper, Middle and Lower Chinle aquifers were grouped together to develop a mixing zone background level. The non-mixing zone water chemistry data for each of the three aquifers were analyzed separately. Table 3.4-1 presents the site standards that resulted from the analysis and related discussions with NRC, EPA and NMED concerning agreement on the standards. Figure 3.3-1 also presents the 2017 data collected from these background wells for selected parameters of sulfate, uranium, TDS, selenium, chloride and nitrate. This data is presented in a format similar to that used for the alluvial background data. The data for wells CW3, CW17 and WR25 are not presented on Figure 3.3-1 and 3.3-2 because concentrations are not natural in these wells for 2017. Table 3.4-1 also presents the 2017 data for the Chinle mixing zone background wells and the Upper, Middle and Lower Chinle non-mixing zone wells separated by their category.

The Upper Chinle mixing zone is presented in Figure 3.3-1 with a yellow pattern. Four wells have a red box around their name in the Upper Chinle mixing zone, and these wells were included with the Middle Chinle and Lower Chinle mixing-zone wells in establishing the mixing-zone background values. Five wells shown on Figure 3.3-1 were used to establish the Upper Chinle non-mixing zone background levels. This figure also presents the 2017 data (931, CW9, CW18 and CW50).

The Middle Chinle mixing zone is presented in Figure 3.3-2 with a yellow pattern. Five wells are shown with a red box in the Middle Chinle mixing zone, and these wells were included with the Upper Chinle and Lower Chinle mixing-zone wells in establishing the mixing-zone background values. Six wells shown on Figure 3.3-2 were used to establish the Middle Chinle non-mixing zone background levels. This figure also presents the 2017 data collected for background wells CW2, CW15, CW24, CW28, ACW and WCW.

Figure 3.3-3 presents the Lower Chinle mixing zone in a yellow pattern. This figure also shows which wells were used to establish the background concentrations in the mixing and non-mixing zones of the Lower Chinle aquifer. The 2017 data for the Lower Chinle wells previously used to define background concentrations are also presented on Figure 3.3-3. The Lower Chinle non-mixing zone background levels are somewhat problematic, because the water quality tends to deteriorate naturally as the groundwater moves down-gradient. Therefore, the expected natural water quality deterioration is a function of the distance from the Lower Chinle subcrop.

TABLE 3.4-1. 2017 BACKGROUND WELL DATA – CHINLE

	CONSTITUENT, concentrations in mg/l							
Aquifer Zone	Selenium	Uranium	Molybdenum	TDS	Sulfate	Chloride	Nitrate	Vanadium
CHINLE SITE STANDARDS								
Chinle Mixing	0.14	0.18	0.10	3140	1750	250	15	0.01
Upper Chinle Non-Mixing	0.06	0.09	0.10	2010	914	412	*	0.01
Middle Chinle Non-Mixing	0.07	0.07	0.10	1560	857	250	*	*
Lower Chinle Non-Mixing	0.32	0.03	0.10	4140	2000	634	*	*
CHINLE MIXING ZONE WELLS								
CW9	0.006	0.02	0.06	61.2	25.7	38	0.2	-
CW50	<0.005	0.03	<0.03	1650	710	54	<0.1	-
CW52	-	-	-	-	-	-	-	-
CW15	0.02	0.03	<0.03	1570	816	32	1.3	-
CW24	0.04	0.13	<0.03	3060	1660	69	10.3	-
CW35	-	-	-	-	-	-	-	-
CW36	<0.005	0.009	<0.03	1520	750	74	0.2	-
CW37	0.07	0.03	<0.03	1920	1050	81	6.2	-
CW39	-	-	-	-	-	-	-	-
CW43	0.05	0.05	<0.03	2590	1180	190	8.5	-
UPPER CHINLE NON-MIXING ZONE WELLS								
931	0.005	0.002	<0.03	1220	367	310	<0.1	-
934	-	-	-	-	-	-	-	-
CW18	0.01	0.03	<0.03	1930	700	205	1.7	-
MIDDLE CHINLE NON-MIXING ZONE WELLS								
ACW	<0.002	0.008	0.006	1650	629	343	<0.1	<0.01
CW1	-	-	-	-	-	-	-	-
CW2	0.06	0.04	<0.03	1530	520	124	2.2	0.02
CW28	0.005	0.04	0.017	1280	429	118	<0.1	-
WCW	<0.005	0.01	<0.03	1750	790	120	<0.1	-
LOWER CHINLE NON-MIXING ZONE WELLS								
CW26	-	-	-	-	-	-	-	-
CW29	0.04	0.2	<0.03	1610	688	162	3.3	<0.01
CW31	<0.005	0.01	<0.03	1640	370	56	<0.1	-
CW32	<0.005	0.008	<0.03	4080	2030	500	<0.1	-
CW33	<0.005	0.01	<0.03	3700	2140	360	<0.1	-
CW41	0.04	0.1	<0.03	970	232	107	6.3	-

* Background water quality analyses for constituent determined that site standard is not necessary.

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

SECTION 4

TABLE OF CONTENTS

GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

TABLES

Page Number

4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2017 monitoring results for the alluvial aquifer. The alluvial aquifer immediately underlies the Grants Project site and is therefore the most important groundwater system at the Grants Project site. The section describing well completions is presented first, and is followed by several report sections presenting water-level and water-quality information. Three additional alluvial maps have been added to present the well information in areas where data is too dense for the initial 1” = 1600’ map. The scale of the additional maps is 1” = 500’. The locations of the additional maps are shown on the 1600 scale map (Figure 4.1-1) and they are the On-Site (OS, Figure 4.1-1A), South Off-Site (SOS, Figure 4.1-1B) and North Off-Site (NOS, Figure 4.1-1C). OS, SOS and NOS have been added to these figure titles. The boundaries of the restoration areas are presented on Figure 1.2-2. The edges of the OS, SOS and NOS maps are not set the same as the restoration boundaries.

4.1 ALLUVIAL WELL COMPLETIONS

Five new alluvial wells were drilled and no new additional infiltration lines installed during 2017. These five new alluvial wells were drilled adjacent to the EP3 to better define the groundwater conditions in the area of EP3. Well DD3 was drilled upgradient of EP3 while wells DD4 and DD5 are located in the alluvial aquifer on the southeast and southwest sides of EP3. Two additional wells drilled to the base of the alluvium on the southwest side of the of EP3 are dry as expected (see Figure 3.2-1 for locations). Operational status and other characteristics of the new and previously installed alluvial wells and infiltration lines are discussed in this section. Figure 4.1-1 shows the locations of the alluvial wells near the Homestake Grants Project with the operational status for each well and infiltration line for 2017. Figure 4.1-1A shows the wells in the OS area while Figures 4.1-1B and 4.1-1C show the SOS and NOS area wells respectively. Wells labeled in black were used only for monitoring and black labeled infiltration lines were not used in 2017. Figure 4.1-1 is plotted at a scale of 1" = 1600' while the other figures are plotted at a scale of 1” =500’. Alluvial wells 914, 920, 921, 922, 950, DD3, DD4, DD6 and DD7 are located outside, and north of, the area presented on Figure 4.1-1. These upgradient wells are shown on Figure 3.2-1 in the previous report section.

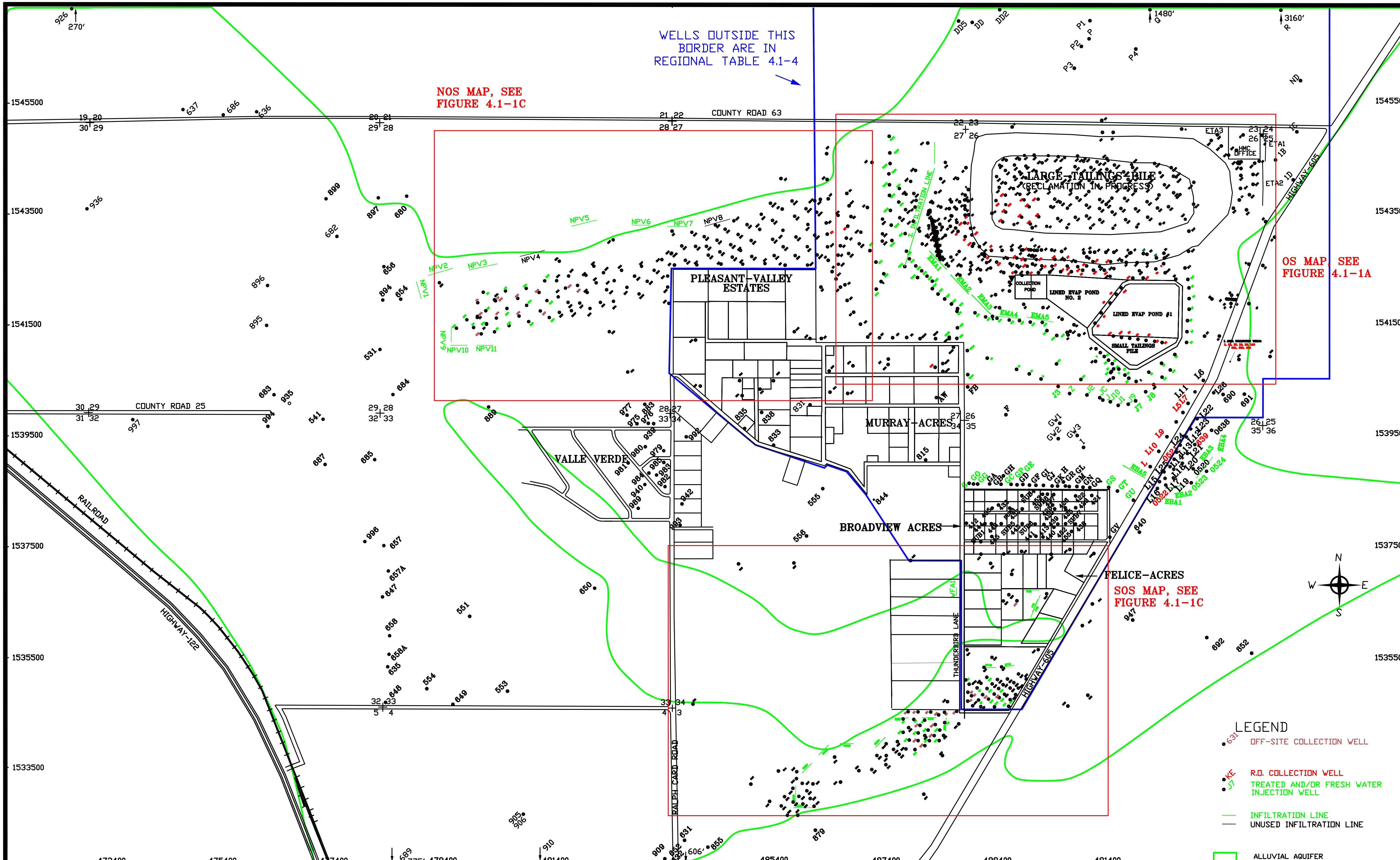
The currently active injection and collection wells are labeled with different colors on Figures 4.1-1, 4.1-1A, 4.1-1B and 4.1-1C so that they can be distinguished from monitoring wells. Figures 4.1-1B and 4.1-1C also shows the wells used for the Off-site collection during 2017. Figure 4.1-1B shows that South collection alluvial wells 490, 866, Q2, Q3, Q5, Q11, Q18, R1, R2, R3 R4, R5, R10, R11, R18, R20 and R22 were pumped in 2017. Figure 4.1-1C shows that North collection alluvial wells 634, 659, 890, H1, H2A, H7, H7B, H12, H16, H17, H24 and H26 were pumped in 2017. This water was pumped to the zeolite for treatment during 2017. Table 4.1-1 presents basic well data for alluvial wells located on the Grants Project that have been used to define the alluvial groundwater hydrology. Many additional alluvial wells outside of the Grants Project have also been used for that purpose. The basic well data table presents the location, well depth, casing diameter, water-level information, depth to the base of the alluvium and casing perforation intervals for each well.

Table 4.1-2 presents the same type of basic well data for alluvial wells in the Broadview and Felice Acres subdivisions. These two subdivisions are located just south of the Homestake property. Figure 4.1-1 shows the locations of the subdivision wells. Table 4.1-3 presents similar basic data for alluvial wells located in Murray Acres and Pleasant Valley Estates subdivisions.

Table 4.1-4 presents data for regional wells located outside of the subdivisions and the immediate Homestake property around the tailings sites (Grants Project). Wells outside the area delineated with a heavy blue boundary line on Figure 4.1-1 are considered to be regional wells; data for these wells are presented in this table. The wells are listed in numerical or alphabetical order based on their well names.

The elevation of the base of the alluvium has been used in determining required depths for alluvial wells. This elevation is the same as the elevation of the top of the Chinle Formation except in the far western portion of the area. Figure 4.1-2 presents the base of the alluvium with data points used to define these elevation contours. The deepest portion of the San Mateo alluvium exists in the western portion of the LTP and extends to the west central portion of Section 28 where the San Mateo alluvium joins the Rio San Jose alluvium. An additional San Mateo channel exists in Section 3 that joins the Rio San Jose in Section 4. The base of the alluvium was adjusted in South Felice Acres area with the additional drilling in this area.

The green line in Figures 4.1-1 and 4.1-2 shows the limits of the alluvial aquifer with alluvial saturation existing inside these limits where the base of the alluvium is lower. The 2014 alluvial water level elevation was used in drawing the aquifer limits. The aquifer limits were updated with the 2014 water-level elevations because additional wells changed the limits of the alluvial aquifer in South Felice Acres area.



SCALE: 1"=1600'

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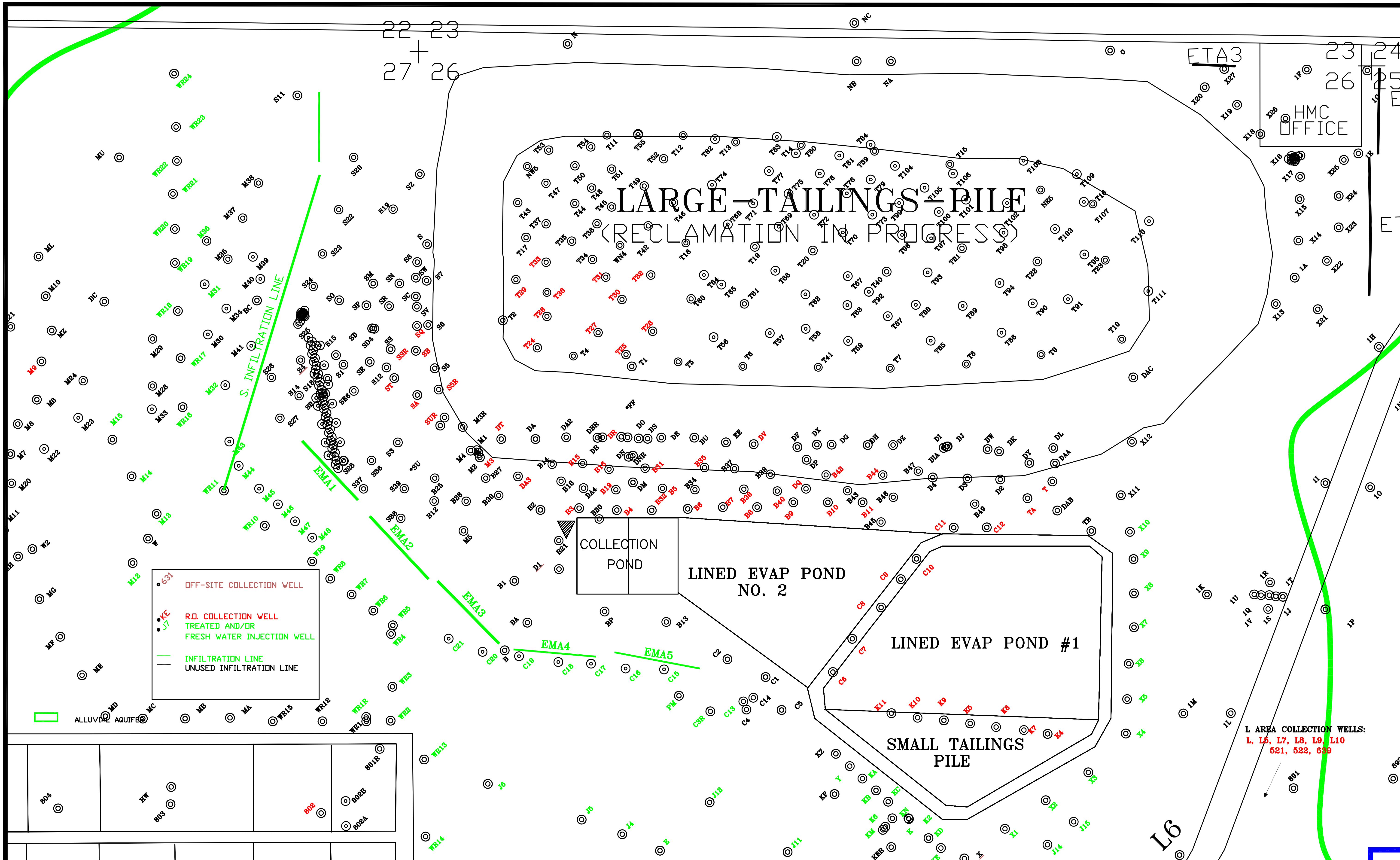
1600QAL17

DATE: 2/5/18

FIGURE 4.1-1 ALLUVIAL WELL LOCATIONS, 2017

4.1-4



SCALE: 1"=500'
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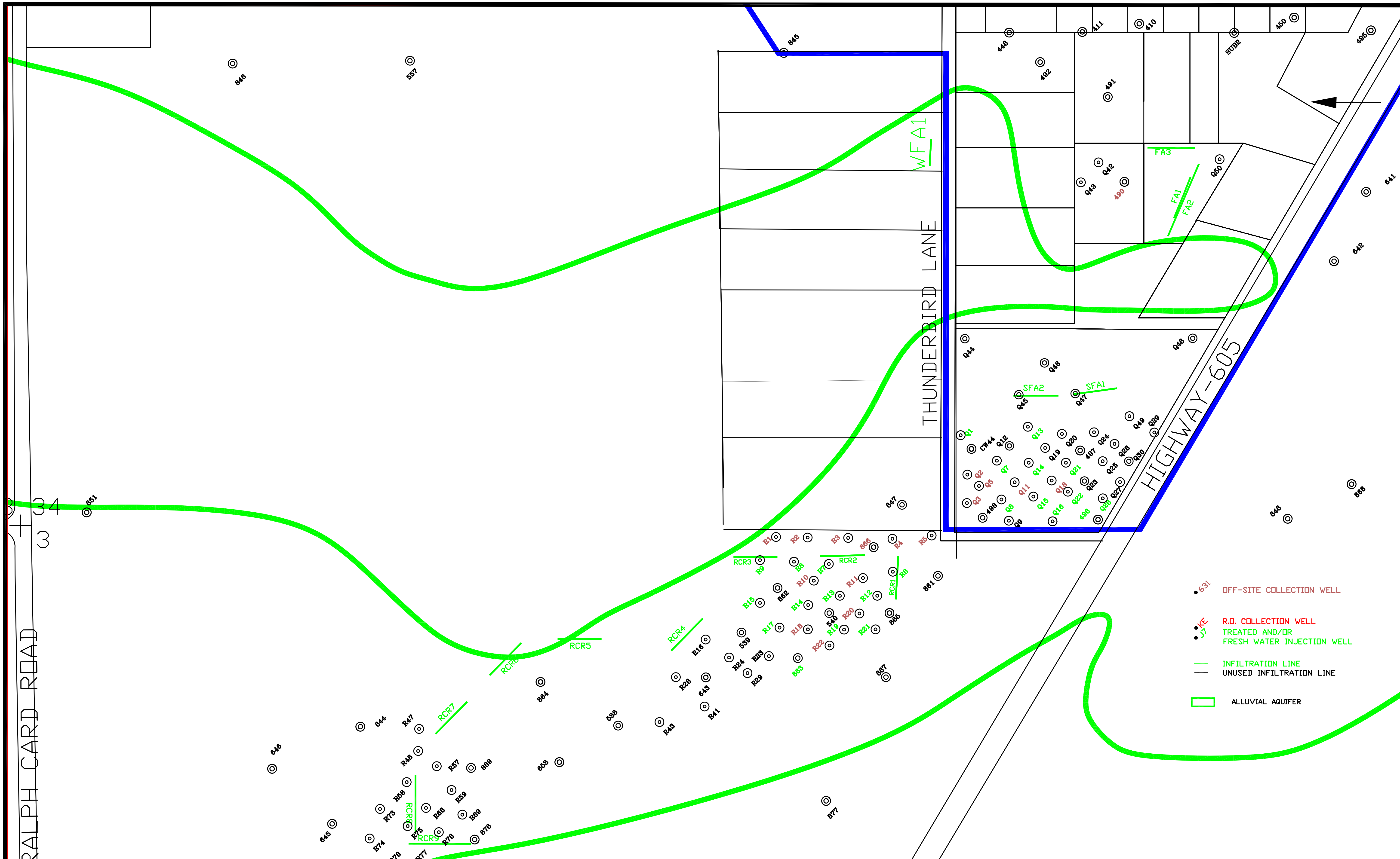
DATE: 2/6/18

FIGURE 4.1-1A. ALLUVIAL WELL LOCATIONS, OS, 2017

4.1-5



SCALE: 1"=500'
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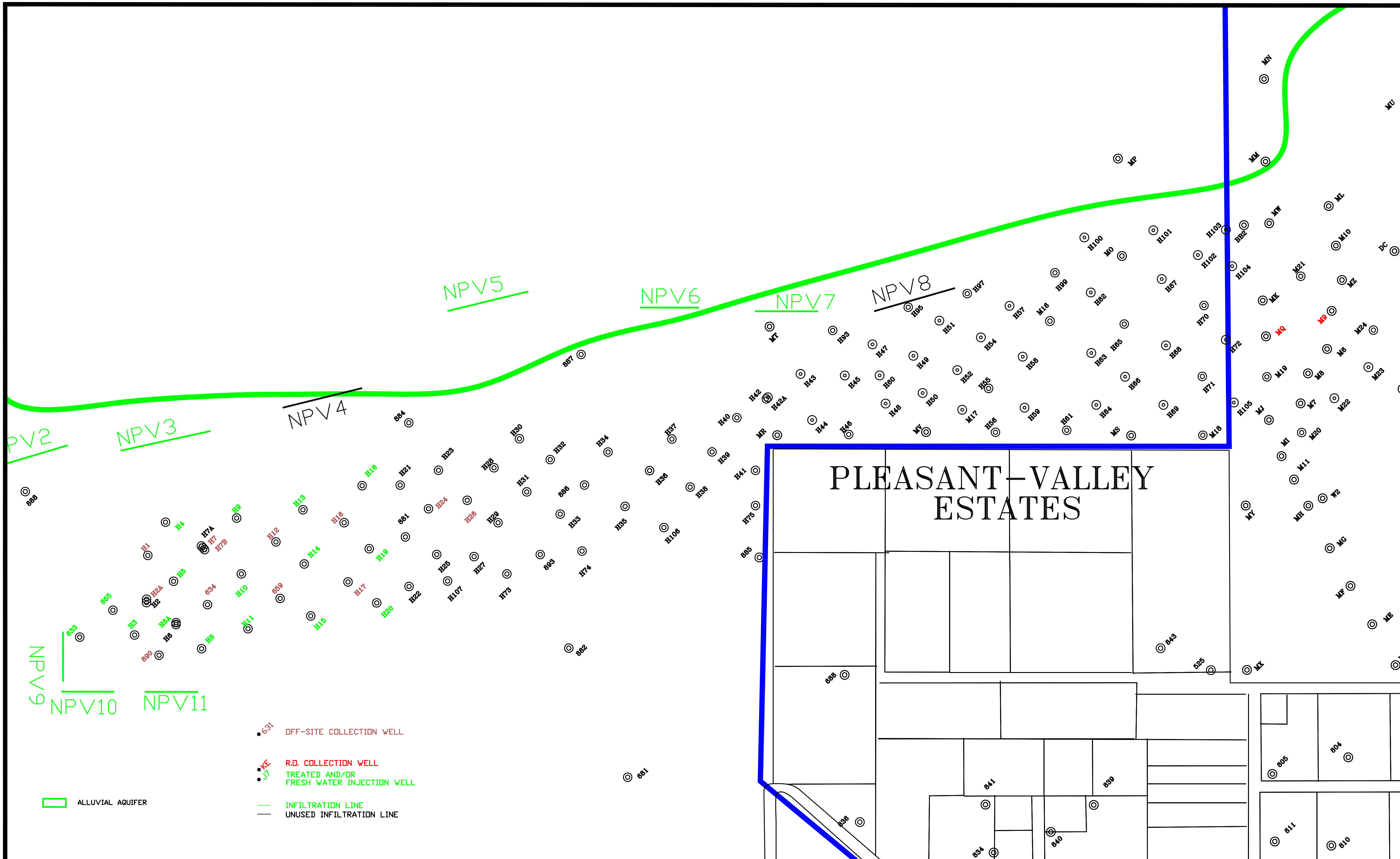
1600QAL17
DATE: 1/26/18

FIGURE 4.1-1B. ALLUVIAL WELL LOCATIONS, SOS, 2017

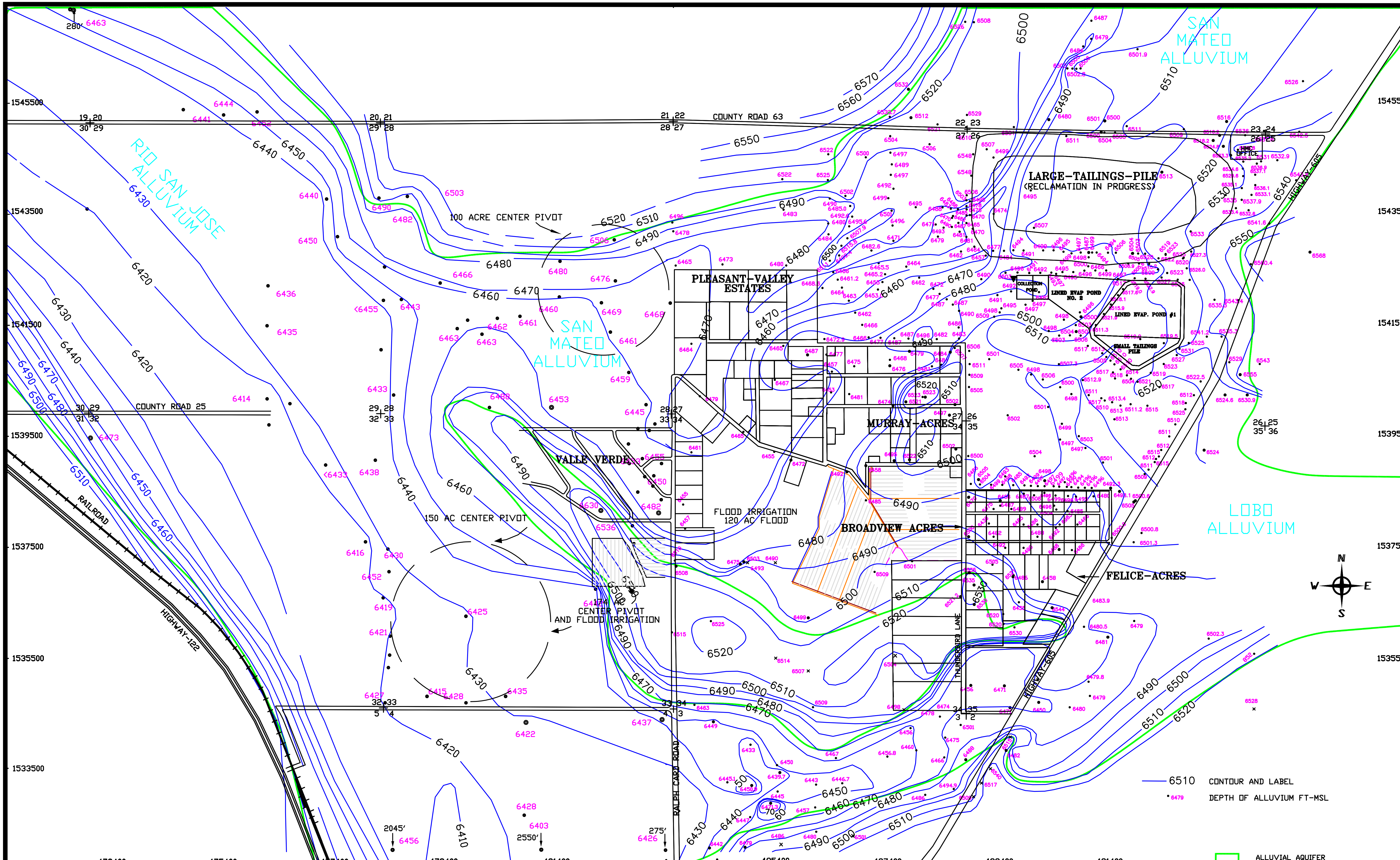
4.1-6



SCALE: 1"=500'
C:\PROJECTS\ 2018-06 16000AL17
DATE: 2/5/18

FIGURE 4.1-1C. ALLUVIAL WELL LOCATIONS, NOS, 2017

4.1-7



SCALE: 1"=1600'
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DATE: 3/10/15

FIGURE 4.1-2 ELEVATION OF BASE OF THE ALLUVIUM, FT-MSL

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0690	1540279	493465	65.0	5.0	12/5/2017	38.83	6543.23	2.5	6582.06	55	6524.6 A	25-65	18.7
0691	1540276	493860	66.0	5.0	12/5/2017	44.14	6544.67	2.9	6588.81	55	6530.9 A	26-66	13.8
0891	1540904	493751	54.0	5.0	4/25/2017	33.39	6547.73	2.1	6581.12	50	6529.0 A	24-54	18.7
0892	1540954	494317	50.0	5.0	12/5/2017	40.05	6547.16	2.0	6587.21	42	6543.2 A	30-50	4.0
1A	1543790	493768	61.0	5.0	9/19/2017	36.90	6548.53	2.9	6585.43	47	6535.5 A	39-51	13.0
1B	1544502	494412	51.8	5.0	---	---	---	1.5	6584.42	50	6532.9 A	20-50	---
1C	1545018	494799	52.9	5.0	12/5/2017	37.88	6550.11	2.5	6587.99	43	6542.5 A	34-54	7.6
1D	1544142	494752	42.9	5.0	---	---	---	2.2	6585.97	40	6543.8 A	22-42	---
1E	1544481	494116	51.4	5.0	9/19/2017	35.00	6549.31	2.1	6584.31	43	6539.2 A	34-54	10.1
1F	1544952	493831	61.8	5.0	9/19/2017	38.80	6548.58	1.8	6587.38	54	6531.6 A	30-60	17.0
1G	1545034	494170	57.5	5.0	---	---	---	2.3	6587.07	48	6536.8 A	35-55	---
1H	1543363	494266	55.4	5.0	12/5/2017	55.40	6530.99	1.8	6586.39	43	6541.6 A	25-55	0.0
1I	1542627	493928	49.8	5.0	12/5/2017	34.61	6563.74	1.3	6598.35	35	6562.1 A	27-47	1.6
1J	1541986	493695	50.3	5.0	---	---	---	1.8	6585.40	40	6543.6 A	30-50	---
1K	1541992	493275	55.6	5.0	3/22/2017	33.90	6550.23	1.0	6584.13	47	6536.1 A	30-55	14.1
1L	1541256	493416	53.4	5.0	---	---	---	3.1	6578.61	40	6535.5 A	35-55	---
1M	1541327	493133	43.1	5.0	3/22/2017	28.20	6547.33	1.3	6575.53	33	6541.2 A	25-54	6.1
1N	1543100	494396	45.6	5.0	12/5/2017	31.21	6559.64	2.4	6590.85	25	6563.5 A	15-44	0.0
1O	1542592	494175	44.0	5.0	12/12/2016	44.02	6550.92	0.8	6594.94	29	6565.1 A	14-34	0.0
1P	1541902	493924	52.8	5.0	12/5/2017	36.58	6548.66	2.6	6585.24	35	6547.6 A	20-40	1.0
1Q	1541993	493619	56.0	5.0	1/16/2017	33.05	6550.06	1.9	6583.11	56	6525.2 A	36-56	24.9
1R	1542071	493623	56.0	5.0	1/16/2017	34.50	6551.49	1.3	6585.99	56	6528.7 A	36-56	22.8
1S	1541920	493614	56.0	5.0	---	---	---	1.5	6581.99	56	6524.5 A	36-56	---
1T	1541990	493656	56.0	5.0	1/16/2017	32.88	6552.03	1.7	6584.91	56	6527.2 A	36-56	24.8
1U	1542001	493542	44.2	4.0	1/16/2017	34.54	6551.68	3.2	6586.22	---	--- A	-	---
1V	1541982	493579	61.4	5.0	1/16/2017	33.20	6551.74	1.7	6584.94	---	--- A	-	---
* A1	1542365	491539	55.6	4.0	---	---	---	1.1	6573.15	55	6517.1 A	37-57	---
* A2	1542356	491539	46.4	4.0	---	---	---	1.1	6573.40	---	--- A	27-47	---
B	1541684	489311	68.6	4.0	12/25/2017	43.68	6527.22	2.4	6570.90	60	6508.5 A	49-69	18.7
B1	1542071	489370	90.9	5.0	12/5/2017	38.10	6533.55	0.6	6571.65	82	6489.1 A	62-82	44.5
B2	1542475	489515	83.0	5.0	---	---	---	2.0	6574.25	72	6500.3 A	55-75	---
B3	1542480	489731	87.0	5.0	5/1/2017	87.30	6486.99	2.6	6574.29	77	6494.7 A	58-78	0.0
B4	1542471	489942	88.8	5.0	5/2/2017	46.21	6528.45	7.4	6574.66	82	6485.3 A	63-83	43.2
B5	1542474	490141	91.0	5.0	5/1/2017	56.67	6516.79	1.4	6573.46	81	6491.1 A	62-82	25.7
B6	1542478	490341	90.0	5.0	---	---	---	2.0	6577.69	80	6495.7 A	63-83	---
B7	1542488	490540	87.0	5.0	5/2/2017	44.98	6529.42	2.2	6574.40	77	6495.2 A	53-78	34.2

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
B8	1542488	490734	87.0	5.0	5/2/2017	46.28	6529.47	2.3	6575.75	77	6496.5 A	53-78	33.0
B9	1542514	490935	86.0	5.0	5/1/2017	48.78	6527.39	2.2	6576.17	76	6498.0 A	51-78	29.4
B10	1542517	491133	84.8	5.0	---	---	---	2.3	6576.77	75	6499.5 A	51-78	---
B11	1542517	491329	84.9	5.0	---	---	---	2.2	6577.39	77	6498.2 A	42-80	---
B12	1542524	488915	100.0	5.0	12/5/2017	37.83	6535.19	2.2	6573.02	91	6479.8 A	30-100	55.4
B13	1541841	490223	80.0	5.0	12/5/2017	35.85	6534.19	3.1	6570.04	72	6494.9 A	30-80	39.3
B14	1542733	489579	120.0	4.5	---	---	---	2.0	6575.65	68	6505.7 A	60-120	---
B15	1542708	489749	120.0	4.5	5/2/2017	60.50	6515.81	2.0	6576.31	72	6502.3 A	60-120	13.5
B16	1542705	489900	120.0	4.5	5/2/2017	45.60	6529.77	2.0	6575.37	83	6490.4 A	60-120	39.4
B17	1542659	489493	95.0	4.5	---	---	---	2.0	6574.31	---	--- A	55-95	---
B18	1542652	489634	120.0	4.5	---	---	---	2.0	6576.13	70	6504.1 A	60-120	---
B19	1542605	489936	120.0	4.5	---	---	---	2.0	6574.01	90	6482.0 A	60-120	---
B20	1542444	489847	120.0	4.5	---	---	---	2.0	6574.44	90	6482.4 A	60-120	---
B21	1542315	489619	80.0	4.5	---	---	---	2.0	6574.02	80	6492.0 A	50-80	---
B25	1542644	488917	90.0	4.5	---	---	---	2.0	6573.67	90	6481.7 A	50-90	---
B26	1542819	2711848	110.0	4.5	---	---	---	1.3	6574.25	---	--- A	50-110	---
B27	1542667	489204	90.0	4.5	---	---	---	2.0	6574.04	90	6482.0 A	50-90	---
B28	1542538	489095	90.0	4.5	---	---	---	2.0	6573.98	80	6492.0 A	50-90	---
B30	1542568	489281	90.0	4.5	---	---	---	2.0	6574.73	90	6482.7 A	50-90	---
B31	1542710	490103	120.0	4.5	---	---	---	2.0	6575.96	83	6491.0 A	60-100	---
B32	1542598	490201	120.0	4.5	5/3/2017	46.01	6529.38	2.0	6575.39	93	6480.4 A	60-120	49.0
B33	1542709	490269	85.0	4.5	---	---	---	2.4	6575.46	---	--- A	45-85	---
B34	1542601	490388	90.0	4.5	---	---	---	2.0	6575.69	90	6483.7 A	50-90	---
B35	1542714	490393	90.0	4.5	5/2/2017	70.12	6506.74	2.0	6576.86	90	6484.9 A	50-90	21.9
B36	1542668	490467	85.0	4.5	---	---	---	2.0	6576.44	---	--- A	40-85	---
B37	1542711	490543	80.0	4.5	---	---	---	2.0	6576.33	80	6494.3 A	40-80	---
B38	1542607	490662	80.0	4.5	5/2/2017	69.37	6506.30	2.0	6575.67	80	6493.7 A	40-80	12.6
B39	1542667	490816	80.0	4.5	---	---	---	2.0	6576.60	80	6494.6 A	40-80	---
B40	1542595	490850	80.0	4.5	5/2/2017	70.01	6505.88	2.0	6575.89	80	6493.9 A	40-80	12.0
B41	1542656	490998	85.0	4.5	---	---	---	1.8	6578.13	---	--- A	40-85	---
B42	1542679	491060	80.0	4.5	5/2/2017	66.61	6512.36	2.0	6578.97	80	6497.0 A	40-80	15.4
B43	1542610	491235	80.0	4.5	---	---	---	2.0	6576.96	80	6495.0 A	40-80	---
B44	1542665	491360	80.0	4.5	5/2/2017	67.75	6510.85	2.0	6578.60	80	6496.6 A	40-80	14.3
B45	1542423	491434	80.0	4.5	---	---	---	2.0	6576.92	80	6494.9 A	40-80	---
B46	1542539	491507	80.0	4.5	---	---	---	2.0	6579.26	80	6497.3 A	40-80	---
B47	1542695	491639	80.0	4.5	---	---	---	2.0	6578.96	80	6497.0 A	40-80	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
B48	1542395	491633	80.0	4.5	---	---	---	2.0	6579.68	---	--- A	40-80	---
B49	1542521	491966	80.0	4.5	---	---	---	2.0	6579.86	80	6497.9 A	40-80	---
BA	1541835	489440	86.0	5.0	12/25/2017	42.17	6529.41	1.7	6571.58	76	6493.9 A	64-78	35.5
BB2	1543791	486213	56.6	4.0	---	---	---	0.6	6573.80	---	--- A	42-62	---
BC	1543655	487910	82.8	4.0	12/5/2017	36.09	6538.52	2.6	6574.61	75	6497.0 A	63-83	41.5
BP	1541882	489841	85.4	4.0	3/22/2017	40.40	6531.90	3.0	6572.30	75	6494.3 A	40-85	37.6
* C	1541762	490854	79.7	4.0	---	---	---	0.3	6570.84	75	6495.5 A	59-79	---
C1	1541533	490780	76.0	5.0	3/21/2017	35.40	6536.46	0.8	6571.86	67	6504.1 A	41-68	32.4
C2	1541630	490566	76.0	5.0	---	---	---	0.9	6565.02	66	6498.1 A	42-67	---
* C3	1541344	490481	75.0	5.0	---	---	---	0.9	6568.53	65	6502.6 A	45-67	---
C3R	1541338	490472	75.0	5.0	---	---	---	2.0	6569.29	66	6501.3 A	43-68	---
C4	1541348	490675	75.0	5.0	---	---	---	1.3	6570.84	66	6503.5 A	46-66	---
C5	1541344	490869	72.0	5.0	3/22/2017	32.05	6537.80	0.8	6569.85	62	6507.1 A	43-63	30.8
C6	1541533	491142	80.8	5.0	9/20/2017	39.30	6545.59	1.6	6584.89	72	6511.3 A	34-74	34.3
C7	1541734	491280	72.4	5.0	3/31/2017	45.49	6538.95	1.5	6584.44	61	6521.9 A	25-65	17.0
C8	1541906	491415	78.1	5.0	9/20/2017	26.80	6557.69	1.6	6584.49	67	6515.9 A	31-71	41.8
C9	1542075	491545	77.0	5.0	9/20/2017	21.20	6563.35	1.5	6584.55	65	6518.1 A	27-67	45.3
C10	1542182	491629	71.6	5.0	9/20/2017	45.20	6540.06	2.7	6585.26	65	6517.6 A	30-70	22.5
C11	1542376	491844	68.2	5.0	9/20/2017	42.50	6538.88	2.4	6581.38	60	6519.0 A	35-65	19.9
C12	1542375	492029	63.5	5.0	9/20/2017	14.50	6566.05	2.6	6580.55	55	6523.0 A	34-64	43.1
C13	1541394	490655	63.0	5.0	---	---	---	2.0	6570.01	63	6505.0 A	36-70	---
C14	1541413	490713	63.0	5.0	---	---	---	2.0	6569.69	63	6504.7 A	36-70	---
C15	1541574	490209	70.0	4.5	---	---	---	0.5	6570.62	70	6500.1 A	30-70	---
C16	1541579	489993	70.0	4.5	---	---	---	0.5	6570.39	70	6499.9 A	30-70	---
C17	1541607	489798	70.0	4.5	---	---	---	0.5	6570.74	70	6500.2 A	30-70	---
C18	1541616	489614	120.0	4.5	---	---	---	0.5	6571.10	60	6510.6 A	40-120	---
C19	1541648	489392	120.0	4.5	---	---	---	0.5	6569.91	80	6489.4 A	40-120	---
C20	1541673	489187	110.0	4.5	---	---	---	0.5	6570.16	70	6499.7 A	50-110	---
C21	1541747	488996	100.0	4.5	---	---	---	0.5	6571.99	90	6481.5 A	40-100	---
* D	1542127	490118	89.7	4.0	---	---	---	0.8	6572.89	90	6482.1 A	71-91	---
D1	1542140	489615	89.4	4.0	6/28/2017	39.40	6531.50	1.0	6570.90	80	6489.9 A	58-90	41.6
D2	1542641	492107	70.0	5.0	---	---	---	3.0	6580.17	62	6515.2 A	40-70	---
D3	1542646	491917	80.0	5.0	---	---	---	2.5	6580.13	72	6505.6 A	40-80	---
D4	1542652	491724	78.0	5.0	---	---	---	2.5	6579.43	70	6506.9 A	48-78	---
DA	1542864	489488	99.1	5.0	---	---	---	3.0	6585.55	90	6492.6 A	50-100	---
DA2	1542881	489656	82.1	5.0	---	---	---	2.8	6587.29	83	6501.5 A	64-74	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
DA3	1542664	489390	81.0	5.0	5/2/2017	39.90	6534.46	2.6	6574.36	72	6499.8	A	30-81	34.6
DA4	1542598	489756	81.0	5.0	---	---	---	1.7	6573.97	71	6501.3	A	31-81	---
DAA	1542733	492411	62.7	5.0	---	---	---	2.2	6580.60	54	6524.4	A	30-60	---
DAB	1542633	492399	65.1	5.0	---	---	---	2.3	6579.88	56	6521.6	A	30-60	---
DAC	1543218	492851	67.7	5.0	---	---	---	4.1	6620.36	45	6571.3	A	20-30	---
DB	1542874	489842	73.2	5.0	---	---	---	0.5	6589.48	---	---	A	55-85	---
DBR	1542877	489855	55.6	5.0	---	---	---	4.8	6589.16	---	---	A	-	---
DC	1543646	487060	64.1	4.0	12/5/2017	38.00	6533.31	2.7	6571.31	---	---	A	45-65	---
DD	1546989	488943	78.5	4.0	12/26/2017	47.41	6545.18	1.9	6592.59	83	6507.7	A	40-80	37.5
DD2	1547439	489251	94.3	5.0	12/26/2017	45.45	6547.83	2.0	6593.28	80	6511.3	A	50-90	36.5
DD3	1548273	489592	69.9	4.0	11/2/2017	48.50	6552.44	3.6	6600.94	67	6530.3	A	40-70	22.1
DD4	1547675	489466	81.5	4.0	12/7/2017	47.77	6551.66	3.8	6599.43	80	6515.6	A	42-82	36.1
DD5	1547013	488704	68.0	4.0	11/2/2017	48.45	6546.90	3.6	6595.35	65	6526.8	A	58-68	20.1
DD6	1547340	488377	35.0	4.0	---	---	---	3.2	6595.81	35	6557.6	A	25-35	---
DD7	1547606	488129	24.2	4.0	---	---	---	4.1	6596.83	20	6572.8	A	14-24	---
DE	1542877	490193	70.2	5.0	---	---	---	0.8	6591.35	80	6510.6	A	60-90	---
DF	1542839	490869	88.5	5.0	---	---	---	0.6	6590.59	---	---	A	65-95	---
DG	1542839	491157	88.9	5.0	---	---	---	0.4	6591.78	---	---	A	65-95	---
DH	1542835	491365	61.7	5.0	---	---	---	4.8	6591.34	---	---	A	65-95	---
DI	1542821	491788	86.1	5.0	---	---	---	2.3	6589.62	75	6512.3	A	35-85	---
DIA	1542821	491793	---	4.0	---	---	---	1.4	6593.63	---	---	A	-	---
DJ	1542821	491793	85.7	5.0	---	---	---	0.7	6589.56	75	6513.9	A	35-85	---
DK	1542799	492094	65.4	5.0	---	---	---	0.7	6585.91	55	6530.2	A	35-55	---
DL	1542813	492398	64.4	5.0	---	---	---	2.9	6584.87	55	6527.0	A	35-55	---
DM	1542628	490035	62.8	5.0	---	---	---	3.0	6575.08	---	---	A	-	---
DN	1542776	490020	66.7	4.0	---	---	---	3.7	6576.66	---	---	A	-	---
DNR	1542779	490031	79.7	4.0	---	---	---	3.3	6577.06	---	---	A	-	---
DO	1542874	490049	75.8	5.0	---	---	---	1.6	6590.33	75	6513.7	A	65-75	---
DP	1542754	491012	79.8	5.0	---	---	---	3.5	6579.71	---	---	A	-	---
DQ	1542592	491006	85.3	5.0	---	---	---	2.2	6576.43	---	---	A	-	---
DR	1542884	489966	87.8	5.0	---	---	---	2.7	6590.83	85	6503.1	A	65-85	---
DS	1542876	490118	87.0	5.0	---	---	---	0.9	6588.81	77	6510.9	A	62-77	---
DT	1542871	489293	72.3	5.0	7/25/2016	44.58	6539.23	2.7	6583.81	99	6482.1	A	59-99	57.1
DU	1542879	490380	84.6	5.0	---	---	---	2.9	6591.07	81	6507.2	A	61-81	---
DV	1542826	490702	80.0	5.0	---	---	---	2.9	6585.60	77	6505.7	A	60-80	---
DW	1542818	492029	73.4	5.0	---	---	---	3.6	6588.66	59	6526.1	A	45-60	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
DX	1542838	491074	90.0	6.0	---	---	---	1.0	6591.98	80	6511.0 A	60-90	---
DY	1542737	492271	65.7	5.0	---	---	---	2.3	6580.61	56	6522.3 A	15-65	---
DZ	1542834	491501	81.8	5.0	12/25/2017	56.73	6533.80	2.2	6590.53	---	--- A	-	---
E	1540553	490187	61.7	4.0	---	---	---	1.7	6568.94	60	6507.2 A	44-64	---
EE	1542853	490523	91.2	5.0	---	---	---	0.6	6588.11	80	6507.5 A	50-90	---
EW-1	1543400	488270	95.0	4.0	---	---	---	---	6577.04	---	--- A	50-90	---
EW-2	1543288	488294	94.0	4.0	---	---	---	---	6576.75	---	--- A	49-89	---
EW-3	1543180	488316	95.0	4.0	---	---	---	---	6576.58	---	--- A	50-90	---
EW-4	1543072	488339	95.0	4.0	---	---	---	---	6575.81	---	--- A	50-90	---
EW-5	1542963	488361	95.0	4.0	---	---	---	---	6575.63	---	--- A	50-90	---
EW-6	1542855	488383	95.0	4.0	---	---	---	---	6575.58	---	--- A	50-90	---
EW-7	1542749	488405	95.0	4.0	---	---	---	---	6576.05	---	--- A	50-90	---
F	1539908	489554	63.8	4.0	12/5/2017	33.37	6531.45	1.2	6564.82	62	6501.6 A	45-65	29.8
FB	1540417	488857	62.0	4.0	11/14/2017	34.20	6531.46	2.0	6565.66	58	6505.7 A	43-58	25.8
* FF	1542878	490017	---	4.0	---	---	---	0.2	6576.54	124	6452.3 A	52-132	---
G	1538672	488890	78.3	4.0	---	---	---	2.0	6563.09	75	6486.1 A	50-80	---
GA	1538657	489255	---	4.0	12/12/2016	30.70	6532.09	1.8	6562.79	62	6499.0 A	45-65	33.1
GB	1538654	489456	65.2	4.0	---	---	---	1.9	6562.99	64	6497.1 A	45-65	---
GC	1538650	489654	---	4.0	---	---	---	2.5	6565.17	78	6484.7 A	60-80	---
GD	1538646	489855	---	4.0	---	---	---	1.8	6565.62	72	6491.8 A	55-75	---
GE	1538637	489972	117.0	4.0	---	---	---	2.4	6566.27	65	6498.9 A	50-120	---
GF	1538632	490097	119.2	4.0	12/5/2017	36.72	6529.29	1.8	6566.01	67	6497.2 A	50-120	32.1
GG	1538662	489055	58.7	4.0	---	---	---	1.8	6563.13	57	6504.3 A	48-68	---
GH	1538807	489509	69.2	4.0	12/5/2017	34.73	6528.03	1.3	6562.76	67	6494.5 A	55-65	33.6
GI	1538631	490218	119.0	4.0	---	---	---	1.5	6565.85	67	6497.4 A	50-120	---
GJ	1538629	490382	119.2	4.0	---	---	---	2.0	6566.15	65	6499.2 A	50-120	---
GK	1538622	490482	115.7	4.0	11/14/2017	35.73	6531.03	2.4	6566.76	67	6497.4 A	50-120	33.7
GL	1538614	490701	119.3	4.0	---	---	---	2.1	6567.15	71	6494.1 A	50-120	---
GM	1538605	490824	118.2	4.0	---	---	---	2.1	6567.65	69	6496.6 A	50-120	---
GN	1538602	490944	116.5	4.0	8/14/2017	36.30	6531.67	1.8	6567.97	70	6496.2 A	50-120	35.5
GO	1538663	488973	122.3	4.0	---	---	---	1.6	6563.00	75	6486.4 A	50-120	---
GP	1538649	489752	121.4	4.0	---	---	---	2.1	6564.87	68	6494.8 A	50-120	---
GQ	1538599	491067	70.0	4.0	---	---	---	0.9	6568.16	71	6496.3 A	50-70	---
GR	1538619	490619	85.0	4.0	---	---	---	1.0	6565.21	75	6489.2 A	50-85	---
GS	1538597	491408	86.4	5.0	---	---	---	2.0	6574.31	80	6492.3 A	50-85	---
GT	1538534	491565	84.0	5.0	---	---	---	2.1	6576.17	76	6498.1 A	60-84	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
GU	1538367	491854	80.0	5.0	---	---	---	2.0	6575.65	73	6500.7 A	60-80	---
GV	1537701	491428	83.0	5.0	12/5/2017	49.80	6527.58	2.5	6577.38	74	6500.9 A	62-82	26.7
GW1	1539755	490530	73.0	5.0	12/5/2017	34.61	6530.66	1.0	6565.27	65	6499.3 A	48-73	31.4
GW2	1539471	490497	75.0	5.0	12/5/2017	36.23	6529.85	1.0	6566.08	68	6497.1 A	47-75	32.8
GW3	1539532	490835	72.0	5.0	---	---	---	1.0	6566.28	62	6503.3 A	45-72	---
H	1538703	490582	69.3	4.0	---	---	---	1.8	6566.58	69	6495.8 A	50-70	---
I	1539319	490954	70.0	4.0	---	---	---	1.6	6567.20	68	6497.6 A	52-72	---
IW-1D	1543443	488206	85.0	4.0	---	---	---	---	6574.57	---	--- A	60-80	---
IW-1S	1543422	488225	63.0						6573.45	---	--- A	38-58	---
IW-2S	1543373	488232	59.0	4.0	---	---	---	---	6573.93	---	--- A	34-54	---
IW-2D	1543401	488218	83.0						6573.79	---	--- A	58-78	---
IW-3S	1543329	488242	59.0	4.0	---	---	---	---	6574.08	---	--- A	34-54	---
IW-3D	1543352	488226	79.0						6574.66	---	--- A	54-74	---
IW-4S	1543286	488251	66.0	4.0	---	---	---	---	6573.55	---	--- A	41-61	---
IW-4D	1543309	488236	86.0						6574.11	---	--- A	61-81	---
IW-5S	1543239	488261	64.0	4.0	---	---	---	---	6574.90	---	--- A	39-59	---
IW-5D	1543264	488245	90.0						6574.85	---	--- A	65-85	---
IW-6S	1543195	488270	62.0	4.0	---	---	---	---	6574.43	---	--- A	37-57	---
IW-6D	1543218	488255	84.5						6574.27	---	--- A	59.5-79.	---
IW-7D	1543174	488265	82.0	4.0	---	---	---	---	6574.02	---	--- A	57-77	---
IW-7S	1543151	488280	60.0						6574.94	---	--- A	35-55	---
IW-8S	1543110	488289	58.0	4.0	---	---	---	---	6574.20	---	--- A	33-53	---
IW-8D	1543129	488274	80.0						6574.53	---	--- A	55-75	---
IW-9S	1543064	488298	58.0	4.0	---	---	---	---	6573.36	---	--- A	33-53	---
IW-9D	1543088	488283	77.0						6574.23	---	--- A	52-72	---
IW-10D	1543043	488292	81.0	4.0	---	---	---	---	6573.46	---	--- A	56-76	---
IW-10S	1543018	488307	58.0						6573.72	---	--- A	33-53	---
IW-11D	1542998	488302	78.0	4.0	---	---	---	---	6574.14	---	--- A	53-73	---
IW-11S	1542974	488317	60.0						6573.56	---	--- A	35-55	---
IW-12S	1542929	488327	65.0	4.0	---	---	---	---	6574.11	---	--- A	40-60	---
IW-12D	1542953	488312	85.0						6573.76	---	--- A	60-80	---
IW-13S	1542883	488337	65.0	4.0	---	---	---	---	6573.36	---	--- A	40-60	---
IW-13D	1542908	488321	84.0						6573.43	---	--- A	59-79	---
IW-14D	1542863	488330	90.0	4.0	---	---	---	---	6573.04	---	--- A	65-85	---
IW-14S	1542839	488346	69.0						6573.10	---	--- A	44-64	---
IW-15D	1542818	488340	87.0	4.0	---	---	---	---	6573.22	---	--- A	62-82	---
IW-15S	1542796	488355	67.0						6573.76	---	--- A	42-62	---
IW-16D	1542775	488350	89.0	4.0	---	---	---	---	6573.98	---	--- A	64-84	---
IW-16S	1542752	488365	67.0						6573.94	---	--- A	42-62	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
IW-17D	1542731	488359	97.0	4.0	---	---	---	---	6573.69	---	--- A	72-92	---
IW-17S	1542709	488373	69.0						6573.48	---	--- A	44-64	---
J	1540174	491302	65.6	4.0	---	---	---	3.4	6570.19	56	6510.8 A	46-68	---
J1	1540082	491585	57.0	6.0	---	---	---	3.8	6571.85	55	6513.1 A	50-57	---
J2	1540271	491013	58.0	6.0	---	---	---	2.9	6570.19	55	6512.3 A	50-58	---
J3	1540414	490499	70.0	6.0	---	---	---	2.6	6569.14	66	6500.5 A	43-70	---
J4	1540643	489974	80.0	6.0	---	---	---	3.9	6569.52	68	6497.6 A	40-70	---
J5	1540728	489747	65.0	6.0	---	---	---	2.8	6569.79	61	6506.0 A	50-65	---
J6	1540919	489221	67.0	6.0	---	---	---	3.7	6570.10	65	6501.4 A	48-67	---
J7	1540168	491892	61.9	5.0	---	---	---	2.1	6570.38	53	6515.3 A	40-60	---
J8	1540318	492064	63.2	5.0	---	---	---	2.4	6570.79	52	6516.4 A	35-61	---
J9	1540101	491759	68.0	5.0	---	---	---	2.0	6571.20	58	6511.2 A	36-68	---
J10	1540138	491436	66.0	5.0	---	---	---	3.5	6570.91	54	6513.4 A	36-66	---
J11	1540545	490909	66.0	5.0	---	---	---	2.0	6569.86	55	6512.9 A	36-66	---
J12	1540827	490466	70.0	5.0	---	---	---	3.0	6570.30	60	6507.3 A	40-70	---
J13	1540451	492218	55.0	5.0	---	---	---	1.8	6568.40	46	6520.6 A	15-55	---
J14	1540585	492367	55.0	5.0	---	---	---	1.7	6568.98	44	6523.3 A	15-55	---
J15	1540719	492521	55.0	4.0	---	---	---	2.2	6569.63	46	6521.4 A	15-55	---
JC	1540215	491240	60.0	5.0	---	---	---	1.8	6568.44	50	6516.6 A	35-55	---
K	1540730	491590	61.7	4.0	---	---	---	3.8	6573.51	60	6509.7 A	44-64	---
K2	1540736	491587	58.9	4.0	---	---	---	2.5	6572.21	58	6511.7 A	46-56	---
K3	1540744	491571	56.7	2.0	---	---	---	1.3	6570.67	---	--- A	53-58	---
K4	1541211	492371	86.2	5.0	11/6/2017	67.27	6534.75	2.5	6602.02	80	6519.5 A	65-85	15.2
K5	1541269	491935	86.4	5.0	11/7/2017	71.05	6530.68	2.8	6601.73	80	6518.9 A	55-85	11.7
K6	1540689	491459	58.0	5.0	---	---	---	2.0	6570.07	---	--- A	33-58	---
K7	1541232	492237	86.0	5.0	11/6/2017	63.00	6538.53	2.0	6601.53	79	6520.5 A	56-86	18.0
K8	1541250	492081	86.0	5.0	11/6/2017	64.24	6536.25	2.0	6600.49	78	6520.5 A	66-86	15.8
K9	1541287	491787	86.0	5.0	11/7/2017	62.29	6538.05	2.0	6600.34	79	6519.3 A	56-86	18.7
K10	1541305	491638	87.0	5.0	11/7/2017	59.90	6540.91	2.0	6600.81	81	6517.8 A	47-87	23.1
K11	1541325	491490	84.0	5.0	11/7/2017	80.29	6520.32	2.0	6600.61	78	6520.6 A	64-84	0.0
KA	1540959	491331	67.8	5.0	---	---	---	1.9	6572.19	65	6505.3 A	42-72	---
KB	1540893	491406	61.8	5.0	---	---	---	0.8	6571.65	60	6510.9 A	40-70	---
KC	1540826	491477	68.6	5.0	---	---	---	0.7	6570.31	59	6510.6 A	42-72	---
KD	1540627	491701	62.1	5.0	---	---	---	0.6	6570.22	---	--- A	40-70	---
KE	1540566	491776	60.8	5.0	---	---	---	2.5	6572.28	---	--- A	40-70	---
KEB	1540570	491487	59.9	5.0	---	---	---	1.5	6569.73	50	6518.2 A	40-60	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
KF	1540870	491169	63.5	5.0	3/28/2017	30.45	6539.76	2.2	6570.21	50	6518.0 A	30-60	21.7
KM	1540671	491444	52.4	5.0	---	---	---	2.2	6569.77	---	--- A	-	---
KN	1540734	491492	50.1	5.0	---	---	---	2.3	6569.59	---	--- A	-	---
KZ	1541100	491183	58.4	5.0	12/25/2017	33.68	6538.04	1.2	6571.72	---	--- A	-	---
L	1538970	492150	67.0	4.0	10/23/2017	57.34	6517.63	0.8	6574.97	59	6515.2 A	46-66	2.5
L5	1539946	492730	60.2	5.0	10/23/2017	51.55	6524.52	1.3	6576.07	50	6524.8 A	25-55	0.0
L6	1540526	493110	51.1	5.0	10/23/2017	33.33	6541.31	2.1	6574.64	50	6522.5 A	25-55	18.8
L7	1540113	492842	67.8	5.0	10/23/2017	49.22	6527.39	2.3	6576.61	62	6512.3 A	36-66	15.1
L8	1539773	492621	73.9	5.0	10/23/2017	36.72	6539.77	2.1	6576.49	65	6509.4 A	32-72	30.4
L9	1539509	492463	74.9	5.0	10/23/2017	51.79	6525.44	2.2	6577.23	64	6511.0 A	43-73	14.4
L10	1539250	492310	74.2	5.0	10/23/2017	45.22	6531.61	2.0	6576.83	63	6511.8 A	53-73	19.8
L11	1540323	492965	70.0	4.5	4/24/2017	32.77	6543.28	2.0	6576.05	70	6504.1 A	30-70	39.2
L12	1539507	492810	75.0	4.5	5/16/2017	50.61	6536.33	2.0	6586.94	70	6514.9 A	55-75	21.4
L13	1539233	492633	75.0	4.5	5/19/2017	51.61	6533.80	2.0	6585.41	75	6508.4 A	35-75	25.4
L14	1538972	492514	75.0	4.5	5/19/2017	47.26	6533.58	2.0	6580.84	60	6518.8 A	35-75	14.7
L15	1538701	492324	75.0	4.5	4/24/2017	45.25	6533.15	2.0	6578.40	70	6506.4 A	35-75	26.8
L16	1538579	492286	75.0	4.5	5/16/2017	46.83	6532.67	2.0	6579.50	70	6507.5 A	35-75	25.2
L17	1538761	492424	75.0	4.5	---	---	---	2.0	6578.52	70	6506.5 A	35-75	---
L18	1538927	492582	75.0	4.5	---	---	---	2.0	6582.32	70	6510.3 A	35-75	---
L19	1538768	492575	75.0	4.5	4/24/2017	47.25	6533.80	2.0	6581.05	70	6509.1 A	35-75	24.8
L20	1539033	492736	75.0	4.5	4/24/2017	49.68	6534.96	2.0	6584.64	70	6512.6 A	35-75	22.3
L21	1539211	492827	75.0	4.5	---	---	---	2.0	6586.62	70	6514.6 A	55-75	---
L22	1539822	493033	70.0	4.5	---	---	---	2.0	6588.55	70	6516.6 A	30-70	---
L23	1539654	492890	70.0	4.5	5/16/2017	53.23	6536.03	2.0	6589.26	70	6517.3 A	30-70	18.8
L24	1539361	492700	70.0	4.5	4/24/2017	53.31	6534.76	2.0	6588.07	70	6516.1 A	30-70	18.7
L25	1538880	492409	70.0	4.5	4/24/2017	46.07	6533.47	2.0	6579.54	70	6507.5 A	30-70	25.9
L26	1540306	493302	60.0	4.5	4/25/2017	35.12	6544.55	2.0	6579.67	---	--- A	20-60	---
M1	1542797	489157	103.4	4.0	---	---	---	1.5	6584.97	120	6463.5 A	66-106	---
M2	1542785	489159	40.4	4.0	---	---	---	1.4	6576.26	---	--- A	-	---
M3	1542805	489151	105.3	4.0	3/23/2017	40.15	6535.95	1.0	6576.10	---	--- A	79-99	---
M3R	1542926	489078	115.0	5.0	---	---	---	2.1	6580.26	108	6470.2 A	55-115	---
M4	1542804	489134	81.8	5.0	---	---	---	3.7	6578.26	---	--- A	78-82	---
M5	1542360	489080	92.3	5.0	12/5/2017	40.39	6534.95	3.2	6575.34	84	6488.1 A	60-90	46.8
M6	1543097	486674	110.0	5.0	12/5/2017	50.44	6524.60	2.2	6575.04	65	6507.9 A	60-110	16.7
M7	1542790	486523	83.0	5.0	12/5/2017	56.10	6516.75	2.4	6572.85	71	6499.4 A	63-83	17.3
M8	1542960	486567	83.0	5.0	---	---	---	2.4	6575.23	57	6515.8 A	53-83	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
M9	1543310	486699	103.0	5.0	12/5/2017	63.65	6513.16	3.5	6576.81	78	6495.3 A	63-103	17.8
M10	1543677	486723	88.0	5.0	12/5/2017	69.92	6503.44	2.3	6573.36	86	6485.1 A	58-88	18.4
M11	1542358	486486	118.0	5.0	---	---	---	3.2	6573.22	109	6461.0 A	58-118	---
M12	1542174	487209	124.0	5.0	---	---	---	2.5	6573.51	118	6453.0 A	57-124	---
M13	1542450	487336	117.0	5.0	---	---	---	3.0	6576.16	108	6465.2 A	57-117	---
M14	1542661	487216	117.0	5.0	---	---	---	2.7	6577.17	109	6465.5 A	57-117	---
M15	1542872	487094	102.0	5.0	---	---	---	3.5	6579.08	93	6482.6 A	52-102	---
M19	1542940	486334	100.0	4.5	---	---	---	2.0	6576.13	97	6477.1 A	60-100	---
M20	1542584	486588	100.0	4.5	---	---	---	2.0	6575.54	100	6473.5 A	60-100	---
M21	1543508	486526	100.0	4.5	---	---	---	2.0	6574.72	80	6492.7 A	60-100	---
M22	1542817	486716	100.0	4.5	---	---	---	2.0	6575.43	100	6473.4 A	60-100	---
M23	1542992	486908	100.0	4.5	---	---	---	2.0	6575.97	100	6474.0 A	60-100	---
M24	1543204	486935	120.0	4.5	---	---	---	2.0	6574.70	65	6507.7 A	60-120	---
M28	1543175	487326	120.0	4.5	---	---	---	2.0	6578.76	69	6507.8 A	60-120	---
M29	1543440	487326	120.0	4.5	---	---	---	2.0	6572.87	61	6509.9 A	60-120	---
M30	1543462	487639	110.0	4.5	---	---	---	2.0	6574.91	80	6492.9 A	80-110	---
M31	1543745	487620	120.0	4.5	---	---	---	2.0	6575.93	80	6493.9 A	70-120	---
M32	1543176	487737	110.0	4.5	---	---	---	2.0	6573.35	80	6491.4 A	50-110	---
M33	1543040	487323	100.0	4.5	---	---	---	2.0	6577.71	100	6475.7 A	50-110	---
M34	1543608	487743	120.0	4.5	---	---	---	2.0	6574.55	66	6506.6 A	60-120	---
M35	1543889	487750	120.0	4.5	---	---	---	2.0	6574.72	71	6501.7 A	60-120	---
M36	1543993	487631	120.0	4.5	---	---	---	2.0	6575.44	72	6501.4 A	60-120	---
M37	1544120	487835	120.0	4.5	---	---	---	2.0	6575.44	73	6500.4 A	60-120	---
M38	1544319	487923	120.0	4.5	---	---	---	2.0	6579.62	79	6498.6 A	60-120	---
M39	1543900	487893	80.0	4.5	---	---	---	2.0	6574.58	60	6512.6 A	40-80	---
M40	1543775	487934	80.0	4.5	---	---	---	2.0	6574.52	60	6512.5 A	40-80	---
M41	1543398	487883	100.0	4.5	---	---	---	2.0	6573.73	60	6511.7 A	40-100	---
M43	1542858	487759	110.0	4.5	---	---	---	2.0	6572.10	80	6490.1 A	50-110	---
M44	1542722	487812	110.0	4.5	---	---	---	2.0	6571.74	110	6459.7 A	50-110	---
M45	1542593	487927	110.0	4.5	---	---	---	2.0	6572.20	110	6460.2 A	50-110	---
M46	1542504	488033	110.0	4.5	---	---	---	2.0	6572.60	110	6460.6 A	50-110	---
M47	1542409	488130	110.0	4.5	---	---	---	2.0	6571.88	110	6459.9 A	50-110	---
M48	1542317	488226	110.0	4.5	---	---	---	2.0	6572.83	100	6470.8 A	50-110	---
MA	1541290	487767	85.0	4.0	12/5/2017	40.91	6531.31	1.0	6572.22	85	6486.2 A	70-85	45.1
MB	1541296	487512	90.0	4.0	11/13/2017	41.50	6530.56	1.0	6572.06	85	6486.1 A	60-90	44.5
MC	1541304	487264	100.0	4.0	12/5/2017	42.90	6529.16	1.0	6572.06	95	6476.1 A	70-100	53.1

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
MD	1541311	487050	105.0	4.0	---	---	---	1.0	6571.46	105	6465.5 A	75-105	---
ME	1541537	486934	105.0	4.0	---	---	---	1.0	6570.92	105	6464.9 A	75-105	---
MF	1541757	486808	110.0	4.0	12/5/2017	46.04	6526.24	1.0	6572.28	110	6461.3 A	90-110	65.0
MG	1541972	486694	110.0	4.0	---	---	---	1.0	6573.08	110	6462.1 A	90-110	---
MH	1542208	486569	110.0	4.0	12/5/2017	50.51	6523.41	1.0	6573.92	110	6462.9 A	90-110	60.5
MI	1542486	486413	110.0	4.0	---	---	---	1.0	6576.27	110	6465.3 A	90-110	---
MJ	1542682	486350	60.0	4.0	12/5/2017	50.51	6522.43	1.8	6572.94	60	6511.1 A	40-60	11.3
MK	1543373	486324	57.0	4.5	---	---	---	1.5	6573.79	92	6480.3 A	-	---
ML	1543902	486691	76.0	5.0	12/5/2017	51.44	6521.26	2.3	6572.70	80	6490.4 A	56-76	30.9
MM	1544154	486324	63.0	5.0	---	---	---	2.4	6577.45	50	6525.1 A	33-63	---
MN	1544613	486325	63.0	5.0	12/5/2017	59.85	6517.71	1.9	6577.56	42	6533.7 A	23-63	0.0
MQ	1543173	486326	98.0	5.0	9/19/2017	72.20	6502.10	1.6	6574.30	88	6484.7 A	58-98	17.4
MU	1544461	487143	80.0	5.0	12/5/2017	30.05	6544.14	1.5	6574.19	72	6500.7 A	50-80	43.5
MW	1543802	486346	85.0	5.0	12/5/2017	59.98	6514.93	1.9	6574.91	83	6490.0 A	35-85	24.9
MX	1541287	486244	103.0	5.0	11/13/2017	49.27	6519.34	1.7	6568.61	94	6472.9 A	63-103	46.4
MY	1542200	486213	112.0	5.0	11/13/2017	59.15	6514.41	3.0	6573.56	102	6468.6 A	72-112	45.8
MZ	1543485	486757	92.0	5.0	12/5/2017	62.00	6514.64	3.0	6576.64	84	6489.6 A	60-92	25.0
N	1545101	489665	92.0	4.0	---	---	---	0.9	6583.97	80	6503.1 A	54-94	---
NA	1545000	491488	91.4	5.0	---	---	---	1.1	6590.98	80	6509.9 A	50-90	---
NB	1545000	491296	96.4	5.0	---	---	---	3.5	6593.30	80	6509.8 A	50-90	---
NC	1545220	491282	95.0	4.0	12/5/2017	40.69	6545.14	0.8	6585.83	85	6500.0 A	65-95	45.1
ND	1545927	494872	70.0	4.0	12/11/2017	41.22	6551.67	1.1	6592.89	65	6526.8 A	50-70	24.9
NE5	1544279	492332	156.8	5.0	6/30/2017	76.71	6590.29	3.2	6667.00	150	--- T	50-110	---
										150	6513.8 A	135-155	76.5
NW5	1544408	489433	149.8	5.0	---	---	---	2.7	6657.58	155	--- T	39-79	---
										155	6499.9 A	119-159	---
O	1545060	492725	69.9	4.0	---	---	---	1.3	6587.83	77	6509.5 A	40-70	---
P	1546691	491058	109.1	4.0	10/26/2017	39.59	6547.67	1.7	6587.26	107	6478.6 A	82-112	69.1
P1	1547017	491060	105.0	6.0	---	---	---	0.8	6592.47	105	6486.7 A	60-105	---
P2	1546555	490912	105.0	6.0	3/23/2017	41.70	6548.09	0.9	6589.79	105	6483.9 A	60-105	64.2
P3	1546159	490785	95.0	5.0	3/23/2017	41.35	6548.60	2.2	6589.95	85	6502.8 A	55-95	45.9
P4	1546504	491899	92.0	5.0	---	---	---	3.6	6589.52	84	6501.9 A	52-92	---
PM	1541426	490292	81.9	4.0	---	---	---	1.8	6567.42	---	--- A	-	---
PMW-1D	1543104	488249	73.0	2.0	---	---	---	---	6575.81	---	--- A	58-68	---
PMW-3S	1542781	488318							6575.07	---	--- A	58-68	---
PMW-3D	1542780		92.0						6575.05	---	--- A	77-87	---
PMW-2S	1542957	488282	61.0						6575.31	---	--- A	46-56	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
PMW-1S	1543104	488249	58.0	2.0	---	---	---	---	6575.81	---	--- A	43-53	---
PMW-2D	1542957	488282	76.0						6575.35	---	--- A	61-71	---
Q	1548693	492153	98.3	4.0	12/5/2017	42.10	6551.72	2.3	6593.82	100	6491.5 A	72-102	60.2
R	1550372	494514	85.0	4.0	12/4/2017	39.85	6564.18	0.3	6604.03	95	6508.7 A	60-90	55.5
S	1543871	488816	72.2	4.0	12/5/2017	42.67	6538.50	2.0	6581.17	75	6504.2 A	52-72	34.3
S1	1543288	488401	85.0	2.0	7/25/2016	34.46	6540.73	5.3	6575.19	85	6484.9 A	60-85	55.8
S2	1543127	488299	100.0	3.0	12/25/2017	46.72	6527.00	2.0	6573.72	100	6471.7 A	90-100	55.3
S3	1542857	488714	122.6	5.0	12/5/2017	39.03	6535.75	6.2	6574.78	116	6452.6 A	80-120	83.2
S4	1543344	488359	112.4	5.0	12/5/2017	38.26	6537.03	2.3	6575.29	108	6465.0 A	50-110	72.0
S5	1543269	488923	115.0	5.0	12/25/2017	42.78	6531.91	1.0	6574.69	105	6468.7 A	54-106	63.2
S5R	1543150	488938	115.0	5.0	3/23/2017	43.30	6537.19	1.9	6580.49	109	6469.6 A	55-115	67.6
S6	1543515	488874	113.2	5.0	---	---	---	1.3	6580.07	105	6473.8 A	55-105	---
S7	1543763	488874	97.0	5.0	---	---	---	1.0	6579.89	82	6496.9 A	40-84	---
S8	1543968	488879	43.8	5.0	---	---	---	1.0	6580.34	40	6539.3 A	12-42	---
S11	1544793	488150	76.2	5.0	12/5/2017	35.70	6542.69	1.9	6578.39	70	6506.5 A	48-78	36.2
S12	1543297	488628	93.0	5.0	---	---	---	2.1	6578.85	80	6496.7 A	53-93	---
S14	1543120	488152	90.0	4.5	---	---	---	2.0	6575.40	90	6483.4 A	50-90	---
S15	1543320	488160	90.0	4.5	---	---	---	2.0	6575.16	90	6483.2 A	50-90	---
S18	1543216	488312	100.0	4.5	---	---	---	2.0	6574.28	100	6472.3 A	60-100	---
S19	1544172	488682	80.0	4.5	12/5/2017	37.36	6540.61	2.0	6577.97	80	6496.0 A	40-80	44.6
S20	1544463	488461	80.0	4.5	---	---	---	2.0	6578.35	80	6496.4 A	40-80	---
S21	1544896	488670	80.0	4.5	12/5/2017	35.15	6545.13	2.0	6580.28	46	6532.3 A	40-80	12.8
S22	1544169	488375	80.0	4.5	---	---	---	2.0	6576.59	80	6494.6 A	40-80	---
S23	1543920	488284	80.0	4.5	---	---	---	2.0	6576.70	80	6494.7 A	40-80	---
S24	1543735	488232	80.0	4.5	---	---	---	2.0	6575.89	80	6493.9 A	40-80	---
S25	1543524	488146	80.0	4.5	---	---	---	2.0	6575.72	80	6493.7 A	40-80	---
S26	1543224	487996	100.0	4.5	---	---	---	2.0	6572.98	100	6471.0 A	60-100	---
S27	1542993	488044	100.0	4.5	---	---	---	2.0	6573.32	100	6471.3 A	60-100	---
S28	1542769	488403	90.0	4.5	---	---	---	2.0	6572.81	90	6480.8 A	50-90	---
S32	1543815	488445	80.0	4.5	---	---	---	2.0	6575.93	---	--- A	40-80	---
S33	1543951	488570	80.0	4.5	---	---	---	2.0	6576.24	---	--- A	40-80	---
S34	1543064	488657	115.0	4.5	---	---	---	2.0	6575.92	---	--- A	55-115	---
S36	1542755	488559	90.0	4.5	---	---	---	2.0	6575.63	90	6483.6 A	50-90	---
S37	1542609	488516	90.0	4.5	---	---	---	2.0	6572.29	90	6480.3 A	50-90	---
S38	1542443	488727	90.0	4.5	---	---	---	2.0	6572.96	90	6481.0 A	50-90	---
S39	1542596	488744	90.0	4.5	---	---	---	2.0	6574.43	90	6482.4 A	50-90	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
S40	1542934	488778	115.0	4.5	---	---	---	2.0	6575.73	---	--- A	55-115	---
SA	1543122	488811	123.7	5.0	11/13/2017	73.40	6506.91	1.0	6580.31	115	6464.3 A	100-130	42.6
SB	1543371	488811	125.0	5.0	11/9/2017	58.83	6522.26	0.9	6581.09	115	6465.2 A	100-130	57.1
SC	1543617	488815	105.4	5.0	---	---	---	1.2	6578.80	103	6474.6 A	55-105	---
SD	1543490	488564	90.1	5.0	---	---	---	0.6	6578.31	107	6470.7 A	50-110	---
SD4	1543497	488556	95.0	5.0	---	---	---	1.1	6578.77	95	6482.7 A	45-95	---
SDR-4S	1543570	488179	70.0	2.0	---	---	---	---	6574.32	---	--- A	55-70	---
SDR-1S	1543571	488169							6574.22	---	--- A	55-70	---
SDR-2D	1543585	488165	95.0						6574.67	---	--- A	75-95	---
SDR-2S			70.0							---	--- A	55-70	---
SDR-3D	1543583	488176	95.0						6574.24	---	--- A	75-95	---
SDR-3S			70.0						6574.23	---	--- A	55-70	---
SDR-4D	1543570	488179	95.0						6574.39	---	--- A	55-70	---
SE	1543301	488550	111.8	5.0	10/4/2017	65.80	6512.19	0.5	6577.99	88	6489.5 A	50-90	22.7
SE4	1543308	488560	105.3	2.0	---	---	---	---	6578.00	---	--- A	-	---
SE6	1543244	488615	92.0	5.0	11/13/2017	42.57	6536.34	2.3	6578.91	---	--- A	-	---
SIW-D	1543575	488174	95.0	2.0	---	---	---	---	6573.40	---	--- A	75-95	---
SIW-S	1543578	488169	75.0	2.0	---	---	---	---	6573.54	---	--- A	55-75	---
SM	1543748	488566	86.0	5.0	12/25/2017	40.17	6538.57	0.7	6578.74	---	--- A	-	---
SMW-4S	1543570	488179	70.0	2.0	---	---	---	---	6574.33	---	--- A	55-70	---
SMW-1		4881643	85.0						6574.39	---	--- A	65-85	---
SMW-5S	1543538	488159	70.0						6574.31	---	--- A	55-70	---
SMW-6	1543596	488183	85.0						6574.32	---	--- A	65-85	---
SMW-5D	1543539	488159	95.0						6574.29	---	--- A	75-95	---
SMW-3S	1543565	488161	70.0						6574.52	---	--- A	55-70	---
SMW-2	1543564	488184	85.0						6574.23	---	--- A	65-85	---
SMW-3D	1543565	488161	95.0						6574.51	---	--- A	75-95	---
SMW-4D	1543570	488179							6574.33	---	--- A	75-95	---
SN	1543752	488716	67.5	4.0	12/25/2017	41.12	6538.14	1.1	6579.26	---	--- A	-	---
SO	1543652	488381	92.3	5.0	12/25/2017	40.31	6538.48	0.6	6578.79	---	--- A	-	---
SP	1543630	488531	94.4	4.0	12/25/2017	40.70	6537.96	2.0	6578.66	---	--- A	-	---
SQ	1543507	488814	95.0	5.0	---	---	---	0.9	6579.20	95	6483.3 A	55-95	---
SR	1543611	488669	95.0	5.0	---	---	---	0.8	6579.19	95	6483.4 A	50-90	---
SS	1543374	488666	101.0	5.0	7/25/2016	41.65	6536.73	1.2	6578.38	90	6487.2 A	51-101	49.5
ST	1543215	488688	97.0	5.0	3/23/2017	45.15	6534.16	2.2	6579.31	96	6481.1 A	55-97	53.0
* SU	1542946	488953	110.0	5.0	---	---	---	0.7	6578.10	110	6467.4 A	50-110	---
SUR	1542991	488968	115.0	5.0	---	---	---	2.6	6580.72	106	6472.1 A	35-115	---
SV	1543676	488813	78.2	6.0	3/22/2017	40.30	6538.95	1.7	6579.25	100	6477.6 A	55-105	61.4
SW	1543783	488812	81.9	6.0	5/3/2017	42.55	6538.74	2.9	6581.29	75	6503.4 A	35-80	35.4

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
SX	1544510	489025	45.0	5.0	---	---	---	1.0	6581.49	40	6540.5 A	20-40	---
SZ	1544367	488833	62.6	5.0	12/5/2017	39.01	6542.46	2.2	6581.47	60	6519.3 A	40-70	23.2
T	1542536	492260	70.2	4.0	9/26/2017	61.90	6517.33	2.4	6579.23	68	6508.8 A	61-71	8.5
T1	1543285	490027	---	5.0	---	---	---	1.0	6663.91	161	6501.9 A	121-171	---
T2	1543538	489303	186.0	5.0	12/12/2017	120.10	6544.72	1.6	6664.82	180	6483.2 A	100-186	61.5
T4	1543340	489699	205.0	5.0	---	---	---	2.9	6657.74	175	6479.8 A	145-205	---
T5	1543307	490289	182.0	5.0	---	---	---	3.1	6657.33	151	6503.2 A	122-182	---
T6	1543282	490655	160.0	5.0	---	---	---	2.9	6658.77	156	6499.9 A	130-160	---
T7	1543272	491484	160.0	5.0	---	---	---	2.0	6659.67	142	6515.7 A	130-160	---
T8	1543296	491914	162.0	5.0	---	---	---	2.6	6661.61	158	6501.0 A	132-162	---
T9	1543347	492337	141.0	5.0	---	---	---	3.3	6663.95	138	6522.7 A	121-141	---
T10	1543434	492791	148.0	5.0	8/3/2017	91.20	6568.76	2.3	6659.96	142	6515.7 A	108-148	53.1
T11	1544585	489887	193.0	5.0	3/29/2017	114.42	6542.39	2.7	6656.81	160	6494.1 A	113-193	48.3
T12	1544583	490317	200.0	5.0	---	---	---	2.5	6657.23	170	6484.7 A	120-200	---
T13	1544534	490619	160.0	5.0	---	---	---	---	6657.37	160	--- A	120-160	---
T14	1544565	491071	155.0	5.0	---	---	---	---	6660.13	155	--- A	125-155	---
T15	1544480	491953	150.0	5.0	---	---	---	---	6665.29	150	--- A	120-150	---
T16	1544276	492718	140.0	5.0	---	---	---	660.0	6659.98	132	-132.0 A	120-140	---
T17	1544008	489430	183.0	5.0	---	---	---	2.6	6656.91	170	6484.3 A	143-183	---
T18	1543977	490333	195.0	5.0	---	---	---	2.9	6665.16	162	6500.3 A	115-195	---
T19	1543958	490722	167.0	5.0	11/9/2017	125.71	6542.05	2.5	6667.76	162	6503.3 A	137-167	38.8
T20	1543935	491048	170.0	5.0	12/11/2017	149.10	6521.59	1.5	6670.69	162	6507.2 A	140-170	14.4
T21	1543951	491882	170.0	5.0	12/1/2017	128.34	6541.66	1.3	6670.00	163	6505.7 A	140-170	36.0
T22	1543876	492311	165.0	5.0	12/12/2017	119.70	6547.49	2.1	6667.19	160	6505.1 A	120-165	42.4
T23	1543901	492805	140.0	5.0	---	---	---	---	6661.11	140	--- A	120-140	---
T24	1543387	489494	200.0	4.5	---	---	---	2.0	6657.03	---	--- A	140-200	---
T25	1543352	489996	200.0	4.5	3/31/2017	120.36	6536.98	2.0	6657.34	---	--- A	140-200	---
T26	1543567	489550	200.0	4.5	---	---	---	2.0	6656.66	---	--- A	140-200	---
T27	1543474	489837	200.0	4.5	---	---	---	2.0	6657.14	---	--- A	140-200	---
T28	1543484	490145	200.0	4.5	---	---	---	2.0	6658.71	---	--- A	140-200	---
T29	1543774	489375	200.0	4.5	---	---	---	2.0	6656.71	---	--- A	140-200	---
T30	1543663	489972	200.0	4.5	---	---	---	2.0	6659.62	---	--- A	140-200	---
T31	1543789	489881	200.0	4.5	---	---	---	2.0	6659.03	---	--- A	140-200	---
T32	1543801	490134	200.0	4.5	---	---	---	2.0	6661.61	---	--- A	140-200	---
T33	1543872	489545	200.0	4.5	---	---	---	2.0	6655.79	---	--- A	140-200	---
T34	1543888	489806	200.0	4.5	---	---	---	2.0	6660.39	---	--- A	140-200	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
T35	1543992	489689	200.0	4.5	---	---	---	2.0	6659.33	---	---	A 140-200	---
T36	1543735	489688	170.0	5.0	---	---	---	2.0	6655.44	170	6483.4	A 130-170	---
T37	1544089	489545	200.0	4.5	3/30/2017	116.13	6540.39	2.0	6656.52	---	---	A 140-200	---
T38	1544089	489832	200.0	4.5	---	---	---	2.0	6658.46	---	---	A 140-200	---
T39	1544498	491669	150.0	5.0	---	---	---	---	6665.31	150	---	A 120-150	---
T40	1543819	491466	170.0	5.0	12/12/2017	128.60	6541.67	2.3	6670.27	165	6503.0	A 140-170	38.7
T41	1543278	491079	160.0	5.0	12/12/2017	92.56	6567.40	3.2	6659.96	155	6501.8	A 130-160	65.6
T42	1544077	490112	200.0	4.5	---	---	---	2.0	6660.01	---	---	A 140-200	---
T43	1544209	489385	180.0	4.5	---	---	---	2.0	6657.52	---	---	A 120-180	---
T44	1544204	489707	---	4.5	---	---	---	2.0	6657.31	---	---	A -	---
T45	1544183	489914	200.0	4.5	---	---	---	2.0	6658.06	---	---	A 140-200	---
T46	1544210	490262	200.0	4.5	---	---	---	2.0	6660.65	---	---	A 140-200	---
T47	1544317	489544	180.0	4.5	---	---	---	2.0	6657.21	---	---	A 120-180	---
T48	1544291	489795	180.0	4.5	---	---	---	2.0	6657.56	---	---	A 120-180	---
T49	1544304	490100	200.0	4.5	---	---	---	2.0	6658.39	---	---	A 140-200	---
T50	1544416	489707	200.0	4.5	3/30/2017	114.88	6541.62	2.0	6656.50	---	---	A 140-200	---
T51	1544397	489914	200.0	4.5	3/29/2017	115.29	6542.05	2.0	6657.34	---	---	A 140-200	---
T52	1544456	490208	200.0	4.5	---	---	---	2.0	6658.00	---	---	A 140-200	---
T53	1544504	489559	175.0	4.5	---	---	---	2.0	6656.98	---	---	A 115-175	---
T54	1544523	489796	200.0	4.5	---	---	---	2.0	6657.10	---	---	A 140-200	---
T55	1544592	490063	195.0	4.5	---	---	---	2.0	6657.66	---	---	A 135-195	---
T56	1543447	490489	180.0	4.5	---	---	---	2.0	6661.39	180	6479.4	A 140-180	---
T57	1543470	490805	160.0	4.5	---	---	---	2.0	6666.15	160	6504.2	A 120-160	---
T58	1543494	491008	160.0	4.5	---	---	---	2.0	6666.59	160	6504.6	A 120-160	---
T59	1543426	491247	160.0	4.5	---	---	---	2.0	6668.00	160	6506.0	A 120-160	---
T60	1543666	490362	200.0	4.5	---	---	---	2.0	6661.86	---	---	A 140-200	---
T61	1543600	490687	160.0	4.5	---	---	---	2.0	6668.85	---	---	A 100-160	---
T62	1543688	491006	180.0	4.5	---	---	---	2.0	6668.34	180	6486.3	A 140-180	---
T63	1543628	491243	180.0	4.5	---	---	---	2.0	6669.54	180	6487.5	A 140-180	---
T64	1543797	490434	180.0	4.5	---	---	---	2.0	6665.29	180	6483.3	A 140-180	---
T65	1543743	490532	180.0	4.5	---	---	---	2.0	6664.86	180	6482.9	A 140-180	---
T66	1543821	490837	180.0	4.5	---	---	---	2.0	6669.08	180	6487.1	A 140-180	---
T67	1543791	491245	180.0	4.5	---	---	---	2.0	6670.75	180	6488.8	A 140-180	---
T68	1544082	490569	180.0	4.5	---	---	---	2.0	6666.45	180	6484.5	A 140-180	---
T69	1544069	490856	180.0	4.5	---	---	---	2.0	6668.52	180	6486.5	A 140-180	---
T70	1544036	491217	160.0	4.5	---	---	---	2.0	6670.67	160	6508.7	A 120-160	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
T71	1544200	490712	160.0	4.5	---	---	---	2.0	6667.54	160	6505.5 A	120-160	---
T72	1544137	491055	160.0	4.5	---	---	---	2.0	6670.03	160	6508.0 A	120-160	---
T73	1544137	491383	160.0	4.5	---	---	---	2.0	6669.85	160	6507.9 A	120-160	---
T74	1544306	490480	160.0	4.5	---	---	---	2.0	6662.57	160	6500.6 A	120-160	---
T75	1544255	490911	160.0	4.5	---	---	---	2.0	6669.55	160	6507.6 A	120-160	---
T76	1544257	491240	160.0	4.5	---	---	---	2.0	6669.33	160	6507.3 A	120-160	---
T77	1544383	490801	160.0	4.5	---	---	---	2.0	6664.51	160	6502.5 A	120-160	---
T78	1544369	491087	160.0	4.5	---	---	---	2.0	6667.13	160	6505.1 A	120-160	---
T79	1544335	491374	160.0	4.5	---	---	---	2.0	6668.27	160	6506.3 A	120-160	---
T80	1544482	490953	160.0	4.5	---	---	---	2.0	6663.14	160	6501.1 A	120-160	---
T81	1544470	491197	160.0	4.5	---	---	---	2.0	6664.98	160	6503.0 A	120-160	---
T82	1544563	490497	160.0	4.5	---	---	---	2.0	6657.66	160	6495.7 A	120-160	---
T83	1544575	490845	160.0	4.5	---	---	---	2.0	6660.72	160	6498.7 A	120-160	---
T84	1544531	491374	160.0	4.5	---	---	---	2.0	6662.09	160	6500.1 A	120-160	---
T85	1543427	491712	160.0	4.5	---	---	---	2.0	6667.09	160	6505.1 A	120-160	---
T86	1543472	492111	160.0	4.5	---	---	---	2.0	6668.52	160	6506.5 A	120-160	---
T87	1543565	491471	160.0	4.5	---	---	---	2.0	6668.18	160	6506.2 A	120-160	---
T88	1543629	491628	160.0	4.5	---	---	---	2.0	6670.12	160	6508.1 A	120-160	---
T89	1543622	491892	160.0	4.5	---	---	---	2.0	6669.63	160	6507.6 A	120-160	---
T90	1543637	492287	160.0	4.5	---	---	---	2.0	6669.67	160	6507.7 A	120-160	---
T91	1543661	492486	160.0	4.5	---	---	---	2.0	6666.41	160	6504.4 A	120-160	---
T92	1543702	491364	160.0	4.5	---	---	---	2.0	6670.13	160	6508.1 A	120-160	---
T93	1543811	491695	160.0	4.5	---	---	---	2.0	6671.90	160	6509.9 A	120-160	---
T94	1543752	492100	160.0	4.5	---	---	---	2.0	6670.22	160	6508.2 A	120-160	---
T95	1543913	492578	160.0	4.5	---	---	---	2.0	6664.51	160	6502.5 A	120-160	---
T96	1544023	491551	160.0	4.5	---	---	---	2.0	6670.17	160	6508.2 A	120-160	---
T97	1544004	491715	160.0	4.5	---	---	---	2.0	6671.69	160	6509.7 A	120-160	---
T98	1544036	492123	160.0	4.5	---	---	---	2.0	6671.69	160	6509.7 A	120-160	---
T99	1544203	491534	160.0	4.5	---	---	---	2.0	6669.25	160	6507.3 A	120-160	---
T100	1544153	491758	160.0	4.5	---	---	---	2.0	6669.13	160	6507.1 A	120-160	---
T101	1544222	491911	160.0	4.5	---	---	---	2.0	6668.43	160	6506.4 A	120-160	---
T102	1544203	492143	160.0	4.5	---	---	---	2.0	6669.85	160	6507.9 A	120-160	---
T103	1544056	492413	160.0	4.5	---	---	---	2.0	6666.69	160	6504.7 A	120-160	---
T104	1544412	491511	160.0	4.5	---	---	---	2.0	6666.09	160	6504.1 A	120-160	---
T105	1544289	491678	160.0	4.5	---	---	---	2.0	6668.99	160	6507.0 A	120-160	---
T106	1544369	491838	160.0	4.5	---	---	---	2.0	6667.00	160	6505.0 A	120-160	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
T107	1544209	492576	160.0	4.5	---	---	---	2.0	6662.80	160	6500.8 A	120-160	---
T108	1544441	492235	160.0	4.5	---	---	---	2.0	6664.75	160	6502.8 A	120-160	---
T109	1544366	492536	160.0	4.5	---	---	---	2.0	6662.90	160	6500.9 A	120-160	---
T110	1544209	492576	160.0	4.5	---	---	---	2.0	6660.29	160	6498.3 A	120-160	---
T111	1543706	492939	160.0	4.5	---	---	---	2.0	6660.29	160	6498.3 A	120-160	---
TA	1542471	492426	62.4	5.0	9/26/2017	41.70	6538.60	2.4	6580.30	55	6522.9 A	35-65	15.7
TB	1542351	492616	64.4	5.0	9/26/2017	39.20	6544.37	1.9	6583.57	55	6526.7 A	35-65	17.7
TDR-4D	1543060	488259	75.5	2.0	---	---	---	---	6575.12	---	--- A	60.5-70.	---
TDR-1S	1543397	488249	59.0						6576.86	---	--- A	44-54	---
TDR-5S	1542852	488302							6574.71	---	--- A	44-54	---
TDR-5D		488303	87.0							---	--- A	62-82	---
TDR-4S	1543060	488258	60.5						6575.12	---	--- A	45.5-55.	---
TDR-3S	1543130	488284	59.0						6576.15	---	--- A	44-54	---
TDR-3D			74.0						6576.16	---	--- A	59-69	---
TDR-2D	1543240	488239	85.0						6576.28	---	--- A	70-80	---
TDR-1D	1543397	488249	83.0						6576.86	---	--- A	68-78	---
TDR-2S	1543240	488240	67.0						6576.07	---	--- A	52-62	---
W	1542302	487297	99.3	4.0	12/5/2017	42.61	6529.53	0.3	6572.14	117	6454.8 A	58-118	74.7
W2	1542251	486654	79.1	4.0	---	---	---	0.9	6571.50	---	--- A	-	---
WN4	1543958	489961	142.4	5.0	---	---	---	3.0	6662.78	165	--- T	40-100	---
										165	6494.8 A	50-190	---
WR1	1541280	488529	---	5.0	---	---	---	0.8	6568.40	---	--- A	-	---
WR1R	1541302	488536	85.0	5.0	---	---	---	0.0	6568.47	85	6483.5 A	-	---
WR2	1541290	488678	94.1	5.0	---	---	---	0.9	6568.59	85	6482.7 A	65-95	---
WR3	1541490	488671	82.3	5.0	---	---	---	2.7	6569.54	83	6483.8 A	63-93	---
WR4	1541788	488678	62.0	5.0	---	---	---	0.0	6572.81	---	--- A	-	---
WR5	1541813	488683	72.4	5.0	---	---	---	0.6	6571.23	80	6490.6 A	60-80	---
WR6	1541902	488566	96.8	5.0	---	---	---	1.3	6573.03	84	6487.7 A	55-85	---
WR7	1541997	488456	97.3	5.0	---	---	---	2.0	6573.73	84	6487.8 A	55-85	---
WR8	1542095	488328	110.2	5.0	---	---	---	0.4	6572.60	100	6472.2 A	50-100	---
WR9	1542185	488217	111.3	5.0	---	---	---	0.8	6573.05	100	6472.3 A	50-100	---
WR10	1542389	487961	120.6	5.0	---	---	---	0.7	6573.19	110	6462.5 A	60-110	---
WR11	1542586	487728	120.5	5.0	---	---	---	0.3	6574.49	110	6464.2 A	60-110	---
WR12	1541280	488277	96.7	4.0	---	---	---	1.1	6568.19	85	6482.1 A	55-85	---
WR13	1541068	488861	70.0	5.0	---	---	---	3.2	6569.17	60	6506.0 A	50-60	---
WR14	1540638	488863	70.0	5.0	---	---	---	2.3	6566.91	61	6503.6 A	50-60	---
WR15	1541280	488016	70.0	4.0	---	---	---	0.0	6571.19	75	6496.2 A	60-75	---
WR16	1543051	487495	122.3	5.0	---	---	---	1.9	6572.78	100	6470.9 A	40-120	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
WR17	1543328	487485	124.4	5.0	---	---	---	2.2	6573.09	75	6495.9 A	40-120	---
WR18	1543597	487465	73.6	5.0	---	---	---	2.2	6572.91	70	6500.7 A	20-70	---
WR19	1543873	487458	87.8	5.0	---	---	---	2.2	6574.93	74	6498.7 A	25-85	---
WR20	1544059	487449	102.3	5.0	---	---	---	2.1	6574.47	80	6492.4 A	42-102	---
WR21	1544241	487449	88.9	5.0	---	---	---	2.1	6576.05	77	6497.0 A	28-88	---
WR22	1544434	487462	91.5	5.0	---	---	---	2.4	6577.89	86	6489.5 A	30-90	---
WR23	1544632	487445	94.3	5.0	---	---	---	2.2	6576.47	77	6497.3 A	32-92	---
WR24	1544938	487438	89.2	5.0	---	---	---	3.0	6588.67	82	6503.7 A	50-90	---
X	1540512	491892	50.7	4.0	12/26/2017	28.46	6543.15	1.7	6571.61	---	--- A	-	---
X1	1540671	492129	54.0	5.0	---	---	---	3.9	6573.54	47	6522.6 A	37-47	---
X2	1540836	492363	53.0	6.0	---	---	---	1.9	6571.93	45	6525.0 A	40-45	---
X3	1540992	492599	52.0	5.0	---	---	---	2.0	6573.28	42	6529.3 A	32-42	---
X4	1541210	492814	54.0	5.0	---	---	---	3.2	6576.94	45	6528.7 A	37-45	---
X5	1541408	492821	44.0	6.0	---	---	---	3.6	6577.61	35	6539.0 A	24-36	---
X6	1541609	492828	46.0	6.0	---	---	---	3.5	6578.72	35	6540.2 A	22-37	---
X7	1541808	492851	56.0	6.0	---	---	---	3.4	6580.43	45	6532.0 A	32-46	---
X8	1542007	492852	61.0	5.0	---	---	---	3.4	6581.76	51	6527.4 A	32-52	---
X9	1542194	492852	61.0	5.0	---	---	---	3.6	6582.92	51	6528.3 A	24-52	---
X10	1542352	492835	61.0	5.0	---	---	---	3.6	6582.43	53	6525.8 A	30-55	---
X11	1542553	492782	57.0	5.0	---	---	---	3.0	6582.00	53	6526.0 A	17-57	---
X12	1542861	492852	57.0	5.0	---	---	---	3.0	6583.33	53	6527.3 A	17-57	---
X13	1543640	493665	56.0	5.0	---	---	---	2.5	6586.94	51	6533.4 A	16-56	---
X14	1544002	493777	56.0	5.0	---	---	---	2.1	6586.20	49	6535.1 A	16-56	---
X15	1544222	493800	57.0	5.0	---	---	---	2.3	6582.91	51	6529.6 A	17-57	---
X16	1544473	493795	47.0	5.0	---	---	---	2.3	6584.79	47	6535.5 A	22-47	---
X17	1544356	493793	55.0	5.0	---	---	---	3.3	6585.84	48	6534.6 A	35-55	---
X18	1544593	493569	57.0	5.0	9/19/2017	36.70	6549.38	2.9	6586.08	49	6534.2 A	37-57	15.1
X19	1544753	493437	63.0	5.0	---	---	---	4.2	6585.20	56	6525.1 A	33-63	---
X20	1544855	493256	71.0	5.0	---	---	---	5.0	6585.73	64	6516.8 A	31-71	---
X21	1543606	493894	55.0	5.0	---	---	---	2.7	6586.33	51	6532.6 A	35-55	---
X22	1543874	493946	56.0	5.0	---	---	---	2.6	6585.70	50	6533.1 A	36-56	---
X23	1544064	494012	56.0	5.0	---	---	---	2.8	6585.94	47	6536.1 A	36-56	---
X24	1544244	494011	56.0	5.0	---	---	---	2.6	6585.72	46	6537.1 A	36-56	---
X25	1544445	494042	53.0	5.0	---	---	---	2.8	6585.63	46	6536.9 A	33-53	---
X26	1544693	493702	53.0	5.0	---	---	---	2.8	6587.64	43	6541.8 A	33-53	---
X27	1544953	493374	71.0	5.0	---	---	---	6.0	6585.30	64	6515.4 A	31-71	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
X28	1540545	491971	56.0	5.0	---	---	---	2.0	6569.96	48	6520.0 A	16-56	---
X29	1540735	492256	51.0	5.0	---	---	---	2.0	6570.03	43	6525.0 A	11-51	---
X30	1540897	492493	51.0	5.0	---	---	---	2.0	6572.53	43	6527.5 A	11-51	---
X31	1541052	492731	51.0	5.0	---	---	---	2.0	6574.13	44	6528.1 A	11-51	---
XDR-1	1544450	493758	45.0	2.0	---	---	---	---	6585.28	---	--- A	35-45	---
XDR-4	1544447	493767							6585.41	---	--- A	35-45	---
XDR-2	1544459	493758							6585.44	---	--- A	35-45	---
XDR-3	1544456	493767							6585.37	---	--- A	35-45	---
XIW	1544453	493762	45.0	4.0	---	---	---	---	6583.09	---	--- A	35-45	---
XMW-1	1544452	493746	45.0	2.0	---	---	---	---	6585.26	---	--- A	35-45	---
XMW-2	1544451	493731							6585.57	---	--- A	35-45	---
XMW-3	1544442	493746							6585.21	---	--- A	35-45	---
XMW-4	1544438	493764							6585.39	---	--- A	35-45	---
XMW-5	1544468	493746							6585.31	---	--- A	35-45	---
XMW-6	1544465	4493778		3.0					6585.57	---	--- A	35-45	---
Y	1541025	491256	60.8	4.0	---	---	---	2.4	6572.88	57	6513.5 A	54-59	---
Z	1540290	490701	73.9	4.0	---	---	---	0.6	6569.22	68	6500.6 A	60-70	---
										68	6500.6 A	60-70	---

Note: A = Alluvial Aquifer
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
						Broadview							
0410	1537459	489882	105.0	6.0	---	---	---	0.0	6559.66	75	6484.7 A	90-105	---
0411	1537400	489510	70.0	6.0	---	---	---	0.0	6560.00	70	6490.0 A	65-70	---
0412	1537940	488830	---	6.0	---	---	---	0.0	6561.00	---	--- A	-	---
0413	1537900	490100	---	---	---	---	---	0.0	6566.00	---	--- A	-	---
0421	1538450	491100	88.0	5.0	---	---	---	0.9	6572.00	92	6479.1 A	72-102	---
0422	1538440	490810	80.0	4.0	---	---	---	0.0	6570.00	75	6495.0 A	60-80	---
0423	1538223	490926	---	---	---	---	---	0.0	6570.00	---	--- A	-	---
0425	1538430	490630	90.0	6.0	---	---	---	0.0	6567.00	71	6496.0 A	50-90	---
0426	1538230	490620	100.0	---	---	---	---	0.0	6565.00	80	6485.0 A	80-100	---
0427	1538450	490410	121.0	6.0	---	---	---	0.0	6570.00	81	6489.0 A	62-120	---
0428	1538367	490435	110.0	4.0	---	---	---	0.0	6570.00	66	6504.0 A	83-104	---
0429	1538210	490430	100.0	6.0	---	---	---	0.0	6570.00	74	6496.0 A	58-75	---
0430	1538469	490300	145.0	---	---	---	---	0.0	6568.00	72	6496.0 A	-	---
										72	6433.0 U	-	---
0431	1538045	490090	130.0	6.0	---	---	---	0.0	6568.00	60	6508.0 A	125-130	---
										60	6450.0 U	125-130	---
0432	1538210	489840	---	---	---	---	---	0.0	6565.00	---	--- A	-	---
0433	1538220	489620	90.0	4.0	---	---	---	1.5	6564.00	75	6487.5 A	58-84	---
0435	1538220	489300	85.0	6.0	---	---	---	1.3	6561.00	85	6474.7 A	-	---
0438	1537854	490840	120.0	4.0	---	---	---	0.0	6571.00	105	6466.0 A	70-100	---
0439	1537940	490490	97.0	4.0	---	---	---	0.0	6567.00	75	6492.0 A	77-97	---
0440	1537700	490230	---	---	---	---	---	0.0	6566.00	---	--- A	-	---
0441	1537720	490090	116.0	6.0	---	---	---	0.0	6566.00	78	6488.0 A	106-116	---
0442	1537940	489840	100.0	4.0	---	---	---	0.0	6565.00	80	6485.0 A	70-100	---
0443	1537940	489280	---	4.0	---	---	---	0.0	6561.00	75	6486.0 A	60-80	---
0444	1537940	489180	80.0	4.0	---	---	---	0.0	6561.00	---	--- A	-	---
0445	1537720	489300	108.0	6.0	---	---	---	0.0	6561.00	79	6482.0 A	75-105	---
0446	1537830	488960	110.0	6.0	---	---	---	0.0	6560.00	60	6500.0 U	60-95	---
										60	6500.0 A	60-95	---
0447	1537490	490480	142.0	6.0	---	---	---	0.0	6568.00	80	6488.0 A	120-142	---
										80	6430.0 U	120-142	---
0448	1537400	489100	---	---	---	---	---	0.0	6561.00	---	--- A	-	---
0450	1537448	490763	---	6.0	---	---	---	0.0	6571.00	85	6486.0 A	70-105	---
* 0451	1537700	490600	---	---	---	---	---	0.0	0.00	---	--- A	-	---
0452	1537880	490420	100.0	4.0	---	---	---	0.8	6567.00	85	6481.2 A	40-100	---

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0453	1538375	490300	110.0	4.0	---	---	---	0.9	6568.00	80	6487.1 A	60-110	---
* 0454	1537920	489025	---	4.0	---	---	---	0.0	0.00	---	--- A	-	---
0455	1537804	490737	0.0	---	---	---	---	---	---	---	--- A	-	---
0456	1538240	490060	300.0	5.0	---	---	---	---	6559.00	---	--- A	-	---
SUB1	1537620	489100	---	4.0	---	---	---	0.0	6561.00	---	--- A	-	---
SUB2	1537392	490370	---	4.0	---	---	---	0.0	6567.57	---	--- A	-	---
SUB3	1538280	489420	84.0	6.0	10/26/2017	35.33	6521.74	0.0	6557.07	72	6485.1 A	56-72	36.7
SUB4	1538440	489840	100.0	4.0	---	---	---	0.0	6565.00	78	6487.0 A	60-85	---
SUB5	1537940	489470	86.0	4.0	---	---	---	0.0	6562.31	66	6496.3 A	55-80	---
SUB6	1537940	490090	82.0	4.0	---	---	---	0.0	6566.00	80	6486.0 A	52-82	---
SUB7	1537940	490630	98.0	4.0	---	---	---	0.0	6568.00	85	6483.0 A	78-98	---
SUB8	1538450	490210	150.0	5.0	---	---	---	0.0	6568.00	72	6496.0 A	60-90	---
SUB9	---	---	---	---	---	---	---	0.0	0.00	---	--- A	-	---
Felice Acres													
0481	1536820	490210	320.0	4.0	---	---	---	2.0	6568.00	110	6456.0 A	270-310	---
										110	6296.0 M	270-310	---
0482	1536981	489579	260.0	5.0	---	---	---	0.0	6562.66	80	6482.7 A	220-260	---
										80	6352.7 M	220-260	---
0483	1536586	489753	280.0	5.0	8/24/2017	35.90	6526.76	0.0	6562.66	40	6522.7 A	-	4.1
										40	6497.7 U	-	29.1
										40	6326.7 M	270-300	200.1
0490	1536553	489752	63.0	4.0	12/5/2017	29.10	6533.32	0.0	6562.42	75	6487.4 A	20-80	45.9
0491	1537031	489658	63.0	4.0	---	---	---	0.0	6562.62	40	6522.6 A	30-63	---
0492	1537220	489280	60.0	4.0	---	---	---	1.2	6560.68	55	6504.5 A	40-60	---
0495	1537400	497100	---	---	---	---	---	0.0	6571.00	---	--- A	-	---
0496	1534650	489603	93.0	5.0	---	---	---	1.6	6562.52	86	6474.9 A	53-93	---
0497	1535039	489503	94.0	5.0	12/5/2017	47.64	6514.98	2.0	6562.62	89	6471.6 A	64-94	43.4
0498	1534661	488953	150.0	6.0	8/24/2017	50.80	6509.79	2.0	6560.59	80	6478.6 A	70-110	31.2
										80	6478.6 M	130-150	31.2
CW44	1535048	488891	208.0	6.0	12/1/2016	64.93	6495.81	2.5	6560.74	94	6464.2 A	-	31.6
										94	6428.2 M	69-208	67.6
Q1	1535125	488830	106.0	4.5	---	---	---	2.0	6561.61	106	6453.6 A	70-110	---
Q2	1534903	488867	97.0	4.5	12/20/2017	83.04	6478.64	2.0	6561.68	97	6462.7 A	60-100	16.0
Q3	1534743	488865	108.0	4.5	3/17/2017	69.48	6490.26	2.0	6559.74	108	6449.7 A	60-100	40.5
Q5	1534829	488945	100.0	4.5	12/20/2017	72.08	6489.40	2.8	6561.48	---	--- A	60-100	---
Q7	1534981	489034	100.0	4.5	---	---	---	1.3	6561.17	100	6459.9 A	60-100	---
Q8	1534762	489059	100.0	4.5	12/5/2017	53.56	6507.24	2.0	6560.80	100	6458.8 A	60-100	48.4

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
Q9	1534643	489101	100.0	4.5	8/21/2017	50.90	6510.43	2.0	6561.33	100	6459.3 A	60-100	51.1
Q11	1534859	489134	100.0	4.5	7/8/2016	46.51	6514.51	2.1	6561.02	100	6458.9 A	60-100	55.6
Q12	1535058	489102	102.0	4.5	9/15/2016	42.94	6518.18	2.0	6561.12	---	--- A	60-100	---
Q13	1535173	489208	100.0	4.5	---	---	---	2.0	6562.14	100	6460.1 A	60-100	---
Q14	1534969	489213	100.0	4.5	---	---	---	1.7	6561.97	100	6460.3 A	60-100	---
Q15	1534779	489239	100.0	4.5	---	---	---	2.1	6562.25	100	6460.2 A	60-100	---
Q16	1534639	489347	102.0	4.5	---	---	---	2.0	6563.28	97	6464.3 A	60-100	---
Q18	1534869	489342	100.0	4.5	7/8/2016	46.25	6515.44	1.3	6561.69	100	6460.4 A	60-100	55.1
Q19	1535053	489306	100.0	4.5	8/4/2016	47.04	6515.13	1.9	6562.17	100	6460.3 A	60-100	54.9
Q20	1535132	489400	100.0	4.5	---	---	---	2.2	6562.81	100	6460.6 A	60-100	---
Q21	1534970	489422	100.0	4.5	---	---	---	2.3	6563.09	100	6460.8 A	60-100	---
Q22	1534806	489433	100.0	4.5	---	---	---	2.9	6562.79	100	6459.9 A	60-100	---
Q23	1534851	489534	100.0	4.5	12/5/2017	51.90	6512.36	2.0	6564.26	---	--- A	60-100	---
Q24	1535141	489581	100.0	4.5	---	---	---	2.0	6564.05	100	6462.1 A	60-100	---
Q25	1534978	489629	100.0	4.5	---	---	---	2.5	6564.51	100	6462.0 A	60-100	---
Q26	1534769	489630	100.0	4.5	---	---	---	---	6564.83	100	--- A	60-100	---
Q27	1534861	489727	100.0	4.5	7/16/2016	48.70	6516.18	2.4	6564.88	100	6462.5 A	60-100	53.7
Q28	1535076	489696	100.0	4.5	---	---	---	2.2	6563.94	100	6461.7 A	60-100	---
Q29	1535140	489920	89.0	4.5	12/12/2016	50.30	6516.16	2.0	6566.46	89	6475.5 A	60-100	40.7
Q30	1534970	489778	100.0	4.5	7/16/2016	48.67	6517.46	2.0	6566.13	---	--- A	60-100	---
Q42	1536662	489606	80.0	4.5	---	---	---	1.6	6564.48	61	6501.9 U	40-80	---
										61	6501.9 A	40-80	---
Q43	1536550	489507	80.0	4.5	---	---	---	1.8	6563.19	80	6481.4 A	40-80	---
Q44	1535671	488864	110.0	4.5	12/5/2017	51.97	6509.36	2.0	6561.33	---	--- A	70-110	---
Q45	1535346	489172	110.0	4.5	---	---	---	2.0	6562.35	---	--- A	70-110	---
Q46	1535526	489315	110.0	4.5	---	---	---	2.0	6561.70	---	--- A	70-110	---
Q47	1535356	489516	110.0	4.5	---	---	---	2.0	6561.16	---	--- A	70-110	---
Q48	1535653	490120	105.0	4.5	12/5/2017	48.98	6518.86	2.0	6567.84	73	6492.8 A	65-105	26.0
										73	6492.8 U	65-105	26.0
Q49	1535232	489780	100.0	4.5	---	---	---	1.7	6564.71	---	--- A	60-100	---
Q50	1536680	490288	85.0	4.5	---	---	---	2.0	6568.93	43	6523.9 A	45-85	---
										43	6505.9 U	45-85	---

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS

Note: A = Alluvial Aquifer
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

TABLE 4.1-3. WELL DATA FOR THE ALLUVIAL AQUIFER MURRAY ACRES AND PLEASANT VALLEY

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
						Murray							
* 0801	1541020	488600	100.0	4.0	---	---	---	0.0	6567.73	85	6482.7 A	80-100	---
0801R	1541096	488431	90.0	5.0	---	---	---	3.0	6569.05	82	6484.1 A	60-90	---
0802	1540765	488277	98.0	6.0	9/8/2016	88.27	6474.45	2.0	6562.72	81	6479.7 A	75-81	0.0
0803	1540800	487430	---	6.0	---	---	---	0.0	6561.00	85	--- C	85-180	---
										85	6476.0 A	85-180	---
0804	1540790	486790	137.0	6.0	---	---	---	0.0	6562.00	85	6477.0 A	125-136	---
0805	1540818	486241	140.0	5.0	---	---	---	0.0	6567.00	110	6457.0 A	100-140	---
0810	1540244	486563	105.0	6.0	---	---	---	0.0	6562.00	81	6481.0 A	75-101	---
0811	1540320	486373	140.0	4.0	---	---	---	0.0	6563.00	110	6453.0 A	100-140	---
0815	1539090	488100	---	4.0	---	---	---	0.0	6555.26	---	--- A	-	---
0844	1538376	487002	75.0	4.0	12/5/2017	36.40	6519.73	1.2	6556.13	70	6484.9 A	35-75	34.8
0845	1537280	487833	65.0	4.0	12/5/2017	34.25	6522.80	1.7	6557.05	55	6500.4 A	45-65	22.5
802A	1540691	488417	90.0	4.5	---	---	---	2.0	6568.72	82	6484.7 A	50-90	---
802B	1540833	488415	90.0	4.5	---	---	---	2.0	6568.14	58	6508.1 U	-	---
										58	6508.1 A	50-90	---
AW	1540235	488015	156.0	6.0	12/5/2017	35.95	6527.48	0.1	6563.43	63	6500.3 A	-	27.1
										63	6463.3 U	66-155	64.1
HW	1540920	487435	115.0	6.0	---	---	---	0.0	6557.00	95	6462.0 A	60-94	---
						Pleasant Valley							
0525	1541283	486020	---	4.5	9/25/2017	51.80	6518.20	---	6570.00	---	--- A	-	---
0688	1541257	483955	105.0	5.0	12/5/2017	59.25	6503.37	2.9	6562.62	95	6464.7 A	65-105	38.7
0831	1540090	486030	---	---	---	---	---	0.0	6561.00	---	--- A	-	---
0833	1539335	485445	110.0	6.0	---	---	---	0.0	6558.00	103	6455.0 A	60-90	---
0834	1540259	484847	100.0	4.0	---	---	---	0.0	6560.00	80	6480.0 A	60-80	---
0835	1539610	484795	98.0	5.0	---	---	---	0.0	6559.00	94	6465.0 A	73-94	---
0836	1540250	484010	90.0	4.0	---	---	---	0.0	6558.00	80	6478.0 A	65-80	---
0838	1540600	485640	100.0	---	---	---	---	0.0	6563.00	---	--- A	-	---
0839	1540782	485371	100.0	5.0	---	---	---	0.0	6560.00	94	6466.0 A	80-96	---
0840	1540440	485360	98.0	6.0	---	---	---	0.0	6561.00	94	6467.0 A	73-94	---
0841	1540835	485020	100.0	---	---	---	---	0.0	6561.00	---	--- A	-	---
0843	1541411	485738	120.0	4.0	---	---	---	0.0	6570.00	112	6458.0 A	100-110	---

TABLE 4.1-3. WELL DATA FOR THE ALLUVIAL AQUIFER MURRAY ACRES AND PLEASANT VALLEY WELLS
(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS

Note: A = Alluvial Aquifer
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0520	1538934	492935	75.0	5.0	12/5/2017	51.87	6534.15	0.3	6586.02	68	6517.7 A	35-75	16.4
0521	1539104	492588	75.0	5.0	4/27/2017	52.10	6532.34	2.5	6584.44	65	6516.9 A	35-75	15.4
0522	1538640	492437	77.0	5.0	4/27/2017	50.34	6530.19	2.8	6580.53	68	6509.7 A	37-77	20.5
0523	1538680	492896	74.0	5.0	---	---	---	3.0	6586.79	62	6521.8 A	34-74	---
0524	1538889	493173	78.0	5.0	---	---	---	3.0	6590.35	70	6517.4 A	33-78	---
0531	1541086	478262	---	---	---	---	---	2.0	6553.79	---	--- A	-	---
* 0533	---	---	195.0	---	---	---	---	0.0	6520.00	---	--- A	-	---
0538	1533486	486899	170.0	6.0	8/9/2016	63.58	6485.36	2.0	6548.94	95	6451.9 A	50-90	33.4
										95	6413.9 L	130-170	71.4
0539	1534014	487596	210.0	6.0	12/12/2016	26.90	6528.42	2.0	6555.32	100	6453.3 A	50-70	75.1
										100	6453.3 A	80-100	75.1
										100	6378.3 L	170-210	150.1
0540	1534125	488091	90.0	6.0	12/5/2017	60.94	6494.97	2.7	6555.91	80	6473.2 A	30-90	21.8
0541	1539831	477236	120.0	5.0	12/5/2017	89.79	6465.83	2.0	6555.62	112	6441.6 A	78-118	24.2
0551	1536272	479881	135.0	5.0	12/5/2017	98.10	6449.20	2.1	6547.30	115	6430.2 A	95-135	19.0
0553	1534923	480563	130.0	5.0	12/5/2017	103.25	6444.23	2.0	6547.48	128	6417.5 A	90-125	26.8
0554	1534967	479107	140.0	5.0	12/5/2017	105.65	6441.52	1.9	6547.17	118	6427.3 A	90-125	14.2
0555	1538572	486236	100.0	5.0	3/27/2017	41.83	6515.31	2.5	6557.14	100	6454.6 A	60-90	60.7
0556	1538006	486184	100.0	5.0	3/27/2017	47.11	6508.91	2.4	6556.02	95	6458.6 A	60-90	50.3
0557	1537204	486000	65.0	5.0	2/10/2016	41.55	6512.22	2.5	6553.77	55	6496.3 A	45-65	16.0
0631	1532234	483756	118.0	6.0	12/5/2017	82.88	6458.22	2.2	6541.10	109	6429.9 A	58-118	28.3
0632	1531850	483767	110.0	6.0	12/5/2017	81.23	6460.07	1.4	6541.30	102	6437.9 A	70-110	22.2
0633	1541467	479642	83.0	8.0	---	---	---	0.0	6557.56	95	6462.6 A	11-83	---
0634	1541652	480362	103.0	4.5	12/13/2017	67.97	6492.10	2.8	6560.07	95	6462.3 A	80-100	29.8
0635	1535363	478401	63.0	12.0	---	---	---	---	6546.25	---	--- A	4-63	---
0636	1545374	476038	123.0	4.5	---	---	---	2.3	6573.44	119	6452.1 A	103-123	---
0637	1545409	474710	124.0	4.5	10/6/2017	110.60	6464.60	2.5	6575.20	118	6454.7 A	104-124	9.9
0638	1539628	493265	75.0	5.0	12/5/2017	46.55	6539.01	0.0	6585.56	65	6520.6 A	35-75	18.5
0639	1539370	492961	80.0	5.0	4/27/2017	51.61	6536.27	2.5	6587.88	71	6514.4 A	35-80	21.9
0640	1537790	491961	84.0	5.0	12/5/2017	84.00	6495.97	2.2	6579.97	77	6500.8 A	64-84	0.0
0641	1536494	491110	95.0	5.0	---	---	---	2.5	6573.36	87	6483.9 A	65-95	---
0642	1536104	490932	95.0	5.0	---	---	---	2.4	6571.88	89	6480.5 A	65-95	---
0643	1533760	487386	108.0	5.0	---	---	---	1.5	6551.33	93	6456.8 A	58-108	---
0644	1533481	485450	110.0	5.0	12/5/2017	67.88	6476.02	2.0	6543.90	102	6439.9 A	55-110	36.1
0645	1532924	485282	80.0	5.0	---	---	---	2.5	6543.79	70	6471.3 A	60-80	---
0646	1533246	484953	100.0	5.0	12/5/2017	71.68	6471.67	1.5	6543.35	91	6450.9 A	60-100	20.8

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0647	1536623	478308	140.0	4.5	12/5/2017	103.83	6448.08	1.4	6551.91	132	6418.5 A	80-140	29.6
0648	1534730	478343	120.0	4.5	---	---	---	2.0	6547.79	120	6425.8 A	80-120	---
0649	1534730	479798	124.0	4.5	12/5/2017	101.90	6441.39	0.3	6543.29	115	6428.0 A	84-124	13.4
0650	1536779	482135	109.0	4.5	12/5/2017	81.60	6465.51	2.2	6547.11	103	6441.9 A	89-109	23.6
0652	1531170	483779	88.0	5.0	12/5/2017	83.95	6454.20	1.5	6538.15	79	6457.7 A	60-88	0.0
0653	1533283	486570	206.0	6.0	12/12/2016	62.30	6482.67	1.6	6544.97	97	6446.4 A	69-206	36.3
										97	6408.4 L	-	74.3
0654	1541994	478636	120.0	4.5	11/14/2017	73.29	6477.21	1.4	6550.50	106	6443.1 A	60-120	34.1
0655	1541620	479830	96.0	8.0	---	---	---	---	6558.18	88	--- A	21-84	---
0656	1542578	478333	88.0	8.0	12/5/2017	72.60	6481.47	---	6554.07	88	--- A	6-88	---
0657	1537497	478392	128.0	6.0	12/5/2017	99.00	6452.81	2.2	6551.81	120	6429.6 A	87-128	23.2
0657A	1537083	478412	35.0	12.0	---	---	---	---	6549.00	---	--- A	17-35	---
0658	1535922	478436	130.0	6.0	12/5/2017	106.40	6443.78	0.4	6550.18	129	6420.8 A	89-130	23.0
0659	1541689	480772	101.0	4.5	12/5/2017	67.30	6492.87	2.0	6560.17	97	6461.2 A	61-101	31.7
0680	1543850	478746	80.0	4.5	12/5/2017	73.20	6485.67	2.0	6558.87	75	6481.9 A	50-80	3.8
0681	1540676	482734	117.0	6.0	12/5/2017	63.25	6497.27	2.1	6560.52	111	6447.4 A	67-117	49.9
0682	1543125	477489	94.0	4.0	---	---	---	2.8	6553.97	102	6449.2 A	54-94	---
0683	1540198	476217	120.0	6.0	---	---	---	2.0	6556.04	140	6414.0 A	80-120	---
0684	1540273	478499	143.0	6.0	12/5/2017	95.45	6457.83	2.0	6553.28	118	6433.3 A	83-143	24.6
0685	1539098	478170	100.0	4.5	---	---	---	1.7	6556.57	116	6438.9 A	60-100	---
0686	1545319	475438	115.0	4.5	10/6/2017	112.10	6466.70	1.8	6578.80	136	6441.0 A	75-115	25.7
0687	1539011	477276	102.0	6.0	12/5/2017	93.10	6462.86	2.2	6555.96	120	6433.8 A	62-102	29.1
0689	1530024	478478	80.0	4.5	---	---	---	2.6	6542.02	75	6464.4 A	60-80	---
0692	1535892	493175	90.0	5.0	---	---	---	2.5	6584.82	80	6502.3 A	58-90	---
0846	1537219	484730	75.0	4.0	12/5/2017	43.84	6505.08	0.8	6548.92	65	6483.1 A	40-65	22.0
0847	1534736	488508	92.0	5.0	---	---	---	2.6	6558.27	80	6475.7 A	52-92	---
0848	1534634	490660	92.0	5.0	---	---	---	2.7	6572.49	91	6478.8 A	52-92	---
0851	1534692	483909	91.0	5.0	12/5/2017	84.71	6461.73	3.3	6546.44	80	6463.1 A	41-91	0.0
0852	1535610	493989	74.0	5.0	12/5/2017	68.79	6521.35	2.5	6590.14	70	6517.7 A	54-74	3.7
0855	1532111	484184	105.0	5.0	12/12/2016	82.10	6459.01	2.1	6541.11	97	6442.0 A	70-105	17.0
0861	1534332	488702	100.0	5.0	---	---	---	2.3	6559.85	65	6492.6 A	50-100	---
0862	1534265	487800	110.0	5.0	12/5/2017	58.91	6497.27	3.3	6556.18	97	6455.9 A	63-103	41.4
0863	1533867	487912	110.0	5.0	---	---	---	2.5	6556.56	94	6460.1 A	63-103	---
0864	1533735	486464	95.0	5.0	8/9/2016	64.53	6482.19	1.9	6546.72	78	6466.9 A	44-84	15.3
0865	1534123	488429	97.0	5.0	8/4/2016	51.75	6505.03	2.2	6556.78	88	6466.6 A	37-97	38.5
0866	1534494	488340	120.0	5.0	3/21/2017	60.70	6497.42	1.8	6558.12	80	6476.3 A	33-113	21.1

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0867	1533762	488409	88.0	5.0	12/5/2017	60.40	6495.50	2.0	6555.90	86	6467.9 A	48-88	27.6
0868	1534848	491033	103.0	5.0	---	---	---	2.2	6574.74	94	6478.5 A	53-103	---
0869	1533251	486073	94.0	5.0	12/5/2017	65.34	6479.15	1.7	6544.49	99	6443.8 A	44-94	35.4
* 0870	1532680	484906	93.0	5.0	---	---	---	1.9	6544.16	95	6447.3 A	69-89	---
0871	1533603	485400	100.0	5.0	---	---	---	2.4	6544.71	93	6449.3 A	60-100	---
* 0872	1533092	485407	100.0	5.0	---	---	---	1.8	6543.31	96	6445.5 A	55-100	---
* 0873	1533286	484505	100.0	5.0	---	---	---	1.9	6543.01	96	6445.1 A	60-100	---
* 0874	1533968	484925	105.0	5.0	---	---	---	2.2	6545.34	110	6433.1 A	55-105	---
* 0875	1532785	483634	125.0	5.0	---	---	---	1.7	6542.84	116	6425.1 A	65-125	---
0876	1532853	486088	95.0	5.0	12/5/2017	64.34	6479.92	1.9	6544.26	85	6457.4 A	58-88	22.6
0877	1533068	488067	70.0	5.0	12/5/2017	60.85	6492.23	1.9	6553.08	65	6486.2 A	58-68	6.1
0879	1532401	486104	70.0	5.0	12/5/2017	64.41	6480.14	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	2/23/2017	71.47	6493.57	2.0	6565.04	103	6460.0 A	76-96	33.5
0882	1541404	482396	110.0	4.5	3/15/2017	63.90	6497.26	2.0	6561.16	98	6461.2 A	70-110	36.0
0883	1540097	483039	100.0	5.0	12/5/2017	59.05	6498.08	1.9	6557.13	96	6459.3 A	60-90	38.8
0884	1542677	481498	90.0	5.0	3/27/2017	71.02	6495.08	1.0	6566.10	85	6480.2 A	58-88	14.9
0885	1541919	483474	100.0	5.0	12/5/2017	64.70	6499.94	1.5	6564.64	95	6468.1 A	70-100	31.8
0886	1542327	482487	90.0	5.0	11/9/2017	67.70	6496.85	1.5	6564.55	87	6476.1 A	60-90	20.8
0887	1543063	482469	67.0	5.0	12/5/2017	62.40	6505.33	1.5	6567.73	60	6506.2 A	42-67	0.0
0888	1542285	479335	105.0	5.0	12/5/2017	76.20	6481.13	1.1	6557.33	90	6466.2 A	75-105	14.9
0889	1540047	480222	65.0	5.0	12/5/2017	65.71	6483.92	1.5	6549.63	60	6488.2 A	35-65	0.0
0890	1541365	480088	101.0	5.0	12/13/2017	73.43	6485.00	1.7	6558.43	93	6463.7 A	81-101	21.3
0893	1541934	482244	98.0	4.5	12/5/2017	63.70	6500.27	2.1	6563.97	93	6468.9 A	78-98	31.4
0894	1541976	478317	78.0	4.5	---	---	---	3.0	6554.29	97	6454.3 A	58-78	---
0895	1541521	476222	104.0	5.0	10/3/2017	83.20	6470.64	2.4	6553.84	116	6435.4 A	61-101	35.2
0896	1542246	476237	113.0	5.0	10/3/2017	84.60	6471.01	2.0	6555.61	117	6436.6 A	73-113	34.4
0897	1543819	478237	93.0	4.0	12/5/2017	79.30	6482.95	2.0	6562.25	70	6490.3 A	63-93	0.0
0899	1543801	477288	110.0	4.0	10/3/2017	99.00	6471.84	2.0	6570.84	120	6448.8 A	70-110	23.0
0905	1532700	480850	120.0	5.0	---	---	---	0.0	6545.00	120	6425.0 A	100-120	---
0906	1532900	480450	---	---	---	---	---	0.0	6537.40	---	--- A	-	---
0909	1531900	483400	140.0	4.0	---	---	---	0.0	6538.90	112	6426.9 L	80-135	---
										112	6426.9 A	80-135	---
0910	1528800	481150	138.0	5.0	---	---	---	0.0	6535.00	132	6403.0 A	120-134	---
0912	1471000	478250	---	---	---	---	---	0.0	6530.00	---	--- A	-	---
0913	1555800	500950	---	8.0	---	---	---	0.3	6643.00	---	--- A	-	---
0914	1555500	500850	---	6.0	---	---	---	1.4	6642.00	---	--- A	-	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0915	1552650	499650	100.0	4.0	---	---	---	0.0	6625.00	70	6555.0 A	55-85	---
0916	1552350	499600	160.0	4.0	---	---	---	0.0	6625.00	---	--- A	45-70	---
0917	1542200	514600	---	---	---	---	---	0.0	6800.00	---	--- A	-	---
0920	1555800	496900	---	7.0	10/6/2016	6.98	6620.62	0.7	6627.60	---	--- A	-	---
0921	1555400	495800	---	5.0	12/11/2017	40.46	6583.54	1.9	6624.00	---	--- A	-	---
0922	1555200	492500	---	6.0	---	---	---	1.7	6621.70	---	--- A	-	---
0924	1547500	438900	135.0	4.0	---	---	---	0.0	6592.90	112	6480.9 A	94-114	---
0925	1548600	480800	150.0	4.0	---	---	---	0.0	6601.40	140	6461.4 A	126-141	---
0926	1547500	472700	134.0	4.0	---	---	---	0.0	6596.90	132	6464.9 A	123-132	---
0935	1540115	476629	300.0	16.0	---	---	---	2.6	6558.12	125	6430.5 A	95-132	---
0936	1543621	472978	160.0	5.0	---	---	---	0.0	6573.38	160	6413.4 A	100-160	---
0939	1539751	483202	97.0	8.0	---	---	---	2.3	6557.00	---	--- A	-	---
0940	1538651	483040	70.0	---	---	---	---	8.8	6553.00	---	--- A	-	---
0942	1538306	483703	100.0	6.0	---	---	---	0.0	6550.20	95	6455.2 A	85-95	---
0947	1536206	491841	100.0	4.0	---	---	---	0.0	6575.18	95	6480.2 A	70-100	---
0950	1560400	498300	81.0	5.0	---	---	---	0.5	6657.00	---	--- A	-	---
0952	1534550	477800	140.0	---	---	---	---	0.0	6550.00	---	--- A	-	---
0975	1539753	482896	---	---	---	---	---	0.0	6556.00	---	--- A	-	---
0976	1539751	483100	115.0	---	---	---	---	0.0	0.00	---	--- A	-	---
0977	1539900	482720	---	---	---	---	---	1.0	6557.00	---	--- A	-	---
0979	1538860	483110	105.0	5.0	---	---	---	0.0	6651.00	100	6551.0 A	90-100	---
0980	1539330	483050	---	---	---	---	---	0.0	6555.00	---	--- A	-	---
0981	1539040	483740	---	---	---	---	---	0.0	6554.00	---	--- A	-	---
0982	1538610	483400	110.0	5.0	---	---	---	0.0	6651.00	105	6546.0 A	90-105	---
0983	1538590	483100	---	---	---	---	---	0.0	6552.00	---	--- A	-	---
0984	1538750	482950	103.0	5.0	---	---	---	0.0	6651.00	98	6553.0 A	88-98	---
0985	1539048	483380	115.0	5.0	---	---	---	0.0	6651.00	102	6549.0 A	90-110	---
0989	1538220	482920	---	---	---	---	---	1.0	6553.00	---	--- A	-	---
0992	1539510	483790	100.0	5.0	---	---	---	0.0	6652.00	95	6557.0 A	85-95	---
0993	1537920	483677	102.0	5.0	---	---	---	0.0	6650.00	98	6552.0 A	85-98	---
0994	1539700	476240	144.0	6.0	10/27/2017	92.15	6462.85	0.0	6555.00	---	--- A	95-110	---
0996	1537621	477989	138.0	5.0	---	---	---	1.7	6552.52	136	6414.8 A	126-136	---
0997	1539821	473807	---	---	---	---	---	0.0	6568.30	---	--- A	-	---
1012	---	---	---	6.0	---	---	---	0.0	0.00	---	--- A	-	---
1013	---	---	---	4.0	---	---	---	0.0	0.00	---	--- A	-	---
1014	---	---	---	9.0	---	---	---	0.0	0.00	---	--- A	-	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
1015	---	---	---	6.0	---	---	---	0.0	0.00	---	--- A	-	---
1018	---	---	---	5.0	---	---	---	0.0	0.00	---	--- A	-	---
1020	---	---	---	5.0	---	---	---	0.0	0.00	---	--- A	-	---
1021	---	---	---	---	---	---	---	0.0	0.00	---	--- A	-	---
H1	1541931	480022	98.0	4.5	12/13/2017	74.14	6485.11	2.0	6559.25	98	6459.3 A	78-98	25.9
H2	1541665	480014	100.0	4.5	---	---	---	2.0	6560.83	100	6458.8 A	80-100	---
H2A	1541694	479997	88.0	4.5	12/13/2017	77.70	6482.17	2.0	6559.87	88	6469.9 A	66-88	12.3
H3	1541482	479947	92.0	4.5	---	---	---	2.0	6557.10	92	6463.1 A	72-92	---
H4	1542118	480122	99.0	4.5	---	---	---	2.0	6557.60	99	6456.6 A	79-99	---
H5	1541786	480167	99.0	4.5	---	---	---	2.0	6558.44	99	6457.4 A	79-99	---
H6	1541541	480181	99.0	4.5	---	---	---	2.0	6559.98	99	6459.0 A	79-99	---
H6A	1541564	480172	100.0	4.5	---	---	---	2.0	6557.57	100	6455.6 A	80-100	---
H7	1541974	480333	102.0	4.5	12/13/2017	82.68	6476.86	2.0	6559.54	102	6455.5 A	82-102	21.3
H7A	1542002	480322	100.0	4.5	12/5/2017	75.60	6483.49	2.0	6559.09	100	6457.1 A	80-100	26.4
H7B	1541933	480350	98.0	4.5	12/13/2017	91.79	6467.59	2.0	6559.38	98	6459.4 A	78-98	8.2
H8	1541405	480325	95.0	4.5	---	---	---	2.0	6558.11	95	6461.1 A	75-95	---
H9	1542143	480524	97.0	4.5	---	---	---	2.0	6560.62	97	6461.6 A	77-97	---
H10	1541828	480550	100.0	4.5	---	---	---	2.0	6558.56	100	6456.6 A	80-100	---
H11	1541517	480586	97.0	4.5	---	---	---	2.0	6559.42	97	6460.4 A	77-97	---
H12	1542007	480744	100.0	4.5	12/13/2017	87.18	6476.44	2.0	6563.62	100	6461.6 A	80-100	14.8
H13	1542183	480842	100.0	4.5	---	---	---	2.0	6562.42	100	6460.4 A	80-100	---
H14	1541884	480906	100.0	4.5	---	---	---	2.0	6558.85	100	6456.9 A	80-100	---
H15	1541590	480941	97.0	4.5	---	---	---	2.0	6560.41	97	6461.4 A	77-97	---
H16	1542116	481129	92.0	4.5	12/13/2017	63.10	6494.88	2.0	6557.98	92	6464.0 A	72-92	30.9
H17	1541782	481151	99.0	4.5	12/13/2017	29.00	6534.36	2.0	6563.36	99	6462.4 A	79-99	72.0
H18	1542325	481231	93.0	4.5	---	---	---	2.0	6560.77	93	6465.8 A	73-93	---
H19	1541970	481270	91.0	4.5	---	---	---	2.0	6562.54	91	6469.5 A	71-91	---
H20	1541664	481314	86.0	4.5	---	---	---	2.0	6557.68	86	6469.7 A	66-86	---
H21	1542330	481444	95.0	4.5	---	---	---	2.0	6564.40	95	6467.4 A	75-95	---
H22	1541756	481496	94.0	4.5	---	---	---	2.0	6561.53	94	6465.5 A	74-94	---
H23	1542412	481663	95.0	4.5	---	---	---	2.0	6564.96	95	6468.0 A	75-95	---
H24	1542195	481605	100.0	4.5	12/13/2017	82.71	6483.16	2.0	6565.87	100	6463.9 A	80-100	19.3
H25	1541937	481652	100.0	4.5	---	---	---	2.0	6564.79	100	6462.8 A	80-100	---
H26	1542244	481823	98.0	4.5	12/13/2017	82.56	6484.25	2.0	6566.81	98	6466.8 A	78-98	17.4
H27	1541924	481863	96.0	4.5	3/28/2017	69.14	6496.11	2.0	6565.25	96	6467.3 A	76-96	28.9
H28	1542427	481976	97.0	4.5	3/28/2017	68.22	6497.16	2.0	6565.38	97	6466.4 A	77-97	30.8

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
H29	1542117	481997	100.0	4.5	3/28/2017	65.41	6496.59	2.0	6562.00	100	6460.0 A	80-100	36.6
H30	1542590	482118	92.0	4.5	---	---	---	2.0	6565.80	92	6471.8 A	72-92	---
H31	1542290	482160	95.0	4.5	---	---	---	2.0	6565.06	95	6468.1 A	75-95	---
H32	1542470	482295	98.0	4.5	3/28/2017	67.82	6497.29	2.0	6565.11	98	6465.1 A	78-98	32.2
H33	1542162	482347	98.0	4.5	3/28/2017	68.60	6497.48	2.0	6566.08	98	6466.1 A	78-98	31.4
H34	1542415	482618	96.0	4.5	3/29/2017	67.85	6498.34	2.0	6566.19	96	6468.2 A	76-96	30.2
H35	1542209	482713	97.0	4.5	3/29/2017	67.70	6497.23	2.0	6564.93	97	6465.9 A	77-97	31.3
H36	1542405	482853	100.0	4.5	---	---	---	2.0	6559.96	100	6458.0 A	80-100	---
H37	1542586	482972	96.0	4.5	3/29/2017	61.71	6498.85	2.0	6560.56	96	6462.6 A	76-96	36.3
H38	1542314	483081	93.0	4.5	3/29/2017	63.31	6499.18	2.0	6562.49	93	6467.5 A	73-93	31.7
H39	1542517	483204	100.0	4.5	---	---	---	2.0	6566.03	100	6464.0 A	80-100	---
H40	1542710	483345	98.0	4.5	---	---	---	2.0	6565.57	98	6465.6 A	78-98	---
H41	1542414	483448	100.0	4.5	3/29/2017	63.21	6501.12	2.0	6564.33	100	6462.3 A	80-100	38.8
H42	1542813	483511	100.0	4.5	---	---	---	2.0	6567.80	100	6465.8 A	80-100	---
H42A	1542822	483522	100.0	4.5	---	---	---	2.6	6567.43	100	6464.8 A	80-100	---
H43	1542954	483706	90.0	4.5	---	---	---	2.4	6569.14	90	6476.7 A	70-90	---
H44	1542694	483771	90.0	4.5	---	---	---	3.1	6569.86	90	6476.8 A	70-90	---
H45	1542945	483956	90.0	4.5	---	---	---	2.0	6569.65	90	6477.7 A	50-90	---
H46	1542614	483981	95.0	4.5	11/3/2017	66.90	6500.46	2.0	6567.36	95	6470.4 A	75-95	30.1
H47	1543121	484112	90.0	4.5	---	---	---	2.0	6569.46	90	6477.5 A	70-90	---
H48	1542787	484185	90.0	4.5	---	---	---	2.0	6568.26	90	6476.3 A	70-90	---
H49	1543056	484342	90.0	4.5	---	---	---	2.0	6570.84	90	6478.8 A	70-90	---
H50	1542846	484394	100.0	4.5	---	---	---	2.2	6568.84	90	6476.6 A	80-100	---
H51	1543254	484489	90.0	4.5	---	---	---	2.6	6569.94	95	6472.3 A	70-90	---
H52	1542976	484590	100.0	4.5	---	---	---	2.5	6570.01	95	6472.5 A	80-100	---
H54	1543160	484723	100.0	4.5	---	---	---	2.0	6569.56	70	6497.6 A	80-100	---
H55	1542909	484706	95.0	4.5	11/13/2017	62.61	6506.64	2.0	6569.25	95	6472.3 A	75-95	34.4
H56	1542625	484804	95.0	4.5	11/3/2017	63.37	6506.12	2.0	6569.49	95	6472.5 A	75-95	33.6
H57	1543338	484884	90.0	4.5	---	---	---	2.0	6571.09	90	6479.1 A	70-90	---
H58	1543051	484959	95.0	4.5	---	---	---	2.5	6571.02	95	6473.5 A	75-95	---
H59	1542764	484969	100.0	4.5	---	---	---	2.5	6570.15	95	6472.7 A	80-100	---
H60	1542945	484152	100.0	4.5	---	---	---	2.0	6571.02	100	6469.0 A	80-100	---
H61	1542631	485206	89.0	4.5	11/3/2017	61.94	6508.55	2.0	6570.49	89	6479.5 A	69-89	29.1
H62	1543413	485343	100.0	4.5	---	---	---	2.3	6572.52	100	6470.3 A	80-100	---
H63	1543072	485346	100.0	4.5	---	---	---	2.5	6571.85	100	6469.4 A	80-100	---
H64	1542779	485373	90.0	4.5	---	---	---	3.0	6571.86	90	6478.9 A	70-90	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
H65	1543237	485530	93.0	4.5	---	---	---	2.0	6575.06	93	6480.1 A	73-93	---
H66	1542938	485536	90.0	4.5	---	---	---	2.5	6571.77	100	6469.3 A	80-90	---
H67	1543489	485743	90.0	4.5	---	---	---	2.9	6573.76	90	6480.9 A	70-90	---
H68	1543114	485766	100.0	4.5	---	---	---	3.0	6573.38	100	6470.4 A	80-100	---
H69	1542779	485752	100.0	4.5	---	---	---	3.6	6573.08	95	6474.5 A	80-100	---
H70	1543343	485979	93.0	4.5	11/3/2017	64.62	6510.00	2.0	6574.62	93	6479.6 A	73-93	30.4
H71	1542939	485966	91.0	4.5	11/3/2017	62.90	6509.42	2.0	6572.32	91	6479.3 A	71-91	30.1
H72	1543147	486104	90.0	4.5	---	---	---	3.3	6575.17	90	6481.9 A	70-90	---
H73	1541828	482047	91.0	4.5	---	---	---	2.0	6556.73	91	6463.7 A	71-91	---
H74	1541953	482471	95.0	4.5	---	---	---	2.0	6563.05	95	6466.1 A	75-95	---
H75	1542212	483453	93.0	4.5	3/29/2017	66.29	6498.96	2.0	6565.25	93	6470.3 A	73-93	28.7
H93	1543202	483884	100.0	4.5	---	---	---	2.0	6566.75	100	6464.8 A	80-100	---
H95	1543327	484311	100.0	4.5	12/5/2017	63.60	6505.31	2.0	6568.91	100	6466.9 A	80-100	38.4
H97	1543406	484644	95.0	4.5	---	---	---	2.0	6570.22	95	6473.2 A	75-95	---
H99	1543525	485438	100.0	4.5	---	---	---	2.0	6571.66	100	6469.7 A	80-100	---
H100	1543724	485306	90.0	4.5	---	---	---	2.8	6574.12	80	6491.3 A	70-90	---
H101	1543764	485695	90.0	4.5	---	---	---	3.8	6575.52	90	6481.8 A	70-90	---
H102	1543624	485946	90.0	4.5	---	---	---	2.5	6575.62	90	6483.1 A	70-90	---
H103	1543767	486104	90.0	4.5	---	---	---	2.3	6575.61	90	6483.4 A	70-90	---
H104	1543562	486140	90.0	4.5	---	---	---	2.0	6575.05	80	6493.1 A	70-90	---
H105	1542792	486149	100.0	4.5	---	---	---	2.0	6574.76	90	6482.8 A	80-100	---
H106	1542087	482933	94.0	4.5	3/29/2017	65.97	6498.78	2.0	6564.75	94	6468.8 A	74-94	30.0
H107	1541784	481742	98.0	4.5	---	---	---	2.0	6562.36	98	6462.4 A	78-98	---
M16	1543252	485112	93.3	5.0	12/5/2017	62.70	6507.89	1.4	6570.59	100	6469.2 A	60-100	38.7
M17	1542752	484617	100.0	4.5	---	---	---	2.0	6569.21	95	6472.2 A	80-100	---
M18	1542607	485970	88.0	4.5	3/29/2017	60.52	6511.76	2.0	6572.28	88	6482.3 A	68-88	29.5
MO	1543620	485518	88.0	4.5	12/5/2017	62.10	6510.79	2.0	6572.89	80	6490.9 A	45-85	19.9
MP	1544164	485492	80.0	5.0	12/5/2017	103.10	6471.38	2.1	6574.48	50	6522.4 A	33-63	0.0
MR	1542609	483574	100.0	5.0	12/5/2017	62.70	6503.56	1.8	6566.26	100	6464.5 A	54-94	39.1
MS	1542607	485570	82.0	5.0	12/5/2017	64.10	6506.57	1.5	6570.67	89	6480.2 A	52-82	26.4
MT	1543221	483531	98.0	4.5	12/12/2016	62.00	6505.43	2.3	6567.43	87	6478.1 A	34-94	27.3
MV	1542618	484418	105.0	4.5	12/5/2017	63.20	6506.58	1.3	6569.78	95	6473.5 A	75-105	33.1
R1	1534551	487790	120.0	5.0	12/5/2017	54.92	6500.20	2.0	6555.12	84	6469.1 A	80-120	31.1
										84	6469.1 M	80-120	31.1
R2	1534548	487968	115.0	5.0	8/24/2017	52.60	6501.56	2.0	6554.16	83	6469.2 A	75-115	32.4
										83	6469.2 M	75-115	32.4

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
R3	1534546	488196	140.0	5.0	11/14/2017	62.81	6492.92	2.0	6555.73	88	6465.7 M	100-140	27.2
										88	6465.7 A	60-80	27.2
R4	1534541	488446	130.0	5.0	3/23/2017	51.77	6507.01	2.0	6558.78	84	6472.8 A	90-130	34.2
										84	6472.8 M	90-130	34.2
R5	1534560	488666	125.0	5.0	3/21/2017	94.17	6463.58	2.0	6557.75	71	6484.8 M	65-125	0.0
										71	6484.8 A	65-125	0.0
R6	1534356	488448	130.0	5.0	---	---	---	2.0	6559.64	68	6489.6 M	110-130	---
										68	6489.6 A	50-90	---
R7	1534399	488087	145.0	5.0	---	---	---	2.0	6554.81	74	6478.8 M	125-145	---
										74	6478.8 A	65-105	---
R8	1534412	487891	145.0	5.0	---	---	---	2.0	6554.16	94	6458.2 A	65-105	---
R9	1534420	487700	120.0	4.5	---	---	---	2.0	6555.75	104	6449.8 A	60-120	---
R10	1534305	488003	120.0	4.5	3/22/2017	53.68	6501.54	2.0	6555.22	83	6470.2 A	60-120	31.3
R11	1534320	488280	120.0	4.5	8/24/2017	58.50	6499.95	2.0	6558.45	70	6486.5 M	60-120	13.5
										70	6486.5 A	60-120	13.5
R12	1534220	488360	120.0	4.5	---	---	---	2.0	6556.95	66	6489.0 M	60-120	---
										66	6489.0 A	60-120	---
R13	1534220	488150	120.0	4.5	---	---	---	2.0	6556.89	96	6458.9 A	60-120	---
R14	1534168	487971	100.0	4.5	---	---	---	2.0	6556.79	83	6471.8 A	60-100	---
R15	1534180	487700	100.0	4.5	---	---	---	2.0	6556.23	98	6456.2 A	60-100	---
R16	1533973	487394	100.0	4.5	---	---	---	2.0	6554.49	92	6460.5 A	60-100	---
R17	1534040	487810	100.0	4.5	---	---	---	2.0	6555.22	95	6458.2 A	60-100	---
R18	1534030	487970	100.0	4.5	3/23/2017	63.70	6492.30	2.0	6556.00	87	6467.0 A	60-100	25.3
R19	1534029	488173	100.0	4.5	---	---	---	2.0	6556.50	90	6464.5 A	60-100	---
R20	1534120	488260	100.0	4.5	3/23/2017	63.45	6492.89	2.0	6556.34	80	6474.3 A	60-100	18.5
R21	1534031	488350	100.0	4.5	---	---	---	2.0	6555.57	88	6465.6 A	60-100	---
R22	1533940	488091	100.0	4.5	10/24/2016	64.23	6492.91	2.0	6557.14	91	6464.1 A	60-100	28.8
R23	1533880	487750	100.0	4.5	---	---	---	2.0	6555.75	97	6456.8 A	60-100	---
R24	1533872	487526	100.0	4.5	---	---	---	2.0	6552.30	100	6450.3 A	60-100	---
R26	1533761	486760	95.0	4.5	---	---	---	2.0	6548.29	95	6451.3 A	75-95	---
R27	1533722	486974	98.0	4.5	---	---	---	2.0	6550.07	98	6450.1 A	78-98	---
R28	1533761	487226	100.0	4.5	---	---	---	2.0	6550.30	100	6448.3 A	60-100	---
R29	1533785	487629	100.0	4.5	---	---	---	2.0	6554.08	100	6452.1 A	60-100	---
R32	1533704	487163	95.0	4.5	---	---	---	2.0	6550.10	90	6458.1 A	75-95	---
R33	1533672	486914	100.0	4.5	---	---	---	2.0	6548.72	100	6446.7 A	80-100	---
R34	1533675	486617	95.0	4.5	---	---	---	2.0	6547.79	95	6450.8 A	75-95	---
R35	1533668	486345	90.0	4.5	---	---	---	2.0	6545.26	90	6453.3 A	70-90	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
R36A	1533568	486184	95.0	4.5	---	---	---	2.0	6545.48	90	6453.5 A	75-95	---
R37A	1533579	486472	95.0	4.5	---	---	---	2.0	6546.81	95	6449.8 A	75-95	---
R38	1533574	486762	98.0	4.5	---	---	---	2.0	6547.69	98	6447.7 A	78-98	---
R39	1533571	487014	95.0	4.5	---	---	---	2.0	6549.34	95	6452.3 A	75-95	---
R40	1533581	487263	90.0	4.5	---	---	---	2.0	6549.12	90	6457.1 A	70-90	---
R41	1533596	487388	100.0	4.5	---	---	---	2.0	6550.90	100	6448.9 A	60-100	---
R42	1533466	487346	90.0	4.5	---	---	---	2.0	6549.34	90	6457.3 A	70-90	---
R43	1533509	487134	100.0	4.5	4/5/2017	63.25	6487.90	2.0	6551.15	100	6449.2 A	60-100	38.8
R47	1533470	485780	160.0	4.5	---	---	---	2.0	6547.17	103	6442.2 L	100-160	---
										103	6442.2 A	100-160	---
R48	1533345	485775	160.0	4.5	---	---	---	2.0	6545.24	100	6443.2 A	100-160	---
										100	6443.2 L	100-160	---
R49A	1533394	485951	95.0	4.5	---	---	---	2.0	6545.70	---	--- A	75-95	---
R50A	1533376	486217	100.0	4.5	---	---	---	2.0	6544.69	---	--- A	60-100	---
R52A	1533367	486751	95.0	4.5	---	---	---	2.0	6546.91	95	6449.9 A	75-95	---
R53	1533402	487020	95.0	4.5	---	---	---	2.0	6549.47	95	6452.5 A	75-95	---
R54	1533331	487163	95.0	4.5	---	---	---	2.0	6549.93	95	6452.9 A	75-95	---
R55	1533272	486897	95.0	4.5	---	---	---	2.0	6548.22	95	6451.2 A	75-95	---
R57	1533260	485880	135.0	4.5	---	---	---	2.0	6547.07	99	6446.1 L	75-135	---
										99	6446.1 A	75-135	---
R58	1533170	485710	160.0	4.5	---	---	---	2.0	6544.45	98	6444.5 A	100-160	---
										98	6444.5 L	100-160	---
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436.0 A	110-150	42.4
										107	6436.0 L	110-150	42.4
R60A	1533163	486219	107.0	4.5	---	---	---	2.0	6544.99	---	--- A	60-107	---
R61A	1533135	486485	100.0	4.5	---	---	---	2.0	6544.69	95	6447.7 A	60-100	---
R63	1533189	487028	95.0	4.5	---	---	---	2.0	6549.92	95	6452.9 A	75-95	---
R64	1533059	486921	95.0	4.5	---	---	---	2.0	6548.15	85	6461.2 A	75-95	---
R65A	1533056	486614	95.0	4.5	---	---	---	2.0	6545.64	95	6448.6 A	75-95	---
R66A	1533023	486355	100.0	4.5	---	---	---	2.0	6545.33	---	--- A	60-100	---
R67A	1532999	486075	90.0	4.5	---	---	---	2.0	6544.38	90	6452.4 A	70-90	---
R68	1533025	485819	160.0	4.5	---	---	---	2.0	6544.85	99	6443.9 A	100-160	---
										99	6443.9 L	100-160	---
R69	1532987	486024	160.0	4.5	---	---	---	2.0	6545.35	96	6447.4 A	100-160	---
										96	6447.4 L	100-160	---
R70A	1532881	486261	105.0	4.5	---	---	---	2.0	6545.30	---	--- A	60-105	---
R73	1533019	485560	150.0	4.5	---	---	---	2.3	6544.34	99	6443.0 A	110-150	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
R73	1533019	485560	150.0	4.5	---	---	---	2.3	6544.34	99	6443.0 L	110-150	---
R74	1532852	485502	140.0	4.5	12/5/2017	67.53	6476.50	2.4	6544.03	104	6437.6 L	100-140	38.9
										104	6437.6 A	100-140	38.9
R75	1532922	485716	140.0	4.5	---	---	---	2.3	6544.88	98	6444.6 A	100-140	---
										98	6444.6 L	100-140	---
R76	1532888	485891	140.0	4.5	---	---	---	2.3	6545.09	106	6436.8 L	100-140	---
										106	6436.8 A	100-140	---
R77	1532683	485800	140.0	4.5	---	---	---	2.4	6544.97	80	6462.6 A	100-140	---
										80	6462.6 L	100-140	---
R78	1532683	485612	140.0	4.5	---	---	---	2.0	6544.03	85	6457.0 A	100-140	---
										85	6457.0 L	100-140	---
R80	1533169	485471	120.0	4.5	---	---	---	2.0	6543.72	---	--- L	80-120	---
										---	--- A	80-120	---

Note: A = Alluvial Aquifer
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

4.2 ALLUVIAL WATER LEVELS

4.2.1 WATER-LEVEL ELEVATION - ALLUVIAL

This section presents information necessary to evaluate the direction of groundwater flow in the alluvial aquifer. Water-level elevations are used to quantify the gradient of the alluvial water table, which in turn can be used to interpret the direction of groundwater flow.

Figures 4.2-1, 4.2-1A, 4.2-1B and 4.2-1C present the fall of 2017 alluvial aquifer water-level elevation contours for the Grants Project area. The three insert maps are used to show water-level elevations where the spacing of the wells is too close for showing the information on Figure 4.2-1. The alluvial aquifer limits (green lines on figure) are based on the 2014 water-level elevation map and base of the alluvium map. This 2014 adjustment in the alluvial aquifer limits resulted in only small changes in the limits of the alluvial aquifer. Locations of the alluvial wells, with their respective well names listed adjacent to the well symbol, are plotted on Figure 4.1-1 in the previous section. The 2017 groundwater flow patterns in the alluvial aquifer are very similar to those observed in the fall of 2014. The ridge in the piezometric surface west of the LTP is attributable to continued injection of water into the injection wells and lines in 2017 (see Figure 4.1-1 for locations). The water-level elevations and flow directions indicate the extent of the area of the alluvial aquifer from which groundwater is drawn by the collection system. The area of collection is between the fresh-water injection area and the collection wells, where groundwater is flowing back to the collection wells. The area underlying the LTP is also within the collection area, because alluvial groundwater in this area flows to the collection wells. The collection area also extends from the southeast corner of the STP through the injection ridge to the zero saturation line to the east.

The water-level elevations in Section 3 overall increased in 2017 with the treated water injection except in the northeast portion of the section where the Off-site pumping in this area caused water levels to decline (see Figure 4.2-1B). Water-level also increased a few feet in Section 33 (see the western half of Figure 4.2-1), likely due to average recharge and no South Collection pumping from this area. The water levels in Section 28 decreased a few feet in 2017 due to the Section 28 Off-site collection.

Several wells were drilled in the area of the zero saturation boundaries to better define the limits of the alluvial aquifer. However, there are occurrences of limited saturation in the

Chinle shale below the alluvium, indicating that there may be zones of perched water in the upper part of the Chinle shale. These wells have been used to help define where the zero saturation boundary of the alluvium occurs and the water levels in these wells may not be representative of the alluvial aquifer. Water levels were measured in wells 652, 680, 851, 852, 867, 877, 879, 887, 889, 892, 897, 1C, 1H, 1I, 1P, 1N, 1O, MN and MP in late 2017 to define the amount of limited groundwater that exists near the saturation boundary.

Flow in the San Mateo alluvium is naturally diverted either west through the western portion of Section 28 or south/southwest through Sections 35 and 3 around the area where the base of the alluvium is elevated. There is no alluvial saturation where the elevation of the base of the alluvium is above the water table. Further downgradient, the San Mateo alluvial water then mixes with the Rio San Jose alluvial water flowing from the northwest. The combined flow continues to flow in a southerly direction. The gradient of the alluvial water surface in the Rio San Jose alluvium has been increased in Section 33, but it is still relatively flat due to its large transmitting ability. San Mateo alluvial groundwater that flows through the northern portion of Section 3 (see Figure 4.2-1) joins the Rio San Jose groundwater system in the eastern portion of Section 4.

Water-level data for the alluvial wells are presented in Appendix A as Table A.1-1 (HMC alluvial wells), Table A.1-2 (Murray Acres, Broadview Acres, Felice Acres, and Pleasant Valley Estates alluvial wells) and Table A.1-3 (regional alluvial wells).

4.2.2 WATER-LEVEL CHANGE - ALLUVIAL

Figure 4.2-2 presents well locations and indicates the grouping of wells for presentation on water-level elevation versus time plots. The figure number of the water-level elevation plots for each group of wells is shown by the well groupings in the black boxes depicted on Figure 4.2-2. The colors used for the well name and well symbol on Figure 4.2-2 correspond with those used on the water-level elevation plots. Time plots (Figures 4.2-3 through 4.2-18) present the last seventeen years of data to illustrate the recent trends.

Water levels in the alluvial aquifer have been fairly stable during the last year except for a gradual declining trend in wells DD and DD2. Figure 4.2-3 presents water-level elevation data for up-gradient wells DD, DD2, ND, P, Q and R. A very slight increasing trend was observed in up-gradient wells ND and Q during 2017. The lower water levels measured in 2017 are outliers based on the adjacent data.

Water-level elevation data are presented for two sets of wells monitored for the purpose of detection of a reversal of water-surface gradient near the S line of the collection system. These wells (SP and SO) are located just northeast of the majority of the S line of collection wells. Figure 4.2-4 graphically illustrates that the alluvial hydraulic gradient is very flat in the area of wells SM, SN, SO and SP. Water-level rises were observed in wells SM, SN, SO and SP in 2003 and 2004 due to injection of fresh water into the injection line with overall a very gradual decline in water levels in 2016 and 2017. The water levels actually indicate a very flat gradient between wells SP and SO for 2017. The injection of water into the injection line has caused slightly more rise in well SP than SO. The head is larger near the injection line than near wells SP and SO. The water levels between wells SM and SN shows a slight reversal in the water level elevation.

Wells S2 and S5 are the two reversal wells down-gradient of the S line of collection wells (see Figures 4.1-1 and 4.2-2 for their location). Recent data from these two wells indicate a very good reversal of the groundwater flow direction due to the collection wells near well S5 and the rise in water levels caused by the injection (see Figure 4.2-5).

Figure 4.2-6 presents water-level elevation data for a group of wells located west of the S line of collection wells. Water-level elevations declined in each of these wells in 2017 due to a larger collection rate.

The alluvial water levels north of Murray Acres gradually declined in 2017 in wells M7, MO, MQ and MX (see Figure 4.2-7) while and overall rise occurred in well M9. The lower water-level elevations in well MQ are due to the pumping of water from this collection well in 2011 through 2017 as RO collection supply well.

Wells B and BA are monitored in order to define the reversal in the groundwater gradient between the M and J injection lines and the D collection line. Figure 4.2-8 presents water-level elevation data for wells B and BA and indicates a reversal gradient between these two wells in 2017. Increased collection rate upgradient of these two wells in 2017 caused water level declines in these two wells. Figure 4.2-9 presents water-level elevation plots for alluvial wells B12, D1 and M5, which are located near the lined collection ponds. Water-level elevations in the alluvial aquifer near the Small Tailings collection system are presented on Figure 4.2-10 for reversal wells DZ and KZ. Well DZ is near the D collection line and well KZ is close to the K injection line and, therefore, is naturally down-gradient of well DZ. This plot shows that, during late 2009 and again in 2014 and some of 2015, the reversal of the groundwater gradient was lost between the line of injection and line of collection. Additional collection in 2016 and 2017 reversed this gradient and caused the water levels to decline.

Figure 4.2-11 presents water-level elevation data for wells C10, C12, K7 and L6. This data reflects the changes in water levels near the STP. Injection of treated water has caused the higher water-level elevations observed in well L6 with steady levels in 2011 through 2016 and a decline in 2017. Figure 4.2-12 shows the water-level elevation plots for wells K5, K8, K9 and X.

Water-level elevations in the alluvial aquifer north of the Broadview Acres injection system declined in 2017. The pumping in Felice Acres for South Off-Site collection supply caused overall steady water level in well 497 in 2017 (see water levels for wells 490, 497, F, GH and SUB3 on Figure 4.2-13).

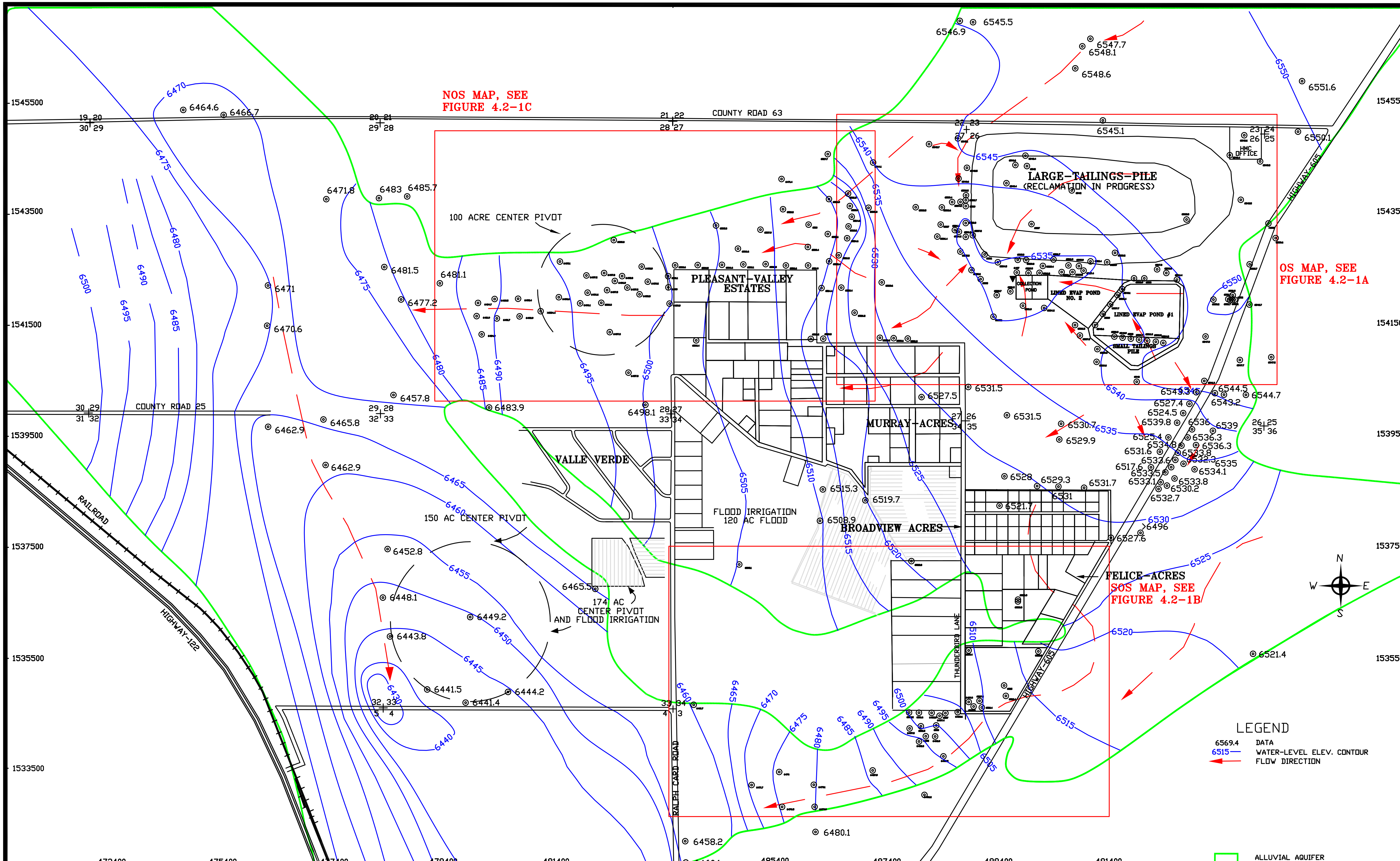
Water levels in the former flood irrigation area south of Murray Acres were fairly steady in alluvial wells 555, 556, 557, 844, 845 and 846 during 2017 (see Figure 4.2-14).

Figure 4.2-15 presents water-level hydrographs for five wells in Section 3. Water levels were steady in 2017 in wells 644, 646 869 and varied in well 862 due to the Off-site pumping and injection in the northeast corner of Section 3. Figure 4.2-15A presents water-level elevations for five of the R wells with the levels showing overall declines but variable depending on which wells are pumping.

Water-level hydrographs for six wells in the former irrigation area in Section 28 are presented on Figure 4.2-16. Water levels in 2017 gradually declined in this area except for a rise in late 2017 in well 893. Water-level hydrographs for five wells just west of the former Section 28 irrigation area are presented on Figure 4.2-16A.

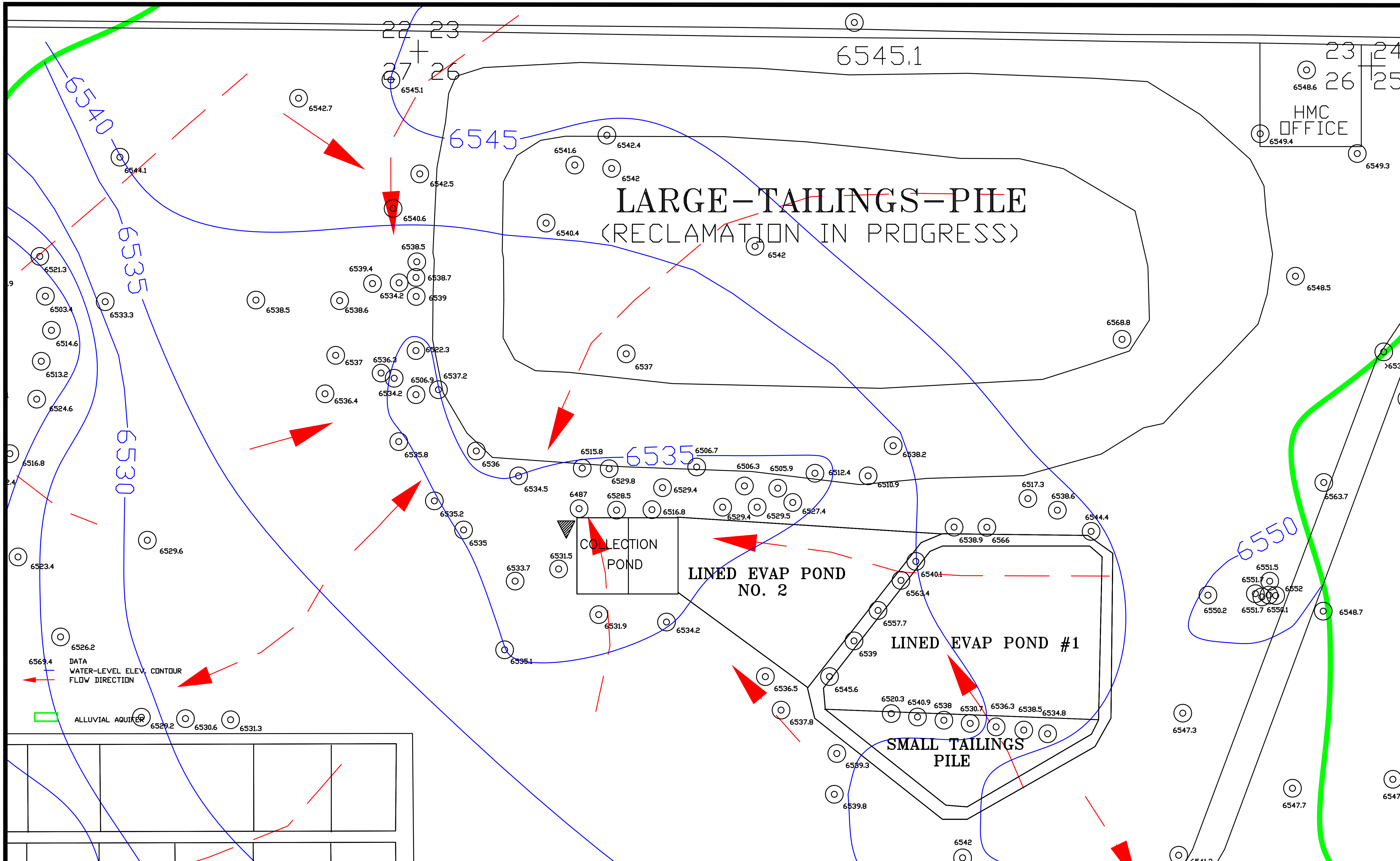
Figure 4.2-17 presents the water- level time plots for two wells in Section 20, one in Section 29 and two wells in Section 32. Water levels were generally gradually declining in 2017.

Figure 4.2-18 presents the water-level plots for the Section 33 wells shown on Figure 4.2-2. No pumping from the Section 33 wells has been done after 2012 and is not expected to be done in the future.



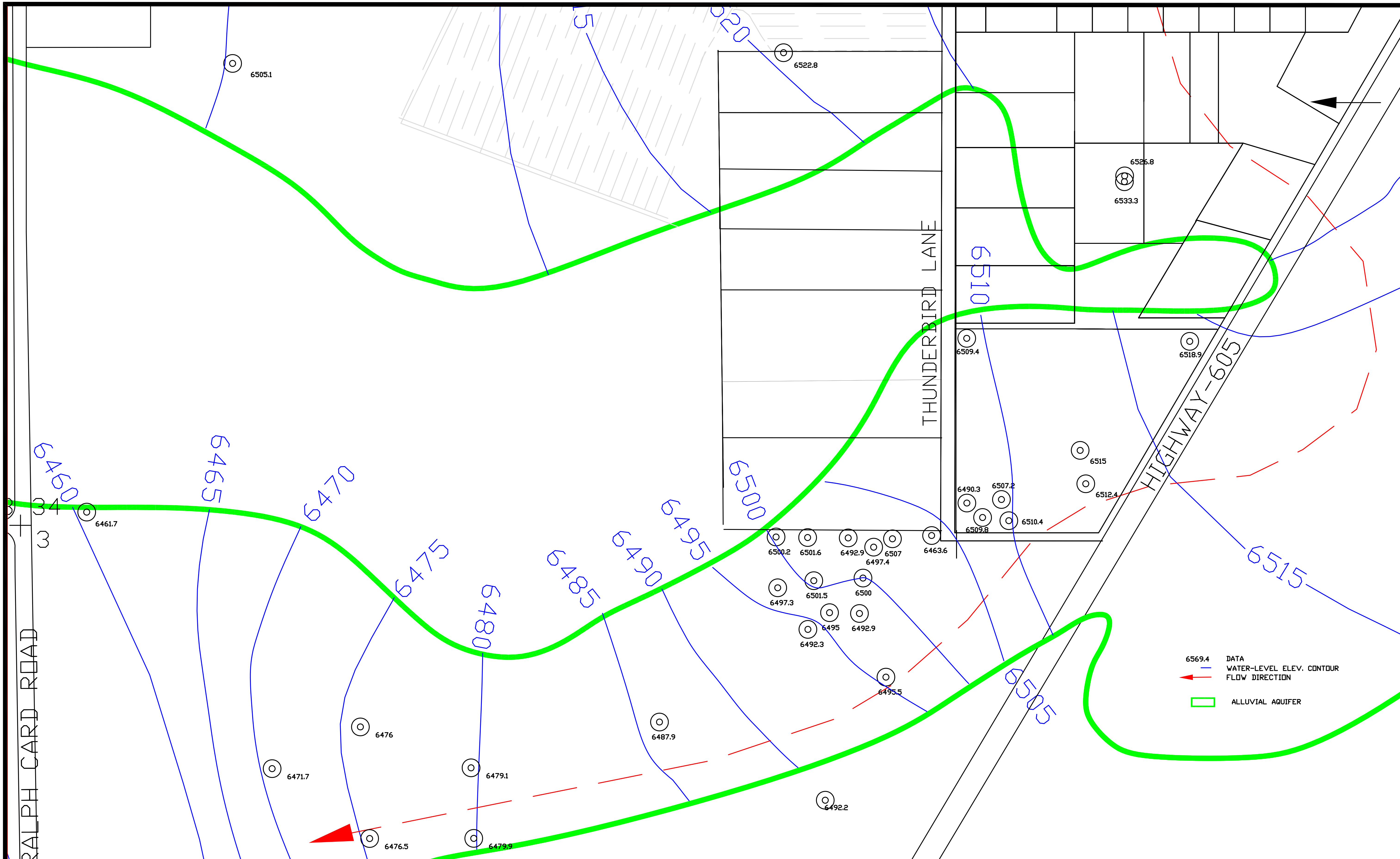
SCALE: 1"=1600'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 12/11/17

FIGURE 4.2-1. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, FALL 2017, FT-MSL



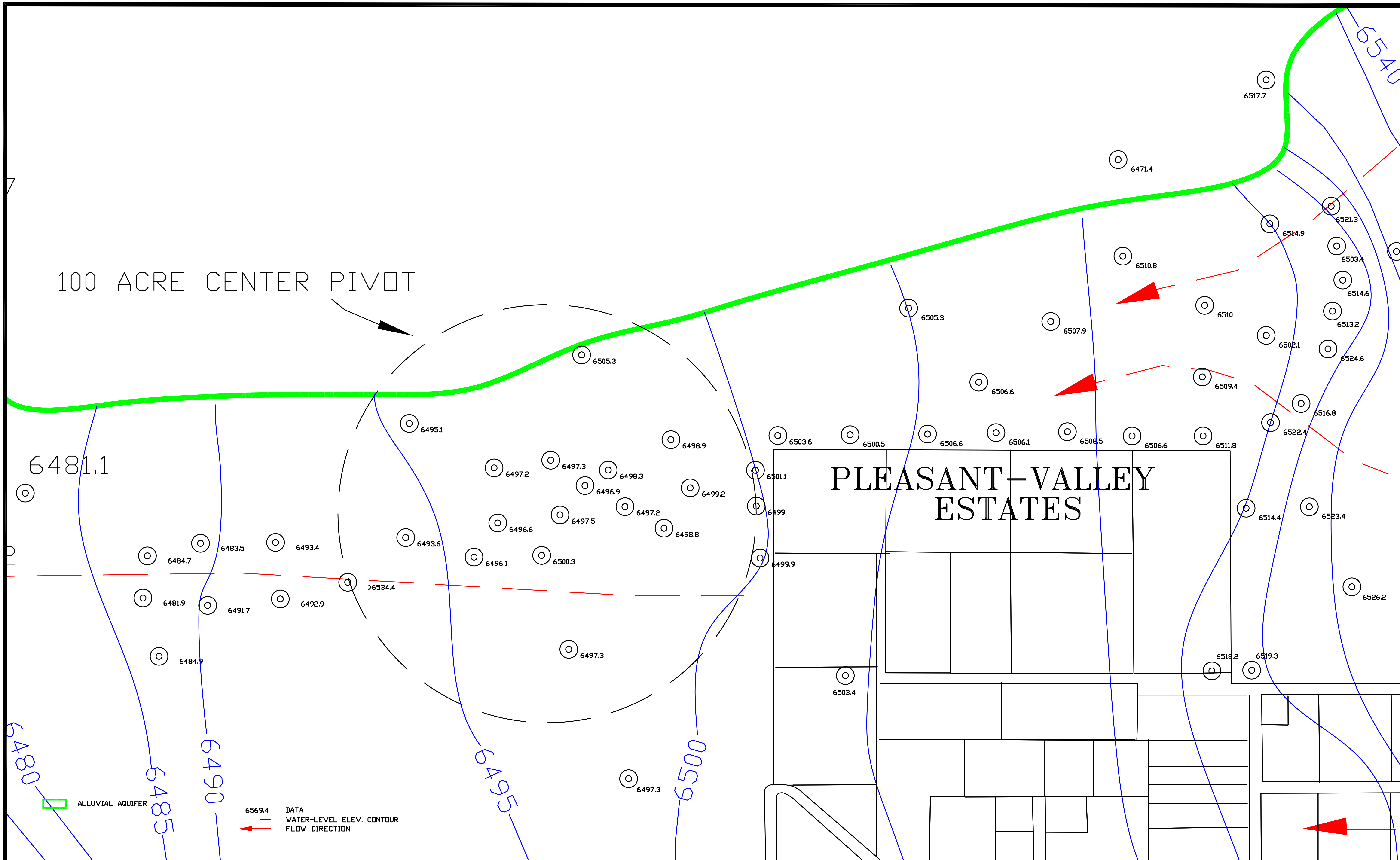
SCALE: 1"=500'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 2/6/18

FIGURE 4.2-1A. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, OS, FALL 2017, FT-MSL



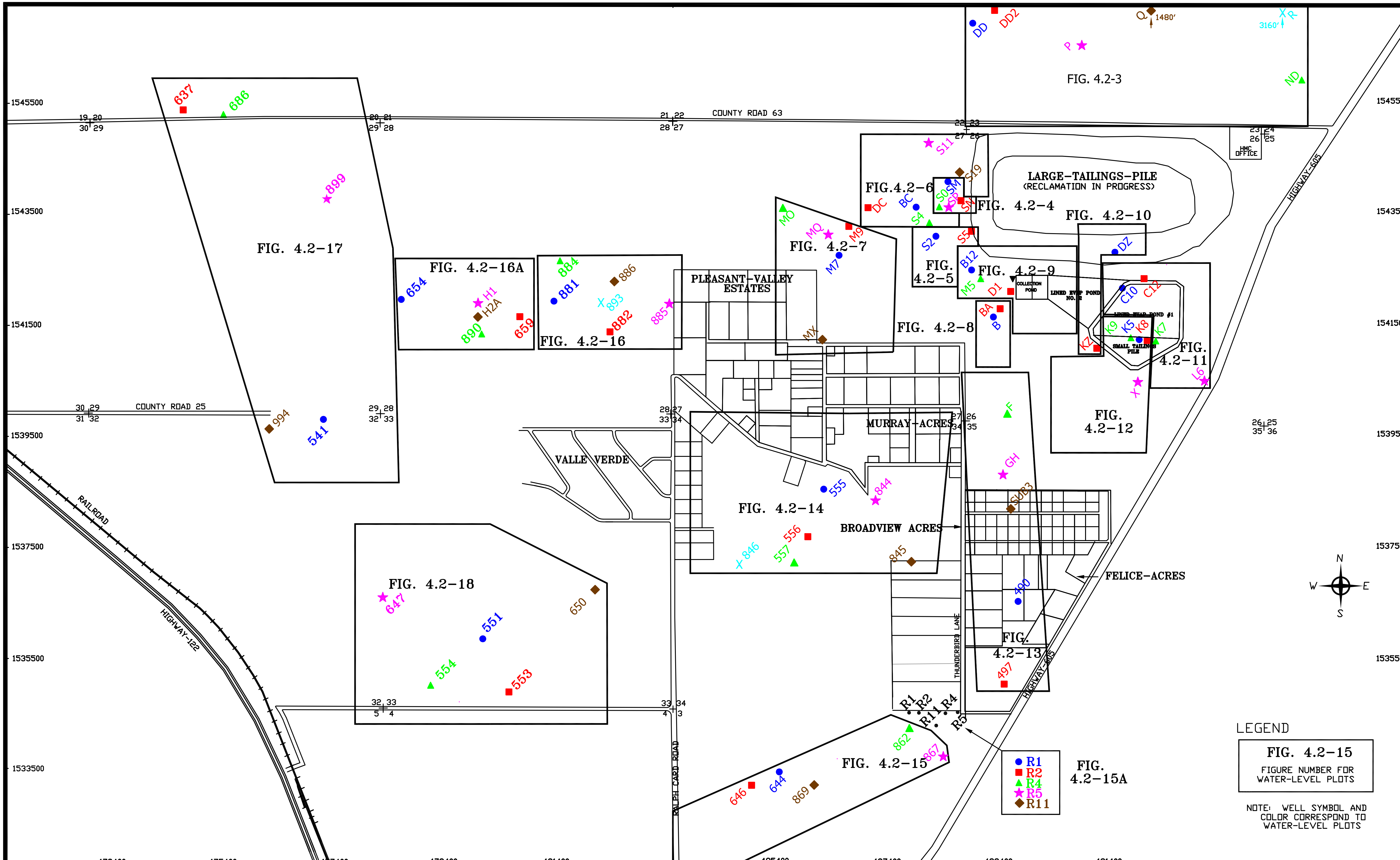
SCALE: 1"=500'
C:\PROJECTS\ 2018-06
1600QAL17
DATE: 1/26/18

FIGURE 4.2-1B. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, SOS, FALL 2017, FT-MSL



SCALE: 1"=500'
C:\PROJECTS\ 2018-06
16000AL17
DATE: 12/11/17

FIGURE 4.2-1C. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, NOS, FALL 2017, FT-MSL



SCALE: 1"=1600'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 1/29/18

FIGURE 4.2-2. LOCATION OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS, 2017

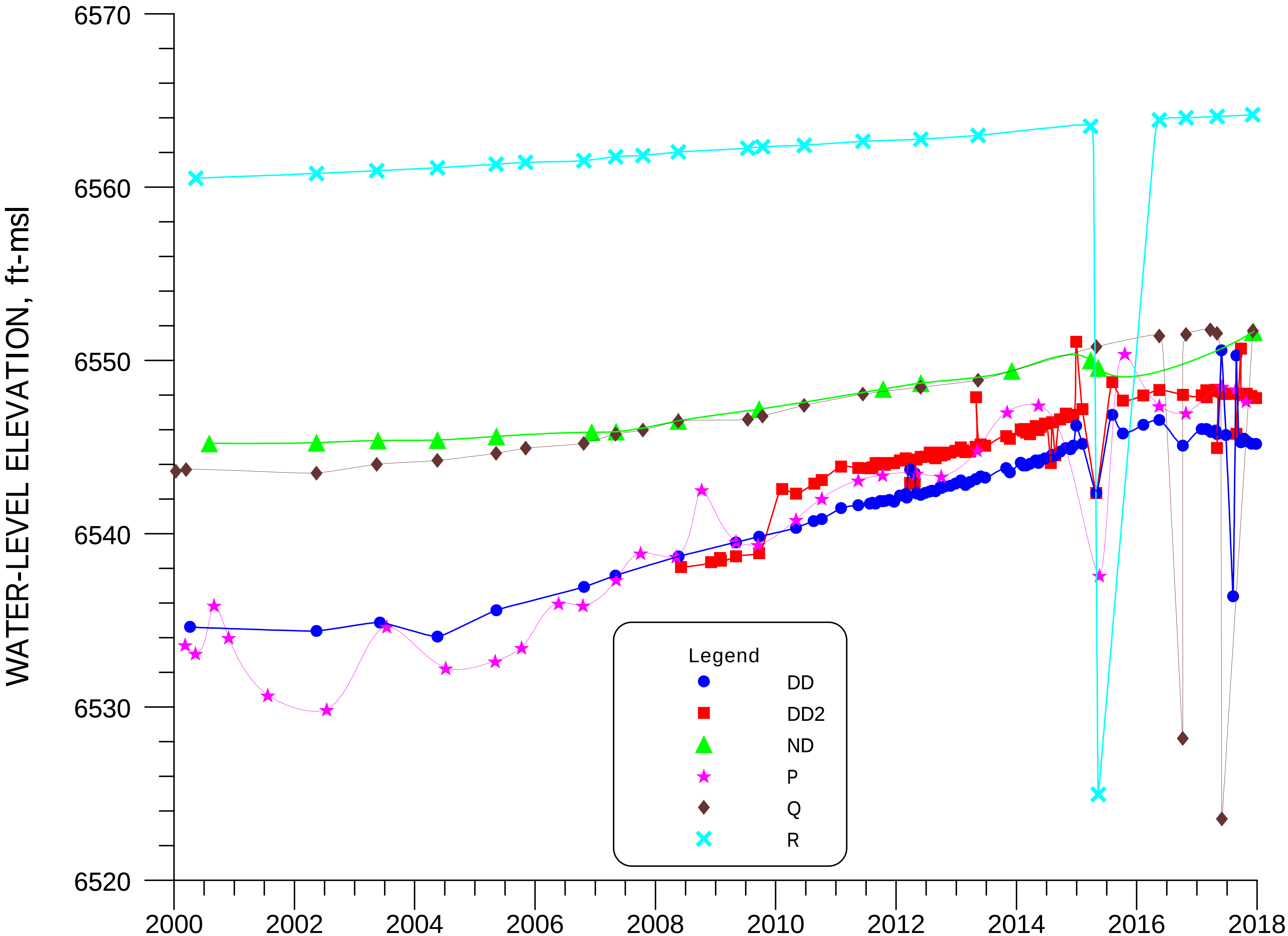


FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS DD, DD2, ND, P, Q AND R.

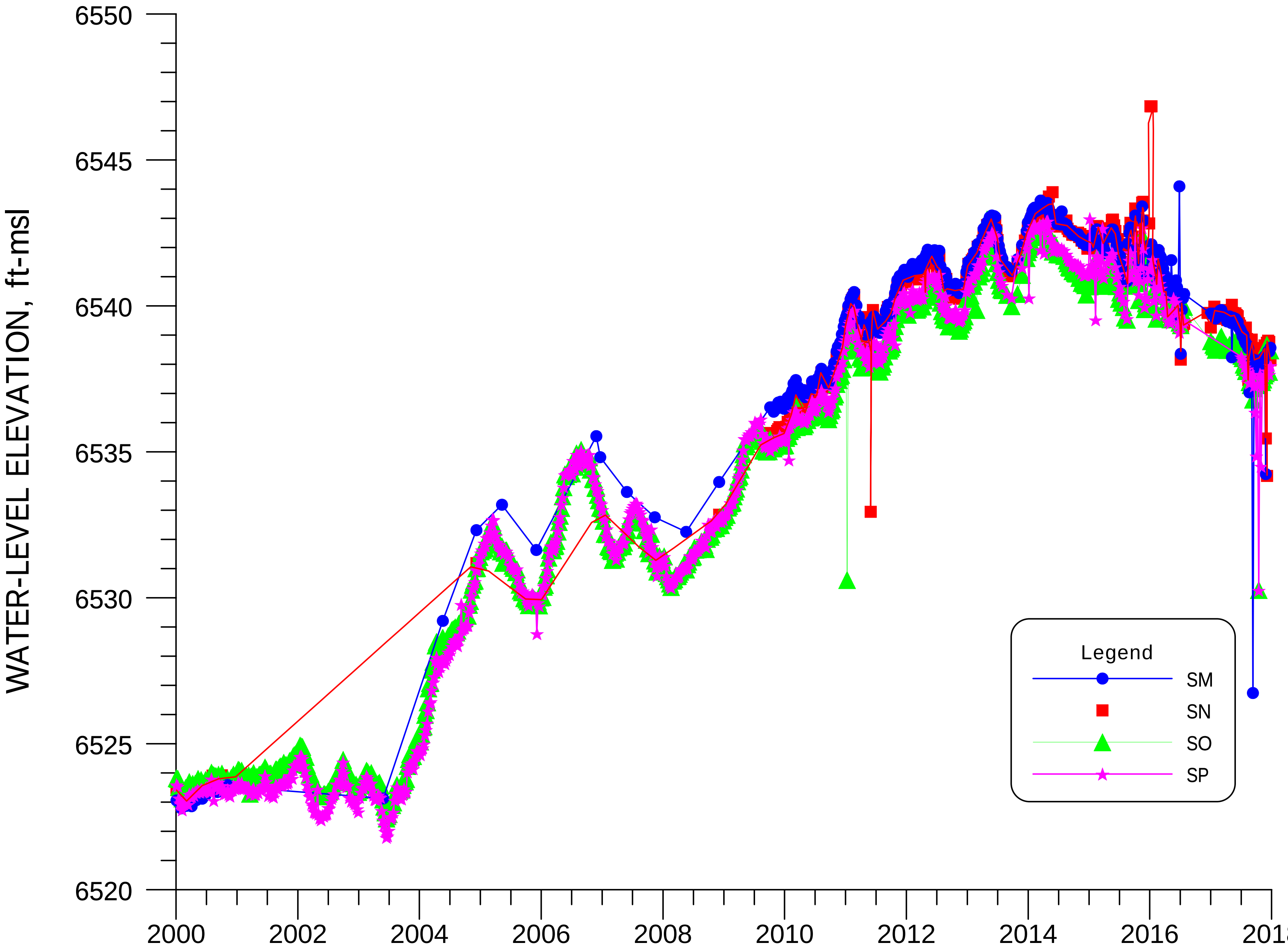


FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SM, SN, SO, AND SP.

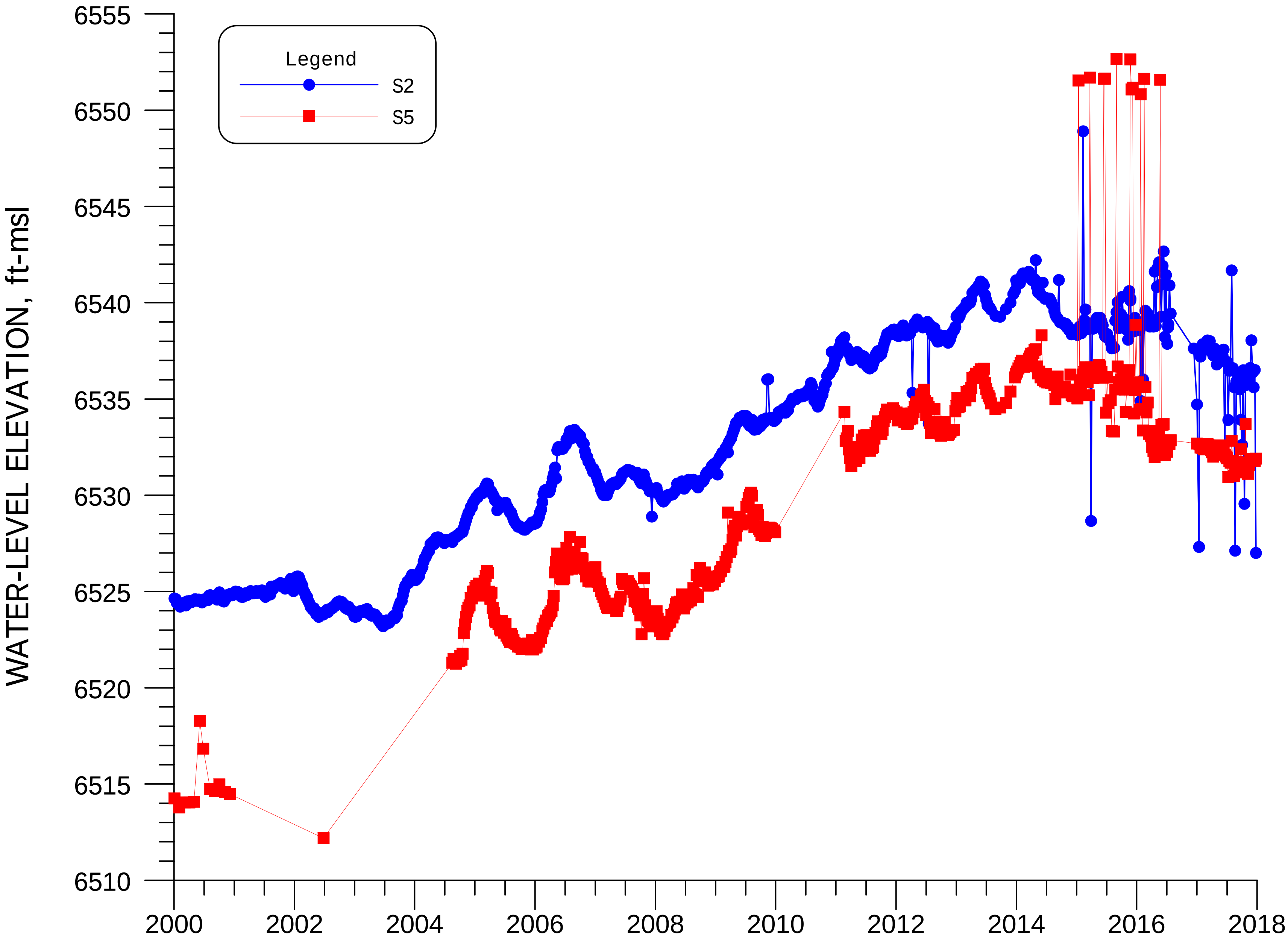


FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S2 AND S5.

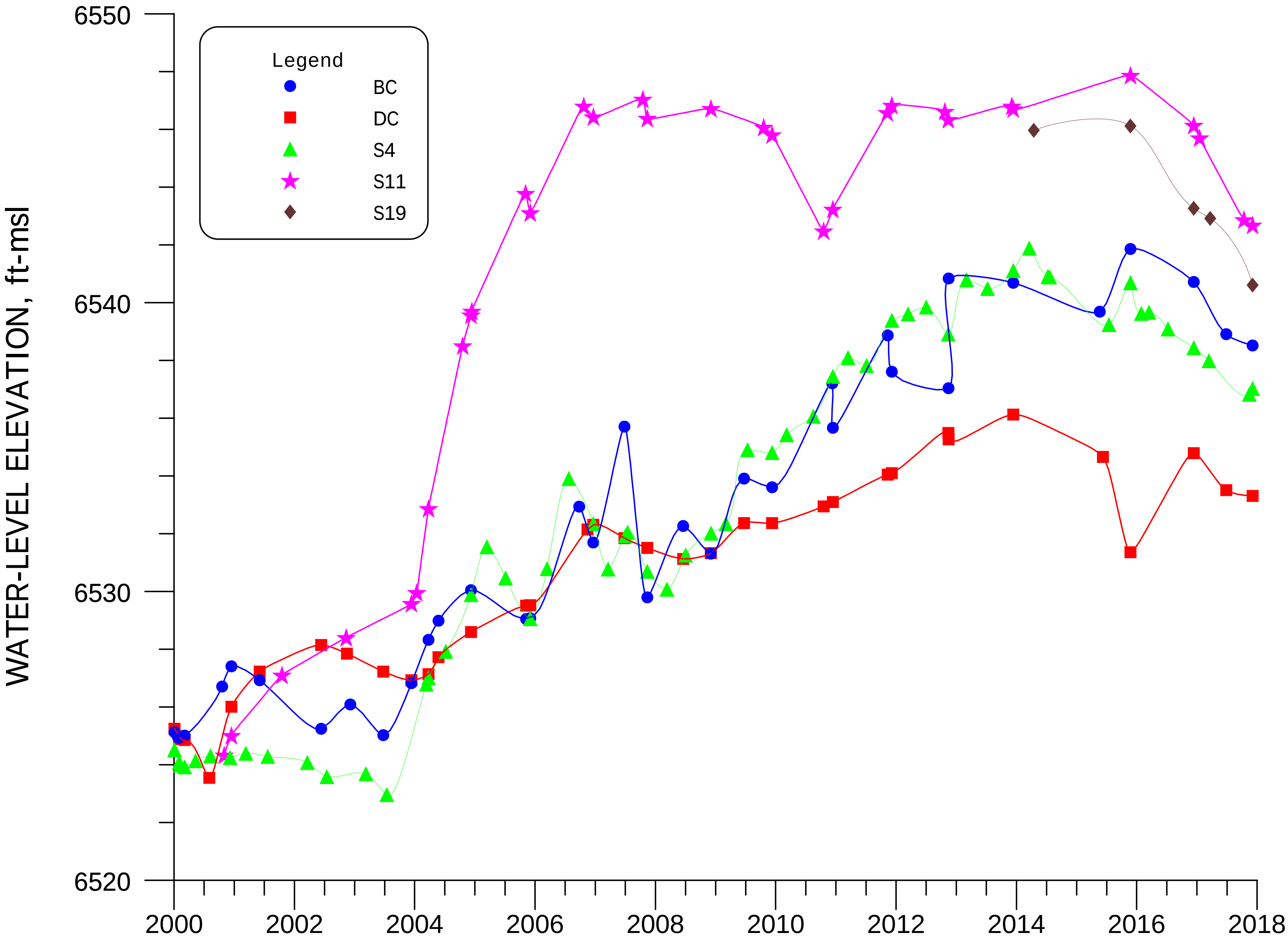


FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, S4, S11, AND S19.

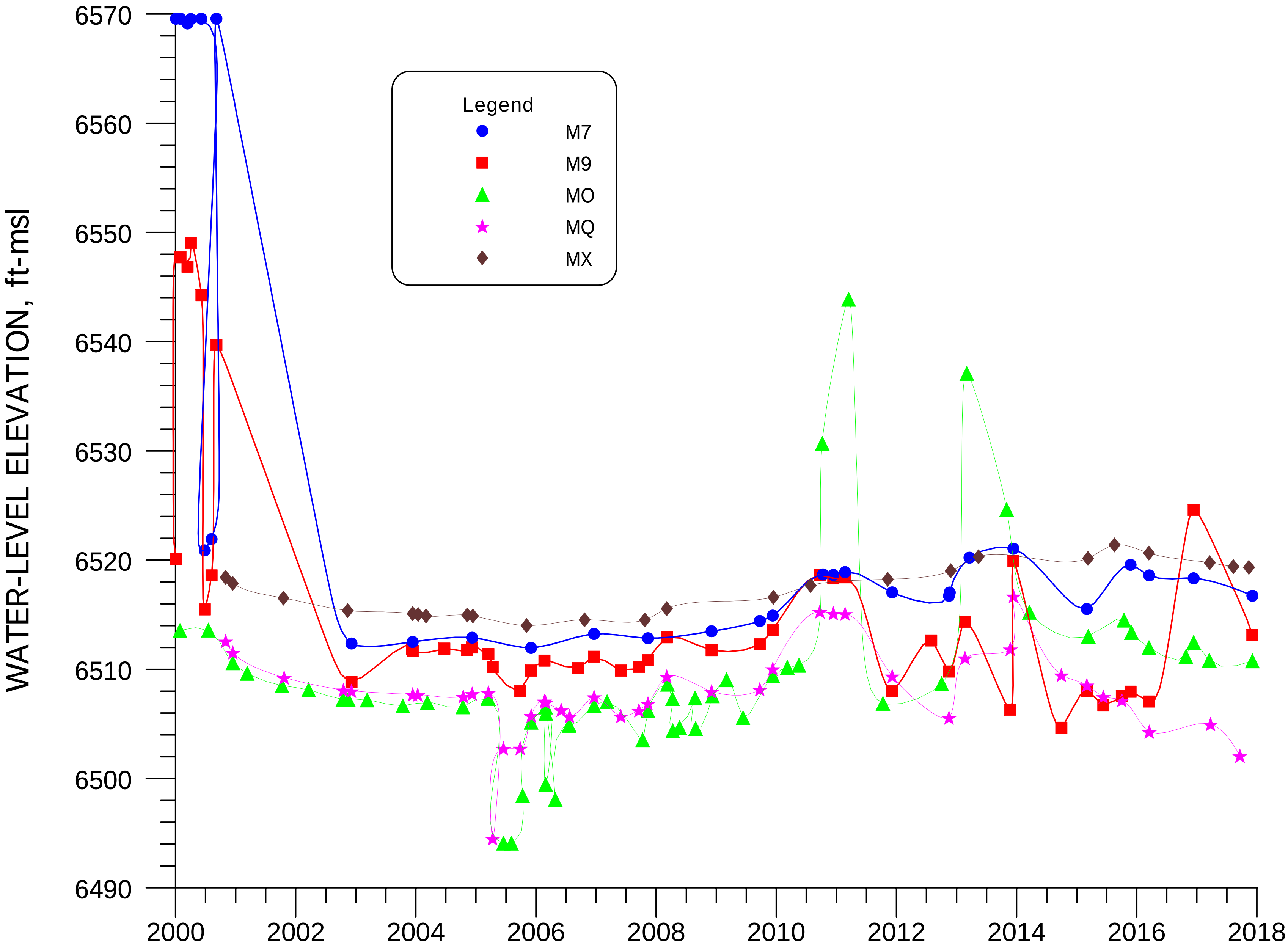


FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS M7, M9, MO, MQ, AND MX.

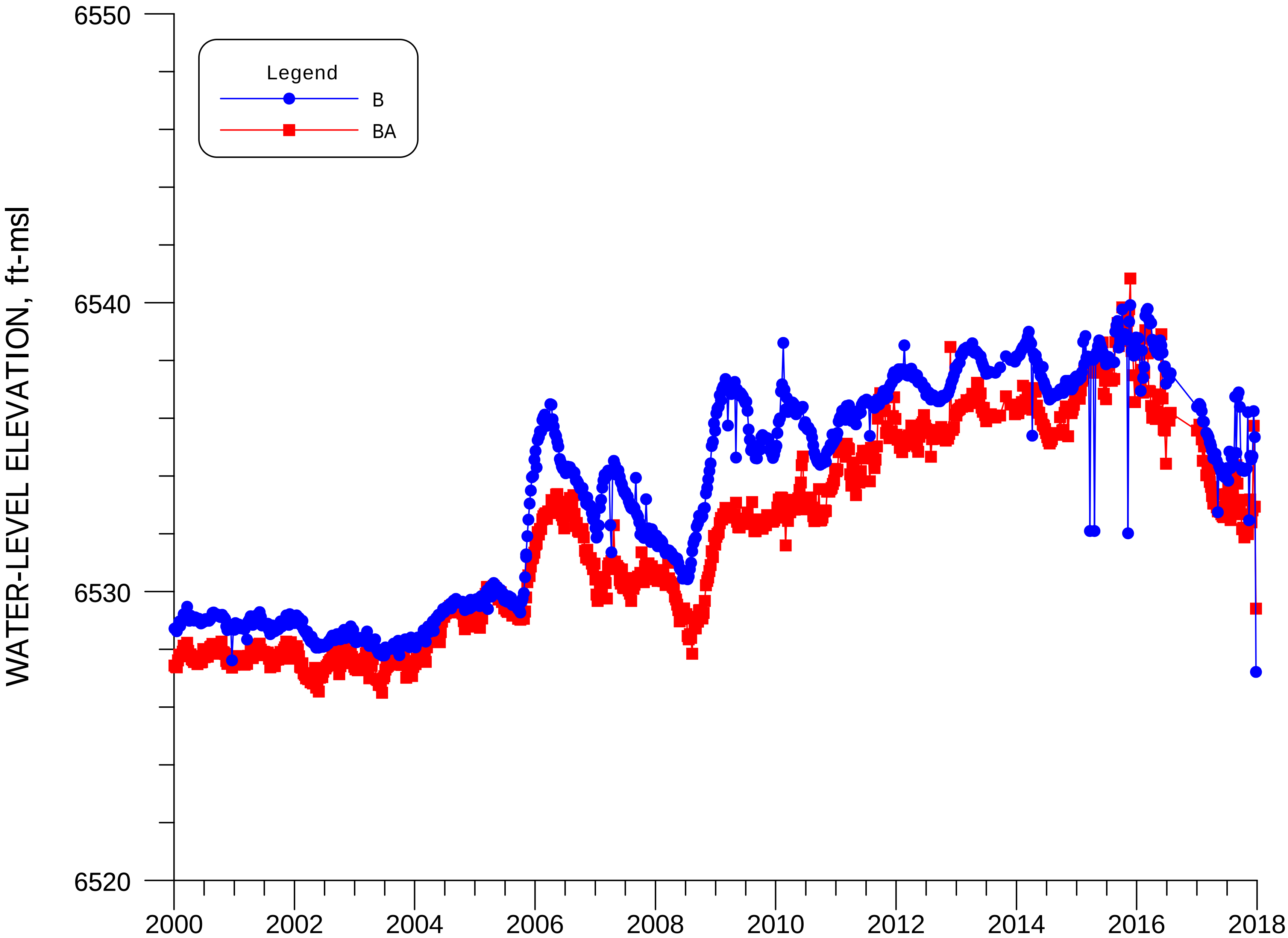


FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.

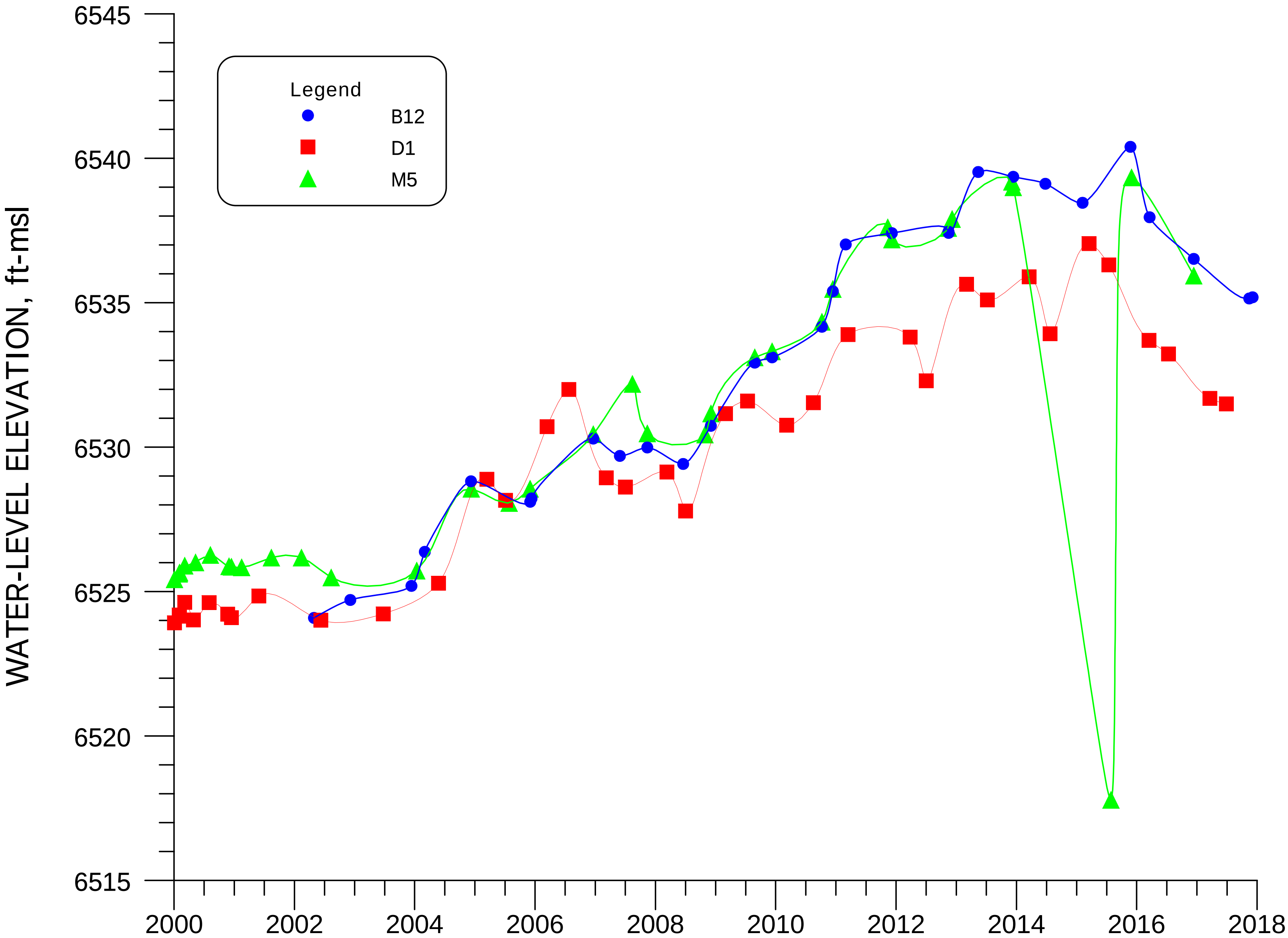


FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS B12, D1, AND M5.

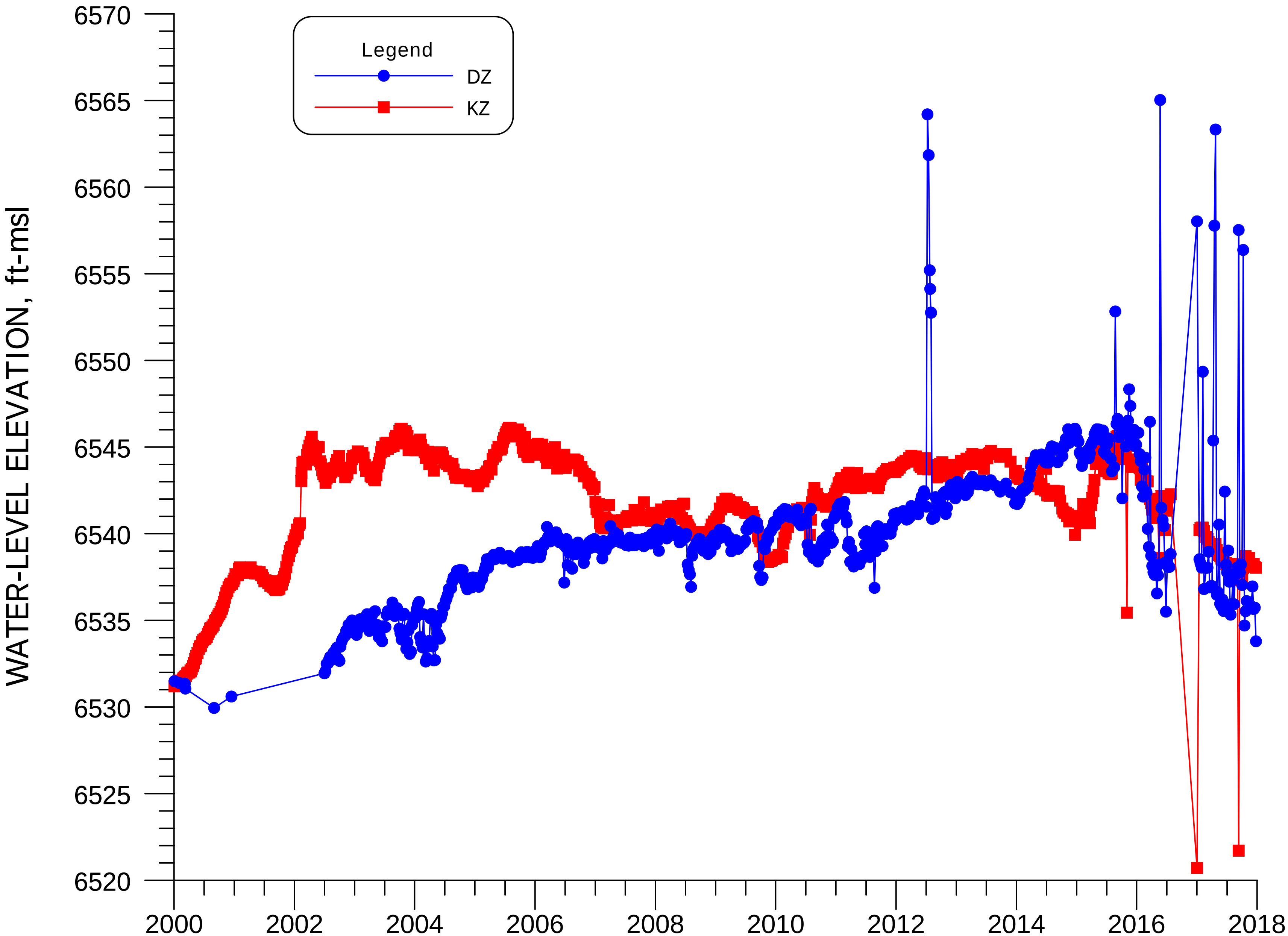


FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

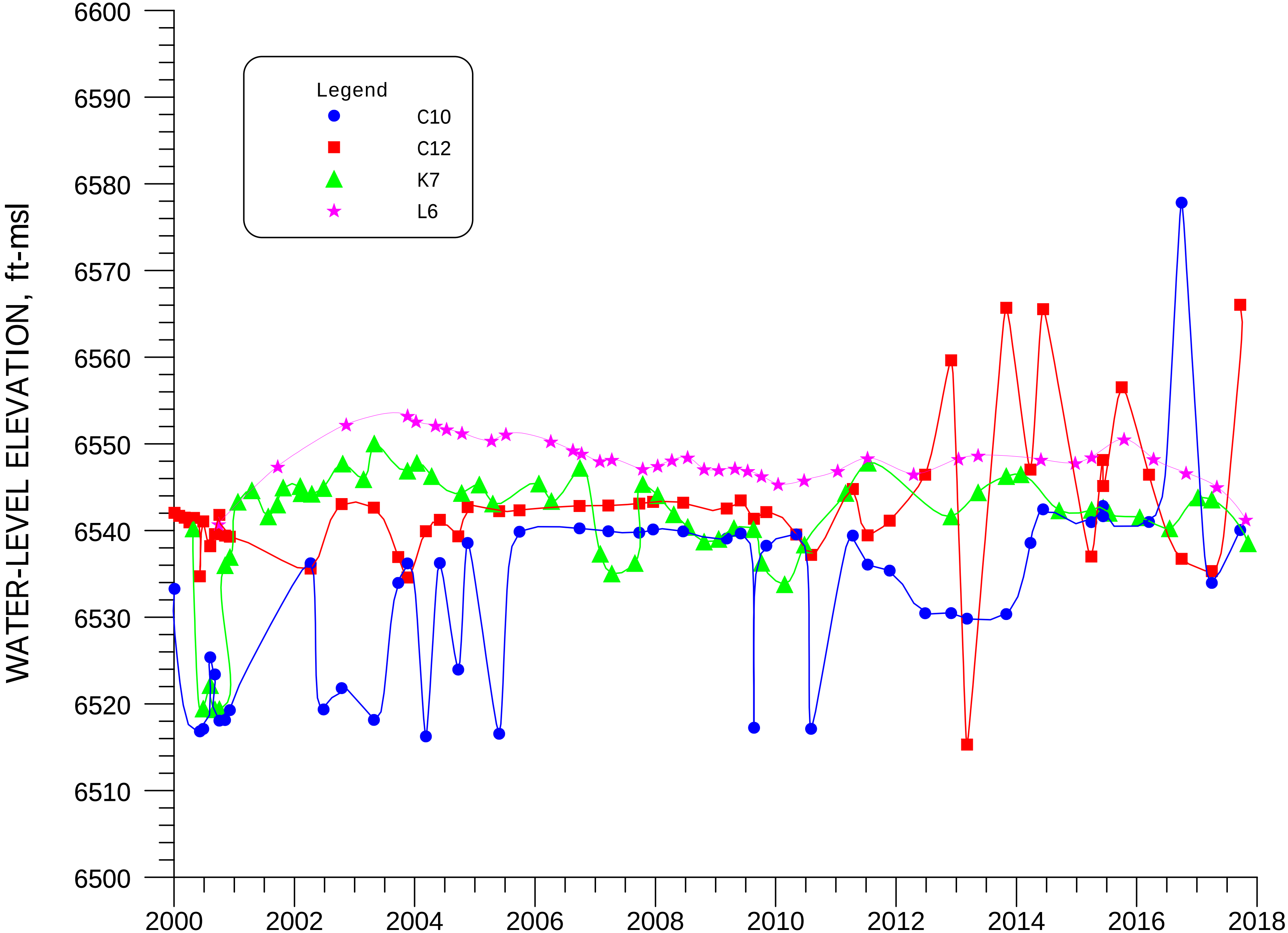


FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS C10, C12, K7, AND L6.

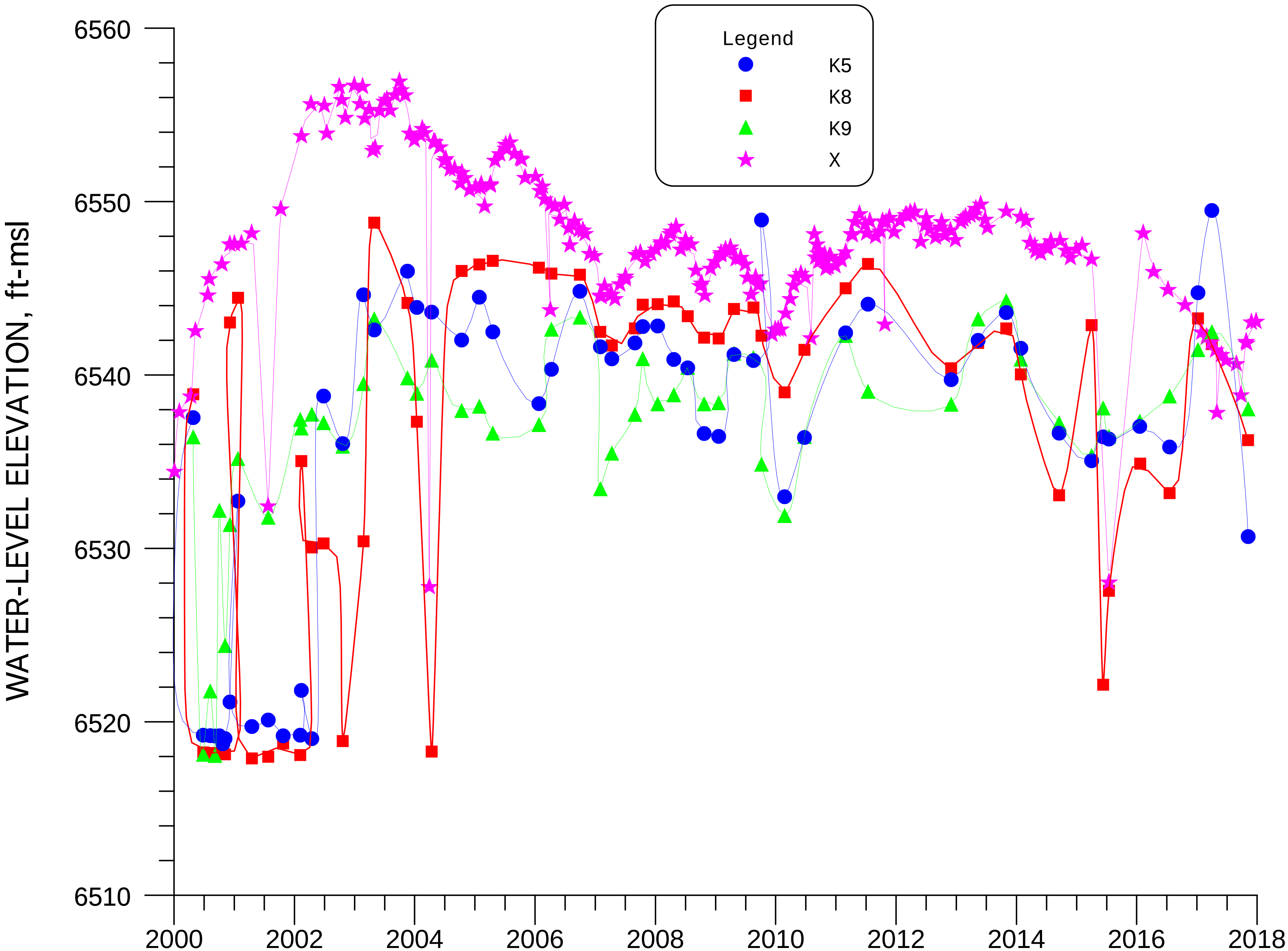


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS K5, K8, K9, AND X.

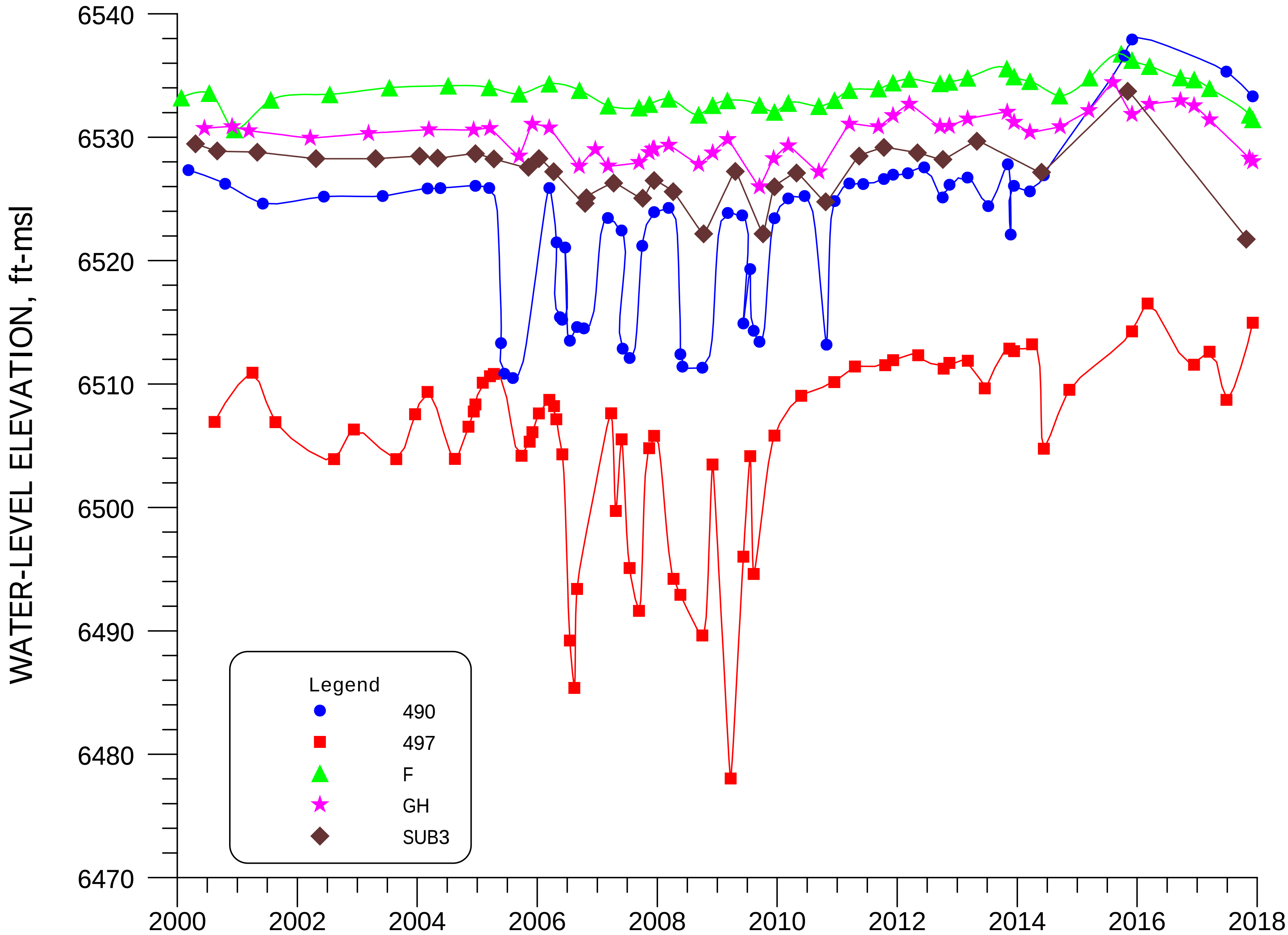


FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 490, 497, F, GH AND SUB3.

