2018 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

MARCH, 2019

Brandon Weaver
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5831 N.M. HYDROLOGIST
3/14/2019

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

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

The data reported within this document represent the results of the monitoring program during 2018. 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 references in Section 9.0).

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

Historically, the contaminants are found in two different aquifer systems. The aquifer system of primary concern is the alluvial system, which averages approximately 100 feet in depth, and extends generally north to south encompassing the San Mateo alluvial aquifer. In addition, a second aquifer system is found within the Chinle formation underlying the San Mateo alluvium. It is comprised of three separate aquifers designated as the Upper, Middle and Lower Chinle aquifers. The Updated Corrective Action Program (CAP, Homestake 2012) and Hydro-Engineering 2003b & 2010b reports should be reviewed for details of the geologic setting and aquifer conditions on the

site. Two cross sections are included that present the hydrologic setting at the Grants site and their locations are shown on Figure 1.1-1. Figure 1.1-2 presents a typical cross section which is located from within the On-Site area and extends to the south-southwest into southern Felice Acres area (see Figure 1.1-1 for location of the typical cross section also). This typical cross section shows the alluvial aquifer relative to the three Chinle aquifers and shows the Upper and Middle Chinle aquifers subcropped with the alluvium. Figure 1.1-3 presents Cross section B-B' which shows the alluvial, Upper and Middle Chinle aquifers just south of the Large Tailings Pile (LTP) and through the Small Tailings Pile (STP). A second cross section (D-D') that runs from Section 3 in the southwest through the LTP is presented in Figure 1.1-4. The Upper and Middle Chinle aquifers subcrop beneath the alluvial system near the project site. Slight to moderately elevated concentrations of constituents of concern have been observed in the Upper, Middle and Lower Chinle aquifers near their subcrops with the overlying alluvial system.

The restoration program, as described above, is made up of injection and collection well systems. A mixture of R.O. product water, zeolite treated and/or fresh water pumped from deep wells is injected in a series of wells or infiltration trenches arranged to form a continuous injection line across the site. The injection line creates a hydraulic barrier that results in containment of the contaminants within the collection area. The contaminated groundwater is pumped and collected from a series of wells within the collection area. The collected aquifer water from On-site is pumped to the R.O. plant or to three large lined evaporation ponds for passive and forced (spray) evaporation. The On-site collection is near the LTP and is located to the north of where Cross section B-B' runs between wells CW-6 and CW-4. This collection would also be south of the LTP on Cross section D-D'. Historically, the Off-site collection water has been used for irrigation. Starting 2016, the Off-site collection water was processed through the zeolite system and the treated water flows to the PTT prior to being used for injection water. Collection and injection started in the northeast portion of Section 3 with the R well field and Felice Acres with mainly the Q and Y well fields. The R well field is in the Middle Chinle subcrop area and the collection is occurring from both the alluvial and Middle Chinle aquifers. The Q and Y well fields are completed in the alluvial and Middle Chinle aquifers, respectively, just north of the Middle Chinle subcrop area. The injection also occurs in both the alluvial and Middle Chinle aquifers. The R well field is located east of well CW-29 on Cross section D-D' and was operated most of 2018 except for approximately two

months when the zeolite treatment was down. The Q and Y wellfields also operated during this period. Saturated alluvium exists above the Middle Chinle aquifer in this location. Timing of restoration of the alluvial aquifer in the R area is important to restoration of the Middle Chinle down gradient of this area. Collection and injection started in the center portion of Section 28 in the North Off-site area with the H well field. The H well field is only in the alluvial aquifer and the collection is occurring from the alluvial aquifer and is located west of well CW-32 on left side of Cross section B-B' and was operated with the collection water being treated through the zeolite most of 2018 except for approximately two months.

In the years from 1977 to the present, the combination of injection wells and the up-gradient collection system has continued the withdrawal of the contaminated groundwater plume up-gradient of the current hydraulic barrier which assists in aquifer restoration of groundwater concentrations to or below site background levels. Selenium concentrations are used to present the progress that has been made in the groundwater restoration program. Selenium was the parameter of most concern in the early years of the corrective action program. Figure 1.1-5 presents the alluvial selenium concentrations for 1976 prior to the start of the corrective action program for the Grants site. The well locations with selenium measurements in 1976 are shown on the figure. The red pattern in this figure shows where selenium concentrations were greater than 5 mg/l in 1976 in the Large and Small Tailings areas. The blue pattern shows where concentrations are above 1 mg/l but less than 5 mg/l with areas On-site and in Broadview Acres. The detached zone of higher concentrations in the Broadview Acres area was caused by faster migration through the Upper Chinle aquifer that entered the alluvial aquifer in the Broadview Acres area. The cyan color shows where concentrations were between 0.32 and 1.0 mg/l in 1976. The 1988 alluvial selenium concentration patterns are presented in Figure 1.1-6 and show that selenium had been restored in all of the subdivisions by 1988 (wells symbols show locations of selenium measurements in 1988). Figures 1.1-7 and 1.1-8 give the selenium patterns for 1999 and 2014, respectively, showing only a small area in the tailings area in 1999 with selenium concentrations above 5 mg/l while no concentrations are above this level in 2014. The area in Section 3 with elevated selenium concentration in 1999 was restored prior to 2014. Selenium patterns for 2018 are presented in Figure 1.1-9 and shows that selenium restoration is only needed in the tailings area and north of the L area southeast of the STP.

Uranium became the most important parameter for restoration at the Grants site after a large portion of selenium restoration and with the establishment of new uranium standards in the mid 2000's. Figure 1.1-10 presents the 1976 alluvial uranium concentrations with the red pattern showing where concentrations exceeded 10 mg/l in the area of the LTP and STP and in the western portion of Broadview Acres. A well symbol shows where uranium concentrations were measured in 1976. The elevated concentrations in Broadview Acres migrated through the Upper Chinle aquifer to this area and then traveled into the alluvial aquifer. This figure also shows that there were additional area in Broadview and Murray Acres where concentrations exceeded 1.0 and 0.5 mg/l levels in 1976. The cyan color shows where concentrations exceed 0.16 mg/l in 1976. Figure 1.1-11 shows the uranium concentrations that existed in the alluvial aquifer in 1988 with concentrations of 0.16 to 0.5 mg/l still present in Broadview and Felice Acres and concentrations above 1 mg/l in the northeast portion of Murray Acres. Uranium concentrations in the On-site area near the LTP and STP were greater than 10 mg/l. The uranium concentrations in 1999 were below the site standard in all of Broadview Acres except the southern area where concentrations were slightly above the site standard (see Figure 1.1-12). Well symbols are shown on this figure where uranium measurements were made in 1999. A small area in the northeast portion of Murray Acres also exceeded the site standard in 1999, but the maximum concentrations in this area were reduced to below 1.0 mg/l. Uranium concentrations in southern Felice Acres and the northeast portion of Section 3 exceeded 1 mg/l in 1999. Concentrations exceeded 0.5 mg/l in the central portion of Section 28 in the North area while the area of concentrations exceeding the site standard extended down to the west-center portion of Section 33. The 2014 uranium concentration patterns are presented in Figure 1.1-13 and show that concentrations in southern Felice Acres and the northeast portion of Section 3 have been reduced to below 1.0 mg/l with a much smaller area of concentrations greater than 0.5 mg/l left in southern Felice Acres and the northeast portion of Section 3. The area of concentrations greater than the site standard that extended into west-central portion of Section 33 has been pulled back approximately one mile to the western portion of Section 28. The On-site area of concentrations greater than 10 mg/l is also much smaller in 2014. The 2018 uranium concentration patterns are presented in Figure 1.1-14 which shows the extent of the uranium pattern in Section 28 approximately 1300 feet less in 2018. The area in the northeast portion of Murray Acres has been restored by 2018.

The uranium concentrations for five different years are presented for the Upper Chinle aquifer in Figures 1.1-15 through 1.1-19 (see locations of well symbols on these figures which show where concentrations were measured during the year). Collection in the Upper Chinle aquifer is mainly south of the Collection ponds in or near the Upper Chinle subcrop area and this area is shown on Cross section B-B' in the area of well CW-4.

Figures 1.1-20 through 1.1-25 give similar maps for the Middle Chinle aquifer and the sequence of measured concentrations showed some improvement in the South Felice Acres area with no area with concentrations above 0.5 mg/l in 2018. Collection in the Middle Chinle in 2018 is mainly in the R and Y well fields in the South collection and one well west of the West Fault in the On-site collection. The hydrologic setting is shown on Cross section D-D' where the Middle Chinle sandstone subcrops with saturated alluvium in the R well field.

The elevated Lower Chinle uranium concentrations were first defined in 1996 and are presented in Figure 1.1-26. The locations where uranium concentrations were measured are shown on each of these figures with a well symbol. The collection of water for irrigation from the Lower Chinle reduced the higher concentrations in 1999 (see Figure 1.1-26) to lower levels in 2014 (see Figure 1.1-27). Figure 1.1-28 give a similar map for the Lower Chinle aquifer for 2018.

An average of 280 gallons per minute (gpm) was pumped into the On-site alluvial treated and/or fresh-water injection systems in 2018. An additional 64 gpm of treated and/or fresh water was injected into the On-site Upper and Middle Chinle aquifer systems. An average rate of 350 gpm of R.O. product water was pumped to the PTT and mixed with zeolite treated water and/or fresh water prior to injection onto the groundwater in 2018. Production of significant quantities of R.O. product water started in July of 1999 with consistent operation from 2000 through 2018 except during equipment repair periods.

In 2018, the average collection rate for the On-site alluvial aquifer was 279 gpm. No collection for re-injection of alluvial aquifer water was done in 2018. The On-Site Upper Chinle aquifer collection program consisted of pumping wells CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A and CE19 at an average composite rate of 130 gpm in 2018. The up-gradient alluvial aquifer collection system was not operated in 2018, while average rates of 8.8 and 0 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 2018 results, shows that sulfate, TDS, chloride, uranium, selenium and molybdenum are still the key constituents of interest at this site. Successful restoration of groundwater quality with respect to these key constituents will also accomplish restoration for other constituents. The monitoring program has shown that any low levels of nitrate, radium-226, radium-228, vanadium and thorium-230 are also reduced when the key constituents are restored in a particular area.

Data relating to key constituents currently being restored at the site have been reviewed and statistically evaluated to determine upgradient site 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 standards 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. The main change in the uranium concentrations in the alluvial aquifer is the decline in concentrations on the north side of EP2. There is also one well in northern Felice Acres and several wells in southern Felice Acres subdivision that contain concentrations of uranium exceeding the site standard. Groundwater withdrawal for treatment was used to further reduce uranium levels that exceed the standard in an area southwest of Felice Acres in Section 3, in Felice Acres and in Section 28. Collection of water from one well in Murray Acres has reduced uranium concentrations in that area to below the site standard. Uranium concentrations in the northeast portion of Section 3 and South Felice acres were reduced in 2018 in the R and Q well fields.

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

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

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

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

No vanadium concentrations exceeded the alluvial site standard 2018 except for wells in the LTP and STP. Concentrations of this constituent have been adequately restored to below the site standard except for levels in the area of the LTP and STP.

Thorium levels observed in 2018 were less than the site standard except levels in the alluvium immediately under the LTP. One value near the STP slightly exceeded the site standard but this value may be an outlier. The mobility of this constituent has been very limited and elevated activities only occur in close proximity to the tailings. However, the analytical results for this constituent vary significantly at the low observed levels as they are approaching laboratory detection limits. Slightly higher values should not be considered significant until they are supported by additional monitoring. The monitoring records for thorium indicate that it is a minor constituent of concern at the Grants site.

Treated water and/or fresh-water injection into Upper Chinle wells CW13 and 944, (See Figure 5.1-2), east of the East Fault, continued in 2018. This injection has maintained higher water levels in the Upper Chinle aquifer east of the East Fault.

Treated water and/or fresh-water injection continued in 2018 in Upper Chinle well CW5 just north of Broadview Acres and also in Upper Chinle wells CW4R and CW25. This injection has resulted in gradient reversal within the Upper Chinle, thereby forcing groundwater from this area back to the north toward the tailings piles. Collection from Upper Chinle well CE2 was initiated in

1999 and continued through 2018. Collection in Upper Chinle wells CE5, CE6, CE11 and CE12 was started in 2006. Collection from Upper Chinle well CE7 started in late 2010 while collection in wells CE15, CE15A and CE19 started in 2017. This collection is used in conjunction with injection wells CW4R, CW5 and CW25 to restore groundwater quality in this area.

