2016 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
CASPER, WYOMING

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FOR HOMESTAKE'S GRANTS PROJECT

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1.0 EXECUTIVE SUMMARY AND INTRODUCTION

1.1 EXECUTIVE SUMMARY

Homestake Mining Company of California manages a ground water 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 ground water collection area (see yellow shaded area on Figure 2.1-1, Page 2.1-16) has been established and is bounded by a down-gradient perimeter of injection/infiltration wells and trenches. Alluvial ground water that flows beneath the tailings enters this collection area. All ground water in the alluvial aquifer that is within the collection area is eventually captured by the collection well system. Once ground-water 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 2016. 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 ground water 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 ground water 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 from June through December during 2016.

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 ground water plume up-gradient of the current hydraulic barrier which assists in aquifer restoration of ground water concentrations to or below site background levels. Selenium concentrations are used to present the progress that has been made in the ground-water 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 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 2016, 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 2016. The area in Section 3 with elevated selenium concentration in 1999 was restored prior to 2016.

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 1.1-9 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. 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 1.1-10 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 1.1-11). 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 2016 uranium concentration patterns are presented in Figure 1.1-12 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 2016.

The uranium concentrations for four different years are presented for the Upper Chinle aquifer in Figures 1.1-13 through 1.1-16. 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 1.1-17 through 1.1-20 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. Collection in the Middle Chinle in 2016 is mainly in the R well field, South Felice Acres and one well west of the West Fault. 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 1.1-21. The collection of water for irrigation from the Lower Chinle reduced the higher concentrations in 1999 (see Figure 1.1-22) to lower levels in 2016 (see Figure 1.1-23).

An average of 748 gallons per minute (gpm) was pumped into the On-site alluvial treated and/or fresh-water injection systems in 2016. An additional 80 gpm of treated and/or fresh water was injected into the On-site Upper and Middle Chinle aquifer systems. An average rate of 417 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 ground water in 2016. Production of significant quantities of R.O. product water started in July of 1999 with consistent operation from 2000 through 2016 except during equipment repair periods.

In 2016, the average collection rate for the On-site alluvial aquifer was maintained at 472 gpm. An additional 19 gpm was pumped from the alluvial aquifer and re-injected within the collection area. The On-Site Upper Chinle aquifer collection program consisted of pumping wells CE2, CE5, CE6, CE7, CE11 and CE12 at an average composite rate of 90 gpm in 2016. The up-gradient alluvial aquifer collection system was not operated in 2016, while average rates of 14 and 5 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 2016 results, shows that sulfate, TDS, chloride, uranium, selenium and molybdenum are still the key constituents of interest at this site. Successful restoration of ground water 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 background water 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 are also two wells in northern Felice Acres and several wells in southern Felice Acres subdivision that contain concentrations of uranium exceeding the site standard. Ground water 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 2016 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. Areas north of the LTP and a small area west of the LTP contains higher nitrate concentrations above the site standard, but these levels are likely natural given their location. Nitrate concentrations in a small area between the LTP and STP is likely caused by tailings seepage. 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. This demonstrates that radium is only a constituent of concern under the LTP.

No vanadium concentrations exceeded the alluvial site standard 2016. Concentrations of this constituent have been adequately restored to below the site standard except for levels near the LTP.

Thorium levels observed in 2016 were less than the site standard except levels in the alluvium immediately under the LTP. 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 2016. 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 2016 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 ground water from this area back to the north toward the tailings piles. Collection from Upper Chinle well CE2 was initiated in 1999 and continued through 2016. Collection in Upper Chinle wells CE5, CE6, CE11 and CE12 was started in 2006. Collection from Upper Chinle well CE7 started in late 2010. This collection is used in conjunction with injection wells CW4R, CW5 and CW25 to restore ground water quality in this area. Injection into well CW25 was started in 2000 and continued through 2016.

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 2016. 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 three more to the north and in Broadview Acres during 2016. 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 2016 for the Upper Chinle mixing zone were less than the nitrate site standard except for a small 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. One Upper Chinle well in Felice Acres exceeded the site standard for radium in the 2016 sampling but this value is considered an outlier. All vanadium and thorium-230 results for the Upper Chinle in 2016 were less than the site standards. This is consistent with the low observed concentrations in the overlying alluvial aquifer.

The direction and rate of ground water flow in the Middle Chinle aquifer in 2016 is very similar to that of past years except for the depression that was developed in western South Felice Acres from the pumping in the second half of 2016. 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 ground water 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 2016.

Water quality in the Middle Chinle aquifer is generally good and all sulfate concentrations are less than the site standards in 2016. All TDS concentrations in the Middle Chinle aquifer are less than the standards except for well in Murray Acres and two wells in Felice Acres that are above the non-mixing zone background value. Chloride concentrations in the Middle Chinle aquifer did not exceed the site standard in 2016.

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 2016 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 2016 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 three wells west of the West Fault but were decreased in 2016. 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 five 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 2016 were at low levels.

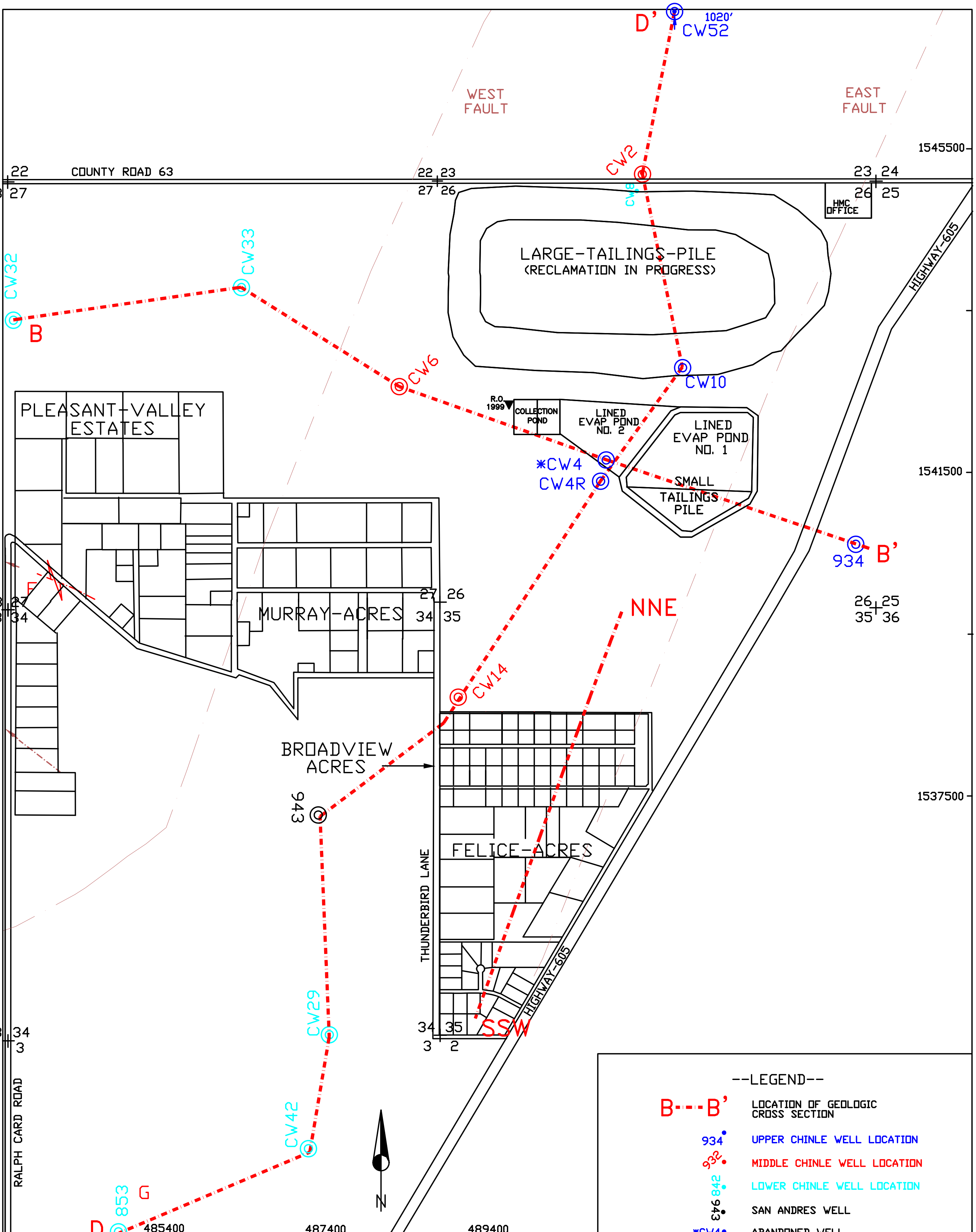

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FIGURE 1.1-1. LOCATIONS OF GEOLOGIC CROSS SECTIONS

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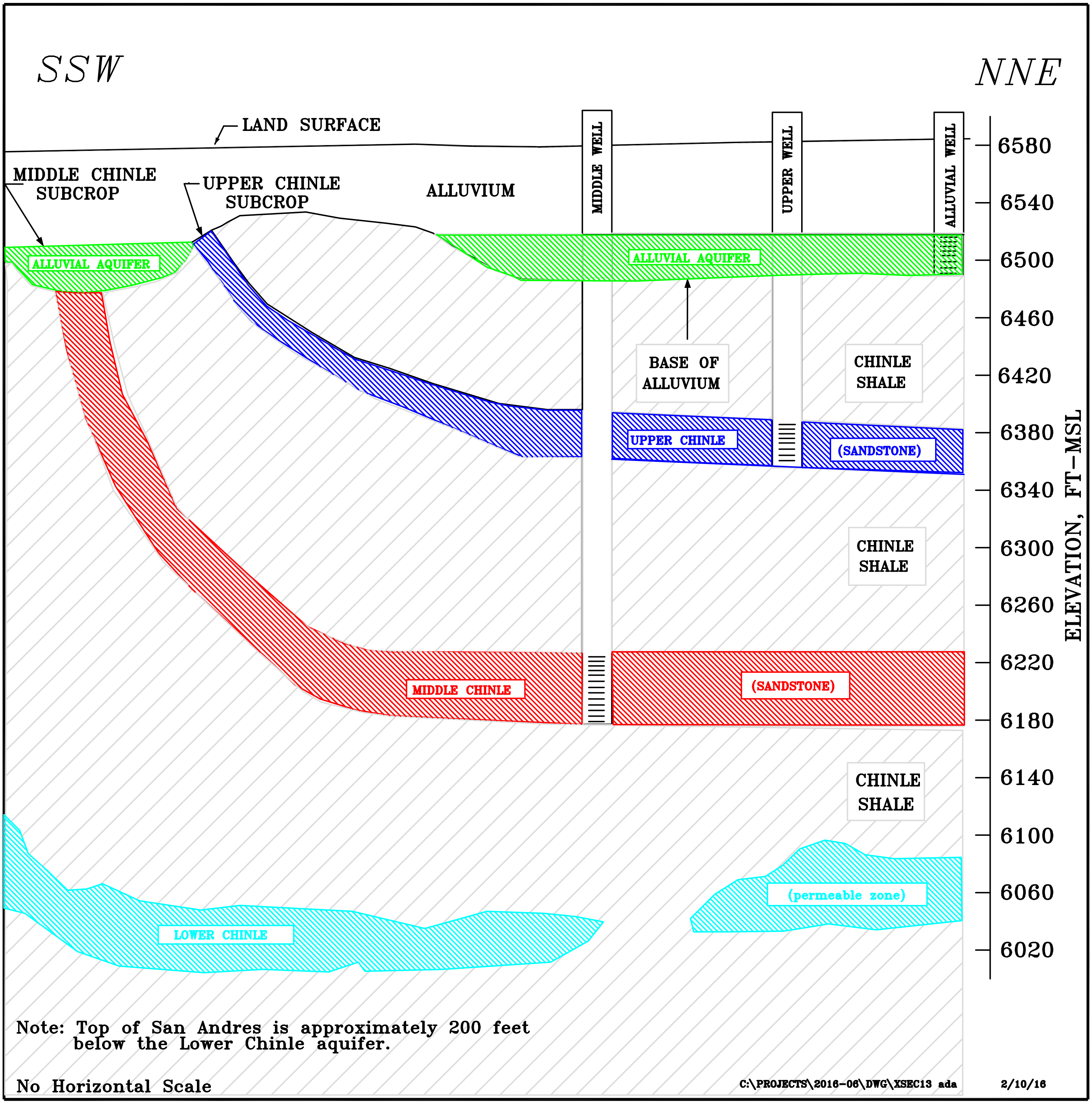
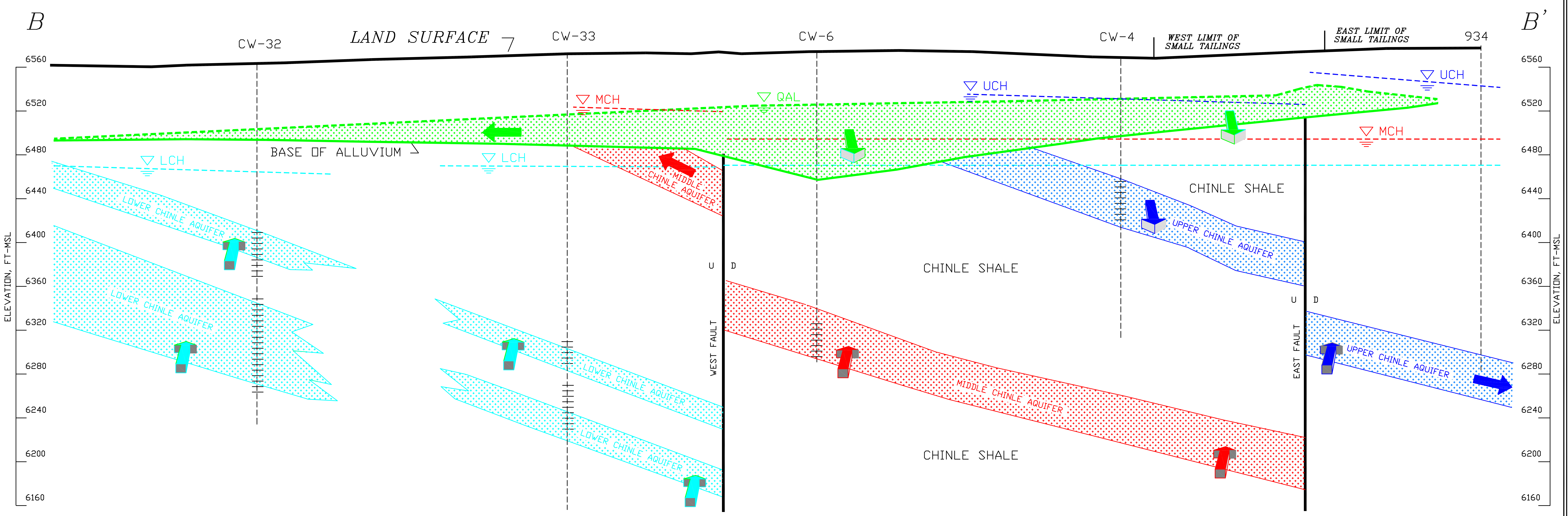


FIGURE 1.1-2. TYPICAL GEOLOGIC CROSS SECTION



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ALLUVIAL
- BASE
- QAL WATER LEVEL ELEVATION (WLE)

UPPLE CHINLE
- LIMITS OF SANDSTONE
- UCH WLE

MIDDLE CHINLE
- LIMITS OF SANDSTONE
- MCH WLE

LOWER CHINLE
- LIMITS OF AQUIFER
- LCH WLE

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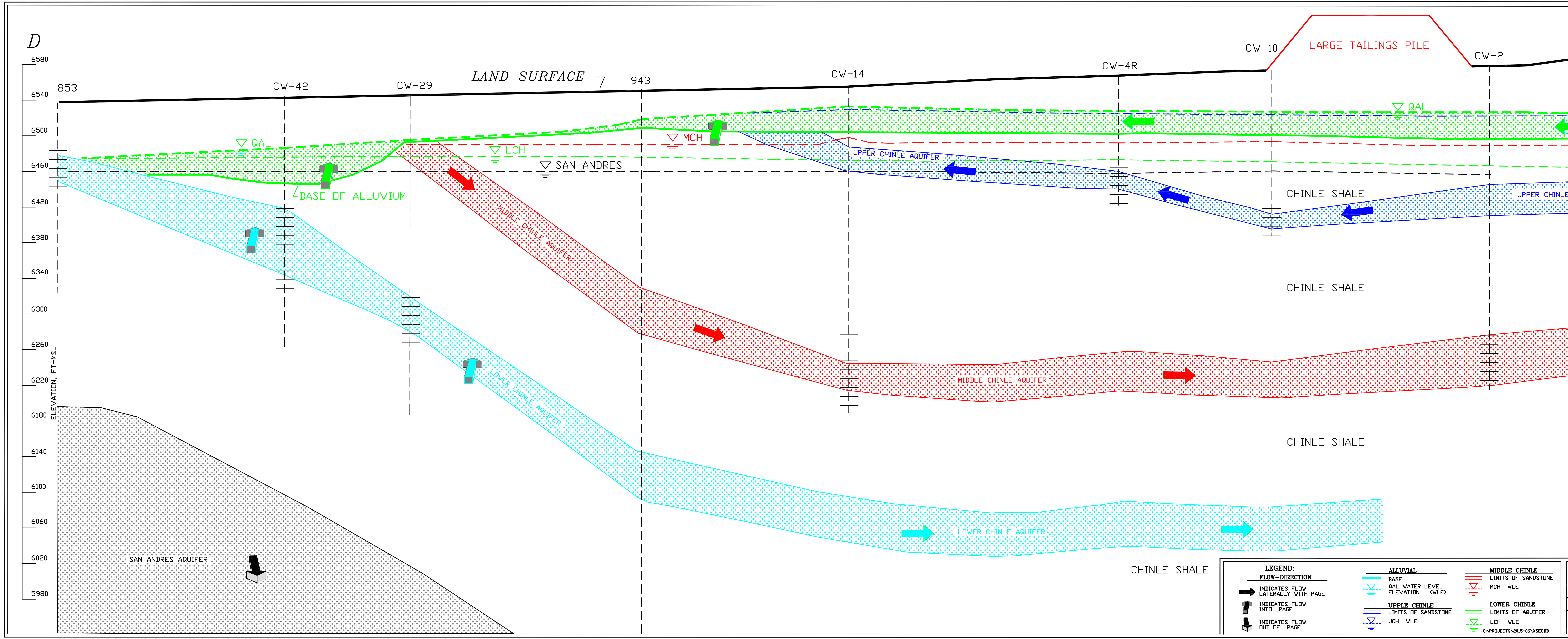
FIGURE 1.1-3. GEOLOGIC CROSS-SECTION B-B' WITH POST RESTORATION FLOW DIRECTION



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

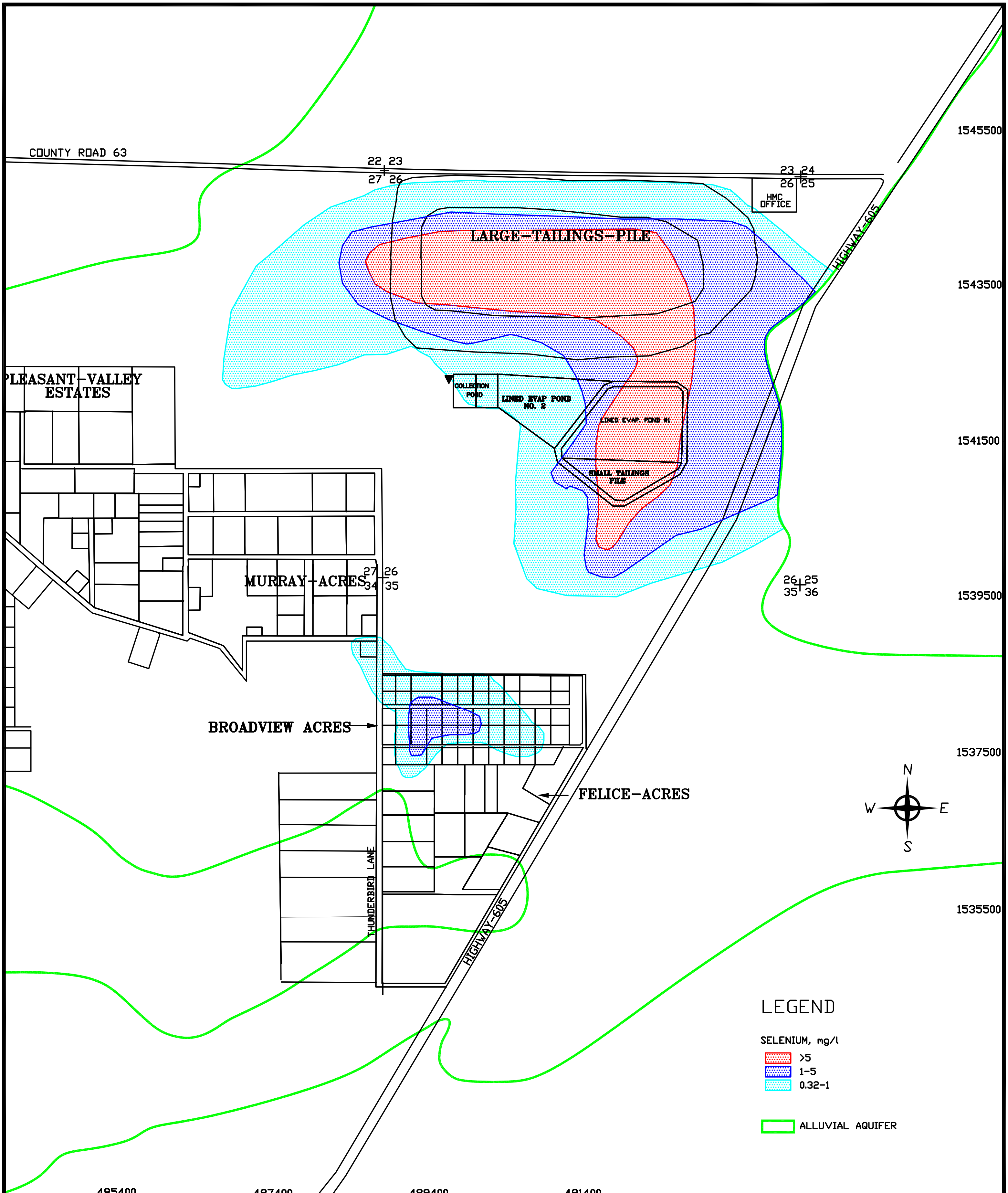

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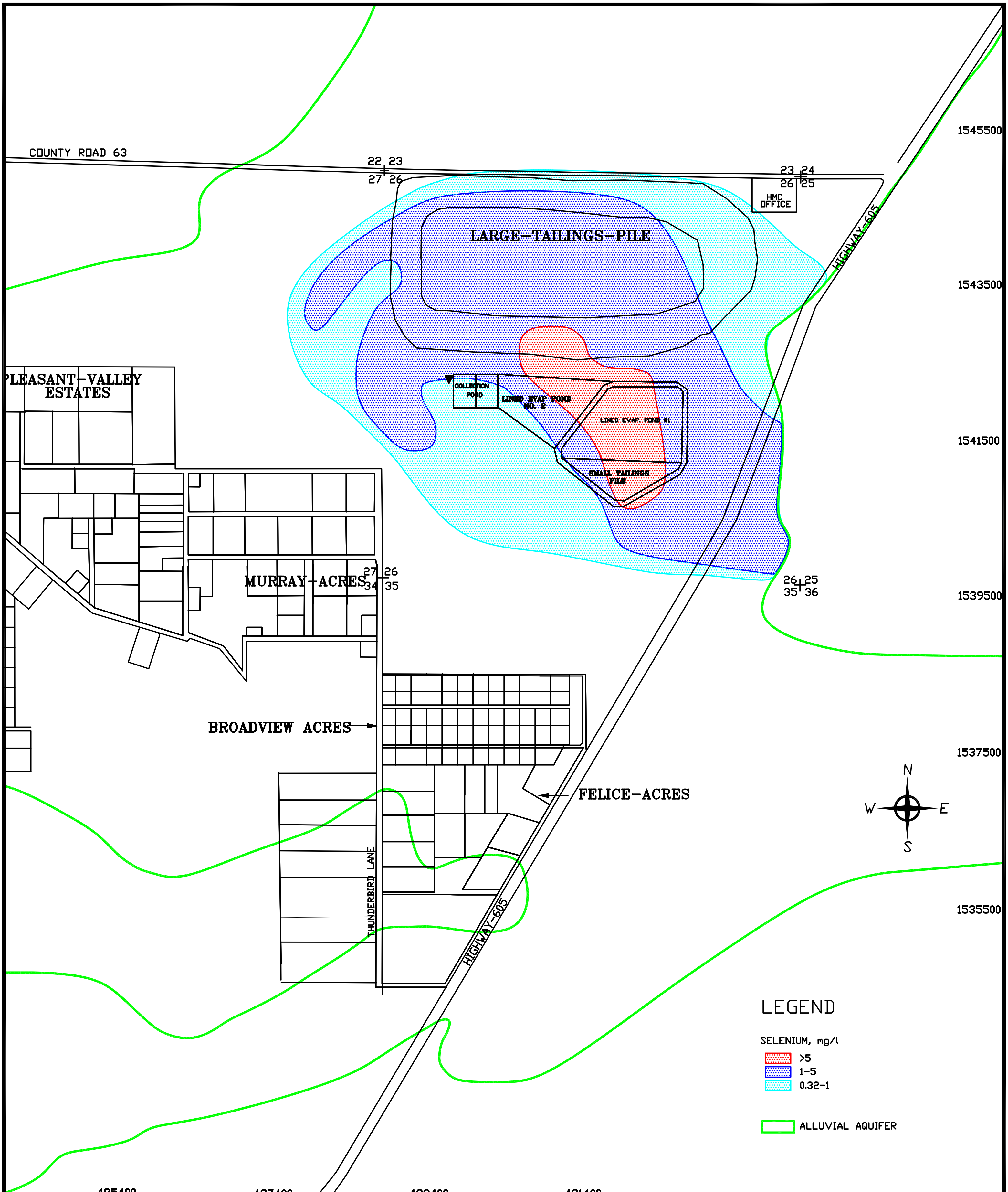
FIGURE 1.1-5. ALLUVIAL SELENIUM CONCENTRATIONS, 1976



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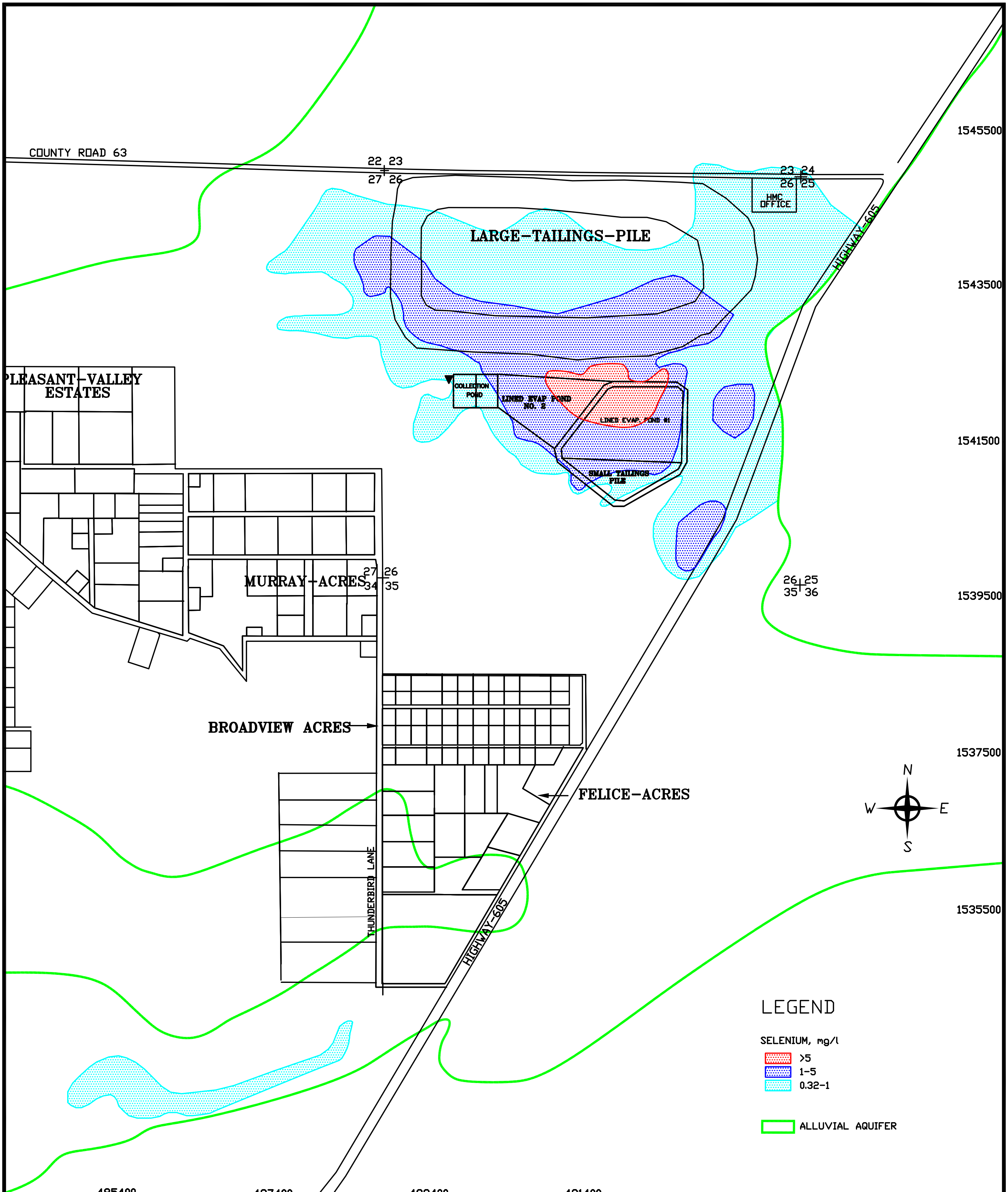

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FIGURE 1.1–7. ALLUVIAL SELENIUM CONCENTRATIONS, 1999

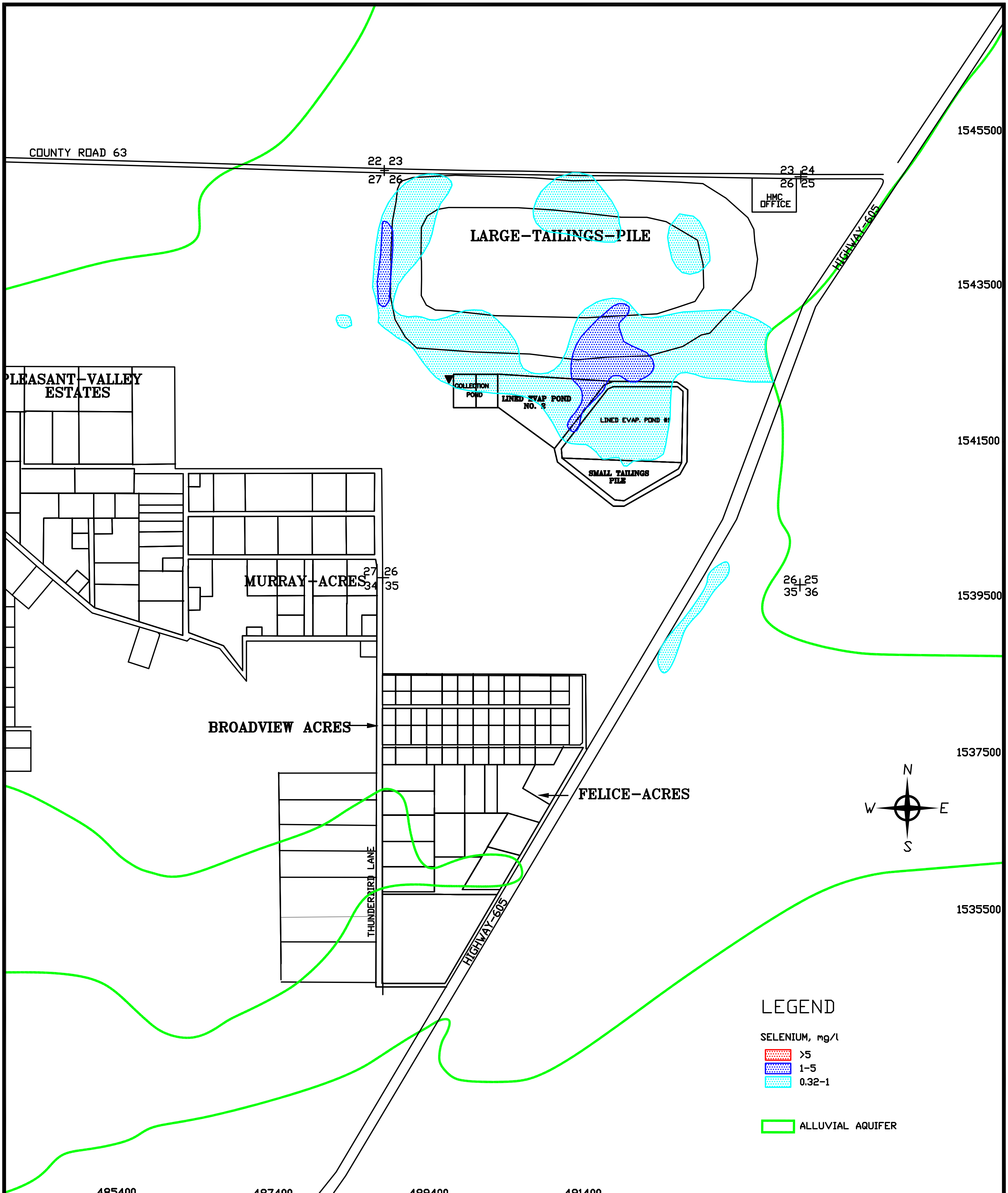

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FIGURE 1.1-8. ALLUVIAL SELENIUM CONCENTRATIONS, 2016

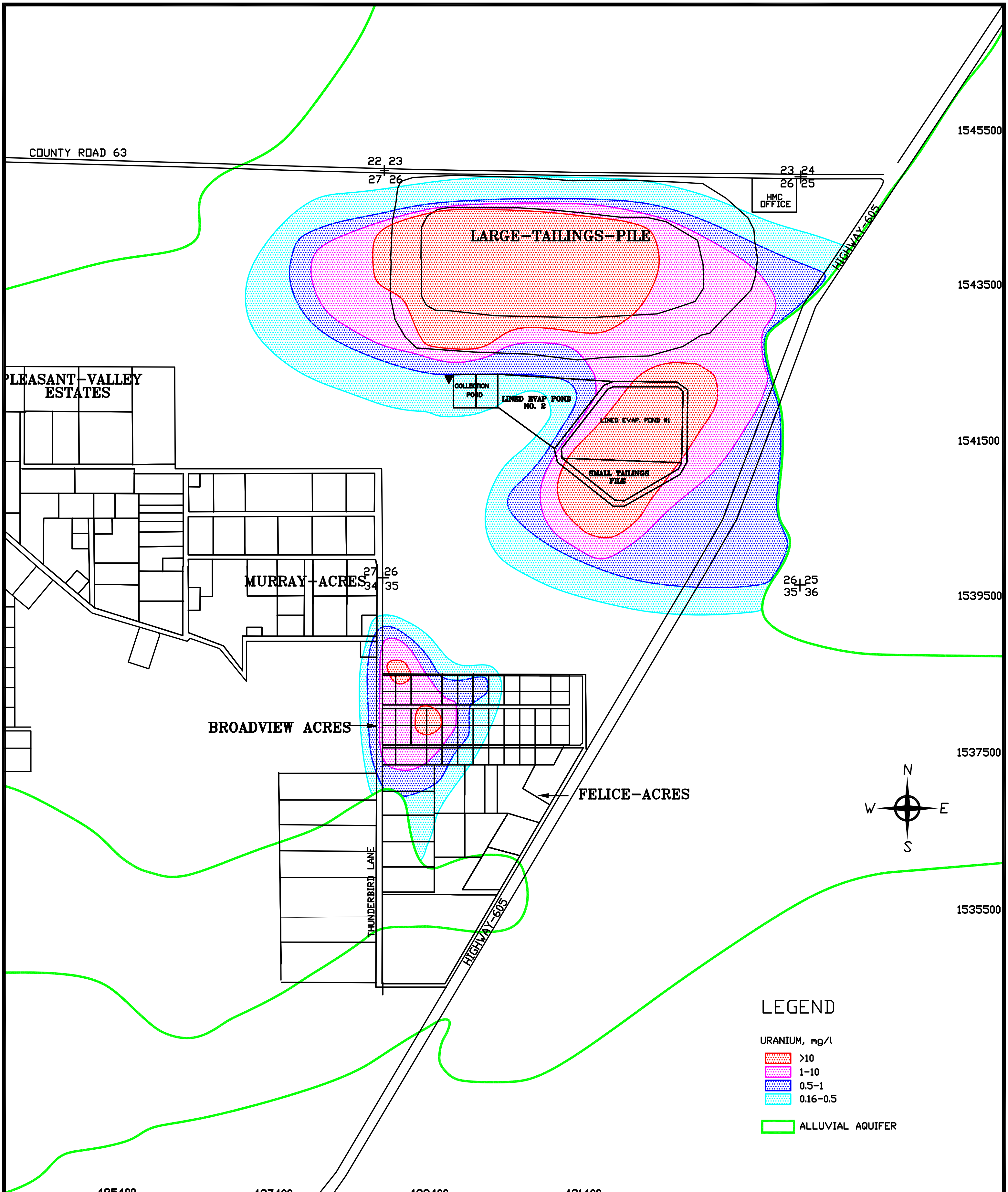

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FIGURE 1.1-9. ALLUVIAL URANIUM CONCENTRATIONS, 1976

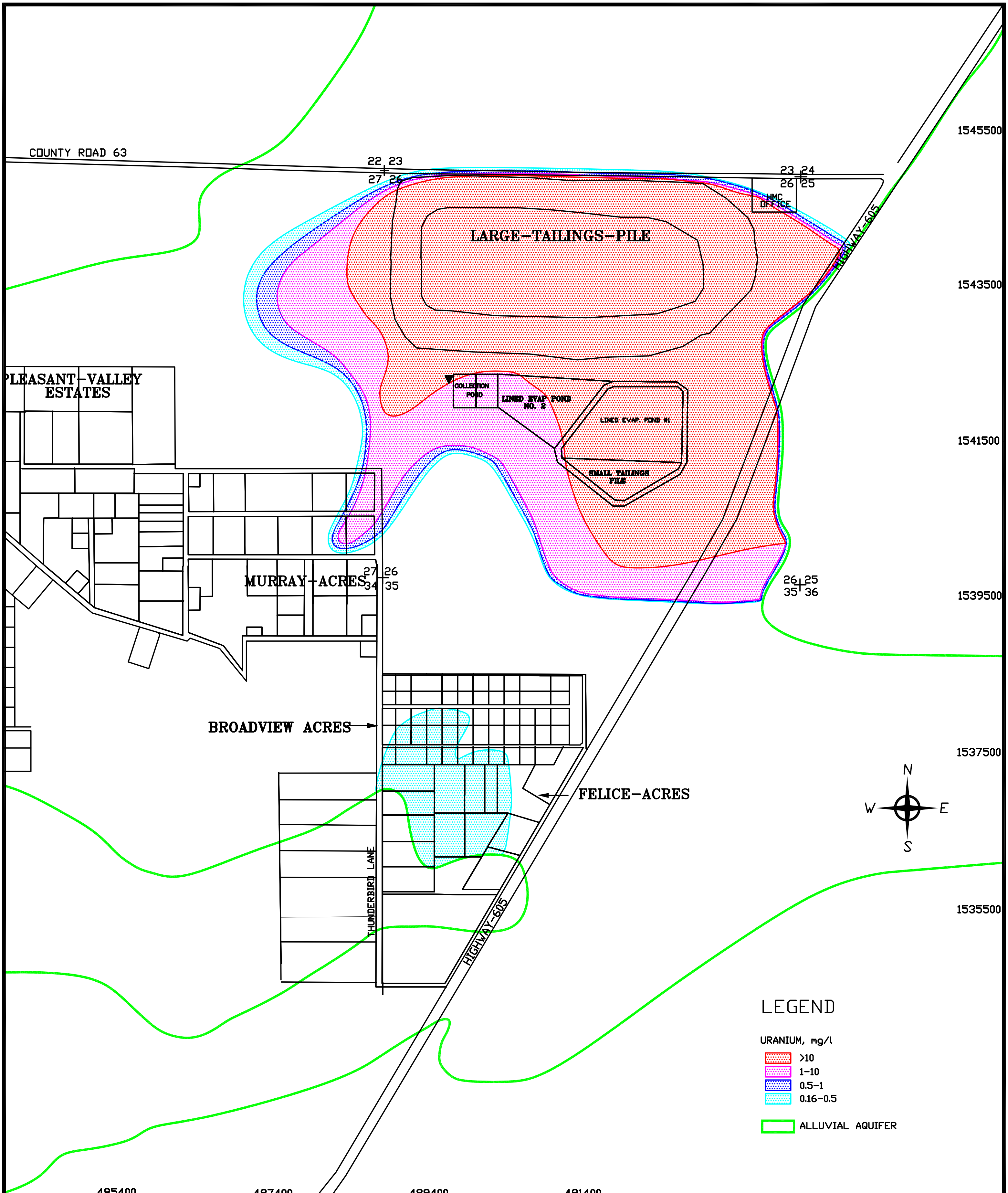

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FIGURE 1.1-10. ALLUVIAL URANIUM CONCENTRATIONS, 1988

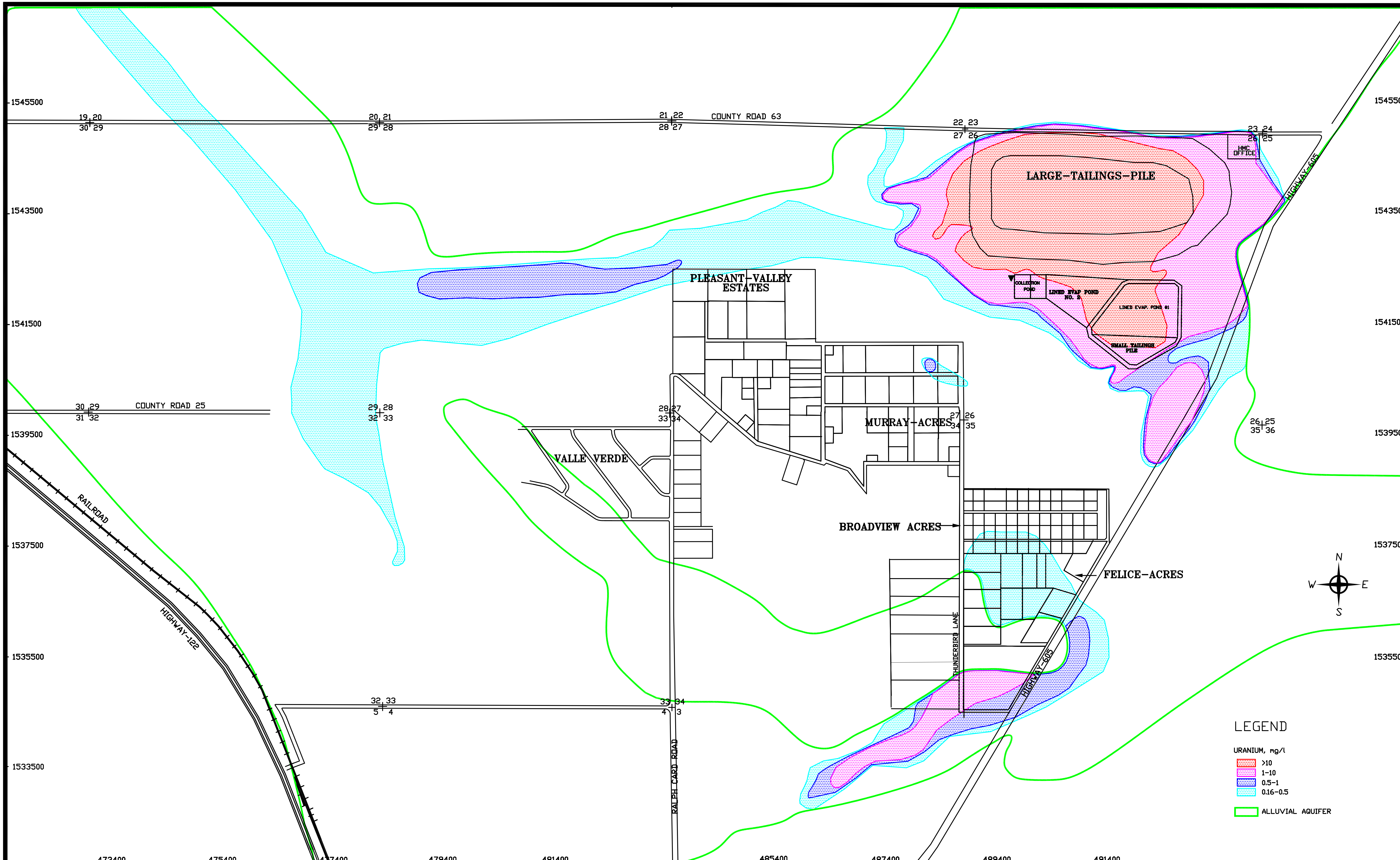

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FIGURE 1.1–11. ALLUVIAL URANIUM CONCENTRATIONS, 1999

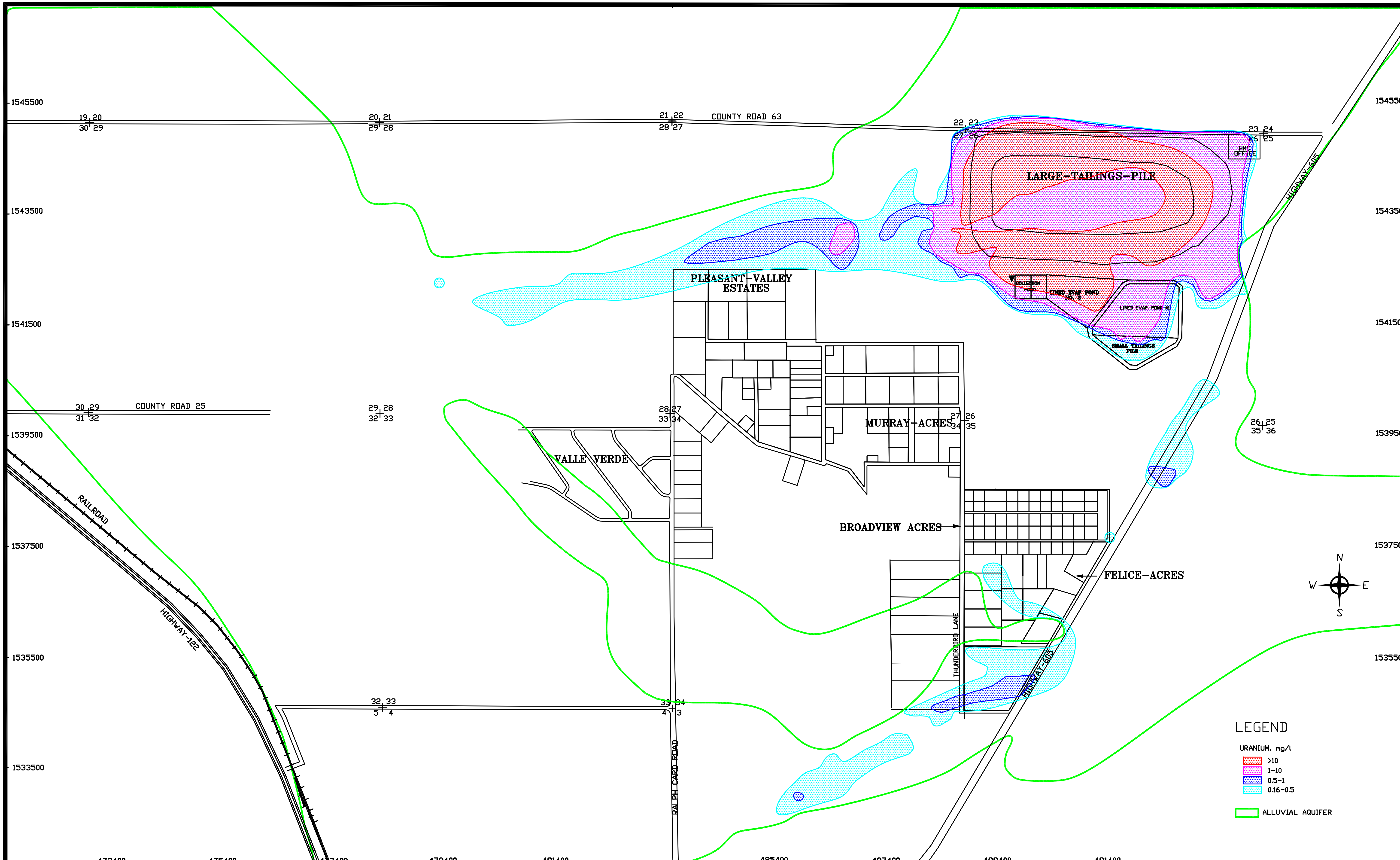

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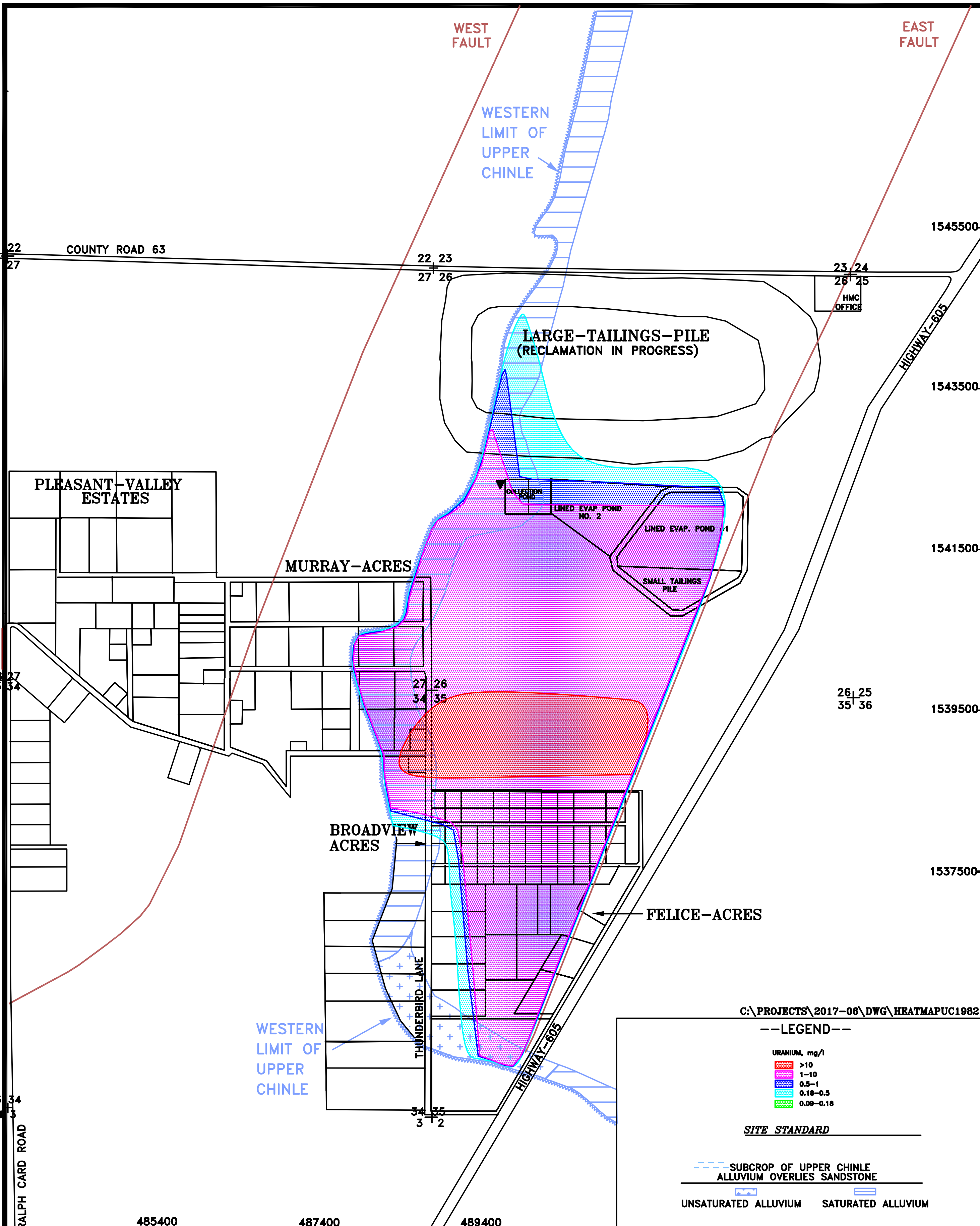
FIGURE 1.1-12. ALLUVIAL URANIUM CONCENTRATIONS, 2016



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W	DATE: 3/6/17
FIGURE 1.1–13. UPPER CHINLE URANIUM CONCENTRATIONS, 1982	SCALE: 1"= 1600'
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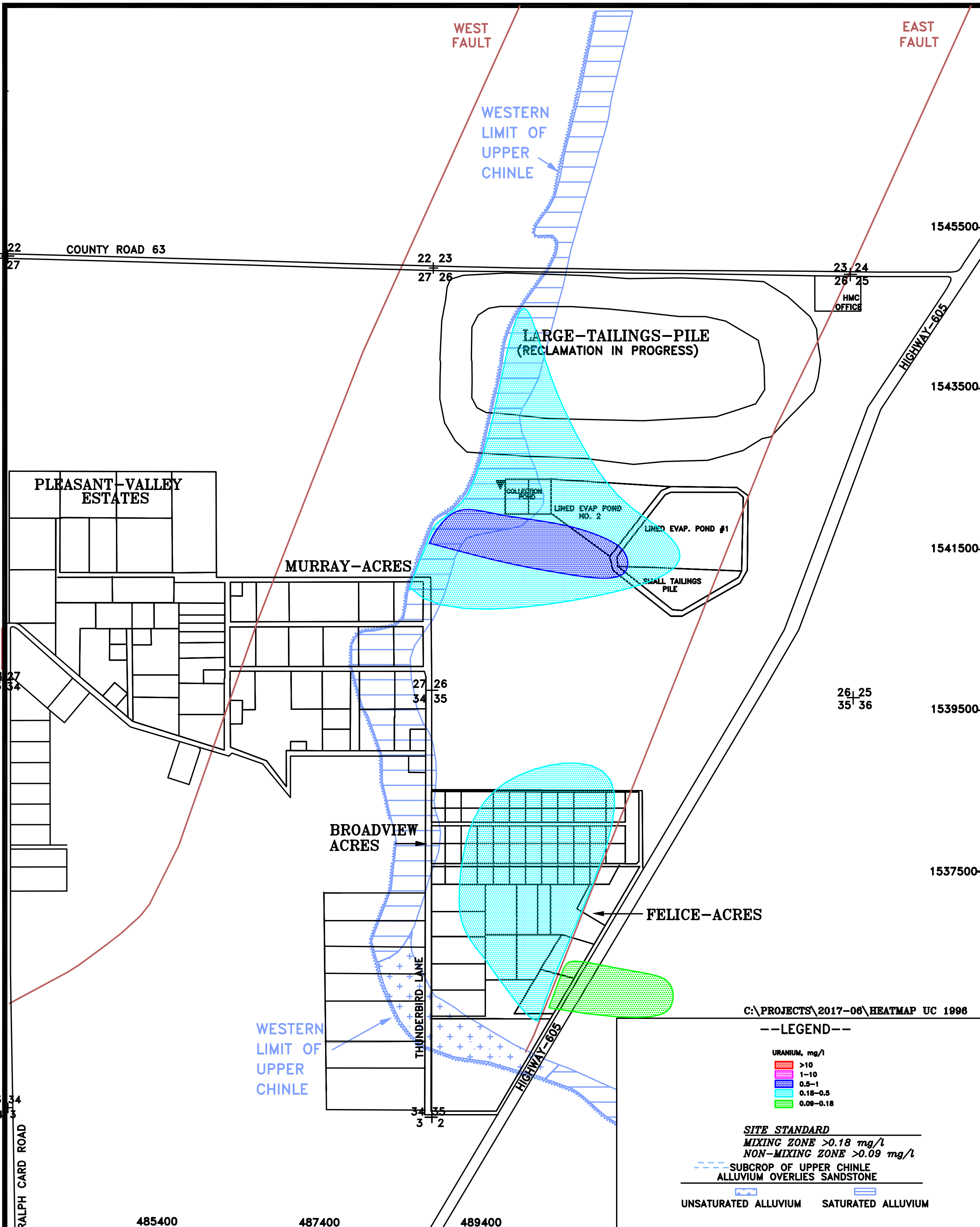

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FIGURE 1.1-14. UPPER CHINLE URANIUM CONCENTRATIONS, 1996

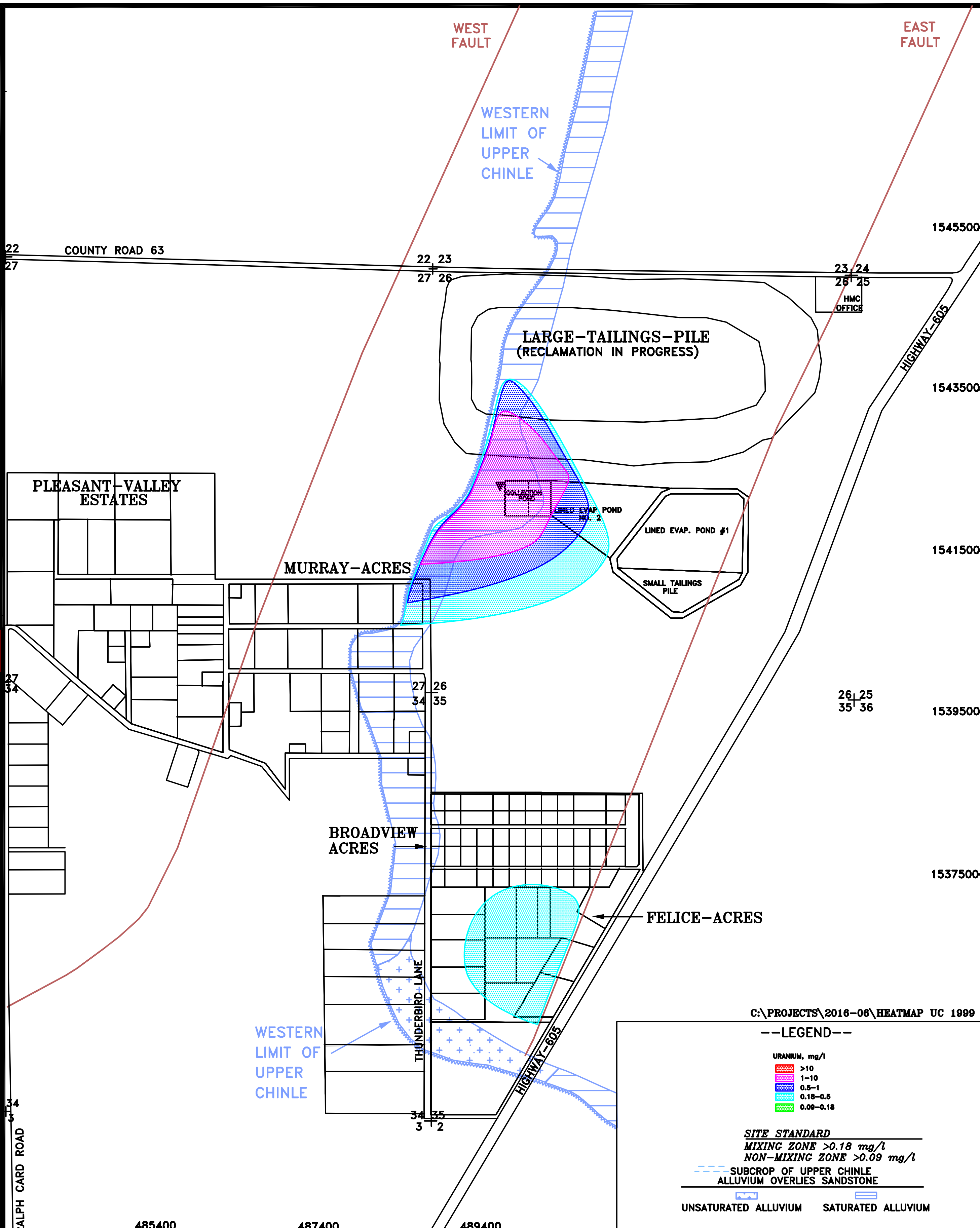

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FIGURE 1.1-15. UPPER CHINLE URANIUM CONCENTRATIONS, 1999

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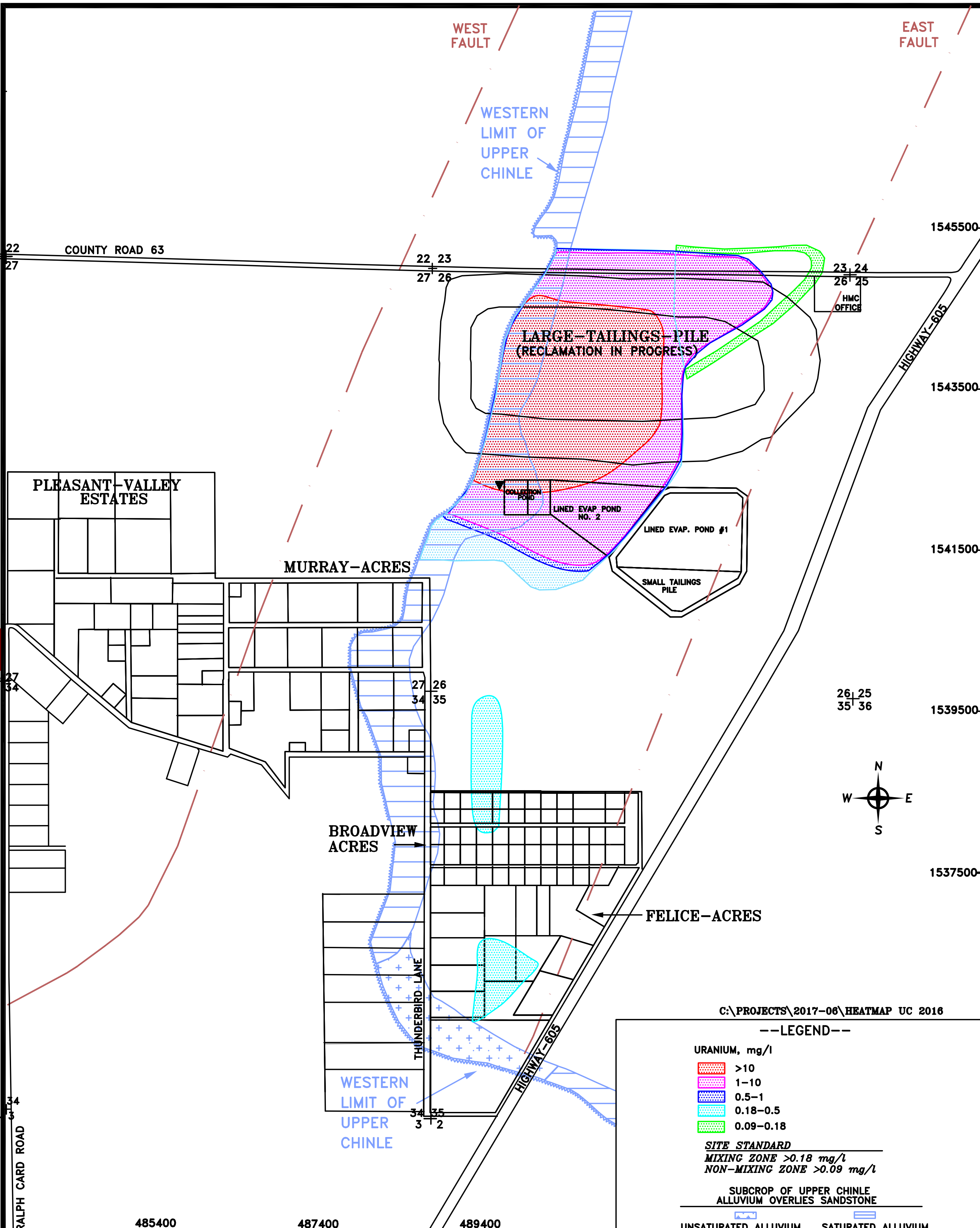

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FIGURE 1.1–16. UPPER CHINLE URANIUM CONCENTRATIONS, 2016

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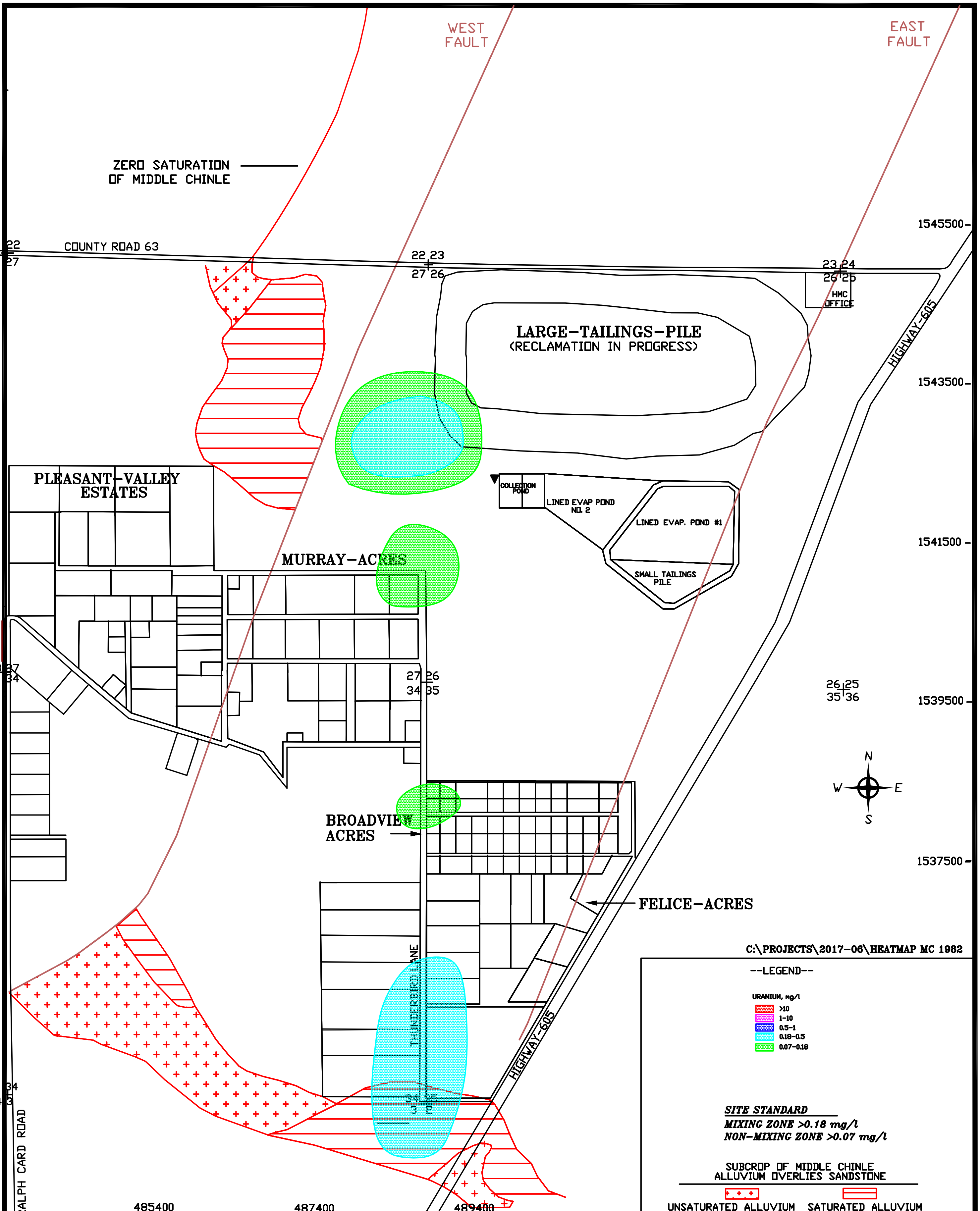
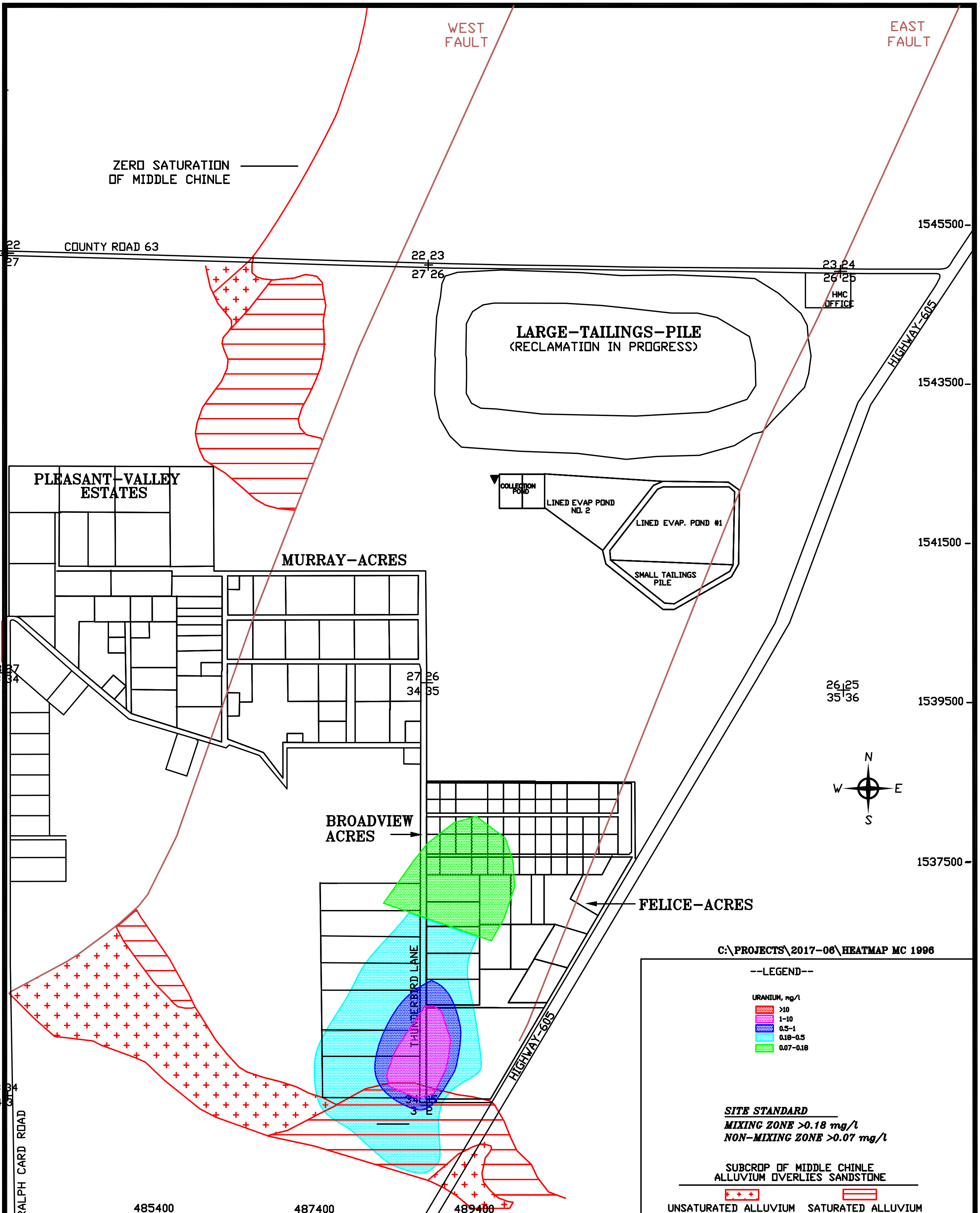


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/7/17
FIGURE 1.1-17. MIDDLE CHINLE URANIUM CONCENTRATIONS 1982	SCALE: 1"= 1600'
	PAGE: 1.1-26

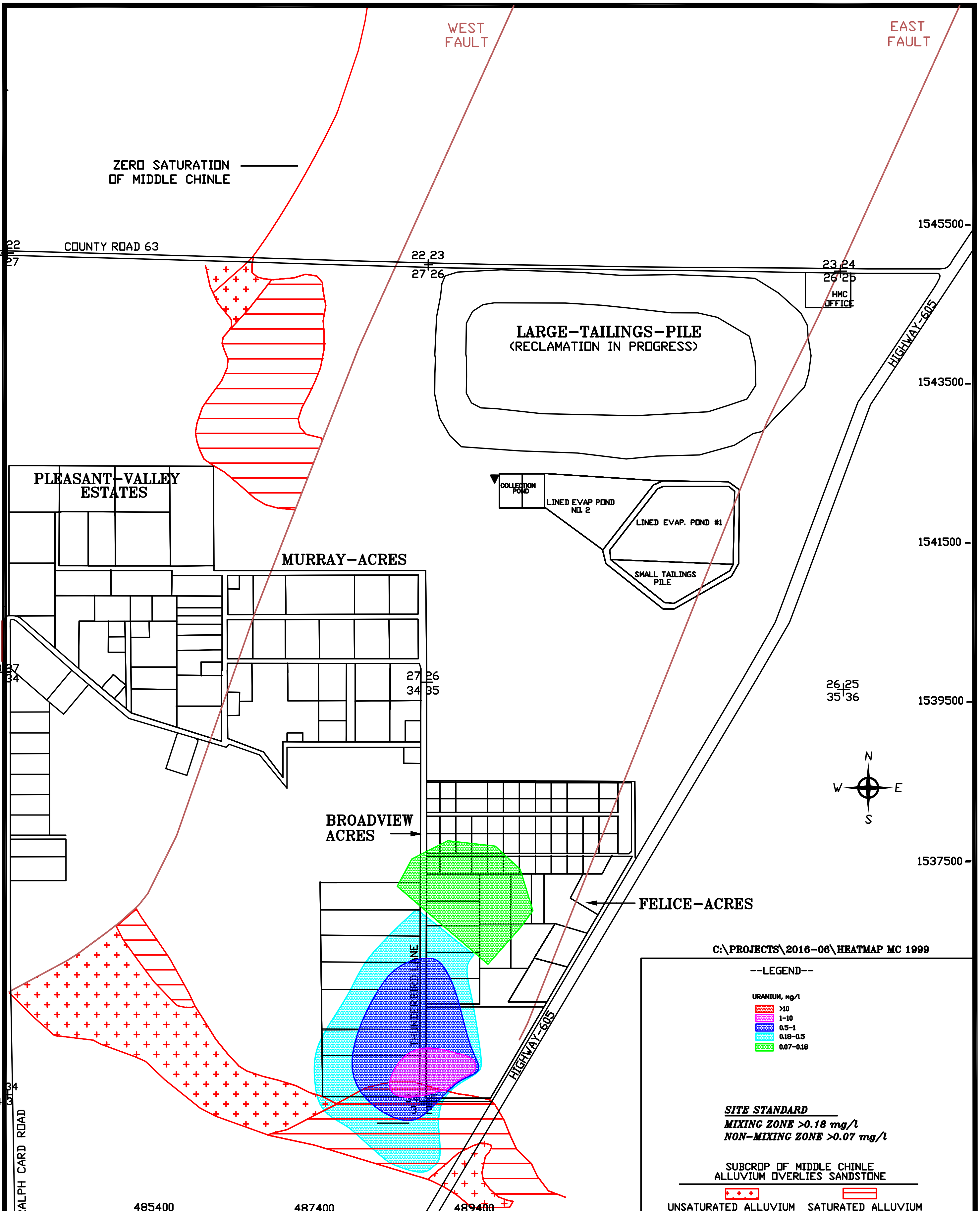


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/7/17

FIGURE 1.1-18. MIDDLE CHINLE URANIUM CONCENTRATIONS 1996

SCALE: 1"= 1600'

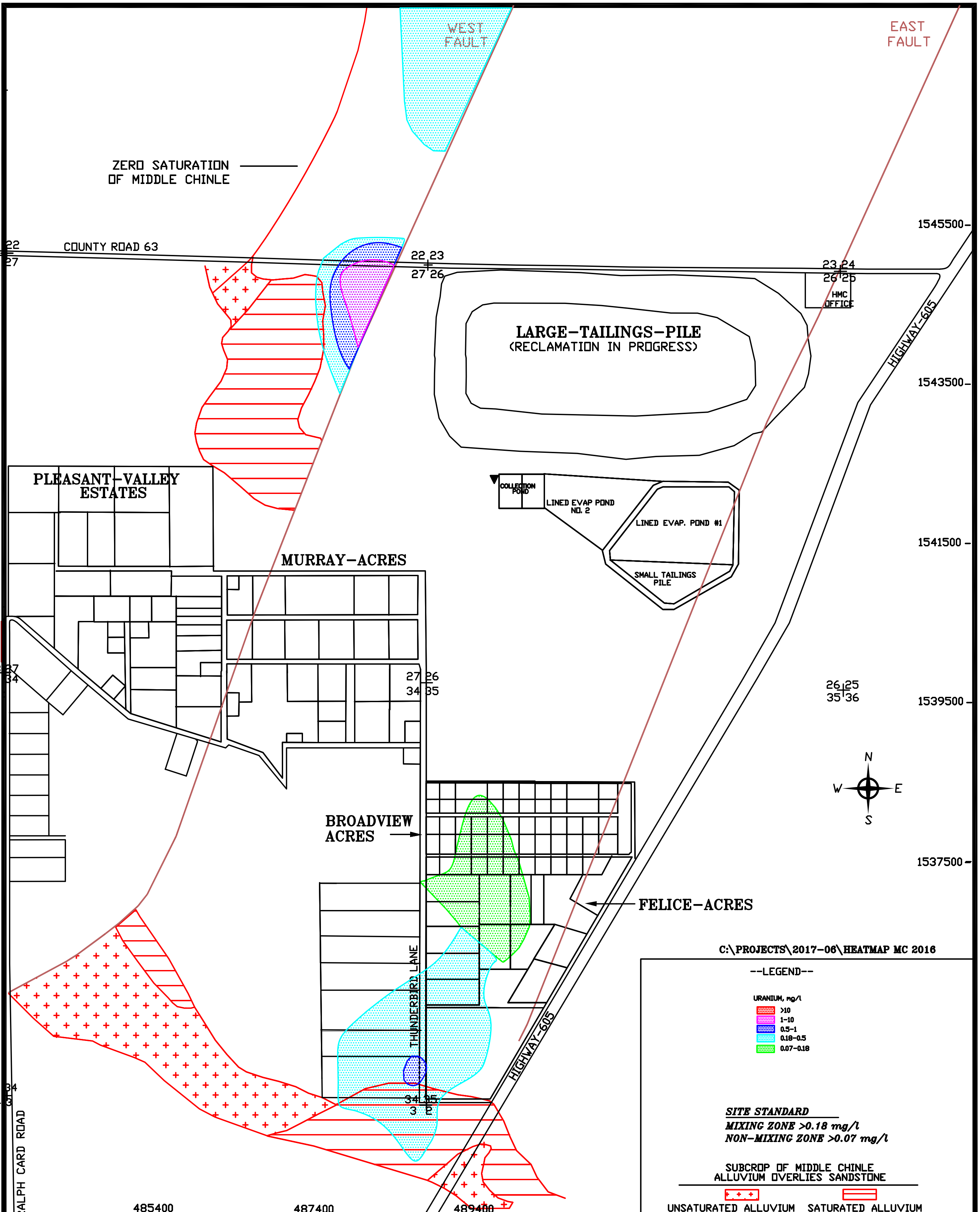


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

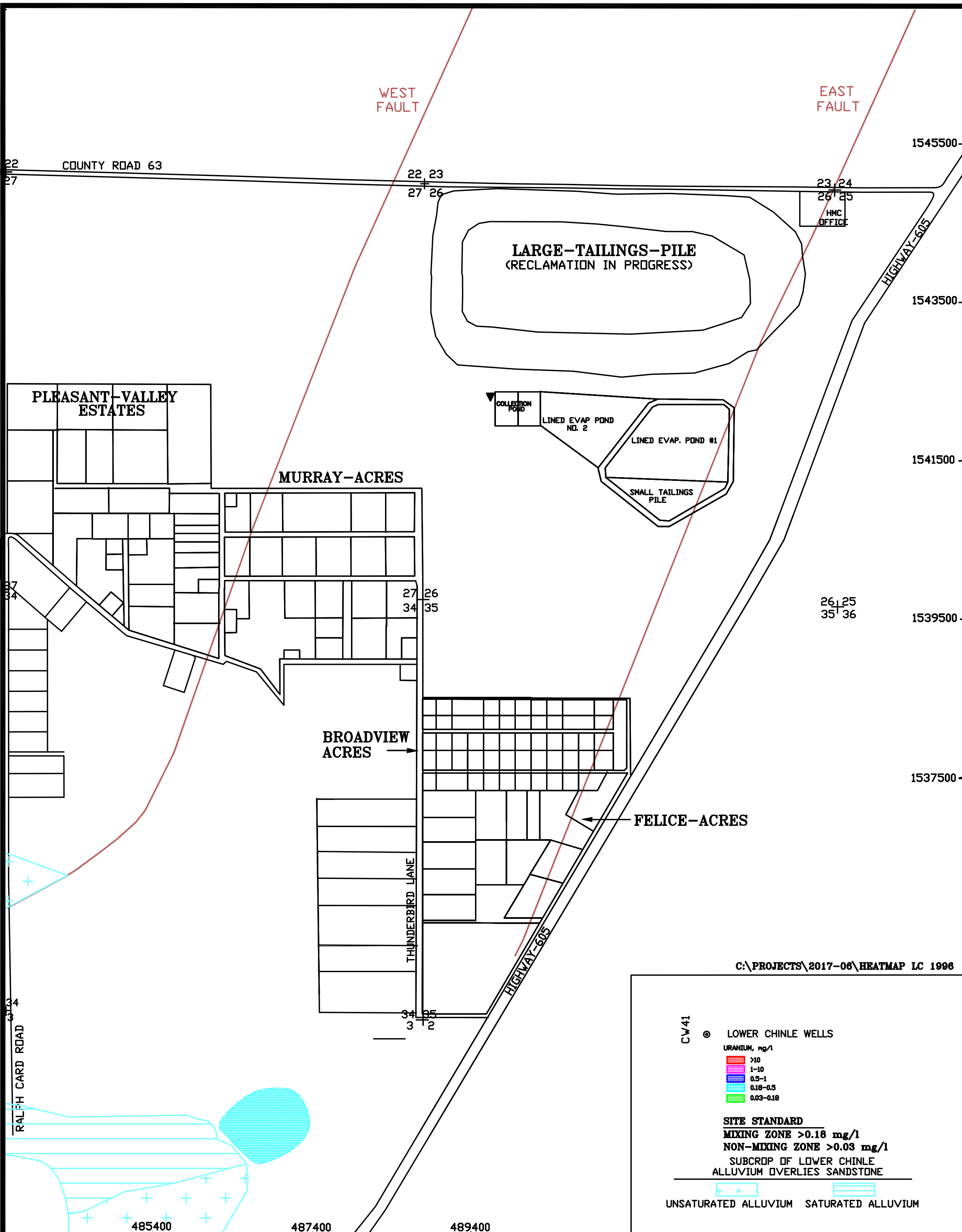
DATE: 3/7/17

FIGURE 1.1-19. MIDDLE CHINLE URANIUM CONCENTRATIONS 1999

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 3/7/17**
FIGURE 1.1-20. MIDDLE CHINLE URANIUM CONCENTRATIONS 2016	**SCALE: 1"= 1600'**
	PAGE: 1.1-29

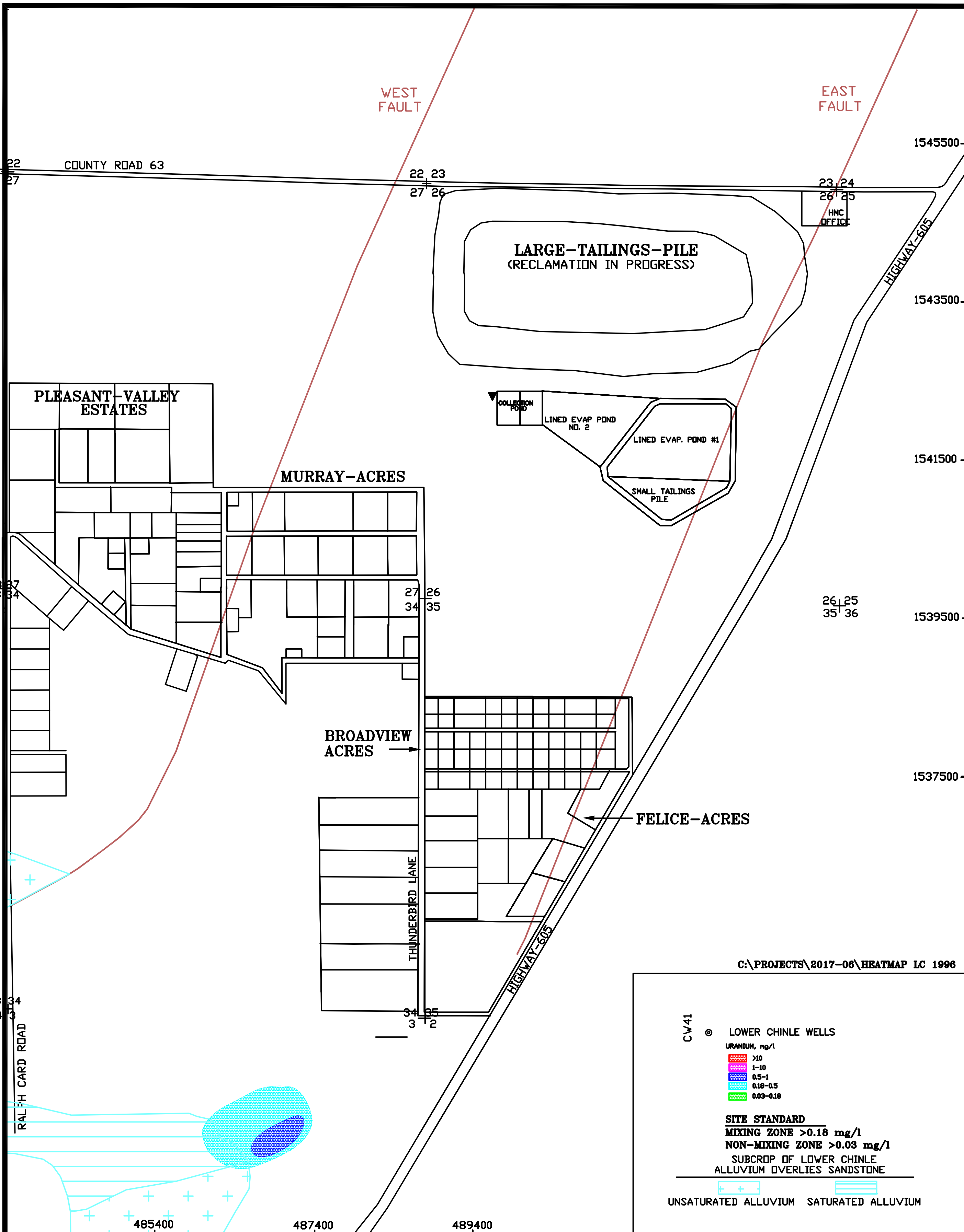


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-21. LOWER CHINLE URANIUM CONCENTRATIONS 1996

DATE: 3/7/17

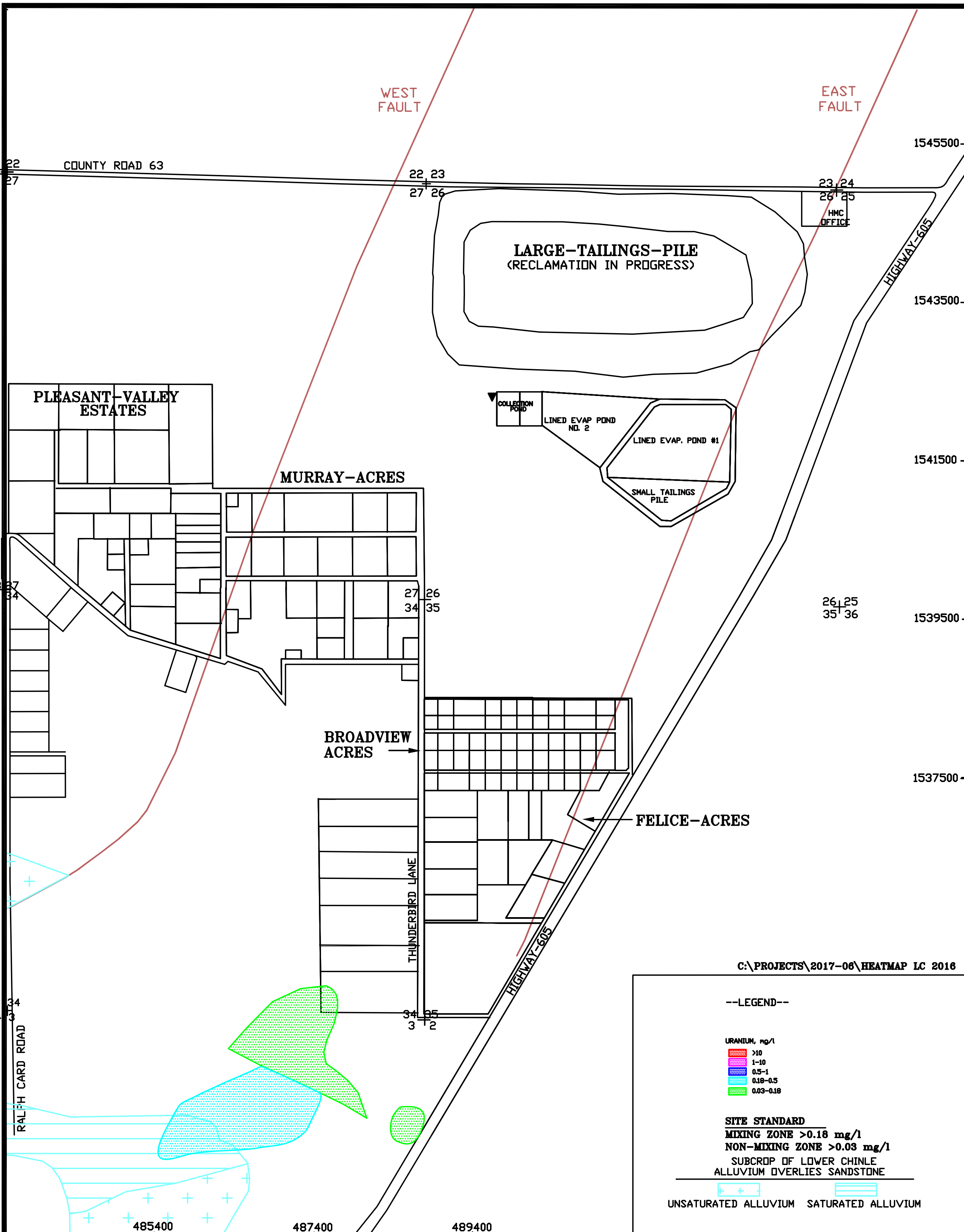
SCALE: 1"= 1600'



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

FIGURE 1.1-22. LOWER CHINLE URANIUM CONCENTRATIONS 1999

DATE: 3/7/17
SCALE: 1"= 1600'
PAGE: 1.1-31



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 3/7/17
FIGURE 1.1-23. LOWER CHINLE URANIUM CONCENTRATIONS 2016	SCALE: 1"= 1600'
	PAGE: 1.1-32

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 2016 annual ground water 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 ground water 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 ground-water 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 ground water west of the project site is included in the 1995 through 2016 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 2016 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

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 and 2016.

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 therefore is not presented in this report as it has been in the past. 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 2016.

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

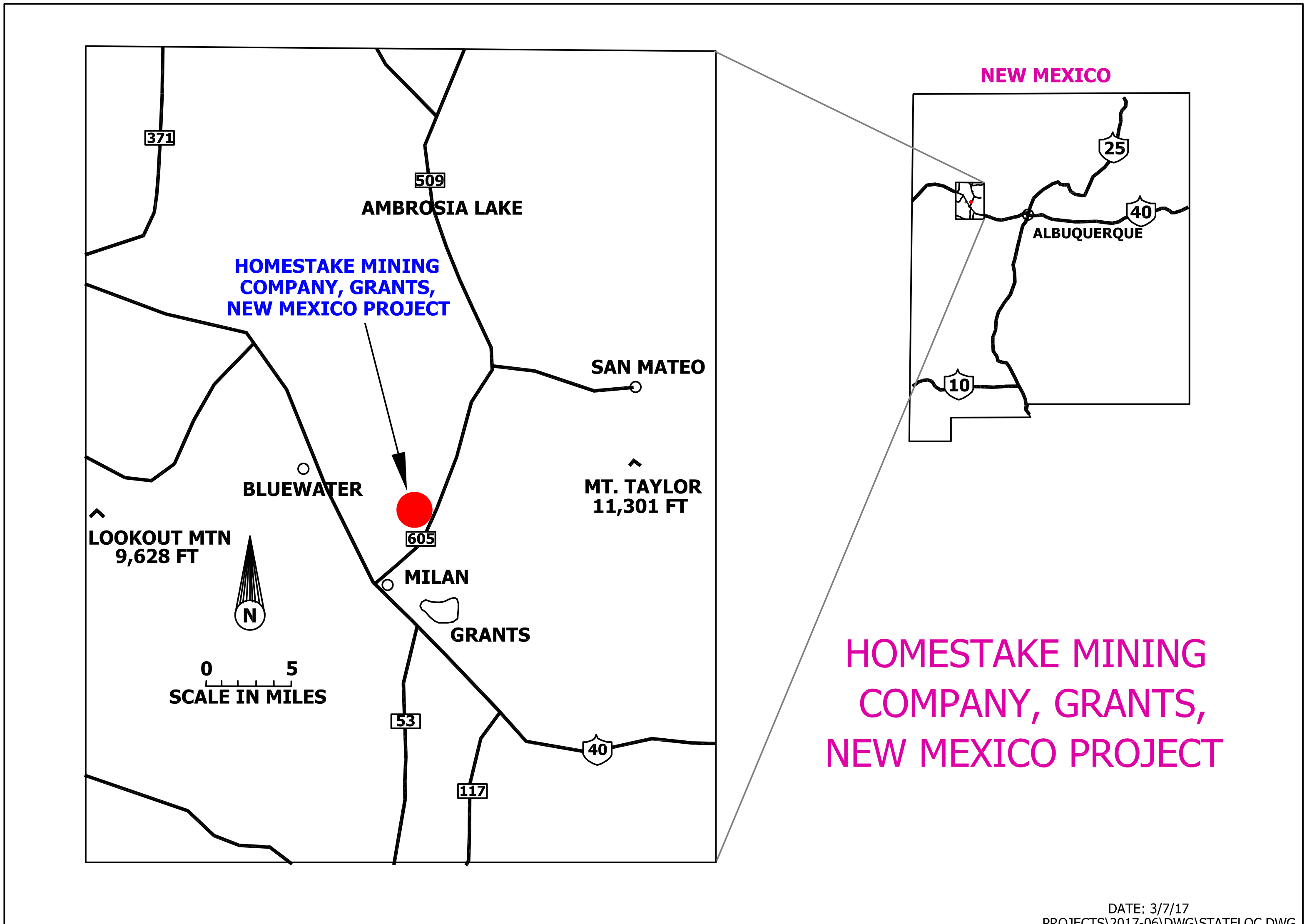


FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

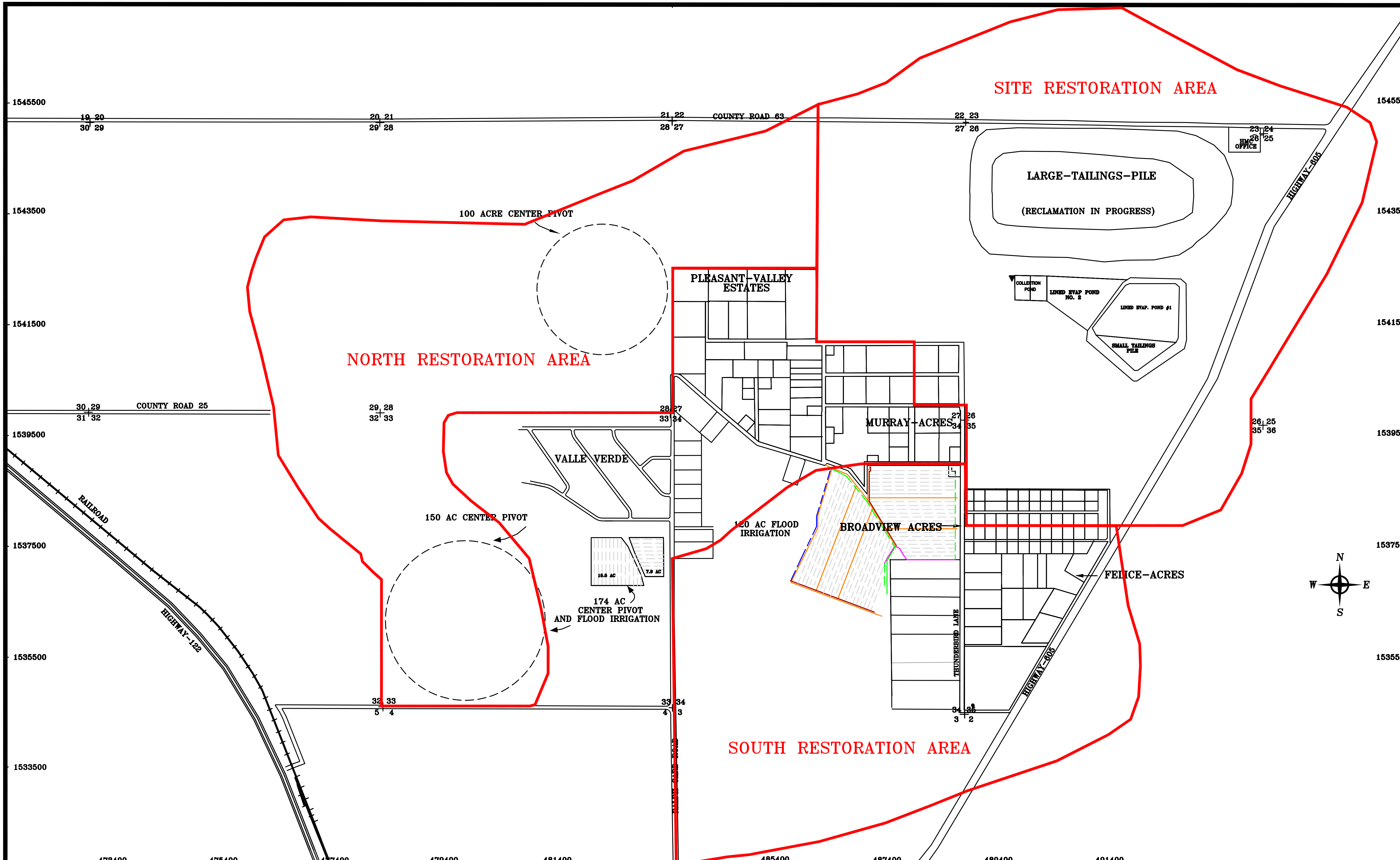


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FIGURE 1.2-2. RESTORATION AREAS DESIGNATION MAP

SECTION 2
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GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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FIGURES

SECTION 2

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT (continued)

Page Number

FIGURES (continued)

TABLES

2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 9.28 inches at the Grants Project site in 2016 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 2016 for the Grants site including an annual wind rose plot.

The Grants Project ground water remediation system consists of collection of contaminated ground water near the tailings piles, collection of slightly contaminated ground water Off-site and down-gradient injection of treated and/or fresh water. The treated water in 2016 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 2016, 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 ground water. 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 2.1-16 shows the location of the present (end of 2016) 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 ground water 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 ground water 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) (2000-2016)				
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

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 628 gpm during 2016.

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. Upper Chinle aquifer collection continued from wells CE2, CE5, CE6, CE11 and CE12 in 2016 (red X symbols located south of the collection ponds), and this water was treated with the R.O. plant in 2016. Upper Chinle well CE7 was also pumped in 2016 to the R.O. plant. 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 2016.

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 2016. The L-line south of the STP continued to operate in 2016 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 2.1-17 graphically presents collection rates for the last seventeen years at the Grants Project. The On-Site alluvial collection system operated at an average rate of 468 gpm in 2016. Additionally, a yearly average of 19 gpm was extracted from the alluvium for re-injection in 2016 with the ceasing of the re-injection at the end of July.

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 and CE12, which are located on the south and north sides of the collection ponds. 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. These wells were used to supply water to the R.O. for 2016. Upper Chinle collection well CE7 was pumped to the R.O. plant in 2011 through most of 2016. Additionally, wells B15, B16, B31, B32, T25, T26, T27, T28, T30 and T32 were pumped in 2016. 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 90 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. The yearly average collection rate from the Middle Chinle aquifer was 22 gpm.

2.1.2.3 OFF-SITE COLLECTION

None of the irrigation systems were operated in 2016 (see Figure 2.1-1 for locations of former irrigation areas). Some of the Section 3 and 35 South Off-site and North Off-site collection wells were operated in 2016 to supply water for the zeolite treatment. Figure 2.1-1 shows the Off-site collection wells that were used in 2016. South collection wells 862, 866, Q2, Q3, Q5, Q11, Q18, Q23, Q28, Q29, Q30, 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, H17 and H24 were pumped for the zeolite treatment of this Off-site water during 2016.

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 2016 (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 2016 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 130 % 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 ground-water monitoring results for 2016 in the irrigation areas is presented in this report. This data shows no effects on the uranium and selenium concentrations in the underlying ground water from the HMC irrigation/land treatment program, except for possibly a small increase in uranium in the Section 34 ground water 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 2016 from the lysimeters.

2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM GROUND WATER

Table 2.1-1 (page 2.1-29) presents the quantities of chemical constituents extracted from the On-site ground water system, the tailings piles and the toe drains. The ground water collection system has produced an average pumping rate of 263 gpm for the entire period between 1978 and 2016. 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 2016 was computed by multiplying the average concentration of a particular constituent for each source of water (ground water, 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 2016. This table lists the total for the On-site and the sum of the Off-site quantities for 2014 through 2016.

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 2016. 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 ground water. The site standards are listed at the top of Table 2.1-3 and all compliant water were less than the site standards in 2016.

Table 2.1-4 presents the R.O. feed water and the R.O. product (SP1) water quality for 2016 and all of the SP1 water quality is less than the site standard concentrations. This table also list concentrations for the individual R.O. units for September 1, 2016. The blue highlighted data shows that the uranium and molybdenum concentrations exceeded the site standards for the LPRO #2 unit. Changes in the membranes on this unit were made after these higher values were measured. The SP2 integrated sample for September concentrations were less than the site standards.

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 2.1-5 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 2.1-5 shows which values exceed the site standards. Uranium concentrations from the zeolite exceeded the site standards from the 300Z and 1200Z for a few samples collected prior to middle August when additional monitoring of the treated zeolite water was implemented. The uranium concentration in the SP2 August 16th integrated sample was less than the site standard but was higher than typical values. Additional monitoring of the treated zeolite water discharged to the Post Treatment Tank has been implemented with more frequent measurements of the approximate uranium concentration using the Kinetic Phosphorescence Analyzer (KPA) instrument. The KPA samples can be processed within a few hours of collection. In conjunction with other field water quality measurements, the frequent KPA sample results allow adjustments of the pretreatment and also provide an indication of the uranium loading condition within the zeolite. With the improved system management allowed by the frequent KPA samples, the uranium concentrations in the zeolite treated water were below the site standard for the remainder of 2016.

The molybdenum concentrations exceeded the site standard in the 300Z samples taken on

April 26th and August 2. These two values are thought to be anomalous because all of the North Off-site collection wells supplying water to the 300Z during this period have molybdenum concentrations less than detection. The molybdenum concentrations in the samples before and after the April 26th and August 2 samples were consistent with the typical concentration of below detection to only slightly above the detection limit of 0.03 mg/l.

The sulfate and TDS concentration site standards were exceeded in a sample taken on November 9th for the 1200Z Trains 1&2 and a sample taken on November 11th for the 1200Z Trains 3&4. These higher sulfate and TDS concentrations occurred after large changes in the flows to these trains were made following regeneration or other operational changes. The corresponding uranium concentration for these samples and associated KPA samples indicates the operating trains were effectively removing uranium, and this in turn indicates that the pretreatment was operating correctly. In addition, the pretreatment acid pumps are equipped with pH monitoring probes and should automatically adjust for changes in the zeolite process flow. With continuing refinement of the regeneration procedures to produce a more uniform fluid distribution during regeneration and subsequent rinsing, along with additional field water quality measurements after operational changes, the likelihood of a future sulfate or TDS concentration exceedance should be significantly reduced.

The radium226 plus radium228 activity site standard was also exceeded in the February 25th 300Z sample and the November 14th sample for the 1200Z Trains 1&2. 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 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 ground water 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 complex (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 2016 injection rate for this horizontal injection line is included in the On-site alluvial injection rates, and was 101 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 in 2016.

Figure 2.1-5 (page 2.1-18) presents treated and/or fresh-water injection rates for the last seventeen years. An average of 566 gpm, or a total of 303 million gallons, was injected during 2016.

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 2016. Figure 2.1-5 shows the rates of R.O. product water produced, which averaged 449 gpm in 2016 for a total of 240 million gallons. Figure 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) and Figure 2.1-4 presents the R.O. feed water and R.O. product (SP1) water quality for 2016.

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 2016 average of 30 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 6 gpm in 2016 (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

A test of fresh-water injection was initiated in late 1999 and continued through January of 2000 by pumping San Andres well 951, which is located in Section 20, (see Figure 2.1-1 for location of supply well 951). This water was subsequently injected into alluvial wells 682, 656, 894, 633 and 655 (see Figure 4.1-1 for location). This fresh-water injection in Sections 28 and 29 was resumed in March of 2002 to impede movement of ground water 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 352 gpm for 2016 with a total injected volume of 189 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 2016. No pumping from well CW28 occurred in 2016 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 fresh-water injection lines and wells (see brown diamond symbols on Figure 2.1-5). This injection effort is associated with the ground water 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 2016, the yearly average injection rate in Sections 34, 35 and 3 was 240 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 ground water. 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. The total collection for re-injection rate in 2016 averaged 19 gpm. Re-injection into alluvial wells X11, X12, D2 through D4, DAA, DAB, DL, DW, DY, DF, DG and DX were used in 2016. 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 2016. 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 2016 were limited by the numbers of dewatering wells that were operational and were down during the fourth quarter of 2015 for pipeline connections to the R.O. plant.

Figure 2.1-6 (page 2.1-19) shows the locations of tailings wells that were available for pumping in 2016. The cumulative volume of tailings water pumped from 1995 through 2016 is presented on Figure 2.1-7. A total volume of 506 million gallons of water had been removed from the tailings via dewatering wells by the end of 2016. Of that total, 2.7 million gallons were pumped from the tailings in 2016. The yearly average collection rate from the tailings wells was 5 gpm in 2016.

No injection into the Large Tailings Pile occurred in 2016. 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 2016. 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 2016, respectively. These figures show the decline in uranium concentrations with time. The 2016 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 2016. 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 ground water 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 403 million gallons of water have been pumped from the toe drains. An average rate of 14.1 gpm of water was collected from the toe drains in 2016, which is less than the 2015 rate. This decline in rate is due to the ceasing of injection into the tailings in 2015.

Table 2.1-1 also presents the 2016 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 2016).

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 2016 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 109 million gallons (average rate of 204 gpm) of water was delivered to the evaporation pond system in 2016 in addition to the 18 million gallons (average rate of 34 gpm) of natural precipitation added to the pond. The net evaporation from the evaporation system averaged 168 gpm in 2016, compared to 184 gpm in 2015.

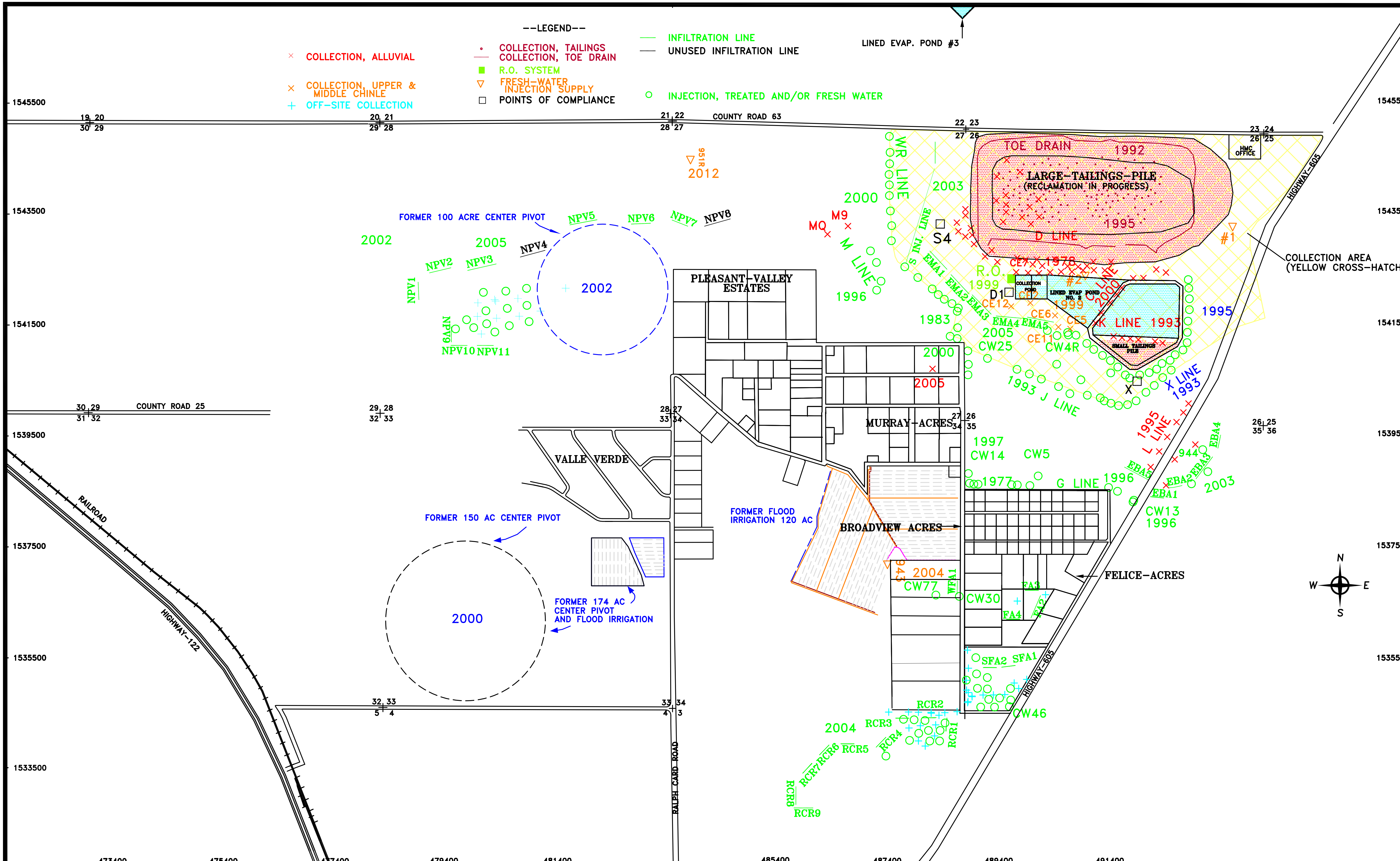
Water quality samples results collected from the No. 1 and No. 2 Evaporation Ponds, the East Collection Pond (E COLL POND), and the West Collection Pond (W COLL POND) are presented in Tables B.3-1 and B.3-2 of Appendix B.

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 2016. A rate of 8 gpm in 2016 was pumped to the RO plant from the LTP while 11 gpm was discharged to the evaporation ponds. A combined rate of 19 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 inputs and discharges, zeolite system 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 2016						
	Injection		Collection		Seepage from LTP	
Aquifer System	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Alluvial	1087	582,280,000	704	377,120,000	41	21,960,000
Upper Chinle	53	28,390,000	93	49,820,000	--	--
Middle Chinle	77	41,250,000	45	24,110,000	--	--
Lower Chinle	--	--	1	540,000	--	--
San Andres	--	--	557	298,370,000	--	--
Tailings	--	--	19	10,180,000	--	--

Major Treatment and Disposal Flows and Volumes During 2016						
	Feed/Input Rate		Treated Water Discharge		Evap/Disposal Discharge	
Treatment/Disposal System	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Reverse Osmosis	632	338,550,000	417	223,380,000	173	92,670,000
Zeolite	259	138,740,000	235	125,880,000	22	11,780,000
Evaporation Ponds	270	144,630,000	--	--	200	107,140,000
Collection Ponds	44	23,570,000	--	--	30	16,070,000



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DATE: 2/23/17

FIGURE 2.1-1. LOCATION OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES, 2016

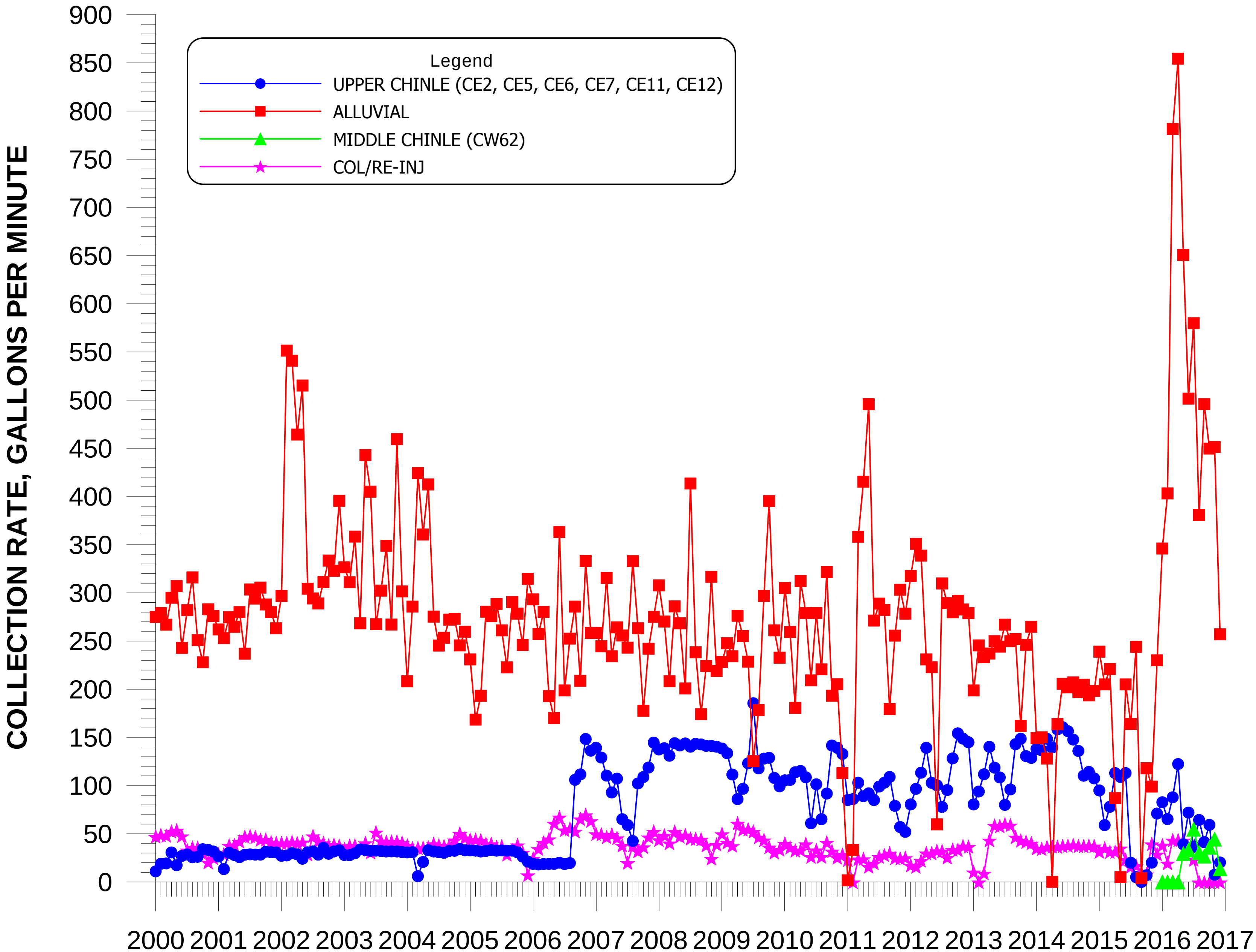

FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ON-SITE ALLUVIAL, UPPER AND MIDDLE CHINLE AQUIFERS.

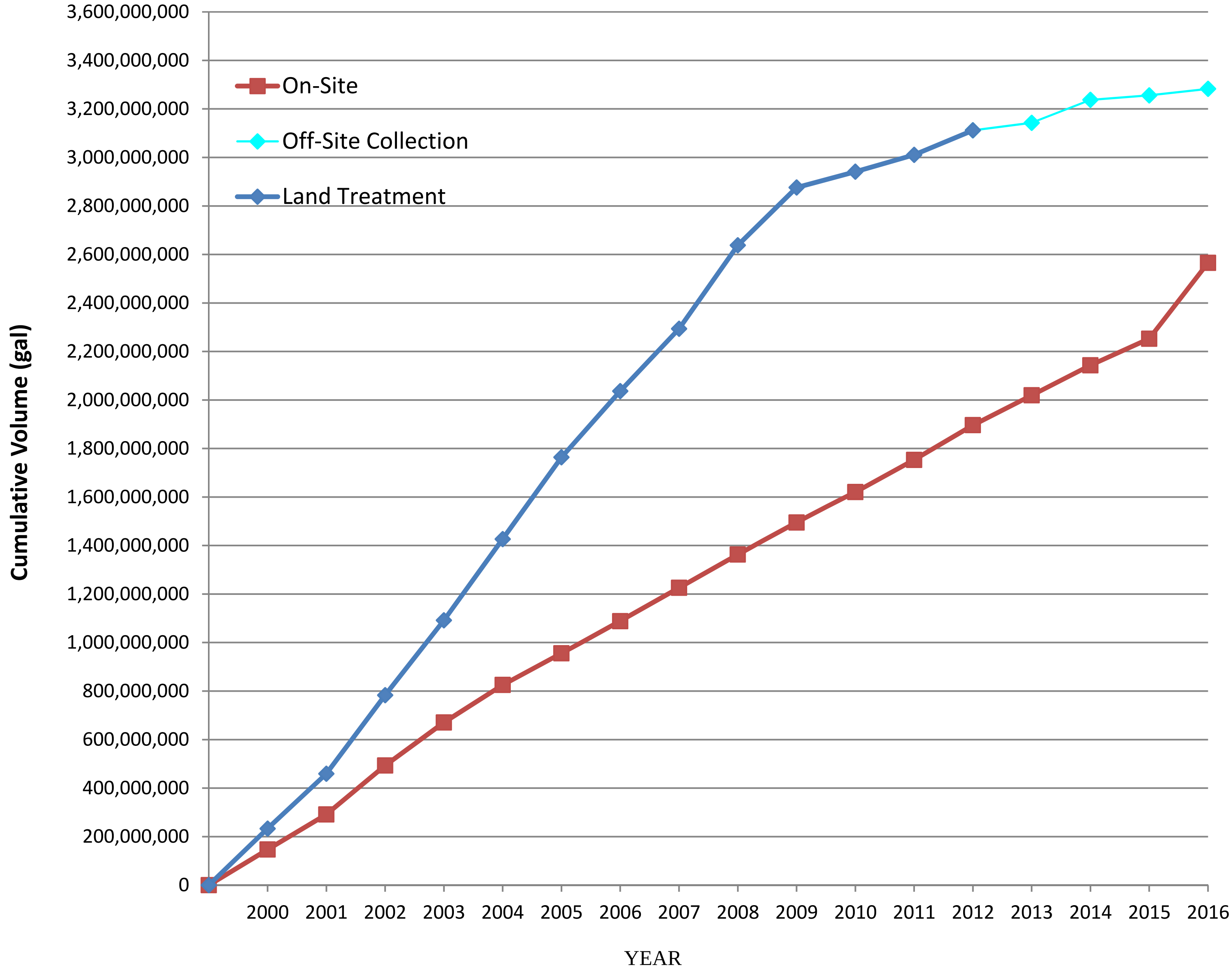

Figure 2.1-3. Cumulative Volume of Land Treatment, On-Site and Off-Site Collection from 2000 to Present

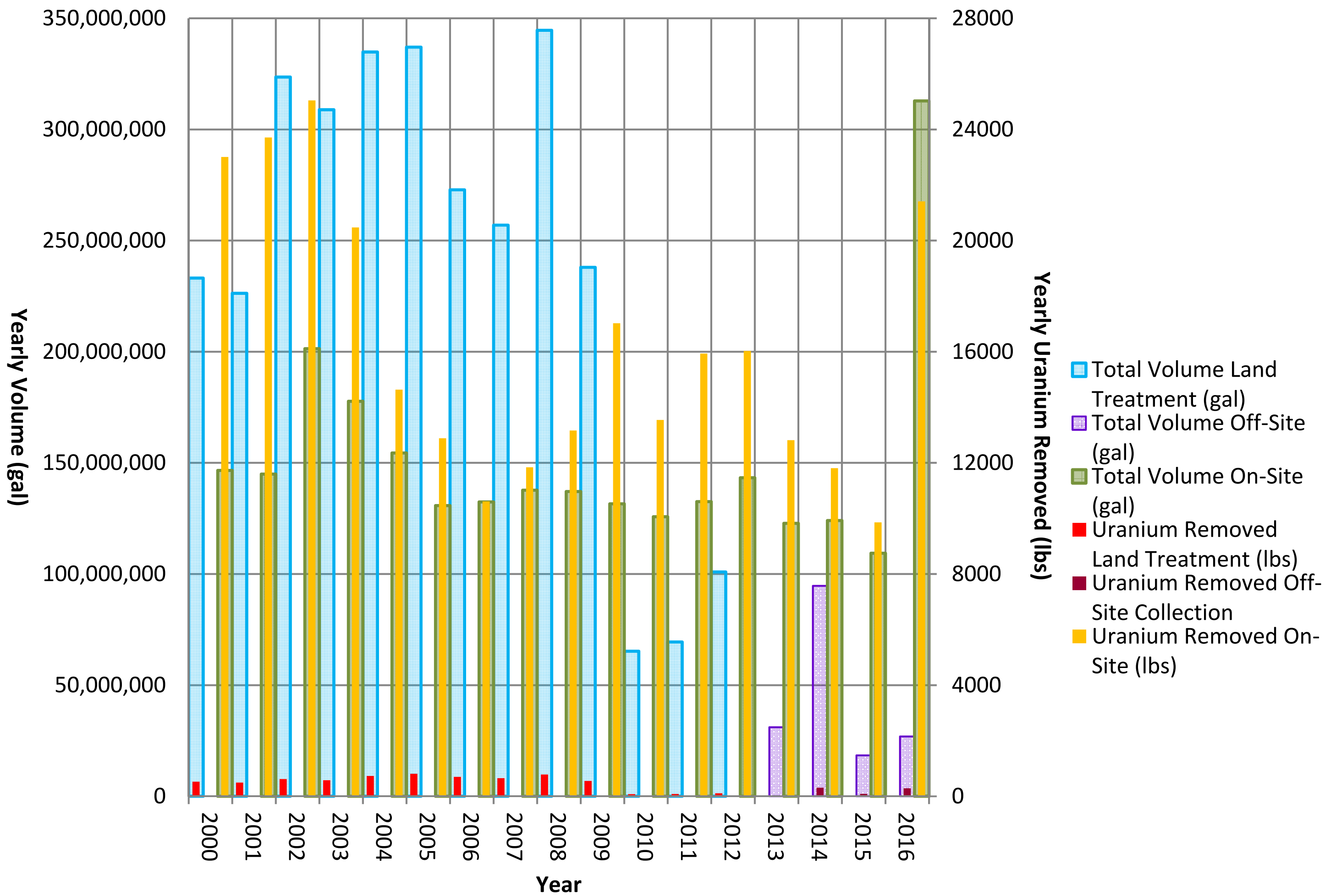

Figure 2.1-4. Yearly Quantity of Water and Uranium Removed

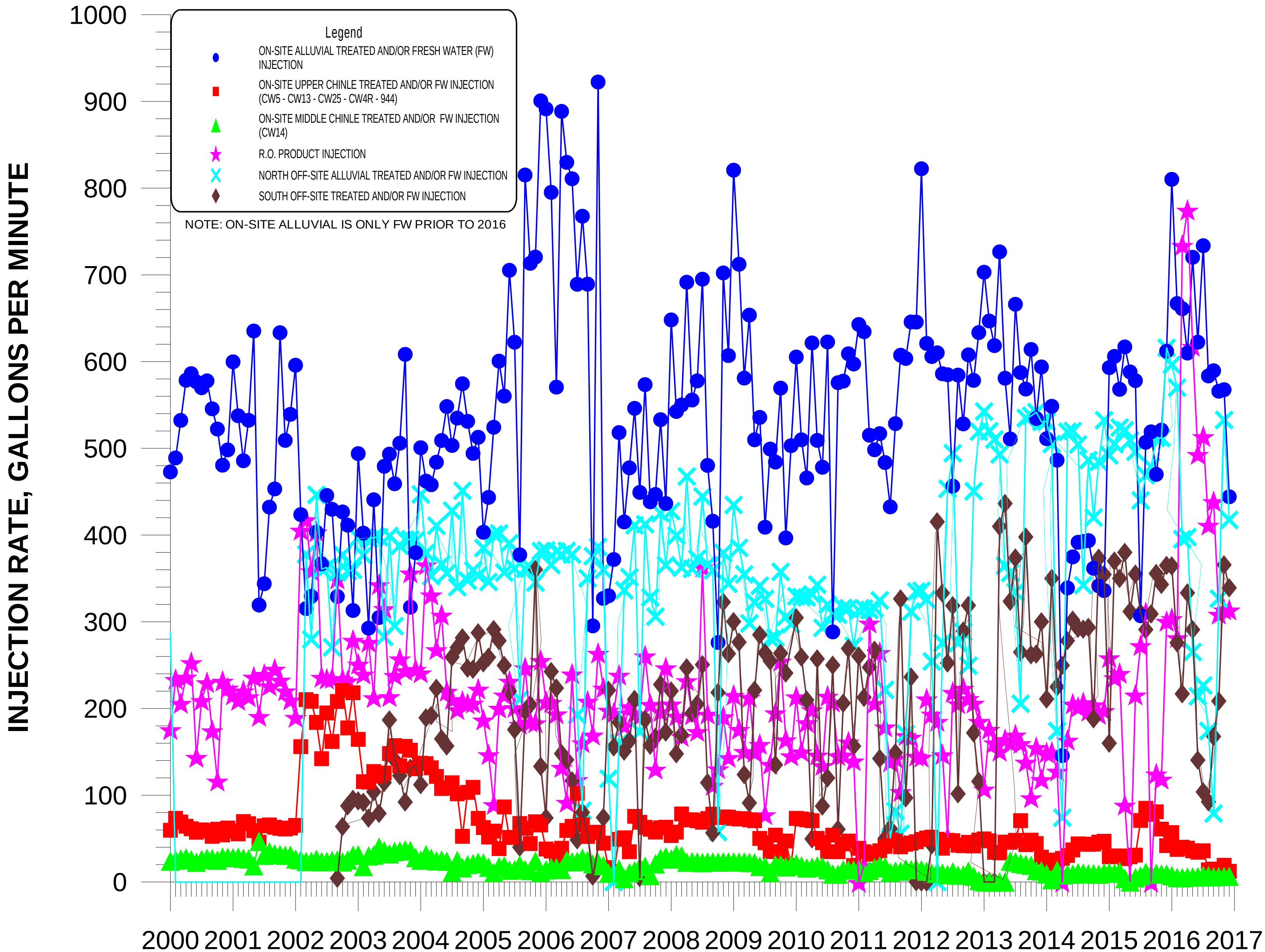

FIGURE 2.1-5. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.

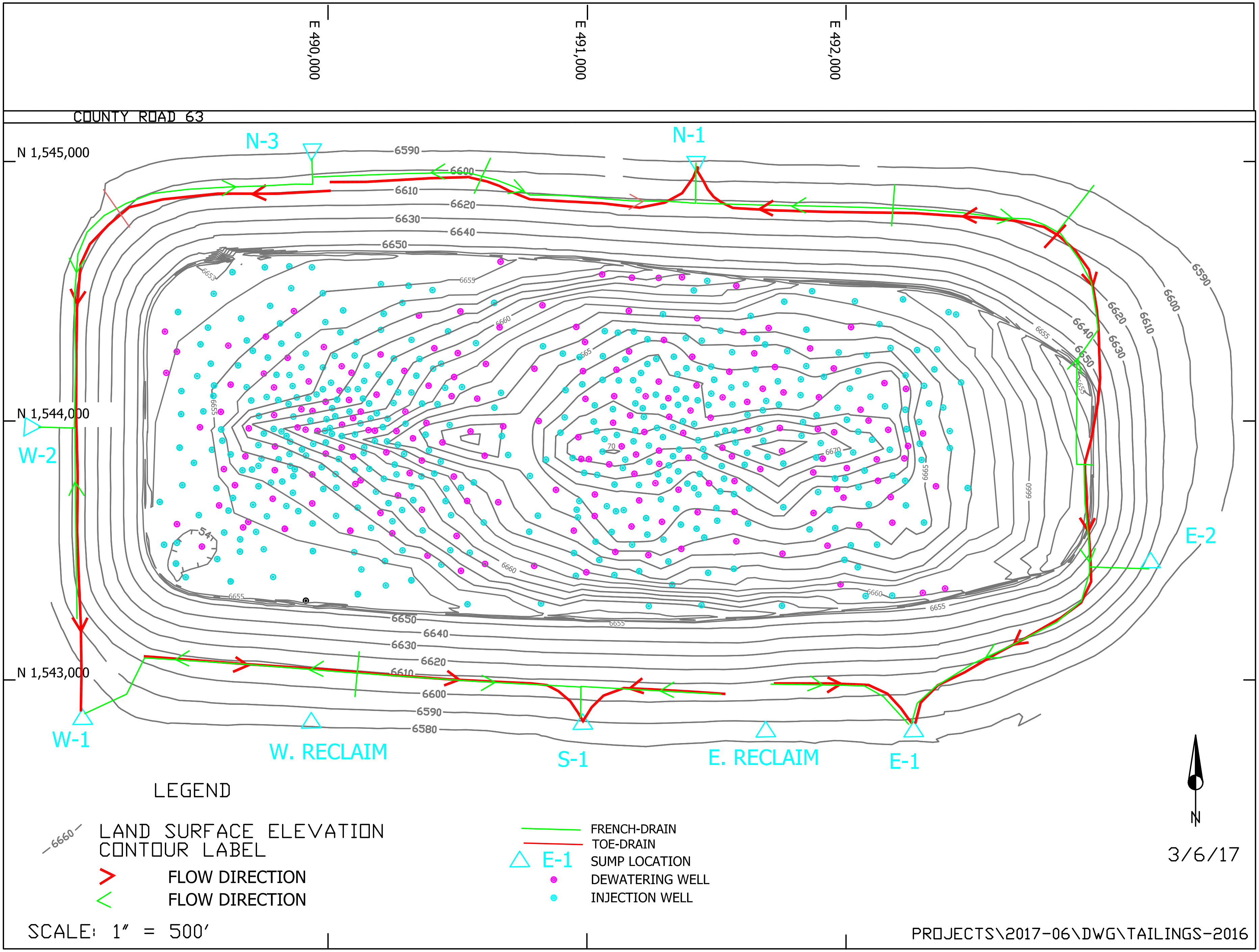

FIGURE 2.1-6. LOCATIONS OF TAILINGS DEWATERING WELLS, TOE DRAINS AND SUMPS

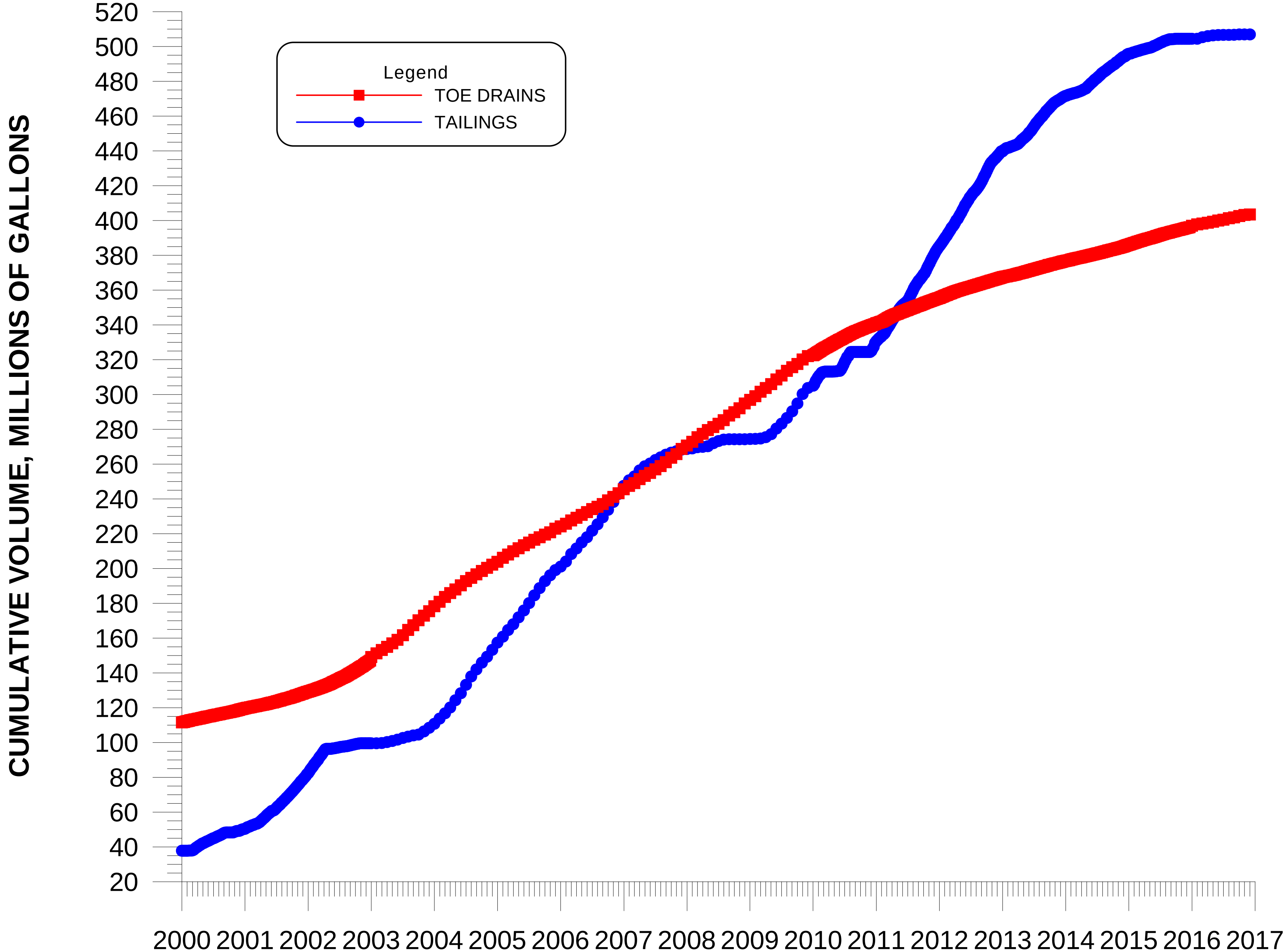

FIGURE 2.1-7. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

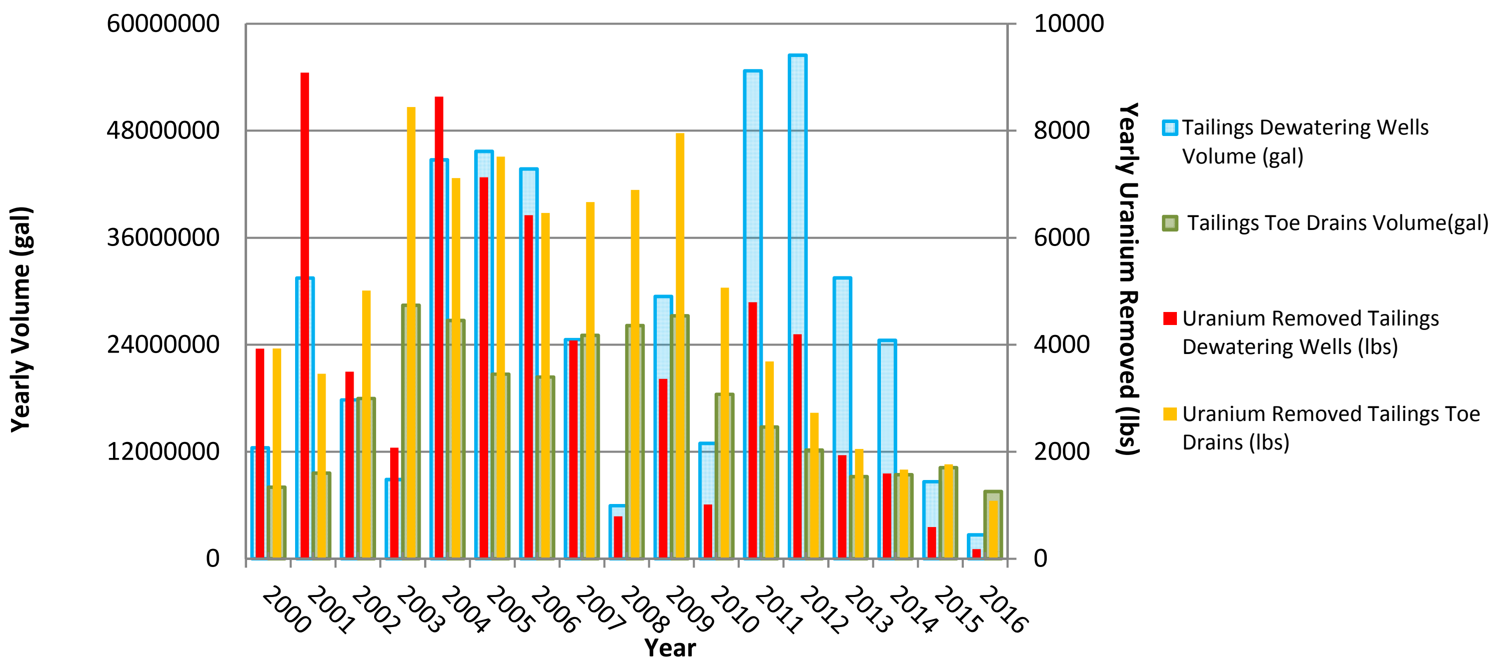

Figure 2.1-8. Yearly Quantity of Tailings Water and Uranium Removed

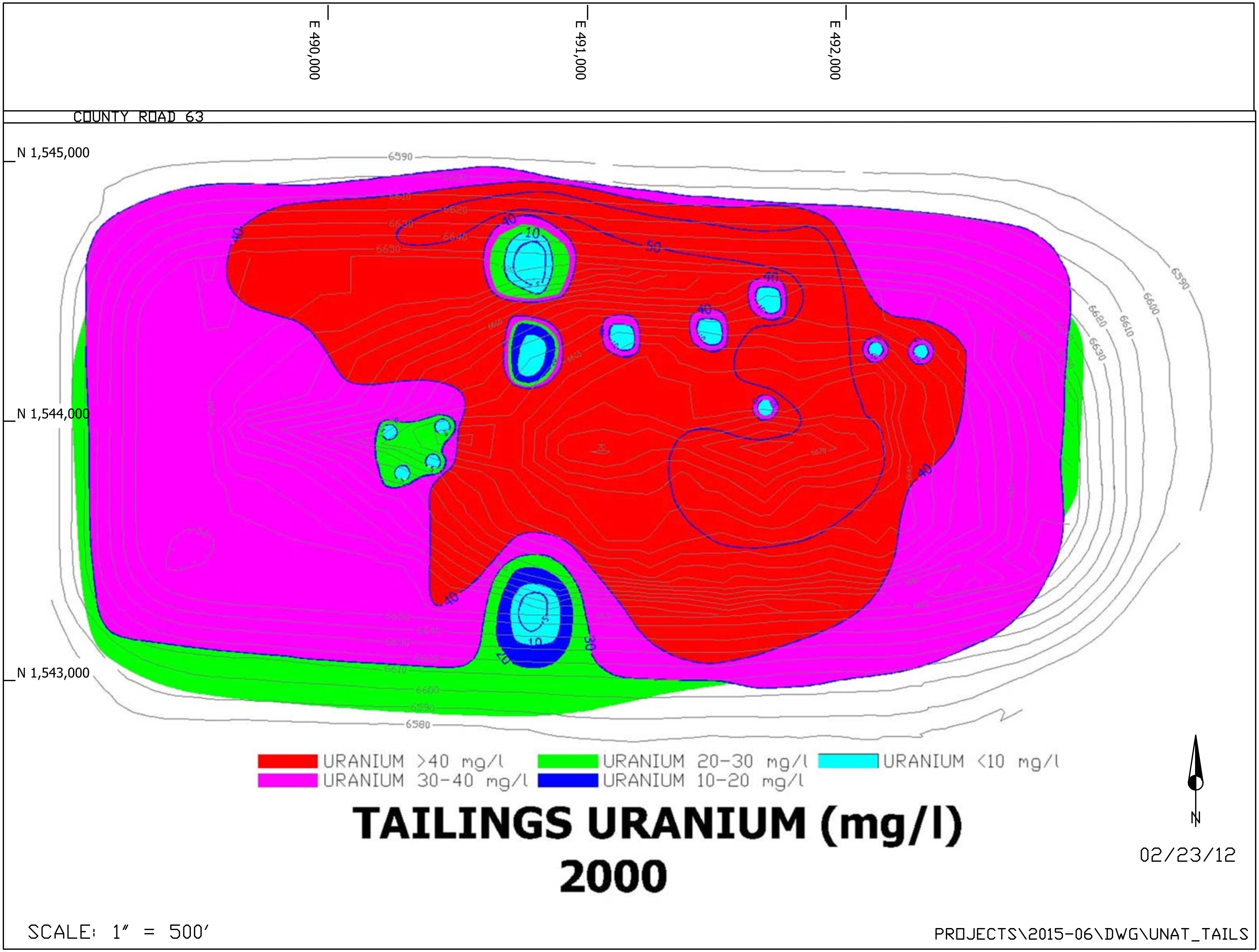

FIGURE 2.1-9. TAILINGS SOLUTION URANIUM CONCENTRATION, 2000

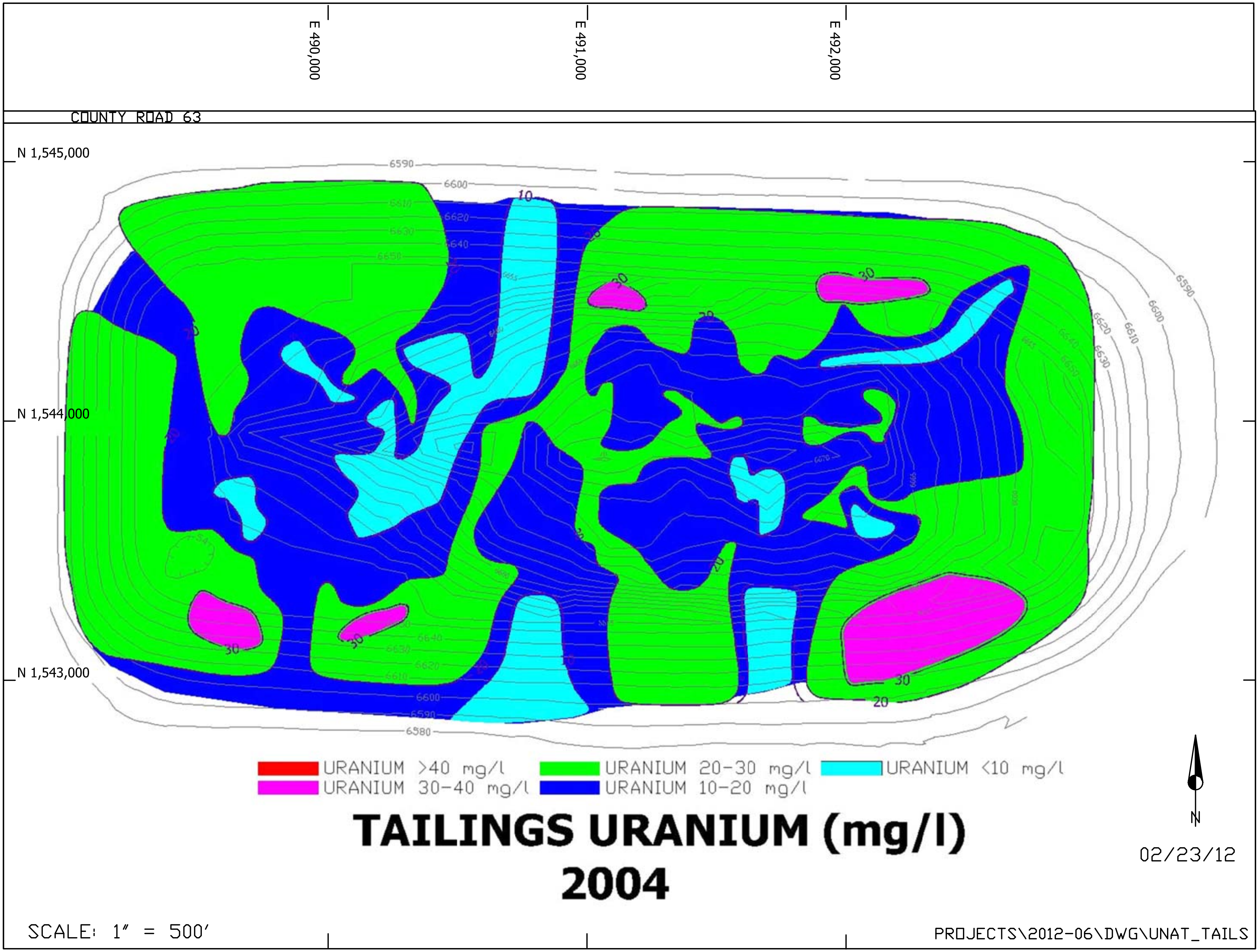

FIGURE 2.1-10. TAILINGS SOLUTION URANIUM CONCENTRATION, 2004

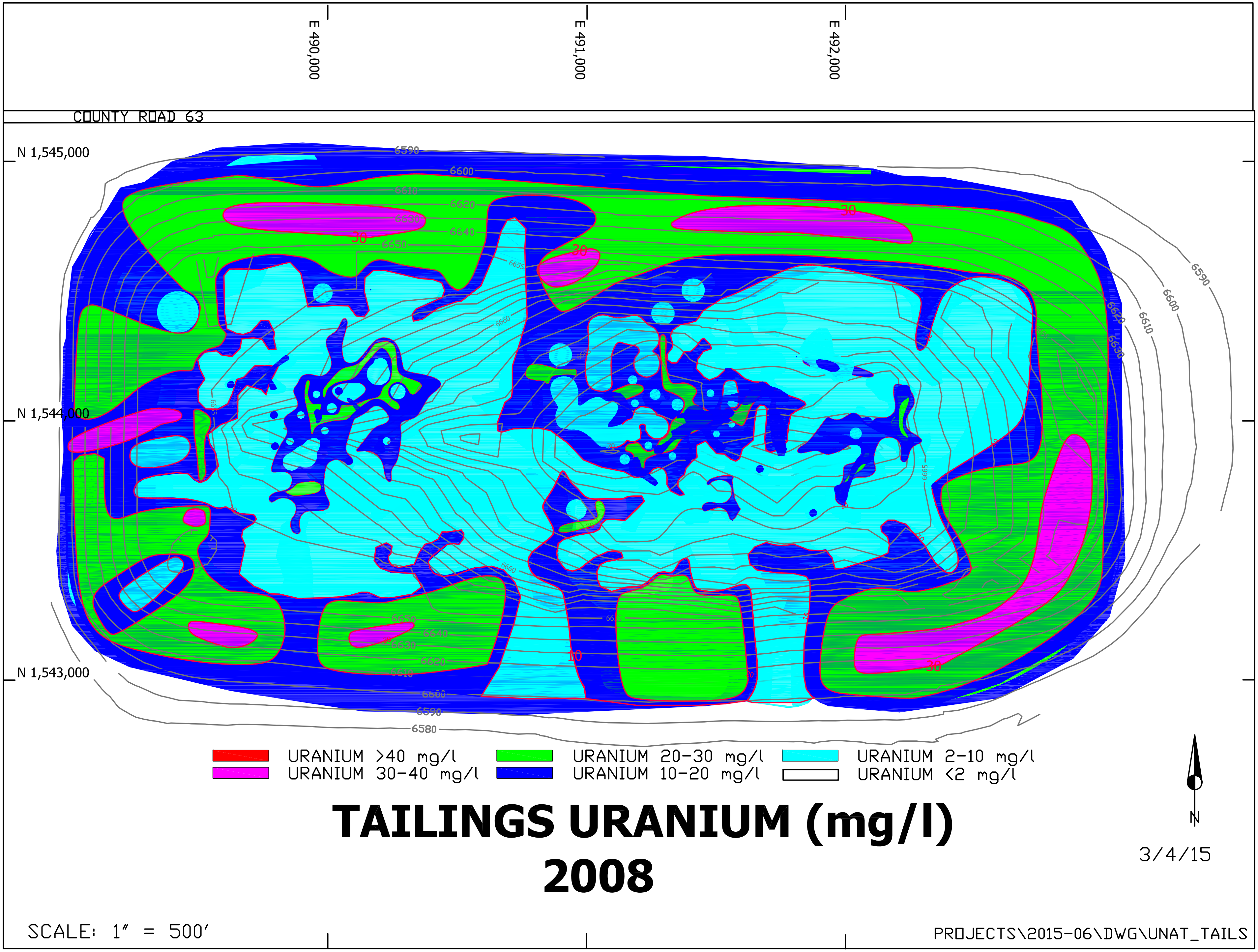

FIGURE 2.1-11. TAILINGS SOLUTION URANIUM CONCENTRATION, 2008

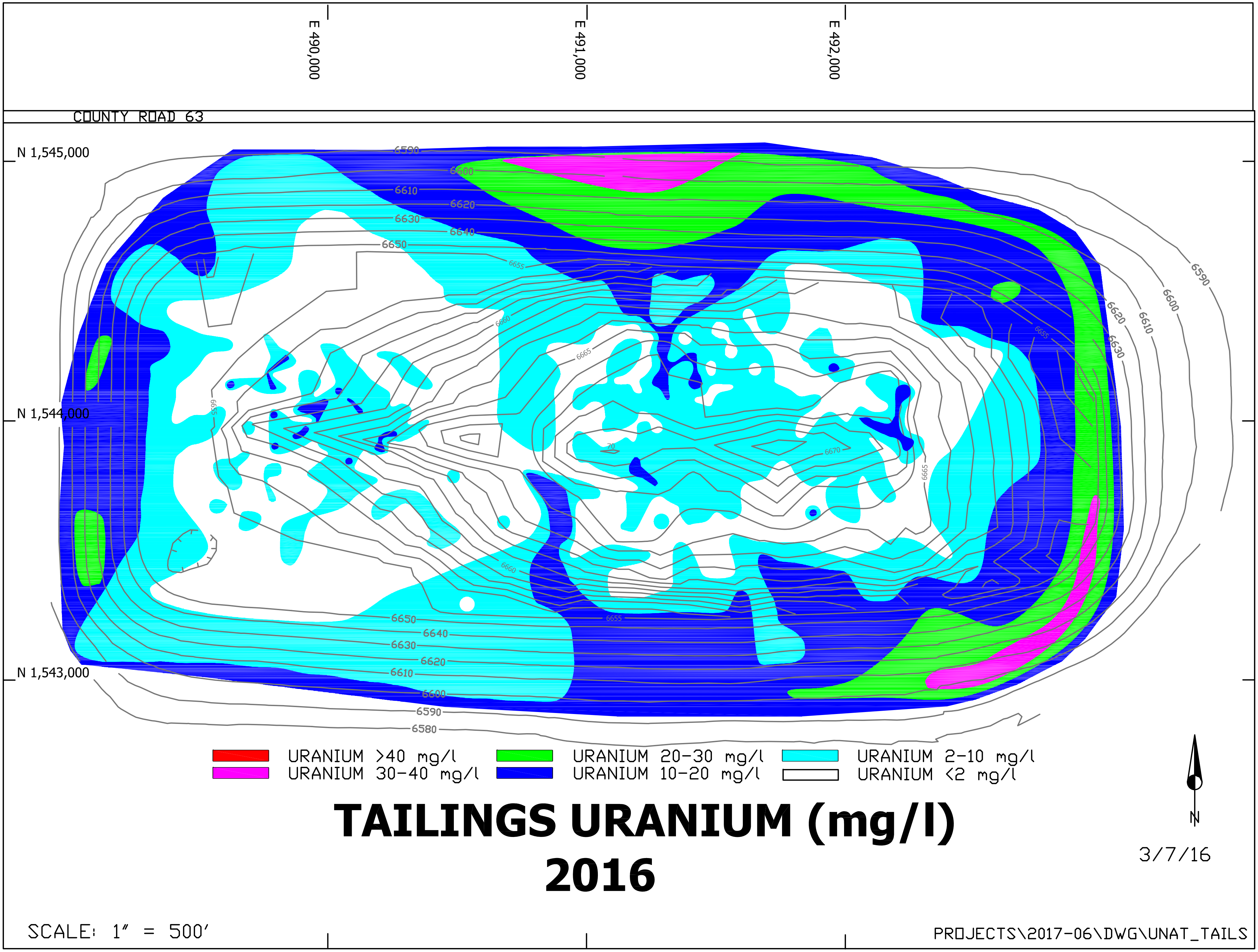

FIGURE 2.1-12. TAILINGS SOLUTION URANIUM CONCENTRATION, 2016

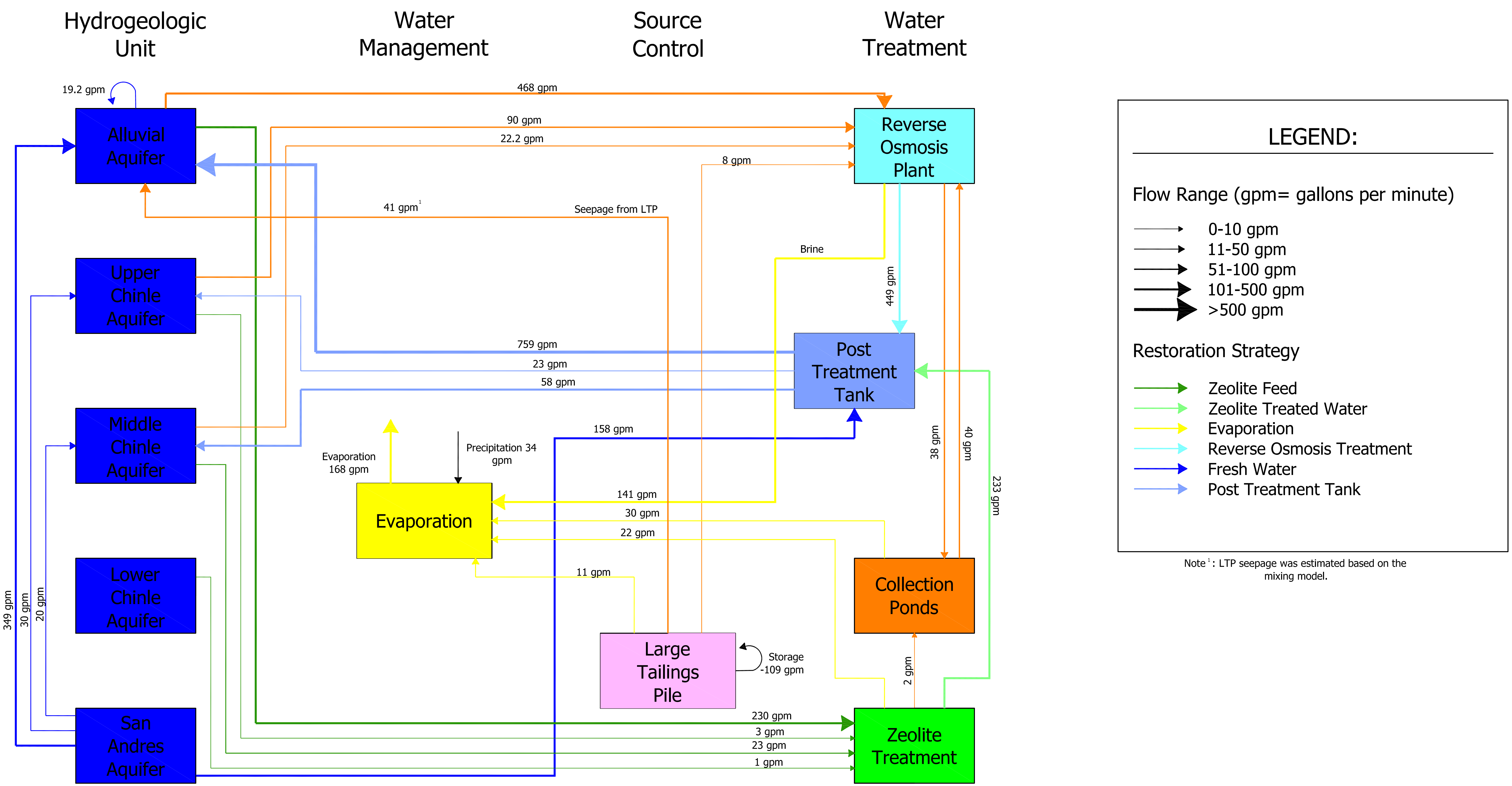

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FIGURE 2.1-13. MAJOR OPERATIONAL FLOWS

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
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
SUM G.W.		5,412,338,791		174,923,554		1,022,990		1,235,805		64,871
SUM TOE		401,632,431		29,247,806		123,702		262,493		4,851
SUM TAILS		492,628,002		20,127,837		76,377		211,648		721
COMBINED SUM		6,306,599,224		224,299,197		1,223,070		1,709,945		70,442

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						
2014	ALLUVIAL	122,493,914	2534	2,590,165	11.21	11,463	15.58	15,927	0.63	643
2014	UPPER CHINLE	1,576,410	5400	71,046	26	342	33	434	0.7	9
2014	MIDDLE CHINLE	0	0	0	0	0	0	0	0	0
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	269,107,424	2850	6,401,016	10.13	22,752	16.59	37,261	0.5	1,123
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
				OFF-SITE						
2014	SOUTH ALLUVIAL	56,040,044	681	318,511	0.45	210	0.03	14	0.03	14
2014	SOUTH UPPER CHINLE	167,400	717	1,002	0.09	0	0.03	0	0.19	0
2014	SOUTH MIDDLE CHINLE	38,493,556	728	233,883	0.31	100	0.03	10	0.04	13
2014	SOUTH LOWER CHINLE	0	0	0	0	0	0	0	0	0
2014	NORTH ALLUVIAL	0	0	0	0	0	0	0	0	0
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
SUM ON-SITE		546,083,917		12,451,500		45,909		67,982		2,411
SUM OFF-SITE		250,727,021		1,464,820		689		63		79
COMBINED SUM		796,810,938		13,916,319		46,598		68,045		2,490

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)	Mo (mg/l)	Se (mg/l)
Site Standard		**250**	**1500**	**2734**	**0.16**	**0.1**	**0.32**
SP2	1/12/2016				0.0801	0.07	
	2/9/2016	42	135	369	0.0277	0.042	0.003
	3/3/2016	78	335	728	0.0586	0.05	0.009
	4/12/2016				0.137	0.056	
	5/2/2016	60	218	563	0.089	0.03	0.007
	6/14/2016				0.124	0.05	
	7/9/2016				0.069	0.037	
	8/16/2016	107	546	1200	0.145	0.05	0.017
	8/30/2016				0.062	0.05	
	9/15/2016				0.019	0.04	
	9/26/2016				0.024	0.05	
	9/26/2016		219	543	0.0382	0.04	<0.005
	10/4/2016	54	265	526	0.0148	<0.03	0.01
	10/24/2016				0.018	<0.03	
	11/30/2016	118	696	1340	0.050	<0.03	0.023
	12/19/2016				0.073	<0.03	

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)	Ra228 (mg/l)	Ra226+ Ra228	Th230 (mg/l)	V (mg/l)
Site Standard		**12**			**5**	**0.3**	**0.02**
SP2	1/12/2016						
	2/9/2016	0.7	1.9	0.9	2.8		<0.01
	3/3/2016	1.2	0.13	1.1	1.23	0.002	<0.01
	4/12/2016						
	5/2/2016	0.9	0.19	1.4	1.59	-0.030	<0.01
	6/14/2016						
	7/9/2016						
	8/16/2016	1.7	0.21	0.1	0.31	0.020	<0.01
	8/30/2016						
	9/15/2016						
	9/26/2016						
	9/26/2016						
	10/4/2016	0.8	0.39	2.1	2.49	0.005	<0.01
	10/24/2016						
	11/30/2016	1.9	0.26	-0.9	-0.64	0.070	<0.01
	12/19/2016						

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

Table 2.1-4 RO Clarifier Feed and RO SP1 Water Quality Data

Sample Point Name	Date	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard		**250**	**1500**	**2734**	**0.16**	**0.1**	**0.32**
RO CLAR FEED	5/2/2016	418	3210	6480	11.7	19.4	0.56
	8/16/2016	365	2540	5230	10.2	15	0.592
	9/26/2016		2500	4870	7.9	12.7	0.35
	11/30/2016		2110	4210	6.03	10.8	0.313
RO SP1	8/16/2016	154	480	1340	0.060	0.1	0.006
	8/30/2016				0.011	0.06	
	9/15/2016				0.021	0.07	
	9/26/2016		31	106	0.023	0.05	<0.005
	10/24/2016				<0.0003	<0.03	
LPRO #1 Product	9/1/2016	7			0.0153	0.049	
LPRO #2 Product	9/1/2016	24			**0.301**	**0.564**	
LPRO #3 Product	9/1/2016	4			0.0099	0.036	
HPRO #1 Product	9/1/2016	7			0.0215	0.063	
HPRO #2 Product	9/1/2016	8			0.0314	0.086	

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

Table 2.1-4 RO Clarifier Feed and RO SP1 Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra228 (mg/l)	Ra226+ Ra228	Th230 (mg/l)	V (mg/l)
Site Standard		12			5	0.3	0.02
RO CLAR FEED	5/2/2016	5.4	2.9		2.9		
	8/16/2016	6.8	0.27		0.27		
	9/26/2016						
	11/30/2016						
RO SP1	8/16/2016	1.1	0.53		0.53		
	8/30/2016						
	9/15/2016						
	9/26/2016						
	10/24/2016						
LPRO #1 Product	9/1/2016						
LPRO #2 Product	9/1/2016						
LPRO #3 Product	9/1/2016						
HPRO #1 Product	9/1/2016						
HPRO #2 Product	9/1/2016						

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

Table 2.1-5 Zeolite Treated Water Quality Data

Sample Point Name	Date	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard		**250**	**1500**	**2734**	**0.16**	**0.1**	**0.32**
300Z	2/20/2016	187	1120	1900	**0.351**	<0.03	0.032
	2/21/2016	186	1100	1890	**0.358**	0.03	0.036
	2/23/2016	178	1040	1780	**0.271**	<0.03	0.026
	2/25/2016	172	928	1660	**0.225**	<0.03	0.028
	4/26/2016	177	1210	2180	0.047	**0.12**	0.039
	4/27/2016	154	881	1710	0.0464	<0.03	0.035
	5/2/2016	150	860	1590	0.0445	0.05	0.031
	5/6/2016	144	831	1600	0.037	0.06	0.038
	5/11/2016	152	877	1660	0.0474	0.06	0.037
	5/18/2016	148	849	1740	0.0856	0.04	0.039
	5/23/2016				0.127		
	5/23/2016	150	873	1780	0.128	0.03	0.042
	6/10/2016	183	**1520**	2680	**0.222**	0.04	0.04
	6/25/2016	139	683	1470	0.156	<0.03	0.029
	6/27/2016	134	655	1470	0.111	0.05	0.028
	7/6/2016	148	840	1740	0.0648	<0.03	0.037
	7/13/2016	171	1010	1820	0.0916	<0.03	0.038
	7/18/2016	160	1150	1820	0.112	<0.03	0.038
	8/2/2016	174	794	1680	**0.447**	**0.13**	0.039
	8/17/2016	178	934	1870	**0.277**	0.05	0.046
	9/23/2016	201	1210	1990	0.0837	<0.03	0.044
	9/28/2016	186	1150	2000	0.0648	<0.03	0.038
	10/3/2016	181	1100	1920	0.0407	0.03	0.038
	10/10/2016	175	1050	1910	0.0459	<0.03	0.037
	10/20/2016	184	1100	1950	0.0354	<0.03	0.043
	10/25/2016	170	1050	1950	0.0409	<0.03	0.038
	11/1/2016	161	1030	1880	0.036	<0.03	0.038
	11/8/2016	159	988	1830	0.0409	<0.03	0.035
	11/14/2016	154	974	1930	0.105	0.03	0.042
	12/6/2016	146	953	1850	0.142	<0.03	0.028
	12/12/2016	166	986	1840	0.121	<0.03	0.032
	12/19/2016	190	1180	2030	0.0833	<0.03	0.036
	12/27/2016	173	1070	2000	0.102	<0.03	0.036
1200Z Trains 1&2	8/2/2016	182	1070	2090	**0.297**	<0.03	0.042
	8/3/2016	164	976	2200	0.124	<0.03	0.038
	10/20/2016	165	1190	2110	0.0263	<0.03	0.032
	10/25/2016	170	1050	1920	0.0131	<0.03	0.033
	11/1/2016	159	1000	1830	0.0098	<0.03	0.035
	11/8/2016	157	977	1870	0.0253	<0.03	0.038
	11/9/2016	165	**2810**	**4510**	0.0326	<0.03	0.032
	11/14/2016	141	957	1910	0.045	<0.03	0.036
	11/22/2016	161	1020	1880	0.0361	<0.03	0.037
	11/30/2016	148	970	1840	0.0775	<0.03	0.036
	12/7/2016	161	973	1750	0.105	<0.03	0.037
	12/12/2016	142	980	1800	0.121	<0.03	0.033
1200Z Trains 3&4	8/2/2016	182	1080	2160	**0.59**	<0.03	0.036
	8/3/2016	158	1130	2180	0.066	<0.03	0.039
	10/19/2016	167	1160	2090	0.0066	<0.03	0.03
	10/25/2016	169	1040	1900	0.0121	<0.03	0.036
	11/4/2016	152	986	1890	0.0227	<0.03	0.035
	11/8/2016	157	972	1860	0.041	<0.03	0.039
	11/11/2016	152	**1920**	**3330**	0.0606	<0.03	0.033
	11/14/2016	137	967	1960	0.0384	<0.03	0.046
	12/16/2016	134	908	1840	0.0215	<0.03	0.036
	12/19/2016	134	909	1840	0.018	<0.03	0.035
	12/27/2016	148	988	1870	0.0099	<0.03	0.036

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

Table 2.1-5 Zeolite Treated Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra228 (mg/l)	Ra226+ Ra228	Th230 (mg/l)	V (mg/l)
Site Standard		**12**			**5**	**0.3**	**0.02**
300Z	2/20/2016	3.6	0.72	0.4	1.12	0.09	<0.01
	2/21/2016	3.7	0.24	0.3	0.54	0.1	<0.01
	2/23/2016	3.6	0.37	0.5	0.87	0.09	<0.01
	2/25/2016	3.2	9.7	1.1	**10.8**	0.05	<0.01
	4/26/2016	2.6	0.73	0.5	1.23	0.02	<0.01
	4/27/2016	2.5	0.27	0.7	0.97	-0.01	<0.01
	5/2/2016	2.6	0.29	0.1	0.39	0.2	<0.01
	5/6/2016	2.4	0.22	1.6	1.82	0.02	<0.01
	5/11/2016	2.3	0.16	1.6	1.76	0.0007	<0.01
	5/18/2016	2.8	0.29	1	1.29	0.04	<0.01
	5/23/2016						
	5/23/2016	2.5	0.31	0.7	1.01	0.06	<0.01
	6/10/2016	2.8	0.47	1.2	1.67	-0.003	<0.01
	6/25/2016	2.4	0.3	1.5	1.8	0.07	<0.01
	6/27/2016	2.3	0.27	-0.4	-0.13	0.02	<0.01
	7/6/2016	2.6	0.24	0.6	0.84	0.02	<0.01
	7/13/2016	2.9	0.34	1.3	1.64	0.03	<0.01
	7/18/2016	2.8	2.4	2	4.4	0.1	<0.01
	8/2/2016	2.4	0.2	0.1	0.3	0.002	<0.01
	8/17/2016	2.4	0.41	0.9	1.31	0.2	<0.01
	9/23/2016	2.9	0.42	3.1	3.52	0.06	<0.01
	9/28/2016	2.8	0.11	1.4	1.51	0.02	<0.01
	10/3/2016	2.8	0.34	0.2	0.54	0.09	<0.01
	10/10/2016	2.8	0.57	2.3	2.87	0.07	<0.01
	10/20/2016	2.9	0.4	3.8	4.2	0.04	<0.01
	10/25/2016	3	0.29	1.3	1.59	0.05	<0.01
	11/1/2016	2.8	0.08	1.3	1.38	0.04	<0.01
	11/8/2016	2.6	0.11	0.6	0.71	0.2	<0.01
	11/14/2016	2.5	0.32	4.1	4.42	0.03	<0.01
	12/6/2016	2.6	0.1	-2	-1.9	0.02	<0.01
	12/12/2016	2.3	0.19	-2	-1.81	0.06	<0.01
	12/19/2016	2.5	1.1	-0.3	0.8	0.04	<0.01
	12/27/2016	2.6	1.3	0.02	1.32	0.1	<0.01
1200Z Trains 1&2	8/2/2016	0.4	0.71	0.8	1.51	0.008	<0.01
	8/3/2016	2.2	0.33	0.3	0.63	-0.001	0.01
	10/20/2016	2.4	0.23	2.1	2.33	0.04	<0.01
	10/25/2016	2.6	0.41	-0.3	0.11	0.03	<0.01
	11/1/2016	2.8	0.31	-1	-0.69	0.1	<0.01
	11/8/2016	2.6	0.25	0.7	0.95	0.2	<0.01
	11/9/2016	1.4	0.45	0.7	1.15	0.05	<0.01
	11/14/2016	2.4	0.26	5.2	**5.46**	0.2	<0.01
	11/22/2016	2.6	0.12	-0.8	-0.68	0.1	<0.01
	11/30/2016	2.6	0.49	1.1	1.59	0.04	<0.01
	12/7/2016	2.2	0.27	-0.6	-0.33	0.05	<0.01
	12/12/2016	2.2	0.23	-3	-2.77	0.02	<0.01
1200Z Trains 3&4	8/2/2016	1.6	0.23	0.1	0.33	0.02	0.01
	8/3/2016	2.3	0.26	3.6	3.86	0.1	<0.01
	10/19/2016	2.4	0.23	1.6	1.83	0.05	<0.01
	10/25/2016	2.6	0.24	0.6	0.84	0.00006	<0.01
	11/4/2016	2.6	0.2	-0.09	0.11	0.06	<0.01
	11/8/2016	2.6	0.09	0.2	0.29	0.06	<0.01
	11/11/2016	2.4	0.58	-0.04	0.54	0.03	<0.01
	11/14/2016	2.3	0.39	3.9	4.29	0.09	<0.01
	12/16/2016	2.3	3.3	1.3	4.6	0.2	<0.01
	12/19/2016	2.3	1.5	-4	-2.5	0.1	<0.01
	12/27/2016	2.5	0.69	0.4	1.09	0.03	<0.01

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

2.2 FUTURE OPERATION

Ground water quality restoration in 2017 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 1000 gpm averaged over the entire year in 2017 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 110 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 2017.

Collection from Upper Chinle wells CE2, CE5, CE6, CE7, CE11 and CE12 will continue to intercept contaminants in this aquifer and collection wells CE15A and CE19 are planned to be added in 2017. 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 2017. 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 2017. Operation of the South five spot patterns in the northeast portion of Section 3 and South Felice Acres should continue in 2017. The addition of a few additional collection wells in central Section 3 should be added in 2017. The North Off-site operation of five spot patterns should continue in 2017 with additional five spot patterns added in this area. Treated and fresh-water injection will mainly be into the injection wells in the five spot areas but some injection into other injection wells and infiltration lines will continue to be utilized in 2017 to restore these areas of low level aquifer contamination. Treated and fresh-water injection will be continued in Sections 35 and

3 in 2017 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 2017. *Insitu* treatment will be tested to evaluate the treatment of ground water in the aquifer; phosphate precipitation will be tested to evaluate the removal of small concentrations from the ground water.

SECTION 3

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FOR HOMESTAKE'S GRANTS PROJECT

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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 BACKGROUND WATER 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. Ground water 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. An additional near up-gradient well, DD2, was drilled in 2008.

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 2016 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. Sulfate concentrations for the wells varied from 934 to 1970 mg/l in 2016. Uranium concentrations also varied over a large range, from 0.02 to 0.22 mg/l. The upgradient monitoring well DD2 has the highest near upgradient uranium concentration and would have resulted in a higher site standard if its values had been used in setting the standard. Selenium concentrations also varied over a large range, from less than 0.005 to 0.68 mg/l.

Chloride concentrations in water sampled in 2016 from the up-gradient wells ranged from a low of 46 mg/l to a high of 75 mg/l. The TDS concentrations varied from 1820 to 3560 mg/l. Nitrate concentrations also vary naturally over a large range in the alluvial aquifer, and ranged from less than 0.1 to 19 mg/l in 2016. Molybdenum concentrations were 0.03 mg/l or less. Concentration versus time plots for near up-gradient wells DD, DD2, P, Q and R are presented later in Section 4.3 of this report.

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 range in concentrations in the alluvial up-gradient wells[1] sampled during 2016 is tabulated in Table 3.2-1 with a list of the site standards. These site standards were established from data from the near up-gradient wells[2]. The following table (Table 3.2-1) summarizes the 2016 data for near up-gradient and far up-gradient wells for constituents of concern where site standards have been set for the Grants site. As shown by the present data, there is a large natural areal variability in the background water quality. Naturally occurring background variation is illustrated by the uranium concentrations, where concentrations in 2016 varied from 0.02 to 0.20 mg/l in the near up-gradient wells.

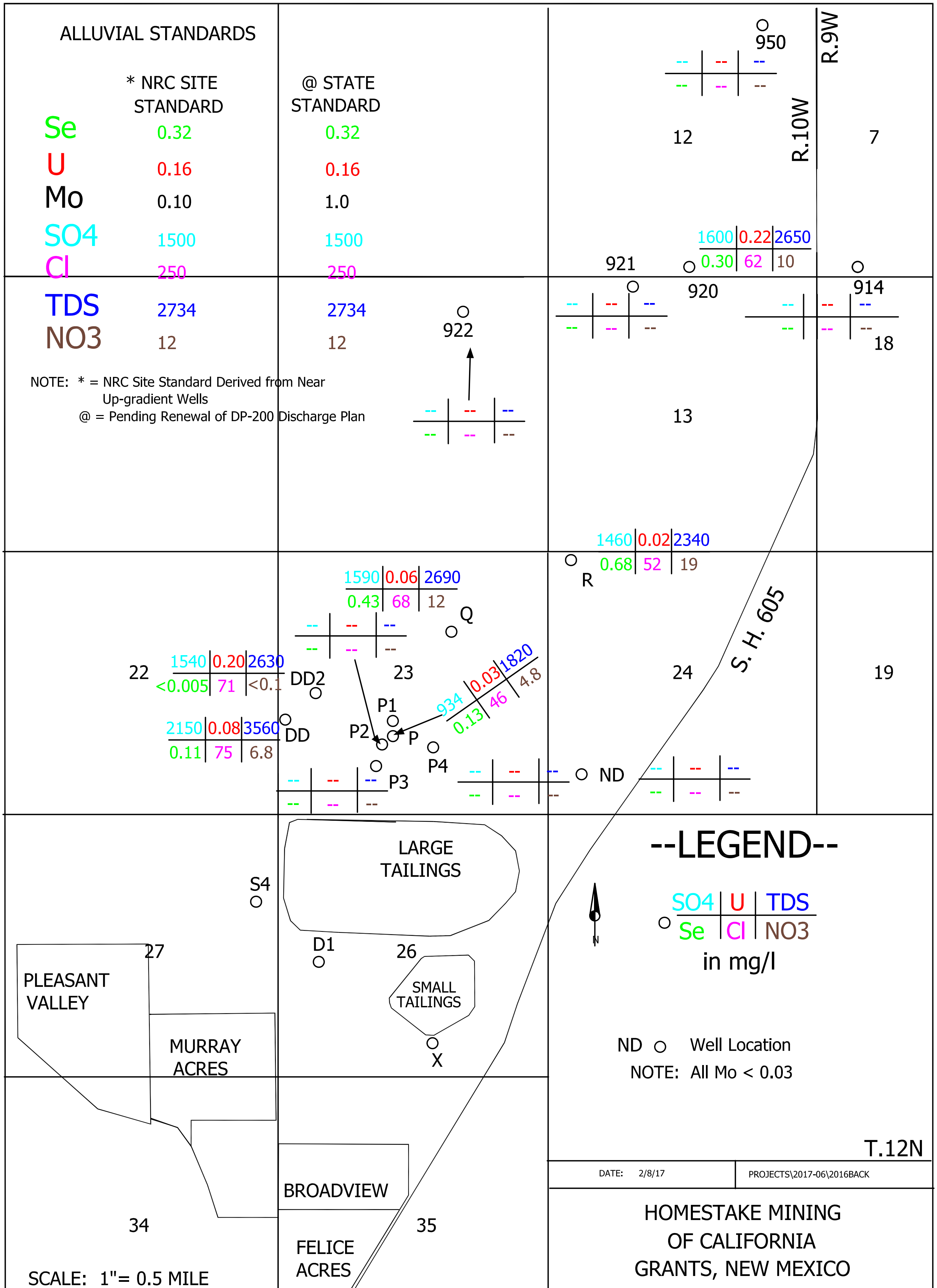


FIGURE 3.2-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2016

TABLE 3.2-1 2016 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
ND	-	-	-	-	-	-	-
P	0.13	0.03	<0.03	934	46	1820	7.8
P2	-	-	-	-	-	-	-
P3	-	-	-	-	-	-	-
P4	-	-	-	-	-	-	-
Q	0.43	0.06	<0.03	1590	68	2690	12
R	0.68	0.02	<0.03	1460	52	2340	19
FAR UP-GRADIENT WELLS							
914	-	-	-	-	-	-	-
920	0.30	0.22	<0.03	1600	62	2650	10
921	-	-	-	-	-	-	-
922	-	-	-	-	-	-	-
950	-	-	-	-	-	-	-

[1] Wells DD, DD2, P, Q, R and 920 are up-gradient wells sampled in 2016.
[2] Wells DD, ND, P, P1, P2, P3, P4, Q and R were used to establish site standards.

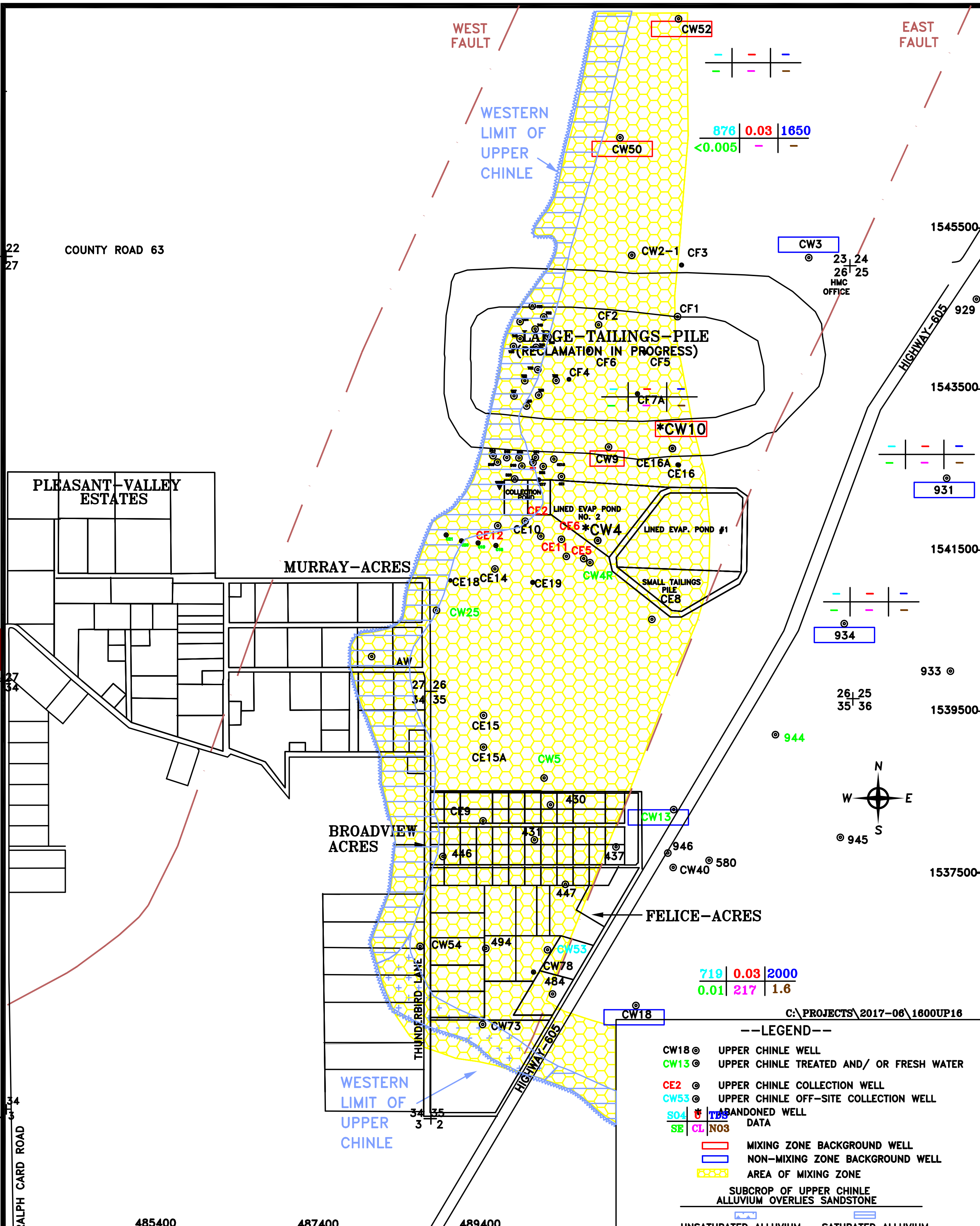
3.3 CHINLE SITE STANDARDS

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 concentration 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.



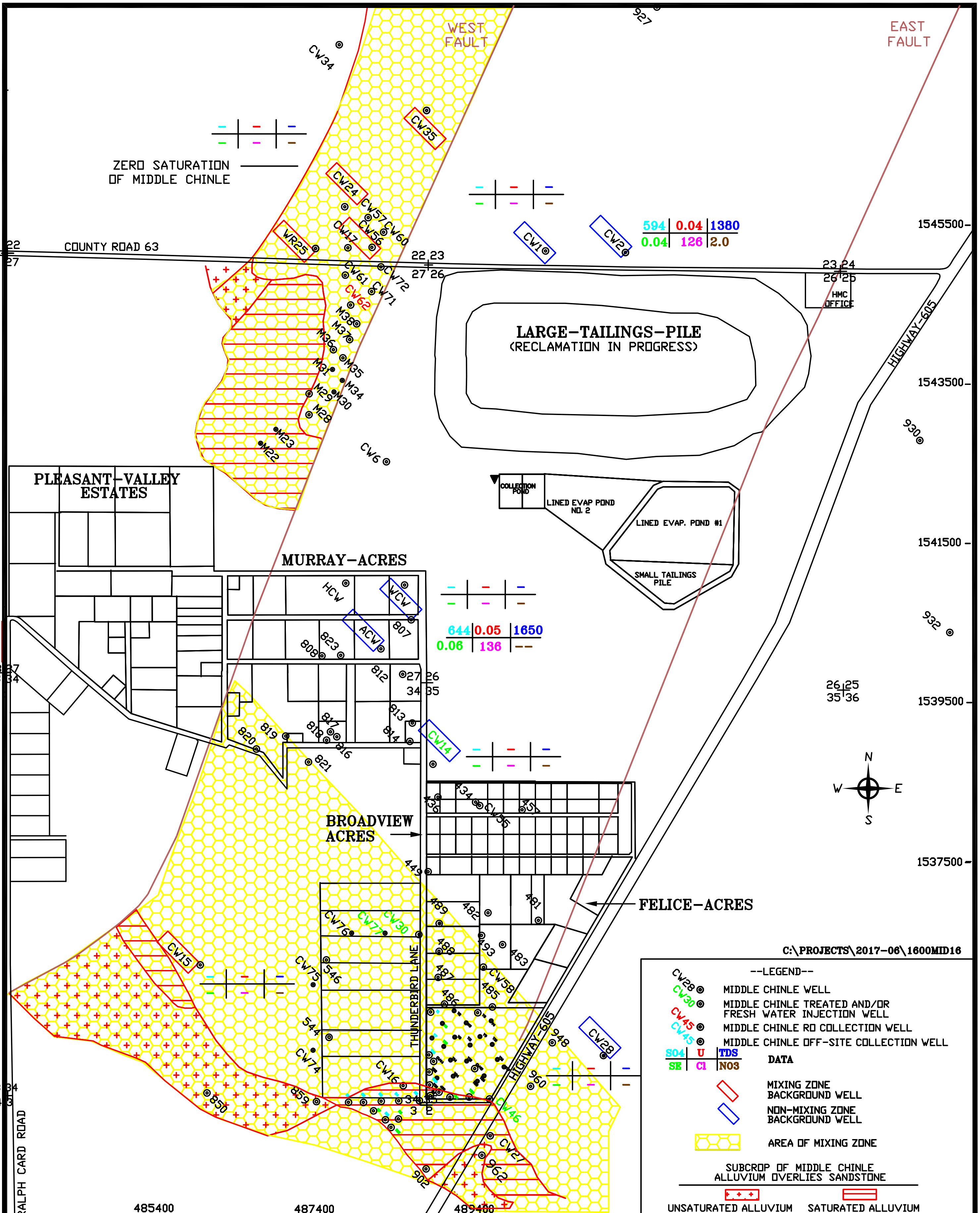
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/8/2017

FIGURE 3.3-1. UPPER CHINLE MIXING ZONE AND 2016 GROUND WATER QUALITY

SCALE: 1"= 1600'

PAGE: 3.3-2

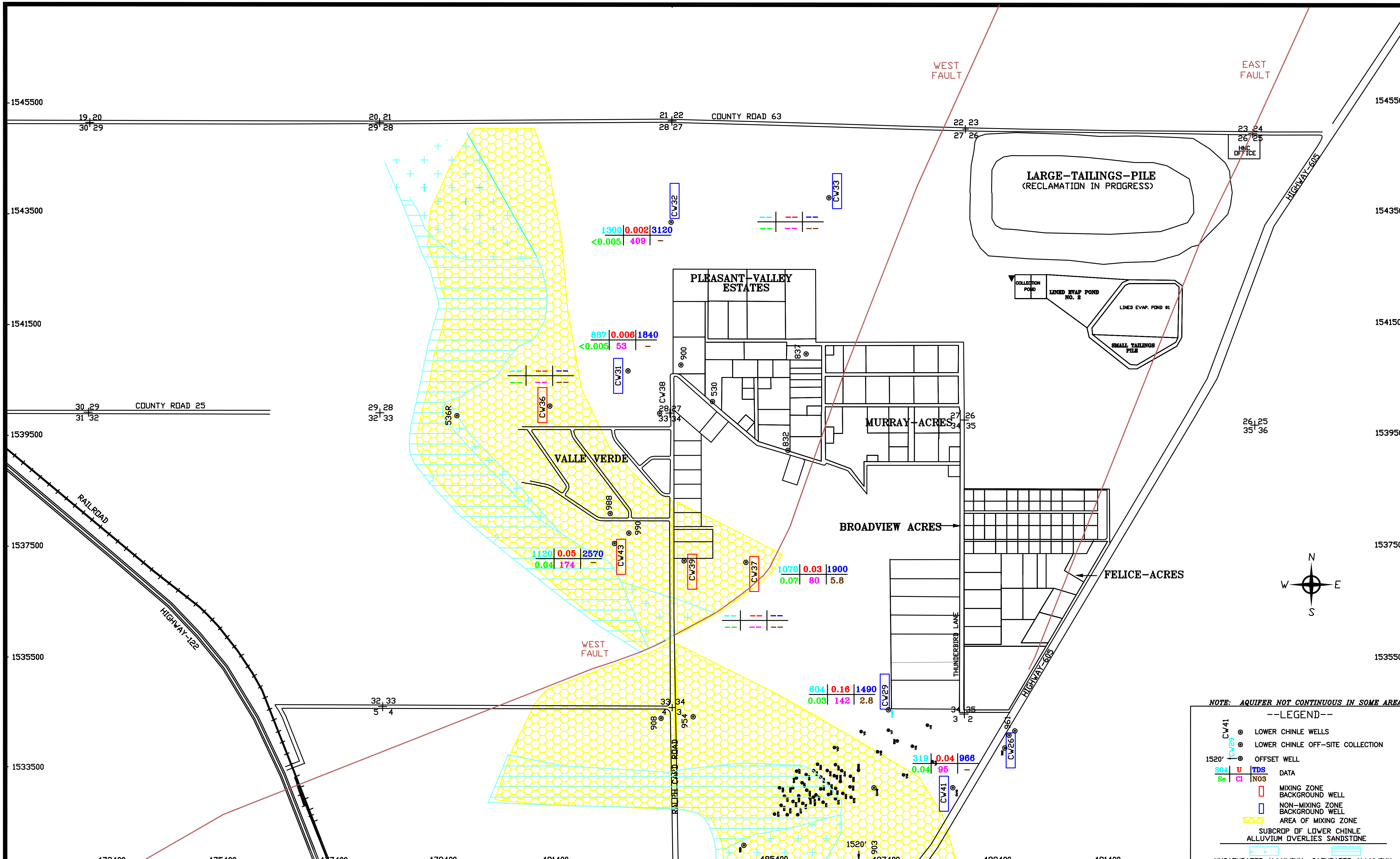


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/6/2017

FIGURE 3.3-2. MIDDLE CHINLE MIXING ZONE AND 2016 GROUND WATER QUALITY

SCALE: 1"=1600'



SCALE: 1" = 1600'

C:\PROJECTS\2017-06\1600LOW16

DATE: 2/7/2017

FIGURE 3.3-3. LOWER CHINLE MIXING ZONE AND 2016 GROUND WATER QUALITY

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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 2016 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 2016. Table 3.4-1 also presents the 2016 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 2016 data (CW50 and CW18).

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 2016 data collected for background wells CW2 and ACW.

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 2016 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 ground water 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. 2016 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	-	-	-	-	-	-	-	-
CW50	<0.005	0.03	<0.03	1650	876	-	-	-
CW52	-	-	-	-	-	-	-	-
CW15	-	-	-	-	-	-	-	-
CW24	-	-	-	-	-	-	-	-
CW35	-	-	-	-	-	-	-	-
CW36	-	-	-	-	-	-	-	-
CW37	0.07	0.03	<0.03	1900	1070	80	5.8	-
CW39	-	-	-	-	-	-	-	-
CW43	0.04	0.05	<0.03	2570	1120	174	-	-
UPPER CHINLE NON-MIXING ZONE WELLS								
931	-	-	-	-	-	-	-	-
934	-	-	-	-	-	-	-	-
CW18	0.01	0.03	<0.03	2000	719	217	1.6	-
MIDDLE CHINLE NON-MIXING ZONE WELLS								
ACW	0.06	0.05	<0.03	1650	644	136	-	-
CW1	-	-	-	-	-	-	-	-
CW2	0.04	0.04	<0.03	1380	595	13.6	2.0	-
CW28	-	-	-	-	-	-	-	-
WCW	-	-	-	-	-	-	-	-
LOWER CHINLE NON-MIXING ZONE WELLS								
CW26	-	-	-	-	-	-	-	-
CW29	0.03	0.16	<0.03	1490	604	14.2	2.8	-
CW31	<0.005	0.006	<0.03	1840	887	53	-	-
CW32	<0.005	0.002	<0.03	3120	1300	409	-	-
CW33	-	-	-	-	-	-	-	-
CW41	0.04	0.04	<0.03	966	319	95	-	-

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

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4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2016 monitoring results for the alluvial aquifer. The alluvial aquifer immediately underlies the Grants Project site and is therefore the most important ground water 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

Thirty eight new alluvial wells were drilled and no new additional infiltration lines installed during 2016. Ten new alluvial wells were drilled west and south of the LTP. Six of the new B alluvial wells were drilled to the south of the LTP while four new S alluvial wells were drilled to the west of the LTP. Twenty eight new alluvial wells (R wells) were drilled in Section 3 in the SOS area. 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 2016. Figure 4.1-1A shows the wells in the OS area while Figure 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 2016. 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 and 950 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

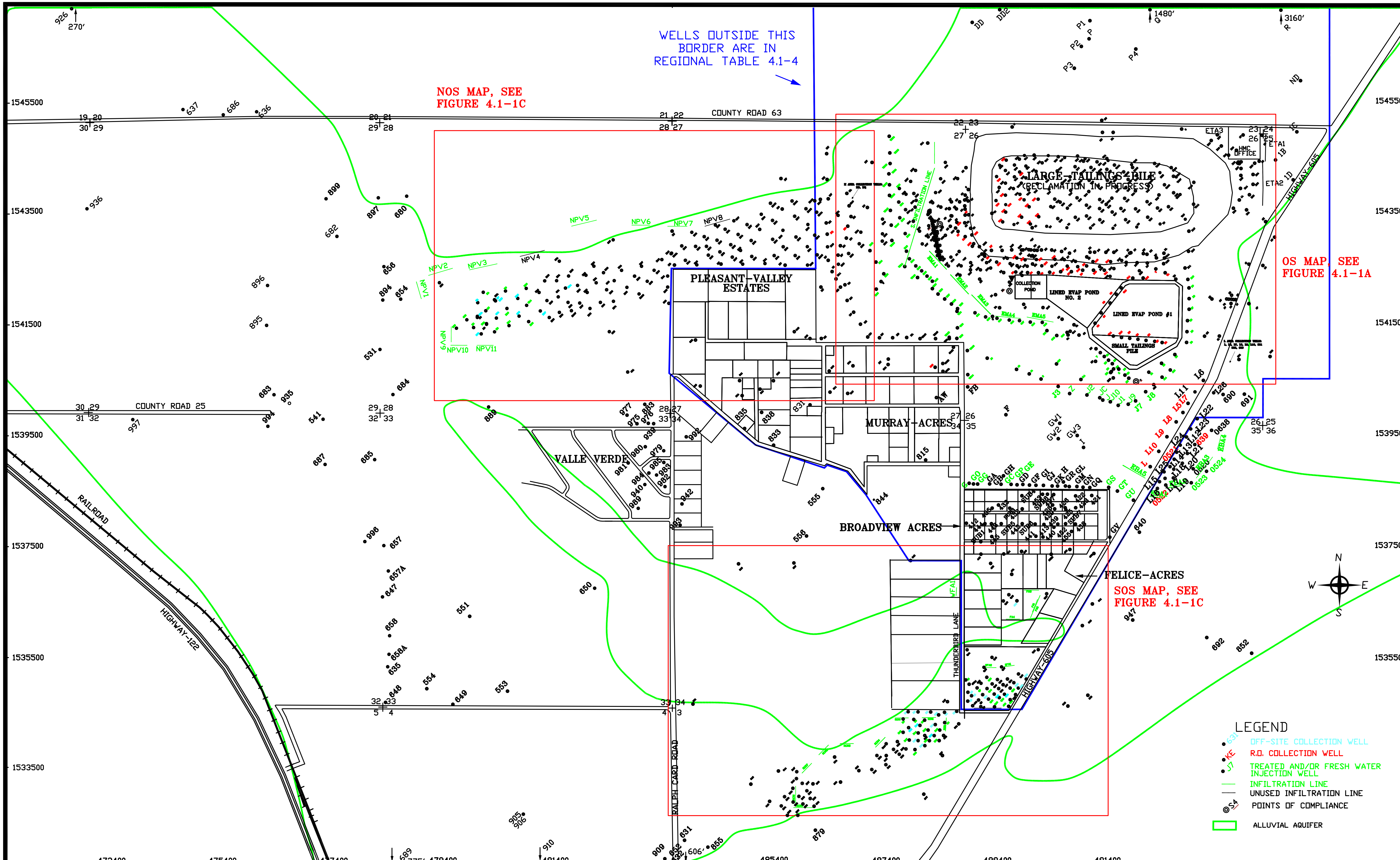
2016. Figure 4.1-1B shows that South collection alluvial wells 862, 866, Q2, Q3, Q5, Q11, Q18, Q23, Q28, Q29, Q30, R1, R2, R3 R4, R5, R10, R11, R18, R20 and R22 were pumped in 2016. Figure 4.1-1C shows that North collection alluvial wells 634, 659, 890, H1, H2A, H7, H7B, H12, H17 and H24 were pumped in 2016. This water was pumped to the zeolite for treatment during the second half of the year. Table 4.1-1 presents basic well data for alluvial wells located on the Grants Project that have been used to define the alluvial ground water 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. Over 200 alluvial wells are included on the regional table, which brings the total number of alluvial wells used to characterize this site to more than 600. 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.