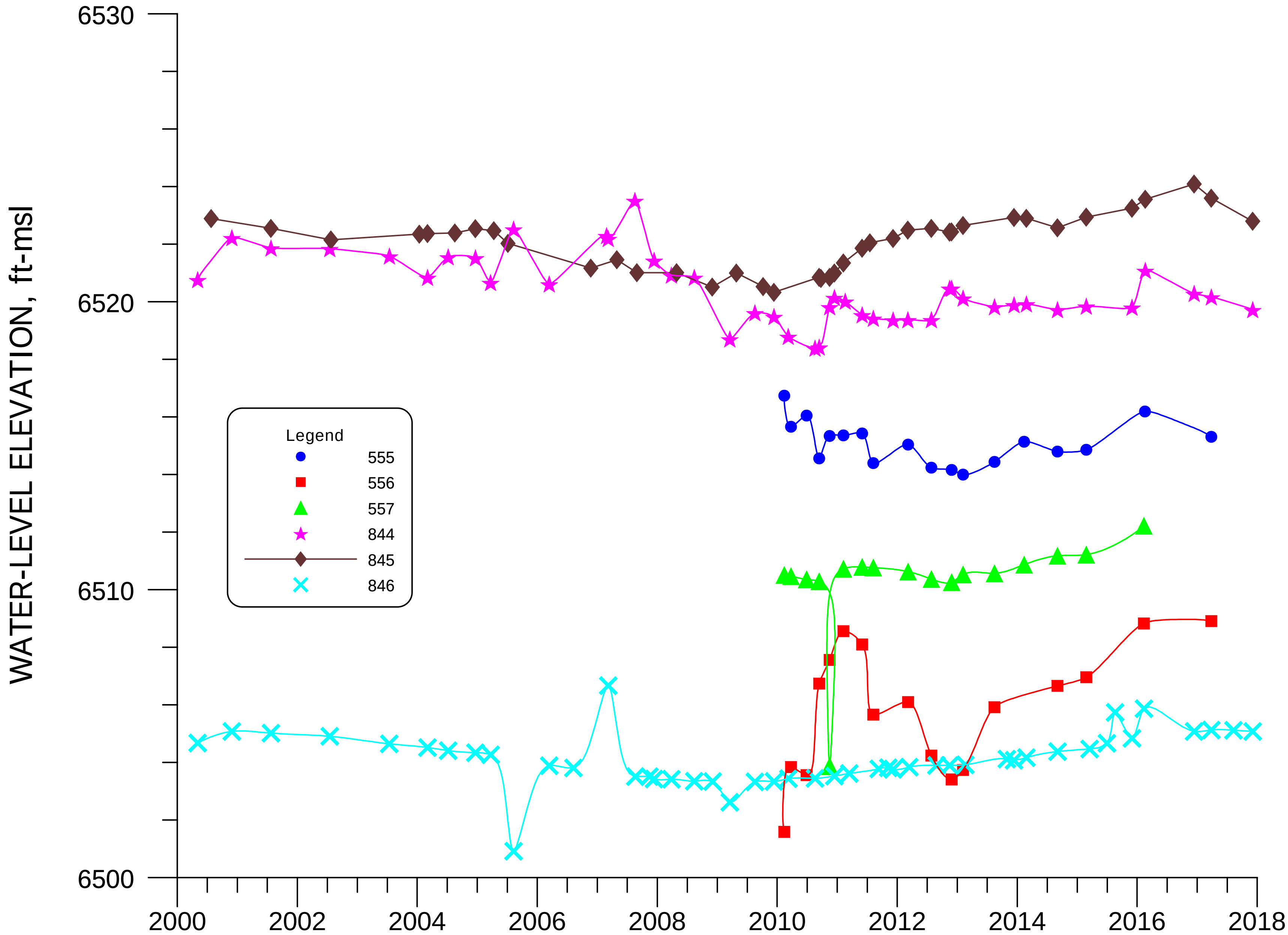


FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 555, 556, 557, 844, 845, AND 846.

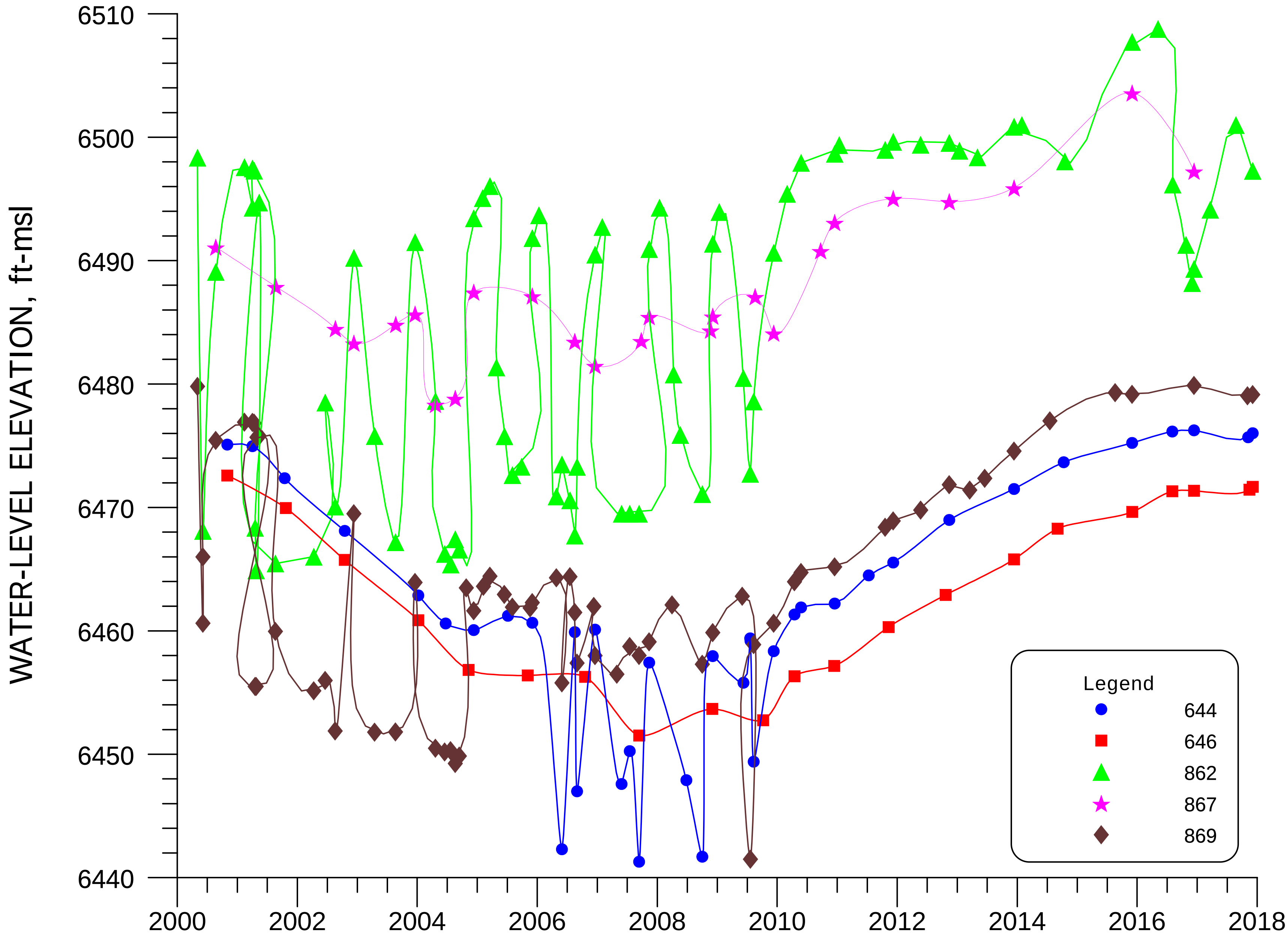


FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 644, 646, 862, 867, AND 869.

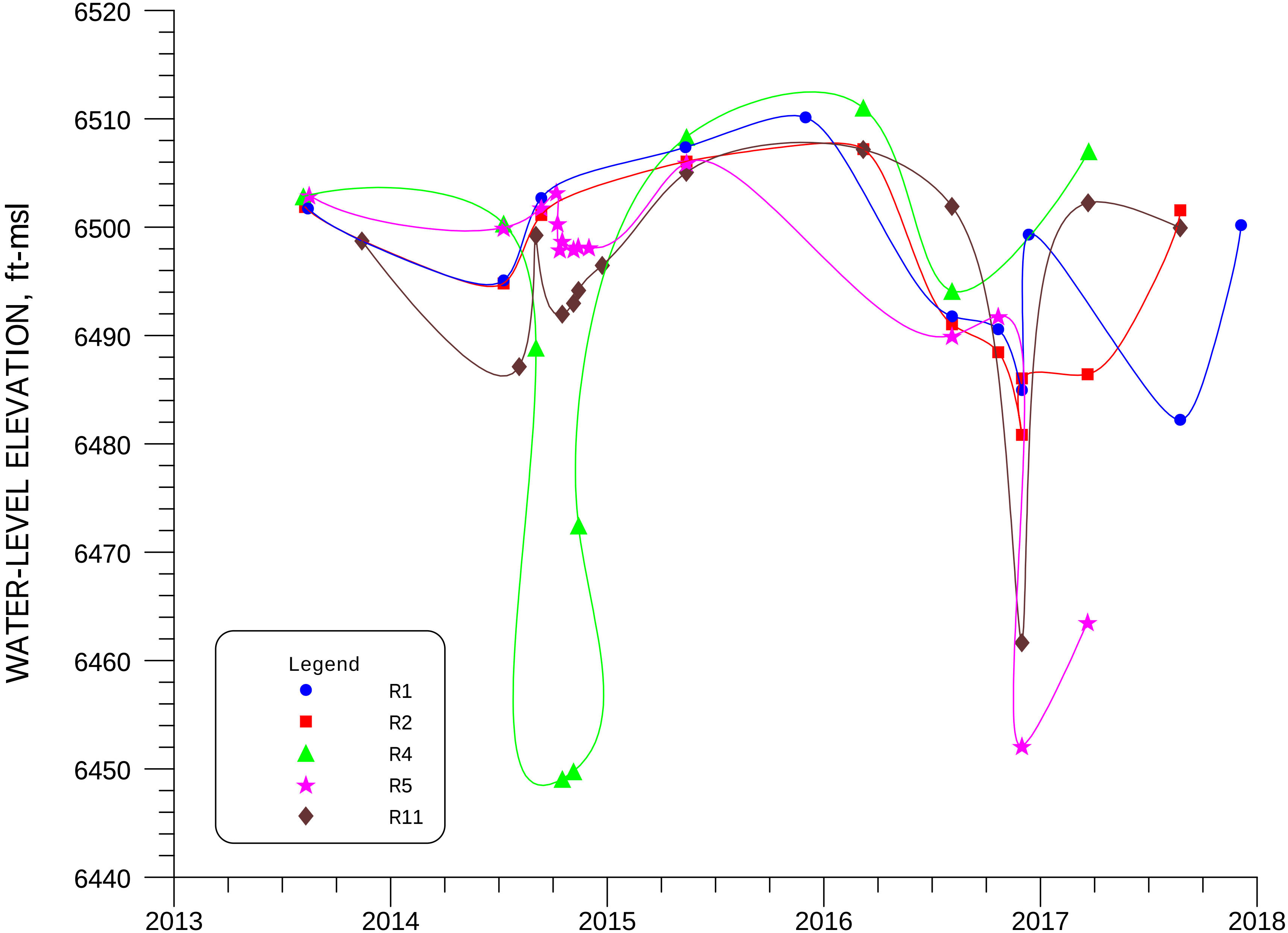


FIGURE 4.2-15A. WATER-LEVEL ELEVATION FOR WELLS R1, R2, R4, R5, AND R11.

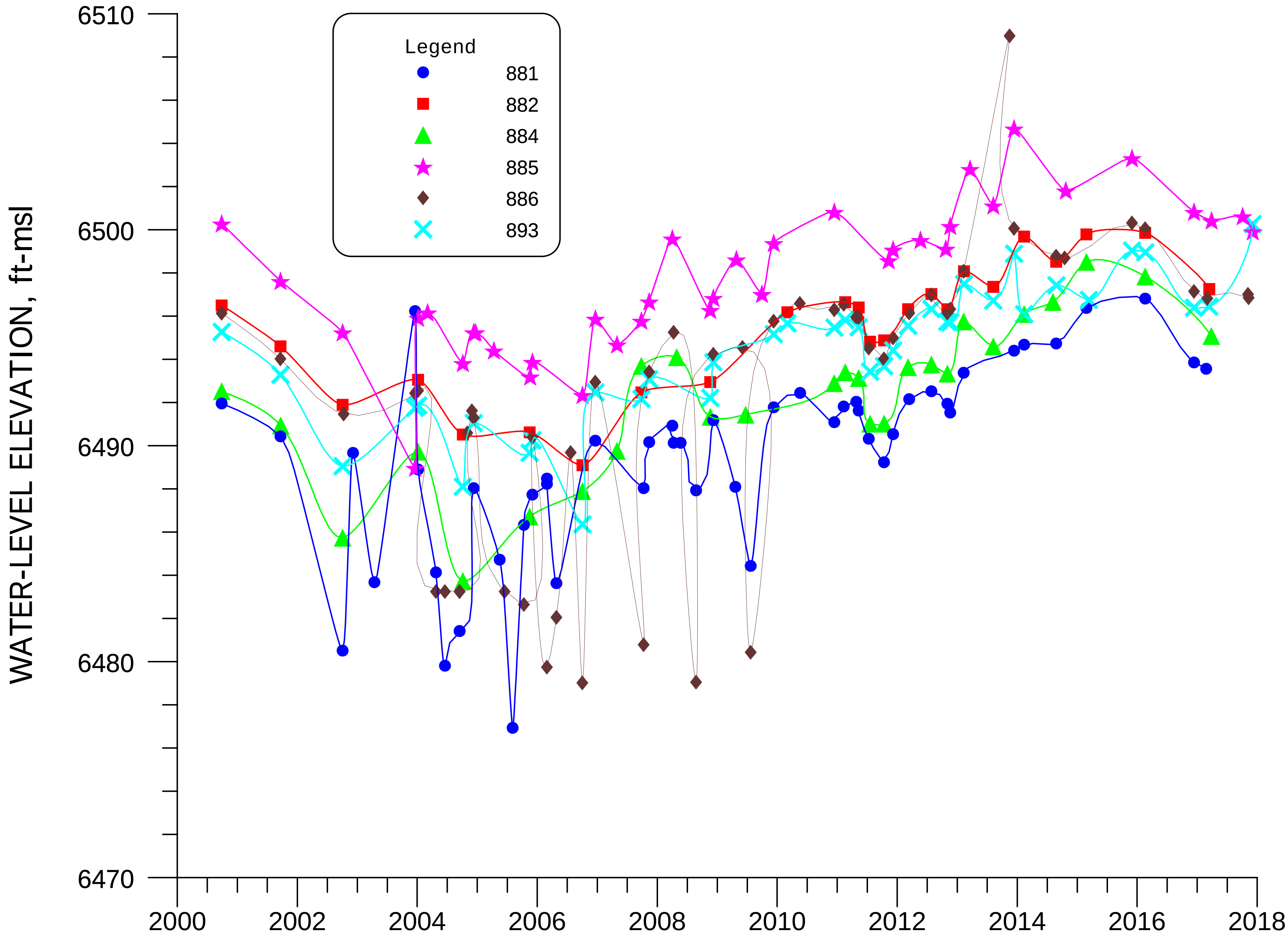


FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 882, 884, 885, 886, AND 893.

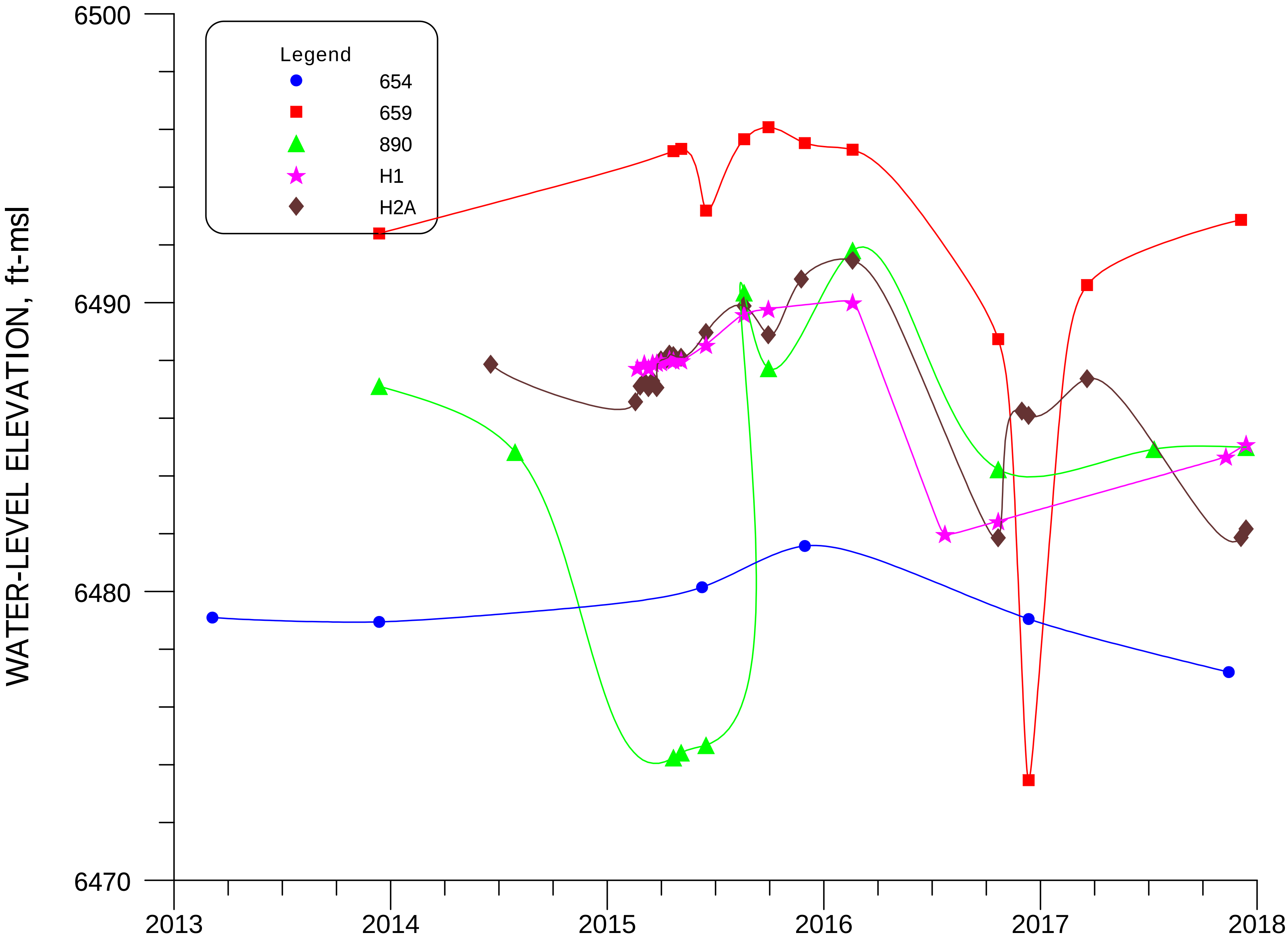


FIGURE 4.2-16A. WATER-LEVEL ELEVATION FOR WELLS 654, 659, 890, H1, AND H2A.

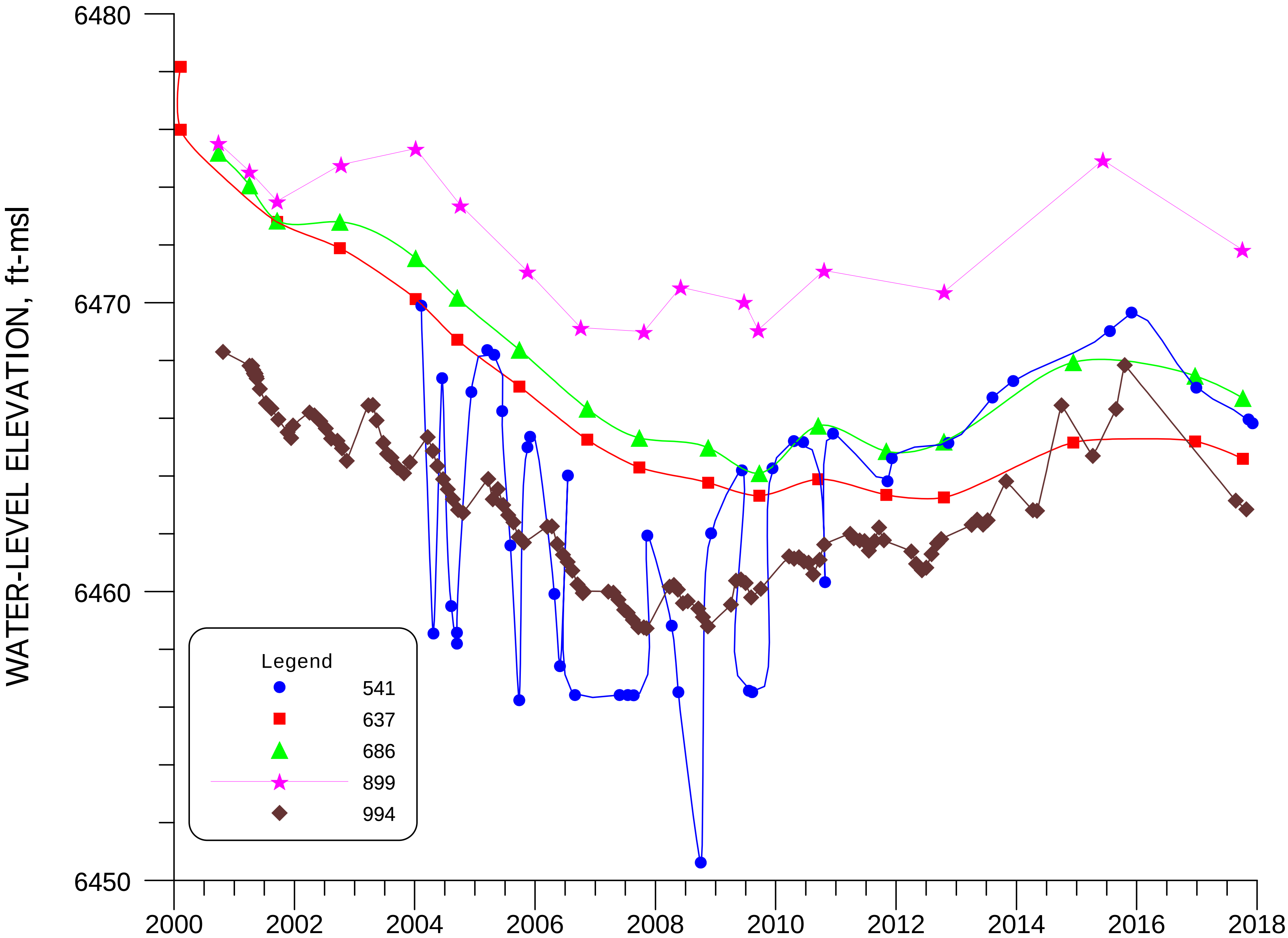


FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 541, 637, 686, 899 AND 994.

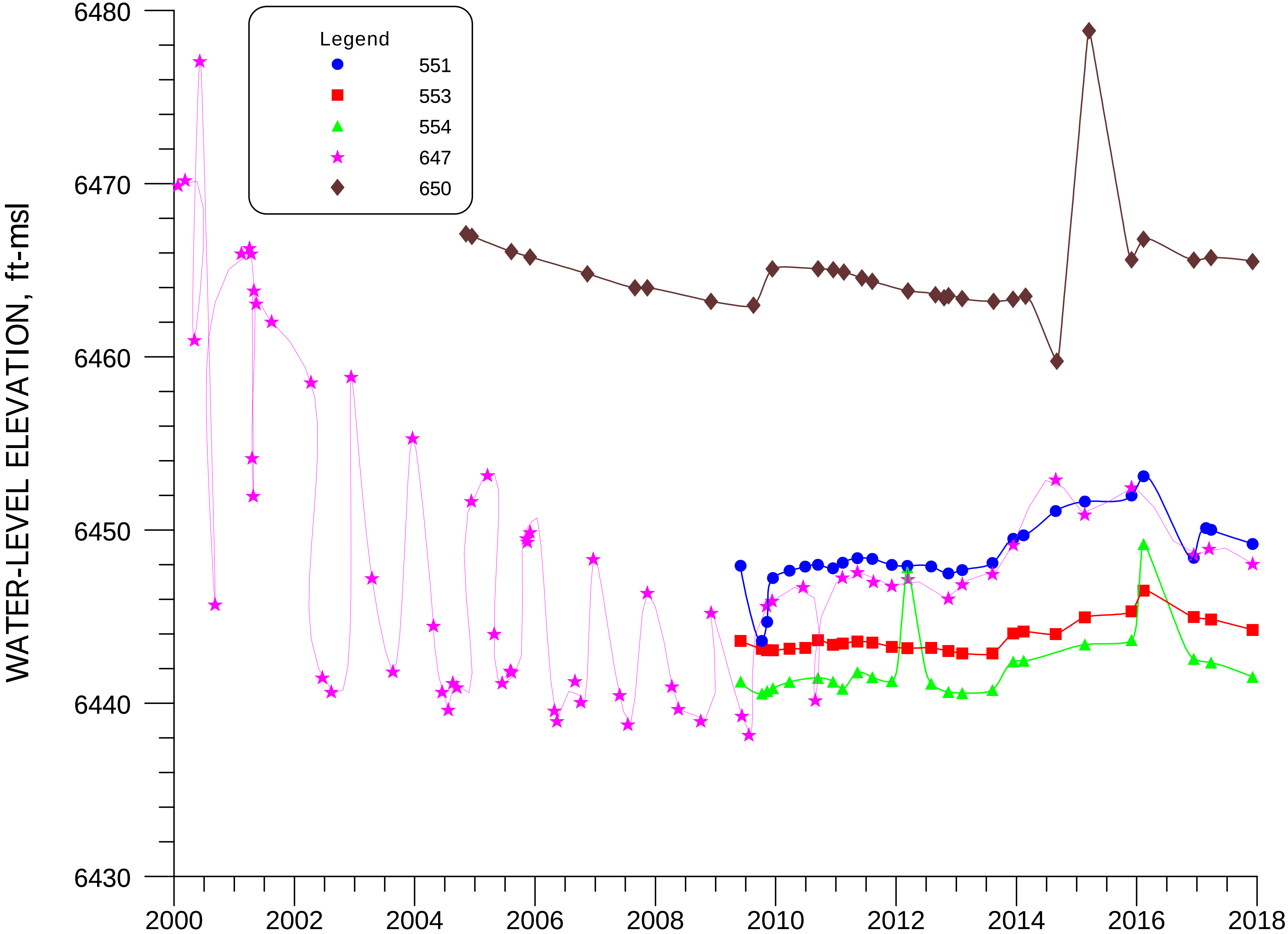


FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 551, 553, 554, 647, AND 650.

4.3 ALLUVIAL WATER QUALITY

This section presents the 2017 water-quality data for the alluvial aquifer. The major general water quality constituents that are typically measured at this site are sulfate, chloride and TDS. Sulfate concentrations are used as the primary indicator where contaminant remediation remains to be completed. Selenium, uranium and molybdenum are the primary metals of concern at this site. Nitrate, radium, vanadium and thorium are also discussed in the monitoring report, but these constituents are of only minor concern at the Grants site. Tables B.4-1 through B.4-6 in Appendix B present the 2017 alluvial water-quality data for each well. The most recent monitoring values were used for the iso-concentration contour figures presented in this section.

Colored patterns are used on the figures to delineate where concentration limits exceed the site standards for each of the constituents. The standard is presented in the legend of the respective figure for each parameter. A greater than sign was added in front of the numeric value to note that the pattern shows where the standard is exceeded.

4.3.1 SULFATE - ALLUVIAL

Sulfate has been used as the primary indicator constituent for this site, because concentrations are large in the tailings water. Concentrations of sulfate in the alluvial aquifer for 2017 are presented on Figure 4.3-1. Upgradient background well concentrations observed in 2017 ranged from 909 to 2160 mg/l. An updated statistical evaluation of the background sulfate concentration with data for a ten year period (1995 – 2004) showed that concentrations as great as 1500 mg/l could occur naturally at this site and is, therefore, the site standard. Areas where sulfate concentrations exceed 1500 mg/l are shown with a green pattern on Figure 4.3-1. This figure shows the locations of three areas where the sulfate concentrations are also posted for the On-Site (OS), the South Off-Site (SOS) and the North Off-Site (NOS) areas respectively in Figures 4.3-1A, 4.3-1B and 4.3-1C. As shown on Figures 4.3-1A, sulfate concentration near the LTP exceeds 5,000 mg/l. The observed sulfate concentrations in the four adjacent subdivisions were less than the site standard of 1500 mg/l in 2017 except for three wells in Section 34. Sulfate concentrations were similar in Section 3 and South Felice Acres in 2017 and are presented in Figure 4.3-1B. A few slightly smaller concentrations were observed in these two areas due the injection of treated water. Sulfate concentrations exceeded 1000 mg/l in the southwest portion of Murray Acres, southern Pleasant Valley Estates, eastern Valle Verde and to the southeast of Valle Verde. Sulfate concentrations also exceeded 1000 mg/l just north of Pleasant Valley in the northern portion of Section 27 (see Figure 4.3-1C). Down-gradient of the Grants Project site, the sulfate concentrations are all within the natural range of background except for the three wells south of Murray Acres and Pleasant Valley and, therefore, no water-quality restoration with respect to sulfate is necessary beyond the immediate Grants Project area except for these three wells. These three wells need their concentration reduced.

Plots of constituent concentrations versus time have been prepared for the alluvial aquifer for sulfate, TDS, chloride, uranium, selenium, molybdenum and nitrate. The groupings of wells used for these plots are shown on Figure 4.3-2. The figure numbers for each of the well groupings that correspond with the sulfate concentration versus time plots are indicated. The color and symbol used for each well are the same as those used in the time plots for each constituent. Figure numbers for the time plots of other constituents are not shown on this map; however, it is useful for the other time-concentration plots because the color, symbol and well groupings are consistent.

Figure 4.3-3 presents sulfate concentrations plotted versus time for near up-gradient background wells DD, DD2, P, P3, Q and R. A gradual increase occurred in the up-gradient well DD in the 2008 through 2012 values compared to previous concentrations while the 2013 through 2015 concentrations were steady with the 2016 and 2017 values indicating an overall increasing trend may still be occurring. The historical values for these wells show similar periods of short term increasing and decreasing trends in the alluvial aquifer. The changes in sulfate concentration in these wells are well within the range previously observed for sulfate in the up-gradient wells except for the higher concentrations in well DD during the last few years. Some of these increases could be due to the influx of groundwater with higher sulfate concentrations into this area up-gradient of Homestake's background wells. The alluvial site standard is presented on each of the water quality plots for comparison with the water quality data.

Sulfate concentrations immediately west of the LTP in alluvial wells S2, S4, S11, S19 and SA were fairly steady in 2017, except for a start of a decline in well SA (see Figure 4.3-4). Figure 4.3-5 presents sulfate concentrations plotted versus time for alluvial wells M6, MO, MQ and MX situated further west of the LTP. Figure 4.3-6 presents sulfate concentration versus time plots for alluvial wells 802, B16, D1, M3 and S3. The large decrease in sulfate concentrations were observed in well D1 in 2016, followed by a small decrease in 2017. Figure 4.3-7 presents time plots of sulfate concentrations for wells T, T10, T11, T25 and TA. Figure 4.3-8 presents plots of sulfate concentrations versus time for alluvial wells on the west side of the STP. Figure 4.3-9 presents sulfate concentrations versus time for alluvial wells on the STP and the south side of the STP. Figure 4.3-10 shows the sulfate concentrations for the STP collection wells K4, K5, K7 and K8 and monitoring well 1K.

Time plots of sulfate concentrations in collection wells and monitoring well L6 located southeast of the STP are presented on Figure 4.3-11. This figure shows reasonably steady sulfate concentrations in 2017 in these wells.

Figure 4.3-12 presents sulfate concentration time plots for wells to the north, east and in Broadview Acres for alluvial wells F, FB, GH, GN, GV and SUB2. Figures 4.3-13 and 4.3-13A present sulfate concentrations versus time for Felice Acres alluvial wells 490, 497, 498, Q2, Q3, Q5, Q18 and Q30.

Figure 4.3-14 contains time plots of sulfate concentrations for wells in and near the former flood irrigation area in Section 34 for alluvial wells 555, 556, 557, 844, 845 and 846. This plot shows that sulfate concentrations in water taken from alluvial wells 555, 556, and 844 were fairly steady in 2017 while a gradual decline was observed in wells 557, 845 and 846. Sulfate concentrations are higher than the site standard in alluvial wells 555, 844 and 846. The sulfate concentrations in well 846 are not thought to be from the Section 34 irrigation. The changes in the last few years in the other wells could be showing the small effect on sulfate concentrations from the former flood irrigation.

Figures 4.3-15 and 4.3-15A present the sulfate concentration time plots for wells in Section 3 (see Figure 4.3-2 for the location of these wells). Sulfate concentrations in the Section 3 alluvial wells have been fairly steady over the last several years except for the higher value from well 862 which is thought to be a lab error due to the lack of change in the TDS concentration.

The sulfate concentrations in water from five wells within and near the former Section 28 center pivot irrigation area and Pleasant Valley monitoring well 688 are presented on Figure 4.3-16 while Figure 4.3-16A presents sulfate concentrations for five wells located west of the Section 28 irrigation area where initial restoration is occurring. The sulfate concentrations in these wells generally show a small decline in the concentration in 2017 due to the injection of treated and/or fresh water injection.

Figure 4.3-17 presents sulfate concentrations with time for five wells located farther west and after the confluence with the Rio San Jose alluvium. Wells 637 and 686 are in the Rio San Jose alluvium upgradient of the San Mateo confluence while the other three wells are near or downgradient of the confluence. The time variations of sulfate concentrations in water sampled from four wells in Section 33 Center Pivot area are plotted on Figure 4.3-18. Sulfate concentrations in each of these wells were fairly steady in 2017 except for a decline in well 551 in 2015. A gradual increase had been observed from well 551 in the center of the Section 33 pivot prior to the decrease. The increase could be due to a small effect from the past Section 33 irrigation but is well within the natural variations that have been observed for this area. Sulfates have been steady the last three years in well 551, likely from the ceasing (2009) of the irrigation.

4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during 2017 are presented on Figures 4.3-19, 4.3-19A, 4.3-19B and 4.3-19C. The alluvial background TDS concentrations measured up-gradient of the LTP in 2017 varied from 1560 to 3520 mg/l. Based on an updated statistical analysis, TDS concentration must exceed 2734 mg/l before it is considered elevated beyond the naturally occurring range. A light green pattern is shown on Figures 4.3-19, 4.3-19A, 4.3-19B and 4.3-19C to indicate where the TDS concentrations exceed the 2734 mg/l site background standard. None of the observed concentrations in the west half of Figure 4.3-19 exceed this level. The TDS concentrations near the tailings exceed 2734 mg/l and to the west and south of the LTP. A significant portion of the alluvial aquifer underlying the Large Tailings area exceeds 10,000 mg/l (see Figure 4.3-19A). A zone of 2000 mg/l or greater TDS concentration extends to the west of the LTP through the eastern half of Section 28 (see Figure 4.3-19C). Additional areas of TDS concentrations greater than 2000 mg/l exists in the southern portion of Pleasant Valley Estates, the southern portion of Murray Acres, the eastern portion of Valle Verde and to the south of this area (see Figure 4.3-19). The only other area of TDS concentrations above 2000 mg/l are two areas in Felice Acres. Only the areas closely proximal to the two tailings piles and a small area west of the Large Tailings and areas east of

Valle Verde and south of the Murray Acres require groundwater quality restoration to meet the site TDS background standard.

TDS time concentration plots were developed for the same grouping of wells as those prepared for sulfate (see Figure 4.3-2 for groupings of wells with TDS plots). Figure 4.3-20 presents the TDS concentrations versus time for the up-gradient wells. TDS concentrations were steady in well DD in 2013 through 2015 and gradually increased in 2016 and 2017. TDS in wells DD2 and Q gradually increased in 2015 through 2017 while concentrations in the remainder of the upgradient wells remained fairly steady.

Figures 4.3-21 through 4.3-24 present TDS concentrations plotted versus time for wells on and near the LTP. Plots of TDS concentrations on and near STP are presented in Figures 4.3-25 through 4.3-27. TDS concentrations in water taken from the L line of wells are presented in Figure 4.3-28 while Figure 4.3-29 presents the TDS concentrations versus time for wells north of Broadview Acres, one well east of Broadview Acres and one in Broadview Acres.

The TDS concentrations in the Felice Acres alluvial wells are presented in Figures 4.3-30 and 4.3-30A with five South Off-site collection wells included in these plots. TDS concentrations for the former flood irrigation area alluvial wells are presented in Figure 4.3-31. Fairly steady TDS concentrations were observed in these wells in 2017 with a small decline in wells 557, 845 and 846 and a small rise in well 555. The prior increases in TDS concentrations in recent years in wells 555, 844 and 845 could be due to the flood irrigation in this area which ceased after the 2012 season.

Figures 4.3-32 and 4.3-32A present time plots of TDS concentrations for five wells located in Section 3 and five of the R collection wells. TDS concentrations for the former Section 28 irrigation monitoring wells and Pleasant Valley monitoring well 688 were overall stable in 2017 (see Figure 4.3-33). The observed changes in these wells in 2013 through 2015 could be due to ceasing irrigation in Section 28 but could be due to freshwater injection proximal to these wells. The TDS in the freshwater injection source increased in 2012 due to the switch from San Andres well 951 to well 951R. Some of the TDS variations could be due to past irrigation in this area. TDS concentrations in alluvial wells just west of the Section 28 former irrigation area are presented on Figure 4.3-33A.

TDS concentrations in alluvial wells in Sections 20, 29 and 32 are presented on Figure 4.3-34 while Figure 4.3-35 presents TDS concentrations in the Section 33 alluvial wells.

This plot shows fairly steady concentrations in these wells in 2016 and 2017 after the decline in well 551 in 2015. These concentrations are within the natural variations observed in this area but prior concentrations to 2015 in well 551 are thought to be showing the very small effect from the past Section 33 irrigation which ceased after the 2009 season.

4.3.3 CHLORIDE - ALLUVIAL

Chloride concentration is another important indicator of tailings seepage because of the conservative nature of this constituent and the fact that up-gradient concentrations are low. Chloride concentrations measured during 2017 in the alluvial aquifer near the tailings are presented on Figures 4.3-36, 4.3-36A, 4.3-36B and 4.3-36-C. Up-gradient chloride concentrations in the alluvial aquifer varied from 45 to 132 mg/l in 2017. The fresh-water injection systems have used water with chloride concentrations of approximately 200 mg/l, whereas the R.O. product chloride concentration is less than 10 mg/l and the typical treated water from the PTT is 150 mg/l. The alluvial aquifer around and underlying the LTP contains chloride concentrations in excess of the State drinking water standard of 250 mg/l (site standard). Measurement of chloride concentration in alluvial groundwater is useful in defining areas where the treated water has migrated in the alluvial aquifer. A light green pattern on Figures 4.3-36, 4.3-36A, 4.3-36B and 4.3-36-C is used to illustrate where concentrations exceed 250 mg/l. The limited areal extent of the green pattern on these figures show that the need for groundwater-quality restoration with respect to chloride is limited to the immediate area of the tailings and three wells in Section 34. Chloride concentrations in the alluvial water in the western half of Figure 4.3-36 have not typically exceeded 250 mg/l. None of the alluvial wells just north of the northern boundary of Pleasant Valley exceed the site standard in 2017 (see Figure 4.3-36C).

Figure 4.3-37 presents chloride concentrations versus time for six up-gradient wells. Analysis of the data on this figure shows overall steady chloride concentrations in 2017.

Figures 4.3-38 through 4.3-40 present time plots of chloride concentration for wells west and southwest of the LTP. Chloride concentrations in wells on and near the LTP are presented on Figures 4.3-41. Chloride concentrations in alluvial wells on and near the STP are presented on Figures 4.3-42 through 4.3-44. The chloride concentrations in water collected from the L line collection wells are presented in Figure 4.3-45.

Figure 4.3-46 presents time plots of chloride concentrations in wells near and in Broadview Acres with the concentrations very similar to the fresh water chloride concentration. Figures 4.3-47 and 4.3-47A present the chloride concentration-time plots for wells in Felice Acres.

Chloride concentration plots for the former flood irrigation area monitoring wells are presented on Figure 4.3-48. Chloride concentrations are very similar to the fresh water injection concentration except chloride concentration increase in wells 555, 844 and 845. The higher values in the last three years in these three wells could possibly be due to the flood irrigation in this area. The decline in chloride in wells 844 and 845 indicate that the effects from irrigation are dissipating.

The plots of chloride concentration versus time in Section 3 wells are presented on Figures 4.3-49 and 4.3-49A. Figure 4.3-50 presents a plot of the variation of chloride concentrations with time in Section 28 wells and Pleasant Valley monitoring well 688. Decline in chloride concentration was observed in well 886 through 2009 but increased in 2011 and 2012. These recent increases in the Section 28 wells could possibly be due to previous irrigation in Section 28 which ceased after 2012. Chloride concentrations in these wells in the Section 28 Center Pivot area had been fairly steady since the irrigation has ceased. If the increase near the end of irrigation was due to irrigation, it shows that the effects on chloride concentrations were small and short lasting. Chloride concentrations in five wells just west of the Section 28 irrigation area are presented on Figure 4.3-50A. Chloride concentrations in this active area of groundwater restoration overall gradually declined in 2017.

Chloride concentrations in the Sections 20, 29 and 32 monitoring wells are presented on Figure 4.3-51 while Figure 4.3-52 presents time plots of chloride concentrations in the Section 33 wells. The 2017 chloride concentrations were generally stable in the Section 33 wells while concentration in well 551 stayed lower after decreasing in 2015. Overall the chloride concentrations in these wells are slightly higher in 2009 through 2015 than observed in previous years. Slightly higher chloride concentrations could be showing a very small effect from the Section 33 irrigation but it also could be a small natural change. The higher levels prior to 2015 in well 551 are likely due to the irrigation. Chloride concentration in well 996, which is upgradient of the Section 33 irrigation area, is showing a very gradual rising trend for the last five years.

4.3.4 URANIUM - ALLUVIAL

Uranium is considered an important groundwater constituent at this site due to the significant levels in the tailings seepage. Uranium data and contours for 2017 are presented on Figure 4.3-53. Background uranium concentrations during 2017 varied from 0.02 to 0.23 mg/l; the alluvial background site standard is 0.16 mg/l. The light green pattern on Figure 4.3-53 shows where uranium concentrations exceed 0.16 mg/l, the statistical upper range of background from previous statistical analysis of the 1995-2004 data. The uranium values inside three areas outlined on Figure 4.3-53 are posted on additional uranium figures due to the density of the new wells in these three areas. Figures 4.3-53A, 4.3-53B and 4.3-53C present the OS, SOS and NOS areas respectively.

Uranium concentrations exceed background in the area of the LTP and STP and west of the LTP (see Figure 4.3-53A). Uranium concentrations extend to the west of the LTP through the eastern half of Section 28 with numerous new wells in the NOS area (see Figure 4.3-53C). All of the uranium concentrations in the west half of Section 28 have been reduced to below the site standard except for one well which slightly exceeded 0.16 mg/l in March. Restoration caused the western limit of the exceedance area to shift 1300 feet to the east from the end of 2016 to the end of 2017. Uranium concentrations in Sections 29 and 32 also reflect a contribution from the Rio San Jose alluvial system in Section 20, but the maximum level observed in these wells in 2017 was 0.07 mg/l. The zones of moderately elevated concentrations join together and the combined area extends down-gradient approximately one mile into the western side of Section 33.

Uranium concentrations greater than 0.16 mg/l are also present near the L collection wells south of the STP. Uranium concentrations in the L wells were overall similar in 2017 to values observed in 2016.

Additional areas, where uranium concentrations in the alluvium are greater than 0.16 mg/l, exist in Felice Acres and to the southwest into Section 3 (see Figure 4.3-53B). The area of elevated concentrations extends approximately 3800 feet to the southwest of the southwest corner of Felice Acres. Significant progress toward restoration was made in the northeast corner of Section 3 with the collection and injection into the R well field in 2014 and most of this restored area was maintained in 2015 through 2017. Concentrations were reduced in 2017 in this area but the limit of the exceedance was similar to the 2016 limit. The uranium concentration in another small area in the northeast portion of Murray Acres at well 802 exceeded the site standard in 2017. Additional restoration is needed in each of these areas with respect to uranium.

Uranium concentration plots were prepared in order to illustrate changes that result from the corrective action program and other factors. Figure 4.3-2 shows the grouping and location of the alluvial wells used for the uranium-time plots. The figure numbers shown on Figure 4.3-2 correspond to the sulfate time plots. The same grouping of wells was used for the uranium plots, and their symbols and colors are the same as those used on other time plots.

Figure 4.3-54 presents uranium concentrations plotted versus time for up-gradient wells DD, DD2, P, P3, Q and R. The uranium concentrations in wells P, Q and R have been fairly steady during the last few years. Data for upgradient wells DD and DD2 are slightly higher uranium concentrations and concentrations in these two wells very gradually declined during the last few years. The site standard of 0.16 mg/l is shown in the legend on Figure 4.3-53 and on Figure 4.3-54.

Uranium concentrations in wells west and southwest of the LTP are presented in Figures 4.3-55 through 4.3-57. Plots of uranium concentration versus time are presented on Figure 4.3-58 for alluvial wells on and near the LTP. Figures 4.3-59 through 4.3-61 present plots of uranium concentration versus time for wells on and near the STP. Uranium concentrations in water from alluvial wells in the L area are presented on Figure 4.3-62.

Figure 4.3-63 presents uranium concentrations versus time for five wells near and in Broadview Acres while Figures 4.3-64 and 4.3-64A present the uranium concentration time plots for Felice Acres wells. Figure 4.3-64A shows small declines in uranium concentrations in collection wells Q2, Q3 and Q5 in 2017. Figure 4.3-65 presents uranium concentrations for wells in the former flood irrigation area. Uranium concentrations had declined in well 844 for the last previous few years but has become fairly steady for the last two years. The previous higher uranium concentrations in well 844 may have defined the effects of irrigation on this area of the alluvial groundwater. Uranium concentrations in the remainder of these wells in this area have been fairly steady except the 2016 value from well 556 which is an outlier.

The uranium concentrations for wells in Section 3 southwest of Felice Acres are plotted on Figures 4.3-66 and 4.3-66A. The uranium concentrations in the R collection wells in northeast corner of Section 3 overall gradual decreased due to the collection of alluvial water and injection of treated water in the northeast portion of Section 3.

Uranium concentrations from five Section 28 wells and Pleasant Valley well 688 are plotted on Figure 4.3-67. Uranium concentrations from five wells west of the Section 28 irrigation are plotted on Figure 4.3-67A. Uranium concentrations declined to below the alluvial site standard in each of these wells in 2017. This area of the alluvial aquifer will be considered adequately restored after an additional sample confirms these levels. Concentrations from well 888 which is down gradient of the restoration area declined in 2017. Collection from the western H wells can be ceased with North Off-site collection and injection shifting to the east.

Uranium concentration time plots for wells in Sections 20, 29 and 32 are presented on Figure 4.3-68. These wells are completed in the Rio San Jose alluvium upgradient and down gradient of the confluence with the San Mateo alluvium in Section 29. Uranium concentrations in wells located in Section 33 are relatively small and are plotted on Figure 4.3-69. Concentrations have remained low with steady values in wells 551, 649, 650 and 996 during 2017. Well 996 is upgradient of the Section 33 irrigation area and its slightly higher value is not caused by the Section 33 irrigation. No increase was observed in the Section 33 wells for uranium which indicate no uranium effects on the groundwater from the Section 33 irrigation.

4.3.5 SELENIUM - ALLUVIAL

Selenium is an important constituent at the Grants Project site because, like uranium, it was present in significant concentrations in the tailings water. Figures 4.3-70, 4.3-70A, 4.3-70B and 4.3-70C present maps of the spatial distribution of selenium concentrations throughout the site. The background site standard for selenium is 0.32 mg/l. Selenium concentrations upgradient of the site varied from less than 0.001 to 0.72 mg/l in 2017. A green pattern is superimposed on the concentration contour figures to show where concentrations exceed 0.32 mg/l. A 0.1 mg/l selenium concentration contour exits around the LTP, most of the STP and a portion of the L Area south of the STP (see Figures 4.3-70, 4.3-70A and 4.3-70C). All selenium concentrations measured west of this area are less than 0.1 mg/l, except one value slightly above 0.1. All selenium concentrations in the alluvial aquifer in all of the nearby subdivisions are less than 0.1 mg/l.

Selenium concentrations exceeding 0.32 mg/l were measured in wells around the LTP and STP and also extend to the south of the STP in the area east of the L collection wells and east of Highway 605. This shows that only the area near the tailings pile and the area near some of the L collection wells require additional restoration in order to reduce selenium concentration.

Figure 4.3-2 presents the location and grouping of wells for selenium concentration plots. The symbols and colors used on Figure 4.3-2 are the same as those used on each constituent time plot.

Figure 4.3-71 presents plots of selenium concentration versus time for up-gradient wells DD, DD2, P, P3, Q and R. There has been a small amount of variation in the selenium concentrations in up-gradient wells for last few years. The concentrations in the farthest upgradient wells Q and R are larger than the remainder of these wells and seem to be fairly steady the last eight years after a long gradual increasing trend. The 2017 value from well P3 indicates an increasing trend is occurring at this well. A small increase in the selenium concentration in well DD has been observed in 2016 and 2017.

Figures 4.3-72 and 4.3-74 show selenium concentrations in water from alluvial wells located west and southwest of the LTP. Figure 4.3-75 presents plots of selenium concentrations for wells on and near the LTP. The selenium concentrations for wells located on and near the STP are plotted on Figures 4.3-76 through 4.3-78. Figure 4.3-79 presents selenium concentration for wells 522. 639, L, L6, L8 and L10.

Figure 4.3-80 presents a selenium concentration plot for five wells to the north and east of Broadview Acres and one well in the subdivision. Figures 4.3-81 and 4.3-81A present selenium concentration plots for wells in Felice Acres.

Selenium concentrations are presented for wells in the former flood irrigation area adjacent to Murray Acres on Figure 4.3-82. This plot shows continuing low selenium concentrations in monitoring wells in this area of the alluvial aquifer. Fairly steady values were observed in these wells in 2017. This data does not indicate that the flood irrigation affected the selenium concentrations in the groundwater in the area of this irrigation.

Selenium concentrations for the Section 3 wells are plotted on Figures 4.3-83 and 4.3-83A. The selenium concentration in these R collection wells was small prior to the start of the collection in this area in 2014 and they stayed low during 2015 through 2017.

The selenium concentrations in alluvial water in Section 28 have been fairly steady with time with a small decrease observed in well 893 over the last few years. Figures 4.3-84 and 4.3-84A present the selenium concentrations from the Section 28 alluvial wells.

Figure 4.3-85 displays selenium concentrations in wells in Sections 20, 29 and 32, which are located before and after the confluence with the Rio San Jose. Selenium concentrations from wells in Section 33 are presented on Figure 4.3-86.

4.3.6 MOLYBDENUM - ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during 2017. Figures 4.3-87, 4.3-87A, 4.3-87B and 4.3-87C are spatial presentations of the concentration data and contours. Molybdenum concentrations in alluvial water in the west area of Figure 4.3-87 have typically been less than 0.03 mg/l and, therefore, samples from the western wells are not routinely analyzed for molybdenum. Numerous samples were taken from these wells in 2017 to update the molybdenum database. The movement of molybdenum in the alluvial aquifer is dramatically attenuated in comparison to that of selenium and uranium. Molybdenum concentrations did not exceed 100 mg/l any location under the LTP in 2017 with only a small portion of the LTP with values above 50 mg/l. A 10 mg/l contour extends around most of the LTP and to the west side of the STP (see Figure 4.3-87A).

The light green patterns on these four figures show the area where molybdenum concentrations exceed 0.10 mg/l, the site standard. A molybdenum concentration of 0.10 mg/l is considered the threshold of significance for this constituent at this site. Significant molybdenum concentrations extend to just north of Pleasant Valley west of the LTP (see Figures 4.3-87A and 4.3-87B) and also to the southeast of the STP to the L collection wells (see Figure 4.3-87). Concentrations in one well in the west half of Section 27 exceed the molybdenum site standard of 0.10 mg/l. None of the concentrations in alluvial wells in the subdivisions exceed 0.10 mg/l of molybdenum.

Figure 4.3-88 presents molybdenum concentration for the up-gradient wells DD, DD2, P, P3, Q and R. Concentrations have remained low in these six wells in 2017.

Molybdenum concentrations are presented in Figures 4.3-89 through 4.3-91 for the alluvial aquifer to the west and southwest of the LTP. Figure 4.3-92 presents molybdenum concentrations for wells on and near the LTP. Molybdenum concentrations in wells on and near the STP are presented on Figures 4.3-93 through 4.3-95. Figure 4.3-96 present molybdenum concentrations in wells 522, 639, L, L6, L8 and L10, which are located further to the southeast of the STP.

Molybdenum concentrations in alluvial wells located north, east and in Broadview Acres are plotted on Figure 4.3-97. Figures 4.3-98 and 4.3-98A present the molybdenum concentrations for the Felice Acres wells.

Figure 4.3-99 presents the molybdenum concentrations for wells in the former flood irrigation area near Murray Acres. This plot shows that molybdenum concentrations have remained low in these alluvial wells.

Molybdenum concentration plots for the Section 3 wells are presented in Figures 4.3-100 and 4.3-100A. The western area wells values are plotted on Figures 4.3-101 through 4.3-103 time plots with the Section 28 wells presented on the first two figures, Sections 20,29 and 32 on the third figure and Section 33 wells on the fourth figure.

4.3.7 NITRATE - ALLUVIAL

The presence of relatively large nitrate concentrations up-gradient of the Grants site has resulted in a site background standard of 12 mg/l (see Table 3.1-1). A statistical analysis of the up-gradient data 1995 through 2004 produced the nitrate concentration of 12 mg/l based on the 95th percentile of background. Upgradient nitrate concentrations varied from less than 0.1 to 48 mg/l in 2017. Figures 4.3-104, 4.3-104A, 4.3-104B and 4.3-104C present nitrate concentrations measured in 2017 in the alluvial aquifer. Figure 4.3-104A list the nitrate values for the wells near the LTP and STP, showing that three of these wells slightly exceed the site standard. The nitrate concentrations north and up-gradient of the tailings ultimately impact the nitrate concentrations down-gradient of the LTP. It is difficult to determine whether seepage from the tailings has any significant impact on the nitrate concentrations in this area, because the naturally higher concentrations up-gradient of the LTP makes modestly elevated nitrate concentrations indistinguishable from background. Also the recent seepage from the LTP contains much smaller nitrate concentrations

Nitrate concentrations exceed 12 mg/l in an area between the LTP and STP which are likely due to seepage from the tailings. Nitrate concentration above 12 mg/l also exists in a small area south of Pleasant Valley. Nitrate concentrations in all of the alluvial subdivision wells are below 12 mg/l. Areas where water-quality restoration is required with respect to nitrate are shown by the green patterns on Figure 4.3-104A. Restoration of nitrate will likely occur prior to the restoration of some other key parameters in these areas.

Plots of nitrate concentration over time were prepared for the alluvial wells that are listed on Figure 4.3-2. Figure 4.3-105 presents the nitrate concentrations for the background wells. Concentrations in these wells have been relatively stable in 2017 with a small outlier for well R in 2015. Nitrate concentrations in upgradient wells farther to the north have been larger and have exceeded the site standard which shows that higher nitrate concentrations upgradient of the site are entering the near-up-gradient area. Overall the nitrate in near upgradient wells Q and R have been steady the last ten years. A small increasing trend has been observed in wells DD and P3 recently.

The nitrate concentrations in wells west and southwest of the LTP, are plotted on Figures 4.3-106 through 4.3-108. Figure 4.3-109 presents nitrate concentrations in wells T, T10, T11, T25 and TA on and near the LTP. Nitrate concentrations in wells on and near the STP are plotted on Figures 4.3-110 through 4.3-112. The nitrate concentrations in the L series wells are presented on Figure 4.3-113.

Nitrate concentrations in wells near Broadview Acres are presented on Figure 4.3-114 while nitrate concentrations for the Felice Acres wells are presented on Figure 4.3-115.

Nitrate concentrations in and near the former flood irrigation area are presented on Figure 4.3-116. Nitrate concentrations in well 846 are higher than the other five wells shown on this figure and shows an overall increase in 2008 through 2012 and a decrease from this peak in 2013 through 2017. Well 846 is down gradient of the flood irrigation area and not thought to be affected by the irrigation. The nitrate concentration in the remainder of these wells adjacent to the flood irrigation was fairly steady in 2017 except for a gradual decline in 844 and a gradual rise in well 555 in recent years. This could possibly be showing a small amount of change in the nitrate groundwater concentration from the irrigation.

Nitrate concentrations in Section 3 wells are presented on Figure 4.3-117. Nitrate concentrations for the Section 28 wells are presented on Figure 4.3-118. Figure 4.3-119 presents nitrate concentrations in wells 637, 654, 686, 899 and 994. Nitrate concentrations in the Section 33 wells are presented on Figure 4.3-120 and were steady in 2017.

4.3.8 RADIUM-226 AND RADIUM-228 - ALLUVIAL

Figures 4.3-121, 4.3-121A, 4.3-121B and 4.3-121C present radium concentrations for the alluvial groundwater in the Grants Project area. Radium concentrations are very small in the alluvial aquifer except directly underneath the LTP. The monitoring program for radium has been scaled back, because radium is not present in significant concentrations in the alluvial aquifer, except very near the LTP. The radium-226 concentrations are printed horizontally in black, while the radium-228 values are shown at a 45° angle and in magenta. The State standard for radium-226 plus radium-228 is 30 pCi/l, while the NRC site standard is 5 pCi/l.

Measured activities of radium-226 in alluvial wells beneath the LTP exceed 10 pCi/l. Some higher radium-228 values were measured in 2017, such as the values of 5.4 and 6.8 pCi/l for wells 846 and 884 (see Figures 4.3-121B and 4.3-121C). Typical historical values for these wells are near or below 1 pCi/l and these 2017 values are thought to be laboratory outliers. These higher radium-228 values should not be given any significance. No radium concentrations beyond the LTP area are in exceedance of the standard in 2017 except these two values. Past data has shown that radium is not mobile in the alluvial aquifer at this site. The laboratory started in 2008 reporting negative and zero values for the radionuclides instead of a less than value. These very low results should be considered non-detect values.

4.3.9 VANADIUM - ALLUVIAL

Vanadium concentrations measured in 20176 are shown on Figures 4.3-122, 4.3-122A, 4.3-122B and 4.3-122C. None of the vanadium concentrations in 2017 exceeded the site standard of 0.02 mg/l except for values in the LTP and STP. Well X was the only well that routinely contained a vanadium concentration above the site standard prior to restoration of that area and was measured at 0.01 mg/l in 2017. Therefore, none of the alluvial wells outside of the tailings areas are expected to contain vanadium concentrations above the site standard of 0.02 mg/l in the future. Injection of treated water has effectively restored groundwater quality in the area near well X. Vanadium concentrations, in eight alluvial wells located within the footprint of the LTP and six wells located on the south side of EP1 on the STP, were above the site standard for vanadium in 2017. The ongoing corrective action program will restore vanadium concentrations in these areas.

4.3.10 THORIUM-230 - ALLUVIAL

Figures 4.3-123, 4.3-123A, 4.3-123B and 4.3-123C presents the 2017 thorium-230 concentrations in the alluvial aquifer. Thorium-230 concentrations are low at this site. The very low site standard of 0.3 pCi/l was established to reflect the low background concentrations. The thorium-230 activity was significant in some of the alluvial wells underneath the LTP in 2017 and well KZ on the southwest side of the STP. The result from well KZ is likely an outlier. Thorium-230 has not been mobile in the alluvial aquifer except in the immediate vicinity of the tailings. The site standard for thorium-230 was exceeded in 2017 in eight wells in the alluvial aquifer underneath the LTP. This area is within the collection area, and additional restoration will result from the ongoing collection/injection programs.

Thorium-230 levels from the wells near the tailings, as well as all other alluvial wells in 2017 were less than the site standard. Therefore, only the alluvial aquifer underneath the LTP requires restoration relative to this parameter.

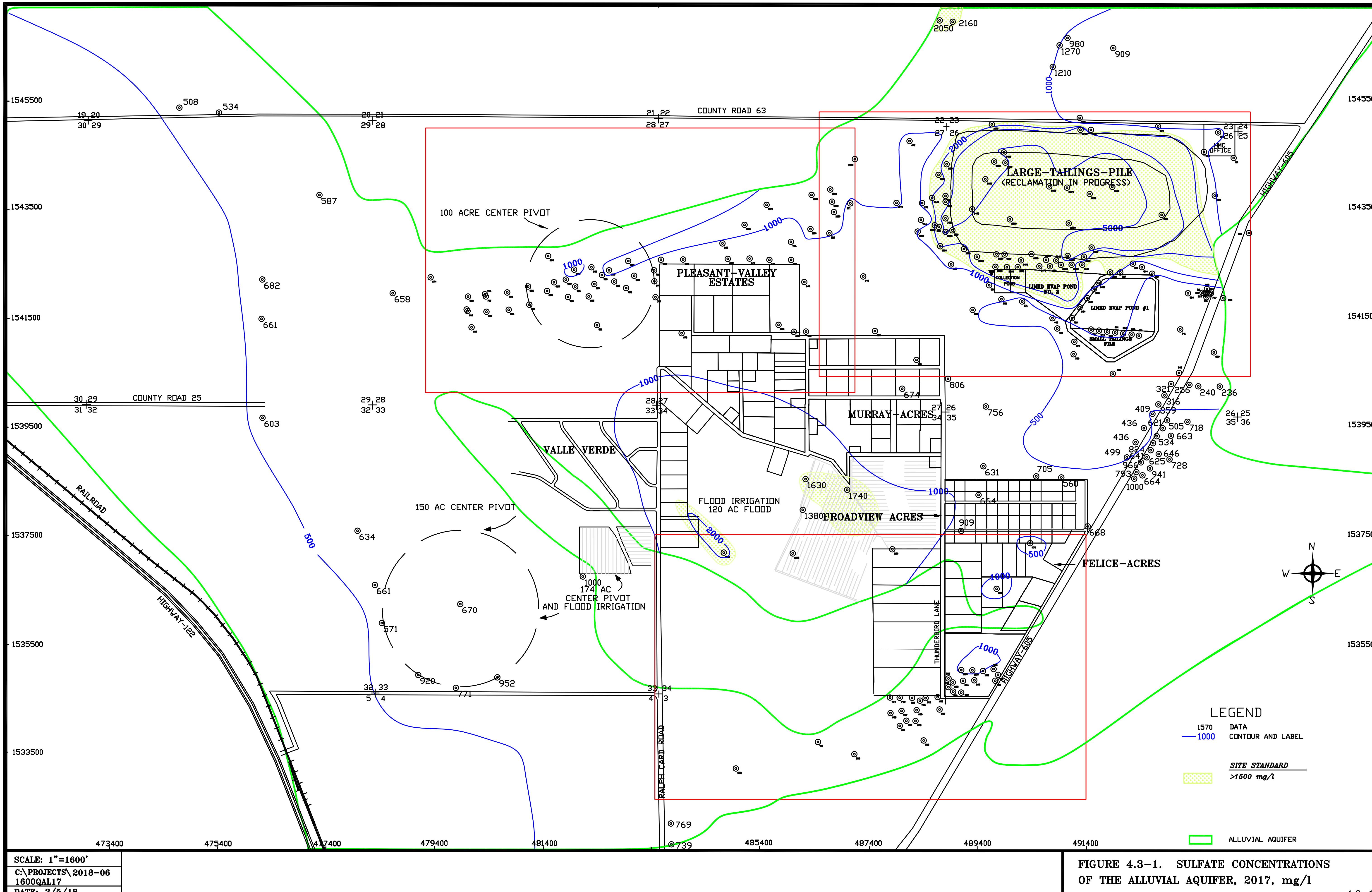


FIGURE 4.3-1. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

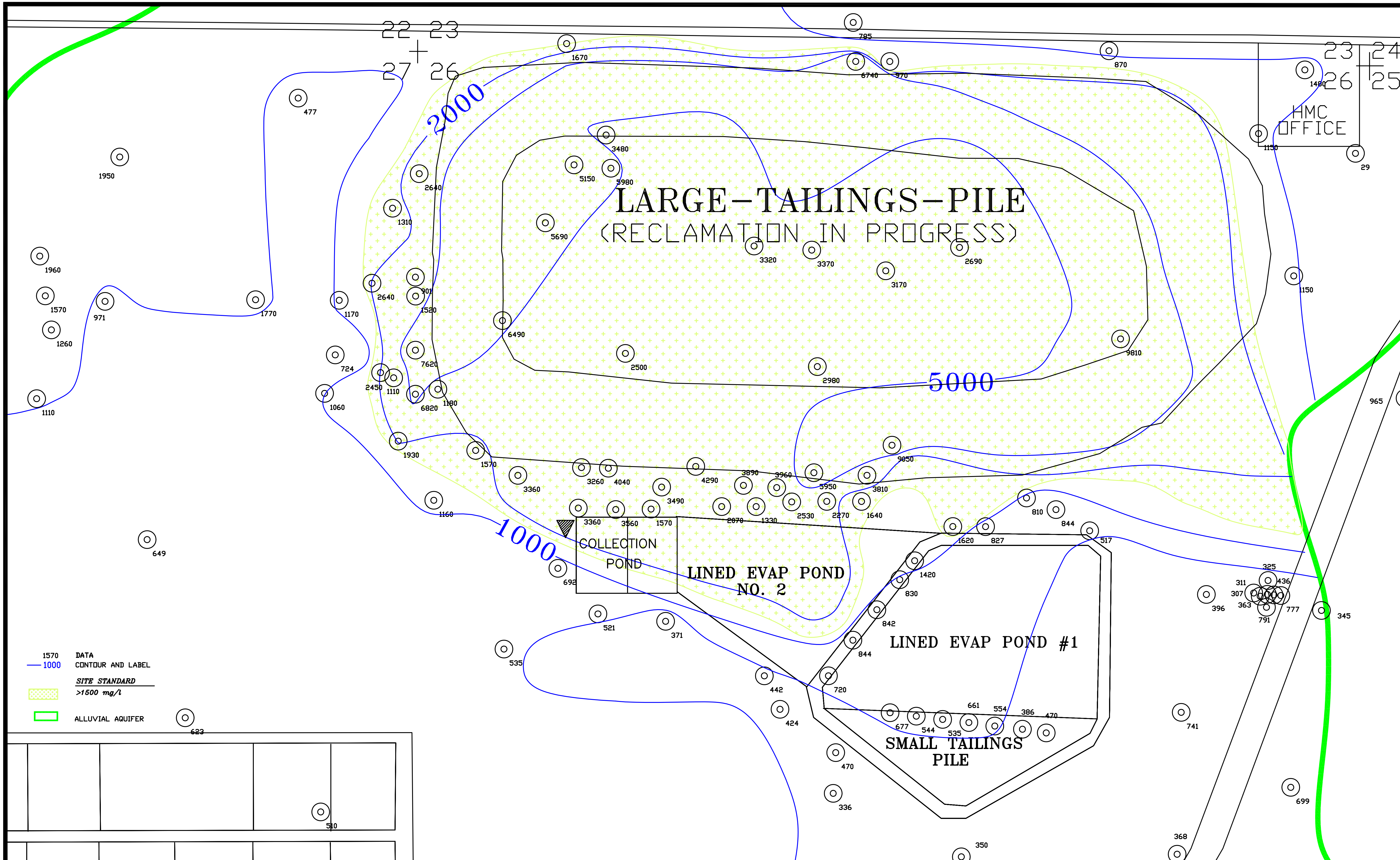


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FIGURE 4.3-1A. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

4.3-18

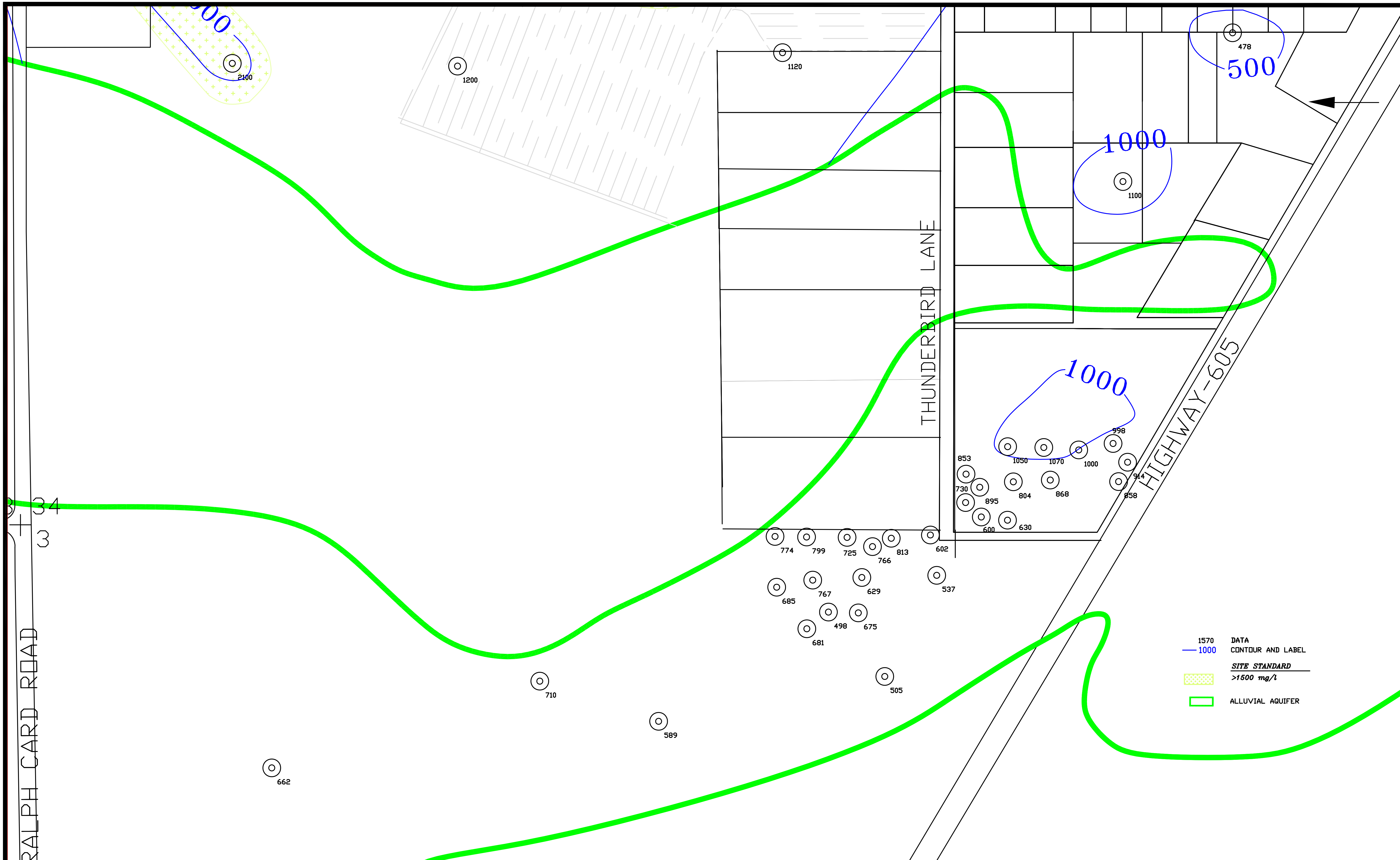

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FIGURE 4.3-1B. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

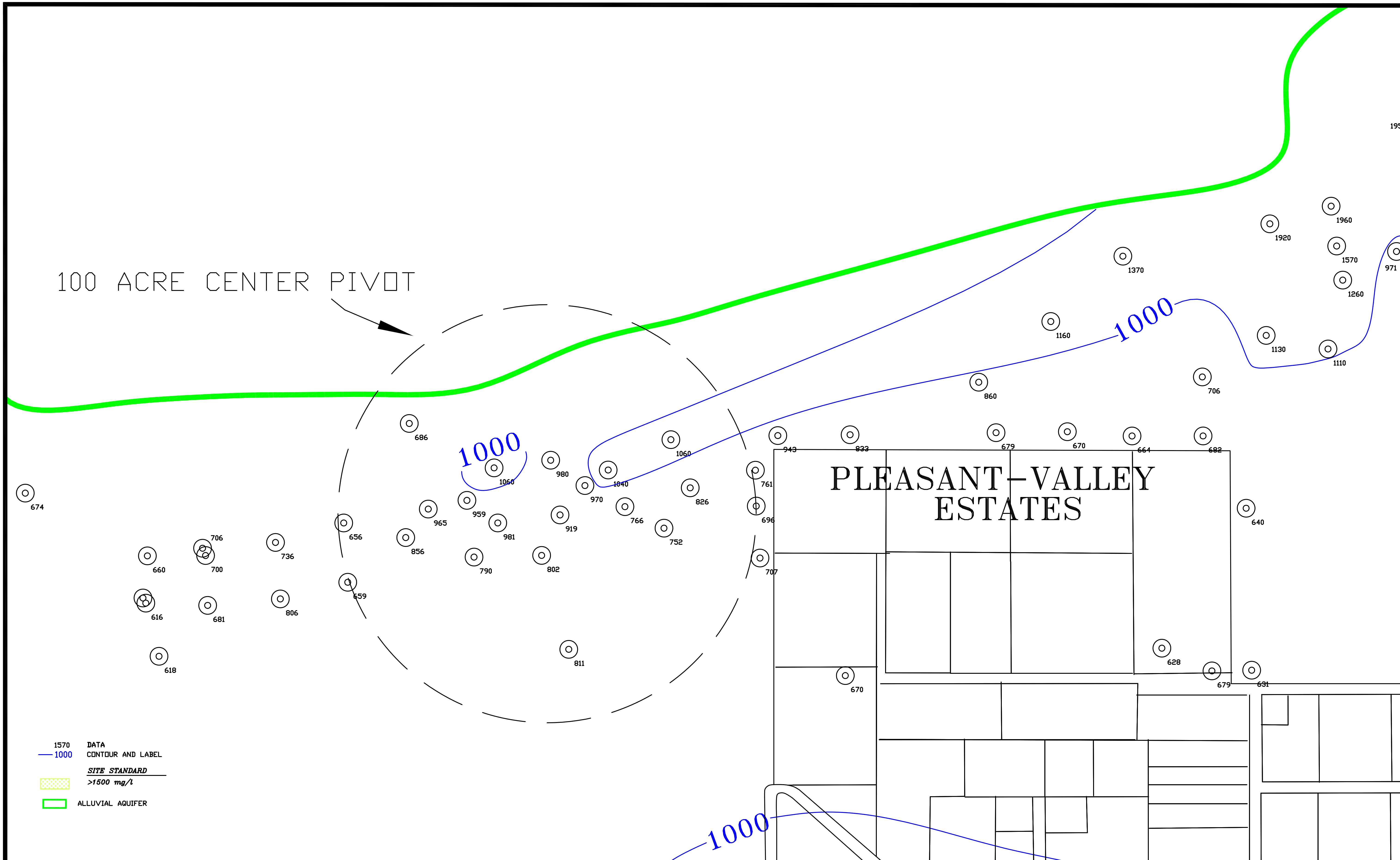

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FIGURE 4.3-1C. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

4.3-20

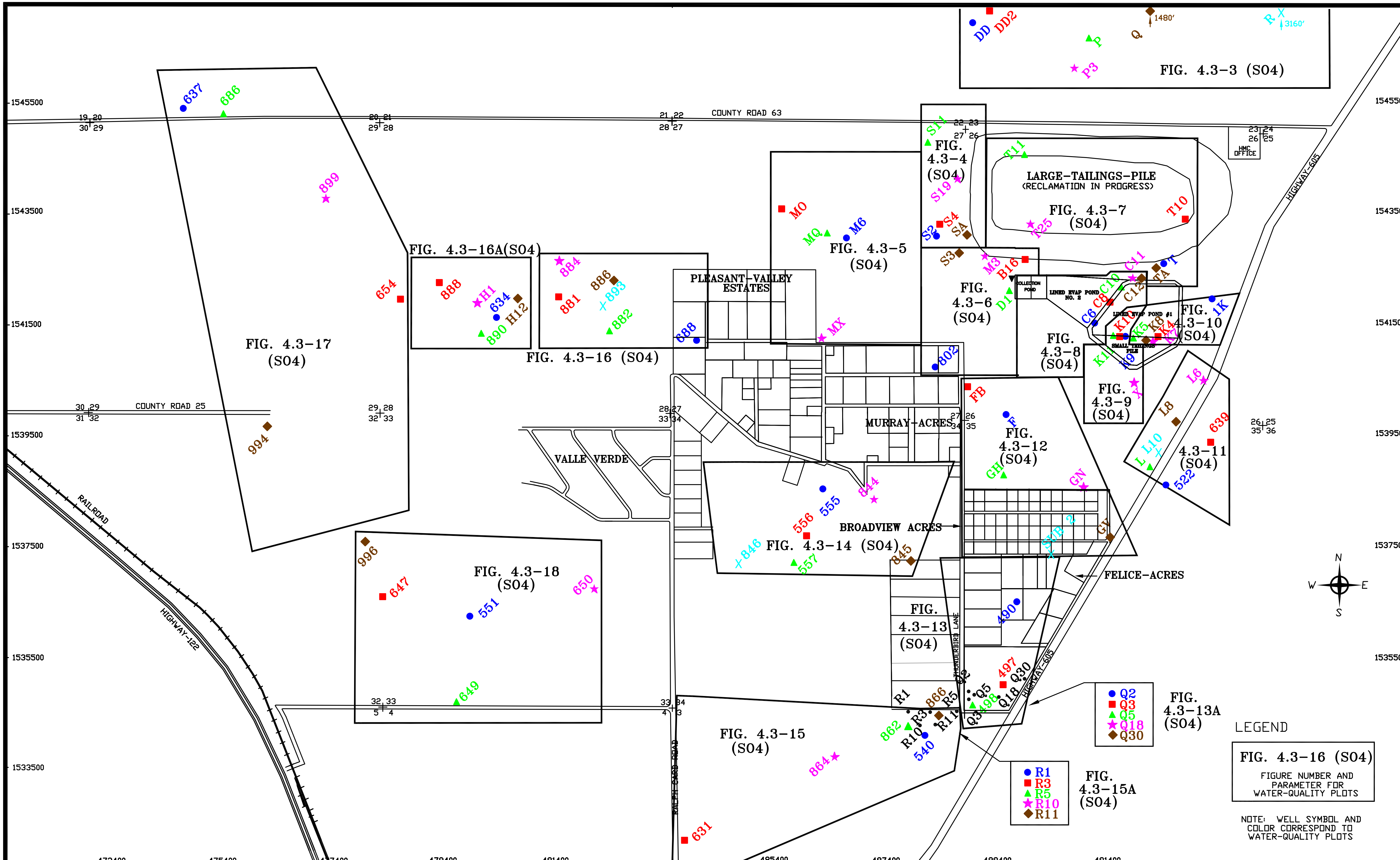

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FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS, 2017

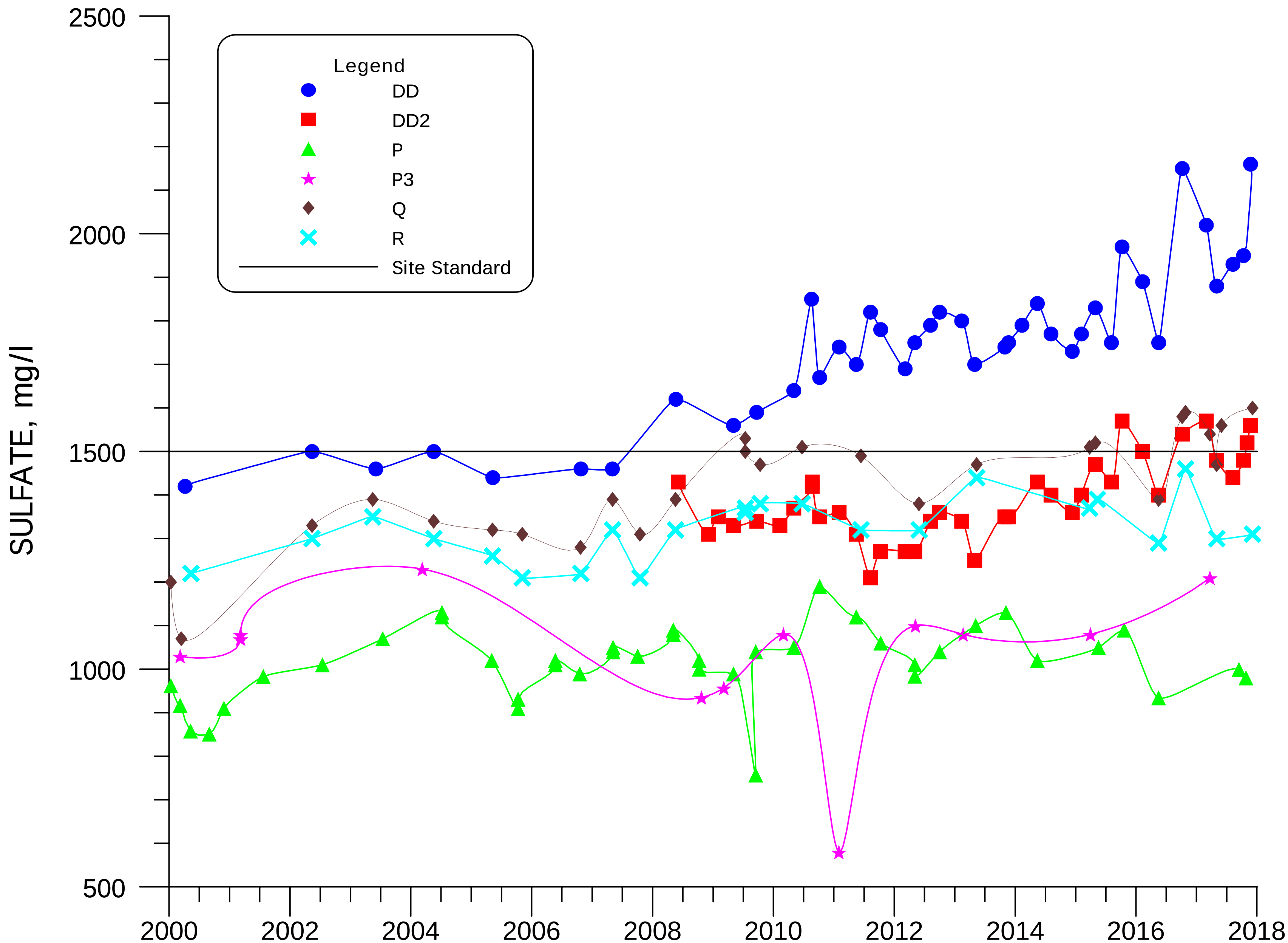

FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

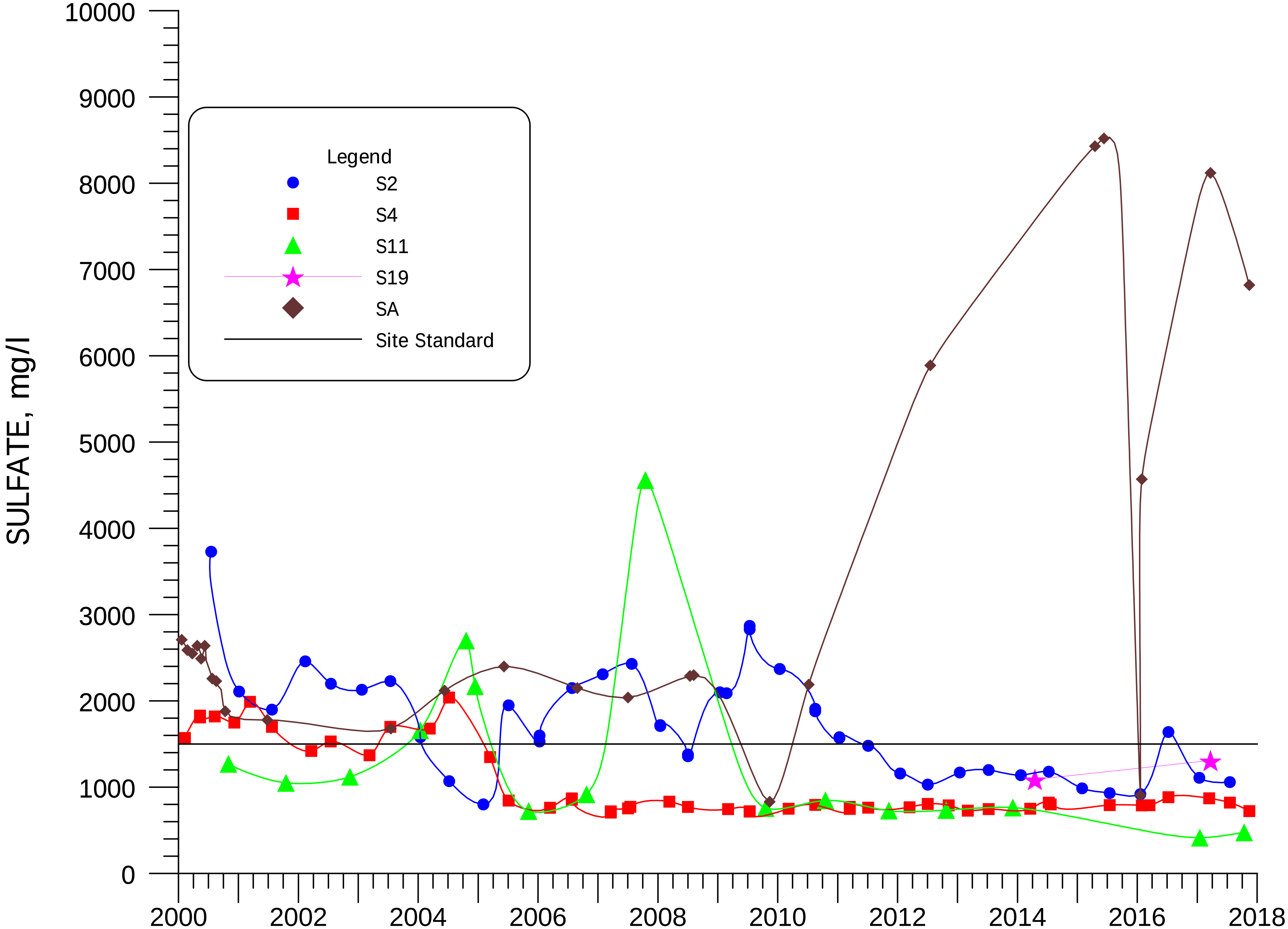

FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

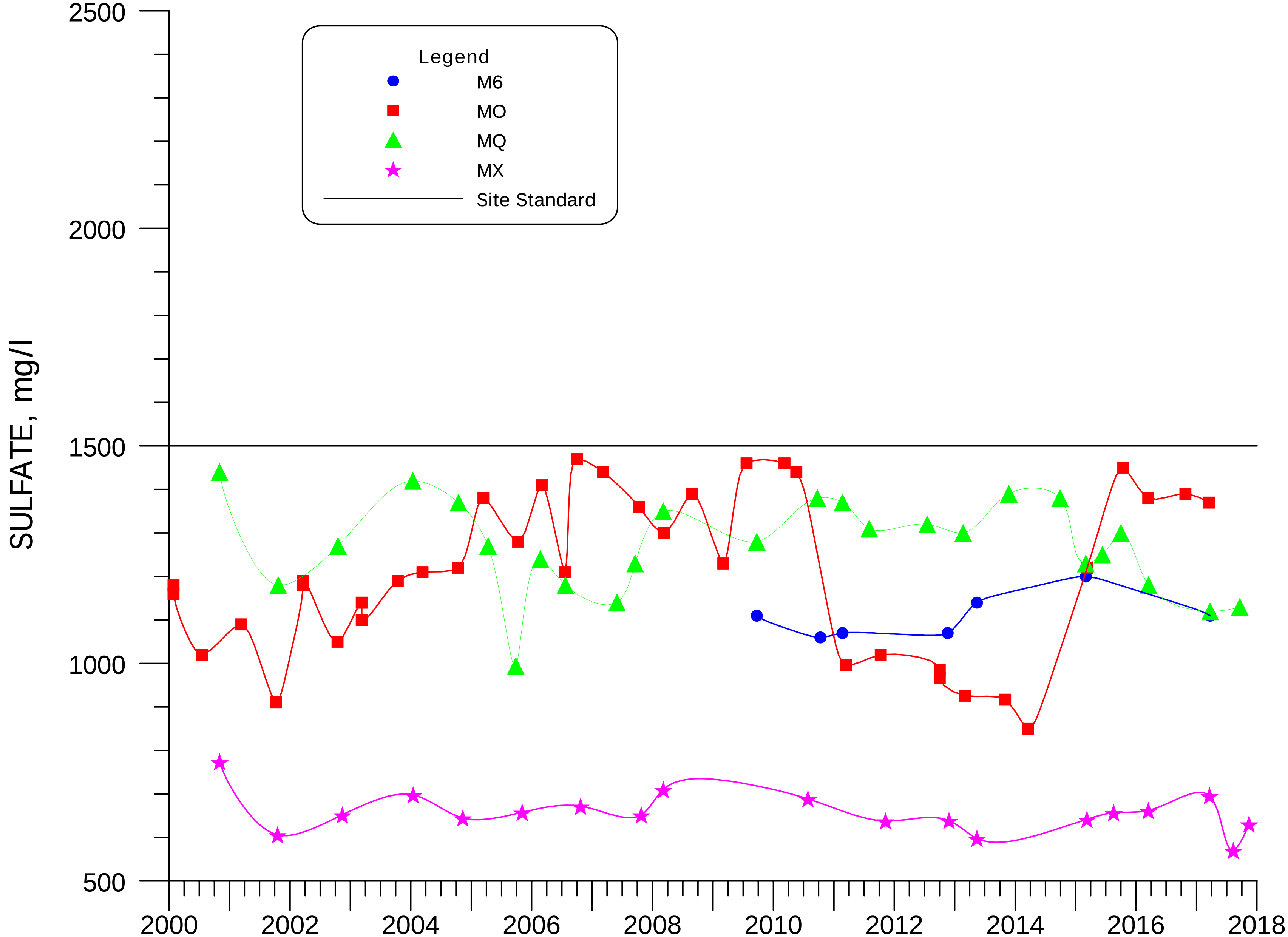

FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS M6, MO, MQ, AND MX.

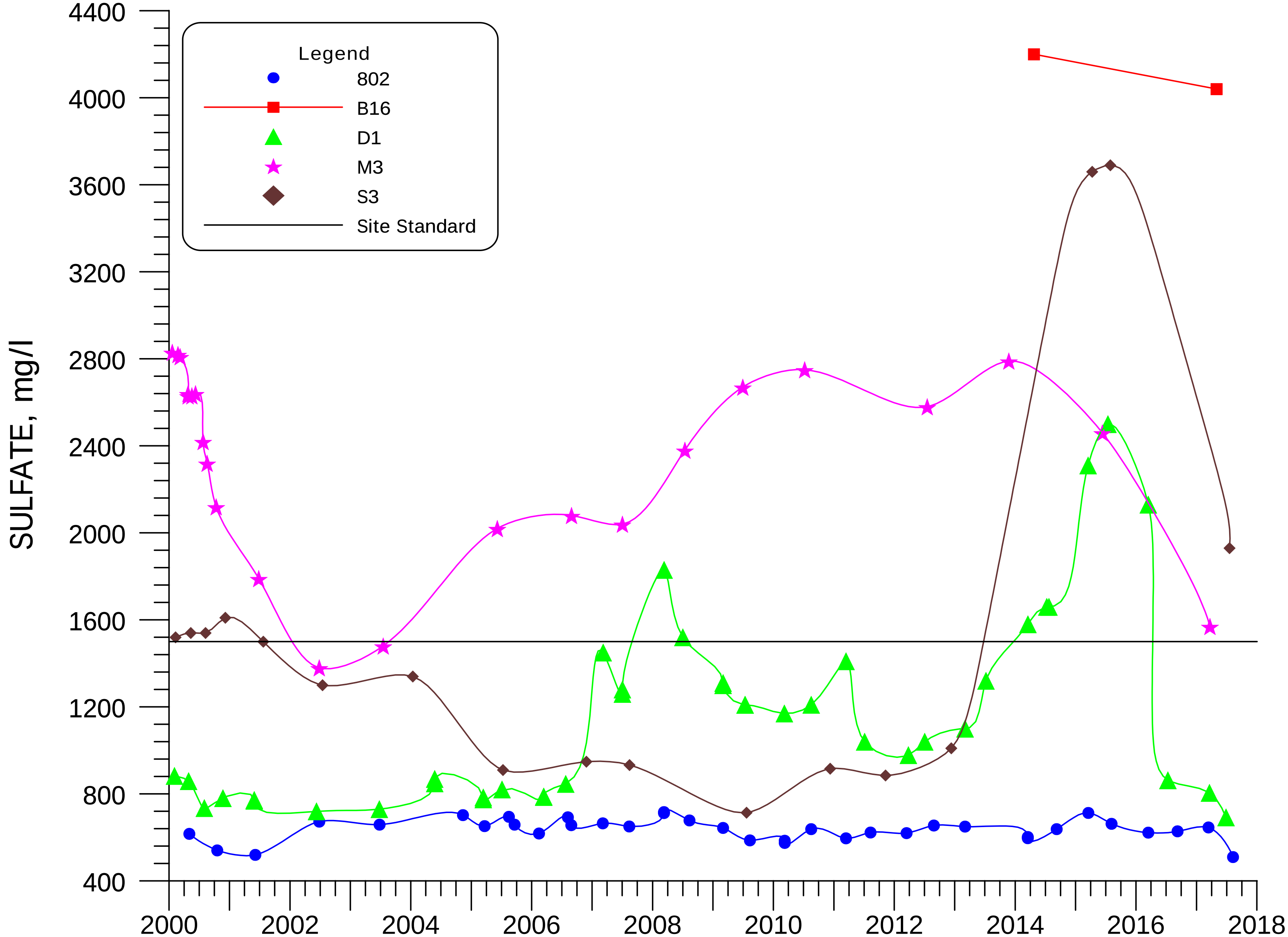

FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

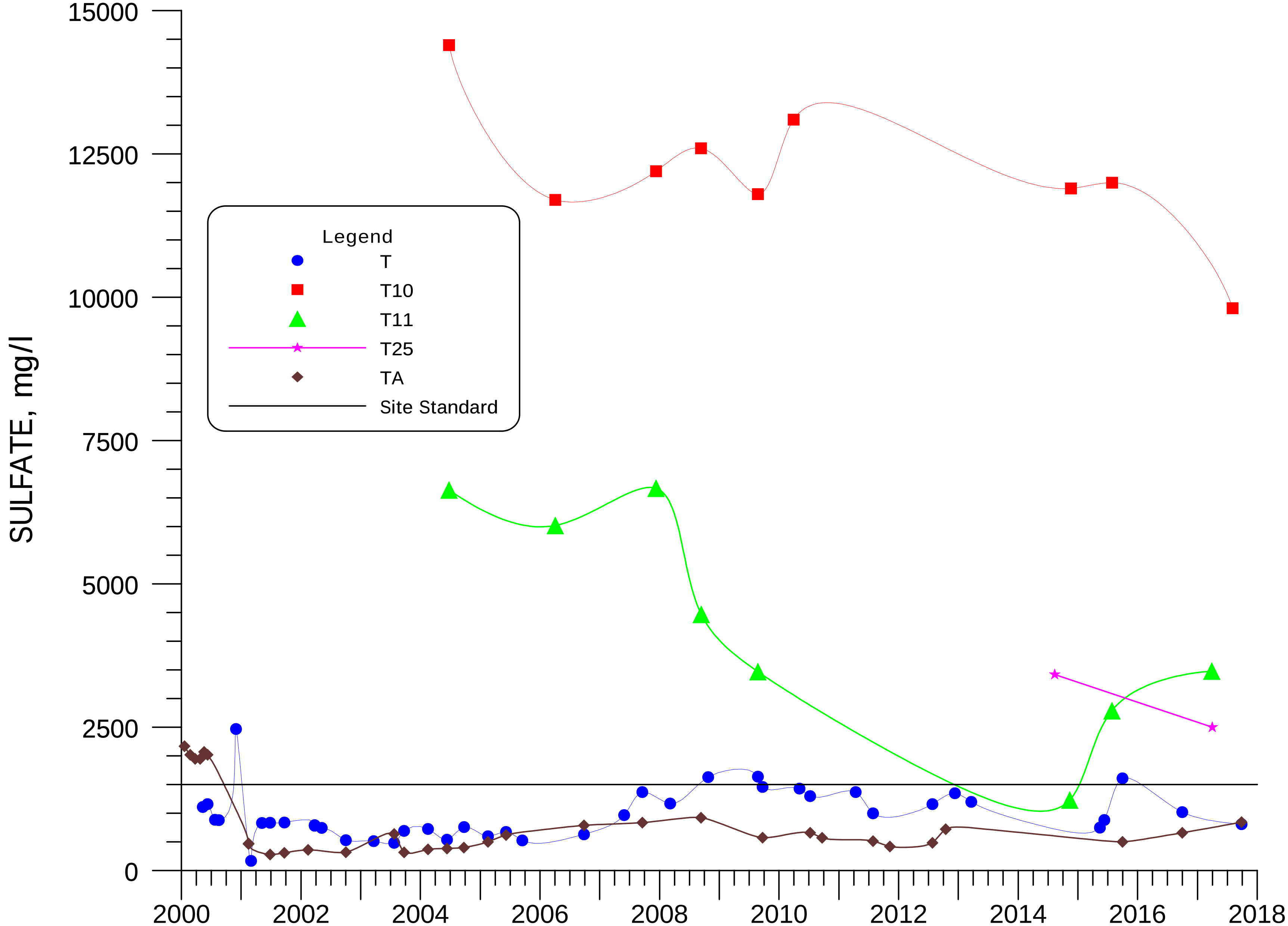

FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

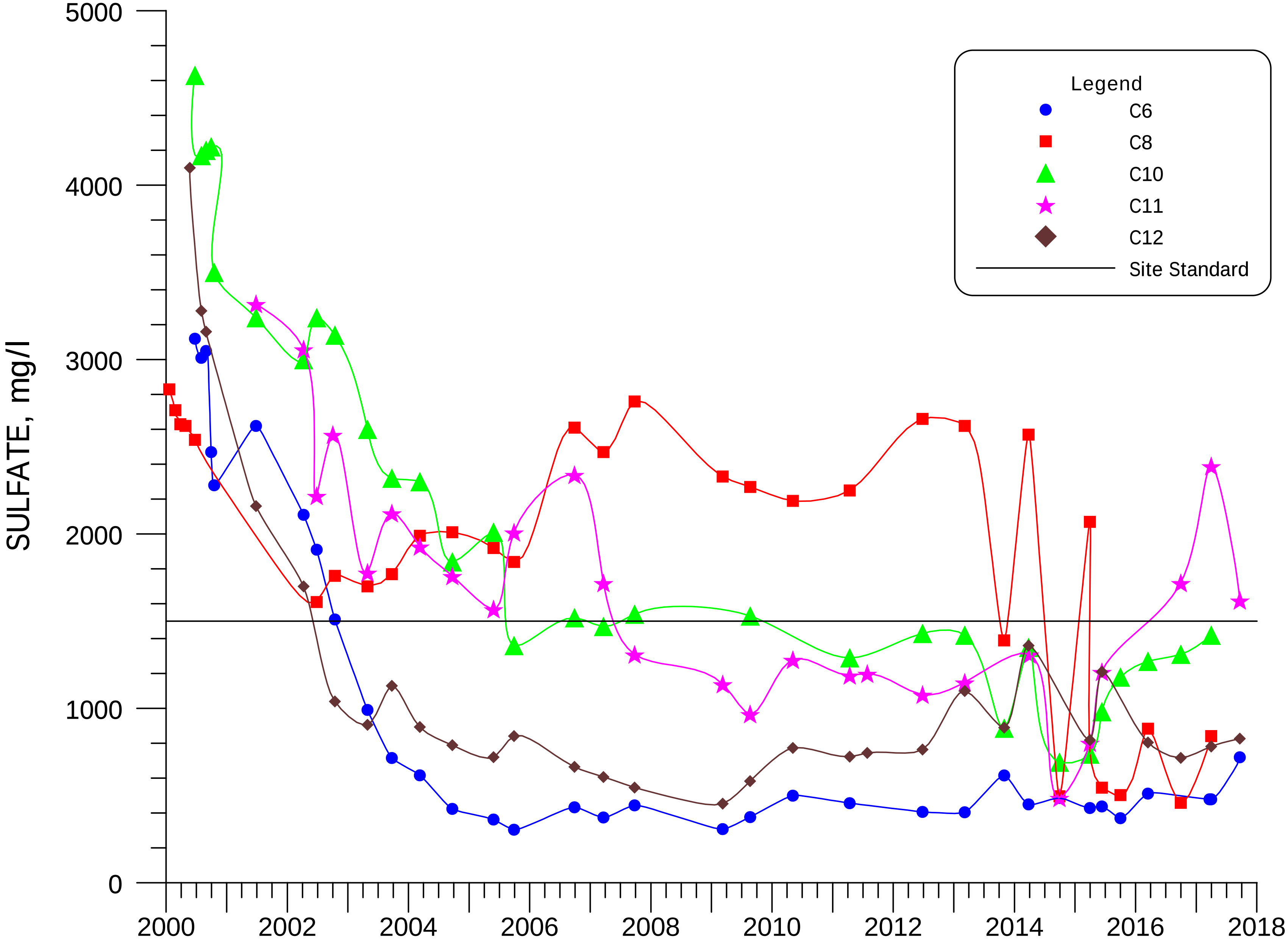

FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS C6, C8, C10, C11 AND C12.

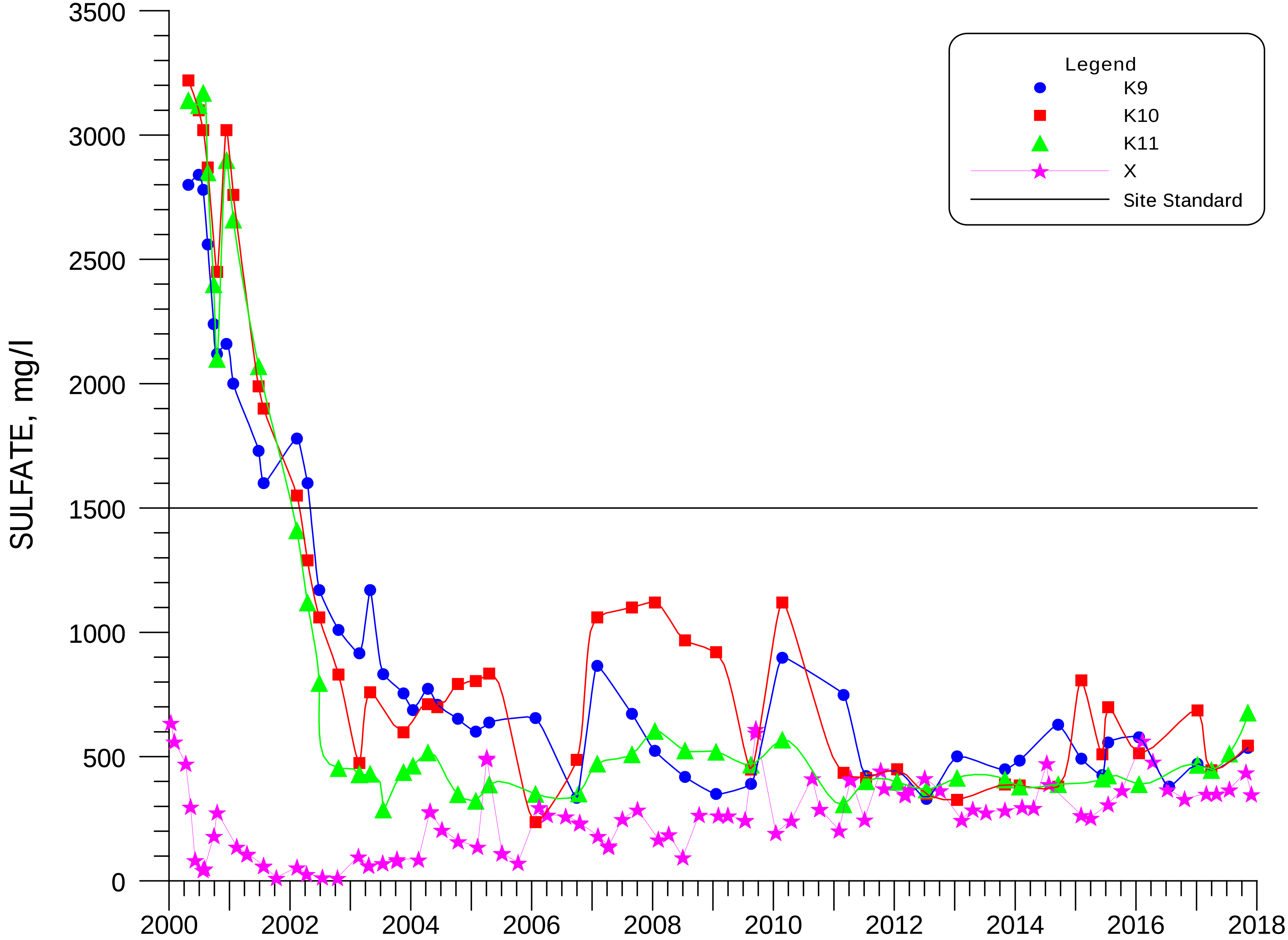

FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

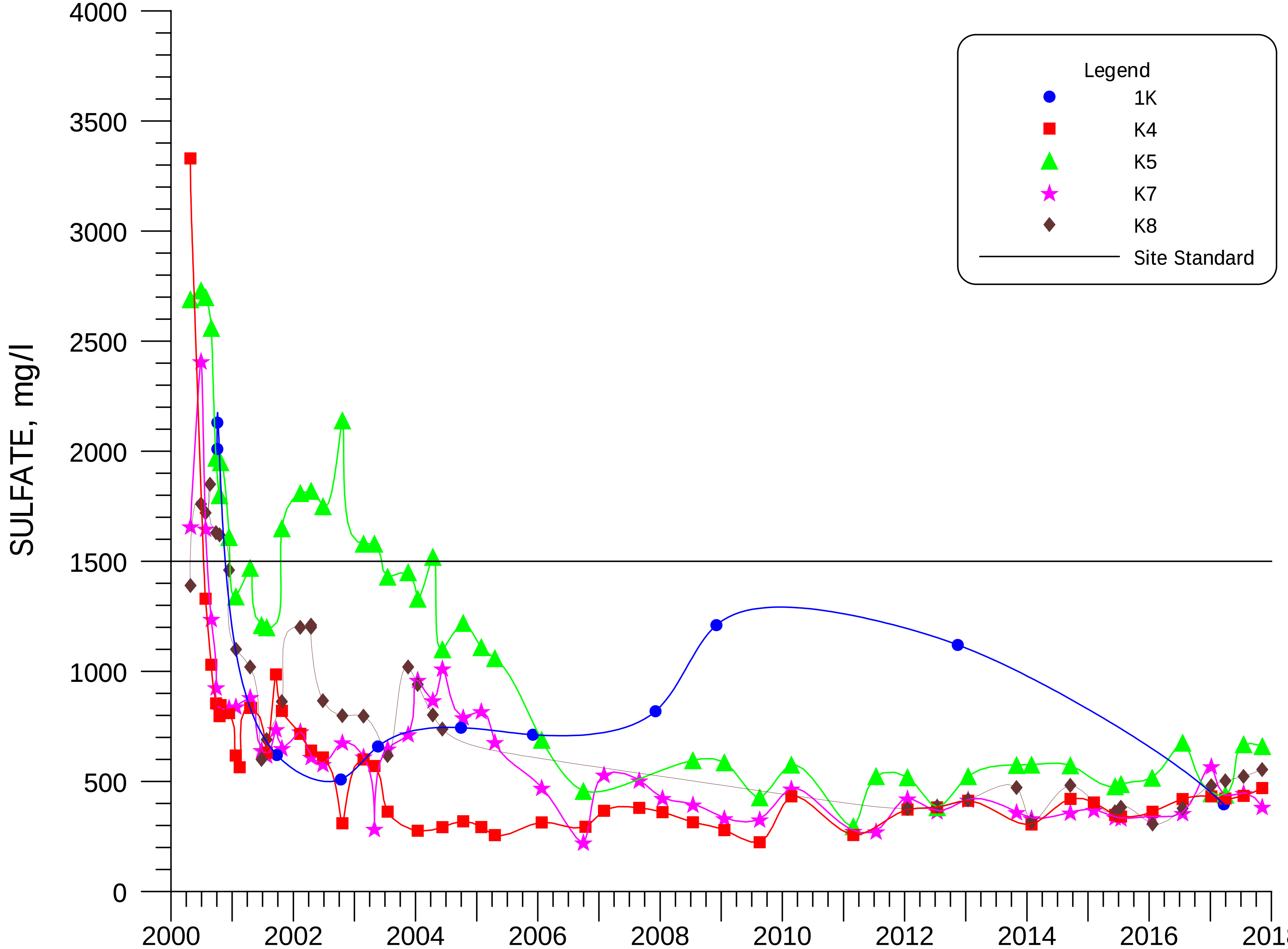

FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS 1K, K4, K5, K7 AND K8.

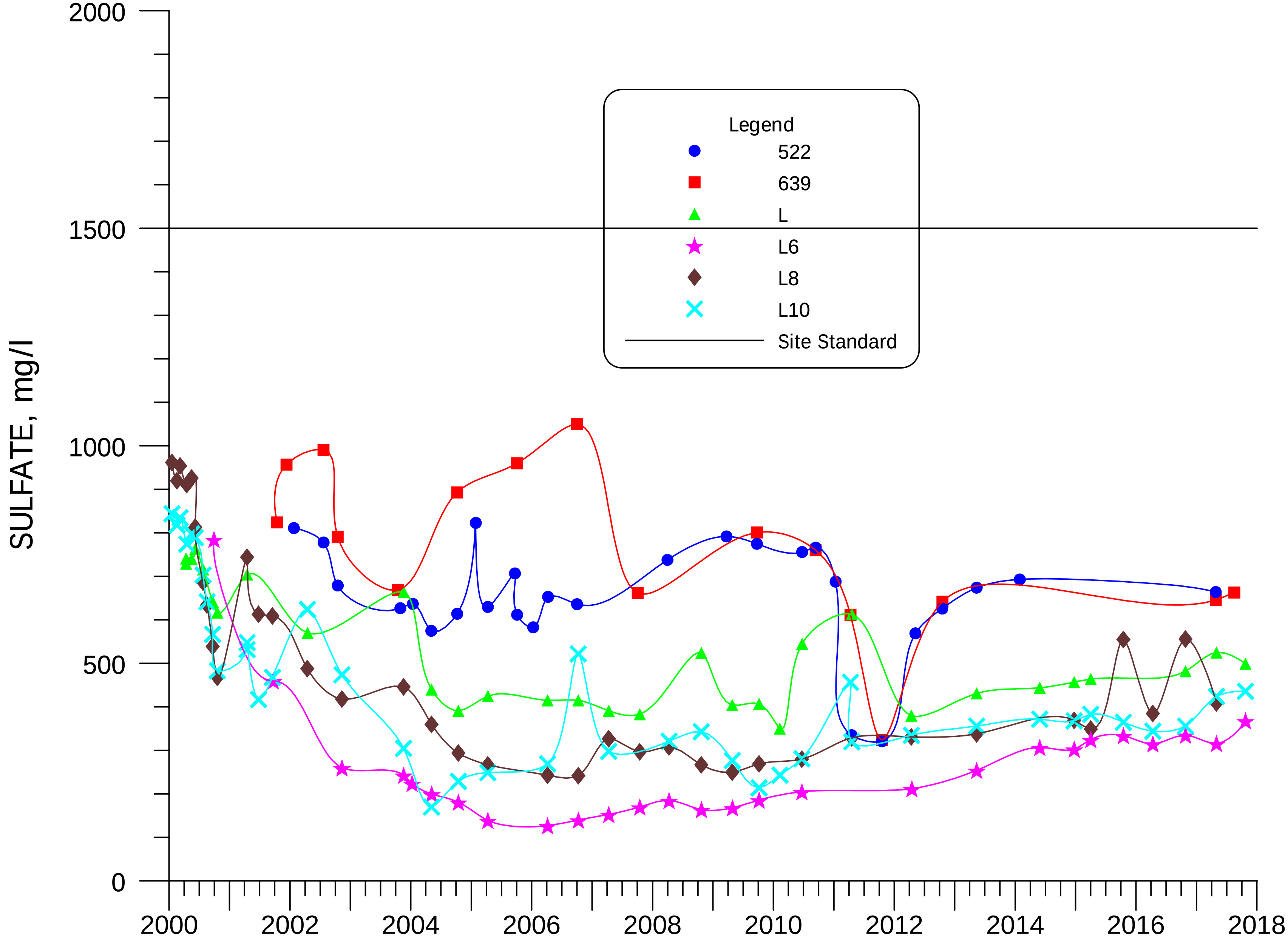

FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

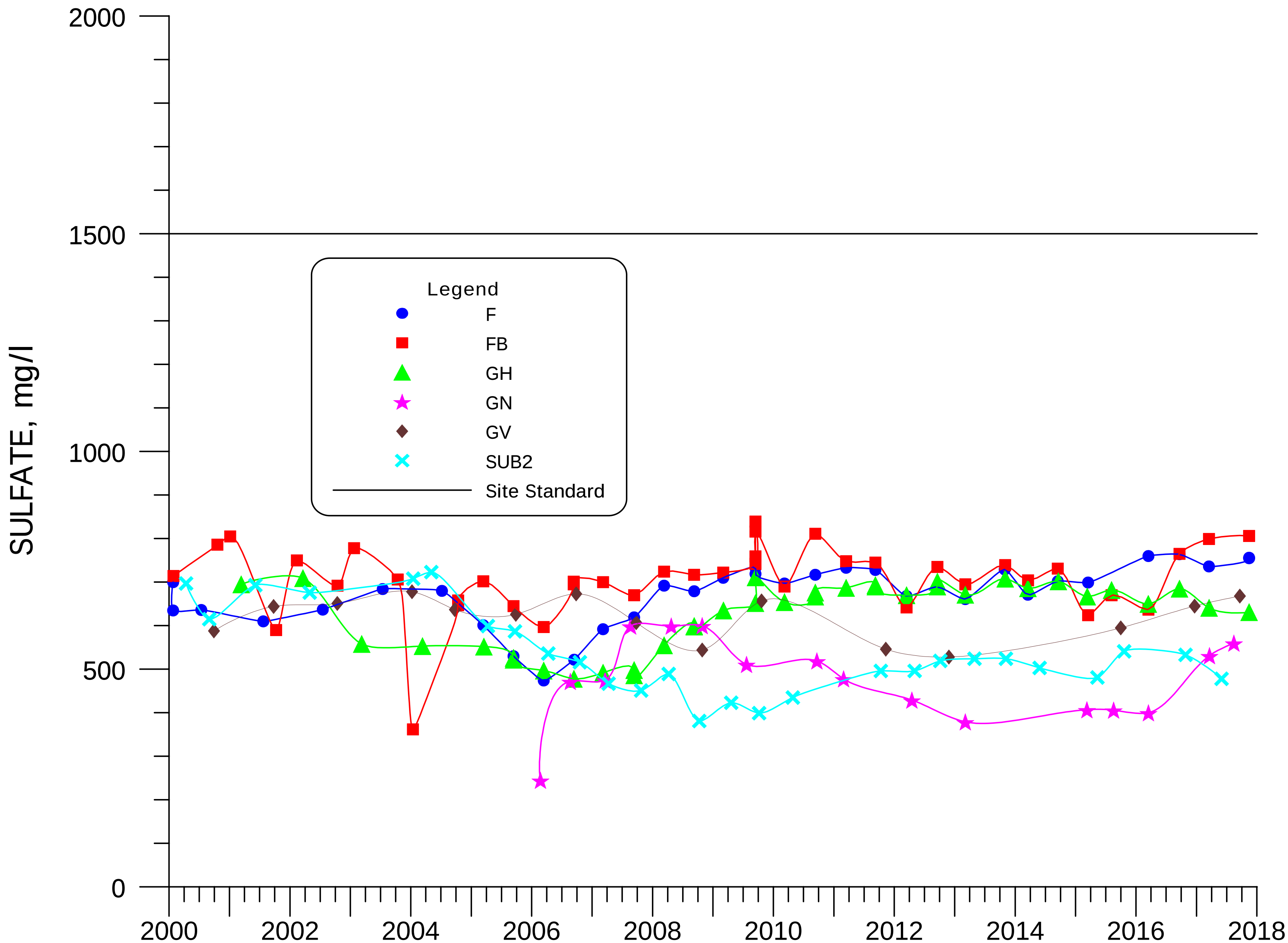

FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

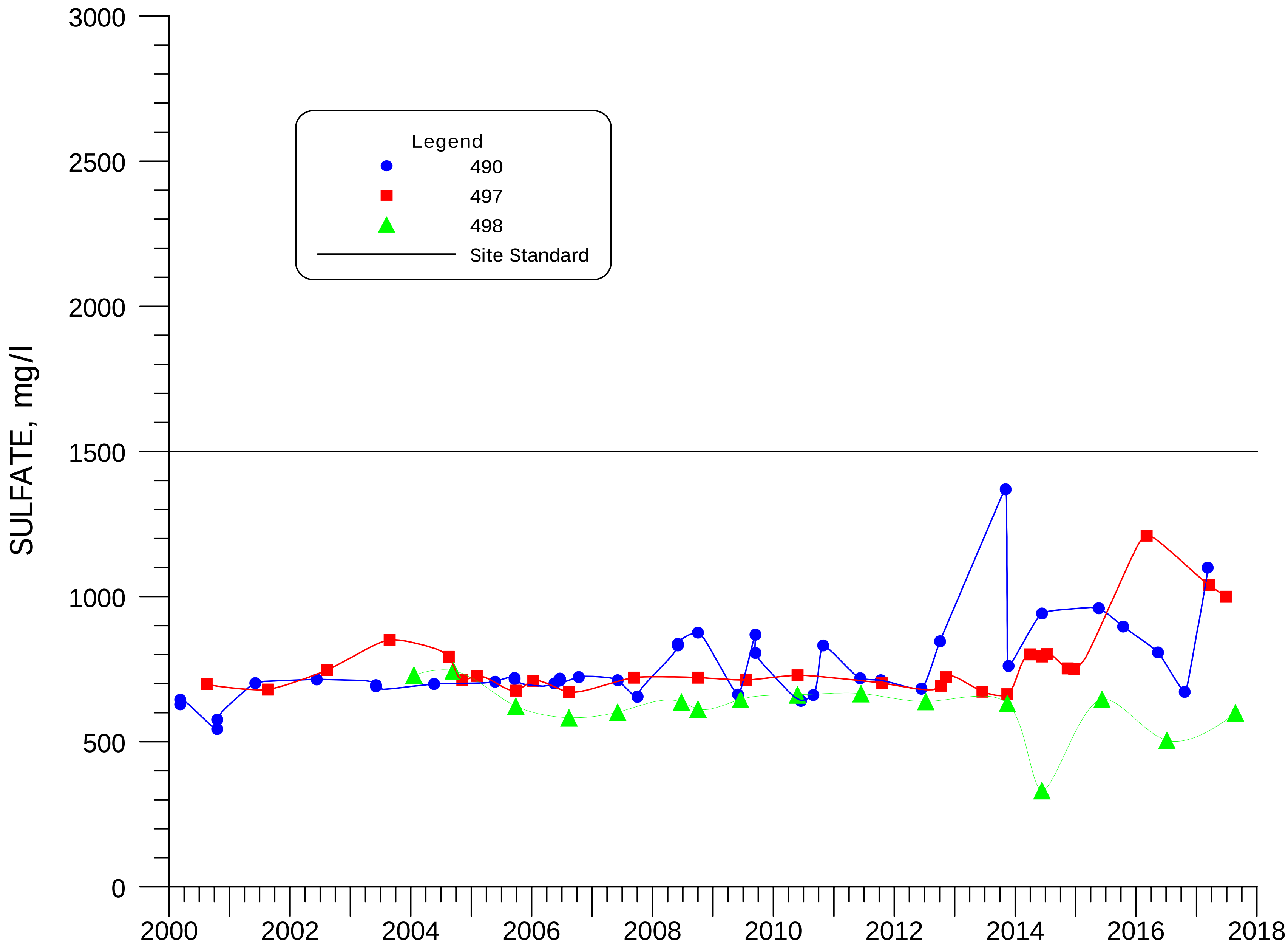

FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

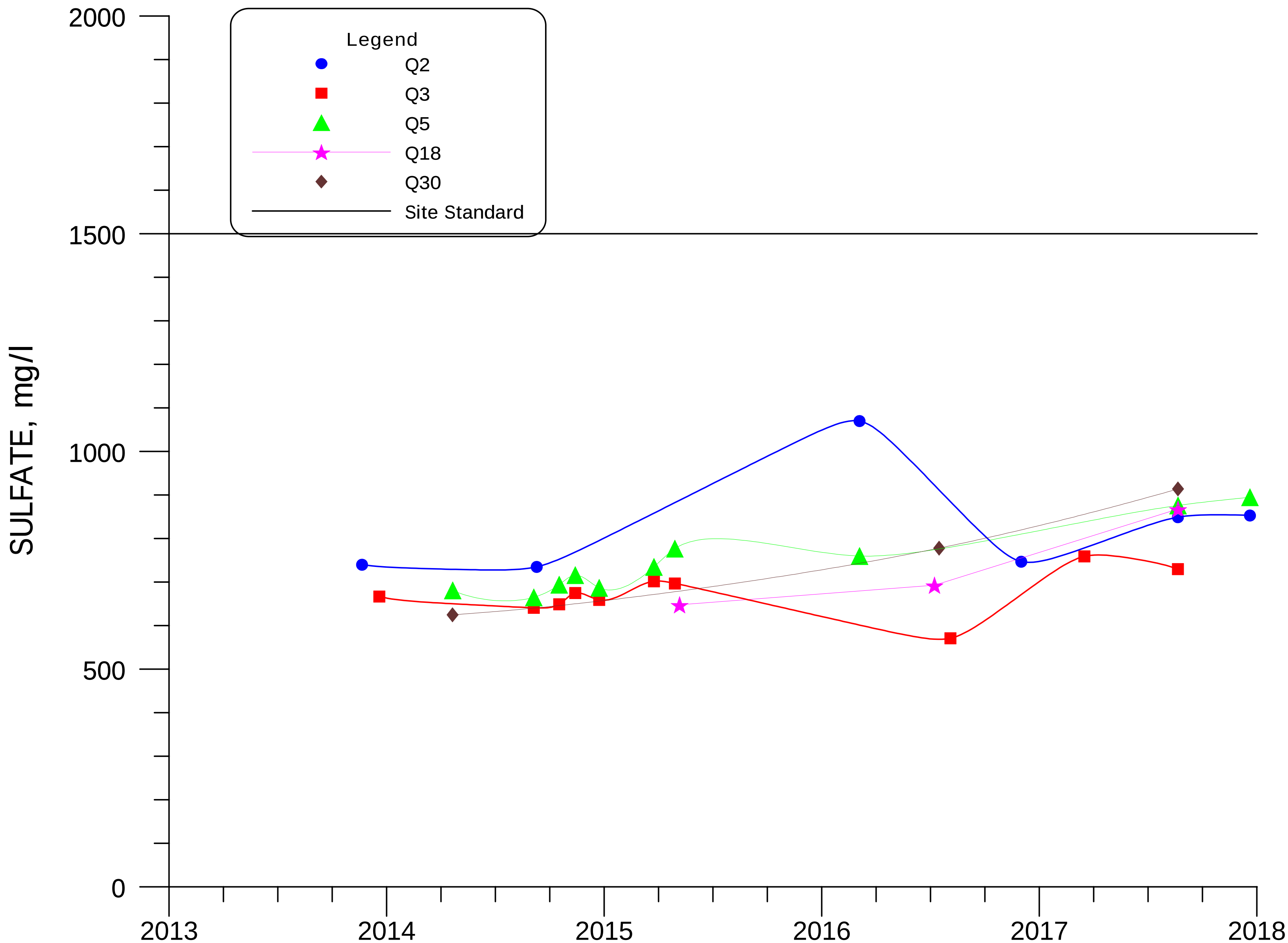

FIGURE 4.3-13A. SULFATE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q30.

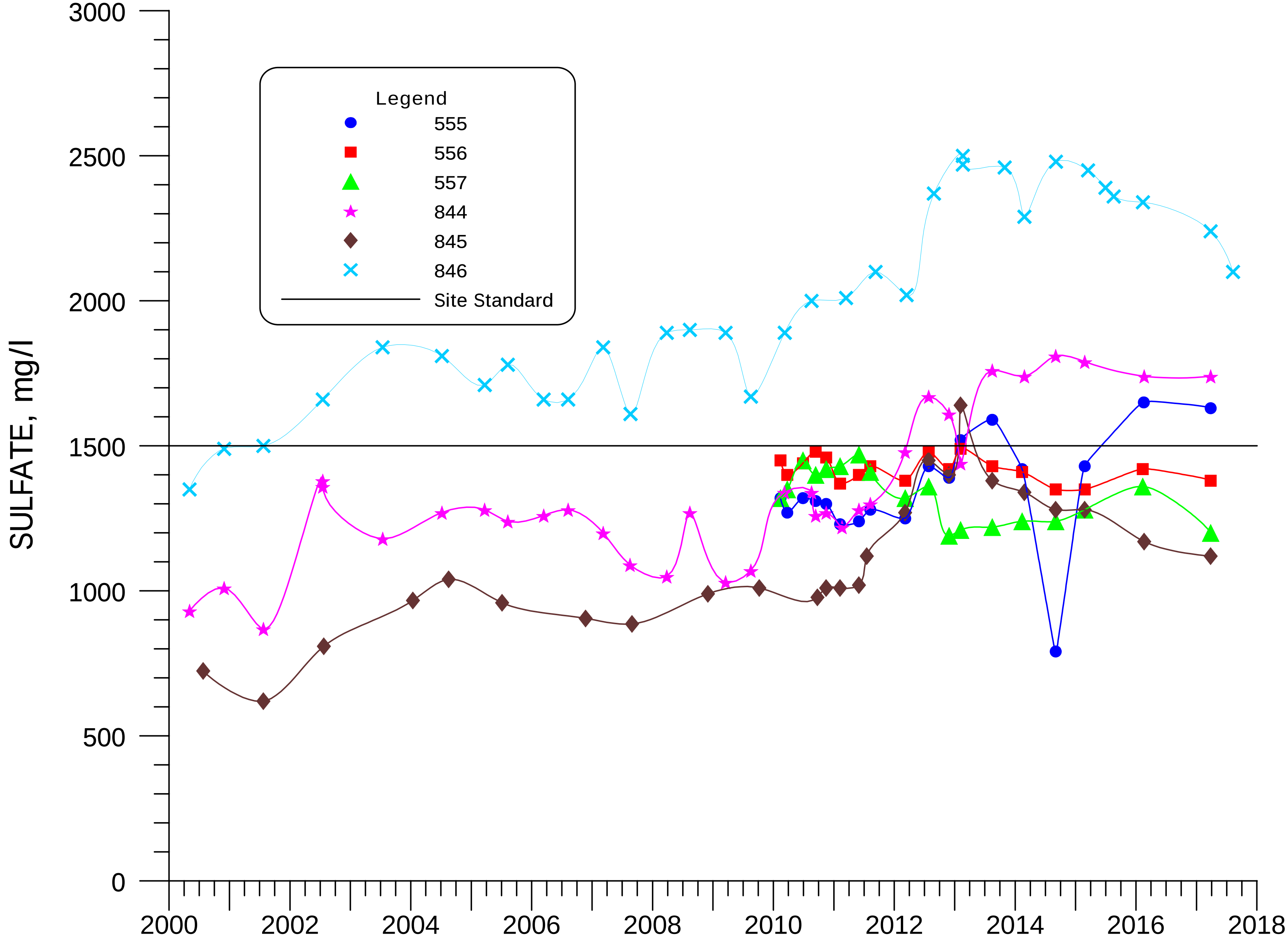

FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

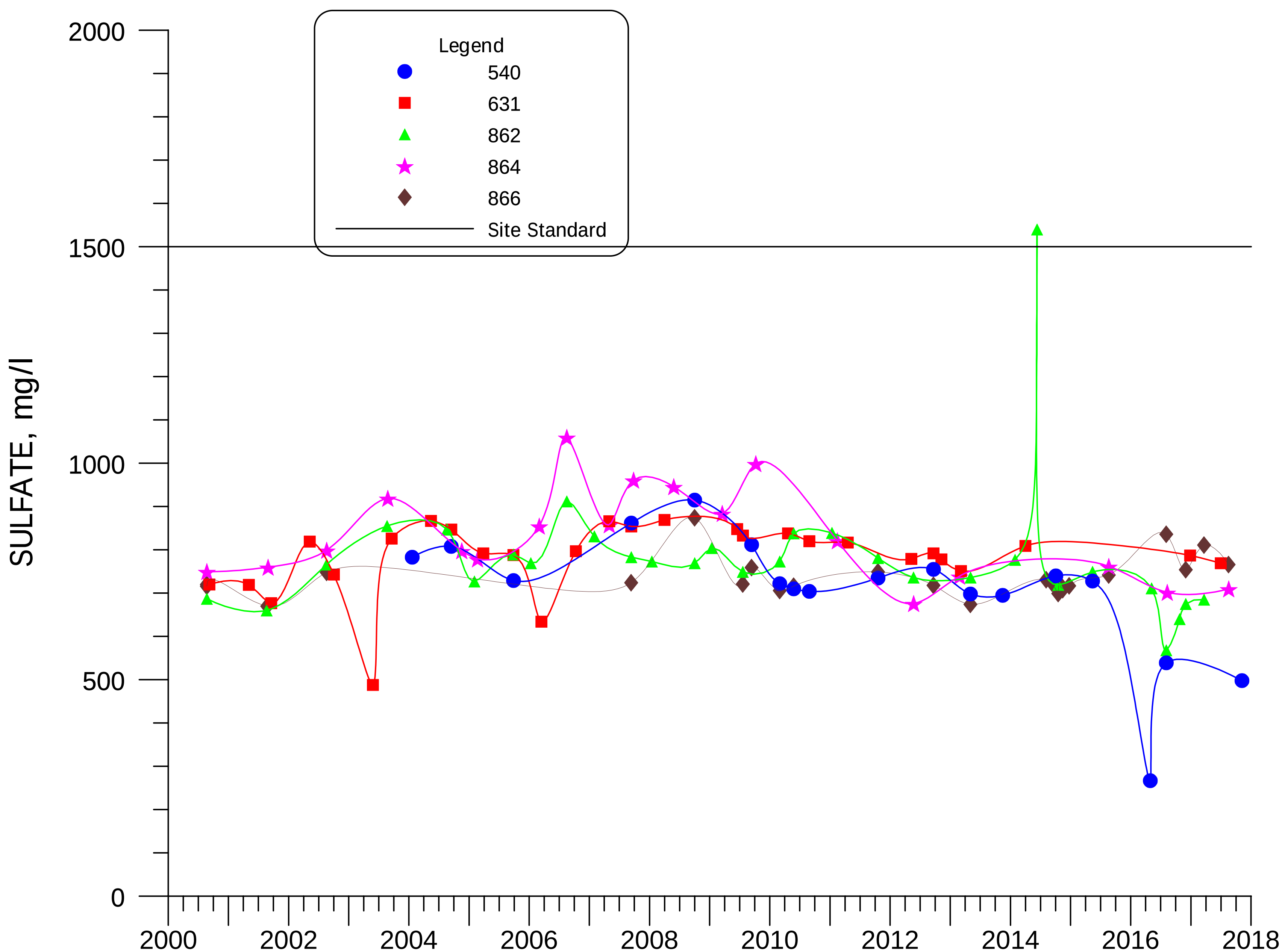

FIGURE 4.3-15. SULFATE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

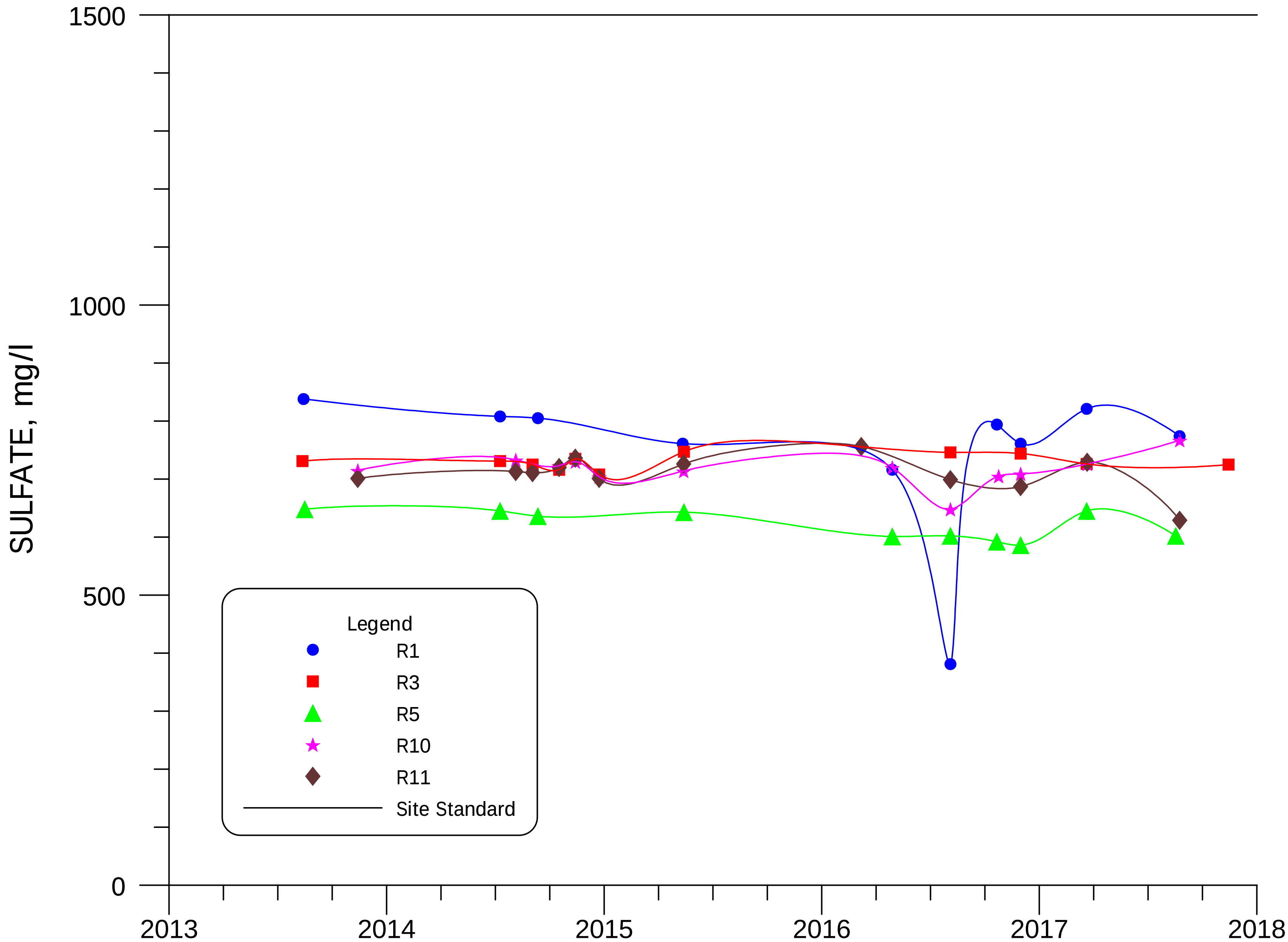

FIGURE 4.3-15A. SULFATE CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

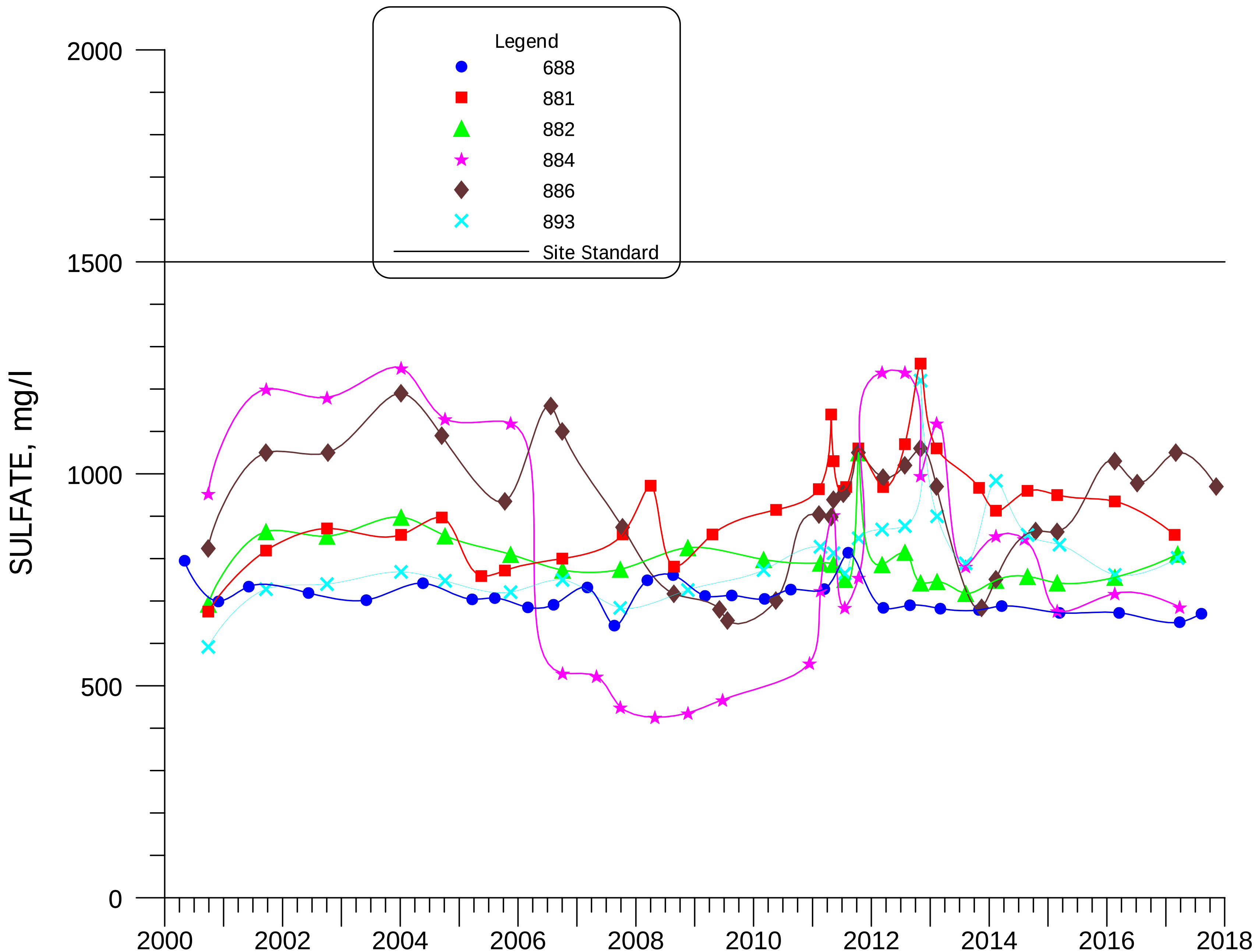

FIGURE 4.3-16. SULFATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

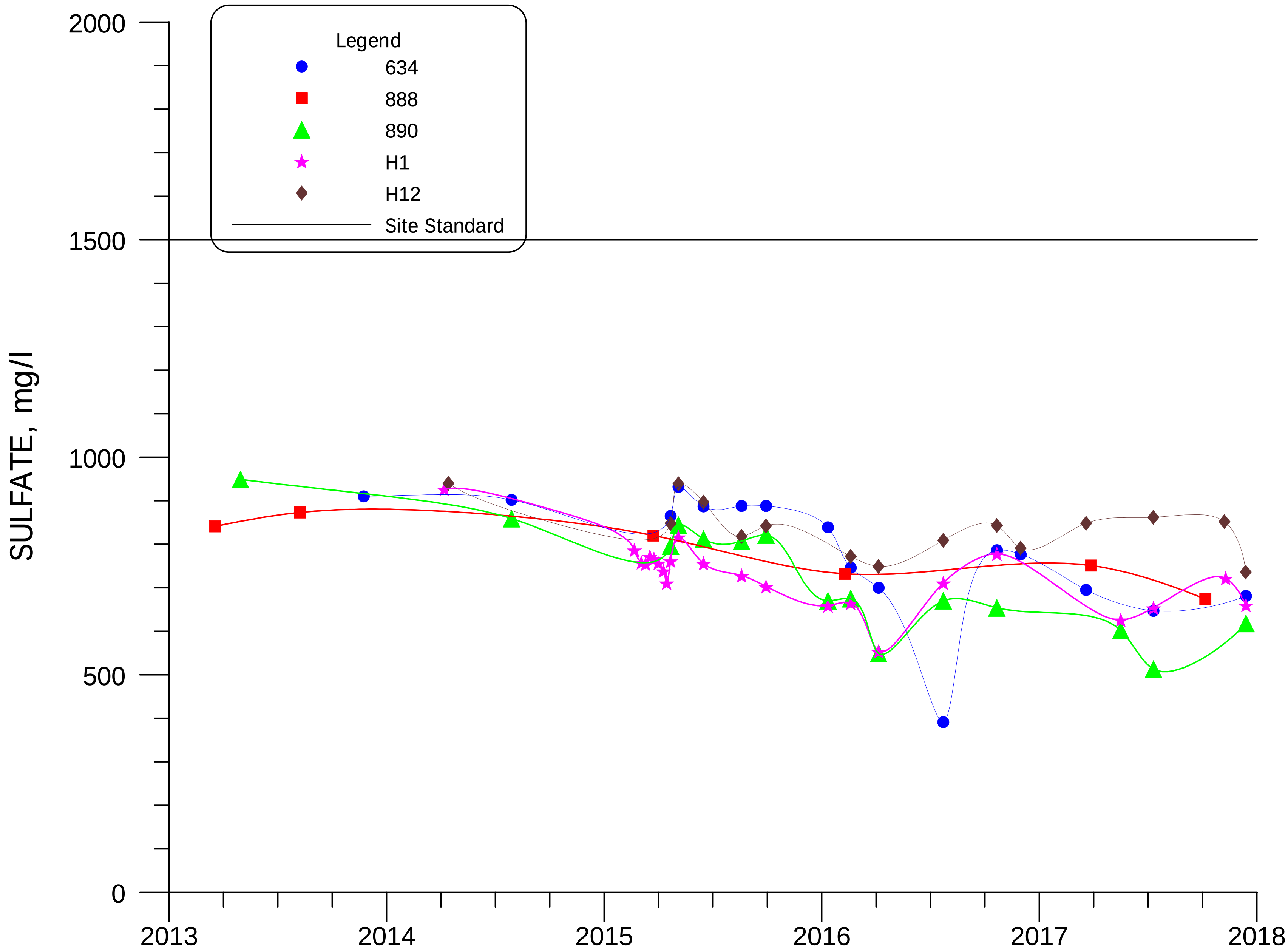

FIGURE 4.3-16A. SULFATE CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

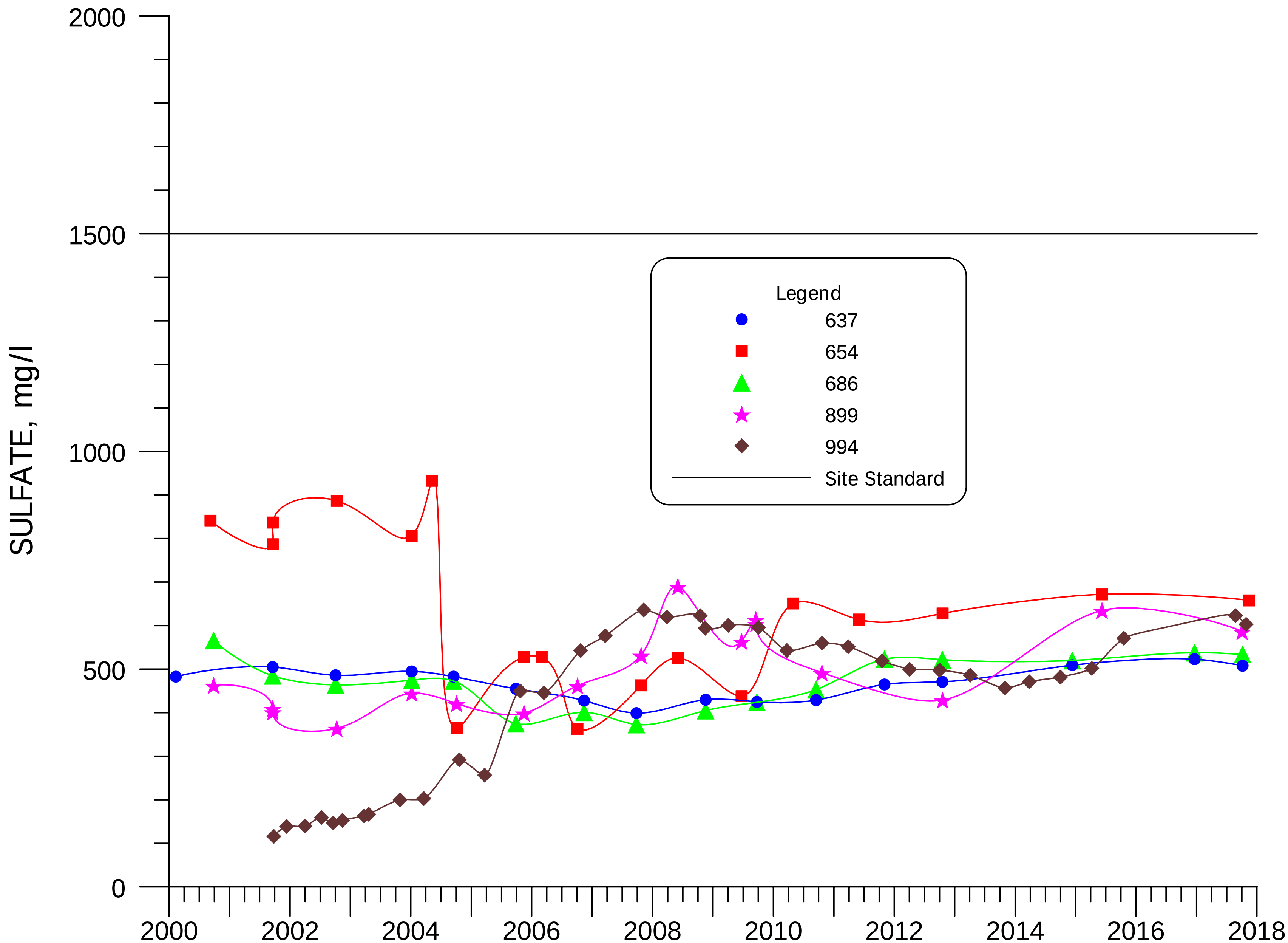

FIGURE 4.3-17. SULFATE CONCENTRATIONS FOR WELLS 637, 654, 686, 899 and 994.

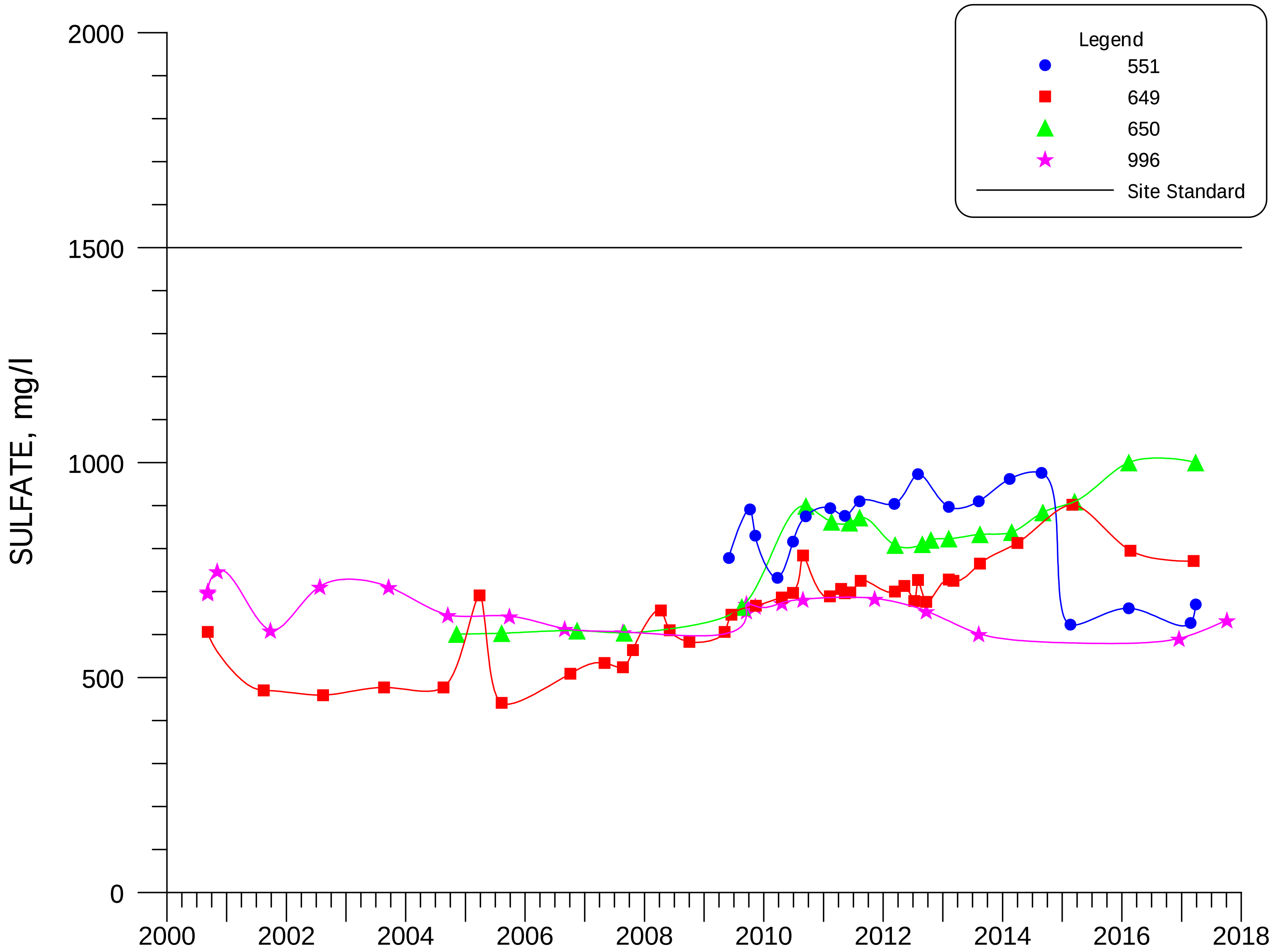

FIGURE 4.3-18. SULFATE CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

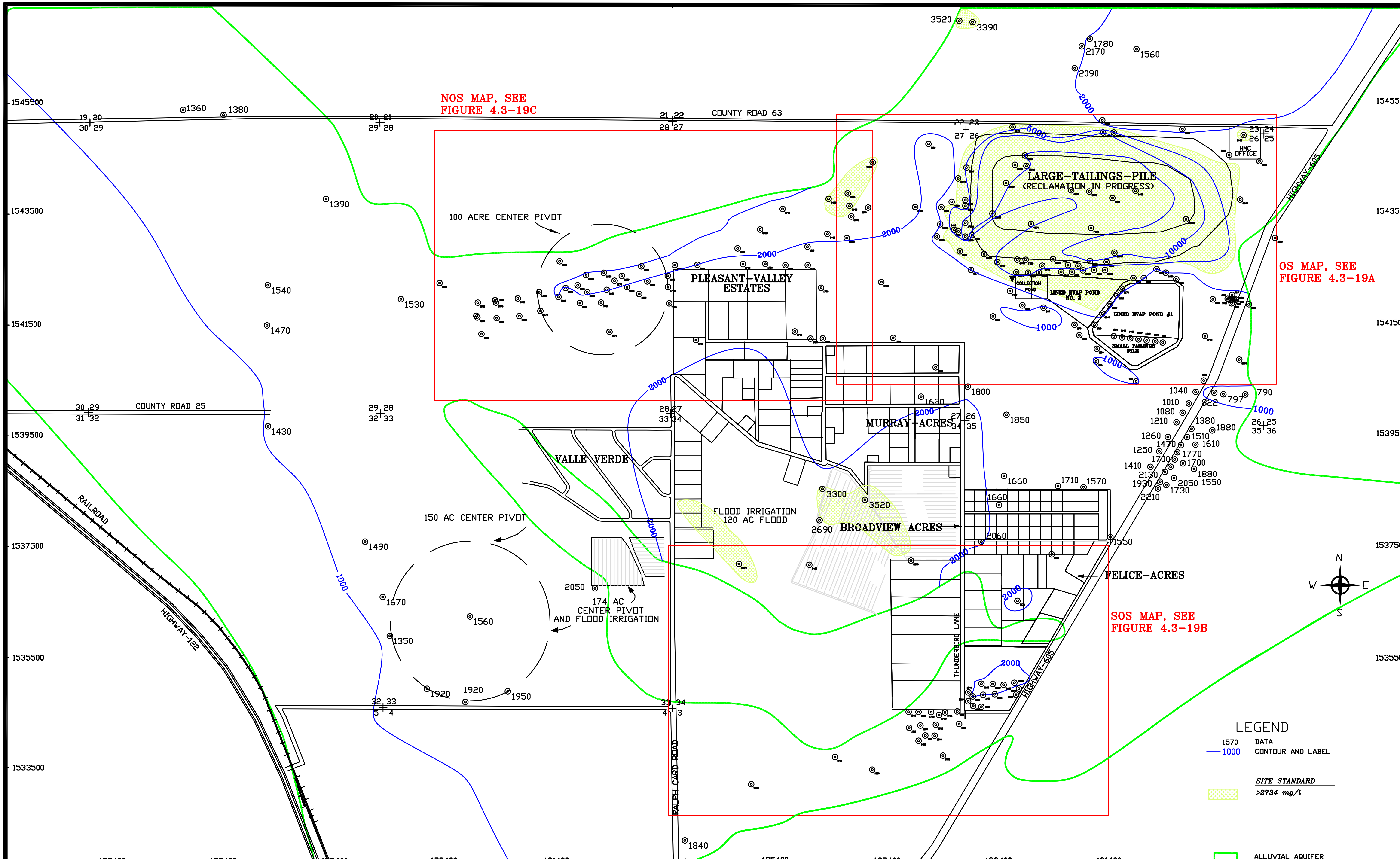

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FIGURE 4.3-19. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

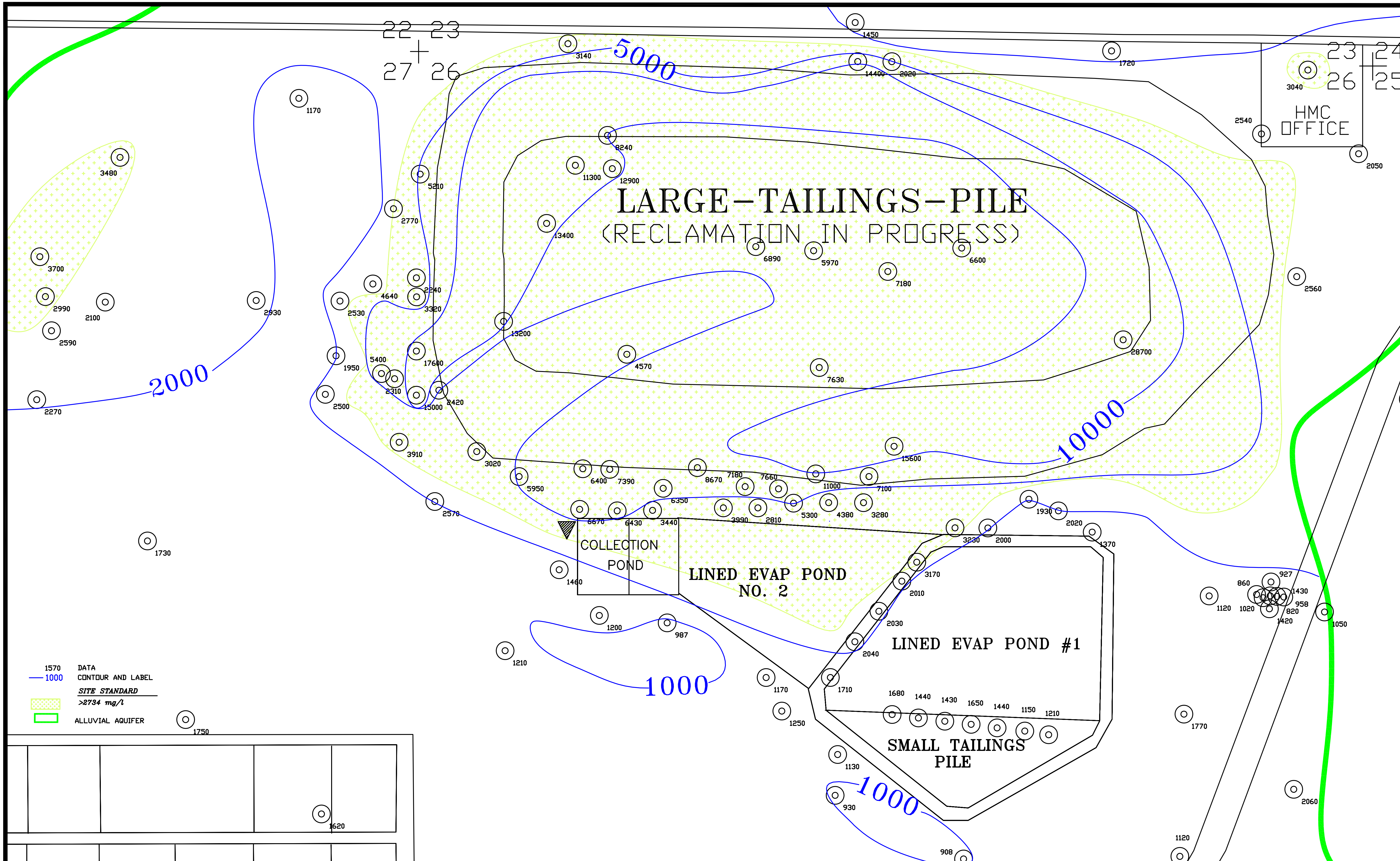

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FIGURE 4.3-19A. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

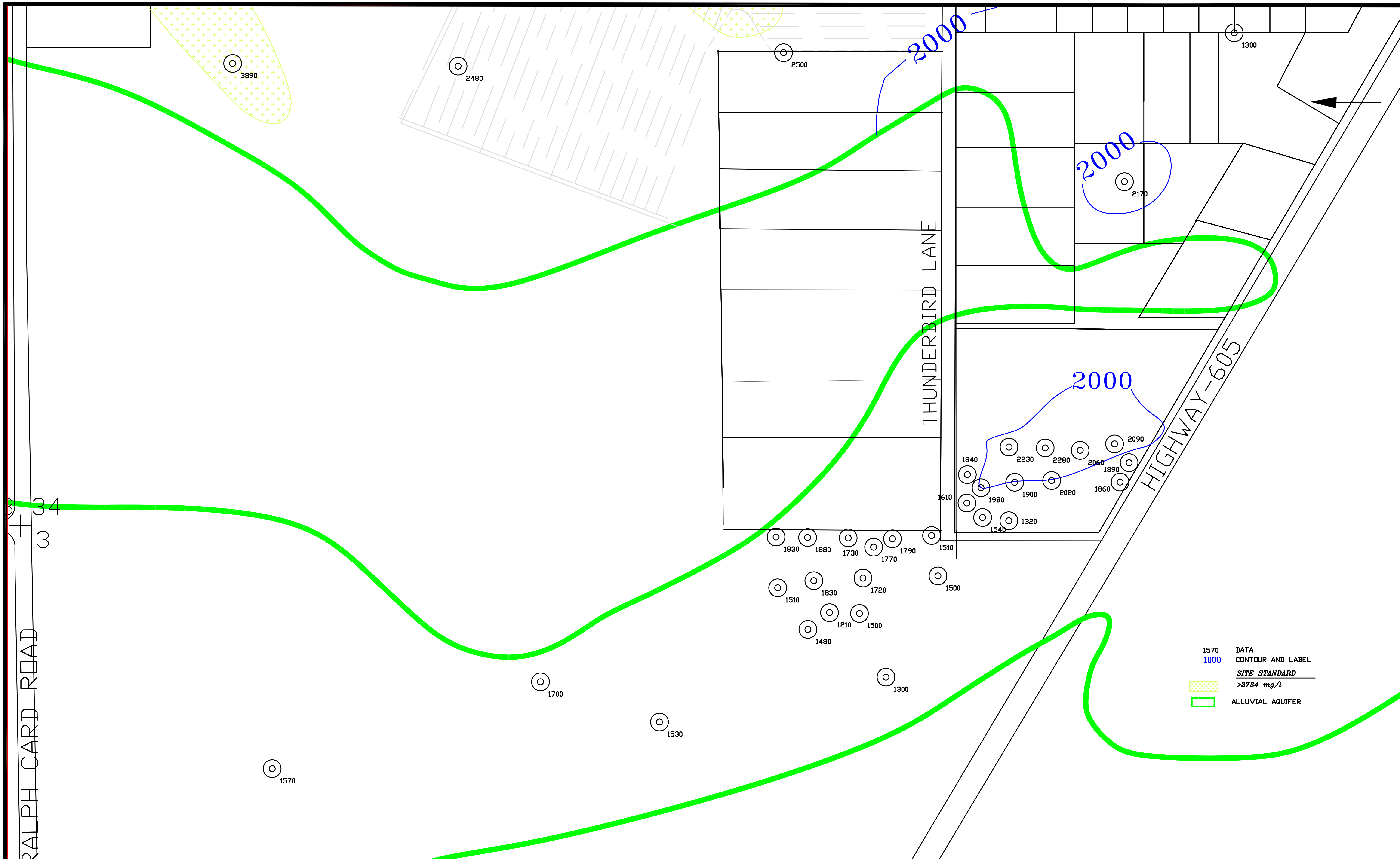

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FIGURE 4.3-19B. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

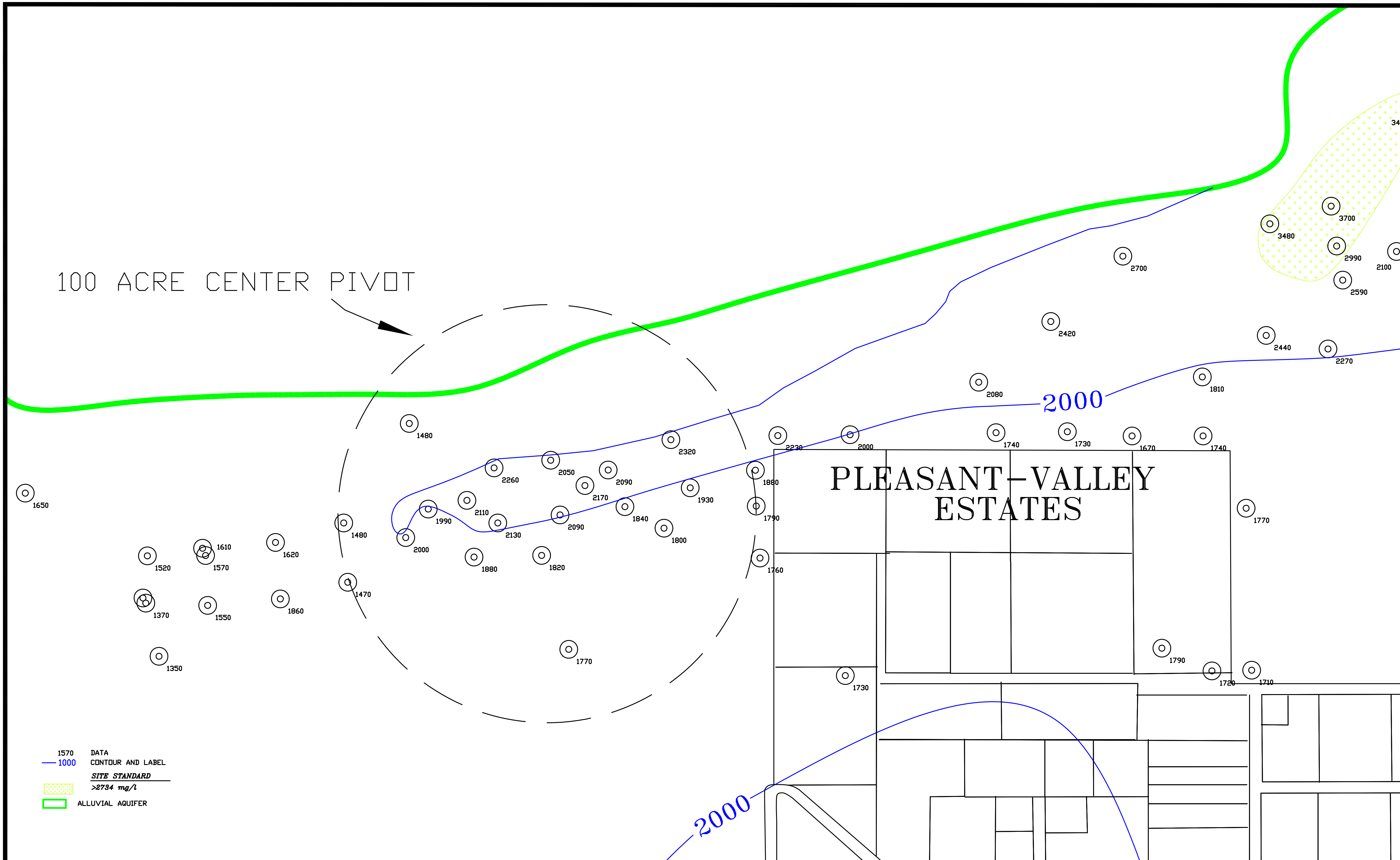

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FIGURE 4.3-19C. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

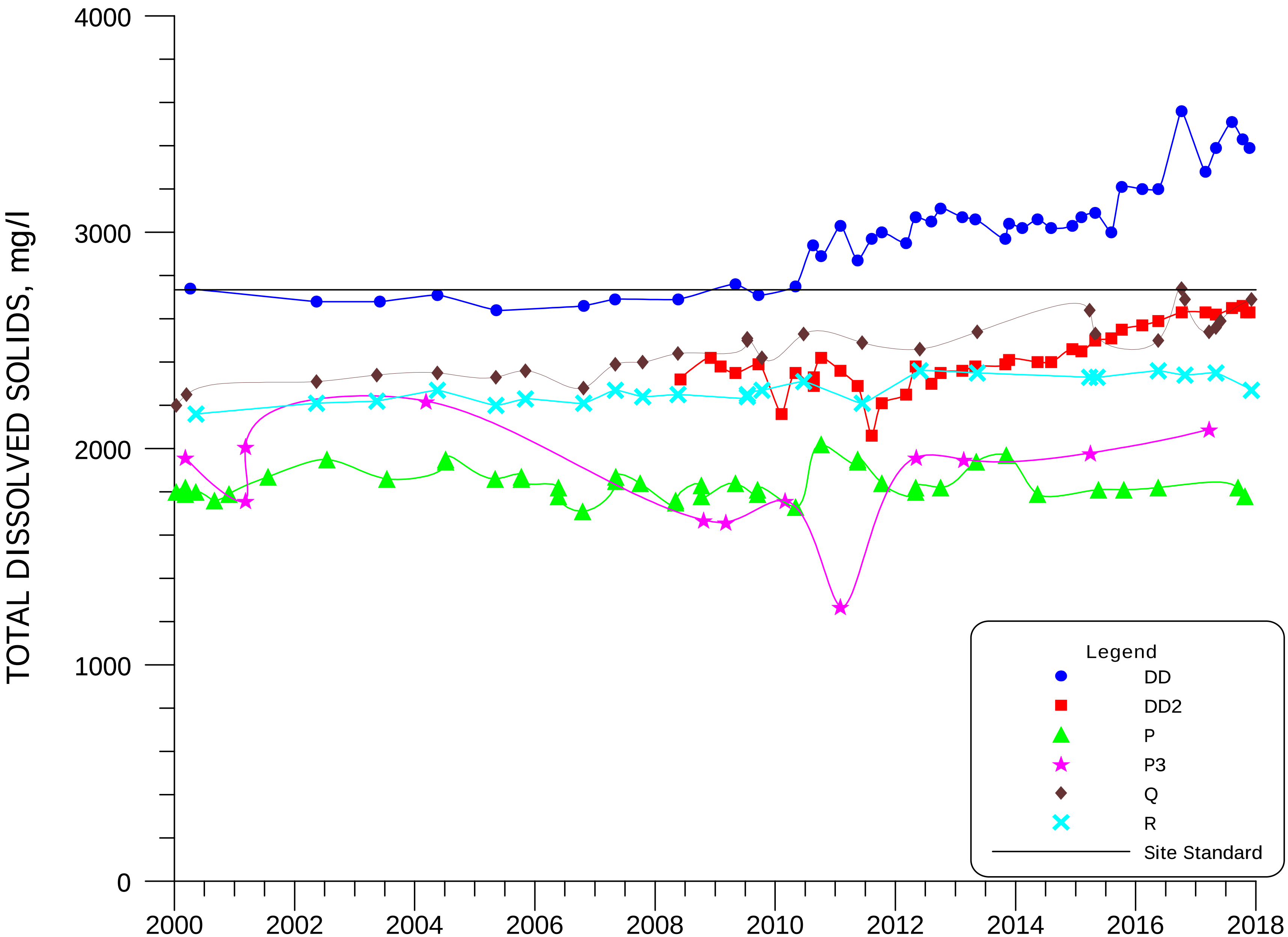

FIGURE 4.3-20. TDS CONCENTRATIONS FOR WELLS DD, DD2, ND, P, P3, Q AND R.

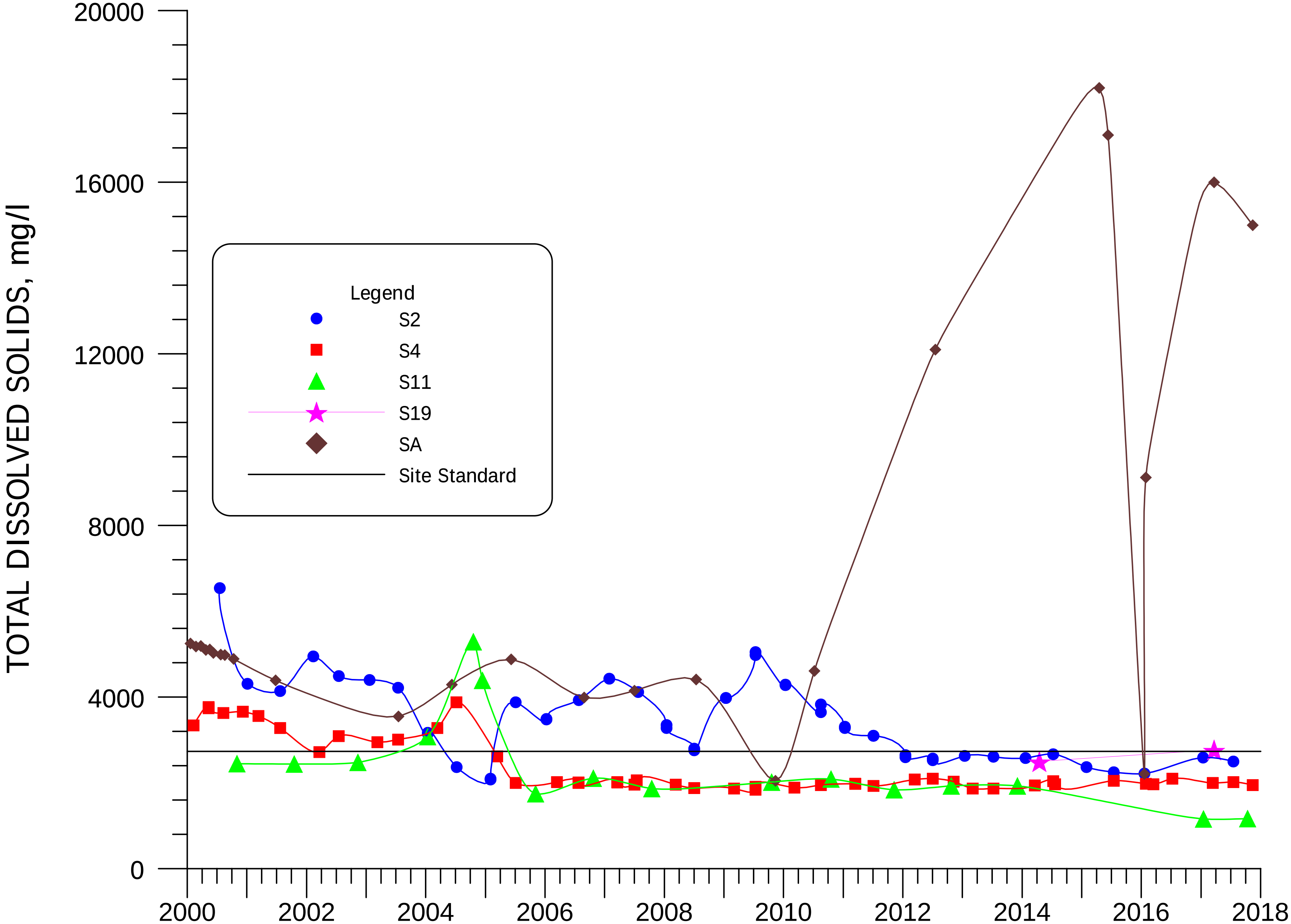

FIGURE 4.3-21. TDS CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

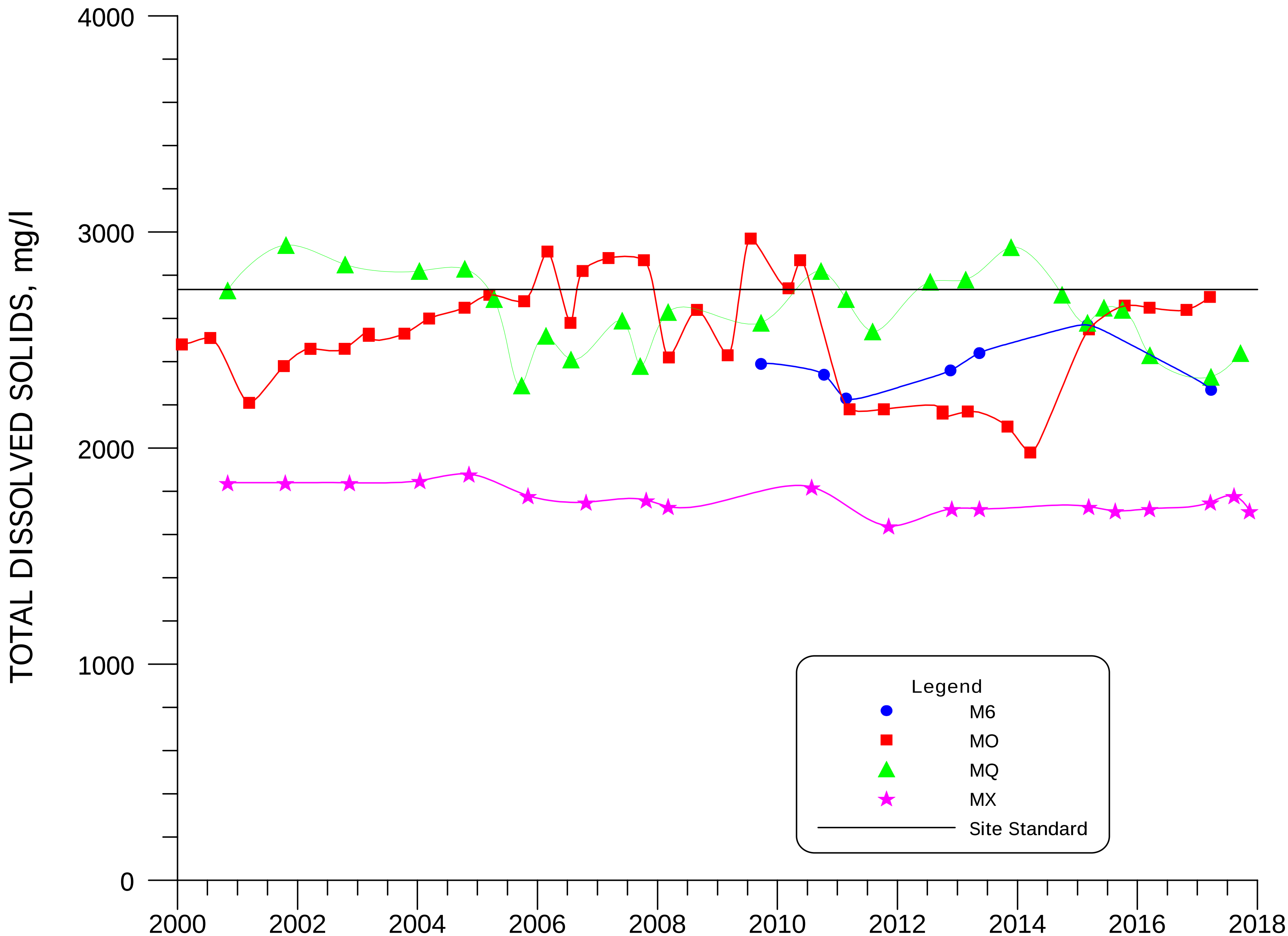

FIGURE 4.3-22. TDS CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

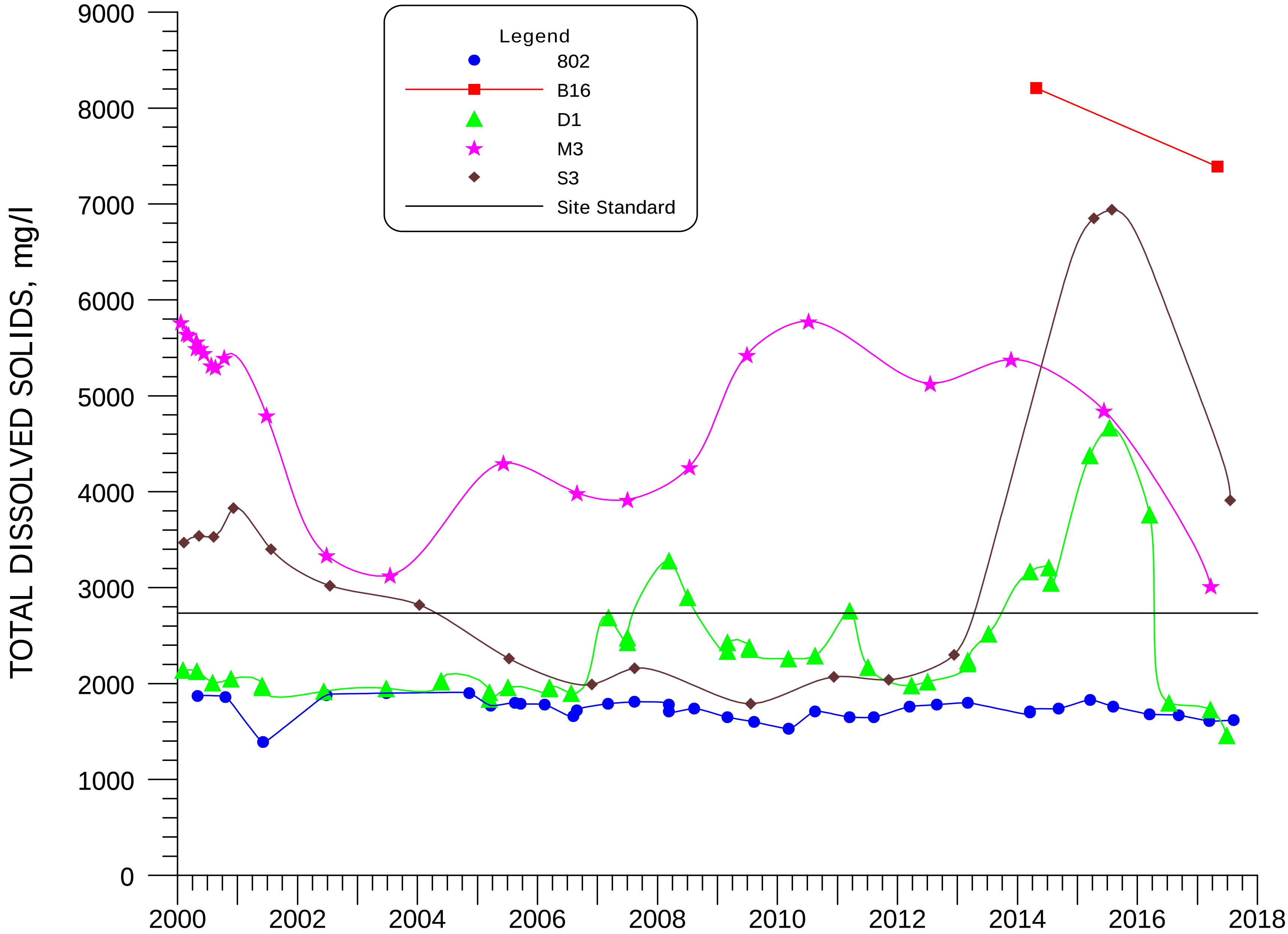

FIGURE 4.3-23. TDS CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

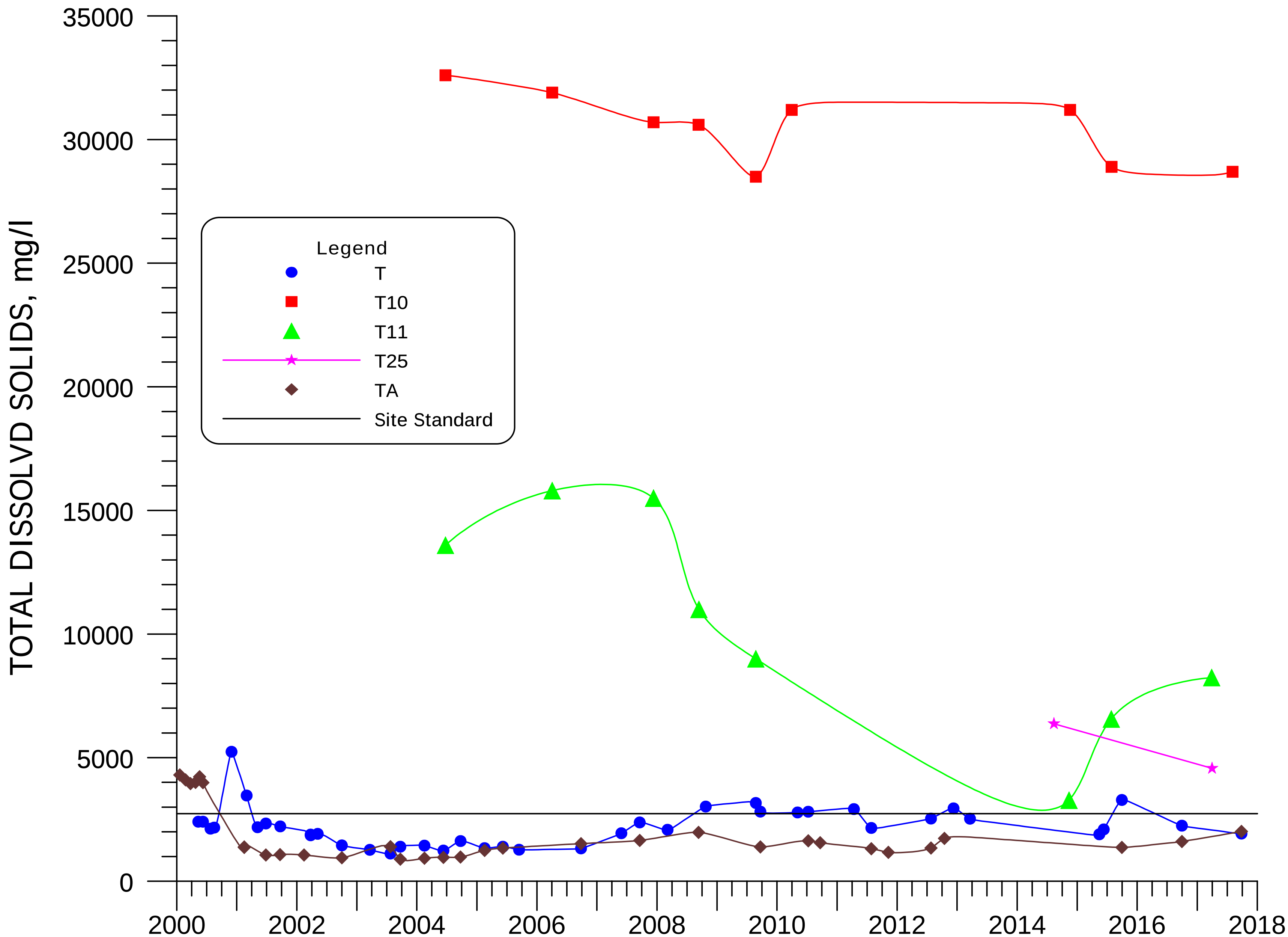

FIGURE 4.3-24. TDS CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

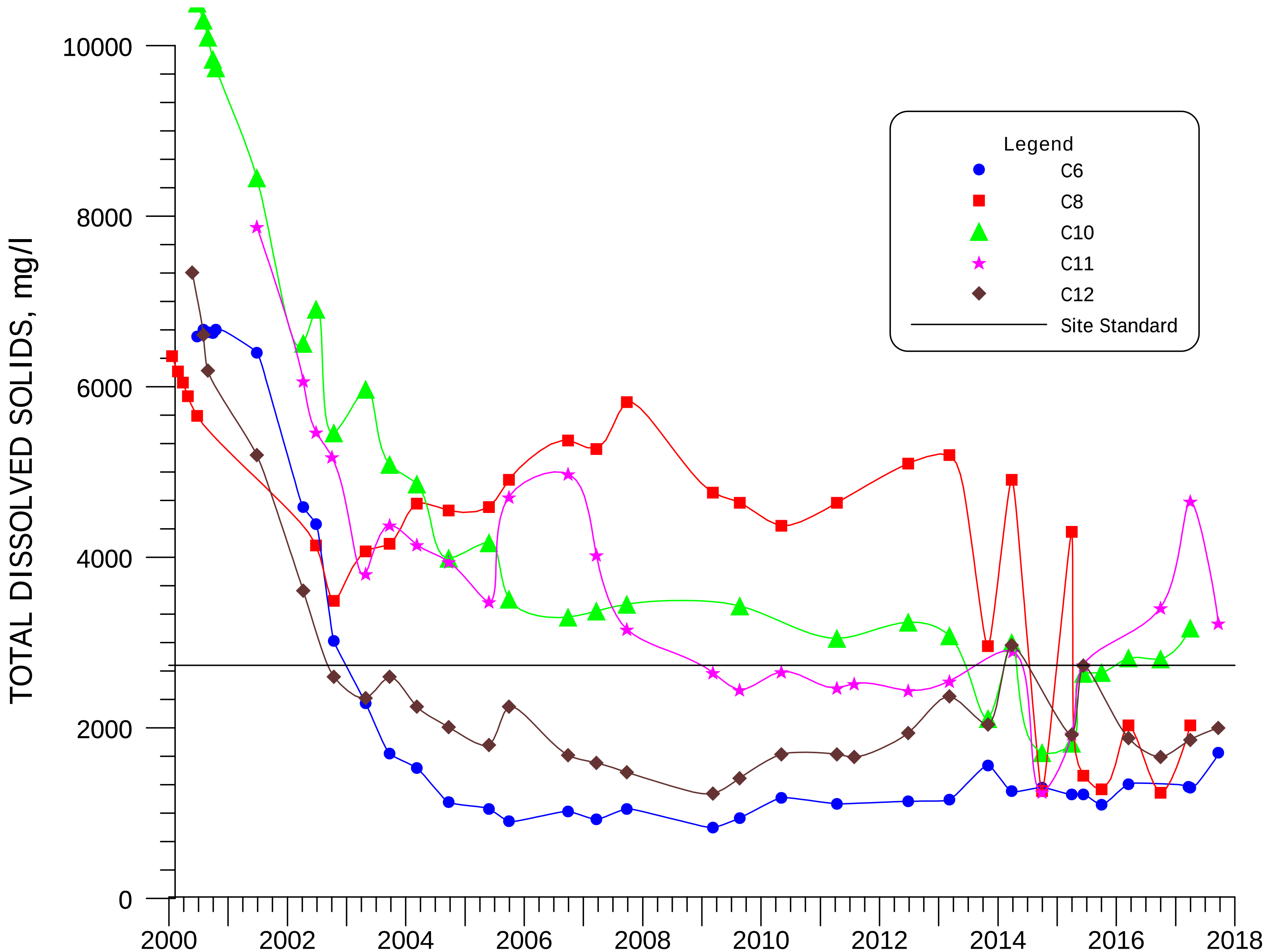

FIGURE 4.3-25. TDS CONCENTRATIONS FOR WELLS C6, C8, C10, C11 AND C12.

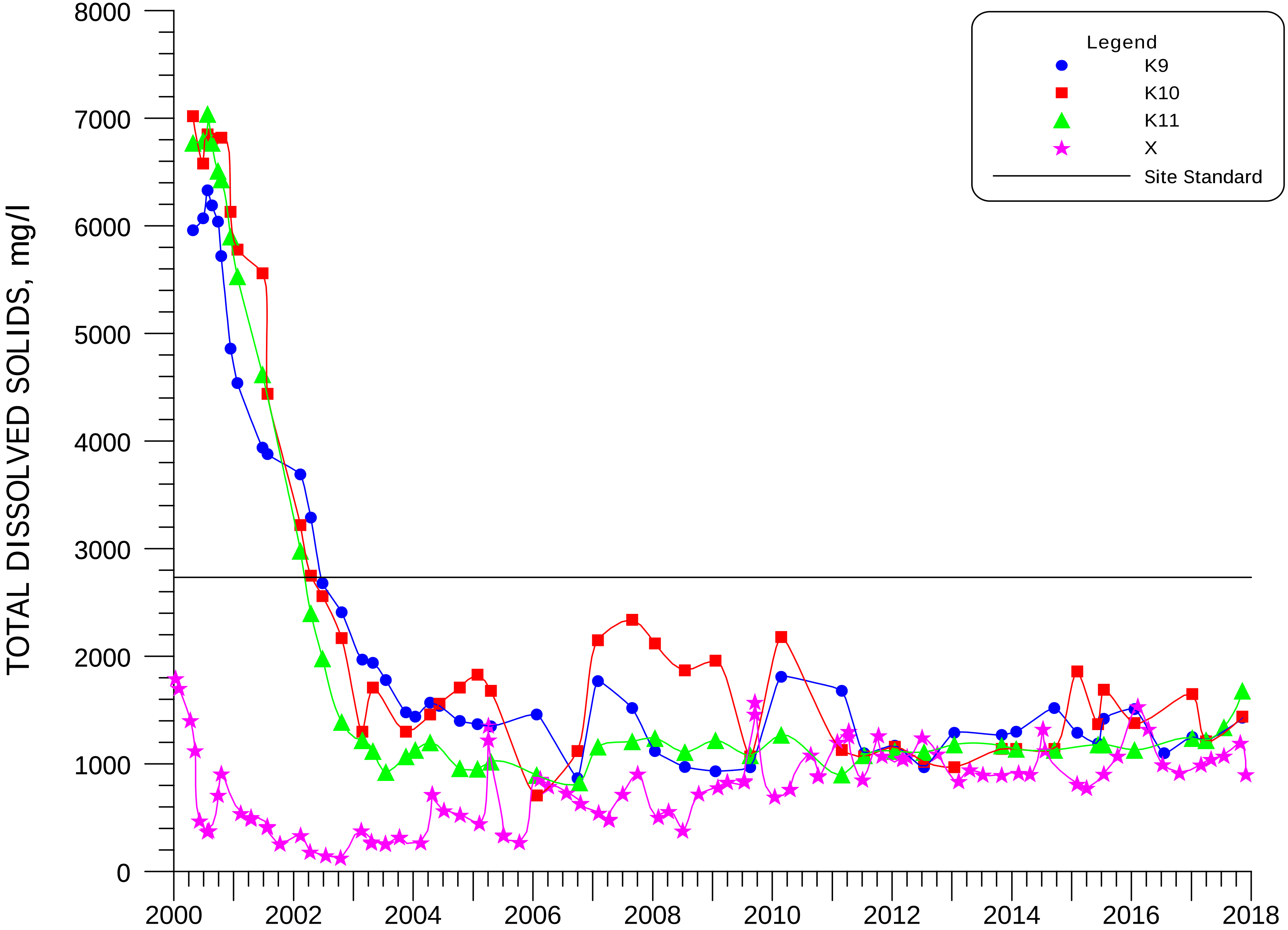

FIGURE 4.3-26. TDS CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

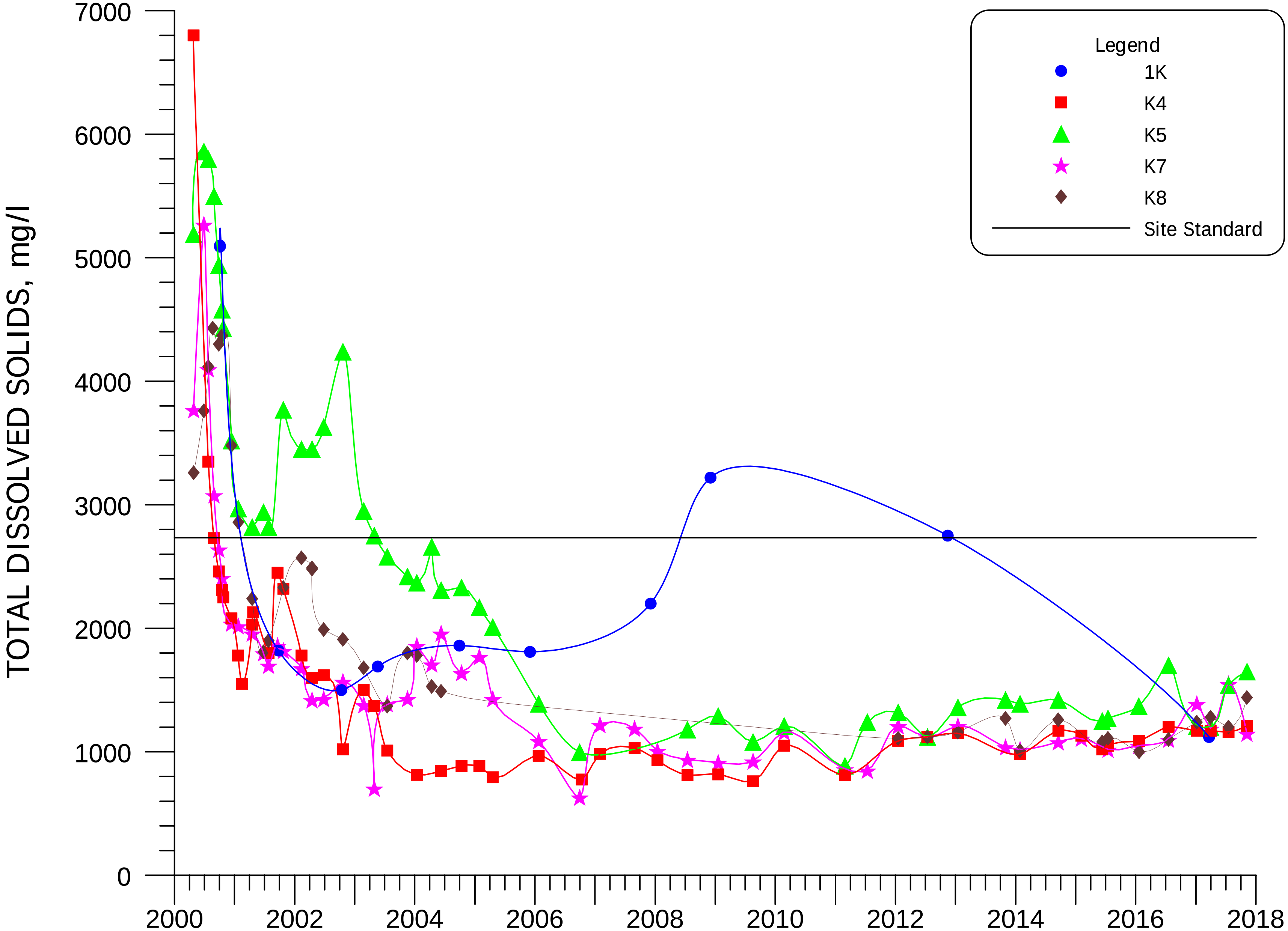

FIGURE 4.3-27. TDS CONCENTRATIONS FOR WELLS 1K, K4, K5, K7 AND K8.

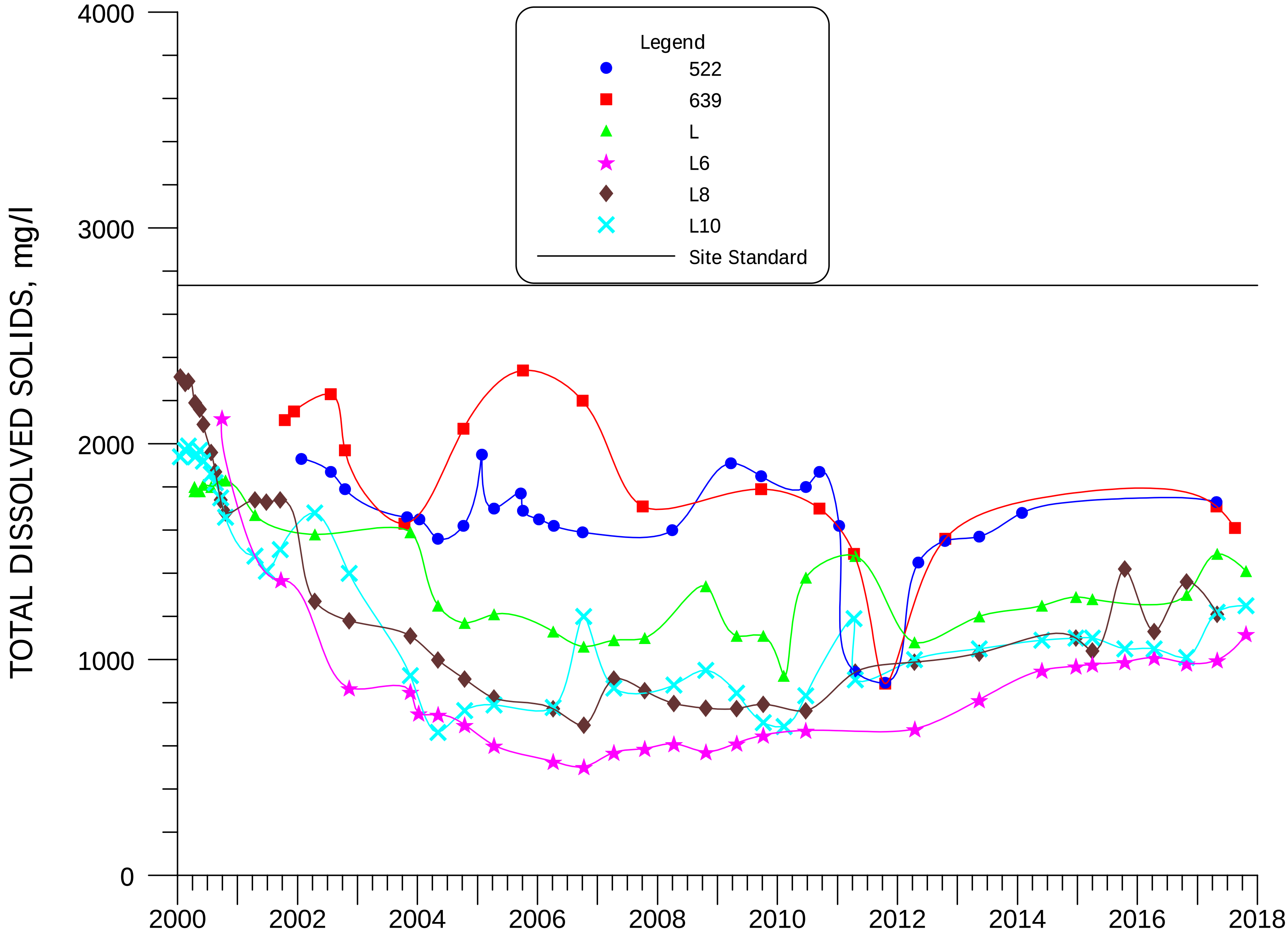

FIGURE 4.3-28. TDS CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

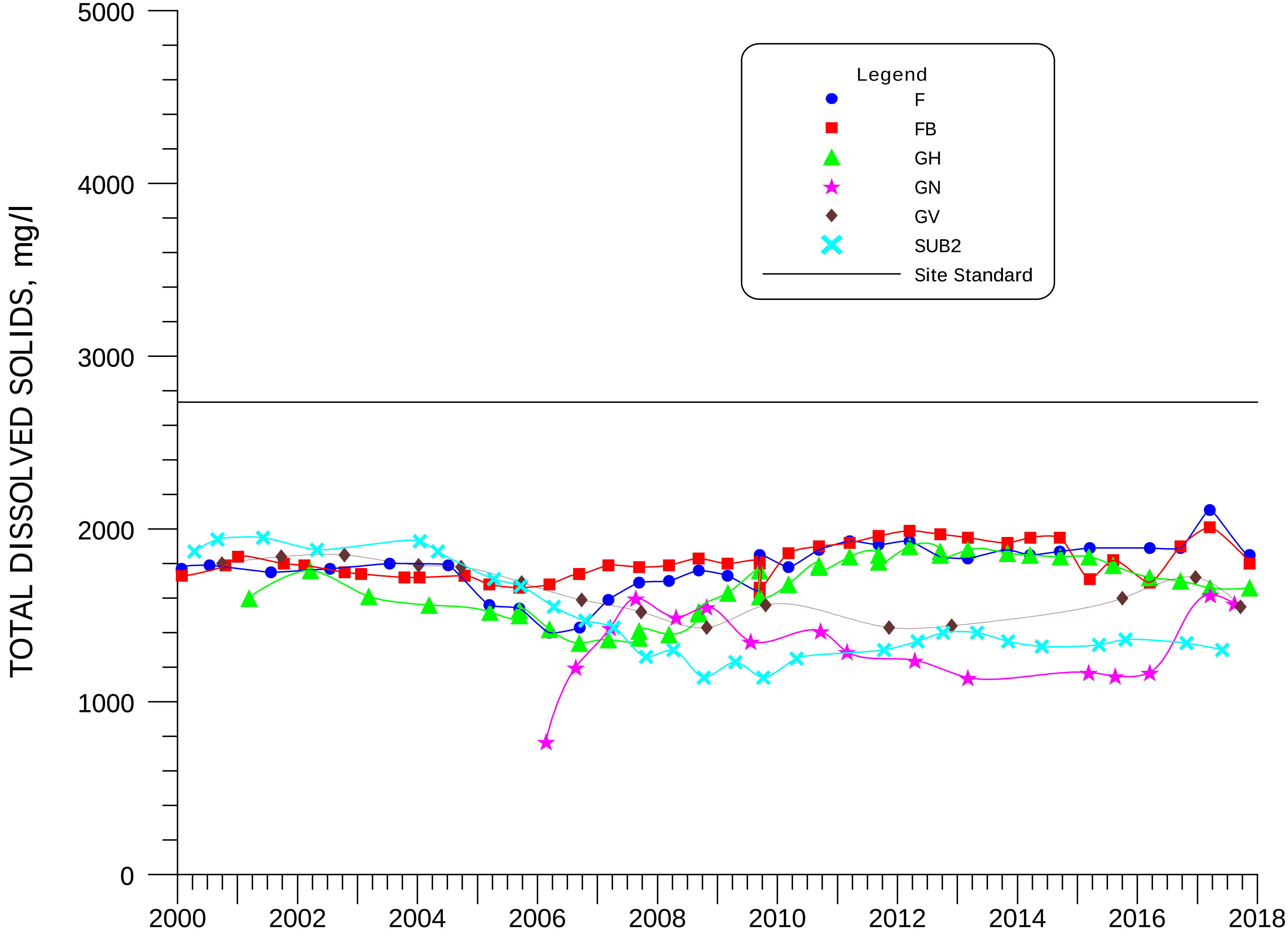

FIGURE 4.3-29. TDS CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

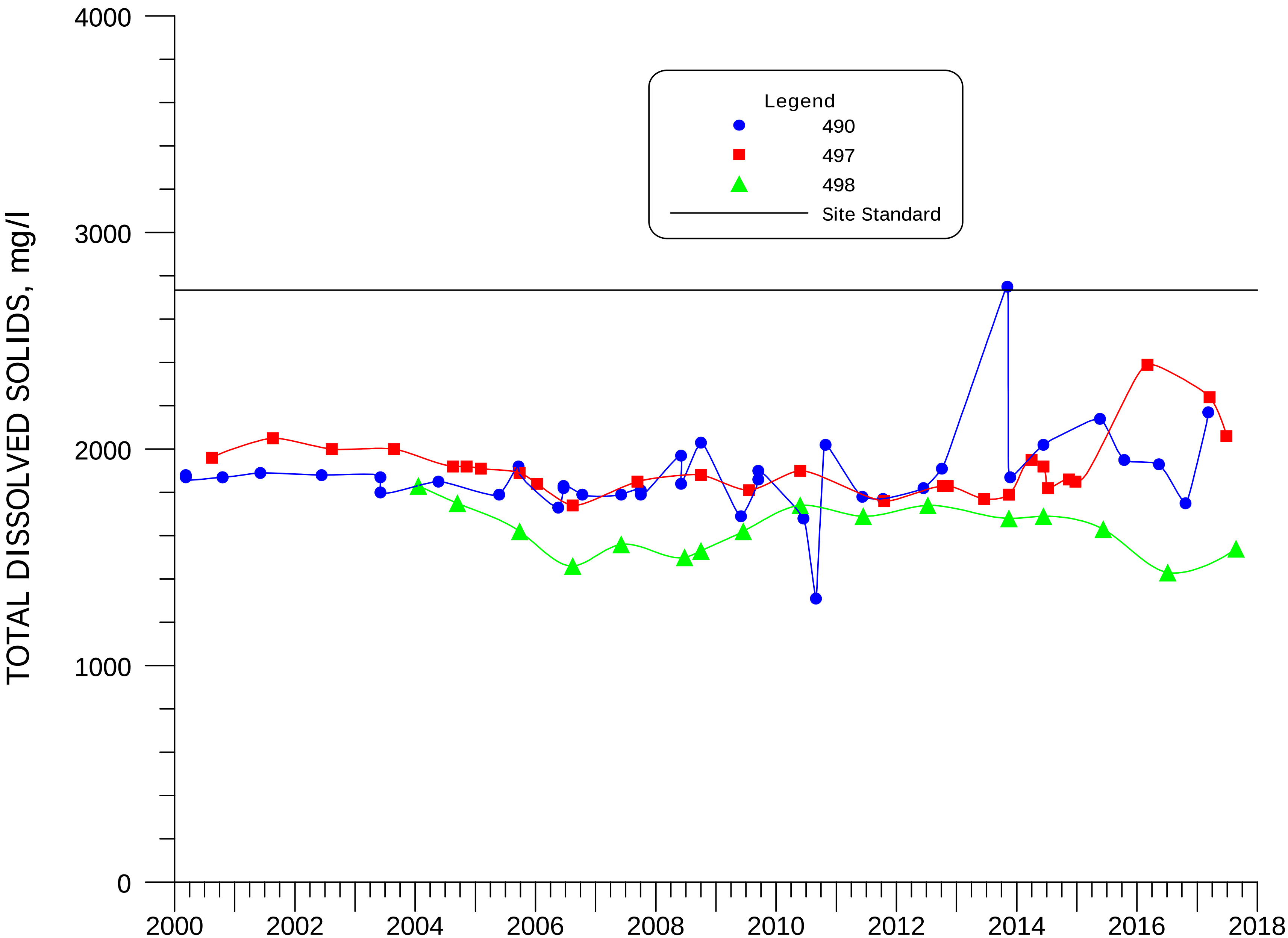

FIGURE 4.3-30. TDS CONCENTRATIONS FOR WELLS 490, 497 AND 498.

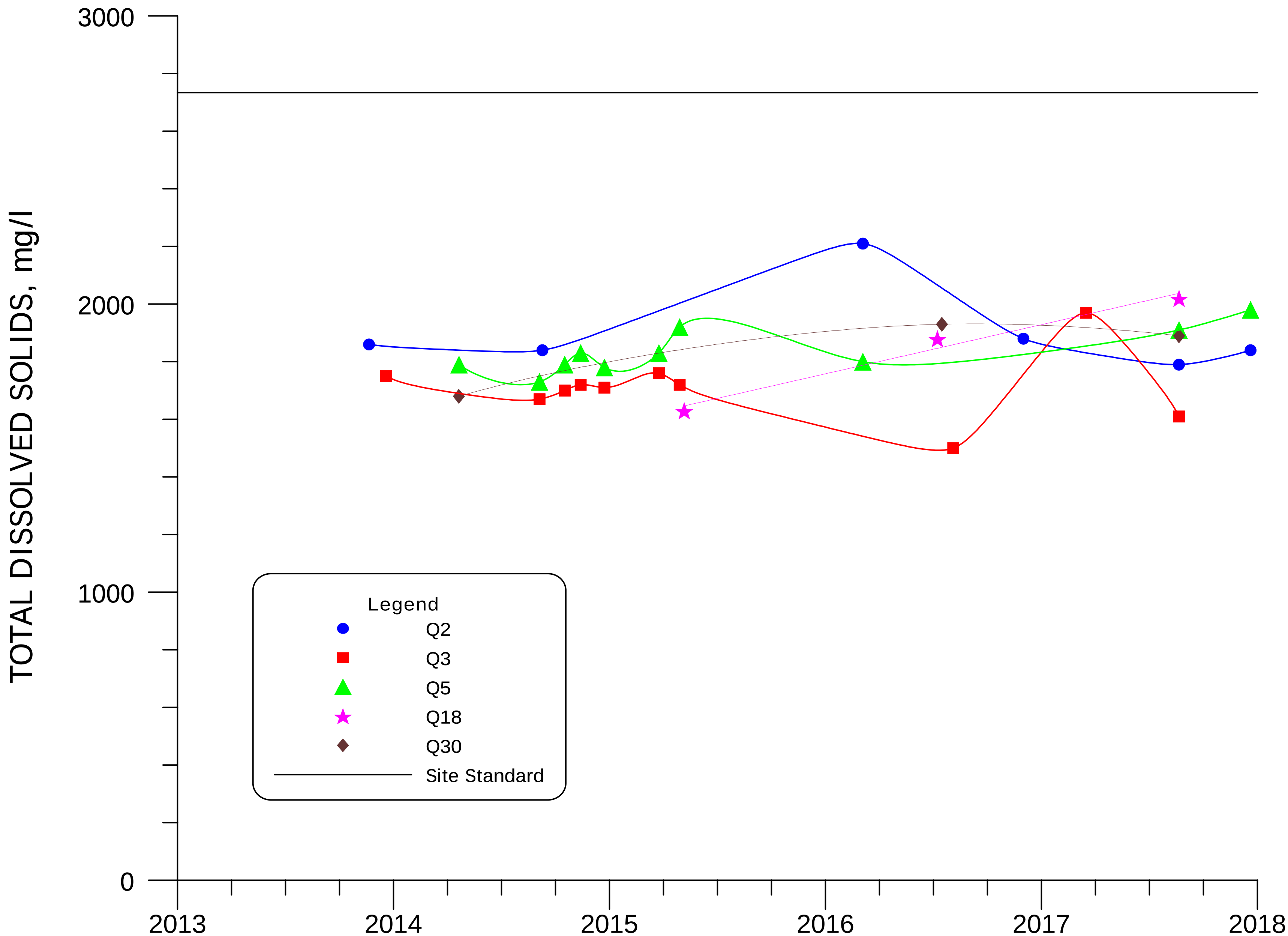

FIGURE 4.3-30A. TDS CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q30.

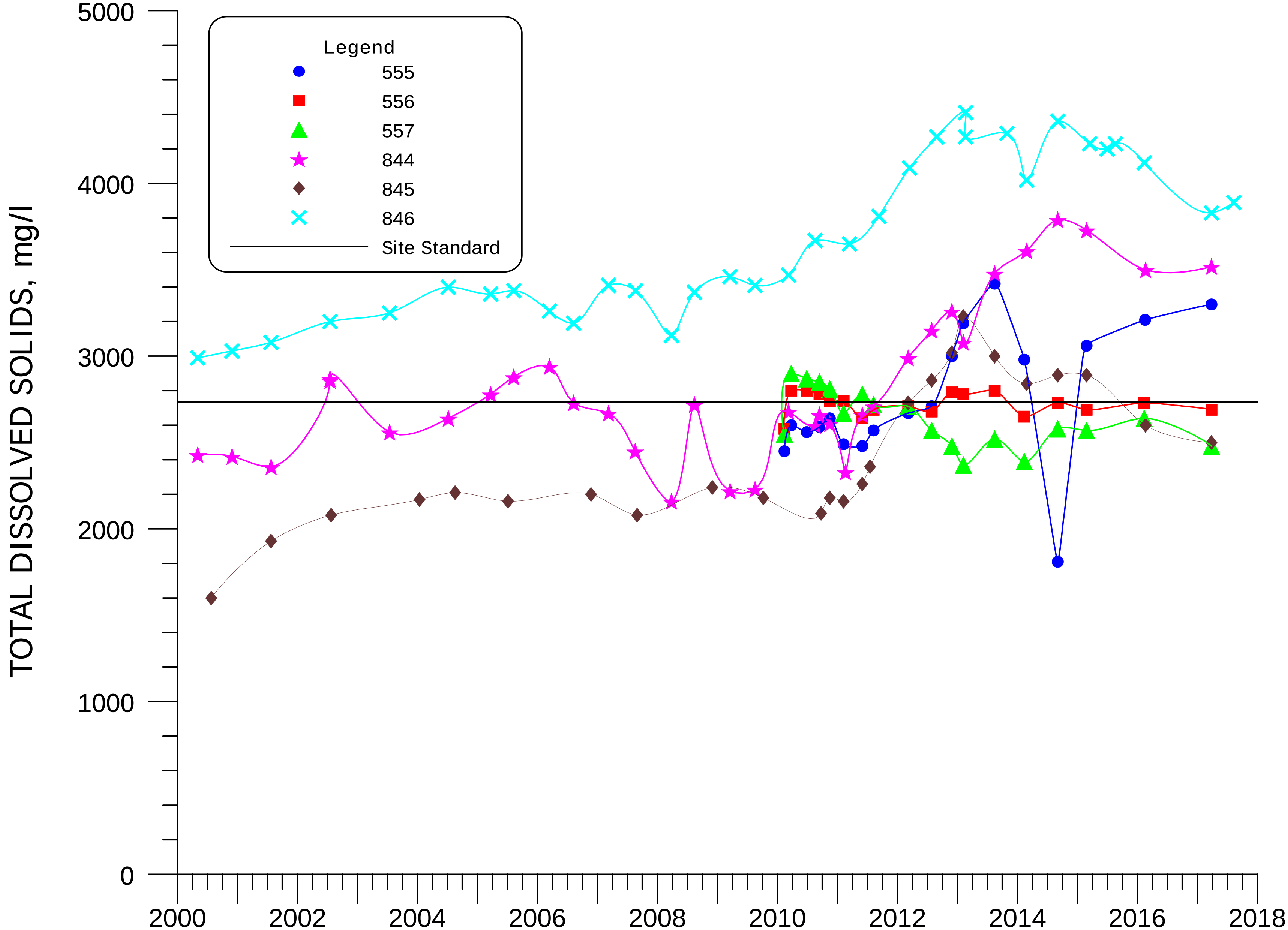

FIGURE 4.3-31. TDS CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

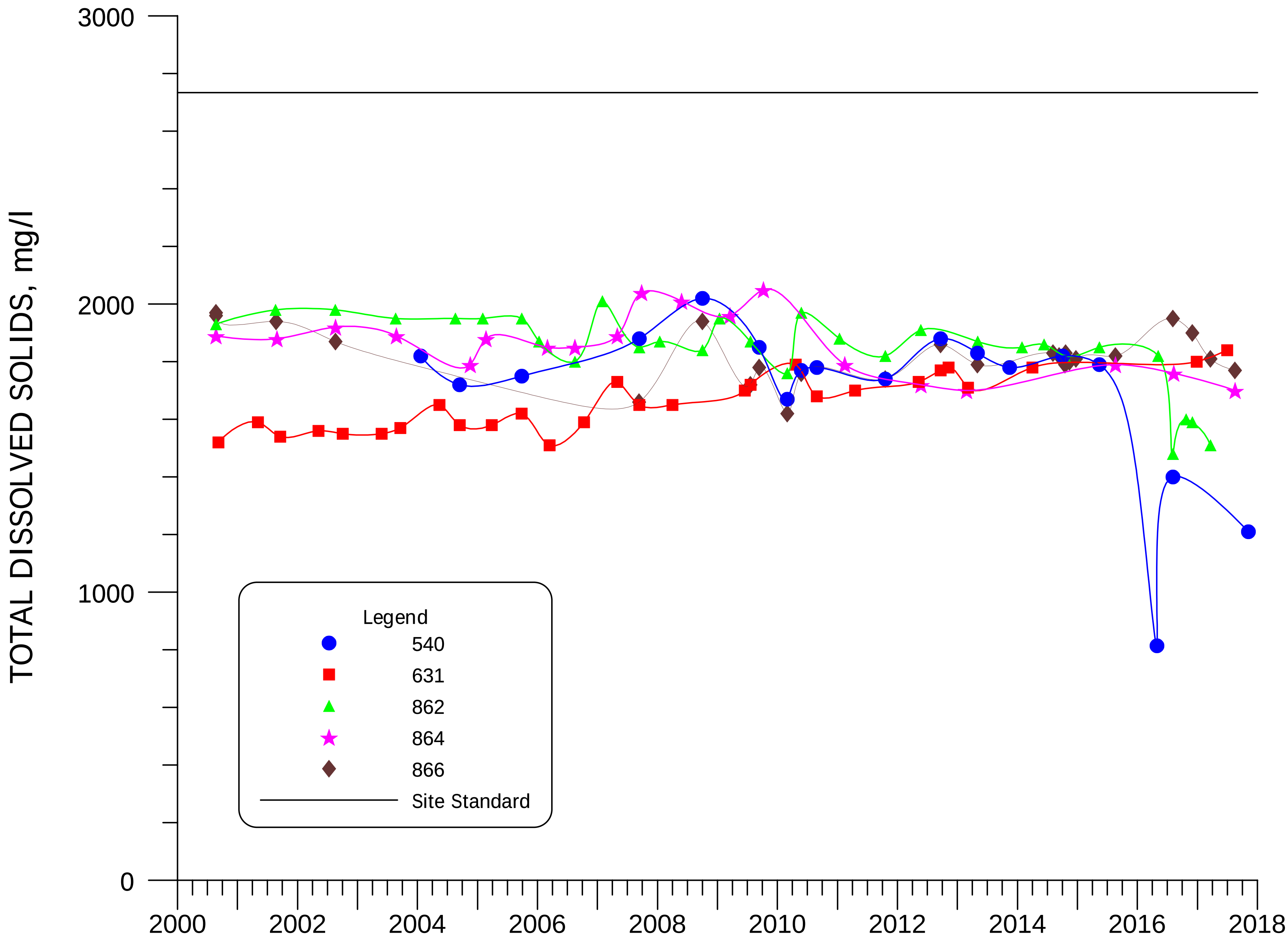

FIGURE 4.3-32. TDS CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

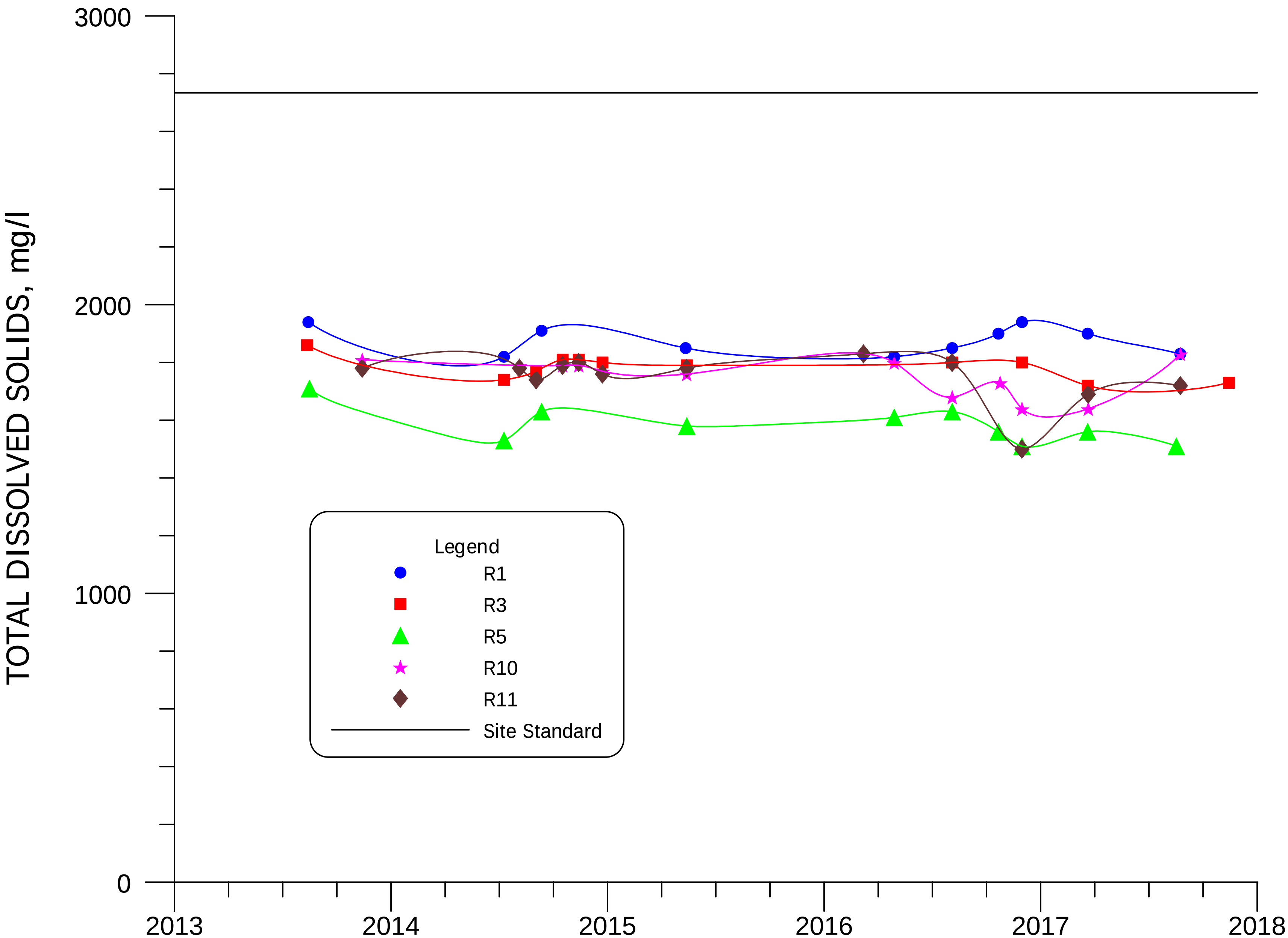

FIGURE 4.3-32A. TDS CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

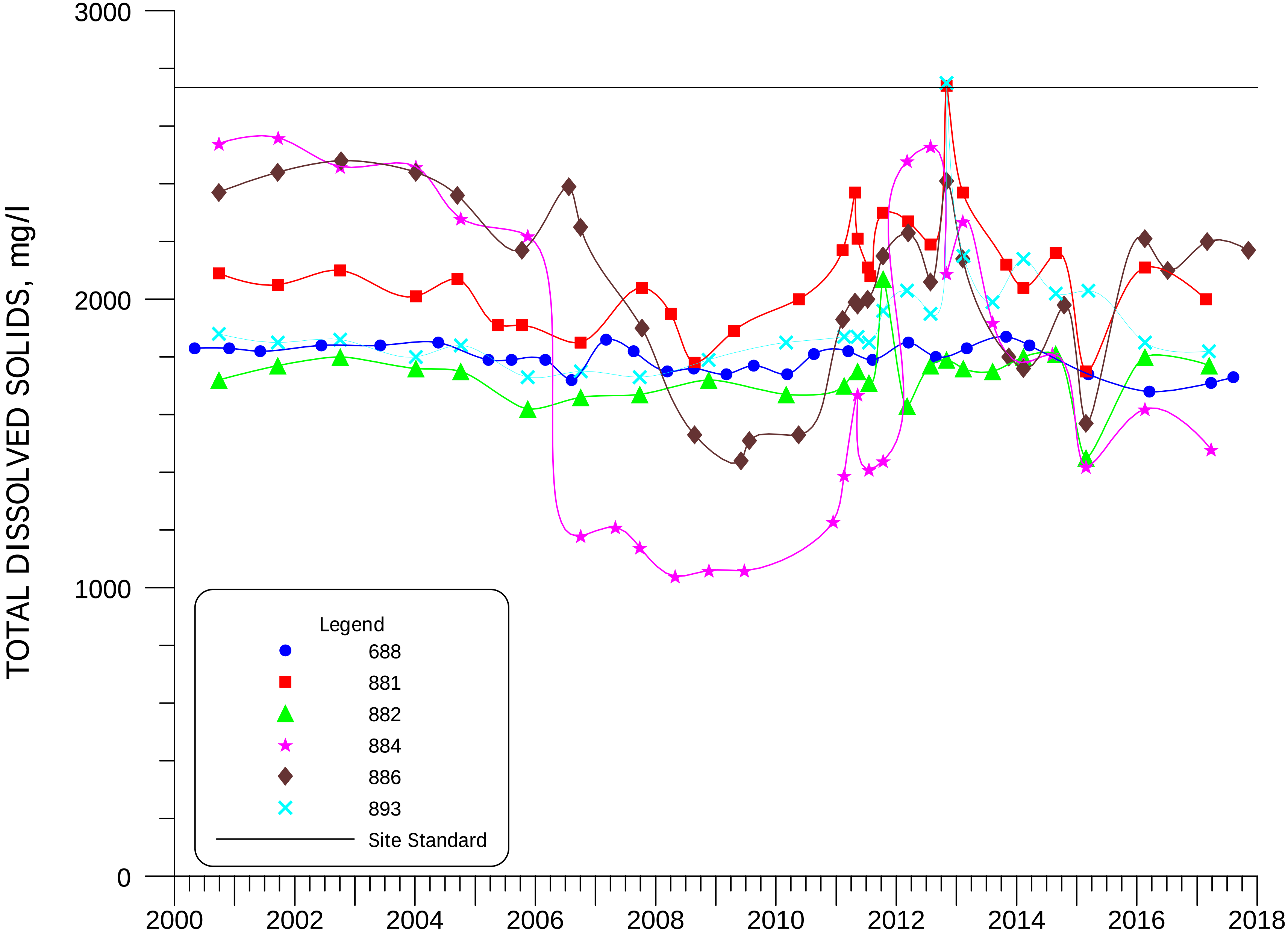

FIGURE 4.3-33. TDS CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

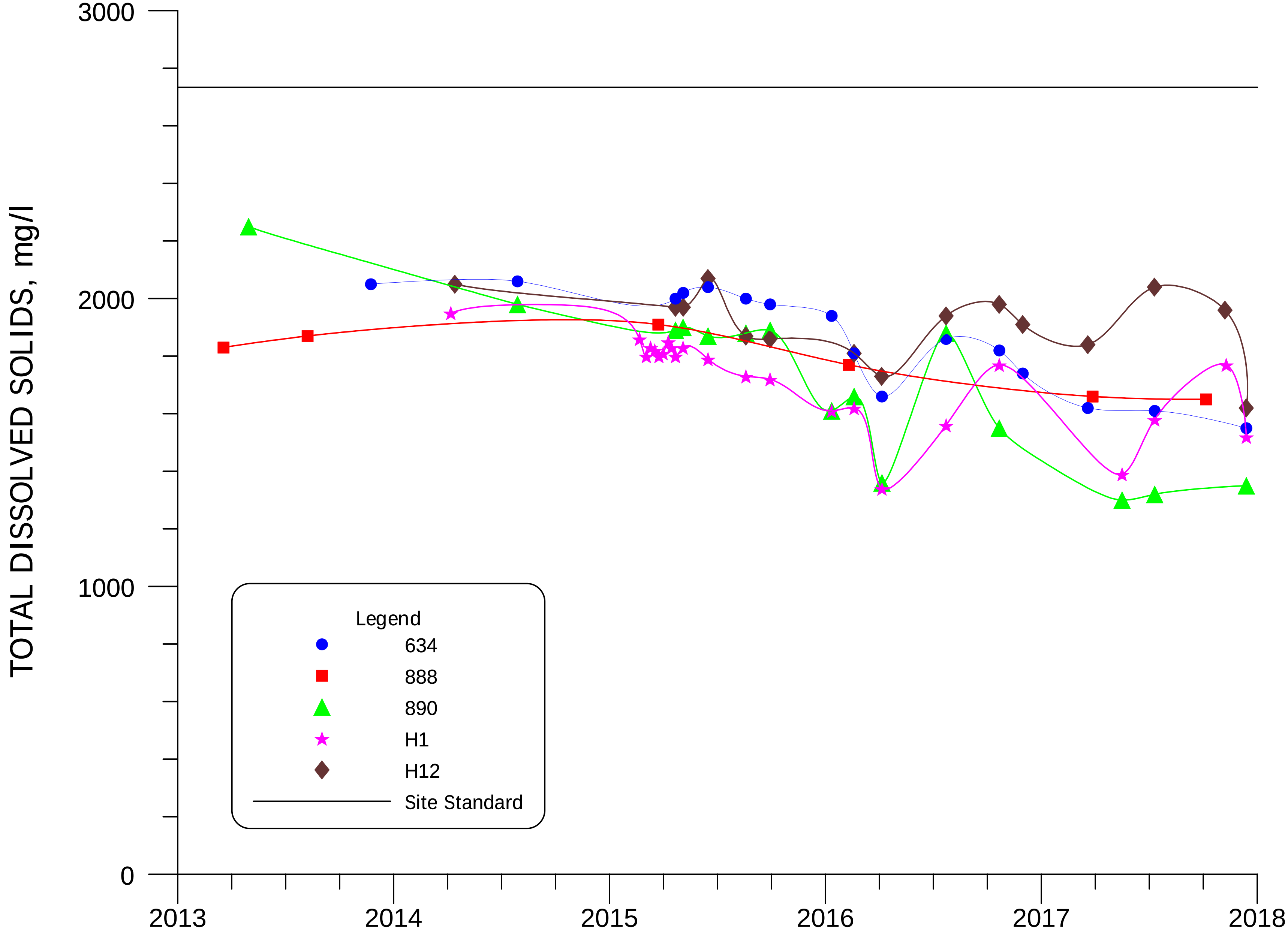

FIGURE 4.3-33A. TDS CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

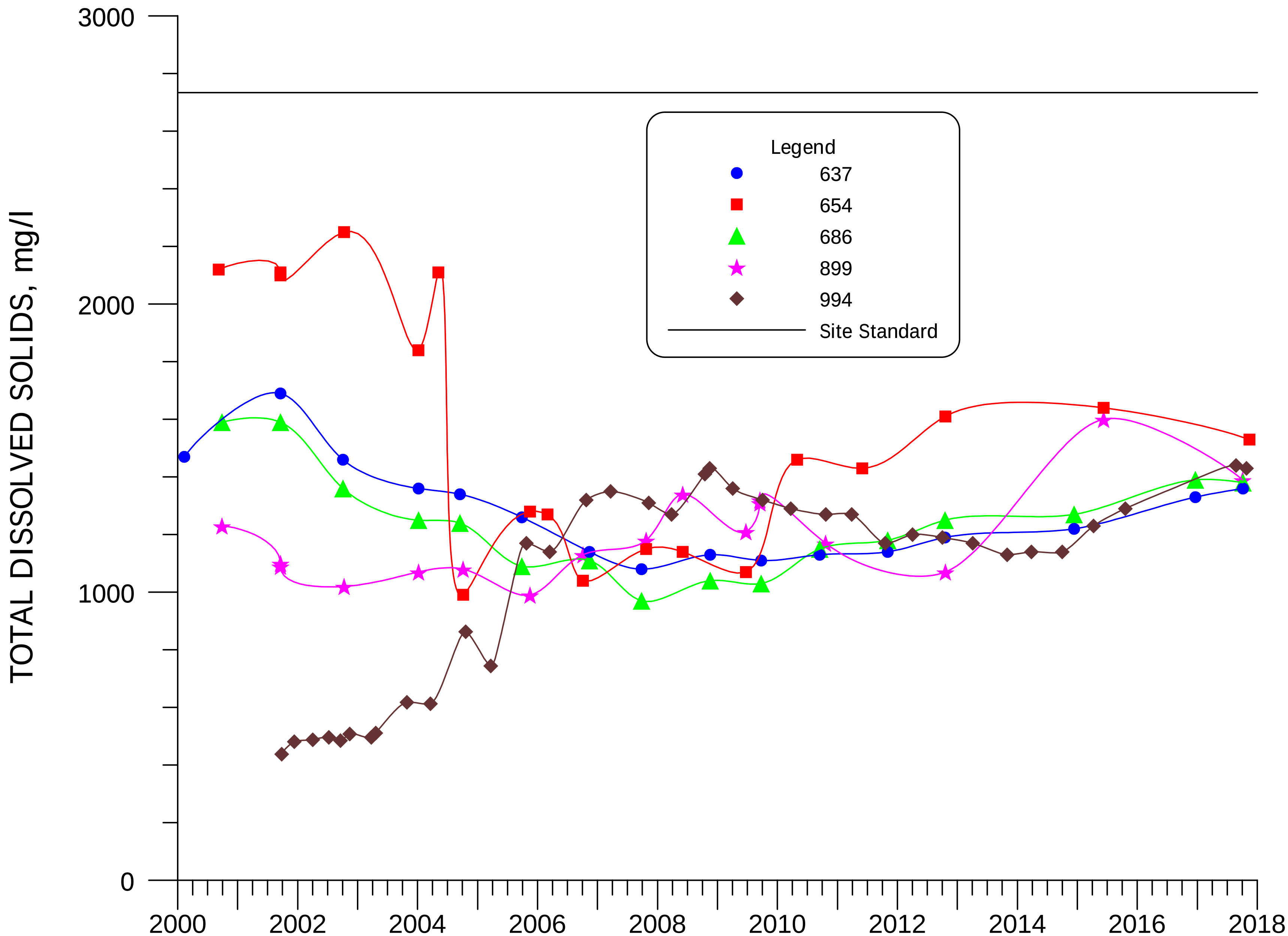

FIGURE 4.3-34. TDS CONCENTRATIONS FOR WELLS 637, 654, 686, 899 and 994.