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, one Upper Chinle well north of Broadview Acres and one in Felice Acres exceeded the Upper Chinle site standard in 2018. 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. The continual decline in uranium concentrations to below or equal to the site standard in Upper Chinle wells, 494, CE9 and CE15A, in the Broadview and Felice Acres areas is the most important Upper Chinle water quality change in 2018. Continual monitoring of Upper Chinle well CW78 in central Felice Acres is needed to determine if additional corrective action is needed in this area or if our collection from well CE15 will decrease these concentrations.

Selenium concentrations in the Upper Chinle aquifer exceed the site standard in the mixing zone near the LTP and north 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 and one well north of Broadview Acres in the Upper Chinle aquifer during 2018. 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 2018 for the Upper Chinle mixing zone were less than the nitrate site standard except for a small area in the LTP area. This indicates that nitrate is not a constituent of concern in this aquifer.

Only an area in the Upper Chinle aquifer in the western portion of the LTP contain a radium-226 plus radium-228 value above 5 pCi/l. All vanadium and thorium-230 results for the

Upper Chinle in 2018 were less than the site standards. This is consistent with the low observed concentrations in the overlying alluvial aquifer.

The direction and rate of groundwater flow in the Middle Chinle aquifer in 2018 is very similar to that of recent years with the depression that exist in western South Felice Acres from the pumping in 2018. Fresh-water injection into well CW14 started in December of 1997. Fresh-water injection into wells CW30 and CW46 started in 2004 while injection into Middle Chinle well CW77 started in 2016. The fresh water is building up a mound of groundwater in this area, which will result in a reversal of the flow of Middle Chinle water back toward the alluvial subcrop. Well CW28 was added as a supply well for fresh-water injection in 2002 but was not used during 2018.

Water quality in the Middle Chinle aquifer is generally good and all sulfate concentrations are less than the site standards in 2018 except for four wells west of the West Fault near collection well CW62. All TDS concentrations in the Middle Chinle aquifer are less than the standards except for two wells in Murray Acres and wells each in Broadview and Felice Acres that are above the non-mixing zone background value and five wells west of the West Fault in the mixing zone. Chloride concentrations in the Middle Chinle aquifer did not exceed the site standard in 2018 except for one well in Murray Acres and one well west of the West Fault.

Uranium concentrations in the western portion of Felice Acres are above the mixing zone site standard due to the alluvial recharge to the Middle Chinle aquifer just south of Felice Acres but the concentrations were decreased with the 2018 collection in this area. The decline in uranium concentrations to Middle Chinle wells 493 and CW55 to near the non-mixing zone site standard is the important change in the Middle Chinle aquifer. 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 2018 with the CW62 collection. Continued pumping of well CW62 should reduce the uranium in the Middle Chinle west of the West Fault.

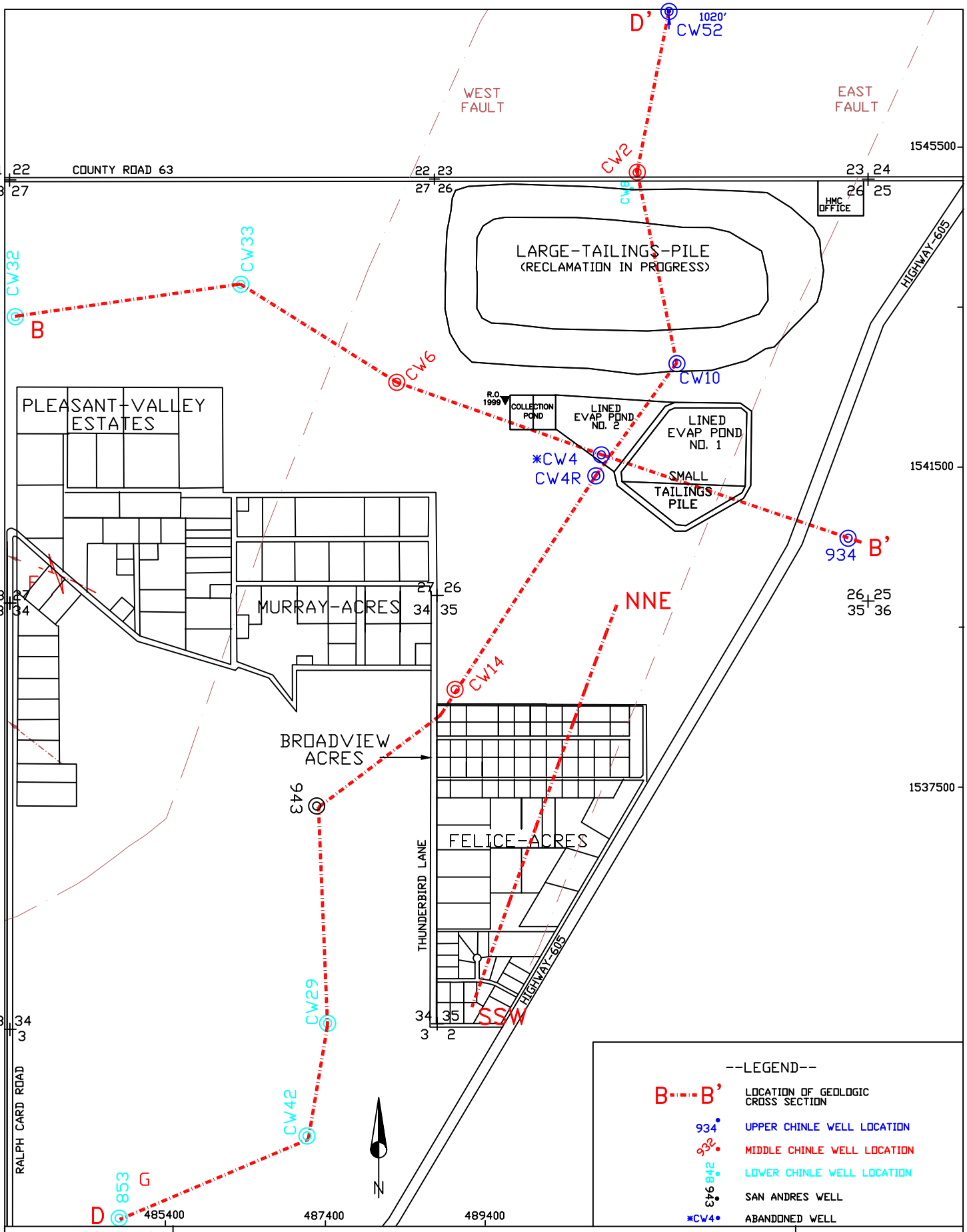
The non-mixing zone selenium site standard is slightly exceeded in well 493 in Felice Acres (See Figure 6.3-14). The mixing zone selenium site standard is exceeded in four wells west of the West Fault but were decreased in 2018. Molybdenum concentrations in several wells west of the West Fault in the Middle Chinle aquifer are above the mixing zone standard of 0.10 mg/l.

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

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

The uranium site standards in the Lower Chinle aquifer are exceeded in several wells in Section 3. The wells where concentrations exceed the mixing zone site standard of 0.18 mg/l are located near the subcrop of the Lower Chinle aquifer with the alluvial aquifer. Concentrations in several non-mixing zone well exceed the site standard of 0.03 mg/l and the gradual decline in uranium concentration in well CW29 is important.

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 2018 were at low levels.



SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 3/6/17

FIGURE 1.1-1. LOCATIONS OF GEOLOGIC CROSS SECTIONS

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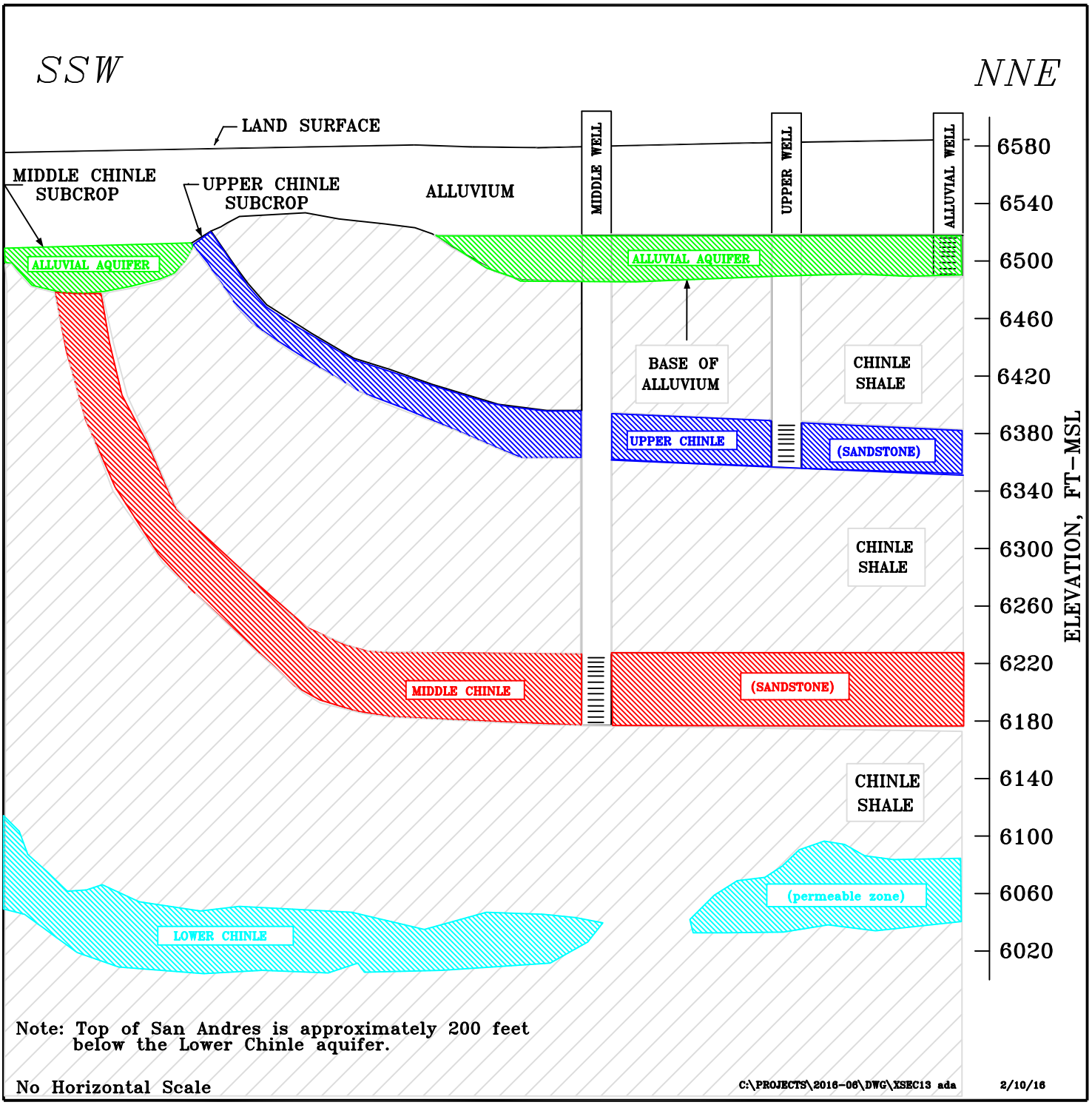
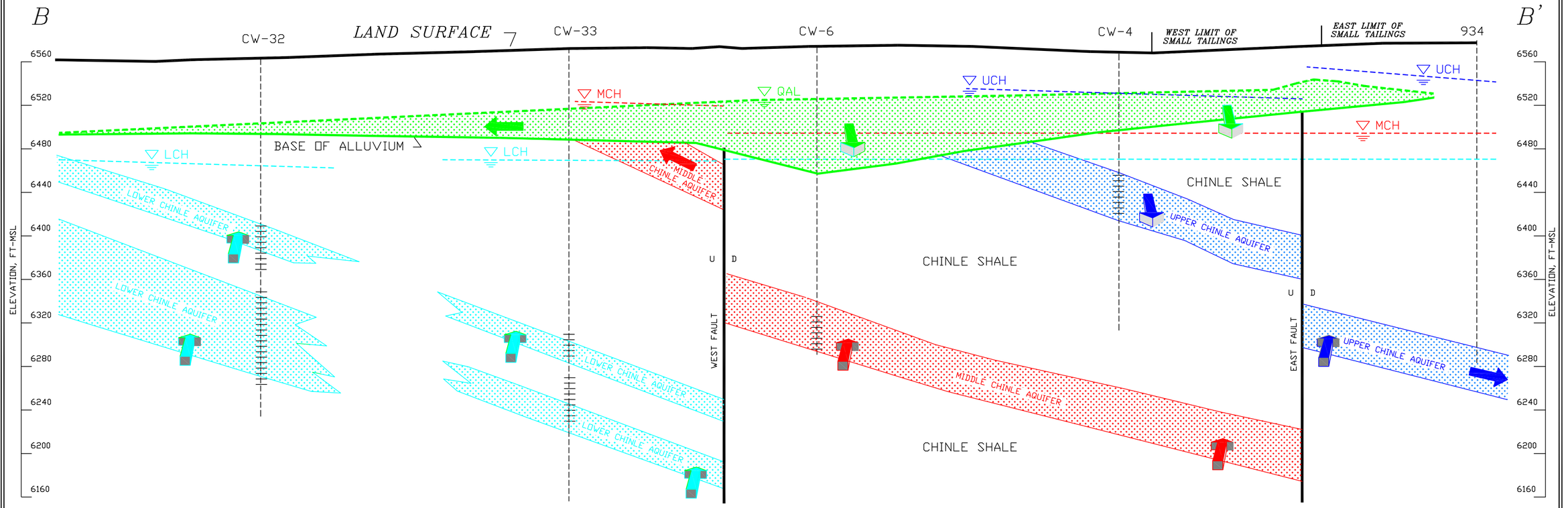