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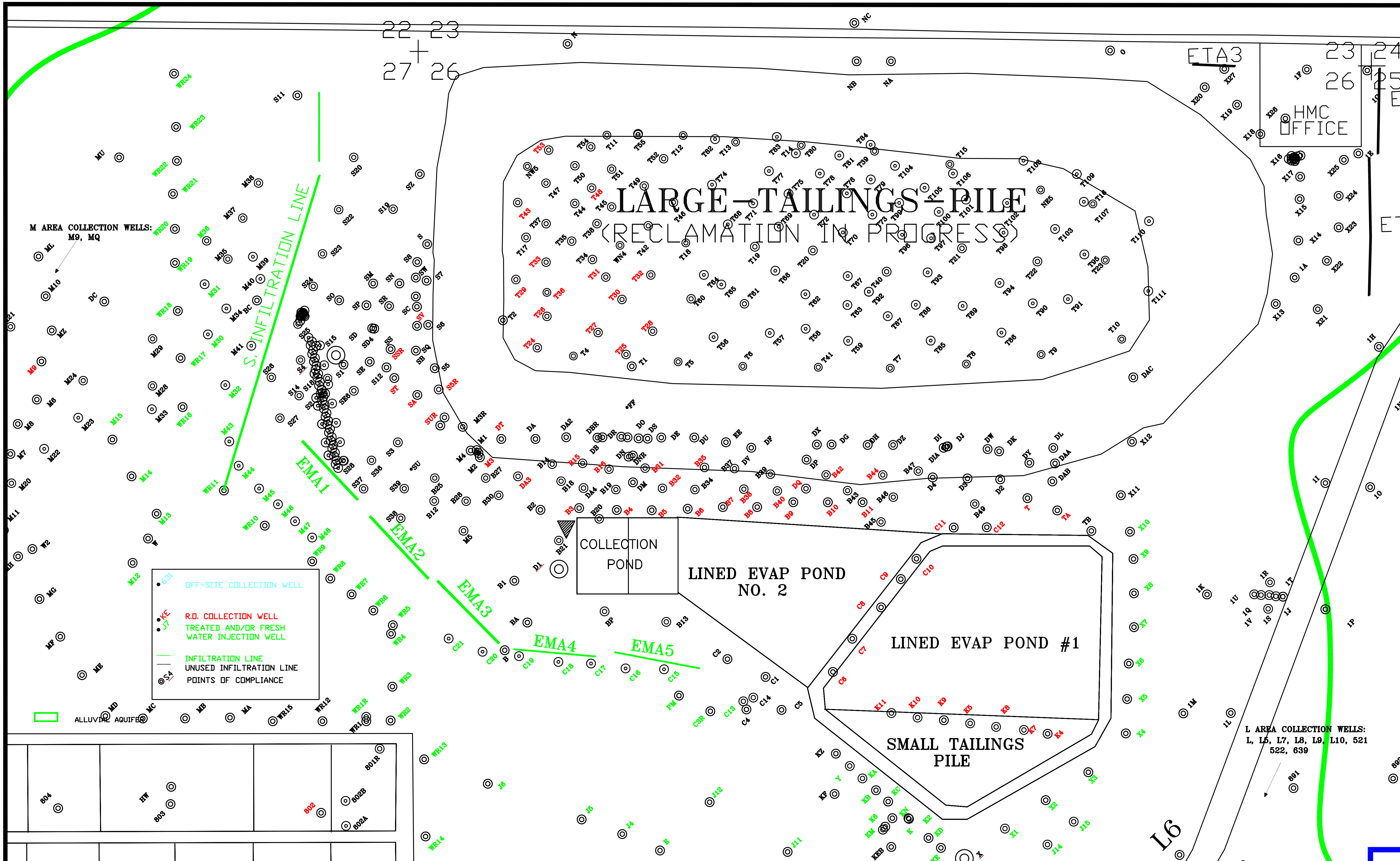
DATE: 3/1/16

FIGURE 4.1-1 ALLUVIAL WELL LOCATIONS

4.1-4



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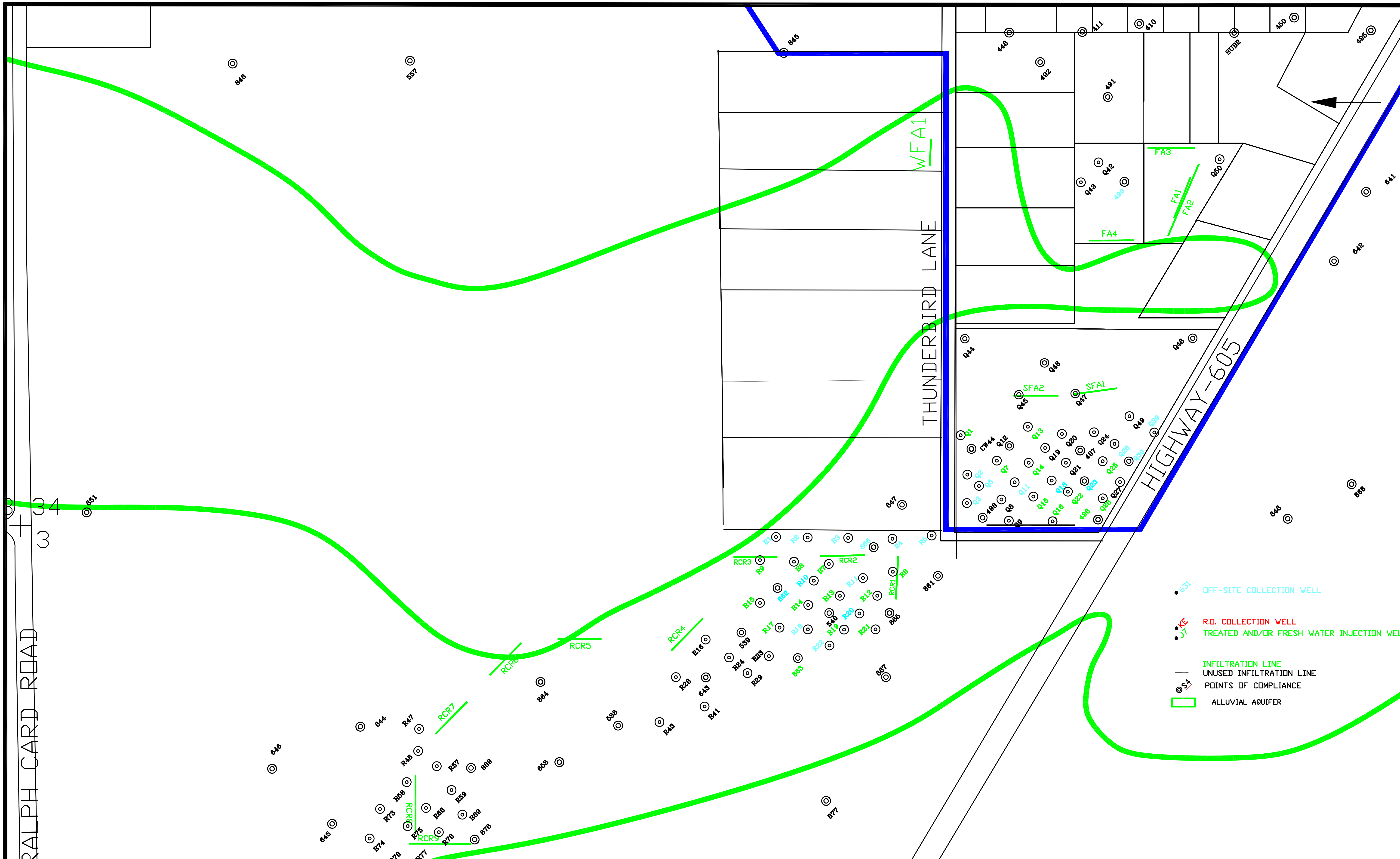
1600QAL16 BMW
DATE: 2/24/17

FIGURE 4.1-1A. ALLUVIAL WELL LOCATIONS, OS, 2016

4.1-5



SCALE: 1"=500'
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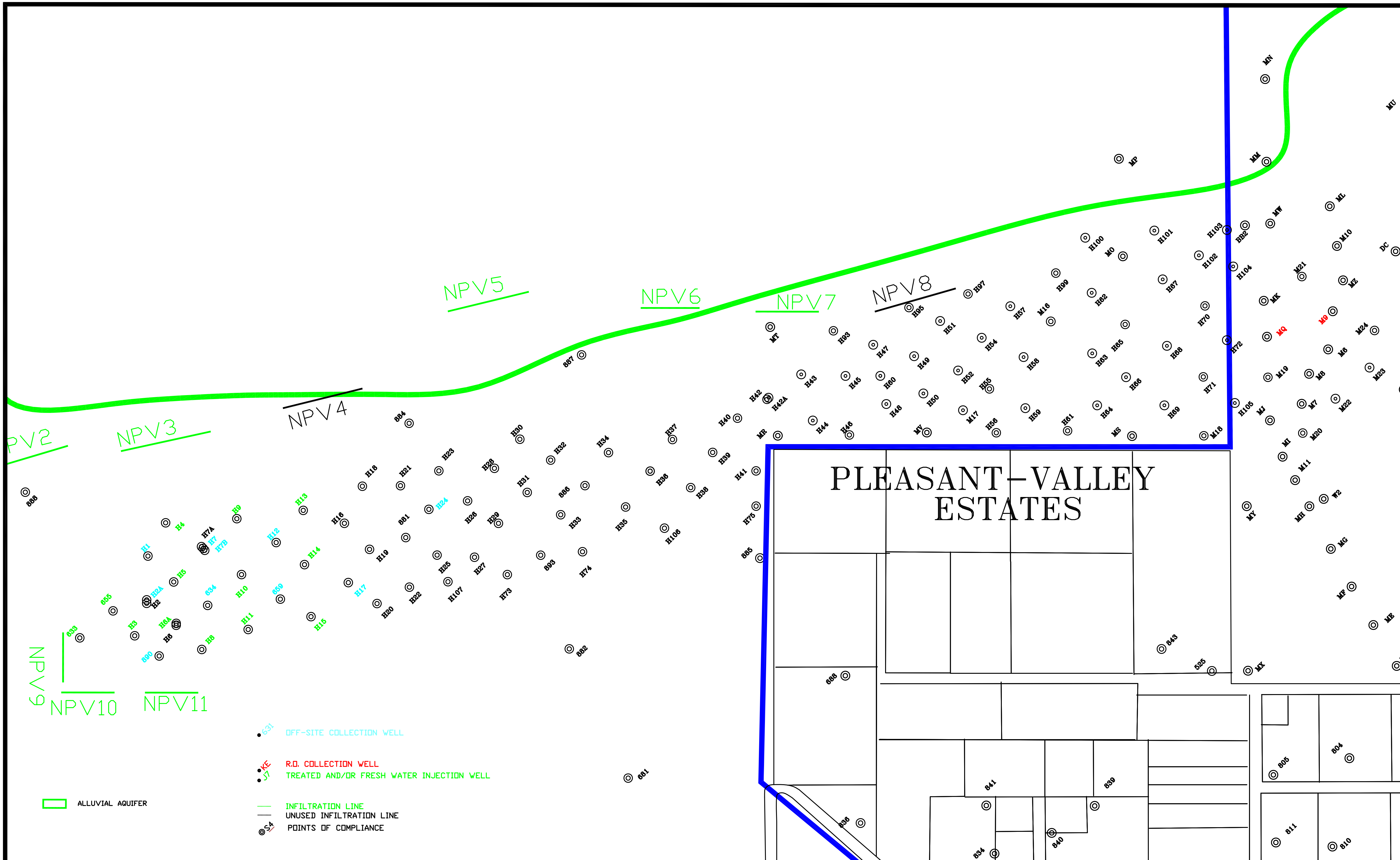
1600QAL16
DATE: 2/23/17

FIGURE 4.1-1B. ALLUVIAL WELL LOCATIONS, SOS, 2016

4.1-6



SCALE: 1"=500'
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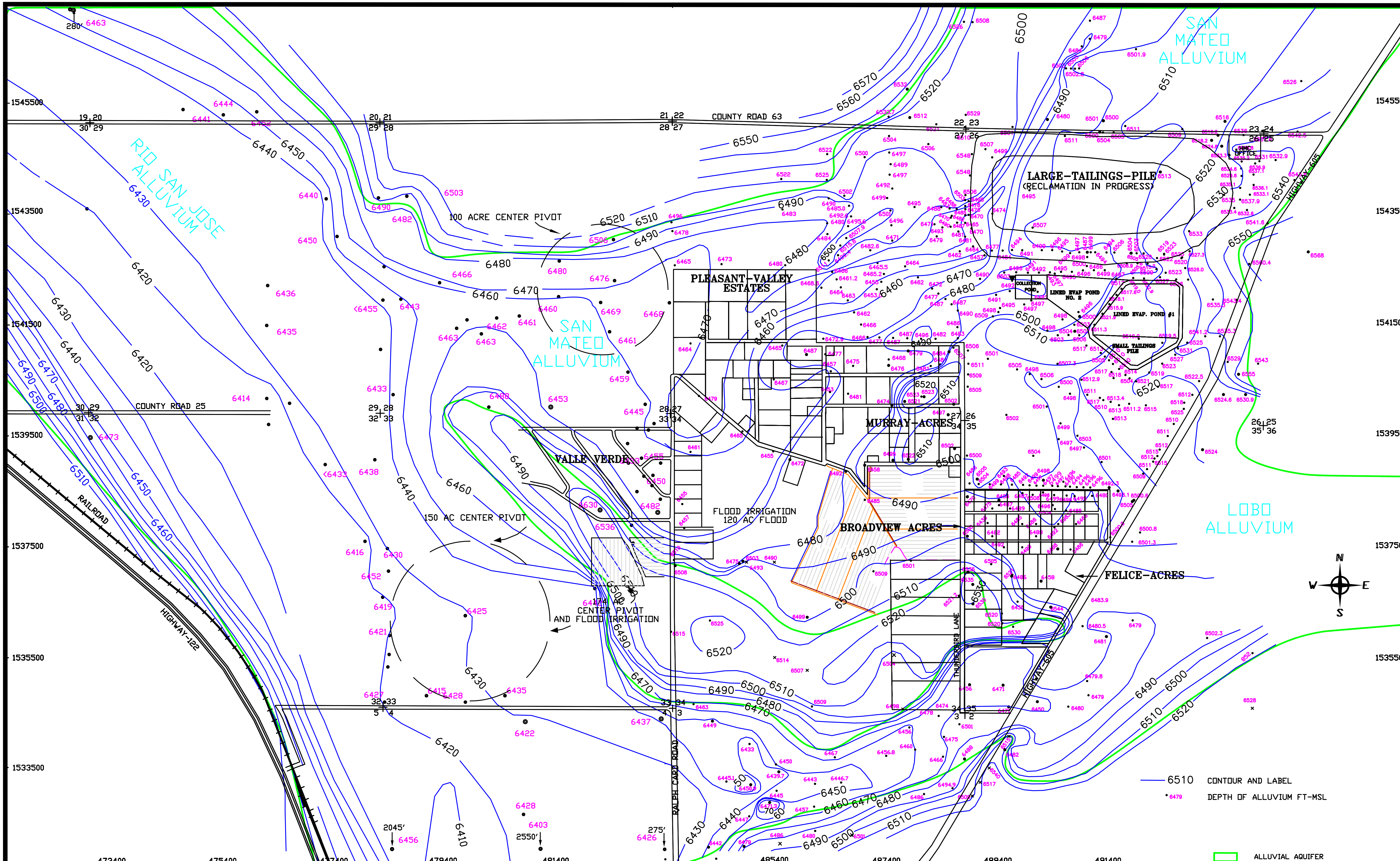
1600QAL16
DATE: 2/23/17

FIGURE 4.1-1C. ALLUVIAL WELL LOCATIONS, NOS, 2016



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1600QAL14
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	12/12/2016	36.62	6545.44	2.5	6582.06	55	6524.6 A	25-65	20.9
0691	1540276	493860	66.0	5.0	12/12/2016	42.43	6546.38	2.9	6588.81	55	6530.9 A	26-66	15.5
0891	1540904	493751	54.0	5.0	2/19/2013	32.46	6548.66	2.1	6581.12	50	6529.0 A	24-54	19.6
0892	1540954	494317	50.0	5.0	12/12/2016	38.52	6548.69	2.0	6587.21	42	6543.2 A	30-50	5.5
1A	1543790	493768	61.0	5.0	4/16/2012	38.29	6547.14	2.9	6585.43	47	6535.5 A	39-51	11.6
1B	1544502	494412	51.8	5.0	10/30/2001	38.70	6545.72	1.5	6584.42	50	6532.9 A	20-50	12.8
1C	1545018	494799	52.9	5.0	12/13/2016	38.22	6549.77	2.5	6587.99	43	6542.5 A	34-54	7.3
1D	1544142	494752	42.9	5.0	12/3/2005	26.42	6559.55	2.2	6585.97	40	6543.8 A	22-42	15.8
1E	1544481	494116	51.4	5.0	4/16/2012	36.80	6547.51	2.1	6584.31	43	6539.2 A	34-54	8.3
1F	1544952	493831	61.8	5.0	9/29/2016	38.92	6548.46	1.8	6587.38	54	6531.6 A	30-60	16.9
1G	1545034	494170	57.5	5.0	11/14/2012	39.28	6547.79	2.3	6587.07	48	6536.8 A	35-55	11.0
1H	1543363	494266	55.4	5.0	12/13/2016	55.45	6530.94	1.8	6586.39	43	6541.6 A	25-55	0.0
1I	1542627	493928	49.8	5.0	12/13/2016	50.25	6548.10	1.3	6598.35	35	6562.1 A	27-47	0.0
1J	1541986	493695	50.3	5.0	4/17/2012	37.80	6547.60	1.8	6585.40	40	6543.6 A	30-50	4.0
1K	1541992	493275	55.6	5.0	11/14/2012	35.20	6548.93	1.0	6584.13	47	6536.1 A	30-55	12.8
1L	1541256	493416	53.4	5.0	11/4/2008	27.46	6551.15	3.1	6578.61	40	6535.5 A	35-55	15.6
1M	1541327	493133	43.1	5.0	9/29/2016	26.75	6548.78	1.3	6575.53	33	6541.2 A	25-54	7.6
1N	1543100	494396	45.6	5.0	12/12/2016	30.20	6560.65	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	12/12/2016	32.48	6552.76	2.6	6585.24	35	6547.6 A	20-40	5.1
1Q	1541993	493619	56.0	5.0	1/20/2016	27.25	6555.86	1.9	6583.11	56	6525.2 A	36-56	30.7
1R	1542071	493623	56.0	5.0	1/20/2016	28.25	6557.74	1.3	6585.99	56	6528.7 A	36-56	29.1
1S	1541920	493614	56.0	5.0	4/17/2012	35.80	6546.19	1.5	6581.99	56	6524.5 A	36-56	21.7
1T	1541990	493656	56.0	5.0	1/20/2016	26.17	6558.74	1.7	6584.91	56	6527.2 A	36-56	31.5
1U	1542001	493542	44.2	4.0	1/20/2016	29.63	6556.59	3.2	6586.22	---	--- A	-	---
1V	1541982	493579	61.4	5.0	1/20/2016	28.00	6556.94	1.7	6584.94	---	--- A	-	---
* A1	1542365	491539	55.6	4.0	1/12/1994	45.29	6527.86	1.1	6573.15	55	6517.1 A	37-57	10.8
* A2	1542356	491539	46.4	4.0	12/23/1991	47.98	6525.42	1.1	6573.40	---	--- A	27-47	---
B	1541684	489311	68.6	4.0	7/25/2016	33.34	6537.56	2.4	6570.90	60	6508.5 A	49-69	29.1
B1	1542071	489370	90.9	5.0	12/12/2016	35.90	6535.75	0.6	6571.65	82	6489.1 A	62-82	46.7
B2	1542475	489515	83.0	5.0	10/17/2006	42.08	6532.17	2.0	6574.25	72	6500.3 A	55-75	31.9
B3	1542480	489731	87.0	5.0	7/14/2008	68.00	6506.29	2.6	6574.29	77	6494.7 A	58-78	11.6
B4	1542471	489942	88.8	5.0	7/14/2008	64.98	6509.68	7.4	6574.66	82	6485.3 A	63-83	24.4
B5	1542474	490141	91.0	5.0	7/14/2008	57.60	6515.86	1.4	6573.46	81	6491.1 A	62-82	24.8
B6	1542478	490341	90.0	5.0	12/5/2000	48.94	6528.75	2.0	6577.69	80	6495.7 A	63-83	33.1
B7	1542488	490540	87.0	5.0	11/23/2013	47.36	6527.04	2.2	6574.40	77	6495.2 A	53-78	31.8

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	6/12/2015	36.20	6539.55	2.3	6575.75	77	6496.5 A	53-78	43.1
B9	1542514	490935	86.0	5.0	6/15/2005	40.03	6536.14	2.2	6576.17	76	6498.0 A	51-78	38.2
B10	1542517	491133	84.8	5.0	7/14/2008	48.91	6527.86	2.3	6576.77	75	6499.5 A	51-78	28.4
B11	1542517	491329	84.9	5.0	7/14/2008	53.00	6524.39	2.2	6577.39	77	6498.2 A	42-80	26.2
B12	1542524	488915	100.0	5.0	12/12/2016	36.50	6536.52	2.2	6573.02	91	6479.8 A	30-100	56.7
B13	1541841	490223	80.0	5.0	11/30/2015	28.77	6541.27	3.1	6570.04	72	6494.9 A	30-80	46.3
B14	1542733	489579	120.0	4.5	4/22/2014	34.46	6541.19	2.0	6575.65	68	6505.7 A	60-120	35.5
B15	1542708	489749	120.0	4.5	4/23/2014	35.09	6541.22	2.0	6576.31	72	6502.3 A	60-120	38.9
B16	1542705	489900	120.0	4.5	---	---	---	2.0	6575.37	83	6490.4 A	60-120	---
B17	1542647	489516	95.0	4.5	---	---	---	2.0	---	---	--- A	55-95	---
B18	1542652	489634	120.0	4.5	9/5/2014	38.48	6537.65	2.0	6576.13	70	6504.1 A	60-120	33.5
B19	1542605	489936	120.0	4.5	9/11/2014	39.79	6534.22	2.0	6574.01	90	6482.0 A	60-120	52.2
B20	1542444	489847	120.0	4.5	10/9/2014	40.11	6534.33	2.0	6574.44	90	6482.4 A	60-120	51.9
B21	1542315	489619	80.0	4.5	9/11/2014	38.45	6535.57	2.0	6574.02	80	6492.0 A	50-80	43.5
B25	1542644	488917	90.0	4.5	9/8/2014	35.77	6537.90	2.0	6573.67	90	6481.7 A	50-90	56.2
B26	1542813	488984	110.0	4.5	---	---	---	2.0	---	---	--- A	50-110	---
B27	1542667	489204	90.0	4.5	9/8/2014	36.57	6537.47	2.0	6574.04	90	6482.0 A	50-90	55.4
B28	1542538	489095	90.0	4.5	9/8/2014	36.43	6537.55	2.0	6573.98	80	6492.0 A	50-90	45.6
B30	1542568	489281	90.0	4.5	9/5/2014	35.38	6539.35	2.0	6574.73	90	6482.7 A	50-90	56.6
B31	1542710	490103	120.0	4.5	4/24/2014	37.57	6538.39	2.0	6575.96	83	6491.0 A	60-100	47.4
B32	1542598	490201	120.0	4.5	4/24/2014	36.91	6538.48	2.0	6575.39	93	6480.4 A	60-120	58.1
B33	1542709	490268	85.0	4.5	---	---	---	2.0	---	---	--- A	45-85	---
B34	1542601	490388	90.0	4.5	9/5/2014	37.12	6538.57	2.0	6575.69	90	6483.7 A	50-90	54.9
B35	1542714	490393	90.0	4.5	9/5/2014	38.12	6538.74	2.0	6576.86	90	6484.9 A	50-90	53.9
B36	1542668	490467	85.0	4.5	---	---	---	2.0	6576.44	---	--- A	40-85	---
B37	1542711	490543	80.0	4.5	9/11/2014	35.60	6540.73	2.0	6576.33	80	6494.3 A	40-80	46.4
B38	1542607	490662	80.0	4.5	9/5/2014	35.76	6539.91	2.0	6575.67	80	6493.7 A	40-80	46.2
B39	1542667	490816	80.0	4.5	9/10/2014	37.49	6539.11	2.0	6576.60	80	6494.6 A	40-80	44.5
B40	1542595	490850	80.0	4.5	9/10/2014	38.64	6537.25	2.0	6575.89	80	6493.9 A	40-80	43.4
B41	1542647	490930	85.0	4.5	---	---	---	2.0	---	---	--- A	40-85	---
B42	1542679	491060	80.0	4.5	9/10/2014	38.77	6540.20	2.0	6578.97	80	6497.0 A	40-80	43.2
B43	1542610	491235	80.0	4.5	9/5/2014	35.49	6541.47	2.0	6576.96	80	6495.0 A	40-80	46.5
B44	1542665	491360	80.0	4.5	9/8/2014	37.95	6540.65	2.0	6578.60	80	6496.6 A	40-80	44.0
B45	1542423	491434	80.0	4.5	10/9/2014	35.31	6541.61	2.0	6576.92	80	6494.9 A	40-80	46.7
B46	1542539	491507	80.0	4.5	9/10/2014	37.87	6541.39	2.0	6579.26	80	6497.3 A	40-80	44.1
B47	1542695	491639	80.0	4.5	9/8/2014	35.51	6543.45	2.0	6578.96	80	6497.0 A	40-80	46.5

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	1542381	491636	80.0	4.5	---	---	---	2.0	---	---	--- A	40-80	---
B49	1542521	491966	80.0	4.5	9/10/2014	34.86	6545.00	2.0	6579.86	80	6497.9 A	40-80	47.1
BA	1541835	489440	86.0	5.0	7/25/2016	35.39	6536.19	1.7	6571.58	76	6493.9 A	64-78	42.3
BB2	1543791	486213	56.6	4.0	11/15/2002	53.36	6520.44	0.6	6573.80	---	--- A	42-62	---
BC	1543655	487910	82.8	4.0	12/12/2016	33.89	6540.72	2.6	6574.61	75	6497.0 A	63-83	43.7
BP	1541882	489841	85.4	4.0	11/14/2012	38.43	6533.87	3.0	6572.30	75	6494.3 A	40-85	39.6
* C	1541762	490854	79.7	4.0	5/16/1994	41.50	6529.34	0.3	6570.84	75	6495.5 A	59-79	33.8
C1	1541533	490780	76.0	5.0	11/13/2012	30.91	6540.95	0.8	6571.86	67	6504.1 A	41-68	36.9
C2	1541630	490566	76.0	5.0	11/13/2012	25.68	6539.34	0.9	6565.02	66	6498.1 A	42-67	41.2
* C3	1541344	490481	75.0	5.0	6/20/1994	36.20	6532.33	0.9	6568.53	65	6502.6 A	45-67	29.7
C3R	1541338	490472	75.0	5.0	3/7/2002	18.00	6551.29	2.0	6569.29	66	6501.3 A	43-68	50.0
C4	1541348	490675	75.0	5.0	10/2/2000	39.66	6531.18	1.3	6570.84	66	6503.5 A	46-66	27.6
C5	1541344	490869	72.0	5.0	11/14/2012	27.70	6542.15	0.8	6569.85	62	6507.1 A	43-63	35.1
C6	1541533	491142	80.8	5.0	3/15/2016	54.00	6530.89	1.6	6584.89	72	6511.3 A	34-74	19.6
C7	1541734	491280	72.4	5.0	10/1/2015	55.50	6528.94	1.5	6584.44	61	6521.9 A	25-65	7.0
C8	1541906	491415	78.1	5.0	9/29/2016	7.37	6577.12	1.6	6584.49	67	6515.9 A	31-71	61.2
C9	1542075	491545	77.0	5.0	3/15/2016	30.50	6554.05	1.5	6584.55	65	6518.1 A	27-67	36.0
C10	1542182	491629	71.6	5.0	9/29/2016	7.41	6577.85	2.7	6585.26	65	6517.6 A	30-70	60.3
C11	1542376	491844	68.2	5.0	9/29/2016	39.47	6541.91	2.4	6581.38	60	6519.0 A	35-65	22.9
C12	1542375	492029	63.5	5.0	9/29/2016	43.80	6536.75	2.6	6580.55	55	6523.0 A	34-64	13.8
C13	1541394	490655	63.0	5.0	11/9/2005	30.00	6540.01	2.0	6570.01	63	6505.0 A	36-70	35.0
C14	1541413	490713	63.0	5.0	11/9/2005	29.95	6539.74	2.0	6569.69	63	6504.7 A	36-70	35.0
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	7/5/2011	37.10	6535.79	0.8	6572.89	90	6482.1 A	71-91	53.7
D1	1542140	489615	89.4	4.0	7/11/2016	37.67	6533.23	1.0	6570.90	80	6489.9 A	58-90	43.3
D2	1542641	492107	70.0	5.0	6/18/2014	46.20	6533.97	3.0	6580.17	62	6515.2 A	40-70	18.7
D3	1542646	491917	80.0	5.0	11/29/1999	0.50	6579.63	2.5	6580.13	72	6505.6 A	40-80	74.0
D4	1542652	491724	78.0	5.0	11/29/1999	0.50	6578.93	2.5	6579.43	70	6506.9 A	48-78	72.0
DA	1542864	489488	99.1	5.0	12/4/1997	61.40	6524.15	3.0	6585.55	90	6492.6 A	50-100	31.6
DA2	1542881	489656	82.1	5.0	1/13/1995	51.11	6536.18	2.8	6587.29	83	6501.5 A	64-74	34.7

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	6/11/2015	39.28	6535.08	2.6	6574.36	72	6499.8 A	30-81	35.3
DA4	1542598	489756	81.0	5.0	6/26/2002	76.50	6497.47	1.7	6573.97	71	6501.3 A	31-81	0.0
DAA	1542733	492411	62.7	5.0	12/5/2000	2.00	6578.60	2.2	6580.60	54	6524.4 A	30-60	54.2
DAB	1542633	492399	65.1	5.0	12/5/2000	0.50	6579.38	2.3	6579.88	56	6521.6 A	30-60	57.8
DAC	1543218	492851	67.7	5.0	---	---	---	4.1	6620.36	45	6571.3 A	20-30	---
DB	1542874	489842	73.2	5.0	9/8/1998	66.15	6523.33	0.5	6589.48	---	--- A	55-85	---
DBR	1542877	489855	55.6	5.0	1/25/1995	52.19	6536.97	4.8	6589.16	---	--- A	-	---
DC	1543646	487060	64.1	4.0	12/12/2016	36.52	6534.79	2.7	6571.31	---	--- A	45-65	---
DD	1546989	488943	78.5	4.0	10/6/2016	47.50	6545.09	1.9	6592.59	83	6507.7 A	40-80	37.4
DD2	1547439	489251	94.3	5.0	10/7/2016	45.26	6548.02	2.0	6593.28	80	6511.3 A	50-90	36.7
DE	1542877	490193	70.2	5.0	10/5/1998	63.70	6527.65	0.8	6591.35	80	6510.6 A	60-90	17.1
DF	1542839	490869	88.5	5.0	5/23/2002	65.06	6525.53	0.6	6590.59	---	--- A	65-95	---
DG	1542839	491157	88.9	5.0	5/23/2002	59.80	6531.98	0.4	6591.78	---	--- A	65-95	---
DH	1542835	491365	61.7	5.0	12/24/1991	52.65	6538.69	4.8	6591.34	---	--- A	65-95	---
DI	1542821	491788	86.1	5.0	12/9/1997	57.87	6531.75	2.3	6589.62	75	6512.3 A	35-85	19.4
DIA	1542821	491793	---	4.0	12/23/1991	50.41	6543.22	1.4	6593.63	---	--- A	-	---
DJ	1542821	491793	85.7	5.0	8/24/1988	46.87	6542.69	0.7	6589.56	75	6513.9 A	35-85	28.8
DK	1542799	492094	65.4	5.0	12/23/1991	43.58	6542.33	0.7	6585.91	55	6530.2 A	35-55	12.1
DL	1542813	492398	64.4	5.0	12/5/2000	2.00	6582.87	2.9	6584.87	55	6527.0 A	35-55	55.9
DM	1542628	490035	62.8	5.0	12/14/2000	52.00	6523.08	3.0	6575.08	---	--- A	-	---
DN	1542776	490020	66.7	4.0	12/14/2000	51.52	6525.14	3.7	6576.66	---	--- A	-	---
DNR	1542779	490031	79.7	4.0	12/5/2000	51.80	6525.26	3.3	6577.06	---	--- A	-	---
DO	1542874	490049	75.8	5.0	12/5/2000	65.20	6525.13	1.6	6590.33	75	6513.7 A	65-75	11.4
DP	1542754	491012	79.8	5.0	6/26/2002	53.46	6526.25	3.5	6579.71	---	--- A	-	---
DQ	1542592	491006	85.3	5.0	6/11/2015	40.77	6535.66	2.2	6576.43	---	--- A	-	---
DR	1542884	489966	87.8	5.0	6/11/2015	55.75	6535.08	2.7	6590.83	85	6503.1 A	65-85	32.0
DS	1542876	490118	87.0	5.0	8/2/1999	65.22	6523.59	0.9	6588.81	77	6510.9 A	62-77	12.7
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	7/6/1988	51.56	6539.51	2.9	6591.07	81	6507.2 A	61-81	32.3
DV	1542826	490702	80.0	5.0	8/28/2006	54.64	6530.96	2.9	6585.60	77	6505.7 A	60-80	25.3
DW	1542818	492029	73.4	5.0	12/5/2000	2.50	6586.16	3.6	6588.66	59	6526.1 A	45-60	60.1
DX	1542838	491074	90.0	6.0	8/2/1999	61.80	6530.18	1.0	6591.98	80	6511.0 A	60-90	19.2
DY	1542737	492271	65.7	5.0	12/5/2000	1.50	6579.11	2.3	6580.61	56	6522.3 A	15-65	56.8
DZ	1542834	491501	81.8	5.0	7/25/2016	51.70	6538.83	2.2	6590.53	---	--- A	-	---
E	1540553	490187	61.7	4.0	12/5/2000	2.00	6566.94	1.7	6568.94	60	6507.2 A	44-64	59.7
EE	1542853	490523	91.2	5.0	1/31/1995	45.26	6542.85	0.6	6588.11	80	6507.5 A	50-90	35.3

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
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	12/13/2016	30.14	6534.68	1.2	6564.82	62	6501.6 A	45-65	33.1
FB	1540417	488857	62.0	4.0	9/19/2016	31.41	6534.25	2.0	6565.66	58	6505.7 A	43-58	28.6
* FF	1542878	490017	---	4.0	6/21/1983	41.08	6535.46	0.2	6576.54	124	6452.3 A	52-132	83.1
G	1538672	488890	78.3	4.0	12/13/2004	4.00	6559.09	2.0	6563.09	75	6486.1 A	50-80	73.0
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	4/3/2000	4.00	6558.99	1.9	6562.99	64	6497.1 A	45-65	61.9
GC	1538650	489654	---	4.0	12/11/2003	33.82	6531.35	2.5	6565.17	78	6484.7 A	60-80	46.7
GD	1538646	489855	---	4.0	12/4/1995	0.50	6565.12	1.8	6565.62	72	6491.8 A	55-75	73.3
GE	1538637	489972	117.0	4.0	12/11/2003	34.61	6531.66	2.4	6566.27	65	6498.9 A	50-120	32.8
GF	1538632	490097	119.2	4.0	12/12/2016	33.10	6532.91	1.8	6566.01	67	6497.2 A	50-120	35.7
GG	1538662	489055	58.7	4.0	4/3/2000	4.00	6559.13	1.8	6563.13	57	6504.3 A	48-68	54.8
GH	1538807	489509	69.2	4.0	12/12/2016	30.20	6532.56	1.3	6562.76	67	6494.5 A	55-65	38.1
GI	1538631	490218	119.0	4.0	4/3/2000	4.00	6561.85	1.5	6565.85	67	6497.4 A	50-120	64.5
GJ	1538629	490382	119.2	4.0	4/3/2000	4.00	6562.15	2.0	6566.15	65	6499.2 A	50-120	63.0
GK	1538622	490482	115.7	4.0	4/13/2012	33.17	6533.59	2.4	6566.76	67	6497.4 A	50-120	36.2
GL	1538614	490701	119.3	4.0	4/3/2000	4.00	6563.15	2.1	6567.15	71	6494.1 A	50-120	69.1
GM	1538605	490824	118.2	4.0	4/3/2000	4.00	6563.65	2.1	6567.65	69	6496.6 A	50-120	67.1
GN	1538602	490944	116.5	4.0	3/15/2016	32.71	6535.26	1.8	6567.97	70	6496.2 A	50-120	39.1
GO	1538663	488973	122.3	4.0	4/3/2000	4.00	6559.00	1.6	6563.00	75	6486.4 A	50-120	72.6
GP	1538649	489752	121.4	4.0	12/5/2000	5.00	6559.87	2.1	6564.87	68	6494.8 A	50-120	65.1
GQ	1538599	491067	70.0	4.0	12/13/2010	1.40	6566.76	0.9	6568.16	71	6496.3 A	50-70	70.5
GR	1538619	490619	85.0	4.0	12/23/1991	36.55	6528.66	1.0	6565.21	75	6489.2 A	50-85	39.5
GS	1538597	491408	86.4	5.0	12/5/2000	33.00	6541.31	2.0	6574.31	80	6492.3 A	50-85	49.0
GT	1538534	491565	84.0	5.0	12/5/2000	8.30	6567.87	2.1	6576.17	76	6498.1 A	60-84	69.8
GU	1538367	491854	80.0	5.0	3/7/2002	15.00	6560.65	2.0	6575.65	73	6500.7 A	60-80	60.0
GV	1537701	491428	83.0	5.0	12/21/2016	46.77	6530.61	2.5	6577.38	74	6500.9 A	62-82	29.7
GW1	1539755	490530	73.0	5.0	12/12/2016	31.70	6533.57	1.0	6565.27	65	6499.3 A	48-73	34.3
GW2	1539471	490497	75.0	5.0	12/12/2016	31.90	6534.18	1.0	6566.08	68	6497.1 A	47-75	37.1
GW3	1539532	490835	72.0	5.0	5/4/1993	34.42	6531.86	1.0	6566.28	62	6503.3 A	45-72	28.6

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
H	1538703	490582	69.3	4.0	12/23/1991	37.93	6528.65	1.8	6566.58	69	6495.8 A	50-70	32.9
I	1539319	490954	70.0	4.0	10/20/2012	31.83	6535.37	1.6	6567.20	68	6497.6 A	52-72	37.8
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	59.5-79.5	---
IW-7S	1543151	488280	60.0	4.0	---	---	---	---	6574.94	---	--- A	35-55	---
IW-7D	1543174	488265	82.0						6574.02	---	--- A	57-77	---
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-10S	1543018	488307	58.0	4.0	---	---	---	---	6573.72	---	--- A	33-53	---
IW-10D	1543043	488292	81.0						6573.46	---	--- A	56-76	---
IW-11S	1542974	488317	60.0	4.0	---	---	---	---	6573.56	---	--- A	35-55	---
IW-11D	1542998	488302	78.0						6574.14	---	--- A	53-73	---
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-14S	1542839	488346	69.0	4.0	---	---	---	---	6573.10	---	--- A	44-64	---
IW-14D	1542863	488330	90.0						6573.04	---	--- A	65-85	---
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-16S	1542752	488365	67.0	4.0	---	---	---	---	6573.94	---	--- A	42-62	---
IW-16D	1542775	488350	89.0						6573.98	---	--- A	64-84	---
IW-17S	1542709	488373	69.0	4.0	---	---	---	---	6573.48	---	--- A	44-64	---
IW-17D	1542731	488359	97.0						6573.69	---	--- A	72-92	---
J	1540174	491302	65.6	4.0	12/5/2000	6.00	6564.19	3.4	6570.19	56	6510.8 A	46-68	53.4
J1	1540082	491585	57.0	6.0	12/5/2000	18.80	6553.05	3.8	6571.85	55	6513.1 A	50-57	40.0
J2	1540271	491013	58.0	6.0	12/5/2000	26.00	6544.19	2.9	6570.19	55	6512.3 A	50-58	31.9

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
J3	1540414	490499	70.0	6.0	12/5/2000	27.40	6541.74	2.6	6569.14	66	6500.5 A	43-70	41.2
J4	1540643	489974	80.0	6.0	12/5/2000	18.00	6551.52	3.9	6569.52	68	6497.6 A	40-70	53.9
J5	1540728	489747	65.0	6.0	12/5/2000	10.55	6559.24	2.8	6569.79	61	6506.0 A	50-65	53.2
J6	1540919	489221	67.0	6.0	12/5/2000	7.10	6563.00	3.7	6570.10	65	6501.4 A	48-67	61.6
J7	1540168	491892	61.9	5.0	12/5/2000	19.50	6550.88	2.1	6570.38	53	6515.3 A	40-60	35.6
J8	1540318	492064	63.2	5.0	12/5/2000	23.30	6547.49	2.4	6570.79	52	6516.4 A	35-61	31.1
J9	1540101	491759	68.0	5.0	12/5/2000	24.60	6546.60	2.0	6571.20	58	6511.2 A	36-68	35.4
J10	1540138	491436	66.0	5.0	12/5/2000	18.00	6552.91	3.5	6570.91	54	6513.4 A	36-66	39.5
J11	1540545	490909	66.0	5.0	12/5/2000	12.00	6557.86	2.0	6569.86	55	6512.9 A	36-66	45.0
J12	1540827	490466	70.0	5.0	12/5/2000	18.44	6551.86	3.0	6570.30	60	6507.3 A	40-70	44.6
J13	1540451	492218	55.0	5.0	2/5/2002	4.00	6564.40	1.8	6568.40	46	6520.6 A	15-55	43.8
J14	1540585	492367	55.0	5.0	2/5/2002	12.90	6556.08	1.7	6568.98	44	6523.3 A	15-55	32.8
J15	1540719	492521	55.0	4.0	2/5/2002	3.10	6566.53	2.2	6569.63	46	6521.4 A	15-55	45.1
JC	1540215	491240	60.0	5.0	12/5/2000	22.10	6546.34	1.8	6568.44	50	6516.6 A	35-55	29.7
K	1540730	491590	61.7	4.0	8/12/2002	2.00	6571.51	3.8	6573.51	60	6509.7 A	44-64	61.8
K2	1540736	491587	58.9	4.0	7/15/2005	19.40	6552.81	2.5	6572.21	58	6511.7 A	46-56	41.1
K3	1540744	491571	56.7	2.0	7/15/2005	19.20	6551.47	1.3	6570.67	---	--- A	53-58	---
K4	1541211	492371	86.2	5.0	7/18/2016	67.09	6534.93	2.5	6602.02	80	6519.5 A	65-85	15.4
K5	1541269	491935	86.4	5.0	7/18/2016	65.88	6535.85	2.8	6601.73	80	6518.9 A	55-85	16.9
K6	1540689	491459	58.0	5.0	3/6/2002	13.00	6557.07	2.0	6570.07	---	--- A	33-58	---
K7	1541232	492237	86.0	5.0	7/18/2016	61.27	6540.26	2.0	6601.53	79	6520.5 A	56-86	19.7
K8	1541250	492081	86.0	5.0	7/18/2016	67.30	6533.19	2.0	6600.49	78	6520.5 A	66-86	12.7
K9	1541287	491787	86.0	5.0	7/18/2016	61.55	6538.79	2.0	6600.34	79	6519.3 A	56-86	19.5
K10	1541305	491638	87.0	5.0	7/16/2015	70.02	6530.79	2.0	6600.81	81	6517.8 A	47-87	13.0
K11	1541325	491490	84.0	5.0	1/18/2016	62.40	6538.21	2.0	6600.61	78	6520.6 A	64-84	17.6
KA	1540959	491331	67.8	5.0	8/12/2002	13.00	6559.19	1.9	6572.19	65	6505.3 A	42-72	53.9
KB	1540893	491406	61.8	5.0	8/12/2002	0.60	6571.05	0.8	6571.65	60	6510.9 A	40-70	60.2
KC	1540826	491477	68.6	5.0	8/12/2002	0.50	6569.81	0.7	6570.31	59	6510.6 A	42-72	59.2
KD	1540627	491701	62.1	5.0	8/12/2002	1.10	6569.12	0.6	6570.22	---	--- A	40-70	---
KE	1540566	491776	60.8	5.0	8/12/2002	9.10	6563.18	2.5	6572.28	---	--- A	40-70	---
KEB	1540570	491487	59.9	5.0	7/21/2015	21.35	6548.38	1.5	6569.73	50	6518.2 A	40-60	30.1
KF	1540870	491169	63.5	5.0	7/21/2015	25.86	6544.35	2.2	6570.21	50	6518.0 A	30-60	26.3
KM	1540671	491444	52.4	5.0	3/6/2002	12.20	6557.57	2.2	6569.77	---	--- A	-	---
KN	1540734	491492	50.1	5.0	10/11/2002	8.36	6561.23	2.3	6569.59	---	--- A	-	---
KZ	1541100	491183	58.4	5.0	7/25/2016	29.44	6542.28	1.2	6571.72	---	--- A	-	---
L	1538970	492150	67.0	4.0	10/26/2016	56.96	6518.01	0.8	6574.97	59	6515.2 A	46-66	2.8

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
L5	1539946	492730	60.2	5.0	4/12/2016	35.53	6540.54	1.3	6576.07	50	6524.8 A	25-55	15.8
L6	1540526	493110	51.1	5.0	10/26/2016	27.95	6546.69	2.1	6574.64	50	6522.5 A	25-55	24.1
L7	1540113	492842	67.8	5.0	4/12/2016	54.24	6522.37	2.3	6576.61	62	6512.3 A	36-66	10.1
L8	1539773	492621	73.9	5.0	10/26/2016	9.74	6566.75	2.1	6576.49	65	6509.4 A	32-72	57.4
L9	1539509	492463	74.9	5.0	4/12/2016	47.63	6529.60	2.2	6577.23	64	6511.0 A	43-73	18.6
L10	1539250	492310	74.2	5.0	10/26/2016	44.03	6532.80	2.0	6576.83	63	6511.8 A	53-73	21.0
L11	1540323	492965	70.0	4.5	4/11/2014	28.68	6547.37	2.0	6576.05	70	6504.1 A	30-70	43.3
L12	1539507	492810	75.0	4.5	---	---	---	2.0	6586.94	70	6514.9 A	55-75	---
L13	1539233	492633	75.0	4.5	---	---	---	2.0	6585.41	75	6508.4 A	35-75	---
L14	1538972	492514	75.0	4.5	---	---	---	2.0	6580.84	60	6518.8 A	35-75	---
L15	1538701	492324	75.0	4.5	---	---	---	2.0	6578.40	70	6506.4 A	35-75	---
L16	1538579	492286	75.0	4.5	---	---	---	2.0	6579.50	70	6507.5 A	35-75	---
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	---	---	---	2.0	6581.05	70	6509.1 A	35-75	---
L20	1539033	492736	75.0	4.5	---	---	---	2.0	6584.64	70	6512.6 A	35-75	---
L21	1539211	492827	75.0	4.5	---	---	---	2.0	6586.62	70	6514.6 A	55-75	---
L22	1539822	493033	70.0	4.5	4/9/2014	45.86	6542.69	2.0	6588.55	70	6516.6 A	30-70	26.1
L23	1539654	492890	70.0	4.5	4/9/2014	49.54	6539.72	2.0	6589.26	70	6517.3 A	30-70	22.5
L24	1539361	492700	70.0	4.5	4/9/2014	50.10	6537.97	2.0	6588.07	70	6516.1 A	30-70	21.9
L25	1538880	492409	70.0	4.5	4/9/2014	43.54	6536.00	2.0	6579.54	70	6507.5 A	30-70	28.5
L26	1540306	493302	60.0	4.5	---	---	---	2.0	6579.67	---	--- A	20-60	---
M1	1542797	489157	103.4	4.0	1/3/1989	79.80	6505.17	1.5	6584.97	120	6463.5 A	66-106	41.7
M2	1542785	489159	40.4	4.0	1/20/1995	34.85	6541.41	1.4	6576.26	---	--- A	-	---
M3	1542805	489151	105.3	4.0	7/14/2008	60.23	6515.87	1.0	6576.10	---	--- A	79-99	---
M3R	1542926	489078	115.0	5.0	12/15/2004	50.70	6529.56	2.1	6580.26	108	6470.2 A	55-115	59.4
M4	1542804	489134	81.8	5.0	10/31/2000	56.72	6521.54	3.7	6578.26	---	--- A	78-82	---
M5	1542360	489080	92.3	5.0	12/12/2016	39.40	6535.94	3.2	6575.34	84	6488.1 A	60-90	47.8
M6	1543097	486674	110.0	5.0	12/12/2016	57.45	6517.59	2.2	6575.04	65	6507.9 A	60-110	9.7
M7	1542790	486523	83.0	5.0	12/12/2016	54.50	6518.35	2.4	6572.85	71	6499.4 A	63-83	18.9
M8	1542960	486567	83.0	5.0	9/5/2000	33.71	6541.52	2.4	6575.23	57	6515.8 A	53-83	25.7
M9	1543310	486699	103.0	5.0	12/12/2016	52.20	6524.61	3.5	6576.81	78	6495.3 A	63-103	29.3
M10	1543677	486723	88.0	5.0	12/12/2016	56.60	6516.76	2.3	6573.36	86	6485.1 A	58-88	31.7
M11	1542358	486486	118.0	5.0	12/8/2003	53.98	6519.24	3.2	6573.22	109	6461.0 A	58-118	58.2
M12	1542174	487209	124.0	5.0	12/5/2000	3.87	6569.64	2.5	6573.51	118	6453.0 A	57-124	116.7
M13	1542450	487336	117.0	5.0	12/5/2000	29.81	6546.35	3.0	6576.16	108	6465.2 A	57-117	81.2

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
M14	1542661	487216	117.0	5.0	12/5/2000	29.42	6547.75	2.7	6577.17	109	6465.5 A	57-117	82.3
M15	1542872	487094	102.0	5.0	12/5/2000	3.71	6575.37	3.5	6579.08	93	6482.6 A	52-102	92.7
M19	1542940	486334	100.0	4.5	4/23/2014	59.34	6516.79	2.0	6576.13	97	6477.1 A	60-100	39.7
M20	1542584	486588	100.0	4.5	4/23/2014	49.64	6525.90	2.0	6575.54	100	6473.5 A	60-100	52.4
M21	1543508	486526	100.0	4.5	4/23/2014	57.74	6516.98	2.0	6574.72	80	6492.7 A	60-100	24.3
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	4/23/2014	43.23	6531.47	2.0	6574.70	65	6507.7 A	60-120	23.8
M28	1543175	487326	120.0	4.5	4/23/2014	42.11	6536.65	2.0	6578.76	69	6507.8 A	60-120	28.9
M29	1543440	487326	120.0	4.5	4/23/2014	36.92	6535.95	2.0	6572.87	61	6509.9 A	60-120	26.1
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	4/15/2014	35.13	6539.59	2.0	6574.72	71	6501.7 A	60-120	37.9
M36	1543993	487631	120.0	4.5	4/15/2014	36.56	6538.88	2.0	6575.44	72	6501.4 A	60-120	37.4
M37	1544120	487835	120.0	4.5	4/15/2014	38.37	6537.07	2.0	6575.44	73	6500.4 A	60-120	36.6
M38	1544319	487923	120.0	4.5	4/15/2014	37.91	6541.71	2.0	6579.62	79	6498.6 A	60-120	43.1
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	12/12/2016	39.45	6532.77	1.0	6572.22	85	6486.2 A	70-85	46.5
MB	1541296	487512	90.0	4.0	9/5/2000	2.05	6570.01	1.0	6572.06	85	6486.1 A	60-90	84.0
MC	1541304	487264	100.0	4.0	12/12/2016	41.16	6530.90	1.0	6572.06	95	6476.1 A	70-100	54.8
MD	1541311	487050	105.0	4.0	9/5/2000	2.00	6569.46	1.0	6571.46	105	6465.5 A	75-105	104.0
ME	1541537	486934	105.0	4.0	9/5/2000	1.61	6569.31	1.0	6570.92	105	6464.9 A	75-105	104.4
MF	1541757	486808	110.0	4.0	12/12/2016	44.50	6527.78	1.0	6572.28	110	6461.3 A	90-110	66.5
MG	1541972	486694	110.0	4.0	9/5/2000	1.72	6571.36	1.0	6573.08	110	6462.1 A	90-110	109.3
MH	1542208	486569	110.0	4.0	12/12/2016	48.90	6525.02	1.0	6573.92	110	6462.9 A	90-110	62.1

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 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
MI	1542486	486413	110.0	4.0	9/5/2000	2.24	6574.03	1.0	6576.27	110	6465.3 A	90-110	108.8
MJ	1542682	486350	60.0	4.0	12/12/2016	58.90	6514.04	1.8	6572.94	60	6511.1 A	40-60	2.9
MK	1543373	486324	57.0	4.5	12/5/2011	59.75	6514.04	1.5	6573.79	92	6480.3 A	-	33.8
ML	1543902	486691	76.0	5.0	12/12/2016	49.60	6523.10	2.3	6572.70	80	6490.4 A	56-76	32.7
MM	1544154	486324	63.0	5.0	9/5/2000	3.46	6573.99	2.4	6577.45	50	6525.1 A	33-63	48.9
MN	1544613	486325	63.0	5.0	12/12/2016	60.10	6517.46	1.9	6577.56	42	6533.7 A	23-63	0.0
MQ	1543173	486326	98.0	5.0	3/16/2016	69.99	6504.31	1.6	6574.30	88	6484.7 A	58-98	19.6
MU	1544461	487143	80.0	5.0	12/12/2016	35.95	6538.24	1.5	6574.19	72	6500.7 A	50-80	37.5
MW	1543802	486346	85.0	5.0	12/12/2016	59.50	6515.41	1.9	6574.91	83	6490.0 A	35-85	25.4
MX	1541287	486244	103.0	5.0	3/15/2016	47.96	6520.65	1.7	6568.61	94	6472.9 A	63-103	47.7
MY	1542200	486213	112.0	5.0	12/16/2016	53.66	6519.90	3.0	6573.56	102	6468.6 A	72-112	51.3
MZ	1543485	486757	92.0	5.0	12/12/2016	60.00	6516.64	3.0	6576.64	84	6489.6 A	60-92	27.0
N	1545101	489665	92.0	4.0	11/20/2012	38.64	6545.33	0.9	6583.97	80	6503.1 A	54-94	42.3
NA	1545000	491488	91.4	5.0	10/28/2008	49.67	6541.31	1.1	6590.98	80	6509.9 A	50-90	31.4
NB	1545000	491296	96.4	5.0	8/27/2015	43.70	6549.60	3.5	6593.30	80	6509.8 A	50-90	39.8
NC	1545220	491282	95.0	4.0	12/13/2016	39.82	6546.01	0.8	6585.83	85	6500.0 A	65-95	46.0
ND	1545927	494872	70.0	4.0	5/12/2015	43.32	6549.57	1.1	6592.89	65	6526.8 A	50-70	22.8
NE5	1544279	492332	156.8	5.0	4/3/2007	57.00	6610.00	3.2	6667.00	150	--- T	50-110	---
										150	6513.8 A	135-155	96.2
NW5	1544408	489433	149.8	5.0	5/29/2007	42.72	6614.86	2.7	6657.58	155	--- T	39-79	---
										155	6499.9 A	119-159	115.0
O	1545060	492725	69.9	4.0	8/26/2015	35.80	6552.03	1.3	6587.83	77	6509.5 A	40-70	42.5
P	1546691	491058	109.1	4.0	10/26/2016	40.28	6546.98	1.7	6587.26	107	6478.6 A	82-112	68.4
P1	1547017	491060	105.0	6.0	11/28/2000	55.75	6536.72	0.8	6592.47	105	6486.7 A	60-105	50.1
P2	1546555	490912	105.0	6.0	12/29/2014	41.84	6547.95	0.9	6589.79	105	6483.9 A	60-105	64.1
P3	1546159	490785	95.0	5.0	3/31/2015	41.38	6548.57	2.2	6589.95	85	6502.8 A	55-95	45.8
P4	1546504	491899	92.0	5.0	12/29/2014	35.45	6554.07	3.6	6589.52	84	6501.9 A	52-92	52.1
PM	1541426	490292	81.9	4.0	1/12/2004	12.33	6555.09	1.8	6567.42	---	--- A	-	---
PMW-3D	1542780	488318	92.0	2.0	---	---	---	---	6575.05	---	--- A	77-87	---
PMW-2S	1542957	488282	61.0						6575.31	---	--- A	46-56	---
PMW-3S	1542781	488318	73.0						6575.07	---	--- A	58-68	---
PMW-1S	1543104	488249	58.0						6575.81	---	--- A	43-53	---
PMW-1D			73.0							---	--- A	58-68	---
PMW-2D	1542957	488282	76.0						6575.35	---	--- A	61-71	---
Q	1548693	492153	98.3	4.0	10/26/2016	42.31	6551.51	2.3	6593.82	100	6491.5 A	72-102	60.0
R	1550372	494514	85.0	4.0	10/26/2016	40.02	6564.01	0.3	6604.03	95	6508.7 A	60-90	55.3
S	1543871	488816	72.2	4.0	12/12/2016	41.90	6539.27	2.0	6581.17	75	6504.2 A	52-72	35.1

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 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
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	12/12/2016	36.10	6537.62	2.0	6573.72	100	6471.7 A	90-100	65.9
S3	1542857	488714	122.6	5.0	12/12/2016	37.90	6536.88	6.2	6574.78	116	6452.6 A	80-120	84.3
S4	1543344	488359	112.4	5.0	12/12/2016	36.85	6538.44	2.3	6575.29	108	6465.0 A	50-110	73.5
S5	1543269	488923	115.0	5.0	7/25/2016	41.84	6532.85	1.0	6574.69	105	6468.7 A	54-106	64.2
S5R	1543150	488938	115.0	5.0	6/11/2015	73.50	6506.99	1.9	6580.49	109	6469.6 A	55-115	37.4
S6	1543515	488874	113.2	5.0	1/3/2000	55.85	6524.22	1.3	6580.07	105	6473.8 A	55-105	50.5
S7	1543763	488874	97.0	5.0	1/4/1999	57.38	6522.51	1.0	6579.89	82	6496.9 A	40-84	25.6
S8	1543968	488879	43.8	5.0	8/22/1995	43.28	6537.06	1.0	6580.34	40	6539.3 A	12-42	0.0
S11	1544793	488150	76.2	5.0	12/12/2016	32.24	6546.15	1.9	6578.39	70	6506.5 A	48-78	39.7
S12	1543297	488628	93.0	5.0	2/5/2015	38.39	6540.46	2.1	6578.85	80	6496.7 A	53-93	43.7
S14	1543120	488152	90.0	4.5	4/22/2014	34.28	6541.12	2.0	6575.40	90	6483.4 A	50-90	57.7
S15	1543320	488160	90.0	4.5	4/17/2014	33.68	6541.48	2.0	6575.16	90	6483.2 A	50-90	58.3
S18	1543216	488312	100.0	4.5	4/22/2014	32.73	6541.55	2.0	6574.28	100	6472.3 A	60-100	69.3
S19	1544172	488682	80.0	4.5	12/12/2016	34.70	6543.27	2.0	6577.97	80	6496.0 A	40-80	47.3
S20	1544463	488461	80.0	4.5	4/16/2014	30.59	6547.76	2.0	6578.35	80	6496.4 A	40-80	51.4
S21	1544896	488670	80.0	4.5	12/12/2016	31.60	6548.68	2.0	6580.28	46	6532.3 A	40-80	16.4
S22	1544169	488375	80.0	4.5	4/16/2014	30.29	6546.30	2.0	6576.59	80	6494.6 A	40-80	51.7
S23	1543920	488284	80.0	4.5	4/17/2014	31.07	6545.63	2.0	6576.70	80	6494.7 A	40-80	50.9
S24	1543735	488232	80.0	4.5	---	---	---	2.0	6575.89	80	6493.9 A	40-80	---
S25	1543524	488146	80.0	4.5	4/17/2014	33.26	6542.46	2.0	6575.72	80	6493.7 A	40-80	48.7
S26	1543224	487996	100.0	4.5	4/22/2014	32.37	6540.61	2.0	6572.98	100	6471.0 A	60-100	69.6
S27	1542993	488044	100.0	4.5	4/22/2014	32.68	6540.64	2.0	6573.32	100	6471.3 A	60-100	69.3
S28	1542769	488403	90.0	4.5	9/11/2014	34.77	6538.04	2.0	6572.81	90	6480.8 A	50-90	57.2
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	4/22/2014	34.86	6540.77	2.0	6575.63	90	6483.6 A	50-90	57.1
S37	1542609	488516	90.0	4.5	9/11/2014	34.24	6538.05	2.0	6572.29	90	6480.3 A	50-90	57.8
S38	1542443	488727	90.0	4.5	9/11/2014	34.90	6538.06	2.0	6572.96	90	6481.0 A	50-90	57.1
S39	1542596	488744	90.0	4.5	4/8/2014	34.02	6540.41	2.0	6574.43	90	6482.4 A	50-90	58.0
S40	1542934	488778	115.0	4.5	---	---	---	2.0	6575.73	---	--- A	55-115	---
SA	1543122	488811	123.7	5.0	7/25/2016	40.31	6540.00	1.0	6580.31	115	6464.3 A	100-130	75.7
SB	1543371	488811	125.0	5.0	6/11/2015	52.50	6528.59	0.9	6581.09	115	6465.2 A	100-130	63.4
SC	1543617	488815	105.4	5.0	12/5/2000	57.11	6521.69	1.2	6578.80	103	6474.6 A	55-105	47.1
SD	1543490	488564	90.1	5.0	2/23/2009	41.50	6536.81	0.6	6578.31	107	6470.7 A	50-110	66.1

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 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
SD4	1543497	488556	95.0	5.0	2/23/2009	46.17	6532.60	1.1	6578.77	95	6482.7 A	45-95	49.9
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	2/23/2009	7.88	6570.11	0.5	6577.99	88	6489.5 A	50-90	80.6
SE4	1543308	488560	105.3	2.0	2/23/2009	45.78	6532.22	---	6578.00	---	--- A	-	---
SE6	1543244	488615	92.0	5.0	1/25/2016	39.20	6539.71	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	7/25/2016	38.33	6540.41	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	12/12/2016	39.50	6539.76	1.1	6579.26	---	--- A	-	---
SO	1543652	488381	92.3	5.0	7/25/2016	38.82	6539.97	0.6	6578.79	---	--- A	-	---
SP	1543630	488531	94.4	4.0	7/25/2016	39.15	6539.51	2.0	6578.66	---	--- A	-	---
SQ	1543507	488814	95.0	5.0	6/11/2015	42.25	6536.95	0.9	6579.20	95	6483.3 A	55-95	53.7
SR	1543611	488669	95.0	5.0	9/21/2007	47.54	6531.65	0.8	6579.19	95	6483.4 A	50-90	48.3
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	7/25/2016	35.62	6543.69	2.2	6579.31	96	6481.1 A	55-97	62.6
* SU	1542946	488953	110.0	5.0	9/5/1995	35.60	6542.50	0.7	6578.10	110	6467.4 A	50-110	75.1
SUR	1542991	488968	115.0	5.0	7/14/2008	58.28	6522.44	2.6	6580.72	106	6472.1 A	35-115	50.3
SV	1543676	488813	78.2	6.0	6/11/2015	37.20	6542.05	1.7	6579.25	100	6477.6 A	55-105	64.5
SW	1543783	488812	81.9	6.0	5/12/2015	38.63	6542.66	2.9	6581.29	75	6503.4 A	35-80	39.3
SX	1544510	489025	45.0	5.0	---	---	---	1.0	6581.49	40	6540.5 A	20-40	---
SZ	1544367	488833	62.6	5.0	12/12/2016	36.00	6545.47	2.2	6581.47	60	6519.3 A	40-70	26.2
T	1542536	492260	70.2	4.0	9/29/2016	63.50	6515.73	2.4	6579.23	68	6508.8 A	61-71	6.9
T1	1543285	490027	---	5.0	12/6/2002	102.40	6561.51	1.0	6663.91	161	6501.9 A	121-171	59.6
T2	1543538	489303	186.0	5.0	7/27/2015	114.46	6550.36	1.6	6664.82	180	6483.2 A	100-186	67.1

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 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
T4	1543340	489699	205.0	5.0	7/27/2015	114.60	6543.14	2.9	6657.74	175	6479.8 A	145-205	63.3
T5	1543307	490289	182.0	5.0	7/27/2015	113.65	6543.68	3.1	6657.33	151	6503.2 A	122-182	40.4
T6	1543282	490655	160.0	5.0	5/18/2015	112.94	6545.83	2.9	6658.77	156	6499.9 A	130-160	46.0
T7	1543272	491484	160.0	5.0	5/18/2015	110.04	6549.63	2.0	6659.67	142	6515.7 A	130-160	34.0
T8	1543296	491914	162.0	5.0	5/14/2015	113.94	6547.67	2.6	6661.61	158	6501.0 A	132-162	46.7
T9	1543347	492337	141.0	5.0	7/27/2015	115.32	6548.63	3.3	6663.95	138	6522.7 A	121-141	26.0
T10	1543434	492791	148.0	5.0	7/28/2015	102.19	6557.77	2.3	6659.96	142	6515.7 A	108-148	42.1
T11	1544585	489887	193.0	5.0	7/27/2015	109.54	6547.27	2.7	6656.81	160	6494.1 A	113-193	53.2
T12	1544583	490317	200.0	5.0	7/27/2015	94.80	6562.43	2.5	6657.23	170	6484.7 A	120-200	77.7
T13	1544534	490619	160.0	5.0	---	---	---	---	6657.37	160	--- A	120-160	---
T14	1544565	491071	155.0	5.0	11/25/2014	112.64	6547.49	---	6660.13	155	--- A	125-155	---
T15	1544480	491953	150.0	5.0	6/9/2015	116.82	6548.47	---	6665.29	150	--- A	120-150	---
T16	1544276	492718	140.0	5.0	5/15/2015	111.29	6548.69	---	6659.98	132	--- A	120-140	---
T17	1544008	489430	183.0	5.0	5/14/2015	110.83	6546.08	2.6	6656.91	170	6484.3 A	143-183	61.8
T18	1543977	490333	195.0	5.0	5/15/2015	117.78	6547.38	2.9	6665.16	162	6500.3 A	115-195	47.1
T19	1543958	490722	167.0	5.0	5/15/2015	112.83	6554.93	2.5	6667.76	162	6503.3 A	137-167	51.7
T20	1543935	491048	170.0	5.0	6/23/2015	136.06	6534.63	1.5	6670.69	162	6507.2 A	140-170	27.4
T21	1543951	491882	170.0	5.0	6/9/2015	120.03	6549.97	1.3	6670.00	163	6505.7 A	140-170	44.3
T22	1543876	492311	165.0	5.0	7/28/2015	108.83	6558.36	2.1	6667.19	160	6505.1 A	120-165	53.3
T23	1543901	492805	140.0	5.0	6/9/2015	112.64	6548.47	---	6661.11	140	--- A	120-140	---
T24	1543387	489494	200.0	4.5	8/12/2014	114.81	6542.22	2.0	6657.03	---	--- A	140-200	---
T25	1543352	489996	200.0	4.5	8/12/2014	115.39	6541.95	2.0	6657.34	---	--- A	140-200	---
T26	1543567	489550	200.0	4.5	8/13/2014	113.24	6543.42	2.0	6656.66	---	--- A	140-200	---
T27	1543474	489837	200.0	4.5	8/12/2014	113.98	6543.16	2.0	6657.14	---	--- A	140-200	---
T28	1543484	490145	200.0	4.5	8/12/2014	114.83	6543.88	2.0	6658.71	---	--- A	140-200	---
T29	1543774	489375	200.0	4.5	8/13/2014	112.81	6543.90	2.0	6656.71	---	--- A	140-200	---
T30	1543663	489972	200.0	4.5	8/8/2014	115.22	6544.40	2.0	6659.62	---	--- A	140-200	---
T31	1543789	489881	200.0	4.5	8/12/2014	114.32	6544.71	2.0	6659.03	---	--- A	140-200	---
T32	1543801	490134	200.0	4.5	8/8/2014	116.48	6545.13	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	8/12/2014	115.45	6544.94	2.0	6660.39	---	--- A	140-200	---
T35	1543992	489689	200.0	4.5	---	---	---	2.0	6659.33	---	--- A	140-200	---
T36	1543735	489688	170.0	5.0	5/14/2015	111.45	6543.99	2.0	6655.44	170	6483.4 A	130-170	60.6
T37	1544089	489545	200.0	4.5	---	---	---	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	6/9/2015	115.78	6549.53	---	6665.31	150	--- A	120-150	---

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
T40	1543819	491466	170.0	5.0	6/9/2015	127.10	6543.17	2.3	6670.27	165	6503.0 A	140-170	40.2
T41	1543278	491079	160.0	5.0	5/14/2015	82.85	6577.11	3.2	6659.96	155	6501.8 A	130-160	75.4
T42	1544077	490112	200.0	4.5	6/5/2014	113.69	6546.32	2.0	6660.01	---	--- A	140-200	---
T43	1544209	489385	180.0	4.5	6/5/2014	111.54	6545.98	2.0	6657.52	---	--- A	120-180	---
T44	1544204	489707	---	4.5	6/2/2014	110.76	6546.55	2.0	6657.31	---	--- A	-	---
T45	1544183	489914	200.0	4.5	6/4/2014	111.58	6546.48	2.0	6658.06	---	--- A	140-200	---
T46	1544210	490262	200.0	4.5	6/3/2014	114.24	6546.41	2.0	6660.65	---	--- A	140-200	---
T47	1544317	489544	180.0	4.5	6/5/2014	110.78	6546.43	2.0	6657.21	---	--- A	120-180	---
T48	1544291	489795	180.0	4.5	6/4/2014	110.51	6547.05	2.0	6657.56	---	--- A	120-180	---
T49	1544304	490100	200.0	4.5	6/3/2014	111.80	6546.59	2.0	6658.39	---	--- A	140-200	---
T50	1544416	489707	200.0	4.5	6/4/2014	109.95	6546.55	2.0	6656.50	---	--- A	140-200	---
T51	1544397	489914	200.0	4.5	6/3/2014	109.08	6548.26	2.0	6657.34	---	--- A	140-200	---
T52	1544456	490208	200.0	4.5	6/3/2014	109.87	6548.13	2.0	6658.00	---	--- A	140-200	---
T53	1544504	489559	175.0	4.5	6/5/2014	110.49	6546.49	2.0	6656.98	---	--- A	115-175	---
T54	1544523	489796	200.0	4.5	6/5/2014	110.08	6547.02	2.0	6657.10	---	--- A	140-200	---
T55	1544592	490063	195.0	4.5	6/3/2014	1110.87	5546.79	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	8/8/2014	116.76	6545.10	2.0	6661.86	---	--- A	140-200	---
T61	1543600	490687	160.0	4.5	8/13/2014	108.93	6559.92	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	---
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	---

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)						
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	---
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	---

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)						
TA	1542471	492426	62.4	5.0	9/29/2016	39.20	6541.10	2.4	6580.30	55	6522.9 A	35-65	18.2
TB	1542351	492616	64.4	5.0	9/30/2015	32.79	6550.78	1.9	6583.57	55	6526.7 A	35-65	24.1
TDR-4D	1543060	488259	75.5	2.0	---	---	---	---	6575.12	---	--- A	60.5-70.5	---
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	45.5-55.5	---
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	11/24/2015	38.59	6533.55	0.3	6572.14	117	6454.8 A	58-118	78.7
W2	1542251	486654	79.1	4.0	3/2/1998	56.21	6515.29	0.9	6571.50	---	--- A	-	---
WN4	1543958	489961	142.4	5.0	7/6/2011	53.00	6609.78	3.0	6662.78	165	--- T	40-100	---
										165	6494.8 A	50-190	115.0
WR1	1541280	488529	---	5.0	6/27/1989	46.54	6521.86	0.8	6568.40	---	--- A	-	---
WR1R	1541302	488536	85.0	5.0	12/5/2000	28.62	6539.85	0.0	6568.47	85	6483.5 A	-	56.4
WR2	1541290	488678	94.1	5.0	12/5/2000	2.52	6566.07	0.9	6568.59	85	6482.7 A	65-95	83.4
WR3	1541490	488671	82.3	5.0	12/5/2000	32.96	6536.58	2.7	6569.54	83	6483.8 A	63-93	52.7
WR4	1541788	488678	62.0	5.0	12/5/2000	1.92	6570.89	0.0	6572.81	---	--- A	-	---
WR5	1541813	488683	72.4	5.0	12/5/2000	38.69	6532.54	0.6	6571.23	80	6490.6 A	60-80	41.9
WR6	1541902	488566	96.8	5.0	12/5/2000	3.04	6569.99	1.3	6573.03	84	6487.7 A	55-85	82.3
WR7	1541997	488456	97.3	5.0	12/5/2000	38.91	6534.82	2.0	6573.73	84	6487.8 A	55-85	47.0
WR8	1542095	488328	110.2	5.0	11/10/2008	26.40	6546.20	0.4	6572.60	100	6472.2 A	50-100	74.0
WR9	1542185	488217	111.3	5.0	12/5/2000	46.82	6526.23	0.8	6573.05	100	6472.3 A	50-100	54.0
WR10	1542389	487961	120.6	5.0	1/29/2003	14.84	6558.35	0.7	6573.19	110	6462.5 A	60-110	95.9
WR11	1542586	487728	120.5	5.0	1/29/2003	14.88	6559.61	0.3	6574.49	110	6464.2 A	60-110	95.4
WR12	1541280	488277	96.7	4.0	11/24/2015	32.00	6536.19	1.1	6568.19	85	6482.1 A	55-85	54.1
WR13	1541068	488861	70.0	5.0	12/5/2000	18.98	6550.19	3.2	6569.17	60	6506.0 A	50-60	44.2
WR14	1540638	488863	70.0	5.0	5/28/2003	15.50	6551.41	2.3	6566.91	61	6503.6 A	50-60	47.8
WR15	1541280	488016	70.0	4.0	5/28/2003	10.90	6560.29	0.0	6571.19	75	6496.2 A	60-75	64.1
WR16	1543051	487495	122.3	5.0	1/29/2003	6.54	6566.24	1.9	6572.78	100	6470.9 A	40-120	95.4
WR17	1543328	487485	124.4	5.0	1/29/2003	2.45	6570.64	2.2	6573.09	75	6495.9 A	40-120	74.7
WR18	1543597	487465	73.6	5.0	1/29/2003	2.97	6569.94	2.2	6572.91	70	6500.7 A	20-70	69.2
WR19	1543873	487458	87.8	5.0	1/29/2003	3.31	6571.62	2.2	6574.93	74	6498.7 A	25-85	72.9
WR20	1544059	487449	102.3	5.0	1/29/2003	3.98	6570.49	2.1	6574.47	80	6492.4 A	42-102	78.1
WR21	1544241	487449	88.9	5.0	1/29/2003	6.28	6569.77	2.1	6576.05	77	6497.0 A	28-88	72.8

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
WR22	1544434	487462	91.5	5.0	1/29/2003	3.44	6574.45	2.4	6577.89	86	6489.5 A	30-90	85.0
WR23	1544632	487445	94.3	5.0	1/29/2003	1.72	6574.75	2.2	6576.47	77	6497.3 A	32-92	77.5
WR24	1544938	487438	89.2	5.0	1/29/2003	2.04	6586.63	3.0	6588.67	82	6503.7 A	50-90	83.0
X	1540512	491892	50.7	4.0	10/20/2016	27.50	6544.11	1.7	6571.61	---	--- A	-	---
X1	1540671	492129	54.0	5.0	8/12/2002	7.50	6650.68	3.9	6658.18	47	6607.3 A	37-47	43.4
X2	1540836	492363	53.0	6.0	8/12/2002	2.50	6569.43	1.9	6571.93	45	6525.0 A	40-45	44.4
X3	1540992	492599	52.0	5.0	8/12/2002	2.50	6570.78	2.0	6573.28	42	6529.3 A	32-42	41.5
X4	1541210	492814	54.0	5.0	8/12/2002	13.10	6563.84	3.2	6576.94	45	6528.7 A	37-45	35.1
X5	1541408	492821	44.0	6.0	8/12/2002	7.80	6569.81	3.6	6577.61	35	6539.0 A	24-36	30.8
X6	1541609	492828	46.0	6.0	8/12/2002	8.00	6570.72	3.5	6578.72	35	6540.2 A	22-37	30.5
X7	1541808	492851	56.0	6.0	12/5/2000	8.60	6571.83	3.4	6580.43	45	6532.0 A	32-46	39.8
X8	1542007	492852	61.0	5.0	12/5/2000	13.00	6568.76	3.4	6581.76	51	6527.4 A	32-52	41.4
X9	1542194	492852	61.0	5.0	12/5/2000	27.00	6555.92	3.6	6582.92	51	6528.3 A	24-52	27.6
X10	1542352	492835	61.0	5.0	8/12/2002	4.00	6578.43	3.6	6582.43	53	6525.8 A	30-55	52.6
X11	1542553	492782	57.0	5.0	12/5/2000	0.50	6581.50	3.0	6582.00	53	6526.0 A	17-57	55.5
X12	1542861	492852	57.0	5.0	12/5/2000	0.50	6582.83	3.0	6583.33	53	6527.3 A	17-57	55.5
X13	1543640	493665	56.0	5.0	4/16/2012	39.61	6547.33	2.5	6586.94	51	6533.4 A	16-56	13.9
X14	1544002	493777	56.0	5.0	4/9/2002	39.80	6546.40	2.1	6586.20	49	6535.1 A	16-56	11.3
X15	1544222	493800	57.0	5.0	4/9/2002	40.54	6542.37	2.3	6582.91	51	6529.6 A	17-57	12.8
X16	1544473	493795	47.0	5.0	4/16/2012	38.22	6546.57	2.3	6584.79	47	6535.5 A	22-47	11.1
X17	1544356	493793	55.0	5.0	4/9/2002	41.06	6544.78	3.3	6585.84	48	6534.6 A	35-55	10.2
X18	1544593	493569	57.0	5.0	4/16/2012	38.36	6547.72	2.9	6586.08	49	6534.2 A	37-57	13.5
X19	1544753	493437	63.0	5.0	11/17/2006	32.46	6552.74	4.2	6585.20	56	6525.1 A	33-63	27.7
X20	1544855	493256	71.0	5.0	4/16/2012	38.54	6547.19	5.0	6585.73	64	6516.8 A	31-71	30.4
X21	1543606	493894	55.0	5.0	12/5/2000	38.99	6547.34	2.7	6586.33	51	6532.6 A	35-55	14.7
X22	1543874	493946	56.0	5.0	12/5/2000	39.21	6546.49	2.6	6585.70	50	6533.1 A	36-56	13.4
X23	1544064	494012	56.0	5.0	12/5/2000	38.96	6546.98	2.8	6585.94	47	6536.1 A	36-56	10.8
X24	1544244	494011	56.0	5.0	12/5/2000	39.94	6545.78	2.6	6585.72	46	6537.1 A	36-56	8.7
X25	1544445	494042	53.0	5.0	12/5/2000	39.41	6546.22	2.8	6585.63	46	6536.9 A	33-53	9.3
X26	1544693	493702	53.0	5.0	12/5/2000	35.34	6552.30	2.8	6587.64	43	6541.8 A	33-53	10.5
X27	1544953	493374	71.0	5.0	11/17/2006	39.75	6545.55	6.0	6585.30	64	6515.4 A	31-71	30.2
X28	1540545	491971	56.0	5.0	8/12/2002	8.30	6561.66	2.0	6569.96	48	6520.0 A	16-56	41.7
X29	1540735	492256	51.0	5.0	8/12/2002	4.00	6566.03	2.0	6570.03	43	6525.0 A	11-51	41.0
X30	1540897	492493	51.0	5.0	8/12/2002	3.00	6569.53	2.0	6572.53	43	6527.5 A	11-51	42.0
X31	1541052	492731	51.0	5.0	8/12/2002	8.00	6566.13	2.0	6574.13	44	6528.1 A	11-51	38.0
XDR-1	1544450	493758	45.0	2.0	---	---	---	---	6585.28	---	--- A	35-45	---

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			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)						
XDR-4	1544447	493767	45.0	2.0	---	---	---	---	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	10/15/2002	15.20	6557.68	2.4	6572.88	57	6513.5 A	54-59	44.2
Z	1540290	490701	73.9	4.0	12/5/2000	5.00	6564.22	0.6	6569.22	68	6500.6 A	60-70	63.6
										68	6500.6 A	60-70	63.6

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	5/25/2005	40.47	6519.19	0.0	6559.66	75	6484.7 A	90-105	34.5
0411	1537400	489510	70.0	6.0	8/7/1996	35.10	6524.90	0.0	6560.00	70	6490.0 A	65-70	34.9
0412	1537940	488830	---	6.0	---	---	---	0.0	6561.00	---	--- A	-	---
0413	1537900	490100	---	---	4/27/1994	35.25	6530.75	0.0	6566.00	---	--- A	-	---
0421	1538450	491100	88.0	5.0	1/30/1996	37.58	6534.42	0.9	6572.00	92	6479.1 A	72-102	55.3
0422	1538440	490810	80.0	4.0	4/6/1994	32.82	6537.18	0.0	6570.00	75	6495.0 A	60-80	42.2
0423	1538223	490926	---	---	---	---	---	0.0	6570.00	---	--- A	-	---
0425	1538430	490630	90.0	6.0	4/7/1994	32.42	6534.58	0.0	6567.00	71	6496.0 A	50-90	38.6
0426	1538230	490620	100.0	---	11/10/1981	30.65	6534.35	0.0	6565.00	80	6485.0 A	80-100	49.4
0427	1538450	490410	121.0	6.0	9/20/2012	33.61	6536.39	0.0	6570.00	81	6489.0 A	62-120	47.4
0428	1538367	490435	110.0	4.0	---	---	---	0.0	6570.00	66	6504.0 A	83-104	---
0429	1538210	490430	100.0	6.0	9/1/1995	37.21	6532.79	0.0	6570.00	74	6496.0 A	58-75	36.8
0430	1538469	490300	145.0	---	---	---	---	0.0	6568.00	72	6496.0 A	-	---
										72	6433.0 U	-	---
0431	1538045	490090	130.0	6.0	4/12/1994	35.00	6533.00	0.0	6568.00	60	6508.0 A	125-130	25.0
										60	6450.0 U	125-130	83.0
0432	1538210	489840	---	---	---	---	---	0.0	6565.00	---	--- A	-	---
0433	1538220	489620	90.0	4.0	5/2/1997	36.05	6527.95	1.5	6564.00	75	6487.5 A	58-84	40.5
0435	1538220	489300	85.0	6.0	3/25/2003	34.48	6526.52	1.3	6561.00	85	6474.7 A	-	51.8
0438	1537854	490840	120.0	4.0	---	---	---	0.0	6571.00	105	6466.0 A	70-100	---
0439	1537940	490490	97.0	4.0	8/7/1996	39.80	6527.20	0.0	6567.00	75	6492.0 A	77-97	35.2
0440	1537700	490230	---	---	---	---	---	0.0	6566.00	---	--- A	-	---
0441	1537720	490090	116.0	6.0	1/30/1995	35.19	6530.81	0.0	6566.00	78	6488.0 A	106-116	42.8
0442	1537940	489840	100.0	4.0	8/7/1996	37.15	6527.85	0.0	6565.00	80	6485.0 A	70-100	42.8
0443	1537940	489280	---	4.0	---	---	---	0.0	6561.00	75	6486.0 A	60-80	---
0444	1537940	489180	80.0	4.0	5/18/1994	28.84	6532.16	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	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500.0 A	60-95	18.7
										60	6500.0 U	60-95	18.7
0447	1537490	490480	142.0	6.0	4/11/1985	41.18	6526.82	0.0	6568.00	80	6488.0 A	120-142	38.8
										80	6430.0 U	120-142	96.8
0448	1537400	489100	---	---	---	---	---	0.0	6561.00	---	--- A	-	---
0450	1537448	490763	---	6.0	1/25/1995	42.29	6528.71	0.0	6571.00	85	6486.0 A	70-105	42.7
* 0451	1537700	490600	---	---	---	---	---	0.0	0.00	---	--- A	-	---
0452	1537880	490420	100.0	4.0	8/7/1996	41.20	6525.80	0.8	6567.00	85	6481.2 A	40-100	44.6

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	7/1/2002	34.93	6533.07	0.9	6568.00	80	6487.1 A	60-110	46.0
* 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	4/30/2013	32.28	6528.72	0.0	6561.00	---	--- A	-	---
SUB2	1537392	490370	---	4.0	5/28/2014	40.85	6526.72	0.0	6567.57	---	--- A	-	---
SUB3	1538280	489420	84.0	6.0	11/3/2015	23.35	6533.72	0.0	6557.07	72	6485.1 A	56-72	48.6
SUB4	1538440	489840	100.0	4.0	9/21/1978	49.11	6515.89	0.0	6565.00	78	6487.0 A	60-85	28.9
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	6/11/2014	75.65	6492.35	0.0	6568.00	110	6458.0 A	270-310	34.3
										110	6298.0 M	270-310	194.3
0482	1536981	489579	260.0	5.0	5/14/2014	46.60	6516.06	0.0	6562.66	80	6482.7 A	220-260	33.4
										80	6352.7 M	220-260	163.4
0483	1536586	489753	280.0	5.0	12/1/2014	35.91	6526.75	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	12/1/2015	24.50	6537.92	0.0	6562.42	75	6487.4 A	20-80	50.5
0491	1537031	489658	63.0	4.0	9/18/2014	36.87	6525.75	0.0	6562.62	40	6522.6 A	30-63	3.1
0492	1537220	489280	60.0	4.0	3/15/2011	29.00	6531.68	1.2	6560.68	55	6504.5 A	40-60	27.2
0495	1537400	497100	---	---	---	---	---	0.0	6571.00	---	--- A	-	---
0496	1534650	489603	93.0	5.0	11/30/2015	48.08	6514.44	1.6	6562.52	86	6474.9 A	53-93	39.5
0497	1535039	489503	94.0	5.0	12/12/2016	51.05	6511.57	2.0	6562.62	89	6471.6 A	64-94	40.0
0498	1534661	488953	150.0	6.0	7/5/2016	46.20	6514.39	2.0	6560.59	80	6478.6 M	130-150	35.8
										80	6478.6 A	70-110	35.8
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	12/1/2014	56.84	6504.77	2.0	6561.61	106	6453.6 A	70-110	51.2
Q2	1534903	488867	97.0	4.5	12/1/2016	78.24	6483.44	2.0	6561.68	97	6462.7 A	60-100	20.8
Q3	1534743	488865	108.0	4.5	8/4/2016	51.71	6508.03	2.0	6559.74	108	6449.7 A	60-100	58.3
Q5	1534829	488945	100.0	4.5	3/4/2016	48.65	6512.83	2.8	6561.48	---	--- A	60-100	---
Q7	1534981	489034	100.0	4.5	5/7/2015	52.71	6508.46	1.3	6561.17	100	6459.9 A	60-100	48.6
Q8	1534762	489059	100.0	4.5	12/12/2016	56.60	6504.20	2.0	6560.80	100	6458.8 A	60-100	45.4

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 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
Q9	1534643	489101	100.0	4.5	7/8/2016	48.03	6513.30	2.0	6561.33	100	6459.3	A	60-100	54.0
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	5/7/2015	51.58	6510.56	2.0	6562.14	100	6460.1	A	60-100	50.4
Q14	1534969	489213	100.0	4.5	5/7/2015	52.05	6509.92	1.7	6561.97	100	6460.3	A	60-100	49.7
Q15	1534779	489239	100.0	4.5	5/6/2015	52.66	6509.59	2.1	6562.25	100	6460.2	A	60-100	49.4
Q16	1534639	489347	102.0	4.5	12/1/2014	57.58	6505.70	2.0	6563.28	97	6464.3	A	60-100	41.4
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	5/8/2015	50.85	6511.96	2.2	6562.81	100	6460.6	A	60-100	51.4
Q21	1534970	489422	100.0	4.5	5/8/2015	51.31	6511.78	2.3	6563.09	100	6460.8	A	60-100	51.0
Q22	1534806	489433	100.0	4.5	5/11/2015	51.96	6510.83	2.9	6562.79	100	6459.9	A	60-100	50.9
Q23	1534851	489534	100.0	4.5	12/12/2016	52.30	6511.96	2.0	6564.26	---	---	A	60-100	---
Q24	1535141	489581	100.0	4.5	5/11/2015	50.55	6513.50	2.0	6564.05	100	6462.1	A	60-100	51.5
Q25	1534978	489629	100.0	4.5	5/8/2015	51.37	6513.14	2.5	6564.51	100	6462.0	A	60-100	51.1
Q26	1534769	489630	100.0	4.5	5/8/2015	51.71	6513.12	---	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	5/11/2015	49.97	6513.97	2.2	6563.94	100	6461.7	A	60-100	52.2
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	5/11/2015	35.27	6529.21	1.6	6564.48	61	6501.9	A	40-80	27.3
										61	6501.9	U	40-80	27.3
Q43	1536550	489507	80.0	4.5	5/14/2015	34.04	6529.15	1.8	6563.19	80	6481.4	A	40-80	47.8
Q44	1535671	488864	110.0	4.5	12/12/2016	52.15	6509.18	2.0	6561.33	---	---	A	70-110	---
Q45	1535346	489172	110.0	4.5	12/1/2014	56.14	6506.21	2.0	6562.35	---	---	A	70-110	---
Q46	1535526	489315	110.0	4.5	9/2/2014	51.71	6509.99	2.0	6561.70	---	---	A	70-110	---
Q47	1535356	489516	110.0	4.5	9/2/2014	53.54	6507.62	2.0	6561.16	---	---	A	70-110	---
Q48	1535653	490120	105.0	4.5	12/12/2016	47.61	6520.23	2.0	6567.84	73	6492.8	A	65-105	27.4
										73	6492.8	U	65-105	27.4
Q49	1535232	489780	100.0	4.5	5/11/2015	49.91	6514.80	1.7	6564.71	---	---	A	60-100	---
Q50	1536680	490288	85.0	4.5	8/25/2015	37.30	6531.63	2.0	6568.93	43	6523.9	A	45-85	7.7
										43	6505.9	U	45-85	25.7

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 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
						Murray							
* 0801	1541020	488600	100.0	4.0	7/15/2004	39.20	6528.53	0.0	6567.73	85	6482.7 A	80-100	45.8
0801R	1541096	488431	90.0	5.0	11/4/2004	41.01	6528.04	3.0	6569.05	82	6484.1 A	60-90	44.0
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	9/19/1983	84.86	6476.14	0.0	6561.00	85	--- C	85-180	---
										85	6476.0 A	85-180	0.1
0804	1540790	486790	137.0	6.0	2/19/2013	42.20	6519.80	0.0	6562.00	85	6477.0 A	125-136	42.8
0805	1540818	486241	140.0	5.0	10/6/1994	59.34	6507.66	0.0	6567.00	110	6457.0 A	100-140	50.7
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	5/22/1991	29.14	6526.12	0.0	6555.26	---	--- A	-	---
0844	1538376	487002	75.0	4.0	12/13/2016	35.84	6520.29	1.2	6556.13	70	6484.9 A	35-75	35.4
0845	1537280	487833	65.0	4.0	12/13/2016	32.96	6524.09	1.7	6557.05	55	6500.4 A	45-65	23.7
802A	1540691	488417	90.0	4.5	4/7/2014	35.64	6533.08	2.0	6568.72	82	6484.7 A	50-90	48.4
802B	1540833	488415	90.0	4.5	4/7/2014	34.46	6533.68	2.0	6568.14	58	6508.1 U	-	25.5
										58	6508.1 A	50-90	25.5
AW	1540235	488015	156.0	6.0	12/19/2016	32.15	6531.28	0.1	6563.43	63	6500.3 A	-	30.9
										63	6463.3 U	66-155	67.9
HW	1540920	487435	115.0	6.0	11/9/1994	40.00	6517.00	0.0	6557.00	95	6462.0 A	60-94	55.0
						Pleasant Valley							
0525	1541283	486020	---	4.5	7/12/2002	55.36	6514.64	---	6570.00	---	--- A	-	---
0688	1541257	483955	105.0	5.0	12/13/2016	58.56	6504.06	2.9	6562.62	95	6464.7 A	65-105	39.3
0831	1540090	486030	---	---	9/6/1983	54.95	6506.05	0.0	6561.00	---	--- A	-	---
0833	1539335	485445	110.0	6.0	12/10/1996	46.61	6511.39	0.0	6558.00	103	6455.0 A	60-90	56.4
0834	1540259	484847	100.0	4.0	---	---	---	0.0	6560.00	80	6480.0 A	60-80	---
0835	1539610	484795	98.0	5.0	5/2/2000	49.74	6509.26	0.0	6559.00	94	6465.0 A	73-94	44.3
0836	1540250	484010	90.0	4.0	---	---	---	0.0	6558.00	80	6478.0 A	65-80	---
0838	1540600	485640	100.0	---	7/22/1995	49.03	6513.97	0.0	6563.00	---	--- A	-	---
0839	1540782	485371	100.0	5.0	12/19/1994	50.00	6510.00	0.0	6560.00	94	6466.0 A	80-96	44.0
0840	1540440	485360	98.0	6.0	9/8/1983	47.32	6513.68	0.0	6561.00	94	6467.0 A	73-94	46.7
0841	1540835	485020	100.0	---	7/22/1995	54.66	6506.34	0.0	6561.00	---	--- A	-	---
0843	1541411	485738	120.0	4.0	6/27/1989	52.40	6517.60	0.0	6570.00	112	6458.0 A	100-110	59.6

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	DEPTH (FT-MP)	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	12/12/2016	49.83	6536.19	0.3	6586.02	68	6517.7 A	35-75	18.5
0521	1539104	492588	75.0	5.0	5/13/2013	49.58	6534.86	2.5	6584.44	65	6516.9 A	35-75	17.9
0522	1538640	492437	77.0	5.0	1/28/2014	46.78	6533.75	2.8	6580.53	68	6509.7 A	37-77	24.0
0523	1538680	492896	74.0	5.0	9/10/2002	2.00	6584.79	3.0	6586.79	62	6521.8 A	34-74	63.0
0524	1538889	493173	78.0	5.0	1/28/2003	3.47	6586.88	3.0	6590.35	70	6517.4 A	33-78	69.5
0531	1541086	478262	---	---	10/30/1996	79.24	6474.55	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	80-100	75.1
										100	6453.3 A	50-70	75.1
										100	6378.3 L	170-210	150.1
0540	1534125	488091	90.0	6.0	12/12/2016	55.28	6500.63	2.7	6555.91	80	6473.2 A	30-90	27.4
0541	1539831	477236	120.0	5.0	12/28/2016	88.56	6467.06	2.0	6555.62	112	6441.6 A	78-118	25.4
0551	1536272	479881	135.0	5.0	12/12/2016	98.90	6448.40	2.1	6547.30	115	6430.2 A	95-135	18.2
0553	1534923	480563	130.0	5.0	12/12/2016	102.50	6444.98	2.0	6547.48	128	6417.5 A	90-125	27.5
0554	1534967	479107	140.0	5.0	12/12/2016	104.60	6442.57	1.9	6547.17	118	6427.3 A	90-125	15.3
0555	1538572	486236	100.0	5.0	2/16/2016	40.95	6513.39	2.5	6554.34	100	6451.8 A	60-90	61.5
0556	1538006	486184	100.0	5.0	2/10/2016	47.19	6506.03	2.4	6553.22	95	6455.8 A	60-90	50.2
0557	1537204	486000	65.0	5.0	2/10/2016	41.55	6509.72	2.5	6551.27	55	6493.8 A	45-65	16.0
0631	1532234	483756	118.0	6.0	12/27/2016	83.82	6457.28	2.2	6541.10	109	6429.9 A	58-118	27.4
0632	1531850	483767	110.0	6.0	12/12/2016	83.74	6457.56	1.4	6541.30	102	6437.9 A	70-110	19.7
0633	1541467	479642	83.0	8.0	12/6/2011	32.40	6525.16	0.0	6557.56	95	6462.6 A	11-83	62.6
0634	1541652	480362	103.0	4.5	12/12/2016	70.82	6489.25	2.8	6560.07	95	6462.3 A	80-100	27.0
0635	1535363	478401	63.0	12.0	---	---	---	---	6546.25	---	--- A	4-63	---
0636	1545374	476038	123.0	4.5	12/18/2014	101.75	6471.69	2.3	6573.44	119	6452.1 A	103-123	19.6
0637	1545409	474710	124.0	4.5	12/20/2016	110.00	6465.20	2.5	6575.20	118	6454.7 A	104-124	10.5
0638	1539628	493265	75.0	5.0	12/12/2016	44.33	6541.23	0.0	6585.56	65	6520.6 A	35-75	20.7
0639	1539370	492961	80.0	5.0	5/13/2013	54.10	6533.78	2.5	6587.88	71	6514.4 A	35-80	19.4
0640	1537790	491961	84.0	5.0	12/1/2015	48.73	6531.24	2.2	6579.97	77	6500.8 A	64-84	30.5
0641	1536494	491110	95.0	5.0	6/30/2015	48.35	6525.01	2.5	6573.36	87	6483.9 A	65-95	41.2
0642	1536104	490932	95.0	5.0	6/30/2015	48.80	6523.08	2.4	6571.88	89	6480.5 A	65-95	42.6
0643	1533760	487386	108.0	5.0	10/16/2002	75.89	6475.44	1.5	6551.33	93	6456.8 A	58-108	18.6
0644	1533481	485450	110.0	5.0	12/12/2016	67.65	6476.25	2.0	6543.90	102	6439.9 A	55-110	36.3
0645	1532924	485282	80.0	5.0	4/15/2010	74.40	6469.39	2.5	6543.79	70	6471.3 A	60-80	0.0
0646	1533246	484953	100.0	5.0	12/12/2016	72.00	6471.35	1.5	6543.35	91	6450.9 A	60-100	20.5

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	12/12/2016	103.30	6448.61	1.4	6551.91	132	6418.5 A	80-140	30.1
0648	1534730	478343	120.0	4.5	3/6/2013	120.00	6427.79	2.0	6547.79	120	6425.8 A	80-120	2.0
0649	1534730	479798	124.0	4.5	12/12/2016	101.40	6441.89	0.3	6543.29	115	6428.0 A	84-124	13.9
0650	1536779	482135	109.0	4.5	12/13/2016	81.52	6465.59	2.2	6547.11	103	6441.9 A	89-109	23.7
0652	1531170	483779	88.0	5.0	12/12/2016	84.70	6453.45	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	12/12/2016	71.45	6479.05	1.4	6550.50	106	6443.1 A	60-120	36.0
0655	1541620	479830	96.0	8.0	4/15/2010	72.30	6485.88	---	6558.18	88	--- A	21-84	---
0656	1542578	478333	88.0	8.0	12/12/2016	72.00	6482.07	---	6554.07	88	--- A	6-88	---
0657	1537497	478392	128.0	6.0	12/12/2016	97.00	6454.81	2.2	6551.81	120	6429.6 A	87-128	25.2
0657A	1537083	478412	35.0	12.0	4/13/1999	37.00	6512.00	---	6549.00	---	--- A	17-35	---
0658	1535922	478436	130.0	6.0	12/12/2016	104.80	6445.38	0.4	6550.18	129	6420.8 A	89-130	24.6
0659	1541689	480772	101.0	4.5	12/12/2016	86.70	6473.47	2.0	6560.17	97	6461.2 A	61-101	12.3
0680	1543850	478746	80.0	4.5	12/12/2016	73.25	6485.62	2.0	6558.87	75	6481.9 A	50-80	3.8
0681	1540676	482734	117.0	6.0	12/13/2016	63.03	6497.49	2.1	6560.52	111	6447.4 A	67-117	50.1
0682	1543125	477489	94.0	4.0	10/20/2010	79.60	6474.37	2.8	6553.97	102	6449.2 A	54-94	25.2
0683	1540198	476217	120.0	6.0	3/19/2013	88.45	6467.59	2.0	6556.04	140	6414.0 A	80-120	53.6
0684	1540273	478499	143.0	6.0	10/13/2015	80.50	6472.78	2.0	6553.28	118	6433.3 A	83-143	39.5
0685	1539098	478170	100.0	4.5	11/30/2015	91.09	6465.48	1.7	6556.57	116	6438.9 A	60-100	26.6
0686	1545319	475438	115.0	4.5	12/20/2016	111.33	6467.47	1.8	6578.80	136	6441.0 A	75-115	26.5
0687	1539011	477276	102.0	6.0	11/30/2015	90.11	6465.85	2.2	6555.96	120	6433.8 A	62-102	32.0
0689	1530024	478478	80.0	4.5	11/24/2008	83.65	6458.37	2.6	6542.02	75	6464.4 A	60-80	0.0
0692	1535892	493175	90.0	5.0	6/30/2015	64.18	6520.64	2.5	6584.82	80	6502.3 A	58-90	18.3
0846	1537219	484730	75.0	4.0	12/13/2016	43.84	6505.08	0.8	6548.92	65	6483.1 A	40-65	22.0
0847	1534736	488508	92.0	5.0	11/22/1996	53.88	6504.39	2.6	6558.27	80	6475.7 A	52-92	28.7
0848	1534634	490660	92.0	5.0	2/28/2007	60.78	6511.71	2.7	6572.49	91	6478.8 A	52-92	32.9
0851	1534692	483909	91.0	5.0	12/13/2016	86.21	6460.23	3.3	6546.44	80	6463.1 A	41-91	0.0
0852	1535610	493989	74.0	5.0	12/12/2016	69.01	6521.13	2.5	6590.14	70	6517.7 A	54-74	3.5
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	9/21/2010	66.96	6492.89	2.3	6559.85	65	6492.6 A	50-100	0.3
0862	1534265	487800	110.0	5.0	12/12/2016	66.85	6489.33	3.3	6556.18	97	6455.9 A	63-103	33.4
0863	1533867	487912	110.0	5.0	9/12/2007	96.08	6460.48	2.5	6556.56	94	6460.1 A	63-103	0.4
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	8/4/2016	56.52	6501.60	1.8	6558.12	80	6476.3 A	33-113	25.3

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	12/12/2016	58.65	6497.25	2.0	6555.90	86	6467.9 A	48-88	29.3
0868	1534848	491033	103.0	5.0	6/30/2015	56.11	6518.63	2.2	6574.74	94	6478.5 A	53-103	40.1
0869	1533251	486073	94.0	5.0	12/12/2016	64.60	6479.89	1.7	6544.49	99	6443.8 A	44-94	36.1
* 0870	1532680	484906	93.0	5.0	1/11/1996	68.56	6475.60	1.9	6544.16	95	6447.3 A	69-89	28.3
0871	1533603	485400	100.0	5.0	1/11/1996	66.86	6477.85	2.4	6544.71	93	6449.3 A	60-100	28.5
* 0872	1533092	485407	100.0	5.0	1/11/1996	65.80	6477.51	1.8	6543.31	96	6445.5 A	55-100	32.0
* 0873	1533286	484505	100.0	5.0	1/11/1996	67.55	6475.46	1.9	6543.01	96	6445.1 A	60-100	30.3
* 0874	1533968	484925	105.0	5.0	1/11/1996	68.68	6476.66	2.2	6545.34	110	6433.1 A	55-105	43.5
* 0875	1532785	483634	125.0	5.0	1/11/1996	69.85	6472.99	1.7	6542.84	116	6425.1 A	65-125	47.9
0876	1532853	486088	95.0	5.0	12/12/2016	64.20	6480.06	1.9	6544.26	85	6457.4 A	58-88	22.7
0877	1533068	488067	70.0	5.0	12/12/2016	59.50	6493.58	1.9	6553.08	65	6486.2 A	58-68	7.4
0879	1532401	486104	70.0	5.0	12/12/2016	64.25	6480.30	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	12/12/2016	71.18	6493.86	2.0	6565.04	103	6460.0 A	76-96	33.8
0882	1541404	482396	110.0	4.5	2/18/2016	61.30	6499.86	2.0	6561.16	98	6461.2 A	70-110	38.7
0883	1540097	483039	100.0	5.0	11/30/2015	57.08	6500.05	1.9	6557.13	96	6459.3 A	60-90	40.8
0884	1542677	481498	90.0	5.0	2/18/2016	68.26	6497.84	1.0	6566.10	85	6480.2 A	58-88	17.7
0885	1541919	483474	100.0	5.0	12/12/2016	63.80	6500.84	1.5	6564.64	95	6468.1 A	70-100	32.7
0886	1542327	482487	90.0	5.0	12/12/2016	67.40	6497.15	1.5	6564.55	87	6476.1 A	60-90	21.1
0887	1543063	482469	67.0	5.0	12/12/2016	59.54	6508.19	1.5	6567.73	60	6506.2 A	42-67	2.0
0888	1542285	479335	105.0	5.0	12/12/2016	74.43	6482.90	1.1	6557.33	90	6466.2 A	75-105	16.7
0889	1540047	480222	65.0	5.0	11/30/2015	62.40	6487.23	1.5	6549.63	60	6488.2 A	35-65	0.0
0890	1541365	480088	101.0	5.0	10/21/2016	74.20	6484.23	1.7	6558.43	93	6463.7 A	81-101	20.5
0893	1541934	482244	98.0	4.5	12/12/2016	67.58	6496.39	2.1	6563.97	93	6468.9 A	78-98	27.5
0894	1541976	478317	78.0	4.5	10/20/2010	77.41	6476.88	3.0	6554.29	97	6454.3 A	58-78	22.6
0895	1541521	476222	104.0	5.0	10/19/2012	84.73	6469.11	2.4	6553.84	116	6435.4 A	61-101	33.7
0896	1542246	476237	113.0	5.0	10/19/2012	85.93	6469.68	2.0	6555.61	117	6436.6 A	73-113	33.1
0897	1543819	478237	93.0	4.0	12/12/2016	79.11	6483.14	2.0	6562.25	70	6490.3 A	63-93	0.0
0899	1543801	477288	110.0	4.0	6/9/2015	95.90	6474.94	2.0	6570.84	120	6448.8 A	70-110	26.1
0905	1532700	480850	120.0	5.0	5/9/2012	102.00	6443.00	0.0	6545.00	120	6425.0 A	100-120	18.0
0906	1532900	480450	---	---	8/29/1995	74.65	6462.75	0.0	6537.40	---	--- A	-	---
0909	1531900	483400	140.0	4.0	5/12/2015	84.49	6454.41	0.0	6538.90	112	6426.9 L	80-135	27.5
										112	6426.9 A	80-135	27.5
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	1/24/1996	38.40	6604.60	0.3	6643.00	---	--- A	-	---
0914	1555500	500850	---	6.0	5/6/2009	42.87	6599.13	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	6/19/2006	30.00	6595.00	0.0	6625.00	70	6555.0 A	55-85	40.0
0916	1552350	499600	160.0	4.0	5/7/2009	36.63	6588.37	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	73.5	5.0	10/22/2014	39.63	6584.37	1.9	6624.00	---	--- A	-	---
0922	1555200	492500	---	6.0	10/17/2012	50.15	6571.55	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	10/13/2015	86.08	6472.04	2.6	6558.12	125	6430.5 A	95-132	41.5
0936	1543621	472978	160.0	5.0	---	---	---	0.0	6573.38	160	6413.4 A	100-160	---
0939	1539751	483202	97.0	8.0	7/25/1996	59.31	6497.69	2.3	6557.00	---	--- A	-	---
0940	1538651	483040	70.0	---	7/24/1996	57.30	6495.70	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	7/27/1994	54.63	6520.55	0.0	6575.18	95	6480.2 A	70-100	40.4
0950	1560400	498300	81.0	5.0	7/12/2000	25.70	6631.30	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	---	---	12/9/1995	61.47	6495.53	1.0	6557.00	---	--- A	-	---
0979	1538860	483110	105.0	5.0	7/10/2002	57.56	6593.44	0.0	6651.00	100	6551.0 A	90-100	42.4
0980	1539330	483050	---	---	11/8/1995	57.70	6497.30	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	7/18/1996	58.75	6592.25	0.0	6651.00	102	6549.0 A	90-110	43.3
0989	1538220	482920	---	---	11/2/1995	58.10	6494.90	1.0	6553.00	---	--- A	-	---
0992	1539510	483790	100.0	5.0	---	---	---	0.0	6552.00	95	6457.0 A	85-95	---
0993	1537920	483677	102.0	5.0	---	---	---	0.0	6550.00	98	6452.0 A	85-98	---
0994	1539700	476240	144.0	6.0	10/19/2015	87.16	6467.84	0.0	6555.00	---	--- A	95-110	---
0996	1537621	477989	138.0	5.0	12/5/2011	49.60	6502.92	1.7	6552.52	136	6414.8 A	126-136	88.1
0997	1539821	473807	---	---	3/12/1996	76.90	6491.40	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	1/18/1996	15.17	-15.17	0.0	0.00	---	--- A	-	---
1021	---	---	---	---	1/18/1996	18.00	-18.00	0.0	0.00	---	--- A	-	---
H1	1541931	480022	98.0	4.5	10/21/2016	76.81	6482.44	2.0	6559.25	98	6459.3 A	78-98	23.2
H2	1541665	480014	100.0	4.5	5/5/2015	71.81	6489.02	2.0	6560.83	100	6458.8 A	80-100	30.2
H2A	1541694	479997	88.0	4.5	12/12/2016	73.77	6486.10	2.0	6559.87	88	6469.9 A	66-88	16.2
H3	1541482	479947	92.0	4.5	4/8/2014	76.00	6481.10	2.0	6557.10	92	6463.1 A	72-92	18.0
H4	1542118	480122	99.0	4.5	4/9/2014	74.00	6483.60	2.0	6557.60	99	6456.6 A	79-99	27.0
H5	1541786	480167	99.0	4.5	8/4/2014	80.00	6478.44	2.0	6558.44	99	6457.4 A	79-99	21.0
H6	1541541	480181	99.0	4.5	5/5/2015	65.36	6494.62	2.0	6559.98	99	6459.0 A	79-99	35.6
H6A	1541564	480172	100.0	4.5	7/14/2014	77.00	6480.57	2.0	6557.57	100	6455.6 A	80-100	25.0
H7	1541974	480333	102.0	4.5	12/16/2016	71.11	6488.43	2.0	6559.54	102	6455.5 A	82-102	32.9
H7A	1542002	480322	100.0	4.5	12/12/2016	68.72	6490.37	2.0	6559.09	100	6457.1 A	80-100	33.3
H7B	1541933	480350	98.0	4.5	12/16/2016	69.28	6490.10	2.0	6559.38	98	6459.4 A	78-98	30.7
H8	1541405	480325	95.0	4.5	5/5/2015	64.85	6493.26	2.0	6558.11	95	6461.1 A	75-95	32.2
H9	1542143	480524	97.0	4.5	5/5/2015	66.14	6494.48	2.0	6560.62	97	6461.6 A	77-97	32.9
H10	1541828	480550	100.0	4.5	5/5/2015	63.79	6494.77	2.0	6558.56	100	6456.6 A	80-100	38.2
H11	1541517	480586	97.0	4.5	5/5/2015	64.84	6494.58	2.0	6559.42	97	6460.4 A	77-97	34.2
H12	1542007	480744	100.0	4.5	11/30/2016	86.51	6477.11	2.0	6563.62	100	6461.6 A	80-100	15.5
H13	1542183	480842	100.0	4.5	4/14/2014	72.00	6490.42	2.0	6562.42	100	6460.4 A	80-100	30.0
H14	1541884	480906	100.0	4.5	4/14/2014	72.00	6486.85	2.0	6558.85	100	6456.9 A	80-100	30.0
H15	1541590	480941	97.0	4.5	---	---	---	2.0	6560.41	97	6461.4 A	77-97	---
H16	1542116	481129	92.0	4.5	4/15/2014	64.00	6493.98	2.0	6557.98	92	6464.0 A	72-92	30.0
H17	1541782	481151	99.0	4.5	7/7/2016	29.97	6533.39	2.0	6563.36	99	6462.4 A	79-99	71.0
H18	1542325	481231	93.0	4.5	4/15/2014	71.00	6489.77	2.0	6560.77	93	6465.8 A	73-93	24.0
H19	1541970	481270	91.0	4.5	4/17/2014	72.00	6490.54	2.0	6562.54	91	6469.5 A	71-91	21.0
H20	1541664	481314	86.0	4.5	4/18/2014	64.00	6493.68	2.0	6557.68	86	6469.7 A	66-86	24.0
H21	1542330	481444	95.0	4.5	4/21/2014	79.00	6485.40	2.0	6564.40	95	6467.4 A	75-95	18.0
H22	1541756	481496	94.0	4.5	4/21/2014	68.00	6493.53	2.0	6561.53	94	6465.5 A	74-94	28.0
H23	1542412	481663	95.0	4.5	4/21/2014	68.00	6496.96	2.0	6564.96	95	6468.0 A	75-95	29.0
H24	1542195	481605	100.0	4.5	4/24/2014	71.00	6494.87	2.0	6565.87	100	6463.9 A	80-100	31.0
H25	1541937	481652	100.0	4.5	4/25/2014	70.00	6494.79	2.0	6564.79	100	6462.8 A	80-100	32.0
H26	1542244	481823	98.0	4.5	4/25/2014	79.00	6487.81	2.0	6566.81	98	6466.8 A	78-98	21.0
H27	1541924	481863	96.0	4.5	4/25/2014	68.00	6497.25	2.0	6565.25	96	6467.3 A	76-96	30.0
H28	1542427	481976	97.0	4.5	4/28/2014	70.00	6495.38	2.0	6565.38	97	6466.4 A	77-97	29.0

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	---	---	---	2.0	6562.00	100	6460.0 A	80-100	---
H30	1542590	482118	92.0	4.5	4/28/2014	68.00	6497.80	2.0	6565.80	92	6471.8 A	72-92	26.0
H31	1542290	482160	95.0	4.5	4/29/2014	68.00	6497.06	2.0	6565.06	95	6468.1 A	75-95	29.0
H32	1542470	482295	98.0	4.5	7/11/2014	66.00	6499.11	2.0	6565.11	98	6465.1 A	78-98	34.0
H33	1542162	482347	98.0	4.5	6/25/2014	65.00	6501.08	2.0	6566.08	98	6466.1 A	78-98	35.0
H34	1542415	482618	96.0	4.5	8/7/2014	65.48	6500.71	2.0	6566.19	96	6468.2 A	76-96	32.5
H35	1542209	482713	97.0	4.5	6/26/2014	73.00	6491.93	2.0	6564.93	97	6465.9 A	77-97	26.0
H36	1542405	482853	100.0	4.5	---	---	---	2.0	6559.96	100	6458.0 A	80-100	---
H37	1542586	482972	96.0	4.5	6/3/2014	59.00	6501.56	2.0	6560.56	96	6462.6 A	76-96	39.0
H38	1542314	483081	93.0	4.5	7/1/2014	68.00	6494.49	2.0	6562.49	93	6467.5 A	73-93	27.0
H39	1542517	483204	100.0	4.5	7/2/2014	62.00	6504.03	2.0	6566.03	100	6464.0 A	80-100	40.0
H40	1542710	483345	98.0	4.5	7/10/2014	51.00	6514.57	2.0	6565.57	98	6465.6 A	78-98	49.0
H41	1542414	483448	100.0	4.5	---	---	---	2.0	6564.33	100	6462.3 A	80-100	---
H42	1542813	483511	100.0	4.5	10/9/2014	64.30	6503.50	2.0	6567.80	100	6465.8 A	80-100	37.7
H42A	1542822	483522	100.0	4.5	10/1/2015	64.00	6503.43	2.6	6567.43	100	6464.8 A	80-100	38.6
H43	1542954	483706	90.0	4.5	---	---	---	2.4	6569.14	90	6476.7 A	70-90	---
H44	1542694	483771	90.0	4.5	10/13/2015	82.00	6487.86	3.1	6569.86	90	6476.8 A	70-90	11.1
H45	1542945	483956	90.0	4.5	10/5/2015	63.50	6506.15	2.0	6569.65	90	6477.7 A	50-90	28.5
H46	1542614	483981	95.0	4.5	---	---	---	2.0	6567.36	95	6470.4 A	75-95	---
H47	1543121	484112	90.0	4.5	10/5/2015	63.00	6506.46	2.0	6569.46	90	6477.5 A	70-90	29.0
H48	1542787	484185	90.0	4.5	10/13/2015	62.00	6506.26	2.0	6568.26	90	6476.3 A	70-90	30.0
H49	1543056	484342	90.0	4.5	---	---	---	2.0	6570.84	90	6478.8 A	70-90	---
H50	1542846	484394	100.0	4.5	10/14/2015	62.00	6506.84	2.2	6568.84	90	6476.6 A	80-100	30.2
H51	1543254	484489	90.0	4.5	10/15/2015	62.00	6507.94	2.6	6569.94	95	6472.3 A	70-90	35.6
H52	1542976	484590	100.0	4.5	10/13/2015	54.00	6516.01	2.5	6570.01	95	6472.5 A	80-100	43.5
H54	1543160	484723	100.0	4.5	10/15/2015	60.00	6509.56	2.0	6569.56	70	6497.6 A	80-100	12.0
H55	1542909	484706	95.0	4.5	9/15/2014	60.00	6509.25	2.0	6569.25	95	6472.3 A	75-95	37.0
H56	1542625	484804	95.0	4.5	6/30/2016	61.73	6507.76	2.0	6569.49	95	6472.5 A	75-95	35.3
H57	1543338	484884	90.0	4.5	10/16/2015	64.00	6507.09	2.0	6571.09	90	6479.1 A	70-90	28.0
H58	1543051	484959	95.0	4.5	10/16/2015	60.00	6511.02	2.5	6571.02	95	6473.5 A	75-95	37.5
H59	1542764	484969	100.0	4.5	10/20/2015	58.00	6512.15	2.5	6570.15	95	6472.7 A	80-100	39.5
H60	1542945	484152	100.0	4.5	10/23/2015	70.00	6501.02	2.0	6571.02	100	6469.0 A	80-100	32.0
H61	1542631	485206	89.0	4.5	6/30/2016	61.36	6509.13	2.0	6570.49	89	6479.5 A	69-89	29.6
H62	1543413	485343	100.0	4.5	10/26/2015	81.00	6491.52	2.3	6572.52	100	6470.3 A	80-100	21.3
H63	1543072	485346	100.0	4.5	10/23/2015	81.00	6490.85	2.5	6571.85	100	6469.4 A	80-100	21.5
H64	1542779	485373	90.0	4.5	10/26/2015	83.00	6488.86	3.0	6571.86	90	6478.9 A	70-90	10.0

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	4/30/2014	58.00	6517.06	2.0	6575.06	93	6480.1 A	73-93	37.0
H66	1542938	485536	90.0	4.5	10/27/2015	64.00	6507.77	2.5	6571.77	100	6469.3 A	80-90	38.5
H67	1543489	485743	90.0	4.5	10/28/2015	64.00	6509.76	2.9	6573.76	90	6480.9 A	70-90	28.9
H68	1543114	485766	100.0	4.5	10/28/2015	62.00	6511.38	3.0	6573.38	100	6470.4 A	80-100	41.0
H69	1542779	485752	100.0	4.5	10/29/2015	61.00	6512.08	3.6	6573.08	95	6474.5 A	80-100	37.6
H70	1543343	485979	93.0	4.5	6/30/2016	63.91	6510.71	2.0	6574.62	93	6479.6 A	73-93	31.1
H71	1542939	485966	91.0	4.5	6/30/2016	62.48	6509.84	2.0	6572.32	91	6479.3 A	71-91	30.5
H72	1543147	486104	90.0	4.5	11/2/2015	64.00	6511.17	3.3	6575.17	90	6481.9 A	70-90	29.3
H73	1541828	482047	91.0	4.5	4/30/2014	60.00	6496.73	2.0	6556.73	91	6463.7 A	71-91	33.0
H74	1541953	482471	95.0	4.5	6/24/2014	65.00	6498.05	2.0	6563.05	95	6466.1 A	75-95	32.0
H75	1542212	483453	93.0	4.5	7/1/2014	60.00	6505.25	2.0	6565.25	93	6470.3 A	73-93	35.0
H93	1543202	483884	100.0	4.5	9/4/2014	59.50	6507.25	2.0	6566.75	100	6464.8 A	80-100	42.5
H95	1543327	484311	100.0	4.5	12/12/2016	62.40	6506.51	2.0	6568.91	100	6466.9 A	80-100	39.6
H97	1543406	484644	95.0	4.5	9/4/2014	58.16	6512.06	2.0	6570.22	95	6473.2 A	75-95	38.8
H99	1543525	485438	100.0	4.5	9/4/2014	58.93	6512.73	2.0	6571.66	100	6469.7 A	80-100	43.1
H100	1543724	485306	90.0	4.5	11/4/2015	82.00	6492.12	2.8	6574.12	80	6491.3 A	70-90	0.8
H101	1543764	485695	90.0	4.5	11/6/2015	64.00	6511.52	3.8	6575.52	90	6481.8 A	70-90	29.8
H102	1543624	485946	90.0	4.5	11/6/2015	63.00	6512.62	2.5	6575.62	90	6483.1 A	70-90	29.5
H103	1543767	486104	90.0	4.5	11/9/2015	70.00	6505.61	2.3	6575.61	90	6483.4 A	70-90	22.3
H104	1543562	486140	90.0	4.5	11/9/2015	83.00	6492.05	2.0	6575.05	80	6493.1 A	70-90	0.0
H105	1542792	486149	100.0	4.5	---	---	---	2.0	6574.76	90	6482.8 A	80-100	---
H106	1542087	482933	94.0	4.5	6/26/2014	64.00	6500.75	2.0	6564.75	94	6468.8 A	74-94	32.0
H107	1541784	481742	98.0	4.5	6/24/2014	66.00	6496.36	2.0	6562.36	98	6462.4 A	78-98	34.0
M16	1543252	485112	93.3	5.0	12/12/2016	59.38	6511.21	1.4	6570.59	100	6469.2 A	60-100	42.0
M17	1542752	484617	100.0	4.5	---	---	---	2.0	6569.21	95	6472.2 A	80-100	---
M18	1542607	485970	88.0	4.5	4/30/2014	54.00	6518.28	2.0	6572.28	88	6482.3 A	68-88	36.0
MO	1543620	485518	88.0	4.5	12/12/2016	60.41	6512.48	2.0	6572.89	80	6490.9 A	45-85	21.6
MP	1544164	485492	80.0	5.0	12/12/2016	62.70	6511.78	2.1	6574.48	50	6522.4 A	33-63	0.0
MR	1542609	483574	100.0	5.0	12/12/2016	66.49	6499.77	1.8	6566.26	100	6464.5 A	54-94	35.3
MS	1542607	485570	82.0	5.0	6/30/2016	59.60	6511.07	1.5	6570.67	89	6480.2 A	52-82	30.9
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	12/12/2016	64.51	6505.27	1.3	6569.78	95	6473.5 A	75-105	31.8
R1	1534551	487790	120.0	5.0	12/12/2016	55.80	6499.32	2.0	6555.12	84	6469.1 A	80-120	30.2
										84	6469.1 M	80-120	30.2
R2	1534548	487968	115.0	5.0	11/30/2016	68.11	6486.05	2.0	6554.16	83	6469.2 A	75-115	16.9
										83	6469.2 M	75-115	16.9

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	11/30/2016	82.94	6472.79	2.0	6555.73	88	6465.7 A	60-80	7.1
										88	6465.7 M	100-140	7.1
R4	1534541	488446	130.0	5.0	8/4/2016	64.67	6494.11	2.0	6558.78	84	6472.8 M	90-130	21.3
										84	6472.8 A	90-130	21.3
R5	1534560	488666	125.0	5.0	11/30/2016	105.60	6452.15	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	11/19/2013	60.75	6498.89	2.0	6559.64	68	6489.6 A	50-90	9.3
										68	6489.6 M	110-130	9.3
R7	1534399	488087	145.0	5.0	8/16/2013	54.21	6500.60	2.0	6554.81	74	6478.8 M	125-145	21.8
										74	6478.8 A	65-105	21.8
R8	1534412	487891	145.0	5.0	8/16/2013	53.47	6500.69	2.0	6554.16	94	6458.2 A	65-105	42.5
R9	1534420	487700	120.0	4.5	11/13/2013	54.74	6501.01	2.0	6555.75	104	6449.8 A	60-120	51.3
R10	1534305	488003	120.0	4.5	11/30/2016	70.31	6484.91	2.0	6555.22	83	6470.2 A	60-120	14.7
R11	1534320	488280	120.0	4.5	11/30/2016	96.79	6461.66	2.0	6558.45	70	6486.5 A	60-120	0.0
										70	6486.5 M	60-120	0.0
R12	1534220	488360	120.0	4.5	11/14/2013	59.23	6497.72	2.0	6556.95	66	6489.0 M	60-120	8.8
										66	6489.0 A	60-120	8.8
R13	1534220	488150	120.0	4.5	11/14/2013	59.43	6497.46	2.0	6556.89	96	6458.9 A	60-120	38.6
R14	1534168	487971	100.0	4.5	11/14/2013	59.22	6497.57	2.0	6556.79	83	6471.8 A	60-100	25.8
R15	1534180	487700	100.0	4.5	11/14/2013	56.46	6499.77	2.0	6556.23	98	6456.2 A	60-100	43.5
R16	1533973	487394	100.0	4.5	11/14/2013	68.19	6486.30	2.0	6554.49	92	6460.5 A	60-100	25.8
R17	1534040	487810	100.0	4.5	11/18/2013	58.62	6496.60	2.0	6555.22	95	6458.2 A	60-100	38.4
R18	1534030	487970	100.0	4.5	11/30/2016	69.10	6486.90	2.0	6556.00	87	6467.0 A	60-100	19.9
R19	1534029	488173	100.0	4.5	11/18/2013	60.42	6496.08	2.0	6556.50	90	6464.5 A	60-100	31.6
R20	1534120	488260	100.0	4.5	11/30/2016	65.21	6491.13	2.0	6556.34	80	6474.3 A	60-100	16.8
R21	1534031	488350	100.0	4.5	11/18/2013	58.86	6496.71	2.0	6555.57	88	6465.6 A	60-100	31.1
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	11/14/2013	62.02	6493.73	2.0	6555.75	97	6456.8 A	60-100	37.0
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	---	---	---	2.0	6551.15	100	6449.2 A	60-100	---
R47	1533470	485780	160.0	4.5	12/20/2013	75.59	6471.58	2.0	6547.17	103	6442.2 A	100-160	29.4
										103	6442.2 L	100-160	29.4
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	12/20/2013	74.67	6472.40	2.0	6547.07	99	6446.1 A	75-135	26.3
										99	6446.1 L	75-135	26.3
R58	1533170	485710	160.0	4.5	4/8/2014	70.98	6473.47	2.0	6544.45	98	6444.5 L	100-160	29.0
										98	6444.5 A	100-160	29.0
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436.0 L	110-150	42.4
										107	6436.0 A	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	10/10/2014	69.44	6475.41	2.0	6544.85	99	6443.9 A	100-160	31.6
										99	6443.9 L	100-160	31.6
R69	1532987	486024	160.0	4.5	4/8/2014	70.53	6474.82	2.0	6545.35	96	6447.4 A	100-160	27.5
										96	6447.4 L	100-160	27.5
R70A	1532881	486261	105.0	4.5	---	---	---	2.0	6545.30	---	--- A	60-105	---
R73	1533019	485560	150.0	4.5	5/13/2015	69.92	6474.42	2.3	6544.34	99	6443.0 L	110-150	31.4

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
R73	1533019	485560	150.0	4.5	5/13/2015	69.92	6474.42	2.3	6544.34	99	6443.0 A	110-150	31.4
R74	1532852	485502	140.0	4.5	12/1/2015	68.63	6475.40	2.4	6544.03	104	6437.6 A	100-140	37.8
										104	6437.6 L	100-140	37.8
R75	1532922	485716	140.0	4.5	5/13/2015	69.14	6475.74	2.3	6544.88	98	6444.6 A	100-140	31.2
										98	6444.6 L	100-140	31.2
R76	1532888	485891	140.0	4.5	5/13/2015	68.37	6476.72	2.3	6545.09	106	6436.8 L	100-140	39.9
										106	6436.8 A	100-140	39.9
R77	1532683	485800	140.0	4.5	5/13/2015	68.28	6476.69	2.4	6544.97	80	6462.6 A	100-140	14.1
										80	6462.6 L	100-140	14.1
R78	1532683	485612	140.0	4.5	5/13/2015	69.16	6474.87	2.0	6544.03	85	6457.0 A	100-140	17.8
										85	6457.0 L	100-140	17.8
R79	1532694	485381	120.0	4.5	---	---	---	2.0	6542.94	80	6460.9 A	80-120	---
										80	6460.9 L	80-120	---
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 ground water 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 ground water flow.

Figures 4.2-1, 4.2-1A, 4.2-1B and 4.2-1C present the fall of 2016 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 2016 ground water 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 2016 (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 ground water is drawn by the collection system. The area of collection is between the fresh-water injection area and the collection wells, where ground water is flowing back to the collection wells. The area underlying the LTP is also within the collection area, because alluvial ground water 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 2016 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 2016 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 2016 to define the amount of limited ground water 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 ground water that flows through the northern portion of Section 3 (see Figure 4.2-1) joins the Rio San Jose ground water 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. 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 during 2016 except for a decline in wells DD, DD2 and P. Additional data with time is needed to determine if these declines are defining a new trend in these wells.

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. The water levels actually indicate a very flat gradient between wells SP and SO for 2016. 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 ground water 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). This data shows that a strong reversal has been maintained between wells S2 and S5 with a gradual water level decline in 2016 due to the larger collection rates.

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 in each of these wells were maintained higher in 2016 due to the injection in this area. The late 2016 water-level elevation in wells S4, S11 and S19 declined.

The alluvial water levels north of Murray Acres were fairly steady in 2016 in wells M7, MO and MX (see Figure 4.2-7). The lower water-level elevation in wells M9 and MQ are due to the pumping of water from these two collection wells in 2011 through 2016 as RO collection supply wells.

Wells B and BA are monitored in order to define the reversal in the ground water 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 2016. Increased collection rate upgradient of these two wells in 2016 caused water level declines in these two wells. Water levels in this area sharply rose after the addition of the R.O. product injection into the new EMA injection lines until the second quarter of 2006 when the water levels overall declined until mid-2008 when the level steadily rose for the remainder of 2008 and have overall been fairly steady through 2010. An overall gradual rise had been observed the last few years until the decline in 2016.

Figure 4.2-9 presents water-level elevation plots for alluvial wells B12, D1 and M5, which are located near the lined collection ponds. This plot shows that these water levels gradually declined in 2016.

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 ground water gradient was lost between the line of injection and line of collection. Additional collection in 2016 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. Steady to gradually declining water levels in wells C10 and K7 were observed in 2016, except for a higher outlier in well C10. The decline in water level in well C12 is due to pumping of this well in 2016.

Figure 4.2-12 shows the water-level elevation plots for wells K8, K9, K11and X. Water levels overall were steady or declined in these wells in 2016.

Water-level elevations in the alluvial aquifer north of the Broadview Acres injection system were steady in 2016. The pumping in Felice Acres for South Off-Site collection supply caused a decline in the water level in well 497 late in 2016 (see water levels for wells 497, F and GH 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 2016, except for a gradual rise in wells 555 and 845 (see Figure 4.2-14).

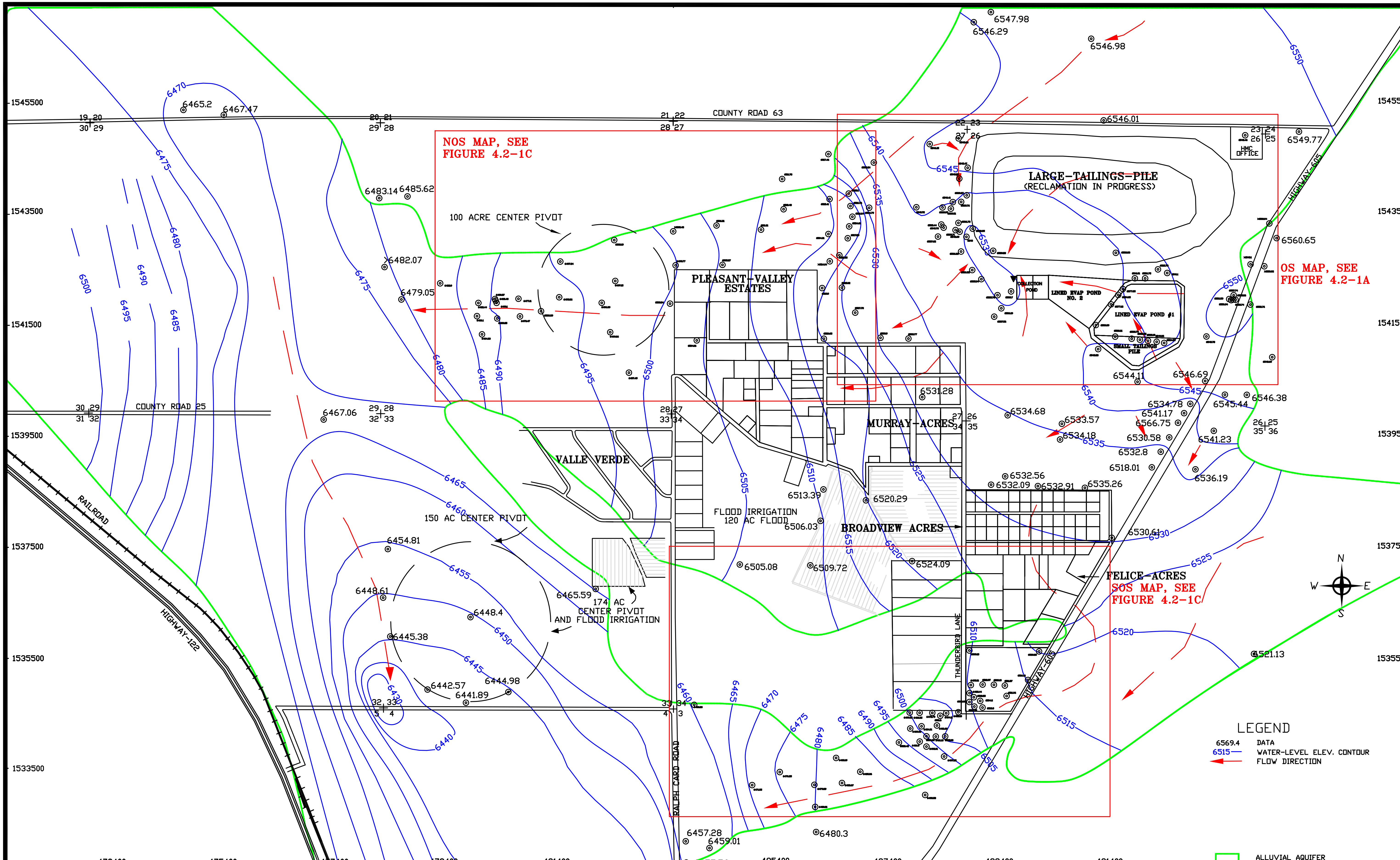
Figure 4.2-15 presents water-level hydrographs for five wells in Section 3. Water levels rose in 2016 in these wells due to treated water injection, except for the declines in wells 862 and 867 due to the Off-site pumping in the northeast corner of Section 3. Figure 4.2-15A presents water-level elevations 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 2016 gradually declined in this area.

Water-level hydrographs for five wells just west of the former Section 28 irrigation area are presented on Figure 4.2-16A. Water levels declined in these wells due to the pumping in this area in 2016.

Figure 4.2-17 presents the water- level time plots for two wells in Section 20 and two wells in Section 32. Water levels were steady to gradually declining in 2016.

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. Water levels overall slightly declined or were steady in 2016 in these wells.

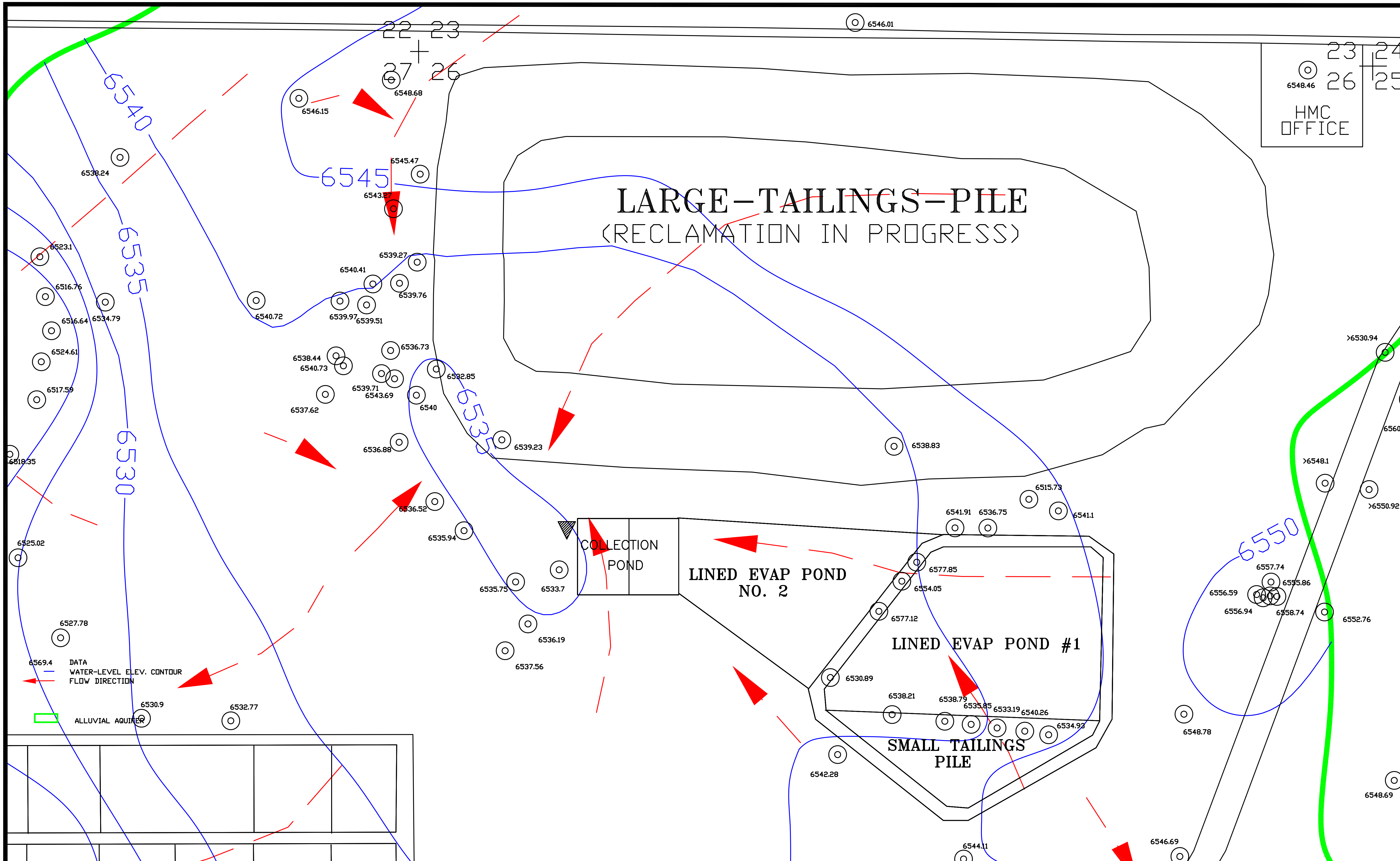


SCALE: 1"=1600'

C:\PROJECTS\2017-06 1600QAL16

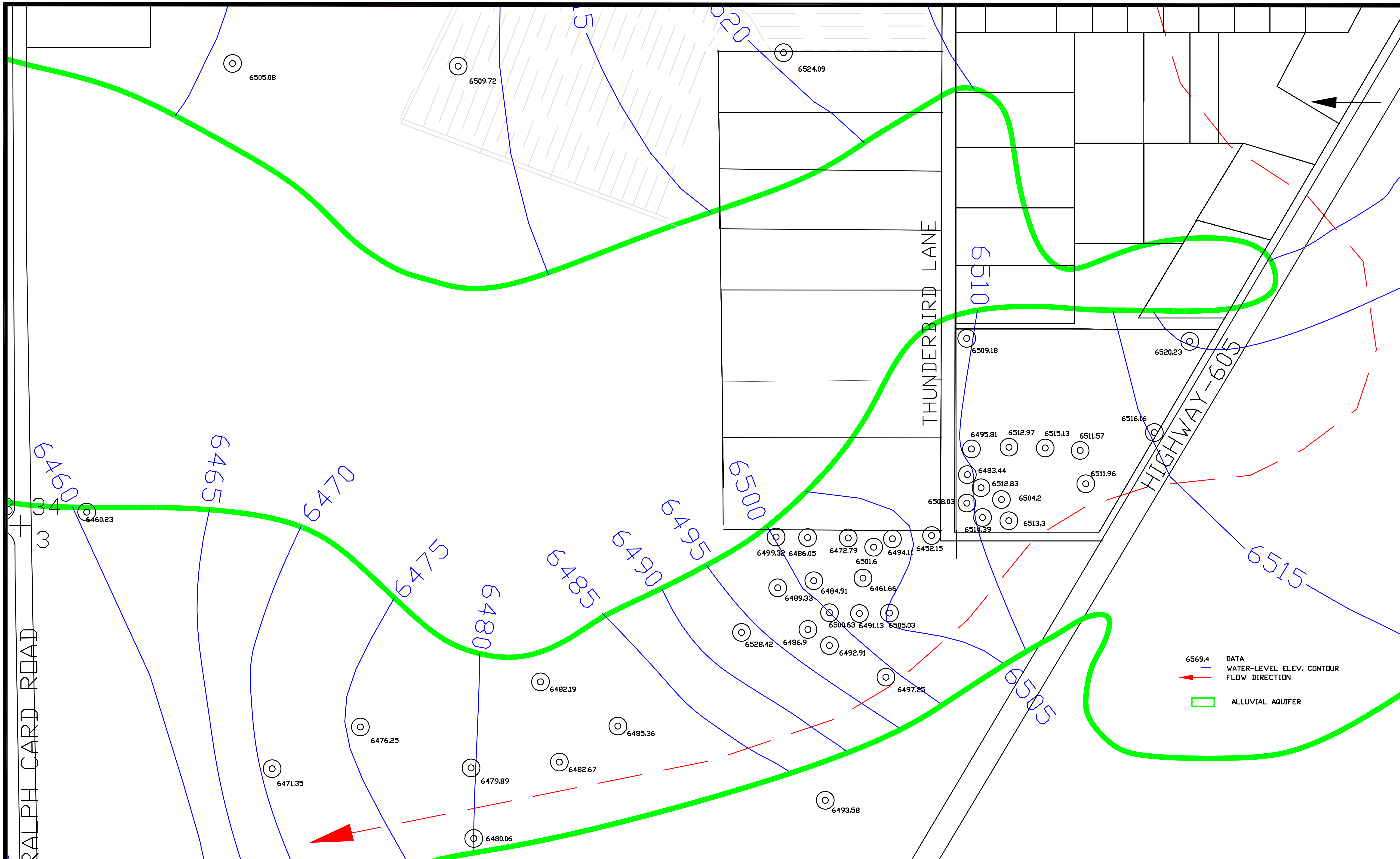
DATE: 3/1/17

FIGURE 4.2-1. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, FALL 2016, FT-MSL



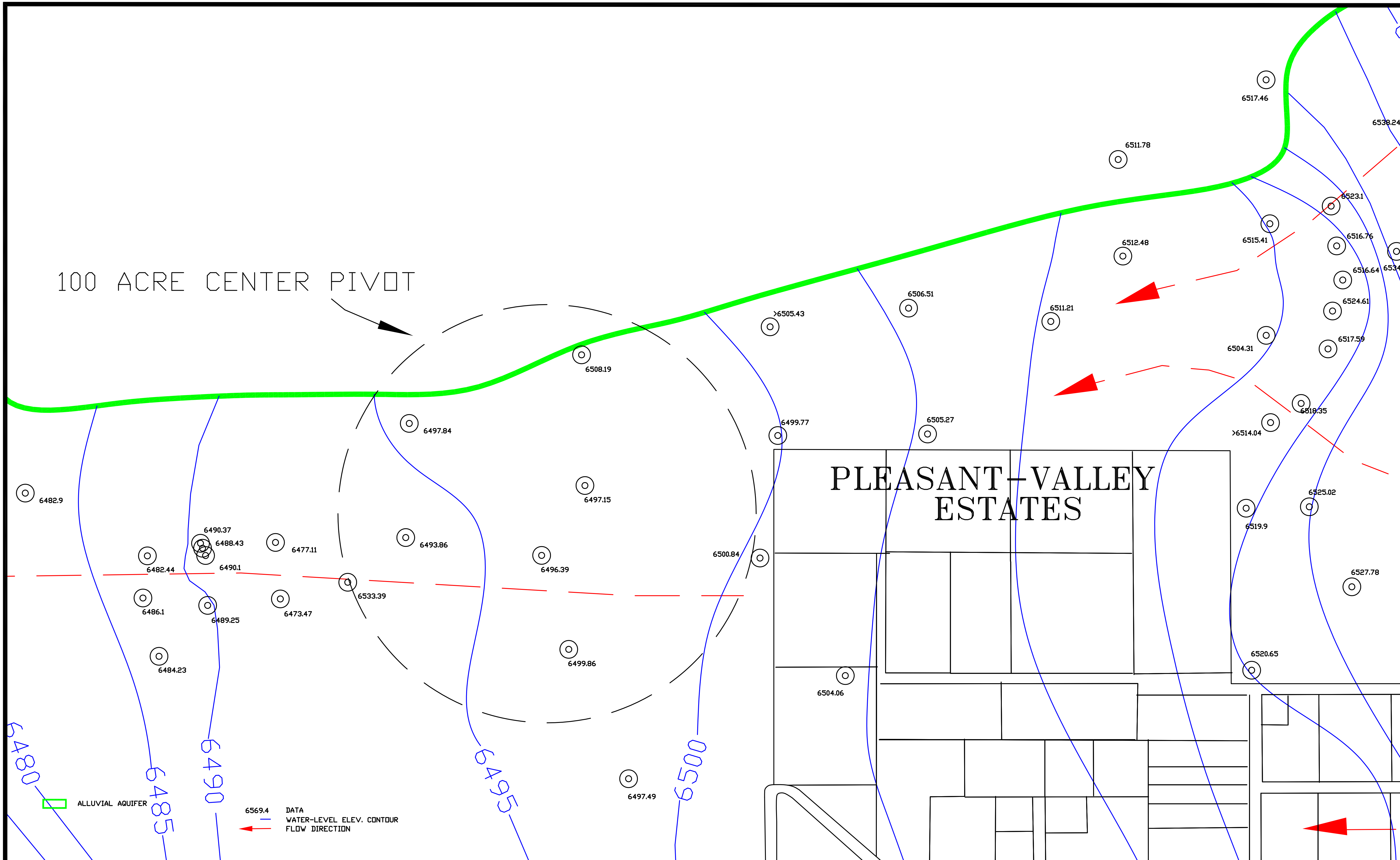
SCALE: 1"=500'
C:\PROJECTS\ 2017-06 1600QAL16
DATE: 3/1/17

FIGURE 4.2-1A. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, OS, FALL 2016, FT-MSL



SCALE: 1"=500'
C:\PROJECTS\ 2017-06
1600QAL16
DATE: 3/1/17

FIGURE 4.2-1B. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, SOS, FALL 2016, FT-MSL



SCALE: 1"=500'
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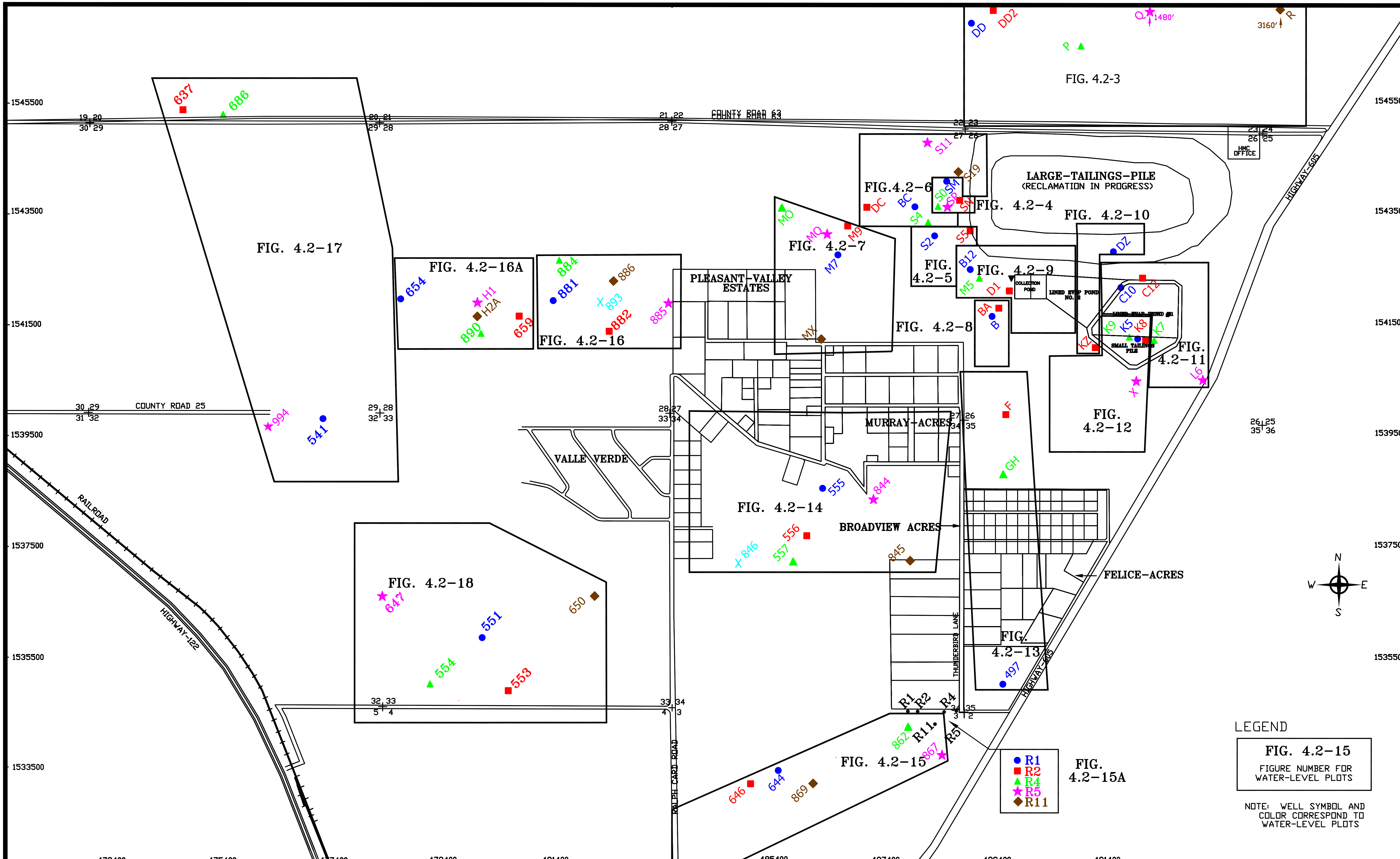
1600QAL16
DATE: 3/1/17

FIGURE 4.2-1C. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, NOS, FALL 2016, FT-MSL



SCALE: 1"=1600'
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DATE: 3/1/17

FIGURE 4.2-2. LOCATION OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS, 2016

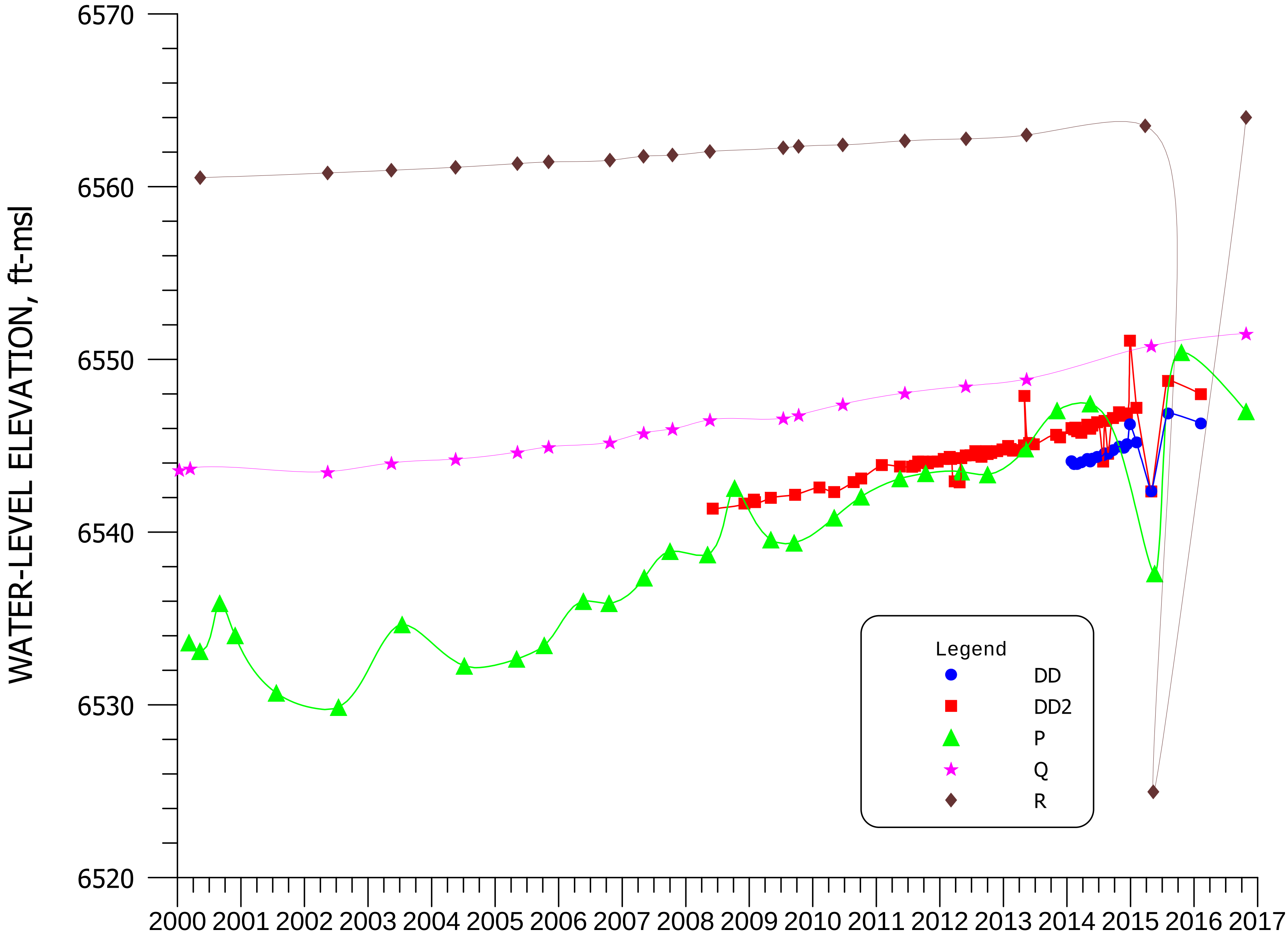

FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS DD, DD2, P, Q, AND R.

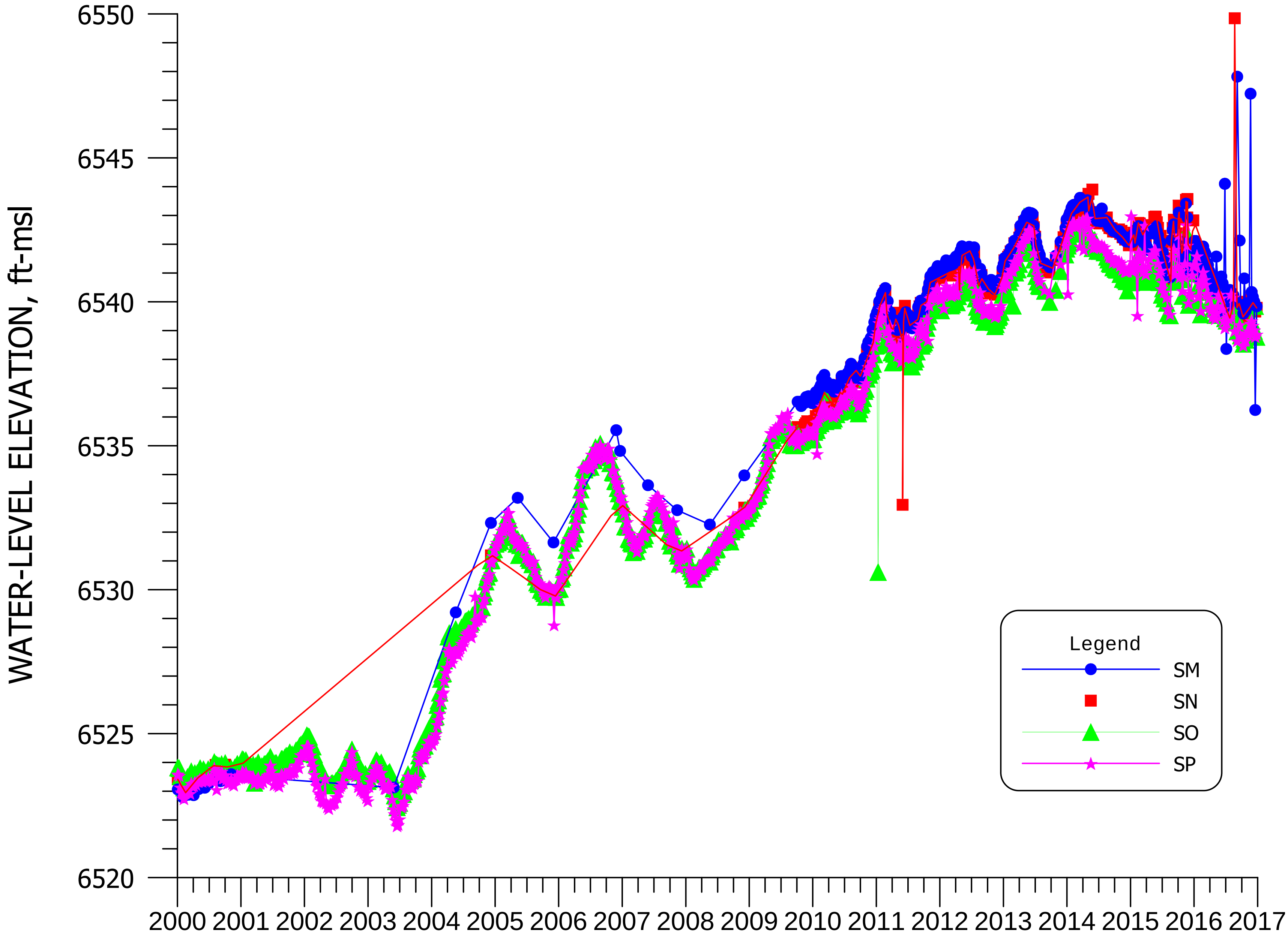

FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SM, SN, SO, AND SP.

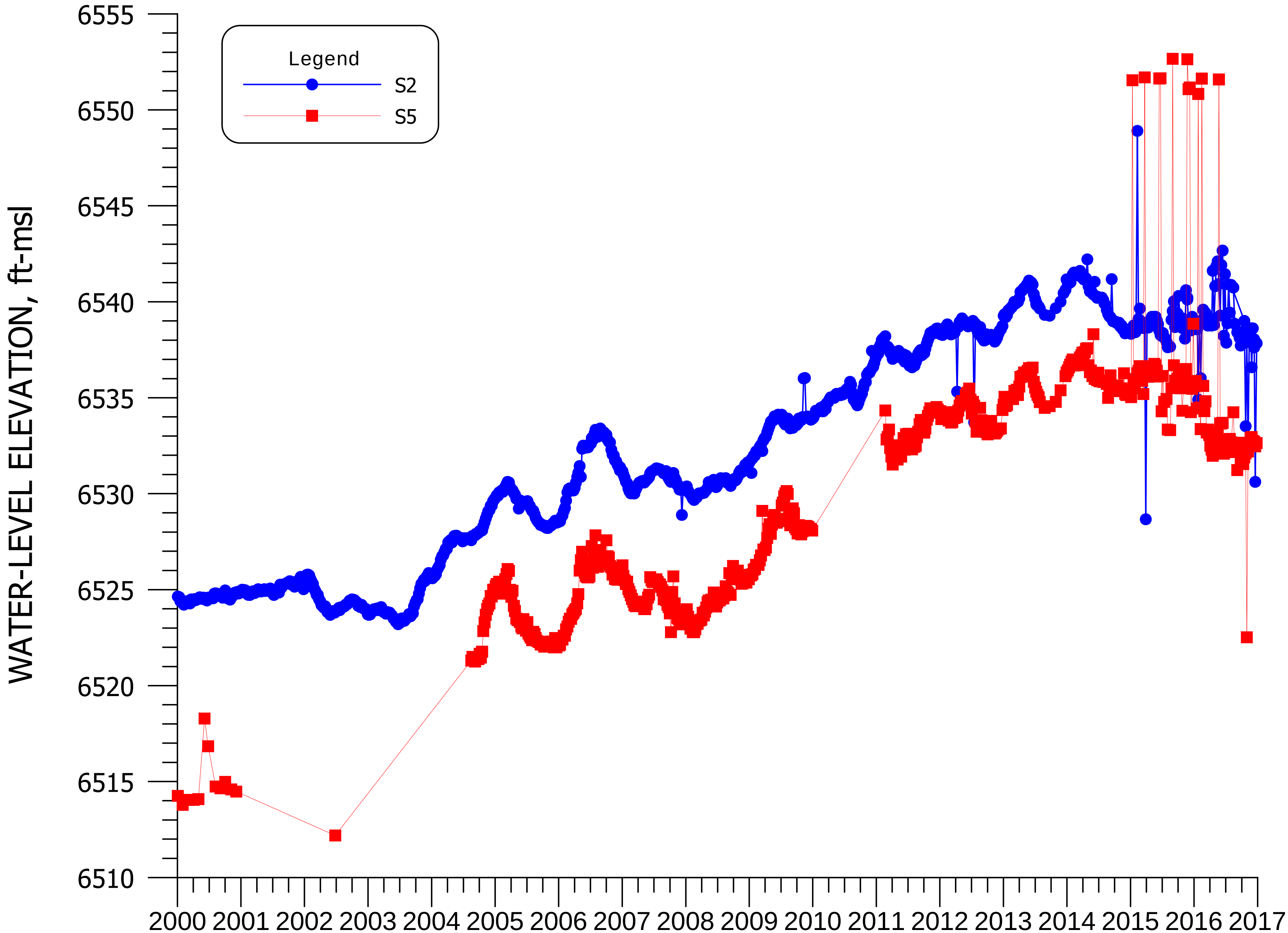

FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S2 AND S5.

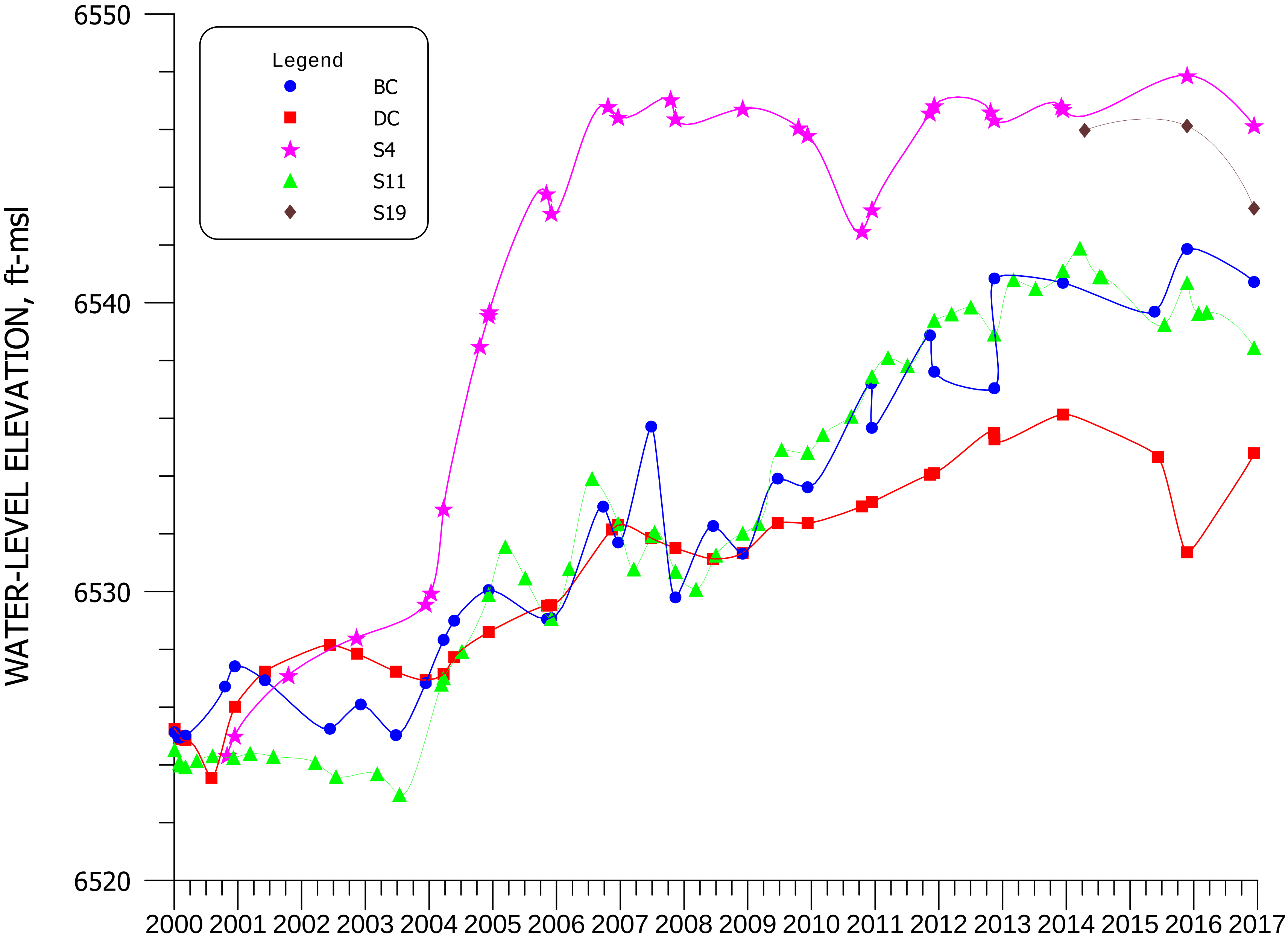

FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, S4, S11, AND S19.

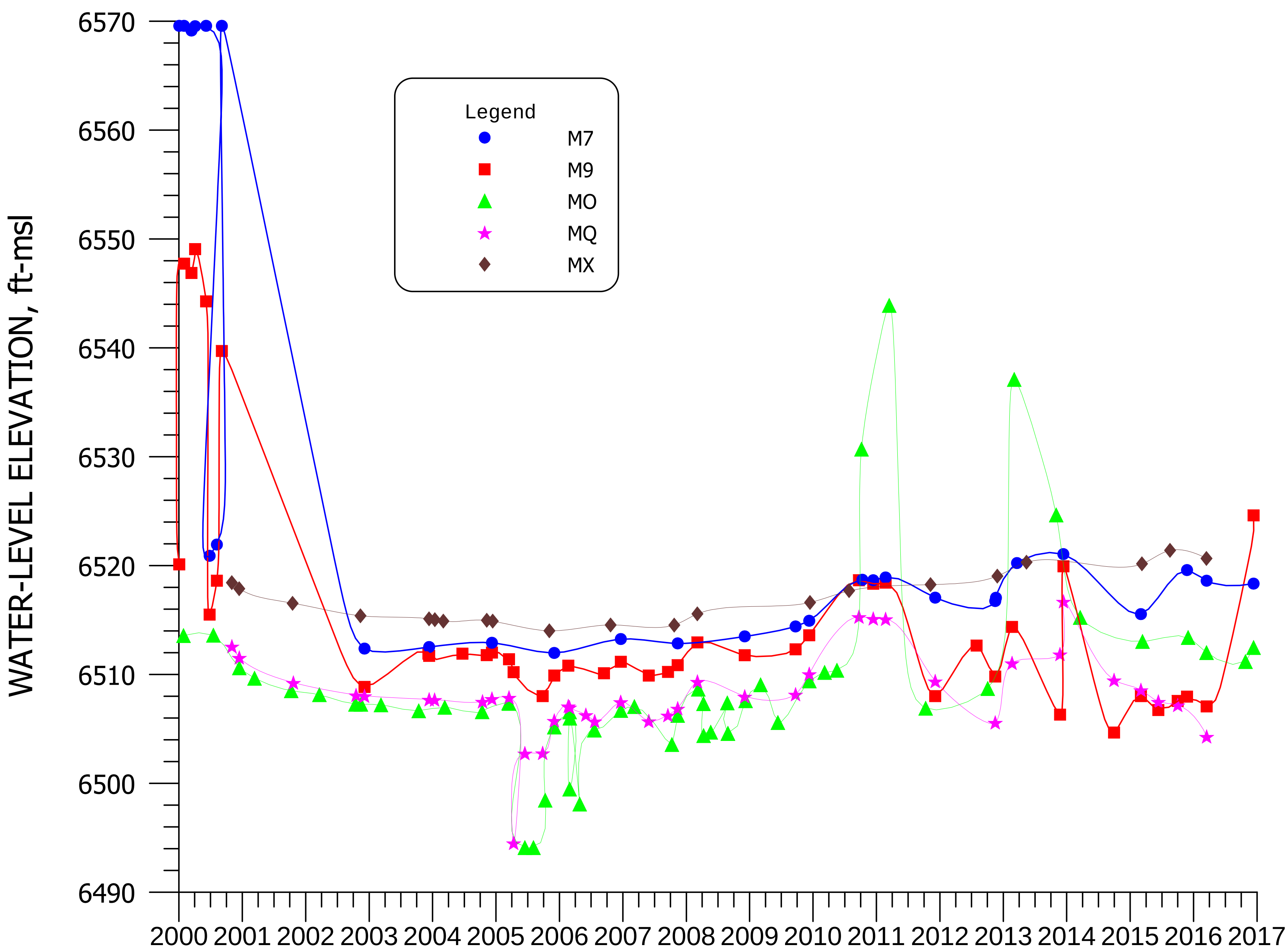

FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS M7, M9, MO, MQ, AND MX.

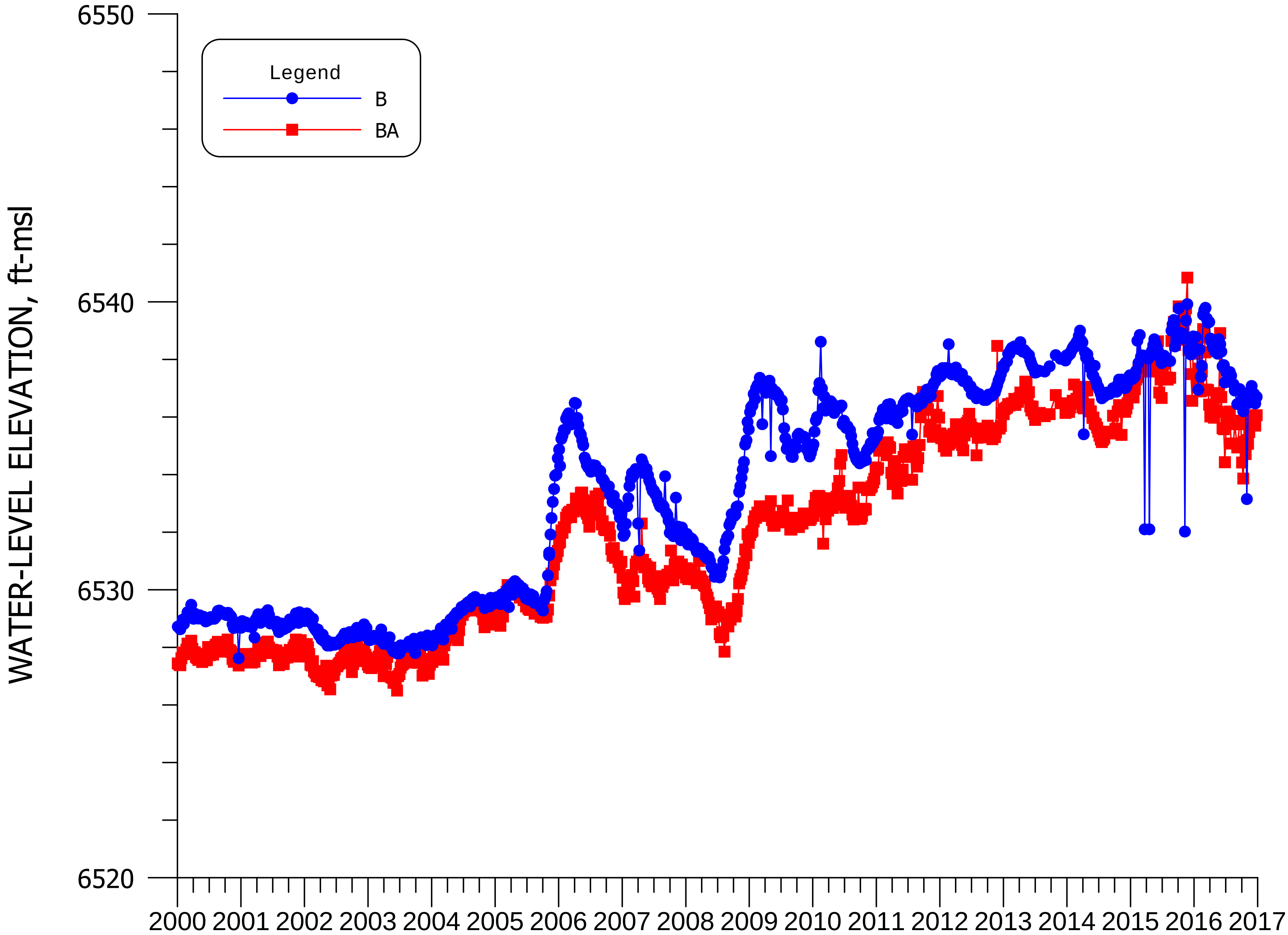

FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.

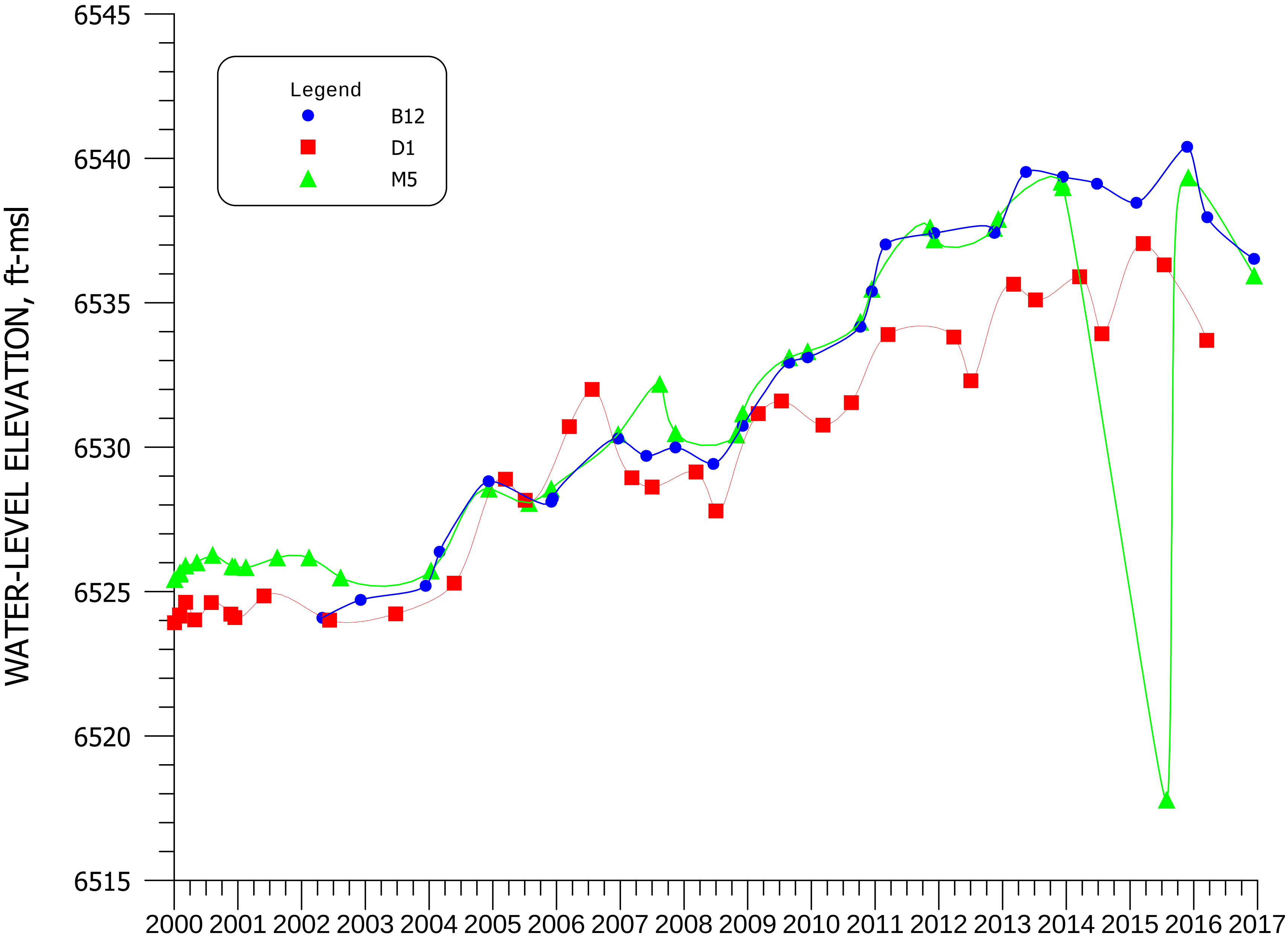

FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS B12, D1, AND M5.

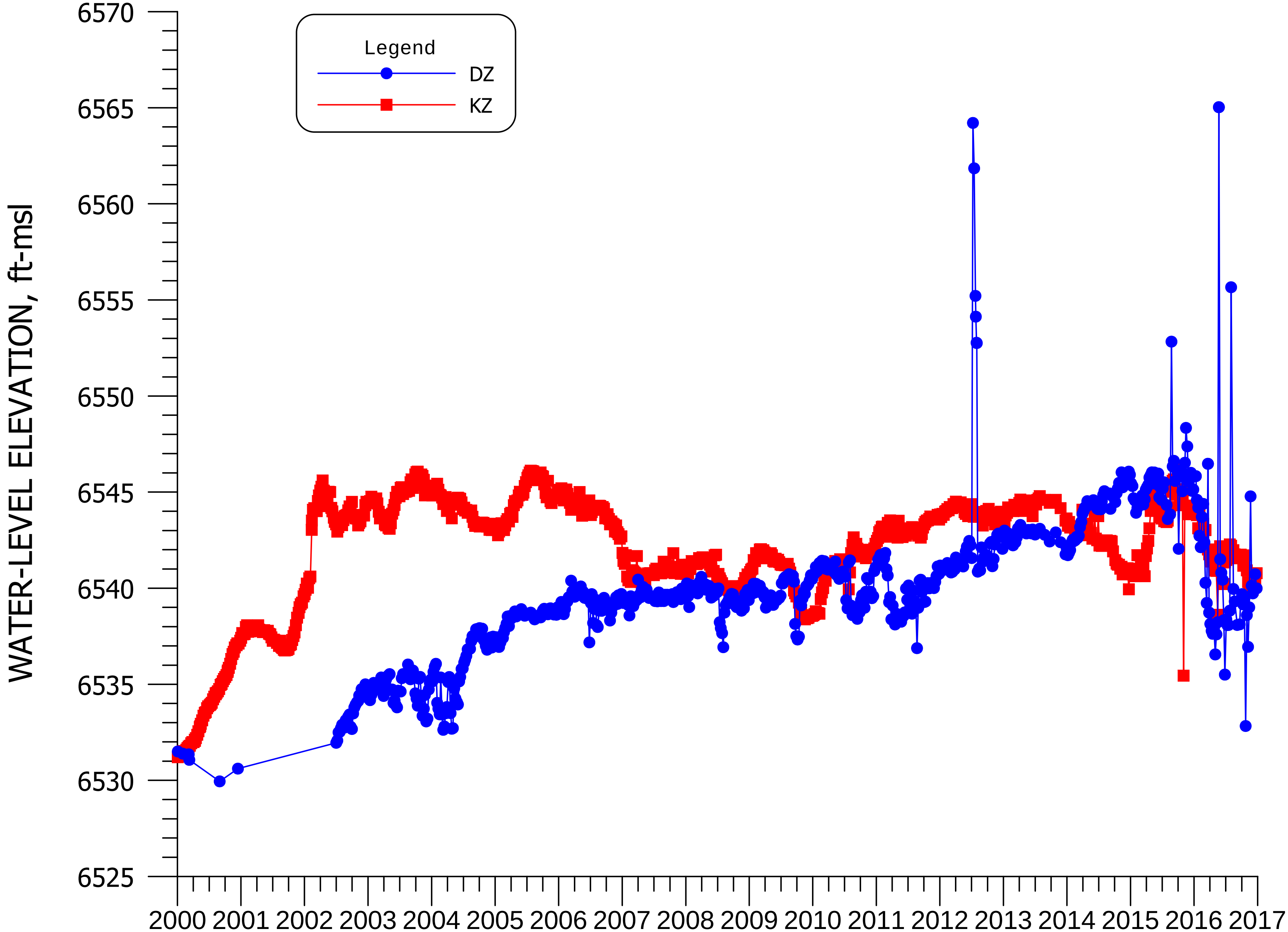

FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

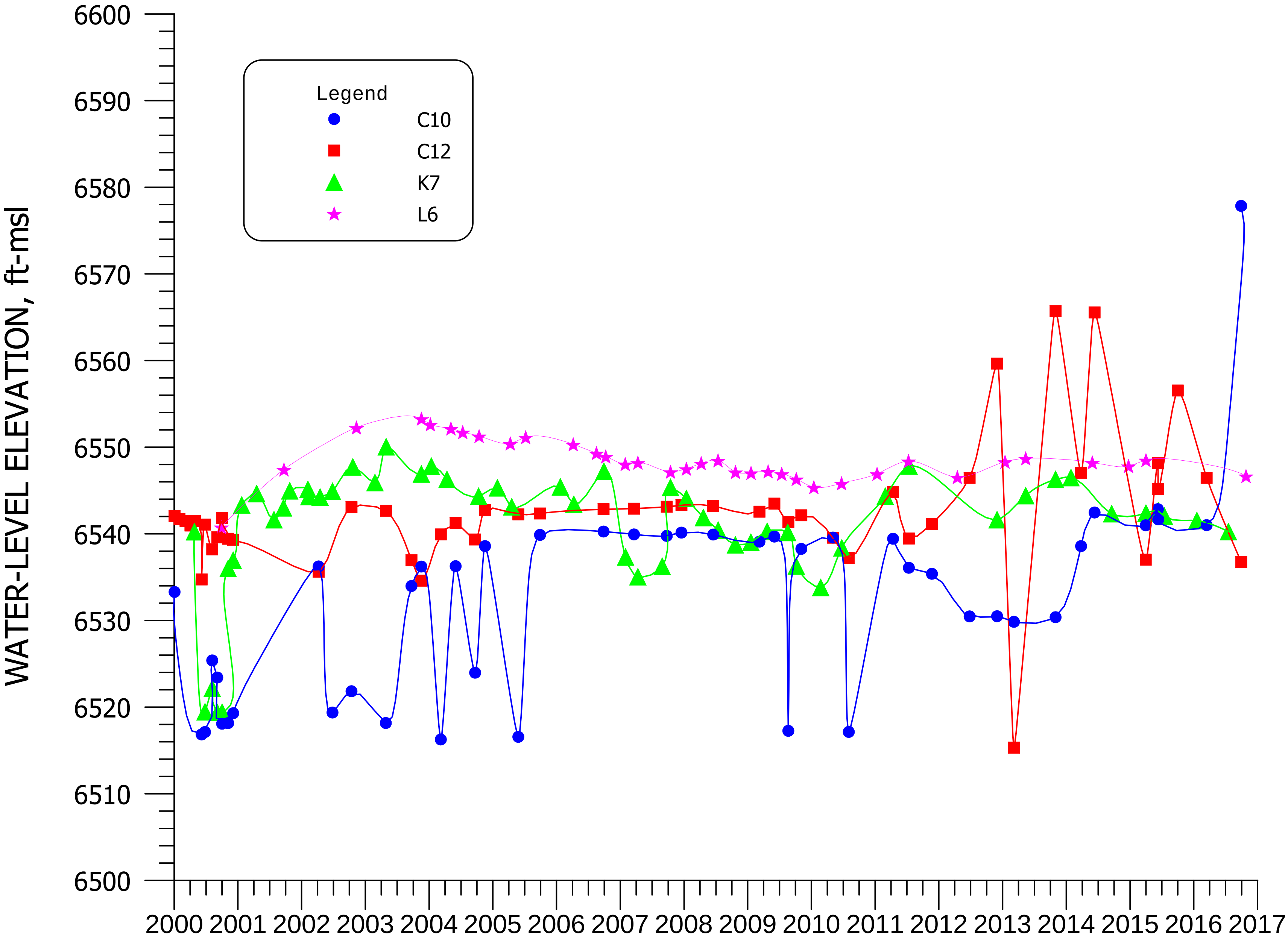

FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS C10, C12, K7, AND L6.

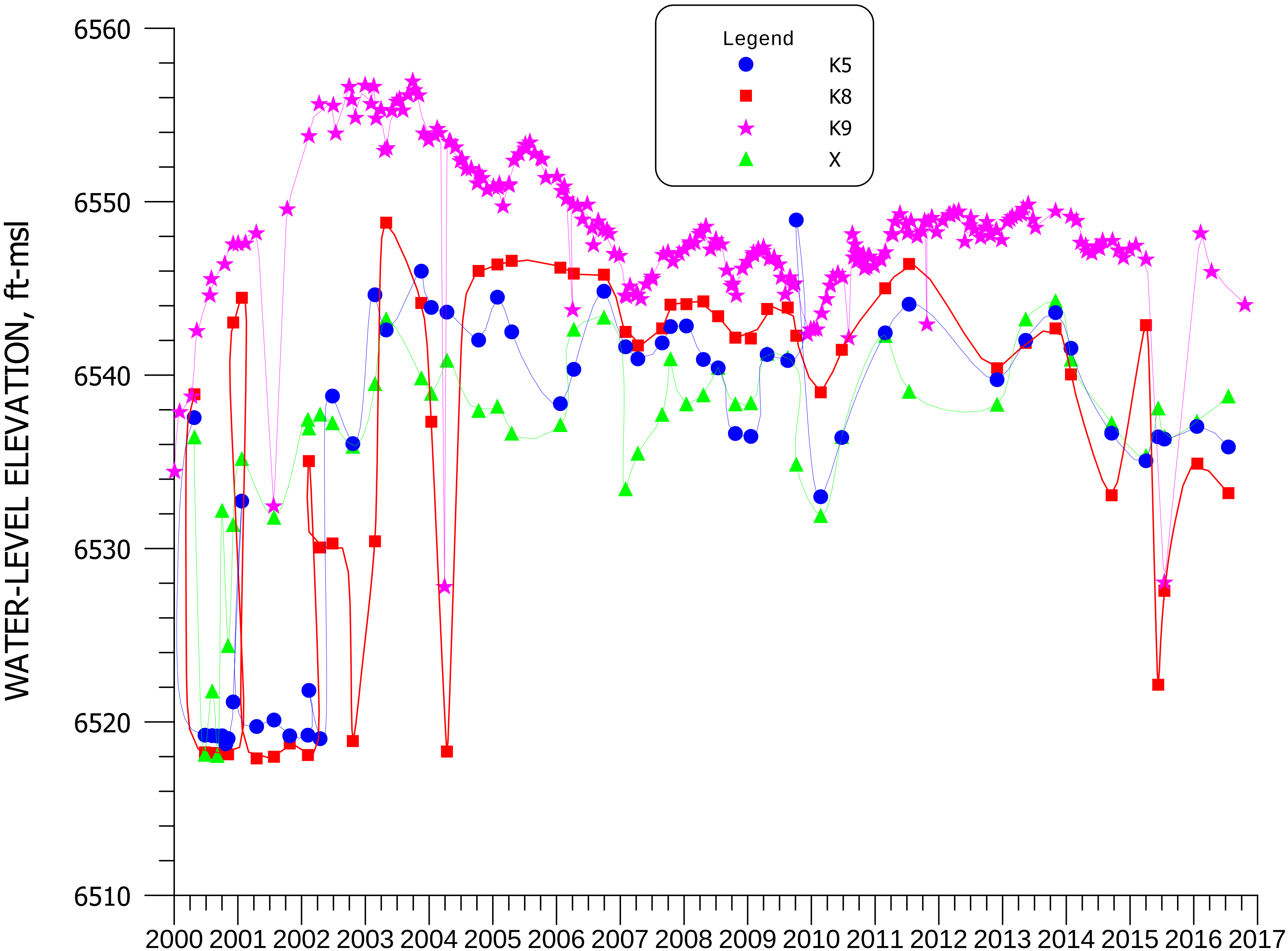

FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS K5, K8, K9, AND X.

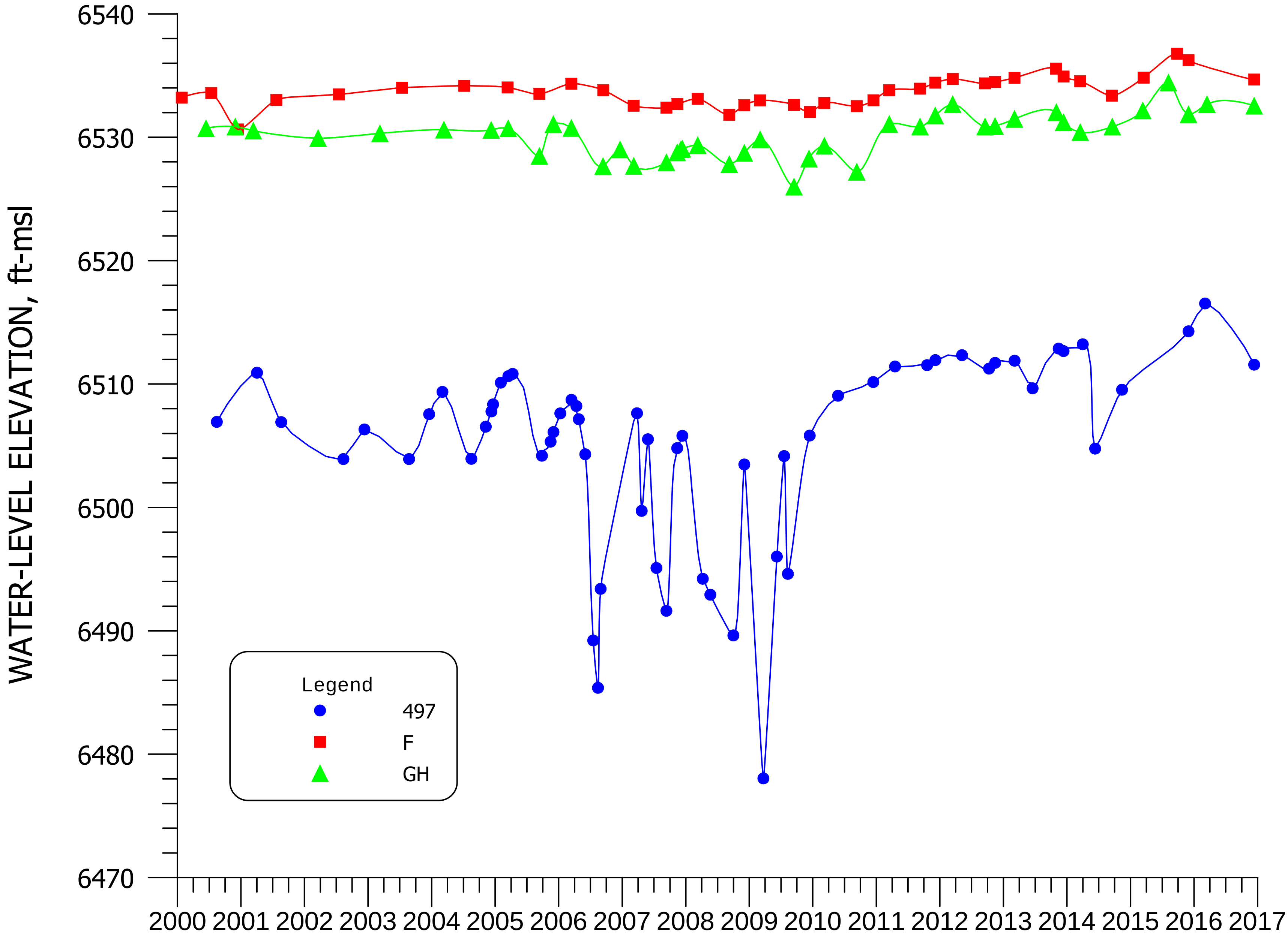

FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 497, F, AND GH.

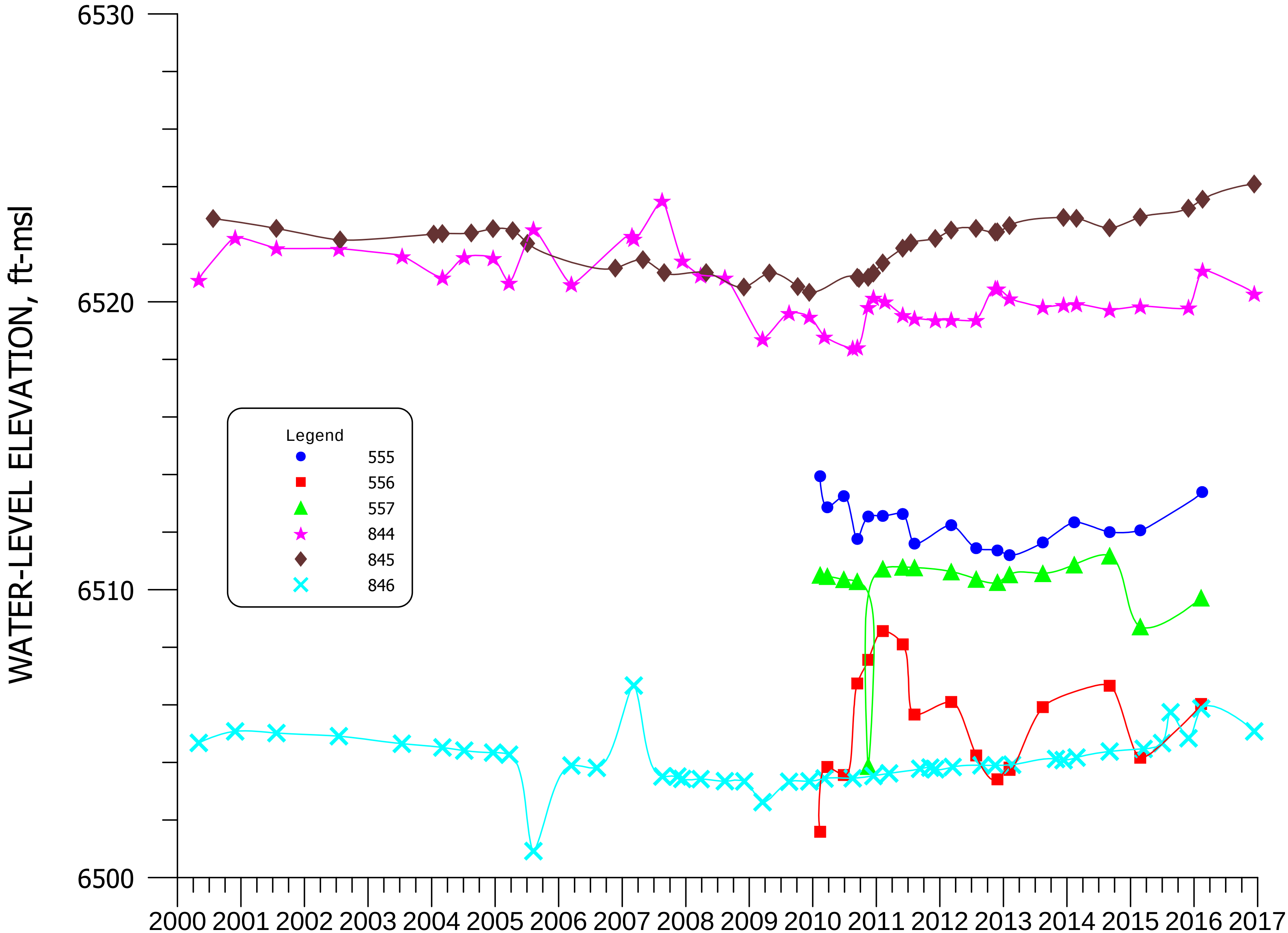

FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 555, 556, 557, 844, 845, AND 846.

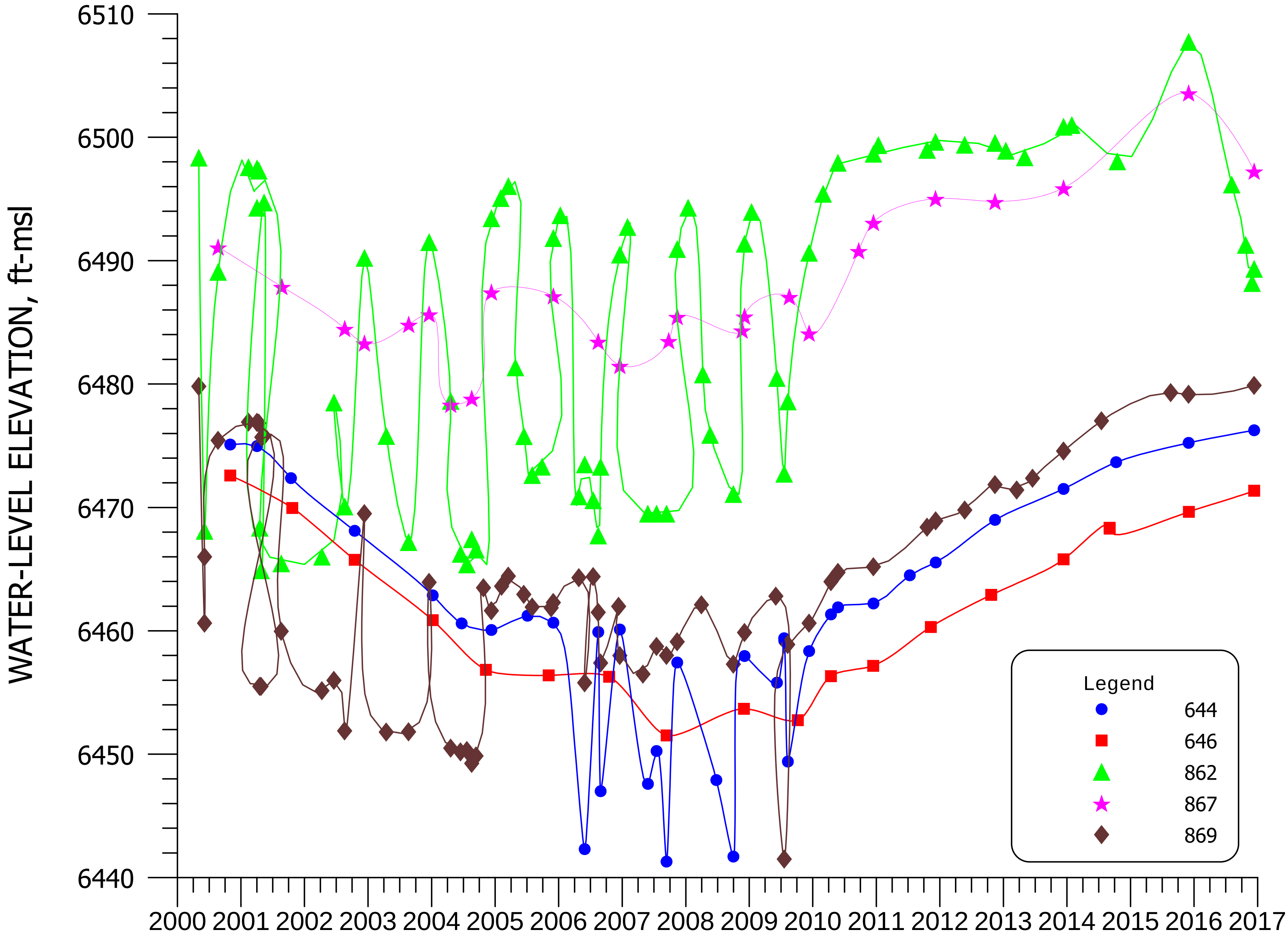

FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 644, 646, 862, 867, AND 869.

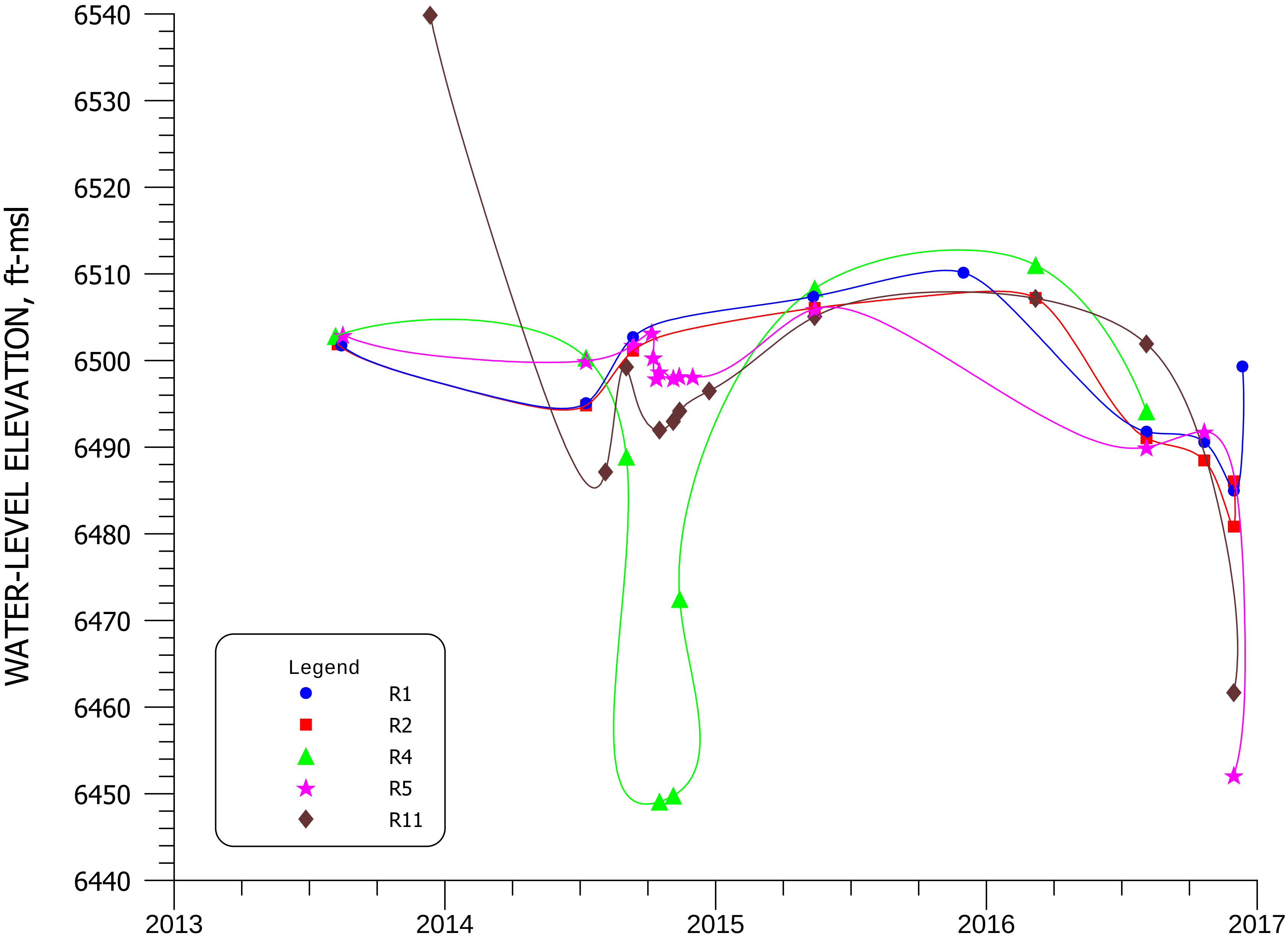

FIGURE 4.2-15A. WATER-LEVEL ELEVATION FOR WELLS R1, R2, R4, R5, AND R11.

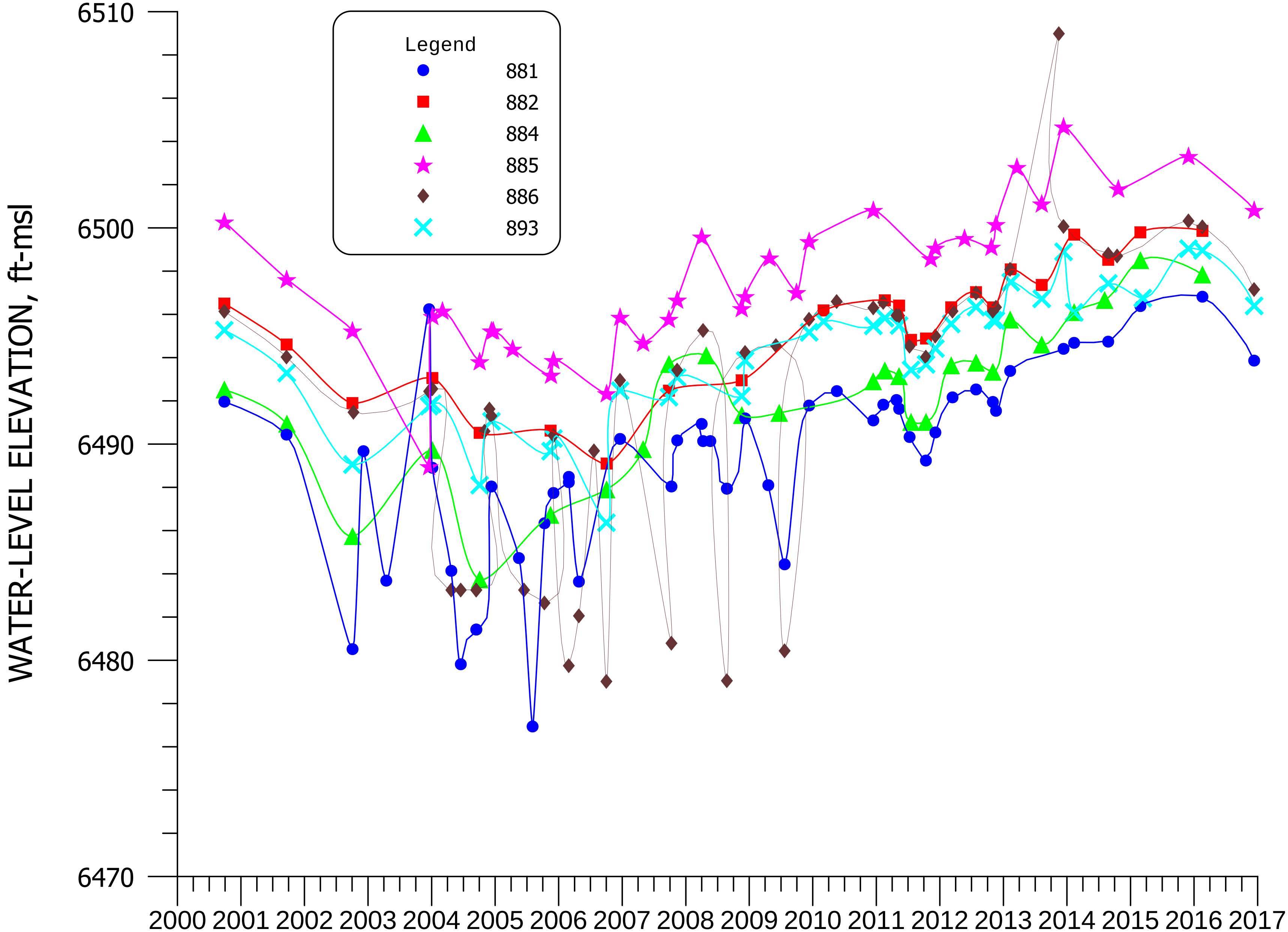

FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 882, 884, 885, 886, AND 893.

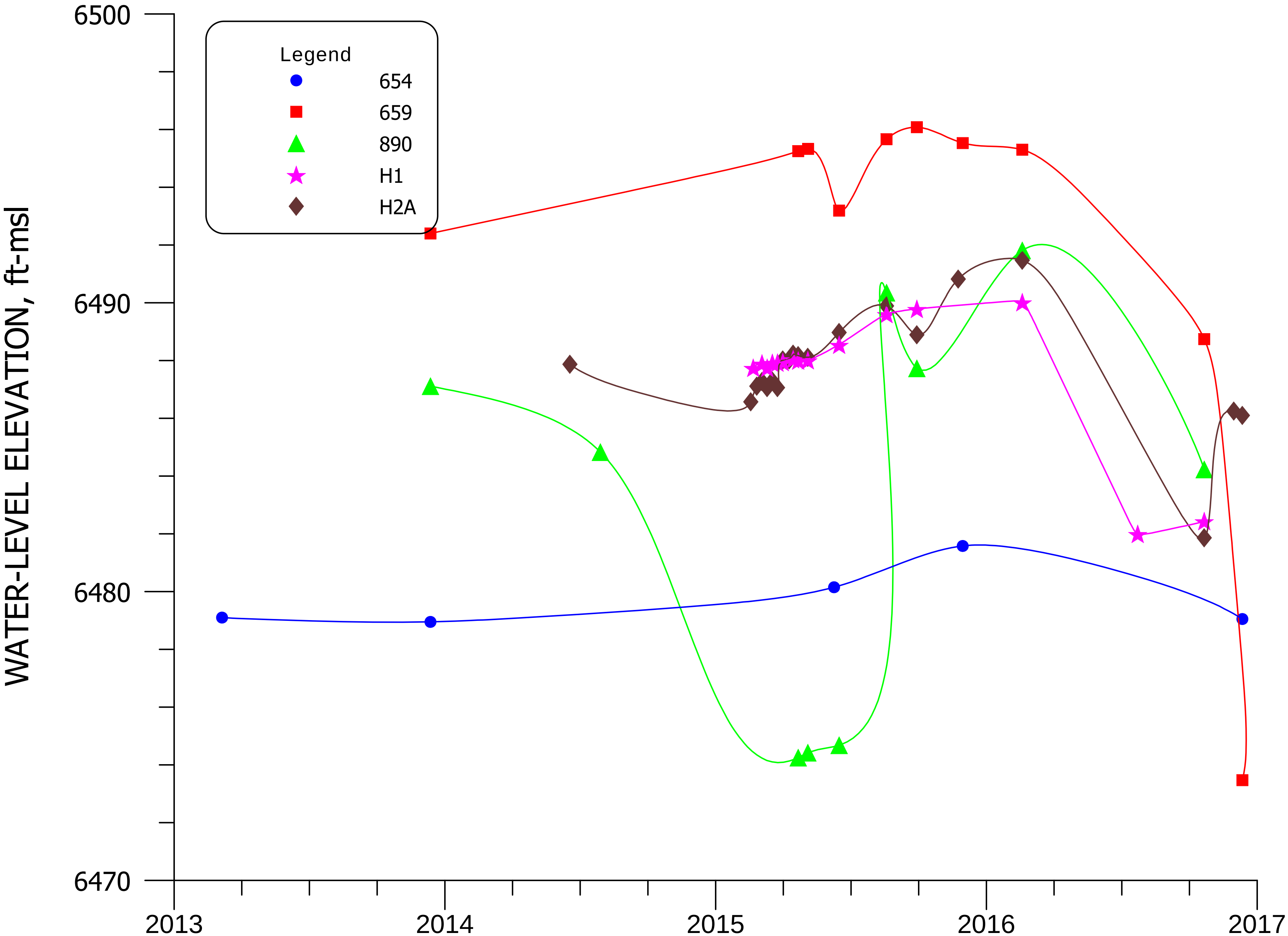

FIGURE 4.2-16A. WATER-LEVEL ELEVATION FOR WELLS 654, 659, 890, H1, AND H2A.

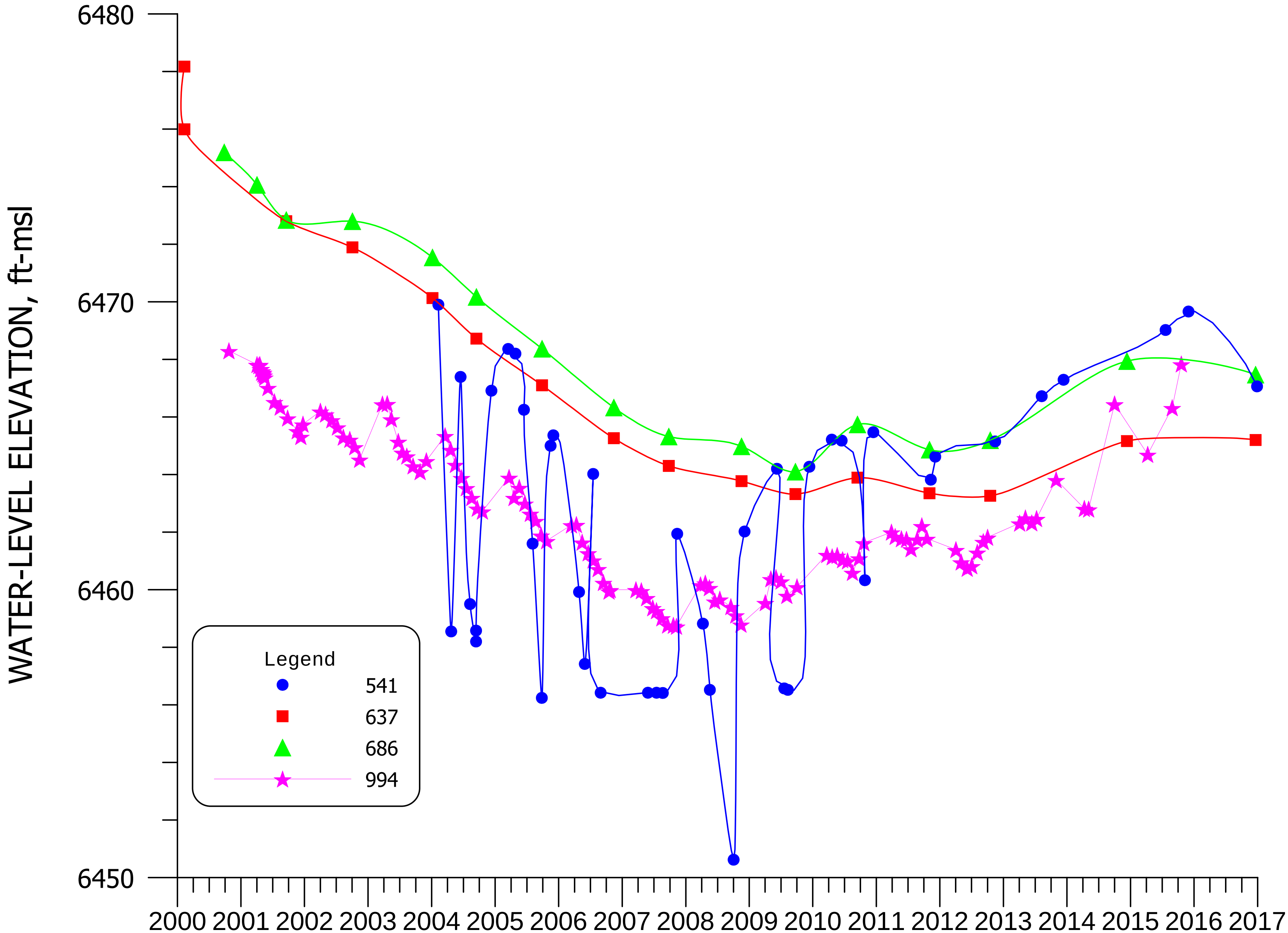

FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 541, 637, 686, AND 994.

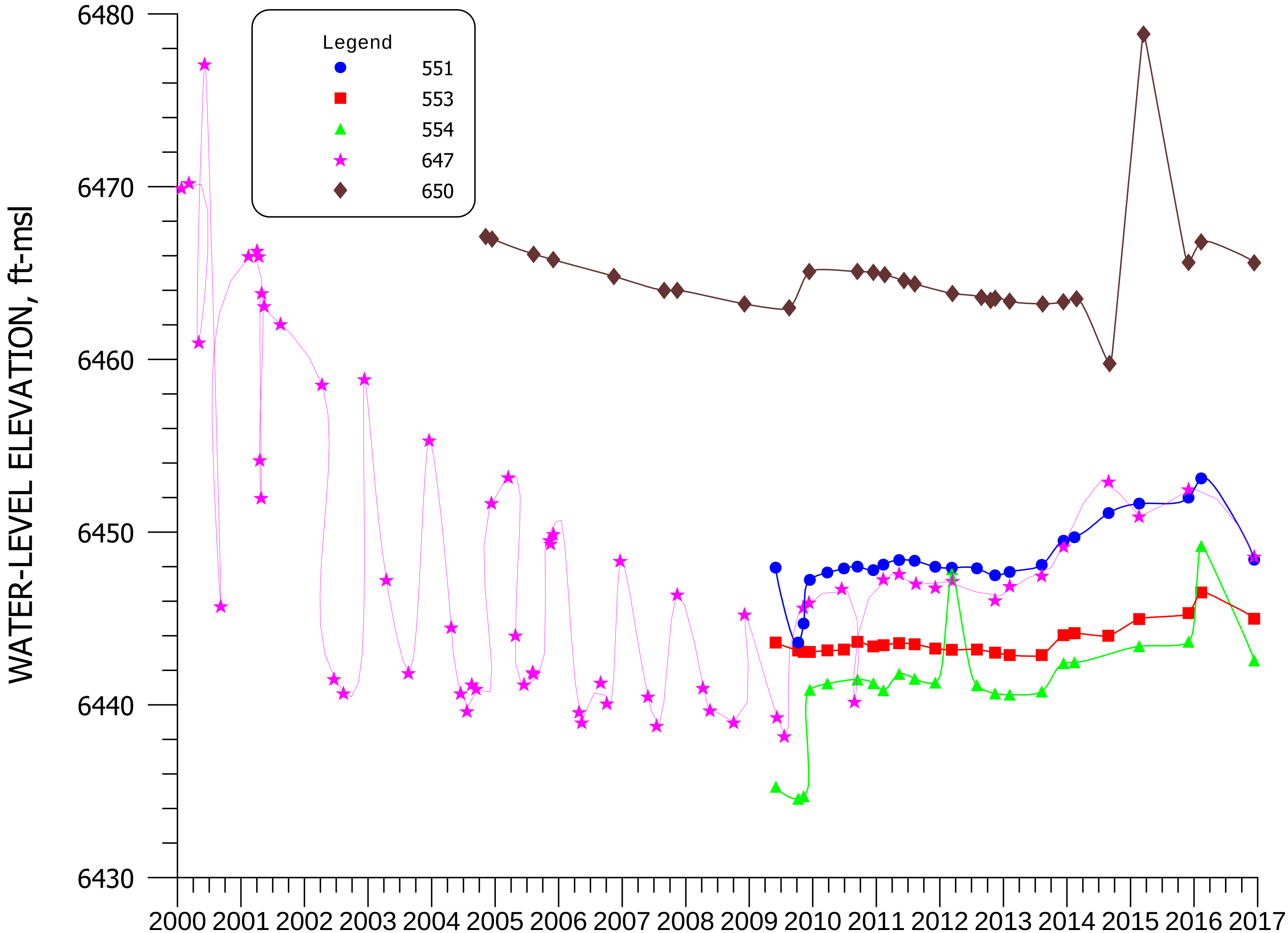

FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 551, 553, 554, 647, AND 650.

4.3 ALLUVIAL WATER QUALITY

This section presents the 2016 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, chromium, 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 2016 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 2016 are presented on Figure 4.3-1. Upgradient background well concentrations observed in 2016 ranged from 934 to 2150 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 2016 except for three wells in Section 34. Sulfate concentrations were similar in Section 3 and South Felice Acres in 2016 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 to below 1500 mg/l.

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, Q and R. A gradual increase occurred in the up-gradient well DD in the 2008 through 2012 values compared to previous recent concentrations while the 2013 through 2016 concentrations were steady except for an increase in the last 2016 value. A gradual increase in sulfate concentration has been observed in alluvial well DD2 in the last three years. Fairly steady sulfate concentrations were observed in wells P, Q and R during 2016. 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. Some of these increases could be due to the influx of ground water with higher sulfate concentrations into this area up-gradient of Homestake's background wells.

Sulfate concentrations immediately west of the LTP in alluvial wells S2, S4, SA and SZ were fairly steady in 2016, except for a small increase in well S2 and the decrease in well SA (see Figure 4.3-4). The sulfate concentrations for well SA had increased in 2010 through 2015 before decreasing in 2016.

Figure 4.3-5 presents sulfate concentrations plotted versus time for alluvial wells M7, M9, MO, MQ and MY situated further west of the LTP. Sulfate concentrations were fairly stable in alluvial wells M7, M9, MO, MQ and MY in 2016.

Figure 4.3-6 presents sulfate concentration versus time plots for alluvial wells 802, B12, D1 and S3. Large decreases in sulfate concentrations were observed in well D1 in 2016. Steady concentrations in well 802 were observed in 2016.

Figure 4.3-7 presents time plots of sulfate concentrations for wells T, T2 and TA. The sulfate concentrations in wells T and TA were overall steady during 2016.

Figure 4.3-8 presents plots of sulfate concentrations versus time for alluvial wells on the west side of the STP. Sulfate concentration decreased in wells C8 and C12 in 2016. The variations observed in these two wells indicate that the restoration front is near these two wells and well C6. A small increase was measured in well C10.

Figure 4.3-9 presents sulfate concentrations versus time for alluvial wells on the STP and the south side of the STP. Sulfate concentrations in these wells were all small in 2016 with small variations.

Figure 4.3-10 shows the sulfate concentrations for the STP collection wells K4, K5, K7 and K8 and monitoring well 1U. Fairly steady sulfate concentrations were observed in these wells during 2016 except a small increase in well K5.

Time plots of sulfate concentrations in collection wells located southeast of the STP are presented on Figure 4.3-11. This figure shows reasonably steady sulfate concentrations in 2016 in wells L6, L7, L9 and L10 and a small increase in the sulfate concentration in wells L and L8.

Figure 4.3-12 presents sulfate concentration time plots for wells to the north and east of Broadview Acres for alluvial wells F, FB, GH, GN and GV. Similar and steady concentrations were observed in these wells in 2016.

Figure 4.3-13 presents sulfate concentrations versus time for Felice Acres alluvial wells 490, 497, 498 and CW44. A small decline was observed in wells 490, 498 and CW44 in 2016 while sulfate increased in well 497. The sulfate concentrations in wells Q2, Q3, Q5, Q18 and Q29 were fairly steady in 2016 except a small decline in wells Q2 and Q3 (see Figure 4.3-13A). Small sulfate concentration declines in these wells is expected with the injection of treated water in South Felice Acres.

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 844 and 846 became fairly steady in 2014 through 2016 while a gradual decline was observed in well 845. Concentrations were fairly steady in alluvial well 556 while a gradual increase was observed in well 555 and 557 during 2016. These changes could be showing the small effect on sulfate concentrations from the former flood irrigation.

Figure 4.3-15 presents the sulfate concentration time plots for five 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 changes in wells 540, 862 and 865 are likely due to the injection of treated water in this area in 2016. Figure 4.3-15A presents the sulfate concentration time plots for five R collection wells in the northeast corner of Section 3 near wells 866 and 862 (see Figure 4.3-2 for the location of these wells). Collection and fresh water injection in the R wells was started in July of 2014 and the injection was switched to treated water in the middle of 2015. This plot shows that the sulfate concentration in these collection wells did not change much due to the fresh water injection sulfate concentration being very similar but has changed some in 2016 with the use of treated water.

The sulfate concentrations in water from six wells within and near the former Section 28 center pivot irrigation area are presented on Figure 4.3-16. The decline in sulfate concentrations that occurred in monitoring well 884 during 2005 and 2006 was due to the movement of fresh water that was injected in Section 28. Sulfate concentrations in well 884 were slightly higher in 2011 through 2013 with a small decline in 2014 through 2016. A sulfate decline continued in well 886 in 2009 but increased in 2011 and 2012 and then declined in 2013 prior to a small increase in 2014 and 2015 which has been followed by a small decline. Sulfate concentrations were steady in wells 688, 881 and 882 in 2016 while a gradual decline was observed in well 893. These small changes could be due to ceasing irrigation in this area.

Figure 4.3-16A presents sulfate concentrations with time for five wells located west of the Section 28 irrigation area where initial restoration is occurring. The sulfate concentrations in these five wells show a decline in the sulfate concentration in early 2016 but then returned to a similar level as occurred before the decline.

Figure 4.3-17 presents sulfate concentrations with time for four 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 two wells are downgradient of the confluence. The sulfate concentrations in these Rio San Jose alluvial wells are fairly steady during 2016.

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 2016 except for a decline in well 551 in 2015 and 2016. 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 declined in the last two years in well 551, likely from the ceasing of the irrigation after the 2009 season.

4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during 2016 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 2016 varied from 1820 to 3560 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 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 is an area in South 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 ground water 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 an increase in 2016. TDS in well DD2 gradually increased in 2016, while concentrations in the remainder of the upgradient wells remained fairly steady.

Figure 4.3-21 presents TDS concentrations plotted versus time for wells S2, S4, SA and SZ. This plot shows steady concentrations in 2016 for these wells except for a decrease in well SA.

TDS concentrations were relatively stable in water collected from wells MO and MY during 2016 (see Figure 4.3-22). Gradual decreasing concentrations were observed in 2016 in wells M9 and MQ.

TDS concentrations in water sampled from wells 802, B12, D1 and S3 are presented in Figure 4.3-23. TDS concentrations decreased in 2016 in well D1 and have returned to a level observed prior to the recent increases. Steady values were measured in well 802 in 2016.

Figure 4.3-24 presents TDS concentrations for wells T, T2 and TA. Lower concentrations were observed in wells T and TA in 2016.

Figure 4.3-25 presents time concentration plots for wells C6, C8 and C10 on the west side of the STP and well C12 on the north side of the STP. The concentrations in wells C6, C8 and C12 were similar levels in 2016 while the values in well C10 were higher.

TDS concentrations versus time for three wells on the STP and one well just south of the STP are presented in Figure 4.3-26. This figure shows continued low and slightly variable concentrations in 2016.

Figure 4.3-27 presents a plot of TDS concentrations for four wells on the south side of the No. 1 Evaporation Pond and on top of the STP and one well to the east of the STP. Samples from these alluvial wells were steady in 2016 except for an increase in wells 1U and K5.

TDS concentrations in water taken from the L line of wells are presented in Figure 4.3-28. TDS concentrations generally show steady concentrations in 2016 in these L wells except for a gradual increase in wells L and L8.

Figure 4.3-29 presents the TDS concentrations versus time for wells north of Broadview Acres and one well east of Broadview Acres. This plot shows fairly steady TDS concentrations in 2016 in these wells except for a gradual increase in well GV.

The TDS concentrations in the Felice Acres alluvial wells 490, 497, 498 and CW44 were overall steady in 2016 (see Figure 4.3-30) except an increase in well 497 and a decrease in well 498. Figure 4.3-30A gives the TDS concentrations for five South Off-site collection wells. TDS gradually increased in well Q2 in early 2016 and gradually declined toward the end of 2016. A decrease in TDS in well Q3 was also observed in 2016. A gradual increase was observed in collection wells Q18 and Q29.

TDS concentrations for the former flood irrigation area alluvial wells are presented in Figure 4.3-31. Steady TDS concentrations were observed in these wells in 2016 except for a gradual decrease in wells 844 and 845. The prior increases in TDS concentrations in recent years in wells 844 and 845 could be due to the flood irrigation in this area which ceased after the 2012 season.

Figure 4.3-32 presents time plots of TDS concentrations for five wells located in Section 3. Overall, TDS concentrations have been relatively steady over the last few years in these wells except for the decline in wells 540 and 862 which probably shows the effect of the treated water injection. Figure 4.3-32A presents time plots of TDS concentrations for five new R collection wells located in the northeast corner of Section 3. These TDS concentrations have been steady due to a very similar TDS that was being used for the fresh water injection adjacent to these collection wells but the switched to treated water injection may slightly decrease the TDS in this area in the future.

TDS concentrations for the former Section 28 irrigation monitoring wells were also overall stable in 2016 (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. The total change in the TDS due to the freshwater injection appears to have occurred in well 884 in 2006. 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 these wells in 2016 were fairly steady.

TDS concentrations in alluvial wells in Sections 20 and 32 are presented on Figure 4.3-34. TDS concentrations in these wells in 2016 were steady.

Figure 4.3-35 presents TDS concentrations in the Section 33 alluvial wells. This plot shows fairly steady concentrations in these wells in 2016 except for a decline in well 551 in 2015 which is supported with the 2016 value. 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 2016 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 46 to 75 mg/l in 2016. 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 ground water 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 ground water-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. No alluvial wells north of Pleasant Valley exceed the site standard in 2016 (see Figure 4.3-36C).

Figure 4.3-37 presents chloride concentrations versus time for five up-gradient wells. Analysis of the data on this figure shows overall steady chloride concentrations in 2016 in these wells.

Figure 4.3-38 presents time plots of chloride concentration for wells S2, S4, SA and SZ. Fairly steady chloride levels were measured in these four wells in 2016 except for the decrease observed in wells SA and SZ.

Chloride concentrations in wells M7, M9, MO, MQ and MY are presented in Figure 4.3-39. Similar values were measured in these wells in 2016.

Plots of chloride concentration for wells 802, B12, D1 and S3 are presented on Figure 4.3-40. Chloride concentrations in well D1 decreased in 2016. The chloride concentration in well 802 was fairly steady in 2016.

Chloride concentrations in wells T, T2 and TA are presented on Figure 4.3-41. Chloride concentrations in wells T and TA were fairly steady in 2016.

Chloride concentrations in alluvial wells on the west and north sides of the STP are presented on Figure 4.3-42. This figure shows an overall decrease in well C8 and with a slightly larger value in well C10 for 2016.

All of the chloride concentrations on the top of the STP and south side of the STP remained very low in 2016 (see Figure 4.3-43). The chloride concentrations in water from the remainder of the K wells on top of the STP (see Figure 4.3-44) have been steady in 2016. A decrease in chloride concentration was observed in well 1U in 2014 through 2016 after steady values that followed a large decline in 2008.

The chloride concentrations in water collected from the L line wells are presented in Figure 4.3-45. The 2016 chloride concentrations in these wells are generally slightly larger than they were several years ago due to switch from RO product water to fresh water to the northwest of this area.

Figure 4.3-46 presents time plots of chloride concentrations in wells near Broadview Acres with the concentrations very similar to the fresh water chloride concentration.

Figure 4.3-47 presents the chloride concentration-time plots for the four Felice Acres wells. The 2016 chloride concentrations are fairly similar to previous chloride concentrations observed in wells 490, 497 and CW44. The chloride in well 498 shows some effects from the treated water injection into this area. The chloride concentrations for five South collection wells are presented in Figure 4.3-47A and shows a small decline in wells Q2 and Q3.

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 Figure 4.3-49. Chloride concentrations were similar in 2016 in these wells to their historic values with wells 540 and 862 showing the effects of the treated water injection. The chloride concentrations for five collection R wells show that their values stayed fairly steady into 2016 with some effects being observed from the treated water injection (see Figure 4.3-49A).

Figure 4.3-50 presents a plot of the variation of chloride concentrations with time in Section 28 wells. 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 ground water restoration were variable in 2016 but have stayed small.

Chloride concentrations in the Sections 20 and 32 monitoring wells are presented on Figure 4.3-51. Chloride concentrations in 2016 stayed small in these wells.

Figure 4.3-52 presents time plots of chloride concentrations in the Section 33 wells. The 2016 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. These 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.

4.3.4 URANIUM - ALLUVIAL

Uranium is considered an important ground water constituent at this site due to the significant levels in the tailings seepage. Uranium data and contours for 2016 are presented on Figure 4.3-53. Background uranium concentrations during 2016 varied from 0.02 to 0.22 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 into the western half of Section 28 with numerous new wells in the NOS area (see Figure 4.3-53C). Uranium concentrations in Sections 29 and 32 also reflect a contribution from the Rio San Jose alluvial system in Section 20, but these levels have decreased to less than 0.16 mg/l. The zones of moderately elevated concentrations join together and the combined area extends down-gradient approximately one mile into 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 2016 to values observed in 2015.

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). Several new wells were added to this area in 2016. 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 and 2016. The uranium concentration in another small area in the northeast portion of Murray Acres at well 802 has been restored to less than 0.16 mg/l and pumping of this well is continuing to decrease the uranium concentration. Additional restoration is needed in each of these areas with respect to uranium concentrations.

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, 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 were steady in 2016 except for a smaller value from well DD late in the year. The site standard of 0.16 mg/l is shown in the legend on Figure 4.3-53.

A decrease in uranium concentrations was observed in 2010 through 2015 with a small increase in 2016 for well S2 (see Figure 4.3-55). Uranium concentrations remained small and steady in well S4 in 2016. Uranium concentrations decreased in wells SA and SZ in 2016.

Figure 4.3-56 presents the uranium concentration time plots for alluvial wells west of the LTP. Uranium concentrations were steady in wells MO and MY in 2016 and declined in collection wells M9 and MQ and monitoring well M7.

Figure 4.3-57 presents time plots of uranium concentrations for alluvial wells 802, B12, D1 and S3. Uranium concentrations quickly declined in well D1 in 2016 showing that significant restoration occurred in this area. Uranium concentration increased in well B12 while a small additional decline was observed in Murray Acres well 802.

Plots of uranium concentration versus time are presented on Figure 4.3-58 for alluvial wells T, T2 and TA. The uranium concentration in 2016 in wells T and TA declined in 2016. Additional restoration is still needed in this area of the alluvial aquifer.

Figure 4.3-59 presents plots of uranium concentration versus time for collection wells C6, C8, C10 and C12 on the west side of the STP. Uranium concentrations in these wells are variable showing that they are near the restoration front. Uranium is the main parameter that requires additional restoration in this area and this plot shows that well C10 requires the most restoration of these wells.

Figure 4.3-60 presents uranium concentrations for wells on the STP and the south side of the STP in wells K9, K10, K11 and X. Uranium concentrations were fairly steady in each of these wells in 2016 with a small decrease in wells K9 and K10.

Uranium concentrations in wells 1U, K4, K5, K7 and K8 were reasonably steady in 2016 (see Figure 4.3-61). A large decrease in concentrations in well 1U was observed prior to the small concentrations measured the last seven years. A small amount of additional restoration is needed in this area.

Uranium concentrations in water from alluvial wells L, L6, L7, L8, L9, and L10 are presented on Figure 4.3-62. Uranium concentrations were fairly steady in 2016 in all of these wells. This time plot shows that additional restoration is also needed in the L collection area.

Figure 4.3-63 presents uranium concentrations versus time for five wells near Broadview Acres: F, FB, GH, GN and GV. Uranium concentrations in each of these wells were fairly steady in 2016 and below the site standard except for well GV which gradually declined in 2016.

Figure 4.3-64 presents the uranium concentration time plots for Felice Acres wells 490, 497, 498 and CW44. Uranium concentrations declined in wells 497 and CW44 in 2016. Additional restoration from the South collection and injection in the alluvial aquifer in the Felice Acres area is needed. Uranium concentrations for five of new collection wells in South Felice Acres are presented in Figure 4.3-64A. This figure shows small declines in uranium concentrations in wells Q2 and Q3. Additional restoration is needed in the South Felice Acres area.

Figure 4.3-65 presents uranium concentrations for wells in the former flood irrigation area. Uranium concentrations declined in well 844 for the last few years. The previous higher uranium concentrations in well 844 may have defined the effects of irrigation on this area of the alluvial ground water. Uranium concentrations in the remainder of these wells in this area have been fairly steady except the 2016 value from well 556 which is thought to be an outlier.

The uranium concentrations for five wells in Section 3 southwest of Felice Acres are plotted on Figure 4.3-66. The uranium concentrations in well 540 declined in 2014 and 2015 while a small decline in wells 862 and 865 was observed in 2015 and 2016. Uranium concentration in well 866 increased in 2015 but decreased some in 2016 due to the collection from this area in 2016. The concentration in well 631 shows a gradual increase in uranium.

The uranium concentrations for five of the R collection wells in northeast corner of Section 3 are presented on Figure 4.3-66A. This plot shows a decrease in uranium concentrations in well R11 in 2016 due to the collection of alluvial water and injection of treated water in the northeast portion of Section 3 in 2016. Some additional restoration is needed in this portion of the alluvial aquifer mainly in the area of collection wells R1, R2, R3, R4, R5 and 866.

Uranium concentrations from six Section 28 wells are plotted on Figure 4.3-67. Higher concentrations in wells 881, 886 and 893 were observed in 2016 which are likely caused from ground water moving into Section 28 from the east. Concentrations from wells 688, 882 and 884 were steady in 2016.

Uranium concentrations from five wells west of the Section 28 irrigation are plotted on Figure 4.3-67A. Small declines in concentrations in wells 634, 890 and H2A were observed in 2016. Concentrations from well 888 were steady in 2016 while a small increase was observed in well H1. Collection from the western H wells in 2017 should result in the restoration of this area.

Uranium concentration time plots for wells in Sections 20 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. Steady concentrations were observed in wells 541, 637 and 686 in 2016. Steady and small concentrations in well 994 in the northern portion of Section 32 have been observed.

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 2016. 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 ground water 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 0.005 to 0.68 mg/l in 2016. 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, 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 seven years.

Figure 4.3-72 shows small selenium concentrations in well S4 during 2016. Larger selenium concentrations were observed in wells S2, SA and SZ with overall declines in 2016. Additional collection from the S wells in 2017 should cause the selenium concentration to continue to decrease in these areas.

Figure 4.3-73 presents selenium concentrations for wells M7, M9, MO, MQ and MX. Selenium concentrations are below the site standard in all of these wells in 2016. Some additional decrease in the selenium concentrations in collection wells M9 and MQ should occur with this collection operation.

Selenium concentrations in water from alluvial wells located southwest of the LTP are plotted on Figure 4.3-74. This figure shows a small selenium concentration for wells 802 and B12 in 2016 and a large decrease in well D1.

Figure 4.3-75 presents plots of selenium concentrations for wells T, T2 and TA. Declining selenium concentrations have been measured for wells T and TA in 2016. Selenium concentrations in these two collection wells need additional restoration.

The selenium concentrations for collection wells located on the west side of the STP are plotted on Figure 4.3-76. A small decrease in concentrations was observed in well C8 in 2016 while steady concentrations were observed in the remainder of these wells. The higher values from wells C10 and C12 show that these two wells need additional selenium restoration.

Figure 4.3-77 presents selenium concentrations for wells K9, K10, K11 and X, which are located on top of the STP and to the south side of the STP. Only small concentrations were measured in water taken from these wells in 2016 except for larger values in wells K9 and K10. The selenium in well K9 decreased in the second half of 2016.

Selenium concentrations in wells K4, K5, K7 and K8 were fairly steady in 2016 (see Figure 4.3-78). The selenium concentration decreased in 2008 in well 1U and has stayed very low for the last eight years.

Figure 4.3-79 presents selenium concentration for wells L, L6, L7, L8, L9 and L10. Fairly steady selenium concentrations with time were observed in these wells during 2016.

Figure 4.3-80 presents a selenium concentration plot for five wells to the north and east of Broadview Acres. This plot shows that the selenium concentrations have been reduced and maintained at low levels for the last several years in these areas.

Figures 4.3-81 and 4.3-81A present selenium concentration plots for wells in Felice Acres. Selenium concentrations have stayed small in these Felice Acres wells. These small concentrations make this constituent not very useful in defining ground-water restoration in this area.

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 2016 except for an overall small declining trend in well 846 with the levels all being below the site standard of 0.32 mg/l. This data does not indicate that the flood irrigation affected the selenium concentrations in the ground water in the area of this irrigation.

Selenium concentrations for five wells in Section 3 are plotted on Figure 4.3-83. Wells 631 and 865 show small declines in selenium concentrations. Selenium concentrations in these two wells gradually decreased in the last several years. Concentrations in wells 540, 862 and 866 were low in 2016.

Selenium concentrations for five wells in the northeast corner Section 3 are plotted on Figure 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 and 2016.

The selenium concentrations in alluvial water in Section 28 have been fairly steady with time with a small decrease observed in well 881 in 2016. Figure 4.3-84 presents the selenium concentrations from the Section 28 alluvial wells. A significant decline was observed in concentration in well 884 in 2006 due to the fresh water injection in this area and this decline leveled off in 2008.

Figure 4.3-84A displays selenium concentrations in wells west of the Section 28 irrigation area, which are located near the front of the uranium concentrations in the North area. Fairly steady and small selenium concentrations were observed in 2016 in these wells. Limited and very small potential changes in selenium concentrations exist in this area.

Figure 4.3-85 displays selenium concentrations in wells in Sections 20 and 32, which are located before and after the confluence with the Rio San Jose. Fairly steady and small selenium concentrations were observed in 2016 in these wells.

Selenium concentrations from wells in Section 33 are presented on Figure 4.3-86. The data demonstrated small and steady selenium concentrations in 2016 in these wells.

4.3.6 MOLYBDENUM - ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during 2016. 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 2016 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 2016 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, Q and R. Concentrations have remained low in these five wells in 2016.

Molybdenum concentrations were fairly steady in wells S4 and SZ in 2016, while the molybdenum concentrations in well S2 increased and decreased in collection well SA (see Figure 4.3-89).

Figure 4.3-90 presents time plots of molybdenum concentration for wells M7, M9, MO, MQ and MY. Molybdenum concentrations in wells MO and MY were small in 2016 while the concentrations in collection well M9 were variable and fairly steady in wells M7 and MQ.

Figure 4.3-91 displays molybdenum concentrations for wells 802, B12, D1 and S3. Higher molybdenum concentrations in wells B12 and D1 were observed while small concentration exists in well 802. Additional collection from the S and D collections wells in 2017 should cause the molybdenum concentrations in these wells to decline.

Figure 4.3-92 presents molybdenum concentrations for wells T, T2 and TA. The molybdenum concentrations in wells T and TA were fairly steady in 2016.

Molybdenum concentrations in wells on the west side of the STP are presented on Figure 4.3-93. Molybdenum concentrations were variable in the water in these wells in 2016 with overall lower levels in wells C8 and C12.

Figure 4.3-94 presents molybdenum concentrations for wells on top of the STP and to the south side of the STP. Small molybdenum concentrations were measured in well X during the last year. Larger and variable values were observed in wells K9 and K10 while fairly steady concentration was observed in well K11.

Figure 4.3-95 shows small molybdenum concentrations in wells 1U, K4, K5, K7 and K8 in 2016 with fairly steady concentrations in wells 1U, K4, K7 and K8. The molybdenum concentrations in well K5 increased in 2016.

Figure 4.3-96 present molybdenum concentrations in wells L, L6, L7, L8, L9 and L10, which are located further to the southeast of the STP. Molybdenum concentrations were steady and small in these wells in 2016.

Molybdenum concentrations in alluvial wells located north and east of Broadview Acres are plotted on Figure 4.3-97 which have stayed very small. Figures 4.3-98 and 4.3-98A present the molybdenum concentrations for the Felice Acres wells. The molybdenum concentrations in Felice wells 490, 497, 498 and CW44 have been small for the last several years. Molybdenum concentrations in South collections wells Q2, Q3, Q5, Q18 and Q29 in Felice Acres remained low for 2016 except for the December 2016 value from well Q2 which is thought to be an outlier.

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 and both show low concentrations. 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, Section 20/32 on the third figure and Section 33 wells on the fourth figure. All of the molybdenum concentrations have remained low in wells located in these areas in 2016. Molybdenum concentrations have migrated into Section 27 and could possibly have migrated into eastern Section 28 in a small area.

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 19 mg/l in 2016. Figures 4.3-104, 4.3-104A, 4.3-104B and 4.3-104C present nitrate concentrations measured in 2016 in the alluvial aquifer. Figure 4.3-104A list the nitrate values for the wells near the LTP and STP, showing that two 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.

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 2016 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 nine years.

The nitrate concentrations in wells S2, S4, SA and SZ, immediately west of the LTP, are plotted on Figure 4.3-106. This figure shows smaller concentrations in 2016 for these wells, except for an increasing nitrate concentration in well SZ.

Figure 4.3-107 presents the nitrate concentrations for wells M7, M9, MO, MQ and MX. Nitrate concentrations was steady in 2016 in well MO at a value less than the site standard.

Nitrate concentrations in the group of wells southwest of the LTP are presented as time plots on Figure 4.3-108. The 2016 nitrate concentrations in wells 802 and D1 were low and fairly steady.

Figure 4.3-109 presents nitrate concentrations in wells T and TA. Nitrate concentrations were fairly steady in these wells in 2016 with a value in well T near the site standard.

Nitrate concentrations in wells on the west side of the STP are plotted on Figure 4.3-110. Overall increases in nitrate concentrations were observed in wells C10 and C12 while the nitrate concentrations in wells C6 and C8 are small.

Figure 4.3-111 shows nitrate concentrations for wells on top of the STP and to the south side of the STP. The nitrate concentrations in these wells were steady and small in 2016.

The nitrate concentrations in the K and L series wells are presented on Figures 4.3-112 and 4.3-113, respectively. Concentrations in recent samples have been very small in all of these wells, except an increase to near the standard in well K5.

Nitrate concentrations in wells near Broadview Acres are presented on Figure 4.3-114. Small and relatively steady nitrate concentrations were measured in water from these wells with time in the last few years.

Nitrate concentrations for the Felice Acres wells are presented on Figure 4.3-115 with small and reasonably steady concentrations over time.

Nitrate concentrations in Murray Acres and Pleasant Valley Estates wells 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 to fairly steady levels through 2016. 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 2016. The small increase in well 844 in recent years could possibly be showing a small amount of change in the nitrate ground-water concentration from the irrigation.

Nitrate concentrations in Section 3 wells are presented on Figure 4.3-117. The nitrate concentrations in these wells were low in 2016.

Nitrate concentrations for the Section 28 wells are presented on Figure 4.3-118. The nitrate concentrations in these wells are all less than the site standard and reasonably steady in 2016 except for some small changes.

Figure 4.3-119 presents nitrate concentrations in wells 541, 637, 686 and 994. The nitrate concentrations are small in these wells.

Nitrate concentrations in the Section 33 wells are presented on Figure 4.3-120 and were steady in 2016.

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 ground water 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^{o} 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 2016, such as the value of 5.1 pCi/l for background well P. Typical historical values for this well are near or below 1 pCi/l and this 2016 value is thought to be a laboratory outlier. These higher radium-228 values should not be given any significance. No radium concentrations near the LTP area are in exceedance of the standard in 2016. 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 2016 are shown on Figures 4.3-122, 4.3-122A, 4.3-122B and 4.3-122C. None of the vanadium concentrations in 2016 exceeded the site standard of 0.02 mg/l. 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 0.02 mg/l in 2016. 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 ground water quality in the area near well X. Vanadium concentrations in 2004, in eight alluvial wells located within the footprint of the LTP, were above the site standard for vanadium. The ongoing corrective action program will restore vanadium concentrations in this area.

4.3.10 THORIUM-230 - ALLUVIAL

Figures 4.3-123, 4.3-123A, 4.3-123B and 4.3-123C presents the 2016 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 2004. 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 2004 in ten 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 2016 were less than the site standard. Therefore, only the alluvial aquifer underneath the LTP requires restoration relative to this parameter.