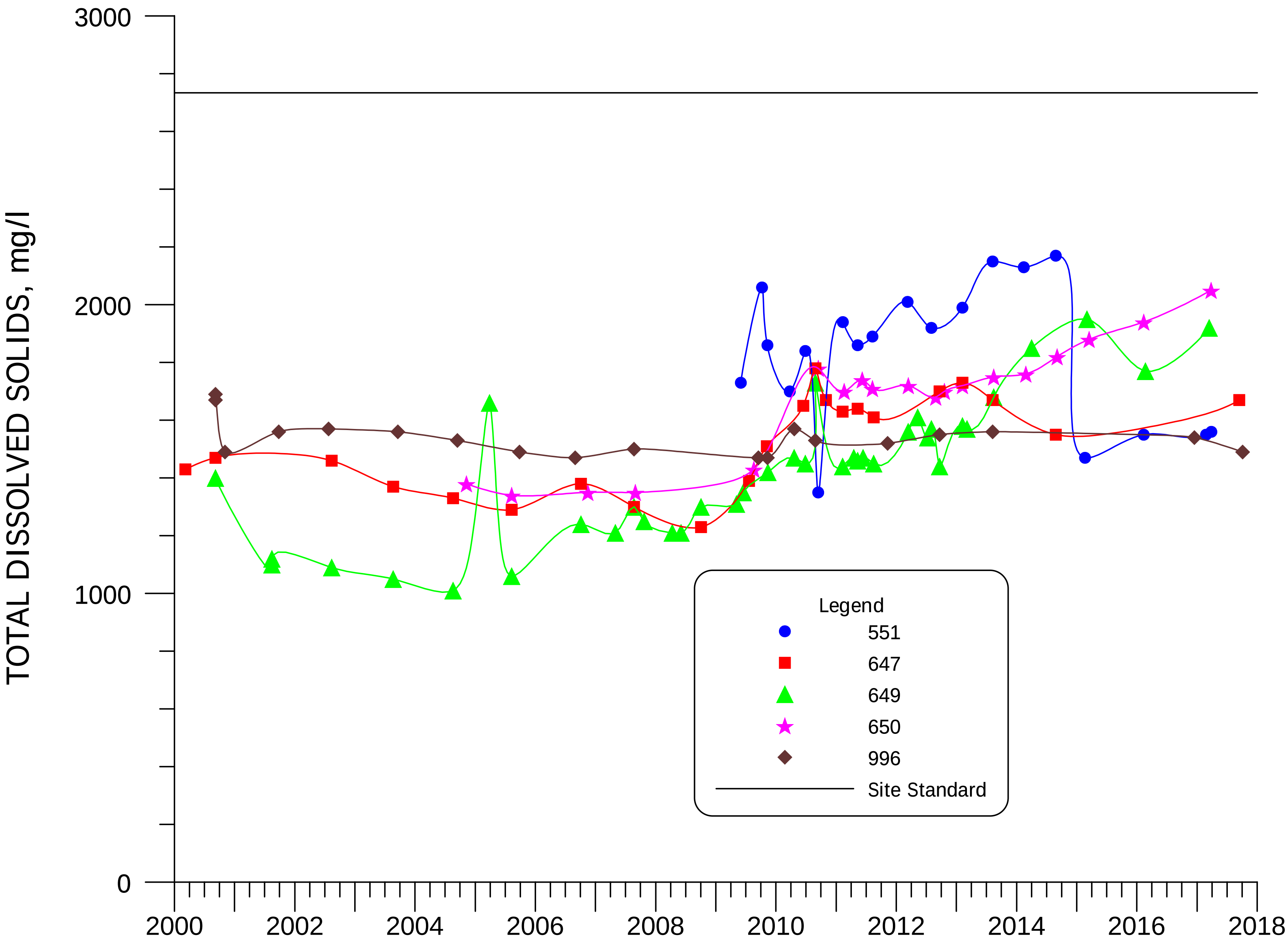

FIGURE 4.3-35. TDS CONCENTRATIONS FOR WELLS 551, 647, 649, 650 AND 996.

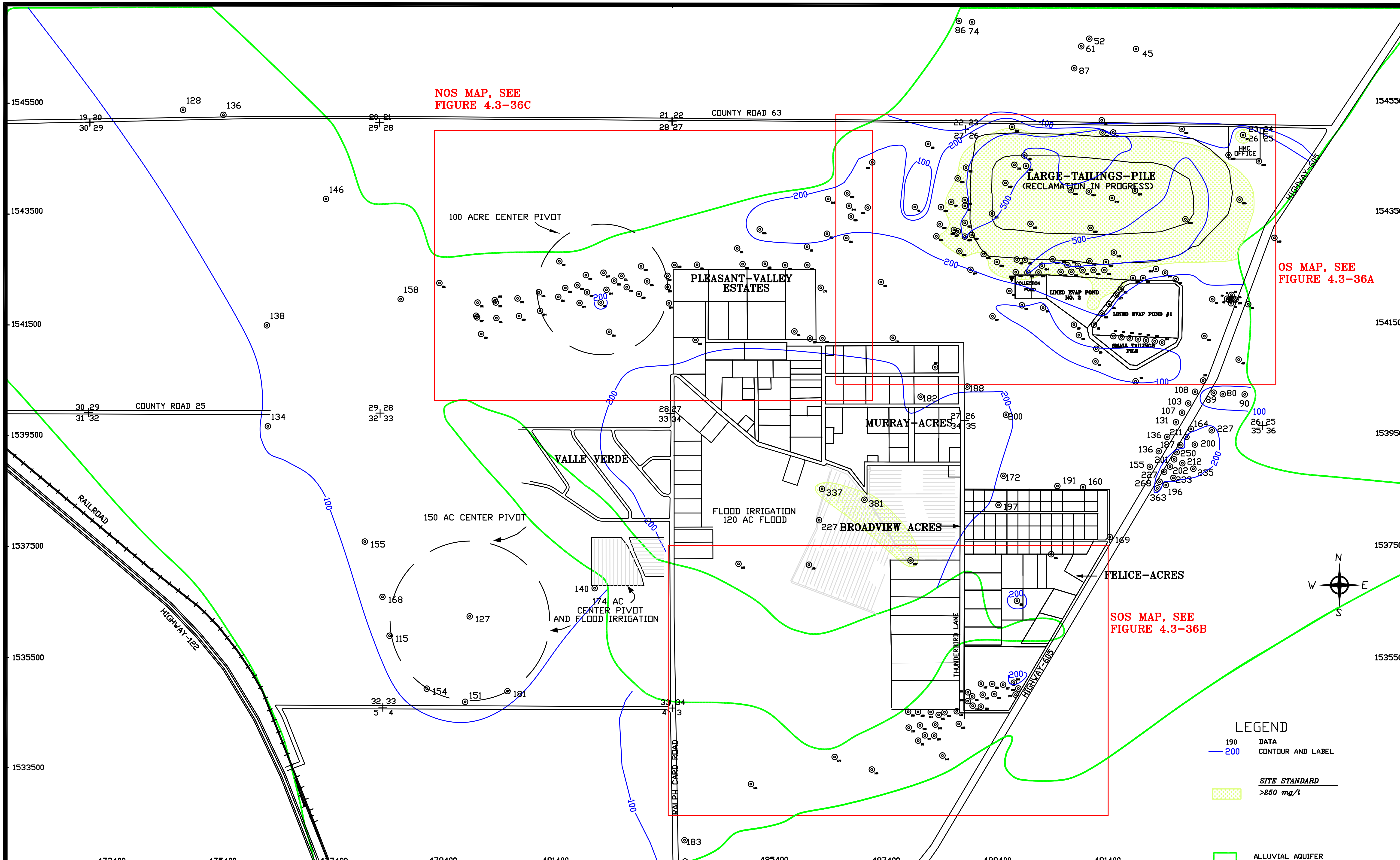

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FIGURE 4.3-36. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

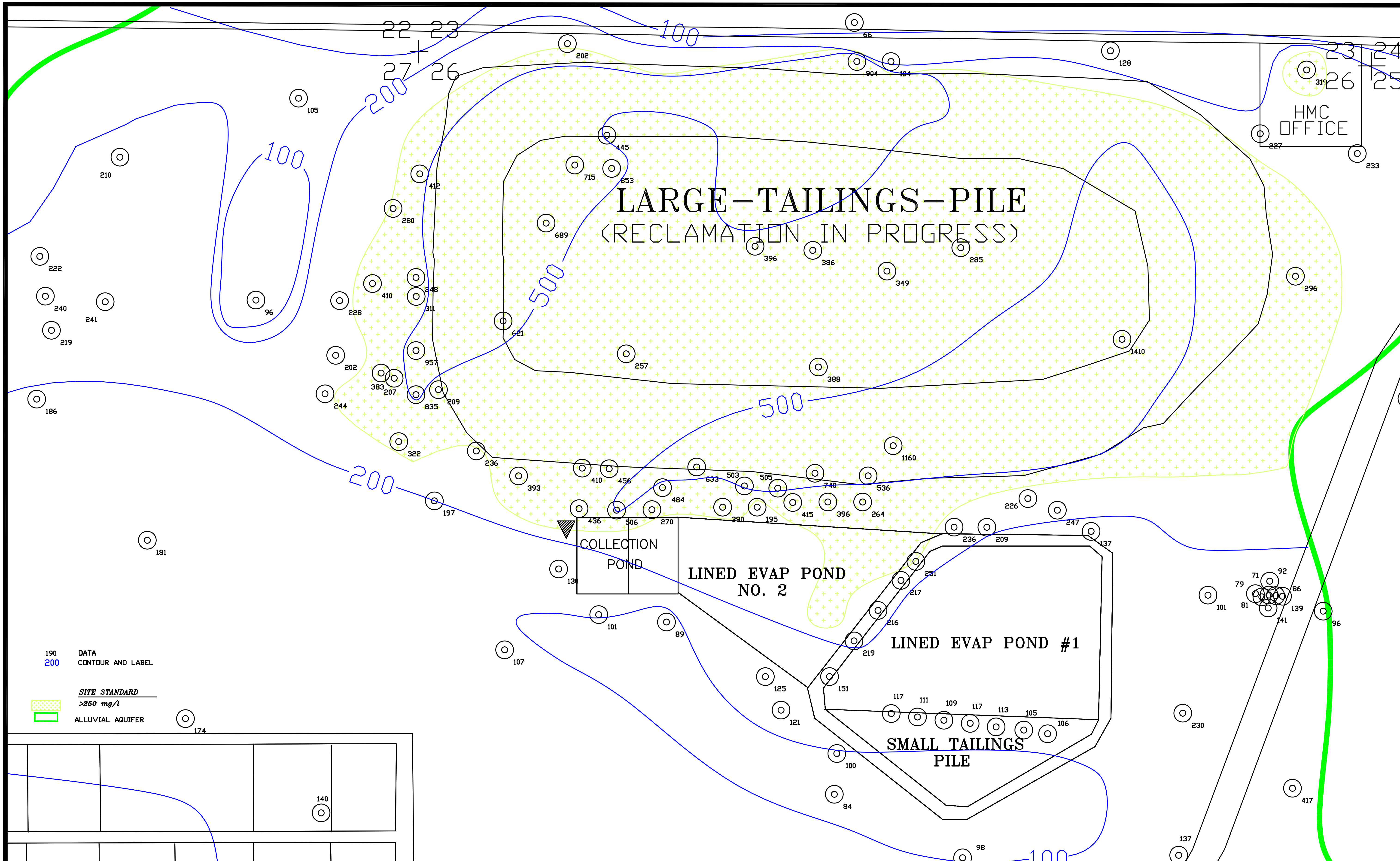

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FIGURE 4.3-36A. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

SCALE: 1"=500'
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FIGURE 4.3-36B. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

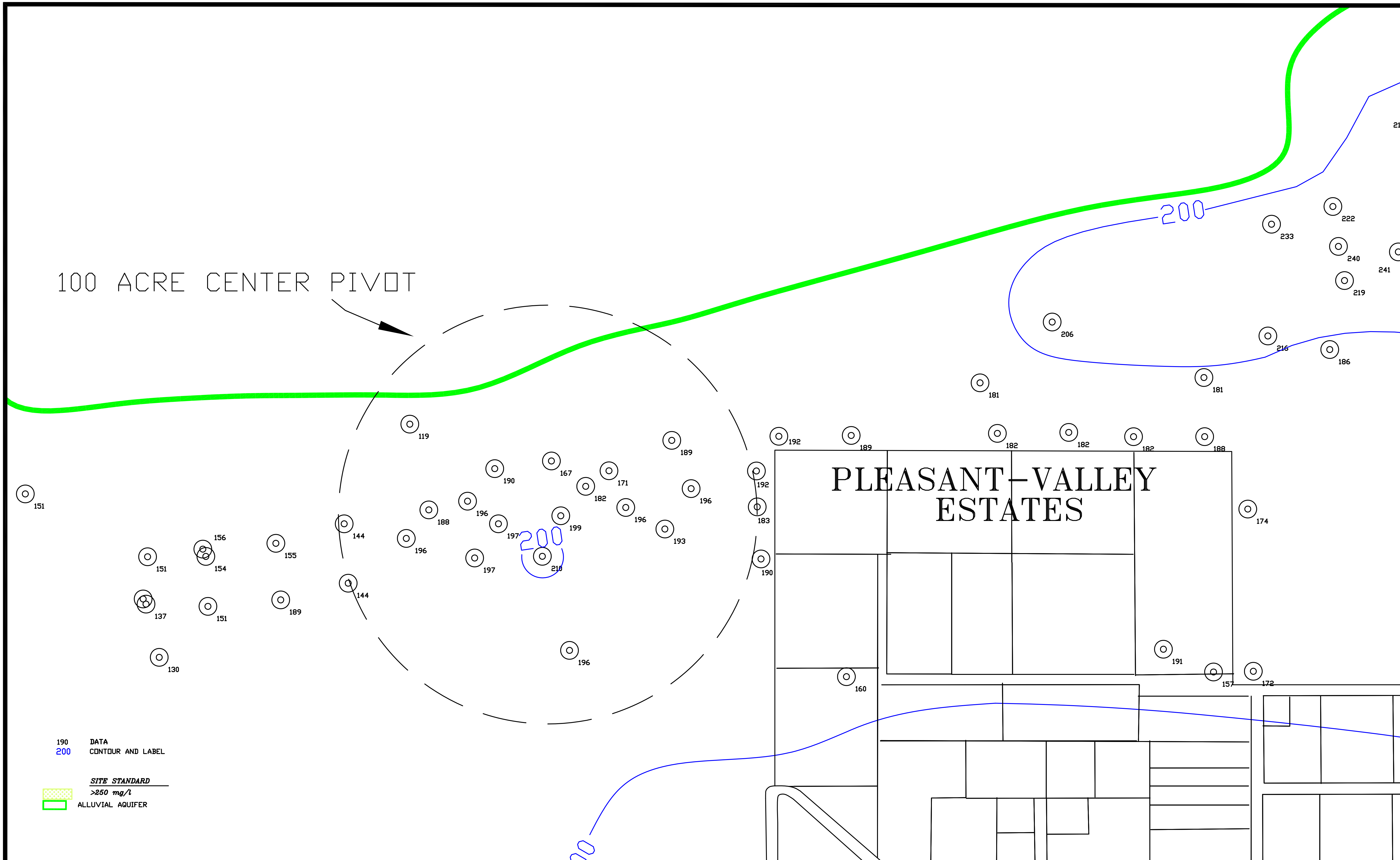

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FIGURE 4.3-36C. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

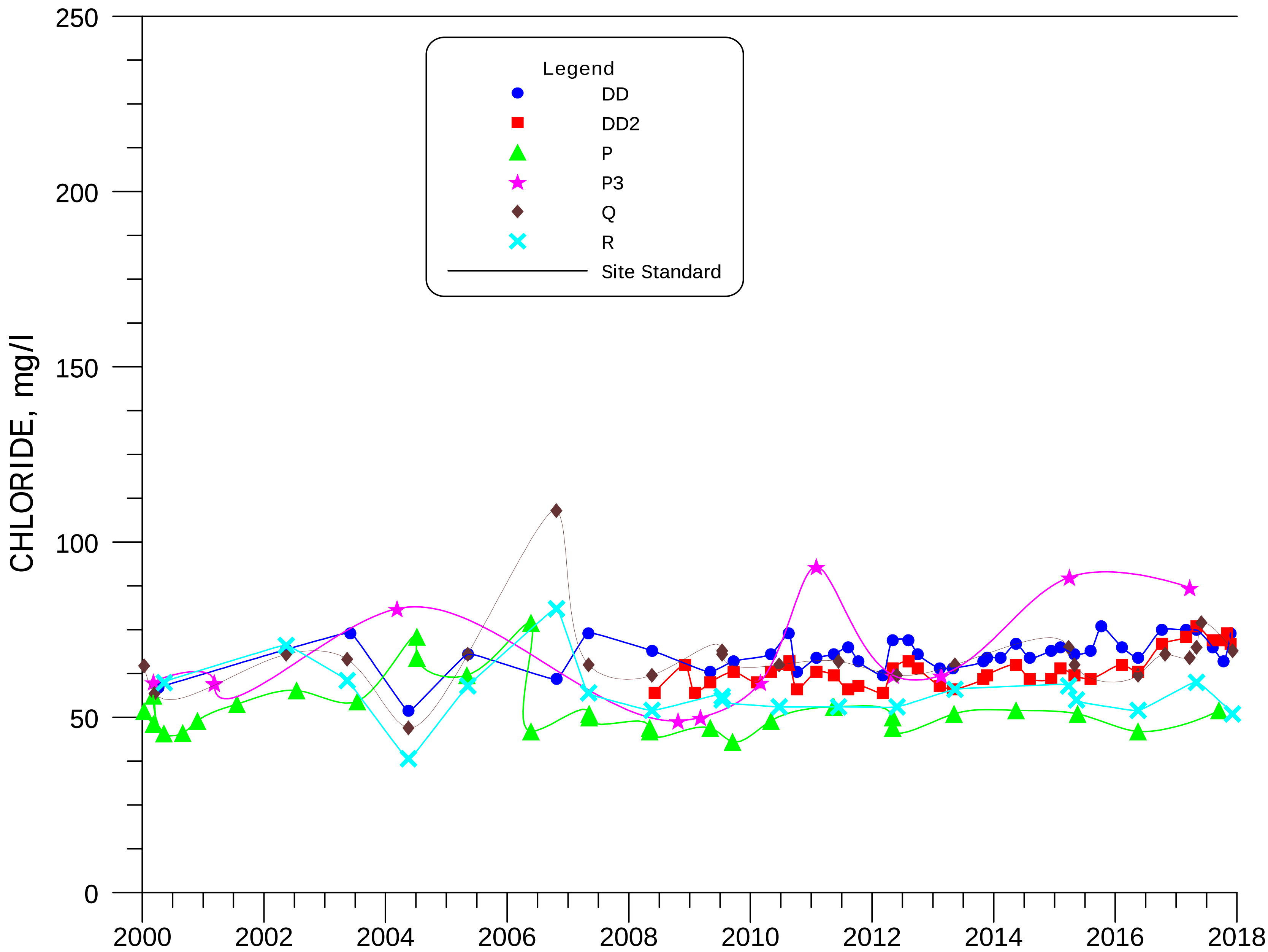

FIGURE 4.3-37. CHLORIDE CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

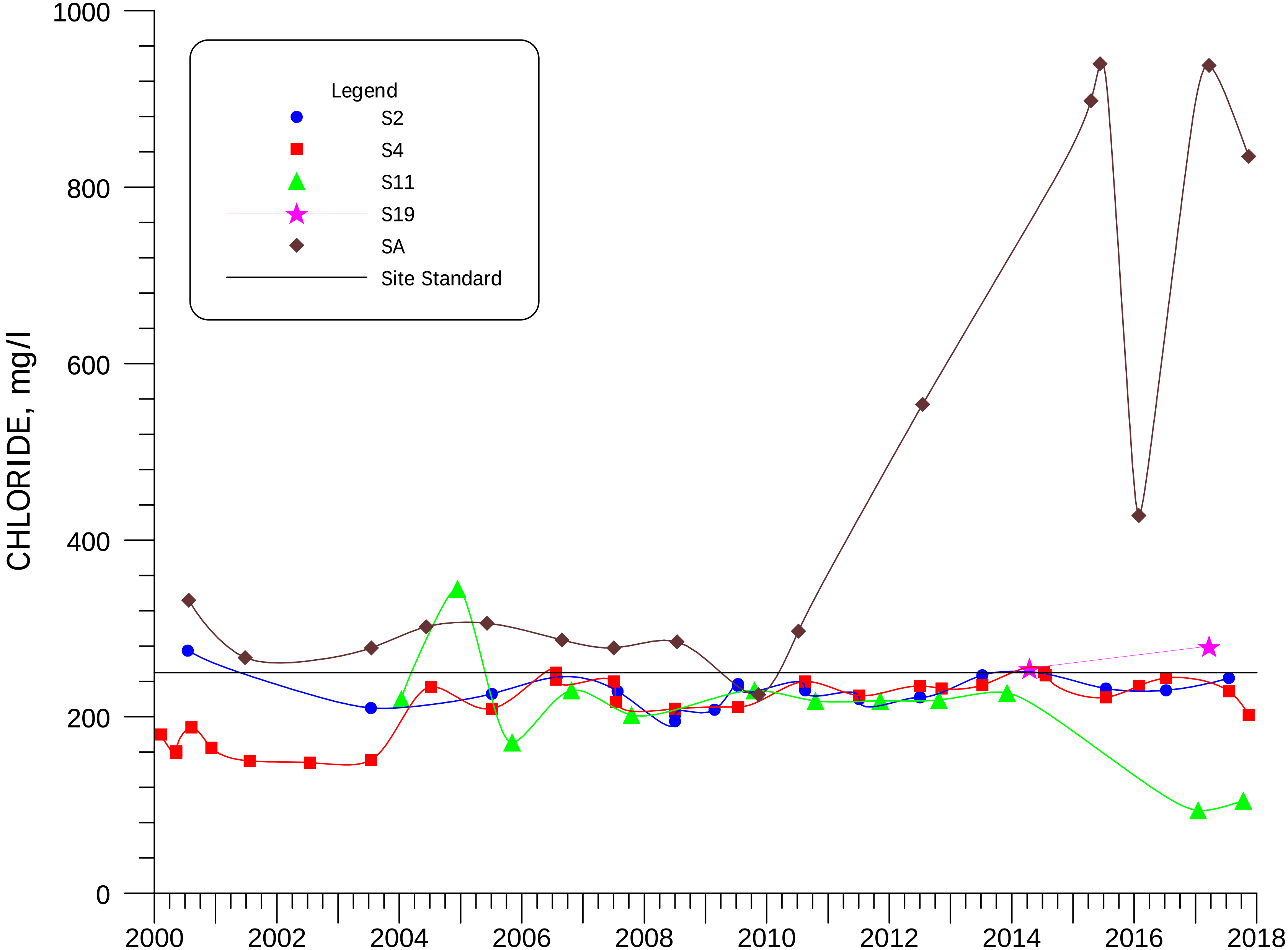

FIGURE 4.3-38. CHLORIDE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

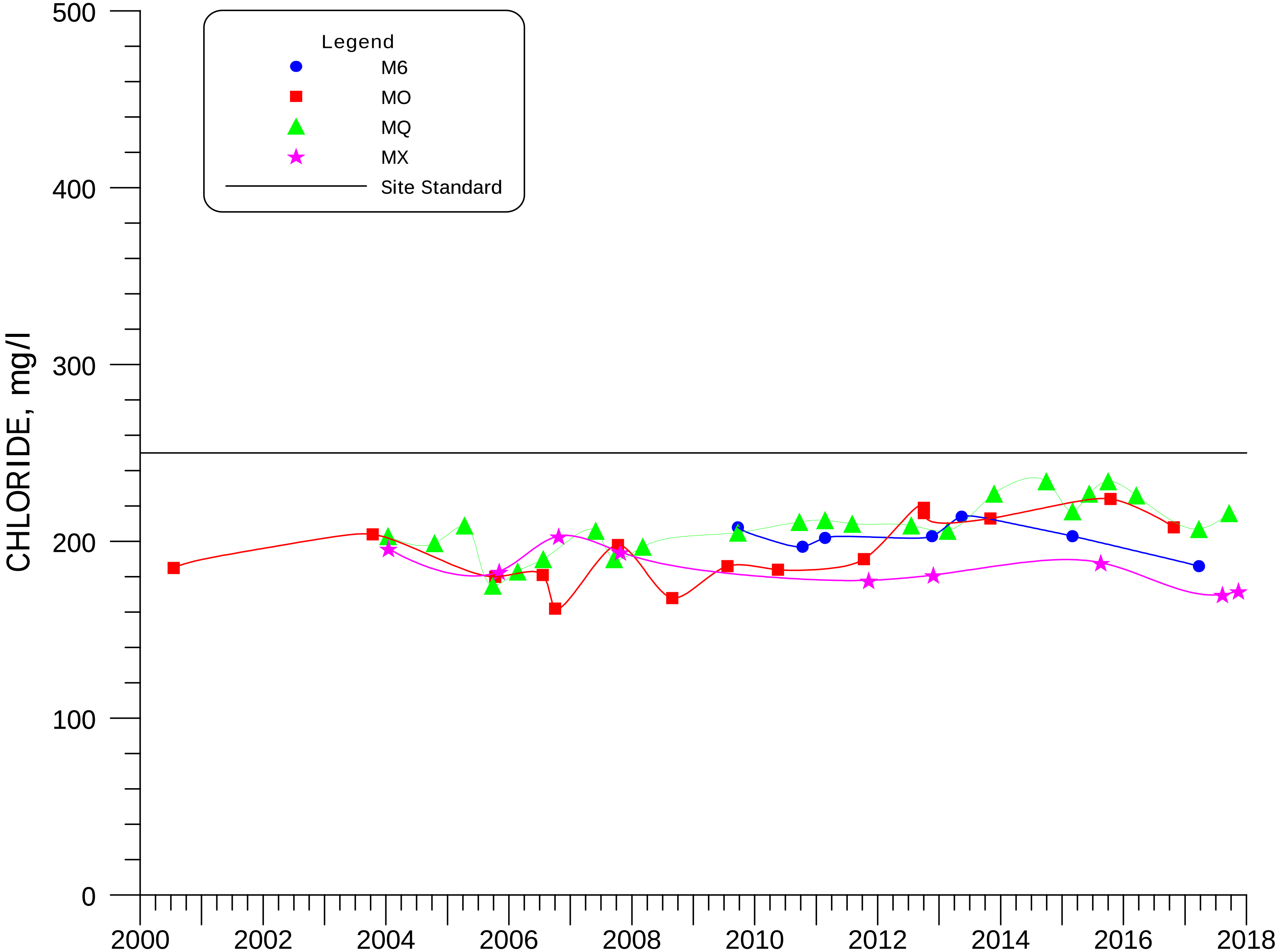

FIGURE 4.3-39. CHLORIDE CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

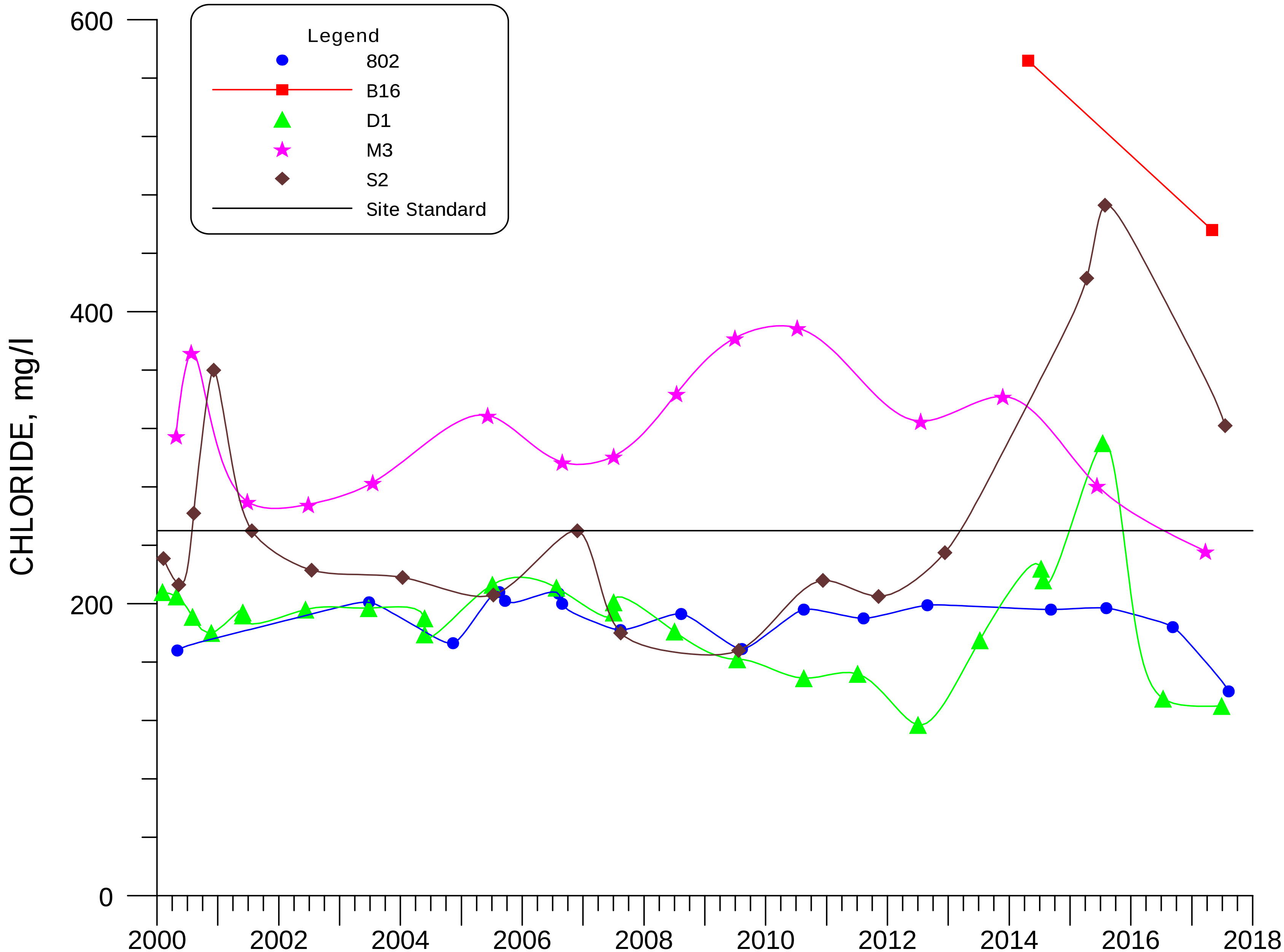

FIGURE 4.3-40. CHLORIDE CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

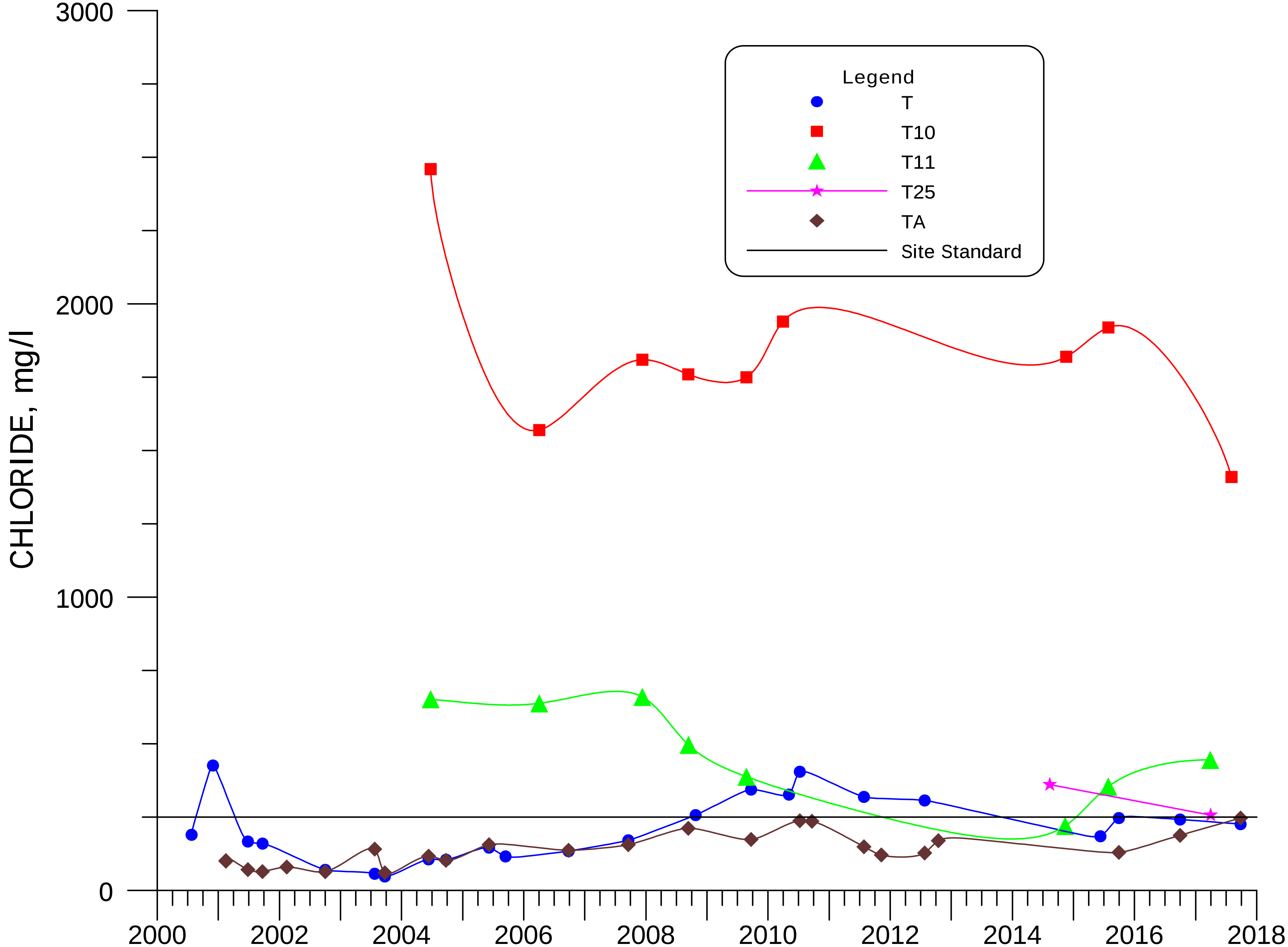

FIGURE 4.3-41. CHLORIDE CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

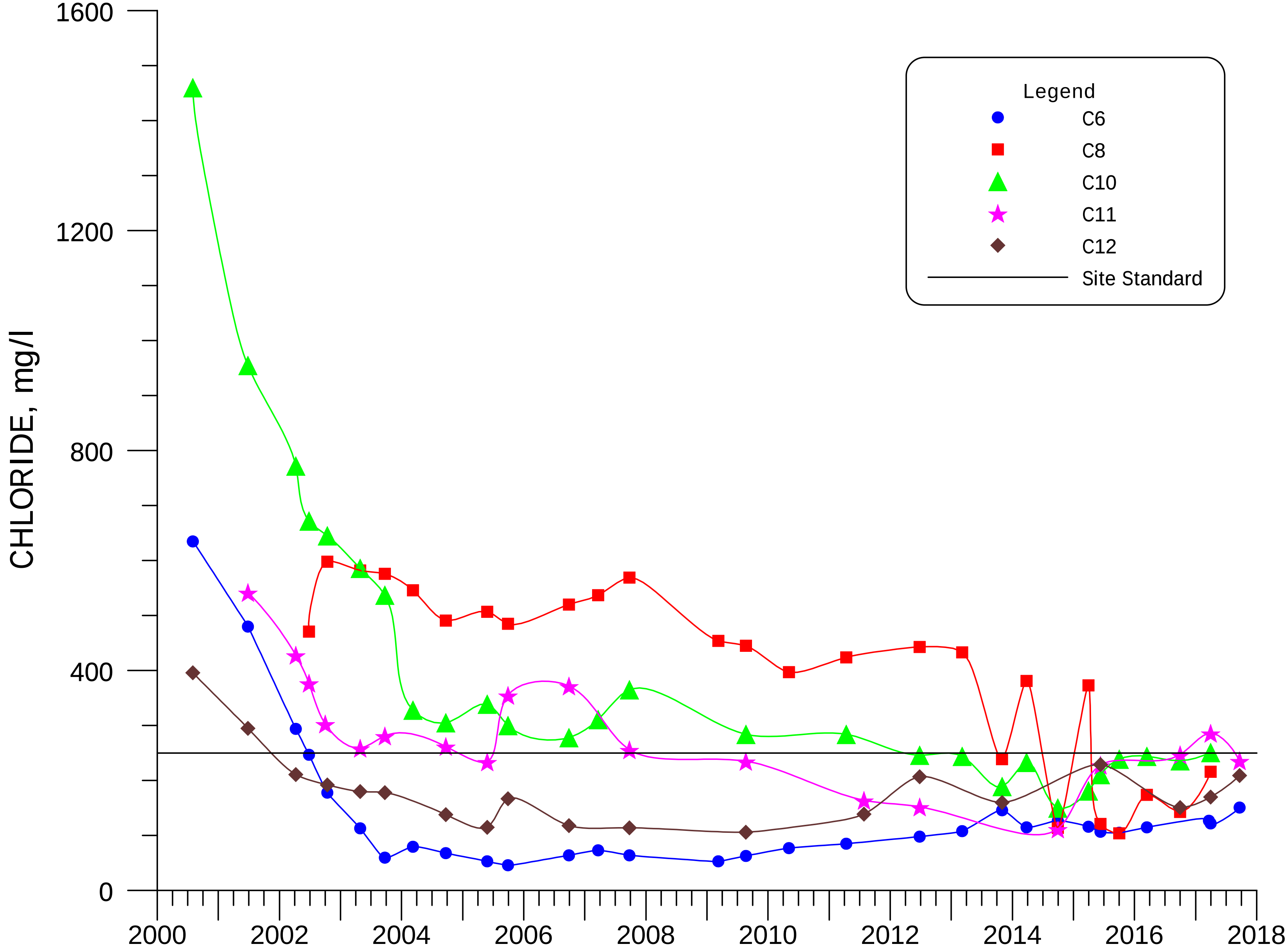

FIGURE 4.3-42. CHLORIDE CONCENTRATIONS FOR WELLS C6, C8, C10, C11 AND C12.

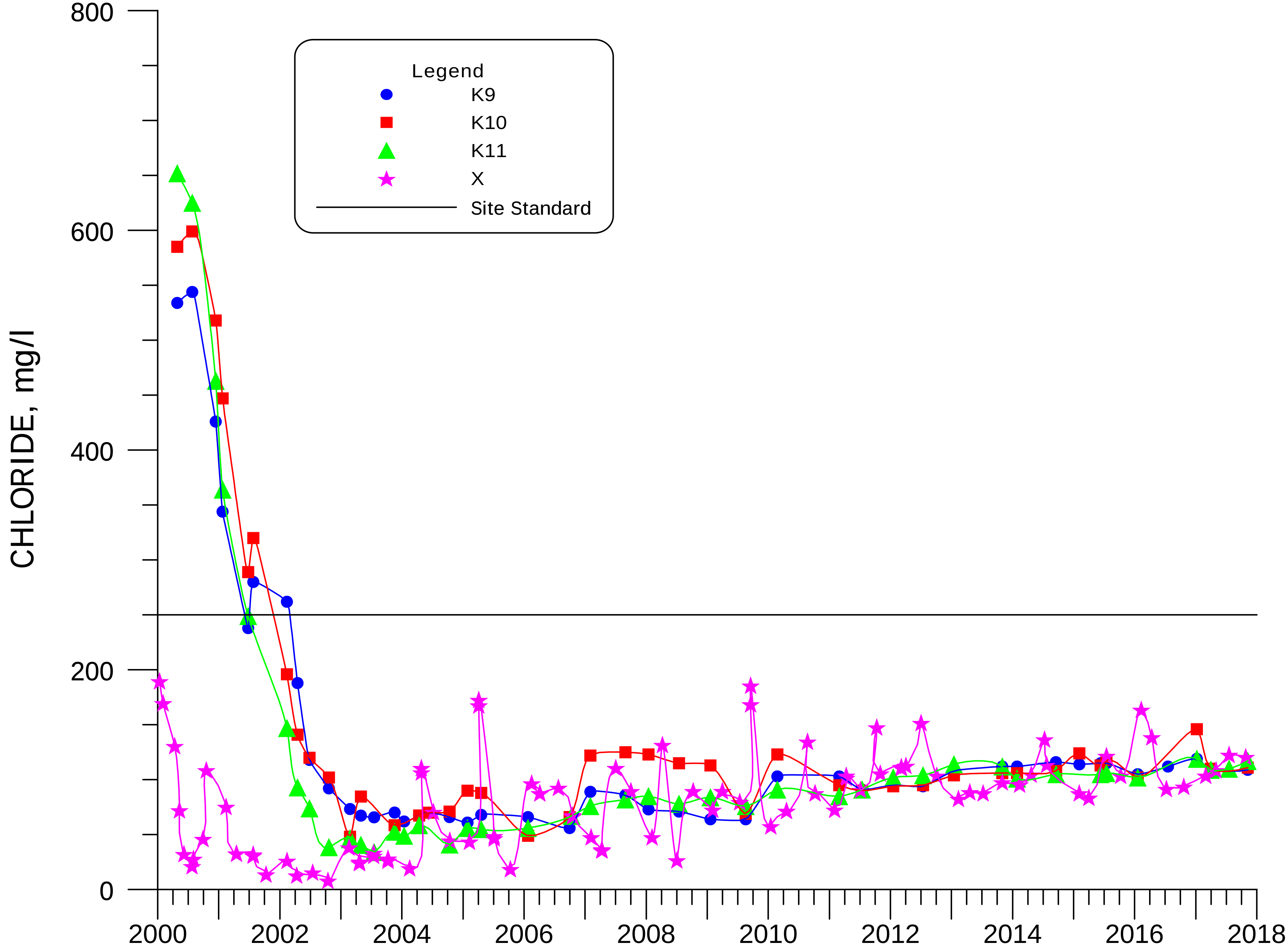

FIGURE 4.3-43. CHLORIDE CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

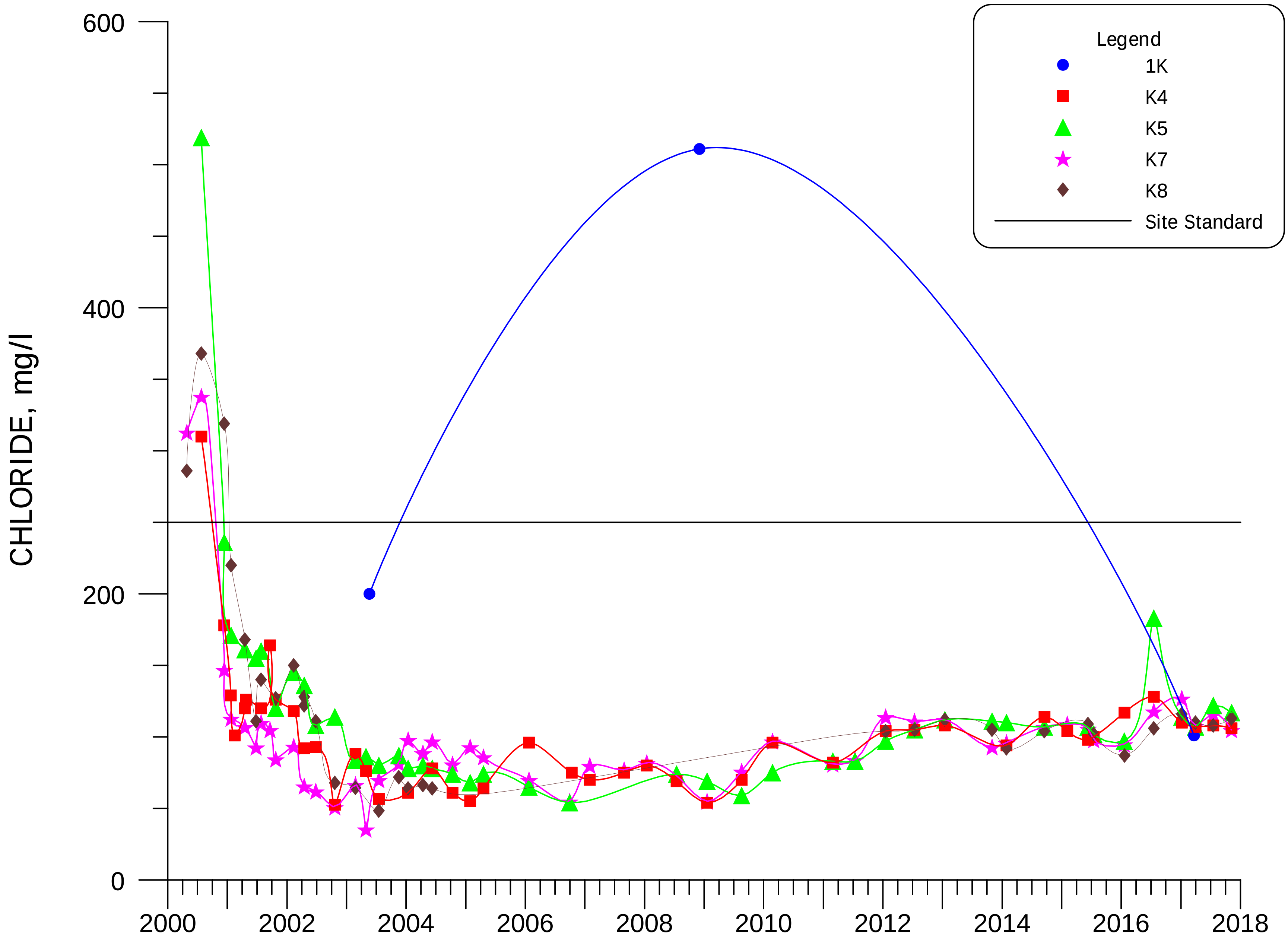

FIGURE 4.3-44. CHLORIDE CONCENTRATIONS FOR WELLS 1K, K4, K5, K7, AND K8.

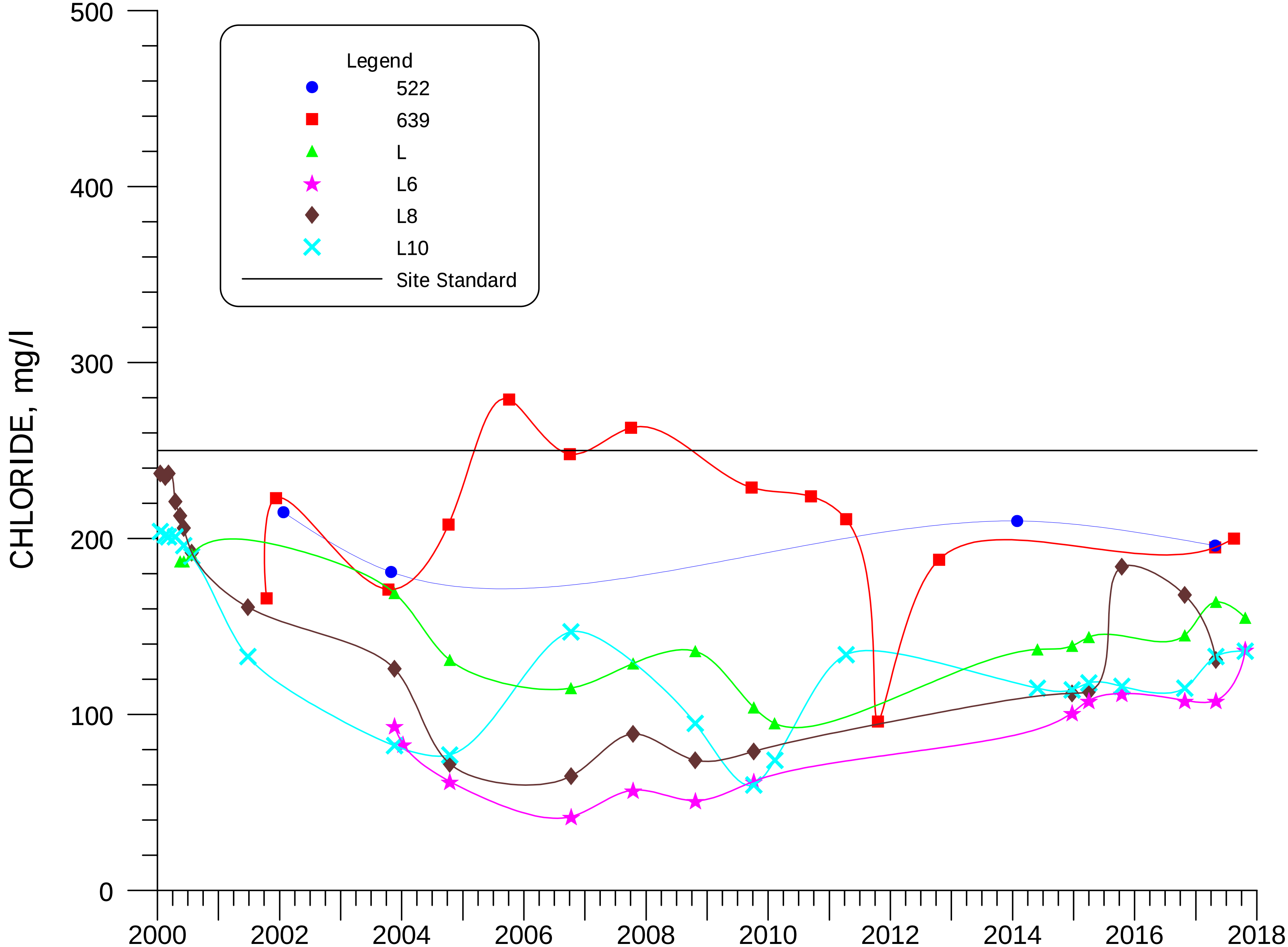

FIGURE 4.3-45. CHLORIDE CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

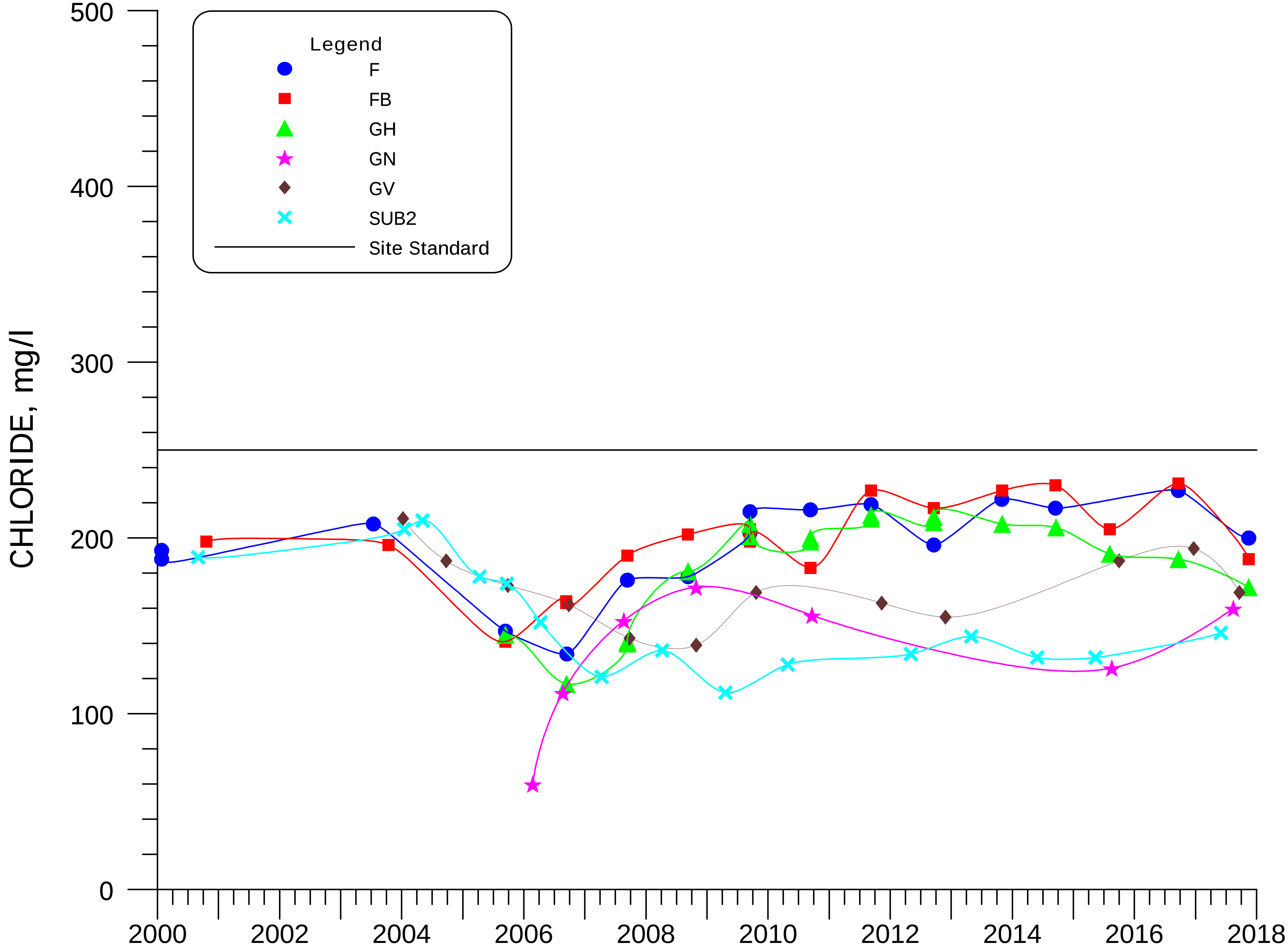

FIGURE 4.3-46. CHLORIDE CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

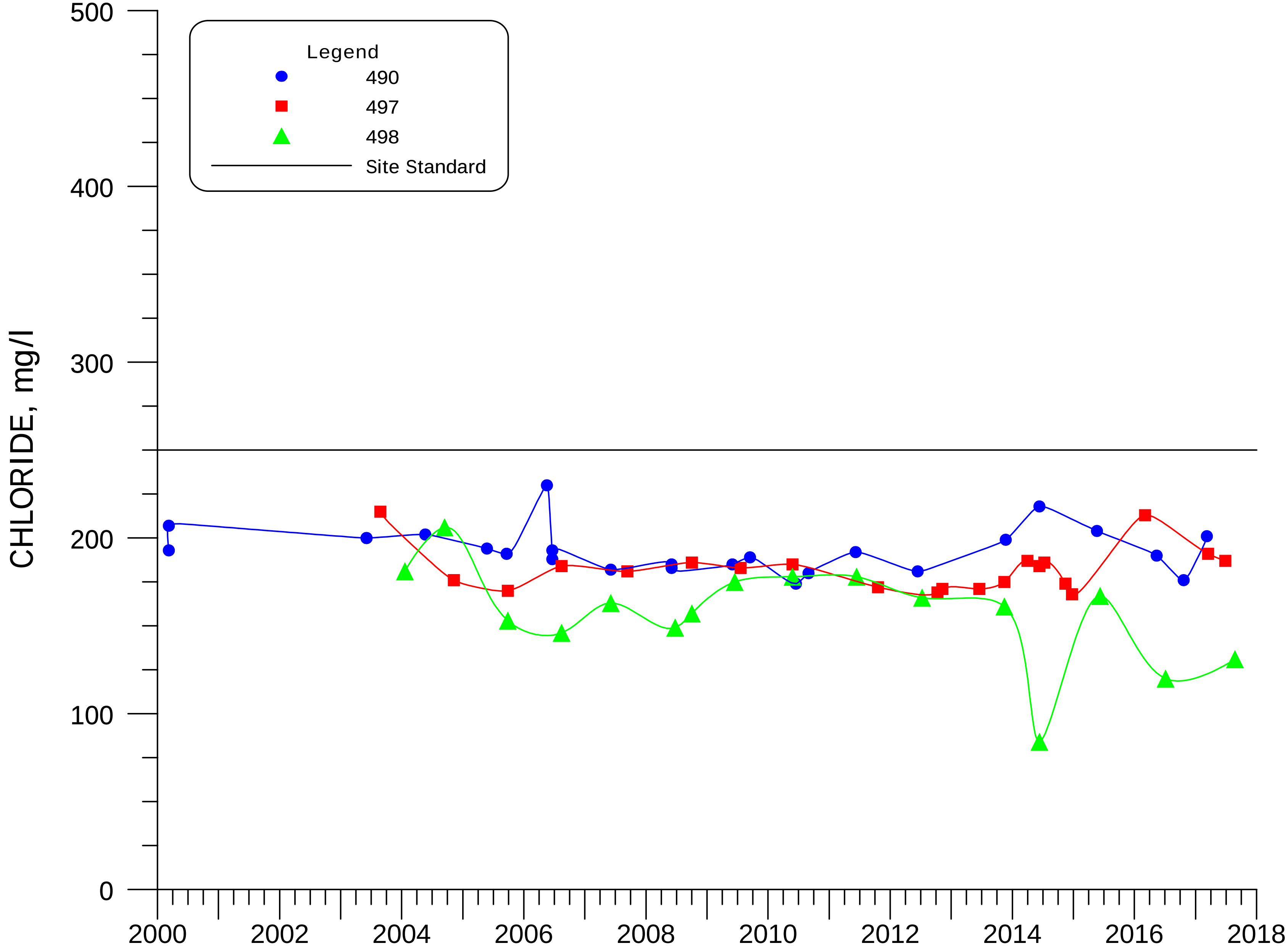

FIGURE 4.3-47. CHLORIDE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

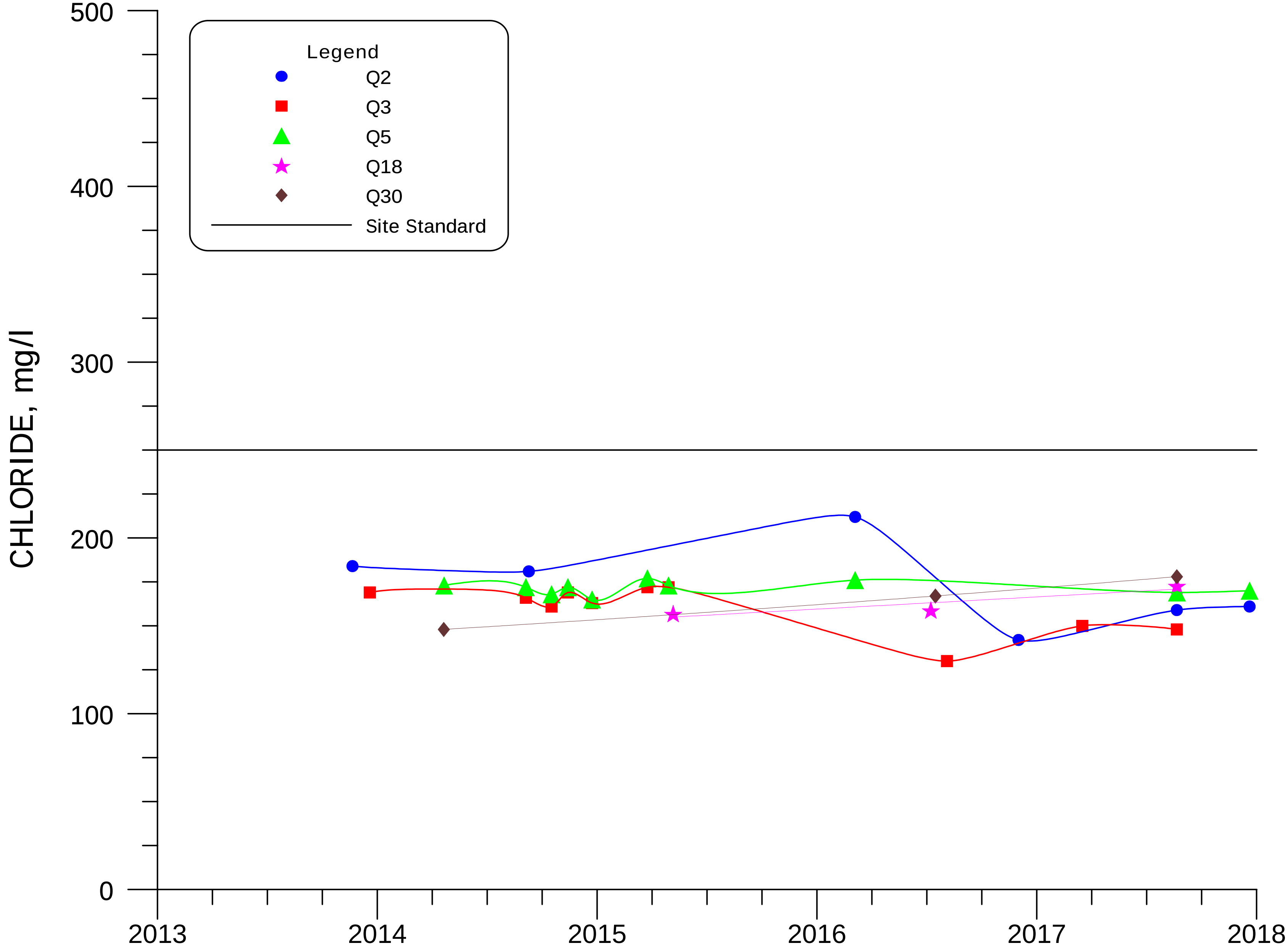

FIGURE 4.3-47A. CHLORIDE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q30.

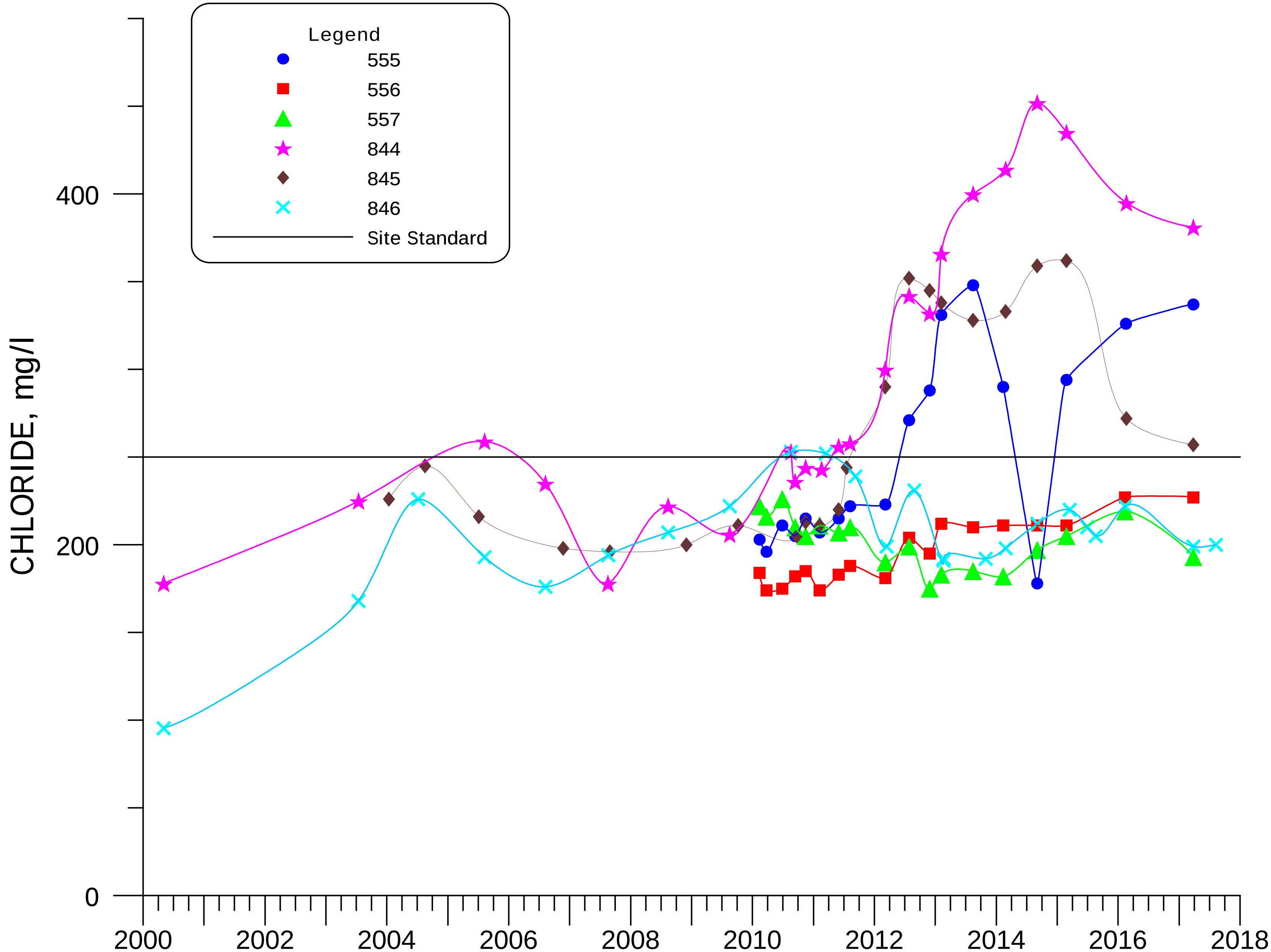

FIGURE 4.3-48. CHLORIDE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

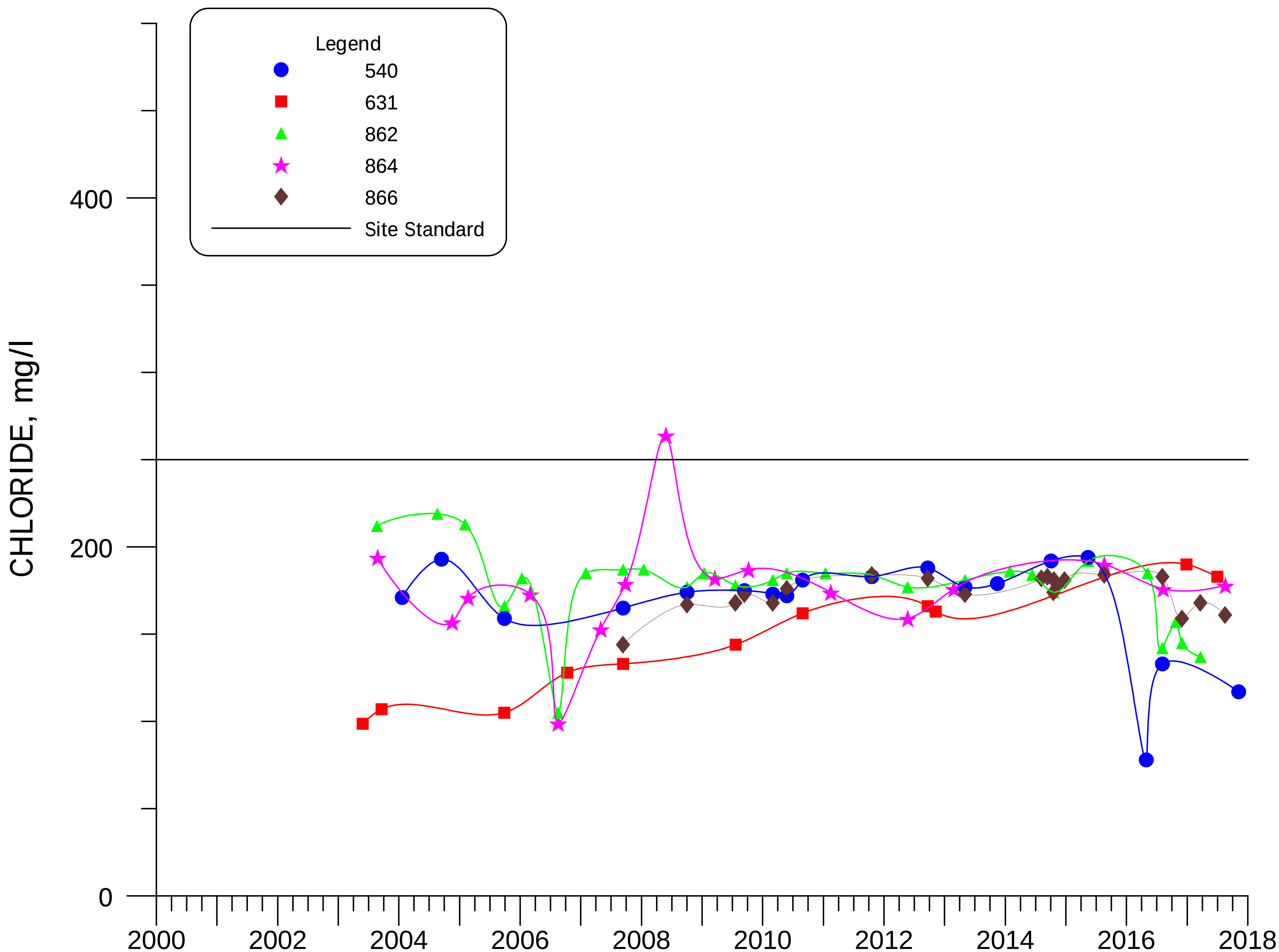

FIGURE 4.3-49. CHLORIDE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

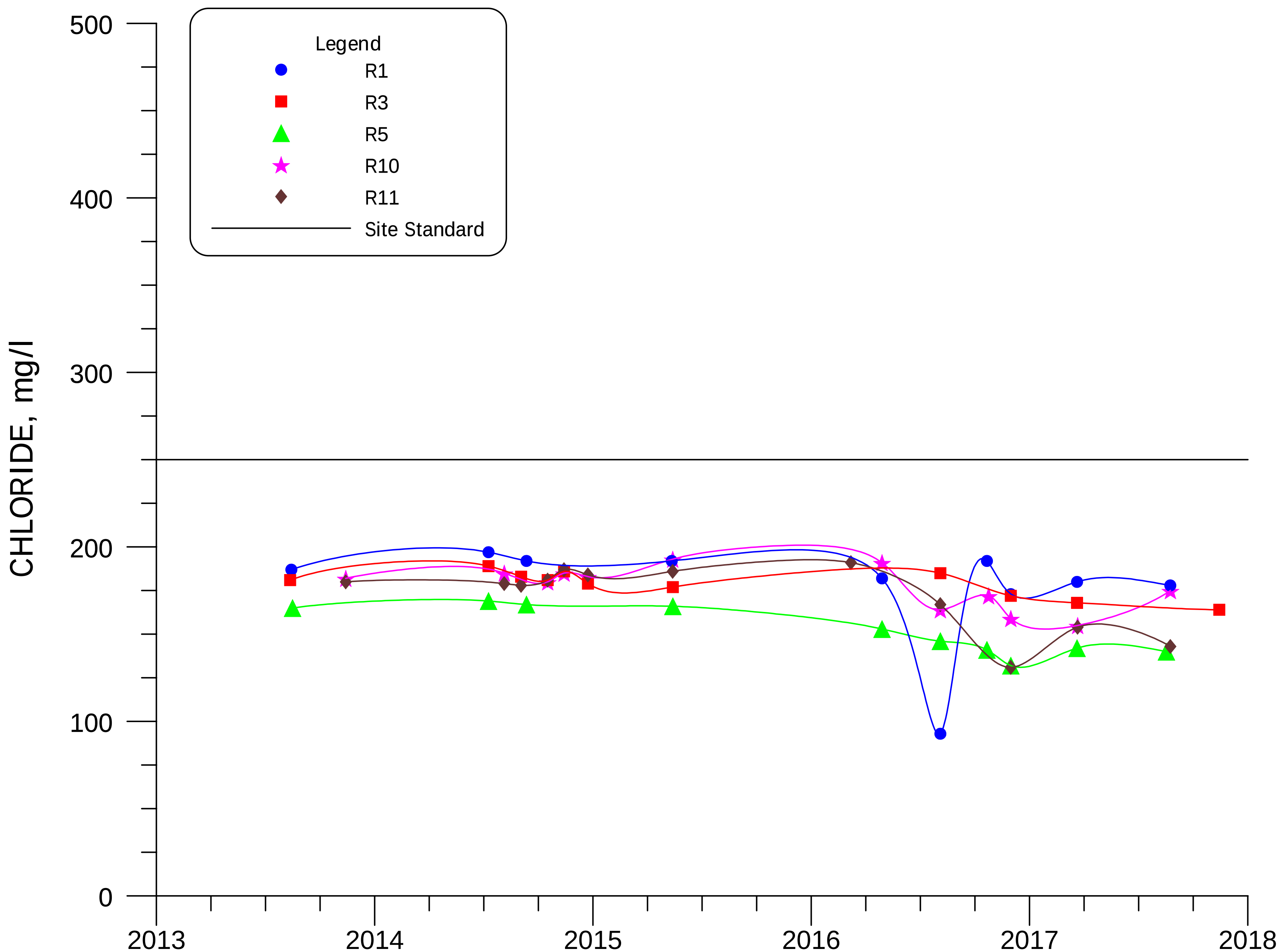

FIGURE 4.3-49A. CHLORIDE CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

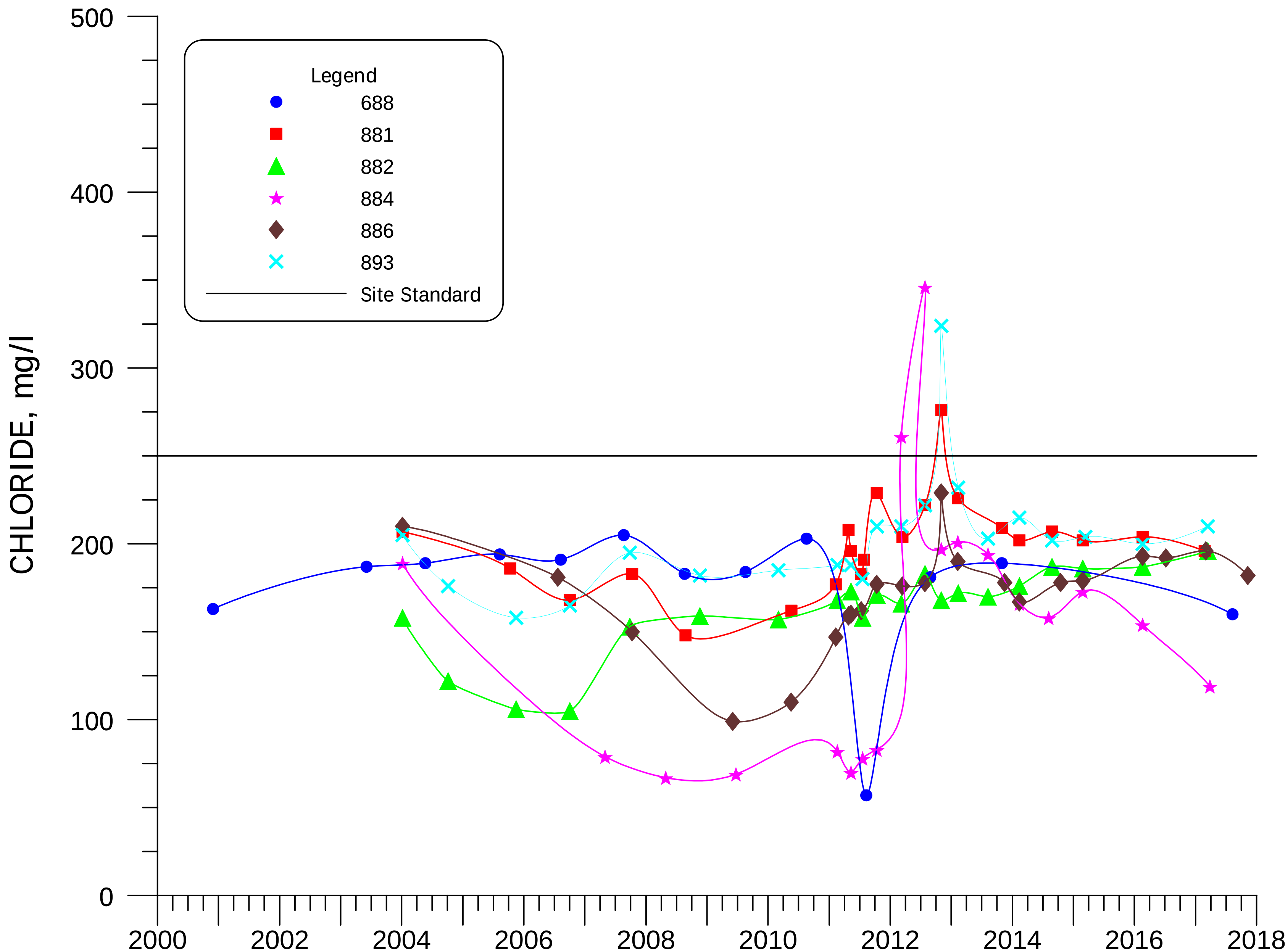

FIGURE 4.3-50. CHLORIDE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

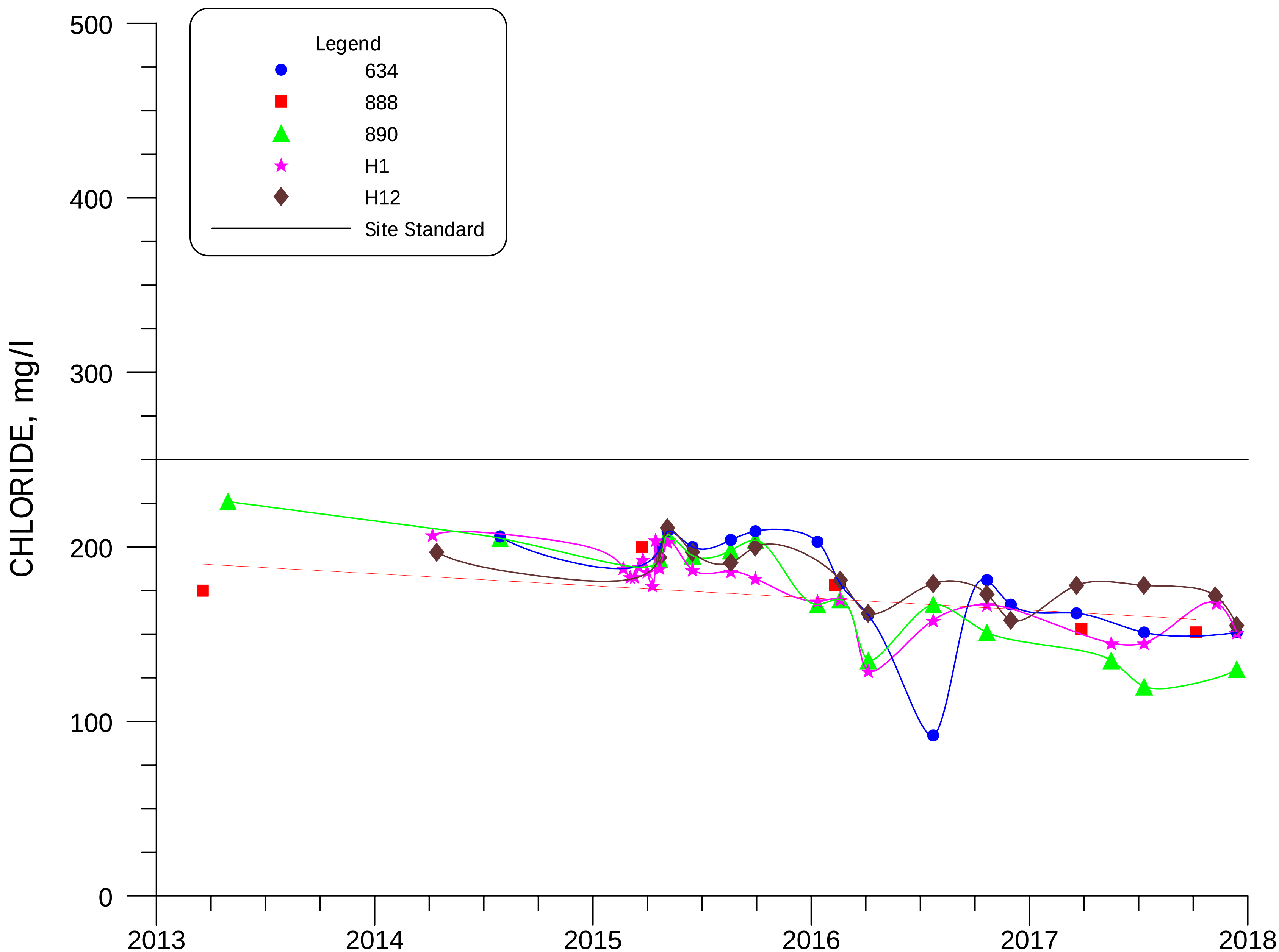

FIGURE 4.3-50A. CHLORIDE CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

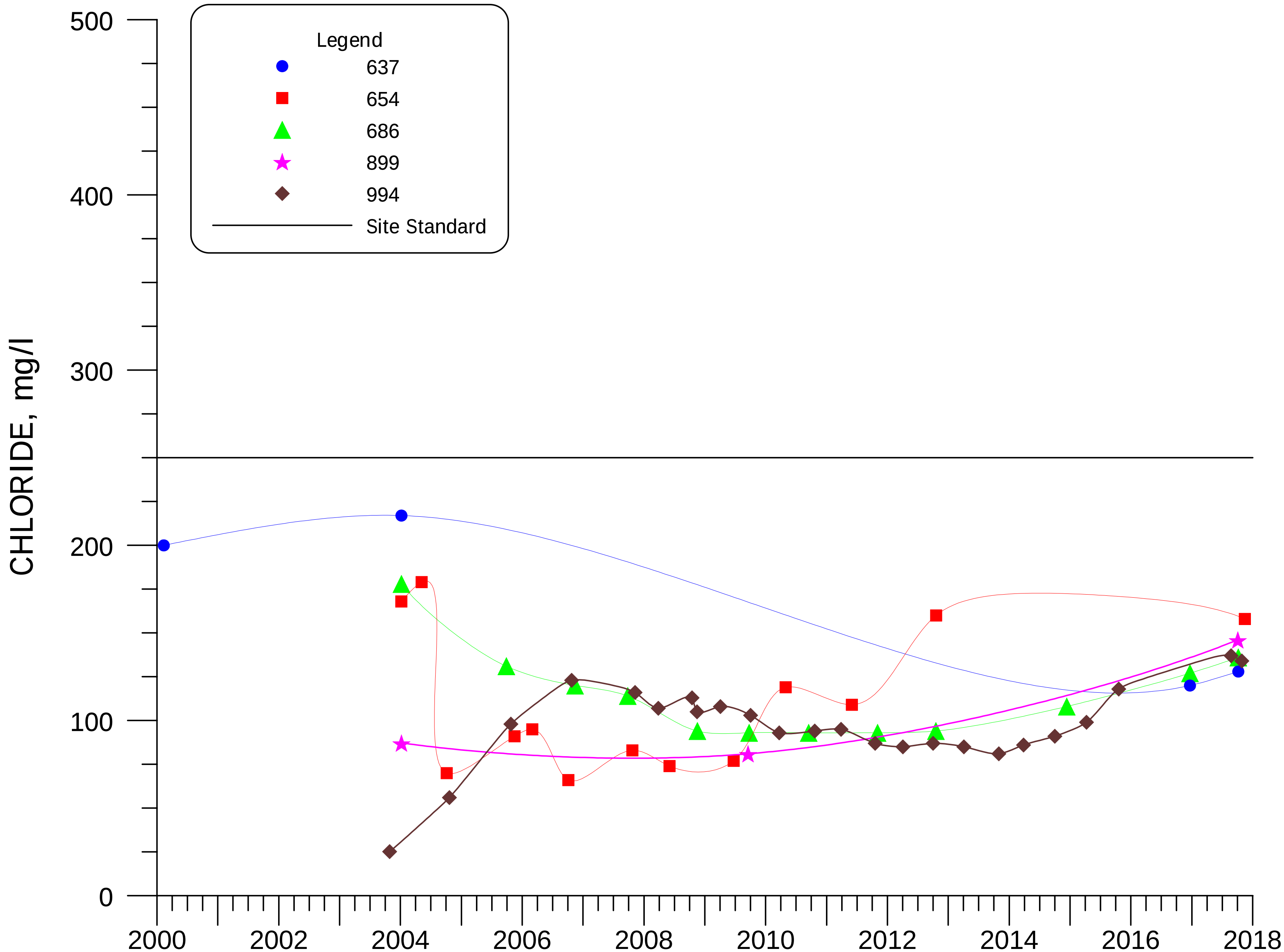

FIGURE 4.3-51. CHLORIDE CONCENTRATIONS FOR WELLS 637, 654, 686, 899 AND 994.

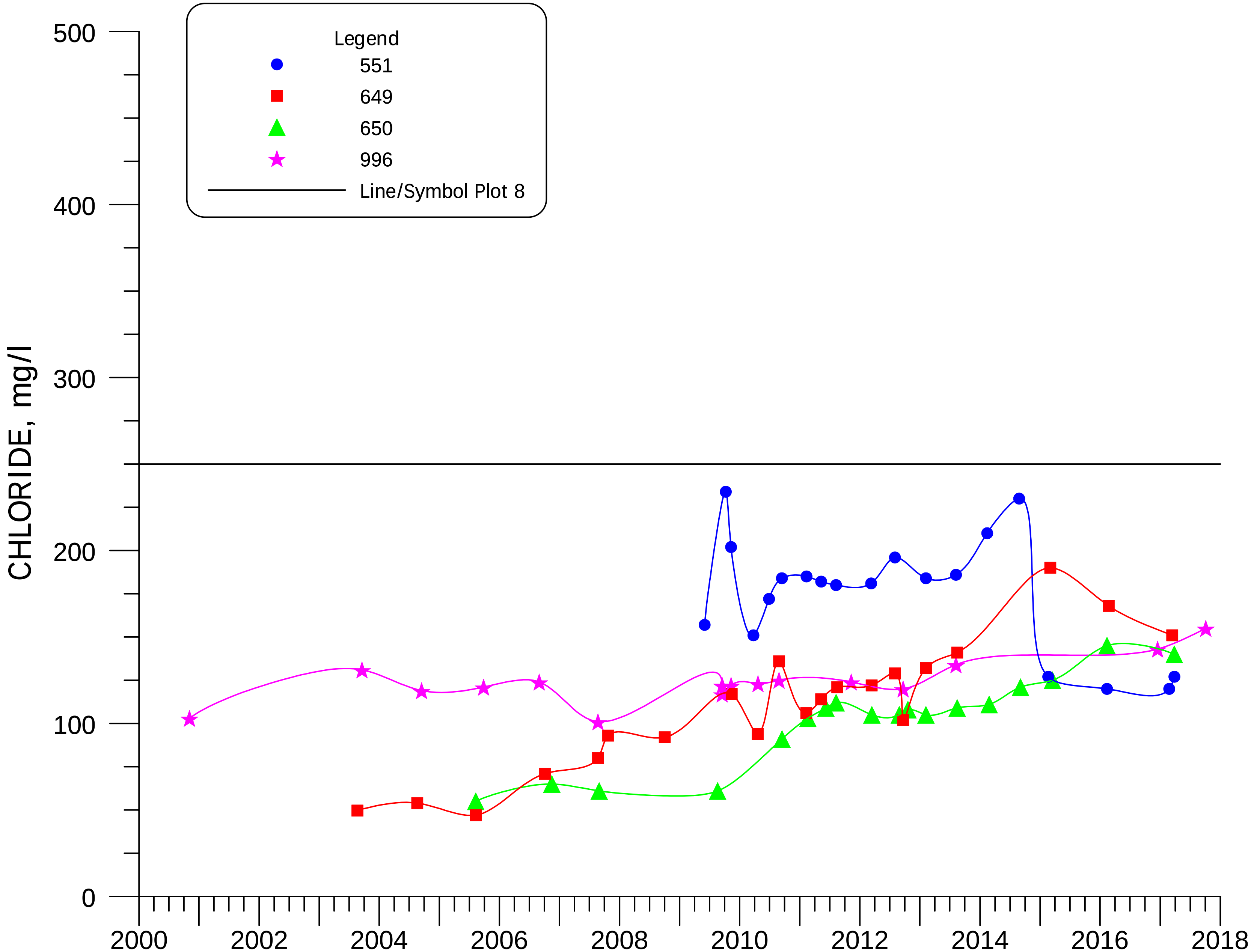

FIGURE 4.3-52. CHLORIDE CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

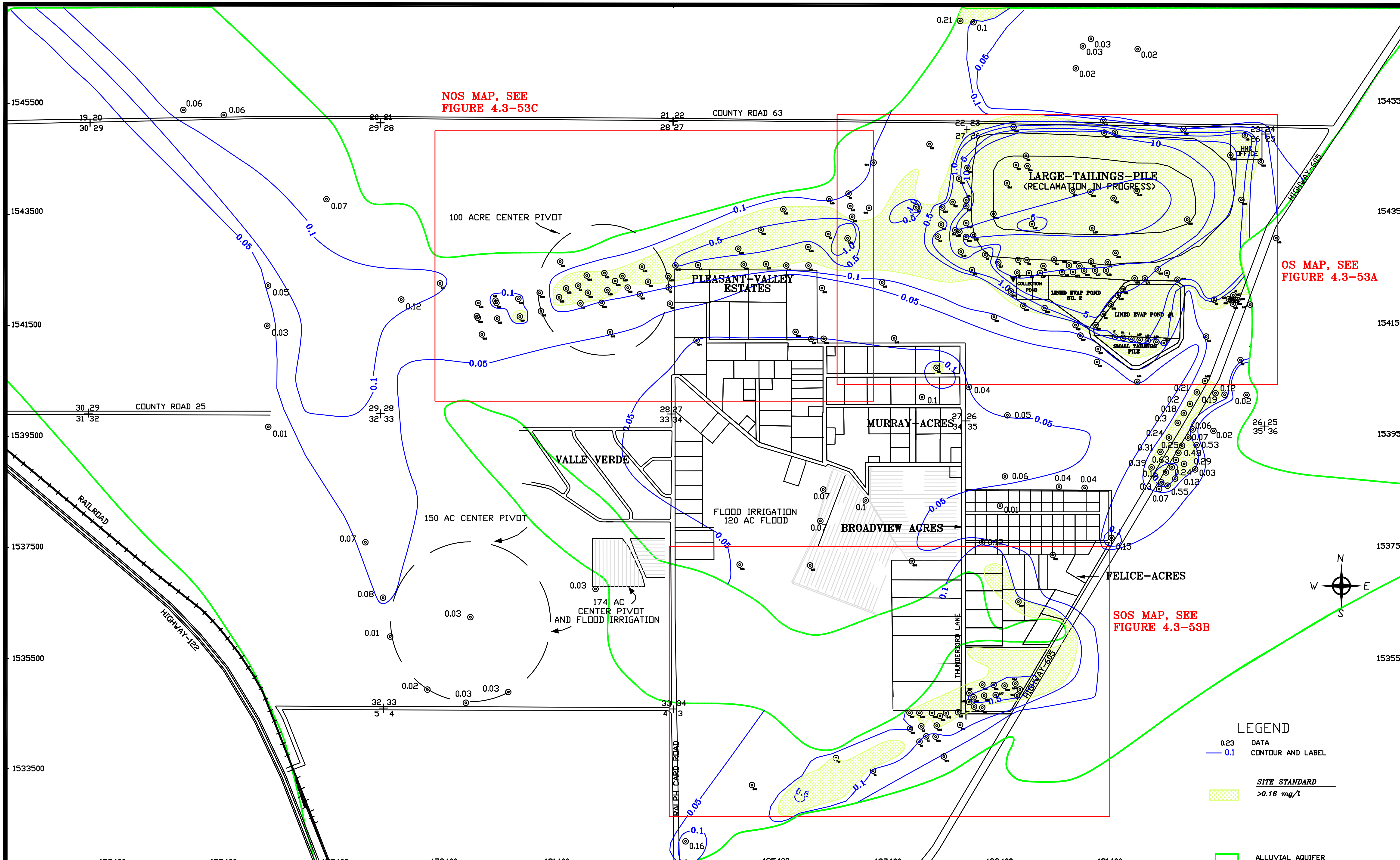

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FIGURE 4.3-53. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

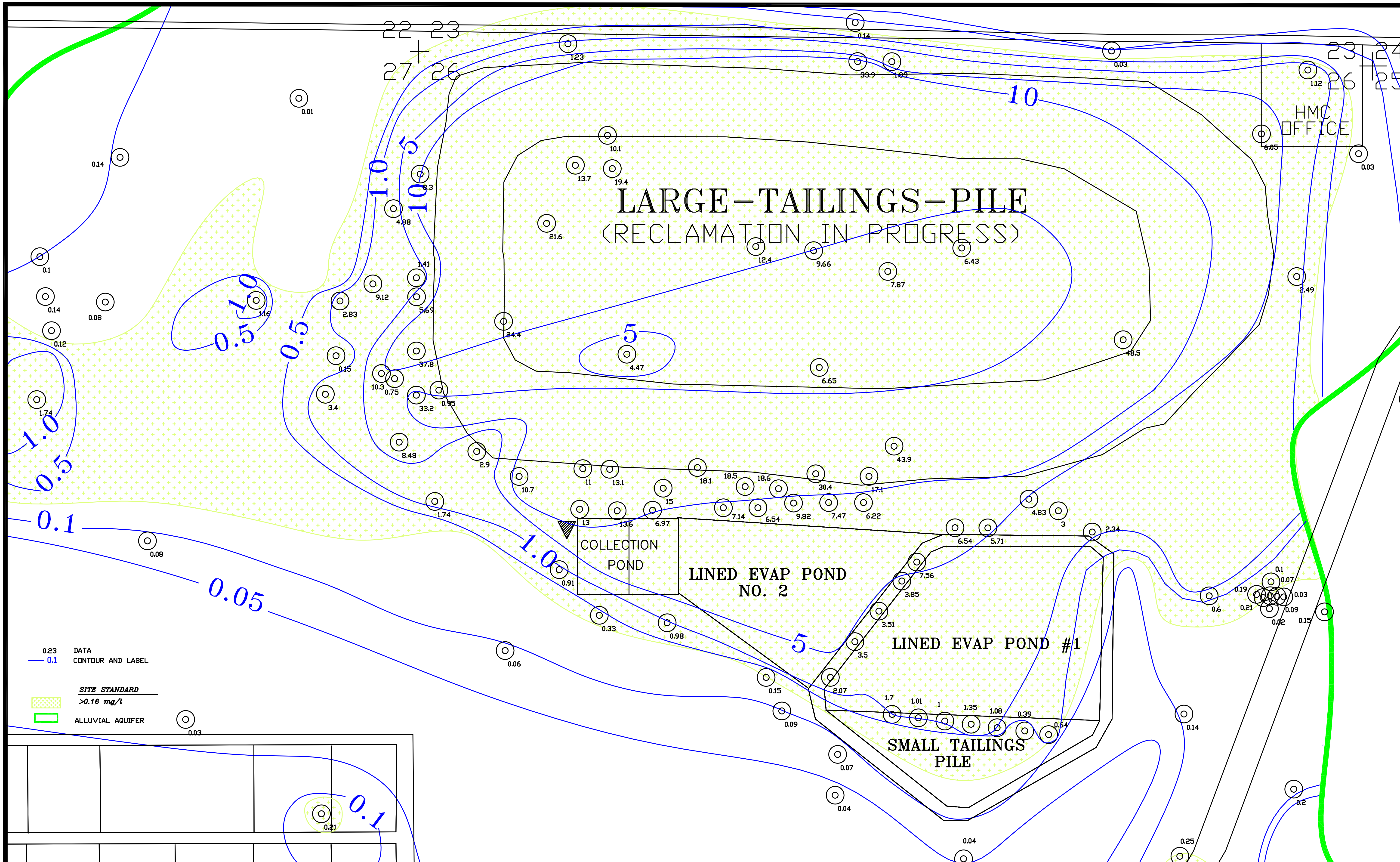

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FIGURE 4.3-53A. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

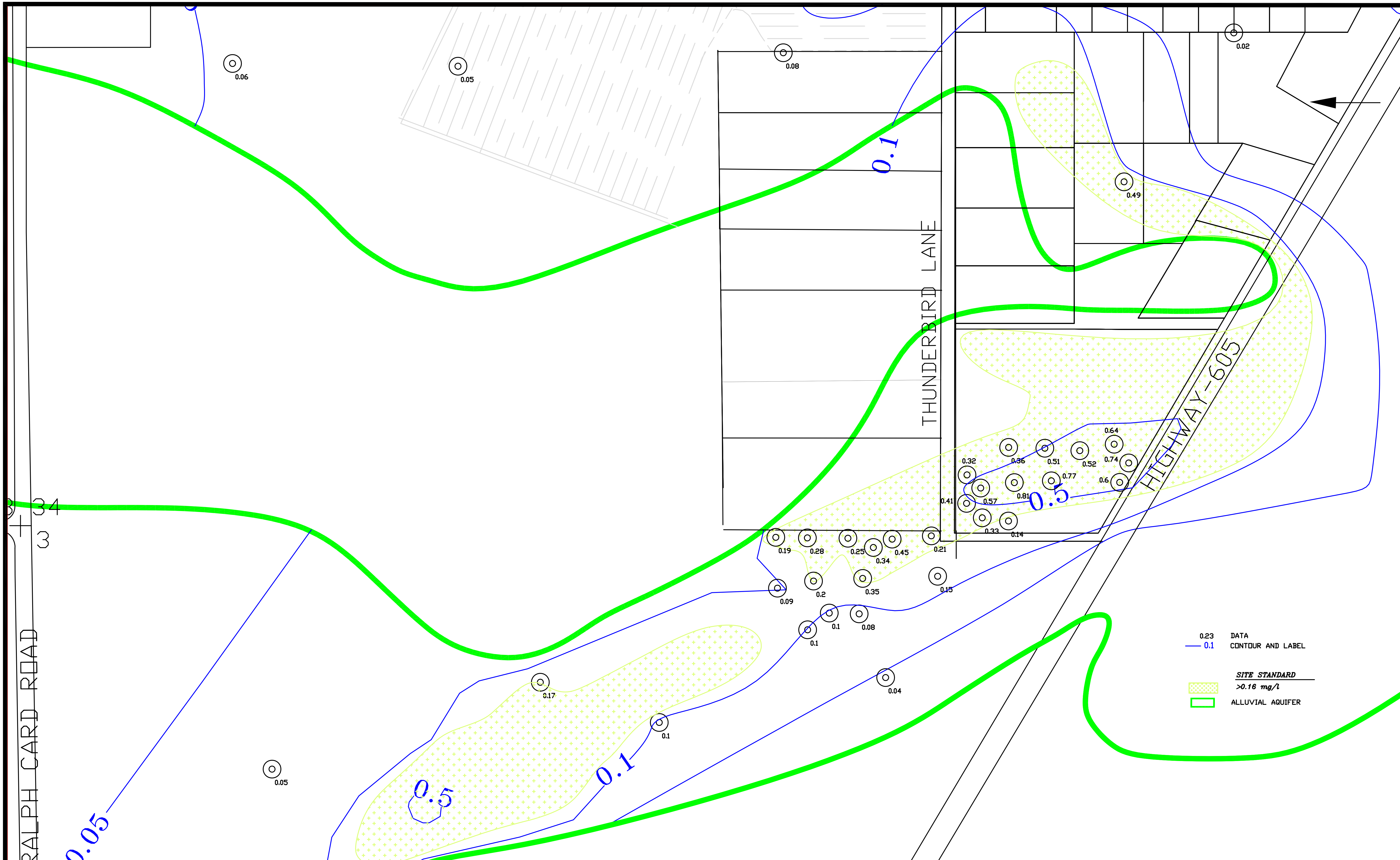

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FIGURE 4.3-53B. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

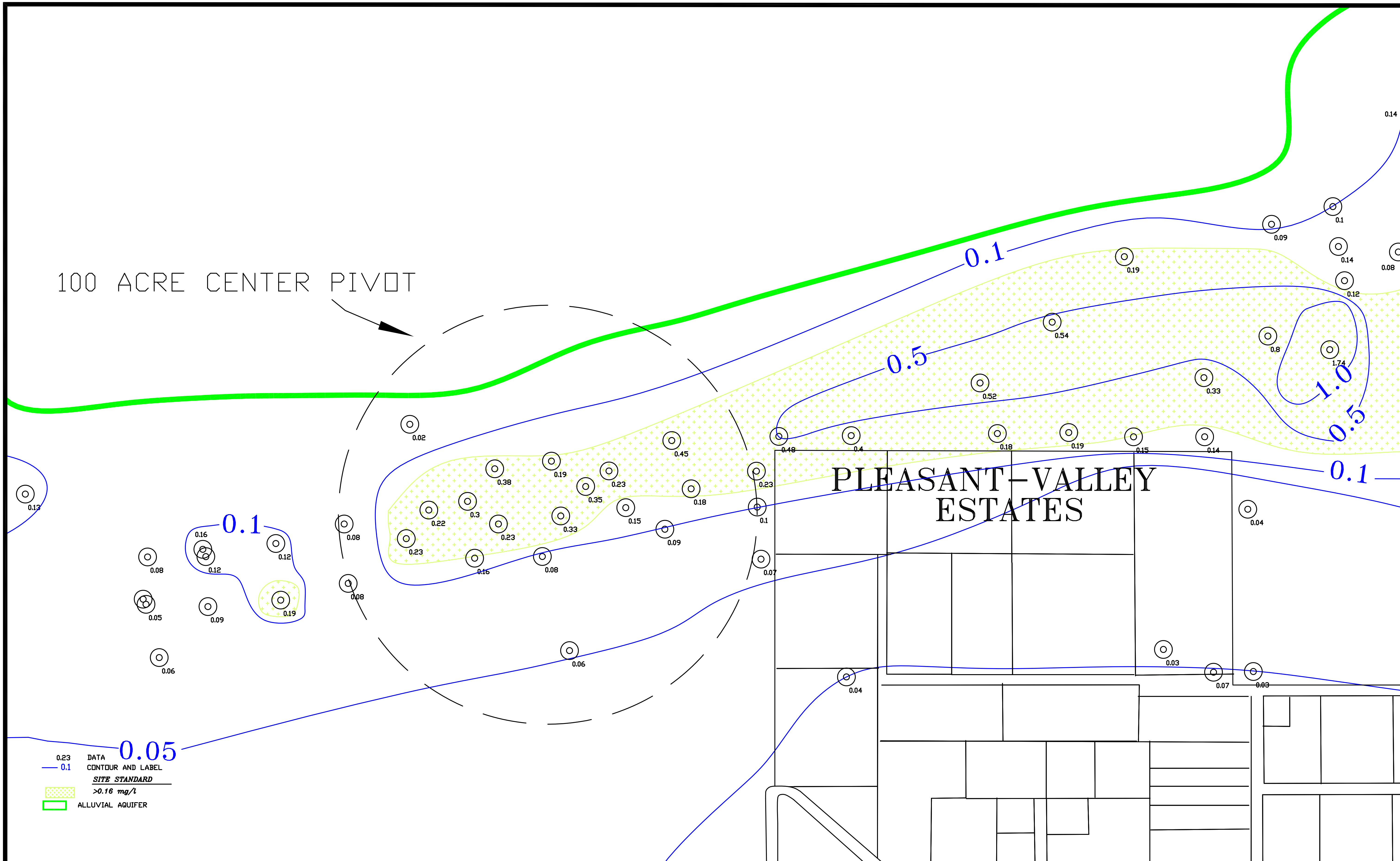

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FIGURE 4.3-53C. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

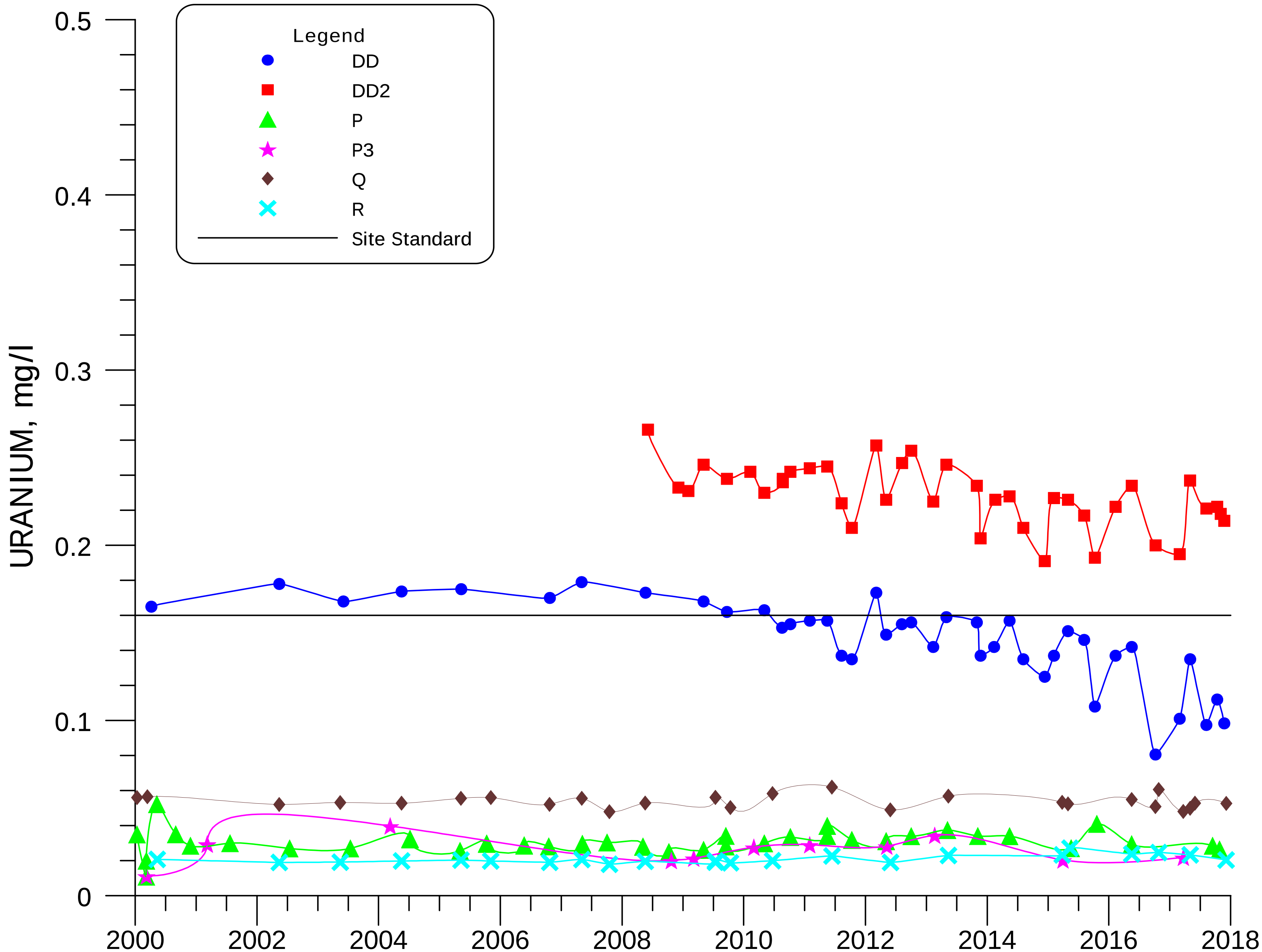

FIGURE 4.3-54. URANIUM CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

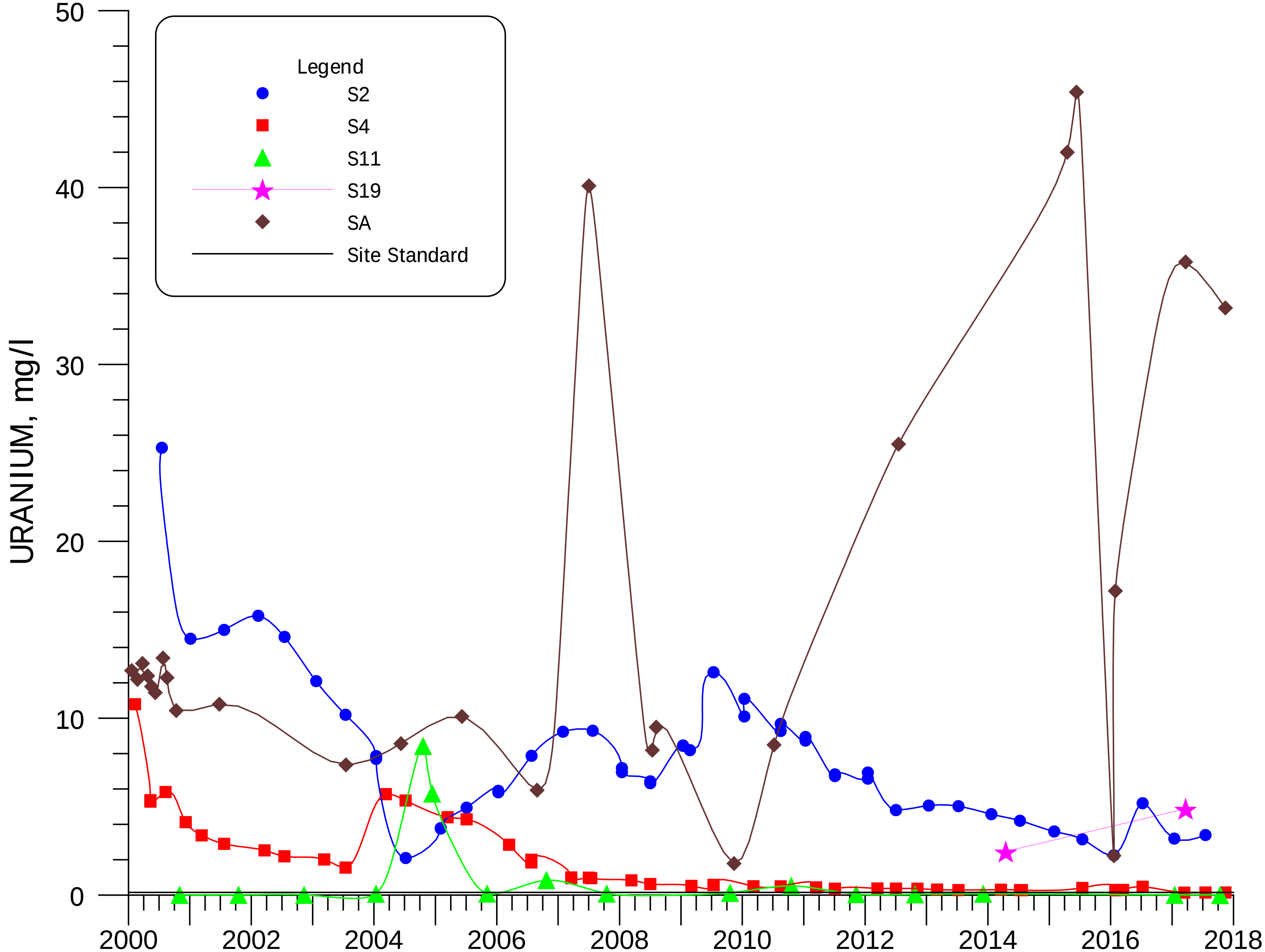

FIGURE 4.3-55. URANIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

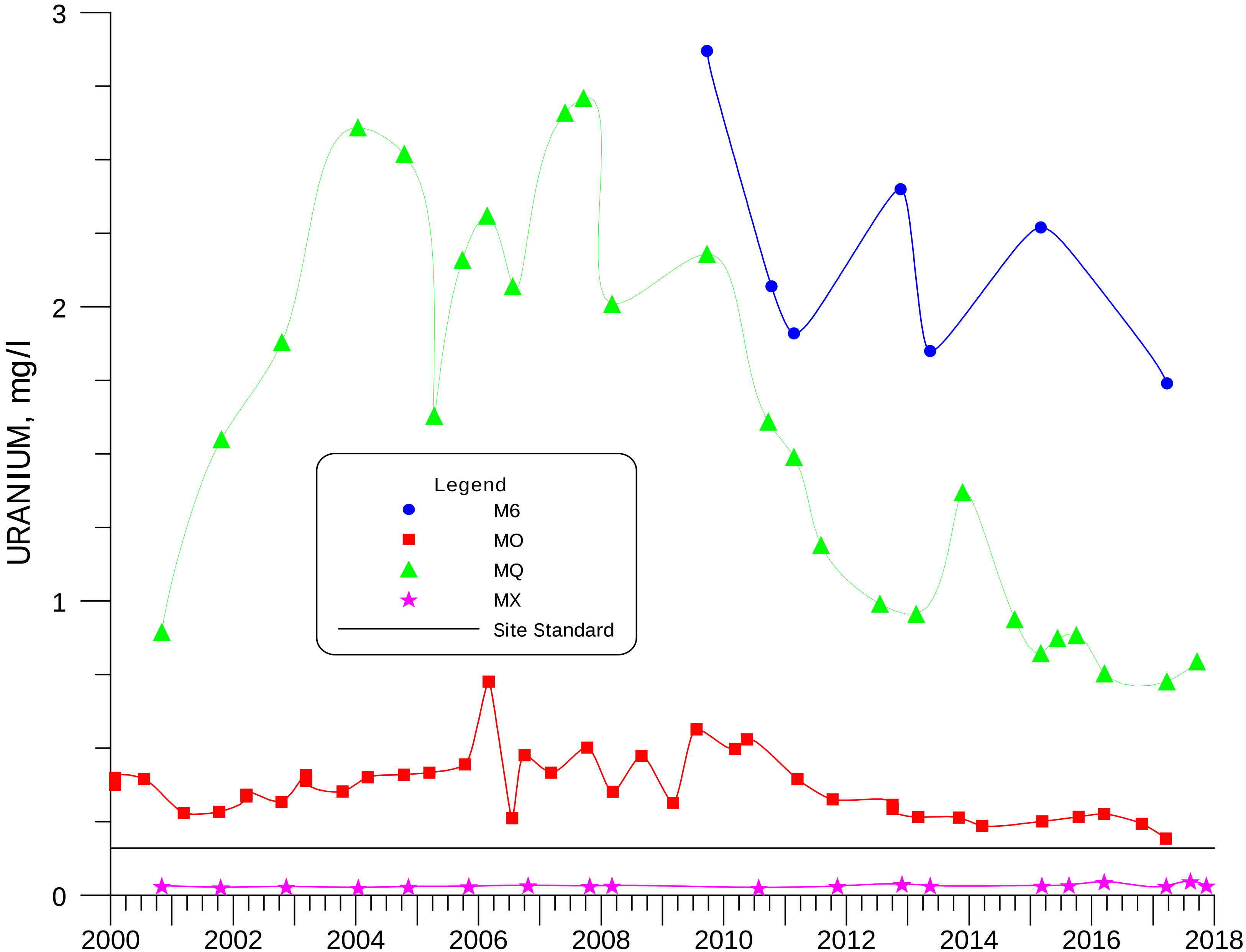

FIGURE 4.3-56. URANIUM CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

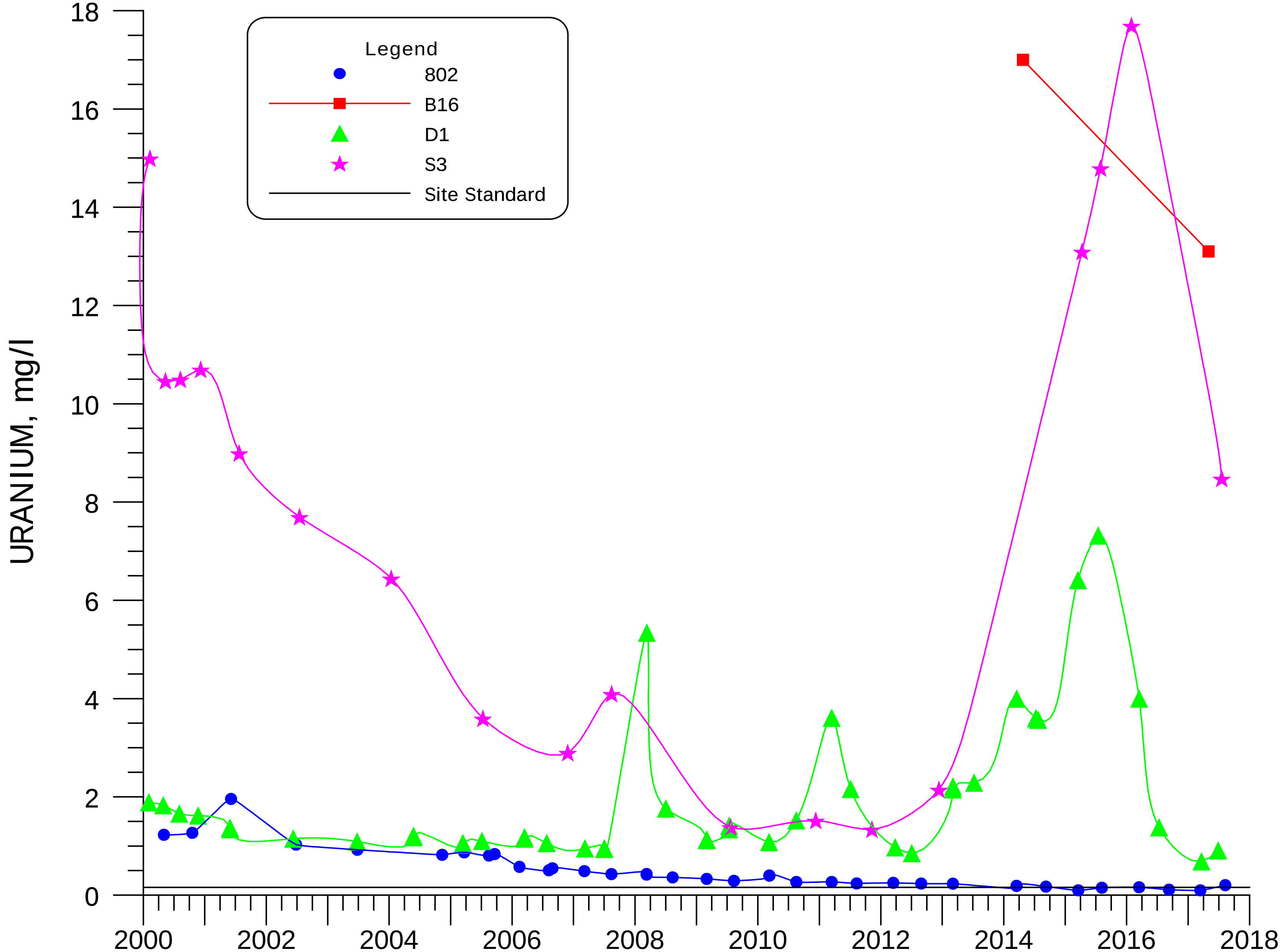

FIGURE 4.3-57. URANIUM CONCENTRATIONS FOR WELLS 802, B16, D1, AND S3.

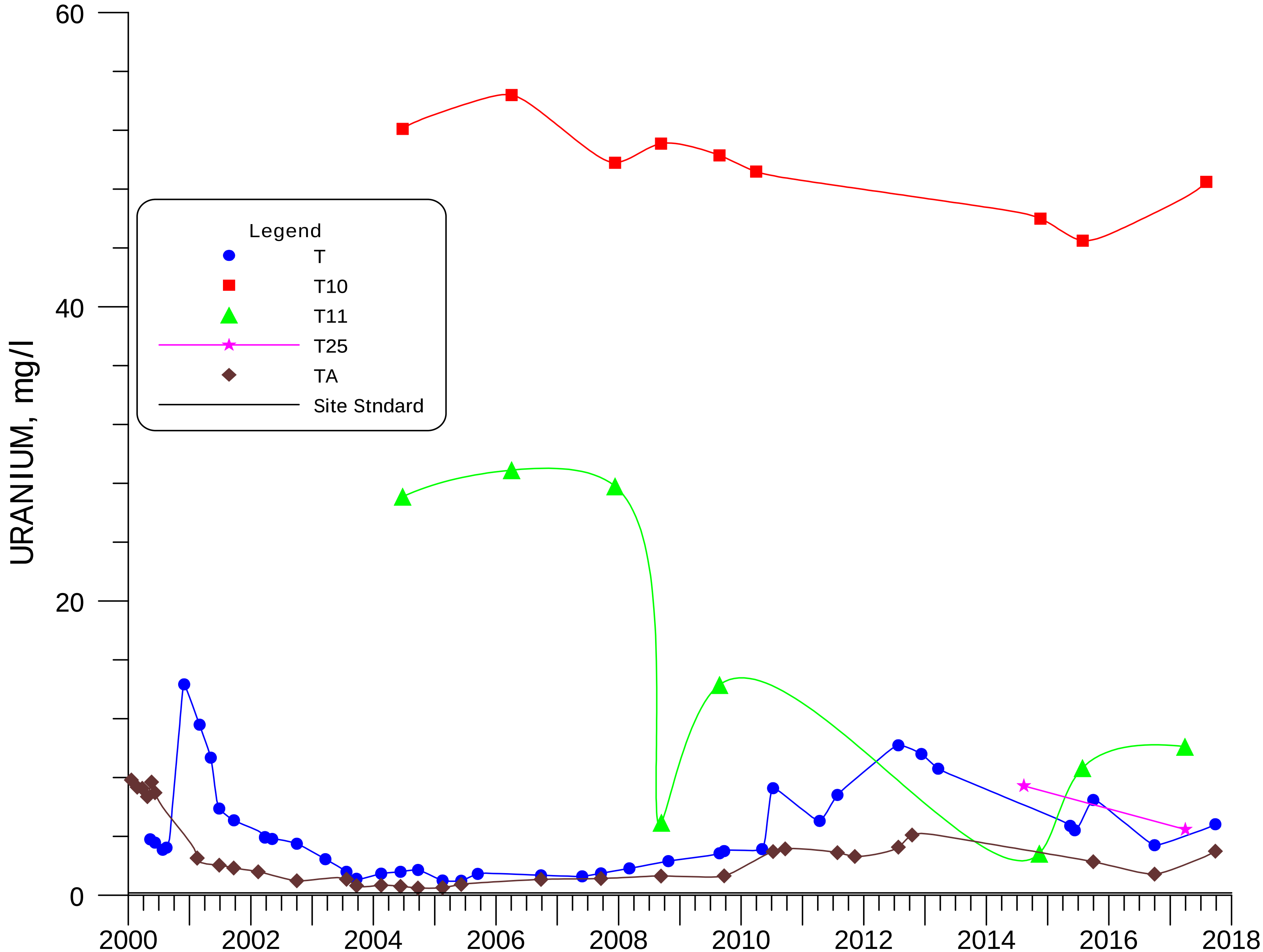

FIGURE 4.3-58. URANIUM CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

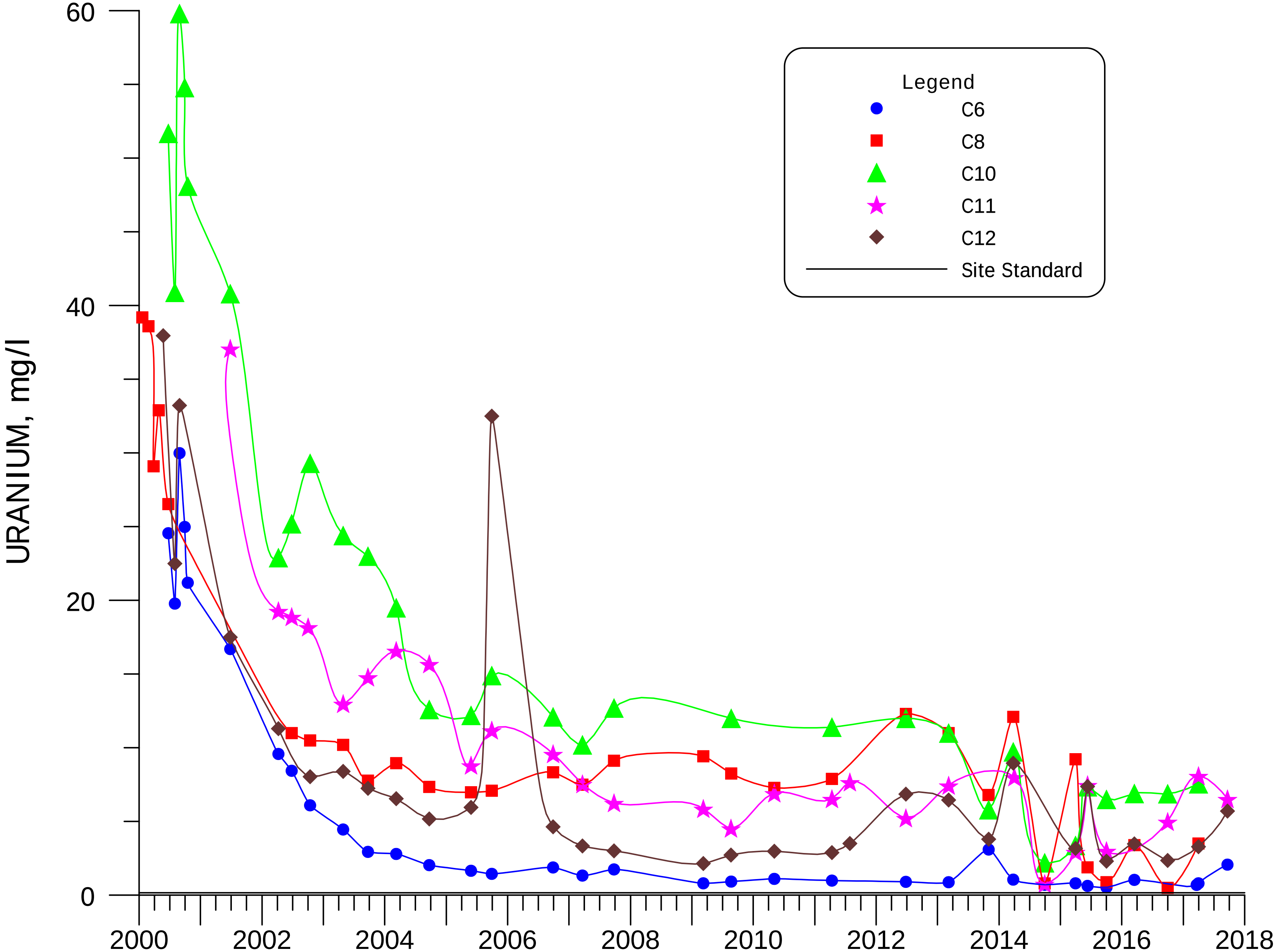

FIGURE 4.3-59. URANIUM CONCENTRATIONS FOR WELLS C6, C8, C10, C11 AND C12.

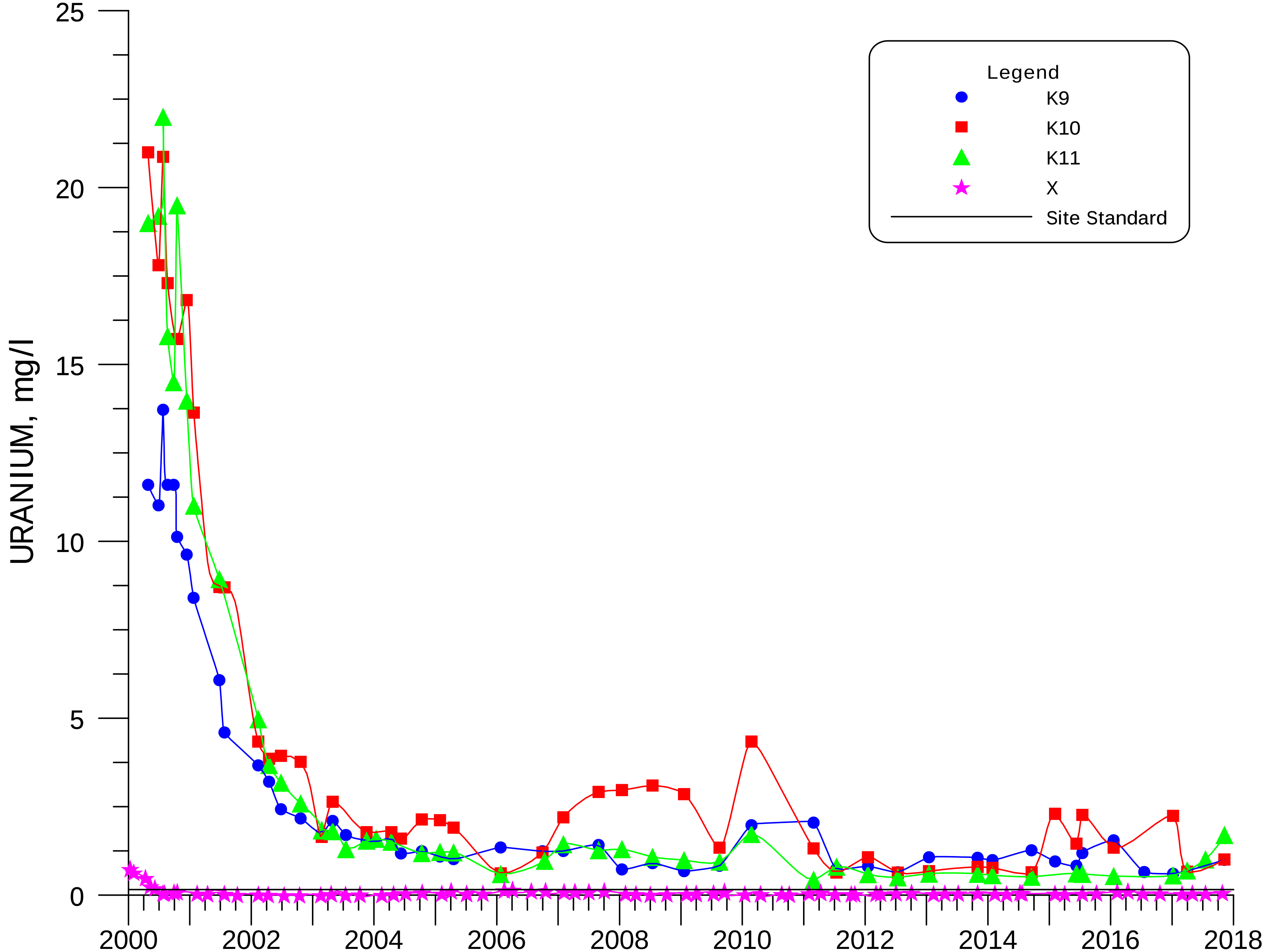

FIGURE 4.3-60. URANIUM CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

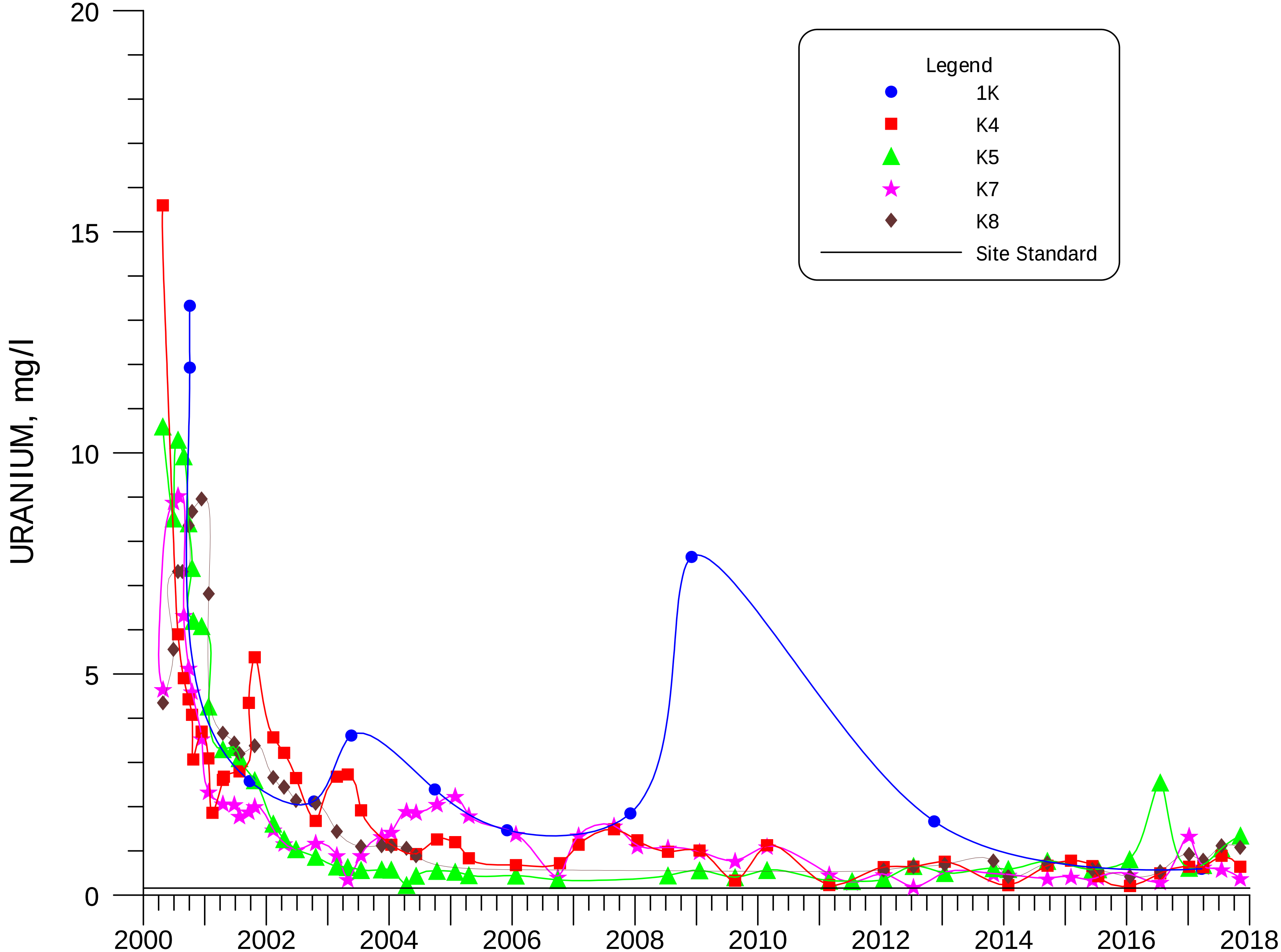

FIGURE 4.3-61. URANIUM CONCENTRATIONS FOR WELLS 1K, K4, K5, K7 AND K8.

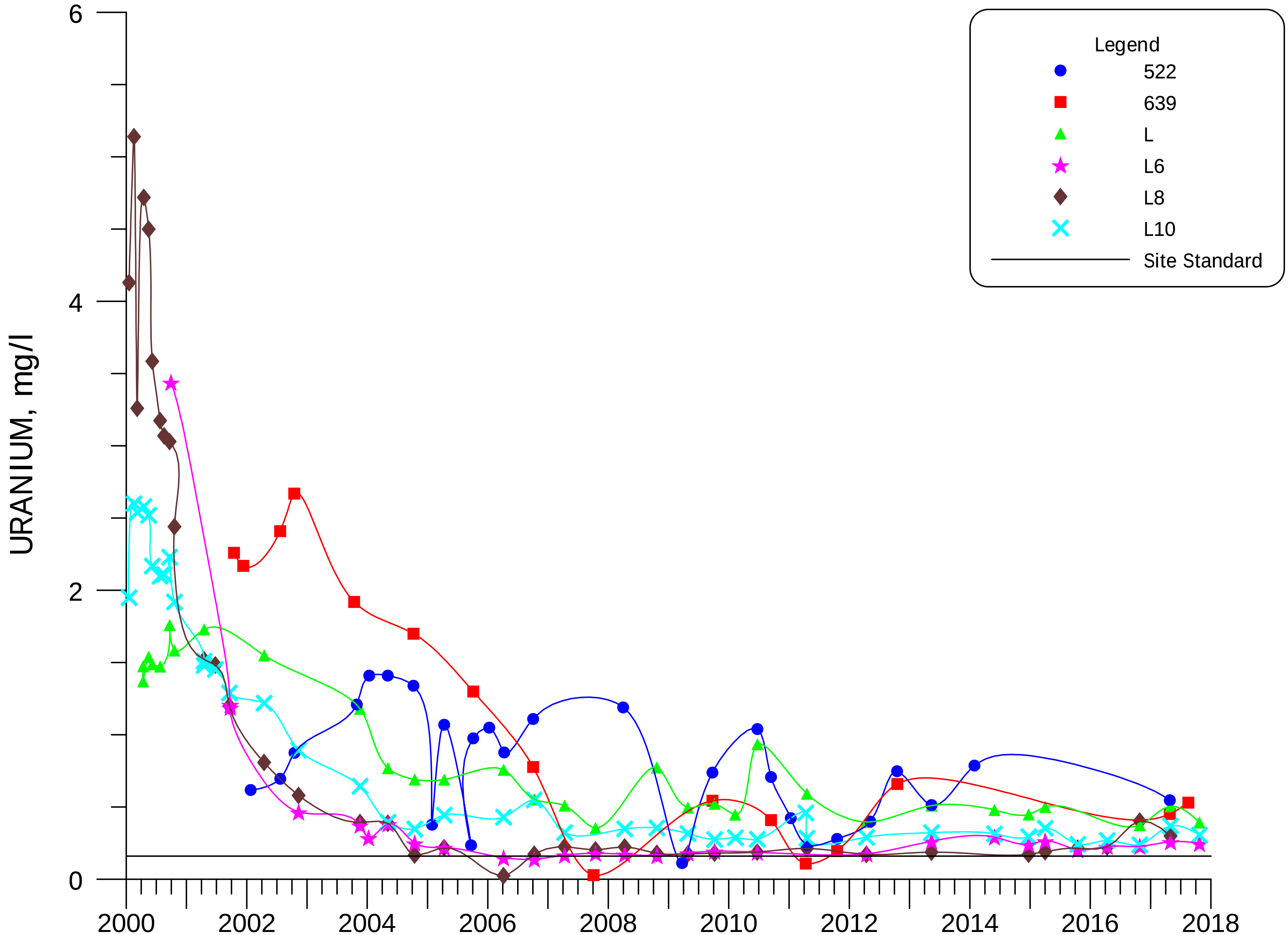

FIGURE 4.3-62. URANIUM CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

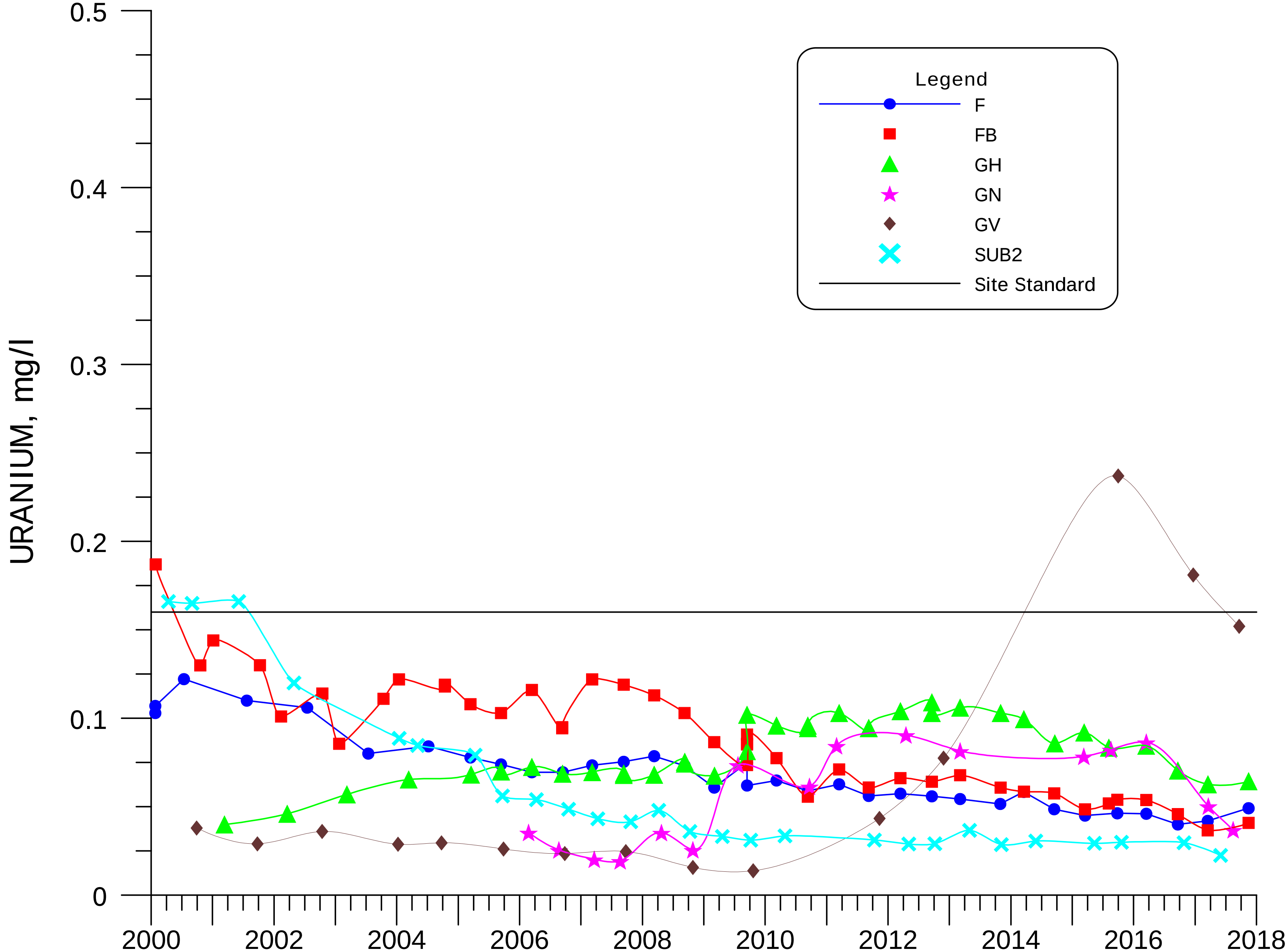

FIGURE 4.3-63. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

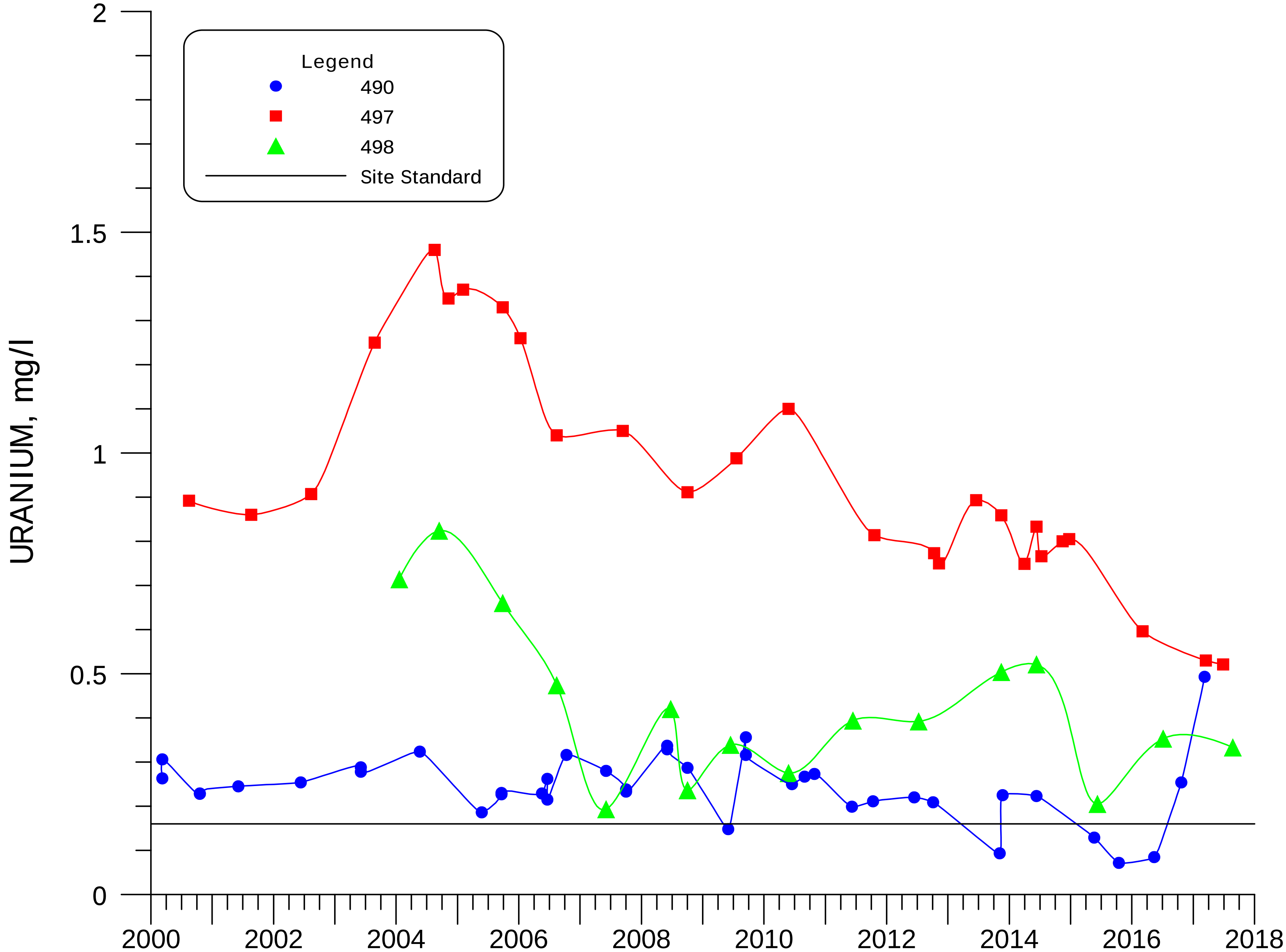

FIGURE 4.3-64. URANIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

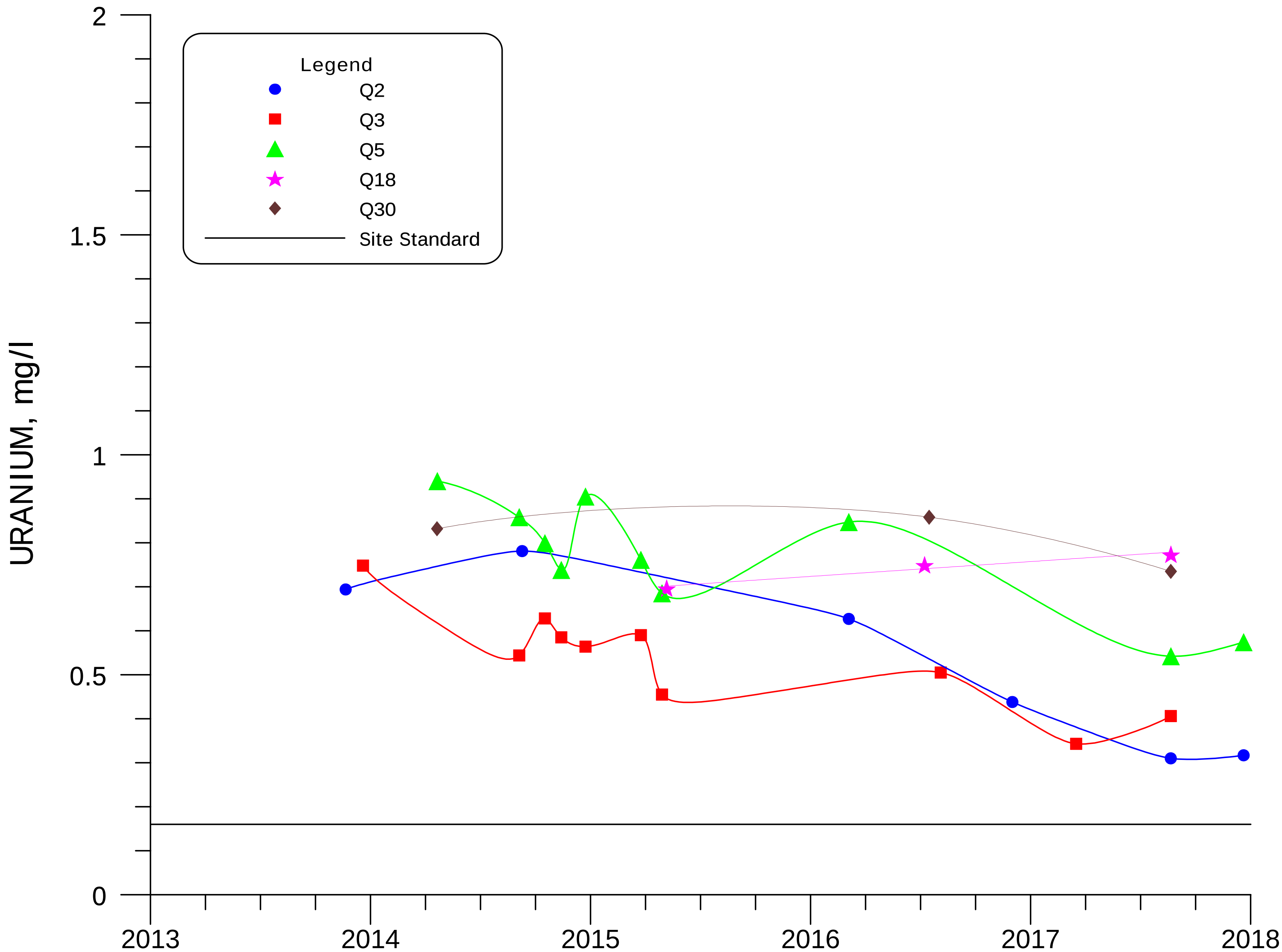

FIGURE 4.3-64A. URANIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q30.

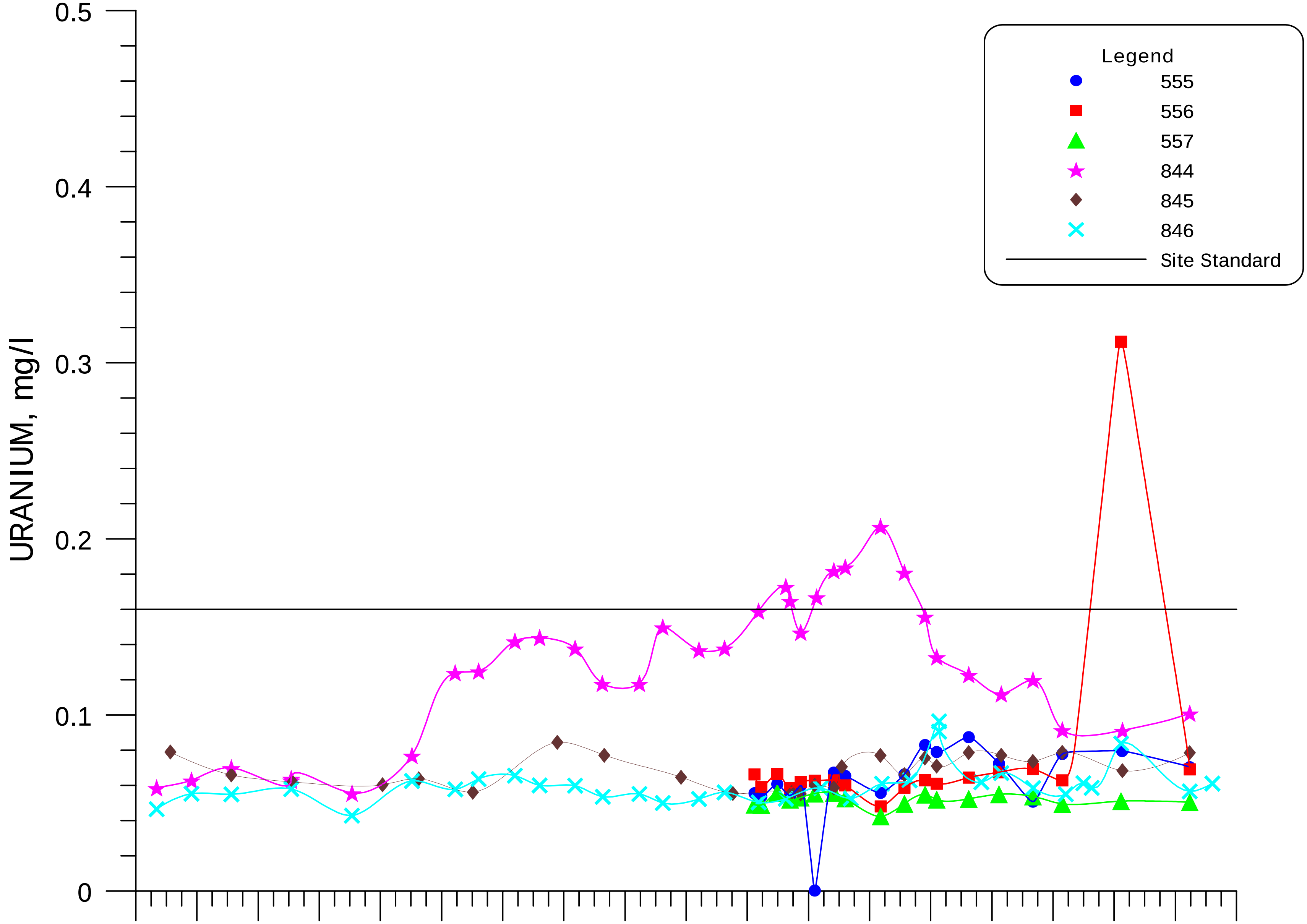

FIGURE 4.3-65. URANIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

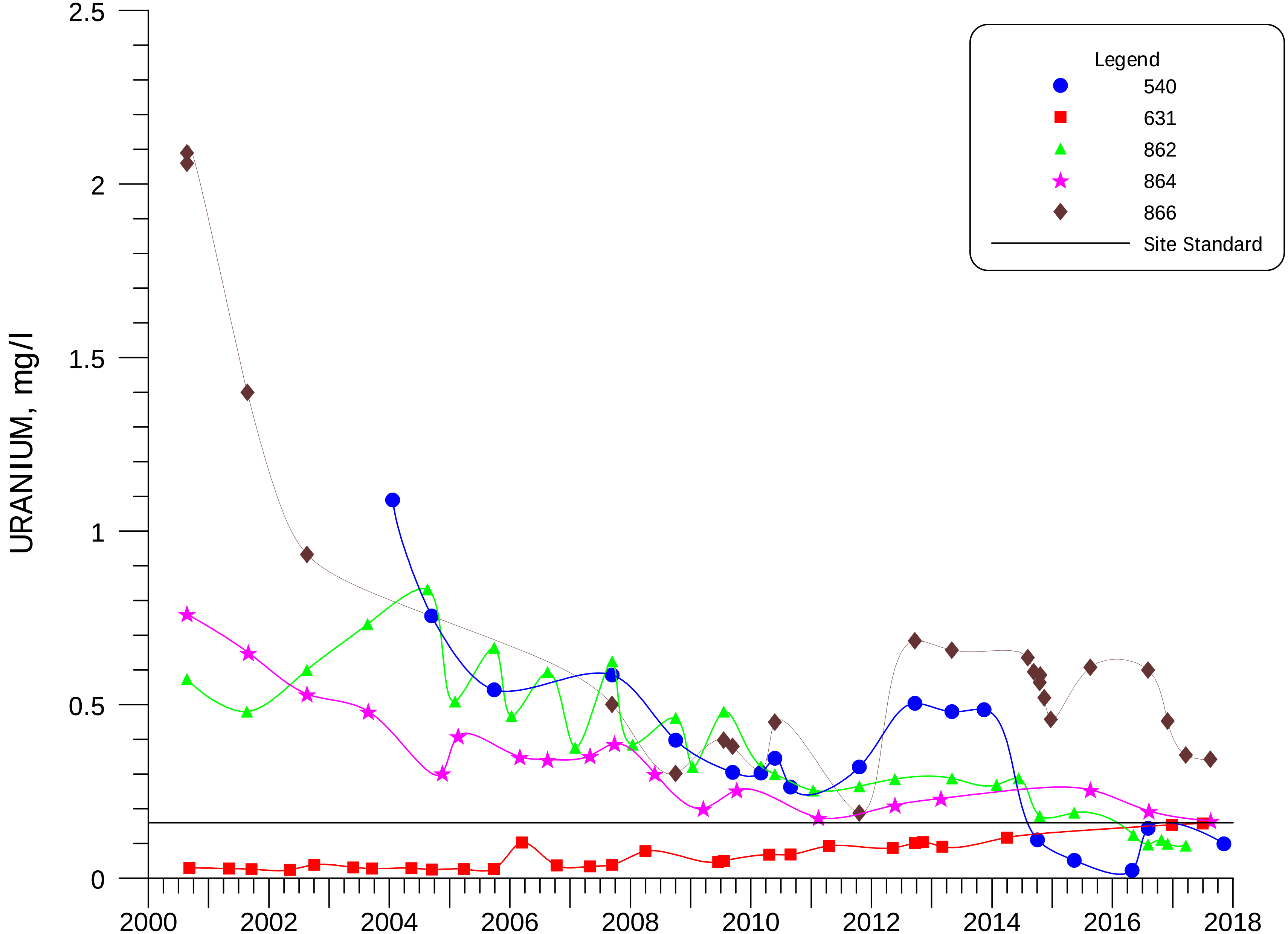

FIGURE 4.3-66. URANIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

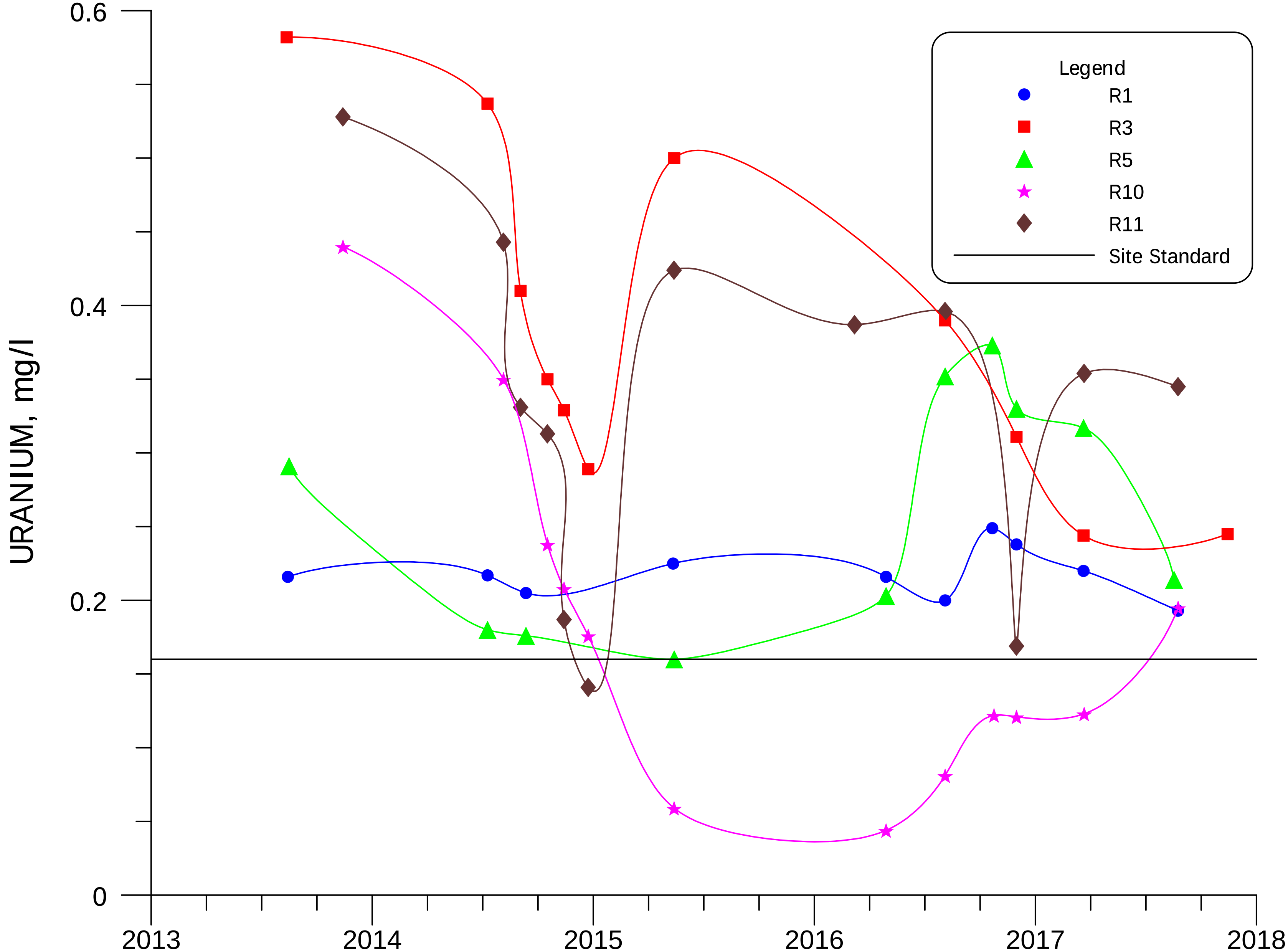

FIGURE 4.3-66A. URANIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

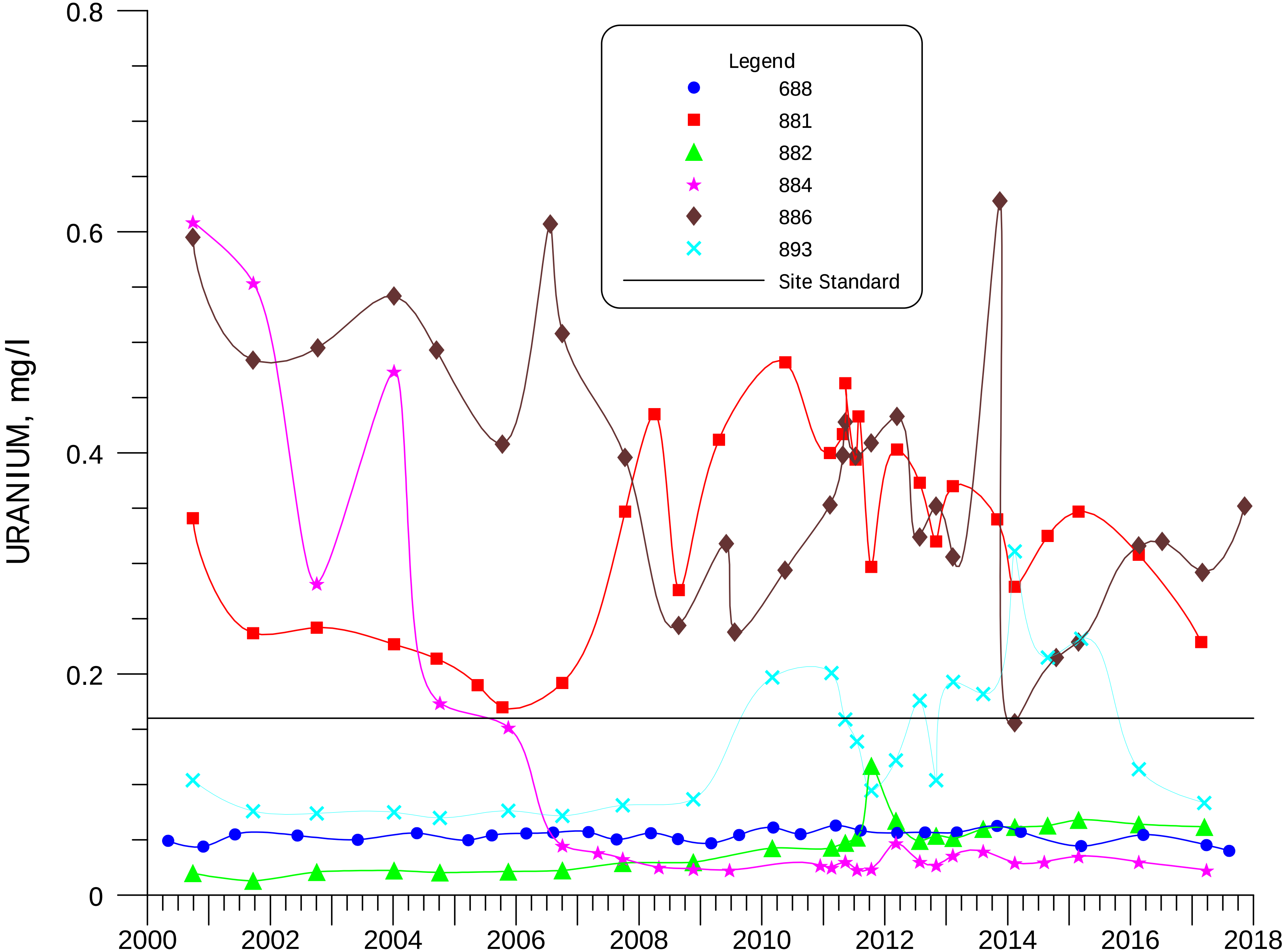

FIGURE 4.3-67. URANIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

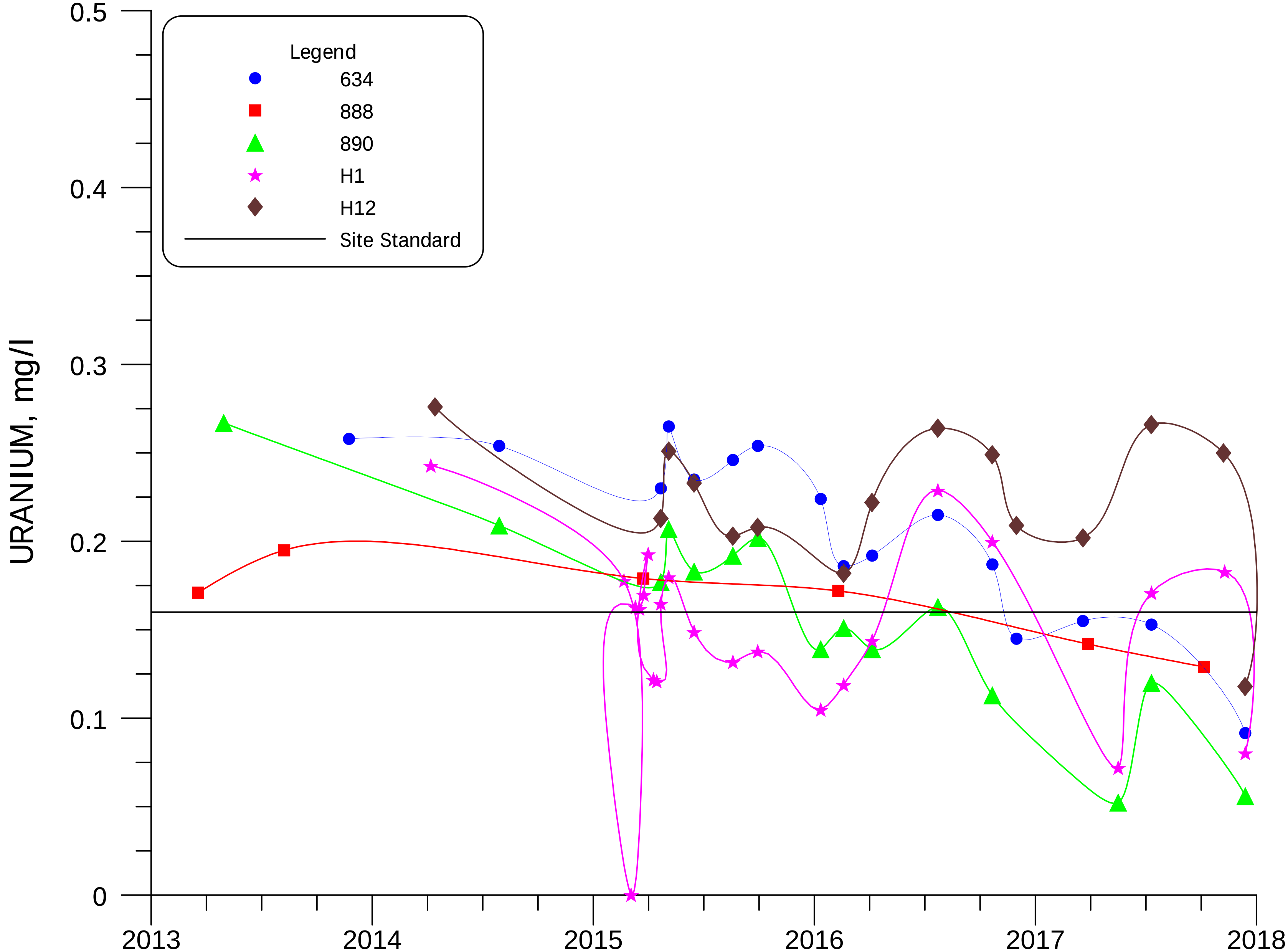

FIGURE 4.3-67A. URANIUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

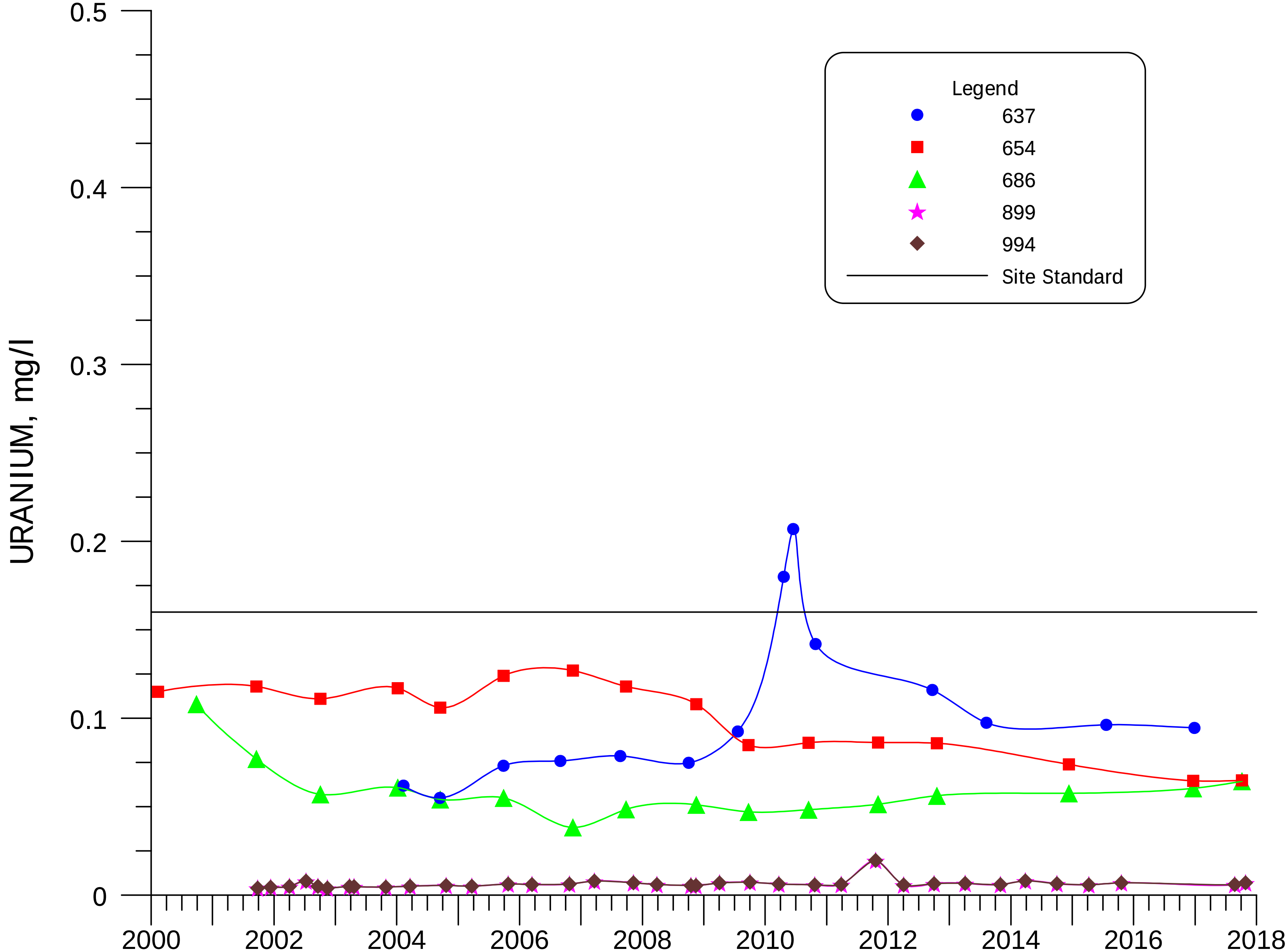

FIGURE 4.3-68. URANIUM CONCENTRATIONS FOR WELLS 637, 654, 686, 899 AND 994.

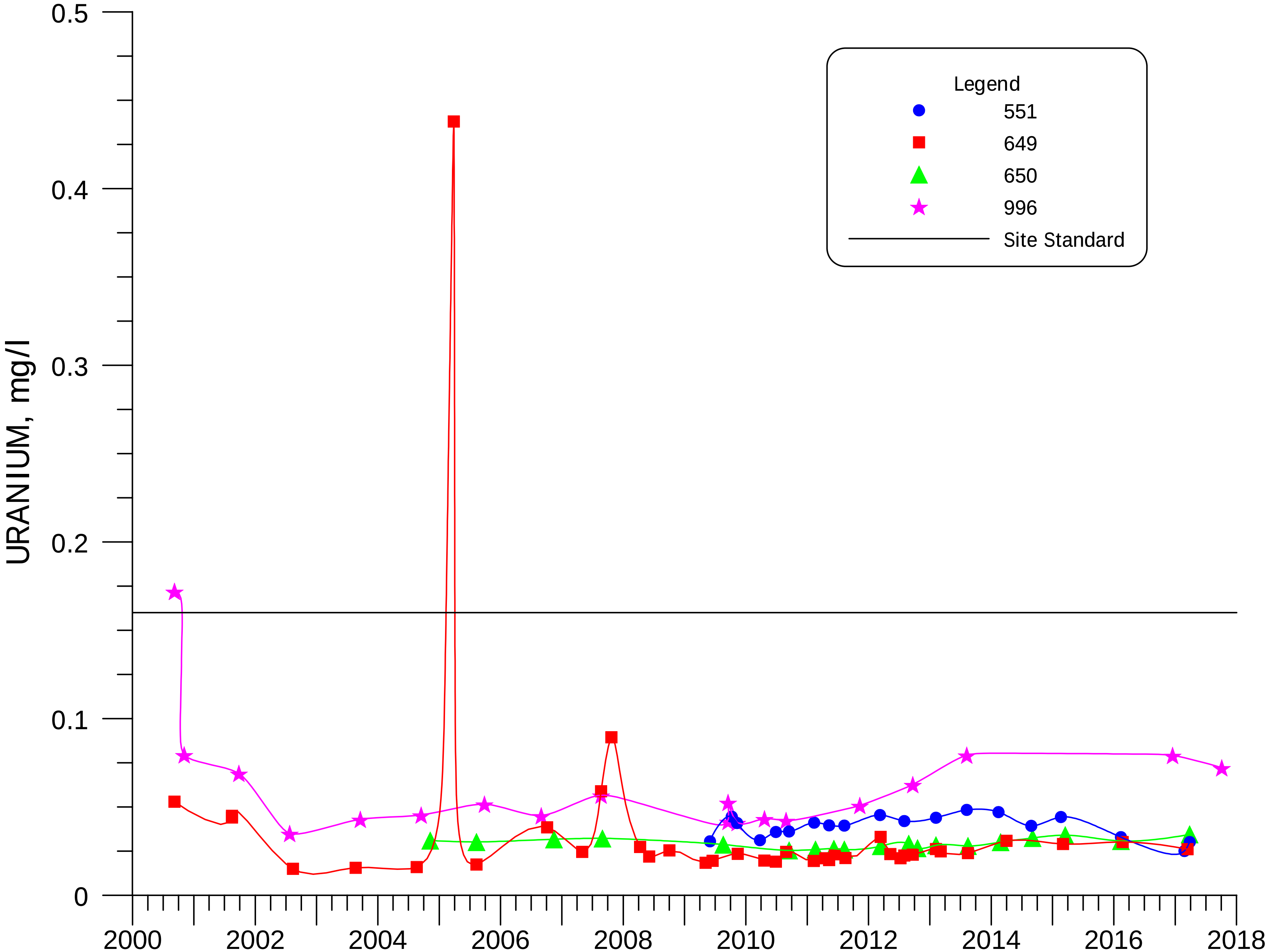

FIGURE 4.3-69. URANIUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

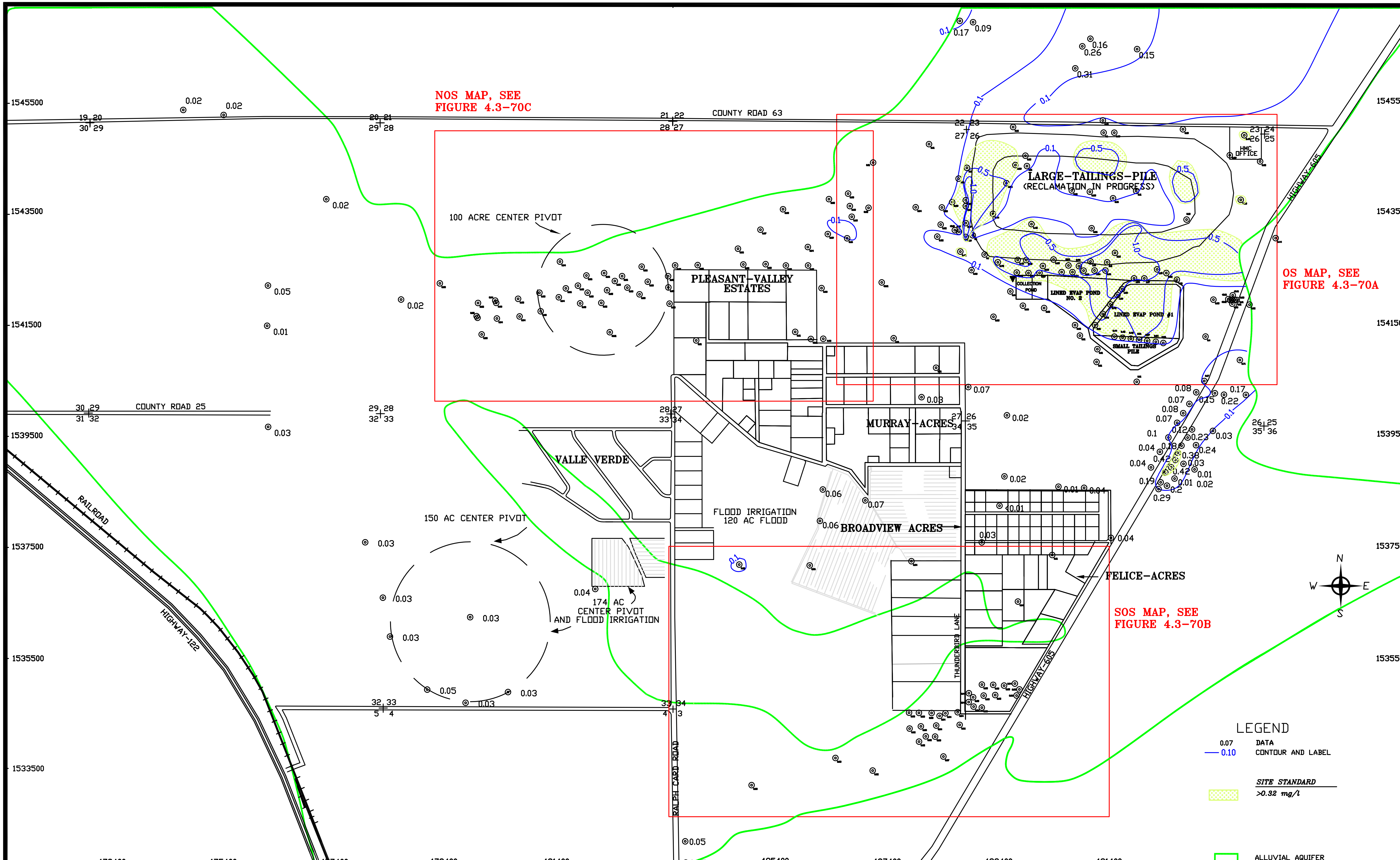

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FIGURE 4.3-70. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017 mg/l

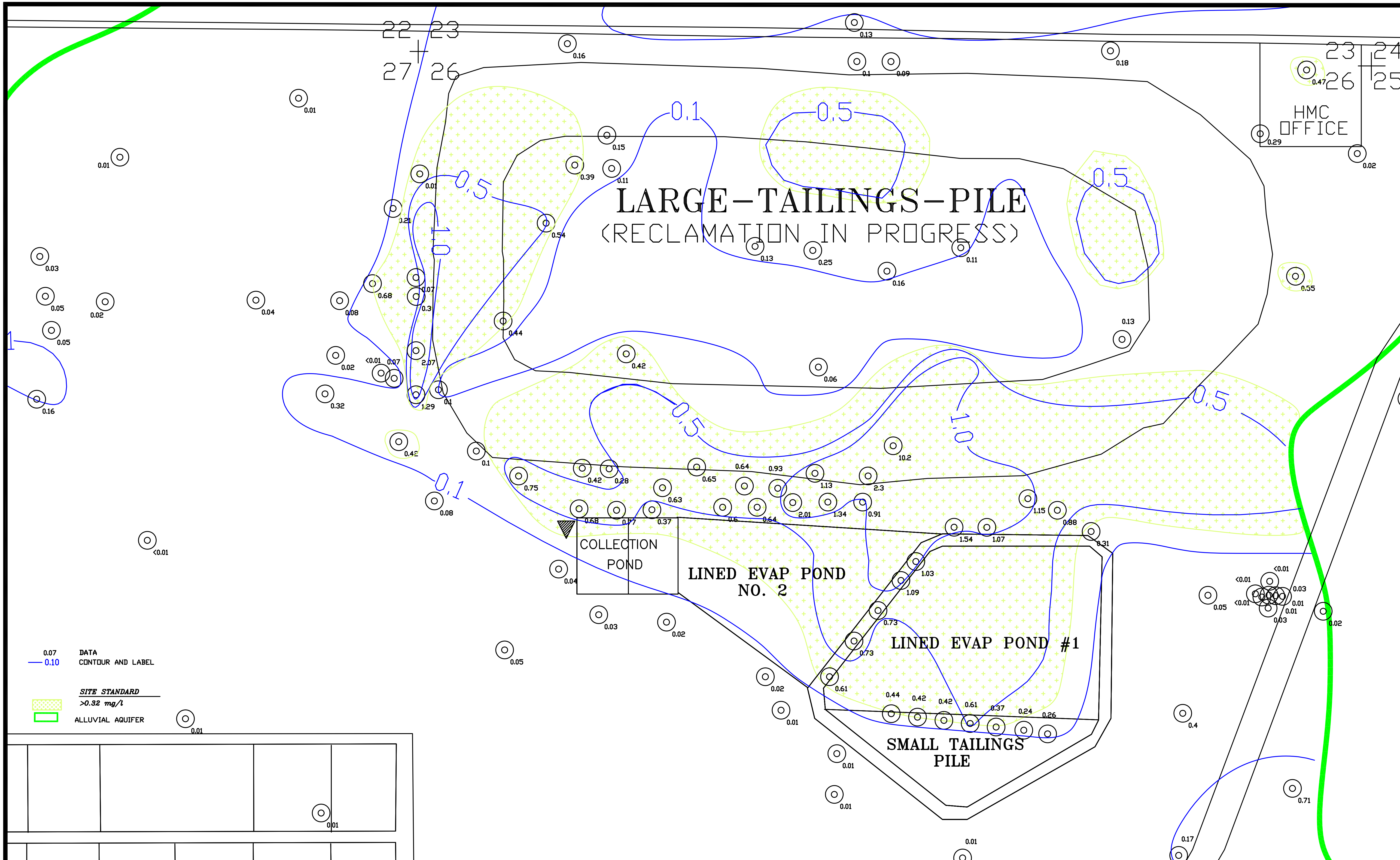

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FIGURE 4.3-70A. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

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DATE: 1/26/18

FIGURE 4.3-70B. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

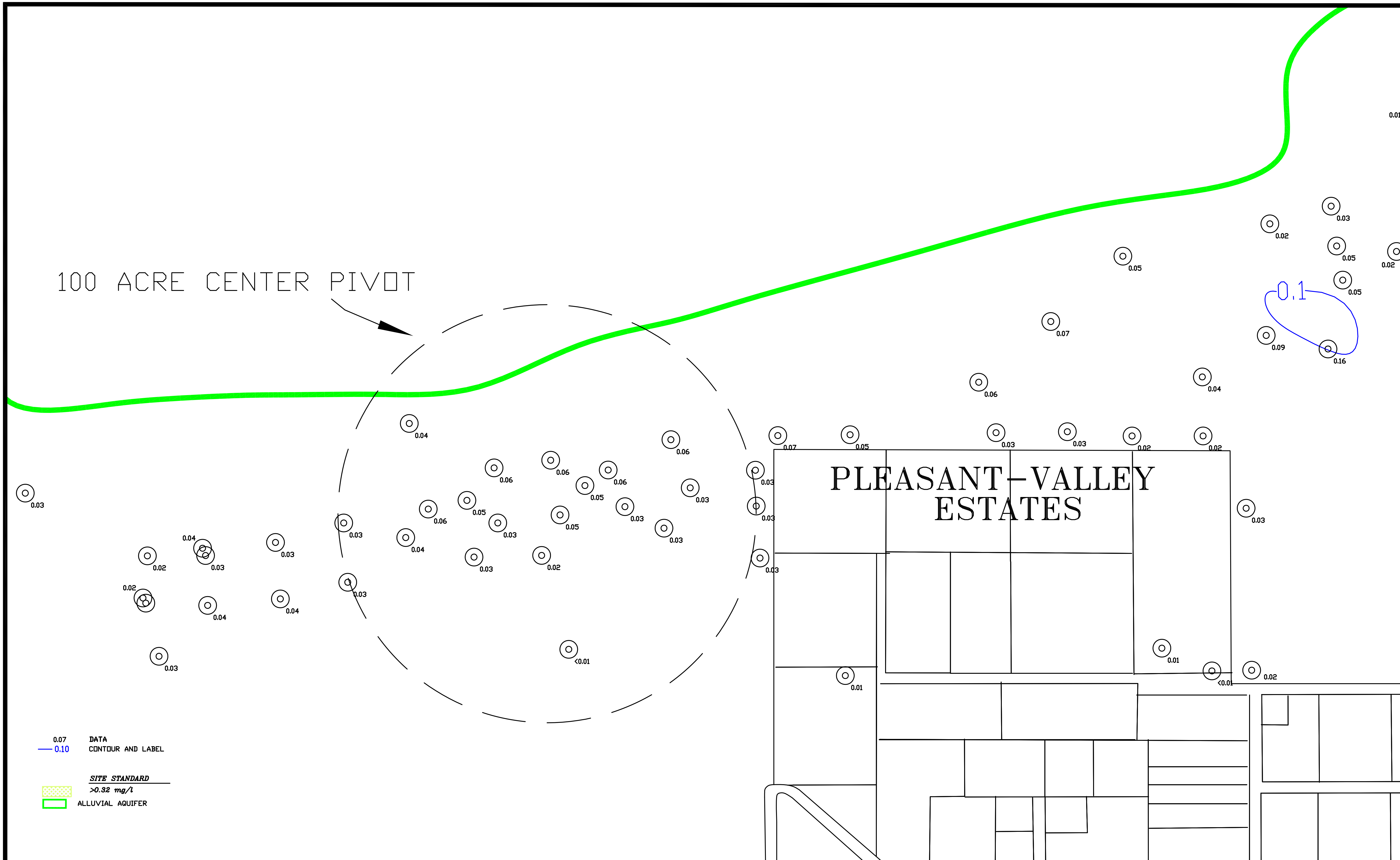

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FIGURE 4.3-70C. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

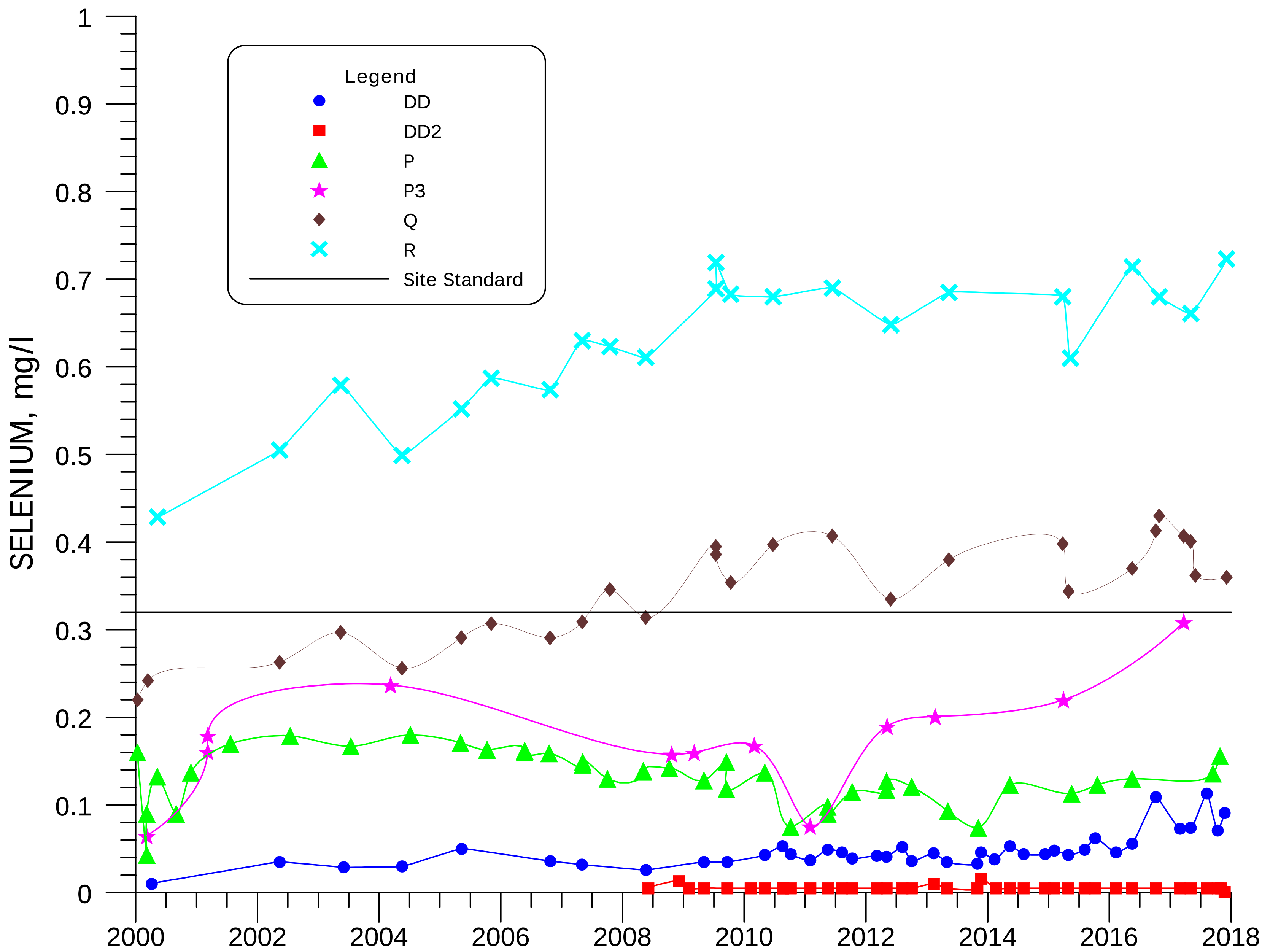


FIGURE 4.3-71. SELENIUM CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

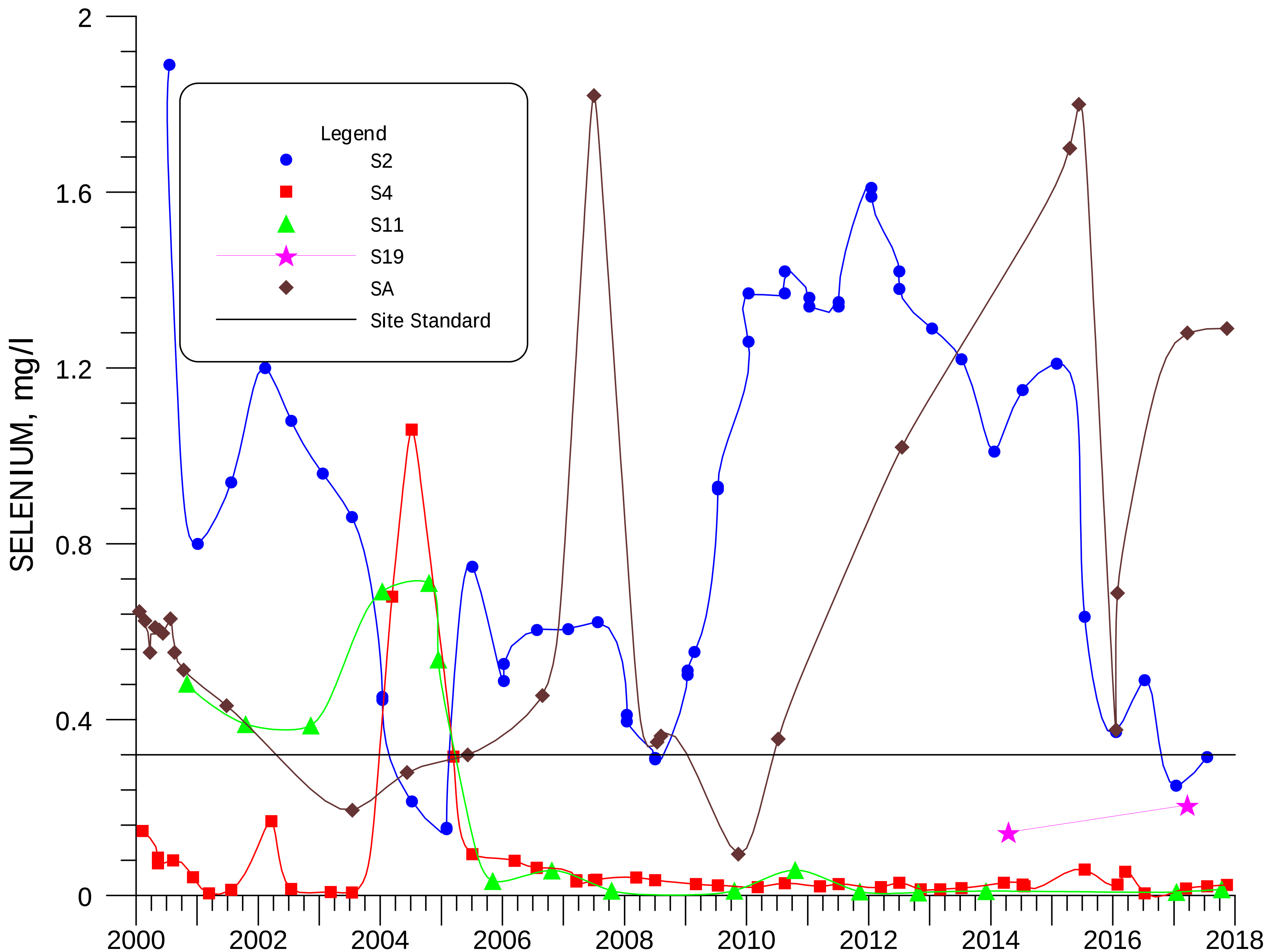


FIGURE 4.3-72. SELENIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

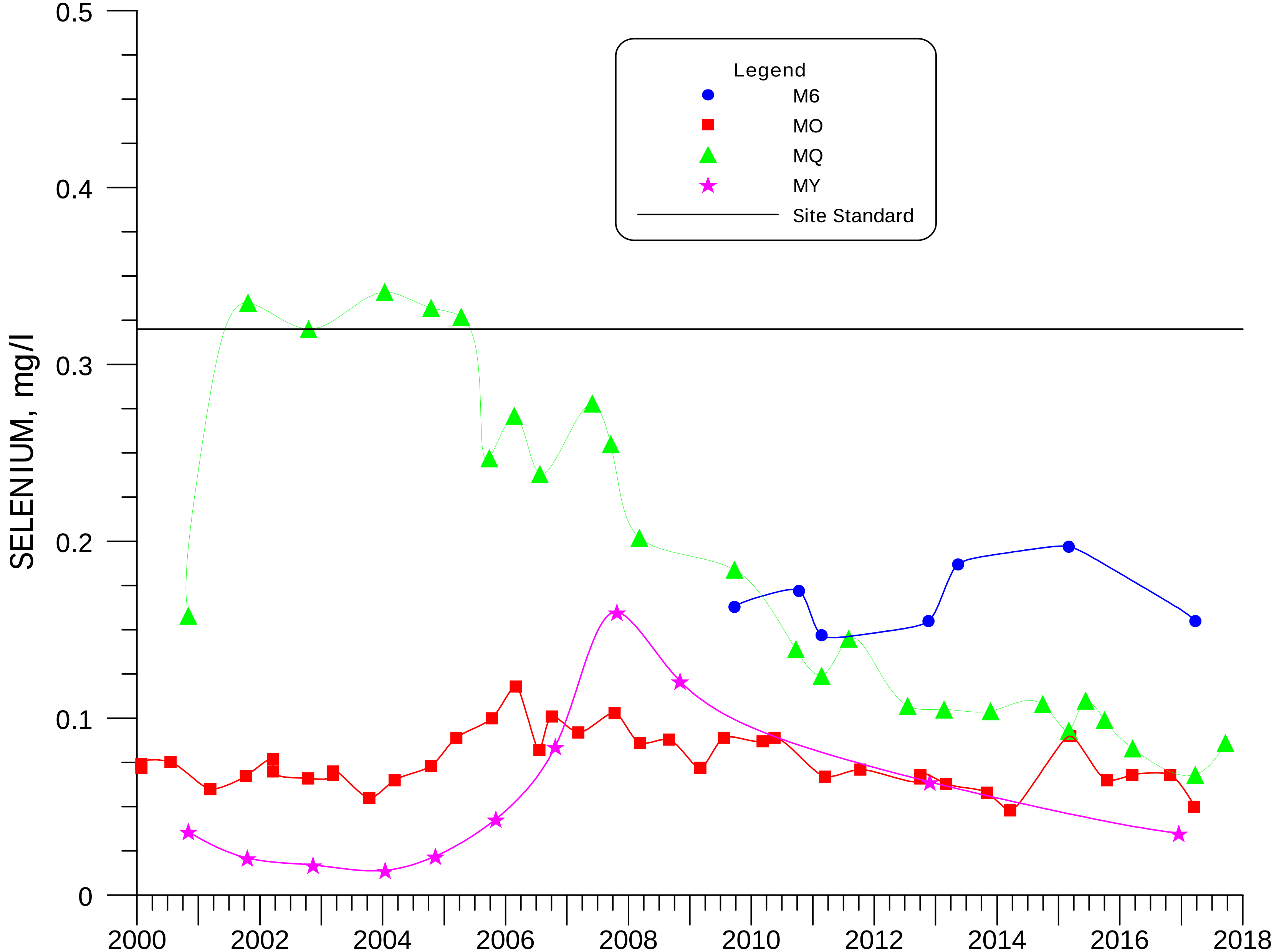


FIGURE 4.3-73. SELENIUM CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

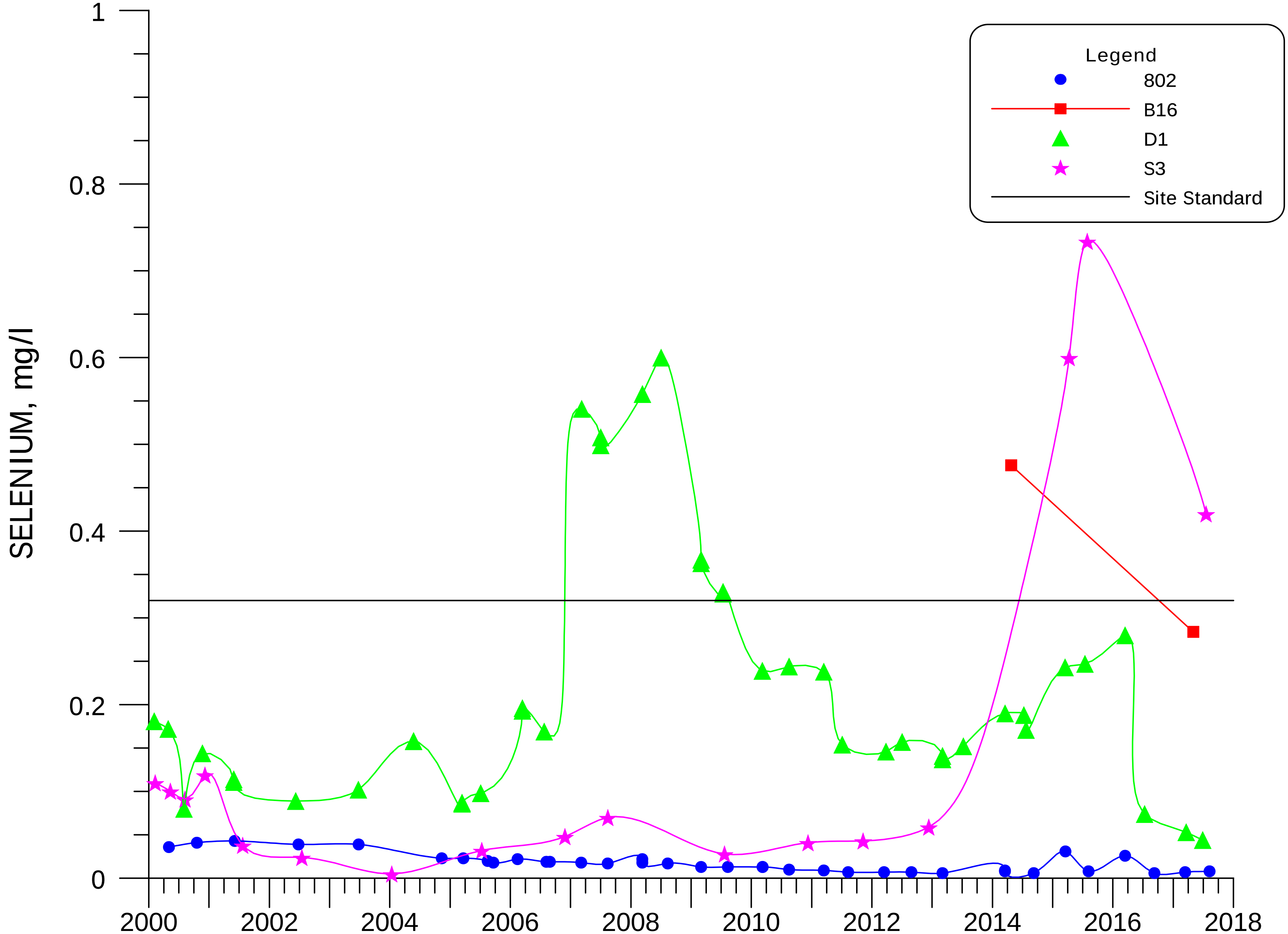


FIGURE 4.3-74. SELENIUM CONCENTRATIONS FOR WELLS 802, B16, D1 AND S3.

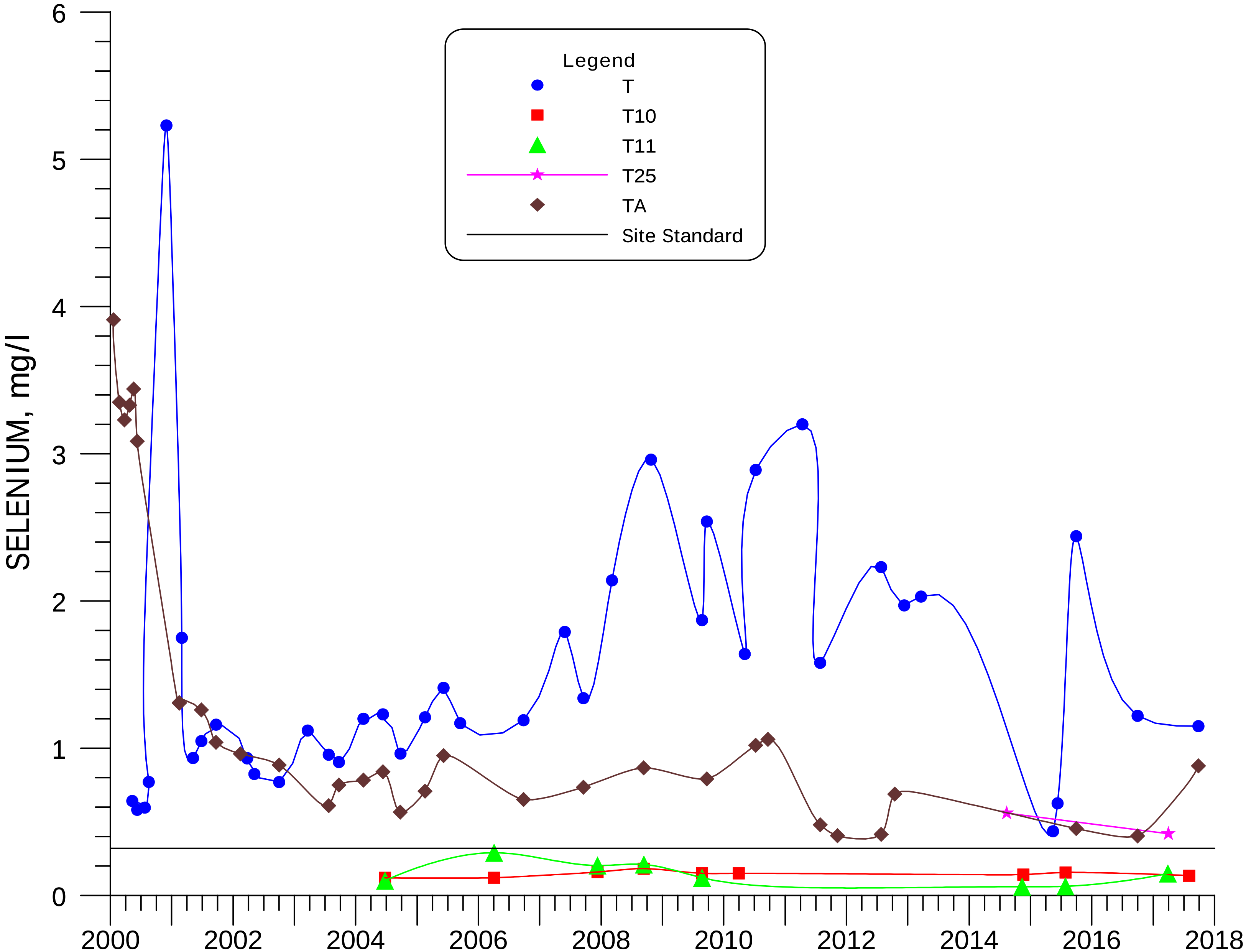


FIGURE 4.3-75. SELENIUM CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

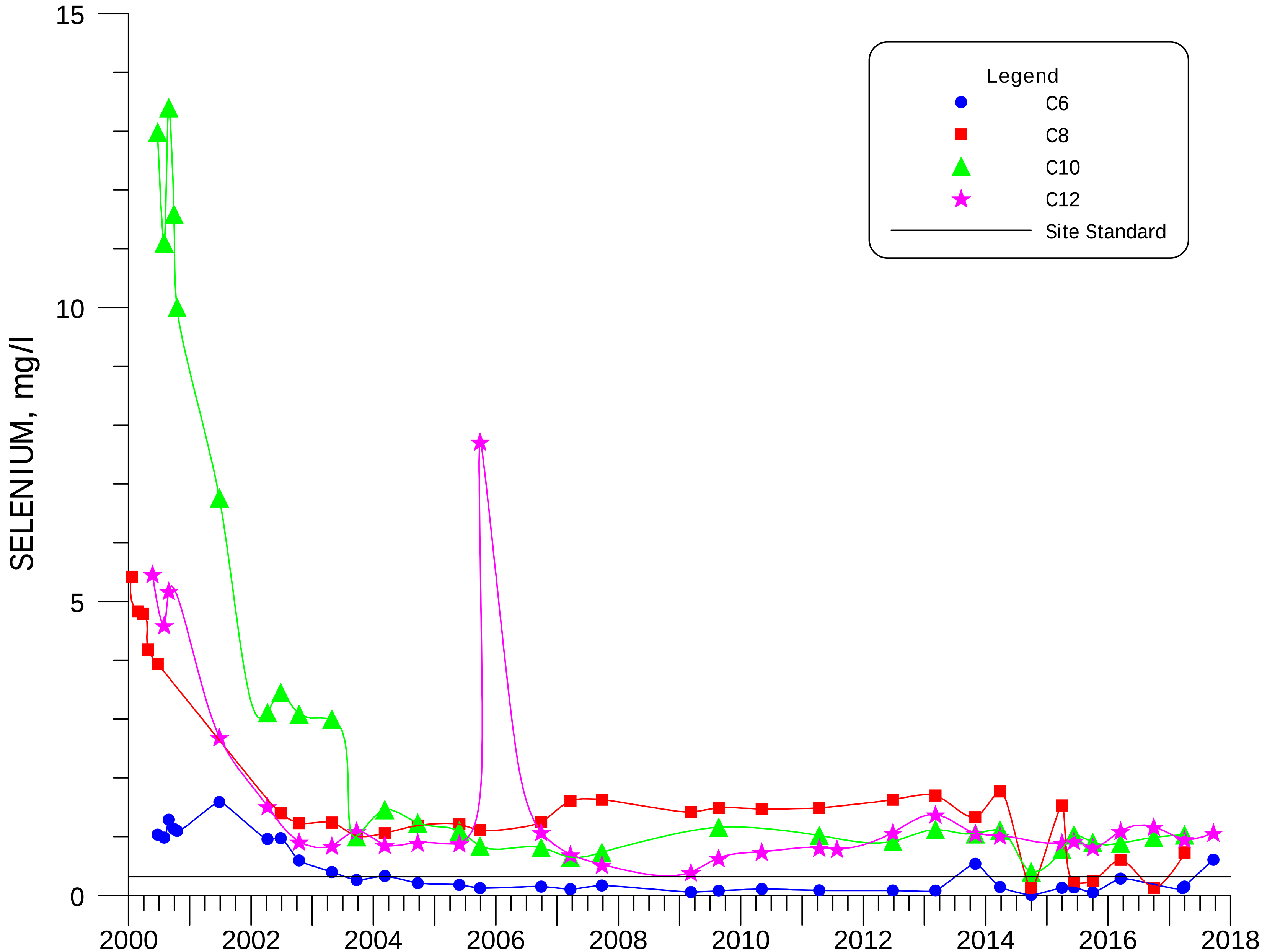


FIGURE 4.3-76. SELENIUM CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

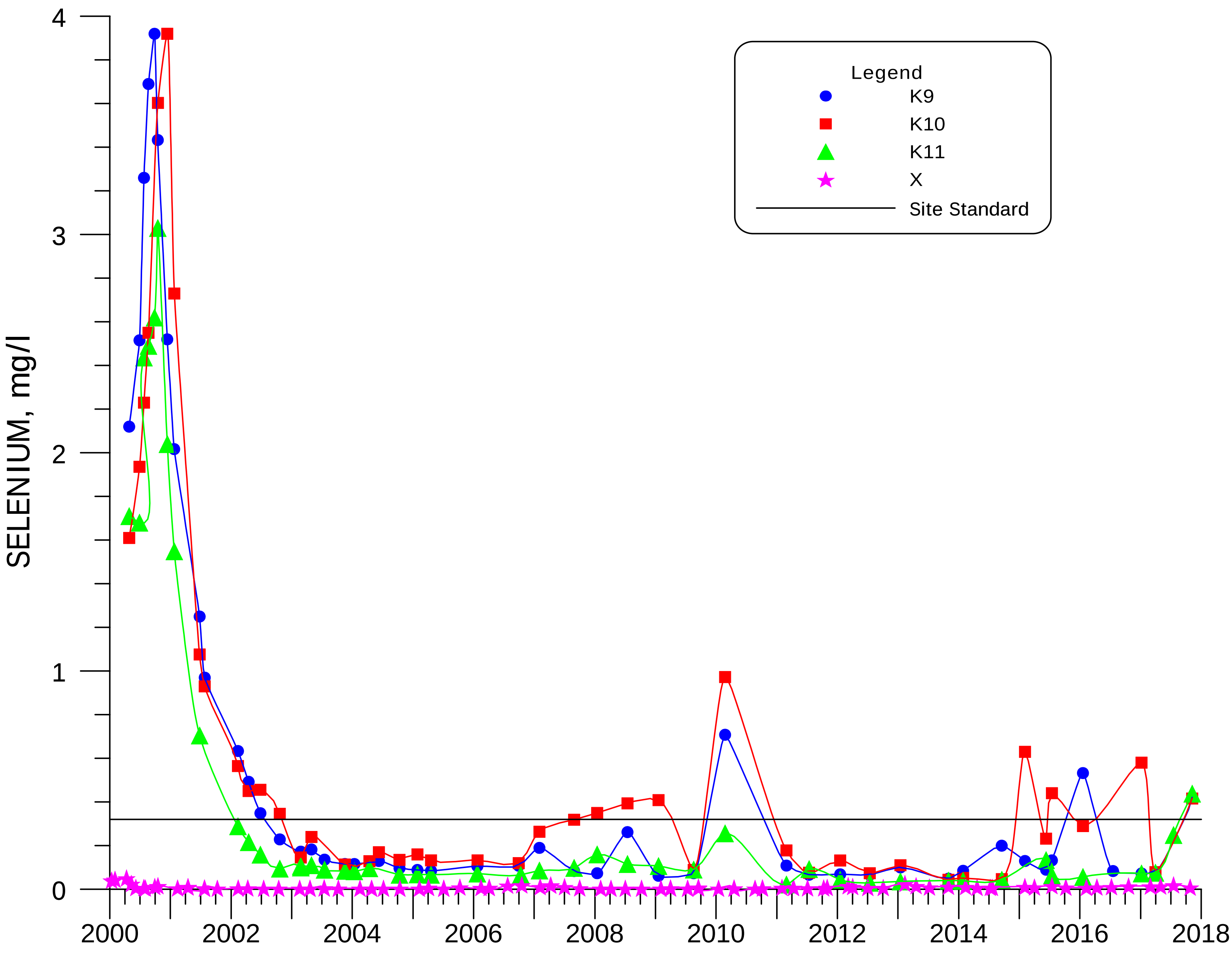


FIGURE 4.3-77. SELENIUM CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

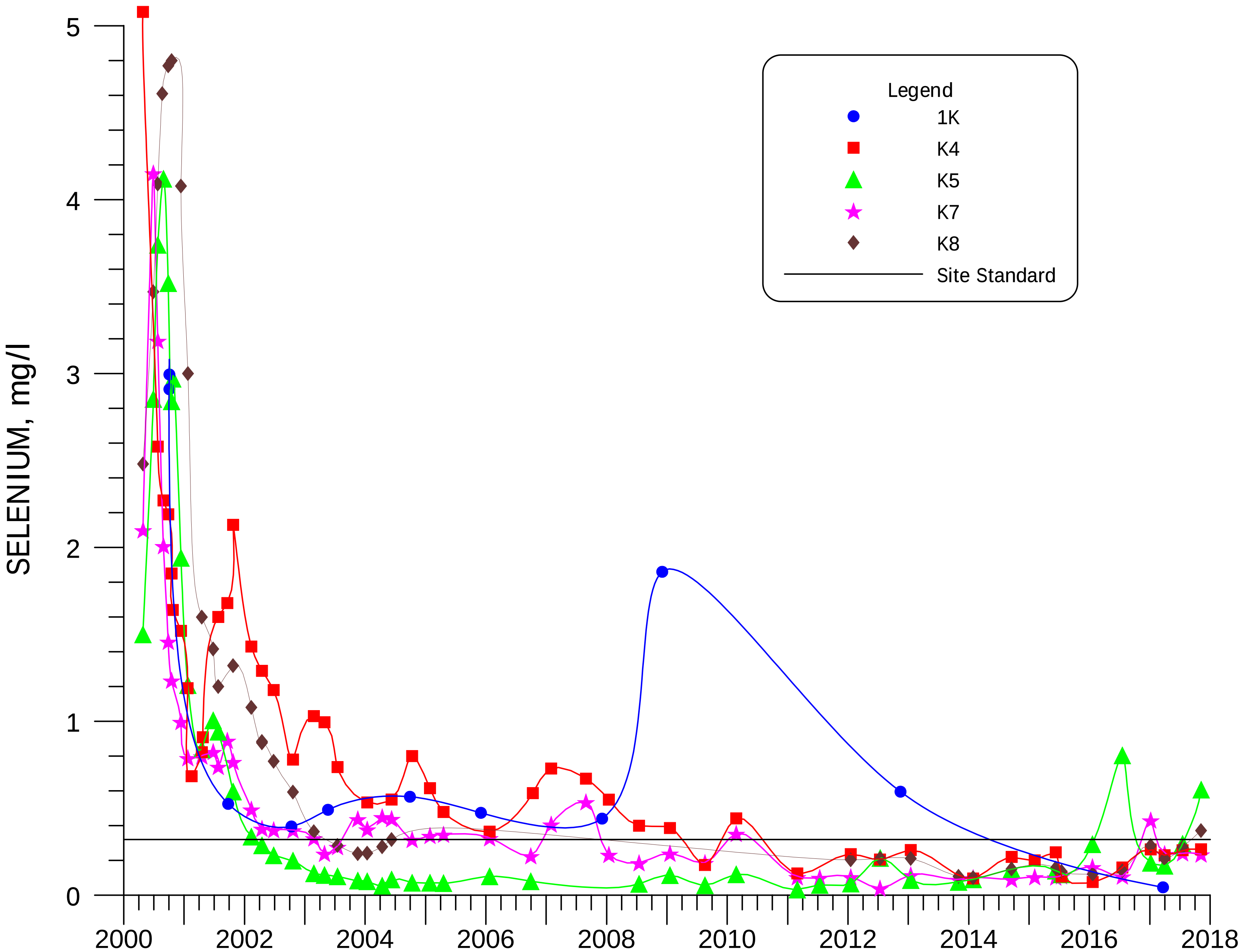


FIGURE 4.3-78. SELENIUM CONCENTRATIONS FOR WELLS 1K, K4, K5, K7, AND K8.