FIGURE 1.1-2. TYPICAL GEOLOGIC CROSS SECTION



LEGEND:

FLOW-DIRECTION

- INDICATES FLOW LATERALLY WITH PAGE
- INDICATES FLOW INTO PAGE
- INDICATES FLOW OUT OF PAGE

ALLUVIAL

- BASE
- QAL WATER LEVEL ELEVATION (WLE)

UPPLE CHINLE

- LIMITS OF SANDSTONE
- UCH WLE

MIDDLE CHINLE

- LIMITS OF SANDSTONE
- MCH WLE

LOWER CHINLE

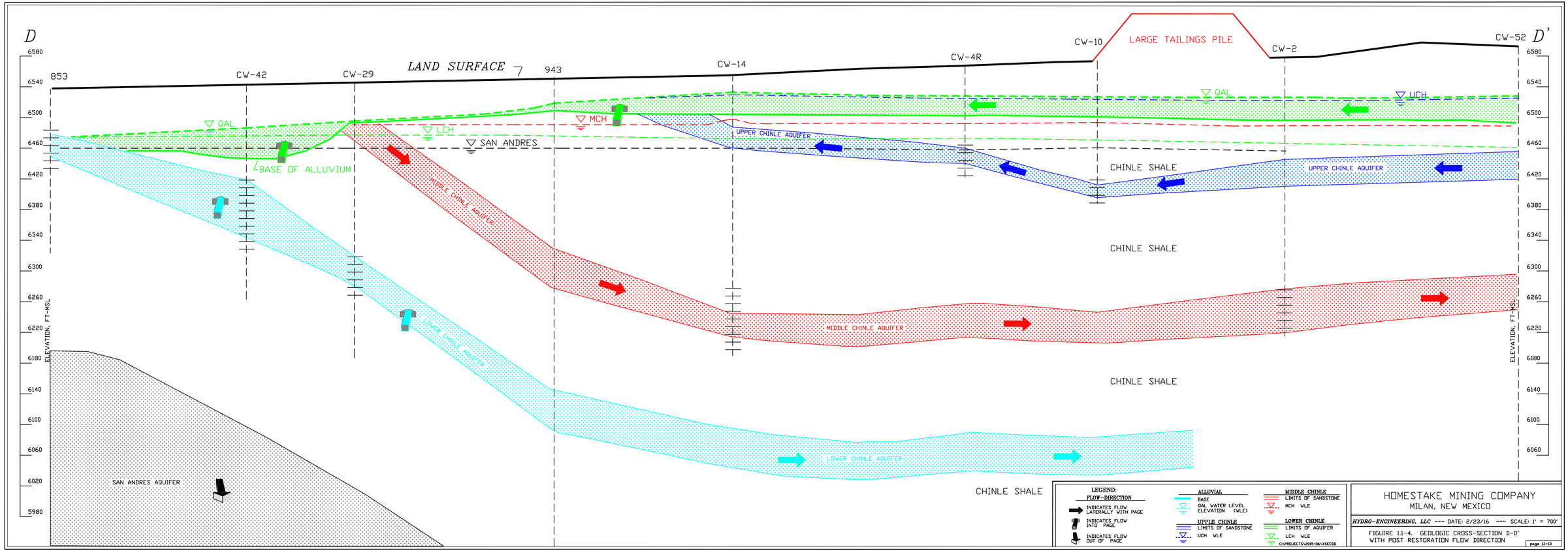
- LIMITS OF AQUIFER
- LCH WLE

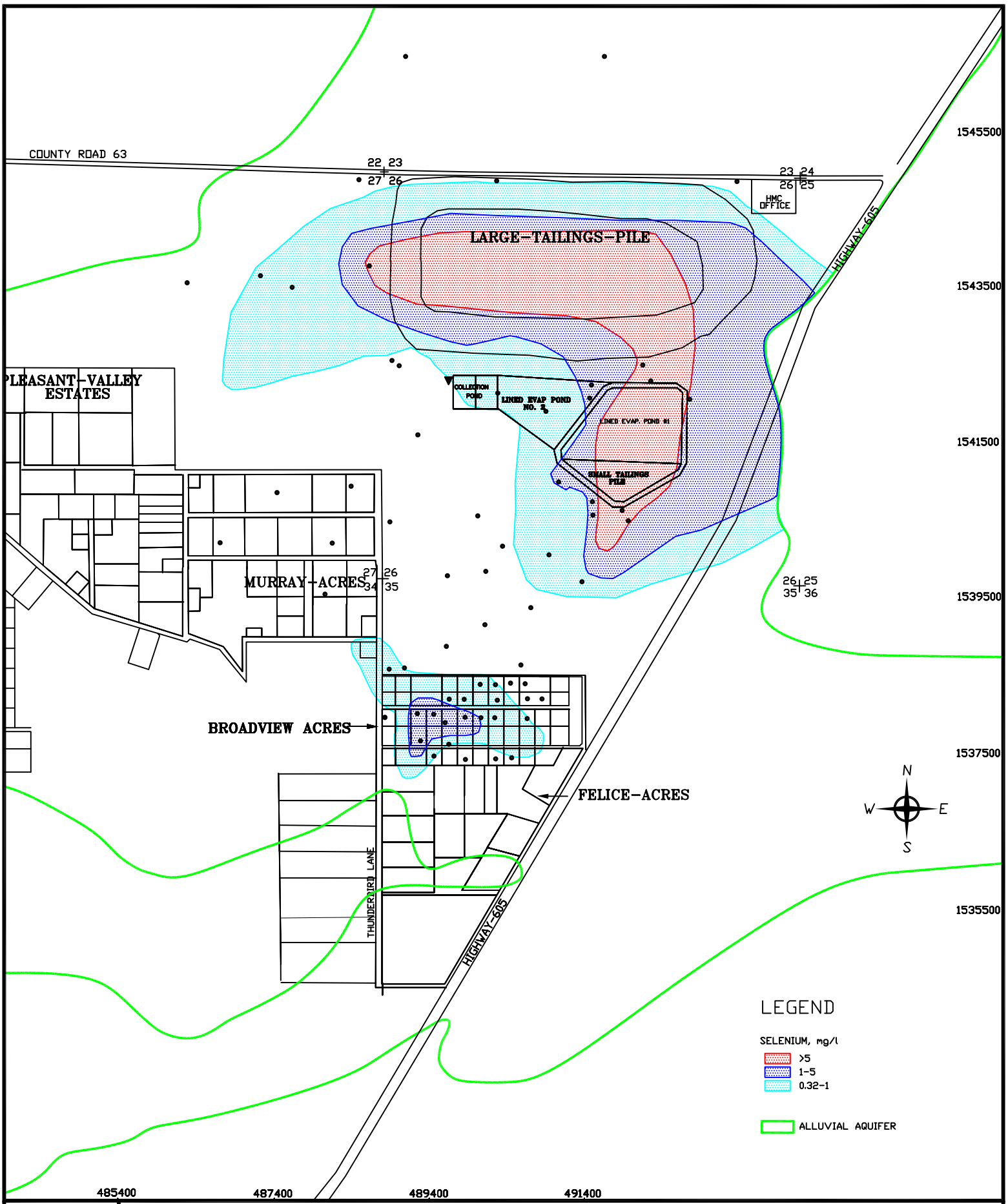
C:\PROJECTS\2015-06\XSECBB

HOMESTAKE MINING COMPANY
MILAN, NEW MEXICO

HYDRO-ENGINEERING, LLC ~~~ DATE: 3/17/15 ~~~ SCALE: 1' = 600'

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


D
D'
LAND SURFACE
853
CW-42
CW-29
943
CW-14
CW-4R
CW-10
LARGE TAILINGS PILE
CW-2
CW-52
6580
6540
6500
6460
6420
6380
6340
6300
6260
6220
6180
6140
6100
6060
6020
5980
ELEVATION, FT-MSL
QAL
LCH
MCH
UCH
SAN ANDRES
BASE OF ALLUVIUM
UPPER CHINLE AQUIFER
MIDDLE CHINLE AQUIFER
LOWER CHINLE AQUIFER
SAN ANDRES AQUIFER
CHINLE SHALE
LEGEND:
FLOW-DIRECTION
INDICATES FLOW LATERALLY WITH PAGE
INDICATES FLOW INTO PAGE
INDICATES FLOW OUT OF PAGE
ALLUVIAL
BASE
QAL WATER LEVEL ELEVATION (WLE)
UPPER CHINLE
LIMITS OF SANDSTONE
UCH WLE
MIDDLE CHINLE
LIMITS OF SANDSTONE
MCH WLE
LOWER CHINLE
LIMITS OF AQUIFER
LCH WLE
C:\PROJECTS\2015-06\XSEC3D
HOMESTAKE MINING COMPANY
MILAN, NEW MEXICO
HYDRO-ENGINEERING, LLC ~~~ DATE: 2/23/16 ~~~ SCALE: 1' = 700'
FIGURE 11-4. GEOLOGIC CROSS-SECTION D-D'
WITH POST RESTORATION FLOW DIRECTION
page 11-13



SCALE: 1"=1600'