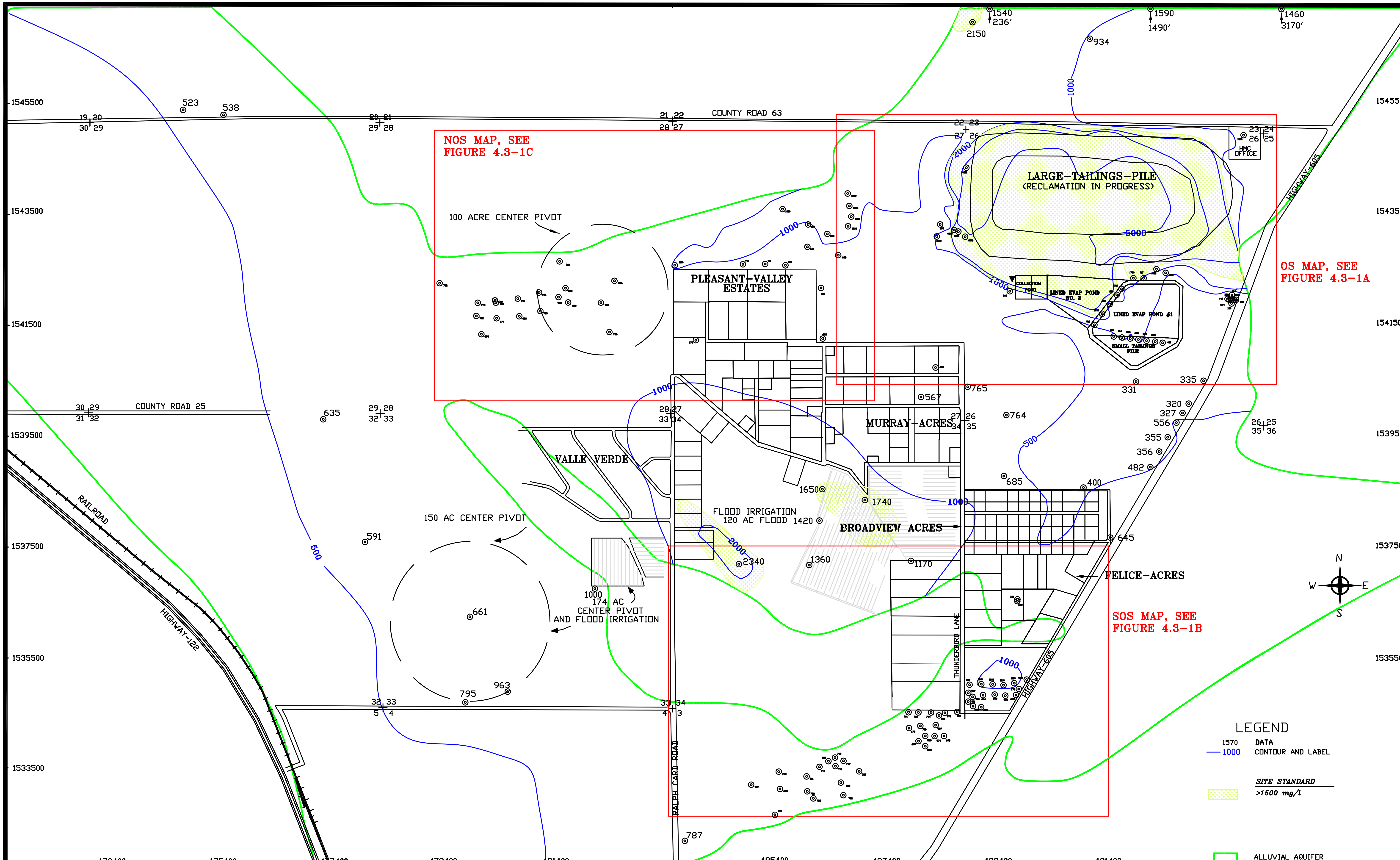

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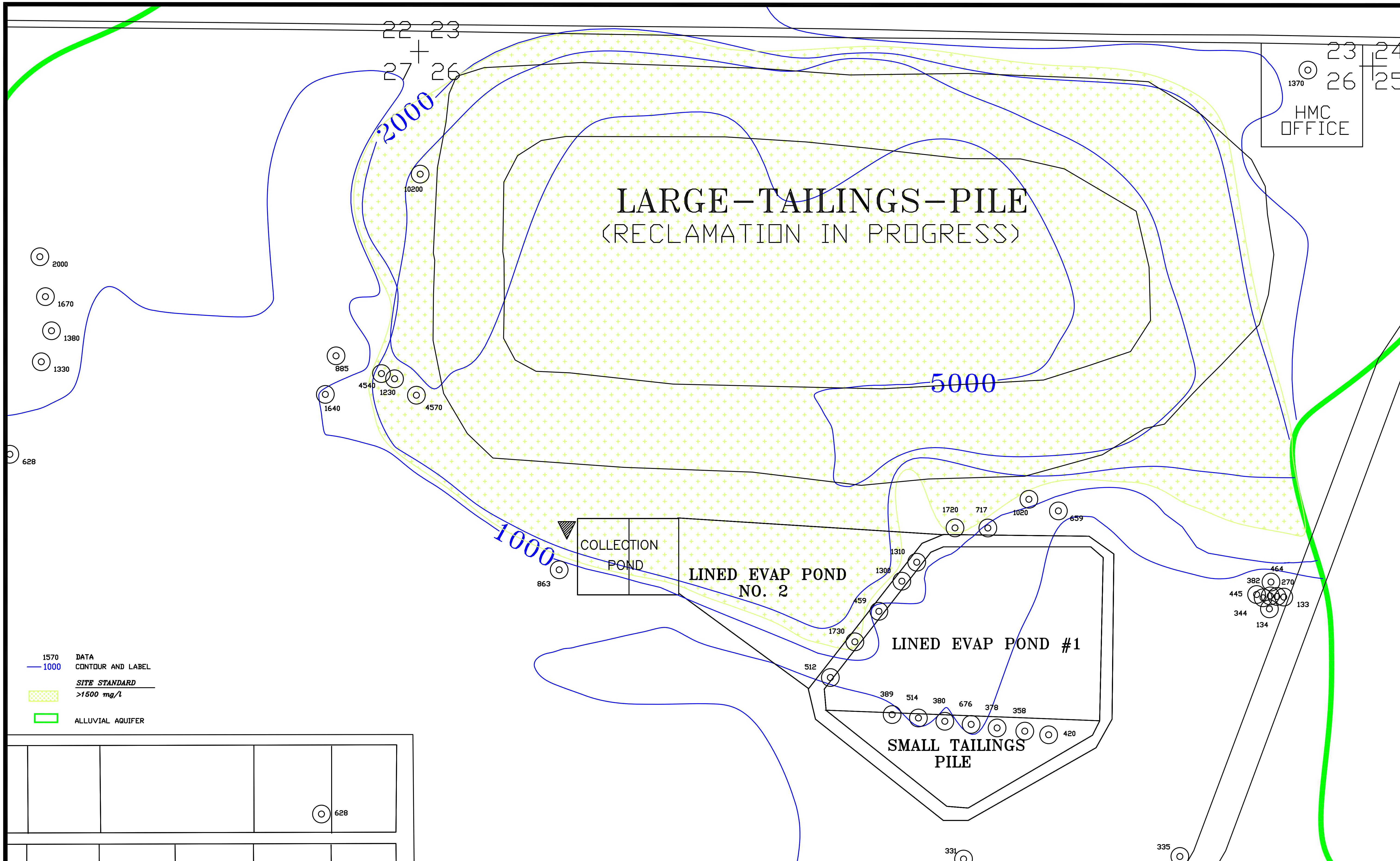
FIGURE 4.3-1. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l



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DATE: 3/1/17

FIGURE 4.3-1A. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

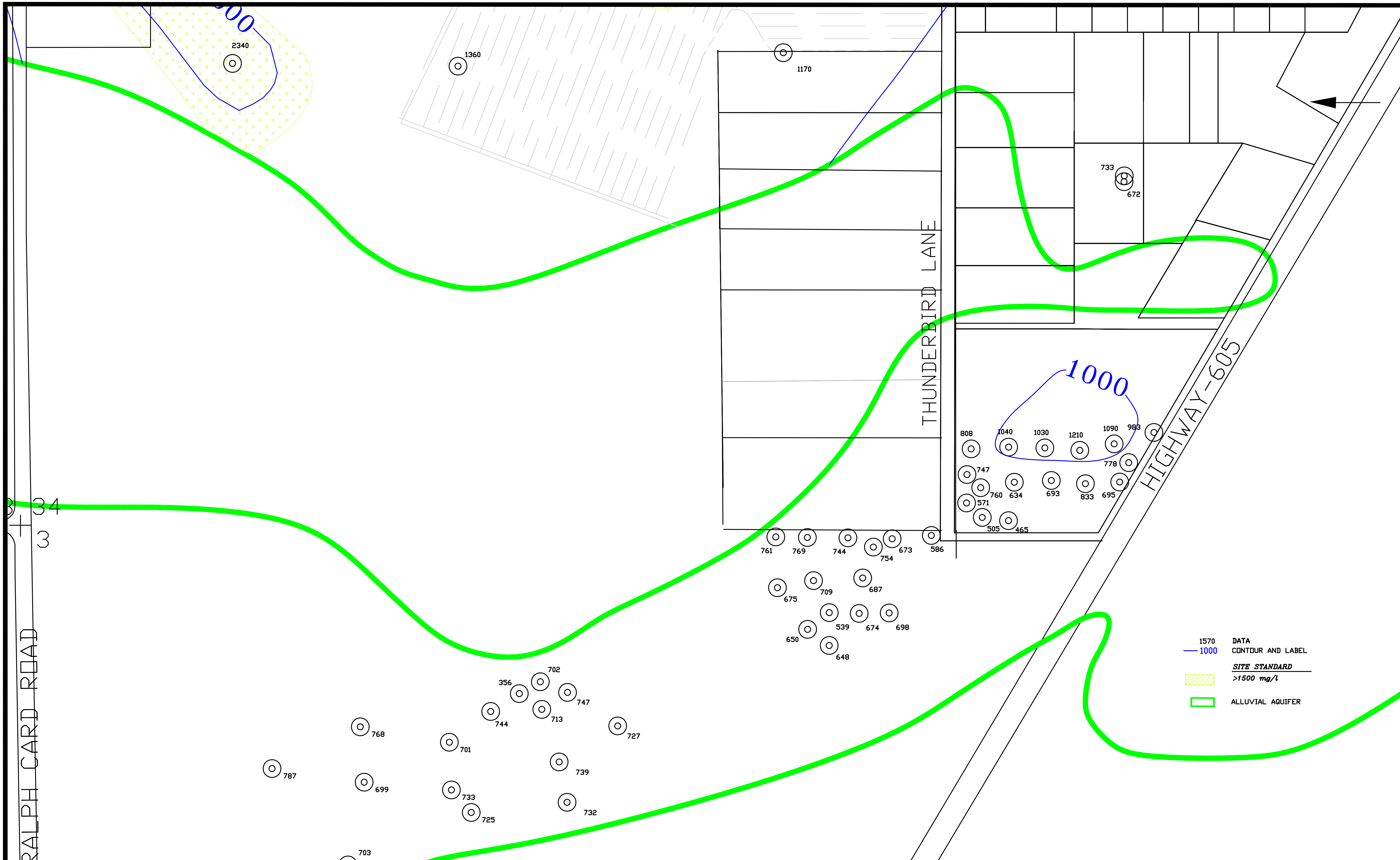

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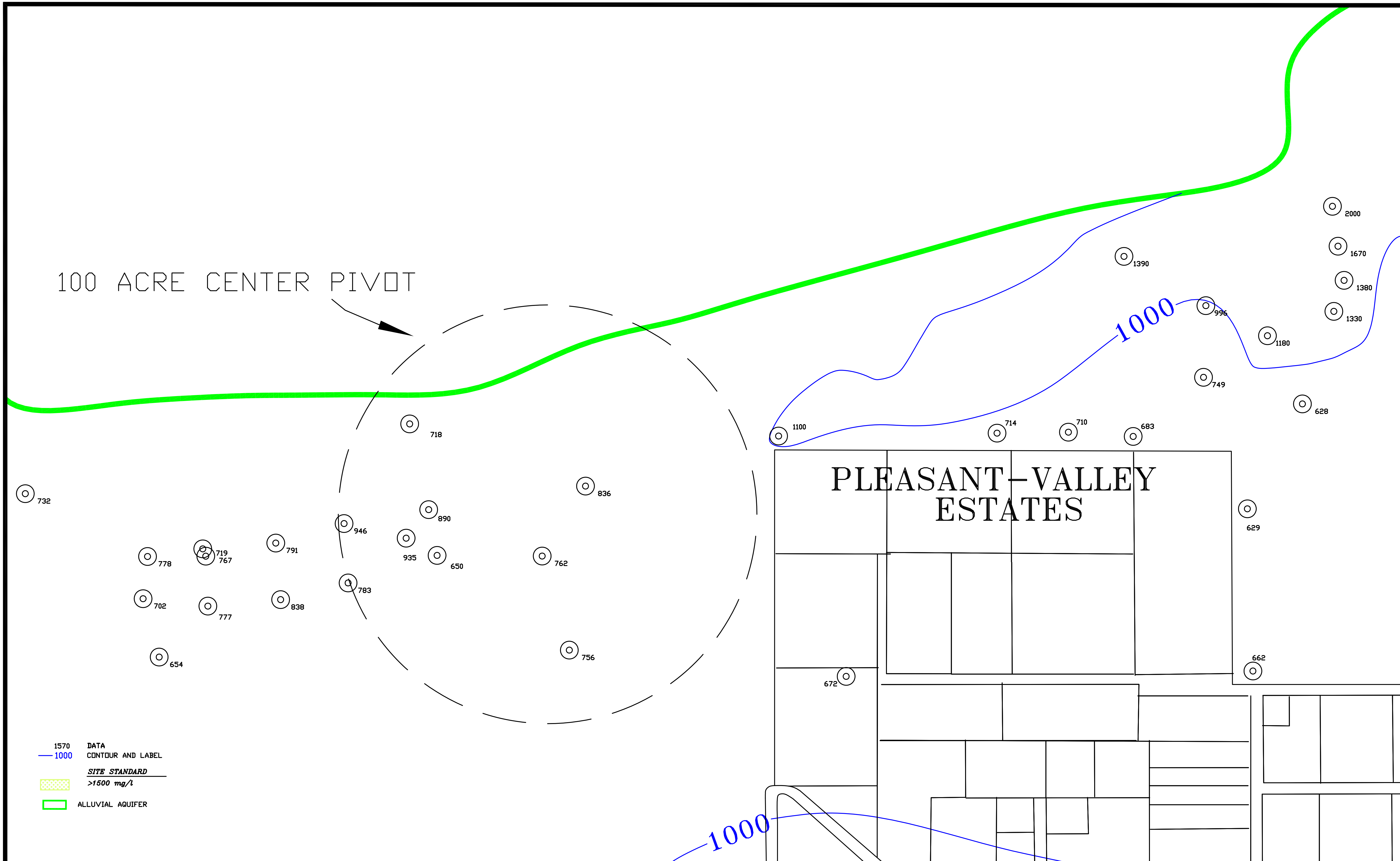
FIGURE 4.3-1B. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l



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DATE: 3/1/17

FIGURE 4.3-1C. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

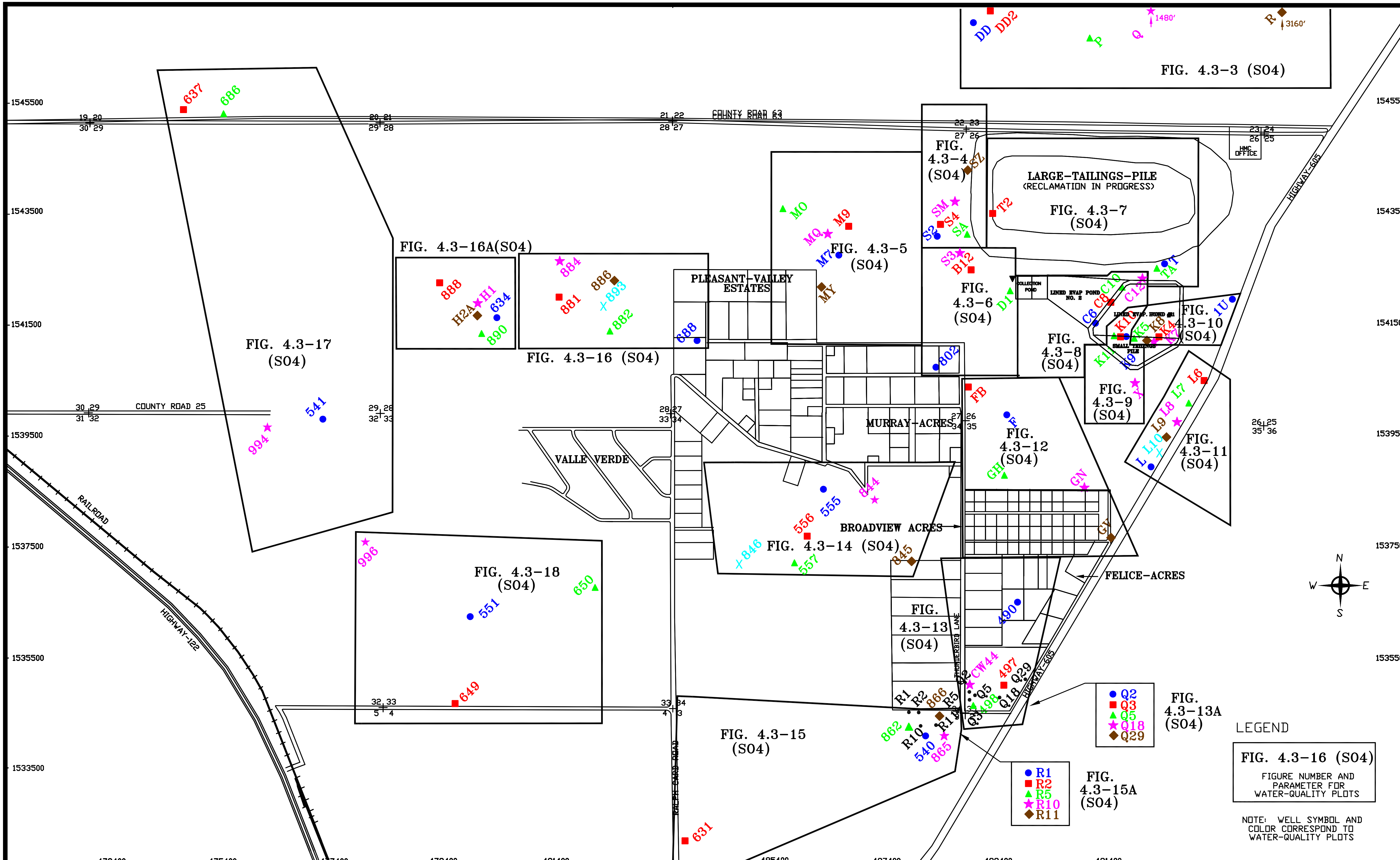

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FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS, 2016

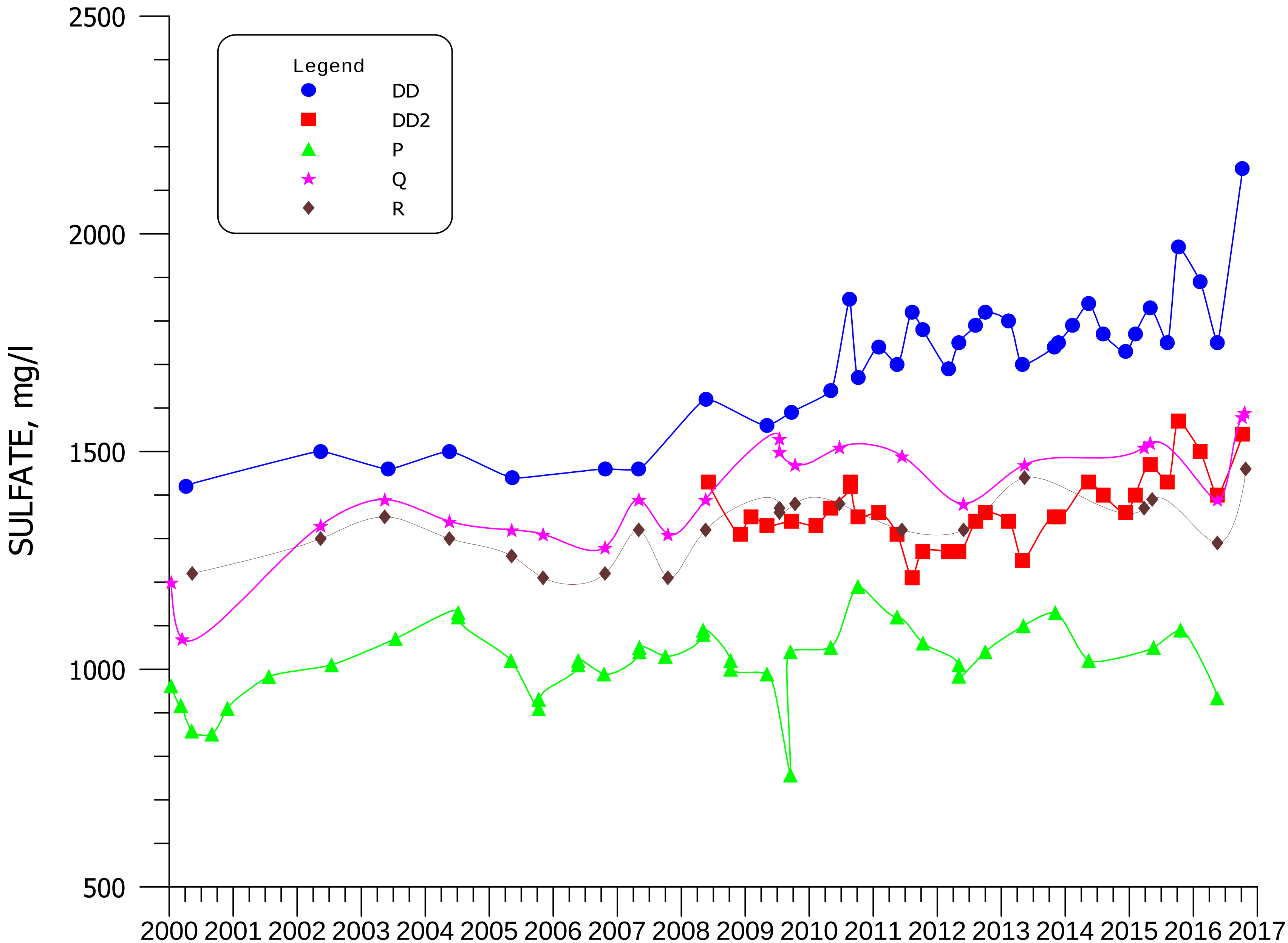

FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

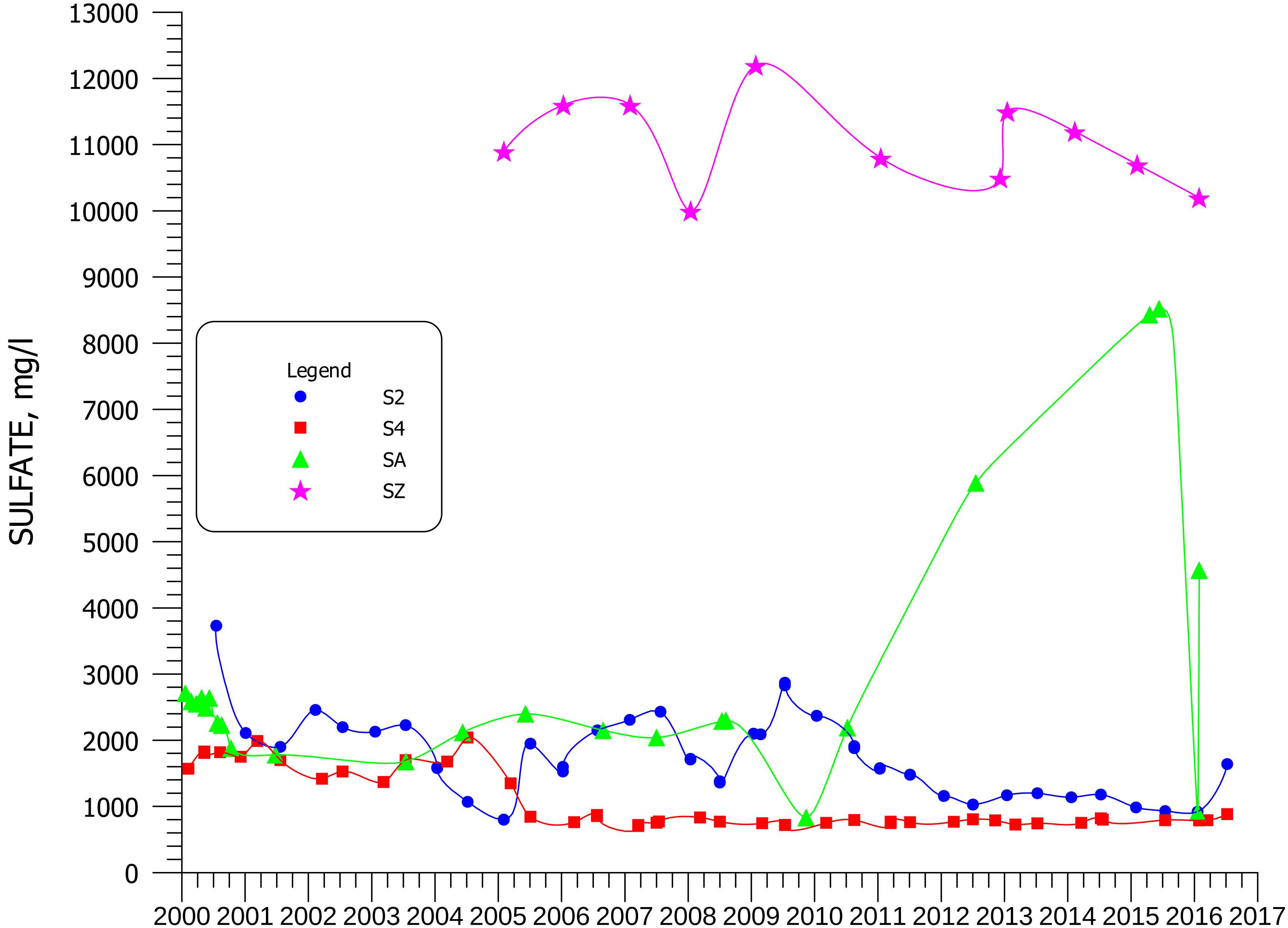

FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

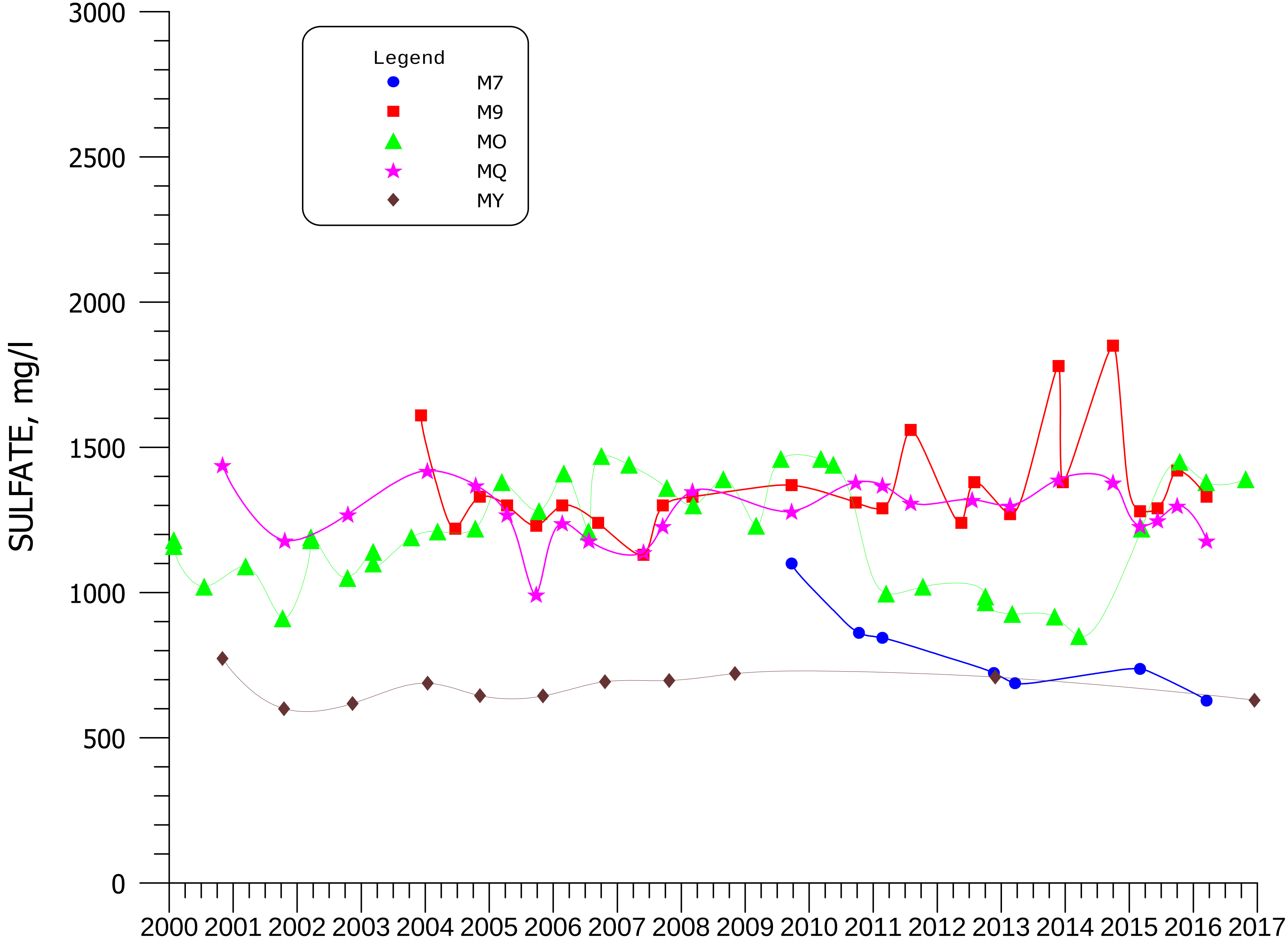

FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

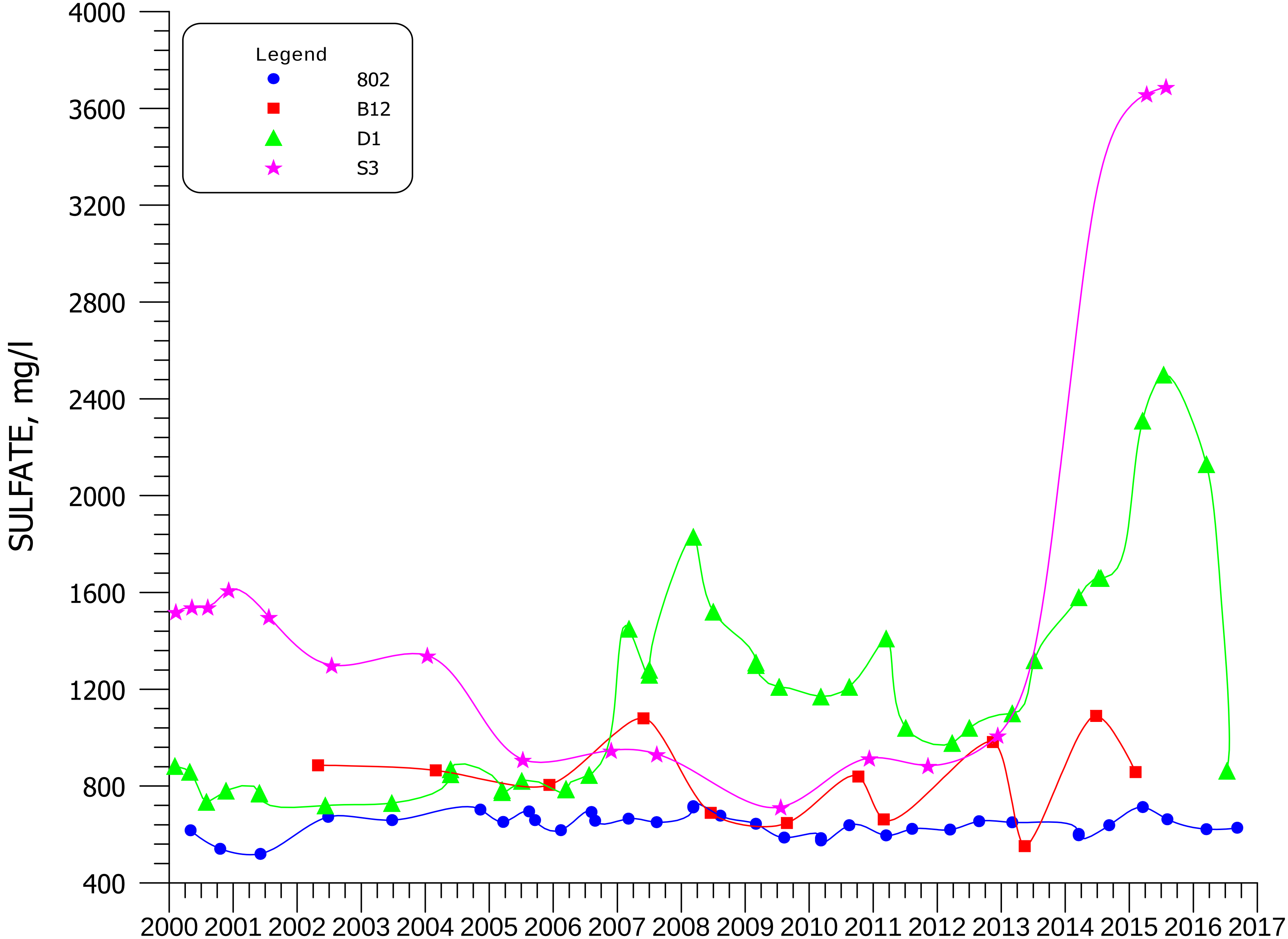

FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

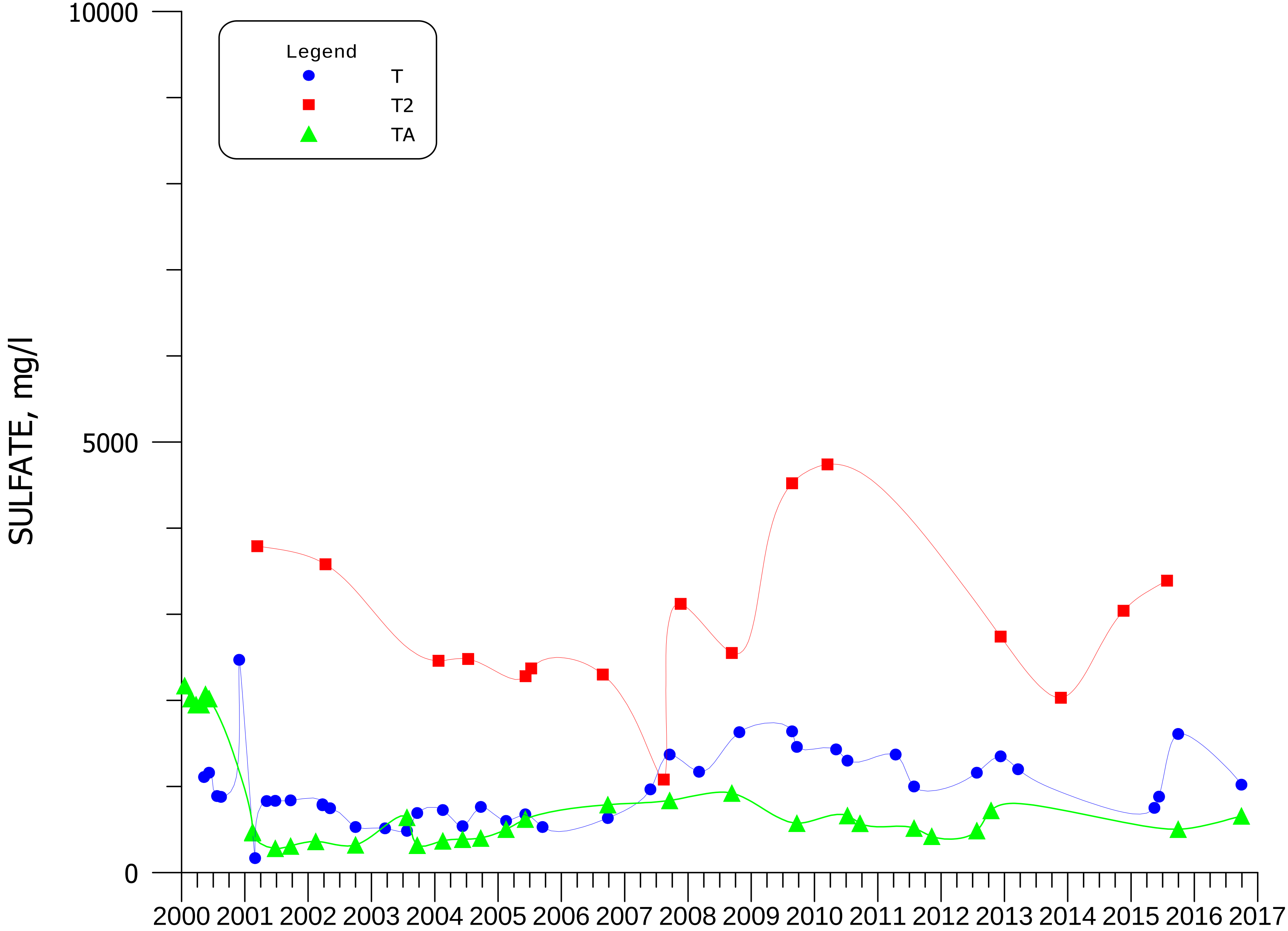

FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS T, T2, AND TA.

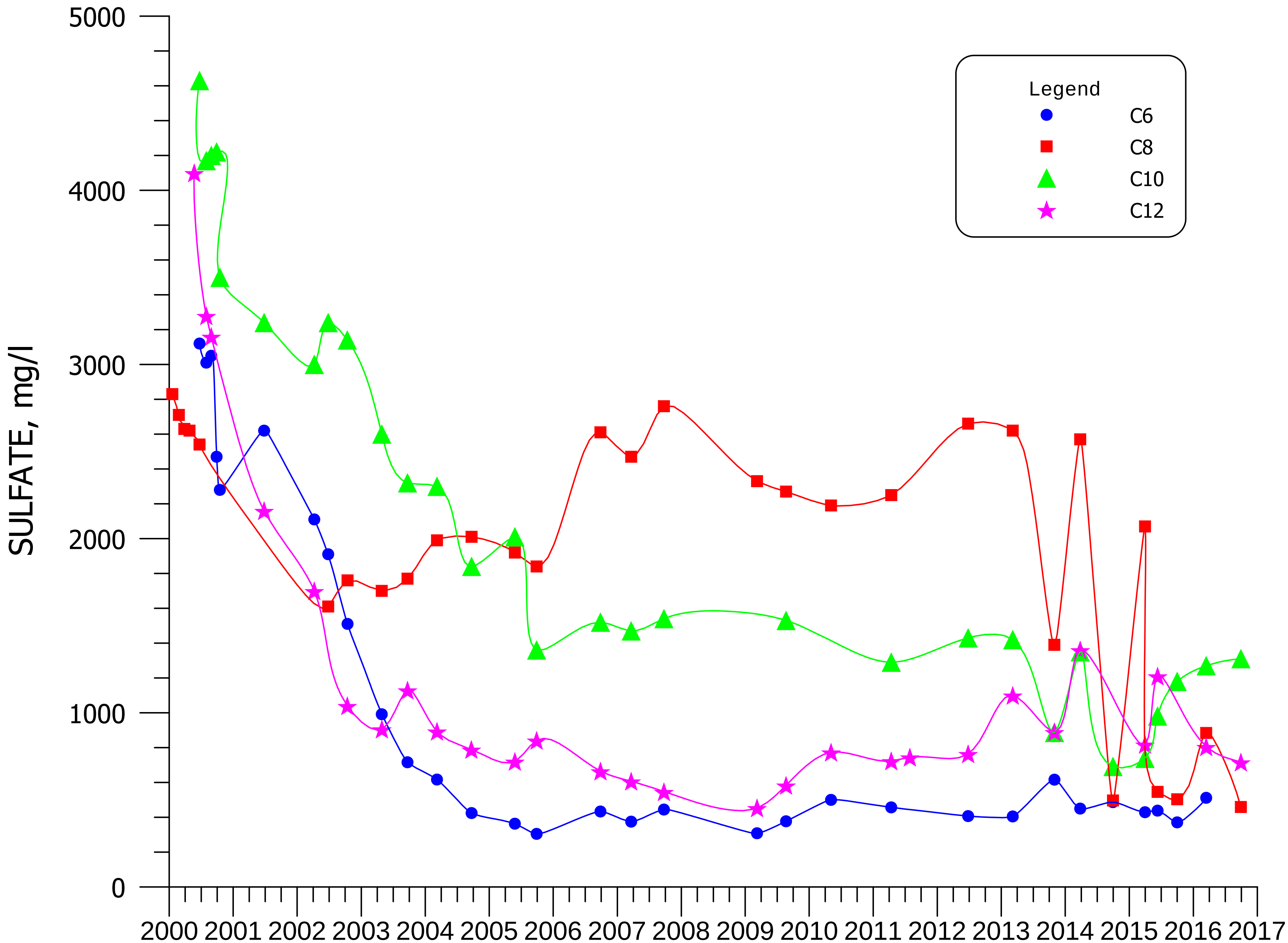

FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS C6, C8, C10 AND C12.

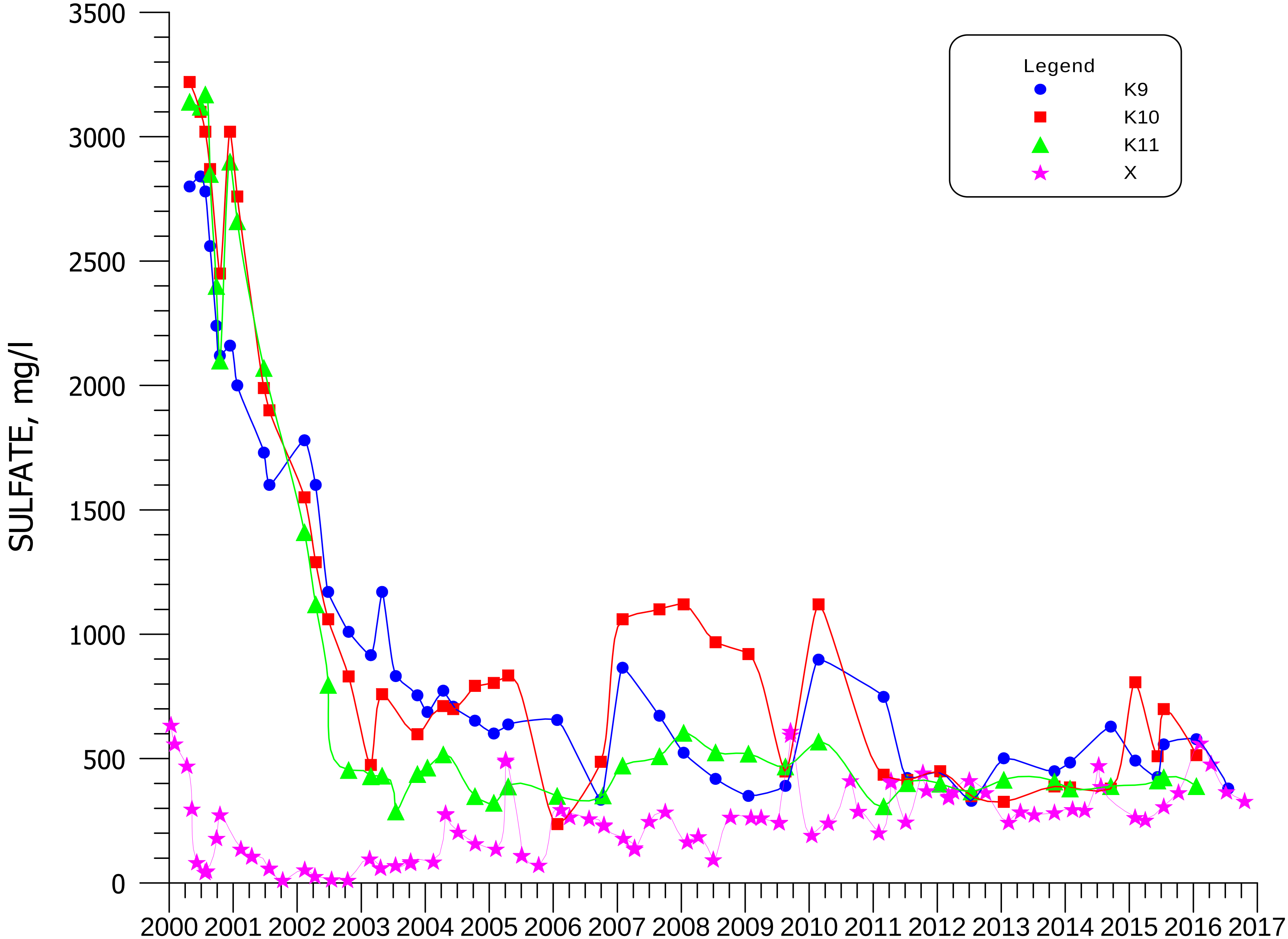

FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

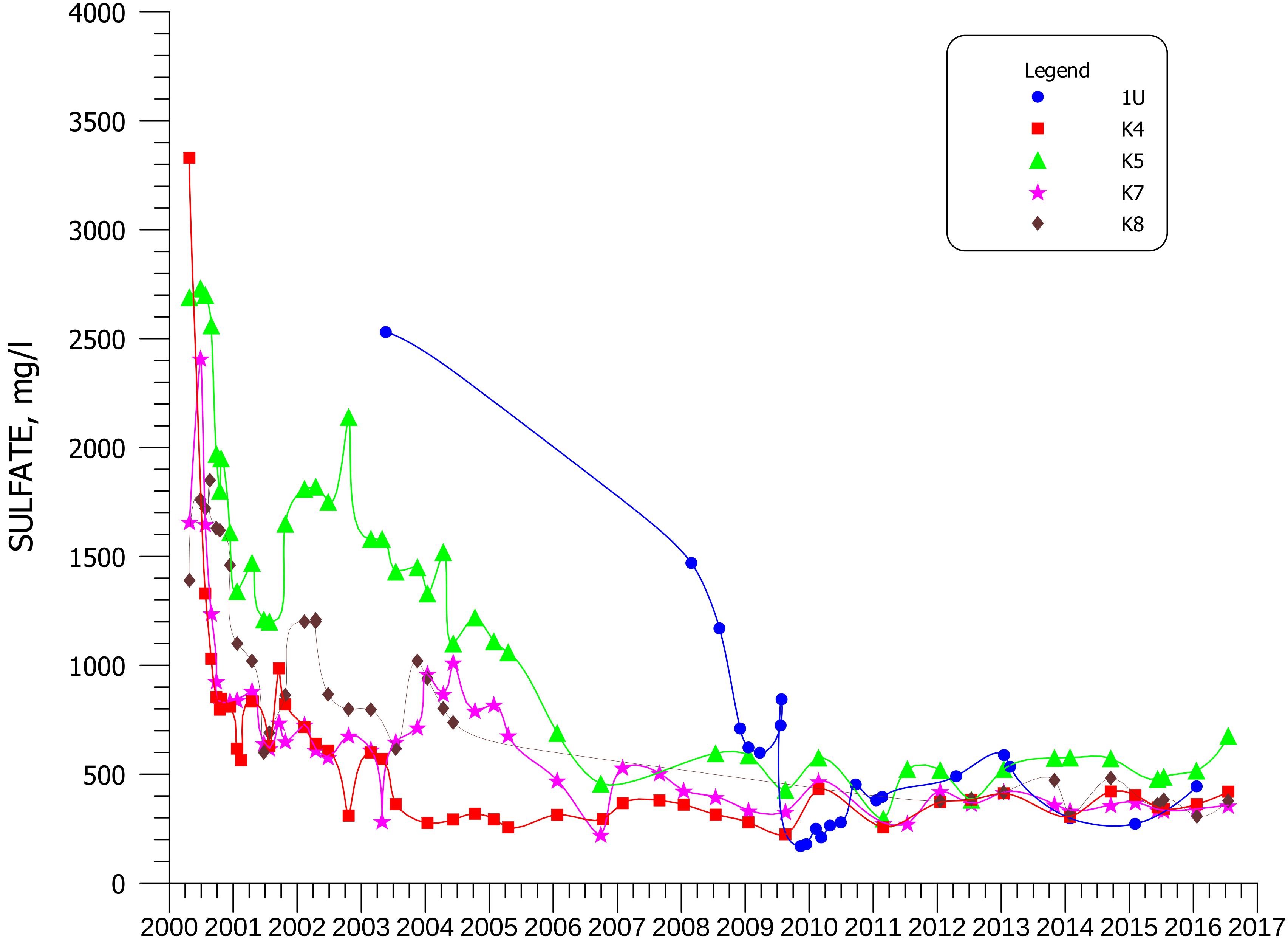

FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS 1U, K4, K5, K7 AND K8.

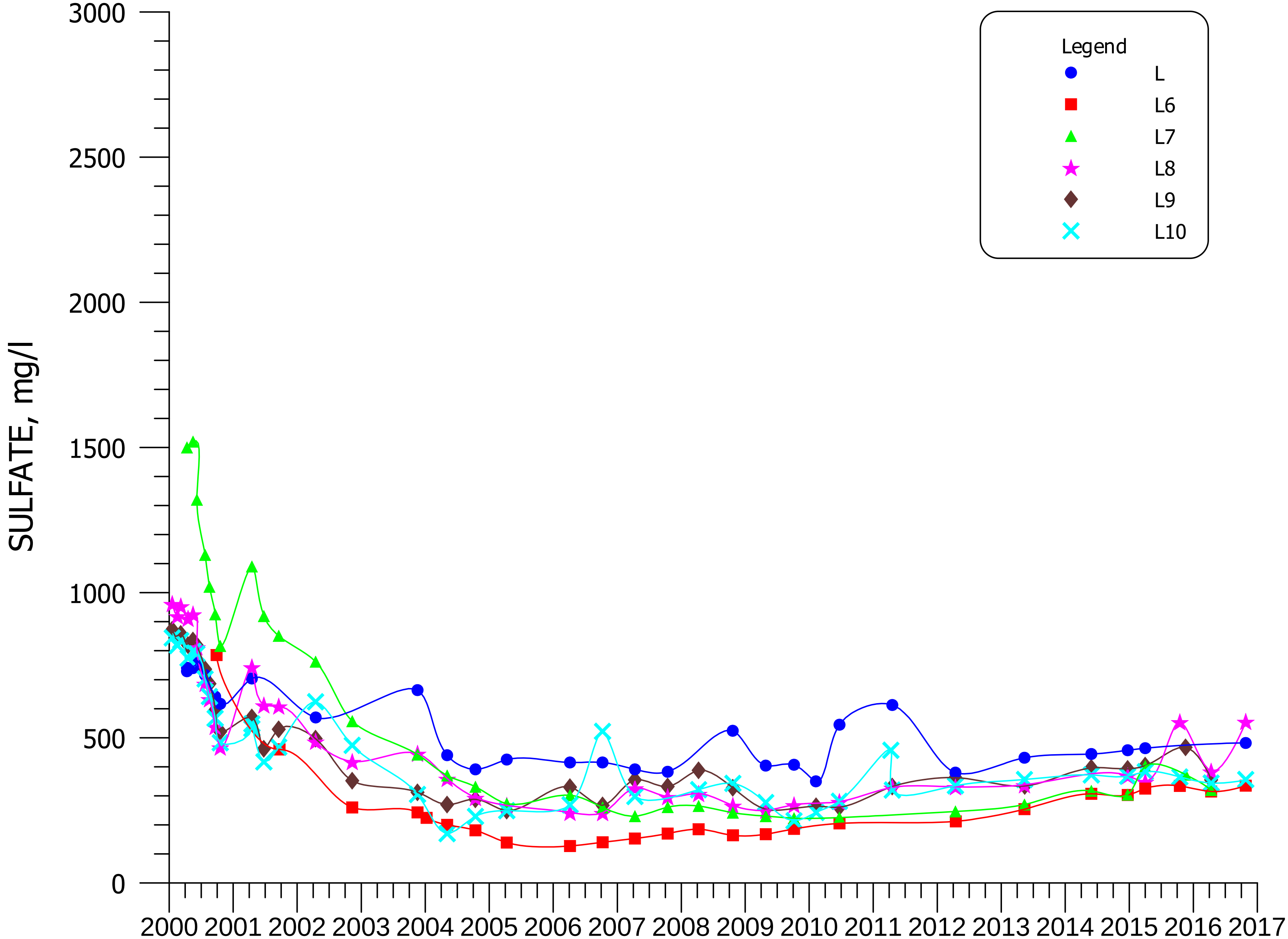

FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9 AND L10.

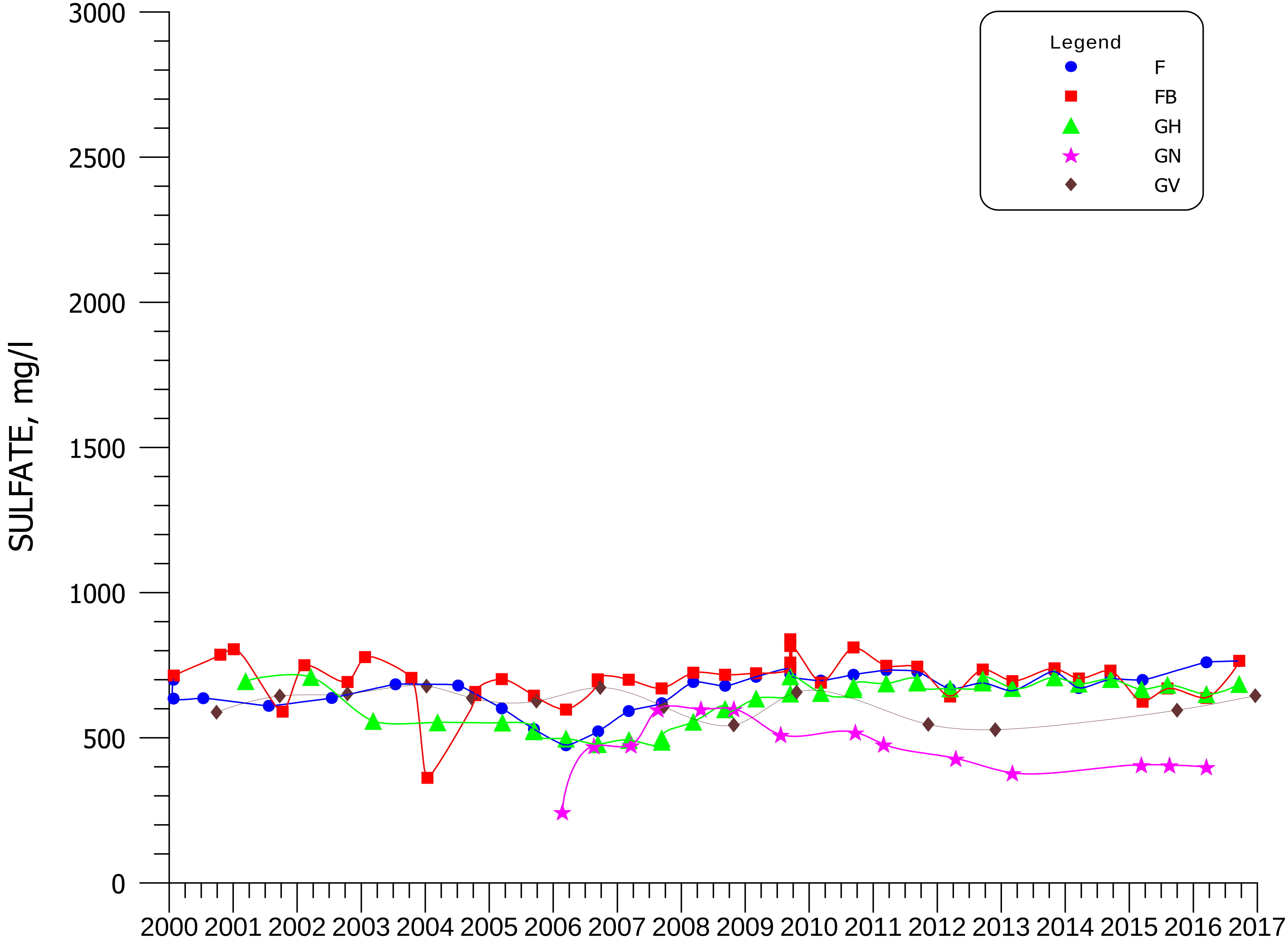

FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

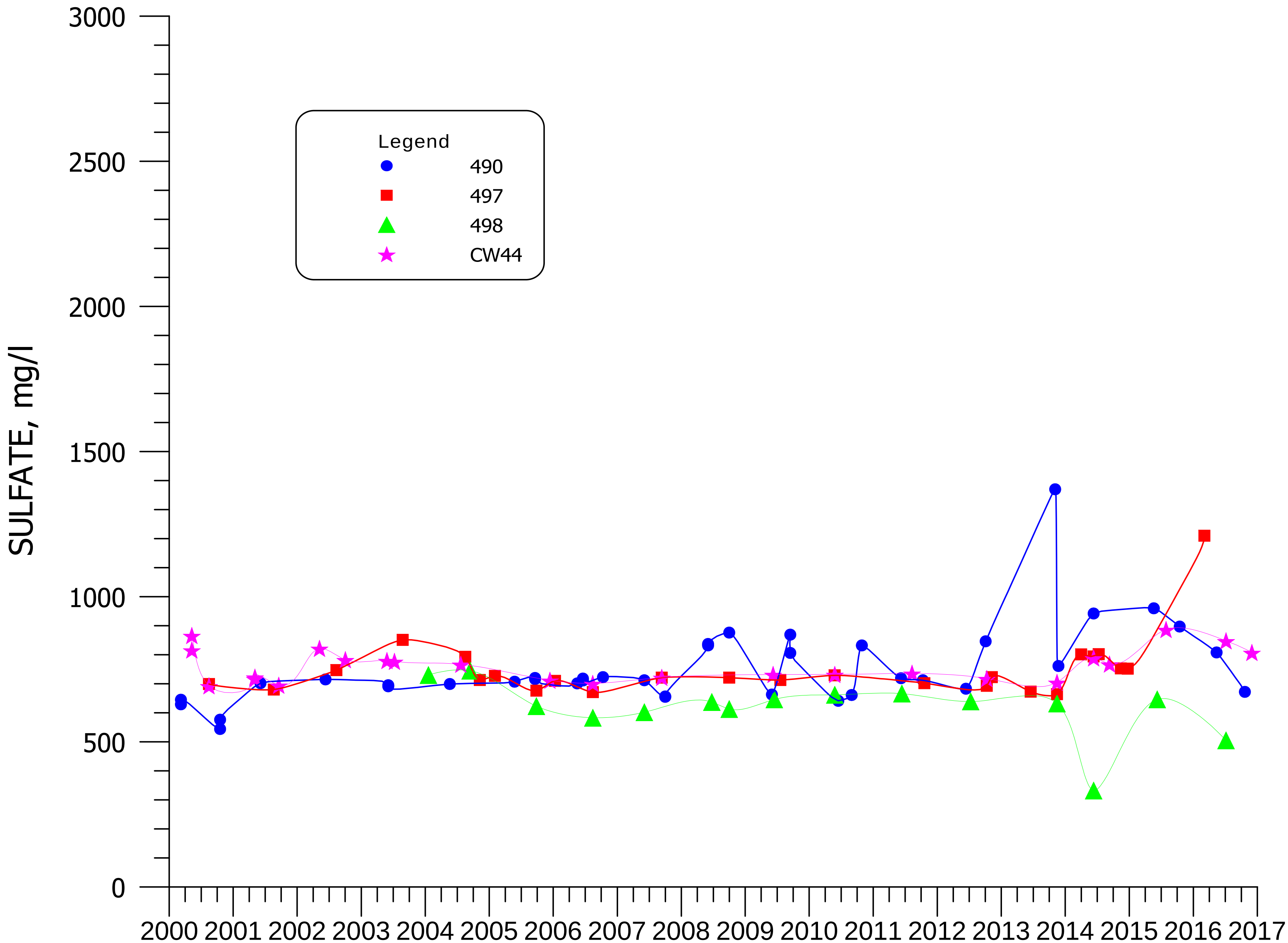

FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

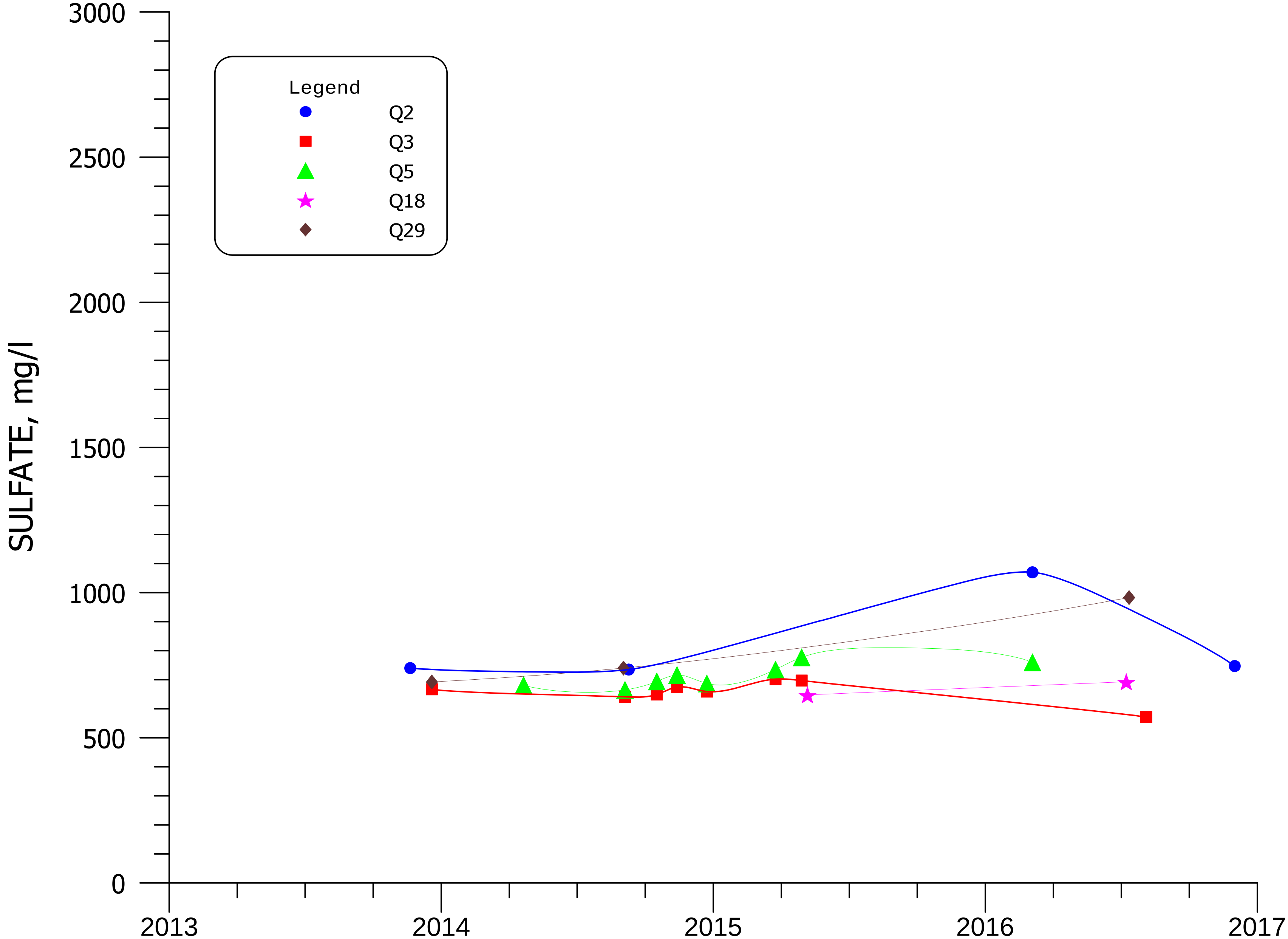

FIGURE 4.3-13A. SULFATE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

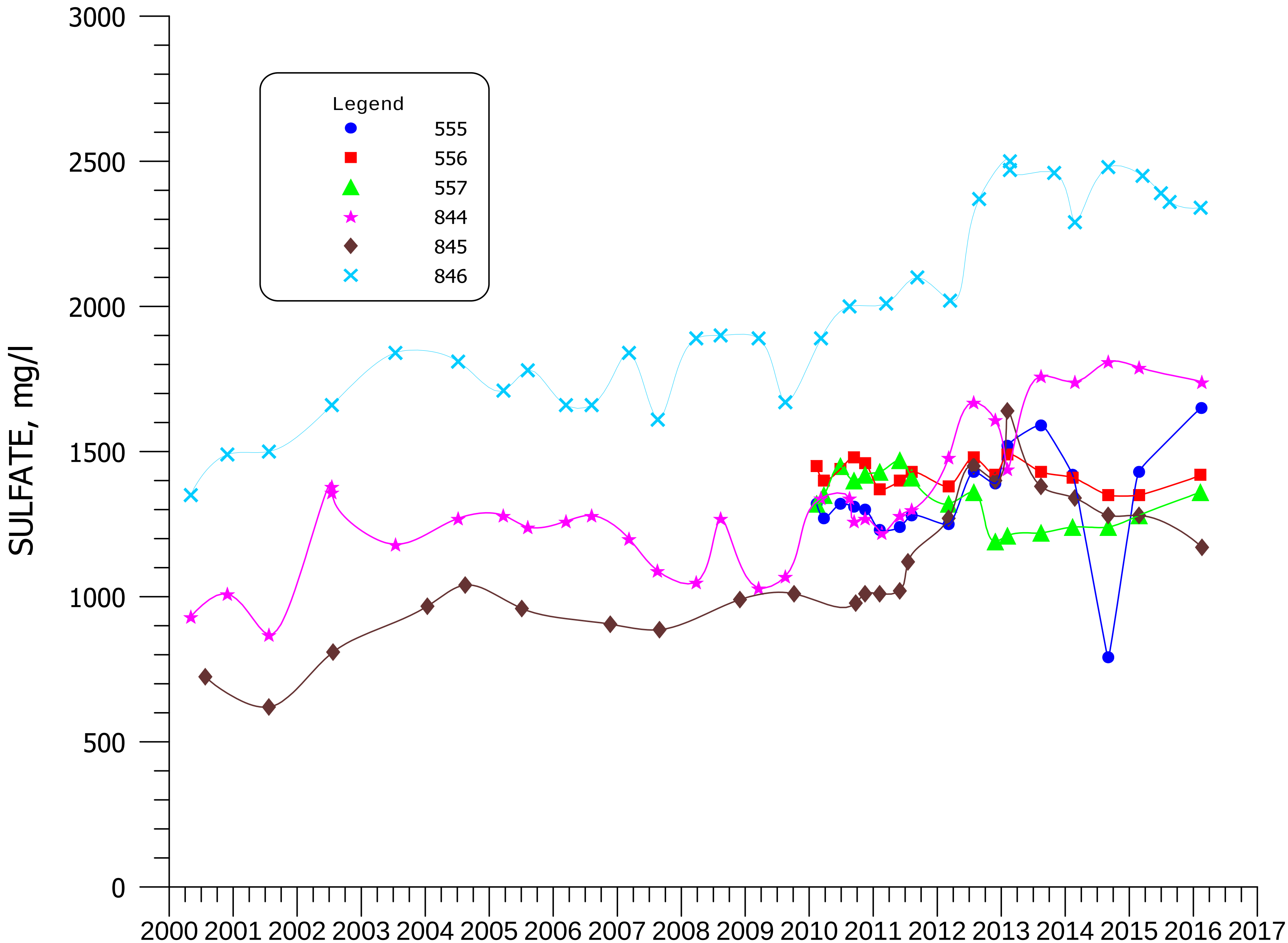

FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

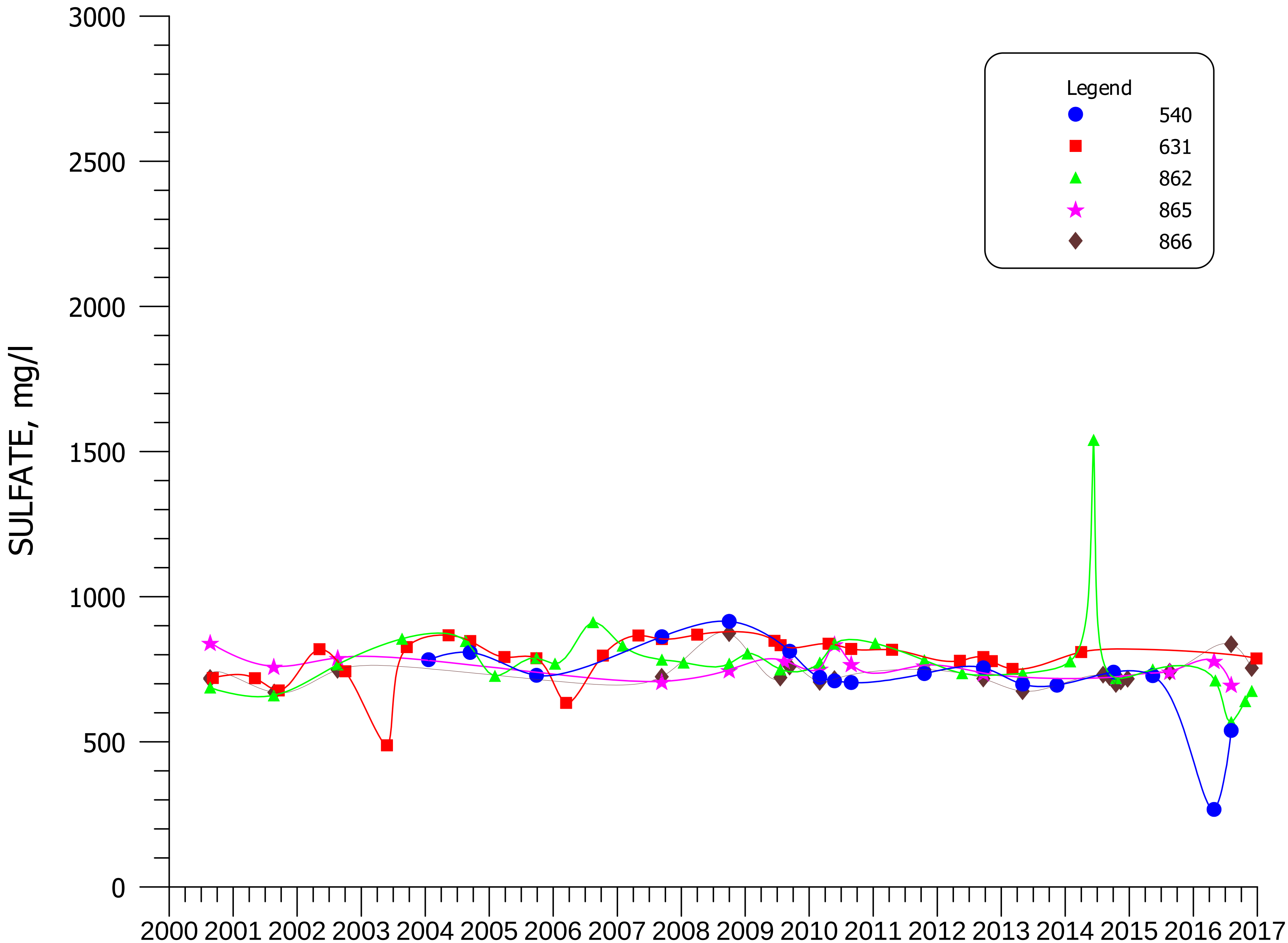

FIGURE 4.3-15. SULFATE CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

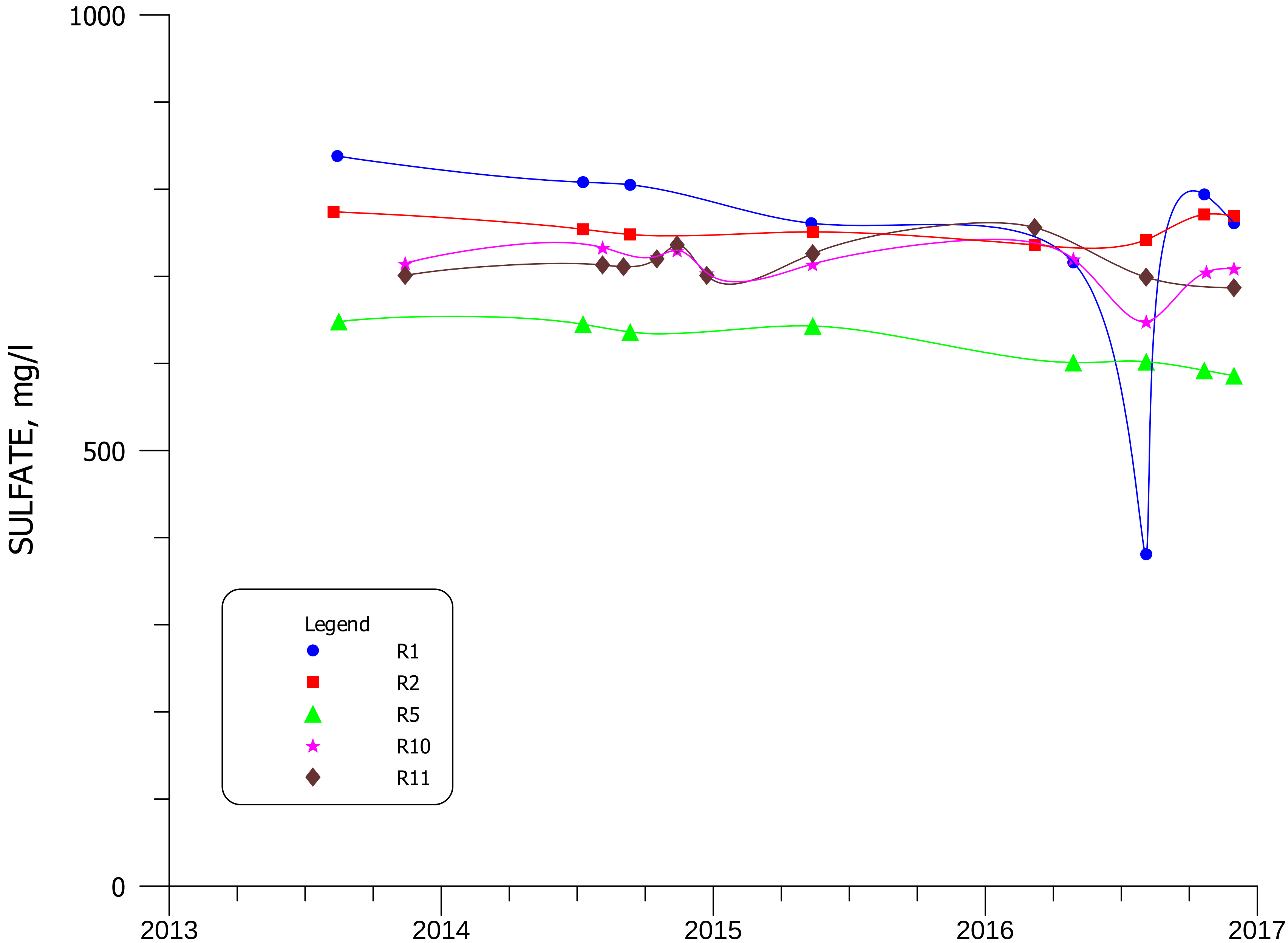

FIGURE 4.3-15A. SULFATE CONCENTRATIONS FOR WELLS R1, R2, R5, R10, AND R11.

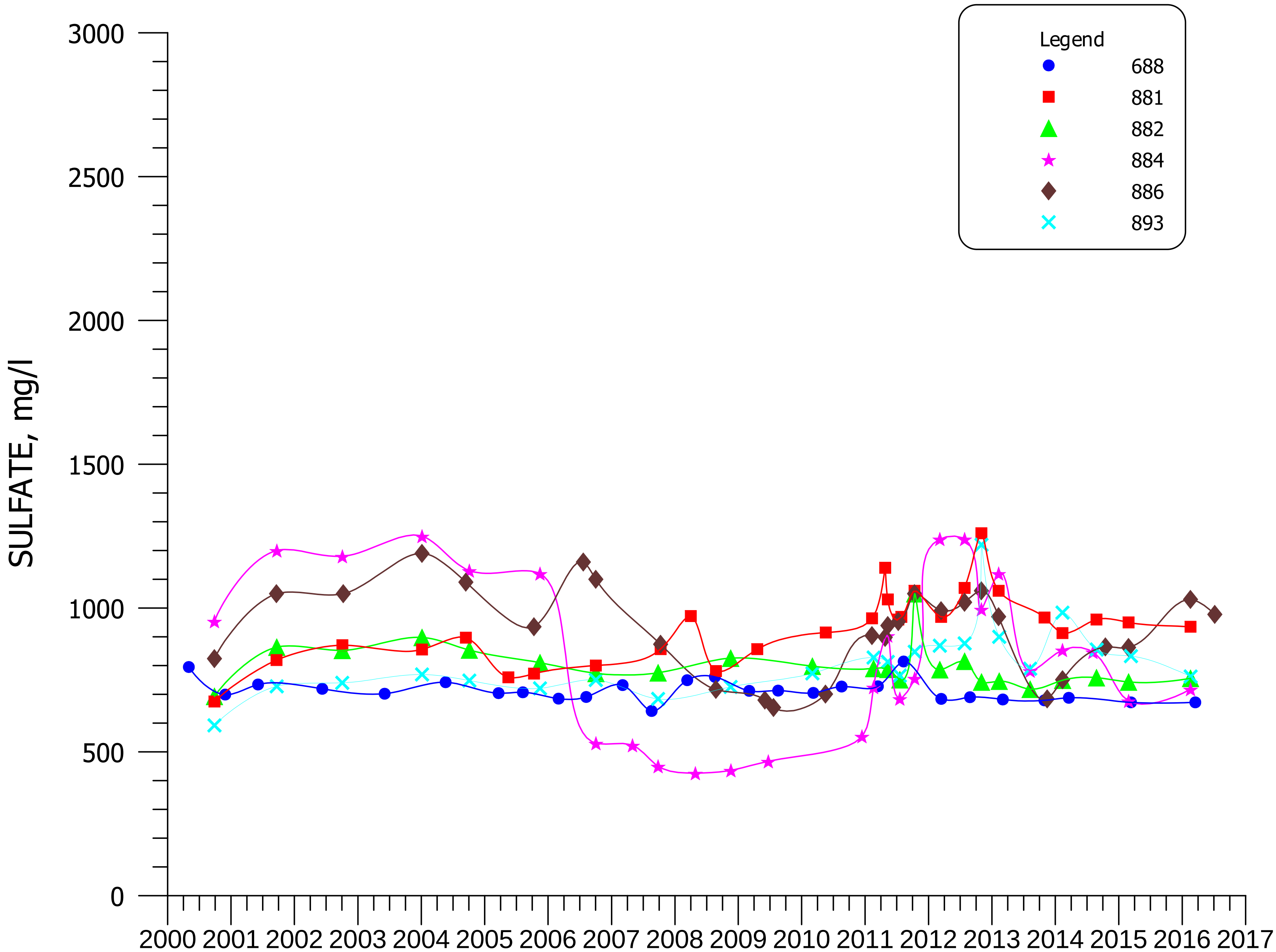

FIGURE 4.3-16. SULFATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

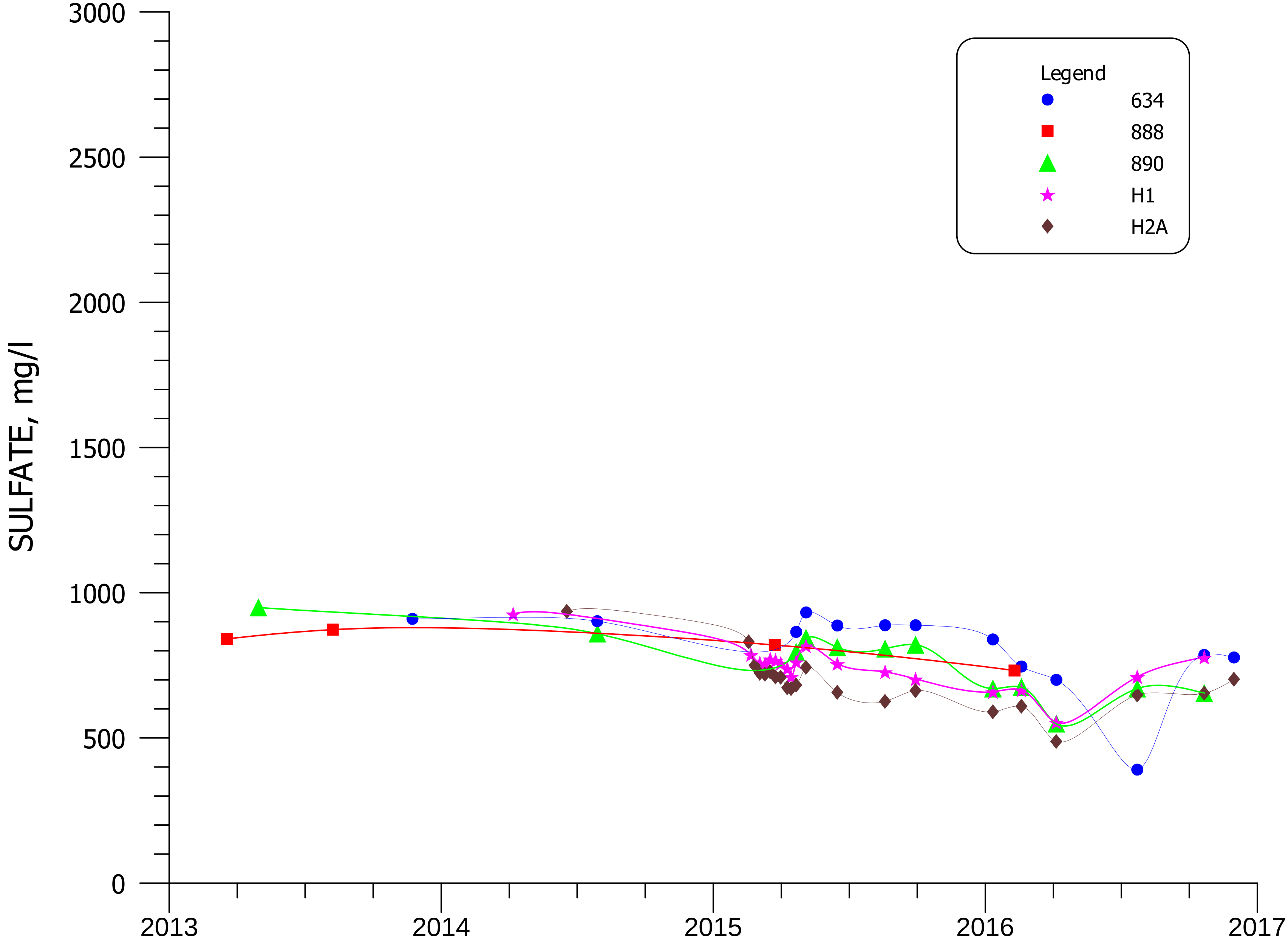

FIGURE 4.3-16A. SULFATE CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

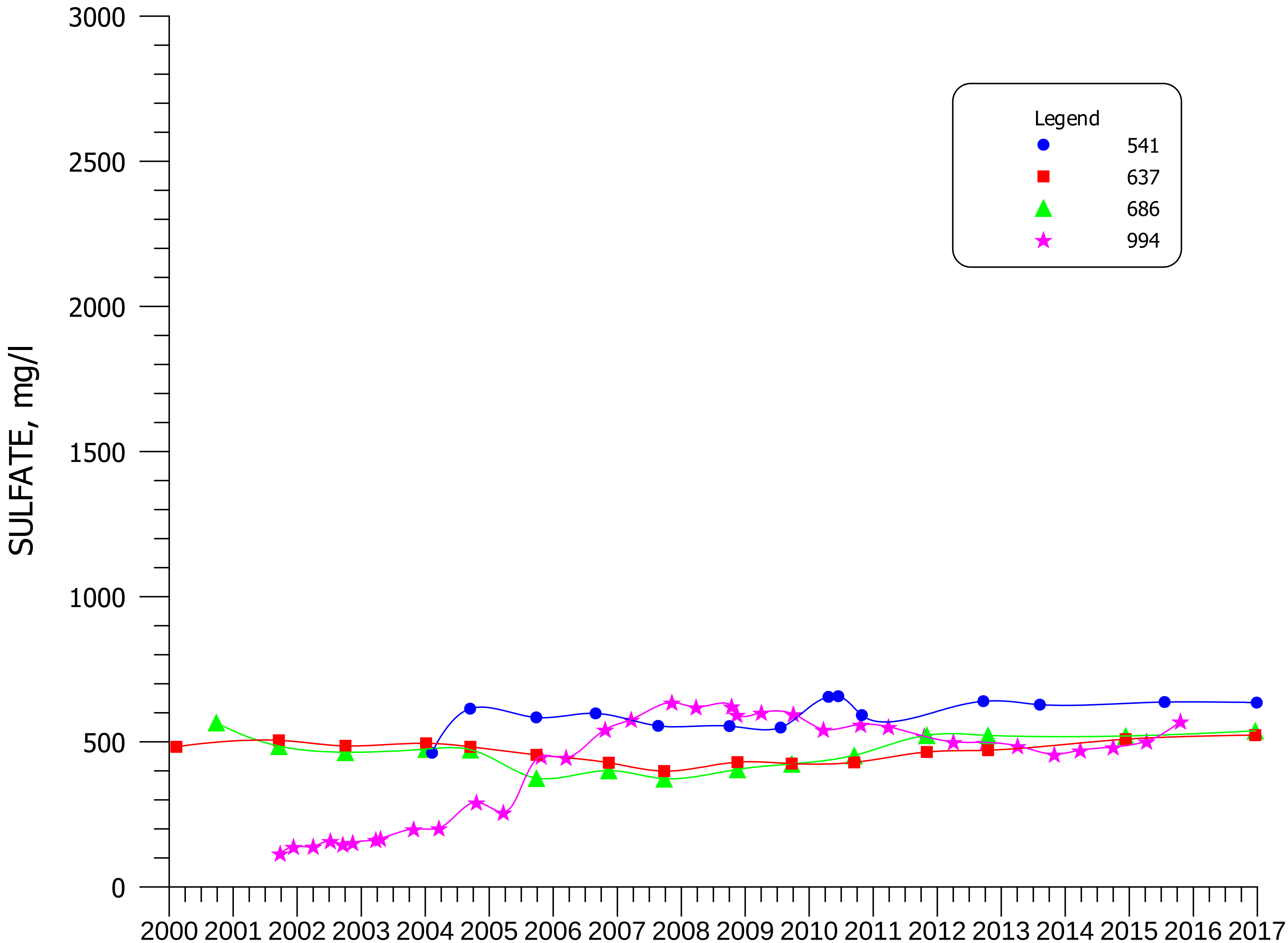

FIGURE 4.3-17. SULFATE CONCENTRATIONS FOR WELLS 541, 637, 686, and 994.

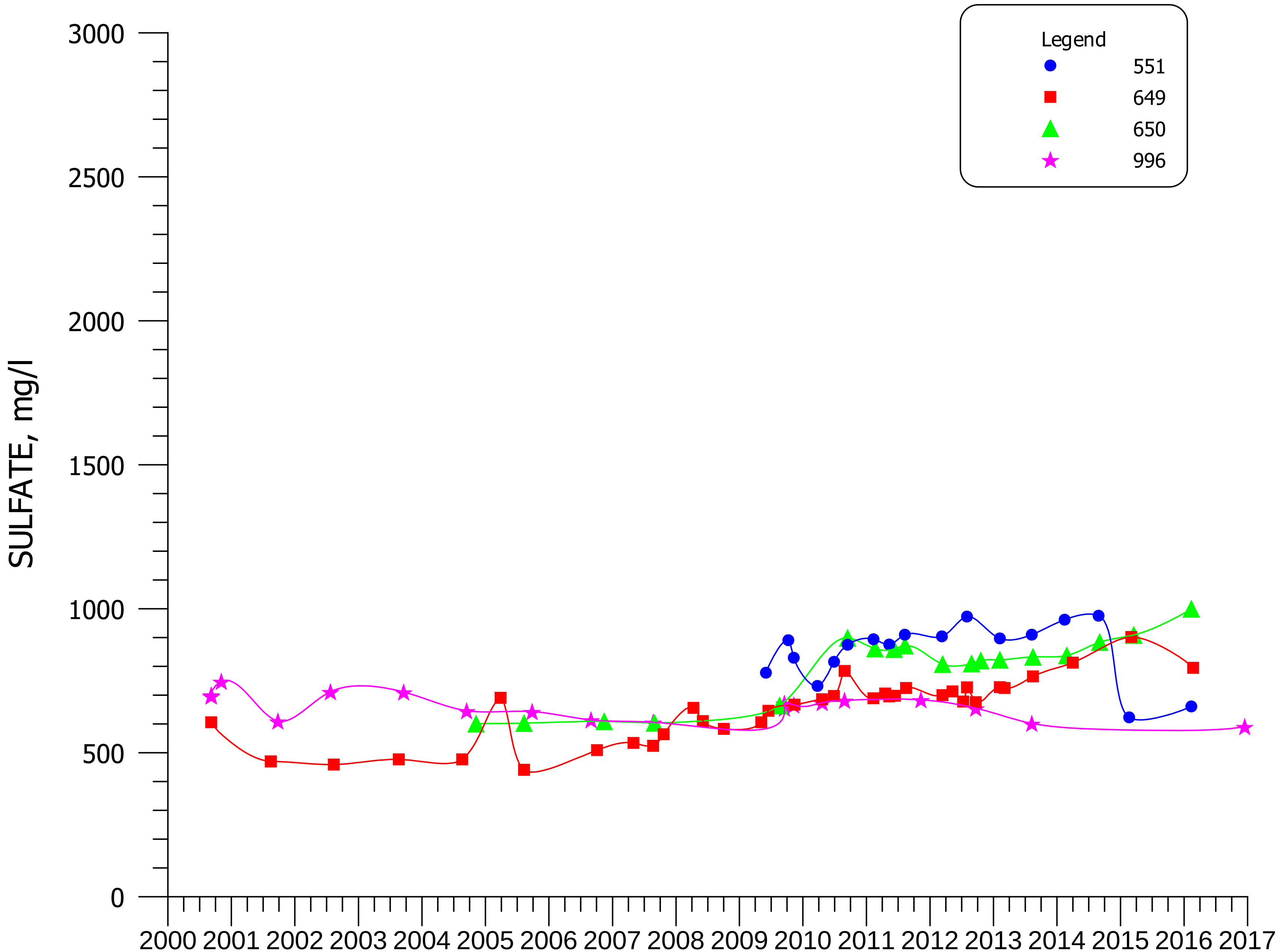

FIGURE 4.3-18. SULFATE CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

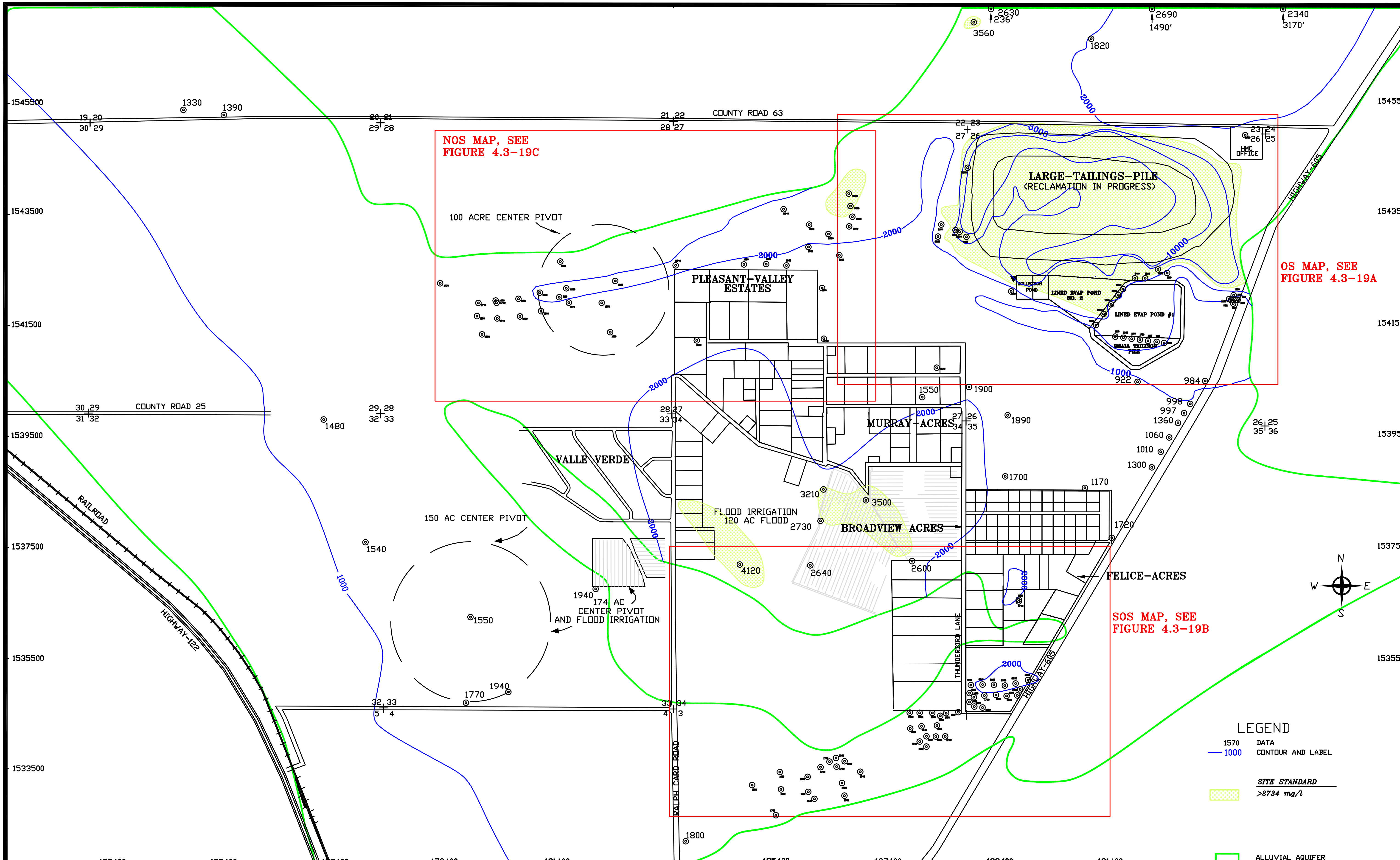

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FIGURE 4.3–19. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l

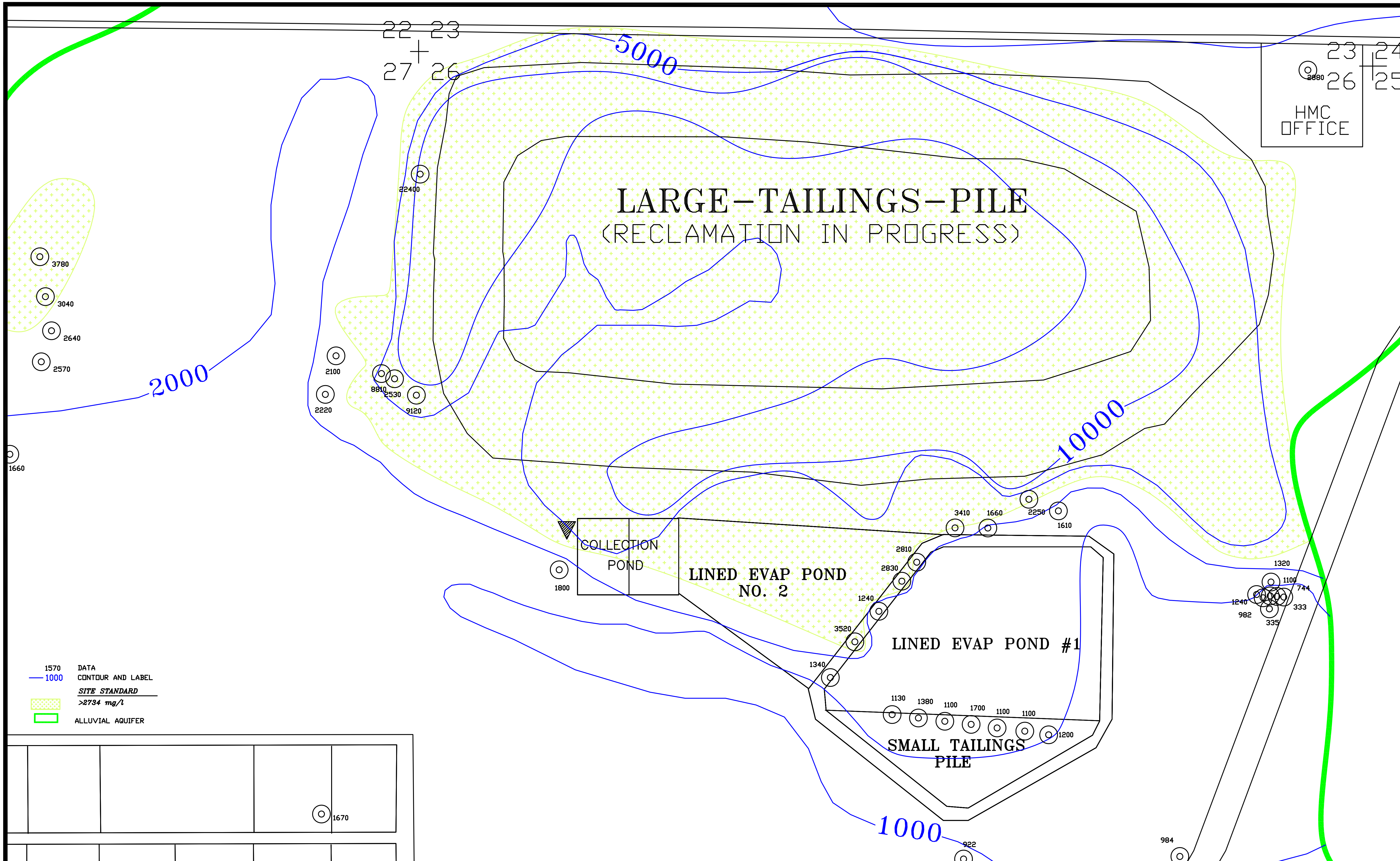

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FIGURE 4.3-19A. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

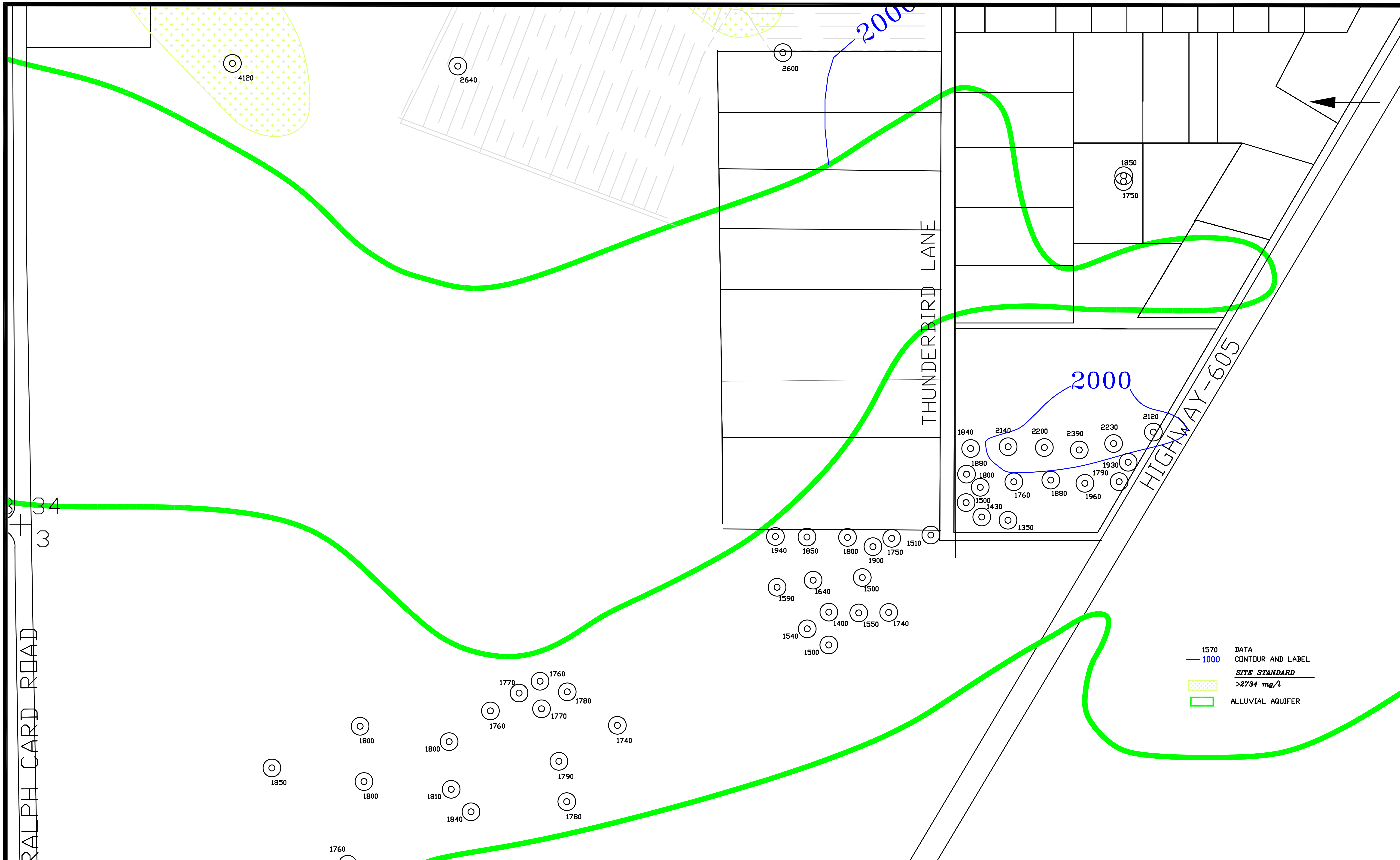

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FIGURE 4.3-19B. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l

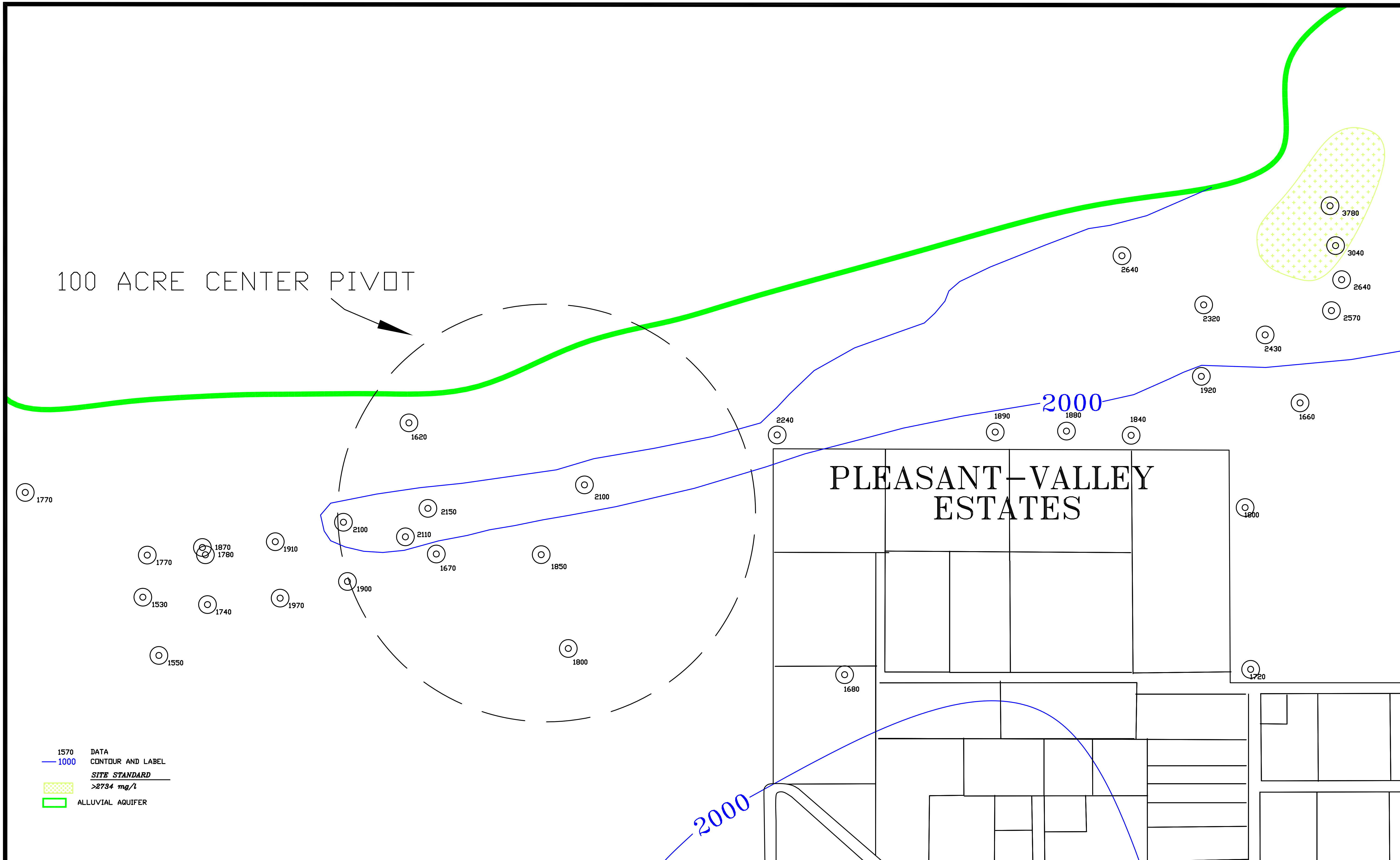

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FIGURE 4.3–19C. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

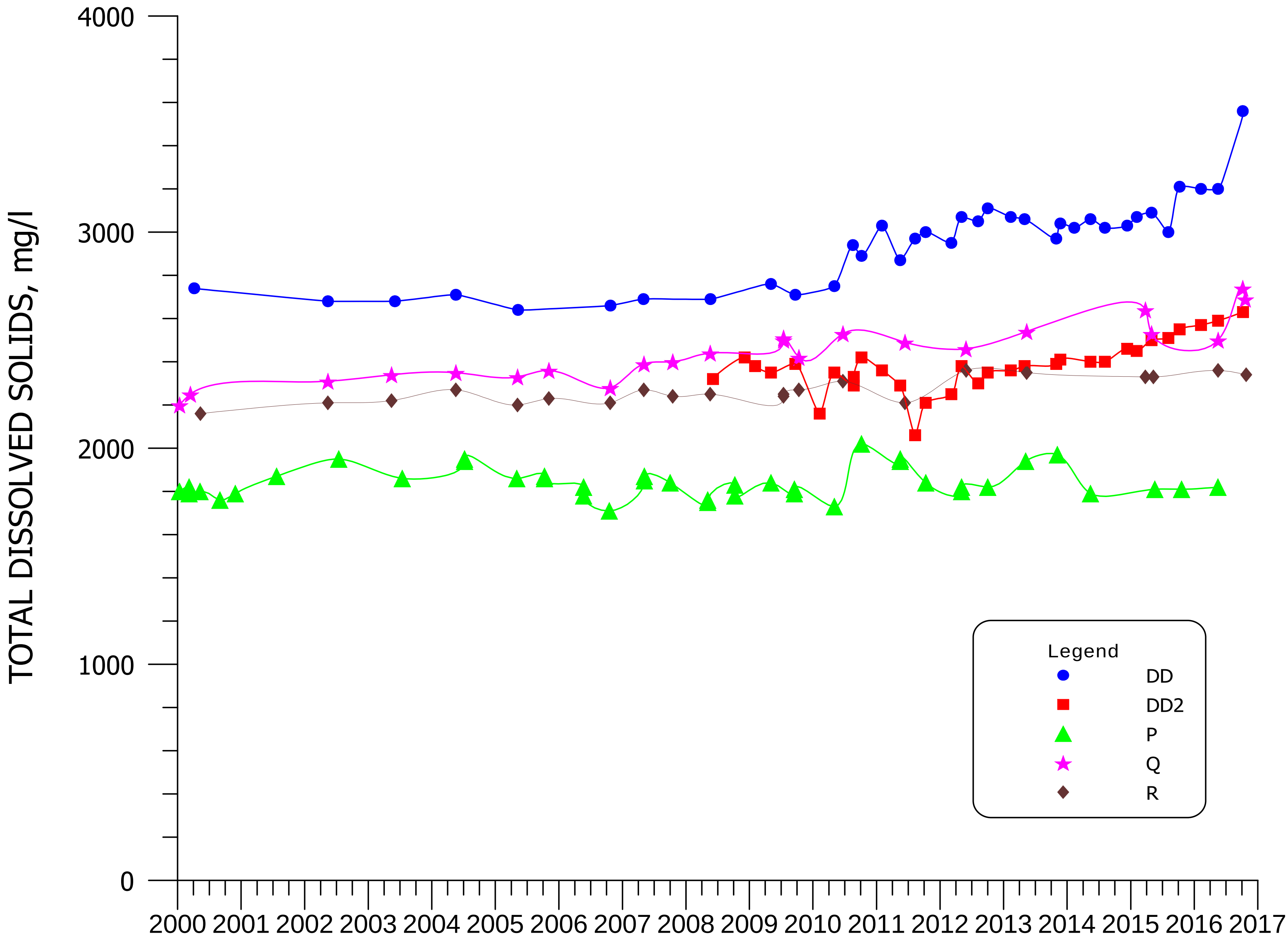

FIGURE 4.3-20. TDS CONCENTRATIONS FOR WELLS DD, DD2, ND, P, Q, AND R.

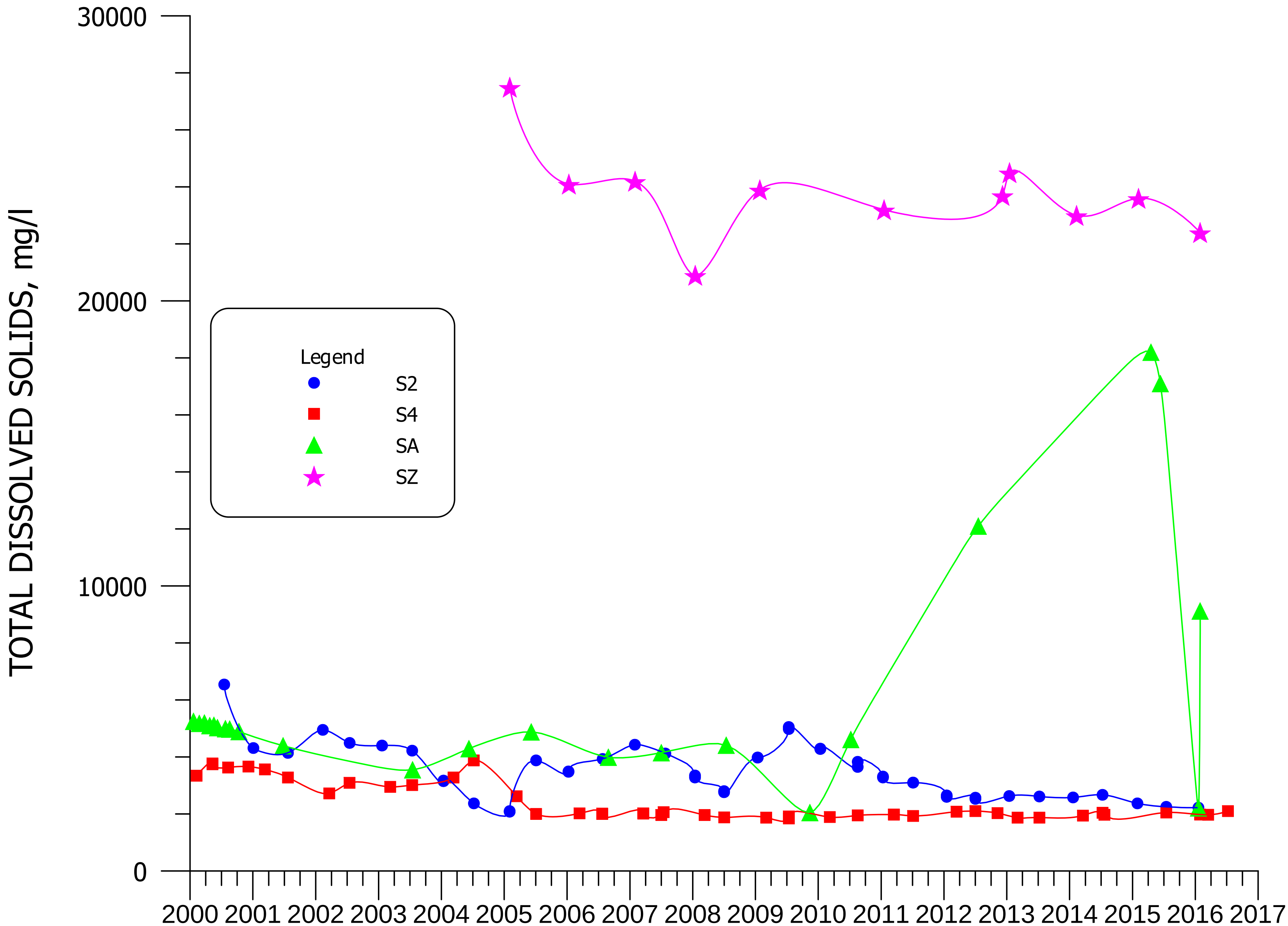

FIGURE 4.3-21. TDS CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

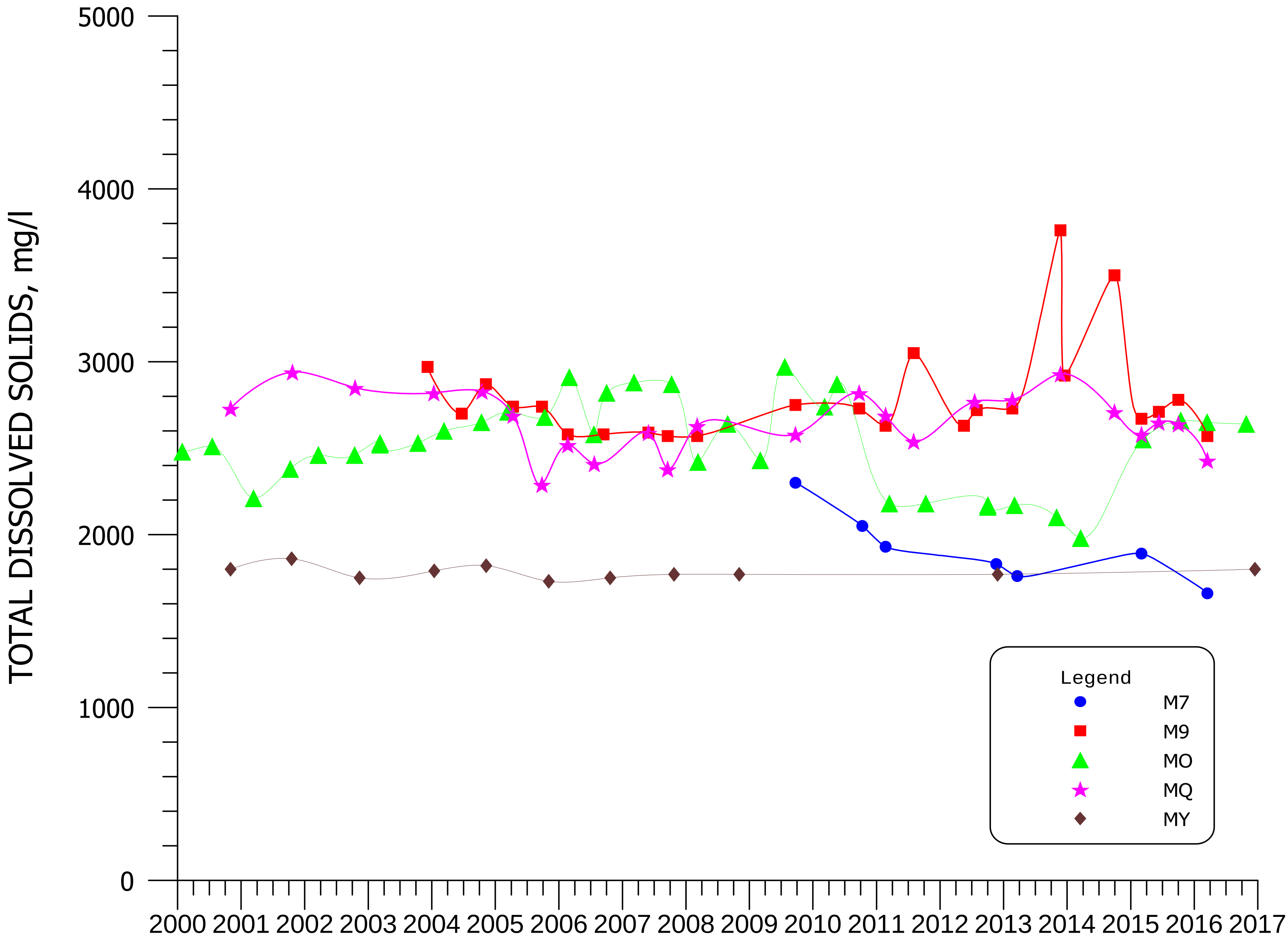

FIGURE 4.3-22. TDS CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

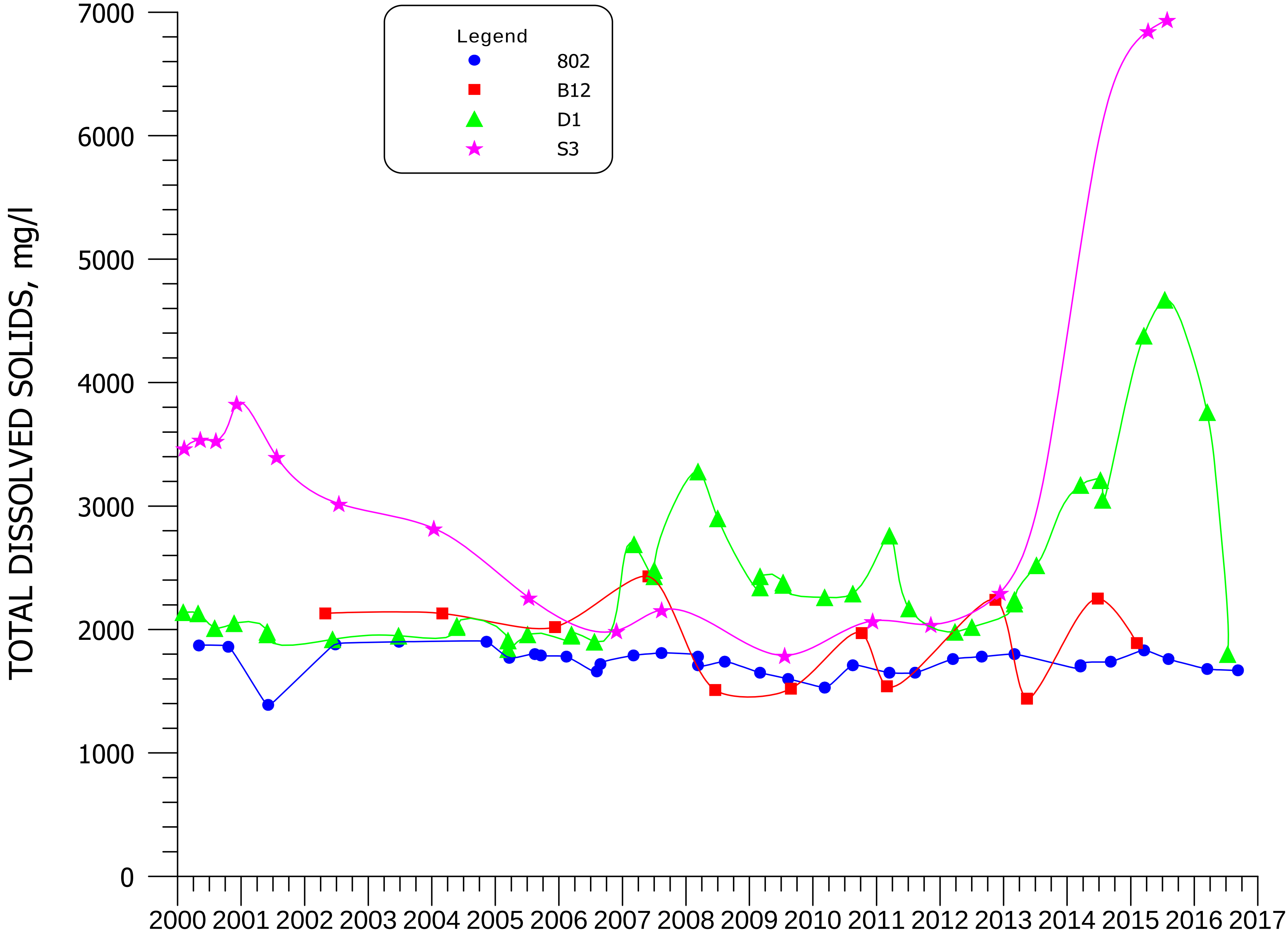

FIGURE 4.3-23. TDS CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

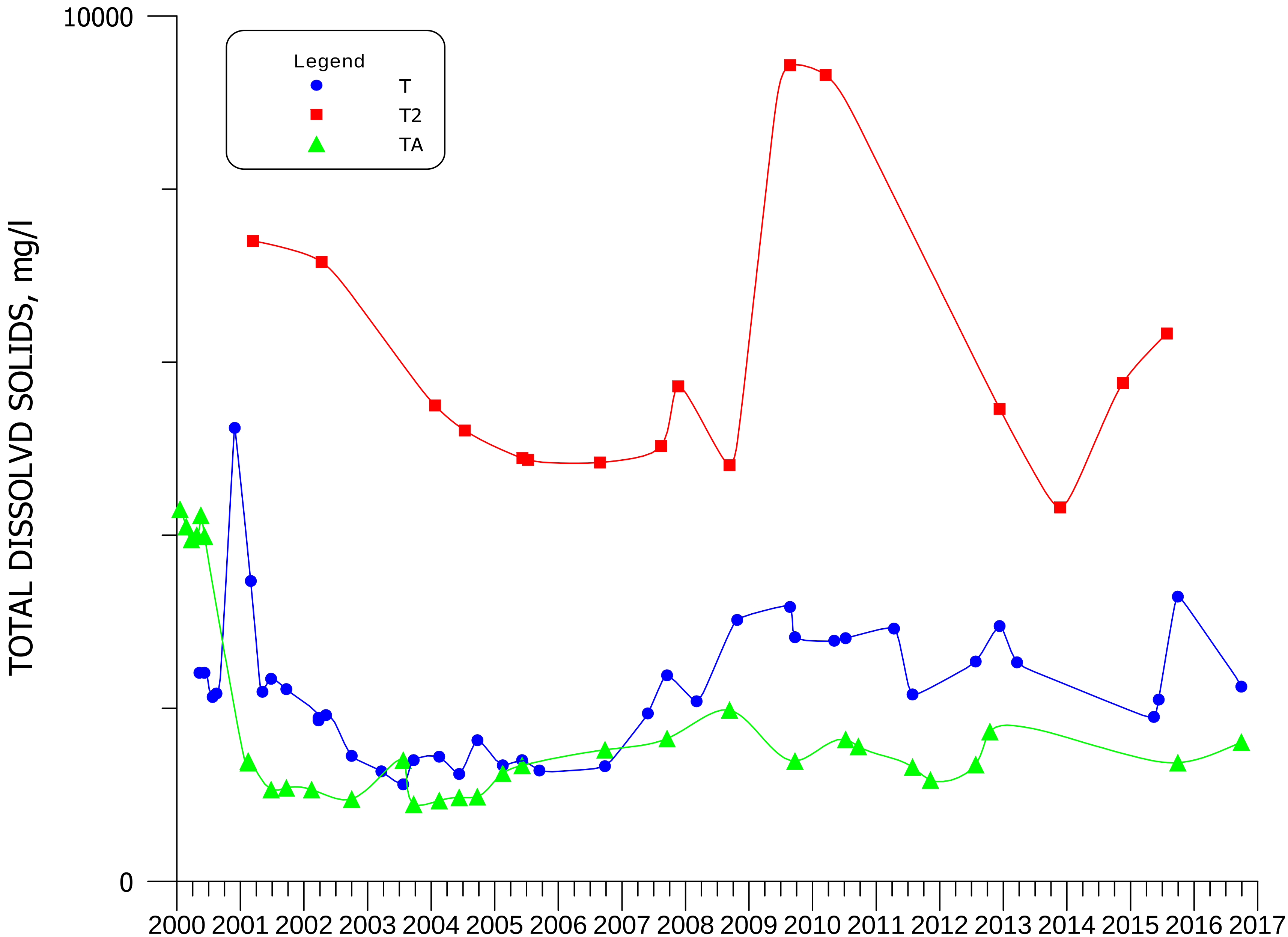

FIGURE 4.3-24. TDS CONCENTRATIONS FOR WELLS T, T2, AND TA.

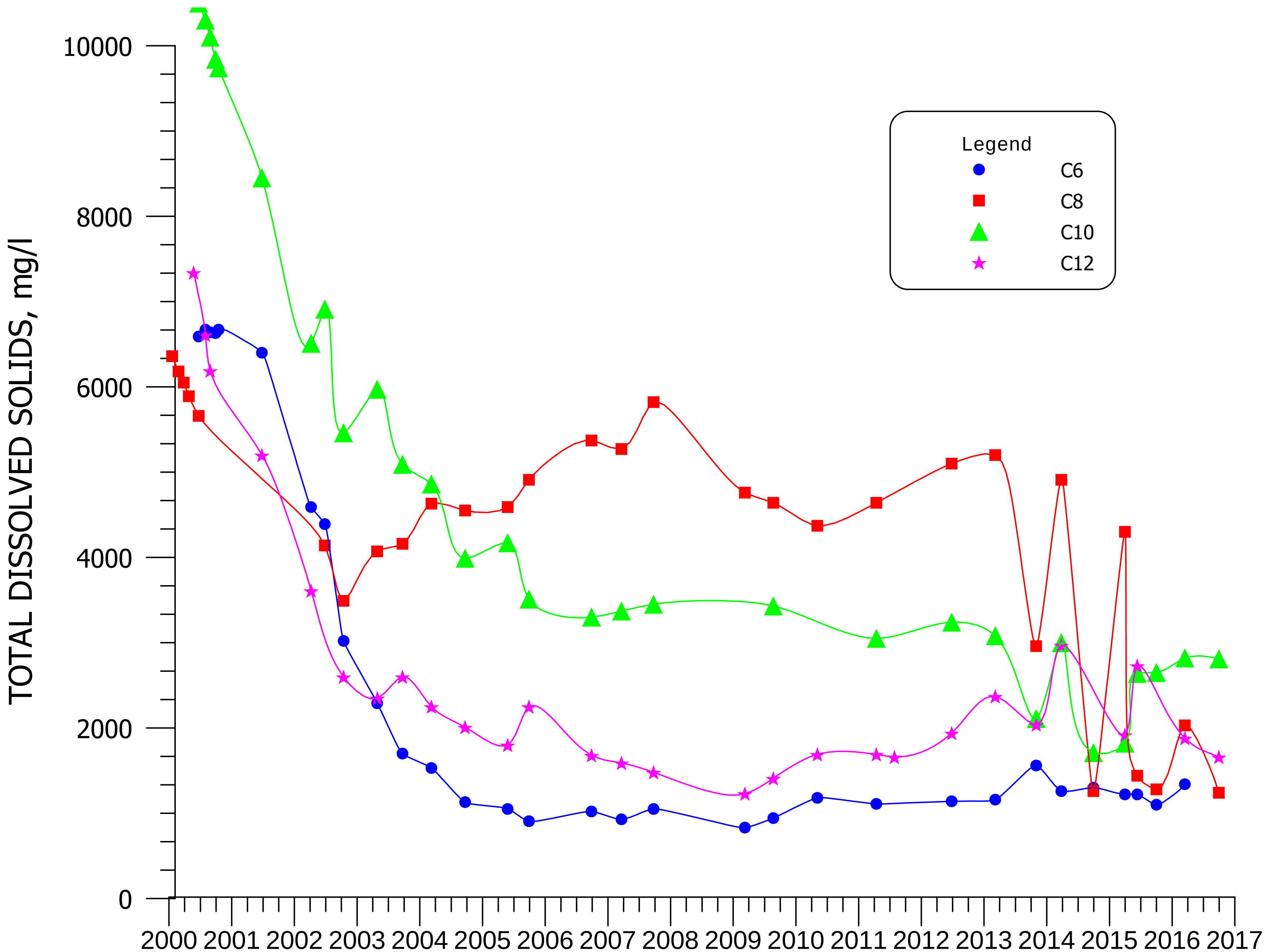

FIGURE 4.3-25. TDS CONCENTRATIONS FOR WELLS C6, C8, C10 AND C12.

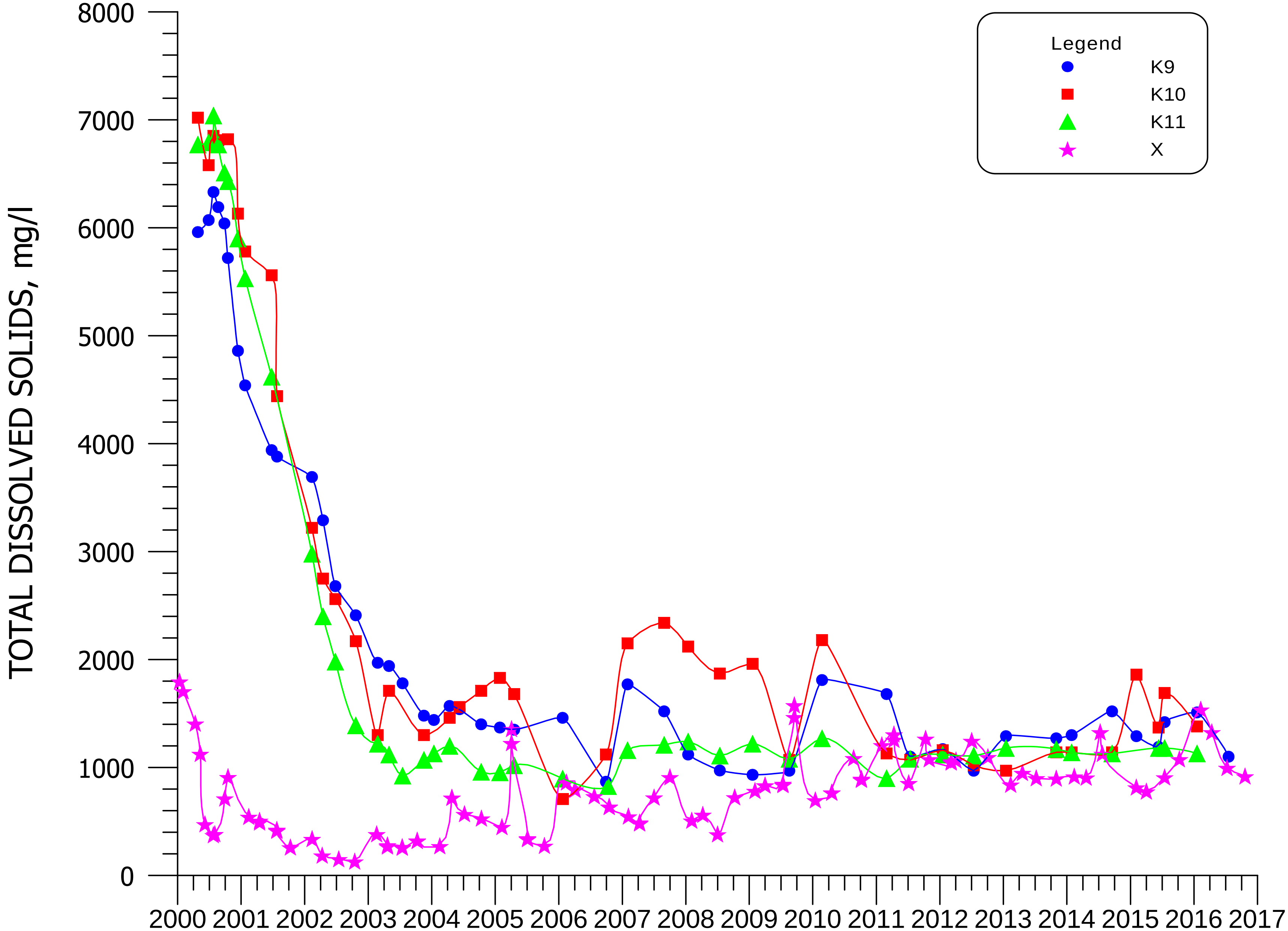

FIGURE 4.3-26. TDS CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

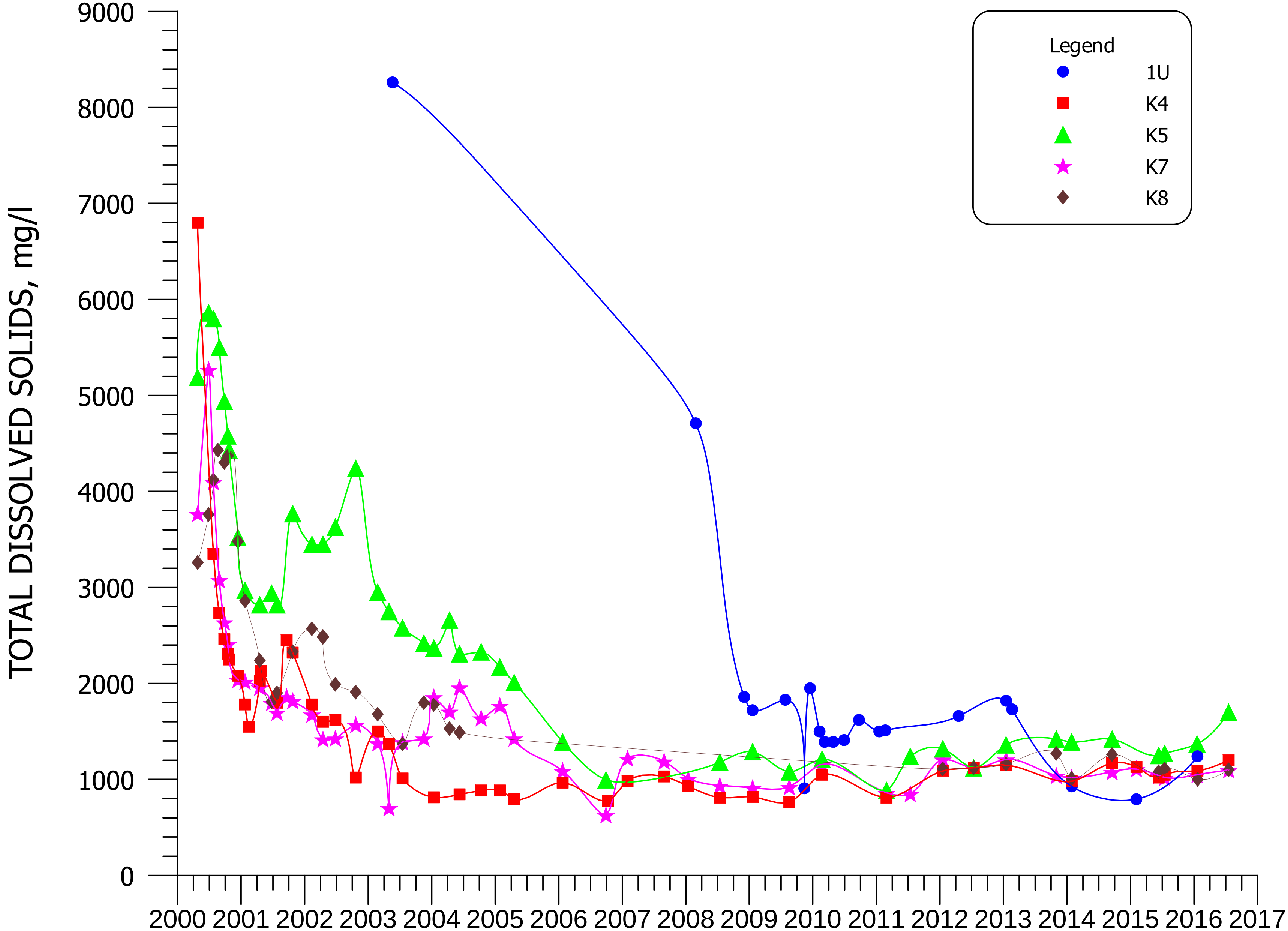

FIGURE 4.3-27. TDS CONCENTRATIONS FOR WELLS 1U, K4, K5, K7 AND K8.

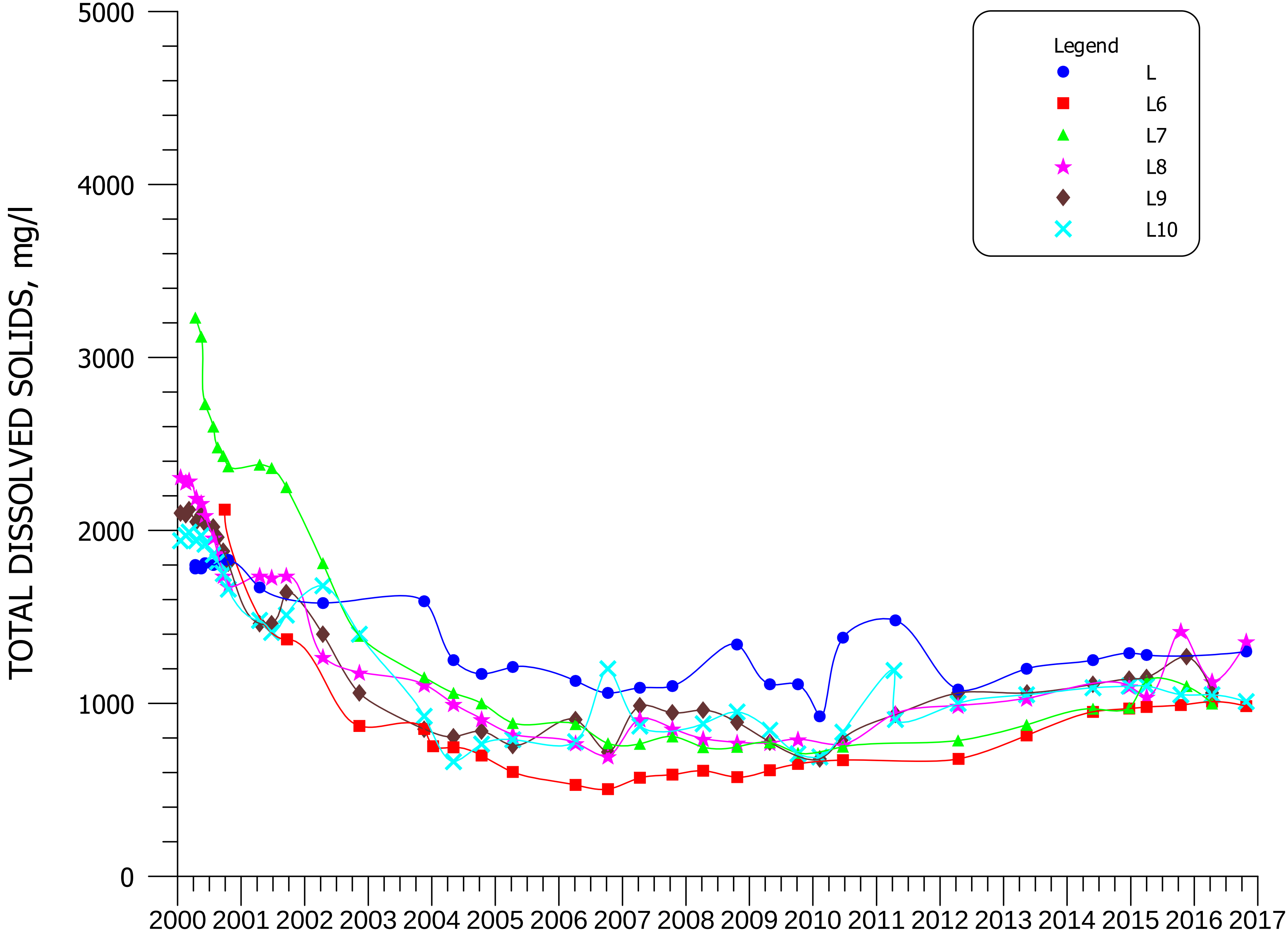

FIGURE 4.3-28. TDS CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

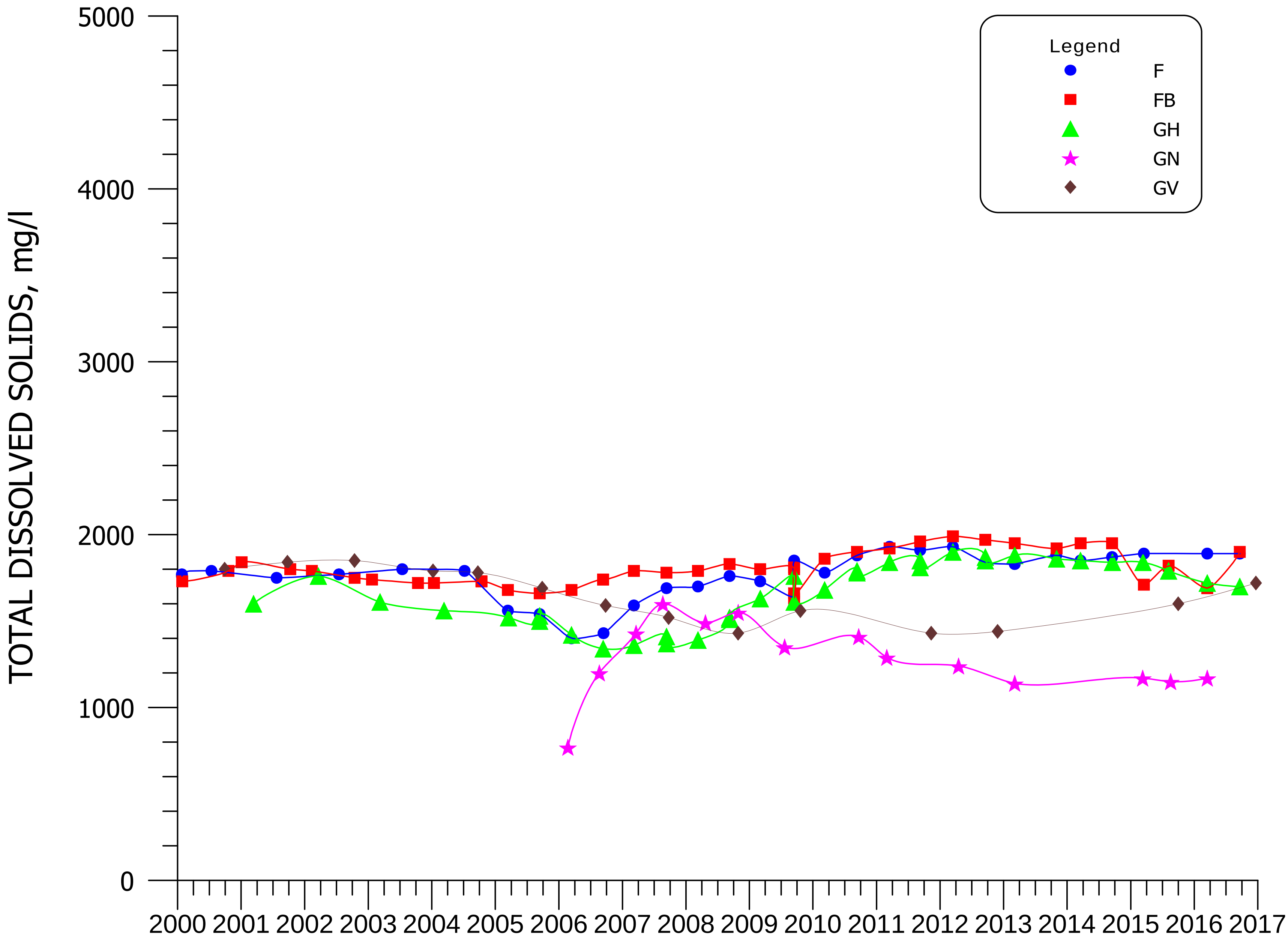

FIGURE 4.3-29. TDS CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

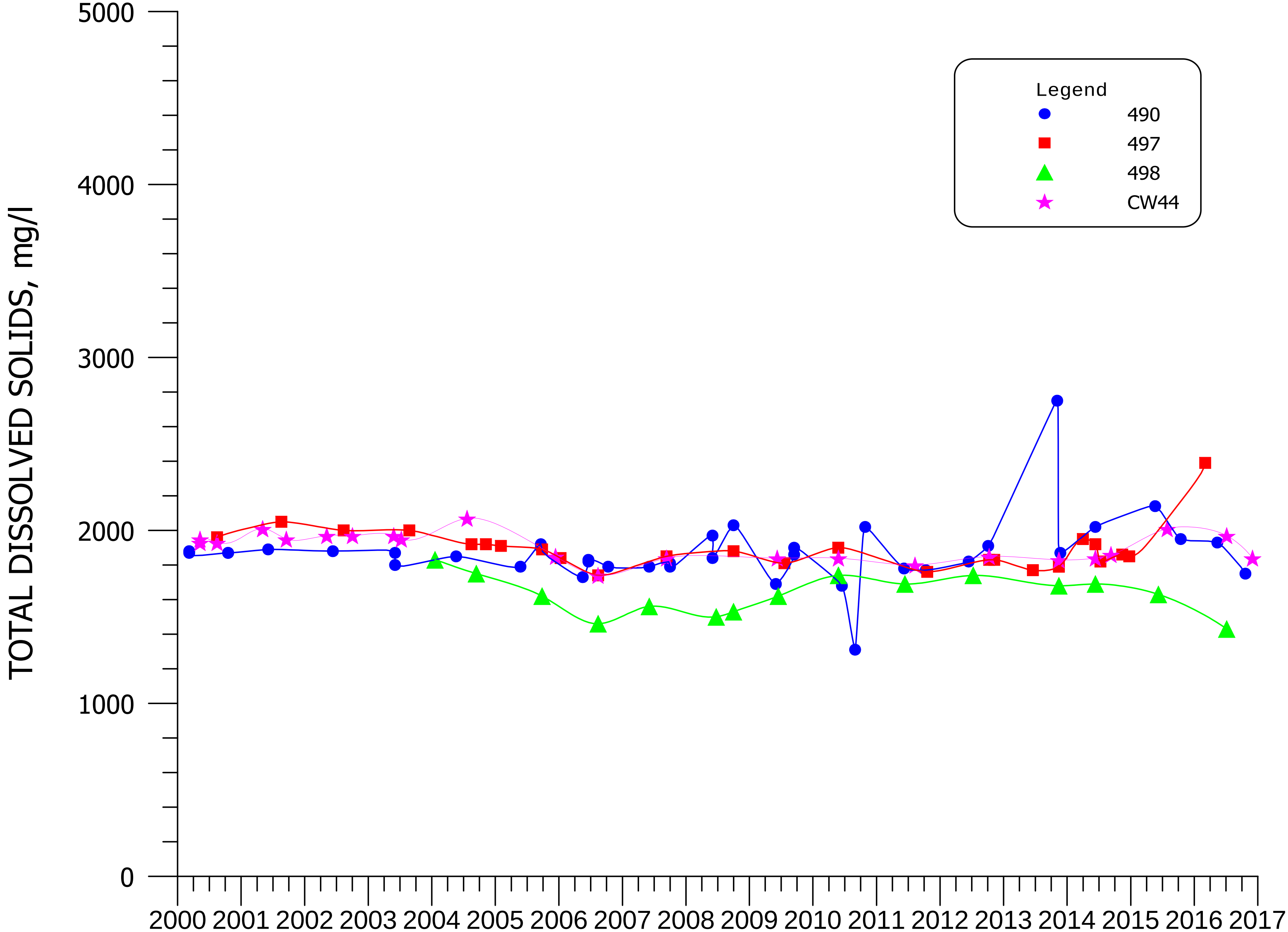

FIGURE 4.3-30. TDS CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

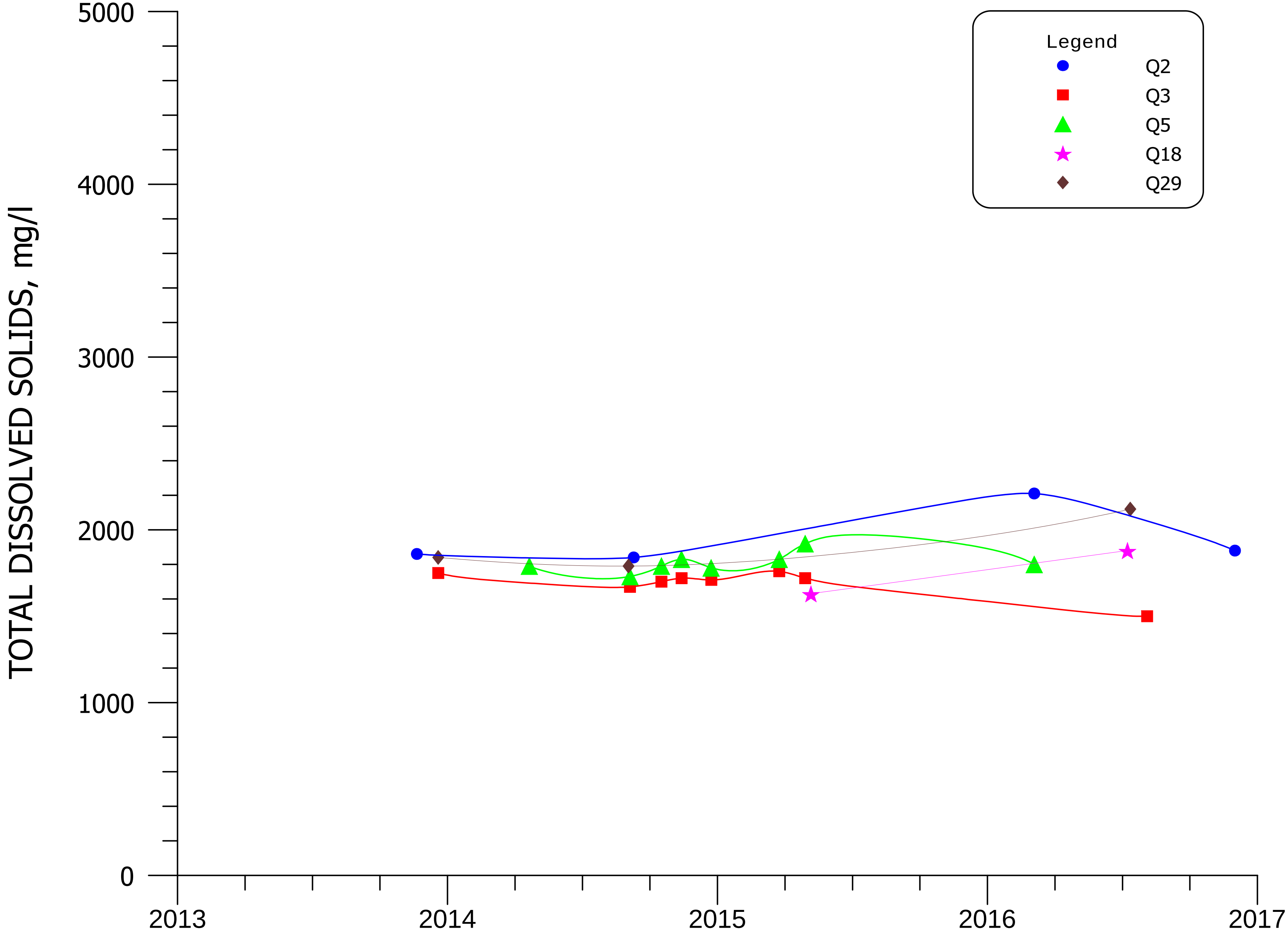

FIGURE 4.3-30A. TDS CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

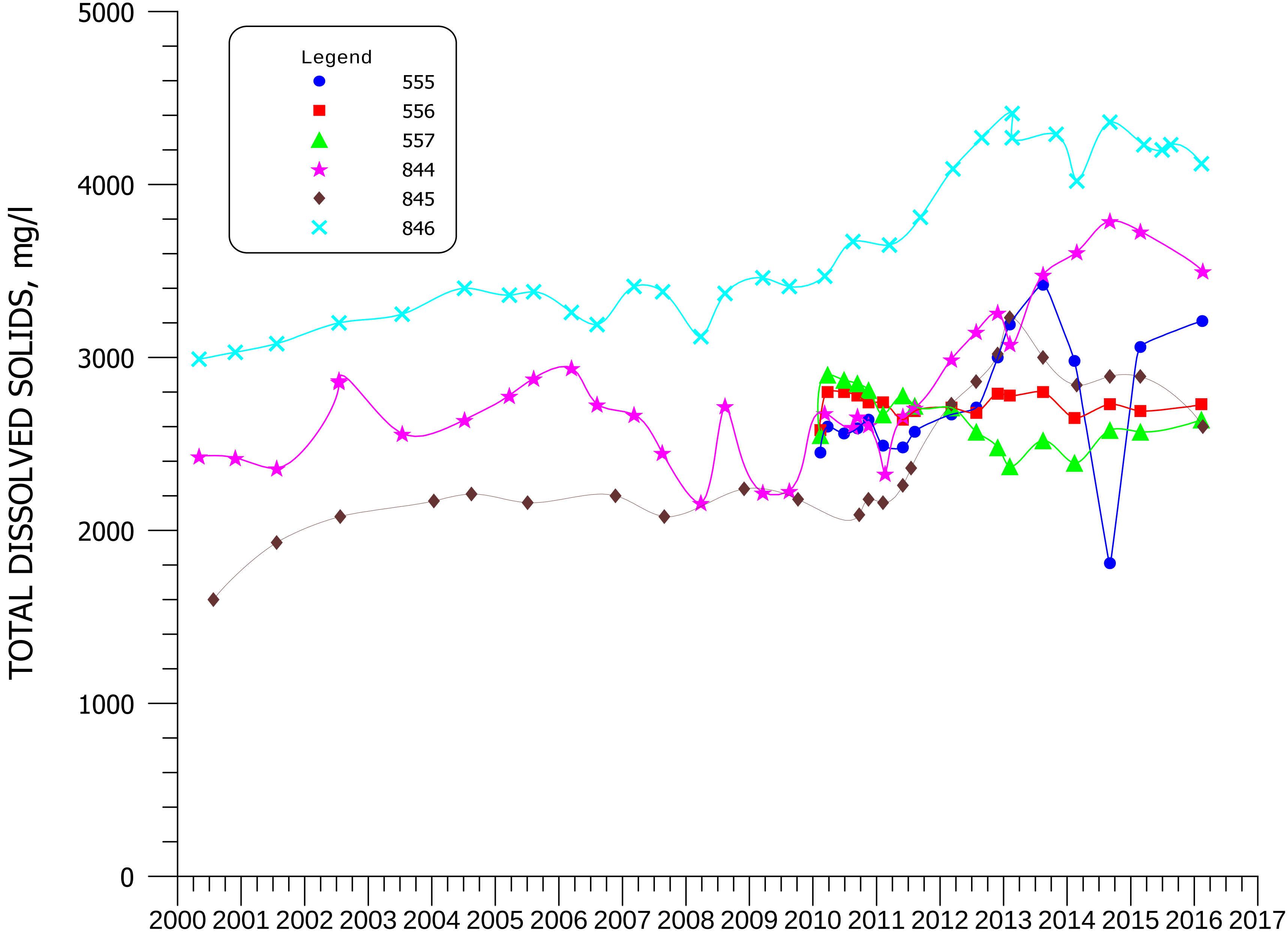

FIGURE 4.3-31. TDS CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

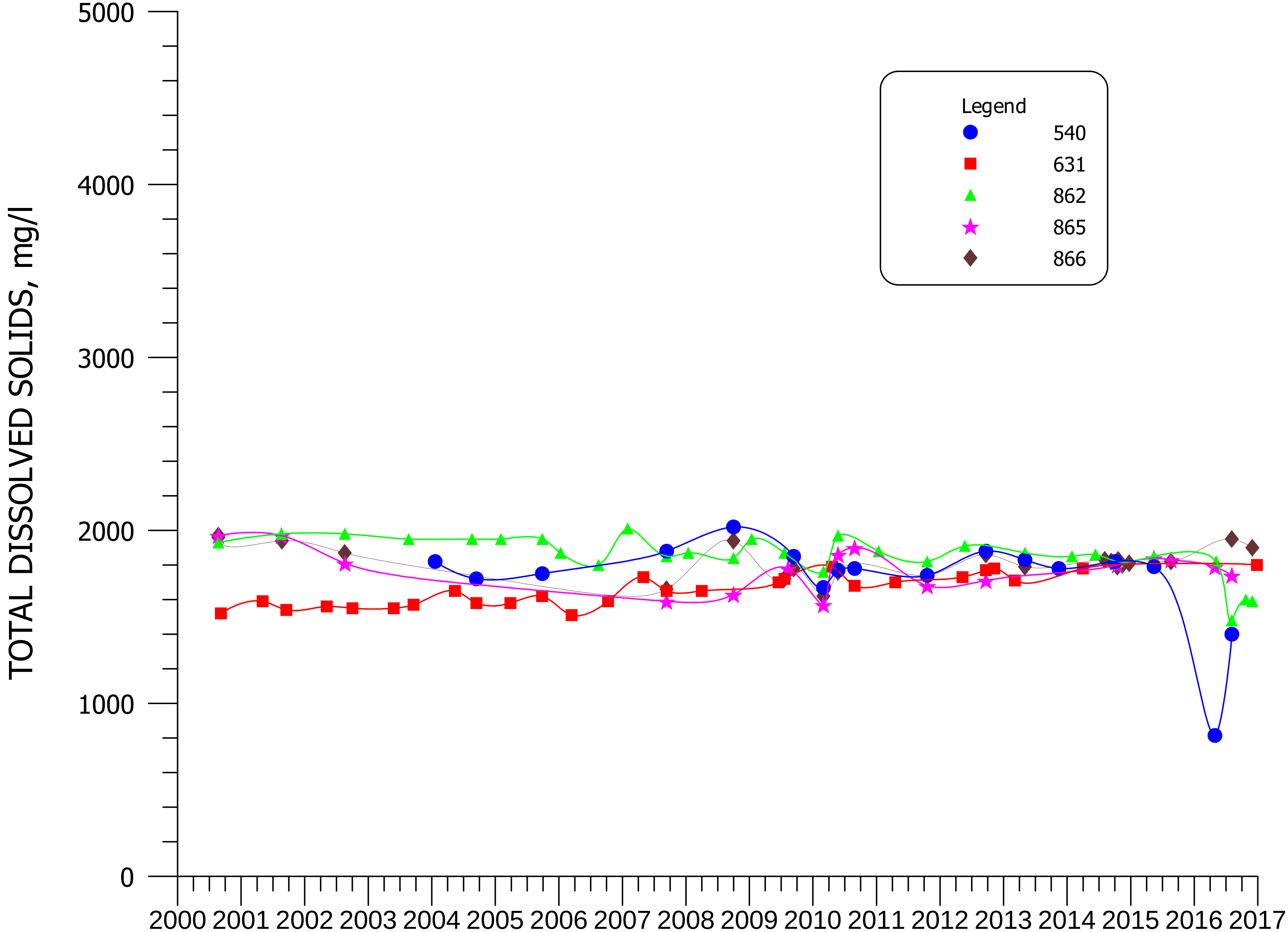

FIGURE 4.3-32. TDS CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

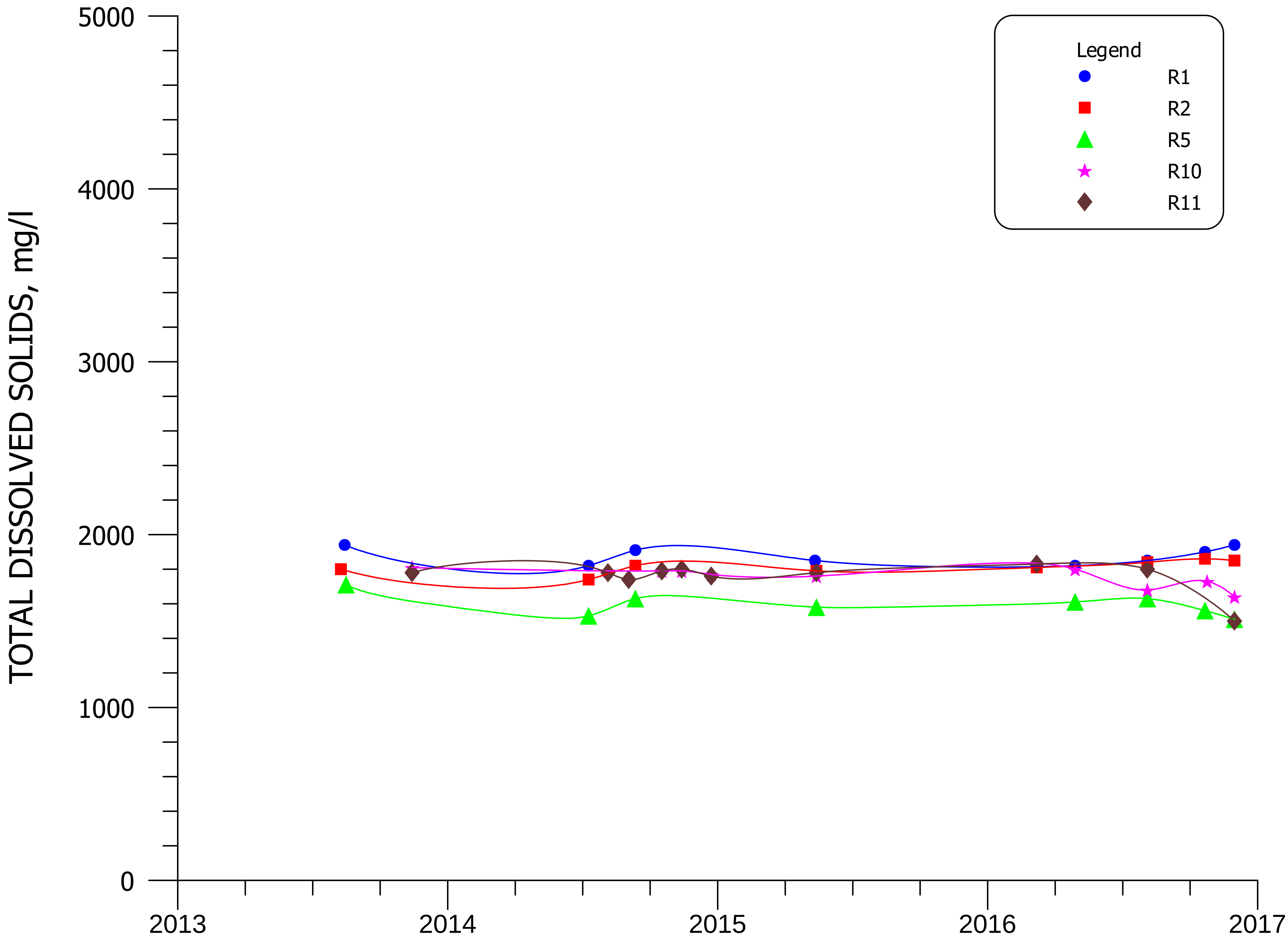

FIGURE 4.3-32A. TDS CONCENTRATIONS FOR WELLS R1, R2, R5, R10, AND R11.

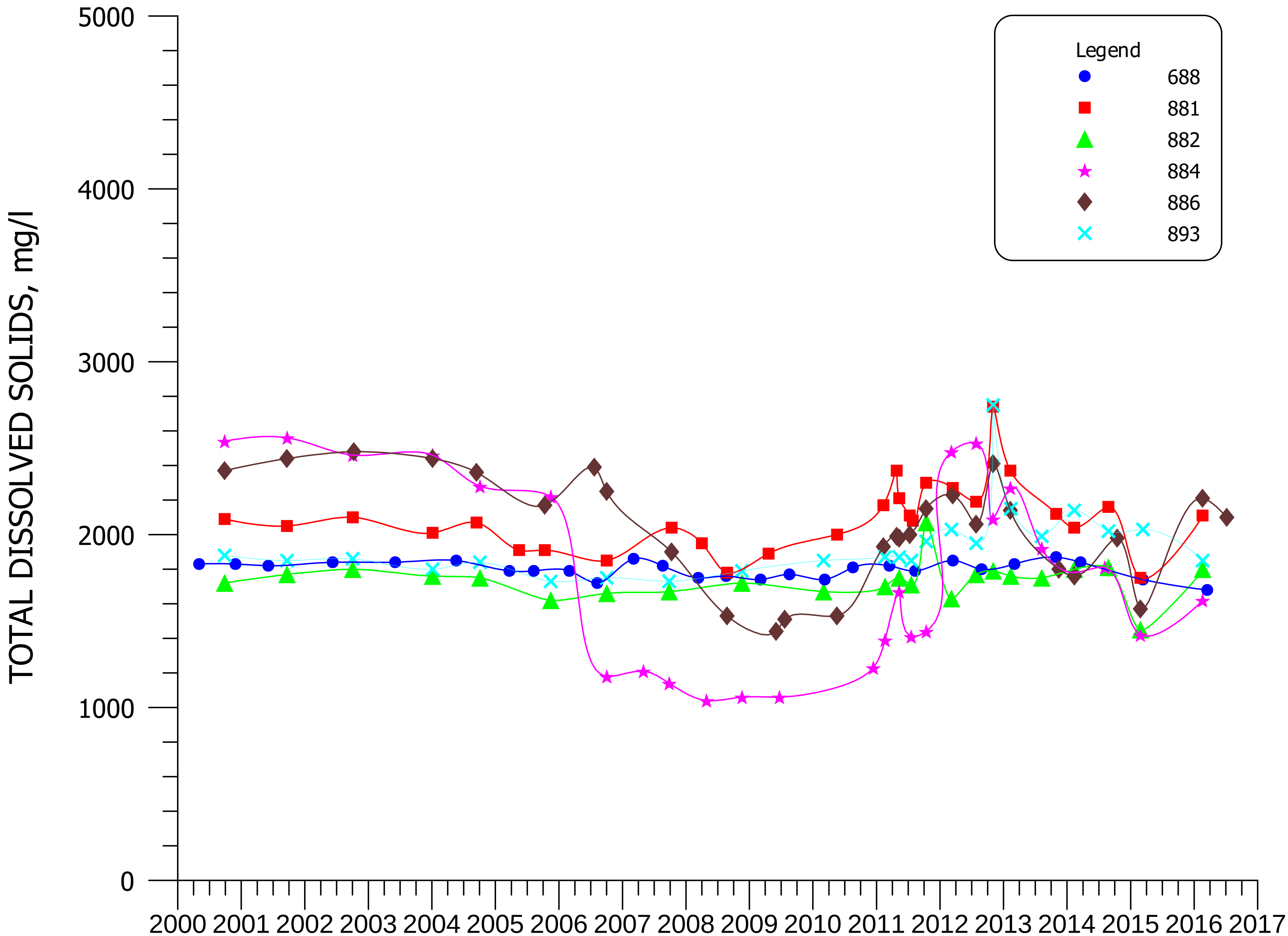

FIGURE 4.3-33. TDS CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

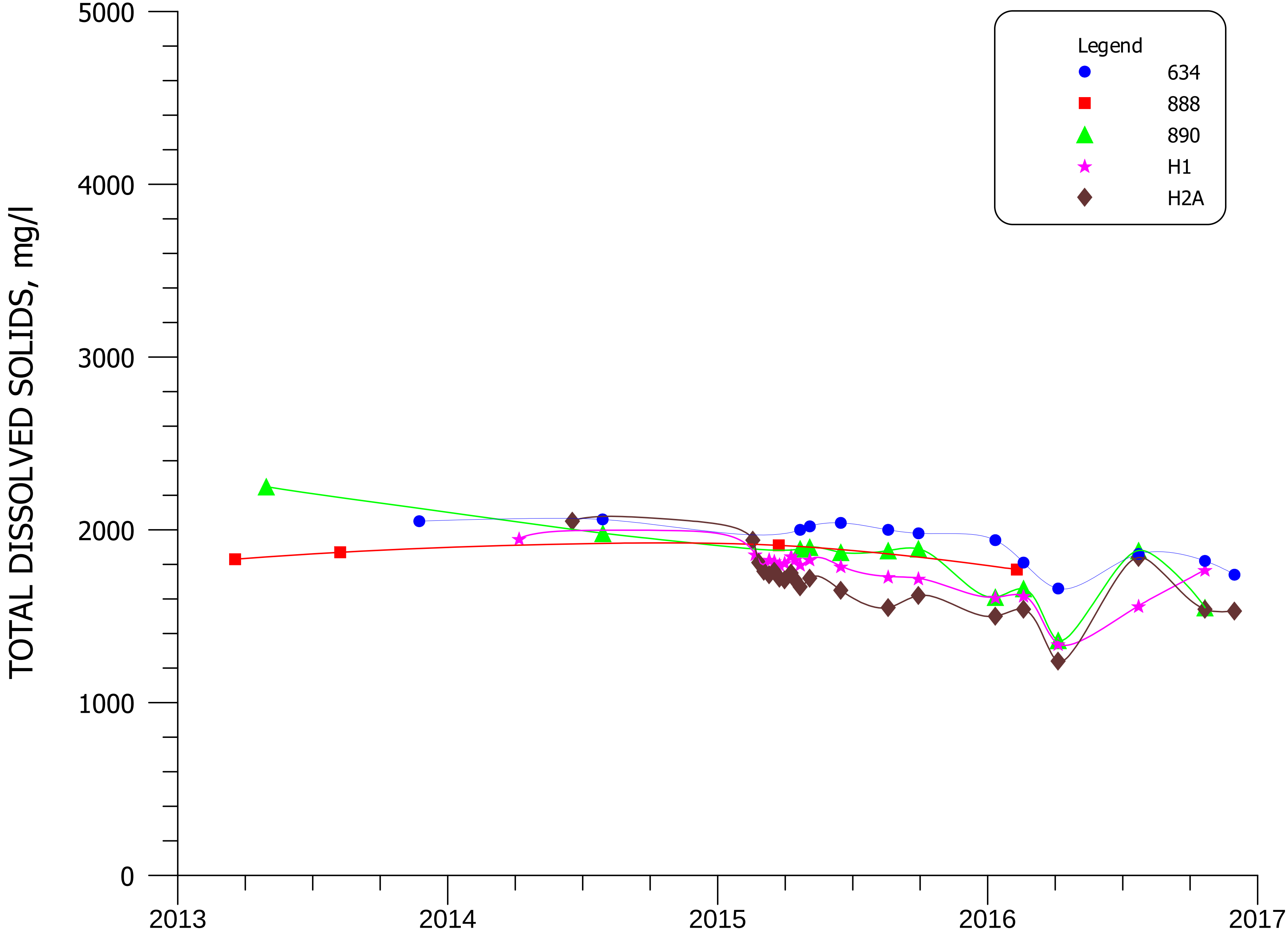

FIGURE 4.3-33A. TDS CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

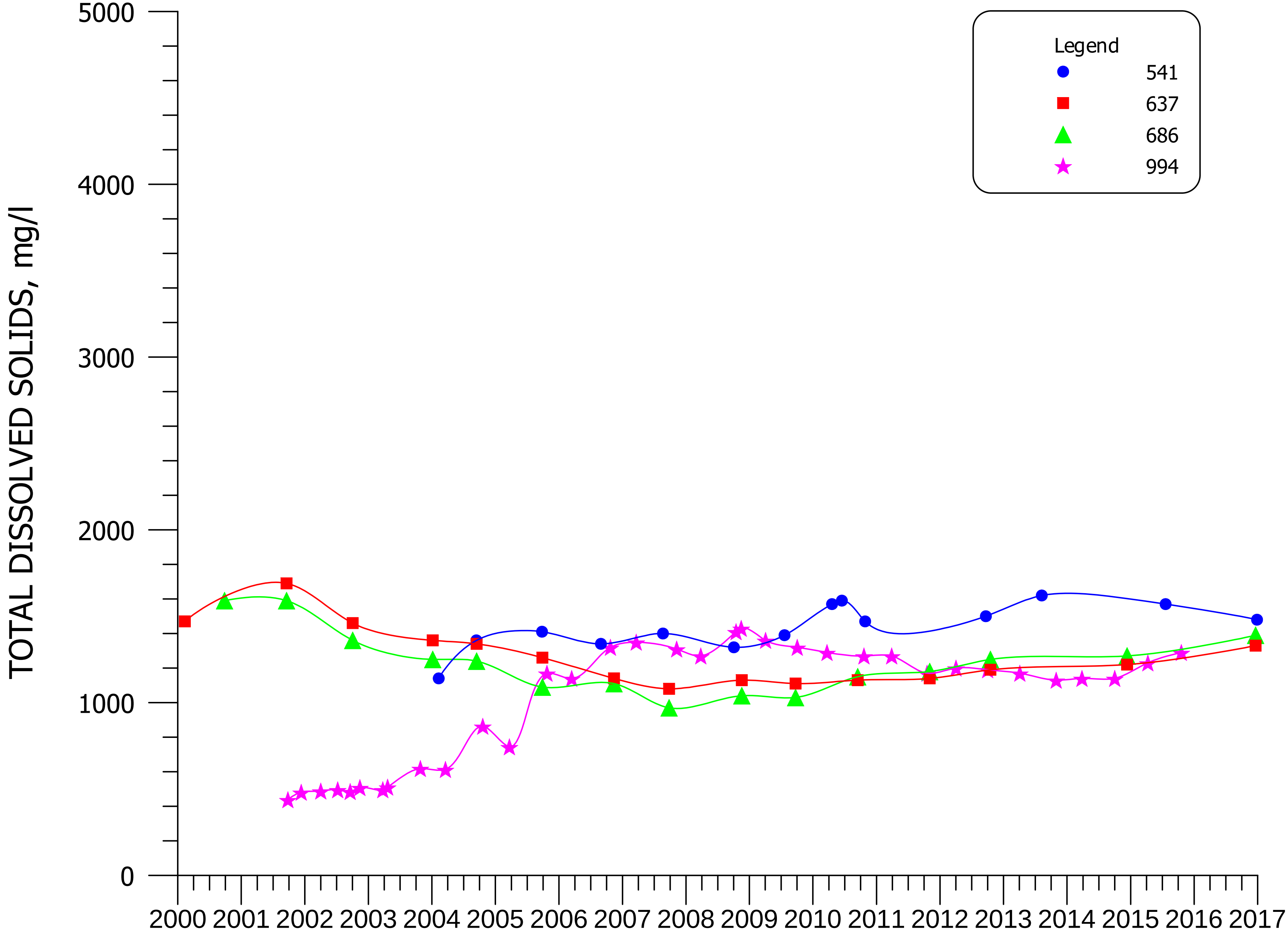

FIGURE 4.3-34. TDS CONCENTRATIONS FOR WELLS 541, 637, 686, and 994.

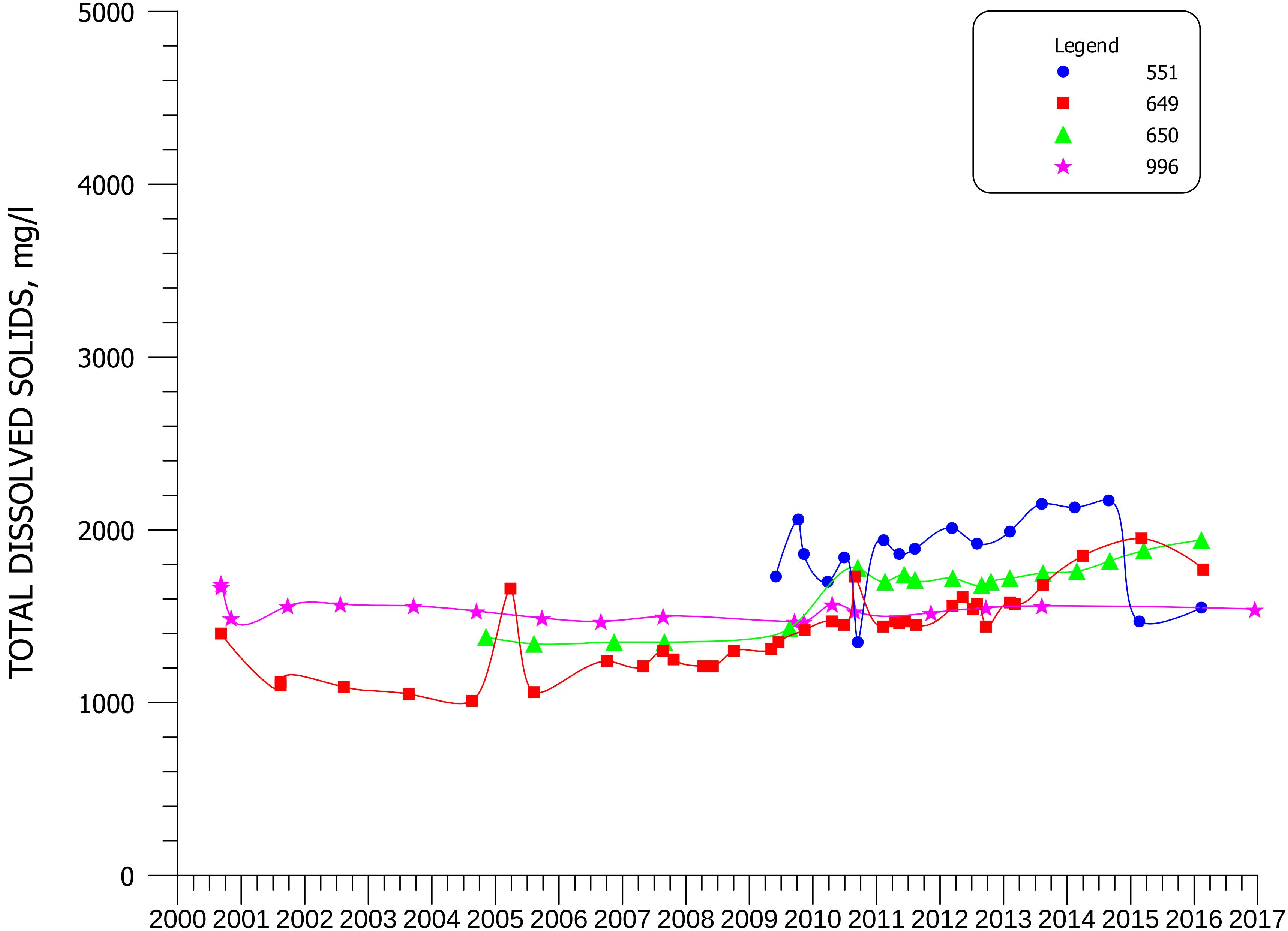

FIGURE 4.3-35. TDS CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

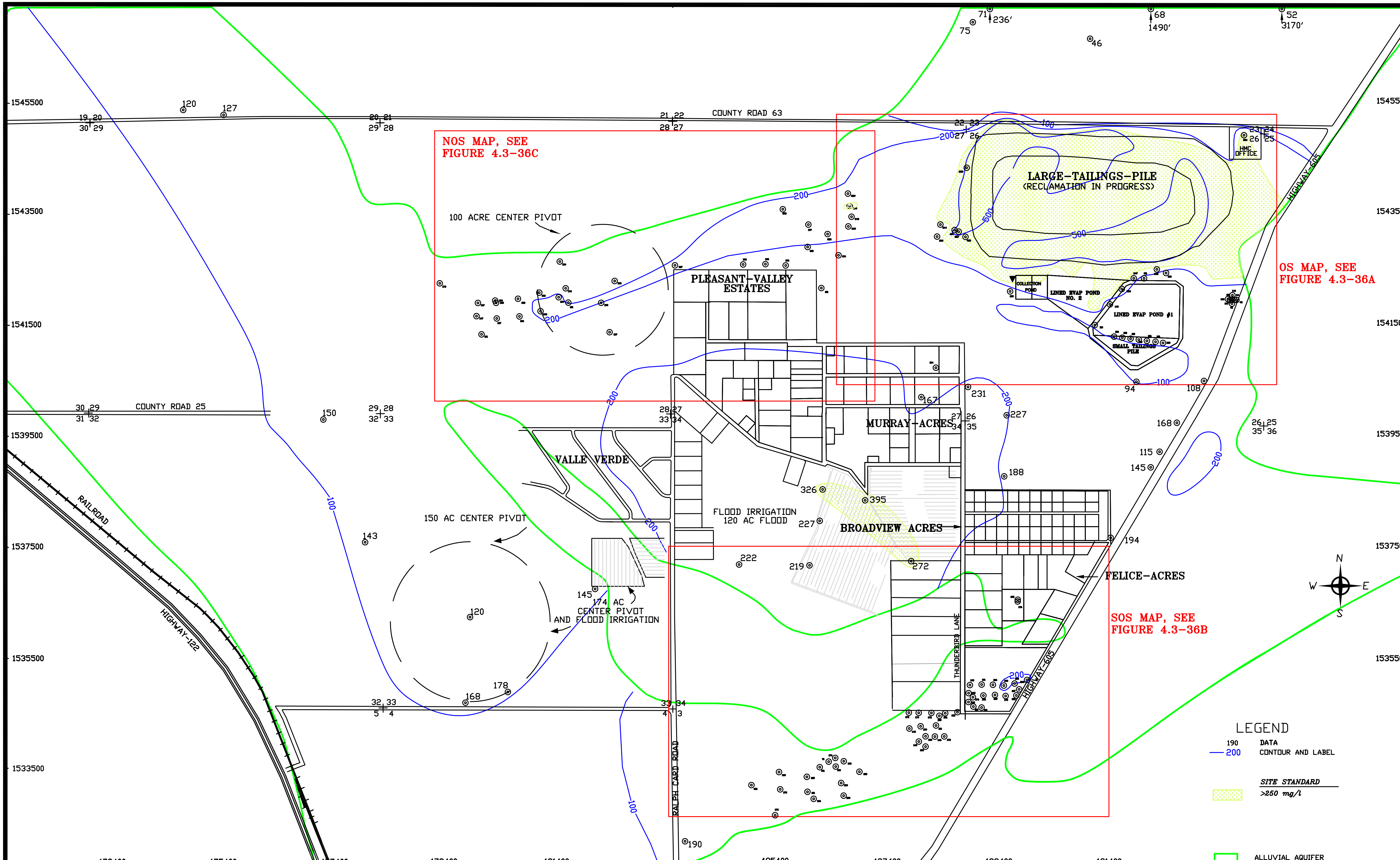

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FIGURE 4.3-36. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l

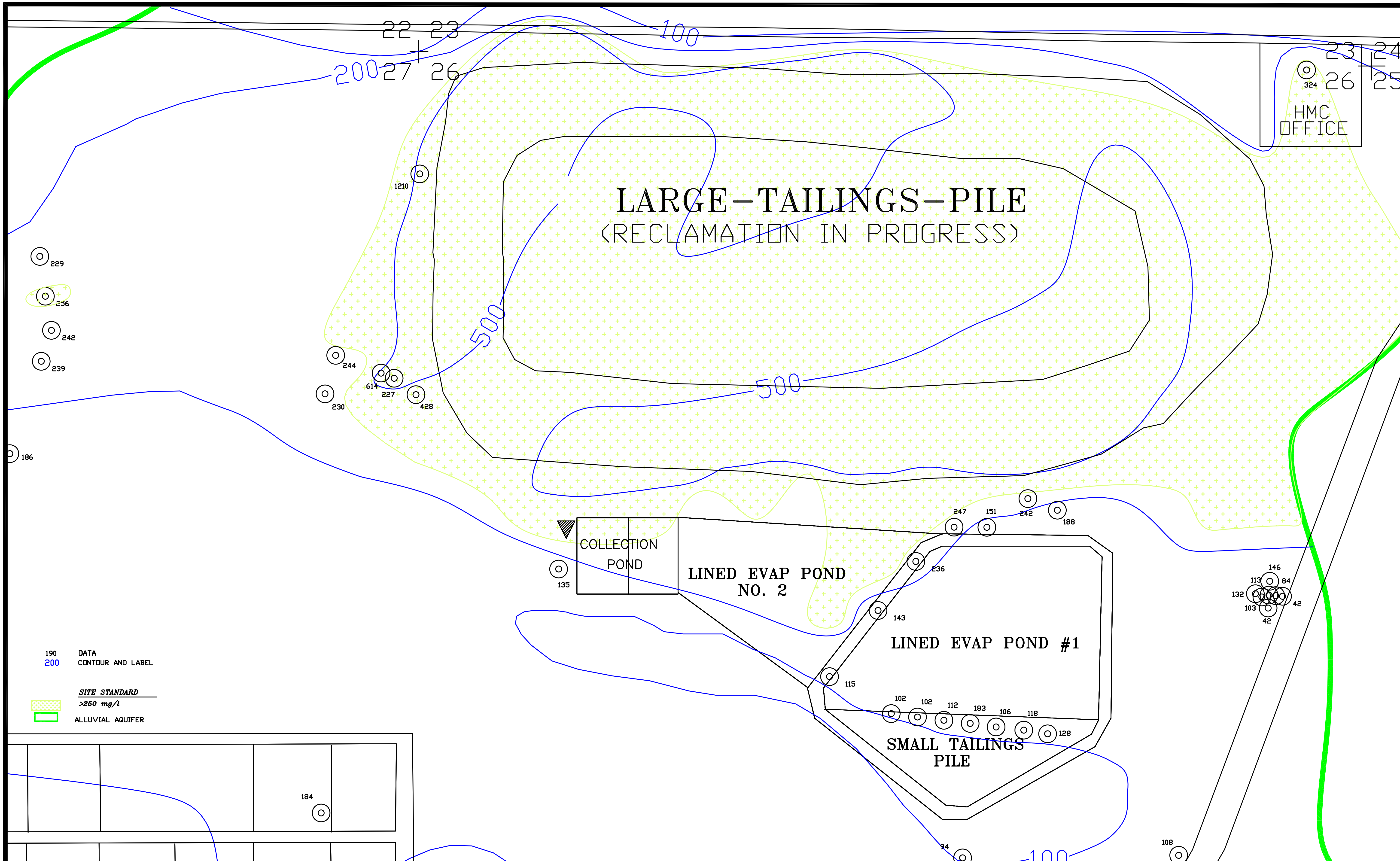

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FIGURE 4.3-36A. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

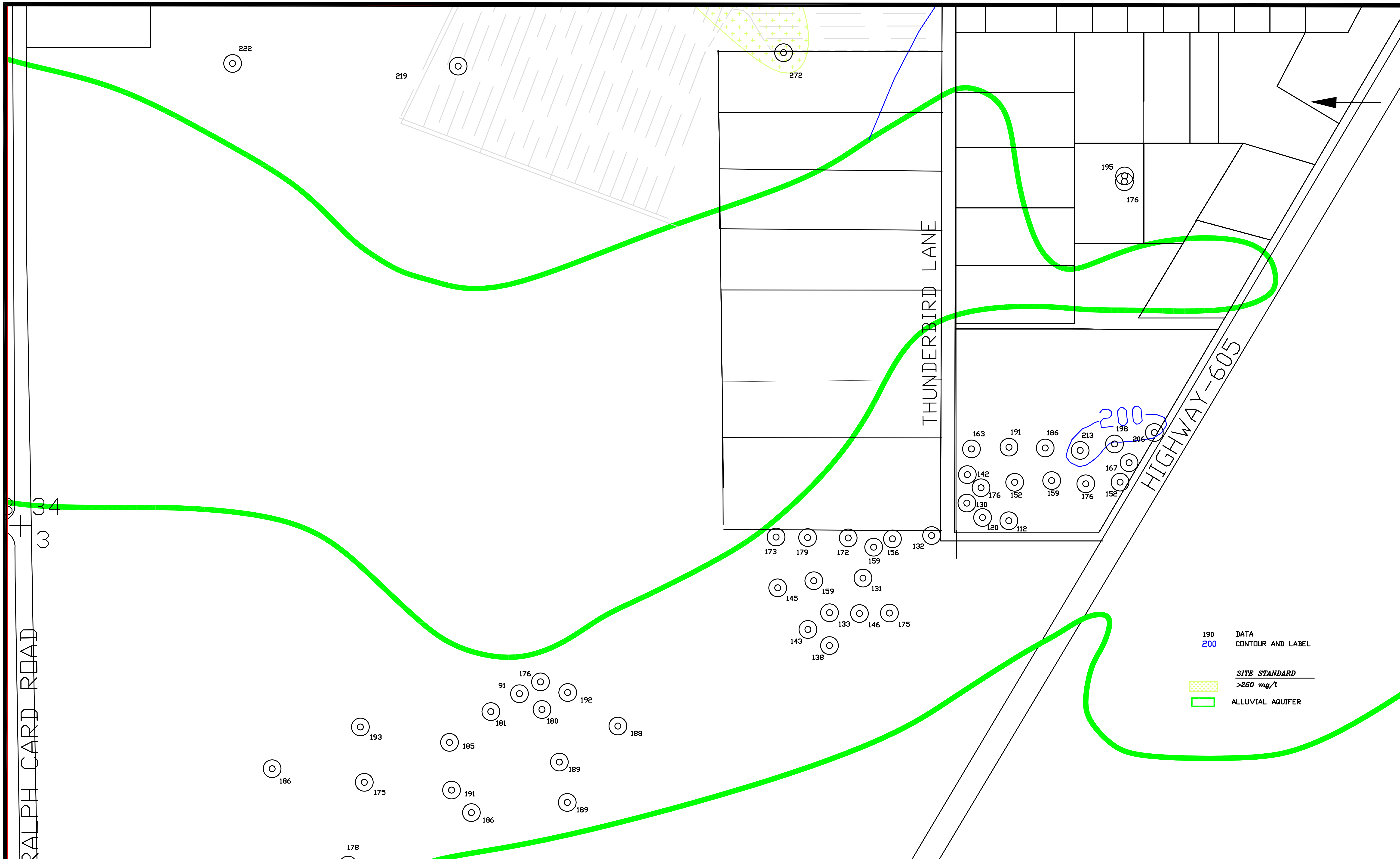

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FIGURE 4.3-36B. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l

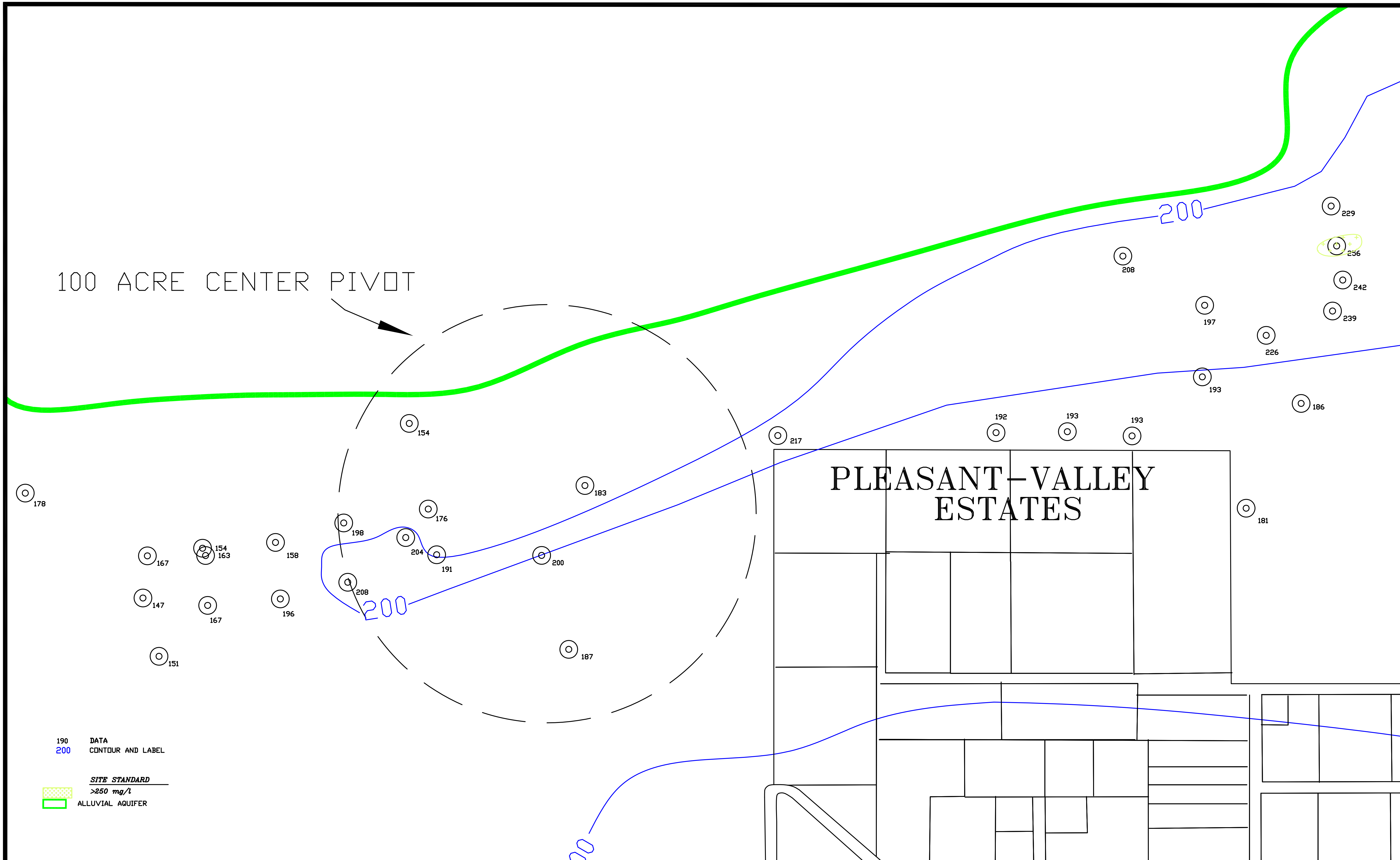

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FIGURE 4.3-36C. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

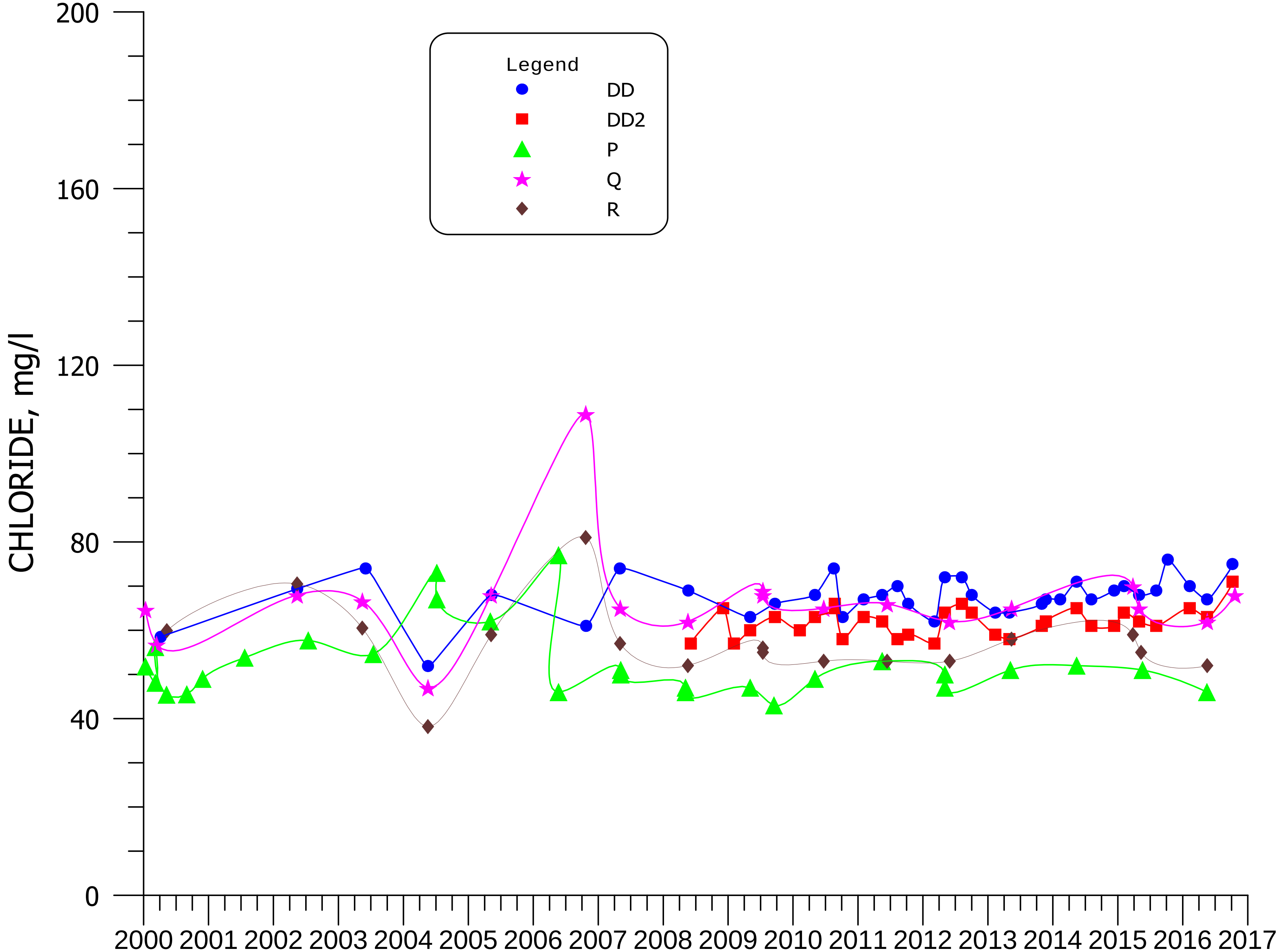

FIGURE 4.3-37. CHLORIDE CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

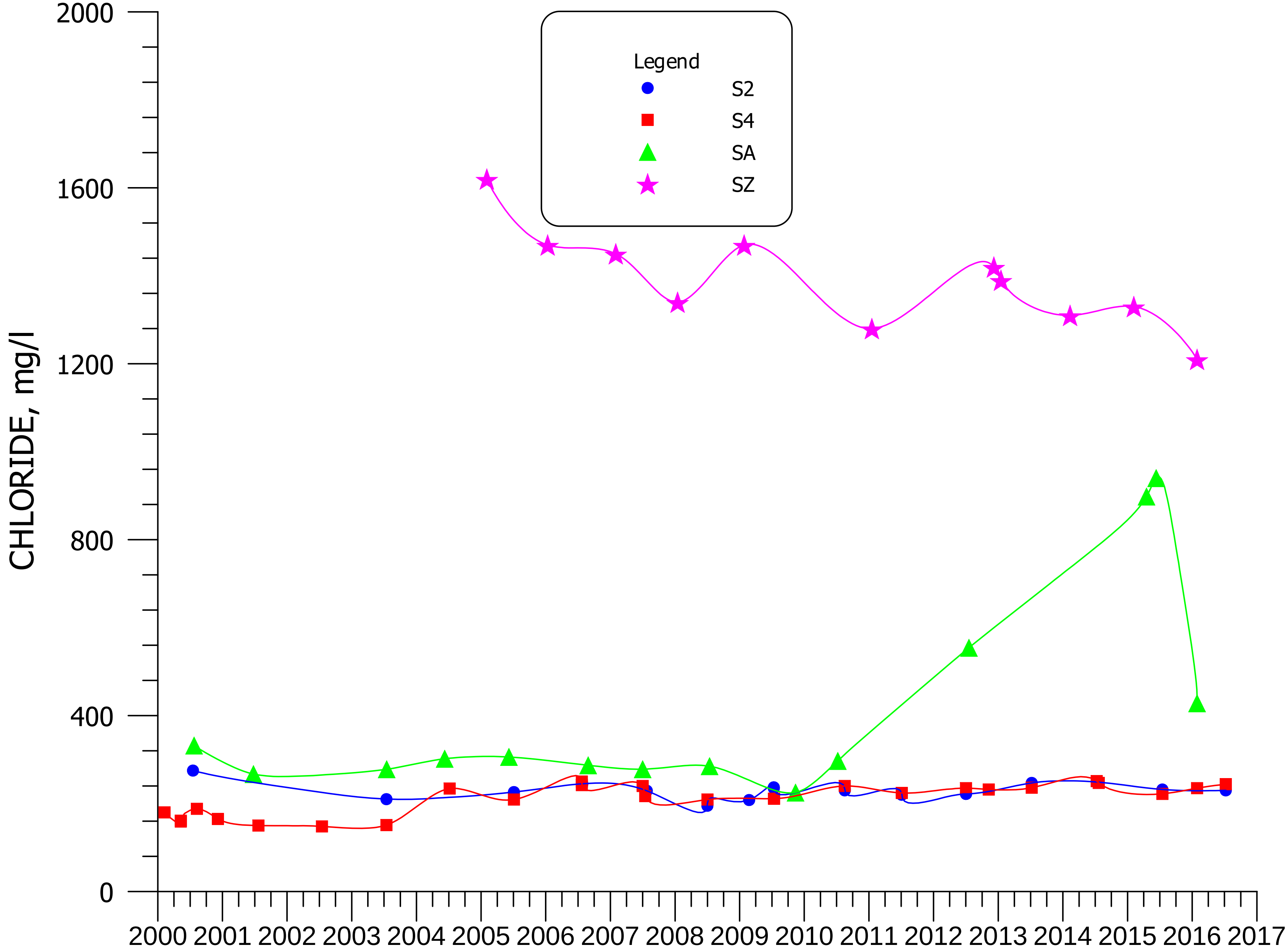

FIGURE 4.3-38. CHLORIDE CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

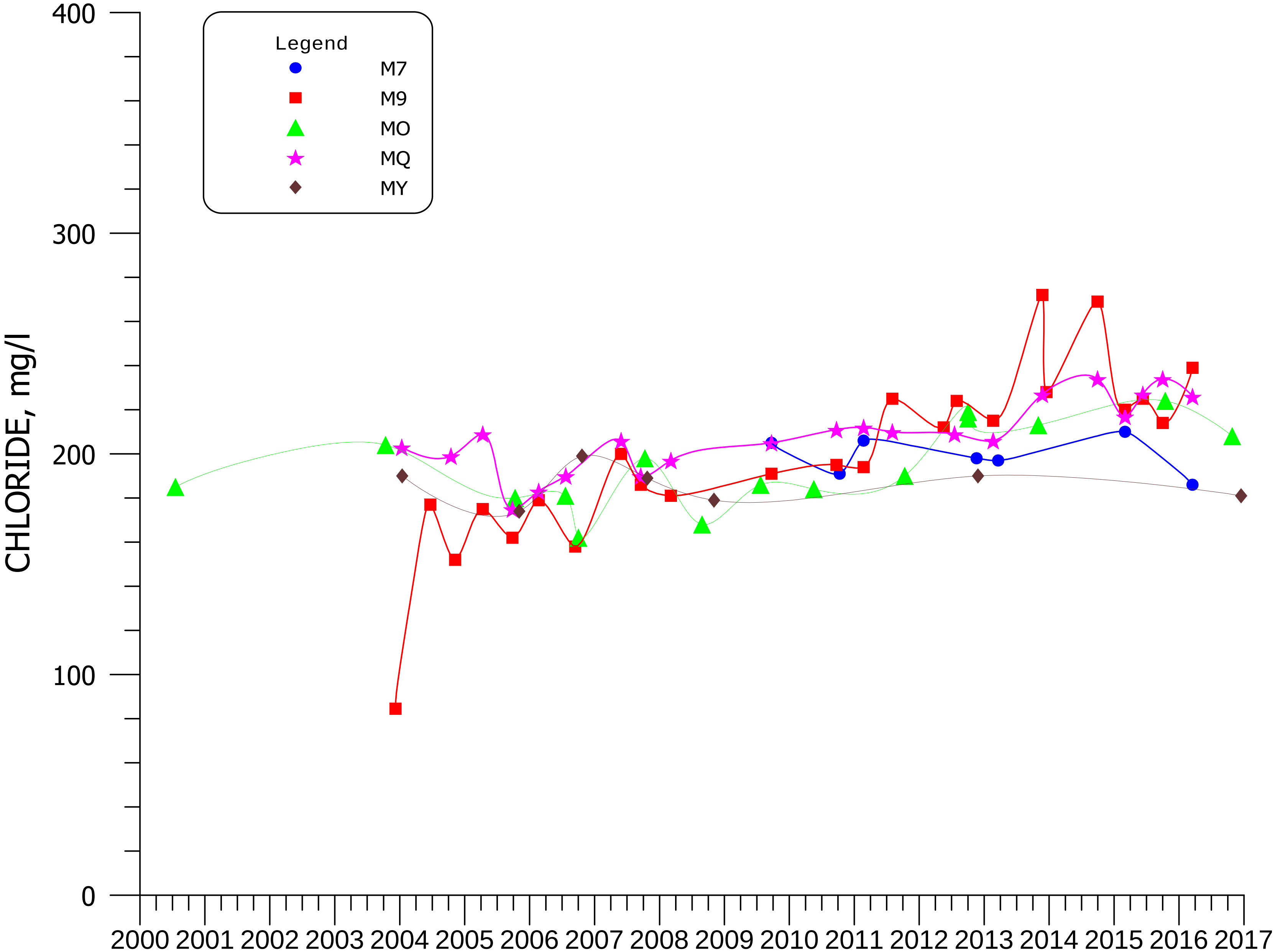

FIGURE 4.3-39. CHLORIDE CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

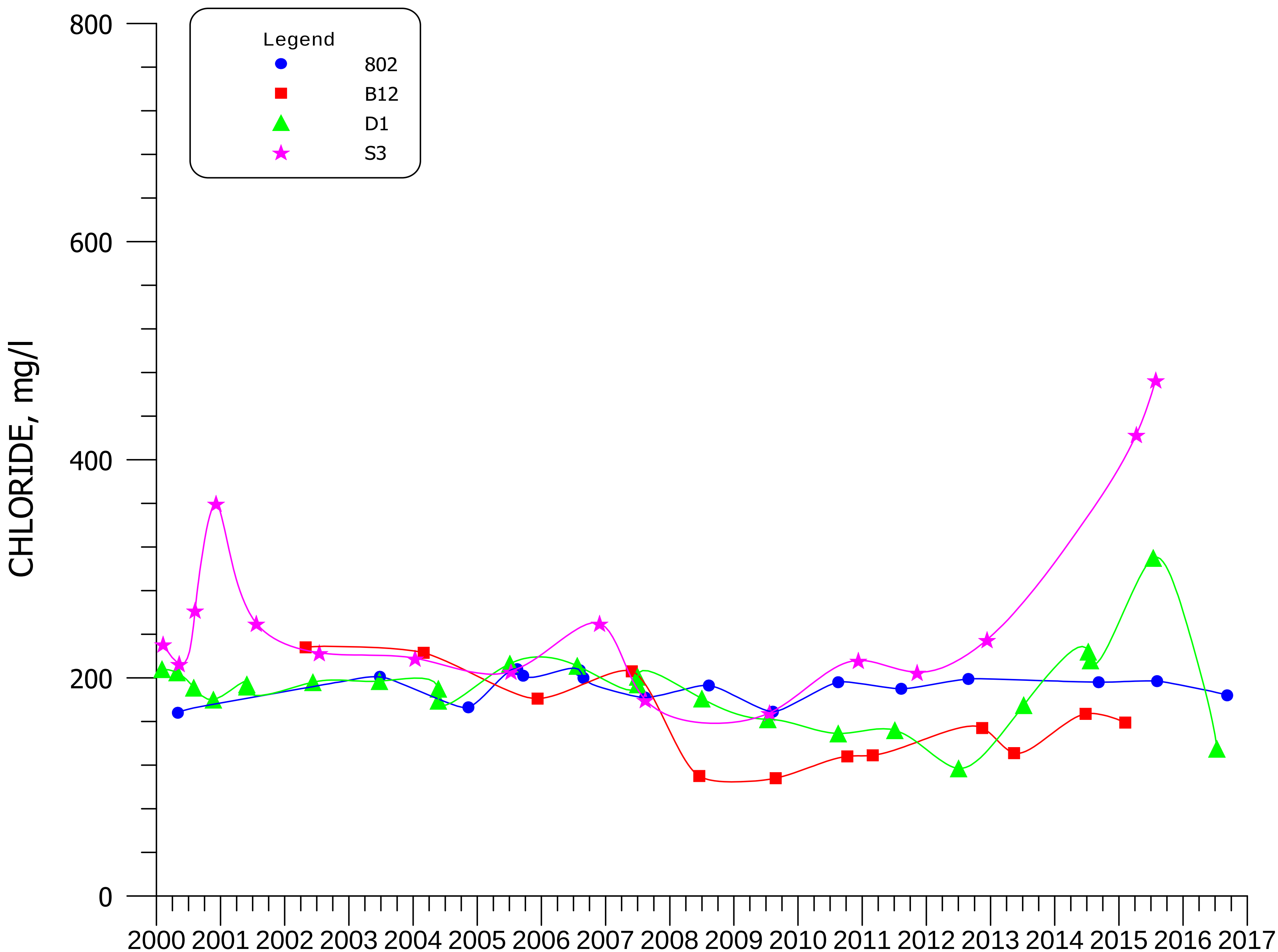

FIGURE 4.3-40. CHLORIDE CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

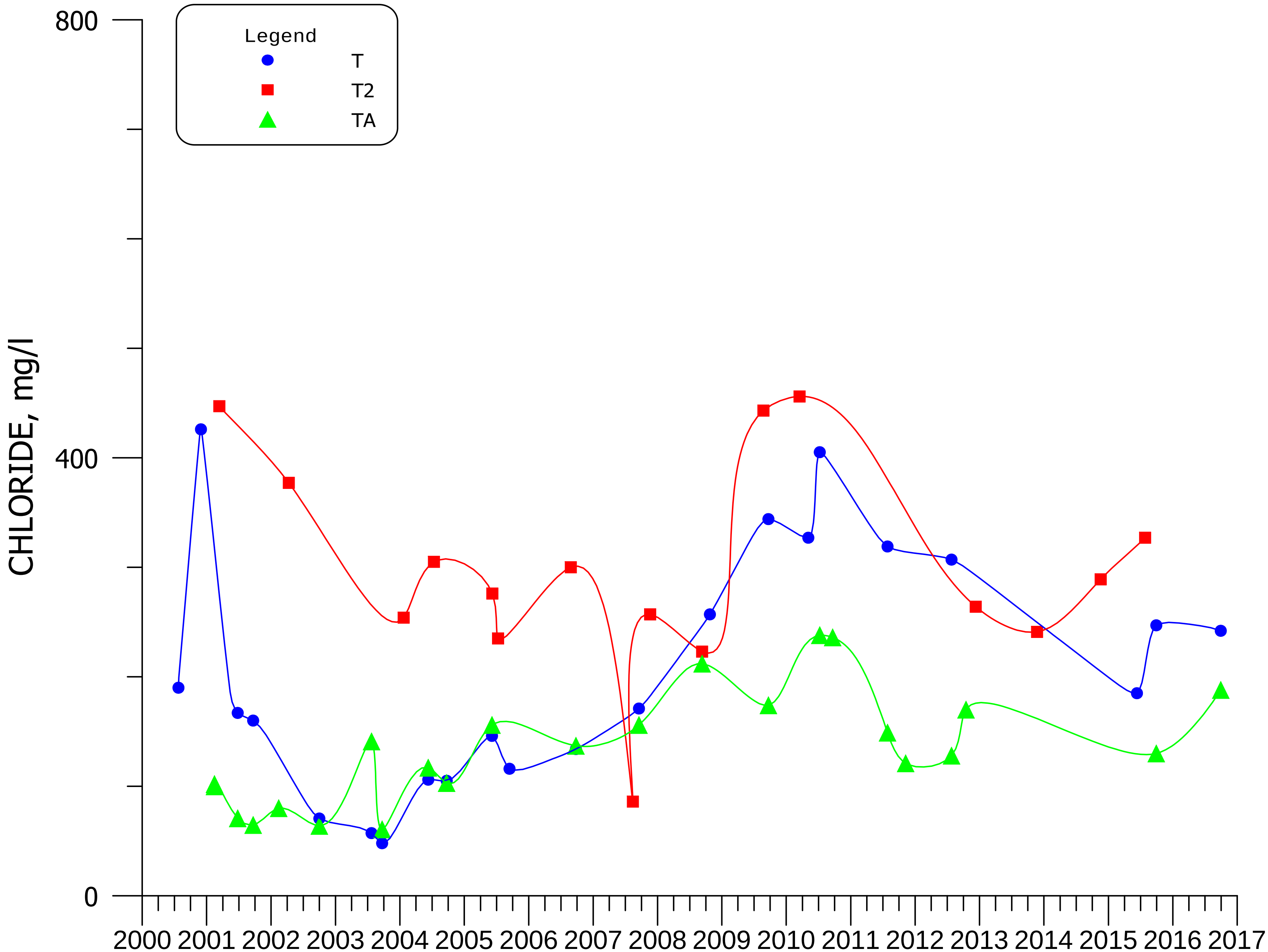

FIGURE 4.3-41. CHLORIDE CONCENTRATIONS FOR WELLS T, T2, AND TA.

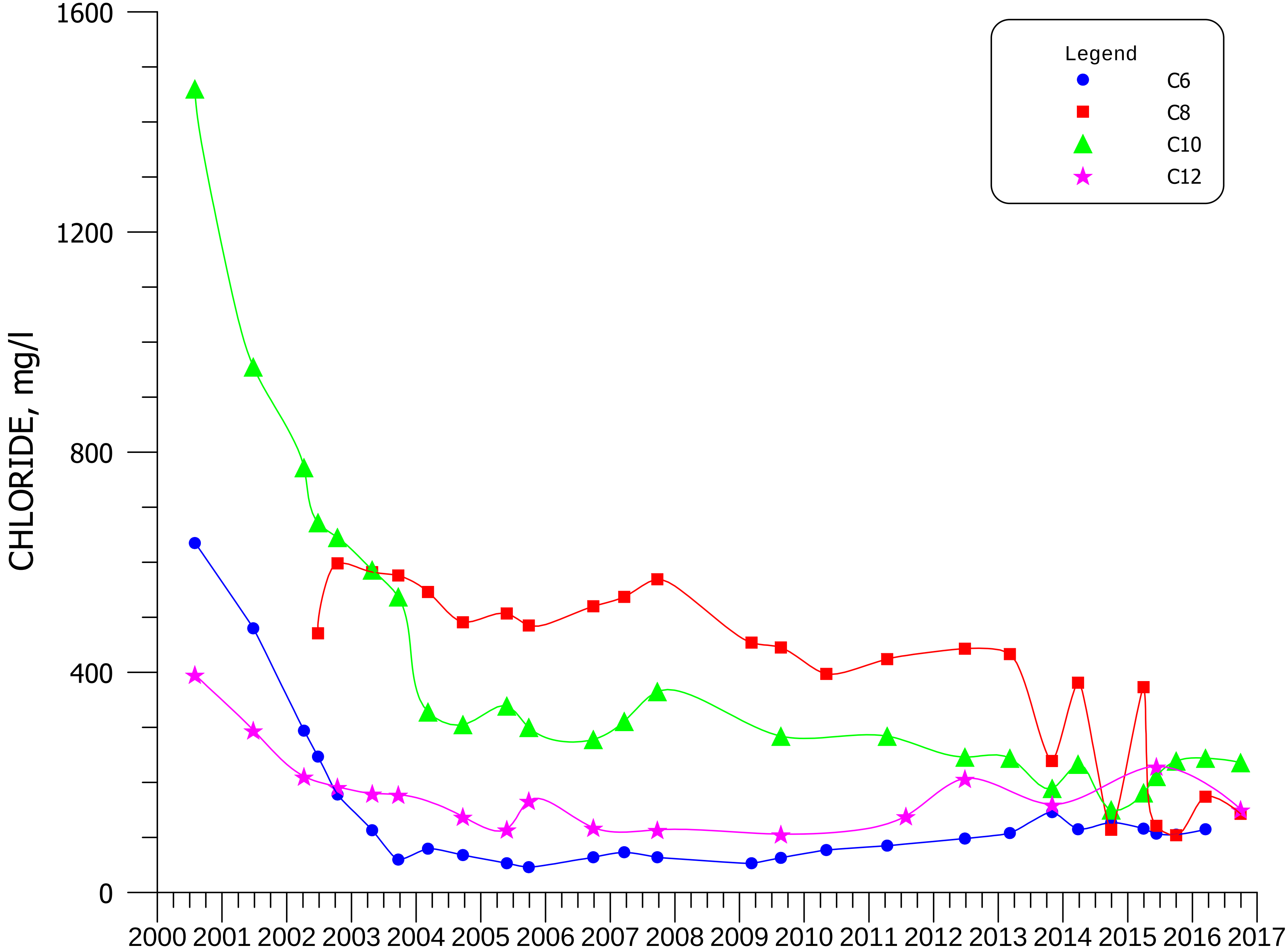

FIGURE 4.3-42. CHLORIDE CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

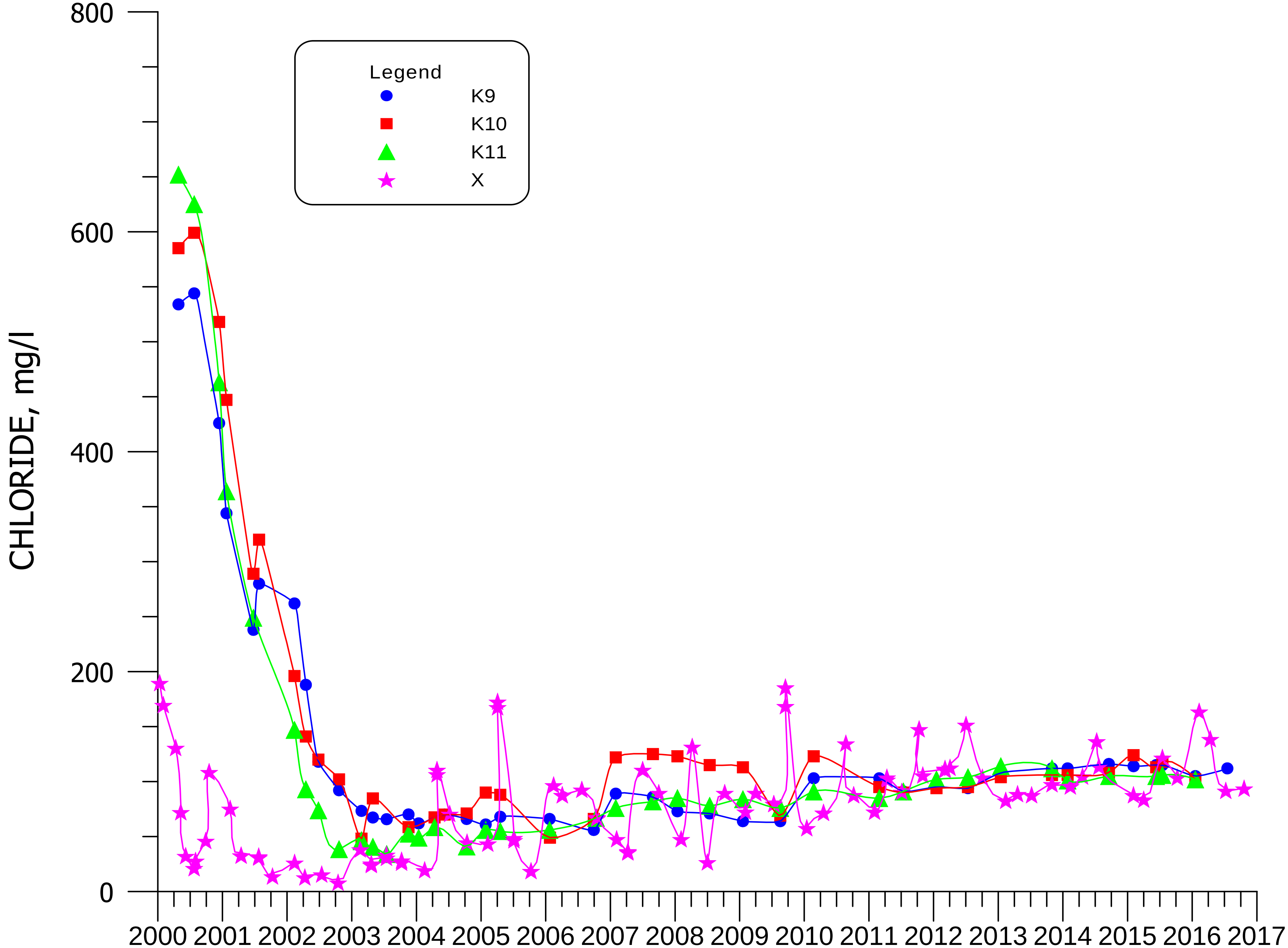

FIGURE 4.3-43. CHLORIDE CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

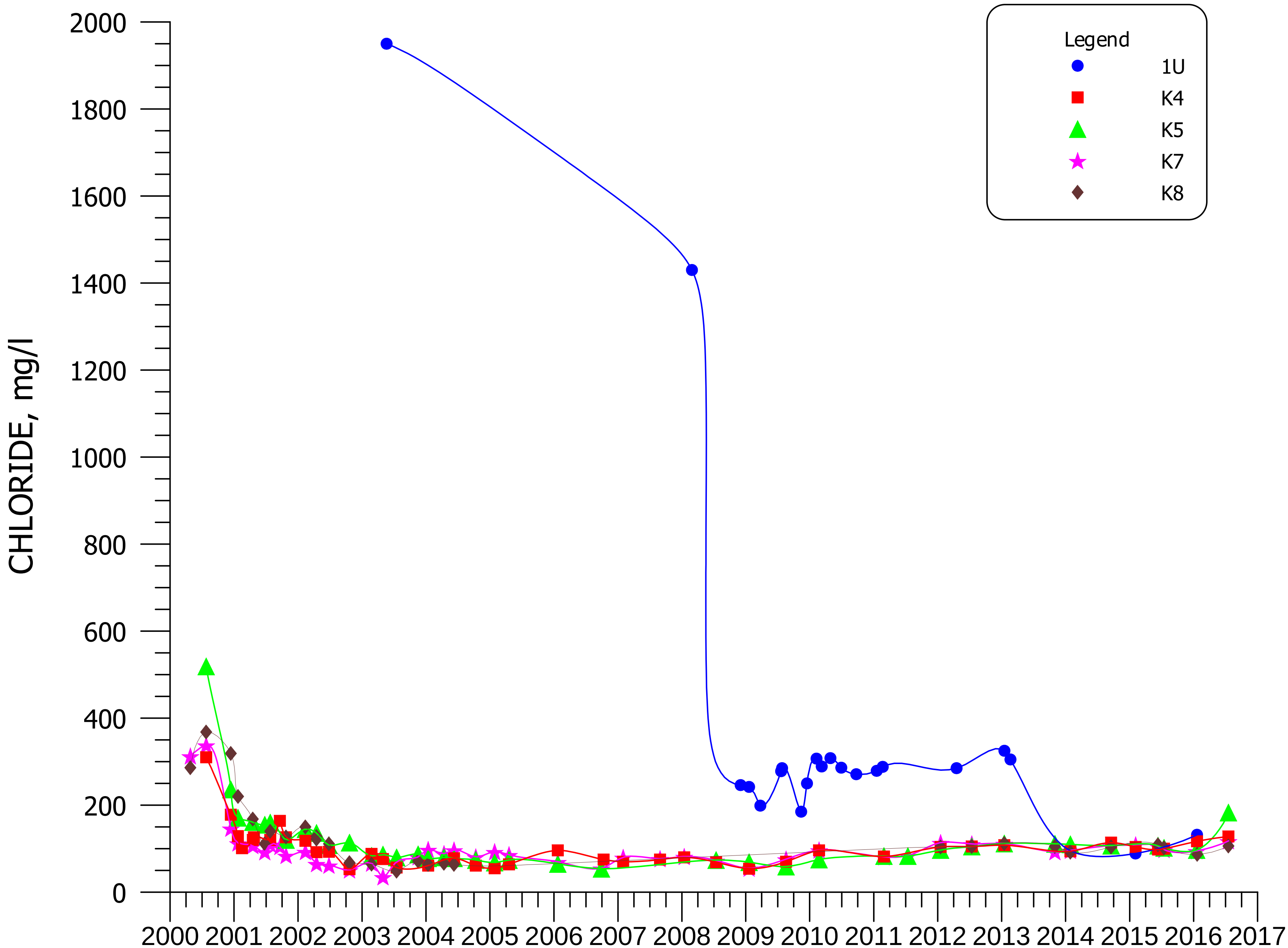

FIGURE 4.3-44. CHLORIDE CONCENTRATIONS FOR WELLS 1U, K4, K5, K7, AND K8.

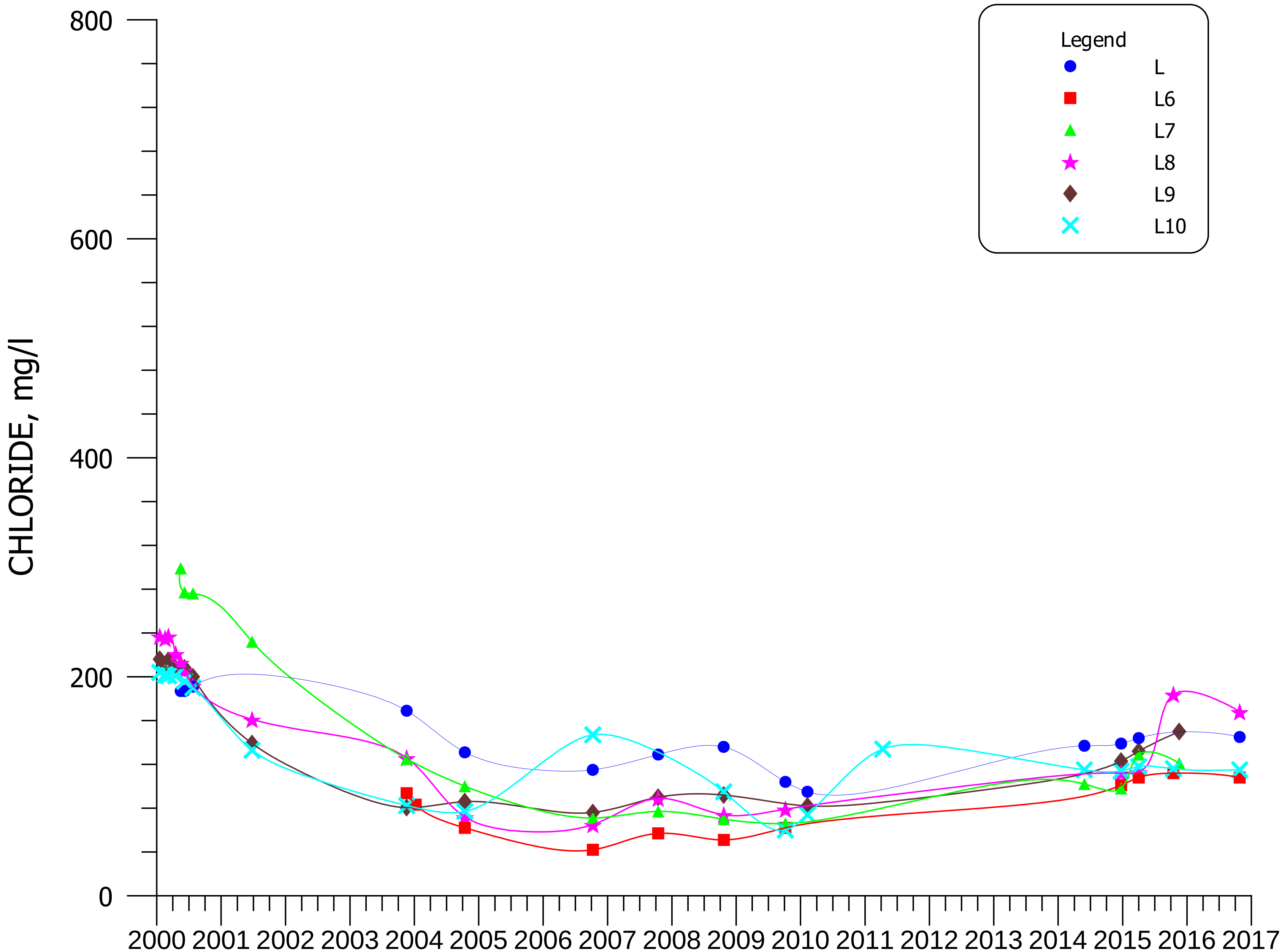

FIGURE 4.3-45. CHLORIDE CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

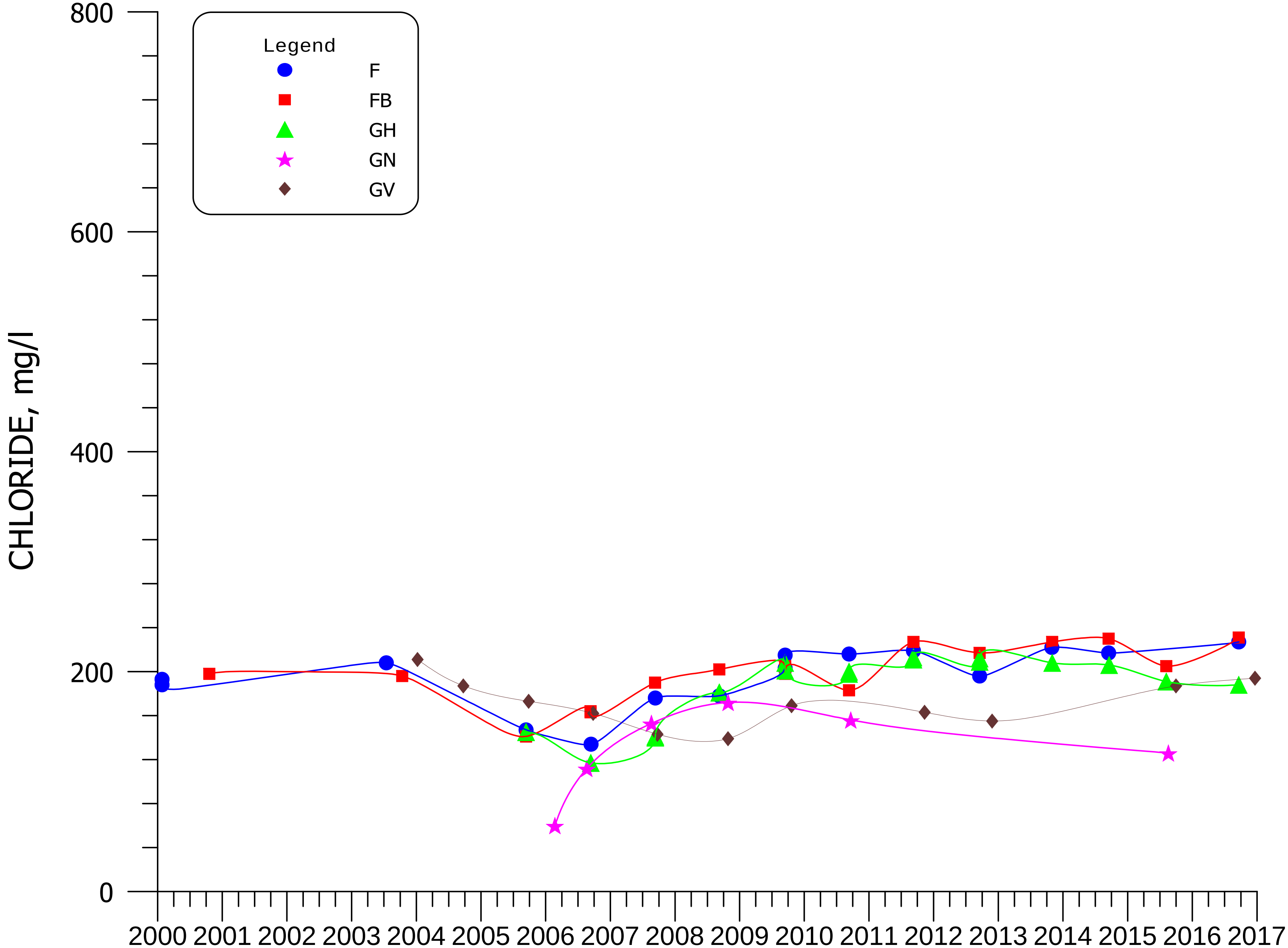

FIGURE 4.3-46. CHLORIDE CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

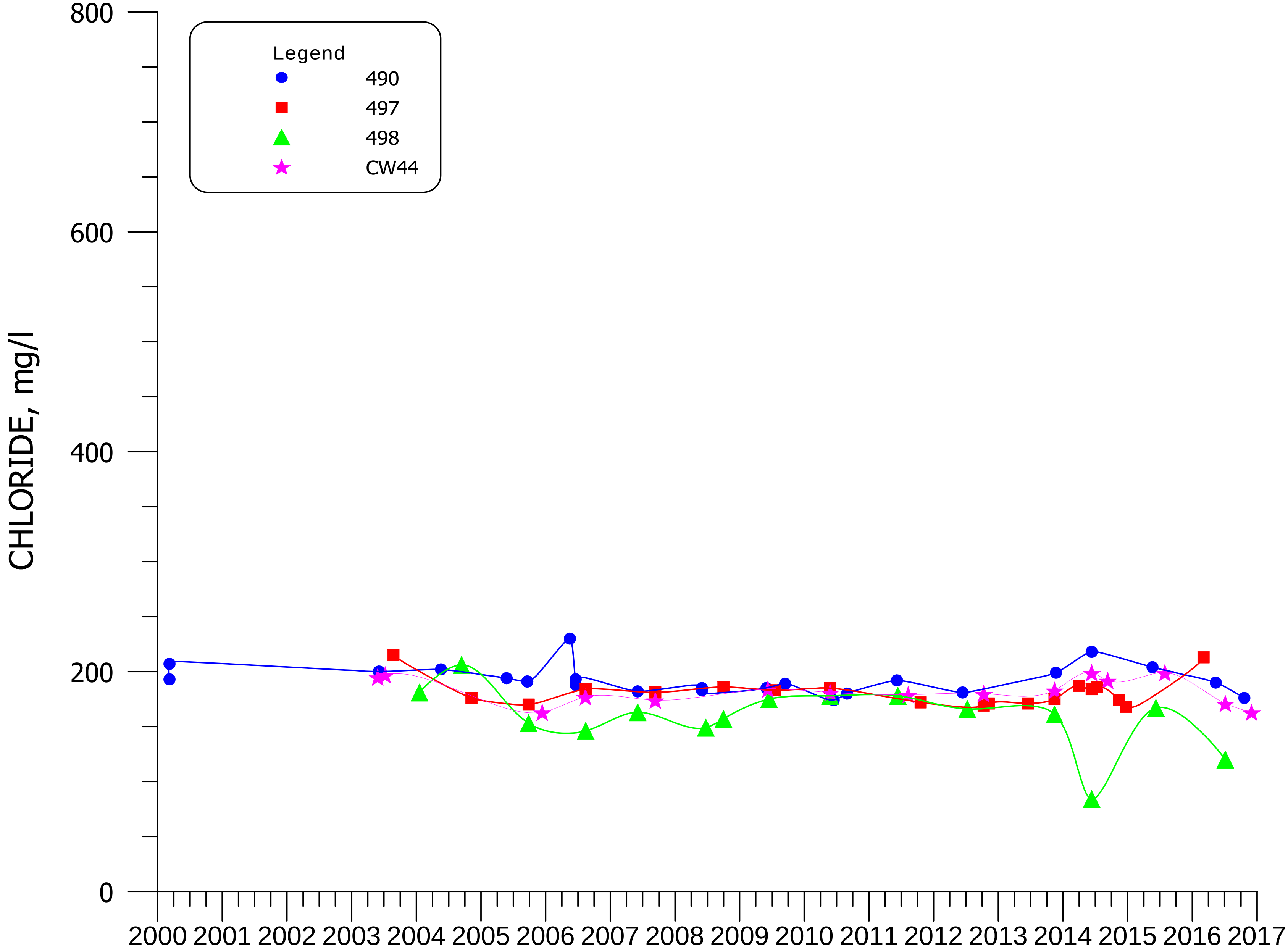

FIGURE 4.3-47. CHLORIDE CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

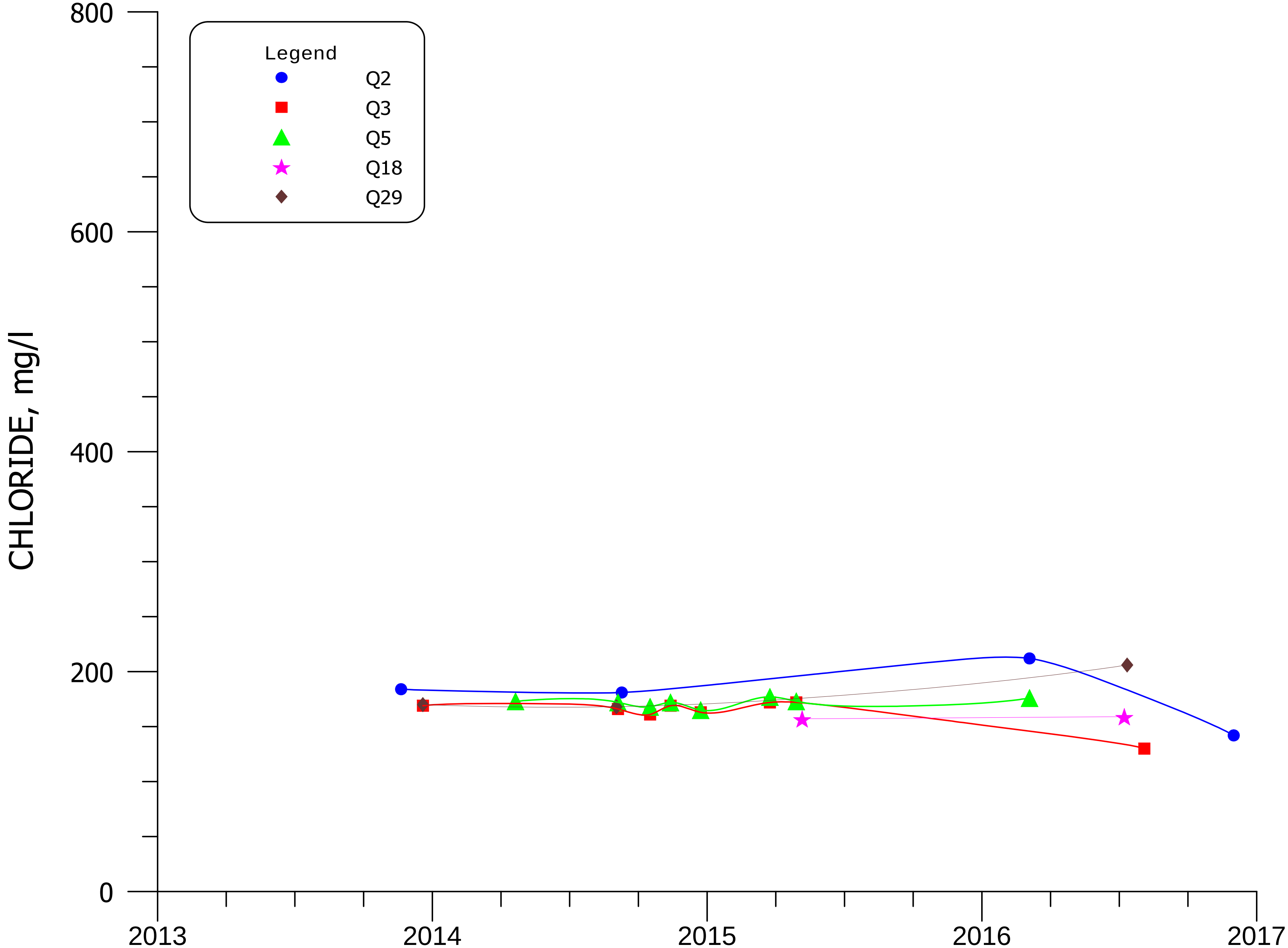

FIGURE 4.3-47A. CHLORIDE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

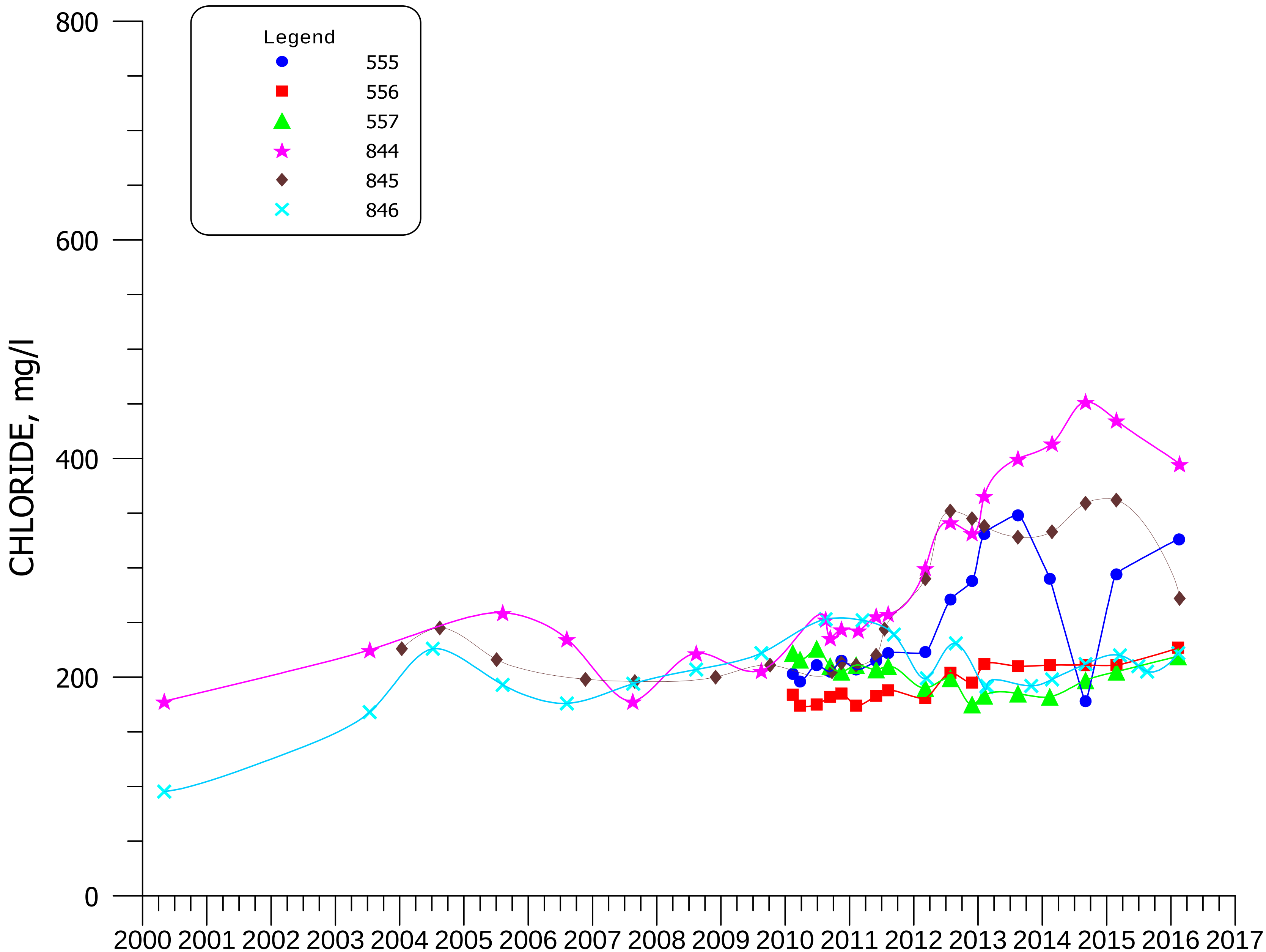

FIGURE 4.3-48. CHLORIDE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

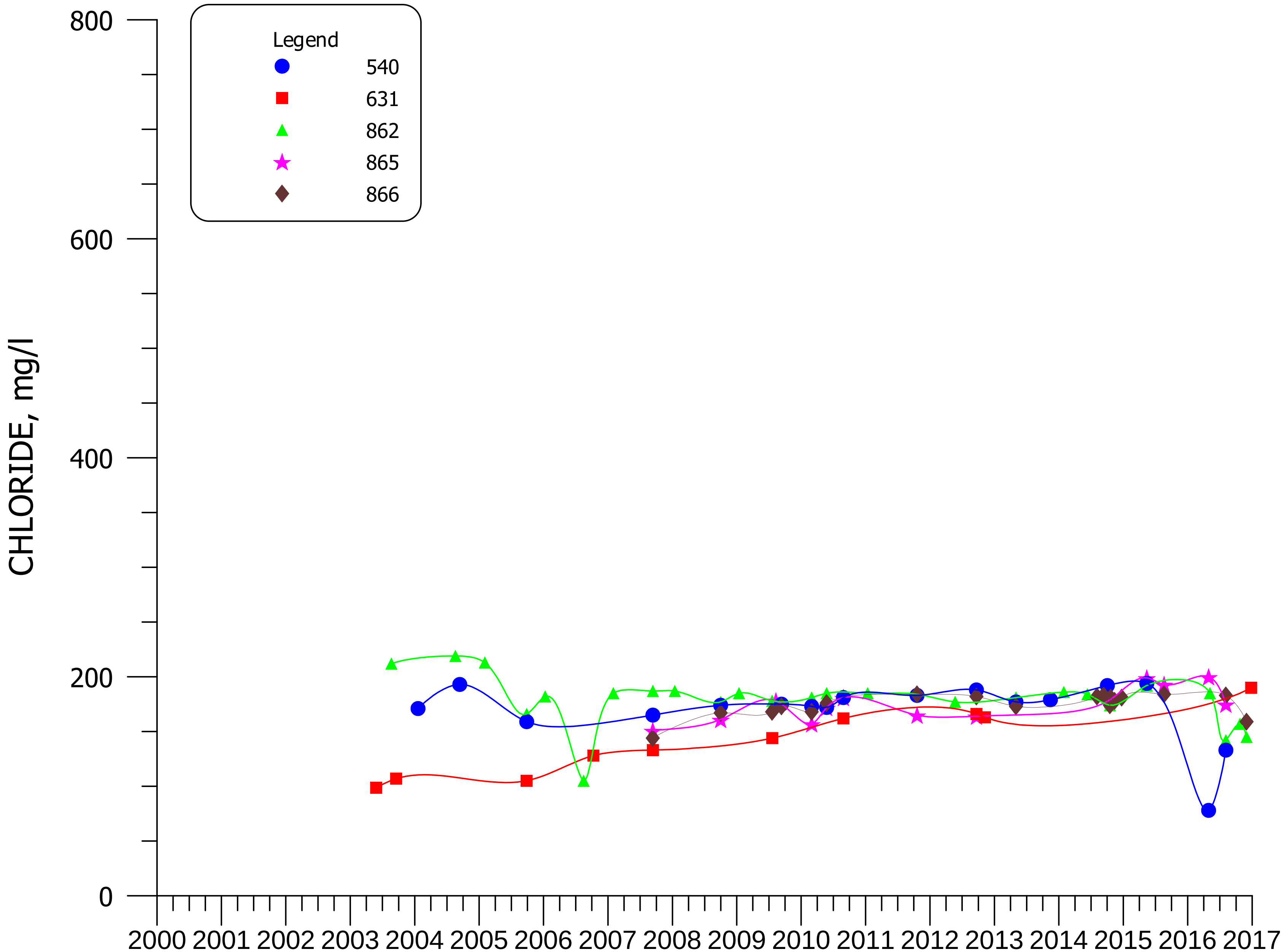

FIGURE 4.3-49. CHLORIDE CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

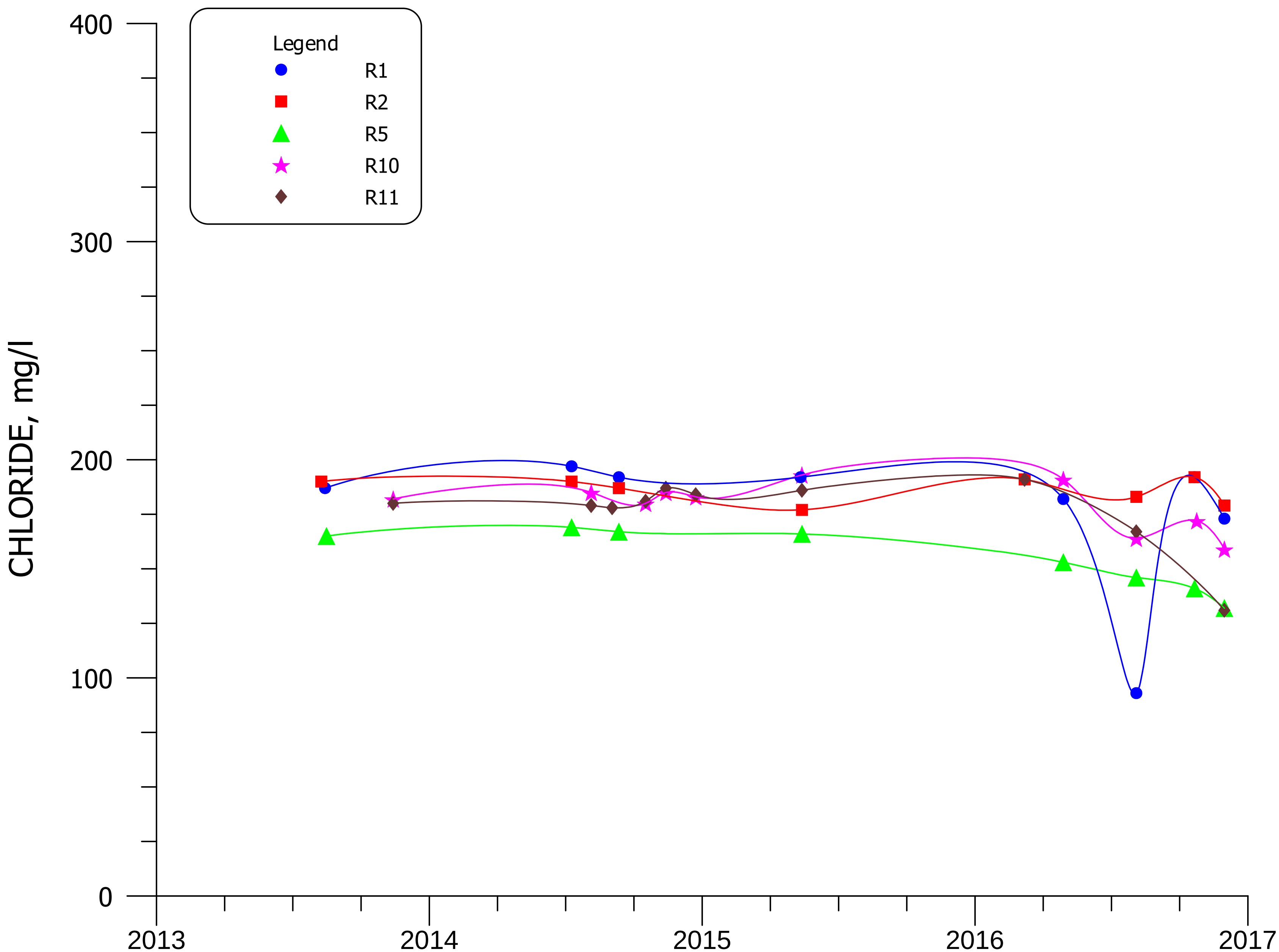

FIGURE 4.3-49A. CHLORIDE CONCENTRATIONS FOR WELLS R1, R2, R5, R10, AND R11.