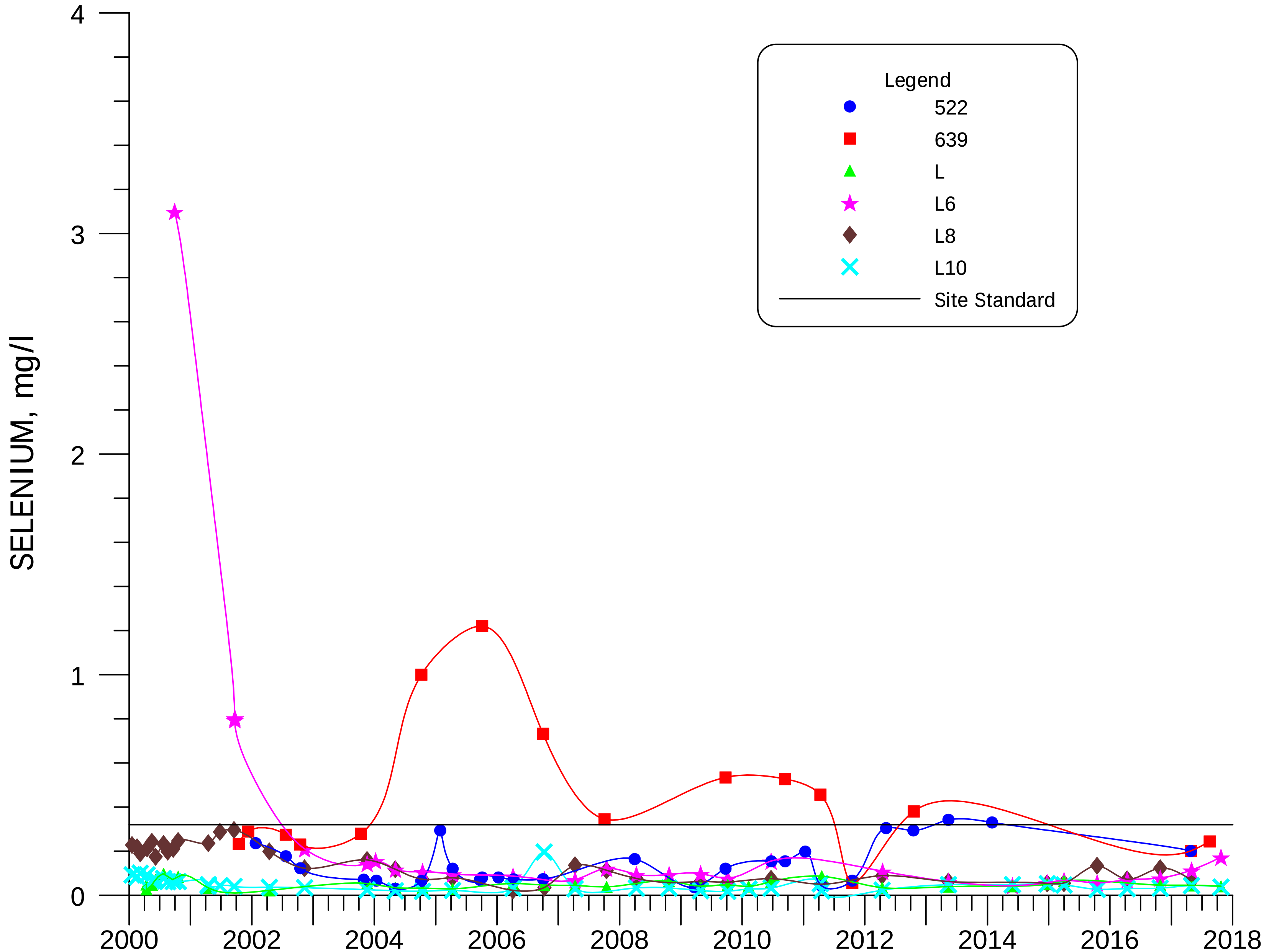


FIGURE 4.3-79. SELENIUM CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

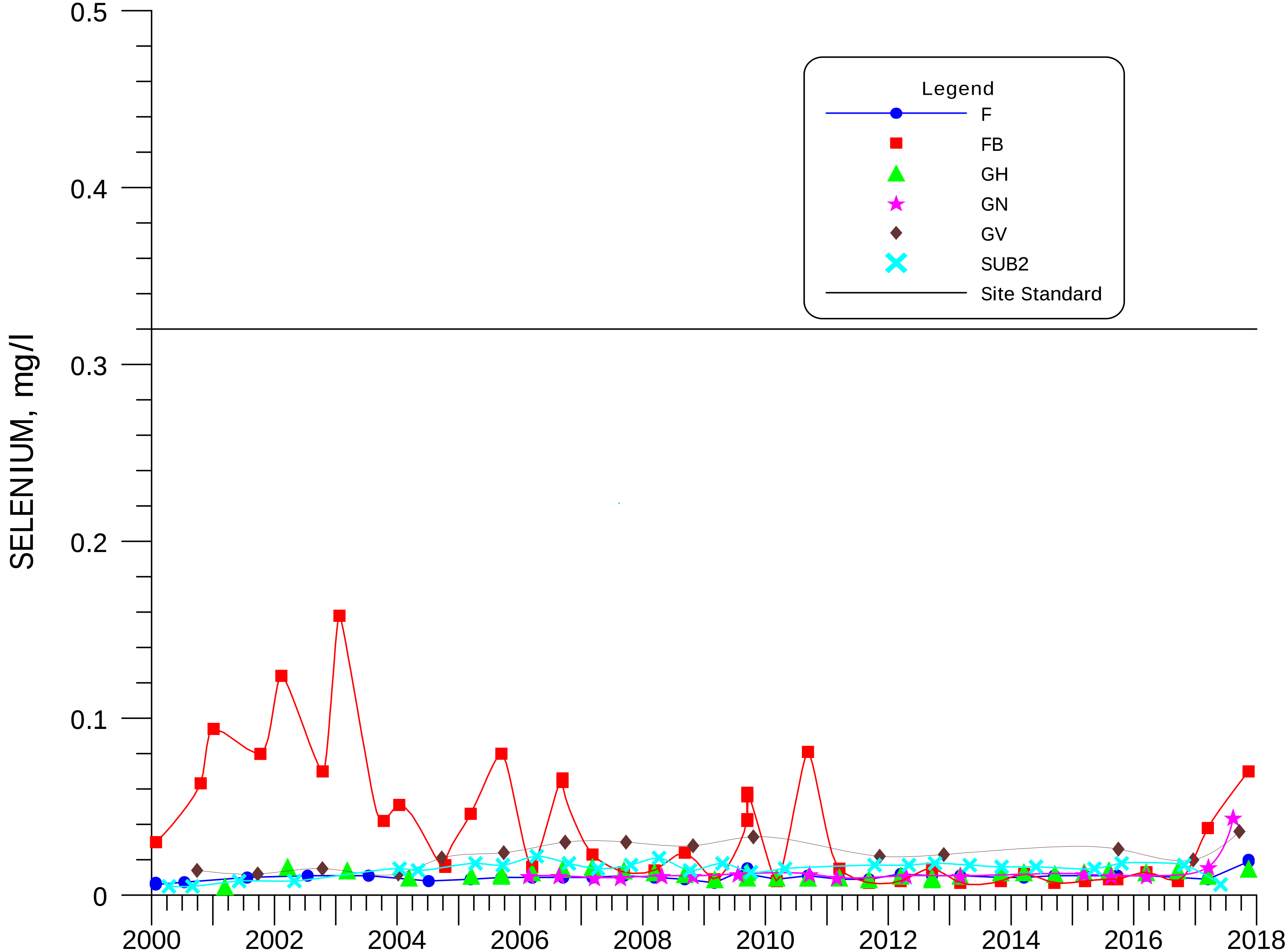


FIGURE 4.3-80. SELENIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

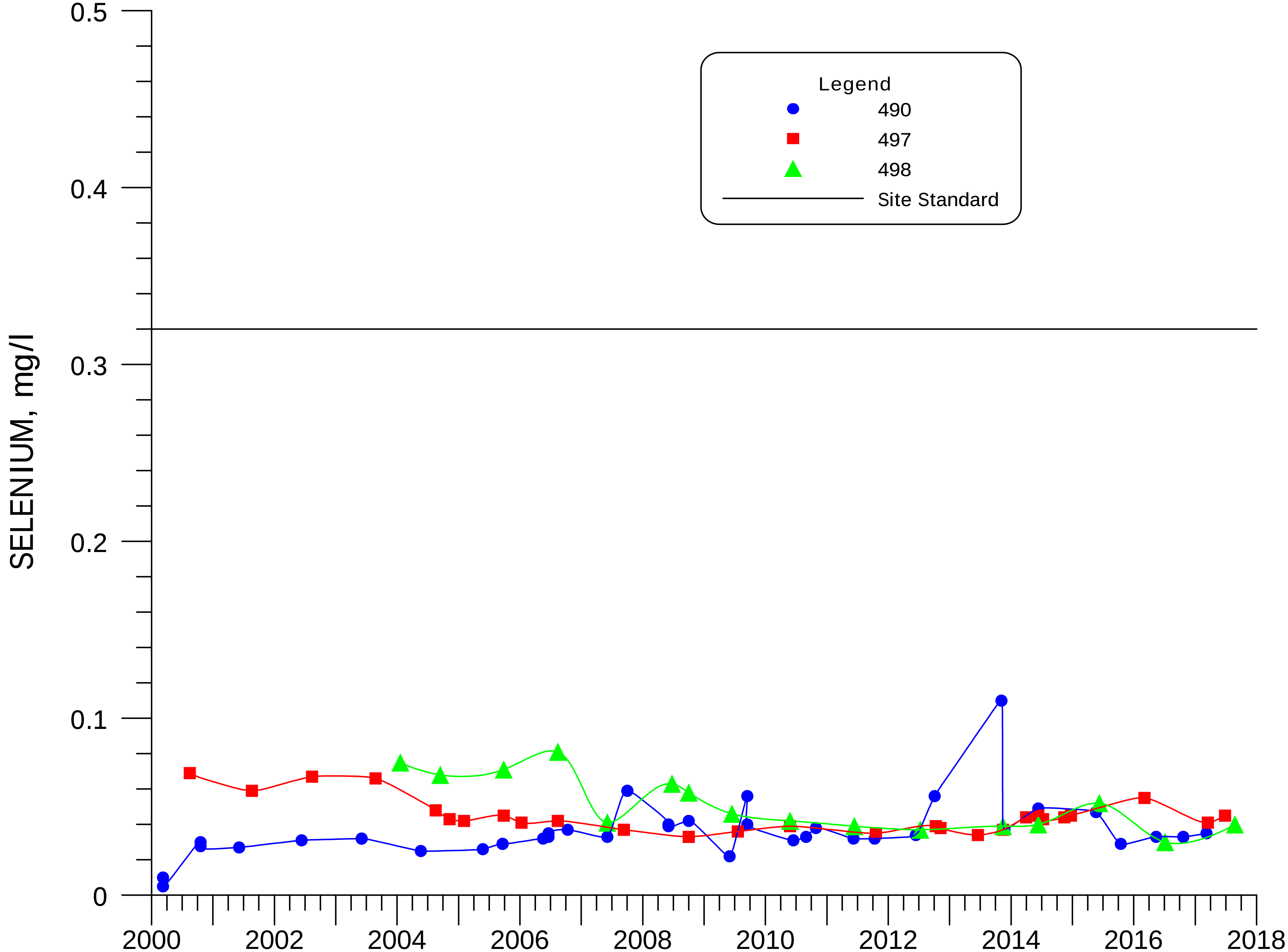


FIGURE 4.3-81. SELENIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

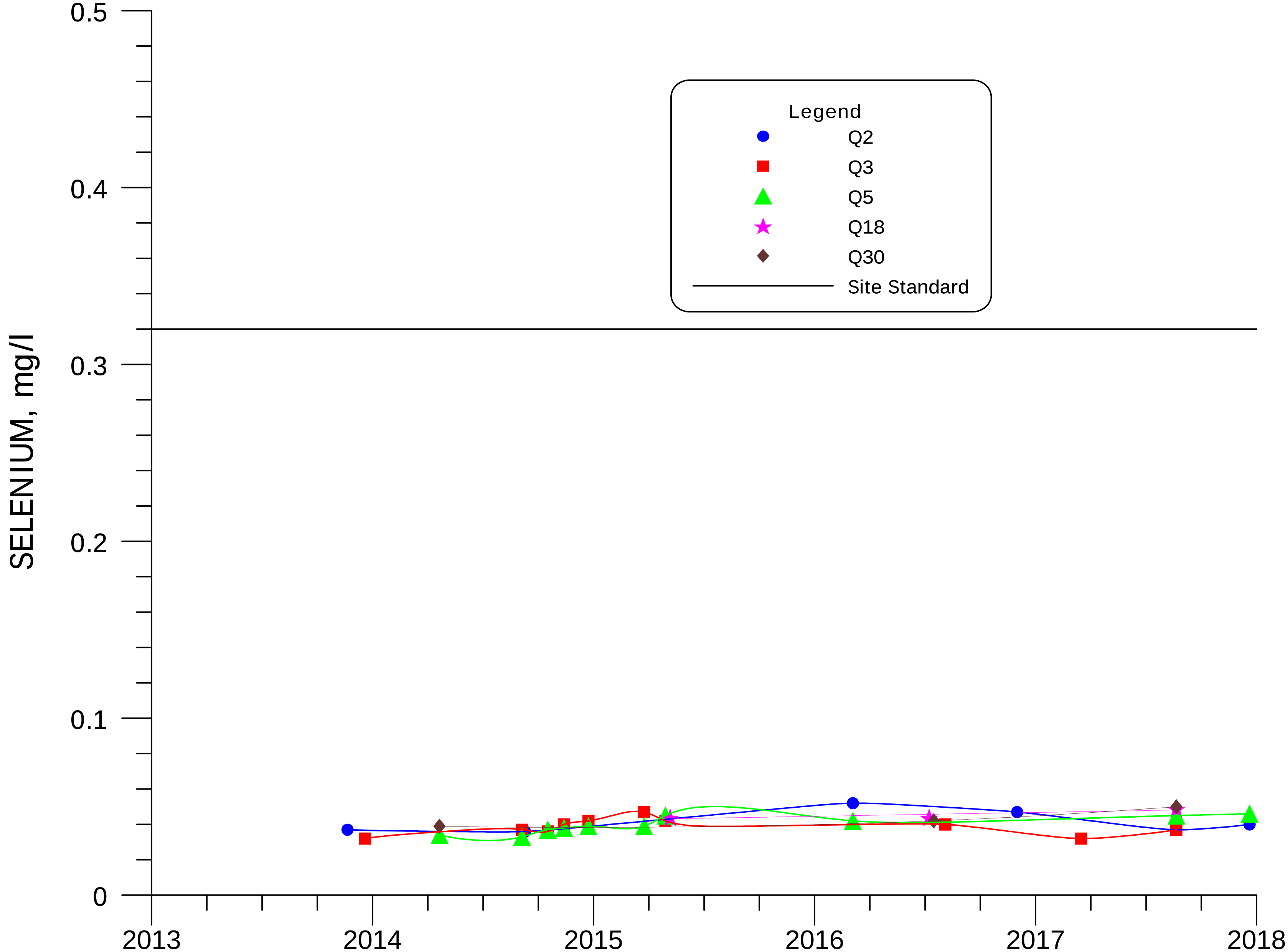


FIGURE 4.3-81A. SELENIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18 AND Q30.

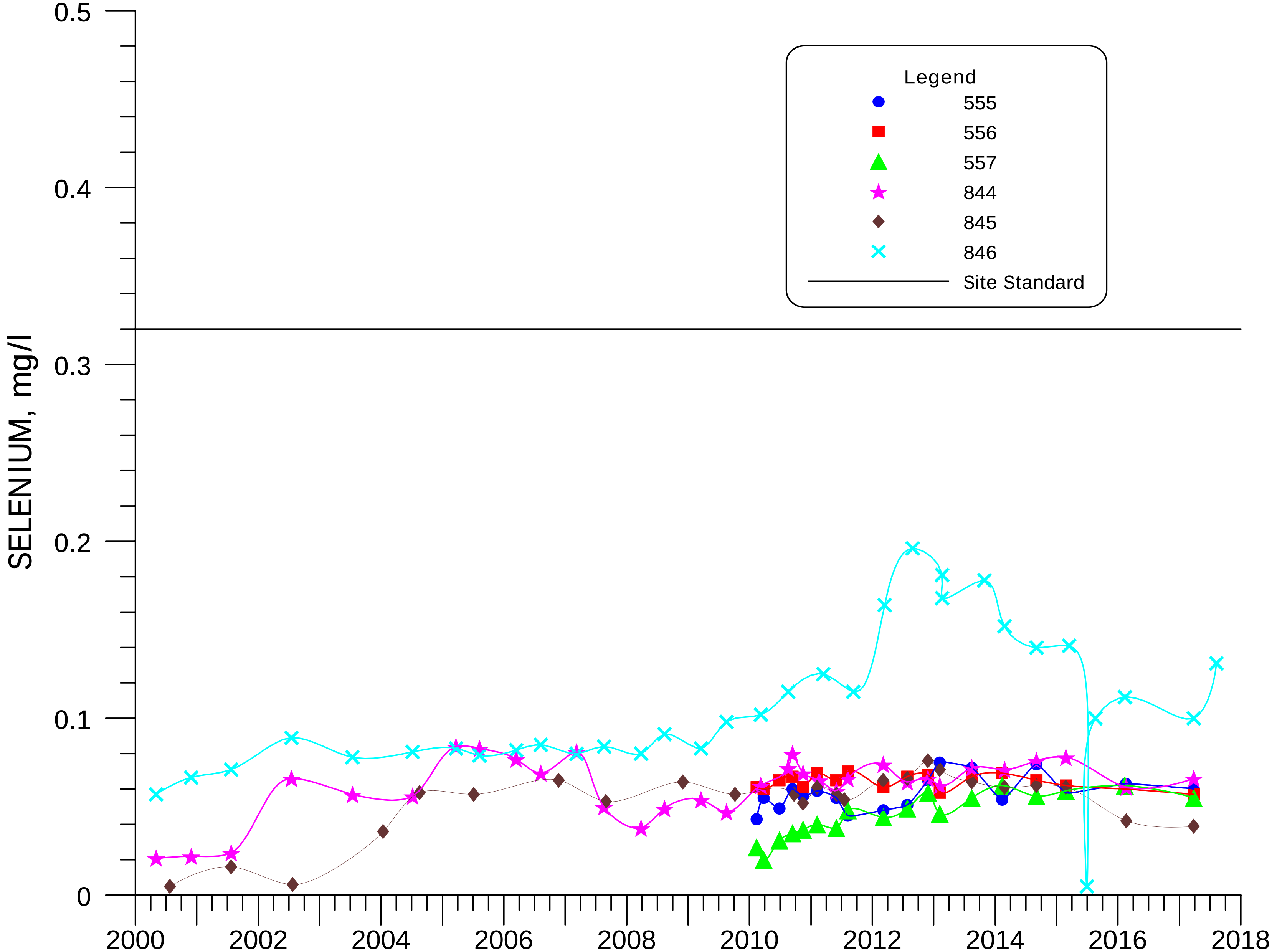


FIGURE 4.3-82. SELENIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

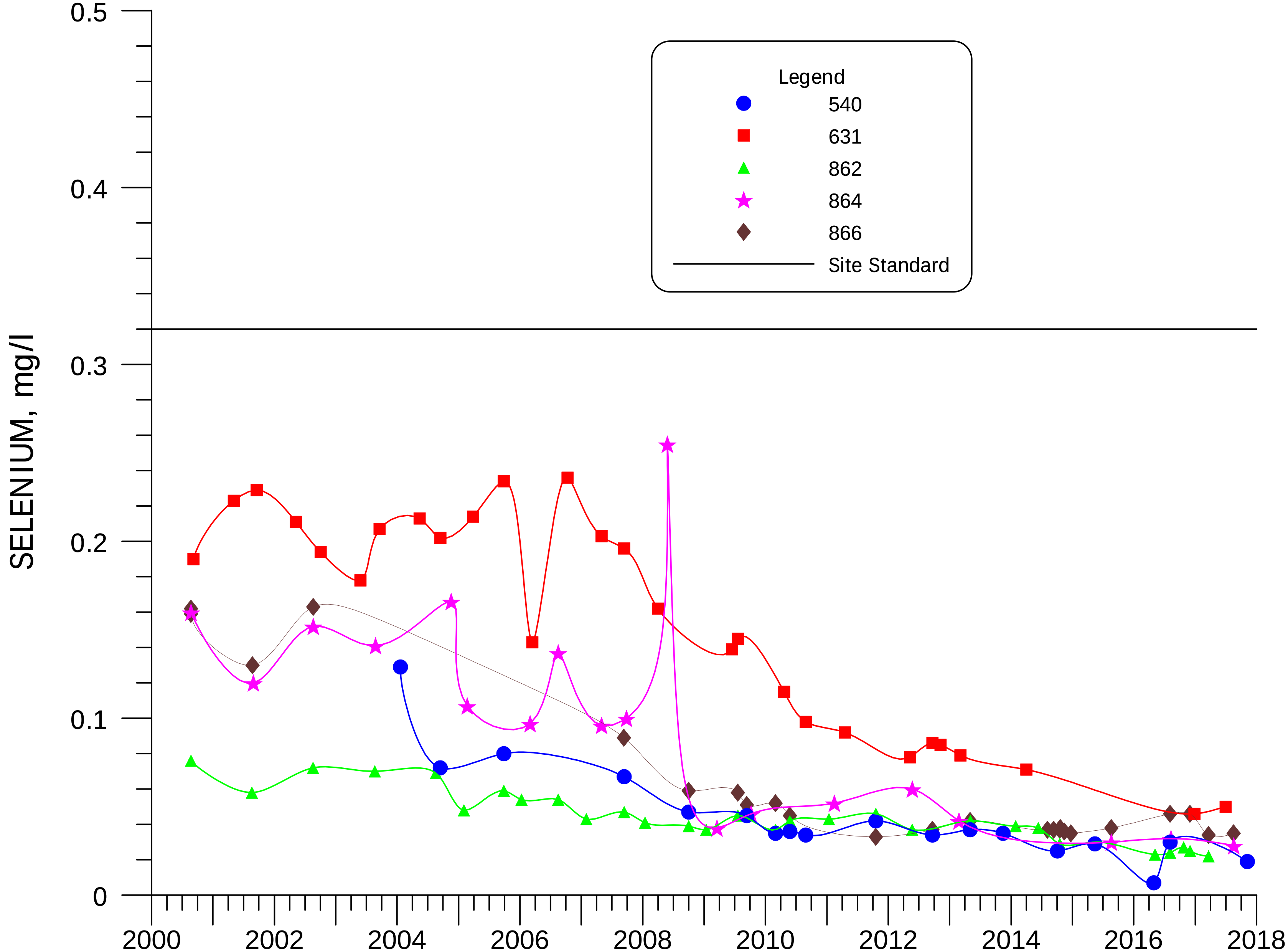


FIGURE 4.3-83. SELENIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

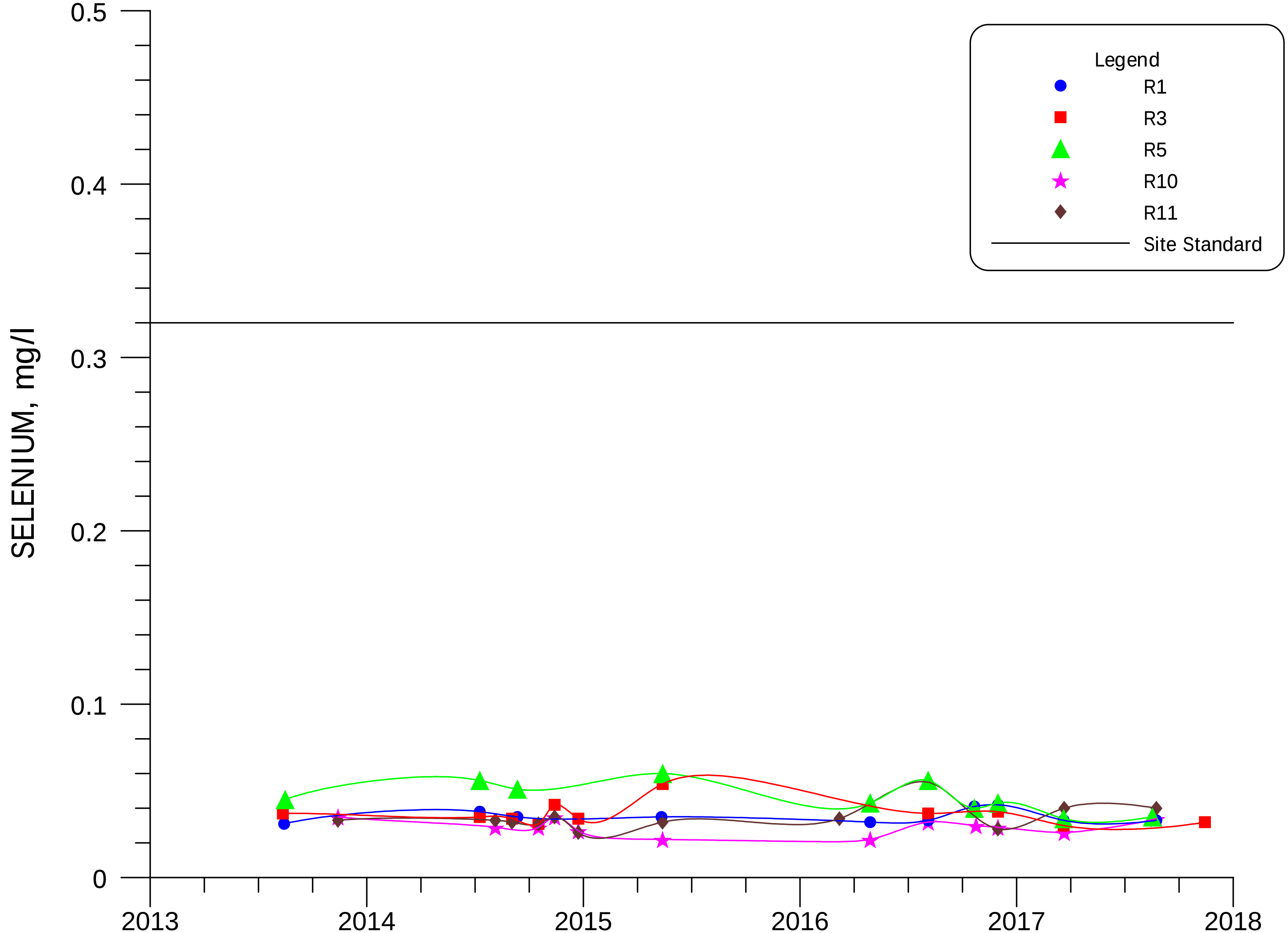


FIGURE 4.3-83A. SELENIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

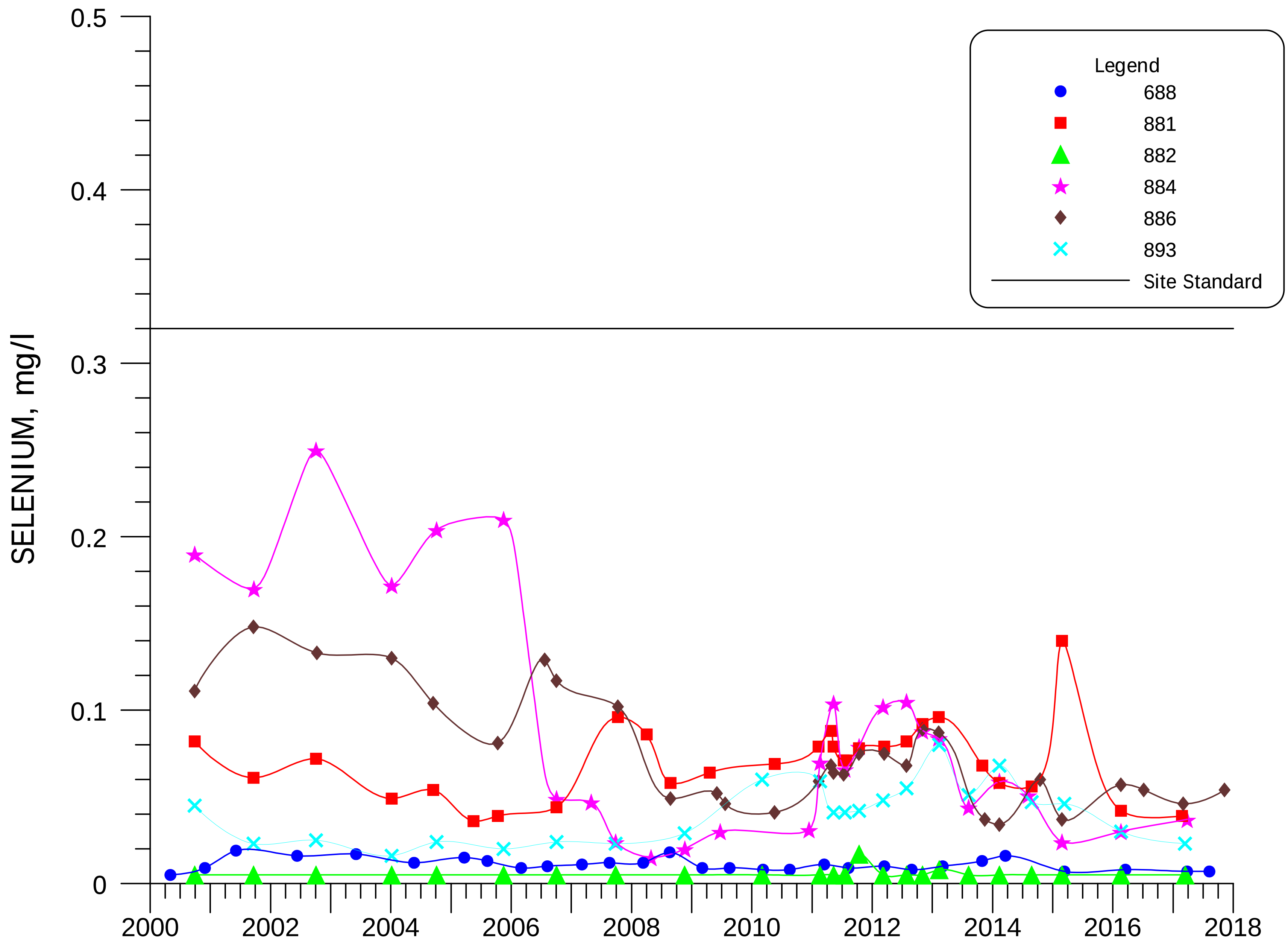


FIGURE 4.3-84. SELENIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

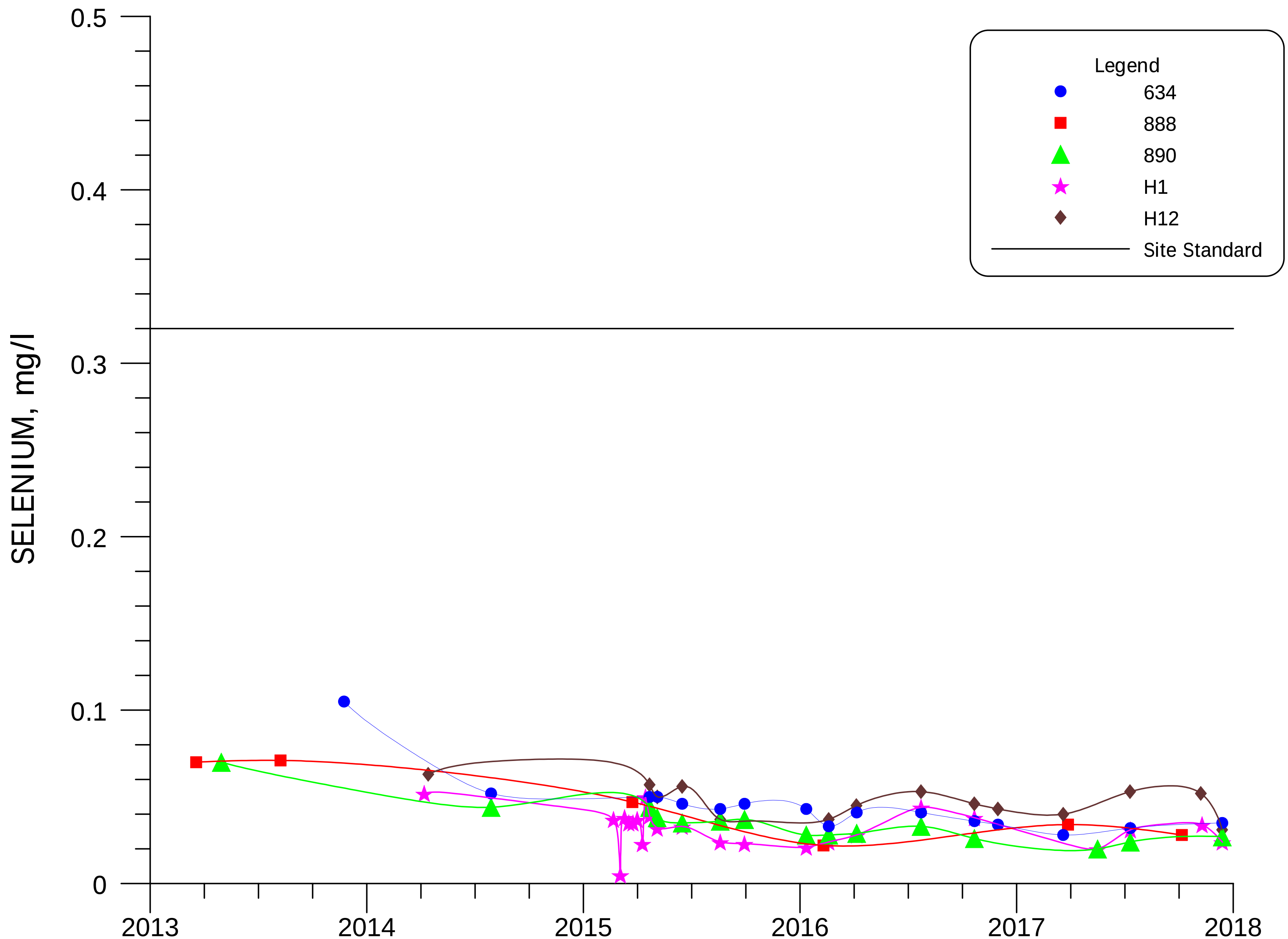


FIGURE 4.3-84A. SELENIUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

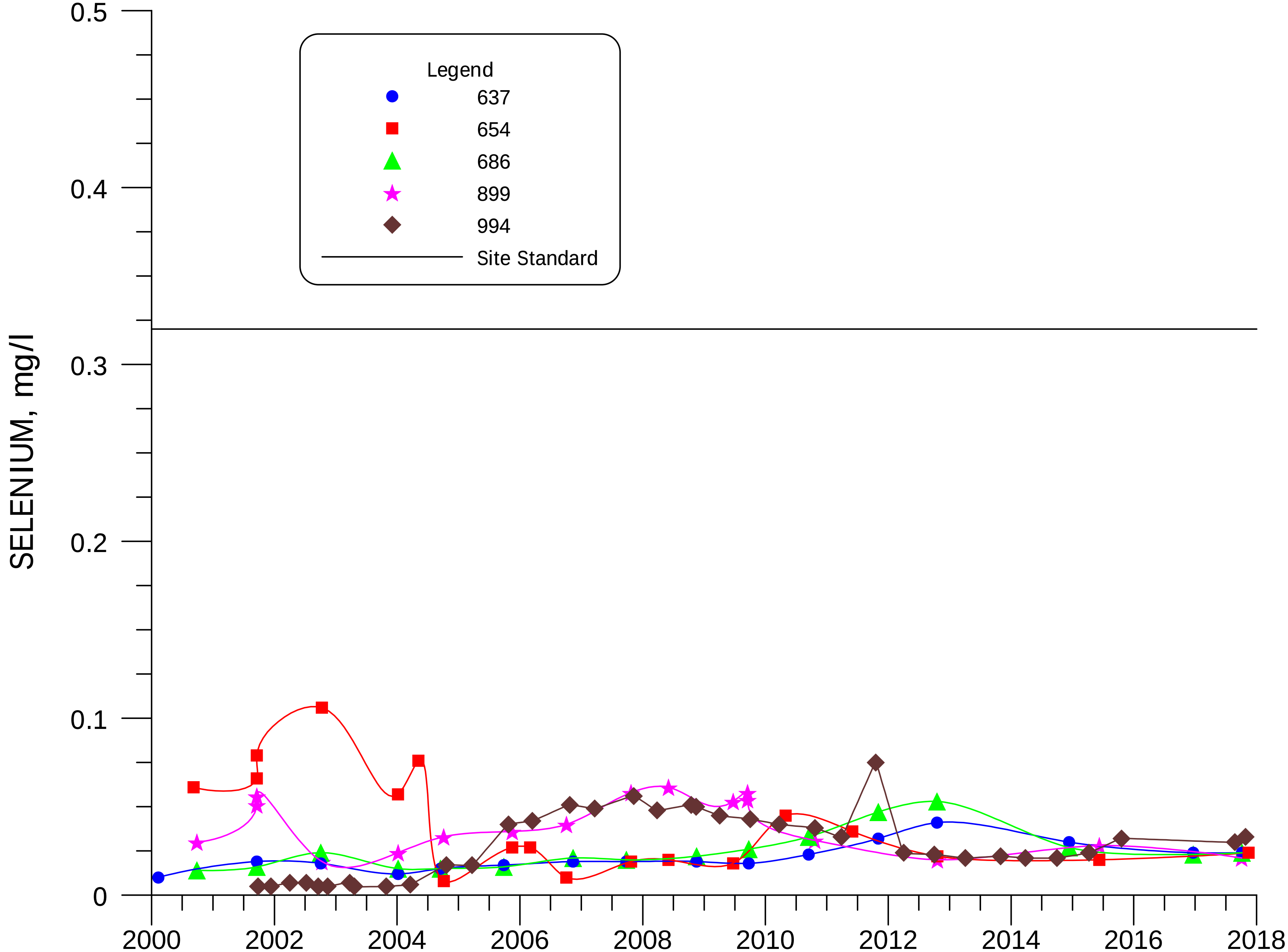


FIGURE 4.3-85. SELENIUM CONCENTRATIONS FOR WELLS 637, 654, 686, 899 AND 994.

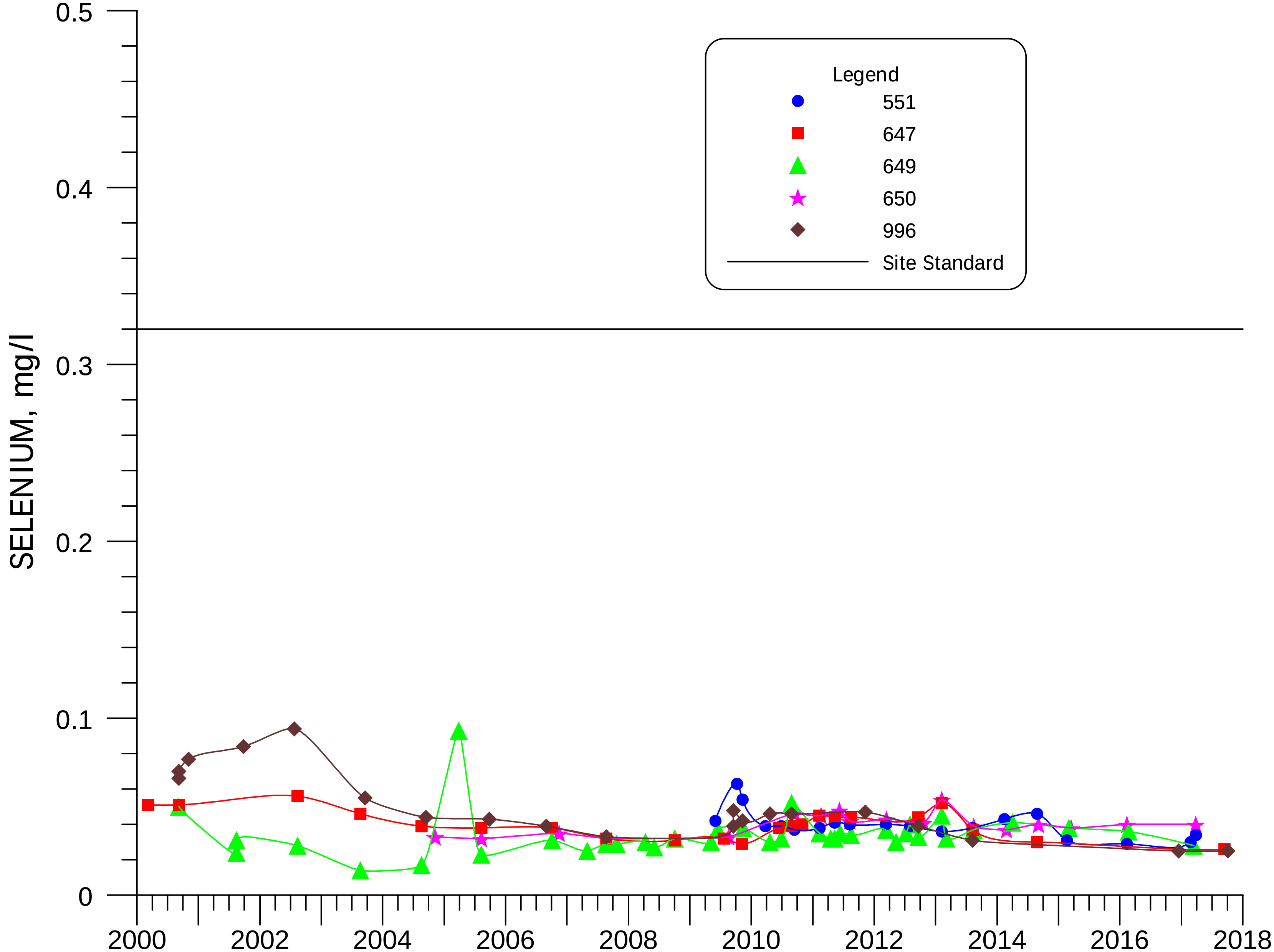
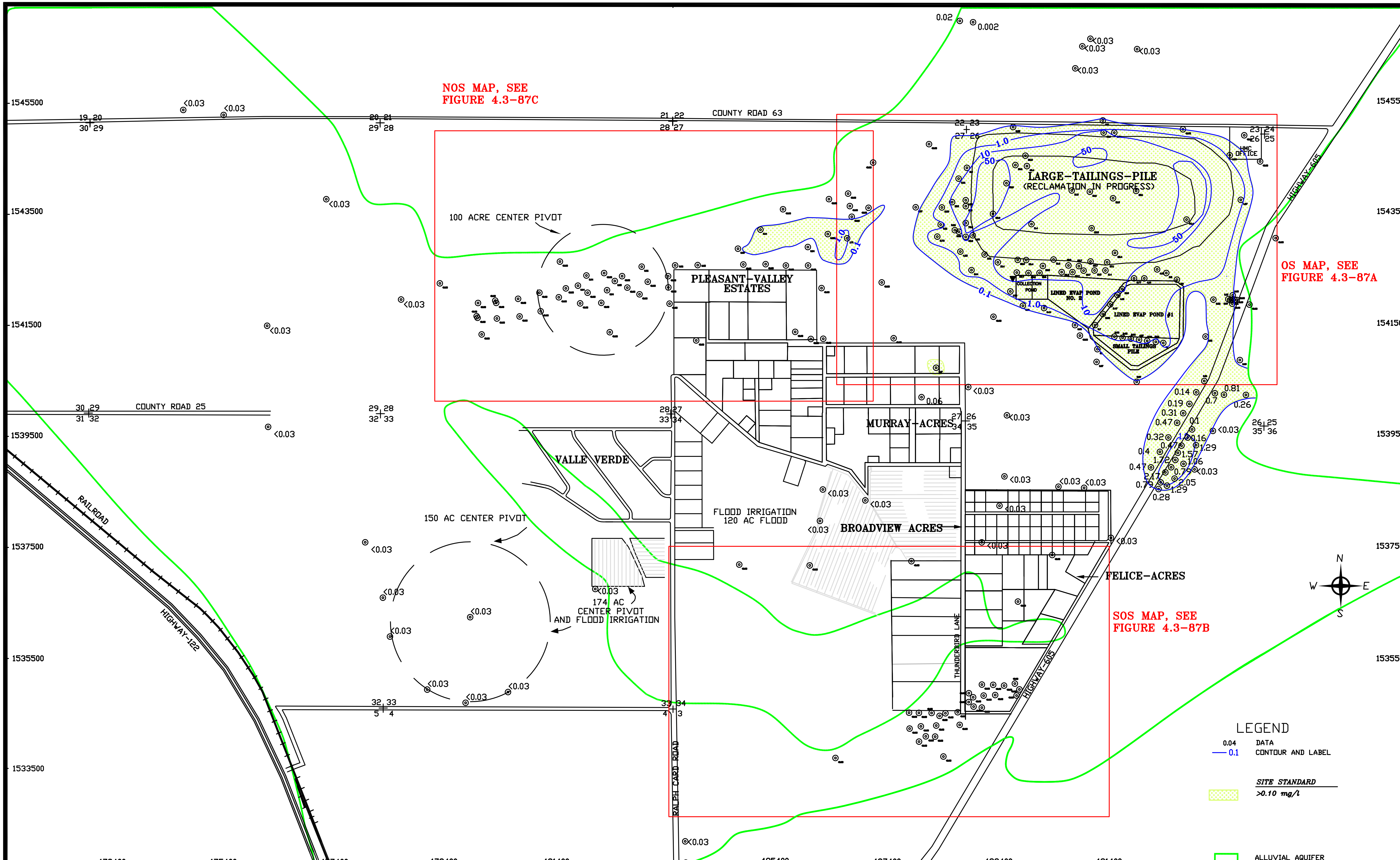


FIGURE 4.3-86. SELENIUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.



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DATE: 2/5/18

FIGURE 4.3-87. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

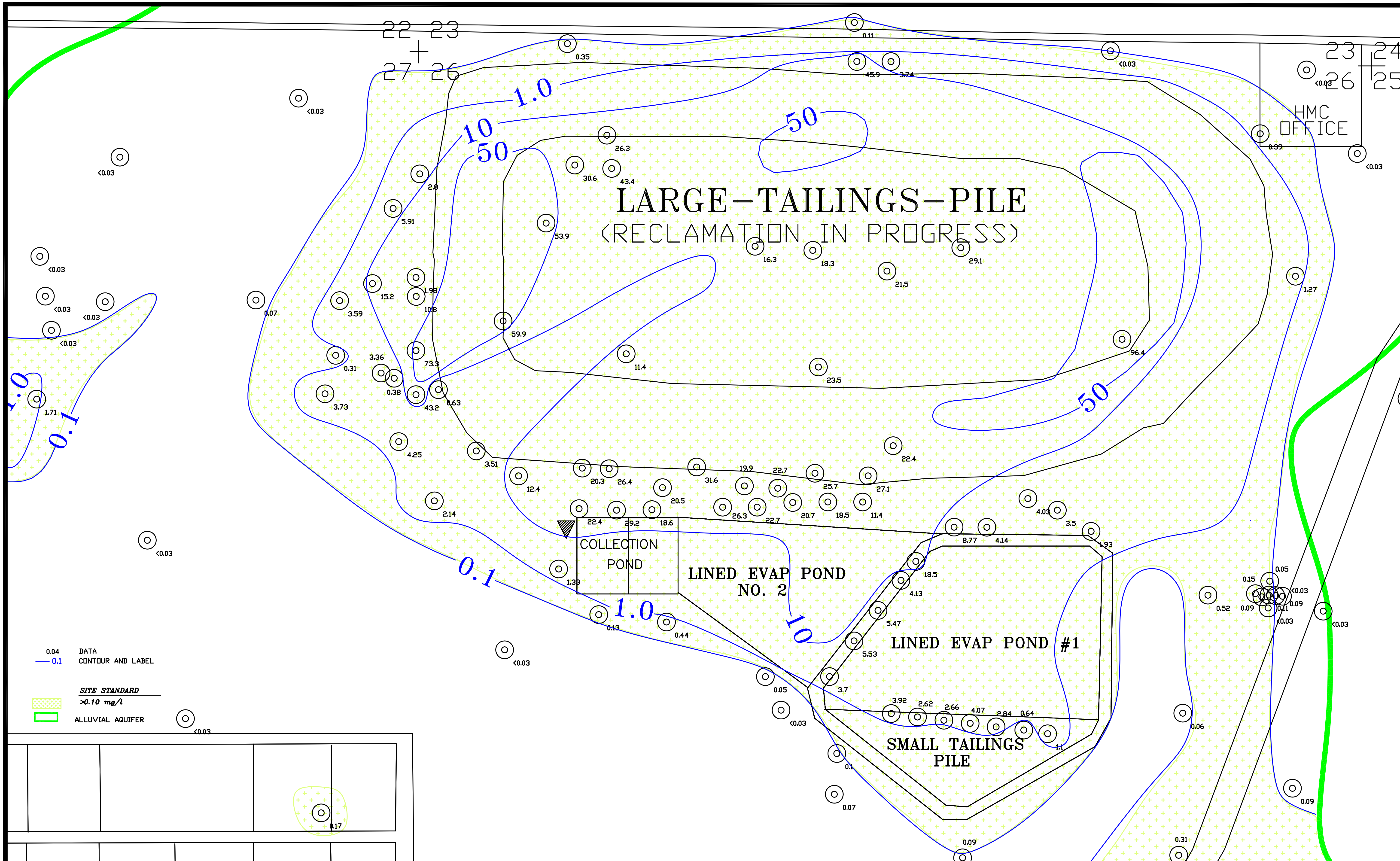

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FIGURE 4.3-87A. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

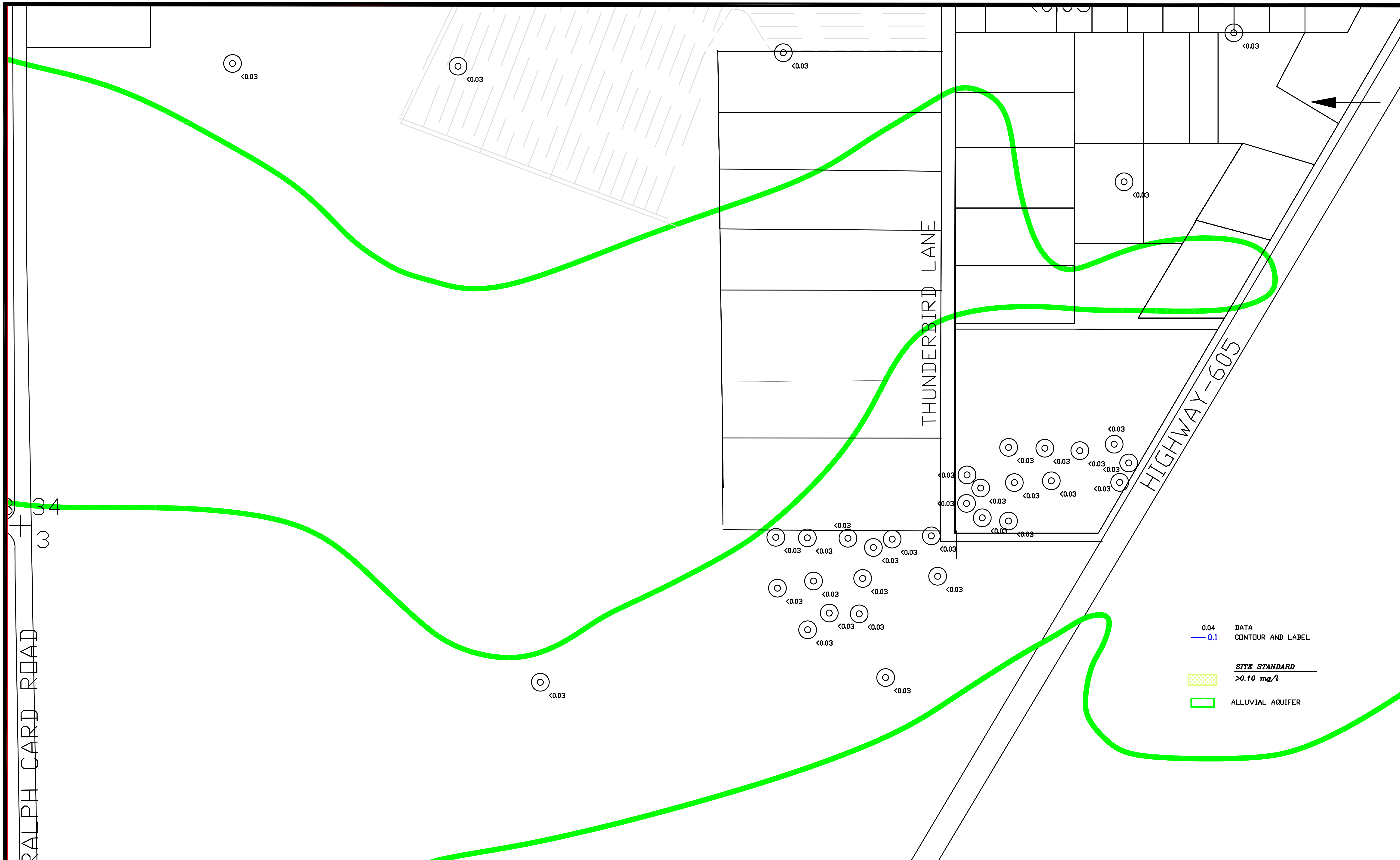

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FIGURE 4.3-87B. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

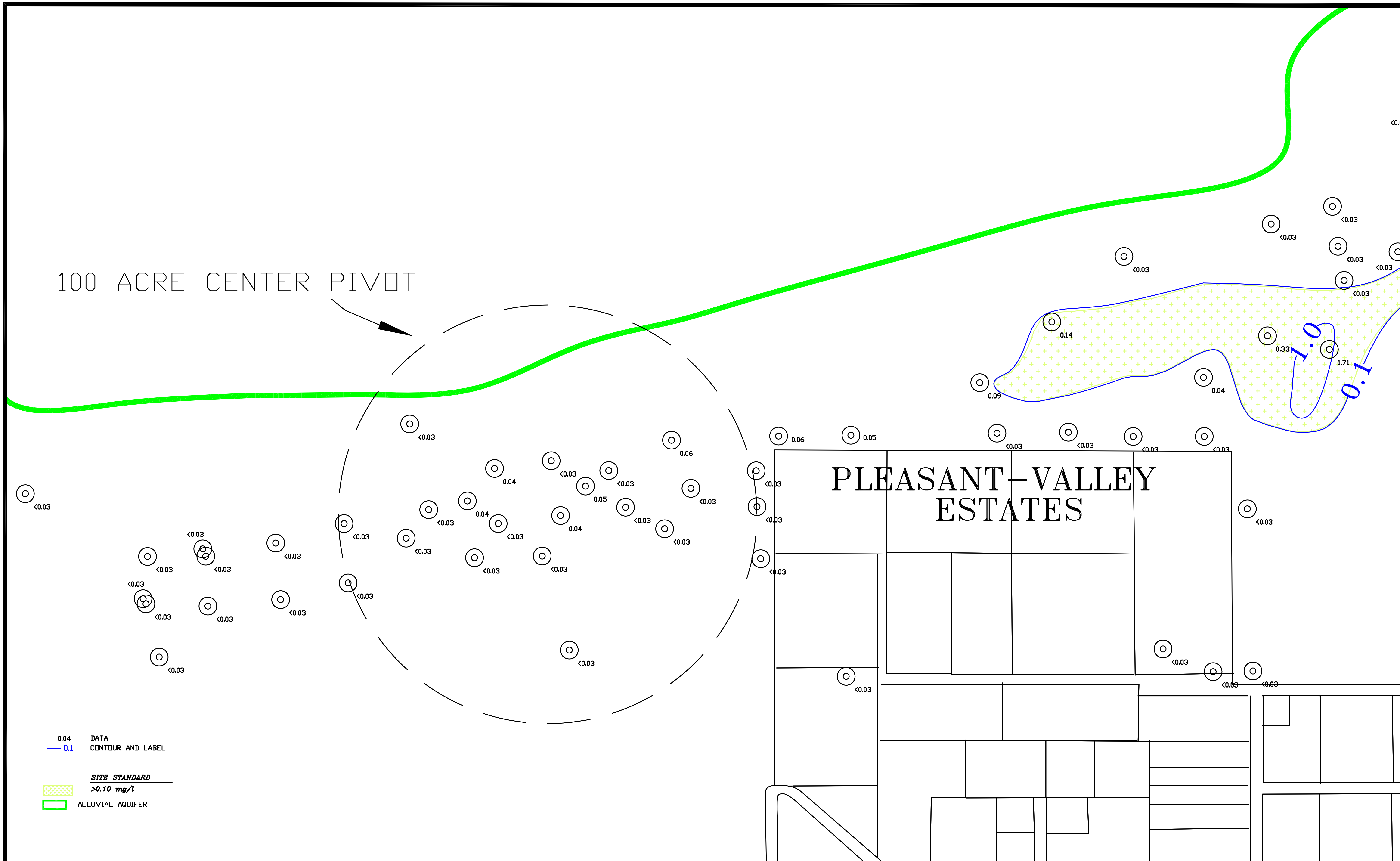

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FIGURE 4.3-87C. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

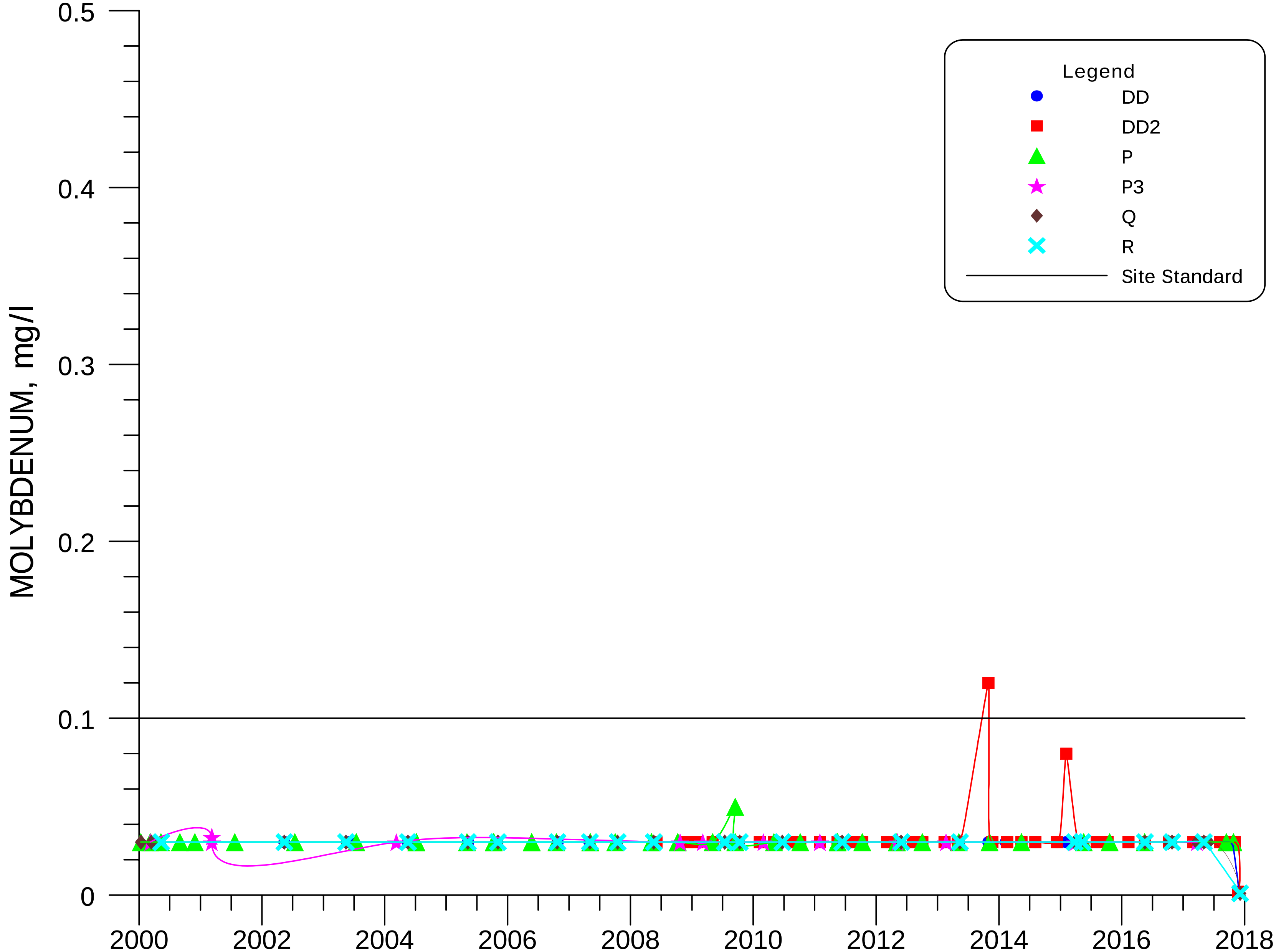

FIGURE 4.3-88. MOLYBDENUM CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

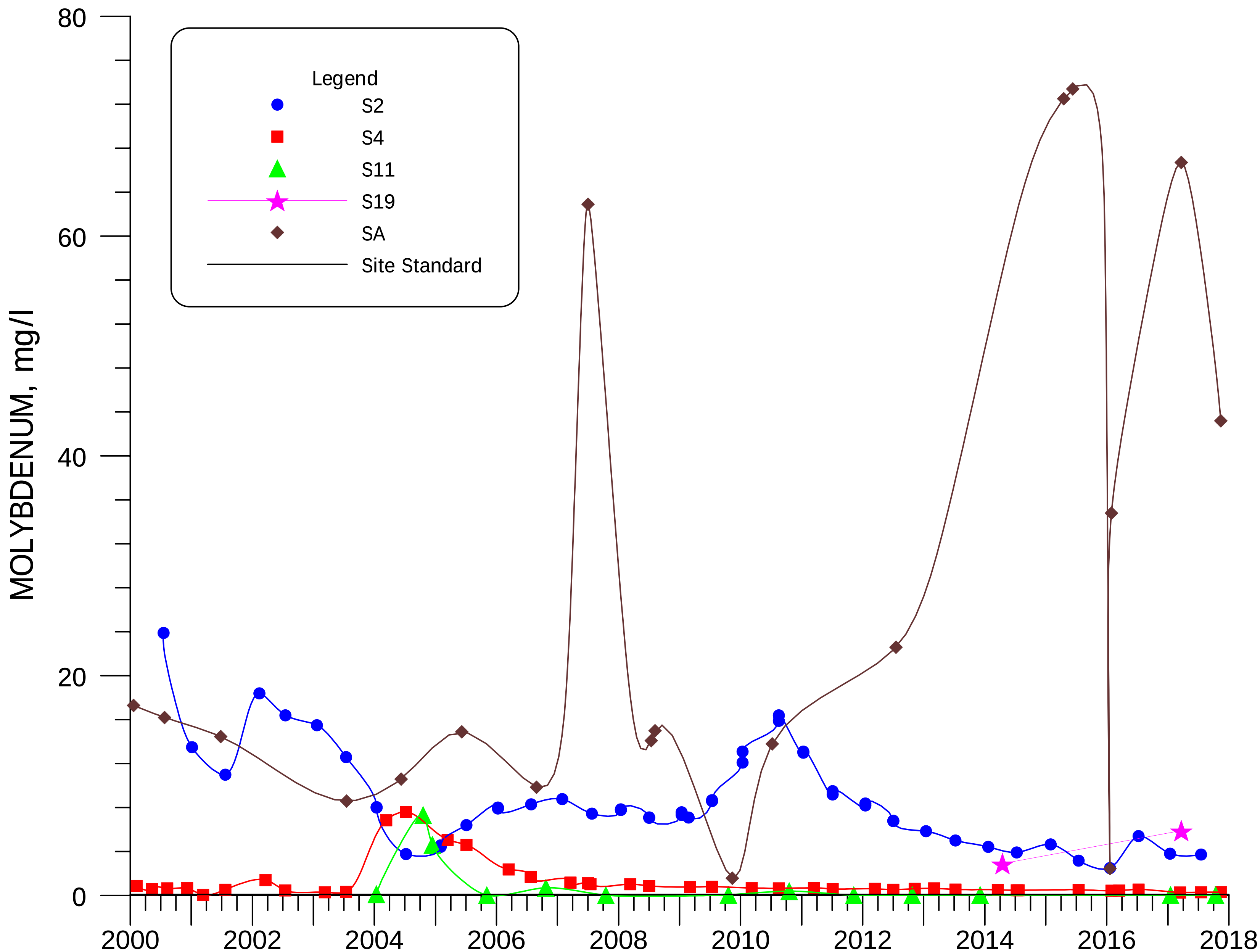

FIGURE 4.3-89. MOLYBDENUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

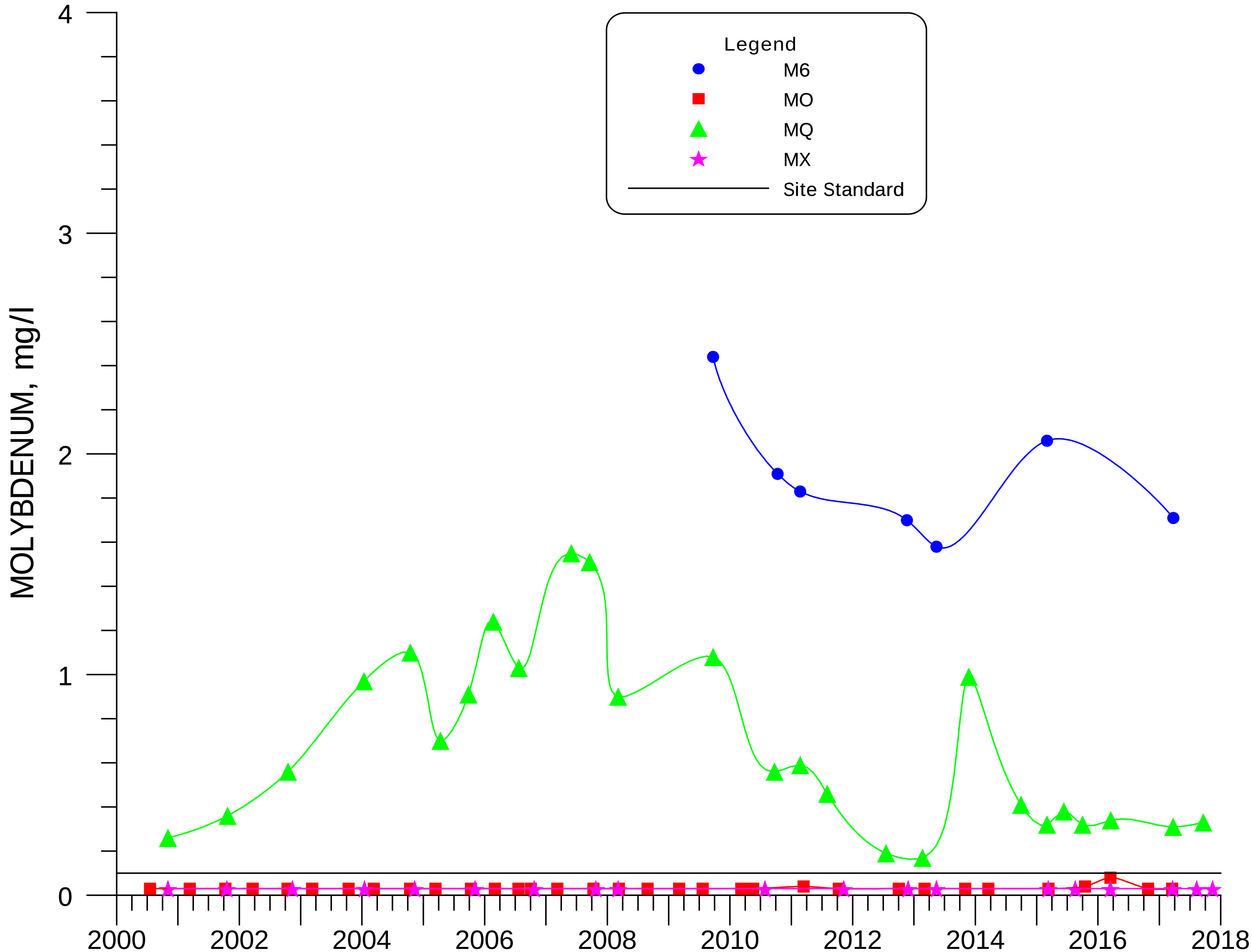

FIGURE 4.3-90. MOLYBDENUM CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

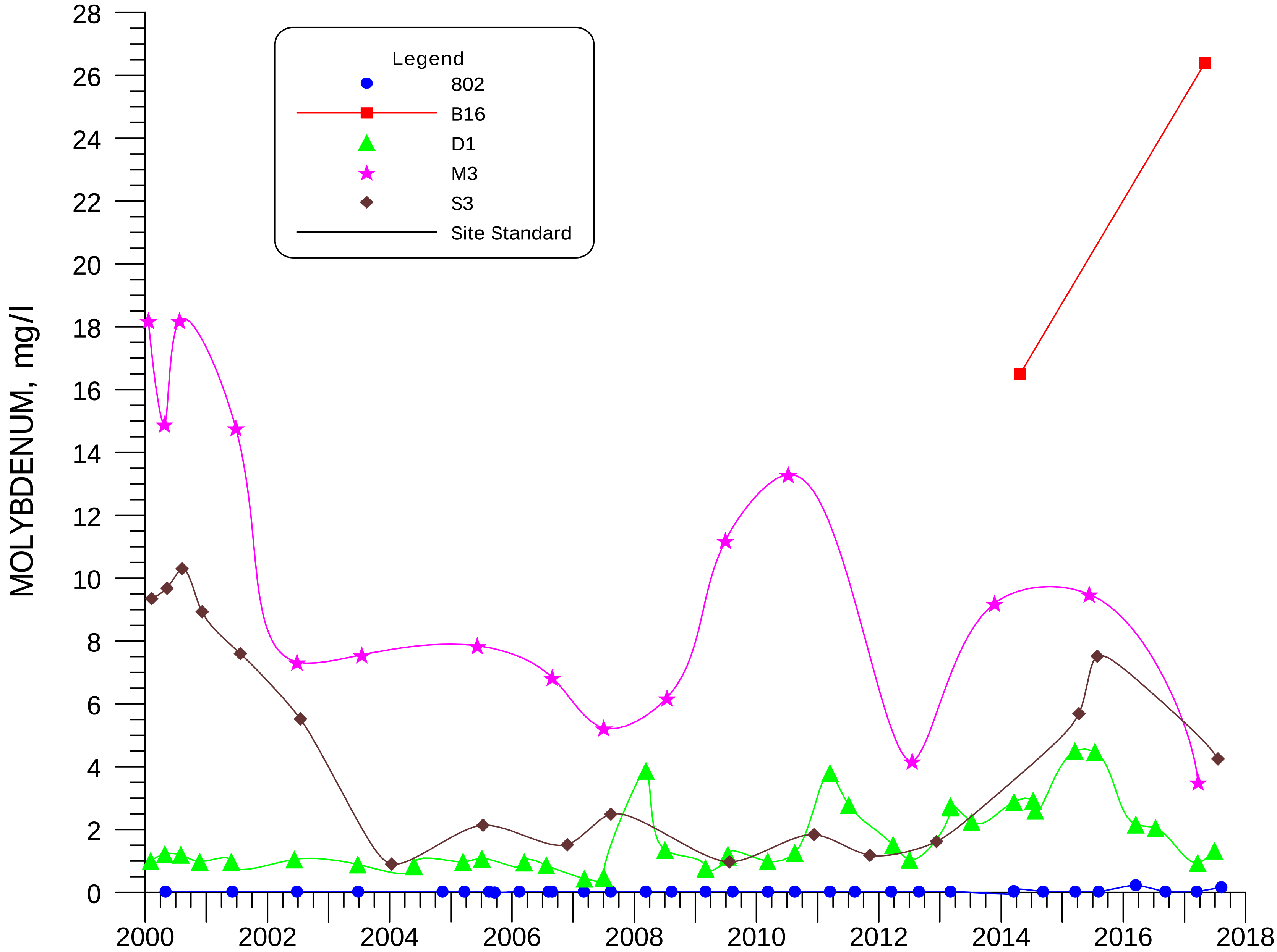

FIGURE 4.3-91. MOLYBDENUM CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

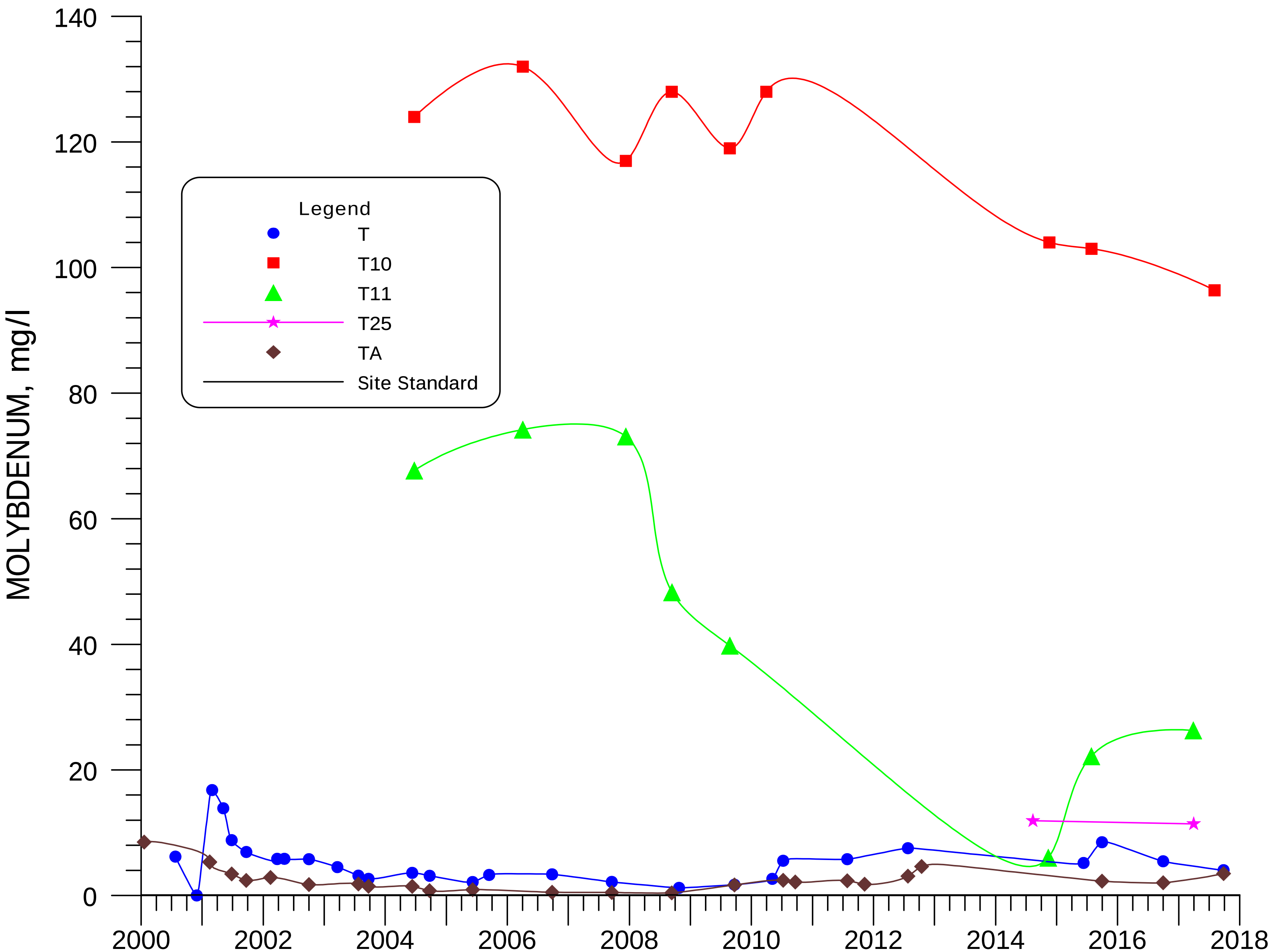

FIGURE 4.3-92. MOLYBDENUM CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

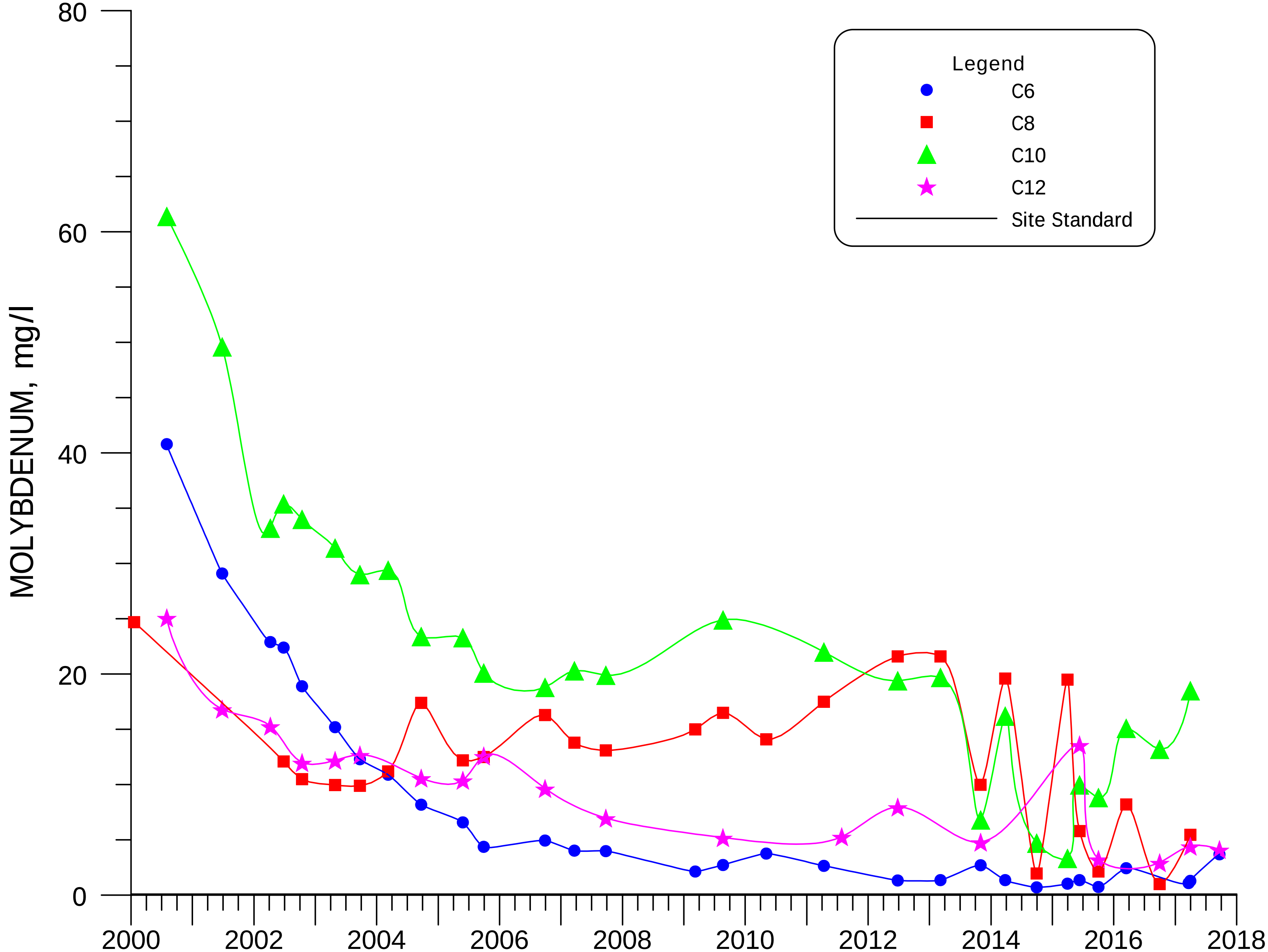

FIGURE 4.3-93. MOLYBDENUM CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

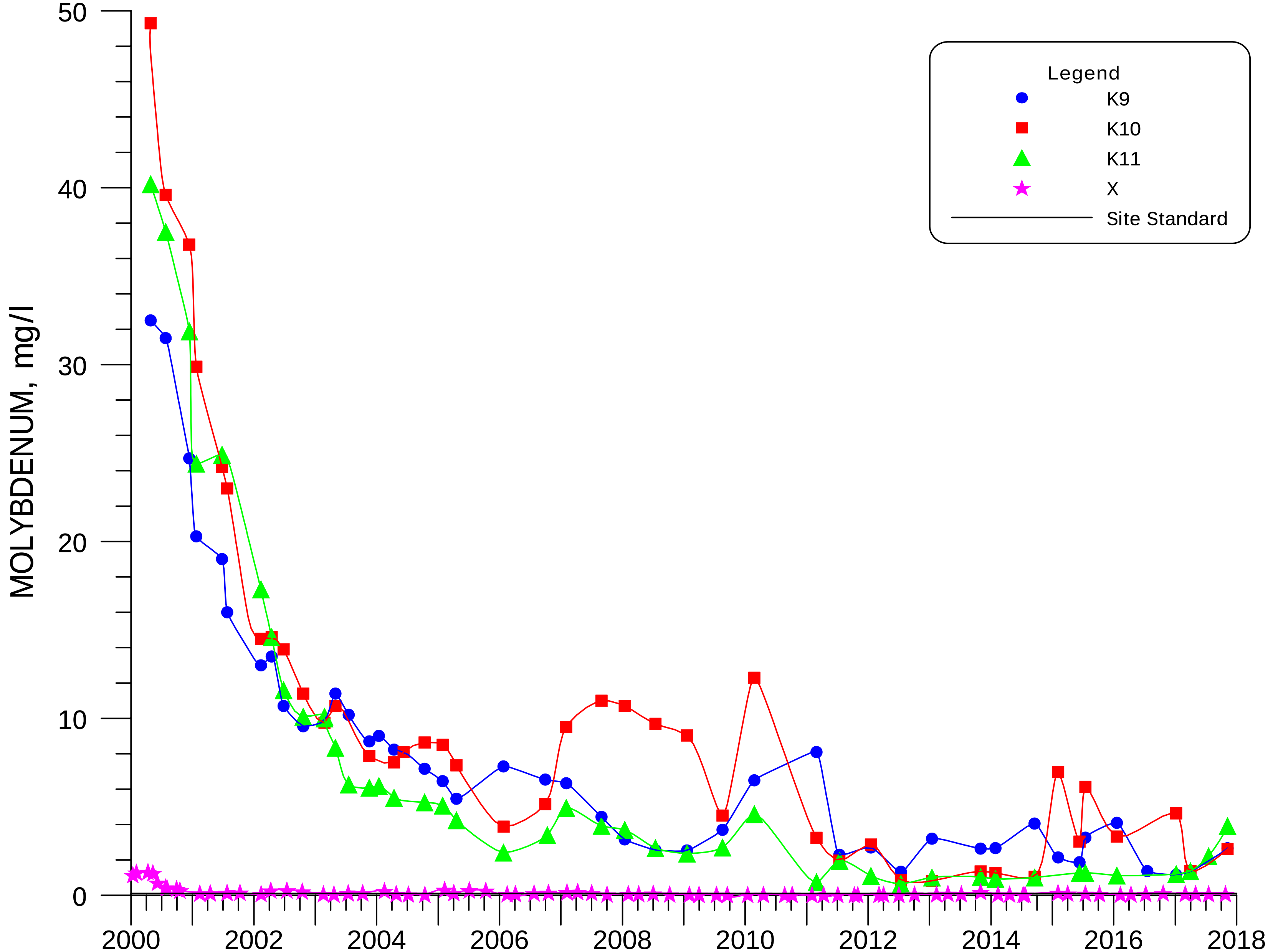

FIGURE 4.3-94. MOLYBDENUM CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

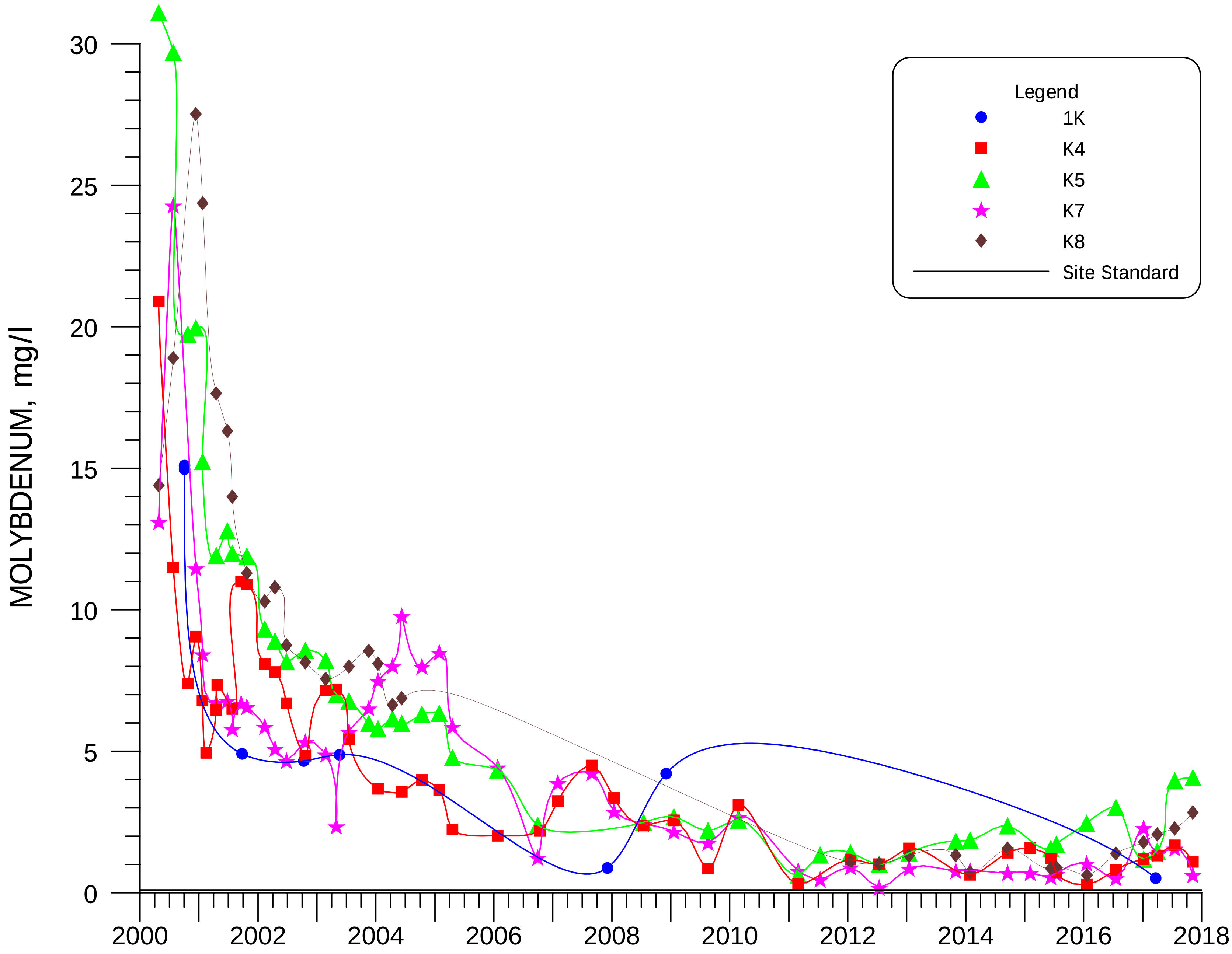

FIGURE 4.3-95. MOLYBDENUM CONCENTRATIONS FOR WELLS 1K, K4, K5, K7 AND K8.

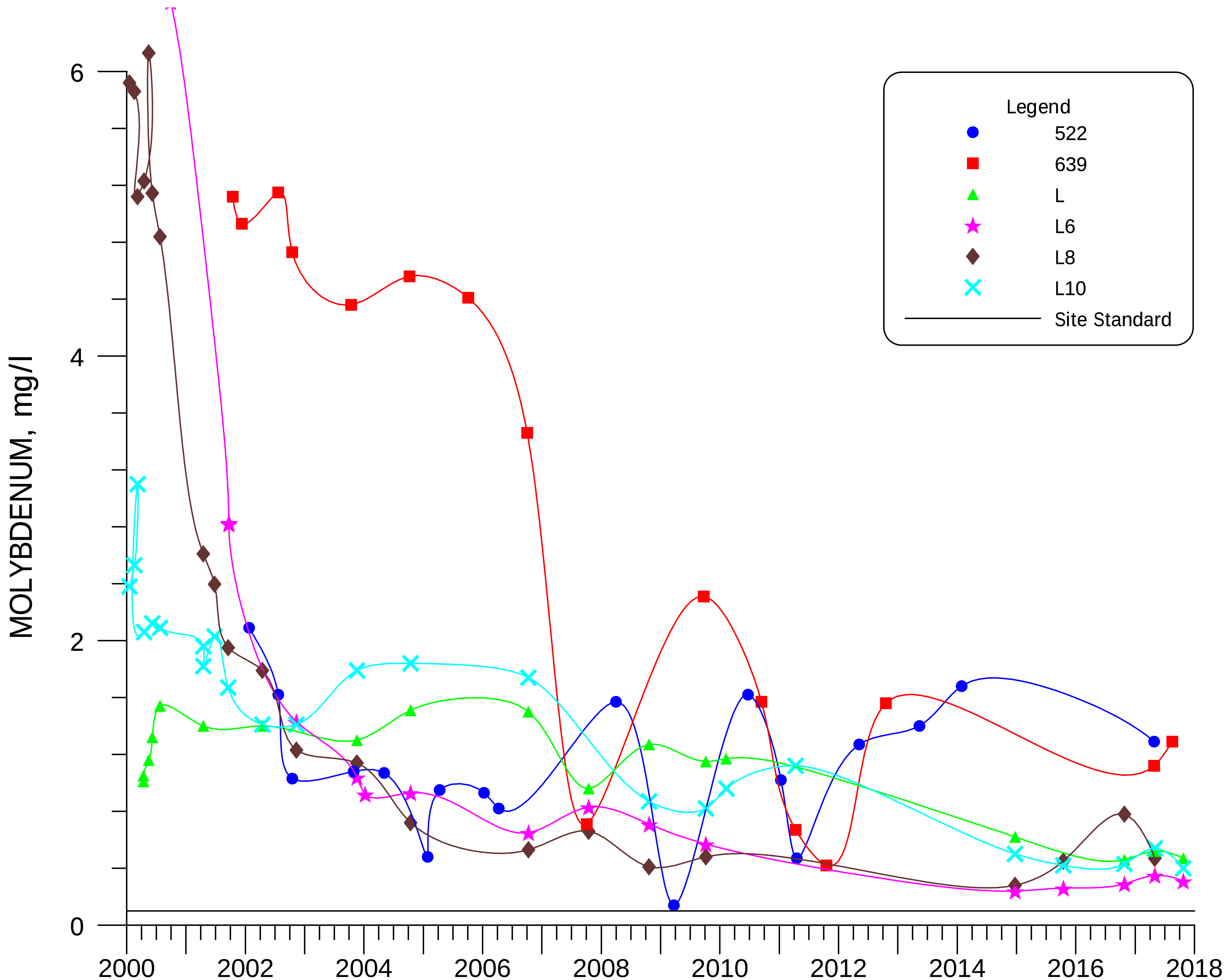

FIGURE 4.3-96. MOLYBDENUM CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

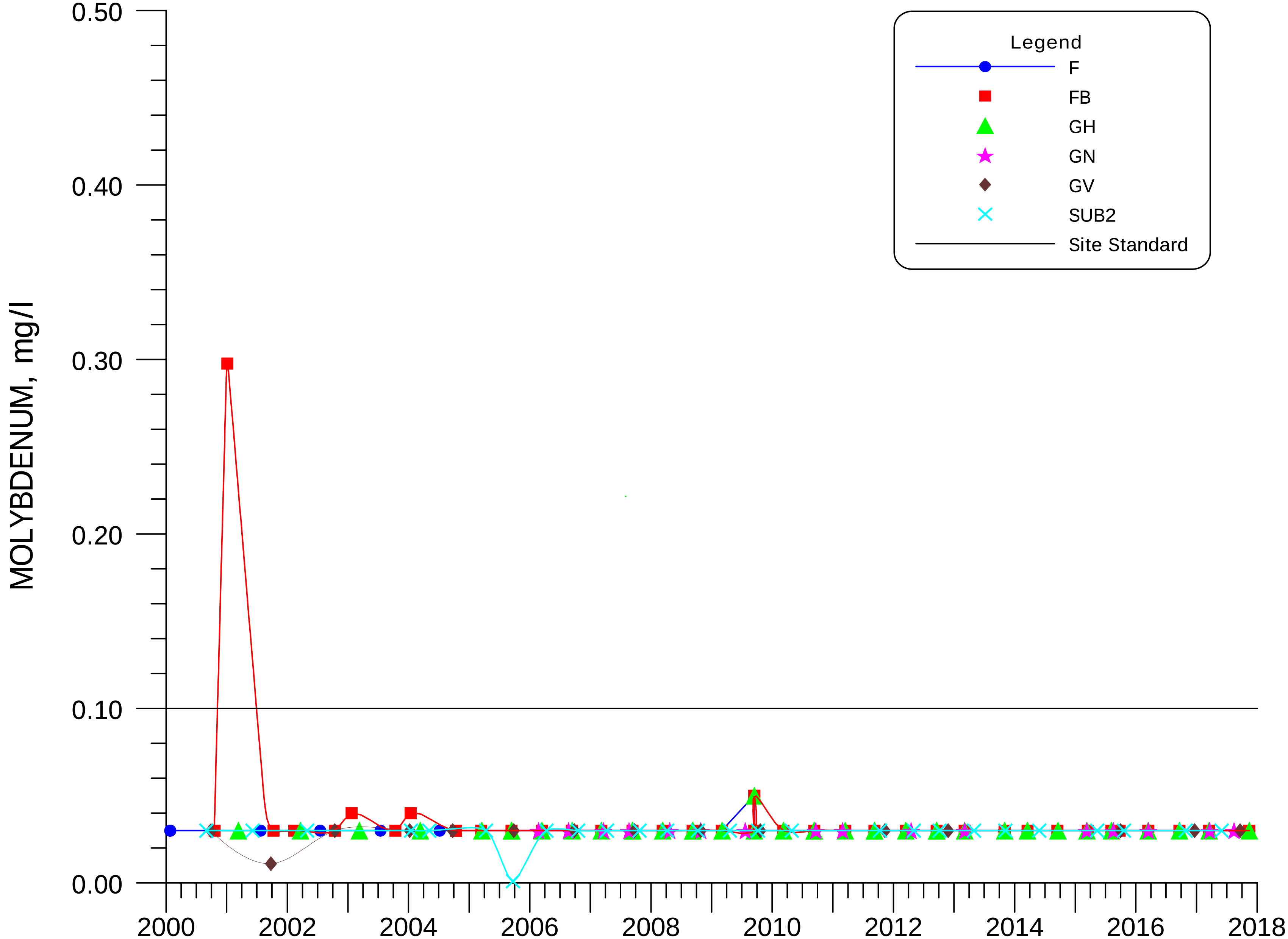

FIGURE 4.3-97. MOLYBDENUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

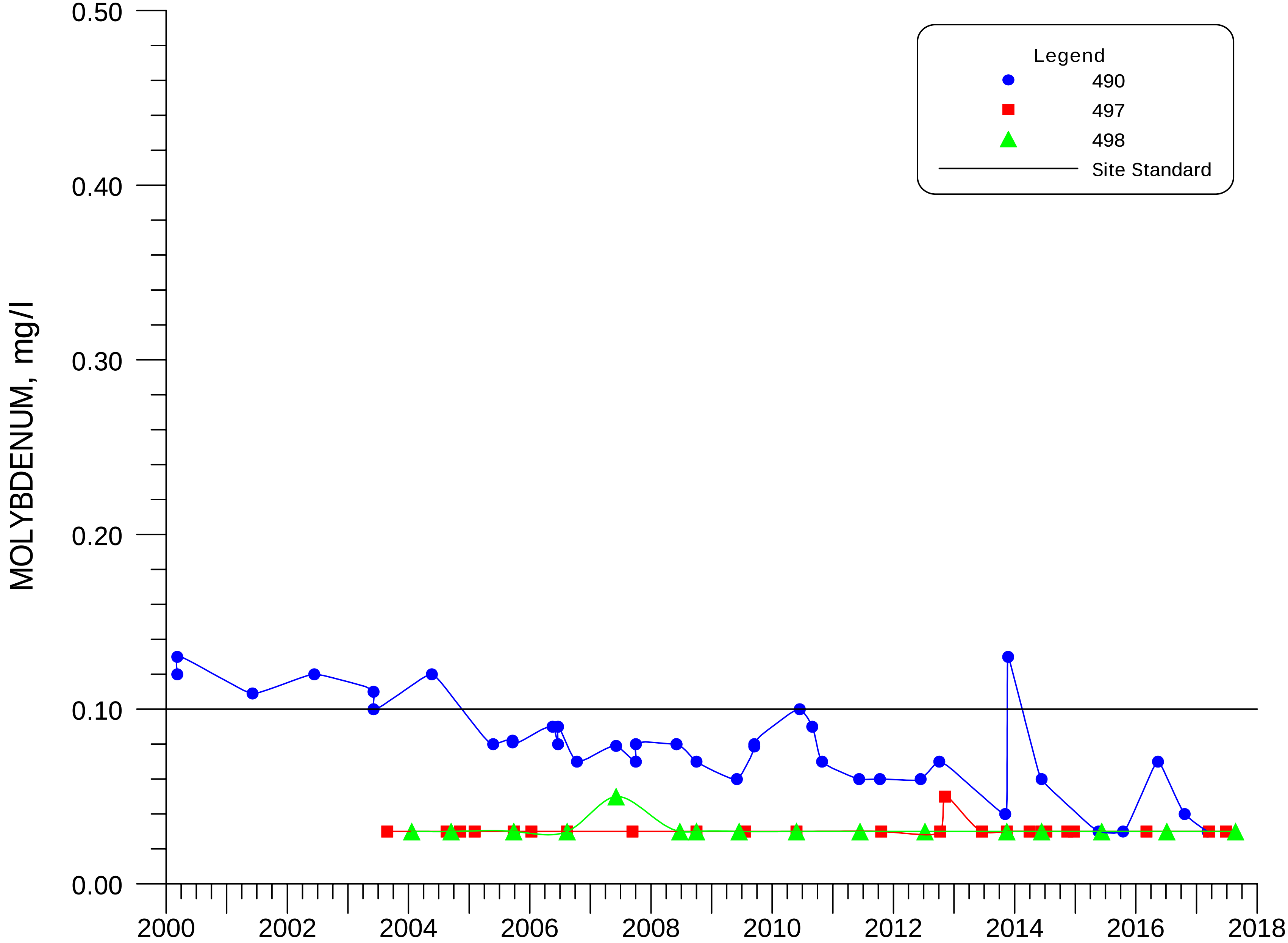

FIGURE 4.3-98. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

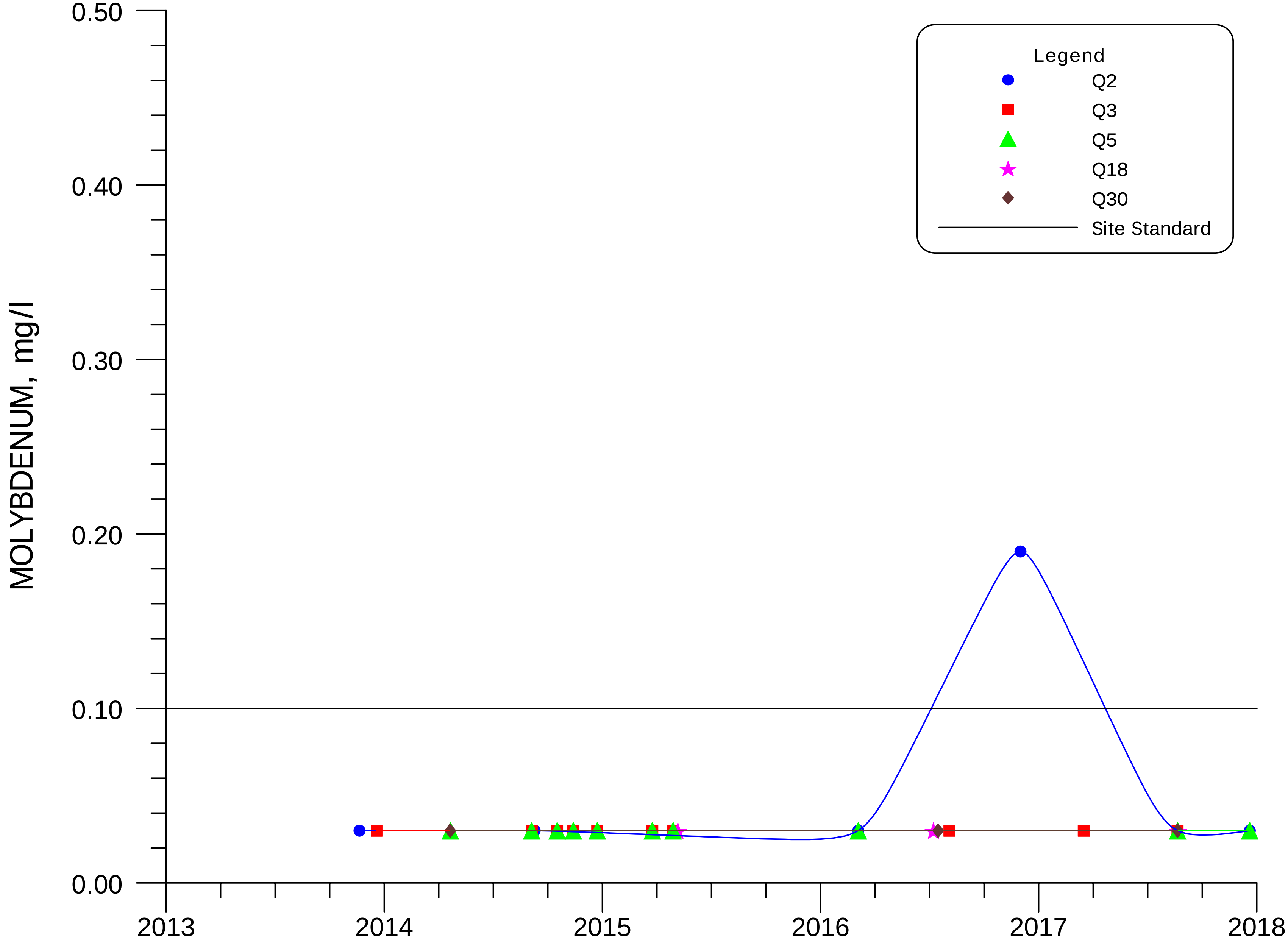

FIGURE 4.3-98A. MOLYBDENUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18 AND Q30.

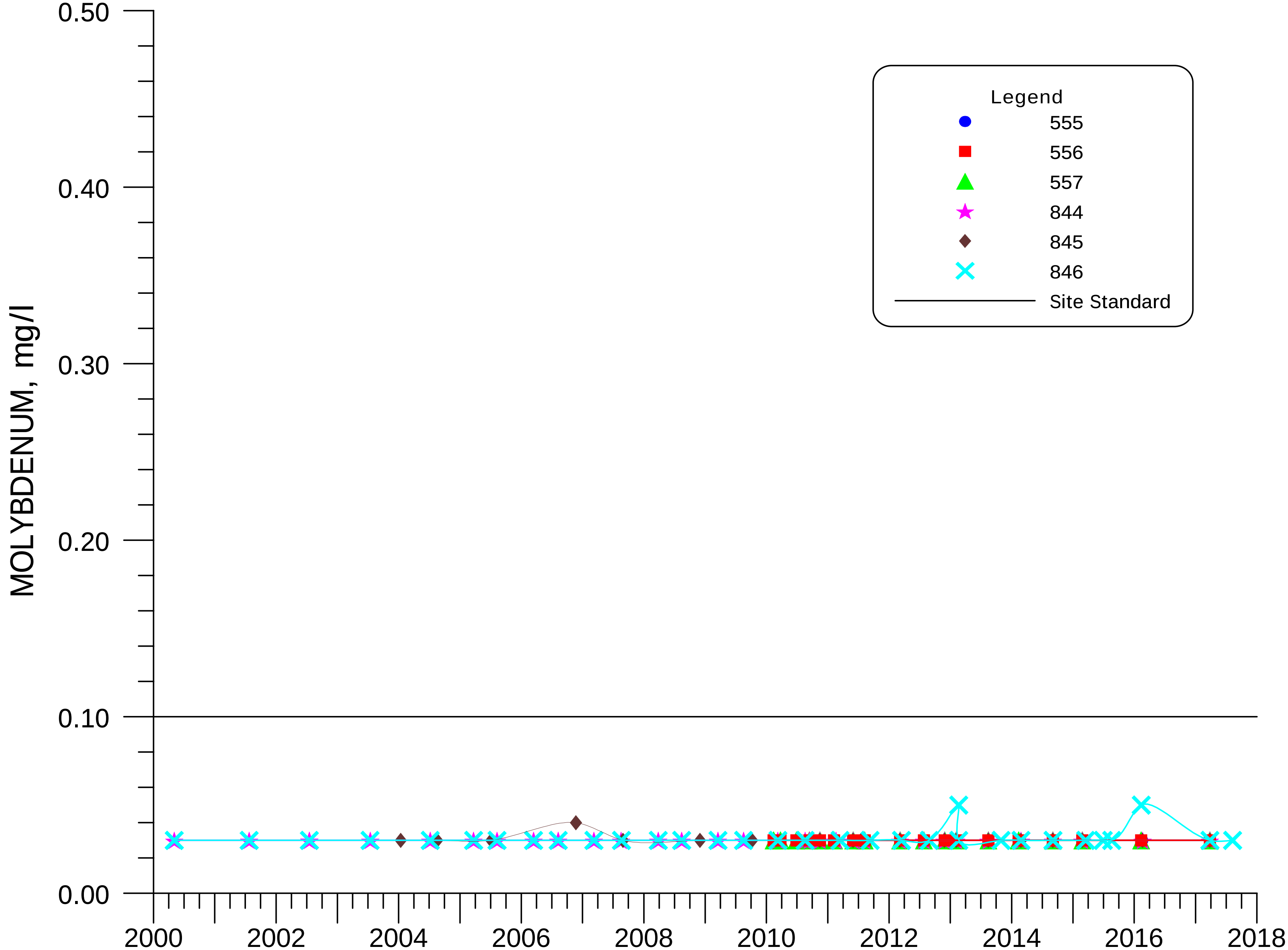

FIGURE 4.3-99. MOLYBDENUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

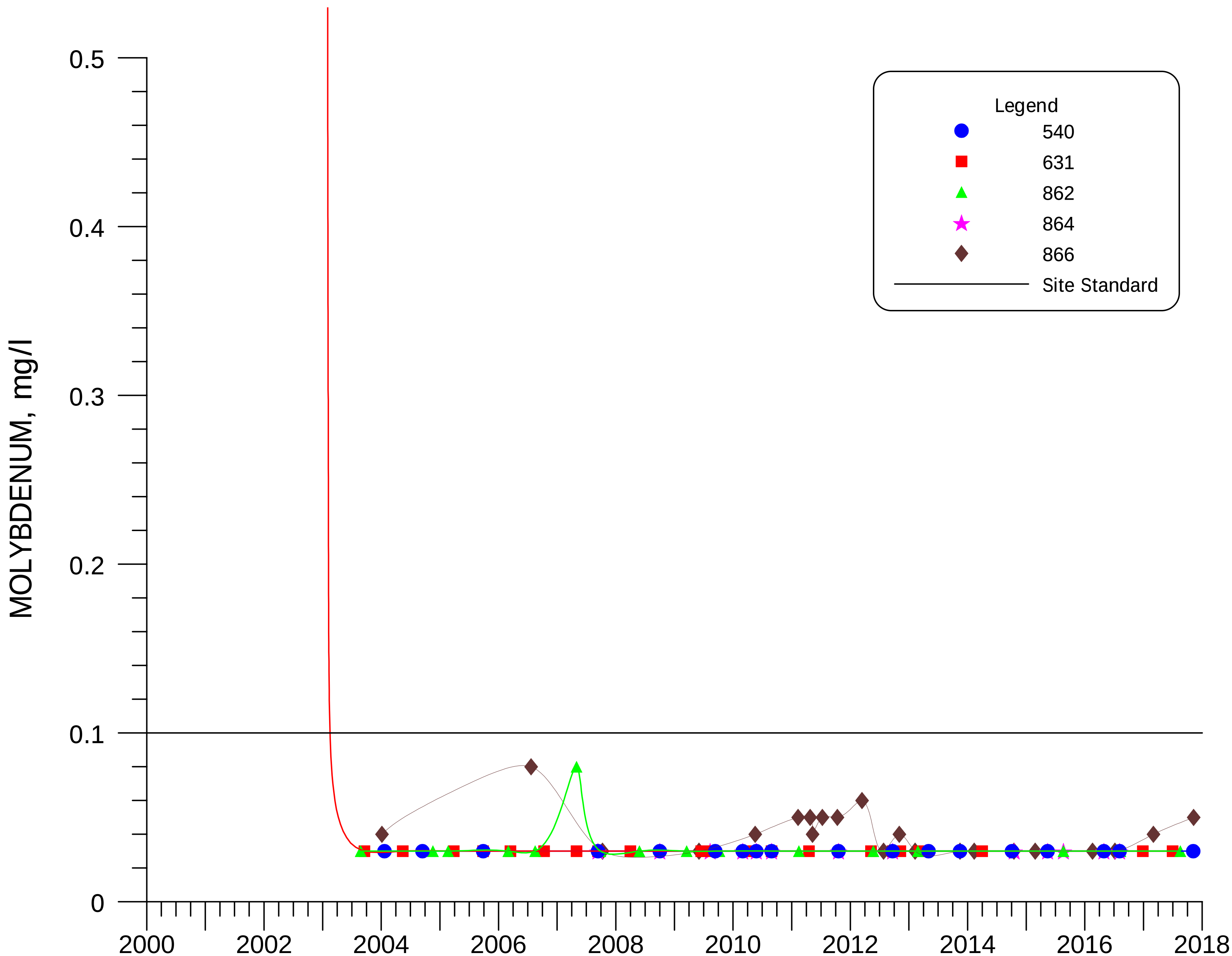

FIGURE 4.3-100. MOLYBDENUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

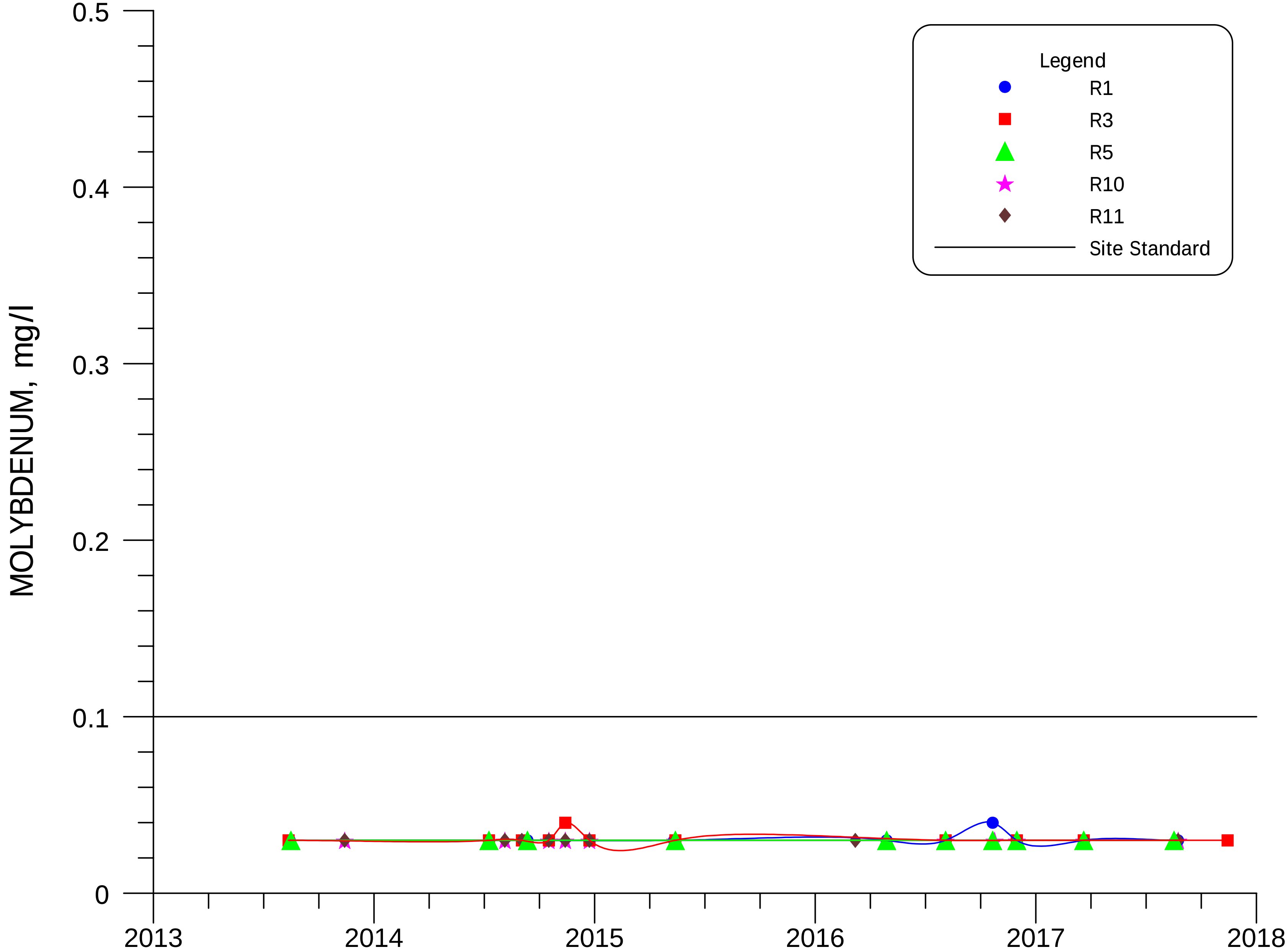

FIGURE 4.3-100A. MOLYBDENUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

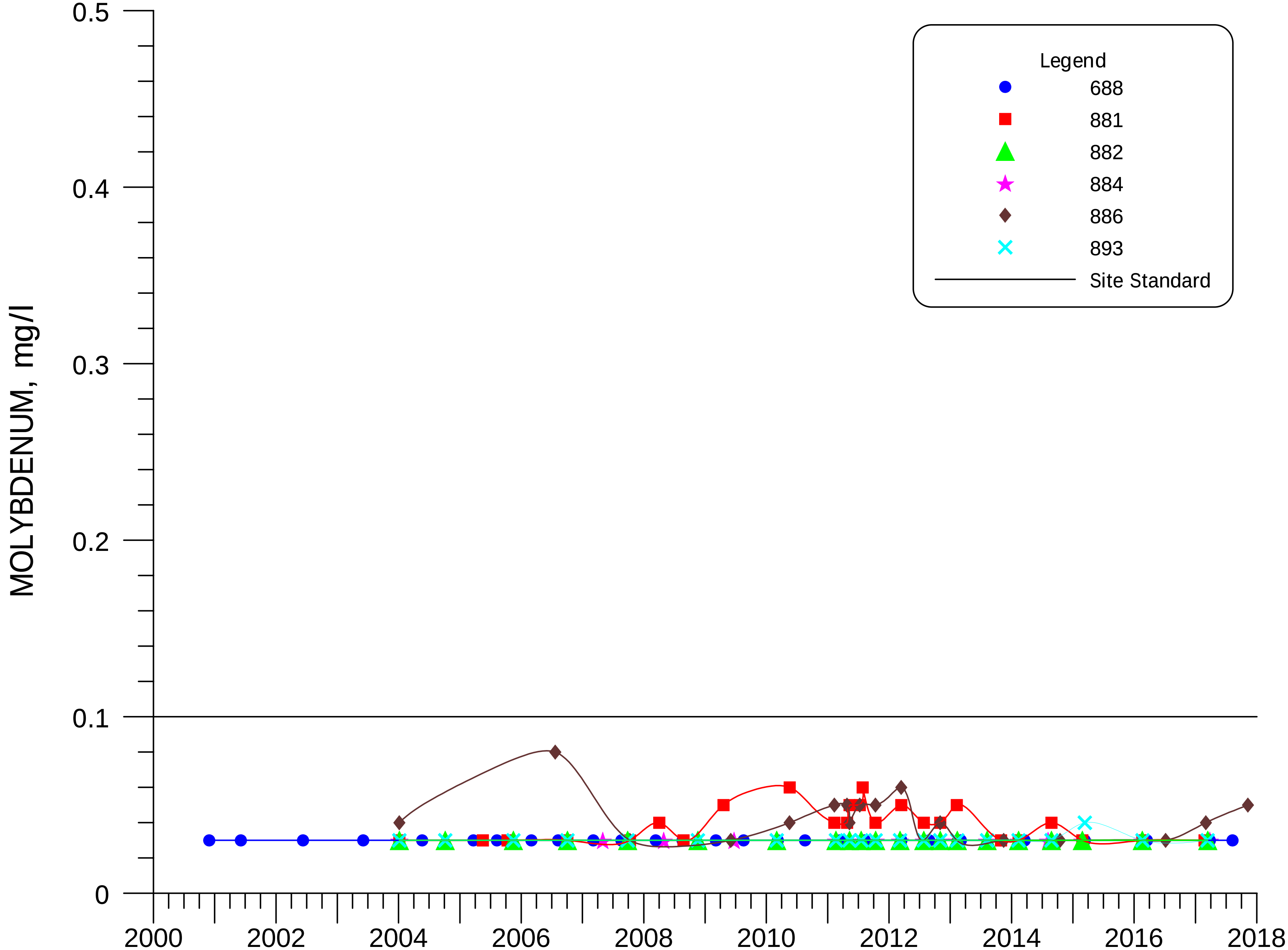

FIGURE 4.3-101. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

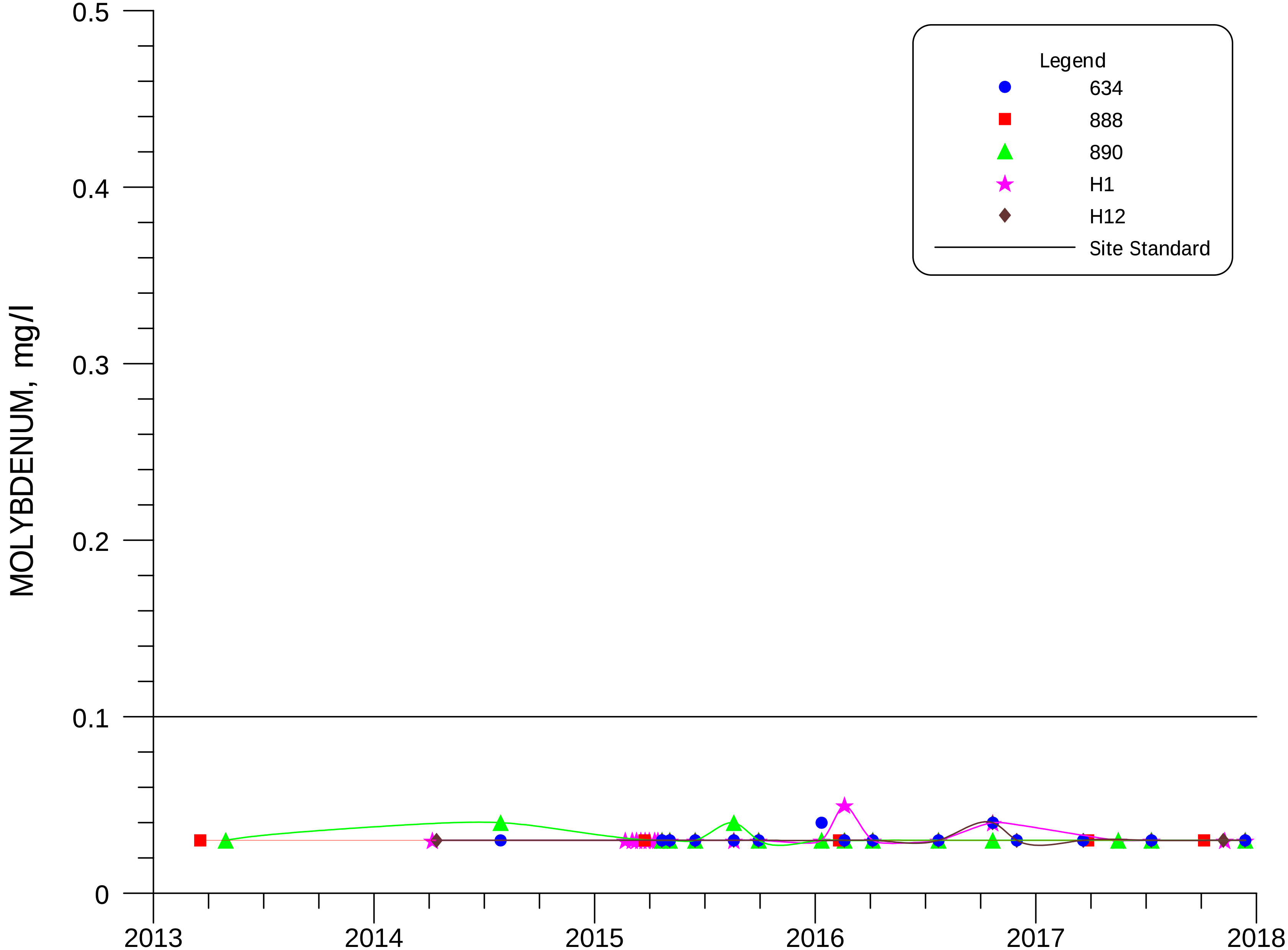

FIGURE 4.3-101A. MOLYBDENUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1 AND H12.

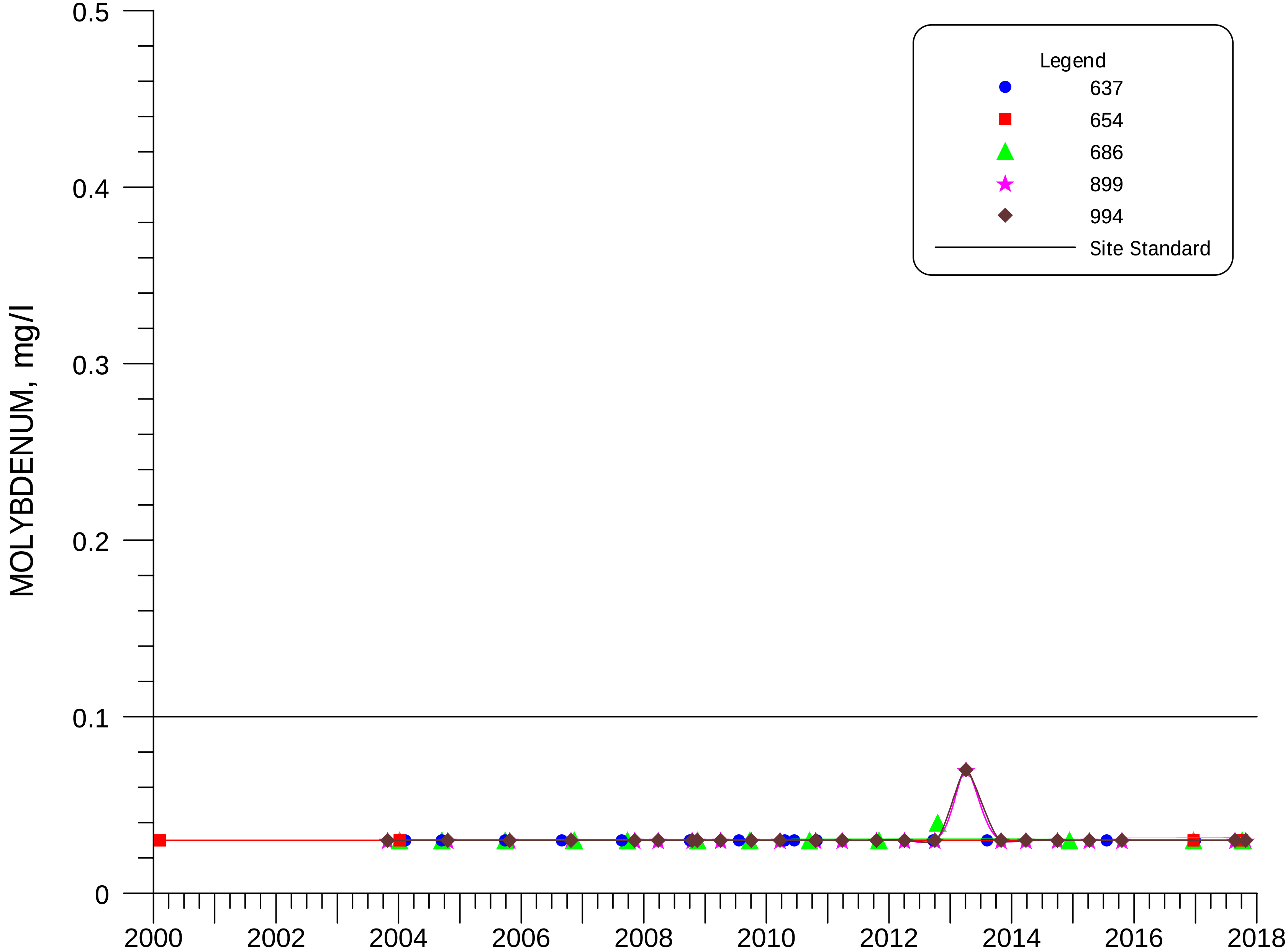

FIGURE 4.3-102. MOLYBDENUM CONCENTRATIONS FOR WELLS 637, 654, 686, 899 AND 994.

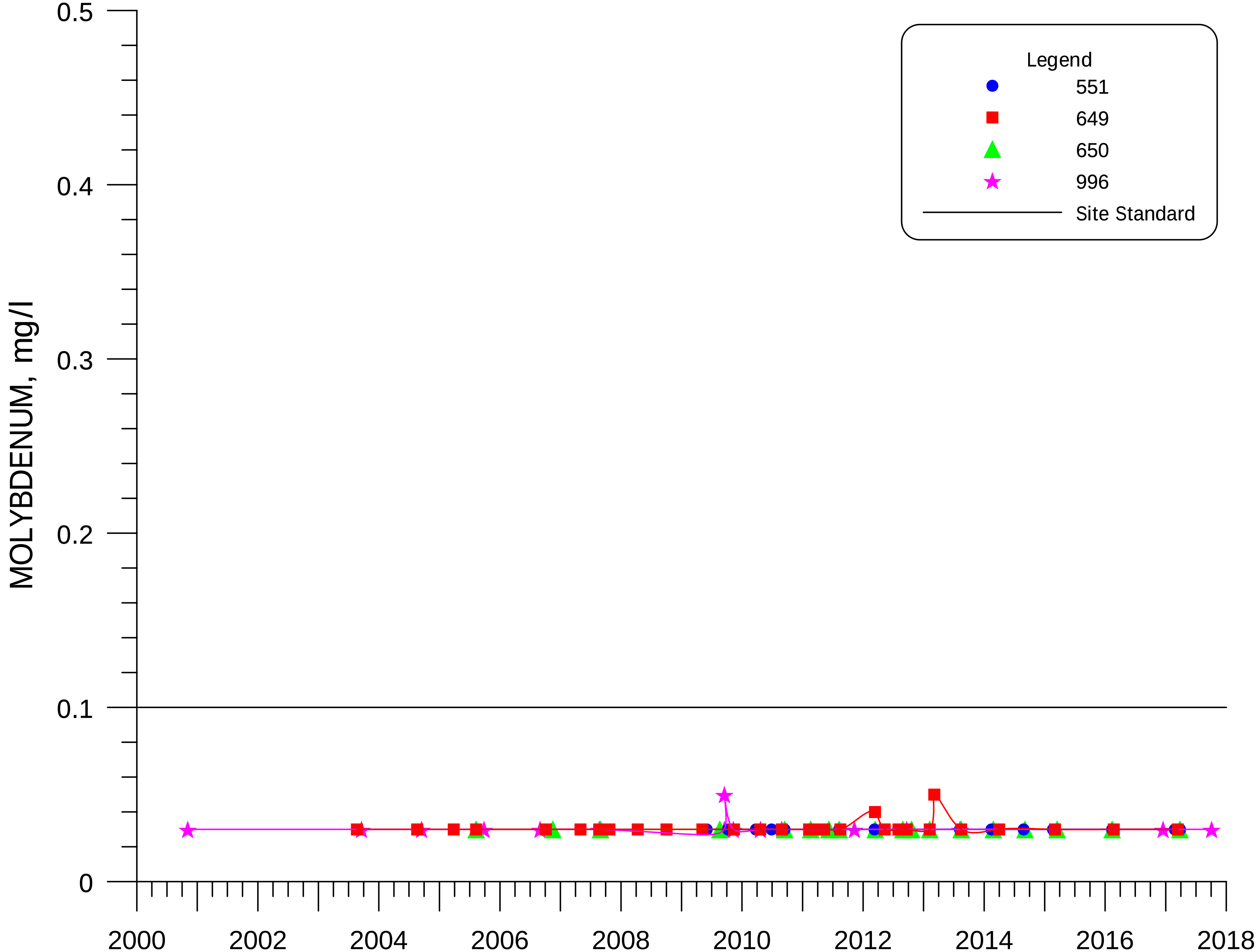

FIGURE 4.3-103. MOLYBDENUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

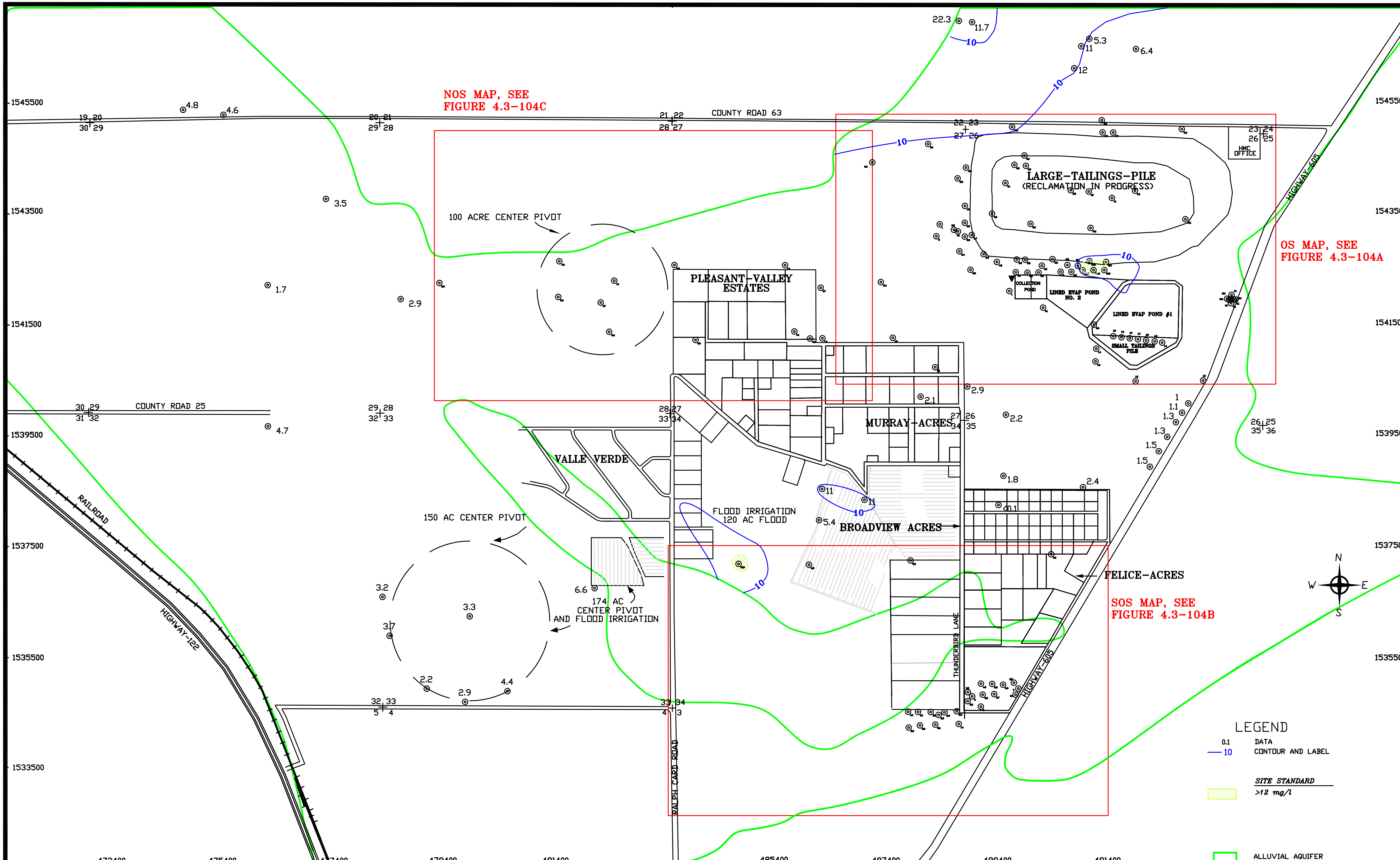

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FIGURE 4.3-104. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l

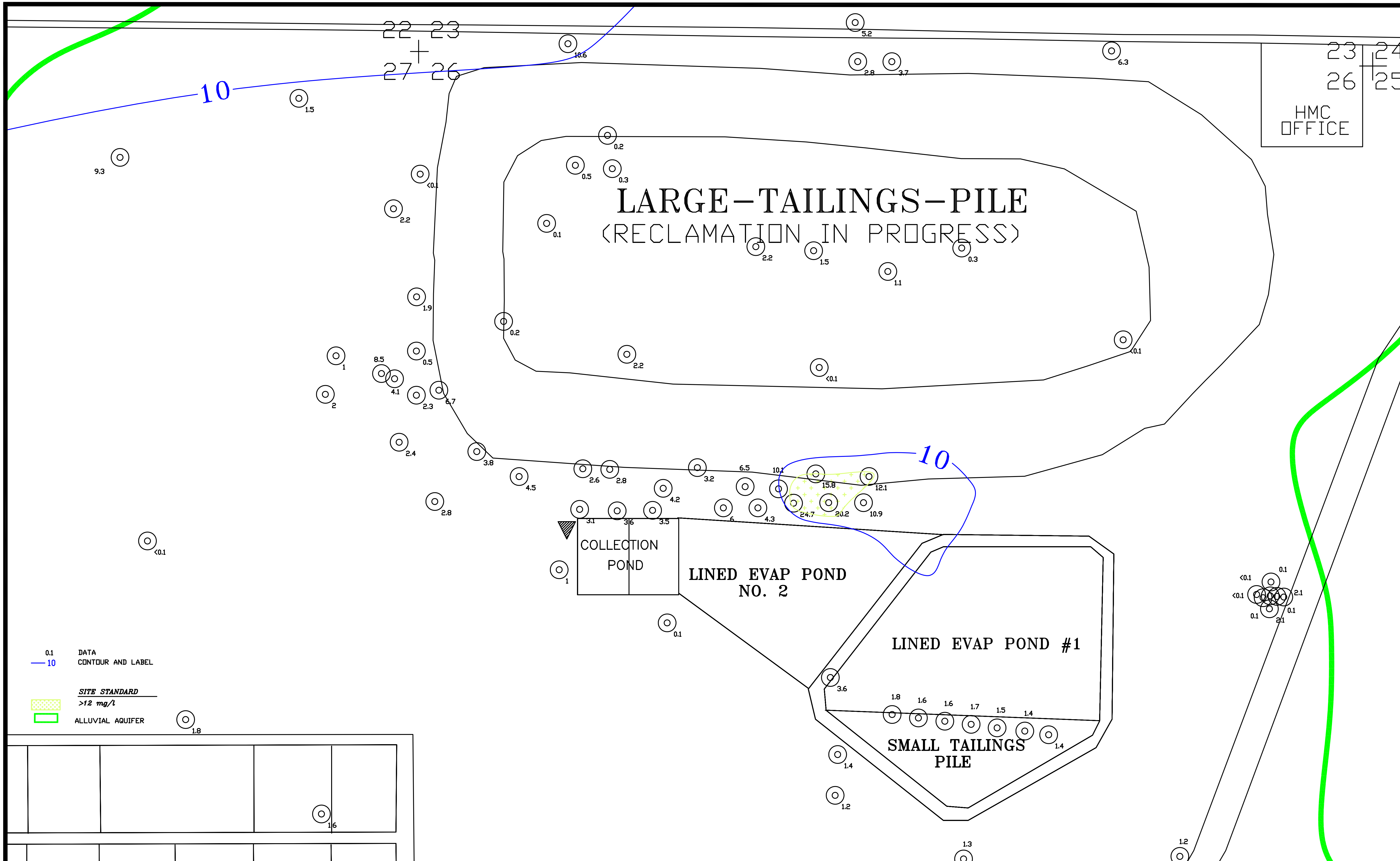

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FIGURE 4.3-104A. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

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FIGURE 4.3-104B. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l

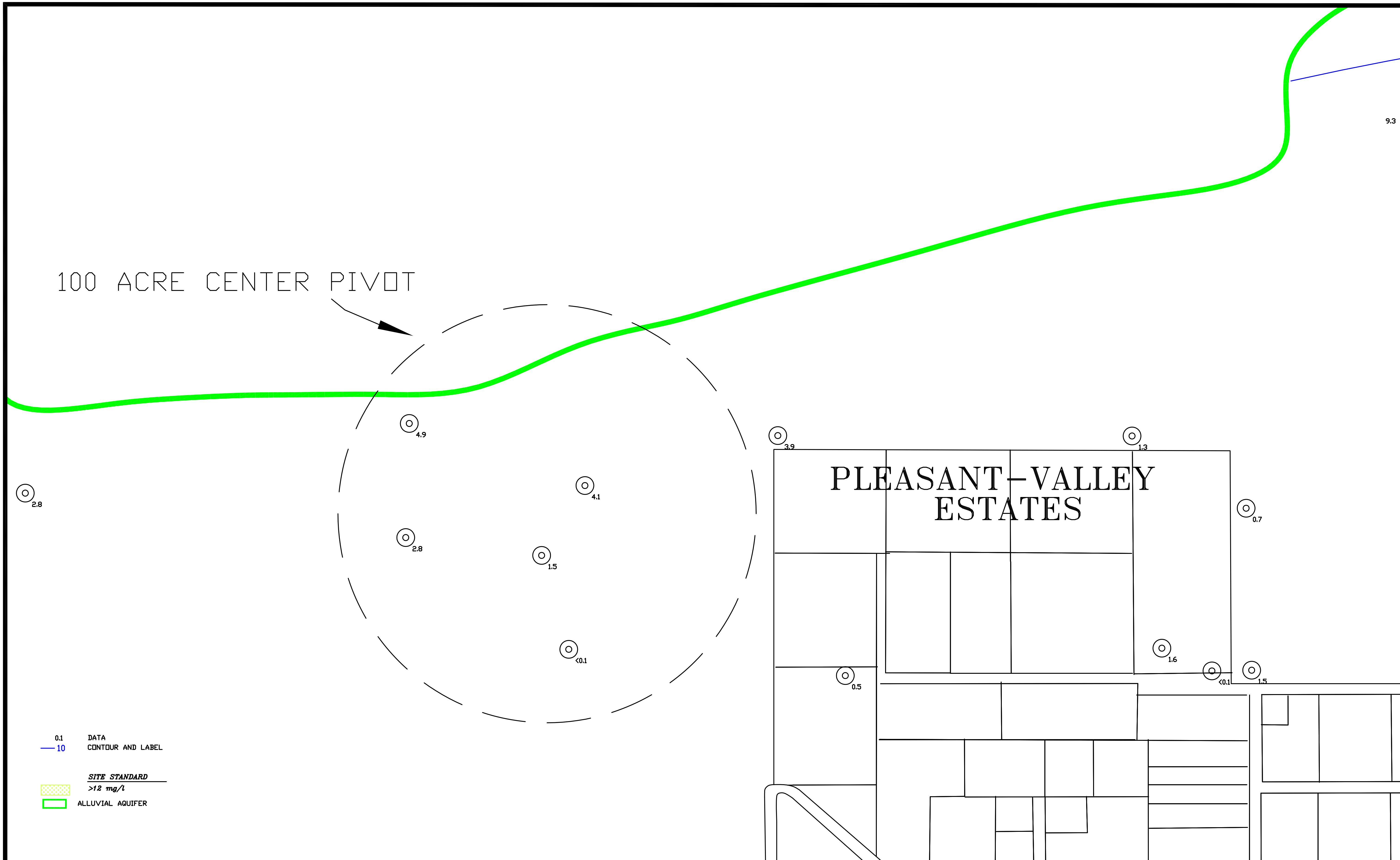

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FIGURE 4.3-104C. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

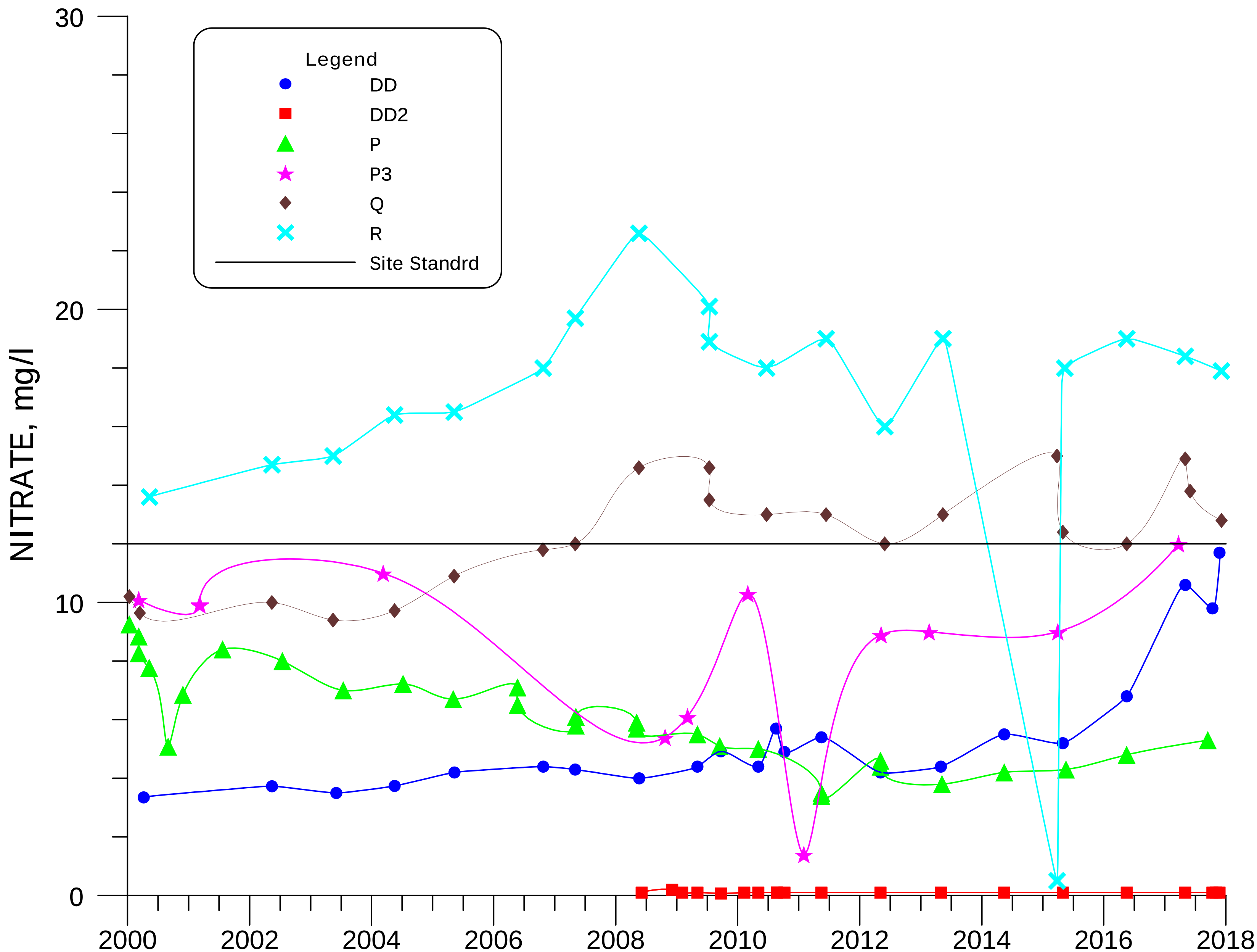

FIGURE 4.3-105. NITRATE CONCENTRATIONS FOR WELLS DD, DD2, P, P3, Q AND R.

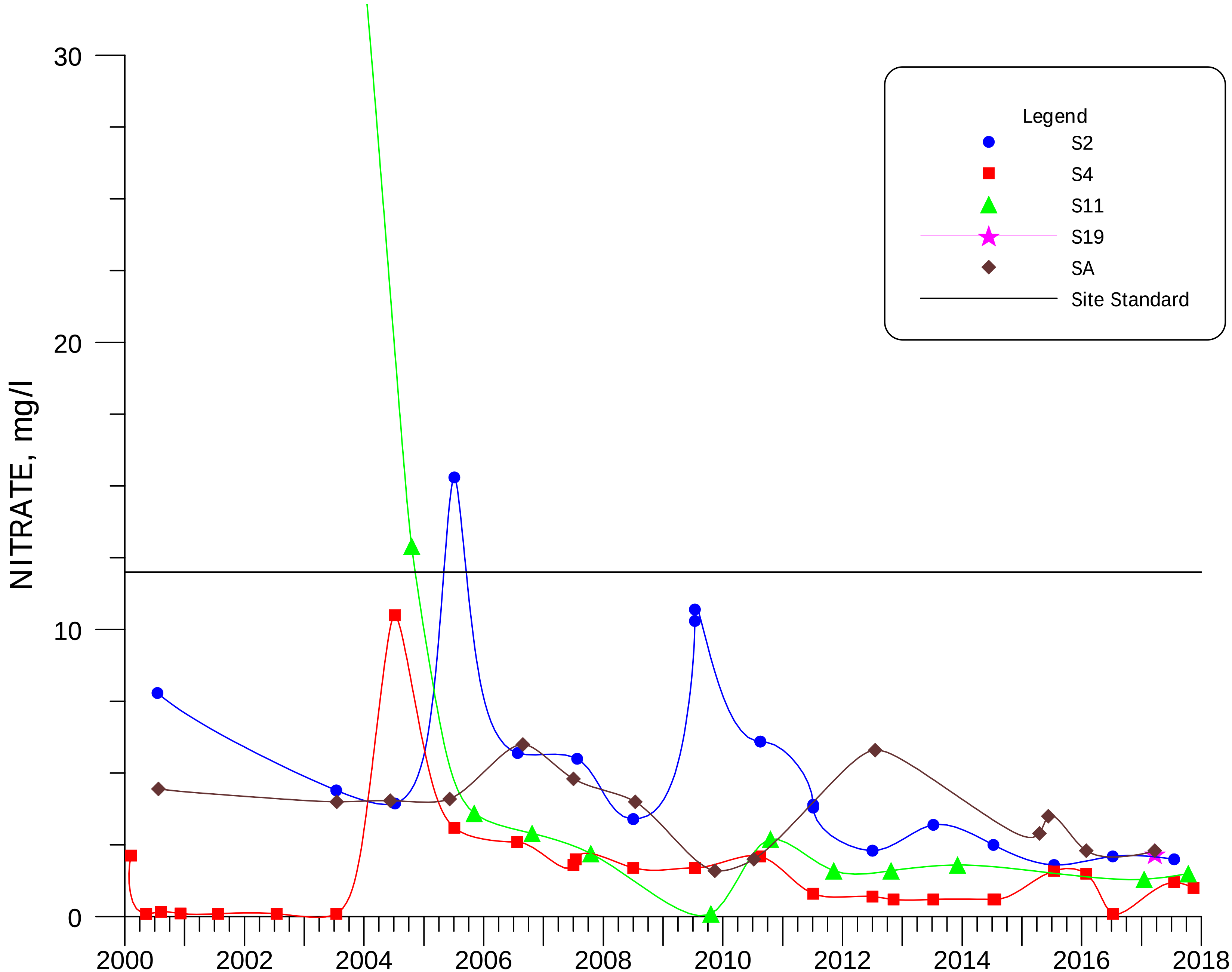

FIGURE 4.3-106. NITRATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

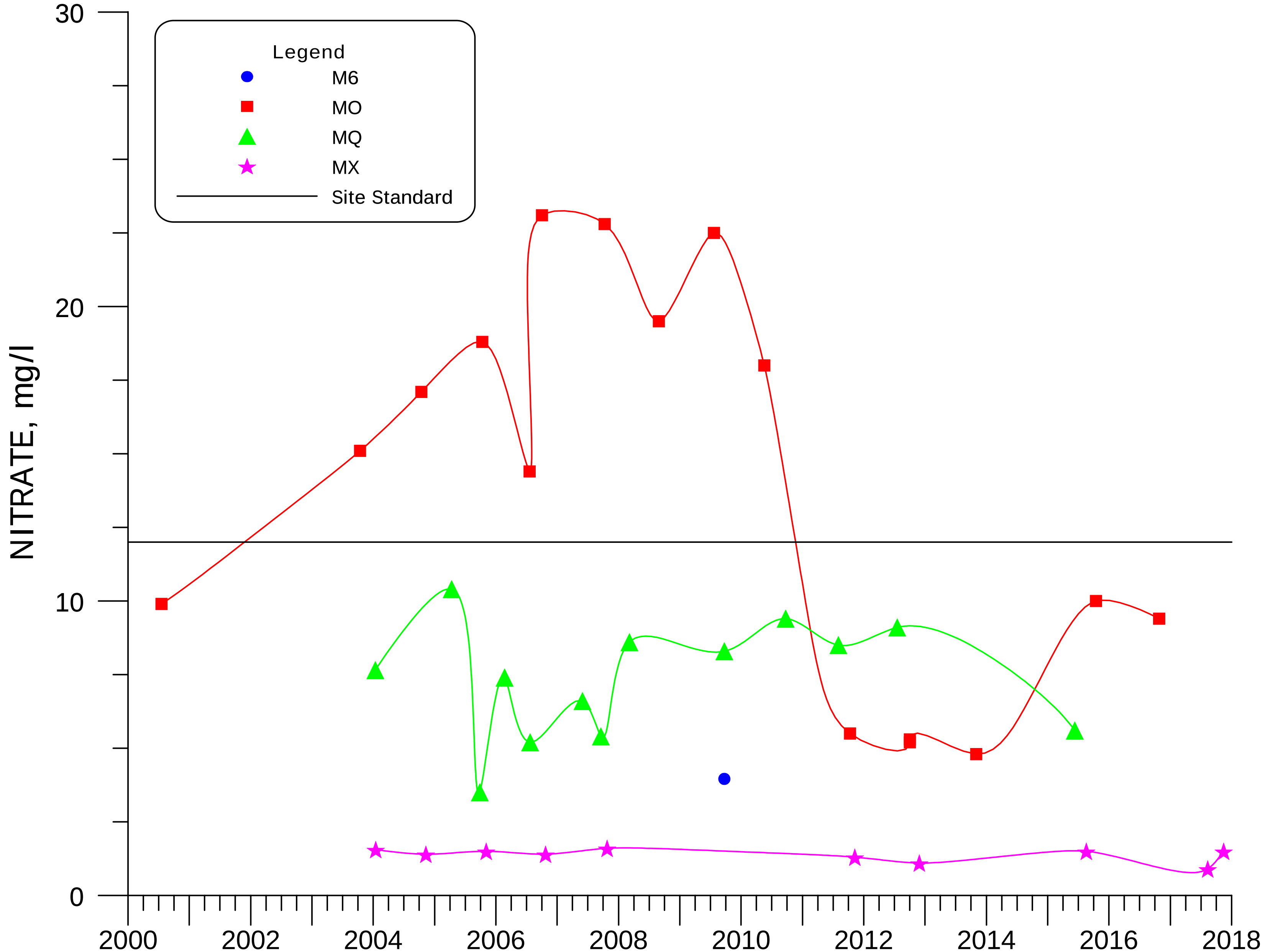

FIGURE 4.3-107. NITRATE CONCENTRATIONS FOR WELLS M6, MO, MQ AND MX.

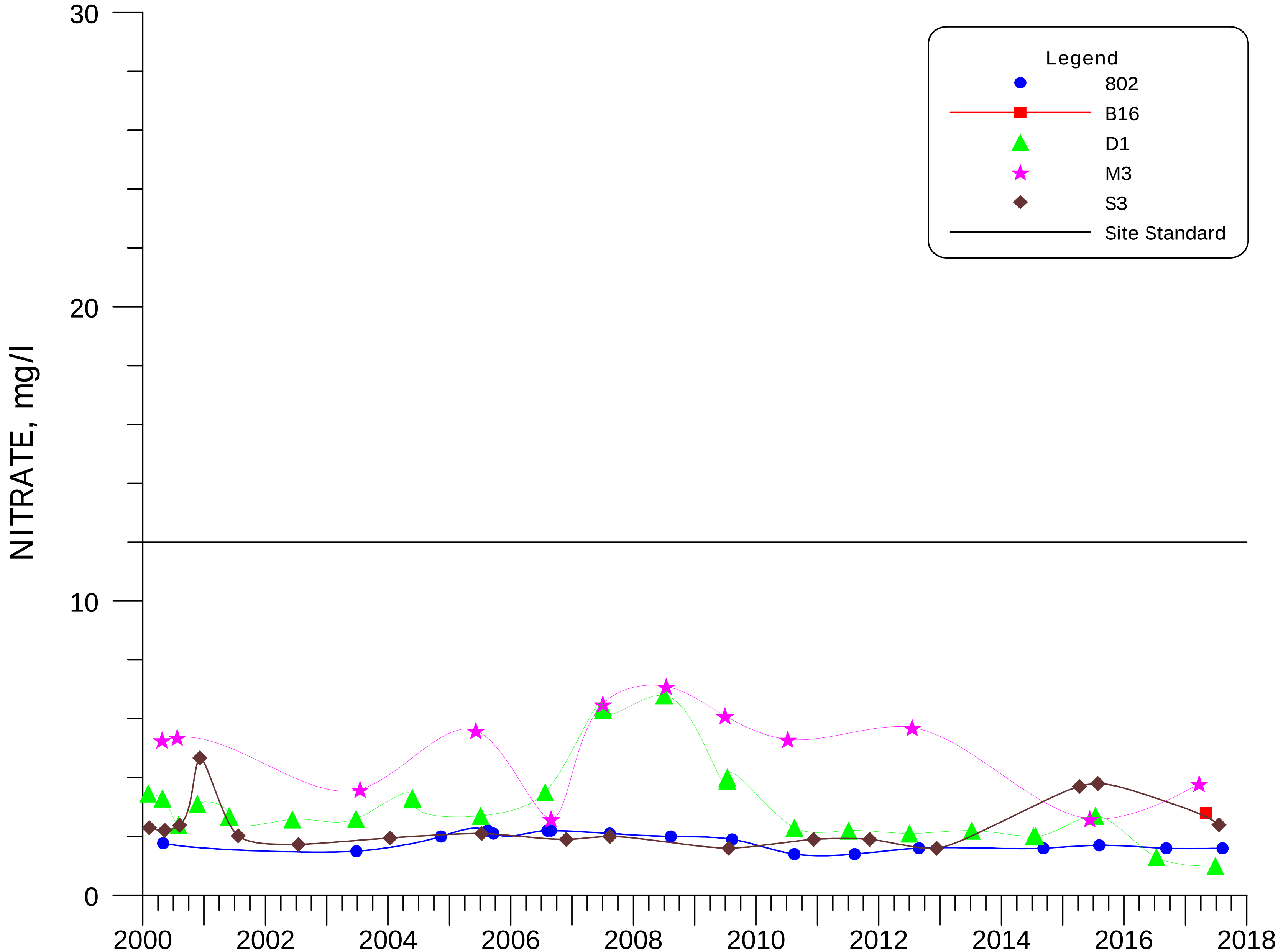

FIGURE 4.3-108. NITRATE CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

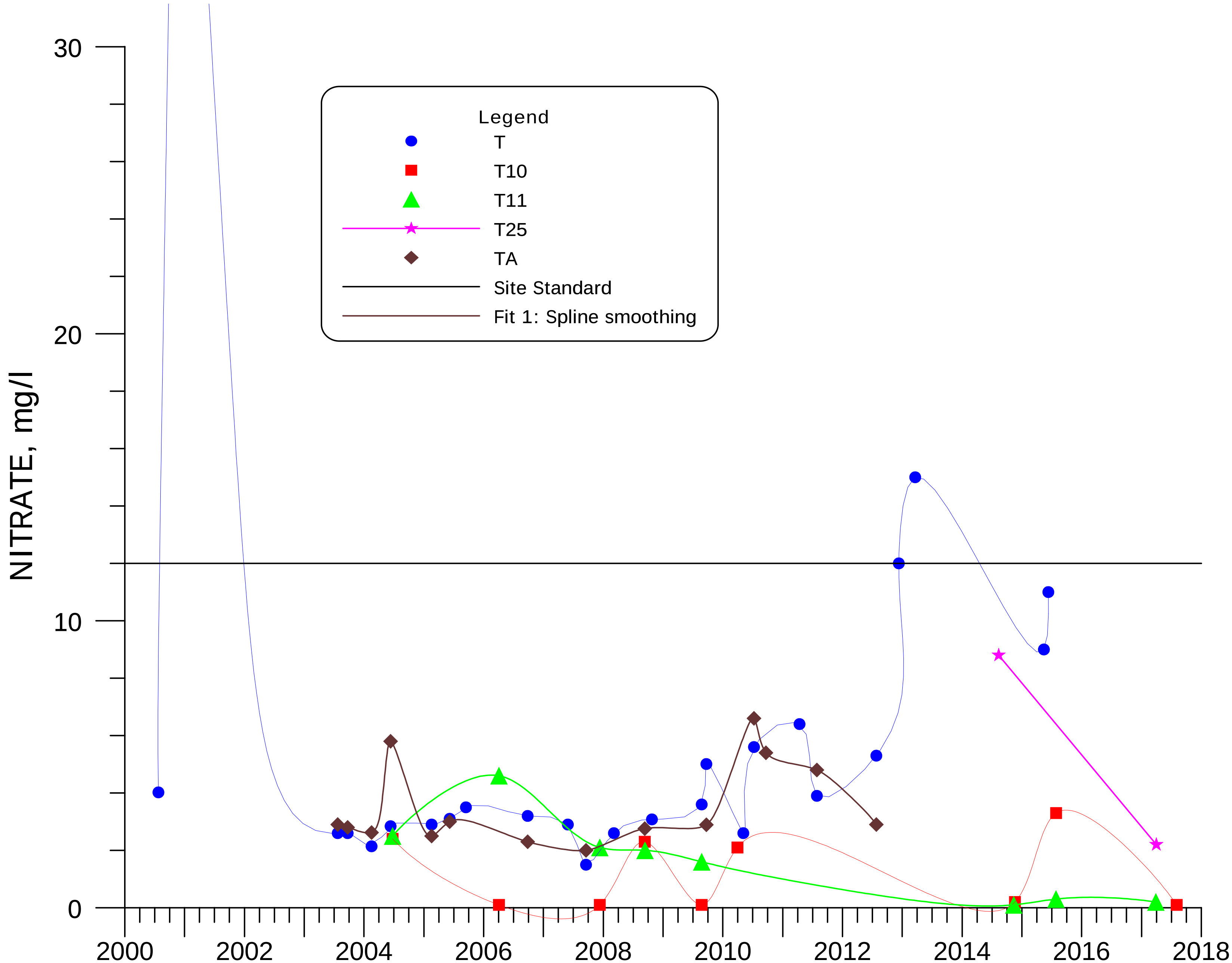

FIGURE 4.3-109. NITRATE CONCENTRATIONS FOR WELLS T, T10, T11, T25 AND TA.

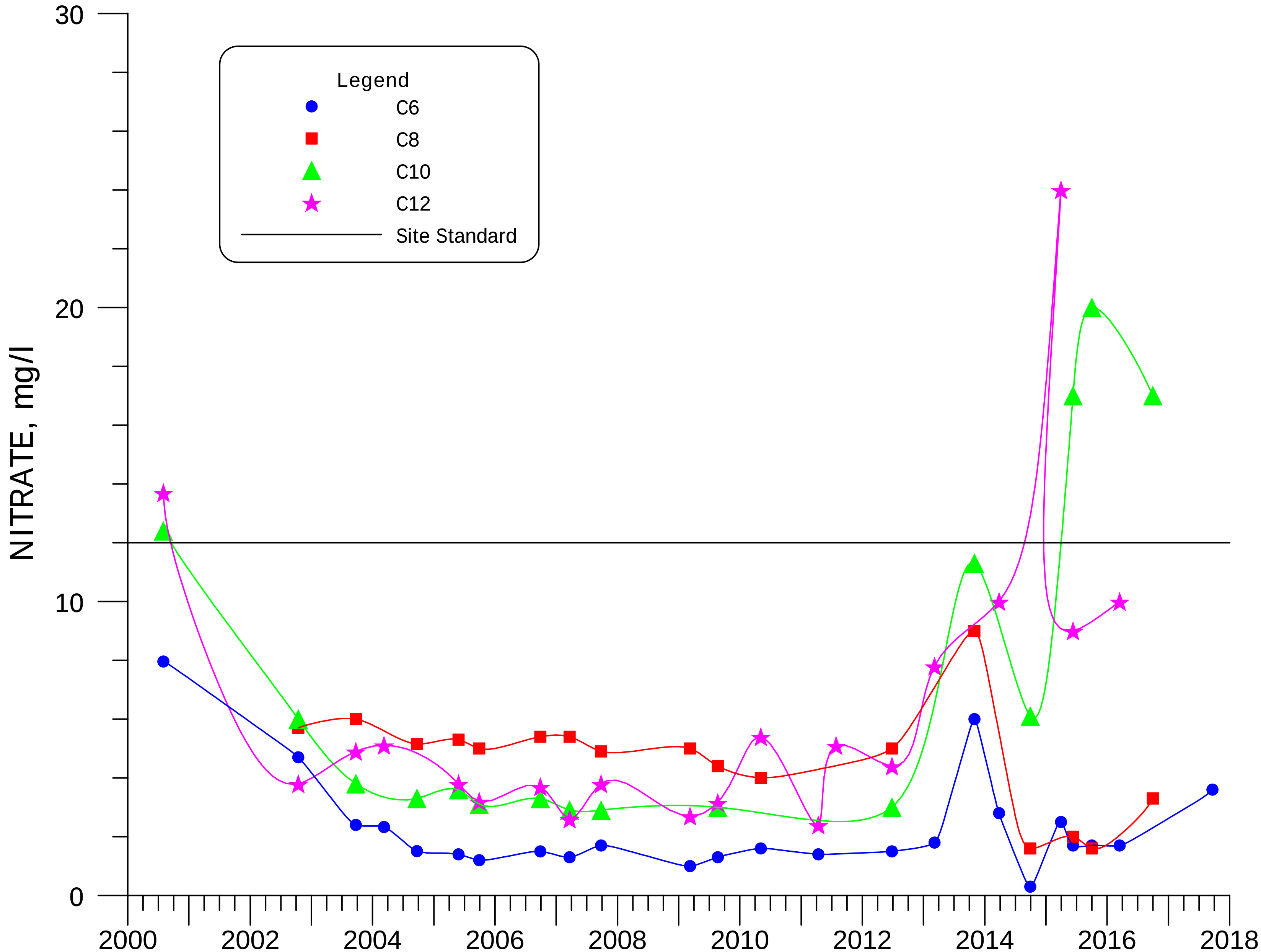

FIGURE 4.3-110. NITRATE CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

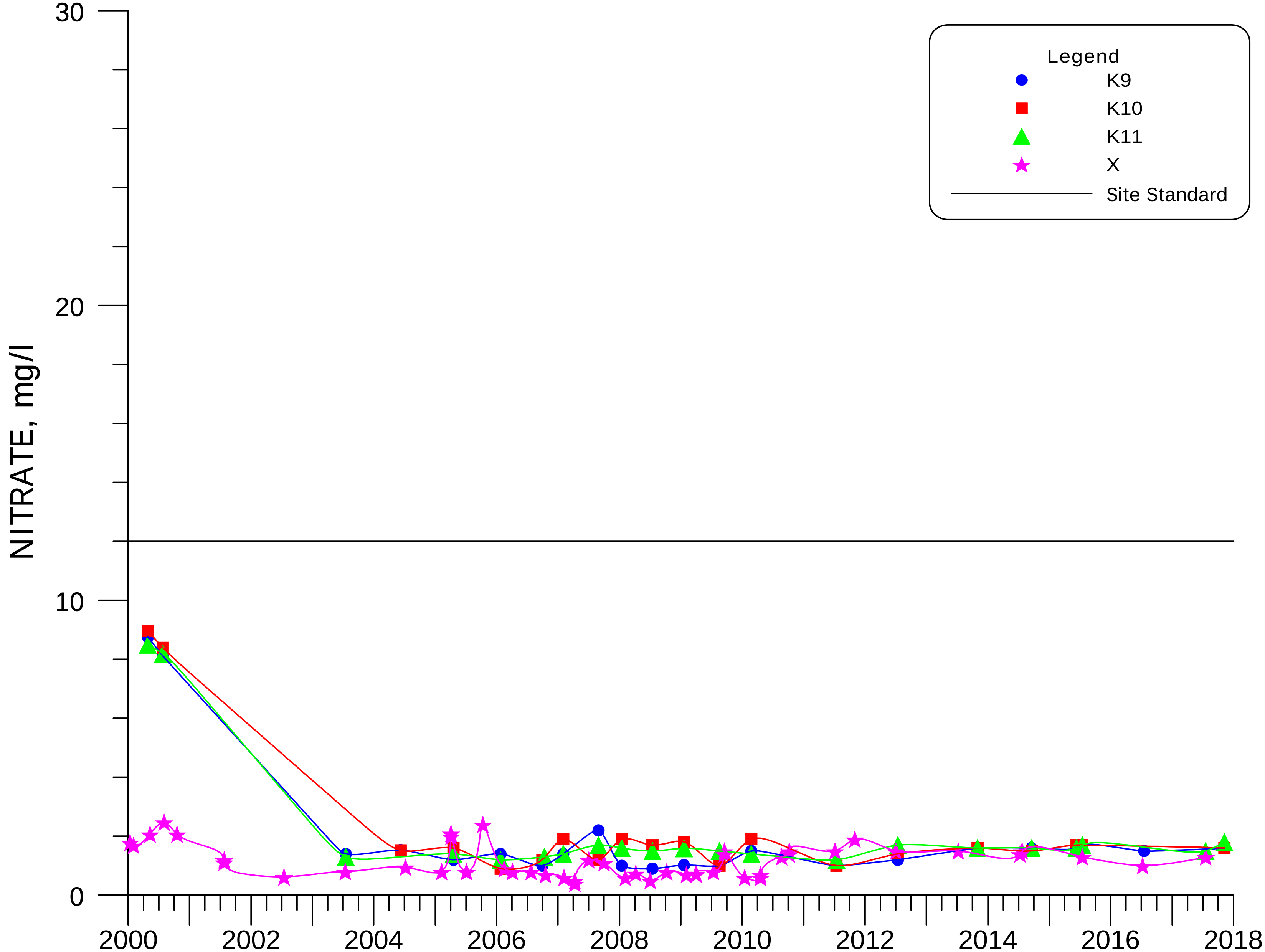

FIGURE 4.3-111. NITRATE CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

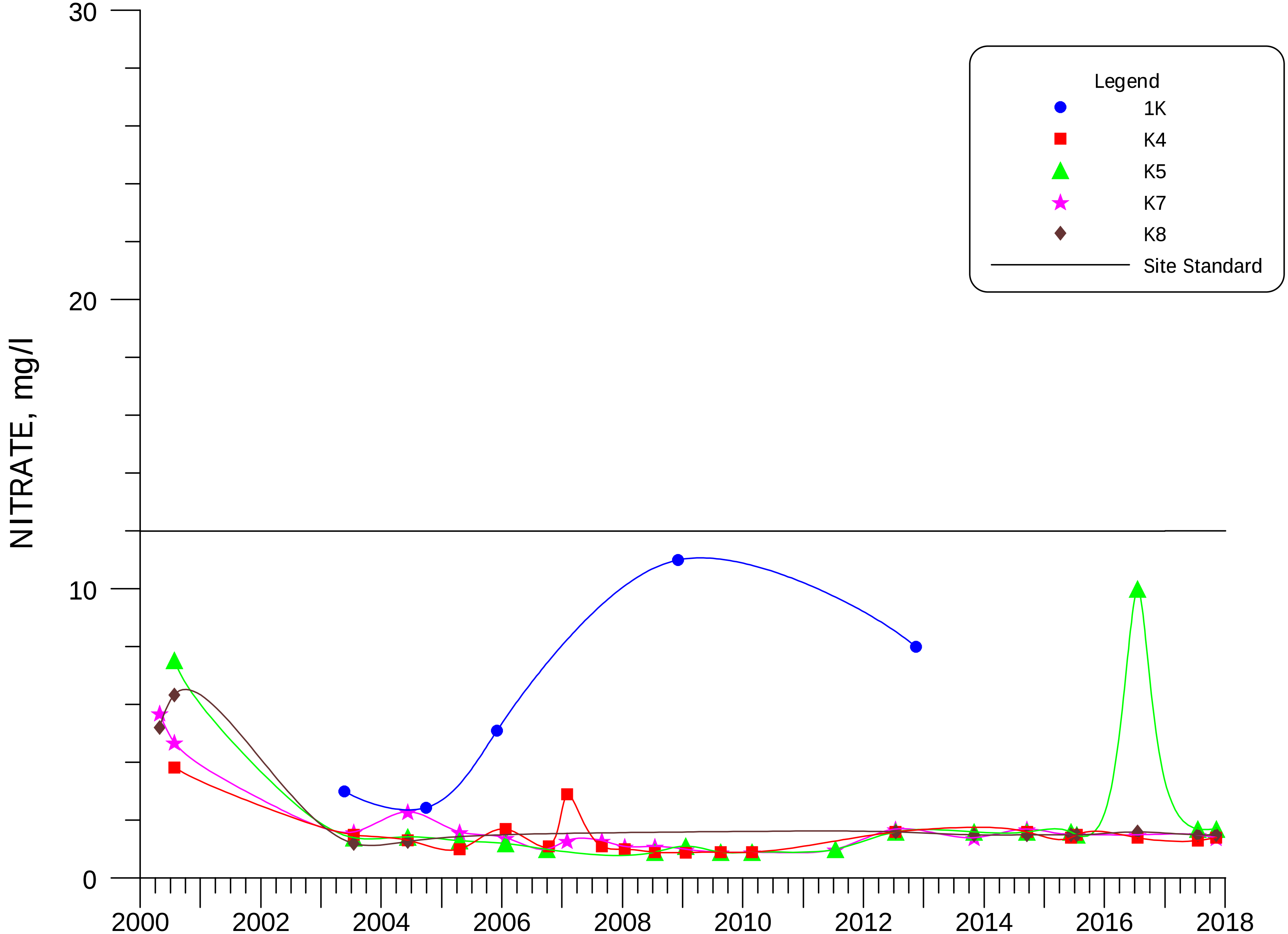

FIGURE 4.3-112. NITRATE CONCENTRATIONS FOR WELLS 1K, K4, K5, K7, AND K8.

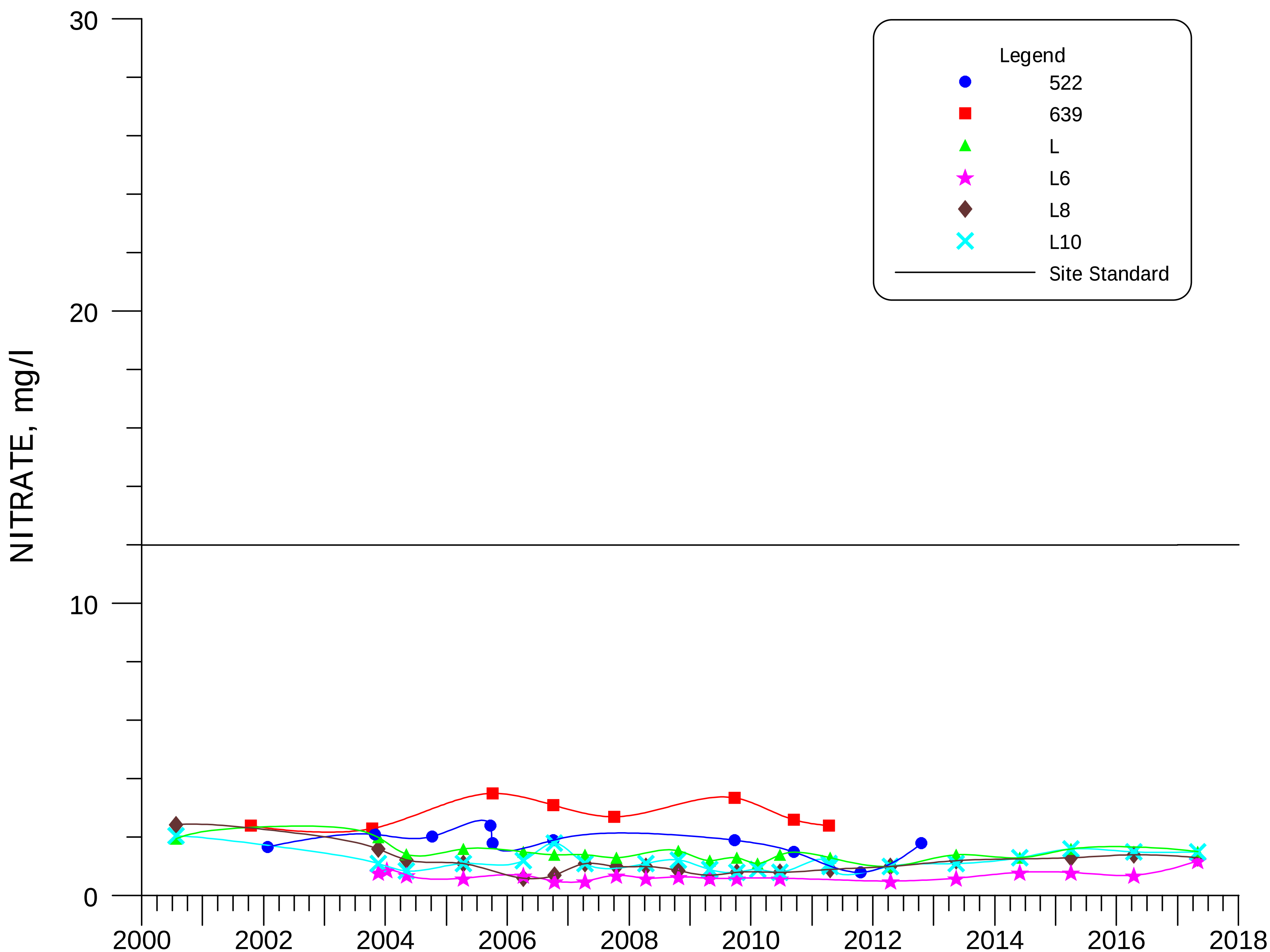

FIGURE 4.3-113. NITRATE CONCENTRATIONS FOR WELLS 522, 639, L, L6, L8 AND L10.

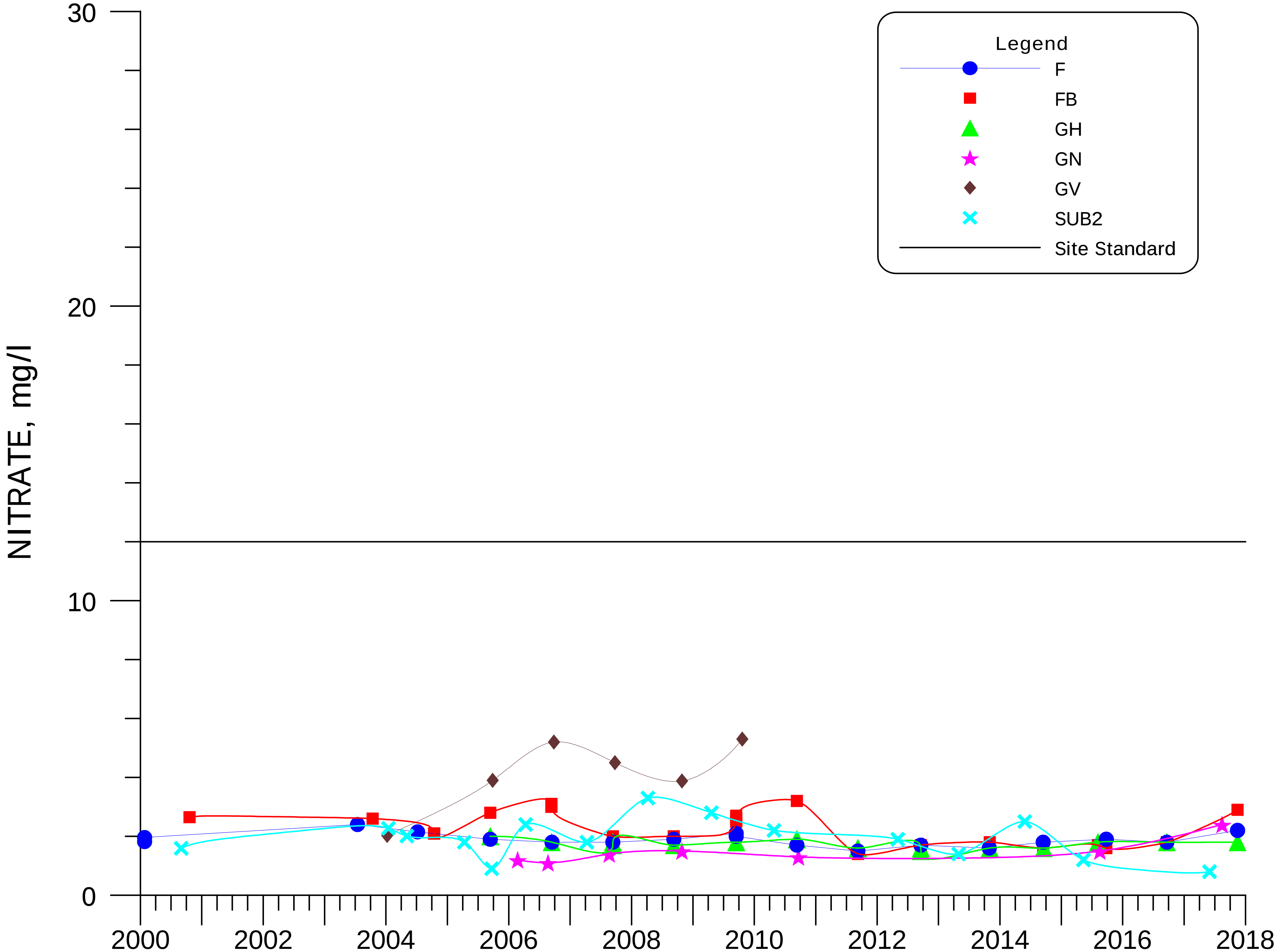

FIGURE 4.3-114. NITRATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, GV AND SUB2.

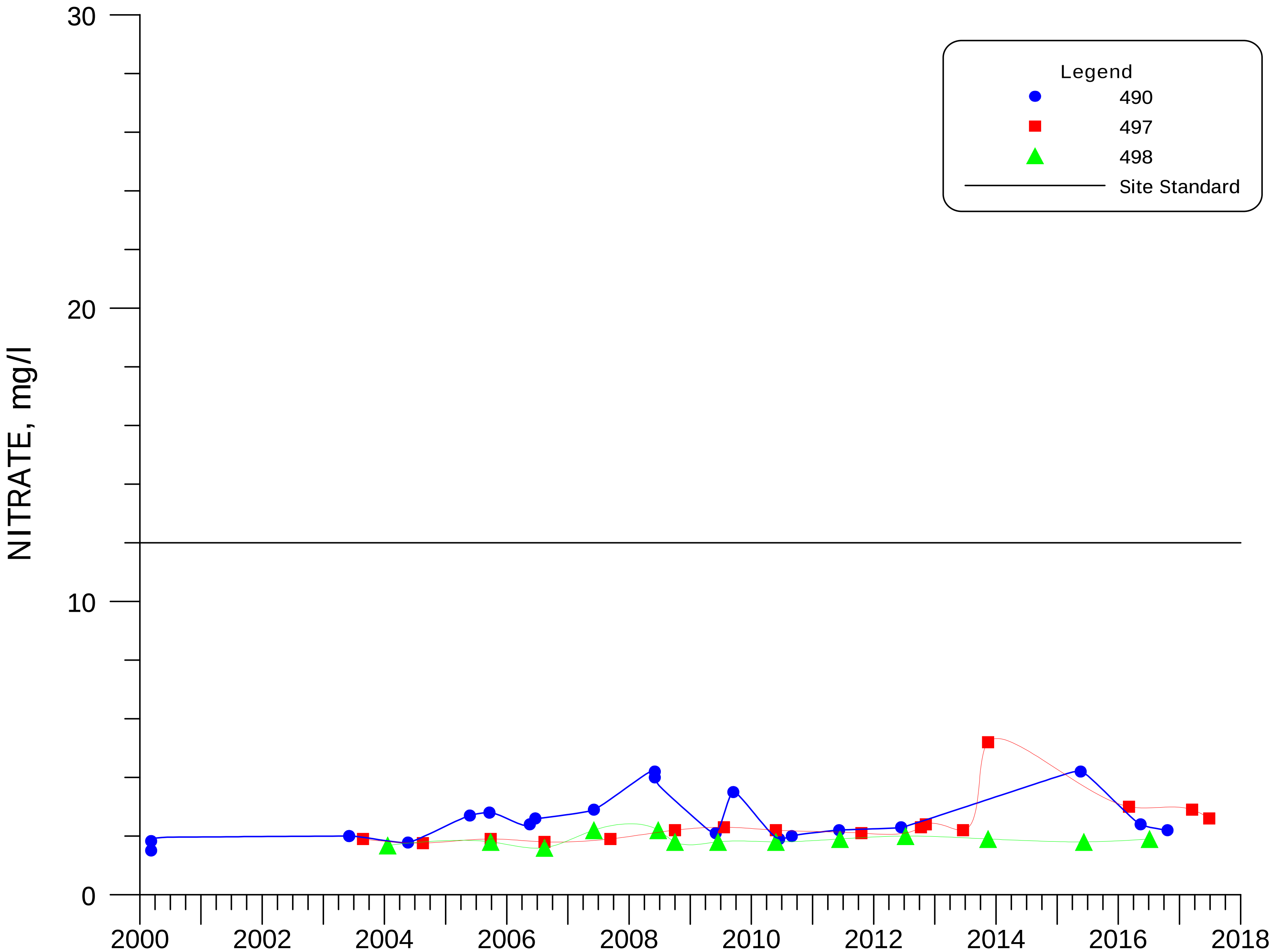

FIGURE 4.3-115. NITRATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

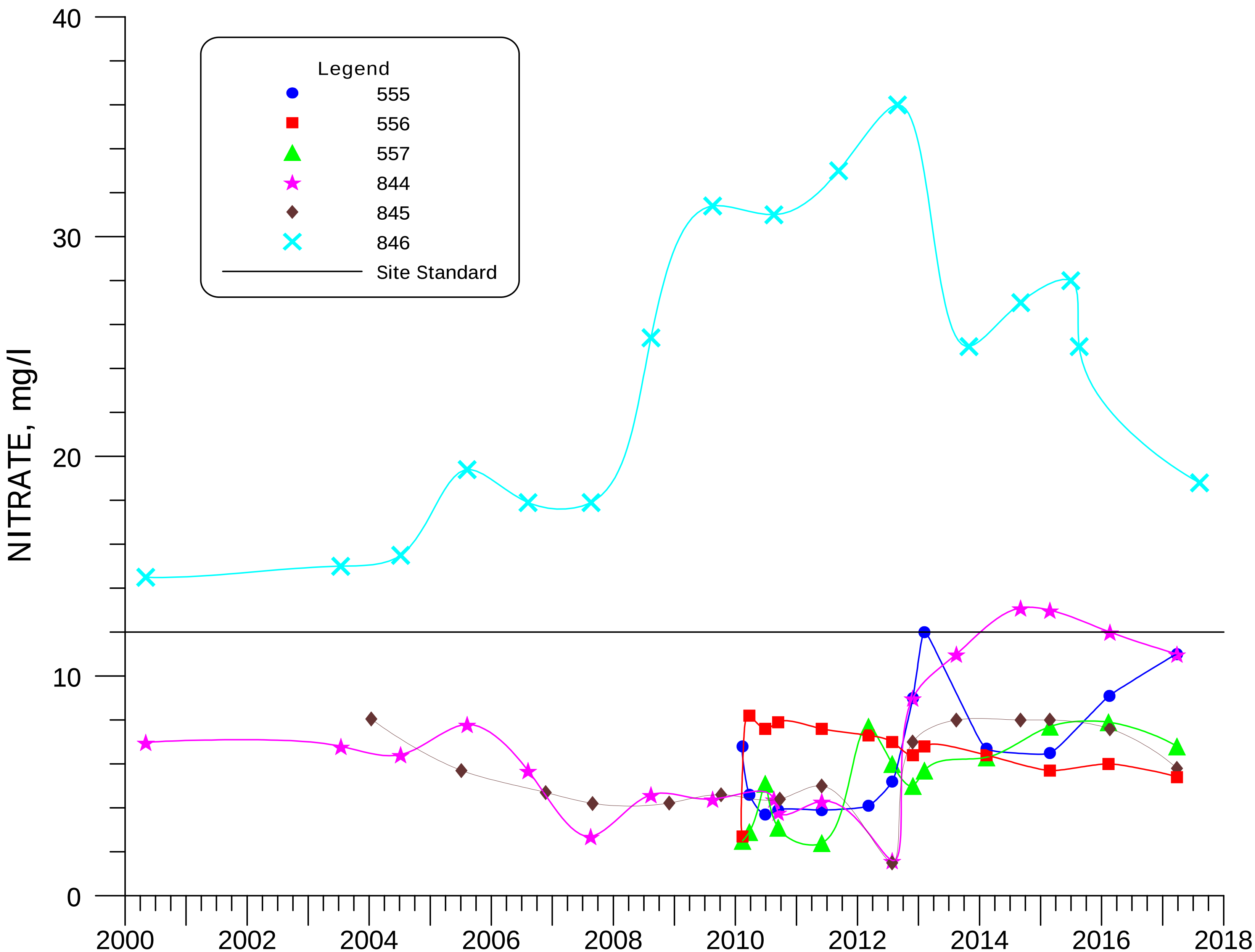

FIGURE 4.3-116. NITRATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

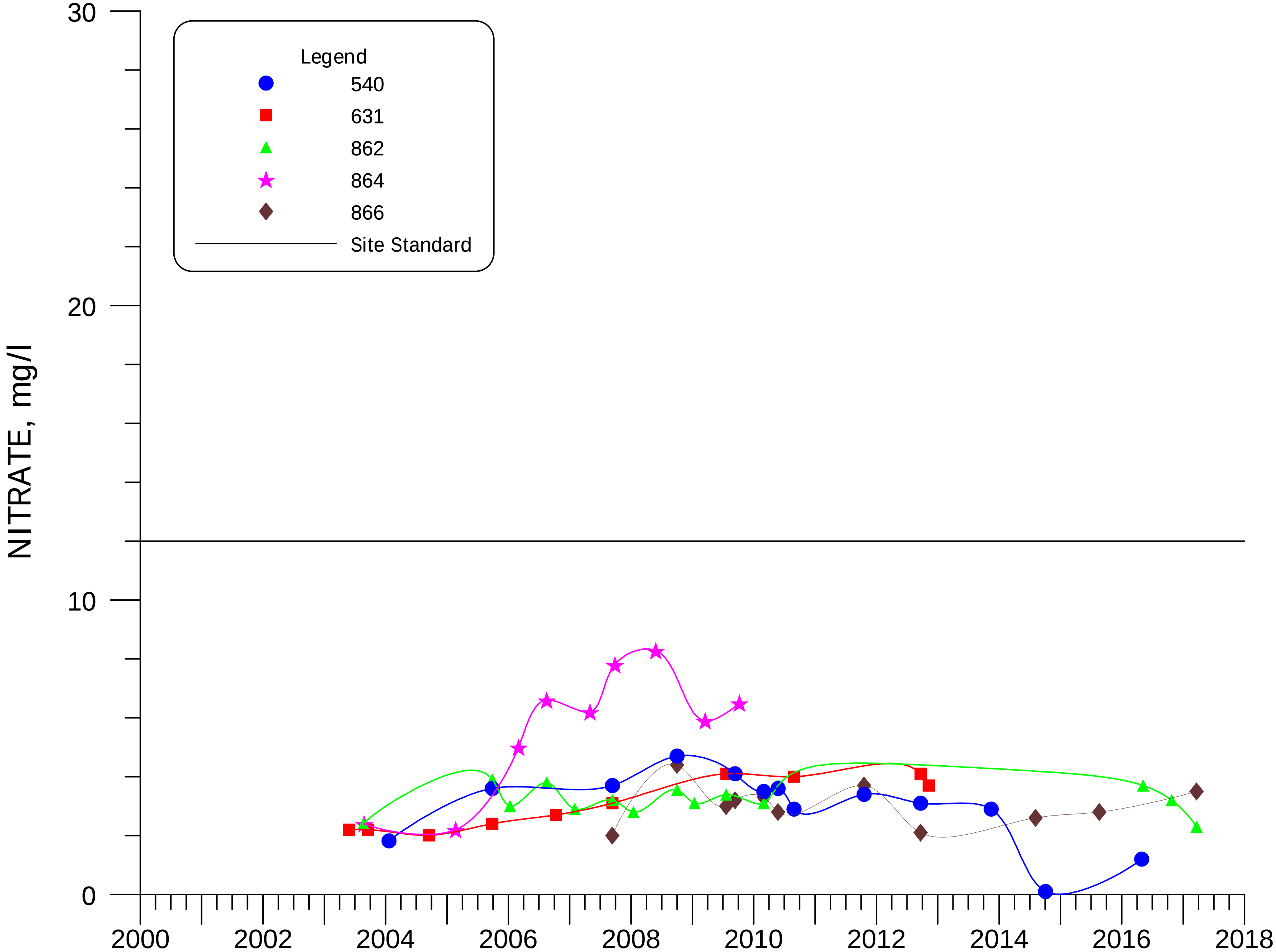

FIGURE 4.3-117. NITRATE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

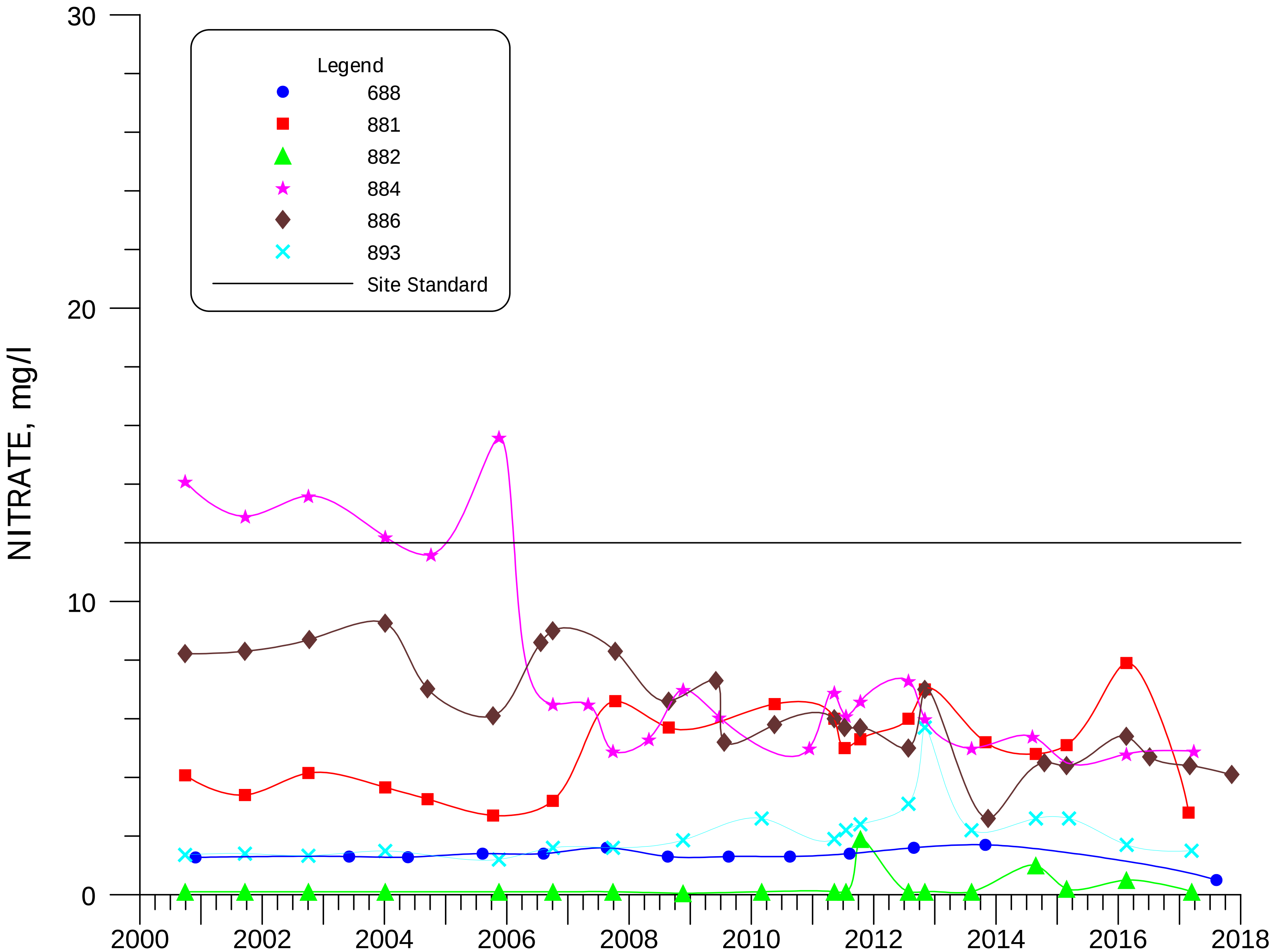

FIGURE 4.3-118. NITRATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

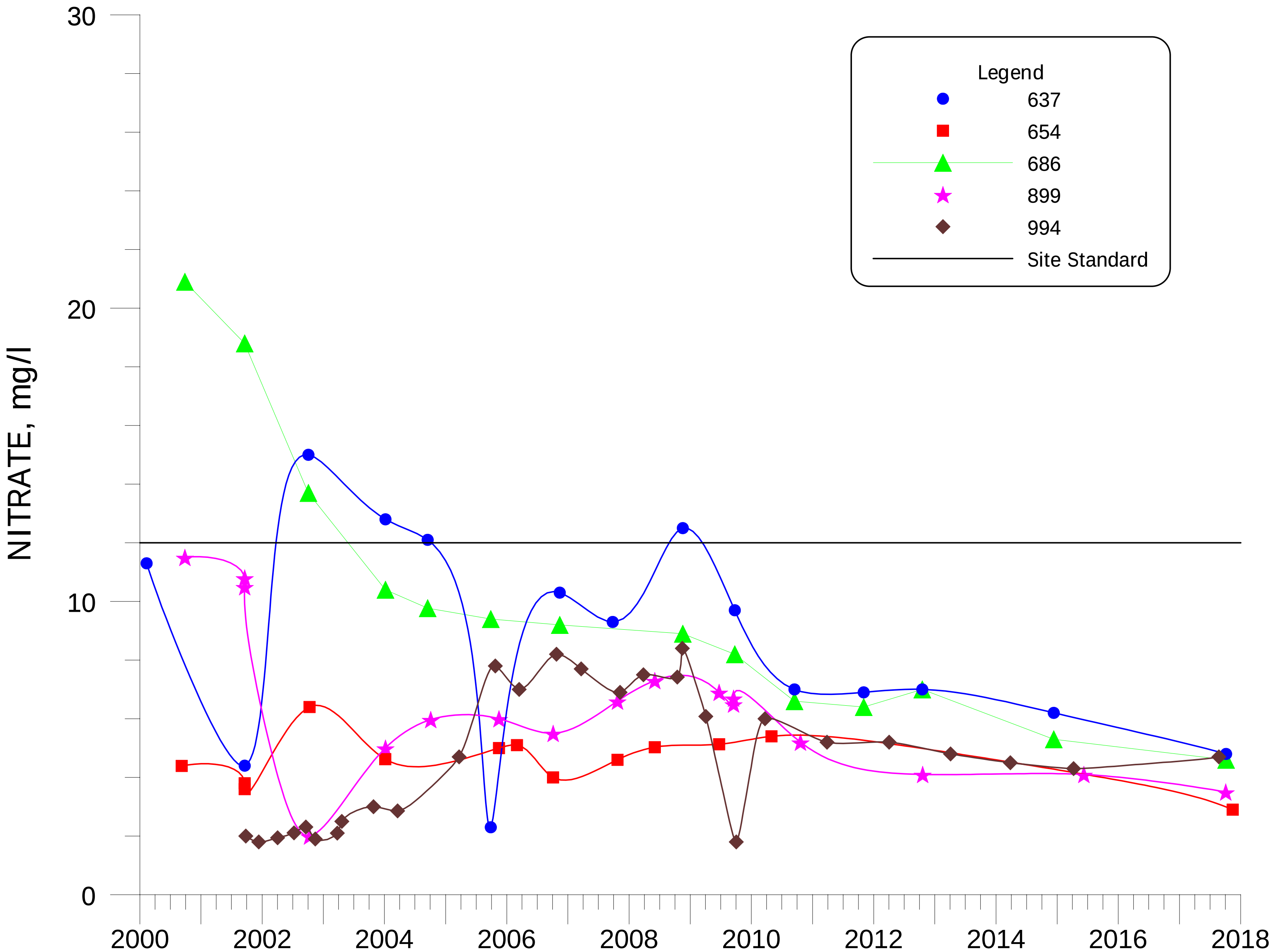

FIGURE 4.3-119. NITRATE CONCENTRATIONS FOR WELLS 637, 654, 686, 899 AND 994.

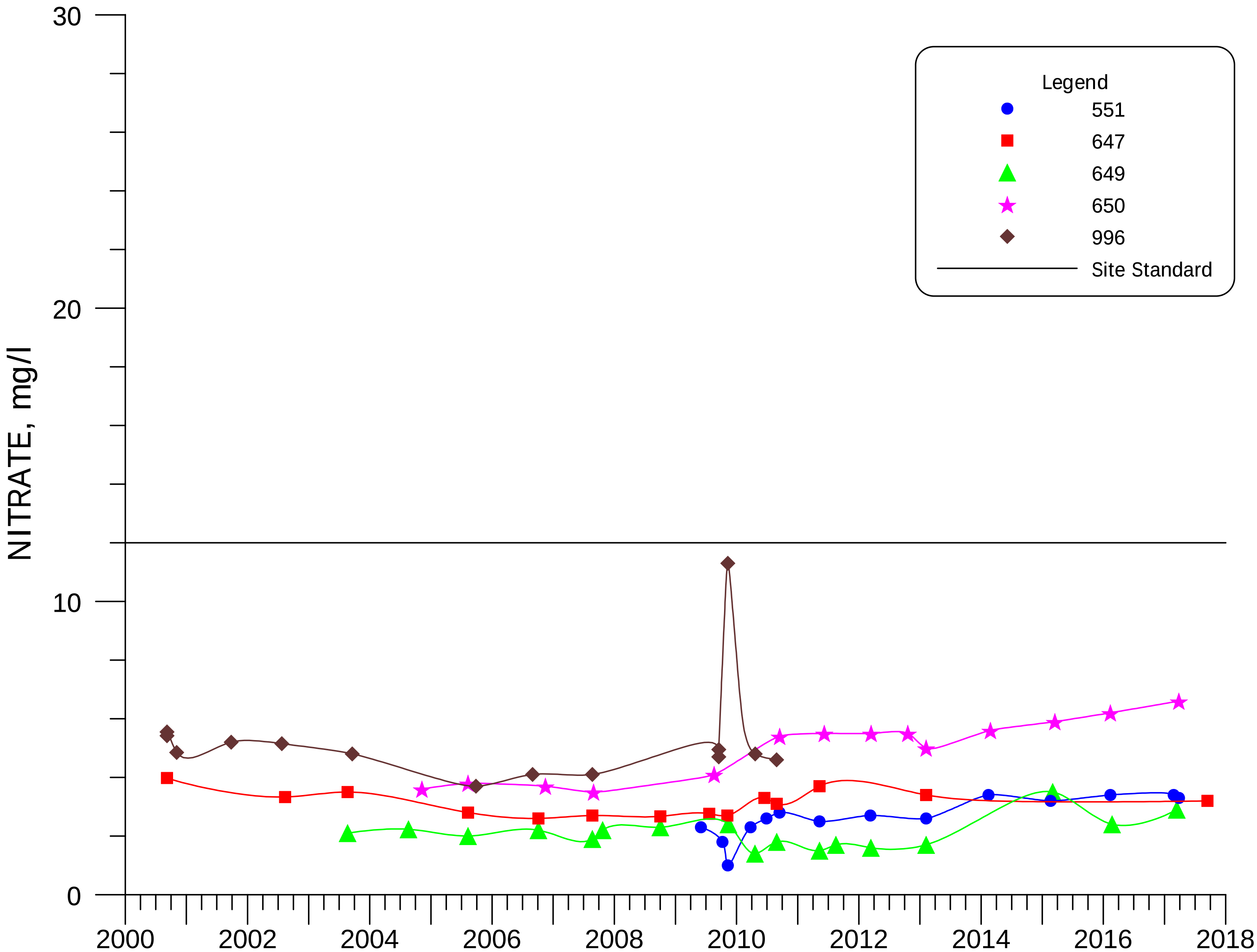

FIGURE 4.3-120. NITRATE CONCENTRATIONS FOR WELLS 551, 647, 649, 650 AND 996.

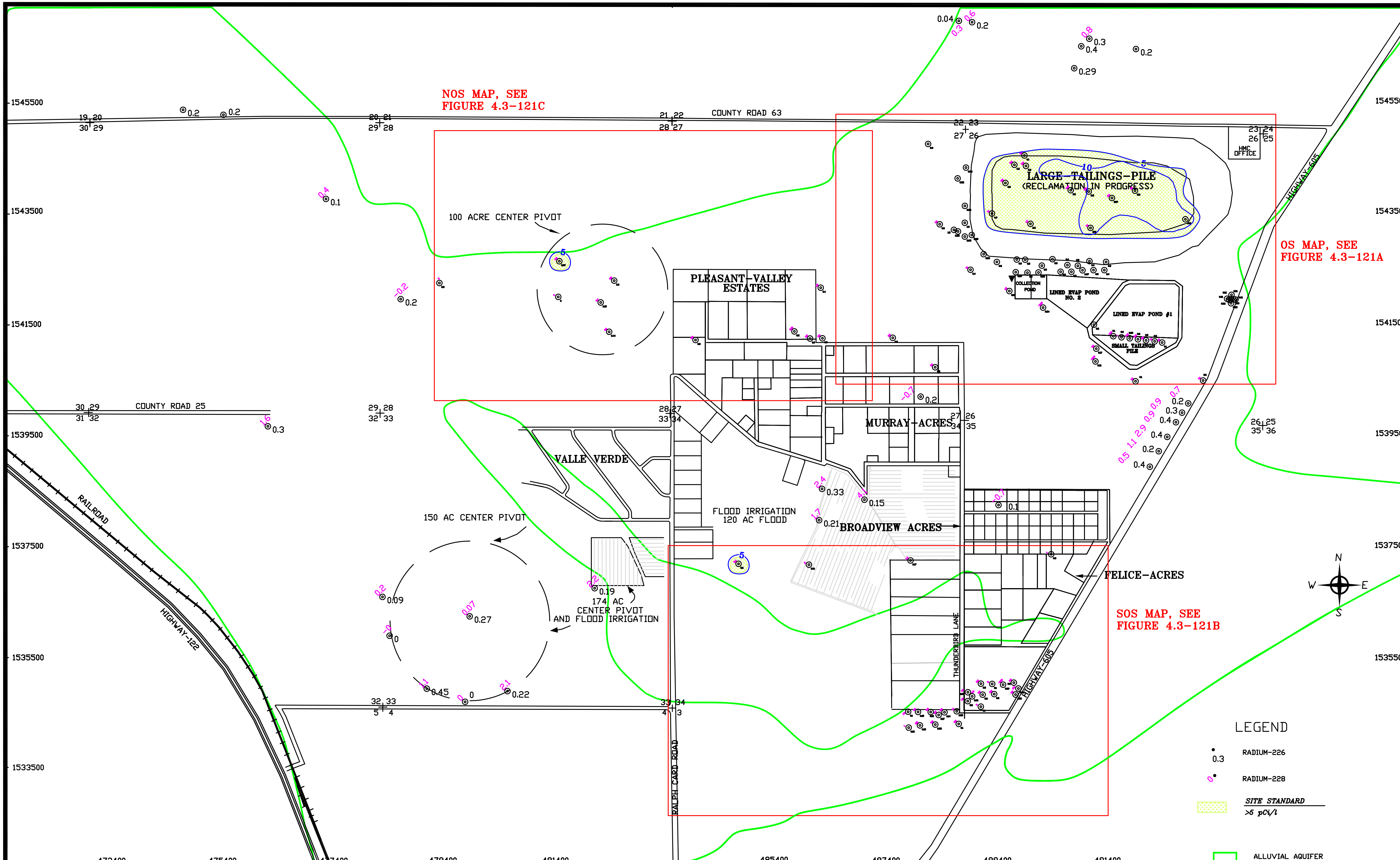

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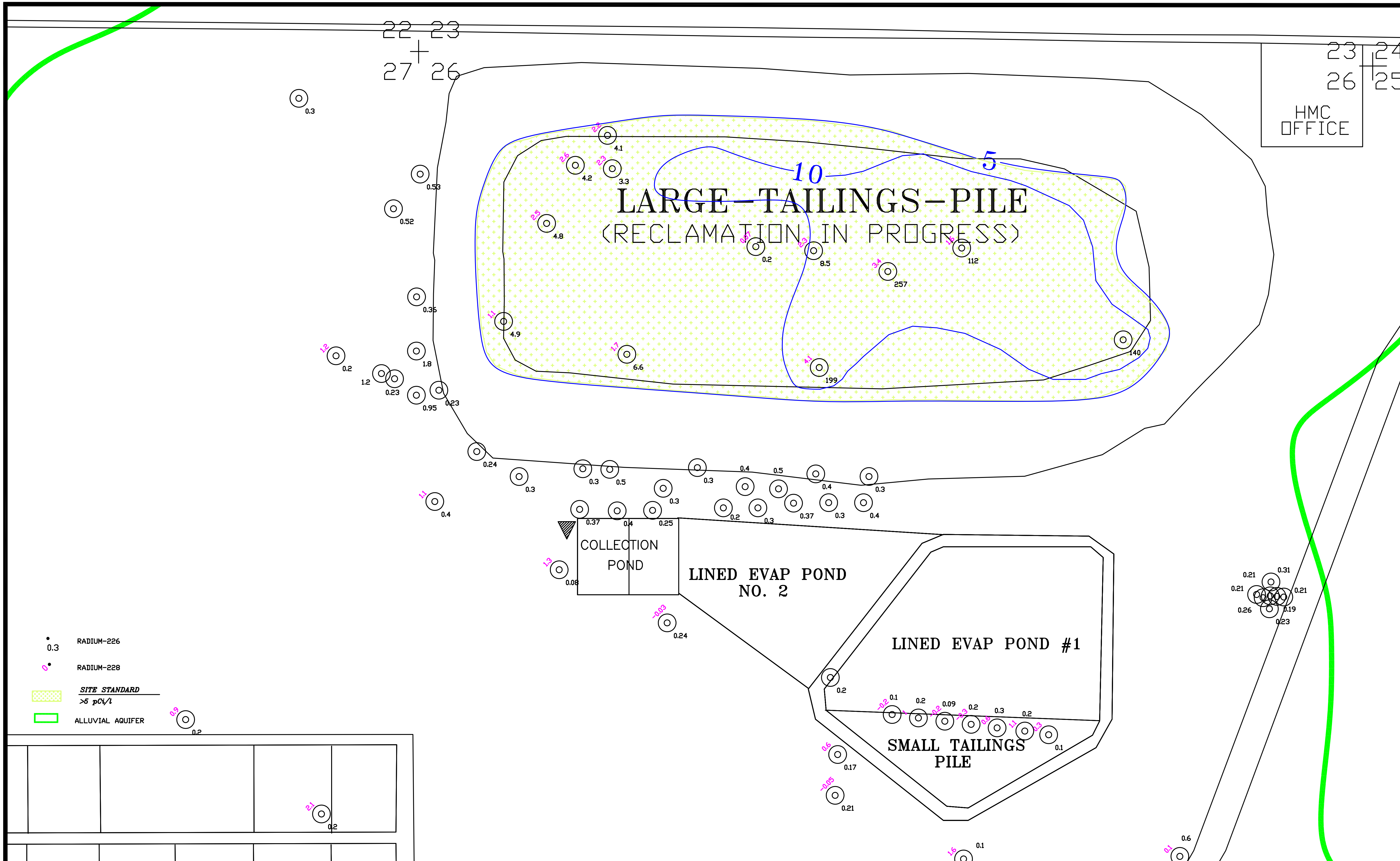
FIGURE 4.3-121. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, pCi/l



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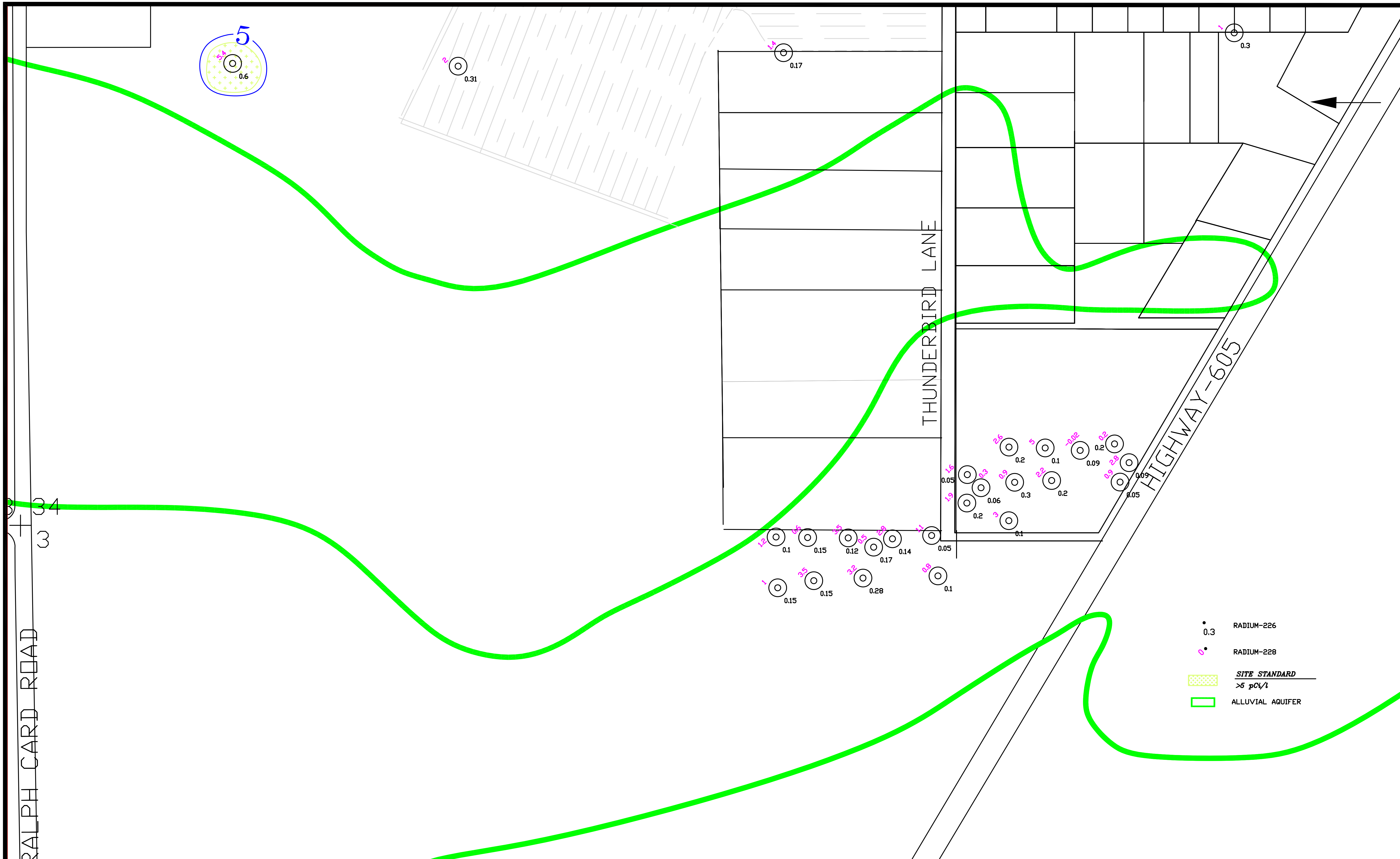
DATE: 2/6/18

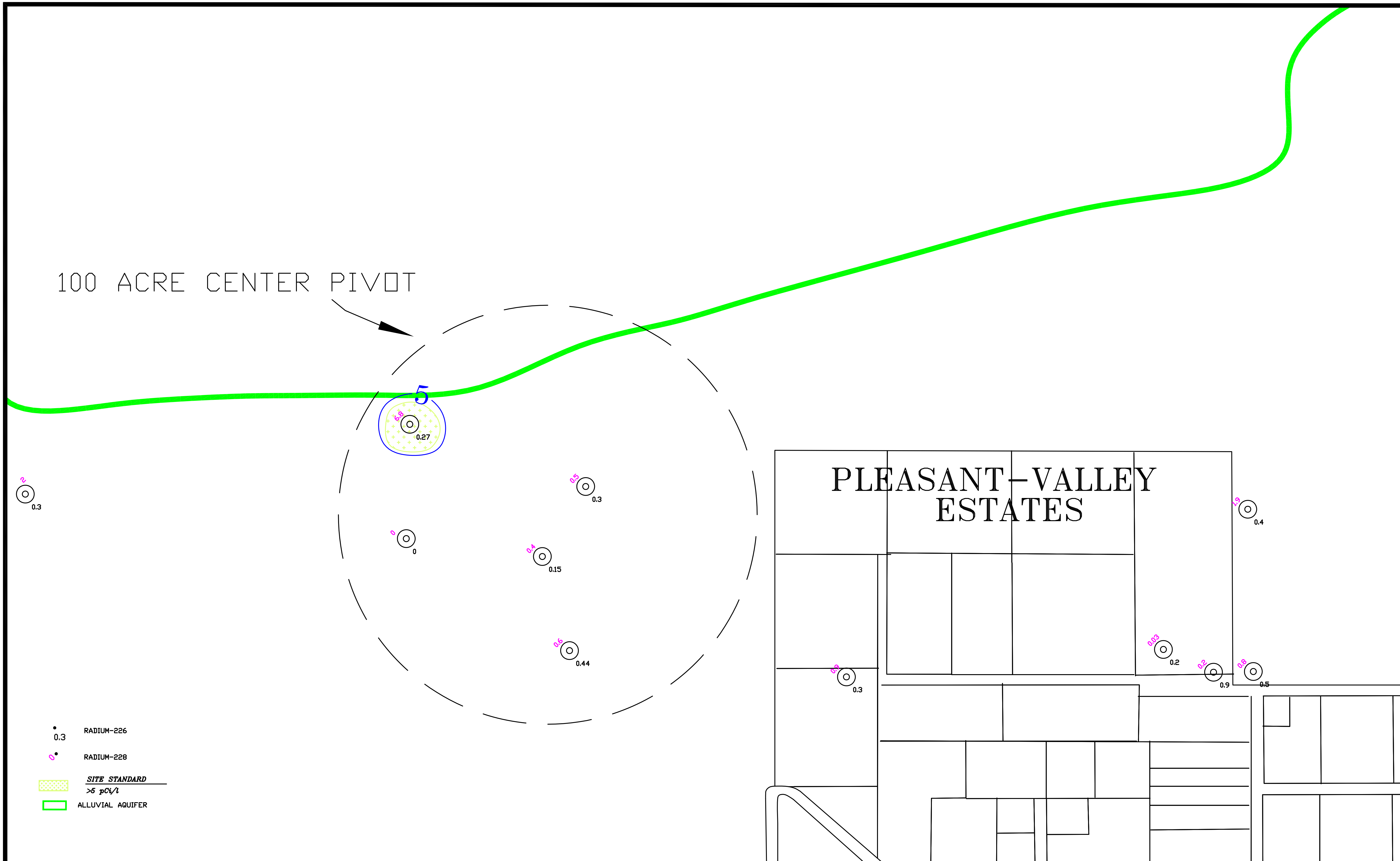
FIGURE 4.3-121A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, pCi/l

4.3-177



SCALE: 1"=500'
C:\PROJECTS\ 2018-06
1600QAL17
DATE: 1/26/18

FIGURE 4.3-121B. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, pCi/l



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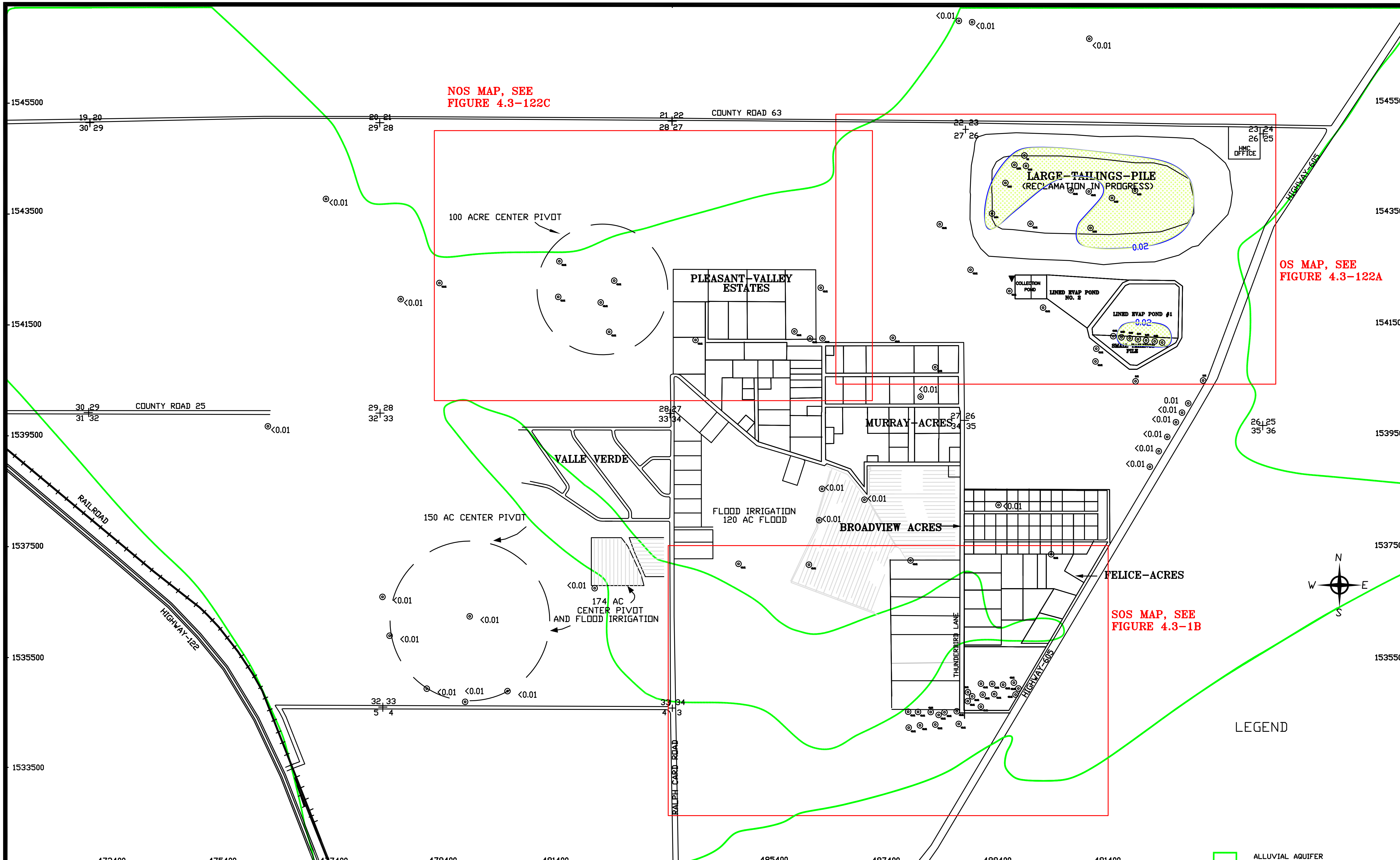
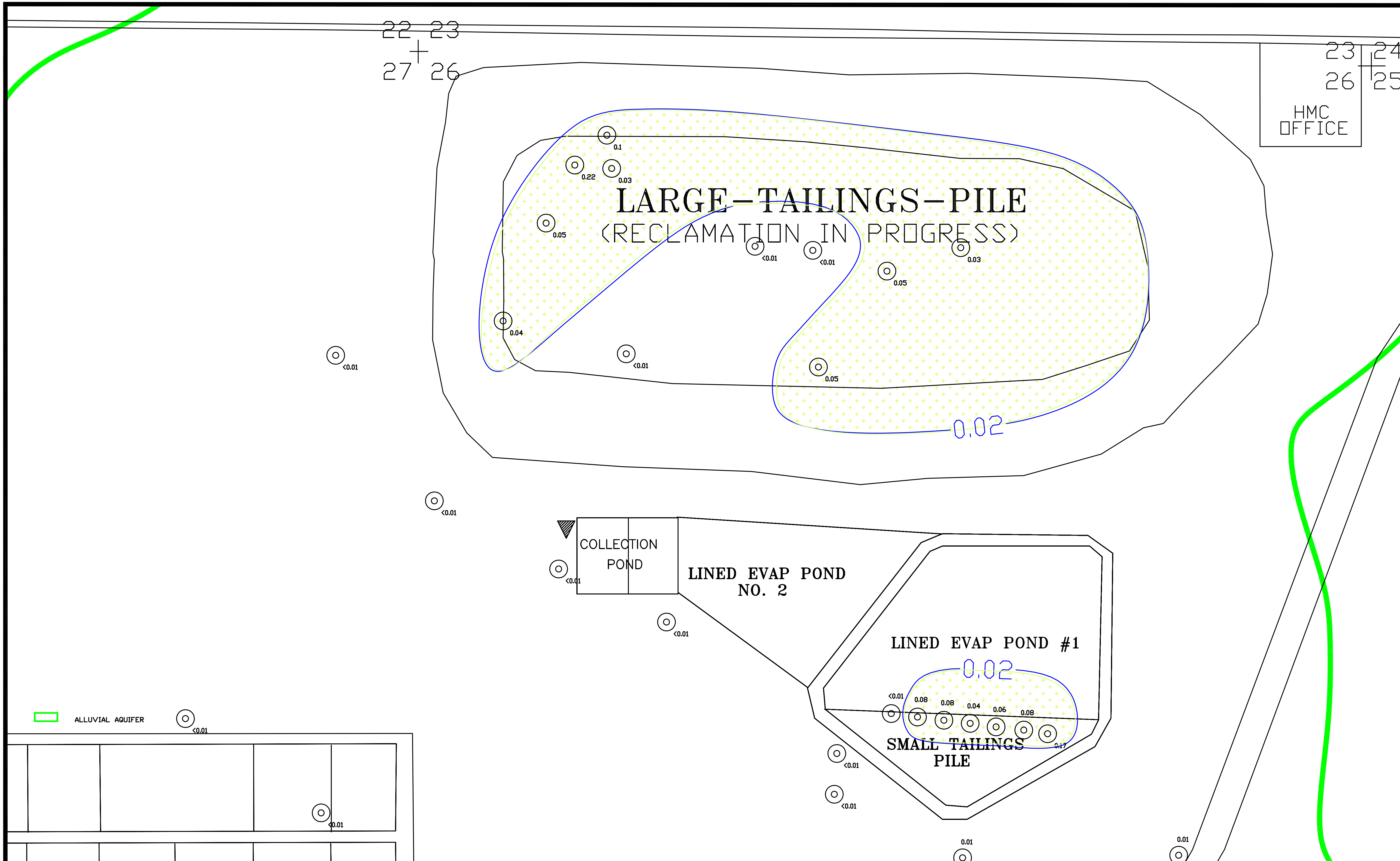
1600QAL17
DATE: 2/5/18

FIGURE 4.3-121C. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, pCi/l



SCALE: 1"=1600'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 2/5/18

FIGURE 4.3-122. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, mg/l



SCALE: 1"=500'
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DATE: 2/6/18

FIGURE 4.3-122A. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l

SCALE: 1"=500'
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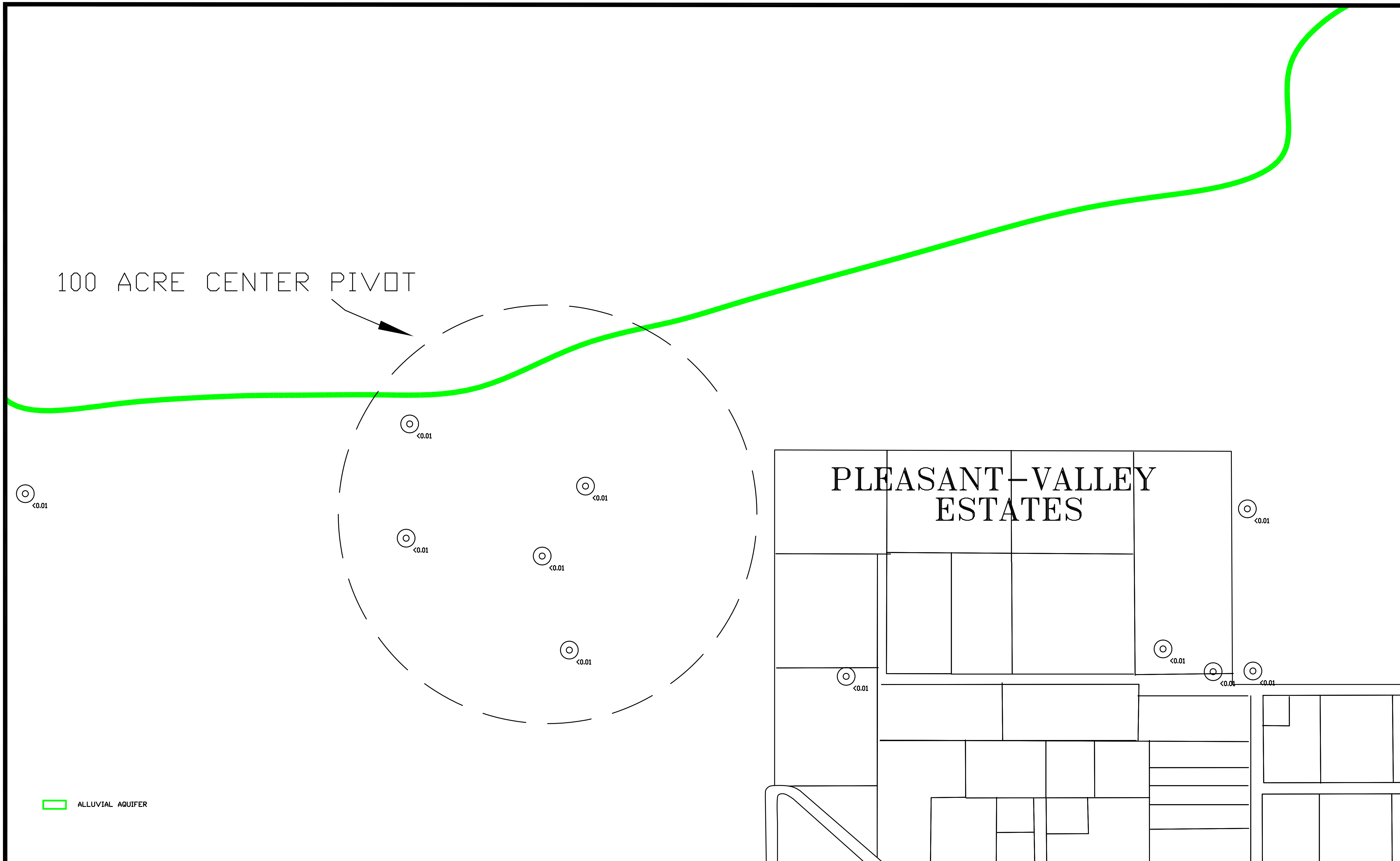
1600QAL17
DATE: 1/26/18

FIGURE 4.3-122B. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l



SCALE: 1"=500'
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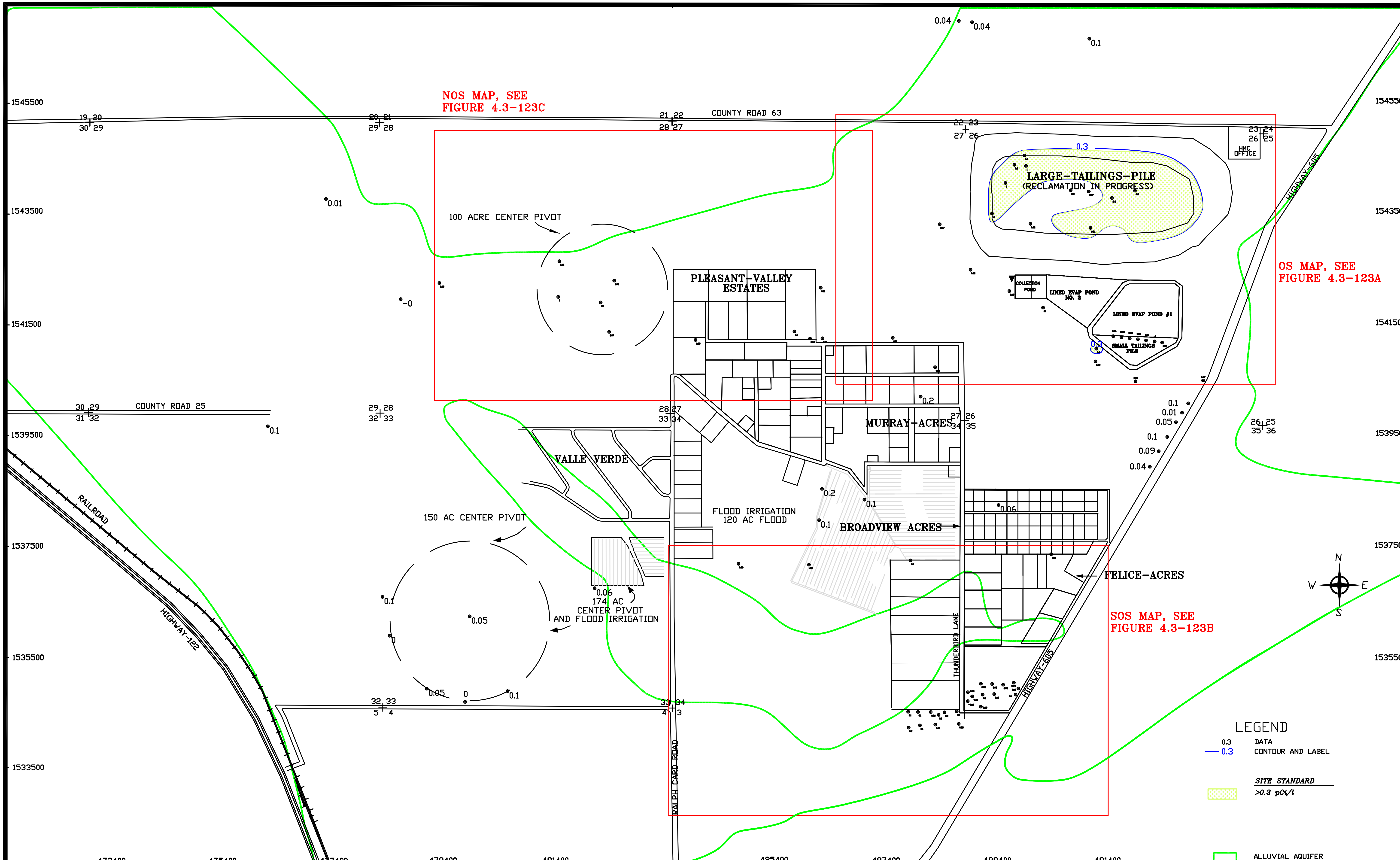
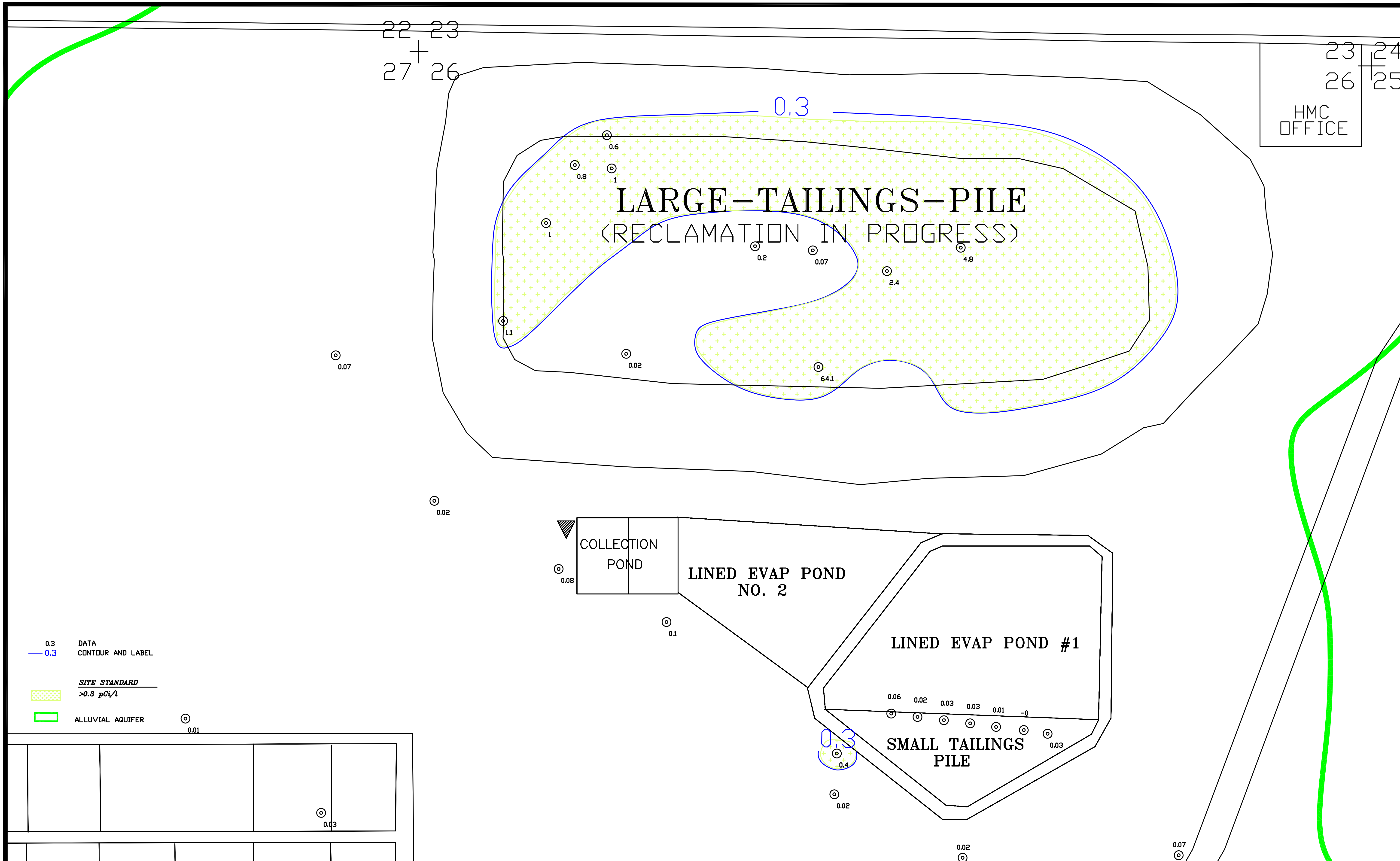
DATE: 2/5/18

FIGURE 4.3-122C. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l



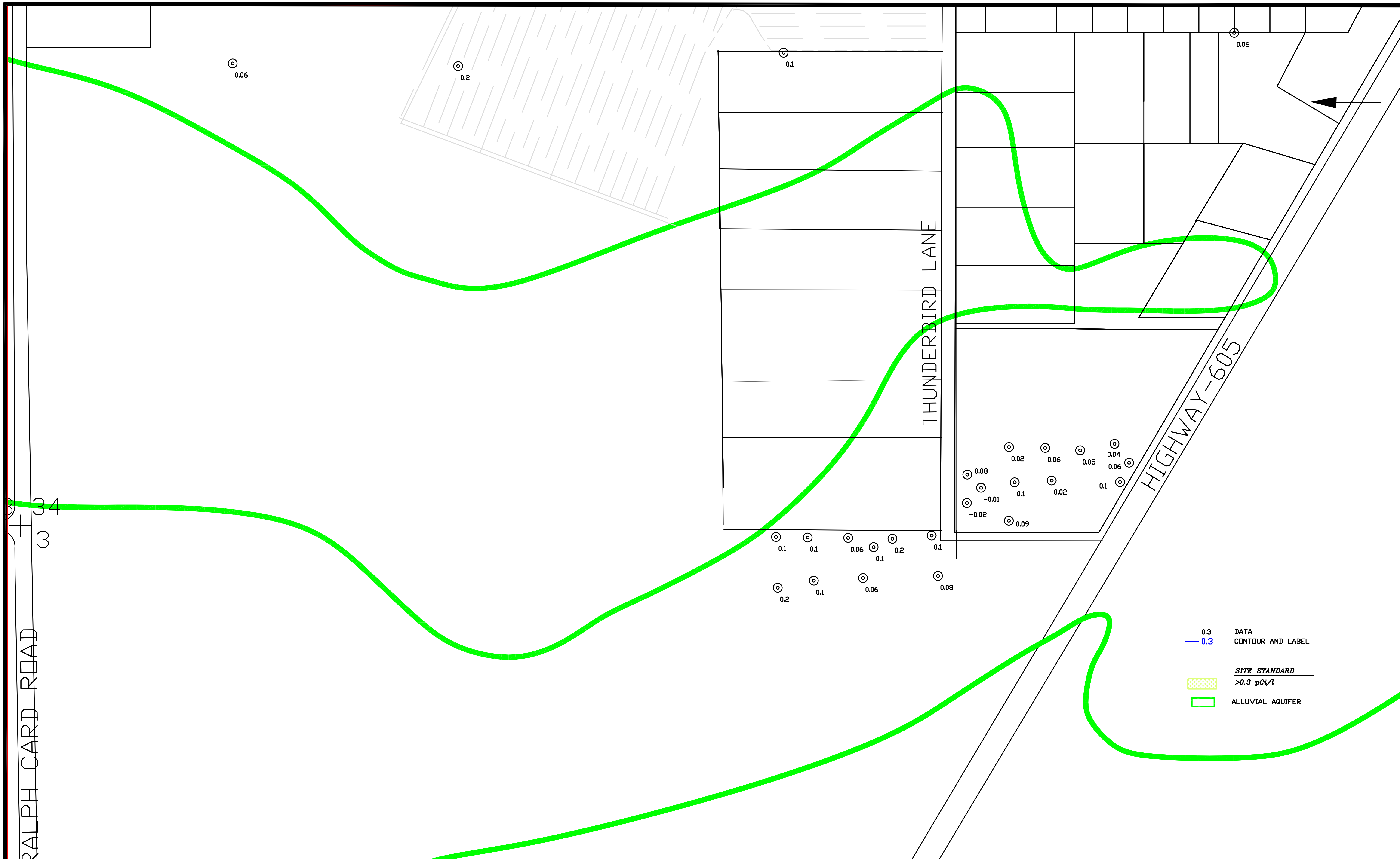
SCALE: 1"=1600'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 2/5/18

FIGURE 4.3-123. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2017, pCi/l



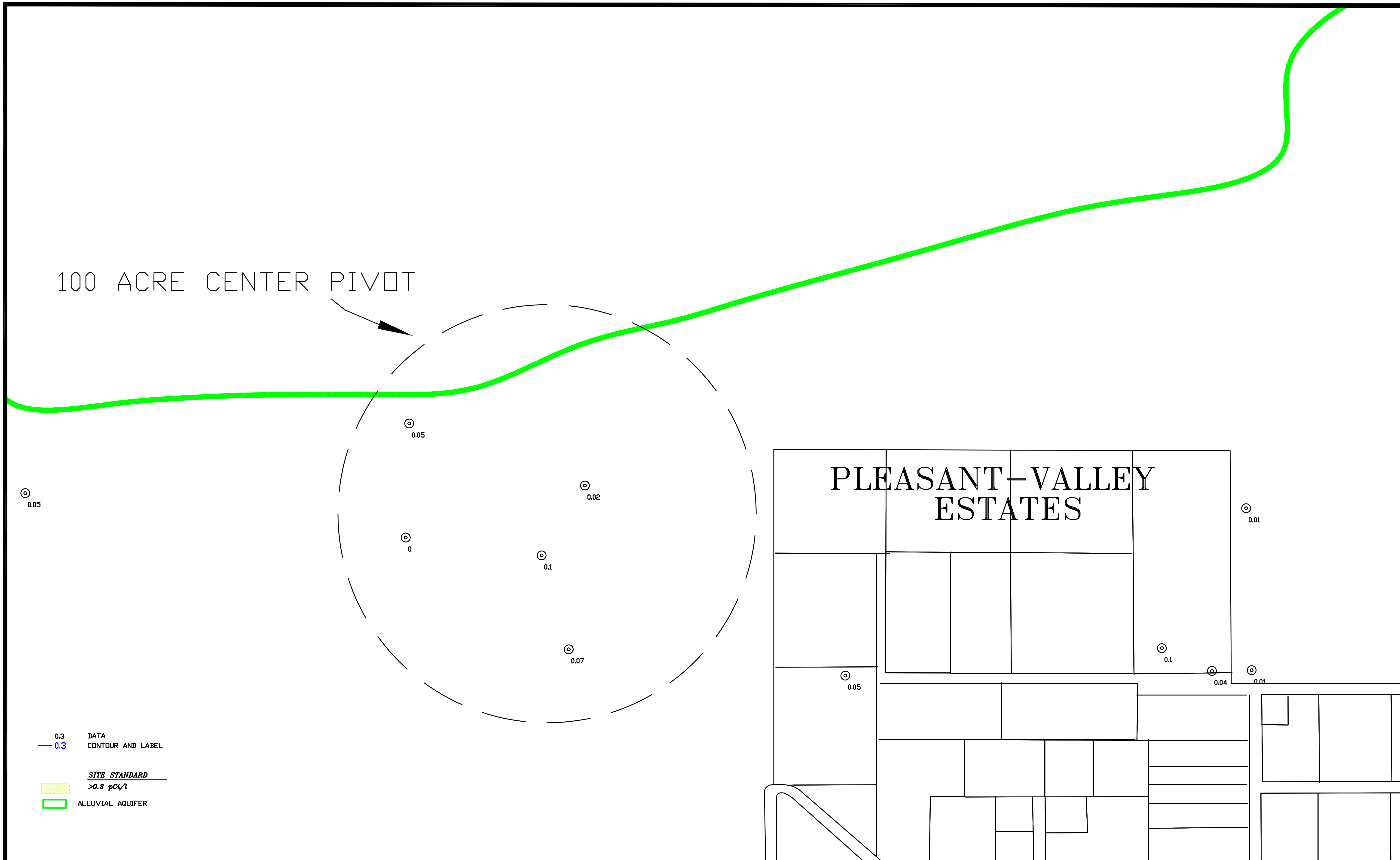
SCALE: 1"=500'
C:\PROJECTS\ 2018-06 1600QAL17
DATE: 2/6/18

FIGURE 4.3-123A. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2017, mg/l



SCALE: 1"=500'
C:\PROJECTS\ 2018-06
1600QAL17
DATE: 1/26/18

FIGURE 4.3-123B. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2017, mg/l



SCALE: 1"=500'
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DATE: 2/5/18

FIGURE 4.3-123C. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2017, mg/l

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

TABLES

Page Number

5.0 UPPER CHINLE AQUIFER MONITORING

5.1 UPPER CHINLE WELL COMPLETION

Chinle aquifer well locations are shown on Figures 5.1-1, 5.1-1A and 5.1-1B. The Upper and Middle Chinle aquifers do not exist in the area west of Ralph Card Road. Table 5.1-1 presents basic information for the Chinle wells located on the Homestake property. This table indicates well coordinates, well depth, casing diameter, water level, measuring point in feet above land surface and elevation, and depth and elevation to the top of the Chinle aquifers. A "U" follows the elevation of the top of the Upper Chinle aquifer, and an "M" and an "L" have the same meaning for the Middle and Lower Chinle aquifers, respectively. Some of the wells have been used to define the depth to the base of the alluvium, and an "A" is presented following the elevation to denote that these values are for the base of the alluvium. The casing perforation interval and aquifer unit are also presented in this table.