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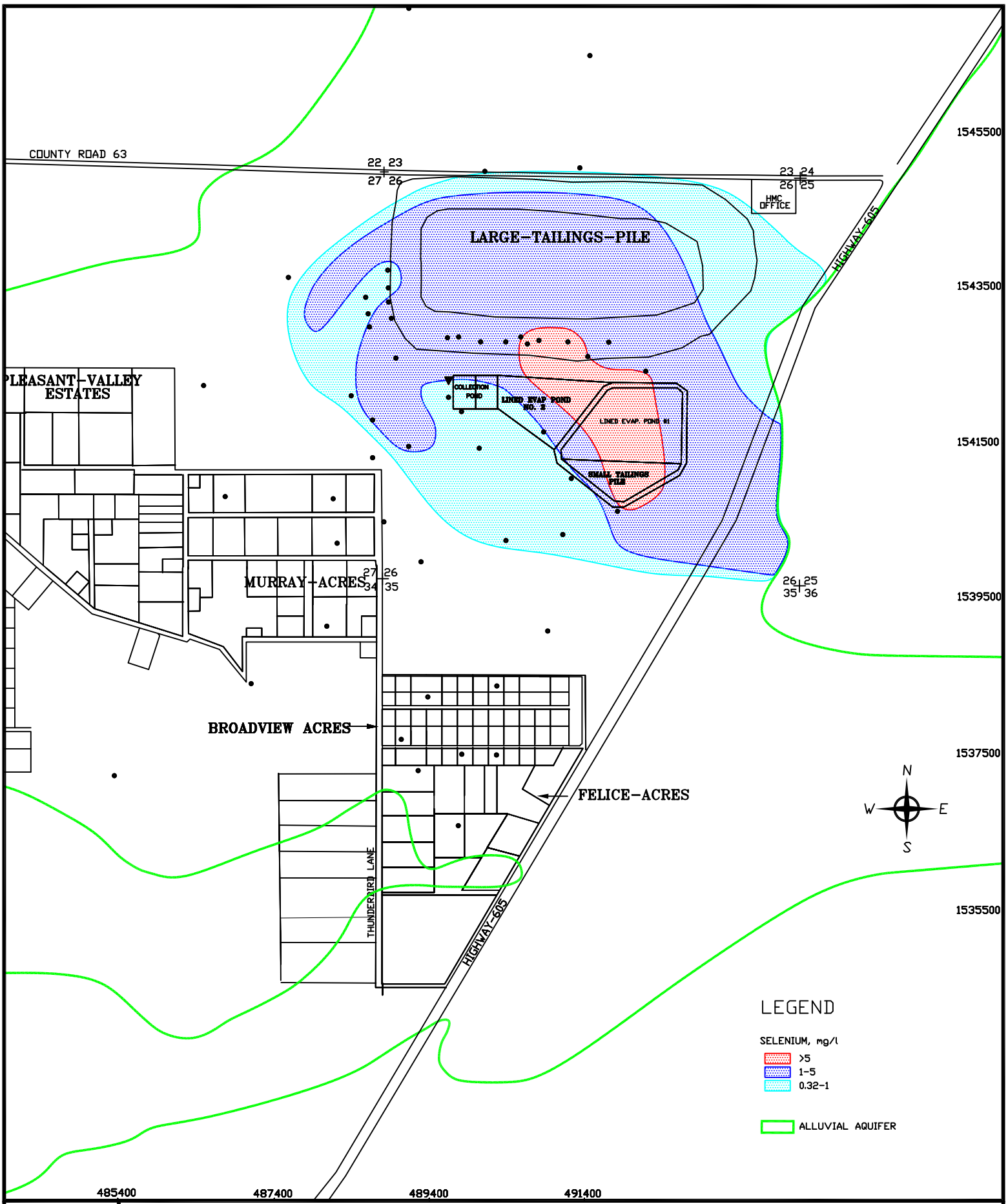
DATE: 3/1/19

FIGURE 1.1-5. ALLUVIAL SELENIUM CONCENTRATIONS, 1976



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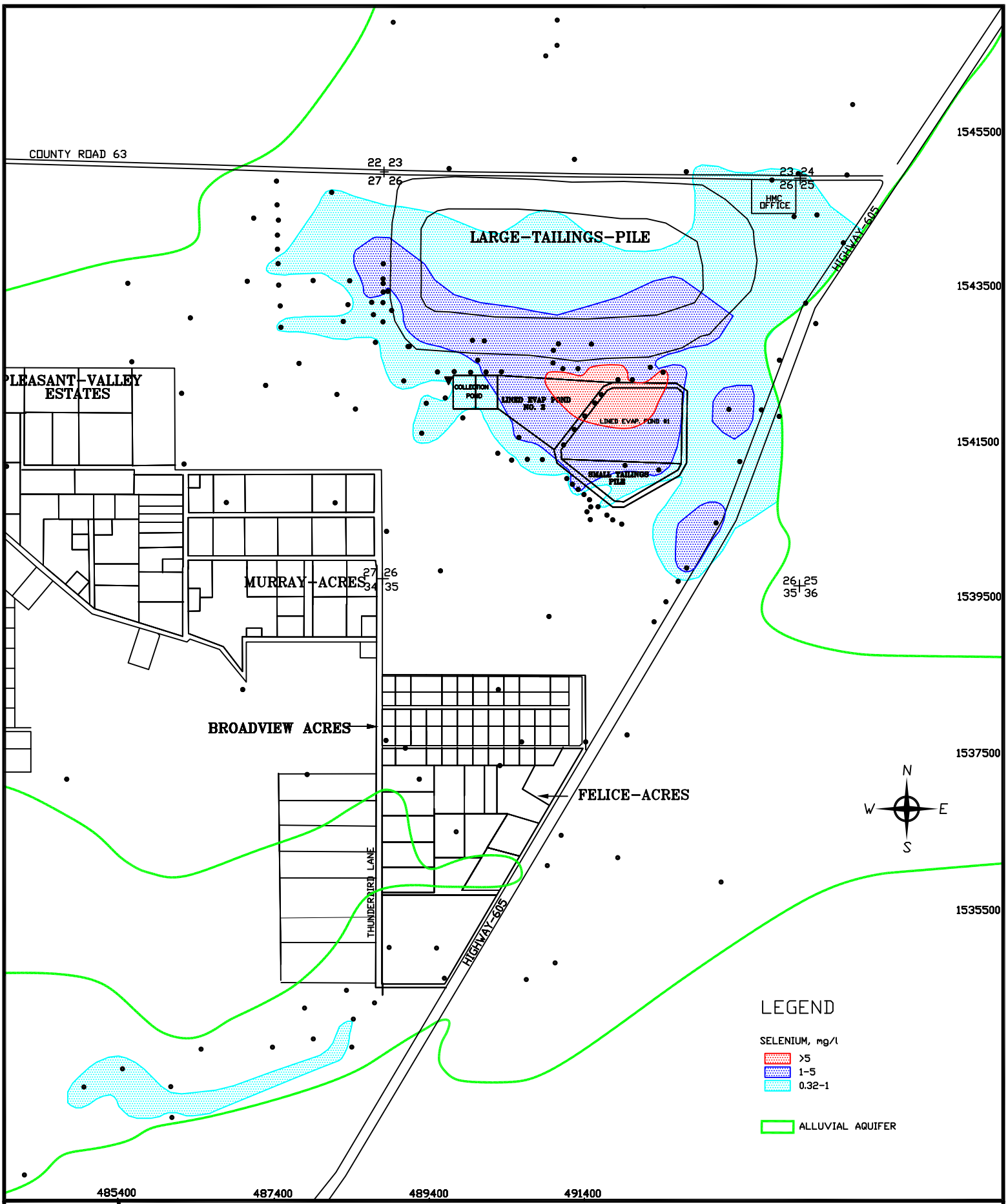
DATE: 3/4/19

FIGURE 1.1-6. ALLUVIAL SELENIUM CONCENTRATIONS, 1988



SCALE: 1"=1600'

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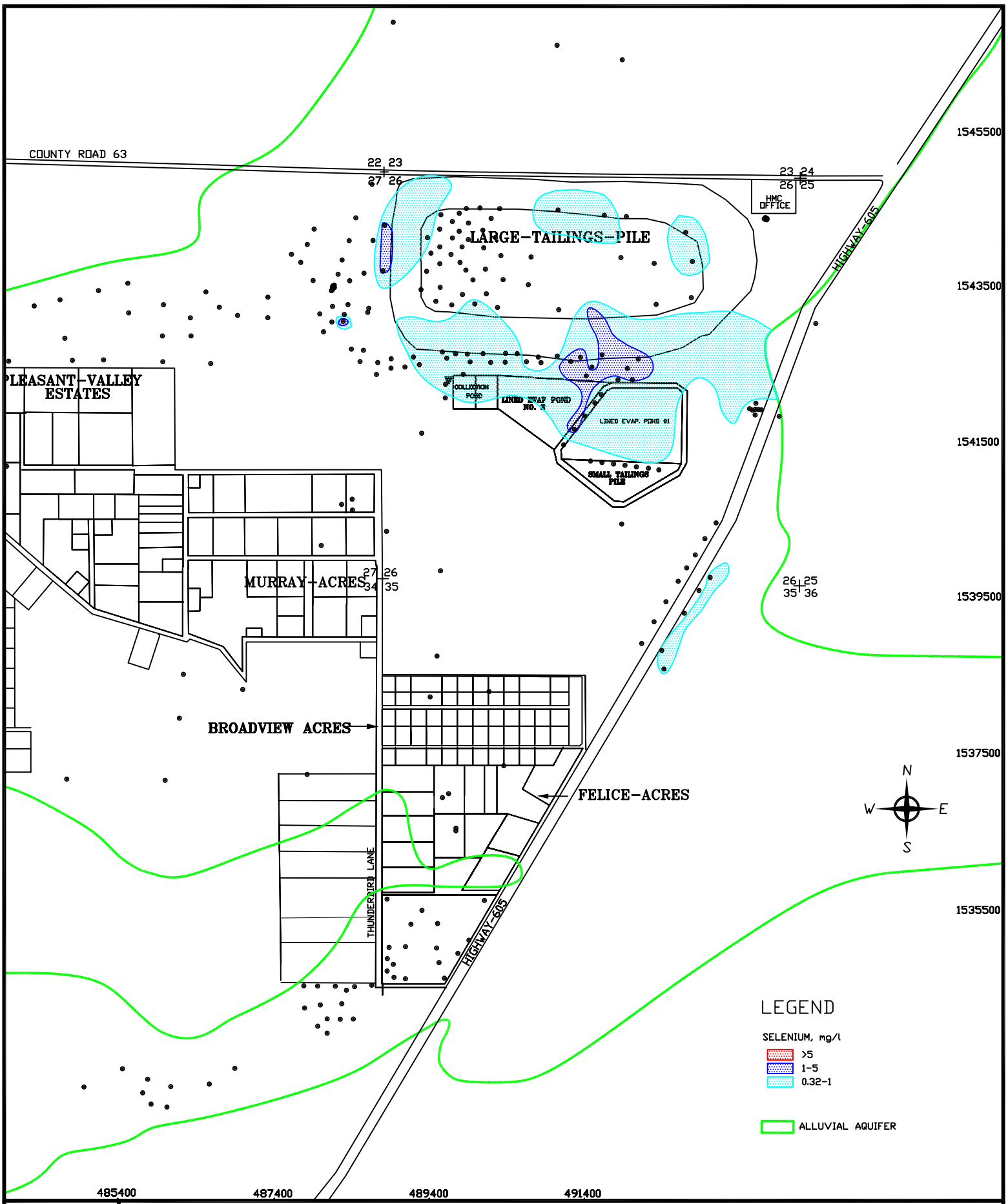
DATE: 3/1/19

FIGURE 1.1-7. ALLUVIAL SELENIUM CONCENTRATIONS, 1999



SCALE: 1"=1600'

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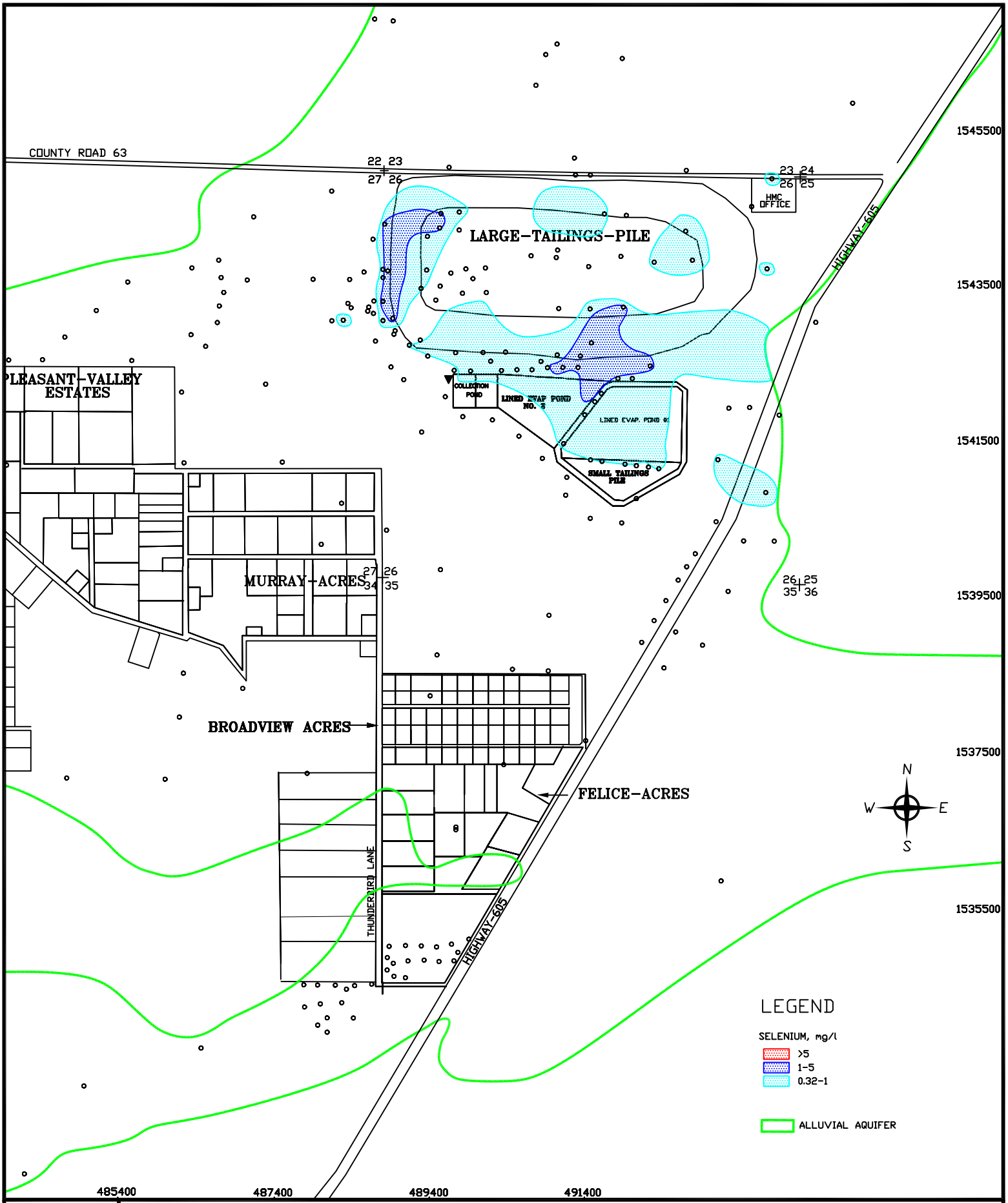
DATE: 3/1/19