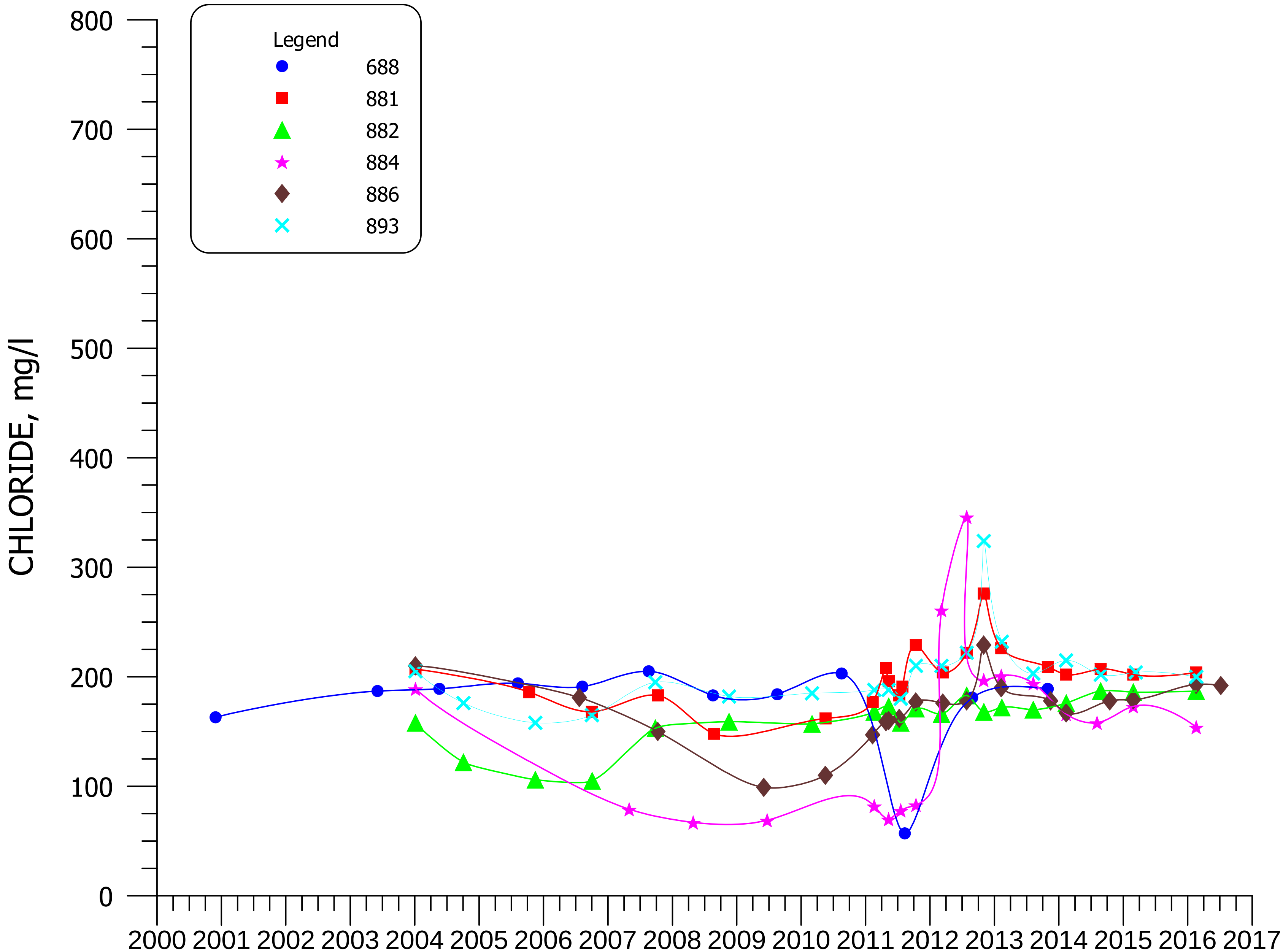

FIGURE 4.3-50. CHLORIDE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

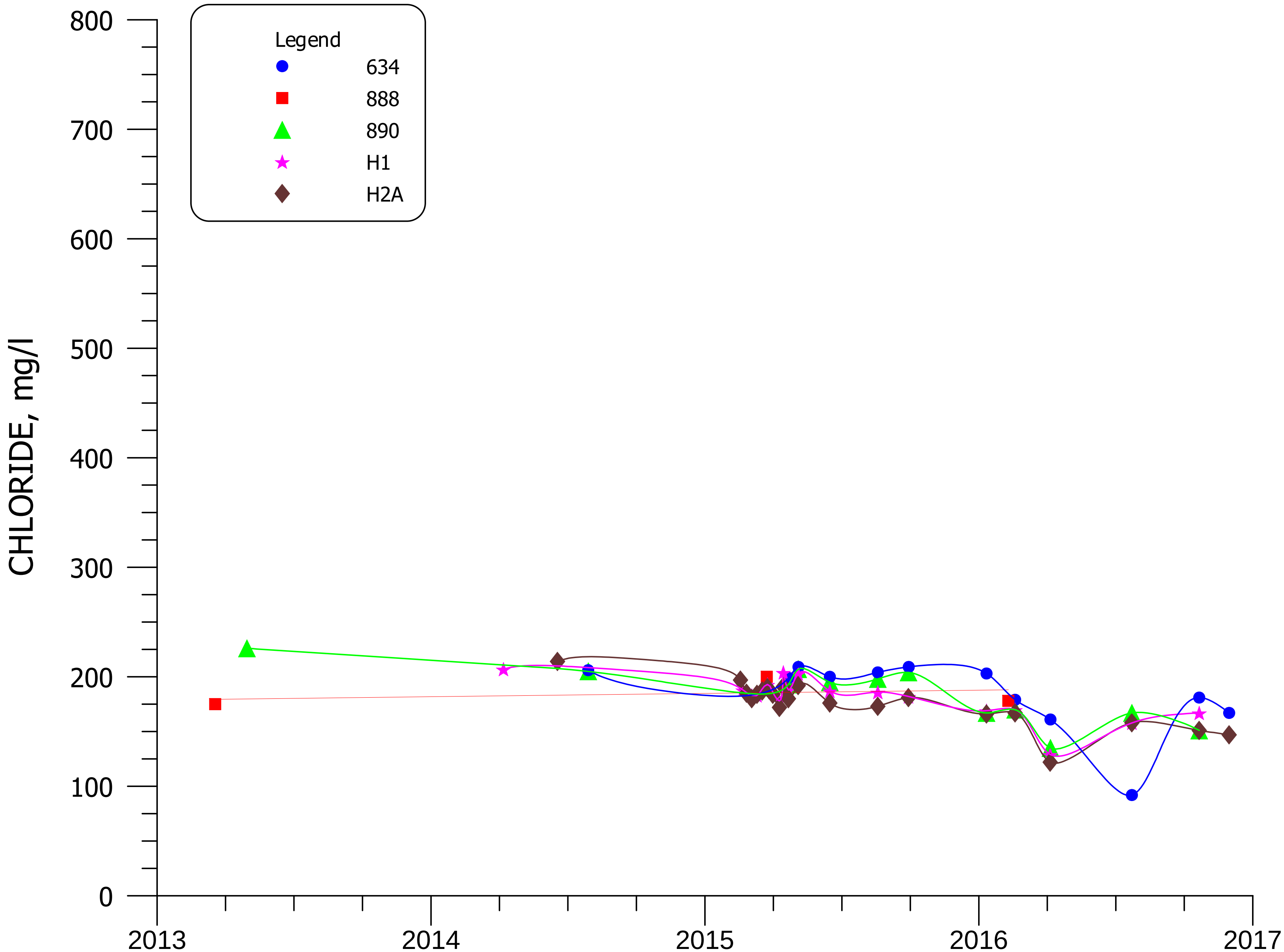

FIGURE 4.3-50A. CHLORIDE CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

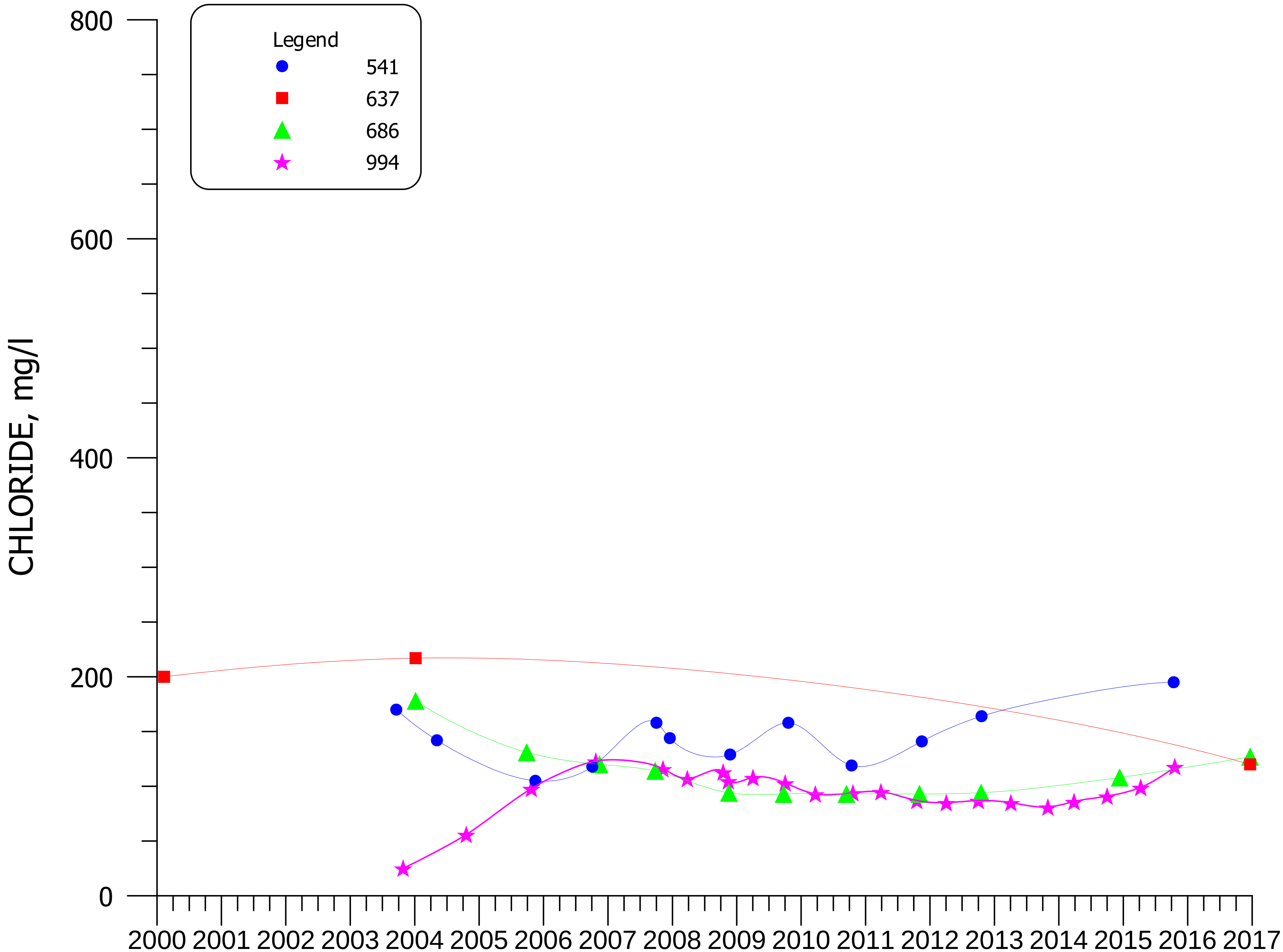

FIGURE 4.3-51. CHLORIDE CONCENTRATIONS FOR WELLS 541, 637, 686, AND 994.

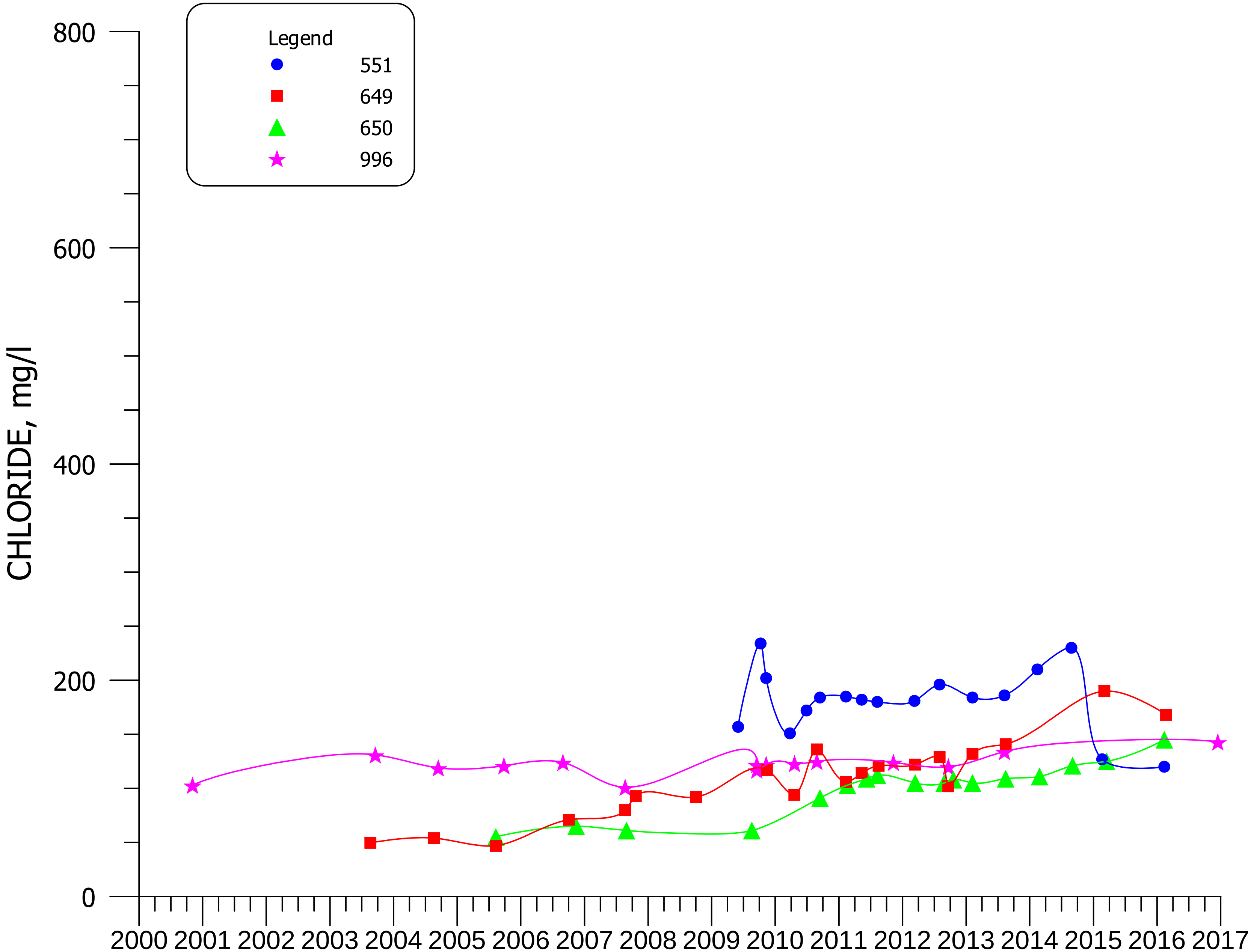

FIGURE 4.3-52. CHLORIDE CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

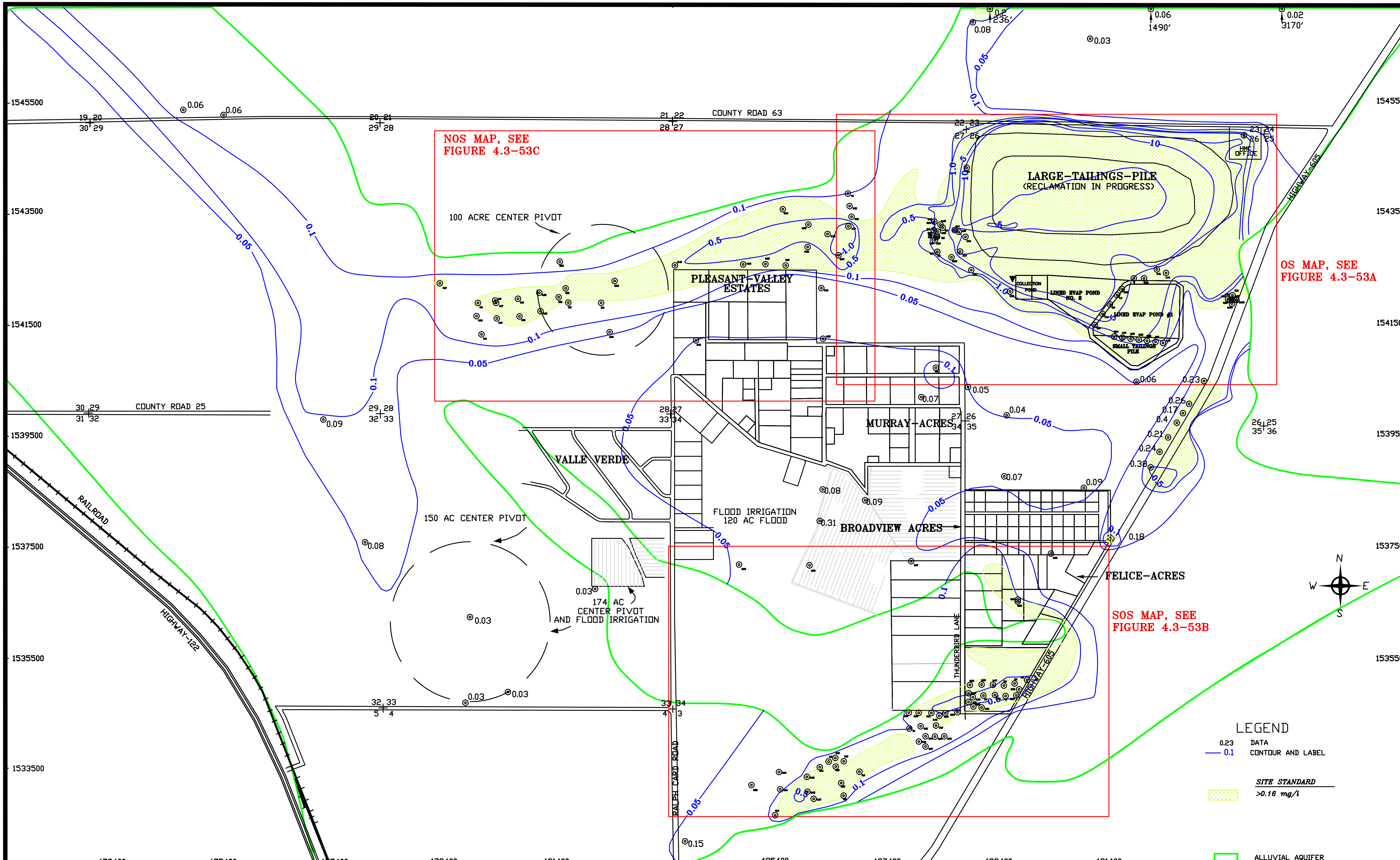

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FIGURE 4.3-53. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l

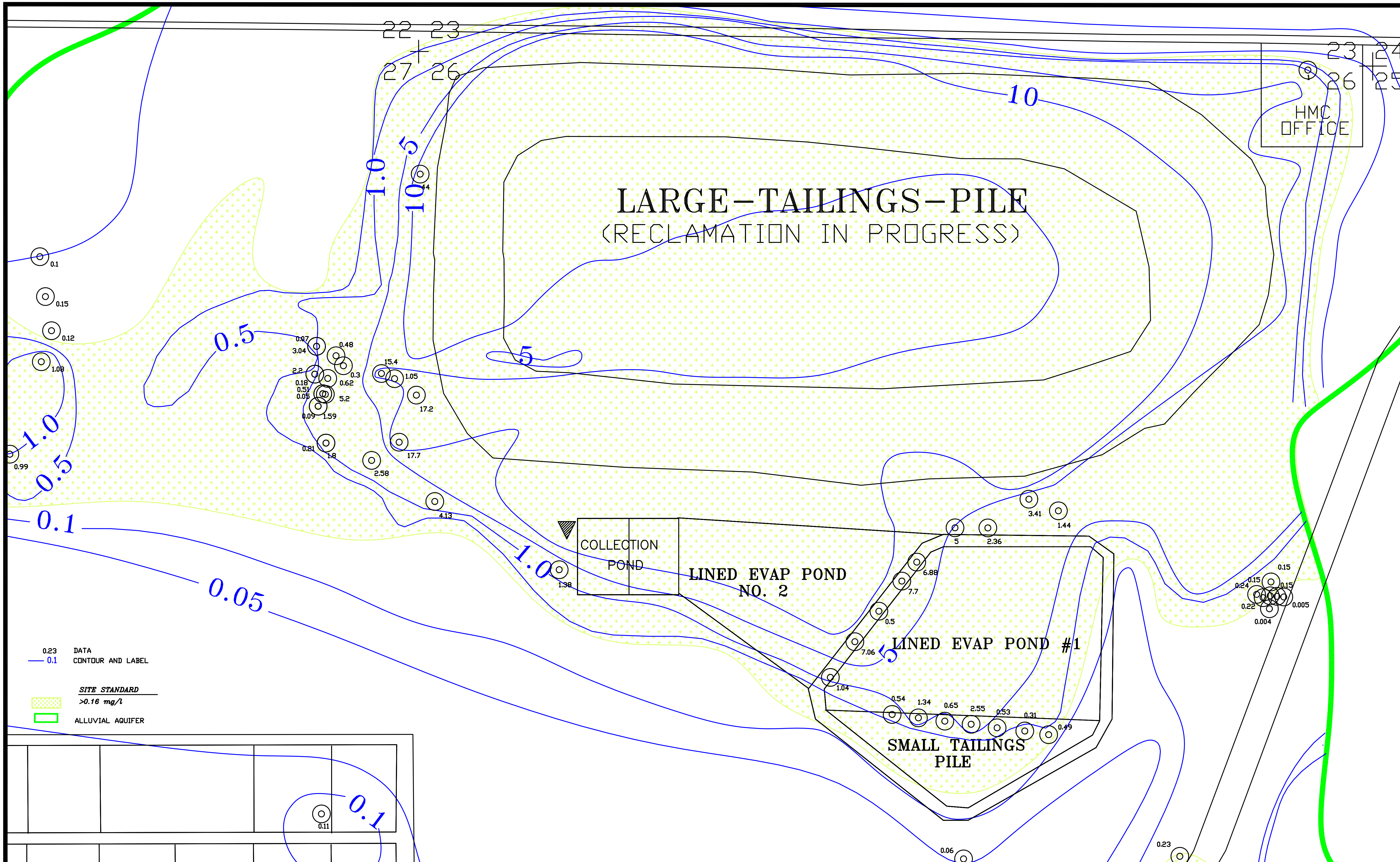

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FIGURE 4.3-53A. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

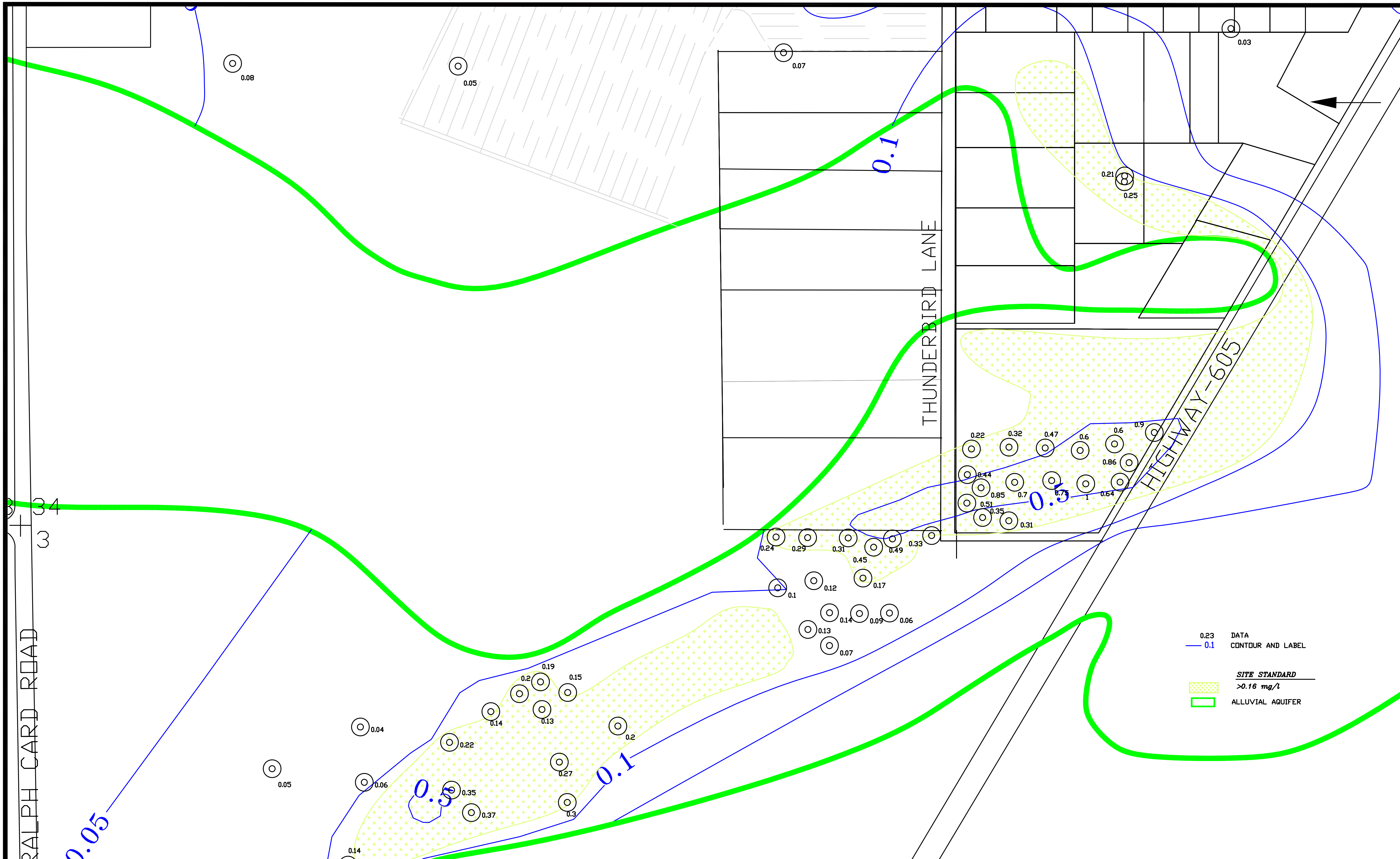

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FIGURE 4.3-53B. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l

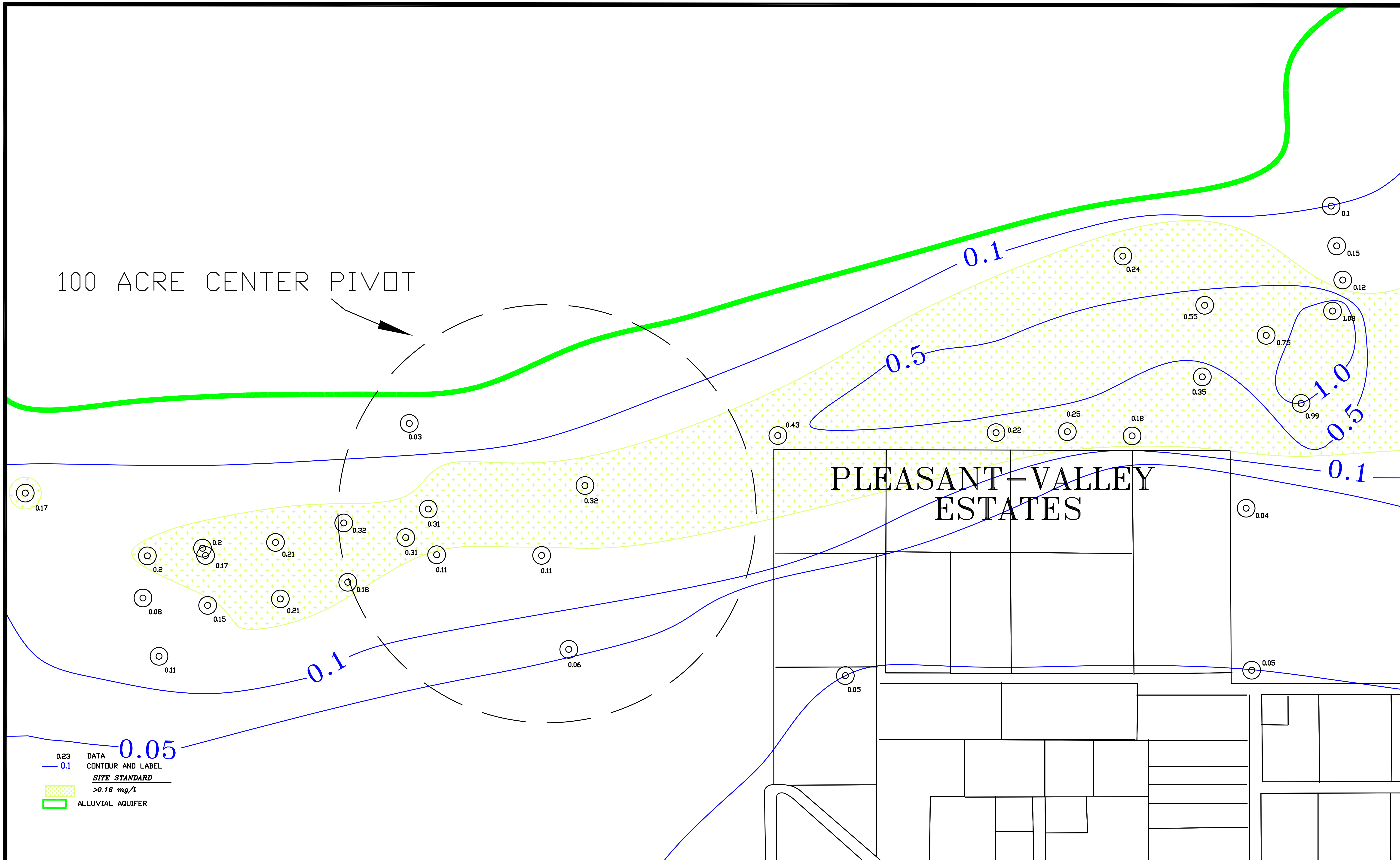

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FIGURE 4.3-53C. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

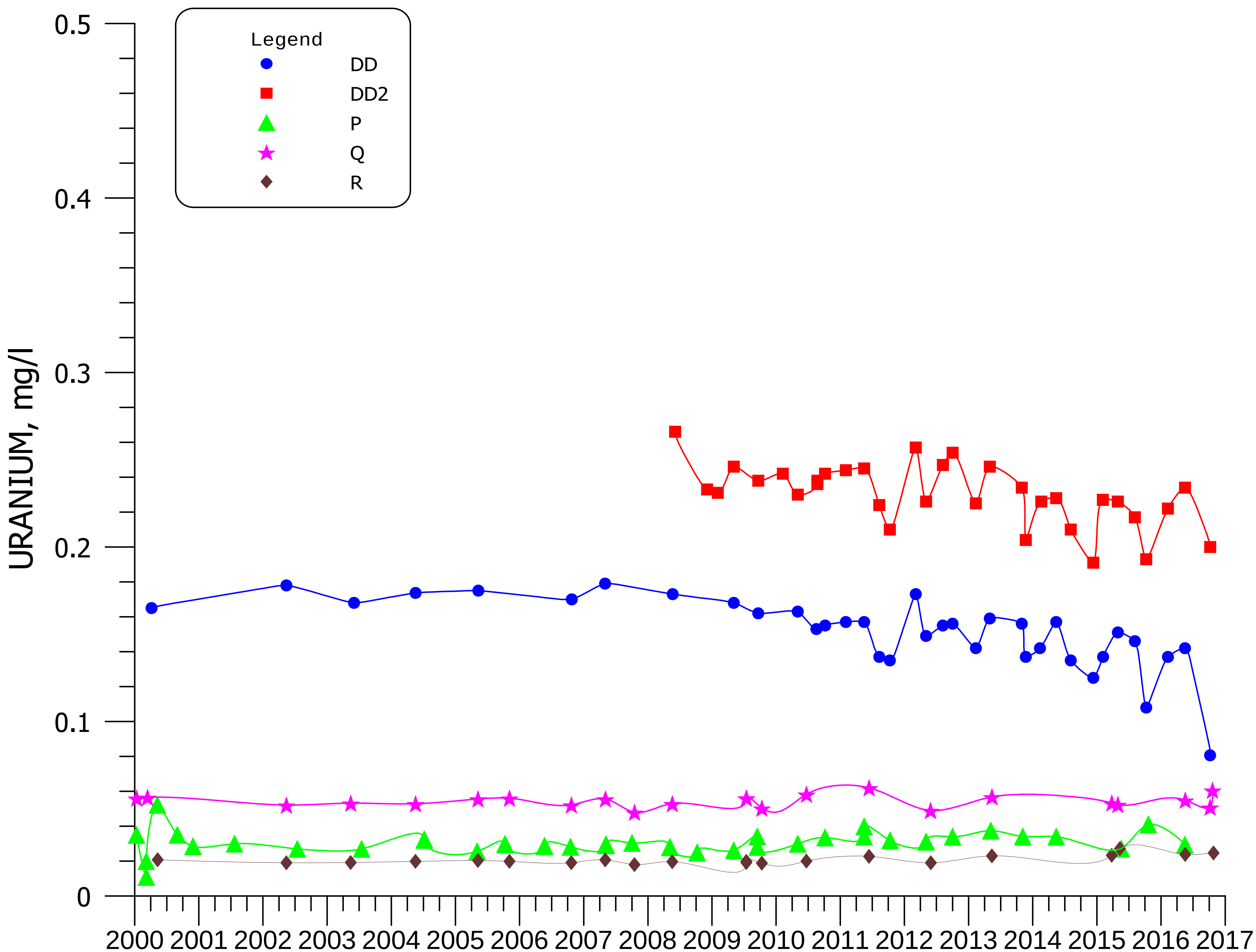

FIGURE 4.3-54. URANIUM CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

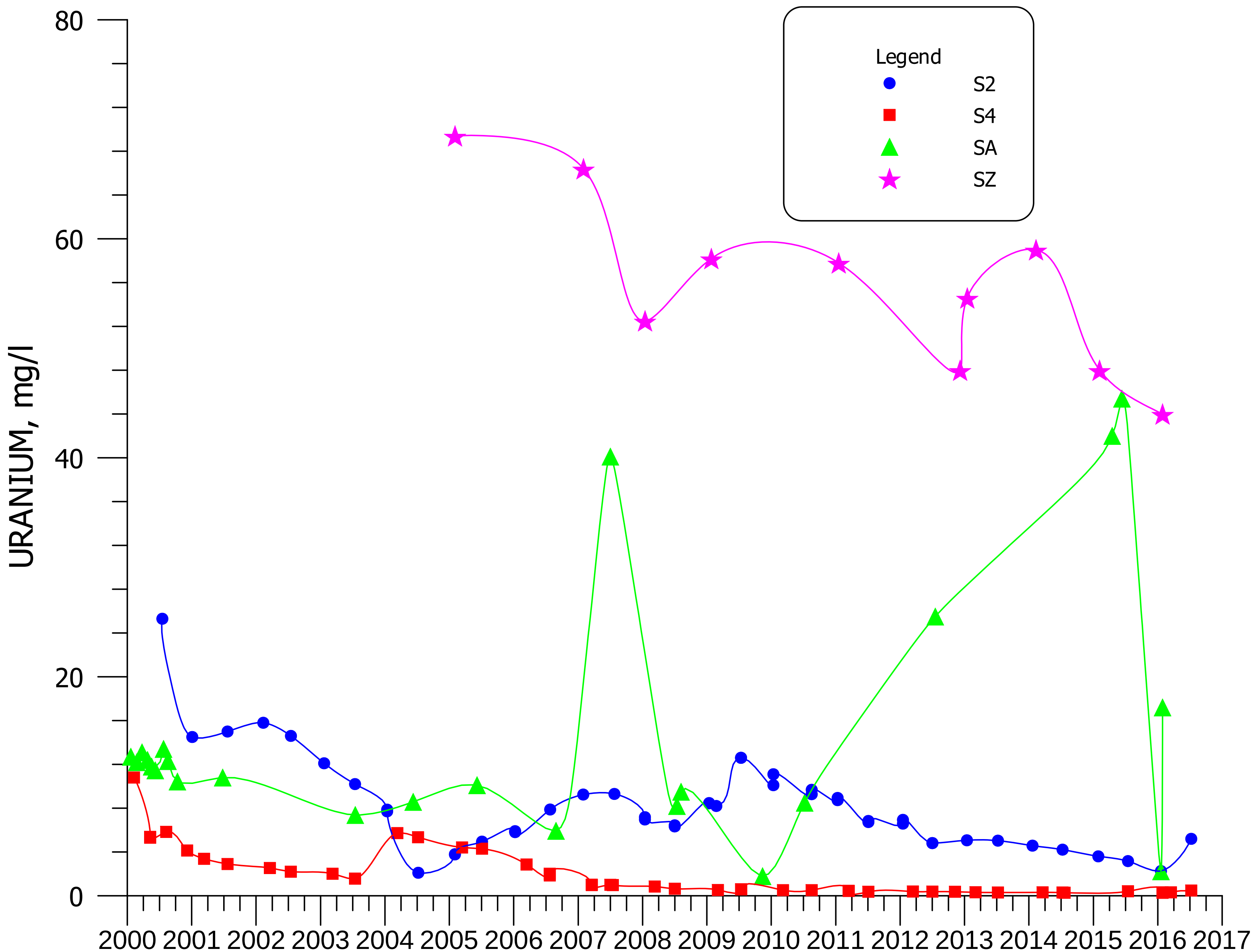

FIGURE 4.3-55. URANIUM CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

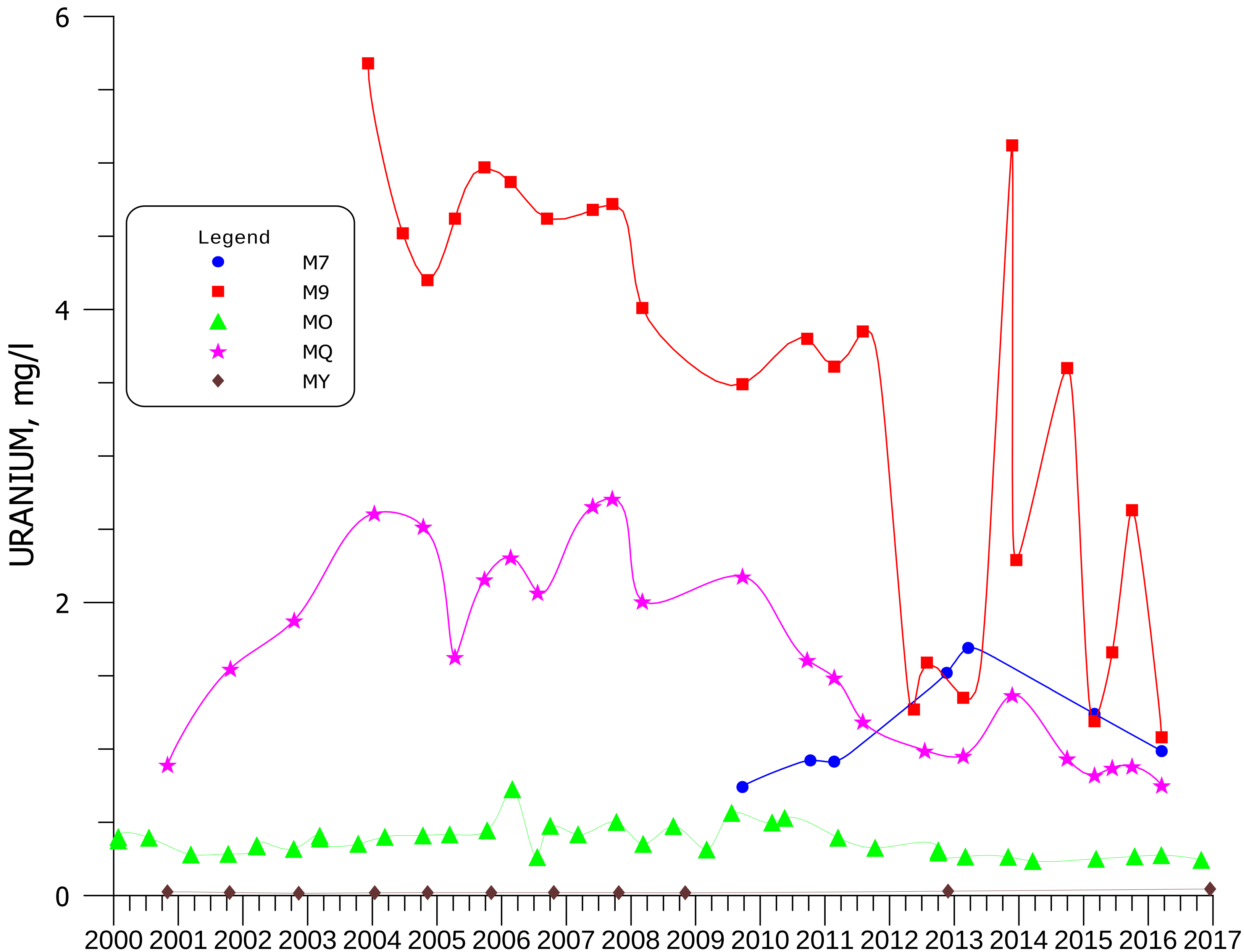

FIGURE 4.3-56. URANIUM CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

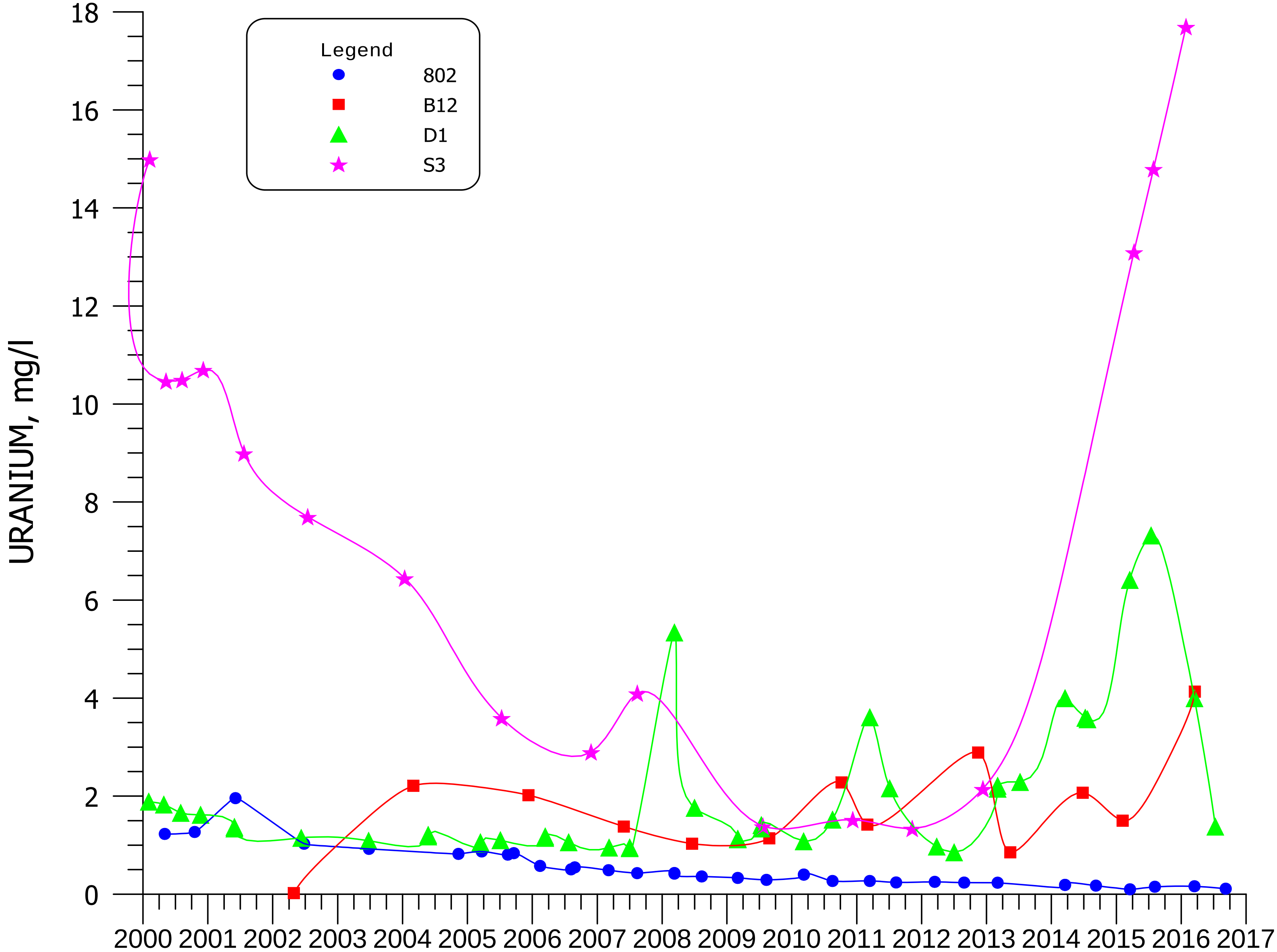

FIGURE 4.3-57. URANIUM CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

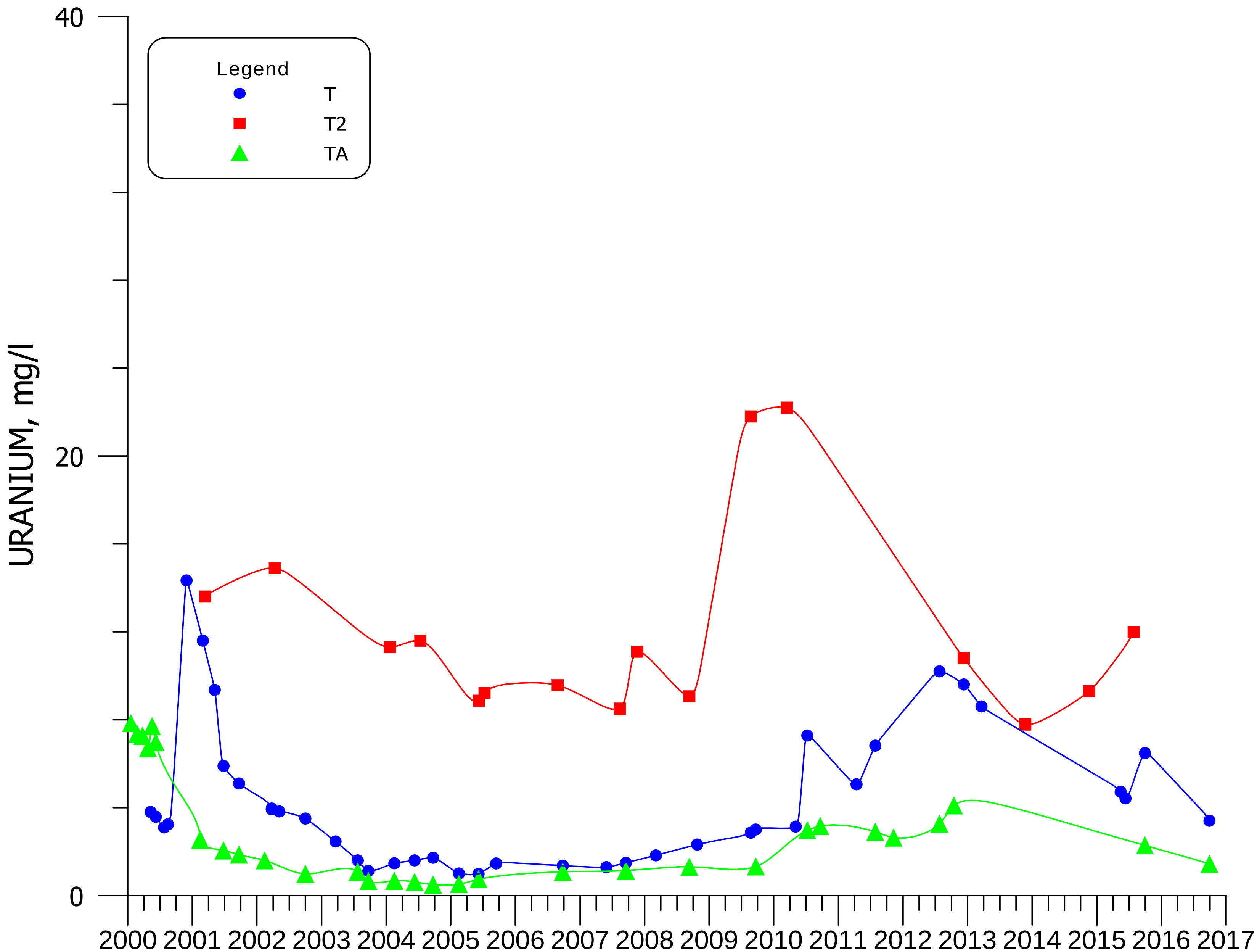

FIGURE 4.3-58. URANIUM CONCENTRATIONS FOR WELLS T, T2, AND TA .

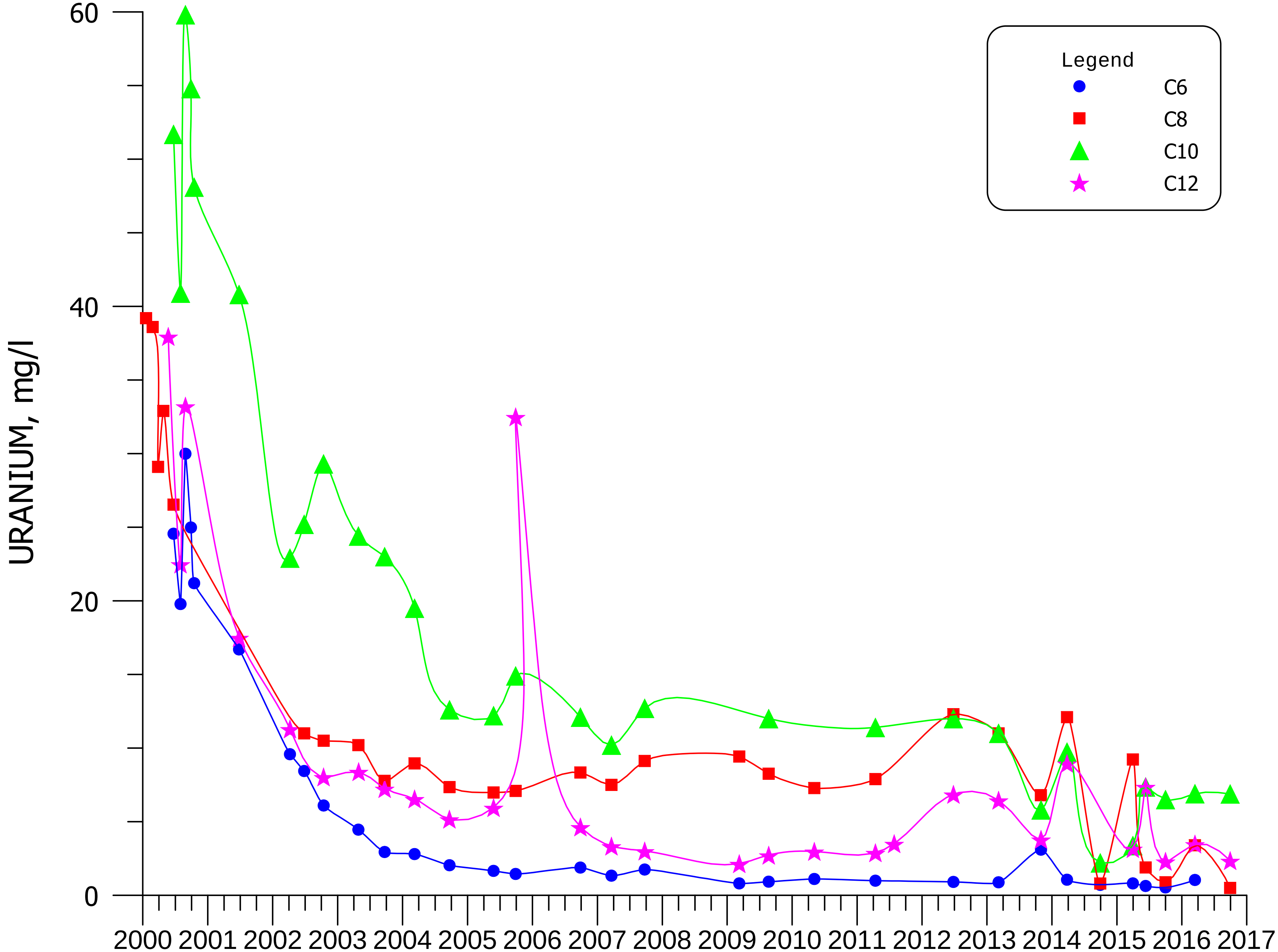

FIGURE 4.3-59. URANIUM CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

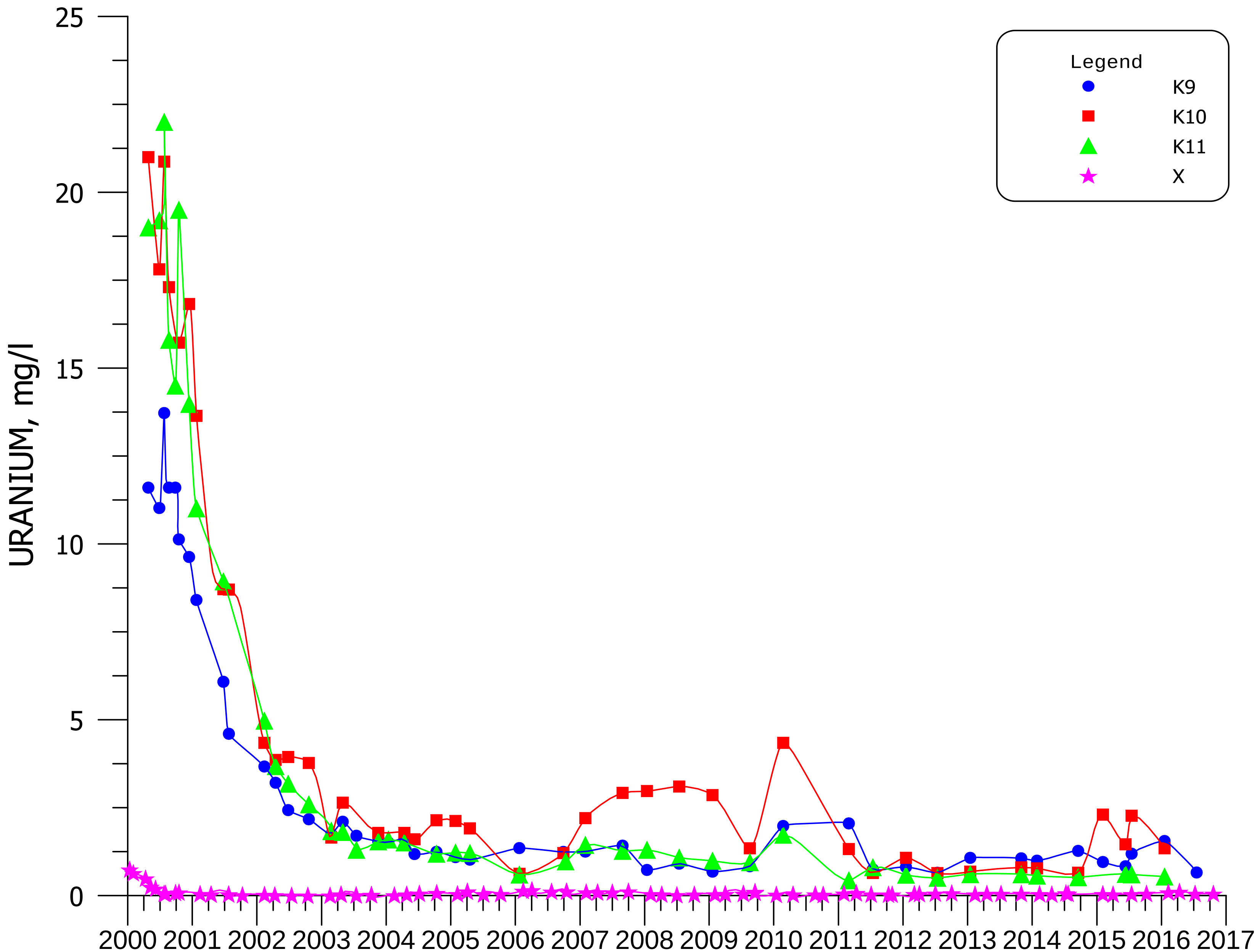

FIGURE 4.3-60. URANIUM CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

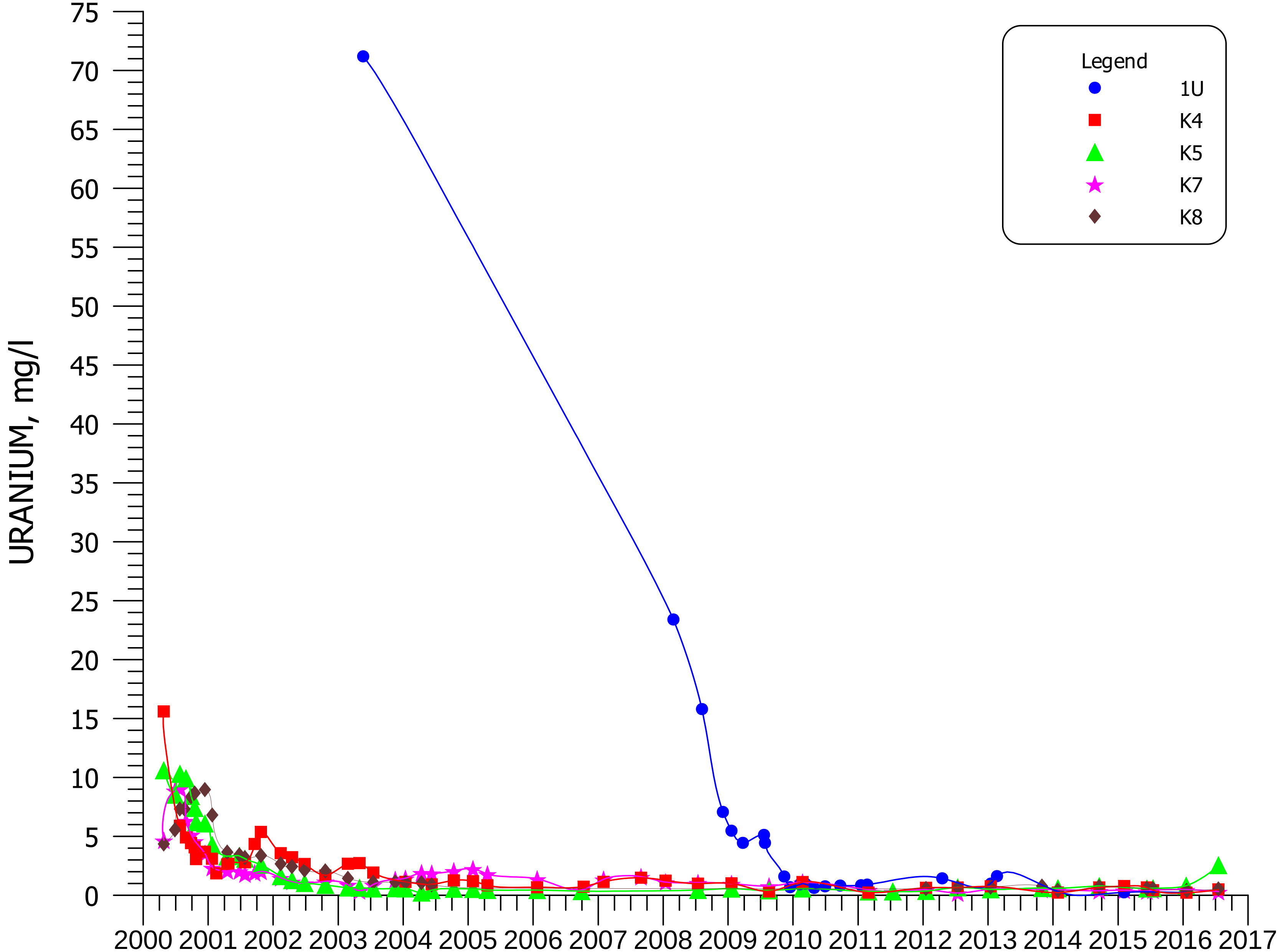

FIGURE 4.3-61. URANIUM CONCENTRATIONS FOR WELLS 1U, K4, K5, K7 AND K8.

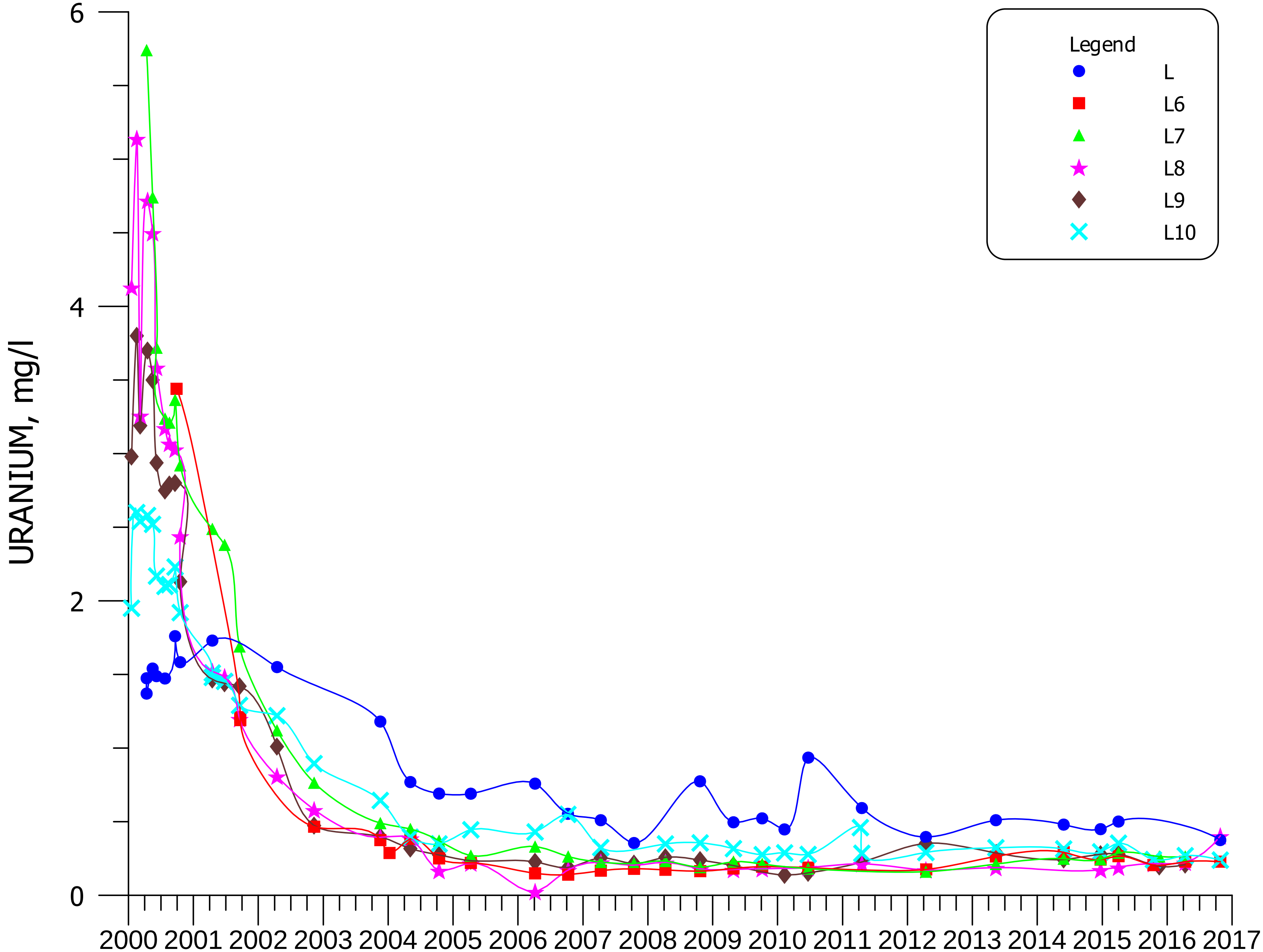

FIGURE 4.3-62. URANIUM CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

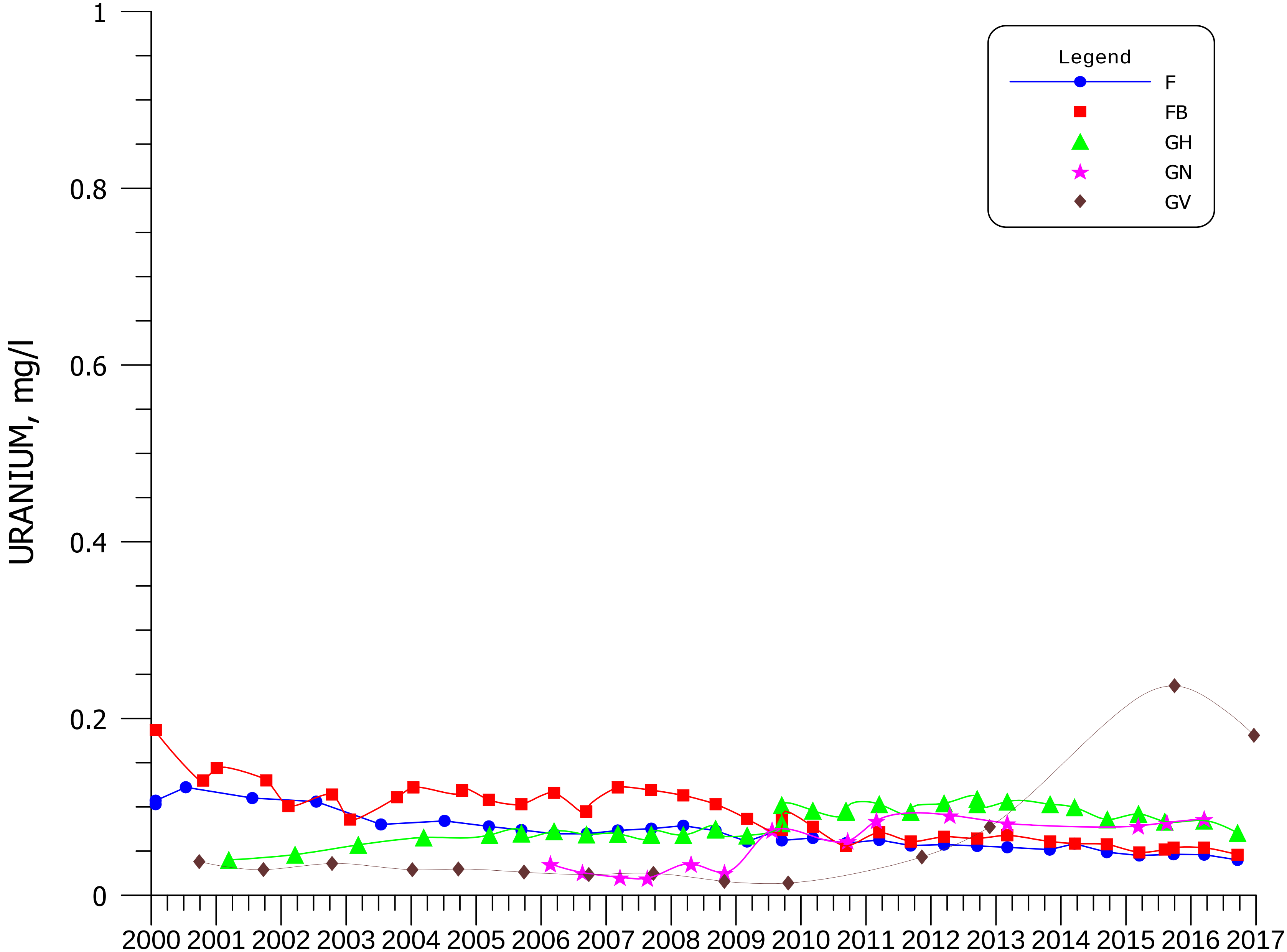

FIGURE 4.3-63. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

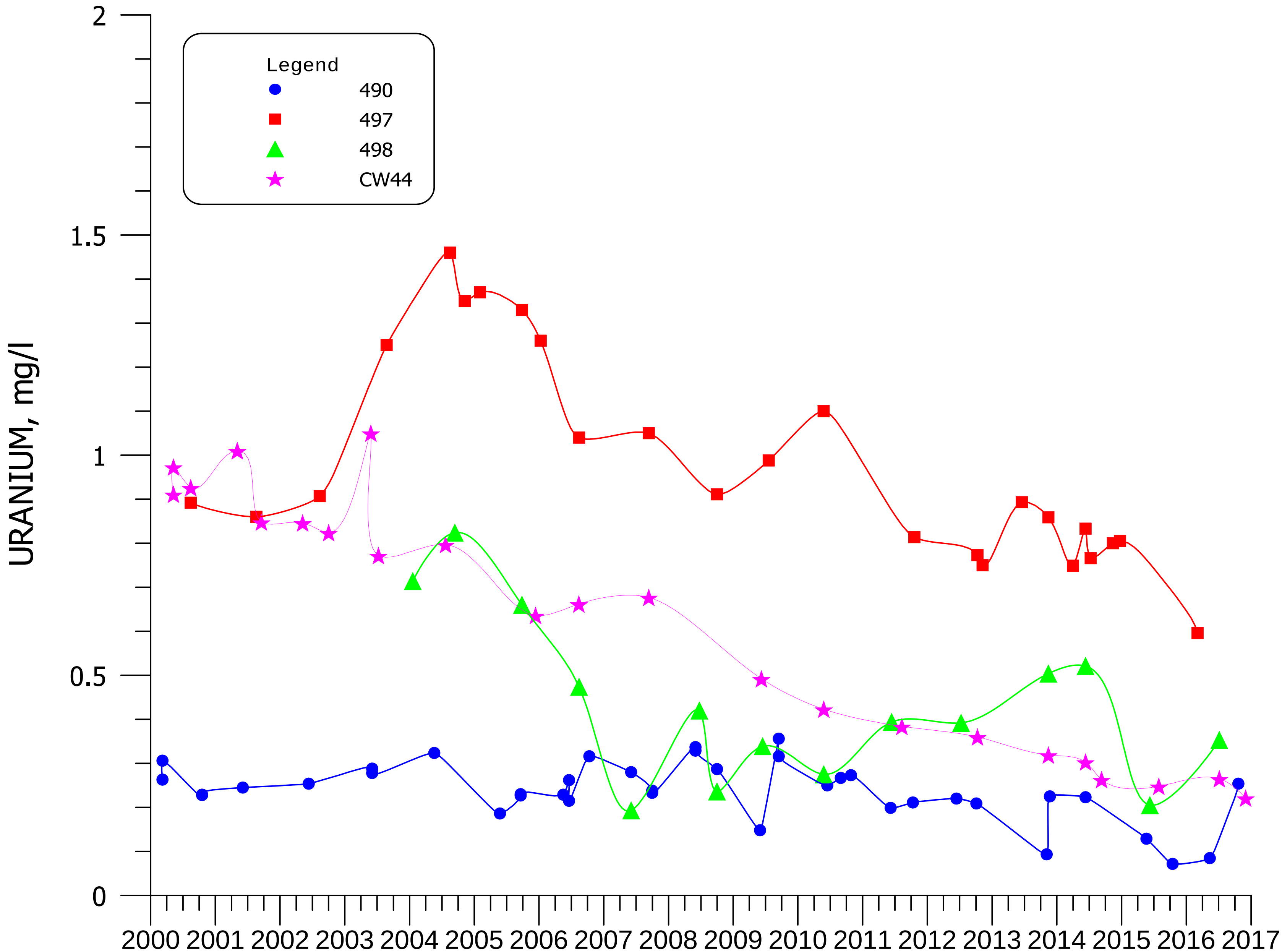

FIGURE 4.3-64. URANIUM CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

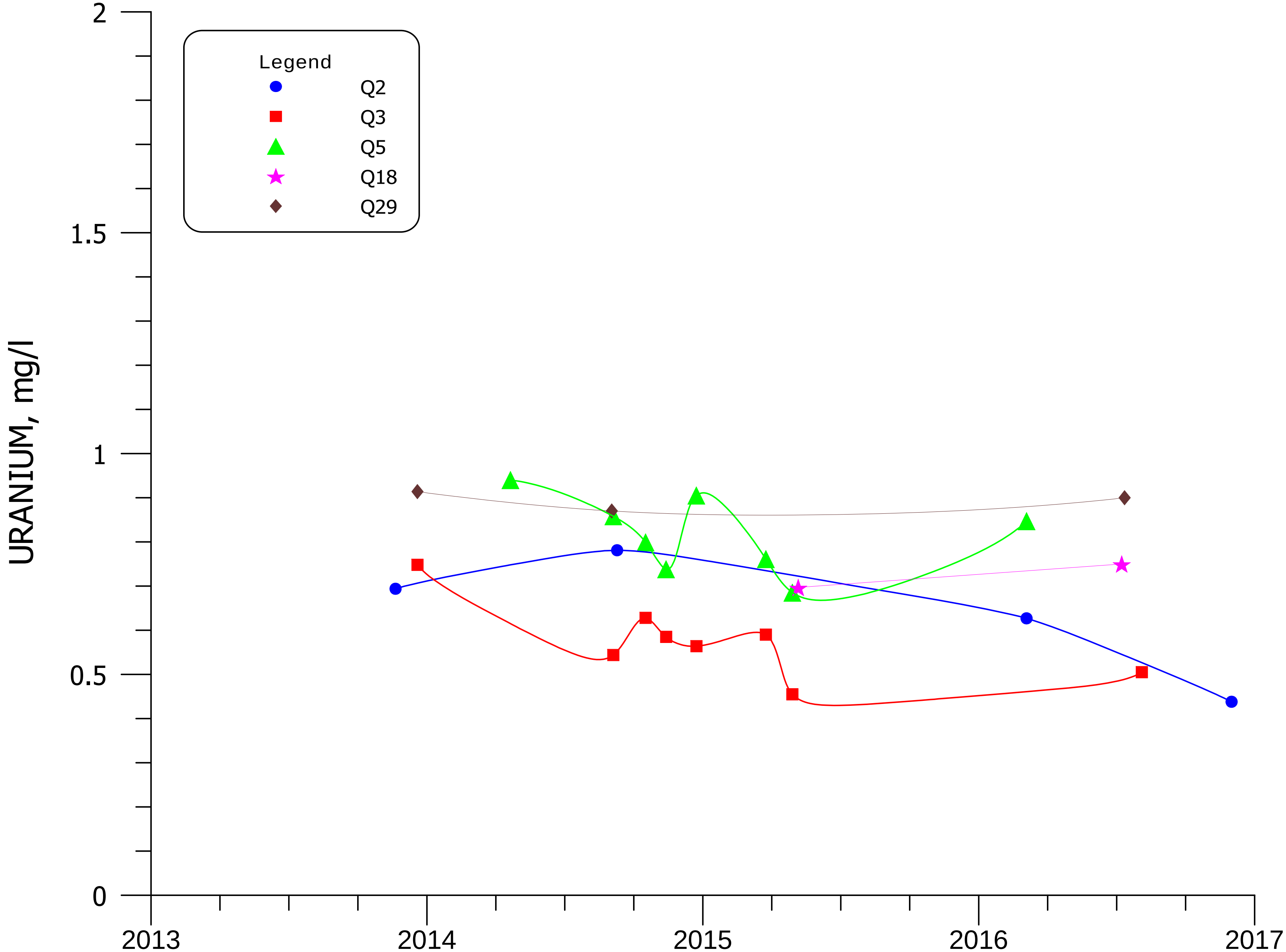

FIGURE 4.3-64A. URANIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

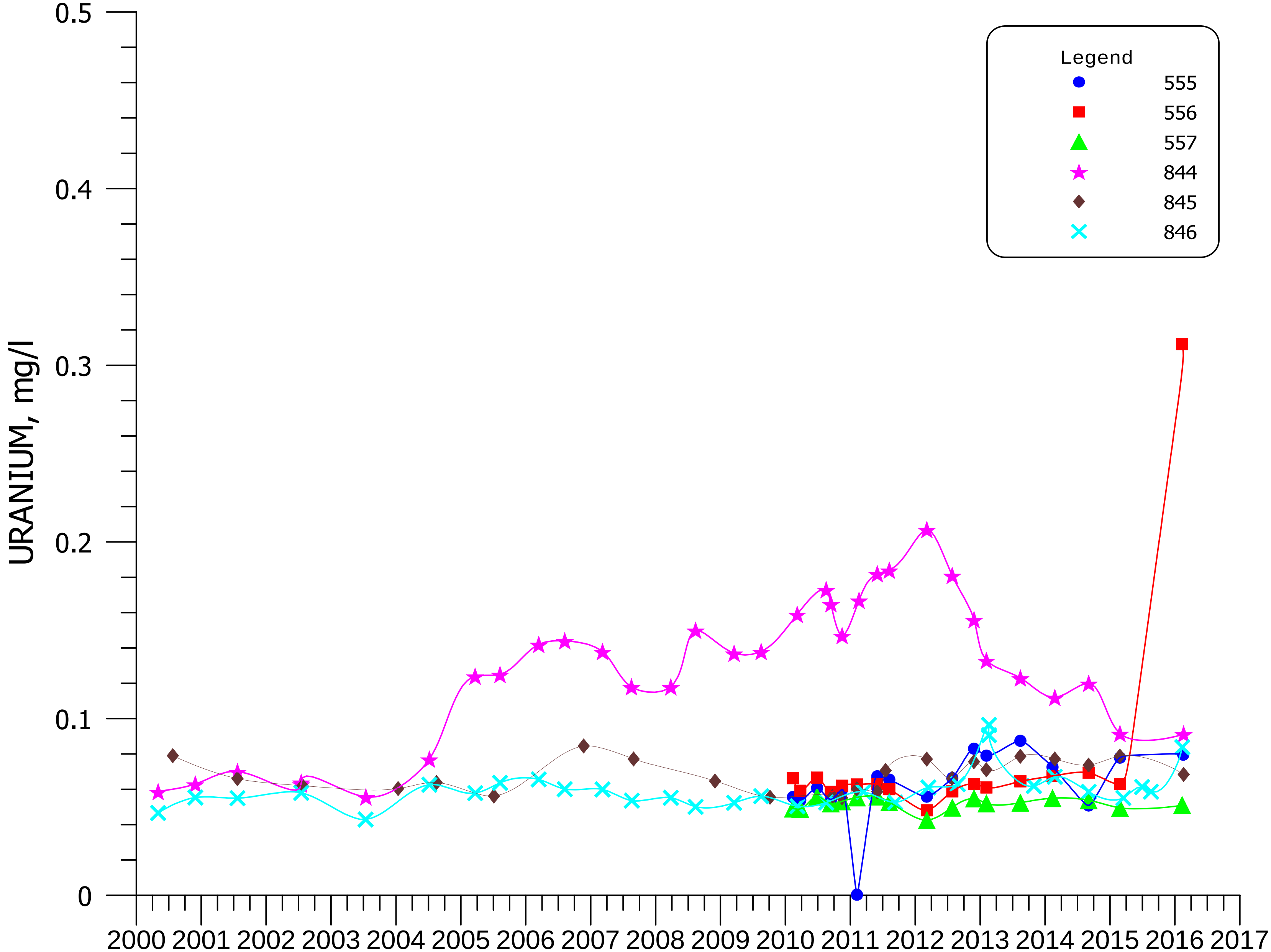

FIGURE 4.3-65. URANIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

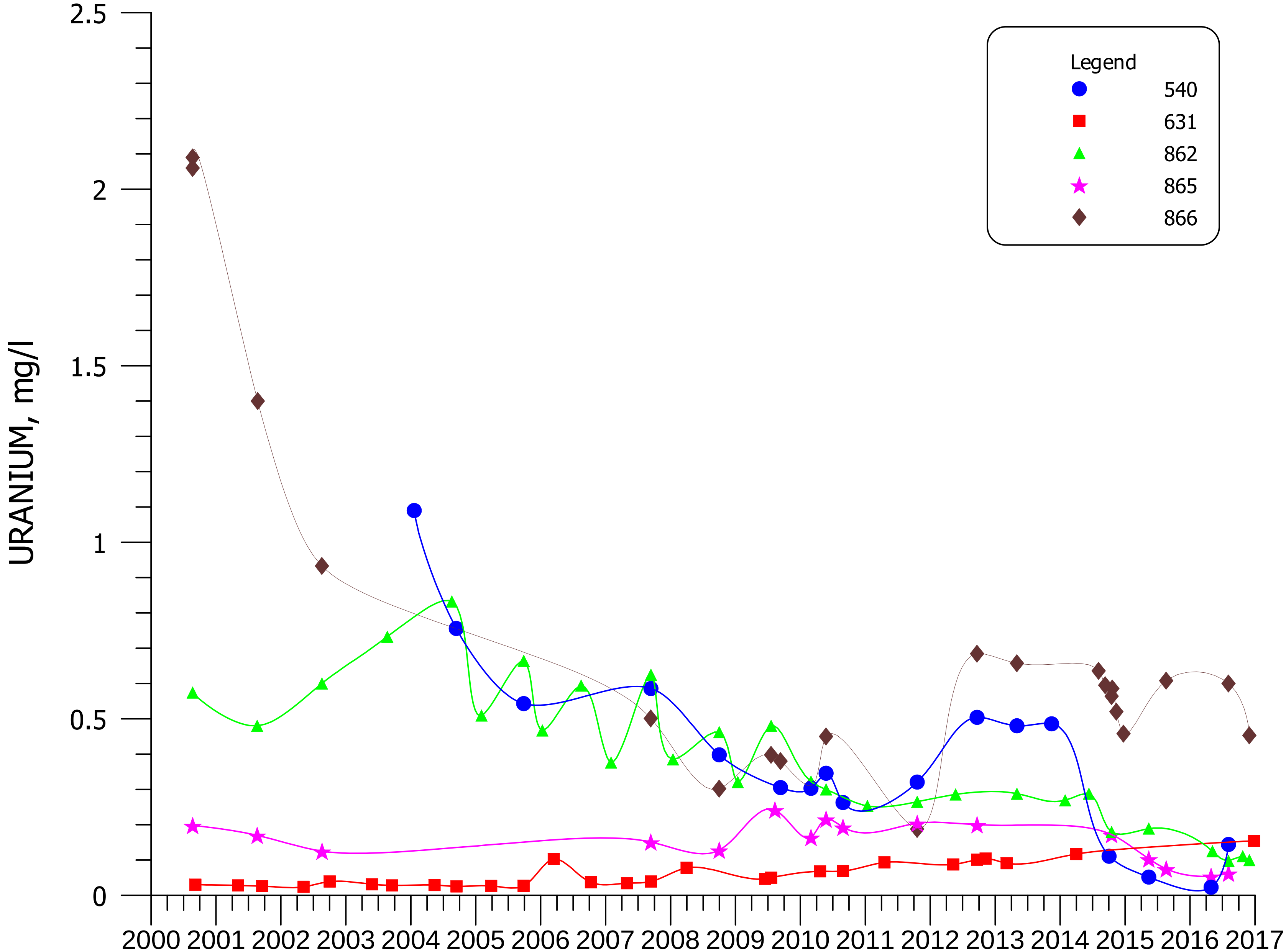

FIGURE 4.3-66. URANIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

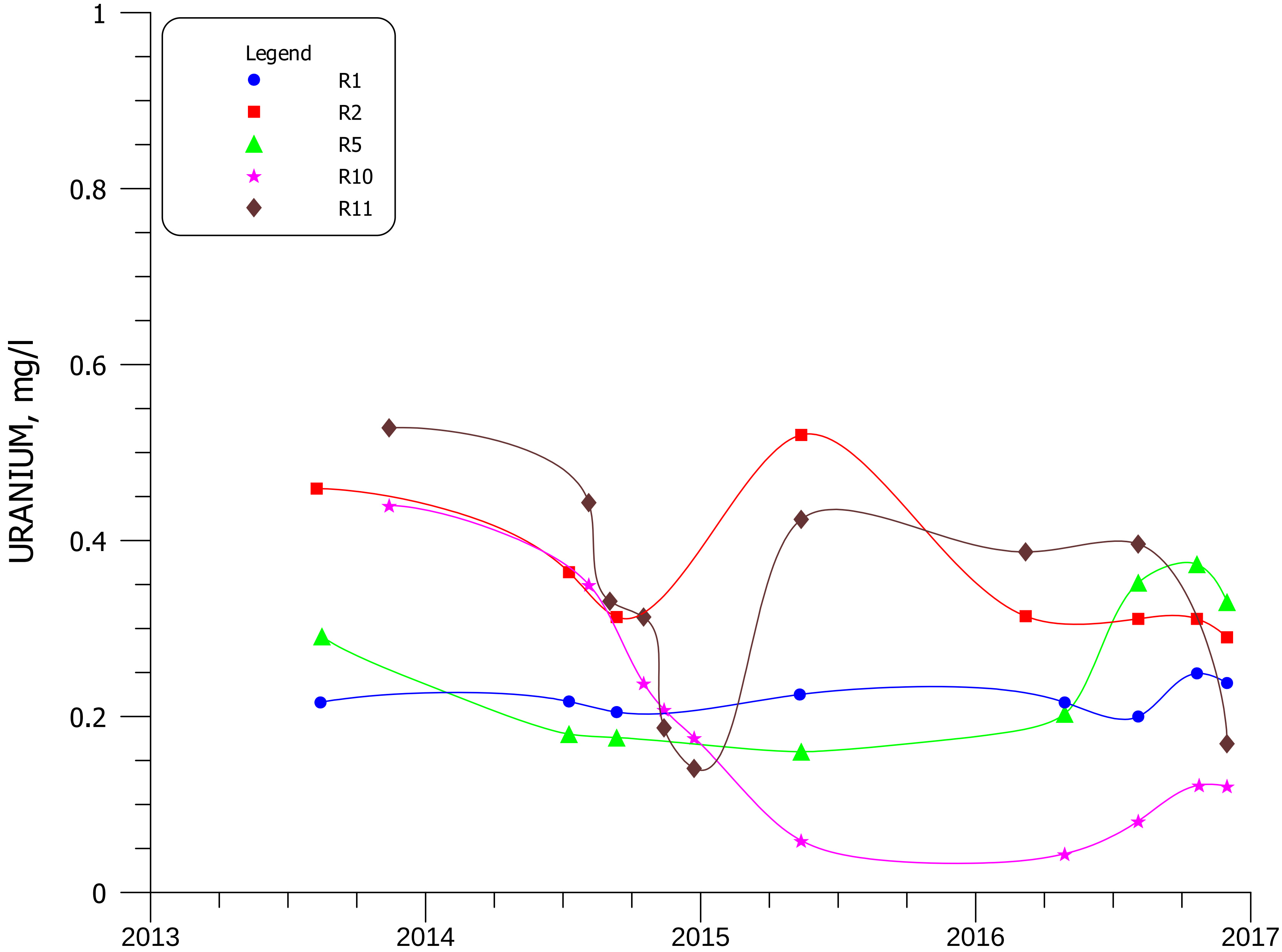

FIGURE 4.3-66A. URANIUM CONCENTRATIONS FOR WELLS R1, R2, R5, R10 AND R11.

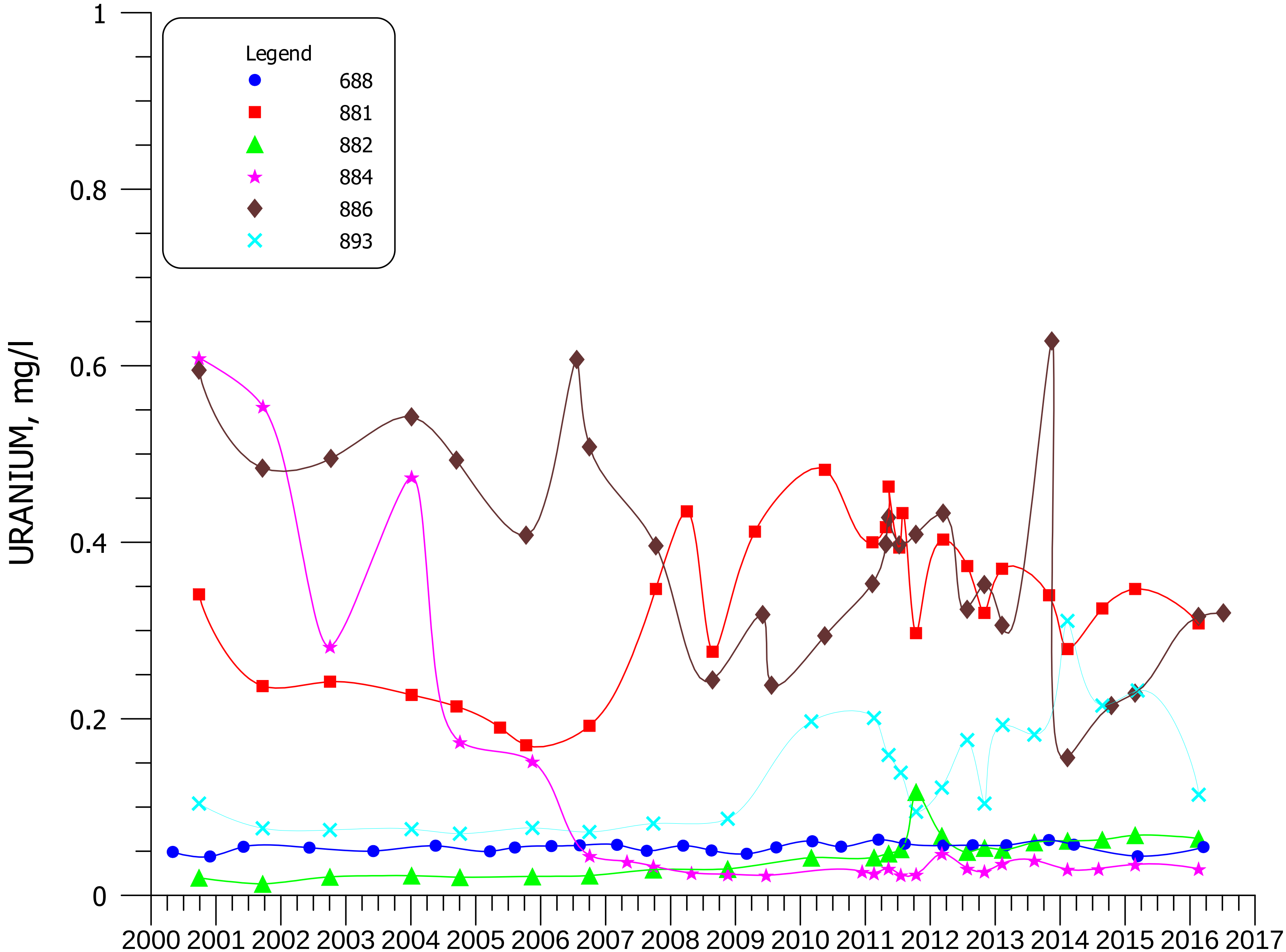

FIGURE 4.3-67. URANIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

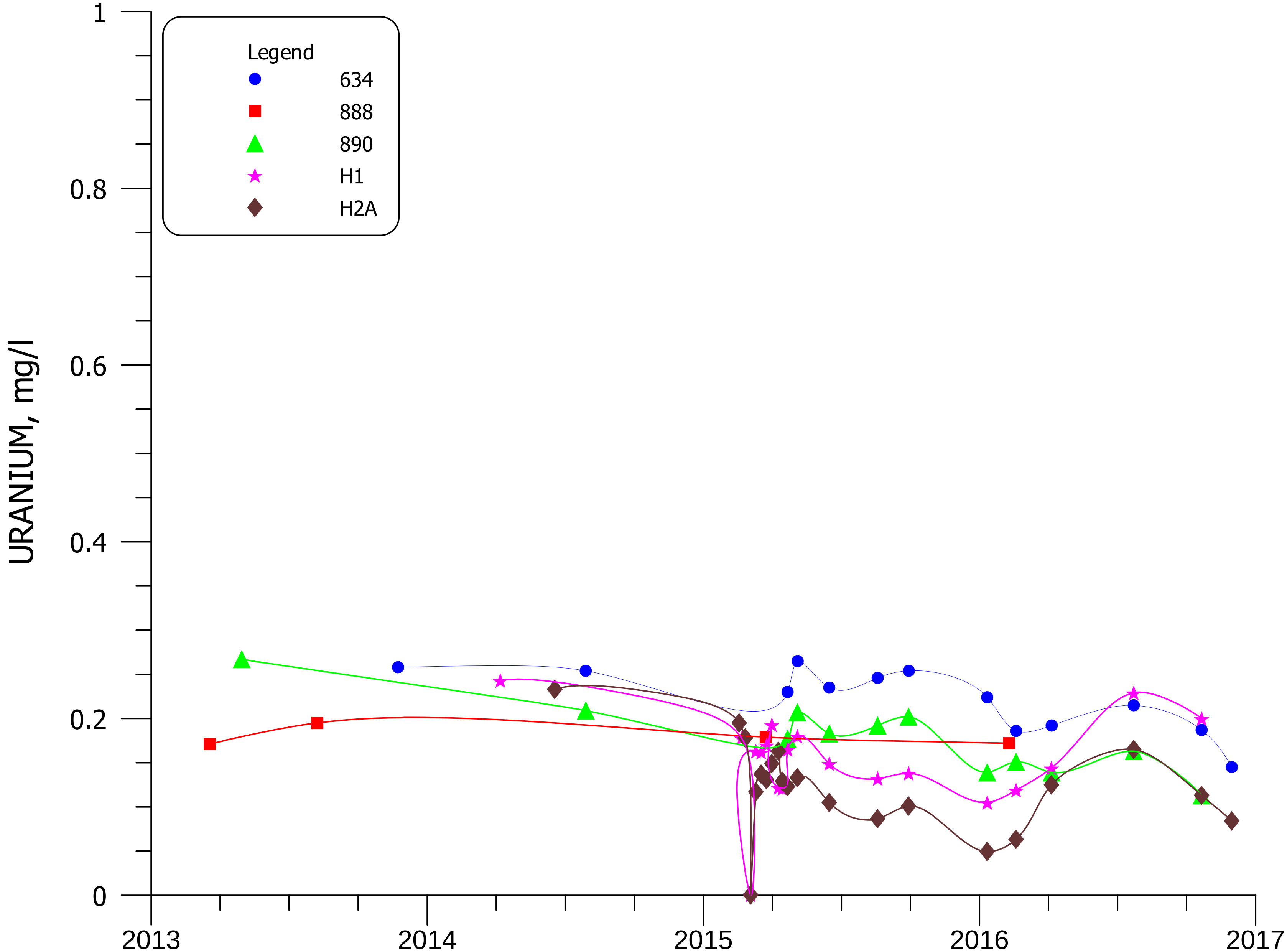

FIGURE 4.3-67A. URANIUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

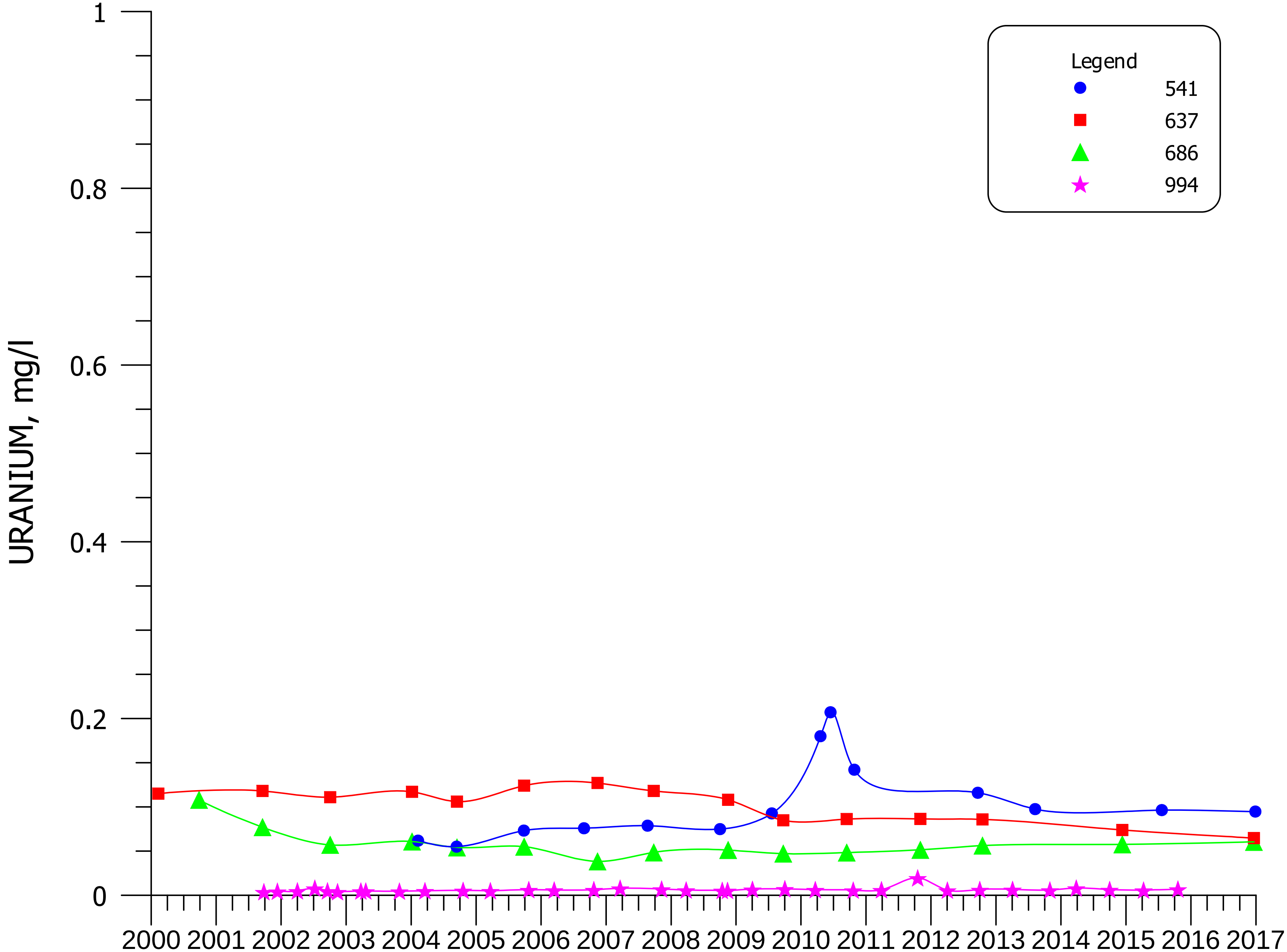

FIGURE 4.3-68. URANIUM CONCENTRATIONS FOR WELLS 541, 637, 686, AND 994.

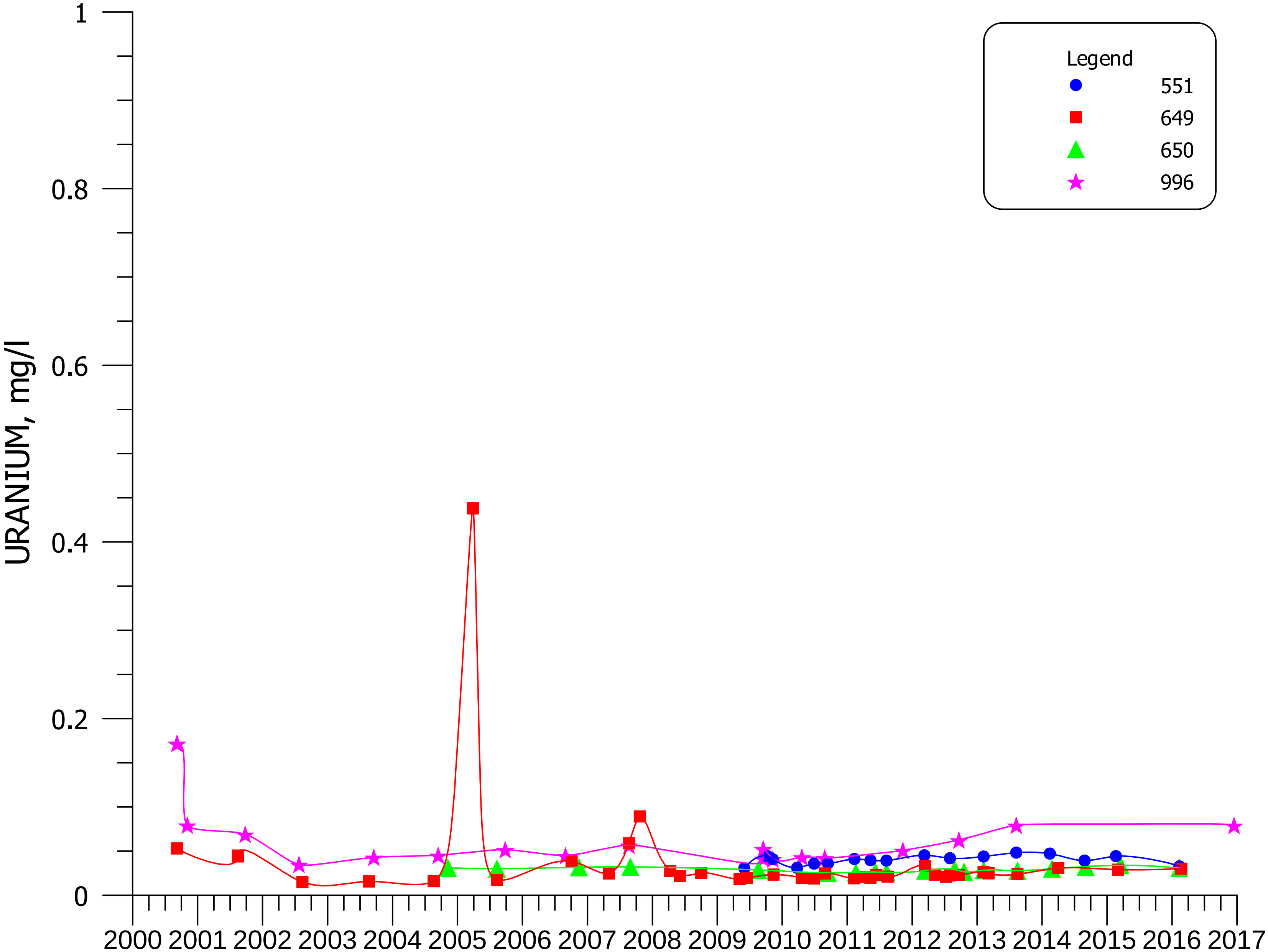

FIGURE 4.3-69. URANIUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

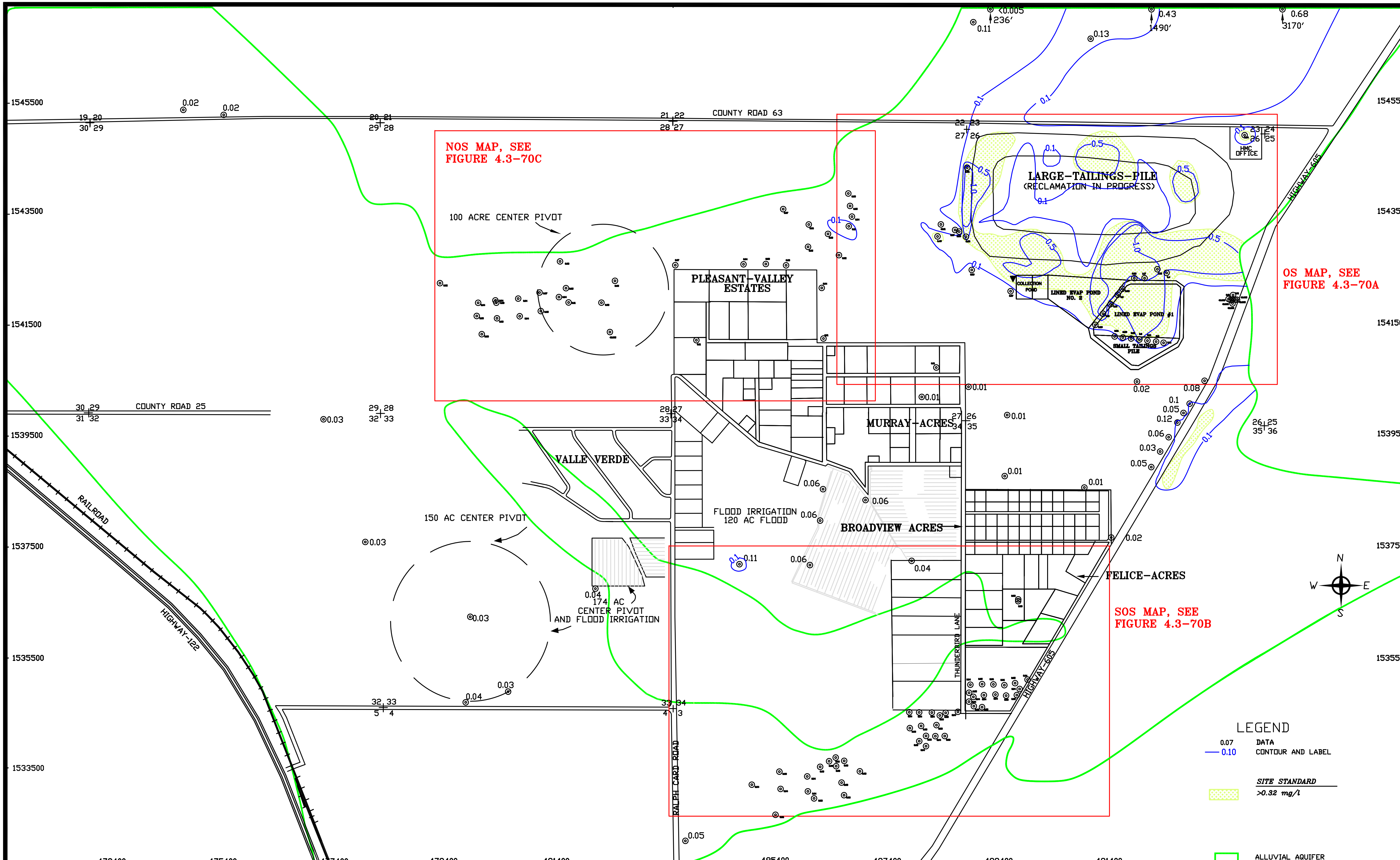

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FIGURE 4.3-70. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016 mg/l

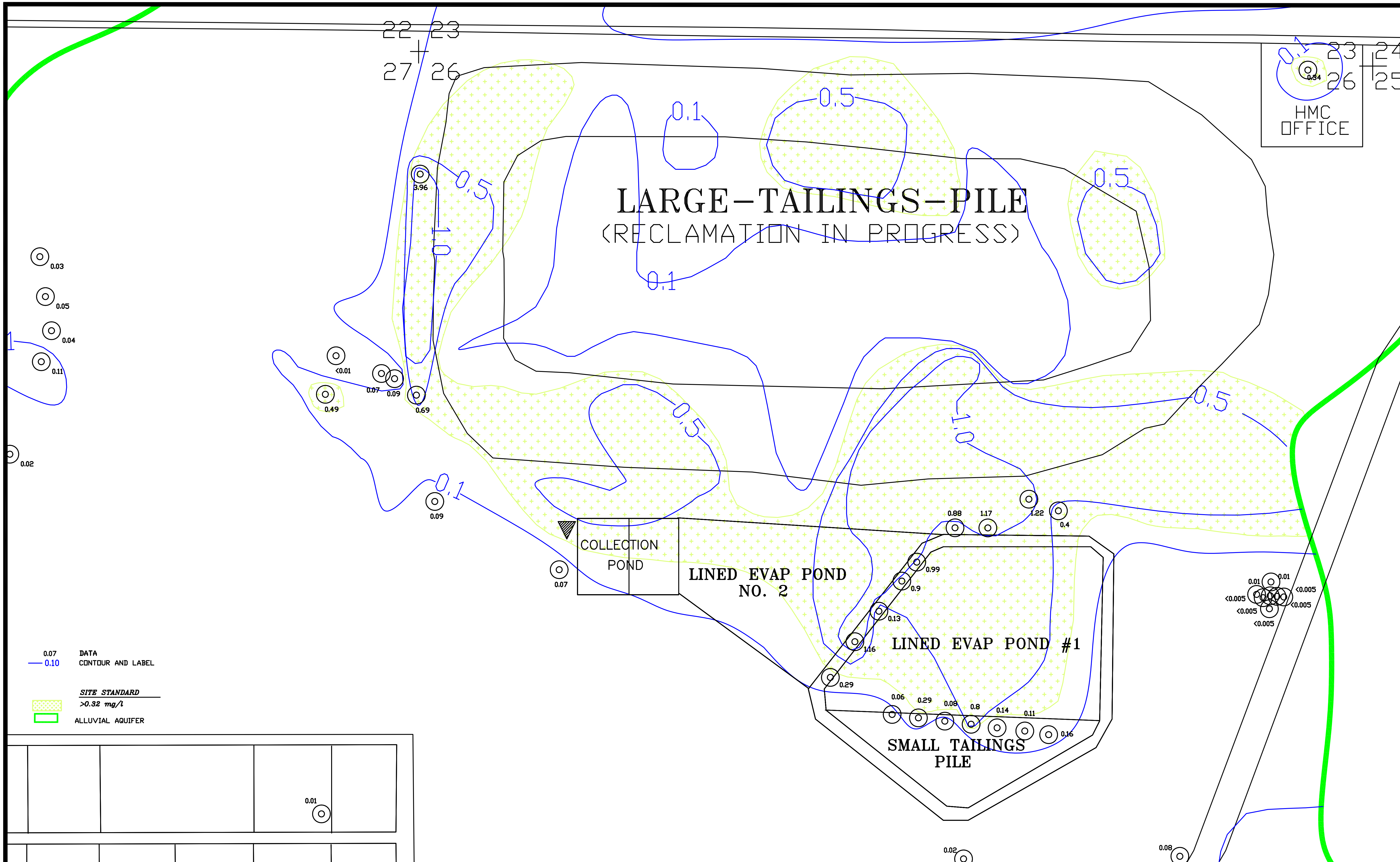

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FIGURE 4.3-70A. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

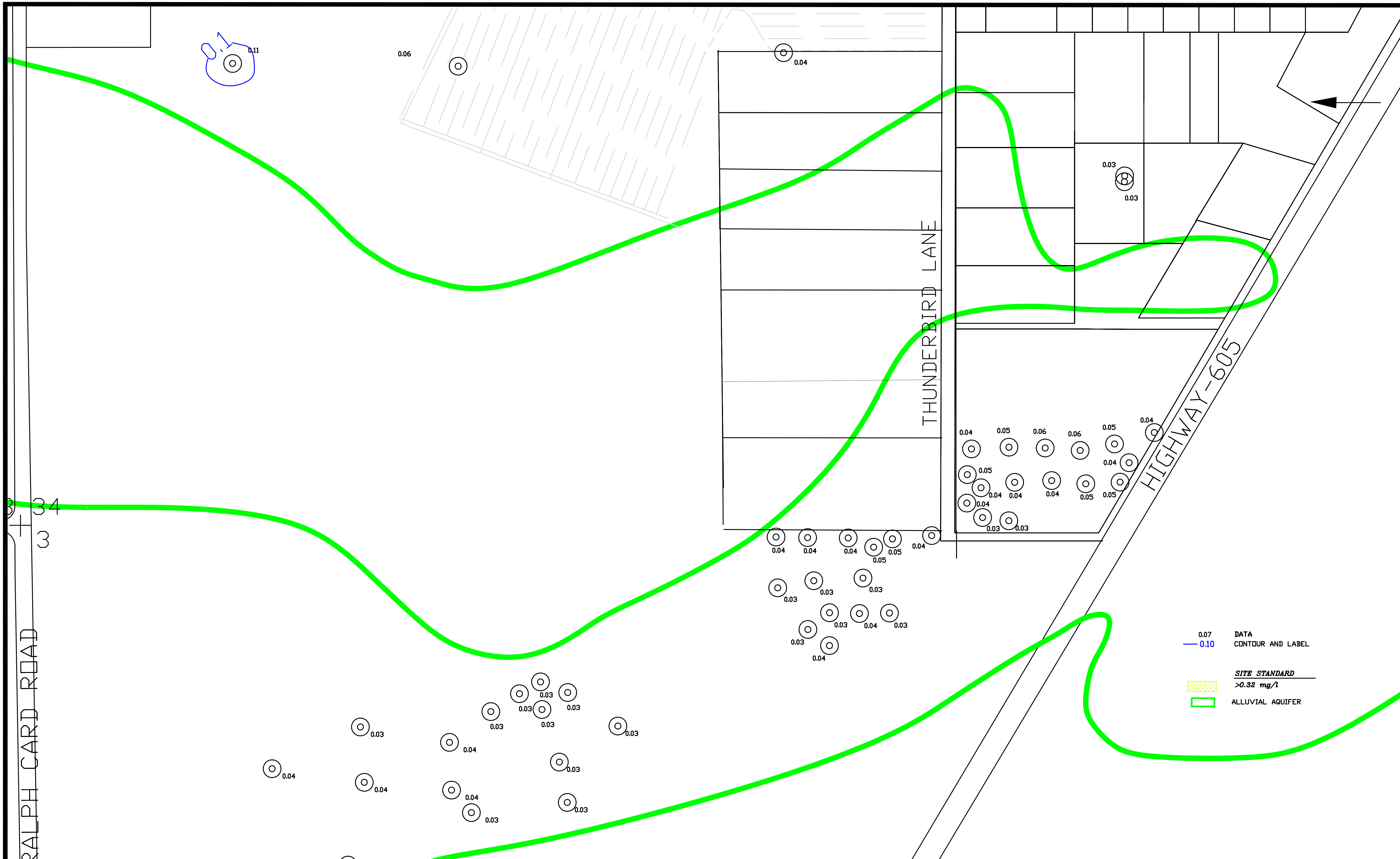

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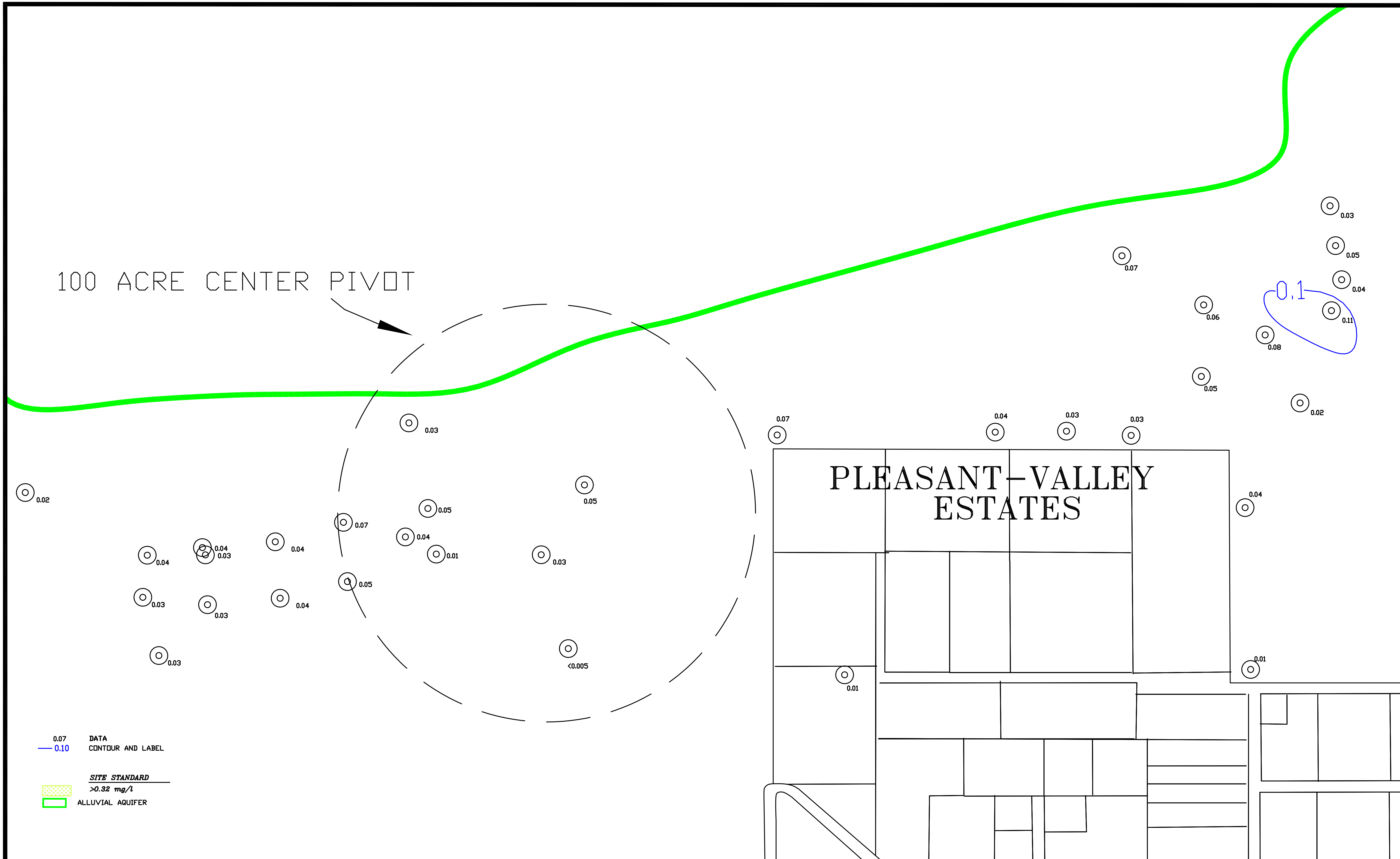
FIGURE 4.3-70B. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l



SCALE: 1"=500'		FIGURE 4.3-70C. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l
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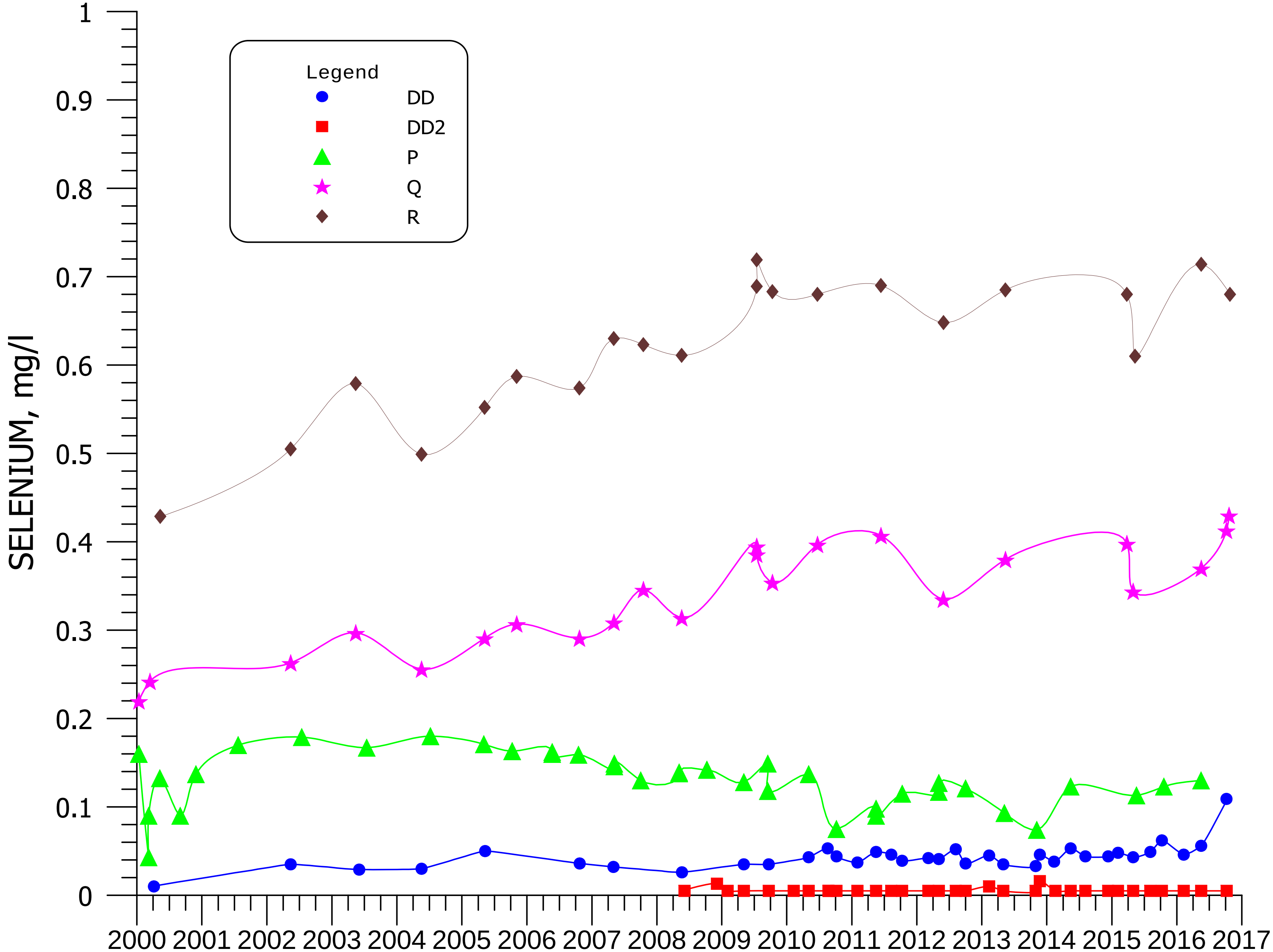

FIGURE 4.3-71. SELENIUM CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

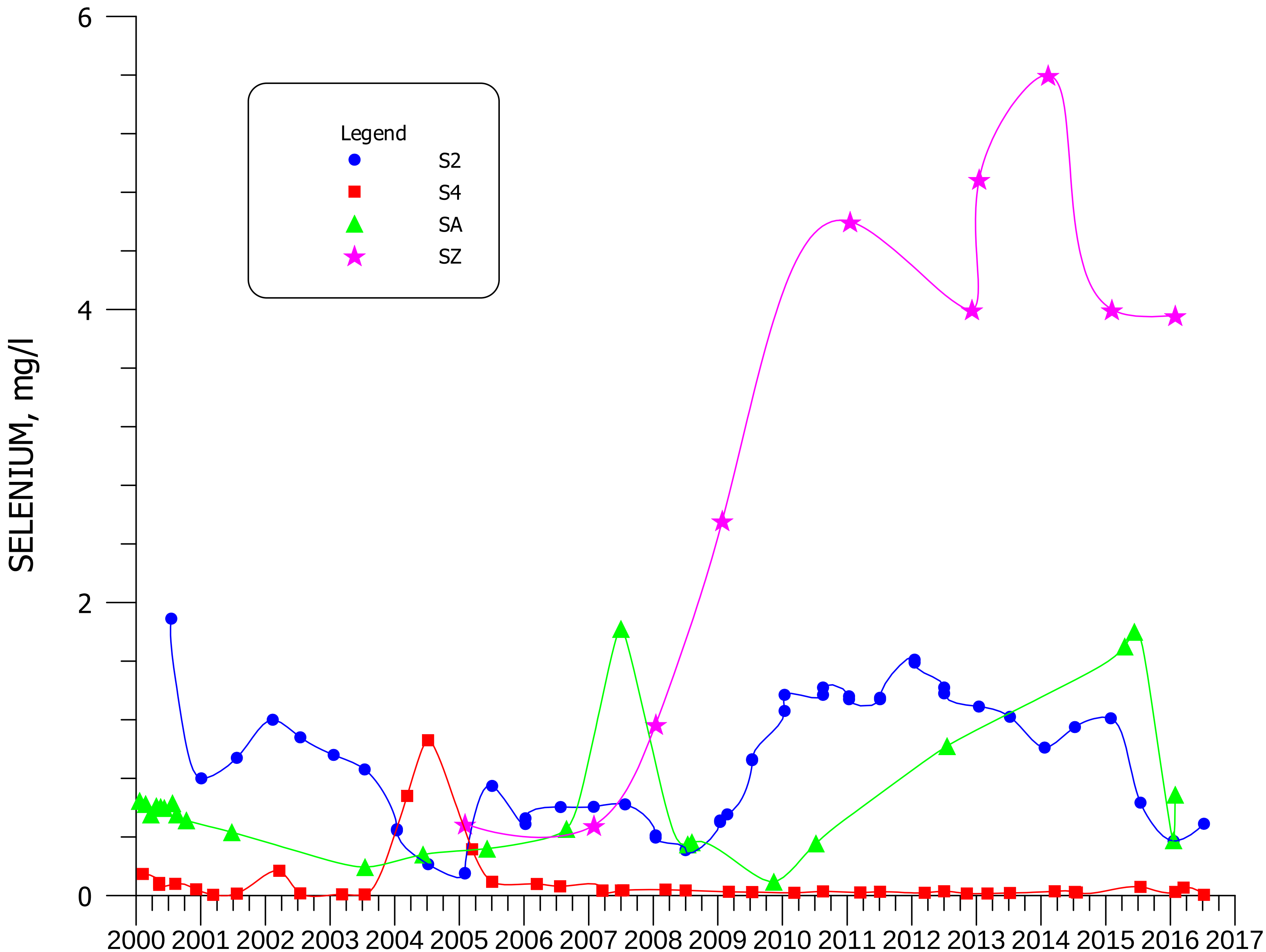

FIGURE 4.3-72. SELENIUM CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

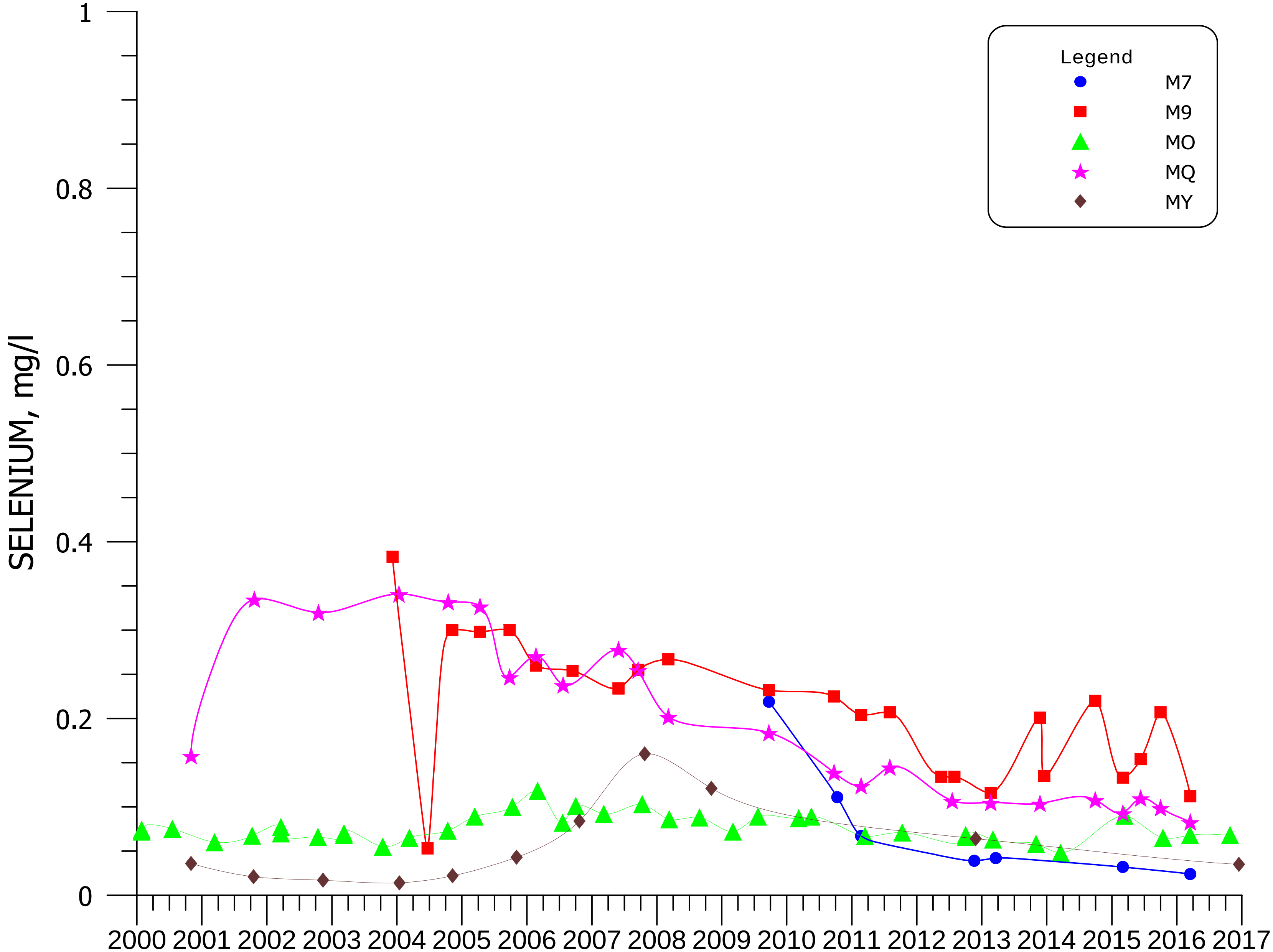

FIGURE 4.3-73. SELENIUM CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

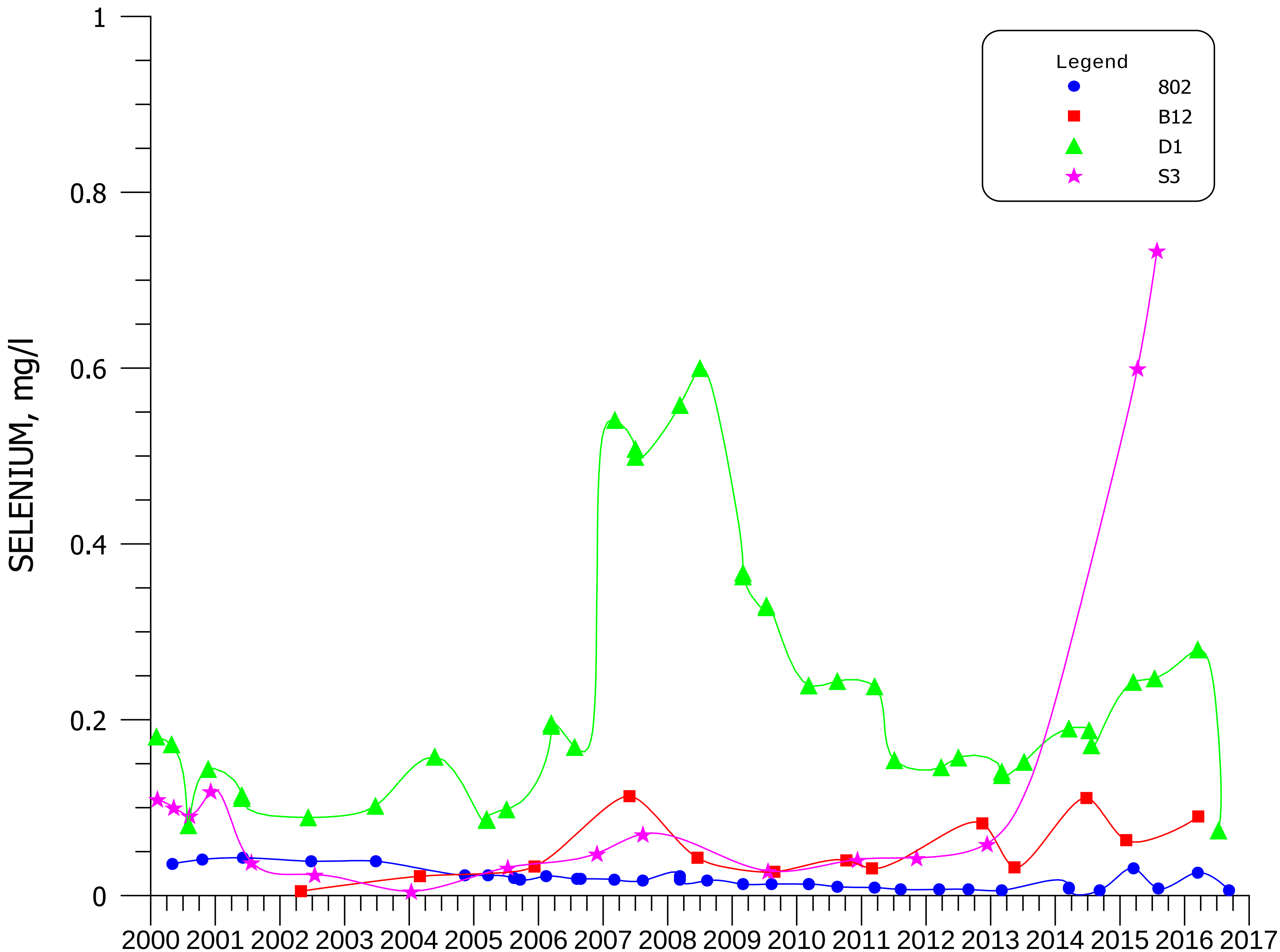

FIGURE 4.3-74. SELENIUM CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

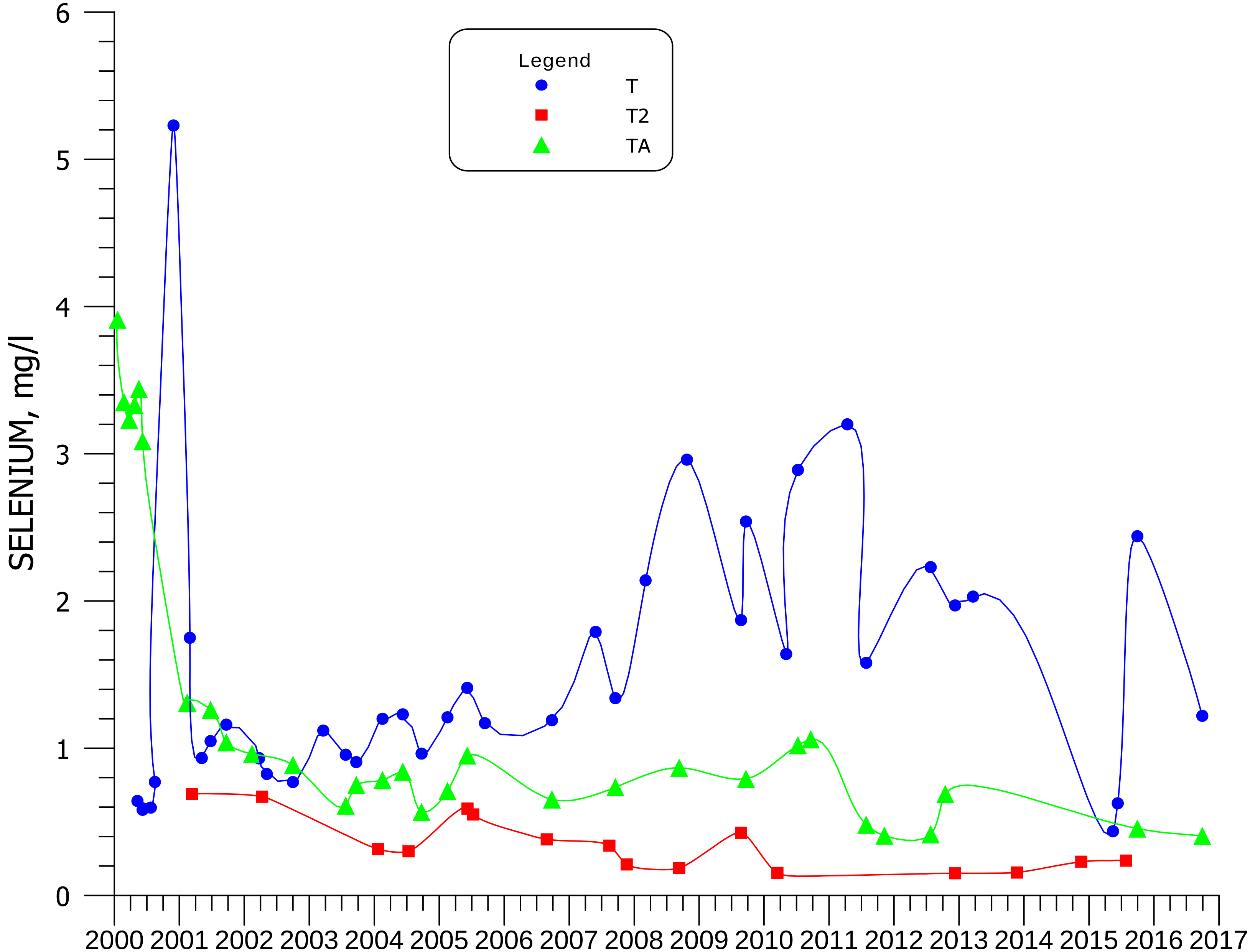

FIGURE 4.3-75. SELENIUM CONCENTRATIONS FOR WELLS T, T2, AND TA.

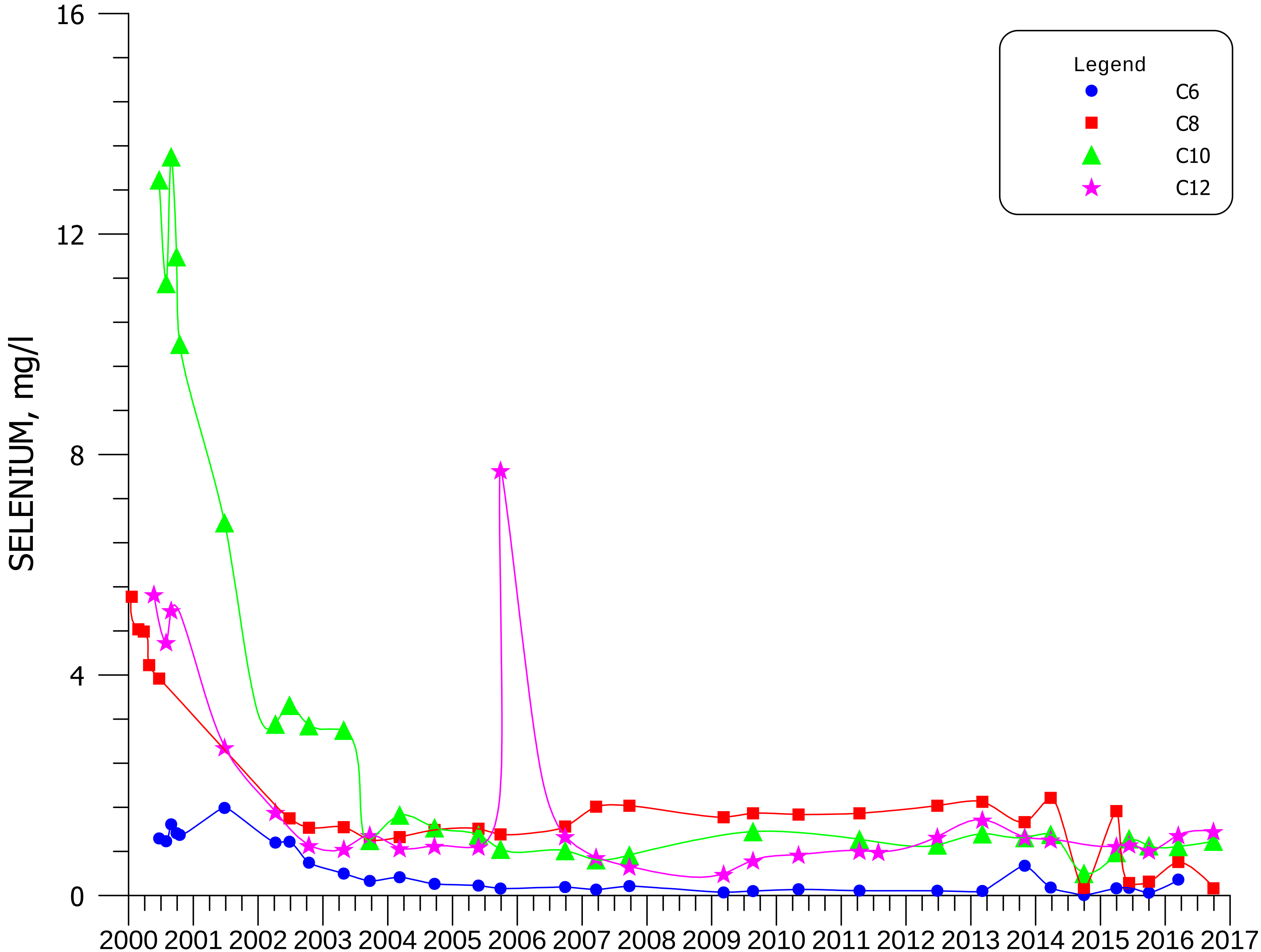

FIGURE 4.3-76. SELENIUM CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

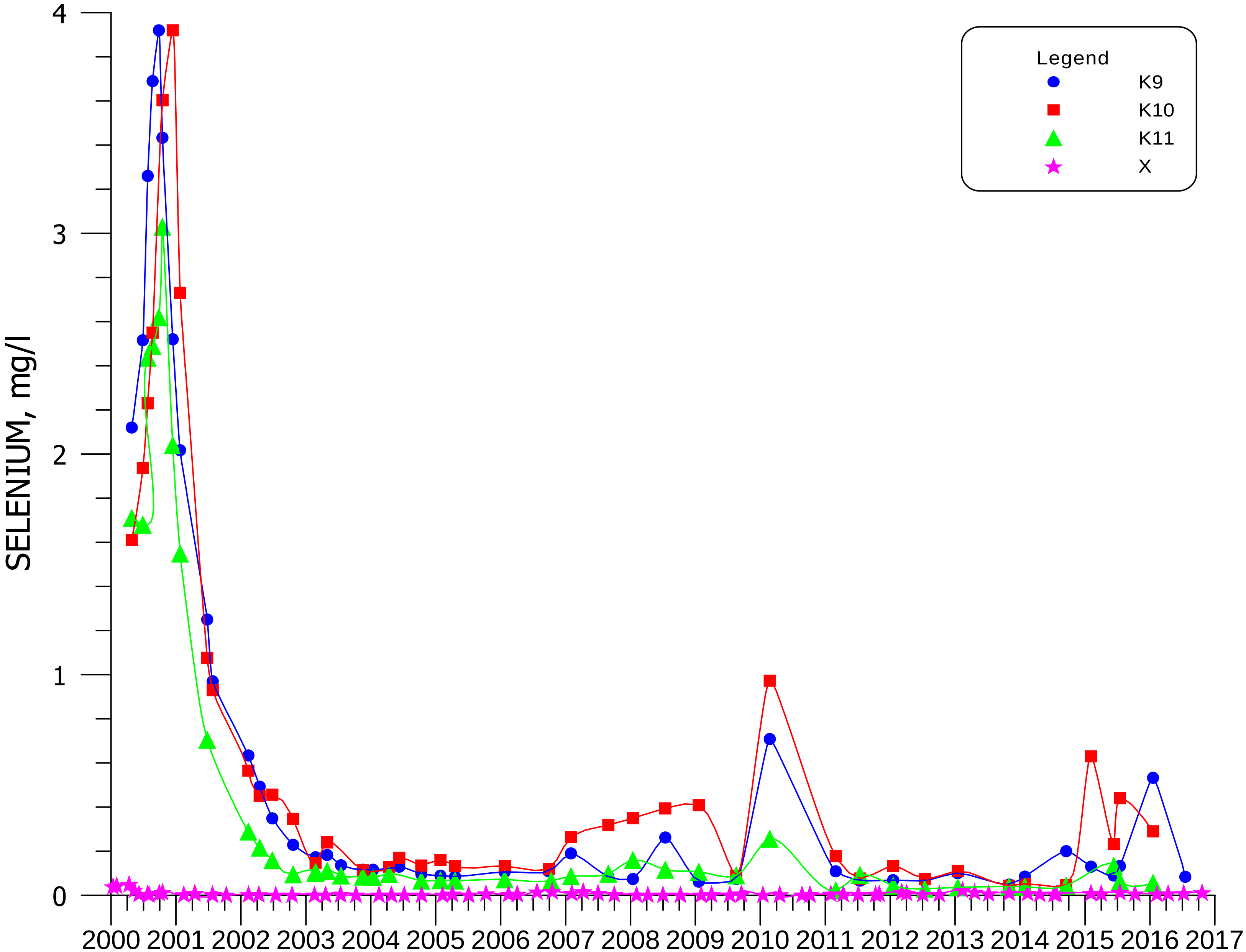

FIGURE 4.3-77. SELENIUM CONCENTRATIONS FOR WELLS K9, K10, K11 AND X.

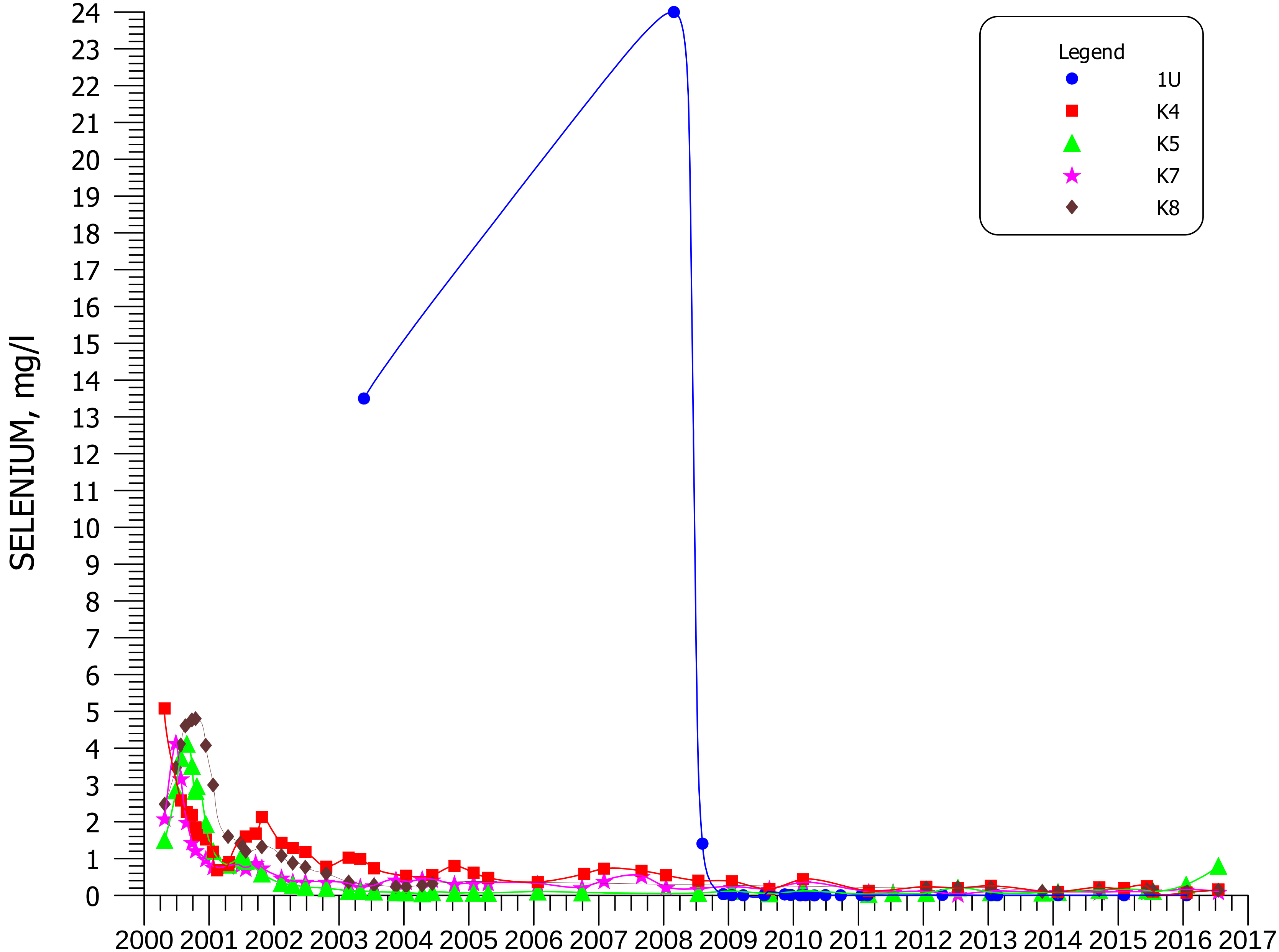

FIGURE 4.3-78. SELENIUM CONCENTRATIONS FOR WELLS 1U, K4, K5, K7, AND K8.

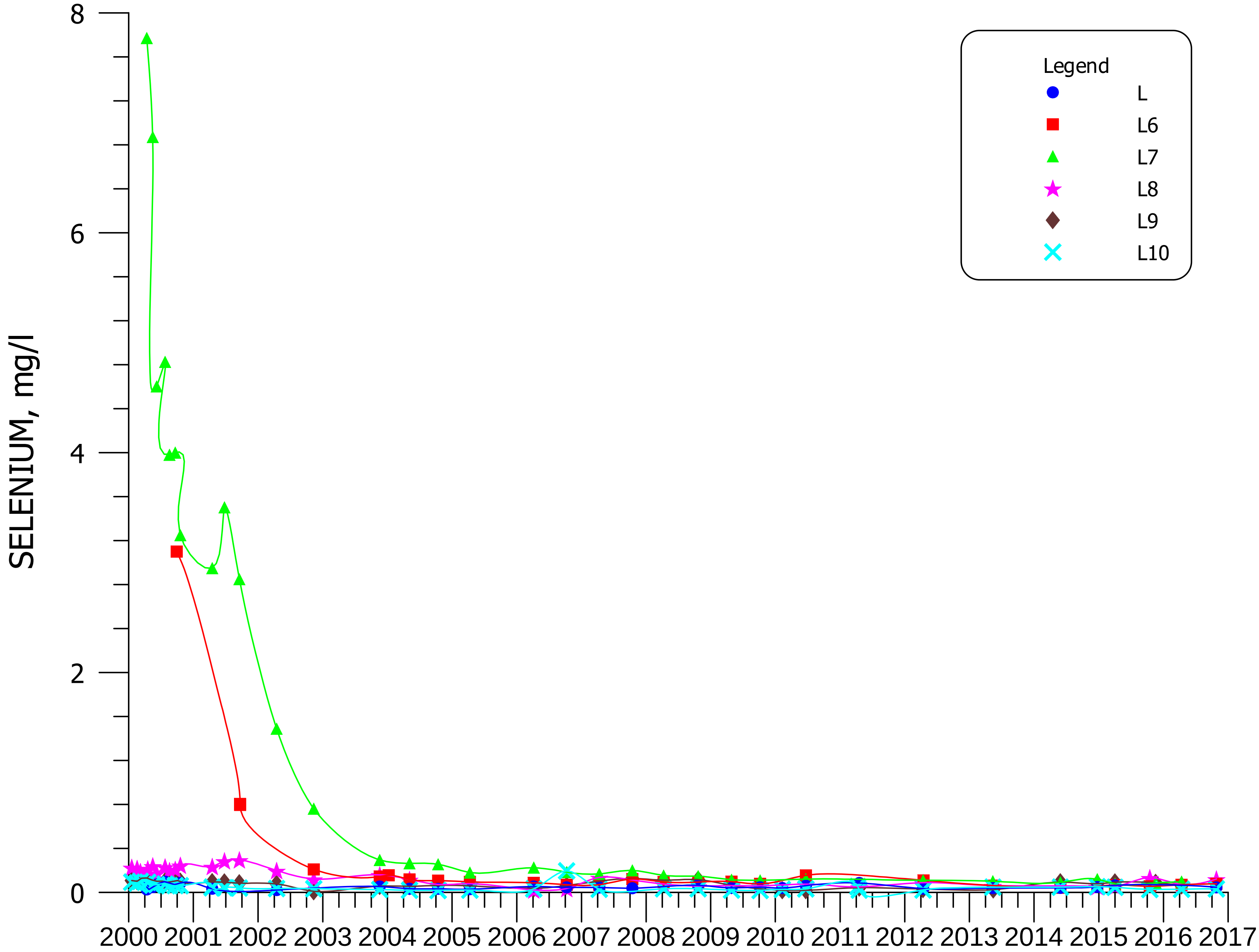

FIGURE 4.3-79. SELENIUM CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

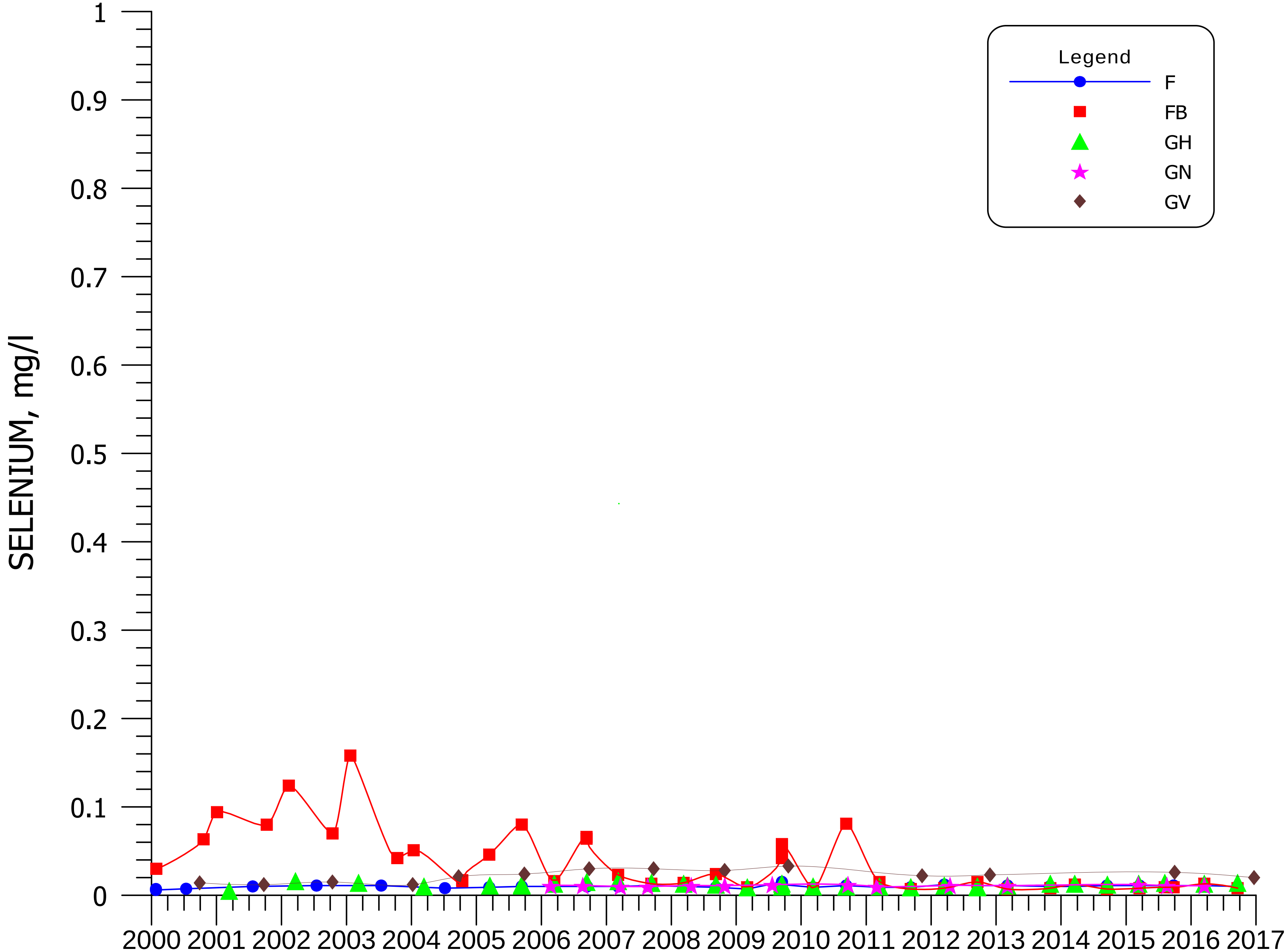

FIGURE 4.3-80. SELENIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

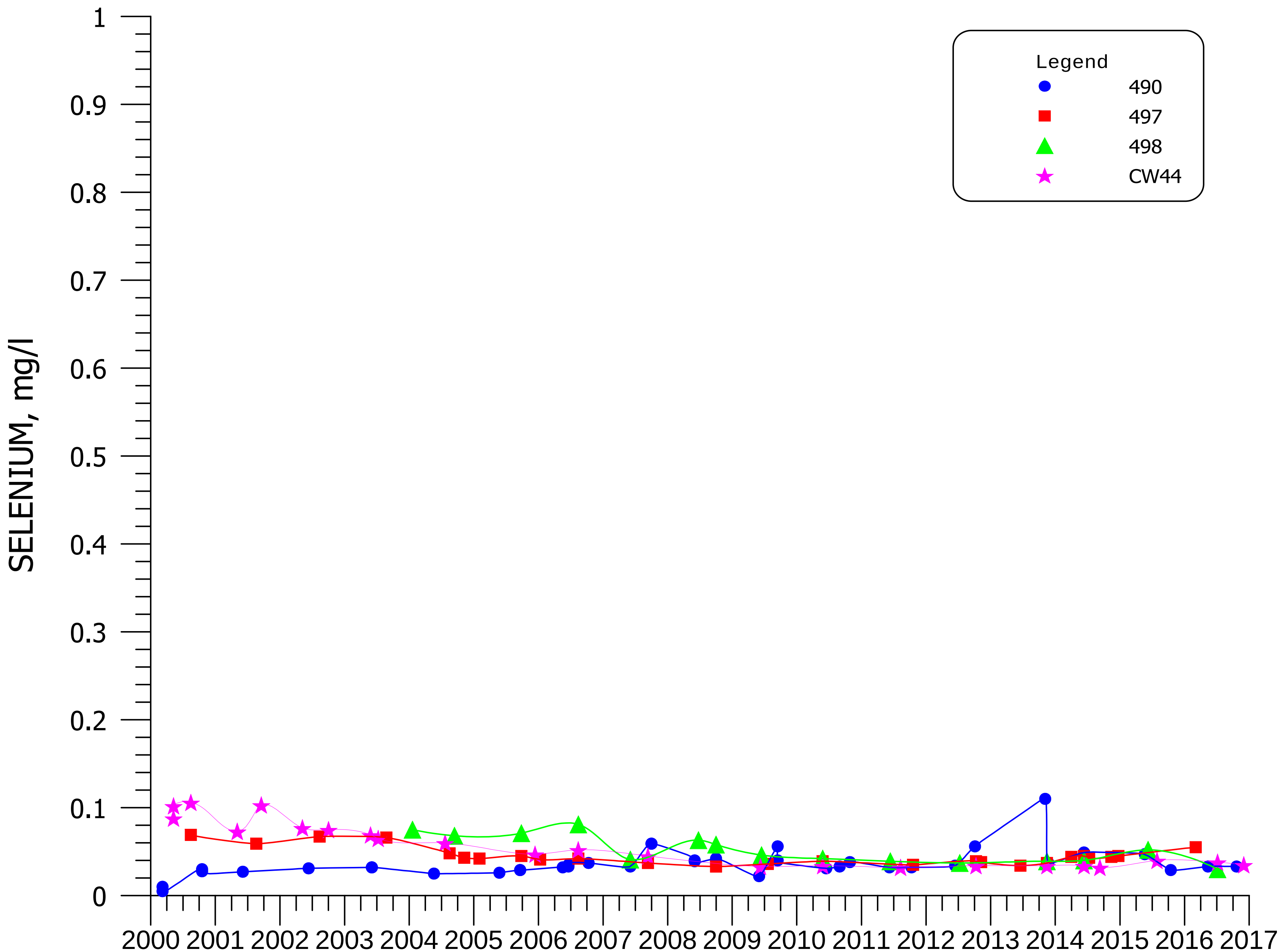

FIGURE 4.3-81. SELENIUM CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

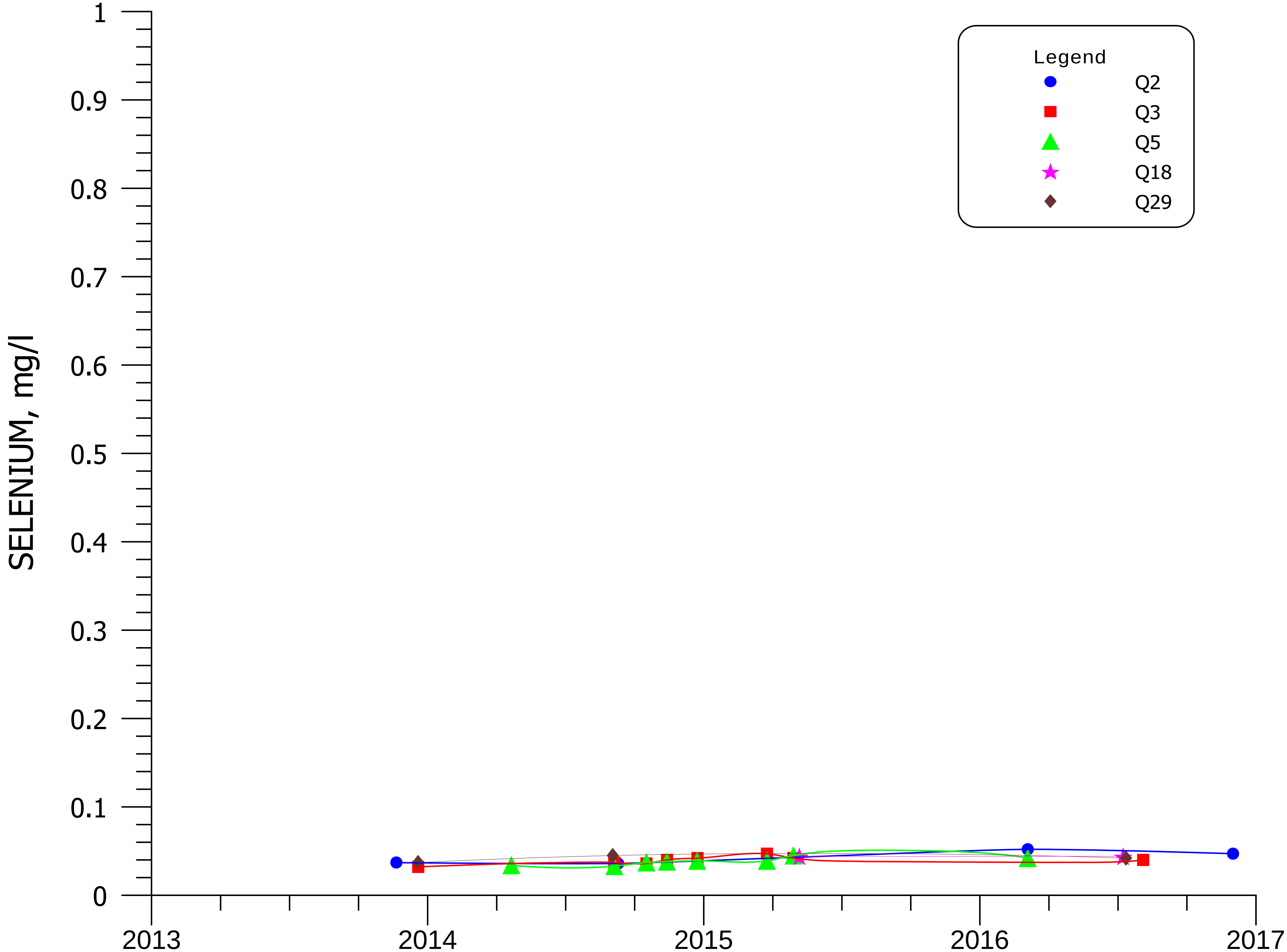

FIGURE 4.3-81A. SELENIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

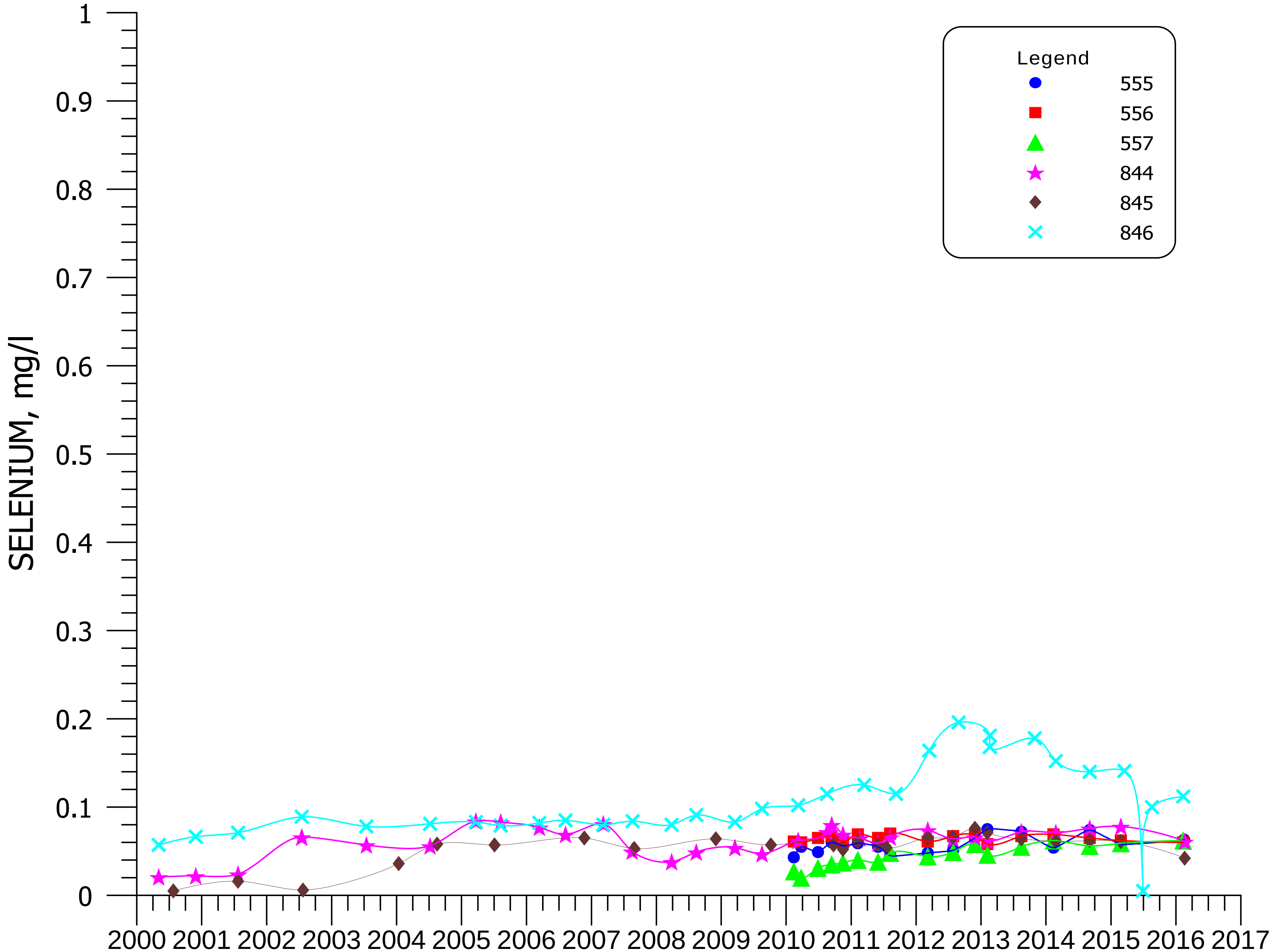

FIGURE 4.3-82. SELENIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

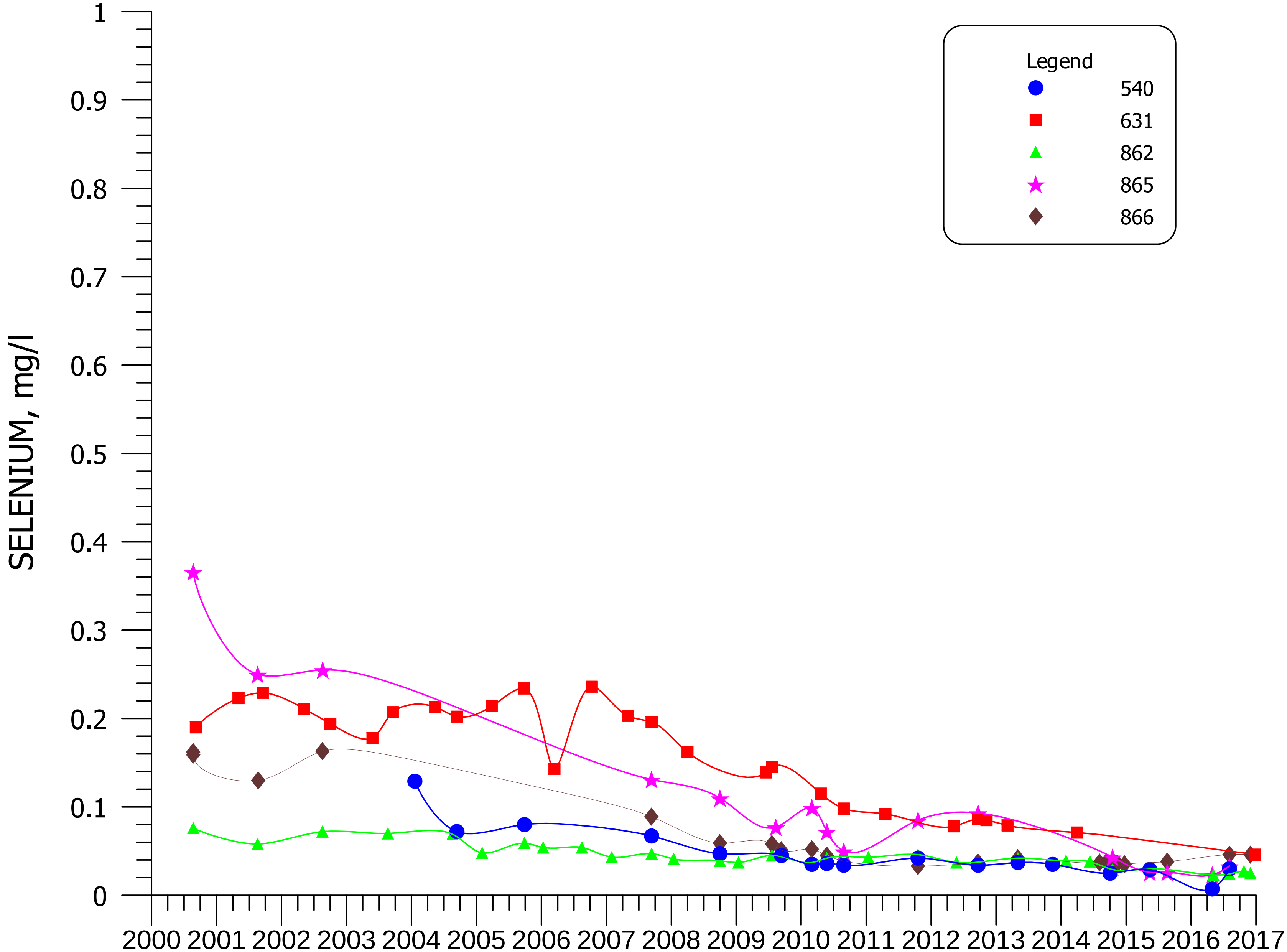

FIGURE 4.3-83. SELENIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

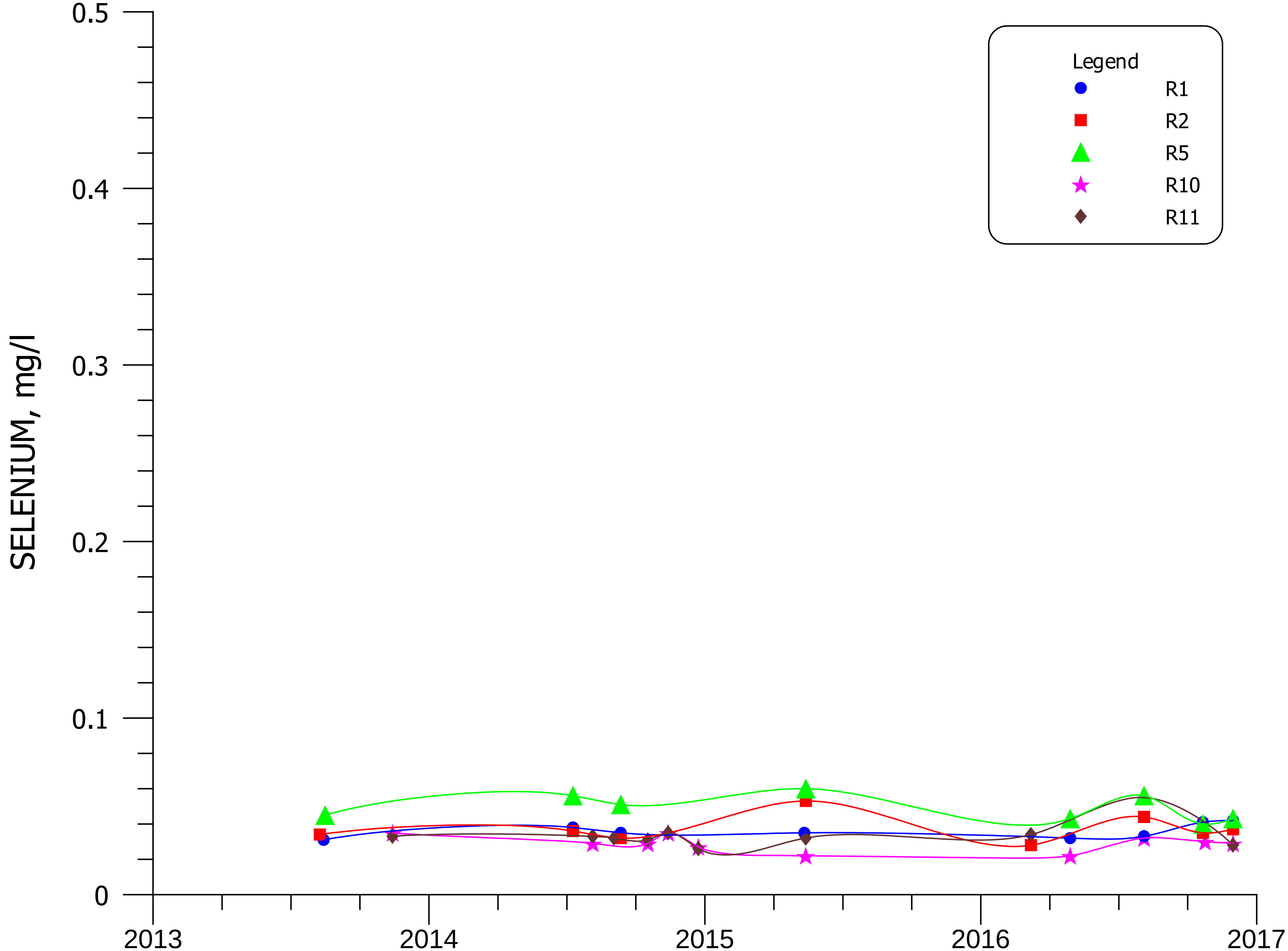

FIGURE 4.3-83A. SELENIUM CONCENTRATIONS FOR WELLS R1, R2, R5, R10, AND R11.

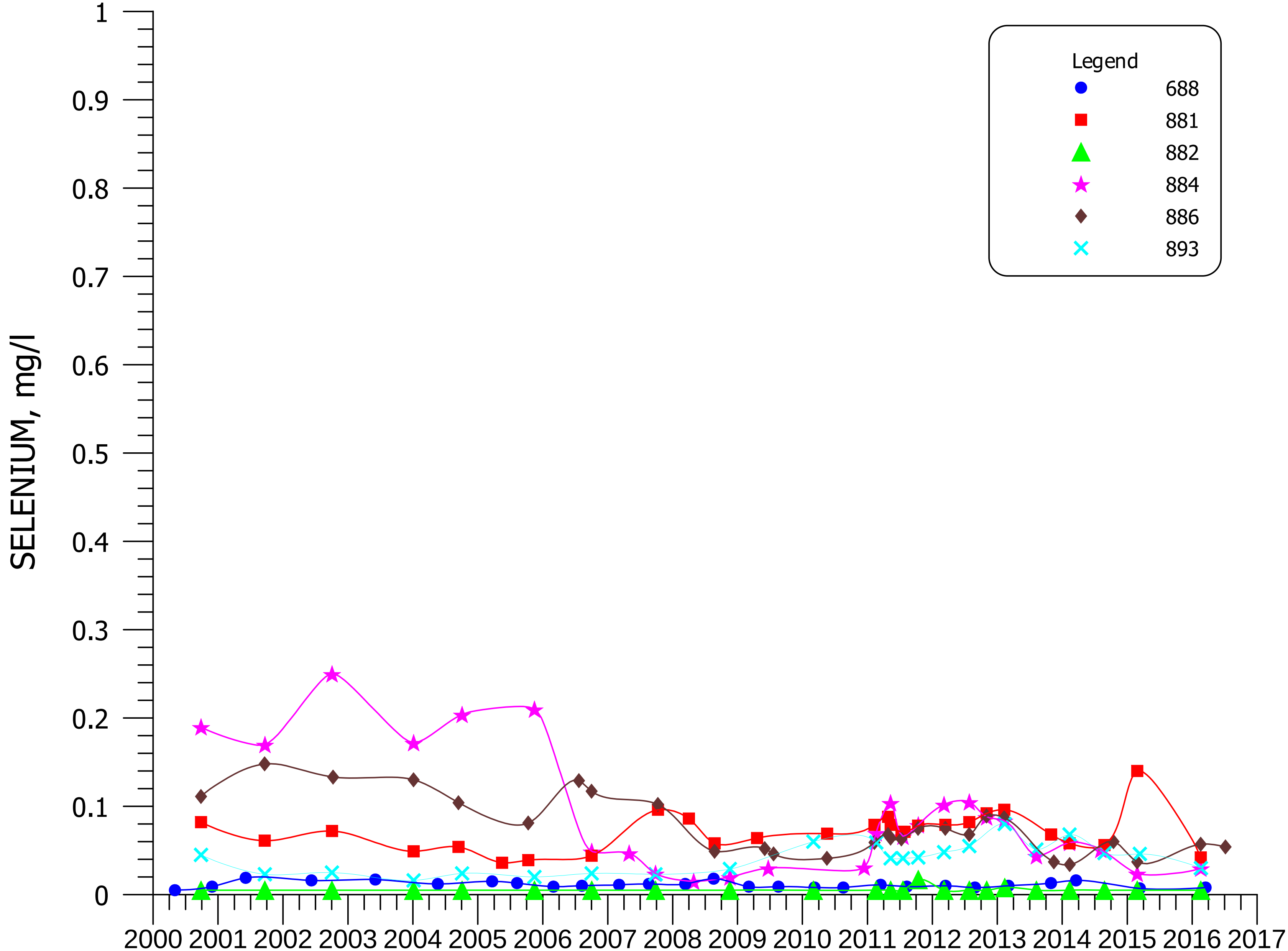

FIGURE 4.3-84. SELENIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

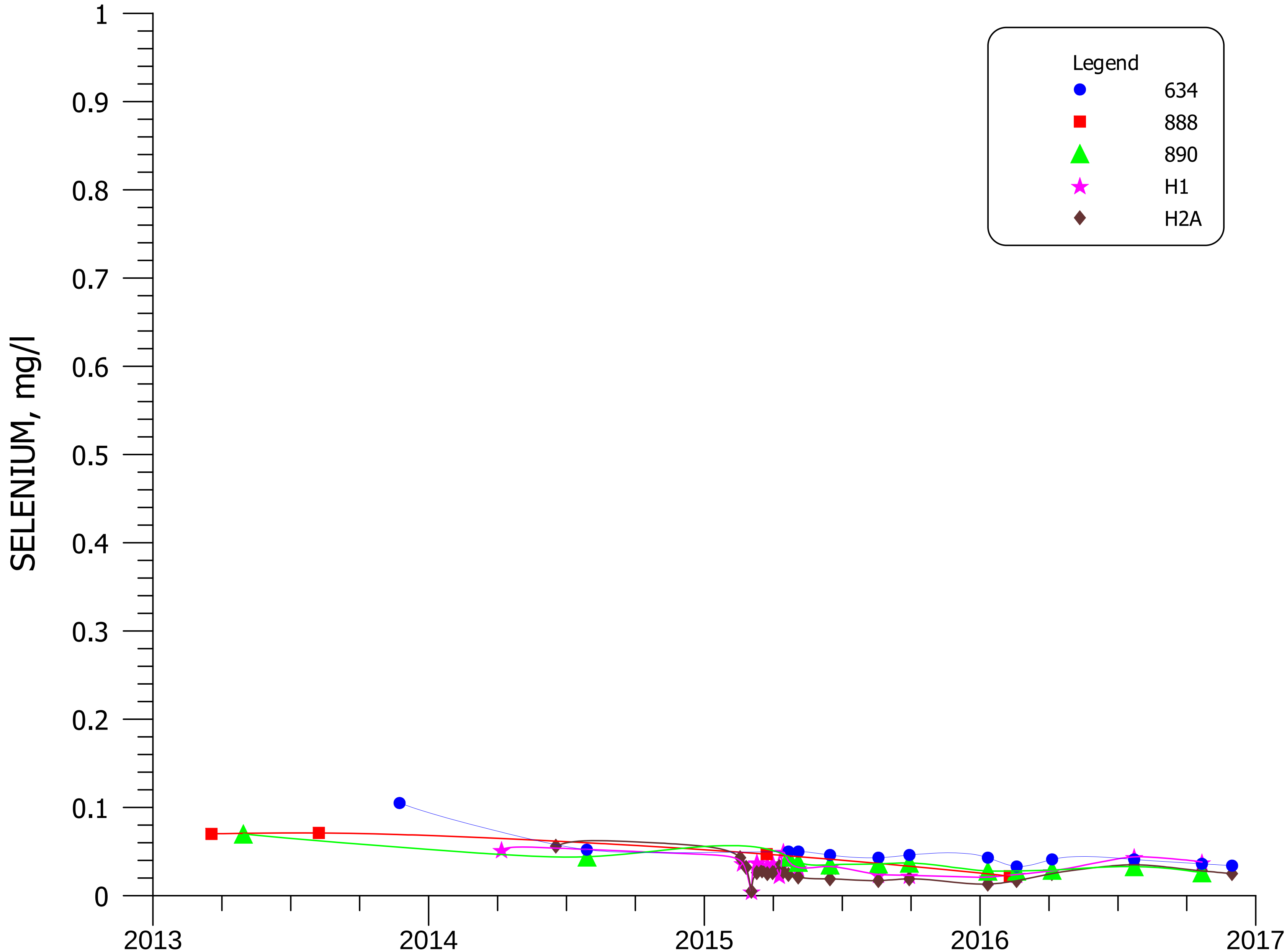

FIGURE 4.3-84A. SELENIUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

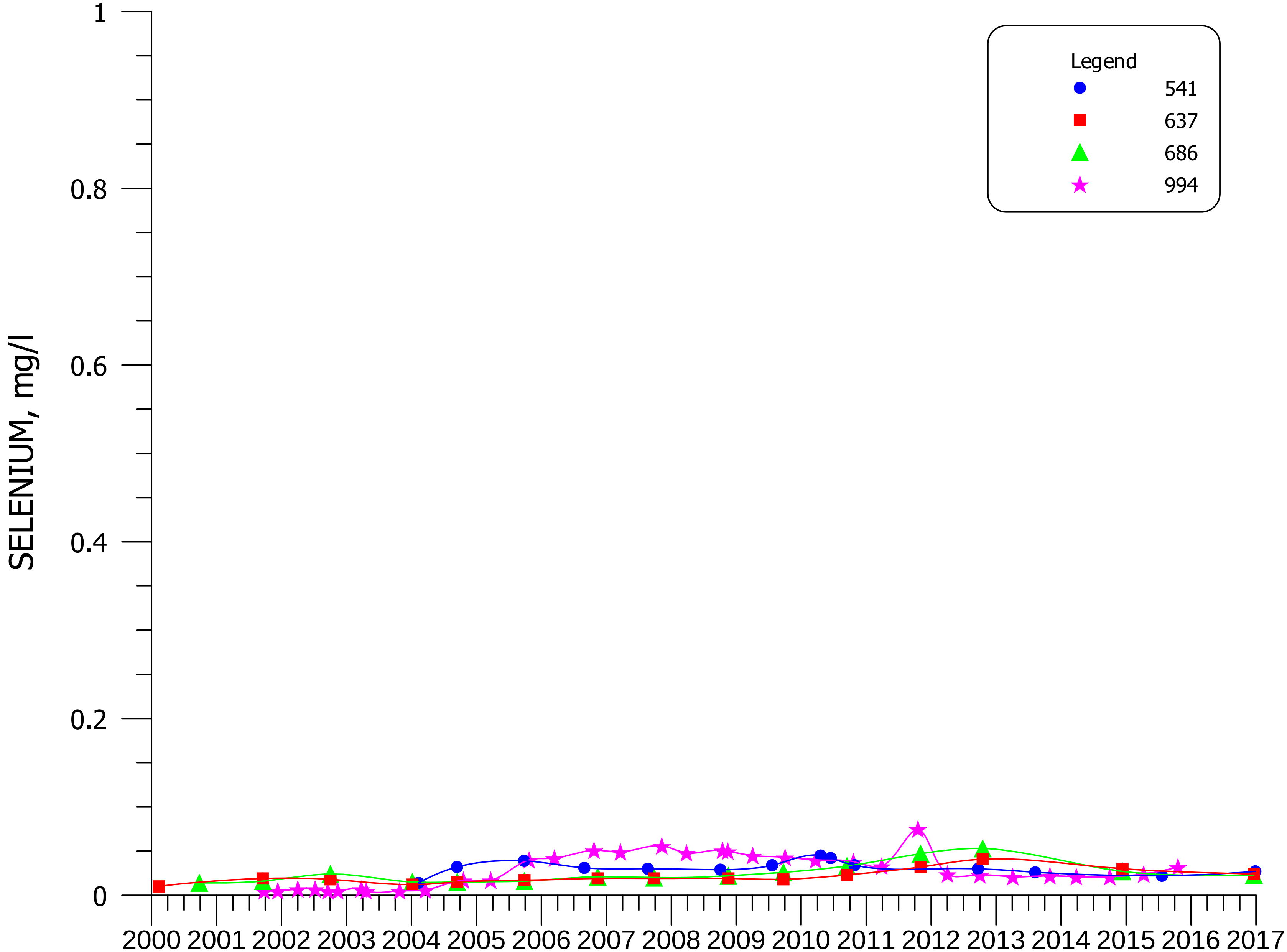

FIGURE 4.3-85. SELENIUM CONCENTRATIONS FOR WELLS 541, 637, 686, AND 994.

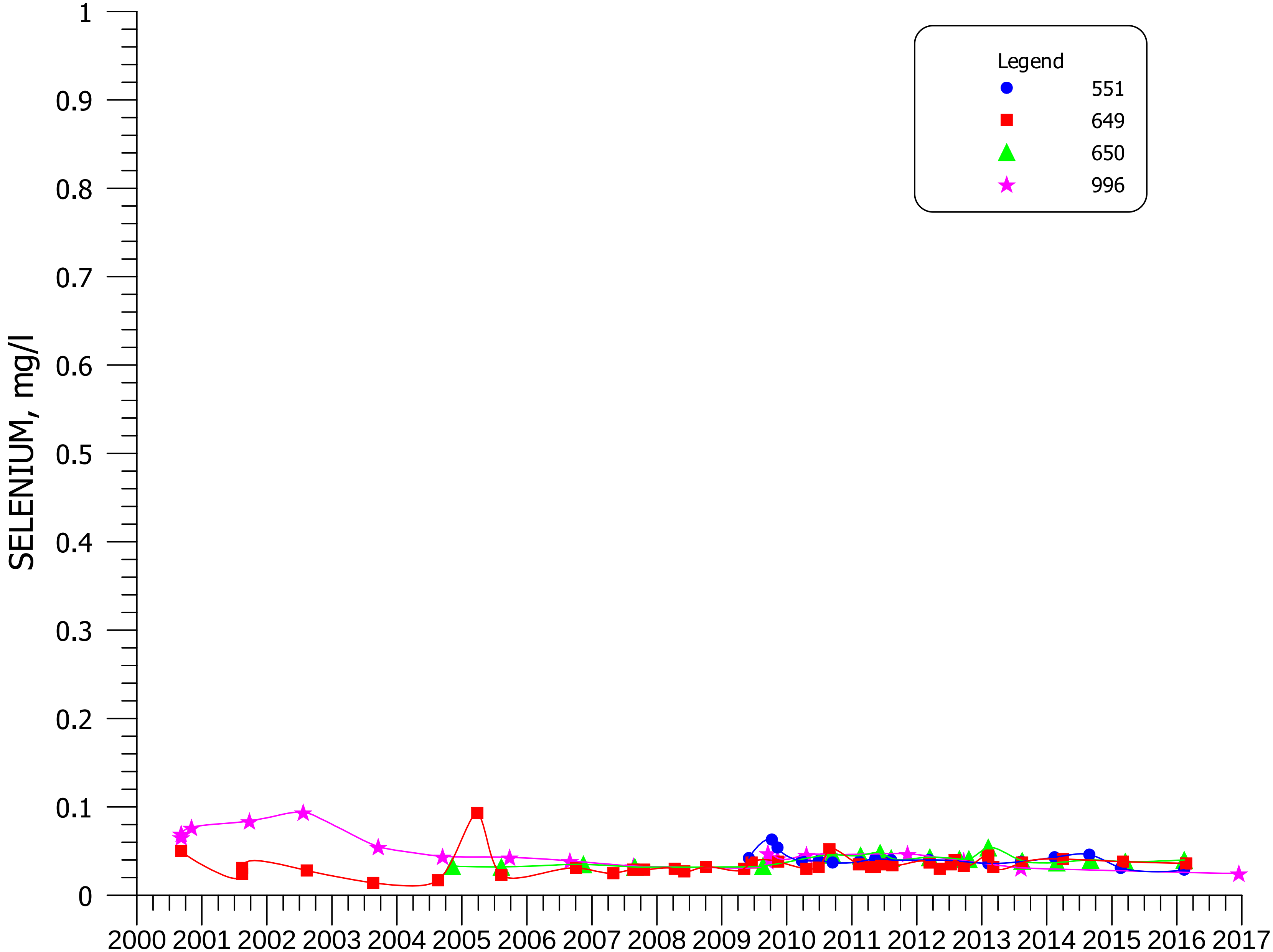

FIGURE 4.3-86. SELENIUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

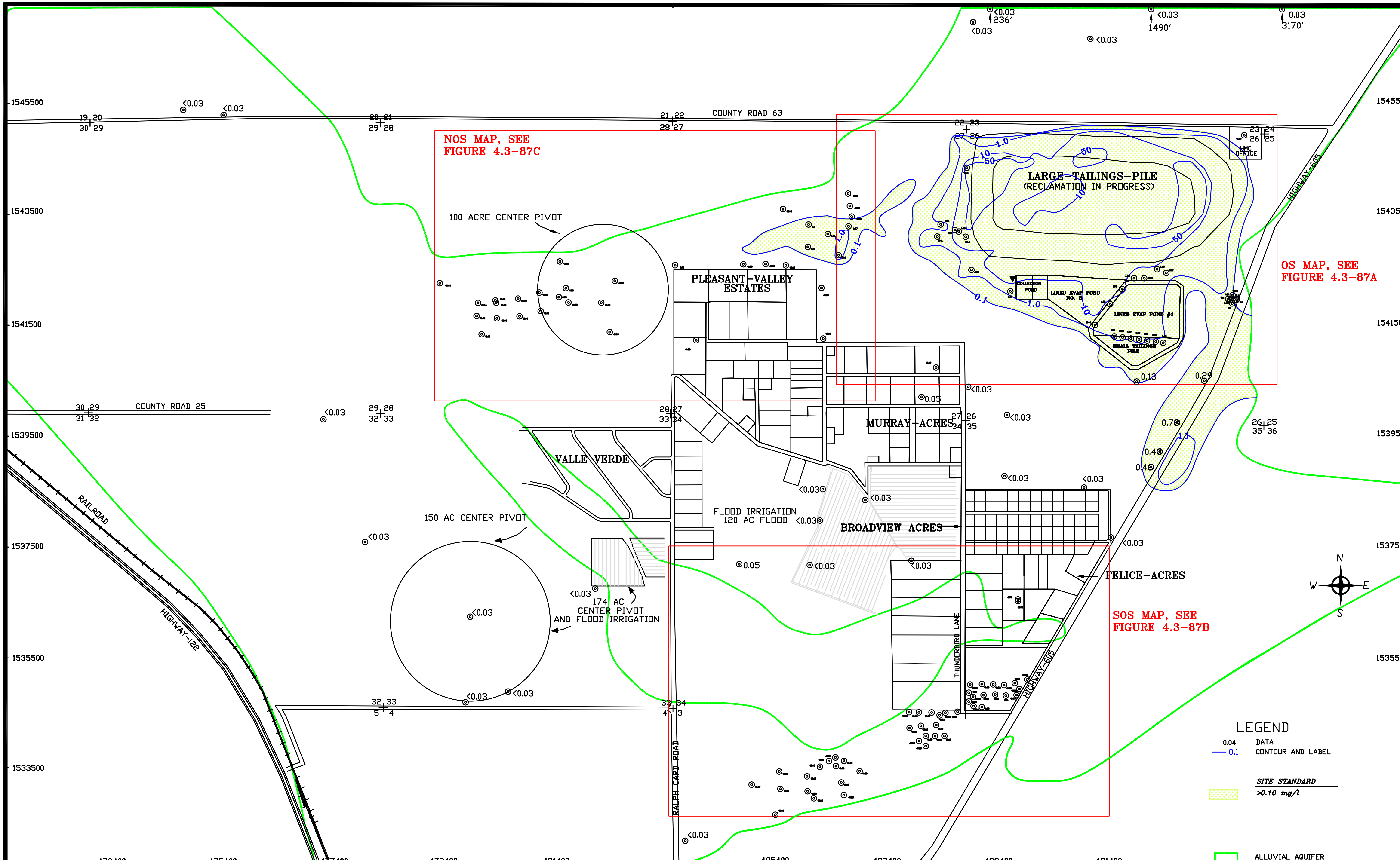

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FIGURE 4.3-87. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l

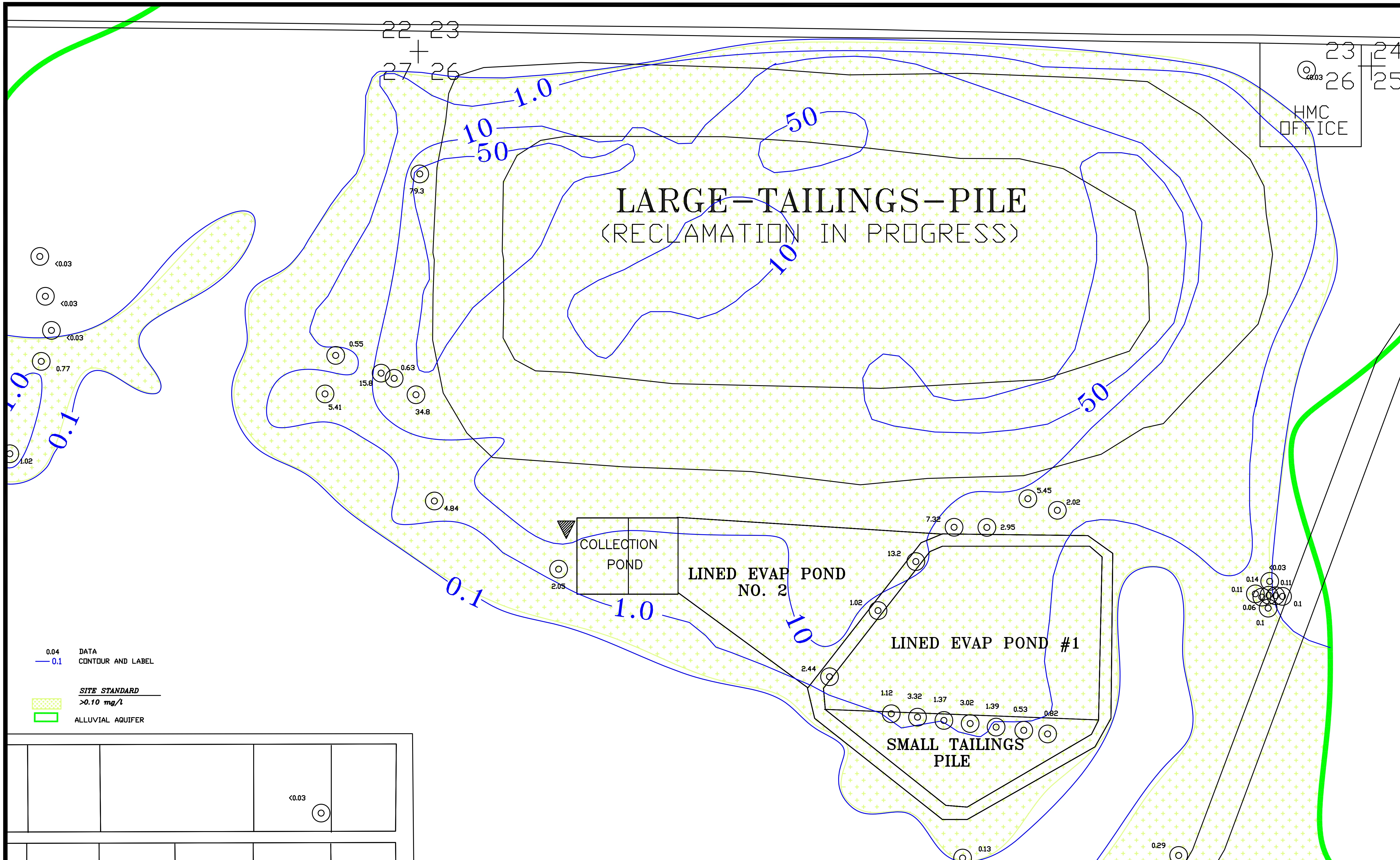

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FIGURE 4.3-87A. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

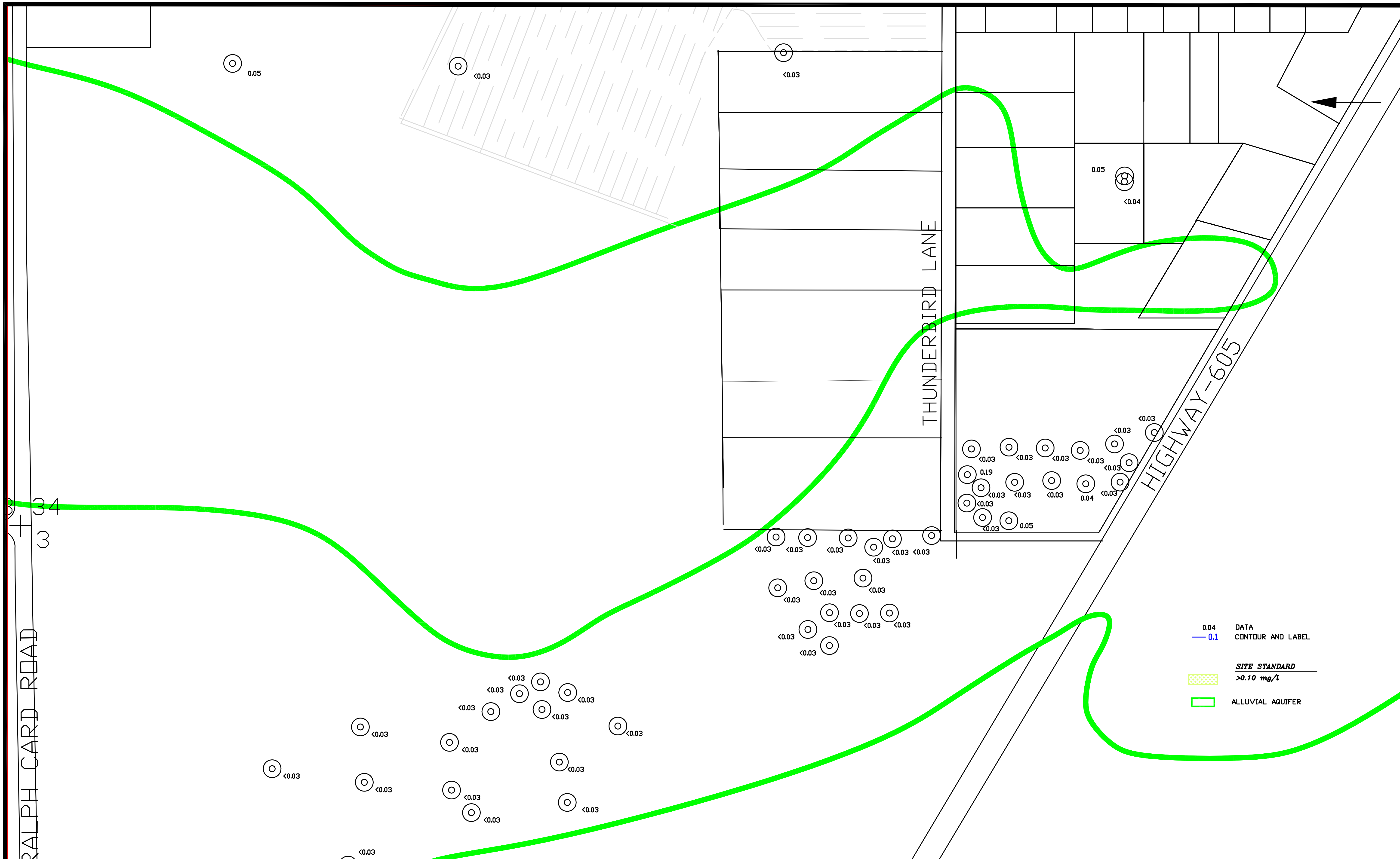

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FIGURE 4.3-87B. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l

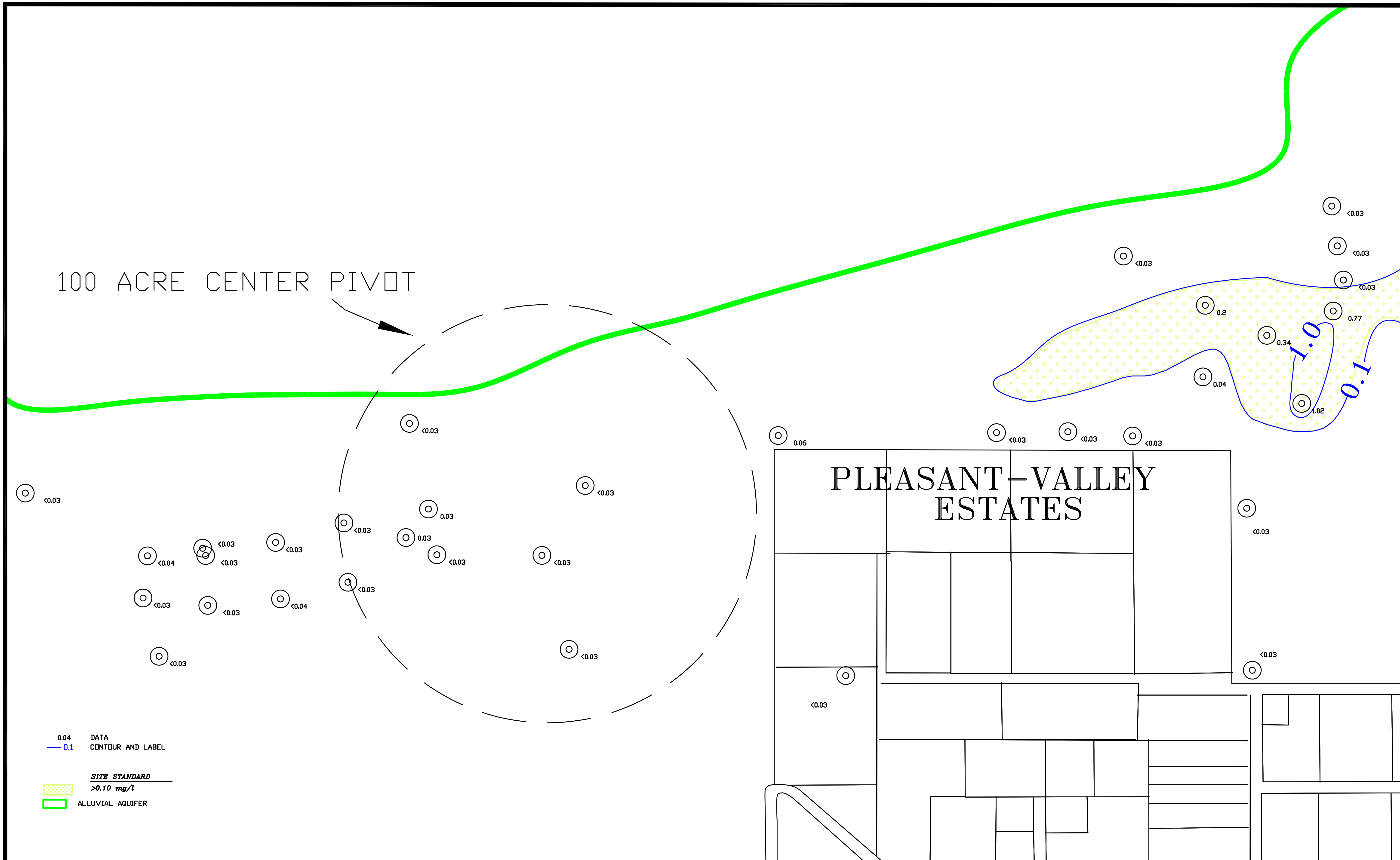

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FIGURE 4.3-87C. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

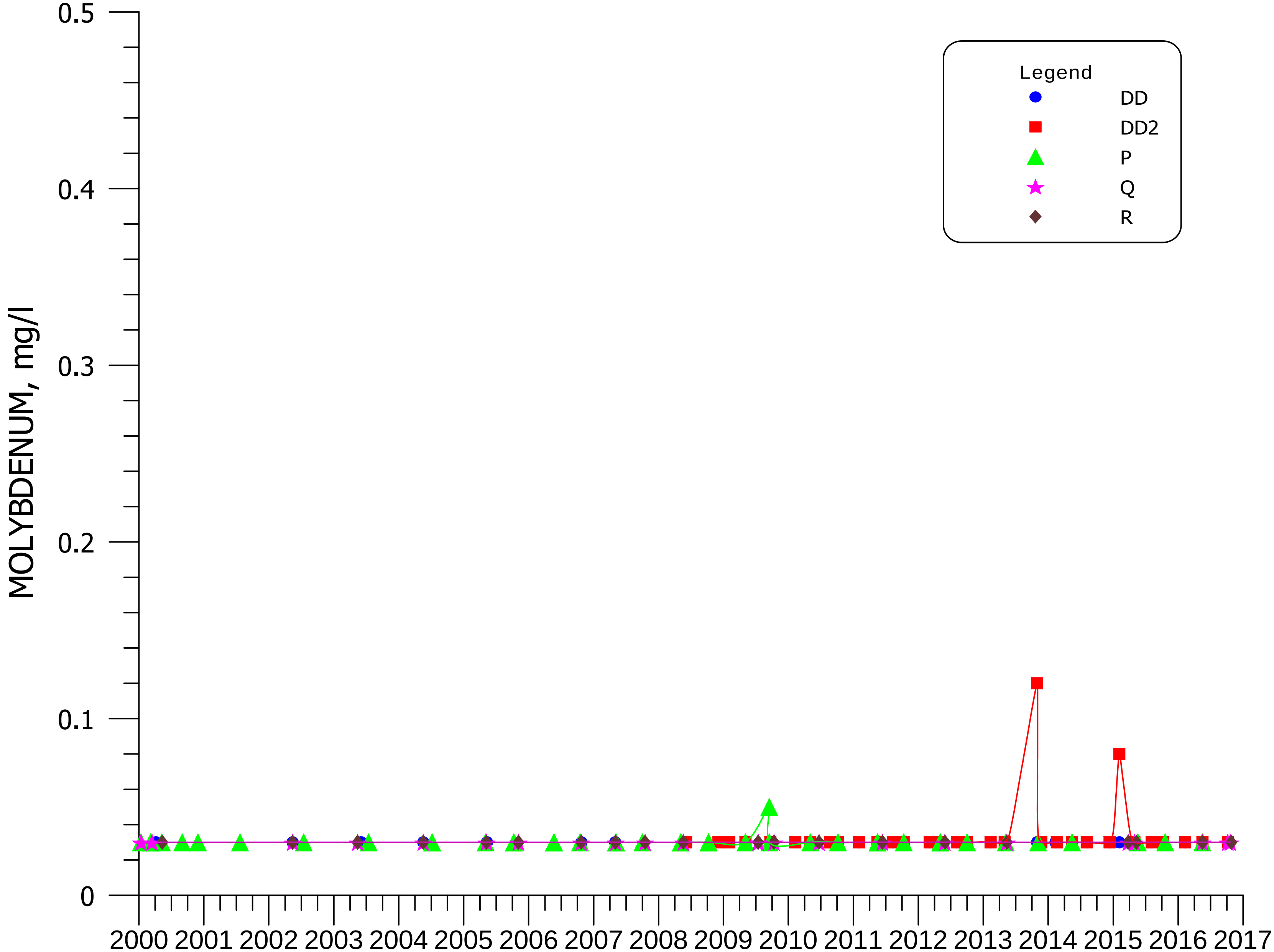

FIGURE 4.3-88. MOLYBDENUM CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

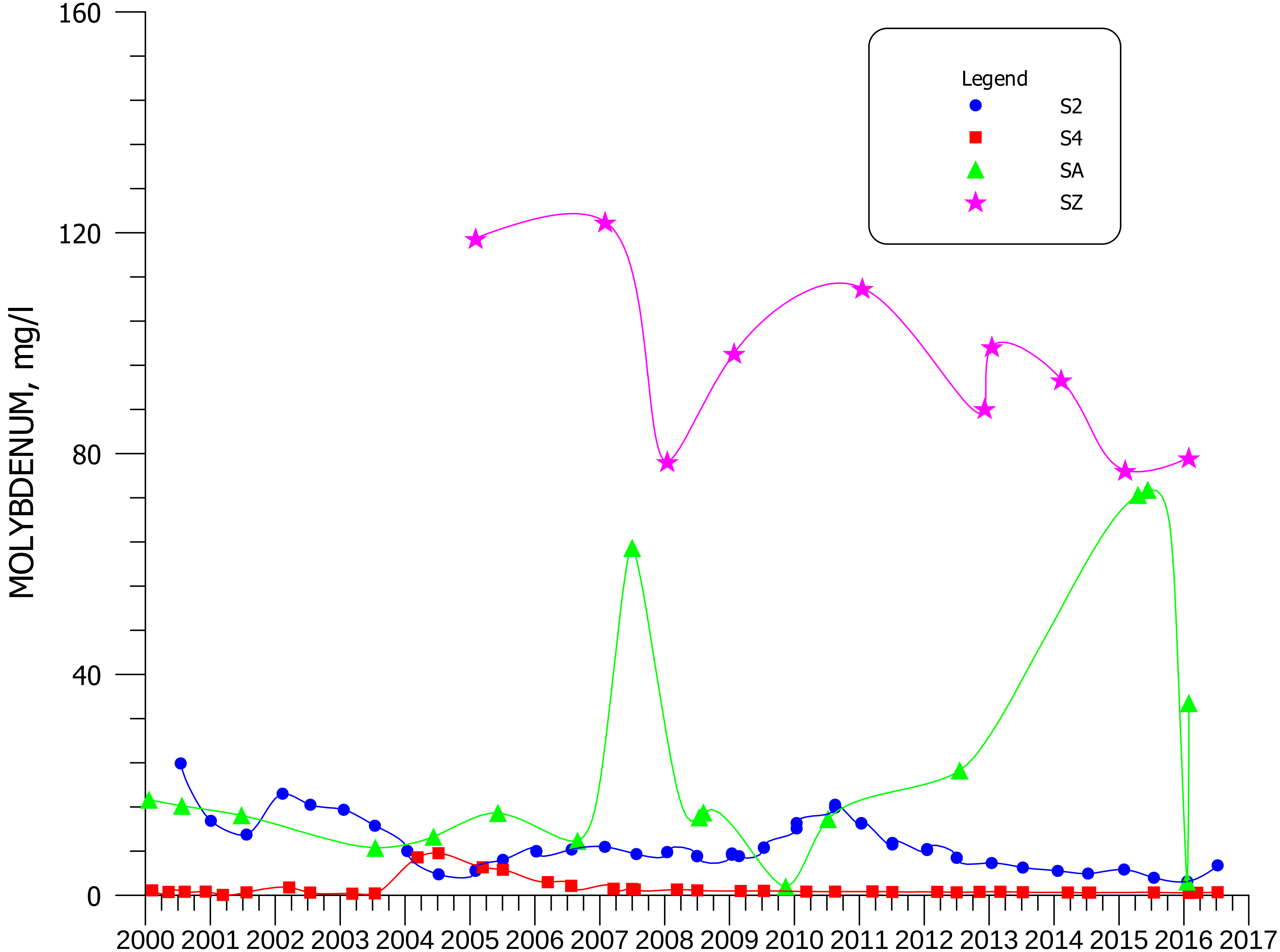

FIGURE 4.3-89. MOLYBDENUM CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

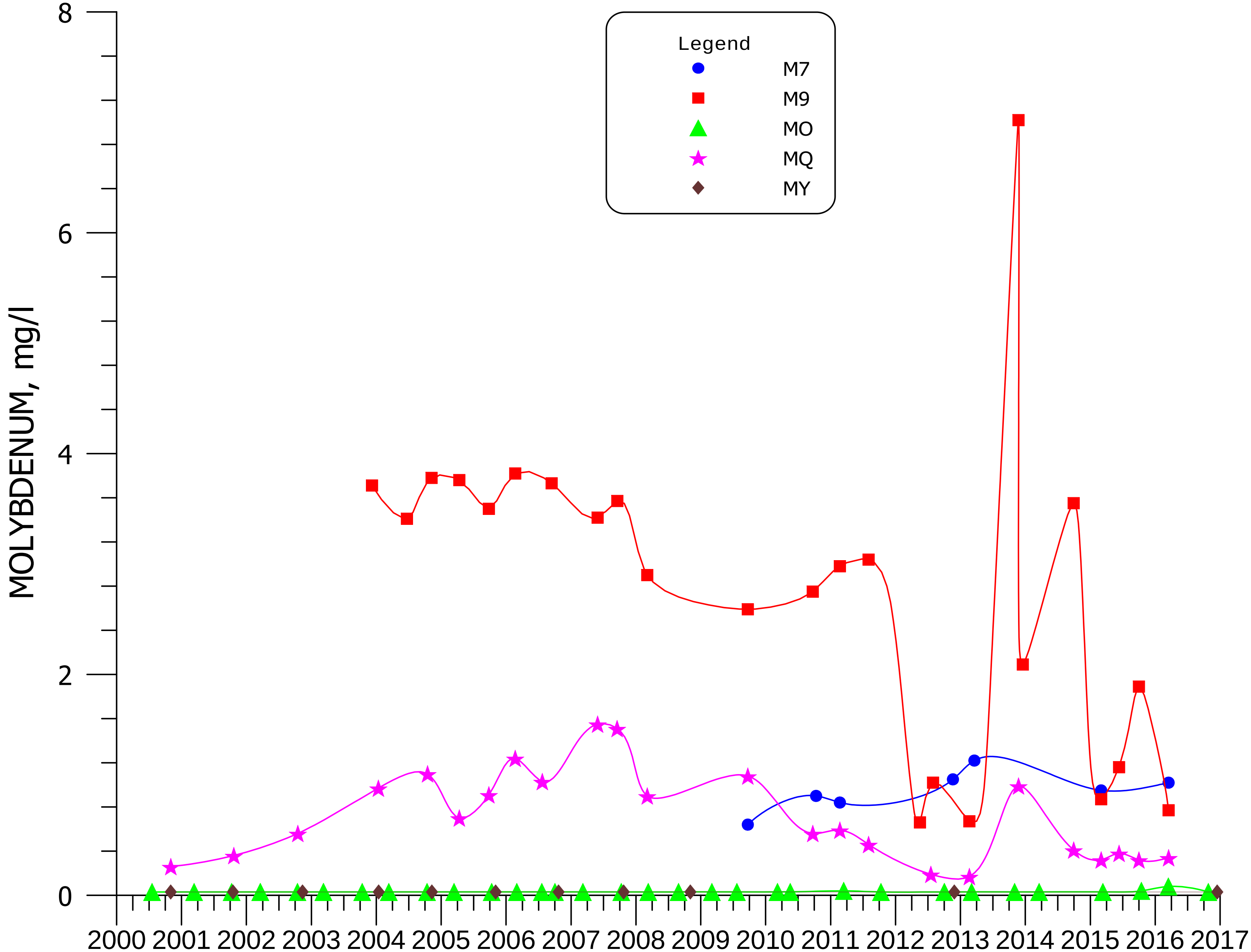

FIGURE 4.3-90. MOLYBDENUM CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

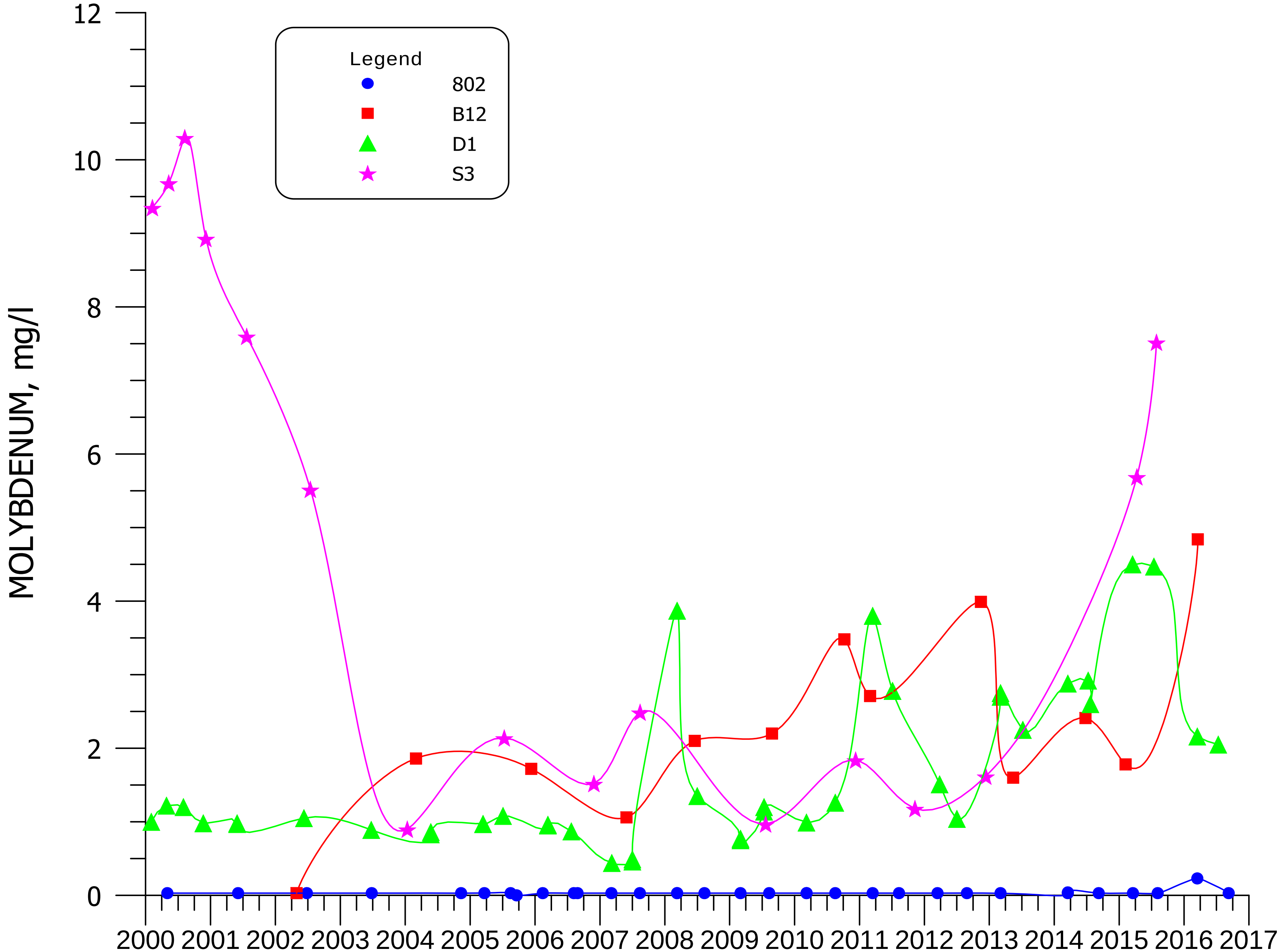

FIGURE 4.3-91. MOLYBDENUM CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

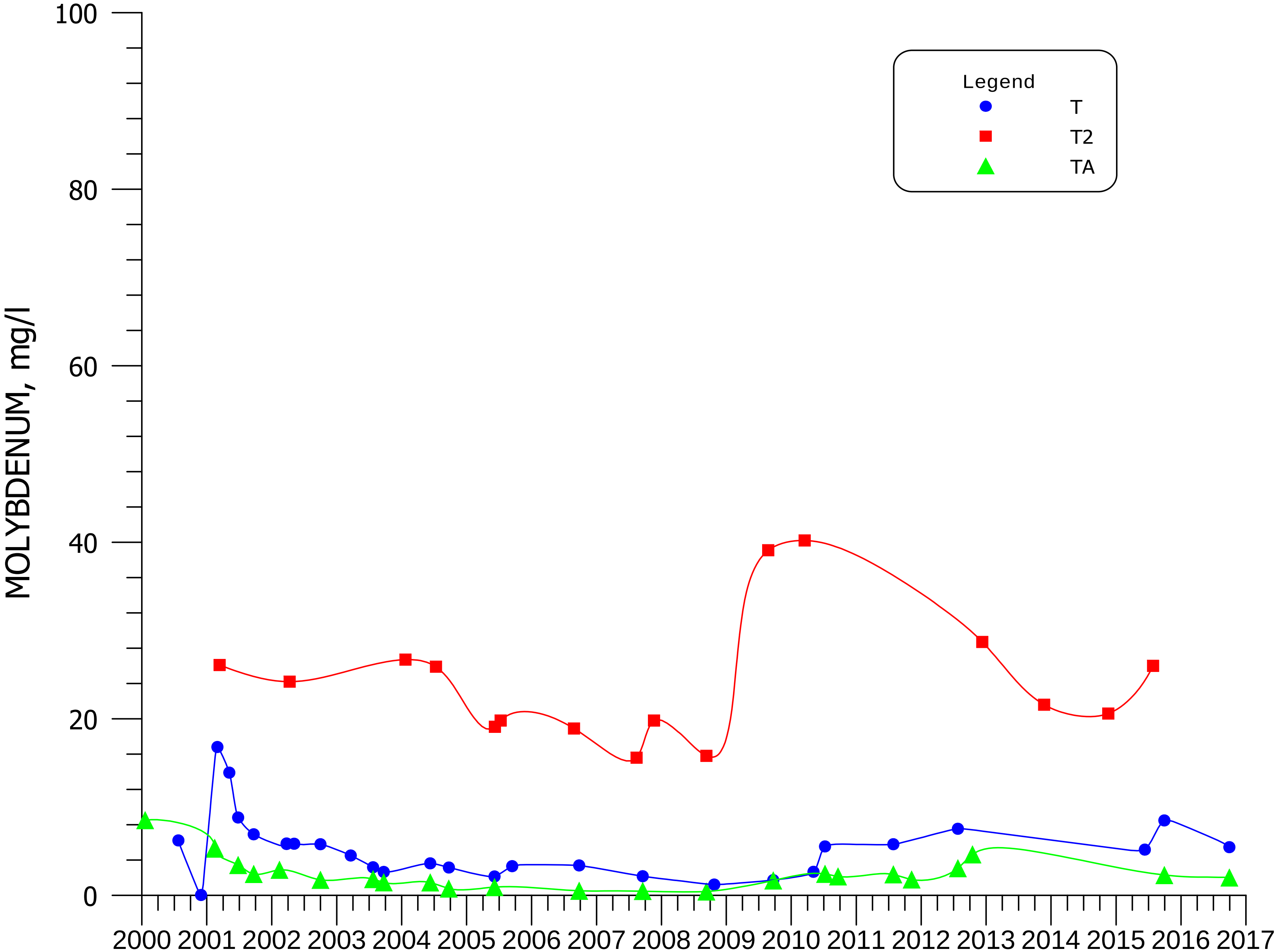

FIGURE 4.3-92. MOLYBDENUM CONCENTRATIONS FOR WELLS T, T2, AND TA.