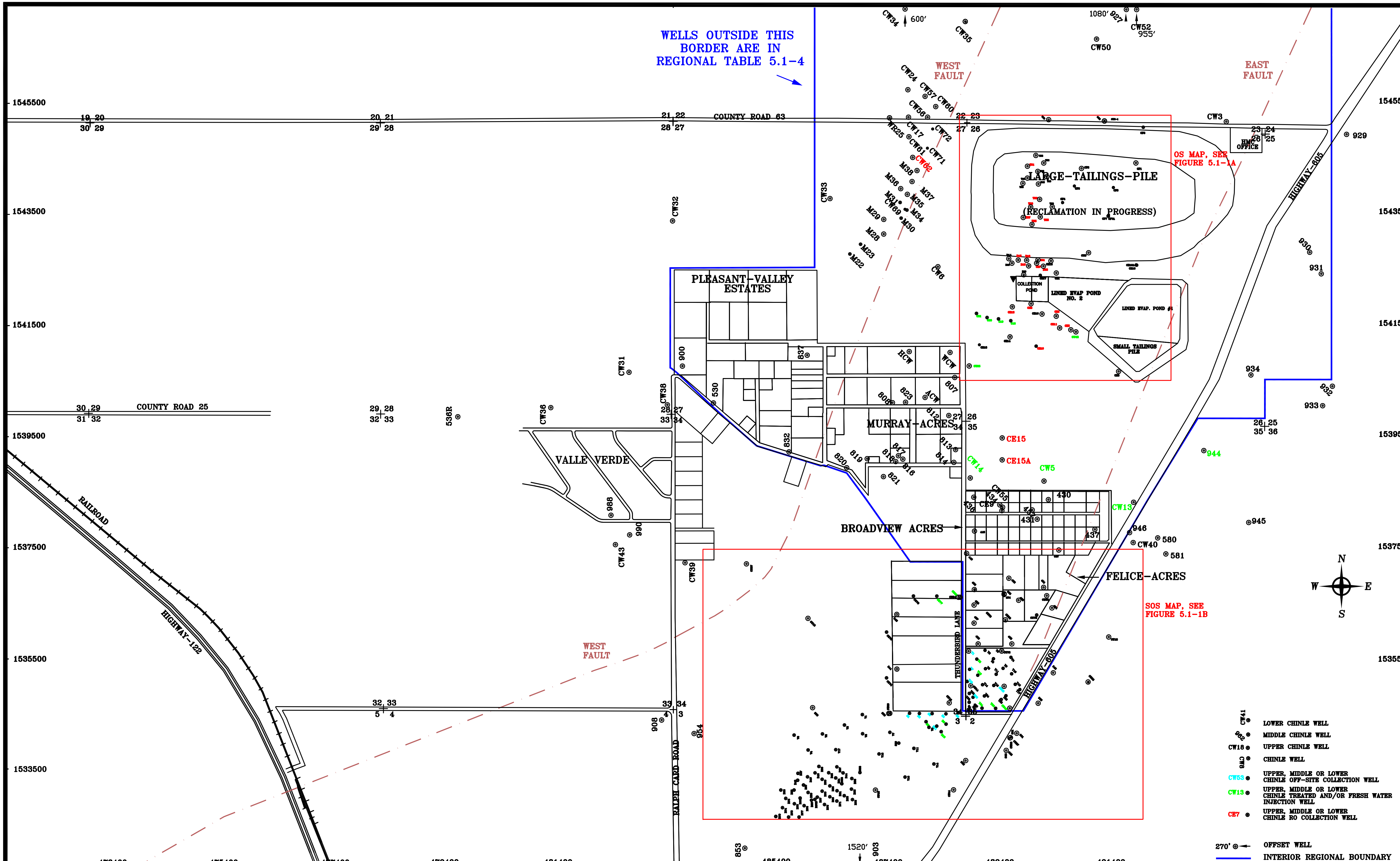
Table 5.1-2 presents basic well data for Chinle wells in Broadview Acres and Felice Acres. Table 5.1-3 presents similar data for Murray Acres and Pleasant Valley Estates Chinle wells. Wells that are not located within the immediate Grants Project property or within the four subdivision boundaries are denoted on Table 5.1-4 as the regional Chinle wells (see Figure 5.1-1 for inner regional boundary shown in blue). Figure 5.1-1A shows the locations of the On-Site Chinle wells while Figure 5.1-1B presents the Chinle well locations for the South Off-Site wells. No Upper, Middle and Lower Chinle wells were drilled by HMC in 2017.

An analysis of the background water quality for the Chinle aquifers was presented in Hydro-Engineering 2003b. Background values for the Chinle mixing zone and the Upper, Middle and Lower Chinle non-mixing zones were also defined in the previously cited report. These site standard values are listed in the title block of the water-quality figures in this report.

The location of Upper Chinle wells and the areal extent of the Upper Chinle aquifer at the Grants Project are shown on Figures 5.1-2 and 5.1-2A. Upper Chinle wells 944, C18, C19, C20, C21, CW4R, CW5, CW13 and CW25 are shown in green to denote that these are treated and/or fresh-water injection wells. Upper Chinle wells B15, B16, B19, B31, B32, CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A, CE19, T25, T27, T28, T30, T32 and T51 were pumped to supply the R.O. plant in 2017 and are shown in red.

Well CW18 was used as a supply for fresh-water injection starting in late September of 2002 but was not used continuously after May of 2004. It was not used as a freshwater injection supply in 2017. Figure 5.1-2 also shows the location of the West and East Faults. A blue dot pattern is used to show the limits of the Upper Chinle sandstone where Chinle shale exists between the sandstone and the alluvium. Figure 1.1-2 presents a typical geologic cross section to show the relative position of the alluvial and Chinle aquifers (see Figure 1.1-1 for the location of this cross section). Figures 1.1-3 and 1.1-4 present additional geologic cross sections which show the relative position of the Chinle aquifers (see Figure 1.1-1 for the locations of these cross sections).

The subcrop of the Upper Chinle sandstone where the alluvium is saturated or unsaturated above the Upper Chinle sandstone is also shown on Figure 5.1-2 and 5.1-2A. The Upper Chinle aquifer does not exist to the west and south of the subcrop area. The Upper Chinle sandstone, therefore, does not exist west of the West Fault.



SCALE: 1"=1600'

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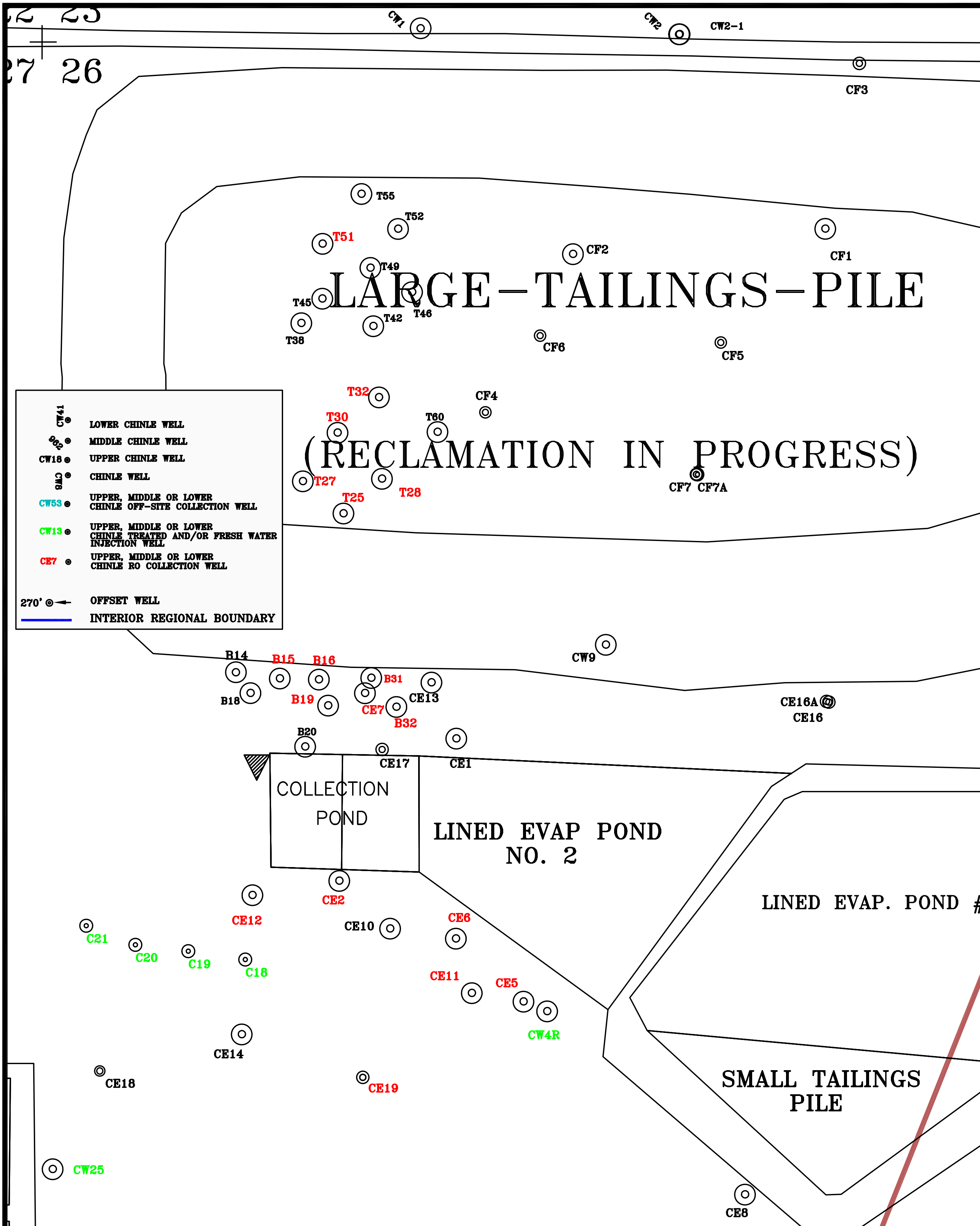
BASE17chinle.DWG

DATE: 2/2/17

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS, 2017



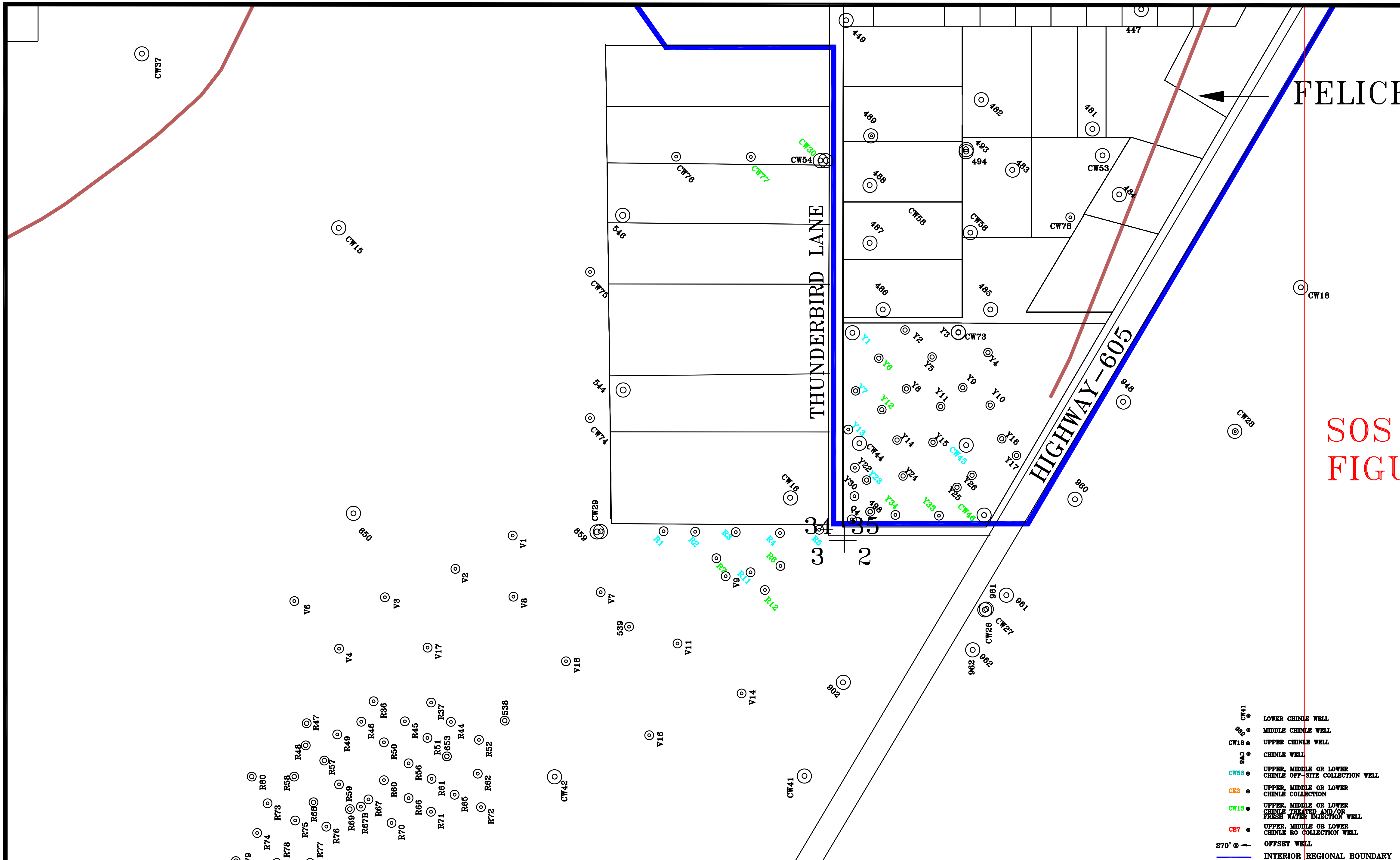
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-1A. CHINLE AQUIFER WELL LOCATIONS, OS, 2017

DATE: 1/22/18

SCALE: 1"=500'

PAGE: 5.1-4

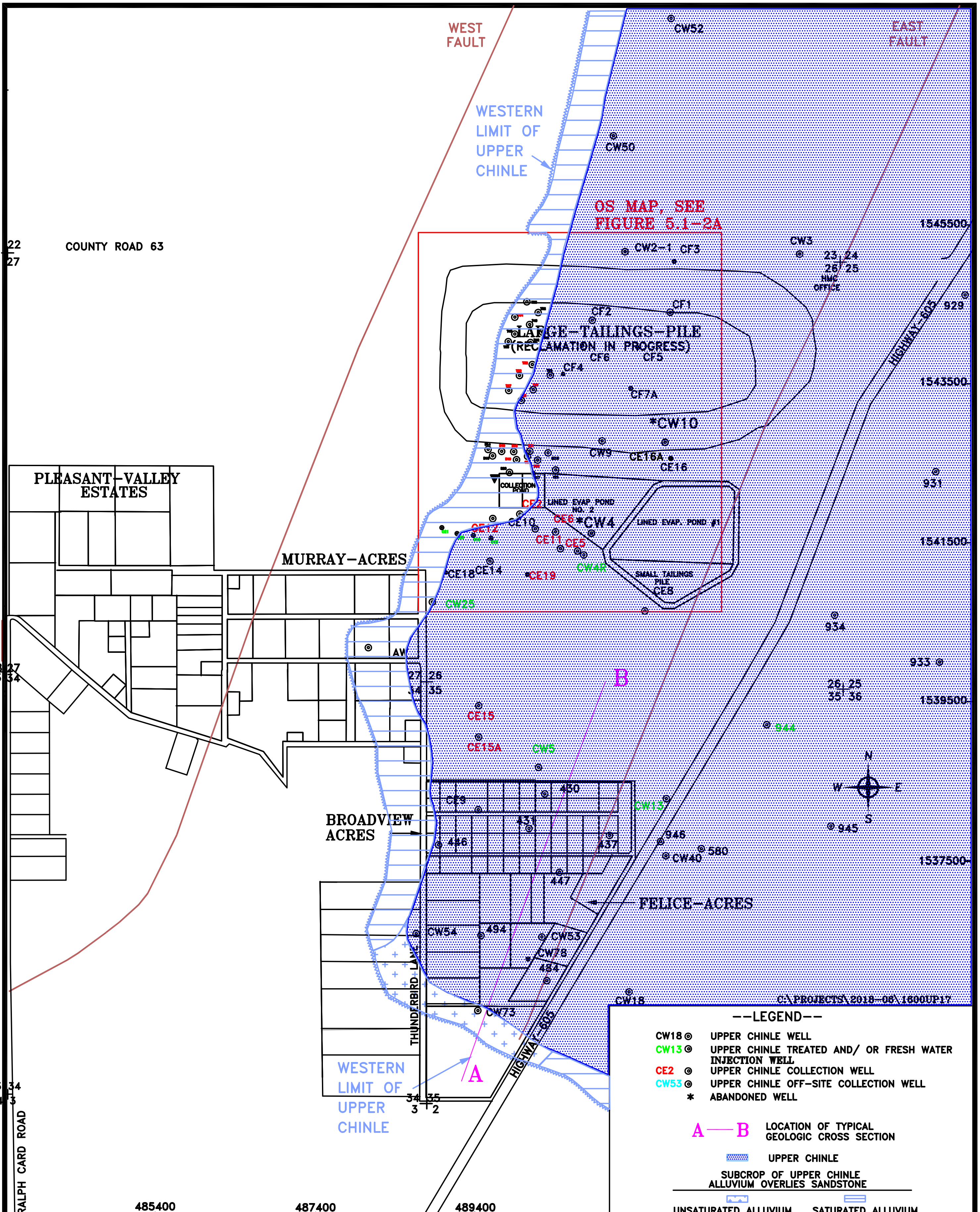


SCALE: 1"=500'

C:\PROJECTS\2018-06
BASE17chinle.DWG

DATE: 1/22/18

FIGURE 5.1-1B CHINLE AQUIFER WELL LCOATIONS, SOS, 2017

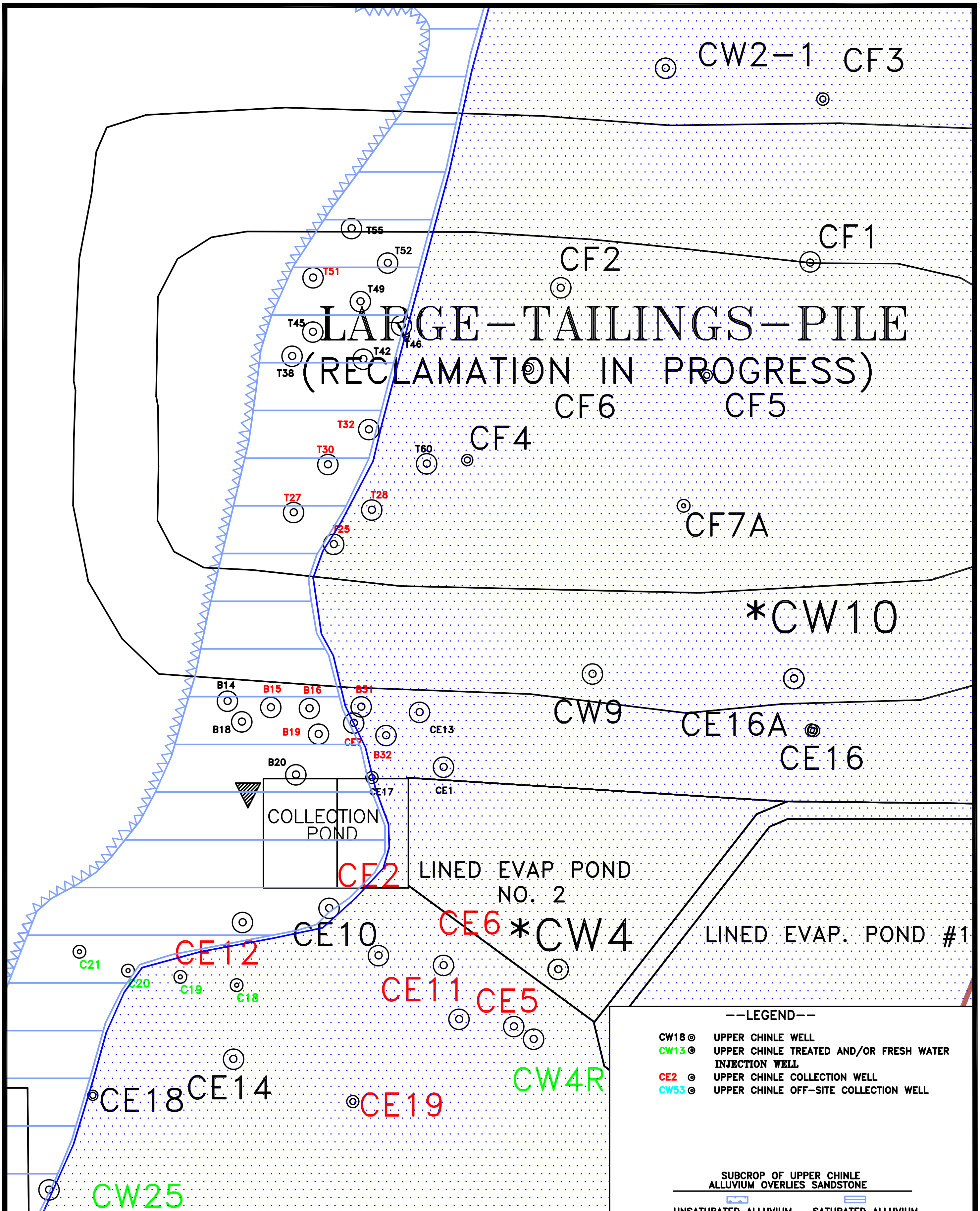


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-2 LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, 2017

DATE: 10/24/2017

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 5.1-2A. LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, OS, 2017	SCALE: 1"= 500'
	PAGE: 5.1-7

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)							
0930	1542848	494997	410.0	6.0	12/5/2017	107.78	6490.76	0.0	6598.54	30	6569	A	-	---
										335	6264	M	330-400	Middle
0931	1542461	495207	366.7	6.0	12/5/2017	63.97	6546.59	0.9	6610.56	339	6271	U	-	Upper
0934	1540641	493941	293.0	6.0	---	---	---	2.0	6585.59	30	6554	A	-	---
										282	6302	U	-	Upper
B14	1542733	489579	120.0	4.5	---	---	---	2.0	6575.65	68	6506	A	60-120	Alluvium
										68	6506	U	60-120	Upper
B15	1542708	489749	120.0	4.5	5/2/2017	60.50	6515.81	2.0	6576.31	72	6502	U	60-120	Upper
										72	6502	A	60-120	Alluvium
B16	1542705	489900	120.0	4.5	5/2/2017	45.60	6529.77	2.0	6575.37	83	6490	U	60-120	Upper
										83	6490	A	60-120	Alluvium
B17	1542659	489493	95.0	4.5	---	---	---	2.0	6574.31	---	---	A	55-95	Alluvium
										---	---	U	55-95	Upper
B18	1542652	489634	120.0	4.5	---	---	---	2.0	6576.13	70	6504	U	60-120	Upper
										70	6504	A	60-120	Alluvium
B19	1542605	489936	120.0	4.5	---	---	---	2.0	6574.01	90	6482	A	60-120	Alluvium
										90	6482	U	60-120	Upper
B20	1542444	489847	120.0	4.5	---	---	---	2.0	6574.44	90	6482	A	60-120	Alluvium
										90	6482	U	60-120	Upper
B31	1542710	490103	120.0	4.5	---	---	---	2.0	6575.96	83	6491	A	60-100	Alluvium
										83	6491	U	60-100	Upper
B32	1542598	490201	120.0	4.5	5/3/2017	46.01	6529.38	2.0	6575.39	93	6480	U	60-120	Upper
										93	6480	A	60-120	Alluvium
C18	1541616	489614	120.0	4.5	---	---	---	0.5	6571.10	---	---	U	40-120	Upper
										60	6511	A	40-120	Alluvium
C19	1541648	489392	120.0	4.5	---	---	---	0.5	6569.91	---	---	U	40-120	Upper
										80	6489	A	40-120	Alluvium
C20	1541673	489187	110.0	4.5	---	---	---	0.5	6570.16	---	---	U	50-110	Upper
										70	6500	A	50-110	Alluvium
C21	1541747	488996	100.0	4.5	---	---	---	0.5	6571.99	---	---	U	40-100	Upper
										90	6481	A	40-100	Alluvium
CE1	1542475	490434	137.0	5.0	12/5/2017	37.67	6532.52	4.4	6570.19	75	6491	A	-	---
										106	6460	U	98-138	Upper
CE2	1541923	489979	119.7	5.0	12/26/2017	69.40	6506.95	1.8	6576.35	74	6501	U	78-118	Upper
										74	6501	A	-	---
CE5	1541453	490695	140.0	5.0	12/26/2017	47.35	6521.20	1.6	6568.55	63	6504	A	-	---
										103	6464	U	100-140	Upper
CE6	1541698	490433	140.0	6.0	12/26/2017	88.30	6476.89	1.5	6565.19	75	6489	U	-	Upper
CE7	1542652	490079	120.0	6.0	12/26/2017	47.70	6528.29	1.9	6575.99	95	6479	U	100-140	Upper

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CE8	1540704	491556	216.6	6.0	12/5/2017	42.57	6527.13	1.7	6569.70	166	6402	U 160-200	Upper
CE10	1541737	490177	130.0	6.0	12/5/2017	48.34	6522.52	2.3	6570.86	80	6489	U 90-130	Upper
CE11	1541487	490494	140.0	6.0	12/26/2017	90.94	6474.48	1.6	6565.42	90	6474	U 100-140	Upper
CE12	1541867	489642	120.0	6.0	12/26/2017	75.57	6496.66	2.1	6572.23	80	6490	U 80-120	Upper
CE13	1542693	490338	129.2	6.0	12/5/2017	46.66	6527.98	1.7	6574.64	95	6478	U 90-130	Upper
CE14	1541326	489600	130.0	5.0	12/5/2017	36.90	6532.55	2.0	6569.45	80	6487	U 90-130	Upper
CE15	1539507	489460	130.0	5.0	12/26/2017	44.13	6521.95	2.0	6566.08	77	6487	U 90-130	Upper
CE15A	1539111	489459	130.0	4.5	12/26/2017	45.34	6519.47	2.0	6564.81	75	6488	U 90-130	Upper
										75	6488	A -	---
CE16	1542618	491883	130.0	4.5	12/21/2016	39.50	6541.67	2.0	6581.17	---	---	U 90-130	Upper
										76	6503	A -	---
CE16A	1542619	491873	0.0	---	12/5/2017	47.02	6533.02	2.0	6580.04	---	---	U 125-185	Upper
CE17	1542434	490146	130.0	4.5	---	---	---	2.0	6576.40	94	6480	A -	---
										94	6480	U 90-130	Upper
CE18	1541185	489048	130.0	4.5	7/5/2017	36.50	6532.38	2.0	6568.88	74	6493	U 90-130	Upper
										74	6493	A -	---
CE19	1541160	490070	130.0	4.5	12/26/2017	48.15	6520.68	2.0	6568.83	88	6479	U 90-130	Upper
										88	6479	A -	---
CF1	1544456	491868	285.0	5.0	6/30/2017	130.08	6535.83	2.8	6665.91	230	6433	U 240-285	Upper
CF2	1544358	490888	260.0	5.0	6/30/2017	119.80	6546.36	2.0	6666.16	220	6444	U 220-260	Upper
CF3	1545099	491918	166.0	4.5	12/5/2017	49.64	6537.15	2.0	6586.79	156	6429	U 146-166	Upper
CF4	1543680	490520	197.0	4.5	12/5/2017	48.02	6615.67	2.0	6663.69	166	6496	U 177-197	Upper
										166	6496	A -	---
CF5	1544013	491463	233.0	4.5	6/30/2017	133.50	6537.96	2.0	6671.46	163	6506	A -	---
										222	6447	U 213-233	Upper
CF6	1544040	490759	205.0	4.5	6/30/2017	114.00	6553.43	2.0	6667.43	163	6502	A -	---
										199	6466	U 185-205	Upper
CF7	1543501	491362	220.0	4.5	---	---	---	2.0	6668.32	---	---	C 200-220	Chinle
										155	6511	A -	---
CF7A	1543500	491371	265.0	4.5	12/5/2017	133.91	6534.20	2.0	6668.11	160	6506	A -	---
										220	6446	U 225-265	Upper
CW1	1545235	490295	325.0	5.0	12/5/2017	106.56	6478.66	0.7	6585.22	105	6480	A -	---
										272	6313	M 212-323	Middle
CW2	1545212	491302	355.0	5.0	12/5/2017	106.83	6478.65	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/5/2017	44.70	6540.78	1.7	6585.48	85	6499	A -	---
										136	6448	U 243-253	Upper
CW3	1545200	493496	235.0	5.0	12/5/2017	55.10	6532.08	0.7	6587.18	70	6516	A -	---

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW3	1545200	493496	235.0	5.0	12/5/2017	55.10	6532.08	0.7	6587.18	209	6377	U 210-235	Upper
										348	6238	M -	---
* CW4	1541682	490874	145.0	5.0	---	---	---	0.8	6570.95	70	6500	A -	---
										112	6458	U 110-145	Upper
CW4R	1541416	490787	138.9	6.0	9/25/2017	46.50	6522.23	1.3	6568.73	61	6506	A -	---
										104	6463	U 102-142	Upper
CW5	1538729	490221	170.0	5.0	10/30/2017	28.70	6540.64	1.6	6569.34	65	6503	A -	---
										137	6431	U 135-170	Upper
CW6	1542588	488301	282.0	4.0	12/5/2017	84.55	6491.09	1.0	6575.64	236	6339	M 246-276	Middle
CW7	1545285	488773	---	---	---	---	---	0.0	6583.59	---	---	C 120-130	Chinle
CW8	1545009	491238	285.0	6.0	---	---	---	0.0	6591.83	---	---	C 276-286	Chinle
										85	6507	A -	---
CW9	1542840	491015	180.0	5.0	12/5/2017	59.30	6532.53	0.0	6591.83	---	---	U 130-180	Upper
										80	6512	A -	---
* CW10	1542823	491803	185.0	5.0	---	---	---	0.0	6587.89	75	6513	A -	---
										167	6421	U 155-185	Upper
CW13	1538349	491827	267.7	6.0	10/30/2017	6.70	6570.00	2.7	6576.70	230	6344	U 225-265	Upper
										378	6196	M -	---
CW14	1538786	488884	360.9	6.0	7/31/2017	2.30	6563.79	2.9	6566.09	56	6507	A -	---
										66	6497	U -	---
										310	6253	M 278-358	Middle
CW17	1545279	487771	108.0	5.0	12/5/2017	57.38	6531.94	3.1	6589.32	73	6513	A -	---
										85	6501	M 83-103	Middle
CW24	1545773	487760	118.0	5.0	12/5/2017	47.48	6541.19	3.0	6588.67	61	6525	A -	---
										65	6521	M 78-118	Middle
CW25	1540802	488866	102.0	5.0	12/5/2017	48.10	6519.10	3.0	6567.20	53	6511	A -	---
										53	6511	U 62-102	Upper
CW33	1543814	486347	347.0	6.0	12/5/2017	105.85	6469.04	1.8	6574.89	63	6510	A -	---
										63	6510	M -	---
										272	6301	L 267-287	Lower
										272	6301	L 307-347	---
CW34	1547827	487707	65.7	6.0	12/5/2017	58.87	6535.53	3.2	6594.40	20	6571	A -	---
										40	6551	M 33-63	Middle
CW35	1547001	488794	120.0	5.0	12/5/2017	49.61	6541.56	1.9	6591.17	63	6526	A -	---
										90	6499	M 93-118	Middle
CW50	1546687	491159	170.0	5.0	12/5/2017	47.20	6541.36	3.0	6588.56	128	6458	U 130-170	Upper
CW52	1548171	491887	180.0	5.0	12/13/2016	67.72	6524.68	2.0	6592.40	138	6452	U 140-180	Upper
CW56	1545279	488115	130.0	5.0	10/24/2017	64.49	6523.37	2.6	6587.86	51	6534	A -	---
										98	6487	M 90-110	Middle
CW57	1545654	488070	140.0	5.0	12/5/2017	46.47	6538.43	2.1	6584.90	55	6528	A -	---

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW57	1545654	488070	140.0	5.0	12/5/2017	46.47	6538.43	2.1	6584.90	101	6482	M 100-140	Middle
CW60	1545470	488262	150.0	5.0	12/5/2017	44.42	6539.78	2.8	6584.20	50	6531	A -	---
										114	6467	M 100-140	Middle
CW61	1544927	487779	130.0	5.0	12/5/2017	52.05	6530.78	2.2	6582.83	62	6519	A -	---
										108	6473	M 90-130	Middle
CW62	1544555	487847	150.0	5.0	12/26/2017	117.20	6462.66	1.9	6579.86	60	6518	A -	---
										134	6444	M 130-150	Middle
CW69	1543638	487679	180.0	4.5	---	---	---	2.0	6576.42	---	---	C 160-180	Chinle
										66	6508	A -	---
CW71	1544724	488111	140.0	4.5	---	---	---	2.0	6579.97	72	6506	A -	---
										121	6457	M 120-140	Middle
CW72	1545034	488229	140.0	4.5	12/5/2017	61.10	6519.03	2.0	6580.13	75	6503	A -	---
										105	6473	M 80-140	Middle
M22	1542817	486716	100.0	4.5	---	---	---	2.0	6575.43	---	---	M 60-100	Middle
										100	6473	A 60-100	Alluvium
M23	1542992	486908	100.0	4.5	---	---	---	2.0	6575.97	---	---	M 60-100	Middle
										100	6474	A 60-100	Alluvium
M28	1543175	487326	120.0	4.5	---	---	---	2.0	6578.76	69	6508	A 60-120	Alluvium
										92	6485	M 60-120	Middle
M29	1543440	487326	120.0	4.5	---	---	---	2.0	6572.87	61	6510	A 60-120	Alluvium
										89	6482	M 60-120	Middle
M30	1543462	487639	110.0	4.5	---	---	---	2.0	6574.91	---	---	M 80-110	Middle
										80	6493	A 80-110	Alluvium
M31	1543745	487620	120.0	4.5	---	---	---	2.0	6575.93	---	---	M 70-120	Middle
										80	6494	A 70-120	Alluvium
M34	1543608	487743	120.0	4.5	---	---	---	2.0	6574.55	---	---	M 60-120	Middle
										66	6507	A 60-120	Alluvium
M35	1543889	487750	120.0	4.5	---	---	---	2.0	6574.72	71	6502	A 60-120	Alluvium
										97	6476	M 60-120	Middle
M36	1543993	487631	120.0	4.5	---	---	---	2.0	6575.44	72	6501	A 60-120	Alluvium
										97	6476	M 60-120	Middle
M37	1544120	487835	120.0	4.5	---	---	---	2.0	6575.44	73	6500	A 60-120	Alluvium
										107	6466	M 60-120	Middle
M38	1544319	487923	120.0	4.5	---	---	---	2.0	6579.62	---	---	M 60-120	Middle
										79	6499	A 60-120	Alluvium
T25	1543352	489996	200.0	4.5	3/31/2017	120.36	6536.98	2.0	6657.34	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T27	1543474	489837	200.0	4.5	---	---	---	2.0	6657.14	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T28	1543484	490145	200.0	4.5	---	---	---	2.0	6658.71	---	---	U 140-200	Upper

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
T28	1543484	490145	200.0	4.5	---	---	---	2.0	6658.71	---	---	A 140-200	Alluvium
T30	1543663	489972	200.0	4.5	---	---	---	2.0	6659.62	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T32	1543801	490134	200.0	4.5	---	---	---	2.0	6661.61	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T38	1544089	489832	200.0	4.5	---	---	---	2.0	6658.46	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T42	1544077	490112	200.0	4.5	---	---	---	2.0	6660.01	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T45	1544183	489914	200.0	4.5	---	---	---	2.0	6658.06	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T46	1544210	490262	200.0	4.5	---	---	---	2.0	6660.65	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T49	1544304	490100	200.0	4.5	---	---	---	2.0	6658.39	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T51	1544397	489914	200.0	4.5	3/29/2017	115.29	6542.05	2.0	6657.34	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T52	1544456	490208	200.0	4.5	---	---	---	2.0	6658.00	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T55	1544592	490063	195.0	4.5	---	---	---	2.0	6657.66	---	---	A 135-195	Alluvium
										---	---	U 135-195	Upper
T60	1543666	490362	200.0	4.5	---	---	---	2.0	6661.86	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
WR25	1545267	487430	113.3	5.0	12/13/2016	44.92	6541.54	2.8	6586.46	50	6534	A -	---
										71	6513	M 71-111	Middle

NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer,Top
M = Middle Chinle Aquifer,Top
L = Lower Chinle Aquifer,Top
* = Abandoned

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
						Broadview								
0430	1538469	490300	145.0	---	---	---	---	0.0	6568.00	72	6496	A	-	Alluvium
										135	6433	U	-	Upper
0431	1538045	490090	130.0	6.0	---	---	---	0.0	6568.00	60	6508	A	125-130	Alluvium
										118	6450	U	125-130	Upper
0434	1538370	489420	280.0	6.0	---	---	---	0.0	6563.68	75	6489	A	-	---
										265	6299	M	-	Middle
0436	1538439	488947	295.0	5.0	---	---	---	0.0	6562.73	90	6473	A	-	---
										280	6283	M	280-295	Middle
0437	1537859	491128	340.0	5.0	---	---	---	1.8	6572.00	90	6480	A	-	---
										180	6390	U	-	---
										280	6290	M	240-300	Middle
0446	1537830	488960	110.0	6.0	---	---	---	0.0	6560.00	60	6500	A	60-95	Alluvium
										60	6500	U	60-95	Upper
0447	1537490	490480	142.0	6.0	---	---	---	0.0	6568.00	80	6488	A	120-142	Alluvium
										138	6430	U	120-142	Upper
0449	1537440	488830	267.0	6.0	---	---	---	0.0	6560.00	---	---	M	-	Middle
0457	1538210	490000	300.0	5.0	---	---	---	---	6571.00	---	---	M	-	Middle
CE9	1538203	489458	130.0	6.0	12/5/2017	38.05	6525.07	1.2	6563.12	---	---	U	90-130	Upper
CW55	1538283	489471	360.0	6.0	12/12/2017	57.86	6506.30	2.3	6564.16	260	6302	M	-	Middle
						Felice Acres								
0481	1536820	490210	320.0	4.0	---	---	---	2.0	6568.00	110	6456	A	270-310	Alluvium
										270	6296	M	270-310	Middle
0482	1536981	489579	260.0	5.0	---	---	---	0.0	6562.66	80	6483	A	220-260	Alluvium
										210	6353	M	220-260	Middle
0483	1536586	489753	280.0	5.0	8/24/2017	35.90	6526.76	0.0	6562.66	40	6523	A	-	Alluvium
										65	6498	U	-	---
										236	6327	M	270-300	Middle
0484	1536448	490356	320.0	5.0	---	---	---	0.0	6563.98	38	6526	A	-	---
										129	6435	U	-	---
										280	6284	M	220-300	Middle
0485	1535800	489630	260.0	6.0	---	---	---	0.0	6565.00	35	6530	A	-	---
										70	6495	U	-	---
										223	6342	M	220-260	Middle
0486	1535800	489024	260.0	4.0	---	---	---	0.0	6558.40	---	---	M	200-260	Middle
										21	6537	A	-	---
										21	6537	U	-	---
0487	1536175	488950	260.0	---	---	---	---	0.0	6561.00	---	---	M	-	Middle
0488	1536500	488950	190.0	6.0	---	---	---	0.0	6562.00	---	---	M	-	Middle

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
0489	1536850	488950	---	---	---	---	---	0.0	6562.00	---	---	M	-	Middle
0493	1536702	489492	300.0	5.0	12/5/2017	81.50	6478.78	0.9	6560.28	40	6519	A	-	---
										65	6494	U	-	---
										236	6323	M	270-300	Middle
0494	1536689	489494	85.0	5.0	6/28/2017	33.90	6526.24	0.6	6560.14	40	6520	A	-	---
										65	6495	U	65-85	Upper
0498	1534661	488953	150.0	6.0	8/24/2017	50.80	6509.79	2.0	6560.59	80	6479	M	130-150	Middle
										80	6479	A	70-110	Alluvium
CW44	1535048	488891	208.0	6.0	12/1/2016	64.93	6495.81	2.5	6560.74	94	6464	A	-	Alluvium
										130	6428	M	69-208	Middle
CW45	1535036	489494	193.0	5.0	12/5/2017	55.15	6506.16	0.6	6561.31	90	6471	A	-	---
										166	6395	M	163-193	Middle
CW46	1534642	489595	187.3	5.0	---	---	---	1.5	6562.26	88	6473	A	-	---
										112	6449	M	125-185	Middle
CW53	1536668	490262	157.0	5.0	12/5/2017	11.50	6553.44	3.0	6564.94	110	6452	U	117-157	Upper
CW58	1536230	489520	305.0	4.5	12/5/2017	81.80	6479.00	2.0	6560.80	45	6514	U	-	---
										45	6514	A	-	---
										226	6333	M	265-305	Middle
CW73	1535670	489450	100.0	4.5	12/5/2017	49.25	6514.20	2.0	6563.45	68	6493	A	-	---
										68	6493	U	80-100	Upper
CW78	1536319	490080	160.0	4.5	12/5/2017	11.40	6555.75	2.0	6567.15	46	6519	A	-	---
										61	6504	U	120-160	Upper
Q4	1534635	488880	160.0	4.5	---	---	---	2.0	6560.32	90	6468	M	100-160	Middle
Q42	1536662	489606	80.0	4.5	---	---	---	1.6	6564.48	61	6502	A	40-80	Alluvium
										61	6502	U	40-80	Upper
Q48	1535653	490120	105.0	4.5	12/5/2017	48.98	6518.86	2.0	6567.84	73	6493	U	65-105	Upper
										73	6493	A	65-105	Alluvium
Q50	1536680	490288	85.0	4.5	---	---	---	2.0	6568.93	43	6524	A	45-85	Alluvium
										61	6506	U	45-85	Upper
Y1	1535670	488850	260.0	4.5	12/20/2017	84.74	6476.70	2.0	6561.44	77	6482	A	-	---
										77	6482	U	-	---
										172	6387	M	220-260	Middle
Y2	1535678	489151	250.0	4.5	12/5/2017	92.35	6469.26	2.9	6561.61	64	6495	A	-	---
										66	6493	U	-	---
										198	6361	M	210-250	Middle
Y3	1535660	489440	280.0	4.5	12/5/2017	82.45	6480.93	2.0	6563.38	61	6500	U	-	---
										61	6500	A	-	---
										196	6365	M	220-240	Middle
										196	6365	M	260-280	Middle
Y4	1535558	489612	260.0	4.5	---	---	---	2.4	6563.14	64	6497	U	-	---

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
Y4	1535558	489612	260.0	4.5	---	---	---	2.4	6563.14	64	6497	A -	---
										194	6367	M 220-260	Middle
Y5	1535528	489302	260.0	4.5	---	---	---	3.6	6562.74	82	6477	U -	---
										82	6477	A -	---
										178	6381	M 220-260	Middle
Y6	1535518	489002	250.0	4.5	---	---	---	0.9	6559.08	100	6458	A -	---
										178	6380	M 210-250	Middle
Y7	1535339	488870	220.0	4.5	12/20/2017	84.32	6476.11	2.5	6560.43	90	6468	A -	---
										158	6400	M 180-220	Middle
Y8	1535349	489161	240.0	4.5	12/5/2017	97.90	6463.57	2.1	6561.47	101	6458	A -	---
										185	6374	M 200-240	Middle
Y9	1535358	489503	235.0	4.5	---	---	---	2.6	6562.72	84	6476	A -	---
										84	6476	U -	---
										178	6382	M 195-235	Middle
Y10	1535258	489632	220.0	4.5	12/5/2017	83.40	6482.78	4.4	6566.18	72	6490	A -	---
										72	6490	U -	---
										183	6379	M 180-220	Middle
Y11	1535218	489352	220.0	4.5	12/19/2016	62.22	6499.83	1.7	6562.05	112	6448	A -	---
										169	6391	M 180-220	Middle
Y12	1535208	489022	210.0	4.5	---	---	---	1.2	6559.68	95	6463	A -	---
										156	6402	M 170-210	Middle
Y13	1535135	488830	212.0	4.5	12/1/2016	126.80	6434.04	2.0	6560.84	106	6453	A -	---
										140	6419	M 172-212	Middle
Y14	1535057	489113	200.0	4.5	12/5/2017	58.30	6502.72	1.2	6561.02	90	6470	A -	---
										139	6421	M 160-200	Middle
Y15	1535046	489312	190.0	4.5	---	---	---	2.3	6562.36	103	6457	A -	---
										155	6405	M 150-190	Middle
Y16	1535068	489702	200.0	4.5	---	---	---	2.0	6563.70	89	6473	A -	---
										158	6404	M 160-200	Middle
Y17	1534978	489782	210.0	4.5	12/5/2017	67.05	6497.58	2.4	6564.63	96	6466	A -	---
										158	6404	M 170-210	Middle
Y22	1534912	488868	210.0	4.5	---	---	---	2.0	6561.69	112	6448	M 160-210	Middle
Y23	1534838	488942	160.0	4.5	12/20/2017	115.22	6446.08	2.7	6561.30	106	6453	M 120-160	Middle
										106	6453	A -	---
Y24	1534859	489143	180.0	4.5	---	---	---	2.6	6561.94	97	6462	A -	---
										119	6440	M 140-180	Middle
Y25	1534798	489442	180.0	4.5	12/5/2017	62.00	6500.67	1.8	6562.67	91	6470	A -	---
										125	6436	M 140-180	Middle
Y26	1534858	489532	185.0	4.5	---	---	---	2.3	6564.40	111	6451	A -	---
										122	6440	M 145-185	Middle

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
Y30	1534752	488865	180.0	4.5	12/5/2017	60.85	6499.20	2.0	6560.05	108	6450 M	140-180	Middle
Y33	1534639	489337	180.0	4.5	---	---	---	2.0	6563.22	100	6461 M	140-180	Middle
Y34	1534642	489091	180.0	4.5	---	---	---	2.0	6560.92	131	6428 M	140-180	Middle

NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer,Top
M = Middle Chinle Aquifer,Top
L = Lower Chinle Aquifer,Top
* = Abandoned

TABLE 5.1-3. WELL DATA FOR THE CHINLE MURRAY ACRES AND PLEASANT VALLEY WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
						Murray							
0803	1540800	487430	---	6.0	---	---	---	0.0	6561.00	---	---	C 85-180	Chinle
										85	6476	A 85-180	Alluvium
0807	1540598	488610	287.0	6.0	---	---	---	0.0	6565.00	63	6502	A -	---
										275	6290	M 275-285	Middle
0808	1540080	487490	290.0	5.0	---	---	---	1.6	6561.00	85	6474	A -	---
										255	6304	M 260-290	Middle
0812	1539910	488505	300.0	6.0	---	---	---	0.6	6566.00	68	6497	A -	---
										268	6297	M 264-284	Middle
0813	1539300	488620	280.0	6.0	---	---	---	0.0	6565.00	63	6502	A -	---
										230	6335	M 235-255	Middle
0814	1539030	488590	280.0	6.0	---	---	---	0.0	6565.00	---	---	M -	Middle
0816	1539110	487705	255.0	6.0	---	---	---	0.0	6557.00	35	6522	A -	---
										240	6317	M 240-250	Middle
0817	1539190	487590	---	---	---	---	---	0.0	6557.00	---	---	M -	Middle
0818	1539085	487547	243.0	4.0	---	---	---	0.0	6557.00	62	6495	A -	---
										230	6327	M 223-243	Middle
0819	1539000	487000	222.0	6.0	---	---	---	0.0	6557.00	62	6495	A -	---
										210	6347	M 210-220	Middle
0820	1539254	486513	230.0	---	---	---	---	0.0	6558.00	---	---	M 125-230	Middle
0821	1538810	487320	260.0	7.0	11/30/2017	67.56	6492.44	0.0	6560.00	---	---	M -	Middle
0823	1540150	487720	265.0	6.0	---	---	---	0.0	6561.00	---	---	M 257-267	Middle
										40	6521	A -	---
ACW	1540235	488070	325.0	6.0	12/5/2017	84.00	6479.80	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	12/5/2017	35.95	6527.48	0.1	6563.43	63	6500	A -	Alluvium
										100	6463	U 66-155	Upper
HCW	1541060	487785	295.0	6.0	---	---	---	1.0	6562.00	82	6479	A -	---
										264	6297	M 264-295	Middle
WCW	1541045	488520	307.0	6.0	12/5/2017	97.55	6469.82	0.8	6567.37	83	6484	A -	---
										254	6313	M 257-307	Middle
						Pleasant Valley							
0530	1540229	484358	490.0	5.0	---	---	---	1.5	6559.19	265	6293	L -	Lower
0832	1539263	485629	280.0	4.0	---	---	---	0.0	6557.00	85	6472	A -	---
										240	6317	L 238-278	Lower
0837	1540995	485950	200.0	5.0	---	---	---	0.0	6567.00	80	6487	A -	---
										160	6407	L 160-200	Lower
* 0842	1541650	483980	250.0	---	---	---	---	0.0	6558.00	---	---	L -	Lower

TABLE 5.1-3. WELL DATA FOR THE CHINLE MURRAY ACRES AND PLEASANT VALLEY WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
0900	1540800	483700	172.1	---	---	---	---	1.5	6560.00	---	--- L	-	Lower

NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer,Top
M = Middle Chinle Aquifer,Top
L = Lower Chinle Aquifer,Top
* = Abandoned

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
0536	1539560	479701	160.0	5.0	---	---	---	-2.0	---	---	---	L -	Lower
0536R	1539888	479654	264.0	4.0	---	---	---	2.0	6555.00	62	6491	A -	---
										160	6393	L -	Lower
0538	1533486	486899	170.0	6.0	8/9/2016	63.58	6485.36	2.0	6548.94	95	6452	A 50-90	Alluvium
										133	6414	L 130-170	Lower
0539	1534014	487596	210.0	6.0	12/12/2016	26.90	6528.42	2.0	6555.32	100	6453	A 50-70	Alluvium
										100	6453	A 80-100	---
										175	6378	L 170-210	Lower
0544	1535653	487969	80.0	4.0	---	---	---	---	6558.00	60	---	M 60-80	Middle
0546	1536330	487560	160.0	5.0	---	---	---	---	6559.00	80	---	M 130-160	Middle
0547	1529133	483106	127.0	---	---	---	---	---	---	---	---	L -	Lower
0548	1521230	482903	220.0	---	---	---	---	---	---	---	---	L -	Lower
0549	1528942	483572	313.0	---	---	---	---	---	---	---	---	L -	Lower
0580	1537700	492300	235.0	4.5	---	---	---	---	6579.00	---	---	U -	Upper
0653	1533283	486570	206.0	6.0	12/12/2016	62.30	6482.67	1.6	6544.97	97	6446	A 69-206	Alluvium
										135	6408	L -	Lower
0850	1534652	486044	54.0	5.0	12/5/2017	52.62	6496.53	3.2	6549.15	37	6509	M 29-54	Middle
										37	6509	A -	---
0853	1532124	484824	95.0	5.0	12/5/2017	70.22	6471.16	1.7	6541.38	60	6480	L 55-95	Lower
										60	6480	A -	---
0859	1534549	487426	83.0	5.0	12/5/2017	63.13	6489.63	2.7	6552.76	52	6498	M 50-83	Middle
0901	1531531	492846	270.0	5.0	---	---	---	0.0	6599.00	40	6559	A -	---
										190	6409	L 240-260	Lower
0902	1533700	488800	150.0	6.0	---	---	---	0.0	6560.00	72	6488	A -	---
										72	6488	M 78-102	Middle
0903	1530250	486900	281.0	5.0	---	---	---	0.0	6559.00	220	6339	L 120-260	Lower
0904	1531100	487150	200.0	4.0	---	---	---	0.0	6560.00	---	---	L 170-200	Lower
0908	1534430	483325	282.8	5.0	---	---	---	1.5	6544.37	107	6436	A -	---
										232	6311	L -	Lower
0909	1531900	483400	140.0	4.0	---	---	---	0.0	6538.90	112	6427	A 80-135	Alluvium
										112	6427	L 80-135	Lower
0927	1548300	491700	---	---	12/13/2016	42.94	6552.06	1.0	6595.00	---	---	C -	Chinle
										---	---	M -	Middle
0929	1544684	495585	320.0	5.0	12/5/2017	43.51	6549.06	2.0	6592.57	---	---	U 290-320	Upper
0932	1540436	495407	501.0	6.0	---	---	---	0.0	6602.11	354	6248	U -	---
										492	6110	M 450-490	Middle
0933	1540087	495231	---	5.0	---	---	---	0.5	6600.51	---	---	U -	Upper
0937	1542180	471478	182.0	5.0	---	---	---	0.0	6578.00	70	6508	A -	---
										160	6418	L 95-182	Lower

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
0944	1539280	493091	300.0	5.0	12/26/2017	47.00	6541.61	1.6	6588.61	64	6523	A	-	---
										252	6335	U	220-280	Upper
0945	1537986	493900	300.0	---	---	---	---	0.0	6590.49	---	---	U	-	Upper
0946	1537804	491754	260.0	5.0	---	---	---	0.0	6579.04	220	6359	U	230-260	Upper
0948	1535190	490400	255.0	5.0	---	---	---	0.0	6568.10	200	6368	M	200-255	Middle
0954	1534187	483910	307.0	5.0	---	---	---	0.0	6545.00	225	6320	L	285-307	Lower
0960	1534730	490110	305.0	6.0	---	---	---	0.0	6565.00	280	6285	M	285-305	Middle
0961	1534190	489720	240.0	5.0	---	---	---	6.9	6565.00	200	6358	M	200-240	Middle
0962	1533750	489796	238.0	6.0	---	---	---	0.0	6560.00	225	6335	M	220-238	Middle
0963	1532555	488792	---	4.0	---	---	---	0.0	6557.00	---	---	L	-	Lower
0964	1531817	488371	200.0	6.0	---	---	---	0.0	6560.00	170	6390	L	170-200	Lower
0965	1531550	489100	200.0	4.0	---	---	---	0.0	6575.00	---	---	L	130-200	Lower
0966	1531300	489000	---	---	---	---	---	0.0	6575.00	---	---	L	-	Lower
0967	1530500	487600	---	---	---	---	---	0.0	6570.00	---	---	L	-	Lower
0968	1529700	488400	---	---	---	---	---	0.0	6630.00	---	---	L	-	Lower
0969	1529400	488450	---	---	---	---	---	0.0	6640.00	---	---	L	-	Lower
0970	1529100	488500	---	5.0	---	---	---	0.0	6660.00	---	---	L	-	Lower
0988	1538124	483423	155.0	5.0	---	---	---	1.3	6649.00	18	6630	A	-	---
										152	6496	L	152-155	Lower
0990	1537600	482750	---	---	---	---	---	0.5	6550.00	---	---	L	-	Lower
CW15	1536259	485961	134.6	5.0	12/5/2017	93.15	6458.17	2.6	6551.32	50	6499	A	-	---
										91	6458	M	73-133	Middle
										311	6238	L	-	---
CW16	1534747	488507	---	5.0	---	---	---	0.0	6558.54	82	6477	M	112-152	Middle
										82	6477	A	-	---
CW18	1535924	491378	230.7	5.0	12/26/2017	36.87	6535.78	1.5	6572.65	90	6481	A	-	---
										190	6381	U	177-232	Upper
										340	6231	M	-	---
CW26	1534116	489593	300.0	5.0	---	---	---	0.5	6561.43	50	6511	A	-	---
										50	6511	M	-	---
										231	6330	L	245-285	Lower
CW27	1534109	489600	110.0	5.0	---	---	---	1.9	6562.88	50	6511	M	80-110	Middle
										50	6511	A	-	---
CW28	1535112	491008	370.0	5.0	12/26/2017	76.74	6494.94	1.9	6571.68	90	6480	A	-	---
										110	6460	U	-	---
										294	6276	M	280-360	Middle
CW29	1534551	487435	290.0	5.0	12/5/2017	76.56	6475.66	1.7	6552.22	52	6499	M	-	---
										52	6499	A	-	---
										228	6323	L	230-270	Lower

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW30	1536642	488704	251.5	5.0	---	---	---	2.0	6558.31	35	6521	A -	---
										220	6336	M 219-249	Middle
CW31	1540689	482738	311.0	6.0	12/5/2017	85.33	6474.93	2.0	6560.26	111	6447	A -	---
										254	6304	L 291-311	---
										254	6304	L 231-271	---
										254	6304	L 136-156	Lower
CW32	1543413	483523	300.0	6.0	12/5/2017	147.30	6419.98	1.7	6567.28	77	6489	A -	---
										157	6409	L 158-188	Lower
										157	6409	L 218-303	---
CW36	1540053	481329	180.0	5.0	12/5/2017	76.75	6474.34	2.8	6551.09	96	6452	A -	---
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	12/5/2017	62.16	6489.01	1.3	6551.17	55	6495	A -	---
										100	6450	L 100-150	Lower
CW38	1540103	483429	174.8	5.0	---	---	---	2.1	6555.60	108	6446	A -	---
										130	6424	L 133-173	Lower
CW39	1537260	483754	126.3	5.0	---	---	---	3.4	6550.71	40	6507	A -	---
										87	6460	L 90-123	Lower
CW40	1537624	491819	264.0	5.0	12/5/2017	22.05	6556.89	2.6	6578.94	75	6501	A -	---
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	12/5/2017	76.98	6478.43	1.5	6555.41	59	6495	A -	---
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	12/5/2017	67.33	6481.45	0.0	6548.78	98	6451	A -	---
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	12/5/2017	68.30	6480.49	2.0	6548.79	57	6490	L 81-101	Lower
										57	6490	A -	---
CW54	1536645	488675	103.1	5.0	12/5/2017	34.49	6524.06	2.2	6558.55	70	6486	C 60-100	Chinle
CW74	1535188	487376	130.0	4.5	12/5/2017	68.86	6484.55	3.1	6553.41	40	6510	A -	---
										100	6450	M 90-130	Middle
CW75	1536012	487376	190.0	4.5	12/5/2017	71.91	6481.67	1.8	6553.58	59	6493	A -	---
										136	6416	M 150-190	Middle
CW76	1536661	487861	270.0	4.5	12/5/2017	76.70	6479.91	2.4	6556.61	40	6514	A -	---
										210	6344	M 230-270	Middle
CW77	1536659	488282	280.0	4.5	---	---	---	2.3	6559.31	53	6504	A -	---
										210	6347	M 240-280	Middle
R1	1534551	487790	120.0	5.0	12/5/2017	54.92	6500.20	2.0	6555.12	84	6469	A 80-120	Alluvium
										84	6469	M 80-120	Middle
R2	1534548	487968	115.0	5.0	8/24/2017	52.60	6501.56	2.0	6554.16	83	6469	A 75-115	Alluvium
										83	6469	M 75-115	Middle
R3	1534546	488196	140.0	5.0	11/14/2017	62.81	6492.92	2.0	6555.73	88	6466	M 100-140	Middle
										88	6466	A 60-80	Alluvium

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
R4	1534541	488446	130.0	5.0	3/23/2017	51.77	6507.01	2.0	6558.78	84	6473	A 90-130	Alluvium
										84	6473	M 90-130	Middle
R5	1534560	488666	125.0	5.0	3/21/2017	94.17	6463.58	2.0	6557.75	71	6485	A 65-125	Alluvium
										71	6485	M 65-125	Middle
R6	1534356	488448	130.0	5.0	---	---	---	2.0	6559.64	68	6490	A 50-90	Alluvium
										68	6490	M 110-130	Middle
R7	1534399	488087	145.0	5.0	---	---	---	2.0	6554.81	74	6479	A 65-105	Alluvium
										74	6479	M 125-145	Middle
R11	1534320	488280	120.0	4.5	8/24/2017	58.50	6499.95	2.0	6558.45	70	6486	M 60-120	Middle
										70	6486	A 60-120	Alluvium
R12	1534220	488360	120.0	4.5	---	---	---	2.0	6556.95	66	6489	A 60-120	Alluvium
										66	6489	M 60-120	Middle
R36	1533594	486157	200.0	4.5	8/3/2016	69.05	6476.41	2.0	6545.46	92	6451	A -	---
										146	6397	L 160-200	Lower
R37	1533586	486481	200.0	4.5	8/10/2016	68.66	6478.18	2.0	6546.84	92	6453	A -	---
										143	6402	L 160-200	Lower
R44	1533478	486593	200.0	4.5	8/10/2016	68.99	6478.60	2.0	6547.59	100	6446	A -	---
										130	6416	L 160-200	Lower
R45	1533481	486334	200.0	4.5	8/3/2016	68.62	6477.81	2.0	6546.43	80	6464	A -	---
										130	6414	L 160-200	Lower
R46	1533478	486088	200.0	4.5	8/2/2016	68.44	6477.80	2.0	6546.24	---	---	L 160-200	Lower
										90	6454	A -	---
R47	1533470	485780	160.0	4.5	---	---	---	2.0	6547.17	103	6442	L 100-160	Lower
										103	6442	A 100-160	Alluvium
R48	1533345	485775	160.0	4.5	---	---	---	2.0	6545.24	100	6443	L 100-160	Lower
										100	6443	A 100-160	Alluvium
R49	1533407	485953	200.0	4.5	12/5/2017	68.57	6477.42	2.0	6545.99	109	6435	A -	---
										109	6435	L 160-200	Lower
R50	1533362	486216	200.0	4.5	4/3/2017	66.41	6479.21	2.0	6545.62	100	6444	A -	---
										120	6424	L 160-200	Lower
R51	1533387	486460	200.0	4.5	8/3/2016	68.09	6478.41	2.0	6546.50	120	6425	A -	---
										140	6405	L 160-200	Lower
R52	1533377	486751	200.0	4.5	---	---	---	2.5	6547.69	94	6451	A -	---
										136	6409	L 160-200	Lower
R56	1533244	486354	180.0	4.5	8/8/2016	67.00	6478.38	2.0	6545.38	---	---	L 140-180	Lower
R57	1533260	485880	135.0	4.5	---	---	---	2.0	6547.07	99	6446	L 75-135	Lower
										99	6446	A 75-135	Alluvium
R58	1533170	485710	160.0	4.5	---	---	---	2.0	6544.45	98	6444	L 100-160	Lower
										98	6444	A 100-160	Alluvium
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	A 110-150	Alluvium

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	L 110-150	Lower
R60	1533149	486216	180.0	4.5	8/2/2016	67.17	6478.13	2.0	6545.30	105	6438	A -	---
										105	6438	L 140-180	Lower
R61	1533157	486484	180.0	4.5	8/8/2016	67.01	6478.78	2.0	6545.79	70	6474	A -	---
										150	6394	L 140-180	Lower
R62	1533186	486744	180.0	4.5	8/8/2016	67.13	6479.57	2.0	6546.70	100	6445	A -	---
										180	6365	L 140-180	Lower
R65	1533068	486614	180.0	4.5	---	---	---	2.3	6546.10	96	6448	A -	---
										122	6422	L 140-180	Lower
R66	1533048	486354	180.0	4.5	---	---	---	2.0	6545.51	120	6424	L 140-180	Lower
										120	6424	A -	---
R67	1533041	486129	180.0	4.5	12/5/2017	66.68	6478.85	2.0	6545.53	105	6439	L 140-180	Lower
										105	6439	A -	---
R67B	1533000	486086	145.0	4.5	---	---	---	2.0	6544.87	100	6443	L 105-145	Lower
R68	1533025	485819	160.0	4.5	---	---	---	2.0	6544.85	99	6444	L 100-160	Lower
										99	6444	A 100-160	Alluvium
R69	1532987	486024	160.0	4.5	---	---	---	2.0	6545.35	96	6447	A 100-160	Alluvium
										96	6447	L 100-160	Lower
R70	1532909	486258	180.0	4.5	---	---	---	2.1	6545.21	---	---	L 140-180	Lower
										80	6463	A -	---
R71	1532972	486481	180.0	4.5	---	---	---	2.4	6545.75	---	---	L 140-180	Lower
										100	6443	A -	---
R72	1532997	486762	180.0	4.5	8/8/2016	66.02	6480.90	2.0	6546.92	100	6445	A -	---
										120	6425	L 140-180	Lower
R73	1533019	485560	150.0	4.5	---	---	---	2.3	6544.34	99	6443	A 110-150	Alluvium
										99	6443	L 110-150	Lower
R74	1532852	485502	140.0	4.5	12/5/2017	67.53	6476.50	2.4	6544.03	104	6438	A 100-140	Alluvium
										104	6438	L 100-140	Lower
R75	1532922	485716	140.0	4.5	---	---	---	2.3	6544.88	98	6445	A 100-140	Alluvium
										98	6445	L 100-140	Lower
R76	1532888	485891	140.0	4.5	---	---	---	2.3	6545.09	106	6437	A 100-140	Alluvium
										106	6437	L 100-140	Lower
R77	1532683	485800	140.0	4.5	---	---	---	2.4	6544.97	80	6463	L 100-140	Lower
										80	6463	A 100-140	Alluvium
R78	1532683	485612	140.0	4.5	---	---	---	2.0	6544.03	85	6457	A 100-140	Alluvium
										85	6457	L 100-140	Lower
R80	1533169	485471	120.0	4.5	---	---	---	2.0	6543.72	---	---	L 80-120	Lower
										---	---	A 80-120	Alluvium
V1	1534527	486940	270.0	4.5	12/5/2017	75.24	6476.87	2.0	6552.11	220	6330	L 230-270	Lower
V2	1534339	486618	270.0	4.5	12/5/2017	73.20	6476.89	2.0	6550.09	210	6338	L 230-270	Lower

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
V3	1534192	486207	260.0	4.5	8/22/2017	74.60	6475.55	2.2	6550.15	240	6308	L	220-260	Lower
V4	1533890	485961	240.0	4.5	8/22/2017	70.00	6475.43	2.1	6545.43	200	6343	L	200-240	Lower
V6	1534156	485710	260.0	4.5	12/5/2017	73.50	6473.93	2.4	6547.43	220	6325	L	220-260	Lower
V7	1534208	487436	270.0	4.5	12/5/2017	77.96	6477.27	2.0	6555.23	---	---	L	230-270	Lower
										80	6473	A	-	---
V8	1534183	486945	260.0	4.5	12/5/2017	72.57	6478.92	2.0	6551.49	100	6449	A	-	---
										210	6339	L	220-260	Lower
V9	1534298	488140	280.0	4.5	12/5/2017	79.26	6476.43	2.0	6555.69	---	---	L	240-280	Lower
										70	6484	A	-	---
V11	1533919	487868	270.0	4.5	12/5/2017	77.26	6478.64	2.0	6555.90	---	---	L	230-270	Lower
										60	6494	A	-	---
V14	1533638	488229	240.0	4.5	8/22/2017	78.50	6477.19	2.0	6555.69	---	---	L	200-240	Lower
										80	6474	A	-	---
V16	1533402	487709	220.0	4.5	12/5/2017	73.15	6478.83	2.0	6551.98	80	6470	A	-	---
										200	6350	L	180-220	Lower
V17	1533896	486461	240.0	4.5	8/24/2017	72.80	6477.35	2.0	6550.15	---	---	L	200-240	Lower
										100	6448	A	-	---
V18	1533819	487241	240.0	4.5	12/5/2017	74.04	6477.34	2.0	6551.38	---	---	L	200-240	Lower
										80	6469	A	-	---

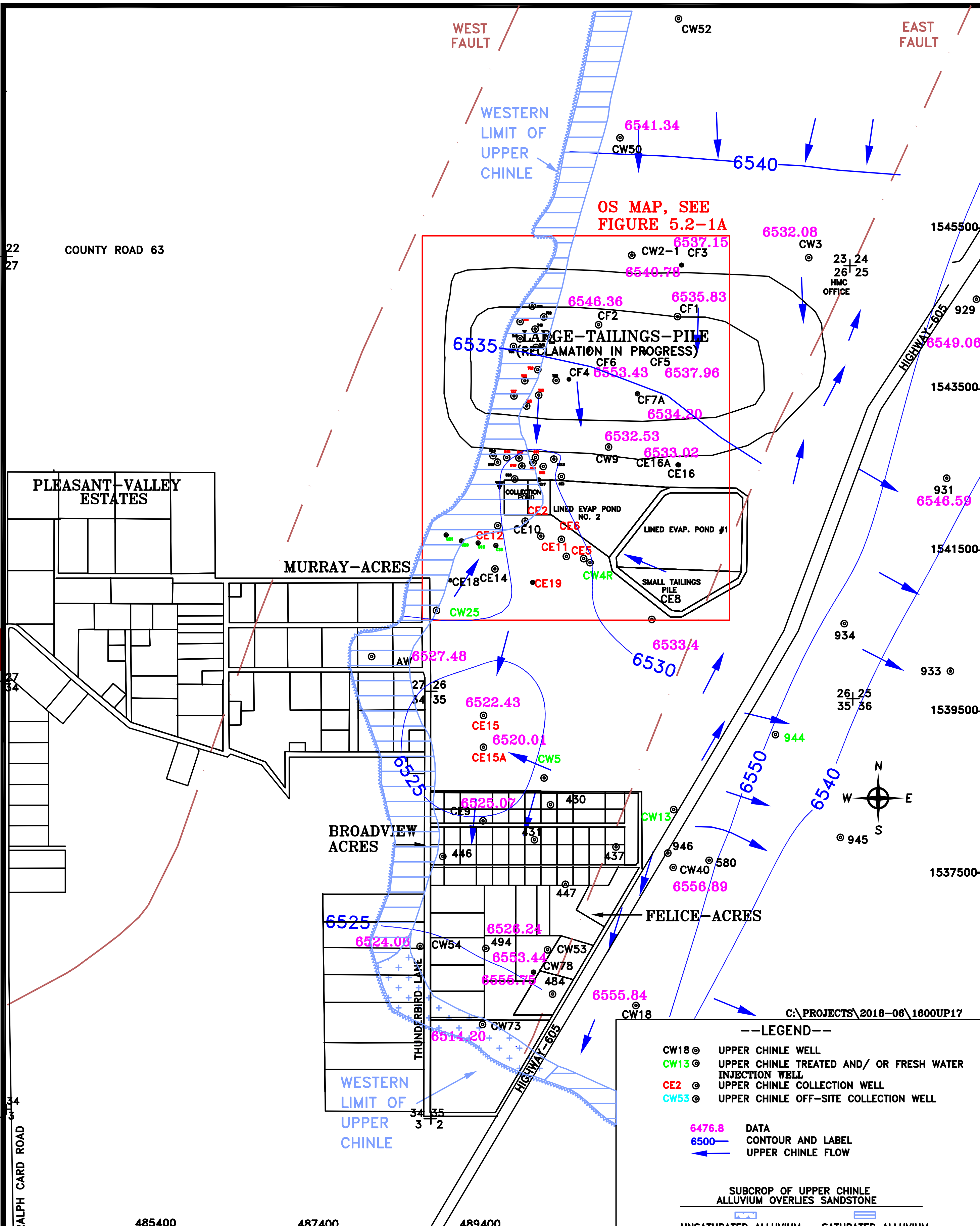
NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer,Top
M = Middle Chinle Aquifer,Top
L = Lower Chinle Aquifer,Top
* = Abandoned

5.2 UPPER CHINLE WATER LEVELS

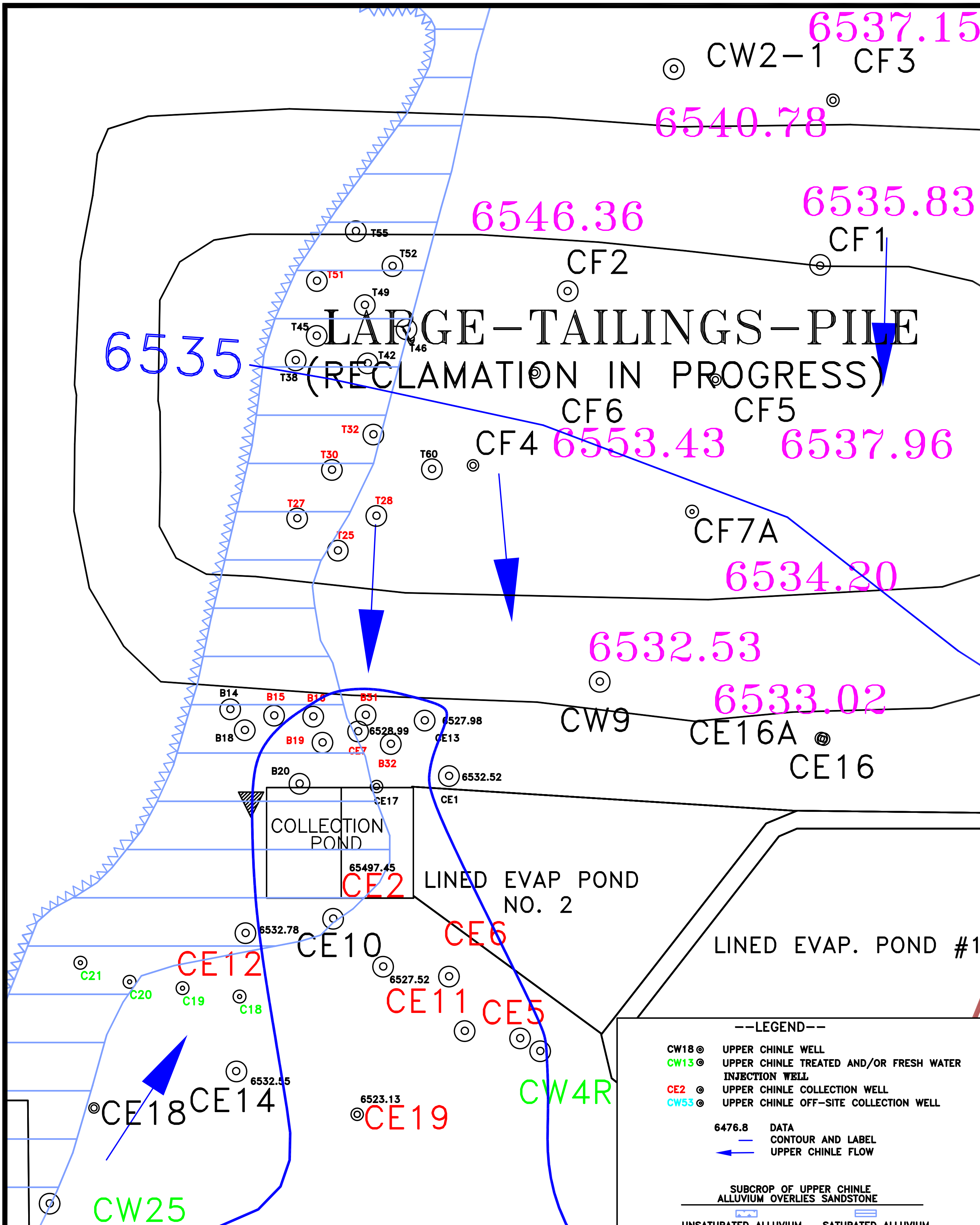
Measured water levels in Homestake's Upper, Middle and Lower Chinle aquifer wells are presented in Appendix A. Table A.2-1 of Appendix A includes water levels for Homestake, subdivision, and regional Chinle wells. Figures 5.2-1 and 5.2-1A presents water-level elevation contours of the Upper Chinle aquifer during the fall of 2017. The blue arrows on Figure 5.2-1 show the direction of ground-water flow, which is greatly influenced by the fresh-water injection into the Upper Chinle at wells C18, C19, C20, C21, CW4R, CW5, CW13 and CW25 and collection from wells B15, B16, B19, B31, B32, CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A, CE19, T25, T27, T28, T30, T32 and T51. Well CW13, an injection well on the east side of the East Fault, is in the high permeability zone of the Upper Chinle aquifer that parallels the East Fault. This high permeability zone extends to a distance of at least 1000 feet parallel and adjacent to the East Fault near well CW18. Injection of fresh water has created a piezometric-surface mound along the east side of the East Fault. The permeability is much smaller at greater distances to the east of the East Fault and, therefore, an easterly gradient occurs in the Upper Chinle away from the East Fault near injection well CW13. The CW13 injection affects water levels on the west side of the East Fault in the area of Upper Chinle wells CW53 and CW78 in Felice Acres. Water level changes in well CW53 respond quickly to change in levels in well CW13 showing that a good connection exists in the Upper Chinle where the East Fault pinches out south of well CW53.

Injection of treated and/or fresh water into Upper Chinle well CW5 is causing ground water flow to the north and south of this area. The flow that moves to the south discharges to the alluvial aquifer in the subcrop area of the Upper Chinle, and the flow that moves to the north converges toward collection wells CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A or CE19. Injection into Upper Chinle well CW25 was started in 2000, and this injection is causing ground water to flow from this well back toward these collection wells. The naturally occurring flow direction in the Upper Chinle aquifer west of the East Fault is from the north. Well CW3 has not been pumped since January 2007 and therefore does not intercept any of the flow from the north.

Figure 5.2-2 shows the location of the Upper Chinle wells that are used to monitor water-level changes with time. Figure 5.2-3 presents water-level elevations for Upper Chinle wells 494, CE2, CE7, CE10, CW3 and CW50. Figure 5.2-4 presents the water-level elevation changes for the Upper Chinle wells east of the East Fault. The variation in water levels in wells 929, 931 and CW18 were due to variations in injection rates into well CW13 during 2017.



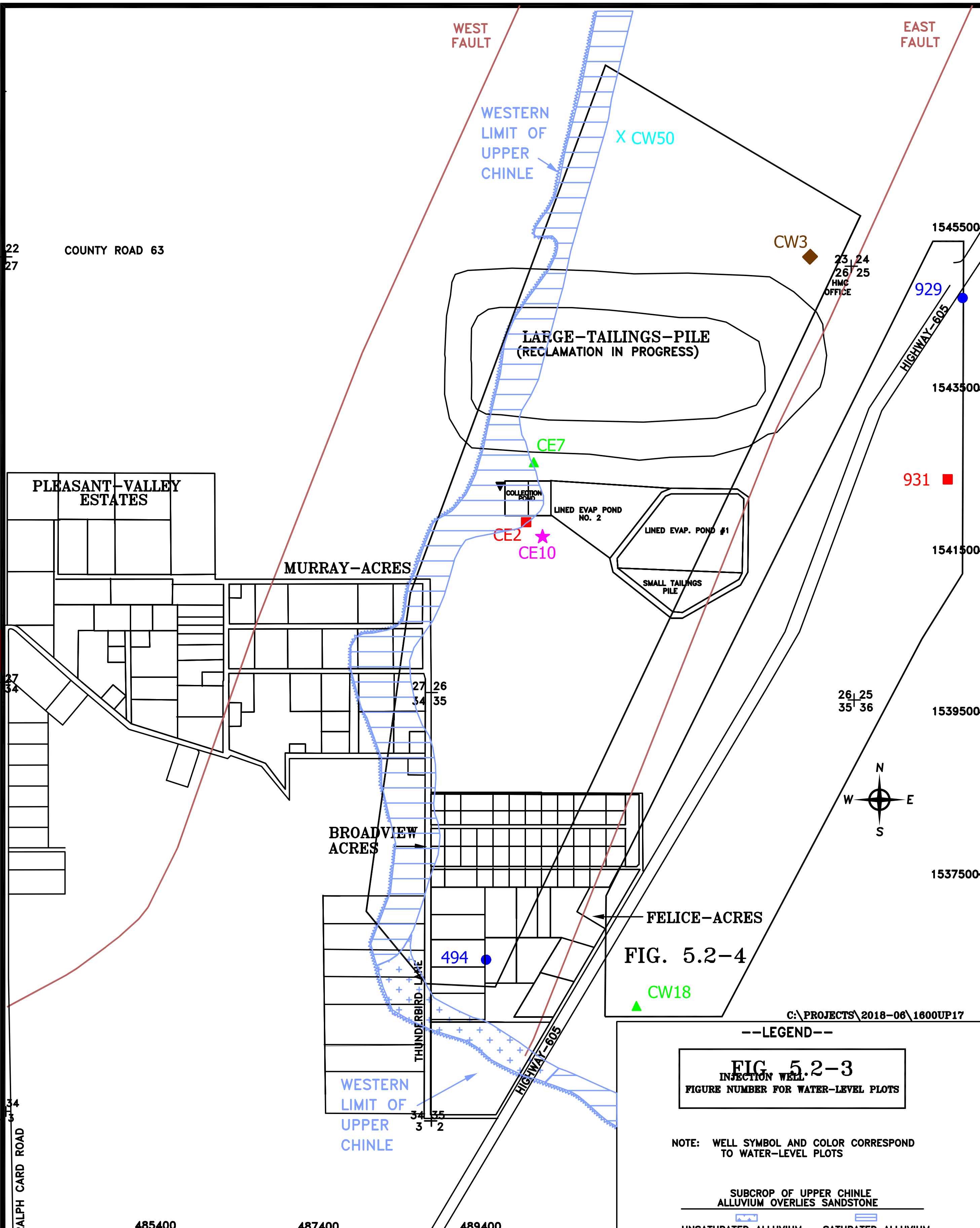
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/24/18
FIGURE 5.2-1. WATER-LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2017, FT-MSL	SCALE: 1"= 1600'
	PAGE: 5.2-3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.2-1A. WATER LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, OS, FALL 2017, FT-MSL

DATE: 1/24/18	
SCALE: 1"= 500'	
PAGE: 5.2-4	



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.2-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2017

DATE: 10/24/2017

SCALE: 1"= 1600'

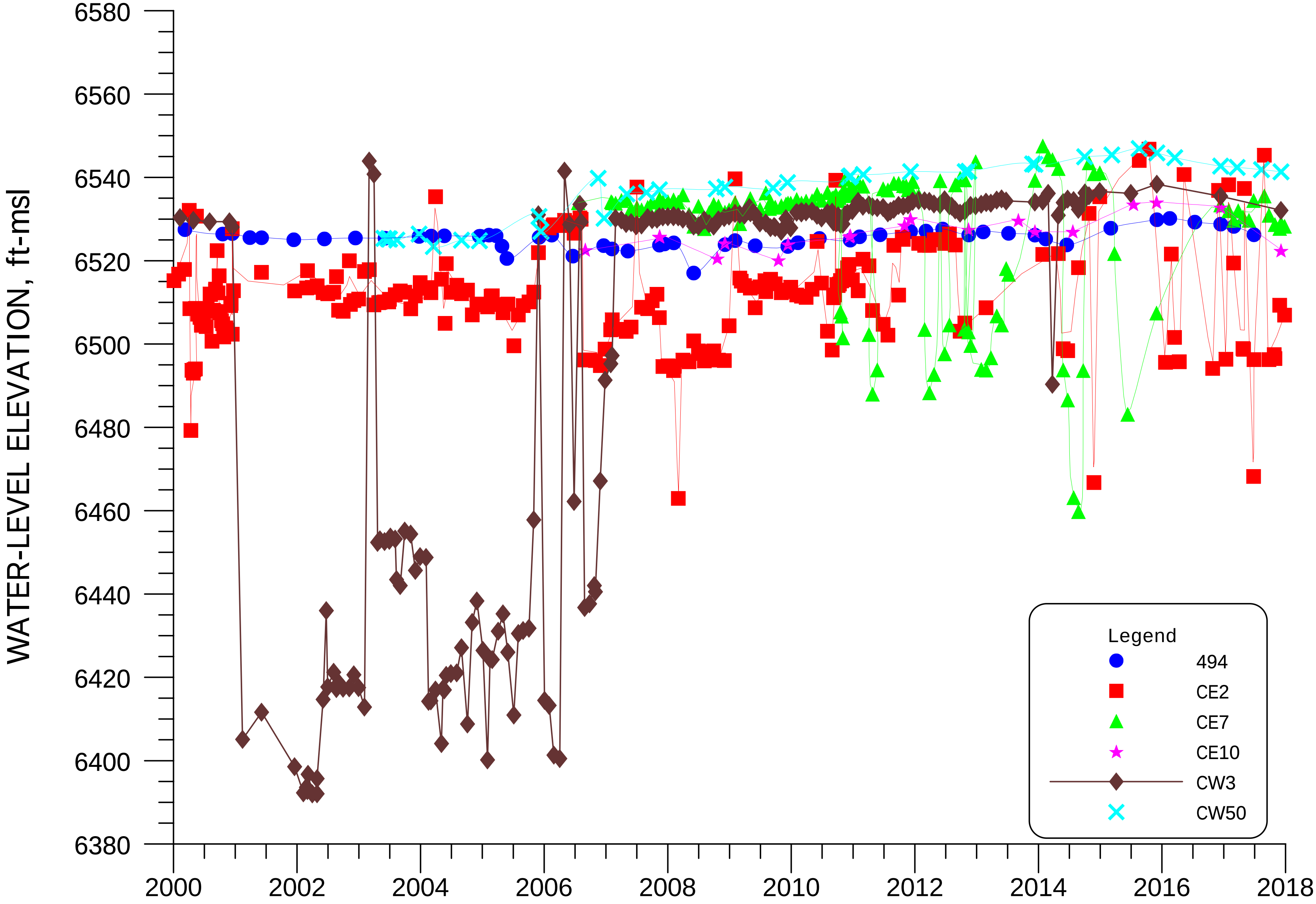


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CE7, CE10, CW3, AND CW50

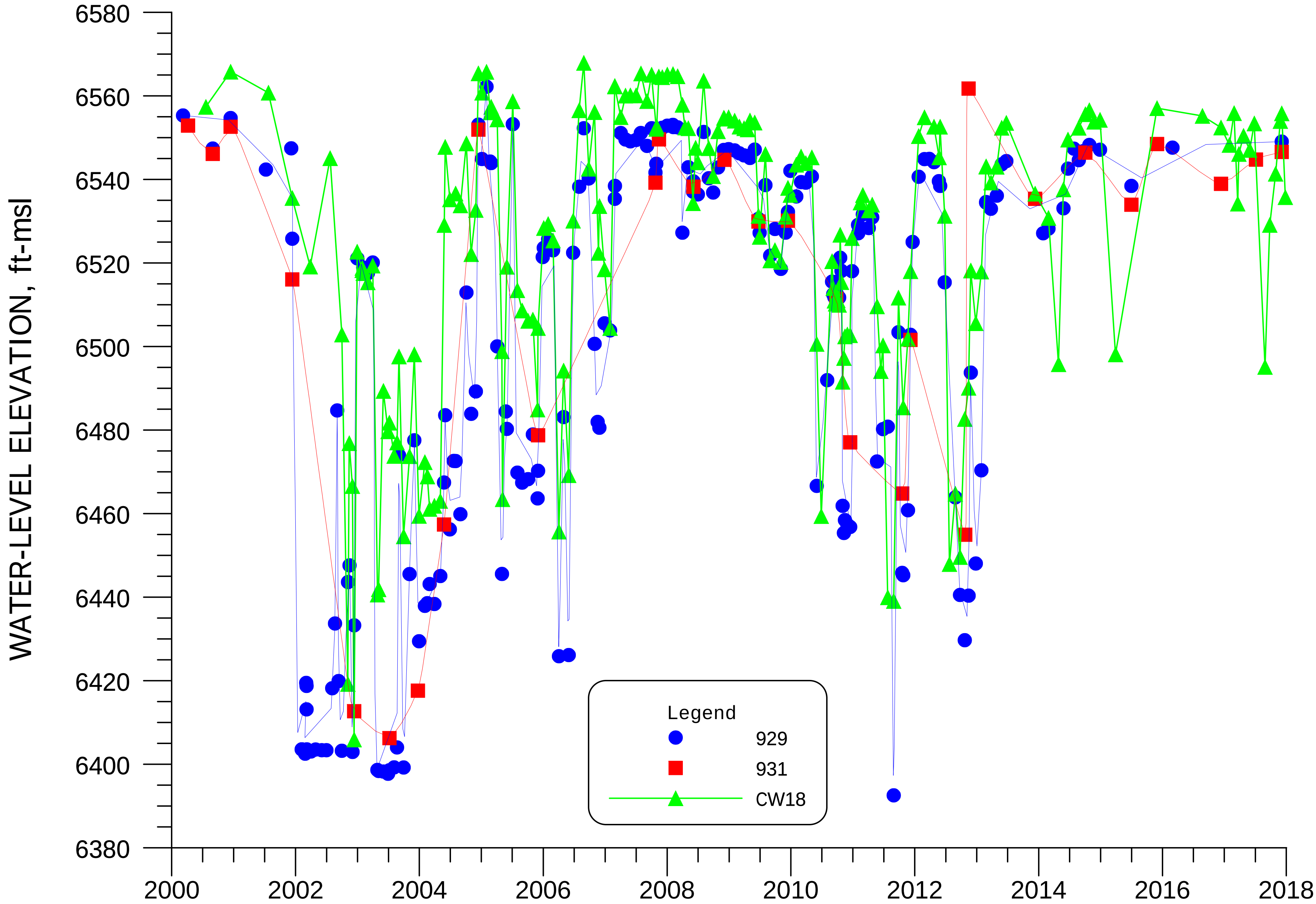


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, AND CW18

5.3 UPPER CHINLE WATER QUALITY

Water-quality data for 2017 for the Chinle aquifers is presented in Tables B.5-1 and B.5-2 of Appendix B. The basic well data is presented in Tables 5.1-1 through 5.1-4 and Figures 5.1-2 and 5.1-2A show locations of the Upper Chinle wells.

Concentrations of key constituents exceed site standards for the Upper Chinle aquifer in only a few locations. Sulfate concentrations have been adequately restored in the Upper Chinle aquifer except for an area near the Large Tailings Pile (LTP). Selenium concentrations during 2017 are less than the site standard in all Upper Chinle wells except for wells near the southern portion of the LTP. Uranium concentrations exceed the site standard in wells near the LTP, two wells in and just north of Broadview Acres and two wells in Felice Acres. Molybdenum concentrations in the Upper Chinle aquifer exceed the site standard in wells in close proximity to the tailings piles and well CE15.

5.3.1 SULFATE - UPPER CHINLE

Figures 5.3-1 and 5.3-1A present sulfate concentrations in the Upper Chinle aquifer during 2017. Figure 5.3-1A has been added for the presentation of the new wells in the LTP area due to the density of these wells. Therefore Figure 5.3-1A should be used for the viewing of the concentrations in the area inside the red box on Figure 5.3-1. Upper Chinle sulfate concentrations varied from 367 mg/l to large values in the LTP area. Only wells near the LTP area exceeded the site standard for the mixing zone of 1750 mg/l. The non-mixing zone site standard of 914 mg/l in the Upper Chinle in 2017 is also exceeded in the eastern portion of the LTP (see Section 3 for zone areas). Upper Chinle site standards based on background data are presented for sulfate in the legend of Figures 5.3-1 and 5.3-1A. These site standards have a greater than sign in front of the numeric value which is associated with the pattern for the particular zone. Therefore, only an area in the LTP to the collection ponds requires restoration in the mixing zone and an area to the east in the non-mixing zone. The information regarding the analysis of background results that were used to develop the background and related site standards are presented previously in Section 3 of this report.

The locations of wells used in the time plots of water quality are presented on Figure 5.3-2. The color and symbol of the individual wells correspond with those used on the various water-quality time plots. Sulfate time-plot figure numbers are also shown on Figure 5.3-2 for each group. The same color and symbol scheme is used for other constituents in the Upper Chinle discussed in this section. Notations on Figure 5.3-2 indicate that mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE12 and CE15A are grouped together on the water-quality time plots, whereas the non-mixing zone wells 931, CW18 and CW3 are grouped together on a second plot.

Figure 5.3-3 presents sulfate concentrations versus time for the mixing zone group of wells listed above. The sulfate concentrations in water sampled from each of these wells in 2017 are less than the mixing-zone site standard (see Figure 5.3-3). A plot of sulfate concentrations versus time for non-mixing zone Upper Chinle wells 931, CW18 and CW3 is presented on Figure 5.3-4 (see Figure 5.3-2 for location of these wells). This plot shows some minor variability with fairly steady sulfate concentrations in these three Upper Chinle wells in 2017.

5.3.2 TOTAL DISSOLVED SOLIDS - UPPER CHINLE

Figures 5.3-5 and 5.3-5A present contours of total dissolved solids (TDS) concentrations for the Upper Chinle aquifer during 2017. Figure 5.3-5A should be used similar to the second sulfate figure for viewing the concentrations inside of the box on Figure 5.3-5. All concentrations are less than the mixing zone site standard except in areas of the Upper Chinle under and near the LTP. The non-mixing zone site standard is exceeded in the LTP area and east of State Highway 605 in Sections 25, 26, 35 and 36 where concentrations are natural. The TDS concentration naturally increases with increasing distance east of the East Fault due to the slower movement of ground water in this less transmissive portion of the aquifer. The blue dashed pattern on Figures 5.3-5 and 5.3-5A shows where the Upper Chinle TDS concentrations are greater than 2010 mg/l, which is the non-mixing zone site standard. TDS concentrations in this area east of Highway 605 are natural and not attributable to the Grants tailings piles. The TDS concentrations exceed the mixing zone standard of 3140 mg/l near the LTP and also exceed the non-mixing zone standard in the areas near wells CF1 and CF3. The Upper Chinle aquifer near the LTP still requires restoration with respect to TDS concentration.

Figure 5.3-6 presents TDS concentrations for mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE12 and CE15A. The TDS concentrations in wells CE2, CE5 and CE12 had increased but decreased in 2016 and 2017. A time plot of TDS concentrations for non-mixing zone wells 931, CW18 and CW3 is presented in Figure 5.3-7.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2017 are presented on Figures 5.3-8 and 5.3-8A. In the up-gradient Upper Chinle well CW50, chloride concentrations are less than 100 mg/l. Typical measured chloride concentrations are between 100 and 220 mg/l in the Upper Chinle aquifer, because this range encompasses natural variations and the range of chloride concentrations in the injection water. Concentrations near the subcrop located under the LTP and down to the northern side of the Collection Ponds exceed 250 mg/l and require restoration in this area. The highest chloride concentrations exist in the area of the western portion of the LTP. Chloride concentrations east of the East Fault naturally increase due to the slower movement of ground water with increasing distance east of the East Fault and are not attributable to the Grants site.

The chloride concentrations in water collected from mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE12 and CE15A are presented on Figure 5.3-9. The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10.

5.3.4 URANIUM - UPPER CHINLE

Uranium is an important parameter for identifying impacts to the Upper Chinle aquifer. Figures 5.3-11 and 5.3-11A presents contours of uranium concentrations in the Upper Chinle aquifer for 2017. Uranium concentrations also exceed the corresponding mixing or non-mixing zone site standards in the LTP area extending down to the south of the Collection Ponds in Upper Chinle water in 2017. Two uranium values exceed the mixing zone site standard of 0.18 mg/l just north of and in Broadview Acres and two values in Felice Acres also exceed this site standard. These concentrations are expected to gradually decrease to below background concentrations with the ongoing ground water-quality restoration efforts in the LTP area and the collection just north of Broadview Acres. The highest value measured east of the East Fault in 2017 was 0.03 mg/l.

Plots of uranium concentrations versus time for Upper Chinle wells 494, CE2, CE5, CE8, CE12 and CE15A are presented on Figure 5.3-12 (see Figure 5.3-2 for location of these wells). Uranium concentrations in well CE15A significantly decreased in 2017. Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells 931, CW18 and CW3.

5.3.5 SELENIUM - UPPER CHINLE

Contours of selenium concentrations for 2017 in the Upper Chinle aquifer are presented on Figures 5.3-14 and 5.3-14A. These figures show that the selenium concentrations are less than the mixing-zone site standard of 0.14 mg/l with the exception of wells in and near the subcrop area near the LTP and extending down to the Collection Ponds. The non-mixing zone site standard of 0.06 mg/l is not exceeded in 2017.

Figure 5.3-15 presents selenium concentrations for wells 494, CE2, CE5, CE8, CE12 and CE15A. Adequate restoration has been obtained in this area of the in Upper Chinle. Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells 931, CW18 and CW3

5.3.6 MOLYBDENUM - UPPER CHINLE

Figures 5.3-17 and 5.3-17A present the molybdenum concentrations in the Upper Chinle aquifer during 2017. Molybdenum concentrations near and underlying the LTP exceeded both the mixing and non-mixing zone site standards. Concentrations are greater than 1.0 mg/l in a region extending from the Upper Chinle-alluvium subcrop area, below the LTP, toward the east side of the LTP and to the south of Evaporation Pond 2 and the Collection Ponds. Additional restoration is needed in this area, and should be accomplished after the alluvial aquifer is restored in the subcrop area. The site standard is exceeded in one well just north of Broadview Acres. All molybdenum concentrations from Broadview Acres to the south and east of the East Fault in the Upper Chinle aquifer are equal or below the site standards in 2017.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. Figure 5.3-19 contains time plots of molybdenum concentrations for wells 931, CW18 and CW3.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2017 to confirm that concentrations are significantly below the site standard of 15 mg/l for the mixing zone.

Figures 5.3-20 and 5.3-20A present nitrate concentrations in the Upper Chinle aquifer during 2017. All measured nitrate concentrations in the Upper Chinle aquifer in 2017 are less than the site standard. Routine monitoring of nitrate concentrations in the Upper Chinle aquifer is only warranted near the LTP because concentrations in the alluvial aquifer are elevated only near the LTP.

Plots of nitrate concentration versus time were not prepared, because historic values in Upper Chinle wells are similar to the low concentrations measured in 2017. In the future, nitrate concentrations in the Upper Chinle aquifer are not expected to be significant because of the very limited extent of elevated concentrations in the alluvial aquifer. Therefore, a nitrate site standard for the non-mixing zone for the Upper Chinle aquifer has not been set and is not considered necessary.

5.3.8 RADIUM-226 AND RADIUM-228 - UPPER CHINLE

All radium concentrations in the Upper Chinle aquifer have been low in past years. Radium values slightly exceed 5 pCi/l in the Upper Chinle aquifer in the western portion of the LTP which will easily be decreased below this value during restoration of this area. Figures 5.3-21 and 5.3-21A present the radium-226 and the radium-228 values measured in 2017. The largest radium-226 concentration measured in the Upper Chinle wells in 2017 was 53.1 pCi/l in well CF6 and this value is thought to be an outlier based on other values in the Upper Chinle aquifer. The largest radium-228 value was 2.3 pCi/l in wells CE2 and T51. Historical data has shown that radium-226 and radium-228 are not present at concentrations that are significant outside the LTP in the Upper Chinle aquifer at the Homestake site. No concentration plots were prepared for radium because observed concentrations have been low. A radium site standard for the Upper Chinle aquifer has not been established.

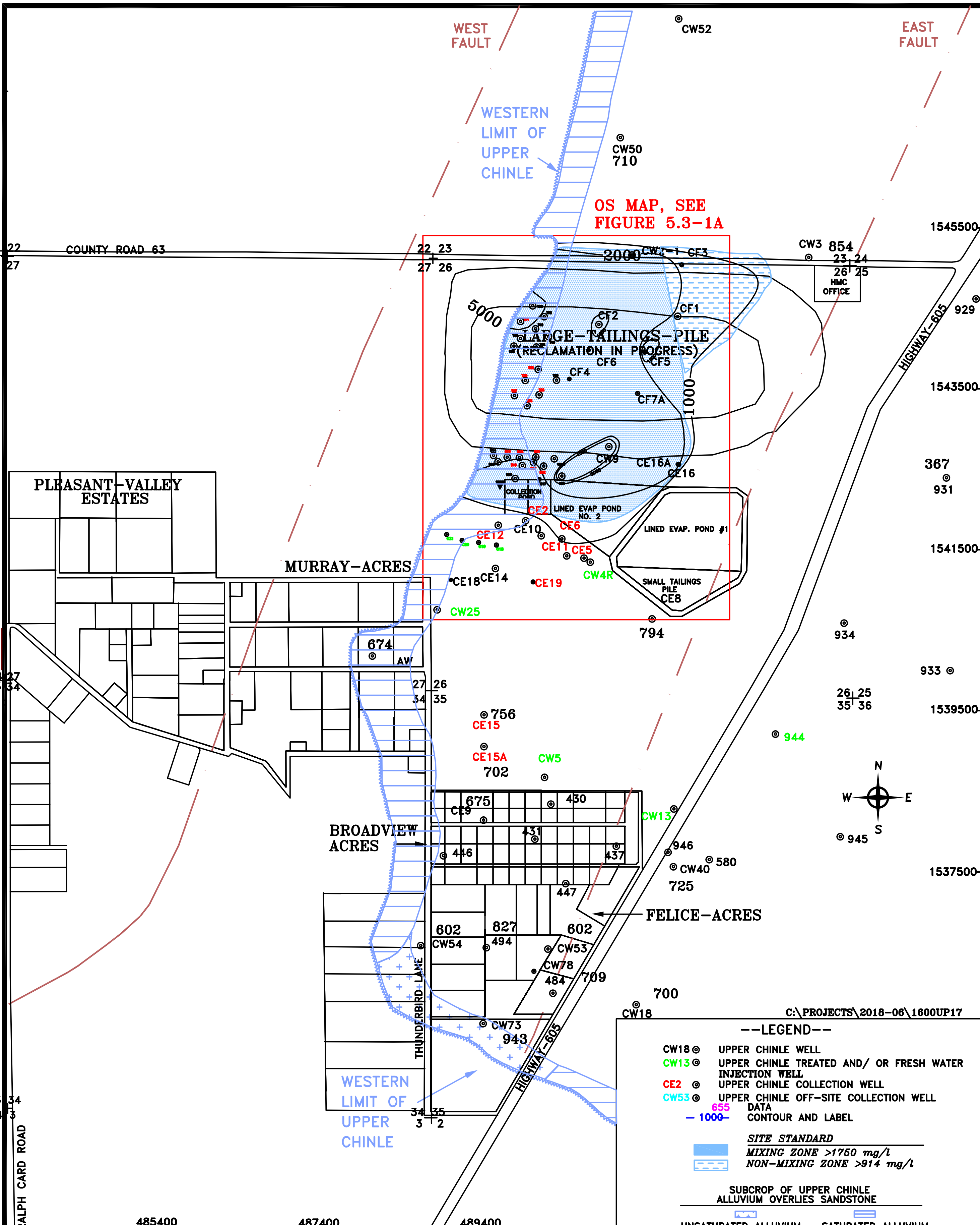
5.3.9 VANADIUM - UPPER CHINLE

Vanadium concentrations have always been low in the Upper Chinle aquifer except in the area of the LTP where they are slightly above the site standard. The occurrence of significant concentrations in the Upper Chinle aquifer is unlikely because this constituent is not present at elevated concentrations in the alluvial aquifer with the exception of the immediate tailings area.

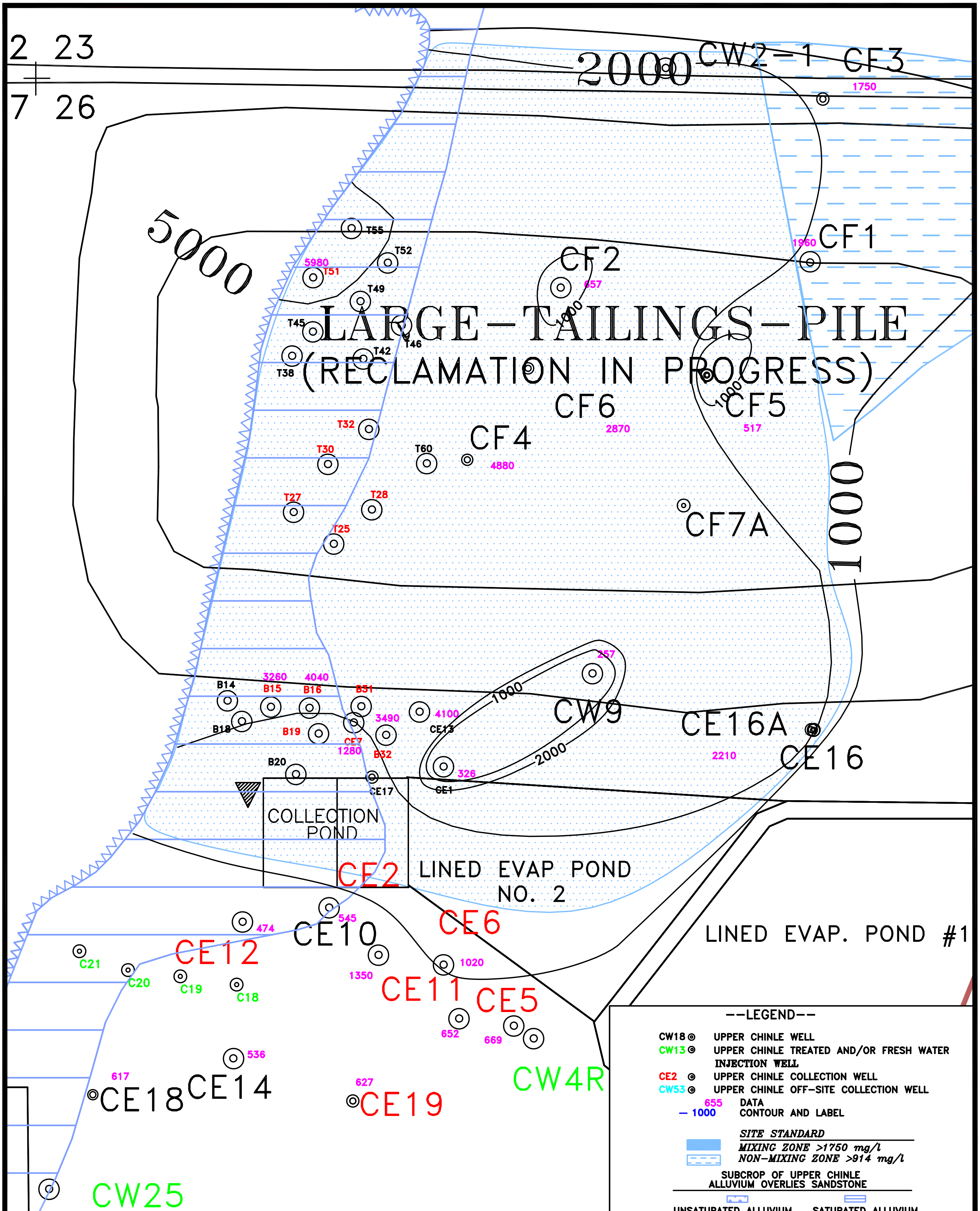
Figure 5.3-22 shows that all of the 2017 measured vanadium concentrations are equal to or less than 0.01 mg/l except for slightly higher values in wells CE7, CW3 and T51. A small amount of restoration is needed in the LTP area for the Upper Chinle aquifer. A site standard was set for the Upper Chinle aquifer for vanadium because a small amount of restoration is needed close to the LTP.

5.3.10 THORIUM-230 - UPPER CHINLE

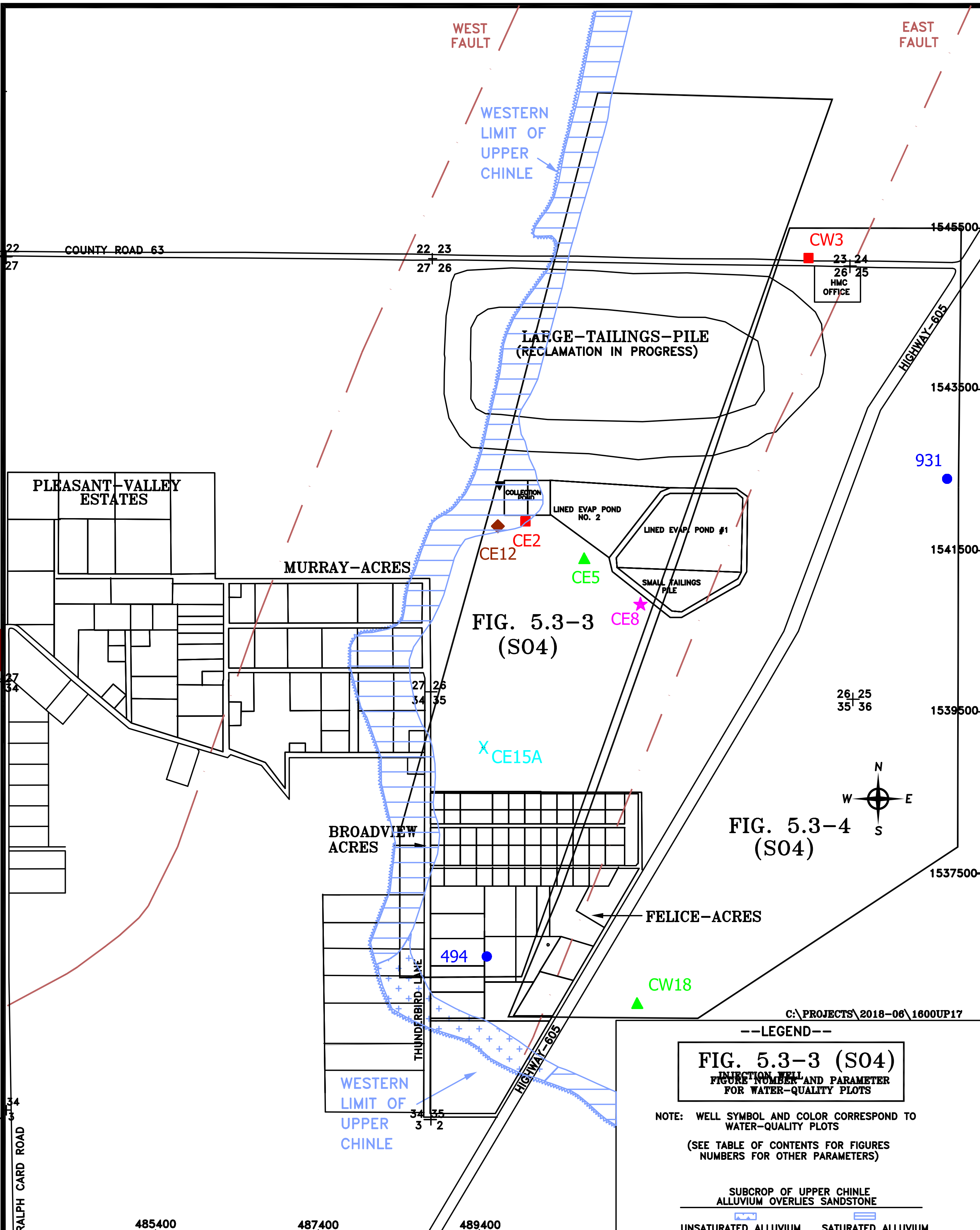
Thorium-230 concentrations have never been significant in the Upper Chinle aquifer. The values measured in 2017 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2017 were less than or equal to 0.3 pCi/l except for values of 0.4 and 1.0 pCi/l in wells CE13 and T51. These two values are within and very near the LTP area. Additional monitoring in this area is needed in the future to confirm these values. No plots of the thorium-230 concentration with time were developed due to the lack of any significant change in the low concentrations over the period of record.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 5.3-1. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l	SCALE: 1"= 1600'
	PAGE: 5.3-7



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 5.3-1A. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l	SCALE: 1"= 500'
	PAGE: 5.3-8



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

FIGURE 5.3–2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2017

DATE: 3/2/18

SCALE: 1"= 1600'

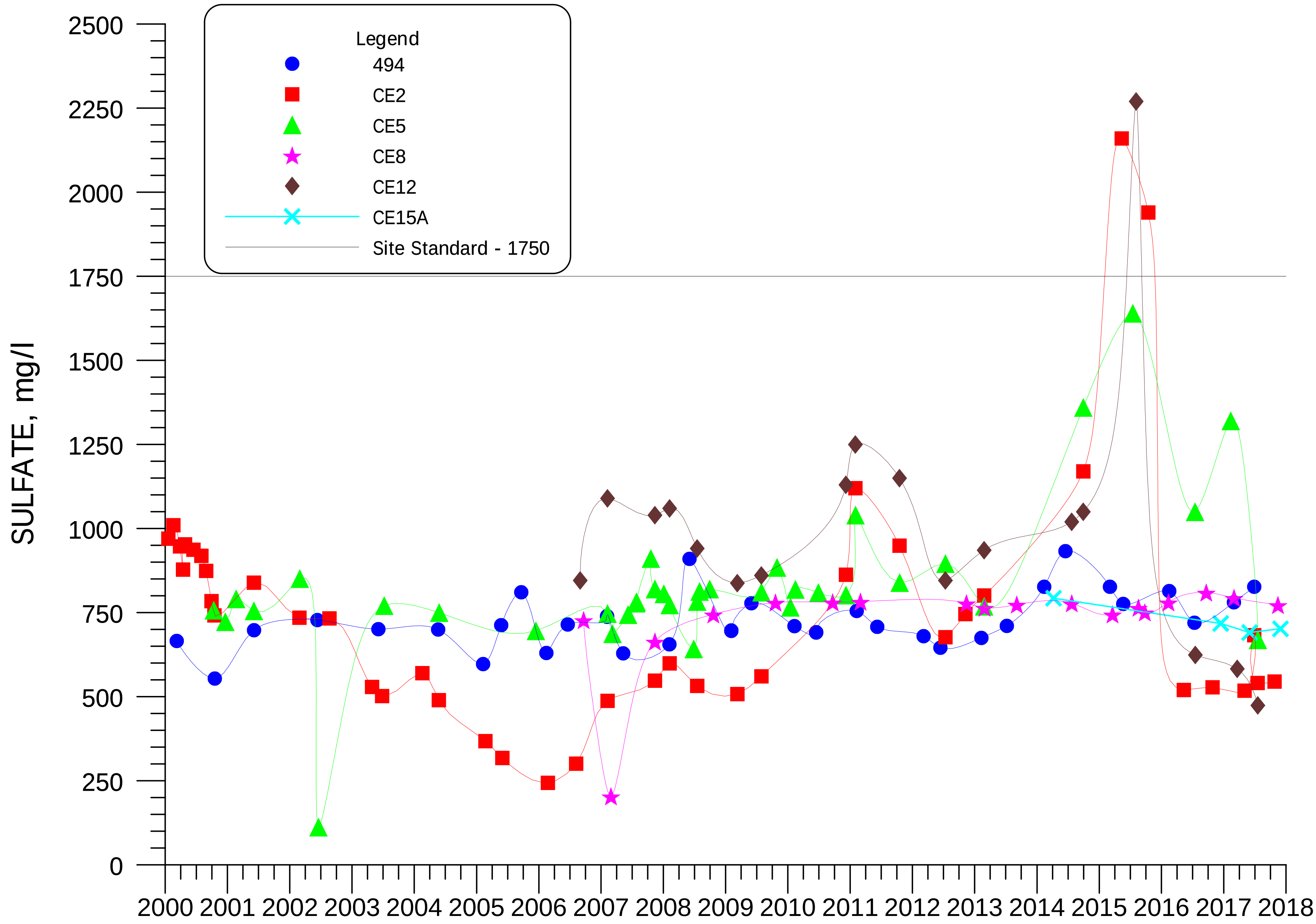


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12 AND CE15A

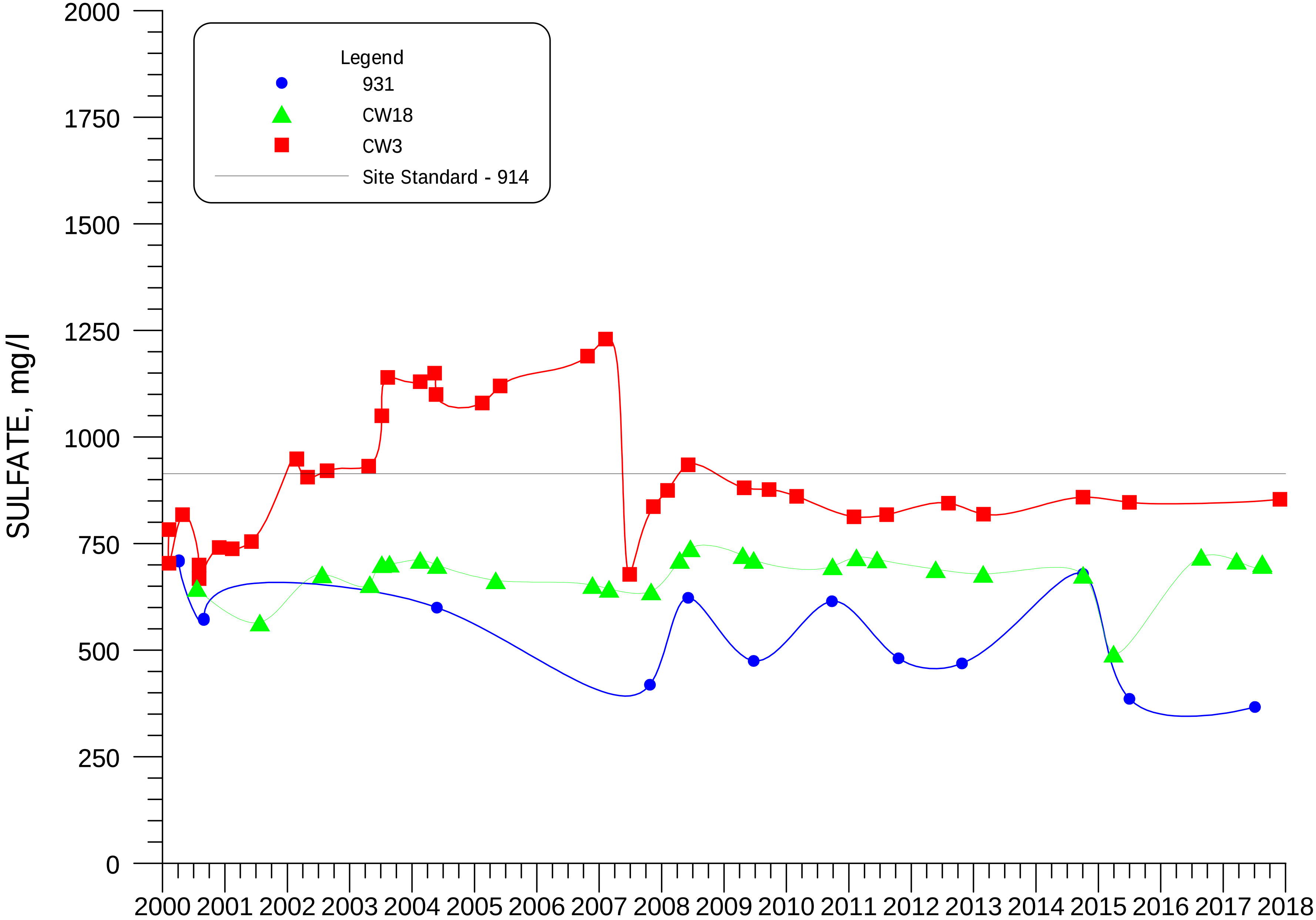
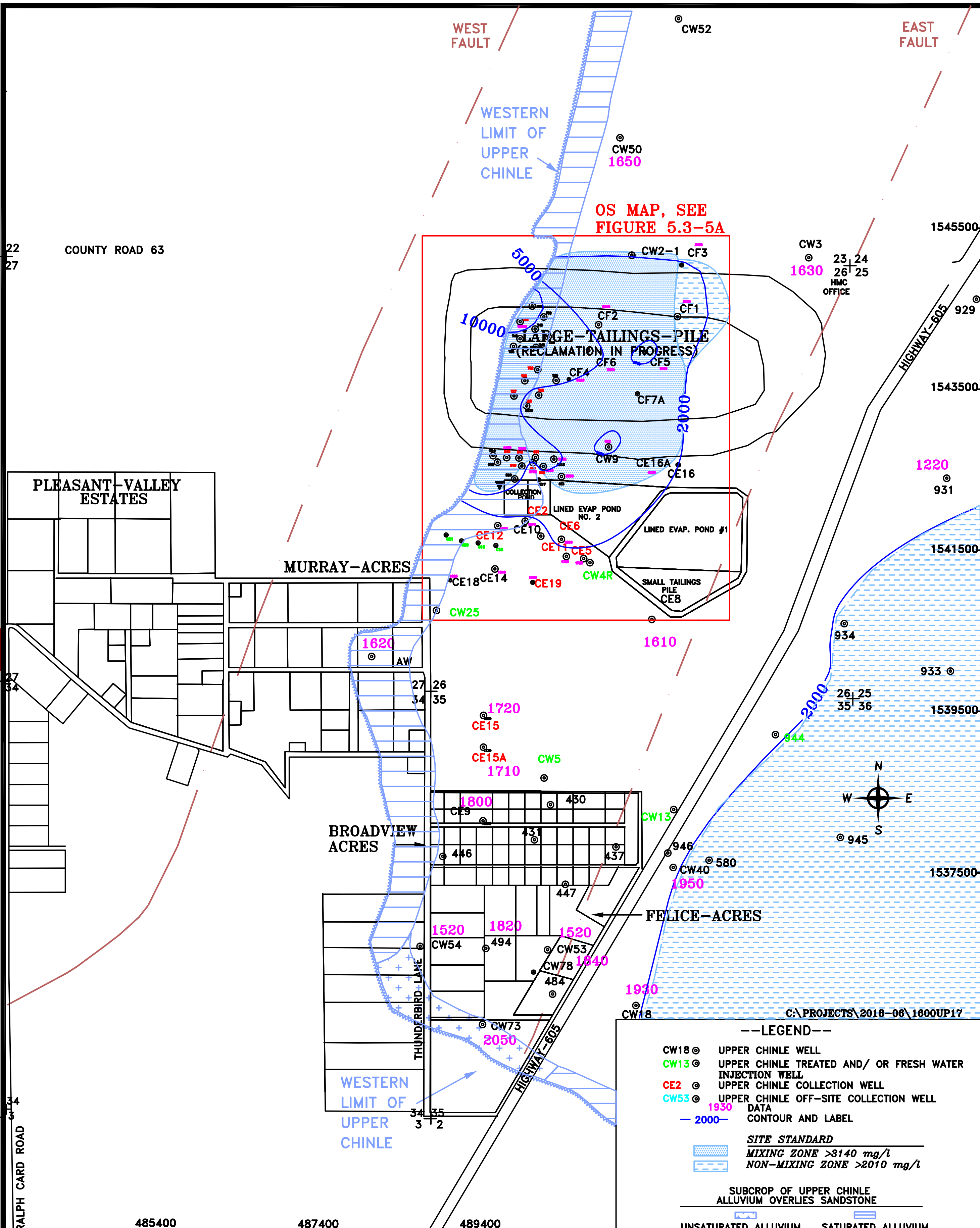


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3

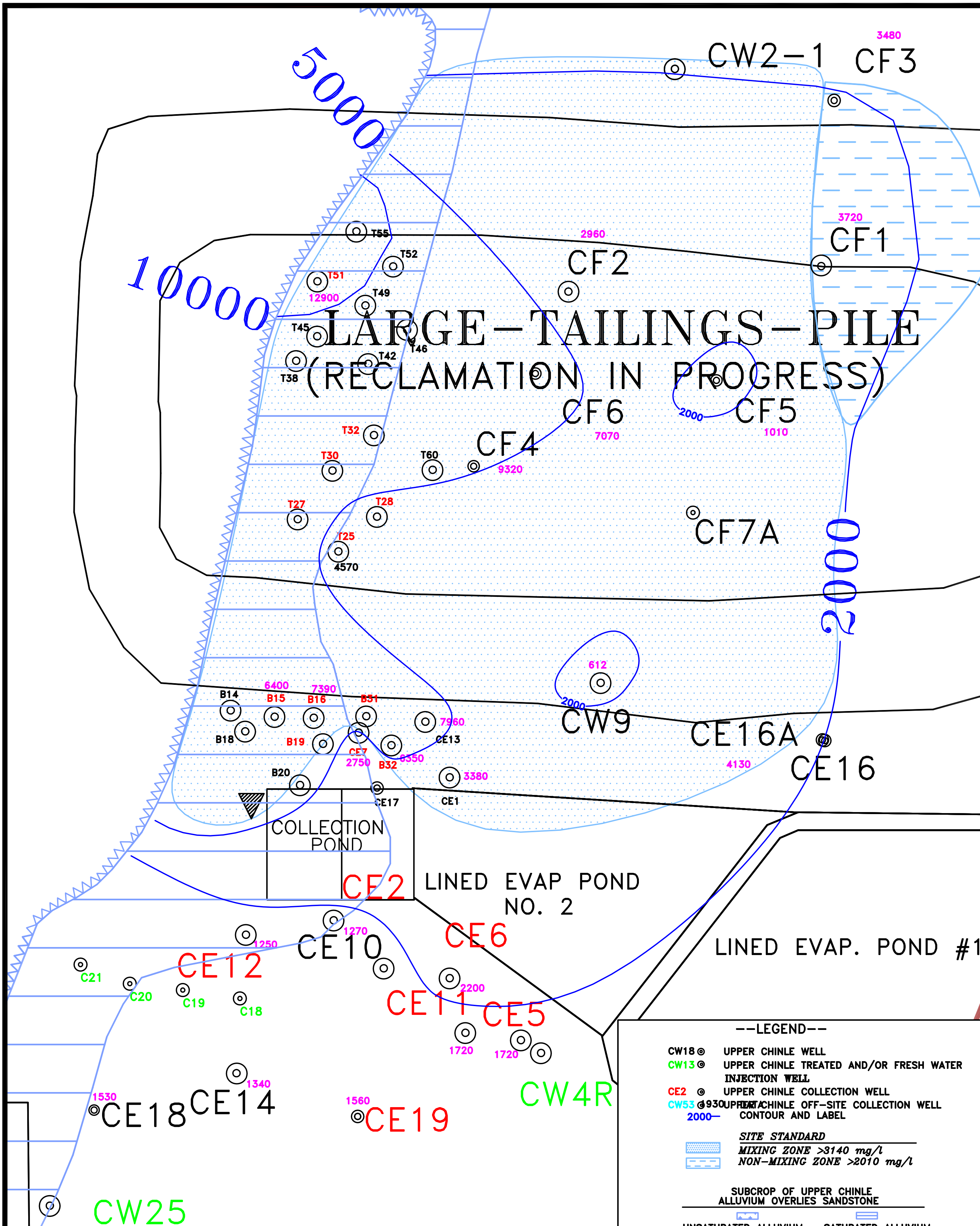


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-5A. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 500'

PAGE: 5.3-13

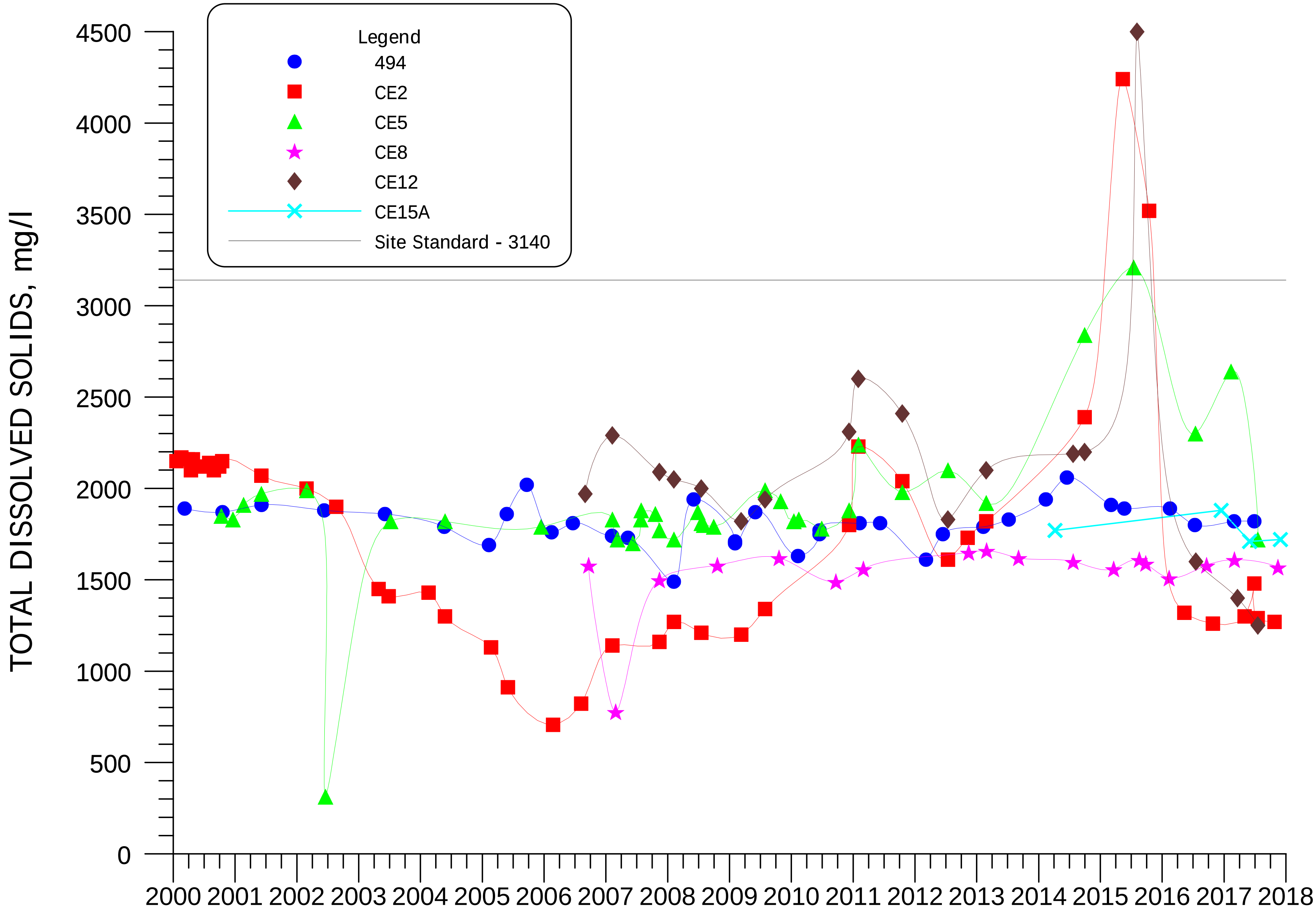


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

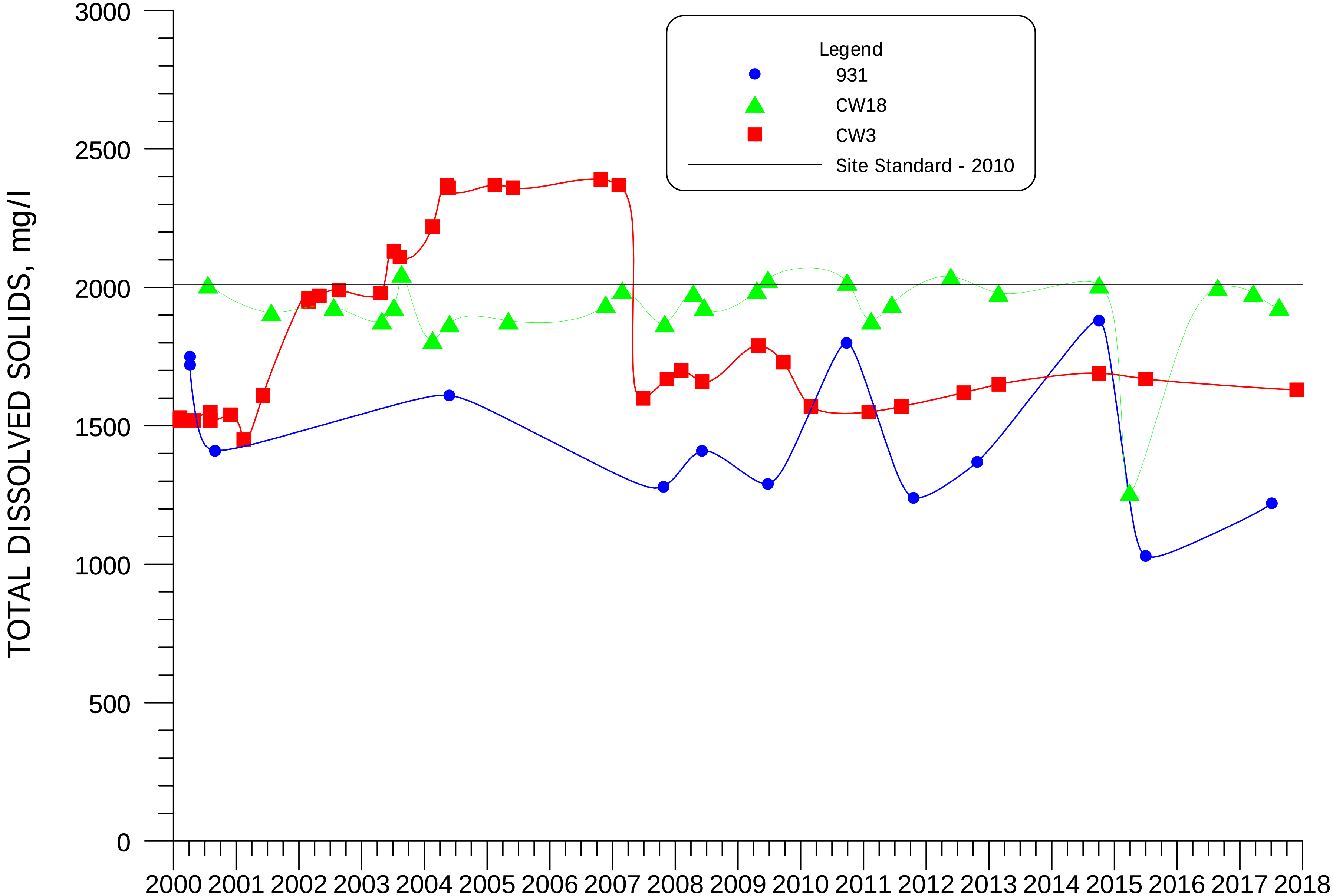
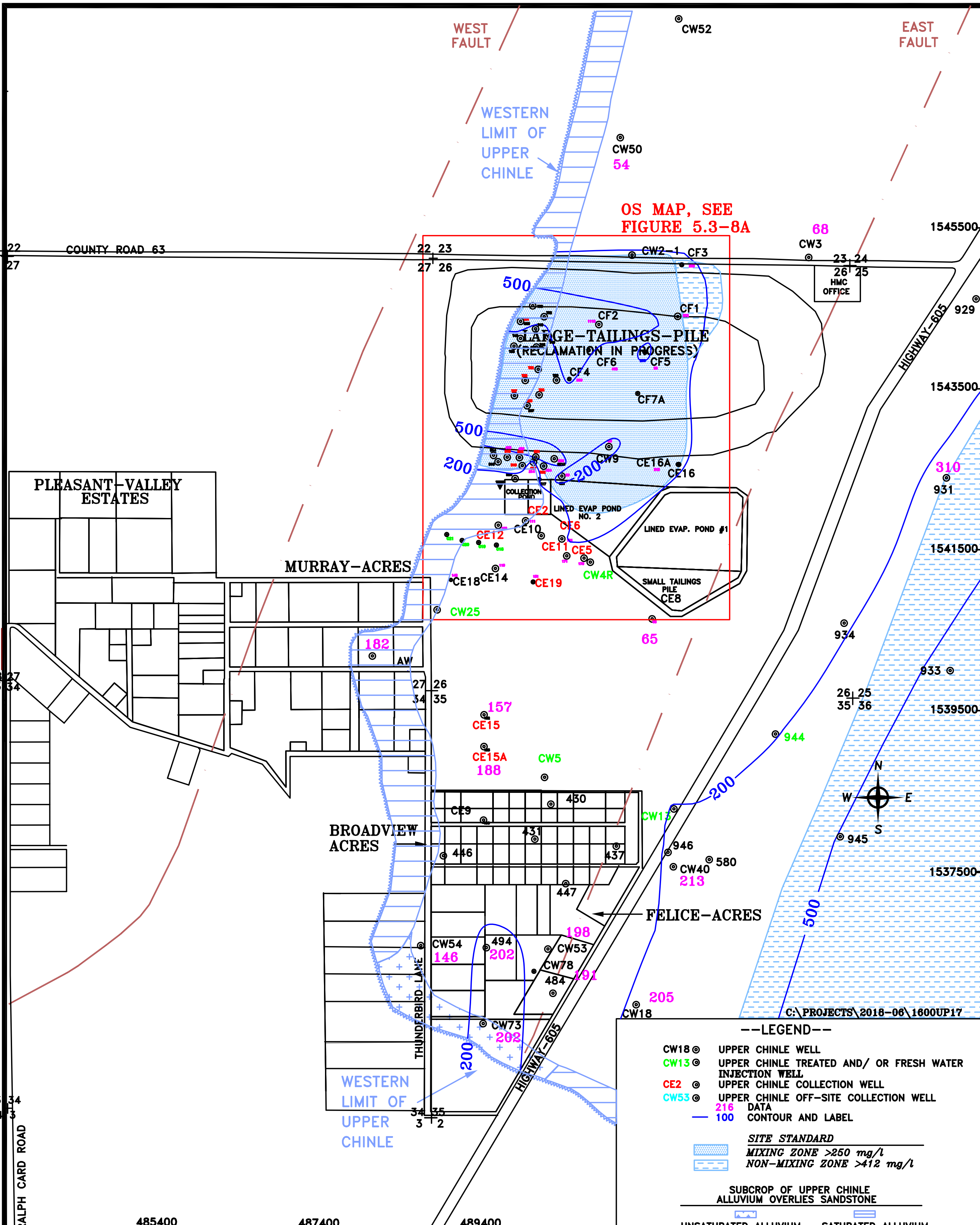


FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3



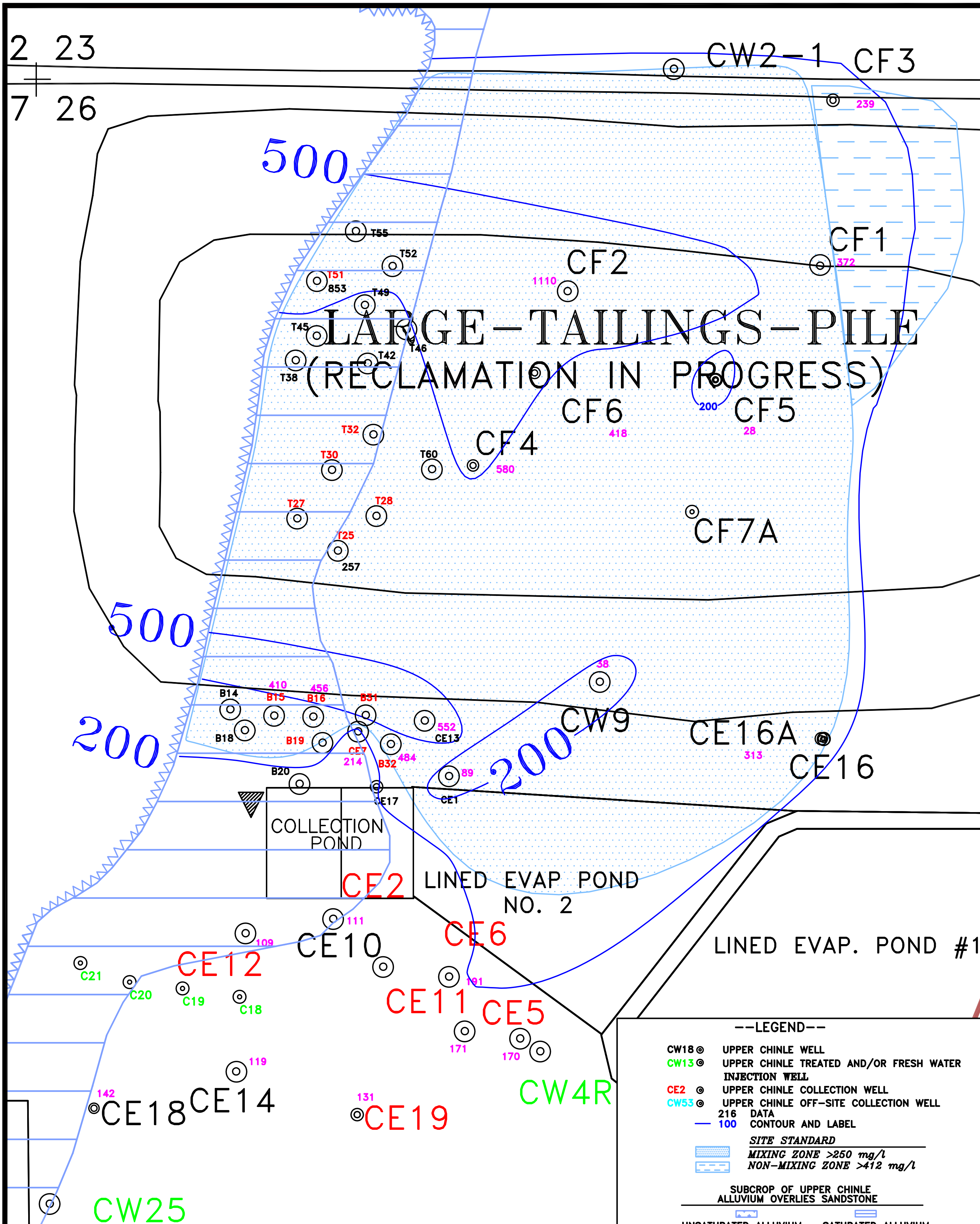
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 1600'

PAGE: 5.3-16



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-8A. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 500'

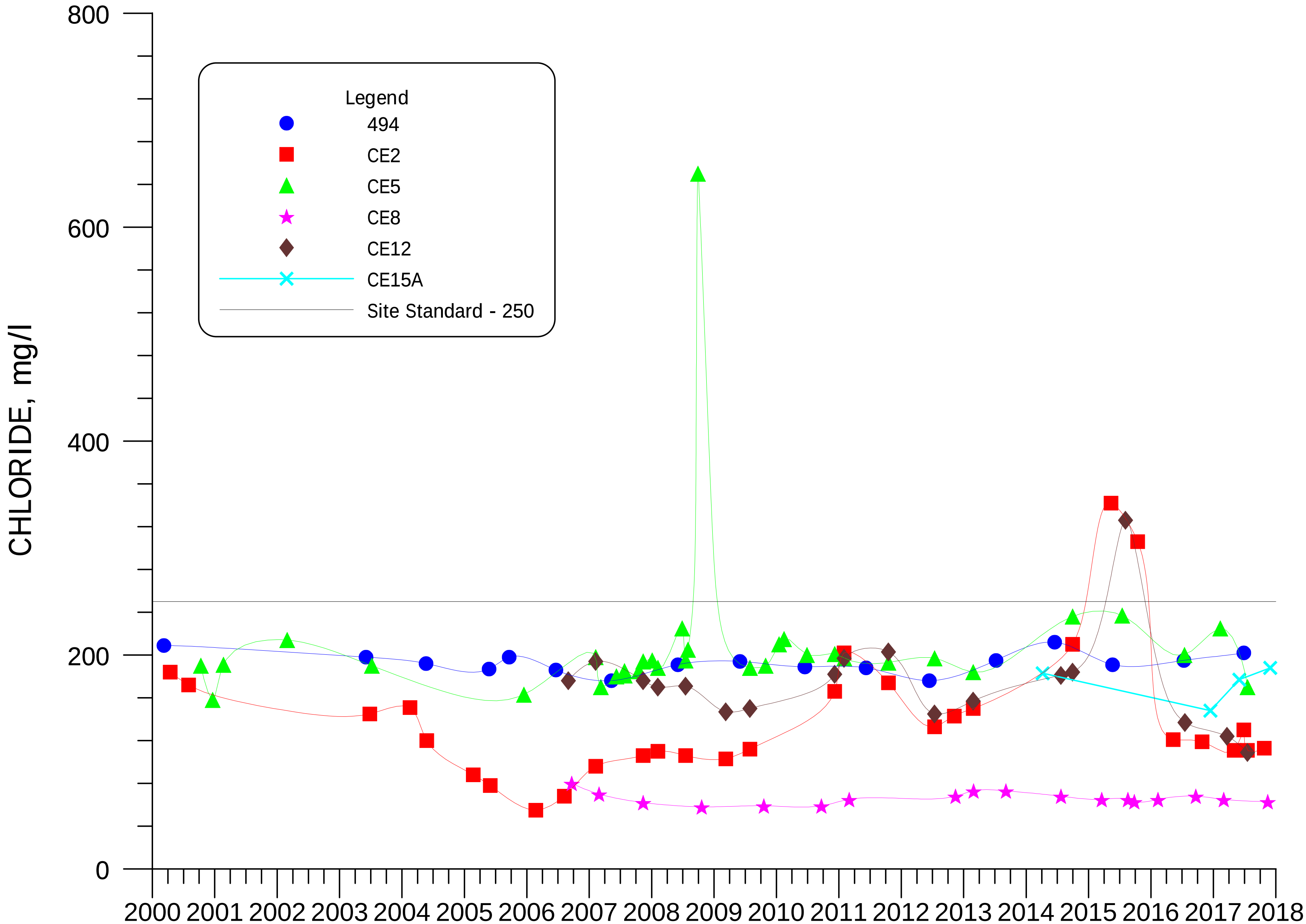


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

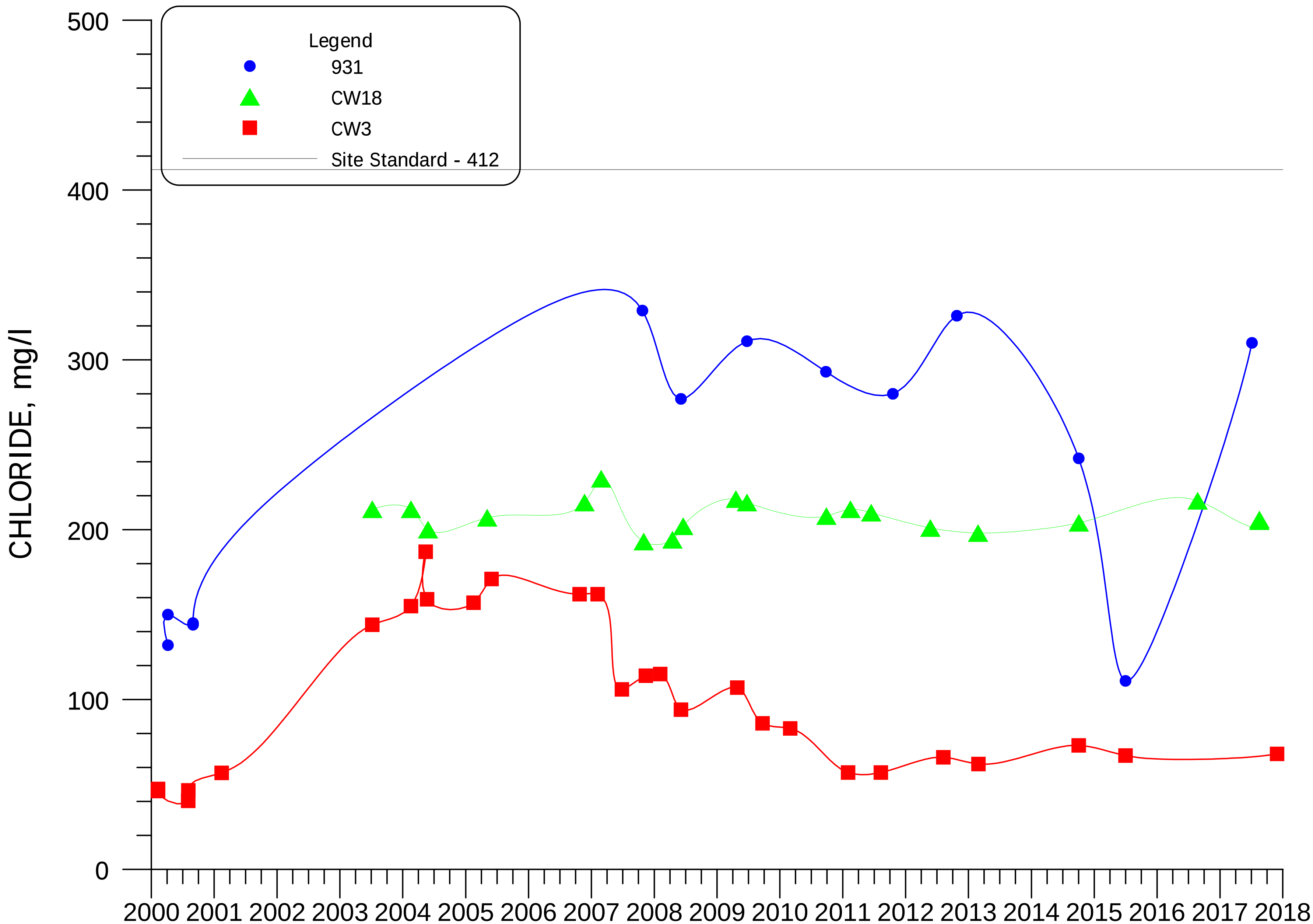
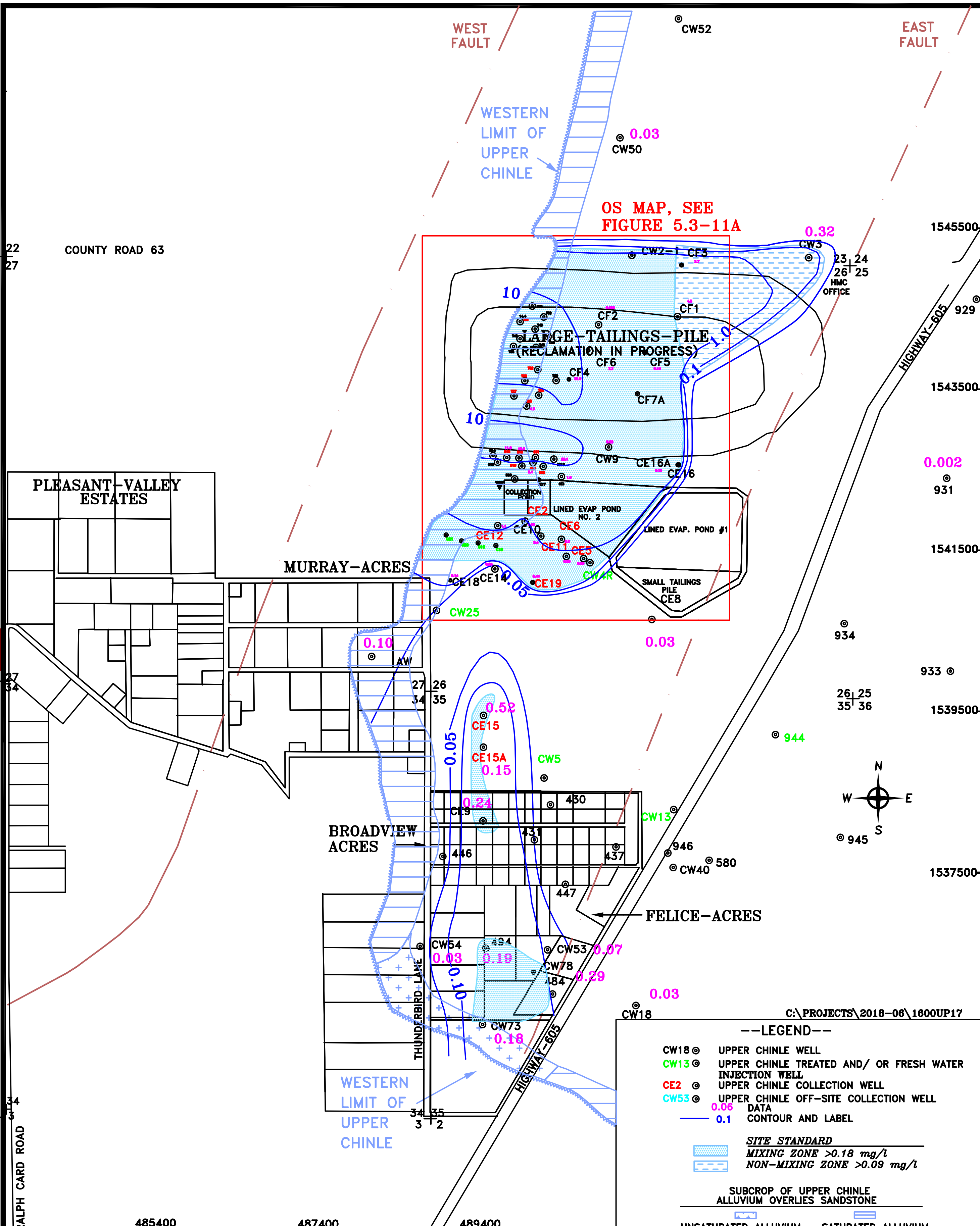
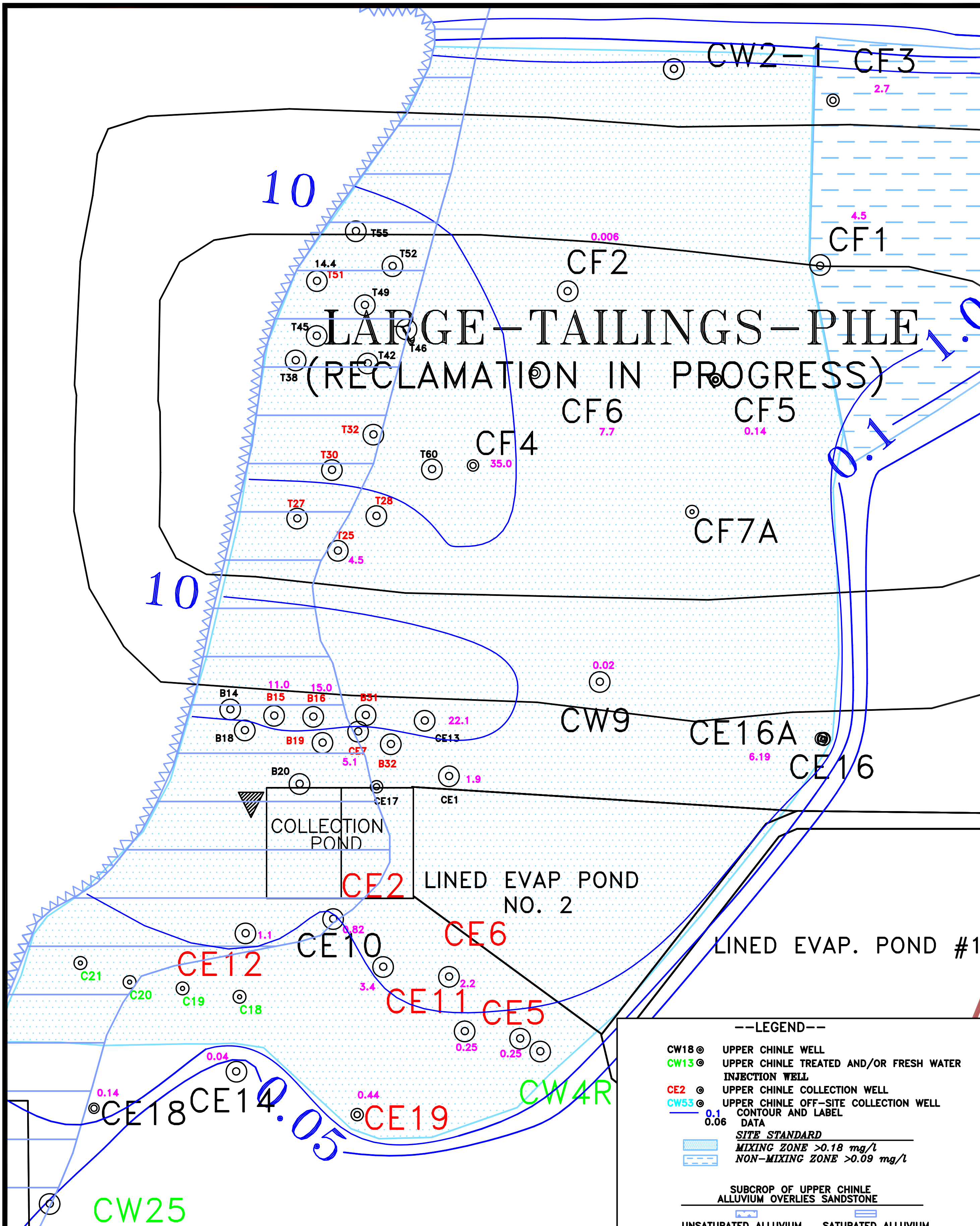


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l	SCALE: 1"= 1600'
	PAGE: 5.3-20



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-11A. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18	
SCALE: 1"= 500'	

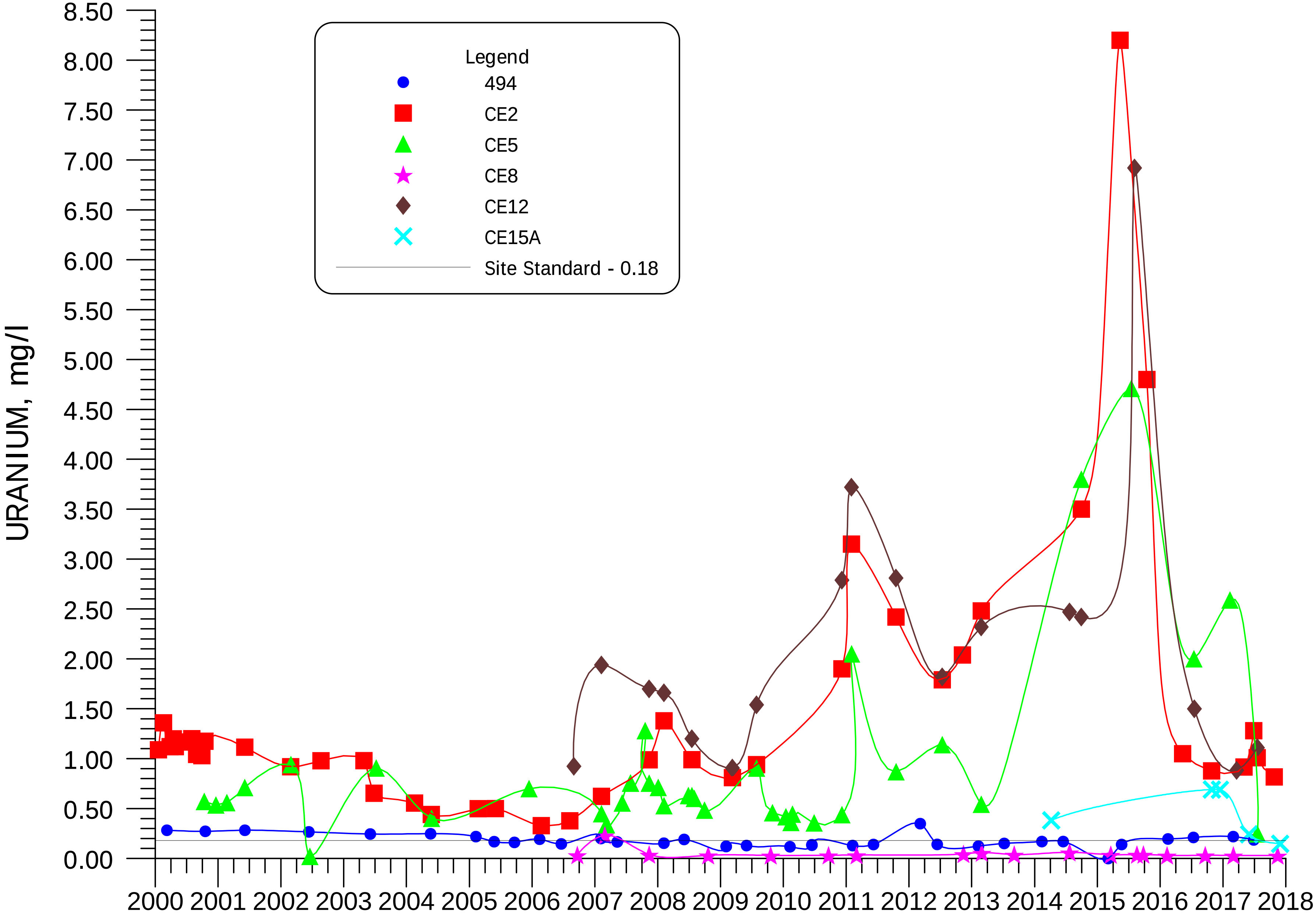


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

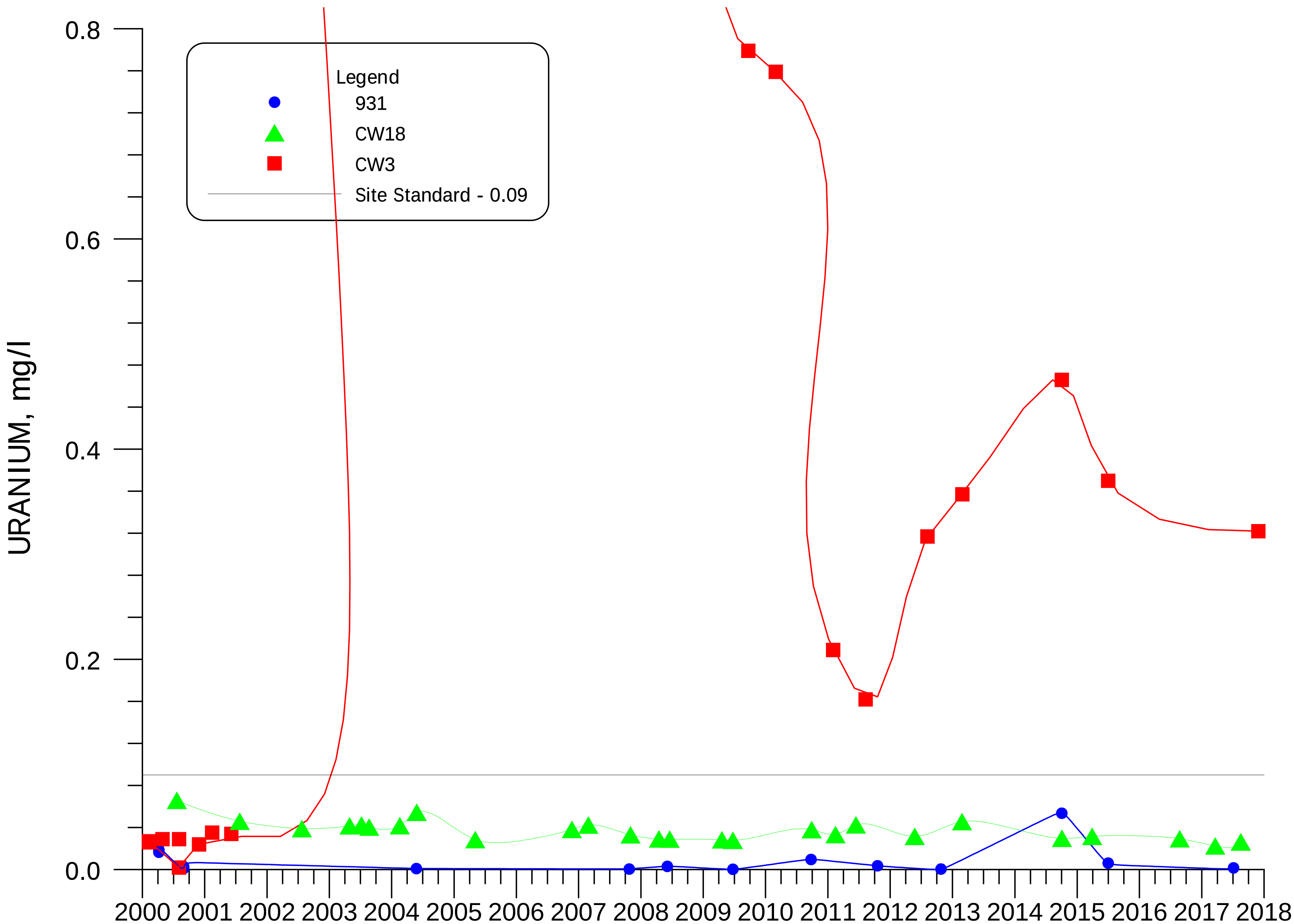
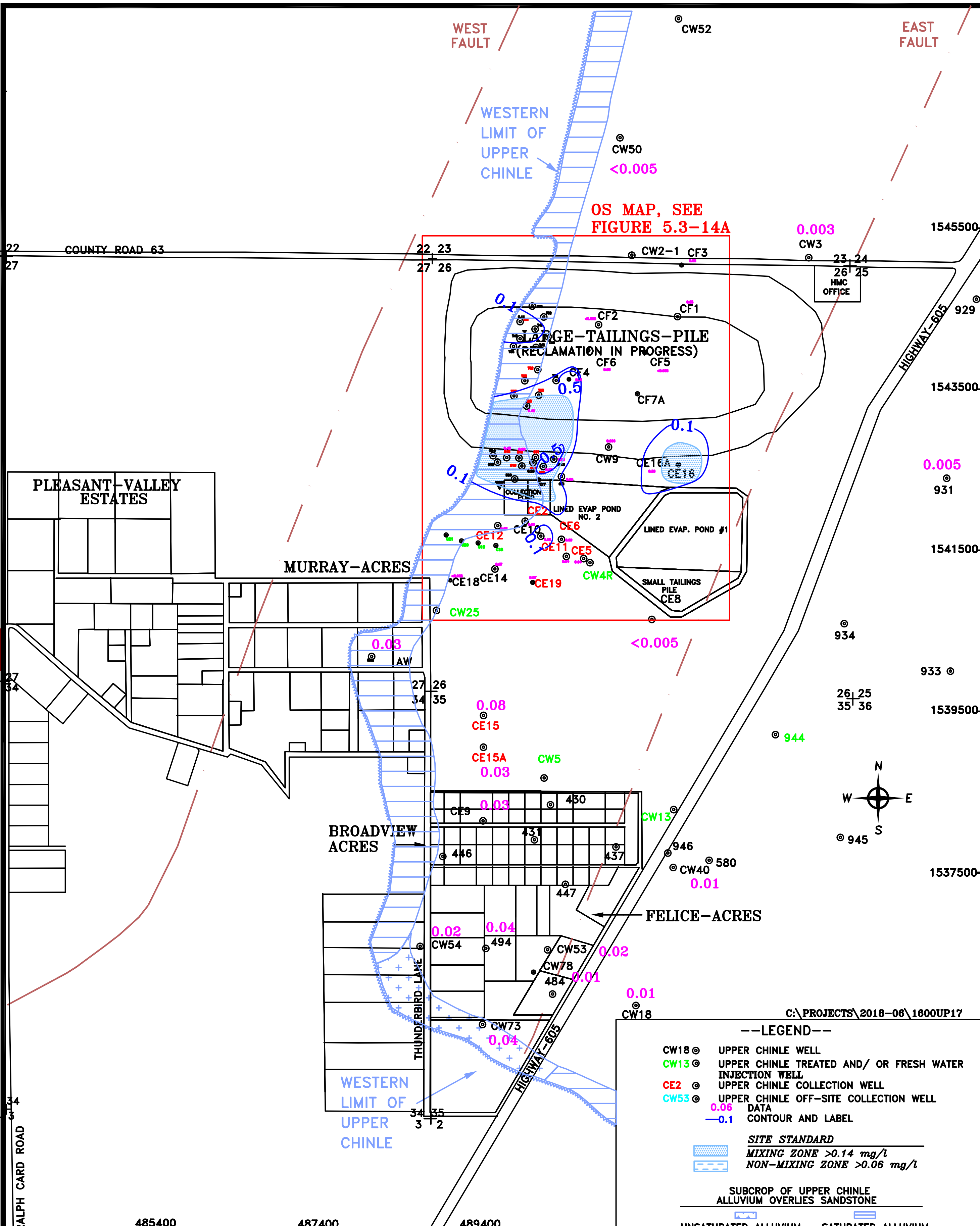
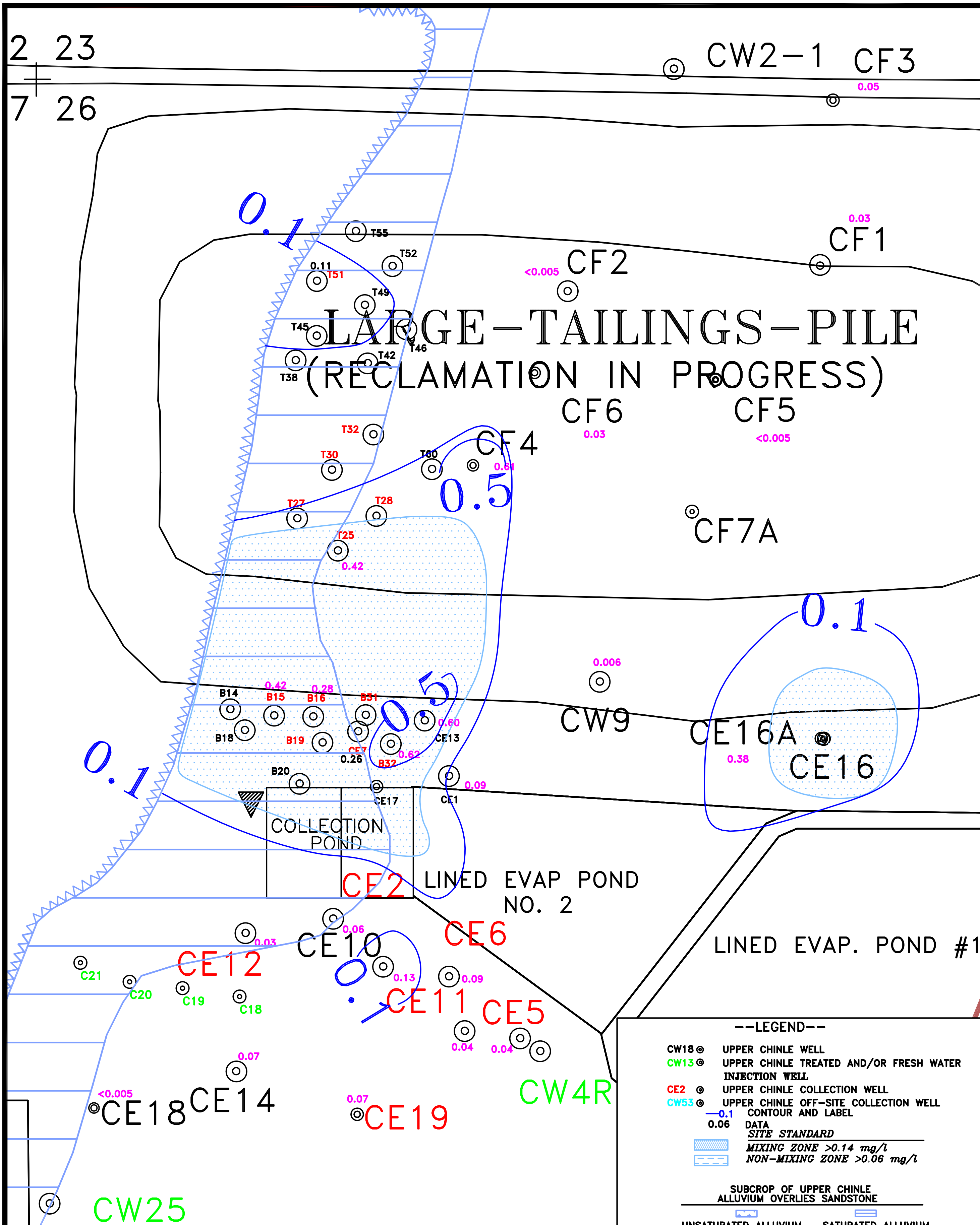


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l	SCALE: 1"= 1600'
	PAGE: 5.3-24



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-14A. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 500'

PAGE: 5.3-25

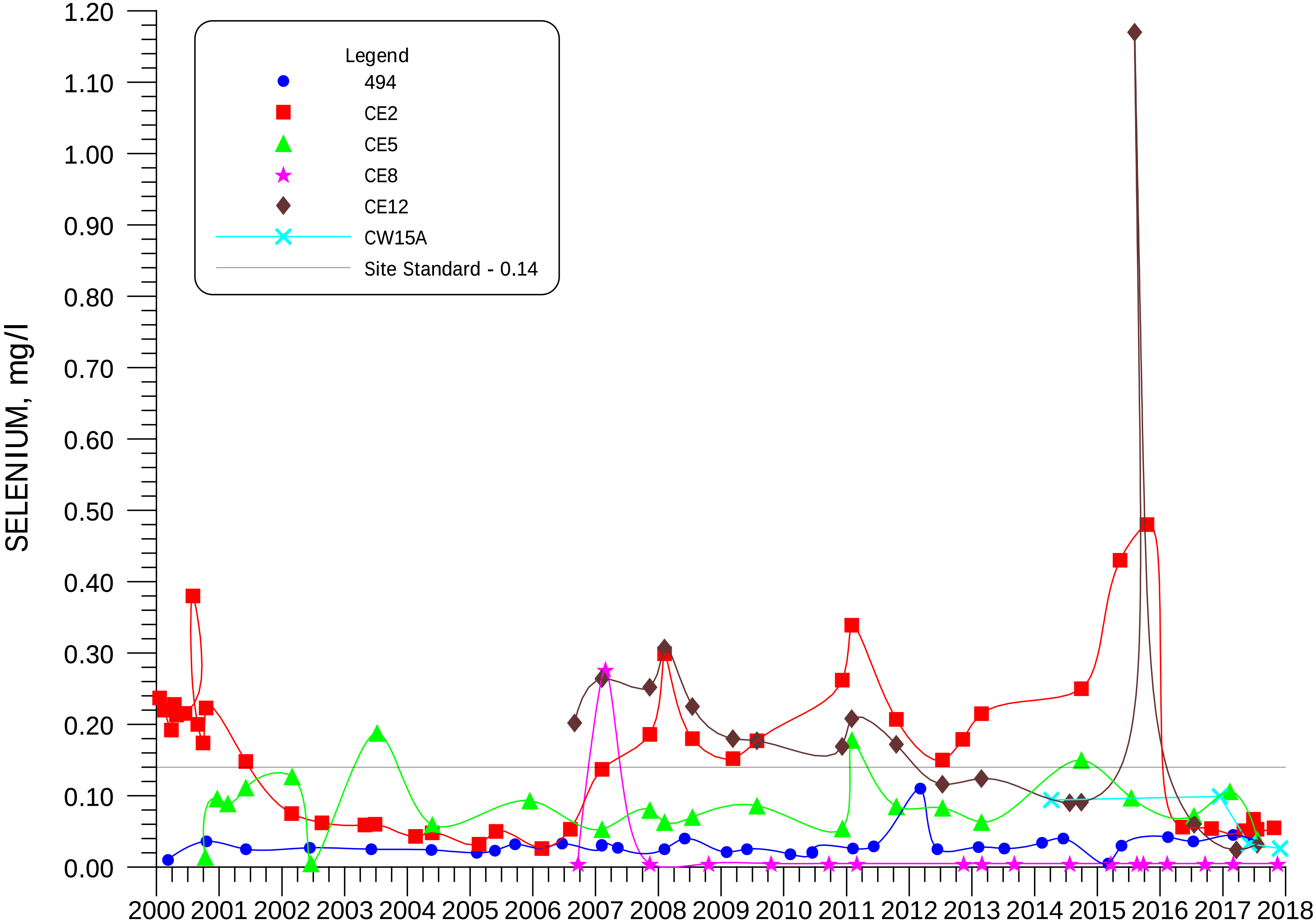


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

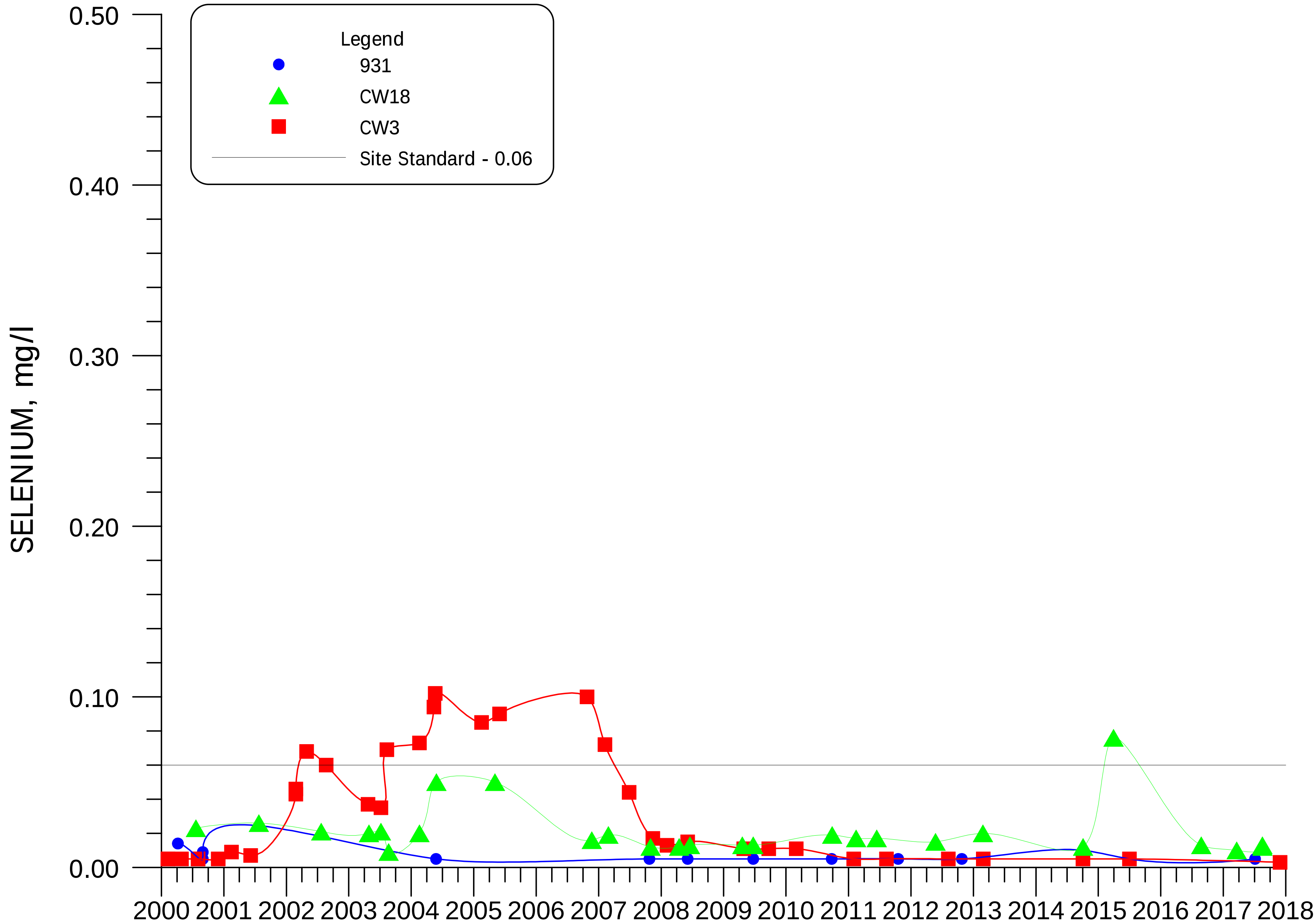
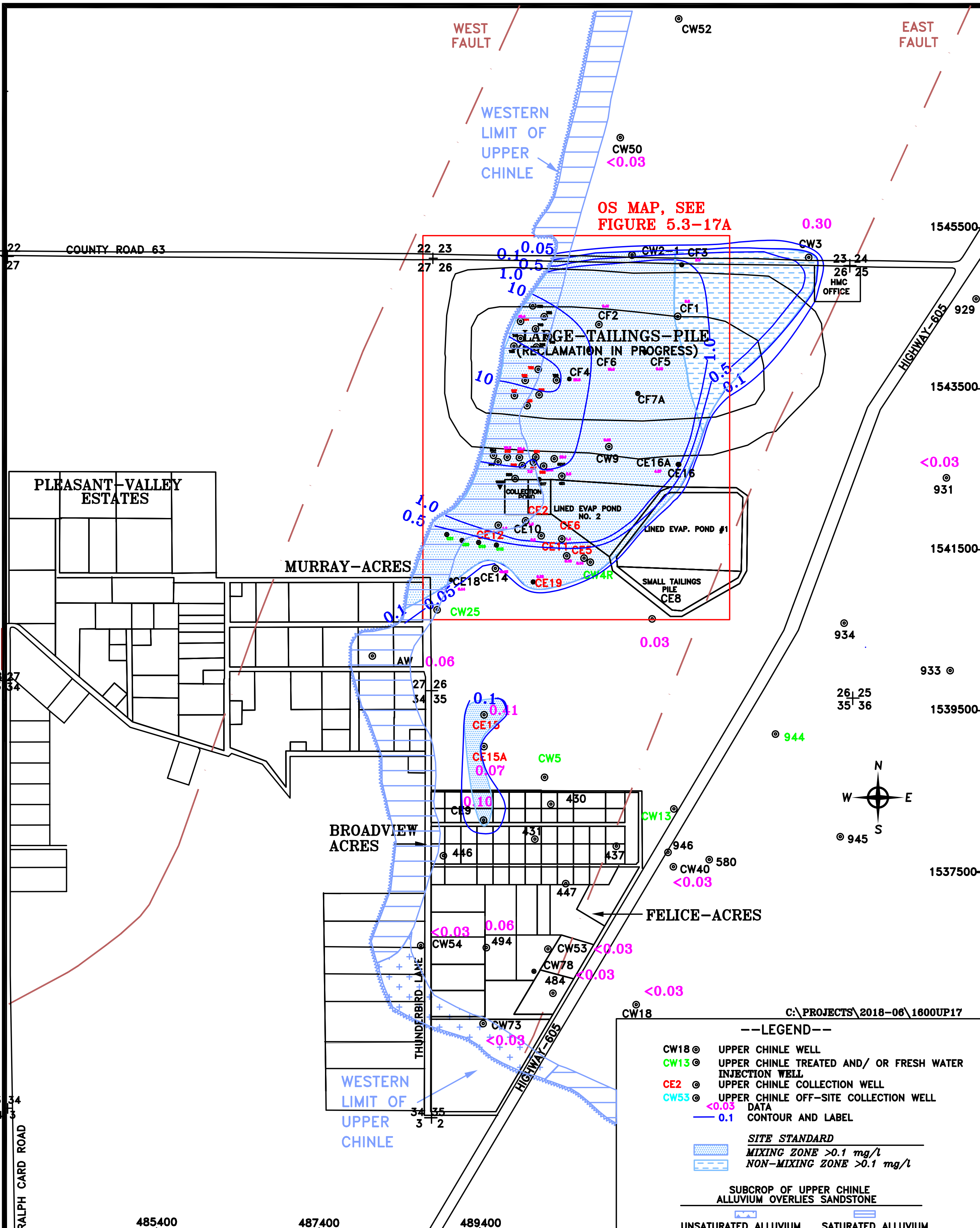


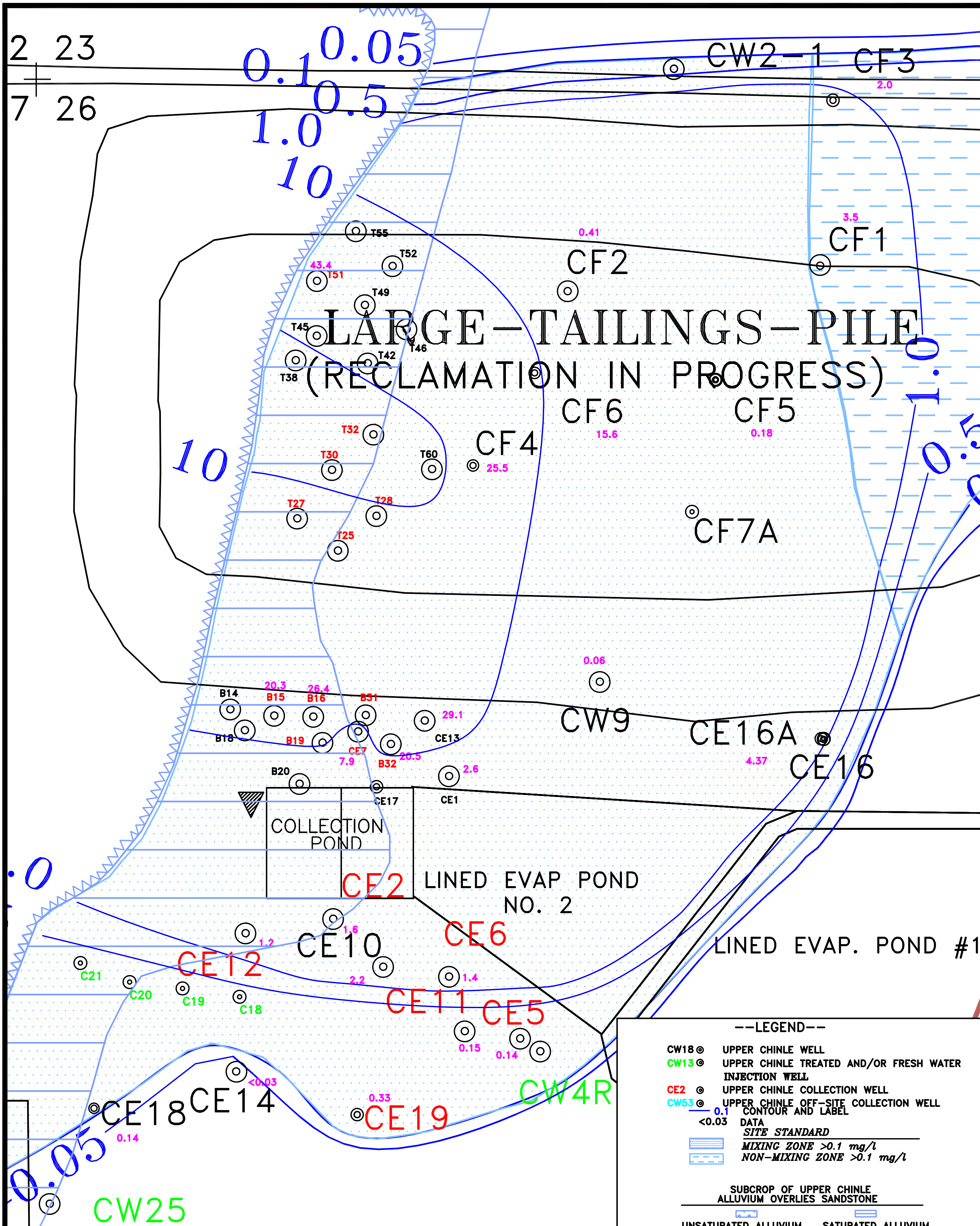
FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18
SCALE: 1"= 1600'
PAGE: 5.3-28



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-17A. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 500'

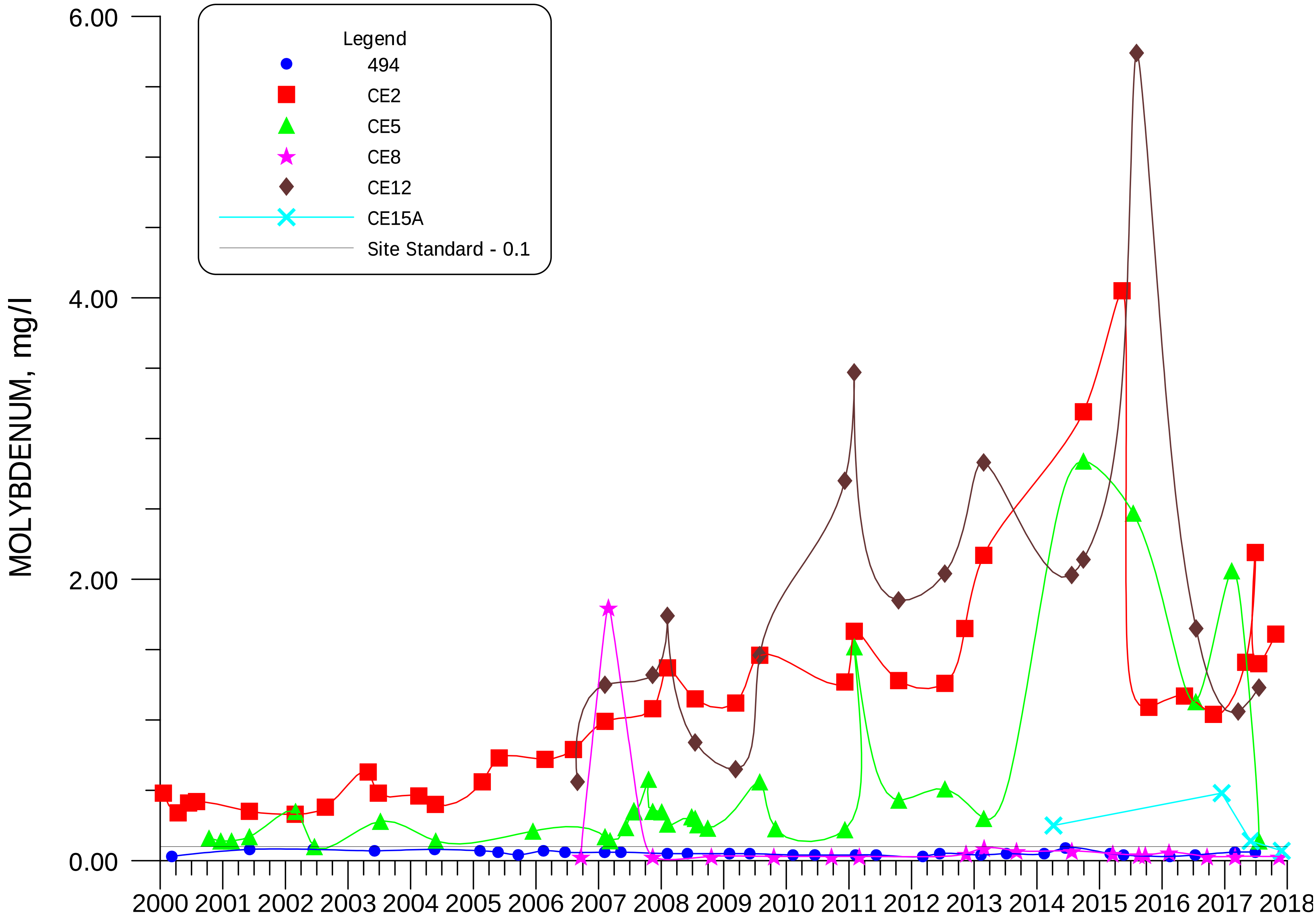


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

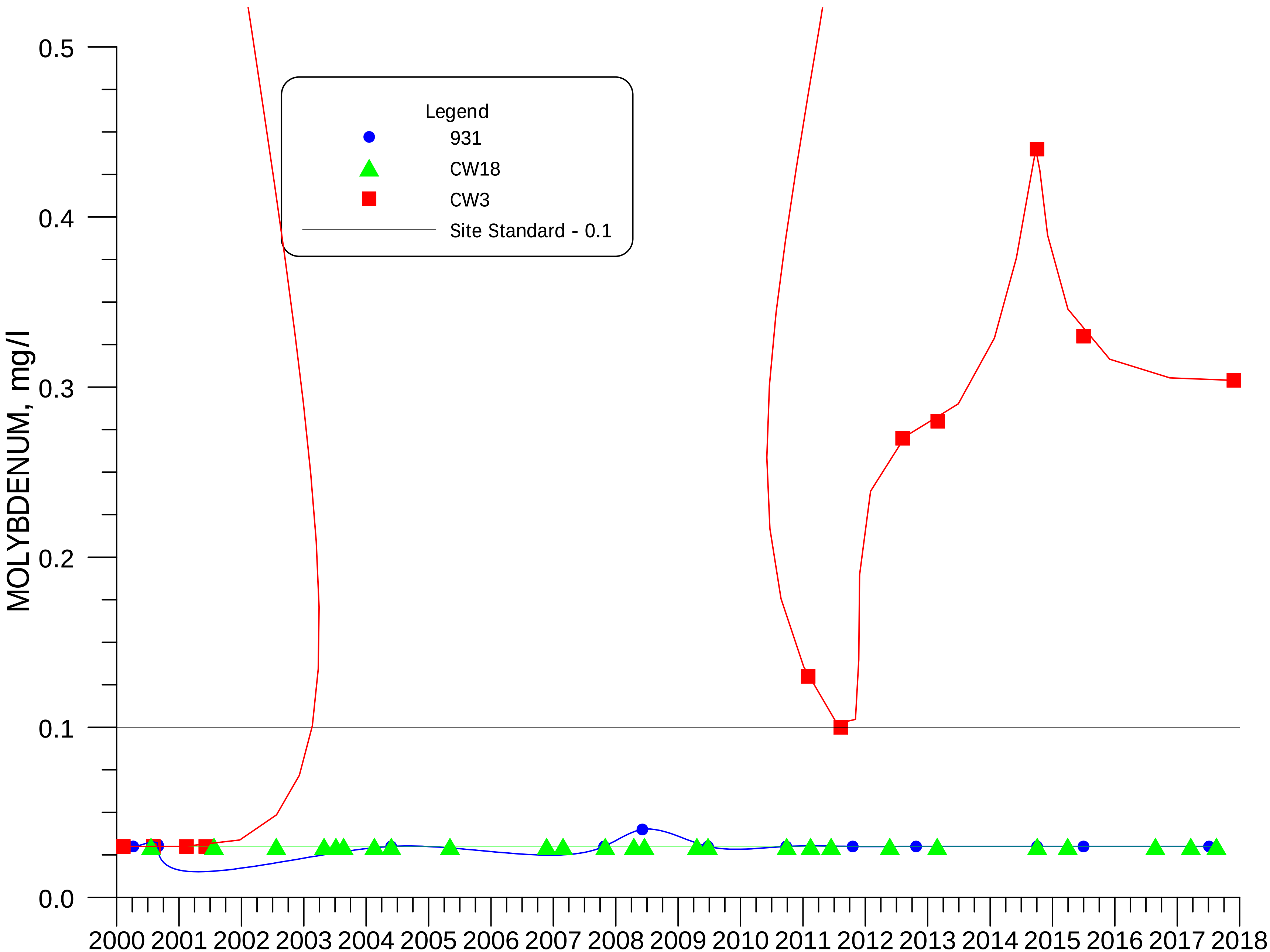
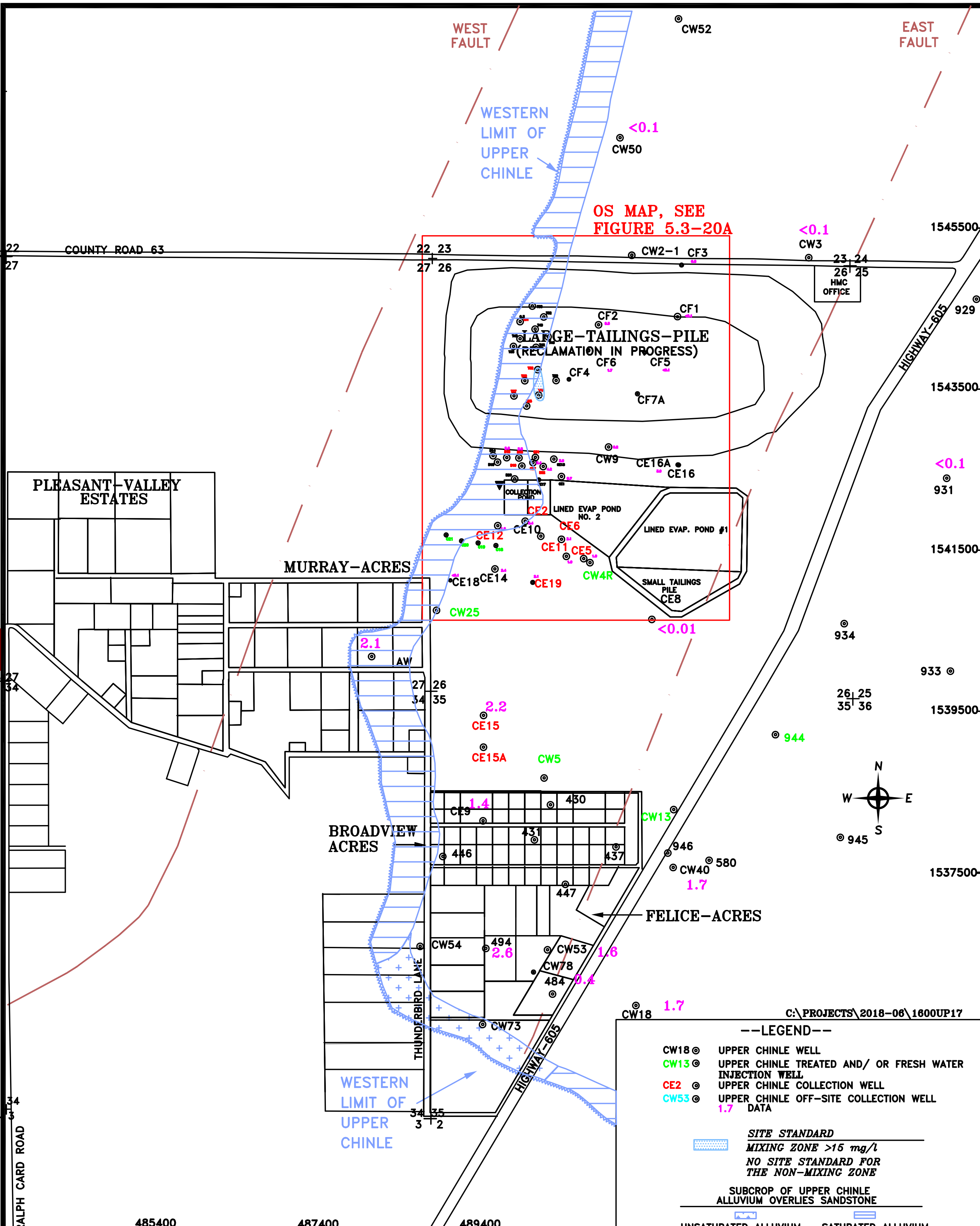


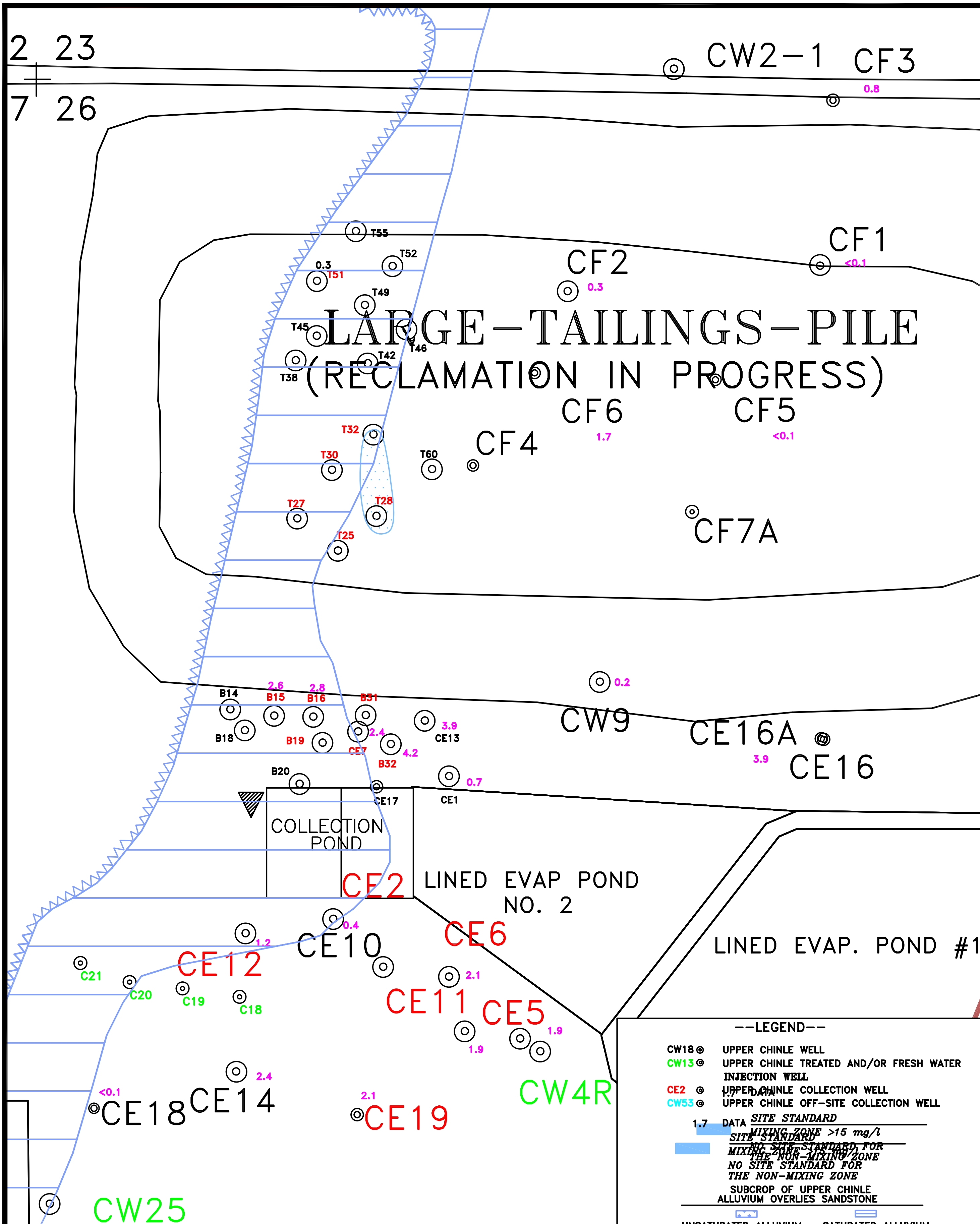
FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 931, CW18 AND CW3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18
SCALE: 1"= 1600'
PAGE: 5.3-32



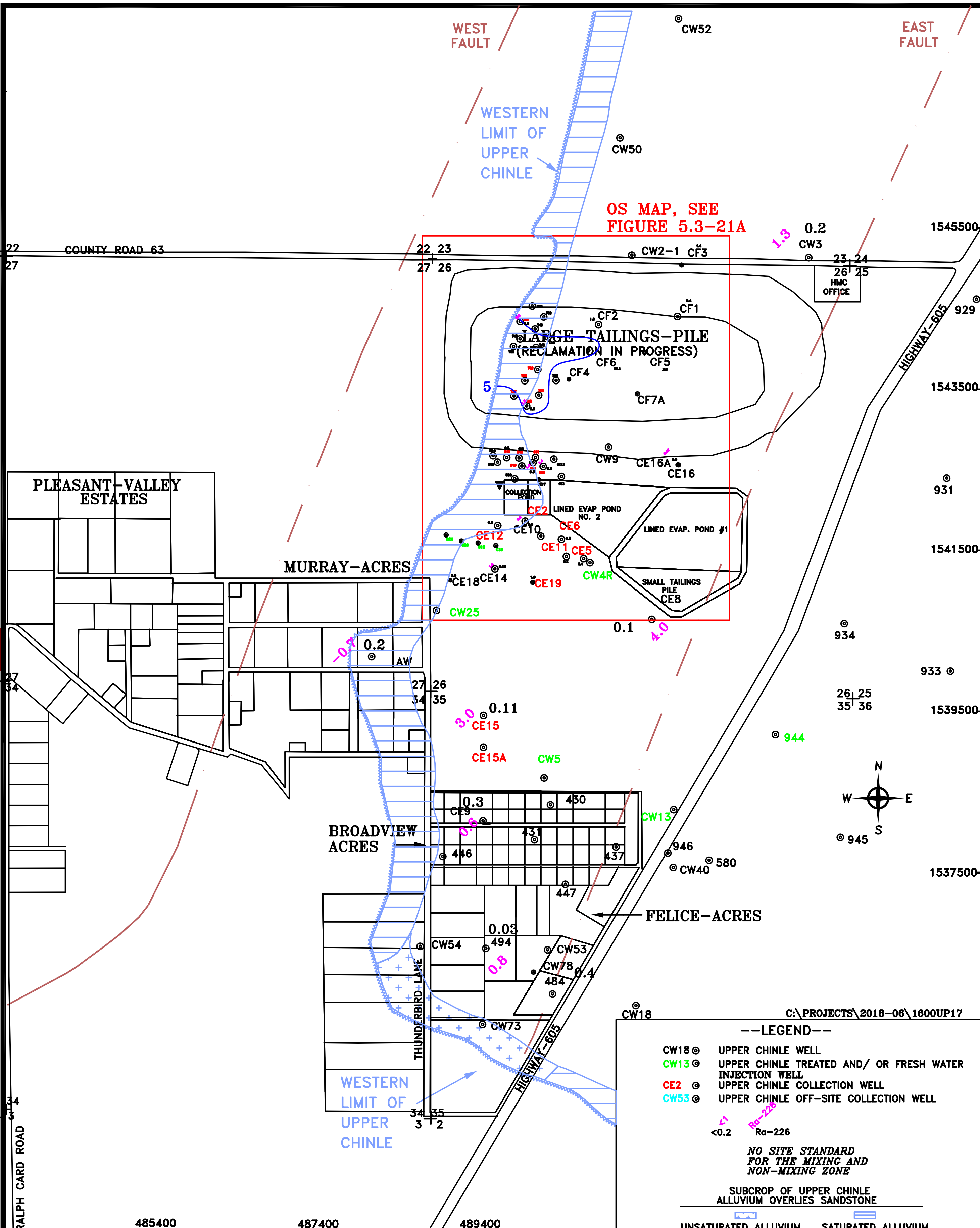
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20A. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, mg/l

DATE: 3/2/18

SCALE: 1"= 500'

PAGE: 5.3-33

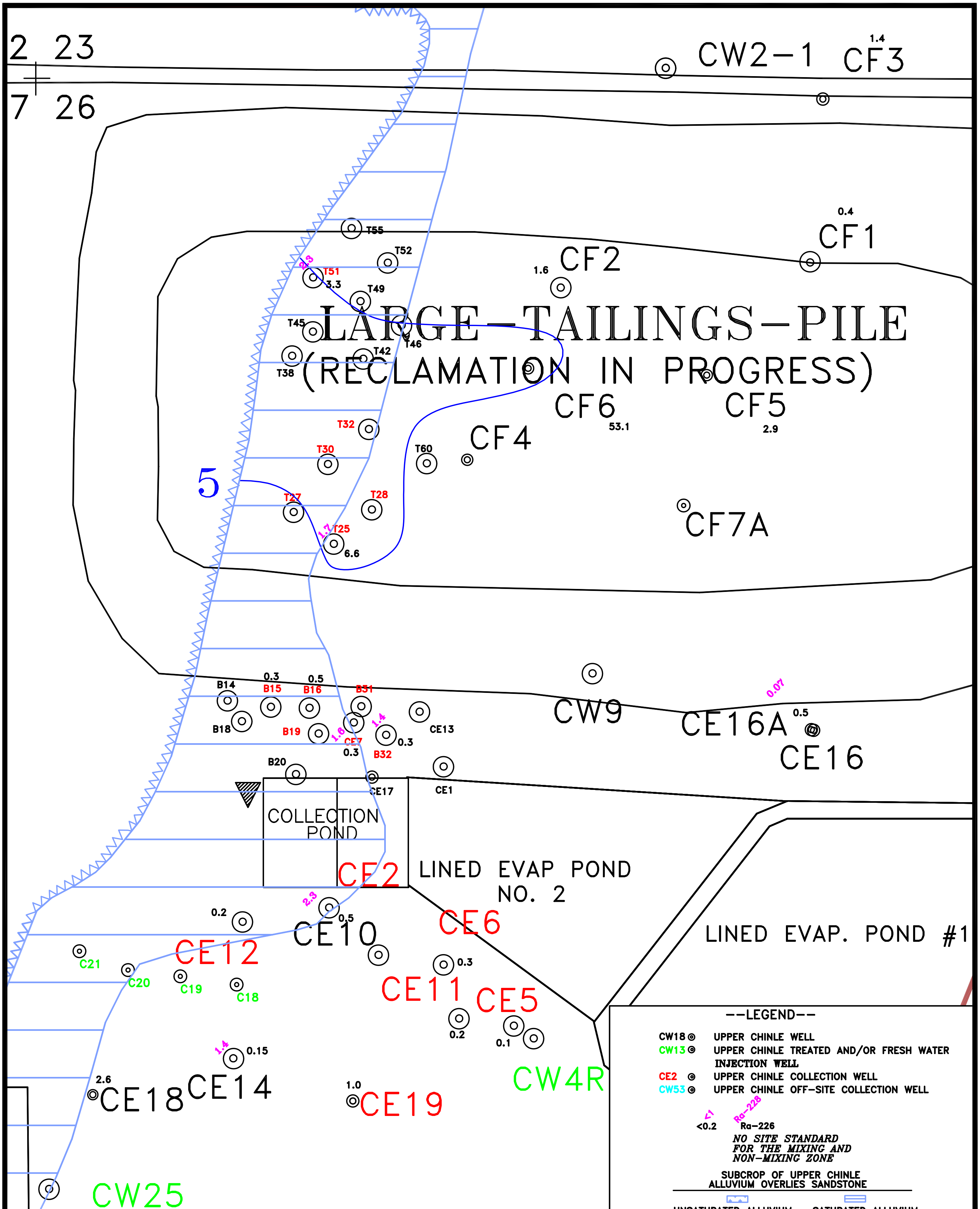


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-21. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, pCi/l

DATE: 3/2/18

SCALE: 1"= 1600'

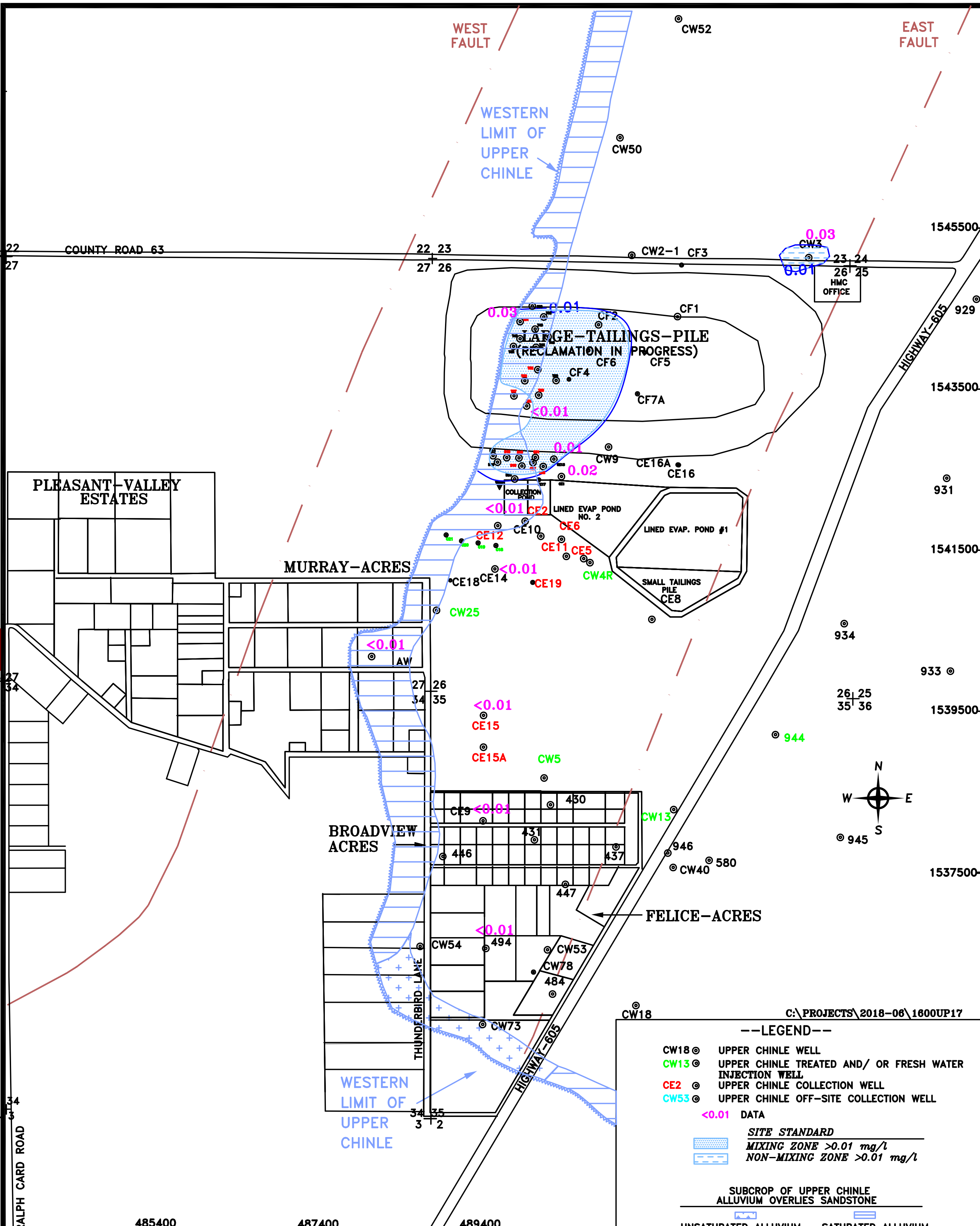


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-21A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2017, pCi/l

DATE: 3/2/18

SCALE: 1"= 500'

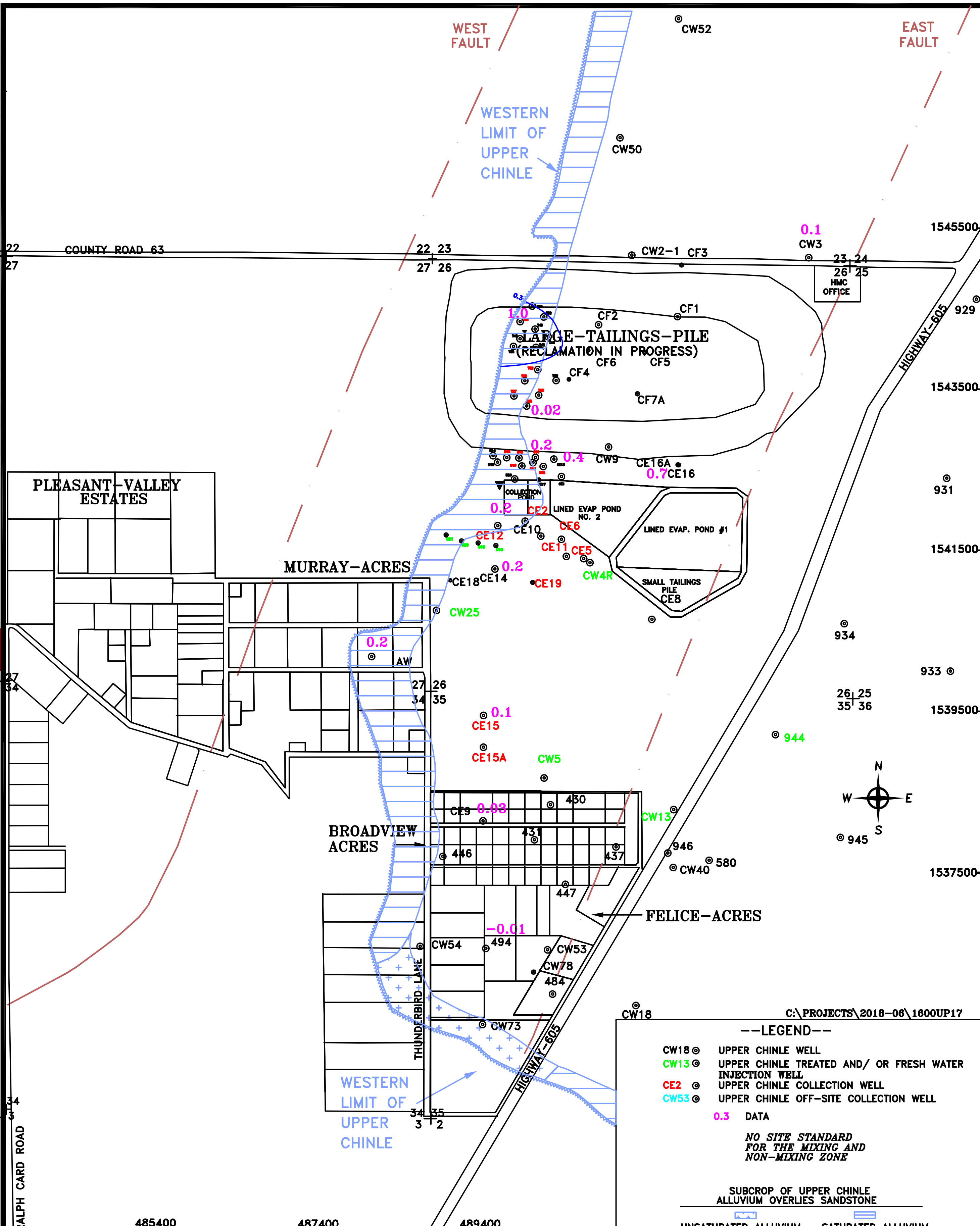


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/2/18

FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, mg/l

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/2/18

FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2017, pCi/l

SCALE: 1"= 1600'

PAGE: 5.3-37

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

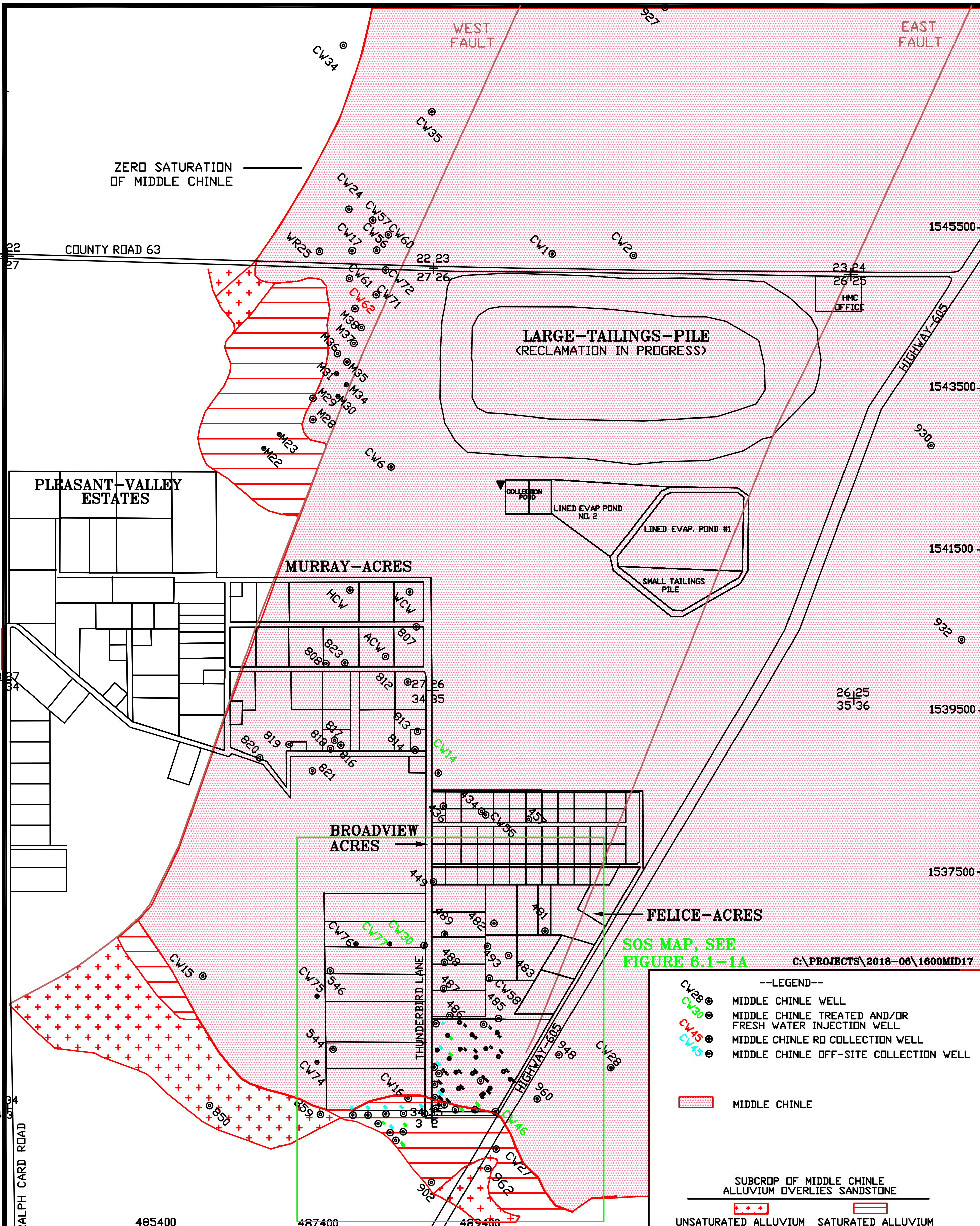
6.0 MIDDLE CHINLE AQUIFER MONITORING

6.1 MIDDLE CHINLE WELL COMPLETION AND LOCATION

Tables 5.1-1 through 5.1-4 (previous section) present the Middle Chinle well data along with other Chinle aquifer wells. Figures 6.1-1 and 6.1-1A show the locations of the Middle Chinle wells and areas where the Middle Chinle aquifer exists at the Grants Project. Figure 6.1-1A shows the closely spaced wells in south Felice Acres and the northeast portion of Section 3. The area where the alluvium is saturated and has direct contact with the Middle Chinle sandstone is very important with respect to transfer of water between these two aquifers and is shown with the red horizontal cross hatch pattern. The area where the Middle Chinle subcrops against alluvium that is not saturated is shown by the red plus (+) pattern. Additional geophysical logging of some of the R wells in the northeast corner of Section 3 has refined the limits of the Middle Chinle aquifer in this area and therefore some of the R wells were concluded to not contain any Middle Chinle. These wells have therefore been removed from the Middle Chinle maps.