FIGURE 1.1-8. ALLUVIAL SELENIUM CONCENTRATIONS, 2014



SCALE: 1"=1600'

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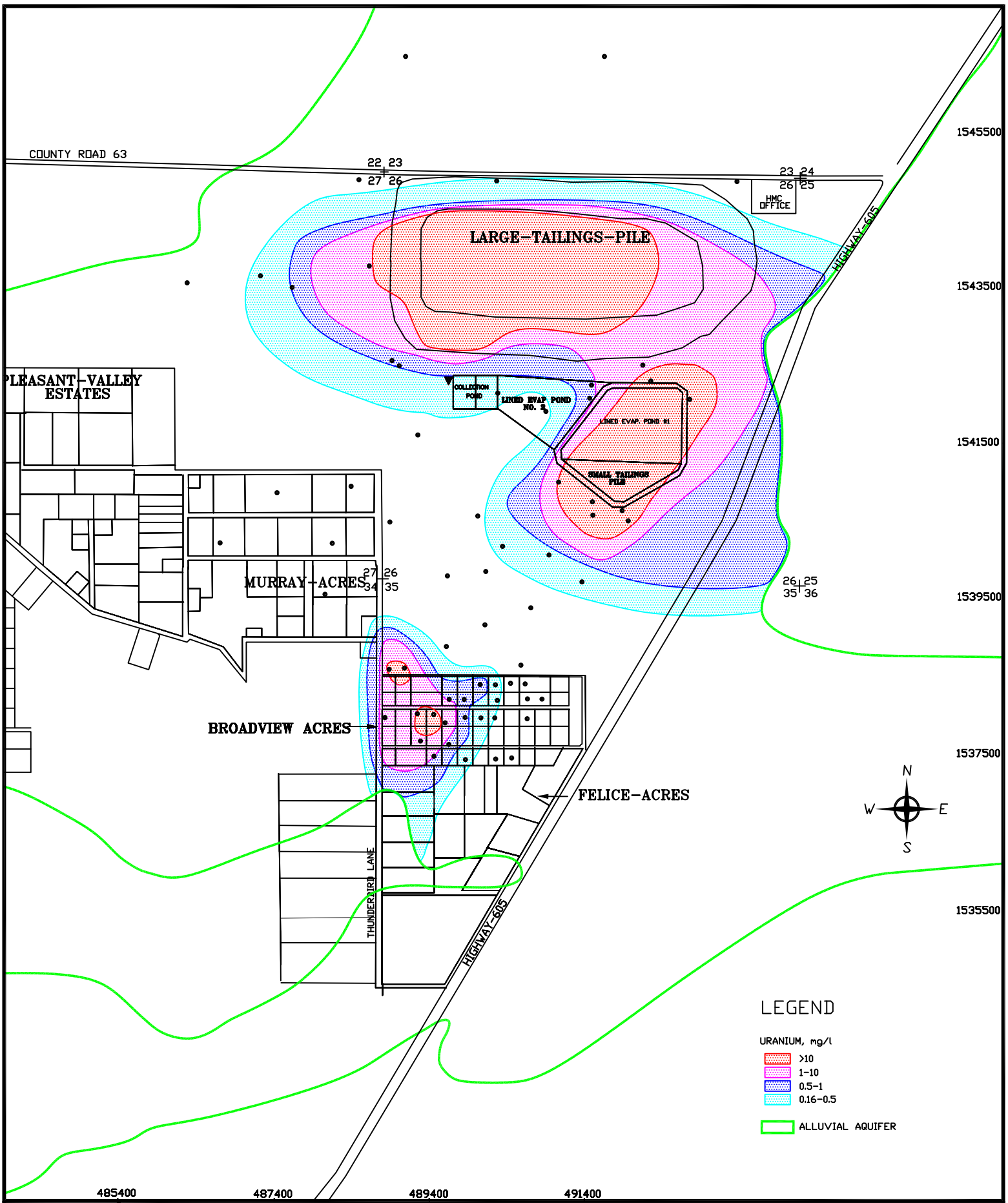
DATE: 3/1/19

FIGURE 1.1-9. ALLUVIAL SELENIUM CONCENTRATIONS, 2018



SCALE: 1"=1600'

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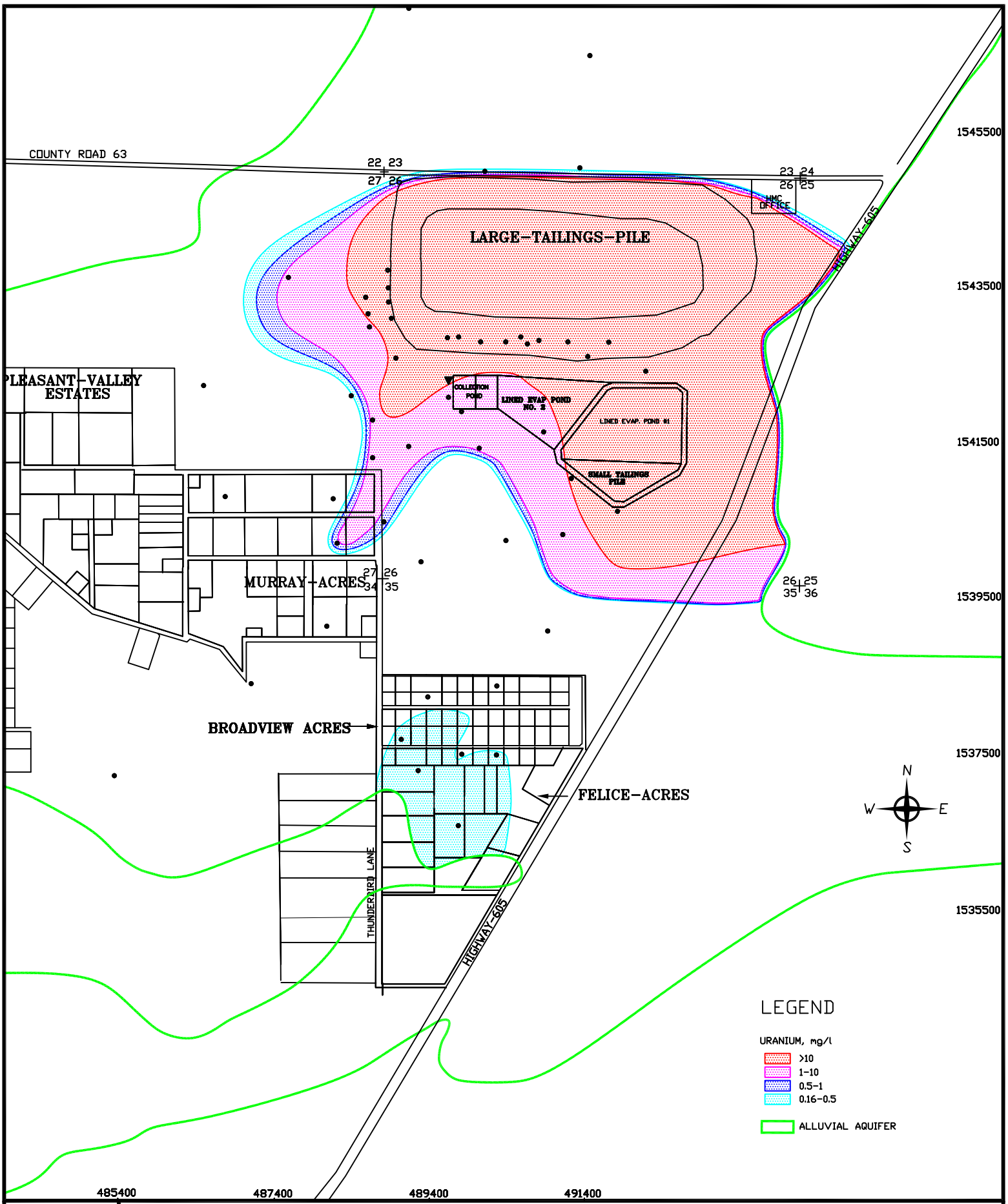
DATE: 3/1/19

FIGURE 1.1-10. ALLUVIAL URANIUM CONCENTRATIONS, 1976



SCALE: 1"=1600'

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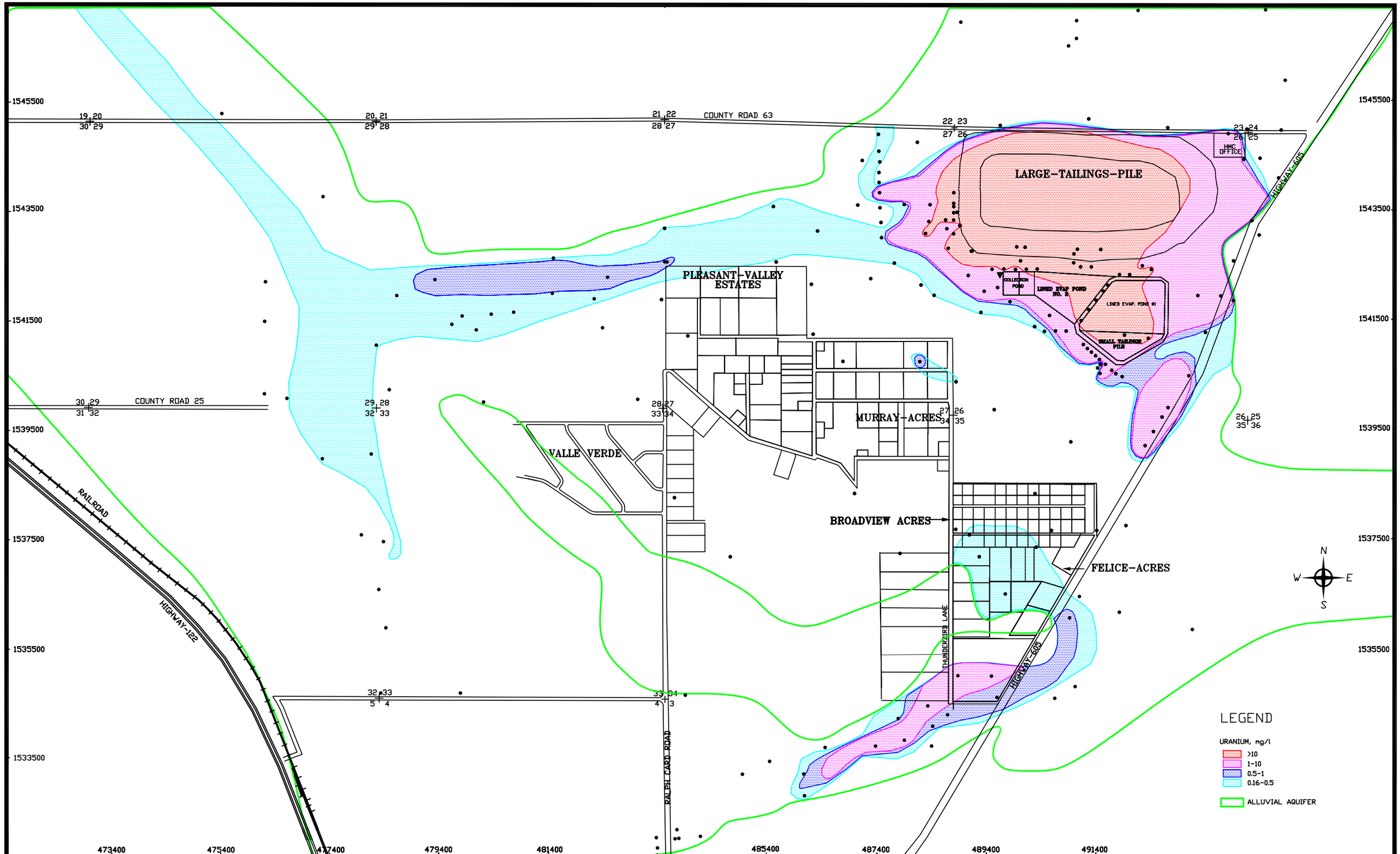
DATE: 3/4/19