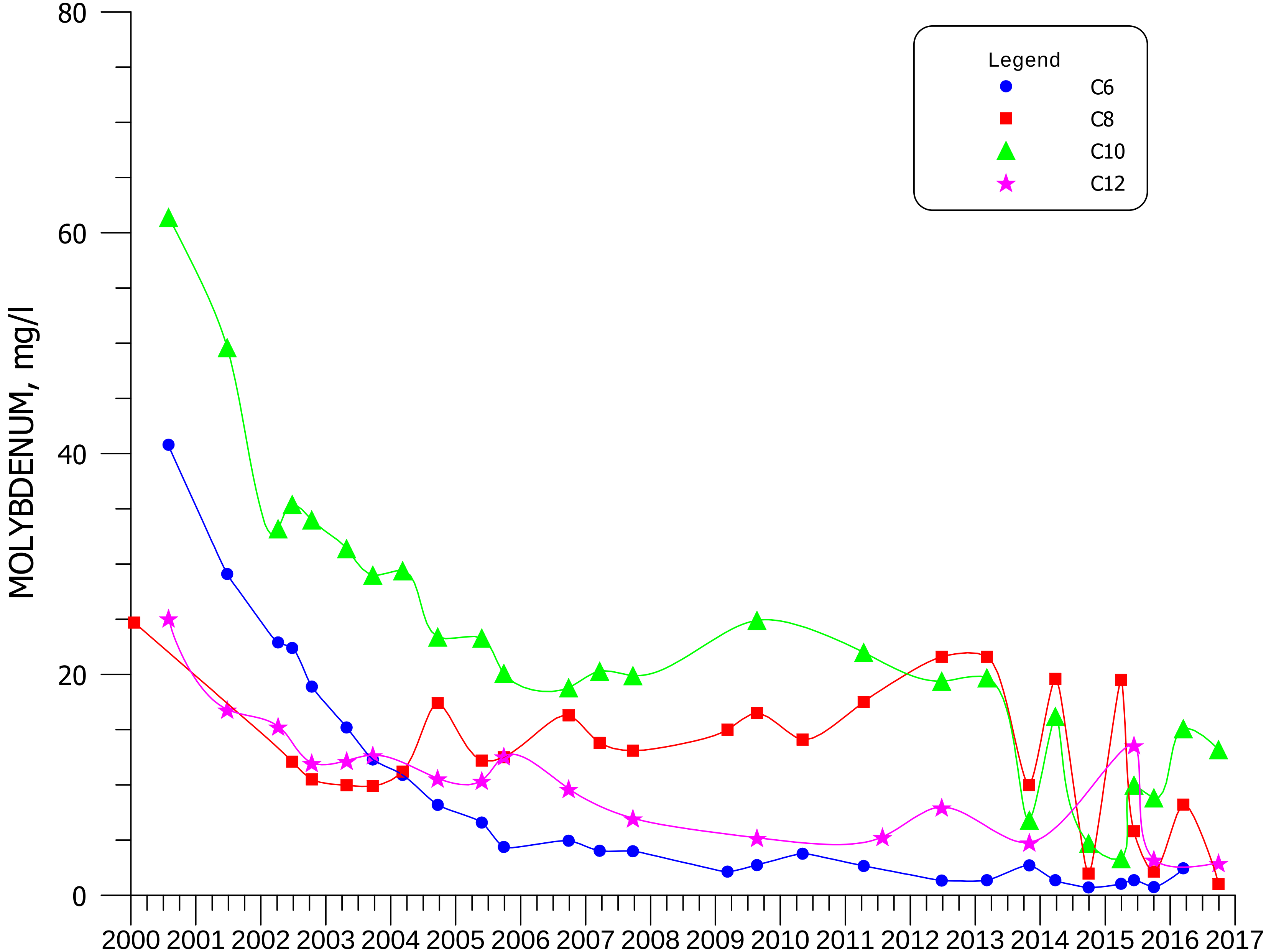

FIGURE 4.3-93. MOLYBDENUM CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

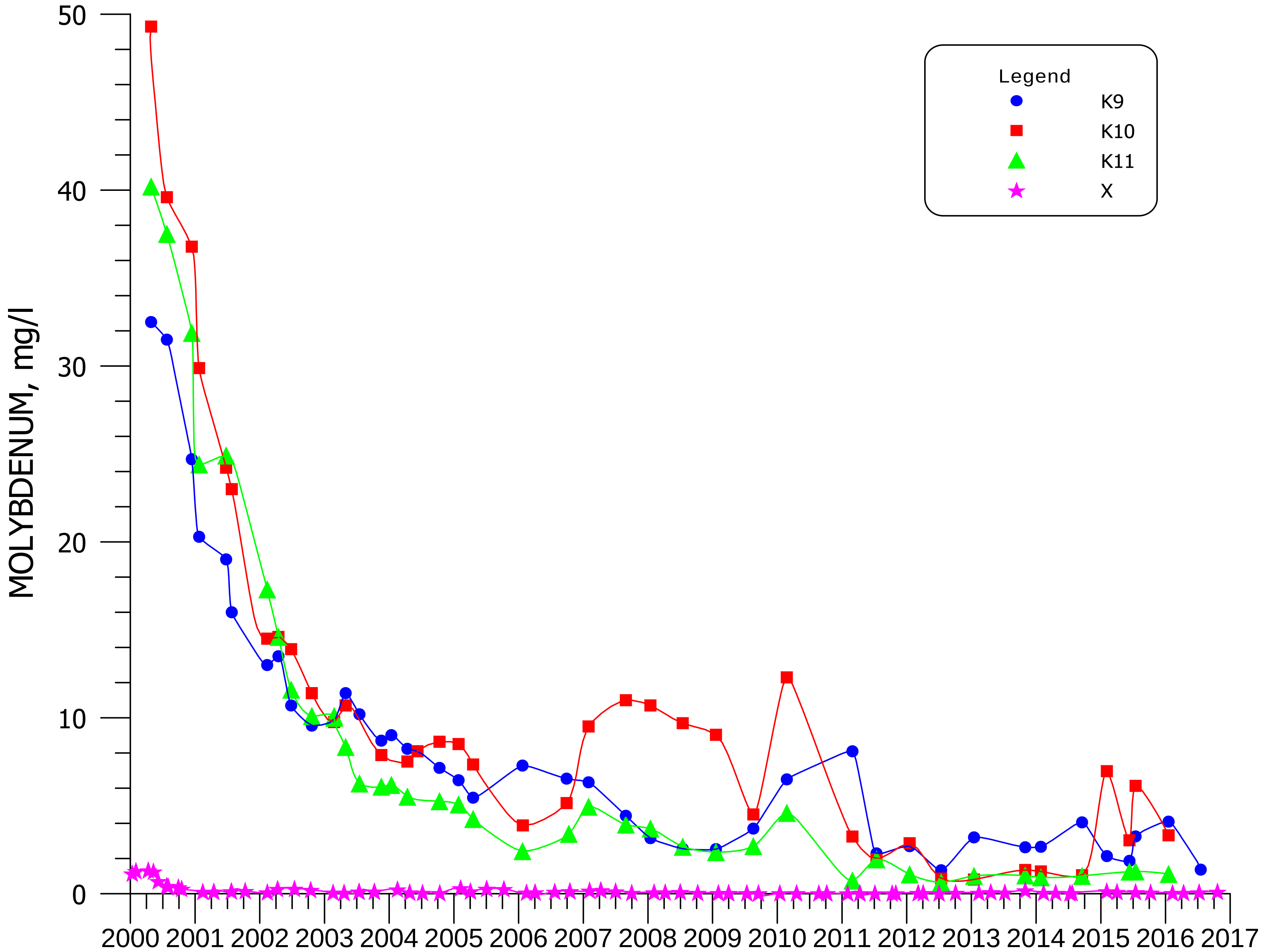

FIGURE 4.3-94. MOLYBDENUM CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

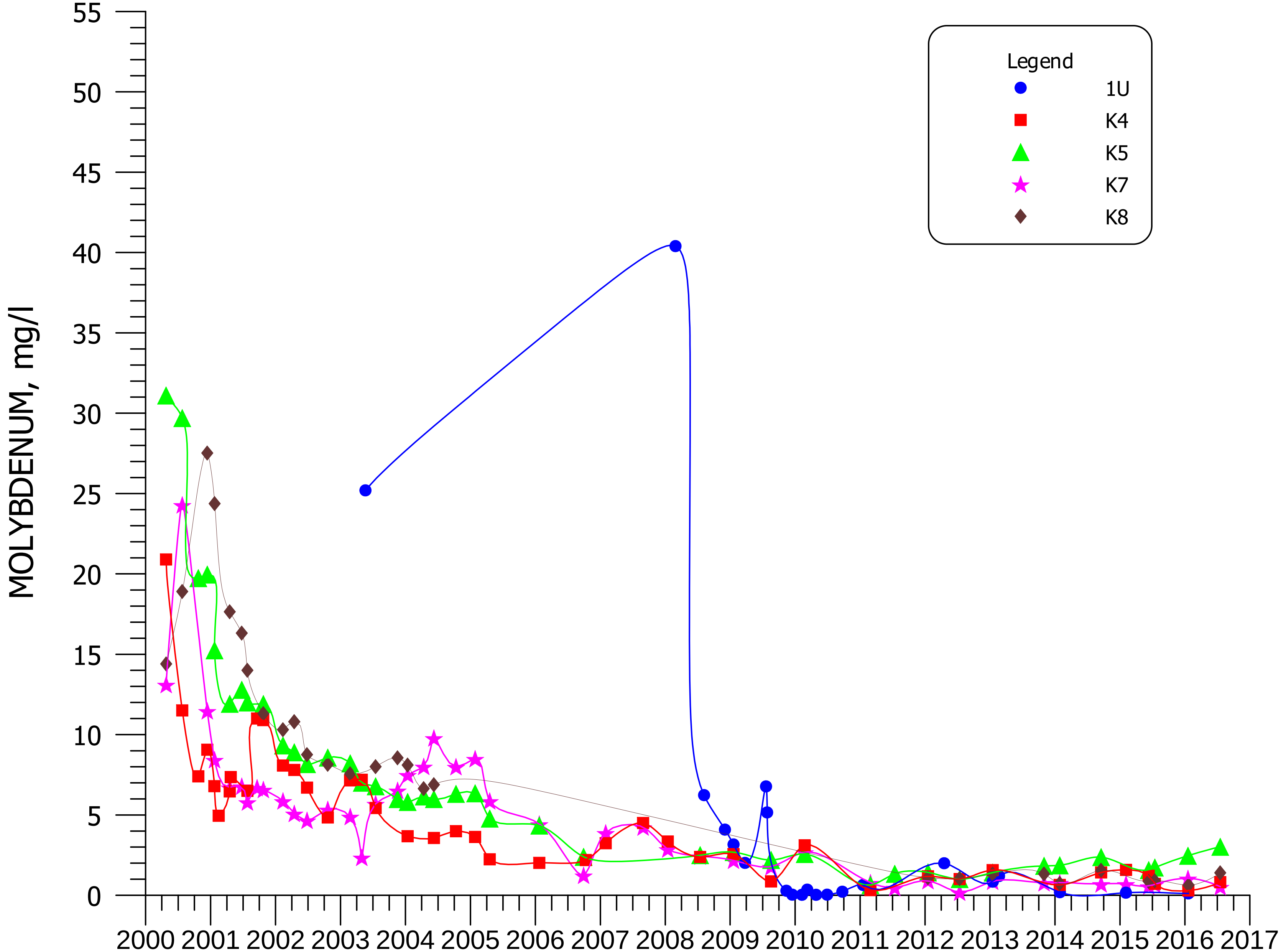

FIGURE 4.3-95. MOLYBDENUM CONCENTRATIONS FOR WELLS 1U, K4, K5, K7, AND K8.

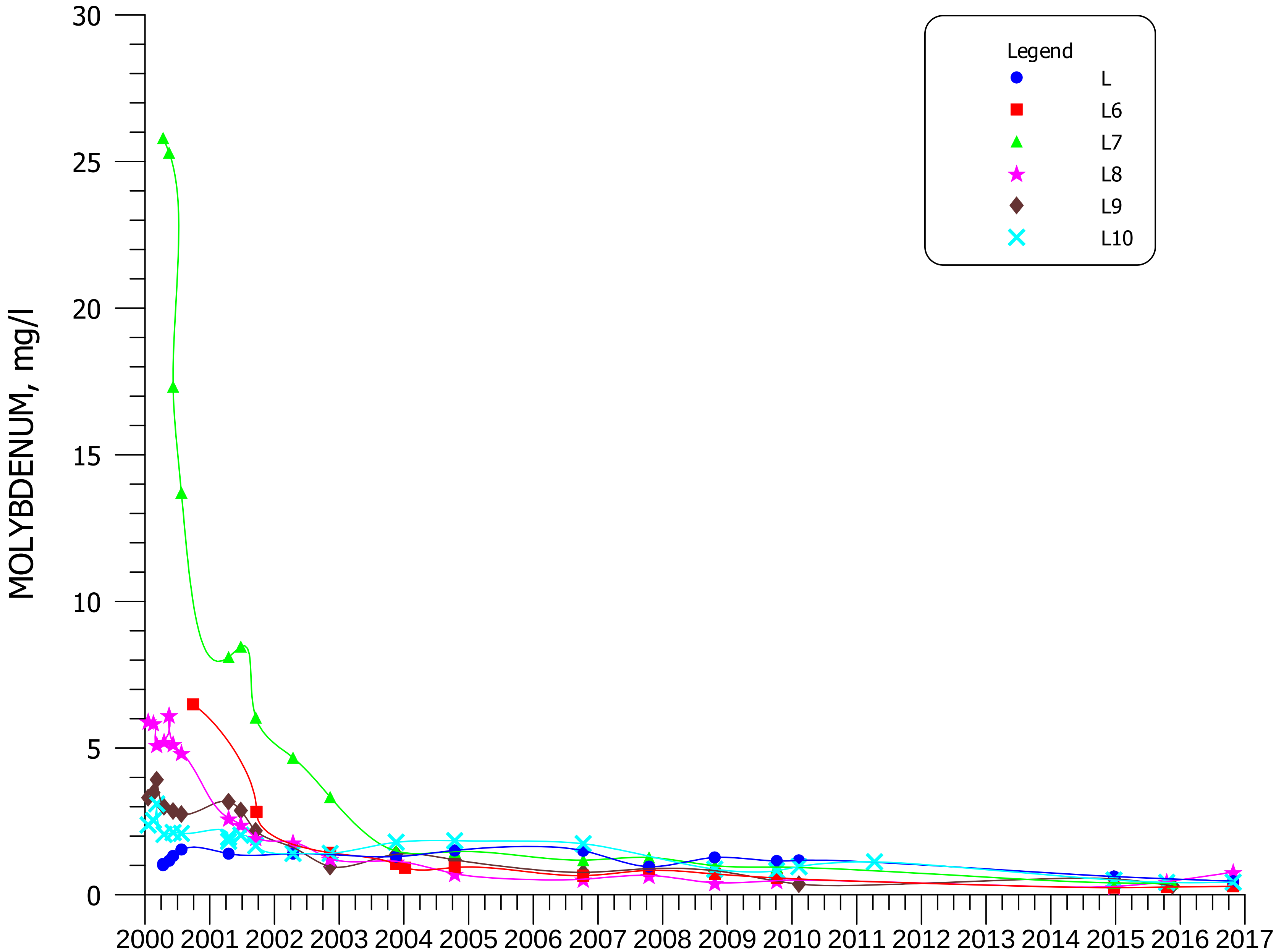

FIGURE 4.3-96. MOLYBDENUM CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

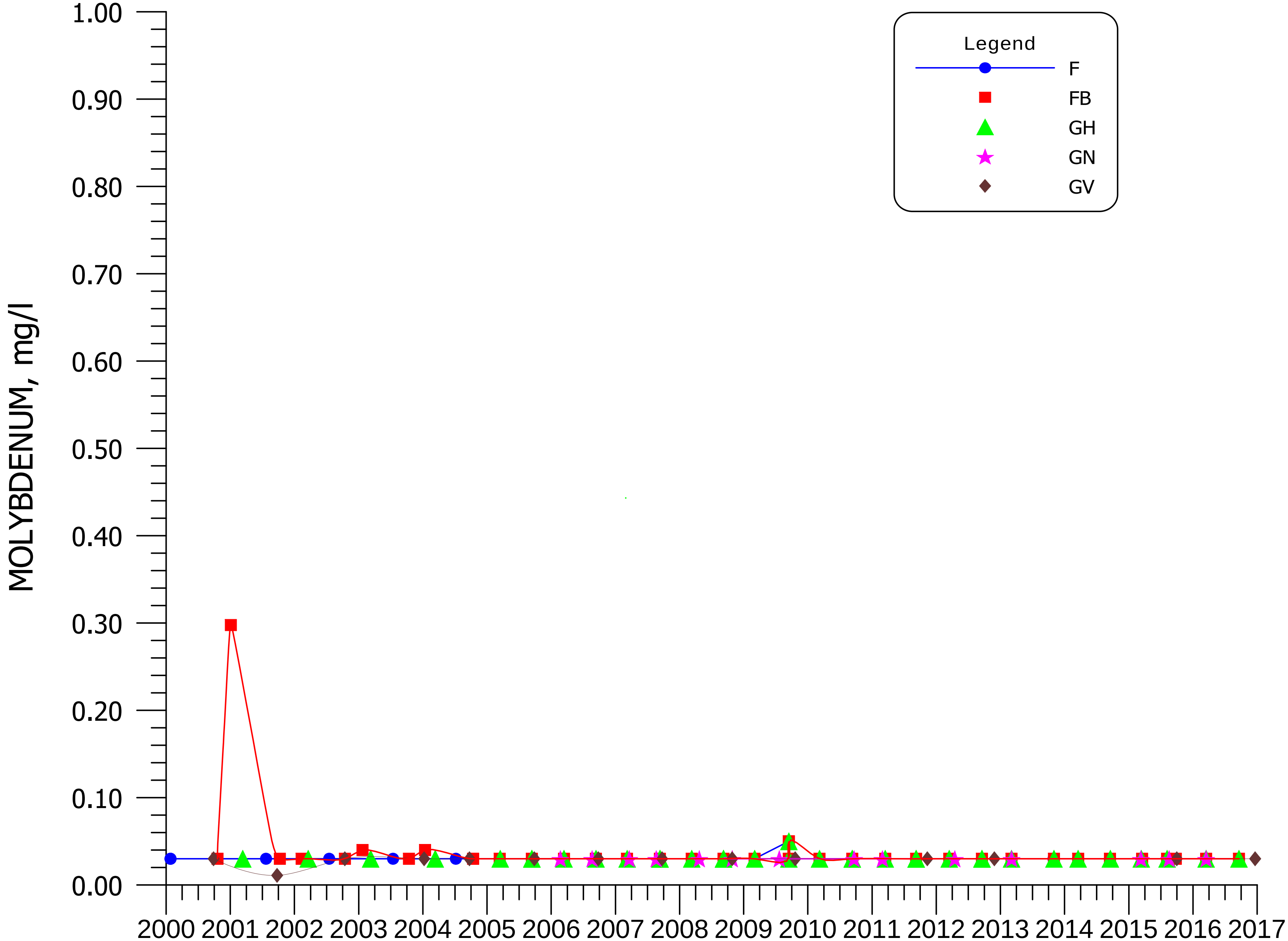

FIGURE 4.3-97. MOLYBDENUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

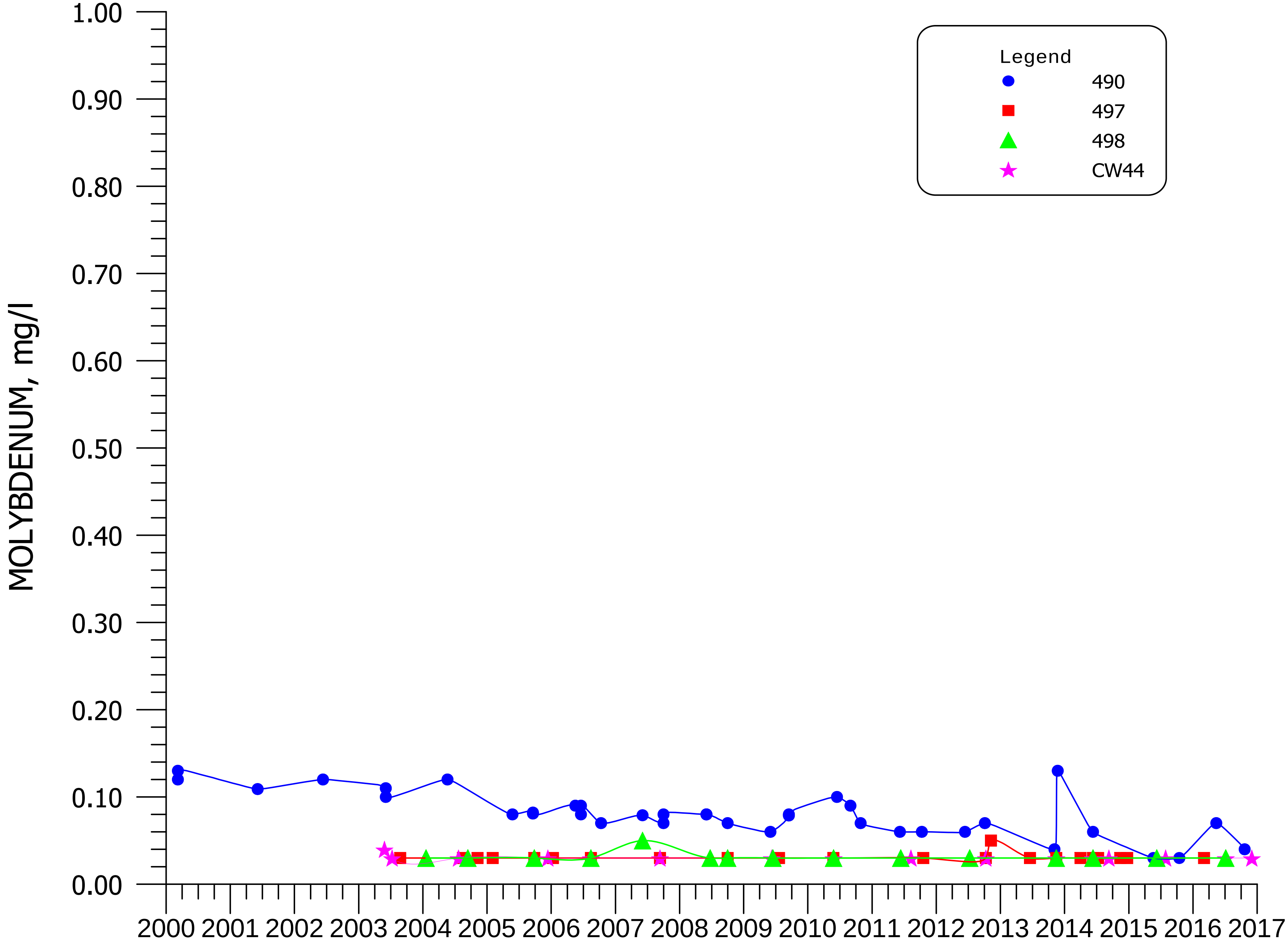

FIGURE 4.3-98. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

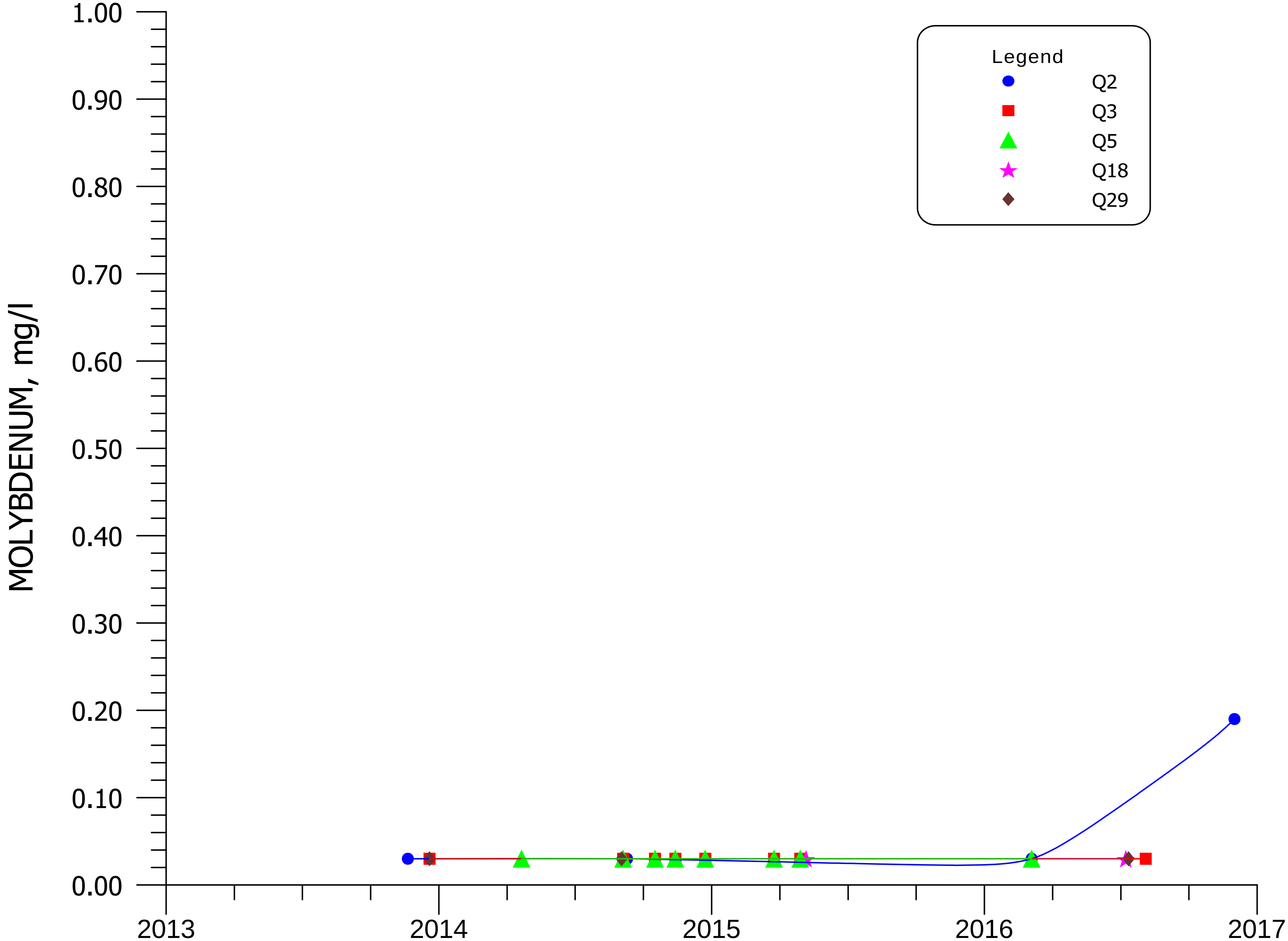

FIGURE 4.3-98A. MOLYBDENUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18, AND Q29.

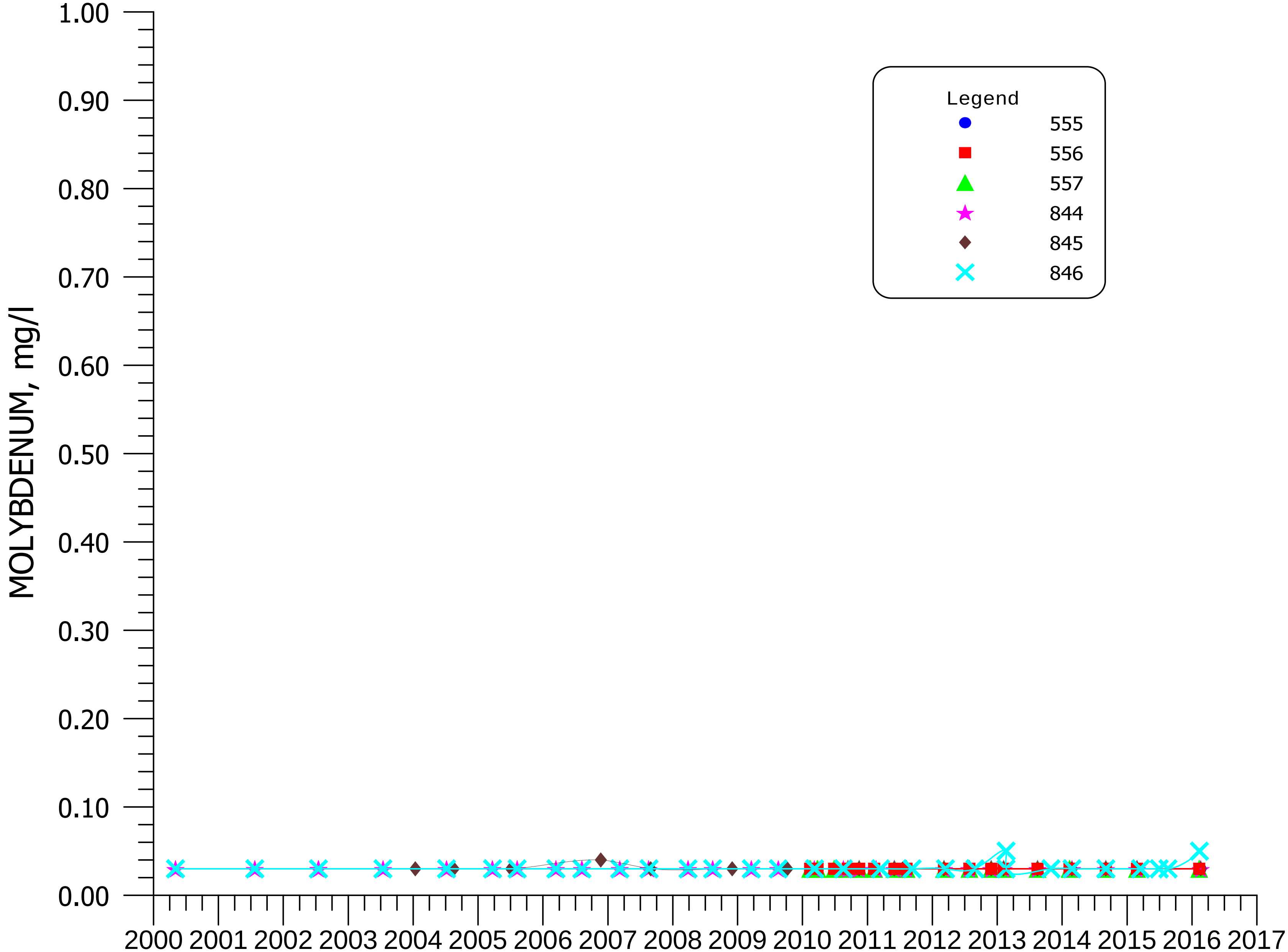

FIGURE 4.3-99. MOLYBDENUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

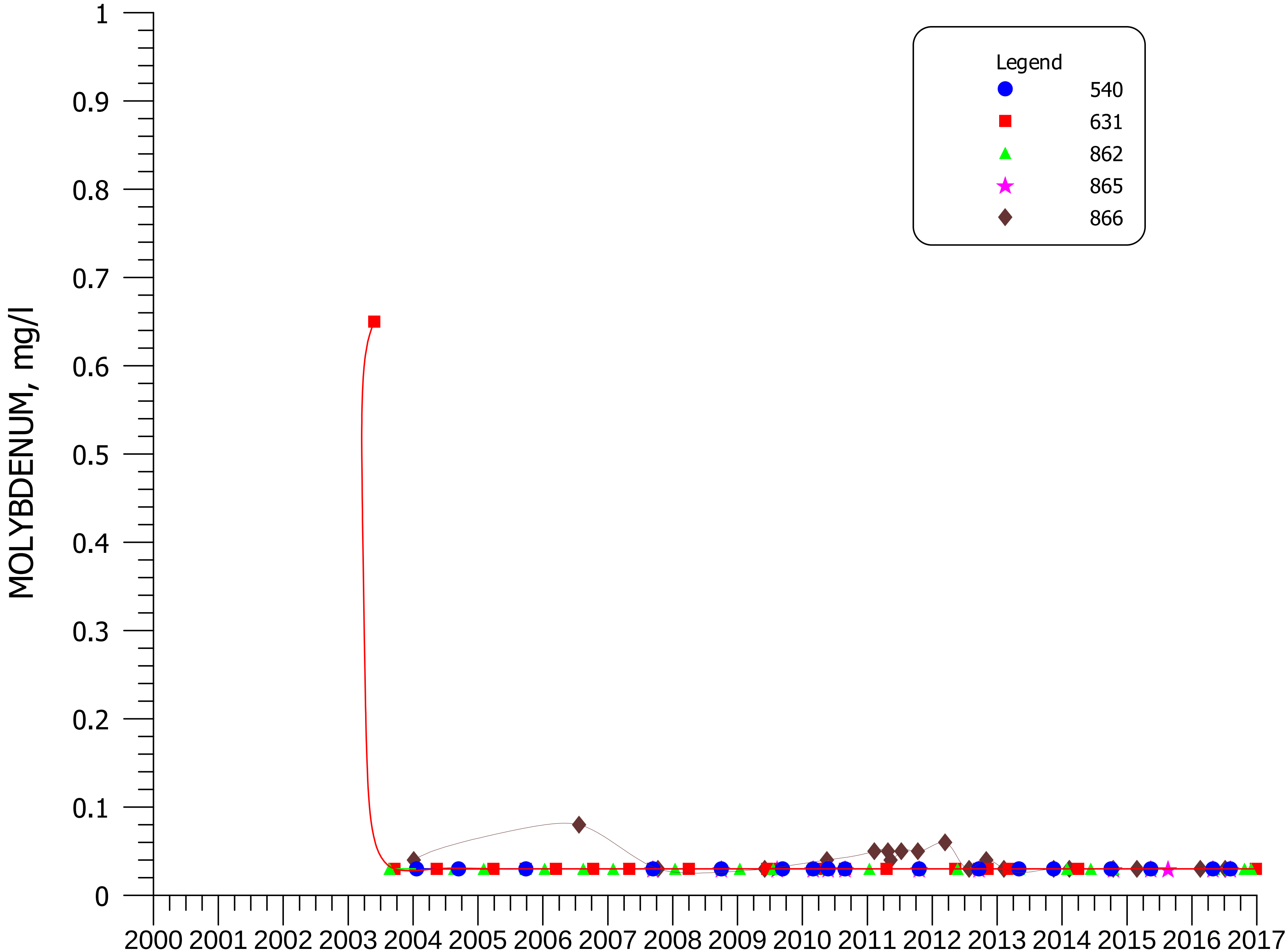

FIGURE 4.3-100. MOLYBDENUM CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

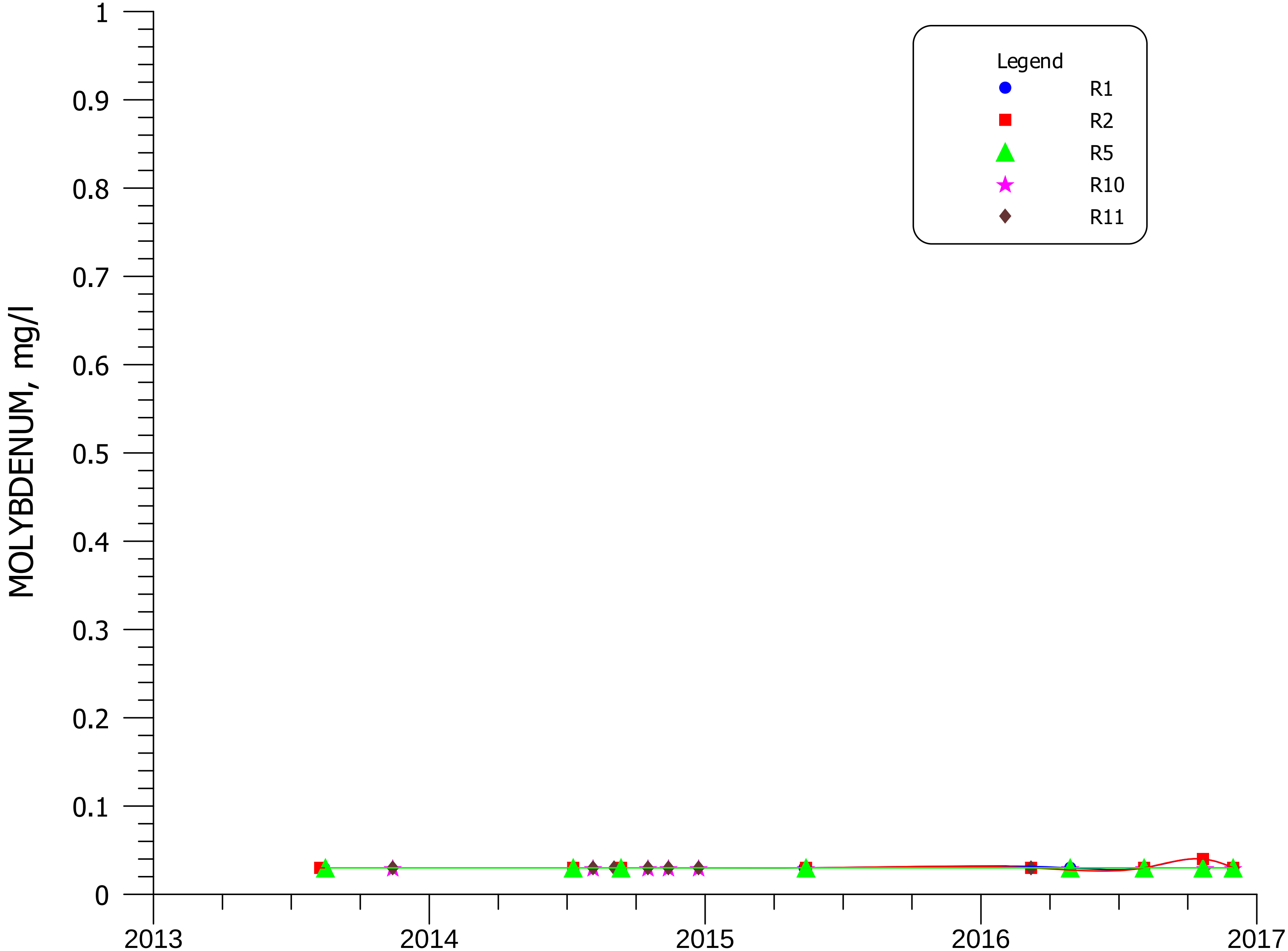

FIGURE 4.3-100A. MOLYBDENUM CONCENTRATIONS FOR WELLS R1, R2, R5, R10 AND R11.

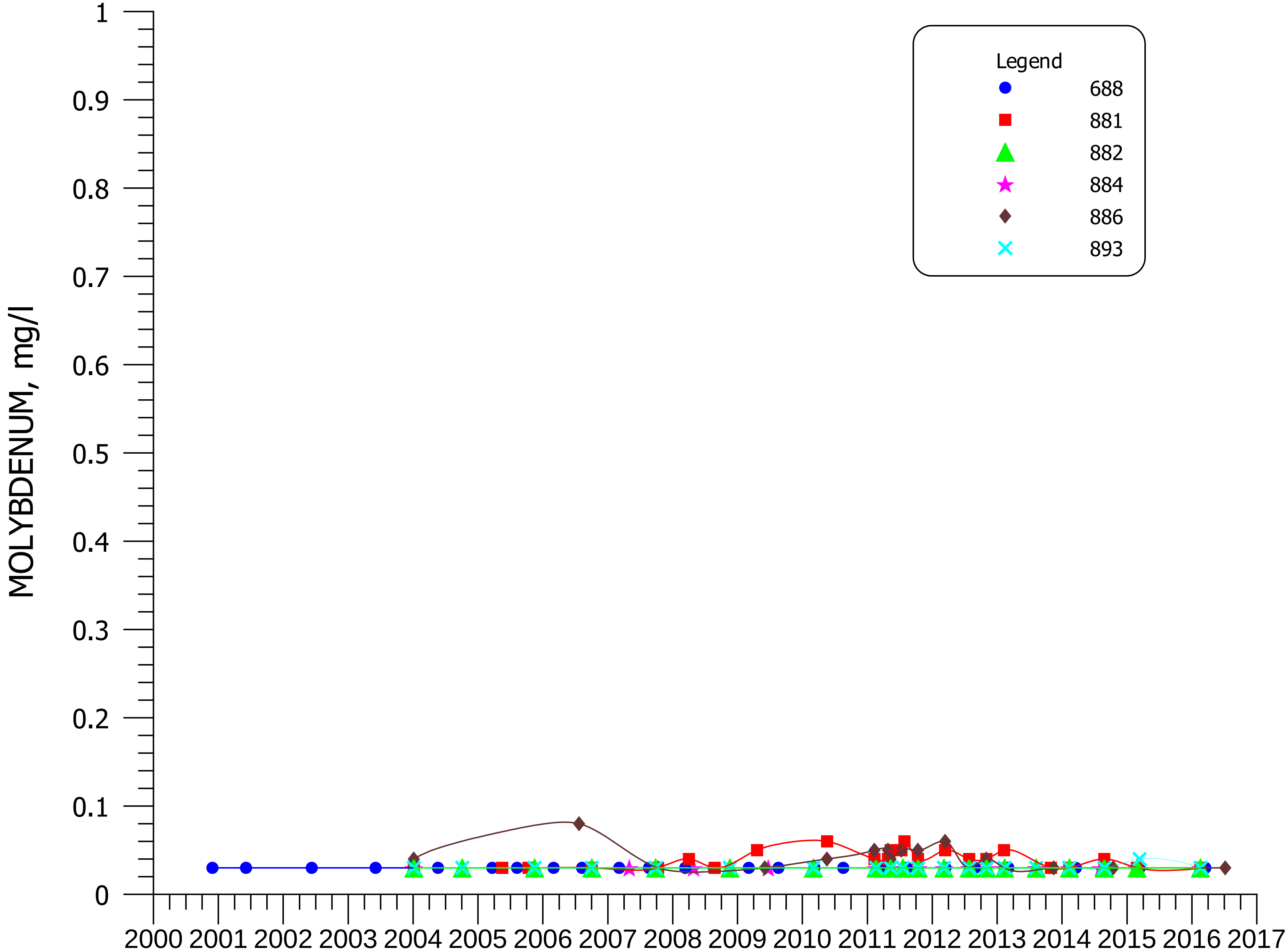

FIGURE 4.3-101. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

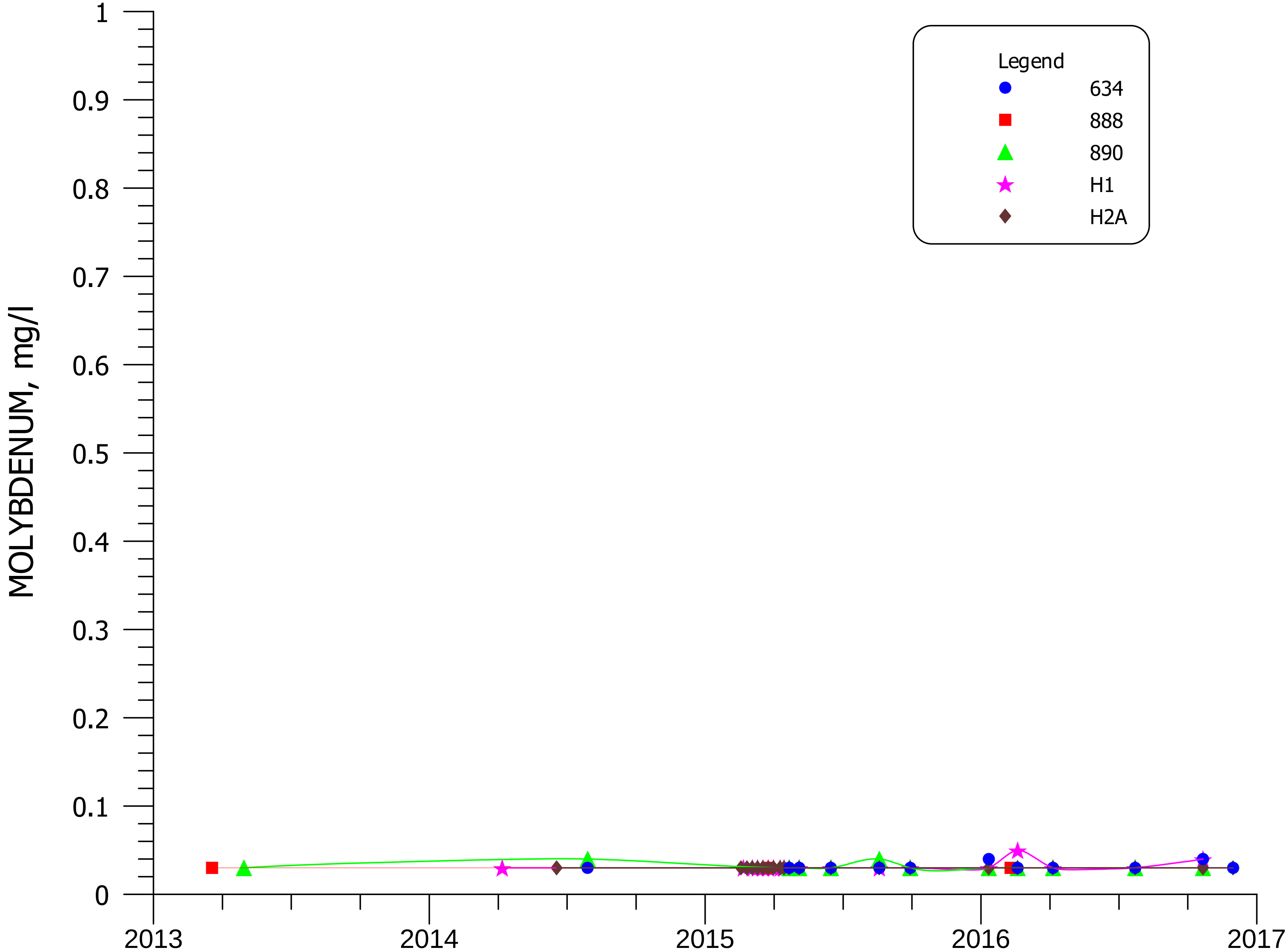

FIGURE 4.3-101A. MOLYBDENUM CONCENTRATIONS FOR WELLS 634, 888, 890, H1, AND H2A.

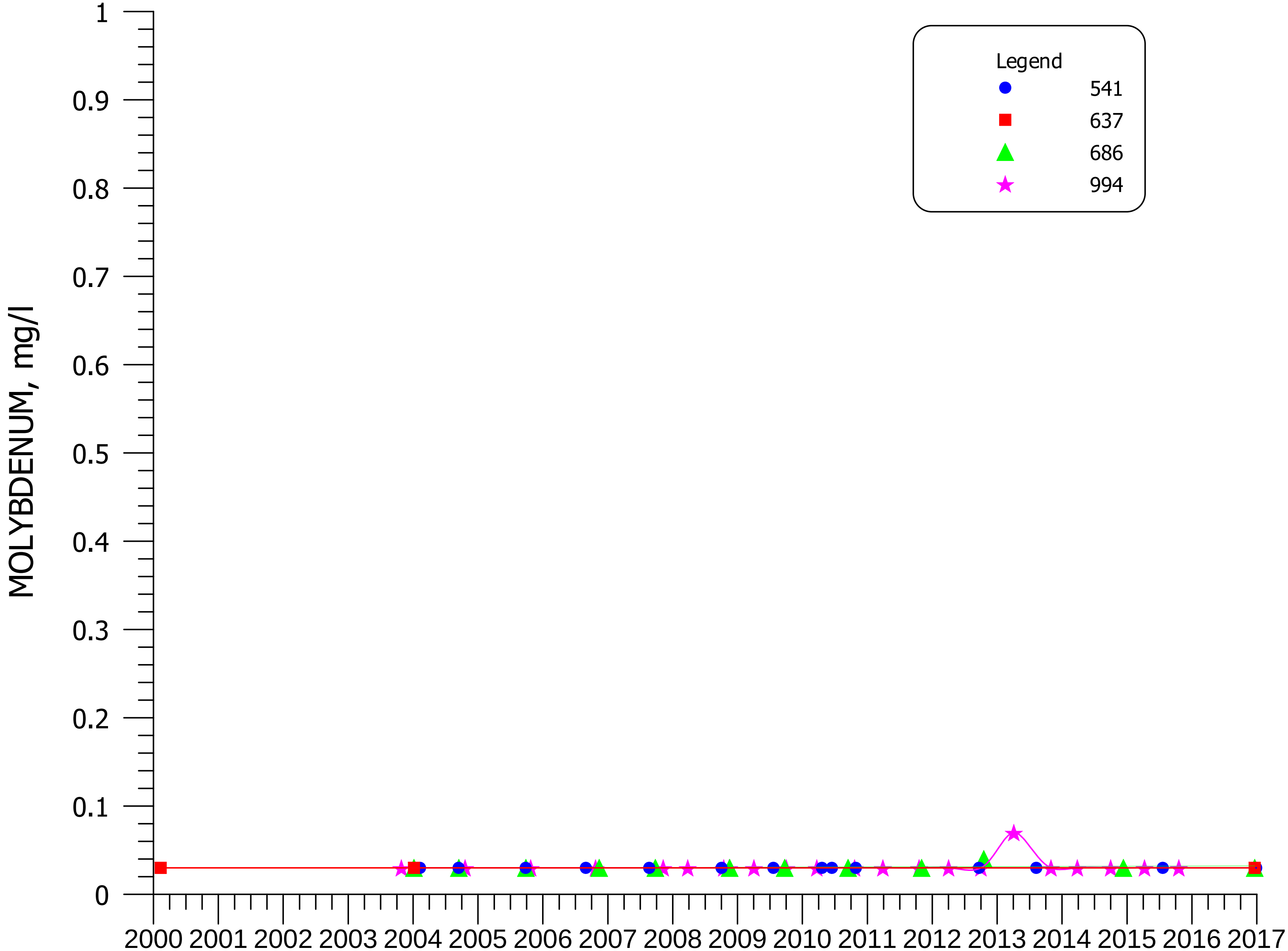

FIGURE 4.3-102. MOLYBDENUM CONCENTRATIONS FOR WELLS 541, 637, 686, AND 994.

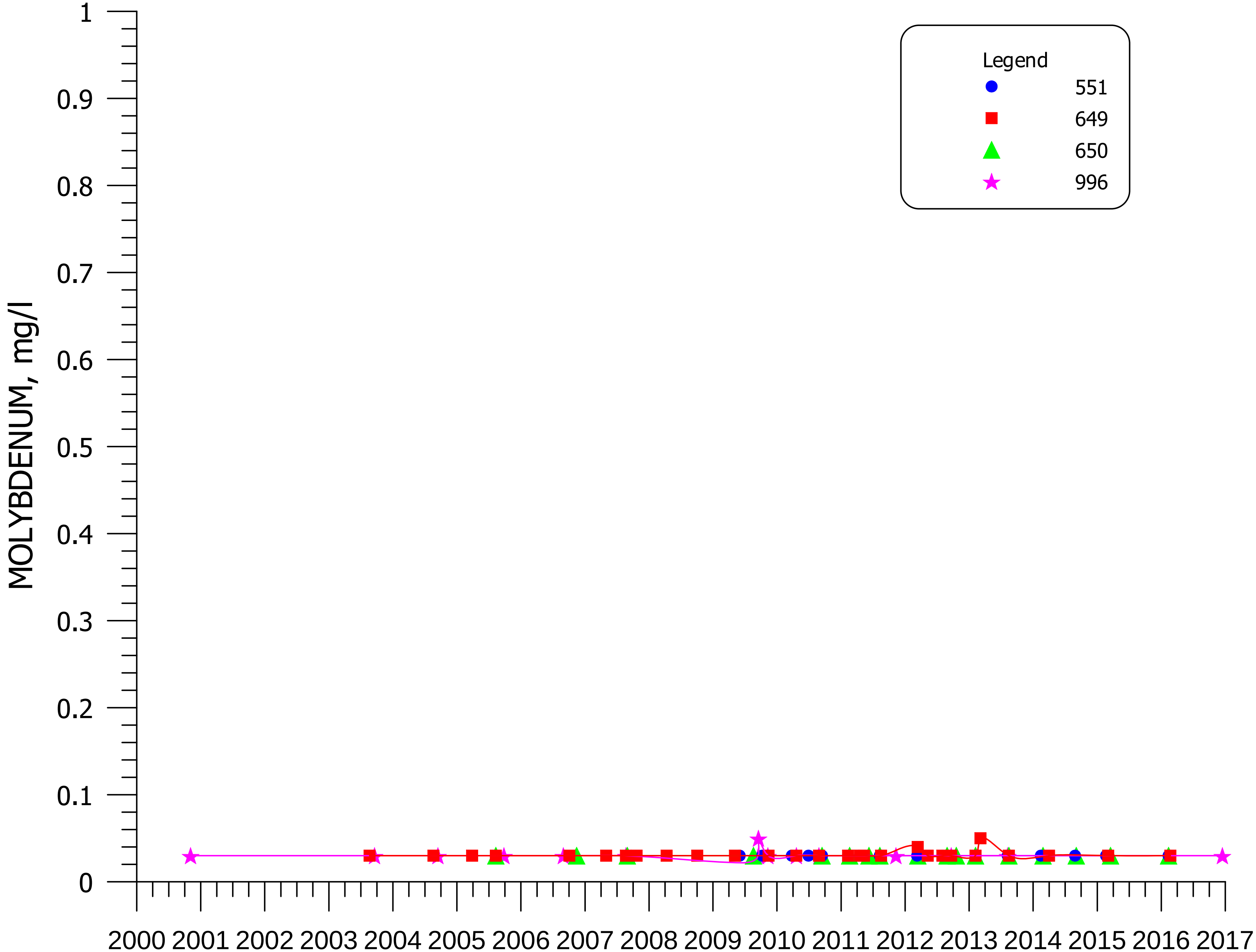

FIGURE 4.3-103. MOLYBDENUM CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.

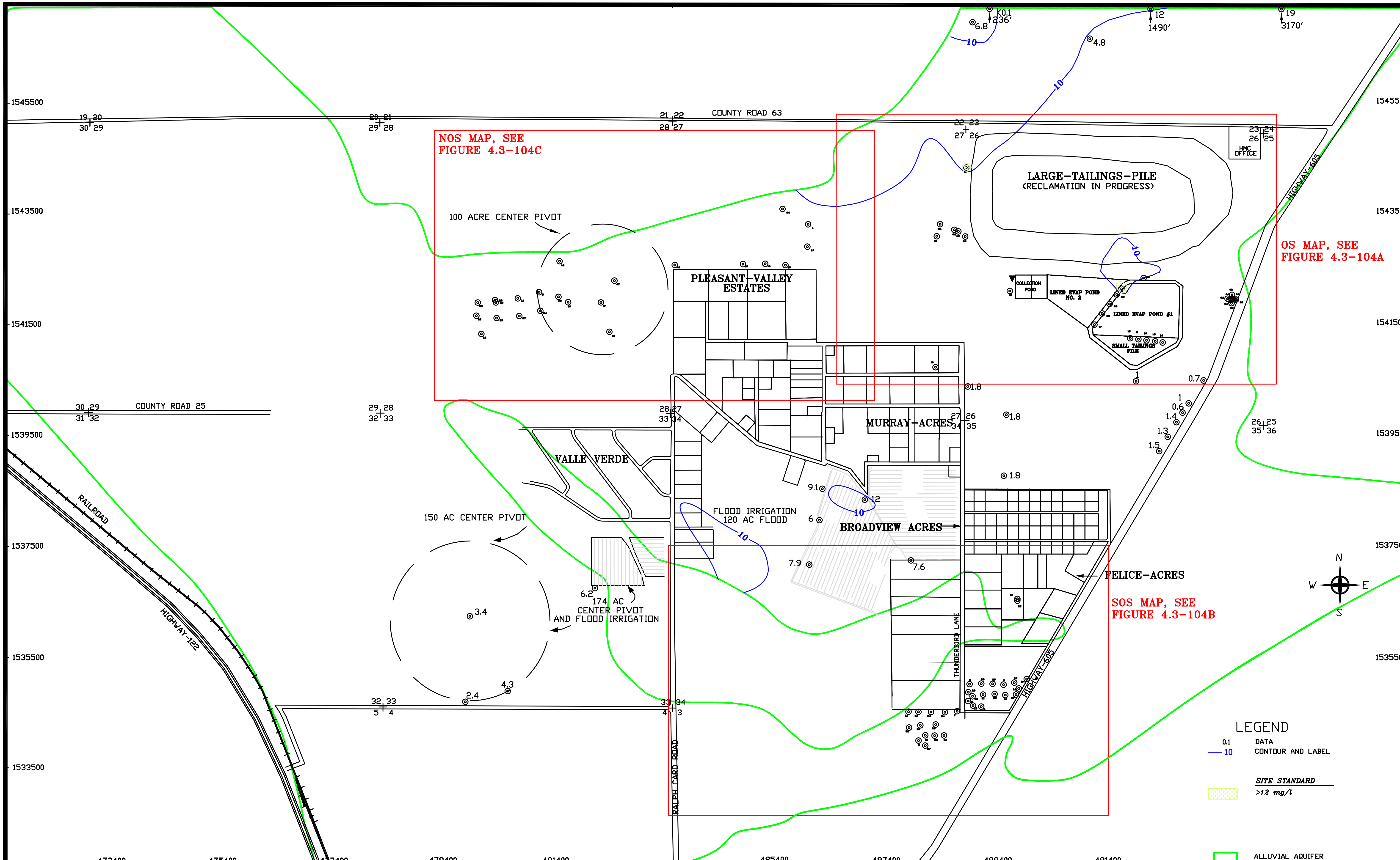

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FIGURE 4.3-104. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l

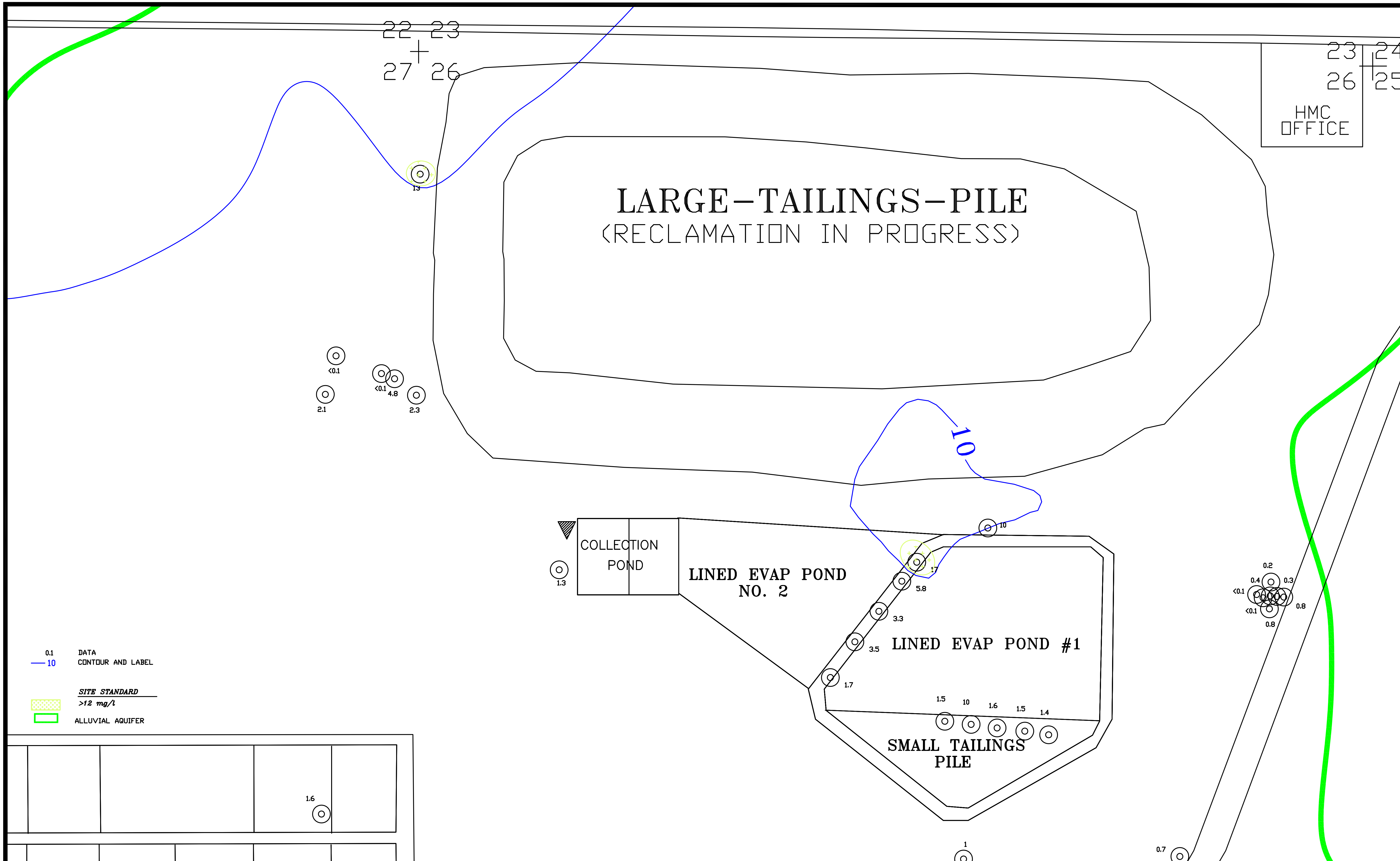

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FIGURE 4.3-104A. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

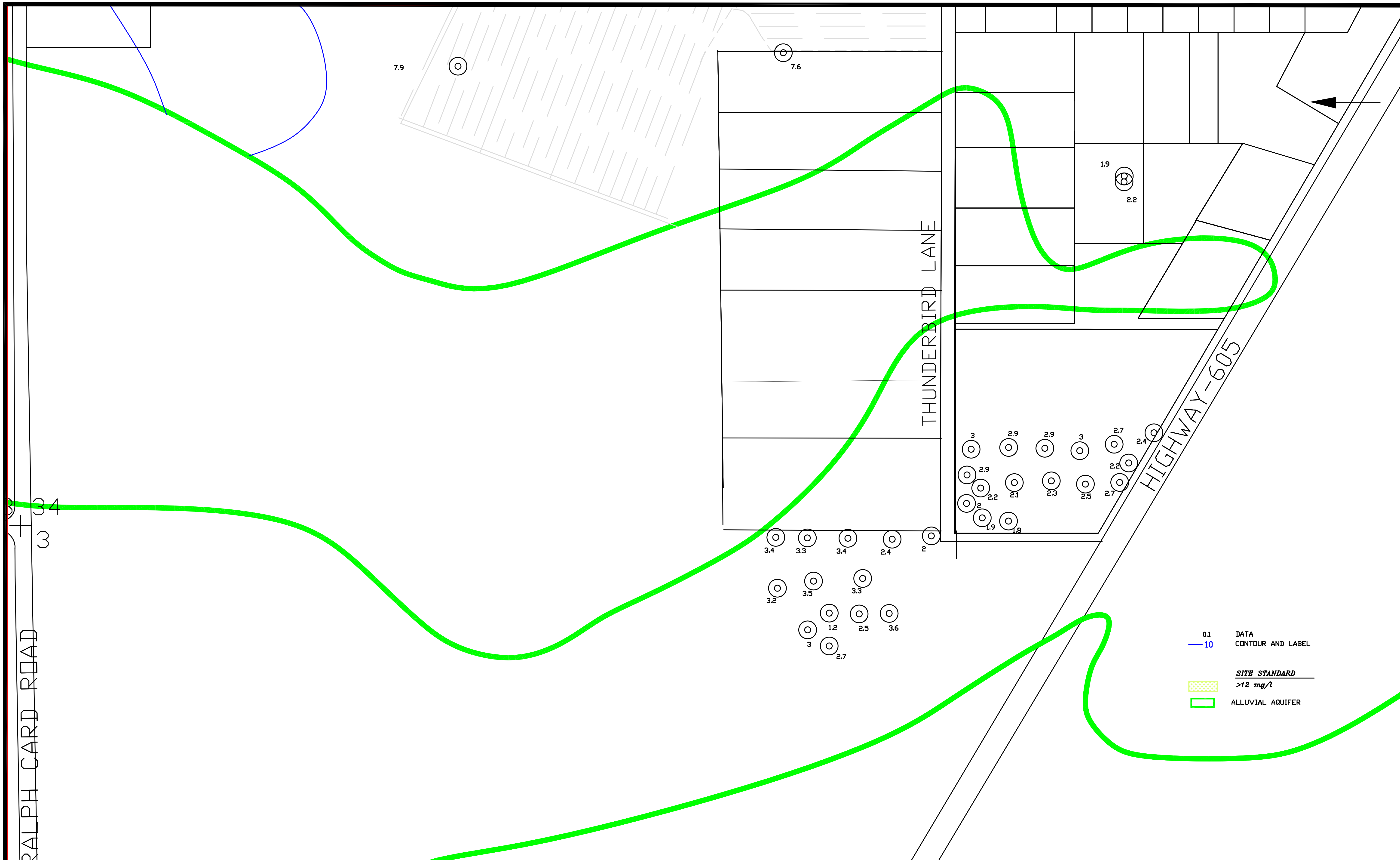

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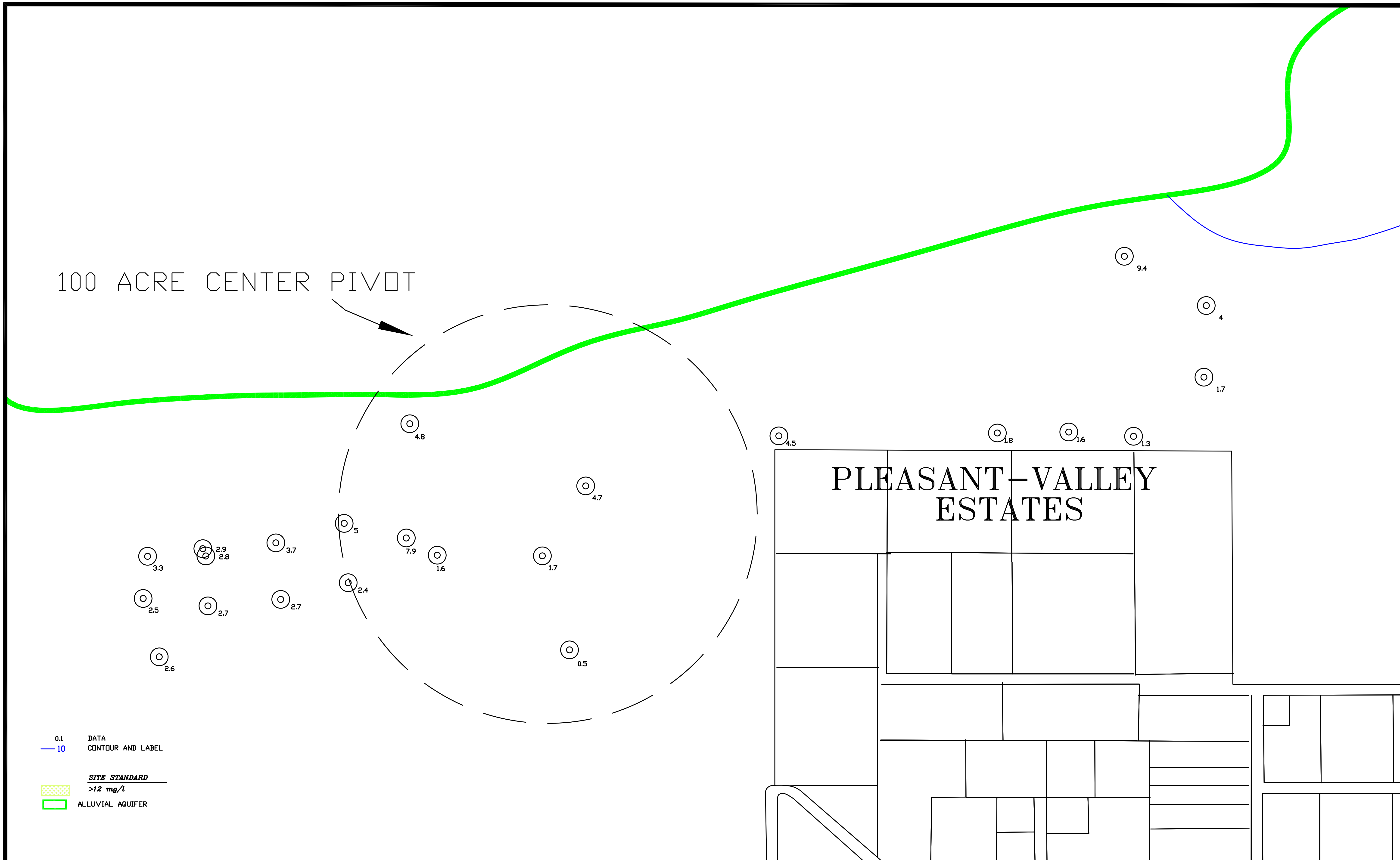
FIGURE 4.3-104B. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l



SCALE: 1"=500'
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FIGURE 4.3-104C. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

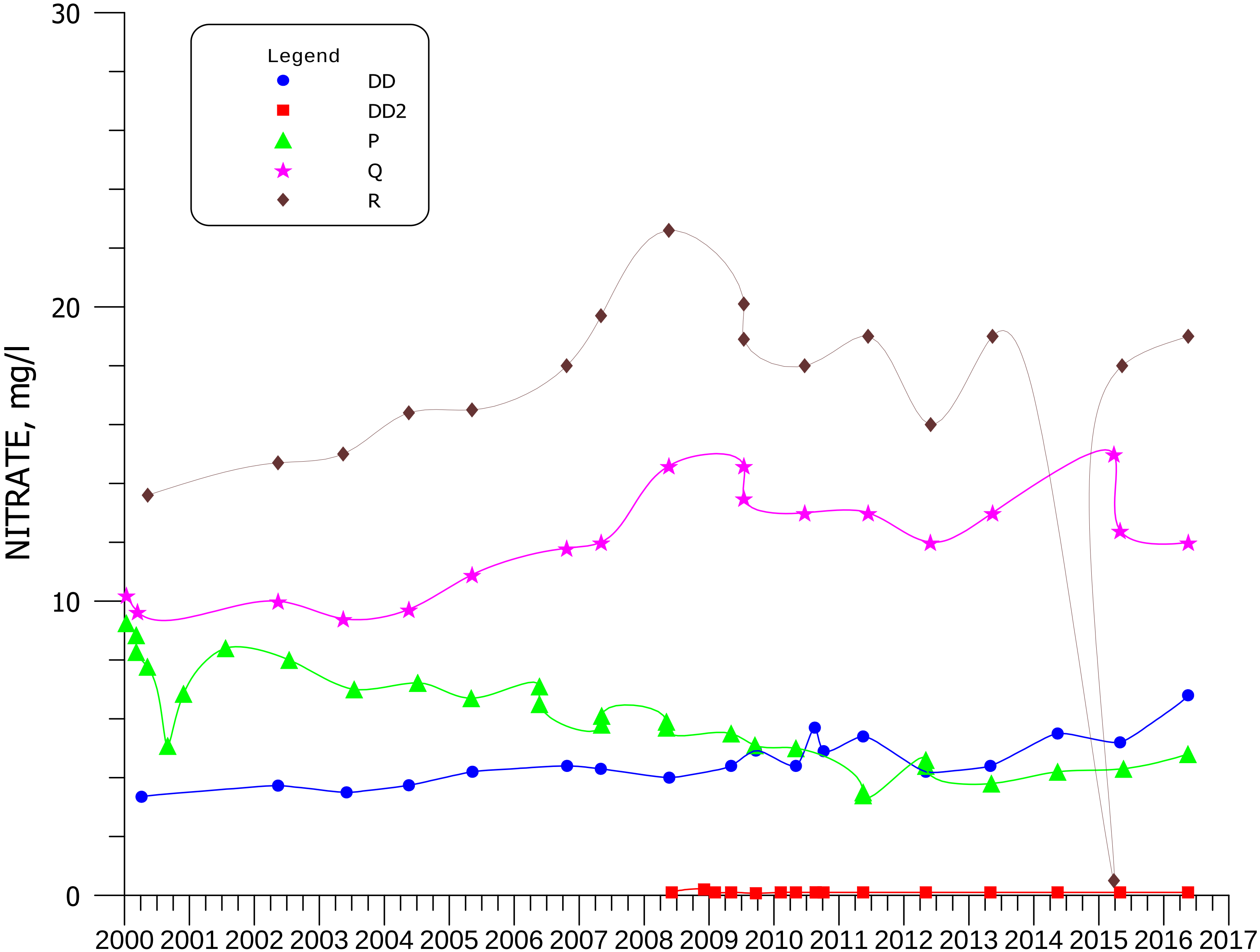


FIGURE 4.3-105. NITRATE CONCENTRATIONS FOR WELLS DD, DD2, P, Q, AND R.

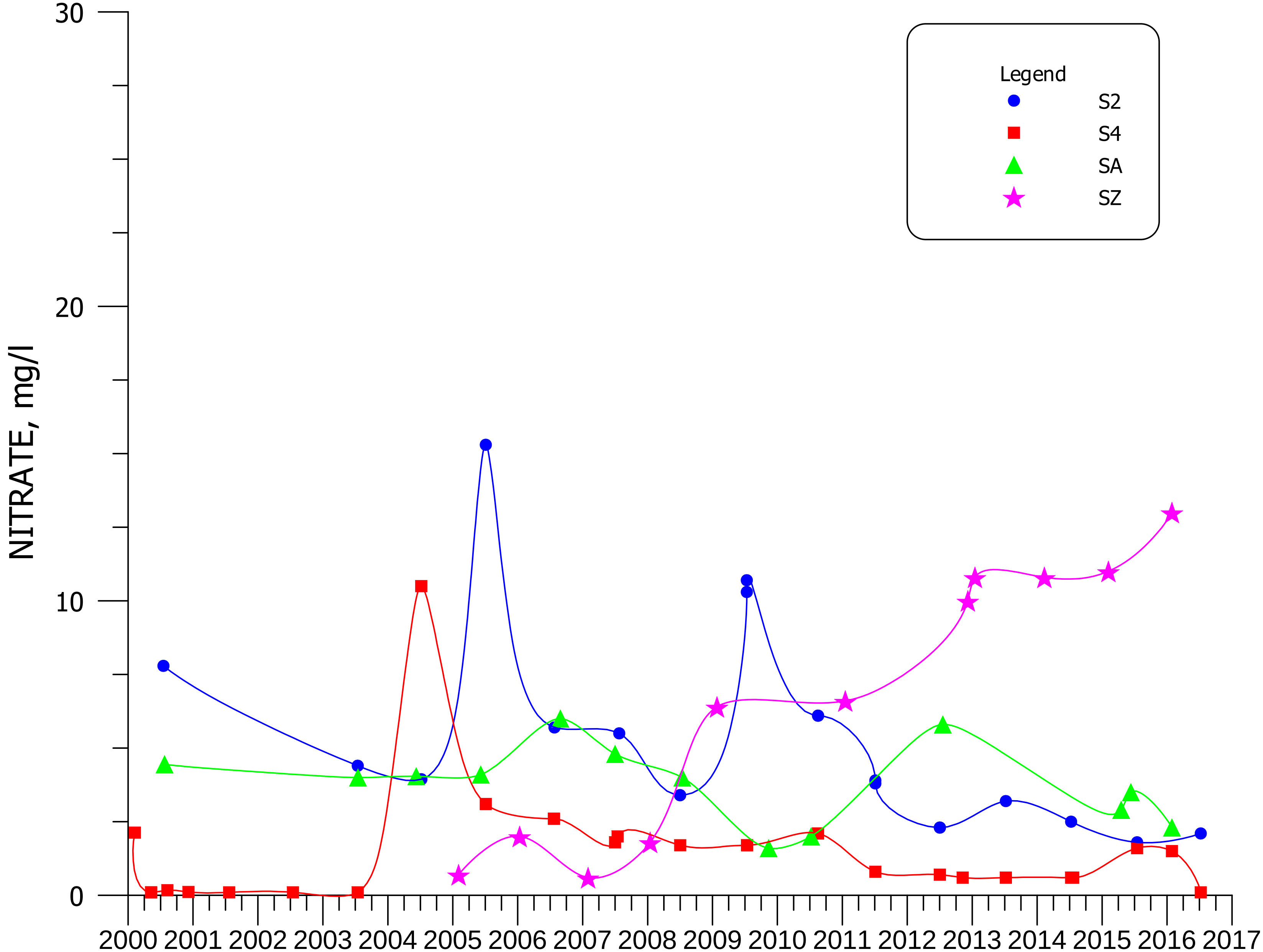


FIGURE 4.3-106. NITRATE CONCENTRATIONS FOR WELLS S2, S4, SA, AND SZ.

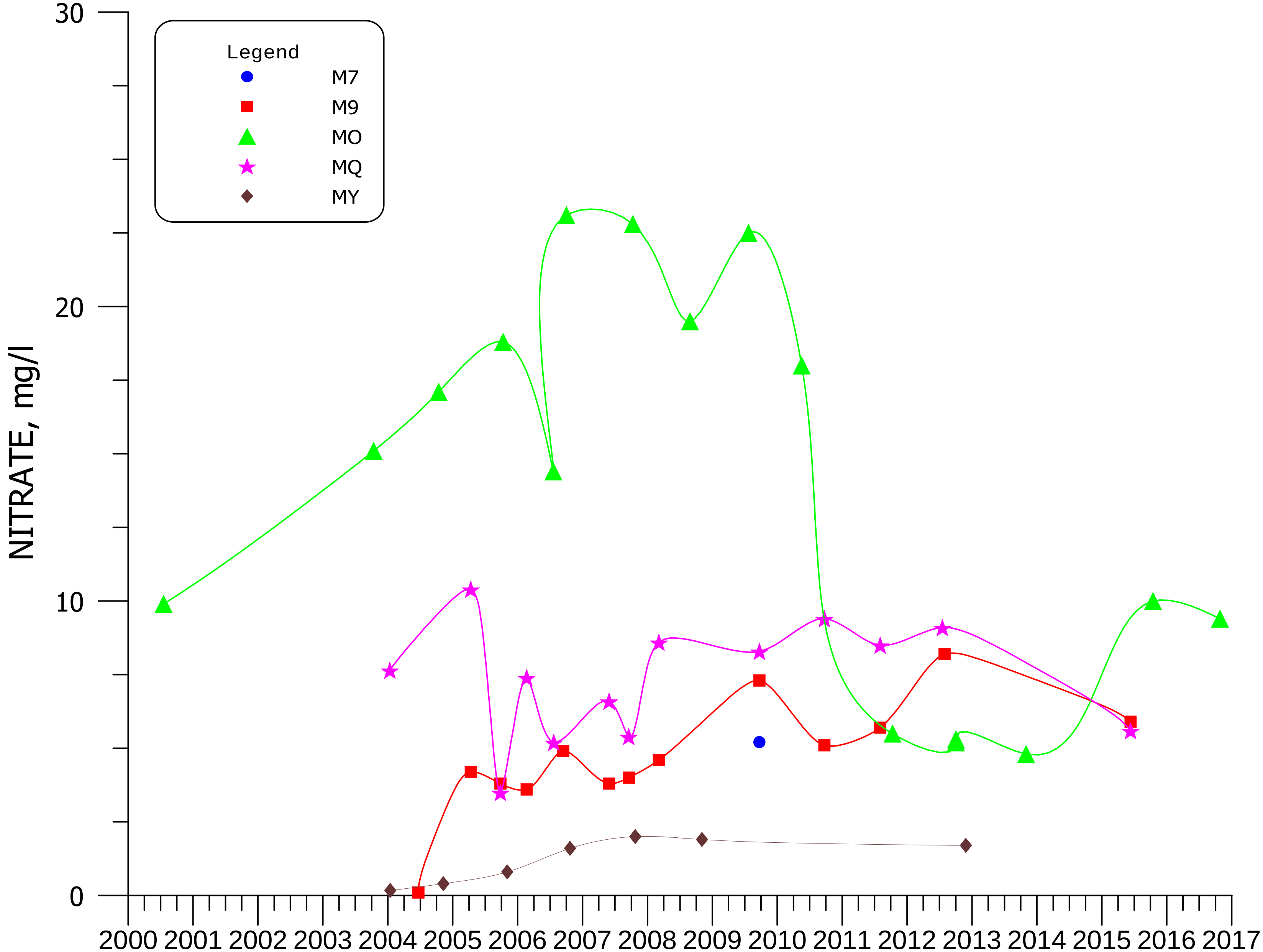


FIGURE 4.3-107. NITRATE CONCENTRATIONS FOR WELLS M7, M9, MO, MQ, AND MY.

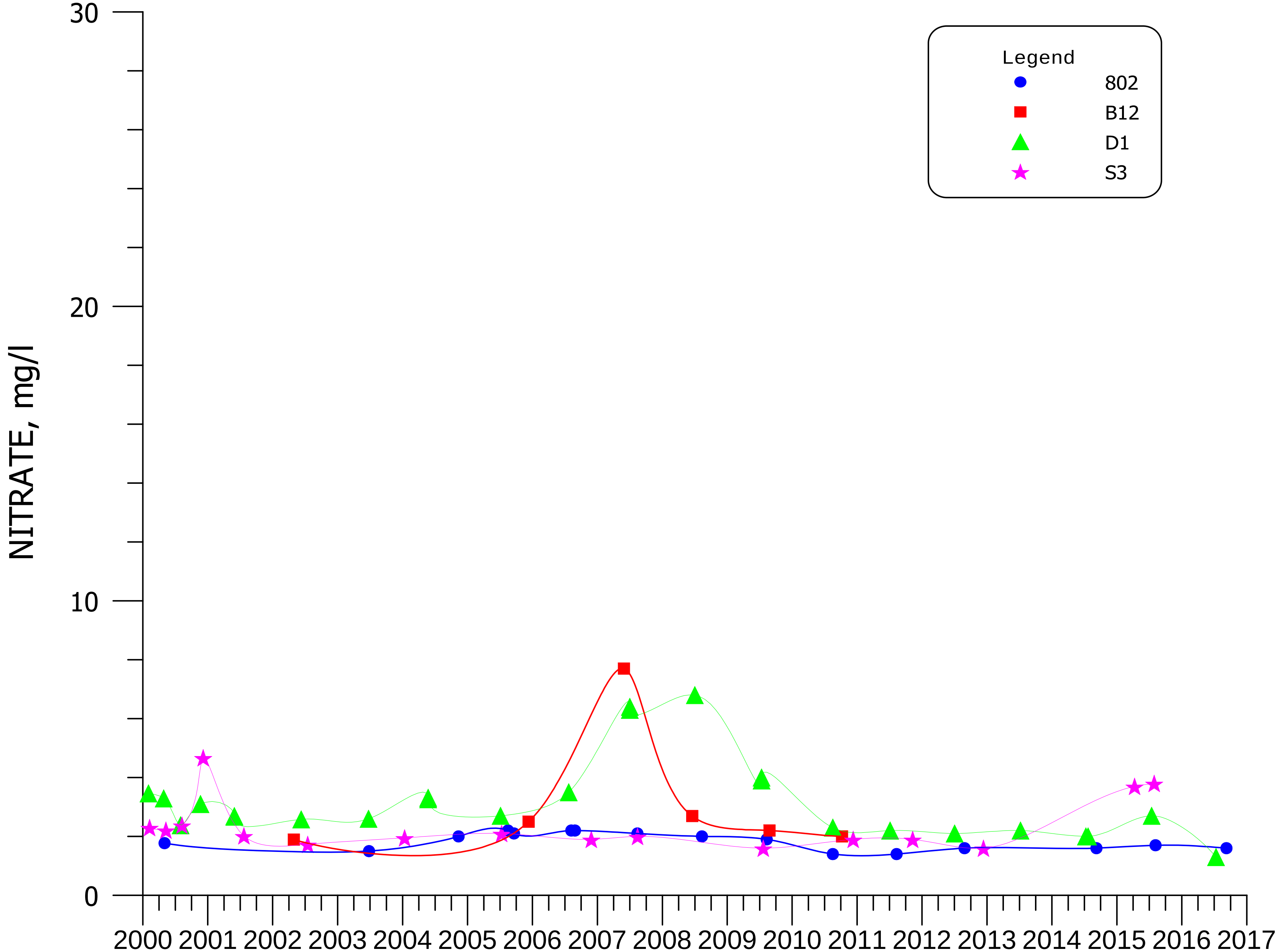


FIGURE 4.3-108. NITRATE CONCENTRATIONS FOR WELLS 802, B12, D1, AND S3.

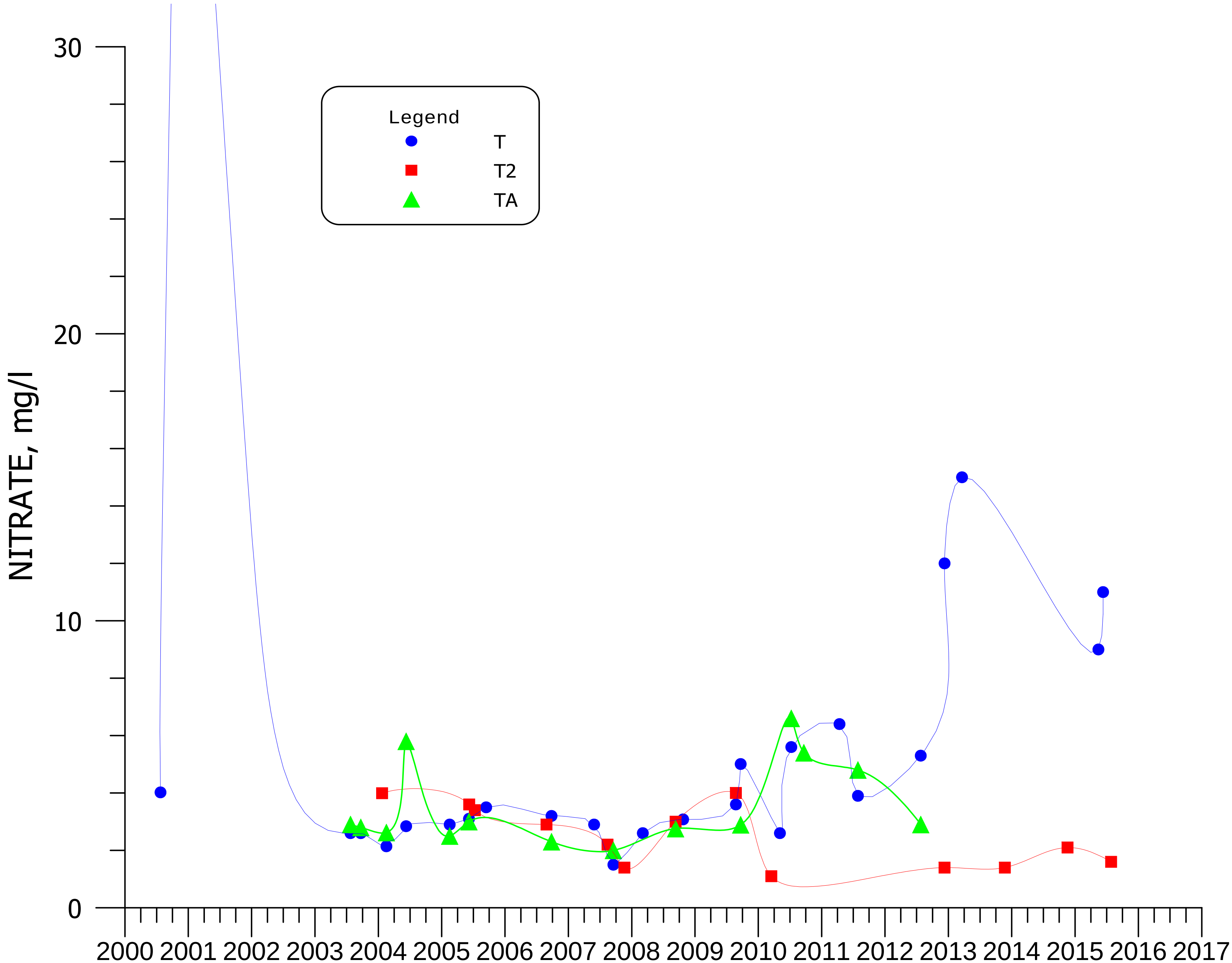


FIGURE 4.3-109. NITRATE CONCENTRATIONS FOR WELLS T, T2, AND TA.

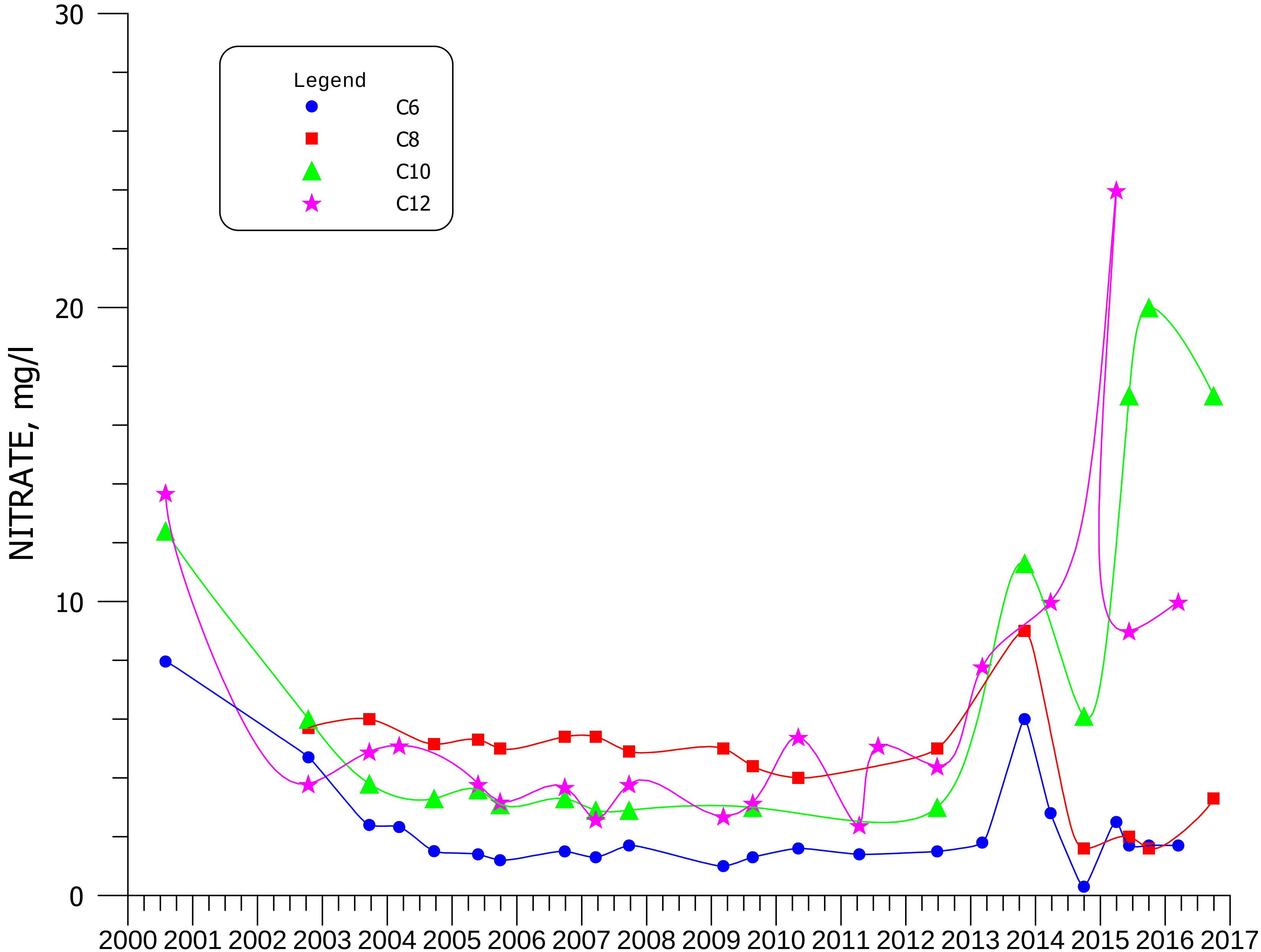


FIGURE 4.3-110. NITRATE CONCENTRATIONS FOR WELLS C6, C8, C10, AND C12.

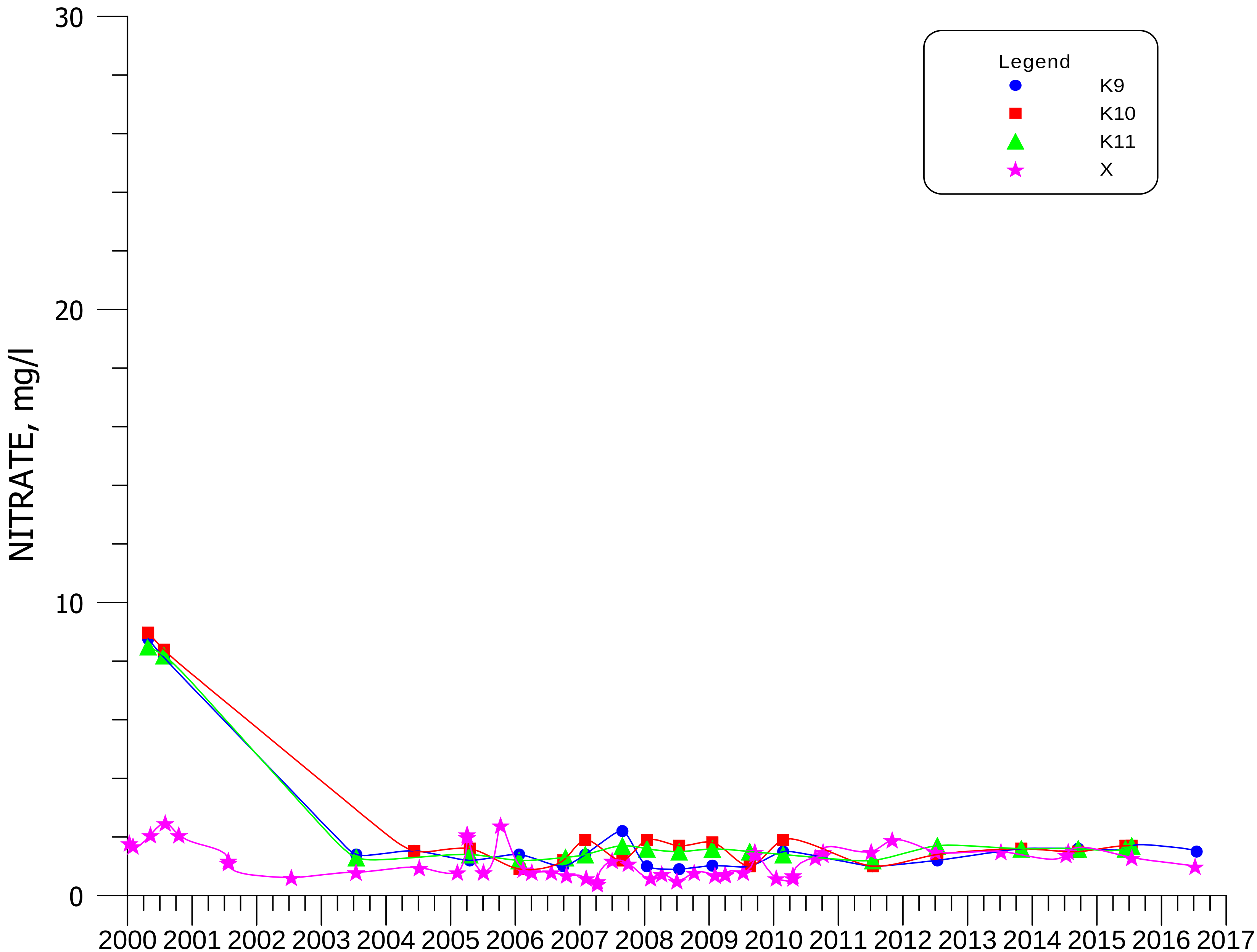


FIGURE 4.3-111. NITRATE CONCENTRATIONS FOR WELLS K9, K10, K11, AND X.

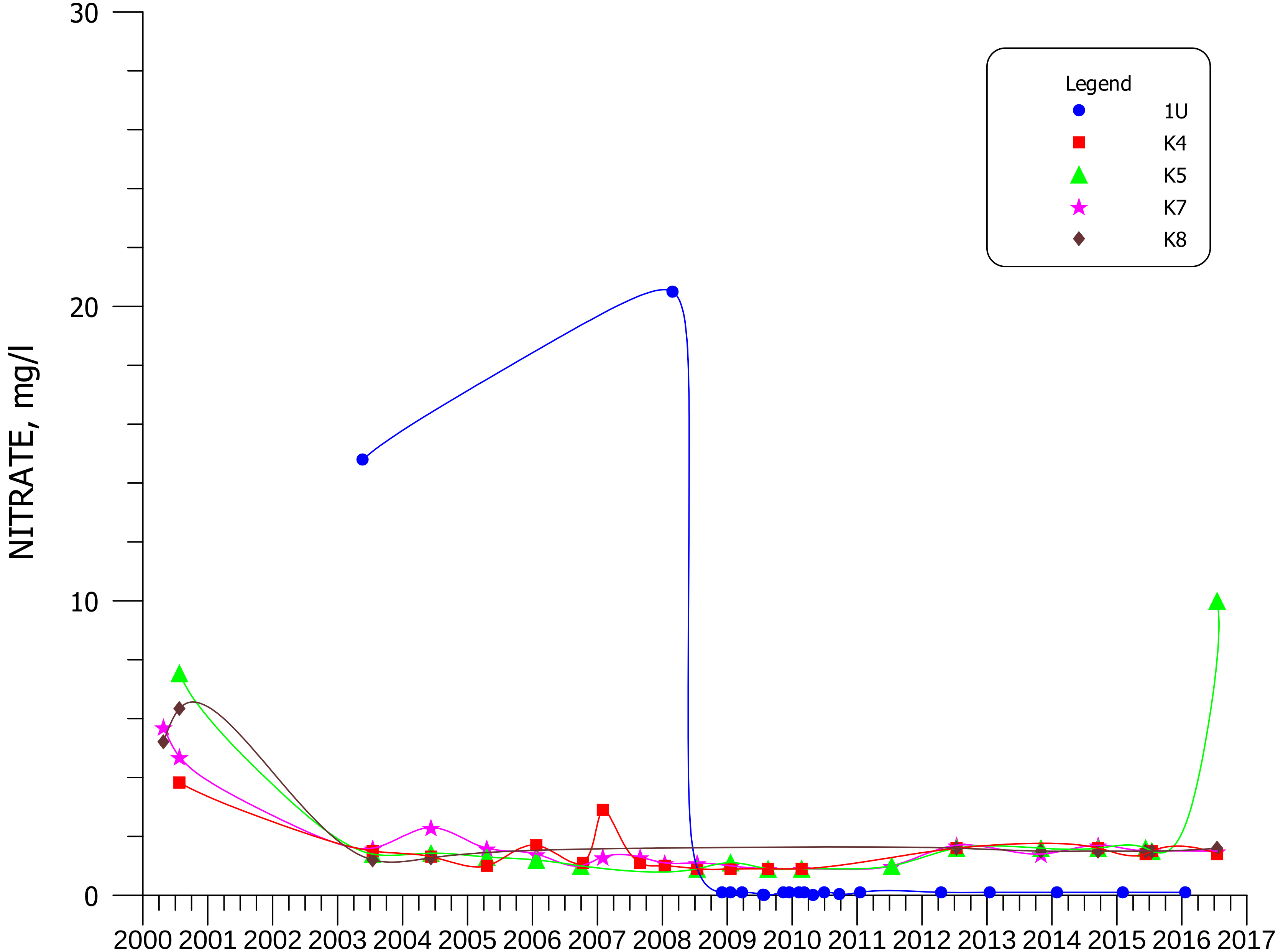


FIGURE 4.3-112. NITRATE CONCENTRATIONS FOR WELLS 1U, K4, K5, K7, AND K8.

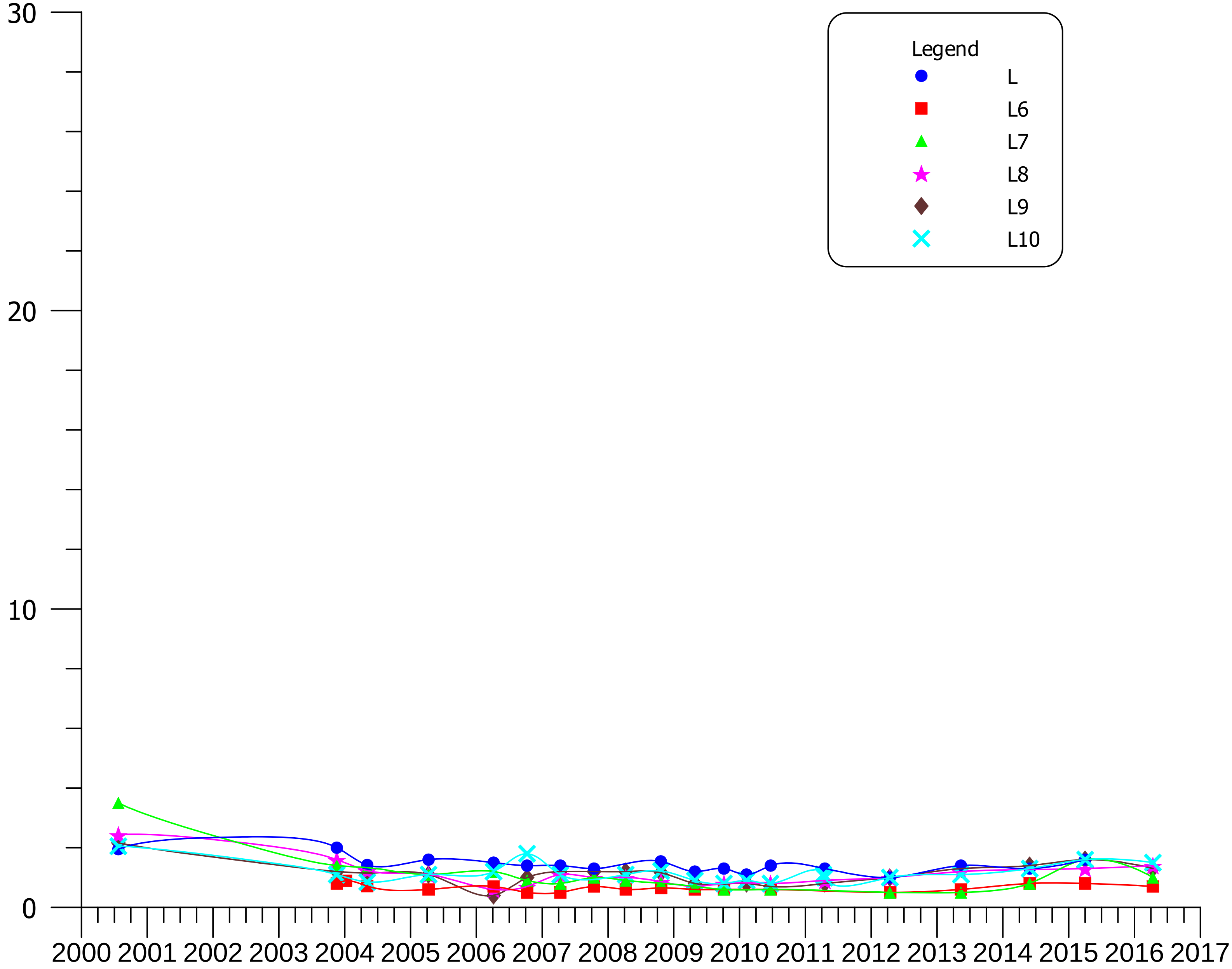


FIGURE 4.3-113. NITRATE CONCENTRATIONS FOR WELLS L, L6, L7, L8, L9, AND L10.

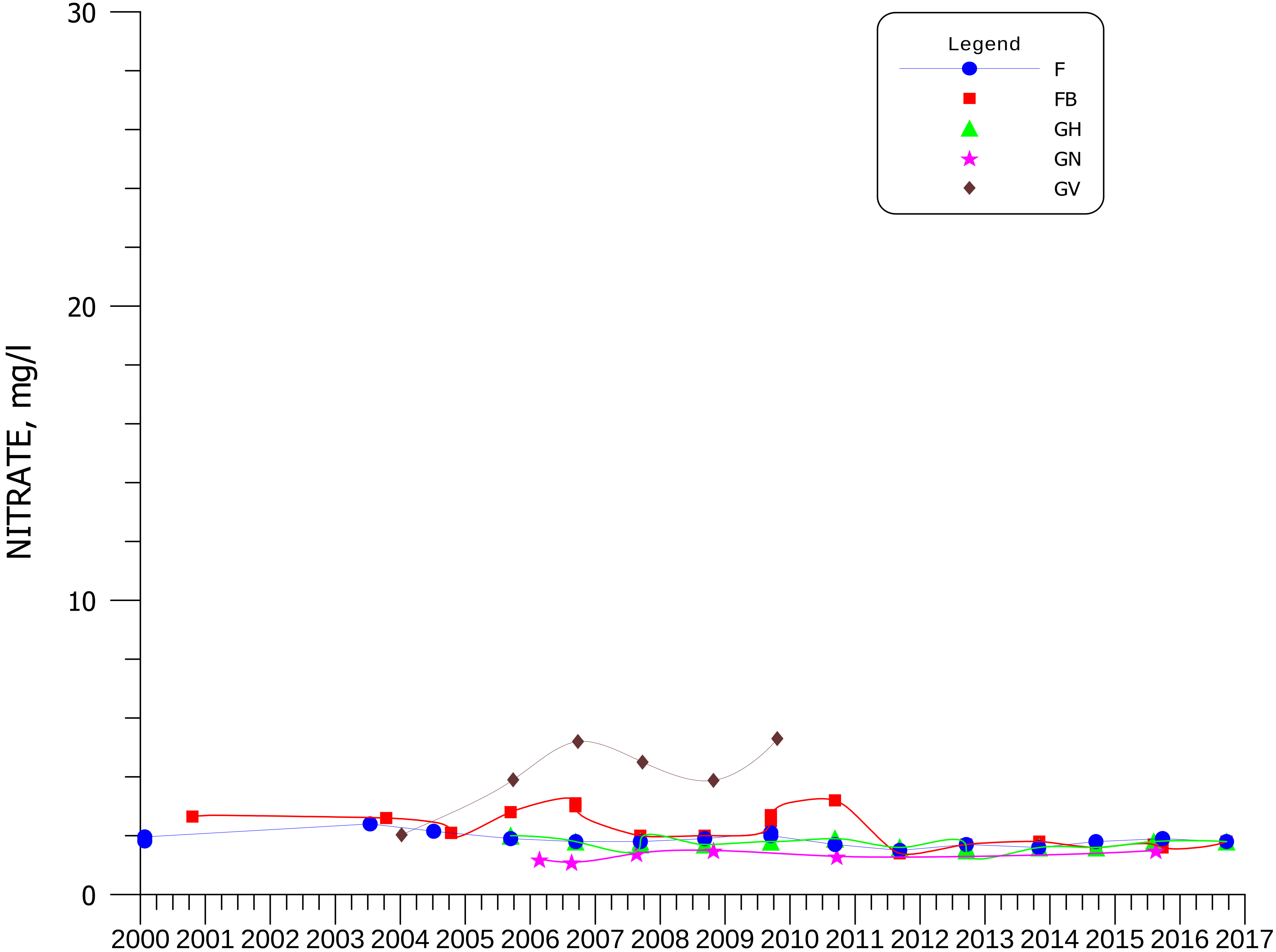


FIGURE 4.3-114. NITRATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, AND GV.

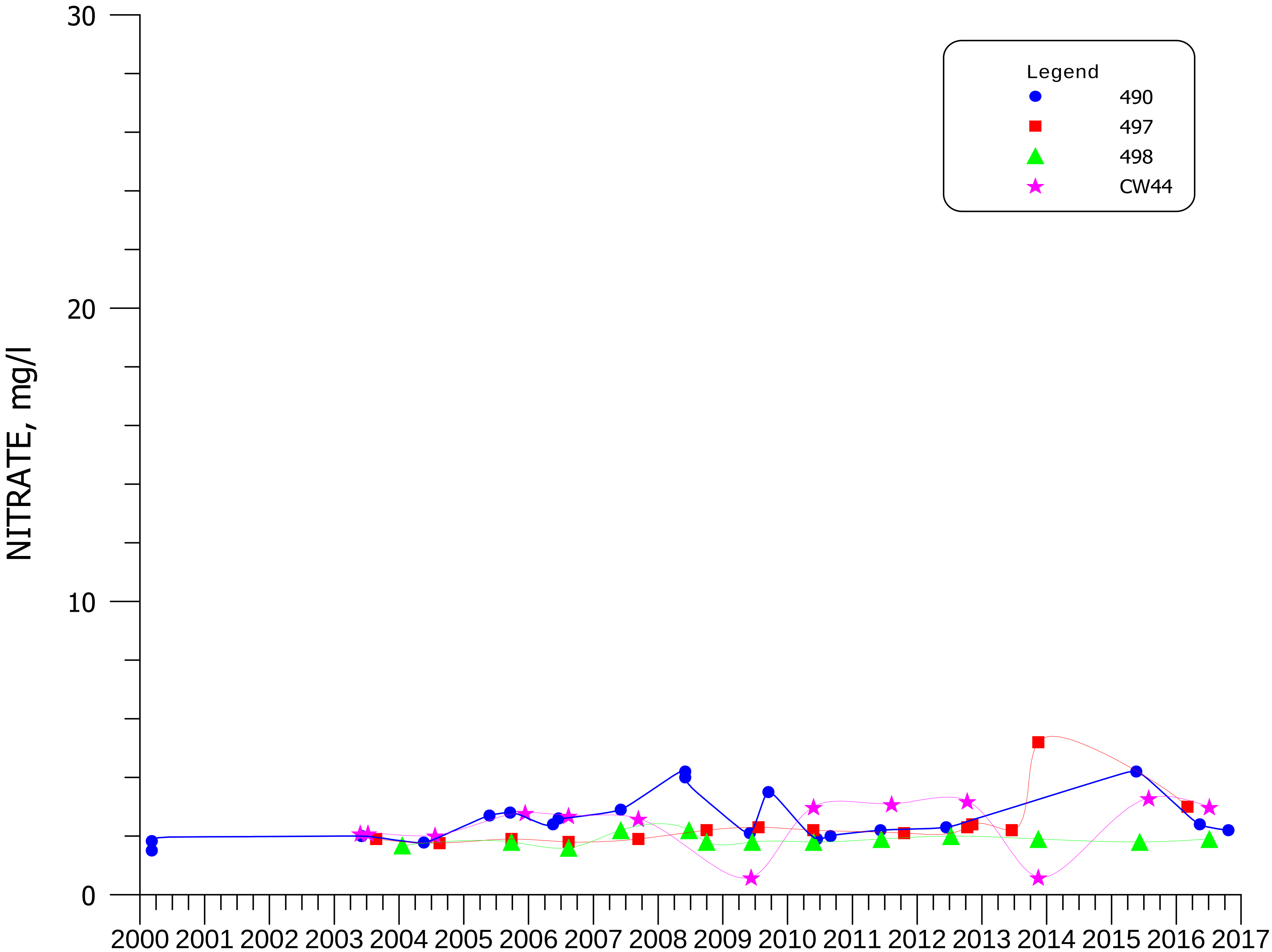


FIGURE 4.3-115. NITRATE CONCENTRATIONS FOR WELLS 490, 497, 498, AND CW44.

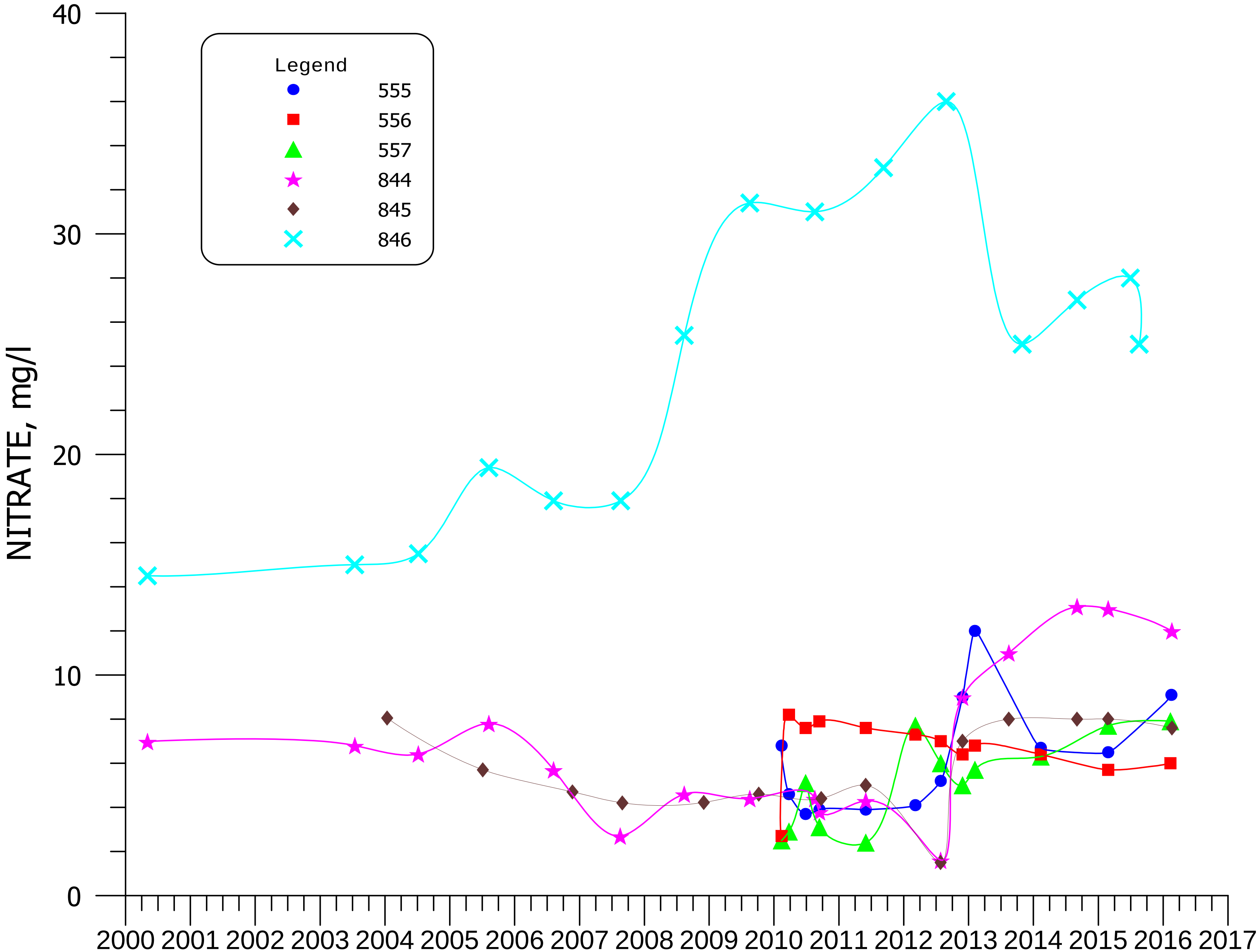


FIGURE 4.3-116. NITRATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

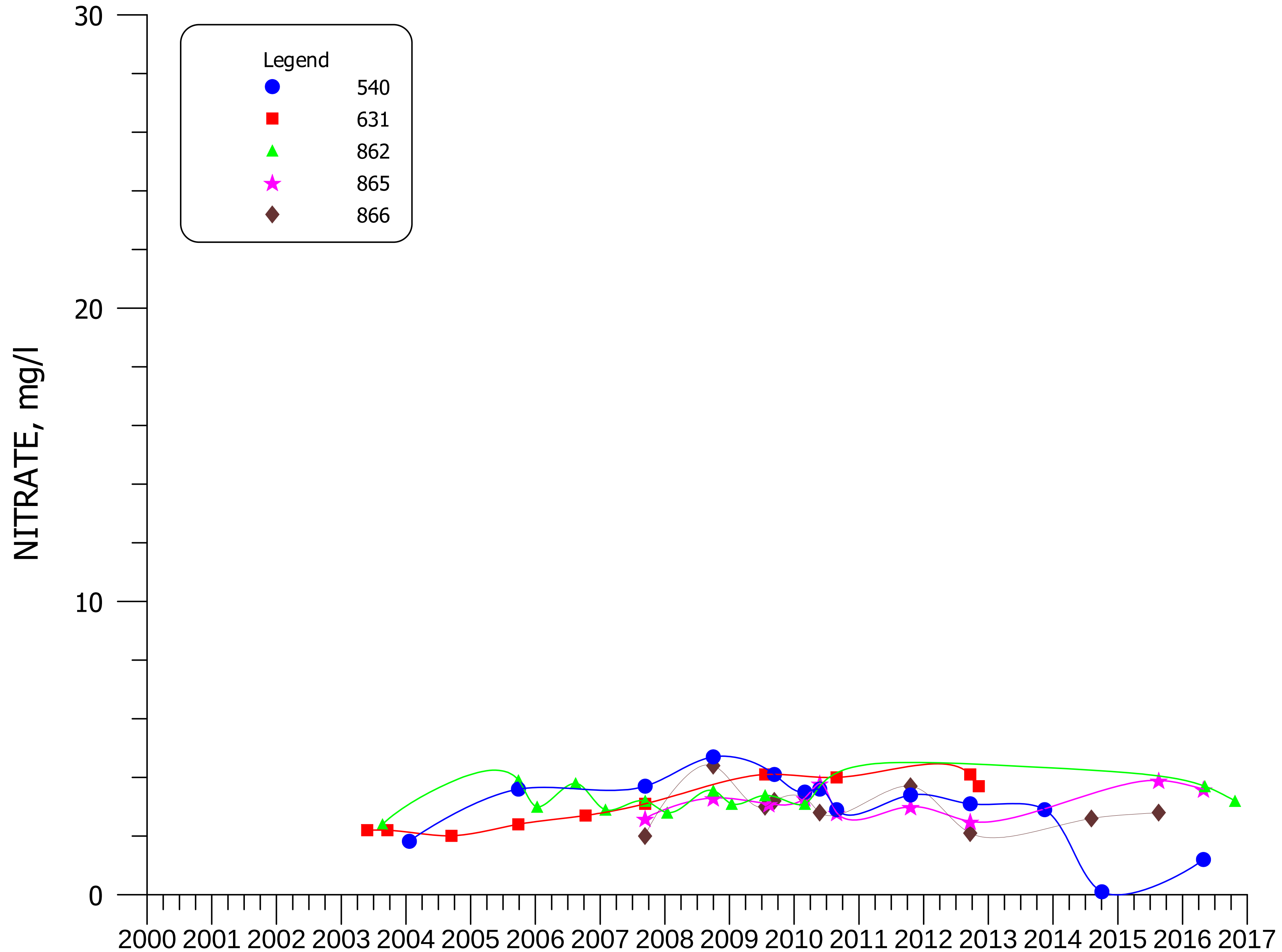


FIGURE 4.3-117. NITRATE CONCENTRATIONS FOR WELLS 540, 631, 862, 865, AND 866.

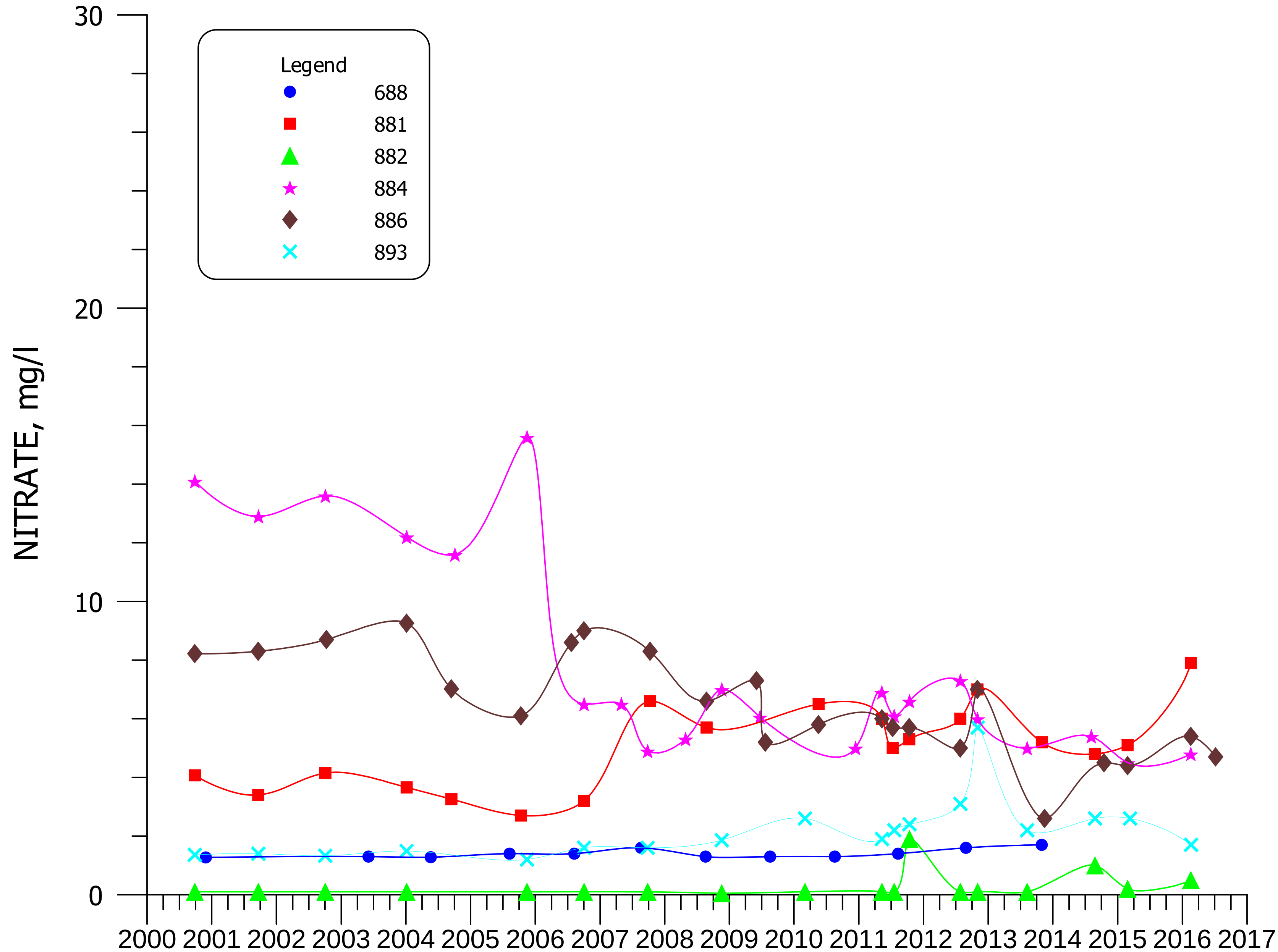


FIGURE 4.3-118. NITRATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

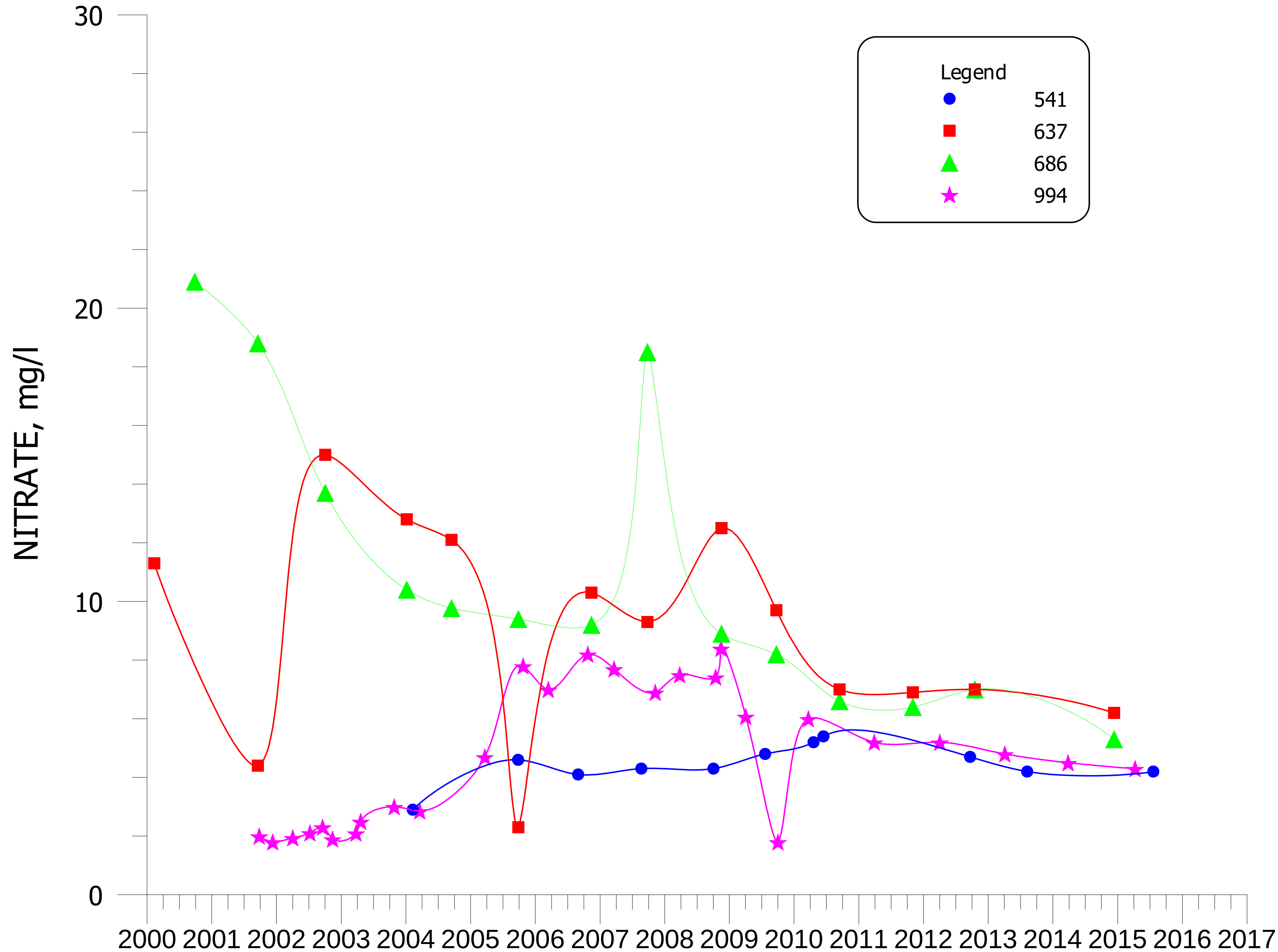


FIGURE 4.3-119. NITRATE CONCENTRATIONS FOR WELLS 541, 637, 686, AND 994.

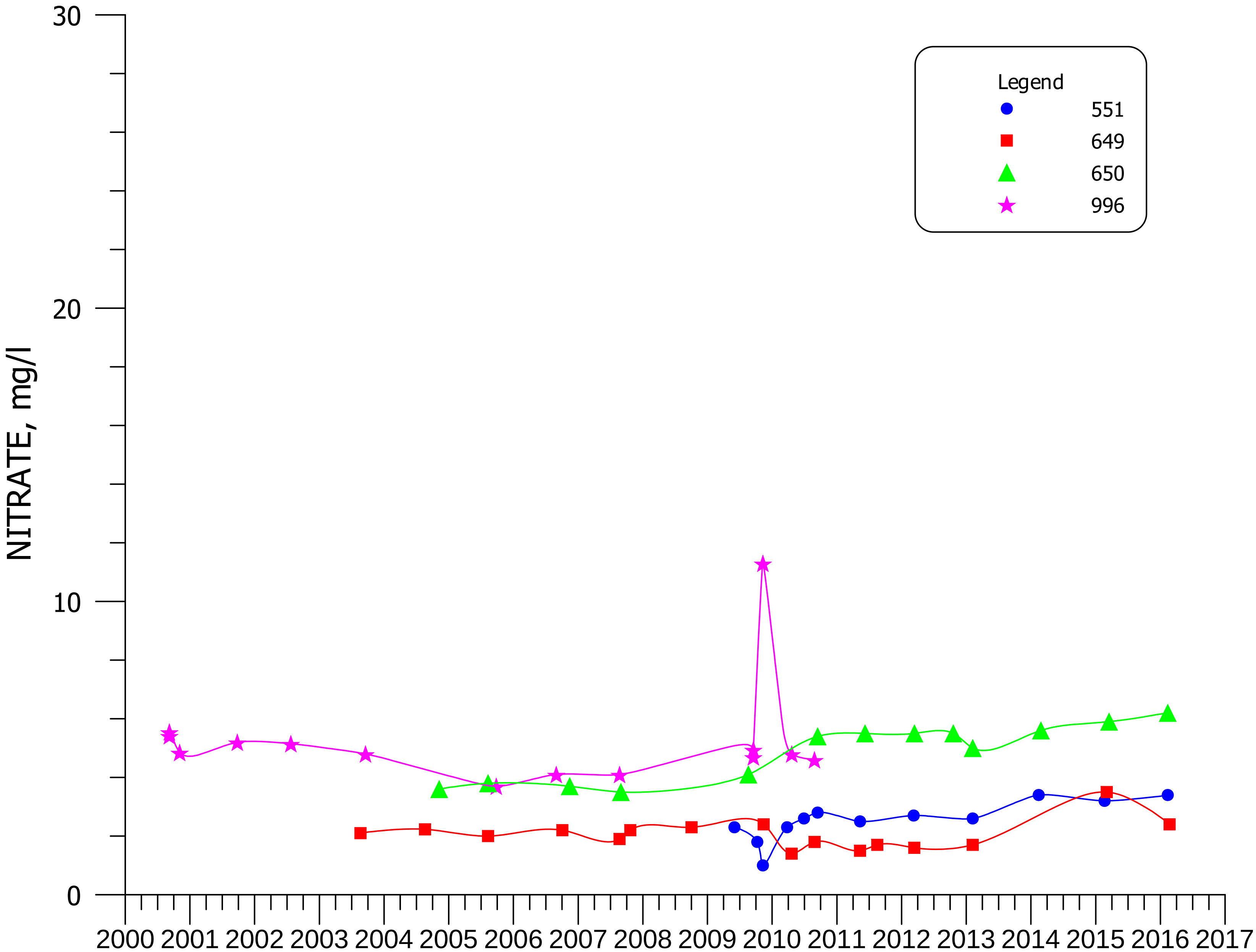
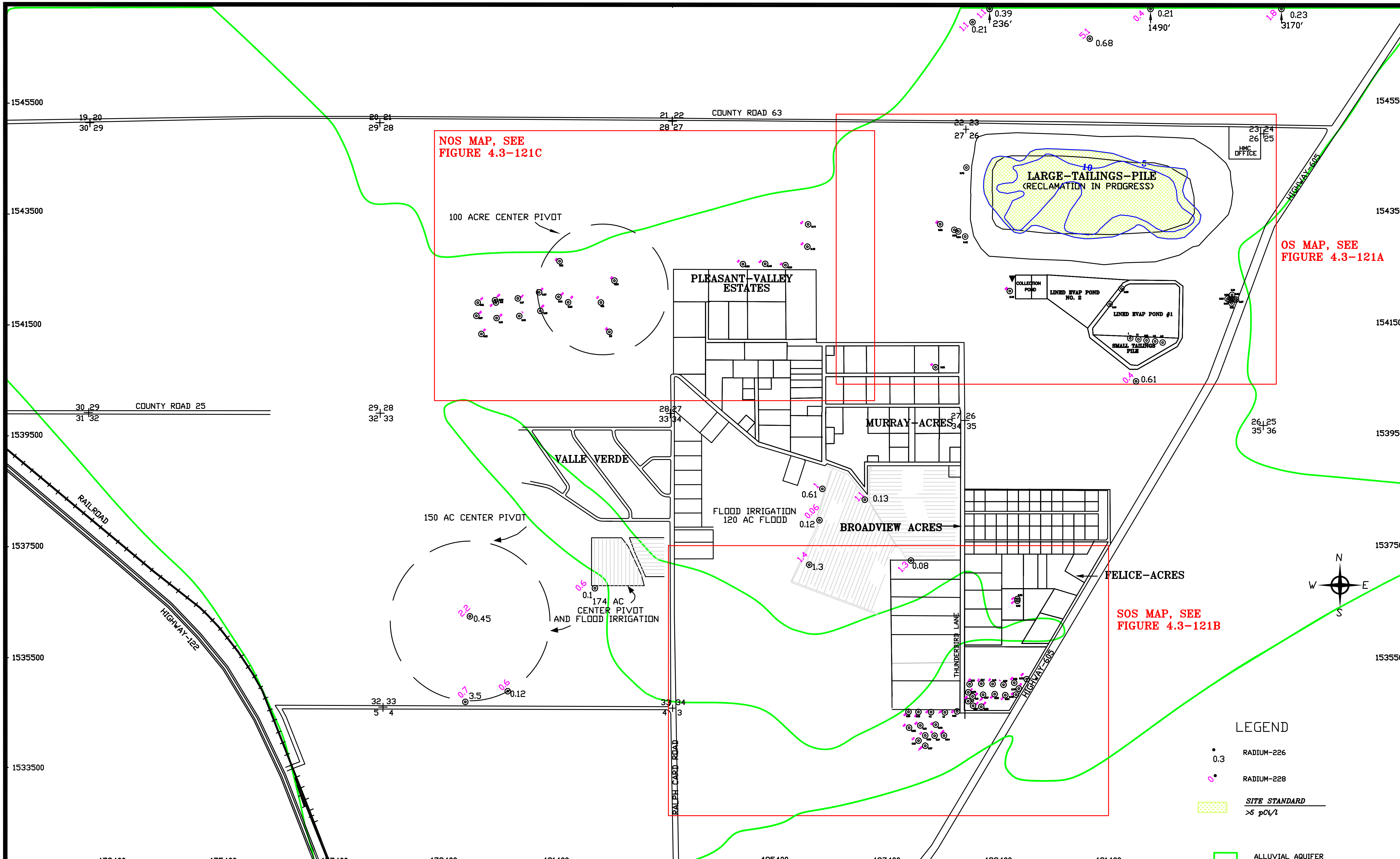


FIGURE 4.3-120. NITRATE CONCENTRATIONS FOR WELLS 551, 649, 650, AND 996.



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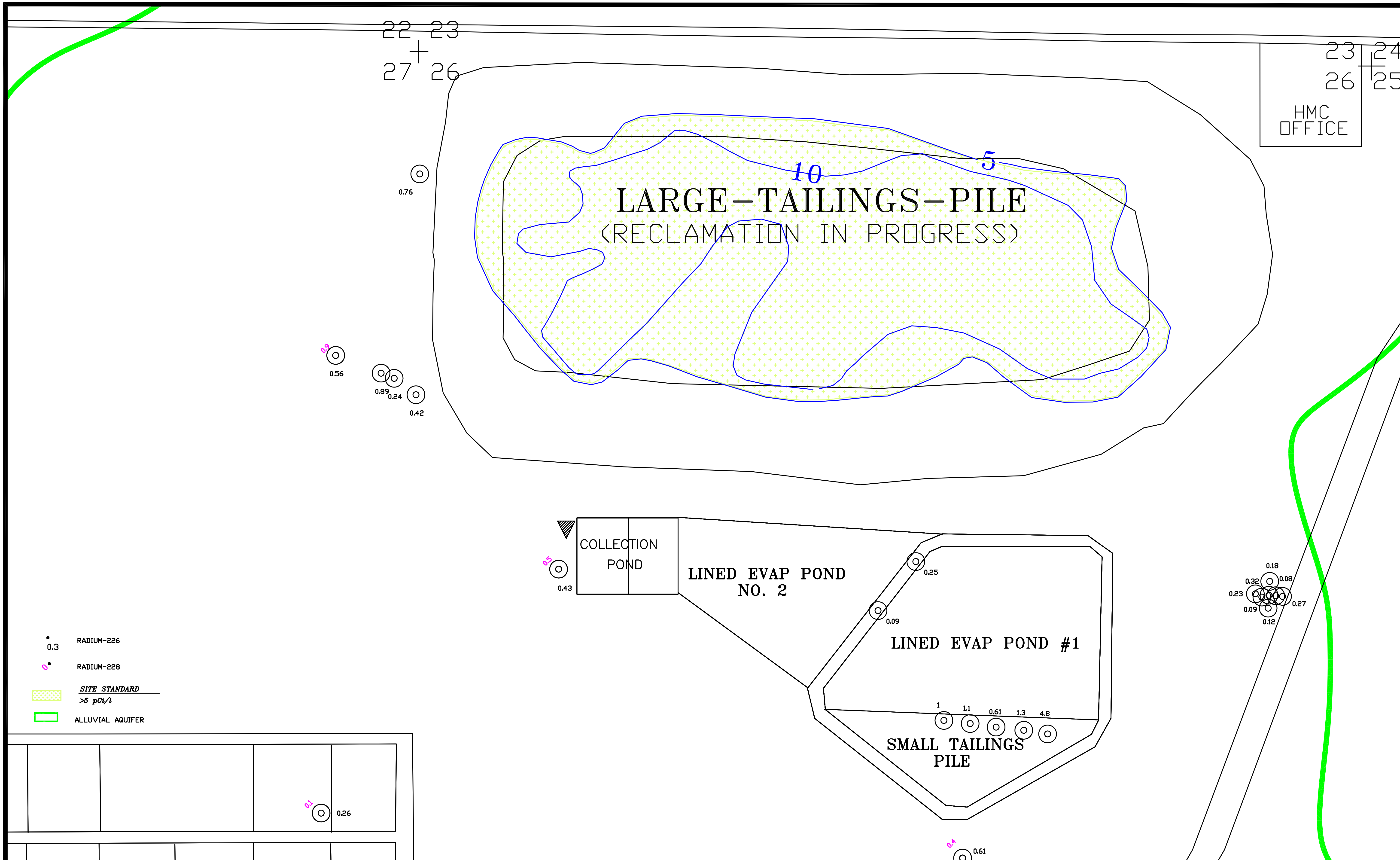
DATE: 3/1/17

FIGURE 4.3-121. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, pCi/l



SCALE: 1"=500'
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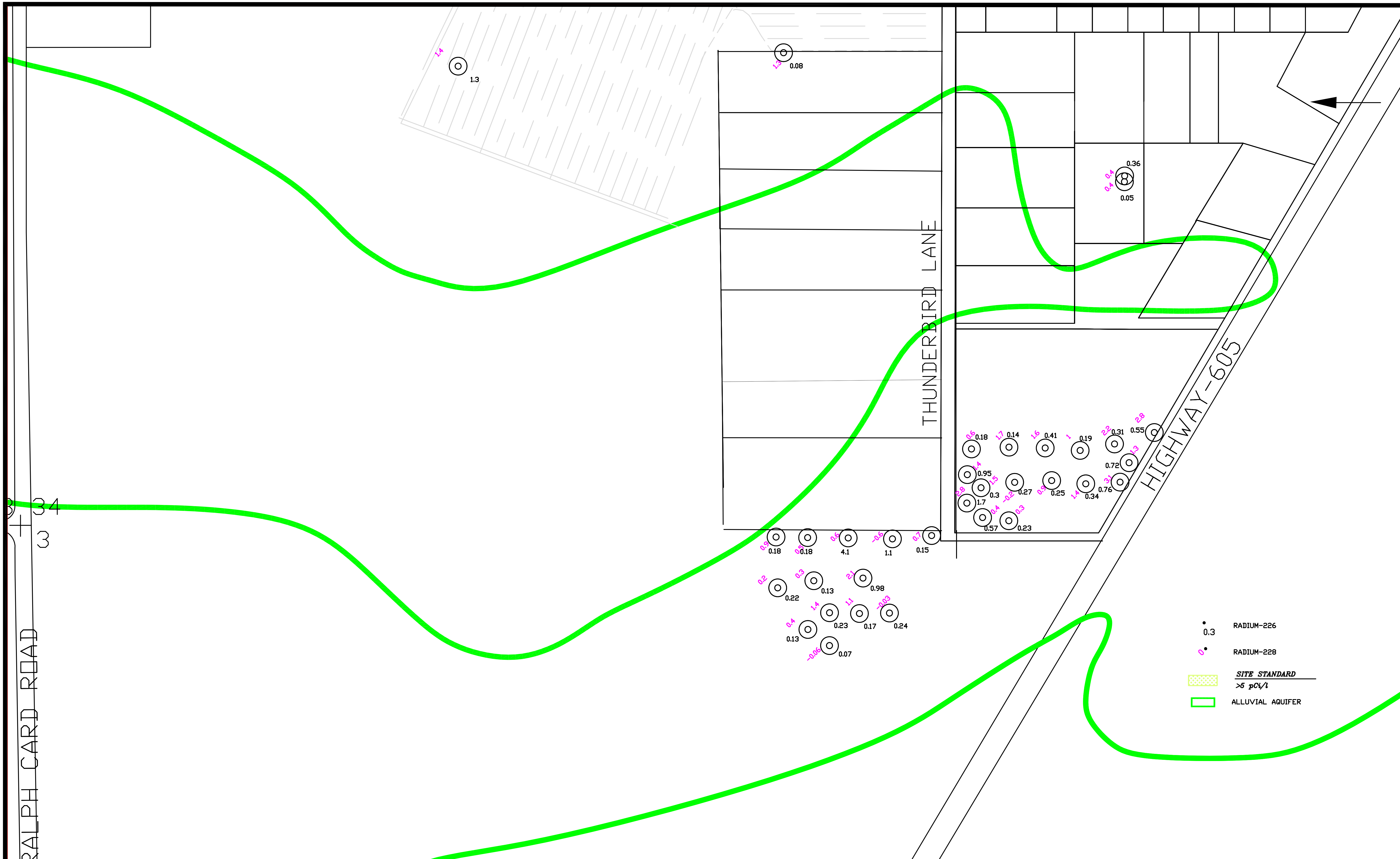
1600QAL16
DATE: 3/1/17

FIGURE 4.3-121A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, pCi/l



SCALE: 1"=500'
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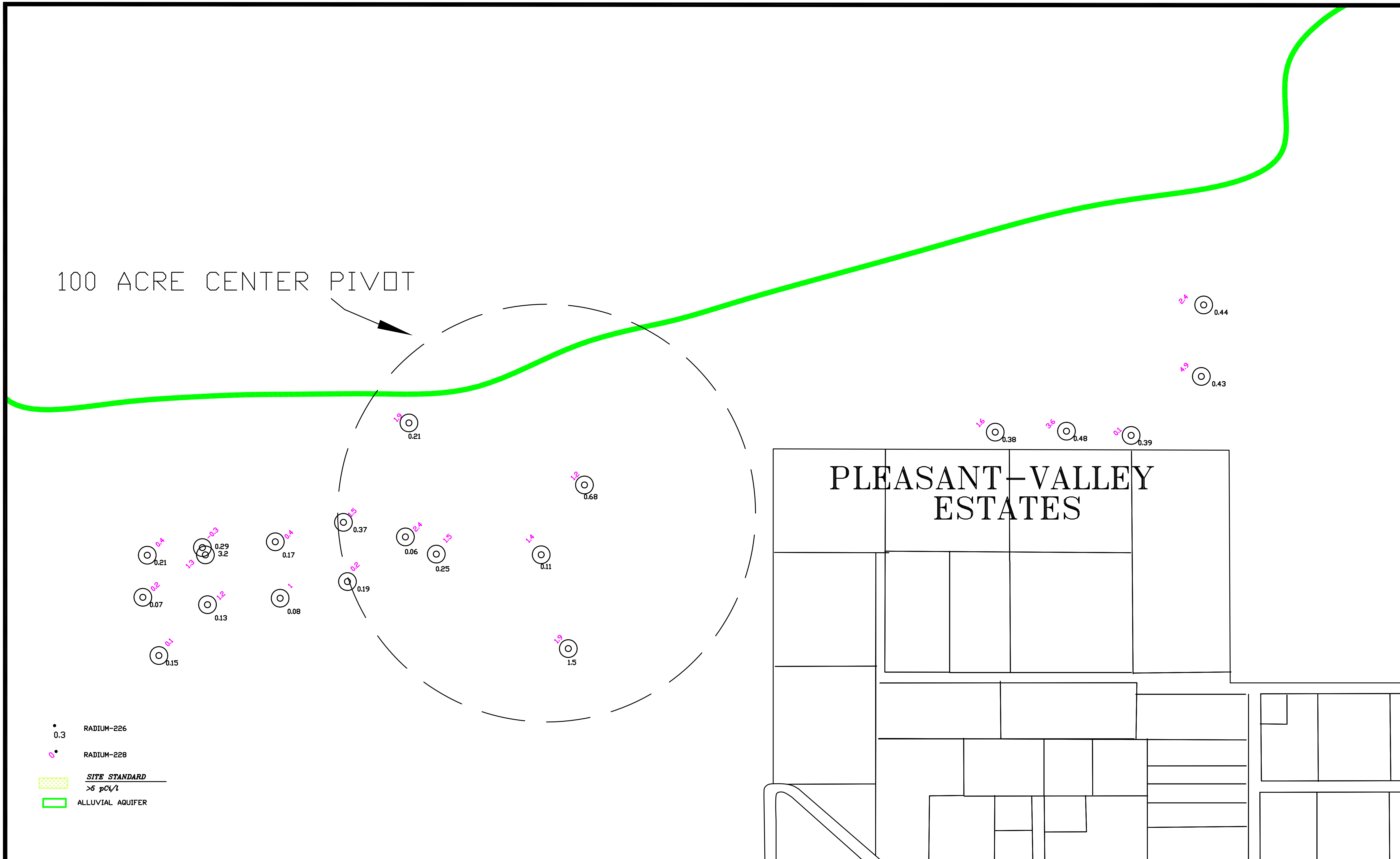
1600QAL16
DATE: 3/1/17

FIGURE 4.3-121B. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, pCi/l



SCALE: 1"=500'
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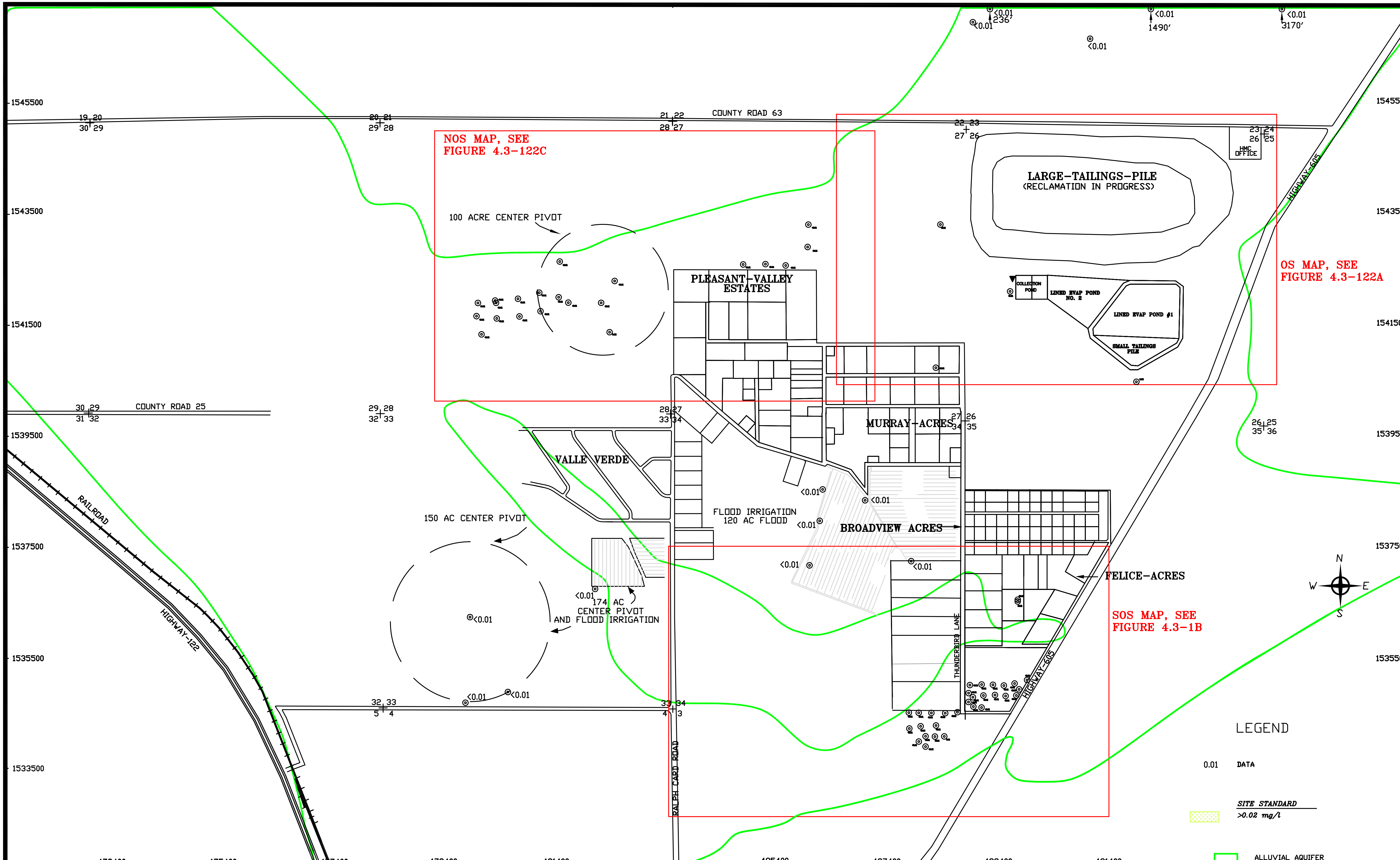
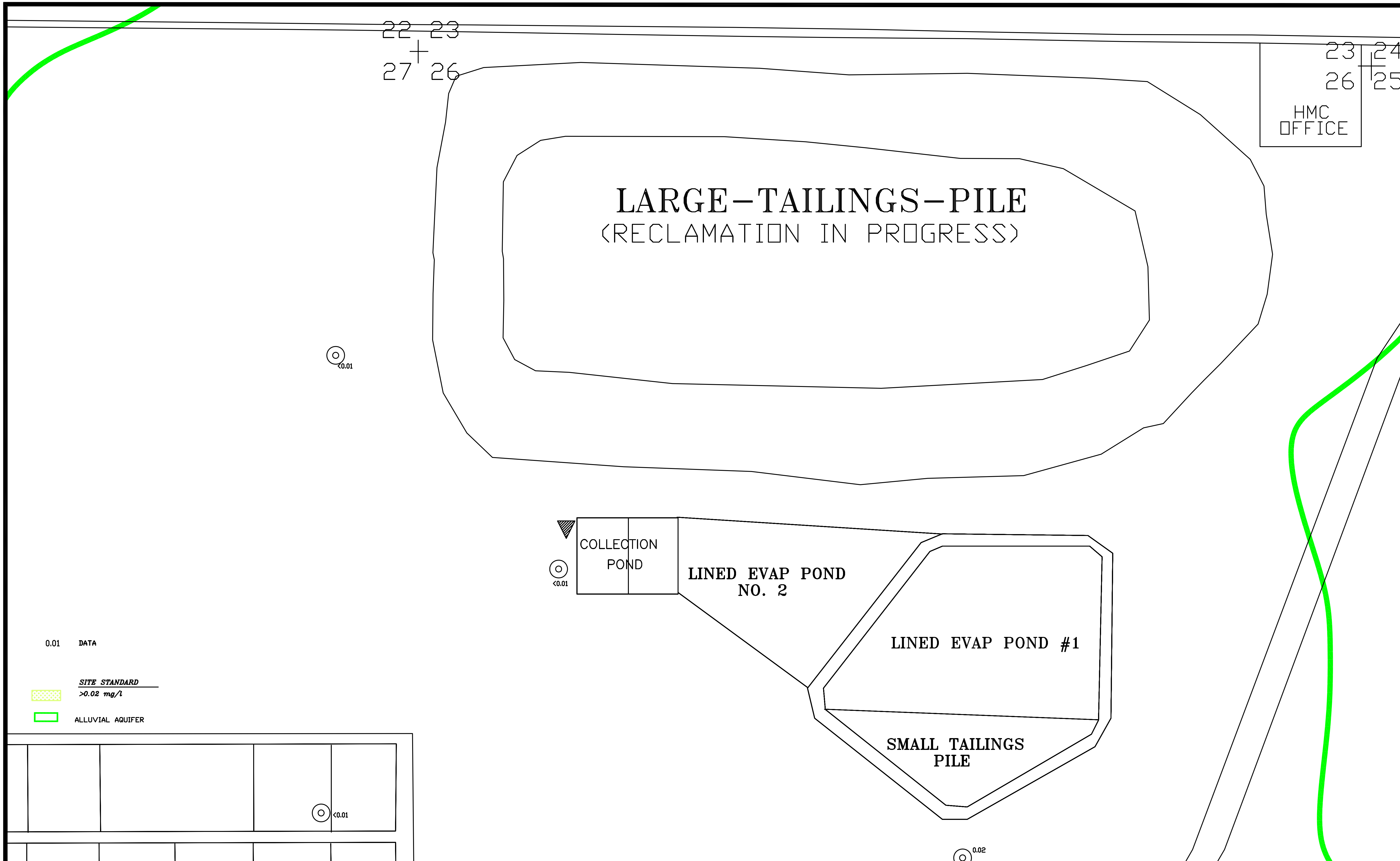
DATE: 3/1/17

FIGURE 4.3-121C. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2015, pCi/l



SCALE: 1"=1600'
C:\PROJECTS\2017-06
1600QAL16
DATE: 3/1/17

FIGURE 4.3-122. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, mg/l



SCALE: 1"=500'
C:\PROJECTS\2017-06
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DATE: 3/1/17

FIGURE 4.3-122A. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

SCALE: 1"=500'
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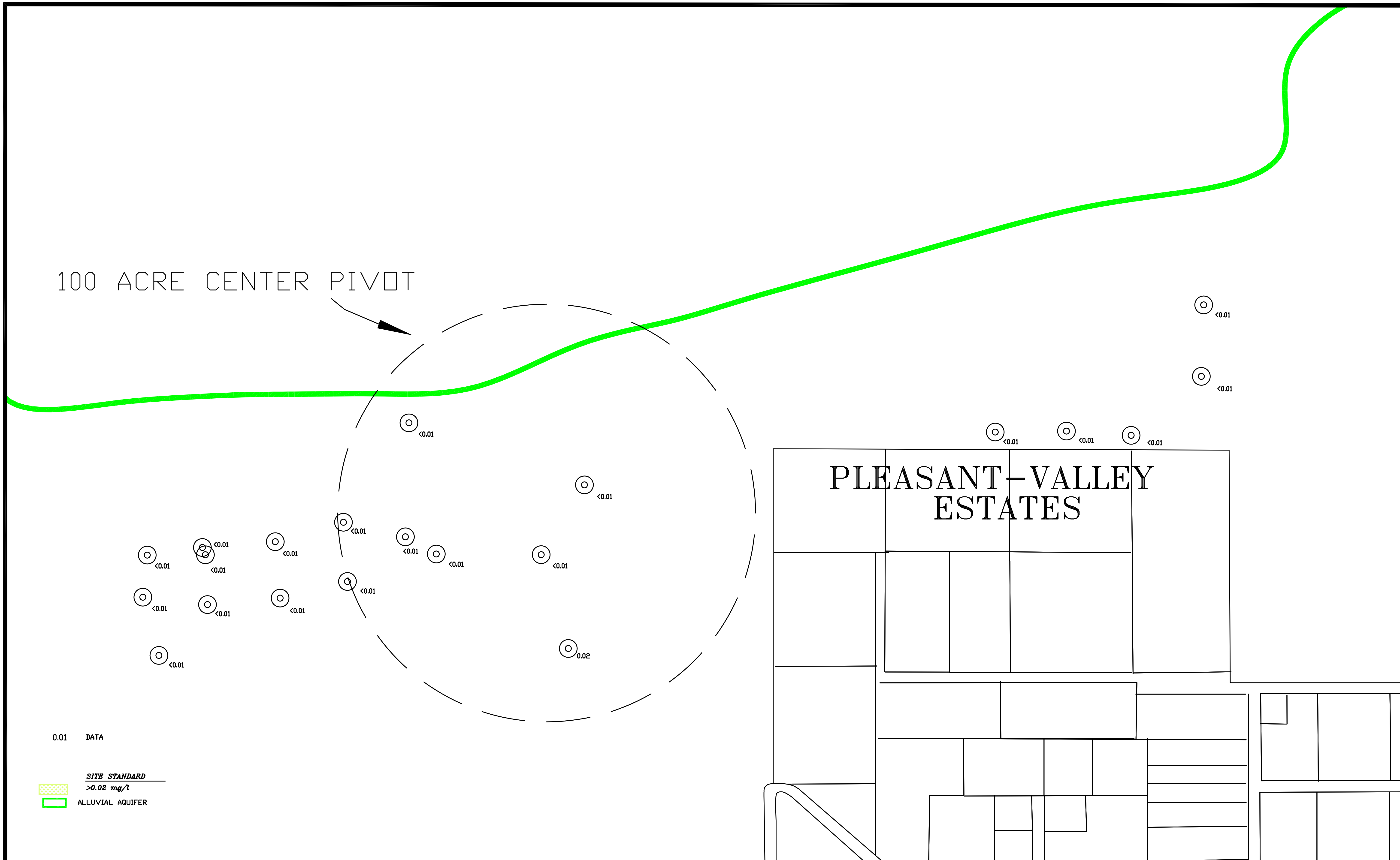
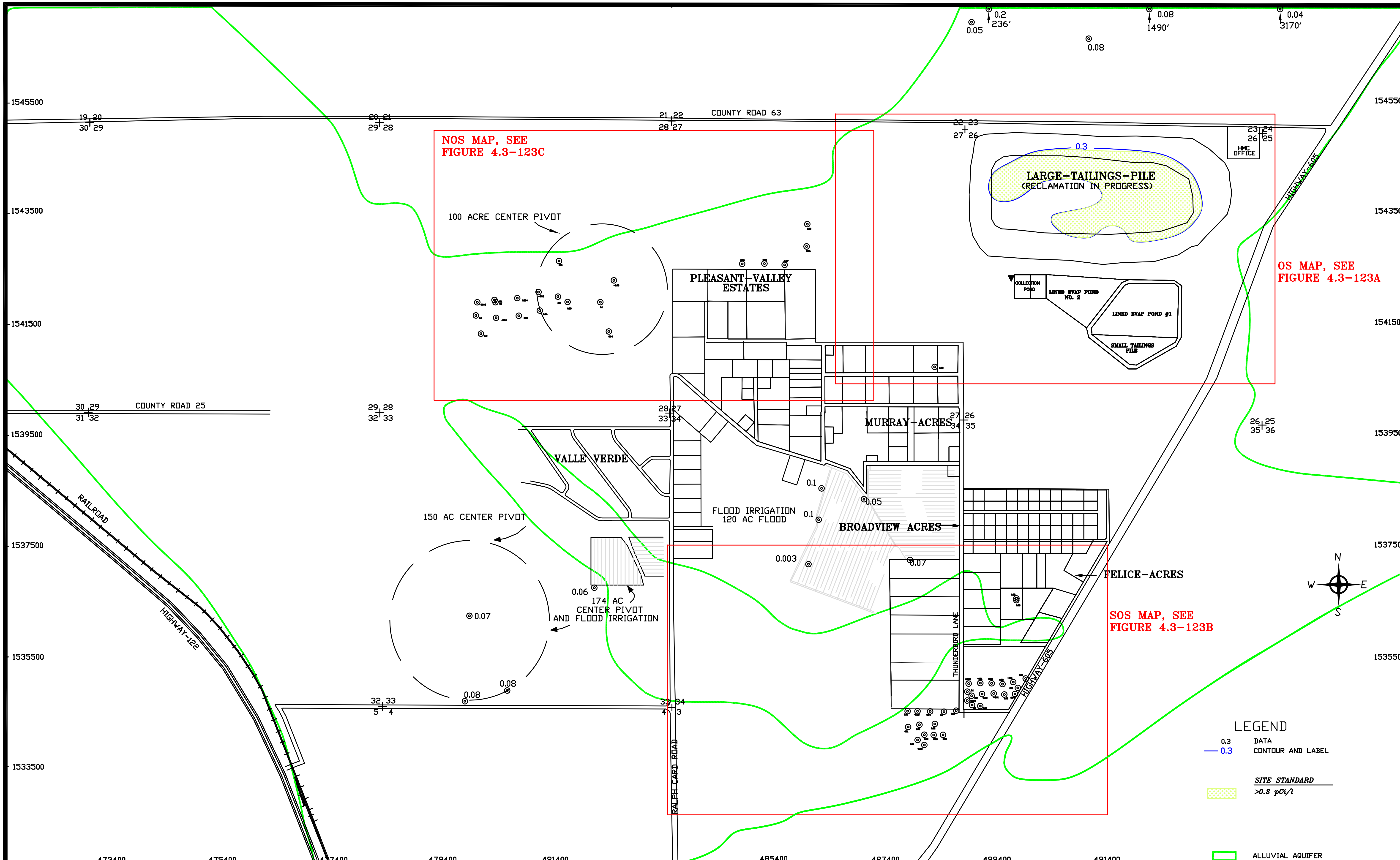
1600QAL16
DATE: 3/1/17

FIGURE 4.3-122B. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2016, mg/l



SCALE: 1"=500'
C:\PROJECTS\ 2017-06 1600QAL16
DATE: 3/1/17

FIGURE 4.3-122C. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l



SCALE: 1"=1600'
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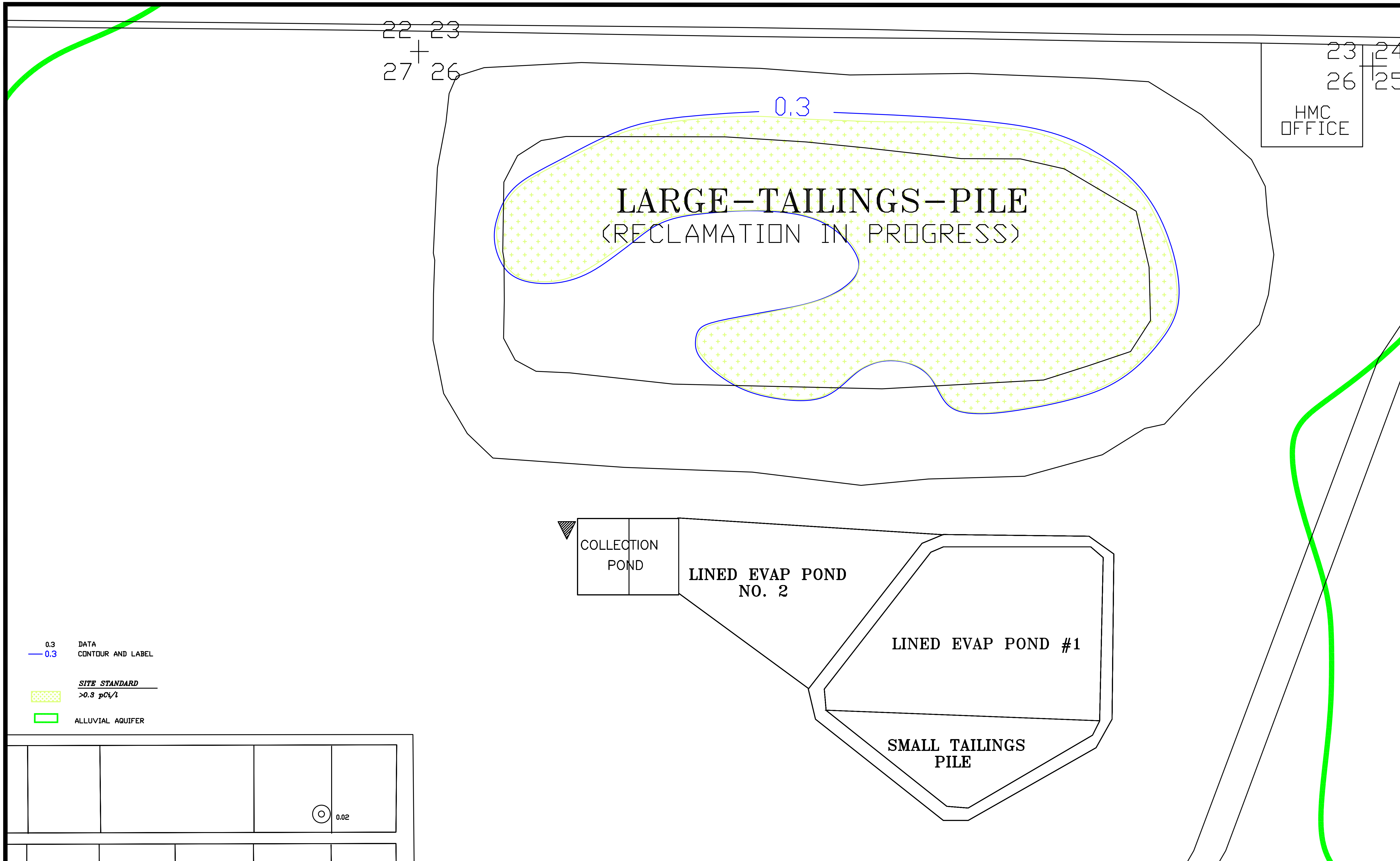
DATE: 3/1/17

FIGURE 4.3-123. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2016, pCi/l



SCALE: 1"=500'
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DATE: 3/1/17

FIGURE 4.3-123A. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2016, mg/l

SCALE: 1"=500'
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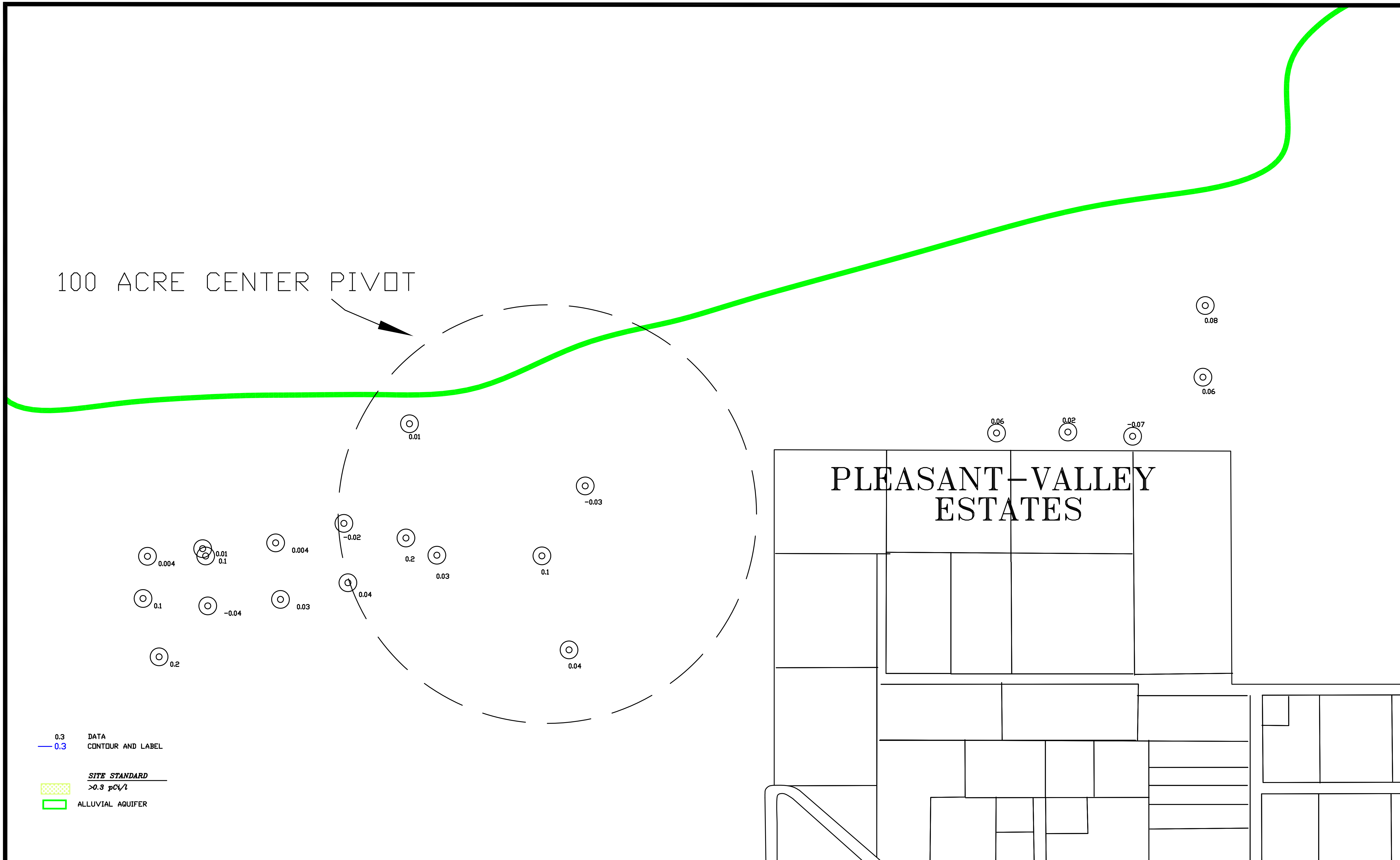
DATE: 3/1/17

FIGURE 4.3-123B. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2015, mg/l



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1600QAL16
DATE: 3/1/17

FIGURE 4.3-123C. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2016, mg/l

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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.

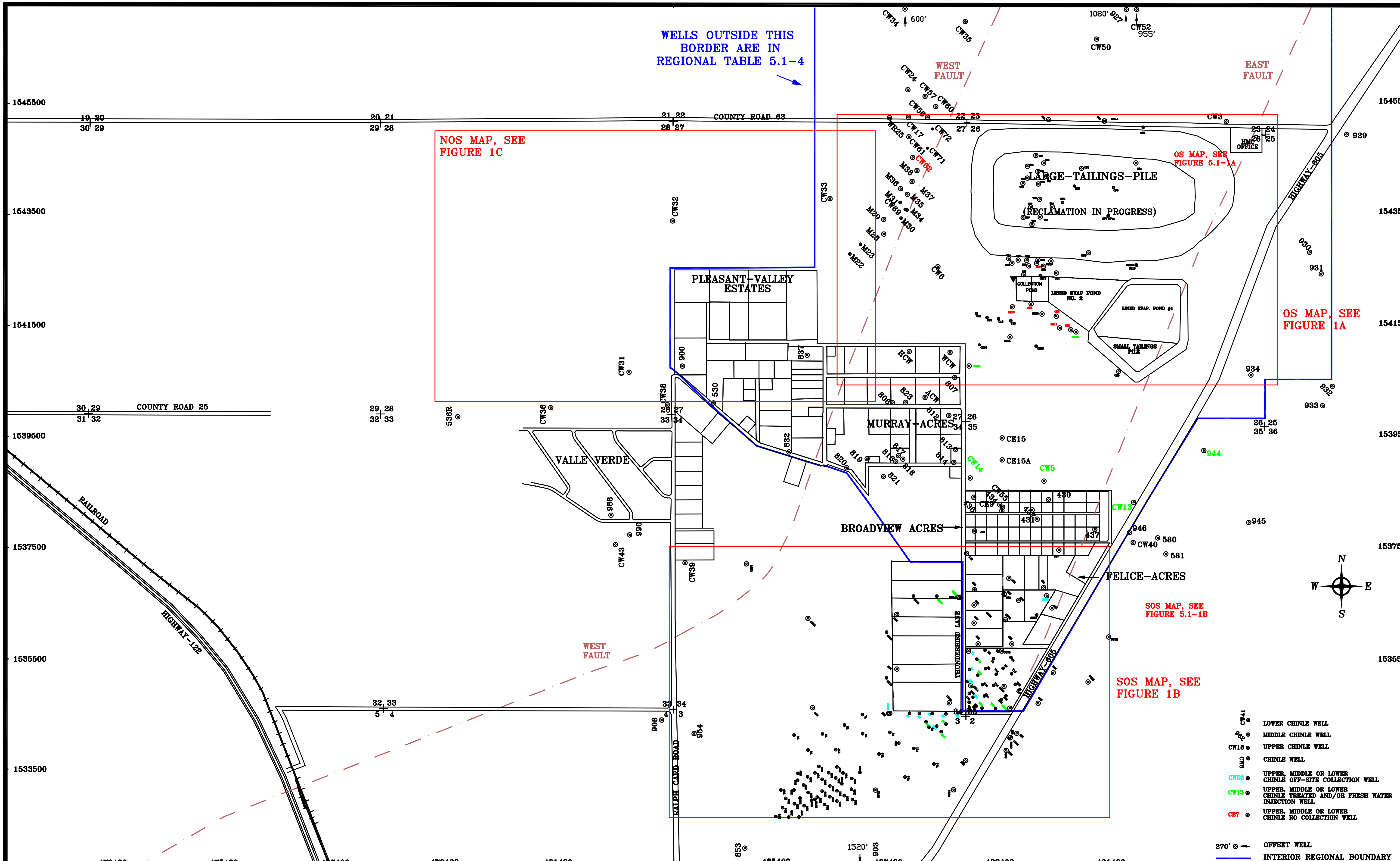
Table 5.1-2 presents basic well data for Chinle wells in Broadview Acres and Felice Acres. Table 5.1-3 presents similar data for Murray Acres and Pleasant Valley Estates Chinle wells. Wells that are not located within the immediate Grants Project property or within the four subdivision boundaries are 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. Upper Chinle wells CF16A and B17 were drilled by HMC in 2016 with each of these wells located On-Site south of the LTP. No Middle Chinle wells were drilled in 2016. A total of eight Lower Chinle wells were drilled in 2016. Lower Chinle wells R67B, R79, R80, V1, V2, V3, V4 and V6 were drilled in Section 3 in 2016. Six of these wells were completed only in the Lower Chinle aquifer because they are located north of the Section 3 subcrop area while wells R79 and R80 are completed in both the alluvial and Lower Chinle aquifers because they are located in the Lower Chinle subcrop.

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, CW4R, CW5, CW13 and CW25 are shown in green to denote that these are treated and/or fresh-water injection wells. Upper Chinle wells CE2, CE5, CE6, CE7, CE11 and CE12 were pumped as a supply to the R.O. plant in 2016 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 2016. 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.



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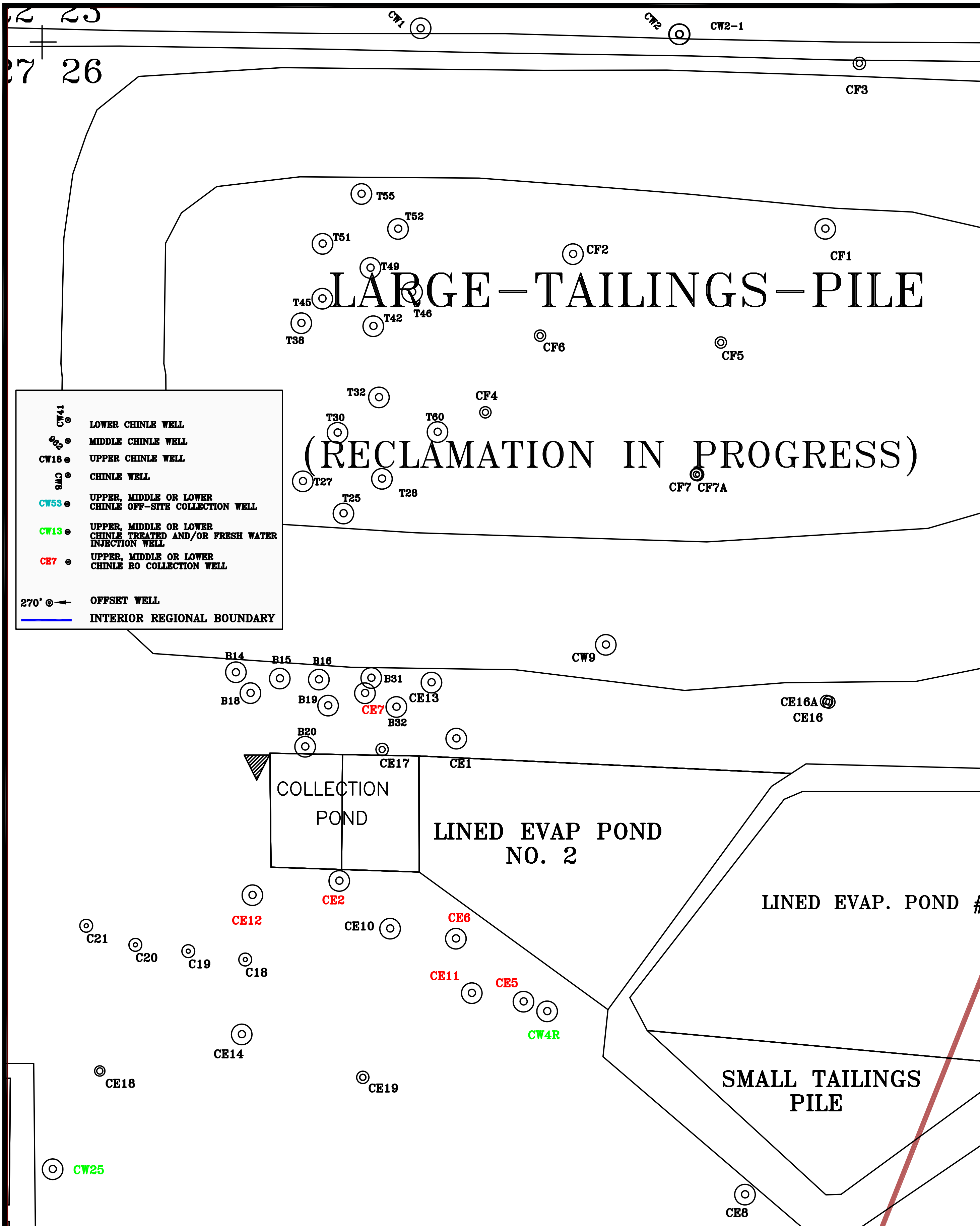
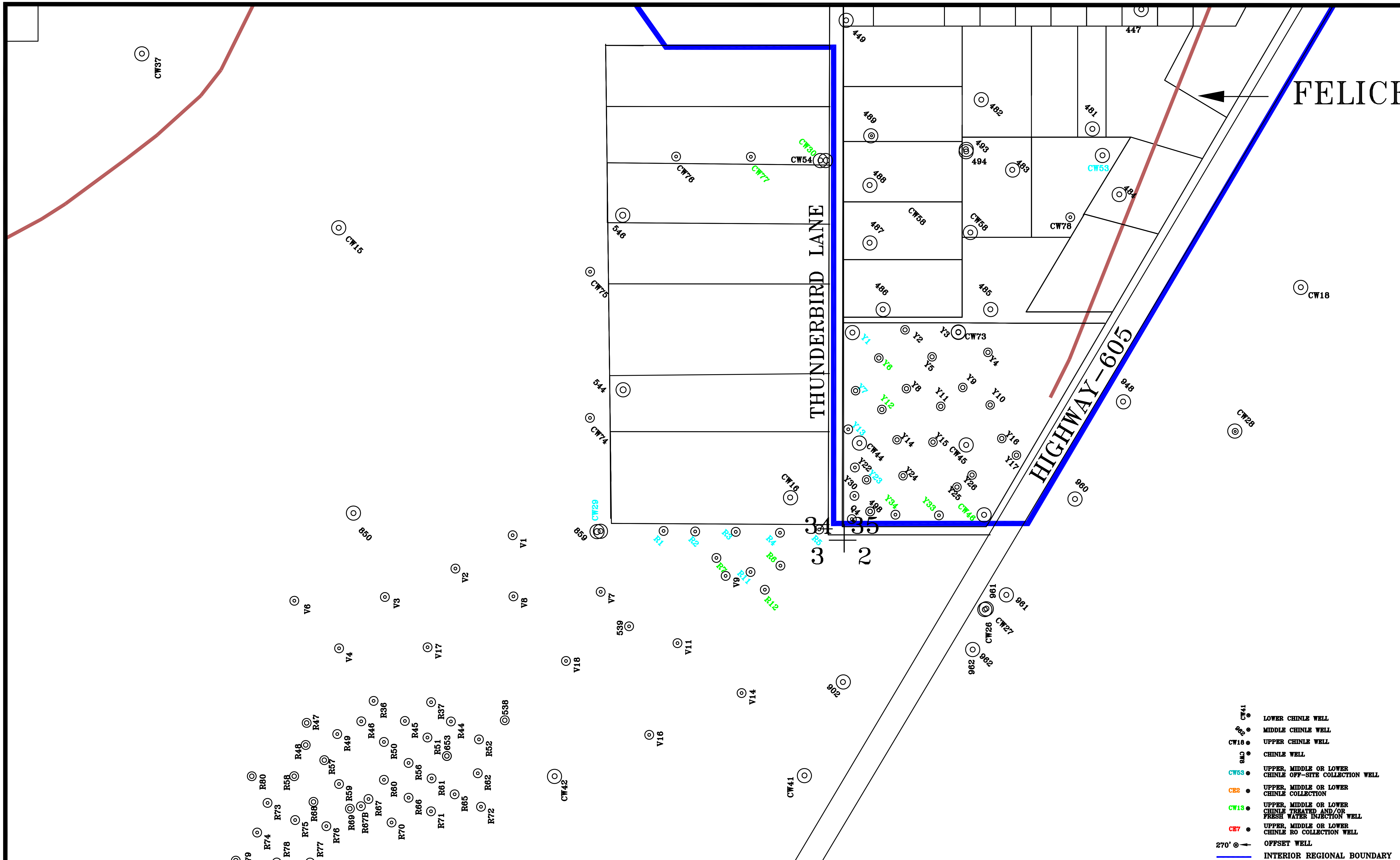
DATE: 2/2/17

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS, 2016



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/17
FIGURE 5.1-1A. CHINLE AQUIFER WELL LOCATIONS, OS, 2016	SCALE: 1"=500'
	PAGE: 5.1-4



SCALE: 1"=500'
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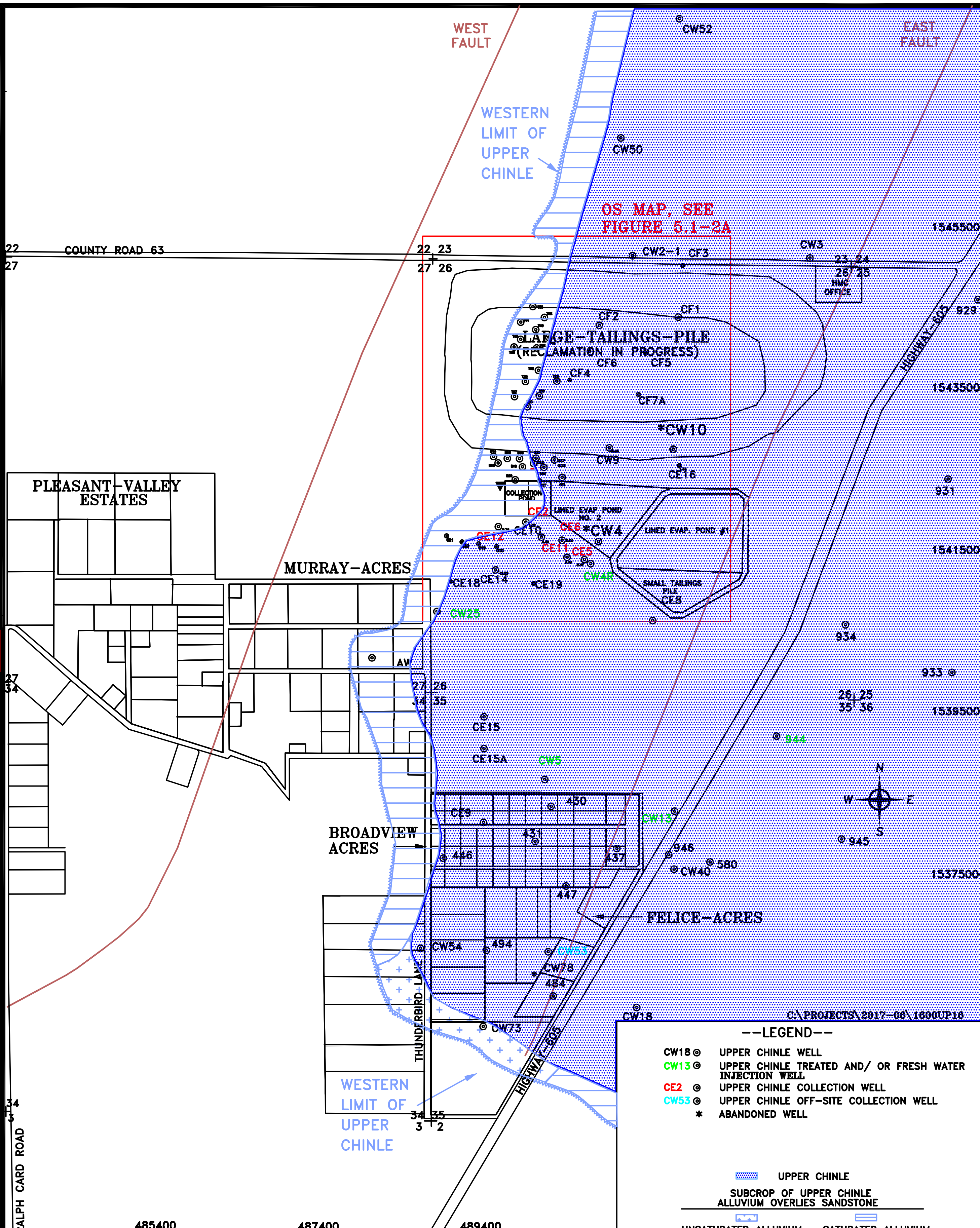
BASE16chinle.DWG
DATE: 2/2/17

FIGURE 5.1-1B CHINLE AQUIFER WELL LCOATIONS, SOS, 2016

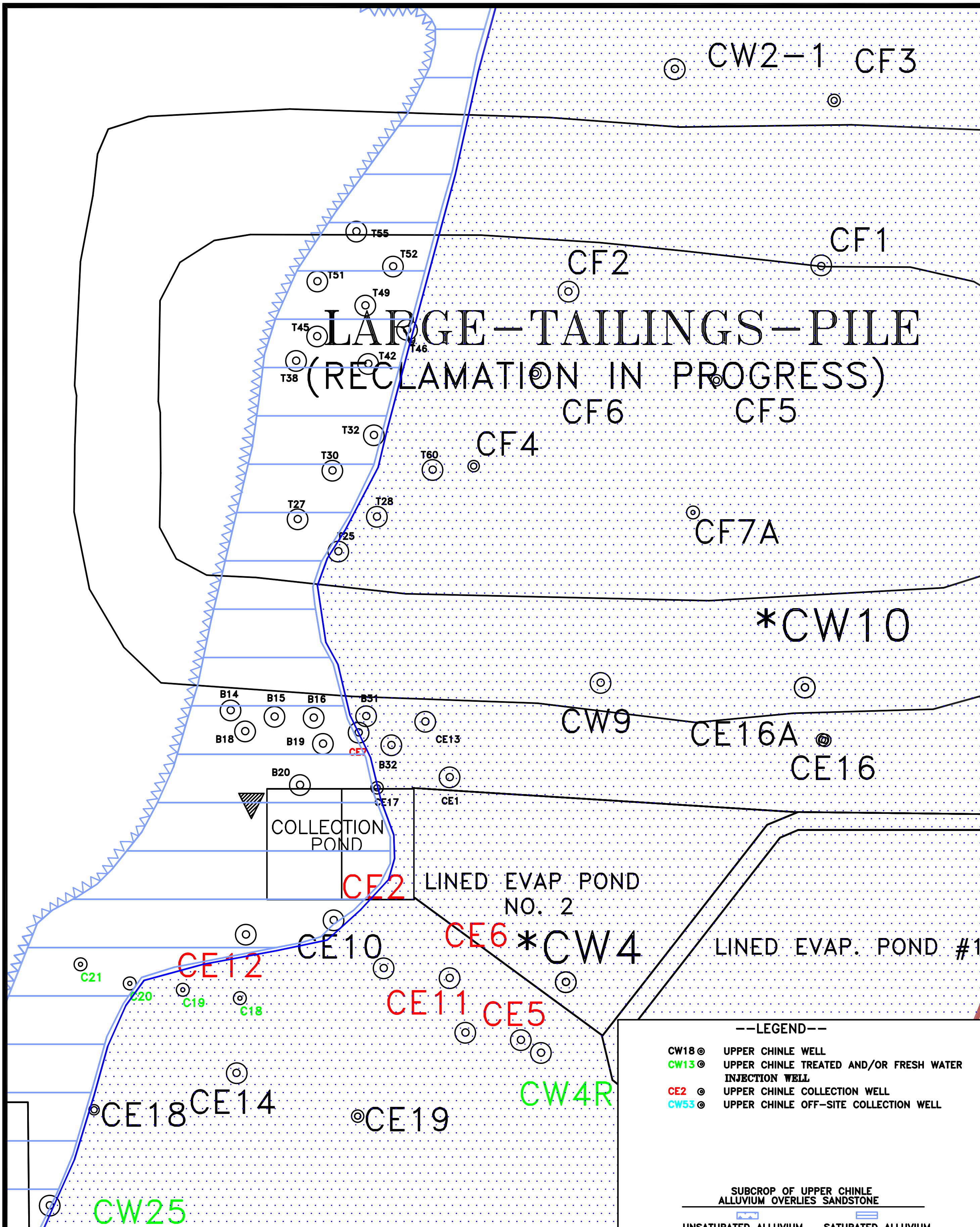


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-2 LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, 2016

DATE: 1/2/2017

SCALE: 1"= 1600'



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

FIGURE 5.1-2A. LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, OS

DATE: 2/3/17

SCALE: 1"= 500'

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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 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
0930	1542848	494997	410.0	6.0	12/12/2016	106.58	6491.96	0.0	6598.54	30	6569	A	-	---
										335	6264	M	330-400	Middle
0931	1542461	495207	366.7	6.0	12/12/2016	71.59	6538.97	0.9	6610.56	339	6271	U	-	Upper
0934	1540641	493941	293.0	6.0	8/27/2012	110.97	6474.62	2.0	6585.59	30	6554	A	-	---
										282	6302	U	-	Upper
B14	1542733	489579	120.0	4.5	4/22/2014	34.46	6541.19	2.0	6575.65	68	6506	A	60-120	Alluvium
										68	6506	U	60-120	Upper
B15	1542708	489749	120.0	4.5	4/23/2014	35.09	6541.22	2.0	6576.31	72	6502	U	60-120	Upper
										72	6502	A	60-120	Alluvium
B16	1542705	489900	120.0	4.5	---	---	---	2.0	6575.37	83	6490	U	60-120	Upper
										83	6490	A	60-120	Alluvium
B17	1542647	489516	95.0	4.5	---	---	---	2.0	---	---	---	A	55-95	Alluvium
										---	---	U	55-95	Upper
B18	1542652	489634	120.0	4.5	9/5/2014	38.48	6537.65	2.0	6576.13	70	6504	U	60-120	Upper
										70	6504	A	60-120	Alluvium
B19	1542605	489936	120.0	4.5	9/11/2014	39.79	6534.22	2.0	6574.01	90	6482	A	60-120	Alluvium
										90	6482	U	60-120	Upper
B20	1542444	489847	120.0	4.5	10/9/2014	40.11	6534.33	2.0	6574.44	90	6482	A	60-120	Alluvium
										90	6482	U	60-120	Upper
B31	1542710	490103	120.0	4.5	4/24/2014	37.57	6538.39	2.0	6575.96	83	6491	A	60-100	Alluvium
										83	6491	U	60-100	Upper
B32	1542598	490201	120.0	4.5	4/24/2014	36.91	6538.48	2.0	6575.39	93	6480	A	60-120	Alluvium
										93	6480	U	60-120	Upper
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	12/12/2016	29.61	6540.58	4.4	6570.19	75	6491	A	-	---
										106	6460	U	98-138	Upper
CE2	1541923	489979	119.7	5.0	11/30/2016	39.45	6536.90	1.8	6576.35	74	6501	A	-	---
										74	6501	U	78-118	Upper
CE5	1541453	490695	140.0	5.0	7/15/2016	36.58	6531.97	1.6	6568.55	63	6504	A	-	---
										103	6464	U	100-140	Upper
CE6	1541698	490433	140.0	6.0	7/18/2016	32.45	6532.74	1.5	6565.19	75	6489	U	-	Upper
CE7	1542652	490079	120.0	6.0	12/12/2016	42.60	6533.39	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	12/12/2016	36.30	6533.40	1.7	6569.70	166	6402	U 160-200	Upper
CE10	1541737	490177	130.0	6.0	12/12/2016	37.95	6532.91	2.3	6570.86	80	6489	U 90-130	Upper
CE11	1541487	490494	140.0	6.0	7/18/2016	33.56	6531.86	1.6	6565.42	90	6474	U 100-140	Upper
CE12	1541867	489642	120.0	6.0	7/18/2016	37.30	6534.93	2.1	6572.23	80	6490	U 80-120	Upper
CE13	1542693	490338	129.2	6.0	12/12/2016	50.07	6524.57	1.7	6574.64	95	6478	U 90-130	Upper
CE14	1541326	489600	130.0	5.0	12/12/2016	33.18	6536.27	2.0	6569.45	80	6487	U 90-130	Upper
CE15	1539507	489460	130.0	5.0	12/12/2016	34.57	6531.51	2.0	6566.08	77	6487	U 90-130	Upper
CE15A	1539111	489459	130.0	4.5	12/14/2016	33.42	6531.39	2.0	6564.81	75	6488	A -	---
										75	6488	U 90-130	Upper
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	185.0	4.5	---	---	---	2.0	6580.04	---	---	U 125-185	Upper
CE17	1542434	490146	130.0	4.5	4/15/2014	38.43	6537.97	2.0	6576.40	94	6480	A -	---
										94	6480	U 90-130	Upper
CE18	1541185	489048	130.0	4.5	4/7/2014	33.79	6535.09	2.0	6568.88	74	6493	A -	---
										74	6493	U 90-130	Upper
CE19	1541160	490070	130.0	4.5	4/8/2014	43.13	6525.70	2.0	6568.83	88	6479	U 90-130	Upper
										88	6479	A -	---
CF1	1544456	491868	285.0	5.0	9/30/2014	127.70	6538.21	2.0	6665.91	230	6434	U 240-285	Upper
CF2	1544358	490888	260.0	5.0	10/2/2014	118.51	6547.65	2.0	6666.16	220	6444	U 220-260	Upper
CF3	1545099	491918	166.0	4.5	12/12/2016	47.34	6539.45	2.0	6586.79	156	6429	U 146-166	Upper
CF4	1543680	490520	197.0	4.5	12/12/2016	126.15	6537.54	2.0	6663.69	166	6496	U 177-197	Upper
										166	6496	A -	---
CF5	1544013	491463	233.0	4.5	8/7/2014	130.58	6540.88	2.0	6671.46	163	6506	A -	---
										222	6447	U 213-233	Upper
CF6	1544040	490759	205.0	4.5	8/7/2014	115.83	6551.60	2.0	6667.43	163	6502	A -	---
										199	6466	U 185-205	Upper
CF7	1543501	491362	220.0	4.5	8/13/2014	116.76	6551.56	2.0	6668.32	---	---	C 200-220	Chinle
										155	6511	A -	---
CF7A	1543500	491371	265.0	4.5	12/12/2016	130.76	6537.35	2.0	6668.11	160	6506	A -	---
										220	6446	U 225-265	Upper
CW1	1545235	490295	325.0	5.0	1/25/2016	96.00	6489.22	0.7	6585.22	105	6480	A -	---
										272	6313	M 212-323	Middle
CW2	1545212	491302	355.0	5.0	9/26/2016	84.85	6500.63	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/13/2016	43.32	6542.16	1.7	6585.48	85	6499	A -	---
										136	6448	U 243-253	Upper
CW3	1545200	493496	235.0	5.0	12/13/2016	51.71	6535.47	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	12/13/2016	51.71	6535.47	0.7	6587.18	209	6377	U 210-235	Upper
										348	6238	M -	---
* CW4	1541682	490874	145.0	5.0	9/7/1994	39.06	6531.89	0.8	6570.95	70	6500	A -	---
										112	6458	U 110-145	Upper
CW4R	1541416	490787	138.9	6.0	11/22/2010	0.68	6568.05	1.3	6568.73	61	6506	A -	---
										104	6463	U 102-142	Upper
CW5	1538729	490221	170.0	5.0	11/22/2010	0.72	6568.62	1.6	6569.34	65	6503	A -	---
										137	6431	U 135-170	Upper
CW6	1542588	488301	282.0	4.0	12/12/2016	76.18	6499.46	1.0	6575.64	236	6339	M 246-276	Middle
CW7	1545285	488773	---	---	10/17/1995	60.80	6522.79	0.0	6583.59	---	---	C 120-130	Chinle
CW8	1545009	491238	285.0	6.0	12/5/2000	38.90	6552.93	0.0	6591.83	---	---	C 276-286	Chinle
										85	6507	A -	---
CW9	1542840	491015	180.0	5.0	12/12/2016	57.46	6534.37	0.0	6591.83	---	---	U 130-180	Upper
										80	6512	A -	---
* CW10	1542823	491803	185.0	5.0	11/13/1995	50.03	6537.86	0.0	6587.89	75	6513	A -	---
										167	6421	U 155-185	Upper
CW13	1538349	491827	267.7	6.0	11/22/2010	0.55	6576.15	2.7	6576.70	230	6344	U 225-265	Upper
										378	6196	M -	---
CW14	1538786	488884	360.9	6.0	4/4/2011	60.00	6506.09	2.9	6566.09	56	6507	A -	---
										66	6497	U -	---
										310	6253	M 278-358	Middle
CW17	1545279	487771	108.0	5.0	12/16/2016	49.60	6539.72	3.1	6589.32	73	6513	A -	---
										85	6501	M 83-103	Middle
CW24	1545773	487760	118.0	5.0	12/13/2016	45.77	6542.90	3.0	6588.67	61	6525	A -	---
										65	6521	M 78-118	Middle
CW25	1540802	488866	102.0	5.0	11/22/2010	0.92	6566.28	3.0	6567.20	53	6511	A -	---
										53	6511	U 62-102	Upper
CW33	1543814	486347	347.0	6.0	12/13/2016	105.75	6469.14	1.8	6574.89	63	6510	M -	---
										63	6510	A -	---
										272	6301	L 267-287	Lower
										272	6301	L 307-347	---
CW34	1547827	487707	65.7	6.0	12/13/2016	49.48	6544.92	3.2	6594.40	20	6571	A -	---
										40	6551	M 33-63	Middle
CW35	1547001	488794	120.0	5.0	12/13/2016	48.74	6542.43	1.9	6591.17	63	6526	A -	---
										90	6499	M 93-118	Middle
CW50	1546687	491159	170.0	5.0	12/13/2016	45.81	6542.75	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	12/16/2016	48.22	6539.64	2.0	6587.86	51	6535	A -	---
										98	6488	M 90-110	Middle
CW57	1545654	488070	140.0	5.0	12/13/2016	44.73	6540.17	2.0	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	12/13/2016	44.73	6540.17	2.0	6584.90	101	6482	M 100-140	Middle
CW60	1545470	488262	150.0	5.0	12/13/2016	42.42	6541.78	2.0	6584.20	50	6532	A -	---
										114	6468	M 100-140	Middle
CW61	1544927	487779	130.0	5.0	12/16/2016	43.27	6539.56	2.0	6582.83	62	6519	A -	---
										108	6473	M 90-130	Middle
CW62	1544555	487847	150.0	5.0	12/14/2016	40.49	6539.37	2.0	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	4/14/2014	37.63	6542.34	2.0	6579.97	72	6506	A -	---
										121	6457	M 120-140	Middle
CW72	1545034	488229	140.0	4.5	12/16/2016	40.38	6539.75	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	4/23/2014	42.11	6536.65	2.0	6578.76	69	6508	A 60-120	Alluvium
										92	6485	M 60-120	Middle
M29	1543440	487326	120.0	4.5	4/23/2014	36.92	6535.95	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	4/15/2014	35.13	6539.59	2.0	6574.72	71	6502	A 60-120	Alluvium
										97	6476	M 60-120	Middle
M36	1543993	487631	120.0	4.5	4/15/2014	36.56	6538.88	2.0	6575.44	72	6501	A 60-120	Alluvium
										97	6476	M 60-120	Middle
M37	1544120	487835	120.0	4.5	4/15/2014	38.37	6537.07	2.0	6575.44	73	6500	A 60-120	Alluvium
										107	6466	M 60-120	Middle
M38	1544319	487923	120.0	4.5	4/15/2014	37.91	6541.71	2.0	6579.62	---	---	M 60-120	Middle
										79	6499	A 60-120	Alluvium
T25	1543352	489996	200.0	4.5	8/12/2014	115.39	6541.95	2.0	6657.34	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T27	1543474	489837	200.0	4.5	8/12/2014	113.98	6543.16	2.0	6657.14	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T28	1543484	490145	200.0	4.5	8/12/2014	114.83	6543.88	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	8/12/2014	114.83	6543.88	2.0	6658.71	---	---	A 140-200	Alluvium
T30	1543663	489972	200.0	4.5	8/8/2014	115.22	6544.40	2.0	6659.62	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T32	1543801	490134	200.0	4.5	8/8/2014	116.48	6545.13	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	6/5/2014	113.69	6546.32	2.0	6660.01	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T45	1544183	489914	200.0	4.5	6/4/2014	111.58	6546.48	2.0	6658.06	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T46	1544210	490262	200.0	4.5	6/3/2014	114.24	6546.41	2.0	6660.65	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T49	1544304	490100	200.0	4.5	6/3/2014	111.80	6546.59	2.0	6658.39	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T51	1544397	489914	200.0	4.5	6/3/2014	109.08	6548.26	2.0	6657.34	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T52	1544456	490208	200.0	4.5	6/3/2014	109.87	6548.13	2.0	6658.00	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T55	1544592	490063	195.0	4.5	6/3/2014	1110.87	5546.79	2.0	6657.66	---	---	U 135-195	Upper
										---	---	A 135-195	Alluvium
T60	1543666	490362	200.0	4.5	8/8/2014	116.76	6545.10	2.0	6661.86	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
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	4/12/1994	35.00	6533.00	0.0	6568.00	60	6508	A	125-130	Alluvium
										118	6450	U	125-130	Upper
0434	1538370	489420	280.0	6.0	10/4/2007	39.51	6524.17	0.0	6563.68	75	6489	A	-	---
										265	6299	M	-	Middle
0436	1538439	488947	295.0	5.0	10/29/1996	71.82	6490.91	0.0	6562.73	90	6473	A	-	---
										280	6283	M	280-295	Middle
0437	1537859	491128	340.0	5.0	10/29/1996	63.23	6508.77	1.8	6572.00	90	6480	A	-	---
										180	6390	U	-	---
										280	6290	M	240-300	Middle
0446	1537830	488960	110.0	6.0	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500	U	60-95	Upper
										60	6500	A	60-95	Alluvium
0447	1537490	490480	142.0	6.0	4/11/1985	41.18	6526.82	0.0	6568.00	80	6488	A	120-142	Alluvium
										138	6430	U	120-142	Upper
0449	1537440	488830	267.0	6.0	12/5/1994	63.42	6496.58	0.0	6560.00	---	---	M	-	Middle
0457	1538210	490000	300.0	5.0	7/2/2008	124.88	6446.12	---	6571.00	---	---	M	-	Middle
CE9	1538203	489458	130.0	6.0	12/13/2016	31.95	6531.17	1.2	6563.12	---	---	U	90-130	Upper
CW55	1538283	489471	360.0	6.0	12/13/2016	53.92	6510.24	2.3	6564.16	260	6302	M	-	Middle
						Felice Acres								
0481	1536820	490210	320.0	4.0	6/11/2014	75.65	6492.35	0.0	6568.00	110	6458	A	270-310	Alluvium
										270	6298	M	270-310	Middle
0482	1536981	489579	260.0	5.0	5/14/2014	46.60	6516.06	0.0	6562.66	80	6483	A	220-260	Alluvium
										210	6353	M	220-260	Middle
0483	1536586	489753	280.0	5.0	12/1/2014	35.91	6526.75	0.0	6562.66	40	6523	A	-	Alluvium
										65	6498	U	-	---
										236	6327	M	270-300	Middle
0484	1536448	490356	320.0	5.0	12/26/1996	39.43	6524.55	0.0	6563.98	38	6526	A	-	---
										129	6435	U	-	---
										280	6284	M	220-300	Middle
0485	1535800	489630	260.0	6.0	7/18/1996	70.90	6494.10	0.0	6565.00	35	6530	A	-	---
										70	6495	U	-	---
										223	6342	M	220-260	Middle
0486	1535800	489024	260.0	4.0	8/4/2004	90.40	6468.00	0.0	6558.40	---	---	M	200-260	Middle
										21	6537	A	-	---
										21	6537	U	-	---
0487	1536175	488950	260.0	---	7/24/1996	49.20	6511.80	0.0	6561.00	---	---	M	-	Middle
0488	1536500	488950	190.0	6.0	8/19/2003	113.80	6448.20	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	12/13/2016	70.78	6489.50	0.9	6560.28	40	6519	A	-	---
										65	6494	U	-	---
										236	6323	M	270-300	Middle
0494	1536689	489494	85.0	5.0	12/13/2016	31.36	6528.78	0.6	6560.14	40	6520	A	-	---
										65	6495	U	65-85	Upper
0498	1534661	488953	150.0	6.0	7/5/2016	46.20	6514.39	2.0	6560.59	80	6479	A	70-110	Alluvium
										80	6479	M	130-150	Middle
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	12/12/2016	57.53	6503.78	0.6	6561.31	90	6471	A	-	---
										166	6395	M	163-193	Middle
CW46	1534642	489595	187.3	5.0	12/18/2006	72.20	6490.06	1.5	6562.26	88	6473	A	-	---
										112	6449	M	125-185	Middle
CW53	1536668	490262	157.0	5.0	12/13/2016	17.36	6547.58	3.0	6564.94	110	6452	U	117-157	Upper
CW58	1536230	489520	305.0	4.5	12/20/2016	79.92	6480.88	2.0	6560.80	45	6514	U	-	---
										45	6514	A	-	---
										226	6333	M	265-305	Middle
CW73	1535670	489450	100.0	4.5	12/19/2016	49.51	6513.94	2.0	6563.45	68	6493	U	80-100	Upper
										68	6493	A	-	---
CW78	1536319	490080	160.0	4.5	12/13/2016	16.91	6550.24	2.0	6567.15	46	6519	A	-	---
										61	6504	U	120-160	Upper
Q4	1534635	488880	160.0	4.5	12/1/2014	60.53	6499.79	2.0	6560.32	90	6468	M	100-160	Middle
Q42	1536662	489606	80.0	4.5	5/11/2015	35.27	6529.21	1.6	6564.48	61	6502	U	40-80	Upper
										61	6502	A	40-80	Alluvium
Q48	1535653	490120	105.0	4.5	12/12/2016	47.61	6520.23	2.0	6567.84	73	6493	U	65-105	Upper
										73	6493	A	65-105	Alluvium
Q50	1536680	490288	85.0	4.5	8/25/2015	37.30	6531.63	2.0	6568.93	43	6524	A	45-85	Alluvium
										61	6506	U	45-85	Upper
Y1	1535670	488850	260.0	4.5	12/1/2016	125.44	6436.00	2.0	6561.44	77	6482	A	-	---
										77	6482	U	-	---
										172	6387	M	220-260	Middle
Y2	1535678	489151	250.0	4.5	12/19/2016	77.28	6484.33	2.9	6561.61	64	6495	A	-	---
										66	6493	U	-	---
										198	6361	M	210-250	Middle
Y3	1535660	489440	280.0	4.5	12/12/2016	73.78	6489.60	2.0	6563.38	61	6500	U	-	---
										61	6500	A	-	---
										196	6365	M	260-280	Middle
										196	6365	M	220-240	Middle
Y4	1535558	489612	260.0	4.5	12/1/2014	82.68	6480.46	2.4	6563.14	64	6497	A	-	---

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	12/1/2014	82.68	6480.46	2.4	6563.14	64	6497	U -	---
										194	6367	M 220-260	Middle
Y5	1535528	489302	260.0	4.5	12/1/2014	87.82	6474.92	3.6	6562.74	82	6477	U -	---
										82	6477	A -	---
										178	6381	M 220-260	Middle
Y6	1535518	489002	250.0	4.5	12/1/2014	90.49	6468.59	0.9	6559.08	100	6458	A -	---
										178	6380	M 210-250	Middle
Y7	1535339	488870	220.0	4.5	12/1/2016	119.87	6440.56	2.5	6560.43	90	6468	A -	---
										158	6400	M 180-220	Middle
Y8	1535349	489161	240.0	4.5	12/19/2016	73.89	6487.58	2.1	6561.47	101	6458	A -	---
										185	6374	M 200-240	Middle
Y9	1535358	489503	235.0	4.5	12/1/2014	76.27	6486.45	2.6	6562.72	84	6476	U -	---
										84	6476	A -	---
										178	6382	M 195-235	Middle
Y10	1535258	489632	220.0	4.5	12/12/2016	74.71	6491.47	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	12/1/2014	81.17	6478.51	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	12/12/2016	61.50	6499.52	1.2	6561.02	90	6470	A -	---
										139	6421	M 160-200	Middle
Y15	1535046	489312	190.0	4.5	12/1/2014	63.19	6499.17	2.3	6562.36	103	6457	A -	---
										155	6405	M 150-190	Middle
Y16	1535068	489702	200.0	4.5	12/1/2014	66.16	6497.54	2.0	6563.70	89	6473	A -	---
										158	6404	M 160-200	Middle
Y17	1534978	489782	210.0	4.5	12/12/2016	64.59	6500.04	2.4	6564.63	96	6466	A -	---
										158	6404	M 170-210	Middle
Y22	1534912	488868	210.0	4.5	12/1/2014	89.49	6472.20	2.0	6561.69	112	6448	M 160-210	Middle
Y23	1534838	488942	160.0	4.5	12/1/2016	126.47	6434.83	2.7	6561.30	106	6453	A -	---
										106	6453	M 120-160	Middle
Y24	1534859	489143	180.0	4.5	12/1/2014	61.68	6500.26	2.6	6561.94	97	6462	A -	---
										119	6440	M 140-180	Middle
Y25	1534798	489442	180.0	4.5	12/12/2016	58.58	6504.09	1.8	6562.67	91	6470	A -	---
										125	6436	M 140-180	Middle
Y26	1534858	489532	185.0	4.5	12/1/2014	62.39	6502.01	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	12/12/2016	60.65	6499.40	2.0	6560.05	108	6450	M 140-180	Middle
Y33	1534639	489337	180.0	4.5	12/1/2014	57.18	6506.04	2.0	6563.22	100	6461	M 140-180	Middle
Y34	1534642	489091	180.0	4.5	12/1/2014	58.48	6502.44	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	9/19/1983	84.86	6476.14	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	---	---	7/22/1995	70.34	6486.66	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	---	5/9/2002	99.20	6458.80	0.0	6558.00	---	---	M 125-230	Middle
0821	1538810	487320	260.0	7.0	11/1/1994	35.88	6524.12	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	12/19/2016	78.58	6485.22	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	12/19/2016	32.15	6531.28	0.1	6563.43	63	6500	A -	Alluvium
										100	6463	U 66-155	Upper
HCW	1541060	487785	295.0	6.0	7/20/2000	75.61	6486.39	1.0	6562.00	82	6479	A -	---
										264	6297	M 264-295	Middle
WCW	1541045	488520	307.0	6.0	12/13/2016	80.55	6486.82	0.8	6567.37	83	6484	A -	---
										254	6313	M 257-307	Middle
						Pleasant Valley							
0530	1540229	484358	490.0	5.0	10/30/1998	95.78	6463.41	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	9/7/1983	59.87	6507.13	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	---	7/24/1995	91.41	6468.59	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	9/12/2000	144.70	---	-2.0	---	---	---	L -	Lower
0536R	1539888	479654	264.0	4.0	12/5/2007	139.06	6415.94	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 80-100	---
										100	6453	A 50-70	Alluvium
										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	7/19/2010	72.50	6486.50	---	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	12/13/2016	51.79	6497.36	3.2	6549.15	37	6509	A -	---
										37	6509	M 29-54	Middle
0853	1532124	484824	95.0	5.0	12/12/2016	70.68	6470.70	1.7	6541.38	60	6480	A -	---
										60	6480	L 55-95	Lower
0859	1534549	487426	83.0	5.0	12/12/2016	62.44	6490.32	2.7	6552.76	52	6498	M 50-83	Middle
0901	1531531	492846	270.0	5.0	11/4/1981	46.88	6552.12	0.0	6599.00	40	6559	A -	---
										190	6409	L 240-260	Lower
0902	1533700	488800	150.0	6.0	1/28/1995	52.10	6507.90	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	11/3/1998	81.16	6463.21	1.5	6544.37	107	6436	A -	---
										232	6311	L -	Lower
0909	1531900	483400	140.0	4.0	5/12/2015	84.49	6454.41	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	2/29/2016	44.95	6547.62	2.0	6592.57	---	---	U 290-320	Upper
0932	1540436	495407	501.0	6.0	4/19/2001	86.73	6515.38	0.0	6602.11	354	6248	U -	---
										492	6110	M 450-490	Middle
0933	1540087	495231	---	5.0	12/14/2009	78.28	6522.23	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	12/27/2010	3.80	6584.81	1.6	6588.61	64	6523	A -	---
										252	6335	U 220-280	Upper
0945	1537986	493900	300.0	---	3/21/1985	92.41	6498.08	0.0	6590.49	---	---	U -	Upper
0946	1537804	491754	260.0	5.0	10/17/1996	37.45	6541.59	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	12/27/1994	77.22	6467.78	0.0	6545.00	225	6320	L 285-307	Lower
0960	1534730	490110	305.0	6.0	4/5/1995	67.46	6497.54	0.0	6565.00	280	6285	M 285-305	Middle
0961	1534190	489720	240.0	5.0	4/5/1995	67.40	6497.60	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	8/21/2003	3.00	6572.00	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	6530.00	---	---	L -	Lower
0969	1529400	488450	---	---	---	---	---	0.0	6540.00	---	---	L -	Lower
0970	1529100	488500	---	5.0	---	---	---	0.0	6560.00	---	---	L -	Lower
0988	1538124	483423	155.0	5.0	7/18/1996	59.86	6489.14	1.3	6549.00	18	6530	A -	---
										152	6396	L 152-155	Lower
0990	1537600	482750	---	---	---	---	---	0.5	6550.00	---	---	L -	Lower
CW15	1536259	485961	134.6	5.0	12/13/2016	88.93	6462.39	2.6	6551.32	50	6499	A -	---
										91	6458	M 73-133	Middle
										311	6238	L -	---
CW16	1534747	488507	---	5.0	12/26/1996	68.02	6490.52	0.0	6558.54	82	6477	A -	---
										82	6477	M 112-152	Middle
CW18	1535924	491378	230.7	5.0	12/12/2016	20.22	6552.43	1.5	6572.65	90	6481	A -	---
										190	6381	U 177-232	Upper
										340	6231	M -	---
CW26	1534116	489593	300.0	5.0	12/11/2013	91.10	6470.33	0.5	6561.43	50	6511	M -	---
										50	6511	A -	---
										231	6330	L 245-285	Lower
CW27	1534109	489600	110.0	5.0	12/11/2013	60.18	6502.70	1.9	6562.88	50	6511	M 80-110	Middle
										50	6511	A -	---
CW28	1535112	491008	370.0	5.0	12/12/2016	72.01	6499.67	1.9	6571.68	90	6480	A -	---
										110	6460	U -	---
										294	6276	M 280-360	Middle
CW29	1534551	487435	290.0	5.0	12/12/2016	76.53	6475.69	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			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)						
CW30	1536642	488704	251.5	5.0	12/14/2004	8.00	6550.31	2.0	6558.31	35	6521	A -	---
										220	6336	M 219-249	Middle
CW31	1540689	482738	311.0	6.0	12/20/2016	85.08	6475.18	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	12/20/2016	147.51	6419.77	1.7	6567.28	77	6489	A -	---
										157	6409	L 218-303	---
										157	6409	L 158-188	Lower
CW36	1540053	481329	180.0	5.0	12/13/2016	78.50	6472.59	2.8	6551.09	96	6452	A -	---
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	12/13/2016	62.05	6489.12	1.3	6551.17	55	6495	A -	---
										100	6450	L 100-150	Lower
CW38	1540103	483429	174.8	5.0	11/14/1997	55.18	6500.42	2.1	6555.60	108	6446	A -	---
										130	6424	L 133-173	Lower
CW39	1537260	483754	126.3	5.0	10/22/2012	28.56	6522.15	3.4	6550.71	40	6507	A -	---
										87	6460	L 90-123	Lower
CW40	1537624	491819	264.0	5.0	12/12/2016	25.27	6553.67	2.6	6578.94	75	6501	A -	---
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	12/12/2016	76.00	6479.41	1.5	6555.41	59	6495	A -	---
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	12/12/2016	67.10	6481.68	0.0	6548.78	98	6451	A -	---
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	12/20/2016	67.80	6480.99	2.0	6548.79	57	6490	L 81-101	Lower
										57	6490	A -	---
CW54	1536645	488675	103.1	5.0	12/13/2016	32.26	6526.29	2.2	6558.55	70	6486	C 60-100	Chinle
CW74	1535188	487376	130.0	4.5	12/13/2016	66.65	6486.76	3.1	6553.41	40	6510	A -	---
										100	6450	M 90-130	Middle
CW75	1536012	487376	190.0	4.5	12/13/2016	70.41	6483.17	1.8	6553.58	59	6493	A -	---
										136	6416	M 150-190	Middle
CW76	1536661	487861	270.0	4.5	12/19/2016	68.58	6488.03	2.4	6556.61	40	6514	A -	---
										210	6344	M 230-270	Middle
CW77	1536659	488282	280.0	4.5	5/11/2015	83.61	6475.70	2.3	6559.31	53	6504	A -	---
										210	6347	M 240-280	Middle
R1	1534551	487790	120.0	5.0	12/12/2016	55.80	6499.32	2.0	6555.12	84	6469	A 80-120	Alluvium
										84	6469	M 80-120	Middle
R2	1534548	487968	115.0	5.0	11/30/2016	68.11	6486.05	2.0	6554.16	83	6469	A 75-115	Alluvium
										83	6469	M 75-115	Middle
R3	1534546	488196	140.0	5.0	11/30/2016	82.94	6472.79	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	8/4/2016	64.67	6494.11	2.0	6558.78	84	6473	A 90-130	Alluvium
										84	6473	M 90-130	Middle
R5	1534560	488666	125.0	5.0	11/30/2016	105.60	6452.15	2.0	6557.75	71	6485	A 65-125	Alluvium
										71	6485	M 65-125	Middle
R6	1534356	488448	130.0	5.0	11/19/2013	60.75	6498.89	2.0	6559.64	68	6490	A 50-90	Alluvium
										68	6490	M 110-130	Middle
R7	1534399	488087	145.0	5.0	8/16/2013	54.21	6500.60	2.0	6554.81	74	6479	M 125-145	Middle
										74	6479	A 65-105	Alluvium
R11	1534320	488280	120.0	4.5	11/30/2016	96.79	6461.66	2.0	6558.45	70	6486	A 60-120	Alluvium
										70	6486	M 60-120	Middle
R12	1534220	488360	120.0	4.5	11/14/2013	59.23	6497.72	2.0	6556.95	66	6489	M 60-120	Middle
										66	6489	A 60-120	Alluvium
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	12/20/2013	75.59	6471.58	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	A 100-160	Alluvium
										100	6443	L 100-160	Lower
R49	1533407	485953	200.0	4.5	12/12/2016	68.20	6477.79	2.0	6545.99	109	6435	L 160-200	Lower
										109	6435	A -	---
R50	1533362	486216	200.0	4.5	---	---	---	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	5/15/2015	69.74	6477.95	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	12/20/2013	74.67	6472.40	2.0	6547.07	99	6446	A 75-135	Alluvium
										99	6446	L 75-135	Lower
R58	1533170	485710	160.0	4.5	4/8/2014	70.98	6473.47	2.0	6544.45	98	6444	A 100-160	Alluvium
										98	6444	L 100-160	Lower
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	L 110-150	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
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	A 110-150	Alluvium
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	5/15/2015	69.24	6476.86	2.3	6546.10	96	6448	A -	---
										122	6422	L 140-180	Lower
R66	1533048	486354	180.0	4.5	5/15/2015	69.33	6476.18	2.0	6545.51	120	6424	L 140-180	Lower
										120	6424	A -	---
R67	1533041	486129	180.0	4.5	12/12/2016	66.50	6479.03	2.0	6545.53	105	6439	A -	---
										105	6439	L 140-180	Lower
R67B	1533000	486086	145.0	4.5	---	---	---	2.0	6544.87	100	6443	L 105-145	Lower
R68	1533025	485819	160.0	4.5	10/10/2014	69.44	6475.41	2.0	6544.85	99	6444	L 100-160	Lower
										99	6444	A 100-160	Alluvium
R69	1532987	486024	160.0	4.5	4/8/2014	70.53	6474.82	2.0	6545.35	96	6447	L 100-160	Lower
										96	6447	A 100-160	Alluvium
R70	1532909	486258	180.0	4.5	5/15/2015	68.01	6477.20	2.1	6545.21	---	---	L 140-180	Lower
										80	6463	A -	---
R71	1532972	486481	180.0	4.5	5/15/2015	68.36	6477.39	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	5/13/2015	69.92	6474.42	2.3	6544.34	99	6443	L 110-150	Lower
										99	6443	A 110-150	Alluvium
R74	1532852	485502	140.0	4.5	12/1/2015	68.63	6475.40	2.4	6544.03	104	6438	A 100-140	Alluvium
										104	6438	L 100-140	Lower
R75	1532922	485716	140.0	4.5	5/13/2015	69.14	6475.74	2.3	6544.88	98	6445	L 100-140	Lower
										98	6445	A 100-140	Alluvium
R76	1532888	485891	140.0	4.5	5/13/2015	68.37	6476.72	2.3	6545.09	106	6437	A 100-140	Alluvium
										106	6437	L 100-140	Lower
R77	1532683	485800	140.0	4.5	5/13/2015	68.28	6476.69	2.4	6544.97	80	6463	A 100-140	Alluvium
										80	6463	L 100-140	Lower
R78	1532683	485612	140.0	4.5	5/13/2015	69.16	6474.87	2.0	6544.03	85	6457	L 100-140	Lower
										85	6457	A 100-140	Alluvium
R79	1532694	485381	120.0	4.5	---	---	---	2.0	6542.94	80	6461	A 80-120	Alluvium
										80	6461	L 80-120	Lower
R80	1533169	485471	120.0	4.5	---	---	---	2.0	6543.72	---	---	A 80-120	Alluvium
										---	---	L 80-120	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
V1	1534527	486940	270.0	4.5	12/12/2016	74.87	6477.24	2.0	6552.11	220	6330	L 230-270	Lower
V2	1534339	486618	270.0	4.5	12/12/2016	73.25	6476.84	2.0	6550.09	210	6338	L 230-270	Lower
V3	1534179	486221	260.0	4.5	---	---	---	2.0	---	240	---	L 220-260	Lower
V4	1533890	485963	240.0	4.5	---	---	---	2.0	---	200	---	L 200-240	Lower
V6	1534158	485711	260.0	4.5	---	---	---	2.0	---	220	---	L 220-260	Lower
V7	1534208	487436	270.0	4.5	12/12/2016	77.68	6477.55	2.0	6555.23	---	---	L 230-270	Lower
										80	6473	A -	---
V8	1534183	486945	260.0	4.5	12/12/2016	72.10	6479.39	2.0	6551.49	100	6449	A -	---
										210	6339	L 220-260	Lower
V9	1534298	488140	280.0	4.5	12/12/2016	78.44	6477.25	2.0	6555.69	---	---	L 240-280	Lower
										70	6484	A -	---
V11	1533919	487868	270.0	4.5	12/12/2016	76.39	6479.51	2.0	6555.90	---	---	L 230-270	Lower
										60	6494	A -	---
V14	1533638	488229	240.0	4.5	12/12/2016	77.46	6478.23	2.0	6555.69	---	---	L 200-240	Lower
										80	6474	A -	---
V16	1533402	487709	220.0	4.5	12/12/2016	72.40	6479.58	2.0	6551.98	80	6470	A -	---
										200	6350	L 180-220	Lower
V17	1533896	486461	240.0	4.5	12/12/2016	72.35	6477.80	2.0	6550.15	---	---	L 200-240	Lower
										100	6448	A -	---
V18	1533819	487241	240.0	4.5	12/12/2016	73.81	6477.57	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

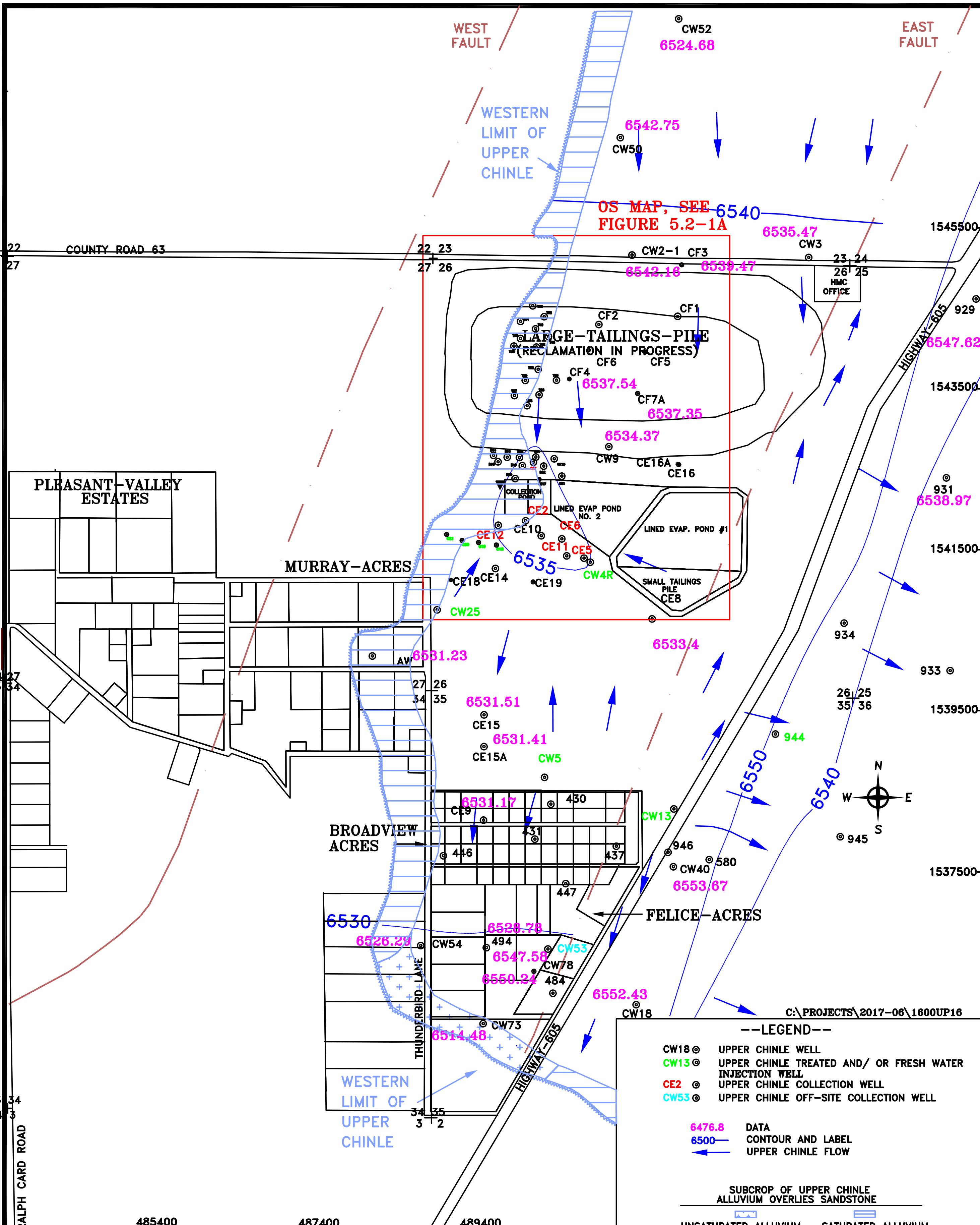
5.2 UPPER CHINLE WATER LEVELS

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 2016. 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 CW4R, CW5, CW13 and CW25 and collection from wells CE2, CE5, CE6, CE7, CE11 and CE12. 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 well CW53 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 or CE12. 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. The water level in well CW3 remained high in 2016 without the pumping of this well. The changes in water levels from collection well CE2 are due to variations in pumping rate in this well and collection from wells CE5, CE6, CE7, CE11 and CE12. Water levels in well 494 were fairly steady in 2016.