The Middle Chinle aquifer also exists east of the extension of the East Fault (shown as a red pattern area on Figure 6.1-1) with an alluvium-Middle Chinle subcrop zone on the south side of this area. A limited area of Middle Chinle aquifer exists west of the West Fault. All three of these areas in the Middle Chinle aquifer act as separate ground water systems, except that there is some connection between two of the three areas of the Middle Chinle near the south end of the East Fault in the southwest corner of Section 35. No additional Middle Chinle wells were drilled in 2017.

Wells CW14, CW30, CW46, CW77, R6, R7, R12, Y6, Y12, Y33 and Y34 were used for treated and/or fresh-water injection in 2017. Middle Chinle wells R1, R2, R3, R4, R5, R11, Y1, Y7, Y13 and Y23 were used as South collection wells in 2017 for the zeolite treatment process. Well CW28 was not used as a source for fresh water injection in 2017.



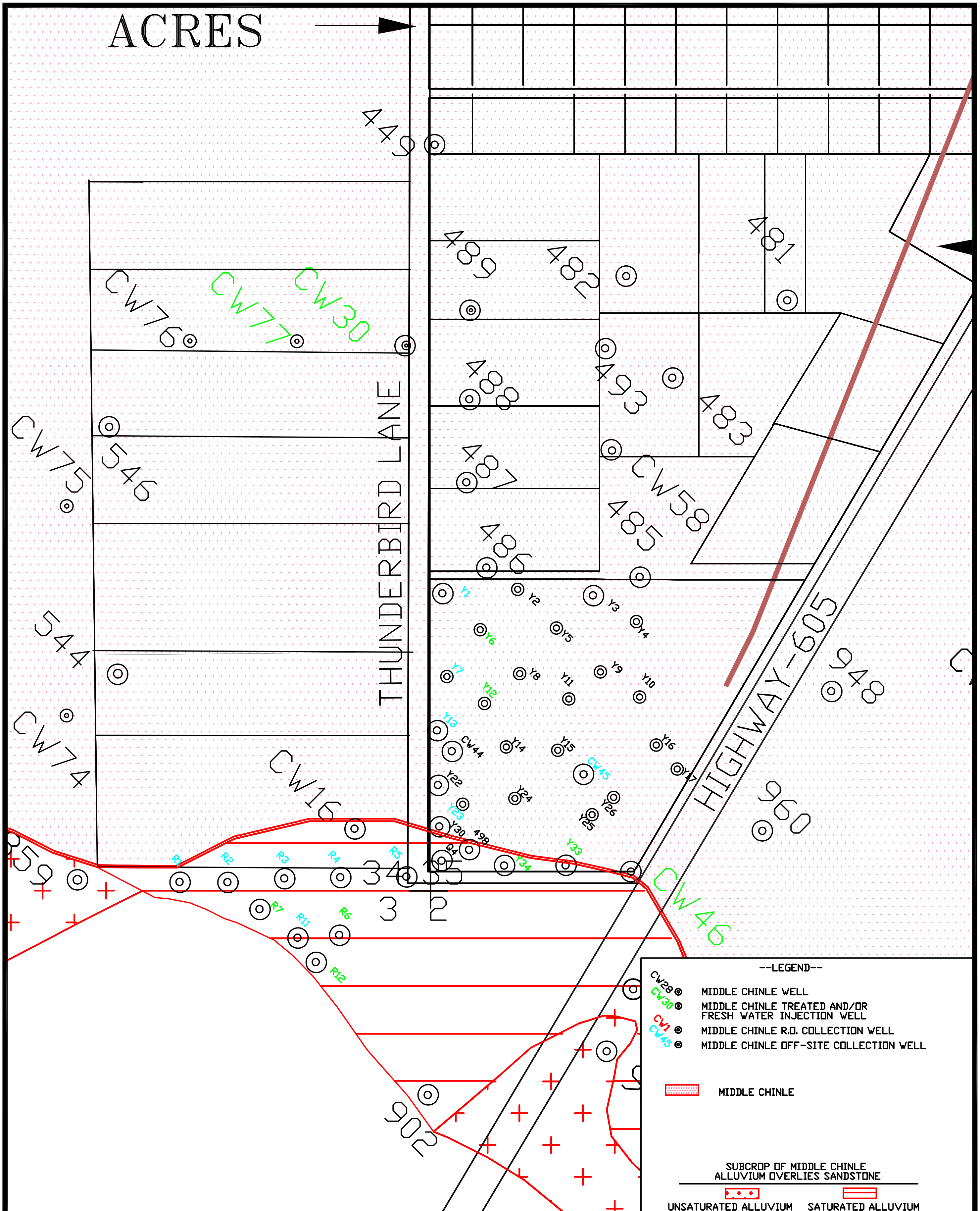
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

6.1-1 LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, 2017

DATE: 11/6/17

SCALE: 1"=1600'

PAGE: 6.1-2



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

6.1–1A. LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2017

DATE: 11/6/2017

SCALE: 1"=500'

6.2 MIDDLE CHINLE WATER LEVELS

Water levels in Homestake's Upper, Middle and Lower Chinle wells are presented in Appendix A. Fall 2017 water-level elevation contours for the Middle Chinle aquifer are presented on Figures 6.2-1 and 6.2-1A. The hydraulic gradient in the Middle Chinle aquifer is steeper in its alluvial subcrop area in the southern portion of Felice Acres in the Y well area. A depression from pumping Middle Chinle South Collection wells Y1, Y7, Y13 and Y23 extends 1000 feet to the northeast of collection well Y1 in the fall of 2017. This depression intercepts flow in the Middle Chinle in this portion of South Felice Acres. The higher heads south of this depression in the Middle Chinle aquifer are due to an influx of water to the Middle Chinle aquifer from the alluvial aquifer. The red arrows on Figure 6.2-1 and 6.2-1A show the direction of ground water flow in the Middle Chinle aquifer. Flow on the east side of the East Fault is toward well CW28 near the East Fault.

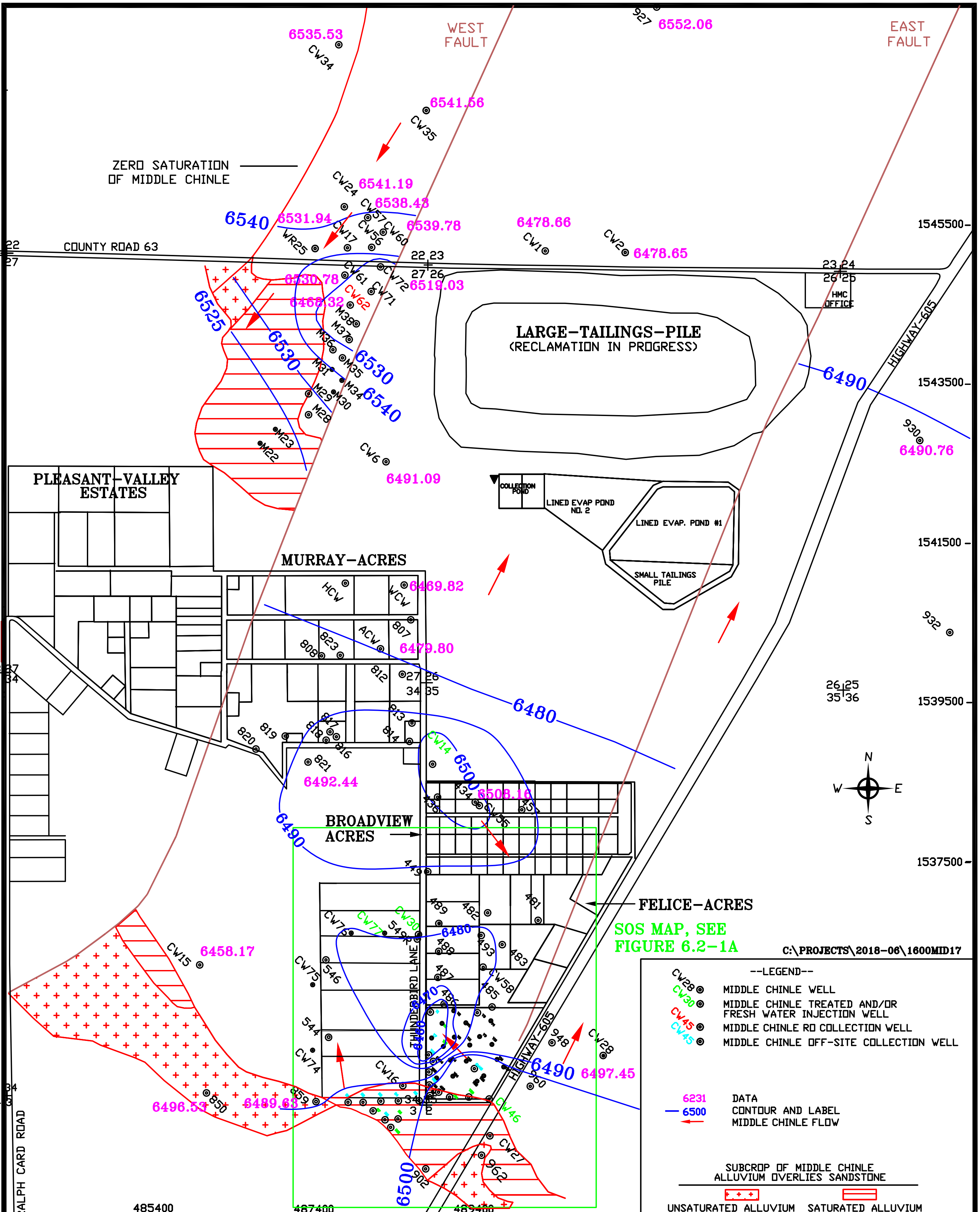
Ground water flow west of the West Fault in the Middle Chinle aquifer is mainly to the southwest, and it discharges into the alluvial aquifer. The pumping of RO collection well CW62 is pulling Middle Chinle water in this area toward this well. This Middle Chinle water flows from up-gradient of the site into the area west of the LTP. The alluvial injection in the northern portion of Section 27 temporarily had reversed the gradient near well CW17 in 2006 through 2015. This allowed some movement to the north toward well CW17 but the CW62 pumping is intercepting this flow in 2016 and 2017. The remainder of the Middle Chinle aquifer is recharged by the alluvial aquifer south of Felice Acres.

The injection of treated and/or fresh water into wells CW14 (north of Broadview Acres) and wells CW30 and CW77 (west of Felice Acres) has created ground water mounds in their respective areas. These mounds cause the ground water to flow both north and south from these three wells. The head in the Middle Chinle aquifer on each side of the two faults is significantly different than the head between the two faults, which demonstrates that the ground water is not readily connected on each side of these faults.

Figure 6.2-2 shows the locations of the Middle Chinle wells that are used to monitor water-level changes with time. The colors and symbols used on this figure are the same as those used on the water-level elevation time plots. Figure 6.2-3 presents the water-level elevation changes versus time in Middle Chinle wells 493, CW28, CW45, CW58, CW75 and CW76. Water levels in well CW75 did not decline as much as they did in well CW76, indicating smaller transmitting ability in the Middle Chinle in the area of well CW75 than in the area of well

CW76. Pump test on these two wells show that well CW76 will yield a much higher rate than well CW75.

The water-level plots for the Middle Chinle wells located west of the West Fault and wells CW2 and ACW are presented on Figure 6.2-4. Water levels had been gradually increasing in the Middle Chinle aquifer west of the West Fault but the CW62 pumping in 2016 and 2017 caused the water levels in the Middle Chinle aquifer west of the West Fault to decline. Water levels declined in Middle Chinle wells ACW and CW2 in 2017, which is thought to be due to the South Felice Acres pumping. Water levels are expected to continue to gradually decrease in wells ACW and CW2 as a result of the South Felice pumping in the future. As expected, the pumping of well CW62 west of the West Fault did not cause any drawdown in water level in well CW2 which is situated east of the West Fault.

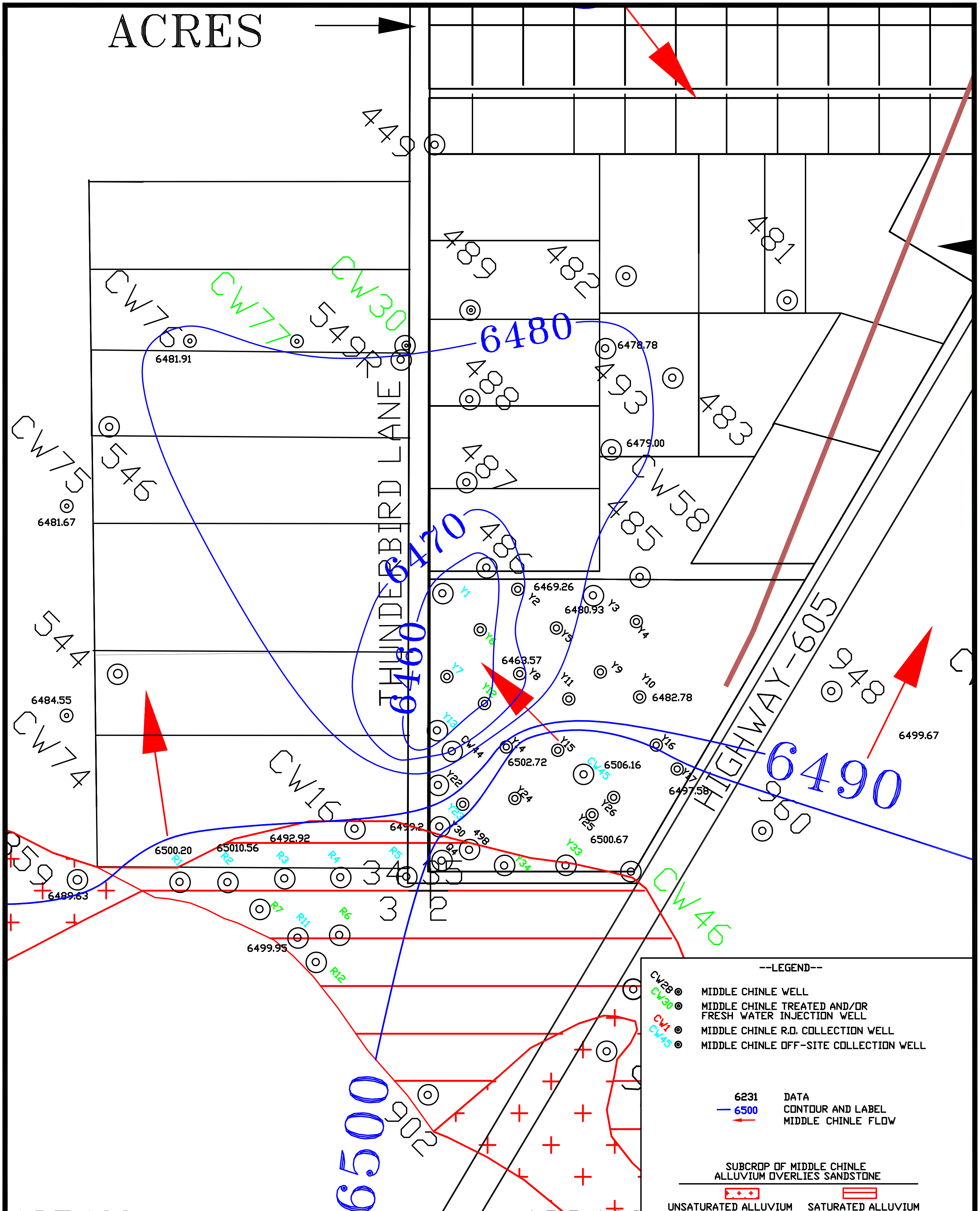


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2017, FT-MSL

DATE: 12/12/17

SCALE: 1"=1600'

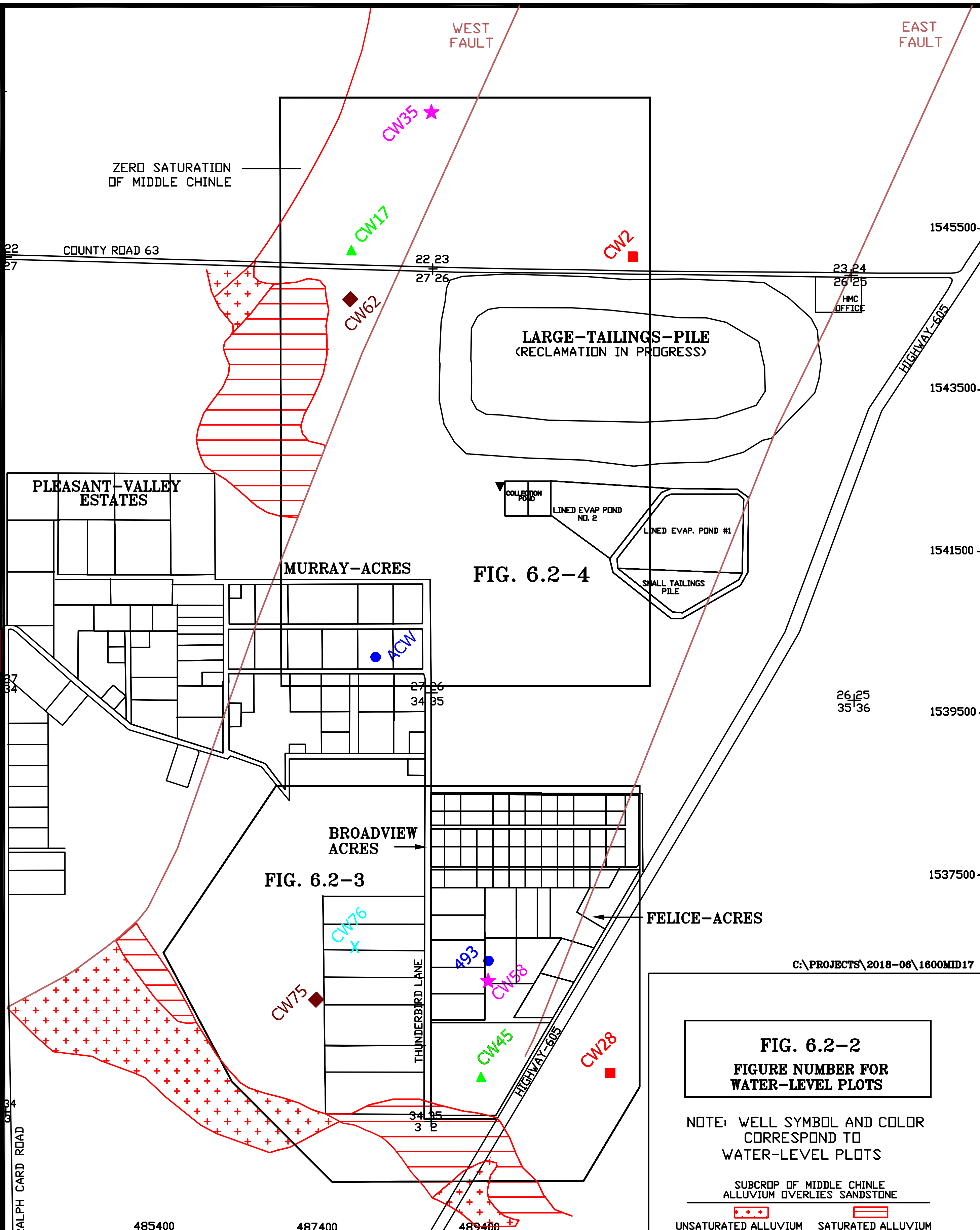


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 12/12/17

FIGURE 6.2-1A. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2017, SOS, FT-MSL

SCALE: 1"=500'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-LEVEL PLOTS, 2017

DATE: 12/12/17
SCALE: 1"=1600'

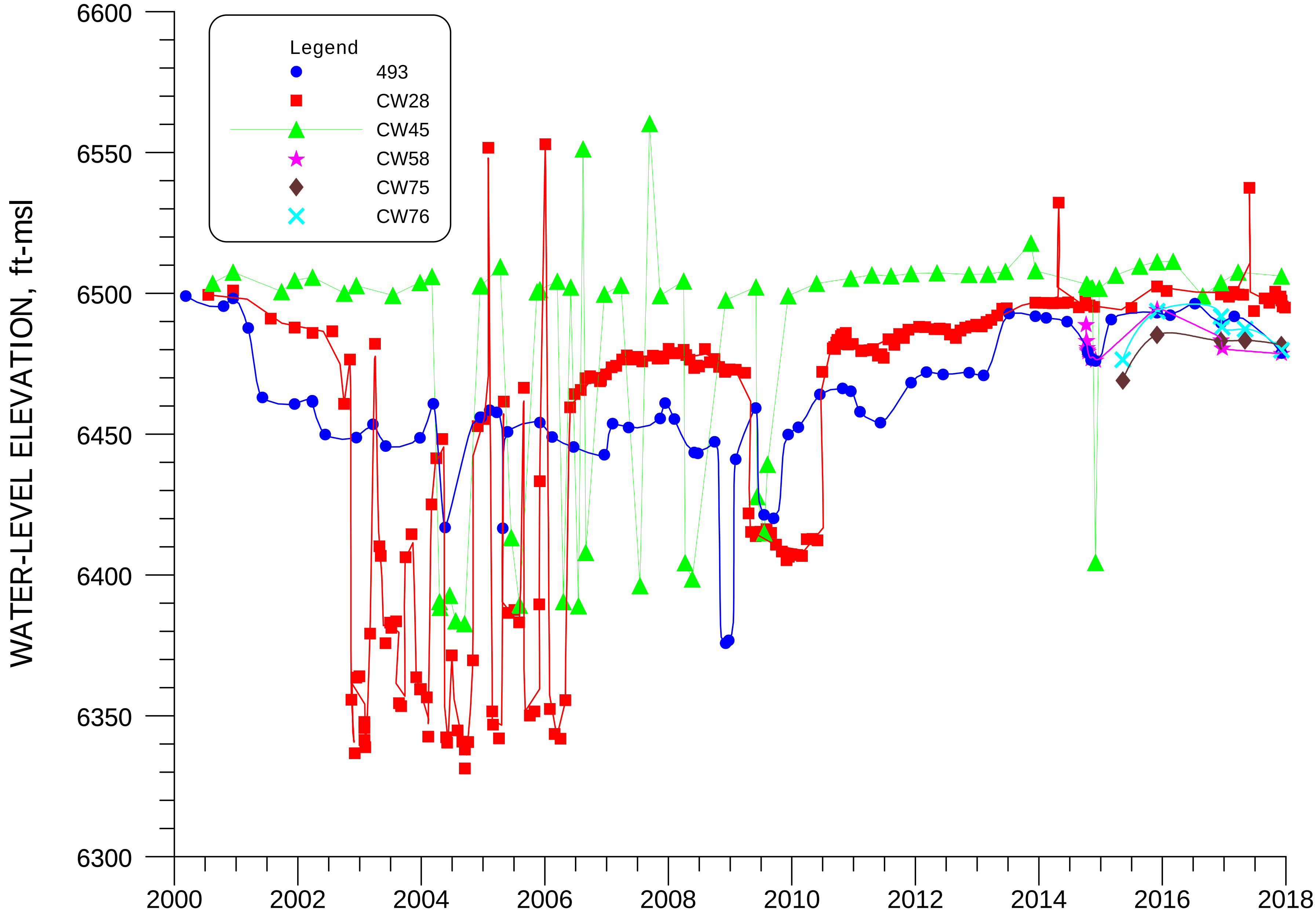


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, CW28, CW45, CW58, CW75 AND CW76

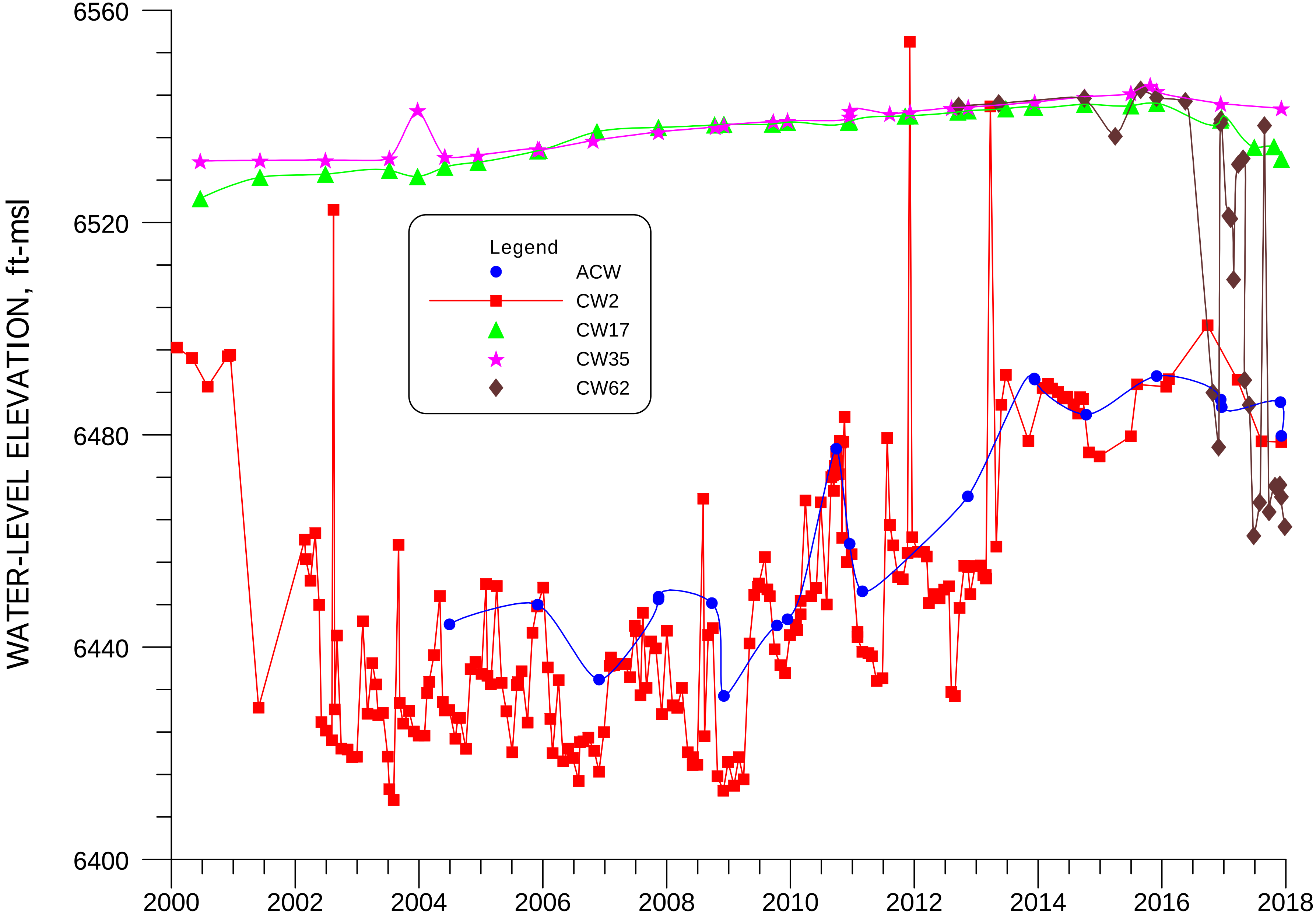


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS ACW, CW2, CW17, CW35, AND CW62

6.3 MIDDLE CHINLE WATER QUALITY

The water-quality data for Homestake's Middle Chinle aquifer is presented with the other Chinle aquifer wells in Tables B.5-1 and B.5-2 of Appendix B. The Chinle aquifer water-quality results for subdivision wells are also presented in these tables. The basic well data for the Middle Chinle aquifer wells is presented in Tables 5.1-1 through 5.1-4 in the Upper Chinle aquifer monitoring section (Section 5). Several Middle Chinle wells were sampled in 2017 to further define the concentration changes in the Middle Chinle aquifer in Felice Acres.

The area of water-quality concern in the Middle Chinle aquifer exists in portions of Broadview Acres and Felice Acres and west of Felice Acres. All sulfate concentrations in the Middle Chinle aquifer in 2017 are within the site standard except for one well west of the West Fault which is slightly above the standard. Uranium concentrations are above site standards in western Broadview Acres and Felice Acres and west of the West Fault. Selenium concentrations also exceed the site standard in one Felice Acres area well and four wells west of the West Fault. The only significant molybdenum concentrations identified in the Middle Chinle aquifer are in wells that are west of the West Fault.

6.3.1 SULFATE - MIDDLE CHINLE

Figures 6.3-1 and 6.3-1A present sulfate concentration contours for the Middle Chinle aquifer for 2017 and shows that the Middle Chinle sulfate concentrations range from 304 to a high of 1780 mg/l. Sulfate site standard concentrations are given in the legend of Figures 6.3-1 and 6.3-1A. Figure 6.3-1A presents sulfate concentrations of the Middle Chinle wells in south Felice Acres and the R collection wells in the northeast portion of Section 3. All mixing-zone sulfate concentrations in the Middle Chinle aquifer are below the site standard of 1750 mg/l except for well CW72 west of the West Fault which has a value of 1780 mg/l. Sulfate concentrations in the area of well CW62, which is located west of the West Fault have been restored by the collection of Middle Chinle water from this well for RO treatment except for well CW72. The sulfates were naturally occurring in this area, until the increase in the head of the alluvial water in the subcrop area caused the alluvial water to flow into the Middle Chinle. Sulfate concentrations in the non-mixing zone of the Middle Chinle are within the natural background range and meet the site standard. The sulfate concentrations for the R wells in the northeast portion of Section 3 and the Y wells in South Felice Acres are posted on Figures 6.3-1A at a scale of 1" = 500' and all of these values are less than the site standard.

Figure 6.3-2 shows the locations of the Middle Chinle wells for which time concentration plots were developed for this report. The sulfate figure number is shown in the group area to define the figure number for each group of wells. Four groups of wells for the Middle Chinle aquifer are presented with the addition of a plot of RO collection well CW62 and wells near this well west of the West Fault. An additional plot was also added for South Felice Acres collection wells CW58, Y1, Y7, Y13 and Y23. The colors and symbols on Figure 6.3-2 correspond to those used in the concentration time plots.

Figure 6.3-3 presents sulfate concentrations for the mixing zone Middle Chinle wells 498, CW15, CW17 and CW45. All of the 2017 concentrations on this plot are below the site standard. The sulfate concentrations for RO collection well CW62 and nearby Middle Chinle wells CW56, CW61 and CW72 are presented in Figure 6.3-3A for these mixing zone Middle Chinle wells. The sulfate concentrations for South Felice collection wells Y1, Y7, Y13 and Y23 and nearby Middle Chinle well CW58 are presented in Figure 6.3-3B for these mixing zone Middle Chinle wells. Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 493, ACW, CW2 and CW55 located between the two faults and wells 930 and CW28 east of the East Fault.

6.3.2 TOTAL DISSOLVED SOLIDS - MIDDLE CHINLE

Total dissolved solids (TDS) and sulfate are used to define changes in major constituents at the Grants Project site. Figures 6.3-5 and 6.3-5A present contours of TDS concentrations for the Middle Chinle aquifer during 2017 and shows that all values are below 2000 mg/l near the alluvial subcrop area in the southern portion of the map (see Figure 6.3-5A for posting of Y wells in South Felice Acres and the R collection wells in the northeast portion of Section 3). Two of the wells west of the West Fault exceed the TDS site standard and three exceed the non-mixing zone standard.

Background data for the Middle Chinle aquifer were used to determine TDS site standards of 3140 and 1560 mg/l for the mixing and non-mixing zones, respectively. All of the

TDS values measured in Middle Chinle aquifer water were less than these values in 2017, except for wells ACW, CW55 and WCW in the non-mixing zone and wells CW60 and CW72.

Plots of TDS concentrations for Middle Chinle wells 498, CW15, CW17 and CW45 are presented in Figure 6.3-6. The TDS concentrations gradually declined in 2017 in RO collection well CW62 and nearby Middle Chinle wells CW56, CW61 and CW72 (see Figure 6.3-6A). The TDS concentrations in wells in the CW62 area have been restored except for the value from well CW72 which is slightly above the site standard. A plot of TDS concentrations for Middle Chinle collection wells Y1, Y7, Y13 and Y23 and Middle Chinle well CW58 are presented in Figure 6.3-6B and shows that the TDS levels in these wells are similar except for the slightly higher value in well Y1. Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 493, 930, ACW, CW2, CW28 and CW55.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figures 6.3-8 and 6.3-8A present chloride concentrations in the Middle Chinle aquifer during 2017, and observed concentrations varied from 64 to 343 mg/l. None of the concentrations exceeded the site standard of 250 mg/l for the mixing and non-mixing zones of the Middle Chinle aquifer except values from wells ACW and CW72. Therefore, in general chloride concentrations are not useful for defining the degree of, or the need for, restoration of the Middle Chinle aquifer.

Time plots of chloride concentration are presented on Figure 6.3-9 for Middle Chinle wells 498, CW15, CW17 and CW45. Chloride concentrations decreased in Middle Chinle well CW17 increased in 2017 after decreasing in 2016. A second set of chloride concentration plots for the Middle Chinle wells west of the West Fault is presented in Figure 6.3-9A. An additional plot of chloride concentrations for the Middle Chinle wells in South Felice Acres was added in Figure 6.3-9B which shows overall steady chloride concentrations in these South Felice Acres collection wells except for the increase in well Y1. The fourth chloride concentration plot for the Middle Chinle aquifer is presented in Figure 6.3-10 which shows very similar 2017 values for wells 493, 930, CW2, CW28 and CW55 and variable values for wells 930 and ACW.

6.3.4 URANIUM - MIDDLE CHINLE

Uranium is an important constituent in the Middle Chinle aquifer due to the presence of elevated concentrations in the aquifer in western Broadview Acres and in the southern and western portions of Felice Acres. These elevated concentrations are a result of alluvial recharge to the Middle Chinle aquifer in this area. Water in the saturated portion of the alluvial aquifer flows across a subcrop of the Middle Chinle aquifer just south of Felice Acres, and alluvial ground water has entered the Middle Chinle aquifer in this area. Figures 6.3-11 and 6.3-11A present contours of uranium concentrations in the Middle Chinle aquifer during 2017. An area of concentrations greater than the mixing-zone site standard exists in the western portion of Felice Acres and the northeast portion of Section 3 (see Figure 6.3-11A). The blowup of South Felice Acres and the northeast portion of Section 3 in Figure 6.3-11A presents the uranium posting of the Y wells and the R collection wells in this area. Uranium concentrations in the Middle Chinle aquifer, west of the West Fault, northwest of the LTP, naturally exceed 0.18 mg/l but values in several wells have increased above this level from the movement of alluvial water in the subcrop to these wells. Flow in the Middle Chinle aquifer west of the West Fault moves from the area near well CW35 toward the subcrop area to the south. Uranium concentrations exceed 0.07 mg/l (non-mixing zone site standard) in an area of the Middle Chinle aquifer in northern Felice Acres and western Broadview Acres.

Figure 6.3-12 presents uranium concentration plots versus time for Middle Chinle wells 498, CW15, CW17 and CW45 (see Figure 6.3-2 for well locations). The uranium concentration plots for the Middle Chinle wells in the mixing zone west of the West Fault are presented on Figure 6.3-12A and shows the benefit in pumping well CW62 in 2016 and 2017. Additional pumping of well CW62 may show that its pumping may be adequate to restore the Middle Chinle west of the West Fault. Figure 6.3-12B shows the benefit in pumping South Felice wells Y1, Y7, Y13 and Y23. Monitoring of these wells will be used to define the future progress of uranium restoration in the Middle Chinle in this area.

The uranium concentration plots for the Middle Chinle wells in the non-mixing zone are presented on Figure 6.3-13. Uranium concentrations were small in wells ACW and CW2 in 2017 and increased in well CW55. Uranium concentrations in well CW55 will continued to be observed to determine if the Felice Acres collection will restore the concentrations in this area.

6.3.5 SELENIUM - MIDDLE CHINLE

None of the Middle Chinle wells in the mixing zone contained water with selenium concentrations exceeding the 0.14 mg/l site standard in 2017, except for four wells west of the West Fault (see Figures 6.3-14 and 6.3-14A). The higher selenium concentrations in these wells are caused by movement of alluvial water in the subcrop area to these wells. None of the R and Y wells in southern Felice Acres or the northeast portion of Section 3 (see Figure 6.3-14A for the posted values) contain water with elevated selenium concentrations. The selenium concentration in the non-mixing zone well 493 currently exceeds the site standard of 0.07 mg/l. This area of elevated concentration has resulted from recharge to the Middle Chinle aquifer from the alluvium in the subcrop area just south of Felice Acres. Flow in the Middle Chinle aquifer in this locale is toward the north causing chemical constituents introduced into the Middle Chinle from the alluvium in the subcrop area to move to the north. Analysis of background selenium concentrations in the mixing and non-mixing zones resulted in setting site standards of 0.14 and 0.07 mg/l, respectively (see legend of Figures 6.3-14 and 6.3-14A).

Selenium concentration of 0.3 mg/l was measured in RO collection Middle Chinle well CW62 west of the West Fault. The higher selenium concentrations observed in this area are due to alluvial water flowing into this area of the Middle Chinle aquifer in 2006 through 2015 while the pumping of well CW62 should decrease these levels to below the site standard in the future. All other selenium concentrations in the Middle Chinle aquifer beyond these areas are low values.

Selenium concentrations with time for the mixing zone Middle Chinle wells 498, CW15, CW17 and CW45 are presented in Figure 6.3-15. The declines in wells CW56 and CW61 are shown in Figure 6.3-15A which demonstrates the benefits in pumping well CW62. Figure 6.3-15B shows that the South Felice Middle Chinle collection wells contain selenium concentrations that have already been restored to levels below the site standard.

Figure 6.3-16 presents the selenium concentrations for Middle Chinle wells in the non-mixing zone. The connection between the alluvial aquifer and the Middle Chinle aquifer south of Felice Acres is the cause for the elevated concentrations in well 493 and selenium was fairly steady in this well in 2017. The injection of fresh water into Middle Chinle wells CW14, CW30, CW46 and CW77 and the collection from Middle Chinle wells in South Felice Acres should cause these elevated concentrations to decrease.

6.3.6 MOLYBDENUM - MIDDLE CHINLE

The 2017 molybdenum concentrations in the Middle Chinle aquifer are presented on Figures 6.3-17 and 6.3-17A. None of the molybdenum concentrations for 2017 exceed the site standard of 0.10 mg/l except for four wells west of the West Fault which are declining due to the pumping of well CW62. Some additional restoration of molybdenum in these wells is needed.

Figure 6.3-18 presents the molybdenum concentrations with time for Middle Chinle wells 498, CW15, CW17 and CW45, while Figure 6.3-18A shows the molybdenum concentrations for wells CW56, CW61, CW62 and CW72. Additional pumping of well CW62 in the Middle Chinle west of the West Fault should cause the molybdenum concentrations to be restored in the future. The molybdenum concentrations are below the site standard in the Middle Chinle in the Felice Acres area (see Figures 6.3-18 and 6.3-18B). Figure 6.3-19 presents the molybdenum concentrations with time for wells 493, 930, ACW, CW2, CW28 and CW55.

6.3.7 NITRATE - MIDDLE CHINLE

Nitrate concentrations have always been low in the Middle Chinle aquifer and therefore are not routinely monitored. Figure 6.3-20 presents the nitrate concentrations in the Middle Chinle aquifer for 2017. This constituent does not require a site standard for the non-mixing zone of the Middle Chinle aquifer.

6.3.8 RADIUM-226 AND RADIUM-228 - MIDDLE CHINLE

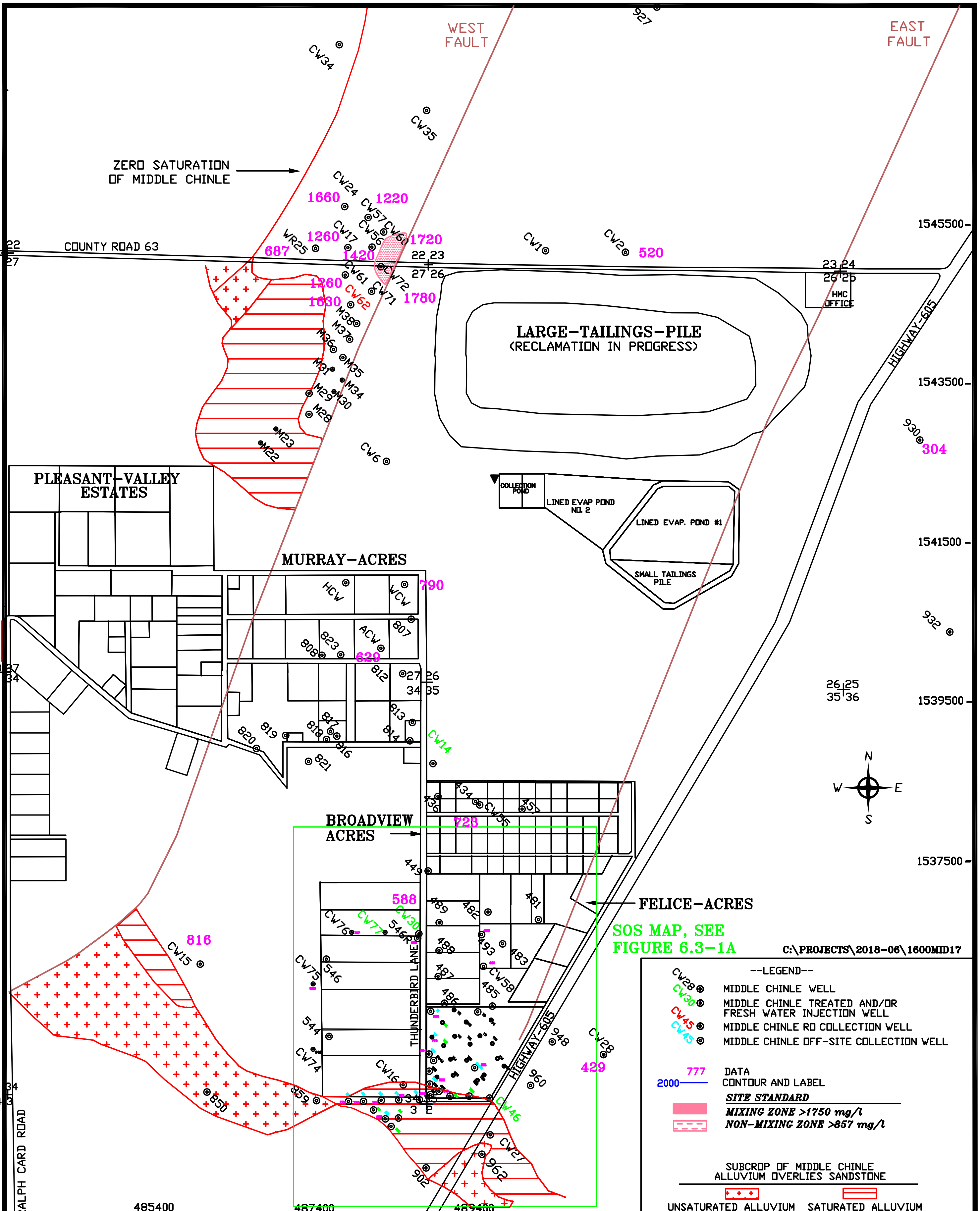
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. All of the radium-226 and radium-228 values measured in 2017 were very small except radium-228 result from well CW57 which is considered an outlier. Radium-226 and radium-228 are not important parameters relative to the Middle Chinle aquifer and a site standard is not warranted and has not been set for these two constituents.

6.3.9 VANADIUM - MIDDLE CHINLE

Vanadium concentrations in the Middle Chinle aquifer have always been low. Previous monitoring of vanadium in the Middle Chinle aquifer has demonstrated that vanadium is not a significant parameter in this aquifer. Monitoring of vanadium for the Middle Chinle should be eliminated, because only a few low values have previously been detected in the alluvial aquifer near the tailings piles. All of the 2017 vanadium measurements for the Middle Chinle aquifer are below the detection limit except a value of 0.02 from well CW28 which is considered to be an outlier. These values are consistent with values observed previously and, therefore, reinforce the conclusion that continued monitoring of vanadium concentrations in the Middle Chinle aquifer should not be required. A site standard for vanadium has therefore not been set for the Middle Chinle aquifer.

6.3.10 THORIUM-230 - MIDDLE CHINLE

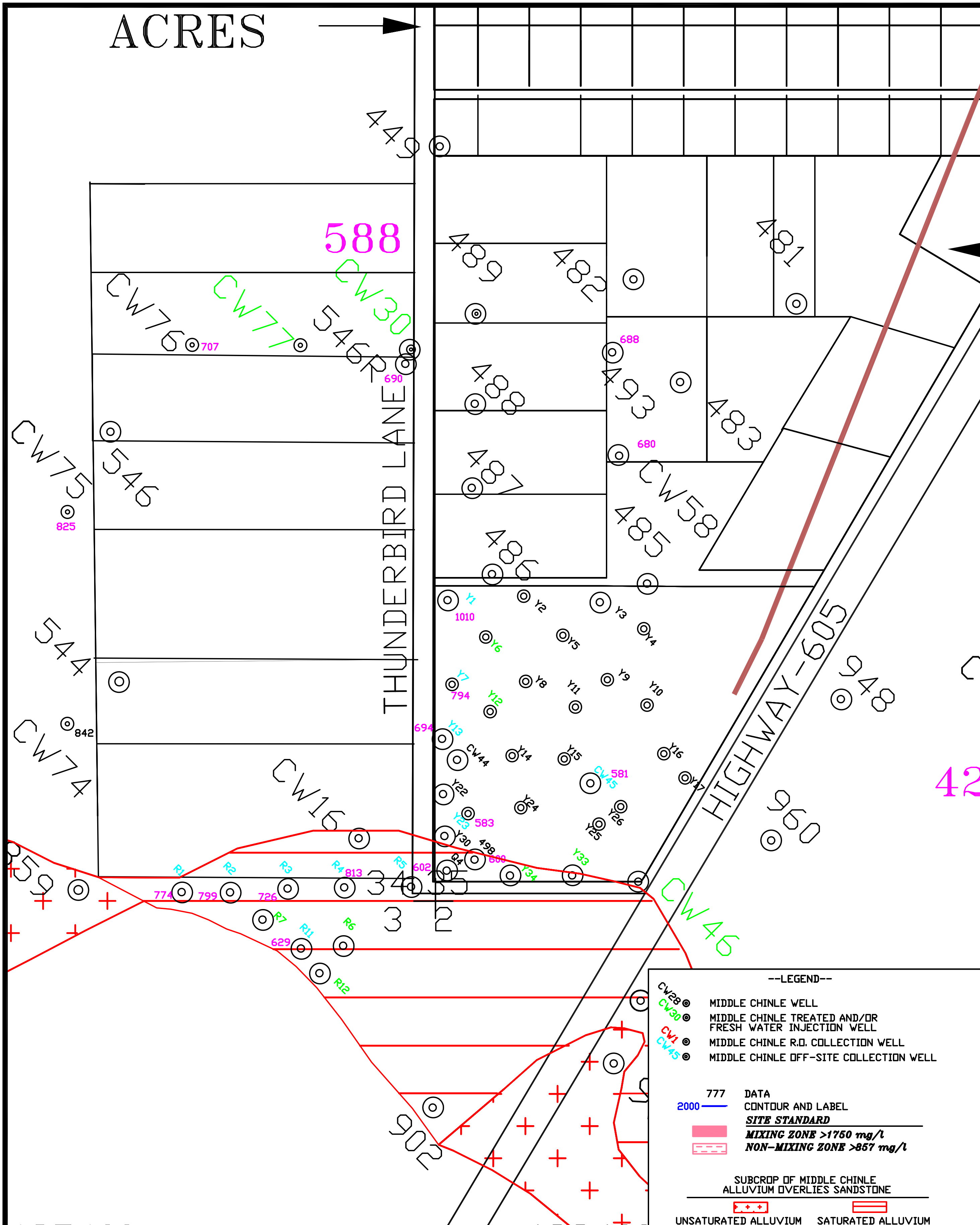
Thorium-230 concentrations are not significant in the alluvial aquifer outside of the Large Tailings Pile. Therefore, the Middle Chinle aquifer does not have the potential for containing significant thorium concentrations from the tailings seepage. Thorium-230 is, therefore, not a significant parameter in the Middle Chinle aquifer and should be eliminated from future monitoring in the Middle Chinle aquifer. Thorium-230 concentrations were measured in all wells sampled from Middle Chinle wells in 2003, and all of these values were less than detection. All of the thorium-230 values measured in 2017 were very small at values of 0.3 pCi/l or less. These thorium-230 levels are consistent with concentrations previously measured in the Middle Chinle aquifer, which shows that thorium-230 is not an important parameter in the Middle Chinle aquifer and thus a site standard has not been set.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-1. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18
SCALE: 1"=1600'

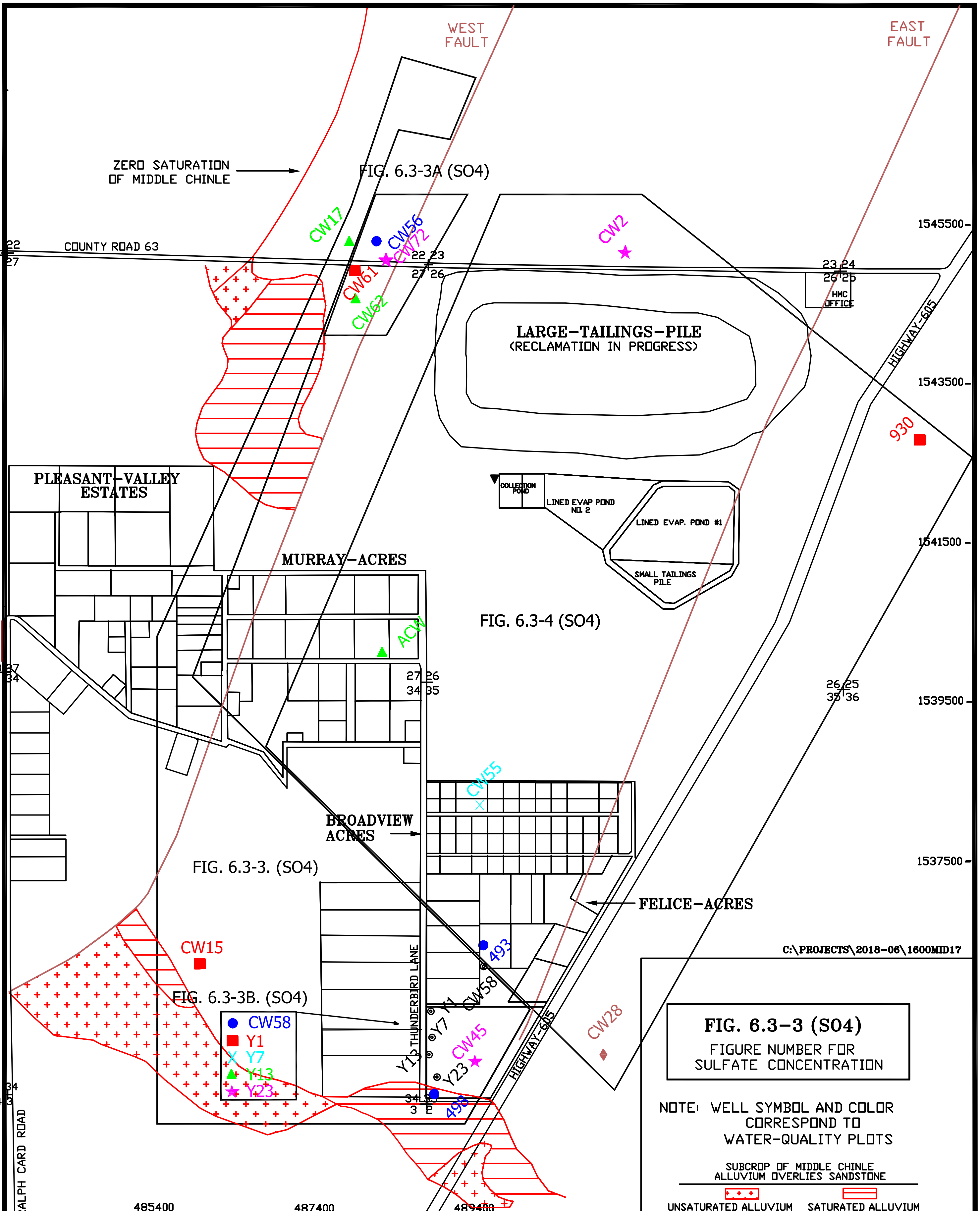


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-1A. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, SOS, mg/l

DATE: 2/26/18

SCALE: 1"=500'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/2/18

FIGURE 6.3-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-QUALITY PLOTS, 2017

SCALE: 1"=1600'

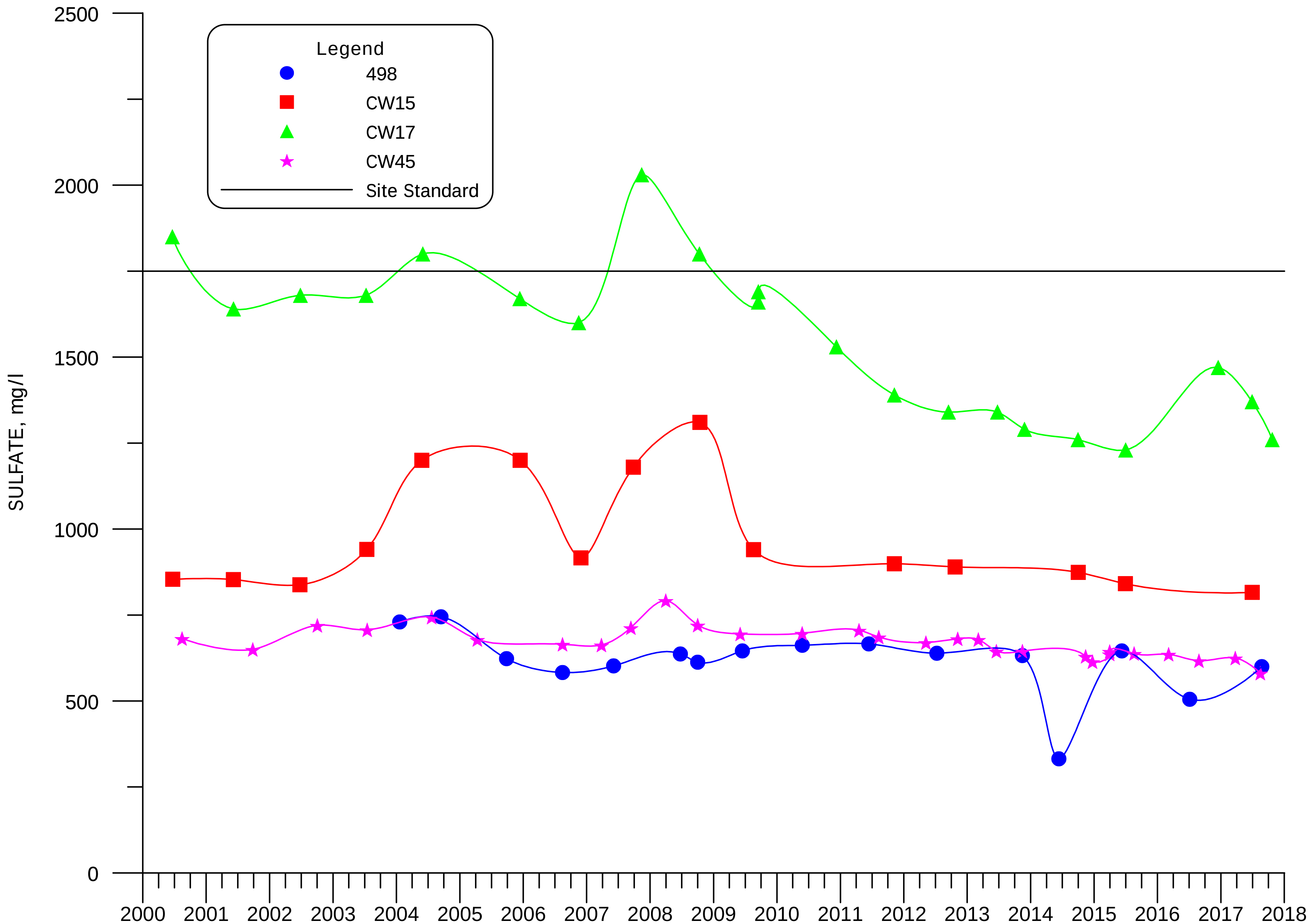


FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

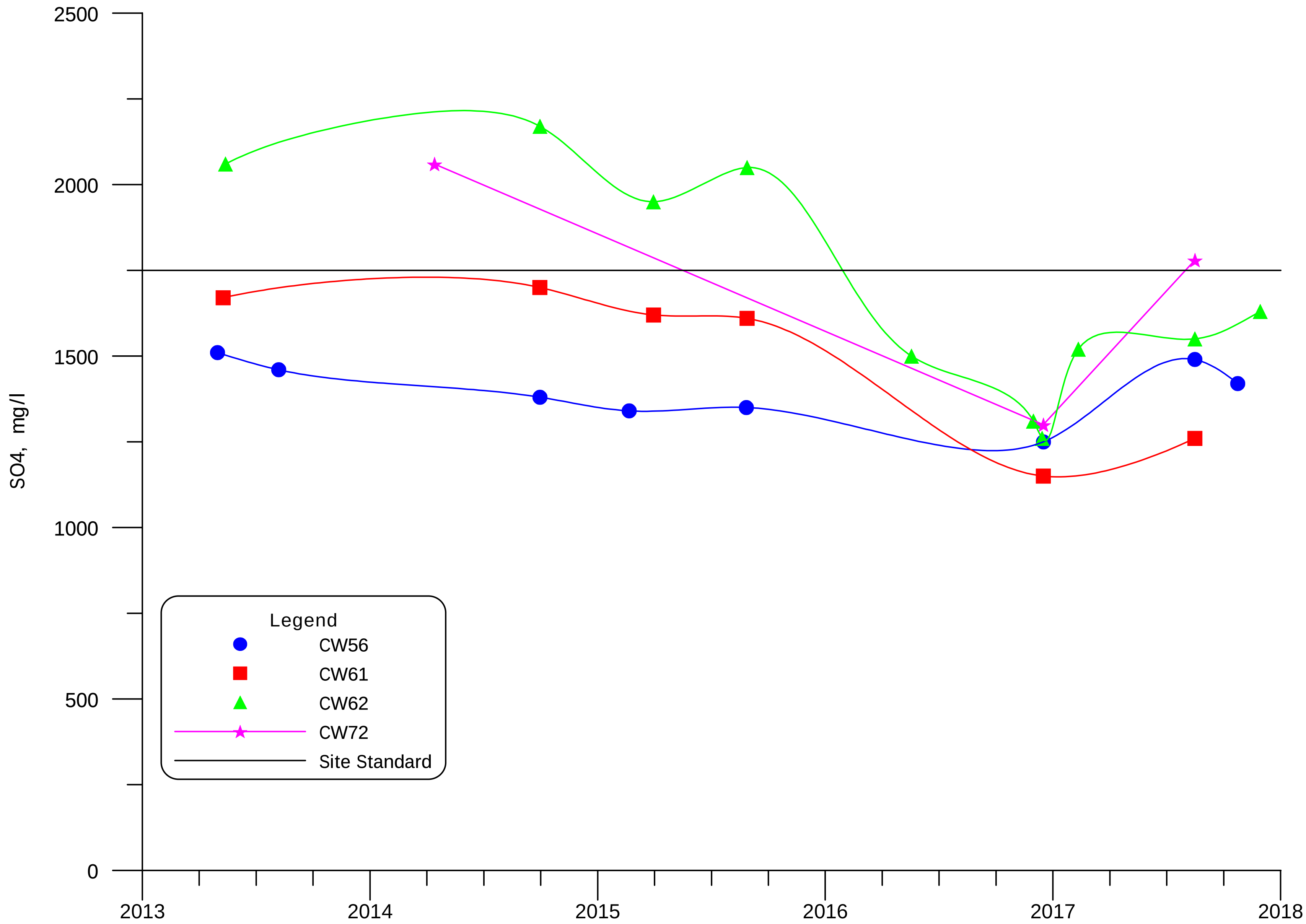


FIGURE 6.3-3A. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

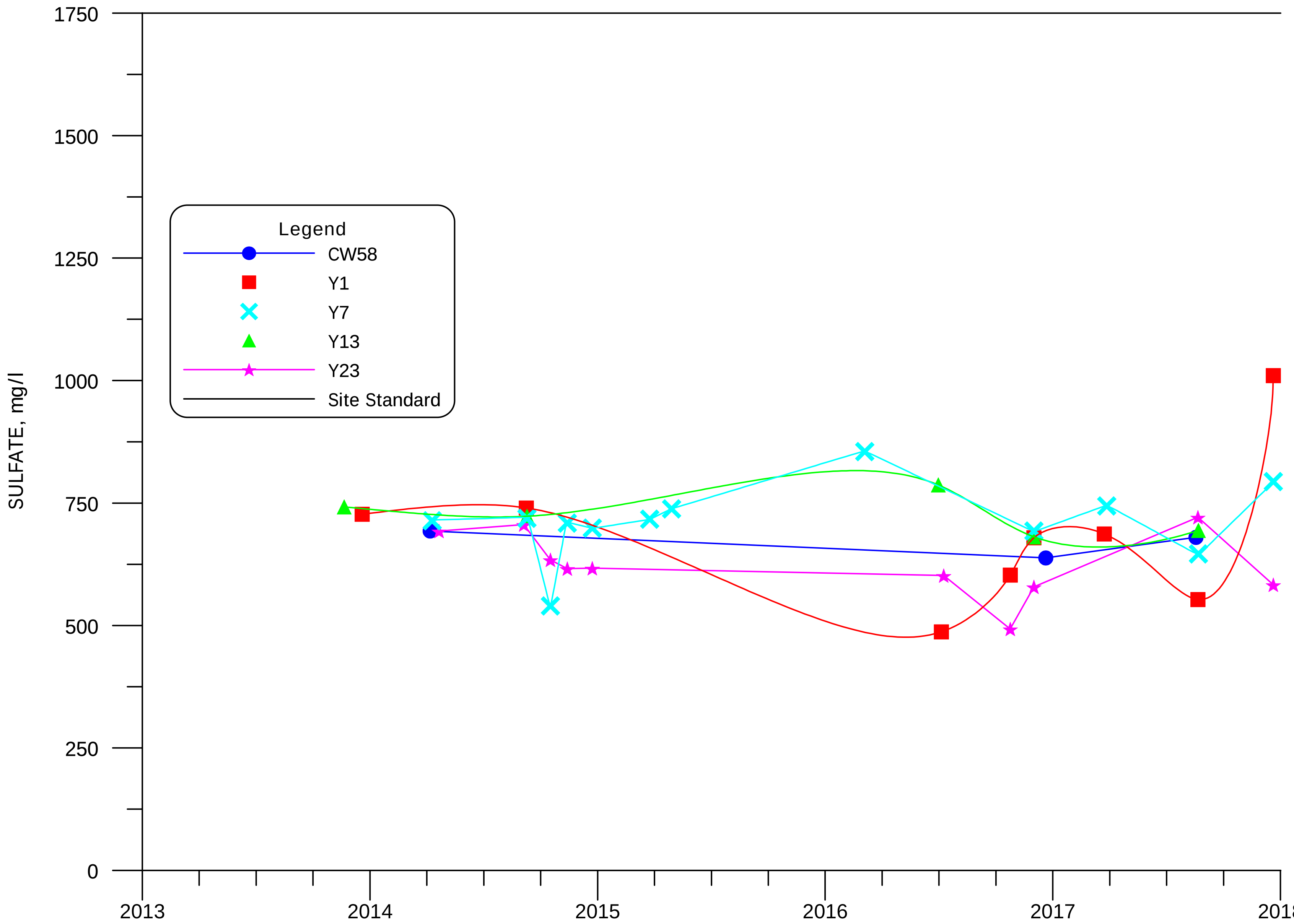


FIGURE 6.3-3B. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

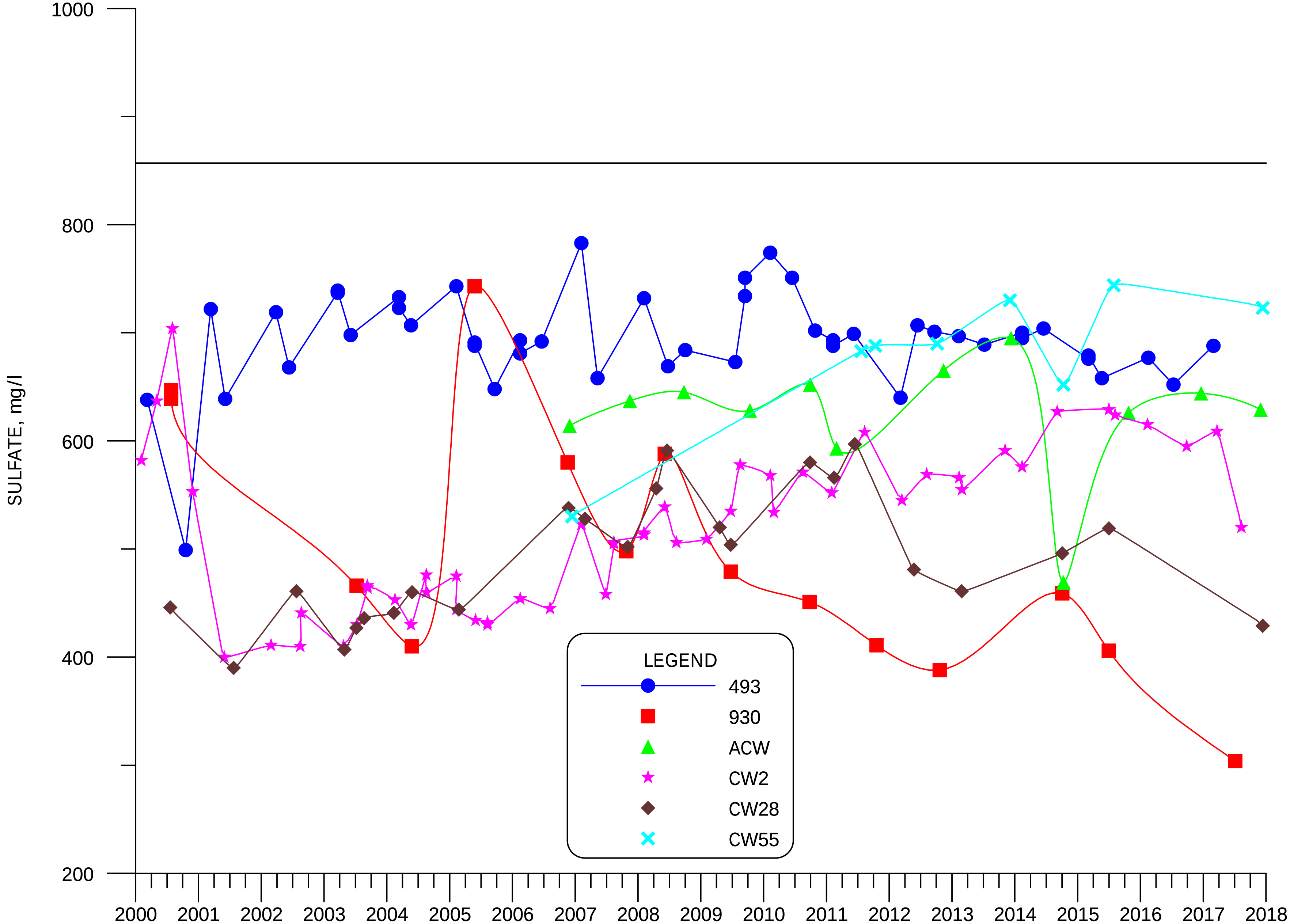
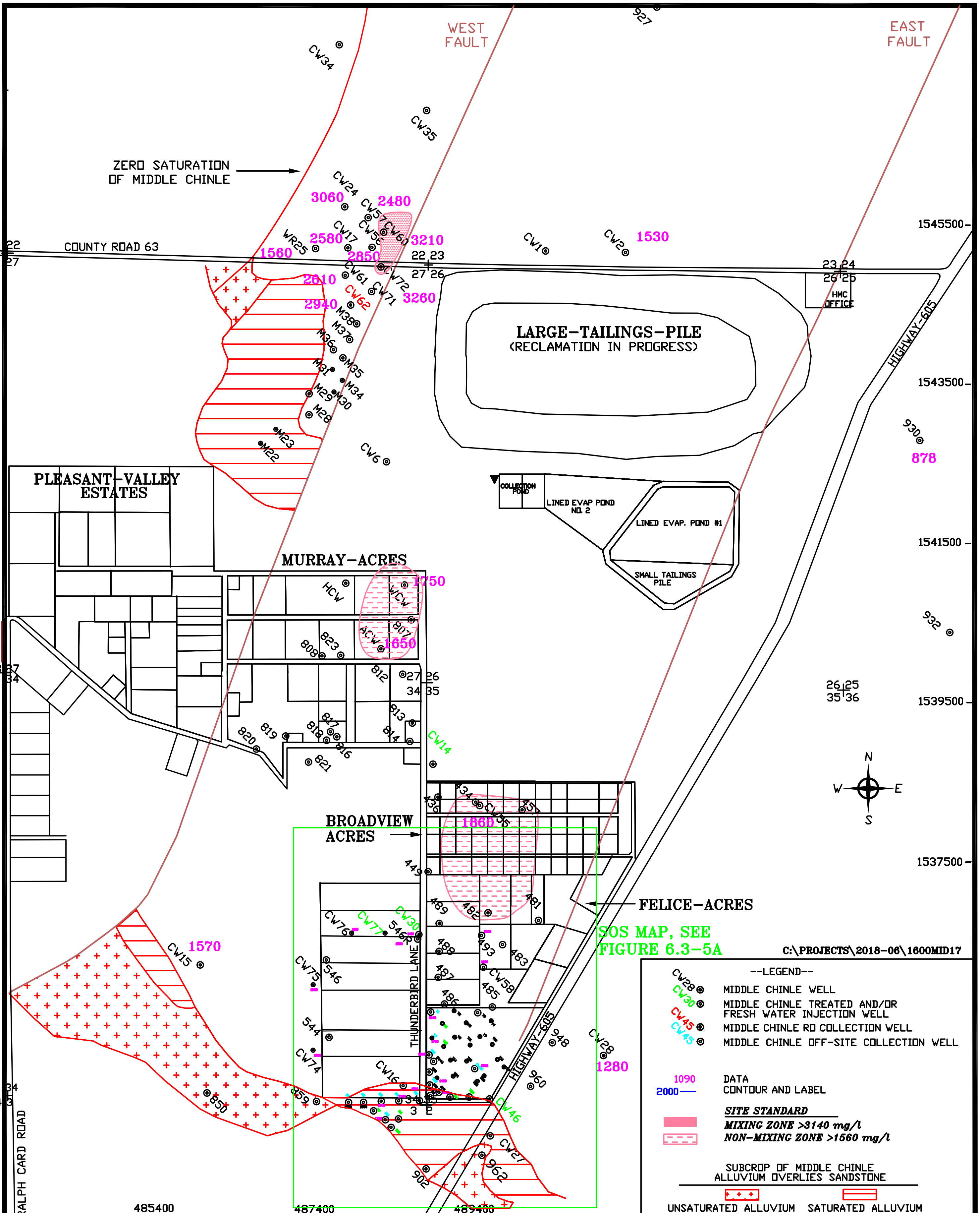


FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

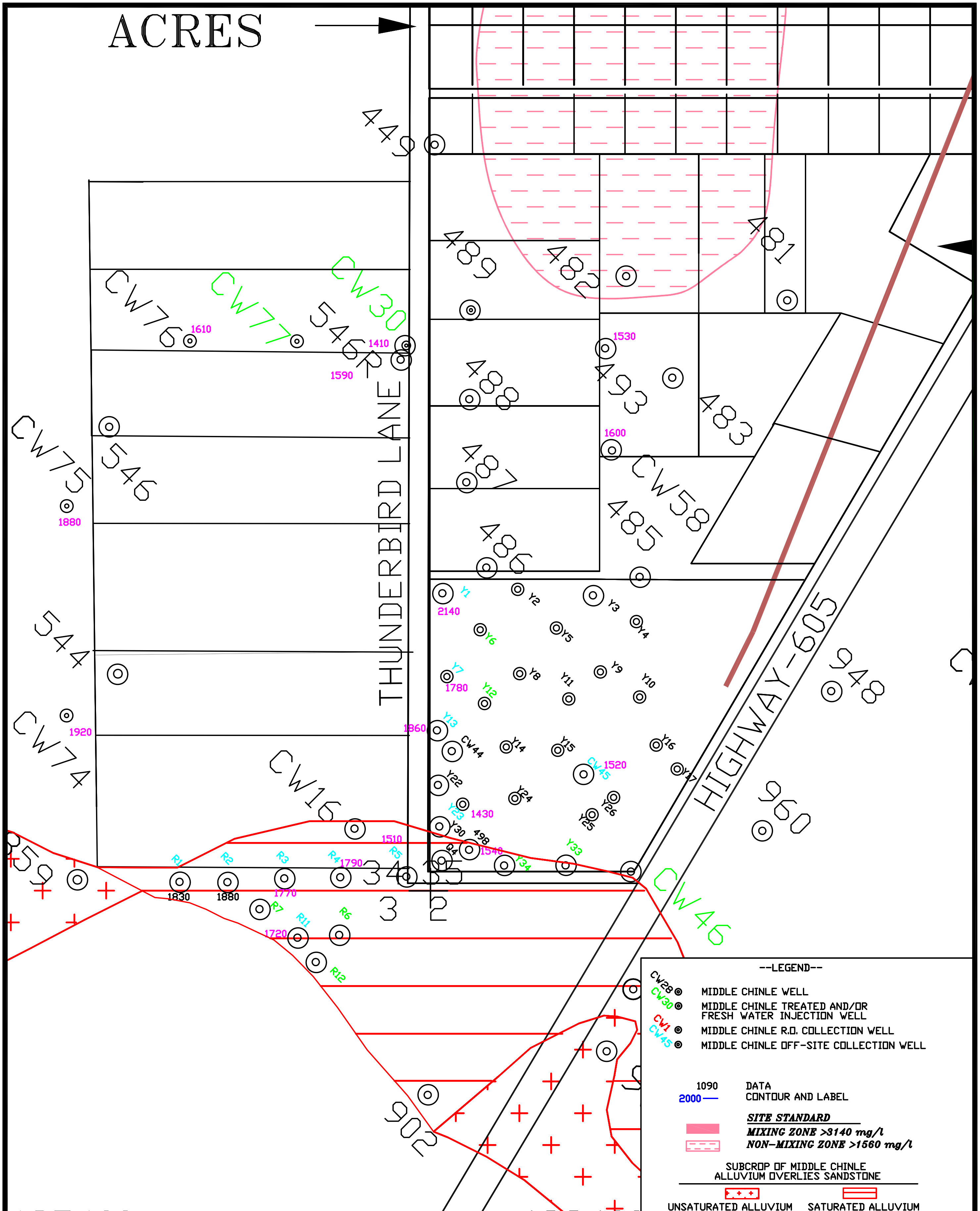


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/2/18

FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l

SCALE: 1"=1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-5A. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, SOS, mg/l

DATE: 2/26/18

SCALE: 1"=500'

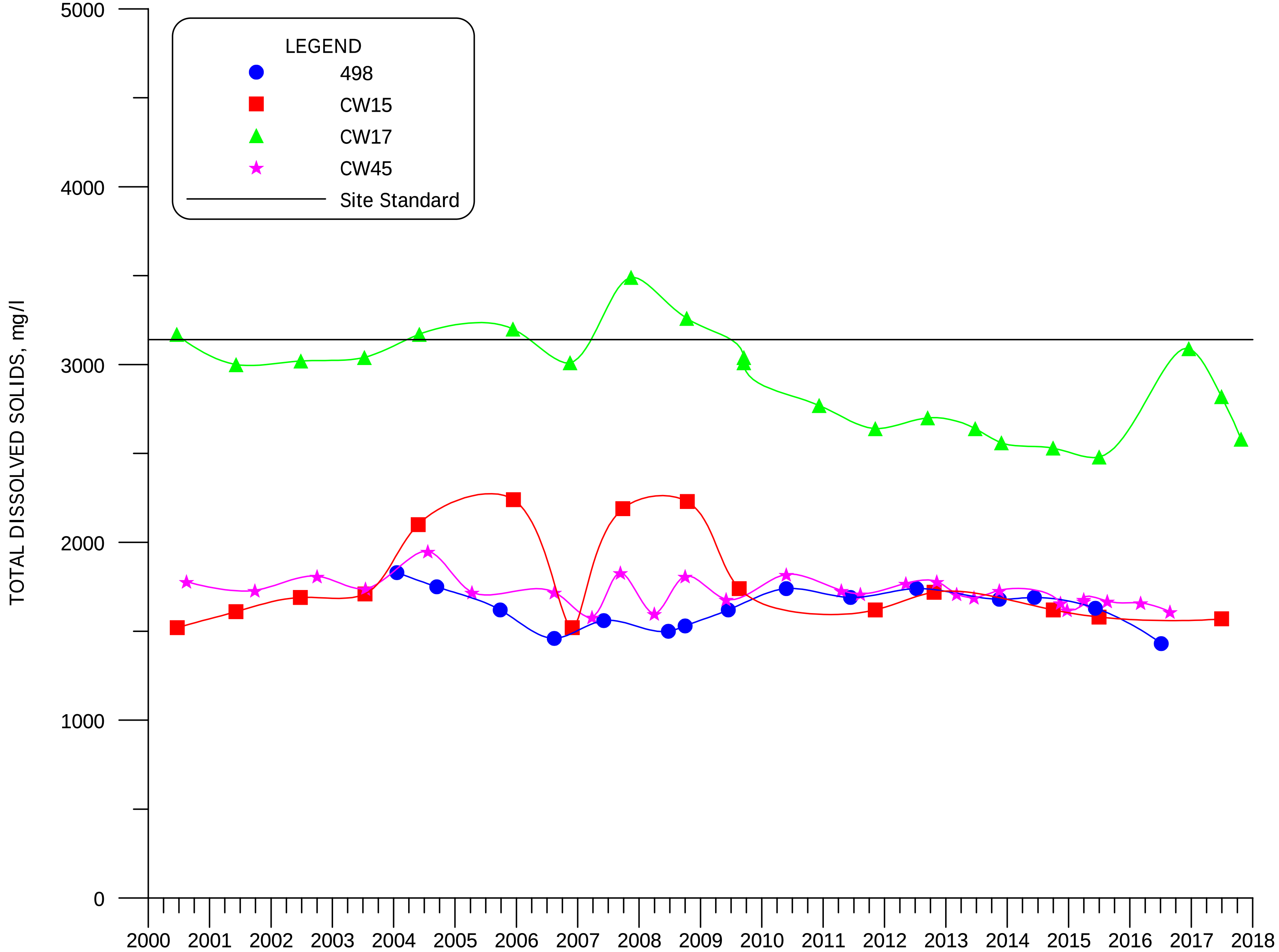


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

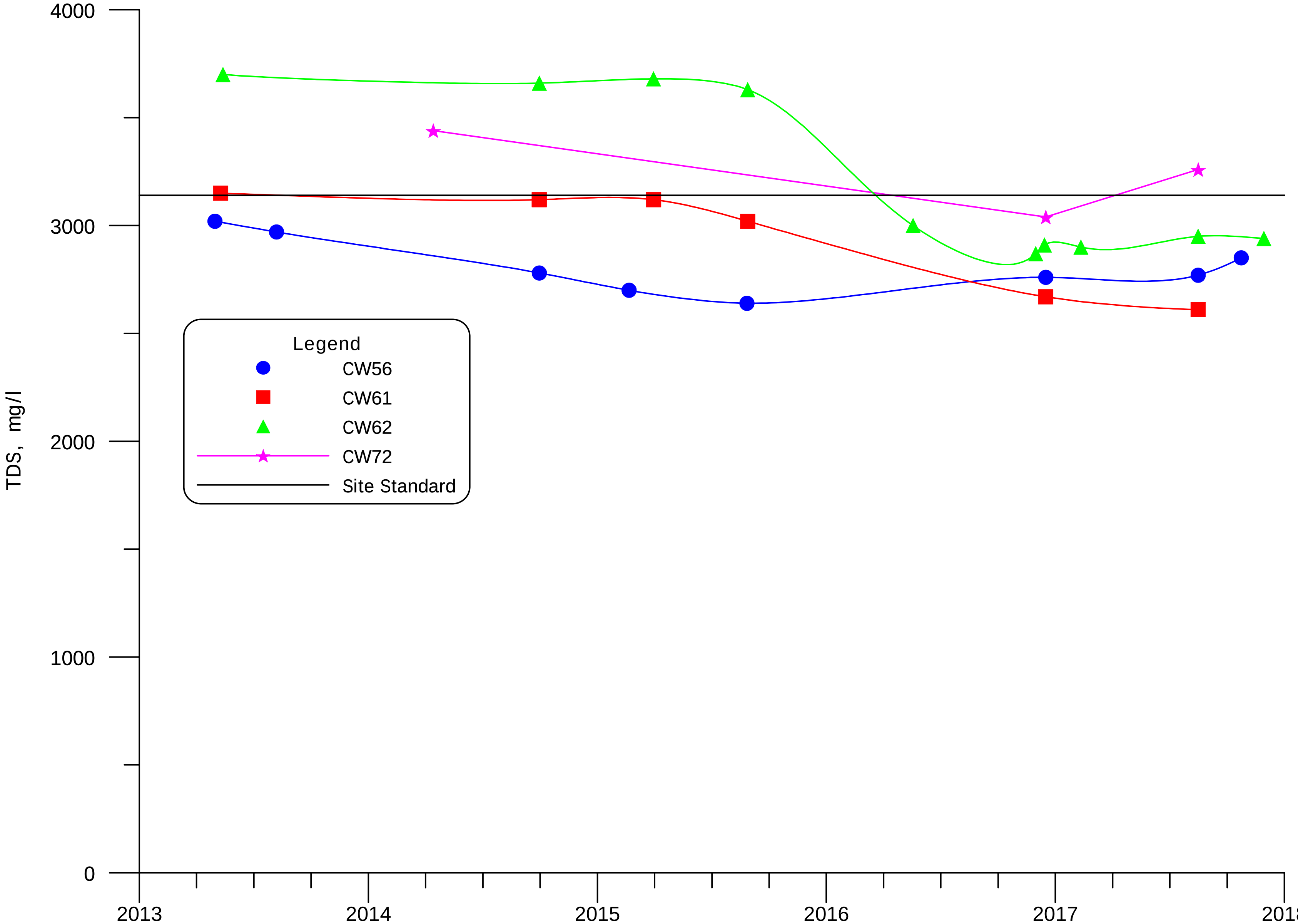


FIGURE 6.3-6A. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

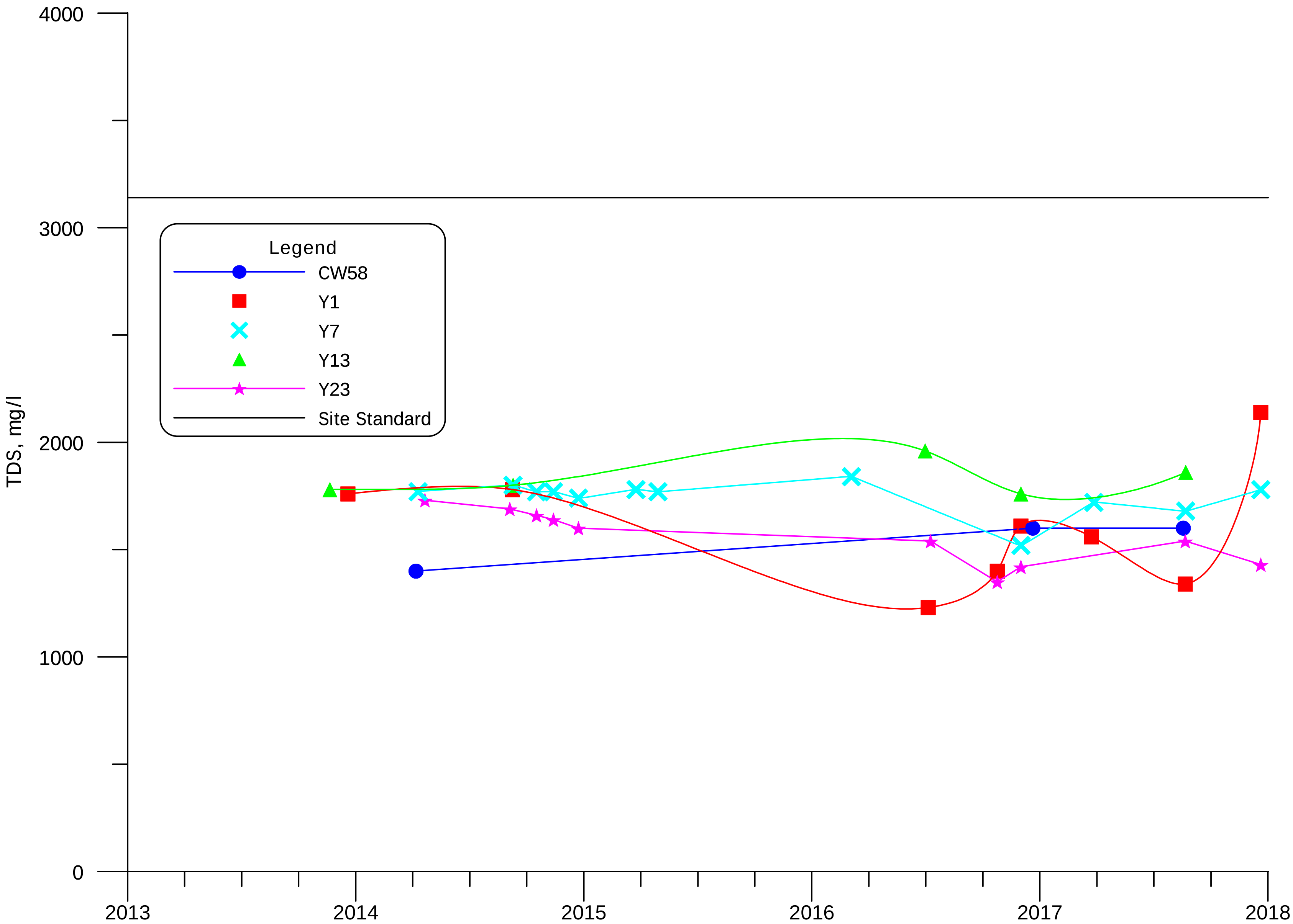


FIGURE 6.3-6B. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

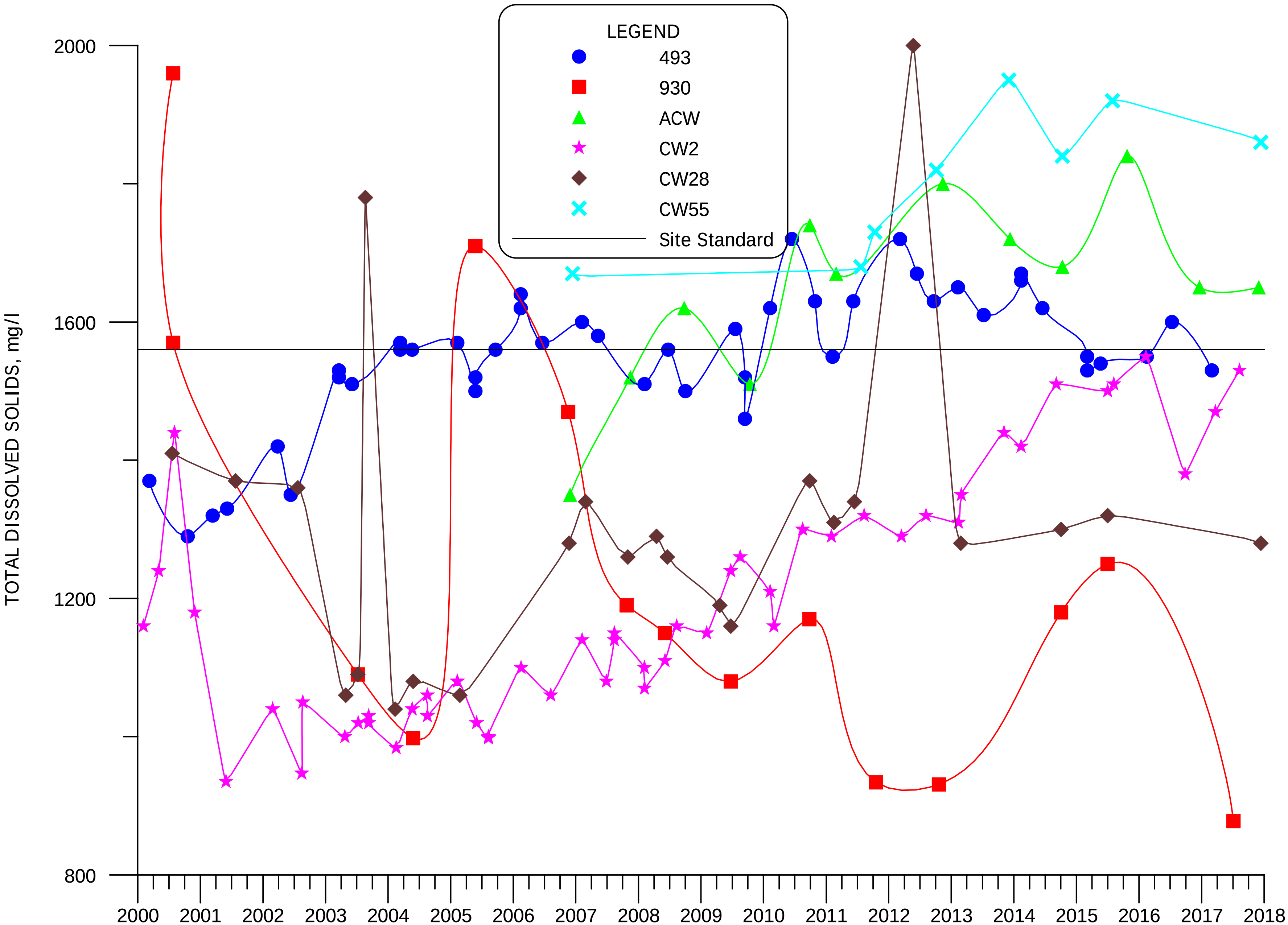
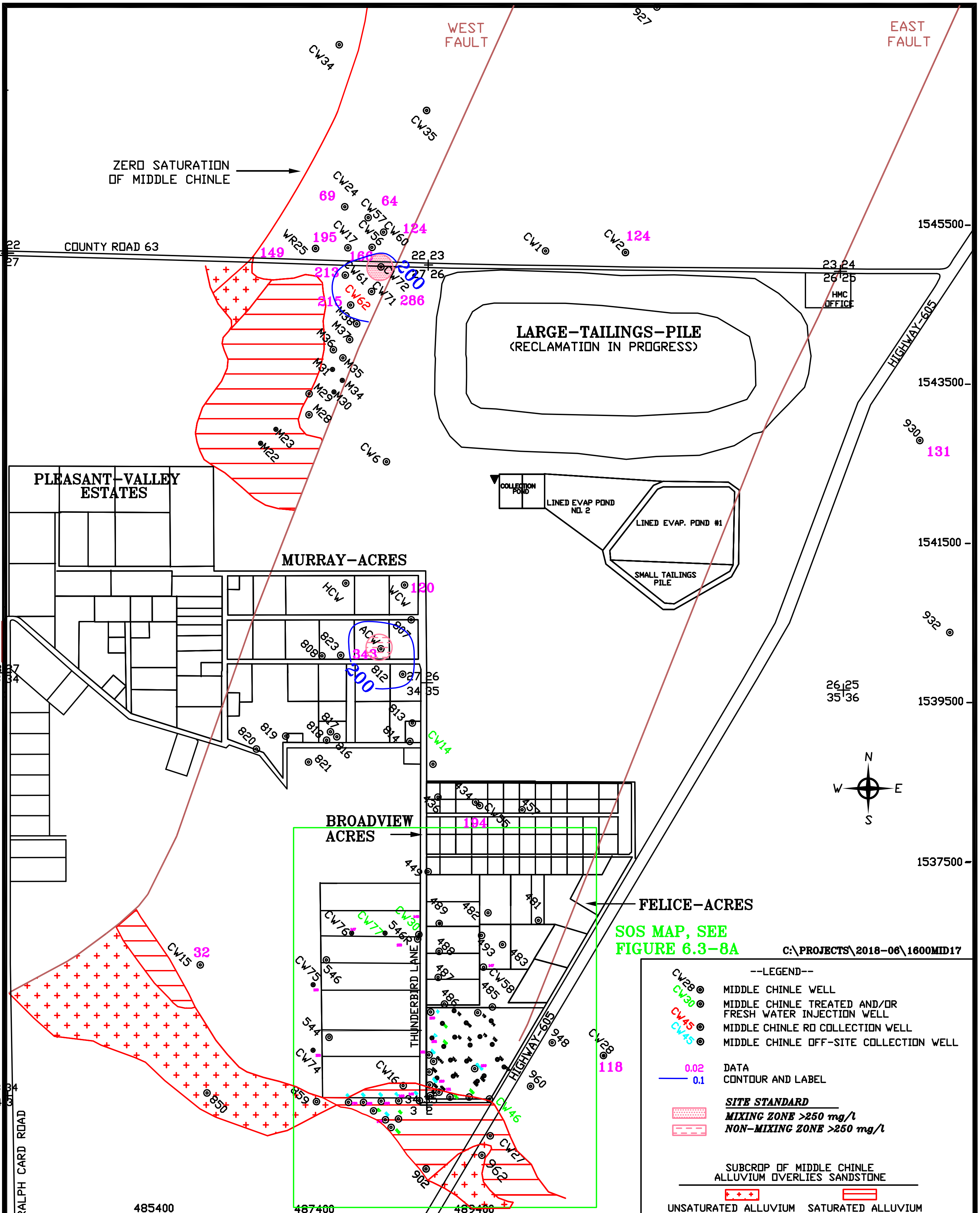


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

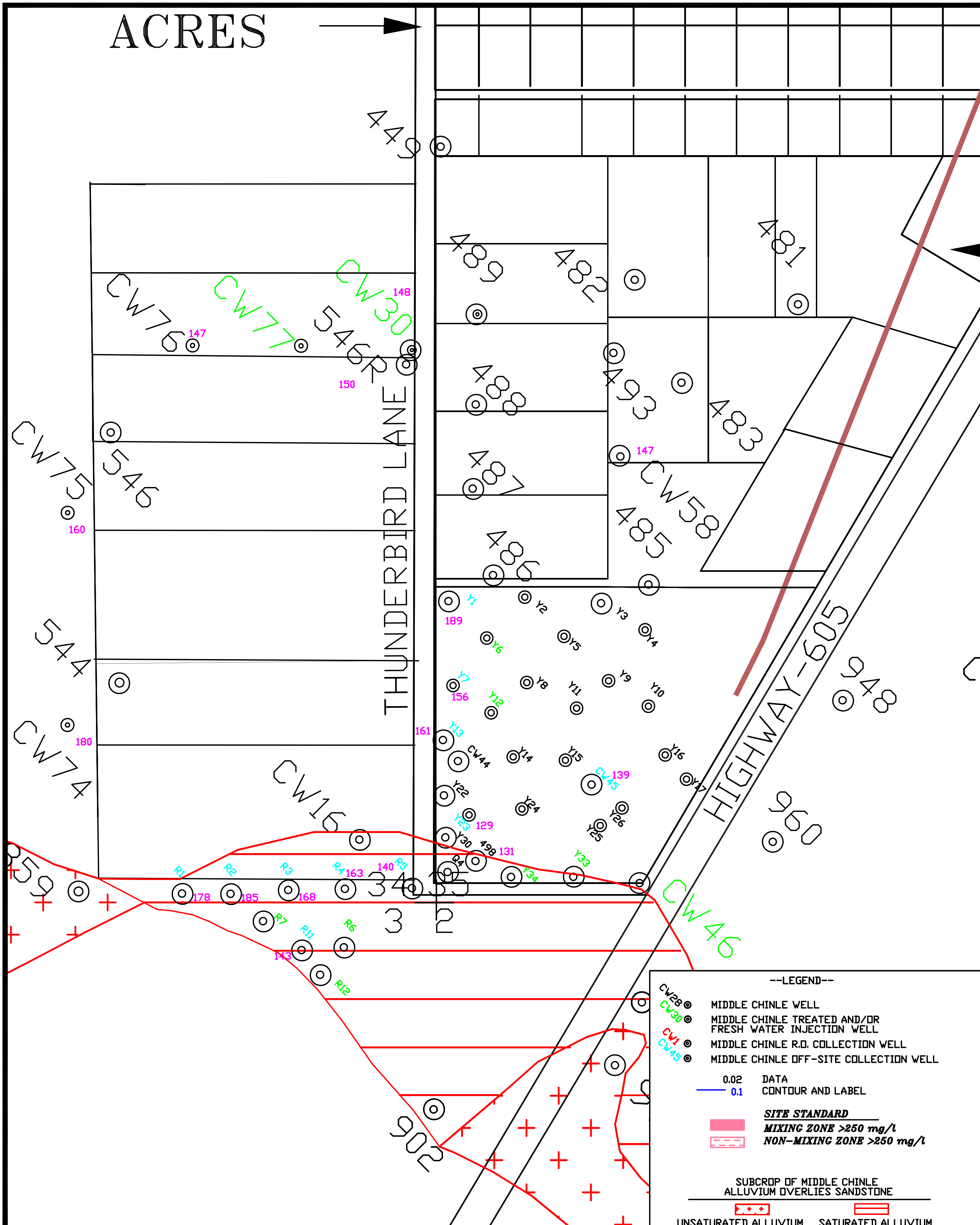


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

DATE: 3/2/18

FIGURE 6.3–8. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l

SCALE: 1"=1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/26/18

FIGURE 6.3-8A. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, SOS, mg/l

SCALE: 1"=500'

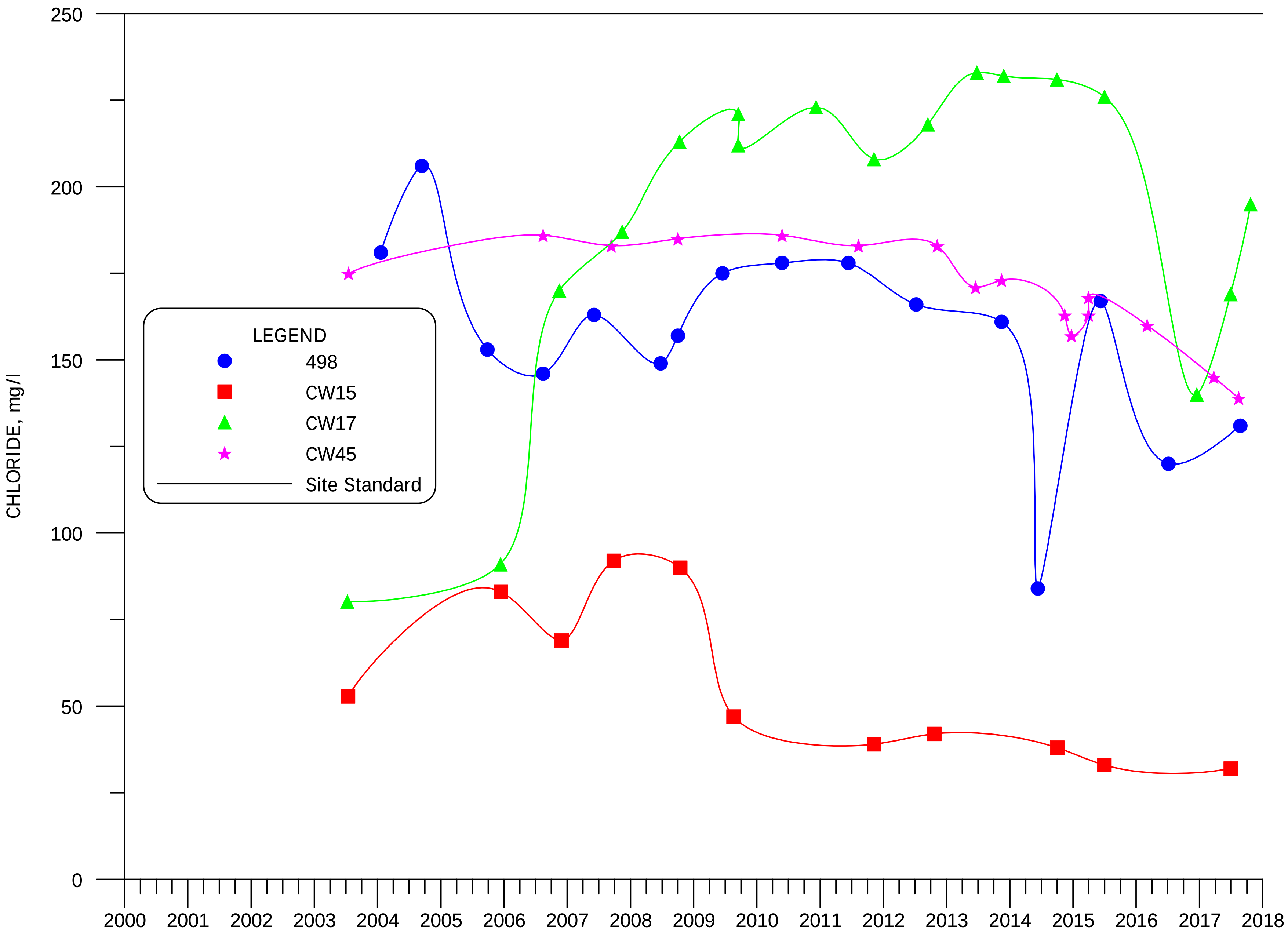


FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

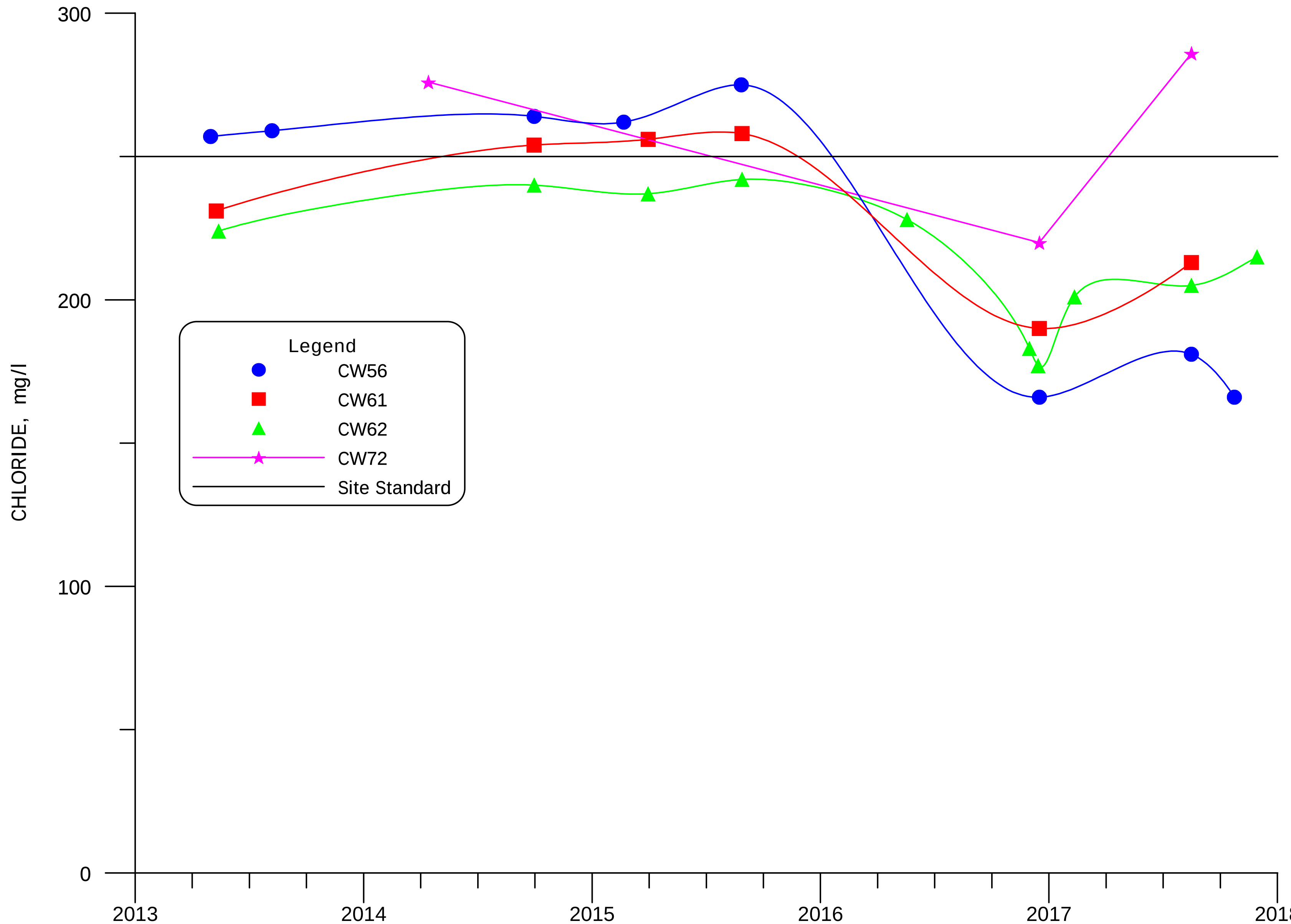


FIGURE 6.3-9A. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

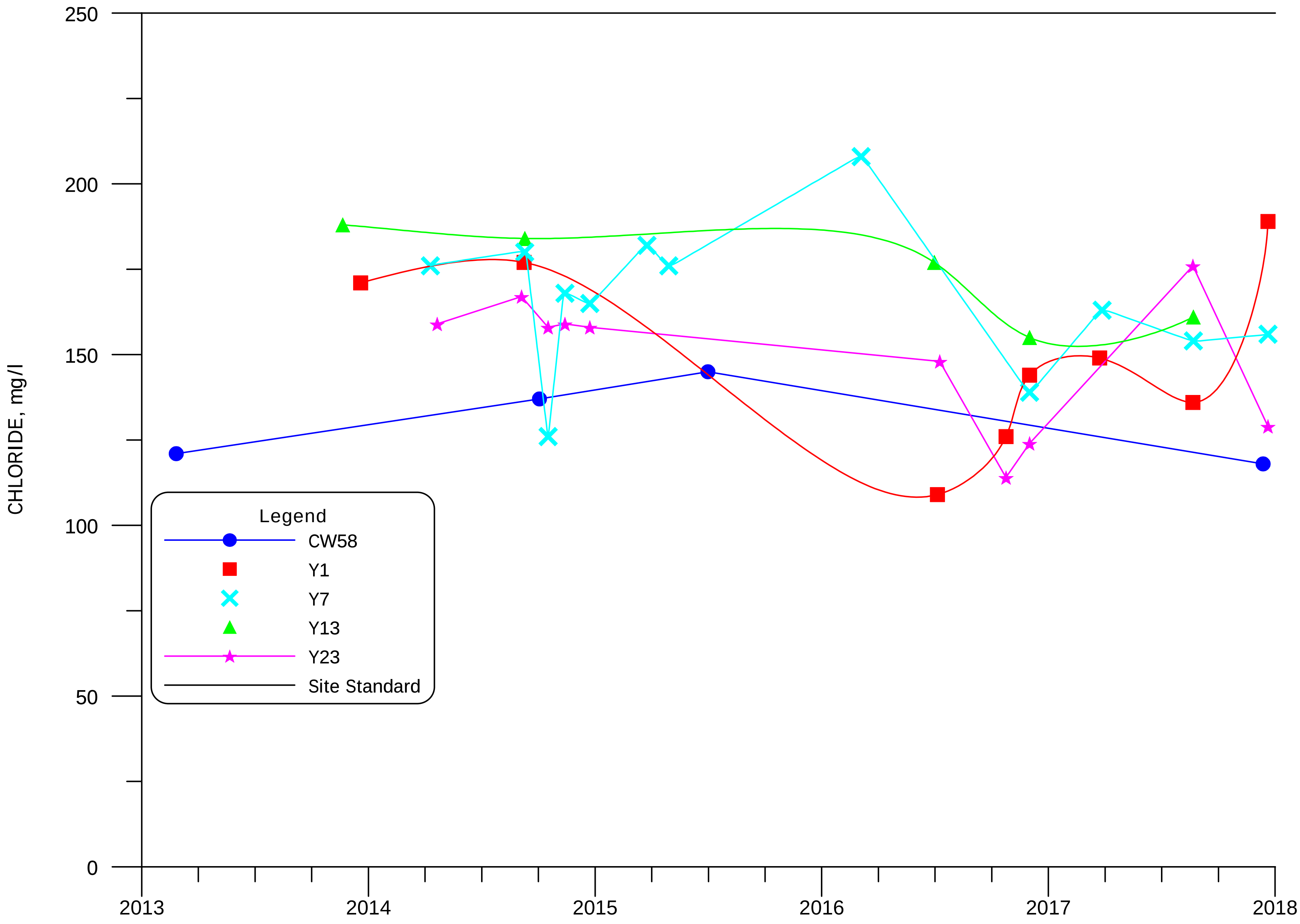


FIGURE 6.3-9B. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

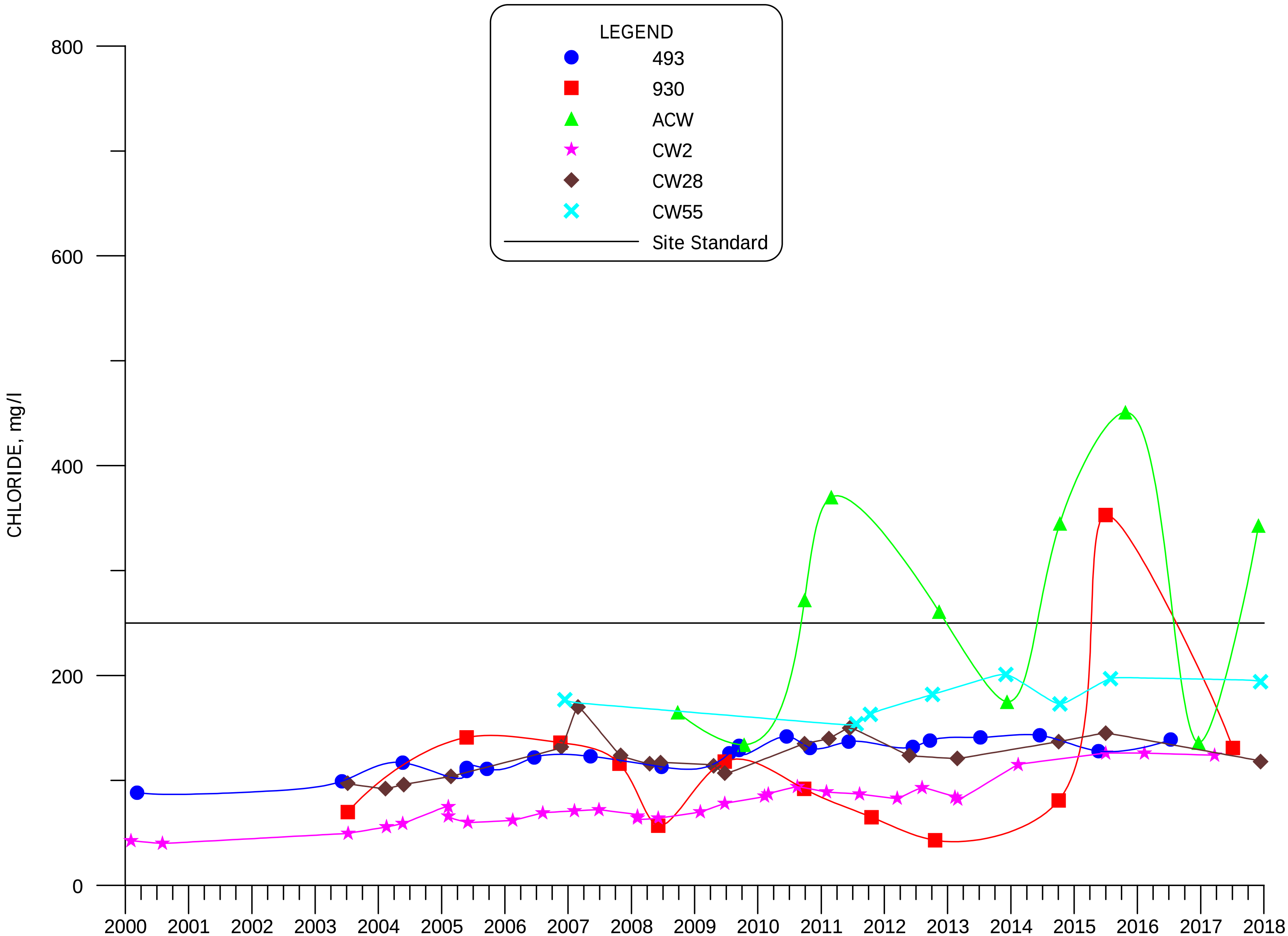
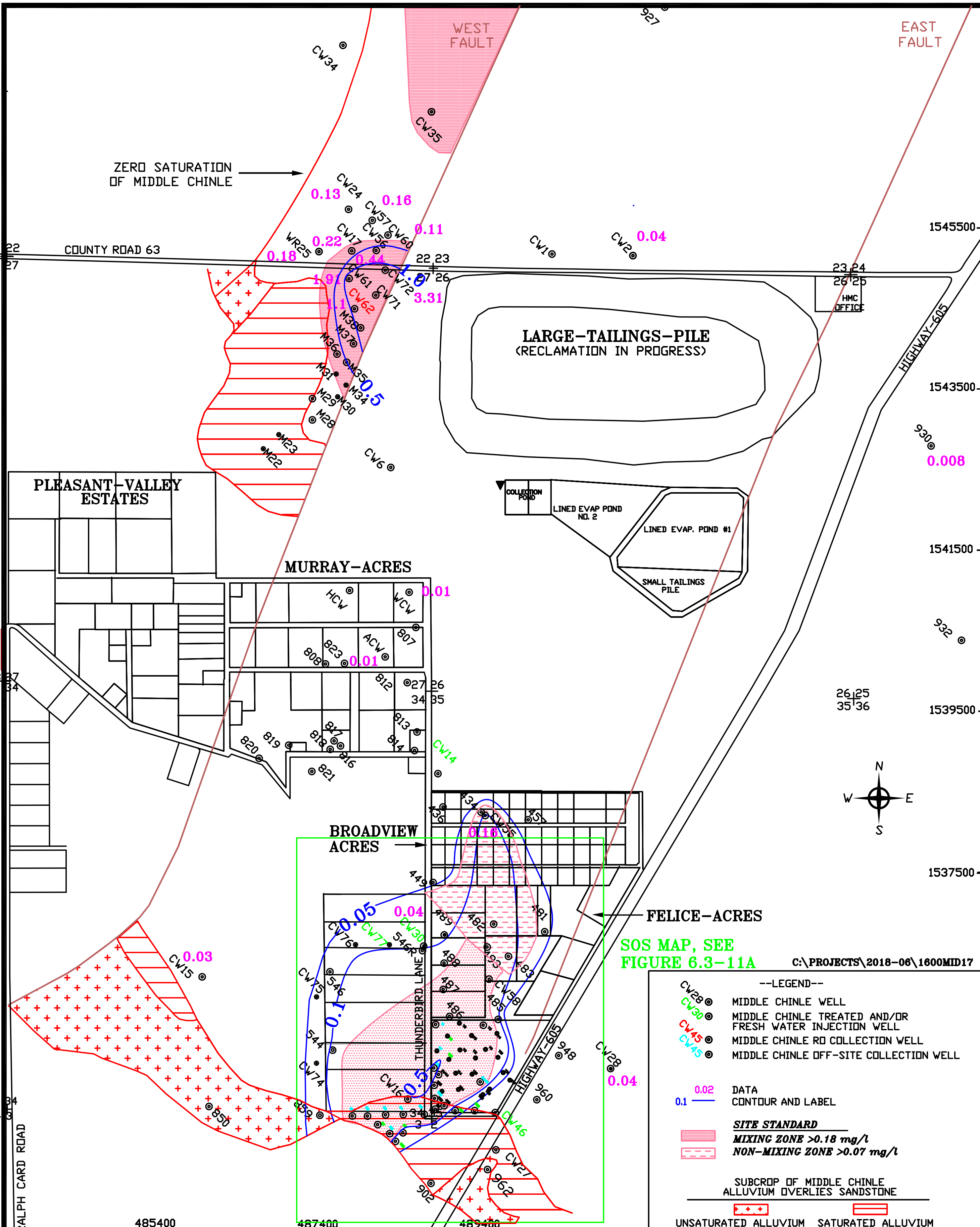


FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

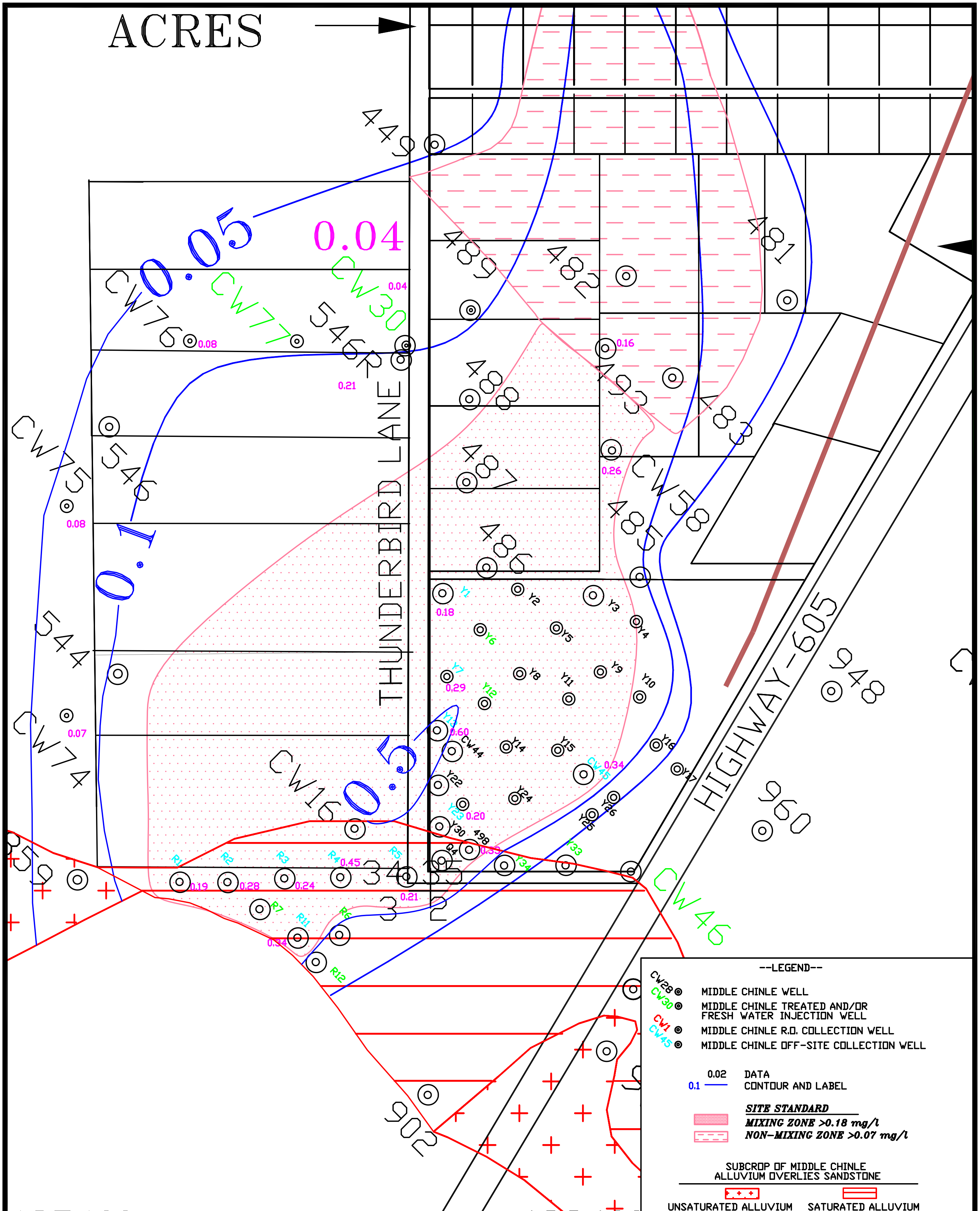


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-11. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18

SCALE: 1"=1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-11A. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/26/18

SCALE: 1"=500'

PAGE: 6.3-28

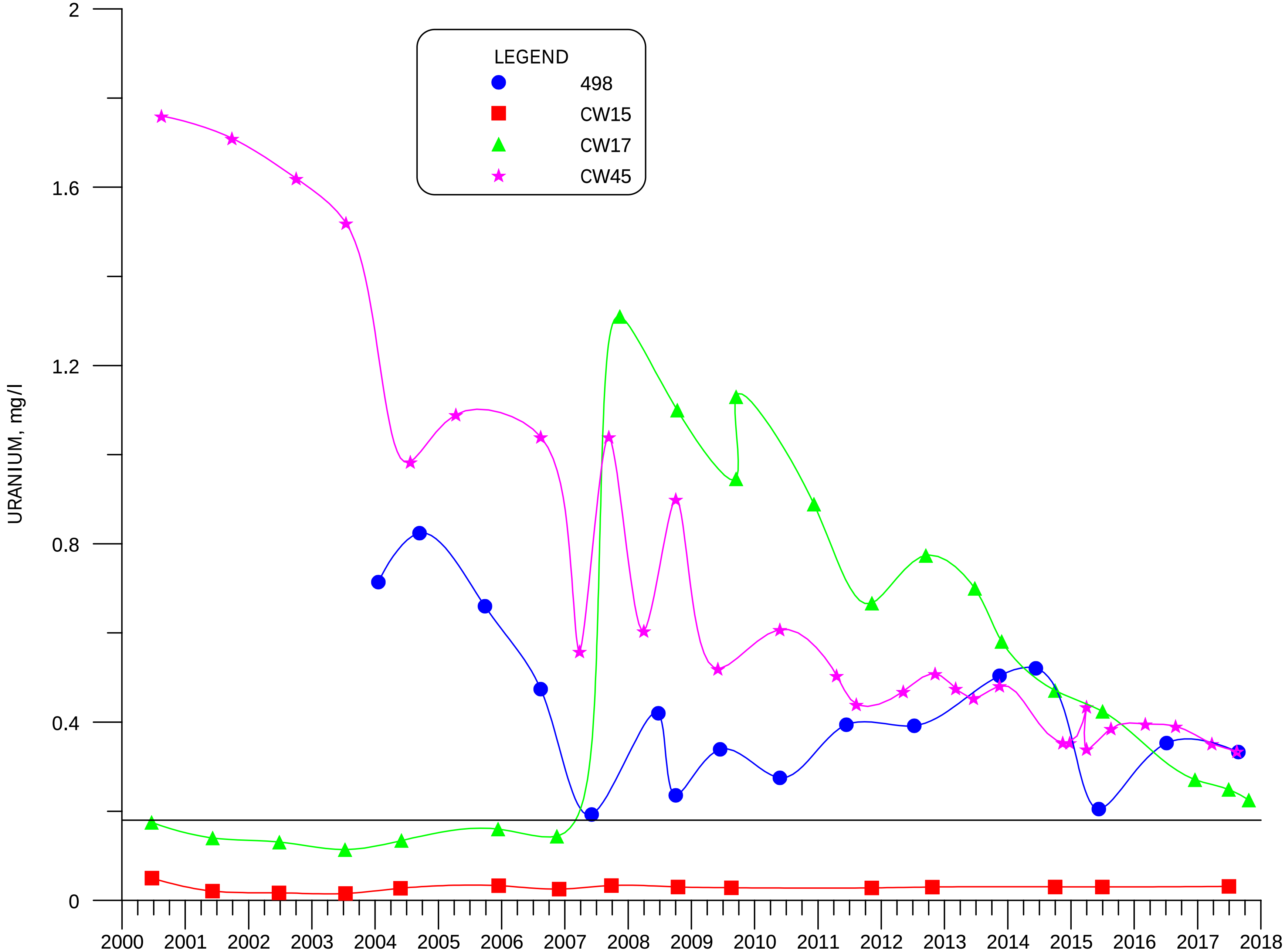


FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

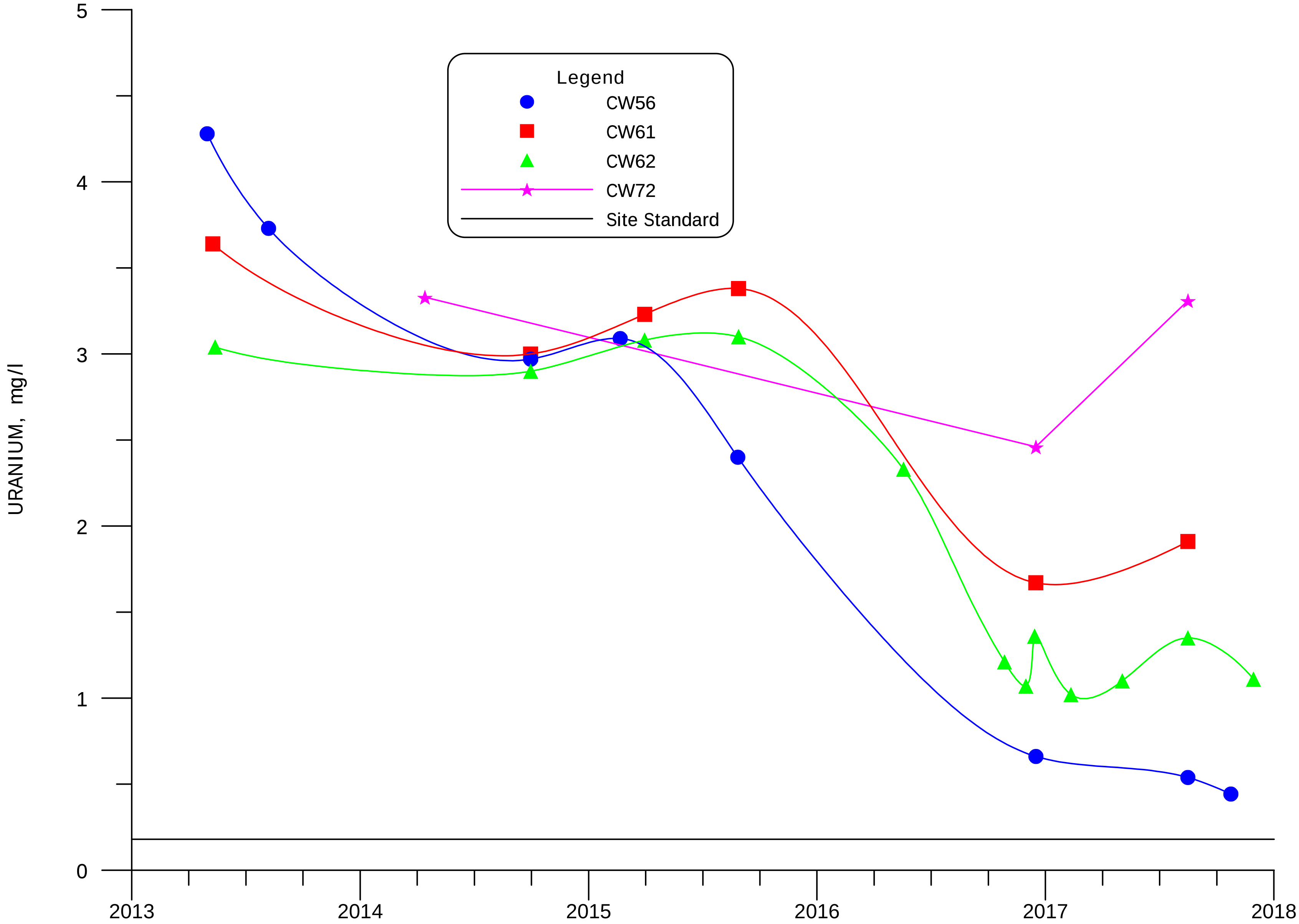


FIGURE 6.3-12A. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

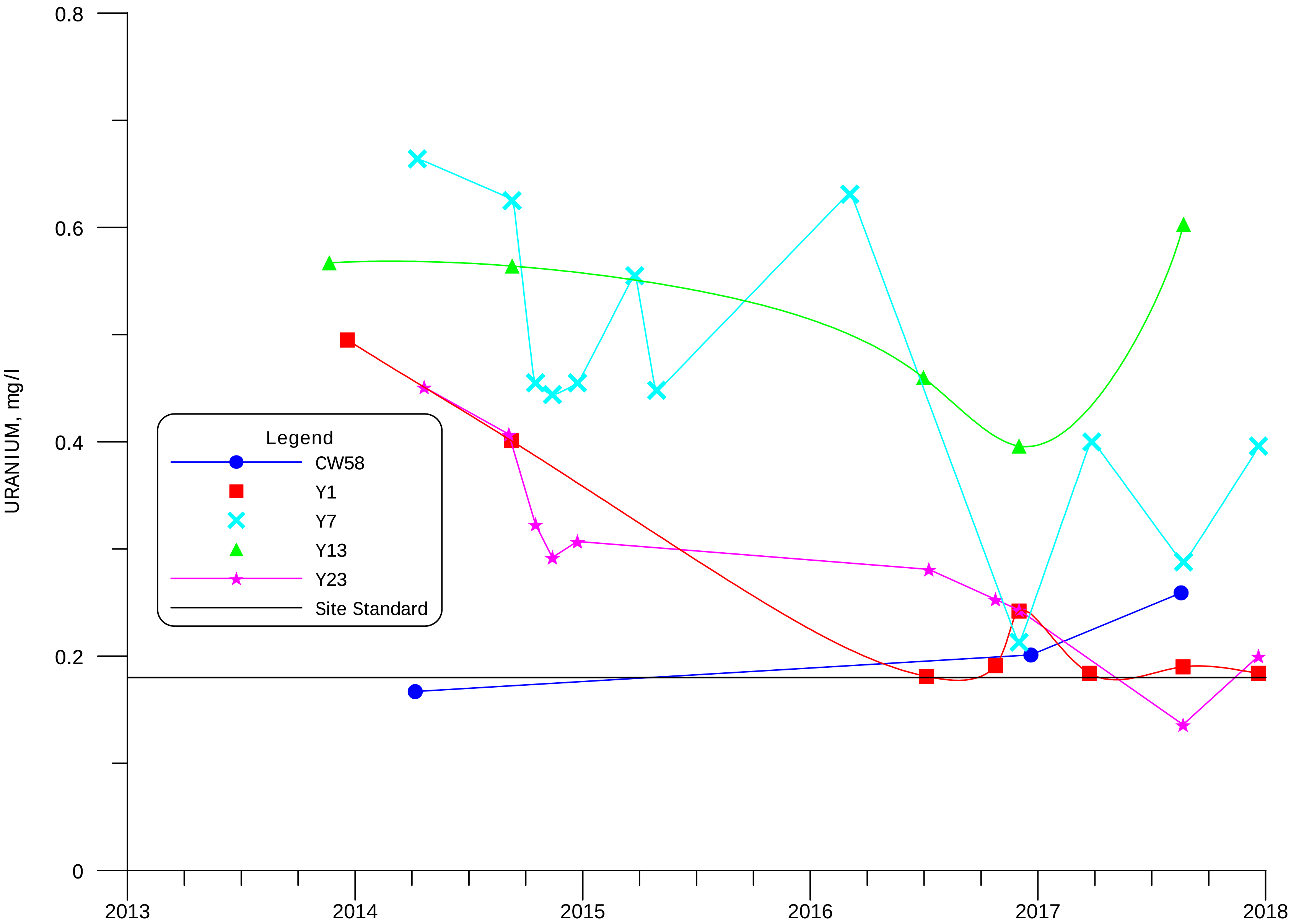


FIGURE 6.3-12B. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

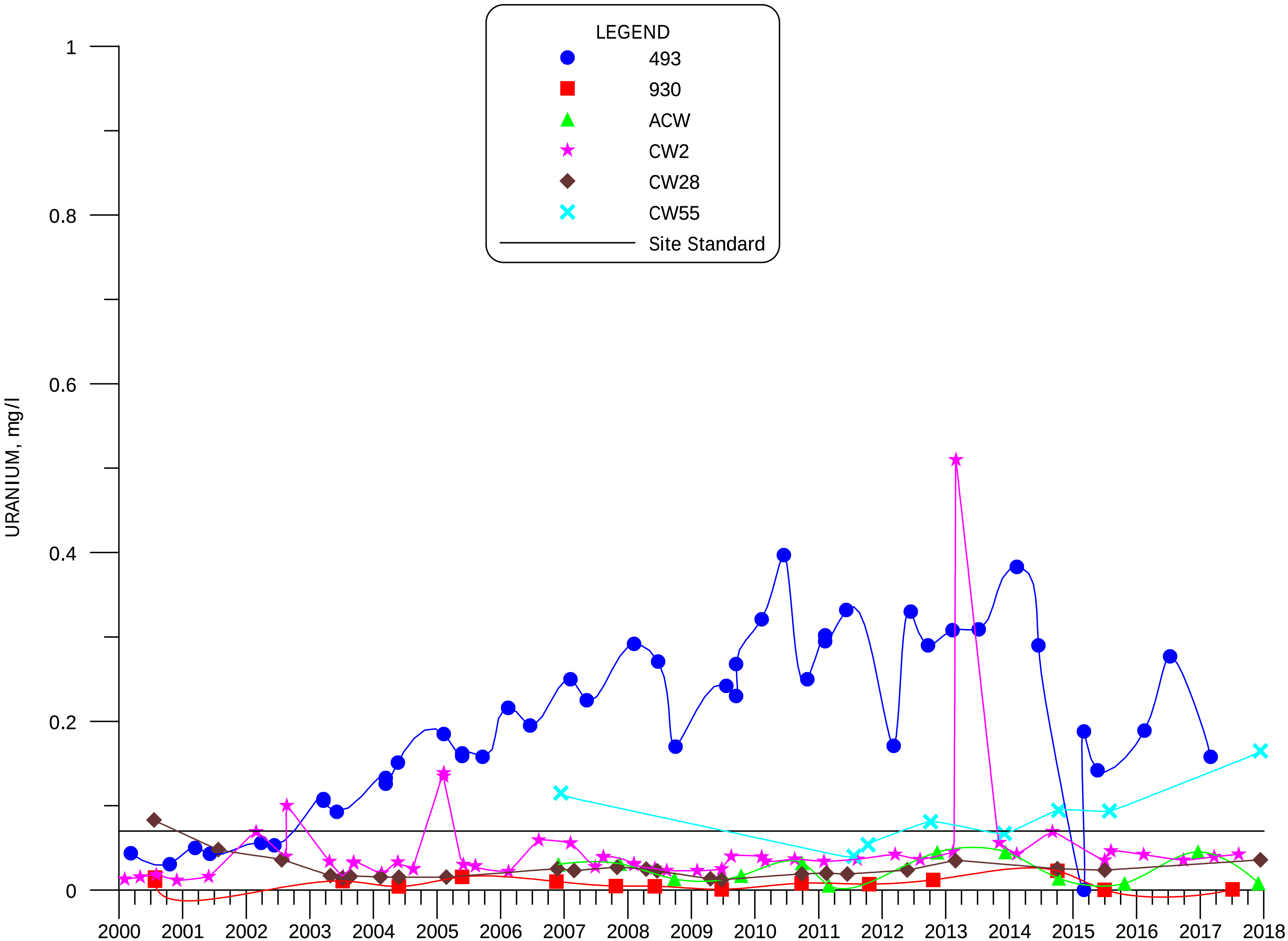
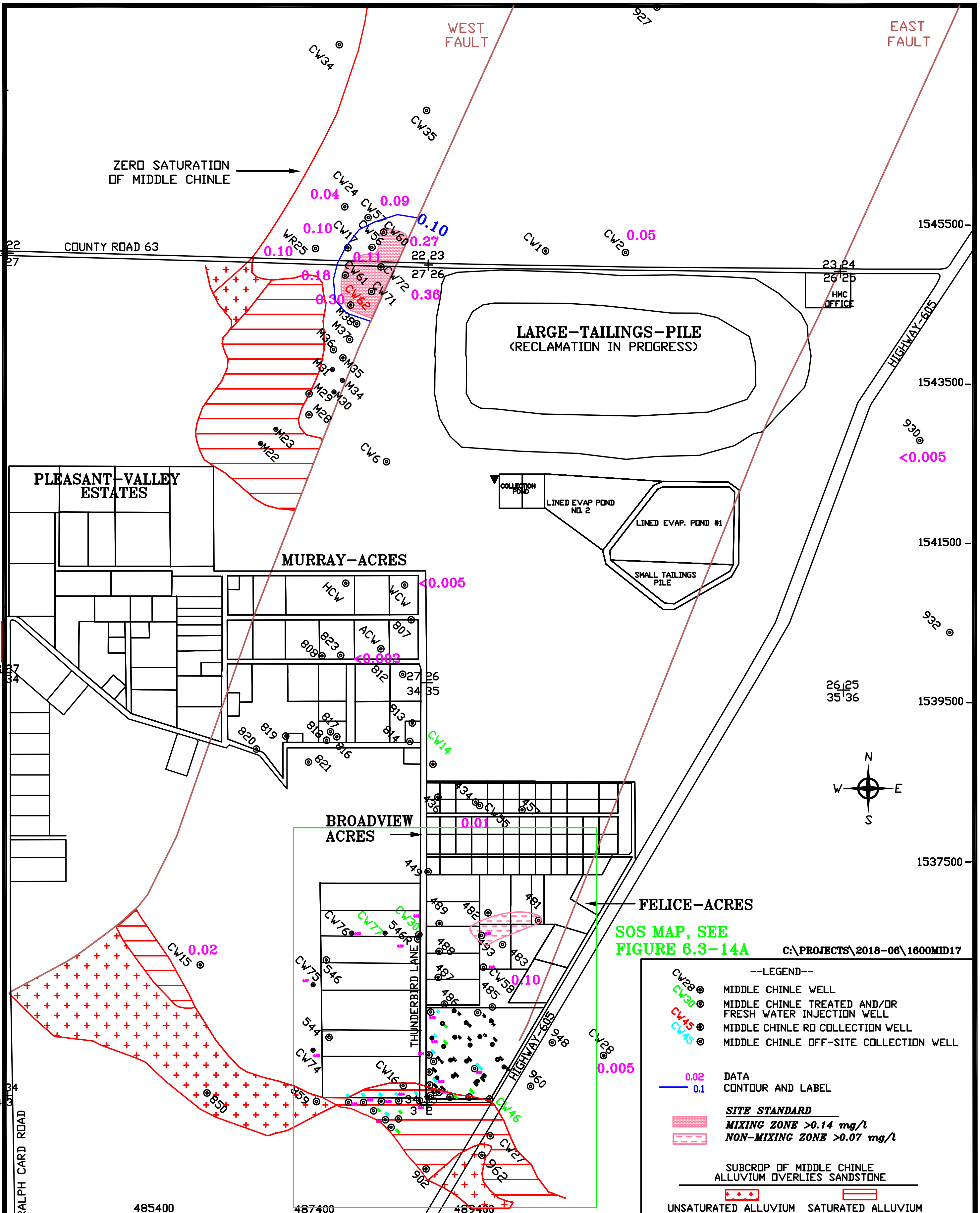
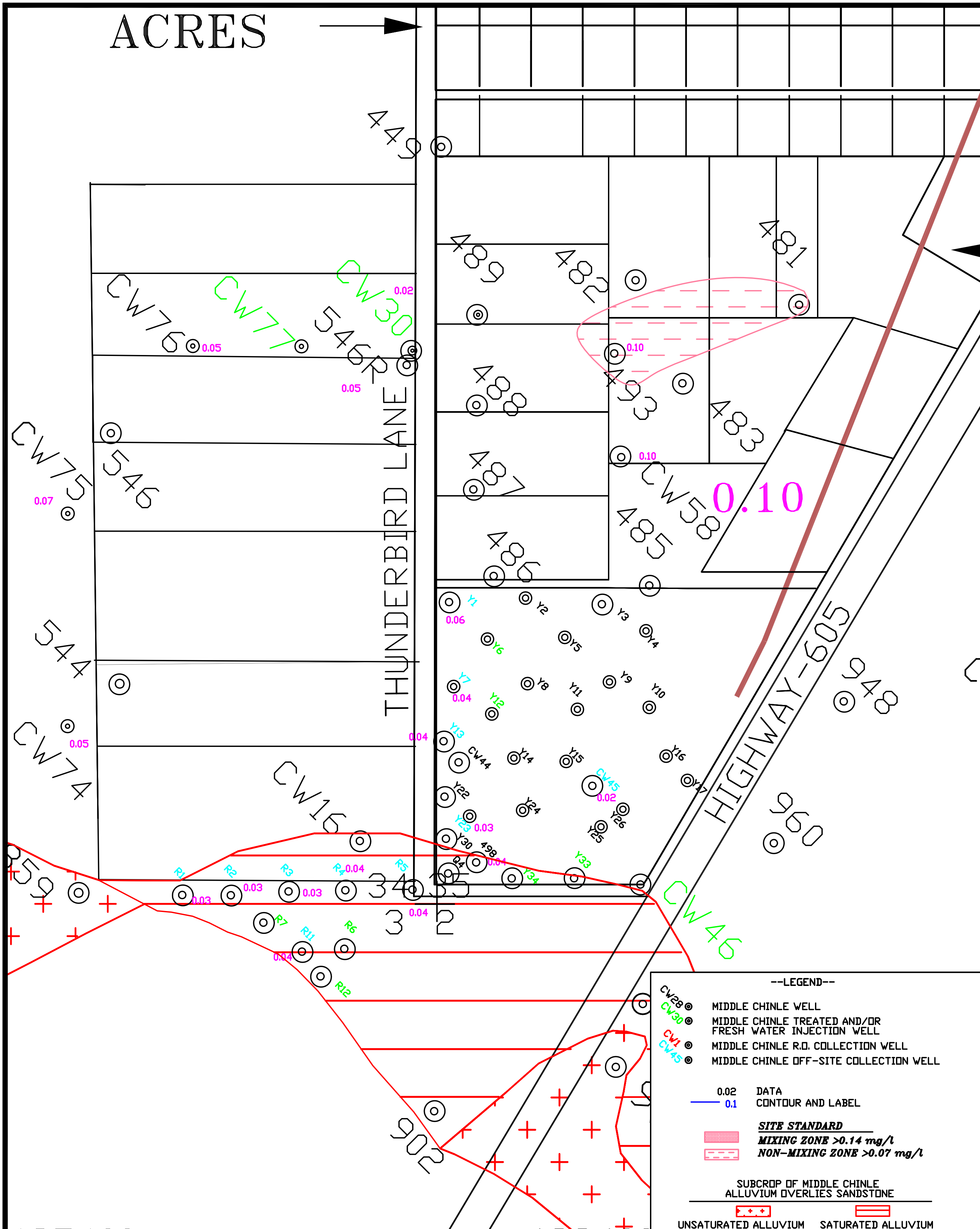


FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/2/18
FIGURE 6.3–14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l	SCALE: 1"=1600'
	PAGE: 6.3–33



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 2/26/18**
FIGURE 6.3-14A. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2017, mg/l	**SCALE: 1"=500'**
	PAGE: 6.3-34

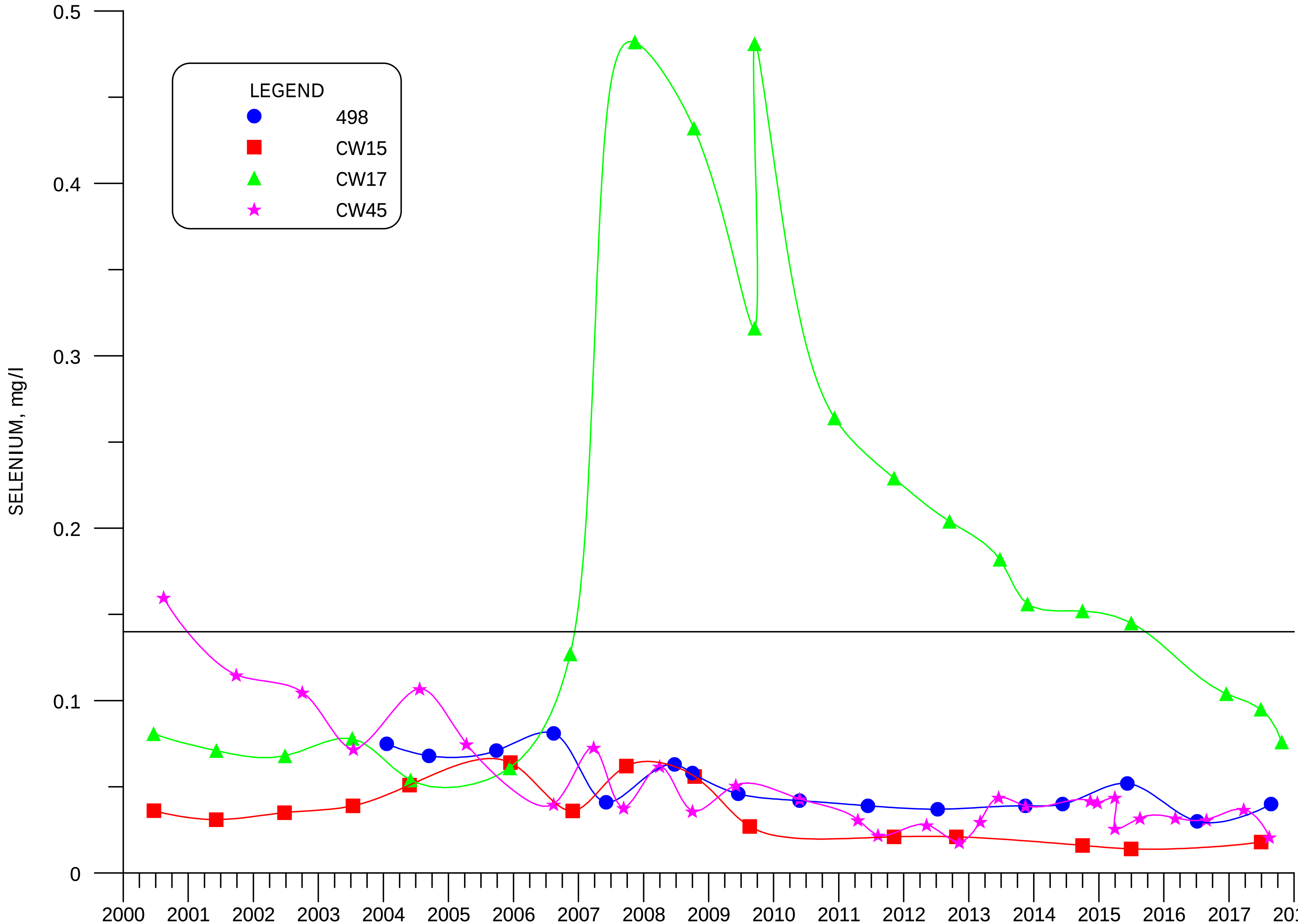


FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

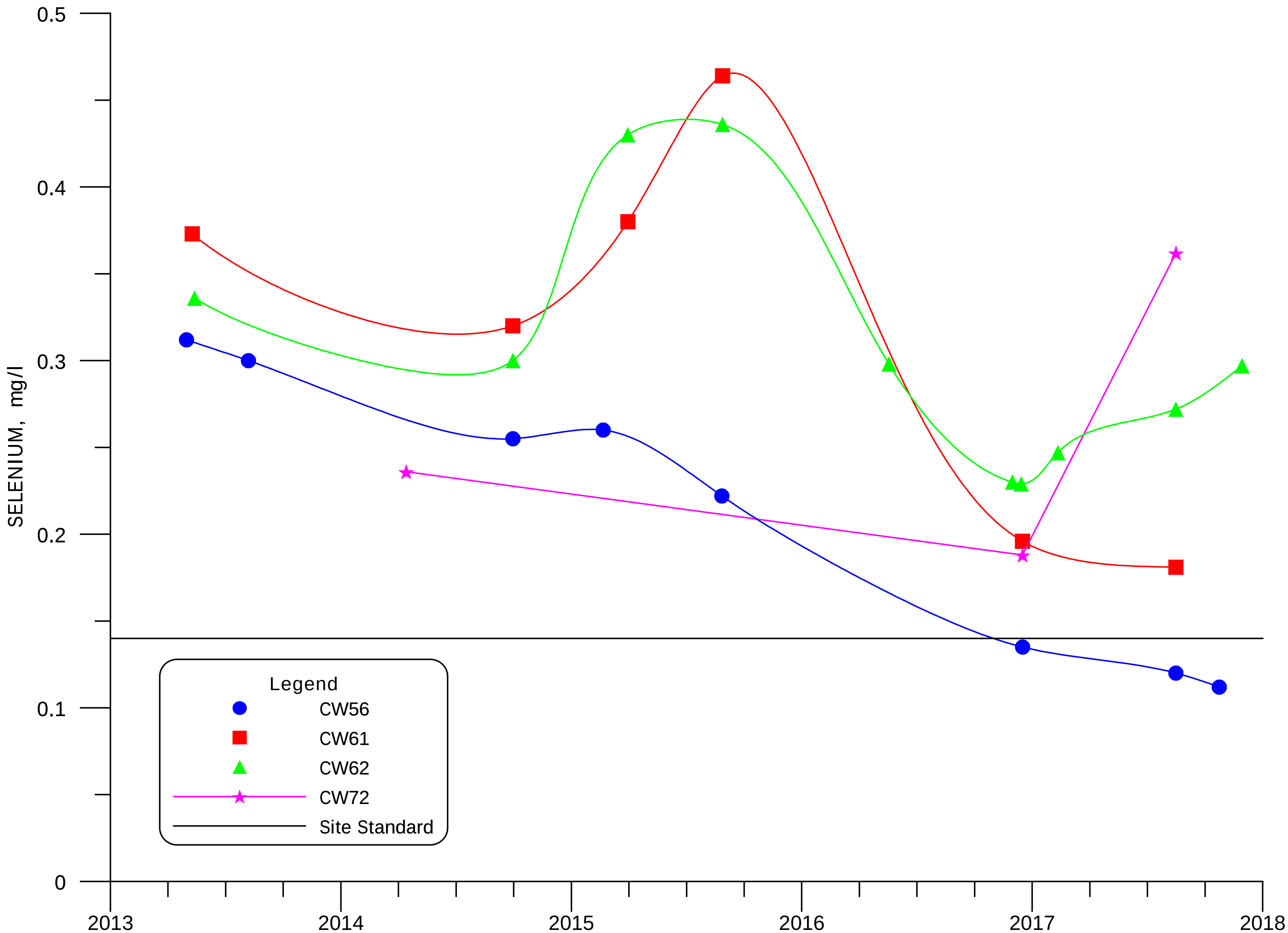


FIGURE 6.3-15A. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

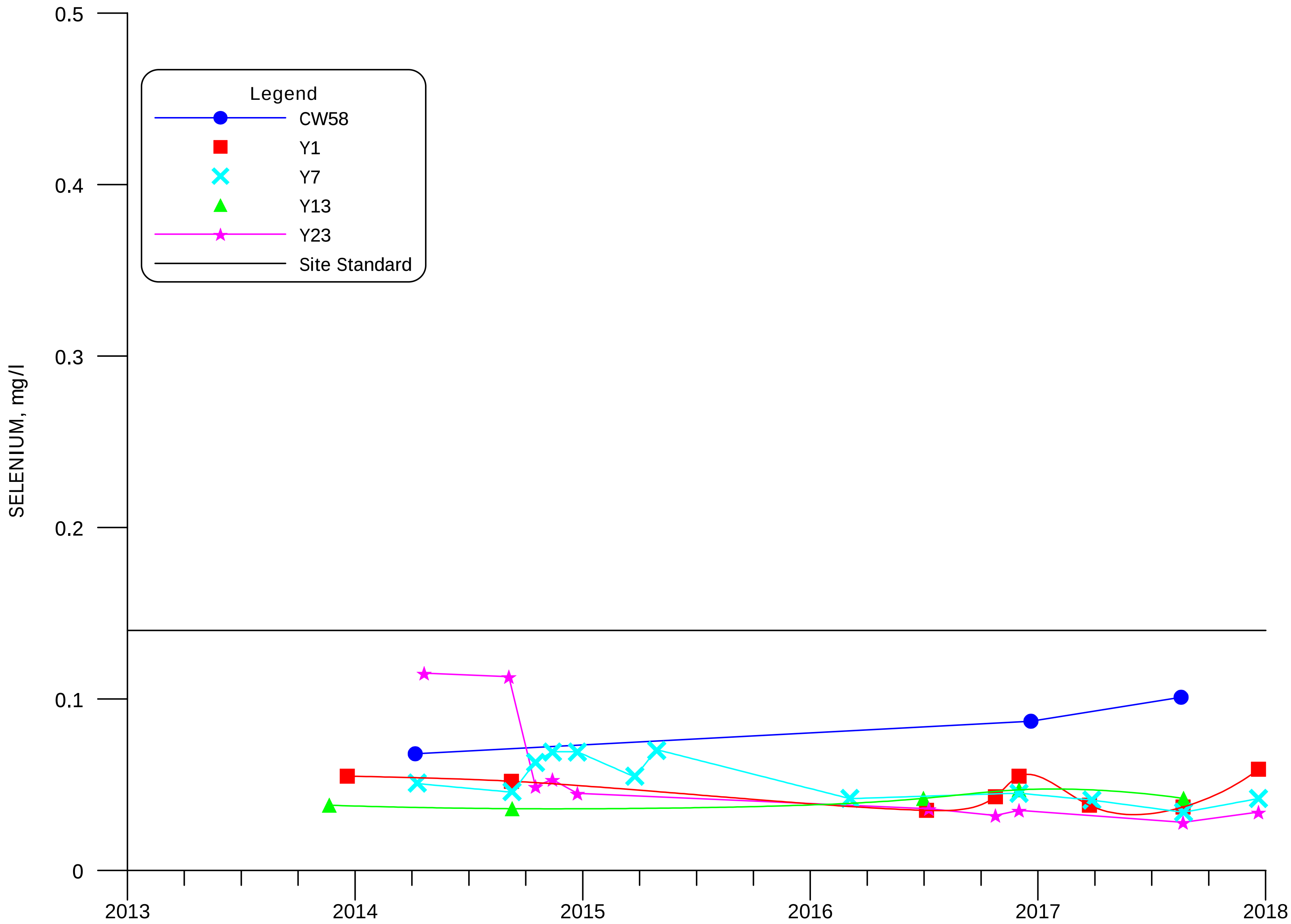


FIGURE 6.3-15B. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

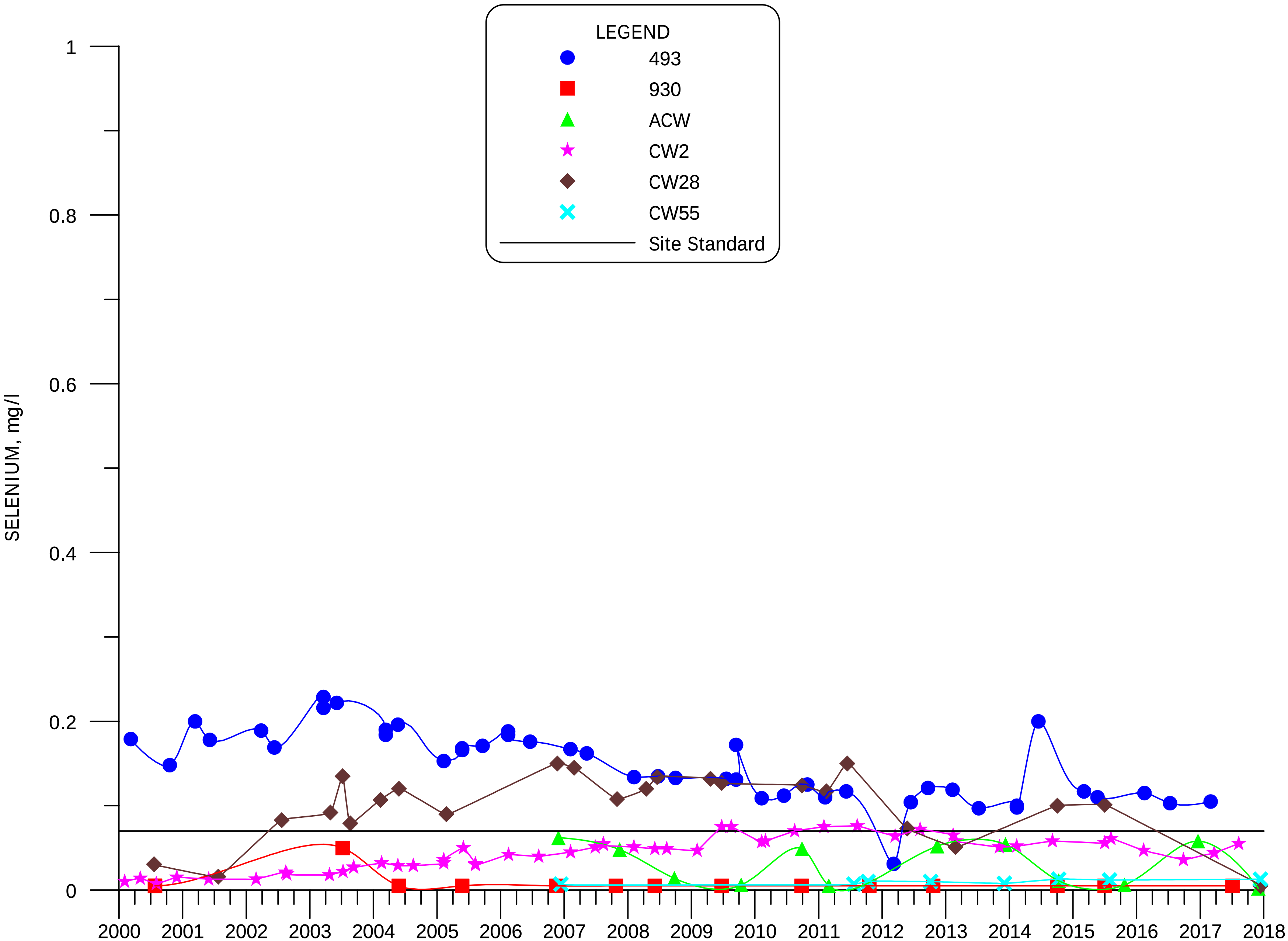
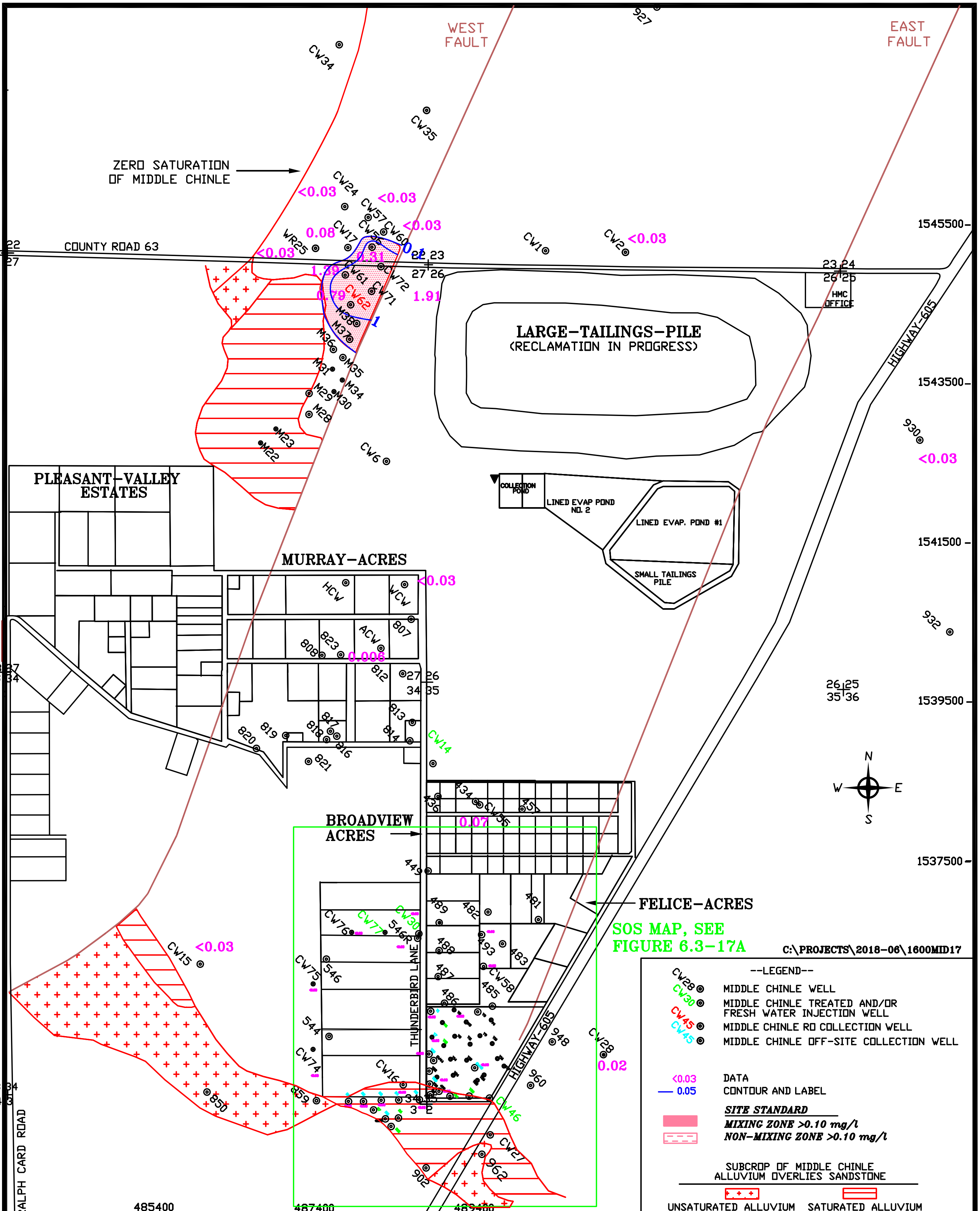


FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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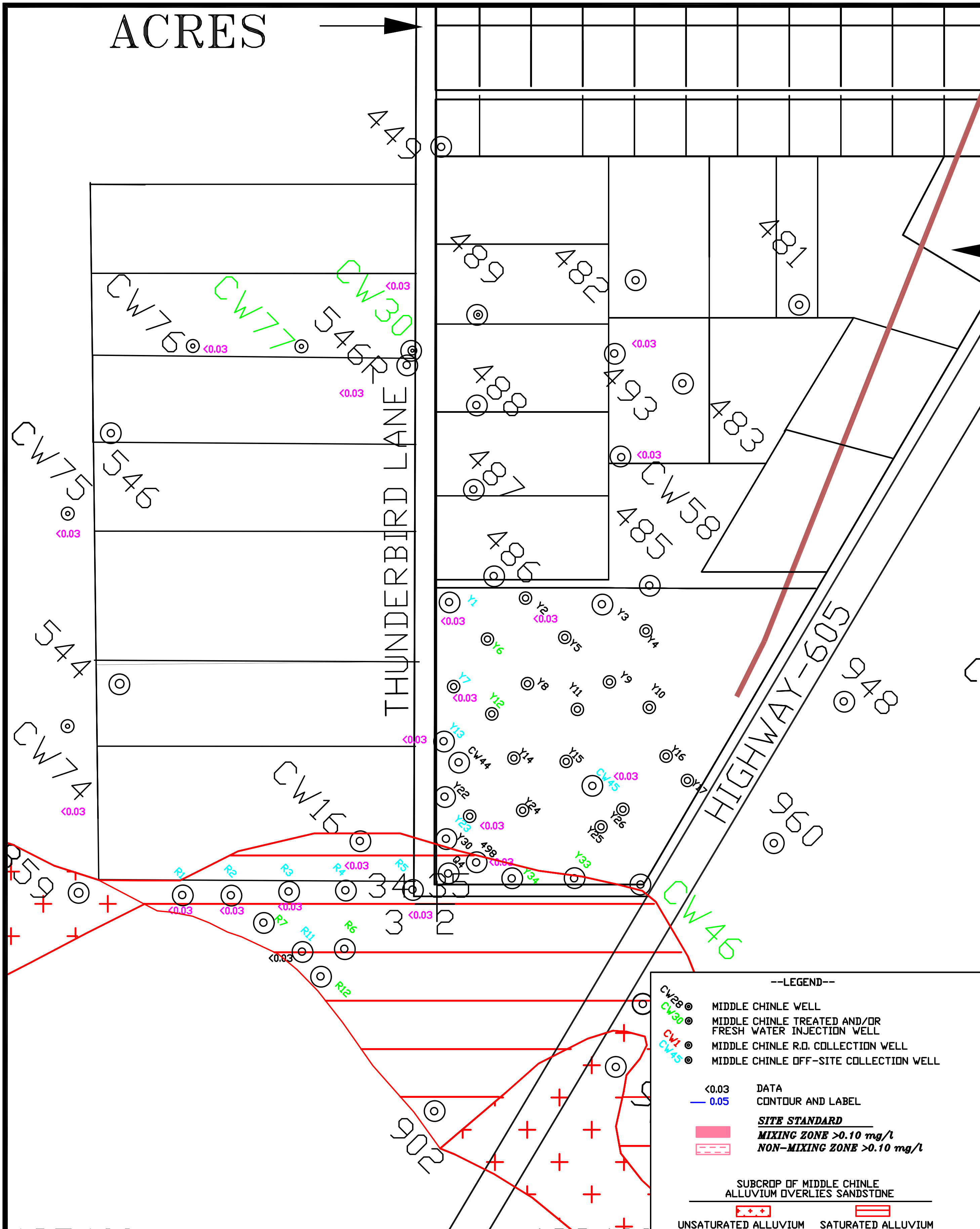
SCALE: 1"=1600'

FIGURE 6.3-17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-17A. MOLYBDENUM OF THE MIDDLE CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/26/18

SCALE: 1"=500'

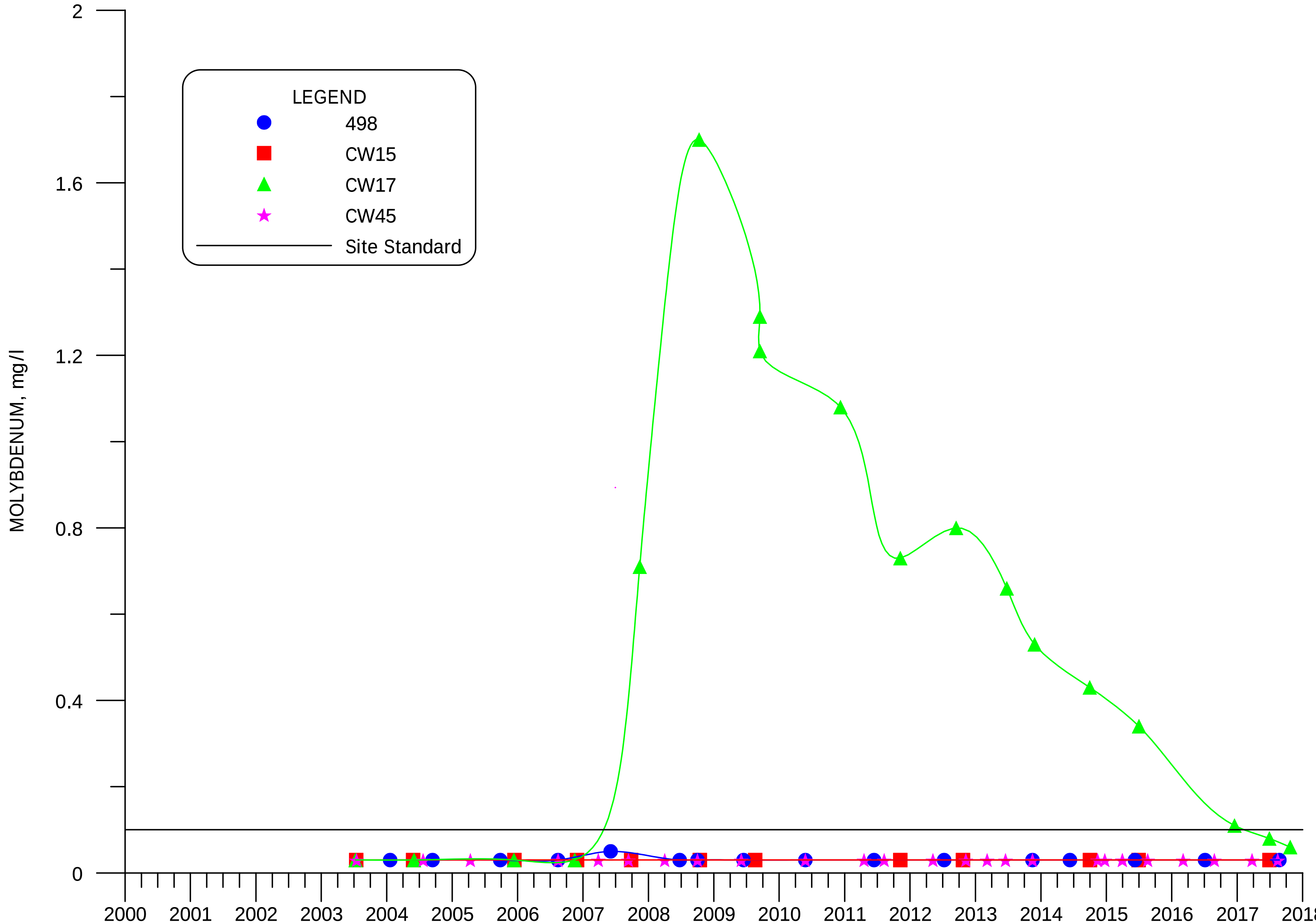


FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17 AND CW45

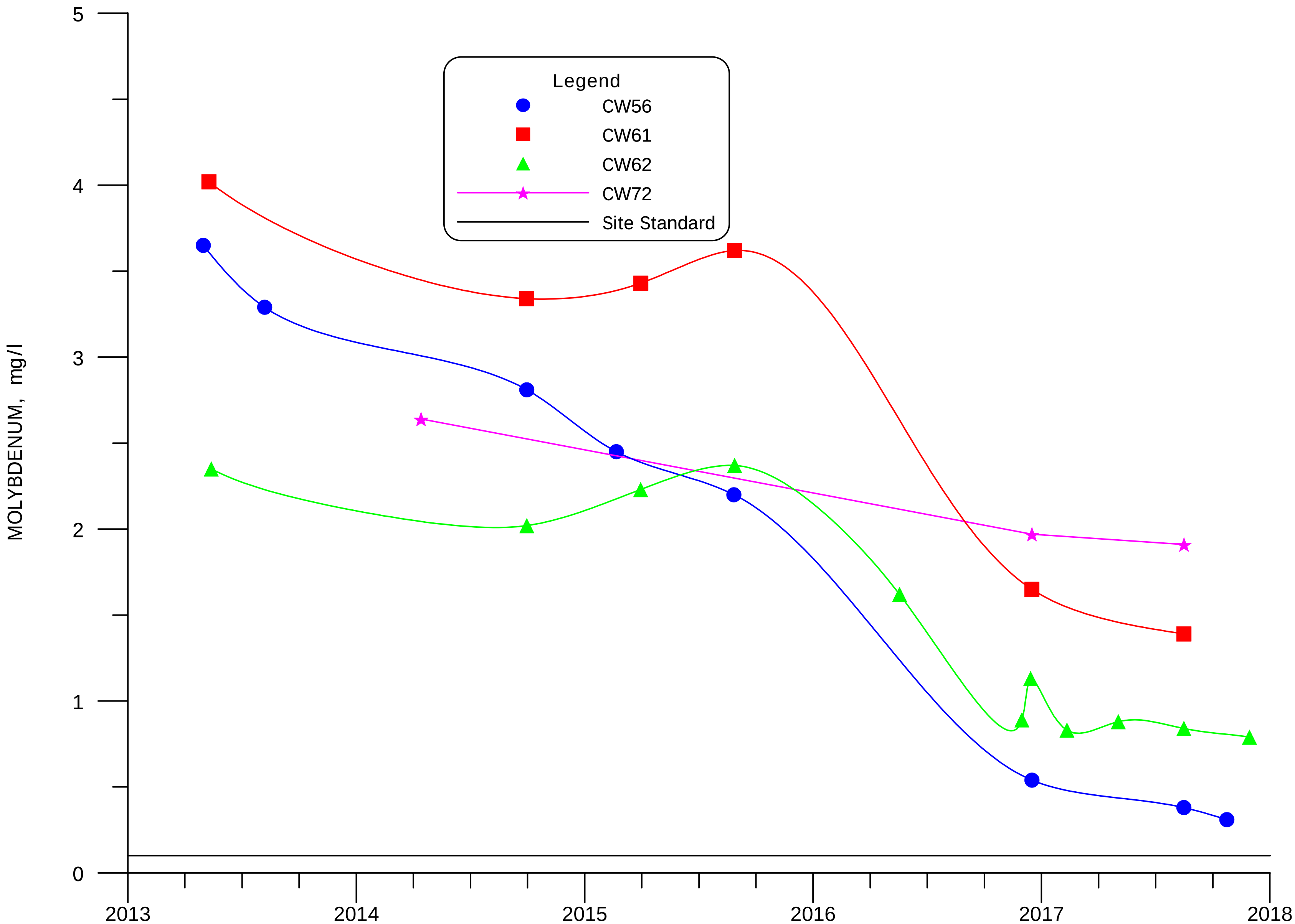


FIGURE 6.3-18A. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

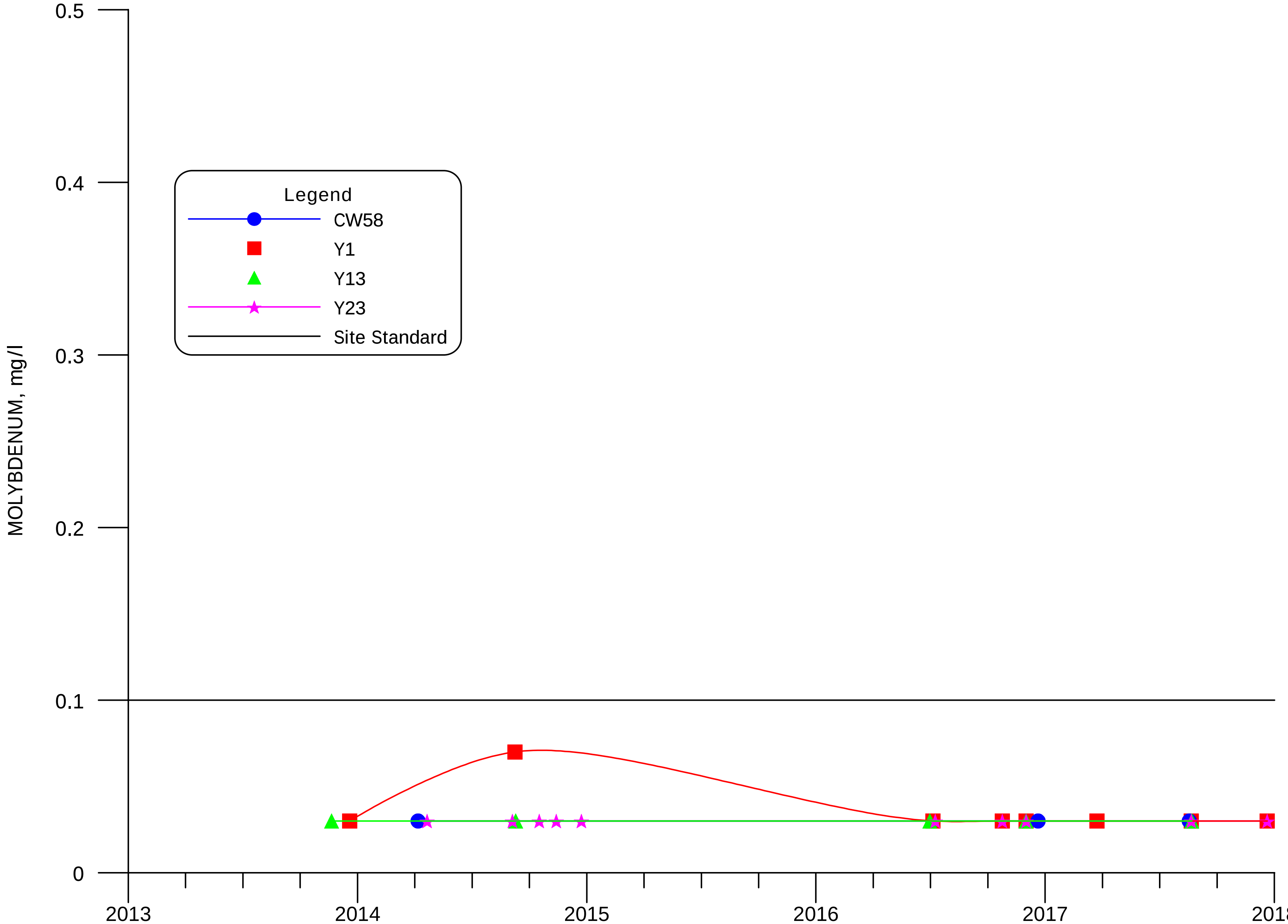


FIGURE 6.3-18B. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y13 AND Y23

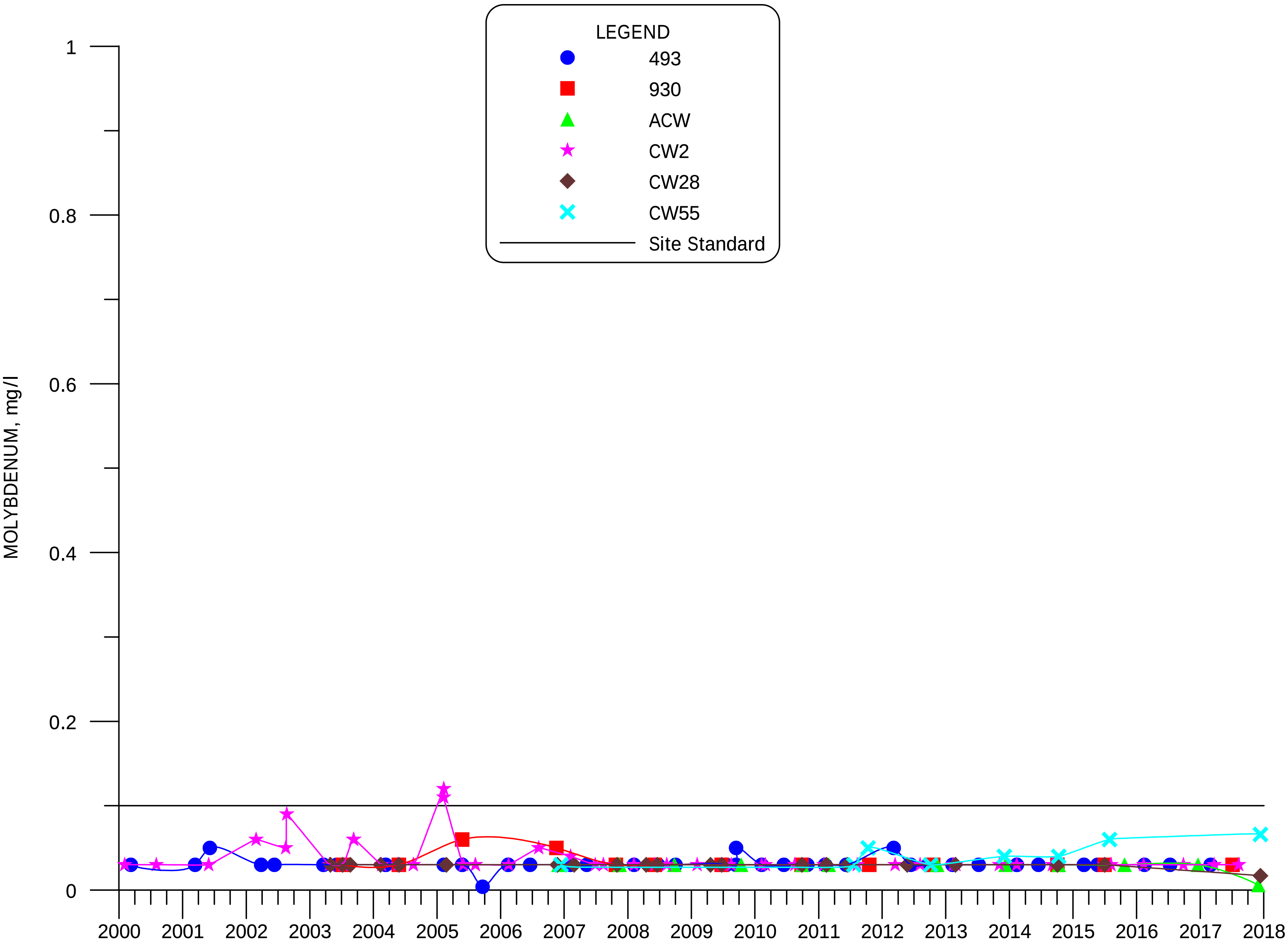
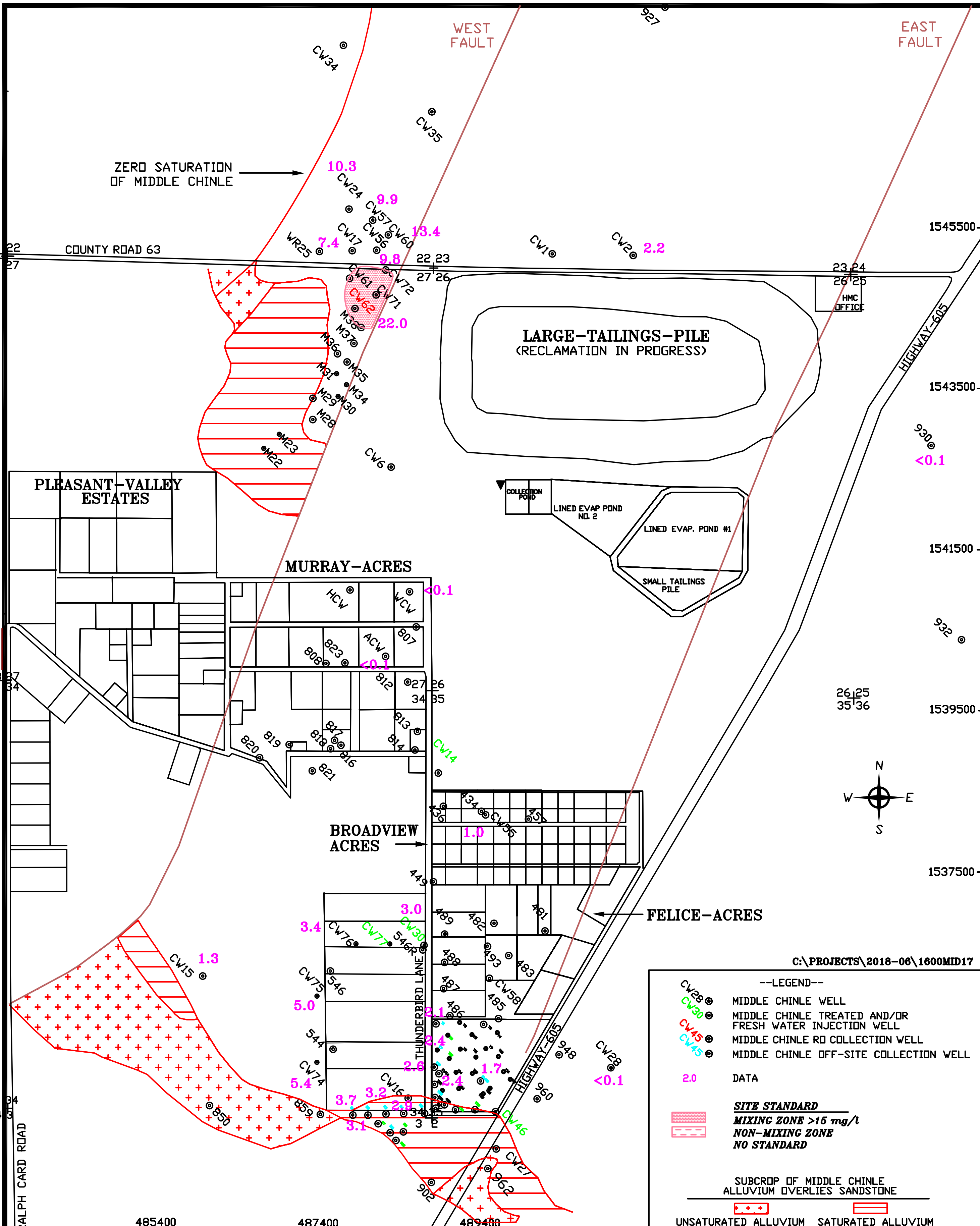


FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-20. NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2017, mg/l

DATE: 3/2/18

SCALE: 1"=1600'

PAGE: 6.3-45

SECTION 7

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

SECTION 7

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

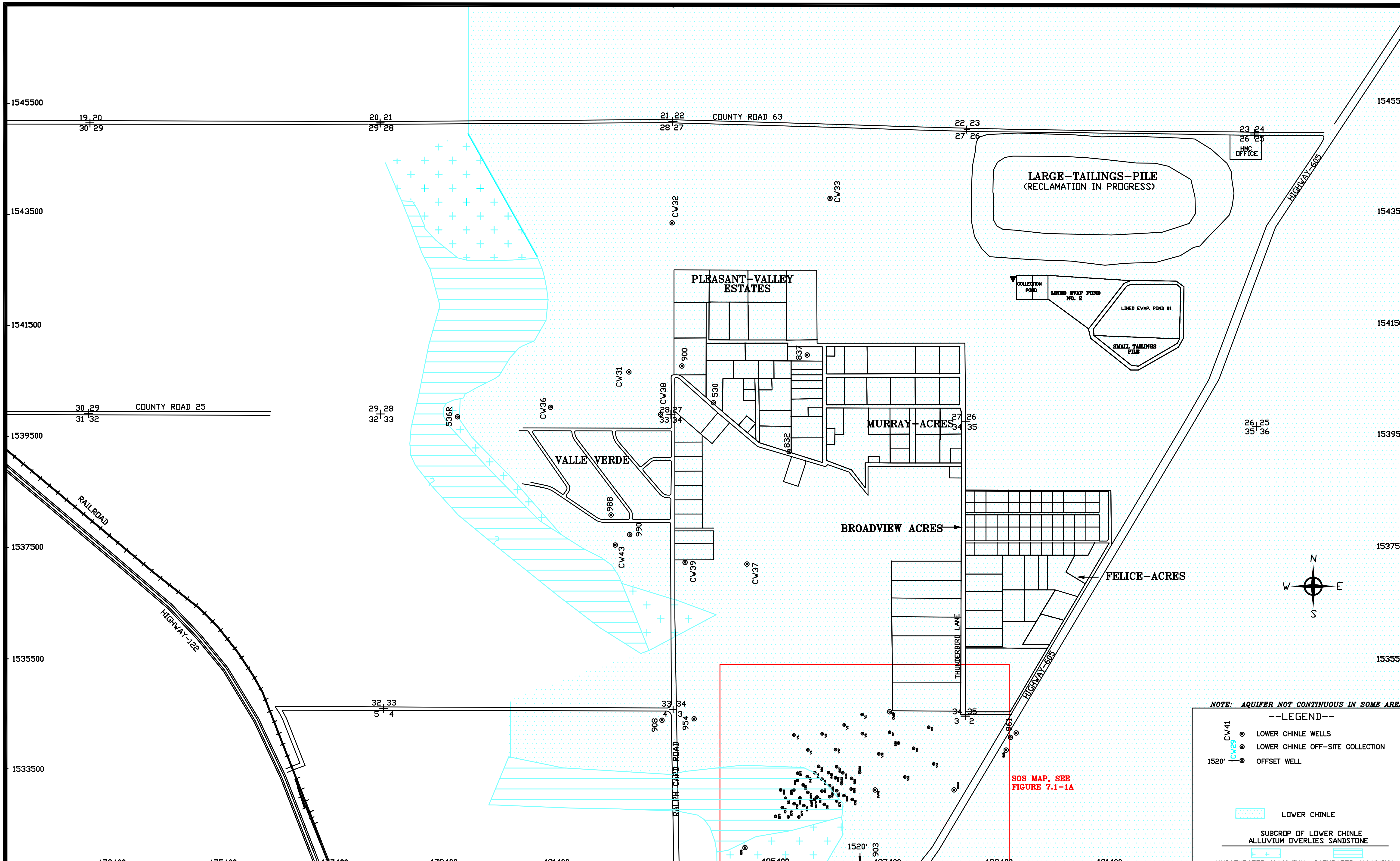
Page Number

7.0 LOWER CHINLE AQUIFER MONITORING

7.1 LOWER CHINLE WELL COMPLETION

The Lower Chinle aquifer is a permeable zone in the Chinle shale which exists below the Middle Chinle sandstone and above the San Andres aquifer. The Lower Chinle aquifer becomes important west and southwest of the Homestake Grants Project area where this unit is present at shallower depths. The general permeability of the Lower Chinle aquifer can vary dramatically, because the transmitting ability of this aquifer depends on the presence of fractured or altered shale that provides secondary permeability. Tables 5.1-1 through 5.1-4 present the Lower Chinle basic well data along with the other Chinle aquifer wells.

Wells that are completed in the Lower Chinle aquifer are shown on Figures 7.1-1 and 7.1-1A. Chinle shale exists above the top of the Lower Chinle aquifer in the area with the dot pattern. This figure also shows the location of the Lower Chinle aquifer subcrop underlying the alluvium. The cyan horizontal hatched pattern shows where the alluvium is saturated in the subcrop area, while the plus-sign pattern shows where the alluvium is not saturated in the subcrop area. No new Lower Chinle wells were drilled in 2017 and no Lower Chinle wells were used for south collection in 2017.



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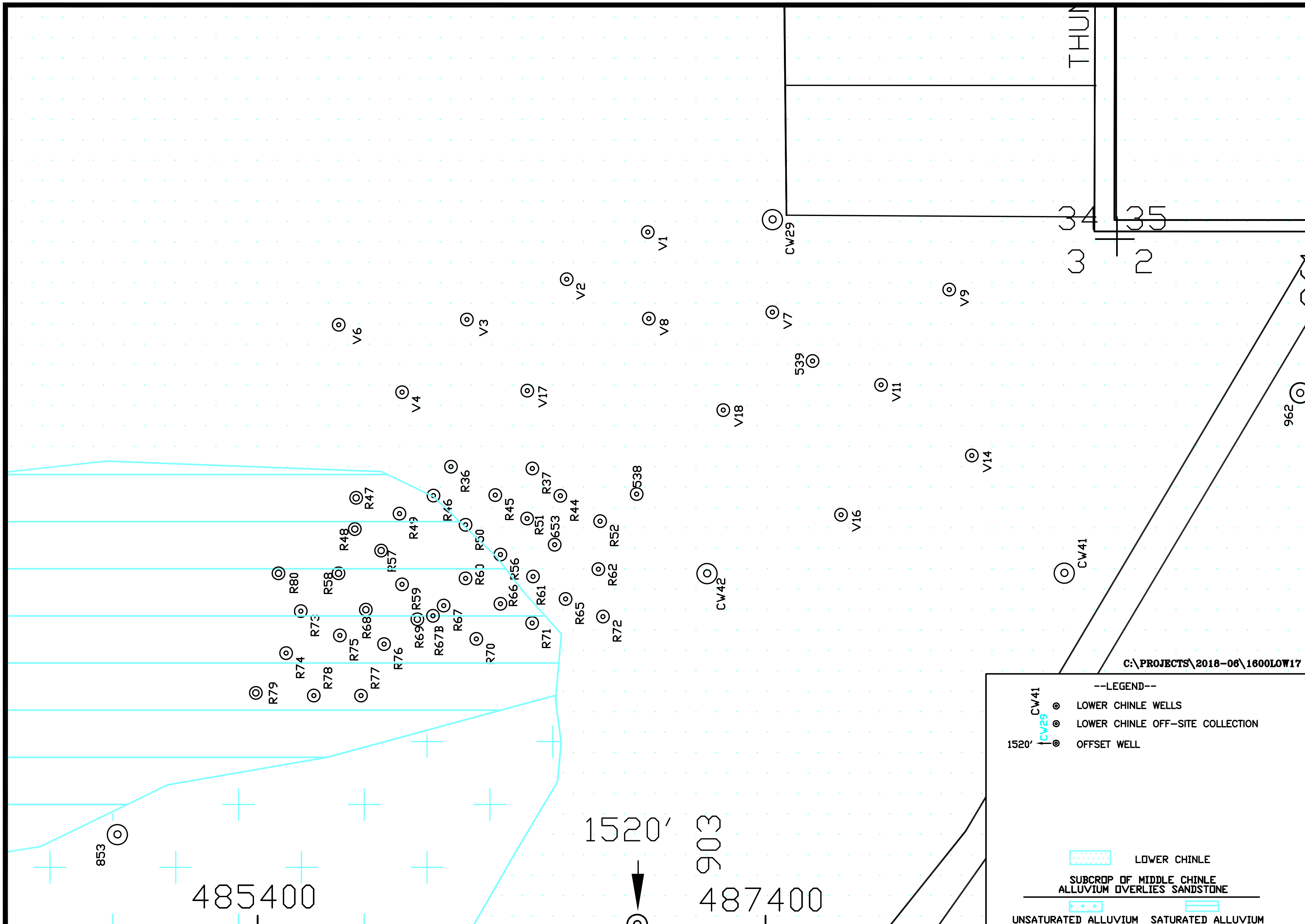
DATE: 1/19/2018

FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, 2017



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.1-1A. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2017

DATE: 2/6/2018

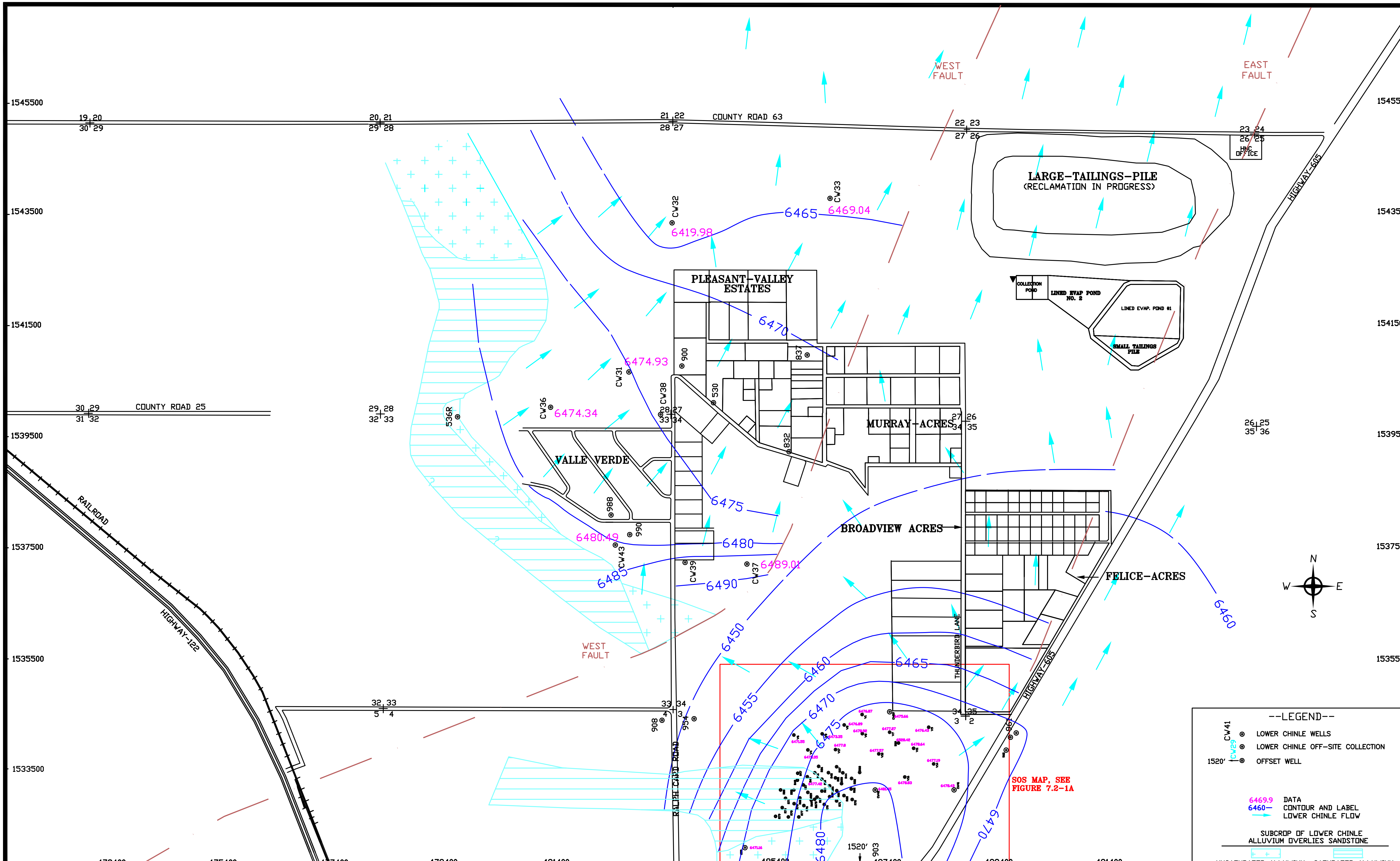
SCALE: 1"=500'

PAGE: 7.1-3

7.2 LOWER CHINLE WATER LEVELS

Water-level elevations in the Lower Chinle wells are presented along with the data for the Upper and Middle Chinle wells in Appendix A. Figures 7.2-1 and 7.2-1A presents water-level elevations in the Lower Chinle wells and the fall of 2017 water-level elevation contours. The West and East Faults are also shown on Figure 7.2-1. The approximate alluvial-Lower Chinle subcrop areas are also shown on this figure. Flow west of the West Fault in the Lower Chinle is mainly to the northeast. Flow between the two faults is to the northeast in the area of the tailings. The flow is to the northwest in the southern portion of the Lower Chinle aquifer between the faults. The northwesterly flow direction in this area indicates that the Lower Chinle water moves across the West Fault in the area west of Broadview Acres. The highest water-level elevations in Section 3 are in or near the subcrop area of the Lower Chinle showing that the alluvial aquifer is recharging the Lower Chinle aquifer in this area.

The Lower Chinle wells for which water-level time plots were prepared are shown on Figure 7.2-2. Water levels are presented for Lower Chinle wells 853, CW29, CW41, CW42 and V9 on Figure 7.2-3. Figure 7.2-4 presents water-level elevations versus time for Lower Chinle wells CW31, CW32, CW33, CW36, CW37 and CW43 (see Figure 7.2-2 for location of these wells).



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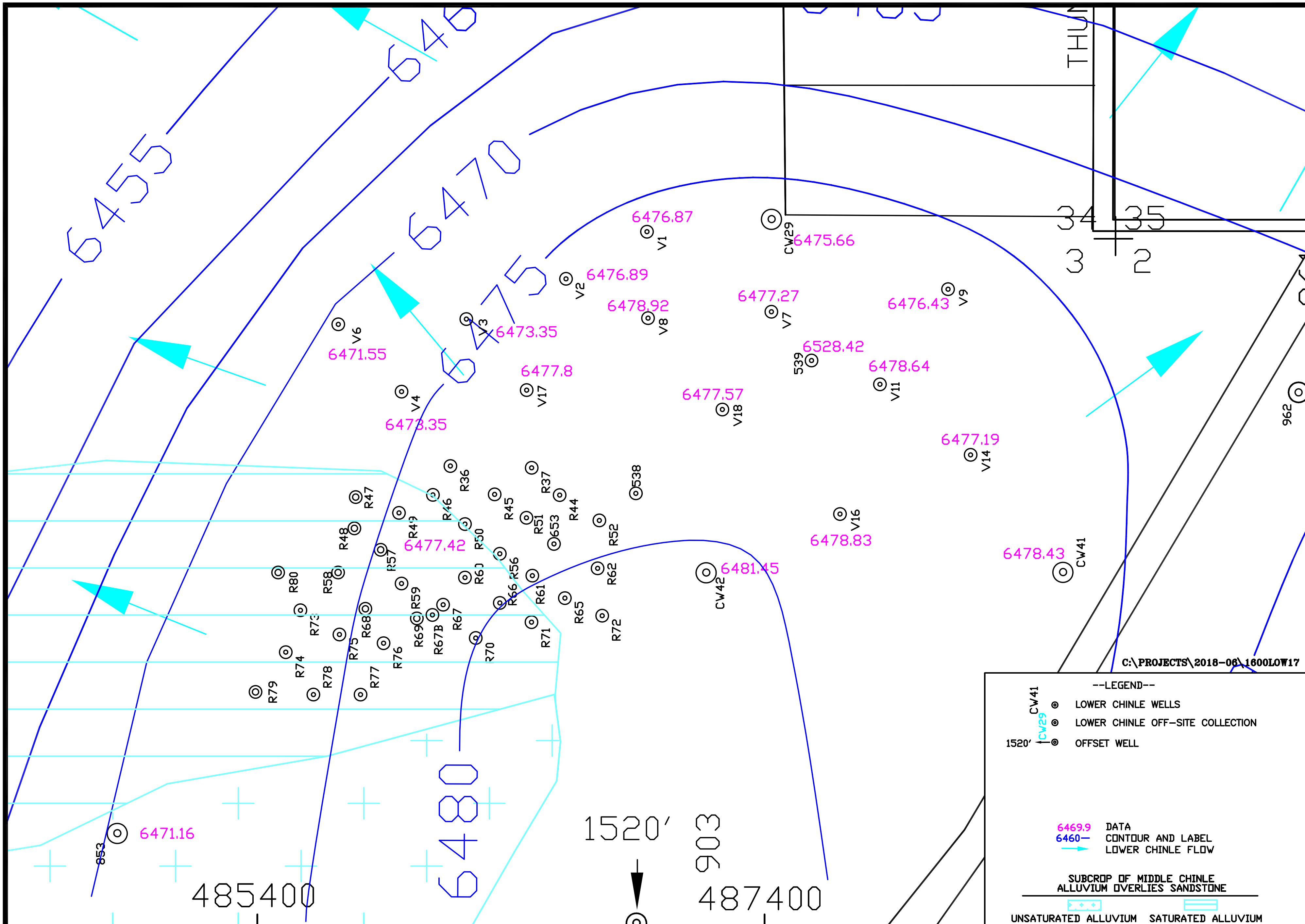
DATE: 1/19/2018

FIGURE 7.2-1 WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, 2017, FT-MSL



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.2-1A. WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2017, FT-MSL

DATE: 2/6/2018	
SCALE: 1"=500'	
PAGE: 7.2-3	

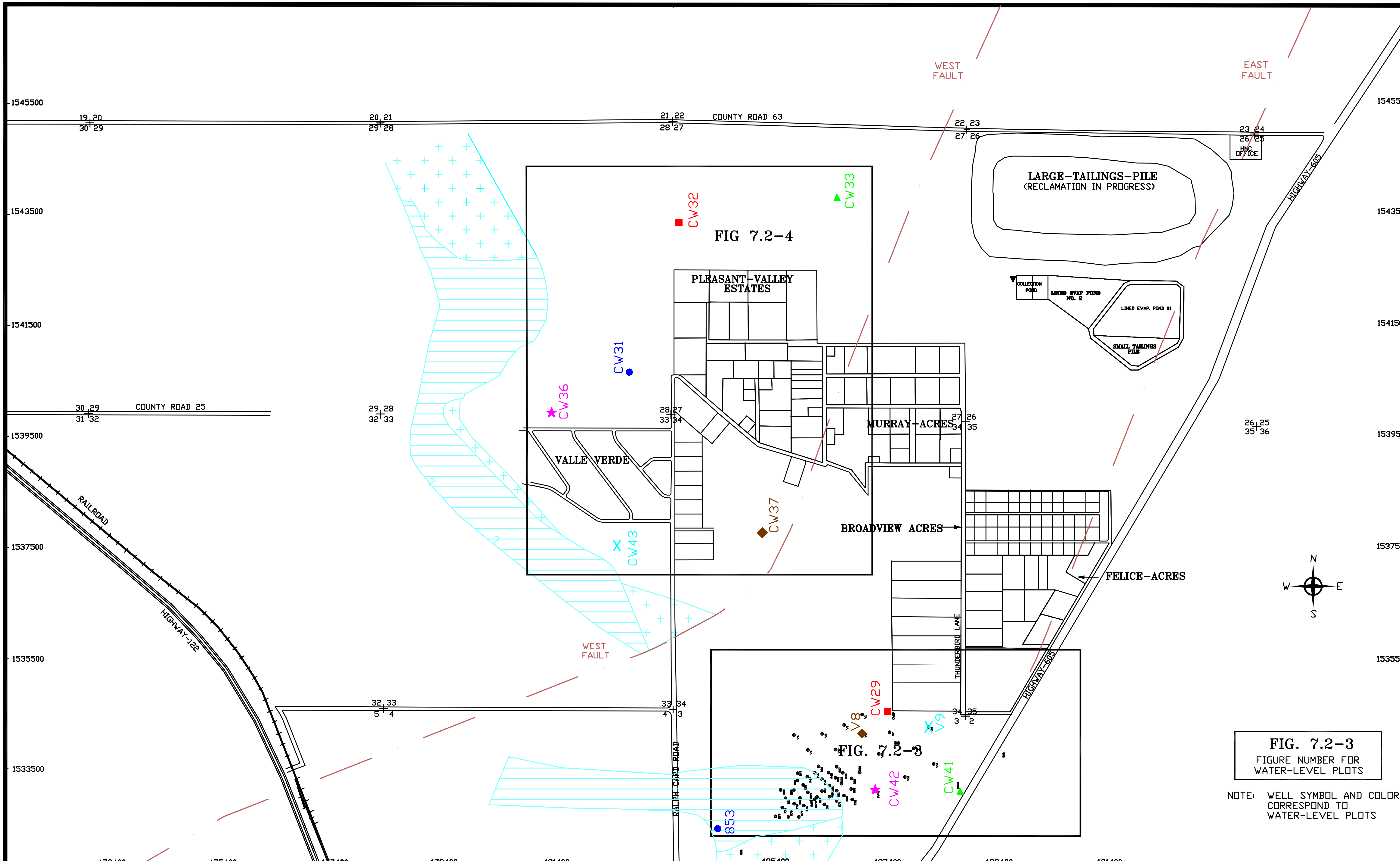


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FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2017

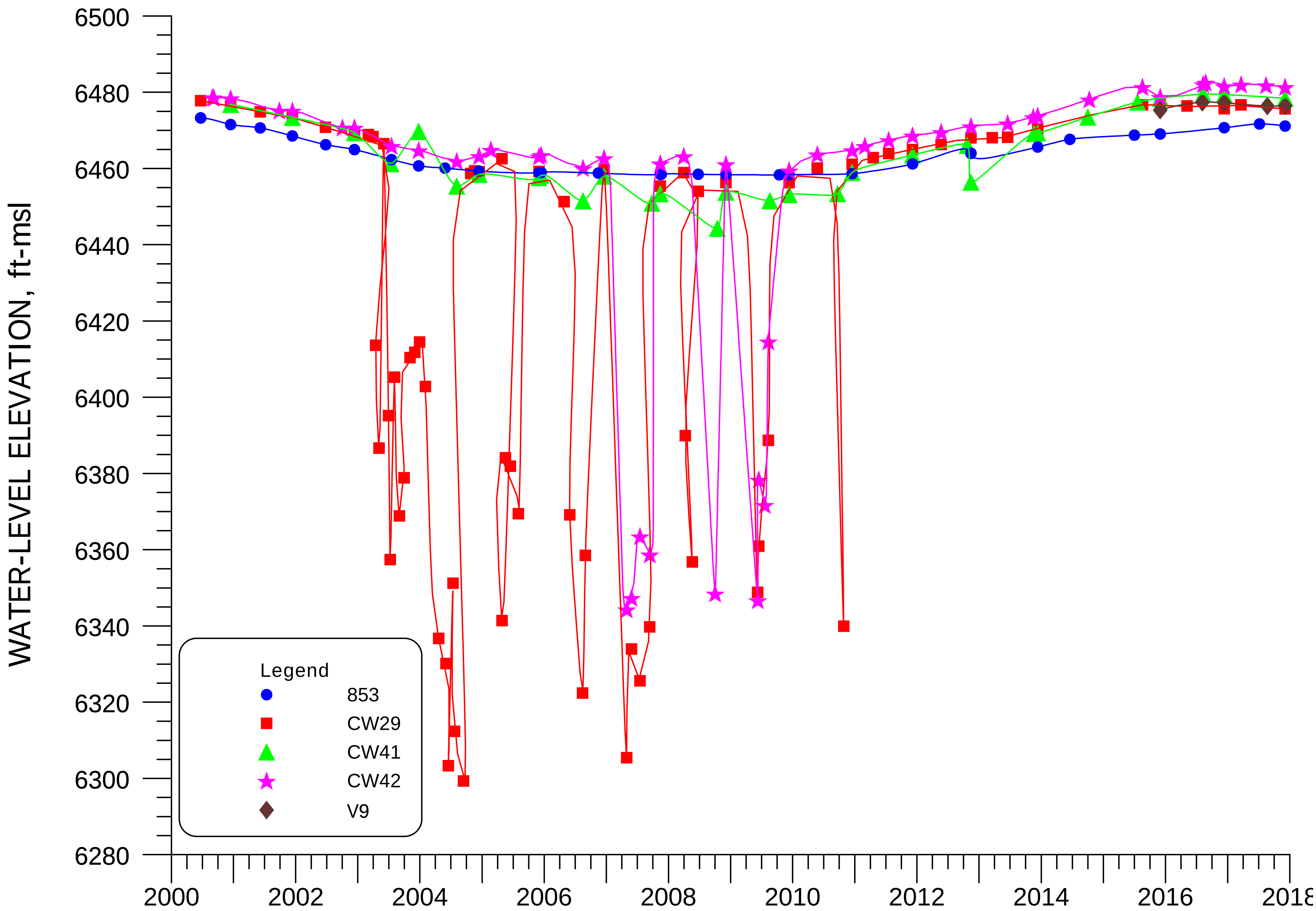

FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 853, CW29, CW41, CW42 AND V9.

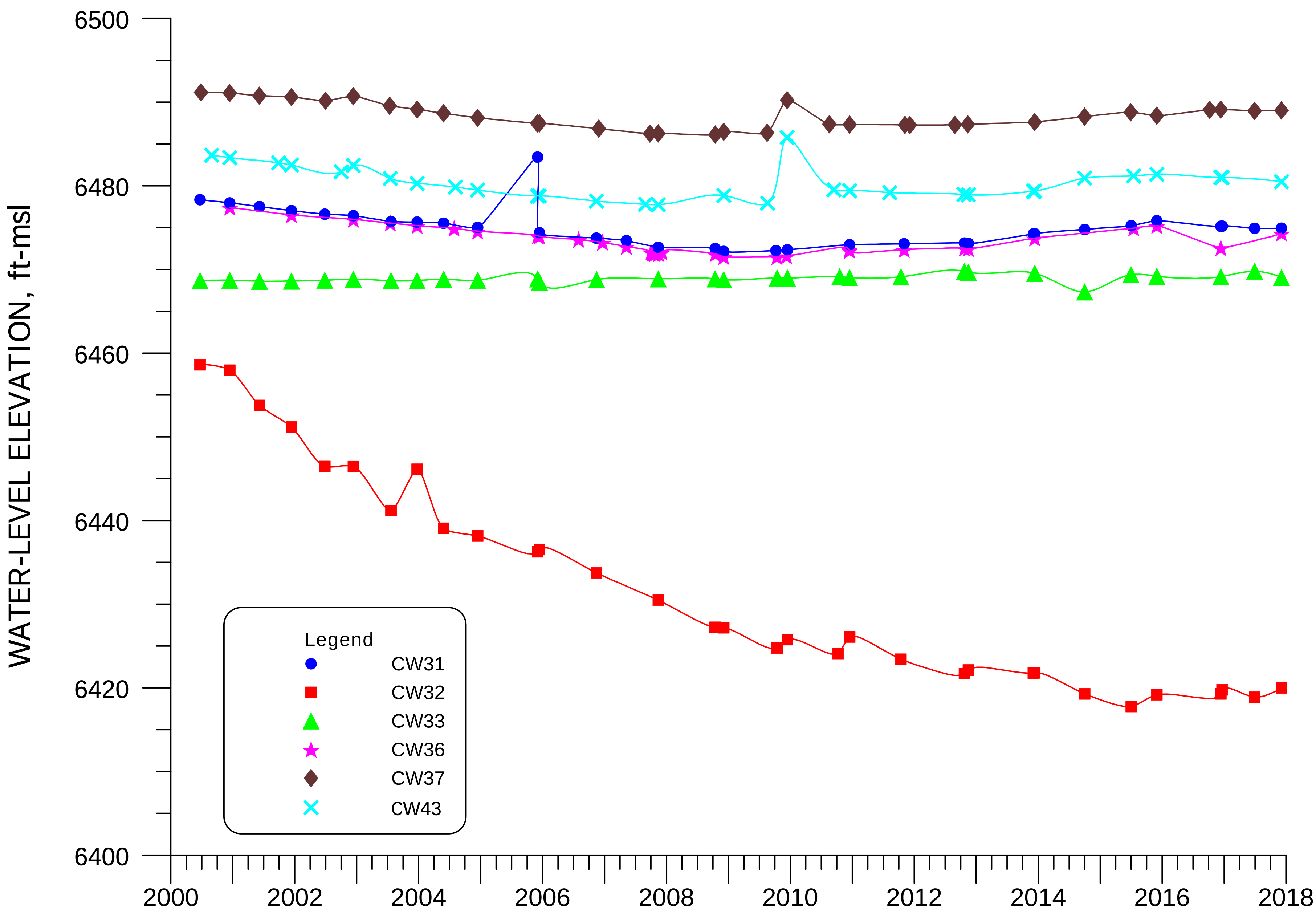

FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW36, CW37, AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2017 for the Lower Chinle aquifer are presented in Tables B.5-1 and B.5-2 of Appendix B along with water-quality data for the other Chinle aquifer wells. The basic well data presented in Tables 5.1-1 through 5.1-4, and the orientation of the well name on Figure 5.1-1 indicates which of the Chinle wells are completed in the Lower Chinle.

Constituent concentrations in the Lower Chinle aquifer exceed background conditions only in Section 3, except for some natural exceedances in the far down-gradient wells. Sulfate concentrations in the Lower Chinle aquifer are within the NRC standards except in far down-gradient where concentrations exceed the relevant non-mixing background value. Uranium concentrations exceed the NRC site standards only in the northeastern and central portions of Section 3 and the southern portion of Section 34. Molybdenum concentrations in the Lower Chinle aquifer are all less than the limit of detection.

7.3.1 SULFATE – LOWER CHINLE

Figures 7.3-1 and 7.3-1A presents contours of sulfate concentrations in the Lower Chinle aquifer during 2017. Lower Chinle standards based on background data are presented for sulfate in the legend of Figures 7.3-1 and 7.3-1A. None of the Lower Chinle concentrations in the mixing zone (see Section 3 and Figure 3.3-3 for zone areas) exceeded the mixing-zone sulfate site standard of 1750 mg/l. Therefore, the Lower Chinle aquifer does not require any restoration with respect to sulfate.

The locations of wells used in the plots of water quality for the Lower Chinle are presented on Figure 7.3-2. Figure 7.3-2 shows that data for mixing zone Lower Chinle wells CW36, CW37, CW42, CW43 and V2 are grouped together on the water-quality time plots, and data for non-mixing zone wells CW29, CW31, CW32, CW33 and CW41 are presented on a second plot. Well V2 was included with the mixing zone wells because it has a high calcium concentration. Figure 7.3-3 presents sulfate concentrations plotted versus time for the Lower Chinle mixing-zone wells. Sulfate concentrations plotted for Lower Chinle wells CW29, CW31, CW32, CW33 and CW41 are presented on Figure 7.3-4 (see Figure 7.3-2 for location of these wells) with the non-mixing zone standard.

7.3.2 TOTAL DISSOLVED SOLIDS – LOWER CHINLE

Figures 7.3-5 and 7.3-5A presents the total dissolved solids (TDS) concentrations in the Lower Chinle aquifer during 2017. All concentrations for 2017 sampled wells are less than the non-mixing zone site standard value of 4140 mg/l. Concentrations are thought to naturally exceed this level farther down-gradient as shown by the cyan pattern. The TDS concentration naturally increases down-gradient due to the low permeability and correspondingly slow movement of water through this shale aquifer. All TDS concentrations on Figure 7.3-5A are less than the non-mixing zone standard of 3140 mg/l.

Figure 7.3-6 presents TDS concentrations for Lower Chinle wells CW36, CW37, CW42, CW43 and V2. TDS concentrations for wells CW29, CW31, CW32, CW33 and CW41 are presented on Figure 7.3-7.

7.3.3 CHLORIDE – LOWER CHINLE

Chloride concentration data in the Lower Chinle aquifer were updated during 2003 to confirm that restoration for this constituent is not necessary in the Lower Chinle aquifer. The chloride concentrations measured during 2017 continue to support this conclusion and are all less than the NRC standard except in the down gradient area where values naturally exceed the standard.

7.3.4 URANIUM – LOWER CHINLE

Uranium concentration in the Lower Chinle aquifer is an important constituent with respect to aquifer restoration in Section 3. Figures 7.3-8 and 7.3-8A presents the uranium concentrations in the Lower Chinle aquifer for 2017. Uranium concentrations in the Lower Chinle exceeded the mixing-zone background concentration in the central portion of Section 3, while seven wells exceeded the non-mixing zone background concentration. Uranium concentrations plotted versus time for Lower Chinle wells CW36, CW37, CW42, CW43 and V2 are presented on Figure 7.3-9. The overall decline in uranium concentration in well CW42 is due to pumping of Lower Chinle wells for the irrigation system. The uranium concentrations in all of the Lower Chinle non-mixing zone wells with data presented on Figure 7.3-10 have remained at low levels with higher values in well CW29.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2017 are presented on Figures 7.3-11 and 7.3-11A. None of the selenium concentrations in water from the Lower Chinle wells exceeded the site standards. The mixing and non-mixing zone site standards are 0.14 and 0.32 mg/l, respectively, for the Lower Chinle aquifer.

Figure 7.3-12 presents selenium concentration versus time plots for wells CW36, CW37, CW42, CW43 and V2. Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW29, CW31, CW32, CW33 and CW41.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2017 were all low at levels near the detection limit and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2017 results are consistent with historical measurements of molybdenum in the Lower Chinle aquifer. Molybdenum is not a constituent of concern in the Lower Chinle aquifer.

7.3.7 NITRATE – LOWER CHINLE

Nitrate monitoring of the Lower Chinle aquifer was updated in 2003 to confirm that concentrations remain significantly below the site standard of 15 mg/l for the mixing zone. Nitrate concentrations measured in 2017 are all significantly below the site standard and therefore a map of the nitrate values for the Lower Chinle was not developed.

Plots of nitrate concentrations versus time were not prepared, because historically, values measured in Lower Chinle wells contained very low concentrations, similar to those measured in 2017. Nitrate concentrations from the tailings seepage are not expected to be significant in the future and therefore the potential in the Lower Chinle aquifer does not exist due to the very limited extent of elevated concentrations in the alluvial aquifer.

7.3.8 RADIUM-226 AND RADIUM-228 – LOWER CHINLE

All radium concentrations have been low in past years in the Lower Chinle aquifer. Radium-226 and radium-228 are not important parameters relative to the Lower Chinle aquifer;

therefore, a site standard for the Lower Chinle has not been set. These low levels of radium do not warrant the development of a figure presenting areal distribution of radium. Radium-228 analysis is typically more erratic than other constituents but the available data shows that radium-226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the Homestake site.

7.3.9 VANADIUM - LOWER CHINLE

Vanadium concentrations have always been low in the Lower Chinle aquifer. Significant concentrations in the Lower Chinle aquifer would not be expected because concentrations of this constituent have only been slightly elevated in the alluvial aquifer near the tailings. Vanadium concentrations in the Lower Chinle aquifer have never been large enough to support consideration of this constituent for setting a site standard.

7.3.10 THORIUM-230 – LOWER CHINLE

Thorium-230 concentrations have never been significant in the Lower Chinle aquifer and, therefore, should be dropped from the Lower Chinle monitoring list and eliminated from consideration as a Lower Chinle standard. No plots of thorium-230 concentrations with time were prepared, because concentrations have historically been low.