FIGURE 1.1-11. ALLUVIAL URANIUM CONCENTRATIONS, 1988



SCALE: 1"=1600'
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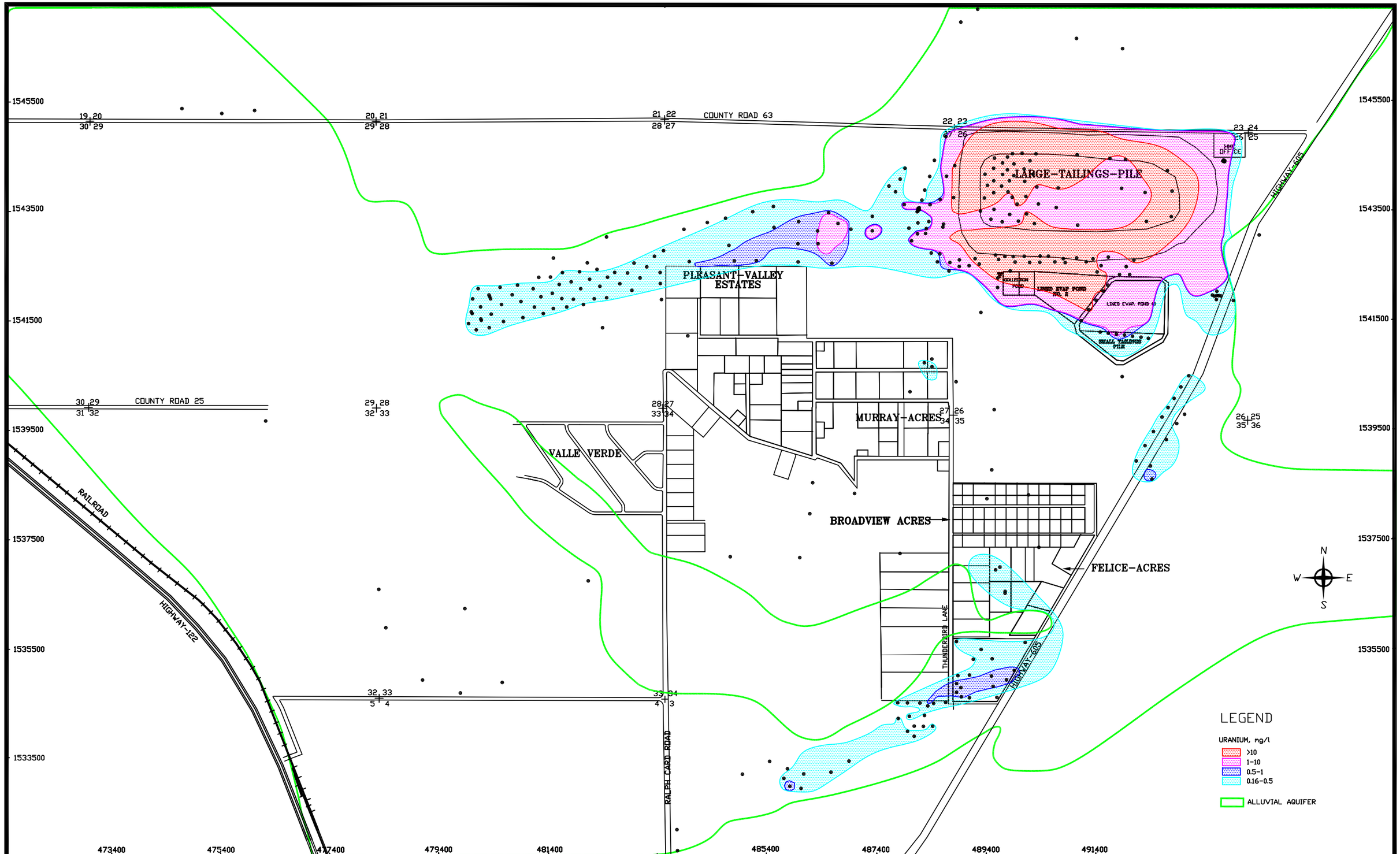
DATE: 2/28/19

FIG. 1.1-12. ALLUVIAL URANIUM CONCENTRATIONS, 1999



SCALE: 1"=1600'
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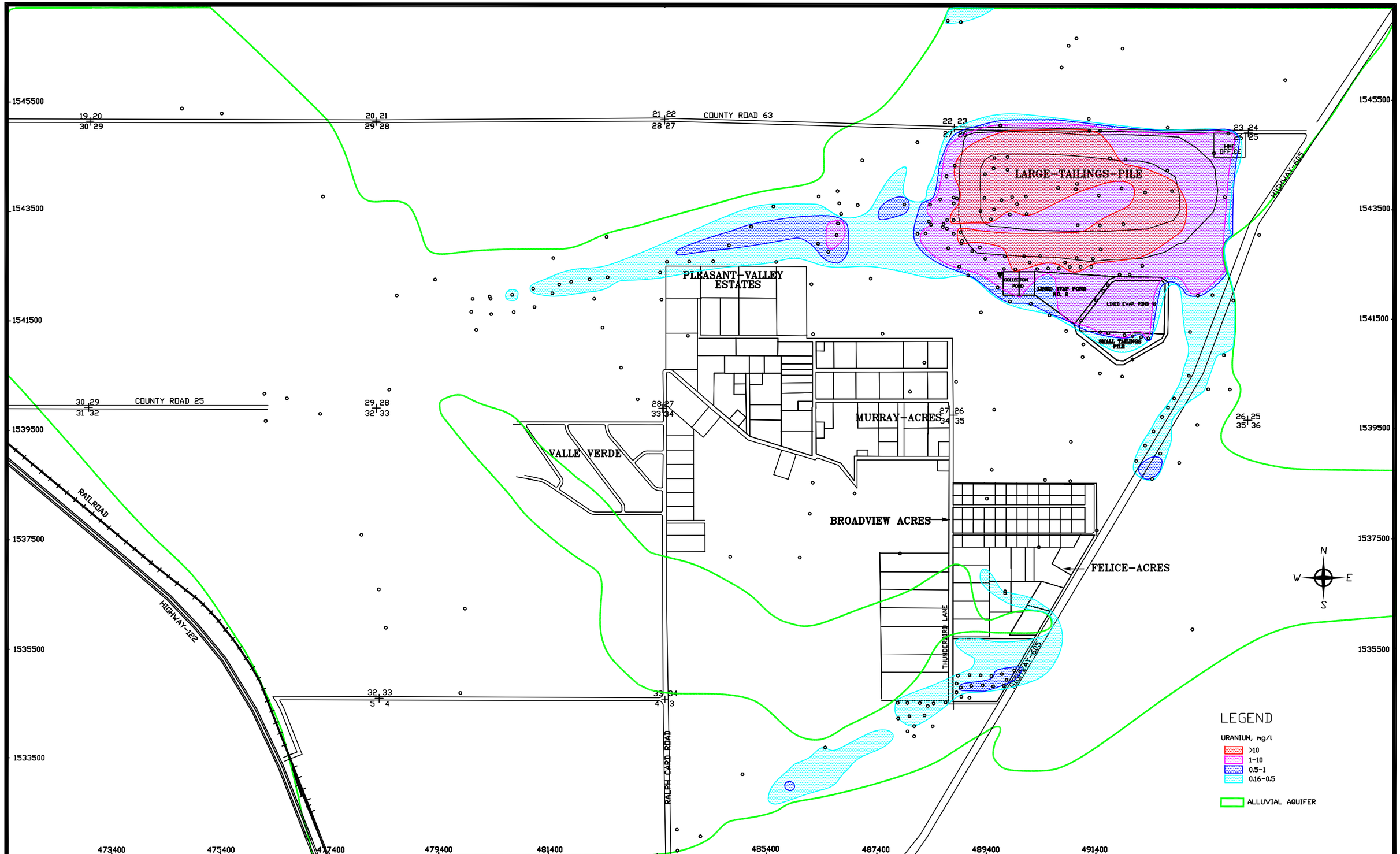
DATE: 2/28/19

FIGURE 1.1-13. ALLUVIAL URANIUM CONCENTRATIONS, 2014



SCALE: 1"=1600'
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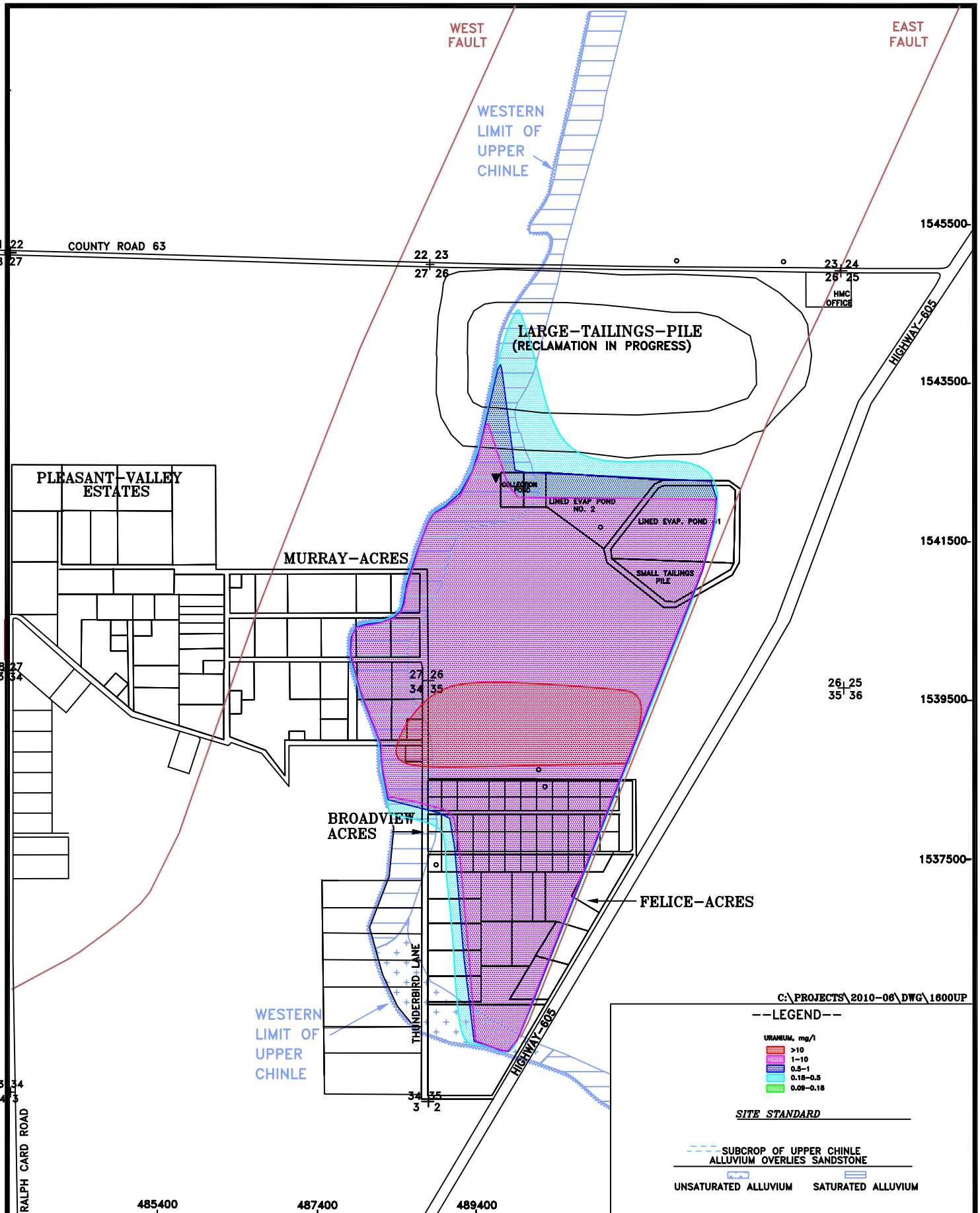
DATE: 2/28/19