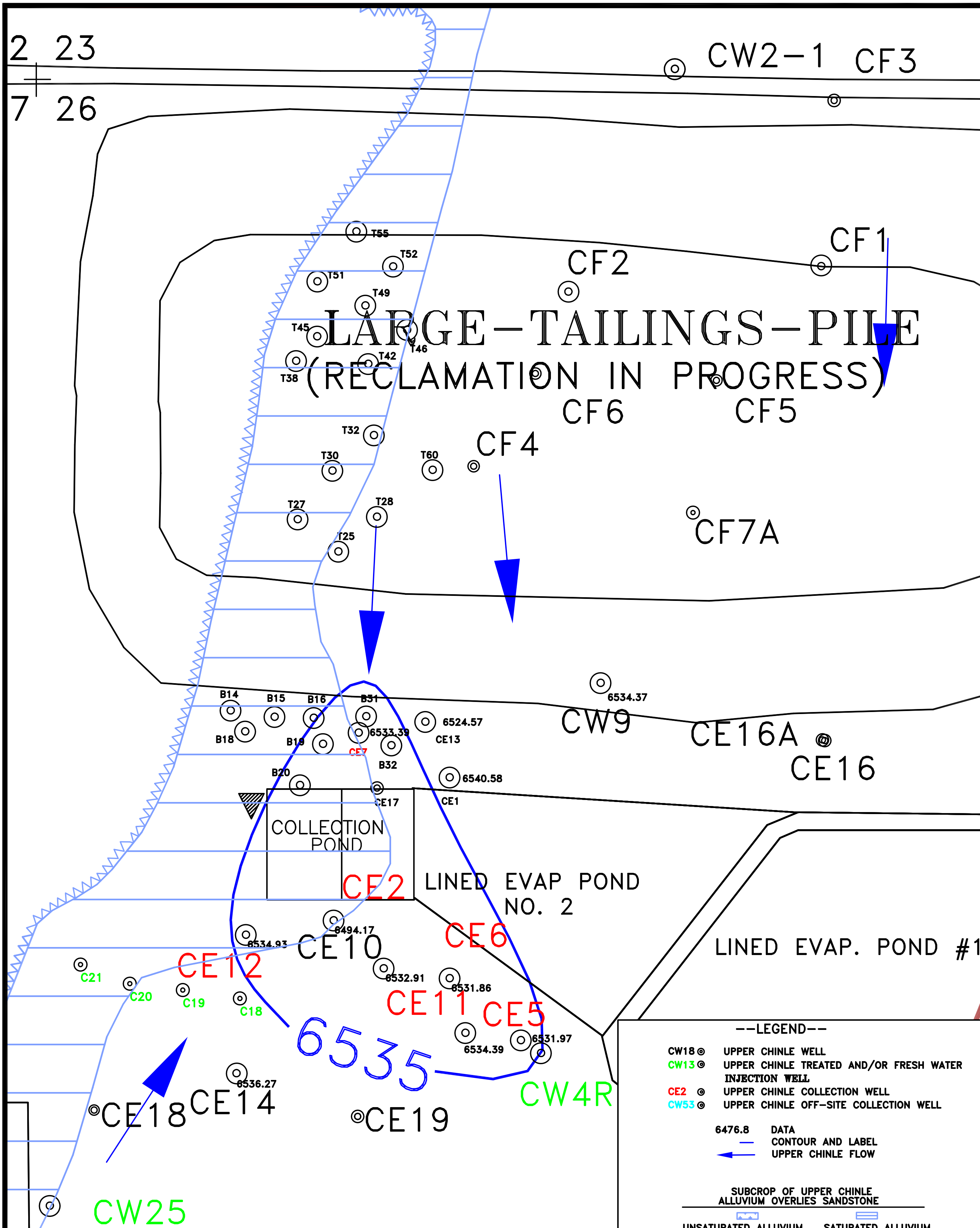
Figure 5.2-4 presents the water-level elevation changes for the Upper Chinle wells east of the East Fault. The variation in water levels in wells 929, 931 and CW18 were due to variations in injection rates into well CW13 during 2016.



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

FIGURE 5.2-1. WATER-LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2016, FT-MSL

DATE: 2/8/2017
SCALE: 1"= 1600'

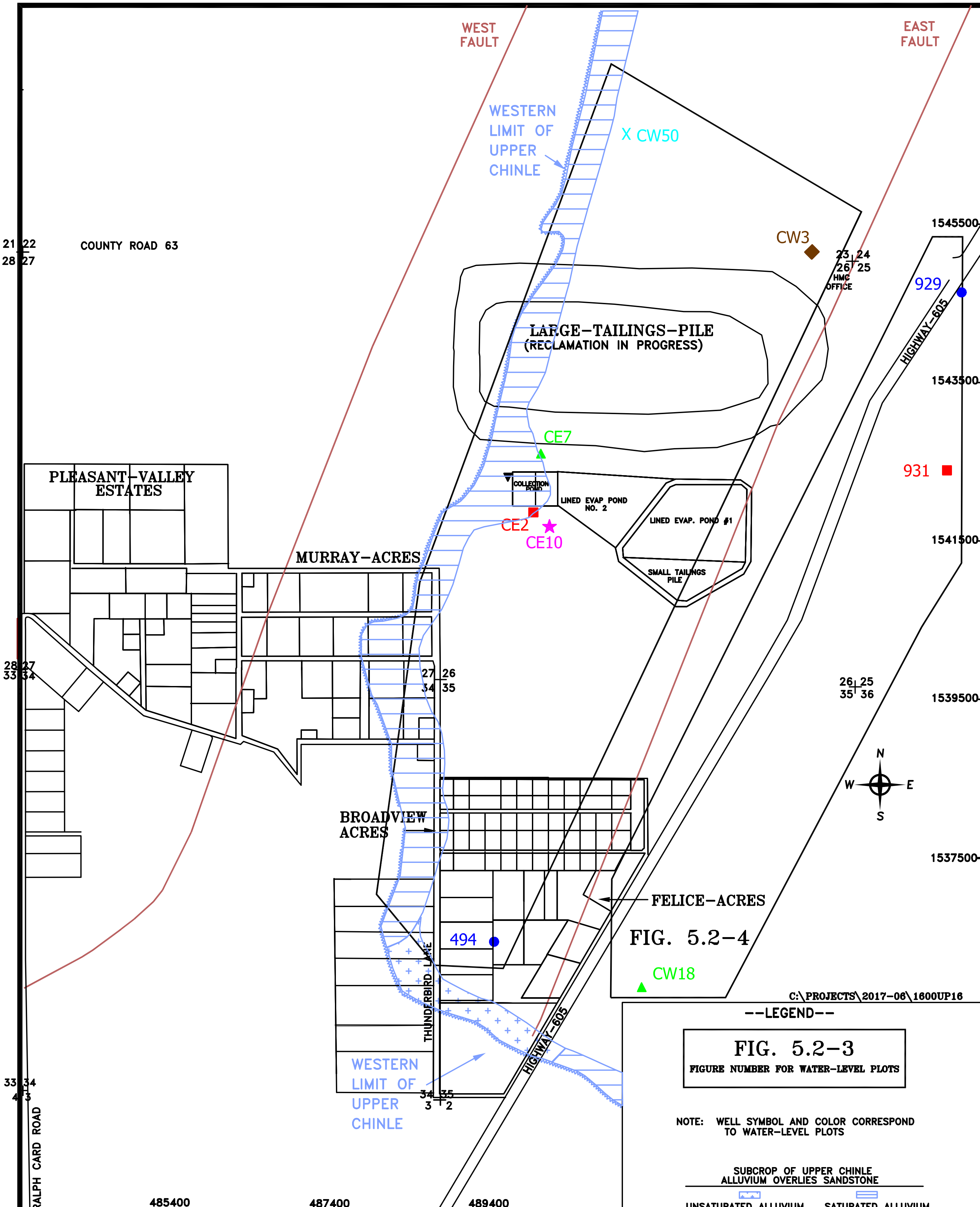


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.2-1A. WATER LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, OS, FALL 2016, FT-MSL

DATE: 2/3/17

SCALE: 1"= 500'



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, 2016

DATE: 1/2/2017

SCALE: 1"= 1600'

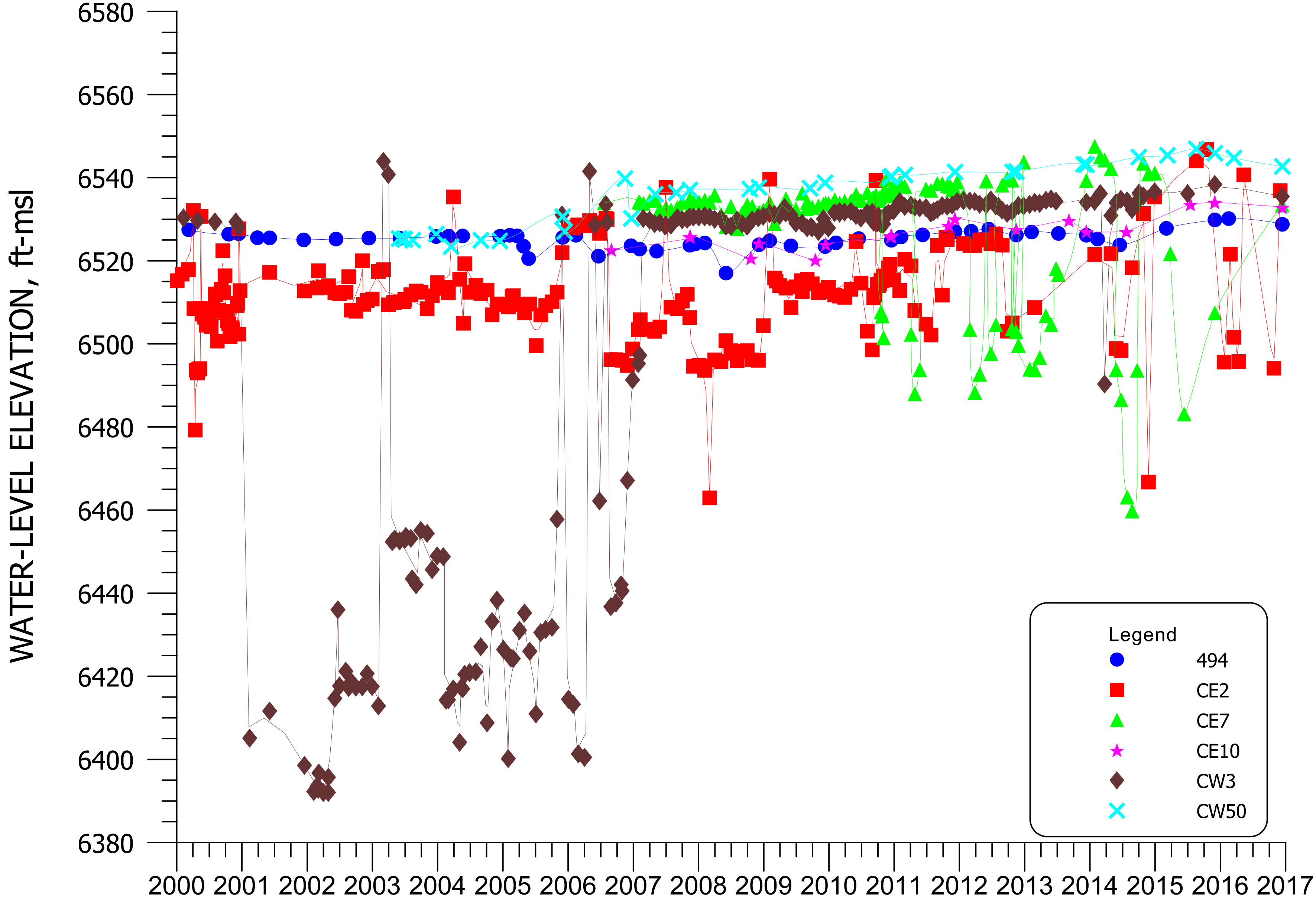


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CE7, CE10, CW3, AND CW50

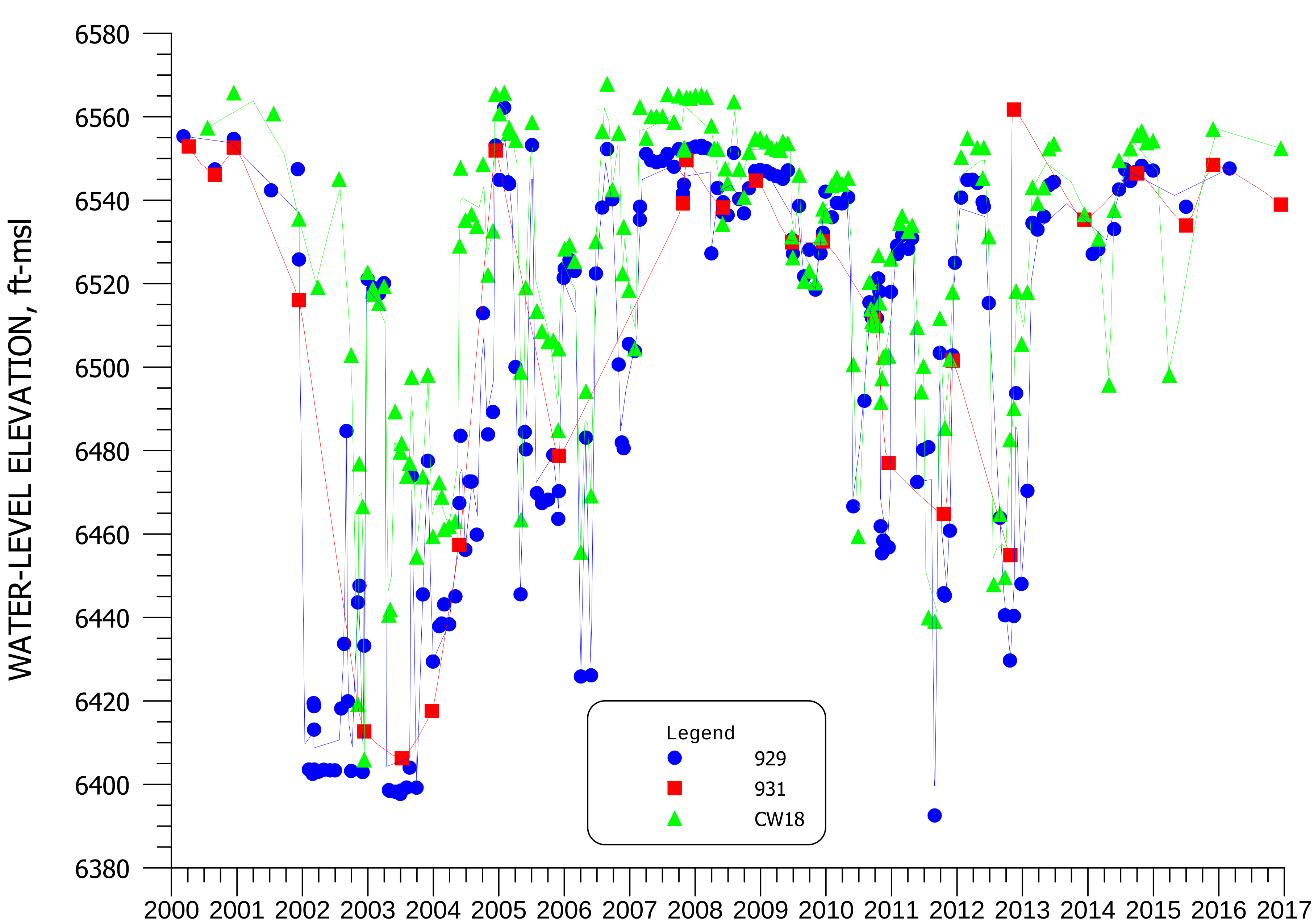


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, AND CW18

5.3 UPPER CHINLE WATER QUALITY

Water-quality data for 2016 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 Figure 5.1-2 shows 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 2016 are less than the site standard in all Upper Chinle wells except for wells near the LTP. Uranium concentrations exceed the site standard in wells near the LTP, three wells in and just north of Broadview Acres and one well in Felice Acres. Molybdenum concentrations in the Upper Chinle aquifer exceed the site standard in wells in close proximity to the tailings piles and wells CE9, CE15 and CE15A.

5.3.1 SULFATE - UPPER CHINLE

Figures 5.3-1 and 5.3-1A present sulfate concentrations in the Upper Chinle aquifer during 2016. 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 Figures 5.3-1. Upper Chinle sulfate concentrations varied from 528 mg/l to large values in the LTP area. Only wells near the LTP area exceeded the site standards for the mixing zone of 1750 mg/l. The non-mixing zone site standard of 914 mg/l in the Upper Chinle in 2016 likely 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 Figure 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 north side of 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 CW18 and CW53 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 are less than the mixing-zone site standard (see Figure 5.3-3). Sulfate concentrations in well CE2, near the subcrop area south of the Large Tailings Pile, had increased in 2011 to a level similar to the remainder of the Upper Chinle wells in this area and also had increased over the last three years prior to declining in 2016. The concentrations in the Upper Chinle wells CE2 and CE12 decreased due to the treated water injection into the alluvium and Upper Chinle in this area.

A plot of sulfate concentrations versus time for non-mixing zone Upper Chinle wells CW18 and CW53 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 two Upper Chinle wells in 2016.

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 2016. 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, 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 are thought to exceed the non-mixing zone standard in the areas near 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 over the last three years but decreased in 2016. The TDS concentrations in the remainder of these wells were fairly steady in 2016. All of these wells contain water with TDS concentrations less than the mixing zone standard of 3140 mg/l.

Time plots of TDS concentrations for non-mixing zone wells CW18 and CW53 are presented in Figure 5.3-7. This figure shows overall steady TDS concentrations in these two wells for 2016.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2016 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 southern side of the Collection Ponds exceed 250 mg/l and require restoration in this area. 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. In Upper Chinle wells CE2 and CE12 chloride concentrations had increased slightly over the last three years but declined in 2016. Overall, the chloride concentrations in wells 494, CE5 and CE15A have not changed significantly in 2016.

The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10. This plot shows steady levels in chloride concentrations for wells CW18 and CW53 through 2016.

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 2016. 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 2016. Three uranium values exceed the mixing zone site standard of 0.18 mg/l just north of and in Broadview Acres and one value 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 2016 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). This plot demonstrates that the uranium concentrations in Upper Chinle wells CE2, CE5 and CE12 had increased in 2015 but significantly declined in 2016. Additional pumping from the Upper Chinle in this area in 2016 reversed the 2015 trend. Uranium concentrations in wells 494 and CE8 were overall steady in 2016 while a small increase was observed in well CE15A.

Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells CW18 and CW53. The concentrations in all of these wells are less than the site standard and concentrations in well CW53 have very gradually declined the last few years. The uranium concentrations in all of these Upper Chinle wells in the non-mixing zone are very low except for values in LTP area.

5.3.5 SELENIUM - UPPER CHINLE

Contours of 2016 selenium concentrations 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 south side of the Collection Ponds and one well a few hundred feet to the south. The non-mixing zone NRC site standard of 0.06 mg/l is thought to be exceeded in a portion of the eastern half of the LTP.

Figure 5.3-15 presents selenium concentrations for wells 494, CE2, CE5, CE8, CE12 and CE15A. The selenium concentrations in collection wells CE2 and CE12 increased in 2015 but were decreased in 2016 with the additional pumping of the CE wells. The selenium concentrations in other wells were fairly steady in 2016. Adequate restoration has been obtained in this area of the in Upper Chinle, except for well CE11.

Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells CW18 and CW53. This plot shows that selenium concentrations for these wells have remained low for more than 10 years. Previously observed decreases in selenium concentrations in well CW18 were due to the injection of fresh water in Upper Chinle well CW13 east of the East Fault; selenium concentrations remain low in these wells.

5.3.6 MOLYBDENUM - UPPER CHINLE

Figures 5.3-17 and 5.3-17A present the molybdenum concentrations in the Upper Chinle aquifer during 2016. 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 three wells just north of and in Broadview Acres. All molybdenum concentrations from Broadview Acres to the south and east of the East Fault in the Upper Chinle aquifer are below the site standards in 2016.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. In 2016, concentrations in wells 494 and CE8 were fairly similar to those observed in previous years while a small increase was observed in well CE15A. Concentrations increased in collection wells CE2, CE5 and CE12 in 2015 with a decline in these wells in 2016.

Figure 5.3-19 contains time plots of molybdenum concentrations for wells CW18 and CW53. Small concentrations of molybdenum are present in each of these wells for the last fifteen years.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2016 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 2016. All measured nitrate concentrations in the Upper Chinle aquifer in 2016 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 2016. 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

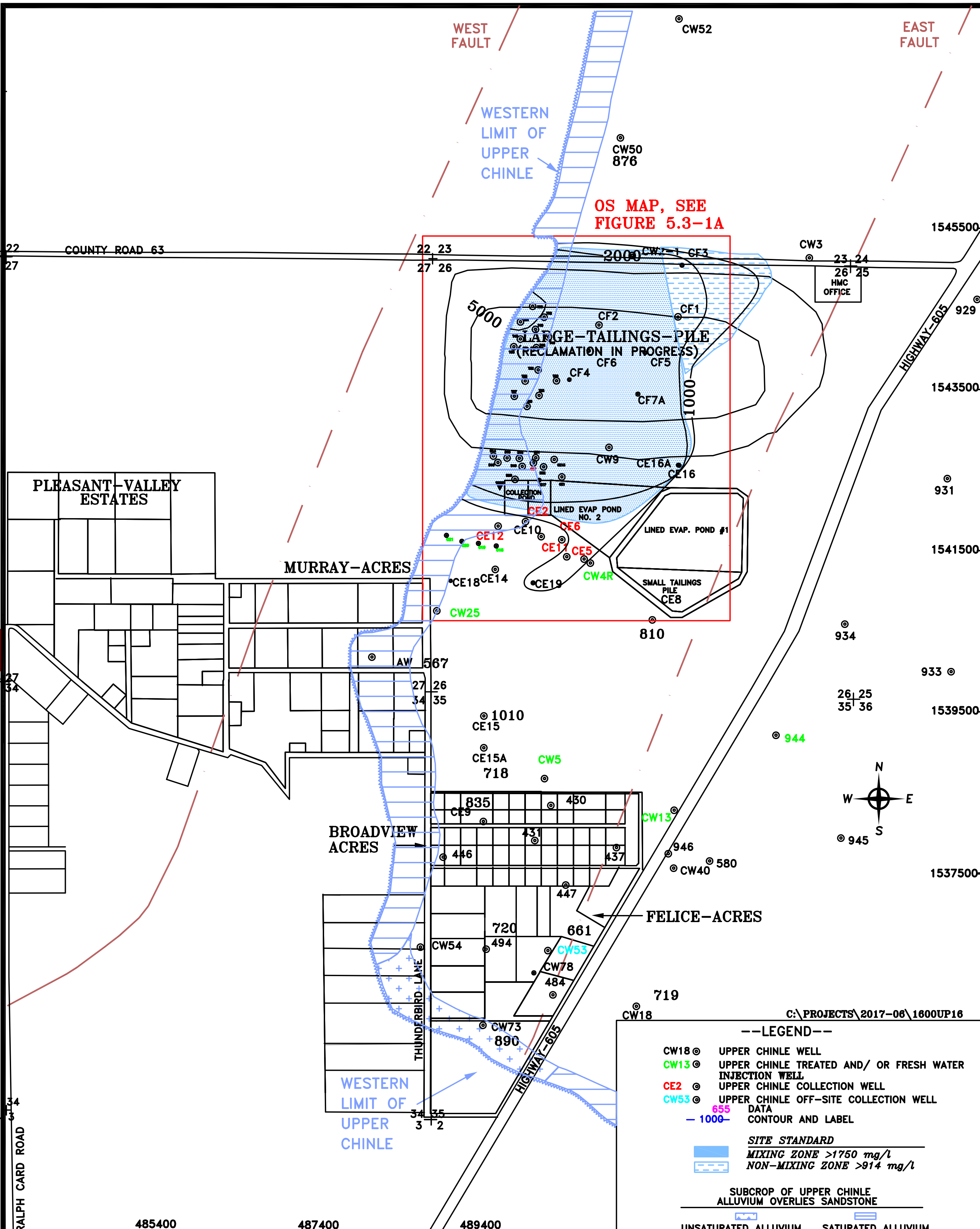
All radium concentrations in the Upper Chinle aquifer have been low in past years. Radium values are thought to exceed the site standard in the Upper Chinle aquifer in the western portion of the LTP. Figures 5.3-21 and 5.3-21A present the radium-226 and the radium-228 values measured in 2016. The largest radium-226 concentration measured in the Upper Chinle wells in 2016 was 1.8 pCi/l in well 494 and this value is thought to be an outlier based on previous measurements. The largest radium-228 value was 4.8 pCi/l in well 494. 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 is not considered to be necessary for the Upper Chinle aquifer and has therefore 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 2016 measured vanadium concentrations are equal to or less than 0.01 mg/l. 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 2016 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2016 were less than or equal to 0.3 pCi/l. 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. Thorium-230 levels do not warrant establishment of a site standard for this constituent.

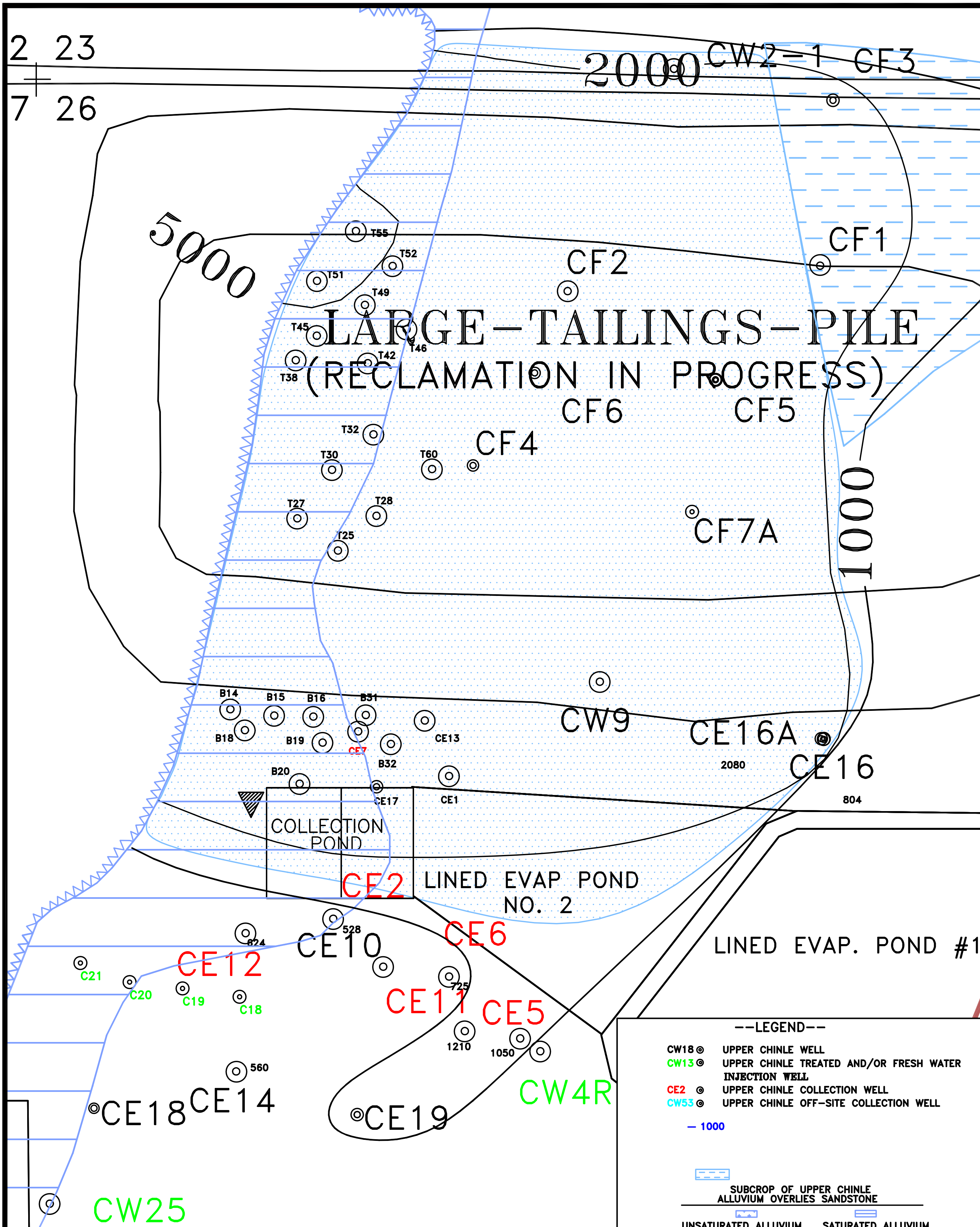


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-1. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l

DATE: 2/8/2017

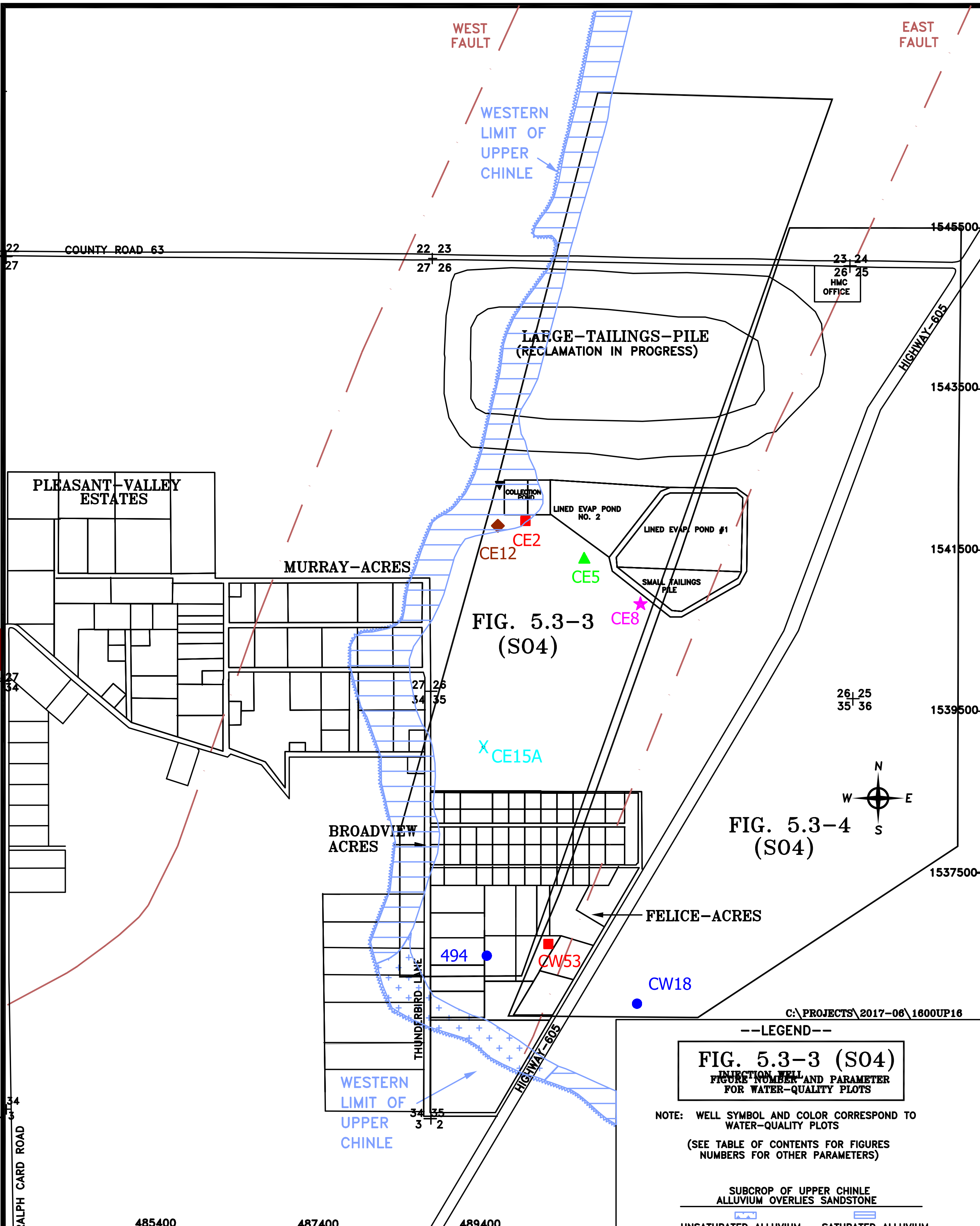
SCALE: 1"= 1600'



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

FIGURE 5.3-1A. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17
SCALE: 1"= 500'
PAGE: 5.3-9



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/8/2017
FIGURE 5.3-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2016	SCALE: 1"= 1600'
	PAGE: 5.3-10

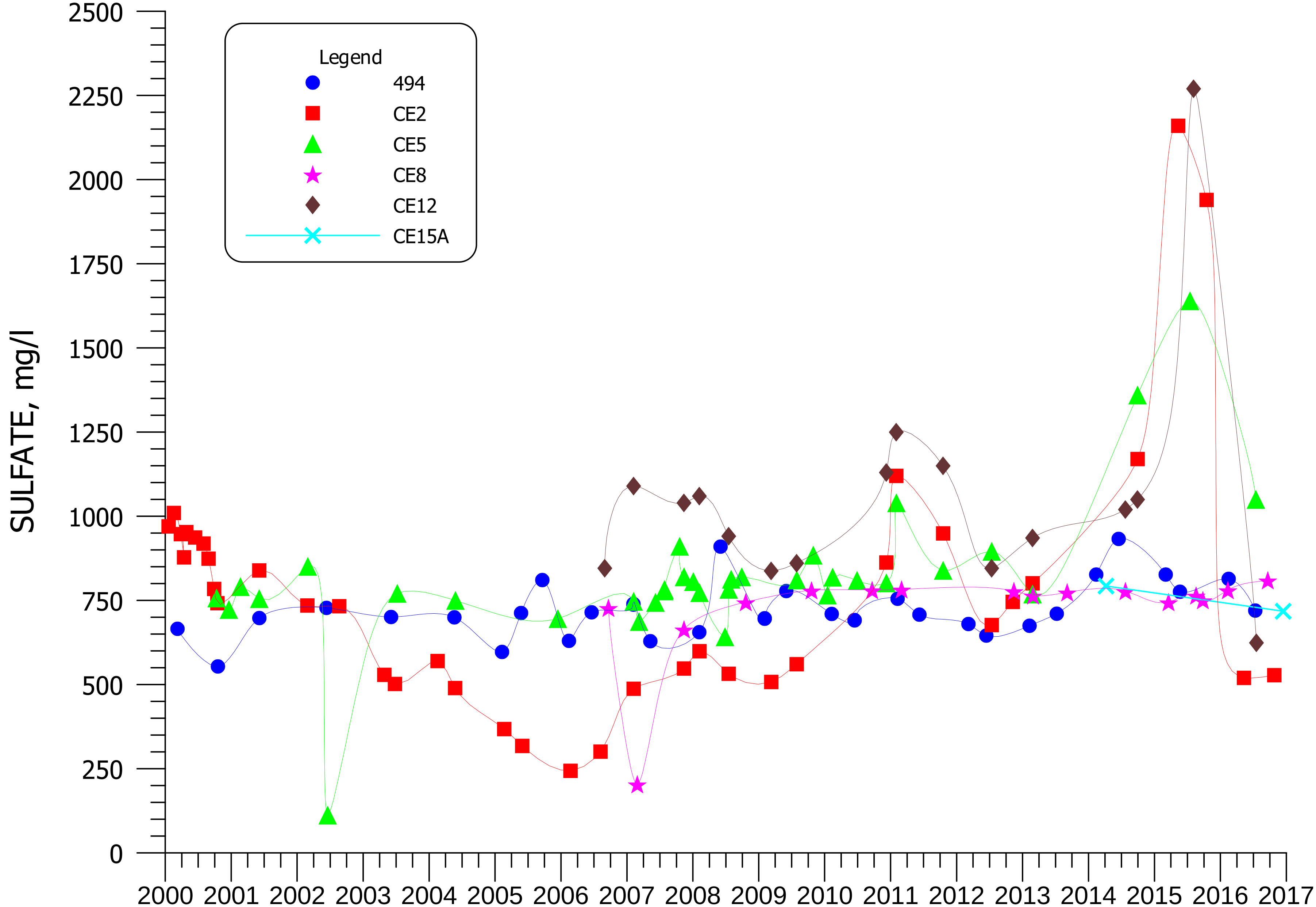


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CW15A

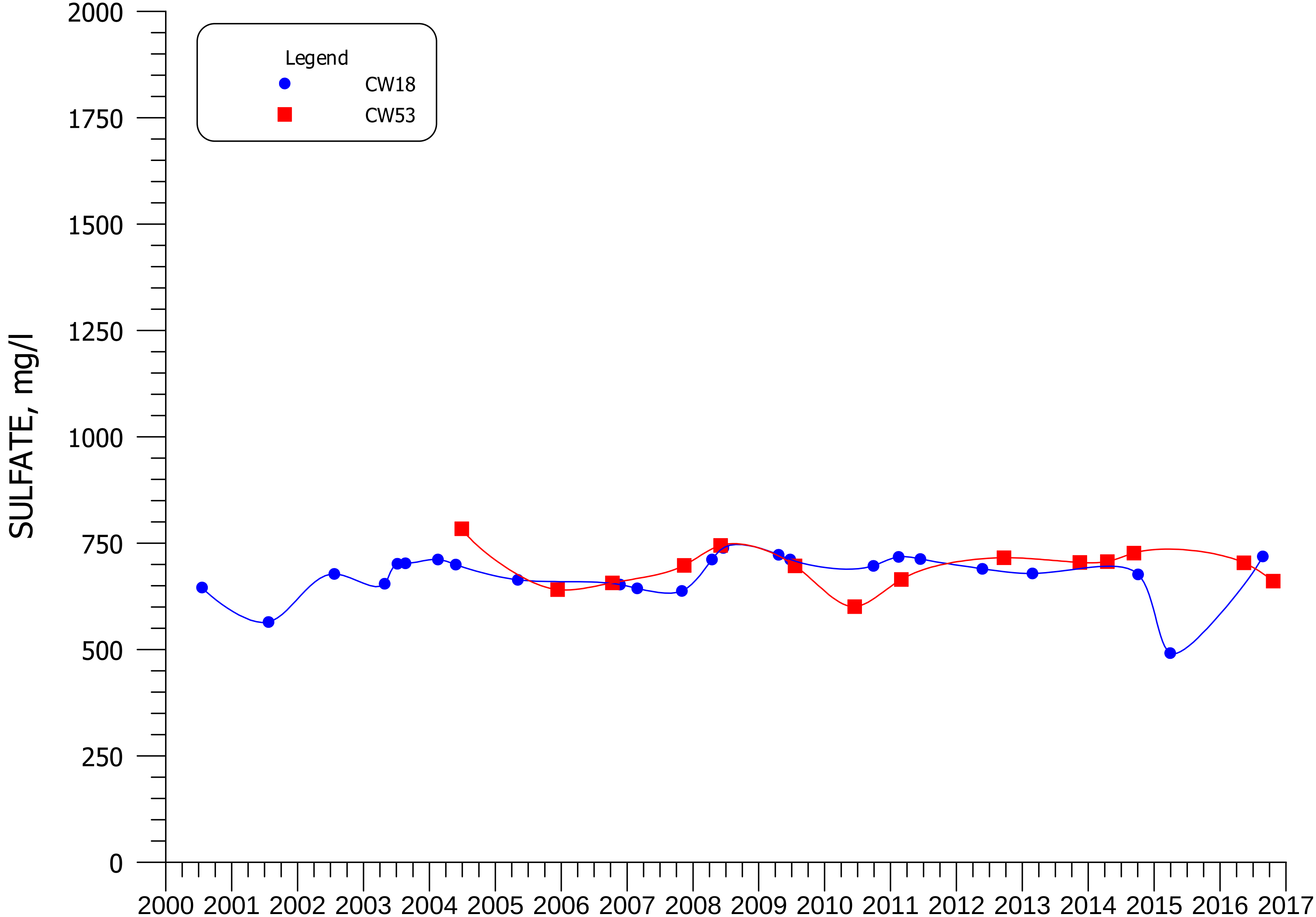
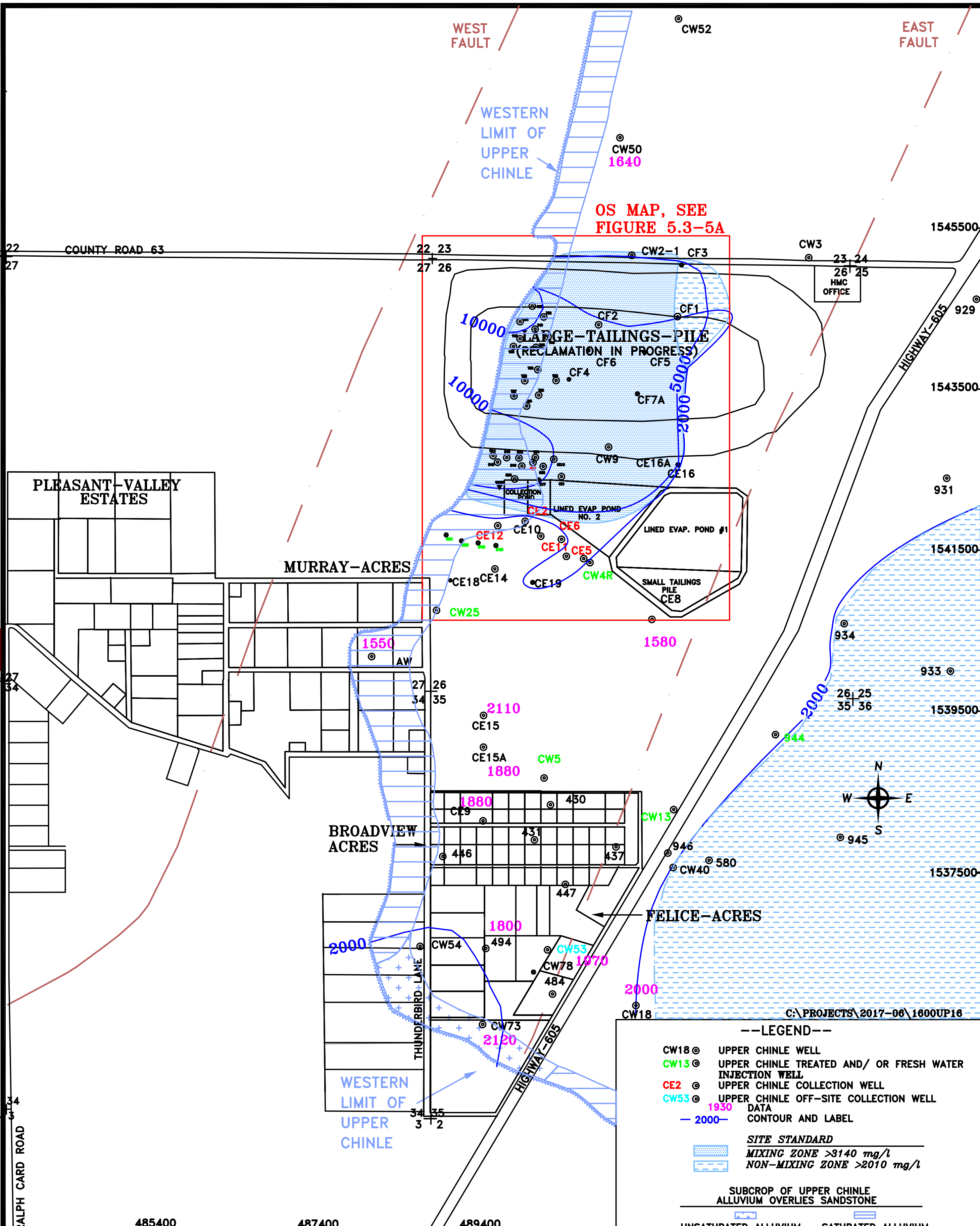
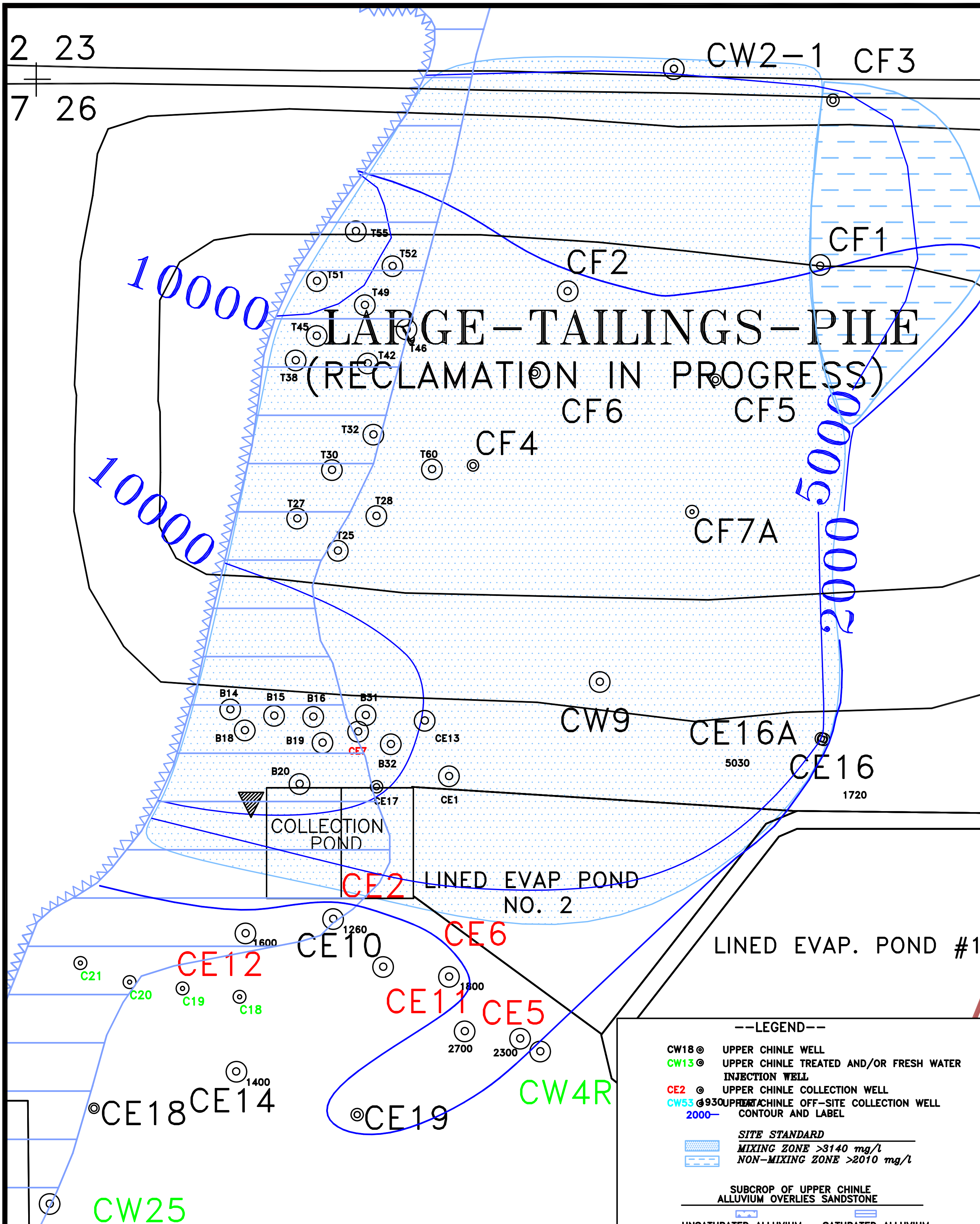


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/8/2017
FIGURE 5.3-5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l	SCALE: 1"= 1600'
	PAGE: 5.3-13



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

FIGURE 5.3-5A. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17

SCALE: 1"= 500'

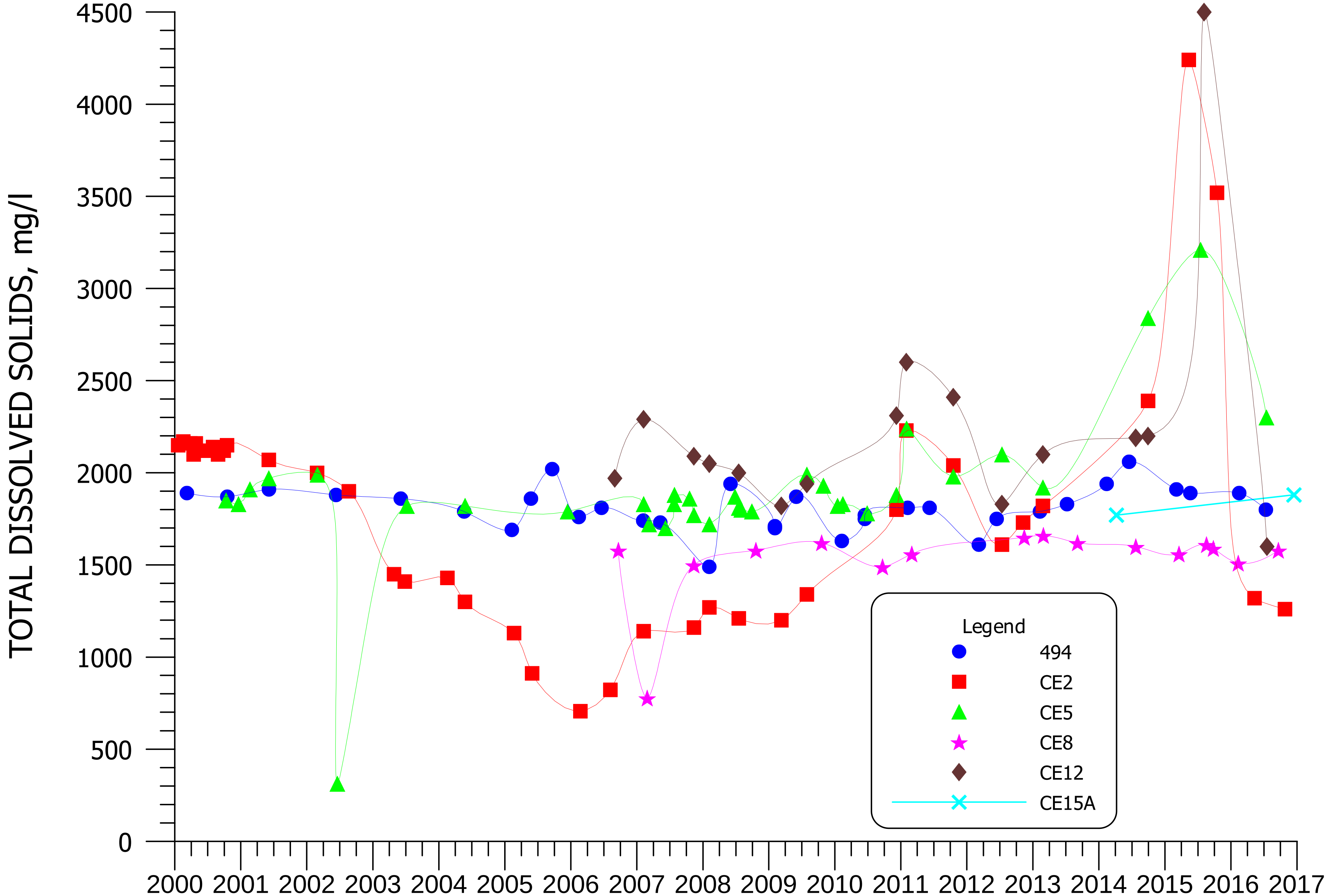


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

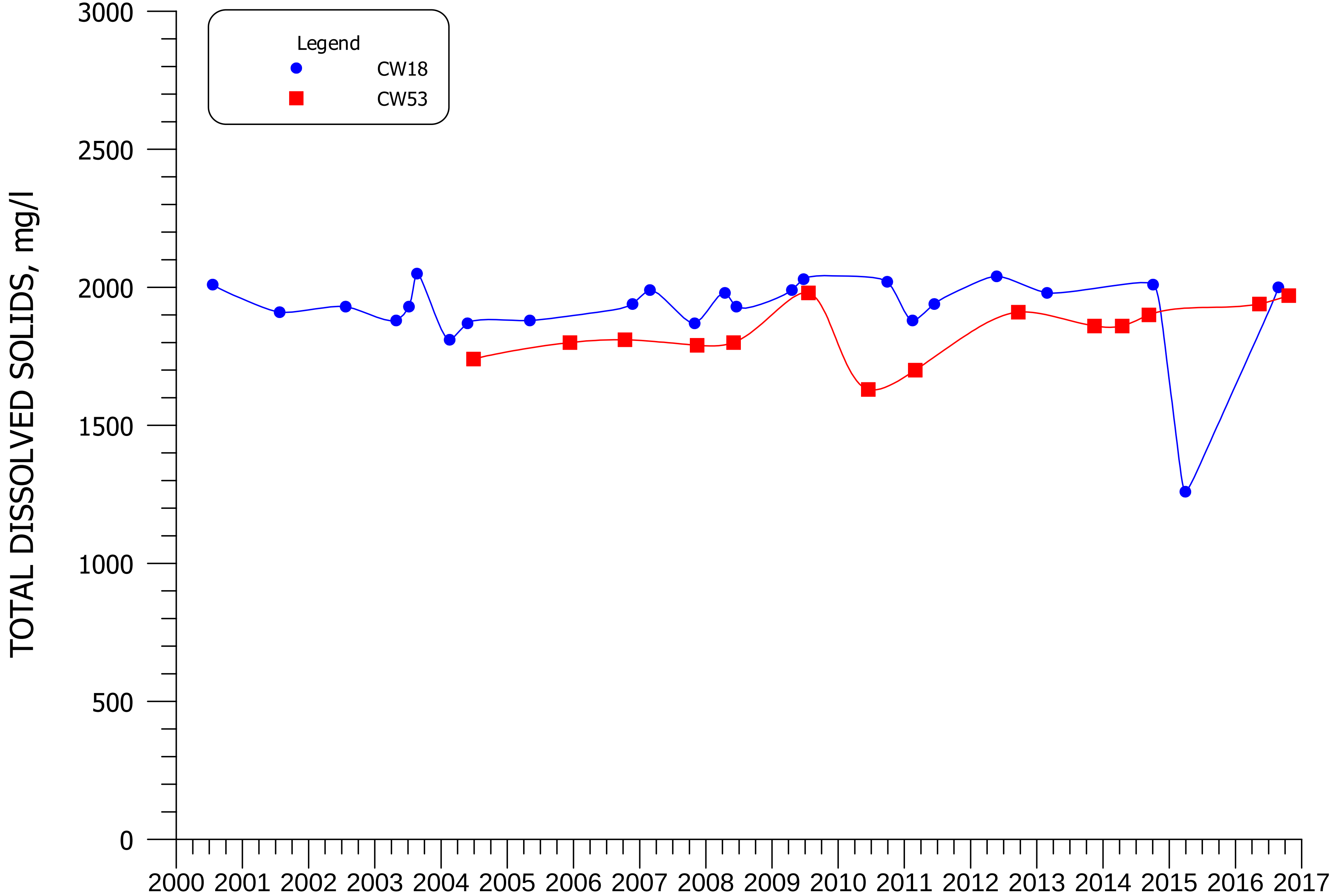
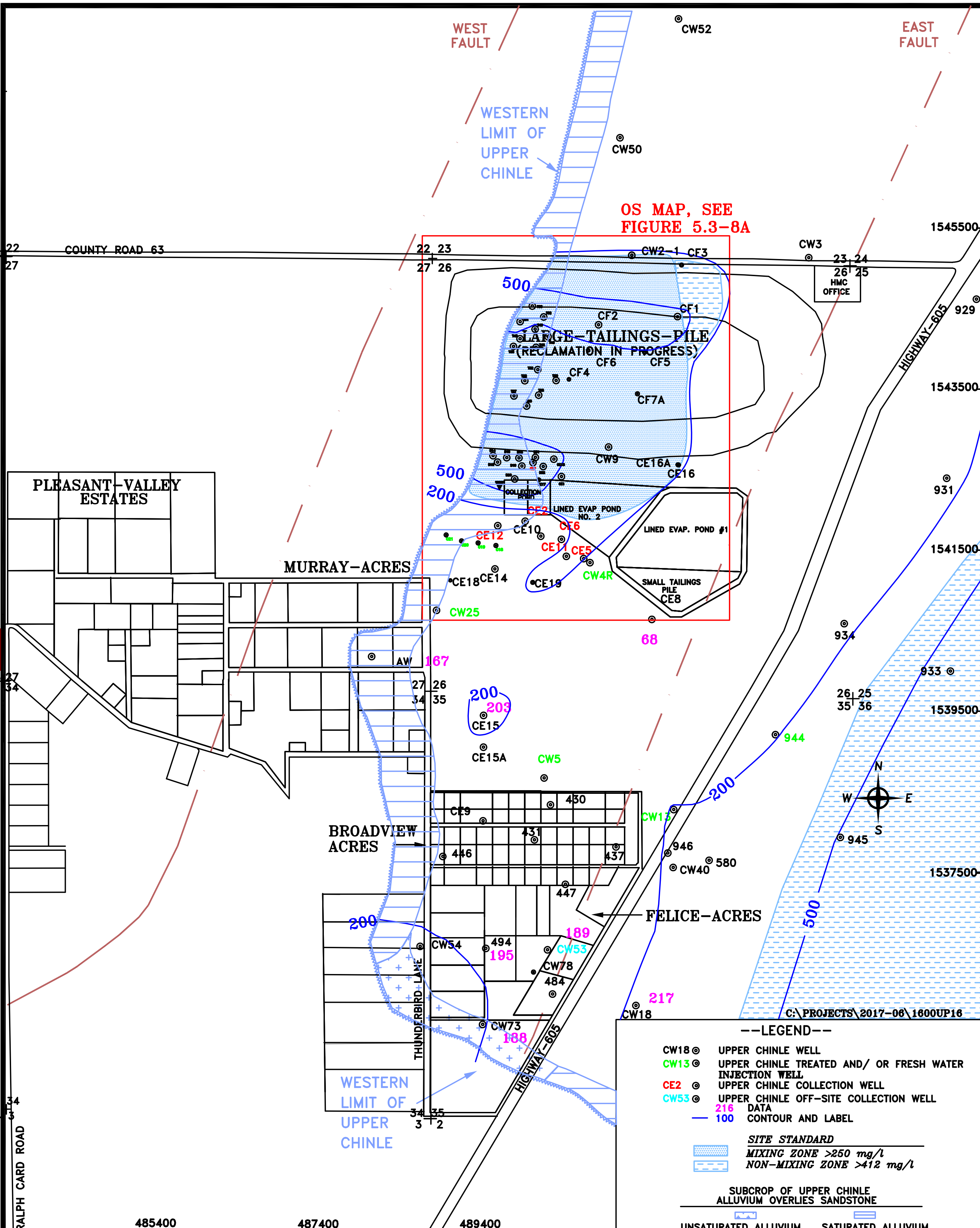


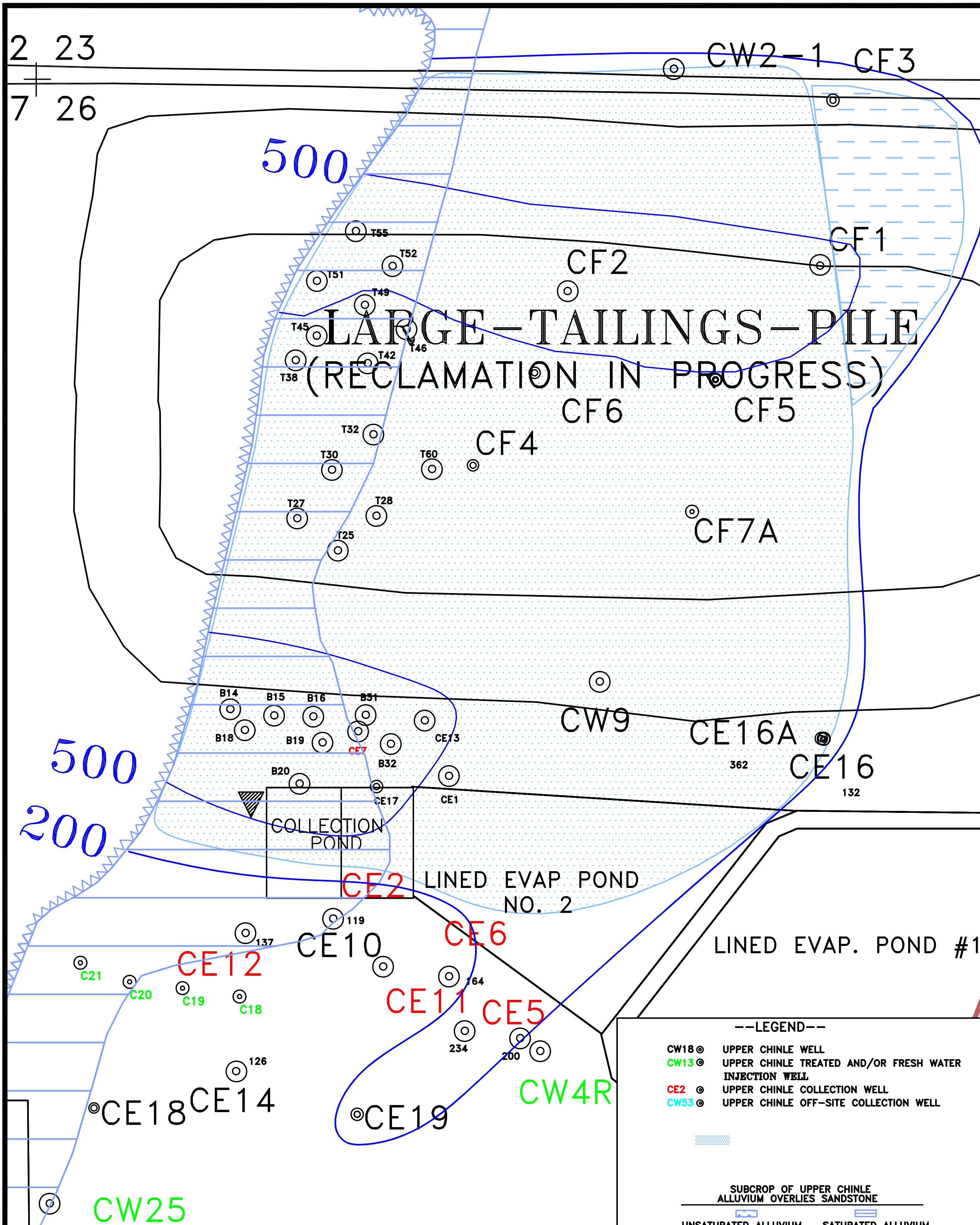
FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53



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

FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l

DATE: 2/8/2017
SCALE: 1"= 1600'



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

FIGURE 5.3-8A. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17

SCALE: 1"= 500'

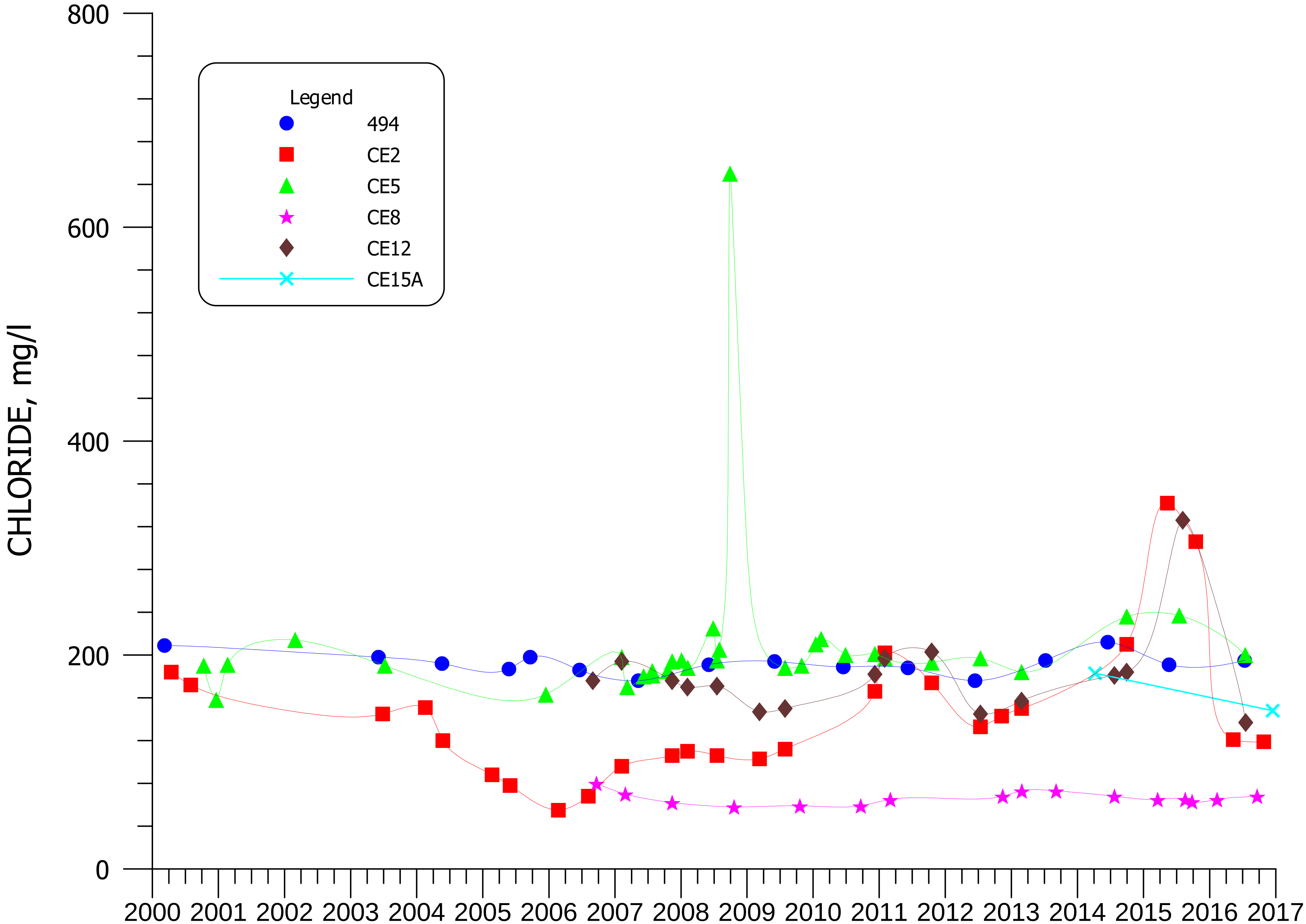


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

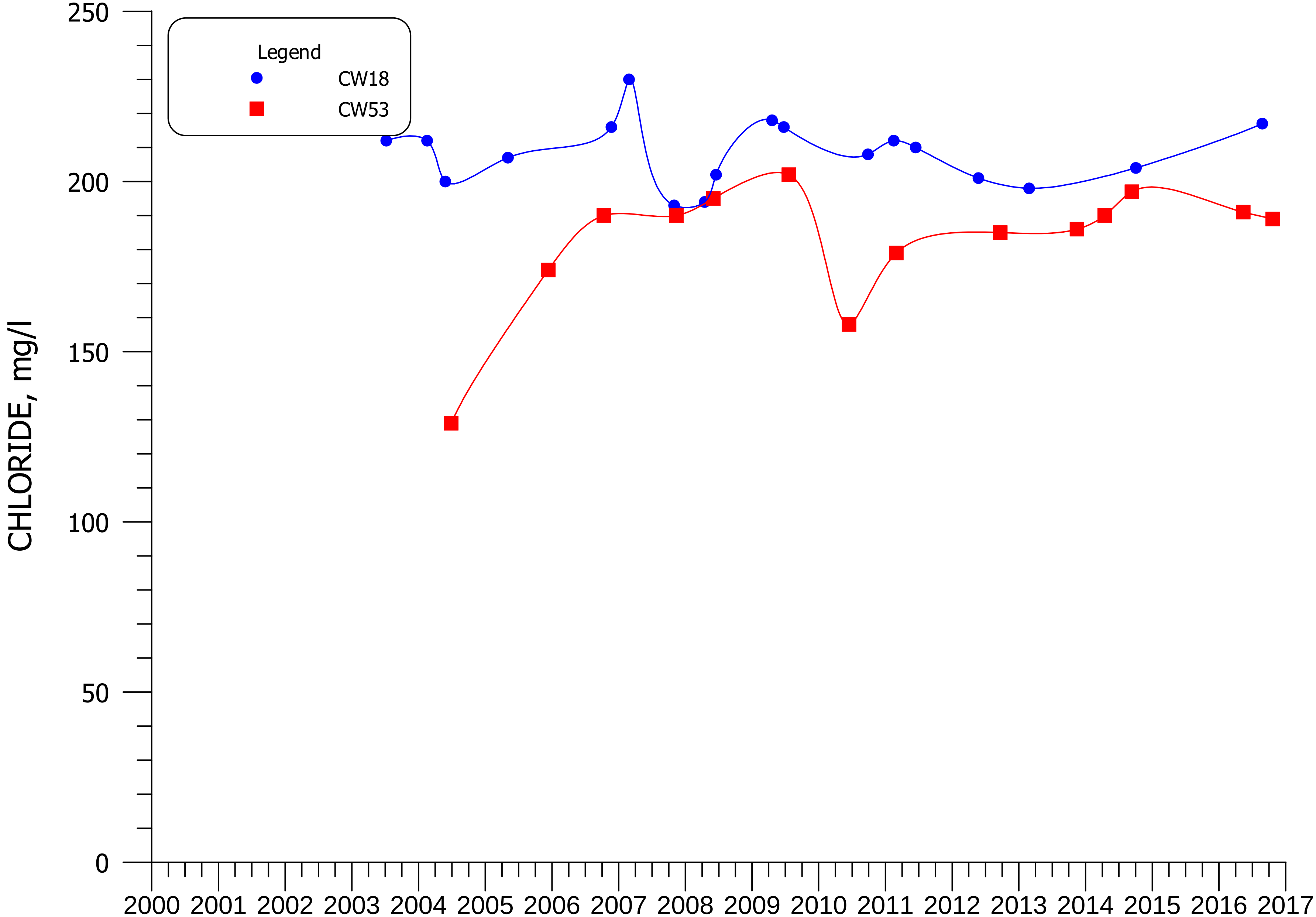
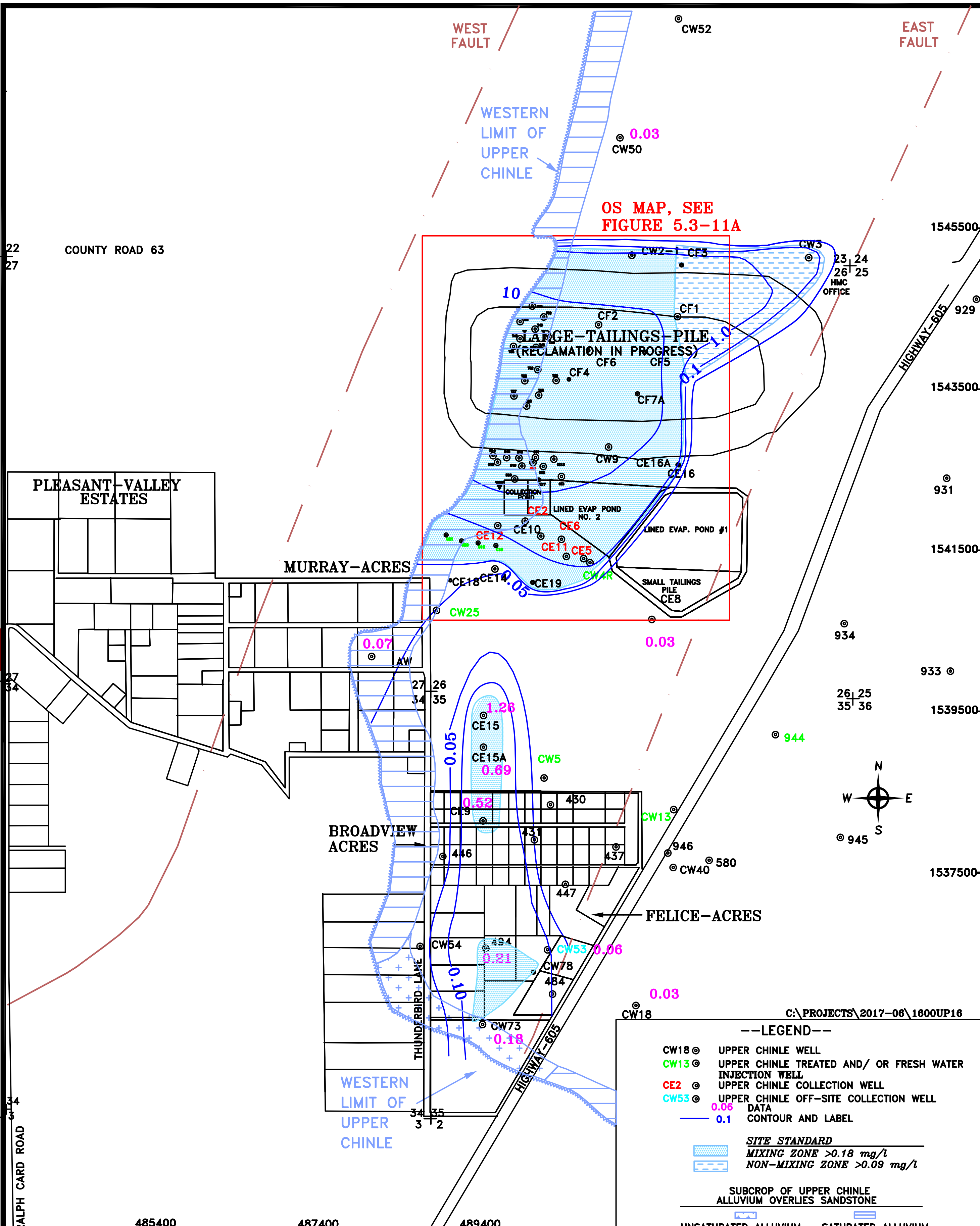


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53

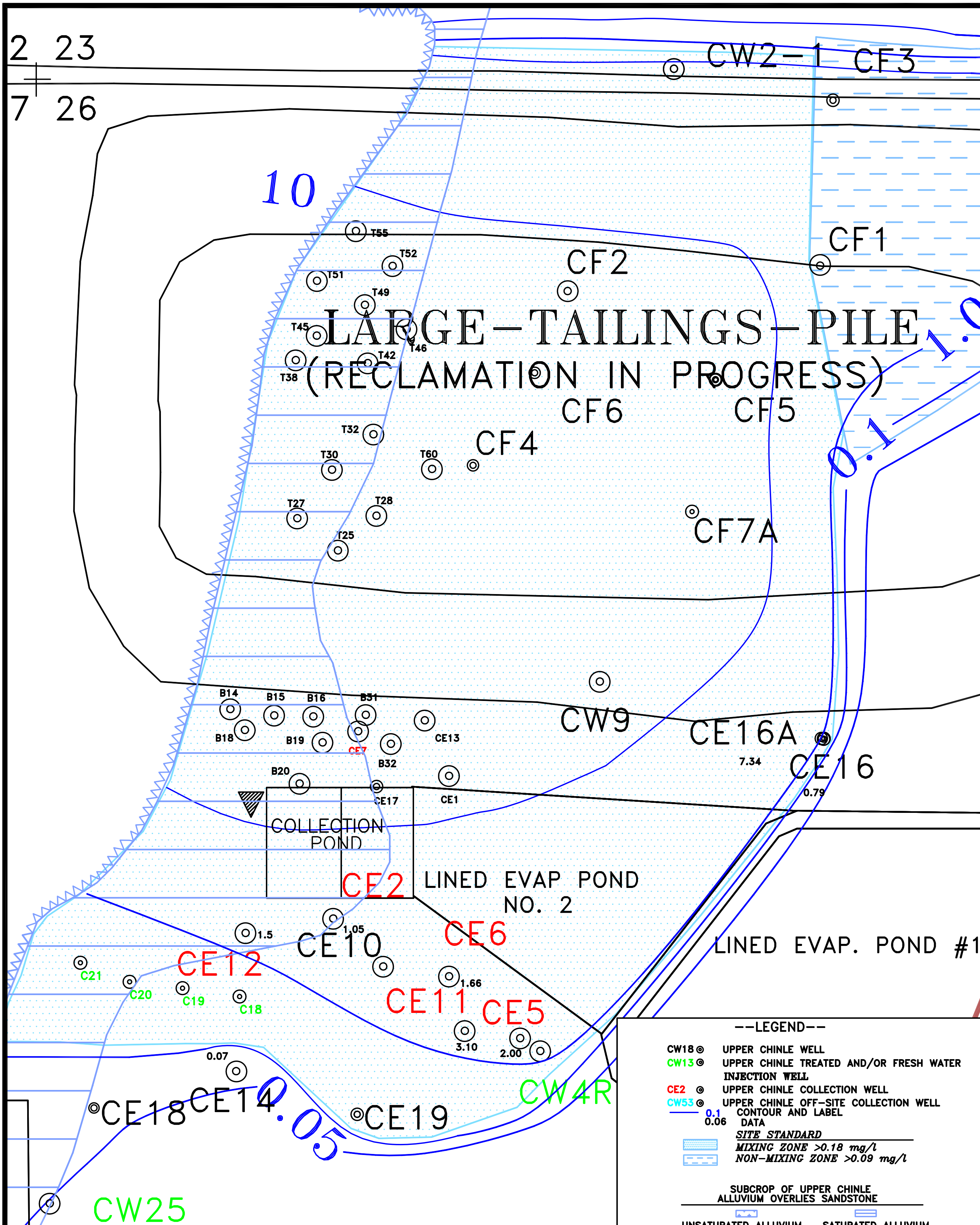


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l

DATE: 2/8/2017

SCALE: 1"= 1600'



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

FIGURE 5.3-11A. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17

SCALE: 1"= 500'

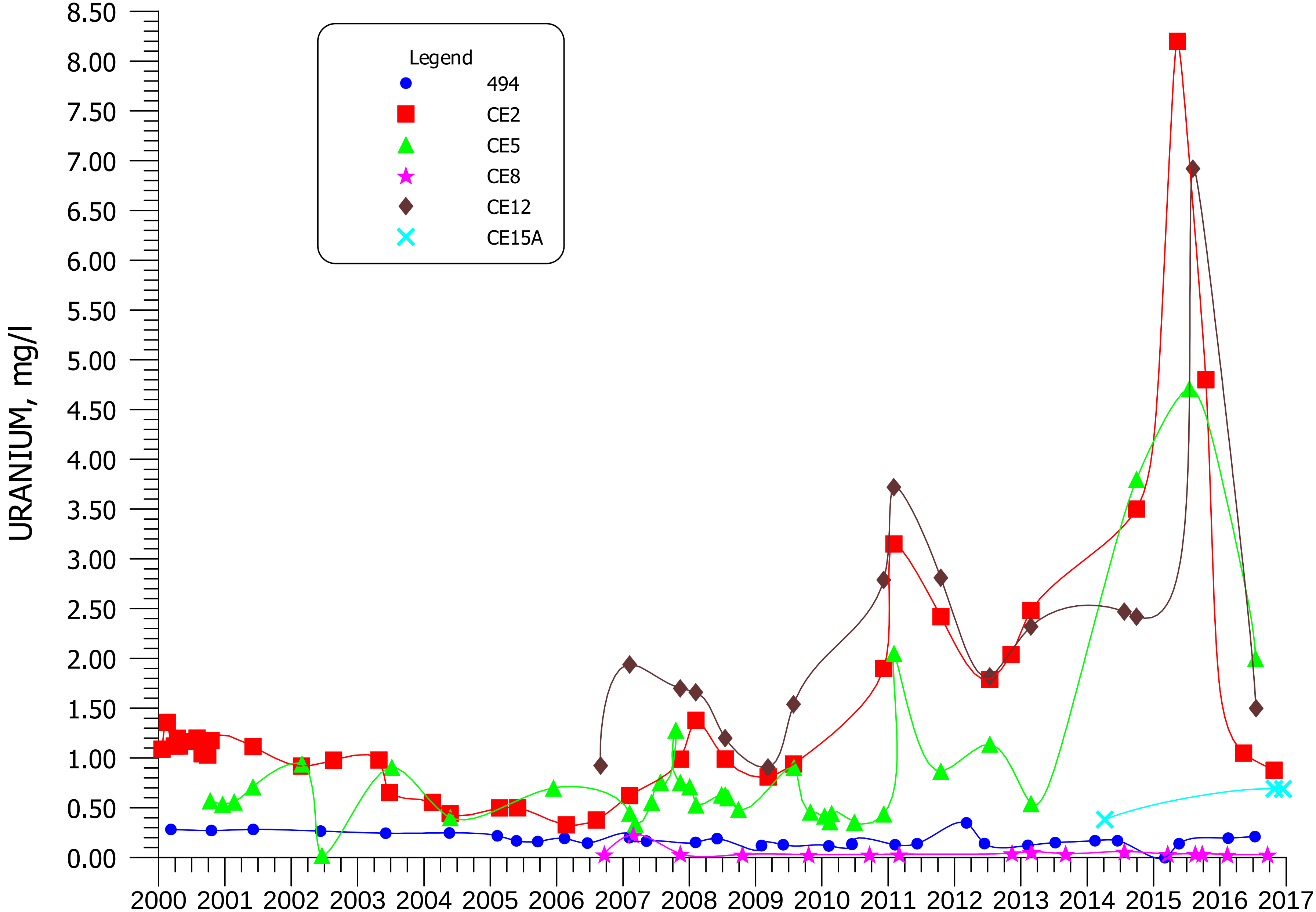


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

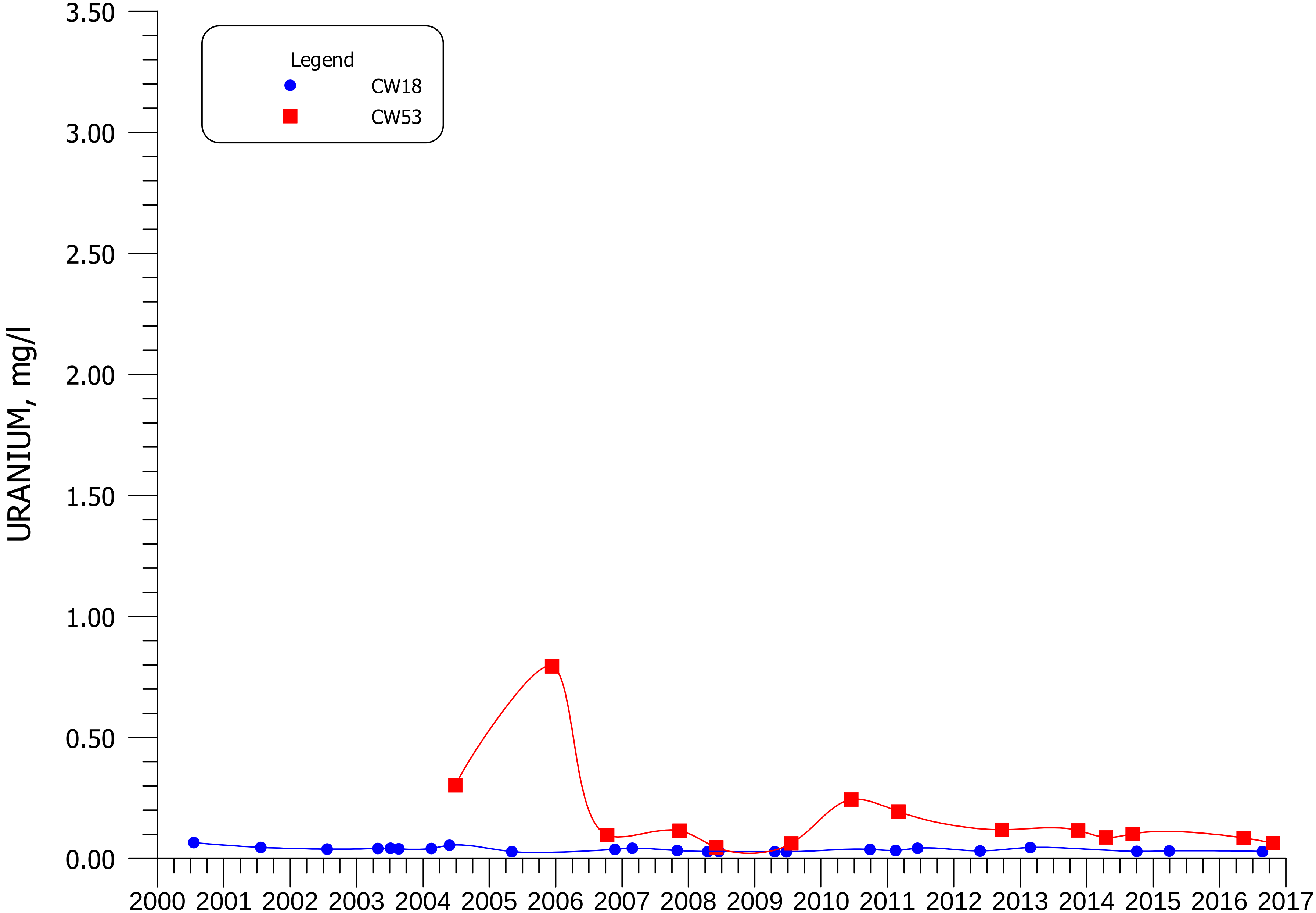
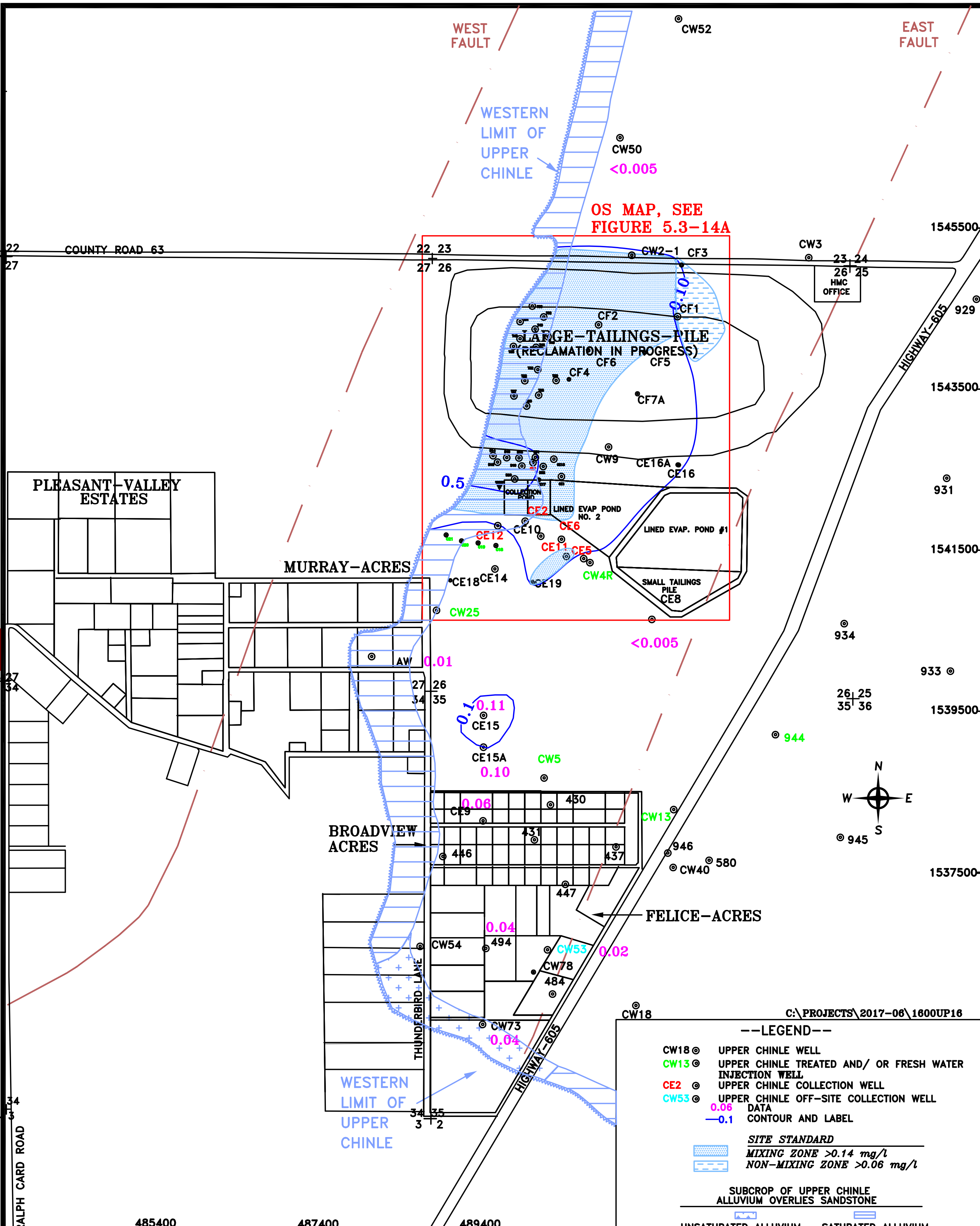


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53

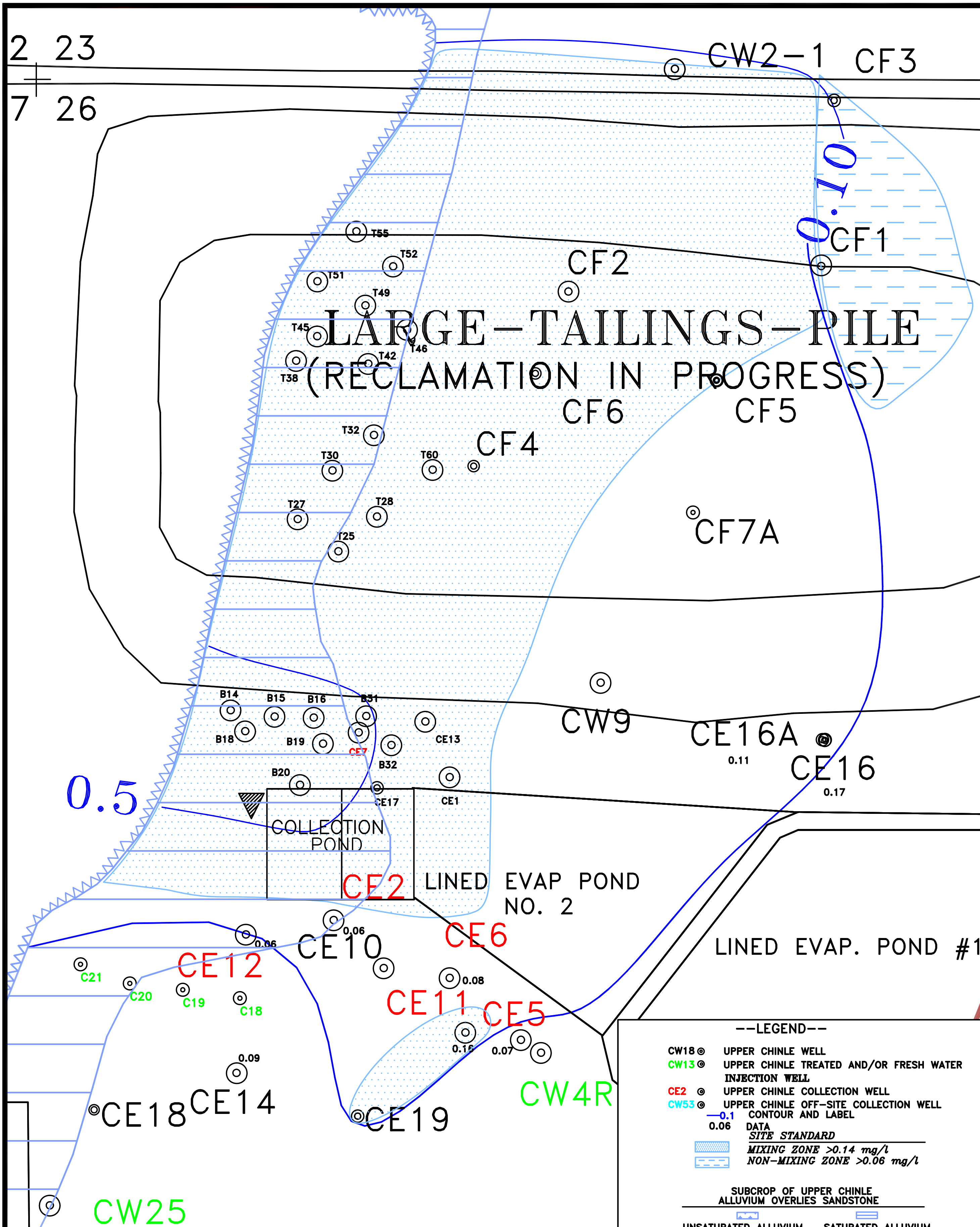


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/8/2017

SCALE: 1"= 1600'

FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l



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

FIGURE 5.3-14A. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17

SCALE: 1"= 500'

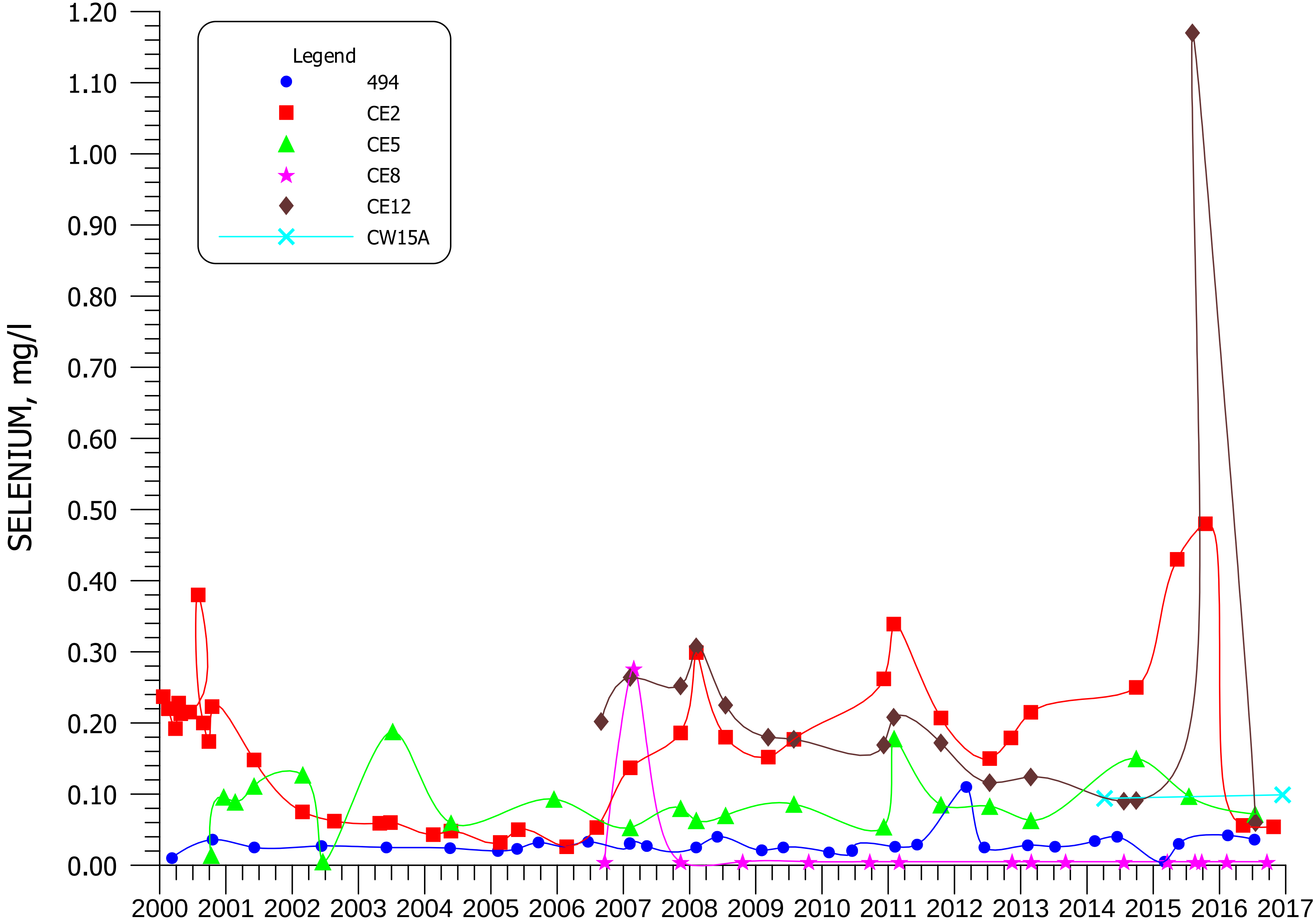


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

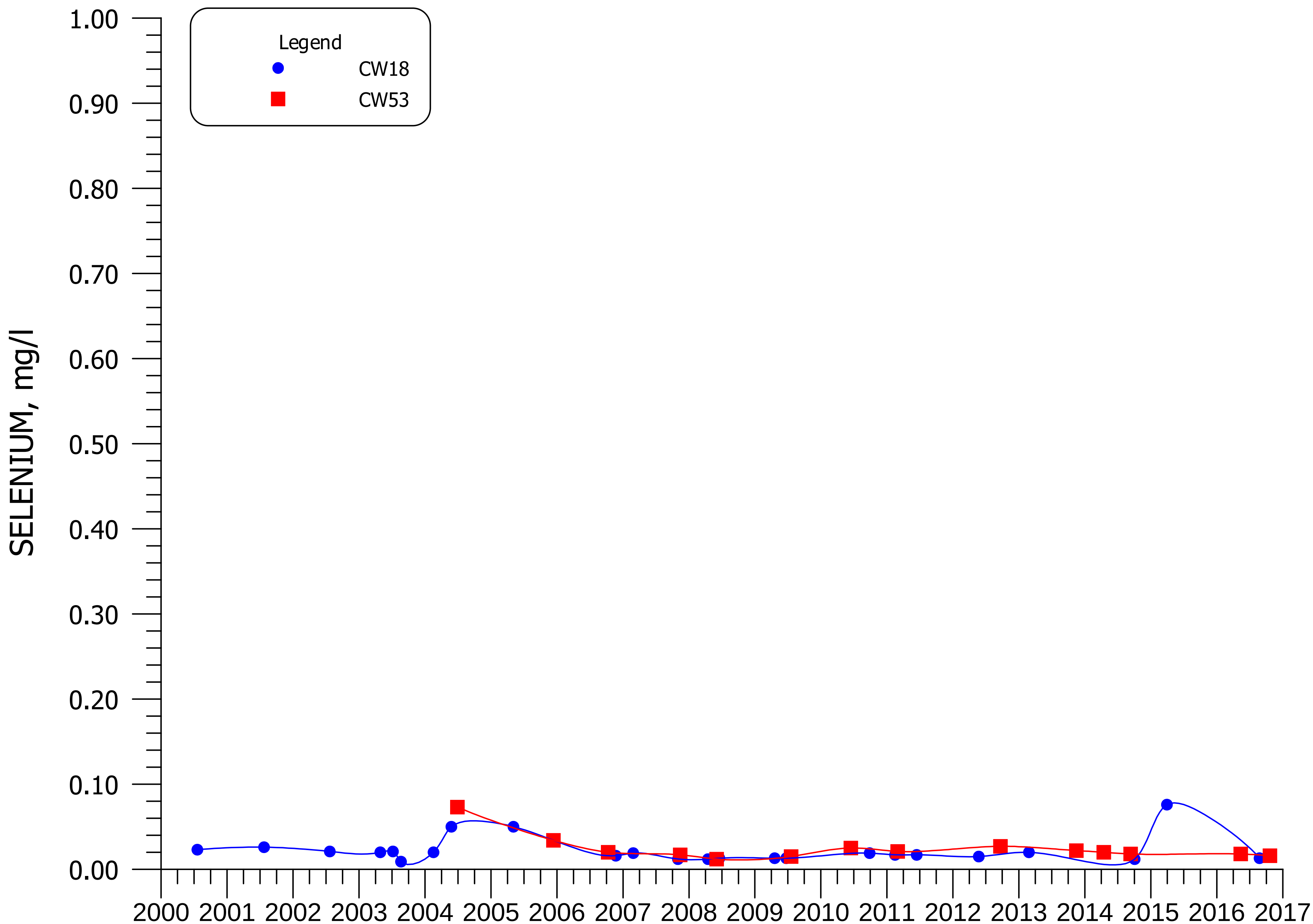
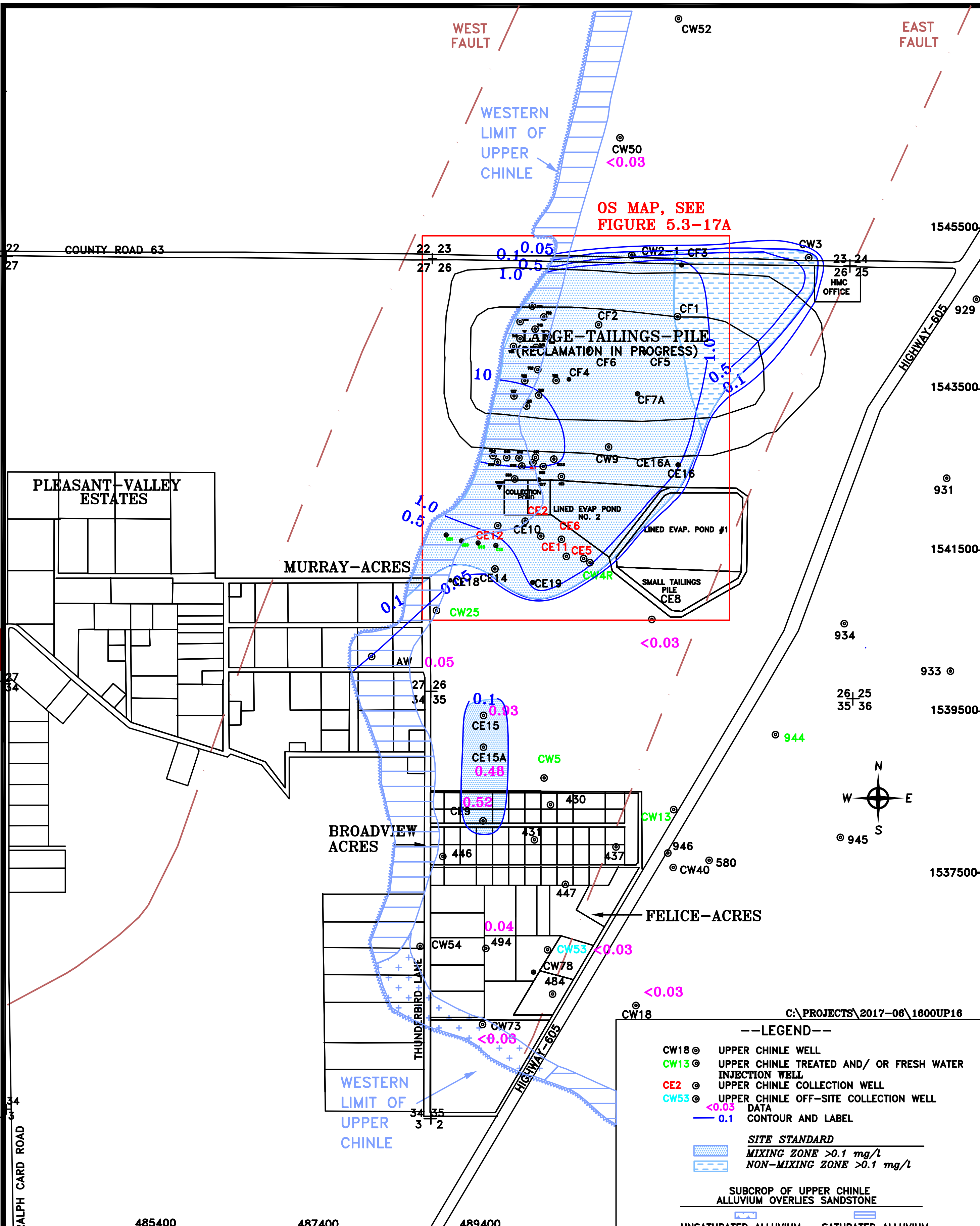
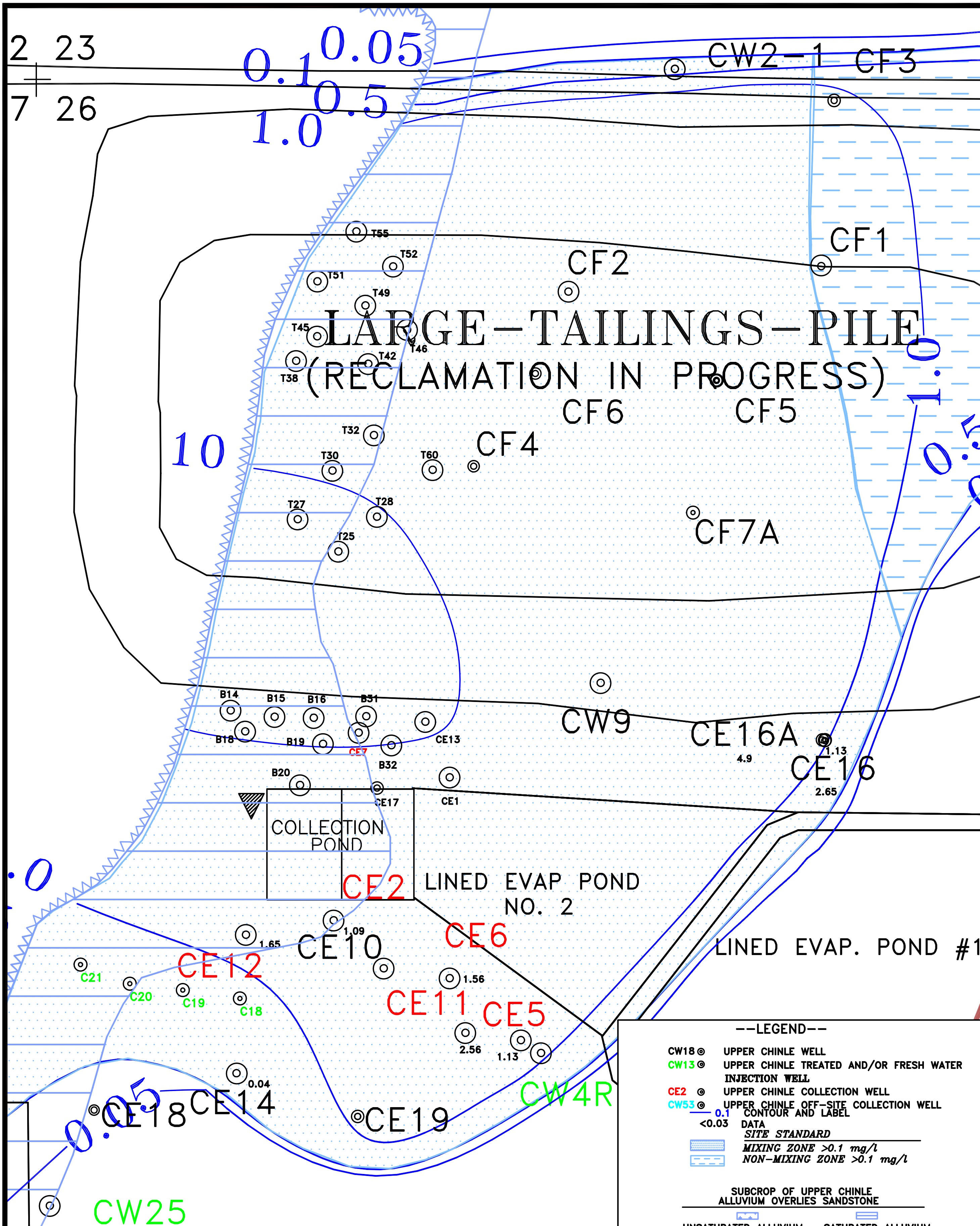


FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/8/2017
FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l	SCALE: 1"= 1600'
	PAGE: 5.3-29



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

FIGURE 5.3-17A. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17
SCALE: 1"= 500'
PAGE: 5.3-30

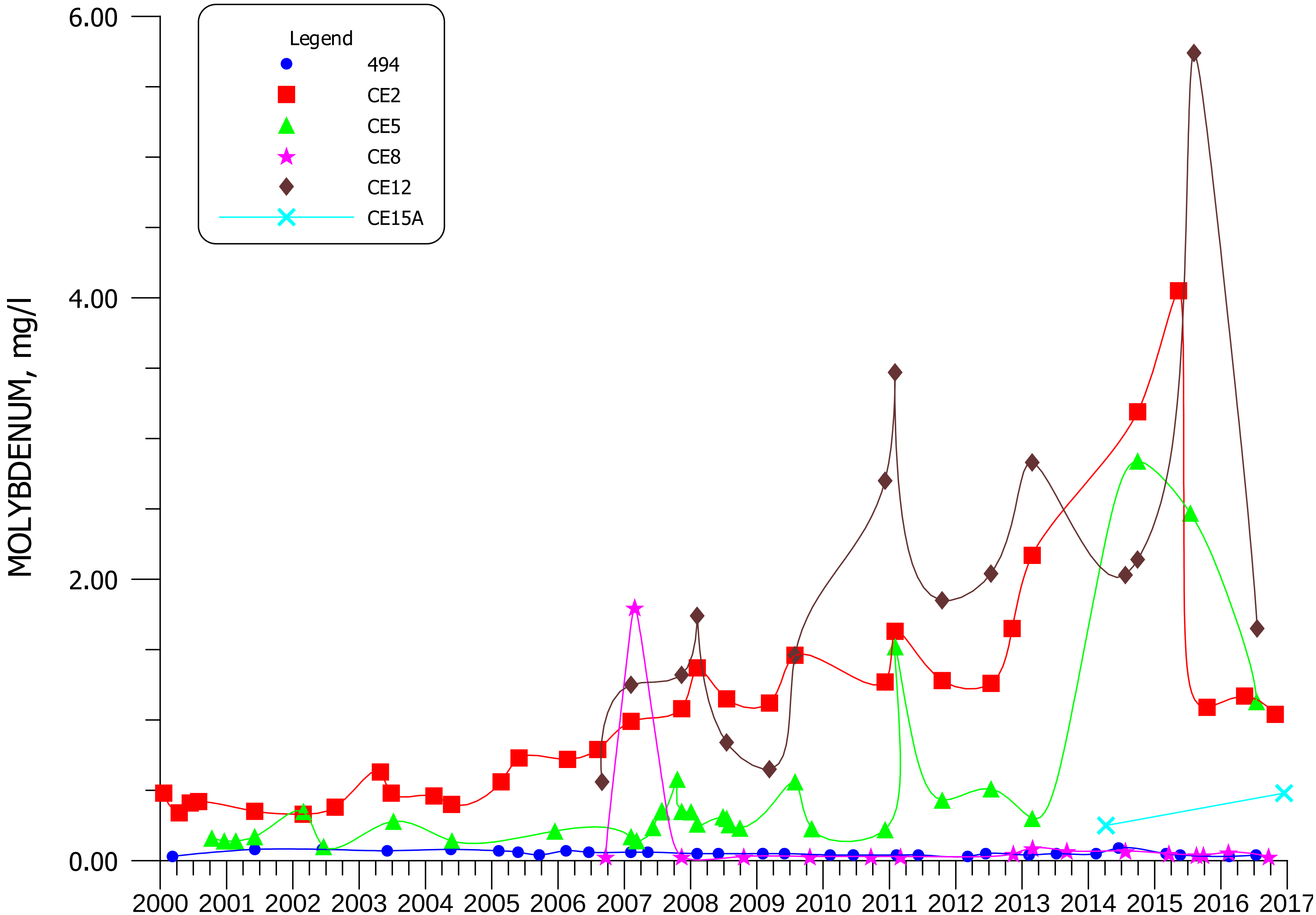


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE12, AND CE15A

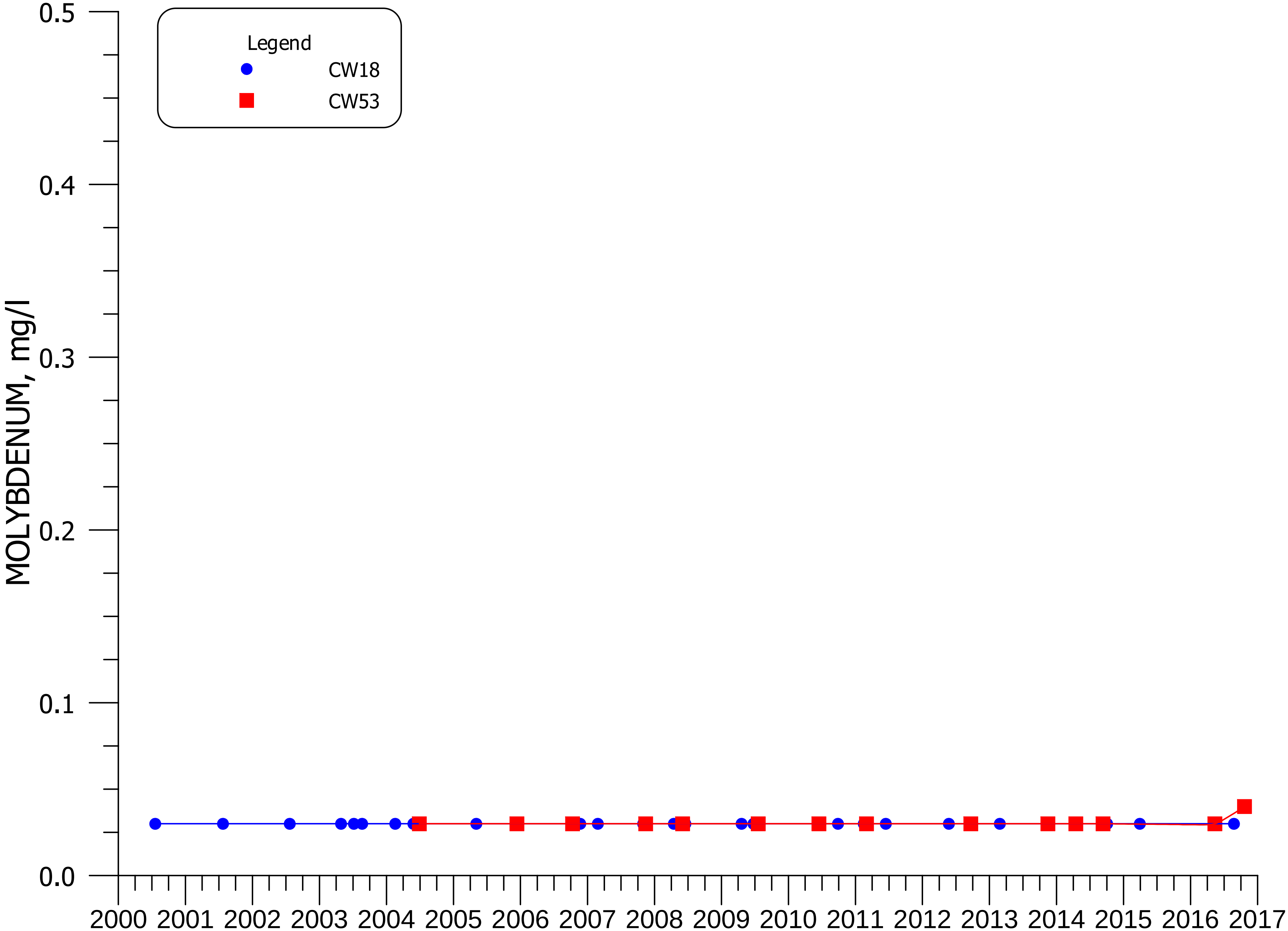
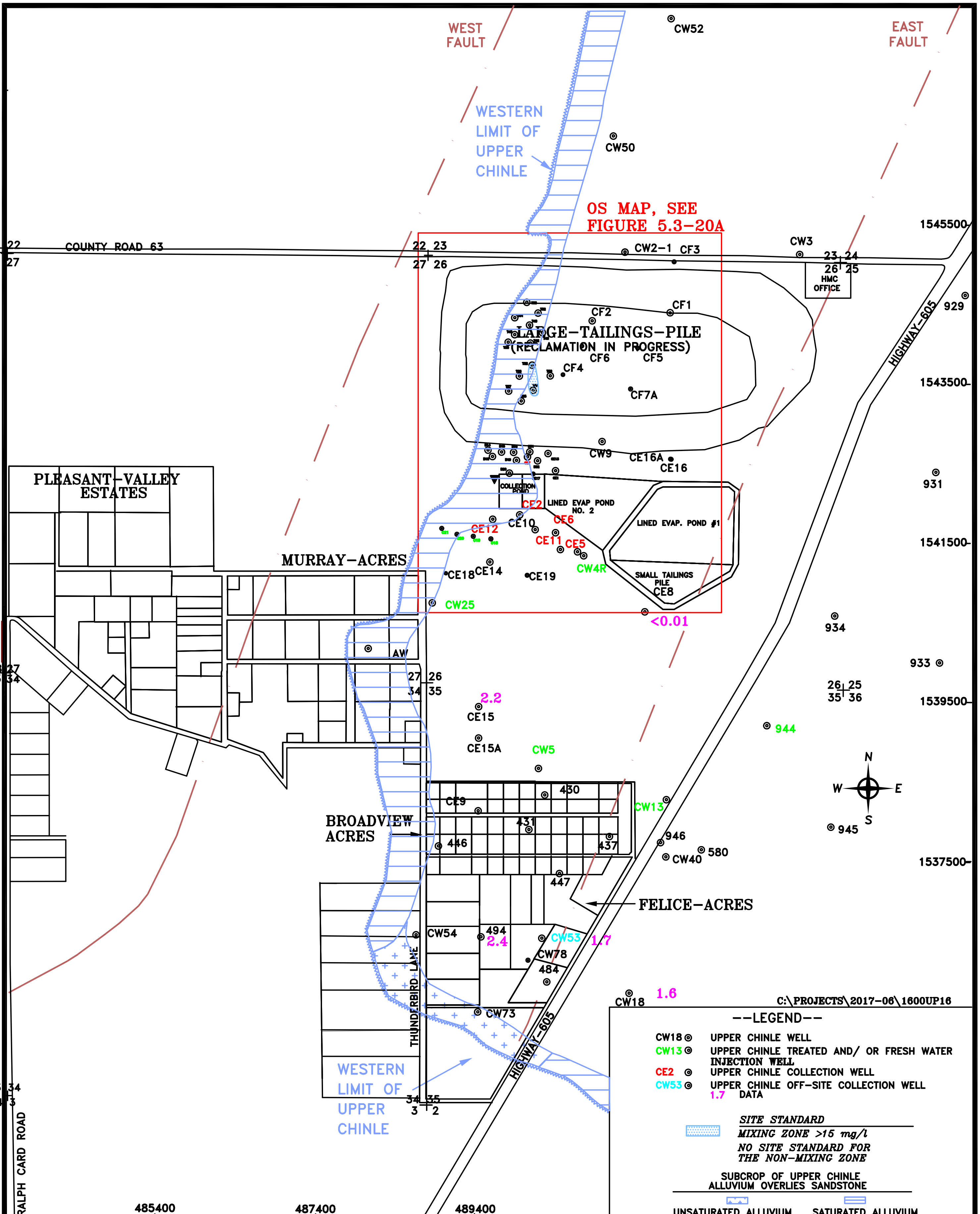


FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW18 AND CW53

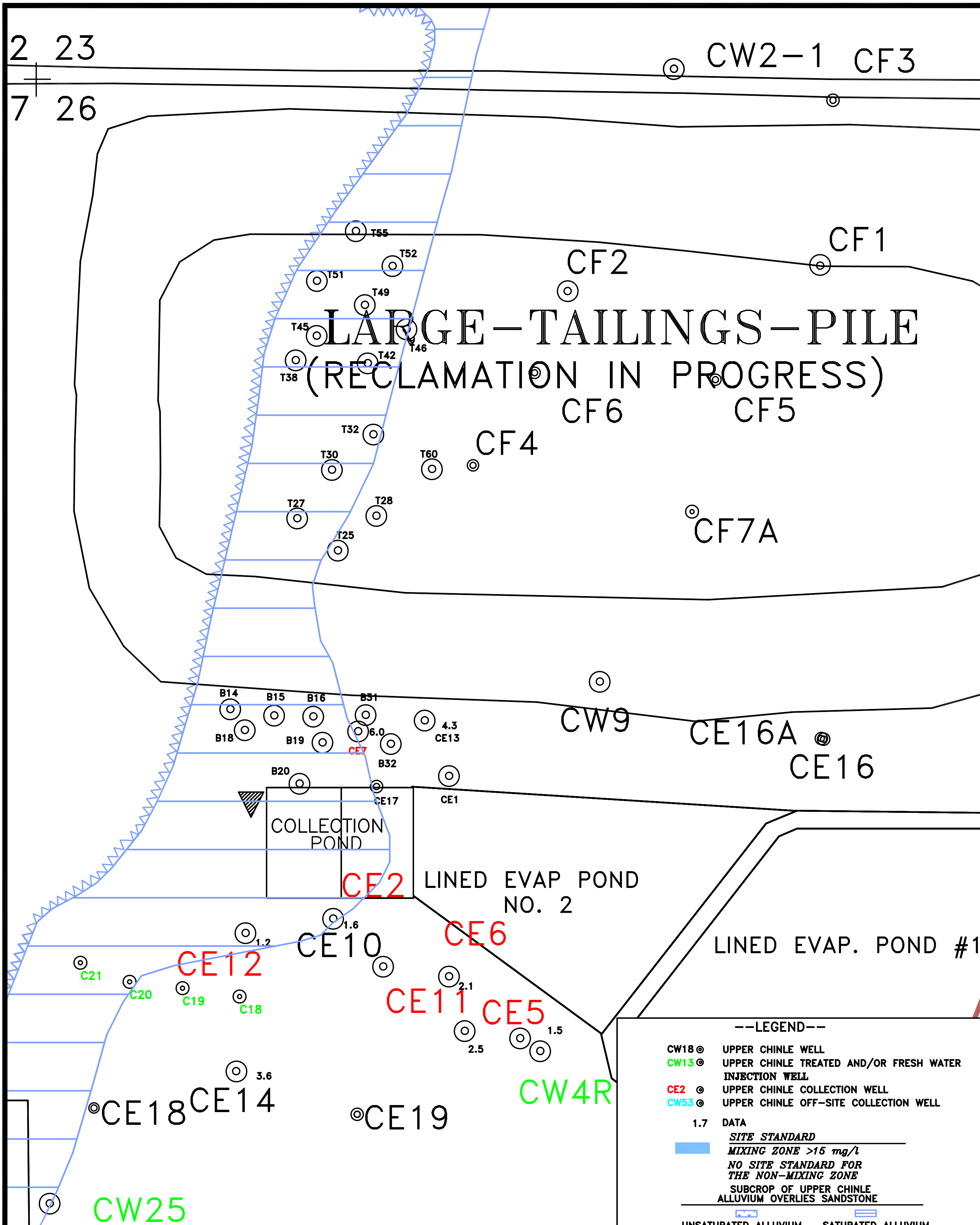


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l

DATE: 2/8/2017

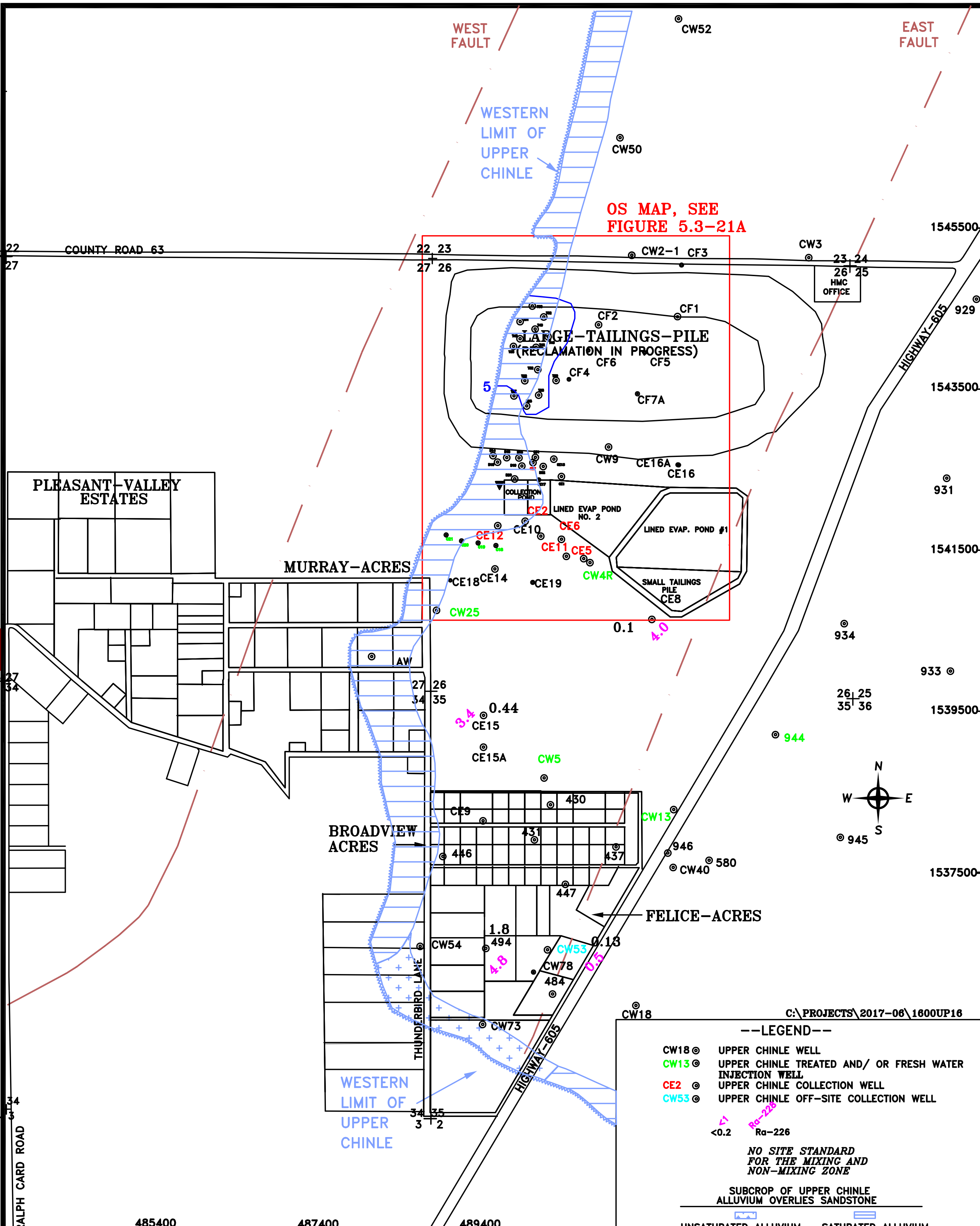
SCALE: 1"= 1600'



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

FIGURE 5.3-20A. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, mg/l

DATE: 2/3/17
SCALE: 1"= 500'

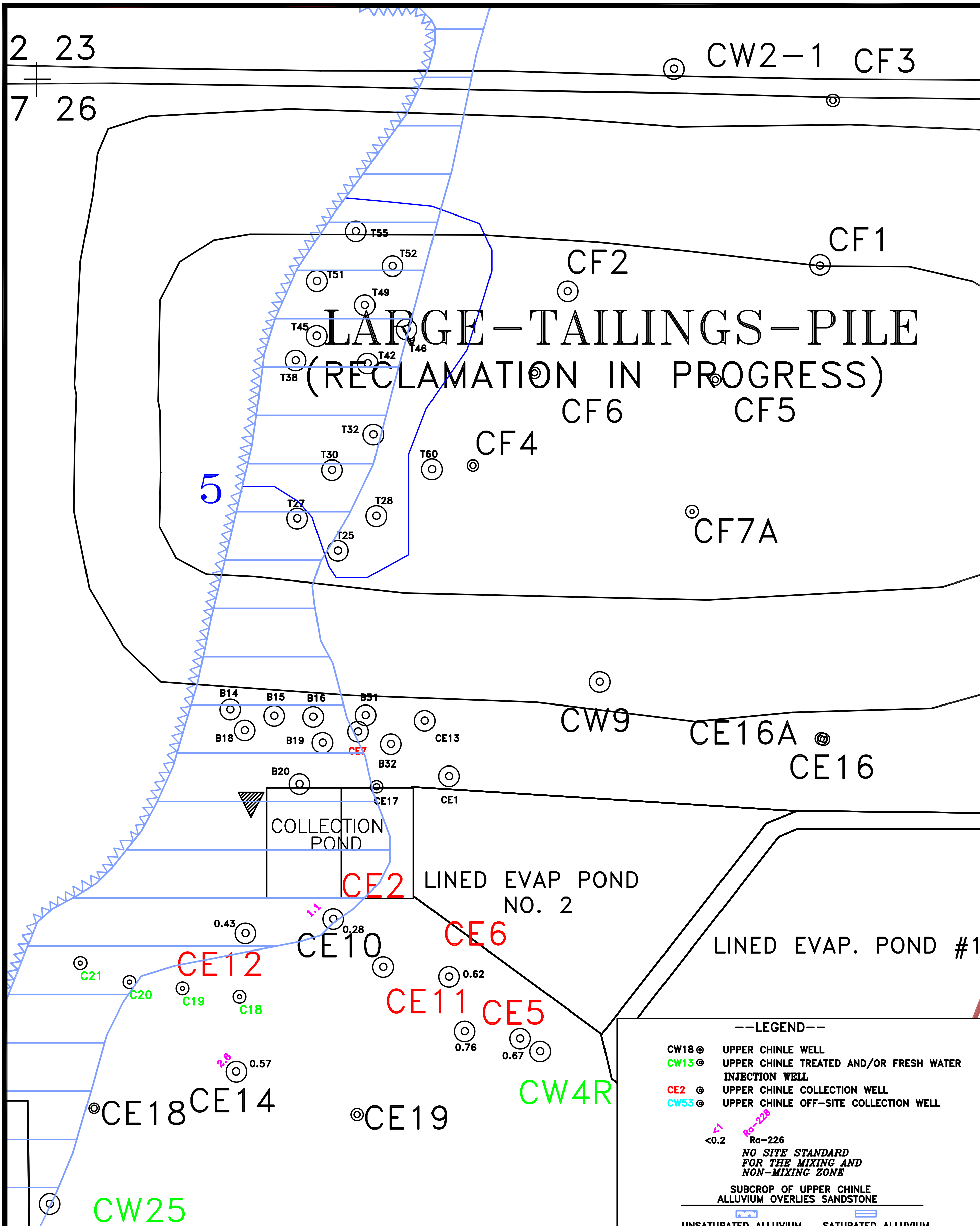


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-21. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, pCi/l

DATE: 2/8/2017

SCALE: 1"= 1600'

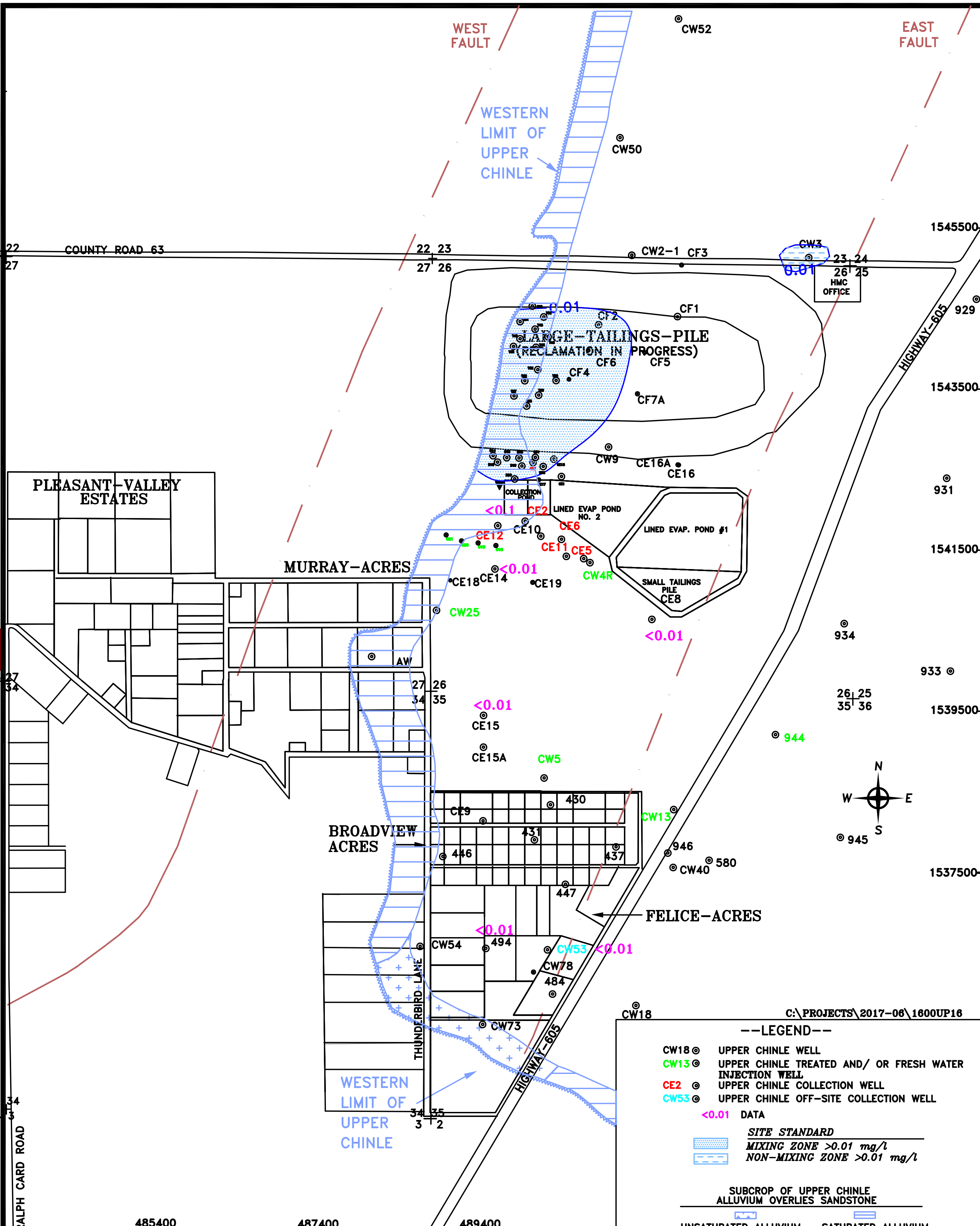


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-21A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2016, pCi/l

DATE: 2/3/17

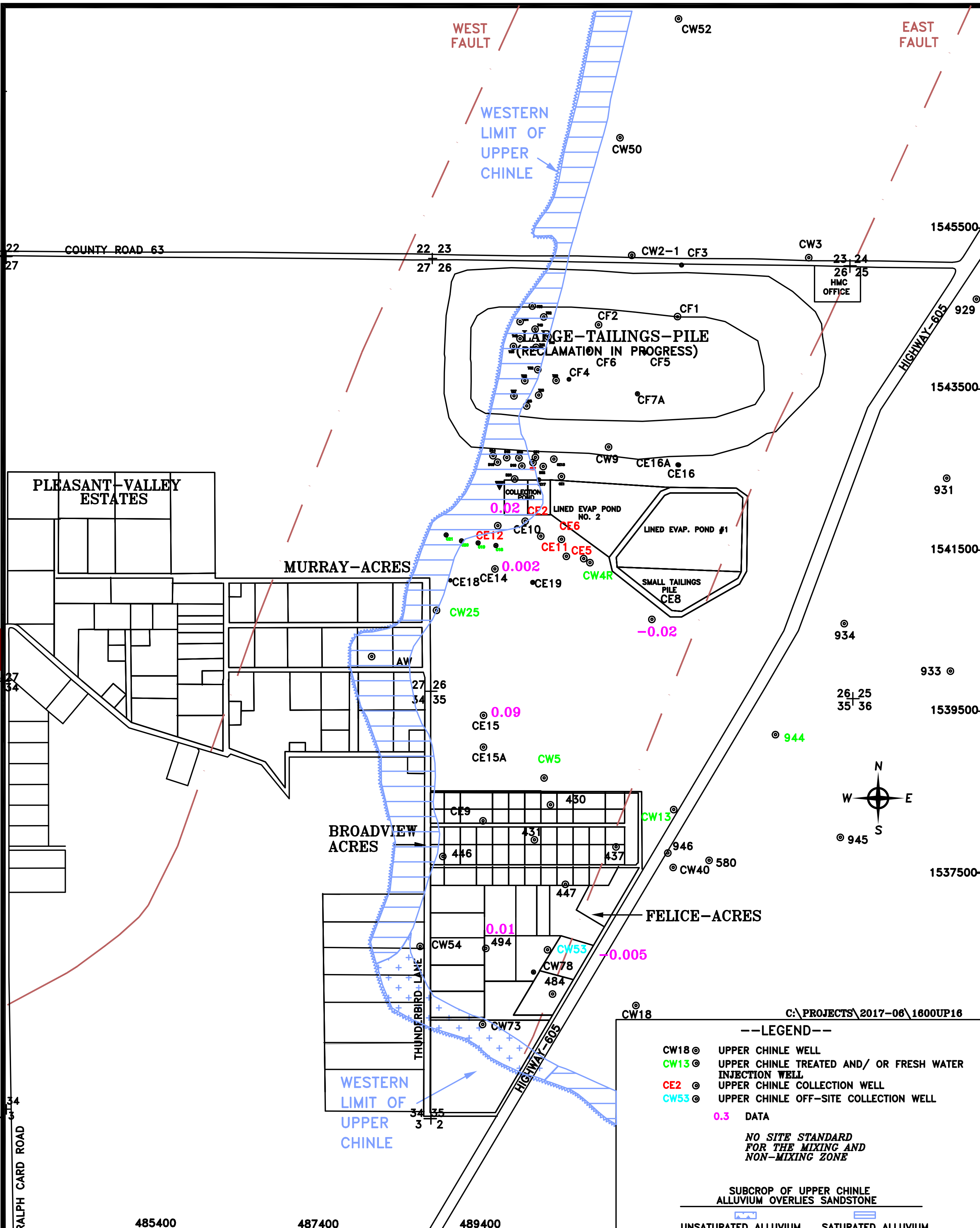
SCALE: 1"= 500'



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

FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, mg/l

DATE: 2/8/2017
SCALE: 1"= 1600'
PAGE: 5.3-37



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

DATE: 2/8/2017

FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2016, pCi/l

SCALE: 1"= 1600'

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FIGURES (continued)

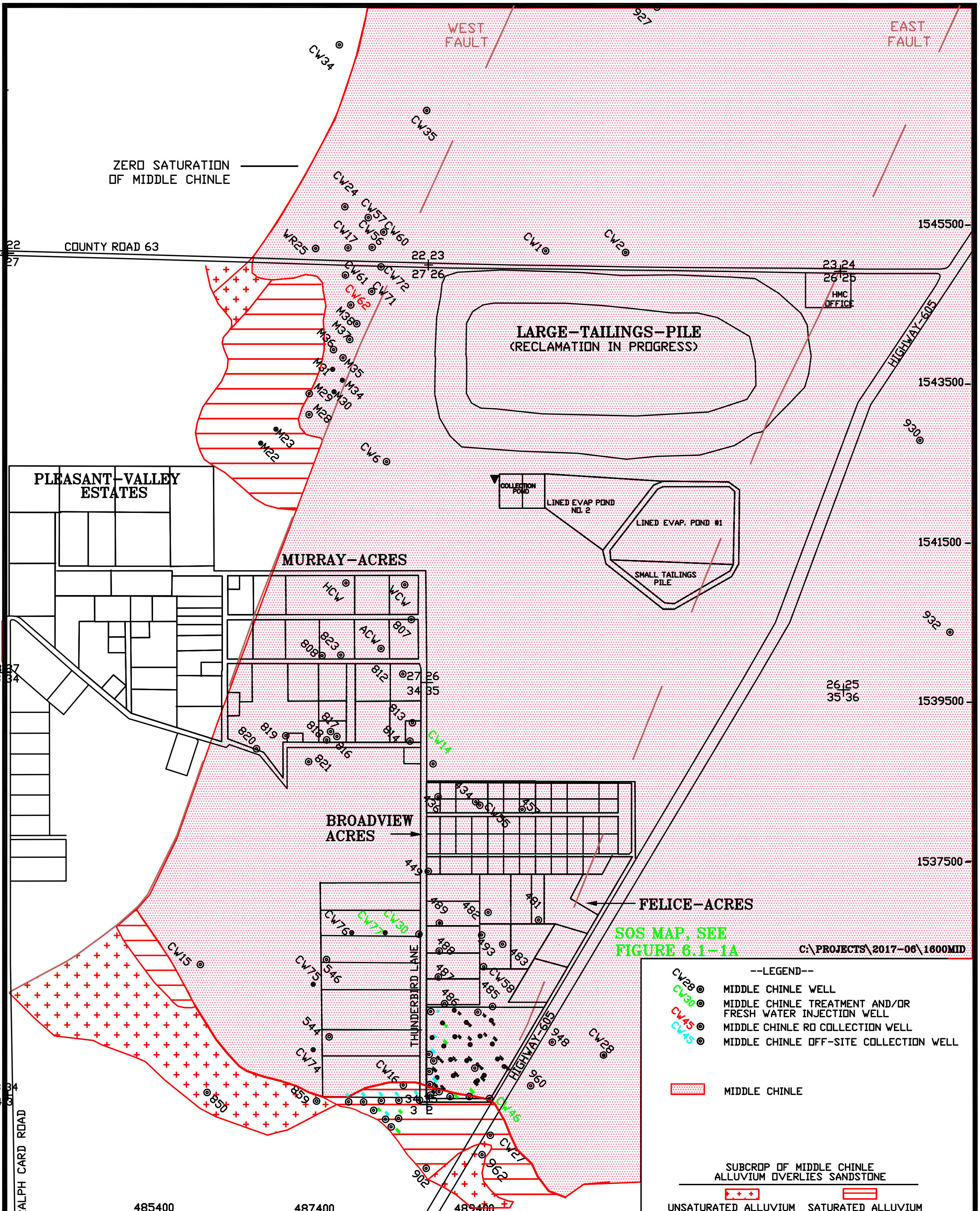
6.0 MIDDLE CHINLE AQUIFER MONITORING

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 2016.

Wells CW14, CW30, CW46, CW77, R6, R7, R12, Y6, Y12, Y33 and Y34 were used for treated and/or fresh-water injection in 2016. Middle Chinle wells R1, R2, R3, R4, R5, R11, Y1, Y7, Y13 and Y23 were used as South collection wells in 2016 for the zeolite treatment process. Well CW28 was not used as a source for fresh water injection in 2016.

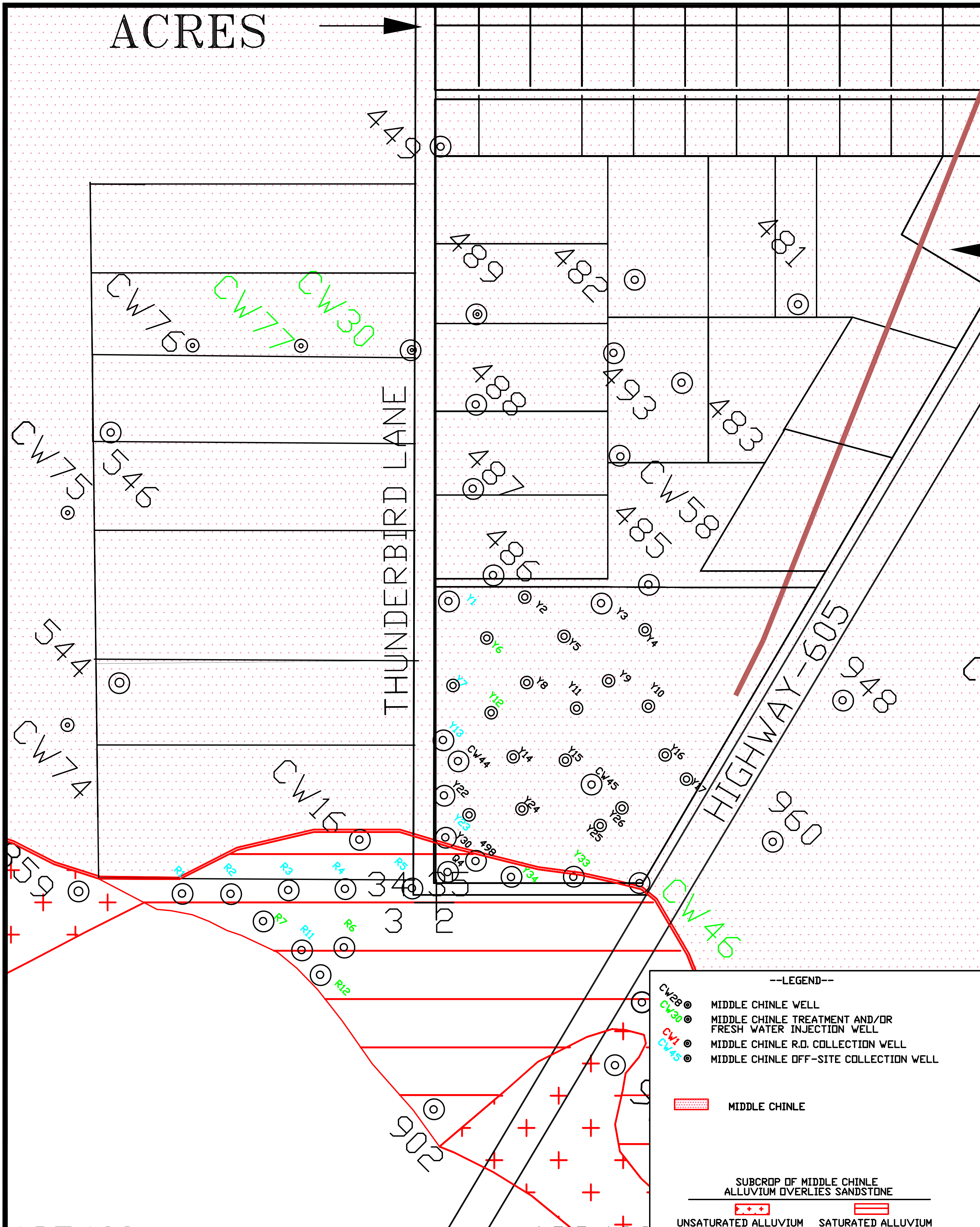


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/2/2017

6.1-1 LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, 2016

SCALE: 1"=1600'



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

6.1-1A. LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2016

DATE: 1/2/2017

SCALE: 1"=500'

6.2 MIDDLE CHINLE WATER LEVELS

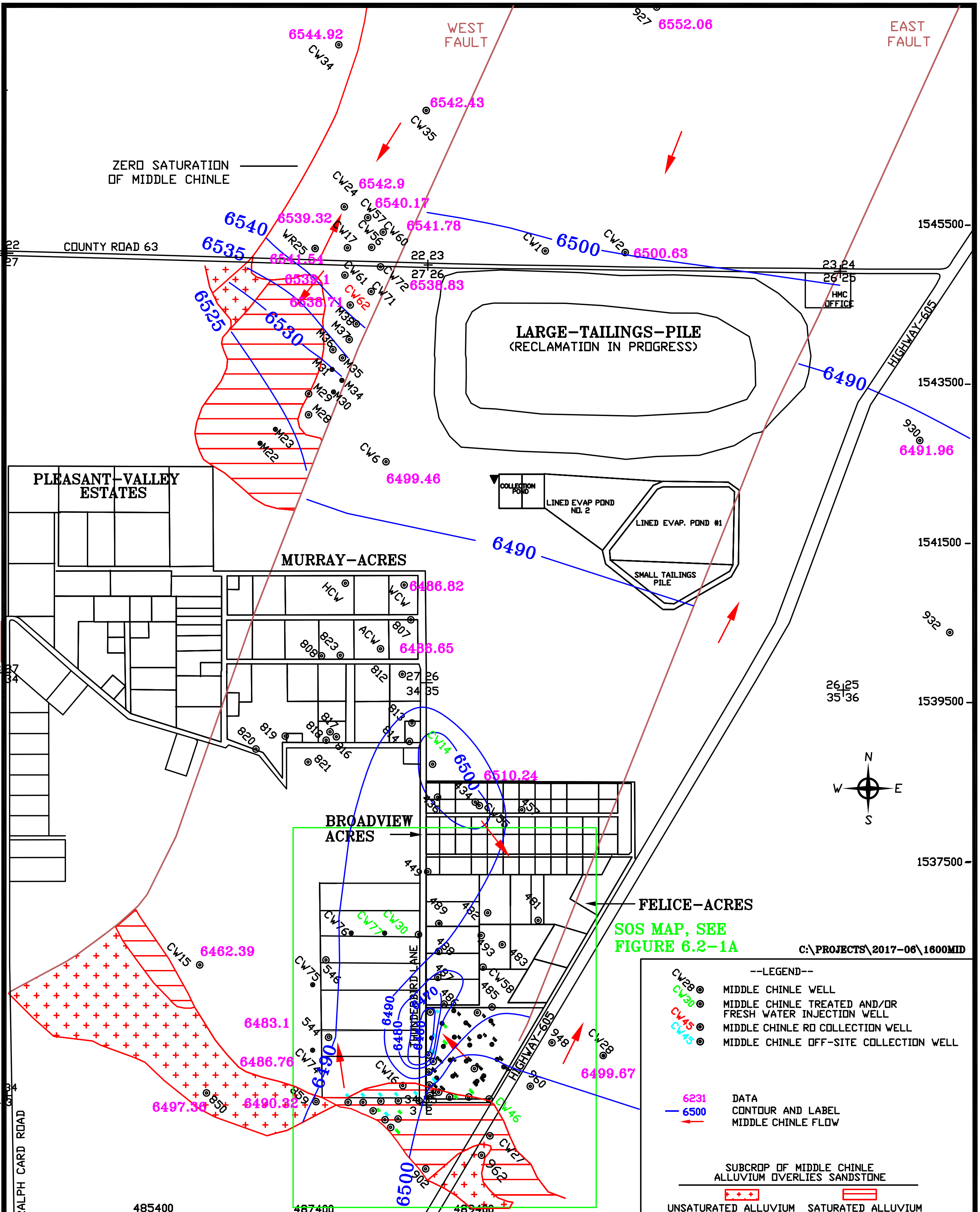
Water levels in Homestake's Upper, Middle and Lower Chinle wells are presented in Appendix A. Fall 2016 water-level elevation contours for the Middle Chinle aquifer are presented on Figures 6.2-1 and 6.2-1A. The hydraulic gradient in the Middle Chinle aquifer is steeper in its alluvial subcrop area in 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 500 feet to the northeast of collection well Y1 in the fall of 2016. 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. The remainder of the Middle Chinle aquifer is recharged by the alluvial aquifer south of Felice Acres.

The injection of 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, 859, CW15, CW28, CW45, and CW58. The water levels are higher in Middle Chinle well CW45 than they are farther north in well 493. The pumping of Middle Chinle South collection wells in the second half of 2016 caused the water levels in these wells to gradually decrease, except for wells CW15 and CW28.

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 caused the water levels in the Middle Chinle aquifer west of the West Fault to decline. Water levels rose in Middle Chinle well CW2 in 2016 but declined in well ACW due to pumping of the South Felice Acres wells in the second half of 2016. Water levels are expected to gradually decrease in well CW2 as a result of the South Felice pumping in the near 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.

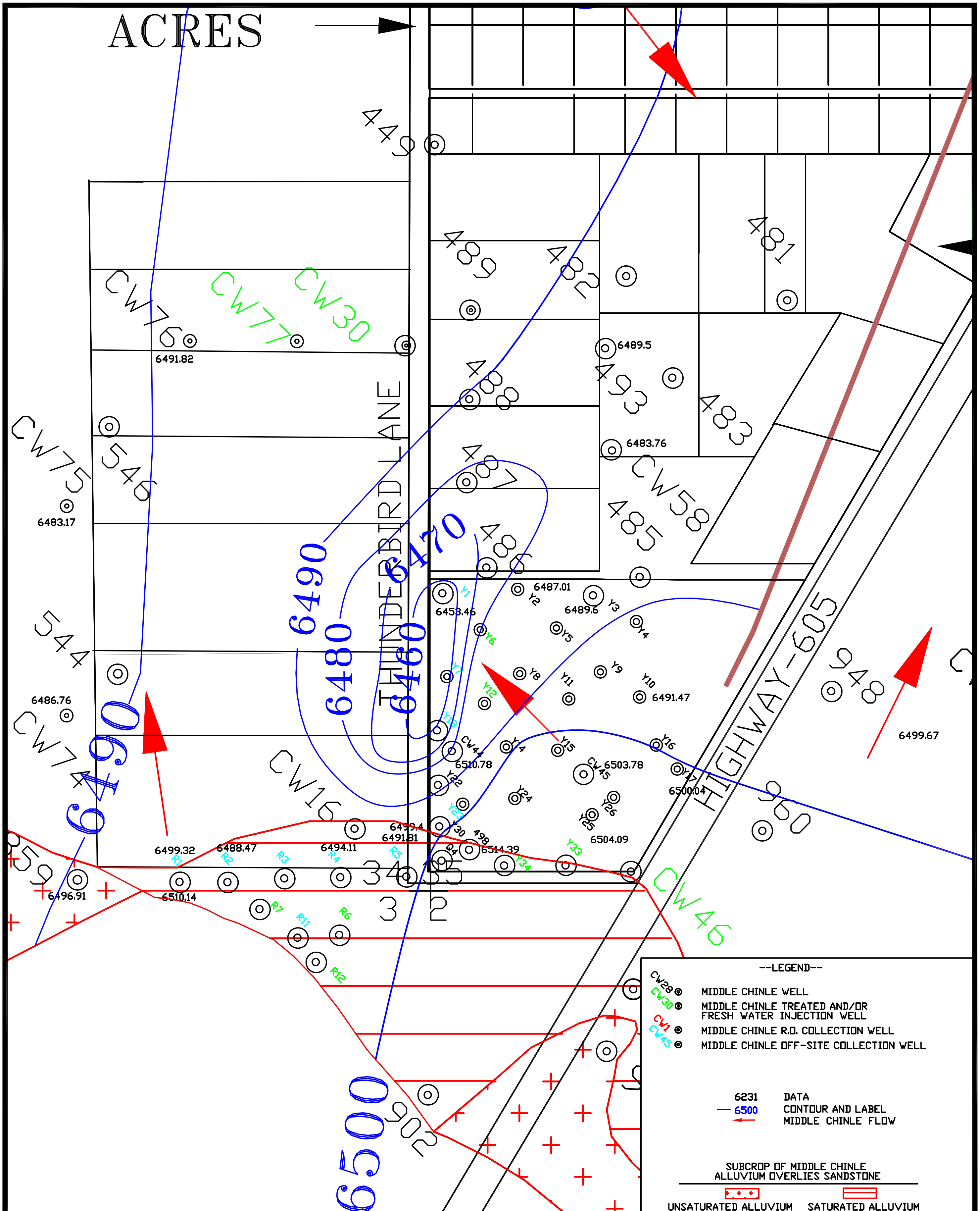


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2016, FT-MSL

DATE: 1/2/2017

SCALE: 1"=1600'

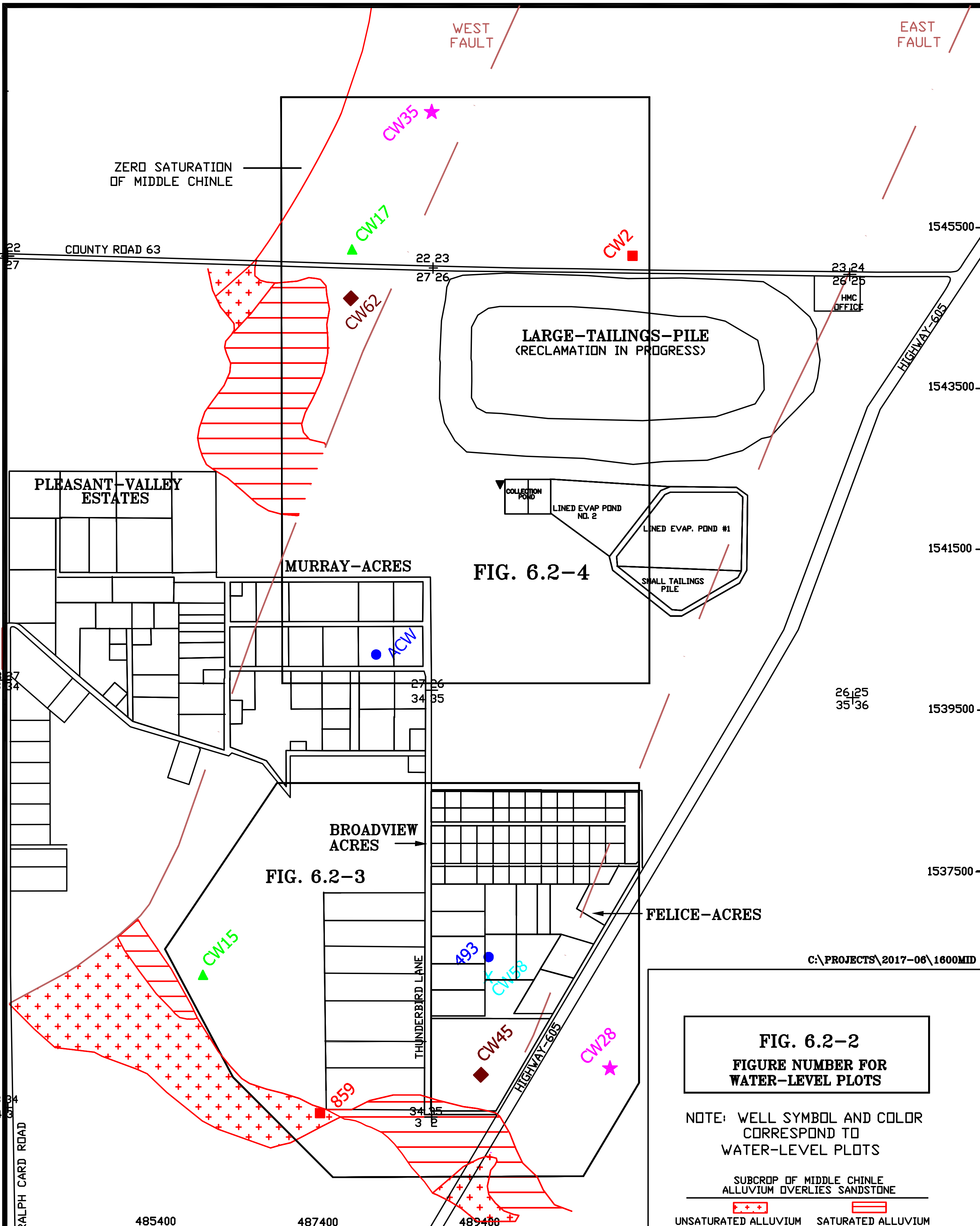


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-1A. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2016, SOS, FT-MSL

DATE: 1/2/2017

SCALE: 1"=500'



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

DATE: 1/2/2017

SCALE: 1"=1600'

FIGURE 6.2-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-LEVEL PLOTS, 2016

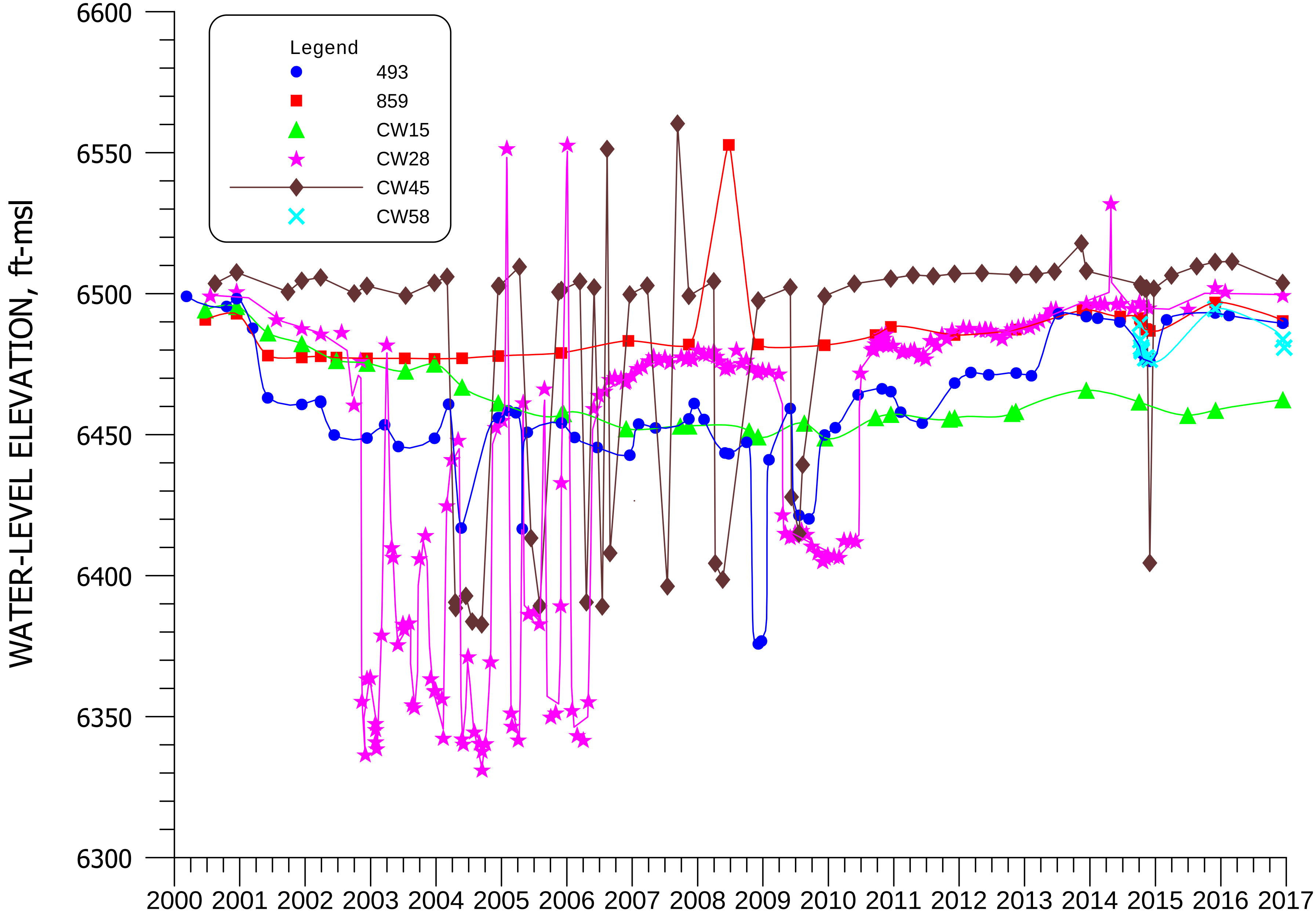


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, 859, CW15, CW28, CW45, AND CW58

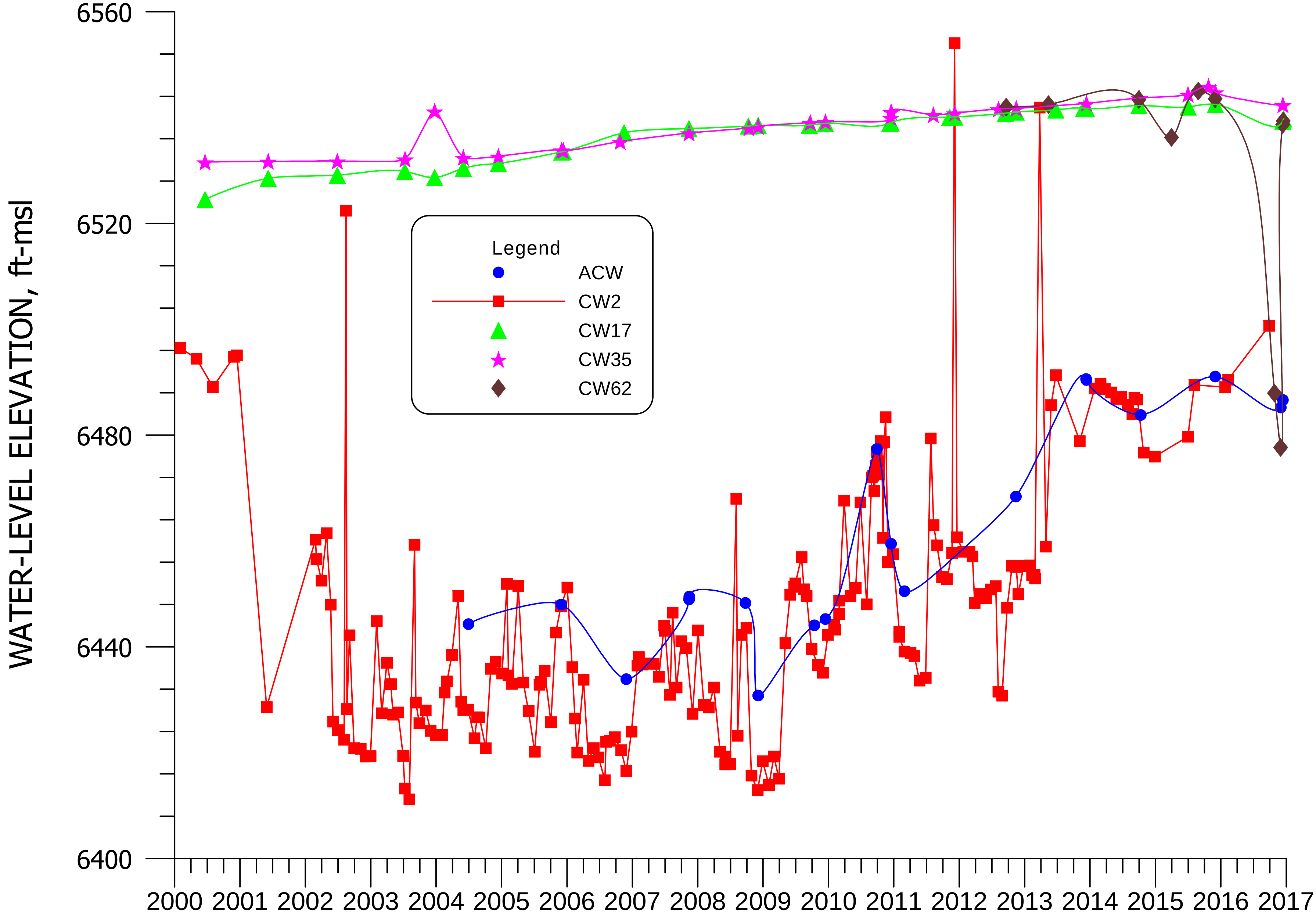


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS ACW, CW2, CW17, CW35, AND CW62

6.3 MIDDLE CHINLE WATER QUALITY

The water-quality data for Homestake's Middle Chinle aquifer is presented with that of 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 2016 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 2016 are within the site 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 three wells west of the West Fault. The only significant molybdenum concentrations identified in the Middle Chinle aquifer are at 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 2016 and shows that the Middle Chinle sulfate concentrations range from 505 to a high of 1300 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. 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. 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’.

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, CW17, CW44 and CW45. A very gradual decline in sulfate concentrations were observed in 2016 in these wells, except for an increase in well CW17. The higher sulfate concentration in 2016 in well CW17 is likely due to the CW62 pumping pulling natural Middle Chinle water from the north into this area. Sulfate levels in CW17 may return to the concentrations observed in 2000 to 2006.

The sulfate concentrations for RO collection well CW62 and nearby Middle Chnile wells CW56, CW61 and CW72 are presented in Figure 6.3-3A for these mixing zone Middle Chinle wells. A very gradual decline in sulfate concentrations were observed in 2016 in these wells due to the pumping of well CW62.

The sulfate concentrations for South Felice collection wells Y1, Y7, Y13 and Y23 and nearby Middle Chnile well CW58 are presented in Figure 6.3-3B for these mixing zone Middle Chinle wells. A very gradual decline in sulfate concentrations were observed in 2016 in these wells due to the pumping of these collection wells, except for an increase observed in South collection well Y1.

Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 493, ACW and CW2, located between the two faults. Data presented on this plot demonstrate that sulfate concentrations have been variable in well ACW and gradually declining in wells 493 and CW2 in 2016.

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 2016 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). None of the wells west of the West Fault exceed the TDS site 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 2016, except for wells 483, 493 and ACW in the non-mixing zone.

Plots of TDS concentrations for Middle Chinle wells 498, CW17, CW44 and CW45 are presented in Figure 6.3-6. TDS declined in these wells in 2016, except for an increase in well CW17. The TDS concentrations gradually declined in 2016 in RO collection well CW62 and nearby Middle Chinle wells CW61 and CW72 (see Figure 6.3-6A). The TDS concentrations in wells in the CW62 area have been restored. 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 have converged to near 1600 mg/l. Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 493, ACW and CW2. Analysis of this data indicates overall stable TDS concentrations in water collected from these wells in 2016 after a gradual rise in well CW2 for several years.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figures 6.3-8 and 6.3-8A present chloride concentrations in the Middle Chinle aquifer during 2016, and observed concentrations varied from roughly 120 to 235 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. 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, CW17, CW44 and CW45. Chloride concentrations decreased in Middle Chinle well CW17 in 2016 and is expected to decline to its pre-2006 level in the near future. Some decline in concentrations were observed in the Middle Chinle wells in South Felice Acres.

A second set of chloride concentration plots for the Middle Chinle wells west of the West Fault is presented in Figure 6.3-9A which shows a decline in chloride due to the CW62 pumping in the Middle Chinle aquifer. An additional plot of chloride concentrations for the Middle Chinle wells in South Felice Acres was added in Figure 6.3-9B which shows a decline in chloride in these South Felice Acres collection wells while chloride increased in well Y1.

The fourth chloride concentration plot for the Middle Chinle aquifer is presented in Figure 6.3-10 which shows very similar 2016 values for these three wells. The large increase in chloride concentrations in well ACW in 2011, 2012, 2014 and 2015 is not supported by changes in sulfate and TDS.

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 2016. 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, CW17, CW44 and CW45 (see Figure 6.3-2 for well locations). The 2016 uranium concentrations shown on this plot declined except for a rise in well 498 and steady values in CW45. These collection-induced trends should continue with additional pumping the Middle Chinle aquifer. 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. 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 2016 and increased in well 493. Uranium concentrations in well 493 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 2016, except for three 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 concentrations slightly greater than 0.2 mg/l were 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 2017. 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, CW17, CW44 and CW45 are presented in Figure 6.3-15. Overall steady selenium concentrations have been observed in these wells in 2016 except the decrease in well CW17. The decline in wells CW56, CW61, CW62 and CW72 is shown in Figure 6.3-15A which demonstrates the benefits in pumping well CW62. The observed higher concentrations in these wells west of the West Fault should be restored with the CW62 pumping. Figure 6.3-15B shows that the South Felice Middle Chinle collection wells contain selenium concentrations that have already been restored.

Figure 6.3-16 presents the selenium concentrations for Middle Chinle wells in the non-mixing zone. Selenium concentrations in well CW2, which is located north of the LTP, have varied over the past few years, but their values are small. 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 2016. The injection of fresh water into Middle Chinle wells CW14, CW30, CW46, CW77, Y6 and Y12 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 2016 molybdenum concentrations in the Middle Chinle aquifer are presented on Figures 6.3-17 and 6.3-17A. None of the molybdenum concentrations for 2016 exceed the site standard of 0.10 mg/l except for five 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, CW17, CW44 and CW45, while Figure 6.3-18A shows the molybdenum concentrations for wells CW56, CW61, CW62 and CW72. These plots show a decline in the molybdenum concentrations due to the CW62 pumping. The majority of the molybdenum restoration in the Middle Chinle west of the West Fault may be done by the end of 2017. 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, ACW and CW2. This plot shows that the concentration in each of these wells has been low for 2016.

6.3.7 NITRATE - MIDDLE CHINLE

Nitrate concentrations have always been low in the Middle Chinle aquifer and therefore are not routinely monitored. However, nitrate concentrations were measured in all of the Middle Chinle aquifer wells in 2003 and in a number of the wells in 2016. Figure 6.3-20 presents the nitrate concentrations in the Middle Chinle aquifer for 2016. 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

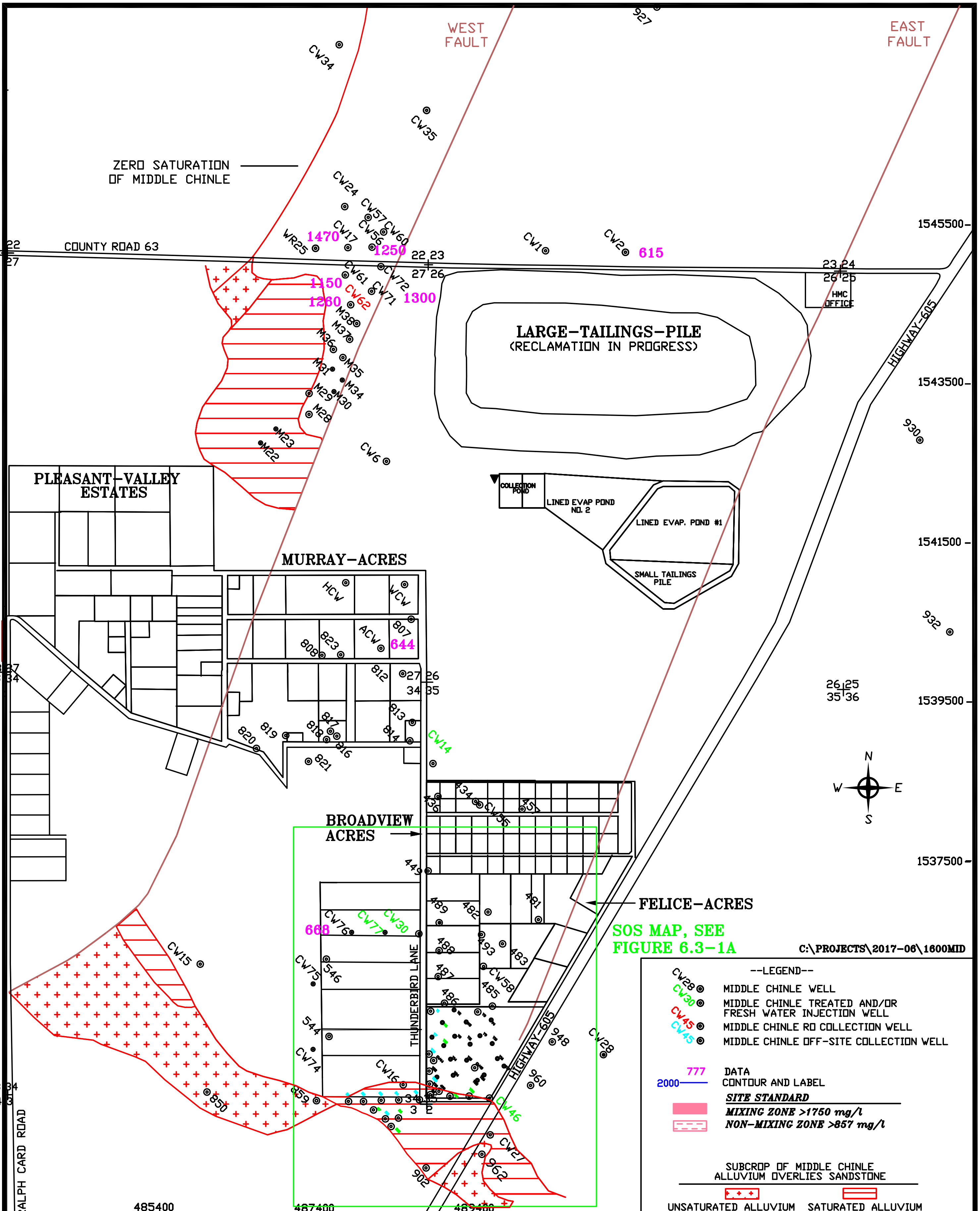
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. All of the radium-226 and radium-228 values measured in 2016 were very small except radium-226 results from wells 493 and 494 which are considered outliers. 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 2016 vanadium measurements for the Middle Chinle aquifer are below the detection limit. 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 2016 were very small. 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.



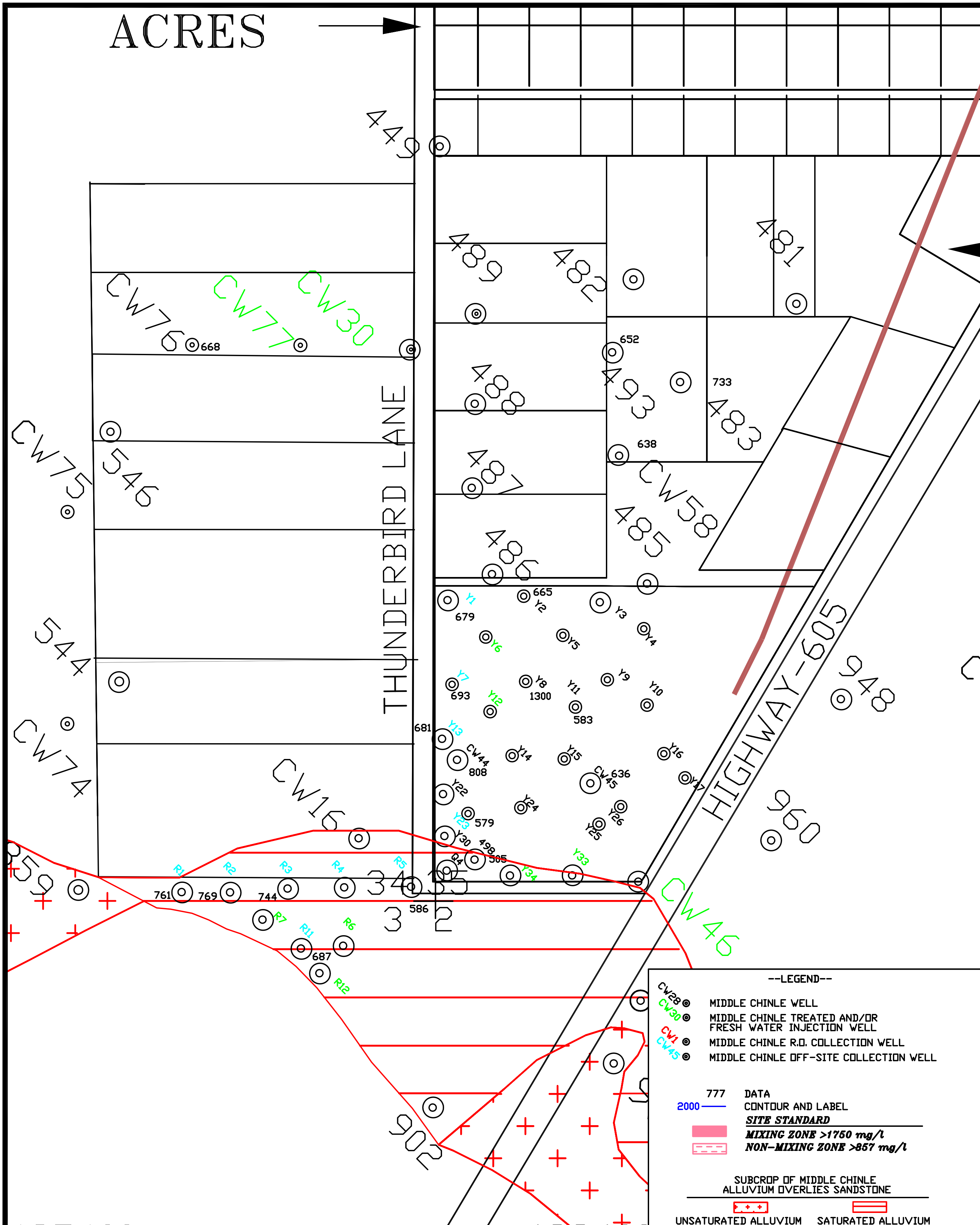
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

FIGURE 6.3–1. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l

DATE: 1/2/2017

SCALE: 1"=1600'

PAGE: 6.3–9

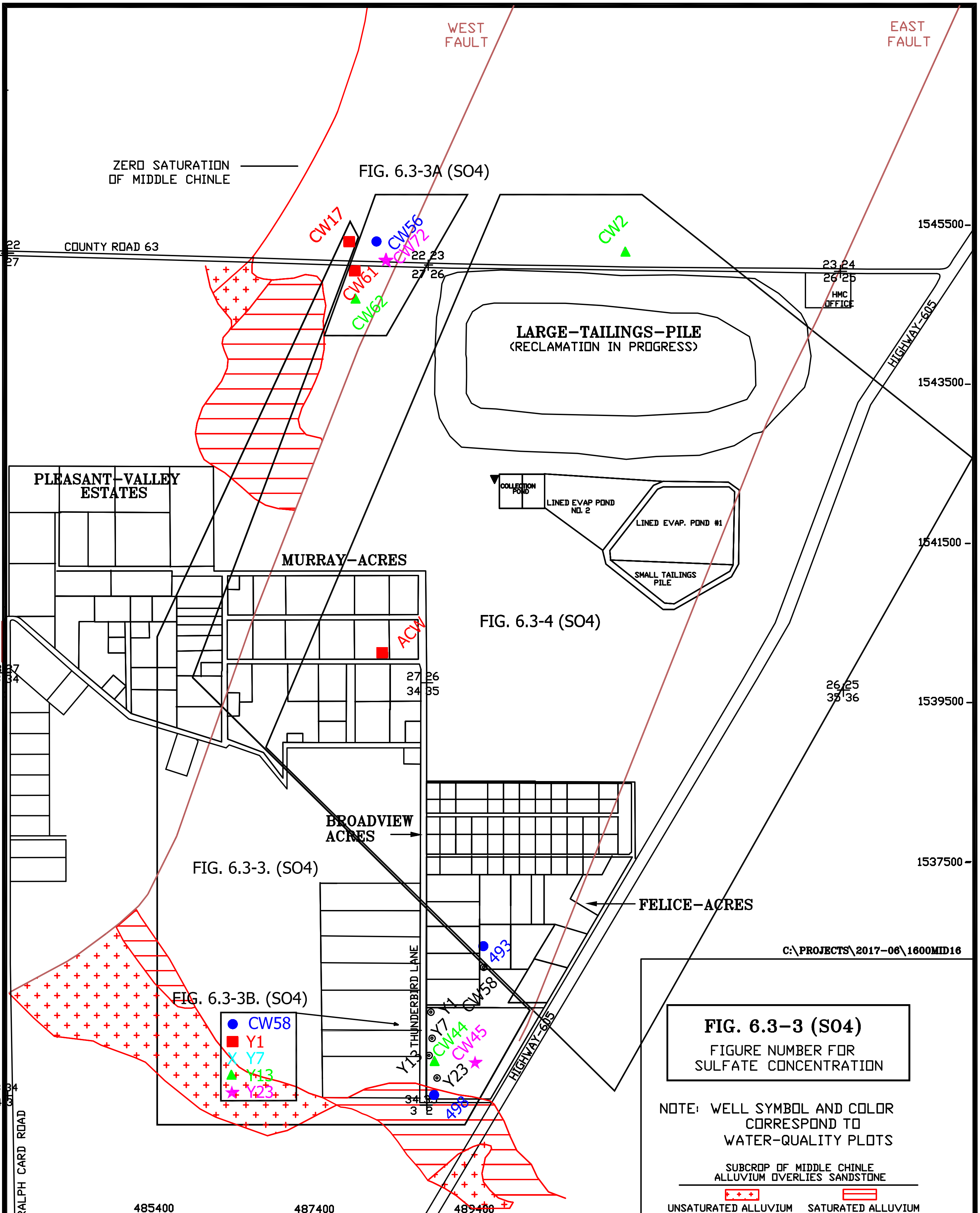


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-1A. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, SOS, mg/l

DATE: 1/2/2017

SCALE: 1"=500'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 2/6/2017**
FIGURE 6.3-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-QUALITY PLOTS, 2016	**SCALE: 1"=1600'**
	PAGE: 6.3-11

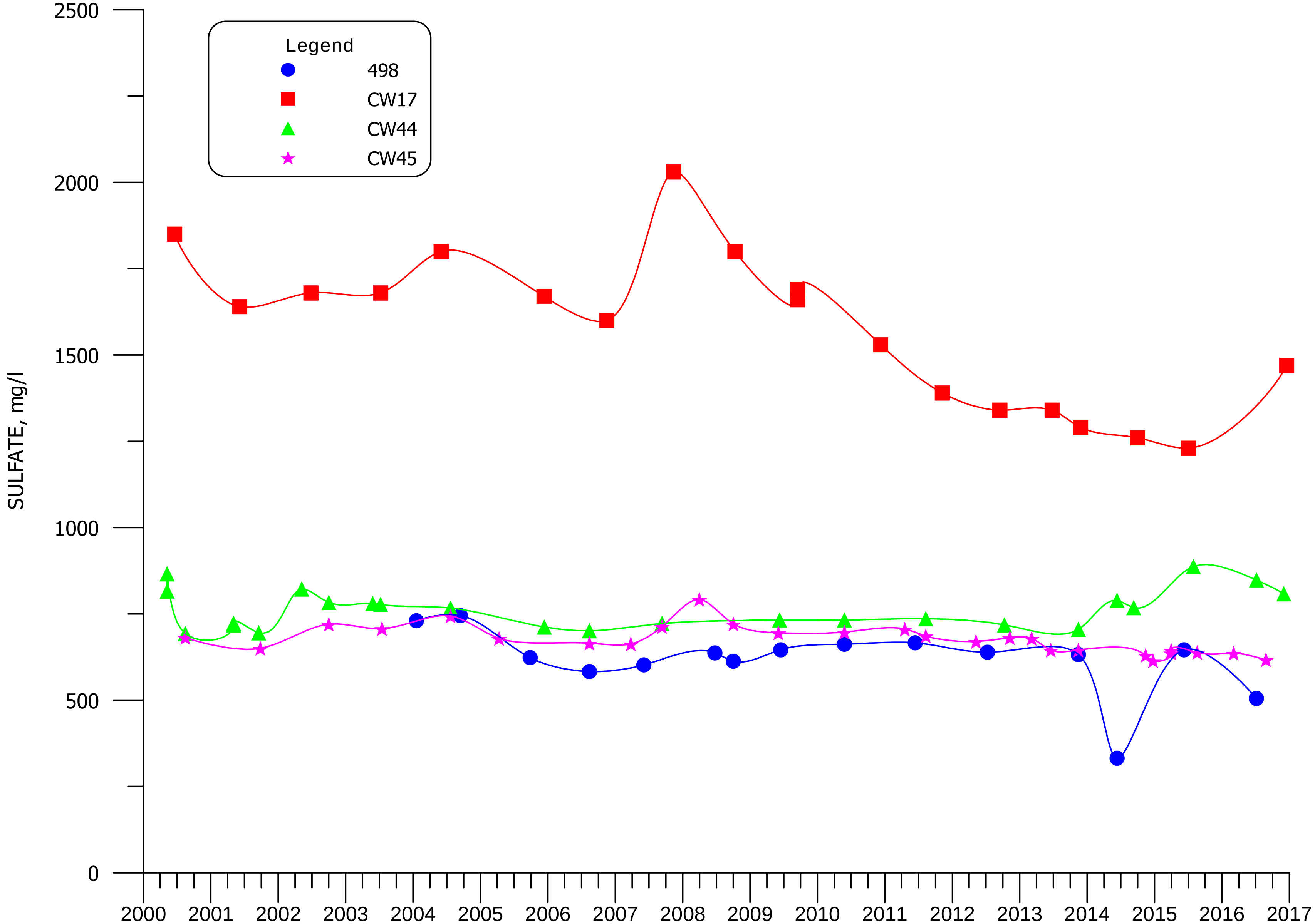


FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW44 AND CW45

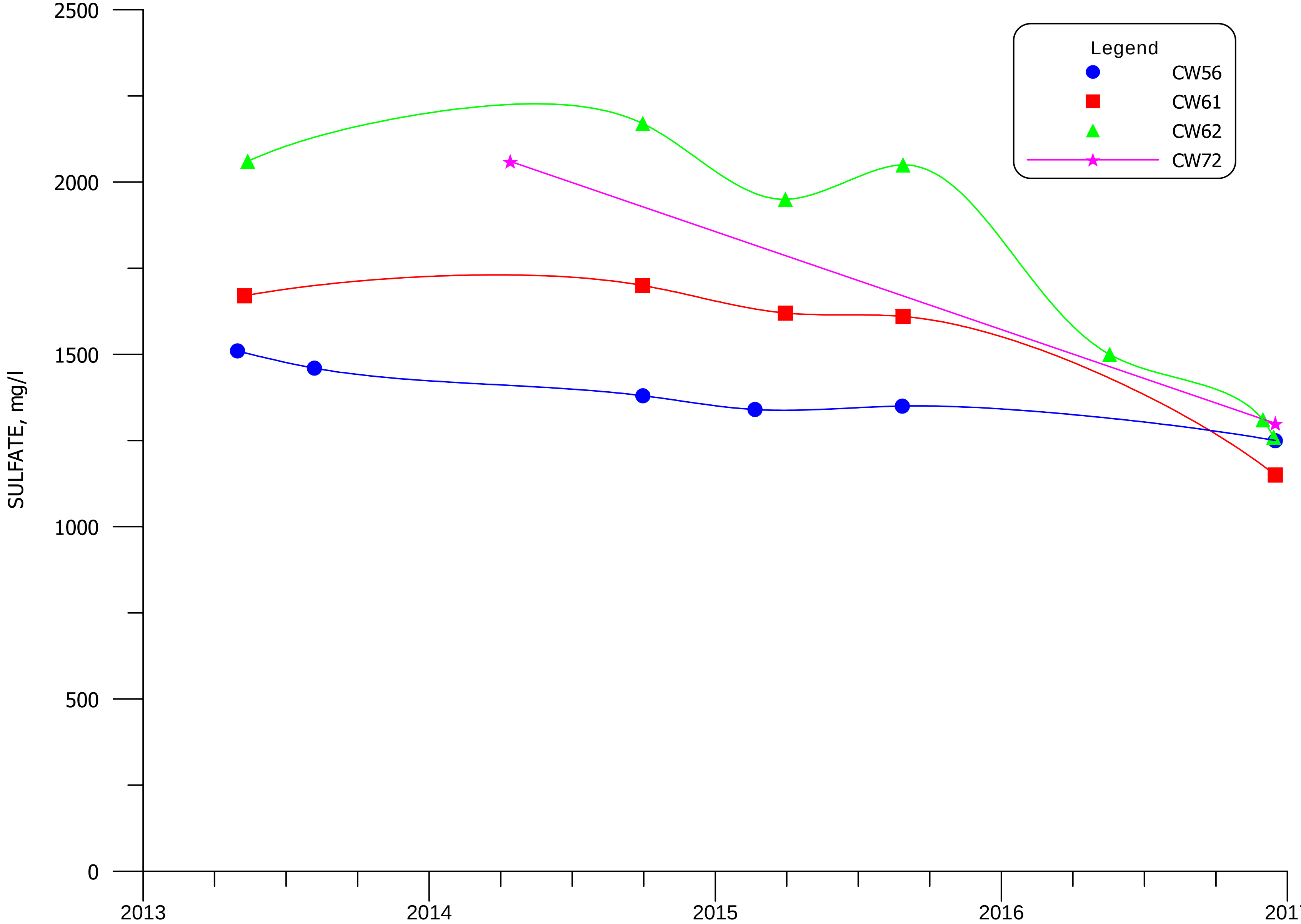


FIGURE 6.3-3A. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

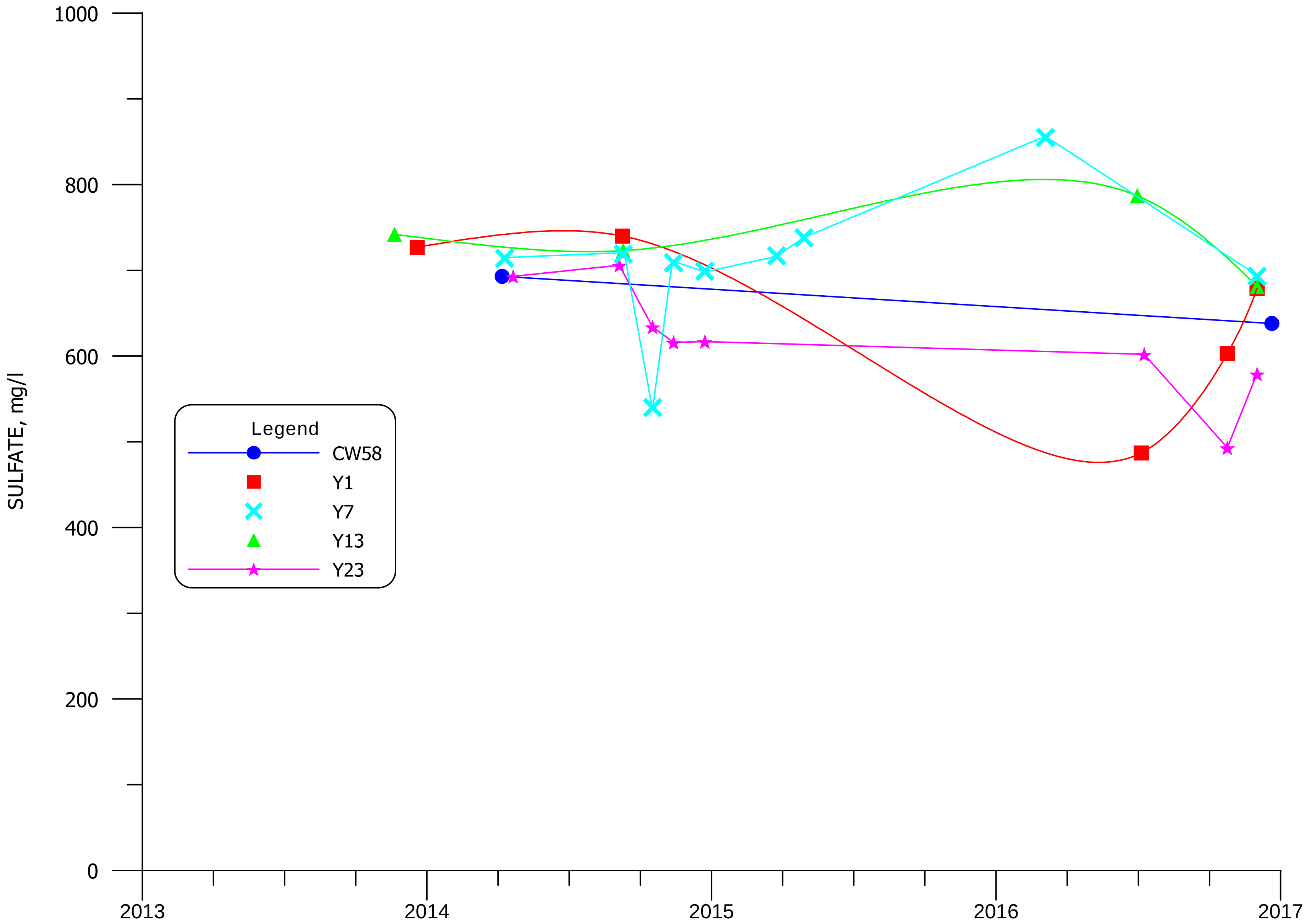


FIGURE 6.3-3B. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

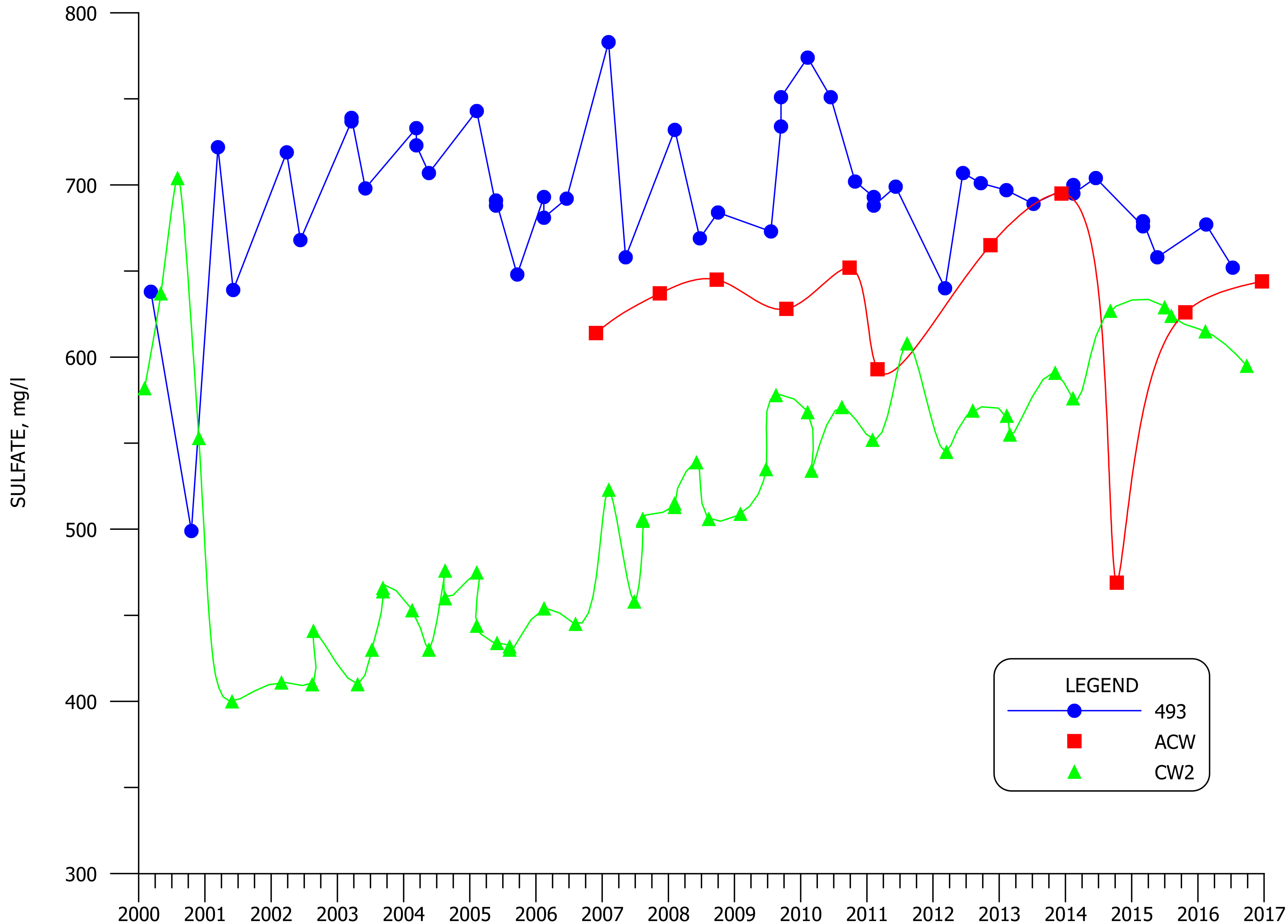
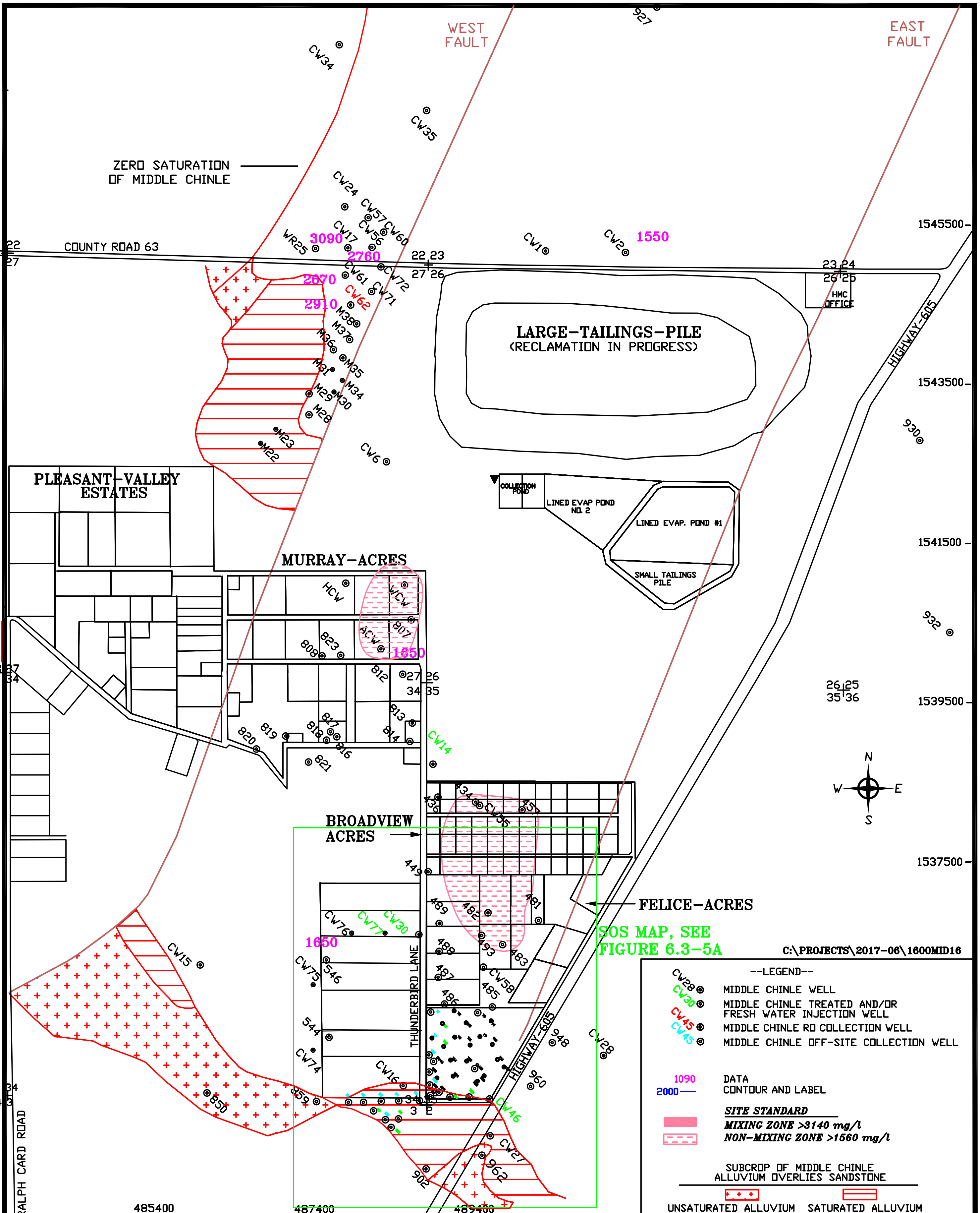


FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2

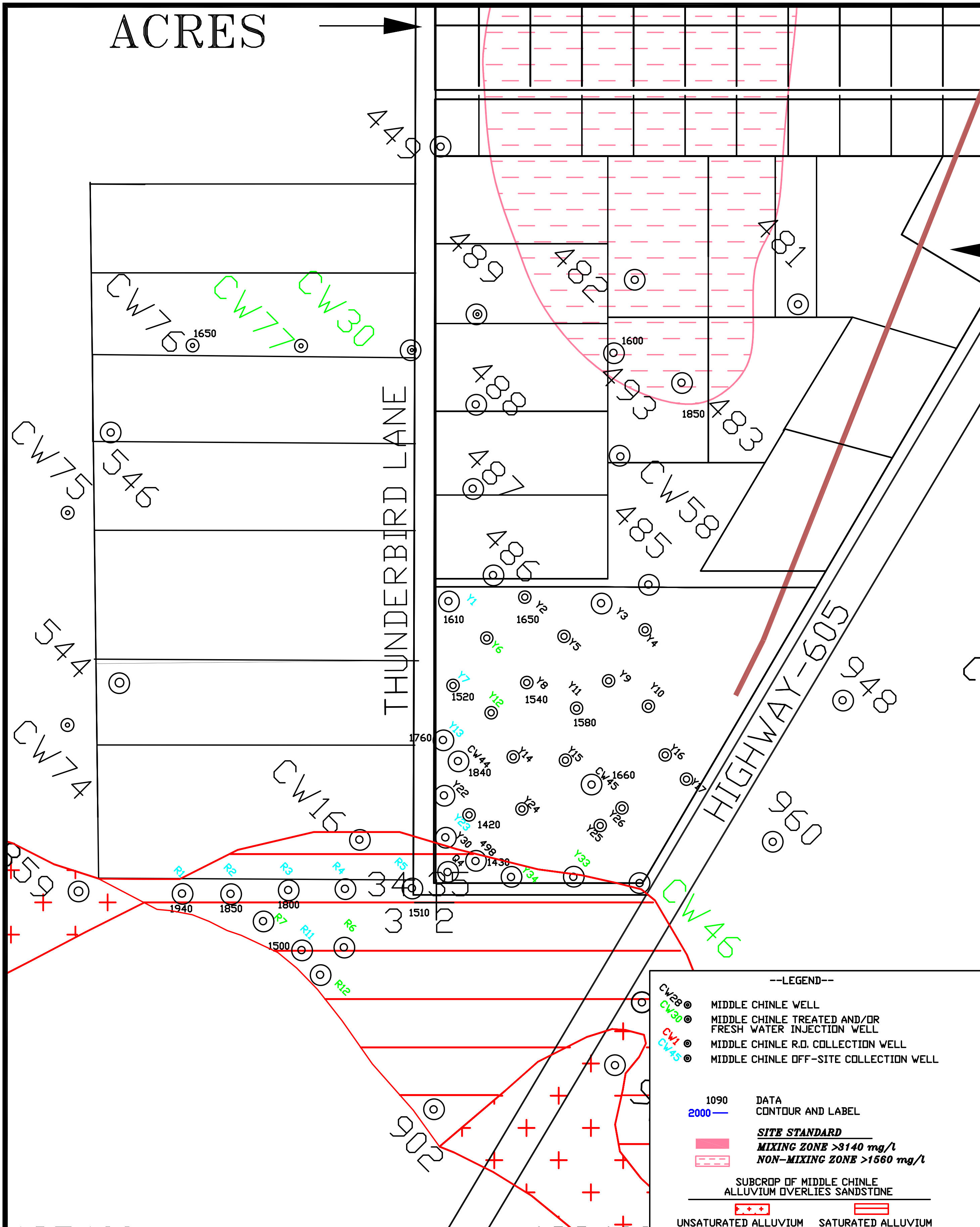


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/6/2017

FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, 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, 2016, SOS, mg/l

DATE: 2/6/2017

SCALE: 1"=500'

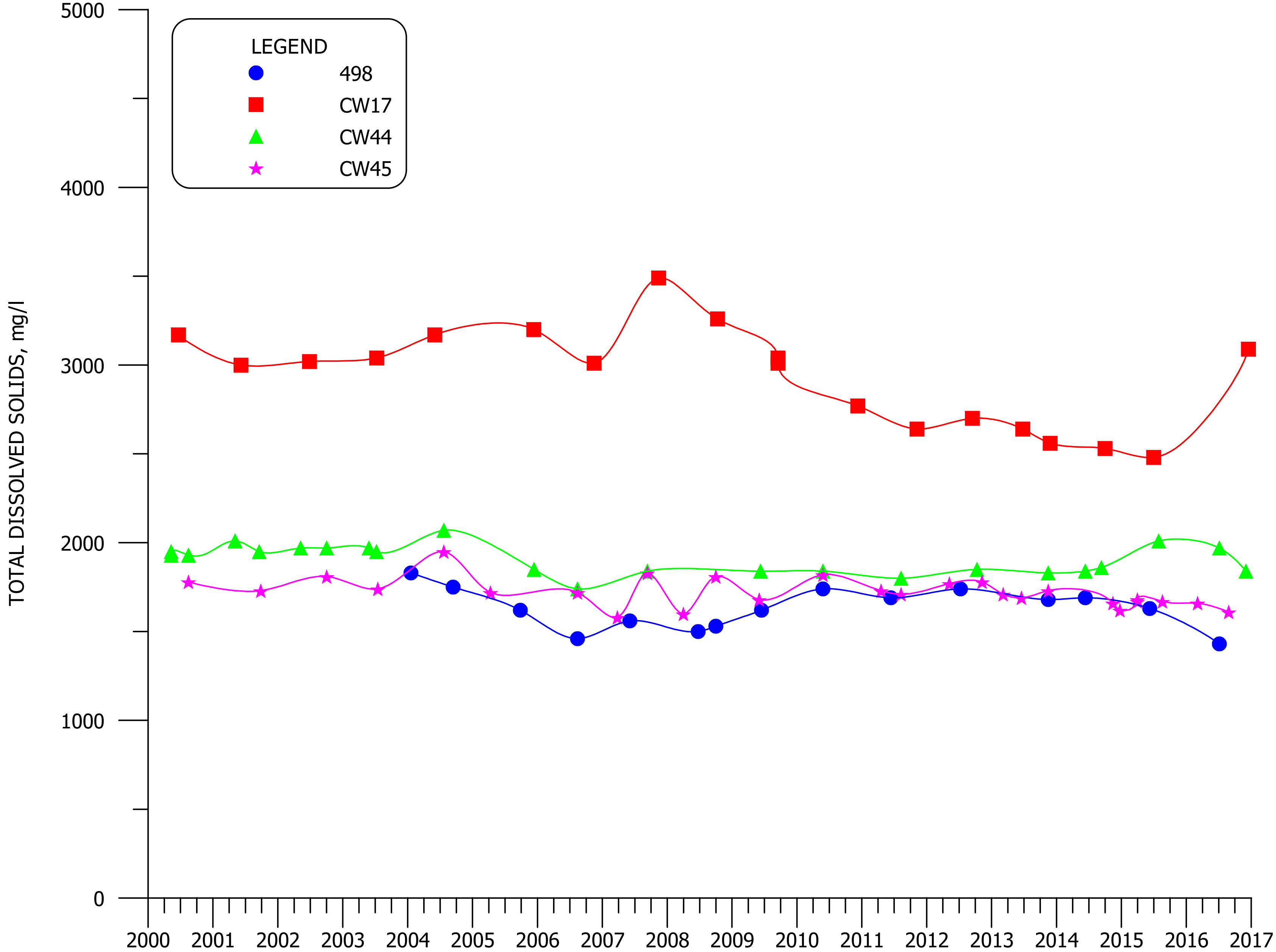


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW44 AND CW45

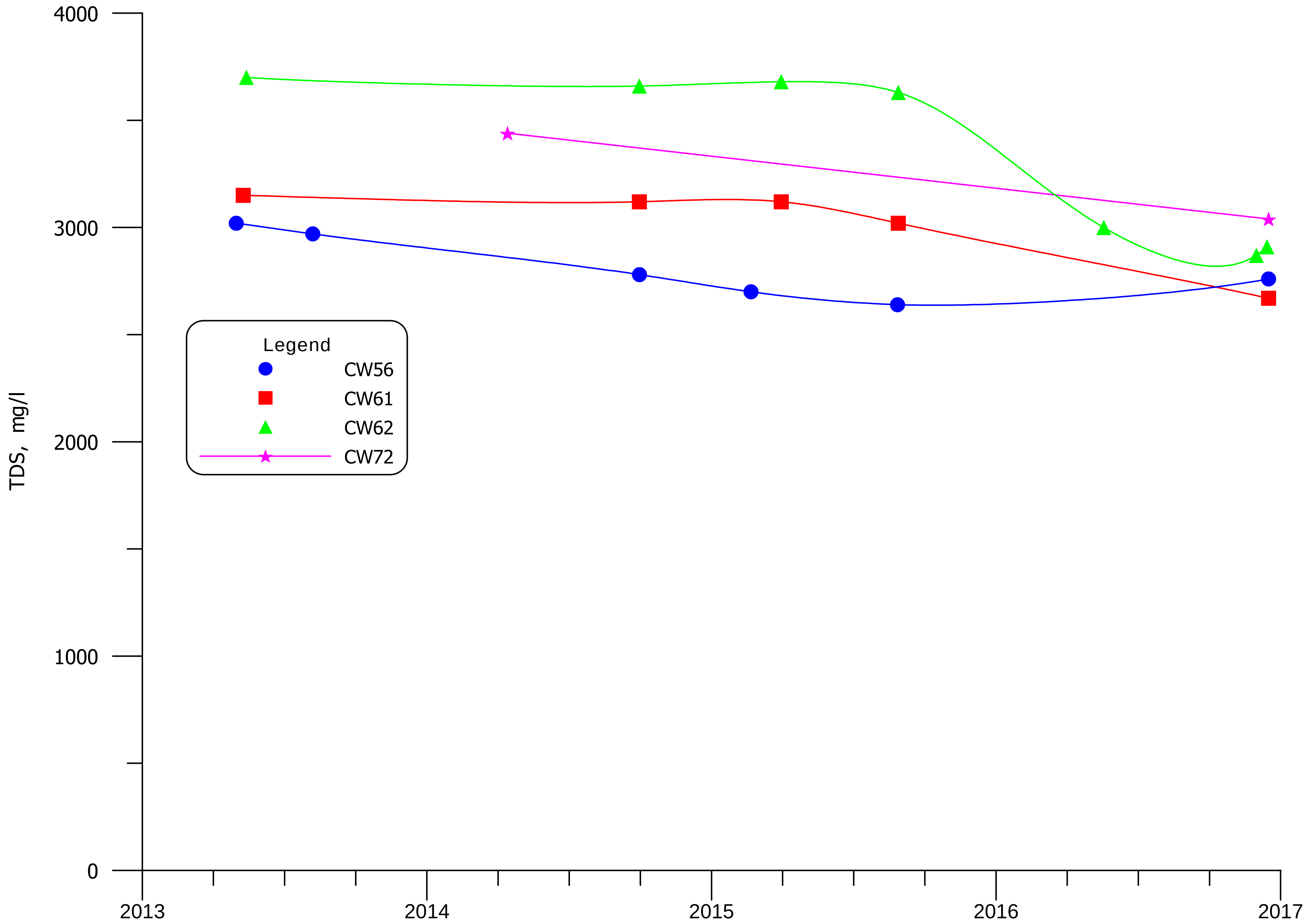


FIGURE 6.3-6A. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

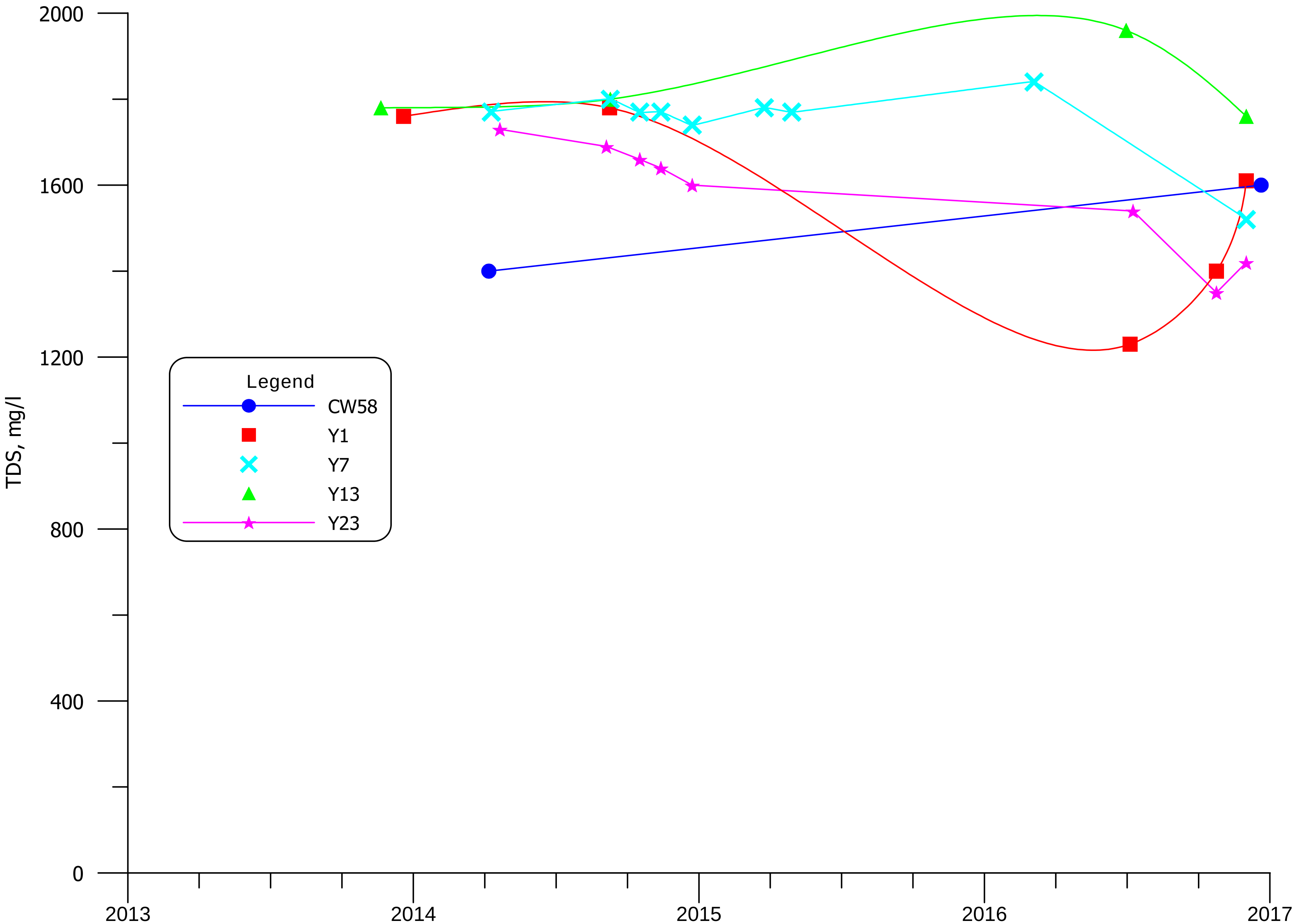


FIGURE 6.3-6B. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

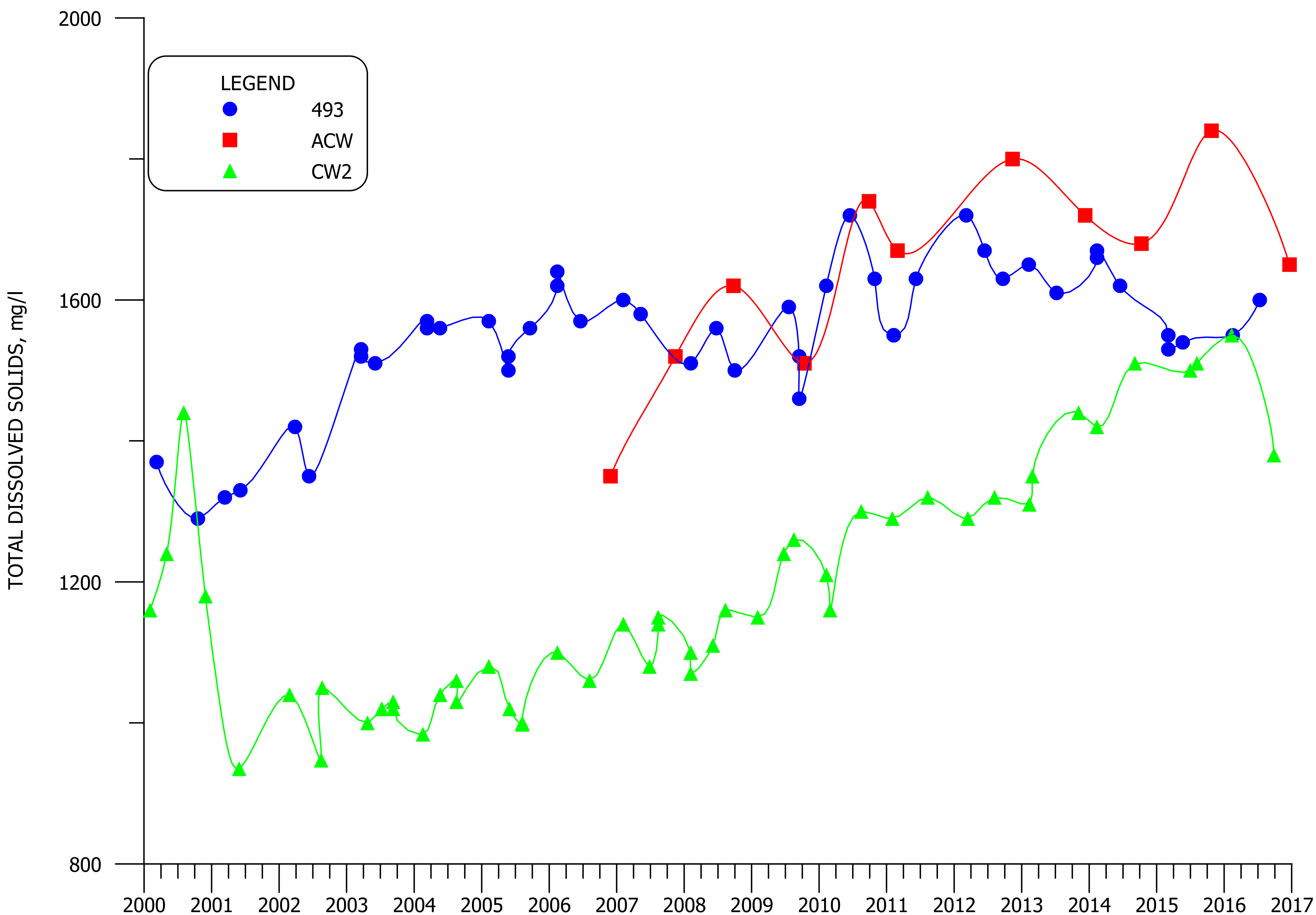
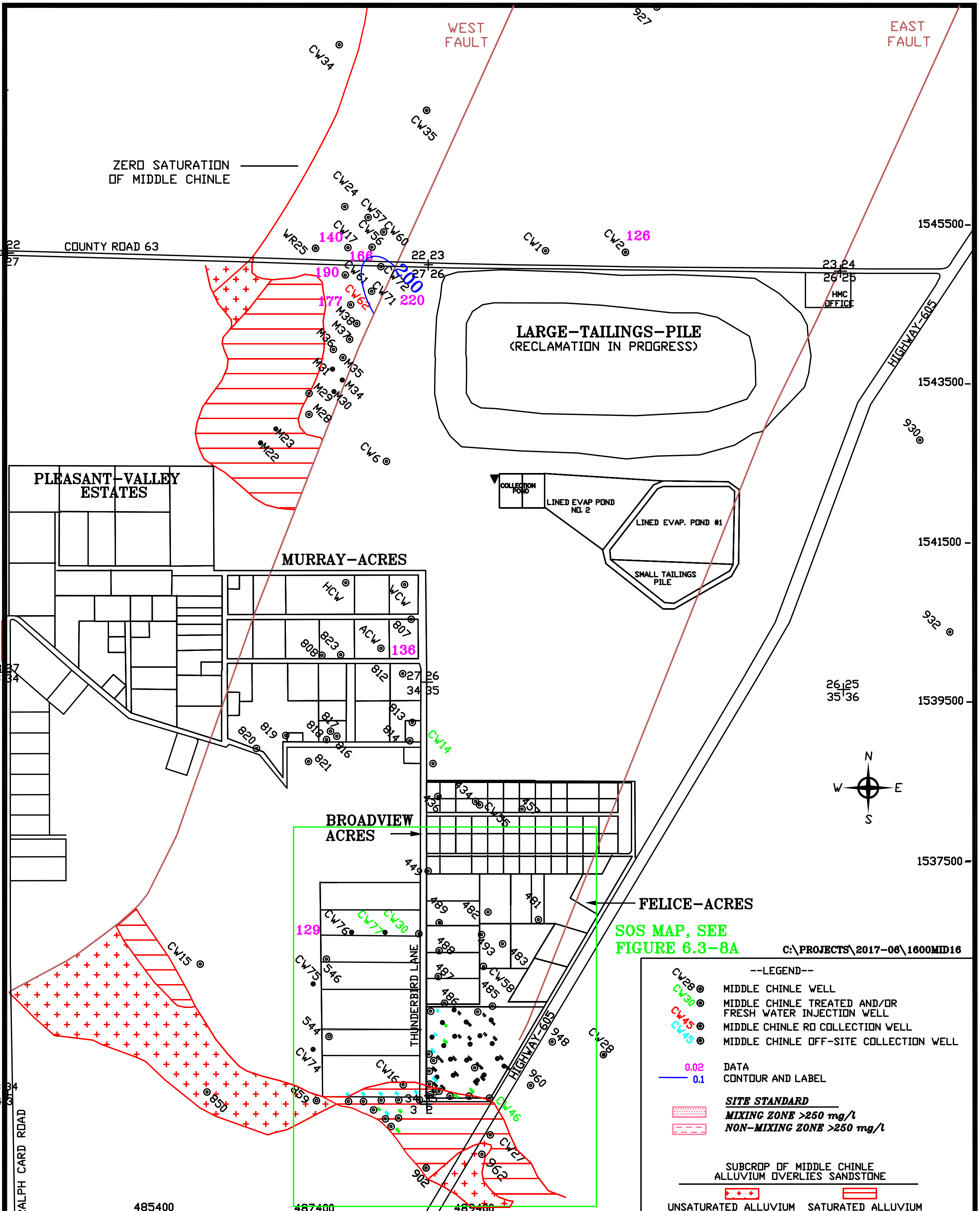


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2

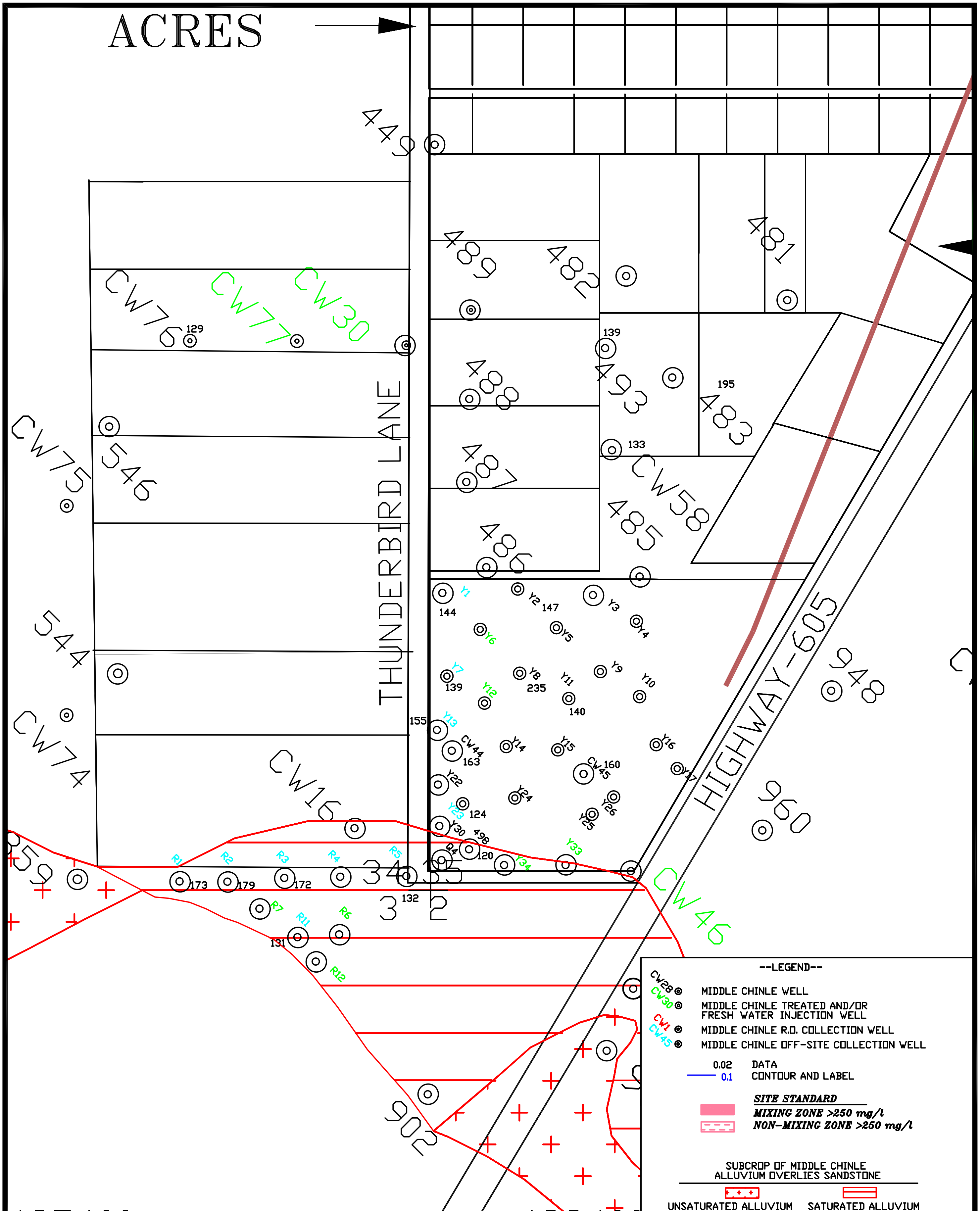


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/6/2017

SCALE: 1"=1600'

FIGURE 6.3-8. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l



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

FIGURE 6.3-8A. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, SOS, mg/l

DATE: 2/6/2017

SCALE: 1"=500'