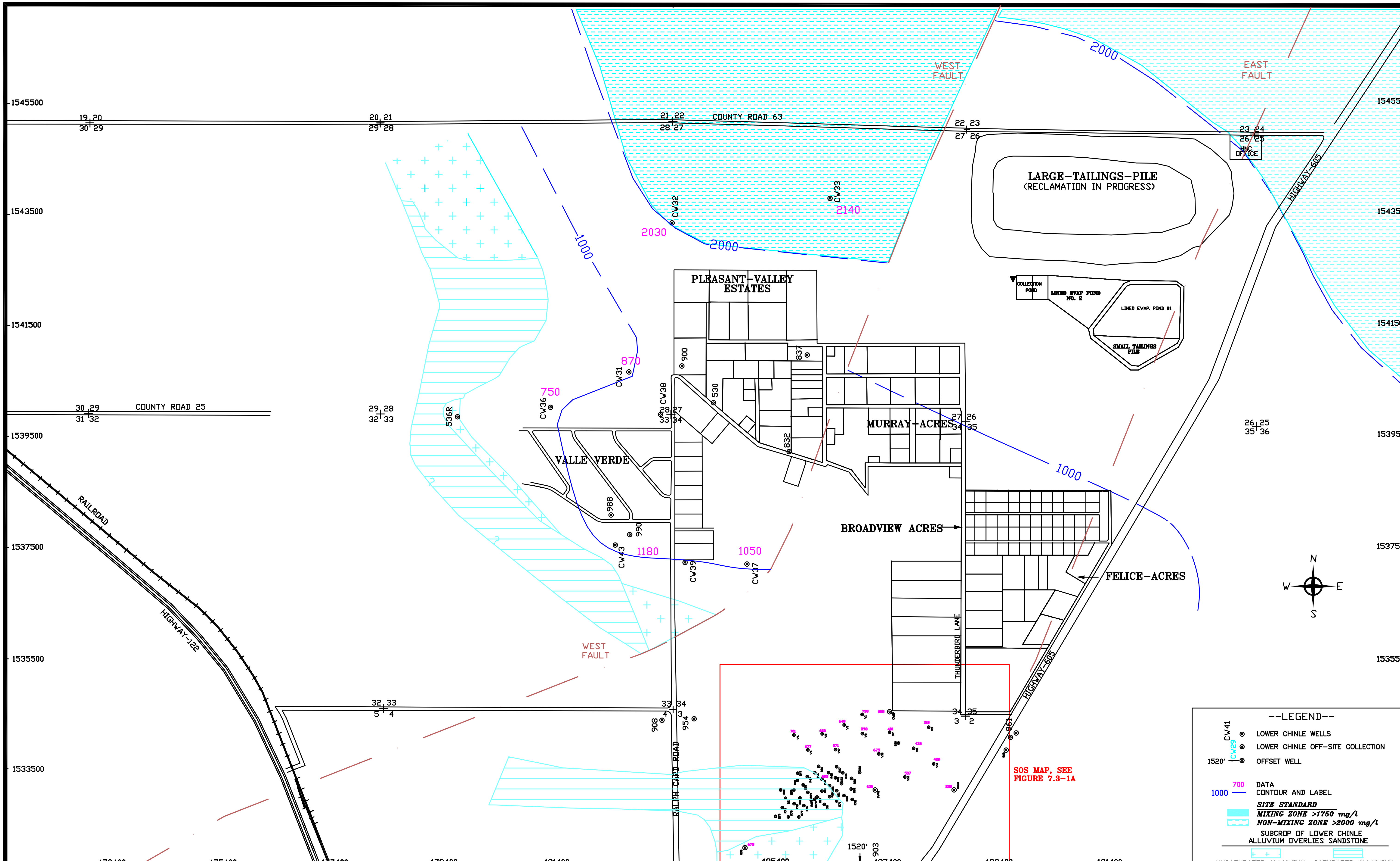

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FIGURE 7.3–1 SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2017, mg/l

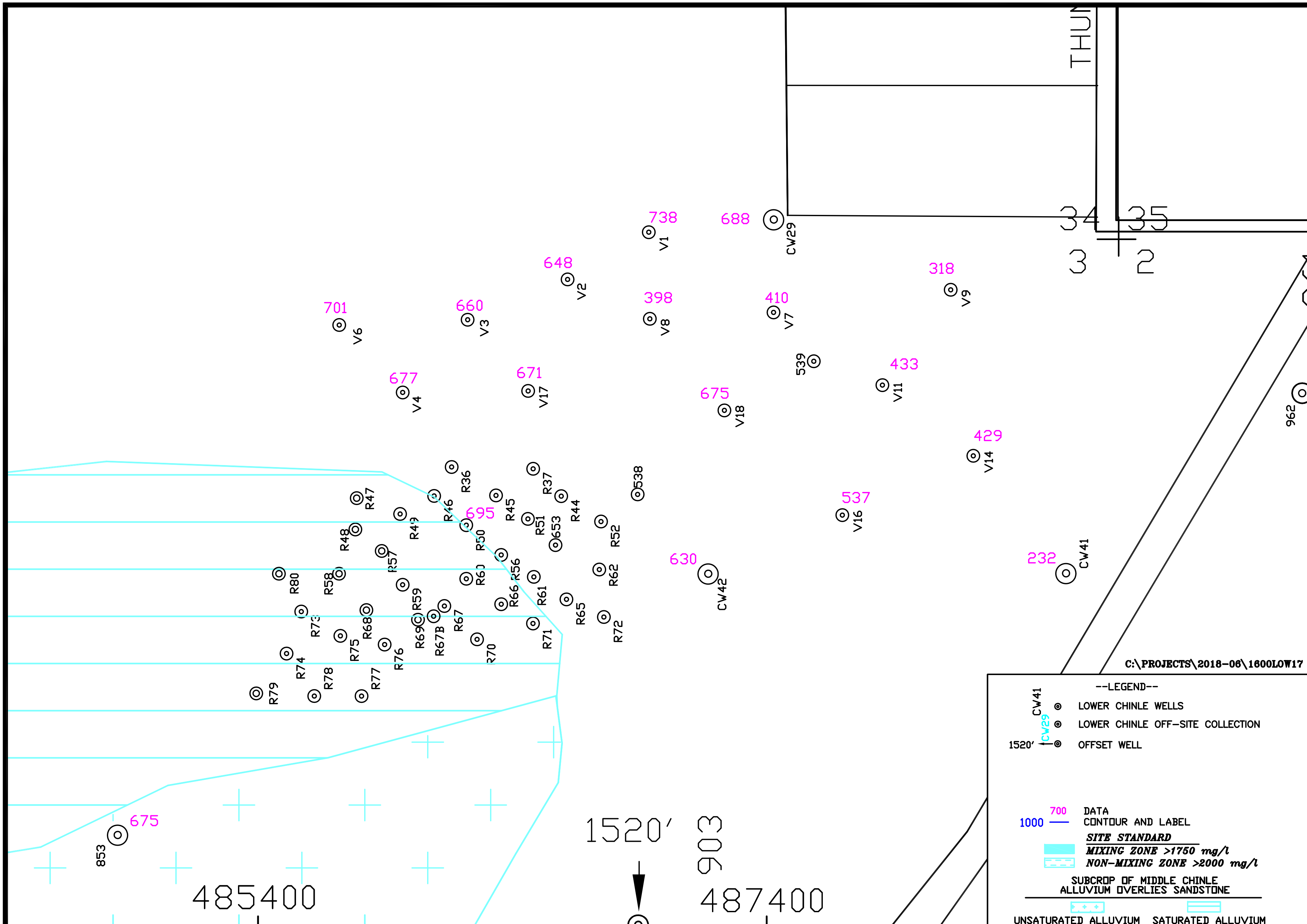

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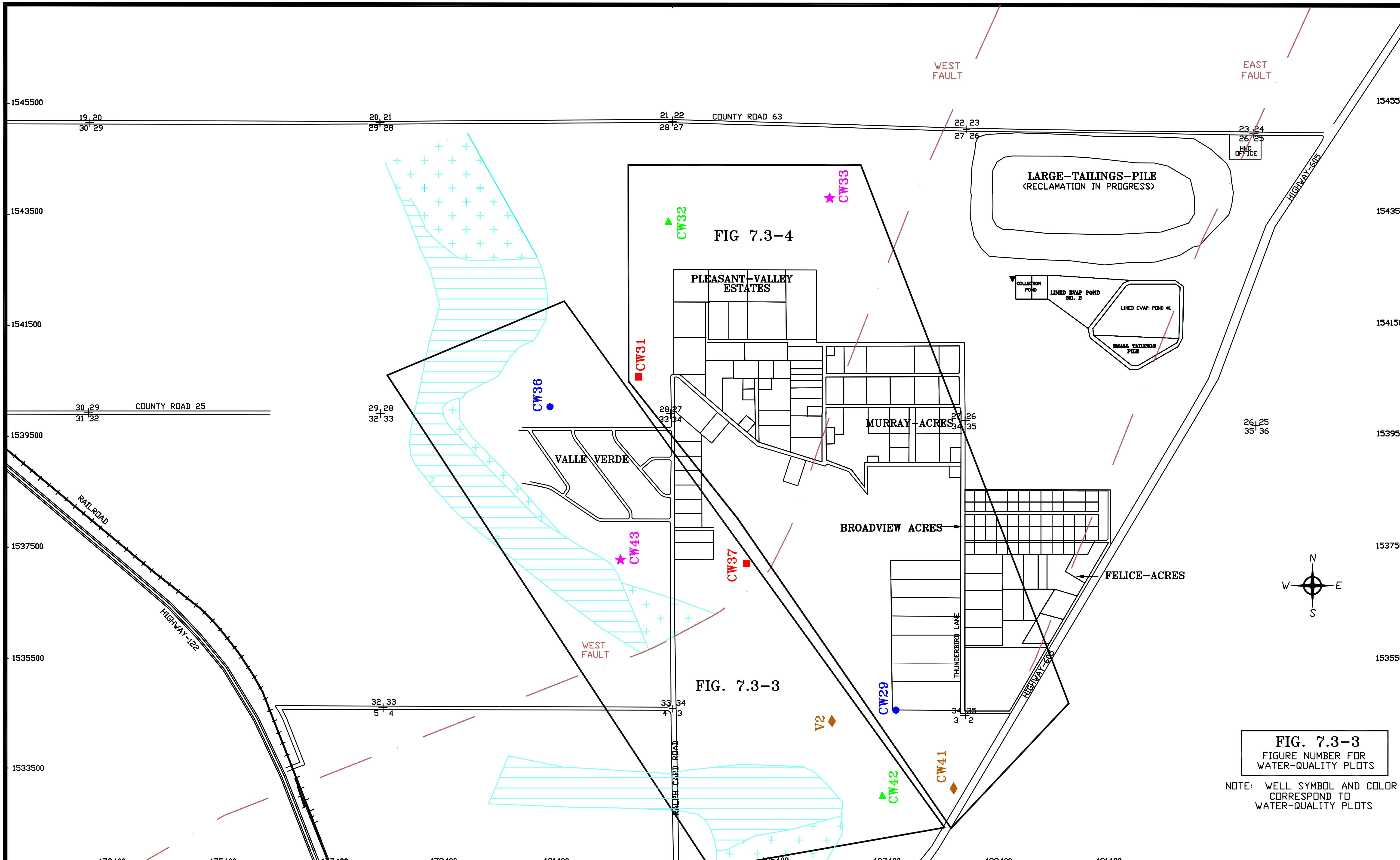
FIGURE 7.3-1A. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/6/2018	
SCALE: 1"=500'	
PAGE: 7.3-6	



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DATE: 1/19/2018

FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2017

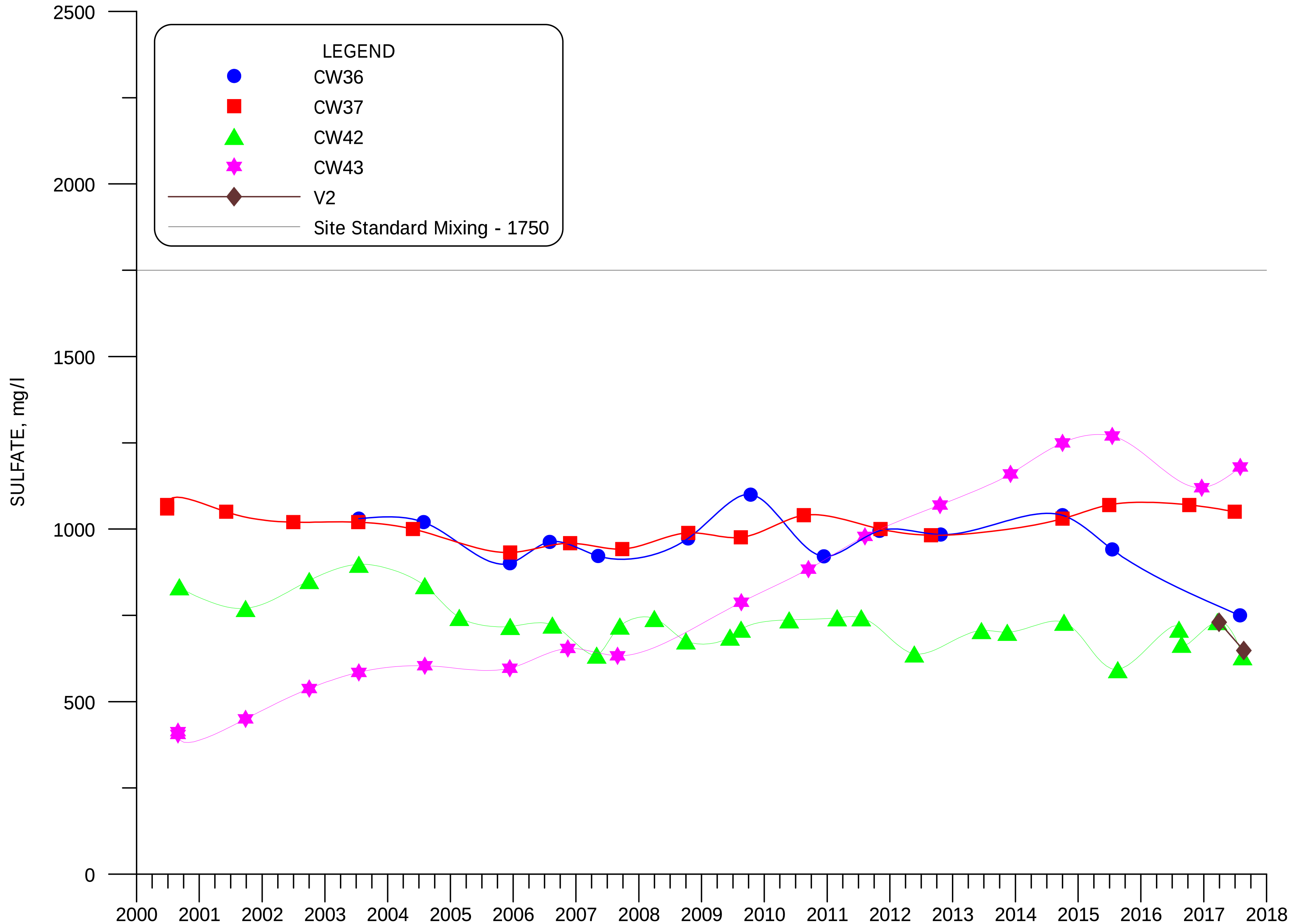


FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43 AND V2

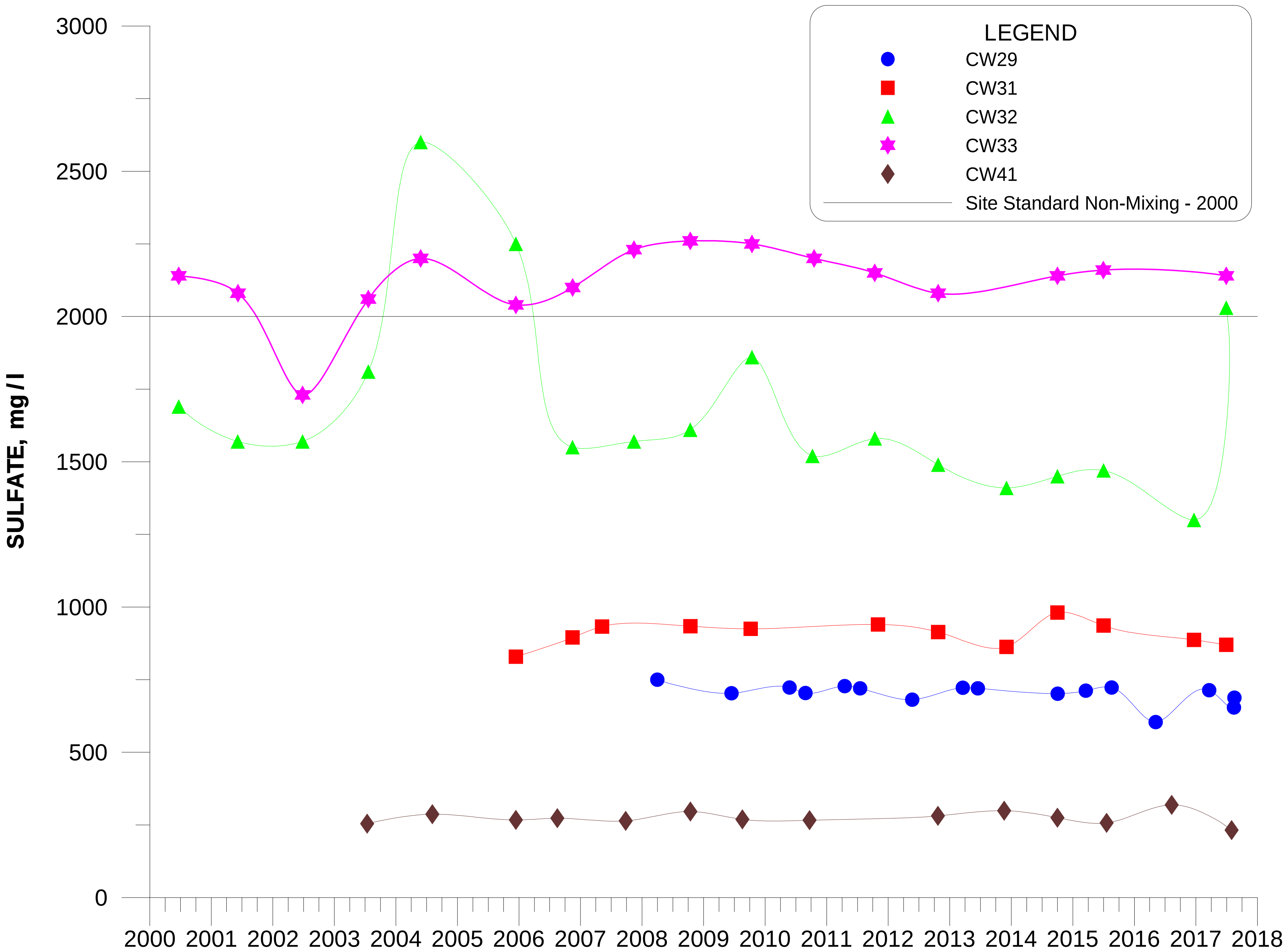
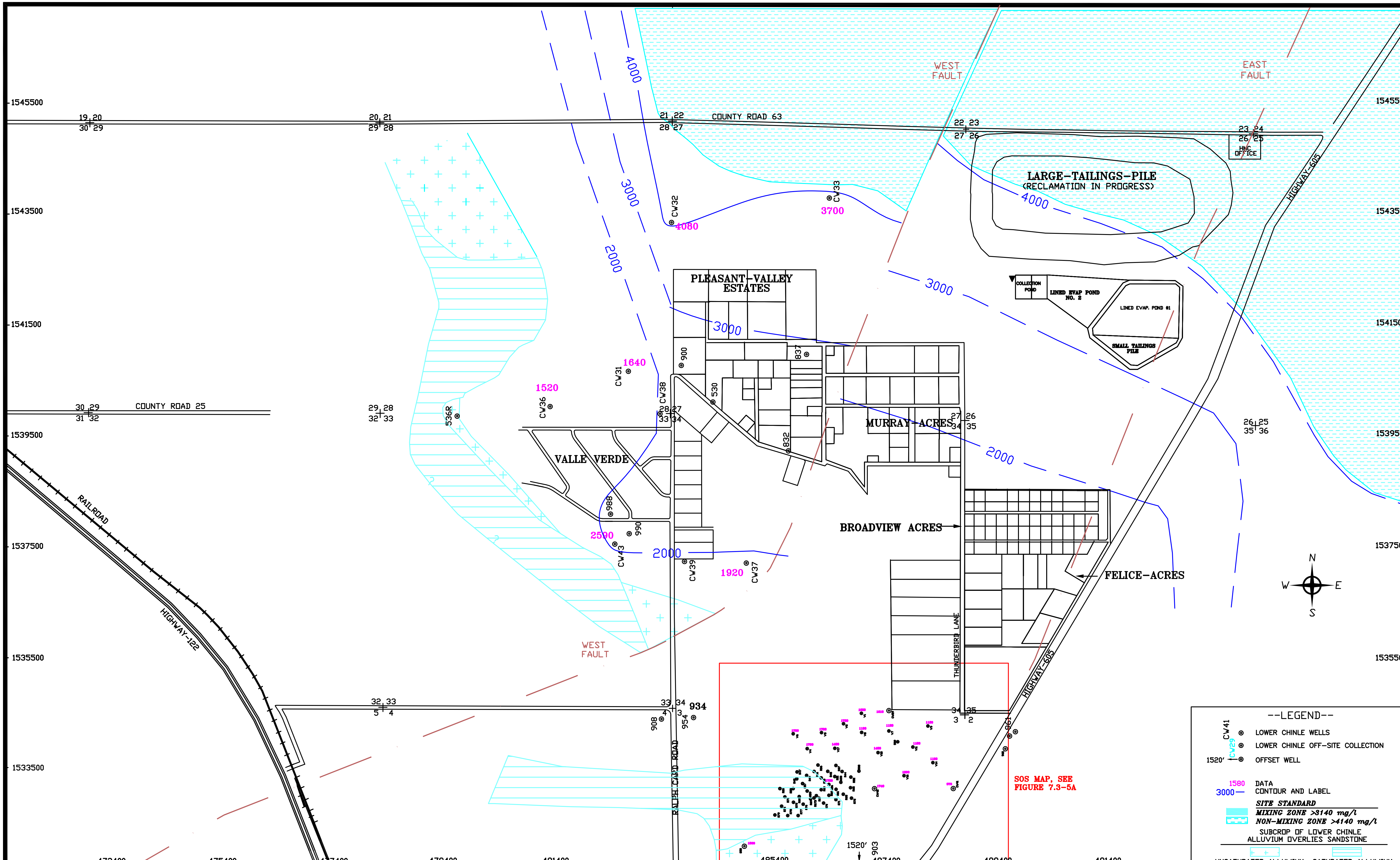


FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



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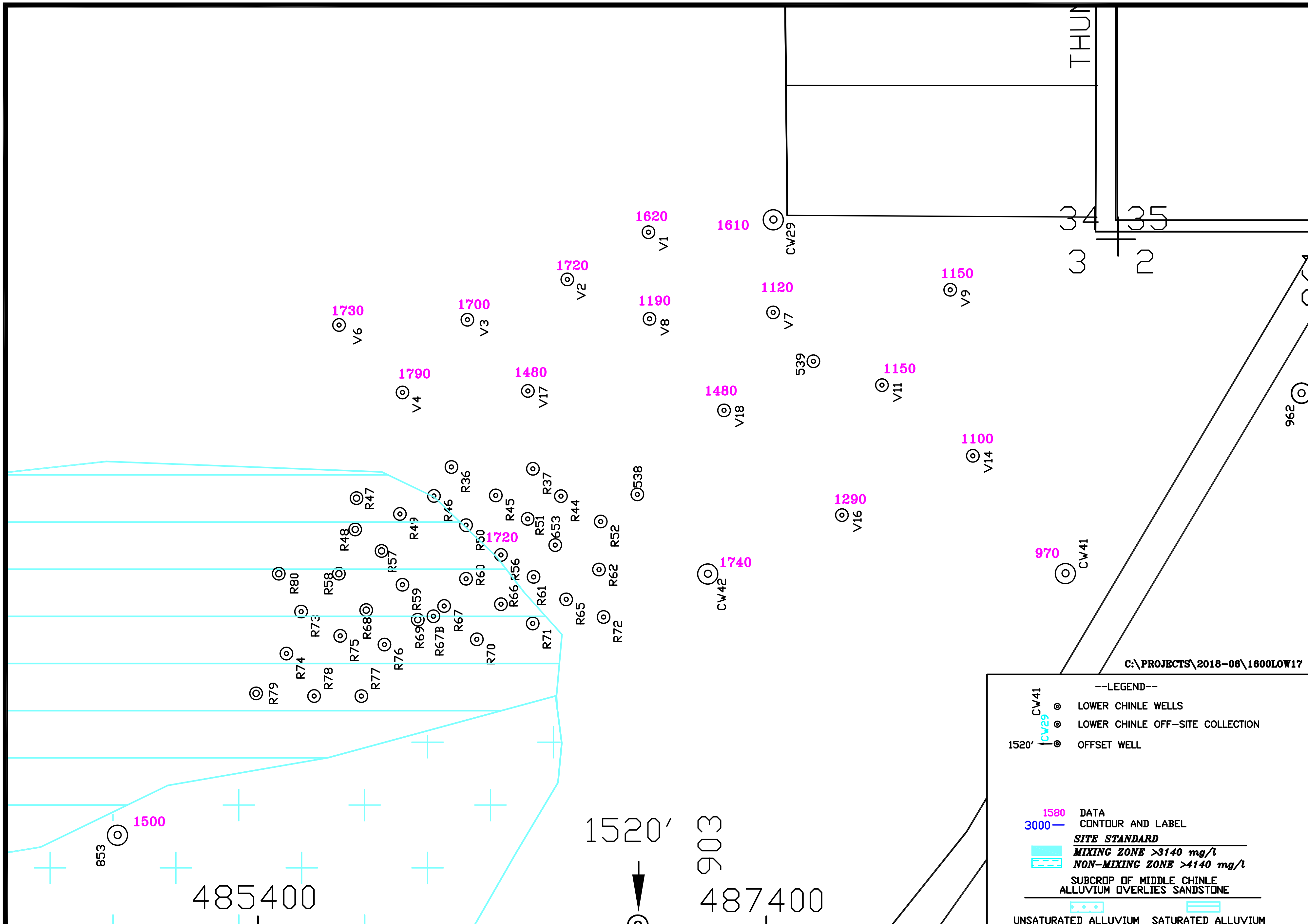
DATE: 1/19/2018

FIGURE 7.3-5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2017, mg/l



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.3-5A. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/6/2018

SCALE: 1"=500'

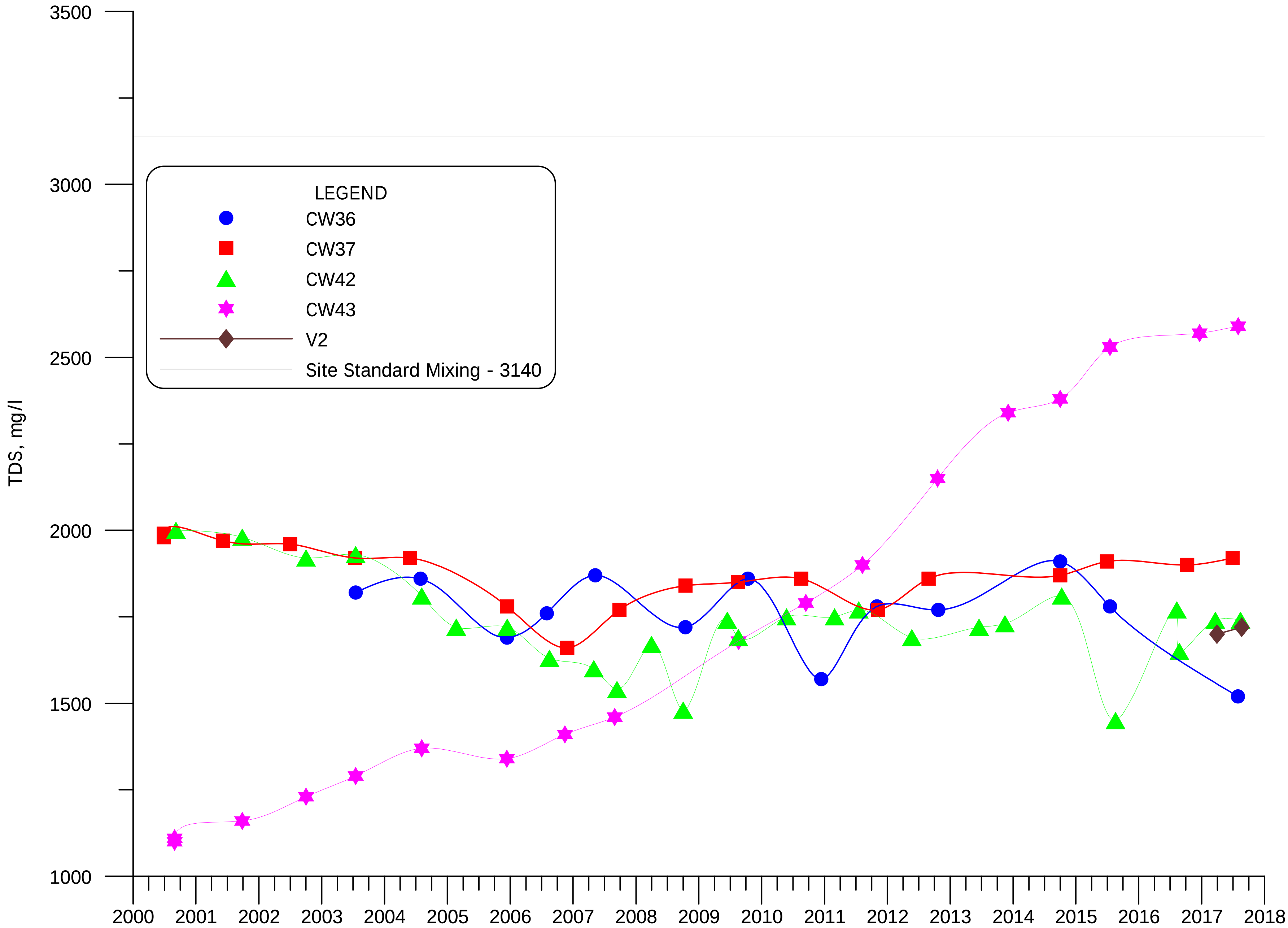


FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43 AND V2

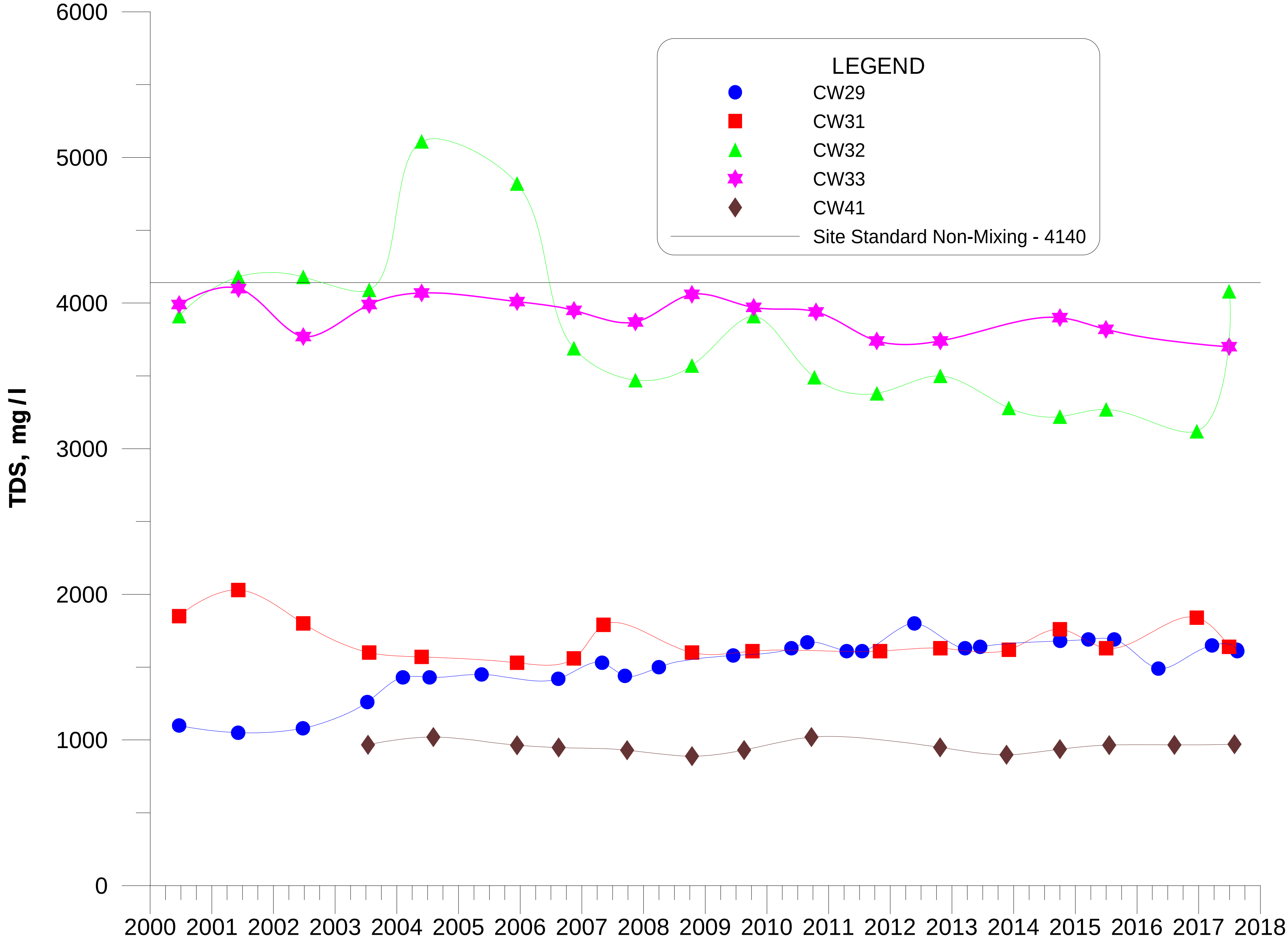
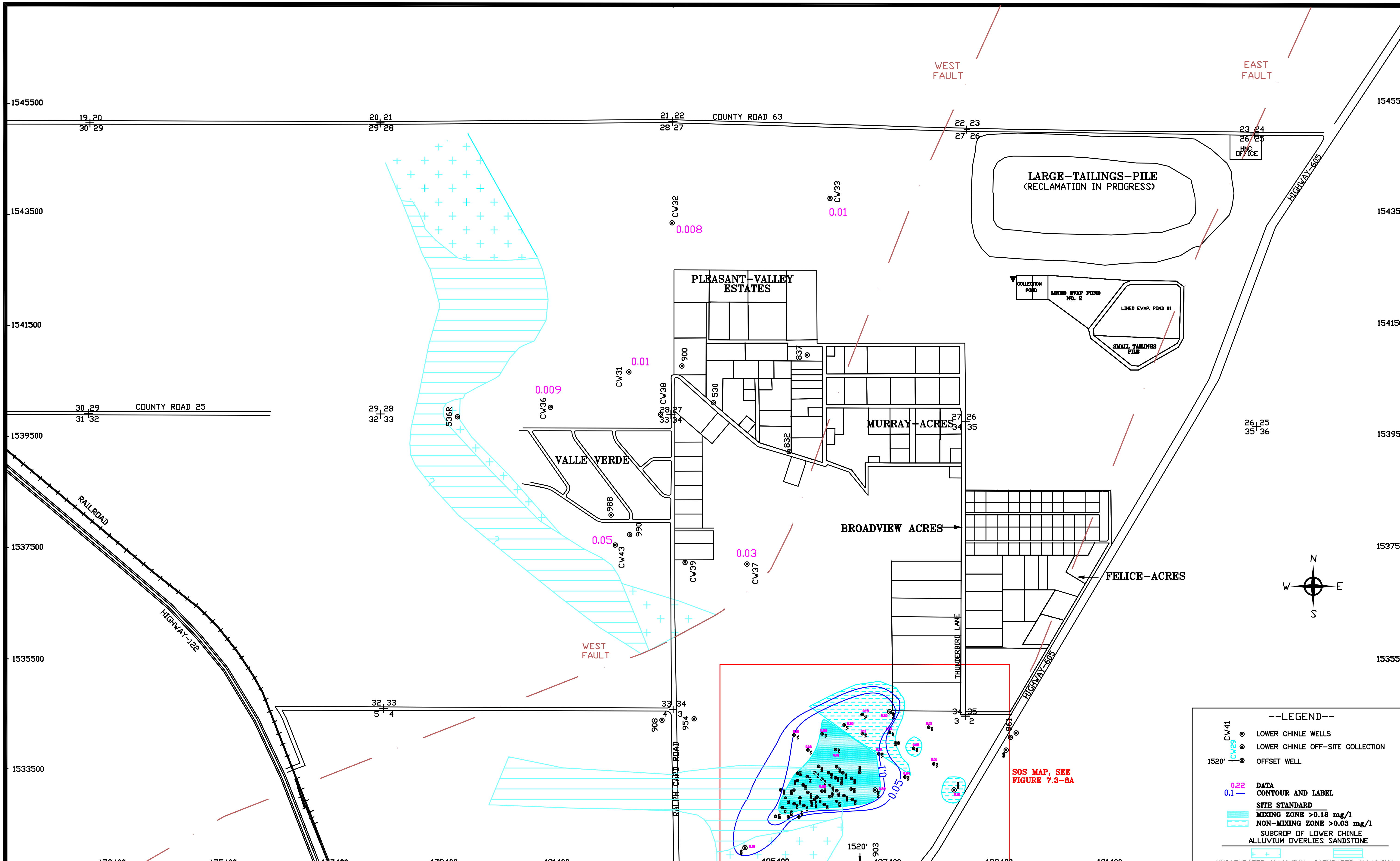


FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



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DATE: 1/19/2018

FIGURE 7.3-8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2017, mg/l

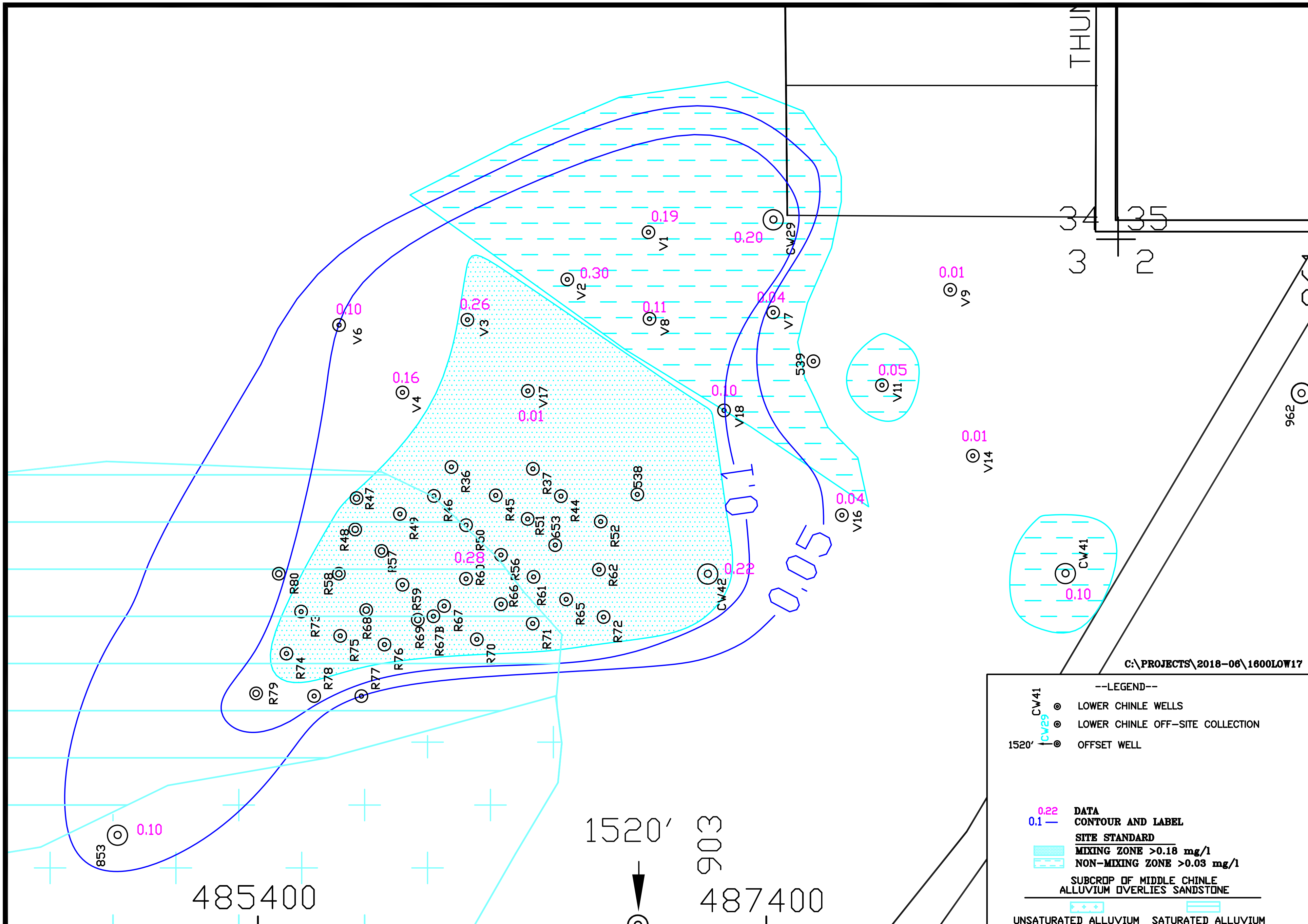

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FIGURE 7.3-8A. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/6/2018

SCALE: 1"=500'

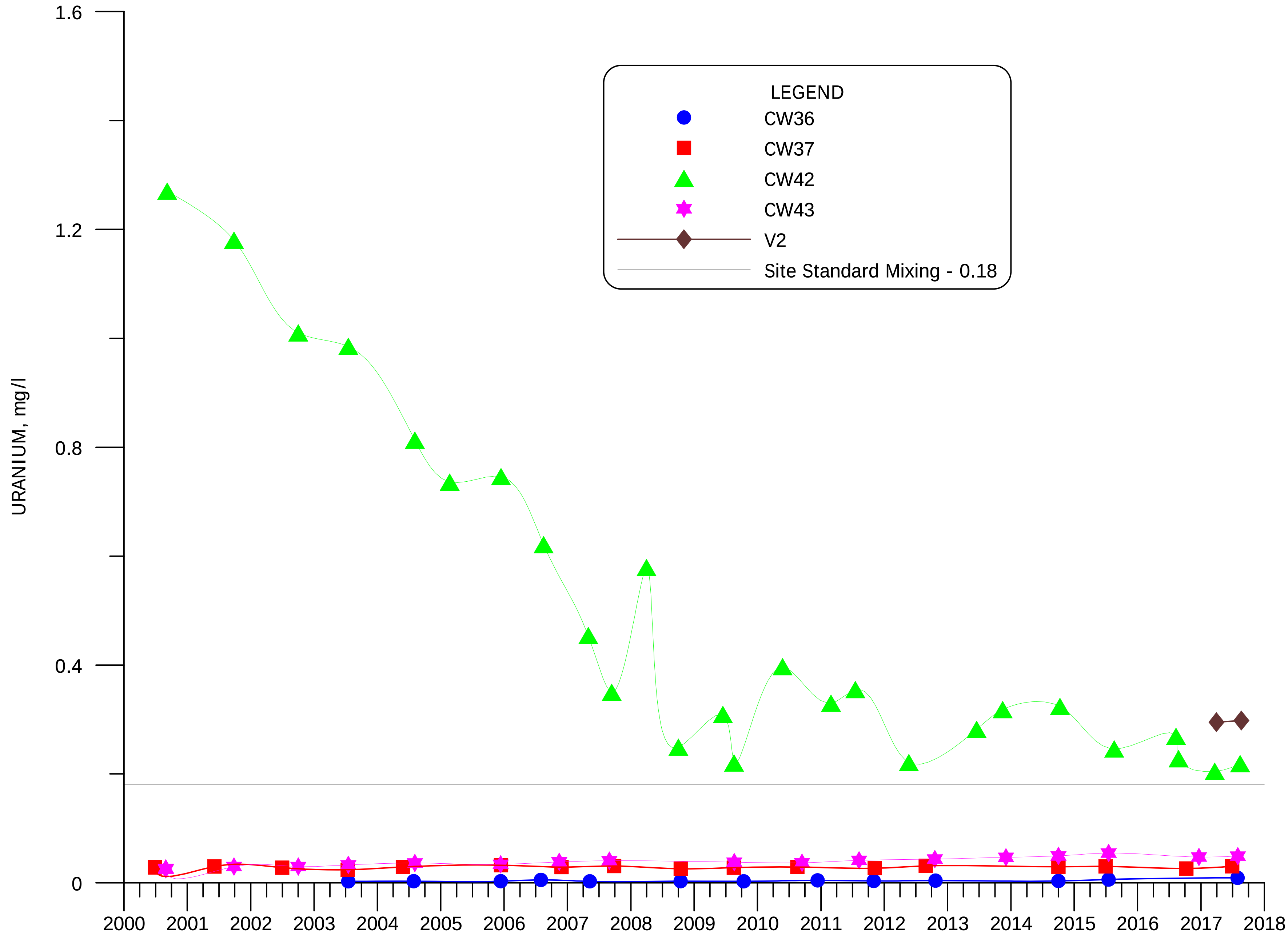


FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43 AND V2

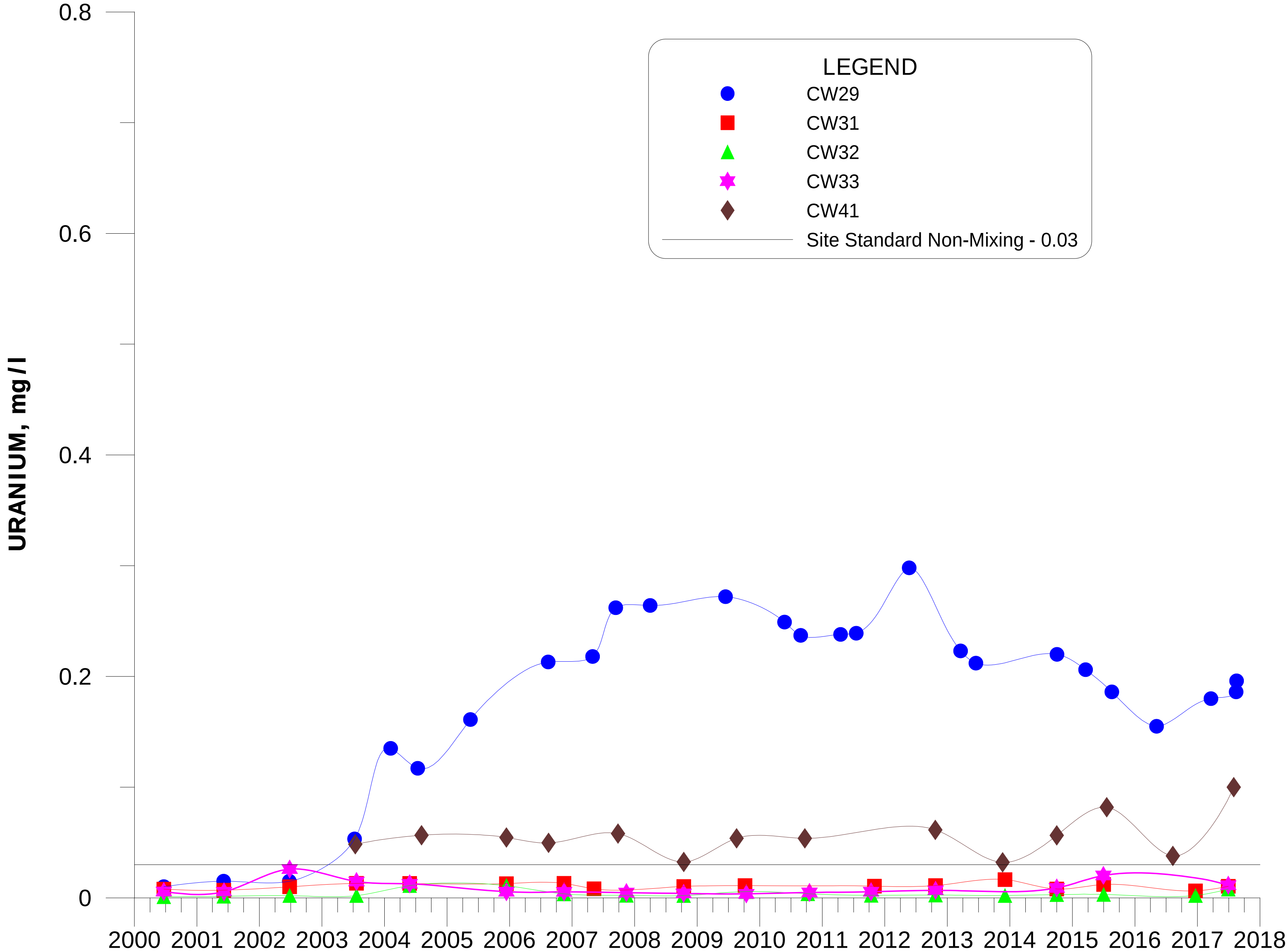
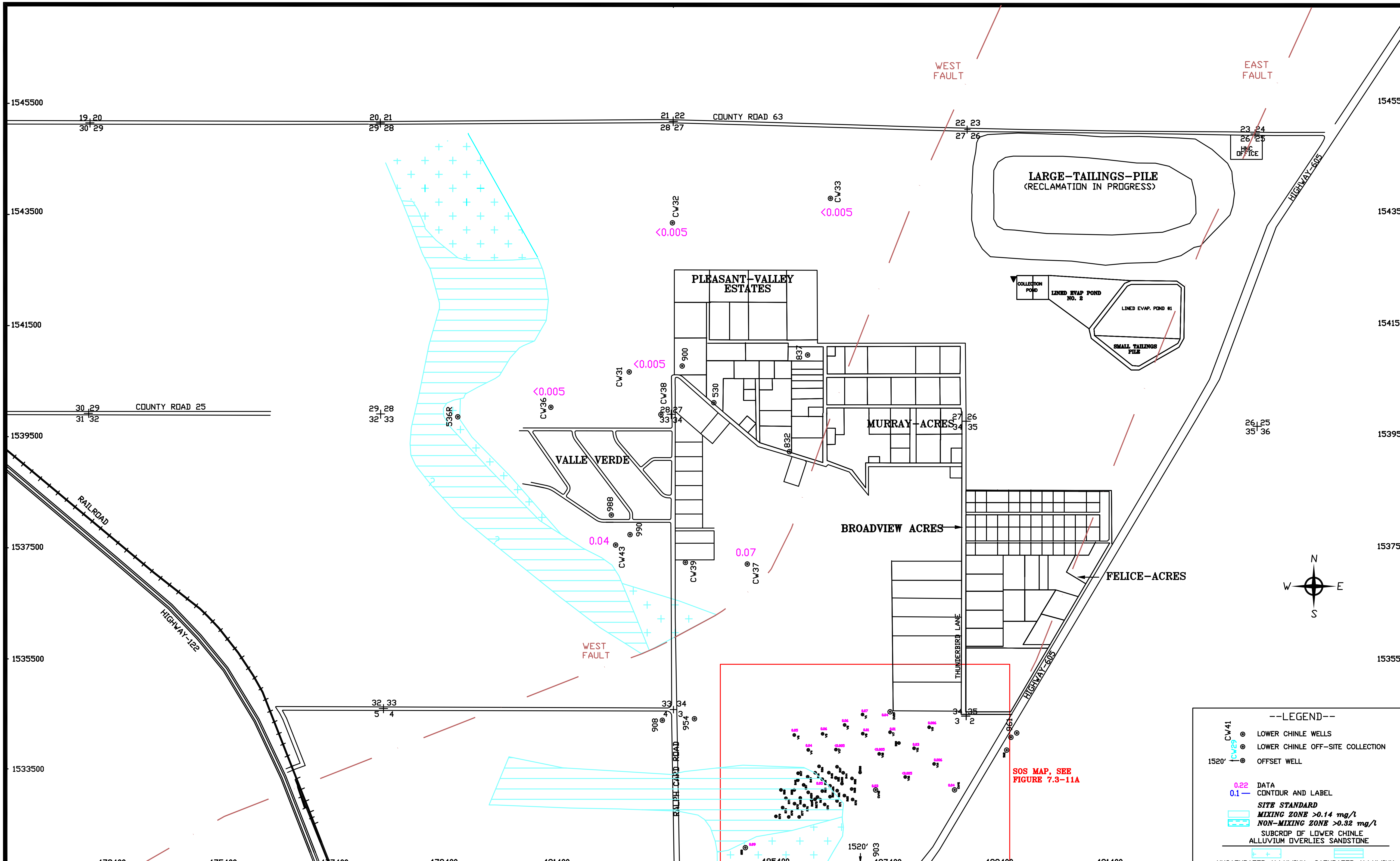


FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



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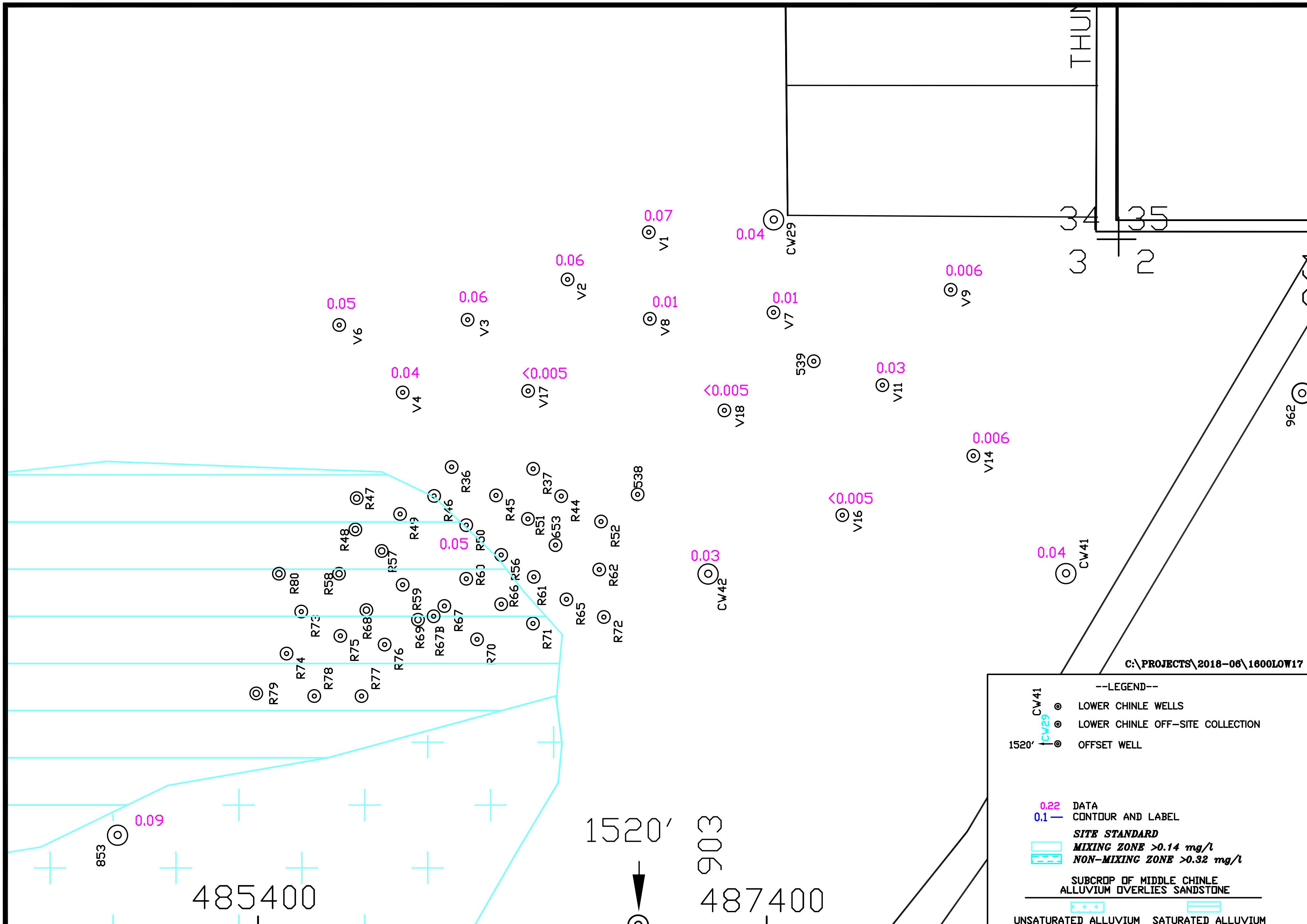
DATE: 1/19/2018

FIGURE 7.3-11. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2017, mg/l



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.3-11A. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2017, mg/l

DATE: 2/6/2018

SCALE: 1"=500'

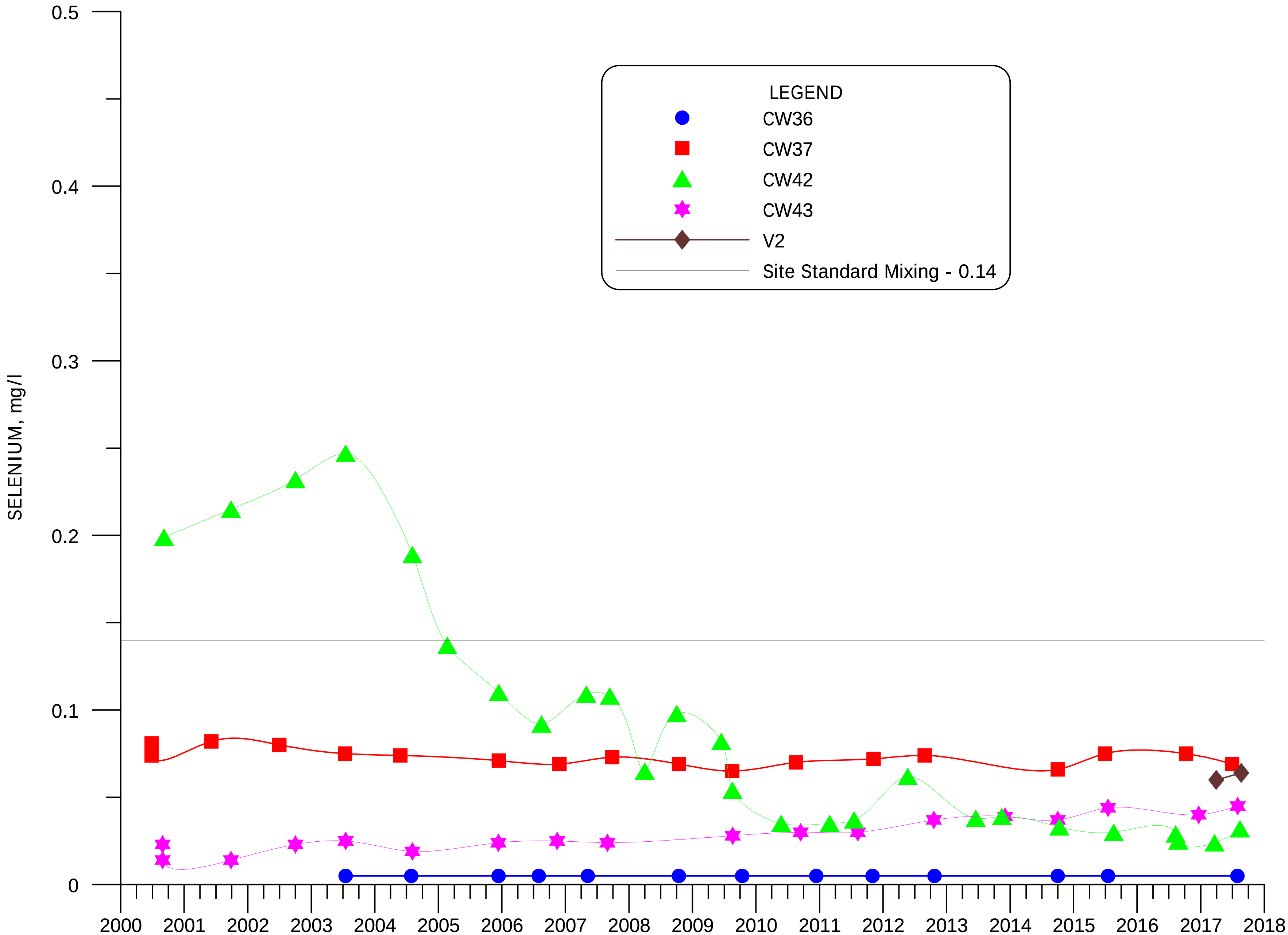


FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43 AND V2

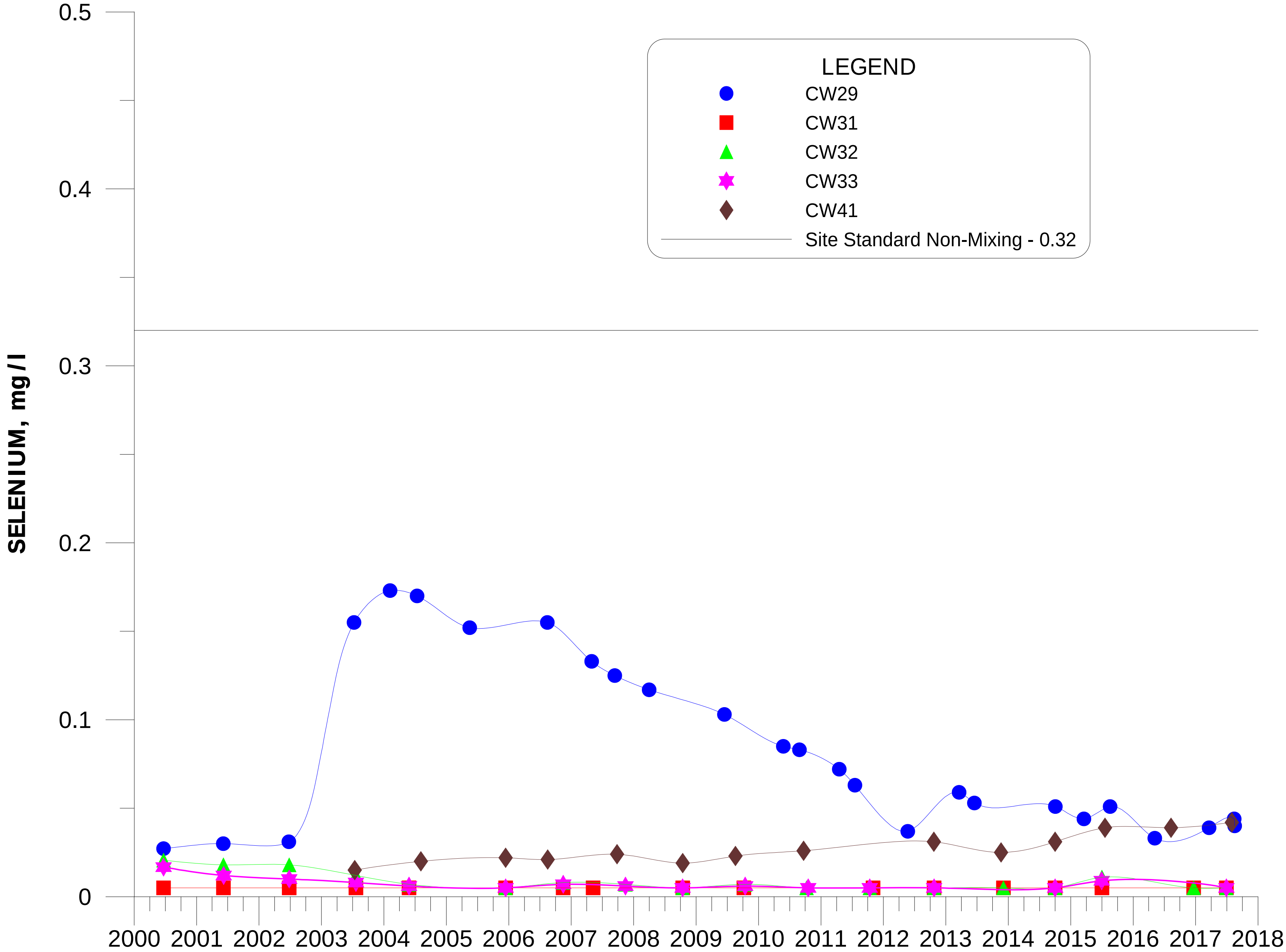


FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.

SECTION 8

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

FIGURES (CONTINUED)

TABLES

8.0 SAN ANDRES AQUIFER MONITORING

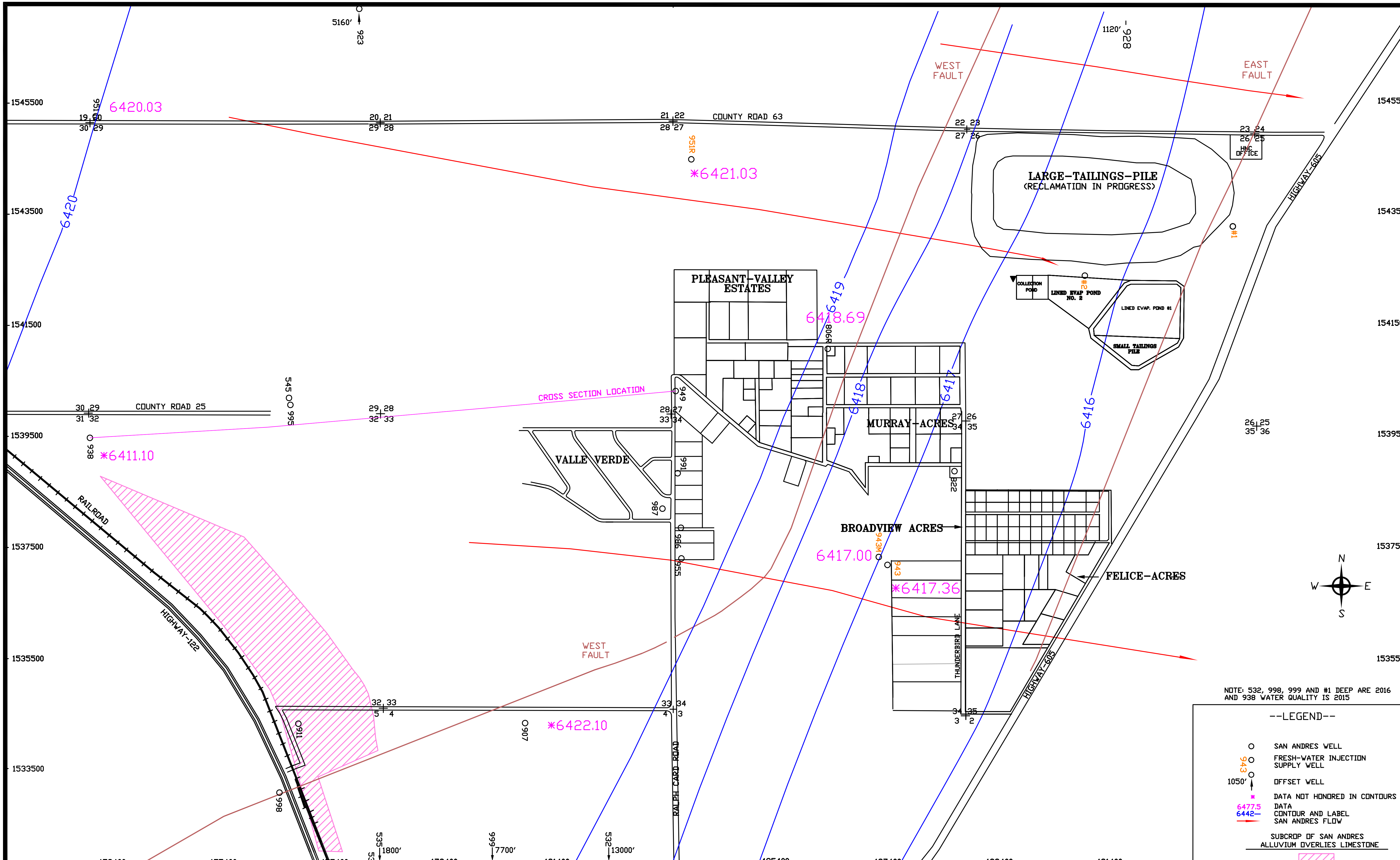
8.1 SAN ANDRES WELL COMPLETIONS AND WATER LEVELS

The San Andres aquifer is the most important regional aquifer in the Grants Project area. The Chinle Formation, which exists between the alluvium and the San Andres, is approximately 800 feet thick at the Homestake tailings site and is primarily a shale with a few sandstone lenses. Therefore, the alluvial aquifer and the San Andres aquifer are separated by a very thick aquitard. The difference in piezometric head between the alluvial and San Andres aquifers is in the range of 80 to 100 feet, which confirms that the flow between the two systems is restricted by the limited permeability of the Chinle Formation. The San Andres and alluvial aquifers are only in direct contact in the western portion of the area presented on Figure 8.1-1 (see magenta pattern area). With no areas of direct communication within the area where the alluvial aquifer is impacted by the Homestake tailings seepage, and only very limited hydraulic communication through the Chinle shale, the San Andres aquifer is not affected by the Grants Project tailings seepage. The San Andres aquifer has been used as the source for fresh-water injection into the alluvium and Chinle aquifers at the Grants Project, and as a result, a monitoring program was established for the San Andres aquifer.

Table 8.1-1 presents well completion information for the San Andres wells in this area. Homestake's two deep wells within the project area are San Andres wells, #1 Deep and #2 Deep. Well #1 Deep was not used in 2017 and drilling replacement well #1R Deep was started in late 2017. These wells are used to supply the fresh-water injection systems around the collection area. San Andres well 951 was used as the fresh-water injection supply for the injection system in Sections 28 and 29 through March of 2012. Replacement well 951R has been used starting in July of 2012. San Andres well 943 has been used as the fresh water injection supply for the injection system in Sections 3 and 34 and Felice Acres and its use as a fresh water injection supply was ceased on May 18, 2017. San Andres monitoring well 943M was drilled in December 2017 and located 217 feet northwest of well 943. Abandonment of San Andres well 928 was initiated in late 2017. Figure 8.1-1 shows the locations of the San Andres wells relevant to this area. Recharge to the San Andres aquifer occurs mainly west of the area shown in the figure and in the far western portion of the figure. The structure of the San Andres aquifer dips to the east, and thus the ground water system becomes progressively deeper in the easterly direction. Figure 8.1-2 shows a cross-section from the west at San Andres well 938 to the east at San Andres well 949 (see Figure 8.1-1 for location of cross section). This cross section shows the dip of the San Andres and the thickness of Chinle shale between the alluvium and the top of the San Andres.

The water-level elevations measured during 2017 (Figure 8.1-1) show a very flat piezometric surface with the gradient being from the west-northwest to the east-southeast. The continuity of the gradient in this area indicates that the East and West faults do not significantly affect the ground water flow in the San Andres aquifer. The displacement at the faults is not large enough to completely displace the entire thickness of this aquifer system. The increase in gradient in the project area also indicates a decrease in transmissivity in the area of the steeper gradient. The faults may cause a decrease in the transmitting ability of the San Andres aquifer in this area. An asterisk is added to the water-level elevation values that were not honored in drawing the contours on the map.

The water-level change in the San Andres aquifer with time is shown in Figure 8.1-3 and shows that the levels in the San Andres generally declined from 2000 to 2012 at a rate of 3 feet per year but has since decline at a much smaller rate since 2012. Water levels in the San Andres aquifer have been fairly steady the last three years.



SCALE: 1" = 1000'
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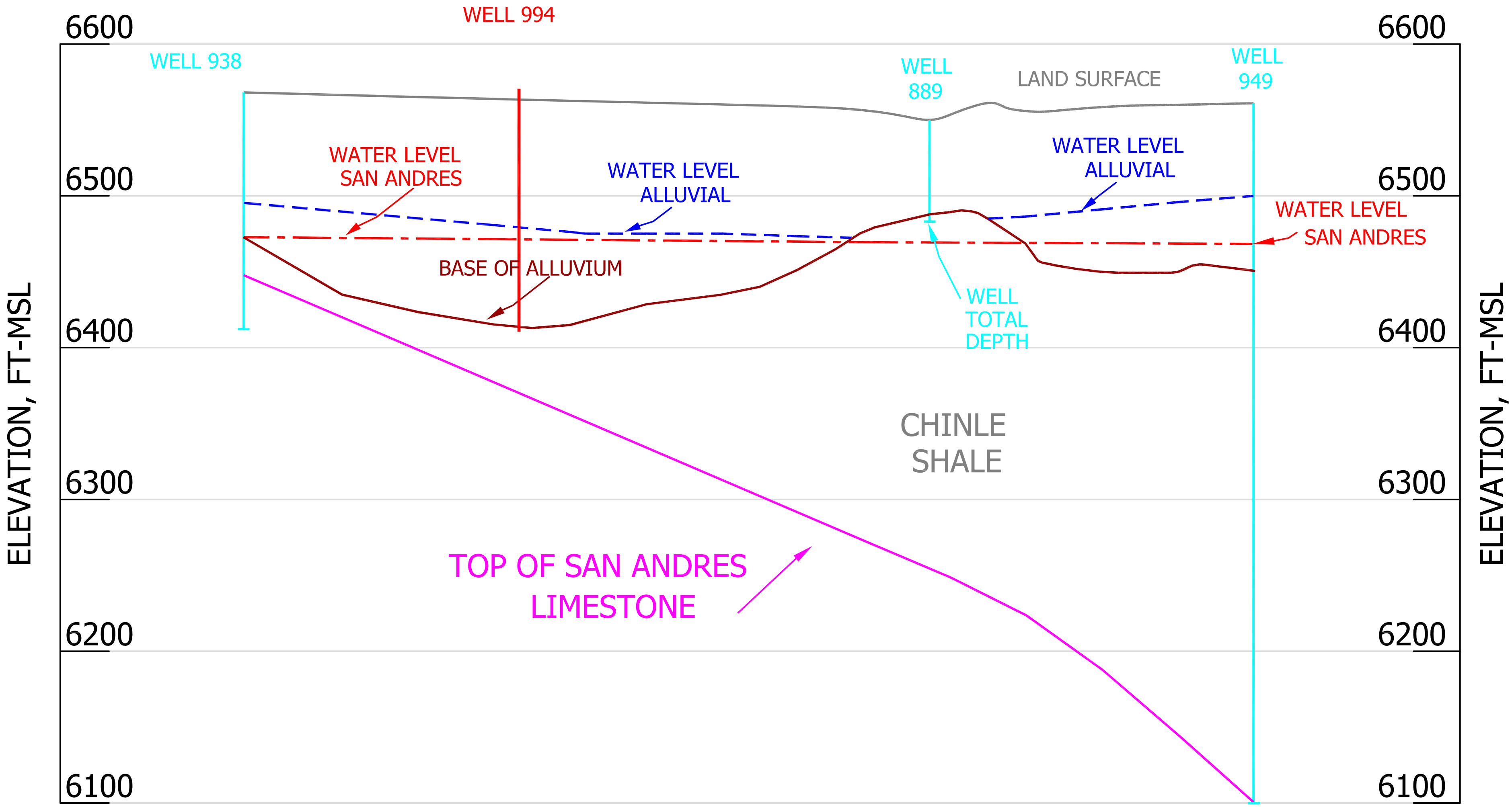
DATE: 2/28/18

FIGURE 8.1-1. LOCATION OF SAN ANDRES WELLS AND WATER-LEVEL ELEVATION FOR THE SAN ANDRES AQUIFER, 2017, FT-MSL



NOTE: X-SECTION BASED ON LOGS FROM WELLS 938, 889, AND 949.

FIGURE 8.1-2. SAN ANDRES CROSS-SECTION ALONG THE NORTHERN BORDER OF SECTIONS 32 AND 33

HORIZONTAL SCALE: 1" = 1600'

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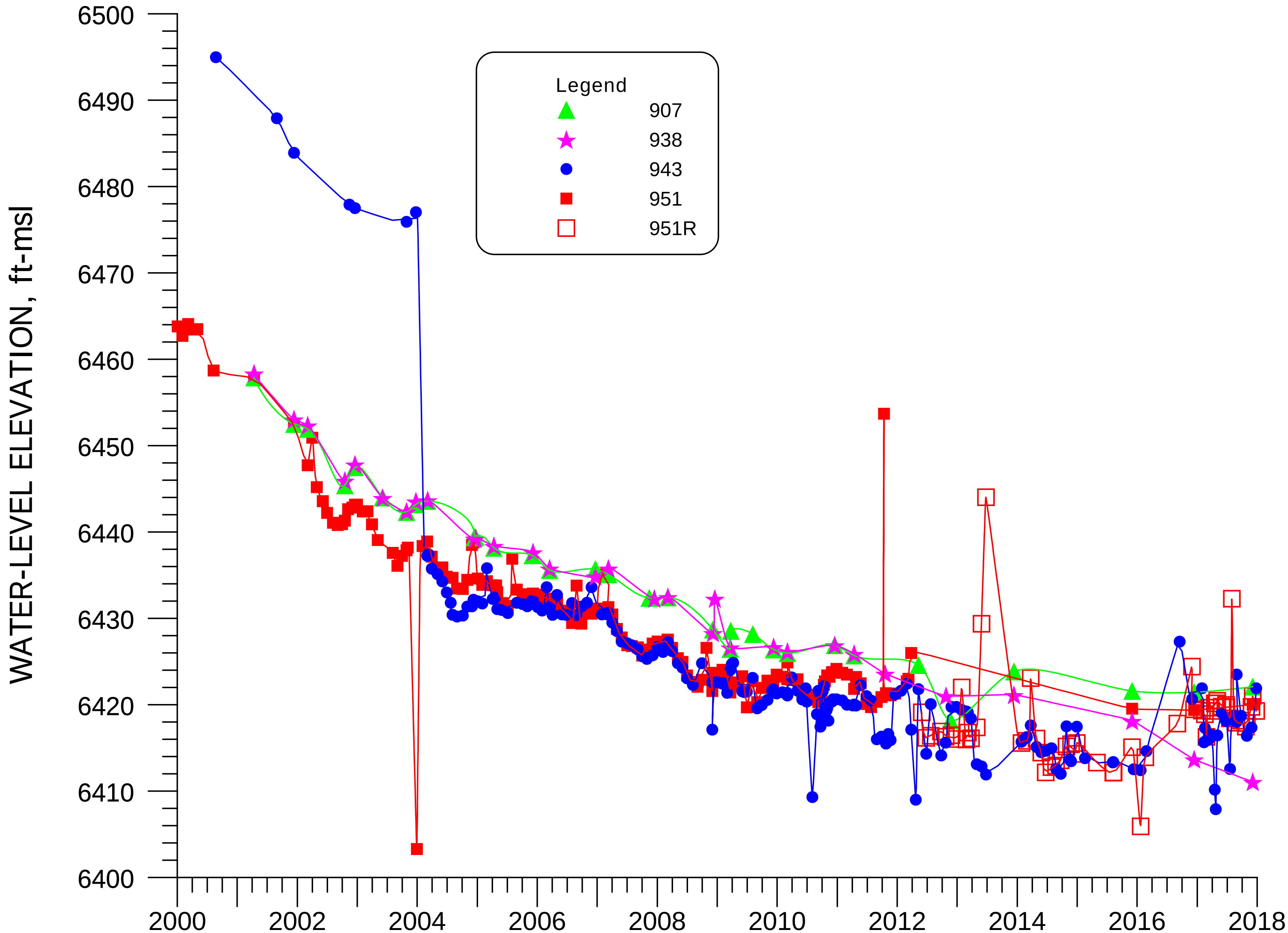


FIGURE 8.1-3. WATER-LEVEL ELEVATION FOR SAN ANDRES WELLS 907, 938, 943, 951, AND 951R.

TABLE 8.1-1. WELL DATA FOR THE SAN ANDRES WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO TOP OF SAN ANDRES (FT-LSD)	ELEV. TO TOP OF SAN ANDRES (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)
#1 Dee	1543307	493633	1000.0	10.0	12/5/2017	152.300	6431.46	0.0	6583.76	130	6454	A	---
										303	6281	U	---
										433	6151	M	---
										597	5987	L	---
										955	5629	S	919-999
#2 Dee	1542424	490972	870.0	---	2/16/2017	174.5	6401.16	0.0	6575.66	110	6466	A	---
										800	5776	S	-
0806R	1541177	486264	600.0	16.0	12/13/2016	148.600	6417.79	---	6566.39	510	---	S	510-580
0532	1518700	482400	214.0	14.0	---	---	---	0.0	6515.00	0	6515	S	-
0534	1534589	476549	1000.0	16.0	---	---	---	0.0	6552.57	---	---	S	-
0535	1530100	478450	198.0	12.0	---	---	---	0.0	6540.00	---	---	S	-
0545	1540200	476600	0.0	8.0	---	---	---	---	6560.00	---	---	S	-
0806	1541120	486320	584.0	16.0	---	---	---	0.0	6567.00	90	6477	A	---
										520	6047	S	-
0822	1538920	488630	980.0	7.0	---	---	---	0.0	6557.00	790	5767	S	790-875
0907	1534250	480800	360.0	16.0	12/5/2017	123.5	6422.10	0.0	6545.60	123	6423	A	---
										262	6284	S	295-360
0911	1534350	476800	188.0	---	---	---	---	0.0	6552.60	---	---	S	-
0918	---	---	725.0	4.0	---	---	---	0.0	6702.40	620	6082	S	635-655
0919	---	---	628.0	5.0	---	---	---	0.0	6684.00	35	6649	A	---
										356	6328	S	364-571
0923	1552400	477900	330.0	5.0	---	---	---	0.0	6622.60	60	6563	A	---
										229	6394	S	234-330
0928	1548250	491700	864.0	18.0	12/13/2016	132.210	6465.39	1.2	6597.60	138	6458	A	---
										801	5795	S	-
0938	1539500	473040	---	---	12/5/2017	157.699	6411.10	0.0	6568.80	95	6474	A	---
										120	6449	S	-
0943	1537222	487407	978.0	18.0	12/26/2017	134	6421.91	0.0	6555.91	704	5852	S	703-978
0943M	1537358	487238	800.0	6.0	1/8/2018	139.10	6417.00	2.3	6556.10	710	5844	S	740-800
0949	1540350	483600	551.0	6.0	---	---	---	0.0	6562.30	112	6450	A	---
										250	6312	L	---
										460	6102	S	400-493
										460	6102	S	505-551
0951	1545500	473200	275.0	10.0	12/5/2017	153.669	6420.03	0.9	6573.70	110	6463	A	---
										227	6346	S	241-275
0951R	1544500	484100	525.0	8.0	12/26/2017	157.5	6419.28	1.0	6576.78	65	6511	A	---
										420	6156	S	415-525
0955	1537338	483699	498.0	5.0	---	---	---	0.2	6550.00	40	6510	A	---
										420	6130	S	385-498

TABLE 8.1-1. WELL DATA FOR THE SAN ANDRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO TOP OF SAN ANDRES (FT-LSD)	ELEV. TO TOP OF SAN ANDRES (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)
0986	1537894	483690	467.0	5.0	---	---	---	0.8	6650.00	65	6584	A	---
										85	6564	L	---
										415	6234	S	420-467
0987	1538226	483357	500.0	5.0	---	---	---	1.0	6650.00	70	6579	A	---
										385	6264	S	425-470
0991	1538873	483630	500.0	---	---	---	---	1.4	6651.00	---	---	S	-
0995	1540115	476594	---	---	---	---	---	0.0	6474.00	---	---	S	-
0998	1533080	476450	145.0	16.0	---	---	---	0.0	6650.00	---	---	S	-
0999	1524230	480187	180.0	16.0	---	---	---	0.0	6527.00	0	6527	S	-

NOTE: A = Base of Alluvium
L = Lower Chinle
S = San Andres Aquifer
r = Reported
* = Abandoned

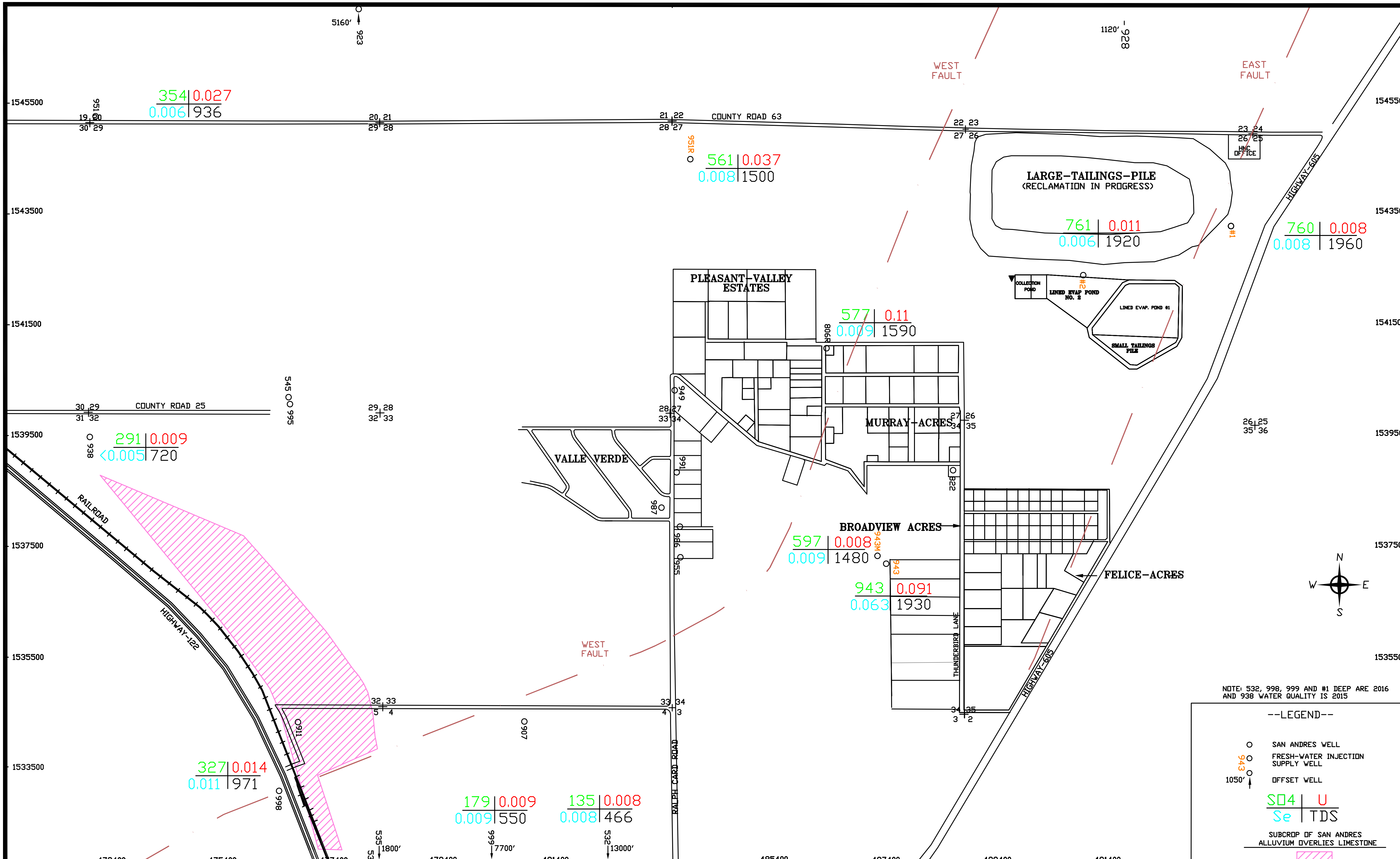
8.2 SAN ANDRES WATER QUALITY

Figure 8.2-1 presents the most recent water-quality data for the San Andres aquifer. Tables B.6-1 and B.6-2 in Appendix B present the tabulation of the water-quality data for the San Andres aquifer. Figure 8.2-1 shows the 2017 data for sulfate, TDS, uranium and selenium concentrations in the San Andres aquifer. Sulfate concentrations are typically near 700 mg/l for Homestake #1 Deep and #2 Deep wells. Sulfate concentrations in the San Andres aquifer generally increase from near its outcrop at wells 532, 938, 998 and 999 to higher levels farther to the east as the water has been in the formation for a longer period of time. TDS concentrations have varied from 466 to 1960 mg/l and generally increase in a down-gradient direction. The higher concentrations of sulfate and TDS to the east are natural and typical of a limestone aquifer where the extended contact time with the formation results in ongoing dissolution of major constituents. This increase in concentrations from the recharge area down dip is expected. Uranium concentrations were generally small in all of the San Andres wells monitored during 2017 with the largest value of 0.091 and 0.11 mg/l in wells 943 and 806R respectively. The 2017 uranium value from well 806R is thought to be an outlier and should be used with caution until it is confirmed. Uranium concentrations in well 943 are much greater than those in San Andres well 943M because leakage into well 943 from an overlying aquifer effect the concentration in well 943. Selenium concentrations in the San Andres aquifer vary from <0.005 to 0.011 mg/l except for the effected concentration in well 943 of 0.063 mg/l. All measured molybdenum concentrations are less than 0.03 mg/l.

Figure 8.2-2 presents sulfate concentrations with time for Homestake's wells 943, 951, 951R, Deep #1 and #2 wells. This data shows that sulfate concentrations in 2017 for these San Andres wells were similar to their historical average since injection water supply has occurred except for the increase in well 943 in the second half of 2016 and 2017. Additional monitoring indicates that the higher sulfate concentrations in well 943 are due to leakage in well 943 from an overlying aquifer. Figure 8.2-3 presents the sulfate concentrations with time for San Andres wells 532, 806R, 938, 998 and 999. Updated sulfate concentrations for wells 951, 951R, 806R and #2 Deep were obtained and are consistent with previous data.

Figures 8.2-4 through 8.2-7 presents TDS and chloride concentrations with time for Homestake's and other San Andres wells for these two additional major constituents. The TDS data shows an increase in 2016 and 2017 in well 943 similar to the sulfate increase.

Uranium and selenium plots are also developed for these two group of San Andres wells and presented in Figures 8.2-8 through 8.2-11. The uranium and selenium concentrations in well 943 show small increases in concentrations in 2016 and 2017 due to the leakage in well 943. The increase in uranium concentration in well 806R in 2017 is not supported by other constituents and is thought to be an outlier.



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DATE: 2/28/18

FIGURE 8.2-1. LOCATION OF SAN ANDRES WELLS AND WATER QUALITY DATA FOR THE SAN ANDRES AQUIFER 2017, mg/l

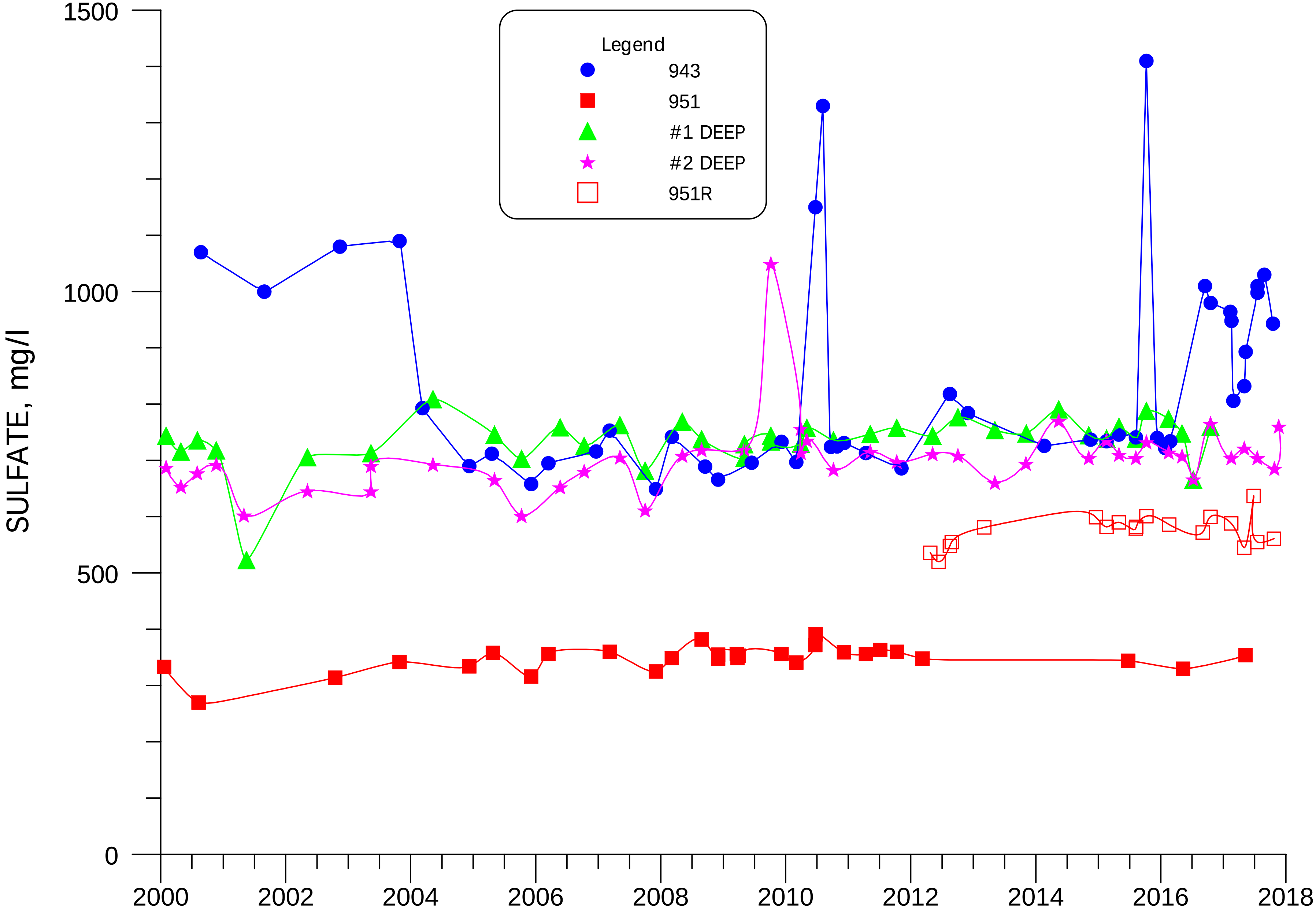

FIGURE 8.2-2. SULFATE CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

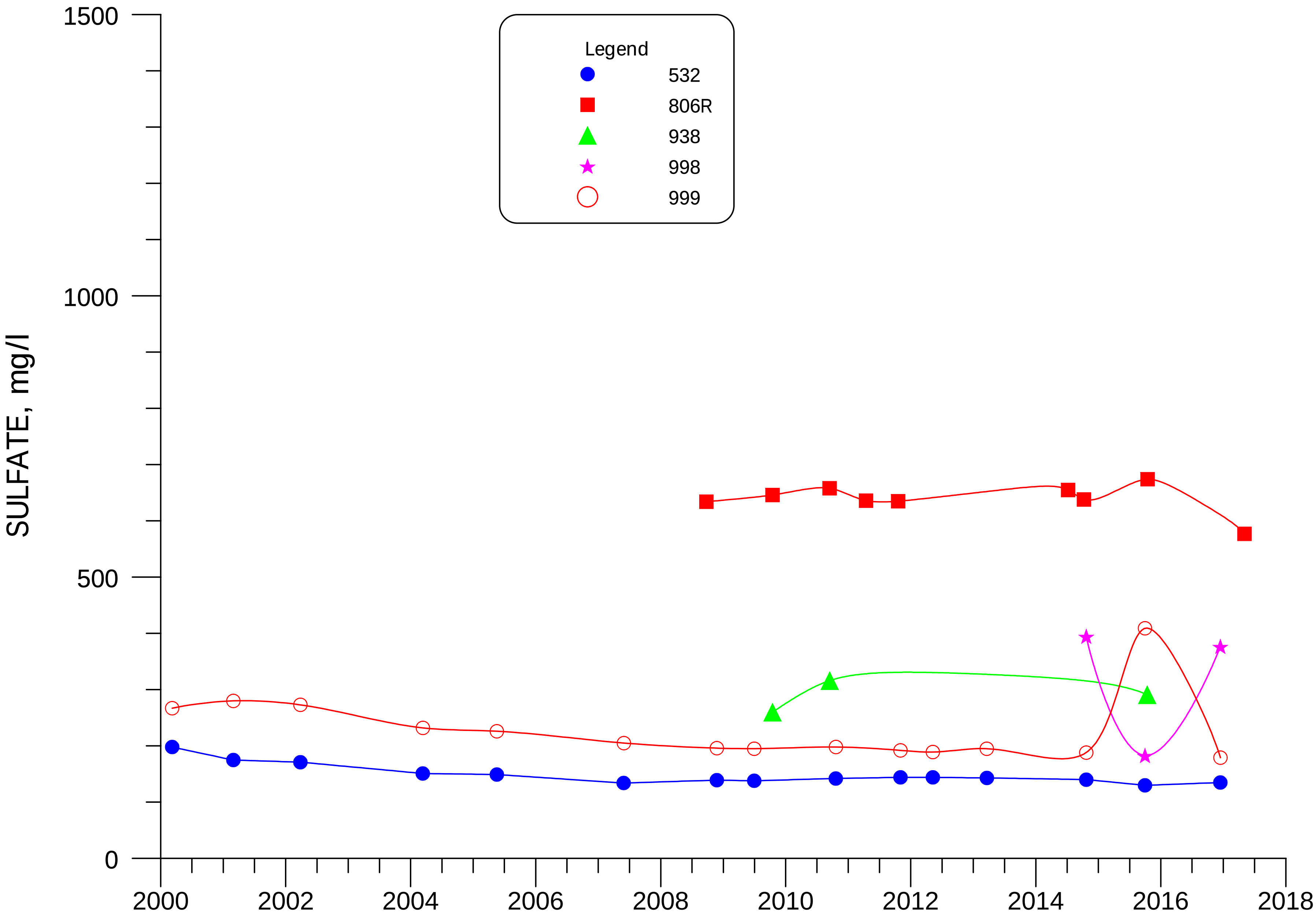

FIGURE 8.2-3. SULFATE CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

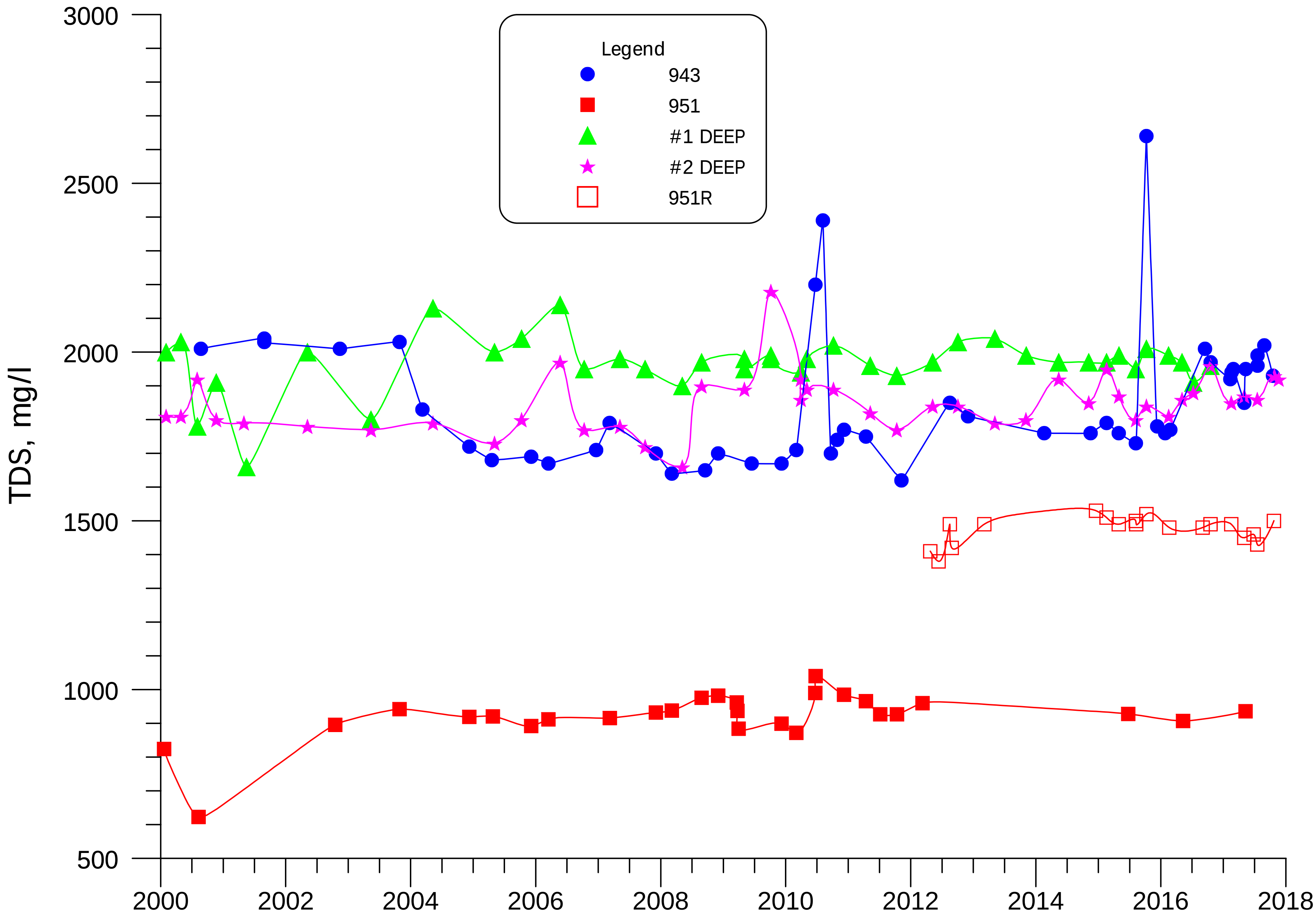

FIGURE 8.2-4. TDS CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

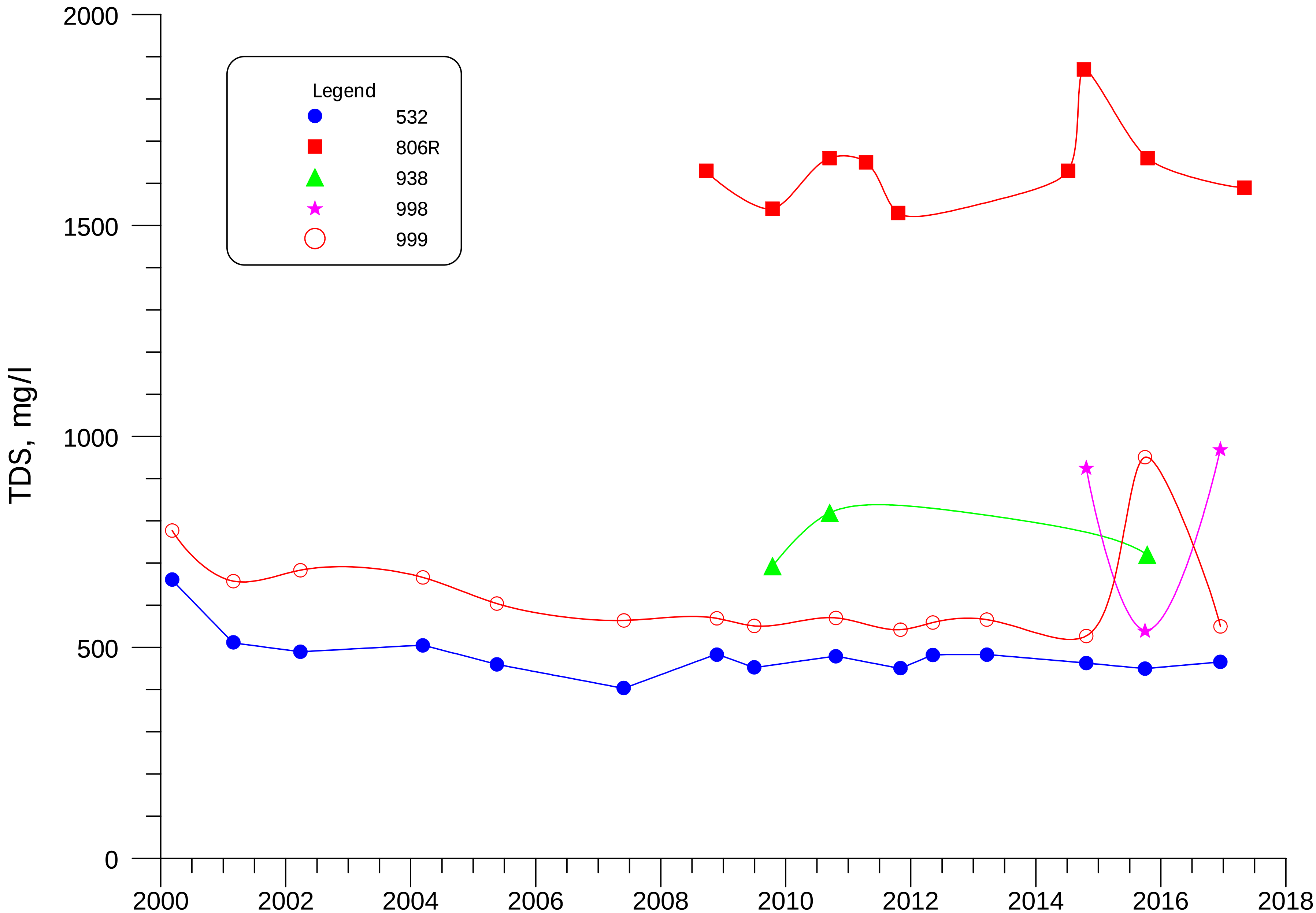

FIGURE 8.2-5. TDS CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

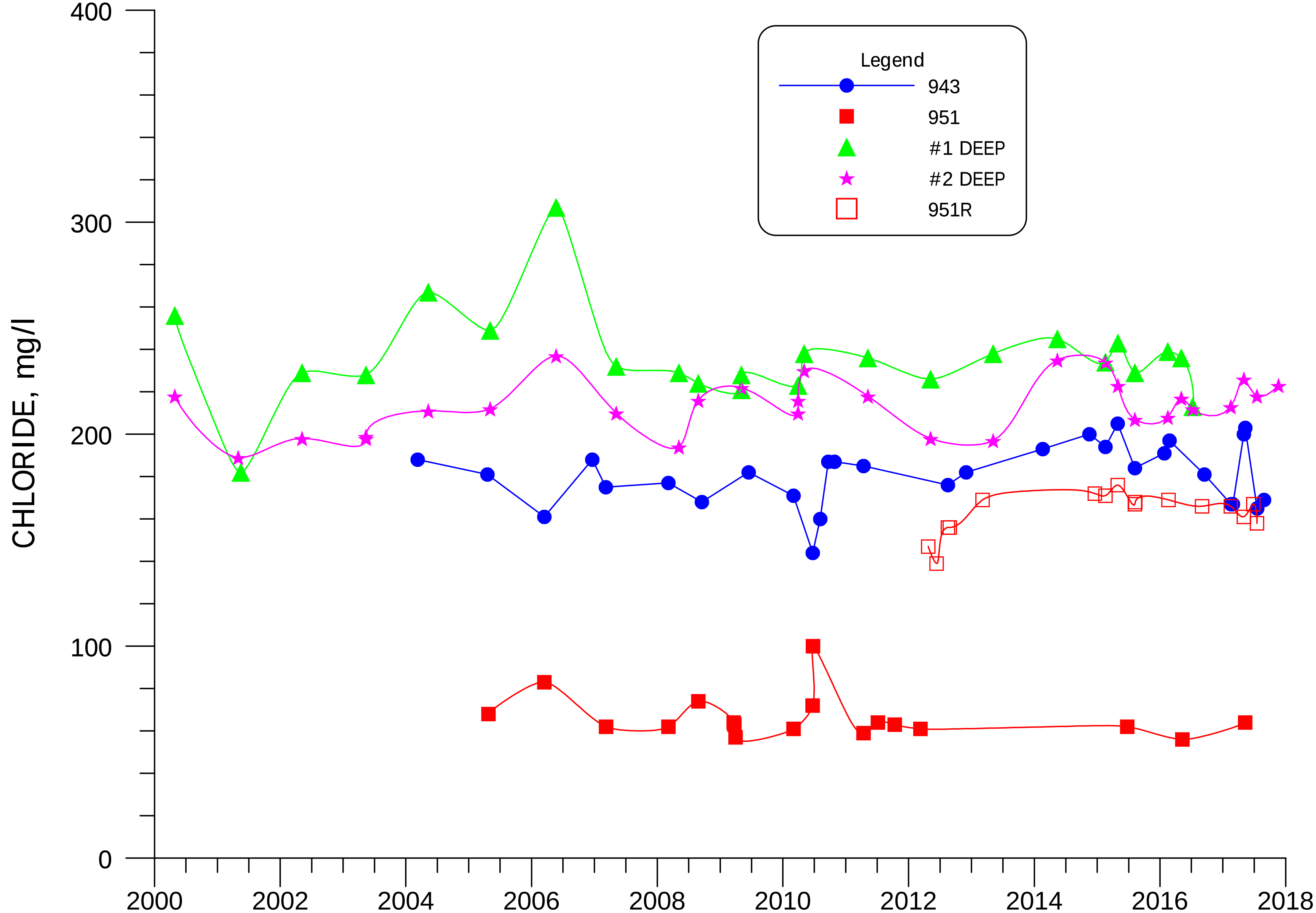

FIGURE 8.2-6. CHLORIDE CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

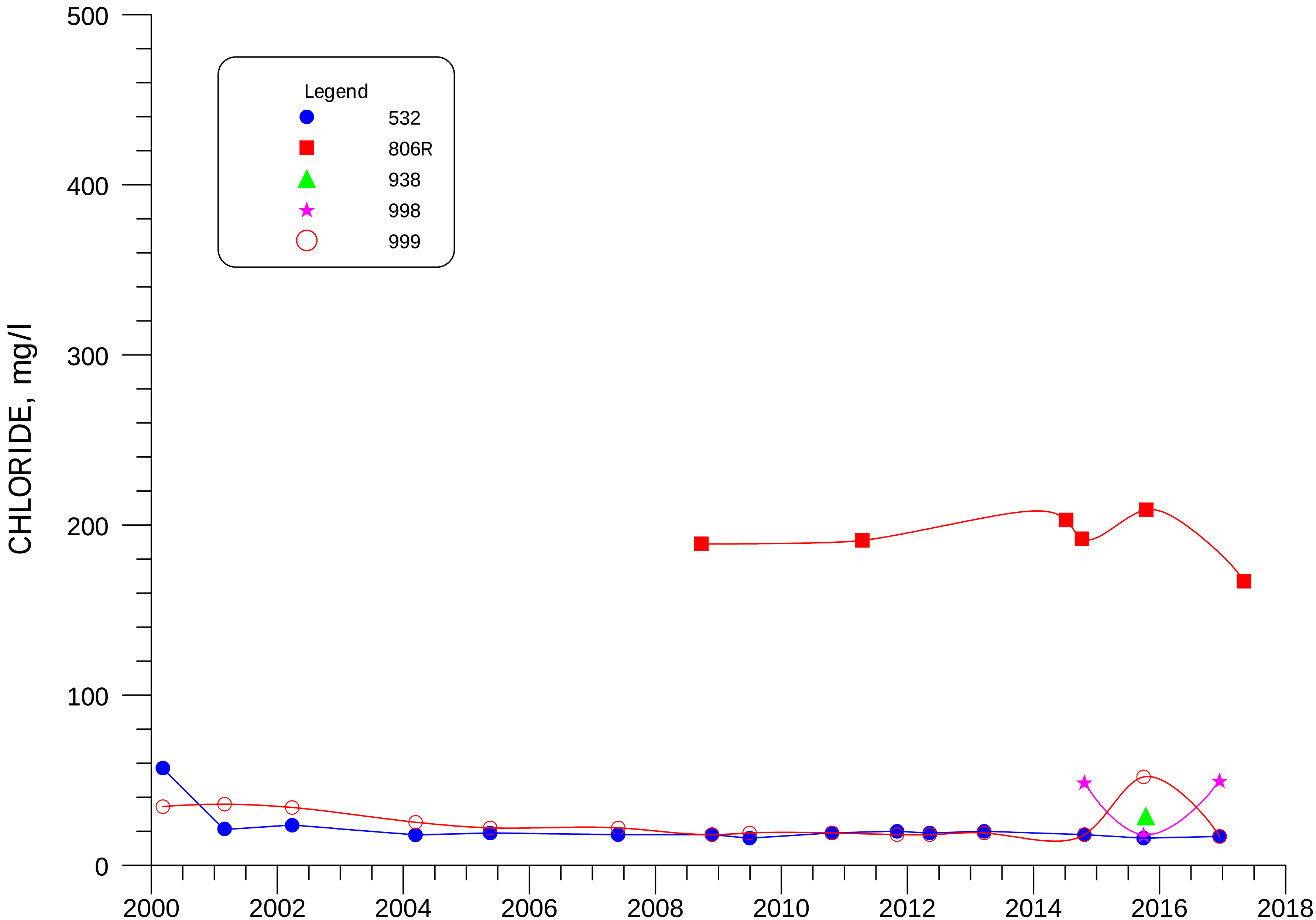

FIGURE 8.2-7. CHLORIDE CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

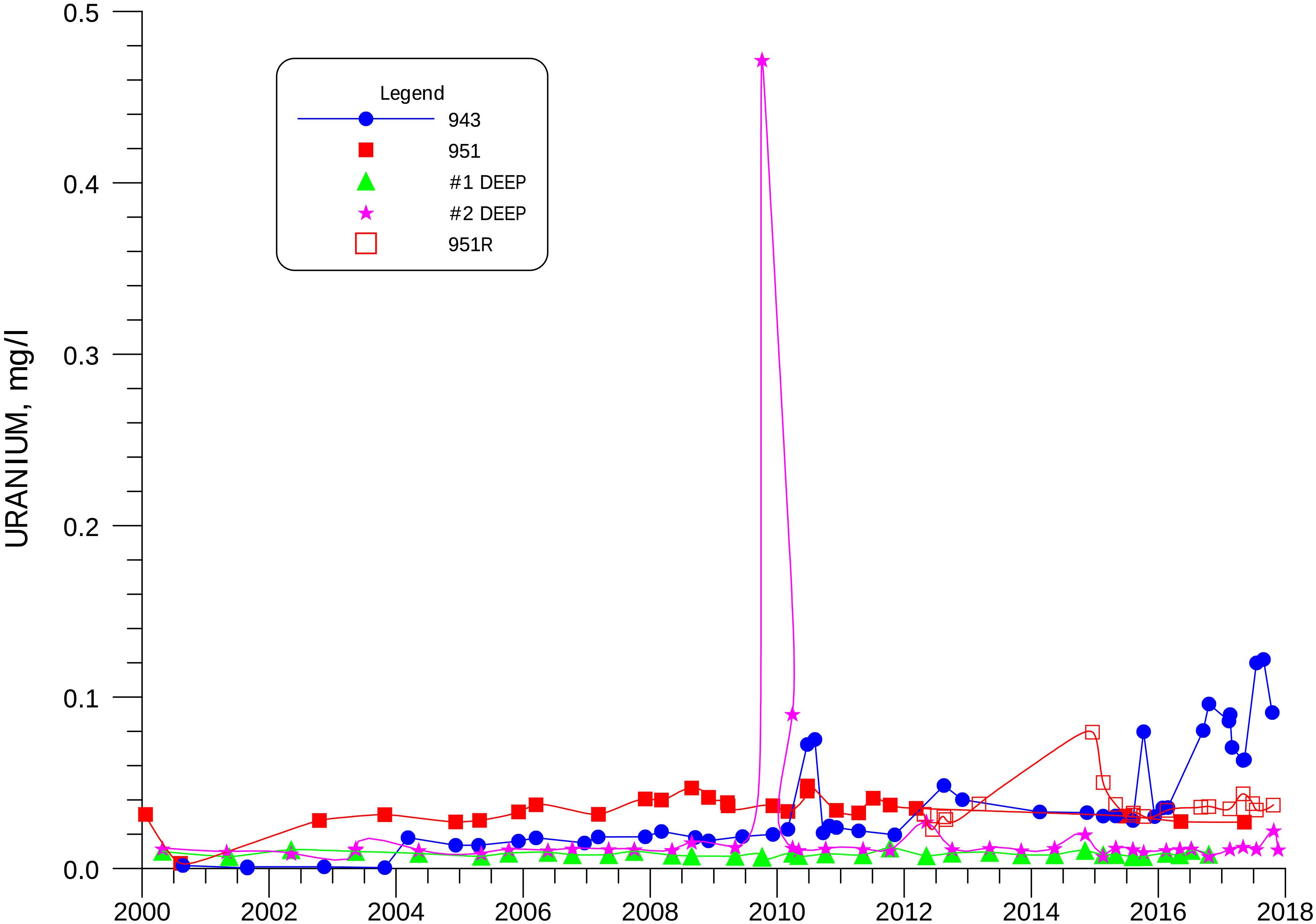

FIGURE 8.2-8. URANIUM CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

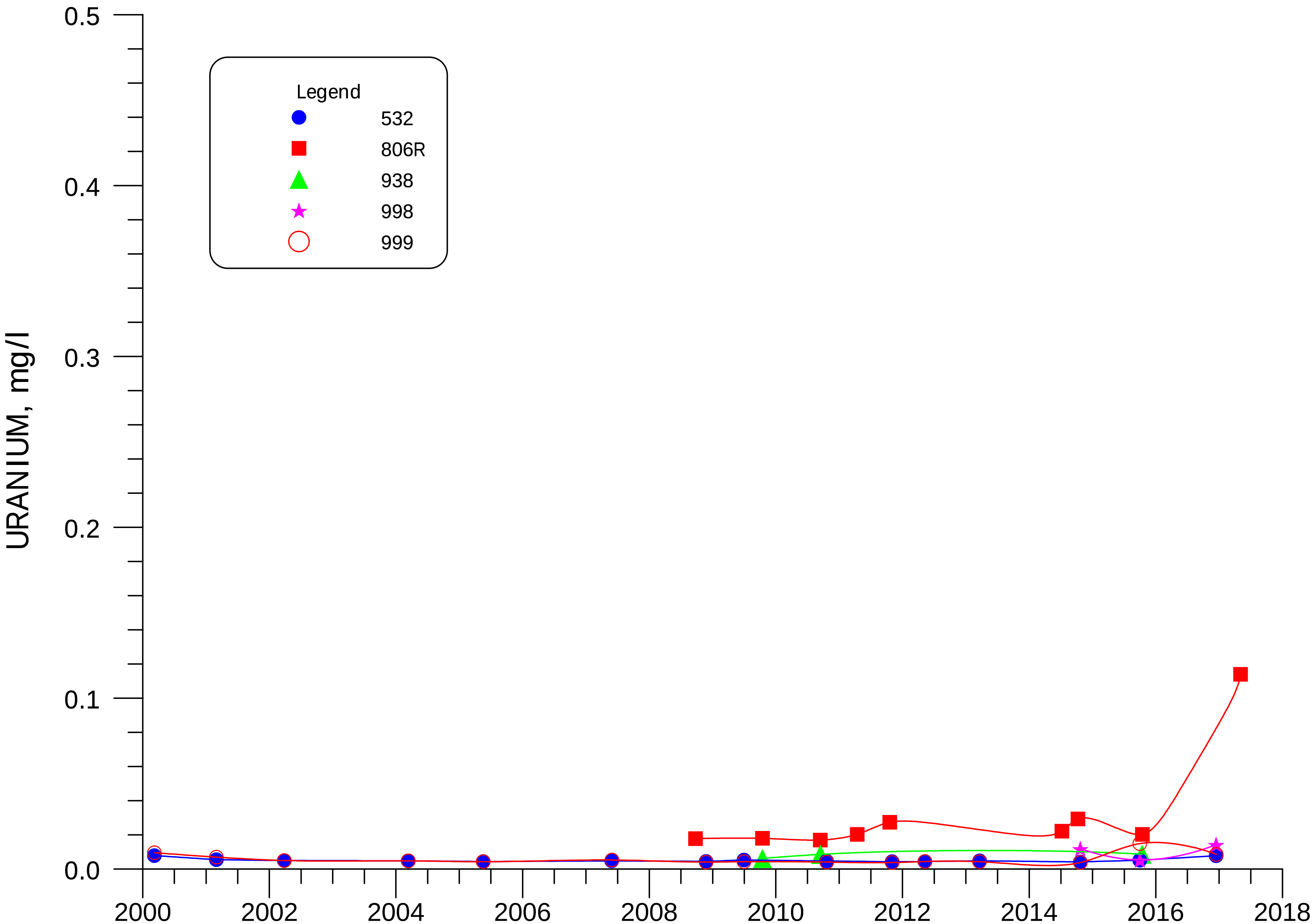

FIGURE 8.2-9. URANIUM CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

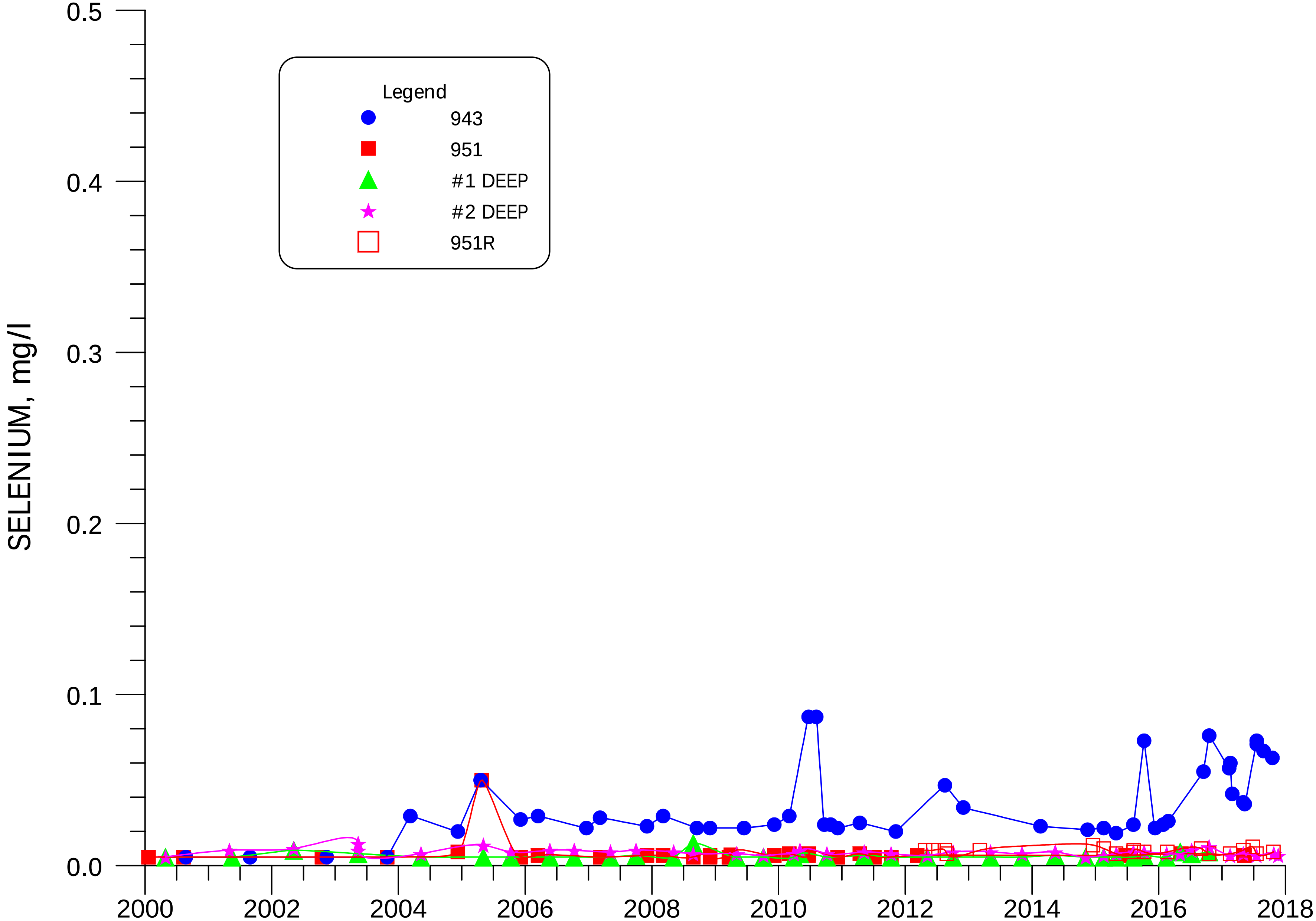

FIGURE 8.2-10. SELENIUM CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

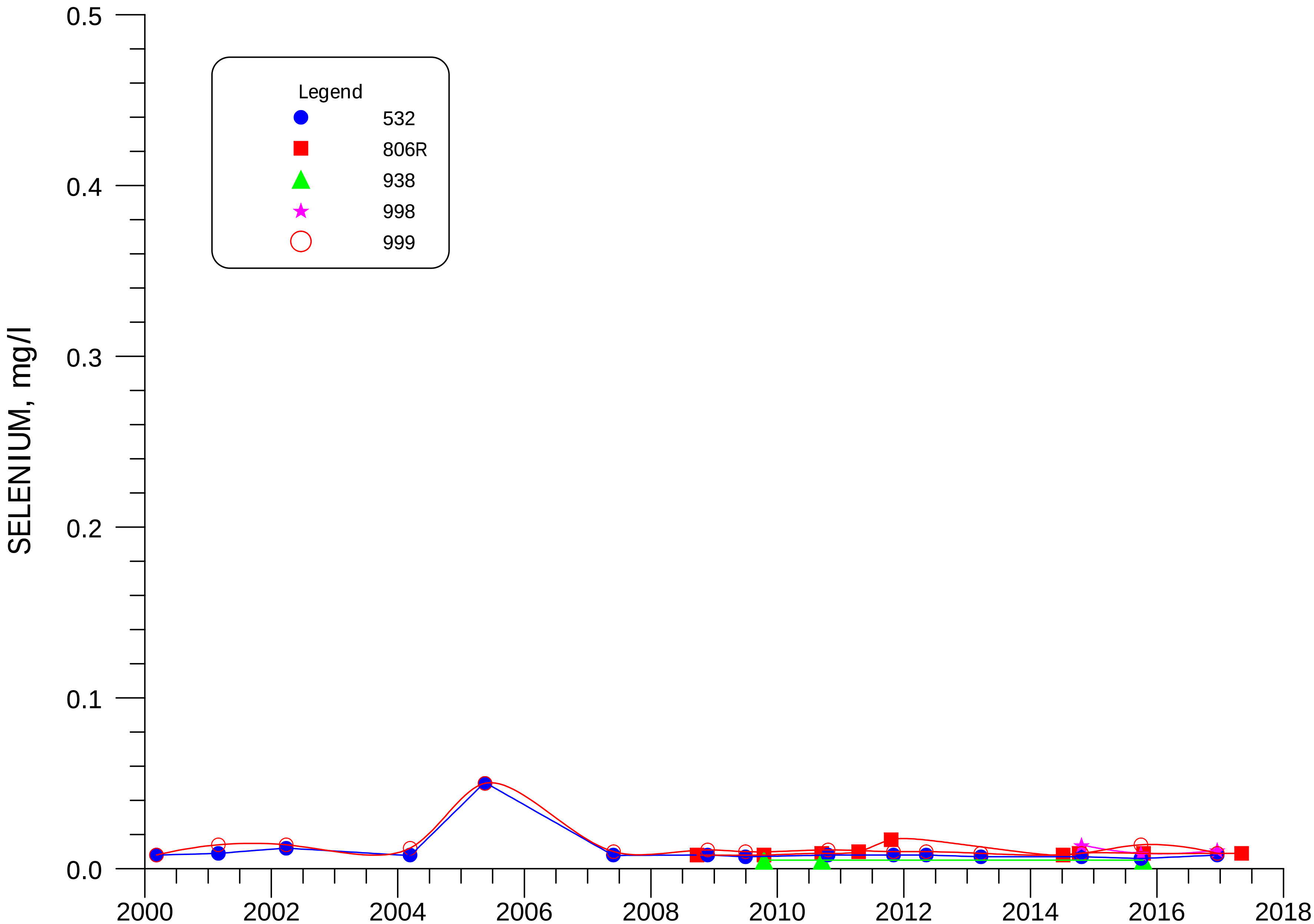

FIGURE 8.2-11. SELENIUM CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

SECTION 9

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

Page Number

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APPENDIX A

WATER LEVELS

TABLE OF CONTENTS

GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX A

Page Number

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0690	4/25/2017	37.48	6544.58
0690	12/5/2017	38.83	6543.23
0691	4/25/2017	42.95	6545.86
0691	12/5/2017	44.14	6544.67
0891	4/25/2017	33.39	6547.73
0892	12/5/2017	40.05	6547.16
1A	9/19/2017	36.90	6548.53
1C	12/5/2017	37.88	6550.11
1E	9/19/2017	35.00	6549.31
1F	9/19/2017	38.80	6548.58
1H	12/5/2017	> 55.40	< 6530.99
1I	12/5/2017	34.61	6563.74
1K	3/22/2017	33.90	6550.23
1M	3/22/2017	28.20	6547.33
1N	3/22/2017	30.35	6560.50
1N	12/5/2017	31.21	6559.64
1P	3/22/2017	33.90	6551.34
1P	12/5/2017	36.58	6548.66
1Q	1/16/2017	33.05	6550.06
1R	1/16/2017	34.50	6551.49
1T	1/16/2017	32.88	6552.03
1U	1/16/2017	34.54	6551.68
1V	1/16/2017	33.20	6551.74
B	1/2/2017	34.50	6536.40
B	1/16/2017	34.40	6536.50
B	1/23/2017	34.46	6536.44
B	1/30/2017	34.65	6536.25
B	2/6/2017	35.00	6535.90
B	2/13/2017	35.02	6535.88
B	2/27/2017	35.40	6535.50
B	3/6/2017	35.46	6535.44
B	3/13/2017	35.55	6535.35
B	3/20/2017	35.74	6535.16
B	3/22/2017	35.75	6535.15
B	3/27/2017	35.85	6535.05
B	4/3/2017	36.02	6534.88
B	4/10/2017	36.28	6534.62
B	4/17/2017	36.11	6534.79
B	4/24/2017	36.13	6534.77
B	5/1/2017	36.37	6534.53
B	5/8/2017	38.15	6532.75
B	5/15/2017	36.55	6534.35
B	5/22/2017	36.65	6534.25
B	5/29/2017	36.76	6534.14
B	6/5/2017	36.87	6534.03
B	6/12/2017	36.90	6534.00
B	6/19/2017	36.94	6533.96
B	6/26/2017	36.83	6534.07
B	7/3/2017	36.62	6534.28
B	7/10/2017	37.06	6533.84
B	7/17/2017	36.05	6534.85
B	7/24/2017	36.62	6534.28
B	7/31/2017	36.27	6534.63
B	8/7/2017	36.25	6534.65
B	8/14/2017	36.50	6534.40
B	8/21/2017	34.15	6536.75
B	8/28/2017	36.10	6534.80
B	9/4/2017	34.15	6536.75
B	9/11/2017	34.00	6536.90
B	9/18/2017	34.50	6536.40
B	9/25/2017	36.60	6534.30
B	10/2/2017	36.70	6534.20
B	10/9/2017	36.65	6534.25
B	10/16/2017	36.72	6534.18
B	10/23/2017	36.70	6534.20
B	10/30/2017	36.64	6534.26
B	11/6/2017	34.69	6536.21
B	11/13/2017	38.43	6532.47
B	11/20/2017	36.20	6534.70
B	11/27/2017	36.32	6534.58
B	12/4/2017	36.21	6534.69
B	12/11/2017	34.65	6536.25
B	12/18/2017	35.55	6535.35
B	12/25/2017	43.68	6527.22
B1	12/5/2017	38.10	6533.72
B3	5/1/2017	87.30	6486.99
B4	5/2/2017	46.21	6528.45
B5	5/1/2017	56.67	6516.79
B7	5/2/2017	44.98	6529.42
B8	5/2/2017	46.28	6529.47
B9	5/1/2017	48.78	6527.39
B12	11/13/2017	37.87	6535.15
B12	12/5/2017	37.83	6535.19
B13	3/28/2017	36.15	6533.89
B13	12/5/2017	35.85	6534.19
B15	5/2/2017	60.50	6515.81
B16	5/2/2017	45.60	6529.77
B32	5/3/2017	46.01	6529.38
B35	5/2/2017	70.12	6506.74
B38	5/2/2017	69.37	6506.30
B40	5/2/2017	70.01	6505.88
B42	5/2/2017	66.61	6512.36

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

B44

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/2/2017	67.75	6510.85

BA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	36.00	6535.58
1/16/2017	35.80	6535.78
1/23/2017	35.90	6535.68
1/30/2017	36.31	6535.27
2/6/2017	37.05	6534.53
2/13/2017	36.55	6535.03
2/27/2017	37.55	6534.03
3/6/2017	37.41	6534.17
3/13/2017	37.07	6534.51
3/20/2017	37.78	6533.80
3/27/2017	37.95	6533.63
4/3/2017	38.27	6533.31
4/10/2017	38.53	6533.05
4/17/2017	37.32	6534.26
4/24/2017	38.21	6533.37
5/1/2017	38.66	6532.92
5/8/2017	38.80	6532.78
5/15/2017	38.63	6532.95
5/22/2017	38.82	6532.76
5/29/2017	38.90	6532.68
6/5/2017	38.97	6532.61
6/12/2017	39.00	6532.58
6/19/2017	38.75	6532.83
6/26/2017	38.47	6533.11
7/3/2017	38.20	6533.38
7/10/2017	37.85	6533.73
7/17/2017	38.75	6532.83
7/24/2017	39.10	6532.48
7/31/2017	37.92	6533.66
8/7/2017	38.16	6533.42
8/14/2017	38.50	6533.08
8/21/2017	37.55	6534.03
8/28/2017	37.20	6534.38
9/4/2017	37.84	6533.74
9/11/2017	38.40	6533.18
9/18/2017	38.72	6532.86
9/25/2017	38.90	6532.68
10/2/2017	39.42	6532.16
10/9/2017	39.37	6532.21
10/16/2017	39.70	6531.88
10/23/2017	39.50	6532.08
10/30/2017	39.50	6532.08
11/6/2017	39.59	6531.99
11/13/2017	38.42	6533.16
11/20/2017	38.39	6533.19
11/27/2017	39.18	6532.40
12/4/2017	38.77	6532.81
12/11/2017	35.84	6535.74
12/18/2017	38.64	6532.94
12/25/2017	42.17	6529.41

BC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/27/2017	35.70	6538.91
12/5/2017	36.09	6538.52

BP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	40.40	6531.90

C1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/21/2017	35.40	6536.46

C5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	32.05	6537.80

C6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/21/2017	64.20	6520.69
3/31/2017	64.10	6520.79
9/20/2017	39.30	6545.59

C7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	45.49	6538.95

C8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	11.59	6572.90
9/20/2017	26.80	6557.69

C9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	76.40	6508.15
9/20/2017	21.20	6563.35

C10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	51.29	6533.97
9/20/2017	45.20	6540.06

C11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	45.82	6535.56
9/20/2017	42.50	6538.88

C12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	45.21	6535.34
9/20/2017	14.50	6566.05

D1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/20/2017	39.21	6531.69
6/28/2017	39.40	6531.50

DA3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/2/2017	39.90	6534.46

DC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/27/2017	37.80	6533.51
12/5/2017	38.00	6533.31

DD

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2017	46.54	6546.05
2/27/2017	46.55	6546.04
3/1/2017	46.55	6546.04
3/27/2017	46.71	6545.88
4/24/2017	46.63	6545.96
5/3/2017	46.83	6545.76
5/30/2017	42.00	6550.59
6/26/2017	46.89	6545.70
8/8/2017	56.20	6536.39
8/28/2017	42.30	6550.29
9/25/2017	47.31	6545.28
10/12/2017	47.10	6545.49
10/30/2017	47.25	6545.34
11/23/2017	47.20	6545.39
11/27/2017	47.39	6545.20
12/26/2017	47.41	6545.18

DD2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2017	45.29	6547.99
2/27/2017	45.00	6548.28
3/1/2017	45.40	6547.88
3/27/2017	45.05	6548.23
4/24/2017	44.97	6548.31
5/2/2017	48.33	6544.95
5/30/2017	45.10	6548.18
6/26/2017	45.21	6548.07
8/8/2017	45.20	6548.08
8/28/2017	47.51	6545.77
9/25/2017	42.60	6550.68
10/12/2017	45.28	6548.00
10/30/2017	45.20	6548.08
11/2/2017	45.40	6547.88
11/23/2017	45.43	6547.85
11/27/2017	45.33	6547.95
12/26/2017	45.45	6547.83

DD3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/12/2017	48.51	6552.43
11/2/2017	48.50	6552.44

DD4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/12/2017	47.66	6551.77
11/2/2017	47.52	6551.91
12/7/2017	47.77	6551.66

DD5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/12/2017	48.47	6546.88
11/2/2017	48.45	6546.90

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

DZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	32.50	6558.03
1/16/2017	52.00	6538.53
1/23/2017	52.25	6538.28
1/30/2017	52.48	6538.05
2/6/2017	41.18	6549.35
2/13/2017	53.72	6536.81
2/27/2017	52.50	6538.03
3/6/2017	52.48	6538.05
3/13/2017	51.56	6538.97
3/20/2017	53.62	6536.91
3/27/2017	53.55	6536.98
4/3/2017	53.55	6536.98
4/10/2017	45.15	6545.38
4/17/2017	32.75	6557.78
4/24/2017	27.20	6563.33
5/1/2017	54.05	6536.48
5/8/2017	53.90	6536.63
5/15/2017	50.00	6540.53
5/22/2017	54.56	6535.97
5/29/2017	54.70	6535.83
6/5/2017	54.33	6536.20
6/12/2017	54.98	6535.55
6/19/2017	48.10	6542.43
6/26/2017	52.31	6538.22
6/27/2017	52.31	6538.22
7/3/2017	52.76	6537.77
7/10/2017	51.50	6539.03
7/17/2017	53.30	6537.23
7/24/2017	55.20	6535.33
7/31/2017	54.60	6535.93
8/7/2017	53.16	6537.37
8/14/2017	54.60	6535.93
8/21/2017	52.90	6537.63
9/4/2017	52.47	6538.06
9/11/2017	33.00	6557.53
9/18/2017	52.75	6537.78
9/25/2017	52.30	6538.23
10/2/2017	53.48	6537.05
10/9/2017	34.15	6556.38
10/16/2017	55.82	6534.71
10/23/2017	55.00	6535.53
10/30/2017	54.41	6536.12
11/6/2017	54.45	6536.08
11/13/2017	54.80	6535.73
11/20/2017	54.79	6535.74
11/27/2017	54.72	6535.81
12/4/2017	53.56	6536.97
12/11/2017	54.87	6535.66
12/18/2017	54.79	6535.74
12/25/2017	56.73	6533.80

F

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/17/2017	30.85	6533.97
11/14/2017	33.00	6531.82
12/5/2017	33.37	6531.45

FB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/17/2017	32.52	6533.14
11/14/2017	34.20	6531.46

GF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	36.72	6529.29

GH

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/17/2017	31.34	6531.42
11/14/2017	34.45	6528.31
12/5/2017	34.73	6528.03

GK

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/14/2017	35.73	6531.03

GN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/20/2017	34.30	6533.67
8/14/2017	36.30	6531.67

GV

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/20/2017	48.80	6528.58
12/5/2017	49.80	6527.58

GW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	34.61	6530.66

GW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	36.23	6529.85

K4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	60.63	6541.39
3/31/2017	63.80	6538.22
11/6/2017	67.27	6534.75

K5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	56.98	6544.75
3/31/2017	52.24	6549.49
11/7/2017	71.05	6530.68

K7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	57.70	6543.83
3/31/2017	57.94	6543.59
11/6/2017	63.00	6538.53

K8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	57.22	6543.27
3/31/2017	58.70	6541.79
11/6/2017	64.24	6536.25

K9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	58.87	6541.47
3/31/2017	57.84	6542.50
11/7/2017	62.29	6538.05

K10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	59.78	6541.03
3/31/2017	57.60	6543.21
11/7/2017	59.90	6540.91

K11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	60.99	6539.62
3/31/2017	57.59	6543.02
11/7/2017	80.29	6520.32

KF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/28/2017	30.45	6539.76

KZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	51.00	6520.72
1/16/2017	31.50	6540.22
1/23/2017	31.40	6540.32
1/30/2017	31.35	6540.37
2/6/2017	31.36	6540.36
2/13/2017	31.58	6540.14
2/27/2017	31.90	6539.82
3/6/2017	32.00	6539.72
3/13/2017	32.20	6539.52
3/20/2017	32.30	6539.42
3/27/2017	32.60	6539.12
3/28/2017	32.45	6539.27
4/3/2017	32.36	6539.36
4/10/2017	32.40	6539.32
4/17/2017	32.47	6539.25
4/24/2017	32.30	6539.42
5/1/2017	32.66	6539.06
5/8/2017	32.93	6538.79
5/15/2017	32.81	6538.91
5/22/2017	33.00	6538.72
5/29/2017	33.15	6538.57
6/5/2017	33.25	6538.47
6/12/2017	33.37	6538.35
6/19/2017	33.47	6538.25
6/26/2017	33.40	6538.32
7/3/2017	33.51	6538.21
7/10/2017	33.50	6538.22
7/17/2017	33.45	6538.27
7/24/2017	33.69	6538.03
7/31/2017	33.76	6537.96
8/7/2017	33.94	6537.78
8/14/2017	34.40	6537.32
8/21/2017	34.20	6537.52
8/28/2017	33.80	6537.92
9/4/2017	33.50	6538.22
9/11/2017	50.00	6521.72
9/18/2017	33.46	6538.26
9/25/2017	33.90	6537.82
10/2/2017	34.30	6537.42
10/9/2017	33.70	6538.02
10/16/2017	33.45	6538.27
10/23/2017	33.00	6538.72
10/30/2017	33.10	6538.62
11/6/2017	33.13	6538.59
11/13/2017	33.11	6538.61
11/20/2017	33.54	6538.18
11/27/2017	33.47	6538.25
12/4/2017	33.52	6538.20
12/11/2017	33.45	6538.27
12/18/2017	33.64	6538.08
12/25/2017	33.68	6538.04

L

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/6/2017	57.33	6517.64
5/1/2017	57.12	6517.85
10/23/2017	57.34	6517.63

* Drawdown Tube Pressure, # Transducer Reading

DZ - L

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
L5	1/6/2017	55.86	6520.21
	5/1/2017	48.45	6527.62
	10/23/2017	51.55	6524.52
L6	5/1/2017	29.57	6545.07
	10/23/2017	33.33	6541.31
L7	1/6/2017	62.80	6513.81
	5/1/2017	45.25	6531.36
	10/23/2017	49.22	6527.39
L8	1/6/2017	68.50	6507.99
	5/1/2017	38.41	6538.08
	10/23/2017	36.72	6539.77
L9	1/6/2017	54.09	6523.14
	10/23/2017	51.79	6525.44
L10	1/6/2017	45.23	6531.60
	10/23/2017	45.22	6531.61
L11	4/24/2017	32.77	6543.28
L12	5/16/2017	50.61	6536.33
L13	5/19/2017	51.61	6533.80
L14	5/19/2017	47.26	6533.58
L15	4/24/2017	45.25	6533.15
L16	5/16/2017	46.83	6532.67
L19	4/24/2017	47.25	6533.80
L20	4/24/2017	49.68	6534.96
L23	5/16/2017	53.23	6536.03
L24	4/24/2017	53.31	6534.76
L25	4/24/2017	46.07	6533.47
L26	4/25/2017	35.12	6544.55
M3	3/23/2017	40.15	6535.95
M5	12/5/2017	40.39	6534.95
M6	3/24/2017	59.85	6515.19
	12/5/2017	50.44	6524.60
M7	12/5/2017	56.10	6516.75
M9	12/5/2017	63.65	6513.16
M10	3/24/2017	58.50	6514.86
	12/5/2017	69.92	6503.44
MA	12/5/2017	40.91	6531.31
MB	11/13/2017	41.50	6530.56
MC	12/5/2017	42.90	6529.16
MF	12/5/2017	46.04	6526.24
MH	12/5/2017	50.51	6523.41
MJ	12/5/2017	50.51	6522.43
ML	3/24/2017	50.65	6522.05
	12/5/2017	51.44	6521.26
MN	12/5/2017	59.85	6517.71
MQ	3/24/2017	69.30	6505.00
	9/19/2017	72.20	6502.10
MU	12/1/2017	36.38	6537.81
	12/5/2017	30.05	6544.14
MW	3/24/2017	89.50	6485.41
	12/5/2017	59.98	6514.93
MX	3/20/2017	48.85	6519.76
	8/11/2017	49.20	6519.41
	11/13/2017	49.27	6519.34
MY	11/13/2017	59.15	6514.41
MZ	3/24/2017	60.90	6515.74
	12/5/2017	62.00	6514.64
NC	12/5/2017	40.69	6545.14
ND	12/5/2017	41.26	6551.63
	12/11/2017	41.22	6551.67
NE5	6/30/2017	76.71	6590.29
P	6/1/2017	38.74	6548.52
	8/24/2017	38.90	6548.36
	10/26/2017	39.59	6547.67
P2	3/23/2017	41.70	6548.09
P3	3/23/2017	41.35	6548.60
Q	3/23/2017	42.05	6551.77
	5/3/2017	42.25	6551.57
	6/1/2017	70.27	6523.55
	12/5/2017	42.10	6551.72
R	5/3/2017	39.95	6564.08
	12/4/2017	39.85	6564.18
S	12/5/2017	42.67	6538.50

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

S2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	39.00	6534.72
1/13/2017	46.40	6527.32
1/16/2017	36.36	6537.36
1/23/2017	36.52	6537.20
1/30/2017	36.20	6537.52
2/6/2017	35.87	6537.85
2/13/2017	35.88	6537.84
2/27/2017	36.15	6537.57
3/6/2017	35.68	6538.04
3/13/2017	35.88	6537.84
3/20/2017	35.71	6538.01
3/27/2017	36.25	6537.47
4/3/2017	36.17	6537.55
4/10/2017	36.46	6537.26
4/17/2017	36.10	6537.62
4/24/2017	36.18	6537.54
5/1/2017	36.93	6536.79
5/8/2017	36.40	6537.32
5/15/2017	36.52	6537.20
5/22/2017	36.23	6537.49
5/29/2017	36.31	6537.41
6/5/2017	36.46	6537.26
6/12/2017	36.15	6537.57
6/19/2017	41.56	6532.16
6/26/2017	36.81	6536.91
7/3/2017	36.79	6536.93
7/10/2017	39.81	6533.91
7/17/2017	37.20	6536.52
7/18/2017	37.25	6536.47
7/24/2017	37.07	6536.65
7/31/2017	32.04	6541.68
8/7/2017	37.12	6536.60
8/14/2017	38.10	6535.62
8/21/2017	46.60	6527.12
8/28/2017	37.80	6535.92
9/4/2017	37.41	6536.31
9/11/2017	38.00	6535.72
9/18/2017	38.21	6535.51
9/25/2017	39.80	6533.92
10/2/2017	41.10	6532.62
10/9/2017	37.23	6536.49
10/16/2017	44.17	6529.55
10/23/2017	38.00	6535.72
10/30/2017	37.57	6536.15
11/6/2017	37.68	6536.04
11/13/2017	37.55	6536.17
11/20/2017	37.11	6536.61
11/27/2017	35.67	6538.05
12/4/2017	37.32	6536.40
12/5/2017	37.34	6536.38
12/11/2017	38.11	6535.61
12/18/2017	37.21	6536.51
12/25/2017	46.72	6527.00

S3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/19/2017	39.10	6535.68
12/5/2017	39.03	6535.75

S4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/14/2017	37.30	6537.99
11/13/2017	38.46	6536.83
12/5/2017	38.26	6537.03

S5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	42.00	6532.69
1/16/2017	42.04	6532.65
1/23/2017	42.21	6532.48
1/30/2017	42.22	6532.47
2/6/2017	42.25	6532.44
2/13/2017	42.30	6532.39
2/27/2017	42.20	6532.49
3/6/2017	42.01	6532.68
3/13/2017	42.08	6532.61
3/20/2017	42.14	6532.55
3/27/2017	42.35	6532.34
4/3/2017	42.45	6532.24
4/10/2017	42.68	6532.01
4/17/2017	42.20	6532.49
4/24/2017	42.30	6532.39
5/1/2017	42.30	6532.39
5/8/2017	42.46	6532.23
5/15/2017	42.17	6532.52
5/22/2017	42.16	6532.53
5/29/2017	42.10	6532.59
6/5/2017	42.30	6532.39
6/12/2017	42.38	6532.31
6/19/2017	42.59	6532.10
6/26/2017	42.67	6532.02
7/3/2017	42.77	6531.92
7/10/2017	43.75	6530.94
7/17/2017	42.90	6531.79
7/24/2017	43.00	6531.69
7/31/2017	41.85	6532.84
8/7/2017	42.90	6531.79
8/14/2017	43.70	6530.99
8/21/2017	43.40	6531.29
8/28/2017	43.30	6531.39
9/4/2017	42.95	6531.74
9/11/2017	43.00	6531.69
9/18/2017	43.44	6531.25
9/25/2017	42.30	6532.39
10/2/2017	43.35	6531.34
10/9/2017	43.38	6531.31
10/16/2017	43.50	6531.19
10/23/2017	41.00	6533.69
10/30/2017	43.22	6531.47
11/6/2017	43.57	6531.12
11/13/2017	43.12	6531.57
11/20/2017	42.88	6531.81
11/27/2017	42.85	6531.84
12/4/2017	42.80	6531.89
12/11/2017	42.81	6531.88
12/18/2017	42.90	6531.79
12/25/2017	42.78	6531.91

S5R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/23/2017	43.30	6537.19

S11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/16/2017	32.68	6545.71
10/13/2017	35.51	6542.88
12/5/2017	35.70	6542.69

S19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	35.05	6542.92
12/5/2017	37.36	6540.61

S21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	35.15	6545.13

SA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	41.80	6538.51
11/13/2017	73.40	6506.91

SB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	43.70	6537.39
11/9/2017	58.83	6522.26

SE

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/4/2017	65.80	6512.19

SE6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/17/2017	41.12	6537.79
11/13/2017	42.57	6536.34

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

SM

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	39.00	6539.74
1/16/2017	39.00	6539.74
1/23/2017	39.03	6539.71
1/30/2017	39.17	6539.57
2/6/2017	39.09	6539.65
2/13/2017	39.09	6539.65
2/27/2017	38.90	6539.84
3/6/2017	38.88	6539.86
3/13/2017	39.00	6539.74
3/20/2017	39.05	6539.69
3/27/2017	39.10	6539.64
4/3/2017	39.13	6539.61
4/10/2017	39.27	6539.47
4/17/2017	39.20	6539.54
4/24/2017	39.10	6539.64
5/1/2017	39.24	6539.50
5/3/2017	39.32	6539.42
5/8/2017	40.50	6538.24
5/15/2017	39.14	6539.60
5/22/2017	39.28	6539.46
5/29/2017	39.18	6539.56
6/5/2017	39.25	6539.49
6/12/2017	39.29	6539.45
6/19/2017	39.48	6539.26
6/26/2017	39.53	6539.21
7/3/2017	39.62	6539.12
7/10/2017	39.78	6538.96
7/17/2017	39.75	6538.99
7/24/2017	39.95	6538.79
7/31/2017	40.03	6538.71
8/7/2017	40.08	6538.66
8/14/2017	40.19	6538.55
8/21/2017	41.70	6537.04
8/28/2017	40.80	6537.94
9/4/2017	40.55	6538.19
9/11/2017	52.00	6526.74
9/18/2017	40.72	6538.02
9/25/2017	40.60	6538.14
10/2/2017	40.62	6538.12
10/9/2017	40.69	6538.05
10/16/2017	40.81	6537.93
10/23/2017	41.00	6537.74
10/30/2017	40.59	6538.15
11/6/2017	40.66	6538.08
11/13/2017	40.68	6538.06
11/20/2017	40.47	6538.27
11/27/2017	44.50	6534.24
12/4/2017	40.83	6537.91
12/11/2017	40.29	6538.45
12/18/2017	40.30	6538.44
12/25/2017	40.17	6538.57

SN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	---	---
1/16/2017	---	---
1/23/2017	---	---
1/30/2017	---	---
2/6/2017	---	---
2/13/2017	---	---
2/27/2017	---	---
3/6/2017	---	---
3/13/2017	---	---
3/20/2017	---	---
3/27/2017	---	---
4/3/2017	---	---
4/10/2017	---	---
4/17/2017	---	---
4/24/2017	---	---
5/1/2017	---	---
5/8/2017	---	---
5/15/2017	---	---
5/22/2017	---	---
5/29/2017	---	---
6/5/2017	---	---
6/12/2017	---	---
6/19/2017	---	---
6/26/2017	---	---
7/3/2017	---	---
7/10/2017	---	---
7/17/2017	---	---
7/24/2017	---	---
7/31/2017	---	---
8/7/2017	---	---
8/14/2017	---	---
8/21/2017	---	---
8/28/2017	---	---
9/4/2017	---	---
9/11/2017	---	---
9/18/2017	---	---
9/25/2017	---	---
10/2/2017	---	---
10/9/2017	---	---
10/16/2017	---	---
10/23/2017	---	---
10/30/2017	---	---
11/6/2017	---	---
11/13/2017	---	---
11/20/2017	---	---
11/27/2017	---	---
12/4/2017	---	---
12/5/2017	---	---
12/11/2017	---	---
12/18/2017	---	---
12/25/2017	---	---

SO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	40.00	6538.79
1/16/2017	40.12	6538.67
1/23/2017	40.18	6538.61
1/30/2017	40.29	6538.50
2/6/2017	40.20	6538.59
2/13/2017	40.16	6538.63
2/27/2017	39.90	6538.89
3/6/2017	39.84	6538.95
3/13/2017	40.00	6538.79
3/20/2017	40.07	6538.72
3/27/2017	40.10	6538.69
4/3/2017	40.14	6538.65
4/10/2017	40.30	6538.49
4/17/2017	40.20	6538.59
4/24/2017	40.12	6538.67
5/1/2017	40.25	6538.54
5/3/2017	40.20	6538.59
5/8/2017	40.10	6538.69
5/15/2017	39.98	6538.81
5/22/2017	40.10	6538.69
5/29/2017	40.04	6538.75
6/5/2017	40.08	6538.71
6/12/2017	40.19	6538.60
6/19/2017	40.23	6538.56
6/26/2017	40.36	6538.43
7/3/2017	40.50	6538.29
7/10/2017	40.58	6538.21
7/17/2017	40.80	6537.99
7/24/2017	40.88	6537.91
7/31/2017	41.02	6537.77
8/7/2017	40.95	6537.84
8/14/2017	40.53	6538.26
8/21/2017	41.40	6537.39
8/28/2017	41.50	6537.29
9/4/2017	41.29	6537.50
9/11/2017	42.00	6536.79
9/18/2017	41.61	6537.18
9/25/2017	41.50	6537.29
10/2/2017	41.50	6537.29
10/9/2017	41.46	6537.33
10/16/2017	48.52	6530.27
10/23/2017	41.00	6537.79
10/30/2017	41.27	6537.52
11/6/2017	41.40	6537.39
11/13/2017	41.31	6537.48
11/20/2017	41.17	6537.62
11/27/2017	41.10	6537.69
12/4/2017	40.12	6538.67
12/11/2017	40.98	6537.81
12/18/2017	41.05	6537.74
12/25/2017	40.31	6538.48

* Drawdown Tube Pressure, # Transducer Reading

SM - SO

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

SP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2017	40.00	6538.66
1/16/2017	39.91	6538.75
1/23/2017	39.96	6538.70
1/30/2017	40.07	6538.59
2/6/2017	40.01	6538.65
2/13/2017	39.96	6538.70
2/27/2017	39.80	6538.86
3/6/2017	39.71	6538.95
3/13/2017	39.80	6538.86
3/20/2017	39.88	6538.78
3/27/2017	39.90	6538.76
4/3/2017	39.96	6538.70
4/10/2017	40.12	6538.54
4/17/2017	40.00	6538.66
4/24/2017	39.98	6538.68
5/1/2017	40.06	6538.60
5/8/2017	40.05	6538.61
5/15/2017	39.90	6538.76
5/22/2017	40.00	6538.66
5/29/2017	39.93	6538.73
6/5/2017	40.05	6538.61
6/12/2017	40.10	6538.56
6/19/2017	40.10	6538.56
6/26/2017	40.28	6538.38
7/3/2017	40.40	6538.26
7/10/2017	40.48	6538.18
7/17/2017	40.60	6538.06
7/24/2017	40.75	6537.91
7/31/2017	41.05	6537.61
8/7/2017	40.81	6537.85
8/14/2017	40.91	6537.75
8/21/2017	41.30	6537.36
8/28/2017	41.10	6537.56
9/4/2017	41.11	6537.55
9/11/2017	41.00	6537.66
9/18/2017	41.40	6537.26
9/25/2017	42.30	6536.36
10/2/2017	43.80	6534.86
10/9/2017	41.35	6537.31
10/16/2017	48.40	6530.26
10/23/2017	41.00	6537.66
10/30/2017	44.15	6534.51
11/6/2017	41.40	6537.26
11/13/2017	41.19	6537.47
11/20/2017	41.05	6537.61
11/27/2017	40.98	6537.68
12/4/2017	40.88	6537.78
12/11/2017	40.92	6537.74
12/18/2017	41.00	6537.66
12/25/2017	40.70	6537.96

ST

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/16/2017	40.90	6538.41
1/24/2017	38.61	6540.70
3/23/2017	45.15	6534.16

SV

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/22/2017	40.30	6538.95

SW

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/3/2017	42.55	6538.74

SZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/16/2017	37.18	6544.29
12/5/2017	39.01	6542.46

T

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/26/2017	61.90	6517.33

T2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2017	120.10	6544.72

T10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/3/2017	91.20	6568.76

T11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/29/2017	114.42	6542.39

T19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/9/2017	125.71	6542.05

T20

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/11/2017	149.10	6521.59

T21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/11/2017	128.34	6541.66

T22

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2017	119.70	6547.49

T25

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/31/2017	120.36	6536.98

T37

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/30/2017	116.13	6540.39

T40

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2017	128.60	6541.67

T41

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2017	92.56	6567.40

T50

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/30/2017	114.88	6541.62

T51

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/29/2017	115.29	6542.05

TA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/26/2017	41.70	6538.60

TB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/26/2017	39.20	6544.37

W

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	42.58	6529.56
12/5/2017	42.61	6529.53

X

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2017	29.08	6542.53
2/27/2017	29.35	6542.26
3/1/2017	29.35	6542.26
3/27/2017	29.66	6541.95
4/24/2017	30.10	6541.51
5/1/2017	33.72	6537.89
5/30/2017	30.38	6541.23
6/26/2017	30.70	6540.91
8/28/2017	30.90	6540.71
9/25/2017	32.70	6538.91
10/26/2017	29.62	6541.99
10/30/2017	29.72	6541.89
11/27/2017	28.50	6543.11
12/26/2017	28.46	6543.15

X18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/19/2017	36.70	6549.38

* Drawdown Tube Pressure, # Transducer Reading

SP - X18

TABLE A.1-2 WATER LEVELS FOR THE SUBDIVISION ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 2/20/2018

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0483		
8/24/2017	35.90	6526.76
0490		
6/27/2017	27.10	6535.32
12/5/2017	29.10	6533.32
0497		
3/17/2017	50.00	6512.62
6/27/2017	53.90	6508.72
12/5/2017	47.64	6514.98
0498		
8/24/2017	50.80	6509.79
0525		
9/25/2017	51.80	6518.20
0688		
3/27/2017	58.87	6503.75
8/9/2017	59.00	6503.62
12/5/2017	59.25	6503.37
0844		
3/27/2017	35.96	6520.17
12/5/2017	36.40	6519.73
0845		
3/27/2017	33.45	6523.60
12/5/2017	34.25	6522.80
AW		
11/30/2017	34.01	6529.42
12/5/2017	35.95	6527.48
Q2		
12/20/2017	83.04	6478.64
Q3		
3/17/2017	69.48	6490.26
Q5		
12/20/2017	72.08	6489.40
Q8		
12/5/2017	53.56	6507.24
Q9		
3/24/2017	76.00	6485.33
8/21/2017	50.90	6510.43
Q23		
12/5/2017	51.90	6512.36
Q44		
12/5/2017	51.97	6509.36
Q48		
12/5/2017	48.98	6518.86
SUB3		
10/26/2017	35.33	6521.74

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL)

3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0520	4/27/2017	50.52	6535.50
0520	12/5/2017	51.87	6534.15
0521	4/27/2017	52.10	6532.34
0522	4/27/2017	50.34	6530.19
0540	11/6/2017	58.87	6497.04
0540	12/5/2017	60.94	6494.97
0541	11/9/2017	89.66	6465.96
0541	12/5/2017	89.79	6465.83
0551	2/24/2017	97.18	6450.12
0551	3/28/2017	97.28	6450.02
0551	12/5/2017	98.10	6449.20
0553	3/27/2017	102.64	6444.84
0553	12/5/2017	103.25	6444.23
0554	3/27/2017	104.82	6442.35
0554	12/5/2017	105.65	6441.52
0555	3/27/2017	41.83	6515.31
0556	3/27/2017	47.11	6508.91
0631	6/30/2017	86.40	6454.70
0631	12/5/2017	82.88	6458.22
0632	6/30/2017	83.03	6458.27
0632	12/5/2017	81.23	6460.07
0634	3/20/2017	69.83	6490.24
0634	7/11/2017	71.00	6489.07
0634	12/5/2017	68.40	6491.67
0634	12/13/2017	67.97	6492.10
0637	10/6/2017	110.60	6464.60
0638	4/27/2017	45.44	6540.12
0638	12/5/2017	46.55	6539.01
0639	4/27/2017	51.61	6536.27
0640	12/5/2017	> 84.00	< 6495.97
0644	11/6/2017	68.21	6475.69
0644	12/5/2017	67.88	6476.02
0646	11/14/2017	71.91	6471.44
0646	12/5/2017	71.68	6471.67
0647	3/15/2017	102.95	6448.96
0647	12/5/2017	103.83	6448.08
0649	3/15/2017	101.56	6441.73
0649	12/5/2017	101.90	6441.39
0650	3/27/2017	81.38	6465.73
0650	12/5/2017	81.60	6465.51
0652	12/5/2017	83.95	6454.20
0654	11/14/2017	73.29	6477.21
0656	12/5/2017	72.60	6481.47
0657	12/5/2017	99.00	6452.81
0658	2/21/2017	106.24	6443.94
0658	12/5/2017	106.40	6443.78
0659	3/20/2017	69.56	6490.61
0659	12/5/2017	67.30	6492.87
0680	12/5/2017	73.20	6485.67
0681	12/5/2017	63.25	6497.27
0684	12/5/2017	95.45	6457.83
0686	10/6/2017	112.10	6466.70
0687	12/5/2017	93.10	6462.86
0846	3/27/2017	43.79	6505.13
0846	8/9/2017	43.80	6505.12
0846	12/5/2017	43.84	6505.08
0851	12/5/2017	84.71	6461.73
0852	12/5/2017	68.79	6521.35
0862	3/21/2017	62.06	6494.12
0862	8/24/2017	55.20	6500.98
0862	12/5/2017	58.91	6497.27
0866	3/21/2017	60.70	6497.42
0867	12/5/2017	60.40	6495.50
0869	11/3/2017	65.44	6479.05
0869	12/5/2017	65.34	6479.15
0876	12/5/2017	64.34	6479.92
0877	12/5/2017	60.85	6492.23
0879	12/5/2017	64.41	6480.14
0881	2/23/2017	71.47	6493.57
0882	3/15/2017	63.90	6497.26
0883	12/5/2017	59.05	6498.08

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0884	3/27/2017	71.02	6495.08
0885	3/29/2017	64.20	6500.44
	10/4/2017	64.00	6500.64
	12/5/2017	64.70	6499.94
0886	3/3/2017	67.72	6496.83
	11/6/2017	67.54	6497.01
	11/9/2017	67.70	6496.85
0887	12/5/2017	62.40	6505.33
0888	3/28/2017	74.02	6483.31
	10/6/2017	75.30	6482.03
	12/5/2017	76.20	6481.13
0889	12/5/2017	65.71	6483.92
0890	7/11/2017	73.50	6484.93
	12/13/2017	73.43	6485.00
0893	3/14/2017	67.52	6496.45
	12/5/2017	63.70	6500.27
0895	10/3/2017	83.20	6470.64
0896	10/3/2017	84.60	6471.01
0897	12/5/2017	79.30	6482.95
0899	10/3/2017	99.00	6471.84
0921	12/11/2017	40.46	6583.54
0994	8/24/2017	91.85	6463.15
	10/27/2017	92.15	6462.85
H1	11/9/2017	74.57	6484.68
	12/13/2017	74.14	6485.11
H2A	3/20/2017	72.50	6487.37
	12/5/2017	78.00	6481.87
	12/13/2017	77.70	6482.17
H7	12/13/2017	82.68	6476.86
H7A	12/5/2017	75.60	6483.49
H7B	12/13/2017	91.79	6467.59
H12	11/7/2017	70.21	6493.41
	12/13/2017	87.18	6476.44
H16	12/13/2017	63.10	6494.88
H17	3/28/2017	> 29.00	< 6534.36
	12/13/2017	29.00	6534.36
H24	12/13/2017	82.71	6483.16
H26	12/13/2017	82.56	6484.25
H27	3/28/2017	69.14	6496.11
H28	3/28/2017	68.22	6497.16
H29	3/28/2017	65.41	6496.59
H32	3/28/2017	67.82	6497.29
H33	3/28/2017	68.60	6497.48
H34	3/29/2017	67.85	6498.34
H35	3/29/2017	67.70	6497.23
H37	3/29/2017	61.71	6498.85
H38	3/29/2017	63.31	6499.18
H41	3/29/2017	63.21	6501.12
H46	3/29/2017	66.14	6501.22
	11/3/2017	66.90	6500.46
H55	11/13/2017	62.61	6506.64
H56	11/3/2017	63.37	6506.12
H61	11/3/2017	61.94	6508.55
H70	11/3/2017	64.62	6510.00
H71	11/3/2017	62.90	6509.42
H75	3/29/2017	66.29	6498.96
H95	12/5/2017	63.60	6505.31
H106	3/29/2017	65.97	6498.78
M16	9/19/2017	66.60	6503.99
	12/5/2017	62.70	6507.89
M18	3/29/2017	60.52	6511.76
MO	3/17/2017	62.05	6510.84
	12/5/2017	62.10	6510.79
MP	12/5/2017	103.10	6471.38

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
MR		
3/20/2017	67.25	6499.01
5/1/2017	66.75	6499.51
8/11/2017	67.20	6499.06
10/13/2017	66.71	6499.55
12/5/2017	62.70	6503.56
MS		
3/29/2017	59.99	6510.68
12/1/2017	60.30	6510.37
12/5/2017	64.10	6506.57
MV		
12/5/2017	63.20	6506.58
R1		
8/24/2017	72.90	6482.22
12/5/2017	54.92	6500.20
R2		
3/21/2017	67.73	6486.43
8/24/2017	52.60	6501.56
R3		
3/21/2017	55.07	6500.66
11/14/2017	62.81	6492.92
R4		
3/23/2017	51.77	6507.01
R5		
3/21/2017	94.17	6463.58
R10		
3/22/2017	53.68	6501.54
R11		
3/22/2017	56.20	6502.25
8/24/2017	58.50	6499.95
R18		
3/23/2017	63.70	6492.30
R20		
3/23/2017	63.45	6492.89
R43		
4/5/2017	63.25	6487.90
R74		
12/5/2017	67.53	6476.50

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0483	8/24/2017	35.90	6526.76
0493	3/1/2017	68.43	6491.85
0493	12/5/2017	81.50	6478.78
0494	3/1/2017	31.90	6528.24
0494	6/28/2017	33.90	6526.24
0498	8/24/2017	50.80	6509.79
0821	11/30/2017	67.56	6492.44
0850	12/5/2017	52.62	6496.53
0853	7/6/2017	69.70	6471.68
0853	12/5/2017	70.22	6471.16
0859	12/5/2017	63.13	6489.63
0929	12/5/2017	43.51	6549.06
0930	7/5/2017	113.80	6484.74
0930	12/5/2017	107.78	6490.76
0931	7/5/2017	65.80	6544.76
0931	12/5/2017	63.97	6546.59
0944	1/30/2017	44.80	6543.81
0944	2/27/2017	42.80	6545.81
0944	8/28/2017	48.50	6540.11
0944	9/25/2017	57.70	6530.91
0944	10/30/2017	52.45	6536.16
0944	11/27/2017	44.20	6544.41
0944	12/26/2017	47.00	6541.61
ACW	11/30/2017	77.63	6486.17
ACW	12/5/2017	84.00	6479.80
AW	11/30/2017	34.01	6529.42
AW	12/5/2017	35.95	6527.48
B15	5/2/2017	60.50	6515.81
B16	5/2/2017	45.60	6529.77
B32	5/3/2017	46.01	6529.38
CE1	7/5/2017	38.50	6531.69
CE1	12/5/2017	37.67	6532.52
CE2	1/13/2017	80.00	6496.35
CE2	1/30/2017	38.10	6538.25
CE2	2/27/2017	56.90	6519.45
CE2	4/24/2017	77.40	6498.95
CE2	4/27/2017	77.63	6498.72
CE2	5/2/2017	39.00	6537.35
CE2	6/26/2017	108.13	6468.22
CE2	6/28/2017	80.10	6496.25
CE2	8/28/2017	31.00	6545.35
CE2	9/25/2017	80.10	6496.25
CE2	10/25/2017	78.90	6497.45
CE2	10/30/2017	79.80	6496.55
CE2	11/27/2017	67.03	6509.32
CE2	12/26/2017	69.40	6506.95
CE5	1/30/2017	37.70	6530.85
CE5	2/10/2017	42.37	6526.18
CE5	2/27/2017	37.55	6531.00
CE5	3/27/2017	46.85	6521.70
CE5	4/24/2017	40.20	6528.35
CE5	5/30/2017	41.70	6526.85
CE5	6/26/2017	41.80	6526.75
CE5	7/31/2017	40.30	6528.25
CE5	8/28/2017	38.73	6529.82
CE5	9/25/2017	49.50	6519.05
CE5	10/30/2017	48.85	6519.70
CE5	11/27/2017	47.03	6521.52
CE5	12/26/2017	47.35	6521.20
CE6	1/30/2017	33.65	6531.54
CE6	2/10/2017	29.90	6535.29
CE6	2/27/2017	33.35	6531.84
CE6	3/27/2017	88.02	6477.17
CE6	4/24/2017	78.00	6487.19
CE6	5/30/2017	73.51	6491.68
CE6	6/26/2017	74.20	6490.99
CE6	7/31/2017	36.80	6528.39
CE6	8/28/2017	34.40	6530.79
CE6	9/25/2017	92.30	6472.89
CE6	10/30/2017	84.40	6480.79
CE6	11/27/2017	90.39	6474.80
CE6	12/26/2017	88.30	6476.89
CE7	1/30/2017	44.00	6531.99
CE7	2/27/2017	46.30	6529.69
CE7	3/27/2017	44.00	6531.99
CE7	4/24/2017	45.48	6530.51
CE7	5/30/2017	46.27	6529.72
CE7	6/26/2017	41.53	6534.46
CE7	8/28/2017	40.44	6535.55
CE7	9/25/2017	45.08	6530.91
CE7	10/30/2017	47.30	6528.69
CE7	11/27/2017	48.23	6527.76
CE7	12/5/2017	47.00	6528.99
CE7	12/26/2017	47.70	6528.29
CE8	3/2/2017	34.33	6535.37
CE8	11/14/2017	42.63	6527.07
CE8	12/5/2017	42.57	6527.13
CE9	3/21/2017	60.40	6502.72
CE9	12/5/2017	38.05	6525.07
CE10	12/5/2017	48.34	6522.52
CE11	1/30/2017	33.90	6531.52
CE11	2/10/2017	75.03	6490.39
CE11	2/27/2017	32.35	6533.07
CE11	3/27/2017	98.51	6466.91
CE11	4/24/2017	111.87	6453.55
CE11	5/30/2017	112.10	6453.32
CE11	6/26/2017	109.68	6455.74
CE11	8/28/2017	34.20	6531.22
CE11	9/25/2017	91.07	6474.35
CE11	10/30/2017	41.60	6523.82
CE11	11/27/2017	71.10	6494.32
CE11	12/26/2017	90.94	6474.48
CE12	1/30/2017	37.67	6534.56
CE12	2/27/2017	29.30	6542.93
CE12	3/21/2017	39.45	6532.78
CE12	3/27/2017	39.89	6532.34
CE12	4/24/2017	40.27	6531.96
CE12	5/30/2017	41.05	6531.18
CE12	6/26/2017	40.03	6532.20
CE12	8/28/2017	38.20	6534.03
CE12	9/25/2017	41.02	6531.21
CE12	10/30/2017	77.10	6495.13
CE12	11/27/2017	72.32	6499.91
CE12	12/26/2017	75.57	6496.66
CE13	12/5/2017	46.66	6527.98
CE14	3/21/2017	35.05	6534.40
CE14	12/5/2017	36.90	6532.55

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

CE15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/21/2017	36.16	6529.92
4/24/2017	38.07	6528.01
5/30/2017	38.55	6527.53
6/26/2017	45.53	6520.55
8/28/2017	36.50	6529.58
9/25/2017	91.00	6475.08
10/30/2017	43.90	6522.18
11/27/2017	43.58	6522.50
12/5/2017	43.65	6522.43
12/26/2017	44.13	6521.95

CE15A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/24/2017	45.20	6519.61
5/30/2017	44.43	6520.38
6/1/2017	45.37	6519.44
6/26/2017	38.70	6526.11
7/31/2017	23.00	6541.81
8/28/2017	35.80	6529.01
9/25/2017	48.03	6516.78
10/30/2017	45.35	6519.46
11/27/2017	43.21	6521.60
11/29/2017	45.02	6519.79
12/5/2017	44.80	6520.01
12/26/2017	45.34	6519.47

CE16A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/1/2017	47.07	6532.97
12/5/2017	47.02	6533.02

CE18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/5/2017	36.50	6532.38

CE19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/24/2017	44.81	6524.02
5/30/2017	45.82	6523.01
6/26/2017	45.21	6523.62
7/5/2017	45.70	6523.13
8/28/2017	38.20	6530.63
9/25/2017	48.50	6520.33
10/30/2017	48.10	6520.73
11/27/2017	67.80	6501.03
12/26/2017	48.15	6520.68

CF1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	130.08	6535.83

CF2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	119.80	6546.36

CF3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/5/2017	48.60	6538.19
12/5/2017	49.64	6537.15

CF4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	48.02	6615.67

CF5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	133.50	6537.96

CF6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	114.00	6553.43

CF7A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	133.91	6534.20

CW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	106.56	6478.66

CW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/21/2017	95.10	6490.38
8/10/2017	106.70	6478.78
12/5/2017	106.83	6478.65

CW2-1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	44.70	6540.78

CW3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/28/2017	55.86	6531.32
12/5/2017	55.10	6532.08

CW4R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/31/2017	28.00	6540.73
9/25/2017	46.50	6522.23

CW5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/25/2017	47.35	6521.99
10/30/2017	28.70	6540.64

CW6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	84.55	6491.09

CW9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	58.30	6533.53
12/5/2017	59.30	6532.53

CW13

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/31/2017	3.40	6573.30
10/30/2017	6.70	6570.00

CW14

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/31/2017	2.30	6563.79

CW15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/30/2017	94.80	6456.52
12/5/2017	93.15	6458.17

CW17

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/29/2017	55.12	6534.20
10/23/2017	55.00	6534.32
12/5/2017	57.38	6531.94

CW18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2017	24.40	6548.25
2/27/2017	16.78	6555.87
3/20/2017	38.45	6534.20
3/27/2017	26.56	6546.09
4/24/2017	22.20	6550.45
5/30/2017	25.60	6547.05
6/26/2017	19.26	6553.39
8/28/2017	77.50	6495.15
9/25/2017	43.53	6529.12
10/30/2017	31.30	6541.35
11/27/2017	18.64	6554.01
12/5/2017	16.81	6555.84
12/26/2017	36.87	6535.78

CW24

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	47.48	6541.19

CW25

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/25/2017	35.01	6532.19
12/5/2017	48.10	6519.10

CW28

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2017	72.84	6498.84
2/27/2017	71.20	6500.48
3/27/2017	72.05	6499.63
4/24/2017	72.20	6499.48
5/30/2017	34.21	6537.47
6/26/2017	78.00	6493.68
8/28/2017	73.50	6498.18
9/25/2017	75.00	6496.68
10/30/2017	71.10	6500.58
11/27/2017	73.13	6498.55
11/30/2017	72.80	6498.88
12/5/2017	74.23	6497.45
12/12/2017	76.28	6495.40
12/26/2017	76.74	6494.94

CW29

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/20/2017	75.50	6476.72
12/5/2017	76.56	6475.66

CW31

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/29/2017	85.35	6474.91
12/5/2017	85.33	6474.93

CW32

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/29/2017	148.40	6418.88
12/5/2017	147.30	6419.98

CW33

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/29/2017	105.09	6469.80
12/5/2017	105.85	6469.04

CW34

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/5/2017	58.87	6535.53

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CW35	12/5/2017	49.61	6541.56
CW36	12/5/2017	76.75	6474.34
CW37	6/29/2017	62.20	6488.97
CW37	12/5/2017	62.16	6489.01
CW40	6/30/2017	24.40	6554.54
CW40	12/5/2017	22.05	6556.89
CW41	12/5/2017	76.98	6478.43
CW42	3/21/2017	66.70	6482.08
CW42	8/14/2017	66.90	6481.88
CW42	12/5/2017	67.33	6481.45
CW43	12/5/2017	68.30	6480.49
CW45	3/24/2017	53.75	6507.56
CW45	12/5/2017	55.15	6506.16
CW50	3/20/2017	46.15	6542.41
CW50	8/11/2017	46.70	6541.86
CW50	12/5/2017	47.20	6541.36
CW53	5/3/2017	13.00	6551.94
CW53	12/5/2017	11.50	6553.44
CW54	6/29/2017	33.60	6524.95
CW54	12/5/2017	34.49	6524.06
CW55	12/5/2017	56.00	6508.16
CW55	12/12/2017	57.86	6506.30
CW56	10/24/2017	64.49	6523.37
CW57	10/24/2017	46.23	6538.67
CW57	12/5/2017	46.47	6538.43
CW58	12/5/2017	81.80	6479.00
CW60	10/24/2017	41.15	6543.05
CW60	12/5/2017	44.42	6539.78
CW61	12/5/2017	52.05	6530.78
CW62	1/30/2017	58.60	6521.26
CW62	2/10/2017	59.15	6520.71
CW62	2/27/2017	70.60	6509.26
CW62	3/27/2017	48.90	6530.96
CW62	4/24/2017	47.84	6532.02
CW62	5/3/2017	89.54	6490.32
CW62	5/30/2017	94.22	6485.64
CW62	6/26/2017	118.90	6460.96
CW62	7/31/2017	112.60	6467.26
CW62	8/28/2017	41.60	6538.26
CW62	9/25/2017	114.40	6465.46
CW62	10/30/2017	109.50	6470.36
CW62	11/27/2017	109.30	6470.56
CW62	11/29/2017	112.61	6467.25
CW62	12/5/2017	111.54	6468.32
CW62	12/26/2017	117.20	6462.66
CW72	12/5/2017	61.10	6519.03
CW73	11/28/2017	49.05	6514.40
CW73	12/5/2017	49.25	6514.20
CW74	5/4/2017	55.91	6497.50
CW74	12/5/2017	68.86	6484.55
CW75	5/4/2017	70.30	6483.28
CW75	12/5/2017	71.91	6481.67
CW76	5/4/2017	69.26	6487.35
CW76	12/5/2017	76.70	6479.91
CW78	5/3/2017	21.91	6545.24
CW78	12/5/2017	11.40	6555.75
Q48	12/5/2017	48.98	6518.86
R1	8/24/2017	72.90	6482.22
R1	12/5/2017	54.92	6500.20
R2	3/21/2017	67.73	6486.43
R2	8/24/2017	52.60	6501.56
R3	3/21/2017	55.07	6500.66
R3	11/14/2017	62.81	6492.92
R4	3/23/2017	51.77	6507.01
R5	3/21/2017	94.17	6463.58
R11	3/22/2017	56.20	6502.25
R11	8/24/2017	58.50	6499.95
R49	12/5/2017	68.57	6477.42
R50	4/3/2017	66.41	6479.21
R67	12/5/2017	66.68	6478.85
R74	12/5/2017	67.53	6476.50
T25	3/31/2017	120.36	6536.98
T51	3/29/2017	115.29	6542.05
V1	8/22/2017	75.30	6476.81
V1	10/3/2017	75.40	6476.71
V1	12/5/2017	75.24	6476.87
V2	8/22/2017	73.30	6476.79
V2	12/5/2017	73.20	6476.89
V3	8/22/2017	74.60	6475.55
V4	8/22/2017	70.00	6475.43
V6	8/22/2017	73.60	6473.83
V6	12/5/2017	73.50	6473.93

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/12/2018

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
V7			**Y3**		
8/22/2017	77.90	6477.33	12/5/2017	82.45	6480.93
12/5/2017	77.96	6477.27	12/5/2017	82.45	6480.93
V8			**Y7**		
8/22/2017	72.60	6478.89	3/28/2017	68.27	6492.16
12/5/2017	72.57	6478.92	12/20/2017	84.32	6476.11
V9			**Y8**		
8/22/2017	79.30	6476.39	12/5/2017	97.90	6463.57
12/5/2017	79.26	6476.43			
			Y10		
V11			12/5/2017	83.40	6482.78
8/22/2017	77.30	6478.60			
12/5/2017	77.26	6478.64	**Y14**		
V14			12/5/2017	58.30	6502.72
8/22/2017	78.50	6477.19	**Y17**		
V16			12/5/2017	67.05	6497.58
8/22/2017	73.20	6478.78	**Y23**		
12/5/2017	73.15	6478.83	12/20/2017	115.22	6446.08
V17			**Y25**		
8/24/2017	72.80	6477.35	12/5/2017	62.00	6500.67
V18			**Y30**		
8/24/2017	74.00	6477.38	12/5/2017	60.85	6499.20
12/5/2017	74.04	6477.34			
WCW					
8/9/2017	102.90	6464.47			
8/11/2017	79.00	6488.37			
12/5/2017	97.55	6469.82			
Y1					
3/24/2017	113.67	6447.77			
12/20/2017	84.74	6476.70			
Y2					
12/5/2017	92.35	6469.26			

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER

WATER LEVEL ELEVATION (FT-MSL) 2/27/2018

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
#1 Deepwell		
2/16/2017	153.23	6430.53
12/5/2017	152.30	6431.46
#2 Deepwell		
2/16/2017	174.50	6401.16
0907		
12/5/2017	123.50	6422.10
0938		
12/5/2017	157.70	6411.10
0943		
1/30/2017	134.00	6421.91
2/10/2017	140.25	6415.66
2/17/2017	138.59	6417.32
2/27/2017	140.05	6415.86
3/14/2017	139.86	6416.05
3/27/2017	139.40	6416.51
4/17/2017	145.72	6410.19
4/24/2017	148.00	6407.91
5/3/2017	139.46	6416.45
5/30/2017	136.83	6419.08
6/26/2017	137.80	6418.11
6/27/2017	137.40	6418.51
7/19/2017	143.35	6412.56
7/31/2017	137.60	6418.31
8/8/2017	137.20	6418.71
8/28/2017	137.90	6418.01
8/28/2017	132.40	6423.51
9/25/2017	137.20	6418.71
10/30/2017	139.50	6416.41
11/27/2017	138.55	6417.36
12/26/2017	134.00	6421.91
0951		
12/5/2017	153.67	6420.03
0951R		
1/30/2017	157.45	6419.33
2/16/2017	157.86	6418.92
2/27/2017	160.50	6416.28
3/14/2017	157.11	6419.67
3/27/2017	157.50	6419.28
4/17/2017	156.62	6420.16
4/24/2017	156.60	6420.18
5/2/2017	156.31	6420.47
5/30/2017	157.00	6419.78
6/26/2017	156.80	6419.98
6/27/2017	157.08	6419.70
7/18/2017	158.35	6418.43
7/31/2017	144.50	6432.28
8/28/2017	158.85	6417.93
9/25/2017	158.60	6418.18
10/23/2017	159.32	6417.46
10/30/2017	158.90	6417.88
11/27/2017	157.02	6419.76
12/5/2017	155.75	6421.03
12/26/2017	157.50	6419.28

* Drawdown Tube Pressure, # Transducer Reading

APPENDIX B

WATER QUALITY

TABLE OF CONTENTS

GROUND-WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX B

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CN1	12/13/2017	ENER	---	---	---	---	---	---	1210	7530	16200	17040	---	---
EN1	12/28/2017	ENER	---	---	---	---	---	---	600	5410	14100	16670	---	---
EN2	12/28/2017	ENER	---	---	---	---	---	---	254	2180	5080	6885	---	---
NE Tails	8/24/2017	ENER	6	2.7	10.5	2600	1280	991	279	2860	7320	11800	0.94	9.89
NE1	12/28/2017	ENER	---	---	---	---	---	---	619	5530	14500	16820	---	---
NW Tails	8/24/2017	ENER	47	51.4	9.4	4190	2150	187	827	6420	12200	15240	0.95	8.84
WN1	12/13/2017	ENER	---	---	---	---	---	---	340	2020	4750	6295	---	---
WN2	12/13/2017	ENER	---	---	---	---	---	---	168	1160	3140	4220	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CN1	12/13/2017	ENER	28.4	± 4.5800	46.40	0.044	---	---	---	---	---	---	---	---
EN1	12/28/2017	ENER	19.8	± 3.1900	62.00	0.366	---	---	---	---	---	---	---	---
EN2	12/28/2017	ENER	2.49	± 0.4020	11.70	0.042	---	---	---	---	---	---	---	---
NE Tails	8/24/2017	ENER	8.24	± 1.3300	34.60	0.074	0.7	50.00	± 9.400	---	---	---	---	---
NE1	12/28/2017	ENER	28.1	± 4.5400	51.50	0.092	---	---	---	---	---	---	---	---
NW Tails	8/24/2017	ENER	19.4	± 3.1300	30.90	1.230	5.2	1.00	± 0.300	---	---	---	---	---
WN1	12/13/2017	ENER	2.87	± 0.4630	10.20	0.147	---	---	---	---	---	---	---	---
WN2	12/13/2017	ENER	0.686	± 0.1110	5.19	0.032	---	---	---	---	---	---	---	---

TABLE B.2-1 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
East 1 Sump	3/24/2017	ENER	---	---	---	---	---	---	---	6010	12800	19080	---	---
	8/7/2017	ENER	< 1	3.2	22.0	6390	2680	2010	928	6440	17900	21500	1.03	9.69
East 2 Sump	3/24/2017	ENER	---	---	---	---	---	---	---	4890	11800	14910	---	---
	8/7/2017	ENER	5	9.6	15.9	3270	2490	986	640	4700	11700	15290	0.76	9.53
East Reclaim	3/24/2017	ENER	---	---	---	---	---	---	---	4200	9650	12920	---	---
	8/7/2017	ENER	5	5.0	15.0	4040	1790	698	550	3700	9790	12530	1.22	9.56
North 1 Sump	3/23/2017	ENER	---	---	---	---	---	---	---	5040	11600	14470	---	---
	8/7/2017	ENER	3	4.9	12.0	4040	2180	834	640	4810	11500	---	0.97	9.51
North 3 Sump	8/7/2017	ENER	3	4.9	13.0	4120	2150	808	640	4800	11600	---	1.00	9.51
South 1 Sump	3/24/2017	ENER	---	---	---	---	---	---	---	2290	4640	6754	---	---
	8/7/2017	ENER	29	18.2	11.1	1610	1020	55	346	2220	4900	6796	0.98	8.46
West 1 Sump	3/23/2017	ENER	---	---	---	---	---	---	---	3340	7180	8704	---	---
	8/7/2017	ENER	44	30.8	10.3	1870	1150	92	376	2910	6020	8365	0.93	8.63
West Reclaim	3/24/2017	ENER	---	---	---	---	---	---	---	2240	5420	3114	---	---
	8/7/2017	ENER	4	4.3	6.5	1960	1260	473	311	2050	5660	8014	0.98	9.57

TABLE B.2-2 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
East 1 Sump	3/24/2017	ENER	20.1	± 3.2400	48.20	0.191	---	---	---	---	---	---	---	---
	8/7/2017	ENER	30.4	± 5.0000	63.30	0.160	< 0.1	101.00	± 19.100	---	---	---	---	---
East 2 Sump	3/24/2017	ENER	21.2	± 3.4200	30.00	0.201	---	---	---	---	---	---	---	---
	8/7/2017	ENER	14.7	± 2.0000	29.60	0.240	3.0	9.90	± 2.000	---	---	---	---	---
East Reclaim	3/24/2017	ENER	13.1	± 2.1100	29.30	0.355	---	---	---	---	---	---	---	---
	8/7/2017	ENER	20.5	± 3.0000	31.00	0.345	2.9	43.70	± 8.300	---	---	---	---	---
North 1 Sump	3/23/2017	ENER	20.4	± 3.3000	41.10	0.266	---	---	---	---	---	---	---	---
	8/7/2017	ENER	22.8	± 4.0000	42.50	0.353	0.4	26.60	± 5.100	---	---	---	---	---
North 3 Sump	8/7/2017	ENER	22.2	± 4.0000	29.30	0.377	2.4	17.80	± 3.400	---	---	---	---	---
South 1 Sump	3/24/2017	ENER	7.51	± 1.2100	12.00	0.037	---	---	---	---	---	---	---	---
	8/7/2017	ENER	9.39	± 2.0000	12.70	0.041	0.3	34.80	± 6.600	---	---	---	---	---
West 1 Sump	3/23/2017	ENER	12.6	± 2.0300	13.40	0.185	---	---	---	---	---	---	---	---
	8/7/2017	ENER	14.5	± 2.0000	10.10	0.094	1.3	0.40	± 0.200	---	---	---	---	---
West Reclaim	3/24/2017	ENER	5.25	± 0.8470	15.80	0.110	---	---	---	---	---	---	---	---
	8/7/2017	ENER	5.51	± 0.0000	15.00	0.123	2.2	10.30	± 2.000	---	---	---	---	---

TABLE B.3-1 WATER QUALITY ANALYSES FOR THE LINED PONDS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
E Coll Pond	2/7/2017	ENER	---	---	---	---	---	---	199	1460	2490	11640	---	---
	5/1/2017	ENER	---	---	---	---	---	---	332	2240	4090	---	---	8.60
	8/7/2017	ENER	76	75.4	7.0	1290	233	< 5	340	2500	4480	6236	1.01	8.29
	10/11/2017	ENER	---	---	---	---	---	---	409	3380	5790	---	---	---
Evap Pond 1	2/7/2017	ENER	---	---	---	---	---	---	3730	23400	43500	43730	---	---
	5/1/2017	ENER	---	---	---	---	---	---	4210	25400	41900	44900	---	9.51
	8/7/2017	ENER	10	393.0	71.0	17800	2860	2640	4330	29600	56000	53050	0.93	9.49
	10/11/2017	ENER	---	---	---	---	---	---	4040	29600	51700	---	---	---
Evap Pond 2	2/7/2017	ENER	---	---	---	---	---	---	1210	9870	17100	19200	---	---
	5/1/2017	ENER	---	---	---	---	---	---	1560	12400	21300	23120	---	9.04
	8/7/2017	ENER	97	245.0	28.0	6480	1360	237	1480	11600	21500	24630	0.98	8.98
	10/11/2017	ENER	---	---	---	---	---	---	1660	13600	22200	---	---	---
Evap Pond 3A	2/7/2017	ENER	---	---	---	---	---	---	34900	17900	98200	98880	---	---
	5/1/2017	ENER	---	---	---	---	---	---	15800	31100	77400	78070	---	9.51
	8/7/2017	ENER	18	459.0	348.0	38200	7370	8630	19700	41700	116000	102000	0.93	9.52
	10/12/2017	ENER	---	---	---	---	---	---	27100	28400	131000	130500	---	---
Evap Pond 3B	2/7/2017	ENER	---	---	---	---	---	---	18400	21100	86900	83070	---	---
	5/1/2017	ENER	---	---	---	---	---	---	24600	22600	108000	100700	---	9.38
	8/7/2017	ENER	15	525.0	162.0	31000	7310	7200	9480	36600	90100	78000	1.01	9.45
	10/12/2017	ENER	---	---	---	---	---	---	11900	46700	103000	80070	---	---
W Coll Pond	2/7/2017	ENER	---	---	---	---	---	---	184	1330	2300	3667	---	---
	5/1/2017	ENER	---	---	---	---	---	---	336	2350	4220	---	---	8.69
	8/7/2017	ENER	19	114.0	9.6	2460	344	107	540	4100	7820	10660	1.07	9.28
	10/11/2017	ENER	---	---	---	---	---	---	380	3090	5450	---	---	---

TABLE B.3-2 WATER QUALITY ANALYSES FOR THE LINED PONDS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
E Coll Pond	2/7/2017	ENER	1.92	± 0.3100	4.40	0.170	---	---	---	---	---	---	---	---
	5/1/2017	ENER	4.17	± 0.6730	9.20	0.325	---	---	---	---	---	---	---	---
	8/7/2017	ENER	4.77	± 0.7690	12.30	0.401	4.1	0.20	± 0.200	1.0	± 1.1	< 0.01	1.80	± 0.40
	10/11/2017	ENER	7.47	± 1.2100	15.90	0.592	---	---	---	---	---	---	---	---
Evap Pond 1	2/7/2017	ENER	92.0	± 14.9000	141.00	0.477	---	---	---	---	---	---	---	---
	5/1/2017	ENER	87.6	± 14.1000	78.50	0.560	---	---	---	---	---	---	---	---
	8/7/2017	ENER	104	± 16.7000	169.00	0.772	< 0.1	0.06	± 0.300	0.0	± 2.4	0.05	3.60	± 0.70
	10/11/2017	ENER	95.6	± 15.4000	91.70	0.271	---	---	---	---	---	---	---	---
Evap Pond 2	2/7/2017	ENER	23.2	± 3.7500	33.20	0.756	---	---	---	---	---	---	---	---
	5/1/2017	ENER	34.1	± 5.5000	47.90	0.970	---	---	---	---	---	---	---	---
	8/7/2017	ENER	31.8	± 5.1300	67.90	0.855	2.1	3.50	± 0.800	0.4	± 1.4	0.05	1.10	± 0.20
	10/11/2017	ENER	34.7	± 5.6000	41.00	0.707	---	---	---	---	---	---	---	---
Evap Pond 3A	2/7/2017	ENER	307	± 49.5000	1230.00	0.880	---	---	---	---	---	---	---	---
	5/1/2017	ENER	179	± 28.9000	238.00	0.560	---	---	---	---	---	---	---	---
	8/7/2017	ENER	227	± 50.6000	730.00	0.520	< 0.1	28.60	5.700	16.9	4.4	0.11	267.00	50.60
	10/12/2017	ENER	340	± 54.8000	993.00	0.718	---	---	---	---	---	---	---	---
Evap Pond 3B	2/7/2017	ENER	422	± 68.1000	611.00	0.340	---	---	---	---	---	---	---	---
	5/1/2017	ENER	570	± 91.9000	950.00	0.300	---	---	---	---	---	---	---	---
	8/7/2017	ENER	269	± 43.5000	395.00	0.636	< 0.1	0.30	± 0.200	-0.2	± 1.1	0.15	136.00	± 25.80
	10/12/2017	ENER	311	± 50.1000	453.00	0.443	---	---	---	---	---	---	---	---
W Coll Pond	2/7/2017	ENER	1.89	± 0.3060	3.46	0.131	---	---	---	---	---	---	---	---
	5/1/2017	ENER	2.18	± 0.3520	7.74	0.268	---	---	---	---	---	---	---	---
	8/7/2017	ENER	12.7	± 2.0500	26.40	0.896	9.0	0.30	± 0.200	0.6	± 0.9	0.02	0.08	± 0.10
	10/11/2017	ENER	7.04	± 1.1400	15.10	0.564	---	---	---	---	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0690	4/25/2017	ENER	---	---	---	---	---	---	80	240	797	1220	---	---
0691	4/25/2017	ENER	---	---	---	---	---	---	90	236	790	1224	---	---
0891	4/25/2017	ENER	---	---	---	---	---	---	417	699	2060	3072	---	---
1A	9/19/2017	ENER	---	---	---	---	---	---	296	1150	2560	3644	---	---
1E	9/19/2017	ENER	---	---	---	---	---	---	233	29	2050	3453	---	---
1F	9/19/2017	ENER	---	---	---	---	---	---	319	1480	3040	4105	---	---
1J	1/24/2017	ENER	156	43.2	7.2	230	75	< 5	139	777	1430	1951	1.00	6.37
1K	3/22/2017	ENER	---	---	---	---	---	---	101	396	1120	1671	---	---
1M	3/22/2017	ENER	---	---	---	---	---	---	230	741	1770	2591	---	---
1N	3/22/2017	ENER	---	---	---	---	---	---	865	965	3090	1781	---	---
1P	3/22/2017	ENER	---	---	---	---	---	---	96	345	1050	1550	---	---
1Q	1/16/2017	ENER	117	25.9	3.4	110	280	< 5	71	307	820	1204	0.98	7.43
1R	1/16/2017	ENER	111	20.0	3.2	167	337	< 5	92	325	927	1381	0.97	7.55
1S	1/24/2017	ENER	157	43.5	7.2	229	77	< 5	141	791	1420	1980	0.99	6.39
1T	1/16/2017	ENER	148	30.8	5.0	107	214	< 5	86	436	958	1355	0.97	7.47
1U	1/16/2017	ENER	111	25.5	3.1	138	325	< 5	79	311	860	1272	0.97	7.50
1V	1/16/2017	ENER	139	31.9	4.3	155	405	< 5	81	363	1020	1484	0.99	7.38
B	3/22/2017	ENER	---	---	---	---	---	---	107	535	1210	1773	---	---
B3	5/1/2017	ENER	139	57.6	5.7	2000	1230	< 5	436	3360	6670	8839	0.96	7.86
B4	5/2/2017	ENER	203	52.0	4.7	1900	1150	< 5	506	3560	6430	8797	0.90	7.62
B5	5/1/2017	ENER	123	38.6	3.0	958	769	< 5	270	1570	3440	4650	0.96	7.72
B7	5/2/2017	ENER	148	41.9	3.6	1220	826	< 5	390	2070	3990	5925	0.94	7.66
B8	5/2/2017	ENER	128	44.6	2.5	819	680	< 5	195	1330	2810	3875	1.03	7.76

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
B9	5/1/2017	ENER	242	79.4	4.8	1250	728	< 5	415	2530	5300	6482	0.96	7.50
B10	5/2/2017	ENER	87	45.3	5.0	1360	795	< 5	396	2270	4380	6333	0.94	7.74
B11	5/2/2017	ENER	168	48.5	5.9	810	576	< 5	264	1640	3280	4524	0.93	7.49
B12	11/13/2017	ENER	300	85.9	4.0	408	477	< 5	197	1160	2570	3020	1.06	7.35
B13	3/28/2017	ENER	94	38.0	3.4	170	355	< 5	89	371	987	1467	0.94	7.43
B15	5/2/2017	ENER	162	53.8	5.9	2010	1230	< 5	410	3260	6400	8311	1.00	7.72
B16	5/2/2017	ENER	241	86.5	5.3	2020	1150	< 5	456	4040	7390	9253	0.92	7.52
B32	5/3/2017	ENER	291	84.6	5.4	1910	1230	< 5	484	3490	6350	8643	0.98	7.57
B35	5/2/2017	ENER	81	51.0	7.0	2670	1790	22	633	4290	8670	11460	0.91	8.03
B38	5/2/2017	ENER	292	129.0	6.0	1950	1450	< 5	503	3890	7180	9464	0.92	7.34
B40	5/2/2017	ENER	301	125.0	5.5	2060	1410	< 5	505	3960	7660	9612	0.96	7.37
B42	5/2/2017	ENER	351	160.0	8.0	3010	1890	< 5	740	5950	11000	13400	0.92	7.31
B44	5/2/2017	ENER	109	56.1	5.1	2270	1330	< 5	536	3810	7100	9717	0.94	7.76
BC	6/27/2017	ENER	---	---	---	---	---	---	96	1770	2930	3245	---	---
BP	3/22/2017	ENER	---	---	---	---	---	---	101	521	1200	1726	---	---
C1	3/21/2017	ENER	---	---	---	---	---	---	125	442	1170	1778	---	---
C5	3/22/2017	ENER	---	---	---	---	---	---	121	424	1250	1783	---	---
C6	3/21/2017	ENER	---	---	---	---	---	---	127	479	1310	1952	---	---
	3/31/2017	ENER	---	---	---	---	---	---	122	479	1300	1972	---	---
	9/20/2017	ENER	112	28.5	3.7	389	486	< 5	151	720	1710	2426	0.91	7.56
C7	3/31/2017	ENER	---	---	---	---	---	---	219	844	2040	2973	---	---
C8	3/31/2017	ENER	---	---	---	---	---	---	216	842	2030	2955	---	---
C9	3/31/2017	ENER	---	---	---	---	---	---	220	1030	2410	3127	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
C9	9/20/2017	ENER	---	---	---	---	---	---	217	830	2010	2940	---	---
C10	3/31/2017	ENER	---	---	---	---	---	---	251	1420	3170	4526	---	---
C11	3/31/2017	ENER	---	---	---	---	---	---	286	2390	4660	6129	---	---
	9/20/2017	ENER	---	---	---	---	---	---	236	1620	3230	4544	---	---
C12	3/31/2017	ENER	---	---	---	---	---	---	170	782	1860	2738	---	---
	9/20/2017	ENER	---	---	---	---	---	---	209	827	2000	2416	---	---
D1	3/20/2017	ENER	---	---	---	---	---	---	---	805	1730	2273	---	---
	6/28/2017	ENER	179	35.3	3.3	262	374	< 5	130	692	1460	2052	0.96	7.47
DA3	5/2/2017	ENER	140	72.4	5.3	1900	1200	< 5	393	3360	5950	8248	0.95	7.81
DC	6/27/2017	ENER	---	---	---	---	---	---	241	971	2100	2730	---	---
DD	3/1/2017	ENER	---	---	---	---	---	---	75	2020	3280	3695	---	---
	5/3/2017	ENER	466	108.0	6.5	378	330	< 5	75	1880	3390	3773	1.04	7.35
	8/8/2017	ENER	---	---	---	---	---	---	70	1930	3510	3712	---	7.34
	10/12/2017	ENER	468	110.0	6.5	358	350	< 5	66	1950	3430	3842	1.00	7.39
	11/23/2017	ENER	538	122.0	7.1	427	316	< 5	74	2160	3390	3504	1.06	7.46
DD2	3/1/2017	ENER	---	---	---	---	---	---	73	1570	2630	3073	---	---
	5/2/2017	ENER	380	93.0	6.0	330	348	< 5	76	1480	2620	3100	1.06	7.23
	8/8/2017	ENER	---	---	---	---	---	---	72	1440	2650	3052	---	7.19
	10/12/2017	ENER	358	89.8	5.2	327	364	< 5	72	1480	2660	3080	1.02	7.25
	11/2/2017	ENER	336	85.7	6.3	348	367	< 5	74	1520	2630	2837	0.98	7.16
	11/23/2017	ENER	374	91.9	6.6	336	341	< 5	71	1560	2630	2811	1.02	7.34
DD3	8/15/2017	ENER	311	84.5	6.7	258	347	< 5	147	1200	2430	---	0.97	7.47
	10/12/2017	ENER	426	113.0	6.0	348	265	< 5	129	1740	3200	3679	1.03	7.59
	11/2/2017	ENER	406	105.0	6.2	352	255	< 5	132	1680	3150	3494	1.03	7.50
DD4	8/8/2017	ENER	529	129.0	7.8	378	315	< 5	101	1860	3470	---	1.14	7.39
	8/15/2017	ENER	320	79.1	5.4	265	352	< 5	69	1440	2640	---	0.90	7.30

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
DD4	10/12/2017	ENER	353	87.0	5.9	301	363	< 5	65	1500	2700	3057	0.97	7.40
	11/2/2017	ENER	355	88.3	6.4	317	364	< 5	63	1540	2630	2919	0.97	7.24
	12/7/2017	ENER	362	88.5	5.9	291	300	< 5	65	1600	2700	3068	0.95	7.20
DD5	8/16/2017	ENER	462	113.0	6.8	312	324	< 5	86	1890	3470	---	0.98	7.35
	10/12/2017	ENER	489	121.0	7.4	344	332	< 5	86	1890	3480	3848	1.04	7.51
	11/2/2017	ENER	513	128.0	8.2	364	332	< 5	84	2020	3430	3582	1.04	7.43
	11/17/2017	ENER	484	114.0	7.4	335	308	< 5	86	2050	3520	---	0.96	7.42
DZ	6/27/2017	ENER	---	---	---	---	---	---	1090	7990	15800	18090	---	---
	6/27/2017	ENER	---	---	---	---	---	---	# 1160	# 9050	# 15600	---	---	---
F	3/17/2017	ENER	---	---	---	---	---	---	---	736	2110	2554	---	---
	11/14/2017	ENER	---	---	---	---	---	---	200	755	1850	2308	---	---
	11/14/2017	ENER	---	---	---	---	---	---	# 200	# 756	# 1850	---	---	---
FB	3/17/2017	ENER	---	---	---	---	---	---	---	799	2010	2510	---	---
	11/14/2017	ENER	---	---	---	---	---	---	188	806	1800	2205	---	---
GH	3/17/2017	ENER	---	---	---	---	---	---	---	641	1660	2323	---	---
	11/14/2017	ENER	---	---	---	---	---	---	172	631	1660	2078	---	---
GK	11/14/2017	ENER	---	---	---	---	---	---	191	705	1710	2186	---	---
GN	3/20/2017	ENER	---	---	---	---	---	---	---	531	1620	2016	---	---
	8/14/2017	ENER	---	---	---	---	---	---	160	560	1570	2047	---	---
GV	9/20/2017	ENER	---	---	---	---	---	---	169	668	1550	1992	---	---
K4	1/6/2017	ENER	---	---	---	---	---	---	110	432	1170	1753	---	---
	3/31/2017	ENER	---	---	---	---	---	---	107	422	1170	1736	---	---
	7/18/2017	ENER	103	27.1	3.0	280	382	< 5	108	435	1160	---	1.06	7.70
	11/6/2017	ENER	106	29.7	3.3	268	388	< 5	106	470	1210	1638	1.01	7.63
K5	1/6/2017	ENER	---	---	---	---	---	---	114	446	1210	1831	---	---
	3/31/2017	ENER	---	---	---	---	---	---	107	440	1200	1789	---	---

Signifies Quality Control Sample

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
K5	7/18/2017	ENER	138	36.9	3.6	383	450	< 5	122	669	1540	---	1.07	7.58
	11/7/2017	ENER	134	36.5	3.6	374	515	< 5	117	661	1650	2186	1.01	7.57
K7	1/6/2017	ENER	---	---	---	---	---	---	127	571	1390	2048	---	---
	3/31/2017	ENER	---	---	---	---	---	---	108	435	1190	1711	---	---
	7/18/2017	ENER	117	28.8	3.2	294	431	< 5	116	449	1550	---	1.06	7.59
	11/6/2017	ENER	110	27.7	3.3	241	445	< 5	105	386	1150	1597	0.99	7.59
K8	1/6/2017	ENER	---	---	---	---	---	---	116	481	1240	1887	---	---
	3/31/2017	ENER	---	---	---	---	---	---	110	503	1280	1967	---	---
	7/18/2017	ENER	112	29.0	3.2	319	404	< 5	108	523	1200	---	1.06	7.67
	11/6/2017	ENER	111	29.9	3.4	328	456	< 5	113	554	1440	1961	1.00	7.60
K9	1/6/2017	ENER	---	---	---	---	---	---	119	471	1250	1955	---	---
	3/31/2017	ENER	---	---	---	---	---	---	109	445	1220	1797	---	---
	11/7/2017	ENER	118	32.3	3.8	319	460	< 5	109	535	1430	1915	1.03	7.61
K10	1/6/2017	ENER	---	---	---	---	---	---	146	686	1650	2335	---	---
	3/31/2017	ENER	---	---	---	---	---	---	110	445	1210	1774	---	---
	11/7/2017	ENER	125	30.0	3.1	300	460	< 5	111	544	1440	1913	0.99	7.60
K11	1/6/2017	ENER	---	---	---	---	---	---	119	467	1240	1964	---	---
	3/31/2017	ENER	---	---	---	---	---	---	109	446	1220	1807	---	---
	7/18/2017	ENER	114	31.1	3.4	307	418	< 5	110	512	1340	---	1.04	7.65
	11/7/2017	ENER	145	37.2	4.6	357	504	< 5	117	677	1680	2179	1.00	7.48
KF	3/28/2017	ENER	120	26.6	3.3	132	327	< 5	84	336	930	1360	0.94	7.55
KZ	3/28/2017	ENER	148	37.3	4.9	152	317	< 5	100	470	1130	1604	0.96	7.53
L	5/1/2017	ENER	149	35.5	4.8	254	431	< 5	164	525	1490	2087	0.94	7.44
	10/23/2017	ENER	---	---	---	---	---	---	155	499	1410	2006	---	---
L5	5/1/2017	ENER	99	23.4	4.0	196	381	< 5	109	345	1040	1496	0.93	7.60
	10/23/2017	ENER	---	---	---	---	---	---	107	359	1080	1578	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
L6	5/1/2017	ENER	102	22.9	5.6	210	358	< 5	108	316	998	1429	1.04	7.63
	10/23/2017	ENER	---	---	---	---	---	---	137	368	1120	1502	---	---
L7	5/1/2017	ENER	69	15.4	3.5	213	382	< 5	100	305	991	1443	0.90	7.69
	10/23/2017	ENER	---	---	---	---	---	---	103	316	1010	1504	---	---
L8	5/1/2017	ENER	126	30.2	4.7	250	390	< 5	131	409	1210	1726	1.05	7.52
L9	5/1/2017	ENER	117	28.2	4.4	232	375	< 5	125	383	1150	---	1.03	7.58
	10/23/2017	ENER	---	---	---	---	---	---	136	436	1260	1802	---	---
L10	5/1/2017	ENER	138	33.4	4.8	240	393	< 5	133	424	1220	---	1.05	7.52
	10/23/2017	ENER	---	---	---	---	---	---	136	436	1250	1802	---	---
L11	4/24/2017	ENER	---	---	---	---	---	---	108	321	1040	1744	---	---
L12	5/16/2017	ENER	---	---	---	---	---	---	211	621	1510	2176	---	---
L13	5/19/2017	ENER	---	---	---	---	---	---	250	824	1770	2517	---	---
L14	5/19/2017	ENER	---	---	---	---	---	---	202	625	1550	2330	---	---
L15	4/24/2017	ENER	---	---	---	---	---	---	268	793	1930	2651	---	---
L16	5/16/2017	ENER	---	---	---	---	---	---	363	1000	2210	3022	---	---
L19	4/24/2017	ENER	---	---	---	---	---	---	233	941	2050	2808	---	---
L20	4/24/2017	ENER	---	---	---	---	---	---	212	646	1700	2458	---	---
L23	5/16/2017	ENER	---	---	---	---	---	---	164	505	1380	1978	---	---
L24	4/24/2017	ENER	---	---	---	---	---	---	187	534	1470	2159	---	---
L25	4/24/2017	ENER	---	---	---	---	---	---	227	966	2130	2817	---	---
L26	4/25/2017	ENER	---	---	---	---	---	---	89	256	822	1269	---	---
M3	3/23/2017	ENER	304	77.9	6.4	548	602	< 5	236	1570	3020	7842	0.92	7.34
M6	3/24/2017	ENER	---	---	---	---	---	---	186	1110	2270	2994	---	---
M10	3/24/2017	ENER	---	---	---	---	---	---	240	1570	2990	3609	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
MB	11/13/2017	ENER	245	67.3	7.7	262	527	< 5	174	623	1750	2214	1.10	7.19
ML	3/24/2017	ENER	---	---	---	---	---	---	222	1960	3700	4264	---	---
MQ	3/24/2017	ENER	---	---	---	---	---	---	207	1120	2330	3113	---	---
	9/19/2017	ENER	---	---	---	---	---	---	216	1130	2440	3096	---	---
MU	12/1/2017	ENER	---	---	---	---	---	---	210	1950	3480	3679	---	---
MW	3/24/2017	ENER	---	---	---	---	---	---	233	1920	3480	4125	---	---
MX	3/20/2017	ENER	---	---	---	---	---	---	---	696	1750	2430	---	---
	8/11/2017	ENER	---	---	---	---	---	---	170	570	1780	2403	---	---
	11/13/2017	ENER	233	62.1	6.8	262	474	< 5	172	631	1710	2185	1.09	7.69
MY	11/13/2017	ENER	238	68.3	7.8	270	567	< 5	174	640	1770	2245	1.06	7.35
MZ	3/24/2017	ENER	---	---	---	---	---	---	219	1260	2590	3248	---	---
N	8/17/2017	ENER	---	---	---	---	---	---	202	1670	3140	---	---	---
NA	8/18/2017	ENER	---	---	---	---	---	---	104	970	2020	---	---	---
NB	8/21/2017	ENER	---	---	---	---	---	---	904	6740	14400	---	---	---
NC	8/16/2017	ENER	---	---	---	---	---	---	66	785	1450	---	---	---
O	8/17/2017	ENER	---	---	---	---	---	---	128	870	1720	---	---	---
P	6/1/2017	ENER	---	---	---	---	---	---	---	---	---	2242	---	---
	9/14/2017	ENER	244	52.5	4.8	269	249	< 5	52	999	1820	---	1.07	7.60
	10/26/2017	ENER	---	---	---	---	---	---	---	980	1780	2148	---	---
P2	3/23/2017	ENER	300	56.9	6.1	262	235	< 5	61	1270	2170	2631	0.97	7.84
P3	3/23/2017	ENER	273	50.1	5.2	264	209	< 5	87	1210	2090	2632	0.94	7.64
P4	3/23/2017	ENER	196	35.0	3.3	231	185	< 5	45	909	1560	2068	0.97	7.72
Q	3/23/2017	ENER	---	---	---	---	---	---	67	1540	2540	3035	---	---
	5/3/2017	ENER	366	67.8	6.9	258	232	< 5	70	1470	2560	3023	0.96	7.51

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
Q	6/1/2017	ENER	385	72.7	7.0	285	225	< 5	77	1560	2590	3009	0.98	7.54
	12/5/2017	ENER	404	75.9	6.8	280	235	< 5	69	1600	2690	2802	0.99	7.53
R	5/3/2017	ENER	339	56.8	4.5	296	159	< 5	60	1300	2350	2812	1.10	7.73
	12/4/2017	ENER	300	51.0	3.7	269	157	< 5	51	1310	2270	2557	0.98	7.69
S2	1/13/2017	ENER	---	---	---	---	---	---	---	1110	2590	3291	---	---
	7/18/2017	ENER	---	---	---	---	---	---	244	1060	2500	3354	---	---
S3	7/19/2017	ENER	---	---	---	---	---	---	322	1930	3910	4933	---	---
S4	3/14/2017	ENER	---	---	---	---	---	---	---	871	2000	2734	---	---
	7/18/2017	ENER	272	72.2	5.1	298	541	< 5	229	822	2020	---	1.00	7.26
	11/13/2017	ENER	257	70.3	4.8	294	568	< 5	202	724	1950	2447	1.04	7.32
S5R	3/23/2017	ENER	305	75.0	6.0	330	466	< 5	209	1180	2420	3385	0.94	7.36
S11	1/16/2017	ENER	137	42.3	6.5	205	518	< 5	94	415	1160	1732	0.97	7.35
	10/13/2017	ENER	---	---	---	---	---	---	105	477	1170	1632	---	---
S19	3/22/2017	ENER	216	52.9	3.0	621	547	< 5	280	1310	2770	3802	0.95	7.46
SA	3/22/2017	ENER	49	74.5	9.5	5280	3970	< 5	938	8120	16000	18540	0.91	8.52
	11/13/2017	ENER	---	---	---	---	---	---	835	6820	15000	16750	---	---
SB	3/22/2017	ENER	13	27.8	11.0	6620	3470	720	1220	9630	18100	21030	0.92	9.05
	11/9/2017	ENER	---	---	---	---	---	---	957	7620	17600	18540	---	---
SE6	1/17/2017	ENER	33	66.3	8.9	7150	4630	300	1200	9980	19100	6814	0.97	8.47
	11/13/2017	ENER	---	---	---	---	---	---	383	2450	5400	6194	---	---
SM	5/3/2017	ENER	---	---	---	---	---	---	410	2640	4640	6987	---	---
SO	5/3/2017	ENER	---	---	---	---	---	---	228	1170	2530	3379	---	---
ST	1/24/2017	ENER	335	82.6	6.5	358	456	< 5	210	1260	2520	3465	0.99	7.62
	3/23/2017	ENER	296	74.0	6.3	314	472	< 5	207	1110	2310	3025	0.94	7.48
SV	3/22/2017	ENER	175	53.8	4.3	888	859	< 5	311	1520	3320	4682	0.95	7.73

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
SW	5/3/2017	ENER	---	---	---	---	---	---	248	901	2240	3021	---	---
SZ	1/16/2017	ENER	295	117.0	7.5	1330	1020	< 5	412	2640	5210	2381	0.99	7.39
T	9/26/2017	ENER	---	---	---	---	---	---	226	810	1930	2267	---	---
T2	12/12/2017	ENER	17	32.0	9.0	4870	2970	295	621	6490	13200	14900	1.02	9.11
T10	8/3/2017	ENER	< 1	1.4	26.0	9900	3840	3750	1410	9810	28700	31090	1.00	9.82
T11	3/29/2017	ENER	17	19.6	7.0	2860	1710	528	445	3480	8240	10630	0.97	9.53
T19	11/9/2017	ENER	212	56.2	5.1	2030	1490	< 5	396	3320	6890	7810	0.99	7.87
T20	12/11/2017	ENER	240	74.2	7.3	1640	1020	< 5	386	3370	5970	7158	0.91	7.62
T21	12/11/2017	ENER	3	2.8	9.2	2320	985	687	285	2690	6600	8227	0.99	9.96
T25	3/31/2017	ENER	245	68.6	6.2	1220	816	< 5	257	2500	4570	6100	0.98	7.44
T37	3/30/2017	ENER	9	43.2	12.0	4720	2560	959	689	5690	13400	16360	0.99	9.33
T40	12/12/2017	ENER	59	34.3	12.5	2600	1340	317	349	3170	7180	8450	1.10	9.60
T41	12/12/2017	ENER	1	< 0.5	13.0	2710	844	1120	388	2980	7630	9708	0.95	10.40
T50	3/30/2017	ENER	3	12.8	9.0	4140	1910	815	715	5150	11300	14900	0.98	9.62
T51	3/29/2017	ENER	12	42.4	11.0	4420	2660	350	853	5980	12900	16030	0.96	9.09
TA	9/26/2017	ENER	---	---	---	---	---	---	247	844	2020	3011	---	---
TB	9/26/2017	ENER	---	---	---	---	---	---	137	517	1370	1956	---	---
W	12/5/2017	ENER	---	---	---	---	---	---	181	649	1730	2186	---	---
X	3/1/2017	ENER	---	---	---	---	---	---	104	352	997	1500	---	---
	5/1/2017	ENER	---	---	---	---	---	---	109	352	1050	1487	---	7.37
	7/18/2017	ENER	151	34.9	4.7	159	376	< 5	123	369	1080	---	1.00	7.40
	10/26/2017	ENER	---	---	---	---	---	---	121	438	1200	1630	---	---
	11/28/2017	ENER	130	29.5	4.6	146	281	< 5	98	350	908	1238	1.04	7.51
X18	9/19/2017	ENER	---	---	---	---	---	---	227	1150	2540	3742	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0690	4/25/2017	ENER	0.118	± 0.0190	0.81	0.216	---	---	---	---	---	---	---	---
0691	4/25/2017	ENER	0.0157	± 0.0025	0.26	0.174	---	---	---	---	---	---	---	---
0891	4/25/2017	ENER	0.196	± 0.0316	0.09	0.708	---	---	---	---	---	---	---	---
1A	9/19/2017	ENER	2.49	± 0.4010	1.27	0.548	---	---	---	---	---	---	---	---
1E	9/19/2017	ENER	0.0344	± 0.0056	< 0.03	0.022	---	---	---	---	---	---	---	---
1F	9/19/2017	ENER	1.12	± 0.1810	< 0.03	0.474	---	---	---	---	---	---	---	---
1J	1/24/2017	ENER	0.0302	± 0.0049	< 0.03	0.030	2.1	0.21	± 0.000	---	---	---	---	---
1K	3/22/2017	ENER	0.597	± 0.0963	0.52	0.045	---	---	---	---	---	---	---	---
1M	3/22/2017	ENER	0.143	± 0.0230	0.06	0.404	---	---	---	---	---	---	---	---
1N	3/22/2017	ENER	0.0586	± 0.0095	< 0.03	0.438	---	---	---	---	---	---	---	---
1P	3/22/2017	ENER	0.147	± 0.0238	< 0.03	0.024	---	---	---	---	---	---	---	---
1Q	1/16/2017	ENER	0.0868	± 0.0140	0.11	0.006	0.1	0.26	± 0.000	---	---	---	---	---
1R	1/16/2017	ENER	0.104	± 0.0168	0.05	< 0.005	0.1	0.31	± 0.000	---	---	---	---	---
1S	1/24/2017	ENER	0.0203	± 0.0033	< 0.03	0.031	2.1	0.23	± 0.000	---	---	---	---	---
1T	1/16/2017	ENER	0.0724	± 0.0117	0.09	0.006	0.1	0.19	± 0.000	---	---	---	---	---
1U	1/16/2017	ENER	0.191	± 0.0308	0.15	< 0.005	< 0.1	0.21	± 0.000	---	---	---	---	---
1V	1/16/2017	ENER	0.210	± 0.0339	0.09	< 0.005	< 0.1	0.21	± 0.000	---	---	---	---	---
B	3/22/2017	ENER	0.0586	± 0.0095	< 0.03	0.053	---	---	---	---	---	---	---	---
B3	5/1/2017	ENER	13.0	± 2.1000	22.40	0.680	3.1	0.37	± 0.140	---	---	---	---	---
B4	5/2/2017	ENER	13.6	± 2.1900	29.20	0.766	3.6	0.40	± 0.200	---	---	---	---	---
B5	5/1/2017	ENER	6.97	± 1.1200	18.60	0.374	3.5	0.25	± 0.130	---	---	---	---	---
B7	5/2/2017	ENER	7.14	± 1.1500	26.30	0.598	6.0	0.20	± 0.100	---	---	---	---	---
B8	5/2/2017	ENER	6.54	± 1.0600	22.70	0.644	4.3	0.30	± 0.100	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
B9	5/1/2017	ENER	9.82	± 1.5900	20.70	2.010	24.7	0.37	± 0.150	---	---	---	---	---
B10	5/2/2017	ENER	7.47	± 1.2100	18.50	1.340	20.2	0.30	± 0.100	---	---	---	---	---
B11	5/2/2017	ENER	6.22	± 1.0000	11.40	0.910	10.9	0.40	± 0.200	---	---	---	---	---
B12	11/13/2017	ENER	1.74	± 0.2810	2.14	0.079	2.8	0.40	± 0.100	1.1	± 0.7	< 0.01	0.02	± 0.05
B13	3/28/2017	ENER	0.978	± 0.1580	0.44	0.024	0.1	0.24	± 0.000	0.0	± 1.0	< 0.01	0.10	± 0.20
B15	5/2/2017	ENER	11.0	± 1.7700	20.30	0.415	2.6	0.30	± 0.100	---	---	---	---	---
B16	5/2/2017	ENER	13.1	± 2.1200	26.40	0.284	2.8	0.50	± 0.200	---	---	---	---	---
B32	5/3/2017	ENER	15.0	± 2.4200	20.50	0.625	4.2	0.30	± 0.100	---	---	---	---	---
B35	5/2/2017	ENER	18.1	± 2.9200	31.60	0.650	3.2	0.30	± 0.200	---	---	---	---	---
B38	5/2/2017	ENER	18.5	± 2.9800	19.90	0.635	6.5	0.40	± 0.200	---	---	---	---	---
B40	5/2/2017	ENER	18.6	± 3.0100	22.70	0.932	10.1	0.50	± 0.200	---	---	---	---	---
B42	5/2/2017	ENER	30.4	± 4.9100	25.70	1.130	15.8	0.40	± 0.200	---	---	---	---	---
B44	5/2/2017	ENER	17.1	± 2.7600	27.10	2.300	12.1	0.30	± 0.100	---	---	---	---	---
BC	6/27/2017	ENER	1.16	± 0.1880	0.07	0.040	---	---	---	---	---	---	---	---
BP	3/22/2017	ENER	0.327	± 0.0528	0.13	0.026	---	---	---	---	---	---	---	---
C1	3/21/2017	ENER	0.151	± 0.0244	0.05	0.016	---	---	---	---	---	---	---	---
C5	3/22/2017	ENER	0.0924	± 0.0149	< 0.03	0.009	---	---	---	---	---	---	---	---
C6	3/21/2017	ENER	0.696	± 0.1120	1.10	0.125	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.808	± 0.1300	1.30	0.152	---	---	---	---	---	---	---	---
	9/20/2017	ENER	2.07	± 0.3330	3.70	0.607	3.6	0.20	± 0.100	---	---	---	---	---
C7	3/31/2017	ENER	3.50	± 0.5650	5.53	0.725	---	---	---	---	---	---	---	---
C8	3/31/2017	ENER	3.51	± 0.5670	5.47	0.731	---	---	---	---	---	---	---	---
C9	3/31/2017	ENER	5.70	± 0.9210	11.40	0.659	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
C9	9/20/2017	ENER	3.85	± 0.6210	4.13	1.090	---	---	---	---	---	---	---	---
C10	3/31/2017	ENER	7.56	± 1.2200	18.50	1.030	---	---	---	---	---	---	---	---
C11	3/31/2017	ENER	8.11	± 1.3100	10.30	1.430	---	---	---	---	---	---	---	---
	9/20/2017	ENER	6.54	± 1.0500	8.77	1.540	---	---	---	---	---	---	---	---
C12	3/31/2017	ENER	3.29	± 0.5310	4.43	0.959	---	---	---	---	---	---	---	---
	9/20/2017	ENER	5.71	± 0.9220	4.14	1.070	---	---	---	---	---	---	---	---
D1	3/20/2017	ENER	0.688	± 0.1110	0.94	0.053	---	---	---	---	---	---	---	---
	6/28/2017	ENER	0.908	± 0.1460	1.33	0.044	1.0	0.08	± 0.100	1.3	± 0.9	< 0.01	0.08	± 0.10
DA3	5/2/2017	ENER	10.7	± 1.7300	12.40	0.748	4.5	0.30	± 0.100	---	---	---	---	---
DC	6/27/2017	ENER	0.0779	± 0.0126	< 0.03	0.023	---	---	---	---	---	---	---	---
DD	3/1/2017	ENER	0.101	± 0.0163	< 0.03	0.073	---	---	---	---	---	---	---	---
	5/3/2017	ENER	0.135	± 0.0218	< 0.03	0.074	10.6	0.30	± 0.100	1.8	± 0.8	< 0.01	0.10	± 0.10
	8/8/2017	ENER	0.0975	± 0.0157	< 0.03	0.113	---	---	---	---	---	---	---	---
	10/12/2017	ENER	0.112	± 0.0164	< 0.03	0.071	9.8	0.10	± 0.100	1.5	± 0.9	< 0.01	0.01	± 0.07
	11/23/2017	ENER	0.0984	± 0.0159	0.00	0.091	11.7	0.20	± 0.200	0.6	± 1.0	< 0.01	0.04	± 0.10
DD2	3/1/2017	ENER	0.195	± 0.0315	< 0.03	< 0.005	---	---	---	---	---	---	---	---
	5/2/2017	ENER	0.237	± 0.0383	< 0.03	< 0.005	< 0.1	0.50	± 0.200	1.0	± 0.7	< 0.01	0.05	± 0.08
	8/8/2017	ENER	0.221	± 0.0357	< 0.03	< 0.005	---	---	---	---	---	---	---	---
	10/12/2017	ENER	0.222	± 0.0358	< 0.03	< 0.005	< 0.1	0.40	± 0.200	2.6	± 1.1	< 0.01	0.07	± 0.09
	11/2/2017	ENER	0.218	± 0.0352	< 0.03	< 0.005	< 0.1	0.50	± 0.200	0.8	± 1.0	< 0.01	0.03	± 0.07
	11/23/2017	ENER	0.214	± 0.0345	0.00	< 0.001	< 0.1	0.60	± 0.200	1.3	± 0.9	< 0.01	0.09	± 0.10
DD3	8/15/2017	ENER	0.0858	± 0.0139	< 0.03	0.120	17.3	0.70	± 0.200	0.3	± 1.0	< 0.01	0.06	± 0.10
	10/12/2017	ENER	0.103	± 0.0166	< 0.03	0.262	48.4	0.40	± 0.200	1.3	± 0.9	< 0.01	-0.01	± 0.07
	11/2/2017	ENER	0.0884	± 0.0143	< 0.03	0.277	48.0	0.30	± 0.100	0.3	± 0.7	< 0.01	0.07	± 0.08
DD4	8/8/2017	ENER	0.244	± 0.0419	0.05	0.196	23.1	0.80	± 0.300	1.7	± 1.0	< 0.01	0.10	± 0.10
	8/15/2017	ENER	0.227	± 0.0367	< 0.03	0.016	1.0	0.50	± 0.200	1.0	± 1.0	< 0.01	0.03	± 0.09

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
DD4	10/12/2017	ENER	0.230	± 0.0368	< 0.03	0.021	0.6	0.30	± 0.100	2.5	± 1.0	< 0.01	0.00	± 0.08
	11/2/2017	ENER	0.225	± 0.0364	< 0.03	0.016	0.5	0.30	± 0.100	3.1	± 1.2	< 0.01	0.02	± 0.07
	12/7/2017	ENER	0.204	± 0.0329	0.00	0.012	0.3	0.10	± 0.200	0.6	± 1.1	< 0.01	0.20	± 0.10
DD5	8/16/2017	ENER	0.216	± 0.0349	< 0.03	0.144	20.0	0.40	± 0.200	0.5	± 1.0	< 0.01	0.02	± 0.09
	10/12/2017	ENER	0.223	± 0.0331	< 0.03	0.171	21.7	0.40	± 0.200	2.4	± 1.1	< 0.01	-0.02	± 0.07
	11/2/2017	ENER	0.204	± 0.0329	< 0.03	0.168	19.4	0.50	± 0.200	0.8	± 1.0	< 0.01	0.09	± 0.09
	11/17/2017	ENER	0.214	± 0.0346	0.02	0.170	22.3	0.04	± 0.100	0.3	± 1.0	< 0.01	0.04	± 0.09
DZ	6/27/2017	ENER	49.6	± 8.0100	36.60	11.100	---	---	---	---	---	---	---	---
	6/27/2017	ENER	# 43.9	# ± 7.0900	# 22.40	# 10.200	---	---	---	---	---	---	---	---
F	3/17/2017	ENER	0.0420	± 0.0068	< 0.03	0.009	---	---	---	---	---	---	---	---
	11/14/2017	ENER	0.0492	± 0.0079	< 0.03	0.019	2.2	---	---	---	---	---	---	---
	11/14/2017	ENER	# 0.0492	# ± 0.0079	# < 0.03	# 0.020	# 2.2	---	---	---	---	---	---	---
FB	3/17/2017	ENER	0.0367	± 0.0059	< 0.03	0.038	---	---	---	---	---	---	---	---
	11/14/2017	ENER	0.0409	± 0.0066	< 0.03	0.070	2.9	---	---	---	---	---	---	---
GH	3/17/2017	ENER	0.0627	± 0.0101	< 0.03	0.011	---	---	---	---	---	---	---	---
	11/14/2017	ENER	0.0644	± 0.0104	< 0.03	0.015	1.8	---	---	---	---	---	---	---
GK	11/14/2017	ENER	0.0443	± 0.0071	< 0.03	0.011	---	---	---	---	---	---	---	---
GN	3/20/2017	ENER	0.0504	± 0.0081	< 0.03	0.016	---	---	---	---	---	---	---	---
	8/14/2017	ENER	0.0370	± 0.0060	< 0.03	0.044	2.4	---	---	---	---	---	---	---
GV	9/20/2017	ENER	0.152	± 0.0245	< 0.03	0.036	---	---	---	---	---	---	---	---
K2	3/28/2017	ENER	---	± 0.0111	---	---	---	---	± 0.150	---	1.0	---	---	± 0.20
K4	1/6/2017	ENER	0.645	± 0.1040	1.19	0.263	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.635	± 0.1030	1.32	0.230	---	---	---	---	---	---	---	---
	7/18/2017	ENER	0.889	± 0.1430	1.68	0.258	1.3	0.20	± 0.200	---	---	---	---	---
	11/6/2017	ENER	0.642	± 0.1040	1.10	0.264	1.4	0.10	± 0.100	0.3	± 1.4	0.17	0.03	± 0.06
K5	1/6/2017	ENER	0.619	± 0.0999	1.19	0.186	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
K5	3/31/2017	ENER	0.685	± 0.1100	1.47	0.169	---	---	---	---	---	---	---	---
	7/18/2017	ENER	1.06	± 0.1710	3.96	0.295	1.7	-0.02	± 0.100	---	---	---	---	---
	11/7/2017	ENER	1.35	± 0.2180	4.07	0.607	1.7	0.20	± 0.200	-0.3	± 1.3	0.04	0.03	± 0.06
K7	1/6/2017	ENER	1.35	± 0.2180	2.30	0.432	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.654	± 0.1060	1.38	0.239	---	---	---	---	---	---	---	---
	7/18/2017	ENER	0.589	± 0.0950	1.58	0.243	1.5	0.05	± 0.100	---	---	---	---	---
	11/6/2017	ENER	0.389	± 0.0628	0.64	0.236	1.4	0.20	± 0.200	1.1	± 0.8	0.08	0.00	± 0.06
K8	1/6/2017	ENER	0.924	± 0.1490	1.79	0.285	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.789	± 0.1270	2.07	0.210	---	---	---	---	---	---	---	---
	7/18/2017	ENER	1.12	± 0.1810	2.28	0.276	1.5	0.10	± 0.200	---	---	---	---	---
	11/6/2017	ENER	1.08	± 0.1750	2.84	0.372	1.5	0.30	± 0.200	0.6	± 1.2	0.06	0.01	± 0.05
K9	1/6/2017	ENER	0.609	± 0.0983	1.16	0.073	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.685	± 0.1110	1.34	0.079	---	---	---	---	---	---	---	---
	11/7/2017	ENER	1.000	± 0.1620	2.66	0.421	1.6	0.09	± 0.200	-0.2	± 1.3	0.08	0.03	± 0.06
K10	1/6/2017	ENER	2.24	± 0.3970	4.63	0.581	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.666	± 0.1080	1.36	0.079	---	---	---	---	---	---	---	---
	11/7/2017	ENER	1.01	± 0.1630	2.62	0.416	1.6	0.20	± 0.200	1.0	± 1.0	0.08	0.02	± 0.10
K11	1/6/2017	ENER	0.560	± 0.1100	1.20	0.073	---	---	---	---	---	---	---	---
	3/31/2017	ENER	0.696	± 0.1120	1.36	0.076	---	---	---	---	---	---	---	---
	7/18/2017	ENER	1.01	± 0.1630	2.21	0.249	1.5	0.30	± 0.200	---	---	---	---	---
	11/7/2017	ENER	1.70	± 0.2750	3.92	0.438	1.8	0.10	± 0.200	-0.2	± 1.5	< 0.01	0.06	± 0.09
KF	3/28/2017	ENER	0.0413	± 0.0067	0.07	0.008	1.2	0.21	± 0.000	-0.1	± 0.9	< 0.01	0.02	± 0.07
KZ	3/28/2017	ENER	0.0690	± 0.0111	0.10	0.013	1.4	0.17	± 0.000	0.6	± 1.0	< 0.01	0.40	± 0.20
L	5/1/2017	ENER	0.506	± 0.0816	0.52	0.045	1.5	0.40	± 0.100	0.5	± 1.1	< 0.01	0.04	± 0.10
	10/23/2017	ENER	0.393	± 0.0635	0.47	0.041	---	---	---	---	---	---	---	---
L5	5/1/2017	ENER	0.208	± 0.0336	0.39	0.065	1.1	0.30	± 0.100	0.9	± 1.0	< 0.01	0.01	± 0.05