FIGURE 1.1-14. ALLUVIAL URANIUM CONCENTRATIONS, 2018



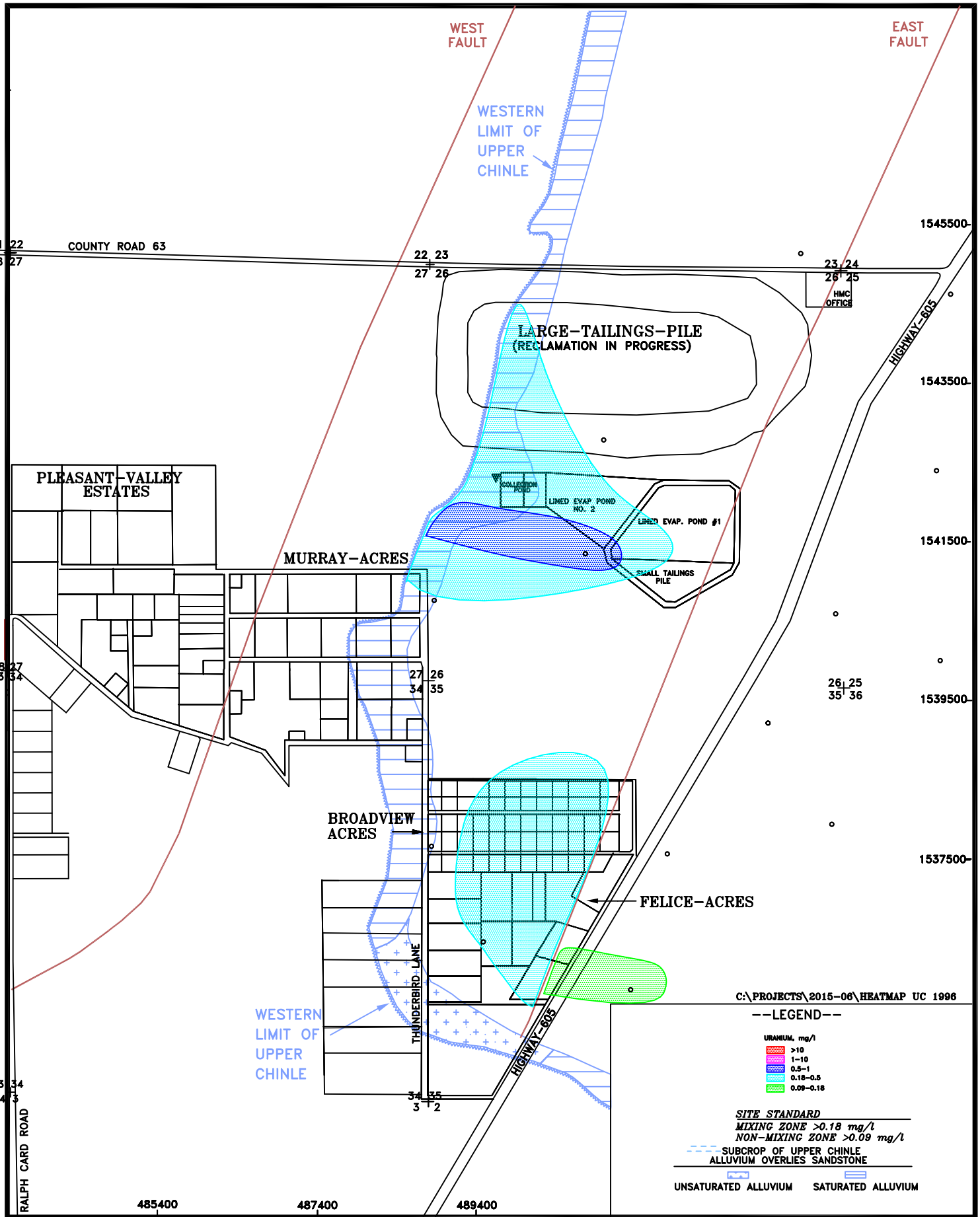
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-15 UPPER CHINLE URANIUM CONCENTRATIONS, 1982

SCALE: 1"= 1600'

PAGE: 1.1-24



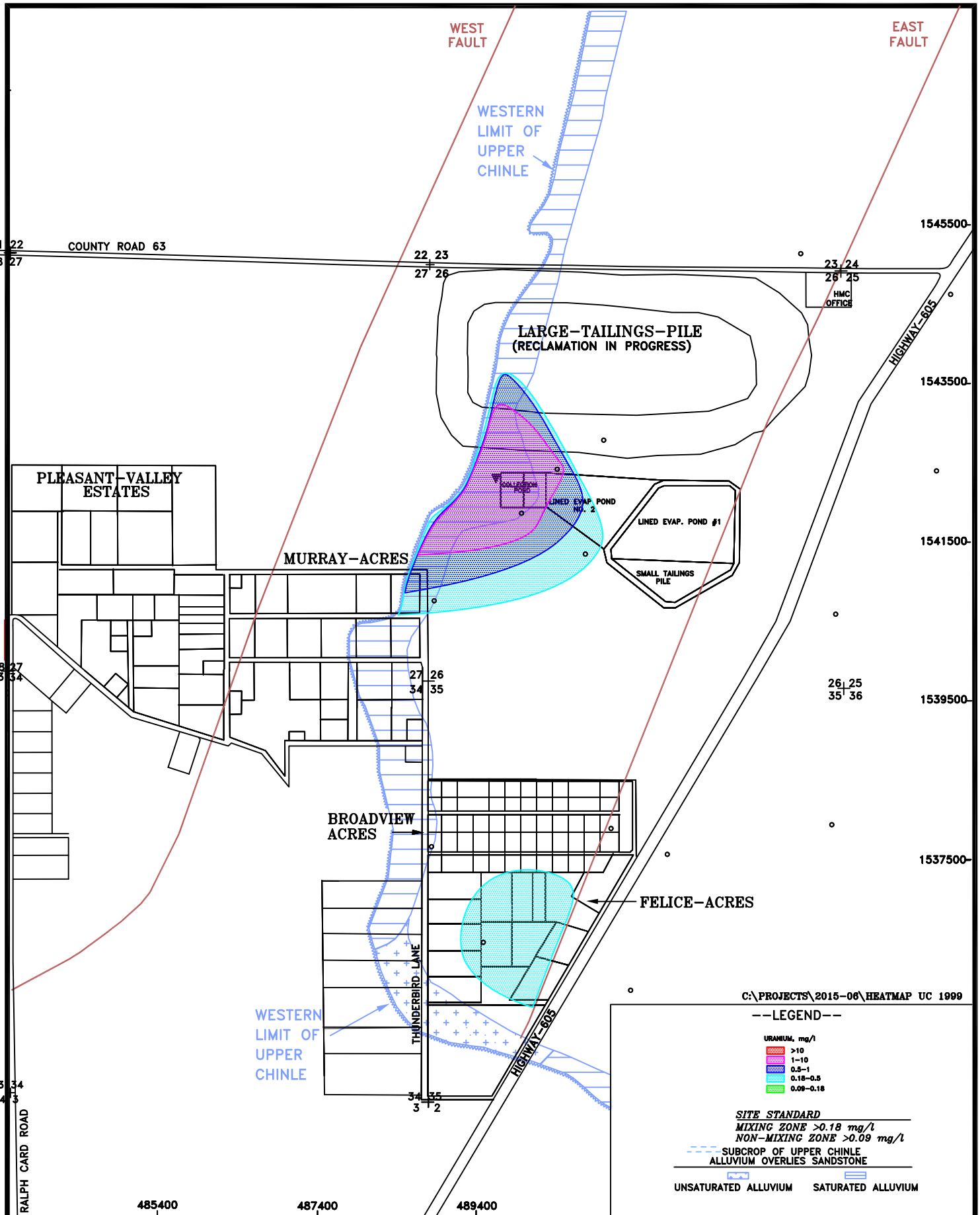
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-16 UPPER CHINLE URANIUM CONCENTRATIONS, 1996

SCALE: 1"= 1600'

PAGE: 1.1-25



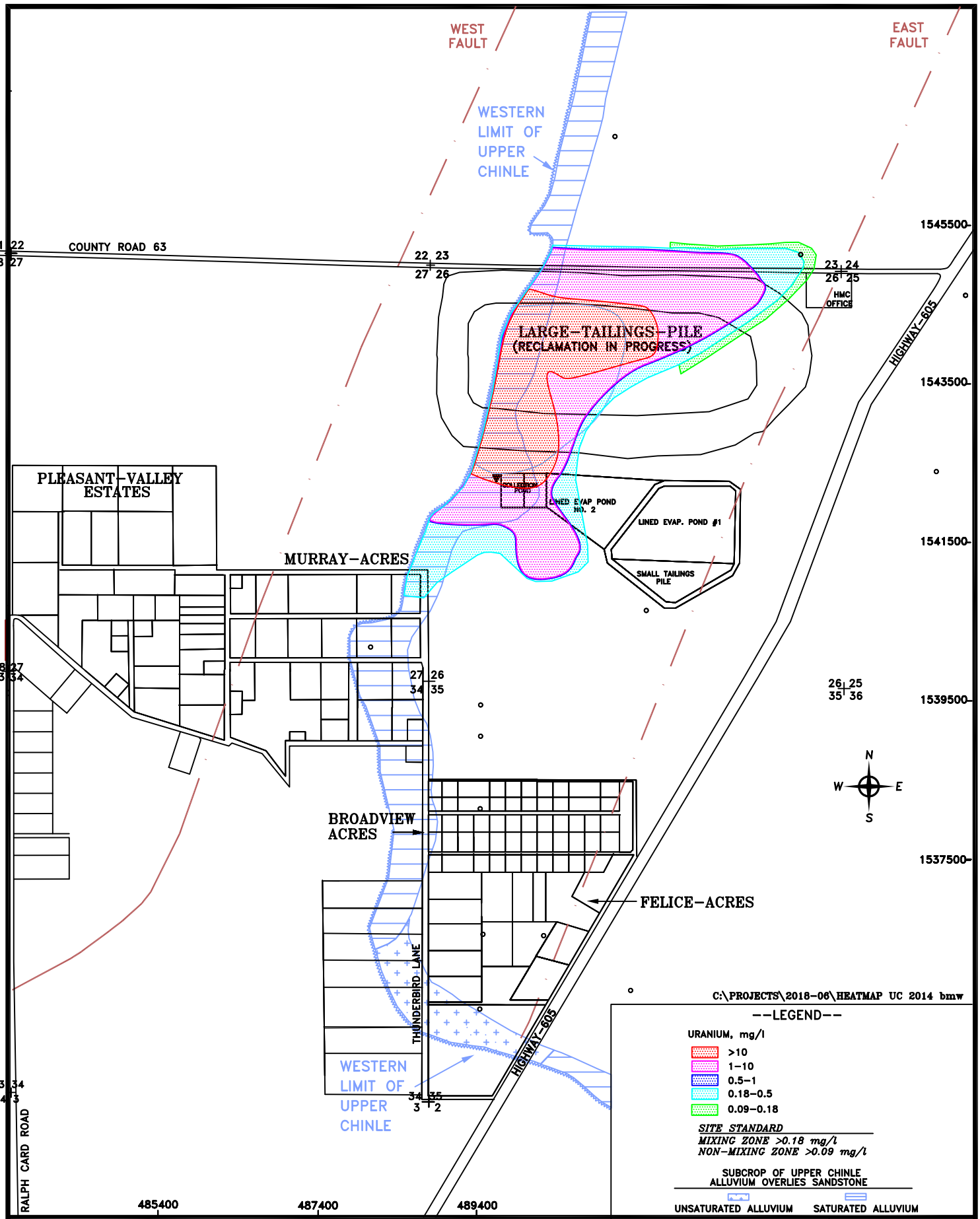
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-17 UPPER CHINLE URANIUM CONCENTRATIONS, 1999