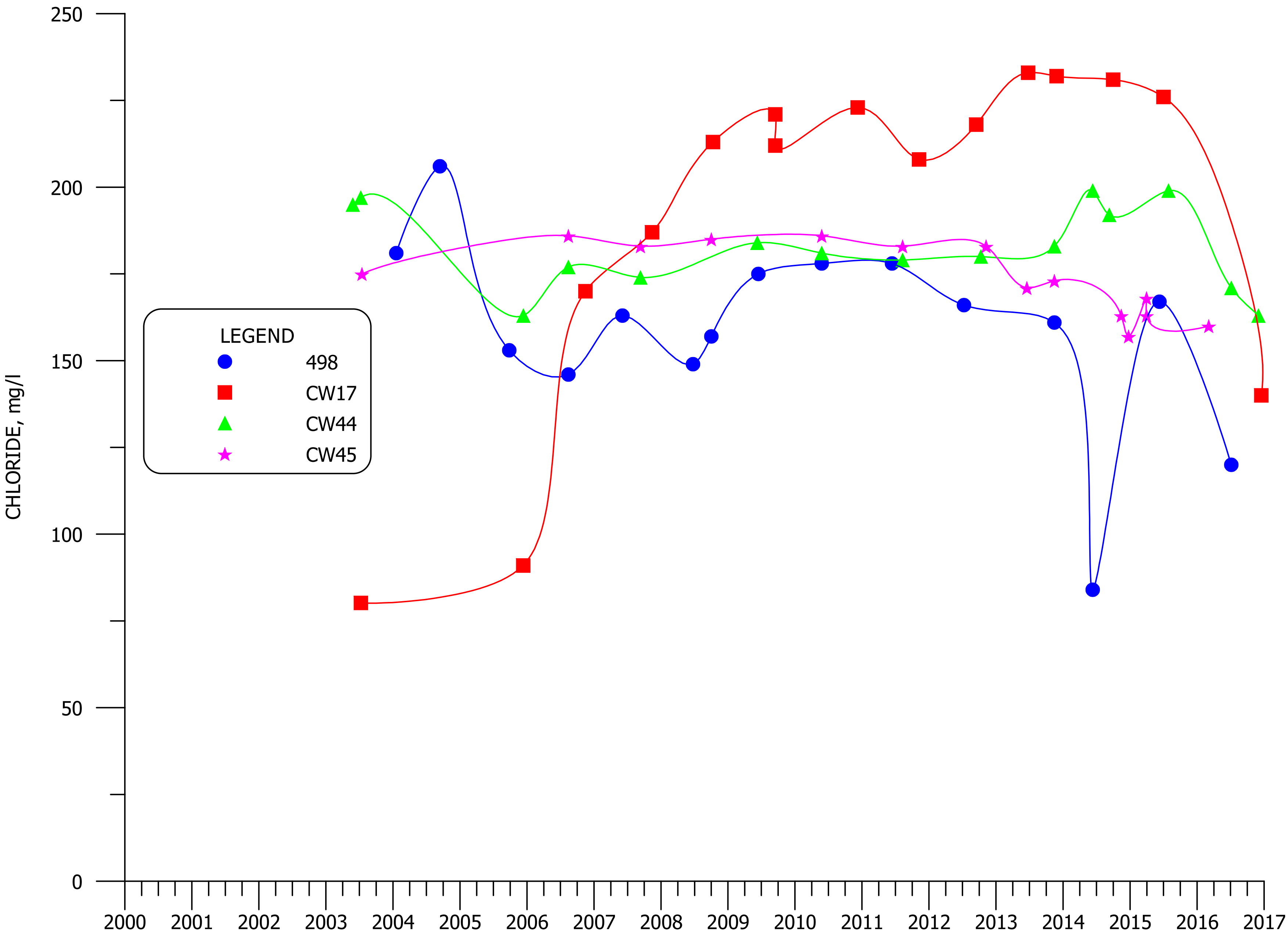


FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW44, CW45, AND CW62

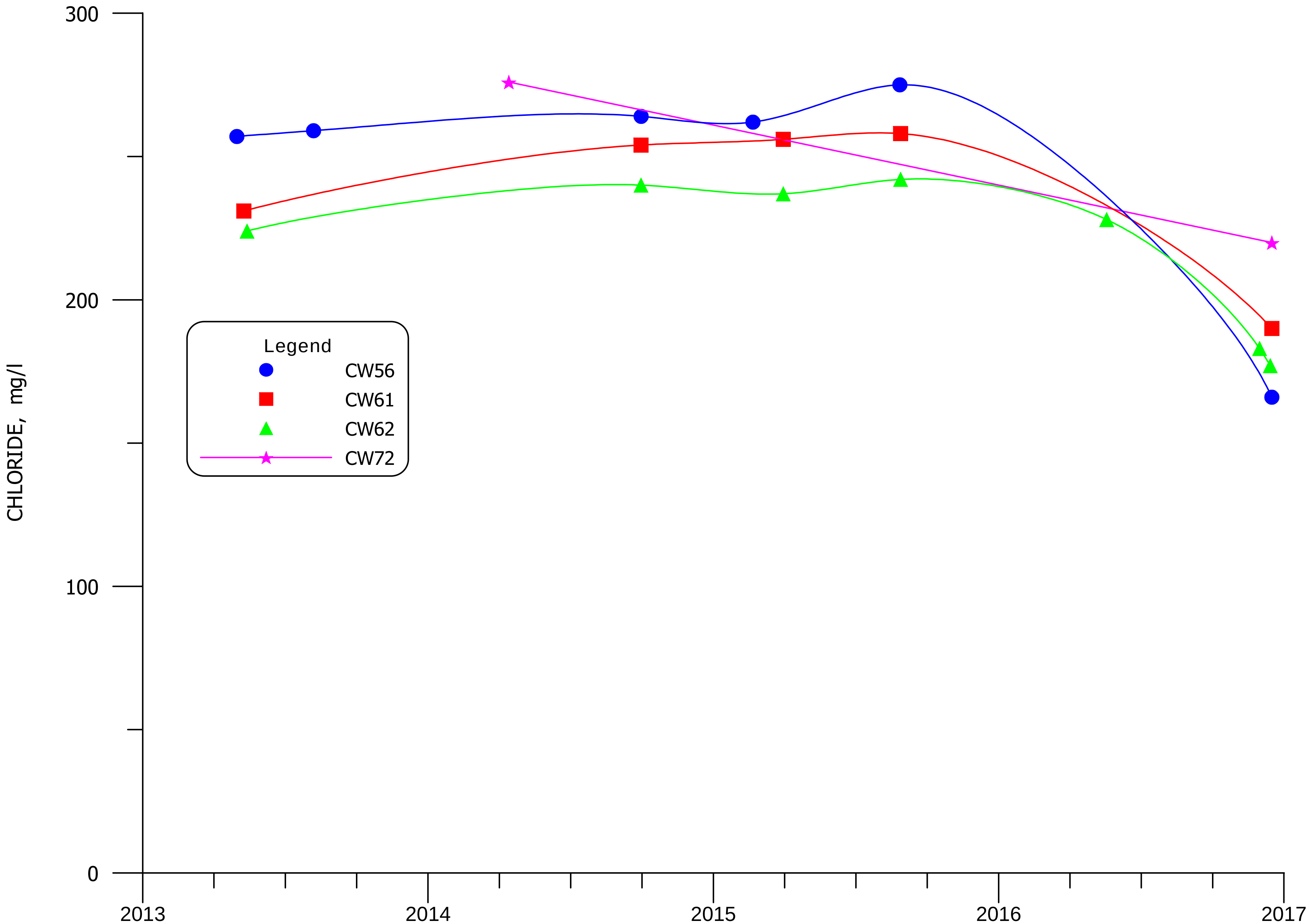


FIGURE 6.3-9A. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

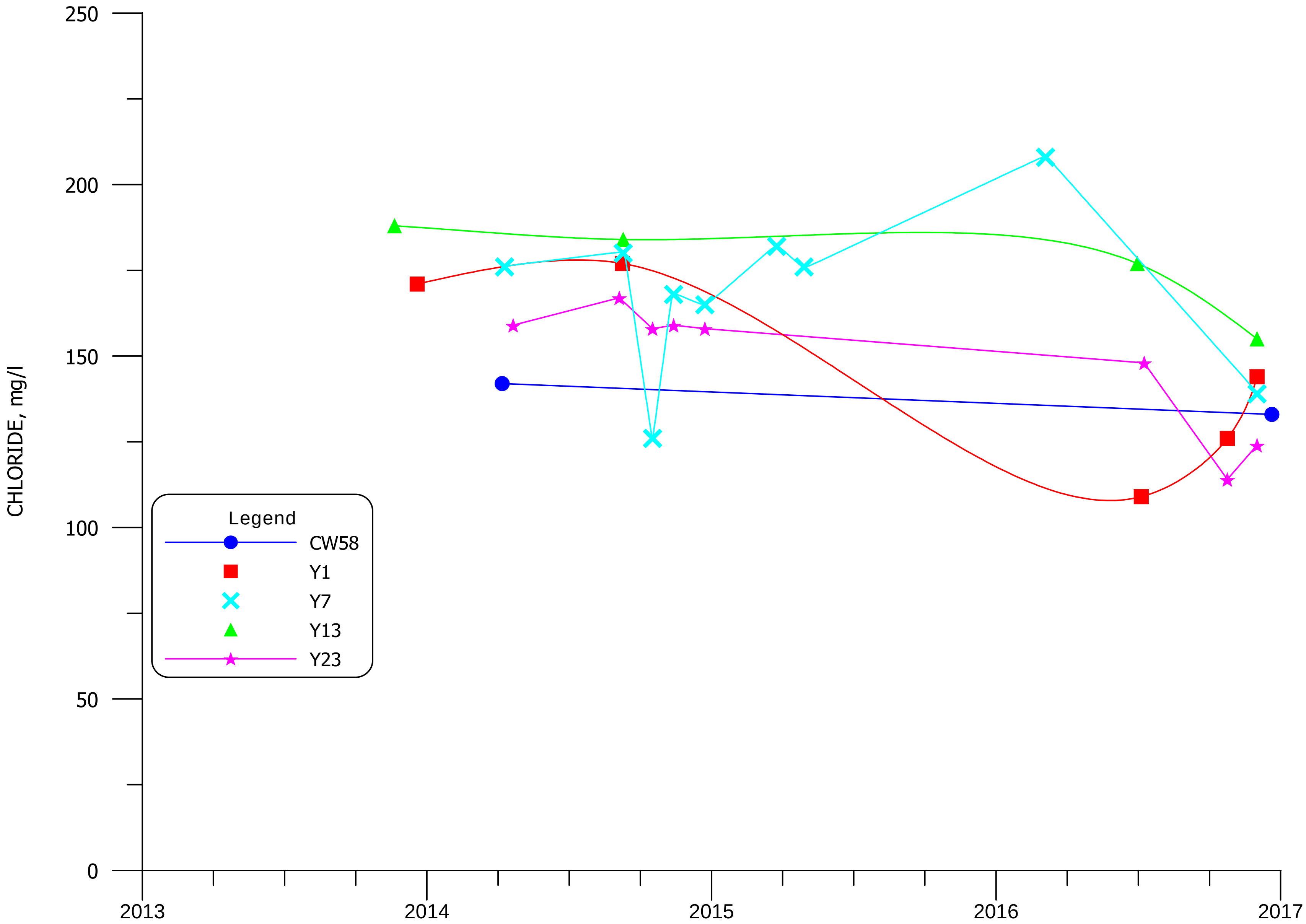


FIGURE 6.3-9B. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

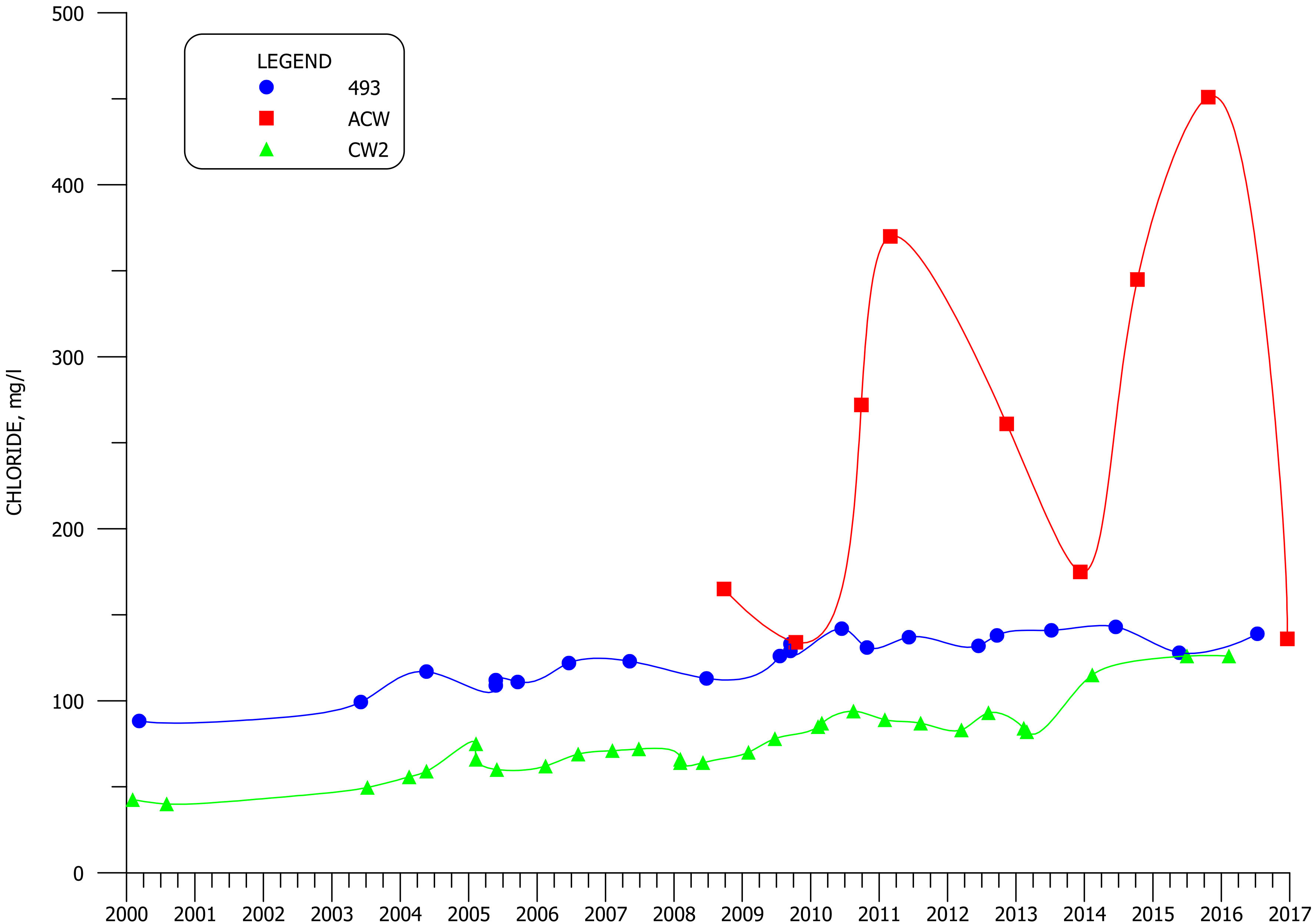
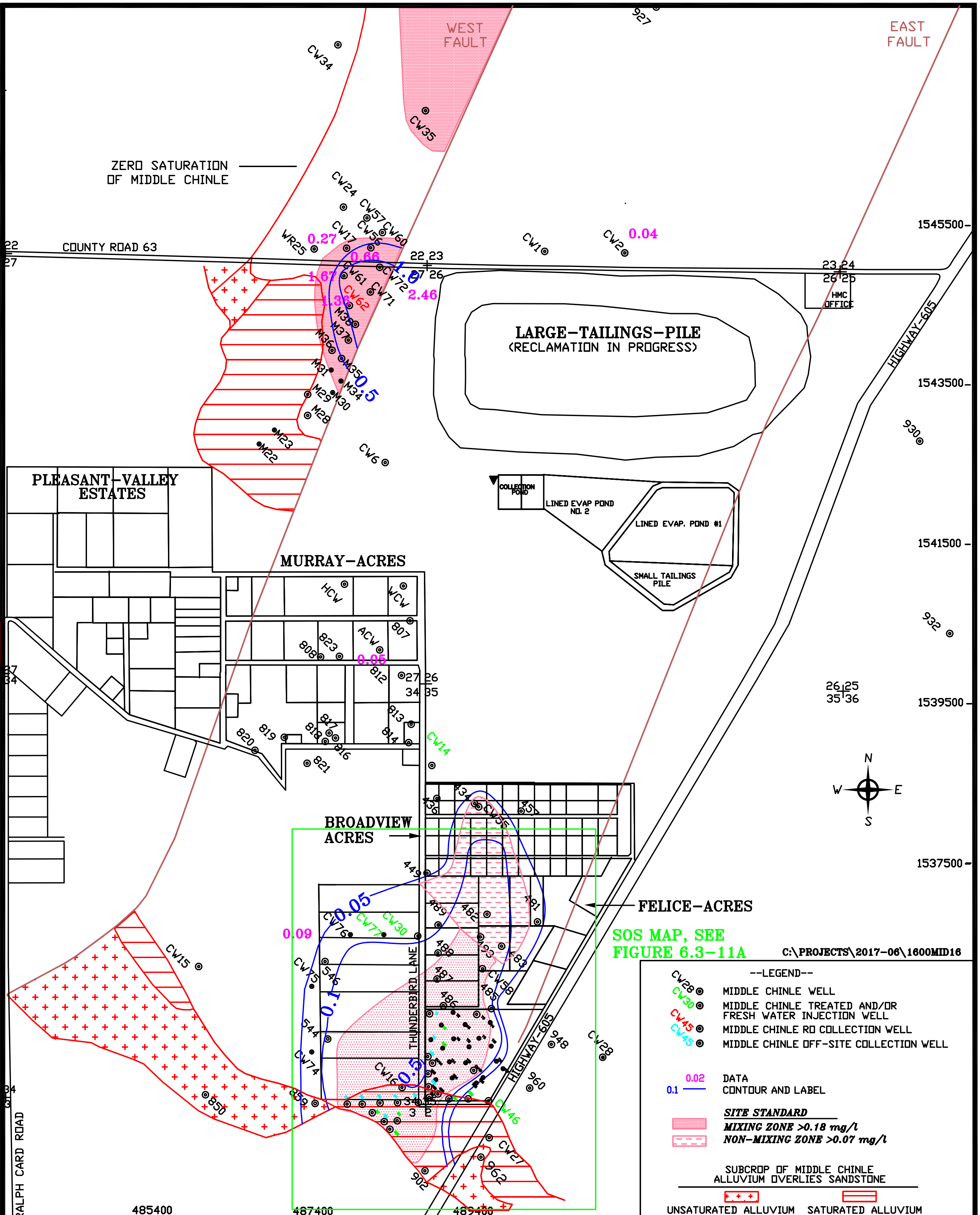


FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2

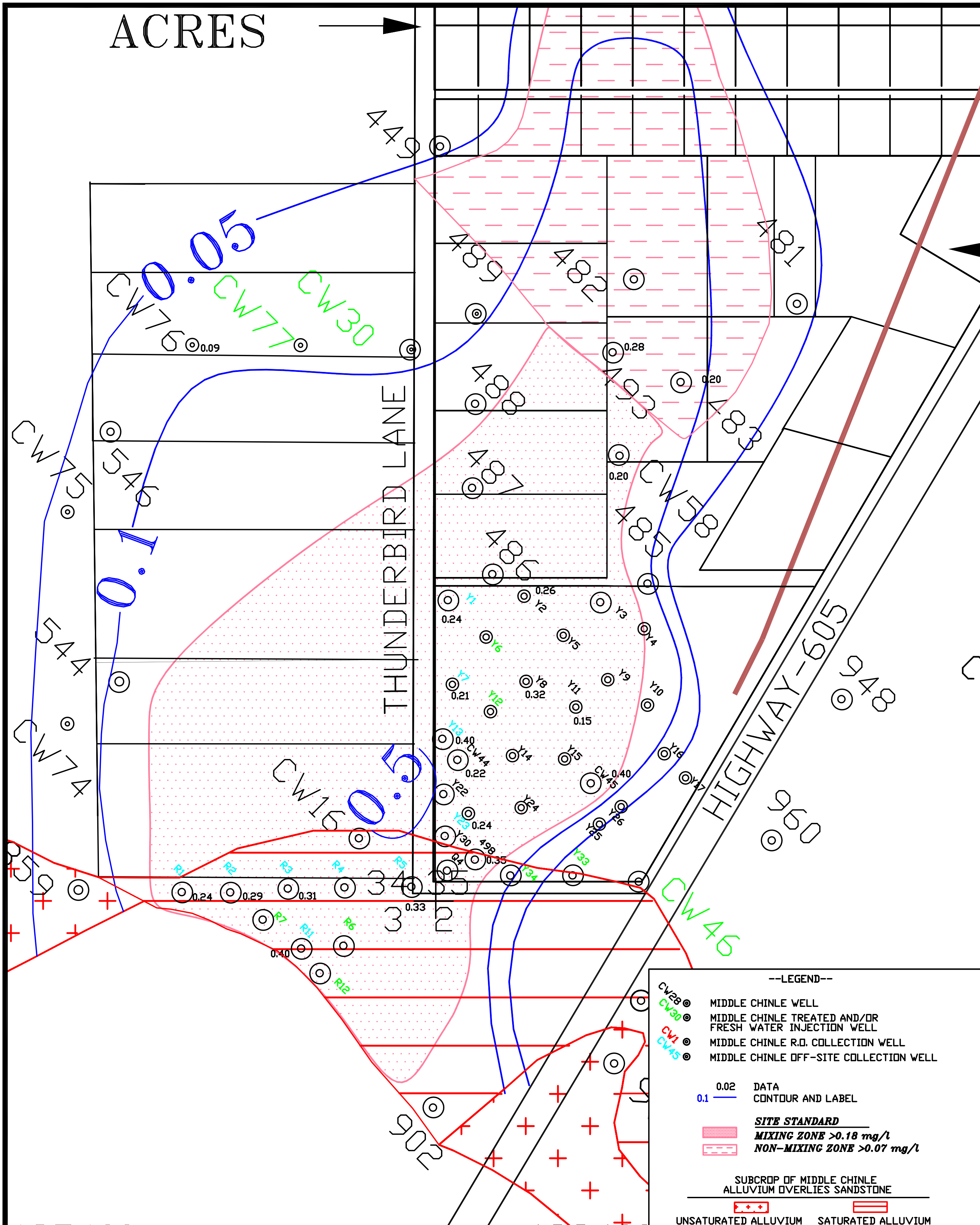


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-11. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l

DATE: 2/6/2017

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, 2016, mg/l

DATE: 2/6/2017

SCALE: 1"=500'

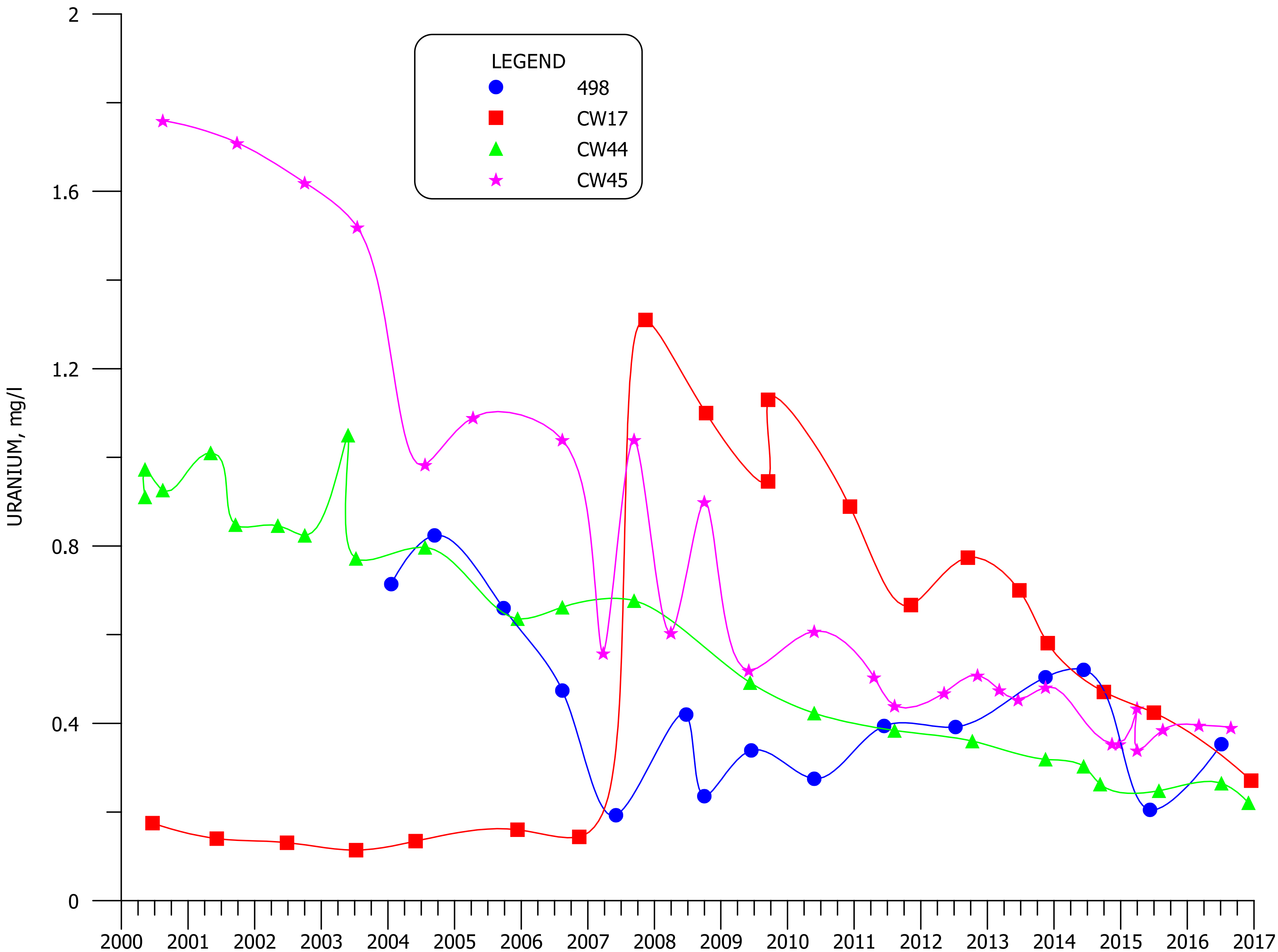


FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW44 AND CW45

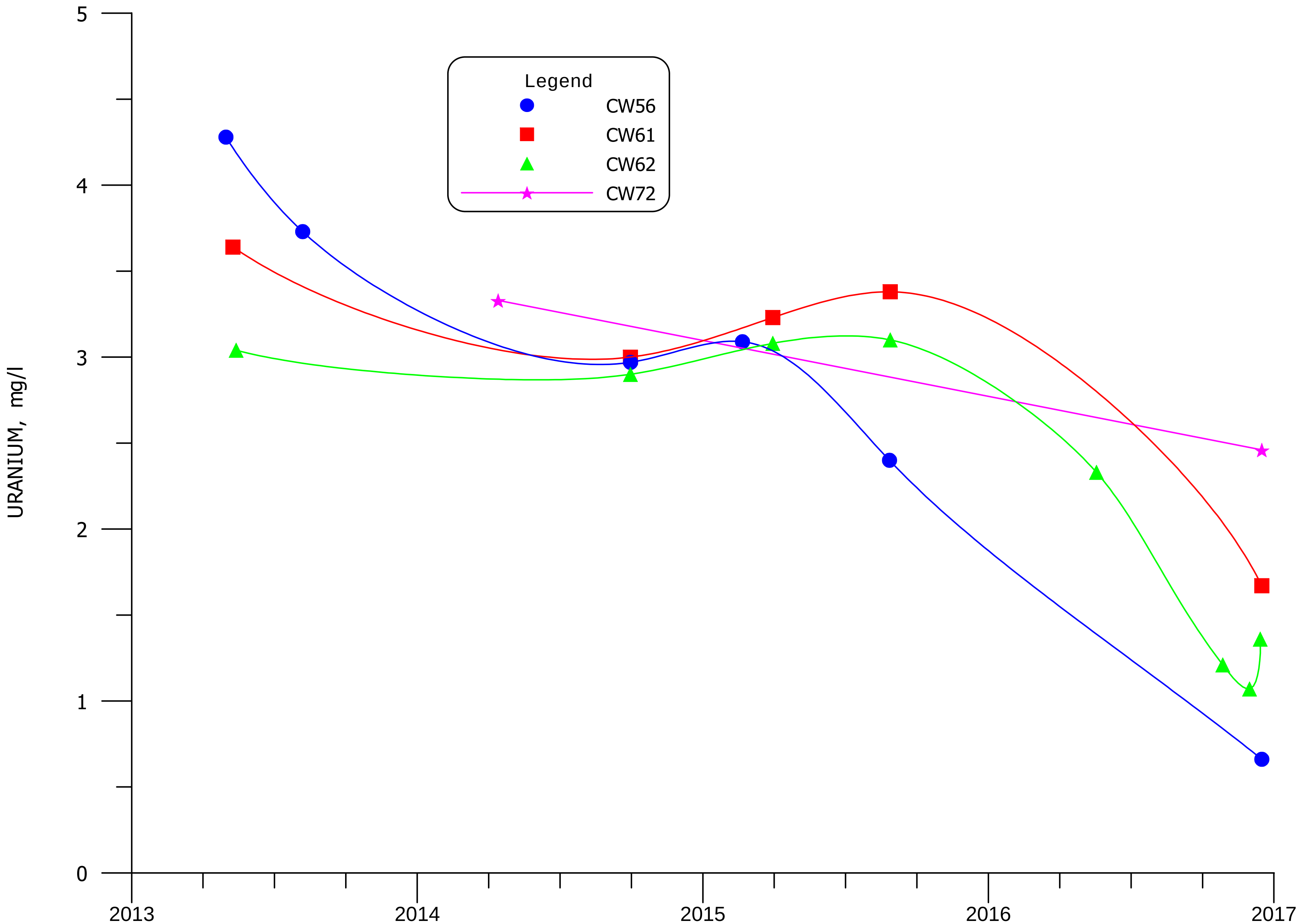


FIGURE 6.3-12A. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

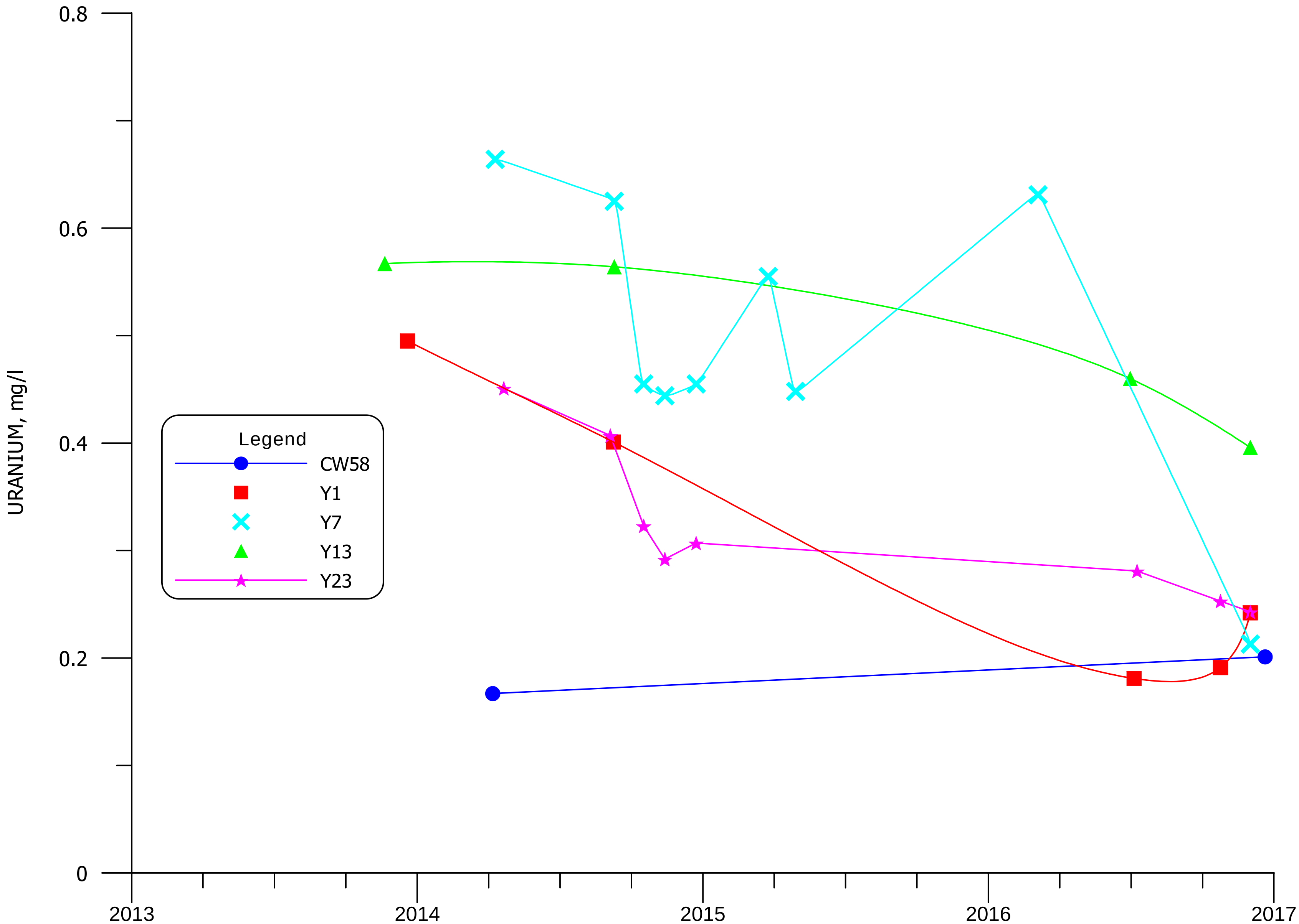


FIGURE 6.3-12B. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

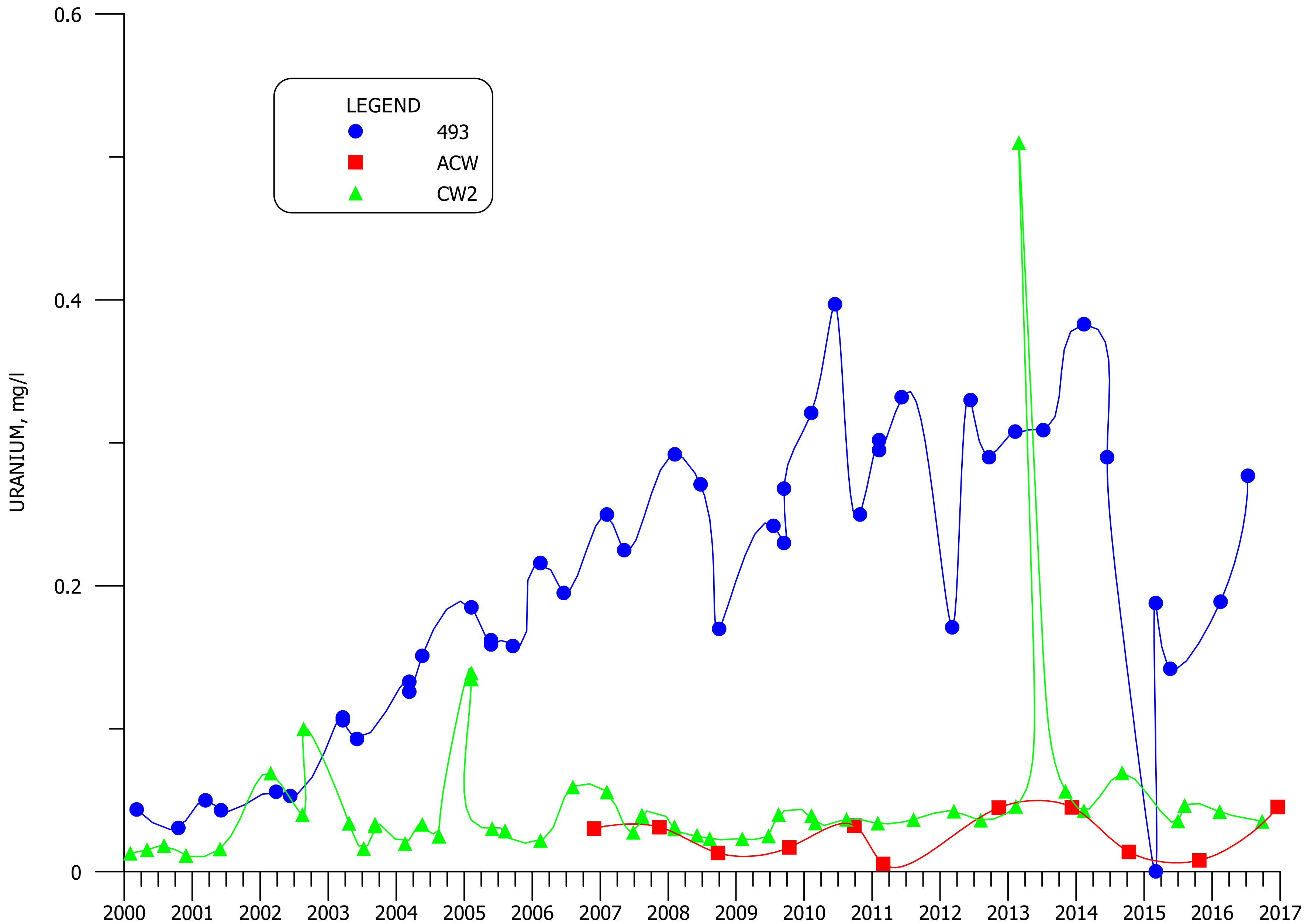
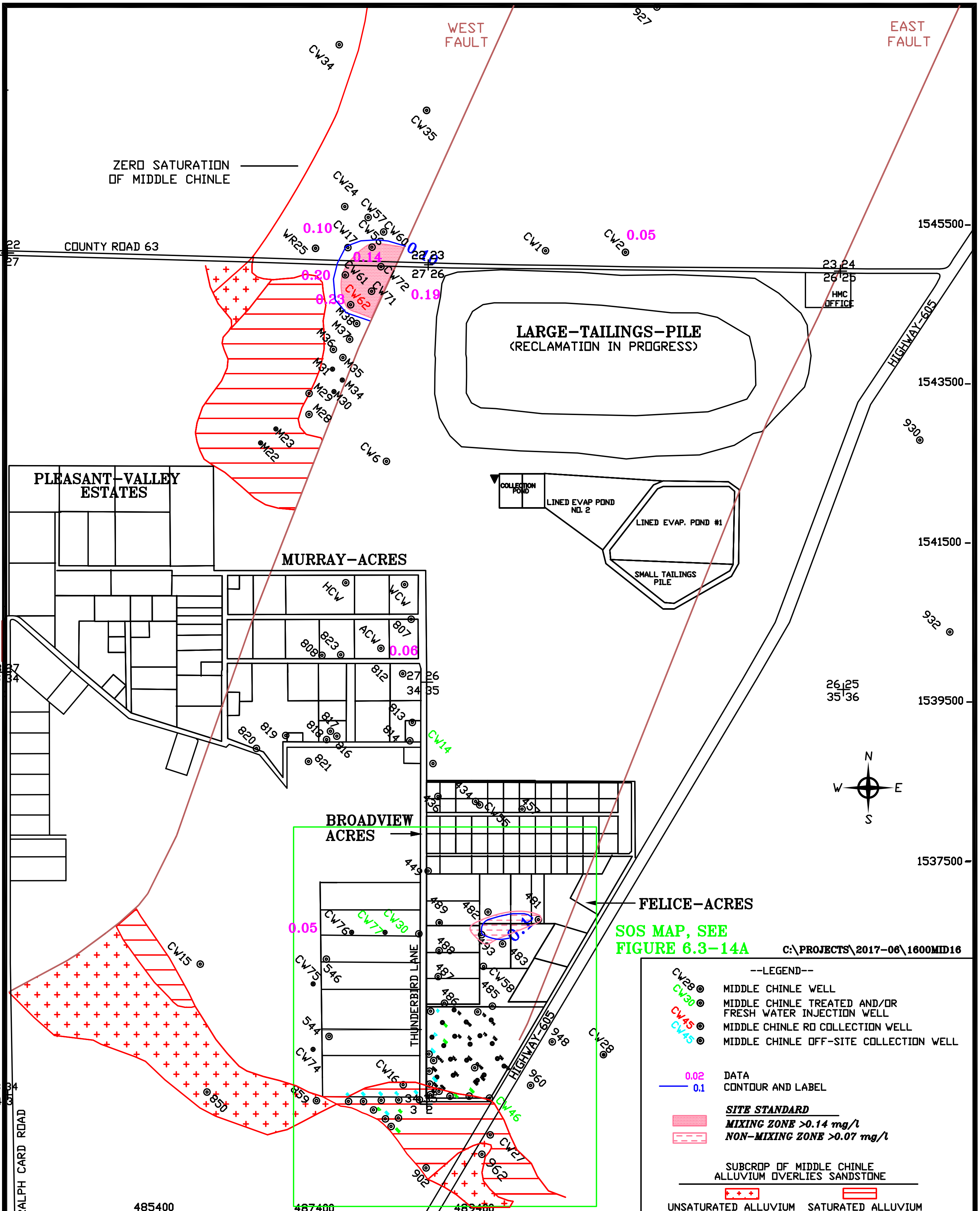


FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2

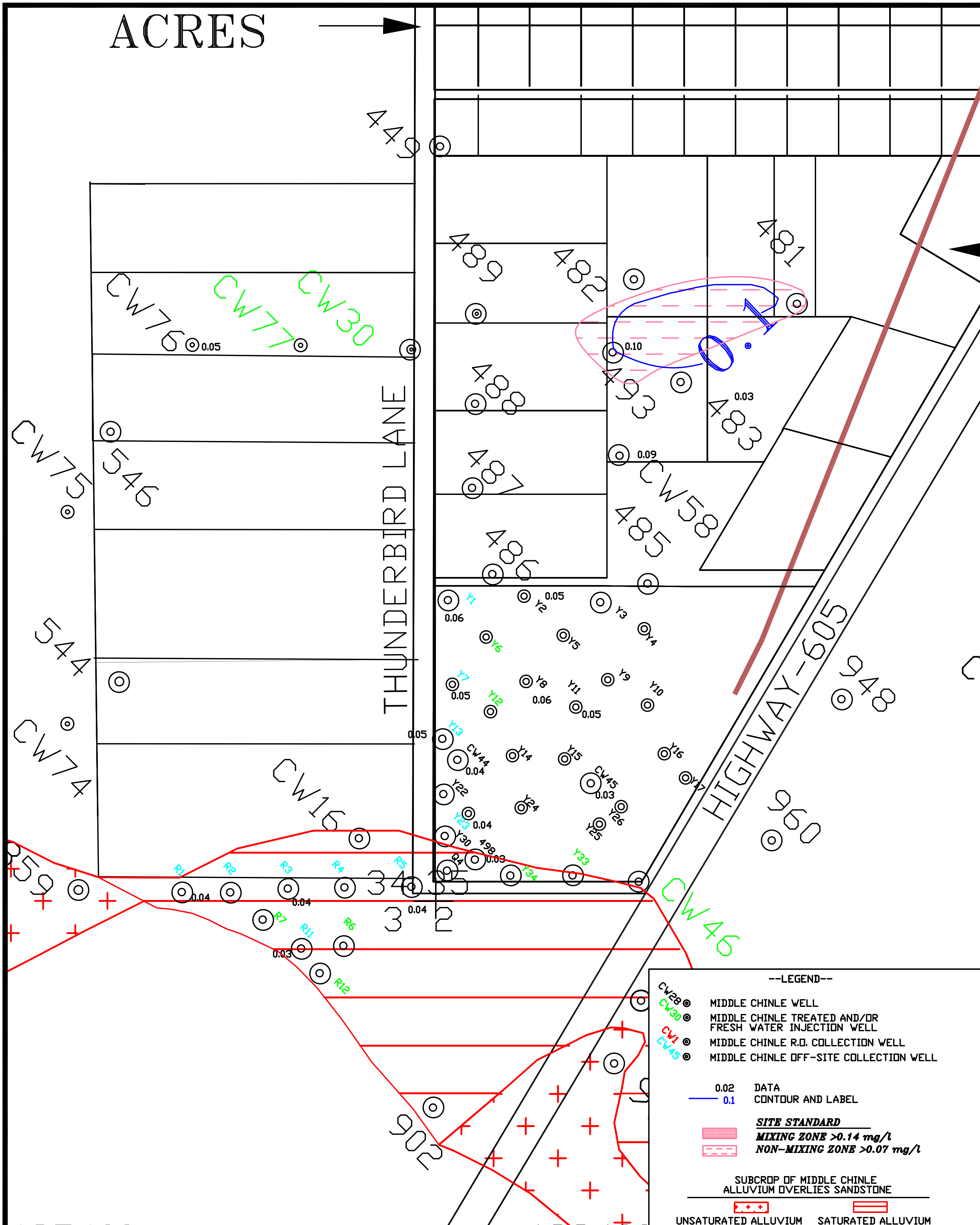


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/6/2017

FIGURE 6.3-14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l

SCALE: 1"=1600'



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

FIGURE 6.3-14A. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2016, mg/l

DATE: 2/6/2017

SCALE: 1"=500'

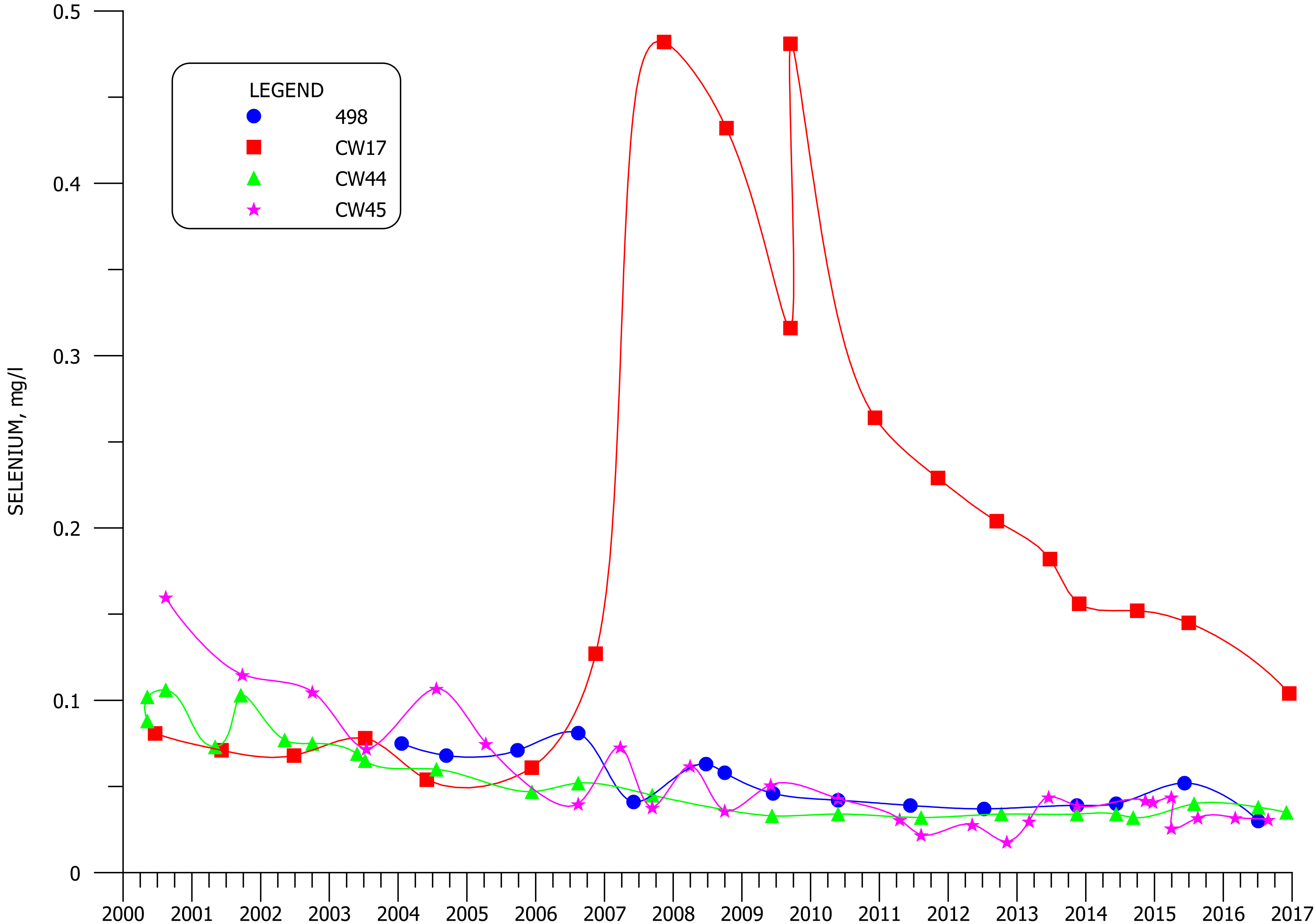


FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW44 AND CW45

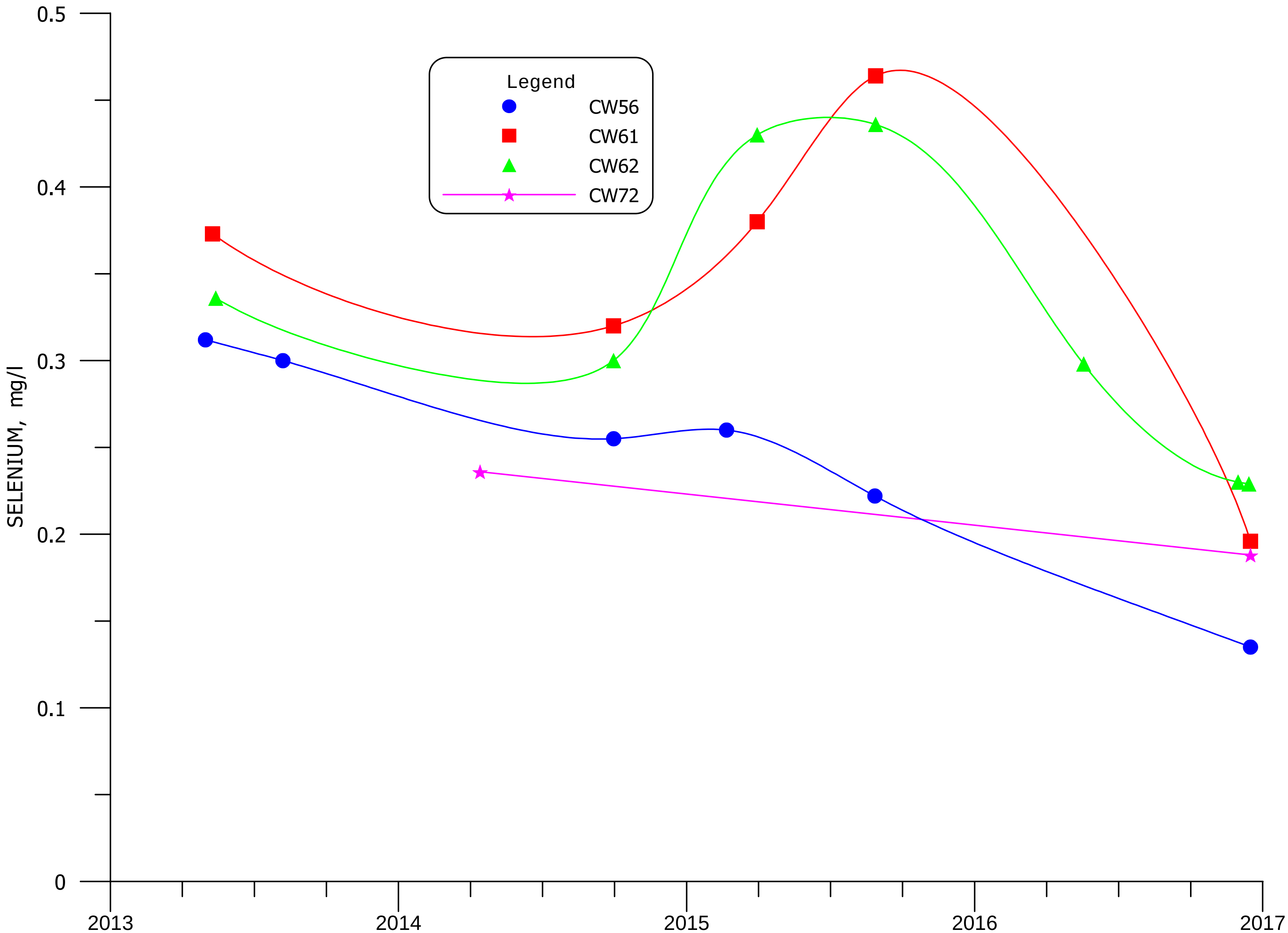


FIGURE 6.3-15A. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

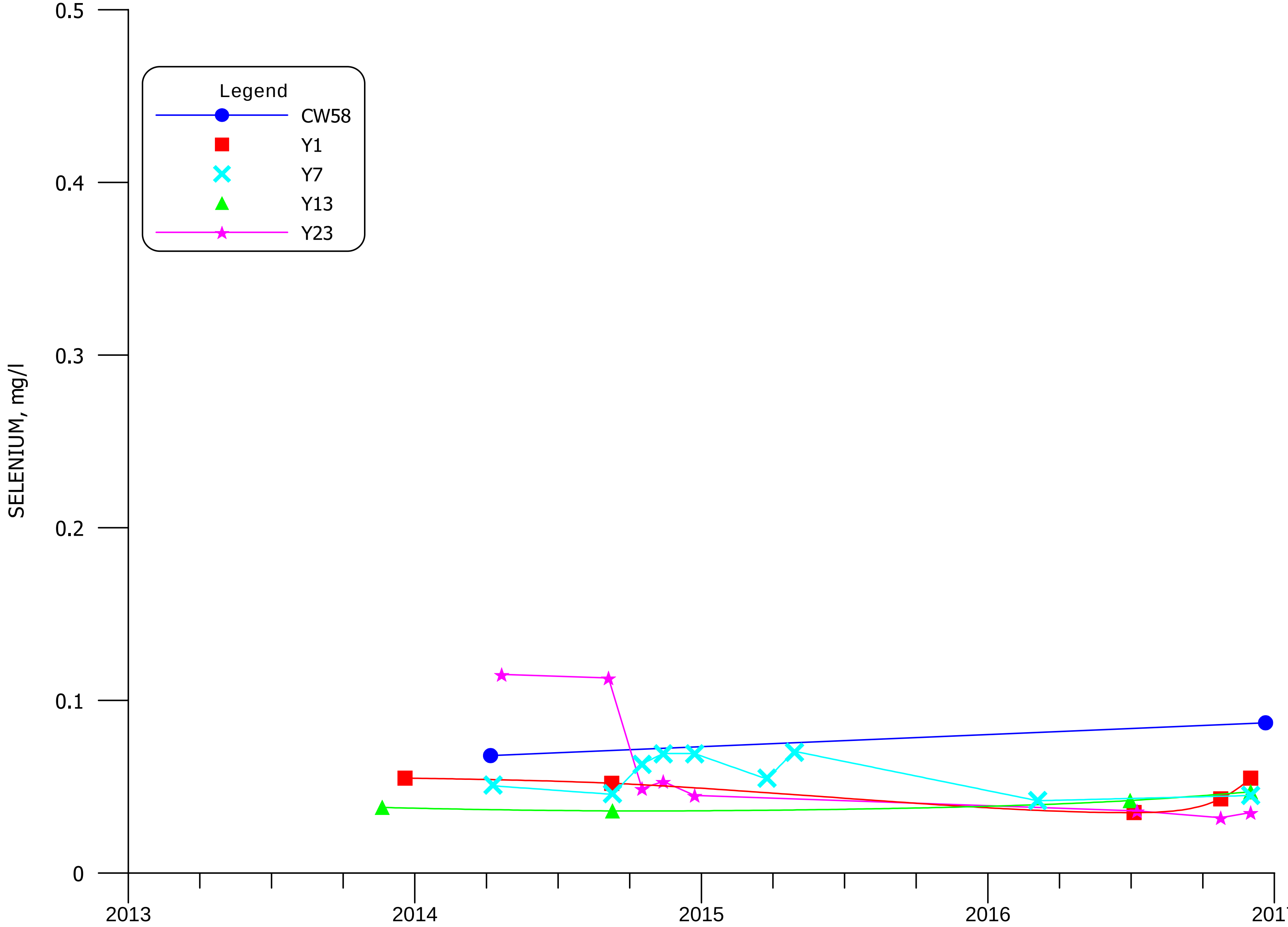


FIGURE 6.3-15B. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

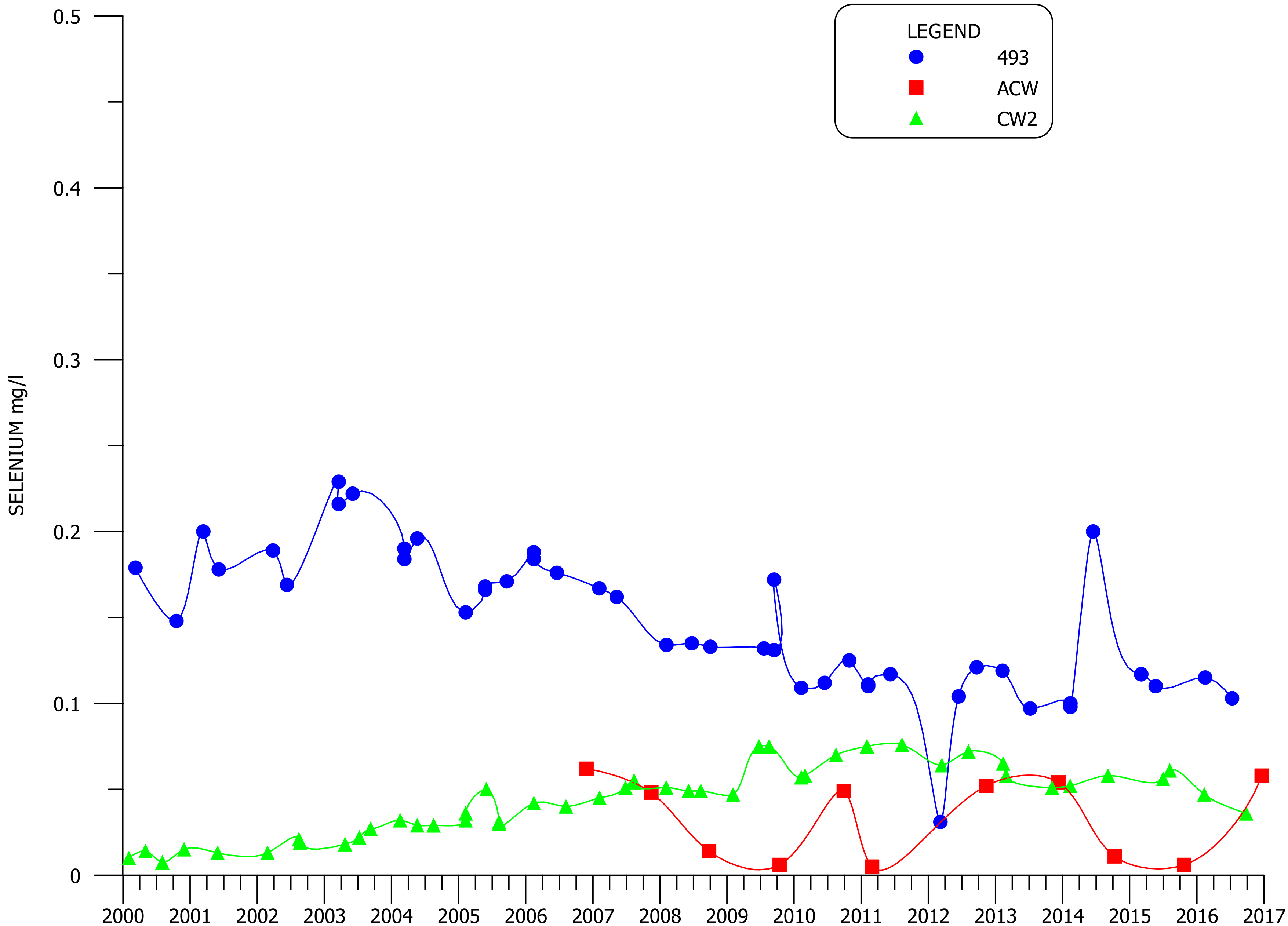
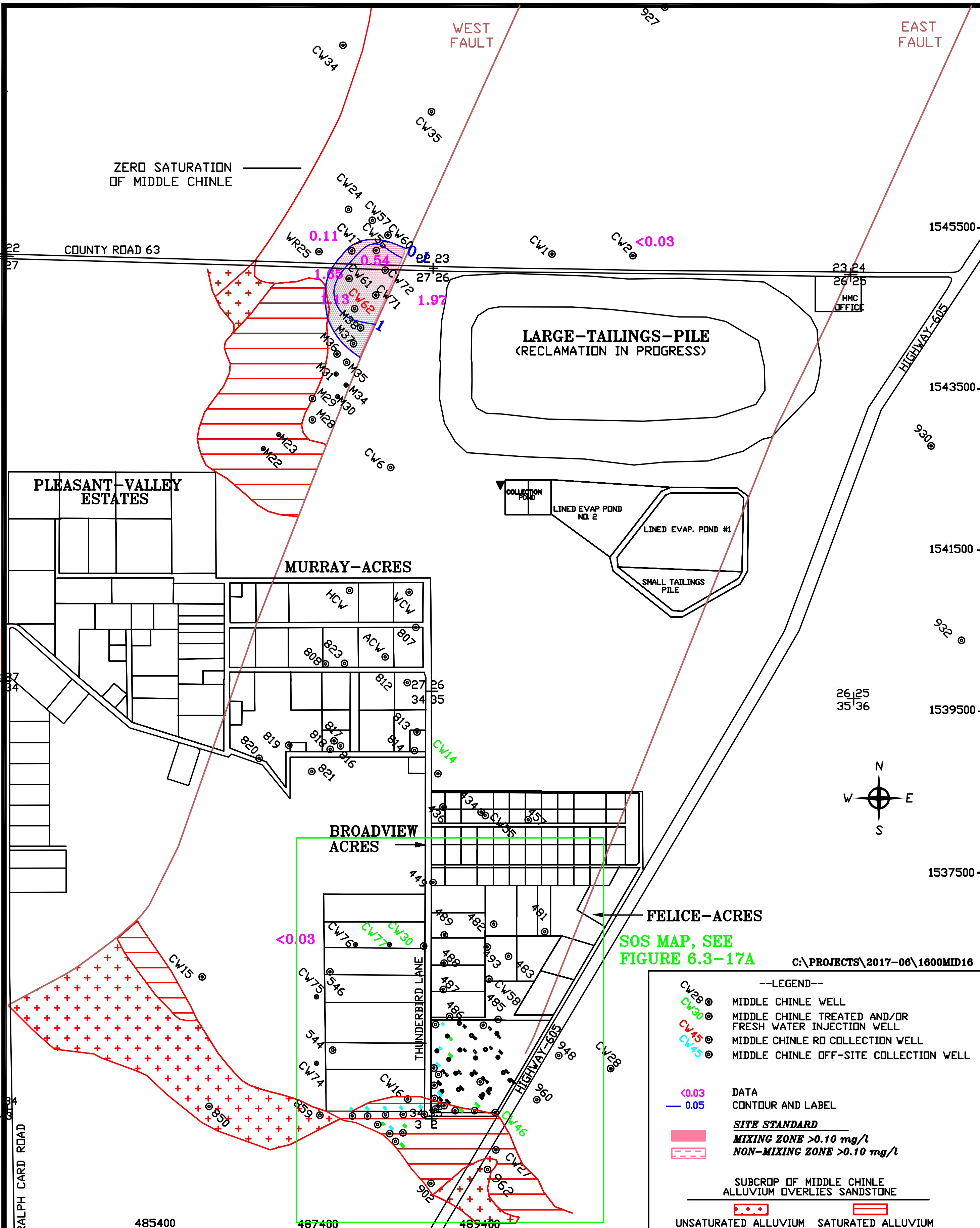


FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2

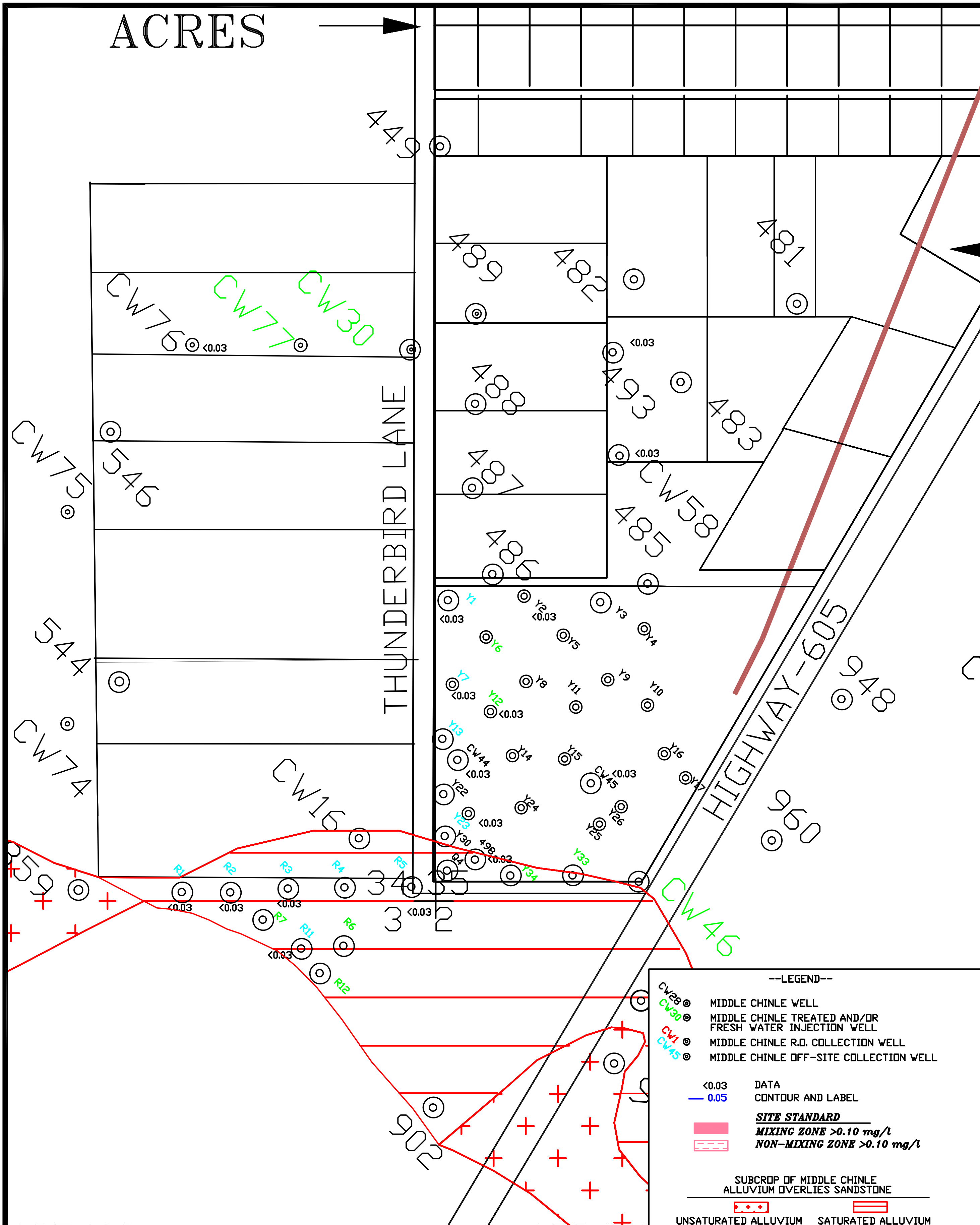


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

FIGURE 6.3–17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l

DATE: 2/6/2017

SCALE: 1"=1600'



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

FIGURE 6.3-17A. MOLYBDENUM OF THE MIDDLE CHINLE AQUIFER, SOS, 2016, mg/l

DATE: 2/6/2017

SCALE: 1"=500'

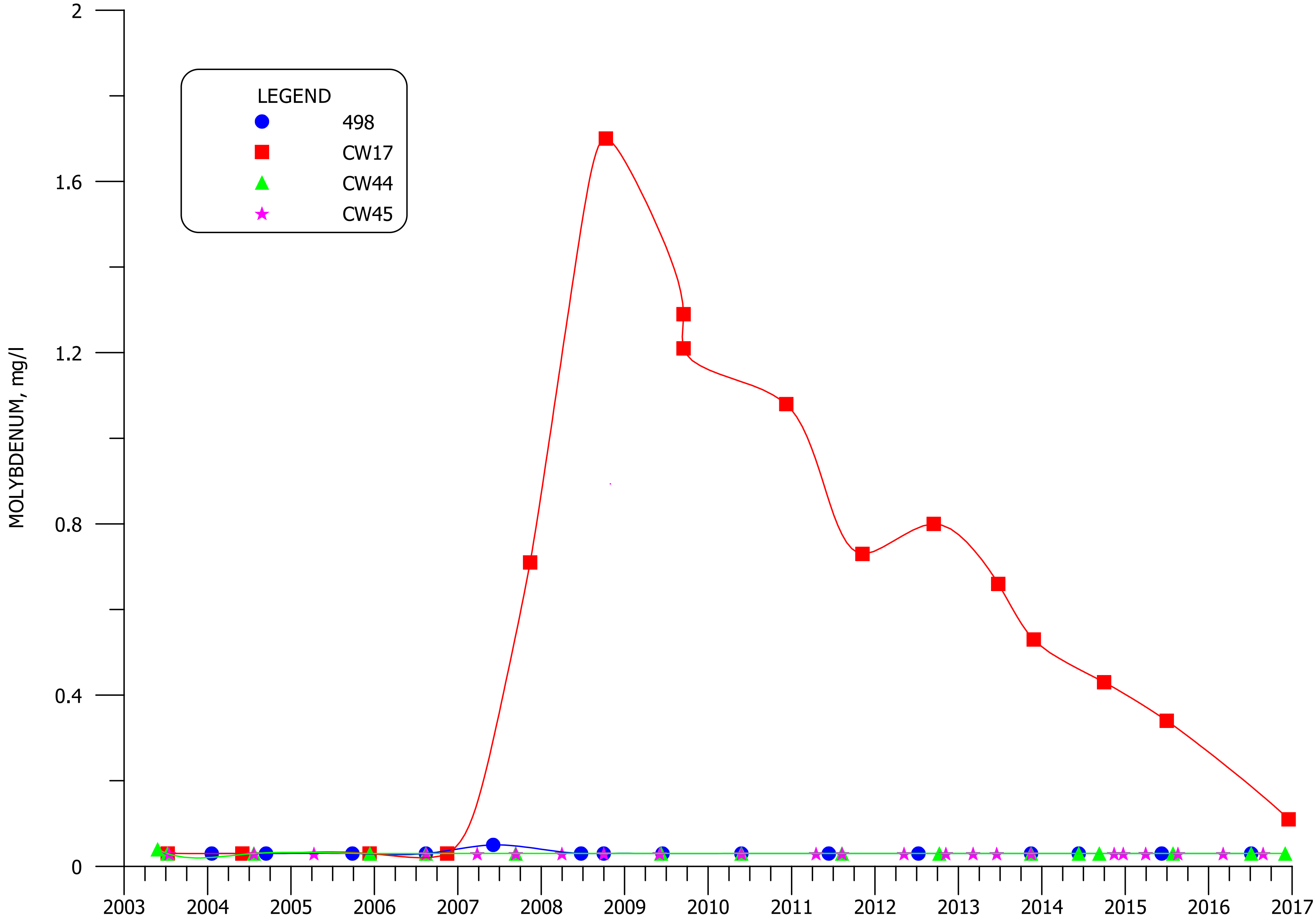


FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW44 AND CW45

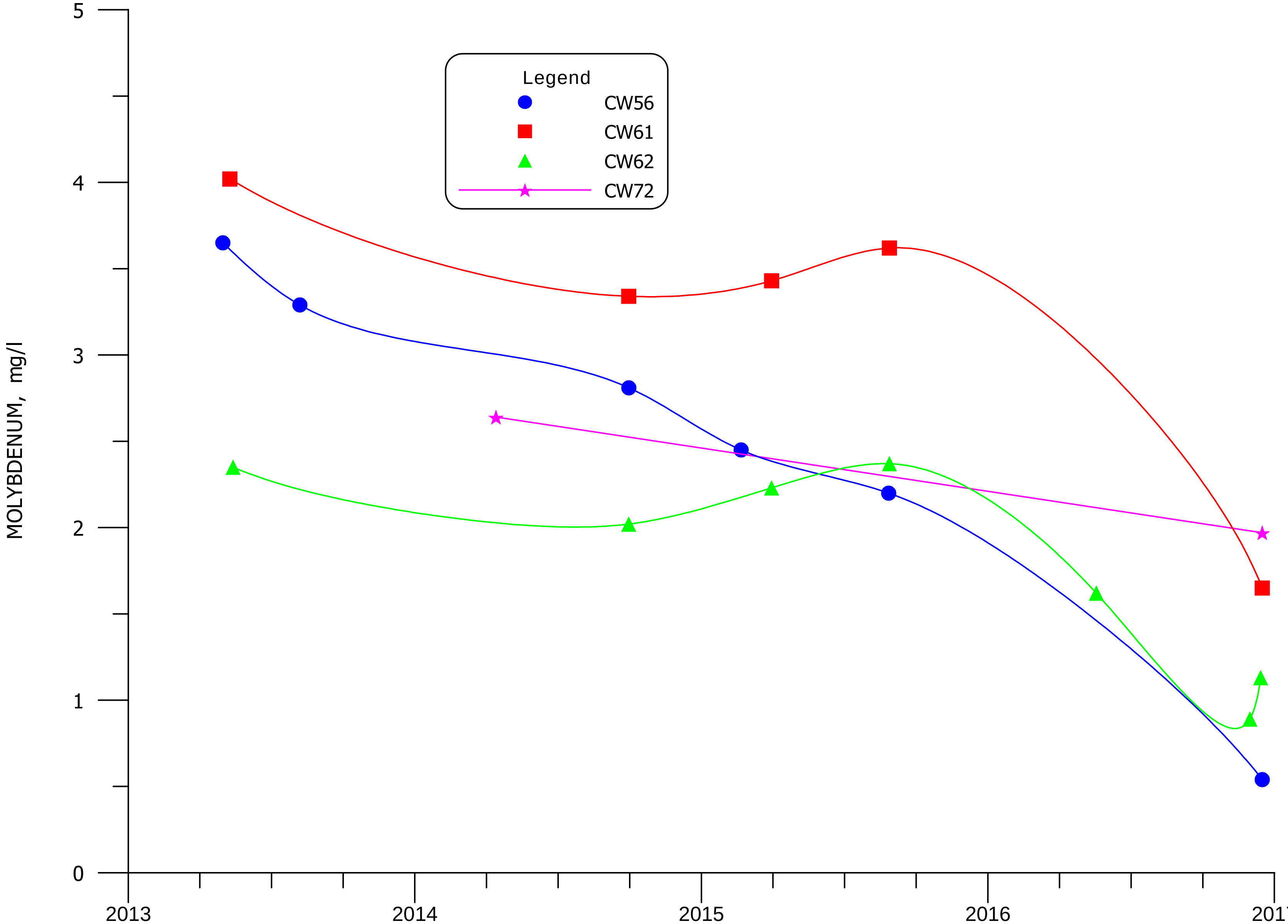


FIGURE 6.3-18A. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW61, CW62 AND CW72

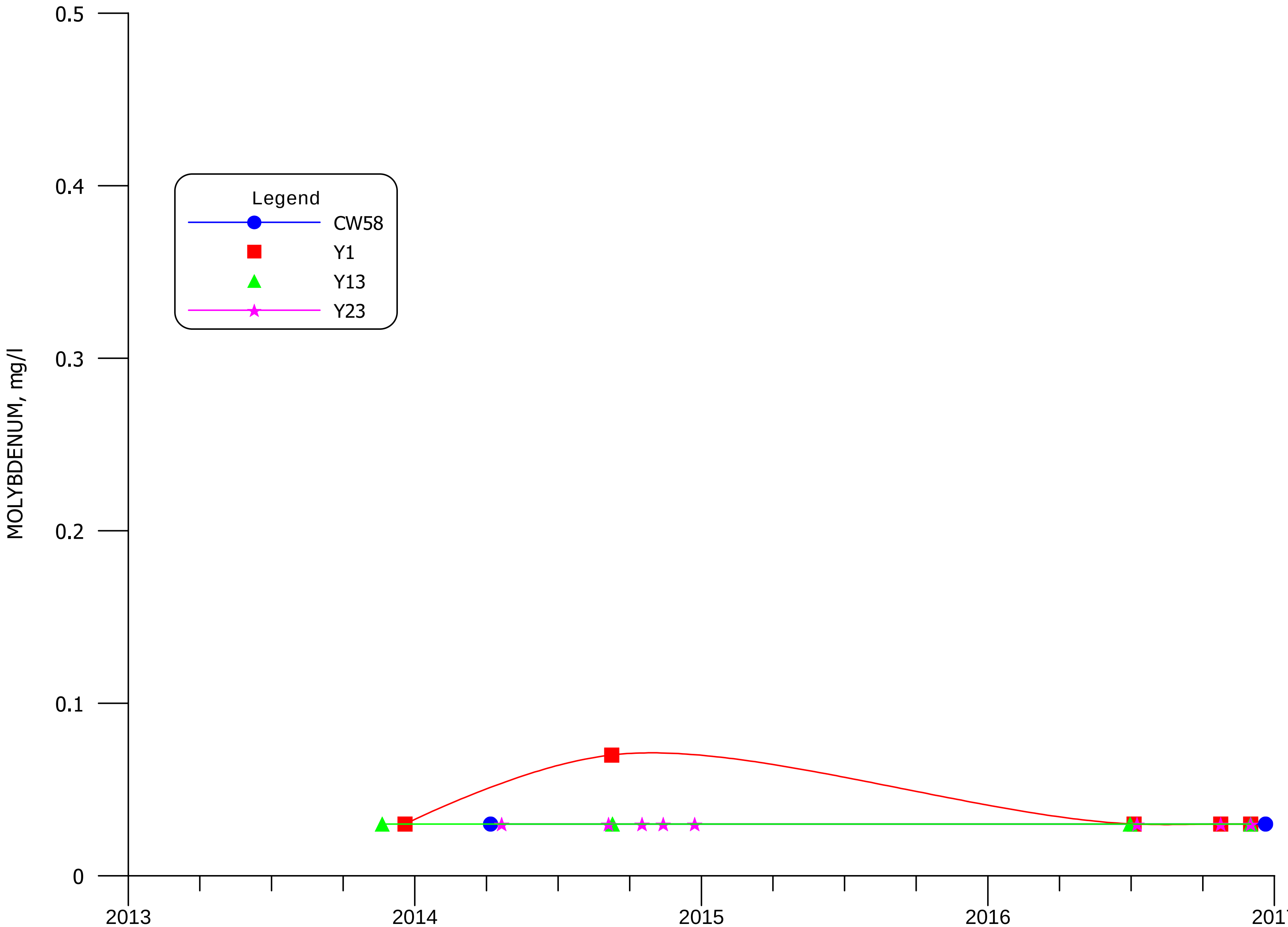


FIGURE 6.3-18B. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y13 AND Y23

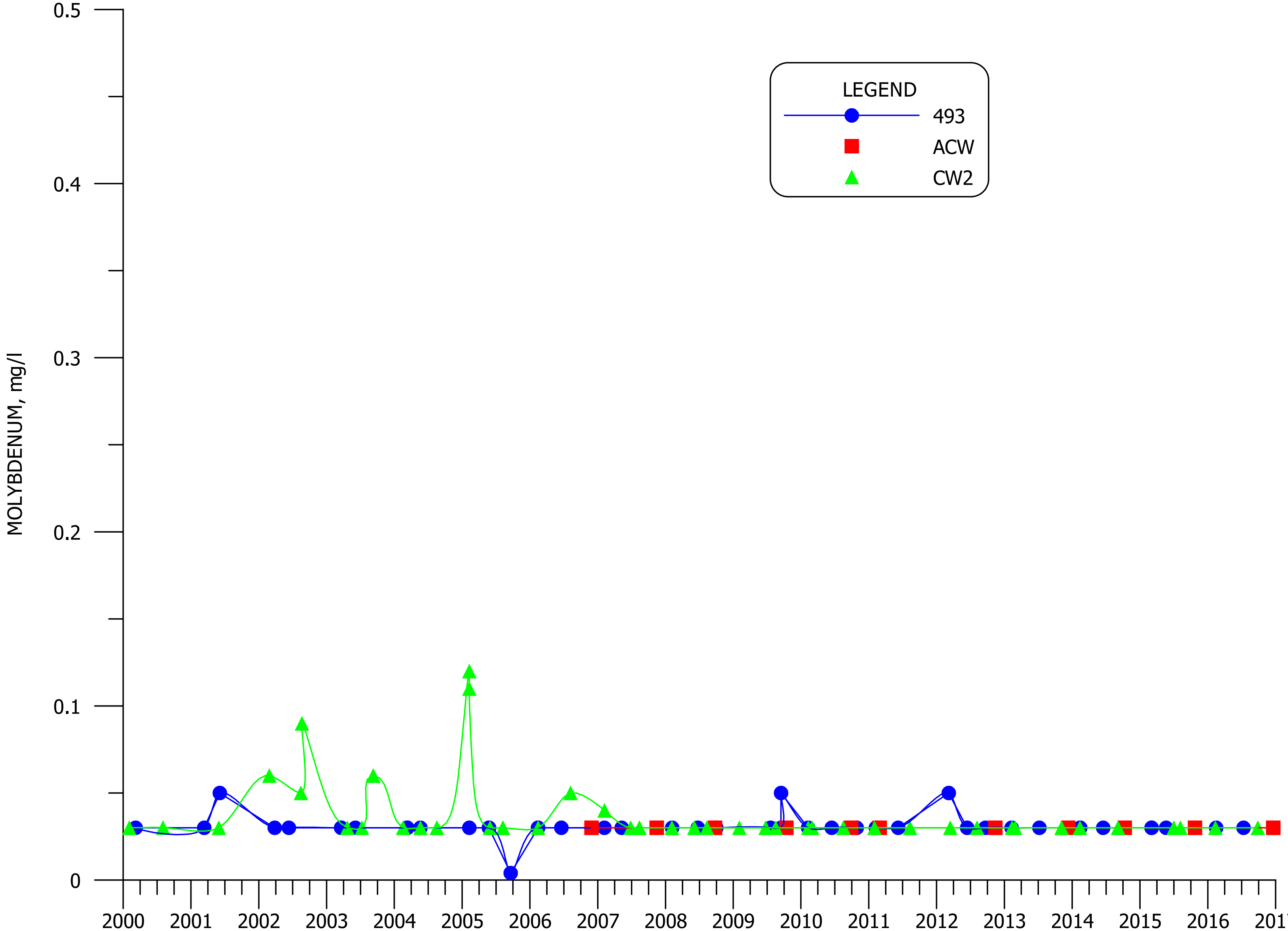
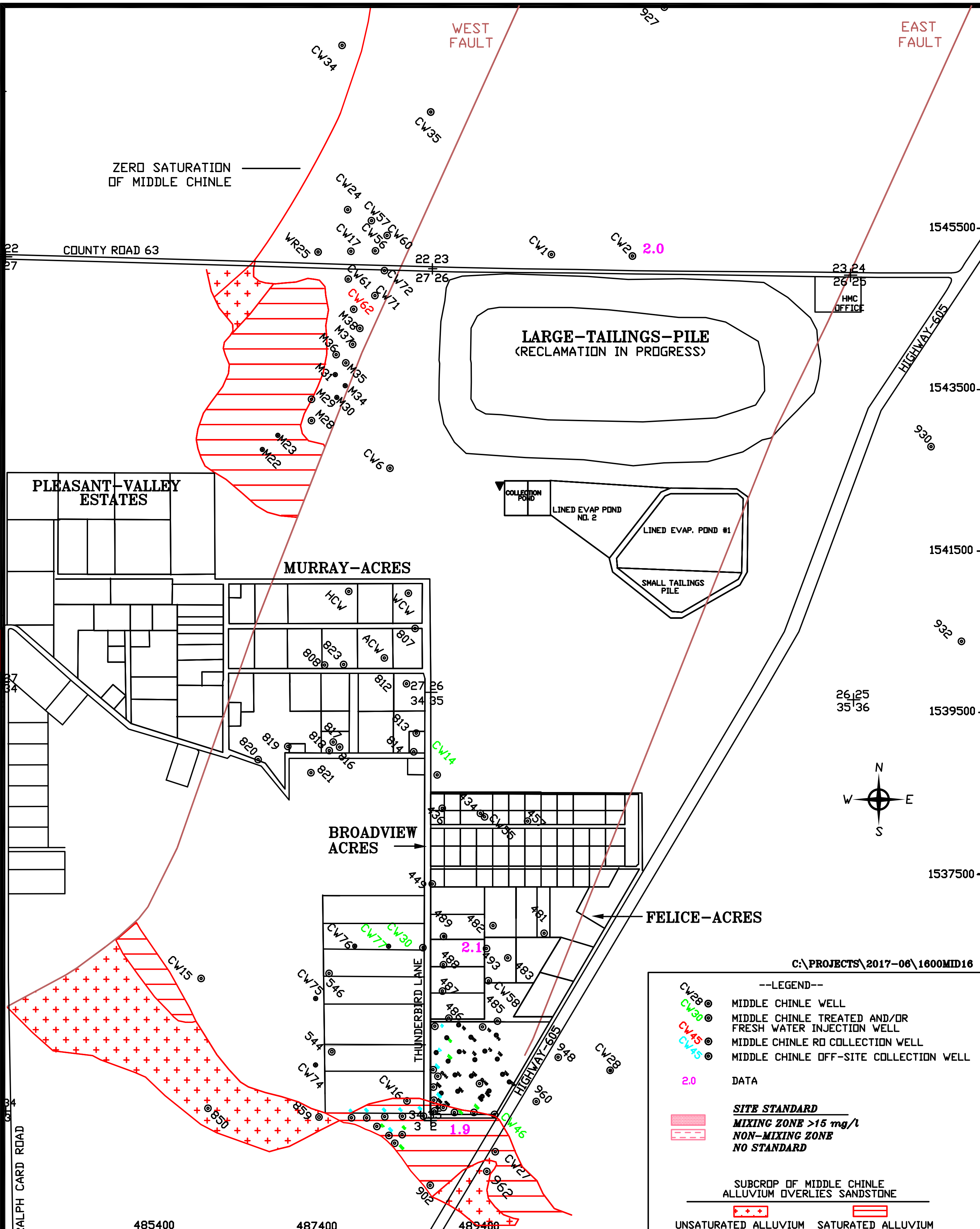


FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, ACW AND CW2



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

FIGURE 6.3-20. NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2016, mg/l

DATE: 2/6/2017

SCALE: 1"=1600'

SECTION 7

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GROUND WATER MONITORING
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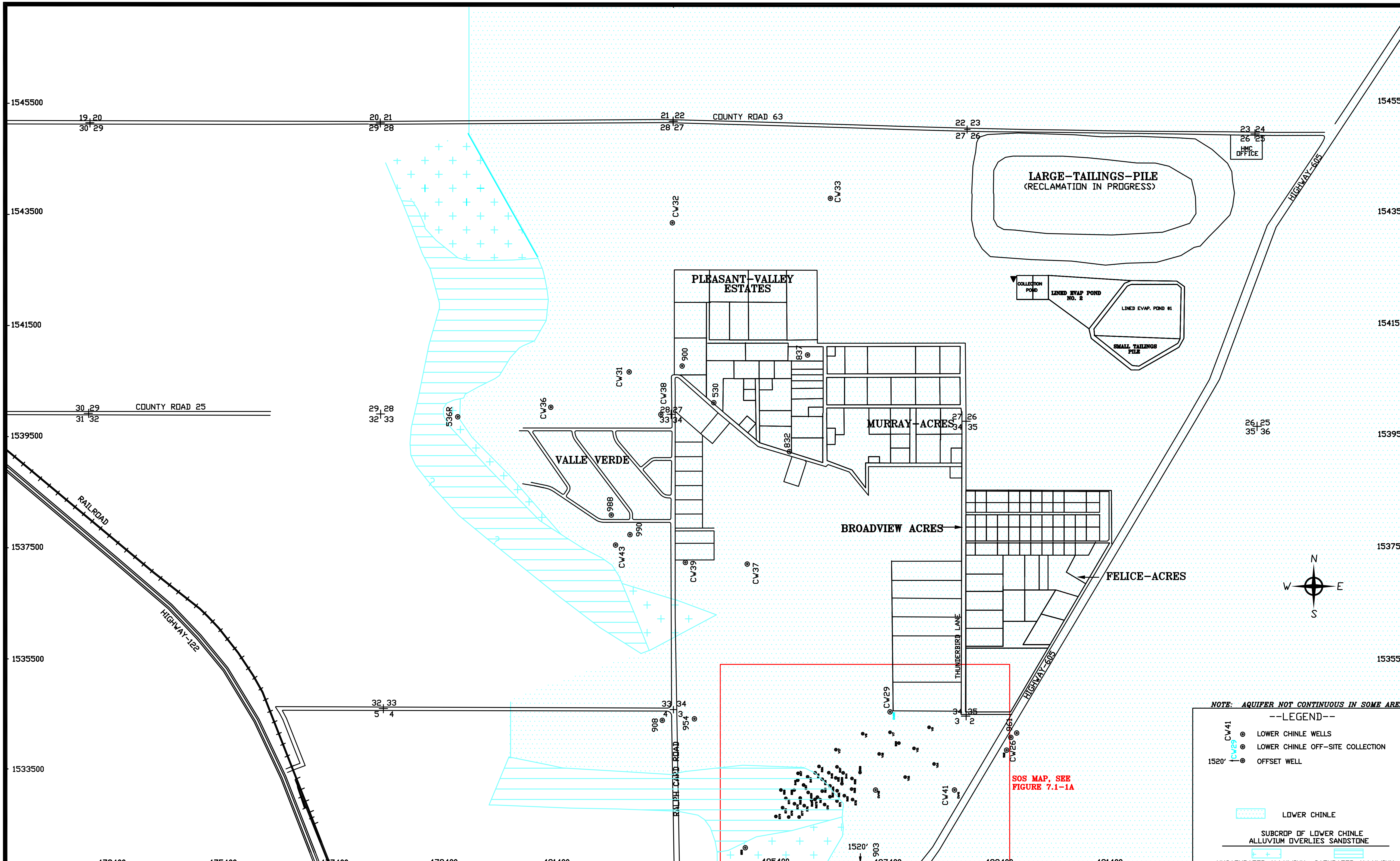
7.0 LOWER CHINLE AQUIFER MONITORING

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. Thirty four new R and V Lower Chinle wells were drilled in Section 3 (see Figure 7.1-1A for location) in 2016. Lower Chinle well CW29 was used for south collection in 2016.



SCALE: 1" = 1600'
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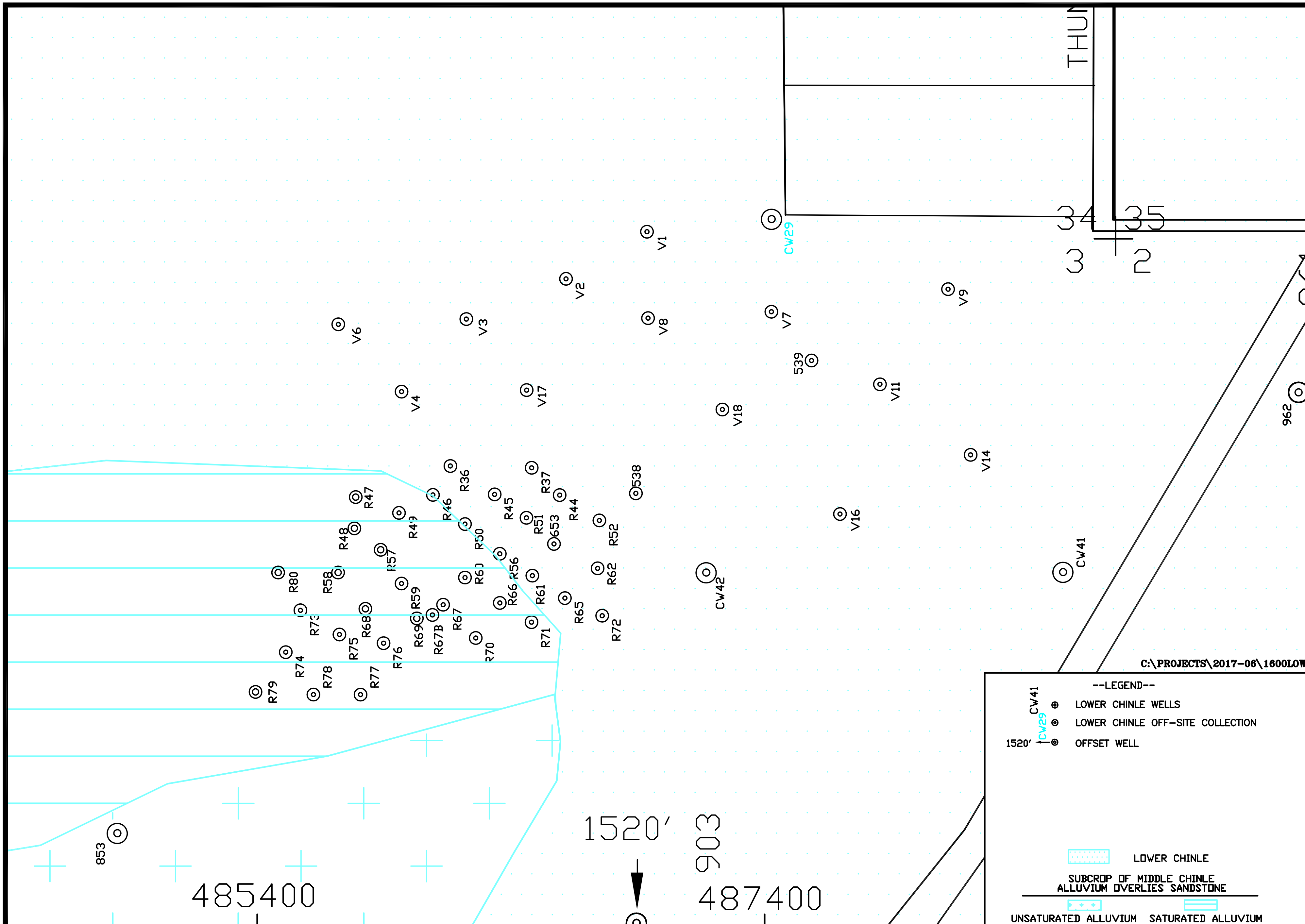
DATE: 2/7/2017

FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, 2016



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, 2016

DATE: 2/7/2017

SCALE: 1"=500'

PAGE: 7.1-3

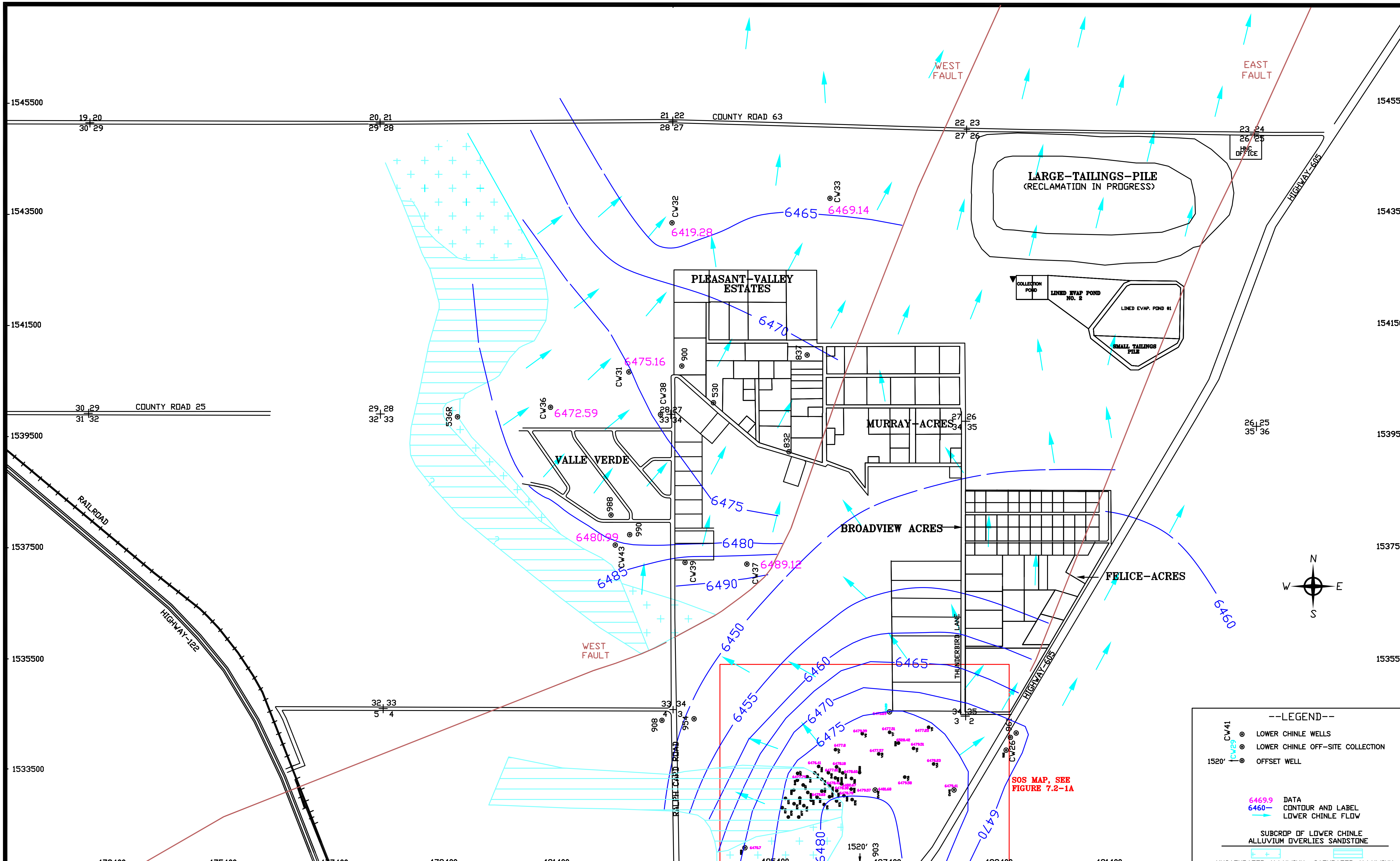
7.2 LOWER CHINLE WATER LEVELS

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 2016 water-level elevation contours. The West and East Faults are also shown on this figure. 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. Lower Chinle water levels in 2016 were similar to the 2015 values in Section 3 but generally higher. 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. Ground water in the Lower Chinle in the area of well CW42 is mainly moving to the north toward well CW29.

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 653, 853, CW29, CW41 and CW42 on Figure 7.2-3. Water levels in each of these Lower Chinle wells were fairly steady or slightly rose in 2016. Small overall water-level decreases had been observed over the last few years in Lower Chinle wells 653, 853, CW41 and CW42 but the 2010 through 2015 water levels very gradually rose.

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). Water levels had gradually declined over the last few years in wells CW31, CW36, CW37 and CW43 but gradually rose in 2010 through 2015 and were steady or slightly declining in 2016. Water levels have very gradually increased in well CW33 with time.

Water levels had decreased in Lower Chinle well CW32 for several years, and this trend ceased in 2015 with fairly steady levels in 2016. The rate and magnitude of decrease in this Lower Chinle well is similar to that observed in the alluvial and San Andres aquifers to the west in Sections 29, 32 and 33. These declines are different than the fairly steady alluvial water levels near well CW32. This indicates that the Lower Chinle aquifer near well CW32 is hydrologically connected to the alluvial aquifer west of this area but is isolated from the alluvial aquifer in its immediate area.



SCALE: 1" = 1600'

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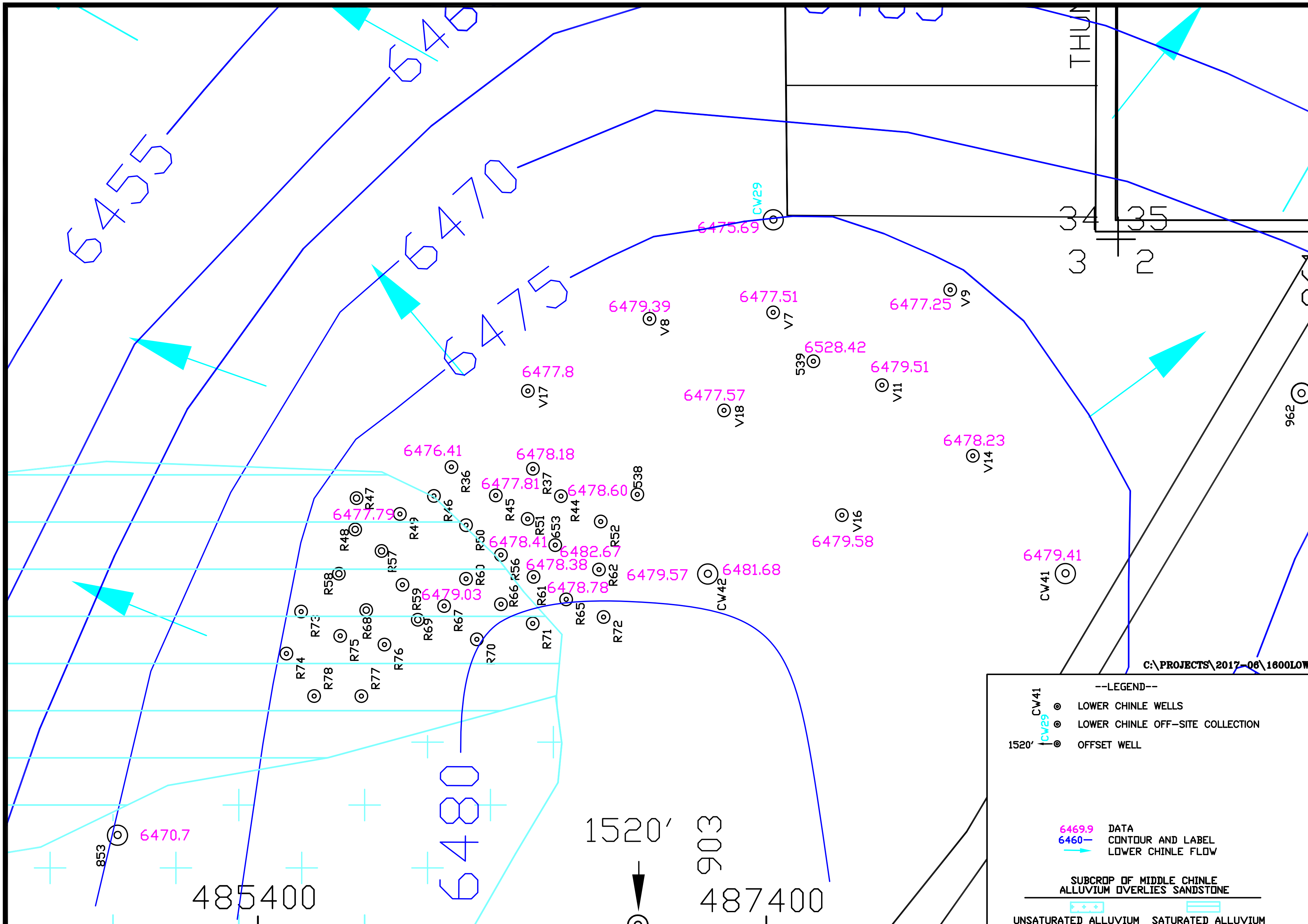
DATE: 2/7/2017

FIGURE 7.2-1 WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, 2016, FT-MSL

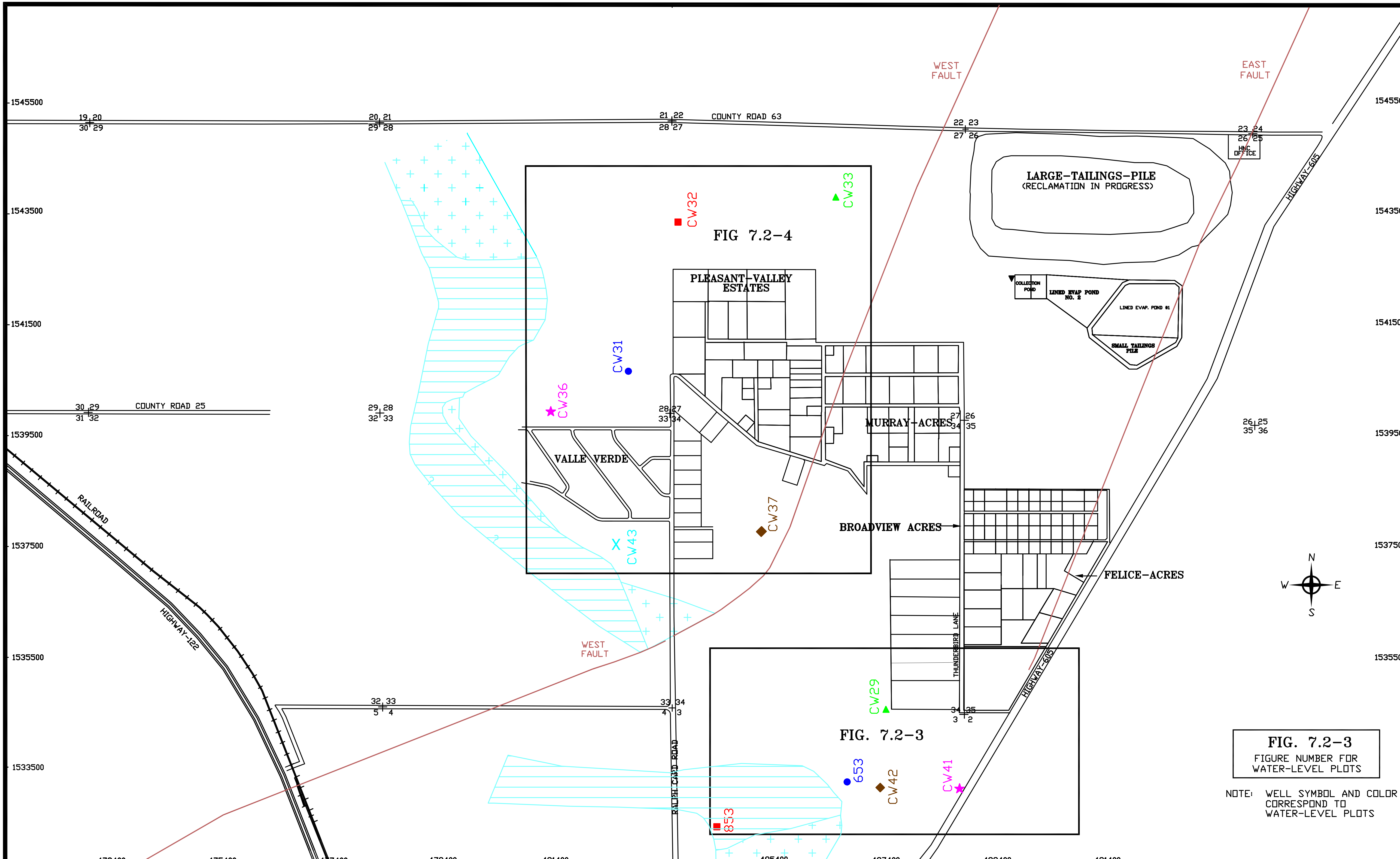


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.2-1A. WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2016, FT-MSL

DATE: 2/7/2017

SCALE: 1"=500'



SCALE: 1" = 1600'
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DATE: 2/7/2017

FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2016

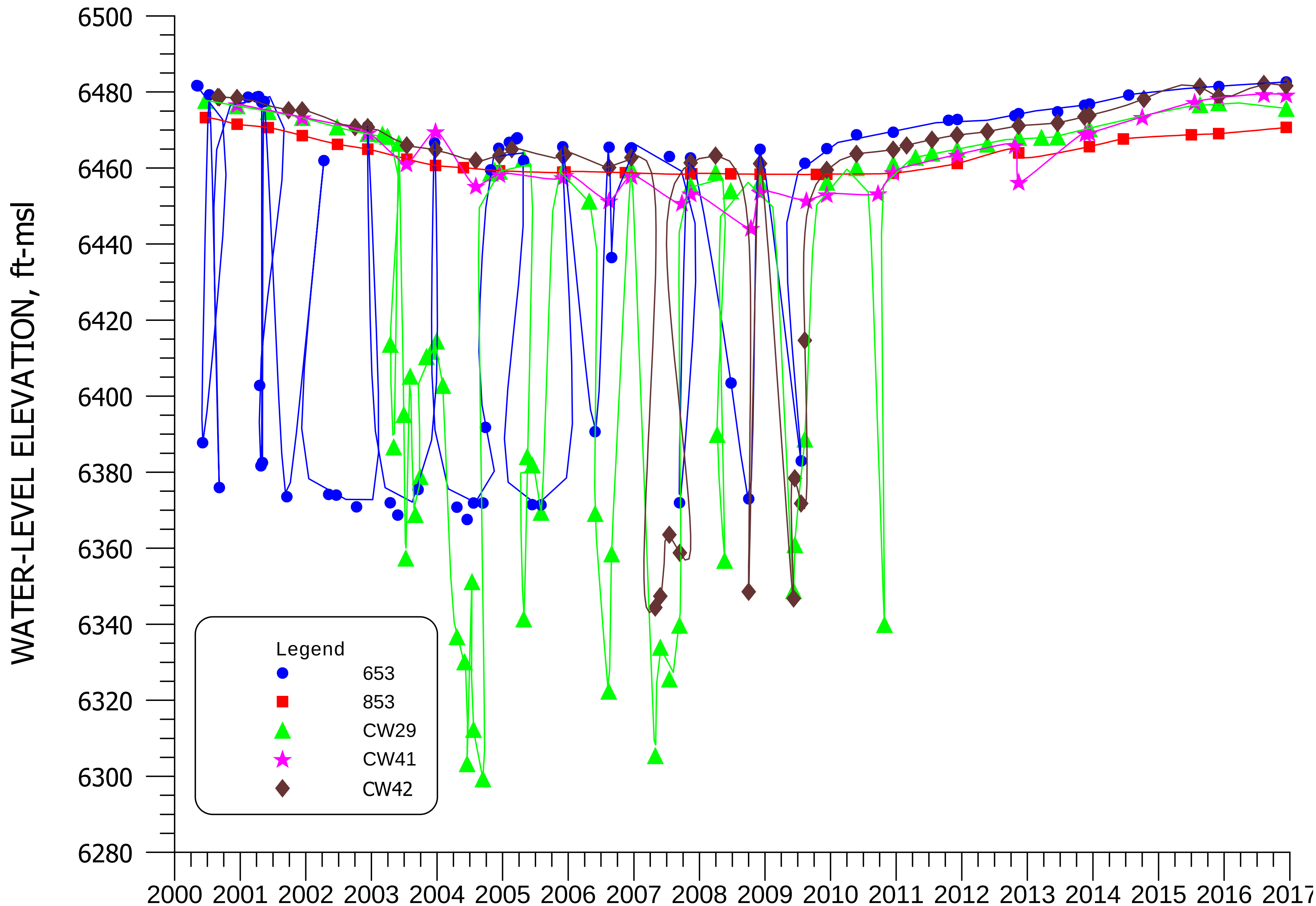


FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 653, 853, CW29, CW41, AND CW42.

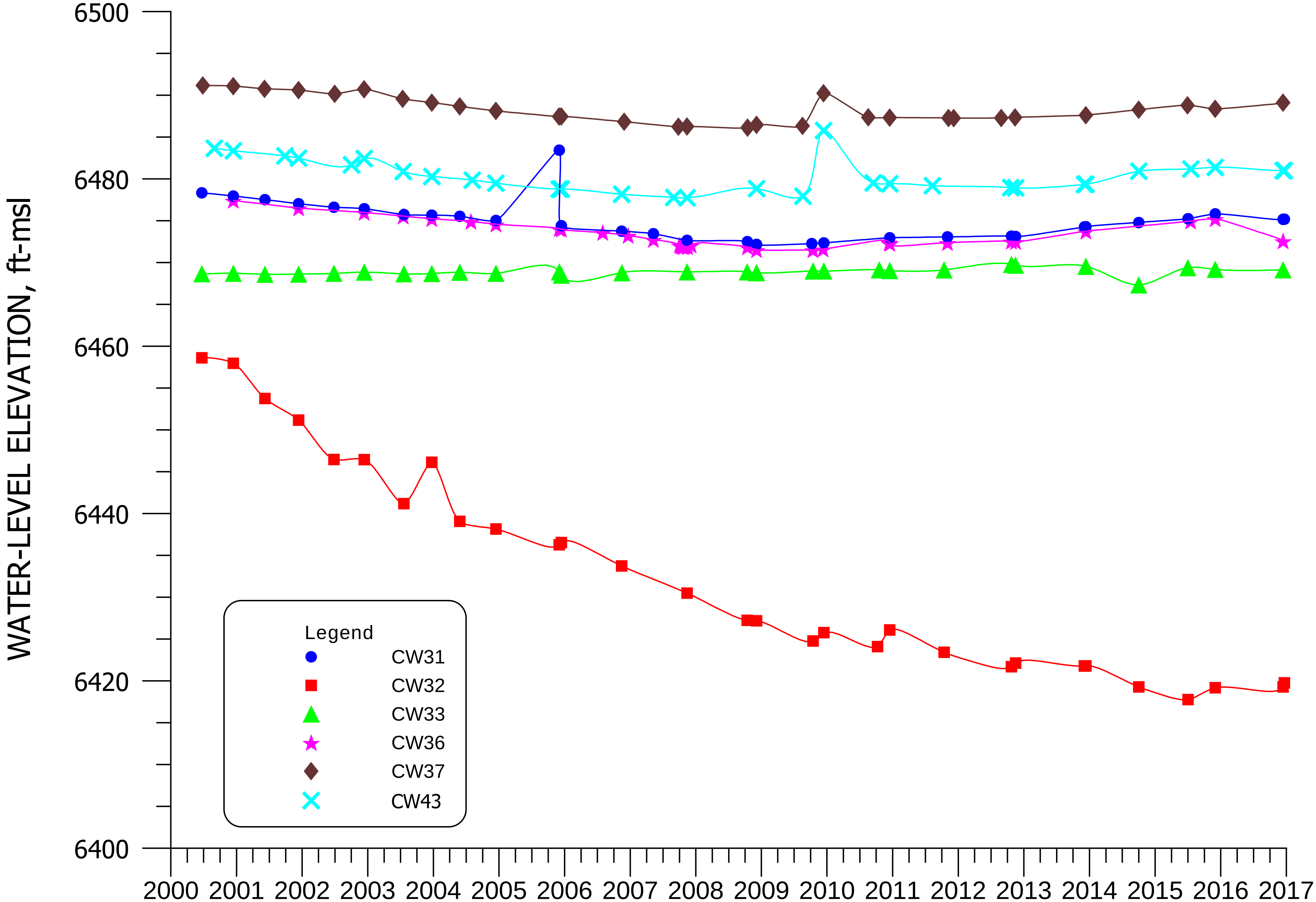


FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW36, CW37, AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2016 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. 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 2016. Lower Chinle standards based on background data are presented for sulfate in the legend of Figures 7.3-1 and 7.3-1A. The Lower Chinle concentrations varied from 319 to 1300 mg/l. 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 CW37, CW42, CW43 and V17 are grouped together on the water-quality time plots, and data for non-mixing zone wells CW29, CW31, CW32, and CW41 are presented on a second plot.

Figure 7.3-3 presents sulfate concentrations plotted versus time for the Lower Chinle mixing-zone wells. The sulfate concentrations in water collected from each of these wells are less than the mixing-zone site standard, showing that sulfate restoration of the Lower Chinle is not needed in the southern portion of the aquifer. Sulfate concentrations in well CW43 have increased to a level slightly larger than nearby well CW37 in this area. Steady concentrations have been observed in well CW42 with and equal concentration in new well V17.

Sulfate concentrations plotted for Lower Chinle wells CW29, CW31, CW32, and CW41 are presented on Figure 7.3-4 (see Figure 7.3-2 for location of these wells). Sulfate concentrations were fairly steady in 2016 in these Lower Chinle wells. An overall gradual decline has been observed in well CW32 for the last several years.

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 2016. All concentrations for 2016 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.

Figure 7.3-6 presents TDS concentrations for Upper Chinle wells CW37, CW42, CW43 and V17. TDS concentrations in these wells have been fairly steady in 2016 except the increase observed in well CW43. The TDS in well CW43 has increased to a level that is above the remainder of the Lower Chinle aquifer wells in this area. TDS concentrations increase in well CW43 started prior to the Section 33 Flood irrigation which was initially done in 2004. All of these concentrations are below the mixing-zone site standard of 3140 mg/l.

TDS concentrations for wells CW29, CW31, CW32, and CW41 are presented on Figure 7.3-7. This figure demonstrates that, overall, TDS concentrations have remained fairly stable during 2016. Additionally, these historical TDS concentrations are well within the range of natural fluctuation in the non-mixing zone of the Lower Chinle aquifer, except for the value from well CW32 being near the top of the natural observed concentrations.

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 2016 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 2016. Uranium concentrations in the Lower Chinle exceeded the mixing-zone background concentration in the central portion of Section 3, and five exceeded the non-mixing zone background concentration. The highest values are in the central portion of Section 3 near the Lower Chinle subcrop area. These concentrations should gradually decrease to less than background concentrations with the restoration program planned for the Lower Chinle aquifer.

Uranium concentrations plotted versus time for Lower Chinle wells CW37, CW42, CW43 and R67 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 concentration in well CW42 was declining until 2008 and has overall been fairly steady the last eight years. Additional results with time will be needed to show when the restoration of the areas of wells CW42 and V17 are adequate. Uranium concentrations in well CW43 have remained low.

The uranium concentrations in all of the Lower Chinle wells with data presented on Figure 7.3-10 have remained at low levels with higher and gradual declining values in well CW29 for the last four years.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2016 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 CW37, CW42, CW43 and V17. The selenium concentrations in these Lower Chinle aquifer wells were steady in 2016, except for a very gradual decline in well CW42.

Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW29, CW31, CW32 and CW41. Selenium concentrations measured during 2016 were consistent with the 2015 levels for each of these wells.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2015 were all low at levels near the detection limit and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2015 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 2016 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 2016. 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. Establishment of a site standard for nitrate in the Lower Chinle non-mixing zone therefore has not been set.

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. Radium concentrations were analyzed in all Lower Chinle wells in the 2003 update. 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-

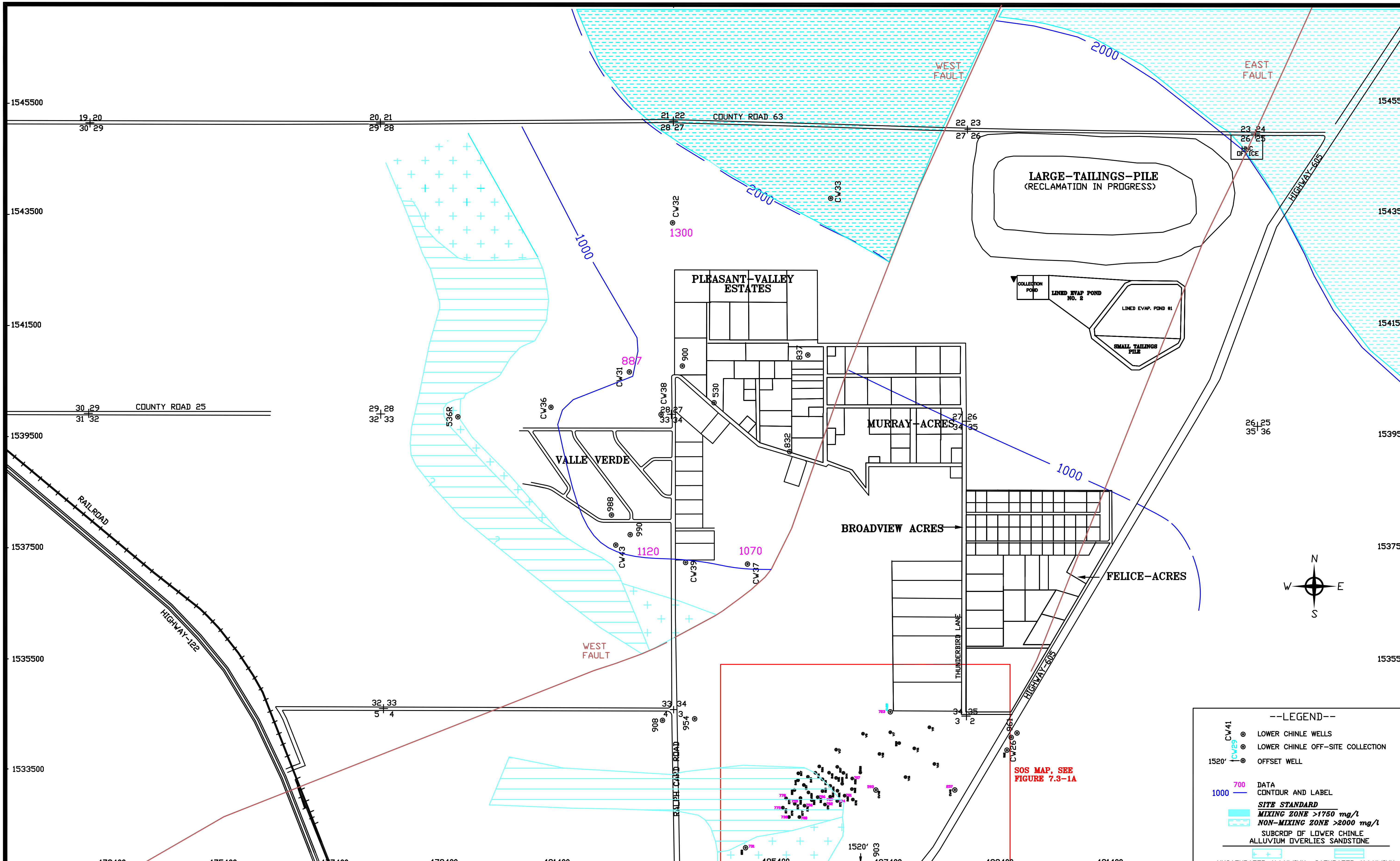
226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the Homestake site.

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. The vanadium concentration data was updated in 2003 for the Lower Chinle aquifer.

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. The thorium-230 concentrations measured in the Lower Chinle aquifer during 2003 were all very small. No plots of thorium-230 concentrations with time were prepared, because concentrations have historically been low.



SCALE: 1" = 1600'
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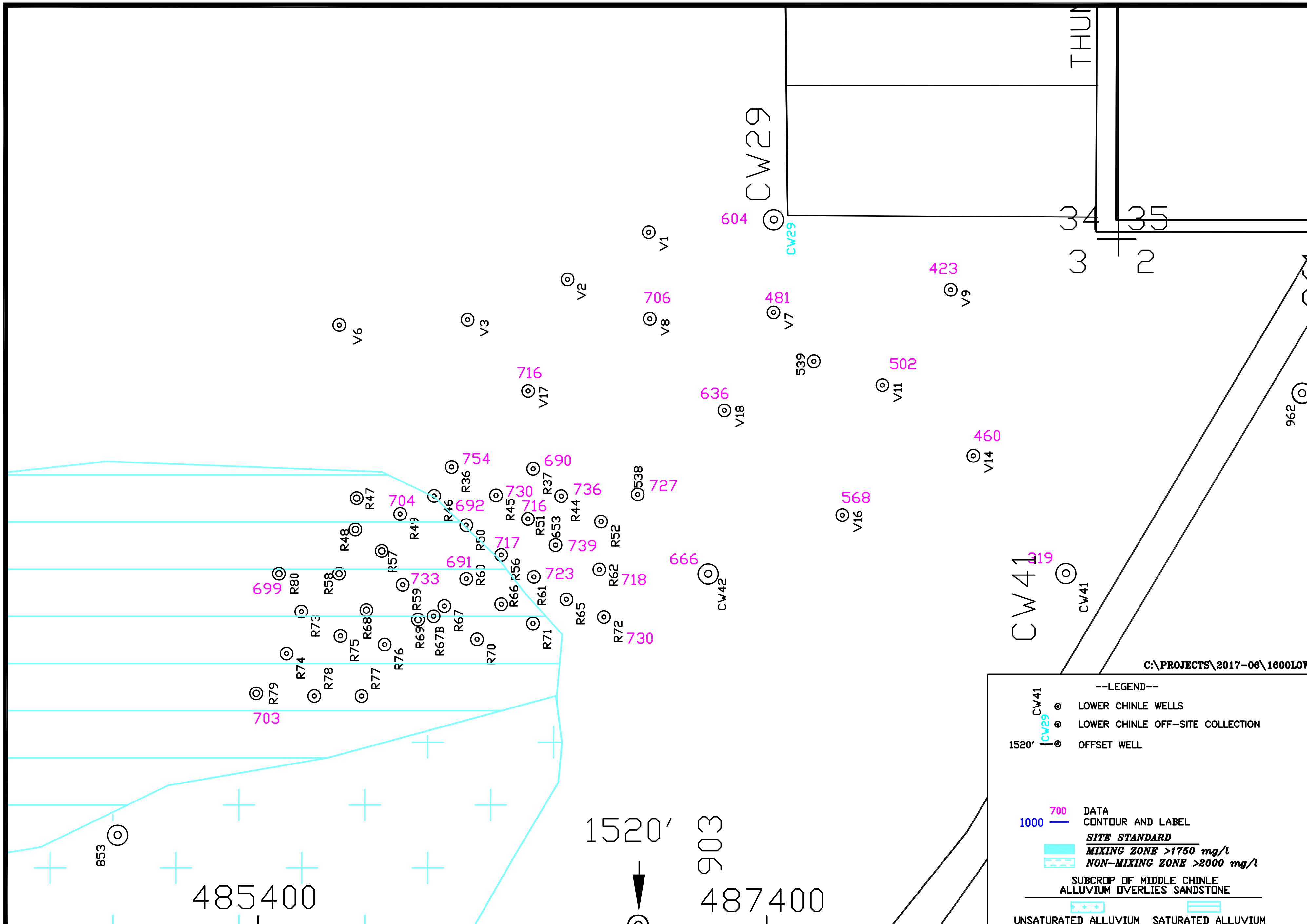
DATE: 2/7/2017

FIGURE 7.3-1 SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2016, mg/l

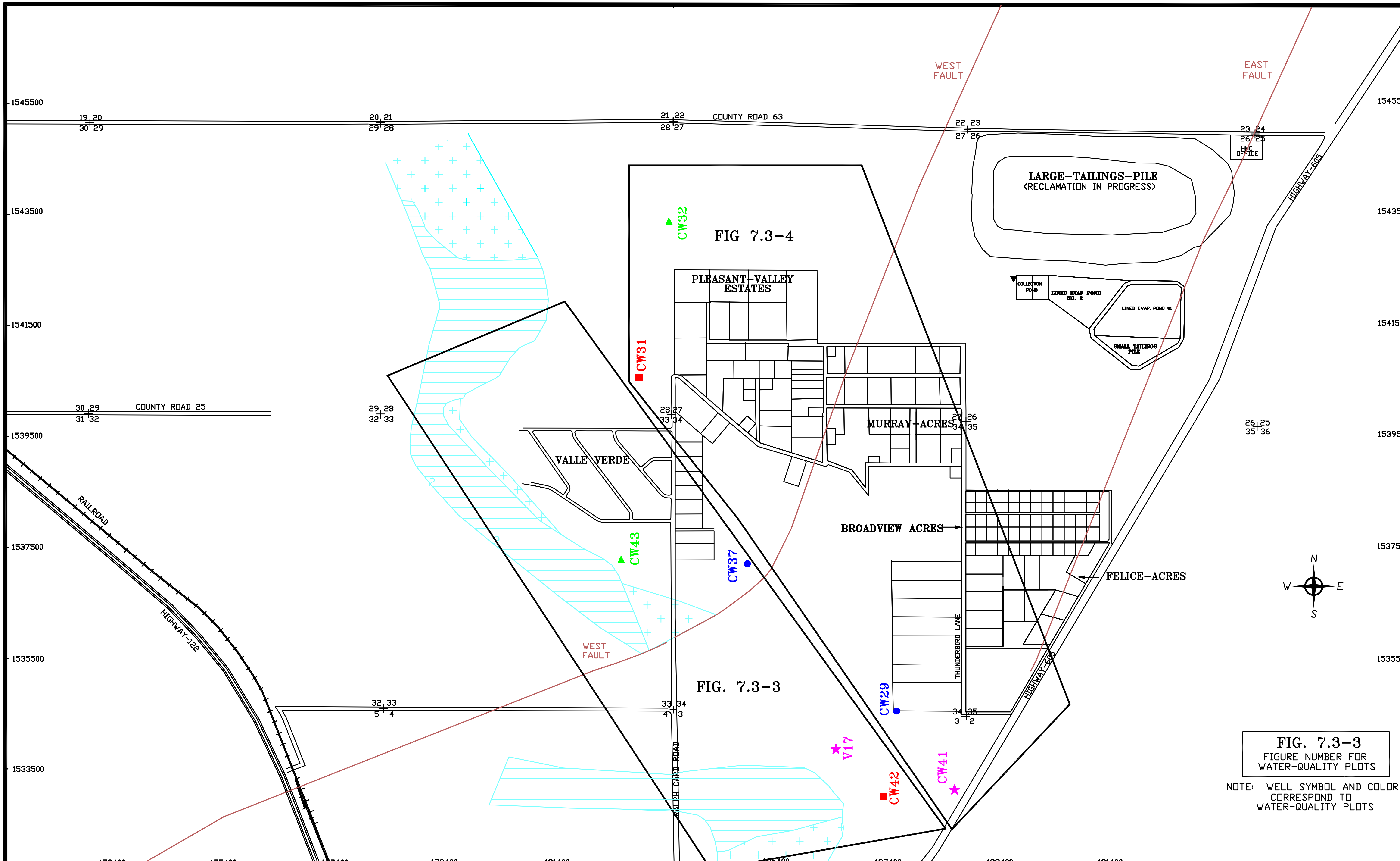


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 7.3-1A. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2016, mg/l

DATE: 2/7/2017

SCALE: 1"=500'



SCALE: 1" = 1600'

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DATE: 2/7/2017

FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2016

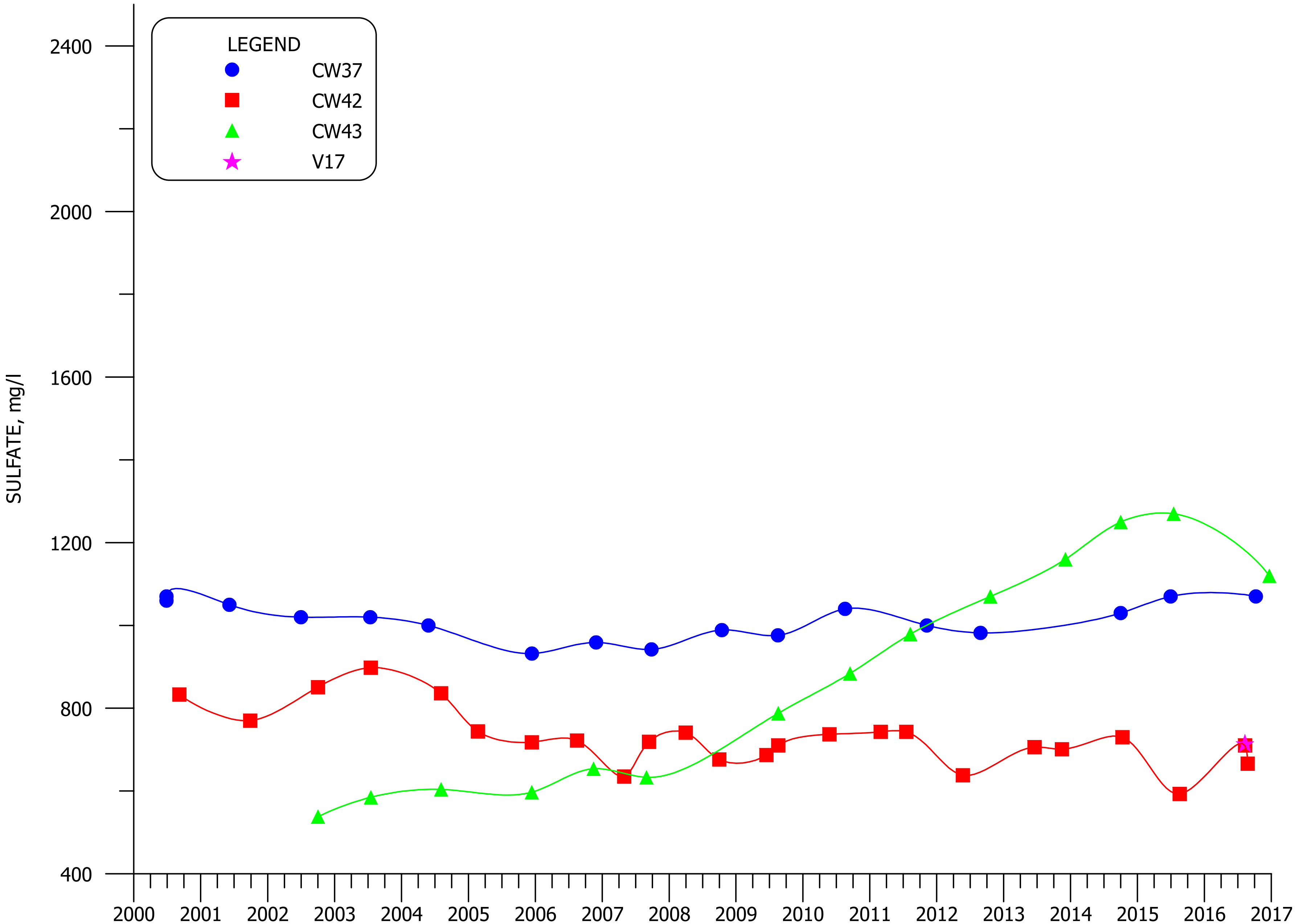


FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW37, CW42, CW43 AND V17

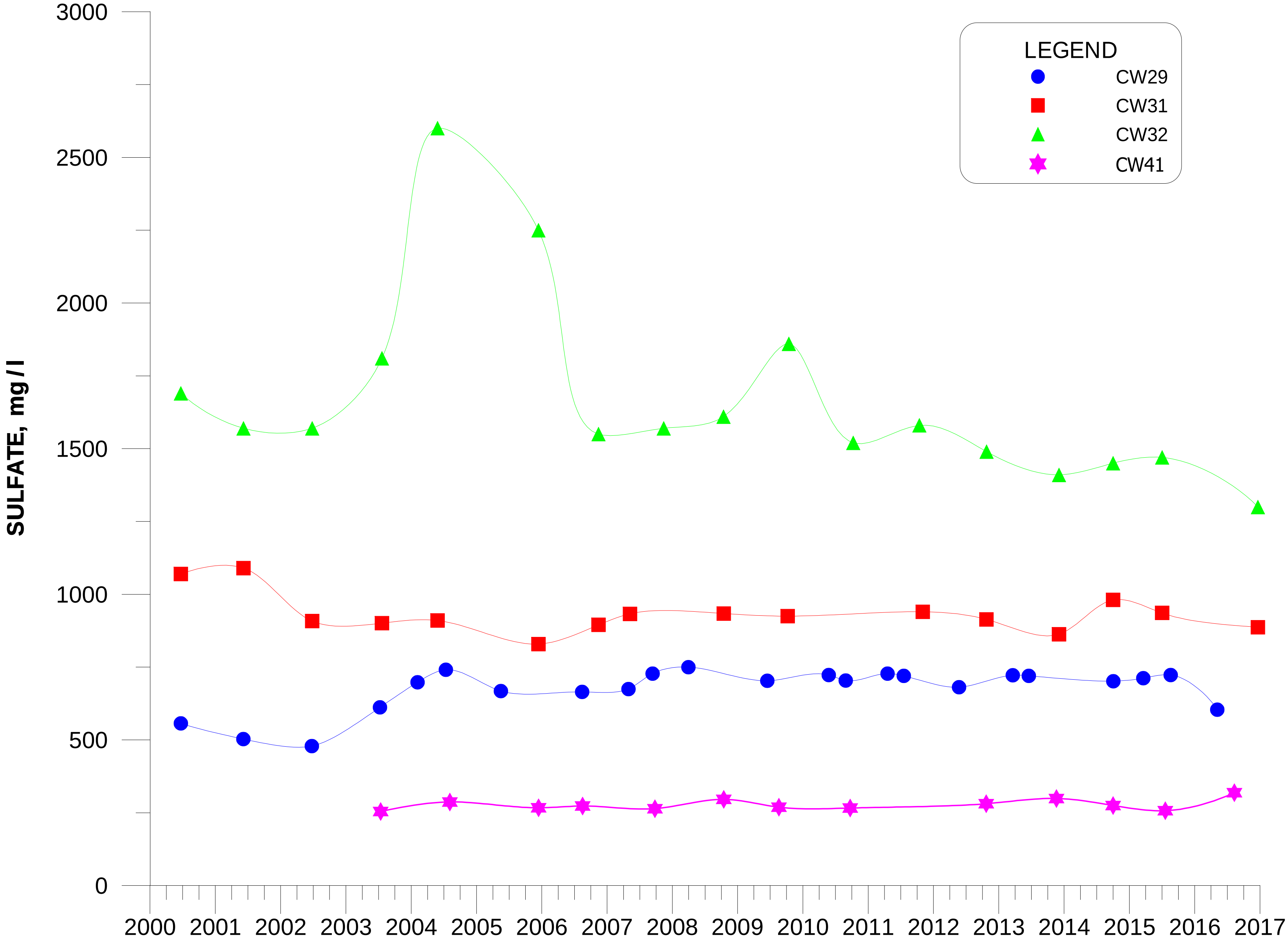
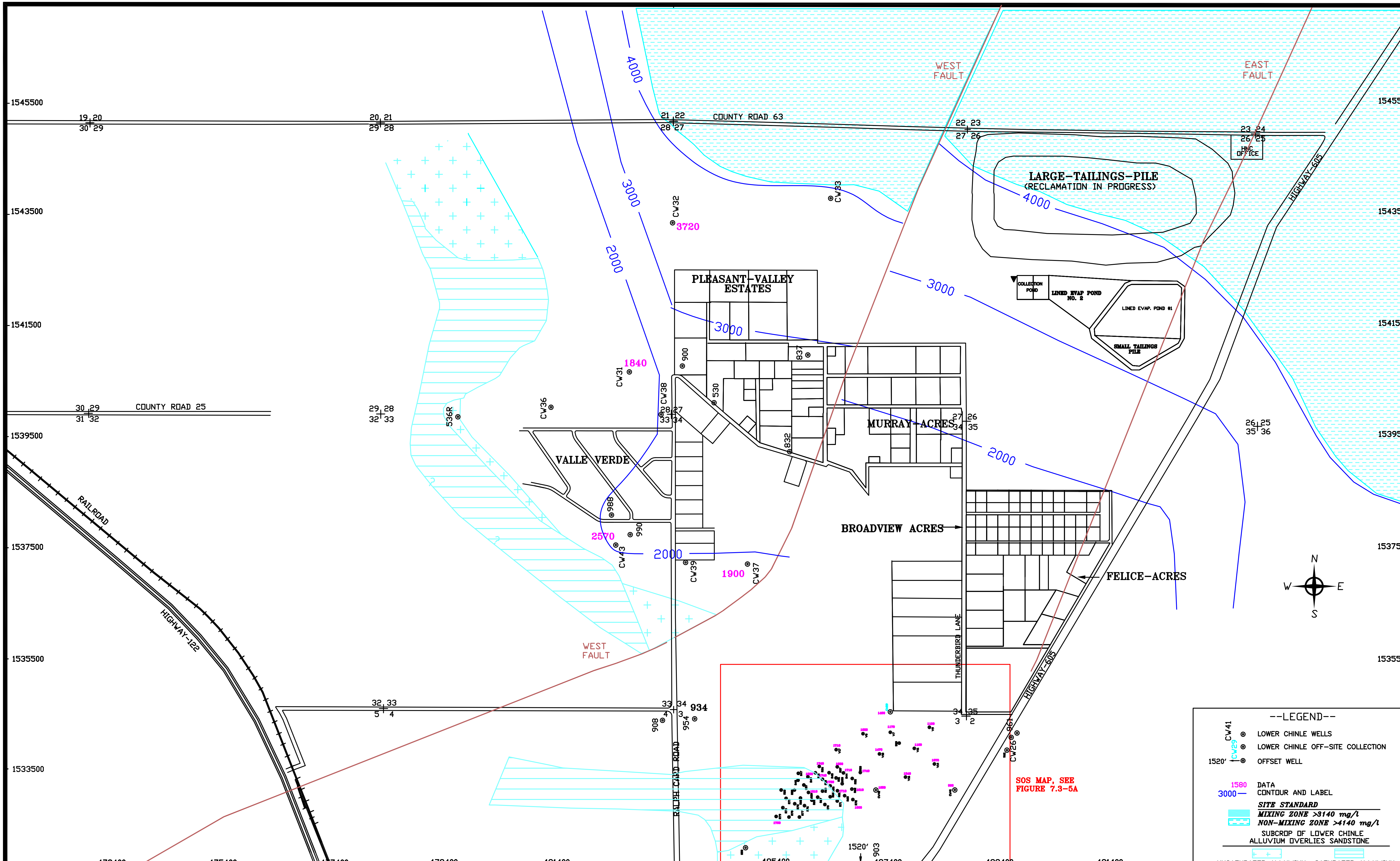


FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32 AND CW41.



SCALE: 1" = 1600'

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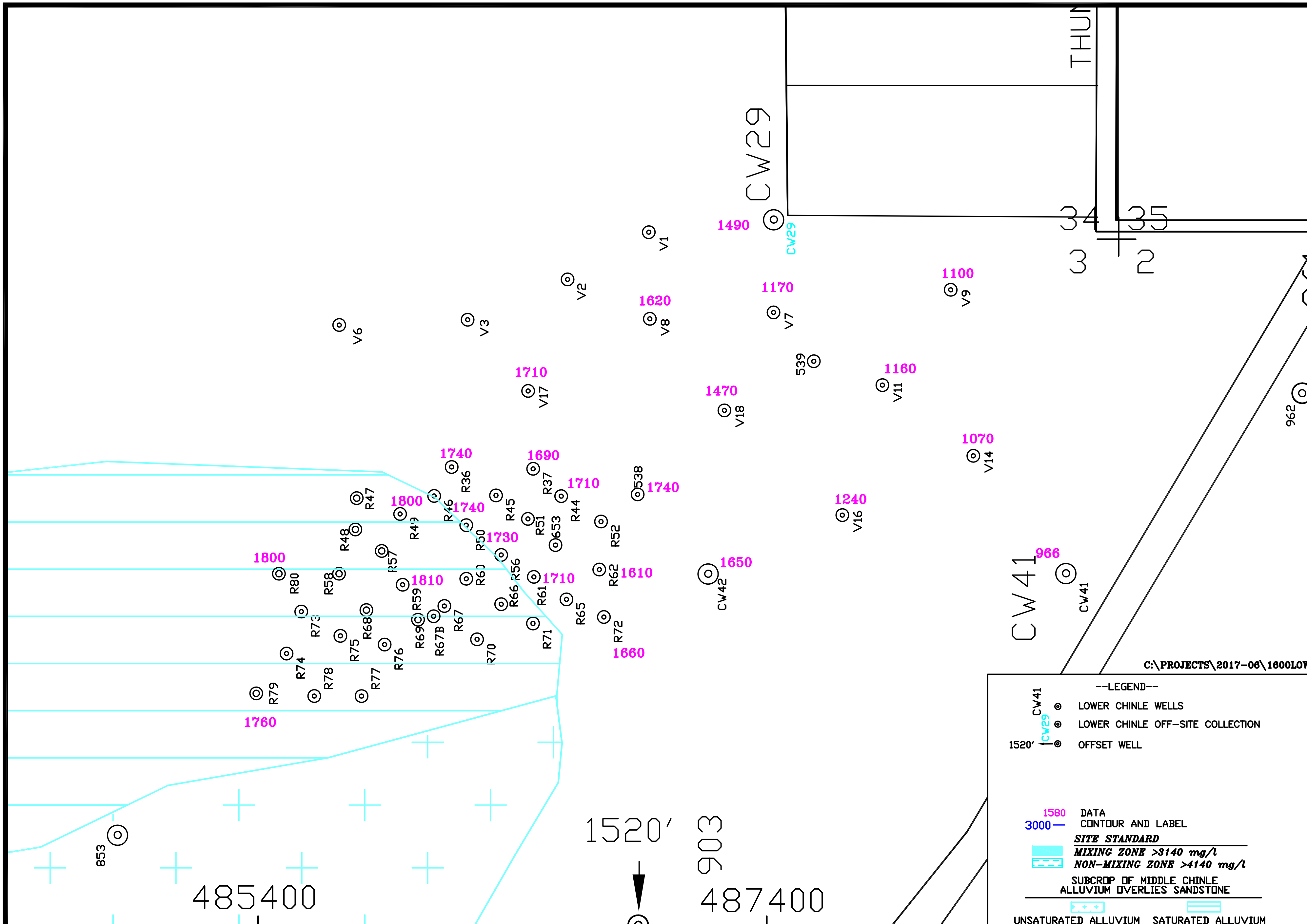
DATE: 2/7/2017

FIGURE 7.3-5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2016, 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, 2016, mg/l

DATE: 2/7/2017

SCALE: 1"=500'

PAGE: 7.3-12

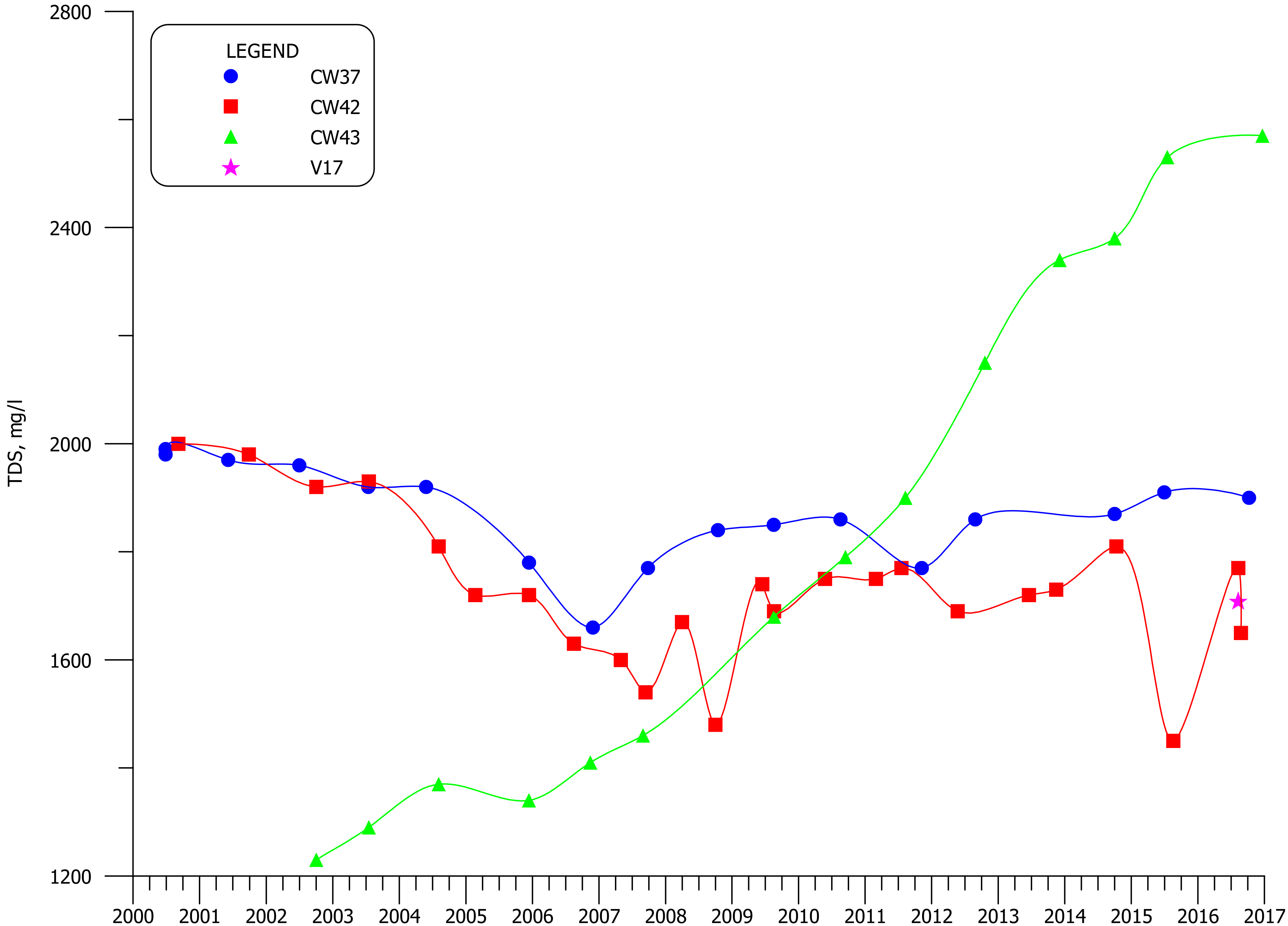


FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW37, CW42, CW43 AND V17

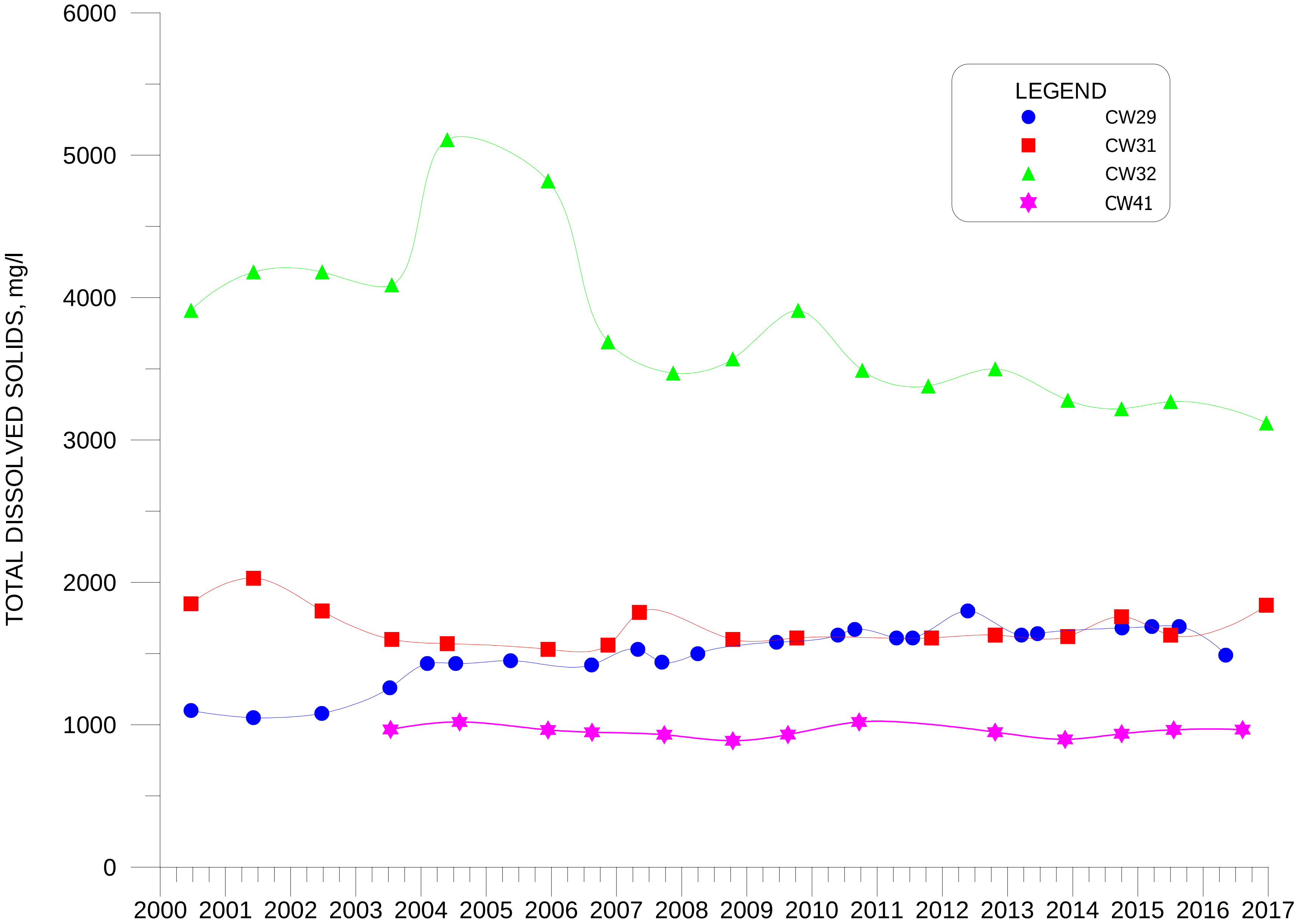
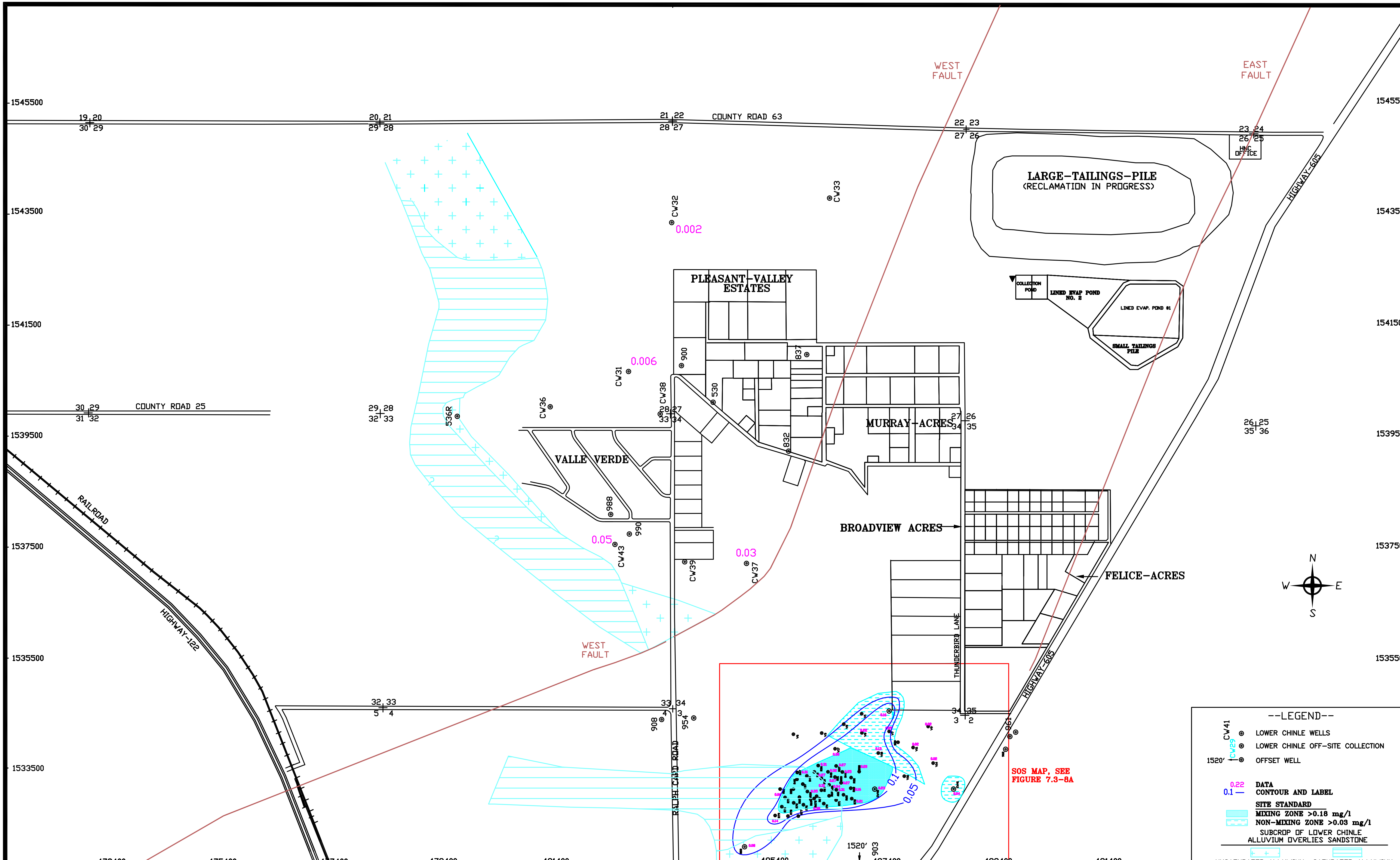


FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW29, CW31, CW32 AND CW41.



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DATE: 2/7/2017

FIGURE 7.3-8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2016, mg/l

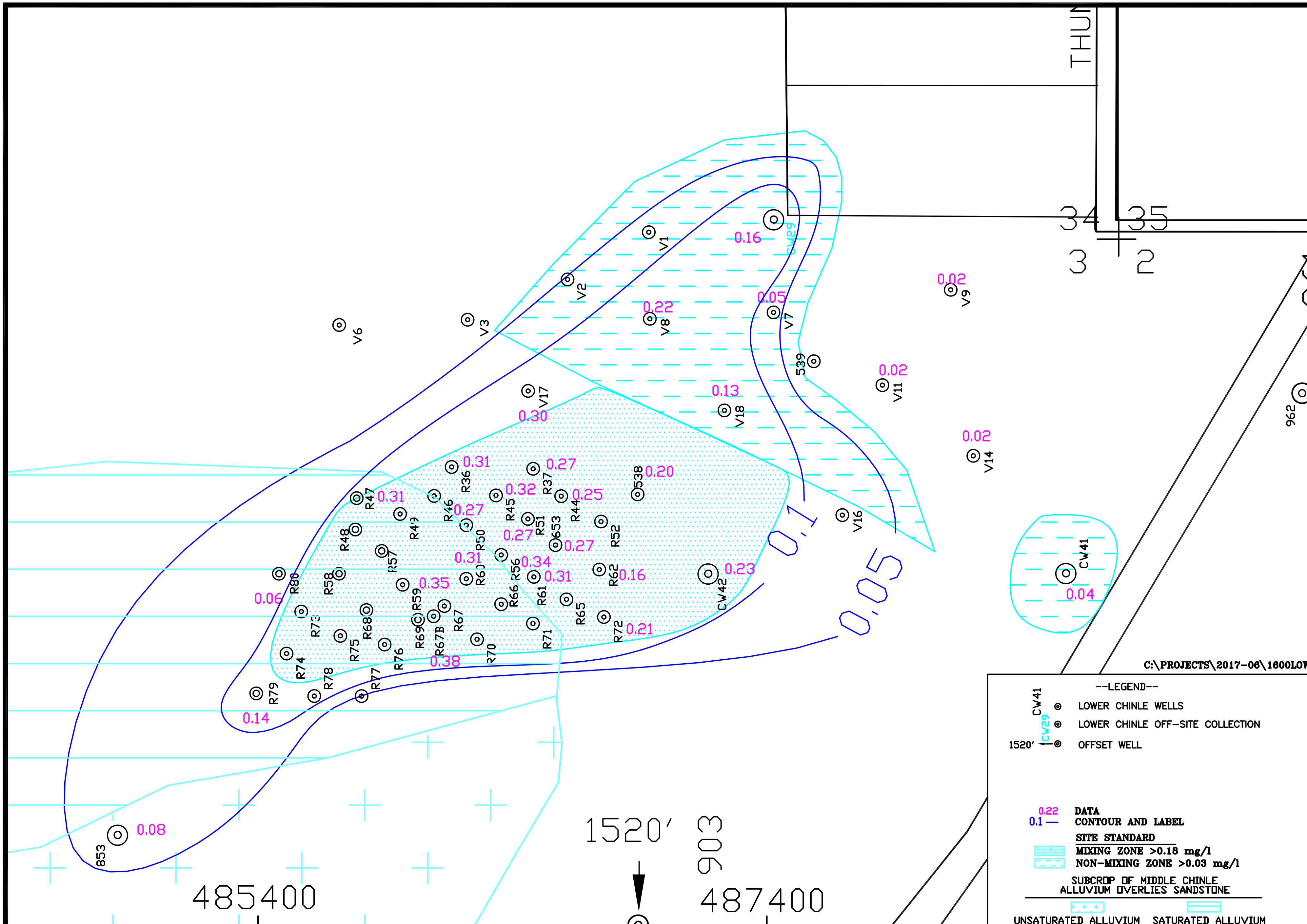

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FIGURE 7.3-8A. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2016, mg/l

DATE: 2/7/2017

SCALE: 1"=500'

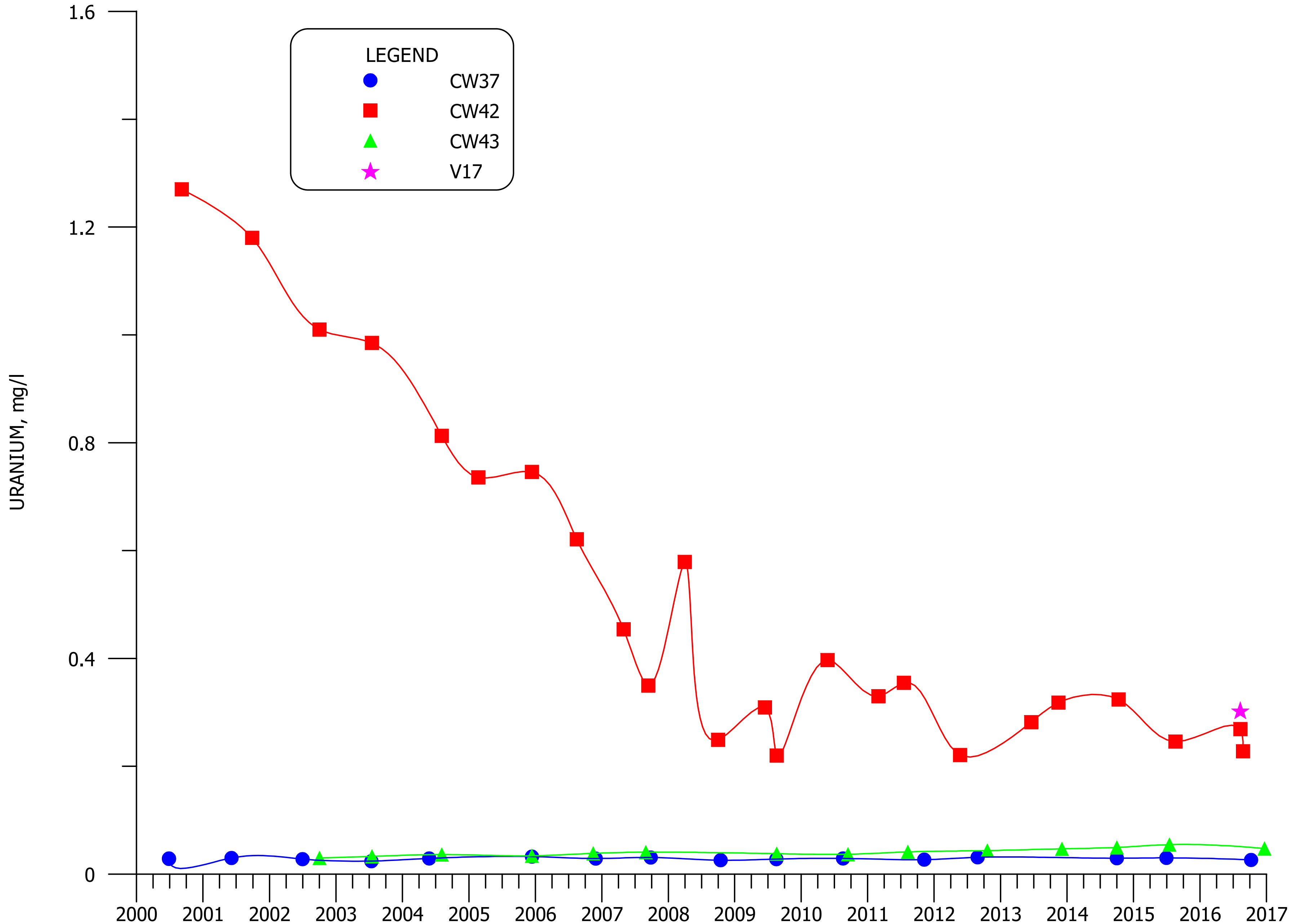


FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW37, CW42, CW43 AND V17

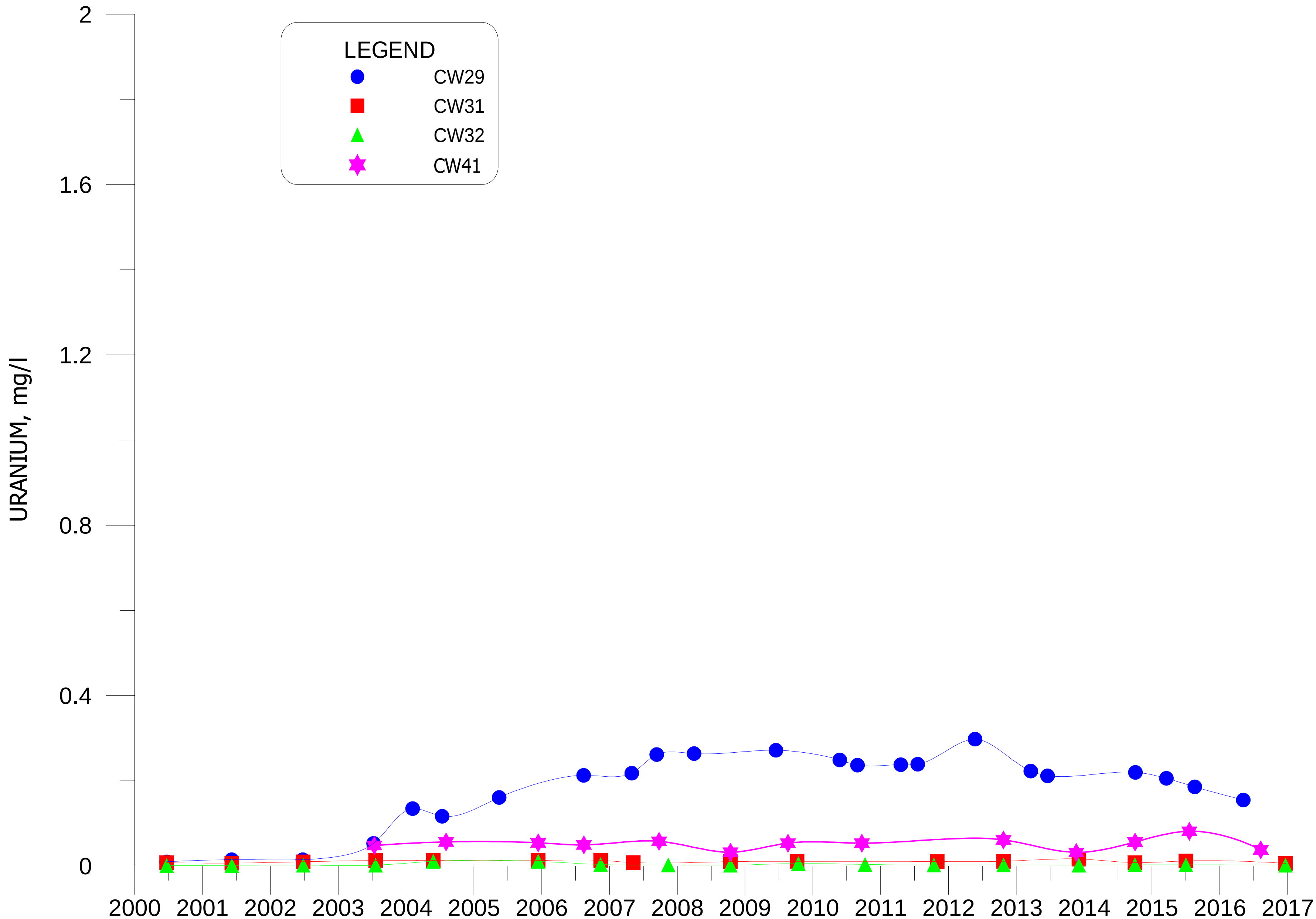
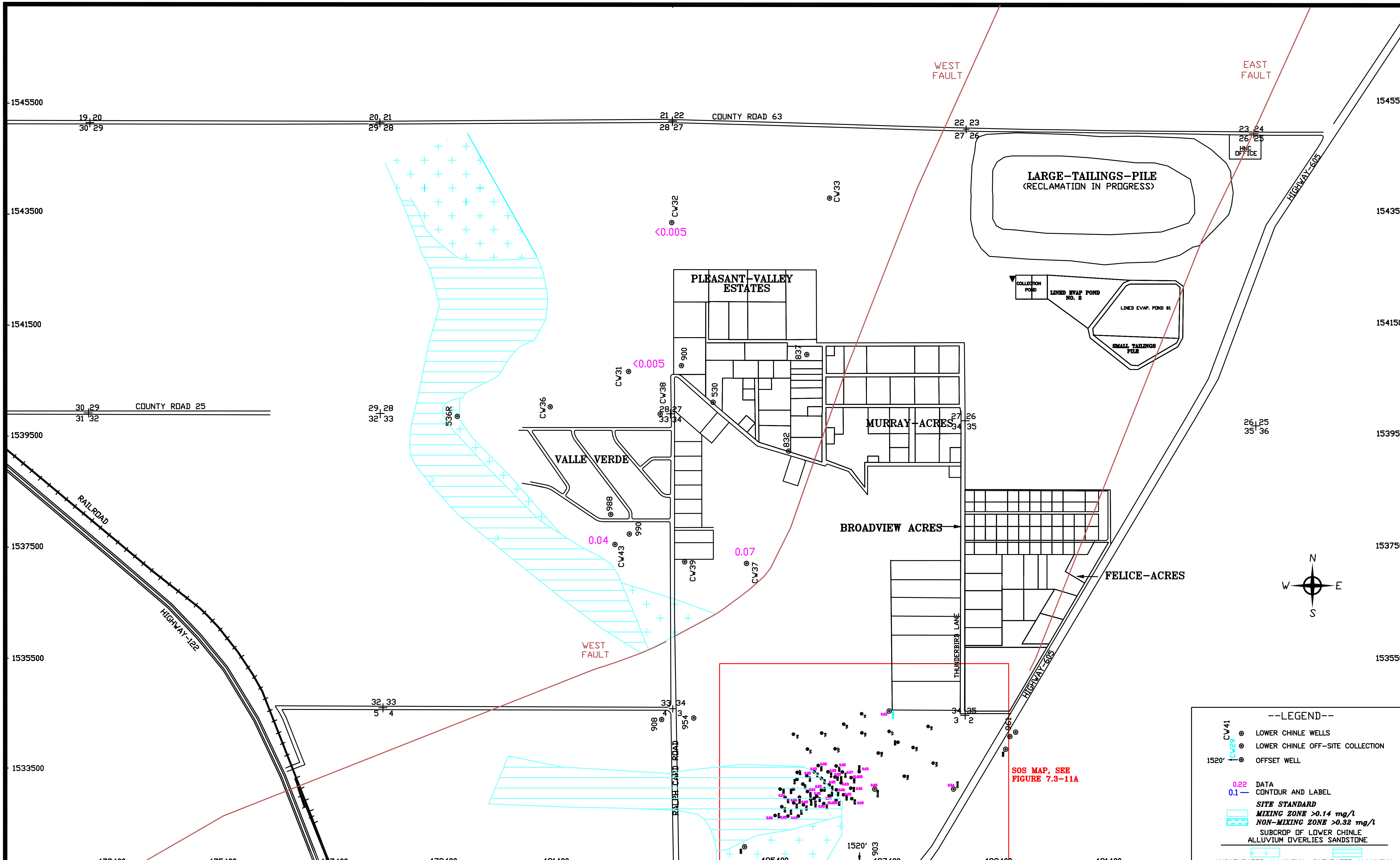


FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32 AND CW41.



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DATE: 2/7/2017

FIGURE 7.3-11. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2016, mg/l

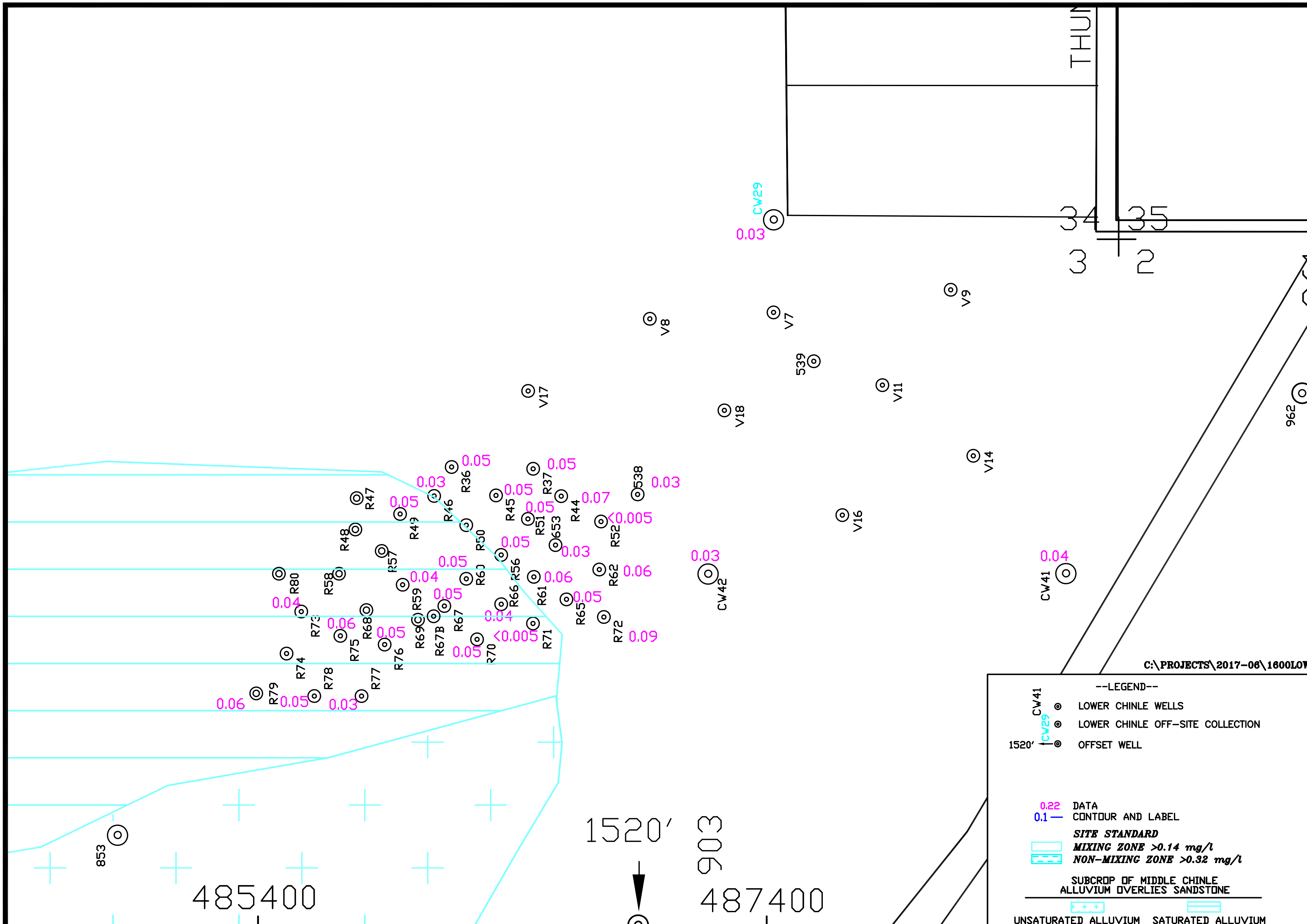

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FIGURE 7.3-11A. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2016, mg/l

DATE: 2/7/2017

SCALE: 1"=500'

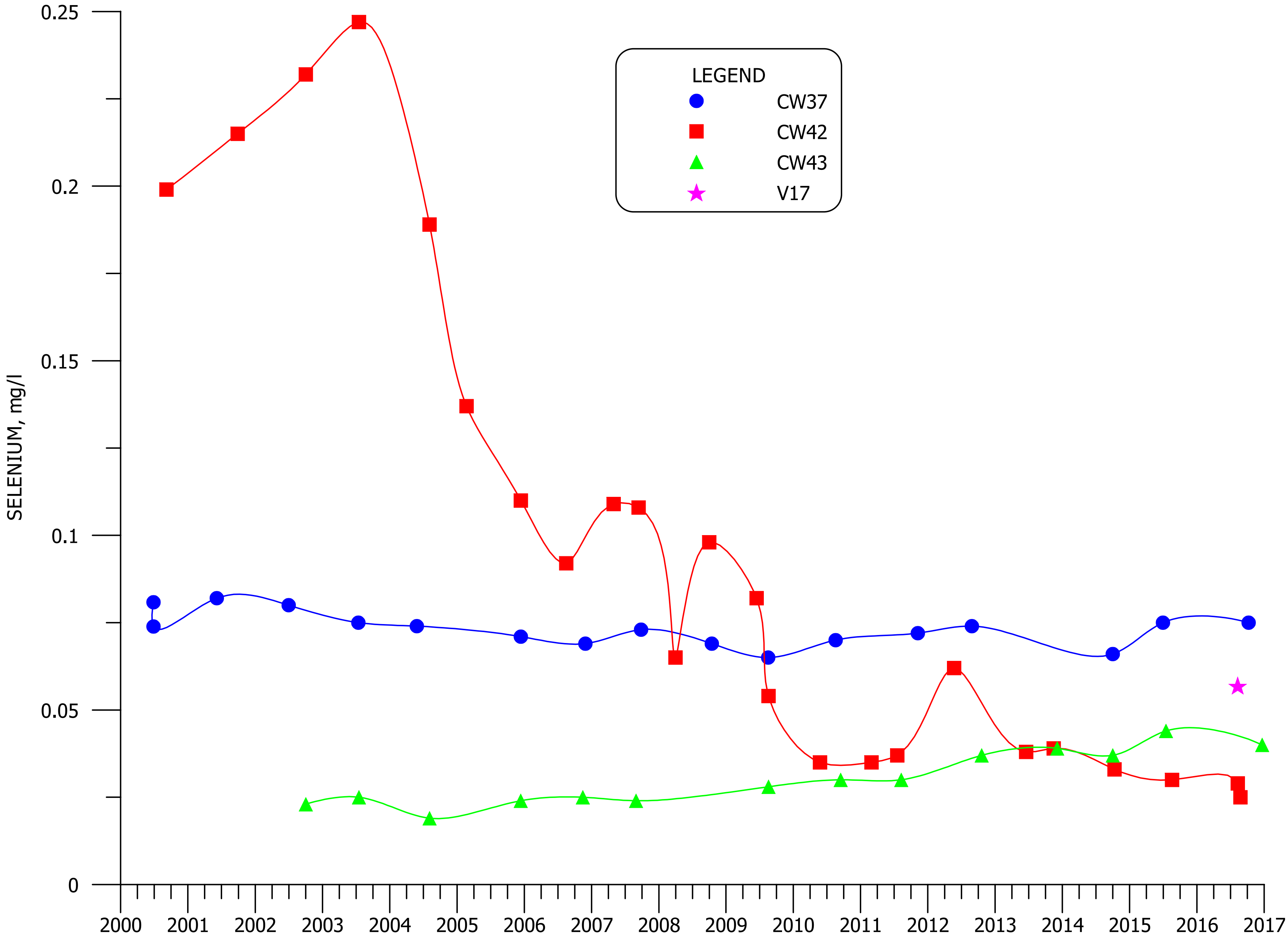

FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW37, CW42, CW43 AND V17

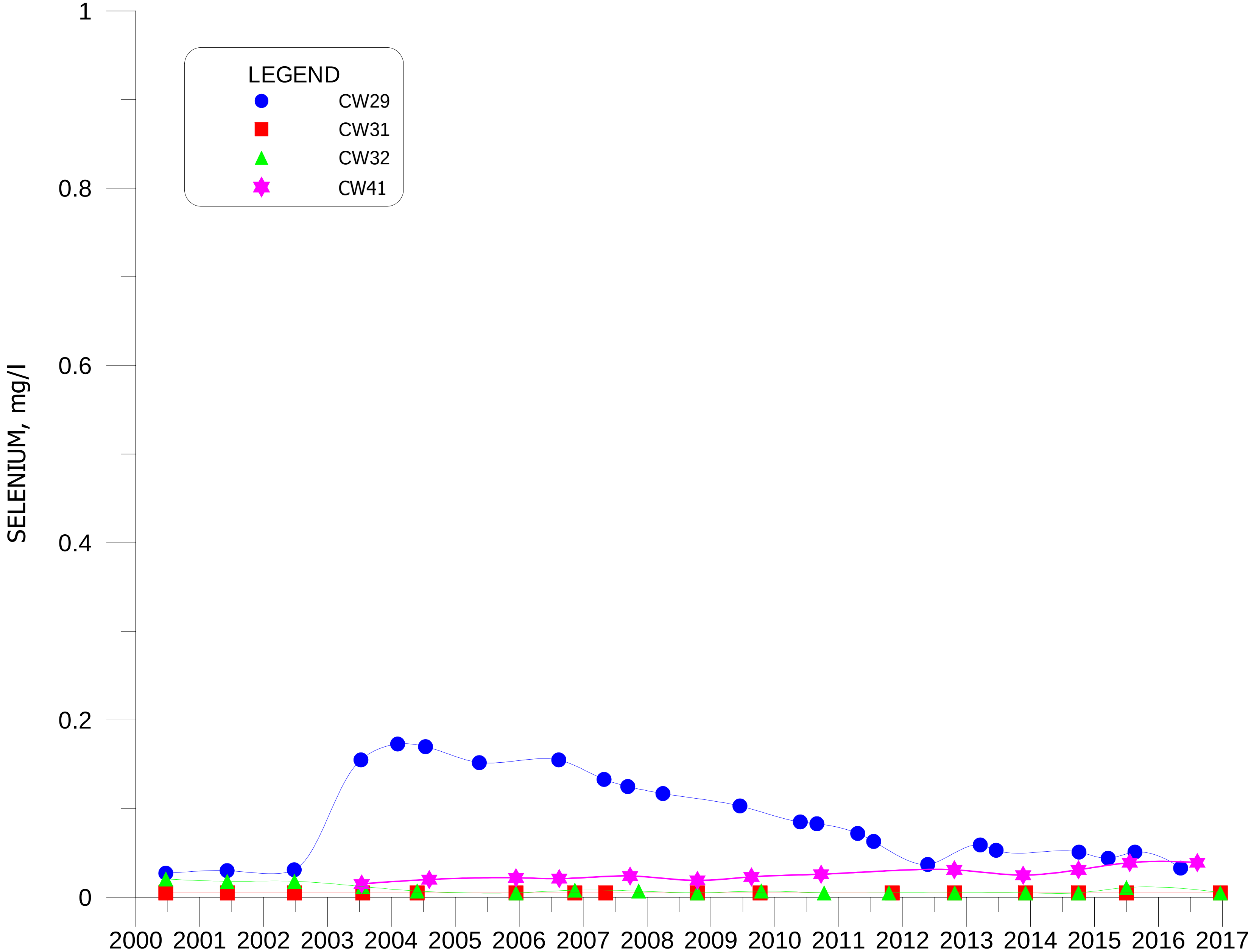

FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW29, CW31, CW32 AND CW41.

SECTION 8

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GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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TABLES

8.0 SAN ANDRES AQUIFER MONITORING

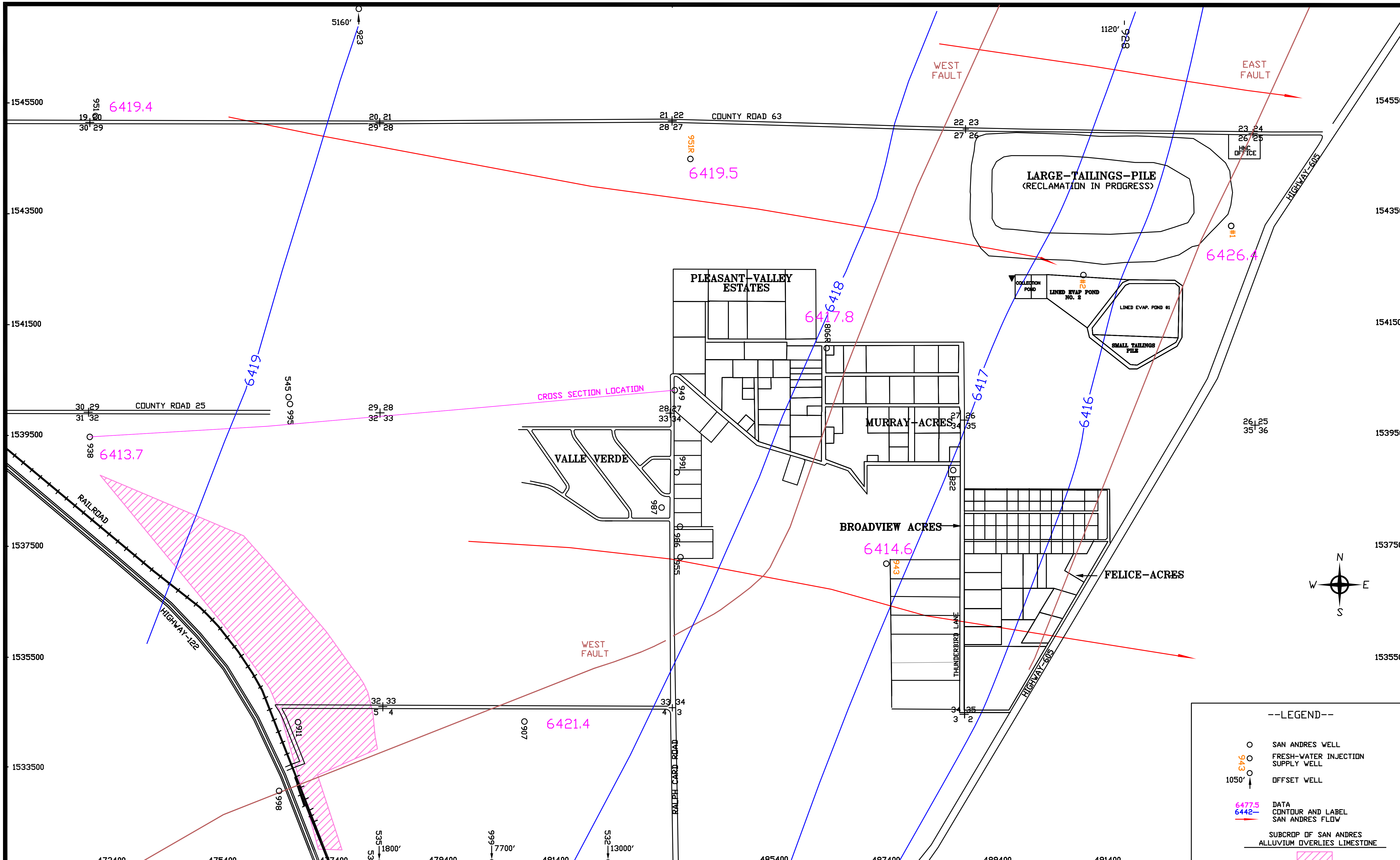
8.1 SAN ANDRES WELL COMPLETIONS AND WATER LEVELS

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. 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. 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 2016 (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.

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 two years.



SCALE: 1" = 1000'
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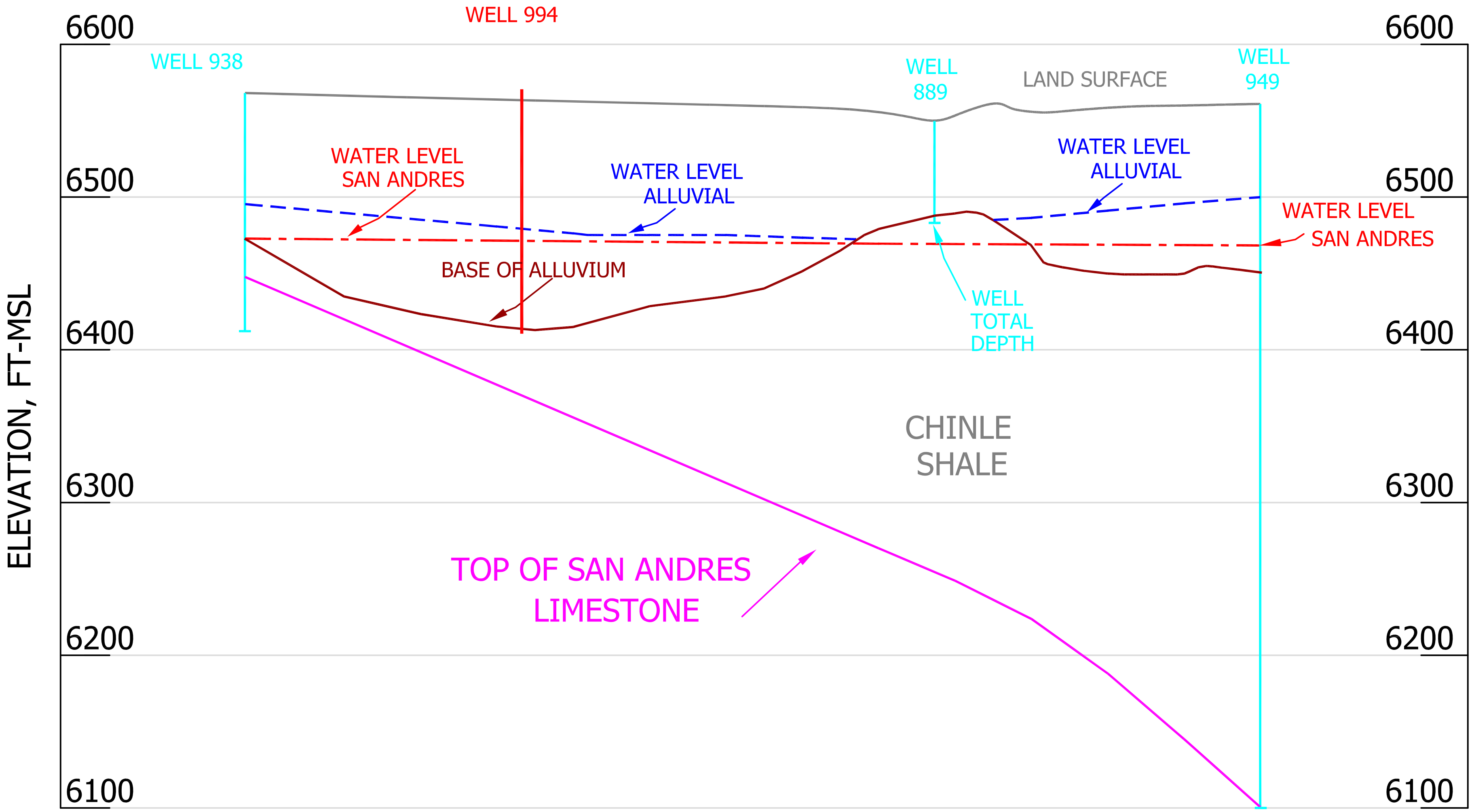
DATE: 2/9/17

FIGURE 8.1-1. LOCATION OF SAN ANDRES WELLS AND WATER-LEVEL ELEVATION FOR THE SAN ANDRES AQUIFER, 2016, 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

DATE: 02/09/17

HORIZONTAL SCALE: 1" = 1600'

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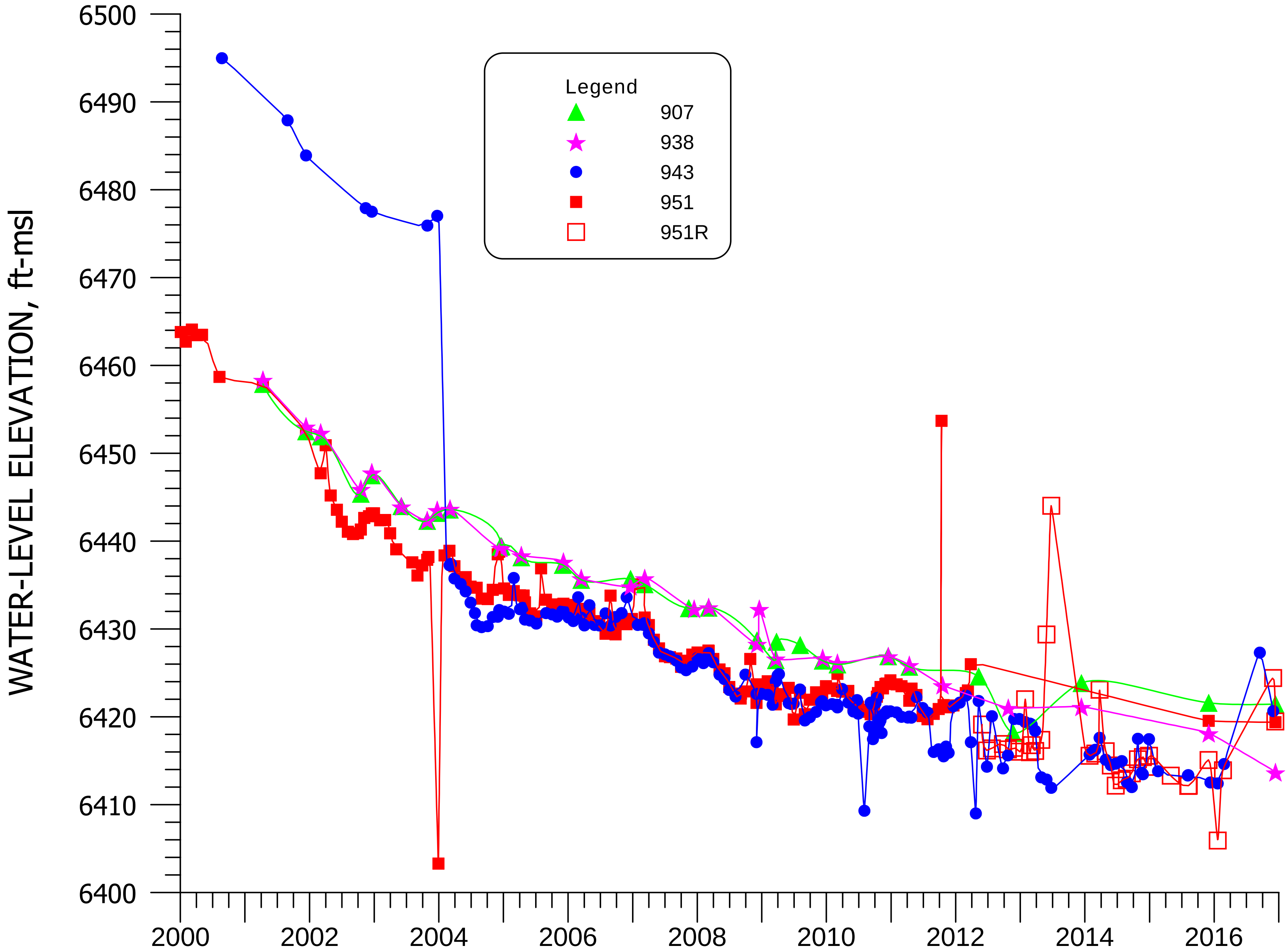


FIGURE 8.1-3. WATER-LEVEL ELEVATION FOR SAN ANDRES WELLS 907, 938, 943, 951, AND 951R.

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	12/12/2016	157.350	6426.41	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	---	2/15/2016	206.619	6369.04	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	12/16/2010	120.010	6432.56	0.0	6552.57	---	---	S	-
0535	1530100	478450	198.0	12.0	12/17/2010	117.849	6422.15	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	2/13/2008	135.600	6421.40	0.0	6557.00	790	5767	S	790-875
0907	1534250	480800	360.0	16.0	12/13/2016	124.150	6421.45	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	4/6/1994	6464.97	157.63	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	---	---	12/13/2016	155.100	6413.70	0.0	6568.80	95	6474	A	---
										120	6449	S	-
0943	1537222	487407	978.0	18.0	11/30/2016	135.240	6420.67	0.0	6555.91	704	5852	S	703-978
0949	1540350	483600	551.0	6.0	2/13/2008	130.600	6431.70	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	12/13/2016	154.300	6419.40	0.9	6573.70	110	6463	A	---
										227	6346	S	241-275
0951R	1544500	484100	525.0	8.0	12/12/2016	157.300	6419.48	1.0	6576.78	65	6511	A	---
										420	6156	S	415-525
0955	1537338	483699	498.0	5.0	11/3/1995	78.0500	6471.95	0.2	6550.00	40	6510	A	---
										420	6130	S	385-498
0986	1537894	483690	467.0	5.0	8/23/2008	124	6526.00	0.8	6650.00	65	6584	A	---

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	8/23/2008	124	6526.00	0.8	6650.00	85	6564	L	---
										415	6234	S	420-467
0987	1538226	483357	500.0	5.0	11/3/1995	54.4799	6595.52	1.0	6650.00	70	6579	A	---
										385	6264	S	425-470
0991	1538873	483630	500.0	---	8/26/2008	126.819	6524.18	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

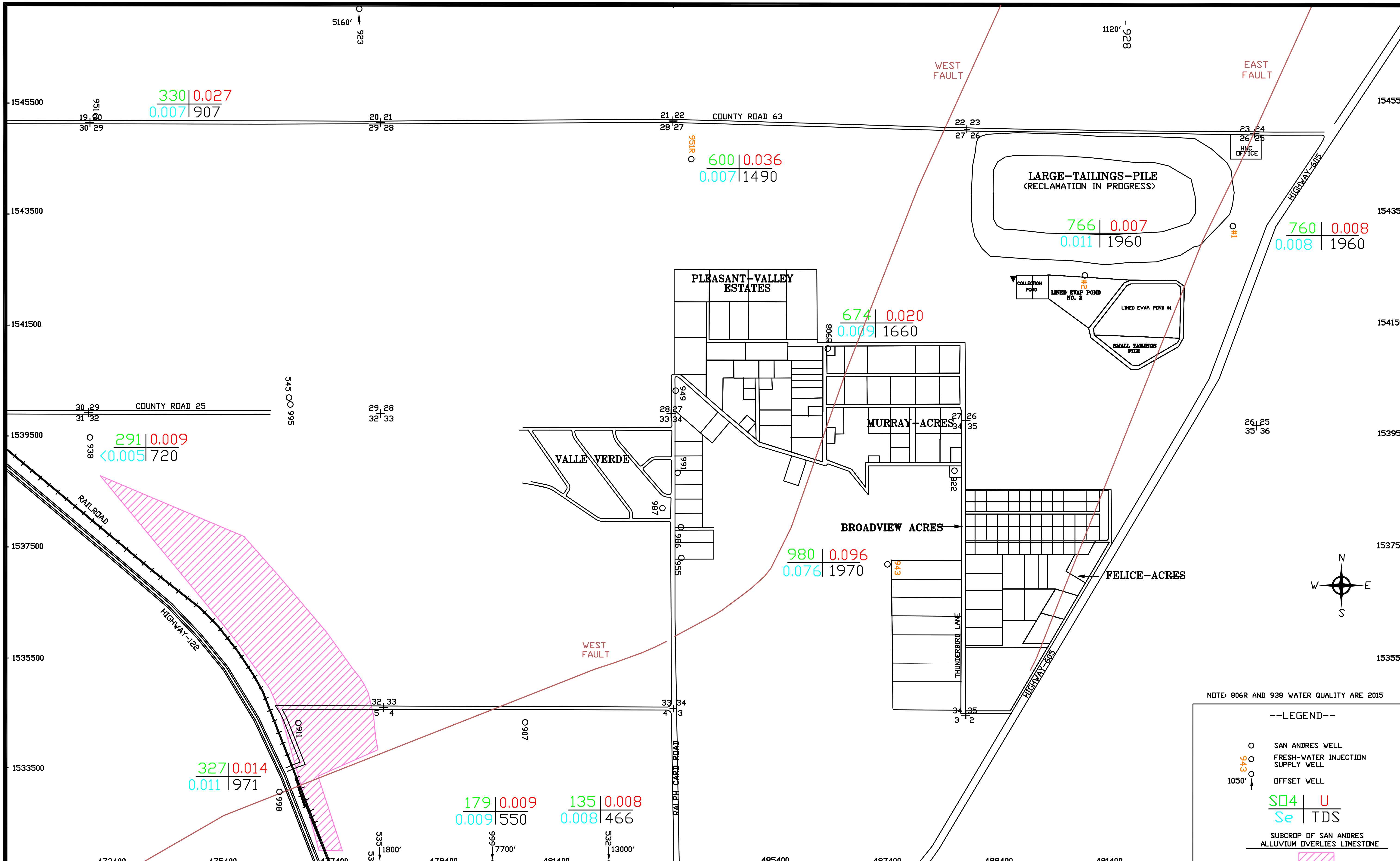
8.2 SAN ANDRES WATER QUALITY

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 2016 data for sulfate, TDS, uranium and selenium concentrations in the San Andres aquifer. Sulfate concentrations vary from 135 mg/l to 980 mg/l 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 1970 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 2016 with the largest value of 0.096 mg/l in well 943. Selenium concentrations in the San Andres aquifer vary from <0.005 to 0.076 mg/l. All measured molybdenum concentrations are less than 0.03 mg/l.

Figure 8.2-1 presents sulfate concentrations with time for Homestake's wells 943, 951, 951R, Deep #1 and #2 wells. This data shows that sulfate concentrations in 2016 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. Additional monitoring with time is needed to be evaluated to determine if the sulfate from well 943 consistently stays at this higher value. Updated sulfate concentrations for wells 951, 951R, #1 Deep and #2 Deep were obtained and are consistent with previous data. Figure 8.2-3 presents the sulfate concentrations with time for San Andres wells 532, 806R, 938, 998 and 999. Wells 532, 998 and 999 are three of the Milan water supply wells and they show consistent sulfate concentrations for 2016. The samples from wells 998 and 999 seem to have been switched in 2015.

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. This data shows that TDS and chloride concentrations in 2016 show very similar plots to sulfate.

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 2016 show consistent and small concentrations for these two minor constituents with an increase in the second half of 2016 in well 943. Additional sampling with time is needed to determine if these increases prevail.



SCALE: 1" = 1000'

C:\PROJECTS\2017-06\1600SAN16 bmw

DATE: 2/9/17

FIGURE 8.2-1. LOCATION OF SAN ANDRES WELLS AND WATER QUALITY DATA FOR THE SAN ANDRES AQUIFER 2016, mg/l

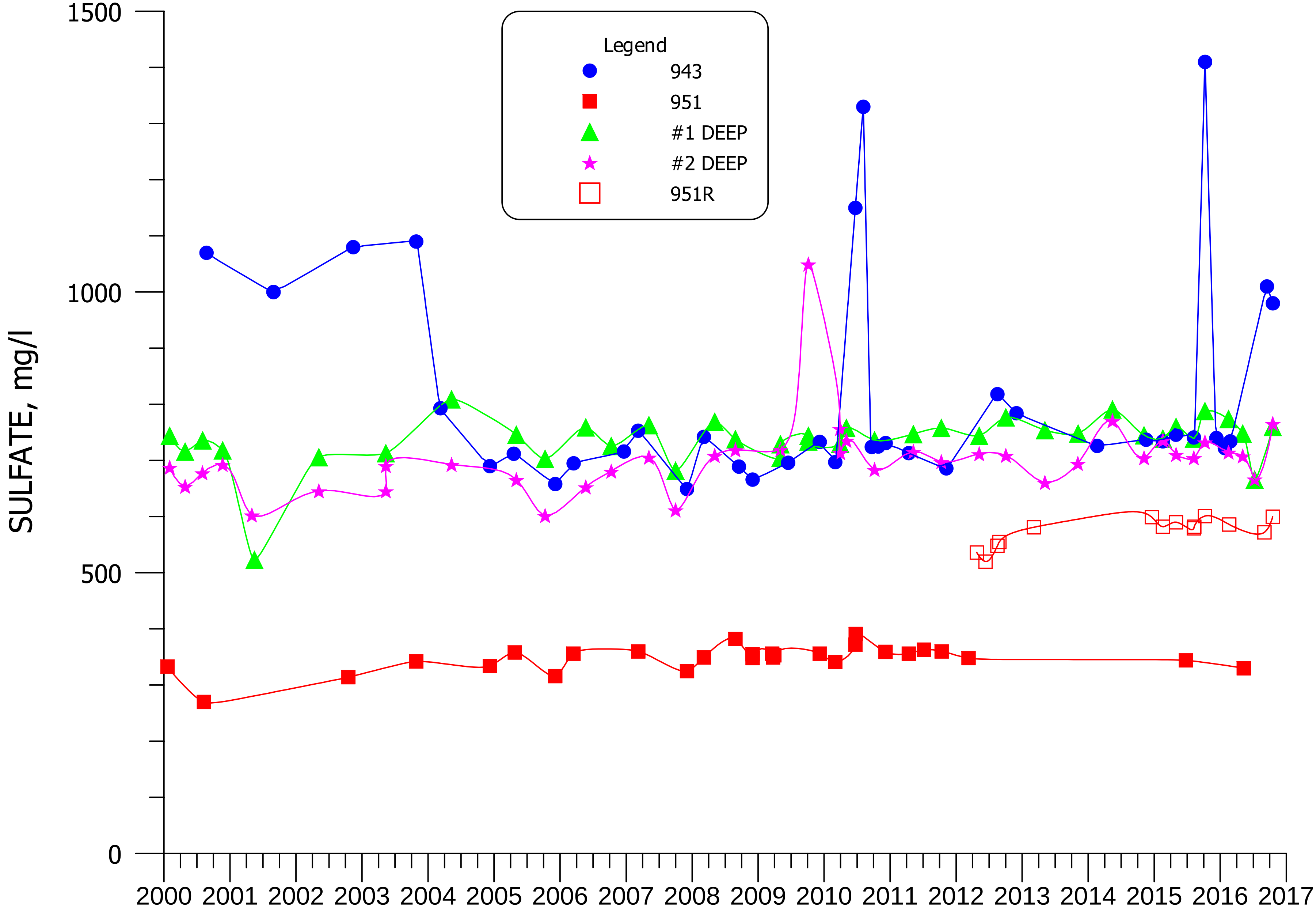


FIGURE 8.2-2. SULFATE CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

8.2-5

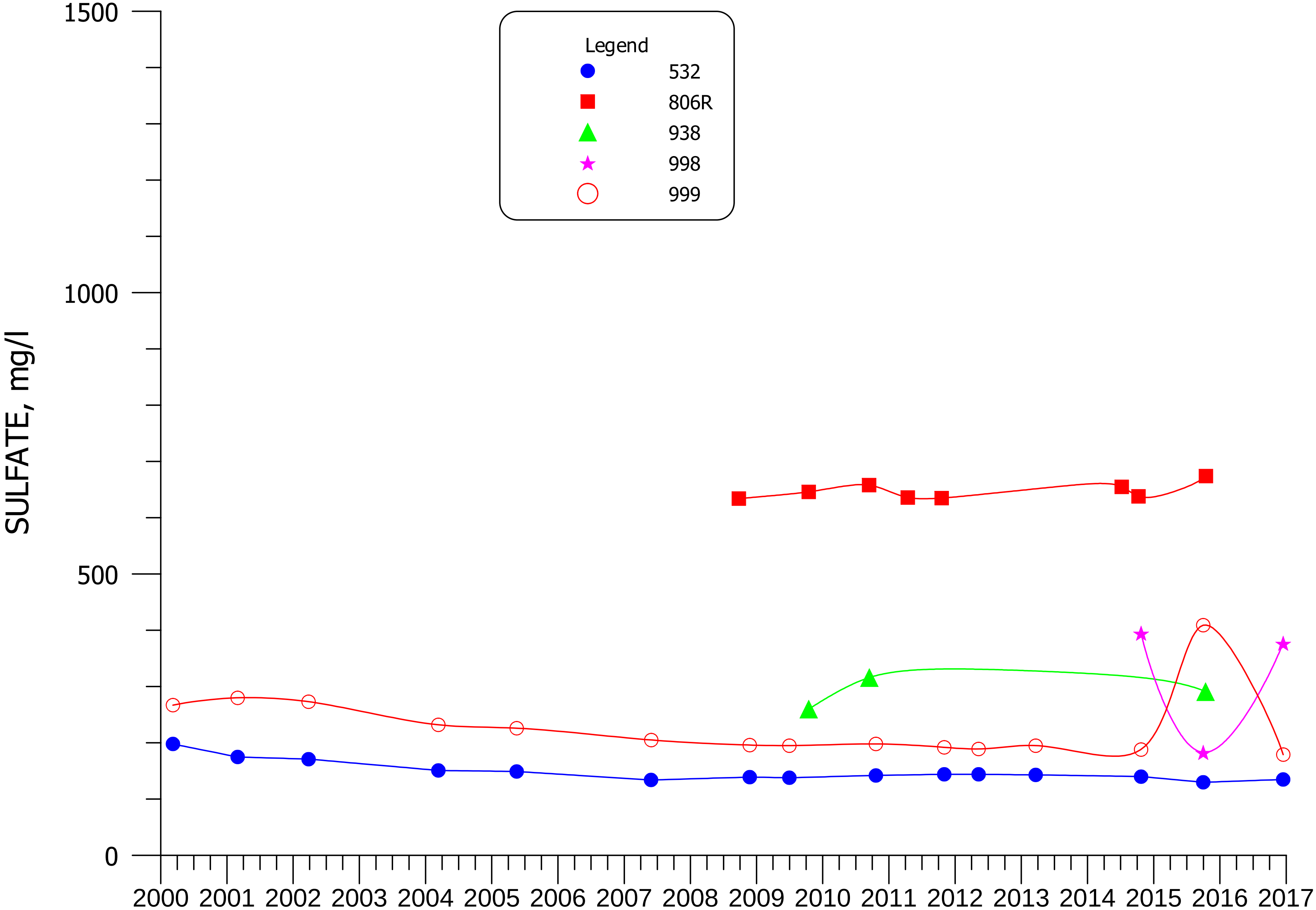


FIGURE 8.2-3. SULFATE CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

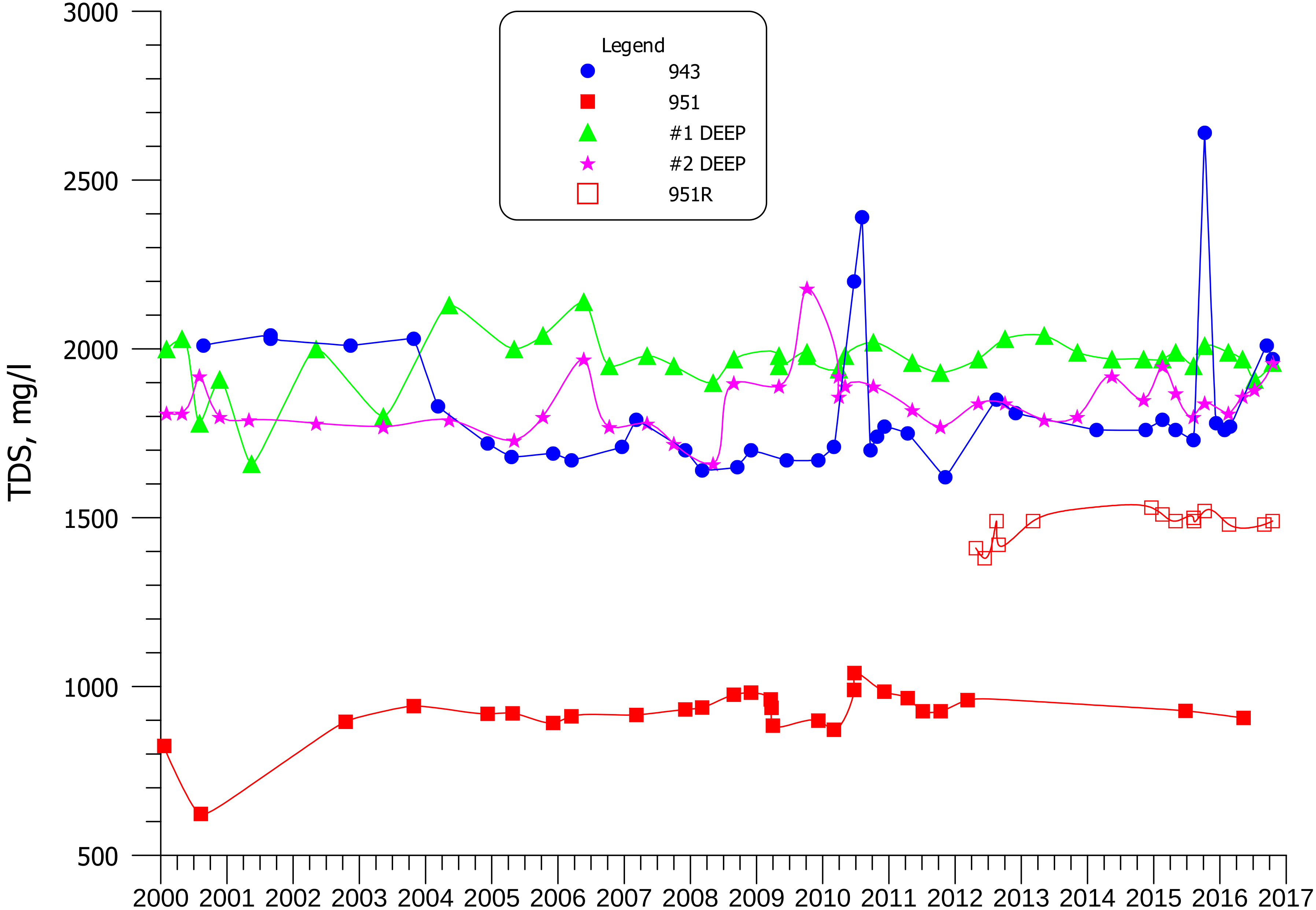


FIGURE 8.2-4. TDS CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

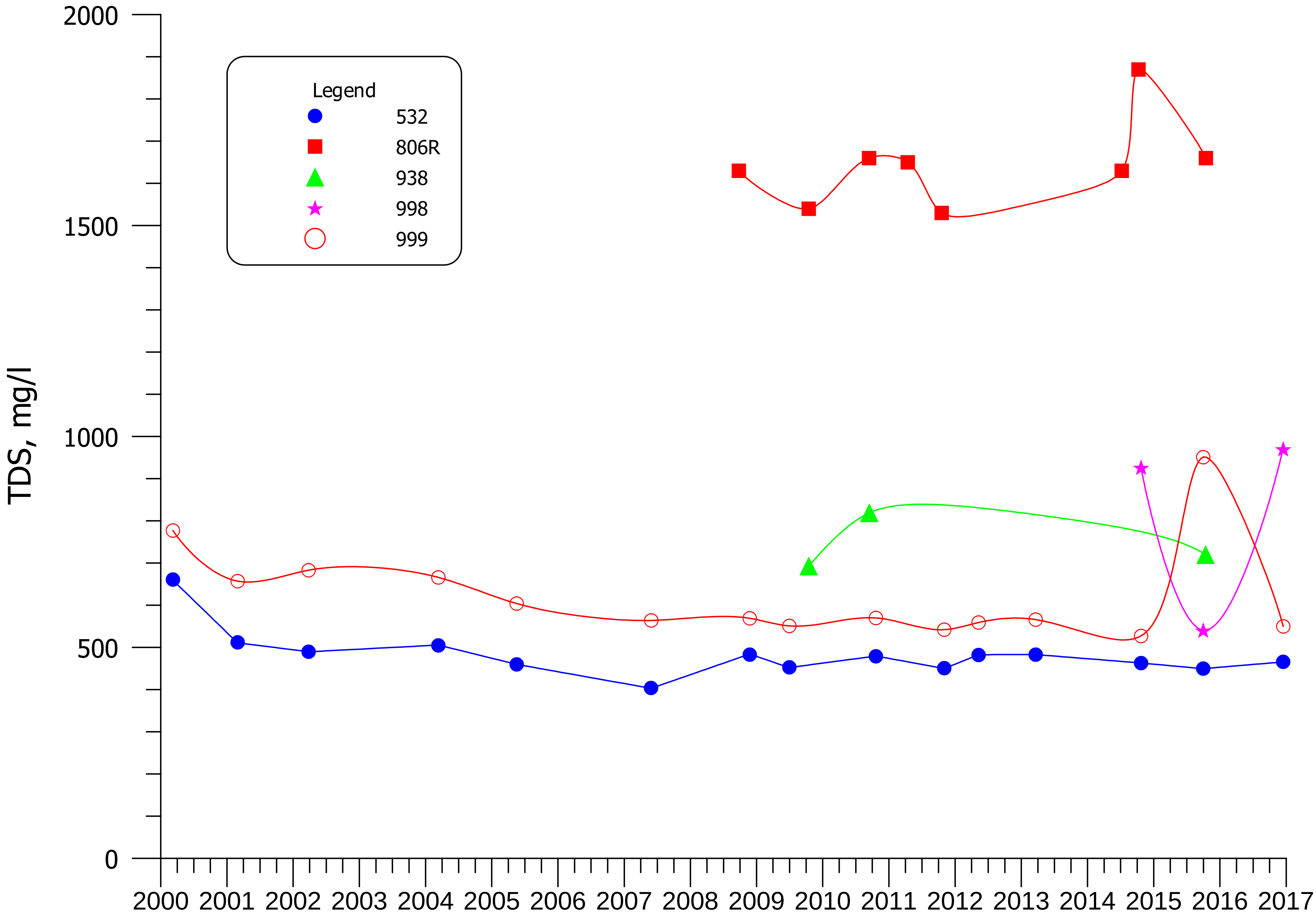


FIGURE 8.2-5. TDS CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

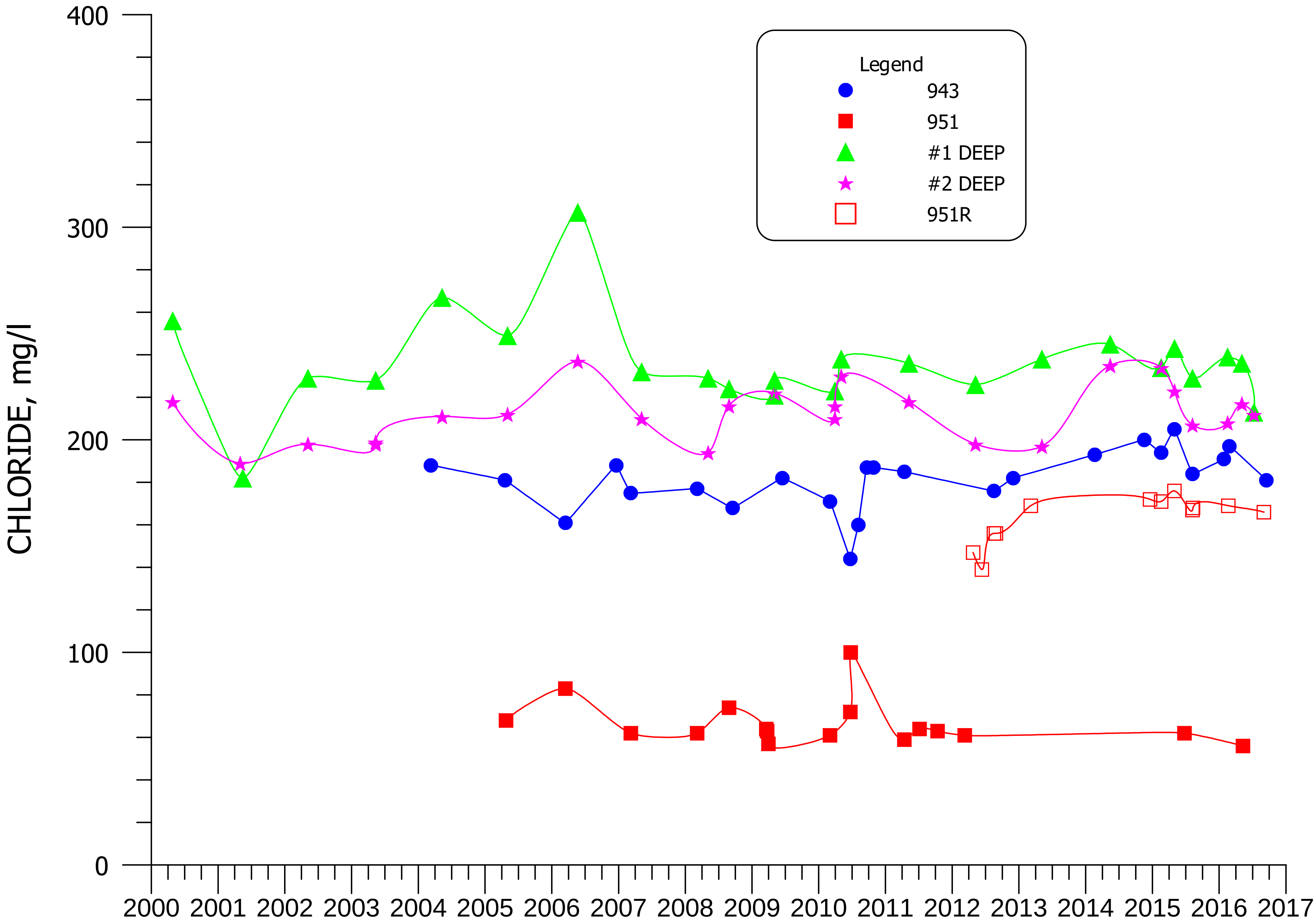


FIGURE 8.2-6. CHLORIDE CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

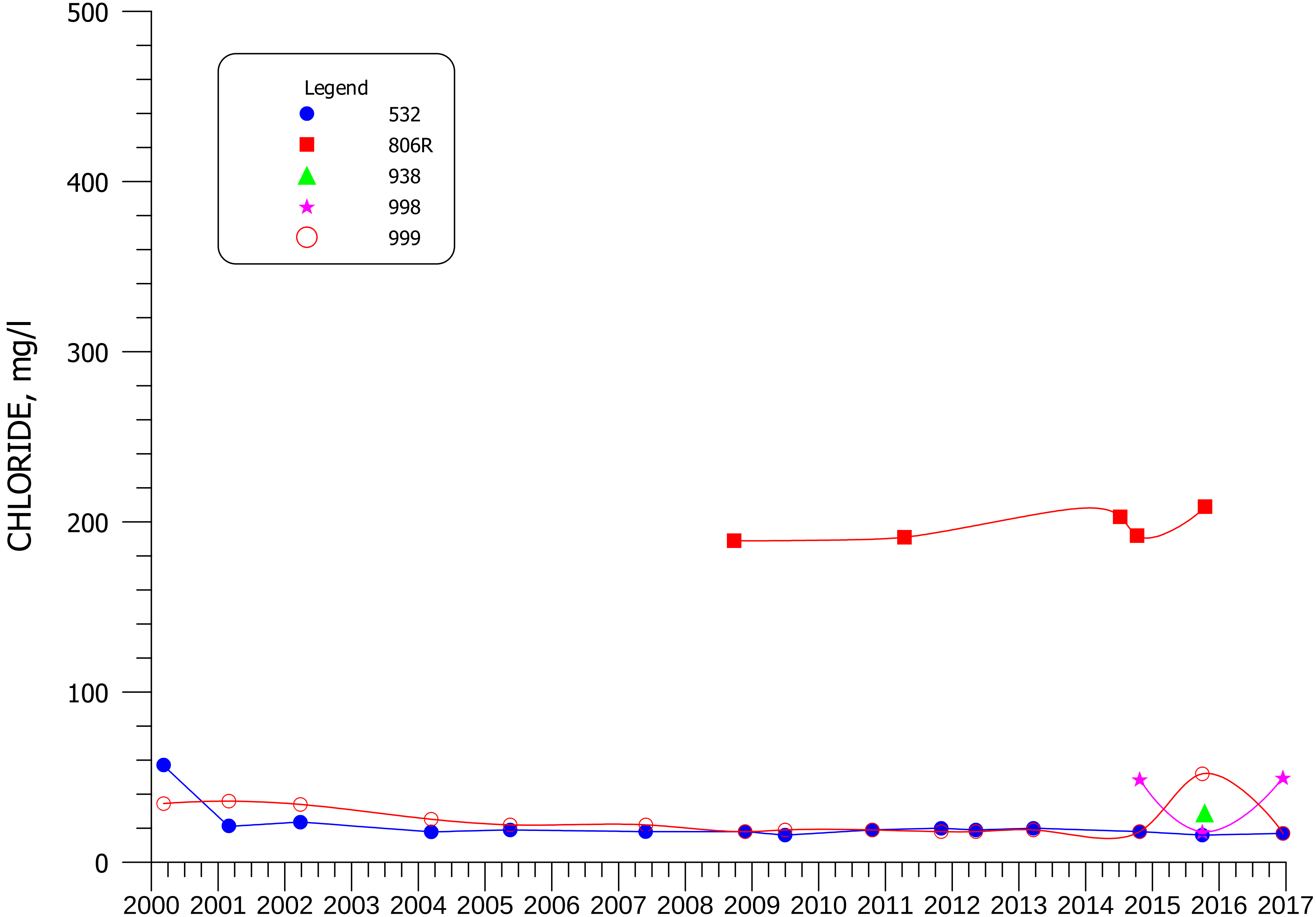


FIGURE 8.2-7. CHLORIDE CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

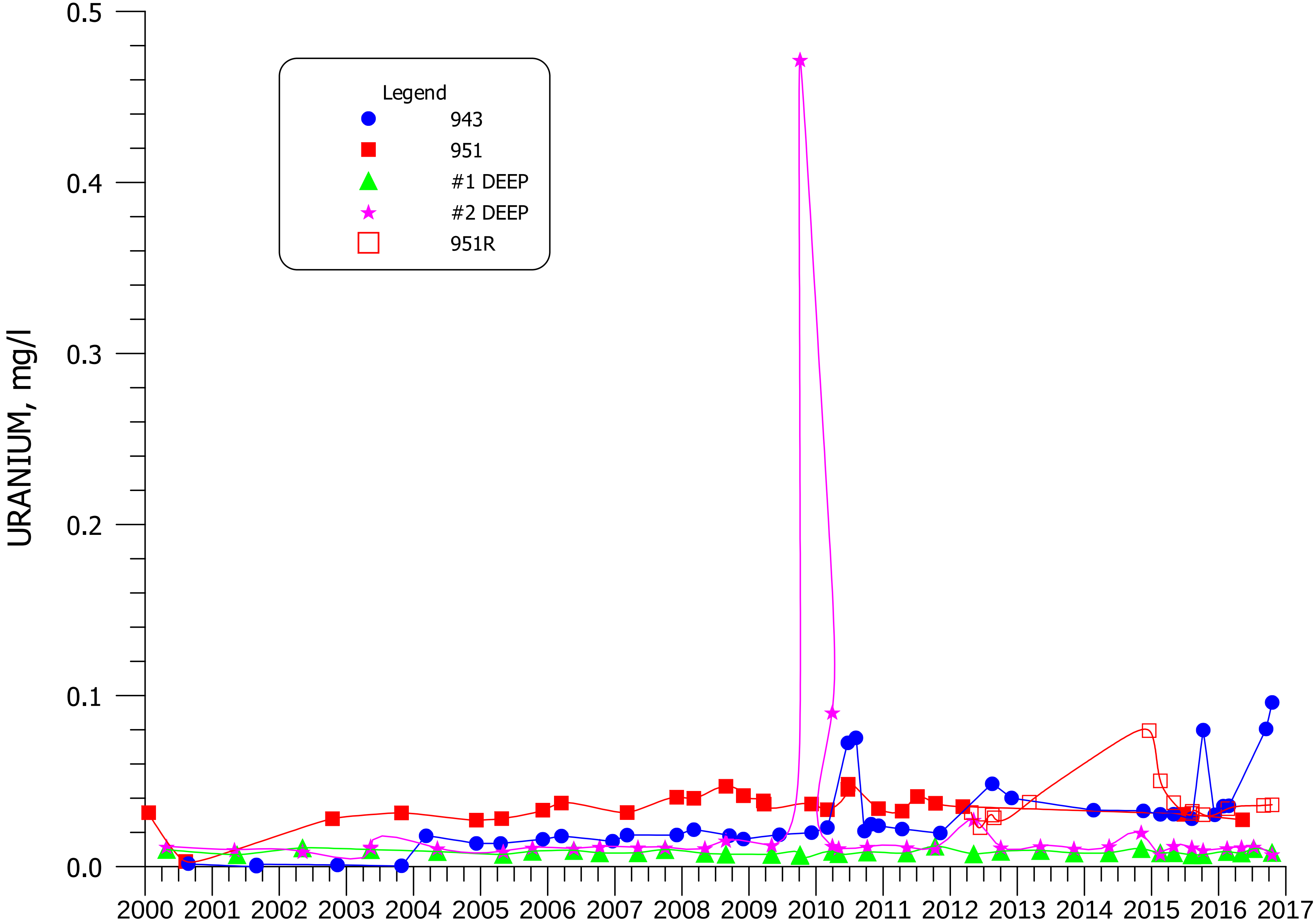


FIGURE 8.2-8. URANIUM CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

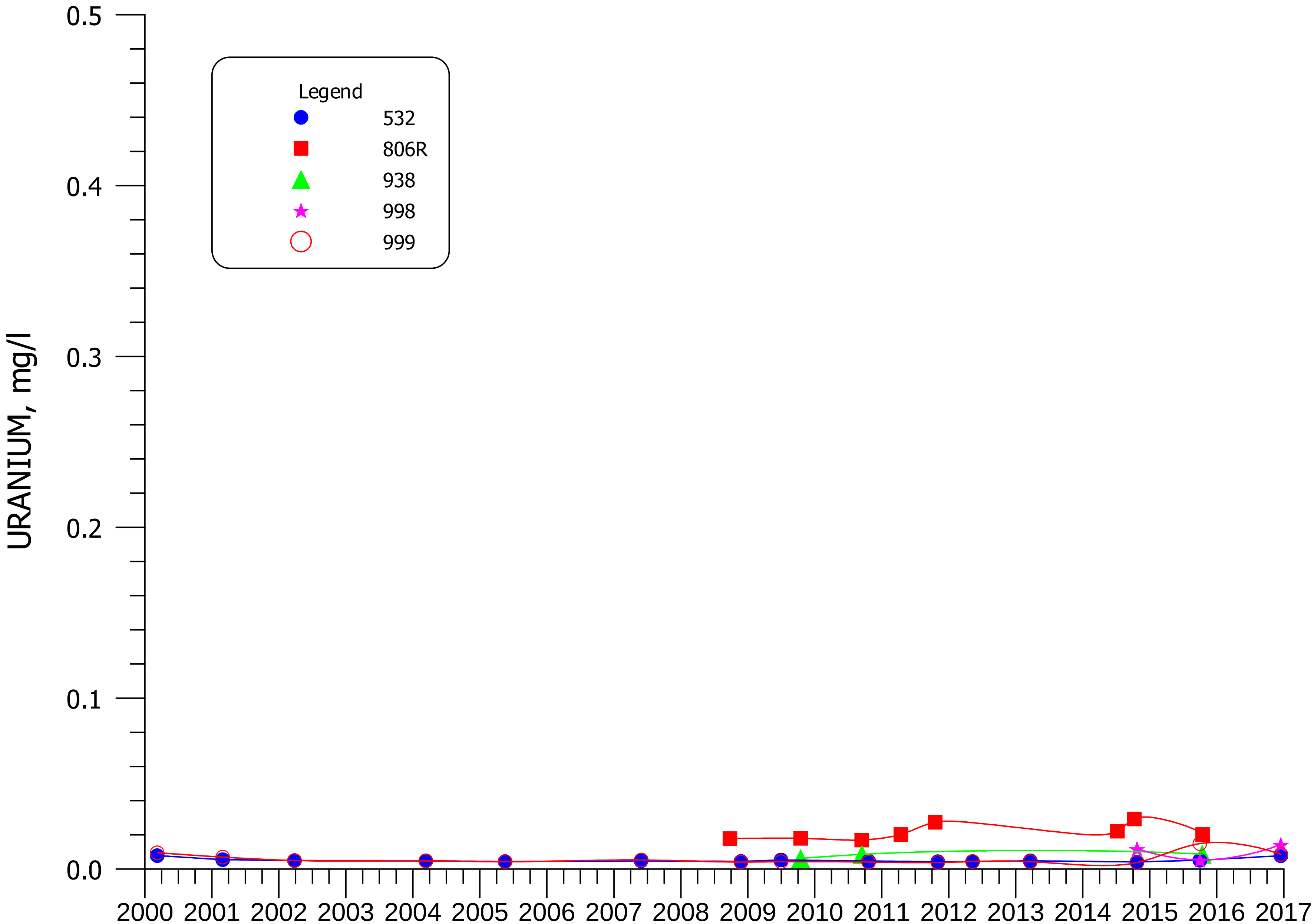


FIGURE 8.2-9. URANIUM CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

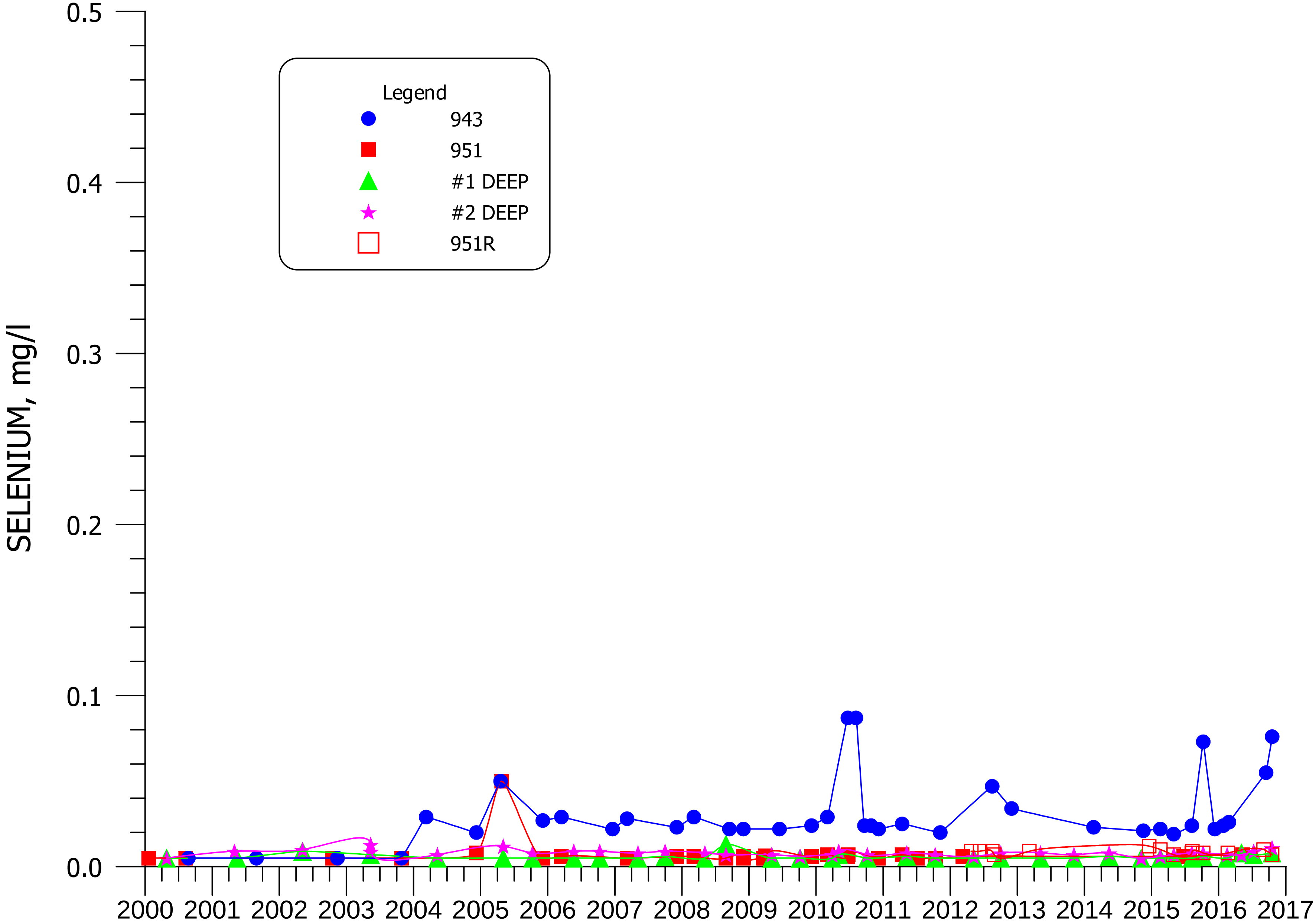


FIGURE 8.2-10. SELENIUM CONCENTRATIONS FOR WELLS 943, 951, 951R, #1 DEEP, AND #2 DEEP.