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
L5	10/23/2017	ENER	0.183	± 0.0295	0.31	0.082	---	---	---	---	---	---	---	---
L6	5/1/2017	ENER	0.260	± 0.0420	0.35	0.114	1.2	0.60	± 0.200	0.1	± 1.0	0.01	0.07	± 0.10
	10/23/2017	ENER	0.248	± 0.0401	0.31	0.173	---	---	---	---	---	---	---	---
L7	5/1/2017	ENER	0.265	± 0.0427	0.39	0.096	1.0	0.20	± 0.100	0.7	± 1.0	0.01	0.10	± 0.10
	10/23/2017	ENER	0.199	± 0.0321	0.19	0.073	---	---	---	---	---	---	---	---
L8	5/1/2017	ENER	0.300	± 0.0484	0.47	0.066	1.3	0.40	± 0.100	0.9	± 1.1	< 0.01	0.05	± 0.08
L9	5/1/2017	ENER	0.246	± 0.0397	0.43	0.076	1.3	0.40	± 0.100	2.9	± 1.2	< 0.01	0.10	± 0.09
	10/23/2017	ENER	0.236	± 0.0380	0.32	0.096	---	---	---	---	---	---	---	---
L10	5/1/2017	ENER	0.370	± 0.0598	0.54	0.044	1.5	0.20	± 0.100	1.1	± 0.8	< 0.01	0.09	± 0.10
	10/23/2017	ENER	0.306	± 0.0494	0.40	0.037	---	---	---	---	---	---	---	---
L11	4/24/2017	ENER	0.210	± 0.0340	0.14	0.081	---	---	---	---	---	---	---	---
L12	5/16/2017	ENER	0.0716	± 0.0116	0.16	0.225	---	---	---	---	---	---	---	---
L13	5/19/2017	ENER	0.476	± 0.0768	1.57	0.377	---	---	---	---	---	---	---	---
L14	5/19/2017	ENER	0.236	± 0.0381	0.79	0.019	---	---	---	---	---	---	---	---
L15	4/24/2017	ENER	0.304	± 0.0491	0.79	0.193	---	---	---	---	---	---	---	---
L16	5/16/2017	ENER	0.0748	± 0.0121	0.28	0.288	---	---	---	---	---	---	---	---
L19	4/24/2017	ENER	0.117	± 0.0188	2.05	0.012	---	---	---	---	---	---	---	---
L20	4/24/2017	ENER	0.294	± 0.0475	1.06	0.028	---	---	---	---	---	---	---	---
L23	5/16/2017	ENER	0.0591	± 0.0095	0.10	0.121	---	---	---	---	---	---	---	---
L24	4/24/2017	ENER	0.252	± 0.0406	0.47	0.181	---	---	---	---	---	---	---	---
L25	4/24/2017	ENER	0.159	± 0.0257	2.17	0.416	---	---	---	---	---	---	---	---
L26	4/25/2017	ENER	0.190	± 0.0306	0.70	0.154	---	---	---	---	---	---	---	---
M2	3/24/2017	ENER	---	± 0.0194	---	---	---	---	---	---	---	---	---	---
M3	3/23/2017	ENER	2.90	± 0.4680	3.51	0.098	3.8	0.24	± 0.000	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
M6	3/24/2017	ENER	1.74	± 0.2810	1.71	0.155	---	---	---	---	---	---	---	---
M10	3/24/2017	ENER	0.141	± 0.0228	< 0.03	0.047	---	---	---	---	---	---	---	---
MB	11/13/2017	ENER	0.0298	± 0.0048	< 0.03	0.012	1.8	0.20	± 0.100	0.9	± 0.8	< 0.01	0.01	± 0.06
ML	3/24/2017	ENER	0.0984	± 0.0159	< 0.03	0.029	---	---	---	---	---	---	---	---
MQ	3/24/2017	ENER	0.727	± 0.1170	0.31	0.068	---	---	---	---	---	---	---	---
	9/19/2017	ENER	0.795	± 0.1280	0.33	0.086	---	---	---	---	---	---	---	---
MU	12/1/2017	ENER	0.144	± 0.0232	< 0.03	0.006	9.3	---	---	---	---	---	---	---
MW	3/24/2017	ENER	0.0912	± 0.0147	< 0.03	0.017	---	---	---	---	---	---	---	---
MX	3/20/2017	ENER	0.0323	± 0.0052	< 0.03	0.010	---	---	---	---	---	---	---	---
	8/11/2017	ENER	0.0484	± 0.0078	< 0.03	0.016	0.9	---	---	---	---	---	---	---
	11/13/2017	ENER	0.0339	± 0.0055	< 0.03	0.016	1.5	0.50	± 0.200	0.8	± 0.9	< 0.01	0.01	± 0.06
MY	11/13/2017	ENER	0.0429	± 0.0069	< 0.03	0.032	0.7	0.40	± 0.200	1.9	± 0.9	< 0.01	0.01	± 0.06
MZ	3/24/2017	ENER	0.120	± 0.0194	< 0.03	0.046	---	---	---	---	---	---	---	---
N	8/17/2017	ENER	1.23	± 0.1980	0.35	0.164	10.6	---	---	---	---	---	---	---
NA	8/18/2017	ENER	1.39	± 0.2250	3.74	0.093	3.7	---	---	---	---	---	---	---
NB	8/21/2017	ENER	33.9	± 5.4700	45.90	0.096	2.8	---	---	---	---	---	---	---
NC	8/16/2017	ENER	0.144	± 0.0232	0.11	0.127	5.2	---	---	---	---	---	---	---
O	8/17/2017	ENER	0.0286	± 0.0046	< 0.03	0.178	6.3	---	---	---	---	---	---	---
P	9/14/2017	ENER	0.0285	± 0.0046	< 0.03	0.136	5.3	0.30	± 0.100	0.8	± 0.8	< 0.01	0.10	± 0.10
	10/26/2017	ENER	0.0264	± 0.0043	< 0.03	0.156	---	---	---	---	---	---	---	---
P2	3/23/2017	ENER	0.0288	± 0.0047	< 0.03	0.255	11.0	0.40	± 0.000	---	---	---	---	---
P3	3/23/2017	ENER	0.0219	± 0.0035	< 0.03	0.309	12.0	0.29	± 0.000	---	---	---	---	---
P4	3/23/2017	ENER	0.0200	± 0.0032	< 0.03	0.147	6.4	0.20	± 0.000	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
Q	3/23/2017	ENER	0.0481	± 0.0078	< 0.03	0.407	---	---	---	---	---	---	---	---
	5/3/2017	ENER	0.0499	± 0.0081	< 0.03	0.401	14.9	0.40	± 0.100	1.0	± 0.8	< 0.01	0.08	± 0.09
	6/1/2017	ENER	0.0528	± 0.0085	< 0.03	0.362	13.8	0.30	± 0.100	0.6	± 0.8	< 0.01	-0.02	± 0.06
	12/5/2017	ENER	0.0527	± 0.0085	< 0.00	0.360	12.8	0.60	± 0.200	-0.1	± 1.0	< 0.01	0.10	± 0.10
R	5/3/2017	ENER	0.0233	± 0.0038	< 0.03	0.661	18.4	0.60	± 0.200	0.8	± 0.6	< 0.01	0.02	± 0.10
	12/4/2017	ENER	0.0204	± 0.0033	0.00	0.723	17.9	3.20	± 0.700	0.1	± 1.0	< 0.01	0.90	± 0.40
S2	1/13/2017	ENER	3.20	± 0.5100	3.82	0.250	---	---	---	---	---	---	---	---
	1/16/2017	ENER	---	± 1.3300	---	---	---	---	± 0.160	---	---	---	---	---
	7/18/2017	ENER	3.40	± 0.5490	3.73	0.315	2.0	---	---	---	---	---	---	---
S3	7/19/2017	ENER	8.48	± 1.3700	4.25	0.420	2.4	---	---	---	---	---	---	---
S4	3/14/2017	ENER	0.138	± 0.0000	0.28	0.016	---	---	---	---	---	---	---	---
	7/18/2017	ENER	0.149	± 0.0241	0.30	0.021	1.2	0.20	± 0.100	1.7	± 1.0	< 0.01	0.08	± 0.09
	11/13/2017	ENER	0.153	± 0.0247	0.31	0.024	1.0	0.20	± 0.100	1.2	± 0.8	< 0.01	0.07	± 0.10
S5R	3/23/2017	ENER	0.953	± 0.1540	0.63	0.099	6.7	0.23	± 0.000	---	---	---	---	---
S11	1/16/2017	ENER	0.0179	± 0.0029	0.04	0.008	1.3	0.30	± 0.000	---	---	---	---	---
	10/13/2017	ENER	0.0122	± 0.0020	< 0.03	0.014	1.5	---	---	---	---	---	---	---
S19	3/22/2017	ENER	4.88	± 0.7870	5.91	0.206	2.2	0.52	± 0.000	---	---	---	---	---
SA	3/22/2017	ENER	35.8	± 5.7800	66.70	1.280	2.3	0.95	± 0.000	---	---	---	---	---
	11/13/2017	ENER	33.2	± 5.3500	43.20	1.290	---	---	---	---	---	---	---	---
SB	3/22/2017	ENER	40.3	± 6.5000	79.80	2.050	0.5	1.80	± 0.000	---	---	---	---	---
	11/9/2017	ENER	37.8	± 6.1100	73.30	2.070	---	---	---	---	---	---	---	---
SE6	1/17/2017	ENER	45.0	± 7.3000	71.50	3.700	8.5	1.20	± 0.000	---	---	---	---	---
	11/13/2017	ENER	10.3	± 1.6600	3.36	< 0.005	---	---	---	---	---	---	---	---
SM	5/3/2017	ENER	9.12	± 1.4700	15.20	0.676	---	---	---	---	---	---	---	---
SO	5/3/2017	ENER	2.83	± 0.4560	3.59	0.077	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
ST	1/24/2017	ENER	0.773	± 0.1250	0.58	0.110	8.9	0.29	± 0.000	---	---	---	---	---
	3/23/2017	ENER	0.752	± 0.1210	0.38	0.070	4.1	0.23	± 0.000	---	---	---	---	---
SV	3/22/2017	ENER	5.69	± 0.9180	10.80	0.295	1.9	0.36	± 0.000	---	---	---	---	---
SW	5/3/2017	ENER	1.41	± 0.2280	1.98	0.069	---	---	---	---	---	---	---	---
SZ	1/16/2017	ENER	8.30	± 1.3300	2.80	0.010	< 0.1	0.53	± 0.000	---	---	---	---	---
T	9/26/2017	ENER	4.83	± 0.7790	4.03	1.150	---	---	---	---	---	---	---	---
T2	12/12/2017	ENER	24.4	± 3.9400	59.90	0.440	0.2	4.90	± 1.000	1.1	± 1.0	0.04	1.10	± 0.20
T10	8/3/2017	ENER	48.5	± 8.0000	96.40	0.133	< 0.1	140.00	± 26.300	---	---	---	---	---
T11	3/29/2017	ENER	10.1	± 1.6400	26.30	0.149	0.2	4.10	± 0.840	2.2	± 1.0	0.10	0.60	± 0.30
T19	11/9/2017	ENER	12.4	± 2.0000	16.30	0.131	2.2	0.20	± 0.100	0.1	± 1.3	< 0.01	0.20	± 0.20
T20	12/11/2017	ENER	9.66	± 1.5600	18.30	0.247	1.5	8.50	± 1.700	2.3	± 0.8	< 0.01	0.07	± 0.10
T21	12/11/2017	ENER	6.43	± 1.0400	29.10	0.106	0.3	112.00	± 21.100	1.6	± 0.8	0.03	4.80	± 0.90
T25	3/31/2017	ENER	4.47	± 0.7220	11.40	0.419	2.2	6.60	± 1.300	1.7	± 0.9	< 0.01	0.02	± 0.10
T37	3/30/2017	ENER	21.6	± 3.4800	53.90	0.536	0.1	4.80	± 0.980	2.5	± 1.0	0.05	1.00	± 0.50
T40	12/12/2017	ENER	7.87	± 1.2700	21.50	0.160	1.1	257.00	± 48.100	3.4	± 1.0	0.05	2.40	± 0.50
T41	12/12/2017	ENER	6.65	± 1.0700	23.50	0.056	< 0.1	199.00	± 37.300	4.1	± 1.1	0.05	64.10	± 12.20
T50	3/30/2017	ENER	13.7	± 2.2100	30.60	0.391	0.5	4.20	± 0.870	2.6	± 1.1	0.22	0.80	± 0.40
T51	3/29/2017	ENER	19.4	± 3.1300	43.40	0.110	0.3	3.30	± 0.690	2.3	± 1.0	0.03	1.00	± 0.20
TA	9/26/2017	ENER	3.00	± 0.4850	3.50	0.880	---	---	---	---	---	---	---	---
TB	9/26/2017	ENER	2.34	± 0.3780	1.93	0.306	---	---	---	---	---	---	---	---
W	12/5/2017	ENER	0.0846	± 0.0137	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
X	3/1/2017	ENER	0.0460	± 0.0074	0.10	0.015	---	---	---	---	---	---	---	---
	5/1/2017	ENER	0.0563	± 0.0091	0.10	0.015	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
X	7/18/2017	ENER	0.0543	± 0.0088	0.08	0.021	1.3	0.20	± 0.100	0.9	± 0.9	0.01	0.07	± 0.09
	10/26/2017	ENER	0.0694	± 0.0112	0.08	0.010	---	---	---	---	---	---	---	---
	11/28/2017	ENER	0.0397	± 0.0064	0.09	0.007	1.3	0.10	± 0.200	1.6	± 1.0	0.01	0.02	± 0.08
X18	9/19/2017	ENER	6.05	± 0.9770	0.39	0.285	---	---	---	---	---	---	---	---

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0490	3/9/2017	ENER	---	---	---	---	---	---	201	1100	2170	2850	---	---
0497	3/17/2017	ENER	270	72.6	6.6	354	483	< 5	191	1040	2240	2888	1.00	7.35
	6/27/2017	ENER	237	63.6	6.3	348	473	< 5	187	1000	2060	2865	0.95	7.33
0498	8/24/2017	ENER	---	---	---	---	---	---	131	600	1540	2162	---	---
0525	9/25/2017	ENER	234	48.4	5.2	244	529	< 5	157	679	1720	2342	0.96	7.67
0688	3/27/2017	ENER	---	---	---	---	---	---	---	650	1710	2377	---	---
	8/9/2017	ENER	228	53.9	4.6	261	504	< 5	160	670	1730	2382	1.01	7.37
0802	3/14/2017	ENER	---	---	---	---	---	---	---	646	1610	2225	---	---
	8/9/2017	ENER	210	53.2	4.8	241	524	< 5	140	510	1620	2329	1.09	7.42
0843	9/25/2017	ENER	232	59.1	8.5	234	577	< 5	191	628	1790	2351	0.96	7.28
0844	3/27/2017	ENER	347	124.0	4.8	524	435	< 5	381	1740	3520	4429	0.93	7.45
0845	3/27/2017	ENER	246	77.9	4.7	377	463	< 5	257	1120	2500	3270	0.92	7.40
AW	11/30/2017	ENER	192	55.4	6.1	268	438	6	182	674	1620	2112	0.98	7.42
Q2	8/21/2017	ENER	225	59.2	5.6	292	422	< 5	159	849	1790	---	0.99	7.46
	12/20/2017	ENER	---	---	---	---	---	---	161	853	1840	2296	---	---
Q3	3/17/2017	ENER	---	---	---	---	---	---	150	759	1970	2588	---	---
	8/21/2017	ENER	201	53.0	5.3	260	430	< 5	148	730	1610	---	0.97	7.47
Q5	8/21/2017	ENER	258	68.1	5.8	301	488	< 5	169	876	1910	---	1.02	7.34
	12/20/2017	ENER	---	---	---	---	---	---	170	895	1980	2423	---	---
Q9	3/24/2017	ENER	---	---	---	---	---	---	131	645	1510	---	---	---
	8/21/2017	ENER	148	38.5	5.4	235	322	< 5	123	630	1320	1908	0.95	7.60
Q11	8/21/2017	ENER	242	63.1	5.8	313	548	< 5	167	804	1900	---	1.01	7.34
Q12	8/21/2017	ENER	299	76.8	6.0	339	467	< 5	187	1050	2230	---	1.03	7.38
Q18	8/21/2017	ENER	254	66.9	5.9	303	541	< 5	173	868	2020	---	0.99	7.34

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
Q19	8/21/2017	ENER	303	79.2	6.0	351	513	< 5	188	1070	2280	---	1.02	7.45
Q27	8/21/2017	ENER	219	59.5	7.0	285	505	< 5	170	858	1860	---	0.91	7.34
Q28	8/21/2017	ENER	255	68.9	5.9	325	530	< 5	200	998	2090	---	0.93	7.30
Q30	8/21/2017	ENER	228	63.7	6.2	294	505	< 5	178	914	1890	---	0.91	7.42
SUB1	10/26/2017	ENER	---	---	---	---	---	---	---	909	2060	2601	---	---
Sub2	6/1/2017	ENER	145	42.3	4.1	224	430	< 5	146	478	1300	1914	0.97	7.77
Sub3	6/2/2017	ENER	86	56.3	8.5	310	356	< 5	197	577	1400	2149	0.96	7.39
	10/26/2017	ENER	---	---	---	---	---	---	---	664	1660	2191	---	---

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0490	3/9/2017	ENER	0.493	± 0.0000	< 0.03	0.035	---	---	---	---	---	---	---	---
0497	3/17/2017	ENER	0.530	± 0.0856	< 0.03	0.041	2.9	0.00	± 0.000	0.0	± 0.0	< 0.01	0.00	± 0.00
	6/27/2017	ENER	0.521	± 0.0840	< 0.03	0.045	2.6	0.09	± 0.100	0.0	± 0.9	< 0.01	0.05	± 0.10
0498	8/24/2017	ENER	0.333	± 0.0537	< 0.03	0.040	---	---	---	---	---	---	---	---
0525	9/25/2017	ENER	0.0738	± 0.0119	< 0.03	< 0.005	< 0.1	0.90	± 0.200	0.2	± 1.3	< 0.01	0.04	± 0.08
0688	3/27/2017	ENER	0.0454	± 0.0073	< 0.03	0.007	---	---	---	---	---	---	---	---
	8/9/2017	ENER	0.0402	± 0.0065	< 0.03	0.007	0.5	0.30	± 0.100	0.9	± 0.5	< 0.01	0.05	± 0.10
0802	3/14/2017	ENER	0.0989	± 0.0000	< 0.03	0.007	---	---	---	---	---	---	---	---
	8/9/2017	ENER	0.205	± 0.0331	0.17	0.008	1.6	0.20	± 0.100	2.1	± 0.7	< 0.01	0.03	± 0.10
0843	9/25/2017	ENER	0.0308	± 0.0050	< 0.03	0.012	1.6	0.20	± 0.100	0.0	± 1.3	< 0.01	0.10	± 0.09
0844	3/27/2017	ENER	0.101	± 0.0162	< 0.03	0.066	11.0	0.15	± 0.000	4.1	± 1.1	< 0.01	0.10	± 0.10
0845	3/27/2017	ENER	0.0786	± 0.0127	< 0.03	0.039	5.8	0.17	± 0.000	1.4	± 0.8	< 0.01	0.10	± 0.10
AW	11/30/2017	ENER	0.0998	± 0.0161	0.06	0.034	2.1	0.20	± 0.100	-0.7	± 0.9	< 0.01	0.20	± 0.20
Q2	8/21/2017	ENER	0.310	± 0.0500	< 0.03	0.037	2.8	0.05	± 0.100	1.6	± 0.9	< 0.01	0.08	± 0.09
	12/20/2017	ENER	0.317	± 0.0511	< 0.03	0.040	---	---	---	---	---	---	---	---
Q3	3/17/2017	ENER	0.343	± 0.0553	< 0.03	0.032	---	---	---	---	---	---	---	---
	8/21/2017	ENER	0.406	± 0.0656	< 0.03	0.037	2.2	0.20	± 0.100	1.9	± 0.9	< 0.01	-0.02	± 0.09
Q5	8/21/2017	ENER	0.542	± 0.0875	< 0.03	0.045	3.0	0.06	± 0.100	0.3	± 0.8	< 0.01	-0.01	± 0.06
	12/20/2017	ENER	0.574	± 0.0926	< 0.03	0.046	---	---	---	---	---	---	---	---
Q9	3/24/2017	ENER	0.171	± 0.0275	< 0.03	0.028	---	---	---	---	---	---	---	---
	8/21/2017	ENER	0.137	± 0.0221	< 0.03	0.028	2.0	0.10	± 0.100	3.0	± 1.2	< 0.01	0.09	± 0.09
Q11	8/21/2017	ENER	0.805	± 0.1300	< 0.03	0.049	2.5	0.30	± 0.100	0.9	± 1.0	< 0.01	0.10	± 0.10
Q12	8/21/2017	ENER	0.356	± 0.0575	< 0.03	0.053	4.2	0.20	± 0.100	2.6	± 0.9	< 0.01	0.02	± 0.06
Q18	8/21/2017	ENER	0.774	± 0.1250	< 0.03	0.049	2.7	0.20	± 0.100	2.2	± 0.9	< 0.01	0.02	± 0.08

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
Q19	8/21/2017	ENER	0.511	± 0.0825	< 0.03	0.053	3.5	0.10	± 0.100	5.0	± 1.3	< 0.01	0.06	± 0.10
Q27	8/21/2017	ENER	0.598	± 0.0965	< 0.03	0.055	3.1	0.05	± 0.100	0.9	± 1.3	< 0.01	0.10	± 0.10
Q28	8/21/2017	ENER	0.643	± 0.1040	< 0.03	0.044	2.5	0.20	± 0.100	0.2	± 0.9	< 0.01	0.04	± 0.08
Q30	8/21/2017	ENER	0.735	± 0.1190	< 0.03	0.050	3.0	0.09	± 0.100	2.8	± 1.0	< 0.01	0.06	± 0.10
SUB1	10/26/2017	ENER	0.116	± 0.0187	< 0.03	0.032	---	---	---	---	---	---	---	---
Sub2	6/1/2017	ENER	0.0225	± 0.0036	< 0.03	0.006	0.8	0.30	± 0.200	1.0	± 0.9	< 0.01	0.06	± 0.09
Sub3	6/2/2017	ENER	0.0064	± 0.0010	< 0.03	< 0.005	< 0.1	0.10	± 0.100	-0.7	± 0.8	< 0.01	0.06	± 0.10
	10/26/2017	ENER	0.0115	± 0.0019	< 0.03	< 0.005	---	---	---	---	---	---	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0520	4/27/2017	ENER	---	---	---	---	---	---	235	728	1880	2543	---	---
0521	4/27/2017	ENER	---	---	---	---	---	---	201	641	1700	2394	---	---
0522	4/27/2017	ENER	---	---	---	---	---	---	196	664	1730	2417	---	---
0540	11/6/2017	ENER	---	---	---	---	---	---	117	498	1210	1645	---	---
0551	2/24/2017	ENER	204	43.8	4.9	210	393	< 5	120	627	1550	2065	1.00	7.45
	3/28/2017	ENER	216	47.7	5.5	229	385	< 5	127	670	1560	2123	1.03	7.54
0553	3/27/2017	ENER	272	66.0	5.2	243	361	< 5	181	952	1950	2576	0.96	7.49
0554	3/27/2017	ENER	248	60.0	5.8	210	332	< 5	154	920	1920	2492	0.91	7.58
0555	3/27/2017	ENER	299	80.8	6.2	599	443	< 5	337	1630	3300	4250	0.94	7.51
0556	3/27/2017	ENER	237	68.7	4.7	485	437	< 5	227	1380	2690	3486	0.91	7.51
0557	3/27/2017	ENER	205	57.7	4.3	453	425	< 5	193	1200	2480	3278	0.93	7.65
0631	6/30/2017	ENER	---	---	---	---	---	---	183	769	1840	2400	---	---
0632	6/30/2017	ENER	---	---	---	---	---	---	168	739	1690	2200	---	---
0634	3/20/2017	ENER	---	---	---	---	---	---	162	695	1620	2168	---	---
	7/11/2017	ENER	---	---	---	---	---	---	151	647	1610	2172	---	---
	12/13/2017	ENER	---	---	---	---	---	---	151	681	1550	1953	---	---
0637	10/6/2017	ENER	186	51.5	5.7	172	347	< 5	128	508	1360	1909	1.06	7.67
0638	4/27/2017	ENER	---	---	---	---	---	---	227	718	1880	2591	---	---
0639	4/27/2017	ENER	---	---	---	---	---	---	195	646	1710	2401	---	---
	8/17/2017	ENER	---	---	---	---	---	---	200	663	1610	---	---	---
0646	11/14/2017	ENER	---	---	---	---	---	---	146	662	1570	2024	---	---
0647	9/14/2017	ENER	225	62.7	5.9	227	410	< 5	168	661	1670	---	1.04	7.52
0649	3/15/2017	ENER	238	56.0	5.0	223	377	< 5	151	771	1920	2265	0.99	7.52
0650	3/27/2017	ENER	219	59.9	4.4	297	348	< 5	140	1000	2050	2663	0.94	7.60

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0654	11/14/2017	ENER	190	54.5	7.2	198	378	< 5	158	658	1530	1938	0.93	7.45
0658	2/21/2017	ENER	181	45.5	4.8	178	365	< 5	115	571	1350	1877	0.97	7.49
0659	3/20/2017	ENER	---	---	---	---	---	---	189	806	1860	2427	---	---
0686	10/6/2017	ENER	177	50.6	5.2	164	355	< 5	136	534	1380	1959	0.97	7.75
0846	3/27/2017	ENER	---	---	---	---	---	---	199	2240	3830	4604	---	---
	8/9/2017	ENER	393	104.0	6.0	646	345	< 5	200	2100	3890	4530	1.02	7.44
0861	8/18/2017	ENER	139	32.1	6.7	337	431	< 5	132	537	1500	---	1.10	7.77
0862	3/21/2017	ENER	163	44.2	6.1	238	356	< 5	137	685	1510	2183	0.92	7.46
0864	8/18/2017	ENER	---	---	---	---	---	---	178	710	1700	---	---	---
0866	3/21/2017	ENER	194	51.3	6.4	294	443	< 5	168	811	1810	2488	0.92	7.40
	8/17/2017	ENER	---	---	---	---	---	---	161	766	1770	---	---	---
0867	8/18/2017	ENER	---	---	---	---	---	---	144	505	1300	---	---	---
0881	2/23/2017	ENER	250	68.0	7.9	289	475	< 5	196	856	2000	2640	0.99	7.36
0882	3/15/2017	ENER	217	57.9	5.5	287	457	< 5	196	811	1770	2375	0.94	7.52
0884	3/27/2017	ENER	117	35.7	5.1	284	314	< 5	119	686	1480	2114	0.93	7.54
0885	3/29/2017	ENER	---	---	---	---	---	---	184	704	1760	2465	---	---
	10/4/2017	ENER	---	---	---	---	---	---	190	707	1760	2437	---	---
0886	3/3/2017	ENER	262	74.5	7.7	302	444	< 5	196	1050	2200	2798	0.93	7.44
	11/9/2017	ENER	264	69.8	7.4	288	453	< 5	182	970	2170	2592	0.96	7.44
0888	3/28/2017	ENER	---	---	---	---	---	---	153	751	1660	2277	---	---
	10/6/2017	ENER	206	61.1	6.9	243	375	< 5	151	674	1650	2252	1.06	7.58
0890	5/17/2017	ENER	---	---	---	---	---	---	135	602	1300	1846	---	---
	7/11/2017	ENER	---	---	---	---	---	---	120	513	1320	1851	---	---
	12/13/2017	ENER	---	---	---	---	---	---	130	618	1350	1701	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0893	3/14/2017	ENER	234	63.9	7.5	275	463	< 5	210	802	1820	2423	0.96	7.32
0895	10/3/2017	ENER	---	---	---	---	---	---	138	661	1470	2032	---	---
0896	10/3/2017	ENER	---	---	---	---	---	---	---	682	1540	2081	---	---
0899	10/3/2017	ENER	173	51.8	5.7	173	350	< 5	146	587	1390	1943	0.92	7.92
0920	3/3/2017	ENER	386	76.5	8.8	245	240	< 5	63	1610	2630	3055	0.92	7.57
	8/10/2017	ENER	---	---	---	---	---	---	58	1400	2700	3012	---	---
0921	12/11/2017	ENER	---	---	---	---	---	---	64	1660	2830	2955	---	---
0994	8/24/2017	ENER	218	53.7	4.3	143	345	< 5	137	623	1440	1917	0.95	7.33
	10/27/2017	ENER	---	---	---	---	---	---	134	603	1430	1811	---	---
0996	10/4/2017	ENER	---	---	---	---	---	---	155	634	1490	2076	---	---
H1	5/17/2017	ENER	---	---	---	---	---	---	145	626	1390	1951	---	---
	7/11/2017	ENER	---	---	---	---	---	---	145	654	1580	---	---	---
	11/9/2017	ENER	---	---	---	---	---	---	168	722	1770	2225	---	---
	12/13/2017	ENER	---	---	---	---	---	---	151	660	1520	1887	---	---
H2A	3/20/2017	ENER	---	---	---	---	---	---	138	576	1340	1898	---	---
	7/11/2017	ENER	---	---	---	---	---	---	136	571	1450	---	---	---
	12/13/2017	ENER	---	---	---	---	---	---	137	616	1370	1740	---	---
H7	3/20/2017	ENER	---	---	---	---	---	---	158	770	1710	2236	---	---
	7/11/2017	ENER	---	---	---	---	---	---	149	709	1700	---	---	---
	12/13/2017	ENER	---	---	---	---	---	---	156	706	1610	2016	---	---
H7B	3/20/2017	ENER	---	---	---	---	---	---	149	695	1570	2077	---	---
	7/11/2017	ENER	---	---	---	---	---	---	150	709	1710	---	---	---
	12/13/2017	ENER	---	---	---	---	---	---	154	700	1570	2009	---	---
H12	3/20/2017	ENER	---	---	---	---	---	---	178	848	1840	2382	---	---
	7/11/2017	ENER	---	---	---	---	---	---	178	862	2040	---	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
H12	11/7/2017	ENER	---	---	---	---	---	---	172	852	1960	2421	---	---
	12/13/2017	ENER	---	---	---	---	---	---	155	736	1620	2391	---	---
H16	12/13/2017	ENER	---	---	---	---	---	---	144	656	1480	1846	---	---
H17	3/28/2017	ENER	---	---	---	---	---	---	195	815	1910	2593	---	---
	12/13/2017	ENER	---	---	---	---	---	---	144	659	1470	1843	---	---
H24	12/13/2017	ENER	---	---	---	---	---	---	188	965	1990	2480	---	---
H26	12/13/2017	ENER	---	---	---	---	---	---	196	959	2110	2549	---	---
H27	3/28/2017	ENER	---	---	---	---	---	---	197	790	1880	2563	---	---
H28	3/28/2017	ENER	---	---	---	---	---	---	190	1060	2260	2913	---	---
H29	3/28/2017	ENER	---	---	---	---	---	---	197	981	2130	2807	---	---
H32	3/28/2017	ENER	---	---	---	---	---	---	167	980	2050	2687	---	---
H33	3/28/2017	ENER	---	---	---	---	---	---	199	919	2090	2766	---	---
H34	3/29/2017	ENER	---	---	---	---	---	---	171	1040	2090	2771	---	---
H35	3/29/2017	ENER	---	---	---	---	---	---	196	766	1840	2545	---	---
H37	3/29/2017	ENER	---	---	---	---	---	---	189	1060	2320	3002	---	---
H38	3/29/2017	ENER	---	---	---	---	---	---	196	826	1930	2625	---	---
H41	3/29/2017	ENER	---	---	---	---	---	---	192	761	1880	2570	---	---
H46	3/29/2017	ENER	---	---	---	---	---	---	190	884	2090	2802	---	---
	11/3/2017	ENER	---	---	---	---	---	---	189	833	2000	2578	---	---
H55	11/13/2017	ENER	---	---	---	---	---	---	181	860	2080	2524	---	---
H56	11/3/2017	ENER	---	---	---	---	---	---	182	679	1740	2288	---	---
H61	11/3/2017	ENER	---	---	---	---	---	---	182	670	1730	2285	---	---
H71	11/3/2017	ENER	---	---	---	---	---	---	181	706	1810	2322	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
H75	3/29/2017	ENER	---	---	---	---	---	---	183	696	1790	2470	---	---
H106	3/29/2017	ENER	---	---	---	---	---	---	193	752	1800	2474	---	---
M16	9/19/2017	ENER	---	---	---	---	---	---	206	1160	2420	3104	---	---
M18	3/29/2017	ENER	---	---	---	---	---	---	188	682	1740	2429	---	---
MO	3/17/2017	ENER	---	---	---	---	---	---	---	1370	2700	3268	---	---
MR	3/20/2017	ENER	---	---	---	---	---	---	---	1010	2170	2914	---	---
	5/1/2017	ENER	---	---	---	---	---	---	---	959	2250	2814	---	---
	8/11/2017	ENER	---	---	---	---	---	---	180	870	2240	2866	---	---
	10/13/2017	ENER	---	---	---	---	---	---	192	943	2230	2026	---	---
MS	3/29/2017	ENER	---	---	---	---	---	---	188	685	1770	2445	---	---
	7/19/2017	ENER	---	---	---	---	---	---	180	628	1710	2391	---	---
	12/1/2017	ENER	---	---	---	---	---	---	182	664	1670	2134	---	---
R1	3/21/2017	ENER	212	57.0	5.9	302	447	< 5	180	821	1900	2618	0.96	7.39
	8/24/2017	ENER	---	---	---	---	---	---	178	774	1830	2486	---	---
R2	3/21/2017	ENER	214	59.4	5.9	310	469	< 5	187	807	1870	2574	0.98	7.43
	8/24/2017	ENER	---	---	---	---	---	---	185	799	1880	2578	---	---
R3	3/21/2017	ENER	184	50.2	6.1	284	453	< 5	168	726	1720	2426	0.94	7.59
	11/14/2017	ENER	---	---	---	---	---	---	164	725	1730	2125	---	---
R4	3/23/2017	ENER	210	54.5	7.1	307	561	< 5	168	809	1820	2537	0.92	7.43
	8/17/2017	ENER	---	---	---	---	---	---	163	813	1790	---	---	---
R5	3/21/2017	ENER	155	38.8	6.1	278	466	< 5	142	645	1560	2233	0.92	7.51
	8/17/2017	ENER	---	---	---	---	---	---	140	602	1510	---	---	---
R10	3/22/2017	ENER	181	54.1	7.7	257	373	< 5	155	726	1640	2300	0.96	7.43
	8/24/2017	ENER	---	---	---	---	---	---	175	767	1830	2486	---	---
R11	3/22/2017	ENER	181	46.1	6.8	291	423	< 5	154	729	1690	2379	0.96	7.52

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
R11	8/24/2017	ENER	---	---	---	---	---	---	143	629	1720	2387	---	---
R18	3/23/2017	ENER	---	---	---	---	---	---	141	681	1480	2184	---	---
R20	3/23/2017	ENER	---	---	---	---	---	---	135	675	1500	2093	---	---
R43	4/5/2017	ENER	---	---	---	---	---	---	144	589	1530	2164	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0520	4/27/2017	ENER	0.0327	± 0.0053	< 0.03	0.011	---	---	---	---	---	---	---	---
0521	4/27/2017	ENER	0.626	± 0.1010	1.72	0.421	---	---	---	---	---	---	---	---
0522	4/27/2017	ENER	0.547	± 0.0882	1.29	0.201	---	---	---	---	---	---	---	---
0540	11/6/2017	ENER	0.0991	± 0.0160	< 0.03	0.019	---	---	---	---	---	---	---	---
0551	2/24/2017	ENER	0.0251	± 0.0041	< 0.03	0.030	3.4	0.22	± 0.000	0.8	± 0.9	< 0.01	0.06	± 0.10
	3/28/2017	ENER	0.0302	± 0.0049	< 0.03	0.034	3.3	0.27	± 0.000	0.1	± 0.9	< 0.01	0.05	± 0.09
0553	3/27/2017	ENER	0.0305	± 0.0049	< 0.03	0.029	4.4	0.22	± 0.000	2.1	± 0.6	< 0.01	0.10	± 0.10
0554	3/27/2017	ENER	0.0199	± 0.0032	< 0.03	0.046	2.2	0.45	± 0.000	1.1	± 0.8	< 0.01	0.05	± 0.09
0555	3/27/2017	ENER	0.0704	± 0.0114	< 0.03	0.060	11.0	0.33	± 0.000	2.4	± 0.7	< 0.01	0.20	± 0.10
0556	3/27/2017	ENER	0.0692	± 0.0112	< 0.03	0.057	5.4	0.21	± 0.000	1.7	± 0.5	< 0.01	0.10	± 0.10
0557	3/27/2017	ENER	0.0505	± 0.0082	< 0.03	0.055	6.8	0.31	± 0.000	2.0	± 0.9	< 0.01	0.20	± 0.10
0631	6/30/2017	ENER	0.158	± 0.0256	< 0.03	0.050	---	---	---	---	---	---	---	---
0632	6/30/2017	ENER	0.133	± 0.0215	< 0.03	0.069	---	---	---	---	---	---	---	---
0634	3/20/2017	ENER	0.155	± 0.0250	< 0.03	0.028	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.153	± 0.0246	< 0.03	0.032	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.0917	± 0.0148	< 0.03	0.035	---	---	---	---	---	---	---	---
0637	10/6/2017	ENER	0.0649	± 0.0105	< 0.03	0.024	4.8	0.20	± 0.100	---	---	---	---	---
0638	4/27/2017	ENER	0.0232	± 0.0037	< 0.03	0.031	---	---	---	---	---	---	---	---
0639	4/27/2017	ENER	0.452	± 0.0730	1.12	0.201	---	---	---	---	---	---	---	---
	8/17/2017	ENER	0.531	± 0.0856	1.29	0.244	---	---	---	---	---	---	---	---
0646	11/14/2017	ENER	0.0472	± 0.0076	< 0.03	0.030	---	---	---	---	---	---	---	---
0647	9/14/2017	ENER	0.0794	± 0.0128	< 0.03	0.026	3.2	0.09	± 0.100	0.2	± 0.7	< 0.01	0.10	± 0.10
0649	3/15/2017	ENER	0.0261	± 0.0042	< 0.03	0.028	2.9	0.00	± 0.000	0.0	± 0.0	< 0.01	0.00	± 0.00
0650	3/27/2017	ENER	0.0345	± 0.0056	< 0.03	0.040	6.6	0.19	± 0.000	2.2	± 0.6	< 0.01	0.06	± 0.10

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0654	11/14/2017	ENER	0.117	± 0.0189	< 0.03	0.024	2.9	0.20	± 0.200	-0.2	± 1.1	< 0.01	0.00	± 0.04
0658	2/21/2017	ENER	0.0149	± 0.0024	< 0.03	0.026	3.7	0.00	± 0.000	0.0	± 0.0	< 0.01	0.00	± 0.00
0659	3/20/2017	ENER	0.194	± 0.0313	< 0.03	0.037	---	---	---	---	---	---	---	---
0686	10/6/2017	ENER	0.0644	± 0.0104	< 0.03	0.024	4.6	0.20	± 0.100	---	---	---	---	---
0846	3/27/2017	ENER	0.0567	± 0.0092	< 0.03	0.100	---	---	---	---	---	---	---	---
	8/9/2017	ENER	0.0611	± 0.0099	< 0.03	0.131	18.8	0.60	± 0.200	5.4	± 1.6	< 0.01	0.06	± 0.10
0861	8/18/2017	ENER	0.145	± 0.0235	< 0.03	0.056	1.4	0.10	± 0.100	0.8	± 1.5	< 0.01	0.08	± 0.20
0862	3/21/2017	ENER	0.0942	± 0.0152	< 0.03	0.022	2.3	0.15	± 0.000	1.0	± 0.9	< 0.01	0.20	± 0.10
0864	8/18/2017	ENER	0.166	± 0.0269	< 0.03	0.028	---	---	---	---	---	---	---	---
0866	3/21/2017	ENER	0.355	± 0.0573	< 0.03	0.034	3.5	0.17	± 0.000	0.5	± 0.9	< 0.01	0.10	± 0.10
	8/17/2017	ENER	0.343	± 0.0553	< 0.03	0.035	---	---	---	---	---	---	---	---
0867	8/18/2017	ENER	0.0443	± 0.0072	< 0.03	0.065	---	---	---	---	---	---	---	---
0881	2/23/2017	ENER	0.229	± 0.0370	< 0.03	0.039	2.8	0.00	± 0.000	0.0	± 0.0	< 0.01	0.00	± 0.00
0882	3/15/2017	ENER	0.0618	± 0.0100	< 0.03	< 0.005	< 0.1	0.44	± 0.000	0.6	± 1.0	< 0.01	0.07	± 0.10
0884	3/27/2017	ENER	0.0228	± 0.0037	< 0.03	0.037	4.9	0.27	± 0.000	6.8	± 1.4	< 0.01	0.05	± 0.09
0885	3/29/2017	ENER	0.0726	± 0.0117	< 0.03	0.028	---	---	---	---	---	---	---	---
	10/4/2017	ENER	0.0717	± 0.0116	< 0.03	0.027	---	---	---	---	---	---	---	---
0886	3/3/2017	ENER	0.292	± 0.0472	0.04	0.046	4.4	0.32	± 0.000	0.7	± 0.8	< 0.01	0.06	± 0.10
	11/9/2017	ENER	0.352	± 0.0568	0.05	0.054	4.1	0.30	± 0.200	0.5	± 1.4	< 0.01	0.02	± 0.06
0888	3/28/2017	ENER	0.142	± 0.0229	< 0.03	0.034	---	---	---	---	---	---	---	---
	10/6/2017	ENER	0.129	± 0.0208	< 0.03	0.028	2.8	0.30	± 0.200	2.0	± 1.0	< 0.01	0.05	± 0.09
0890	5/17/2017	ENER	0.0523	± 0.0085	< 0.03	0.020	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.120	± 0.0193	< 0.03	0.024	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.0560	± 0.0090	< 0.03	0.027	---	---	---	---	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0893	3/14/2017	ENER	0.0835	± 0.0135	< 0.03	0.023	1.5	0.15	± 0.000	0.4	± 1.0	< 0.01	0.10	± 0.20
0895	10/3/2017	ENER	0.0284	± 0.0046	< 0.03	0.008	---	---	---	---	---	---	---	---
0896	10/3/2017	ENER	0.0509	± 0.0082	---	0.051	1.7	---	---	---	---	---	---	---
0899	10/3/2017	ENER	0.0656	± 0.0106	< 0.03	0.021	3.5	0.10	± 0.100	0.4	± 1.0	< 0.01	0.01	± 0.06
0920	3/3/2017	ENER	0.196	± 0.0316	< 0.03	0.252	10.0	0.35	± 0.000	0.8	± 0.7	< 0.01	0.04	± 0.09
	8/10/2017	ENER	0.232	± 0.0375	< 0.03	0.247	10.0	---	---	---	---	---	---	---
0921	12/11/2017	ENER	0.212	± 0.0343	< 0.03	0.581	---	---	---	---	---	---	---	---
0994	8/24/2017	ENER	0.0060	± 0.0010	< 0.03	0.030	4.7	0.30	± 0.100	1.6	± 0.9	< 0.01	0.10	± 0.10
	10/27/2017	ENER	0.0070	± 0.0011	< 0.03	0.033	---	---	---	---	---	---	---	---
0996	10/4/2017	ENER	0.0722	± 0.0117	< 0.03	0.025	---	---	---	---	---	---	---	---
H1	5/17/2017	ENER	0.0722	± 0.0117	< 0.03	0.020	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.171	± 0.0275	< 0.03	0.031	---	---	---	---	---	---	---	---
	11/9/2017	ENER	0.183	± 0.0295	0.03	0.034	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.0805	± 0.0130	< 0.03	0.024	---	---	---	---	---	---	---	---
H2A	3/20/2017	ENER	0.0715	± 0.0115	< 0.03	0.017	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.110	± 0.0177	< 0.03	0.023	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.0496	± 0.0080	< 0.03	0.021	---	---	---	---	---	---	---	---
H7	3/20/2017	ENER	0.180	± 0.0291	< 0.03	0.051	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.179	± 0.0289	< 0.03	0.038	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.159	± 0.0257	< 0.03	0.044	---	---	---	---	---	---	---	---
H7B	3/20/2017	ENER	0.148	± 0.0239	< 0.03	0.031	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.184	± 0.0297	< 0.03	0.041	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.117	± 0.0188	< 0.03	0.029	---	---	---	---	---	---	---	---
H12	3/20/2017	ENER	0.202	± 0.0326	< 0.03	0.040	---	---	---	---	---	---	---	---
	7/11/2017	ENER	0.266	± 0.0429	< 0.03	0.053	---	---	---	---	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
H12	11/7/2017	ENER	0.250	± 0.0403	< 0.03	0.052	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.118	± 0.0190	< 0.03	0.031	---	---	---	---	---	---	---	---
H16	12/13/2017	ENER	0.0805	± 0.0130	< 0.03	0.028	---	---	---	---	---	---	---	---
H17	3/28/2017	ENER	0.181	± 0.0291	< 0.03	0.035	---	---	---	---	---	---	---	---
	12/13/2017	ENER	0.0793	± 0.0128	< 0.03	0.027	---	---	---	---	---	---	---	---
H24	12/13/2017	ENER	0.220	± 0.0355	< 0.03	0.056	---	---	---	---	---	---	---	---
H26	12/13/2017	ENER	0.295	± 0.0476	0.04	0.050	---	---	---	---	---	---	---	---
H27	3/28/2017	ENER	0.163	± 0.0263	< 0.03	0.034	---	---	---	---	---	---	---	---
H28	3/28/2017	ENER	0.377	± 0.0608	0.04	0.060	---	---	---	---	---	---	---	---
H29	3/28/2017	ENER	0.230	± 0.0371	< 0.03	0.028	---	---	---	---	---	---	---	---
H32	3/28/2017	ENER	0.185	± 0.0299	< 0.03	0.061	---	---	---	---	---	---	---	---
H33	3/28/2017	ENER	0.327	± 0.0528	0.04	0.048	---	---	---	---	---	---	---	---
H34	3/29/2017	ENER	0.226	± 0.0365	< 0.03	0.062	---	---	---	---	---	---	---	---
H35	3/29/2017	ENER	0.146	± 0.0235	< 0.03	0.031	---	---	---	---	---	---	---	---
H37	3/29/2017	ENER	0.453	± 0.0731	0.06	0.059	---	---	---	---	---	---	---	---
H38	3/29/2017	ENER	0.176	± 0.0283	< 0.03	0.025	---	---	---	---	---	---	---	---
H41	3/29/2017	ENER	0.230	± 0.0371	< 0.03	0.033	---	---	---	---	---	---	---	---
H46	3/29/2017	ENER	0.446	± 0.0720	0.06	0.054	---	---	---	---	---	---	---	---
	11/3/2017	ENER	0.399	± 0.0644	0.05	0.053	---	---	---	---	---	---	---	---
H55	11/13/2017	ENER	0.515	± 0.0832	0.09	0.061	---	---	---	---	---	---	---	---
H56	11/3/2017	ENER	0.182	± 0.0294	< 0.03	0.029	---	---	---	---	---	---	---	---
H61	11/3/2017	ENER	0.187	± 0.0302	< 0.03	0.028	---	---	---	---	---	---	---	---
H71	11/3/2017	ENER	0.331	± 0.0534	0.04	0.040	---	---	---	---	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
H75	3/29/2017	ENER	0.0999	± 0.0161	< 0.03	0.026	---	---	---	---	---	---	---	---
H106	3/29/2017	ENER	0.0884	± 0.0143	< 0.03	0.027	---	---	---	---	---	---	---	---
M16	9/19/2017	ENER	0.541	± 0.0874	0.14	0.066	---	---	---	---	---	---	---	---
M18	3/29/2017	ENER	0.141	± 0.0227	< 0.03	0.021	---	---	---	---	---	---	---	---
MO	3/17/2017	ENER	0.193	± 0.0312	< 0.03	0.050	---	---	---	---	---	---	---	---
MR	3/20/2017	ENER	0.391	± 0.0631	0.05	0.053	---	---	---	---	---	---	---	---
	5/1/2017	ENER	0.460	± 0.0742	0.06	0.060	---	---	---	---	---	---	---	---
	8/11/2017	ENER	0.461	± 0.0744	0.06	0.061	3.6	---	---	---	---	---	---	---
	10/13/2017	ENER	0.475	± 0.0767	0.06	0.069	3.9	---	---	---	---	---	---	---
MS	3/29/2017	ENER	0.162	± 0.0261	< 0.03	0.023	---	---	---	---	---	---	---	---
	7/19/2017	ENER	0.152	± 0.0245	< 0.03	0.023	1.3	---	---	---	---	---	---	---
	12/1/2017	ENER	0.151	± 0.0244	< 0.03	0.024	---	---	---	---	---	---	---	---
R1	3/21/2017	ENER	0.220	± 0.0355	< 0.03	0.033	3.7	0.10	± 0.000	1.2	± 0.9	< 0.01	0.10	± 0.10
	8/24/2017	ENER	0.193	± 0.0311	< 0.03	0.033	---	---	---	---	---	---	---	---
R2	3/21/2017	ENER	0.279	± 0.0450	< 0.03	0.029	3.1	0.15	± 0.000	0.6	± 0.9	< 0.01	0.10	± 0.10
	8/24/2017	ENER	0.277	± 0.0446	< 0.03	0.034	---	---	---	---	---	---	---	---
R3	3/21/2017	ENER	0.244	± 0.0394	< 0.03	0.030	3.2	0.12	± 0.000	3.5	± 1.3	< 0.01	0.06	± 0.10
	11/14/2017	ENER	0.245	± 0.0395	< 0.03	0.032	---	---	---	---	---	---	---	---
R4	3/23/2017	ENER	0.463	± 0.0747	< 0.03	0.041	2.9	0.14	± 0.000	2.8	± 0.9	< 0.01	0.20	± 0.20
	8/17/2017	ENER	0.448	± 0.0723	< 0.03	0.040	---	---	---	---	---	---	---	---
R5	3/21/2017	ENER	0.317	± 0.0511	< 0.03	0.034	2.3	0.05	± 0.000	1.1	± 1.1	< 0.01	0.10	± 0.10
	8/17/2017	ENER	0.214	± 0.0345	< 0.03	0.035	---	---	---	---	---	---	---	---
R10	3/22/2017	ENER	0.123	± 0.0198	< 0.03	0.026	2.9	0.15	± 0.000	3.5	± 1.0	< 0.01	0.10	± 0.10
	8/24/2017	ENER	0.195	± 0.0314	< 0.03	0.034	---	---	---	---	---	---	---	---
R11	3/22/2017	ENER	0.354	± 0.0571	< 0.03	0.040	2.6	0.28	± 0.000	3.2	± 1.1	< 0.01	0.06	± 0.10

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
R11	8/24/2017	ENER	0.345	± 0.0557	< 0.03	0.040	---	---	---	---	---	---	---	---
R18	3/23/2017	ENER	0.101	± 0.0163	< 0.03	0.024	---	---	---	---	---	---	---	---
R20	3/23/2017	ENER	0.0779	± 0.0126	< 0.03	0.026	---	---	---	---	---	---	---	---
R43	4/5/2017	ENER	0.0976	± 0.0158	< 0.03	0.021	---	---	---	---	---	---	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0493	3/1/2017	ENER	---	---	---	---	---	---	---	688	1530	2393	---	---
0494	3/1/2017	ENER	---	---	---	---	---	---	---	781	1820	2507	---	---
	6/28/2017	ENER	208	60.3	5.6	295	461	< 5	202	827	1820	2499	0.92	7.26
0498	8/24/2017	ENER	---	---	---	---	---	---	131	600	1540	2162	---	---
0853	7/6/2017	ENER	---	---	---	---	---	---	137	675	1500	2108	---	---
0930	7/5/2017	ENER	---	---	---	---	---	---	131	304	878	1491	---	---
0931	7/5/2017	ENER	---	---	---	---	---	---	310	367	1220	2090	---	---
ACW	11/30/2017	ENER	2	0.8	1.7	598	192	49	343	629	1650	2532	0.95	9.52
AW	11/30/2017	ENER	192	55.4	6.1	268	438	6	182	674	1620	2112	0.98	7.42
B15	5/2/2017	ENER	162	53.8	5.9	2010	1230	< 5	410	3260	6400	8311	1.00	7.72
B16	5/2/2017	ENER	241	86.5	5.3	2020	1150	< 5	456	4040	7390	9253	0.92	7.52
B32	5/3/2017	ENER	291	84.6	5.4	1910	1230	< 5	484	3490	6350	8643	0.98	7.57
CE1	7/5/2017	ENER	---	---	---	---	---	---	89	326	3380	1807	---	---
CE2	5/2/2017	ENER	134	35.9	3.2	266	384	< 5	111	518	1300	1900	1.04	7.68
	6/28/2017	ENER	---	---	---	---	---	---	130	683	1480	2104	---	---
	7/18/2017	ENER	---	---	---	---	---	---	111	541	1290	---	---	---
	10/25/2017	ENER	---	---	---	---	---	---	113	545	1270	1743	---	---
CE5	2/10/2017	ENER	330	91.5	5.8	392	553	< 5	225	1320	2640	3387	0.96	7.25
	7/19/2017	ENER	206	57.1	5.0	289	471	< 5	170	669	1720	---	1.04	7.25
CE6	2/10/2017	ENER	---	---	---	---	---	---	226	1330	2620	3444	---	---
	7/19/2017	ENER	228	59.9	4.0	393	464	< 5	191	1020	2200	---	0.97	7.66
CE7	7/20/2017	ENER	139	42.7	3.6	697	596	< 5	214	1280	2750	---	0.96	7.52
CE8	3/2/2017	ENER	---	---	---	---	---	---	65	794	1610	2393	---	---
	11/14/2017	ENER	10	1.5	0.9	508	386	6	63	773	1570	2163	0.93	7.95

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CE9	3/21/2017	ENER	---	---	---	---	---	---	---	815	1870	2570	---	---
	7/19/2017	ENER	222	62.9	6.1	318	493	< 5	186	706	1770	---	1.07	7.21
	8/14/2017	ENER	202	57.2	5.3	254	537	< 5	188	675	1800	---	0.92	7.24
CE10	7/19/2017	ENER	175	46.8	4.2	626	408	< 5	184	1350	2660	---	0.99	7.51
CE11	2/10/2017	ENER	---	---	---	---	---	---	228	1350	2660	3611	---	---
	7/19/2017	ENER	207	56.9	5.7	282	470	< 5	171	652	1720	---	1.04	7.37
CE12	3/21/2017	ENER	---	---	---	---	---	---	124	583	1400	1997	---	---
	7/19/2017	ENER	125	31.4	3.5	279	392	< 5	109	474	1250	---	1.08	7.39
CE13	7/20/2017	ENER	307	107.0	6.0	2290	1380	< 5	552	4100	7960	---	1.00	7.41
CE14	3/21/2017	ENER	140	34.6	3.5	228	406	< 5	119	536	1340	1886	0.93	7.41
CE15	3/21/2017	ENER	186	48.2	4.2	273	442	< 5	157	756	1720	2399	0.91	7.34
CE15A	6/1/2017	ENER	---	---	---	---	---	---	177	691	1710	2385	---	---
	11/29/2017	ENER	---	---	---	---	---	---	188	702	1720	2223	---	---
CE16A	12/1/2017	ENER	468	114.0	7.8	594	579	< 5	313	2210	4130	4457	0.91	7.51
CE18	7/5/2017	ENER	85	20.8	3.8	443	416	< 5	142	617	1530	1241	1.06	7.66
CE19	7/5/2017	ENER	165	42.4	3.8	301	402	< 5	131	627	1560	1902	1.06	7.34
CF1	6/30/2017	ENER	283	114.0	129.0	634	212	< 5	372	1960	3720	4706	0.99	8.01
CF2	6/30/2017	ENER	174	1.1	61.8	830	15	11	1110	657	2960	4713	1.02	9.49
CF3	7/5/2017	ENER	383	93.5	5.6	603	519	< 5	239	1750	3480	1168	1.03	7.41
CF5	6/30/2017	ENER	88	23.2	3.0	190	144	< 5	28	517	1010	1332	1.04	7.69
CF6	6/30/2017	ENER	8	9.0	8.0	2490	1480	334	418	2870	7070	9334	1.03	9.34
CW2	3/21/2017	ENER	---	---	---	---	---	---	124	609	1470	2367	---	---
	8/10/2017	ENER	---	---	---	---	---	---	---	520	1530	5410	---	---
CW3	11/28/2017	ENER	41	9.8	1.5	529	340	< 5	68	854	1630	2194	1.02	7.90

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CW9	6/30/2017	ENER	---	---	---	---	---	---	38	257	612	9567	---	---
CW15	6/30/2017	ENER	---	---	---	---	---	---	32	816	1570	2332	---	---
CW17	6/29/2017	ENER	407	103.0	6.5	360	384	< 5	169	1370	2820	3431	1.12	7.40
	10/23/2017	ENER	360	91.2	5.9	323	427	< 5	195	1260	2580	3250	1.02	7.27
CW18	3/20/2017	ENER	---	---	---	---	---	---	---	710	1980	2985	---	---
	8/17/2017	ENER	---	---	---	---	---	---	205	700	1930	---	---	---
	8/17/2017	ENER	---	---	---	---	---	---	# 206	# 704	# 1930	---	---	---
CW24	7/31/2017	ENER	---	---	---	---	---	---	69	1660	3060	---	---	---
CW28	12/12/2017	ENER	6	1.0	1.1	435	412	14	118	429	1280	1774	0.99	8.52
CW29	3/20/2017	ENER	---	---	---	---	---	---	167	714	1650	2339	---	---
	8/14/2017	ENER	137	39.3	4.7	283	388	< 5	155	654	1620	---	0.92	7.49
	8/17/2017	ENER	151	43.4	5.9	319	390	< 5	162	688	1610	---	0.99	7.56
CW30	5/5/2017	ENER	131	41.5	6.5	276	324	< 5	148	588	1410	2112	1.01	7.23
CW31	6/29/2017	ENER	115	33.7	5.4	351	210	< 5	56	870	1640	2203	1.03	7.79
CW32	6/29/2017	ENER	---	---	---	---	---	---	500	2030	4080	5749	---	---
CW33	6/29/2017	ENER	---	---	---	---	---	---	360	2140	3700	5189	---	---
CW36	7/31/2017	ENER	---	---	---	---	---	---	74	750	1520	---	---	---
CW37	6/29/2017	ENER	---	---	---	---	---	---	81	1050	1920	2442	---	---
CW40	6/30/2017	ENER	---	---	---	---	---	---	213	725	1950	2975	---	---
CW41	7/31/2017	ENER	---	---	---	---	---	---	107	232	970	---	---	---
CW42	3/21/2017	ENER	---	---	---	---	---	---	---	732	1740	2418	---	---
	8/14/2017	ENER	---	---	---	---	---	---	160	630	1740	2330	---	---
CW43	8/1/2017	ENER	---	---	---	---	---	---	190	1180	2590	---	---	---
CW45	3/24/2017	ENER	153	39.9	4.2	283	516	< 5	145	625	1530	2278	0.91	7.46

Signifies Quality Control Sample

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CW45	8/15/2017	ENER	---	---	---	---	---	---	139	581	1520	---	---	---
CW50	3/20/2017	ENER	---	---	---	---	---	---	---	851	1620	2141	---	---
	8/11/2017	ENER	---	---	---	---	---	---	54	710	1650	2155	---	---
CW53	5/3/2017	ENER	---	---	---	---	---	---	198	701	1930	2859	---	---
CW54	6/29/2017	ENER	---	---	---	---	---	---	146	602	1520	9431	---	---
CW55	12/12/2017	ENER	49	10.3	3.4	588	511	< 5	194	723	1860	2530	1.00	7.59
CW56	8/16/2017	ENER	---	---	---	---	---	---	181	1490	2770	---	---	---
	10/24/2017	ENER	384	< 0.5	9.9	595	379	< 5	166	1420	2850	3171	1.12	7.34
CW57	10/24/2017	ENER	162	44.0	6.3	632	514	< 5	64	1220	2480	3010	1.10	7.38
CW58	8/18/2017	ENER	---	---	---	---	---	---	147	680	1600	---	---	---
CW60	8/16/2017	ENER	---	---	---	---	---	---	128	1780	3200	---	---	---
	10/24/2017	ENER	448	109.0	5.5	413	356	< 5	124	1720	3210	3511	1.09	7.15
CW61	8/16/2017	ENER	---	---	---	---	---	---	213	1260	2610	---	---	---
CW62	2/10/2017	ENER	357	85.0	5.2	368	359	< 5	201	1520	2900	3631	0.94	7.39
	5/3/2017	ENER	---	---	---	---	---	---	---	---	---	3609	---	---
	8/16/2017	ENER	---	---	---	---	---	---	205	1550	2950	---	---	---
	11/29/2017	ENER	---	---	---	---	---	---	215	1630	2940	3436	---	---
CW72	8/16/2017	ENER	---	---	---	---	---	---	286	1780	3260	---	---	---
CW73	11/28/2017	ENER	---	---	---	---	---	---	202	943	2050	2494	---	---
CW74	5/4/2017	ENER	40	11.6	2.9	591	433	< 5	180	842	1920	2841	0.96	8.01
CW75	5/4/2017	ENER	12	1.7	1.7	597	390	11	160	825	1880	2821	0.94	8.41
CW76	5/4/2017	ENER	10	1.3	1.6	583	365	8	147	707	1610	2503	1.03	8.31
CW78	5/3/2017	ENER	79	20.5	2.8	544	597	< 5	191	709	1840	2762	0.98	7.71
R1	3/21/2017	ENER	212	57.0	5.9	302	447	< 5	180	821	1900	2618	0.96	7.39

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
R1	8/24/2017	ENER	---	---	---	---	---	---	178	774	1830	2486	---	---
R2	3/21/2017	ENER	214	59.4	5.9	310	469	< 5	187	807	1870	2574	0.98	7.43
	8/24/2017	ENER	---	---	---	---	---	---	185	799	1880	2578	---	---
R3	3/21/2017	ENER	184	50.2	6.1	284	453	< 5	168	726	1720	2426	0.94	7.59
	11/14/2017	ENER	---	---	---	---	---	---	164	725	1730	2125	---	---
R4	3/23/2017	ENER	210	54.5	7.1	307	561	< 5	168	809	1820	2537	0.92	7.43
	8/17/2017	ENER	---	---	---	---	---	---	163	813	1790	---	---	---
R5	3/21/2017	ENER	155	38.8	6.1	278	466	< 5	142	645	1560	2233	0.92	7.51
	8/17/2017	ENER	---	---	---	---	---	---	140	602	1510	---	---	---
R11	3/22/2017	ENER	181	46.1	6.8	291	423	< 5	154	729	1690	2379	0.96	7.52
	8/24/2017	ENER	---	---	---	---	---	---	143	629	1720	2387	---	---
R50	4/3/2017	ENER	---	---	---	---	---	---	163	695	1720	2381	---	---
T25	3/31/2017	ENER	245	68.6	6.2	1220	816	< 5	257	2500	4570	6100	0.98	7.44
T51	3/29/2017	ENER	12	42.4	11.0	4420	2660	350	853	5980	12900	16030	0.96	9.09
V1	3/31/2017	ENER	---	---	---	---	---	---	144	738	1620	---	---	---
	8/22/2017	ENER	34	6.8	3.3	430	303	< 5	111	635	1560	2466	0.98	7.53
	10/3/2017	ENER	---	---	---	---	---	---	146	738	1620	2317	---	---
V2	3/31/2017	ENER	---	---	---	---	---	---	161	730	1700	---	---	---
	8/22/2017	ENER	164	37.2	6.1	290	407	< 5	152	648	1720	2380	0.98	7.55
V3	3/31/2017	ENER	---	---	---	---	---	---	157	725	1680	---	---	---
	8/22/2017	ENER	158	36.6	6.3	293	383	< 5	150	660	1700	2285	0.97	7.50
V4	3/31/2017	ENER	---	---	---	---	---	---	163	732	1690	---	---	---
	8/22/2017	ENER	140	37.1	6.8	327	380	< 5	157	677	1790	2430	0.98	7.51
V6	4/3/2017	ENER	---	---	---	---	---	---	160	739	1720	---	---	---
	8/22/2017	ENER	122	33.9	6.8	356	355	< 5	162	701	1730	2406	0.98	7.53

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
V7	8/22/2017	ENER	62	20.8	4.3	301	378	< 5	86	410	1120	1656	1.04	7.76
V8	8/22/2017	ENER	71	19.8	3.6	268	427	< 5	96	398	1190	1745	0.93	7.70
V9	8/22/2017	ENER	26	7.5	2.6	346	466	< 5	74	318	1150	1664	1.03	7.72
V11	8/22/2017	ENER	55	17.8	4.8	328	369	< 5	78	433	1150	1676	1.07	7.79
V14	8/22/2017	ENER	73	22.3	4.2	267	325	< 5	86	429	1100	1640	1.02	7.54
V16	8/22/2017	ENER	95	28.6	3.8	249	340	< 5	106	537	1290	1802	0.90	7.47
V17	8/24/2017	ENER	123	31.6	4.8	307	408	< 5	106	671	1480	2088	0.93	7.47
V18	8/24/2017	ENER	133	38.2	5.0	278	336	< 5	137	675	1480	2078	0.93	7.55
WCW	8/9/2017	ENER	---	---	---	---	---	---	174	2480	4050	5709	---	---
	8/11/2017	ENER	---	---	---	---	---	---	120	790	1750	2662	---	---
WR25	7/31/2017	ENER	---	---	---	---	---	---	170	1660	3200	---	---	---
Y1	3/24/2017	ENER	---	---	---	---	---	---	149	687	1560	---	---	---
	8/21/2017	ENER	61	15.8	3.2	380	377	< 5	136	553	1340	---	0.97	7.58
	12/20/2017	ENER	---	---	---	---	---	---	189	1010	2140	2653	---	---
Y7	3/28/2017	ENER	---	---	---	---	---	---	163	744	1720	2446	---	---
	8/22/2017	ENER	165	41.9	5.8	324	439	< 5	154	646	1680	---	1.03	7.41
	12/20/2017	ENER	---	---	---	---	---	---	156	794	1780	2202	---	---
Y13	8/22/2017	ENER	183	44.7	5.6	331	498	< 5	161	694	1860	---	1.00	7.38
Y23	8/21/2017	ENER	207	58.2	6.3	240	393	< 5	176	721	1540	---	0.97	7.51
	12/20/2017	ENER	---	---	---	---	---	---	129	583	1430	1850	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0493	3/1/2017	ENER	0.158	± 0.0255	< 0.03	0.105	---	---	---	---	---	---	---	---
0494	3/1/2017	ENER	0.219	± 0.0354	0.06	0.045	---	---	---	---	---	---	---	---
	6/28/2017	ENER	0.186	± 0.0300	0.06	0.038	2.6	0.03	± 0.100	0.8	± 1.0	< 0.01	-0.01	± 0.05
0498	8/24/2017	ENER	0.333	± 0.0537	< 0.03	0.040	---	---	---	---	---	---	---	---
0853	7/6/2017	ENER	0.0998	± 0.0161	< 0.03	0.091	2.0	---	---	---	---	---	---	---
0930	7/5/2017	ENER	0.0008	± 0.0001	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
0931	7/5/2017	ENER	0.0016	± 0.0003	< 0.03	0.005	< 0.1	---	---	---	---	---	---	---
ACW	11/30/2017	ENER	0.0083	± 0.0013	0.01	< 0.002	< 0.1	0.30	± 0.200	-0.6	± 0.9	< 0.01	0.10	± 0.10
AW	11/30/2017	ENER	0.0998	± 0.0161	0.06	0.034	2.1	0.20	± 0.100	-0.7	± 0.9	< 0.01	0.20	± 0.20
B15	5/2/2017	ENER	11.0	± 1.7700	20.30	0.415	2.6	0.30	± 0.100	---	---	---	---	---
B16	5/2/2017	ENER	13.1	± 2.1200	26.40	0.284	2.8	0.50	± 0.200	---	---	---	---	---
B32	5/3/2017	ENER	15.0	± 2.4200	20.50	0.625	4.2	0.30	± 0.100	---	---	---	---	---
CE1	7/5/2017	ENER	1.88	± 0.3030	2.63	0.090	0.7	---	---	---	---	---	---	---
CE2	5/2/2017	ENER	0.917	± 0.1480	1.41	0.051	1.6	0.50	± 0.200	2.3	± 0.9	< 0.01	0.20	± 0.10
	6/28/2017	ENER	1.28	± 0.2070	2.19	0.067	---	---	---	---	---	---	---	---
	7/18/2017	ENER	1.01	± 0.1630	1.40	0.053	---	---	---	---	---	---	---	---
	10/25/2017	ENER	0.817	± 0.1320	1.61	0.055	---	---	---	---	---	---	---	---
CE5	2/10/2017	ENER	2.59	± 0.4180	2.06	0.106	2.0	0.22	± 0.000	---	---	---	---	---
	7/19/2017	ENER	0.247	± 0.0399	0.14	0.039	1.9	0.10	± 0.100	---	---	---	---	---
CE6	2/10/2017	ENER	2.90	± 0.4670	2.50	0.122	---	---	---	---	---	---	---	---
	7/19/2017	ENER	2.22	± 0.3590	1.40	0.089	2.1	0.30	± 0.200	---	---	---	---	---
CE7	7/20/2017	ENER	5.06	± 0.8170	7.87	0.256	2.4	0.30	± 0.200	1.6	± 1.1	0.02	0.20	± 0.20
CE8	3/2/2017	ENER	0.0308	± 0.0050	0.03	< 0.005	---	---	---	---	---	---	---	---
	11/14/2017	ENER	0.0303	± 0.0049	< 0.03	< 0.005	< 0.1	0.40	± 0.200	0.9	± 1.2	< 0.01	-0.02	± 0.06

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CE9	3/21/2017	ENER	0.473	± 0.0763	0.22	0.052	---	---	---	---	---	---	---	---
	7/19/2017	ENER	0.252	± 0.0407	0.12	0.028	1.5	0.20	± 0.200	---	---	---	---	---
	8/14/2017	ENER	0.241	± 0.0373	0.10	0.030	1.4	0.30	± 0.200	0.6	± 1.2	< 0.01	0.03	± 0.10
CE10	7/19/2017	ENER	3.39	± 0.5470	2.19	0.128	0.4	0.70	± 0.200	---	---	---	---	---
CE11	2/10/2017	ENER	3.18	± 0.5130	3.20	0.155	---	---	---	---	---	---	---	---
	7/19/2017	ENER	0.248	± 0.0401	0.15	0.036	1.9	0.20	± 0.100	---	---	---	---	---
CE12	3/21/2017	ENER	0.883	± 0.1420	1.06	0.024	---	---	---	---	---	---	---	---
	7/19/2017	ENER	1.11	± 0.1790	1.23	0.032	1.2	0.20	± 0.200	---	---	---	---	---
CE13	7/20/2017	ENER	22.1	± 3.5700	29.10	0.598	3.9	0.80	± 0.200	1.4	± 1.0	0.01	0.40	± 0.70
CE14	3/21/2017	ENER	0.0382	± 0.0062	< 0.03	0.070	2.4	0.15	± 0.000	1.4	± 1.0	< 0.01	0.20	± 0.20
CE15	3/21/2017	ENER	0.519	± 0.0838	0.41	0.075	2.3	0.11	± 0.000	3.0	± 1.4	< 0.01	0.10	± 0.20
CE15A	6/1/2017	ENER	0.242	± 0.0391	0.14	0.033	---	---	---	---	---	---	---	---
	11/29/2017	ENER	0.148	± 0.0240	0.07	0.026	---	---	---	---	---	---	---	---
CE16A	12/1/2017	ENER	6.19	± 0.9990	4.37	0.378	3.9	0.50	± 0.200	0.1	± 0.8	< 0.01	0.70	± 0.40
CE18	7/5/2017	ENER	0.139	± 0.0224	0.14	< 0.005	< 0.1	2.60	± 0.600	---	---	---	---	---
CE19	7/5/2017	ENER	0.441	± 0.0712	0.33	0.066	2.1	1.00	± 0.200	---	---	---	---	---
CF1	6/30/2017	ENER	4.47	± 0.7210	3.47	0.028	< 0.1	0.40	± 0.100	---	---	---	---	---
CF2	6/30/2017	ENER	0.0058	± 0.0009	0.41	< 0.005	0.3	1.60	± 0.400	---	---	---	---	---
CF3	7/5/2017	ENER	2.74	± 0.4430	2.04	0.053	0.8	1.40	± 0.400	---	---	---	---	---
CF5	6/30/2017	ENER	0.135	± 0.0218	0.18	< 0.005	< 0.1	2.90	± 0.700	---	---	---	---	---
CF6	6/30/2017	ENER	7.68	± 1.2400	15.60	0.030	1.7	53.10	± 10.100	---	---	---	---	---
CW2	3/21/2017	ENER	0.0394	± 0.0064	< 0.03	0.044	2.2	---	---	---	---	---	---	---
	8/10/2017	ENER	0.0424	± 0.0068	< 0.03	0.055	---	---	---	---	---	---	---	---
CW3	11/28/2017	ENER	0.322	± 0.0519	0.30	0.003	< 0.1	0.20	± 0.200	1.3	± 1.1	0.03	0.10	± 0.10

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CW9	6/30/2017	ENER	0.0197	± 0.0032	0.06	0.006	0.2	---	---	---	---	---	---	---
CW15	6/30/2017	ENER	0.0316	± 0.0051	< 0.03	0.018	1.3	---	---	---	---	---	---	---
CW17	6/29/2017	ENER	0.249	± 0.0402	0.08	0.095	11.5	0.10	± 0.100	---	---	---	---	---
	10/23/2017	ENER	0.225	± 0.0363	0.06	0.076	7.4	0.30	± 0.200	1.2	± 0.8	< 0.01	0.05	± 0.08
CW18	3/20/2017	ENER	0.0226	± 0.0037	< 0.03	0.010	---	---	---	---	---	---	---	---
	8/17/2017	ENER	0.0262	± 0.0042	< 0.03	0.012	1.7	---	---	---	---	---	---	---
	8/17/2017	ENER	0.0264	# ± 0.0043	# < 0.03	# 0.013	# 1.8	---	---	---	---	---	---	---
CW24	7/31/2017	ENER	0.132	± 0.0213	< 0.03	0.044	10.3	---	---	---	---	---	---	---
CW28	12/12/2017	ENER	0.0360	± 0.0058	0.02	0.005	< 0.1	0.40	± 0.200	1.4	± 0.8	0.02	0.03	± 0.06
CW29	3/20/2017	ENER	0.180	± 0.0290	< 0.03	0.039	---	---	---	---	---	---	---	---
	8/14/2017	ENER	0.186	± 0.0300	< 0.03	0.044	3.1	0.20	± 0.200	1.1	± 1.0	< 0.01	0.07	± 0.10
	8/17/2017	ENER	0.196	± 0.0316	< 0.03	0.040	3.3	0.30	± 0.200	2.7	± 0.9	< 0.01	0.10	± 0.10
CW30	5/5/2017	ENER	0.0420	± 0.0068	< 0.03	0.025	3.0	0.20	± 0.100	0.8	± 0.8	< 0.01	0.03	± 0.10
CW31	6/29/2017	ENER	0.0104	± 0.0017	< 0.03	< 0.005	< 0.1	0.30	± 0.100	---	---	---	---	---
CW32	6/29/2017	ENER	0.0079	± 0.0013	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
CW33	6/29/2017	ENER	0.0114	± 0.0018	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
CW36	7/31/2017	ENER	0.0093	± 0.0015	< 0.03	< 0.005	0.2	---	---	---	---	---	---	---
CW37	6/29/2017	ENER	0.0304	± 0.0049	< 0.03	0.069	6.2	---	---	---	---	---	---	---
CW40	6/30/2017	ENER	0.0203	± 0.0033	< 0.03	0.014	1.7	---	---	---	---	---	---	---
CW41	7/31/2017	ENER	0.100	± 0.0162	< 0.03	0.042	6.3	---	---	---	---	---	---	---
CW42	3/21/2017	ENER	0.205	± 0.0331	< 0.03	0.024	---	---	---	---	---	---	---	---
	8/14/2017	ENER	0.219	± 0.0353	< 0.03	0.032	3.3	---	---	---	---	---	---	---
CW43	8/1/2017	ENER	0.0491	± 0.0079	< 0.03	0.045	8.5	---	---	---	---	---	---	---
CW45	3/24/2017	ENER	0.352	± 0.0568	< 0.03	0.037	1.7	0.34	± 0.000	1.4	± 1.1	< 0.01	0.10	± 0.10

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CW45	8/15/2017	ENER	0.335	± 0.0540	< 0.03	0.021	---	---	---	---	---	---	---	---
CW50	3/20/2017	ENER	0.0237	± 0.0038	< 0.03	< 0.005	---	---	---	---	---	---	---	---
	8/11/2017	ENER	0.0272	± 0.0044	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
CW53	5/3/2017	ENER	0.0674	± 0.0109	< 0.03	0.016	1.6	---	---	---	---	---	---	---
CW54	6/29/2017	ENER	0.0317	± 0.0051	< 0.03	0.020	2.3	---	---	---	---	---	---	---
CW55	12/12/2017	ENER	0.165	± 0.0266	0.07	0.013	1.0	0.40	± 0.200	1.2	± 0.9	< 0.01	0.05	± 0.08
CW56	8/16/2017	ENER	0.539	± 0.0870	0.38	0.120	---	---	---	---	---	---	---	---
	10/24/2017	ENER	0.443	± 0.0716	0.31	0.112	9.8	0.20	± 0.100	0.5	± 1.3	< 0.01	0.05	± 0.09
CW57	10/24/2017	ENER	0.161	± 0.0260	< 0.03	0.092	9.9	0.90	± 0.200	14.6	± 3.0	0.01	0.10	± 0.10
CW58	8/18/2017	ENER	0.259	± 0.0418	< 0.03	0.101	---	---	---	---	---	---	---	---
CW60	8/16/2017	ENER	0.113	± 0.0183	< 0.03	0.276	---	---	---	---	---	---	---	---
	10/24/2017	ENER	0.106	± 0.0171	< 0.03	0.266	13.4	0.80	± 0.200	0.7	± 1.2	< 0.01	0.00	± 0.07
CW61	8/16/2017	ENER	1.91	± 0.3080	1.39	0.181	---	---	---	---	---	---	---	---
CW62	2/10/2017	ENER	1.02	± 0.1650	0.83	0.247	22.0	0.38	± 0.000	-2.0	± 1.2	< 0.01	0.20	± 0.10
	5/3/2017	ENER	1.10	± 0.1780	0.88	---	---	---	---	---	---	---	---	---
	8/16/2017	ENER	1.35	± 0.2180	0.84	0.272	---	---	---	---	---	---	---	---
	11/29/2017	ENER	1.11	± 0.1800	0.79	0.297	---	---	---	---	---	---	---	---
CW72	8/16/2017	ENER	3.31	± 0.5340	1.91	0.362	---	---	---	---	---	---	---	---
CW73	11/28/2017	ENER	0.178	± 0.0288	< 0.03	0.043	---	---	---	---	---	---	---	---
CW74	5/4/2017	ENER	0.0660	± 0.0106	< 0.03	0.047	5.4	0.50	± 0.200	---	---	---	---	---
CW75	5/4/2017	ENER	0.0752	± 0.0121	< 0.03	0.074	5.0	0.30	± 0.200	---	---	---	---	---
CW76	5/4/2017	ENER	0.0839	± 0.0135	< 0.03	0.052	3.4	0.30	± 0.200	---	---	---	---	---
CW78	5/3/2017	ENER	0.286	± 0.0462	< 0.03	0.012	0.4	0.40	± 0.200	---	---	---	---	---
R1	3/21/2017	ENER	0.220	± 0.0355	< 0.03	0.033	3.7	0.10	± 0.000	1.2	± 0.9	< 0.01	0.10	± 0.10

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
R1	8/24/2017	ENER	0.193	± 0.0311	< 0.03	0.033	---	---	---	---	---	---	---	---
R2	3/21/2017	ENER	0.279	± 0.0450	< 0.03	0.029	3.1	0.15	± 0.000	0.6	± 0.9	< 0.01	0.10	± 0.10
	8/24/2017	ENER	0.277	± 0.0446	< 0.03	0.034	---	---	---	---	---	---	---	---
R3	3/21/2017	ENER	0.244	± 0.0394	< 0.03	0.030	3.2	0.12	± 0.000	3.5	± 1.3	< 0.01	0.06	± 0.10
	11/14/2017	ENER	0.245	± 0.0395	< 0.03	0.032	---	---	---	---	---	---	---	---
R4	3/23/2017	ENER	0.463	± 0.0747	< 0.03	0.041	2.9	0.14	± 0.000	2.8	± 0.9	< 0.01	0.20	± 0.20
	8/17/2017	ENER	0.448	± 0.0723	< 0.03	0.040	---	---	---	---	---	---	---	---
R5	3/21/2017	ENER	0.317	± 0.0511	< 0.03	0.034	2.3	0.05	± 0.000	1.1	± 1.1	< 0.01	0.10	± 0.10
	8/17/2017	ENER	0.214	± 0.0345	< 0.03	0.035	---	---	---	---	---	---	---	---
R11	3/22/2017	ENER	0.354	± 0.0571	< 0.03	0.040	2.6	0.28	± 0.000	3.2	± 1.1	< 0.01	0.06	± 0.10
	8/24/2017	ENER	0.345	± 0.0557	< 0.03	0.040	---	---	---	---	---	---	---	---
R50	4/3/2017	ENER	0.284	± 0.0459	< 0.03	0.048	---	---	---	---	---	---	---	---
T25	3/31/2017	ENER	4.47	± 0.7220	11.40	0.419	2.2	6.60	± 1.300	1.7	± 0.9	< 0.01	0.02	± 0.10
T51	3/29/2017	ENER	19.4	± 3.1300	43.40	0.110	0.3	3.30	± 0.690	2.3	± 1.0	0.03	1.00	± 0.20
V1	3/31/2017	ENER	0.212	± 0.0342	< 0.03	0.075	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.0361	± 0.0058	< 0.03	0.039	1.8	0.30	± 0.200	2.1	± 1.1	< 0.01	0.08	± 0.08
	10/3/2017	ENER	0.194	± 0.0314	< 0.03	0.072	---	---	---	---	---	---	---	---
V2	3/31/2017	ENER	0.295	± 0.0476	< 0.03	0.060	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.298	± 0.0481	< 0.03	0.064	3.7	0.20	± 0.100	2.4	± 1.0	< 0.01	0.10	± 0.10
V3	3/31/2017	ENER	0.259	± 0.0417	< 0.03	0.058	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.264	± 0.0425	< 0.03	0.060	3.1	0.20	± 0.100	2.3	± 1.0	< 0.01	0.10	± 0.08
V4	3/31/2017	ENER	0.237	± 0.0383	< 0.03	0.051	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.161	± 0.0260	< 0.03	0.044	2.9	0.40	± 0.200	1.1	± 0.9	< 0.01	0.10	± 0.10
V6	4/3/2017	ENER	0.190	± 0.0306	< 0.03	0.051	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.0995	± 0.0161	< 0.03	0.045	2.2	0.40	± 0.200	0.1	± 1.1	< 0.01	0.10	± 0.09

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
V7	8/22/2017	ENER	0.0449	± 0.0073	< 0.03	0.010	< 0.1	0.40	± 0.200	2.0	± 0.9	< 0.01	0.07	± 0.09
V8	8/22/2017	ENER	0.108	± 0.0175	< 0.03	0.013	< 0.1	0.30	± 0.200	1.5	± 1.0	< 0.01	0.08	± 0.09
V9	8/22/2017	ENER	0.0131	± 0.0021	< 0.03	0.006	< 0.1	0.20	± 0.100	2.5	± 1.1	< 0.01	0.04	± 0.20
V11	8/22/2017	ENER	0.0481	± 0.0078	< 0.03	0.034	0.2	0.20	± 0.200	0.6	± 1.4	< 0.01	0.07	± 0.10
V14	8/22/2017	ENER	0.0136	± 0.0022	< 0.03	0.006	< 0.1	0.40	± 0.200	1.5	± 0.9	< 0.01	0.07	± 0.09
V16	8/22/2017	ENER	0.0431	± 0.0070	< 0.03	< 0.005	< 0.1	0.30	± 0.200	7.4	± 2.1	< 0.01	0.10	± 0.10
V17	8/24/2017	ENER	0.0099	± 0.0016	< 0.03	< 0.005	< 0.1	0.20	± 0.100	10.0	± 2.4	< 0.01	0.10	± 0.10
V18	8/24/2017	ENER	0.100	± 0.0162	< 0.03	< 0.005	< 0.1	0.30	± 0.100	0.4	± 1.5	< 0.01	0.01	± 0.09
WCW	8/9/2017	ENER	0.0042	± 0.0007	0.06	< 0.005	< 0.1	---	---	---	---	---	---	---
	8/11/2017	ENER	0.0110	± 0.0018	< 0.03	< 0.005	< 0.1	---	---	---	---	---	---	---
WR25	7/31/2017	ENER	0.177	± 0.0285	< 0.03	0.098	8.8	---	---	---	---	---	---	---
Y1	3/24/2017	ENER	0.184	± 0.0298	< 0.03	0.038	---	---	---	---	---	---	---	---
	8/21/2017	ENER	0.190	± 0.0306	< 0.03	0.037	2.1	0.20	± 0.100	0.8	± 1.0	< 0.01	0.01	± 0.10
	12/20/2017	ENER	0.184	± 0.0296	< 0.03	0.059	---	---	---	---	---	---	---	---
Y7	3/28/2017	ENER	0.400	± 0.0646	< 0.03	0.041	---	---	---	---	---	---	---	---
	8/22/2017	ENER	0.288	± 0.0464	< 0.03	0.034	2.4	0.20	± 0.200	0.8	± 1.5	< 0.01	0.05	± 0.07
	12/20/2017	ENER	0.396	± 0.0639	< 0.03	0.042	---	---	---	---	---	---	---	---
Y13	8/22/2017	ENER	0.603	± 0.0973	< 0.03	0.042	2.6	0.10	± 0.100	1.4	± 0.9	< 0.01	0.30	± 0.20
Y23	8/21/2017	ENER	0.136	± 0.0220	< 0.03	0.028	2.4	0.02	± 0.090	1.4	± 1.2	< 0.01	0.10	± 0.09
	12/20/2017	ENER	0.200	± 0.0322	< 0.03	0.034	---	---	---	---	---	---	---	---

TABLE B.6-1 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
#2 Deepwell	2/16/2017	ENER	---	---	---	---	---	---	213	705	1850	2645	---	---
	5/2/2017	ENER	250	81.4	13.0	293	548	< 5	226	722	1870	2618	1.06	7.43
	7/18/2017	ENER	---	---	---	---	---	---	218	705	1860	2627	---	---
	10/25/2017	ENER	---	---	---	---	---	---	---	686	1930	2480	---	---
	11/20/2017	ENER	---	---	---	---	---	---	223	761	1920	5022	---	---
0806R	5/4/2017	ENER	207	51.4	4.7	227	524	< 5	167	577	1590	2289	0.96	7.26
0943	2/10/2017	ENER	---	---	---	---	---	---	---	964	1920	3141	---	---
	2/17/2017	ENER	---	---	---	---	---	---	167	948	1940	4217	---	---
	2/28/2017	ENER	131	40.1	6.2	418	384	< 5	167	806	1950	2673	1.01	7.34
	5/3/2017	ENER	161	50.9	7.7	380	412	< 5	200	832	1850	2649	0.97	7.30
	5/11/2017	ENER	---	---	---	---	---	---	203	893	1950	2746	---	---
	7/19/2017	ENER	---	---	---	---	---	---	165	998	1960	2963	---	---
	8/28/2017	ENER	73	21.7	4.3	539	328	< 5	169	1030	2020	2948	0.91	7.79
	10/17/2017	ENER	---	---	---	---	---	---	---	943	1930	---	---	---
0951	5/10/2017	ENER	144	45.5	5.3	86	343	< 5	64	354	936	---	0.99	7.41
	11/15/2017	ENER	145	42.2	4.9	84	352	< 5	65	367	945	---	0.94	7.42
0951R	2/16/2017	ENER	---	---	---	---	---	---	166	588	1490	2150	---	---
	5/2/2017	ENER	211	68.5	9.7	187	414	< 5	161	545	1450	2048	1.07	7.32
	6/27/2017	ENER	---	---	---	---	---	---	167	637	1460	2056	---	---
	7/18/2017	ENER	---	---	---	---	---	---	158	555	1430	2093	---	---
	10/23/2017	ENER	---	---	---	---	---	---	---	561	1500	1914	---	---

TABLE B.6-2 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
#2 Deepwell	2/16/2017	ENER	0.0115	± 0.0019	< 0.03	0.006	---	---	---	---	---	---	---	---
	5/2/2017	ENER	0.0129	± 0.0021	< 0.03	0.007	1.9	0.90	± 0.200	0.9	± 0.6	< 0.01	0.07	± 0.08
	7/18/2017	ENER	0.0116	± 0.0019	< 0.03	0.006	---	---	---	---	---	---	---	---
	10/25/2017	ENER	0.0225	± 0.0036	< 0.03	0.007	---	---	---	---	---	---	---	---
	11/20/2017	ENER	0.0113	± 0.0018	< 0.03	0.006	---	---	---	---	---	---	---	---
0806R	5/4/2017	ENER	0.114	± 0.0185	< 0.03	0.009	1.6	0.20	± 0.100	0.4	± 0.7	< 0.01	0.06	± 0.08
0943	2/10/2017	ENER	0.0861	± 0.0139	< 0.03	0.057	---	---	---	---	---	---	---	---
	2/17/2017	ENER	0.0898	± 0.0145	< 0.03	0.060	---	---	---	---	---	---	---	---
	2/28/2017	ENER	0.0707	± 0.0114	< 0.03	0.042	4.3	0.33	± 0.000	1.2	± 0.8	< 0.01	0.20	± 0.20
	5/3/2017	ENER	0.0631	± 0.0102	< 0.03	0.037	4.1	0.30	± 0.100	0.6	± 0.7	< 0.01	0.10	± 0.10
	5/11/2017	ENER	0.0635	± 0.0103	< 0.03	0.036	---	---	---	---	---	---	---	---
	7/19/2017	ENER	0.120	± 0.0194	< 0.03	0.073	---	---	---	---	---	---	---	---
	8/28/2017	ENER	0.122	± 0.0197	< 0.03	0.067	4.8	0.30	± 0.200	0.2	± 1.2	< 0.01	-0.01	± 0.07
	10/17/2017	ENER	0.0910	± 0.0147	< 0.03	0.063	---	---	---	---	---	---	---	---
0951	5/10/2017	ENER	0.0271	± 0.0044	< 0.03	0.006	4.4	0.20	± 0.100	1.9	± 1.1	< 0.01	0.10	± 0.10
	11/15/2017	ENER	0.0317	± 0.0051	< 0.03	0.011	4.3	0.10	± 0.100	0.6	± 1.1	< 0.01	0.02	± 0.07
0951R	2/16/2017	ENER	0.0348	± 0.0056	< 0.03	0.007	---	---	---	---	---	---	---	---
	5/2/2017	ENER	0.0436	± 0.0070	< 0.03	0.009	4.4	0.80	± 0.200	0.4	± 0.8	< 0.01	0.08	± 0.09
	6/27/2017	ENER	0.0379	± 0.0061	< 0.03	0.011	---	---	---	---	---	---	---	---
	7/18/2017	ENER	0.0342	± 0.0055	< 0.03	0.007	---	---	---	---	---	---	---	---
	10/23/2017	ENER	0.0370	± 0.0060	< 0.03	0.008	---	---	---	---	---	---	---	---

APPENDIX C

ANNUAL ALARA AUDIT

ANNUAL ALARA AUDIT REPORT FOR 2017

Grants Operations
Homestake Mining Company
P. O. Box 98
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February 20, 2018

ABSTRACT

The Annual ALARA Audit for 2017 was conducted by Janet Johnson, PhD, CHP on December 11 and 12, 2017 at the Homestake facility in Grants, New Mexico. Data for the first three quarters of 2017 were reviewed during the on-site audit. Fourth quarter 2017 data were not available at the time of the on-site audit but were reviewed subsequently, after receipt of laboratory reports and the December 2017 and January 2018 Monthly ALARA Reports. The audit was conducted in accordance with Section 2.3.3 of U. S. Nuclear Regulatory Guide 8.31 (RG 8.31) (USNRC, 2002a) and License Condition 42 of Radioactive Materials License SUA-1471, Amendment 49. The areas reviewed included personal monitoring data, bioassay data, worker dose reports, training records, inspection records, monthly ALARA reports, environmental data, Radiation Work Permits (RWPs), instrument calibrations and records of Standard Operating Procedure (SOP) reviews by the Site Closure Manager and the Radiation Safety Officer.[1] All records were found in substantial compliance with the RG 8.31 guidance. The records were easily available, clear and transparent. The site is well maintained. The Radiation Safety Program at the Homestake facility is well-organized and implemented. There were no findings or recommendations resulting from this ALARA audit.

[1] The Radioactive Materials License (RML) references a Radiation Protection Administrator (RPA). The RPA was, formerly the Site Closure Manager (SCM). Radiation safety responsibilities now rest primarily with the contract Radiation Safety Office in addition to the SCM.

TABLE OF CONTENTS

TABLES

1.0 INTRODUCTION

The Annual ALARA Audit (the Audit), required by License Condition 42 of Homestake Mining Company's Grants Uranium Mill facility (NRC Materials License Number SUA-1471, Amendment 49), was conducted on December 11 and 12, 2017 at the facility in Grants, New Mexico, by Janet A. Johnson, PhD, CHP in accordance with the provisions of the U. S. Nuclear Regulatory Commission's Regulatory Guide 8.31 (NRC, 2002a). Mr. Thomas Wohlford, Site Closure Manager (SCM) and Mr. Randy Whicker, Radiation Safety Officer (RSO) contracted through Environmental Restoration Group (ERG), were present at the Audit opening and close out sessions. In addition, Mr. Chuck Farr (ERG) assisted with the audit. Mr. William Archuleta, Senior Shift Supervisor and Radiation Safety Technician (RST), and Mr. Kyle Martinez, RST, were available to assist during the entire course of the Audit. (Two new technicians have been hired and are in the process of qualification as RSTs. One of the new technicians has considerable past experience in uranium recovery.) Environmental monitoring and personal dosimetry fourth quarter data were reviewed in February 2018 on receipt of the January 2018 Monthly ALARA Report.

Mr. Jesse Toepfer was the site closure manager (SCM) and the Radiation Protection Administrator (RPA) during the 2016 ALARA Audit conducted on January 10 and 11, 2017. Mr Thomas Wohlford took over the position of SCM during the first quarter of 2017. Mr. Randy Whicker, Certified Health Physicist, assumed the position of RSO in March 2017 through the Safety and Environmental Review Panel (SERP) process documented in March, 2017. The Homestake facility is in the process of a self-assessment as required by the Confirmatory Order modifying NRC License Number SUA-1471 issued by the NRC on March 28, 2017 (Amendment 49).

1.1 Site History

The Homestake Mining Company Grants Uranium Mill facility is located in the Grants Mining District, 5.5 miles northeast of Milan in Cibola County, New Mexico. Milling operations were conducted at the site from 1958 to 1990. The environmental restoration program began in 1977 and is expected to continue until 2022.

The facility consists of the decommissioned mill site, two tailings impoundments, three evaporation ponds, a reverse osmosis plant and a zeolite groundwater treatment facility. The mill buildings have been decommissioned and disposed to backfilled trenches on site. Soil cleanup has been mostly completed except for areas near the evaporation impoundments. A radon barrier has been installed on the large tailings pond embankments and an interim cover installed on top of the impoundment. A pilot zeolite treatment facility for impacted groundwater was constructed on top of the large tailings impoundment in 2014 and augmented with additional units in 2015 and 2016. A reverse osmosis (RO) facility was also constructed at the site to treat groundwater. Additional capacity was also constructed in the RO facility in 2015 and 2016. The application for Amendment 50 to License has been submitted to add the zeolite treatment facility as part of the Corrective Action Plan (CAP).

The Homestake facility covers approximately 14,000 acres within the site boundary. The NRC license boundary area covers 1074 acres and includes the Large Tailings Pile (LTP), Small Tailings Pile (STP), three Evaporation Ponds, the RO facility, Zeolite system and the office area. The "Restricted Area" is not defined in previously existing Site documentation, but a definition was developed in early 2018 in a new Radiation Protection Program (RPP) Manual (HMC,

2018) in association with Radiation Work Permits (RWP) that require a temporary area of restricted access for specific projects as warranted at the discretion of the RSO. The "Controlled Area" has also been defined in the RPP Manual, consisting of fenced areas that encompass major facilities (e.g. tailings piles, evaporation ponds, RO plant, and offices complex) and have appropriate signage posted at major access points (e.g. radioactive materials caution signs and no trespassing warnings).

1.2 ALARA Audit Requirements

The NRC Regulatory Guide 8.31 requires review of the following data:

- Employee exposure records
- Bioassay results
- Inspection log entries
- Training program activities
- Radiation safety meeting reports
- Radiological survey and sampling data
- Reports on overexposure of workers
- Operating procedures reviewed during the period covered by the audit.

In addition, the ALARA audit includes reviews of the following:

- Trends in personnel exposures, for identifiable categories of workers and types of operation activities
- Use, maintenance, and inspection of equipment for exposure control
- Recommendations to further reduce personnel exposures.

The qualifications and training of the health physics staff were reviewed during the audit.

1.3 2017 Activities

Activities conducted in 2017 included continued groundwater collection and treatment, operation of the reverse osmosis system and operation of zeolite treatment units as well as general site maintenance along with environmental and radiological monitoring. In the past, a mixture of clean water and treated water was used to flush the groundwater through injection wells. The flushing operation was terminated in 2015. Water from the dewatering wells is pumped to either the reverse osmosis (RO) treatment plant for removal of a number of contaminants including uranium or to the zeolite treatment facility for removal of uranium only, depending on the source of the water. The new RO plant, completed in 2016, increased the nominal treatment capacity from approximately 300 gallons per minute to 1200 gallons per minute. However, the capacity of the RO plant is reduced due to clogging of the microfiltration filters. At the time of the audit, The RO plant was running at approximately 600 gallons per minute. A technician from the manufacturer was scheduled to visit the site and fix the problem. The RO plant removes all contaminants of concern from the groundwater. The original zeolite water treatment facility was designed to operate at a rate of approximately 300 gallons per minute. The addition of the four new zeolite treatment units in 2016 theoretically increased the total capacity to 900 to 1,100 gallons per minute; however, in practice, if all zeolite units are in operation approximately 600 gallons of water per minute are treated. One of the units is normally undergoing regeneration. The Zeolite Facility removes uranium only.

Groundwater remediation is a three-pronged process. The Evaporation Ponds receive the most contaminated water, e.g., leachate. The RO facility treats on-site groundwater. The Zeolite units remove uranium from off-site groundwater.

1.4 Occupational Dose Summary

The personal monitoring protocol was modified in 2016, partially in response to a recommendation from the 2015 ALARA Audit. All Homestake workers are badged with the exception of administrative staff who do not access Controlled Areas (HMC, 2018). Contractors spending more than five consecutive days on site inside Controlled Areas, are badged. No internal committed effective doses from intake of radionuclides are calculated for workers as there are limited potential airborne radionuclide sources remaining on the site. However, an investigation involving breathing zone monitoring during activities associated with 2017 well abandonment activities on top of the LTP was conducted under a Radiation Work Permit (RWP) issued by the RSO. A previously discontinued procedure for occupational air monitoring (SOP 11) was re-activated and revised for assessment of ongoing airborne radioactive materials concentrations to which workers might be exposed (Whicker, 2017c and 2017d). A new and more comprehensive study of occupational exposures at the Site was initiated in December 2017 (Whicker, 2017d). This study is expected to continue for at least several months in 2018 until worker exposure conditions are sufficiently characterized over an adequate period of time.

The maximum occupational radiation deep dose for 2017, as measured by the quarterly Optically Stimulated Luminescent (OSL) badges, was 1 mrem. The exposure rate at the control badge location was measured and found to be typical for background in the area. Because no internal doses are calculated, the measured deep dose is the total effective dose equivalent (TEDE) for the year. The trends in occupational doses are discussed in Section 2.1.3.

1.5 Public Dose Summary

Radon concentrations, direct gamma radiation doses, and air particulate concentrations are measured at the site boundary and at locations representative of the nearest residents. The maximum annual effective dose equivalent to a member of the public is reported in the Semi-Annual Environmental Monitoring Report for the second half of the year. The dose is calculated assuming a residential scenario at 75 percent total occupancy, 200 equivalent days per year indoors and 71 days per year outdoors. The dose from 0.1 pCi/L radon gas continuous occupancy is assumed to be equal to 50 mrem/year (based on 10CFR20, Appendix B, Table 2 effluent concentration limits.) The calculated radon doses in 2016were 66 mrem/y for HMC-4 and 44 mrem/y for HMC-5. The estimated total annual dose to the nearest residents in 2016 were 66 mrem/year at HMC-4 and 47 mrem/year at HMC-5 (ERG, 2016). These doses are essentially the same as were calculated for 2015. The 2017 public doses will be reported in the Semi-Annual Environmental Monitoring Report for the second half of 2017 to be completed by February 28, 2018.

The dose is calculated by summing the committed effective dose equivalents from inhalation of radionuclides in airborne particulates and inhalation of radon decay products with the direct gamma radiation dose. The concentration of radon decay products at each location is estimated based on the incremental annual average radon gas concentration (background subtracted) assuming an equilibrium factor of 0.2 for site-derived radon. The dose from direct gamma radiation is calculated by subtracting the measured annual background dose from the measured annual dose at each of the nearest resident locations. The doses from inhalation of radionuclides in airborne particulate material are negligible at the nearest residences. The calculated doses are well within the 10 CFR 20.1301(a)(1) public dose limit of 100 mrem per year and the doses from airborne radionuclides, excluding radon, meet the ALARA constraint limit of 10 mrem per year (10 CFR 20.1101(d)).

The dose calculations were reviewed and found to be accurate. More than 95 percent of the calculated dose to the nearest residents in 2016 was due to potential inhalation of radon decay products. Fourth quarter 2017 environmental monitoring data were not available at the time of the on-site audit; however, the data were reviewed in February 2018 as reported in the December 2017 and January 2018 Monthly ALARA Reports. The calculated doses to residents in 2017 will be reported in the second half 2017 Environmental Monitoring Report. A related and unresolved issue regarding a lack of representativeness of background radon levels at monitoring station HMC-16 persists, and new monitoring of radon and its decay products at upgradient station HMC 1-OFF, on top of the LTP, and at downgradient station HMC 5 has been initiated to provide additional data of relevance to this issue. An apparent low bias in background radon levels at station HMC-16 is believed to result in overestimation of public dose from radon associated with the tailings piles.This observation is supported by MILDOS modeling of airborne radon concentrations at downgradient air monitoring stations due to measured releases of radon flux from the tailings piles.

2.0 AUDIT RESULTS

The following sections describe the results of the on-site ALARA audit and review of documents.

2.1 Routine Operations

Routine operations at the Homestake Mining Company mill site in 2017 involved water treatment and maintenance of treatment systems and environmental monitoring. Bioassay and direct radiation monitoring programs for workers are conducted in accordance with the Homestake Manual of Standard Practices and specific Radiation Work Permits (RWPs).

2.1.1 Bioassay Data

The routine bioassay program was modified in 2016 to take into account the diminished potential for intake of uranium and in response to a recommendation from the 2015 ALARA Audit Report. Homestake Mining collects routine urine bioassay samples semi-annually from Homestake employees and contractors who spend more than five consecutive days on site and work inside the Controlled Area. In addition, bioassay samples mandated by RWPs are collected at the start of the activity and at termination. The samples are submitted to Energy Laboratories, Inc. (ELI) in Casper Wyoming for analysis for uranium. A total of 158 (not including spikes and blanks) bioassay samples from employees and contractors had been submitted to ELI from January 1 through November 2017. An additional 37 samples were submitted in December 2017. A blank and a spiked sample were submitted with each batch of samples. The samples were accompanied by a standard Chain of Custody form. One designated sample from each batch was spiked to obtain a known concentration of 15 µg/L of uranium.

As noted in the 2015 and 2016 ALARA Audits, it is difficult to track bioassay samples to document that all contractors who worked on the site for more than five consecutive days and were potentially exposed to uranium submitted both entry and termination samples. In response to a recommendation in the 2014 ALARA Audit Report, Homestake developed a spreadsheet to track contractor badging, training and bioassays. The system was implemented in 2015 but was not complete. However, the 2016 and 2017 spreadsheets reviewed by the auditor appears to have been more complete. It is difficult to track contractors since individual workers come and go from the site without necessarily informing the radiation safety staff so that exit bioassays may be obtained.

10 CFR 19.13 a requires annual notification of workers of the results of any monitoring if the dose exceeds 100 mrem 10 CFR 19.13 (b)(1). No worker doses exceeded 100 mrem in 2015, 2016 or 2017; therefore, written notification is not mandatory; however, it is good practice to inform monitored workers of their badge and bioassay results. Workers are notified if the bioassay result exceeds the laboratory reporting limit so that no notification indicates no positive bioassay samples. A form, similar to NRC Form 5 is maintained in the file for each individual employee providing the badge results and a general statement regarding bioassay. The report is available to the employee on request.

The QA results for each batch or bioassay samples submitted to the laboratory are shown in Table 1. All spikes were within the required 30% of the nominal value. All blanks were less than 5 µg/L, the reporting limit. One urine sample was reported as slightly above the reporting limit at 5.7 µg/L but below any regulatory action level. The laboratory repeated the analysis with essentially the same results. No supplemental urine sample was obtained from the worker as the individual was a temporary contractor (no longer available onsite to provide a follow-up sample), the result was very close to the detection limit, and the result was well below any regulatory action level. Regulatory Guide 8.22 (NRC, 2014) requires actions to be taken if the concentration exceeds 15 µg/L.

Table 1: QA Results for Bioassays

Lab submission date	# samples	Blank	Spike Activity conc.	Reported spike conc.	Results
11/20/17	6	<5	15.0	14.6	
11/14/17	13	<5	15.0	15.4	5.7
10-18-17	5	<5	15.0	13.4	
10/10/17	1	<5	15.0	13.9	
10/5/17	8	<5	15.0	14.9	
9/15/17	2	<5	15.0	15.1	
9/25/17	11	<5	15.0	12.6	
9/26/17	6	<5	15.0	12.0	
9/29/17	6	<5	15.0	13.4	
8/28/17	8	<5	15.0	15.8	
8/21/17	10	<5	15.0	15.3	
8/15/17	1	<5	15.0	16.4	
8/1/17	1				No data
7/31/17	3	<5	15.0	14.5	
7/24/17	4	<5	15.0	14.6	
7/19/17	6	<5	15.0	15.0	
6/26/17	2	<5	15.0	15.0	
6/14/17	2	<5	15.0	13.7	
6/8/17	7	<5	15.0	16.5	
6-1-17	1	<5	15.0	16.1	
5-12-17	6	<5	15.0	15.7	
3-6-17	15				See 3-7 data
3-7-17	11	<5	15.0	17.2, 15.5	
2-16-17	3	<5	15.0	14.5	
2-7-17	8	<5	15.0	14.2	
2-2-17	3	<5	15.0	14.1	
1-26-17	4	<5	15.0	14.9	
1-23-17	4	<5	15.0	16.1	

2.1.2 Internal Doses

Internal doses are not generally assessed for Homestake Mining Company workers because there is little potential for inhalation or ingestion of radioactive materials. The airborne particulate sources have been covered. Radon concentrations in the Reverse Osmosis Building and the Mill Office Building are within the range of normal indoor values and less than the 4 pCi/L EPA guidance level for residences. Radon decay product concentrations are not routinely measured in these areas.

However, special studies were conducted by the RSO in 2017 on the Large Tailings Pile (LTP), Zeolite Facilities and the Surface Ponds to assess and potential worker exposures (Whicker, 2017a, 2017b, 2017c). Measurements on the LTP showed radon and particulate concentrations well below the 10 CFR 20 derived air concentrations (DACs). The RSO has proposed an occupational radiation exposure study, including general and breathing zone air measurements for particulates, radon and radon decay products as well as exposure rate measurements and a revision to SOP 11 (HP-1) for ongoing monitoring.

2.1.3 External Doses

All Homestake Mining Company employees (other than administrative staff) are badged using OSL dosimeters obtained from Landauer, Inc. The badging protocol was modified in 2016 at least partially in response to a recommendation from the 2015 ALARA Audit Report. The modified procedure requires continued badging of Homestake employees and contractors who are on site in the fenced area for more than five consecutive days. Nine badges were issued to Homestake employees and 74, to contractors in 2017. Badges are exchanged quarterly. Contractor badges are stored on a badge board in the work area or a board in the main office. Contractors sign their badges out each day and log them back in at the end of the work shift. The badge log forms were reviewed. Workers appear to be conscientious about logging badges in and out. The annual deep doses reported for the previous three years and for the first three quarters of 2017 are summarized in Table 2.

The maximum total dose to an individual worker in 2015 was 11 mrem. This dose was incurred during the fourth quarter of 2015 thus was not included in the 2015 ALARA Audit Report: but was discussed in the 2016 report. The maximum deep dose to a worker in 2017 was 1 mrem for one individual. All other doses were below the reporting limit of 1 mrem.

Table 2: Annual Deep Doses

	2011	2012	2013	2014	2015	2016	2017
# Badges – Homestake	7	8	7	7	7	9	9
# Badges – contractor	55	65	62	114	171	135	74 (through 3rd quarter)
Deep Dose Range (mrem/y)	3 – 59	All below detection	Below detection to 4	Below detection to 23*	Below detection to 11 mrem	Below detection to 1 mrem	Below detection to 1 mrem/y
Mean Deep Dose (mrem/y)	28.2	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Standard Deviation (mrem/y)	12.4	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

The doses are recorded and filed annually on a form comparable to the NRC Form 5. Results are provided to individual workers upon request. The Total Effective Dose Equivalent (TEDE) assigned to workers is limited to contributions from external deep dose equivalent as measured with OSL dosimeters. The Committed Effective Dose Equivalent (CEDE) is reported as zero since airborne radionuclide concentrations to which workers may be exposed are not expected to be elevated. The new occupational exposures study (as previously described) is intended to verify this expectation. Skin and lens doses are also reported on the form but are not included in the assigned TEDE value. Individual Dose Reports are not required under 10CFR19.13(b)(1) since no worker doses exceeded 100 mrem per year; however, such notification of monitored workers is a good practice.

During the third quarter of 2017, the RSO evaluated the potential inhalation dose to workers atop the LTP engaged in routine and non-routine activities use lapel type air samplers in a one-week study (Whicker, 2017a). The maximum measured fraction of the derived air concentration for uranium (DAC) over the six-day period was 6.1% with an average of 4.5% over the six-day period. The maximum radon decay product concentration 4.2% of the DAC with an average fraction of 1.5%. Therefore, it is unlikely that any worker would receive a dose greater than 500 mrem in a year, the level at which monitoring would be required. However, Homestake has instituted a reactivated and revised procedure for “Radiological Air Monitoring for Occupational Exposures” (SOP 11). Sampling will be required under a RWP as “deemed appropriate” by the RSO. While implicit in the procedure, SOP 11 should be modified to state explicitly that monitoring will be required when a worker has the potential to receive an annual dose in excess of 500 mrem to clarify compliance with 10 CFR Part 20.

Additional studies have been performed to assess the potential for internal dose from work at the surface pond facilities and other areas (Whicker 2017b, 2017c). Dose assessments indicate that the potential for the annual radiation dose to a worker to exceed 500 mrem is very small.

As noted in previous ALARA Audit Reports, the reason for the discrepancy between the 2011 doses and the doses for subsequent years has not been determined. OSL dosimeters were used in 2011. Given the fact that the doses in 2011 were generally less than one percent of the occupational dose limit, and, with one exception, have been less than 5 mrem per year subsequently, there is no discernable trend in worker doses.

2.2 Safety Meetings and Training Programs

Safety meetings are held weekly and are attended by all available Homestake staff. Meeting subjects are not limited to radiation safety but may cover any aspect of occupational or environmental safety. The 2017 safety meeting logs were reviewed and found to cover appropriate subjects with attendance adequately documented.

The training records for the radiation safety staff were reviewed. The contract RSO, Mr. Randy Whicker, CHP, attended 40-hour RSO refresher training for uranium recovery facilities in June 2017 to fulfill the biennial refresher training specified in NRC Regulatory Guide 8.31. The two Radiation Technicians, Kyle Martinez and William Archuleta (along with other HMC employees)attended annual Radiation worker refresher training on December 5, 2016 and December 8, 2017 at the HMC Grants site. In addition, Mr. Martinez and Mr. Archuleta are being trained specifically by the RSO and Chuck Farr (ERG)to fulfill the qualifications recommended in Reg Guide 8.31 for Radiation Safety Technicians. A license amendment request is planned to clarify that a minimum of 40 hours of relevant radiation protection training is required for the RST position (in addition to significant experience requirements). The individualized training, approximately 44 hours to date, included: site walkover, general radiation worker training, review of past site activities, hands on instrument training, discussion of dose calculations, etc. A training spreadsheet documenting the content was reviewed and found to be appropriate.

Nine Homestake employees received annual Radiation Worker Refresher Training on December 8, 2017. The training records, including the slide presentation and the test scores were reviewed during the audit. The presentation and test were appropriate for the level of hazard at the site. The instructor went over completed tests with the students as part of the training. The tests were signed by the instructor. However, there was no signature on the test for the participant. An attendance sheet was signed by the participants acknowledging receipt of the "radiation safety training applicable to activities conducted at the HMC site in Grants NM."

Contractors receive radiation safety orientation through a video with additional information provided by ERG or Homestake radiation safety personnel. A total of 92 contractors were trained by video. Contractors and new employees complete a test prior to receiving a dosimeter. The test is reviewed with the individuals in the class. A training log documenting successful completion of the test is maintained. A spreadsheet to track training, dosimeter issuance, and bioassay was devised in 2015 in response to a recommendation in the 2014 ALARA Audit Report. It has been implemented and maintained up-to-date by Mr. Archuleta. The spreadsheet highlights the dates for expired refresher training. While this is an improvement, it is still in the development process. As noted previously, maintaining up-to-date records on contractors is challenging given the temporary nature of their work on site.

Homestake does not at this time transport or offer for transport radioactive materials that exceed the exempt concentration limit for U-nat in equilibrium with its decay products (27 pCi/g) or U-nat without decay products (270 pC/g). Mr. Venable and Mr. Archuleta received documented training in transportation of radioactive materials in 2014. If they are to have any function related to transportation of non-exempt radioactive material in 2018, they will need refresher training and should receive in-house "function-specific" training. Anyone else who could be involved in transportation of non-exempt radioactive materials, will need to have documented radioactive materials transportation training.

2.3 Inspection Reports

The water system is inspected daily. The inspection includes measurement of water levels in Evaporation Ponds 1 and 2 as well as the east and west collection ponds, the spray system, leak detection sumps, and well and tailings embankment conditions, toe sumps, etc. A sample of site inspection forms was reviewed. No issues were found.

The NRC conducted its routine annual on-site inspection the week of August 22, 2016. As a result of that inspection, a Notice of Violation (NOV) was issued on April 20, 2017 concerning the radon flux measurement and calculation methodology[2]. However, the Inspection Report (NRC, 2017) also determined that the "licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license." Homestake's response in a letter dated September 8, 2016 (Homestake, 2016) was deemed inadequate by the NRC. Homestake entered into mediation with the NRC resulting in a Confirmatory order issued in March 2017 that was incorporated into the license (Amendment 49). The Confirmatory Order required a site self-assessment that is ongoing. Homestake further responded with a plan for future radon flux measurements an a request for a variance from the license flux standard of 20 pCi/s-m^2 (Homestake, 2017). Subsequent inspections on April 24, 2017 and September 13,

[2] The previous inspection in August 2015 identified no violations and concluded that the "licensee was conducting reclamation activities in accordance with license and regulatory requirements."

2017 resulted in changes to Homestake operations that are incorporated into the revised site Standard Operating Procedures currently under review.

2.4 Radiological Surveys and Monitoring Data

Air monitoring data, radionuclide concentrations in airborne particulates and radon gas, as well as environmental gamma radiation dose rates are provided in the monthly ALARA Reports. Radionuclide concentrations in airborne particulate matter are monitored at seven locations around the site, including four locations at the property boundary in the predominant wind directions, two locations at the boundary representing the nearest occupied residences, and one background location. Filters are exchanged weekly and composited quarterly for analysis by ELI for U-nat, Th-230, and Ra-226 as well as vanadium. The radionuclide data for the fourth quarter of 2016 and all four quarters of 2017 were reviewed. No trends or anomalous results were observed. The gamma dose rates (deep dose) for the second half of 2016 and the first and second halves 2017 are shown in Table 3. The second half 2017 gamma exposure rates were somewhat higher than for the first half of 2017 but consistent with the second half 2015 . However, there are no clear trends in gamma exposure rates.

Table 3: Environmental Gamma Monitoring Results

Location	Q3-Q4 2015	Q1-Q2 2016	Q3-Q4 2016	Q1-Q2 2017	Q3-Q4 2017
	mrem	mrem	mrem	mrem	mrem
HMC 1	61	55	55	51	61
HMC 1A	54	50	56	52	60
HMC 2	64	53	61	58	63
HMC 3	59	60	58	51	59
HMC 4	63	56	48	59	69
HMC 5	61	57	60	59	66
HMC 6	62	55	59	55	65
HMC 16 Background	53	60	53	lost	54

Environmental radon gas concentrations were monitored at ten locations on the site or at the site perimeter as well as in the RO Building and the Mill Office Building using alpha track detectors supplied by Radonova Laboratories (Rapidos). Landauer Rad Trak detectors had been used until third quarter 2016 when Landauer discontinued the line. The Rapidos detectors have a lower detection limit and are designed specifically for environmental use. In the past, three detectors were placed at each location and the measured concentrations averaged. Based on experience using the Rapidos detectors with their greater sensitivity and reproducibility, two detectors are currently co-located at each monitoring location with the measured concentrations averaged. (Note: The monthly ALARA Reports should be changed to reflect the current practice of dual detectors at each location rather than the triple detector configuration used previously.)

The quarterly radon concentrations for Q4 2015, Q1 through Q4, 2016, and Q1 through Q4, 2017, are shown in Table 4. The reported concentrations for the detectors deployed outside appear to have decreased significantly with the use of the Rapidos detectors (with the exception of 2016 Q4). However, the indoor measurements with the Rapidos detectors appear to be consistent with the Rad Trak measurements. Given the fact that no significant changes occurred on the site at the time of the switch to the Rapidos detector, it is possible that the observed “trend” is due to differences in the sensitivity of the detectors in the outdoor environment.

As expected, the highest indoor radon concentrations (RO Building and office) occurred during the fourth quarters of 2015 and 2016 and the first quarters of 2016 and 2017 (fall/winter months). The fourth quarter 2017 outdoor radon concentrations are consistently higher than for the previous three quarters. Elevated radon concentrations were also observed in 2016 (using the Rapidos detectors) indicating that this is probably a seasonal effect. The Environmental Monitoring Program is described in detail in the Semi-Annual Environmental Monitoring Reports.

Table 4: Quarterly Radon Gas Concentrations

Location	Radon Gas Concentration (pCi/L)								
	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4
HMC1	1.33	0.93	1.07	0.45	1.19	0.64	0.64	0.50	1.15
HMC1A	1.23	1.13	1.07	0.50	1.05	0.64	0.47	0.37	0.99
HMC1OFF	1.33	1.13	0.87	0.56	1.25	0.69	0.60	0.37	1.06
HMC2	1.47	1.27	0.93	0.58	1.10	0.74	0.58	0.45	1.09
HMC3	1.13	0.76	0.60	0.48	1.05	0.53	0.42	0.50	0.83
HMC4	1.63	1.47	1.20	0.56	1.17	0.79	0.51	0.49	1.05
HMC5	1.47	1.0	0.97	0.52	1.15	0.66	0.57	0.47	1.01
HMC6	1.17	1.17	0.80	0.52	1.20	0.61	0.82	0.40	0.92
HMC7	1.10	0.93	0.73	0.57	1.15	0.69	0.57	0.45	1.05
HMC16	0.73	0.5	0.50	0.31	0.65	0.35	0.26	0.18	0.49
HMC Office	2.2	1.6	0.90	1.4	1.95	2.10	1.50	1.10	Lost
R. O. Plant	2.9	2.4	1.50	1.4	2.8	1.30	1.45	1.35	2.2

Personal contamination surveys are conducted by the radiation safety staff in accordance with the requirements of specific Radiation Work Permits (RWPs). There is no designated scan out station, but this provision has been revised in 2018 under the new RPP and respective definition of Restricted Areas. The survey meters are stored in the radiation technician office. Surveys are conducted using a Ludlum Model 43-5 alpha probe coupled to a Model 12 meter. As noted in the 2016 ALARA Audit Report, the daily scan log (EDF-15) does not define the pass/fail count rate; however, it does include the alpha background count rate. According to Procedure SOP 12, the release limit for personal contamination is background. Equipment release surveys are conducted using a Ludlum Model 19 microR meter, a Model 44-9 detector (pancake probe) coupled to a Model 12 meter and a Model 43-5 alpha detector coupled to a Model 12 meter. Wipe tests are not performed unless the measured surface activity exceeds 250 disintegrations per minute (d/m) beta or alpha. Monitoring data are included in the documentation for the RWP.

2.5 Radiation Work Permits

Six Radiation Work Permits were issued in 2017 (through the date of this audit, 12-11-17). The RWPs are listed in Table 5, below:

Table 5. Radiation Work Permits Issued in 2017

ID Number	Issue date	Title	Bioassay?	Other monitoring required	Workers trained	Termination date
1-2017	5/4/17	Work on #2 Clarifier	yes	Alpha scan	4	5-17-17
2-2017	8/27/17	Work on Clarifiers #1 and #2	yes	Alpha scan	4	8-18-17
3-2017[3]	9-14-17	Building up berms between Train 1&2 and 3&4	yes	Contamination survey; equipment release survey,	4	10-12-17
4-2017	9-18-17	Removal of Water Fowl in Evap. Ponds (in process)				
5-2017	9-25-17	Plugging and abandonment of wells	Yes	Alpha scan	7	12-7-17
6-2017	11-6-17	Rock placement in Zeolite 300 system				11-8-17

2.6 Radiological Effluent and Environmental Monitoring Data

The Semi-Annual Environmental Monitoring Reports for the periods July through December 2016 and January through June 2017 were reviewed. No issues with the environmental data were identified.

Radon flux monitoring was performed on the Large and Small Tailings Piles in August and September, 2015, October 2016 (Homestake, January 2017) and September and October 2017 (Homestake, December 2017). The procedure for radon flux measurements was modified in 2017 in response to a NOV issued by the NRC resulting from the August 2016 routine inspection. In October, 2016, Homestake deployed a total of 100 canisters on each tailings impoundment in two separate deployments. The area-weighted average radon flux on the LTP was 21.73 pCi/m^2-s, averaging in the previous measurements on the embankments. Area-weighted averaging for the LTP was cited in the NOV as unacceptable to NRC. The area-weighted average radon flux on the STP was 7.88 pCi/m^2-s. The STP includes Evaporation Pond 1. The flux from the evaporation pond was assumed to be 0.0 pCi/m^2-s for the purpose of calculating the area-weighted average. HMC believes that area-weighted averaging for the STP is appropriate and consistent with EPA Method 115 specifications as this tailings pile is still considered an operational tailings impoundment.

On September 21-22, one hundred radon flux canisters were placed on the Large Tailings Pond (LTP); one hundred canisters were placed on the Small Tailings Pond (STP) on October 12-13, 2017. The average measured flux on the top of the LTP was 46.6 pCi/m^2-s. The area-weighted

[3] RWP issued during construction work

average measured flux on the STP was 3.5 pCi/m^2-s. The area covered by Evaporation Pond 1 was assigned a flux of 0.0 pCi/m^2-s. Assuming no credit for the embankments of the LTP, the average flux exceeds the standard required by the license, 20 pCi/m^2-s. Homestake has requested a variance from the flux standard for the top of the LTP as existing groundwater treatment and monitoring wells prevent placement of final radon barrier, and a dose assessment with MILDOS modeling indicates that a variance would not result in exceedances of public dose limits. As of the date of this audit, the variance has not been approved. The flux measurement results will be included in the Semi-Annual Environmental Monitoring Report for July – December 2017.

2.7 Instrument Calibration Record

The calibration dates on the instruments in service were checked with the records and the instrument calibration labels. The instruments identified by radiation safety staff as currently in use and their calibration dates are given in Table 6. All instruments in current use are in calibration with the calibration records maintained in a three-ring binder. Instruments are calibrated annually in accordance with NRC Regulatory Guide 8.30 (NRC, 2002b).

The instruments are checked for reproducibility daily when in use in accordance with Regulatory Guide 8.30. The Model 19 microR meters are checked against a Cs-137 source; alpha meters against a Th-230 source; and beta meters, against a Tc-99 source. Two Cs-137 sources are used for the daily checks. The nominal 4.44 µCi source is 25 years old; the nominal 1.275 µCi source is 35 years old. The activities were corrected for decay in 2016. However, the exposure rate check is used just to demonstrate reproducibility from day to day so the activity is not a critical factor.

Table 6: Instrument Current Calibration Dates

Instrument Type	Meter	Probe	Most recent Calibration Date
Alpha/beta scaler	3030 (210768)	Na	02/06/17 01/17/18
Pancake	Model 12 (145977)	Model 44-9 (151416)	09/19/17
MicroRmeter	Model 19 (310400)	Na	04/26/17
MicroRmeter	Model 19 (82709)	Na	09/19/17
Alpha	12 (87919)	43-5 (102859)	04/26/17
Pancake	12(227940)	44-9 (237615)	04/26/17
Alpha/Beta scaler	3030 (247268)	Na	10/20/17[4]

2.8 Review of Standard Operating Procedures

Standard Operating Procedures are contained in the Homestake Manual of Standard Practices Policy Guidance Documents and Standard Operating Procedures (Homestake, 2017). A single controlled copy of the document is maintained in the office of the SCM. All procedures have

[4] Per monthly ALARA Report for October 2017.

undergone review as part of the self-assessment required under the Confirmatory Order (NRC, 2017) and License Amendment Number 49. Additional SOPs have been developed in 2017, including SOP 11 – Radiological Air Monitoring for Occupational Exposures (HP-1). The procedures review was completed in December 2017. In addition, a new Radiation Protection Program Manual has been developed (HMC, 2018).

2.9 Source Leak Tests

Three sources in use (Th-230, Tc-99, and Cs-137) are leak tested annually. The most recent leak tests were conducted in November, 2017 with the results reported in the November ALARA Report. The maximum activity was 0.000013 µCi, well below the required 0.0005 pCi limit.

Sources that are not currently in use are stored in a locked source cabinet with “Caution, Radioactive Materials” signage. The exposure rates at the surface of the source cabinet, measured in January 2017, ranged from approximately 75 µR/hr at the front and a maximum of 250 µR/hr at the side. A wipe test performed on the source cabinet showed alpha and beta counts in the range of background levels.

As noted in previous ALARA Audit Reports, the source cabinet contains a large number of sources that are not currently in use. The source inventory was updated in 2015 and re-checked in 2016 and on August 31, 2017. A total of 59 sources are listed in the 2017 inventory. The four sources currently in use, (Th-230 [15,520 d/m], Tc-99 [12,670 d/m], Cs-137 [1.275 µCi as of 10/6/80] and Cs-137 [4.44 µCi as of 10/26/90]), are stored in the source cabinet. Homestake is exploring the options for disposal of the unneeded sources.

2.10 Review of Radiation Protection Data and Exposure Control

Radiation protection data, including personal dosimetry, bioassay results, and RWPs, indicated that the program is protective of worker radiation health. No deficiencies were found. The results of the bioassay and personal dosimetry monitoring are described in Sections 2.1.1 and 2.1.3, respectively.

Radon concentrations were measured in two occupied or potentially occupied locations on the site using alpha track detectors. The results are shown in Table 7.

Radtrak detectors supplied by Landauer were used until third quarter 2016 when Landauer discontinued that line. Since that time, Rapidos detectors supplied by Radnova Laboratories have been used for both indoor and outdoor radon concentration measurements. The Rapidos detectors are more sensitive than the previously used Radtrak detectors and tend to be more consistent. Measurements in the occupied indoor locations, are within the range of average indoor values for the United States, i.e. approximately 1 to 3 pCi/L. Radon concentrations are measured in two locations in the RO Building. The average value for the two detectors is reported in the Monthly ALARA Reports. Concentrations are measured in one location in the HMC Office. All radon concentrations were less than the EPA guideline for residences. Ventilation in the RO Building appears to be operating properly to control radon concentrations. The radon concentrations in the RO plant decreased significantly in the second quarter of 2015 but have remained relatively constant since that time.

Table 7: Radon Concentrations for Monitored Indoor Locations

Source – Monthly ALARA Reports	**HMC office (pCi/L)**	**RO Plant (pCi/L)***
November 2014 Q3	1.30	4.15
January – 2014Q4	2.40	4.35
April – 2015 Q1	3.0	5.25
July – 2015 Q2	1.30	0.75
October – 2015 Q3	1.5	1.1
February – 2015 Q4	2.2	2.9
June – 2016 Q1	1.6	2.4
August – 2016 Q2	0.9	1.5
October – 2016 Q3	1.4	1.4
January -2017Q1	1.95	2.8
April - 2017 Q1	2.1	1.30
July - 2017 Q2	1.5	1.45
October - 2017 Q3	1.1	1.35
December – 2017 Q4	Lost	2.2

*Average of two measurements

2.11 Unusual Events

There were no unusual events reported in 2016. However, there was a single urine bioassay sample that at 5.7 µg/L slightly exceeded the reporting limit of 5 µg/L. Repeat laboratory analyses of that sample were consistent with the initial result. Homestake contracted with an outside consultant to review regulatory compliance issues in response to a NOV issued in April 2017 and a 2017 Confirmatory Order included in the NRC radioactive materials license.

2.12 Review of 2016 Audit Findings and Recommendation

Recommendation (1) (open from the2015 ALARA Audit): Investigate the options for disposal of unneeded sources.

Homestake is investigating options for disposal of unneeded sources. This recommendation will remain open.

3.0 SUMMARY OF AUDIT

3.1 Findings

There were no Findings from this ALARA Audit. The ALARA program at the Homestake facility complies with license conditions, regulatory requirements and the guidance provided by US NRC Regulatory Guide 8.31 (NRC, 2002a). Regulatory Guide 8.31 requires the ALARA Audit to review of trends in personnel exposure. Quarterly doses for badged workers are very low, generally below the reporting limit, and have been consistent for the last four years. Therefore, there are no trends. Public doses have also been consistent for the past three years. Therefore, there are no trends to report.

3.2 Summary of Recommendations

There are several recommendations from this audit. Recommendations from previous audits have been addressed. One recommendation from the 2015 and 2016 ALARA Audits regarding disposal of unused sources remains open. However, a survey of the source storage cabinet in January 2017 demonstrated that the sources are secure and the potential exposures do not pose a hazard to any worker or member of the public. A preliminary wipe test indicated no significant removable contamination above background.

Other recommendations include the following:

1. Revise the monthly ALARA Report template to reflect the fact that two, rather than three, radon detectors are co-located at each measurement site.
2. The monthly ALARA Reports are very useful and informative. It would be helpful to a reviewer put the report date in the footer.
3. The license or RWP SOP should define what is a “significant potential” for radiation exposure to eliminate confusion regarding when an RWP is required.
4. Contractors and Homestake workers should sign the training test. The RSO or other individual conducting the training and grading the test should also sign or initial the test.

3.3 Significant Improvements in 2017

The radiation protection program at the Homestake facility is well-designed and continues to operate at a high level of competence. The procedures were reviewed and revised in 2017 resulting in updated versions that are designed to ensure compliance with the license and 10 CFR Part 20.

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Whicker, R. 2017d. Occupational radiation exposure study for the HMC Grants reclamation Project. December 4.

APPENDIX D

INSPECTION OF TAILINGS PILES AND PONDS

AND

ELEVATION SURVEY OF THE SETTLEMENT MONUMENTS ON TOP OF THE LARGE TAILINGS PILE SETTLE

Alan Kuhn Associates LLC
13212 Manitoba Dr. NE, Albuquerque, NM 87111 505 350 9188

January 31, 2018 File No.: HMC2017

Mr. Tom Wohlford
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

SUBJECT: REPORT OF 2017 ANNUAL INSPECTION OF TAILING IMPOUNDMENTS AND PONDS, HOMESTAKE GRANTS PROJECT, GRANTS, NEW MEXICO

Dear Mr. Wohlford:

On November 8, 2017 the undersigned performed the annual visual inspection of the tailing impoundments and evaporation ponds at the Homestake Grants Project located at Grants, New Mexico. Tom Wohlford (Closure Manager of Homestake Mining Company) and Reginald Shirley (contract engineer with Brown and Caldwell) accompanied me on the inspection. As the Responsible Engineer for these impoundments, I am required to annually inspect the stability and functionality of the impoundments per NRC Radioactive Materials License SUA-1471, Condition 12 and DP-200, Condition 52i.

Subsequent to my visual inspection, I reviewed additional information including:

- Impoundment piezometer readings taken by Homestake personnel during 2017 and tabulated at various times through the year,
- Summary of tailing collection well and tailing drainage sump collection rates through 2017,
- Map and table of tailing impoundment phreatic levels most recently measured in 2017, provided by Hydro Engineering on January 10, 2018,
- The settlement monument survey performed by Professional Land Surveying Services on 11/29-12/1/2016 and dated 1/04/2017,
- Sump discharges recorded by Homestake during 2017,
- Leak detection monitoring records for evaporation ponds #2 and #3,
- Pond level measurements by Homestake through 2017,

These records are typically included in Homestake's Annual Report, so they are not included here. This report, which is appended to the Annual Report, addresses the observations and findings of my site inspection as well as my assessment of the additional information listed above.

OBSERVATIONS

The undersigned performed visual observations of the tops and outslopes of both tailing impoundments and of the dikes, slopes, and liners of the evaporation ponds. The weather was sunny and breezy with temperatures in the low 60's. The ground surface was dry with no standing water.

Large Tailing Impoundment (LTP)

Overall, the surface of the LTP remains in good condition. The outslope riprap appears to be intact throughout and is extensively covered with volunteer vegetation, primarily Russian thistle with scattered small shrubs. The vegetation does not compromise the structural integrity or erosion resistance of the slope riprap; in fact, the vegetation appears to be providing additional erosion protection for the rock cover.

No recent washouts of cover soil under the riprap were observed during this inspection. The repairs of washouts that occurred in 2015 near the top of the south outslope and in 2013 on the north outslope are intact and functioning as intended.

Both zeolite facilities (the older 300 gpm facility and the newer 1200 gpm facility) located on the LTP appear to be stable with no visible indication of negative impact of these facilities on the stability of the LTP. The related pipe corridor on the southeast slope appears to be intact and functioning as intended, with no evident impact on the LTP. Upgrades to the 1200 gpm facility were completed in October 2017; these consisted of reconfiguration of two internal berms and had no effect of the stability of the facility.

No injection of water into the LTP has occurred since 2015.

The buried drains and sumps within the LTP slopes have continued to collect interstitial water draining from the LTP tailings, but the drainage rate (see Records Review below) dropped substantially during 2017 as the phreatic level in the LTP declined. At the time of this site visit, the ground surface in the toe at the east end of the north outslope, where seepage had emerged for many years, remained dry for the second consecutive year, and no standing water was visible anywhere around the toe of the LTP.

The slope stability analysis of the LTP updated in 2010 ("Stability Analysis of the large Tailing Impoundment, Homestake Grants Project, Grants, New Mexico", Kleinfelder, January 21, 2010) is still valid for 2017; the stability parameters have improved as the LTP phreatic surface declines. The static and pseudo-static factors of safety remain well above the design minimum values of 1.5 and 1.0, respectively.

Small Tailing Impoundment/ Evaporation Pond #1 (EP1)

The small impoundment (location of evaporation pond #1, or EP1) remains in generally good condition. The slumps in the subgrade fill of the south inslope of EP1, under the pond liner along approximately 200 feet of the pond westward from the southeast corner (Photo 1), have not visibly changed in 2017, and the liner remains intact. Similar but more limited slumps are now visible along the east inside slope of EP1 (Photo 2). During 2017, the water level was lowered for part of the year, making it possible to examine the precipitated sludge that has accumulated since 1990 (Photo 3). Weathering cracks have developed at several locations in the pond liner. The liner remains functional despite these conditions, but Homestake initiated an engineering feasibility assessment of options to address the issues related to aging of EP1, including the slumps in the liner (letter Wohlford to Meyer, 4/24/17).

On 6/17/2017 HMC reported the results of its mid-2017 inspection of the EP1 liner to the NRC, EPA, NMED, and NM OSE. That report identified the same conditions addressed in previous Engineer's Inspection Reports.

HDPE drain pipes and the HDPE-liner runoff discharge chute on the south end of the small tailings pile remain in good condition and are functioning as intended and effectively discharging runoff.

On 11/8/2017, EP1 pond water level was approximately 6-8 feet below crest elevation, leaving much more than the required minimum freeboard of 2.0 feet. The highest pond level during 2017 was 12.5 feet on 2/13/17 with freeboard of 2.5 feet, so more than the minimum required freeboard was maintained throughout the year.

At the time of my inspection, the turbo-misters and sprays were shut down for the winter, and the wave dissipater booms were not deployed.

Homestake repaired rills during the 2016-2017 winter, but rills have developed again on all of the small tailing pile outslopes during 2017. On the east outslope, rills were up to 6 inches deep. On the southeast and north slopes, rills were generally 4-8 inches deep but up to two feet deep in a few places downslope from low spots in the EP1 perimeter berm where runoff was concentrated (Photo 4). The west and southwest slopes had minor rilling up to 4 inches deep. HMC has prepared an erosion mitigation plan that includes earthwork to fill rills and deployment of erosion control blanket. Implementation of this plan is expected in early 2017.

Evaporation pond #2 (EP2)

EP2 liner and outslopes are in good condition, protected by the gravel cover on the north and south outslopes, and are free of major rills.

During the annual inspection, the freeboard was estimated at approximately 10 feet. At the highest 2017 pond level on 1/2/17, the water depth was 22.7 feet and the freeboard was 2.3 feet. Required minimum freeboard levels were maintained throughout the year. Evaporation sprays were shut down for the winter prior to the date of my inspection.

Evaporation pond #3 (EP3)

EP3 appears to be functioning in accordance with design and the operating plan. At the time of this inspection, the freeboard was estimated to be 6-7 feet in both cells of EP3. During 2017 water was transferred between EP3 and EP1 to allow observations and repairs of the EP1 liner and to maximize storage and evaporation capacity in the winter months. On 5/8/17 the maximum pond water depth of the year in cell A was 10.35 feet, giving a freeboard of 3.05 feet. Maximum cell B pond depth was 10.2 feet on 6/26-7/3/17, giving a freeboard of 3.2 feet. Required minimum freeboard levels were maintained throughout the year.

The pond outslopes are in good condition with rills up to 6 inches on the outslopes. There is no visible indication of slope deformation or leakage through the lining system.

RECORDS REVIEW

Evaporation Pond Freeboard

Homestake measured and recorded freeboard levels for the ponds during 2017. The minimum freeboard levels at any time during 2017 were:

- EP1 – 2.5 feet
- EP2 – 2.3 feet
- EP3A – 3.05 feet
- EP3B – 3.2 feet

All freeboard levels exceeded the minimum required freeboard of 2.0 feet.

LTP Drainage

HMC recorded tailing water drainage/ withdrawal data for the LTP on a weekly basis. Hydro Engineering reported that the average LTP dewatering rate was 0.9 gpm, which was down considerably from the 4 gpm in 2016 and from the 16.88 gpm average of 2015. Collection rates in the sumps averaged 10.4 gpm, down from an average rate of 14 gpm in 2016 and 19.9 gpm for 2015.

EP2 and EP3 Leak Detection Systems

During 2017, Homestake obtained and recorded weekly measurements of leakage through the primary liners collected in sumps of the leak detection and recovery system (LDCS) in EP2 and EP3 in accordance with DP 200 and the NRC Source Material License. Gallons of water removed through the collection sumps each week were recorded, and these records are maintained on site.

In its November 14, 2017 letter to the NRC, HMC reported leakage rate exceedances in the LDCS of EP2 and EP3. Subsequently, HMC has initiated a root cause analysis of the leakage. Starting in mid-2017 HMC began replacing the manual-control pumps on the LDCS sump pumps with pumps equipped with water-level activated switches to provide real-time response to primary liner leakage and more precise control of the hydrostatic head on the secondary liner. The pumps with water-level activated switches will limit the head across the bottom liner to less than 1.0 feet as required by DP 200 and 40 CFR 264.222.

For EP2, primary liner leakage rates varied through the year and did not appear to be correlated to pond water levels or weather. Zone 1 had minor (below the Action Leakage Rate, ALR) recorded leakage during 2017. In Zone 2, leakage rates exceeded the ALR briefly in July and August and for one week in early September but dropped to zero after the water-level activated pump was installed. Zone 3 had one week of leakage above the ALR in December, none otherwise for the year. Leakage in Zone 4 was below the ALR throughout 2017. Zone 5 leakage exceeded the ALR for several weeks in the first half of 2017 but was negligible through remainder of the year. Leakage rates in EP2 during 2017 were not consistently above the ALR, did not correlate with pond water stage, and were not considered evidence of unacceptable primary liner performance per DP 200 Condition 34, which specifies that pump capacity should be sufficient to minimize the amount of liquid in the inter-liner interstitial space, per SUA-1471, Condition 35D (via 7/18/2007 reference).

In EP3, only minor, intermittent primary liner leakage was recorded in cell A zones 2, 3 and 5 during May and June. Highest leakage rates in EP3A occurred in zones A2, A3 and A5 when the freeboard was less than 3.8 feet, and leakage did not persist with even less freeboard (higher pond water stage). Otherwise, cell A has no measureable leakage during 2017.

Through the first three quarters of 2017, Cell B had a only few weeks of ALR exceedance in zone B4 and B5; zones B1, B2 and B3 had none. From 10/30/17 through the end of 2017, zone B1, B2 and B4 had one or two weeks of slight ALR exceedance and zone B5 had none. Zone B3 leakage rates exceeded the ALR from 10/30/17 through the end of the year. There appeared to be no correlation between leakage rates and pond water levels in EP3B.

Piezometer and Settlement Monitoring

During 2017 the LTP continued to drain the interstitial water from the tailings. The phreatic surface continued to drop significantly during 2017. Water level measurements were taken by Homestake on 66 wells or piezometers, 39 of which were the same as those measured during 2016. Thirty six piezometers showed water level declines ranging from -0.02 feet to -15.83 feet, with the average of -3.34 feet.

Three piezometers/wells had anomalous increases recorded, ranging from 7.89 feet to 22.82 feet. There is no evident cause for actual increases, so these probably resulted from erroneous readings or calculations.

The 2017 settlement monument survey was performed by Professional Land Surveying Services on 11/29-11/30/17. Of the 49 monuments found and surveyed, 46 had settlements from 2016 to 2017 of 0.04 feet to 0.17 feet; the other three had no 2016 readings.

Because of the apparent systematic error in the 2016 survey that carried through all of the settlement measurements, the 2017 readings were compared to the 2015 readings, as well. Settlements from 2015 to 2017 of zero to 0.07 feet were measured on 26 settlement monuments; the remaining 20 had positive elevation changes (heave) of 0.01 feet to 0.13 feet. The amounts of elevation increase on interior locations were small, 0.01 feet to 0.04 feet, within the margin of expectable survey error. Larger increases, 0.05 feet to 0.13 feet, were limited to southernmost (E) line of monuments near the south edge of the LTP top. Increase in equipment traffic associated with well abandonment is the most likely cause for this minor heaving.

CONCLUSIONS AND RECOMMENDATIONS

The tailing impoundments and the three evaporation ponds are in generally good condition, with exceptions described above. HMC has elevated its maintenance efforts to stay within the operating limits of the NRC license and NMED discharge permit (DP 200).

HMC has recognized the effects of aging on EP1, which has now operated for 27 years, far beyond its design life, and has commissioned a study of alternatives for EP1, including changes to allow it to continue to operate as well as options to replace it. The study is evaluating the feasibility study of relining EP1 or replacing it with a new pond. That study was started in 2017 and will be completed in early 2018.

The undersigned advised HMC that rill management and grade control are needed annually to maintain erosional stability of the small tailing impoundment, the evaporation ponds, and the interim cover of the LTP. Perimeter berms on the covers of the STP and LTP should be maintained to minimize the potential for surface runoff to create concentrated sideslope flows and sideslope rilling. In response, HMC has developed a plan for erosion control on EP1, with applications for EP3, as well.

Most of the piezometers in LTP were measured at least once during 2017. From those readings it is apparent that the phreatic surface in the LTP is approaching, or falling below, the depth of some of the piezometers. Consequently, fewer water level measurements will be possible in 2018 and later years, so the schedule of measurements can be relaxed to annual measurements.

Consolidation and settlement of tailings, especially slimes, is dependent on drainage of pore water. The LTP has drained enough that consolidation of tailings has probably already reached 90% of primary settlement, despite the residual effects of the tailing flushing program that ended in 2015. The settlement survey demonstrates that some settlement is still continuing but at very small rates. Now that LTP dewatering appears to well advanced and drainage rates have decreased substantially, the record of settlement dating back almost 25 years will be re-evaluated. This re-evaluation was appropriate in 2017, but because the 2016 settlement monument survey was evidently not accurate, it has been postponed until survey errors could be assessed. For 2017 HMC contracted with a different professional land surveyor to perform the annual survey of settlement points, and the results of this survey will support the assessment of settlement progress and whether primary settlement can be deemed complete.

Recent activity on the top of the LTP has resulted in damage to some settlement monuments, HMC should take the measures necessary to protect the survey monuments from further disturbance so that reliable elevation data can be obtained until cover final placement. Caution is especially important during the process of abandoning wells in the LTP near the settlement monument locations.

Until the EP1 options are evaluated and a course of action taken, the slumps along the inside slopes of EP1 should be protected against further displacement to protect the liner. Site staff should note any changes in the slumps and in the condition of the liner.

Outslopes of the LTP should continue to be observed by site staff at least weekly for signs of displacements in the slope surface and for ponding of runoff or rilling on the interim cover of the top . The undersigned should be notified immediately if surface slumps, erosional breaches of the interim cover, or other deformations are observed. Site staff should continue to be vigilant and to be ready to respond promptly to future washouts.

Until the final top cover of the LTP is constructed, the interim cover should be graded toward each HDPE drain so that no low spots remain between the drain pipe collars along the perimeter of the cover.

LIMITATIONS

The recommendations contained in this report are based on the undersigned's field visit, evaluation of information generated by others and obtained from Homestake, and his understanding of the inspected facilities. If any conditions are encountered at this site which are significantly different than those described in this report, the undersigned should be immediately notified so that he may make any necessary revisions to findings or recommendations contained in this report.

This report was prepared in accordance with generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made. It is the Client's responsibility to see that all parties to the project are made aware of this report in its entirety. The information contained in this report should be used at the Owner's option and risk.

If you have any questions or need additional information, please contact me.

Respectfully submitted,

Alan K. Kuhn, Ph.D., P.E., D.GE
Consultant and Responsible Engineer

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REGISTERED PROFESSIONAL ENGINEER
1/31/2018

Photo 1 – EP1 liner near the southeast corner. Slumps along right side.

Photo 2 – EP1 east slope. Slumps below normal pool level.

Photo 3 – Close-up of precipitated sludge of the EP1 liner.

Photo 4 – Major rill in EP1 north outslope.

N

0 50 100 200

SCALE: 1"=100'

Elevation Survey

of the Settlement Monuments on top of the Large Tailings Pile Homestake Mining Company Grants Reclamation Project situated in the NW/4 of Section 26, Township 12 North, Range 10 West, Cibola County, New Mexico.

KEYED NOTES

A C4 FOUND BENT 15° FROM 1.5FT. MONMENT WOULD BE 0.05FT. HIGHER IF STRAIGHTENED

B B7 FOUND BENT 10° FROM 4.0FT. MONUMENT WOULD BE 0.06FT. HIGHER IF STRAIGHTENED

C C7 FOUND BENT 15° FROM 1.3FT. MONUMENT WOULD BE 0.05FT. HIGHER IF STRAIGHTENED

D E7 FOUND PARTIALLY DISMANTLED. A 2.08FT. SECTION OF DRILL STEM WAS FOUND UNSCREWED FROM THE MONUMENT. THE REMOVED SECTION HAD EVIDENCE THAT IT HAD BEEN SCREWED 0.14FT. DOWN ONTO THE REMAINING SECTION OF THE MONUMENT. MONUMENT WOULD BE 1.94FT. HIGHER IF REASSEMBLED.

E FOUND BURIED 1.3' DEEP.

NOTES

1 FIELD SURVEY PERFORMED NOVEMBER 29 & 30, 2017.

2 ELEVATIONS ARE REFERENCED TO PLANT CONTROL MONUMENT 'SW' AS SHOWN.

H.E.I. HAMMON ENTERPRISES, INC.
PROFESSIONAL LAND SURVEYING SERVICES
P. O. Box 770 ▪ Ramah, NM 87321-0770 ▪ Tel: (505) 870-6901 ▪ HEISurveys@Yahoo.com

170912 SETTLEMENT SVY DEC 2017.DWG DRAWN BY: AH CHECKED BY: CK DATE: 11-30-2017

APPENDIX E

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

TABLE OF CONTENTS

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

APPENDIX E

Page Number

FIGURES

TABLES

Grants Reclamation Project

<u>Land Use Review / Survey</u>

Annual Report No. 16 - CY2017

1.0 Background

As part of Amendment 34 to the Grants Reclamation Project Radioactive Materials License – SUA-1471-Docket 40-8903 (approved June 19, 2002), License Condition (LC) 42 was amended to require submittal of a land use survey with the License annual report to NRC. This report is the fifhteenth annual land use review / survey pursuant to LC 42.

The general focus of the land use survey is to document and summarize the current land uses and any identified changes to land use in proximity to the Grants Reclamation Project. In particular, land use activities for those areas proximal to the tailings pile areas undergoing reclamation and closure and immediate surrounding areas where ongoing ground-water restoration continues to be reviewed.

2.0 2017 – Land Use – Homestake Properties

Homestake Mining Company of California (HMC) owns and controls a sizeable land area in and around the Grants Reclamation project. Over the last number of years, additional lands have been acquired as opportunity has arisen and acquisition of such lands are deemed appropriate in relation to ongoing ground-water remediation and restoration activities and final reclamation / closure of the site.

Much of the HMC lands held in the area that are not in immediate proximity to the tailings pile complex have been, and are continuing to be, utilized for livestock grazing on a lessor/lessee tenant arrangement. Much of the current land area within the immediate Site Boundary area containing the evaporation ponds, RO plant and both tailings pile areas and office / shop compound have been excluded from livestock grazing and other land use except those directly related to the ongoing ground-water restoration activities. These areas have been livestock fenced to exclude grazing; certain small areas in the southern and western portions of land within the Site Boundary are, however, seasonally utilized for livestock grazing.

Several small lot / small acreage parcels [e.g. residential lot(s)] held by HMC in the general area of the reclamation site are idle and are essentially not in use except in certain instances where treated and/or fresh water injection and water collection is underway as part of the ongoing groundwater restoration program or are under agricultural use on selected lot(s). For example, Block 1 Lot 5 and Block 2 Lot 2 in Murray Acres were planted and irrigated in 2008 through 2017.

The other significant land use activity situated on HMC-held lands in the area includes land treatment / crop irrigation utilized for crop production. Water used for irrigation was an integral part of the ongoing ground-water restoration and cleanup program for the project. Prior to 2002, HMC had 270 acres of land under irrigation consisting of flood irrigation area comprising 120 acres and a center pivot spray irrigation area comprising 150 acres. During 2002, an additional center pivot irrigation system was commissioned that comprises 60 acres. In 2003, an additional 24 acres of flood irrigation was added to the irrigation system in Section 33. In 2005, the 60 acre center pivot irrigation system was expanded by 40 acres to a total of 100 acres.

For 2013 through 2017, HMC lands were not crop irrigated except the two lots in Murray acres (see project location Figure 2.1-1 in report Section 2.1 of this annual report for location of the four areas with past irrigation activity).

3.0 2017 – Land Use – Pleasant Valley Estates, Murray Acres, Broadview Acres, Felice Acres and Valle Verde Residential Subdivisions

Aside from the land uses on HMC land in the Grants Reclamation Project area described in the previous section above, the other major land use immediately proximal to the Site consists of residential development located in the Pleasant Valley Estates, Murray Acres, Broadview Acres and Felice Acres residential subdivisions. By way of background, HMC provided these subdivision areas with a potable water supply system as an extension of the Village of Milan water supply in the mid-1980's. The Village of Milan water supply extension to these areas was provided at that time to address a concern over the quality of groundwater used for domestic purposes in these adjacent subdivision areas.

An assessment of current land use in these four subdivision areas was undertaken in November 2017 to provide an annual review of the present uses, occupancy and status for the various lots within these subdivisions. Over the years, permanent residential homes, modular homes and mobile homes have been established in the subdivision areas, and immediate adjacent areas, as would typify a rural residential neighborhood. A number of lots remain vacant, or are utilized for uses such as horse barns, corrals, equipment storage, etc. In some cases, dwellings are present on several lots throughout the subdivisions but are currently vacant or have been permanently abandoned and in various states of disrepair.

This year, the annual review also included an assessment of the residential areas adjacent to Felice Acres, Pleasant Valley Estates and the Valle Verde residential areas and adjacent lots as was done for 2006 through 2016 surveys.

The primary issue of concern in the subdivision areas is to determine whether current occupied dwellings are utilizing water service from the Village of Milan system for potable water consumption and not private wells, particularly private domestic wells that are completed into the underlying shallow alluvial aquifer.

The survey conducted in November 2017 consisted of first obtaining the records and customer database from the Village of Milan water district. This information was reviewed to prepare a separate residential customer database for the subdivisions that would reflect the lot number, customer, water meter customer ID number and whether the customer utilized Milan water during 2017. See Tables E-1 through E-5 for 2017 database information.

A lot-by-lot reconnaissance was made in each of the subdivisions to determine whether each lot was occupied or vacant, contained a residence(s), and which residences are currently occupied. This information was then checked against the database to determine whether each occupied residence is supplied and metered through the Village of Milan water supply system. Results of this reconnaissance effort are summarized on the subdivision plat maps; see attached Figures E-1 through E-5.

Field review of the subdivisions areas, along with follow-up inquiries as required to confirm the status of water use at each property, indicates that occupied residential sites in, or immediately adjacent to the Felice Acres, Broadview Acres, Murray Acres, and Pleasant Valley subdivisions are on metered water service with the Village of Milan; exceptions to this overall status are discussed below.

In the Valle Verde residential area and immediately adjacent to the subdivision, one residence was identified that is not on the Village of Milan water supply system and is therefore obtaining domestic-use water from private well supply. This residence is currently on a domestic well supply and this property owner has stated that he does not want to be hooked up to the Village water supply system.

4.0 New Milan Water Hook-Ups

Homestake (HMC) and the New Mexico Environment Department - Superfund Oversight Section entered into and executed a Memorandum of Agreement (MOA) in January 2009 regarding private well supplies utilized for domestic household use in the area. The MOA established an Area of Concern (AOC) wherein those residences within the area that are not on the Village of Milan water supply for domestic potable water use should be contacted and given the opportunity to be hooked up to that supply with HMC covering the cost of the hookup. Additionally, those residents in the AOC area that arranged for Village hookup after January 2004 would be reimbursed for the related costs if cost records are supplied to HMC. Eight (8) residents in the AOC were identified as eligible for reimbursement of Village potable water supply hookup costs pursuant to terms of the MOA. The current status is as follows:

• Number of residents reimbursed	5
• Number of residents not interested in reimbursement	1
• Number of residents not providing necessary cost detail	2
TOTAL	**8**

The last significant facet of the MOA addresses the concern with regard to an offer by HMC to residential property owners in the AOC to arrange for and pay for plugging and abandonment of private wells in the area. In 2010, HMC mailed notice letters and offers to property owners in the MOA that extends the opportunity to have their well(s) plugged and abandoned. The time period for well owners to respond, as specified in the AOC, was reached during 2010. Six property owners had indicated a desire to have their well(s) plugged; HMC sent out consent forms to these property owners to get permission for HMC to plug and abandon these wells. Three of these well owners declined the offer to abandon their wells and three have not responded. Communications have been underway with the New Mexico State Engineers Office (OSE) regarding preparation of plug and abandon permits for these six wells; the permits with the SEO are on hold until consent forms are signed and will proceed if the well owners sign the consent form.

As of December 2012, no residences within the MOA Area of Concern (AOC) are pending with respect to a domestic water supply hook-up to the Village of Milan municipal water supply; all other known and identified residences are currently on the Village municipal supply, except for the one residence in Valle Verde which has stated that he is not interested in being hooked up to the Milan water system and one residence east of Highway 605 which was hooked up to the Milan water but discontinued the use of the Milan water in 2015. This residential hookup in the Valle Verde area is discussed above in Sec 3.0 of this report.

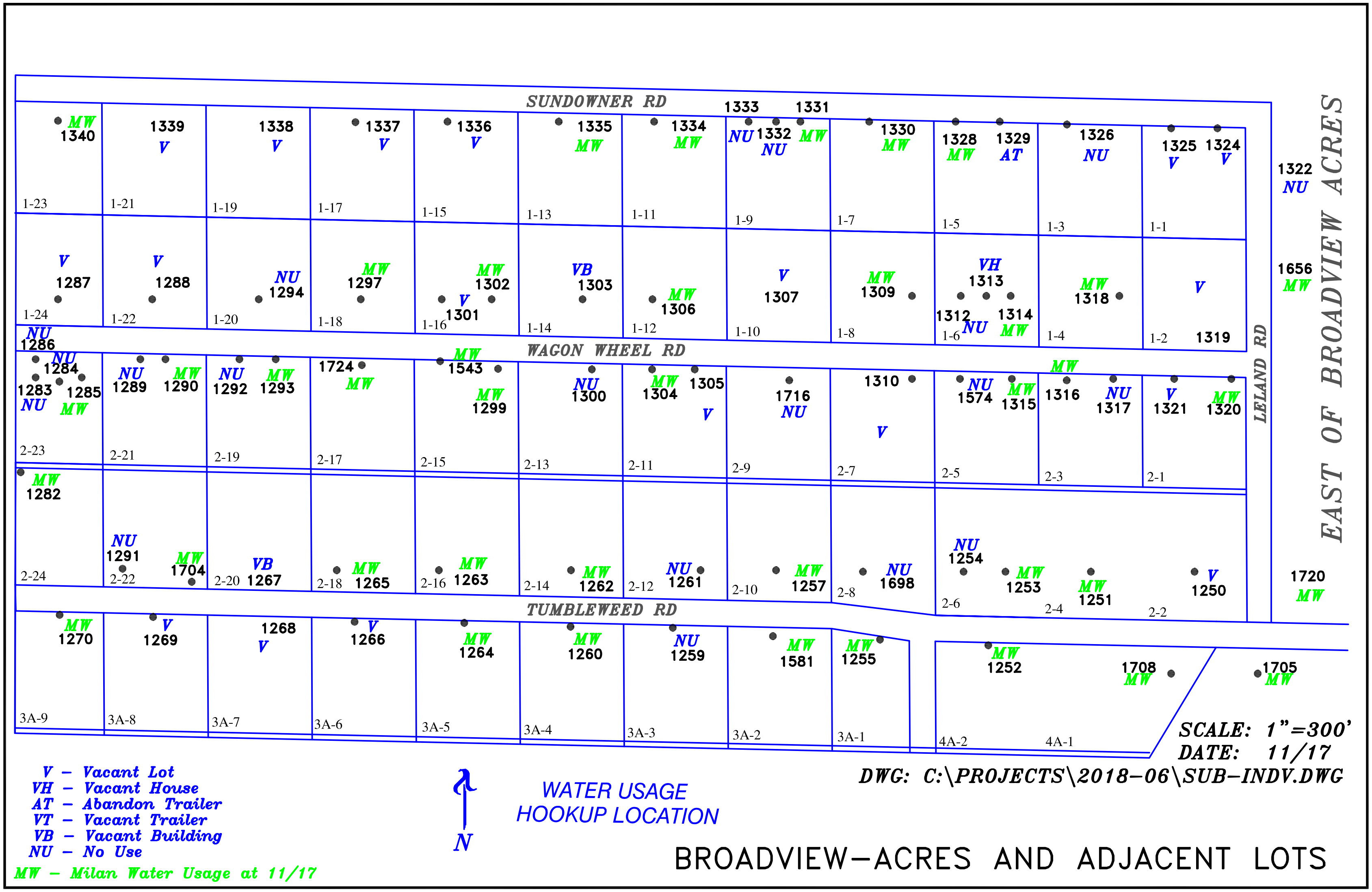
5.0 Conclusion

The review of land use for HMC properties and the five residential subdivision areas to the south and west of the Grants Reclamation Project site indicates that present land uses in the area have not changed significantly. As a result of the annual survey of the residential areas within the Memorandum of Agreement (MOA) Area of Concern (AOC) during 2017, no residential properties remain to be addressed in terms of providing a domestic water supply hookup. Survey results indicate that all other water users in the AOC area are supplied by the Village of Milan water supply, except the one Valle Verde residence that has stated he is not interested in being hooked up to the Milan water system.

This land use survey / review is completed on an annual basis to meet annual license condition reporting requirements under the NRC License. This will help in assuring that land use activities in the immediate area surrounding the Grants project are regularly reviewed and assist in determining that those uses do not present a new concern with local ground-water usage until project ground-water restoration activities are completed.

FIGURE E-1. BROADVIEW ACRES-LAND USE STATUS AND WATER USE

E-6



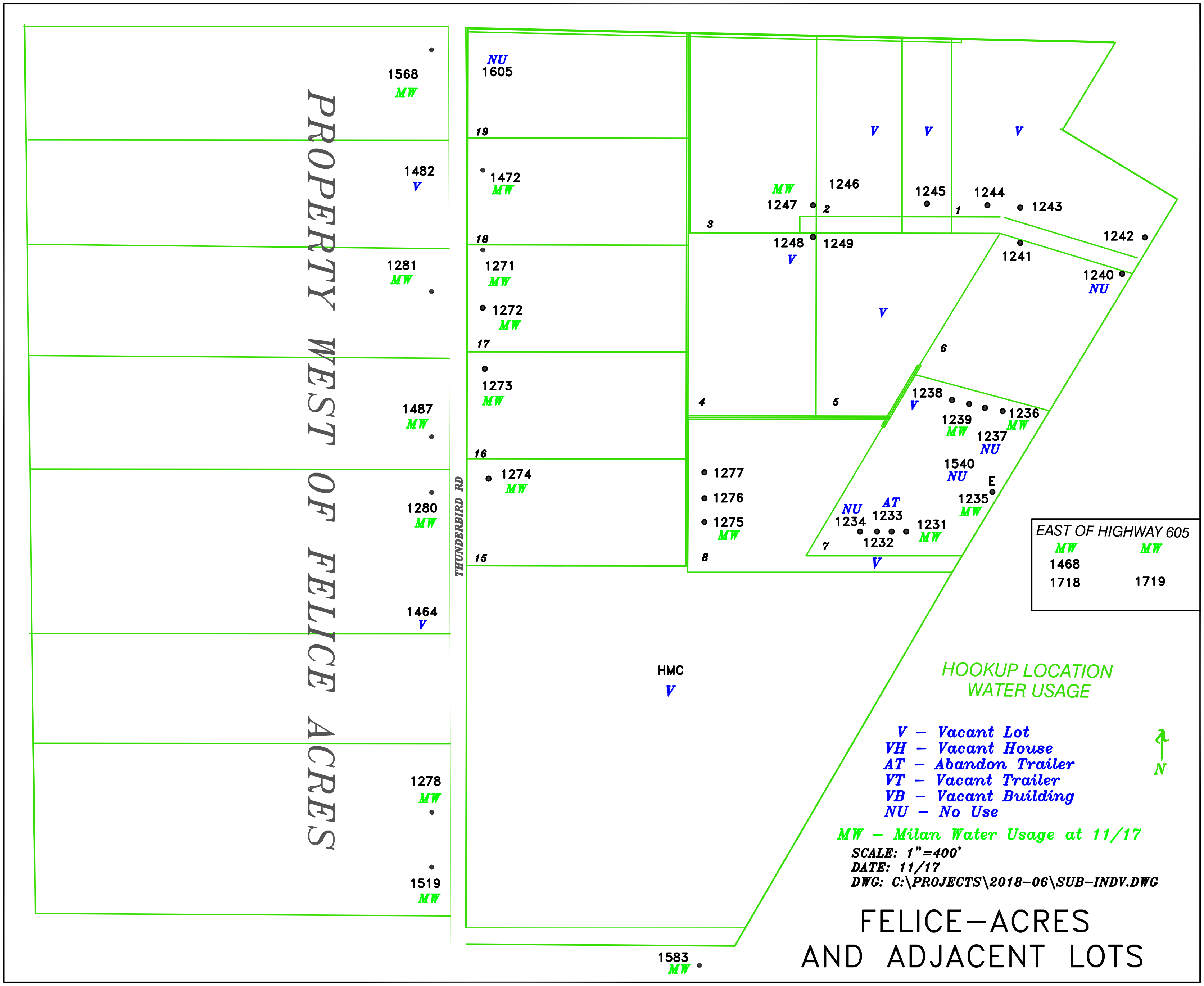


FIGURE E-2. FELICE ACRES – LAND USE STATUS AND WATER USE

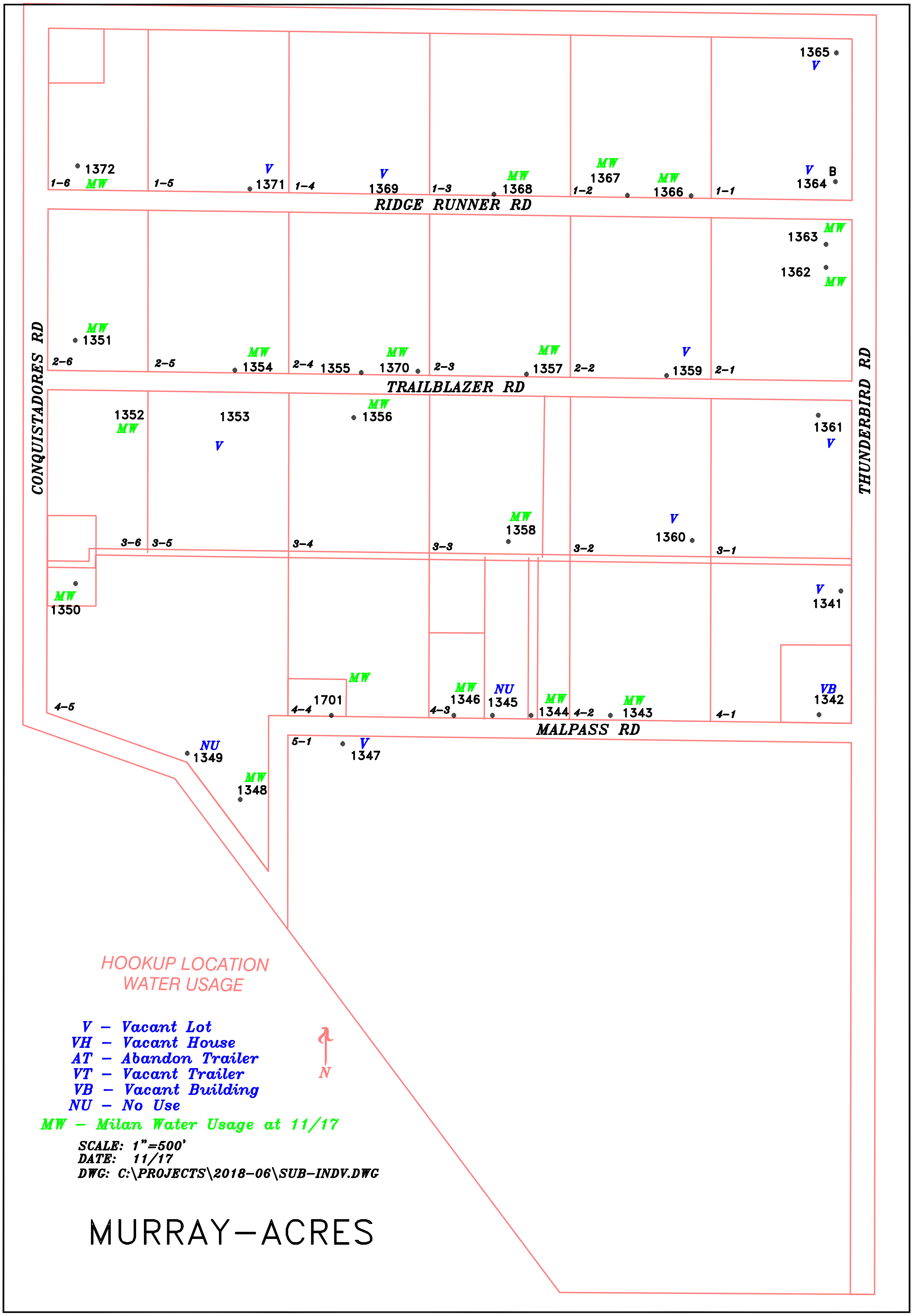


FIGURE E-3. MURRAY ACRES–LAND USE STATUS AND WATER USE

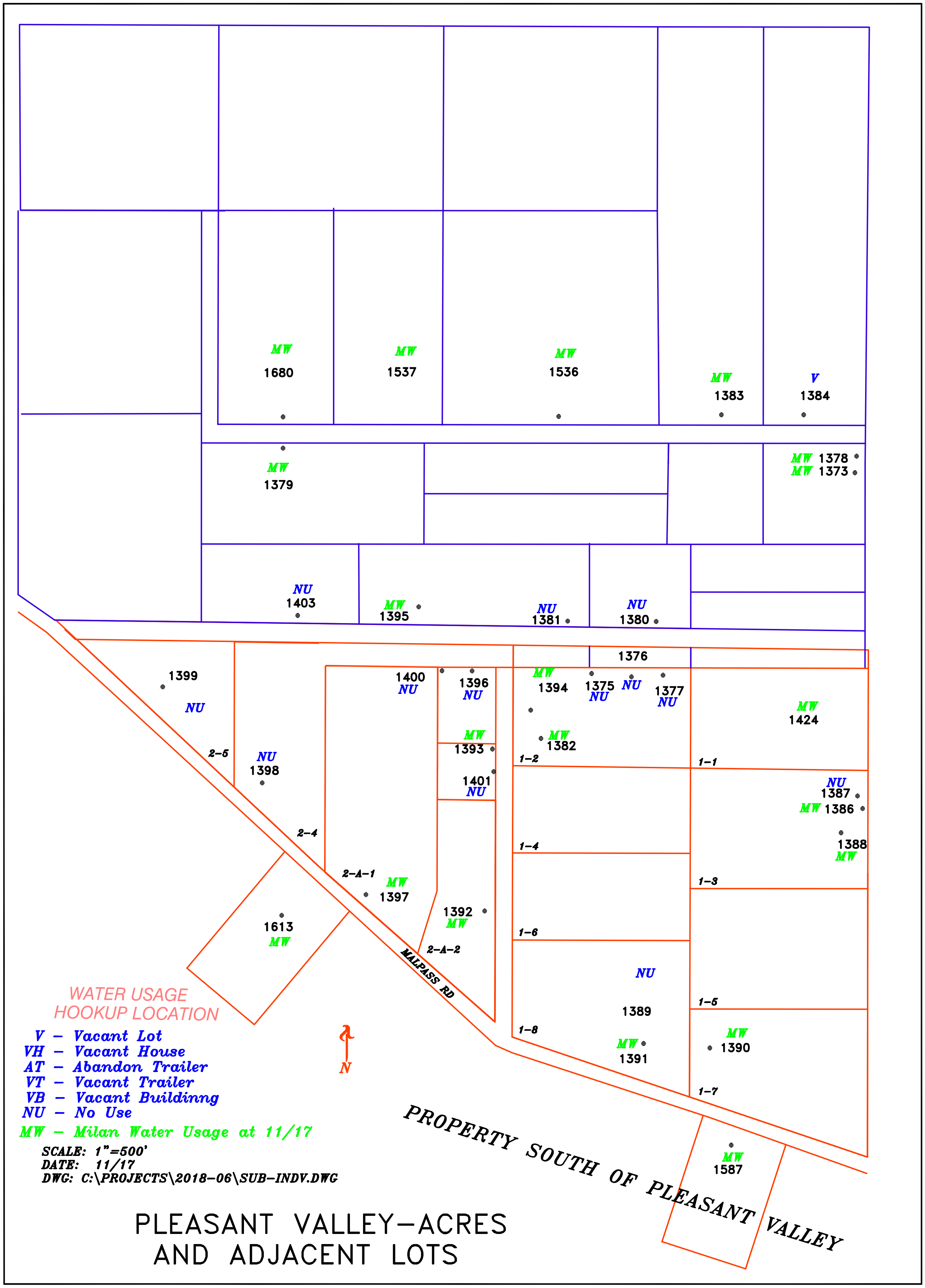


FIGURE E-4. PLEASANT VALLEY ESTATES–
LAND USE STATUS AND WATER USE

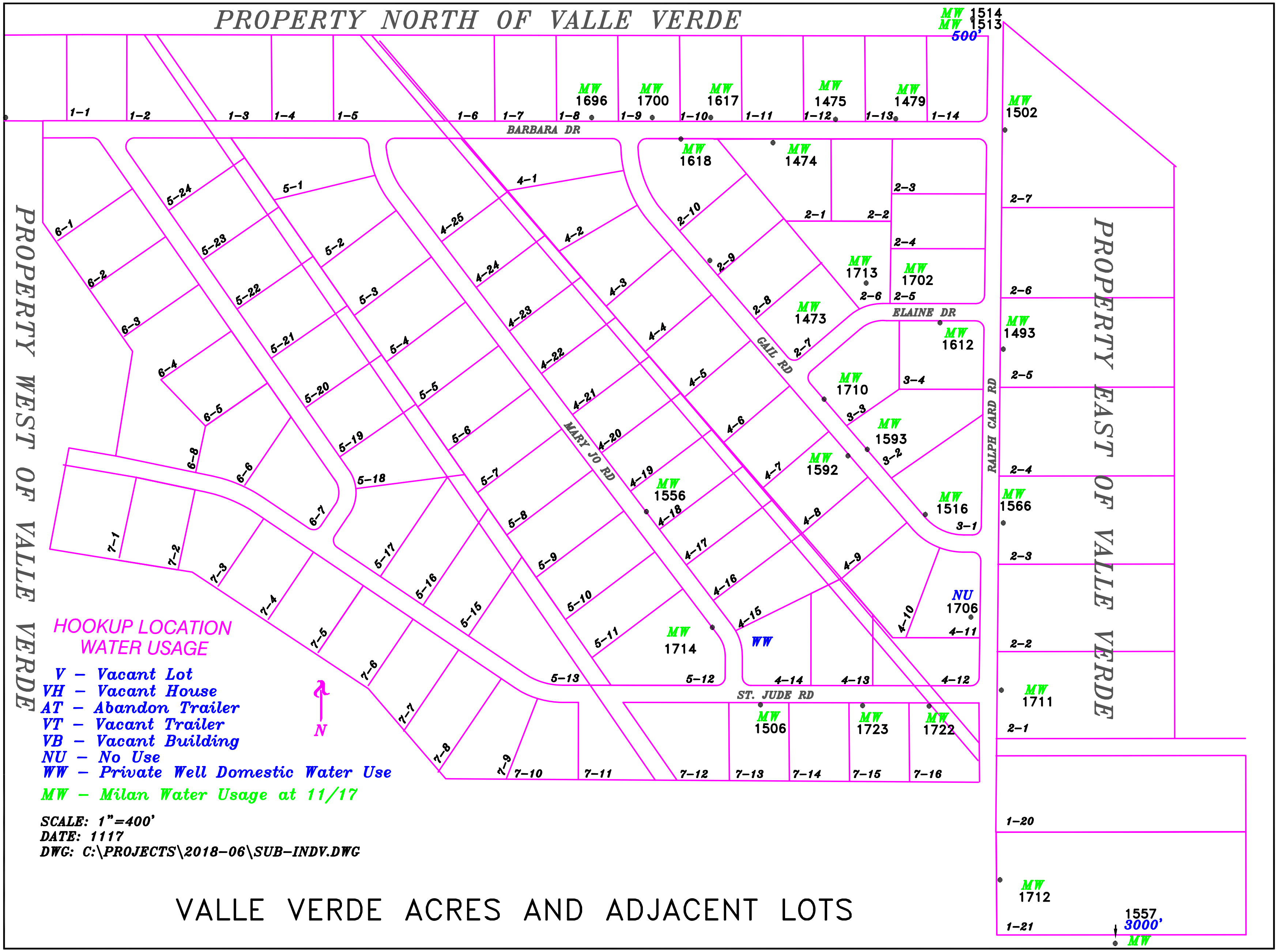


FIGURE E-5. VALLE VERDE ACRES–LAND USE STATUS AND WATER USE

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
1 / 1	1324		
1 / 1	1325		
1 / 2	1319		
1 / 3	1326		
1 / 4	1318	X	X
1 / 5	1328	X	X
1 / 5	1329		
1 / 6	1312		
1 / 6	1313		
1 / 6	1314	X	X
1 / 7	1330	X	X
1 / 8	1309	X	X
1 / 9	1331	X	X
1 / 9	1332		
1 / 9	1333		
1 / 10	1307		
1 / 11	1334	X	X
1 / 12	1306	X	X
1 / 13	1335	X	X
1 / 14	1303		
1 / 15	1336		
1 / 16	1301		
1 / 16	1302	X	X
1 / 17	1337		
1 / 18	1297	X	X
1 / 19	1338		
1 / 20	1294		
1 / 21	1339		
1 / 22	1288		
1 / 23	1340	X	X
1 / 24	1287		
2 / 1	1320	X	X
2 / 1	1321		
2 / 2	1250		
2 / 3	1316	X	X
2 / 3	1317	X	
2 / 4	1251	X	X

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
2 / 5	1315	X	X
2 / 5	1574		
2 / 6	1253	X	X
2 / 6	1254		
2 / 7	1310		
2 / 8	1698		
2 / 9	1308		
2 / 10	1257	X	X
2 / 11	1304	X	X
2 / 11	1305		
2 / 12	1261		
2 / 13	1300		
2 / 14	1262	X	X
2 / 15	1299	X	X
2 / 15	1543	X	X
2 / 16	1263	X	X
2 / 17	1724		X
2 / 18	1265	X	X
2 / 19	1292		
2 / 19	1293	X	X
2 / 20	1267		
2 / 21	1289		
2 / 21	1290	X	X
2 / 22	1291		
2 / 22	1704	X	X
2 / 23	1283		
2 / 23	1284		
2 / 23	1285	X	X
2 / 23	1286		
2 / 24	1282	X	X
3A / 1	1255	X	X
3A / 2	1581		X
3A / 3	1259		
3A / 4	1260	X	X
3A / 5	1264	X	X

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
3A / 6	1266		
3A / 7	1268		
3A / 8	1269		
3A / 9	1270	X	X
4A / 1	1708	X	X
4A / 2	1252	X	X
	1705	X	X

EAST OF BROADVIEW ACRES			
	1322		
	1656	X	X
	1720	X	X

TABLE E-2 WATER USE OF MILAN WATER IN FELICE ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
1	1242		
1	1243		
1	1244		
2	1245		
2	1246		
3	1247	X	X
4	1248	X	
5	1249		
6	1240		
6	1241		
7	1231	X	X
7	1232		
7	1233		
7	1234		
7	1235	X	X
7	1236	X	X
7	1237	X	
7	1238		
7	1239	X	X
7	1540	X	
8	1275	X	X
8	1276		
8	1277		
9			
10			
11			
12			
13			
14			
15	1274	X	X
16	1273	X	X
17	1271	X	X
17	1272	X	X
18	1472	X	X
19	1605		

TABLE E-2 WATER USE OF MILAN WATER IN FELICE ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
PROPERTY WEST OF FELICE ACRES			
	1519	X	X
	1278	X	X
	1279		
	1280	X	X
	1464		
	1487	X	X
	1281	X	X
	1482		
	1568	X	X
PROPERTY SOUTH OF FELICE ACRES			
	1583	X	X
PROPERTY EAST OF FELICE ACRES			
	1468	X	X
	1709		
	1718	X	X
	1719	X	X

TABLE E-3 WATER USE OF MILAN WATER IN MURRAY ACRES

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
1 / 1	1364		
1 / 1	1365		
1 / 2	1366	X	X
1 / 2	1367	X	X
1 / 3	1368	X	X
1 / 4	1369		
1 / 5	1371		
1 / 6	1372	X	X
2 / 1	1362	X	X
2 / 1	1363	X	X
2 / 2	1359		
2 / 3	1357	X	X
2 / 4	1355		
2 / 4	1370	X	X
2 / 5	1354	X	X
2 / 6	1351	X	X
3 / 1	1361		
3 / 2	1360		
3 / 3	1358	X	X
3 / 4	1356	X	X
3 / 5	1353		
3 / 6	1352	X	X
4 / 1	1341		
4 / 1	1342		
4 / 2	1343	X	X
4 / 3	1344	X	X
4 / 3	1345		
4 / 3	1346	X	X
4 / 4	1701	X	X
4 / 5	1349	X	
4 / 5	1350	X	X
5 / 1	1347		
	1348	X	X

TABLE E-4 WATER USE OF MILAN WATER IN PLEASANT VALLEY ESTATES AND ADJACAENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE
1 / 1	1424	X	X
1 / 2	1375		
1 / 2	1376		
1 / 2	1377		
1 / 2	1382	X	X
1 / 2	1394	X	X
1 / 3	1386	X	X
1 / 3	1387		
1 / 3	1388	X	X
1 / 7	1390	X	X
1 / 8	1389		
1 / 8	1391	X	X
2 / 4	1398		
2 / 5	1399		
2 / A1	1397	X	X
2 / A2	1392	X	X
2 / A2	1393	X	X
2 / A2	1396		
2 / A2	1400		
2 / A2	1401		
	1373	X	X
	1378	X	X
	1379	X	X
	1380		
	1381		
	1383	X	X
	1384		
	1395	X	X
	1403		
	1536	X	X
	1537	X	X
	1680	X	X
PROPERTY SOUTH OF PLEASANT VALLEY ESTATES			
17 - 2	1587	X	X
11 - 2	1613	X	X

TABLE E-5 WATER USE IN VALLE VERDE AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2016	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2017
1 / 8	1696	X		X	
1 / 9	1700	X		X	
1 / 10	1617	X		X	
1 / 12	1475	X		X	
1 / 13	1479	X		X	
2 / 1	1474	X		X	
2/5	1702	X		X	
2 / 6	1713	X		X	
2 / 7	1473	X		X	
2 / 9					
2/10	1618	X		X	
3 / 1	1516	X		X	
3 / 2	1593	X		X	
3 / 3	1710	X		X	
3 / 4	1612	X		X	
4/11	1706				
4 / 8	1592	X		X	
4 / 14			X		X
4 / 18	1556	X		X	
5 / 12	1714	X		X	
7 / 13	1506	X		X	
7/ 16	1722	X		X	
7/ 15	1723	X		X	
PROPERTY NORTH OF VALLE VERDE					
	1513	X		X	
	1514	X		X	
PROPERTY EAST OF VALLE VERDE					
1/21	1712	X		X	
2 / 1	1711	X		X	
2 / 5	1493	X		X	
2 / 7	1502	X		X	
2 / 3	1566	X		X	
PROPERTY SOUTH OF VALLE VERDE					
	1557	X		X	

APPENDIX F

SOIL MOISTURE CONTENT
FROM IRRIGATION INSTRUMENTATION

APPENDIX F

TABLE OF CONTENTS

SOIL MOISTURE CONTENT
FROM IRRIGATION INSTRUMENTATION

Page Number

FIGURES

TABLES

F.0 Introduction

Appendix F presents the information from the lysimeter soil moisture sampling in 2017 and the soil moisture instrumentation data for the former Section 34 flood area and the former Section 28 center pivot area. The scheduled lysimeter sampling was ceased after 2015 but additional attempts at sampling were made in 2016 and in 2017. The historical water quality data for the lysimeters can be found in Appendix G of the 2015 Annual Performance Report.

F.1 Lysimeter Soil Moisture Sampling

The New Mexico Environment Department (NMED) requested that Homestake Mining Company of California (HMC) sample the lysimeters in the former irrigation areas after the monsoon season in 2017. Attempts at sampling the lysimeters in the first quarter of 2016 did not produce any samples. The October 2017 attempts at sampling the lysimeters also did not produce any samples. No samples were successfully collected in the first quarter of 2016 or the fourth quarter of 2017 due to dry soil conditions following cessation of irrigation at least five years prior to the 2017 sampling. The likelihood of successful sampling diminishes as the soil profile gradually dries out after the termination of irrigation. It was thought that the best opportunity to collect additional lysimeter samples, particularly in the shallower lysimeters, would likely be shortly after the monsoon season. However, sampling attempts were not successful in 2016 or 2017 and further attempts are likely futile.

The following Table F-1 presents the notes from the March 2016 lysimeter sampling while the October 2017 sampling notes are presented in Table F-2:

Table F-1

Table 1. March 2016 Lysimeter Sampling Notes

Sampler: Dan Kump, HMC

	Vacuum Application				Sample Collection			
Lysimeter Name	Date	Time	Vacuum Reading (in-Hg)	Notes	Date	Time	Vacuum Reading (in-Hg)	Notes
LY1	3/22/2016	12:40	-20		3/23/2016	8:55	-8	No Sample
LY2	3/22/2016	12:50	N/A	Would not hold vacuum	3/23/2016			No Sample
LY4	3/22/2016	13:03	-12		3/23/2016	9:18	-10	No Sample
LY4ML	3/22/2016	13:05	-12		3/23/2016	9:20	0	No Sample
LY4MU	3/22/2016	13:08	-12		3/23/2016	9:25	-10	No Sample
LY28-2	3/22/2016	13:43	-10		3/23/2016	10:02	-8	No Sample
LY28-2M	3/22/2016	13:48	-6		3/23/2016	10:05	0	No Sample
LY28-1	3/22/2016	13:55	-10		3/23/2016	10:12	-6	No Sample
LY28-3	3/22/2016	14:00	N/A	Lysimeter was not found	3/23/2016			No Sample
LY34-1	3/22/2016	14:26	-6		3/23/2016	10:40	0	No Sample
LY34-2	3/22/2016	14:35	-10		3/23/2016	10:50	-6	No Sample

Table F-2

Table 2. October 2017 Lysimeter Sampling Notes								
Sampler: Adam Arguello, Hydro-Engineering								
	Vacuum Application				Sample Collection			
Lysimeter Name	Date	Time	Vacuum Reading (in-Hg)	Notes	Date	Time	Vacuum Reading (in-Hg)	Notes
LY2-2M	10/3/2017	9:10	N/A	Wouldn't hold vacuum	10/4/2017			No Sample
LY28-2	10/3/2017	9:11	-10		10/4/2017	14:00	-10	No Sample
LY28-1	10/3/2017	9:17	-6		10/4/2017	13:55	-4	No Sample
LY28-3	10/3/2017	9:21	-12		10/4/2017	13:42	-10	No Sample
LY34-4	10/3/2017	9:31	-6		10/4/2017	14:08	0	No Sample
LY3	10/3/2017	9:43	-6		10/4/2017	14:20	0	No Sample
LY3M	10/3/2017	9:45	-9		10/4/2017	14:18	-9	No Sample
LY5	10/3/2017	9:51	N/A	Wouldn't hold vacuum	10/4/2017			No Sample
LY2	10/3/2017	9:59	-8		10/4/2017	14:26	0	No Sample
LY1	10/3/2017	10:05	-10		10/4/2017	14:30	-8	No Sample
LY4	10/3/2017	10:11	-10		10/4/2017	14:34	-8	No Sample
LY4M-U	10/3/2017	10:13	-16		10/4/2017	14:36	-14	No Sample
LY4M-L	10/3/2017	10:15	-8		10/4/2017	14:38	0	No Sample
LY34-3	10/3/2017	10:34	-5		10/4/2017	14:54	0	No Sample
LY34-2	10/3/2017	10:39	-10		10/4/2017	14:58	0	No Sample
LY34-1	10/3/2017	10:46	-10		10/4/2017	15:02	-10	No Sample

F.2 Soil Moisture Instrumentation

In July of 2012, two types of soil moisture measurement devices were installed in the Section 34 flood area and the Section 28 center pivot. The Campbell Scientific CS655 is a water content reflectometer. This device measures volumetric water content, electrical conductivity and temperature in porous materials such as soil. The volumetric water content is calculated using the relationship between the travel time of electromagnetic waves along the rods. The electrical conductivity is determined by the signal attenuation of a known non-polarizing waveform and the temperature is measured by a thermistor attached to one of the rods.

The Campbell Scientific CS229 is a heat dissipation matric water potential sensor. The sensor indirectly measures soil water matric potential using an empirical relationship between heat dissipation and the soil water matric potential. The device has a heating element and a thermocouple encased in a porous ceramic cylinder. To measure the heat dissipation, the heating element is turned on for 30 seconds while the thermocouple takes a measurement at the beginning and at the end of the heating cycle. A decrease in the delta temperature indicates an increase in soil moisture content.

The termination of the irrigation program after the 2012 season has resulted in gradual drying of the soils in the irrigation areas. With the passing of more than five years since the last irrigation, the soil moisture condition in the irrigation areas is relatively stable and does not reflect any residual effects from the irrigation. Future changes in the moisture condition are expected to be relatively small and the continued monitoring of the soil moisture instruments is not expected to provide any information that is useful in managing the areas or evaluating the impacts of the past irrigation. The groundwater monitoring program will continue and is a more reliable means of detecting significant water quality impacts, if any, by the past irrigation. The lysimeters are still in place and, although the sample collection success and frequency is limited by the dry condition of the soils, the lysimeters could potentially be sampled in the future if the moisture content of the soil were to increase significantly. Because the soil moisture instruments are not expected to provide useful information in the future, and both the groundwater monitoring and lysimeters are a more reliable means of detecting impacts by the past irrigation, the operation and monitoring of the soil moisture instruments should be discontinued.

F.2.1 Section 34

Instrumentation for the Section 34 flood area was installed next to lysimeter LY34-3 (see Figure F-1). A CS655 and a CS229 were installed at depths of 5 feet, 10 feet, and 15 feet. Completion information and initial soil moisture content in the installation interval are shown in Table F-1. The initial soil moisture contents for the three Section 34 flood intervals were very low. The instruments were attached to a datalogger that collected the data every 15 minutes through October 8, 2012, after which the measurement frequency was changed to one hour.

Figure F-2 presents the volumetric water content values for the instruments in Section 34. The slight increases in water content in the 5 foot depth and the 15 foot depth are reasonably consistent with expected water content changes resulting from the irrigation in 2012. However, the cause of the sharp increase in the 5 foot and the sharp decrease in the 10 foot water content measurements in October of 2012 is not known. The values are within the accepted range for the water content in these clay soils, but the manner of change is questionable. The decline in moisture content in the 5 foot depth observed over the last four years is consistent with the expectation of drying of the soil profile without irrigation. The seasonal fluctuations in the 5 foot depth observed over the last three years appear to be better correlated with temperature change than to significant rainfall events. The data does indicate a slight drying trend in the 10 and 15 foot depths.

The electrical conductivity of the soil in Section 34 is presented in Figure F-3. The rapid initial increase in conductivity is attributed to the first measurements reflecting the low conductivity of the RO water used for installation. The cause of the sharp conductivity increase shown in the 5 foot depth, like the increase in water content, is unknown. The subsequent conductivity changes shown at all three depths appear to be seasonal soil moisture cycling. All three depths show a slight decline in conductivity over the last three years.

Table F-3. Irrigation Field Soil Moisture Instruments

INSTRUMENT DETPH	INTERVAL (FT-LSD)	DEPTH TO TOP OF BASALT (FT-LSD)	INTERVAL OF BENTONITE SEAL (FT-LSD)	SOIL MOISTURE CONTENT (% BY WEIGHT)
		SECTION 28		
4'	3-4	8	0.5-2.5	15.34
6'	5-6	8	2.5-4.5	4.87
8'	7-8	8	4.5-6.5	18.46
		SECTION 34 FLOOD		
5'	4-5	DNE	1.5-3.5	3.79
10'	9-10	DNE	7.5-9.5	5.31
15'	14-15	DNE	11.5-13.5	2.71

Note: DNE indicates did not encounter.

Figure F-4 presents the data collected from the CS229's in Section 34. The average daily delta temperature is the change in temperature from the start of the heating cycle to the end of it. The change in temperature is inversely proportional to the water content (higher delta temperature equals lower water content). All three depths have shown an increase in delta temperature over the course of measurement, indicating a steady decrease in the water content. The significant variation shown in the 15 foot depth appears to be seasonal in nature. The sensor for the 5 foot depth appears to have malfunctioned in October of 2013 and attempts to fix it were unsuccessful. The sensor for the 10 foot depth malfunctioned in August of 2015 and was not successfully fixed.

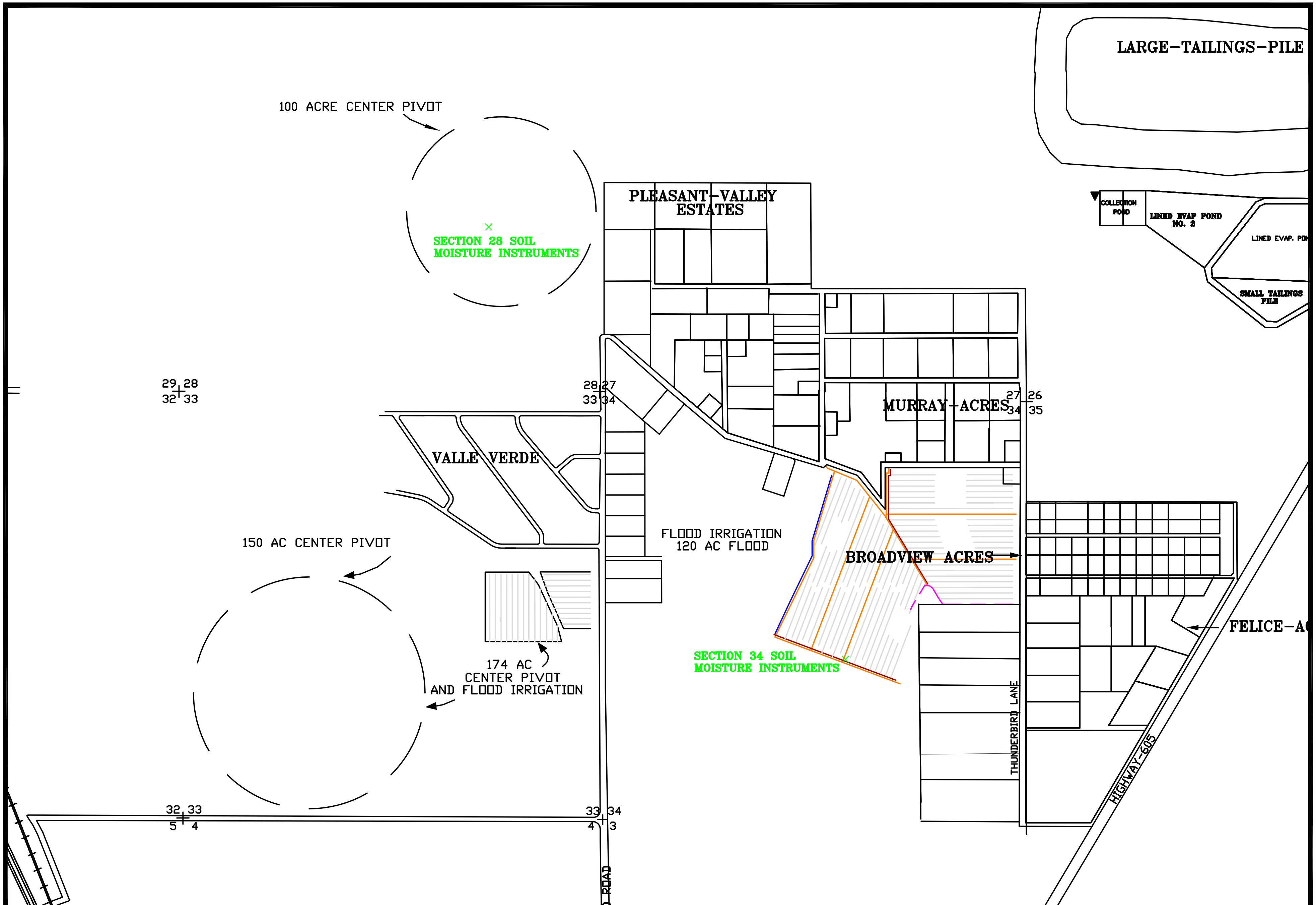
F.2.2 Section 28

The soil moisture measurement devices were installed next to lysimeters LY28-2 and LY28-2M (see Figure F-1). One of each instrument was installed at 4, 6, and 8 feet below the ground surface (see Table F-1 for completion information and initial soil moisture contents). Data was collected by a data logger every fifteen minutes before October 8, 2012 and every hour after that date. The power source for the data logger was damaged in March of 2016 and was repaired in December of 2016.

The volumetric water content is presented in Figure F-5. The sharp increase shown in all three depths early in the irrigation season is much larger than reasonable water content values. It is highly unlikely that the water content of the soil reached 78% at the 8 foot depth and is likely due to the imprecision of the equipment beyond a certain range of measurement. The disturbance of the soil during instrument installation could also have contributed to anomalous readings shortly after installation. The inverse relationship between depth and water content is expected given the increase in clay content with depth. Data from the six foot interval was not recorded from the middle of November through the end of 2012 due to a wire to the data logger coming loose. The rate of decline for two to three weeks after irrigation is slightly steeper than the rate before and after this period, indicating some decrease in the moisture content shortly after irrigation ceased in each of the three depths. These measurements indicate movement of soil moisture through all three depths during the 2012 irrigation season. The decline in moisture content has been continuing since the end of 2012 at all three depths with a diminishing rate.

Figure F-6 presents the electrical conductivity for Section 28. The trends shown follow a very similar pattern to the water content, however all three depths show a possible seasonal variation in conductivity that isn't correlated to water content. The larger rate of decline in the electrical conductivity for a few weeks after irrigation in 2012 was also observed.

The data collected from the CS229's in Section 28 is presented in Figure F-7. All three intervals showed an increase initially until a sharp decrease that coincides with the spike in water content and electrical conductivity. After the initial changes, the instrument at the 4 foot depth shows changes in moisture content after some of the center pivot irrigation cycles. The center pivot rotation rate was set at 1.5 days per revolution. Both the 6 and 8 foot depths show some variations during the irrigation with some overall decrease in the delta temperature in the last half of the irrigation season. The 4 foot depth showed more variation than the other depths with an increase in delta temperature after the irrigation ceased. A smaller increase in delta temperature at the 6 and 8 foot depths after irrigation also indicates a decrease in moisture content in these two deeper instrument depths after irrigation. A steady overall increasing trend in delta temperature has been observed at the 8 foot depth while the 4 foot and 6 foot intervals have shown a significantly higher level of variability. No useable delta temperature data were recorded for the 4 foot and 6 foot intervals after August of 2016.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE F–1. LOCATIONS OF THE SOIL MOISTURE INSTRUMENTATION IN THE IRRIGATION AREAS

DATE: 3/9/17

SCALE: 1"=1600'

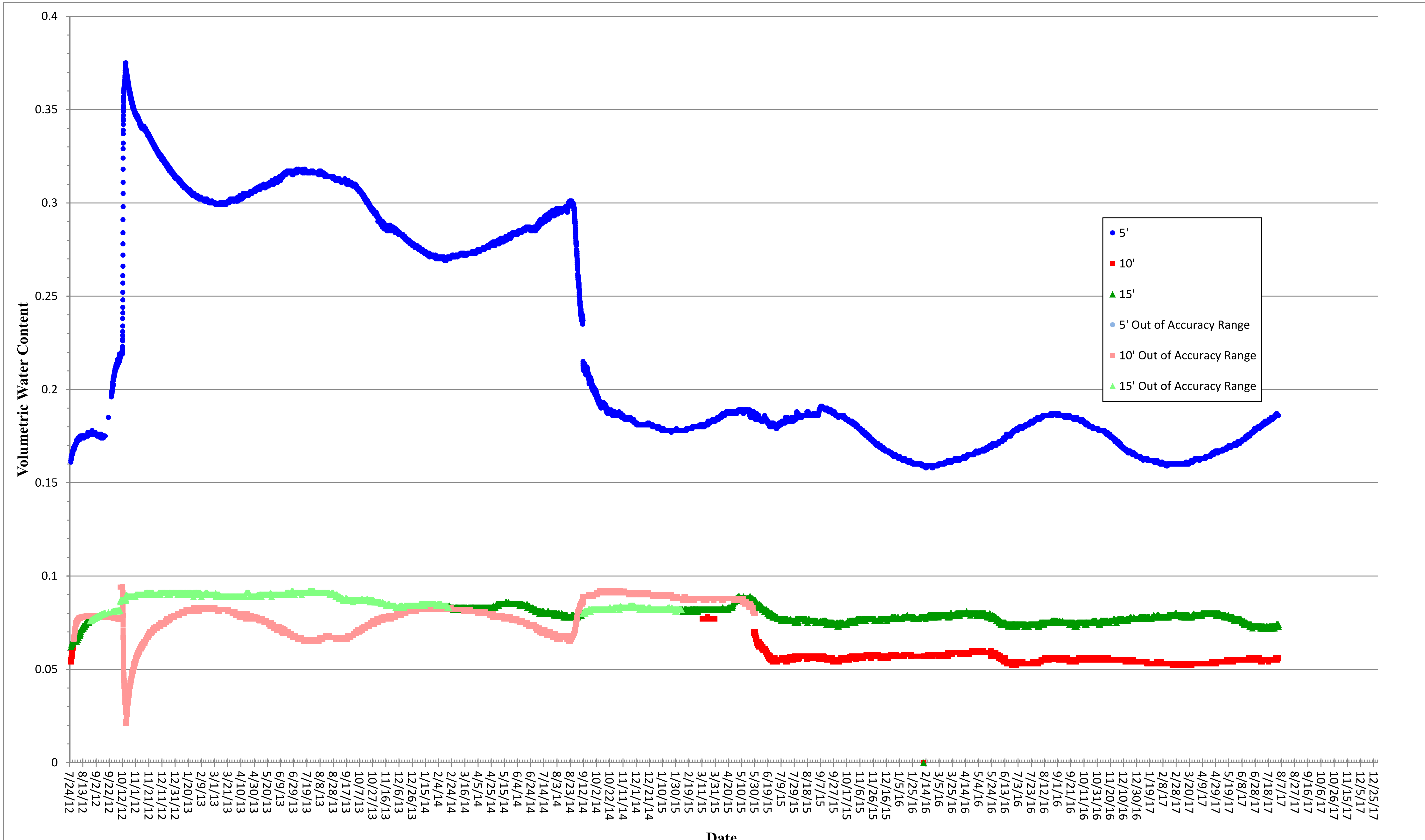


Figure F-2. Volumetric Water Content, Section 34 Flood Area

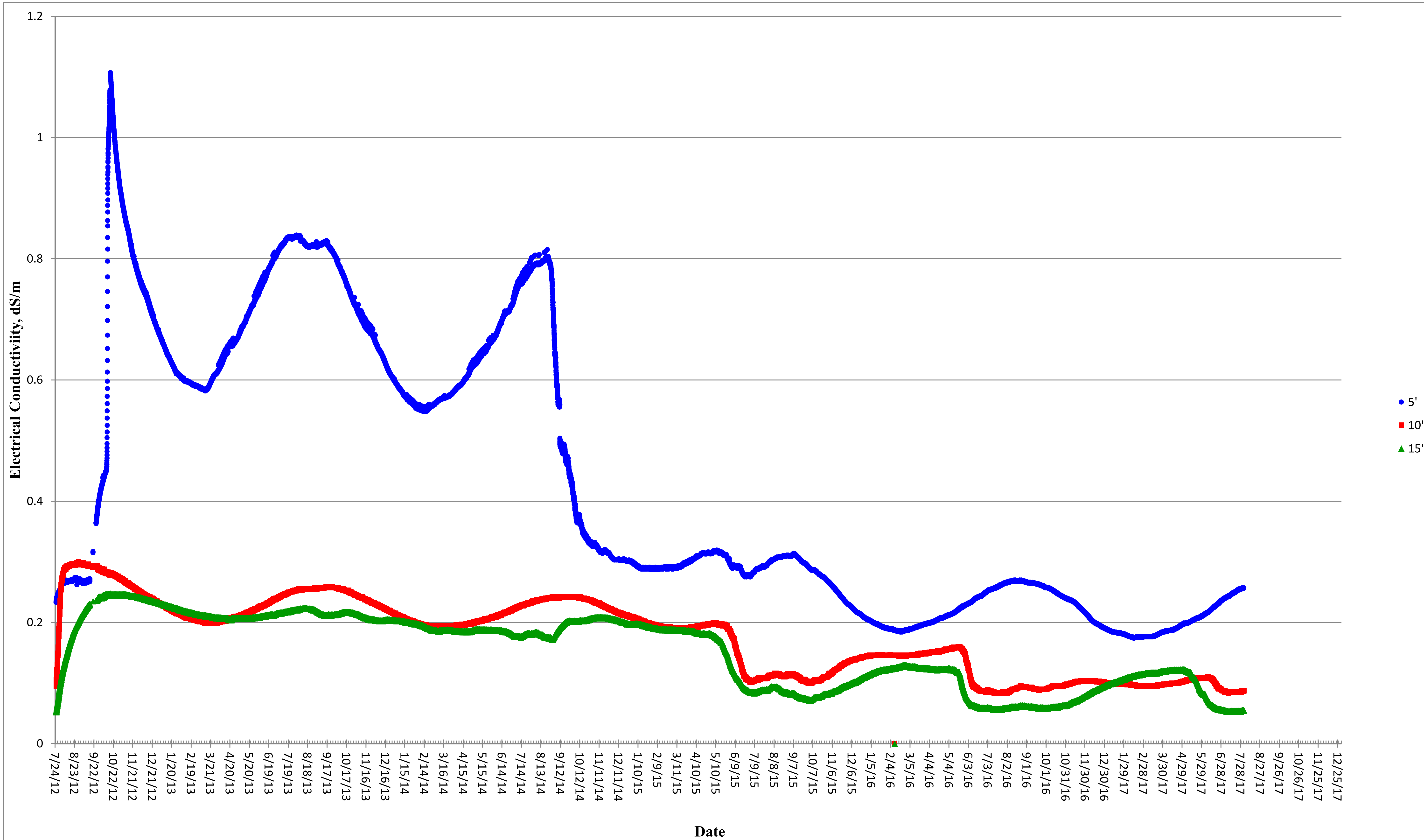


Figure F-3. Electrical Conductivity, Section 34 Flood Area

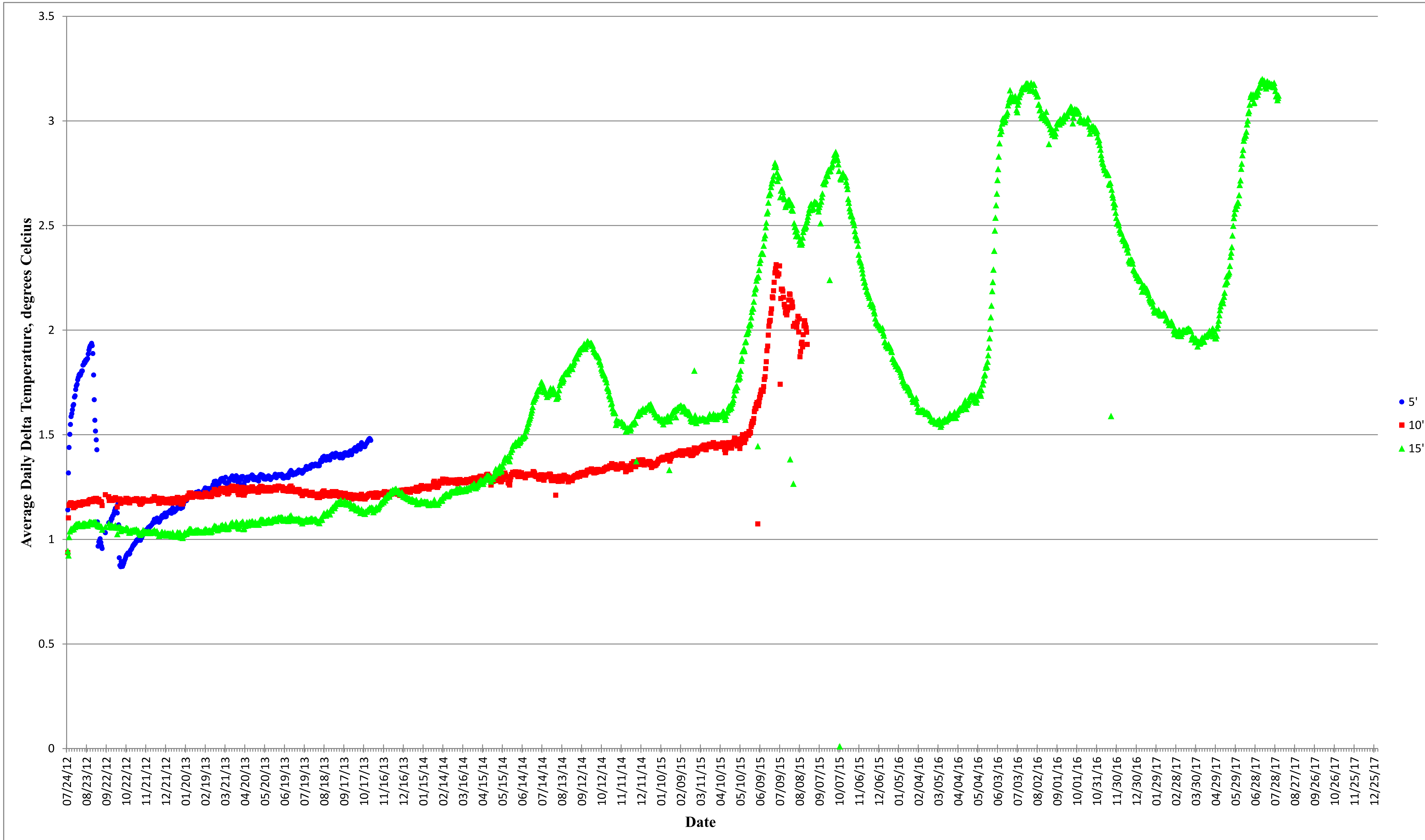


Figure F-4. Average Daily Delta Temperature, Section 34 Flood Area

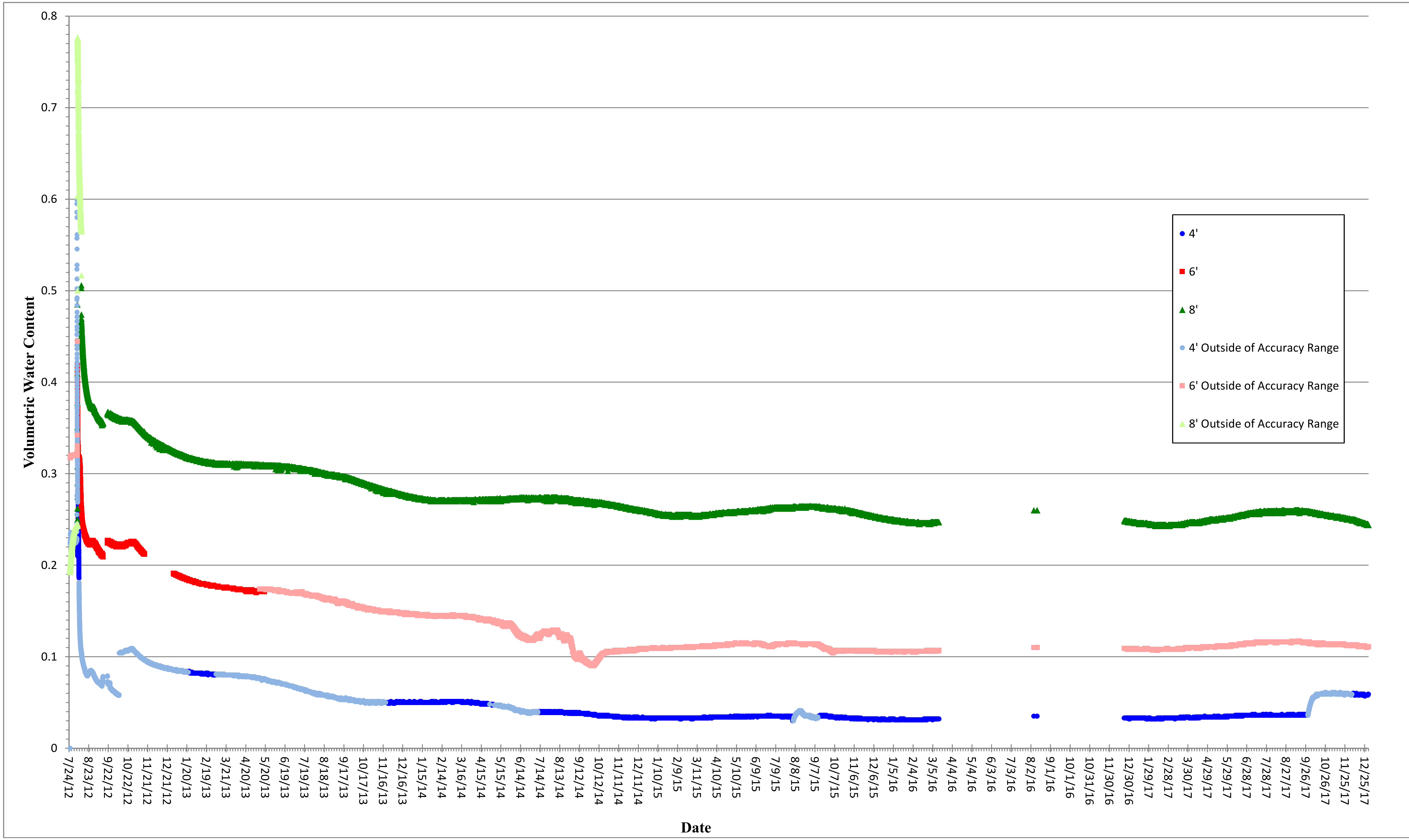


Figure F-5. Volumetric Water Content, Section 28 Center Pivot

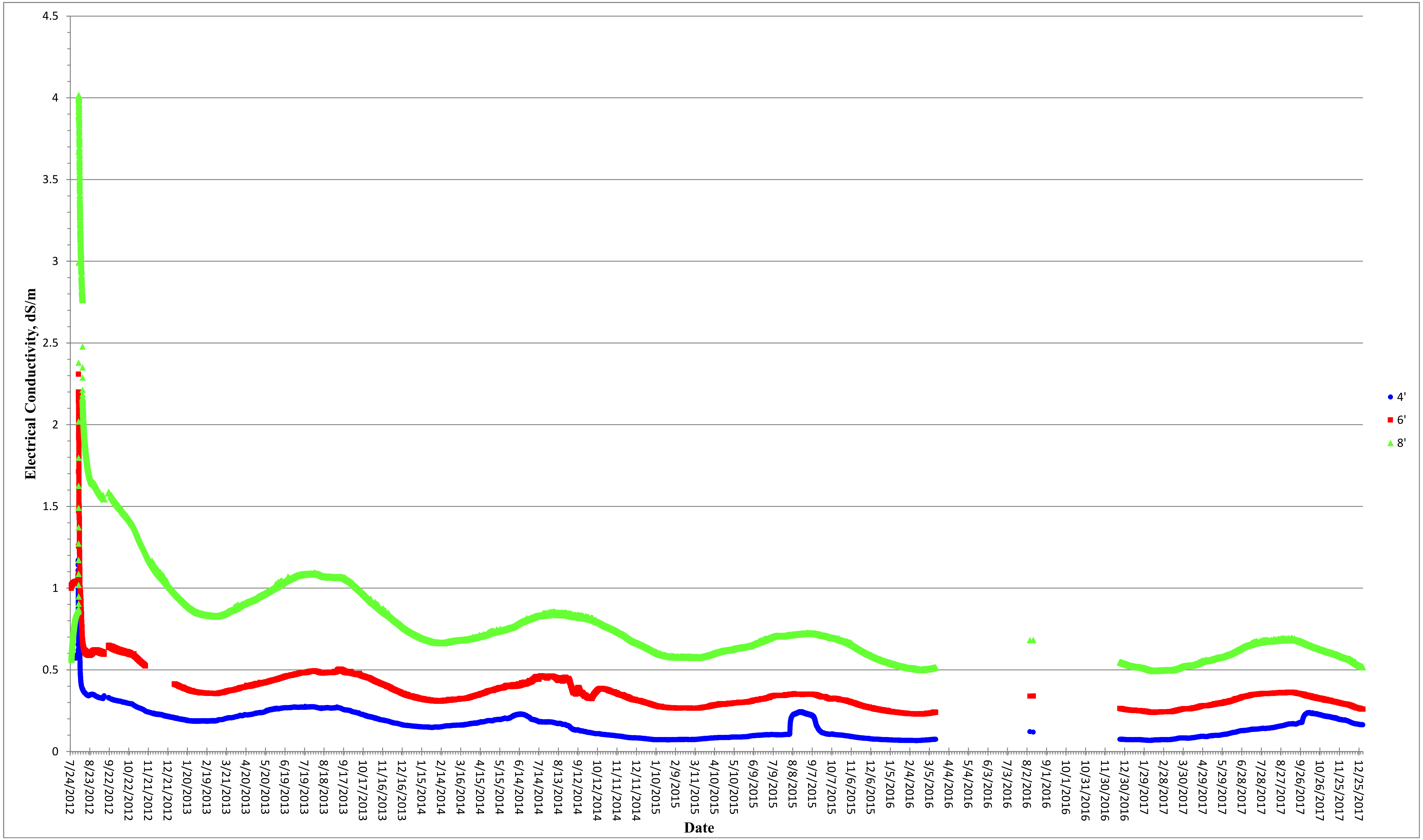


Figure F-6. Electrical Conductivity, Section 28 Center Pivot

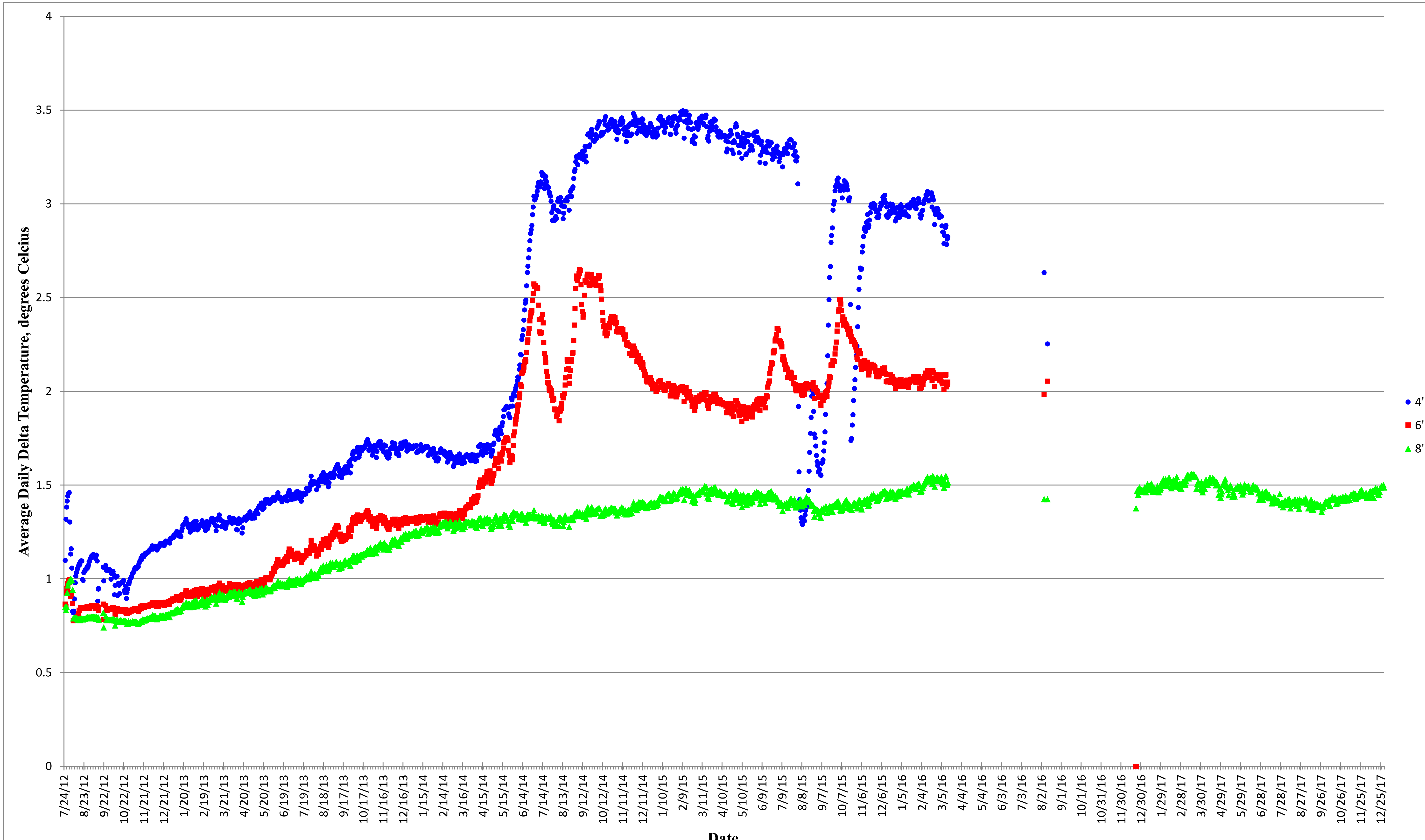


Figure F-7. Average Daily Delta Temperature, Section 28 Center Pivot

APPENDIX G

GRANTS RECLAMATION PROJECT
METEOROLOGICAL DATA SUMMARY

TABLE OF CONTENTS

GRANTS RECLAMATION PROJECT
METEOROLOGICAL DATA

APPENDIX G

Page Number

FIGURES

TABLES

Grants Reclamation Project

Meteorological Data

CY2017

1.0 Introduction

Homestake Mining Company of California (HMC) was issued discharge permit DP-200 in 2014. Specific permit condition 52 requires inclusion of available meteorological data in tabular format within the annual report. The following discussions, figures and tabulation present meteorological data for 2017.

2.0 Wind

The annual wind rose developed from data taken at HMC's meteorological station is presented in Figure G-1. The maximum, minimum and mean monthly wind speeds are presented in Table G-1.

3.0 Precipitation

The monthly precipitation depths are presented in Table G-1. The total measured precipitation depth at the Grant's was 8.83 inches in 2017.

3.0 Temperature and Humidity

The maximum, minimum and mean monthly temperatures are presented in Table G-1. The maximum, minimum and mean monthly relative humidity for 2017 is presented in Table G-1.

4.0 Solar Radiation and Evaporation

The solar radiation measurements are presented in Table G-1. Table G-1 also presents an estimate of monthly potential evaporation based on available meteorological data.

Figure G-1. Grants Site 2017 Annual Wind Rose

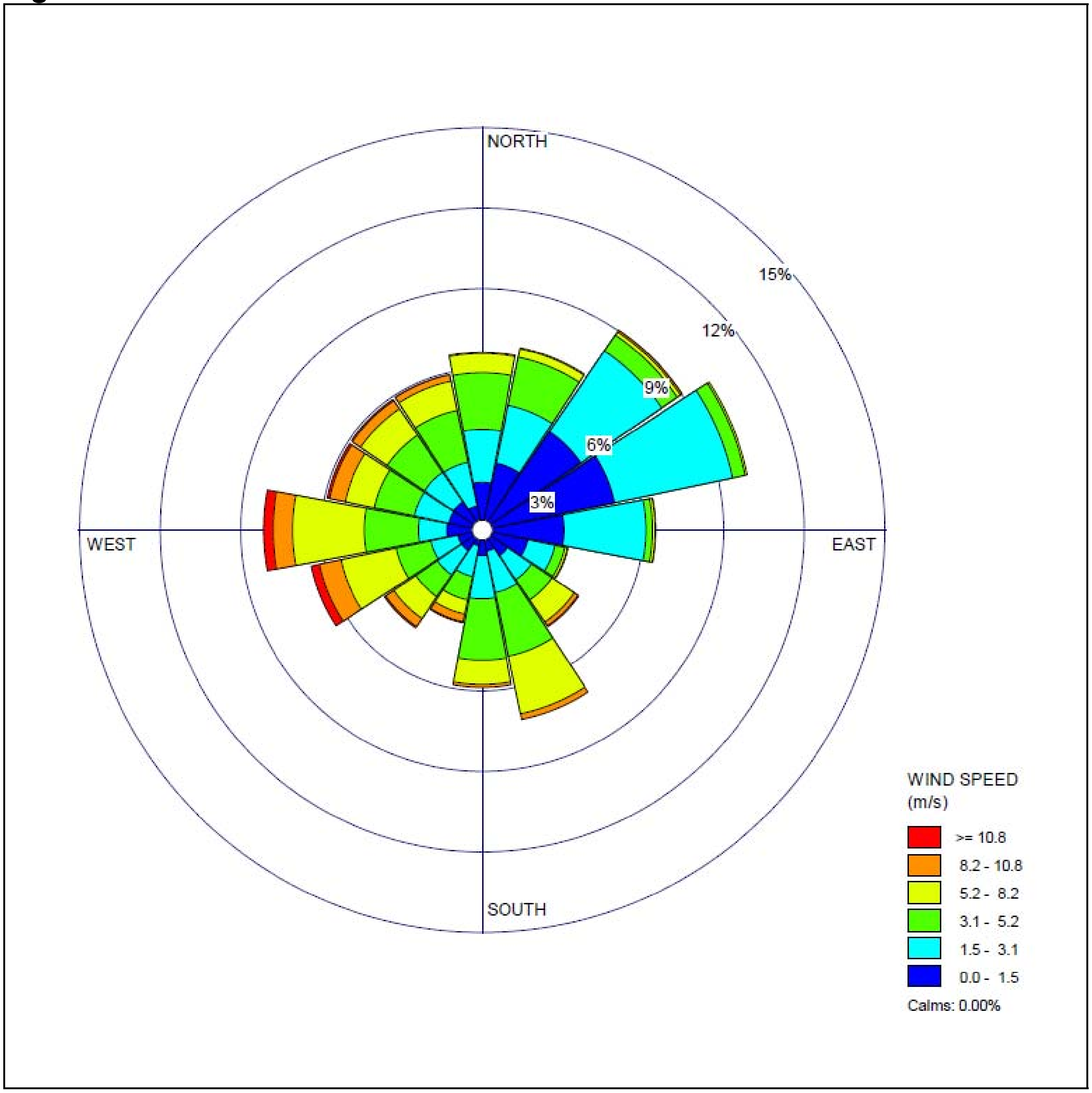


Table G-1. Grants Site 2017 Monthly Meteorological Data Summary

Month	Simple Stats	Wind Speed (m/s)	Air Temperature (c)	Relative Humidity (%)	Monthly Precipitation (in)	Net Solar Radiation (W/m²)	Average Daily Temp (c)	Calculated Heat Index	Evaporation Potential (cc/month)
Jan-17	*max*	13.4	14.6	95.9	1.33	82.4	0.63	0.04	0.11
	min	0.2	-15.7	8.3					
	mean	3.2	0.6	65.4					
Feb-17	*max*	12.5	19.7	95.2	0.48	109.9	3.78	0.66	1.02
	min	0.3	-12.1	9.0					
	mean	3.3	3.8	56.6					
Mar-17	*max*	13.5	23.2	93.0	0.26	160.8	7.56	1.87	2.97
	min	0.3	-11.1	7.1					
	mean	3.5	7.6	37.7					
Apr-17	*max*	15.0	24.5	94.7	0.61	187.6	10.15	2.92	4.57
	min	0.2	-6.2	5.5					
	mean	4.1	10.1	32.9					
May-17	*max*	12.3	27.7	94.2	0.44	208.2	13.72	4.61	7.43
	min	0.2	-2.2	5.6					
	mean	4.1	13.7	33.3					
Jun-17	*max*	12.8	34.3	84.5	0.38	227.5	22.03	9.44	13.56
	min	0.2	2.4	2.5					
	mean	3.4	22.0	22.3					
Jul-17	*max*	11.4	32.2	90.2	1.77	185.3	21.94	9.39	13.70
	min	0.3	9.8	6.3					
	mean	3.1	21.9	44.8					
Aug-17	*max*	10.8	30.1	92.1	0.4	174.3	20.48	8.45	11.83
	min	0.1	7.3	9.5					
	mean	2.8	20.5	42.6					
Sep-17	*max*	10.7	31.0	91.4	2.7	152.5	17.67	6.76	8.74
	min	0.2	0.1	8.0					
	mean	3.2	17.7	39.0					
Oct-17	*max*	10.4	23.6	94.1	0.44	139.6	11.27	3.42	4.65
	min	0.1	-3.3	6.7					
	mean	3.1	11.3	39.2					
Nov-17	*max*	11.8	22.0	81.8	0.01	100.6	7.67	1.91	2.52
	min	0.2	-12.4	6.6					
	mean	2.9	7.7	37.6					
Dec-17	*max*	9.4	16.9	83.6	0.01	87.5	0.34	0.02	0.05
	min	0.1	-14.1	6.1					
	mean	2.3	0.3	35.2					

Net solar radiation = $(1-\alpha) \times SR$

α = albedo (Earth average around 0.35. Typical desert sands average 0.4 and grassses average 0.25. Going with a 0.33.

SR = solar radiation {From HMC met station data]

Evaporation Potential (PET) = $1.6 \times (L/12) \times (N/30) \times (10\,T_a/I)^{\alpha}$

T_a = Average daily temperature (degrees Celsius; if negative then value of 0) for month being calculated.

L = Average day length (in hours) of month being calculated.

N = number of days in month being calculated.

$\alpha = (6.75E\text{-}7) \times I^3 - (7.71E\text{-}5) \times I^2 + (1.792E\text{-}2) \times I + 0.49239$

α =	(a)	(b)	= a × b
	6.75E-07	121238.9	8.18E-02
	7.71E-05	2449.6	1.89E-01
	1.79E-02	49.5	8.87E-01
			0.49239
	α =		1.27E+00

$I = \Sigma$ *(for i = 1 to 12)* $(T_{ai}/5)^{1.514}$ = Heat index which depends on the 12 monthly mean temperatures (T_{ai}).

	I =		49.49