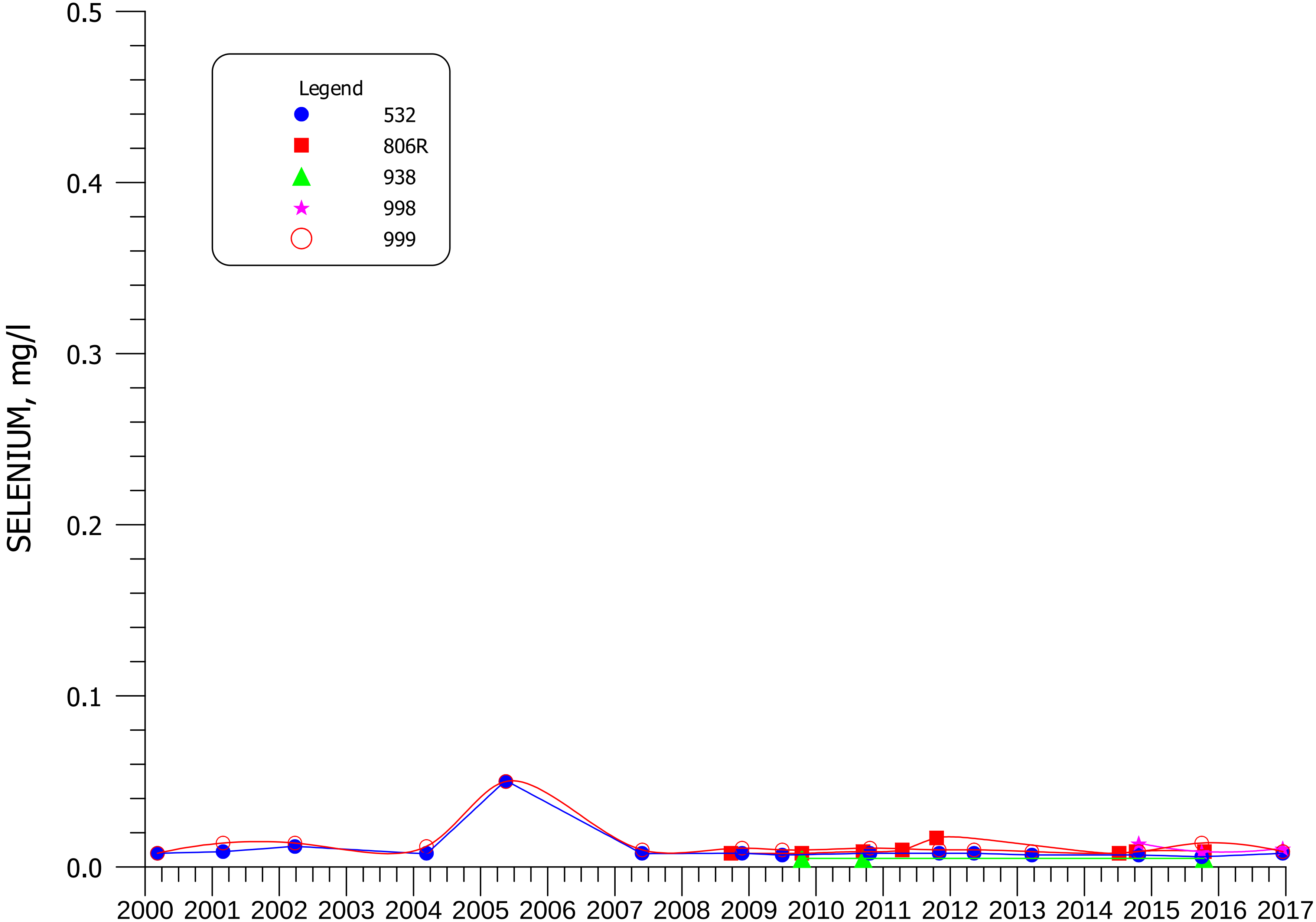


FIGURE 8.2-11. SELENIUM CONCENTRATIONS FOR WELLS 943, 532, 806R, 938, 989 AND 998.

SECTION 9

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GROUND WATER MONITORING
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APPENDIX A

WATER LEVELS

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GROUND-WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX A

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

0690

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	36.62	6545.44

0691

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	42.43	6546.38

0892

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	38.52	6548.69

1C

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/13/2016	38.22	6549.77

1F

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/29/2016	38.92	6548.46

1H

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/13/2016	> 55.45	< 6530.94

1I

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/13/2016	> 50.25	< 6548.10

1M

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/29/2016	26.75	6548.78

1N

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	30.20	6560.65

1O

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	> 44.02	< 6550.92

1P

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	32.48	6552.76

1Q

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	27.25	6555.86

1R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	28.25	6557.74

1T

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	26.17	6558.74

1U

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	29.63	6556.59

1V

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	28.00	6556.94

B

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	32.12	6538.78
1/11/2016	32.12	6538.78
1/18/2016	32.55	6538.35
1/25/2016	33.95	6536.95
2/1/2016	32.55	6538.35
2/8/2016	33.50	6537.40
2/15/2016	33.12	6537.78
2/22/2016	31.35	6539.55
2/29/2016	31.18	6539.72
3/7/2016	31.11	6539.79
3/14/2016	31.48	6539.42
3/21/2016	31.62	6539.28
3/28/2016	31.60	6539.30
4/4/2016	32.18	6538.72
4/11/2016	32.30	6538.60
4/18/2016	32.48	6538.42
4/25/2016	32.31	6538.59
5/2/2016	32.64	6538.26
5/9/2016	32.49	6538.41
5/16/2016	32.70	6538.20
5/23/2016	32.20	6538.70
5/30/2016	32.37	6538.53
6/6/2016	32.63	6538.27
6/13/2016	33.14	6537.76
6/20/2016	33.10	6537.80
6/27/2016	33.70	6537.20
7/5/2016	33.35	6537.55
7/11/2016	33.35	6537.55
7/18/2016	33.52	6537.38
7/25/2016	33.34	6537.56

B1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	35.90	6535.92

B12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/18/2016	35.06	6537.96
12/12/2016	36.50	6536.52

BA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	32.91	6538.67
1/11/2016	32.91	6538.67
1/18/2016	33.38	6538.20
1/25/2016	34.41	6537.17
2/1/2016	33.90	6537.68
2/8/2016	34.69	6536.89
2/15/2016	34.00	6537.58
2/22/2016	32.53	6539.05
2/29/2016	32.82	6538.76
3/7/2016	33.33	6538.25
3/14/2016	34.63	6536.95
3/21/2016	34.65	6536.93
3/28/2016	35.15	6536.43
4/4/2016	35.56	6536.02
4/11/2016	35.37	6536.21
4/18/2016	35.36	6536.22
4/25/2016	35.60	6535.98
5/2/2016	35.34	6536.24
5/9/2016	34.91	6536.67
5/16/2016	35.40	6536.18
5/23/2016	34.75	6536.83
5/30/2016	32.67	6538.91
6/6/2016	34.89	6536.69
6/13/2016	35.97	6535.61
6/20/2016	36.00	6535.58
6/27/2016	37.15	6534.43
7/5/2016	35.60	6535.98
7/11/2016	35.46	6536.12
7/18/2016	35.66	6535.92
7/25/2016	35.39	6536.19

BC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	33.89	6540.72

C6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	54.00	6530.89

C8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	53.75	6530.74
9/29/2016	7.37	6577.12

C9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	30.50	6554.05

C10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	44.26	6541.00
9/29/2016	7.41	6577.85

C11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/29/2016	39.47	6541.91

C12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	34.10	6546.45
9/29/2016	43.80	6536.75

D1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	37.20	6533.70
7/11/2016	37.67	6533.23

DC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	36.52	6534.79

DD

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/9/2016	46.30	6546.29
5/17/2016	46.02	6546.57
10/6/2016	47.50	6545.09

DD2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/9/2016	45.30	6547.98
5/17/2016	44.98	6548.30
10/7/2016	45.26	6548.02

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

DT

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	43.50	6540.31
1/11/2016	43.50	6540.31
1/18/2016	46.38	6537.43
1/25/2016	49.19	6534.62
2/1/2016	48.35	6535.46
2/8/2016	48.21	6535.60
2/15/2016	43.62	6540.19
2/22/2016	43.29	6540.52
2/29/2016	47.98	6535.83
3/14/2016	49.66	6534.15
3/21/2016	49.48	6534.33
3/28/2016	46.60	6537.21
4/4/2016	50.28	6533.53
4/11/2016	45.74	6538.07
4/18/2016	47.86	6535.95
4/25/2016	47.73	6536.08
5/2/2016	50.79	6533.02
5/9/2016	47.86	6535.95
5/16/2016	47.20	6536.61
5/23/2016	48.00	6535.81
5/30/2016	46.55	6537.26
6/6/2016	46.66	6537.15
6/13/2016	46.90	6536.91
6/20/2016	48.10	6535.71
6/27/2016	51.98	6531.83
7/5/2016	52.55	6531.26
7/11/2016	47.98	6535.83
7/18/2016	47.91	6535.90
7/25/2016	44.58	6539.23

DZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	44.70	6545.83
1/11/2016	44.70	6545.83
1/18/2016	45.93	6544.60
1/25/2016	46.33	6544.20
2/1/2016	47.80	6542.73
2/8/2016	48.39	6542.14
2/15/2016	46.82	6543.71
2/22/2016	46.14	6544.39
2/29/2016	48.14	6542.39
3/7/2016	50.25	6540.28
3/14/2016	51.30	6539.23
3/21/2016	44.06	6546.47
3/28/2016	51.80	6538.73
4/4/2016	52.39	6538.14
4/11/2016	52.75	6537.78
4/18/2016	52.90	6537.63
4/25/2016	52.60	6537.93
5/2/2016	53.97	6536.56
5/9/2016	52.93	6537.60
5/16/2016	52.30	6538.23
5/23/2016	25.50	6565.03
5/30/2016	49.02	6541.51
6/6/2016	49.73	6540.80
6/13/2016	50.09	6540.44
6/20/2016	52.20	6538.33
6/27/2016	55.02	6535.51
7/5/2016	52.15	6538.38
7/11/2016	52.45	6538.08
7/18/2016	52.44	6538.09
7/25/2016	51.70	6538.83

F

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	29.05	6535.77
9/19/2016	29.98	6534.84
12/13/2016	30.14	6534.68

FB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	30.78	6534.88
9/19/2016	31.41	6534.25

GA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	30.70	6532.09

GF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	33.10	6532.91

GH

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	30.09	6532.67
9/19/2016	29.80	6532.96
12/12/2016	30.20	6532.56

GN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/15/2016	32.71	6535.26

GV

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	46.90	6530.48
12/21/2016	46.77	6530.61

GW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	31.70	6533.57

GW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	31.90	6534.18

K4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/20/2016	55.62	6546.40
7/18/2016	67.09	6534.93

K5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/18/2016	64.69	6537.04
7/18/2016	65.88	6535.85

K7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/18/2016	60.00	6541.53
7/18/2016	61.27	6540.26

K8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/21/2016	65.60	6534.89
7/18/2016	67.30	6533.19

K9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/18/2016	63.00	6537.34
7/18/2016	61.55	6538.79

K11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/18/2016	62.40	6538.21

KZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	27.53	6544.19
1/11/2016	27.53	6544.19
1/18/2016	27.92	6543.80
1/25/2016	28.60	6543.12
2/1/2016	27.84	6543.88
2/8/2016	28.76	6542.96
2/15/2016	28.78	6542.94
2/22/2016	28.37	6543.35
2/29/2016	28.69	6543.03
3/7/2016	28.70	6543.02
3/21/2016	29.70	6542.02
3/28/2016	29.95	6541.77
4/4/2016	30.32	6541.40
4/11/2016	30.33	6541.39
4/18/2016	30.32	6541.40
4/25/2016	30.34	6541.38
5/2/2016	30.80	6540.92
5/9/2016	30.81	6540.91
5/16/2016	33.10	6538.62
5/23/2016	29.70	6542.02
5/30/2016	29.54	6542.18
6/6/2016	29.85	6541.87
6/13/2016	30.20	6541.52
6/20/2016	31.50	6540.22
6/27/2016	30.38	6541.34
7/5/2016	30.25	6541.47
7/11/2016	29.62	6542.10
7/18/2016	29.61	6542.11
7/25/2016	29.44	6542.28

L

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/26/2016	56.96	6518.01

L5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/19/2016	34.90	6541.17
4/12/2016	35.53	6540.54

L6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/12/2016	26.34	6548.30
10/26/2016	27.95	6546.69

L7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/19/2016	41.83	6534.78
4/12/2016	54.24	6522.37

L8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/19/2016	29.10	6547.39
4/12/2016	30.06	6546.43
10/26/2016	9.74	6566.75

L9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/19/2016	46.65	6530.58
4/12/2016	47.63	6529.60

L10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/19/2016	41.85	6534.98
4/12/2016	43.14	6533.69
10/26/2016	44.03	6532.80

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
M5		
12/12/2016	39.40	6535.94
M6		
12/12/2016	57.45	6517.59
M7		
3/16/2016	54.24	6518.61
12/12/2016	54.50	6518.35
M9		
3/16/2016	69.75	6507.06
12/12/2016	52.20	6524.61
M10		
3/16/2016	52.59	6520.77
12/12/2016	56.60	6516.76
MA		
12/12/2016	39.45	6532.77
MC		
12/12/2016	41.16	6530.90
MF		
12/12/2016	44.50	6527.78
MH		
12/12/2016	48.90	6525.02
MJ		
12/12/2016	> 58.90	< 6514.04
ML		
3/16/2016	48.50	6524.20
12/12/2016	49.60	6523.10
MN		
12/12/2016	60.10	6517.46
MQ		
3/16/2016	69.99	6504.31
MU		
12/12/2016	35.95	6538.24
MW		
12/12/2016	59.50	6515.41
MX		
3/15/2016	47.96	6520.65
MY		
12/16/2016	53.66	6519.90
MZ		
3/16/2016	61.41	6515.23
12/12/2016	60.00	6516.64
NC		
12/13/2016	39.82	6546.01
P		
5/16/2016	39.87	6547.39
10/26/2016	40.28	6546.98
Q		
5/17/2016	42.40	6551.42
10/6/2016	65.63	6528.19
10/26/2016	42.31	6551.51
R		
5/17/2016	40.15	6563.88
10/26/2016	40.02	6564.01
S		
12/12/2016	41.90	6539.27
S1		
1/4/2016	33.20	6541.99
1/11/2016	33.20	6541.99
1/18/2016	34.81	6540.38
1/25/2016	35.18	6540.01
2/8/2016	35.77	6539.42
2/15/2016	34.73	6540.46
2/22/2016	34.37	6540.82
2/29/2016	33.56	6541.63
3/14/2016	34.94	6540.25
3/21/2016	34.90	6540.29
3/28/2016	35.01	6540.18
4/4/2016	35.34	6539.85
4/11/2016	35.44	6539.75
4/18/2016	35.65	6539.54
4/25/2016	35.45	6539.74
5/2/2016	35.54	6539.65
5/9/2016	35.24	6539.95
5/16/2016	34.80	6540.39
5/23/2016	34.80	6540.39
5/30/2016	34.75	6540.44
6/6/2016	34.70	6540.49
6/13/2016	35.30	6539.89
6/20/2016	35.70	6539.49
6/27/2016	35.84	6539.35
7/5/2016	35.65	6539.54
7/11/2016	35.29	6539.90
7/18/2016	35.28	6539.91
7/25/2016	34.46	6540.73
S2		
1/4/2016	34.92	6538.80
1/11/2016	34.92	6538.80
1/18/2016	35.15	6538.57
1/19/2016	34.87	6538.85
1/25/2016	38.82	6534.90
2/1/2016	34.80	6538.92
2/8/2016	37.70	6536.02
2/15/2016	34.69	6539.03
2/22/2016	34.13	6539.59
2/29/2016	34.26	6539.46
3/7/2016	34.30	6539.42
3/14/2016	34.46	6539.26
3/21/2016	34.96	6538.76
3/28/2016	34.56	6539.16
4/4/2016	34.90	6538.82
4/11/2016	34.96	6538.76
4/18/2016	32.10	6541.62
4/25/2016	34.93	6538.79
5/2/2016	32.90	6540.82
5/9/2016	31.87	6541.85
5/16/2016	31.61	6542.11
5/23/2016	32.80	6540.92
5/30/2016	34.44	6539.28
6/6/2016	31.80	6541.92
6/13/2016	31.05	6542.67
6/20/2016	35.50	6538.22
6/27/2016	32.28	6541.44
7/5/2016	35.85	6537.87
7/9/2016	35.00	6538.72
7/11/2016	34.84	6538.88
7/18/2016	32.81	6540.91
7/25/2016	34.28	6539.44
12/12/2016	36.10	6537.62
S3		
12/12/2016	37.90	6536.88
S4		
1/28/2016	35.66	6539.63
3/15/2016	35.62	6539.67
7/9/2016	36.20	6539.09
12/12/2016	36.85	6538.44

* Drawdown Tube Pressure, # Transducer Reading

S5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	38.82	6535.87
1/11/2016	38.82	6535.87
1/18/2016	40.25	6534.44
1/25/2016	23.86	6550.83
2/1/2016	40.20	6534.49
2/8/2016	41.32	6533.37
2/15/2016	23.06	6551.63
2/22/2016	39.07	6535.62
2/29/2016	40.38	6534.31
3/7/2016	39.87	6534.82
3/14/2016	41.50	6533.19
3/21/2016	41.35	6533.34
3/28/2016	41.63	6533.06
4/4/2016	42.19	6532.50
4/11/2016	42.39	6532.30
4/18/2016	42.71	6531.98
4/25/2016	42.32	6532.37
5/2/2016	42.37	6532.32
5/9/2016	41.97	6532.72
5/16/2016	41.50	6533.19
5/23/2016	23.10	6551.59
5/30/2016	41.03	6533.66
6/6/2016	41.03	6533.66
6/13/2016	41.00	6533.69
6/20/2016	42.60	6532.09
6/27/2016	41.93	6532.76
7/5/2016	42.43	6532.26
7/11/2016	41.96	6532.73
7/18/2016	42.02	6532.67
7/25/2016	41.84	6532.85

S11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	32.24	6546.15

S19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	34.70	6543.27

S21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/12/2016	31.60	6548.68

SA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2016	84.24	6496.07
4/4/2016	77.40	6502.91
4/11/2016	78.45	6501.86
4/18/2016	81.93	6498.38
5/9/2016	28.26	6552.05
5/16/2016	41.40	6538.91
5/23/2016	28.30	6552.01
5/30/2016	40.33	6539.98
6/6/2016	40.23	6540.08
6/13/2016	28.10	6552.21
6/20/2016	70.70	6509.61
6/27/2016	74.15	6506.16
7/5/2016	41.50	6538.81
7/11/2016	41.29	6539.02
7/18/2016	38.15	6542.16
7/25/2016	40.31	6540.00

SE6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/25/2016	39.20	6539.71

SM

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	36.63	6542.11
1/11/2016	36.63	6542.11
1/18/2016	37.14	6541.60
1/25/2016	37.61	6541.13
2/1/2016	37.04	6541.70
2/8/2016	38.02	6540.72
2/15/2016	37.07	6541.67
2/22/2016	36.82	6541.92
2/29/2016	36.99	6541.75
3/7/2016	37.07	6541.67
3/14/2016	37.40	6541.34
3/21/2016	37.46	6541.28
3/28/2016	37.67	6541.07
4/4/2016	37.79	6540.95
4/11/2016	37.94	6540.80
4/18/2016	38.19	6540.55
4/25/2016	38.10	6540.64
5/2/2016	38.36	6540.38
5/9/2016	37.17	6541.57
5/16/2016	38.00	6540.74
5/23/2016	39.10	6539.64
5/30/2016	37.89	6540.85
6/6/2016	37.86	6540.88
6/13/2016	38.10	6540.64
6/20/2016	38.50	6540.24
6/27/2016	34.64	6544.10
7/5/2016	40.38	6538.36
7/11/2016	38.88	6539.86
7/18/2016	38.48	6540.26
7/25/2016	38.33	6540.41

SN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	32.42	6546.84
1/11/2016	32.42	6546.84
1/18/2016	37.81	6541.45
1/25/2016	37.55	6541.71
2/1/2016	37.73	6541.53
2/8/2016	38.70	6540.56
2/15/2016	38.21	6541.05
2/22/2016	37.47	6541.79
2/29/2016	37.85	6541.41
3/7/2016	38.10	6541.16
3/14/2016	38.53	6540.73
3/21/2016	38.68	6540.58
3/28/2016	38.85	6540.41
4/4/2016	38.51	6540.75
4/11/2016	39.32	6539.94
4/18/2016	39.63	6539.63
4/25/2016	39.55	6539.71
5/2/2016	39.79	6539.47
5/9/2016	39.68	6539.58
5/16/2016	39.50	6539.76
5/23/2016	39.45	6539.81
5/30/2016	39.20	6540.06
6/6/2016	39.22	6540.04
6/13/2016	39.50	6539.76
6/20/2016	39.20	6540.06
6/27/2016	39.36	6539.90
7/5/2016	41.10	6538.16
7/11/2016	38.87	6540.39
7/18/2016	39.98	6539.28
7/25/2016	39.87	6539.39
12/12/2016	39.50	6539.76

SO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	37.79	6541.00
1/11/2016	37.79	6541.00
1/18/2016	38.32	6540.47
1/25/2016	38.80	6539.99
2/1/2016	38.25	6540.54
2/8/2016	39.23	6539.56
2/15/2016	38.23	6540.56
2/22/2016	37.78	6541.01
2/29/2016	37.95	6540.84
3/7/2016	38.00	6540.79
3/14/2016	38.28	6540.51
3/21/2016	38.29	6540.50
3/28/2016	38.45	6540.34
4/4/2016	38.73	6540.06
4/11/2016	38.83	6539.96
4/18/2016	39.03	6539.76
4/25/2016	39.04	6539.75
5/2/2016	39.25	6539.54
5/9/2016	38.78	6540.01
5/16/2016	38.50	6540.29
5/23/2016	38.40	6540.39
5/30/2016	38.46	6540.33
6/6/2016	38.41	6540.38
6/13/2016	38.90	6539.89
6/20/2016	39.20	6539.59
6/27/2016	39.36	6539.43
7/5/2016	39.45	6539.34
7/11/2016	38.97	6539.82
7/18/2016	39.06	6539.73
7/25/2016	38.82	6539.97

SP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/4/2016	37.36	6541.30
1/11/2016	37.36	6541.30
1/18/2016	37.06	6541.60
1/25/2016	38.48	6540.18
2/1/2016	38.02	6540.64
2/8/2016	38.97	6539.69
2/15/2016	37.90	6540.76
2/22/2016	37.62	6541.04
2/29/2016	37.88	6540.78
3/7/2016	38.05	6540.61
3/14/2016	38.36	6540.30
3/21/2016	38.40	6540.26
3/28/2016	38.53	6540.13
4/4/2016	38.84	6539.82
4/11/2016	38.93	6539.73
4/18/2016	39.18	6539.48
4/25/2016	39.05	6539.61
5/2/2016	39.24	6539.42
5/9/2016	39.01	6539.65
5/16/2016	38.80	6539.86
5/23/2016	38.40	6540.26
5/30/2016	38.54	6540.12
6/6/2016	38.52	6540.14
6/13/2016	38.90	6539.76
6/20/2016	39.30	6539.36
6/27/2016	39.56	6539.10
7/5/2016	39.37	6539.29
7/11/2016	39.20	6539.46
7/18/2016	39.24	6539.42
7/25/2016	39.15	6539.51

6546.84
6546.84
6541.45
6541.71
6541.53
6540.56
6541.05
6541.79
6541.41
6541.16
6540.73
6540.58
6540.41
6540.75
6539.94
6539.63
6539.71
6539.47
6539.58
6539.76
6539.81
6540.06
6540.04
6539.76
6540.06
6539.90
6538.16
6540.39
6539.28
6539.39

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SS		
4/4/2016	41.35	6537.03
4/11/2016	42.52	6535.86
4/18/2016	41.81	6536.57
5/9/2016	40.02	6538.36
5/16/2016	40.00	6538.38
5/23/2016	40.00	6538.38
5/30/2016	40.40	6537.98
6/6/2016	40.26	6538.12
6/13/2016	41.65	6536.73
6/20/2016	41.80	6536.58
6/27/2016	42.05	6536.33
7/5/2016	40.70	6537.68
7/11/2016	40.85	6537.53
7/18/2016	41.78	6536.60
7/25/2016	41.65	6536.73
ST		
1/25/2016	31.50	6547.81
2/1/2016	52.80	6526.51
4/4/2016	23.50	6555.81
4/11/2016	53.26	6526.05
4/18/2016	54.80	6524.51
5/9/2016	35.91	6543.40
5/16/2016	41.20	6538.11
5/23/2016	31.70	6547.61
5/30/2016	39.67	6539.64
6/6/2016	30.16	6549.15
6/13/2016	33.50	6545.81
6/20/2016	42.15	6537.16
6/27/2016	53.02	6526.29
7/5/2016	51.55	6527.76
7/11/2016	36.00	6543.31
7/18/2016	38.27	6541.04
7/25/2016	35.62	6543.69
SZ		
1/28/2016	35.05	6546.42
12/12/2016	36.00	6545.47
T		
9/29/2016	63.50	6515.73
TA		
9/29/2016	39.20	6541.10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
X		
2/9/2016	23.36	6548.25
4/12/2016	25.59	6546.02
7/9/2016	26.63	6544.98
10/20/2016	27.50	6544.11

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-2 WATER LEVELS FOR THE SUBDIVISION ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0497		
3/4/2016	46.09	6516.53
12/12/2016	51.05	6511.57
0498		
7/5/2016	46.20	6514.39
0688		
3/16/2016	58.02	6504.60
12/13/2016	58.56	6504.06
0802		
9/8/2016	88.27	6474.45
0844		
2/19/2016	35.04	6521.09
12/13/2016	35.84	6520.29
0845		
2/19/2016	33.49	6523.56
12/13/2016	32.96	6524.09
AW		
12/13/2016	32.20	6531.23
12/19/2016	32.15	6531.28
CW44		
12/1/2016	64.93	6495.81
Q2		
12/1/2016	78.24	6483.44
Q3		
8/4/2016	51.71	6508.03
Q5		
3/4/2016	48.65	6512.83
Q8		
12/12/2016	56.60	6504.20
Q9		
7/8/2016	48.03	6513.30
Q11		
7/8/2016	46.51	6514.51
Q12		
7/12/2016	48.15	6512.97
9/15/2016	42.94	6518.18
Q18		
7/7/2016	46.25	6515.44
Q19		
8/4/2016	47.04	6515.13
Q23		
7/9/2016	47.65	6516.61
12/12/2016	52.30	6511.96
Q27		
7/16/2016	48.70	6516.18
Q29		
12/12/2016	50.30	6516.16
Q30		
7/16/2016	48.67	6517.46
Q44		
12/12/2016	52.15	6509.18
Q48		
12/12/2016	47.61	6520.23

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0520	12/12/2016	49.83	6536.19
0538	8/9/2016	63.58	6485.36
0539	12/12/2016	26.90	6528.42
0540	8/4/2016	55.34	6500.57
	12/12/2016	55.28	6500.63
0541	12/28/2016	88.56	6467.06
0551	2/11/2016	94.19	6453.11
	12/12/2016	98.90	6448.40
0553	2/11/2016	100.97	6446.51
	12/12/2016	102.50	6444.98
0554	2/11/2016	> 97.98	< 6449.19
	12/12/2016	104.60	6442.57
0555	2/16/2016	40.95	6516.19
0556	2/10/2016	47.19	6508.83
0557	2/10/2016	41.55	6512.22
0631	12/12/2016	83.70	6457.40
	12/27/2016	83.82	6457.28
0632	12/12/2016	83.74	6457.56
0634	2/18/2016	64.62	6495.45
	10/21/2016	73.54	6486.53
	11/30/2016	70.81	6489.26
	12/12/2016	70.82	6489.25
0637	12/20/2016	110.00	6465.20
0638	12/12/2016	44.33	6541.23
0644	8/1/2016	67.74	6476.16
	12/12/2016	67.65	6476.25
0646	8/1/2016	72.04	6471.31
	12/12/2016	72.00	6471.35
0647	12/12/2016	103.30	6448.61
0649	2/22/2016	100.60	6442.69
	12/12/2016	101.40	6441.89
0650	2/11/2016	80.31	6466.80
	12/13/2016	81.52	6465.59
0652	12/12/2016	84.70	6453.45
0653	8/1/2016	61.52	6483.45
	12/12/2016	62.30	6482.67
0654	12/12/2016	71.45	6479.05
0656	12/12/2016	> 72.00	< 6482.07
0657	12/12/2016	97.00	6454.81
0658	12/12/2016	104.80	6445.38
0659	2/18/2016	64.87	6495.30
	10/21/2016	71.43	6488.74
	12/12/2016	86.70	6473.47
0680	12/12/2016	73.25	6485.62
0681	12/13/2016	63.03	6497.49
0686	12/20/2016	111.33	6467.47
0846	2/11/2016	43.05	6505.87
	12/13/2016	43.84	6505.08
0851	12/13/2016	86.21	6460.23
0852	12/12/2016	69.01	6521.13
0855	12/12/2016	82.10	6459.01
0862	5/6/2016	47.40	6508.78
	8/4/2016	60.02	6496.16
	10/24/2016	64.90	6491.28
	11/30/2016	68.00	6488.18
	12/12/2016	66.85	6489.33
0864	8/9/2016	64.53	6482.19
0865	8/4/2016	51.75	6505.03
0866	8/4/2016	56.52	6501.60
0867	12/12/2016	58.65	6497.25
0869	12/12/2016	64.60	6479.89
0876	12/12/2016	64.20	6480.06
0877	12/12/2016	59.50	6493.58
0879	12/12/2016	64.25	6480.30
0881	2/18/2016	68.23	6496.81
	12/12/2016	71.18	6493.86
0882	2/18/2016	61.30	6499.86
0884	2/18/2016	68.26	6497.84

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0885	12/12/2016	63.80	6500.84
0886	2/18/2016	64.50	6500.05
0886	12/12/2016	67.40	6497.15
0887	12/12/2016	59.54	6508.19
0888	2/9/2016	72.24	6485.09
0888	12/12/2016	74.43	6482.90
0890	2/18/2016	66.62	6491.81
0890	10/21/2016	74.20	6484.23
0893	2/19/2016	65.01	6498.96
0893	12/12/2016	67.58	6496.39
0897	12/12/2016	79.11	6483.14
0920	10/6/2016	6.98	6620.62
H1	2/18/2016	69.23	6490.02
H1	7/23/2016	77.25	6482.00
H1	10/21/2016	76.81	6482.44
H2A	2/18/2016	68.40	6491.47
H2A	10/21/2016	78.01	6481.86
H2A	11/30/2016	73.62	6486.25
H2A	12/12/2016	73.77	6486.10
H7	2/18/2016	66.12	6493.42
H7	12/16/2016	71.11	6488.43
H7A	12/12/2016	68.72	6490.37
H7B	2/18/2016	65.46	6493.92
H7B	12/16/2016	69.28	6490.10
H12	2/18/2016	67.30	6496.32
H12	10/21/2016	87.40	6476.22
H12	11/30/2016	86.51	6477.11
H17	7/7/2016	29.97	6533.39
H56	6/30/2016	61.73	6507.76
H61	6/30/2016	61.36	6509.13
H70	6/30/2016	63.91	6510.71
H71	6/30/2016	62.48	6509.84
H95	12/12/2016	62.40	6506.51
M16	12/12/2016	59.38	6511.21
MO	3/15/2016	60.88	6512.01
MO	10/26/2016	61.70	6511.19
MO	12/12/2016	60.41	6512.48
MP	12/12/2016	62.70	6511.78
MR	3/15/2016	65.94	6500.32
MR	9/8/2016	67.19	6499.07
MR	12/12/2016	66.49	6499.77
MS	6/30/2016	59.60	6511.07
MT	12/12/2016	> 62.00	< 6505.43
MV	12/12/2016	64.51	6505.27
R1	8/4/2016	63.34	6491.78
R1	10/21/2016	64.53	6490.59
R1	11/30/2016	70.14	6484.98
R1	12/12/2016	55.80	6499.32
R2	3/7/2016	46.95	6507.21
R2	8/4/2016	63.12	6491.04
R2	10/21/2016	65.69	6488.47
R2	11/30/2016	73.32	6480.84
R2	11/30/2016	68.11	6486.05
R3	8/4/2016	62.03	6493.70
R3	11/30/2016	82.94	6472.79
R4	3/7/2016	47.76	6511.02
R4	8/4/2016	64.67	6494.11
R5	8/4/2016	67.75	6490.00
R5	10/21/2016	65.94	6491.81
R5	11/30/2016	105.60	6452.15
R10	8/4/2016	59.61	6495.61
R10	10/24/2016	60.93	6494.29
R10	11/30/2016	70.31	6484.91
R11	3/7/2016	51.28	6507.17
R11	8/4/2016	56.53	6501.92
R11	11/30/2016	96.79	6461.66
R18	10/24/2016	63.48	6492.52
R18	11/30/2016	69.10	6486.90
R20	10/21/2016	60.49	6495.85
R20	11/30/2016	65.21	6491.13
R22	10/24/2016	64.23	6492.91
R59	8/2/2016	66.61	6478.40

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0493	2/15/2016	68.05	6492.23
0493	7/11/2016	63.94	6496.34
0493	12/13/2016	70.78	6489.50
0494	2/15/2016	29.97	6530.17
0494	7/12/2016	30.86	6529.28
0494	12/13/2016	31.36	6528.78
0498	7/5/2016	46.20	6514.39
0538	8/9/2016	63.58	6485.36
0539	12/12/2016	26.90	6528.42
0653	8/1/2016	61.52	6483.45
0653	12/12/2016	62.30	6482.67
0850	12/13/2016	51.79	6497.36
0853	12/12/2016	70.68	6470.70
0859	12/12/2016	62.44	6490.32
0927	12/13/2016	42.94	6552.06
0927	12/13/2016	42.94	6552.06
0929	2/29/2016	44.95	6547.62
0930	12/12/2016	106.58	6491.96
0931	12/12/2016	71.59	6538.97
ACW	12/1/2016	78.58	6485.22
ACW	12/13/2016	77.15	6486.65
AW	12/13/2016	32.20	6531.23
AW	12/19/2016	32.15	6531.28
CE1	12/12/2016	29.61	6540.58
CE2	1/21/2016	80.73	6495.62
CE2	2/24/2016	54.75	6521.60
CE2	3/15/2016	74.75	6501.60
CE2	4/12/2016	80.61	6495.74
CE2	5/10/2016	35.65	6540.70
CE2	10/26/2016	82.18	6494.17
CE2	11/30/2016	39.45	6536.90
CE5	1/25/2016	37.90	6530.65
CE5	2/29/2016	35.58	6532.97
CE5	7/15/2016	36.58	6531.97
CE6	1/25/2016	29.63	6535.56
CE6	2/29/2016	27.81	6537.38
CE6	7/18/2016	32.45	6532.74
CE7	12/12/2016	42.60	6533.39
CE8	2/10/2016	36.01	6533.69
CE8	12/12/2016	36.30	6533.40
CE9	3/15/2016	52.69	6510.43
CE9	12/13/2016	31.95	6531.17
CE10	12/12/2016	37.95	6532.91
CE11	1/25/2016	31.03	6534.39
CE11	2/29/2016	29.92	6535.50
CE11	7/18/2016	33.56	6531.86
CE12	1/25/2016	35.41	6536.82
CE12	2/29/2016	31.58	6540.65
CE12	7/18/2016	37.30	6534.93
CE13	12/12/2016	50.07	6524.57
CE14	3/18/2016	32.13	6537.32
CE14	12/12/2016	33.18	6536.27
CE15	3/18/2016	35.36	6530.72
CE15	12/12/2016	34.57	6531.51
CE15A	10/27/2016	34.18	6530.63
CE15A	12/12/2016	33.40	6531.41
CE15A	12/14/2016	33.42	6531.39
CE16	12/21/2016	39.50	6541.67
CF3	12/12/2016	47.34	6539.45
CF4	12/12/2016	126.15	6537.54
CF7A	12/12/2016	130.76	6537.35
CW1	1/25/2016	96.00	6489.22
CW2	1/25/2016	96.41	6489.07
CW2	2/10/2016	95.01	6490.47
CW2	9/26/2016	84.85	6500.63
CW2-1	12/13/2016	43.32	6542.16
CW3	12/13/2016	51.71	6535.47
CW6	12/12/2016	76.18	6499.46
CW9	12/12/2016	57.46	6534.37
CW15	12/13/2016	88.93	6462.39
CW17	12/13/2016	50.00	6539.32
CW17	12/16/2016	49.60	6539.72
CW18	8/24/2016	17.45	6555.20
CW18	12/12/2016	20.22	6552.43
CW24	12/13/2016	45.77	6542.90
CW28	1/25/2016	70.76	6500.92
CW28	12/12/2016	72.01	6499.67

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CW29	5/6/2016	75.78	6476.44
CW29	12/12/2016	76.53	6475.69
CW31	12/13/2016	85.10	6475.16
CW31	12/20/2016	85.08	6475.18
CW32	12/13/2016	148.00	6419.28
CW32	12/20/2016	147.51	6419.77
CW33	12/13/2016	105.75	6469.14
CW34	12/13/2016	49.48	6544.92
CW35	12/13/2016	48.74	6542.43
CW36	12/13/2016	78.50	6472.59
CW37	10/8/2016	62.08	6489.09
CW37	12/13/2016	62.05	6489.12
CW40	12/12/2016	25.27	6553.67
CW41	8/9/2016	75.89	6479.52
CW41	12/12/2016	76.00	6479.41
CW42	8/9/2016	66.62	6482.16
CW42	8/24/2016	66.20	6482.58
CW42	12/12/2016	67.10	6481.68
CW43	12/13/2016	67.80	6480.99
CW43	12/20/2016	67.80	6480.99
CW44	12/1/2016	64.93	6495.81
CW45	3/4/2016	49.93	6511.38
CW45	8/24/2016	62.22	6499.09
CW45	12/12/2016	57.53	6503.78
CW50	3/16/2016	43.80	6544.76
CW50	12/13/2016	45.81	6542.75
CW52	12/13/2016	67.72	6524.68
CW53	10/21/2016	116.15	6448.79
CW53	12/13/2016	17.36	6547.58
CW54	12/13/2016	32.26	6526.29
CW55	12/13/2016	53.92	6510.24
CW56	12/16/2016	48.22	6539.64
CW57	12/13/2016	44.73	6540.17
CW58	12/13/2016	77.04	6483.76
CW58	12/20/2016	79.92	6480.88
CW60	12/13/2016	42.42	6541.78
CW61	12/12/2016	43.73	6539.10
CW61	12/16/2016	43.27	6539.56
CW62	5/18/2016	37.00	6542.86
CW62	10/27/2016	91.91	6487.95
CW62	11/30/2016	102.17	6477.69
CW62	12/12/2016	41.15	6538.71
CW62	12/14/2016	40.49	6539.37
CW72	12/12/2016	41.30	6538.83
CW72	12/16/2016	40.38	6539.75
CW73	12/12/2016	48.97	6514.48
CW73	12/19/2016	49.51	6513.94
CW74	12/13/2016	66.65	6486.76
CW75	12/13/2016	70.41	6483.17
CW76	12/13/2016	64.79	6491.82
CW76	12/19/2016	68.58	6488.03
CW78	12/13/2016	16.91	6550.24
R1	8/4/2016	63.34	6491.78
R1	10/21/2016	64.53	6490.59
R1	11/30/2016	70.14	6484.98
R1	12/12/2016	55.80	6499.32
R2	3/7/2016	46.95	6507.21
R2	8/4/2016	63.12	6491.04
R2	10/21/2016	65.69	6488.47
R2	11/30/2016	73.32	6480.84
R2	11/30/2016	68.11	6486.05
R3	8/4/2016	62.03	6493.70
R3	11/30/2016	82.94	6472.79
R4	3/7/2016	47.76	6511.02
R4	8/4/2016	64.67	6494.11
R5	8/4/2016	67.75	6490.00
R5	10/21/2016	65.94	6491.81
R5	11/30/2016	105.60	6452.15
R11	3/7/2016	51.28	6507.17
R11	8/4/2016	56.53	6501.92
R11	11/30/2016	96.79	6461.66
R36	8/3/2016	69.05	6476.41
R37	8/10/2016	68.66	6478.18
R44	8/10/2016	68.99	6478.60
R45	8/3/2016	68.62	6477.81
R46	8/2/2016	68.44	6477.80

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/6/2017

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
R49		
8/2/2016	68.79	6477.20
12/12/2016	68.20	6477.79
R51		
8/3/2016	68.09	6478.41
R56		
8/8/2016	67.00	6478.38
R59		
8/2/2016	66.61	6478.40
R60		
8/2/2016	67.17	6478.13
R61		
8/8/2016	67.01	6478.78
R62		
8/8/2016	67.13	6479.57
R67		
12/12/2016	66.50	6479.03
R72		
8/8/2016	66.02	6480.90
V7		
8/5/2016	77.55	6477.68
12/12/2016	77.68	6477.55
V8		
8/5/2016	72.47	6479.02
12/12/2016	72.10	6479.39
V9		
8/5/2016	78.31	6477.38
12/12/2016	78.44	6477.25
V11		
8/9/2016	76.36	6479.54
12/12/2016	76.39	6479.51
V14		
8/10/2016	77.43	6478.26
12/12/2016	77.46	6478.23
V16		
8/9/2016	72.43	6479.55
12/12/2016	72.40	6479.58
V17		
8/9/2016	72.78	6477.37
12/12/2016	72.35	6477.80
V18		
8/9/2016	73.62	6477.76
12/12/2016	73.81	6477.57
WCW		
12/13/2016	80.55	6486.82
WR25		
12/13/2016	44.92	6541.54
Y1		
7/5/2016	63.97	6497.47
10/24/2016	107.98	6453.46
12/1/2016	125.44	6436.00
Y2		
12/12/2016	74.60	6487.01
12/19/2016	77.28	6484.33
Y3		
12/12/2016	73.78	6489.60
12/12/2016	73.78	6489.60
Y7		
3/4/2016	67.88	6492.55
12/1/2016	119.87	6440.56
Y8		
12/12/2016	71.99	6489.48
12/19/2016	73.89	6487.58
Y10		
12/12/2016	74.71	6491.47
Y11		
12/19/2016	62.22	6499.83
Y13		
12/1/2016	126.80	6434.04
Y14		
12/12/2016	61.50	6499.52
Y17		
12/12/2016	64.59	6500.04
Y23		
7/9/2016	47.23	6514.07
10/24/2016	123.08	6438.22
12/1/2016	126.47	6434.83
Y25		
12/12/2016	58.58	6504.09
Y30		
12/12/2016	60.65	6499.40

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER

WATER LEVEL ELEVATION (FT-MSL) 3/3/2017

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
#1 Deepwell		
2/15/2016	116.31	6467.45
12/12/2016	157.35	6426.41
#2 Deepwell		
2/15/2016	206.62	6369.04
0806R		
12/13/2016	148.60	6417.79
0907		
12/13/2016	124.15	6421.45
0928		
12/13/2016	132.21	6465.39
0938		
12/13/2016	155.10	6413.70
0943		
1/21/2016	143.48	6412.43
2/25/2016	141.28	6414.63
9/15/2016	128.60	6427.31
11/30/2016	135.24	6420.67
0951		
12/13/2016	154.30	6419.40
0951R		
1/21/2016	170.85	6405.93
2/19/2016	162.85	6413.93
9/1/2016	158.95	6417.83
11/30/2016	152.35	6424.43
12/12/2016	157.30	6419.48
OLD #1		
7/5/2016	100.00	6482.97

* Drawdown Tube Pressure, # Transducer Reading

APPENDIX B

WATER QUALITY

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GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX B

Page Number

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS

Ca THROUGH ION_BAL

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)
CN1	11/1/2016	ENER	---	---	---	---	---	---	1080	6890	16600	19840	---
CN2	11/1/2016	ENER	---	---	---	---	---	---	350	3070	5470	8250	---
CN4	11/7/2016	ENER	---	---	---	---	---	---	262	1940	4290	6293	---
CS1	11/10/2016	ENER	---	---	---	---	---	---	264	1440	3500	6125	---
	12/15/2016	ENER	---	---	---	---	---	---	262	1340	3460	4865	---
CS2	11/2/2016	ENER	---	---	---	---	---	---	627	3920	8000	10760	---
CS7	12/14/2016	ENER	---	---	---	---	---	---	537	3210	8150	11080	---
EE2	11/2/2016	ENER	---	---	---	---	---	---	312	2420	6870	9713	---
EI4	11/7/2016	ENER	---	---	---	---	---	---	178	1130	2280	3181	---
EL4	11/7/2016	ENER	---	---	---	---	---	---	321	2120	4290	5900	---
EN1	11/1/2016	ENER	---	---	---	---	---	---	561	5020	13100	16480	---
EN2	11/1/2016	ENER	---	---	---	---	---	---	283	2050	4880	6990	---
EN3	11/8/2016	ENER	---	---	---	---	---	---	307	2060	4050	5276	---
EO14	11/7/2016	ENER	---	---	---	---	---	---	374	2570	5400	6989	---
EO49	11/8/2016	ENER	---	---	---	---	---	---	168	861	2040	2930	---
EP23	11/7/2016	ENER	---	---	---	---	---	---	329	2330	4800	6364	---
EP31	12/14/2016	ENER	---	---	---	---	---	---	259	1870	4130	5370	---
ES6	12/14/2016	ENER	---	---	---	---	---	---	845	4930	12600	16280	---
ET19	11/8/2016	ENER	---	---	---	---	---	---	231	1750	3680	5130	---
ET20	12/14/2016	ENER	---	---	---	---	---	---	134	897	2100	2963	---
NE1	11/1/2016	ENER	---	---	---	---	---	---	586	5560	14300	12130	---
NE2	12/14/2016	ENER	---	---	---	---	---	---	382	4210	9060	11400	---
NW3	12/13/2016	ENER	---	---	---	---	---	---	257	1620	3520	4553	---

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
SE2	12/14/2016	ENER	---	---	---	---	---	---	237	1710	5050	8450	---
SW1	11/1/2016	ENER	---	---	---	---	---	---	424	3230	6700	8864	---
SW2	11/1/2016	ENER	---	---	---	---	---	---	777	4460	8960	11900	---
SW3	12/13/2016	ENER	---	---	---	---	---	---	590	2820	6250	8450	---
WC15	12/13/2016	ENER	---	---	---	---	---	---	1080	6610	18500	22030	---
WD3	11/3/2016	ENER	---	---	---	---	---	---	1890	7750	15800	19410	---
WN1	11/1/2016	ENER	---	---	---	---	---	---	339	2080	4820	7112	---
WN2	11/1/2016	ENER	---	---	---	---	---	---	171	1080	3060	4624	---
WO10	11/2/2016	ENER	---	---	---	---	---	---	251	2160	5910	8575	---
WO21	11/2/2016	ENER	---	---	---	---	---	---	220	1410	3360	4883	---
WO32	12/13/2016	ENER	---	---	---	---	---	---	261	1570	3510	4751	---
WP10	12/13/2016	ENER	---	---	---	---	---	---	171	1060	2630	3627	---
WP15	12/13/2016	ENER	---	---	---	---	---	---	219	1640	3960	4735	---
WP29	11/3/2016	ENER	---	---	---	---	---	---	314	2760	6030	4311	---
WS1	11/1/2016	ENER	---	---	---	---	---	---	1000	6510	13400	17390	---
WS2	11/1/2016	ENER	---	---	---	---	---	---	304	2000	3940	5650	---
WT6	11/3/2016	ENER	---	---	---	---	---	---	264	1710	3880	4815	---
WT15	11/7/2016	ENER	---	---	---	---	---	---	215	1200	2520	3573	---
WT18	11/2/2016	ENER	---	---	---	---	---	---	223	1330	2830	3931	---
WW1	11/1/2016	ENER	---	---	---	---	---	---	543	4180	10300	14140	---
WW3	11/2/2016	ENER	---	---	---	---	---	---	653	3210	6530	8695	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CN1	11/1/2016	ENER	---	26.0	55.8	0.442	---	---	---	---	---
CN2	11/1/2016	ENER	---	14.0	13.6	0.0350	---	---	---	---	---
CN4	11/7/2016	ENER	---	4.60	7.82	0.0690	---	---	---	---	---
CS1	11/10/2016	ENER	---	6.06	12.7	0.0420	---	---	---	---	---
	12/15/2016	ENER	---	5.88	12.5	0.0620	---	---	---	---	---
CS2	11/2/2016	ENER	---	6.82	17.5	0.0650	---	---	---	---	---
CS7	12/14/2016	ENER	---	11.0	22.6	0.0910	---	---	---	---	---
EE2	11/2/2016	ENER	---	4.79	16.7	0.271	---	---	---	---	---
EI4	11/7/2016	ENER	---	1.40	1.23	0.0250	---	---	---	---	---
EL4	11/7/2016	ENER	---	8.70	9.32	0.0800	---	---	---	---	---
EN1	11/1/2016	ENER	---	15.0	40.7	0.376	---	---	---	---	---
EN2	11/1/2016	ENER	---	2.47	9.64	0.0490	---	---	---	---	---
EN3	11/8/2016	ENER	---	4.14	7.05	0.268	---	---	---	---	---
EO14	11/7/2016	ENER	---	6.60	8.81	0.256	---	---	---	---	---
EO49	11/8/2016	ENER	---	1.90	0.950	0.0550	---	---	---	---	---
EP23	11/7/2016	ENER	---	6.70	12.2	0.0610	---	---	---	---	---
EP31	12/14/2016	ENER	---	6.93	11.2	0.123	---	---	---	---	---
ES6	12/14/2016	ENER	---	17.7	45.3	0.0480	---	---	---	---	---
ET19	11/8/2016	ENER	---	4.22	8.61	0.104	---	---	---	---	---
ET20	12/14/2016	ENER	---	1.45	1.42	0.136	---	---	---	---	---
NE1	11/1/2016	ENER	---	35.4	59.5	0.109	---	---	---	---	---
NE2	12/14/2016	ENER	---	40.7	55.1	1.02	---	---	---	---	---
NW3	12/13/2016	ENER	---	3.26	5.78	0.0290	---	---	---	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
SE2	12/14/2016	ENER	---	5.23	16.2	0.0960	---	---	---	---	---
SW1	11/1/2016	ENER	---	6.80	14.2	3.85	---	---	---	---	---
SW2	11/1/2016	ENER	---	2.69	11.9	6.10	---	---	---	---	---
SW3	12/13/2016	ENER	---	3.52	14.8	0.0350	---	---	---	---	---
WC15	12/13/2016	ENER	---	19.1	45.9	0.300	---	---	---	---	---
WD3	11/3/2016	ENER	---	17.7	7.40	0.976	---	---	---	---	---
WN1	11/1/2016	ENER	---	3.54	12.0	1.70	---	---	---	---	---
WN2	11/1/2016	ENER	---	0.856	3.58	0.0960	---	---	---	---	---
WO10	11/2/2016	ENER	---	4.96	15.1	0.319	---	---	---	---	---
WO21	11/2/2016	ENER	---	1.70	5.54	0.0790	---	---	---	---	---
WO32	12/13/2016	ENER	---	1.94	4.91	0.0290	---	---	---	---	---
WP10	12/13/2016	ENER	---	2.96	3.79	0.0200	---	---	---	---	---
WP15	12/13/2016	ENER	---	3.06	11.5	0.149	---	---	---	---	---
WP29	11/3/2016	ENER	---	8.40	25.9	0.0820	---	---	---	---	---
WS1	11/1/2016	ENER	---	9.92	6.25	0.114	---	---	---	---	---
WS2	11/1/2016	ENER	---	1.44	6.10	0.560	---	---	---	---	---
WT6	11/3/2016	ENER	---	1.61	7.65	0.0600	---	---	---	---	---
WT15	11/7/2016	ENER	---	2.40	2.33	0.0360	---	---	---	---	---
WT18	11/2/2016	ENER	---	3.40	4.13	0.0900	---	---	---	---	---
WW1	11/1/2016	ENER	---	13.0	34.4	2.50	---	---	---	---	---
WW3	11/2/2016	ENER	---	3.49	12.4	0.348	---	---	---	---	---

TABLE B.2-1 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Ca THROUGH ION_BAL

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)
East 1 Sump	7/20/2016	ENER	2.20	2.70	19.1	5590	1950	2160	791	5900	16000	20590	0.979
East 2 Sump	7/20/2016	ENER	9.60	9.90	15.7	4220	2230	916	693	5310	12000	17490	0.940
East Reclaim	7/20/2016	ENER	4.50	9.60	15.5	3650	1810	783	631	4530	10000	14617	0.954
North 1 Sump	7/20/2016	ENER	5.70	5.80	14.1	4390	2210	921	716	5500	13000	16090	0.953
North 3 Sump	7/20/2016	ENER	5.00	5.80	13.9	4300	2200	885	703	5330	12000	15746	0.958
South 1 Sump	7/20/2016	ENER	30.2	19.4	11.5	1580	1060	76.0	370	2340	5000	7050	0.912
West 1 Sump	7/20/2016	ENER	39.0	32.1	10.9	2170	1190	128	412	3150	6600	8832	0.983
West Reclaim	7/20/2016	ENER	5.10	4.50	5.80	1950	1050	555	299	2060	5400	8178	0.984

TABLE B.2-2 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
East 1 Sump	7/20/2016	ENER	9.80	21.9	53.1	0.169	3.40	76.0	---	---	---
East 2 Sump	7/20/2016	ENER	9.62	26.6	33.2	0.139	2.80	11.0	---	---	---
East Reclaim	7/20/2016	ENER	9.71	14.4	31.8	0.173	3.30	60.0	---	---	---
North 1 Sump	7/20/2016	ENER	9.63	21.9	47.1	0.139	0.300	34.0	---	---	---
North 3 Sump	7/20/2016	ENER	9.60	20.0	45.7	0.186	2.60	29.0	---	---	---
South 1 Sump	7/20/2016	ENER	8.73	9.00	14.1	0.0350	< 0.100	41.0	---	---	---
West 1 Sump	7/20/2016	ENER	8.95	13.0	12.7	0.146	2.90	1.20	---	---	---
West Reclaim	7/20/2016	ENER	9.70	4.70	14.9	0.103	0.200	12.0	---	---	---

TABLE B.3-1 WATER QUALITY ANALYSES FOR THE LINED PONDS

Ca THROUGH ION_BAL

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)
E Coll Pond	2/9/2016	ENER	---	---	---	---	---	---	441	3810	6710	8389	---
	4/12/2016	ENER	---	---	---	---	---	---	502	4390	7740	10800	---
	8/17/2016	ENER	103	103	9.20	2090	727	< 5.00	462	3820	6930	9033	1.00
	10/17/2016	ENER	---	---	---	---	---	---	377	3040	5320	6852	---
Evap Pond 1	2/9/2016	ENER	---	---	---	---	---	---	4690	24900	53200	50290	---
	4/12/2016	ENER	---	---	---	---	---	---	4620	24100	62600	55410	---
	8/17/2016	ENER	32.0	372	93.2	22100	2500	5160	5580	32700	63500	58730	0.947
	10/17/2016	ENER	---	---	---	---	---	---	5440	33400	64900	59730	---
Evap Pond 2	2/9/2016	ENER	---	---	---	---	---	---	1310	10500	19200	21970	---
	4/12/2016	ENER	---	---	---	---	---	---	1620	12900	22900	25520	---
	8/17/2016	ENER	39.9	261	31.6	9090	2220	549	1780	14600	26700	29320	1.03
	10/17/2016	ENER	---	---	---	---	---	---	1810	15100	25200	27230	---
Evap Pond 3A	2/9/2016	ENER	---	---	---	---	---	---	80800	11000	210000	153900	---
	4/12/2016	ENER	---	---	---	---	---	---	149000	21500	349000	60000	---
	8/17/2016	ENER	22.7	369	297	34400	6030	8150	14800	35100	92800	83370	1.01
	10/17/2016	ENER	---	---	---	---	---	---	20000	27500	92000	92980	---
Evap Pond 3B	2/9/2016	ENER	---	---	---	---	---	---	11000	29300	64500	60000	---
	4/12/2016	ENER	---	---	---	---	---	---	9780	31700	85900	74550	---
	8/17/2016	ENER	20.8	579	292	53100	13000	15100	15400	50800	100000	108100	1.07
	10/17/2016	ENER	---	---	---	---	---	---	17900	30400	93600	100500	---
W Coll Pond	2/9/2016	ENER	---	---	---	---	---	---	374	3320	5920	7529	---
	4/12/2016	ENER	---	---	---	---	---	---	1110	9970	16600	19290	---
	8/17/2016	ENER	58.3	81.0	7.30	1650	620	63.0	368	2770	5450	7244	1.02
	10/17/2016	ENER	---	---	---	---	---	---	389	2990	5210	7265	---

TABLE B.3-2 WATER QUALITY ANALYSES FOR THE LINED PONDS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
E Coll Pond	2/9/2016	ENER	---	9.00	17.7	0.325	---	---	---	---	---
	4/12/2016	ENER	---	9.46	18.5	0.329	1.90	---	---	---	---
	8/17/2016	ENER	8.20	8.65	17.2	0.354	3.20	3.00	5.00	< 0.0100	0.900
	10/17/2016	ENER	---	5.75	11.2	0.309	---	---	---	---	---
Evap Pond 1	2/9/2016	ENER	---	132	123	0.399	---	---	---	---	---
	4/12/2016	ENER	---	135	170	0.440	---	---	---	---	---
	8/17/2016	ENER	9.51	120	220	0.590	< 0.500	22.0	6.50	0.0600	59.4
	10/17/2016	ENER	---	124	157	0.500	---	---	---	---	---
Evap Pond 2	2/9/2016	ENER	---	25.0	53.9	0.713	---	---	---	---	---
	4/12/2016	ENER	---	36.9	77.8	0.840	---	---	---	---	---
	8/17/2016	ENER	9.13	40.8	66.7	0.190	< 0.100	20.0	4.60	0.0400	3.00
	10/17/2016	ENER	---	35.1	68.2	0.640	---	---	---	---	---
Evap Pond 3A	2/9/2016	ENER	---	1690	2750	0.525	---	---	---	---	---
	4/12/2016	ENER	---	2680	4300	1.05	---	---	---	---	---
	8/17/2016	ENER	9.52	198	656	0.700	< 0.500	40.0	32.5	0.130	348
	10/17/2016	ENER	---	203	415	0.900	---	---	---	---	---
Evap Pond 3B	2/9/2016	ENER	---	187	310	0.215	---	---	---	---	---
	4/12/2016	ENER	---	226	267	0.320	---	---	---	---	---
	8/17/2016	ENER	9.45	376	634	0.360	< 0.500	86.0	34.8	0.140	368
	10/17/2016	ENER	---	311	525	0.600	---	---	---	---	---
W Coll Pond	2/9/2016	ENER	---	8.47	15.2	0.512	---	---	---	---	---
	4/12/2016	ENER	---	26.0	52.0	1.48	13.0	---	---	---	---
	8/17/2016	ENER	8.85	7.41	13.9	0.347	3.90	0.890	0.700	< 0.0100	0.0060
	10/17/2016	ENER	---	5.76	11.5	0.313	---	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Ca THROUGH ION_BAL

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)
1F	9/29/2016	ENER	---	---	---	---	---	---	324	1370	2880	3975	---
1J	1/21/2016	ENER	37.8	12.3	2.10	58.6	91.0	< 5.00	42.0	133	333	557	0.980
1M	9/29/2016	ENER	---	---	---	---	---	---	170	530	1350	2001	---
1Q	1/20/2016	ENER	150	30.6	3.70	176	423	< 5.00	113	382	1100	1610	0.973
1R	1/20/2016	ENER	167	30.3	3.80	231	466	< 5.00	146	464	1320	1910	0.972
1S	1/21/2016	ENER	37.9	12.4	2.30	59.0	92.0	< 5.00	42.0	134	335	562	0.980
1T	1/20/2016	ENER	102	24.7	4.30	113	262	< 5.00	84.0	270	744	1133	0.976
1U	1/20/2016	ENER	164	37.1	3.90	191	431	< 5.00	132	445	1240	1780	0.972
1V	1/20/2016	ENER	125	28.8	4.10	165	362	< 5.00	103	344	982	1462	0.983
B12	3/18/2016	ENER	---	---	---	---	---	---	---	---	---	4192	---
C6	3/15/2016	ENER	---	---	---	---	---	---	115	512	1340	4548	---
C7	3/15/2016	ENER	---	---	---	---	---	---	---	1730	3520	4593	---
C8	3/15/2016	ENER	---	---	---	---	---	---	174	884	2030	---	---
	9/29/2016	ENER	113	25.6	4.30	266	392	< 5.00	143	459	1240	1840	0.963
C9	3/15/2016	ENER	---	---	---	---	---	---	---	1300	2830	3875	---
C10	3/15/2016	ENER	---	---	---	---	---	---	244	1270	2820	3877	---
	9/29/2016	ENER	96.0	23.8	2.70	860	654	< 5.00	236	1310	2810	4039	0.987
C11	9/29/2016	ENER	---	---	---	---	---	---	247	1720	3410	4693	---
C12	3/15/2016	ENER	---	---	---	---	---	---	---	805	1880	2733	---
	9/29/2016	ENER	---	---	---	---	---	---	151	717	1660	2539	---
D1	3/15/2016	ENER	---	---	---	---	---	---	---	2130	3760	4651	---
	7/11/2016	ENER	205	38.0	3.60	331	396	< 5.00	135	863	1800	2445	0.979
DD	2/9/2016	ENER	---	---	---	---	---	---	70.0	1890	3200	3607	---
	5/17/2016	ENER	445	107	6.70	381	346	< 5.00	67.0	1750	3200	3634	1.08

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
DD	10/6/2016	ENER	---	---	---	---	---	---	75.0	2150	3560	4368	---
DD2	2/9/2016	ENER	---	---	---	---	---	---	65.0	1500	2570	3014	---
	5/17/2016	ENER	340	86.0	5.90	318	350	< 5.00	63.0	1400	2590	3056	1.03
	10/7/2016	ENER	---	---	---	---	---	---	71.0	1540	2630	3108	---
F	3/15/2016	ENER	---	---	---	---	---	---	---	760	1890	2604	---
	9/19/2016	ENER	---	---	---	---	---	---	227	764	1890	2530	---
FB	3/15/2016	ENER	---	---	---	---	---	---	---	637	1690	2374	---
	9/19/2016	ENER	---	---	---	---	---	---	231	765	1900	2543	---
GH	3/15/2016	ENER	---	---	---	---	---	---	---	650	1720	2405	---
	9/19/2016	ENER	---	---	---	---	---	---	188	685	1700	2344	---
GN	3/15/2016	ENER	---	---	---	---	---	---	---	400	1170	1754	---
GV	12/21/2016	ENER	---	---	---	---	---	---	194	645	1720	2393	---
K4	1/20/2016	ENER	---	---	---	---	---	---	117	362	1090	1682	---
	7/18/2016	ENER	135	33.9	3.60	230	471	< 5.00	128	420	1200	1805	0.969
K5	1/18/2016	ENER	---	---	---	---	---	---	97.0	517	1370	2003	---
	7/18/2016	ENER	113	24.2	5.00	404	425	< 5.00	183	676	1700	2554	0.961
K7	1/18/2016	ENER	---	---	---	---	---	---	95.0	341	1050	1676	---
	7/18/2016	ENER	126	27.5	3.50	198	423	< 5.00	118	358	1100	1639	0.965
K8	1/21/2016	ENER	---	---	---	---	---	---	87.0	307	1000	1638	---
	7/18/2016	ENER	103	23.4	3.10	233	422	< 5.00	106	378	1100	1639	0.963
K9	1/18/2016	ENER	---	---	---	---	---	---	105	578	1510	2281	---
	7/18/2016	ENER	108	25.7	3.30	233	436	< 5.00	112	380	1100	1741	0.964
K10	1/18/2016	ENER	---	---	---	---	---	---	102	514	1380	2031	---
K11	1/18/2016	ENER	---	---	---	---	---	---	102	389	1130	1682	---
L	10/26/2016	ENER	---	---	---	---	---	---	145	482	1300	1899	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
L5	4/12/2016	ENER	---	---	---	---	---	---	---	327	997	1523	---
L6	4/12/2016	ENER	---	---	---	---	---	---	---	315	1010	1504	---
	10/26/2016	ENER	---	---	---	---	---	---	108	335	984	1465	---
L7	4/12/2016	ENER	---	---	---	---	---	---	---	320	998	1495	---
L8	4/12/2016	ENER	---	---	---	---	---	---	---	385	1130	1655	---
	10/26/2016	ENER	---	---	---	---	---	---	168	556	1360	1997	---
L9	4/12/2016	ENER	---	---	---	---	---	---	---	355	1060	1586	---
L10	4/12/2016	ENER	---	---	---	---	---	---	---	344	1050	1608	---
	10/26/2016	ENER	---	---	---	---	---	---	115	356	1010	1493	---
M7	3/16/2016	ENER	---	---	---	---	---	---	186	628	1660	2333	---
M9	3/16/2016	ENER	---	---	---	---	---	---	239	1330	2570	3282	---
M10	3/16/2016	ENER	---	---	---	---	---	---	256	1670	3040	3646	---
ML	3/16/2016	ENER	---	---	---	---	---	---	229	2000	3780	4290	---
MQ	3/16/2016	ENER	---	---	---	---	---	---	226	1180	2430	3154	---
MX	3/15/2016	ENER	---	---	---	---	---	---	---	662	1720	2436	---
MY	12/16/2016	ENER	---	---	---	---	---	---	181	629	1800	2560	---
MZ	3/16/2016	ENER	---	---	---	---	---	---	242	1380	2640	3250	---
P	5/16/2016	ENER	238	49.8	5.10	257	268	< 5.00	46.0	934	1820	2288	1.08
	10/26/2016	ENER	---	---	---	---	---	---	---	---	---	2374	---
Q	5/17/2016	ENER	368	69.9	7.00	287	256	< 5.00	62.0	1390	2500	2920	1.05
	10/6/2016	ENER	---	---	---	---	---	---	---	1580	2740	3396	---
	10/26/2016	ENER	---	---	---	---	---	---	68.0	1590	2690	31.4	---
R	5/17/2016	ENER	330	56.8	4.30	294	164	< 5.00	52.0	1290	2360	2810	1.09
	10/26/2016	ENER	---	---	---	---	---	---	---	1460	2340	2798	---
S1	1/26/2016	ENER	240	---	---	---	---	---	---	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
S2	1/19/2016	ENER	---	---	---	---	---	---	---	920	2220	2995	---
	7/9/2016	ENER	---	---	---	---	---	---	230	1640	---	4308	---
S3	1/28/2016	ENER	596	---	---	---	---	---	---	---	---	---	---
S4	1/28/2016	ENER	294	---	---	---	---	---	---	---	---	---	---
	1/28/2016	ENER	253	66.7	4.70	290	617	< 5.00	235	790	1980	2710	0.925
	3/15/2016	ENER	---	---	---	---	---	---	---	792	1970	2758	---
	7/9/2016	ENER	282	63.9	5.10	295	555	< 5.00	244	885	2100	2758	0.934
S18	1/28/2016	ENER	242	---	---	---	---	---	---	---	---	---	---
S36	1/27/2016	ENER	433	---	---	---	---	---	---	---	---	---	---
SA	1/19/2016	ENER	---	---	---	---	---	---	---	910	2210	---	---
	1/28/2016	ENER	129	70.6	5.80	2850	2130	21.0	428	4570	9120	1139	0.955
SE6	1/25/2016	ENER	231	115	8.00	2520	1630	< 5.00	614	4540	8810	1072	0.943
	1/28/2016	ENER	275	---	---	---	---	---	---	---	---	---	---
ST	1/25/2016	ENER	331	82.4	6.60	346	514	< 5.00	227	1230	2530	3202	0.949
SZ	1/28/2016	ENER	11.5	49.2	9.00	7740	5730	300	1210	10200	22400	2508	0.975
T	9/29/2016	ENER	---	---	---	---	---	---	242	1020	2250	3371	---
TA	9/29/2016	ENER	---	---	---	---	---	---	188	659	1610	2418	---
TDR-1D	1/26/2016	ENER	289	---	---	---	---	---	---	---	---	---	---
TDR-1S	1/26/2016	ENER	291	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	97.0	---	---	---	---	---	---	---	---	---	---
TDR-2D	1/25/2016	ENER	225	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	239	---	---	---	---	---	---	---	---	---	---
TDR-2S	1/25/2016	ENER	321	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	291	---	---	---	---	---	---	---	---	---	---
TDR-3D	1/26/2016	ENER	272	---	---	---	---	---	---	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
TDR-3D	4/26/2016	ENER	268	---	---	---	---	---	---	---	---	---	---
TDR-3S	1/26/2016	ENER	224	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	244	---	---	---	---	---	---	---	---	---	---
TDR-4D	1/26/2016	ENER	275	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	269	---	---	---	---	---	---	---	---	---	---
TDR-4S	1/26/2016	ENER	314	---	---	---	---	---	---	---	---	---	---
	4/26/2016	ENER	305	---	---	---	---	---	---	---	---	---	---
TDR-5D	1/27/2016	ENER	263	---	---	---	---	---	---	---	---	---	---
	4/27/2016	ENER	251	---	---	---	---	---	---	---	---	---	---
TDR-5S	1/27/2016	ENER	320	---	---	---	---	---	---	---	---	---	---
	4/27/2016	ENER	298	---	---	---	---	---	---	---	---	---	---
X	2/9/2016	ENER	---	---	---	---	---	---	164	565	1540	2173	---
	4/12/2016	ENER	---	---	---	---	---	---	139	481	1330	1927	---
	7/9/2016	ENER	149	29.9	4.50	147	427	< 5.00	92.0	370	1000	1476	0.939
	10/20/2016	ENER	---	---	---	---	---	---	94.0	331	922	1380	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
1F	9/29/2016	ENER	---	0.999	< 0.0300	0.339	---	---	---	---	---
1J	1/21/2016	ENER	7.19	0.0047	0.100	< 0.0050	0.800	0.270	---	---	---
1M	9/29/2016	ENER	---	0.177	0.100	0.338	---	---	---	---	---
1Q	1/20/2016	ENER	7.44	0.153	0.0600	0.0070	0.400	0.320	---	---	---
1R	1/20/2016	ENER	7.35	0.154	< 0.0300	0.0060	0.200	0.180	---	---	---
1S	1/21/2016	ENER	7.14	0.0043	0.100	< 0.0050	0.800	0.120	---	---	---
1T	1/20/2016	ENER	7.71	0.151	0.110	< 0.0050	0.300	0.0800	---	---	---
1U	1/20/2016	ENER	7.30	0.239	0.110	< 0.0050	< 0.100	0.230	---	---	---
1V	1/20/2016	ENER	7.48	0.215	0.140	< 0.0050	< 0.100	0.0900	---	---	---
B12	3/18/2016	ENER	---	4.13	4.84	0.0900	---	---	---	---	---
C6	3/15/2016	ENER	---	1.04	2.44	0.288	1.70	---	---	---	---
C7	3/15/2016	ENER	---	7.06	---	1.16	3.50	---	---	---	---
C8	3/15/2016	ENER	---	3.40	8.21	0.607	---	---	---	---	---
	9/29/2016	ENER	7.64	0.502	1.02	0.131	3.30	0.0900	---	---	---
C9	3/15/2016	ENER	---	7.70	---	0.896	5.80	---	---	---	---
C10	3/15/2016	ENER	---	6.90	15.1	0.889	---	---	---	---	---
	9/29/2016	ENER	7.67	6.88	13.2	0.987	17.0	0.250	---	---	---
C11	9/29/2016	ENER	---	5.00	7.32	0.880	---	---	---	---	---
C12	3/15/2016	ENER	---	3.48	---	1.10	10.00	---	---	---	---
	9/29/2016	ENER	---	2.36	2.95	1.17	---	---	---	---	---
D1	3/15/2016	ENER	---	4.00	2.16	0.280	---	---	---	---	---
	7/11/2016	ENER	7.49	1.38	2.05	0.0740	1.30	0.430	0.500	< 0.0100	---
DD	2/9/2016	ENER	---	0.137	< 0.0300	0.0460	---	---	---	---	---
	5/17/2016	ENER	7.35	0.142	< 0.0300	0.0560	6.80	0.210	1.10	< 0.0100	0.0500

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
DD	10/6/2016	ENER	---	0.0806	< 0.0300	0.109	---	---	---	---	---
DD2	2/9/2016	ENER	---	0.222	< 0.0300	< 0.0050	---	---	---	---	---
	5/17/2016	ENER	7.24	0.234	< 0.0300	< 0.0050	< 0.100	0.390	1.10	< 0.0100	0.200
	10/7/2016	ENER	---	0.200	< 0.0300	< 0.0050	---	---	---	---	---
F	3/15/2016	ENER	---	0.0460	< 0.0300	0.0110	---	---	---	---	---
	9/19/2016	ENER	---	0.0400	< 0.0300	0.0100	1.80	---	---	---	---
FB	3/15/2016	ENER	---	0.0538	< 0.0300	0.0130	---	---	---	---	---
	9/19/2016	ENER	---	0.0458	< 0.0300	0.0080	1.80	---	---	---	---
GH	3/15/2016	ENER	---	0.0845	< 0.0300	0.0130	---	---	---	---	---
	9/19/2016	ENER	---	0.0705	< 0.0300	0.0140	1.80	---	---	---	---
GN	3/15/2016	ENER	---	0.0865	< 0.0300	0.0110	---	---	---	---	---
GV	12/21/2016	ENER	---	0.181	< 0.0300	0.0200	---	---	---	---	---
K4	1/20/2016	ENER	---	0.207	0.290	0.0760	---	---	---	---	---
	7/18/2016	ENER	7.63	0.494	0.820	0.159	1.40	4.80	---	---	---
K5	1/18/2016	ENER	---	0.813	2.46	0.293	---	---	---	---	---
	7/18/2016	ENER	7.44	2.55	3.02	0.804	10.00	1.10	---	---	---
K7	1/18/2016	ENER	---	0.480	1.05	0.163	---	---	---	---	---
	7/18/2016	ENER	7.63	0.307	0.530	0.110	1.50	1.30	---	---	---
K8	1/21/2016	ENER	---	0.417	0.630	0.122	---	---	---	---	---
	7/18/2016	ENER	7.66	0.533	1.39	0.140	1.60	0.610	---	---	---
K9	1/18/2016	ENER	---	1.55	4.10	0.533	---	---	---	---	---
	7/18/2016	ENER	7.66	0.653	1.37	0.0840	1.50	1.000	---	---	---
K10	1/18/2016	ENER	---	1.34	3.32	0.290	---	---	---	---	---
K11	1/18/2016	ENER	---	0.542	1.12	0.0570	---	---	---	---	---
L	10/26/2016	ENER	---	0.375	0.460	0.0460	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
L5	4/12/2016	ENER	---	0.173	---	0.0480	0.600	---	---	---	---
L6	4/12/2016	ENER	---	0.228	---	0.0700	0.700	---	---	---	---
	10/26/2016	ENER	---	0.228	0.290	0.0780	---	---	---	---	---
L7	4/12/2016	ENER	---	0.263	---	0.0980	1.000	---	---	---	---
L8	4/12/2016	ENER	---	0.224	---	0.0720	1.40	---	---	---	---
	10/26/2016	ENER	---	0.403	0.780	0.123	---	---	---	---	---
L9	4/12/2016	ENER	---	0.208	---	0.0630	1.30	---	---	---	---
L10	4/12/2016	ENER	---	0.269	---	0.0300	1.50	---	---	---	---
	10/26/2016	ENER	---	0.239	0.430	0.0320	---	---	---	---	---
M7	3/16/2016	ENER	---	0.986	1.02	0.0240	---	---	---	---	---
M9	3/16/2016	ENER	---	1.08	0.770	0.112	---	---	---	---	---
M10	3/16/2016	ENER	---	0.146	< 0.0300	0.0540	---	---	---	---	---
ML	3/16/2016	ENER	---	0.0952	< 0.0300	0.0290	---	---	---	---	---
MQ	3/16/2016	ENER	---	0.754	0.340	0.0830	---	---	---	---	---
MX	3/15/2016	ENER	---	0.0462	< 0.0300	0.0130	---	---	---	---	---
MY	12/16/2016	ENER	---	0.0446	< 0.0300	0.0350	---	---	---	---	---
MZ	3/16/2016	ENER	---	0.122	< 0.0300	0.0420	---	---	---	---	---
P	5/16/2016	ENER	7.60	0.0294	< 0.0300	0.130	4.80	0.680	5.10	< 0.0100	0.0800
Q	5/17/2016	ENER	7.46	0.0549	< 0.0300	0.370	12.0	0.210	0.400	< 0.0100	0.0800
	10/6/2016	ENER	---	0.0509	< 0.0300	0.413	---	---	---	---	---
	10/26/2016	ENER	---	0.0606	< 0.0300	0.430	---	---	---	---	---
R	5/17/2016	ENER	7.62	0.0238	< 0.0300	0.714	19.0	0.230	1.80	< 0.0100	0.0400
	10/26/2016	ENER	---	0.0247	0.0300	0.680	---	---	---	---	---
S1	1/26/2016	ENER	---	0.298	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
S2	1/19/2016	ENER	---	2.26	2.49	0.372	---	---	---	---	---
	7/9/2016	ENER	---	5.20	5.41	0.490	2.10	---	---	---	---
S3	1/28/2016	ENER	---	17.7	---	---	---	---	---	---	---
S4	1/28/2016	ENER	---	0.301	---	---	---	---	---	---	---
	1/28/2016	ENER	7.77	0.271	0.440	0.0250	1.50	0.290	---	---	---
	3/15/2016	ENER	---	0.304	0.460	0.0540	---	---	---	---	---
	7/9/2016	ENER	7.38	0.475	0.550	< 0.0050	< 0.100	0.560	0.900	< 0.0100	---
S18	1/28/2016	ENER	---	0.617	---	---	---	---	---	---	---
S36	1/27/2016	ENER	---	2.58	---	---	---	---	---	---	---
SA	1/19/2016	ENER	---	2.23	2.46	0.377	---	---	---	---	---
	1/28/2016	ENER	8.09	17.2	34.8	0.688	2.30	0.420	---	---	---
SE6	1/25/2016	ENER	7.38	16.0	15.8	0.0740	< 0.100	0.890	---	---	---
	1/28/2016	ENER	---	15.4	---	---	---	---	---	---	---
ST	1/25/2016	ENER	7.68	1.05	0.630	0.0920	4.80	0.240	---	---	---
SZ	1/28/2016	ENER	8.71	44.0	79.3	3.96	13.0	0.760	---	---	---
T	9/29/2016	ENER	---	3.41	5.45	1.22	---	---	---	---	---
TA	9/29/2016	ENER	---	1.44	2.02	0.404	---	---	---	---	---
TDR-1D	1/26/2016	ENER	---	6.49	---	---	---	---	---	---	---
	4/26/2016	ENER	---	3.04	---	---	---	---	---	---	---
TDR-1S	1/26/2016	ENER	---	0.0631	---	---	---	---	---	---	---
	4/26/2016	ENER	---	0.0716	---	---	---	---	---	---	---
TDR-2D	1/25/2016	ENER	---	0.409	---	---	---	---	---	---	---
	4/26/2016	ENER	---	2.20	---	---	---	---	---	---	---
TDR-2S	1/25/2016	ENER	---	0.236	---	---	---	---	---	---	---
	4/26/2016	ENER	---	0.184	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
TDR-3D	1/26/2016	ENER	---	0.645	---	---	---	---	---	---	---
	4/26/2016	ENER	---	0.514	---	---	---	---	---	---	---
TDR-3S	1/26/2016	ENER	---	0.0979	---	---	---	---	---	---	---
	4/26/2016	ENER	---	0.0474	---	---	---	---	---	---	---
TDR-4D	1/26/2016	ENER	---	1.20	---	---	---	---	---	---	---
	4/26/2016	ENER	---	1.59	---	---	---	---	---	---	---
TDR-4S	1/26/2016	ENER	---	0.131	---	---	---	---	---	---	---
	4/26/2016	ENER	---	0.0866	---	---	---	---	---	---	---
TDR-5D	1/27/2016	ENER	---	2.18	---	---	---	---	---	---	---
	4/27/2016	ENER	---	1.80	---	---	---	---	---	---	---
TDR-5S	1/27/2016	ENER	---	0.371	---	---	---	---	---	---	---
	4/27/2016	ENER	---	0.212	---	---	---	---	---	---	---
X	2/9/2016	ENER	---	0.0985	0.0600	0.0090	---	---	---	---	---
	4/12/2016	ENER	---	0.115	0.0700	0.0110	---	---	---	---	---
	7/9/2016	ENER	7.43	0.0634	0.100	0.0120	1.000	0.610	0.400	0.0200	---
	10/20/2016	ENER	---	0.0606	0.130	0.0150	---	---	---	---	---

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Ca THROUGH ION_BAL

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)
0483	5/12/2016	ENER	226	63.6	5.70	315	532	< 5.00	195	733	1850	2509	1.02
0490	5/12/2016	ENER	227	61.1	6.30	318	462	< 5.00	190	808	1930	2567	1.01
	10/21/2016	ENER	200	53.0	6.70	309	519	< 5.00	176	672	1750	3944	1.01
0497	3/4/2016	ENER	291	78.3	7.40	374	476	< 5.00	213	1210	2390	3059	0.955
0498	7/5/2016	ENER	151	36.6	5.60	260	539	< 5.00	120	505	1430	2026	0.961
0688	3/16/2016	ENER	---	---	---	---	---	---	---	672	1680	2371	---
0802	3/15/2016	ENER	---	---	---	---	---	---	---	622	1680	2351	---
	9/8/2016	ENER	220	56.2	6.60	240	543	< 5.00	184	628	1670	2354	0.959
0844	2/19/2016	ENER	377	133	4.40	553	444	< 5.00	395	1740	3500	4427	0.984
0845	2/19/2016	ENER	279	89.7	4.70	421	457	< 5.00	272	1170	2600	3414	1.00
AW	12/19/2016	ENER	---	---	---	---	---	---	167	567	1550	2170	---
CW44	7/5/2016	ENER	232	56.9	6.00	294	458	< 5.00	171	848	1970	2569	0.968
	12/1/2016	ENER	---	---	---	---	---	---	163	808	1840	2508	---
Q2	3/4/2016	ENER	262	70.3	6.20	361	545	< 5.00	212	1070	2210	2900	0.929
	12/1/2016	ENER	---	---	---	---	---	---	142	747	1880	2542	---
Q3	8/4/2016	ENER	164	43.1	5.40	285	522	< 5.00	130	571	1500	2049	0.999
Q5	3/4/2016	ENER	206	56.1	6.30	330	536	< 5.00	176	760	1800	2486	0.989
Q9	7/8/2016	ENER	136	36.0	5.50	256	496	< 5.00	112	465	1350	1913	0.995
Q11	7/8/2016	ENER	190	50.0	5.90	298	550	< 5.00	152	634	1760	2378	1.00
Q12	7/12/2016	ENER	---	---	---	---	---	---	---	---	---	2724	---
	9/15/2016	ENER	250	65.9	6.80	326	433	< 5.00	191	1040	2140	2734	0.940
Q18	7/8/2016	ENER	210	56.0	6.20	307	571	< 5.00	159	693	1880	2507	1.01
Q19	8/4/2016	ENER	265	64.3	7.50	338	455	< 5.00	186	1030	2200	2679	0.974
Q23	7/9/2016	ENER	216	56.9	6.40	302	553	< 5.00	176	833	1960	2496	0.912

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd)

Ca THROUGH ION_BAL

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)
Q27	7/16/2016	ENER	212	55.3	6.60	299	540	< 5.00	152	695	1790	2412	1.02
Q28	9/15/2016	ENER	259	71.2	6.70	342	501	< 5.00	198	1090	2230	---	0.923
Q29	7/12/2016	ENER	233	62.4	5.60	321	507	< 5.00	206	983	2120	---	0.888
Q30	7/16/2016	ENER	230	61.6	6.30	313	552	< 5.00	167	778	1930	2556	1.01
SUB2	10/26/2016	ENER	---	---	---	---	---	---	---	533	1340	1919	---

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0483	5/12/2016	ENER	7.40	0.205	0.0500	0.0330	1.90	0.360	0.400	< 0.0100	0.0200
0490	5/12/2016	ENER	7.34	0.0848	0.0700	0.0330	2.40	0.220	0.200	< 0.0100	0.0080
	10/21/2016	ENER	7.60	0.254	< 0.0400	0.0330	2.20	0.0500	0.400	< 0.0100	0.0300
0497	3/4/2016	ENER	7.29	0.596	< 0.0300	0.0550	3.00	0.190	1.000	< 0.0100	0.0800
0498	7/5/2016	ENER	7.56	0.353	< 0.0300	0.0300	1.90	0.570	0.400	< 0.0100	0.100
0688	3/16/2016	ENER	---	0.0546	< 0.0300	0.0080	---	---	---	---	---
0802	3/15/2016	ENER	---	0.162	0.230	0.0260	---	---	---	---	---
	9/8/2016	ENER	7.55	0.111	< 0.0300	0.0060	1.60	0.260	0.100	< 0.0100	0.0200
0844	2/19/2016	ENER	7.27	0.0913	< 0.0300	0.0610	12.0	0.130	1.10	< 0.0100	0.0500
0845	2/19/2016	ENER	7.25	0.0684	< 0.0300	0.0420	7.60	0.0800	1.30	< 0.0100	0.0700
AW	12/19/2016	ENER	---	0.0716	0.0500	0.0140	---	---	---	---	---
CW44	7/5/2016	ENER	7.47	0.265	< 0.0300	0.0380	3.00	0.180	0.600	< 0.0100	0.0040
	12/1/2016	ENER	---	0.221	< 0.0300	0.0350	---	---	---	---	---
Q2	3/4/2016	ENER	7.46	0.627	< 0.0300	0.0520	2.90	0.950	1.40	< 0.0100	0.100
	12/1/2016	ENER	---	0.438	0.190	0.0470	---	---	---	---	---
Q3	8/4/2016	ENER	7.51	0.505	< 0.0300	0.0400	2.00	1.70	2.80	< 0.0100	0.0040
Q5	3/4/2016	ENER	7.38	0.847	< 0.0300	0.0420	2.20	0.300	1.50	< 0.0100	0.200
Q9	7/8/2016	ENER	7.70	0.309	0.0500	0.0290	1.80	0.230	0.300	< 0.0100	0.0700
Q11	7/8/2016	ENER	7.68	0.700	< 0.0300	0.0400	2.10	0.270	-0.200	< 0.0100	-0.0200
Q12	9/15/2016	ENER	7.56	0.316	< 0.0300	0.0470	2.90	0.140	1.70	< 0.0100	-0.0060
Q18	7/8/2016	ENER	7.56	0.750	< 0.0300	0.0440	2.30	0.250	0.900	< 0.0100	-0.0100
Q19	8/4/2016	ENER	7.42	0.465	< 0.0300	0.0570	2.90	0.410	1.60	< 0.0100	0.0800
Q23	7/9/2016	ENER	7.51	1.000	0.0400	0.0490	2.50	0.340	1.40	< 0.0100	0.0300
Q27	7/16/2016	ENER	7.60	0.643	< 0.0300	0.0460	2.70	0.760	3.10	< 0.0100	0.0400

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
Q28	9/15/2016	ENER	7.50	0.604	< 0.0300	0.0470	2.70	0.310	2.20	< 0.0100	-0.0100
Q29	7/12/2016	ENER	7.60	0.900	< 0.0300	0.0420	2.40	0.550	2.80	< 0.0100	0.0050
Q30	7/16/2016	ENER	7.53	0.858	< 0.0300	0.0420	2.20	0.720	1.30	< 0.0100	0.0100
SUB2	10/26/2016	ENER	---	0.0297	< 0.0300	0.0170	---	---	---	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Ca THROUGH ION_BAL

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)
0538	8/9/2016	ENER	---	---	---	---	---	---	188	727	1740	2453	---
0540	4/28/2016	ENER	92.0	28.3	5.00	142	298	< 5.00	78.0	267	814	---	1.03
	8/4/2016	ENER	---	---	---	---	---	---	133	539	1400	1994	---
0541	12/28/2016	ENER	---	---	---	---	---	---	150	635	1480	2028	---
0551	2/11/2016	ENER	198	39.0	5.00	189	390	< 5.00	120	661	1550	2101	0.904
0555	2/16/2016	ENER	315	84.2	5.10	619	487	< 5.00	326	1650	3210	4182	0.961
0556	2/10/2016	ENER	248	71.3	4.60	518	463	< 5.00	227	1420	2730	3518	0.935
0557	2/10/2016	ENER	240	67.3	4.00	510	437	< 5.00	219	1360	2640	3444	0.952
0631	12/27/2016	ENER	---	---	---	---	---	---	190	787	1800	2535	---
0634	1/11/2016	ENER	---	---	---	---	---	---	203	839	1940	---	---
	2/18/2016	ENER	---	---	---	---	---	---	179	746	1810	2489	---
	4/5/2016	ENER	203	58.6	7.20	231	388	< 5.00	161	700	1660	---	0.982
	7/23/2016	ENER	---	---	---	---	---	---	92.0	391	1860	2461	---
	10/21/2016	ENER	237	64.2	7.70	265	423	< 5.00	181	786	1820	2441	1.01
	11/30/2016	ENER	---	---	---	---	---	---	167	777	1740	---	---
0637	12/20/2016	ENER	---	---	---	---	---	---	120	523	1330	1858	---
0644	8/1/2016	ENER	---	---	---	---	---	---	193	768	1800	2504	---
0646	8/1/2016	ENER	---	---	---	---	---	---	186	787	1850	2513	---
0649	2/22/2016	ENER	245	59.3	5.10	233	359	< 5.00	168	795	1770	2328	1.00
0650	2/11/2016	ENER	217	59.5	4.40	311	362	< 5.00	145	1000	1940	2535	0.947
0653	8/1/2016	ENER	---	---	---	---	---	---	189	739	1790	2439	---
0659	2/18/2016	ENER	---	---	---	---	---	---	201	886	2030	2715	---
	2/23/2016	ENER	262	71.4	7.70	288	490	< 5.00	206	891	2050	---	0.973
	4/5/2016	ENER	248	68.6	7.90	277	469	< 5.00	200	857	1990	---	0.966
	7/23/2016	ENER	---	---	---	---	---	---	185	744	1950	2589	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
0659	10/21/2016	ENER	252	68.1	8.10	286	475	< 5.00	196	838	1970	2622	0.997
0686	12/20/2016	ENER	---	---	---	---	---	---	127	538	1390	1927	---
0846	2/11/2016	ENER	---	---	---	---	---	---	222	2340	4120	4868	---
0862	5/6/2016	ENER	197	53.4	5.80	305	434	< 5.00	185	711	1820	2485	1.01
	8/4/2016	ENER	---	---	---	---	---	---	142	568	1480	2045	---
	10/24/2016	ENER	176	48.5	5.50	259	407	< 5.00	157	640	1600	2233	0.983
	11/30/2016	ENER	---	---	---	---	---	---	145	675	1590	---	---
0864	8/9/2016	ENER	---	---	---	---	---	---	176	702	1760	2469	---
0865	4/28/2016	ENER	200	45.3	7.90	323	425	< 5.00	200	780	1790	---	0.964
	8/4/2016	ENER	---	---	---	---	---	---	175	698	1740	2440	---
0866	8/4/2016	ENER	---	---	---	---	---	---	183	836	1950	2618	---
	11/30/2016	ENER	---	---	---	---	---	---	159	754	1900	---	---
0881	2/18/2016	ENER	273	73.5	8.20	304	500	< 5.00	204	935	2110	2862	0.986
0882	2/18/2016	ENER	221	57.1	6.20	287	502	< 5.00	187	756	1800	2483	0.965
0884	2/18/2016	ENER	163	49.7	6.30	294	382	< 5.00	154	718	1620	2299	0.979
0886	2/18/2016	ENER	284	77.8	7.90	311	488	< 5.00	193	1030	2210	2908	0.979
	7/7/2016	ENER	279	73.7	7.70	302	466	< 5.00	192	978	2100	2826	0.992
0888	2/9/2016	ENER	---	---	---	---	---	---	178	732	1770	2426	---
0890	1/11/2016	ENER	---	---	---	---	---	---	167	670	1610	---	---
	2/18/2016	ENER	---	---	---	---	---	---	170	675	1660	2315	---
	4/5/2016	ENER	166	47.6	6.10	191	334	< 5.00	135	549	1360	---	0.990
	7/23/2016	ENER	---	---	---	---	---	---	167	670	1880	2226	---
	10/21/2016	ENER	196	55.1	7.00	210	338	< 5.00	151	654	1550	2108	1.00
0893	2/19/2016	ENER	239	63.4	7.70	277	506	< 5.00	200	762	1850	2532	0.981
0920	4/13/2016	ENER	427	80.5	9.30	261	230	< 5.00	59.0	1550	2640	3044	1.04

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
0920	10/6/2016	ENER	---	---	---	---	---	---	62.0	1600	2650	3073	---
0996	12/15/2016	ENER	---	---	---	---	---	---	143	591	1540	2117	---
H1	1/11/2016	ENER	---	---	---	---	---	---	169	659	1610	---	---
	2/18/2016	ENER	---	---	---	---	---	---	170	665	1620	2247	---
	4/5/2016	ENER	163	49.2	6.50	191	326	< 5.00	129	554	1340	---	0.999
	7/23/2016	ENER	---	---	---	---	---	---	158	711	1560	2311	---
	10/21/2016	ENER	228	63.4	7.70	258	380	< 5.00	167	778	1770	2352	1.03
H2A	1/11/2016	ENER	---	---	---	---	---	---	166	590	1500	---	---
	2/18/2016	ENER	---	---	---	---	---	---	167	609	1540	2158	---
	4/5/2016	ENER	151	43.8	5.70	175	314	< 5.00	122	488	1240	---	0.999
	7/23/2016	ENER	---	---	---	---	---	---	158	648	1840	2125	---
	10/21/2016	ENER	196	55.5	7.20	212	349	< 5.00	151	654	1540	2070	1.000
	11/30/2016	ENER	---	---	---	---	---	---	147	702	1530	---	---
H7	1/11/2016	ENER	---	---	---	---	---	---	162	629	1540	---	---
	2/18/2016	ENER	---	---	---	---	---	---	164	696	1670	2304	---
	4/5/2016	ENER	182	55.5	7.10	206	371	< 5.00	137	619	1490	---	0.991
	7/23/2016	ENER	---	---	---	---	---	---	166	716	1800	2346	---
	12/16/2016	ENER	---	---	---	---	---	---	154	719	1870	2488	---
H7B	1/11/2016	ENER	---	---	---	---	---	---	155	598	1480	---	---
	2/18/2016	ENER	---	---	---	---	---	---	162	633	1550	2150	---
	4/5/2016	ENER	179	54.2	6.90	203	349	< 5.00	133	600	1440	---	1.01
	7/23/2016	ENER	---	---	---	---	---	---	83.0	381	1900	2429	---
	12/16/2016	ENER	---	---	---	---	---	---	163	767	1780	2699	---
H12	2/18/2016	ENER	---	---	---	---	---	---	181	772	1810	2472	---
	4/5/2016	ENER	215	62.2	7.50	242	393	< 5.00	162	749	1730	---	0.992
	7/23/2016	ENER	---	---	---	---	---	---	179	809	1940	2557	---
	10/21/2016	ENER	249	69.6	8.20	292	437	< 5.00	173	843	1980	2580	1.04

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
H12	11/30/2016	ENER	---	---	---	---	---	---	158	791	1910	---	---
H16	7/7/2016	ENER	277	73.4	8.00	301	464	< 5.00	198	946	2100	2800	1.00
H17	7/7/2016	ENER	244	63.2	7.60	272	518	< 5.00	208	783	1900	2625	0.954
H24	11/30/2016	ENER	---	---	---	---	---	---	176	890	2150	---	---
H25	9/13/2016	ENER	217	55.8	8.50	236	549	< 5.00	191	650	1670	---	0.922
H56	6/30/2016	ENER	237	61.1	8.20	249	528	< 5.00	192	714	1890	2543	0.958
H61	6/30/2016	ENER	240	62.5	8.50	253	528	< 5.00	193	710	1880	2540	0.976
H70	6/30/2016	ENER	301	74.9	7.50	288	507	< 5.00	197	996	2320	2960	0.975
H71	6/30/2016	ENER	238	62.5	7.90	258	516	< 5.00	193	749	1920	2602	0.959
MO	3/15/2016	ENER	---	---	---	---	---	---	---	1380	2650	3346	---
	10/26/2016	ENER	---	---	---	---	---	---	208	1390	2640	3303	---
MR	3/15/2016	ENER	---	---	---	---	---	---	---	1110	2290	3015	---
	9/8/2016	ENER	---	---	---	---	---	---	217	1100	2240	2865	---
MS	6/30/2016	ENER	232	59.1	8.20	242	512	< 5.00	193	683	1840	2510	0.963
R1	4/28/2016	ENER	203	54.7	5.80	313	438	< 5.00	182	716	1820	---	1.04
	8/4/2016	ENER	---	---	---	---	---	---	93.0	381	1850	2529	---
	10/21/2016	ENER	218	57.3	5.80	315	473	< 5.00	192	794	1900	2625	0.986
	11/30/2016	ENER	---	---	---	---	---	---	173	761	1940	---	---
R2	3/7/2016	ENER	195	53.2	5.40	346	457	< 5.00	191	736	1810	2545	1.03
	8/4/2016	ENER	---	---	---	---	---	---	183	742	1840	2494	---
	10/21/2016	ENER	214	57.1	5.80	309	472	< 5.00	192	771	1860	2502	0.986
	11/30/2016	ENER	---	---	---	---	---	---	179	769	1850	---	---
R3	8/4/2016	ENER	204	55.1	6.40	311	474	< 5.00	185	746	1800	2525	0.990
	11/30/2016	ENER	---	---	---	---	---	---	172	744	1800	---	---
R4	3/7/2016	ENER	189	47.5	7.20	328	484	< 5.00	176	696	1720	2455	1.01

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

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)
R4	8/4/2016	ENER	---	---	---	---	---	---	156	673	1750	2299	---
R5	4/28/2016	ENER	155	38.1	6.80	329	473	< 5.00	153	601	1610	---	1.02
	8/4/2016	ENER	---	---	---	---	---	---	146	602	1630	2299	---
	10/21/2016	ENER	158	38.8	6.40	301	519	< 5.00	141	592	1560	2189	0.974
	11/30/2016	ENER	---	---	---	---	---	---	132	586	1510	---	---
R10	4/28/2016	ENER	198	59.1	7.20	293	416	< 5.00	191	720	1800	---	1.01
	8/4/2016	ENER	---	---	---	---	---	---	164	648	1680	2348	---
	10/24/2016	ENER	192	53.6	7.20	285	401	< 5.00	172	705	1730	2403	1.01
	11/30/2016	ENER	---	---	---	---	---	---	159	709	1640	---	---
R11	3/7/2016	ENER	203	49.3	8.10	340	488	< 5.00	191	756	1830	2556	0.996
	8/4/2016	ENER	---	---	---	---	---	---	167	699	1800	2473	---
	11/30/2016	ENER	---	---	---	---	---	---	131	687	1500	---	---
R18	4/28/2016	ENER	177	48.8	6.10	274	402	< 5.00	168	630	1630	---	1.01
	10/24/2016	ENER	167	45.8	6.00	245	375	< 5.00	147	610	1530	2133	0.989
	11/30/2016	ENER	---	---	---	---	---	---	143	650	1540	---	---
R20	4/28/2016	ENER	133	33.3	7.20	247	369	< 5.00	128	479	1280	---	1.03
	10/21/2016	ENER	158	40.8	7.60	221	326	< 5.00	125	574	1340	1885	1.00
	11/30/2016	ENER	---	---	---	---	---	---	146	674	1550	---	---
R22	4/28/2016	ENER	160	43.1	7.10	270	386	< 5.00	150	575	1490	---	1.03
	10/24/2016	ENER	157	42.3	7.00	251	360	< 5.00	136	581	1440	2482	1.02
	11/30/2016	ENER	---	---	---	---	---	---	138	648	1500	---	---
R59	8/2/2016	ENER	---	---	---	---	---	---	191	733	1810	2474	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0538	8/9/2016	ENER	---	0.203	< 0.0300	0.0260	---	---	---	---	---
0540	4/28/2016	ENER	7.63	0.0231	< 0.0300	0.0070	1.20	0.230	1.40	< 0.0100	0.0200
	8/4/2016	ENER	---	0.144	< 0.0300	0.0300	---	---	---	---	---
0541	12/28/2016	ENER	---	0.0946	< 0.0300	0.0270	---	---	---	---	---
0551	2/11/2016	ENER	7.59	0.0329	< 0.0300	0.0290	3.40	0.450	2.20	< 0.0100	0.0700
0555	2/16/2016	ENER	7.51	0.0796	< 0.0300	0.0630	9.10	0.610	1.000	< 0.0100	0.100
0556	2/10/2016	ENER	7.53	0.312	< 0.0300	0.0600	6.00	0.120	0.0600	< 0.0100	0.100
0557	2/10/2016	ENER	7.66	0.0511	< 0.0300	0.0620	7.90	1.30	1.40	< 0.0100	-0.0030
0631	12/27/2016	ENER	---	0.154	< 0.0300	0.0460	---	---	---	---	---
0634	1/11/2016	ENER	---	0.224	0.0400	0.0430	---	---	---	---	---
	2/18/2016	ENER	---	0.186	< 0.0300	0.0330	---	---	---	---	---
	4/5/2016	ENER	7.50	0.192	< 0.0300	0.0410	2.80	6.70	0.500	< 0.0100	0.200
	7/23/2016	ENER	---	0.215	< 0.0300	0.0410	---	---	---	---	---
	10/21/2016	ENER	7.68	0.187	< 0.0400	0.0360	2.70	0.130	1.20	< 0.0100	-0.0400
	11/30/2016	ENER	---	0.145	< 0.0300	0.0340	---	---	---	---	---
0637	12/20/2016	ENER	---	0.0647	< 0.0300	0.0240	---	---	---	---	---
0644	8/1/2016	ENER	---	0.0431	< 0.0300	0.0270	---	---	---	---	---
0646	8/1/2016	ENER	---	0.0488	< 0.0300	0.0420	---	---	---	---	---
0649	2/22/2016	ENER	7.55	0.0302	< 0.0300	0.0360	2.40	3.50	0.700	< 0.0100	0.0800
0650	2/11/2016	ENER	7.57	0.0307	< 0.0300	0.0400	6.20	0.100	0.600	< 0.0100	0.0600
0653	8/1/2016	ENER	---	0.266	< 0.0300	0.0310	---	---	---	---	---
0659	2/18/2016	ENER	---	0.257	< 0.0300	0.0480	---	---	---	---	---
	2/23/2016	ENER	7.45	0.253	0.0400	0.0460	3.60	0.0400	0.700	< 0.0100	-0.0010
	4/5/2016	ENER	7.39	0.248	< 0.0300	0.0480	3.10	0.120	-0.300	< 0.0100	0.0300
	7/23/2016	ENER	---	0.224	0.0300	0.0450	---	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0659	10/21/2016	ENER	7.72	0.208	< 0.0400	0.0390	2.70	0.0800	1.000	< 0.0100	0.0300
0686	12/20/2016	ENER	---	0.0604	< 0.0300	0.0230	---	---	---	---	---
0846	2/11/2016	ENER	---	0.0838	0.0500	0.112	---	---	---	---	---
0862	5/6/2016	ENER	7.42	0.125	< 0.0300	0.0230	3.70	0.210	1.90	< 0.0100	-0.0200
	8/4/2016	ENER	---	0.0970	< 0.0300	0.0240	---	---	---	---	---
	10/24/2016	ENER	7.57	0.111	< 0.0300	0.0270	3.20	0.220	0.200	< 0.0100	0.0100
	11/30/2016	ENER	---	0.0996	< 0.0300	0.0250	---	---	---	---	---
0864	8/9/2016	ENER	---	0.194	< 0.0300	0.0320	---	---	---	---	---
0865	4/28/2016	ENER	7.60	0.0541	< 0.0300	0.0230	3.60	0.240	-0.0300	0.0100	0.0600
	8/4/2016	ENER	---	0.0626	< 0.0300	0.0330	---	---	---	---	---
0866	8/4/2016	ENER	---	0.600	< 0.0300	0.0460	---	---	---	---	---
	11/30/2016	ENER	---	0.453	< 0.0300	0.0460	---	---	---	---	---
0881	2/18/2016	ENER	7.38	0.308	0.0300	0.0420	7.90	0.0600	2.40	< 0.0100	0.200
0882	2/18/2016	ENER	7.71	0.0642	< 0.0300	< 0.0050	0.500	1.50	1.90	0.0200	0.0400
0884	2/18/2016	ENER	7.39	0.0302	< 0.0300	0.0300	4.80	0.210	1.90	< 0.0100	0.0100
0886	2/18/2016	ENER	7.43	0.316	< 0.0300	0.0570	5.40	0.130	1.10	< 0.0100	0.0700
	7/7/2016	ENER	7.55	0.320	< 0.0300	0.0540	4.70	0.680	1.20	< 0.0100	-0.0300
0888	2/9/2016	ENER	---	0.172	< 0.0300	0.0220	---	---	---	---	---
0890	1/11/2016	ENER	---	0.139	< 0.0300	0.0280	---	---	---	---	---
	2/18/2016	ENER	---	0.151	< 0.0300	0.0280	---	---	---	---	---
	4/5/2016	ENER	7.35	0.139	< 0.0300	0.0290	2.10	2.00	-0.300	< 0.0100	0.100
	7/23/2016	ENER	---	0.163	< 0.0300	0.0330	---	---	---	---	---
	10/21/2016	ENER	7.50	0.113	< 0.0300	0.0260	2.60	0.150	0.100	< 0.0100	0.200
0893	2/19/2016	ENER	7.35	0.114	< 0.0300	0.0300	1.70	0.110	1.40	< 0.0100	0.100
0920	4/13/2016	ENER	7.51	0.240	< 0.0300	0.300	11.0	1.30	0.600	< 0.0100	0.0900

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0920	10/6/2016	ENER	---	0.215	< 0.0300	0.302	10.00	---	---	---	---
0996	12/15/2016	ENER	---	0.0792	< 0.0300	0.0250	---	---	---	---	---
H1	1/11/2016	ENER	---	0.105	< 0.0300	0.0210	---	---	---	---	---
	2/18/2016	ENER	---	0.119	0.0500	0.0240	---	---	---	---	---
	4/5/2016	ENER	7.28	0.144	< 0.0300	0.0280	2.20	0.410	0.0050	< 0.0100	0.200
	7/23/2016	ENER	---	0.229	< 0.0300	0.0440	---	---	---	---	---
	10/21/2016	ENER	7.54	0.200	< 0.0400	0.0380	3.30	0.210	0.400	< 0.0100	-0.0040
H2A	1/11/2016	ENER	---	0.0495	< 0.0300	0.0130	---	---	---	---	---
	2/18/2016	ENER	---	0.0633	< 0.0300	0.0170	---	---	---	---	---
	4/5/2016	ENER	7.27	0.125	< 0.0300	0.0250	2.00	2.50	-0.600	< 0.0100	0.0060
	7/23/2016	ENER	---	0.165	< 0.0300	0.0350	---	---	---	---	---
	10/21/2016	ENER	7.57	0.113	< 0.0300	0.0280	2.50	0.0700	0.200	< 0.0100	0.100
	11/30/2016	ENER	---	0.0841	< 0.0300	0.0250	---	---	---	---	---
H7	1/11/2016	ENER	---	0.104	< 0.0300	0.0140	---	---	---	---	---
	2/18/2016	ENER	---	0.151	< 0.0300	0.0290	---	---	---	---	---
	4/5/2016	ENER	7.45	0.173	< 0.0300	0.0350	2.90	0.290	-0.300	< 0.0100	0.0090
	7/23/2016	ENER	---	0.206	< 0.0300	0.0520	---	---	---	---	---
	12/16/2016	ENER	---	0.196	< 0.0300	0.0400	---	---	---	---	---
H7B	1/11/2016	ENER	---	0.0990	< 0.0300	0.0130	---	---	---	---	---
	2/18/2016	ENER	---	0.117	< 0.0300	0.0200	---	---	---	---	---
	4/5/2016	ENER	7.49	0.169	< 0.0300	0.0330	2.80	3.20	1.30	< 0.0100	0.100
	7/23/2016	ENER	---	0.233	< 0.0300	0.0500	---	---	---	---	---
	12/16/2016	ENER	---	0.168	< 0.0300	0.0340	---	---	---	---	---
H12	2/18/2016	ENER	---	0.182	< 0.0300	0.0370	---	---	---	---	---
	4/5/2016	ENER	7.61	0.222	< 0.0300	0.0450	3.70	1.40	0.900	< 0.0100	0.0300
	7/23/2016	ENER	---	0.264	< 0.0300	0.0530	---	---	---	---	---
	10/21/2016	ENER	7.66	0.249	< 0.0400	0.0460	3.70	0.170	0.400	< 0.0100	0.0030

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
H12	11/30/2016	ENER	---	0.209	< 0.0300	0.0430	---	---	---	---	---
H16	7/7/2016	ENER	7.45	0.321	< 0.0300	0.0700	5.00	0.370	1.50	< 0.0100	-0.0200
H17	7/7/2016	ENER	7.58	0.179	< 0.0300	0.0450	2.40	0.190	0.200	< 0.0100	0.0400
H24	11/30/2016	ENER	---	0.307	0.0300	0.0520	---	---	---	---	---
H25	9/13/2016	ENER	7.64	0.112	< 0.0300	0.0090	1.60	0.250	1.50	< 0.0100	0.0300
H56	6/30/2016	ENER	7.50	0.224	< 0.0300	0.0370	1.80	0.380	1.60	< 0.0100	0.0600
H61	6/30/2016	ENER	7.45	0.251	< 0.0300	0.0330	1.60	0.480	3.60	< 0.0100	0.0200
H70	6/30/2016	ENER	7.54	0.552	0.200	0.0600	4.00	0.440	2.40	< 0.0100	0.0800
H71	6/30/2016	ENER	7.53	0.350	0.0400	0.0480	1.70	0.430	4.90	< 0.0100	0.0600
MO	3/15/2016	ENER	---	0.276	0.0800	0.0680	---	---	---	---	---
	10/26/2016	ENER	---	0.243	< 0.0300	0.0680	9.40	---	---	---	---
MR	3/15/2016	ENER	---	0.503	0.0800	0.0730	---	---	---	---	---
	9/8/2016	ENER	---	0.430	0.0600	0.0650	4.50	---	---	---	---
MS	6/30/2016	ENER	7.41	0.175	< 0.0300	0.0260	1.30	0.390	0.100	< 0.0100	-0.0700
R1	4/28/2016	ENER	7.48	0.216	< 0.0300	0.0320	3.70	0.390	1.30	< 0.0100	0.0600
	8/4/2016	ENER	---	0.200	< 0.0300	0.0330	---	---	---	---	---
	10/21/2016	ENER	7.60	0.249	< 0.0400	0.0410	3.40	0.180	0.900	< 0.0100	0.0060
	11/30/2016	ENER	---	0.238	< 0.0300	0.0420	---	---	---	---	---
R2	3/7/2016	ENER	7.72	0.314	< 0.0300	0.0280	3.80	0.980	-0.0500	< 0.0100	0.0800
	8/4/2016	ENER	---	0.311	< 0.0300	0.0440	---	---	---	---	---
	10/21/2016	ENER	7.60	0.311	< 0.0400	0.0350	3.30	0.180	0.500	< 0.0100	-0.0300
	11/30/2016	ENER	---	0.290	< 0.0300	0.0370	---	---	---	---	---
R3	8/4/2016	ENER	7.62	0.390	< 0.0300	0.0370	3.40	4.10	0.600	< 0.0100	0.0400
	11/30/2016	ENER	---	0.311	< 0.0300	0.0380	---	---	---	---	---
R4	3/7/2016	ENER	7.64	0.531	< 0.0300	0.0400	2.40	1.10	-0.600	< 0.0100	0.100

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
R4	8/4/2016	ENER	---	0.494	< 0.0300	0.0540	---	---	---	---	---
R5	4/28/2016	ENER	7.58	0.203	< 0.0300	0.0430	2.10	1.10	1.10	< 0.0100	0.100
	8/4/2016	ENER	---	0.352	< 0.0300	0.0560	---	---	---	---	---
	10/21/2016	ENER	7.70	0.373	< 0.0300	0.0400	2.00	0.150	0.700	< 0.0100	0.0200
	11/30/2016	ENER	---	0.330	< 0.0300	0.0430	---	---	---	---	---
R10	4/28/2016	ENER	7.39	0.0439	< 0.0300	0.0220	3.90	0.440	1.40	< 0.0100	0.100
	8/4/2016	ENER	---	0.0811	< 0.0300	0.0320	---	---	---	---	---
	10/24/2016	ENER	7.50	0.122	< 0.0300	0.0300	3.50	0.130	0.300	< 0.0100	0.0300
	11/30/2016	ENER	---	0.121	< 0.0300	0.0290	---	---	---	---	---
R11	3/7/2016	ENER	7.63	0.387	< 0.0300	0.0340	3.30	0.980	2.10	< 0.0100	0.0200
	8/4/2016	ENER	---	0.396	< 0.0300	0.0550	---	---	---	---	---
	11/30/2016	ENER	---	0.169	< 0.0300	0.0280	---	---	---	---	---
R18	4/28/2016	ENER	7.46	0.0617	< 0.0300	0.0190	3.40	0.440	1.20	< 0.0100	0.0400
	10/24/2016	ENER	7.52	0.0950	< 0.0300	0.0260	3.00	0.130	0.400	< 0.0100	0.0050
	11/30/2016	ENER	---	0.128	< 0.0300	0.0300	---	---	---	---	---
R20	4/28/2016	ENER	7.57	0.0585	< 0.0300	0.0160	2.30	0.190	-0.0300	< 0.0100	0.0050
	10/21/2016	ENER	7.90	0.0904	< 0.0300	0.0310	2.50	0.170	1.10	< 0.0100	0.0600
	11/30/2016	ENER	---	0.0938	< 0.0300	0.0390	---	---	---	---	---
R22	4/28/2016	ENER	7.55	0.0660	< 0.0300	0.0180	3.00	0.210	0.400	< 0.0100	0.100
	10/24/2016	ENER	7.65	0.0960	< 0.0300	0.0310	2.70	0.0700	-0.0600	< 0.0100	-0.0200
	11/30/2016	ENER	---	0.0730	< 0.0300	0.0360	---	---	---	---	---
R59	8/2/2016	ENER	---	0.347	< 0.0300	0.0400	---	---	---	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Ca THROUGH ION_BAL

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)
0483	5/12/2016	ENER	226	63.6	5.70	315	532	< 5.00	195	733	1850	2509	1.02
0493	2/15/2016	ENER	---	---	---	---	---	---	---	677	1550	2393	---
	7/11/2016	ENER	13.9	2.80	1.90	550	388	11.0	139	652	1600	2449	1.03
0494	2/15/2016	ENER	---	---	---	---	---	---	---	814	1890	2590	---
	7/12/2016	ENER	221	61.1	5.80	300	502	< 5.00	195	720	1800	2469	1.01
0498	7/5/2016	ENER	151	36.6	5.60	260	539	< 5.00	120	505	1430	2026	0.961
0538	8/9/2016	ENER	---	---	---	---	---	---	188	727	1740	2453	---
0653	8/1/2016	ENER	---	---	---	---	---	---	189	739	1790	2439	---
ACW	12/19/2016	ENER	---	---	---	---	---	---	136	644	1650	2617	---
AW	12/19/2016	ENER	---	---	---	---	---	---	167	567	1550	2170	---
CE2	4/12/2016	ENER	---	---	---	---	---	---	---	---	---	3155	---
	5/10/2016	ENER	113	31.4	3.20	300	415	< 5.00	121	520	1320	1933	1.01
	10/26/2016	ENER	---	---	---	---	---	---	119	528	1260	1847	---
CE5	7/15/2016	ENER	275	77.0	5.60	368	526	< 5.00	200	1050	2300	3012	0.998
CE6	7/18/2016	ENER	165	42.8	3.60	375	466	< 5.00	164	725	1800	2538	1.02
CE8	2/10/2016	ENER	---	---	---	---	---	---	65.0	781	1510	2424	---
	9/19/2016	ENER	9.80	1.40	1.000	530	374	< 5.00	68.0	810	1580	---	0.944
CE9	3/15/2016	ENER	---	---	---	---	---	---	---	835	1880	2604	---
CE11	7/18/2016	ENER	258	71.1	4.70	533	621	< 5.00	234	1210	2700	3682	0.997
CE12	7/18/2016	ENER	143	36.6	3.50	334	440	< 5.00	137	624	1600	2291	1.02
CE14	3/18/2016	ENER	186	39.4	4.20	241	409	< 5.00	126	560	1400	1953	1.05
CE15	3/18/2016	ENER	285	63.7	5.50	327	468	< 5.00	203	1010	2110	2761	0.978
CE15A	10/27/2016	ENER	---	---	---	---	---	---	---	---	---	2527	---
	12/14/2016	ENER	---	---	---	---	---	---	148	718	1880	2540	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

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)
CE16	12/21/2016	ENER	---	---	---	---	---	---	132	804	1720	2436	---
CE16A	12/21/2016	ENER	---	---	---	---	---	---	362	2680	5030	---	---
CW2	2/10/2016	ENER	---	---	---	---	---	---	126	615	1550	2386	---
	9/26/2016	ENER	---	---	---	---	---	---	---	595	1380	2279	---
CW17	12/16/2016	ENER	---	---	---	---	---	---	140	1470	3090	3633	---
CW18	8/24/2016	ENER	---	---	---	---	---	---	217	719	2000	3005	---
CW29	5/6/2016	ENER	149	41.0	5.00	274	320	< 5.00	142	604	1490	2186	1.04
CW31	12/20/2016	ENER	---	---	---	---	---	---	53.0	887	1840	2558	---
CW32	12/20/2016	ENER	---	---	---	---	---	---	409	1300	3120	4426	---
CW37	10/8/2016	ENER	---	---	---	---	---	---	80.0	1070	1900	2933	---
CW41	8/9/2016	ENER	---	---	---	---	---	---	95.0	319	966	1518	---
CW42	8/9/2016	ENER	---	---	---	---	---	---	183	710	1770	2476	---
	8/24/2016	ENER	---	---	---	---	---	---	170	666	1650	2343	---
CW43	12/20/2016	ENER	---	---	---	---	---	---	174	1120	2570	3270	---
CW44	7/5/2016	ENER	232	56.9	6.00	294	458	< 5.00	171	848	1970	2569	0.968
	12/1/2016	ENER	---	---	---	---	---	---	163	808	1840	2508	---
CW45	3/4/2016	ENER	169	45.4	5.20	339	522	< 5.00	160	636	1660	2349	1.02
	8/26/2016	ENER	---	---	---	---	---	---	---	617	1610	2304	---
CW50	3/16/2016	ENER	---	---	---	---	---	---	---	876	1650	2205	---
CW53	5/12/2016	ENER	61.9	14.5	2.60	643	681	< 5.00	191	704	1940	2840	1.03
	10/21/2016	ENER	52.0	12.1	2.30	640	680	< 5.00	189	661	1970	5258	1.04
CW56	12/16/2016	ENER	---	---	---	---	---	---	166	1250	2760	3376	---
CW58	12/20/2016	ENER	---	---	---	---	---	---	133	638	1600	2412	---
CW61	12/16/2016	ENER	---	---	---	---	---	---	190	1150	2670	3398	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

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)
CW62	5/18/2016	ENER	---	---	---	---	---	---	228	1500	3000	3813	---
	10/27/2016	ENER	---	---	---	---	---	---	---	---	---	3613	---
	11/30/2016	ENER	---	---	---	---	---	---	183	1310	2870	3633	---
	12/14/2016	ENER	---	---	---	---	---	---	177	1260	2910	3598	---
CW72	12/16/2016	ENER	---	---	---	---	---	---	220	1300	3040	3797	---
CW73	12/19/2016	ENER	---	---	---	---	---	---	188	890	2120	2822	---
CW76	12/19/2016	ENER	---	---	---	---	---	---	129	668	1650	2519	---
R1	4/28/2016	ENER	203	54.7	5.80	313	438	< 5.00	182	716	1820	---	1.04
	8/4/2016	ENER	---	---	---	---	---	---	93.0	381	1850	2529	---
	10/21/2016	ENER	218	57.3	5.80	315	473	< 5.00	192	794	1900	2625	0.986
	11/30/2016	ENER	---	---	---	---	---	---	173	761	1940	---	---
R2	3/7/2016	ENER	195	53.2	5.40	346	457	< 5.00	191	736	1810	2545	1.03
	8/4/2016	ENER	---	---	---	---	---	---	183	742	1840	2494	---
	10/21/2016	ENER	214	57.1	5.80	309	472	< 5.00	192	771	1860	2502	0.986
	11/30/2016	ENER	---	---	---	---	---	---	179	769	1850	---	---
R3	8/4/2016	ENER	204	55.1	6.40	311	474	< 5.00	185	746	1800	2525	0.990
	11/30/2016	ENER	---	---	---	---	---	---	172	744	1800	---	---
R4	3/7/2016	ENER	189	47.5	7.20	328	484	< 5.00	176	696	1720	2455	1.01
	8/4/2016	ENER	---	---	---	---	---	---	156	673	1750	2299	---
R5	4/28/2016	ENER	155	38.1	6.80	329	473	< 5.00	153	601	1610	---	1.02
	8/4/2016	ENER	---	---	---	---	---	---	146	602	1630	2299	---
	10/21/2016	ENER	158	38.8	6.40	301	519	< 5.00	141	592	1560	2189	0.974
	11/30/2016	ENER	---	---	---	---	---	---	132	586	1510	---	---
R11	3/7/2016	ENER	203	49.3	8.10	340	488	< 5.00	191	756	1830	2556	0.996
	8/4/2016	ENER	---	---	---	---	---	---	167	699	1800	2473	---
	11/30/2016	ENER	---	---	---	---	---	---	131	687	1500	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

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)
R36	8/3/2016	ENER	---	---	---	---	---	---	181	754	1740	2435	---
R37	8/10/2016	ENER	---	---	---	---	---	---	159	690	1690	2371	---
R44	8/10/2016	ENER	---	---	---	---	---	---	166	736	1710	2364	---
R45	8/3/2016	ENER	---	---	---	---	---	---	171	730	1740	2418	---
R46	8/2/2016	ENER	---	---	---	---	---	---	171	692	1740	2389	---
R49	8/2/2016	ENER	---	---	---	---	---	---	180	704	1800	2435	---
R51	8/3/2016	ENER	---	---	---	---	---	---	170	716	1730	2404	---
R56	8/8/2016	ENER	---	---	---	---	---	---	179	717	1730	2448	---
R59	8/2/2016	ENER	---	---	---	---	---	---	191	733	1810	2474	---
R60	8/2/2016	ENER	---	---	---	---	---	---	169	691	1790	2420	---
R61	8/8/2016	ENER	---	---	---	---	---	---	175	723	1710	2402	---
R62	8/8/2016	ENER	---	---	---	---	---	---	152	718	1610	2264	---
R72	8/8/2016	ENER	---	---	---	---	---	---	160	730	1660	2316	---
V7	8/5/2016	ENER	---	---	---	---	---	---	99.0	481	1170	1797	---
V8	8/5/2016	ENER	---	---	---	---	---	---	148	706	1620	2272	---
V9	8/5/2016	ENER	---	---	---	---	---	---	77.0	423	1100	1665	---
V11	8/9/2016	ENER	---	---	---	---	---	---	91.0	502	1160	1746	---
V14	8/10/2016	ENER	---	---	---	---	---	---	87.0	460	1070	1598	---
V16	8/9/2016	ENER	---	---	---	---	---	---	105	568	1240	1799	---
V17	8/9/2016	ENER	---	---	---	---	---	---	172	716	1710	2403	---
V18	8/9/2016	ENER	---	---	---	---	---	---	135	636	1470	2107	---
Y1	7/5/2016	ENER	61.1	15.4	2.90	338	320	< 5.00	109	487	1230	1828	1.03
	7/20/2016	HMC	---	---	---	---	---	---	---	---	---	2664	---
	7/20/2016	ENER	---	---	---	---	---	---	---	---	---	1828	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

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)
Y1	10/24/2016	ENER	46.6	11.2	3.00	414	309	< 5.00	126	603	1400	2119	1.000
	12/1/2016	ENER	---	---	---	---	---	---	144	679	1610	2472	---
Y2	12/19/2016	ENER	---	---	---	---	---	---	147	665	1650	2411	---
Y7	3/4/2016	ENER	138	35.4	5.30	460	503	< 5.00	208	855	1840	2633	0.933
	7/23/2016	ENER	---	---	---	---	---	---	---	---	---	2633	---
	12/1/2016	ENER	---	---	---	---	---	---	139	693	1520	2260	---
Y8	12/19/2016	ENER	---	---	---	---	---	---	285	1300	1540	2191	---
Y11	12/19/2016	ENER	---	---	---	---	---	---	140	583	1580	2247	---
Y13	6/30/2016	ENER	208	50.1	5.90	319	498	< 5.00	177	787	1960	2652	0.960
	7/23/2016	HMC	---	---	---	---	---	---	---	---	---	2599	---
	12/1/2016	ENER	---	---	---	---	---	---	155	681	1760	2618	---
Y22	7/23/2016	HMC	---	---	---	---	---	---	---	---	---	2620	---
Y23	7/9/2016	ENER	152	38.5	5.60	293	504	< 5.00	148	602	1540	2127	0.941
	7/23/2016	ENER	---	---	---	---	---	---	---	---	---	2127	---
	10/24/2016	ENER	134	34.0	4.90	262	442	< 5.00	114	493	1350	1944	1.01
	12/1/2016	ENER	---	---	---	---	---	---	124	579	1420	2043	---
Y30	7/23/2016	HMC	---	---	---	---	---	---	---	---	---	2549	---
Y33	7/23/2016	HMC	---	---	---	---	---	---	---	---	---	2139	---
Y34	7/23/2016	HMC	---	---	---	---	---	---	---	---	---	2397	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0483	5/12/2016	ENER	7.40	0.205	0.0500	0.0330	1.90	0.360	0.400	< 0.0100	0.0200
0493	2/15/2016	ENER	---	0.189	< 0.0300	0.115	---	---	---	---	---
	7/11/2016	ENER	8.30	0.277	< 0.0300	0.103	2.10	0.340	4.60	< 0.0100	0.0020
0494	2/15/2016	ENER	---	0.196	0.0300	0.0420	---	---	---	---	---
	7/12/2016	ENER	7.60	0.211	0.0400	0.0360	2.40	1.80	4.80	< 0.0100	0.0100
0498	7/5/2016	ENER	7.56	0.353	< 0.0300	0.0300	1.90	0.570	0.400	< 0.0100	0.100
0538	8/9/2016	ENER	---	0.203	< 0.0300	0.0260	---	---	---	---	---
0653	8/1/2016	ENER	---	0.266	< 0.0300	0.0310	---	---	---	---	---
ACW	12/19/2016	ENER	---	0.0453	< 0.0300	0.0580	---	---	---	---	---
AW	12/19/2016	ENER	---	0.0716	0.0500	0.0140	---	---	---	---	---
CE2	5/10/2016	ENER	7.81	1.05	1.17	0.0560	1.60	0.280	1.10	< 0.0100	0.0200
	10/26/2016	ENER	---	0.878	1.04	0.0540	---	---	---	---	---
CE5	7/15/2016	ENER	7.65	2.00	1.13	0.0720	1.50	0.670	---	---	---
CE6	7/18/2016	ENER	7.59	1.66	1.56	0.0790	2.10	0.620	---	---	---
CE8	2/10/2016	ENER	---	0.0307	0.0600	< 0.0050	---	---	---	---	---
	9/19/2016	ENER	8.35	0.0322	< 0.0300	< 0.0050	< 0.100	0.100	4.00	< 0.0100	-0.0200
CE9	3/15/2016	ENER	---	0.519	0.240	0.0620	---	---	---	---	---
CE11	7/18/2016	ENER	7.58	3.10	2.56	0.163	2.50	0.760	---	---	---
CE12	7/18/2016	ENER	7.66	1.50	1.65	0.0600	1.20	0.430	---	---	---
CE14	3/18/2016	ENER	7.41	0.0682	0.0400	0.0910	3.60	0.570	2.60	< 0.0100	0.0020
CE15	3/18/2016	ENER	7.34	1.26	0.930	0.111	2.20	0.440	3.40	< 0.0100	0.0900
CE15A	10/27/2016	ENER	---	0.691	---	---	---	---	---	---	---
	12/14/2016	ENER	---	0.688	0.480	0.0990	---	---	---	---	---
CE16	12/21/2016	ENER	---	0.791	2.65	0.166	---	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CE16A	12/21/2016	ENER	---	7.34	4.90	0.107	---	---	---	---	---
CW2	2/10/2016	ENER	---	0.0420	< 0.0300	0.0470	2.00	---	---	---	---
	9/26/2016	ENER	---	0.0353	< 0.0300	0.0360	---	---	---	---	---
CW17	12/16/2016	ENER	---	0.271	0.110	0.104	---	---	---	---	---
CW18	8/24/2016	ENER	---	0.0294	< 0.0300	0.0130	1.60	---	---	---	---
CW29	5/6/2016	ENER	7.46	0.155	< 0.0300	0.0330	2.80	0.330	2.10	< 0.0100	0.0200
CW31	12/20/2016	ENER	---	0.0063	< 0.0300	< 0.0050	---	---	---	---	---
CW32	12/20/2016	ENER	---	0.0021	< 0.0300	< 0.0050	---	---	---	---	---
CW37	10/8/2016	ENER	---	0.0265	< 0.0300	0.0750	5.80	---	---	---	---
CW41	8/9/2016	ENER	---	0.0379	< 0.0300	0.0390	---	---	---	---	---
CW42	8/9/2016	ENER	---	0.269	< 0.0300	0.0290	---	---	---	---	---
	8/24/2016	ENER	---	0.228	< 0.0300	0.0250	4.00	---	---	---	---
CW43	12/20/2016	ENER	---	0.0474	< 0.0300	0.0400	---	---	---	---	---
CW44	7/5/2016	ENER	7.47	0.265	< 0.0300	0.0380	3.00	0.180	0.600	< 0.0100	0.0040
	12/1/2016	ENER	---	0.221	< 0.0300	0.0350	---	---	---	---	---
CW45	3/4/2016	ENER	7.43	0.396	< 0.0300	0.0320	1.40	0.200	1.000	< 0.0100	0.100
	8/26/2016	ENER	---	0.391	< 0.0300	0.0310	---	---	---	---	---
CW50	3/16/2016	ENER	---	0.0312	< 0.0300	< 0.0050	---	---	---	---	---
CW53	5/12/2016	ENER	7.75	0.0850	< 0.0300	0.0180	1.40	0.230	0.500	< 0.0100	0.0080
	10/21/2016	ENER	7.91	0.0640	< 0.0400	0.0160	1.70	0.130	0.500	< 0.0100	-0.0050
CW56	12/16/2016	ENER	---	0.661	0.540	0.135	---	---	---	---	---
CW58	12/20/2016	ENER	---	0.201	< 0.0300	0.0870	---	---	---	---	---
CW61	12/16/2016	ENER	---	1.67	1.65	0.196	---	---	---	---	---
CW62	5/18/2016	ENER	---	2.33	1.62	0.298	---	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CW62	10/27/2016	ENER	---	1.21	---	---	---	---	---	---	---
	11/30/2016	ENER	---	1.07	0.890	0.230	---	---	---	---	---
	12/14/2016	ENER	---	1.36	1.13	0.229	---	---	---	---	---
CW72	12/16/2016	ENER	---	2.46	1.97	0.188	---	---	---	---	---
CW73	12/19/2016	ENER	---	0.182	< 0.0300	0.0380	---	---	---	---	---
CW76	12/19/2016	ENER	---	0.0898	< 0.0300	0.0510	---	---	---	---	---
R1	4/28/2016	ENER	7.48	0.216	< 0.0300	0.0320	3.70	0.390	1.30	< 0.0100	0.0600
	8/4/2016	ENER	---	0.200	< 0.0300	0.0330	---	---	---	---	---
	10/21/2016	ENER	7.60	0.249	< 0.0400	0.0410	3.40	0.180	0.900	< 0.0100	0.0060
	11/30/2016	ENER	---	0.238	< 0.0300	0.0420	---	---	---	---	---
R2	3/7/2016	ENER	7.72	0.314	< 0.0300	0.0280	3.80	0.980	-0.0500	< 0.0100	0.0800
	8/4/2016	ENER	---	0.311	< 0.0300	0.0440	---	---	---	---	---
	10/21/2016	ENER	7.60	0.311	< 0.0400	0.0350	3.30	0.180	0.500	< 0.0100	-0.0300
	11/30/2016	ENER	---	0.290	< 0.0300	0.0370	---	---	---	---	---
R3	8/4/2016	ENER	7.62	0.390	< 0.0300	0.0370	3.40	4.10	0.600	< 0.0100	0.0400
	11/30/2016	ENER	---	0.311	< 0.0300	0.0380	---	---	---	---	---
R4	3/7/2016	ENER	7.64	0.531	< 0.0300	0.0400	2.40	1.10	-0.600	< 0.0100	0.100
	8/4/2016	ENER	---	0.494	< 0.0300	0.0540	---	---	---	---	---
R5	4/28/2016	ENER	7.58	0.203	< 0.0300	0.0430	2.10	1.10	1.10	< 0.0100	0.100
	8/4/2016	ENER	---	0.352	< 0.0300	0.0560	---	---	---	---	---
	10/21/2016	ENER	7.70	0.373	< 0.0300	0.0400	2.00	0.150	0.700	< 0.0100	0.0200
	11/30/2016	ENER	---	0.330	< 0.0300	0.0430	---	---	---	---	---
R11	3/7/2016	ENER	7.63	0.387	< 0.0300	0.0340	3.30	0.980	2.10	< 0.0100	0.0200
	8/4/2016	ENER	---	0.396	< 0.0300	0.0550	---	---	---	---	---
	11/30/2016	ENER	---	0.169	< 0.0300	0.0280	---	---	---	---	---
R36	8/3/2016	ENER	---	0.311	< 0.0300	0.0480	---	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
R37	8/10/2016	ENER	---	0.274	< 0.0300	0.0500	---	---	---	---	---
R44	8/10/2016	ENER	---	0.253	< 0.0300	0.0700	---	---	---	---	---
R45	8/3/2016	ENER	---	0.321	< 0.0300	0.0510	---	---	---	---	---
R46	8/2/2016	ENER	---	0.274	< 0.0300	0.0320	---	---	---	---	---
R49	8/2/2016	ENER	---	0.312	< 0.0300	0.0480	---	---	---	---	---
R51	8/3/2016	ENER	---	0.268	< 0.0300	0.0500	---	---	---	---	---
R56	8/8/2016	ENER	---	0.344	< 0.0300	0.0470	---	---	---	---	---
R59	8/2/2016	ENER	---	0.347	< 0.0300	0.0400	---	---	---	---	---
R60	8/2/2016	ENER	---	0.310	< 0.0300	0.0470	---	---	---	---	---
R61	8/8/2016	ENER	---	0.307	< 0.0300	0.0560	---	---	---	---	---
R62	8/8/2016	ENER	---	0.164	< 0.0300	0.0580	---	---	---	---	---
R72	8/8/2016	ENER	---	0.210	< 0.0300	0.0890	---	---	---	---	---
V7	8/5/2016	ENER	---	0.0488	< 0.0300	0.0180	---	---	---	---	---
V8	8/5/2016	ENER	---	0.219	< 0.0300	0.0680	---	---	---	---	---
V9	8/5/2016	ENER	---	0.0230	< 0.0300	0.0340	---	---	---	---	---
V11	8/9/2016	ENER	---	0.0207	< 0.0300	0.0220	---	---	---	---	---
V14	8/10/2016	ENER	---	0.0221	< 0.0300	0.0590	---	---	---	---	---
V16	8/9/2016	ENER	---	0.0692	< 0.0300	0.0650	---	---	---	---	---
V17	8/9/2016	ENER	---	0.304	< 0.0300	0.0570	---	---	---	---	---
V18	8/9/2016	ENER	---	0.134	< 0.0300	0.0580	---	---	---	---	---
Y1	7/5/2016	ENER	7.58	0.181	< 0.0300	0.0350	3.70	1.70	0.300	< 0.0100	0.0400
	10/24/2016	ENER	7.47	0.191	< 0.0300	0.0430	2.60	0.170	1.90	< 0.0100	-0.0070
	12/1/2016	ENER	---	0.242	< 0.0300	0.0550	---	---	---	---	---
Y2	12/19/2016	ENER	---	0.259	< 0.0300	0.0510	---	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
Y7	3/4/2016	ENER	7.49	0.631	< 0.0300	0.0420	2.70	0.110	1.40	< 0.0100	0.0900
	12/1/2016	ENER	---	0.213	< 0.0300	0.0450	---	---	---	---	---
Y8	12/19/2016	ENER	---	0.316	< 0.0300	0.0550	---	---	---	---	---
Y11	12/19/2016	ENER	---	0.153	< 0.0300	0.0470	---	---	---	---	---
Y13	6/30/2016	ENER	7.57	0.460	< 0.0300	0.0420	3.00	0.950	1.90	< 0.0100	0.0300
	12/1/2016	ENER	---	0.396	< 0.0300	0.0470	---	---	---	---	---
Y23	7/9/2016	ENER	7.70	0.281	< 0.0300	0.0360	1.80	0.390	3.40	< 0.0100	0.200
	10/24/2016	ENER	7.65	0.253	< 0.0300	0.0320	1.80	0.200	0.500	< 0.0100	0.0200
	12/1/2016	ENER	---	0.243	< 0.0300	0.0350	---	---	---	---	---

TABLE B.6-1 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Ca THROUGH ION_BAL

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)
#1 Deepwell	2/15/2016	ENER	---	---	---	---	---	---	239	774	1990	2784	---
	5/4/2016	ENER	235	78.8	12.1	294	555	< 5.00	236	748	1970	2754	0.994
	7/9/2016	ENER	---	---	---	---	---	---	213	666	1910	2653	---
	10/17/2016	ENER	---	---	---	---	---	---	---	760	1960	2741	---
#2 Deepwell	2/15/2016	ENER	---	---	---	---	---	---	208	715	1810	2524	---
	5/4/2016	ENER	226	75.7	11.3	260	509	< 5.00	217	708	1860	2608	0.991
	7/9/2016	ENER	---	---	---	---	---	---	212	667	1880	2532	---
	10/17/2016	ENER	---	---	---	---	---	---	---	766	1960	2746	---
0532	12/14/2016	ENER	---	---	---	---	---	---	17.0	135	466	834	---
0928	1/26/2016	ENER	86.0	20.9	2.80	431	308	< 5.00	50.0	909	1700	2430	0.972
0943	1/26/2016	ENER	189	61.4	8.50	283	446	< 5.00	191	722	1760	2521	0.968
	2/25/2016	ENER	---	---	---	---	---	---	197	734	1770	2572	---
	9/15/2016	ENER	---	---	---	---	---	---	181	1010	2010	2904	---
	10/18/2016	ENER	---	---	---	---	---	---	---	980	1970	2857	---
0951	5/10/2016	ENER	150	44.2	5.40	84.2	354	< 5.00	56.0	330	907	1220	1.03
0951R	2/19/2016	ENER	---	---	---	---	---	---	169	586	1480	2136	---
	9/1/2016	ENER	---	---	---	---	---	---	166	572	1480	2146	---
	10/17/2016	ENER	---	---	---	---	---	---	---	600	1490	2211	---
0998	12/14/2016	ENER	---	---	---	---	---	---	50.0	377	971	1297	---
0999	12/15/2016	ENER	---	---	---	---	---	---	17.0	179	550	953	---
OLD #1	7/5/2016	ENER	15.3	2.70	1.40	660	624	---	157	669	1860	2889	---
	7/11/2016	ENER	---	---	---	---	---	---	161	699	1830	2901	---

TABLE B.6-2 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
#1 Deepwell	2/15/2016	ENER	---	0.0088	< 0.0300	< 0.0050	---	---	---	---	---
	5/4/2016	ENER	7.13	0.0080	< 0.0300	0.0080	0.900	0.520	1.80	< 0.0100	0.0020
	7/9/2016	ENER	---	0.0106	< 0.0300	0.0070	---	---	---	---	---
	10/17/2016	ENER	---	0.0083	< 0.0300	0.0080	---	---	---	---	---
#2 Deepwell	2/15/2016	ENER	---	0.0110	< 0.0300	0.0070	---	---	---	---	---
	5/4/2016	ENER	7.31	0.0116	0.0500	0.0070	2.10	0.390	1.70	< 0.0100	-0.0400
	7/9/2016	ENER	---	0.0119	0.0400	0.0090	---	---	---	---	---
	10/17/2016	ENER	---	0.0075	< 0.0300	0.0110	---	---	---	---	---
0532	12/14/2016	ENER	---	0.0078	< 0.0300	0.0080	---	---	---	---	---
0928	1/26/2016	ENER	7.84	0.0854	0.0600	0.0180	0.100	0.210	0.400	< 0.0100	0.200
0943	1/26/2016	ENER	7.35	0.0354	< 0.0300	0.0240	3.90	0.410	0.100	< 0.0100	0.200
	2/25/2016	ENER	---	0.0356	< 0.0300	0.0260	---	---	---	---	---
	9/15/2016	ENER	---	0.0805	< 0.0300	0.0550	---	---	---	---	---
	10/18/2016	ENER	---	0.0960	< 0.0300	0.0760	---	---	---	---	---
0951	5/10/2016	ENER	7.51	0.0274	< 0.0300	0.0070	4.10	0.260	0.900	< 0.0100	0.0700
0951R	2/19/2016	ENER	---	0.0339	< 0.0300	0.0080	---	---	---	---	---
	9/1/2016	ENER	---	0.0358	< 0.0300	0.0100	---	---	---	---	---
	10/17/2016	ENER	---	0.0362	< 0.0300	0.0070	---	---	---	---	---
0998	12/14/2016	ENER	---	0.0144	0.0600	0.0110	---	---	---	---	---
0999	12/15/2016	ENER	---	0.0086	< 0.0300	0.0090	---	---	---	---	---
OLD #1	7/5/2016	ENER	---	0.0460	< 0.0300	0.0190	---	---	---	---	---
	7/11/2016	ENER	---	0.0335	< 0.0300	0.0190	---	---	---	---	---

APPENDIX C

ANNUAL ALARA AUDIT

ANNUAL ALARA AUDIT REPORT FOR 2016

Grants Operations
Homestake Mining Company
P. O. Box 98
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Prepared by:

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March 20, 2017

ABSTRACT

The Annual ALARA Audit for 2016 was conducted by Janet Johnson, PhD, CHP on January 11 and 12, 2017 at the Homestake facility in Grants, New Mexico. Data for the first three quarters of 2016 were reviewed during the audit. Some fourth quarter 2016 data were not available at the time of the audit. 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 48. 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 Radiation Safety Administrator (RSA).[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. There were no findings or recommendations resulting from this ALARA audit.

The Radiation Safety Program at the Homestake facility is well-organized and implemented.

[1] As defined in the Homestake Radioactive Materials License, the RSA is equivalent to a radiation safety officer (RSO)

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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 48), was conducted on January 11 and 12, 2017[2] 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[3] (NRC, 2002a). Mr. Jesse Toepfer, Radiation Protection Administrator (RPA) for the facility and Mr. Thomas Wohlford were present at the Audit opening and close out sessions. In addition, Mr. Michael Schierman, Environmental Restoration Group (outside consultants to Homestake Mining Company), attended the opening meeting to provide support. Mr. Adrian Venable (Project Superintendent), Mr. William Archuleta (Radiation Technician), and Mr. Kyle Martinez (Environmental Technician)were available to assist the auditor during the entire course of the Audit.

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 and three evaporation ponds. 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.

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:

[2] The ALARA Audit, originally scheduled for early December, 2016, was postponed at the request of the auditor due to a family emergency.

[3] Regulatory Guide 8.31 "Information relevant to ensuring that occupational exposure at uranium mills will be as low as is reasonably achievable"

- 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 2016 Activities

Activities conducted in 2016 included continued groundwater collection and treatment, operation of the reverse osmosis system, construction and operation of additional zeolite treatment units and general site maintenance. 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. The original zeolite water treatment facility operates at a rate of approximately 300 gallons per minute. The addition of the four new zeolite treatment units increased the total capacity to 900 to 1,100 gallons per minute. The nominal capacity is 1,500 gallons per minute; however, one unit is normally undergoing regeneration.

1.4 Occupational Dose Summary

The personal monitoring protocol was modified in 2016, partially in response to a recommendation for the 2015 ALARA Audit. All Homestake workers, with the exception of one office worker, are badged. Contractors spending more than five consecutive days on site inside the fence, 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. The maximum occupational radiation deep dose for 2015, as measured by the quarterly Optically Stimulated Luminescent (OSL) badges was 11 mrem incurred during the fourth quarter. The maximum 2016 deep dose to a worker for any quarter through the third quarter of 2016 was 1 mrem. One individual received a shallow dose of 20 mrem and a lens dose of 11 mrem during the first quarter of 2016. The deep dose on that badge was below the reporting limit of 1 mrem. 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 2015 were 58 mrem/y for HMC-4 and 54 mrem/y for HMC-5. The estimated total annual dose to the nearest residents in 2015 were 60 mrem/year at HMC-4 and 56 mrem/year at HMC-5 (ERG, 2016). These doses are essentially the same as were calculated for 2014. The 2016 public doses will be reported in the

Semi-Annual Environmental Monitoring Report for the second half of 2016 to be completed by March 31, 2017.

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 2015 was due to potential inhalation of radon decay products. The data for 2016 were incomplete at the time of the audit but will be reported in the first half 2017 Environmental Monitoring Report.

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 2016 involved water treatment and maintenance of treatment systems, construction of new treatment facilities, 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 fence. 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 186 bioassay samples from employees and contractors had been submitted to ELI from January 1 through October, 2016. 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. The spike sample and blank submitted in June 2016 showed a concentration outside of the acceptable limits. The discrepancy was investigated and resolved with a re-run of the spike and blank. The re-run of the blank was less than the reporting limit; the spike sample was 15.1 µg/L. This indicates that the error occurred at the laboratory during the initial analysis. All other spike samples submitted in 2016 through October showed acceptable accuracy. In response to a recommendation from the 2015 ALARA Audit, in February 2016 Homestake audited Energy Laboratories, Inc. No laboratory issues were identified.

As noted in the 201 ALARA Audit, it is difficult to track bioassay samples to document that all contractors who worked on the site 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 spreadsheet 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.

As noted in the 2015 ALARA Audit Report, workers receive annual written notification of direct radiation doses based on personal dosimetry. 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 or through the first three quarters of 2016; therefore, written notification is not mandatory; however, it is good practice to inform monitored workers of their badge results. The existing notification form does not include results of bioassay measurements. Workers are notified if the bioassay result exceeds the laboratory reporting limit so that no notification indicates no positive bioassay samples.

2.1.2 Internal Doses

Internal doses are not assessed for Homestake Mining Company workers, other than through bioassay, 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.

2.1.3 External Doses

All Homestake Mining Company on-site contractors and employees, except one office worker, were badged in 2015 and prior years using OSL dosimeters 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, except for the single office worker, and contractors who are on site in the fenced area for more than five consecutive days. 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. A sample of the badge log forms was 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 2016 are summarized in Table 1.

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. The maximum deep dose to a worker in 2016 through the first three quarters was 1 mrem. One drilling contractor received a shallow dose of 20 mrem and an eye dose of 11 mrem during the first quarter of 2016; however, the deep dose on this badge was below the reporting limit of 1 mrem. The shallow dose was due to beta radiation. The disparity between the non-detectable deep dose and the shallow dose indicates possible beta contamination of the badge or placement of the badge near a uranium source. In any case, the shallow and lens doses were less than 25% of the maximum allowable Total Effective Dose Equivalent (TEDE) to a member of the public. The anomalous badge result was reviewed and noted in the April ALARA Report.

Table 1: Annual Deep Doses

	2011	2012	2013	2014	2015	2016 Q1-Q3 only
# Badges – Homestake	7	8	7	7	7	7
# Badges – contractor	55	65	62	114	171	Q1 – 82 Q2 – 41 Q3 – 37
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
Mean Deep Dose (mrem/y)	28.2	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

The doses are reported annually to individual workers on a form comparable to the NRC Form 5. Deep doses are reported as Total Effective Dose Equivalent (TEDE). The Committed Effective Dose Equivalent (CEDE) is reported as zero since airborne radionuclide concentrations to which workers may be exposed are not elevated. Skin and lens doses are not reported on the form. 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.

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 2016 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 RSA attended 40-hour Radiation Safety Officer Training in March of 2015, thus is not due for biennial refresher training until March of 2017. The two Radiation Technicians, Mr. Venable and Mr. Archuleta attended 40-hour radiation safety officer training in October, 2014. Certificates are on file in the training records. Regulatory Guide 8.31 (NRC, 2002a) does not specifically require biennial refresher training for Radiation Technicians other than annual radiation worker refresher training. Ivan Williams will be assuming the Radiation Technician position and is scheduled for 40-hour training in March.

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 2017, 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, such as Mr. Williams, will need to have documented radioactive materials transportation training.

Annual radiation worker training was provided to nine Homestake employees on December 6, 2016 by Environmental Restoration Group (ERG). The roster was signed and the graded tests reviewed. Contractors receive radiation safety orientation through a video with additional information provided by ERG or Homestake radiation safety personnel. A total of 75 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. Maintaining up-to-date records on contractors is challenging given the temporary nature of their work on site.

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.

The NRC conducted its routine annual on-site inspection the week of August 22, 2016. The final inspection report has not yet been issued. The report from the August, 2015 inspection, dated September 11, 2015, identified no violations and concluded that “the licensee was conducting reclamation activities in accordance with license and regulatory requirements.”

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 data for the fourth quarter of 2015 and the first three quarters of 2016 were reviewed. No trends or anomalous results were observed.

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 the Landauer Rad Trak (alpha track) detectors for the first two quarters of 2016. Landauer discontinued the RadTrak detectors in June, 2016. Homestake switched to Landauer Nordic Rapidos radon detectors for the third and fourth quarters of 2016. The Rapidos detectors have a lower detection limit and are designed for environmental use. The quarterly radon concentrations for Q4 2015 and Q11 through Q4, 2016 are shown in Table 2.

Table 2: Quarterly Radon Gas Concentrations

Location	Radon Gas Concentration (pCi/L)				
	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4
HMC1	1.33	0.93	1.07	0.45	1.19
HMC1A	1.23	1.13	1.07	0.50	1.05
HMC1OFF	1.33	1.13	0.87	0.56	1.25
HMC2	1.47	1.27	0.93	0.58	1.10
HMC3	1.13	0.76	0.60	0.48	1.05
HMC4	1.63	1.47	1.20	0.56	1.17
HMC5	1.47	1.0	0.97	0.52	1.15
HMC6	1.17	1.17	0.80	0.52	1.20
HMC7	1.10	0.93	0.73	0.57	1.15
HMC16	0.73	0.5	0.50	0.31	0.65
HMC Office	2.2	1.6	0.90	1.4	1.95
R. O. Plant1.23	2.9	2.4	1.50	1.4	2.8

No discernable trends were noted. Radon concentrations were essentially the same as had been reported for previous years, except for Q3 2016 at the outdoor monitoring stations, when the Rapidos were first deployed at the site. The Rapidos detectors showed radon concentrations approximately one-half to two thirds of the values measured previously. The data for the fourth quarter of 2016 show concentrations essential the same as for previous measurements. This may be a real seasonal decrease in radon concentration during the summer or an artifact of the first use of the Rapidos detectors. As expected, the highest indoor radon concentrations (RO Building and office) occurred during the fourth quarters of 2015 and 2016 the first quarter and fourth quarter of 2016 (fall/winter months). The Environmental Monitoring Program is described in detail in the Semi-Annual Environmental Monitoring Reports.

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. The survey meters are 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 2015 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 HP-2, the release limit for personal contamination is background. Equipment surveys are conducted using a Ludlum Model 19 microRmeter, 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 d/m beta or alpha. Monitoring data are included in the documentation for the RWP. A review of the RWPs showed the data to be complete.

2.5 Radiation Work Permits

One Radiation Work Permit (2016-1 RWP) was issued on 2/16/16 for replacement of CLF-2 drive with unit seals at the RO facility. Bioassay was required. The RWP was signed off on 2/17/16. Four workers attended a briefing conducted by Mr. Archuleta and Mr. Venable.

No RWPs were issued for construction of the zeolite and RO facilities as those activities had no potential for non-routine radiation exposures.

2.6 Radiological Effluent and Environmental Monitoring Data

The Semi-Annual Environmental Monitoring Reports for the periods July through December 2015 and January through June 2016 were reviewed. No issues with the environmental data were identified.

Radon flux monitoring was carried out on the Large and Small Tailings Piles in August and September, 2015 and October 2016. A combined total of 100 canisters was placed on the Large Tailings Pond (LTP) and the Small Tailings Pond (STP). The results were included in the Semi-Annual Environmental Monitoring Report for July – December 2015. The canisters were distributed between the two impoundments in proportion to their areas. The average flux for the LTP was 19.64 pCi/m^2-s after addition of interim cover in three locations showing elevated flux measurements. The average flux for the STP was 7.22 pCi/m^2-s. The average flux for the LTP is calculated by averaging in the flux measured on the side slopes prior to installation of rock cover.[4]

In October, 2016 a total of 100 canisters was deployed on each tailings impoundment in two separate deployments. The average radon flux on the LTP was 21.73 pCi/m2-s. The average radon flux on the STP was 7.88 pCi/m^2-s.

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 3. All instruments are in current 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 microRmeters 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.

[4] Appendix A, Criterion 6 (2) of 10CFR40 requires that the radon flux averaged over the entire pile or impoundment not exceed 20 pCi/m^2-s.

Table 3: Instrument Current Calibration Dates

Instrument Type	Meter	Probe	Most recent Calibration Date
Alpha/beta scaler	3030 (245268)	Na	9/21/16
Pancake	Model 12 (145977)	Model 44-9 (151416)	9/22/16
Alpha	Model 12 (102859)	Model 43-5 (082781)	9/22/16
MicroRmeter	Model 19 (310400)	Na	4/20/16
MicroRmeter	Model 19 (82709)	Na	9/22/16
Alpha/beta scaler	3030 (210768)	Na	2/19/16
Alpha	12 (87919)	43-5 (077534)	4/20/16
Pancake	12(227940)	44-9 (237615)	4/20/16

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, 2016). A single controlled copy of the document is maintained in the office of the RSA. The RSA reviewed all radiation safety policies and procedures in 2016. The review is documented in the Manual of Standard Practices.

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 January, 2016. Leak test results were all below 0.0005 µCi. No failures were reported in the January ALARA Report.

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 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 the 2014 ALARA Audit Report, 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. A total of 48 sources are listed in the 2015 inventory. (The number of sources in the 2016 inventory was not recorded during the audit.) 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 also 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, measured in two occupied or potentially occupied locations on the site using Landauer alpha track detectors (Radtrak and Rapidos), are within the range of general indoor values, 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 Q4 2014, Q1 through Q4 2015 and Q1 through Q4 2016 radon concentrations are shown in Table 4. It is interesting to note that while the Q3 measured outdoor environmental radon concentrations were approximately half of the previous values, the indoor measurements were consistent with previous values.

Table 4: 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
To be reported in the January -2017 Q1 Report	1.95	2.8

2.11 Unusual Events

There were no unusual events reported in 2016. There were no overexposures.

2.12 Review of 2015 Audit Findings and Recommendation

There were no findings from the 2015 ALARA Audit. Four recommendations were included in the 2015 Audit Report as follows:

Recommendation (1) Perform an audit of the contract laboratory (Energy Laboratories) held over from the 2014 ALARA Audit.

Homestake audited Energy Laboratories in 2016. Recommendation (1) is closed.

Recommendation (2): Consider discontinuing routine urine bioassay for contractors with little or no potential for contact with contaminated materials.

The routine bioassay program was modified in 2016 to include only those employees and contractors who were expected to be on site for more than five days during the year in areas other than the administration areas. Bioassays will still be performed in accordance with RWPs. Recommendation (2) is closed.

Recommendation (3): Consider discontinuing the routine OSL badge monitoring program for contractors, in particular, those on site for relatively short periods of time, except as required by a Radiation Work Permit.

As with the bioassay program, the OSL badge monitoring program for contractors was modified to required badging only of individuals expected to be on site in areas other than administrative areas for more than five days per year. Recommendation (3) is closed.

Recommendation (4): 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. Worker doses are very low 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 no recommendations from this audit. Recommendations from previous audits have been addressed. One recommendation from the 2015 ALARA Audit regarding disposal of unused sources remains open. However, a survey of the source storage cabinet 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.

3.3 Significant Improvements in 2016

Improvements in the clarity of the record keeping, instituted in 2014 continued through 2015 and 2016. The changes to the RWP format and the monthly ALARA Reports implemented in 2015 have simplified the review process. The ALARA Reports are succinct and very useful.

The modifications to the bioassay and OSL badge procedures to require only individuals who are onsite, outside of administrative areas, to be subject to the programs are reasonable and reduce the record-keeping burden on the radiation safety and environmental technicians without impacting worker safety.

The radiation protection program at the Homestake facility is well-designed and continues to operate at a high level of competence.

4.0 REFERENCES

Homestake Mining Company. 2016. Manual of Standard Practices.

Homestake Mining Company. 2015. Monthly ALARA Reports. November and December.

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Homestake Mining Company. 2017. Radon Flux Measurements for the HMC Tailings Piles. January.

U. S. Nuclear Regulatory Commission (NRC). 2014. NRC Regulatory Guide 8.22, Revision 2. *Bioassay at Uranium Mills*. .May.

U. S. Nuclear Regulatory Commission (NRC). 2002a. NRC Regulatory Guide 8.31, Revision 1. *Information relevant to ensuring that occupational radiation exposures at uranium recovery facilities will be as low as is reasonably achievable*. May.

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APPENDIX D

INSPECTION OF TAILINGS PILES AND PONDS

Alan Kuhn Associates LLC
13212 Manitoba Dr. NE, Albuquerque, NM 87111 505 350 9188

January 31, 2017 File No.: HMC2016

Mr. Jesse Toepfer
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

SUBJECT: REPORT OF 2016 ANNUAL INSPECTION OF TAILING IMPOUNDMENTS AND PONDS, HOMESTAKE GRANTS PROJECT, GRANTS, NEW MEXICO

Dear Mr. Toepfer:

On October 12, 2016 the undersigned performed the annual visual inspection of the tailing impoundments and evaporation ponds at the Homestake Grants Project located at Grants, New Mexico. Adrian Venable 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.

Subsequent to my visual inspection, I reviewed additional information including:

- Impoundment piezometer readings taken by Homestake personnel during 2016 and tabulated at various times through the year,
- Summary of tailing collection well and tailing drainage sump collection rates through 2016,
- Map and table of tailing impoundment phreatic levels most recently measured in 2016, provided by Hydro Engineering on January 10, 2017,
- The settlement monument survey performed by Souder Miller on 11/29-12/1/2016 and dated 1/04/2017,
- Sump discharges recorded by Homestake during 2016,
- Leak detection monitoring records for evaporation ponds #2 and #3,
- Pond level measurements by Homestake through 2016.

This report addresses the observations and findings of my site inspection as well as 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 calm with temperatures in the 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. The vegetation does not compromise the structural integrity or erosion resistance of the slope riprap.

The washout of cover soil under the riprap that occurred in 2015 near the top of the south outslope near well #T41 was repaired in 2015 using flowable fill, which Homestake also used successfully in 2014 in remediating cover washouts that occurred during 2013. This repair, as well as the previous one on the north slope, remains intact and functioning as intended.

During 2015, Homestake constructed a second zeolite treatment system near the southeast corner of the LTP for treatment of contaminated ground water. At the time of my inspection, the zeolite cells were being brought on line. The old zeolite cells located near the middle of the LTP were working at the time of this inspection. Both zeolite facilities appear to be stable, and there was no visible indication of negative impact of these facilities on the stability of the LTP. The pipe corridor on the southeast slope of the LTP to convey water to and from the zeolite cells appears to be intact and functioning as intended, with no evident impact on the LTP.

At the time of this inspection, additional soil cover was been added on the northwest quadrant of the LTP to improve radon attenuation in the area.

Water injection into the LTP, part of the ground water restoration program, was discontinued in mid-2015. No injection of water into the LTP occurred in 2016.

The sumps along the toe of the east end of the north outslope of the LTP have continued to collect the toe seepage that previously had emerged at the ground surface. Since injection into the LTP was stopped, less water has been leaving the LTP and pumping rates have dropped accordingly. The buried drains and collection sumps around the toe of the LTP are still collecting water draining out of the tailings. At the time of this site visit, the ground surface in the toe at the east end of the north outslope has dried up, and no standing water was visible anywhere around the toe of the LTP.

The slope stability analysis of the LTP updated in 2010 is still valid for 2016; the stability parameters have not changed negatively during 2016 and, as a result of cessation of water injection in the LTP, are gradually improving 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, under the pond liner along approximately 200 feet of the pond westward from the southeast corner (Figure 1), have not visibly changed from 2013 and the liner remains intact. With the pond water level much lower than normal for this time of year, more of this liner was visible and a second, lower slump was exposed approximately two vertical feet below the upper slump. Each slump is an irregular step or bench about 1-1.5 feet high. The function of the liner has not been compromised by this condition. However, weathering cracks have developed at several locations in this area (Figures 2 and 3), and although they do not yet appear to penetrate the entire thickness of the liner, it is likely that they will expand with time. While the water level was still relatively low and much of the liner on the slopes was exposed during October 2016, HMC personnel marked, cleaned and repaired (by application of hot asphaltic emulsion) cracks or tears in the liner above water level.

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.

Water has been transferred from EP 1 to EP3. Consequently, on 10/12/16, EP1 pond water level was approximately eight feet below crest elevation, six feet more than the required minimum freeboard of 2.0 feet. This freeboard corresponds with a pond water depth of seven feet. The highest pond level during 2016 was 11.25 feet on 5/30/16 with freeboard of 3.75 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 remainder of the year. The wave dissipater booms were not deployed.

Rills have developed on all of the EP1 outslopes during 2016. On the south, southeast, and east outslopes of EP1, rills were up to 6-12 inches deep. On the north slope, rills were 6-8 inches deep. Blading to remove rills had not yet been completed at the time of my inspection but was completed during the week of January 23, 2017.

Evaporation pond #2 (EP2)

EP2 liner and outslopes are in good condition. The gravel cover on the north and south outslopes is intact and the slopes are free of major rills.

On 10/12/16, the pond water depth was 16.13 feet, 6.87 feet below maximum pond level, and the freeboard was 5.21 feet. At the highest pond level on 4/25/2016, the water depth was 22.67 feet and the freeboard was 2.33 feet. Required minimum freeboard levels were maintained throughout the year. Evaporation sprays were shut down for the winter on the date on my inspection.

Evaporation pond #3 (EP3)

EP3 is functioning in accordance with design and the operating plan. During the latter months of 2016, water was transferred to EP3 from EP1 to free up more capacity in EP1 and EP2 for storage during the winter months, similar to 2015. On 11/14/16 the maximum pond water depth of the year in cell A was 8.6 feet, giving a freeboard of 4.80 feet. Maximum cell B pond level was 7.95 feet on 1/11-1/18/16, giving a freeboard of 5.45 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 2016. The minimum freeboard levels at any time during 2016 were:

- EP1 – 3.75 feet
- EP2 – 2.33 feet
- EP3A – 4.8 feet
- EP3B – 5.45 feet

All 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 4 gpm, which was down considerably from the 16.88 gpm average of 2015. Collection rates in the sumps averaged 14 gpm, down from an average rate of 19.9 gpm for 2015.

EP2 and EP3 Leak Detection Systems

During 2016, Homestake obtained and recorded weekly measurements of leakage through the primary liners collected in sumps of the leak detection and recovery system (LDRS) in EP2 and EP3 in accordance with DP 200. Gallons of water removed through the collection sumps each week are recorded, and these records are maintained on site. HMC is operating the pumps in the collection sumps of EP2 and EP3 at rates that are intended to limit the average head across the bottom liner to less than 1.0 feet as required by DP 200 and 40 CFR 264.222.

For EP2, Zone 1 had no recorded leakage during 2016. In zone 2, leakage occurred intermittently in the first of the year and reached 2.7 gpm is February. Zone 3 had one week of leakage at a rate of 4.5 gpm but otherwise had negligible or no leakage for the rest of the year. Leakage was intermittent and minor in zone 4 through 2016. In zone 5, leakage was negligible through most of the year but increased during a four-week period in Oct-Nov to about 4 gpm, then dropped to zero. Leakage rates in EP2 did not reach levels requiring investigation and development of an action plan per DP 200.

In EP3, only minor, intermittent primary liner leakage was observed in cell A. Cell B had leakage in zone B-1 up to 8.05 gpm in February and lesser rates at intermittent periods, separated by periods of no leakage, through the remainder of the year. Leakage in zone B-2 peaked at 5 gpm in early April, then declined to zero in June and remained negligible through the remainder of the year . B-3 saw leakage rates up to 5 gpm during the first half of the year and negligible leakage thereafter. Zone B-4 leakage was up to 3.5 gpm in July-August and essentially none during the rest of the year. Zone B-5 saw leakage in April-May up to 5.6 gpm but only intermittent, negligible leakage otherwise. Leakage rates in EP3 did not reach levels requiring investigation and development of an action plan per DP 200.

Piezometer and Settlement Monitoring

The LTP flushing program was discontinued in 2015, and no additional flushing was done in 2016. During 2016 the LTP was draining, and with only direct precipitation providing recharge to the LTP, the phreatic surfaced dropped substantially during 2016. Water level measurements were taken by Homestake on 55 wells or piezometers, 19 of which were the same as those measured during 2015. Eighteen piezometers showed water level declines ranging from -0.57 feet to -6.16 feet, with the average of -3.22 feet. Only one piezometer, CN2 at the top of middle-north slope, had a year-to-year increase in water level of +0.35 feet, but other piezometers in the vicinity had recorded declines in water level of several feet, so there is probably an error in the CN2 record, which has a history of unusual variability.

A number of piezometers on the LTP slopes show a 5-10 feet spike in water level in the 9/28/2016 record, followed by an equivalent decline in the following month. This was probably due to infiltration of one or more monsoonal storm events during August-September 2016.

Both the piezometer records and the LTP water level map provided by Hydro Engineering indicate that the phreatic level in the LTP has declined substantially but not uniformly during 2016. Below the pile slopes, the level has declined 2-6 feet. Within the west cell, levels have dropped 10-20 feet during 2016, and slightly less in the east cell.

The settlement monument survey performed by Souder Miller on 11/29-12/1/2016 recorded increases in elevation of all 46 monuments that were in working order. Two others were broken and one could not be found. The recorded increases in elevation ranged from +0.06 feet to +0.18 feet. These readings are opposite to what was expected – with pore water continuing to drain from the tailings, the tailings are consolidating and the LTP surface should be settling, producing negative elevation changes. The most likely explanation is that there was a systematic error in the survey that carried through all of the measurements, either due to instrument error or disruption of one or more survey control points.

CONCLUSIONS AND RECOMMENDATIONS

The tailing impoundments and the three evaporation ponds are in generally good condition and are being maintained within the operating limits of the NRC license and NMED discharge permit (DP 200) and the respective facility designs. The undersigned advised HMC that rill management and grade control were needed to maintain erosional stability of the small tailing impoundment, the evaporation ponds, and the interim cover of the LTP. This work on the small pile (EP1) was performed in January 2017.

The piezometers in the north and south slopes of the LTP were measured on a monthly to quarterly basis during 2016, as recommended in the Engineer’s Report for 2015. Now that the phreatic surface is declining throughout the LTP and is below levels of interest for stability, the schedule of measurements can be relaxed; semi-annual measurements are sufficient.

The LTP is draining at a rate that should lead in a few years to the point where consolidation of tailings is nearly complete and 95% of primary settlement has occurred. When this point is reached, HMC can request that the NRC approve final grading and cover placement on the top of the LTP (outslopes are already in their final configuration with cover). To demonstrate that 95% of primary settlement has been reached, HMC must have enough settlement monitoring data to plot settlement versus log time for several years after pile flushing ceased. The 95% point is defined by the point at which the time-settlement curve becomes asymptotic to the log time axis. This will require protection and reliable elevation data of the survey monuments that are still accessible and undisturbed. The 2016 settlement monument survey was evidently not accurate, and another survey should be performed as soon as possible, with additional surveys thereafter at six-month intervals until 95% primary settlement can be demonstrated.

The slump along the south inslope of EP1 should be protected against further displacement to protect the liner. In its present condition, the EP1 liner continues to be serviceable. Site staff should note any changes in the slump and the condition of the liner at that location.

Outslopes of the LTP should continue to be observed by site staff at least weekly for signs of water emerging from the slope, especially near the toe, and for visible evidence of slumps or other displacements in the slope surface. The undersigned should be notified immediately if slope seepage, surface slumps, or other deformations in the slopes are observed.

Repairs to the LTP slopes, completed in 2014 and 2015 using flowable fill, have been successful in remediating cover washouts. Until the final cover and erosion protection are applied to the top of the LTP, additional washouts on the outslopes are possible. 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

Figure 1 – Slumps below liner at east end of south inslope, EP1

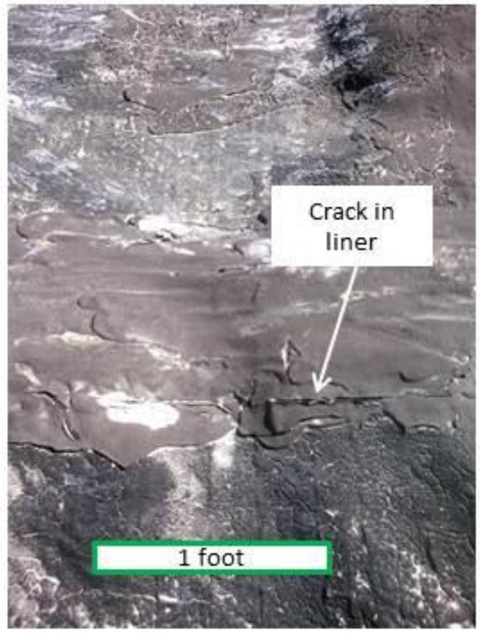

Figure 2 – Cracks in liner at east end of south inslope, EP1

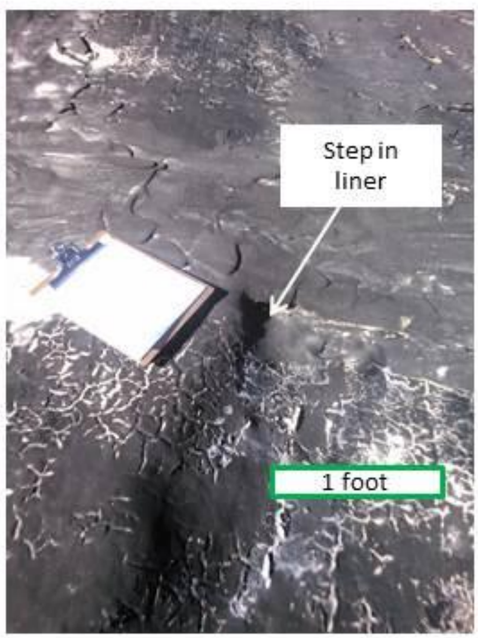

Figure 3 – Small step in liner related to lumps below liner at east end of south inslope, EP1

APPENDIX E

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

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LAND USE REVIEW / SURVEY

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Grants Reclamation Project

Land Use Review / Survey

Annual Report No. 15 - CY2016

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 fourteenth 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 2016 – 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 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 2016.

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 is 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 2016, 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 available for irrigation activity).

3.0 2016 – 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 early 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 2015 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 early 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 2016. See Tables E-1 through E-5 for 2016 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.

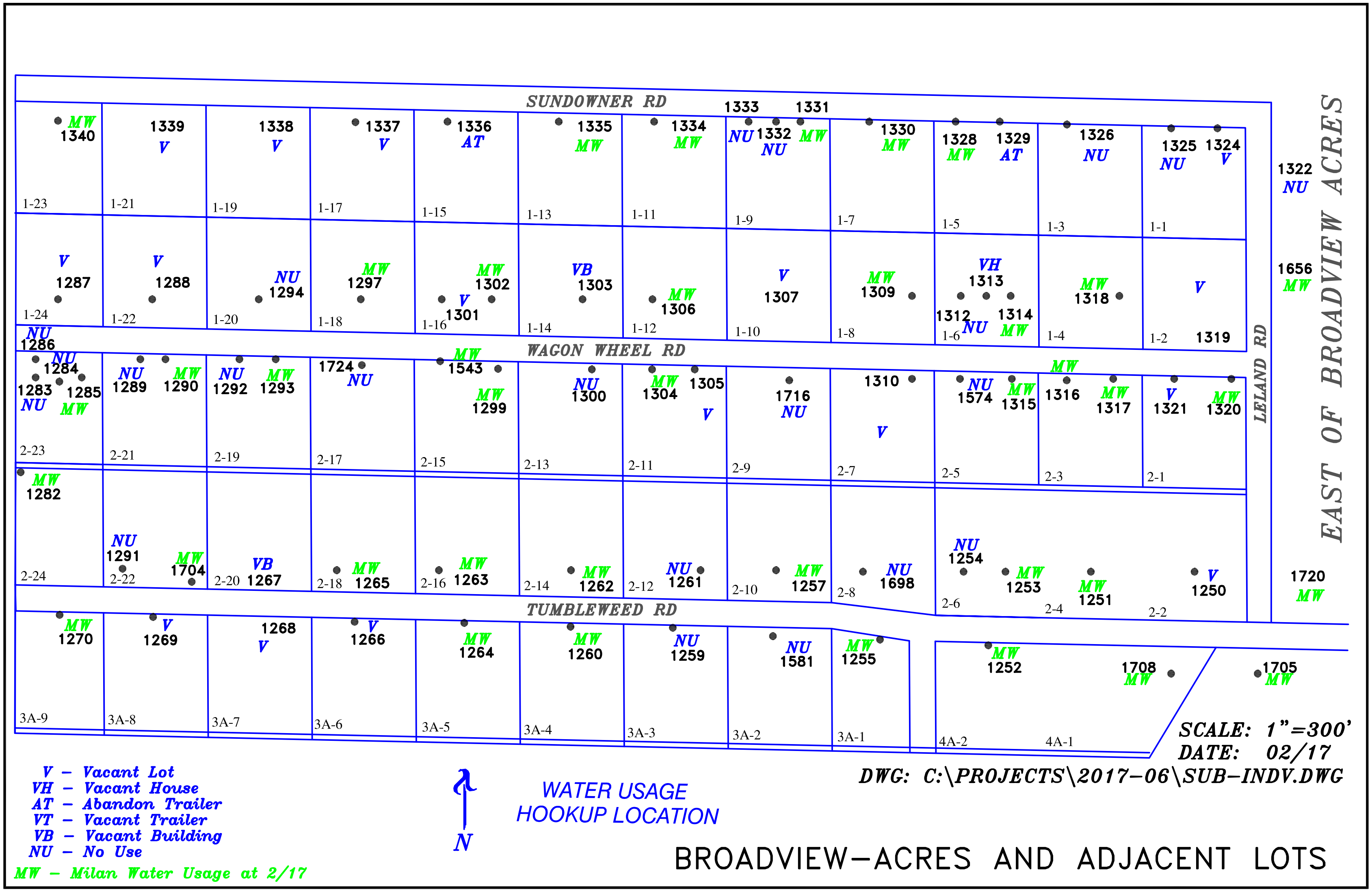
As of December 2012, no residences within the MOA Area of Concern (AOC) are pending with respect to a domestic water supply hook-up to the Village of Milan municipal water supply; all other known and identified residences are currently on the Village municipal supply, except for the one residence in 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 early 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



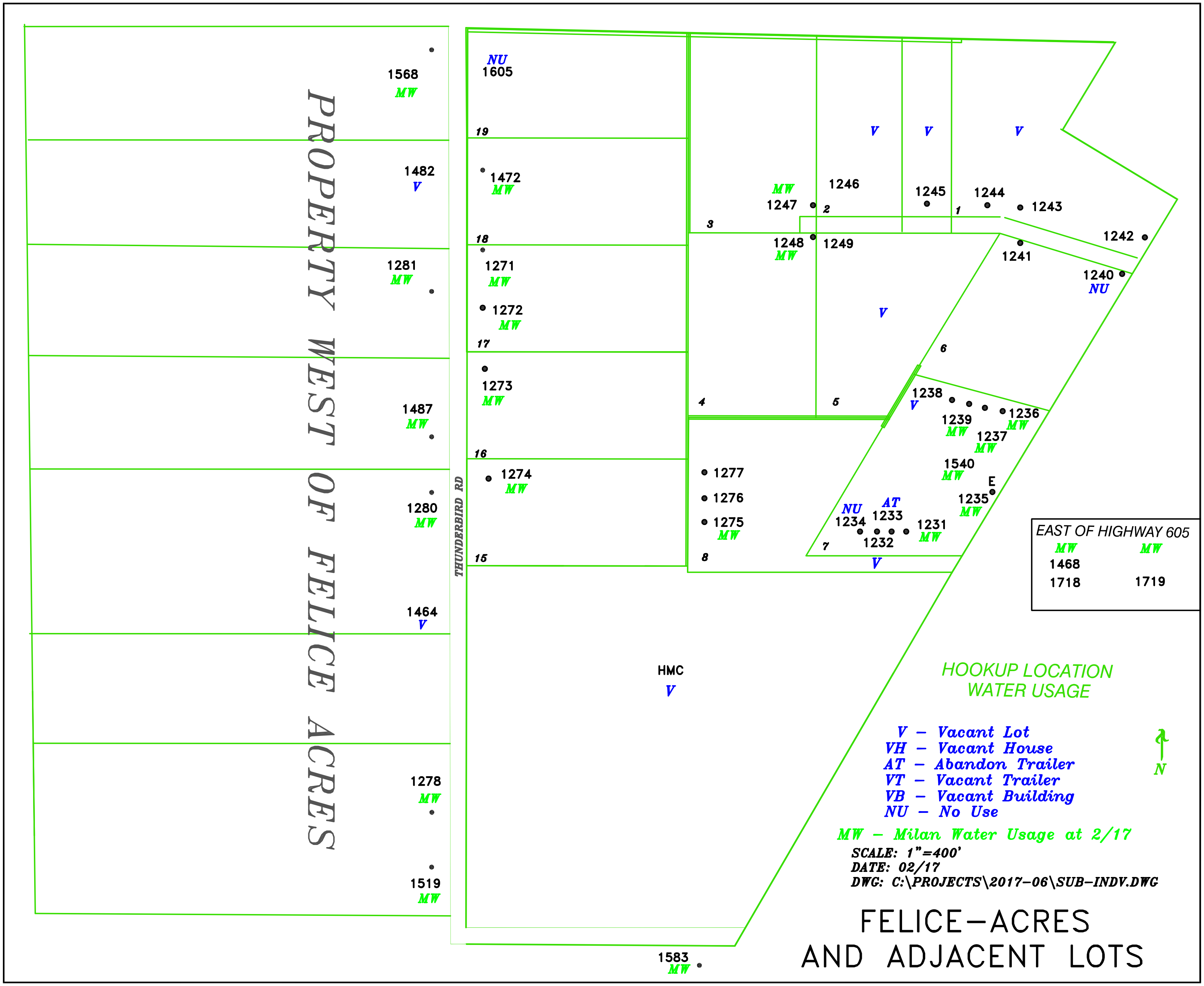


FIGURE E-2. FELICE ACRES – LAND USE STATUS AND WATER USE

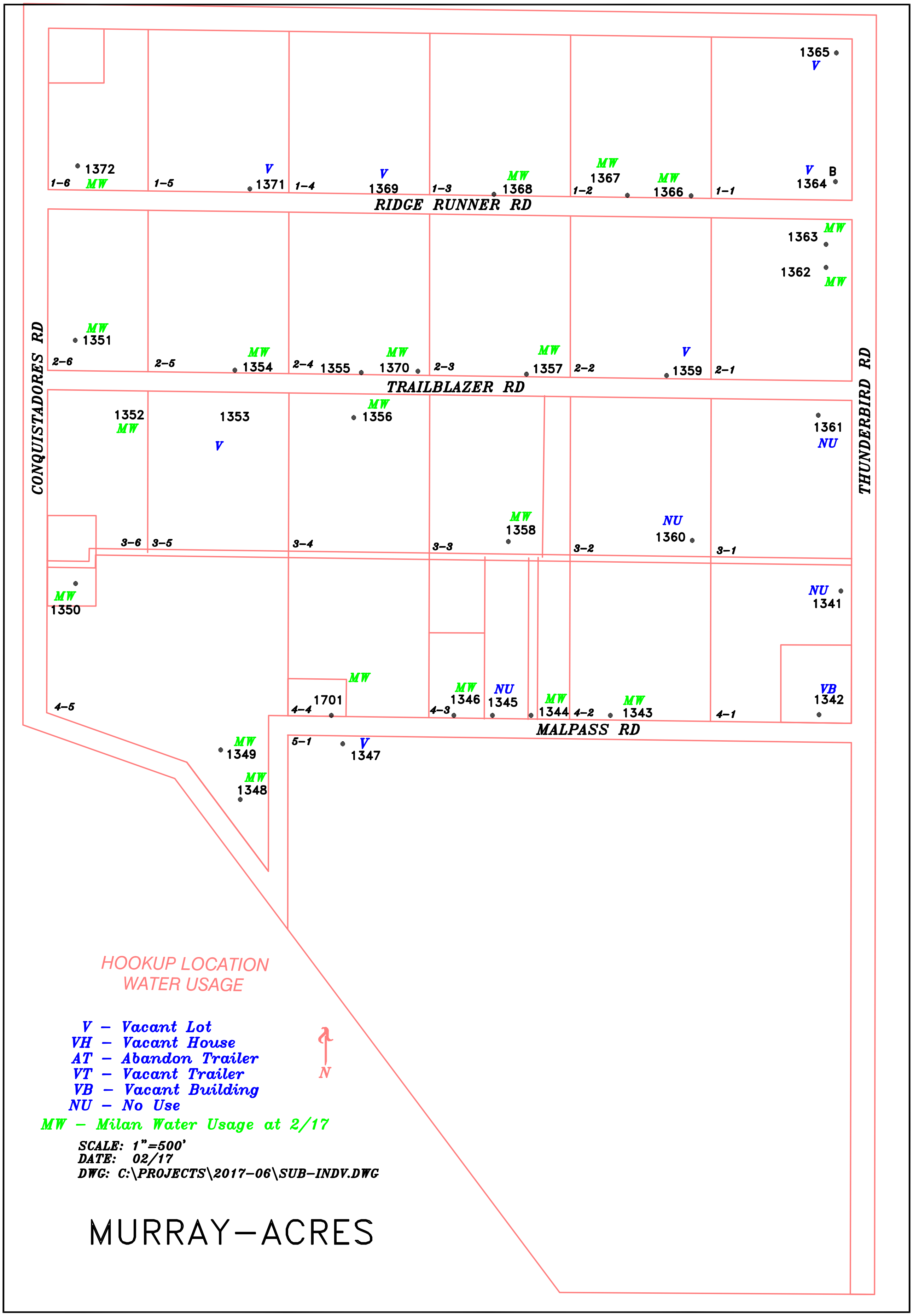


FIGURE E-3. MURRAY ACRES-LAND USE STATUS AND WATER USE

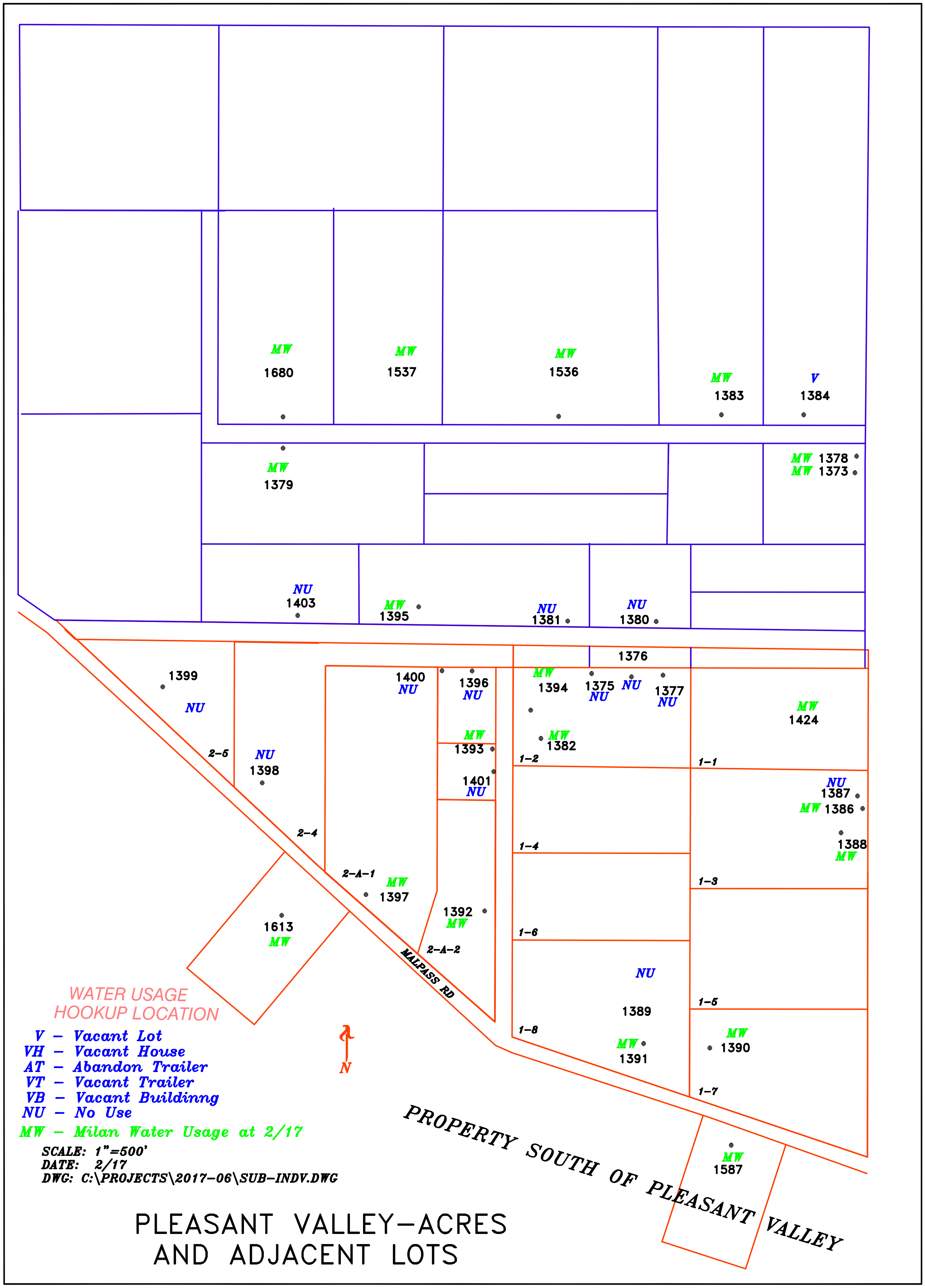


FIGURE E-4. PLEASANT VALLEY ESTATES–
LAND USE STATUS AND WATER USE

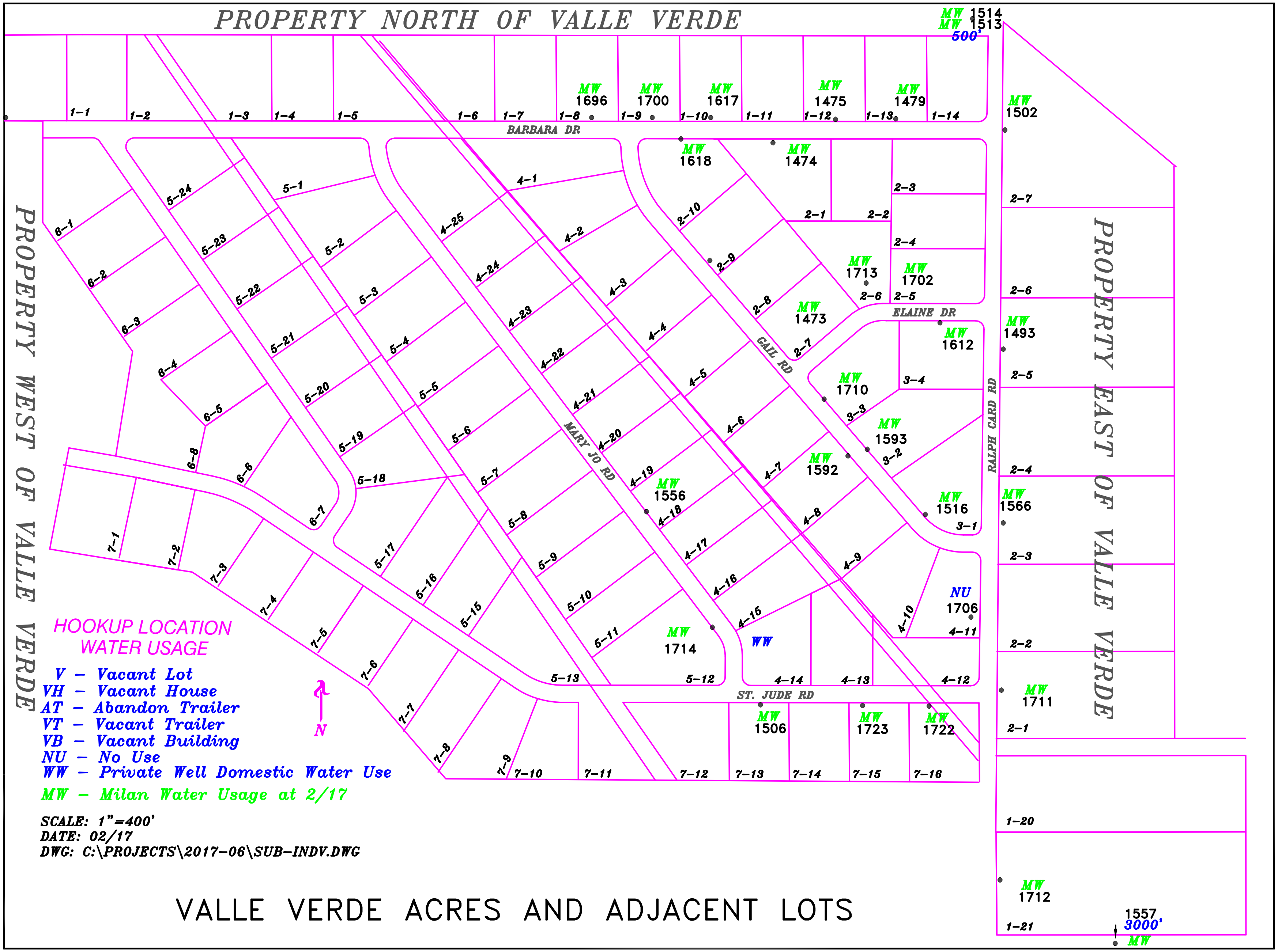


FIGURE E-5. VALLE VERDE ACRES–LAND USE STATUS AND WATER USE

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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE
1 / 1	1324		
1 / 1	1325	X	
1 / 2	1319		
1 / 3	1326	X	
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	X
2 / 4	1251		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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 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	X	
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	1295		
2 / 17	1296		
2 / 17	1298		
2 / 18	1265	X	X
2 / 19	1292	X	
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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 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
	1716		
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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE
1	1242		
1	1243		
1	1244		
2	1245		
2	1246		
3	1247	X	X
4	1248	X	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	X
7	1238		
7	1239	X	X
7	1540	X	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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 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	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 2015 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 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	X	
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 2015 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2015	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2016 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2016
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	X			
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

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SOIL MOISTURE CONTENT FROM IRRIGATION INSTRUMENTATION

Page Number

FIGURES

TABLES

F.0 Soil Moisture Instrumentation

Appendix F presents the soil moisture instrumentation data for the former Section 34flood area and the former Section 28 center pivot area. The lysimeter sampling was ceased after the2015 sampling. The historical data for the lysimeters can be found in Appendix G of the 2015 Annual Performance Report.

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 volumetricwater 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 four 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 ground-water 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, they could potentially be sampled in the future. Because the soil moisture instruments are not expected to provide useful information in the future, and both the ground-water 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.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 2012is 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 three years is consistent with the expectation of drying of the soil profile without irrigation. The seasonal fluctuations in the five foot depth observed over the last two years appear to be better correlated with temperature change than to significant rainfall events. A significant portion of the 10 and 15 foot data is out of the accuracy range and should be used with caution.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 couple years.

Table F-1. 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.

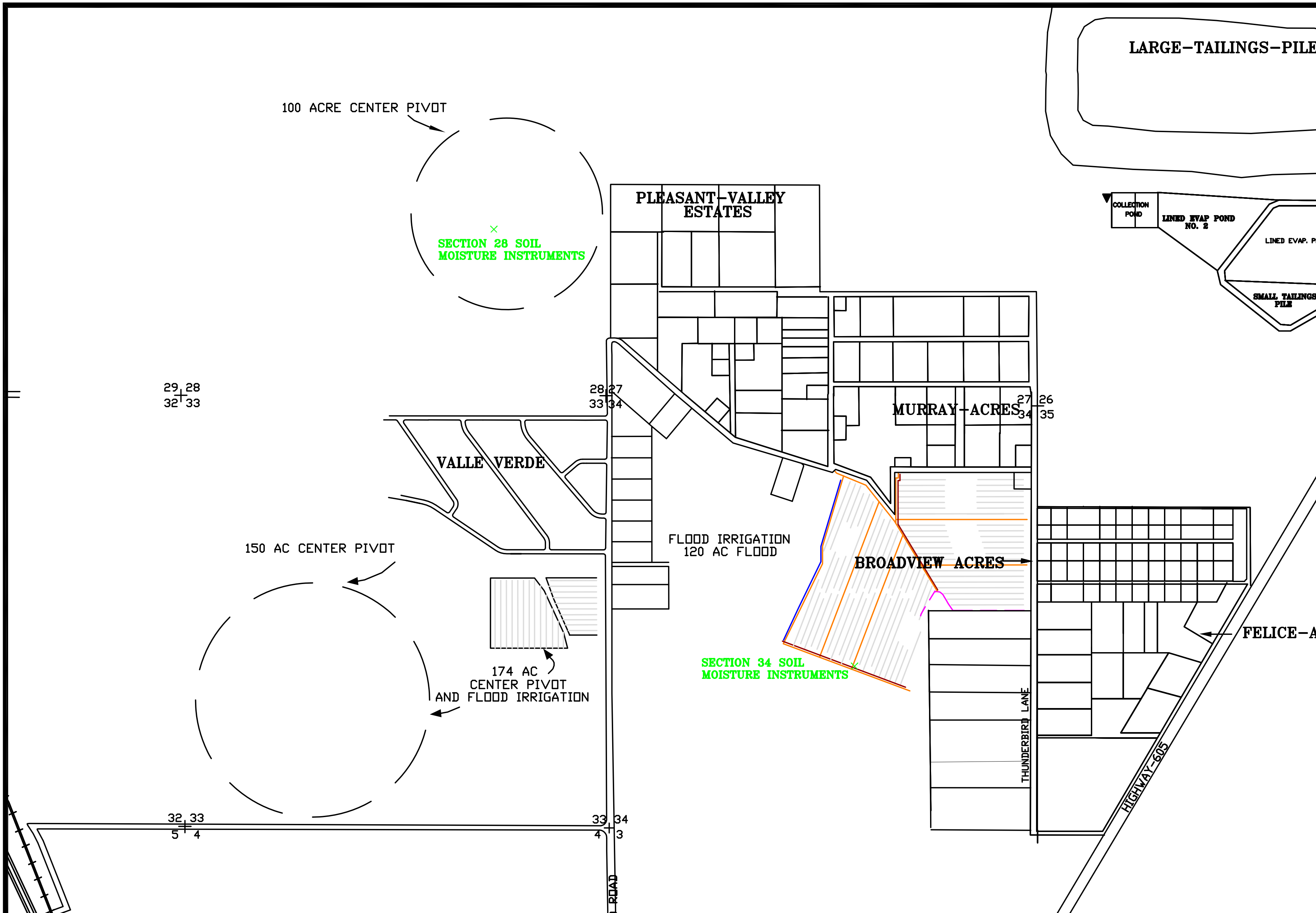
F.2 Section 28

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 rate of decline has been steady since the end of 2012 in all three depths.

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 four 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 six and eight 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 four 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 six and eight 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 eight foot depth while the four foot and six foot intervals have shown a significantly higher level of variability.



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'

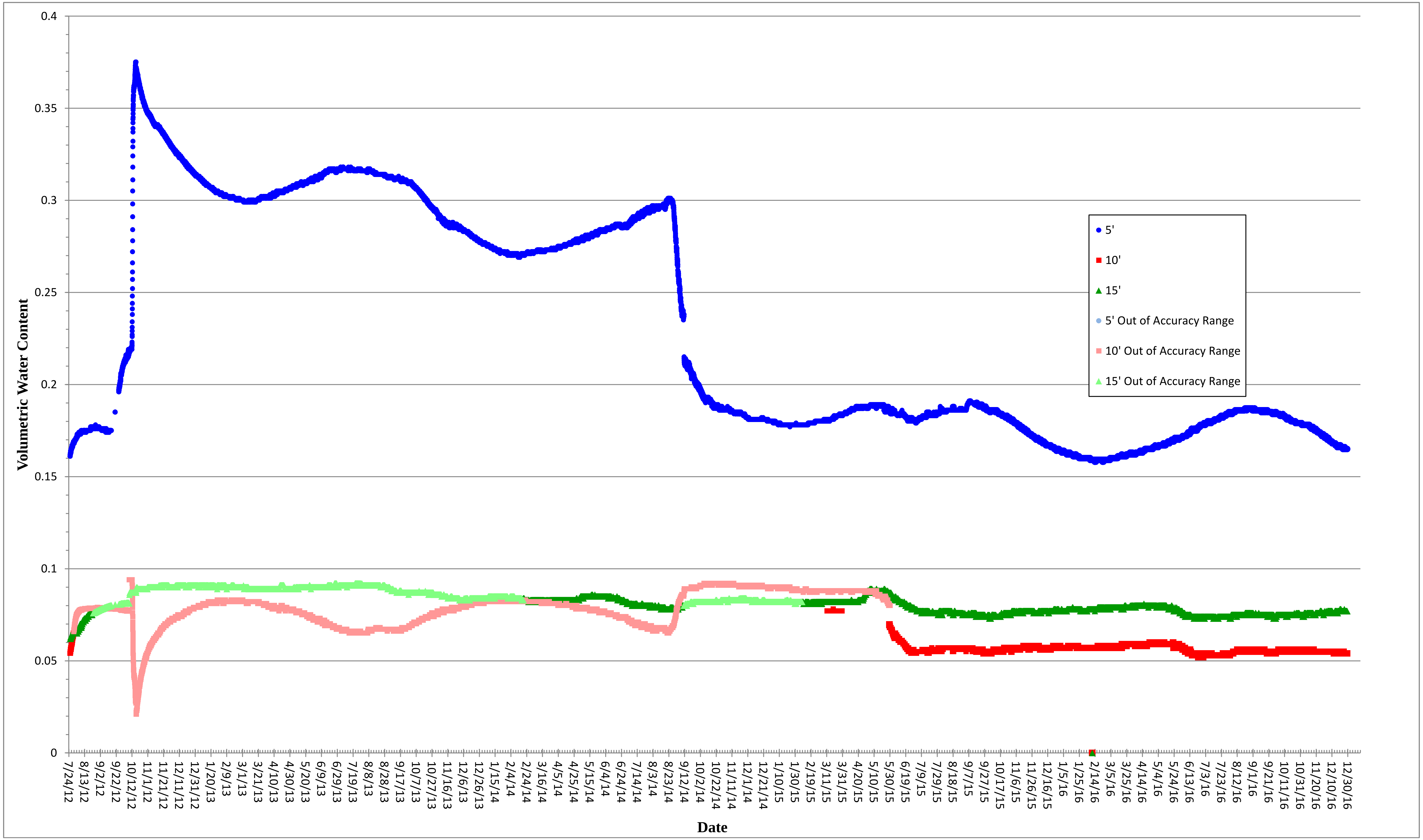


Figure F-2. Volumetric Water Content, Section 34 Flood Area

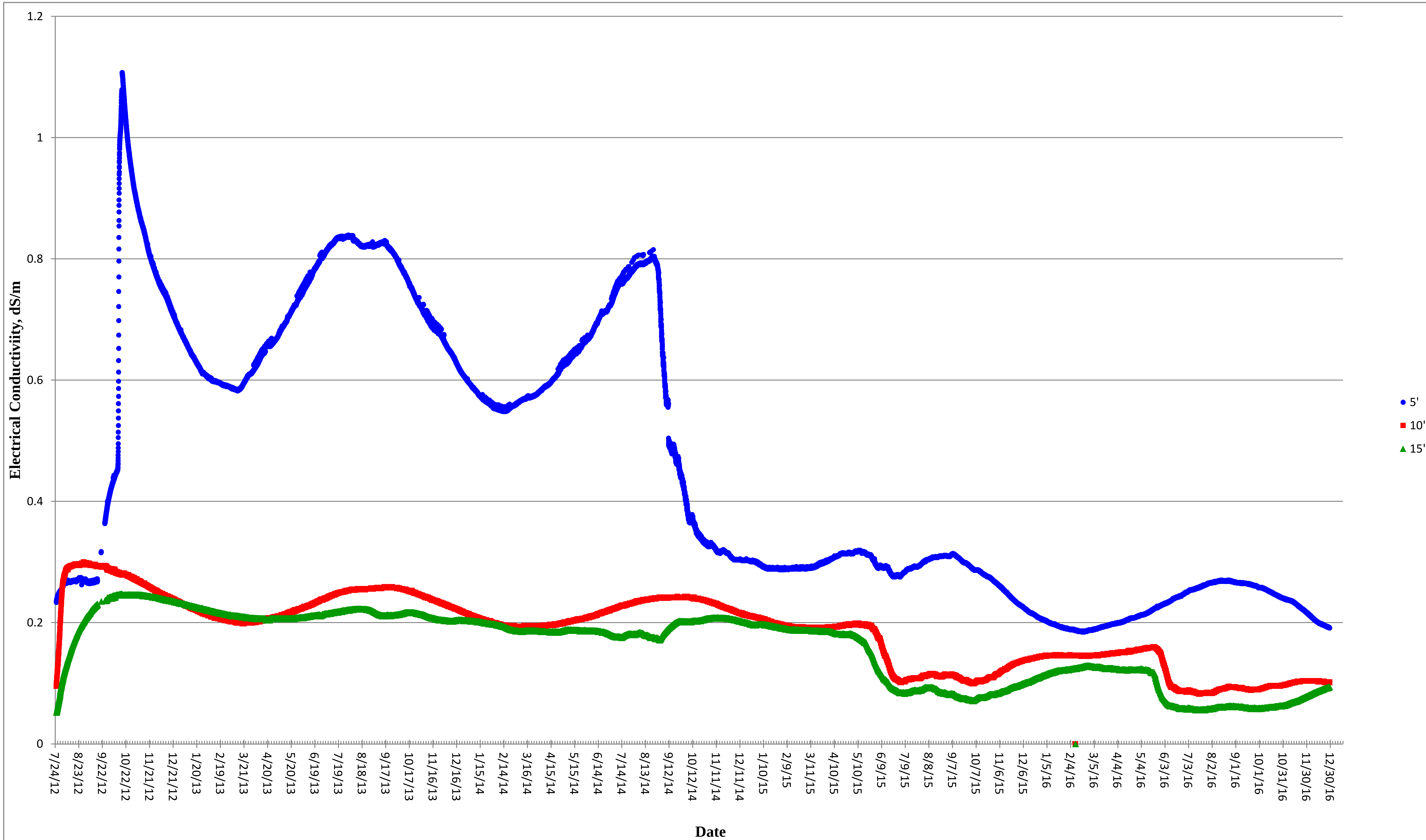


Figure F-3. Electrical Conductivity, Section 34 Flood Area

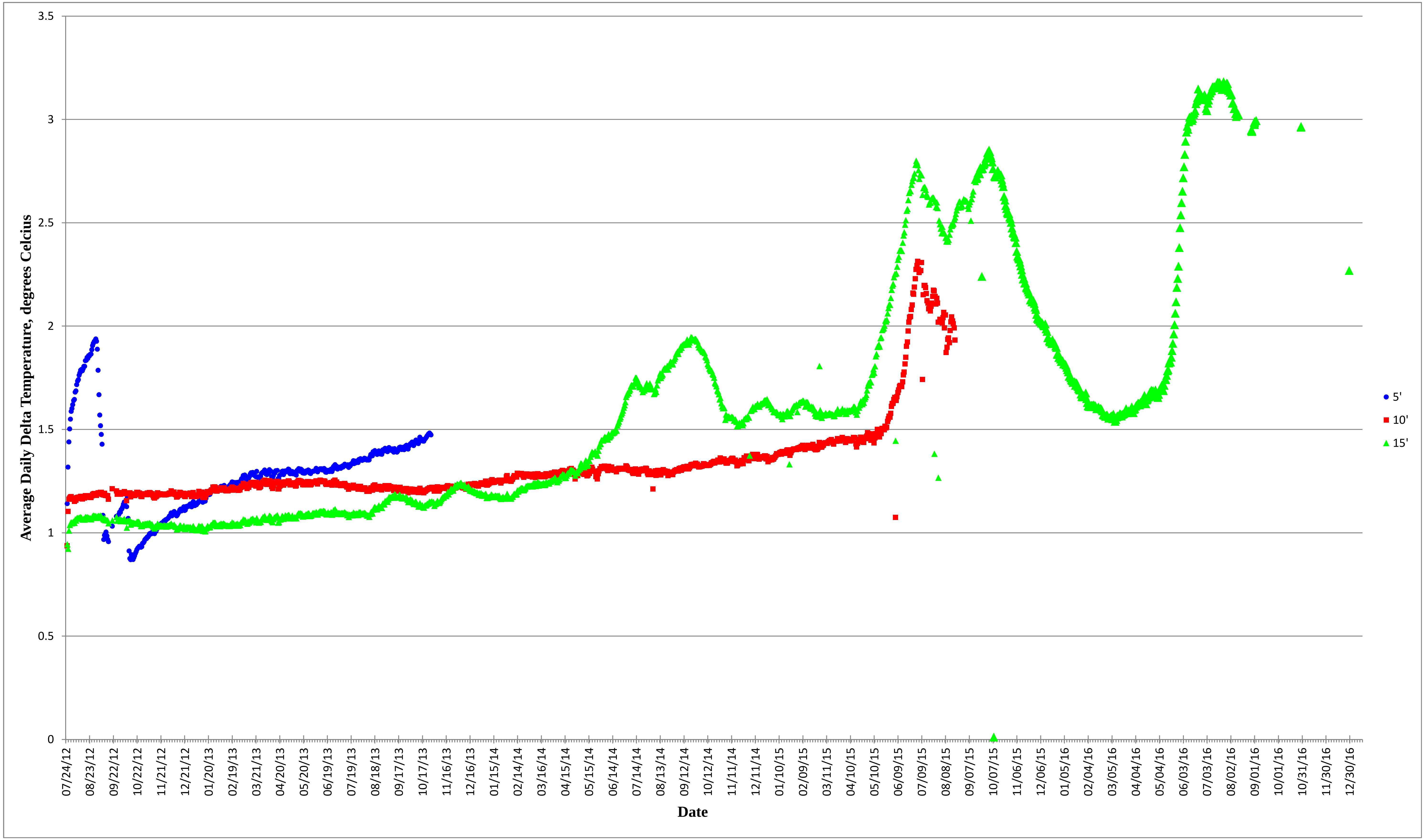


Figure F-4. Average Daily Delta Temperature, Section 34 Flood Area

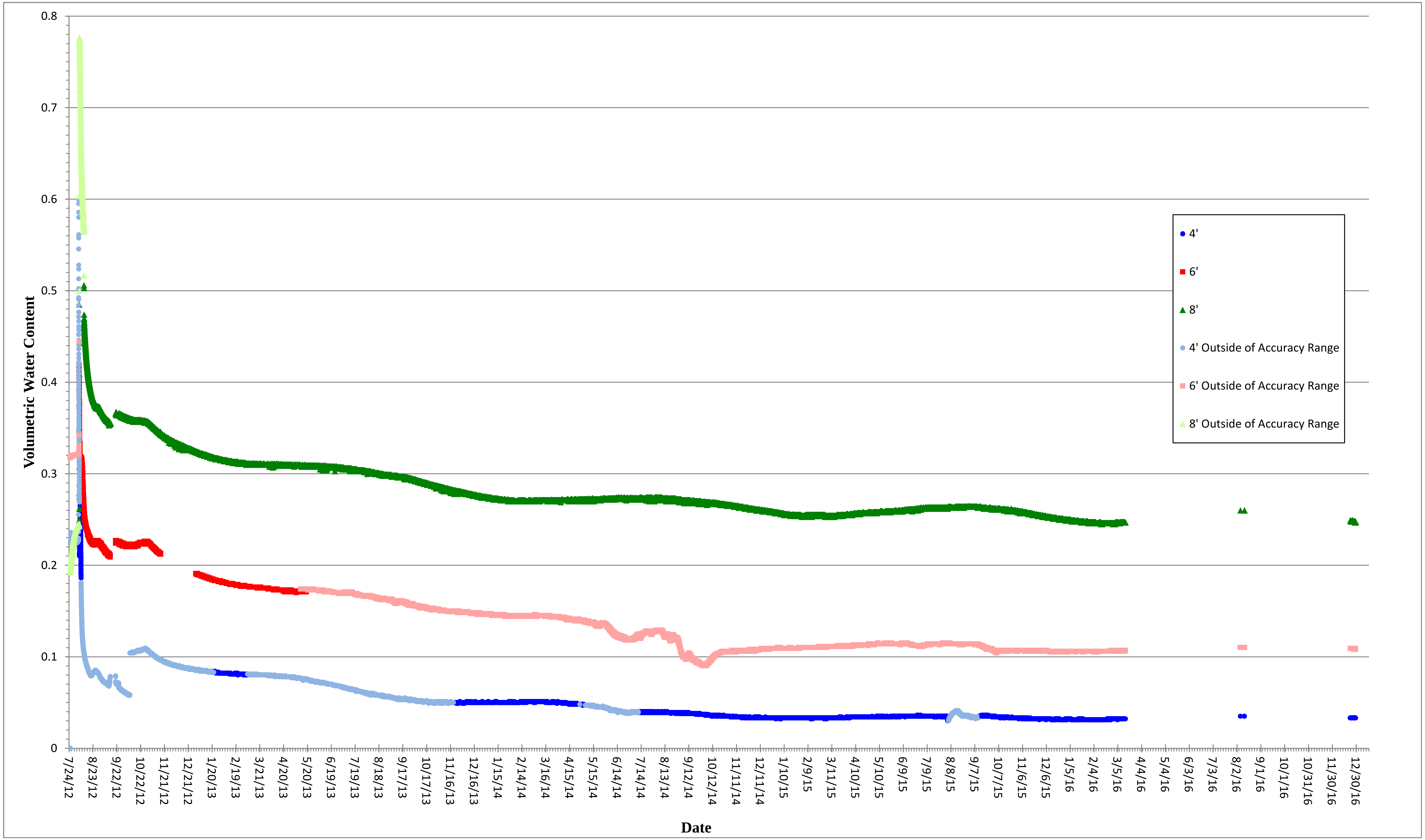


Figure F-5. Volumetric Water Content, Section 28 Center Pivot

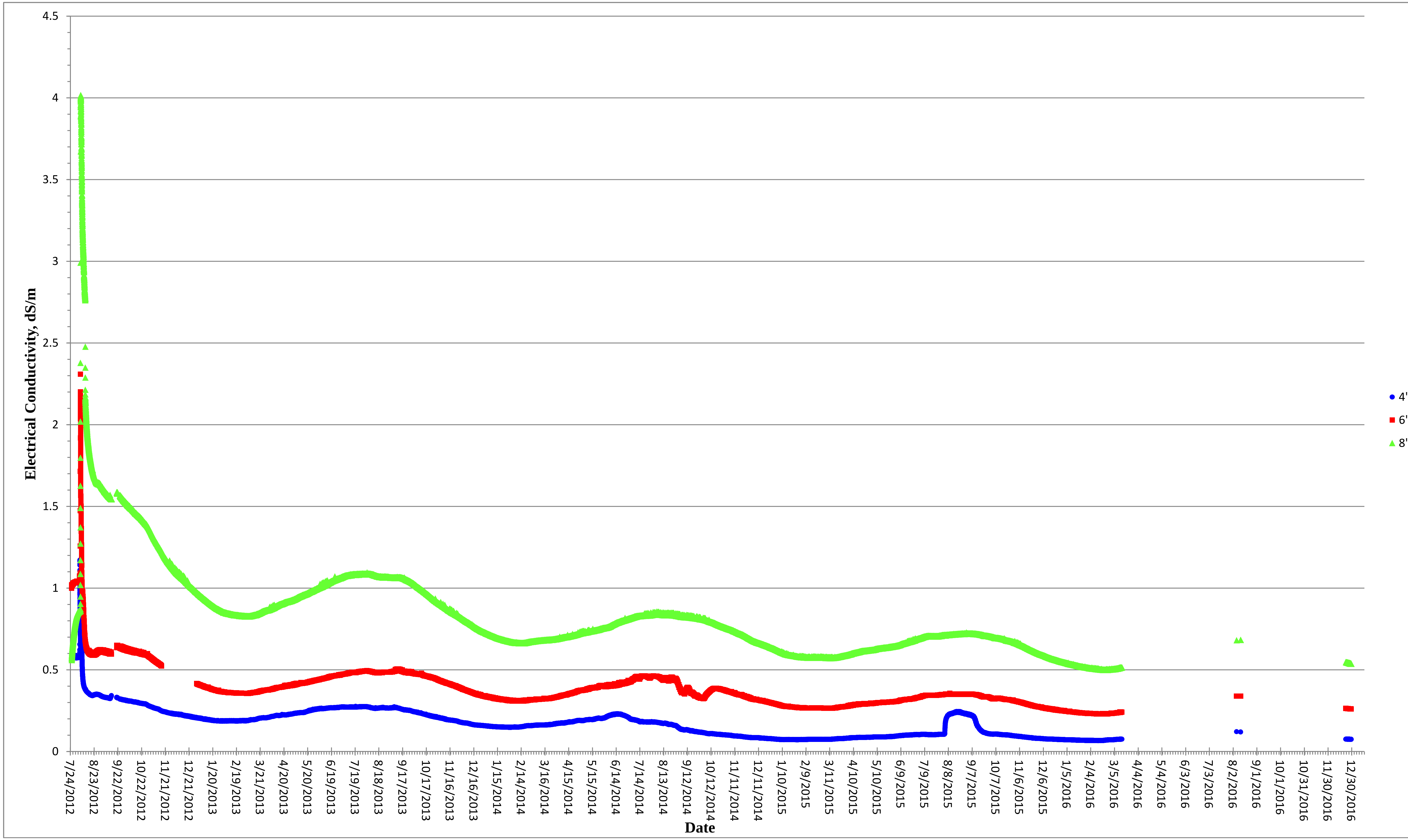


Figure F-6. Electrical Conductivity, Section 28 Center Pivot

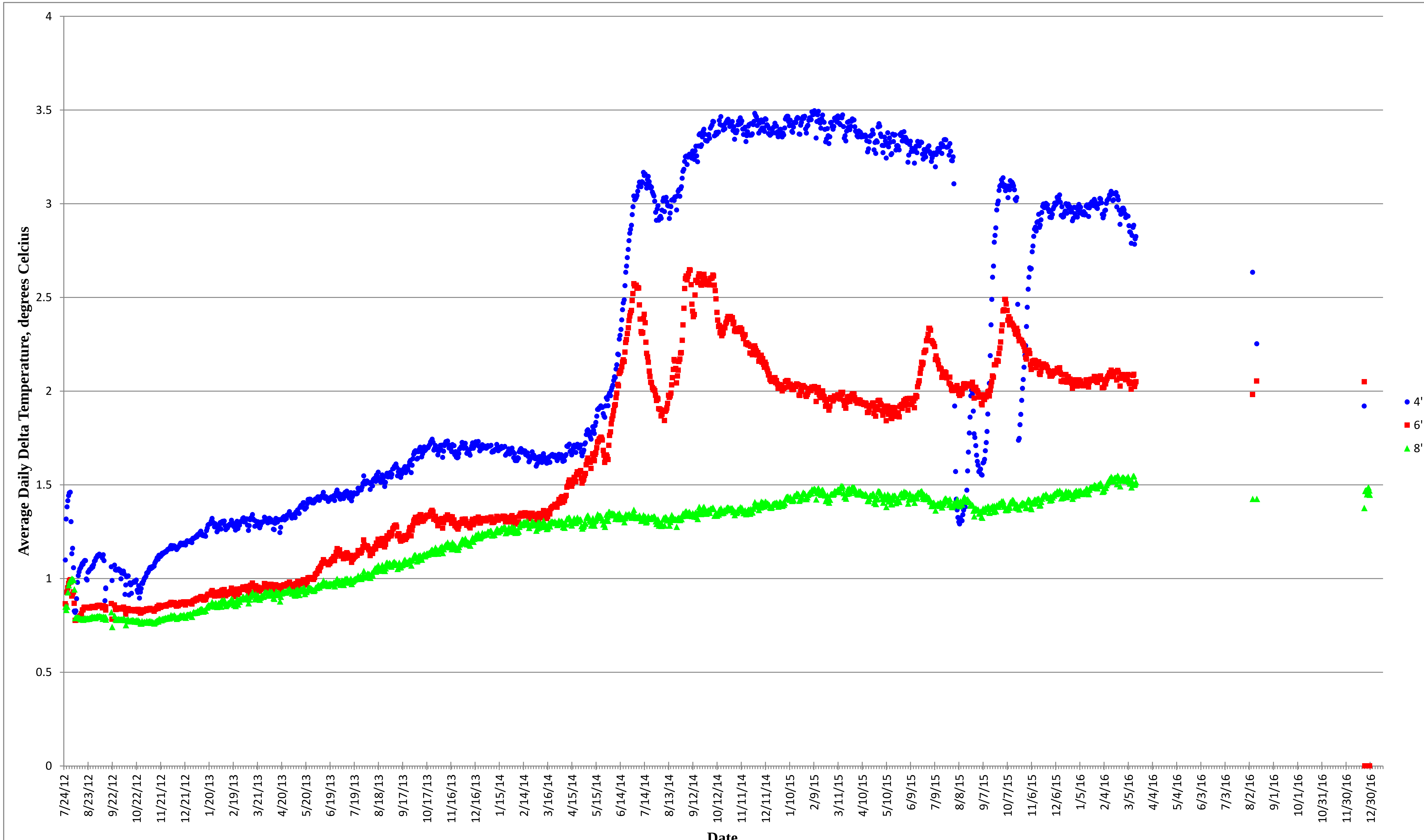


Figure F-7. Average Daily Delta Temperature, Section 28 Center Pivot

APPENDIX G

GRANTS RECLAMATION PROJECT
METEOROLOGICAL DATA SUMMARY

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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 2016.

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 9.3 inches in 2016.

4.0 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 2016 is presented in Table G-1.

5.0 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 2016 Annual Wind Rose

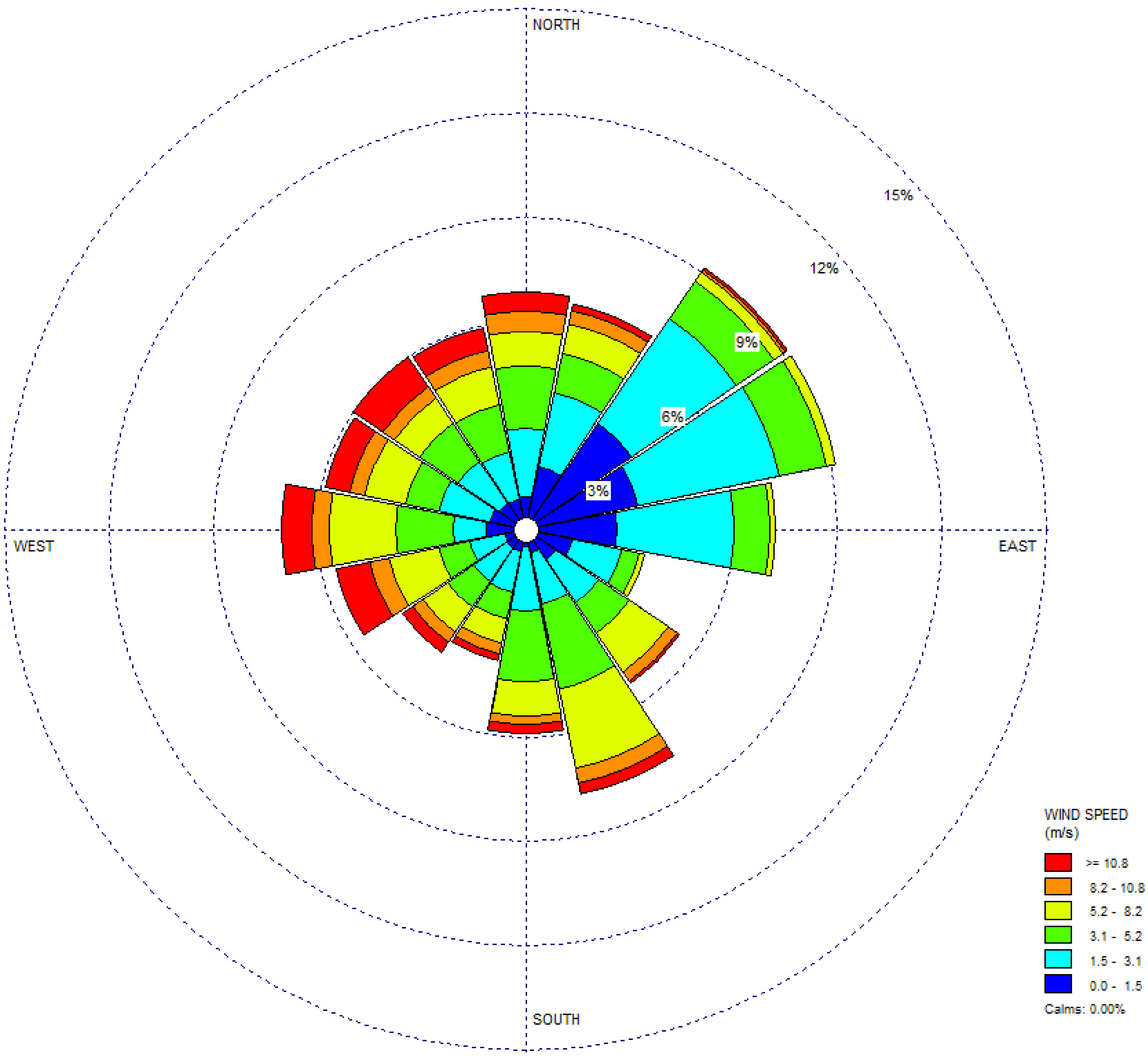

Table G-1. Monthly Meteorological Data Summary

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-16	*max*	27.2	15.19	95.2	0.25	88.6	0	0.00	0.00
	min	0.608	-13.92	8.27					
	mean	6.78	-1.09	59.98					
Feb-16	*max*	20.56	21.24	93.7	0.12	130.2	2.09	0.27	0.55
	min	0.559	-17.37	8.29					
	mean	6.39	2.09	45.88					
Mar-16	*max*	37.58	20.75	88.6	0.01	163.7	6.41	1.46	2.55
	min	0.944	-10.38	5.108					
	mean	8.57	6.41	30.35					
Apr-16	*max*	14.87	22.64	95.4	1.65	171.0	9.00	2.44	4.10
	min	0.105	-7.91	6.062					
	mean	3.60	9.00	44.04					
May-16	*max*	14.09	26.57	93.3	0.38	206.8	13.35	4.42	7.37
	min	0.293	-1.368	5.961					
	mean	3.95	13.35	36.27					
Jun-16	*max*	10.22	34.33	77.59	0.35	214.8	22.24	9.58	13.82
	min	0.363	6.144	3.811					
	mean	3.44	22.24	25.82					
Jul-16	*max*	10.84	33.27	89.9	1.01	200.0	23.12	10.16	14.73
	min	0.22	11.25	5.984					
	mean	3.39	23.12	33.82					
Aug-16	*max*	10.31	29.79	93	2.22	158.8	18.46	7.22	10.51
	min	0.289	6.157	9.77					
	mean	2.69	18.46	56.38					
Sep-16	*max*	11.05	28.72	92.2	0.99	151.9	16.79	6.26	8.33
	min	0.381	-2.578	4.45					
	mean	2.96	16.79	42.36					
Oct-16	*max*	11.81	25.81	93.8	0.25	137.2	12.92	4.21	5.68
	min	0.224	-5.299	8.88					
	mean	2.65	12.92	41.61					
Nov-16	*max*	12.92	21.21	95.7	1.29	95.0	4.56	0.87	1.39
	min	0.192	-16.59	11.25					
	mean	2.85	4.56	59.26					
Dec-16	*max*	15.2	15.81	94.6	0.76	82.5	0.87	0.07	0.18
	min	0.185	-13.53	13.26					
	mean	2.85	0.87	62.37					

Table G-1. Monthly Meteorological Data Summary (cont.)

Net solar radiation = (1-α) × 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 × (L/12) × (N/30) × (10 T_a/I)^a					
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.					
α = (6.75E-7) × I^3 - (7.71E-5) × I^2 + (1.792E-2) × I + 0.49239					
α =	(a)	(b)	= a × b		
	6.75E-07	103522.6	6.99E-02		
	7.71E-05	2204.7	1.70E-01		
	1.79E-02	47.0	8.41E-01		
			0.49239		
	α =		1.23E+00		
I = Σ *(for i = 1 to 12)* (T_{ai}/5)$^{1.514}$ = Heat index which depends on the 12 monthly mean temperatures (T_{ai}).					
	I =		46.95		