SCALE: 1"= 1600'

PAGE: 1.1-26



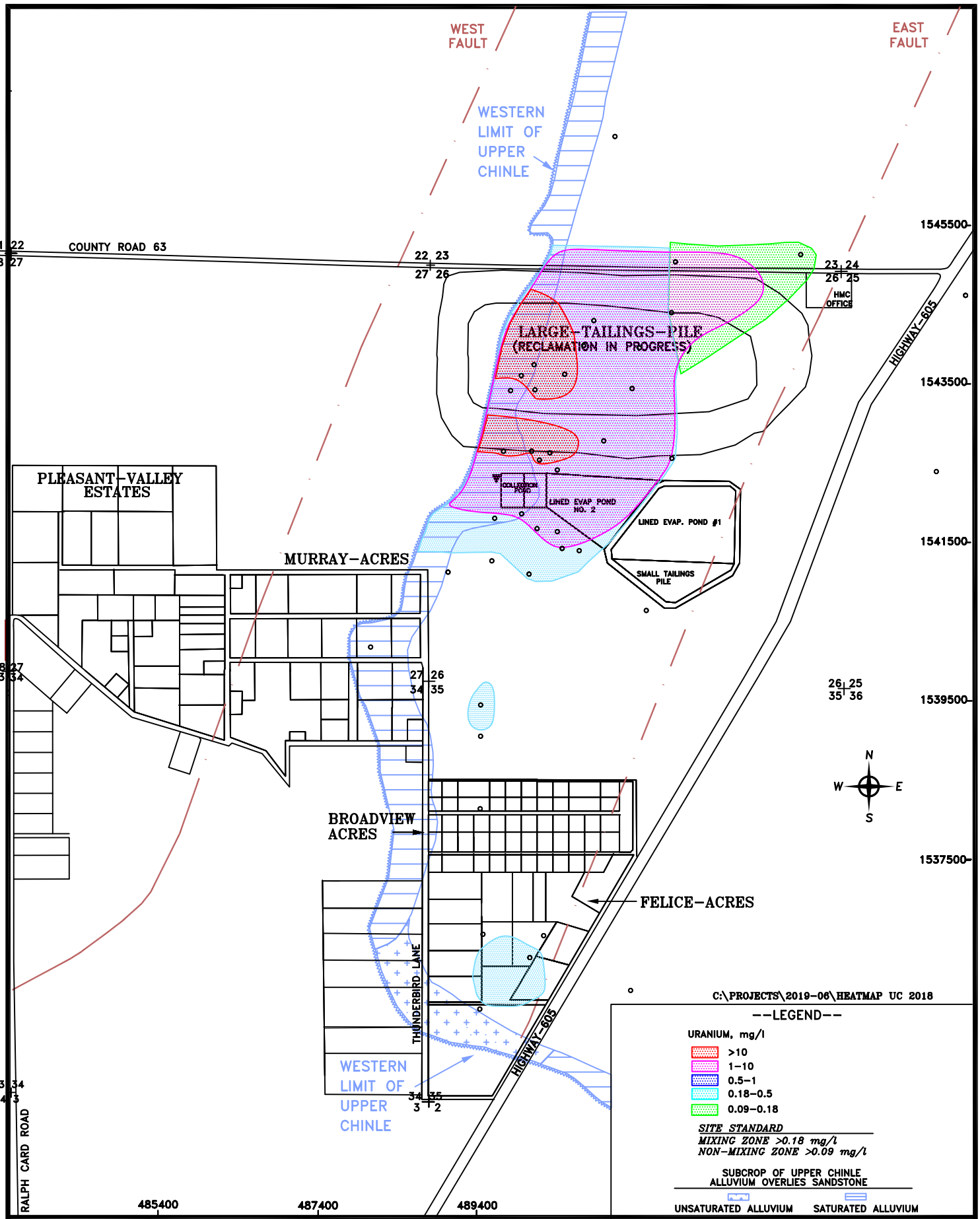
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-18 UPPER CHINLE URANIUM CONCENTRATIONS, 2014

SCALE: 1"= 1600'

PAGE: 1.1-27



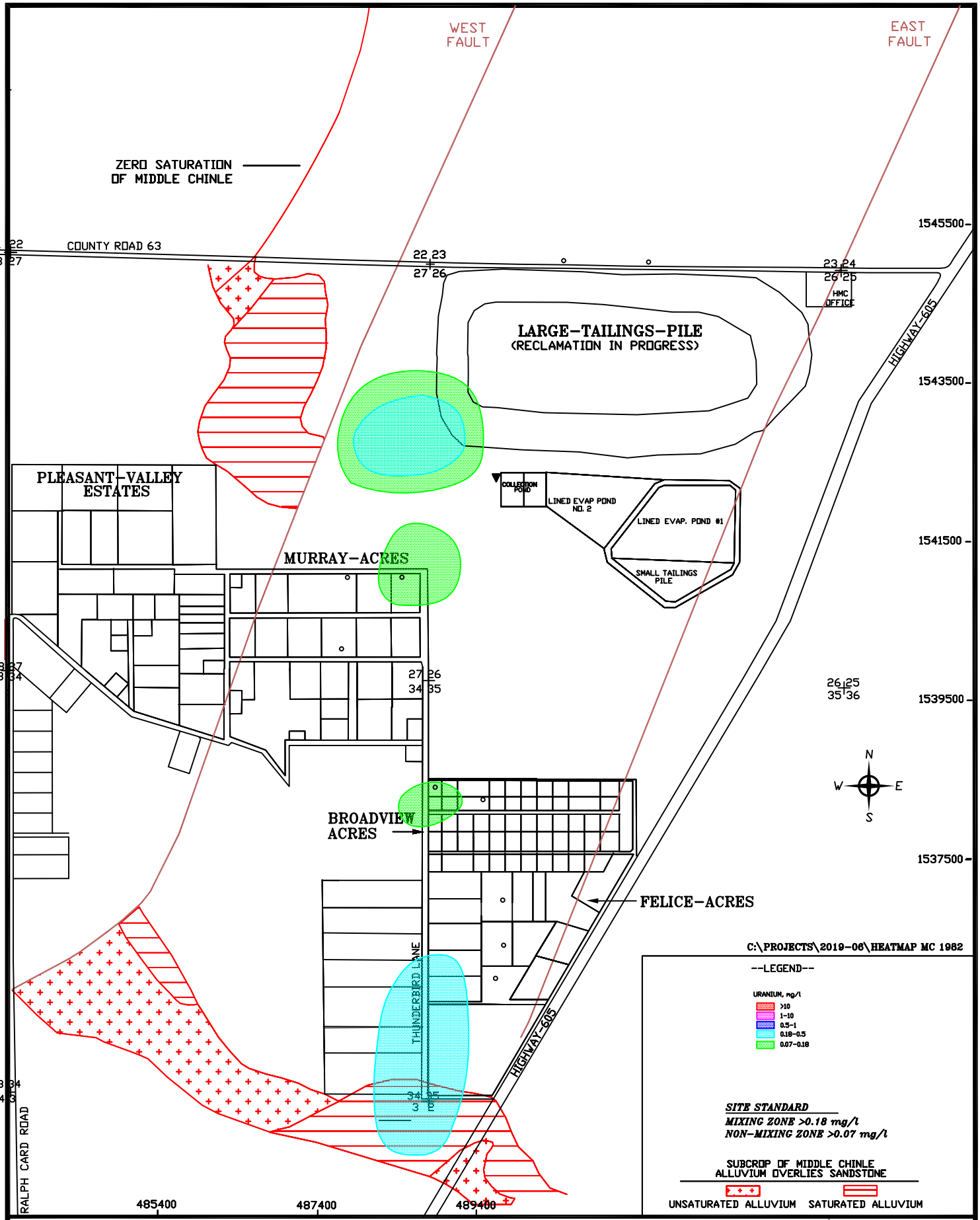
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-19. UPPER CHINLE URANIUM CONCENTRATIONS, 2018

SCALE: 1"= 1600'

PAGE: 1.1-28



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

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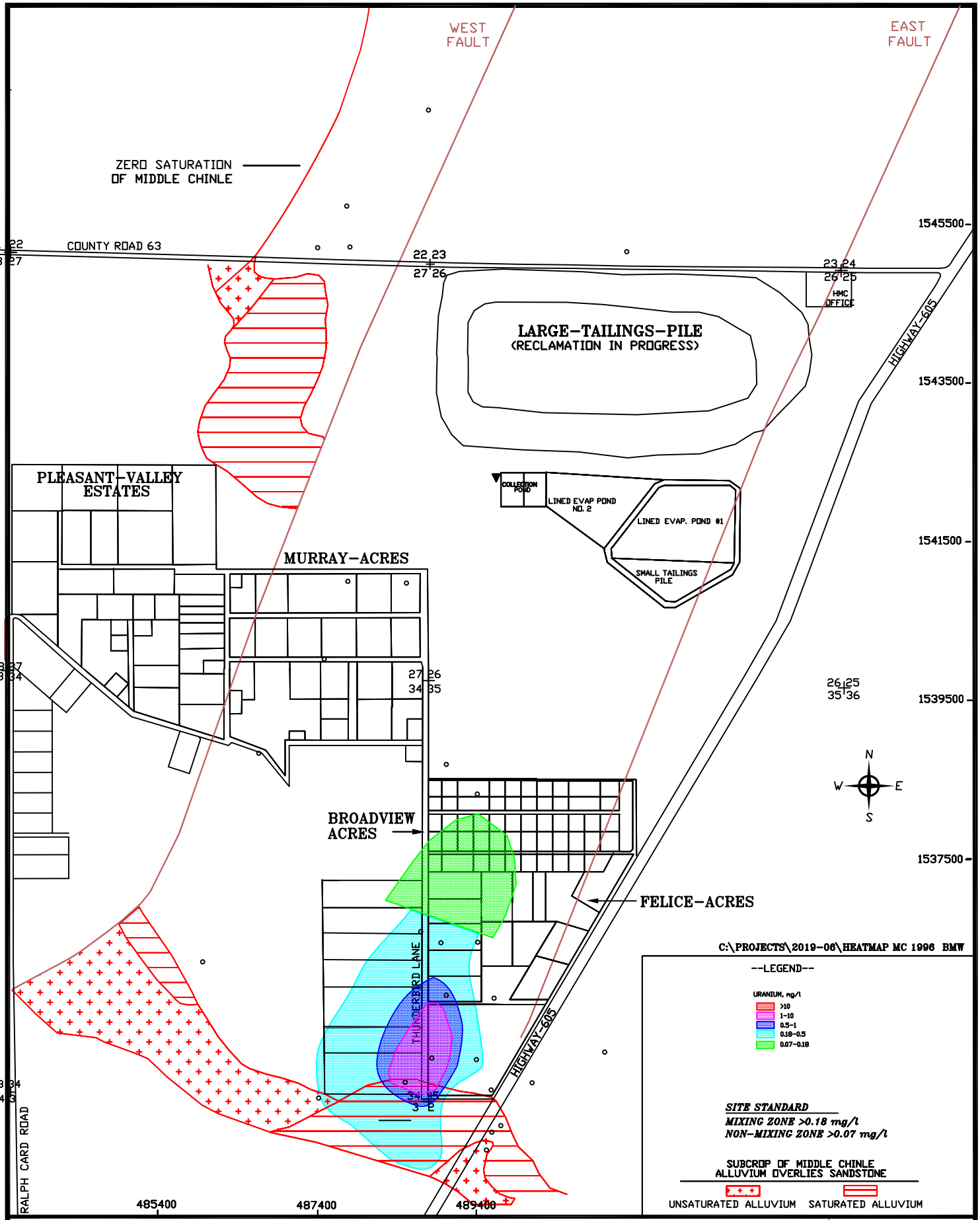
SCALE: 1"= 1600'

PAGE: 1.1-29

FIGURE 1.1-20. MIDDLE CHINLE URANIUM CONCENTRATIONS 1982



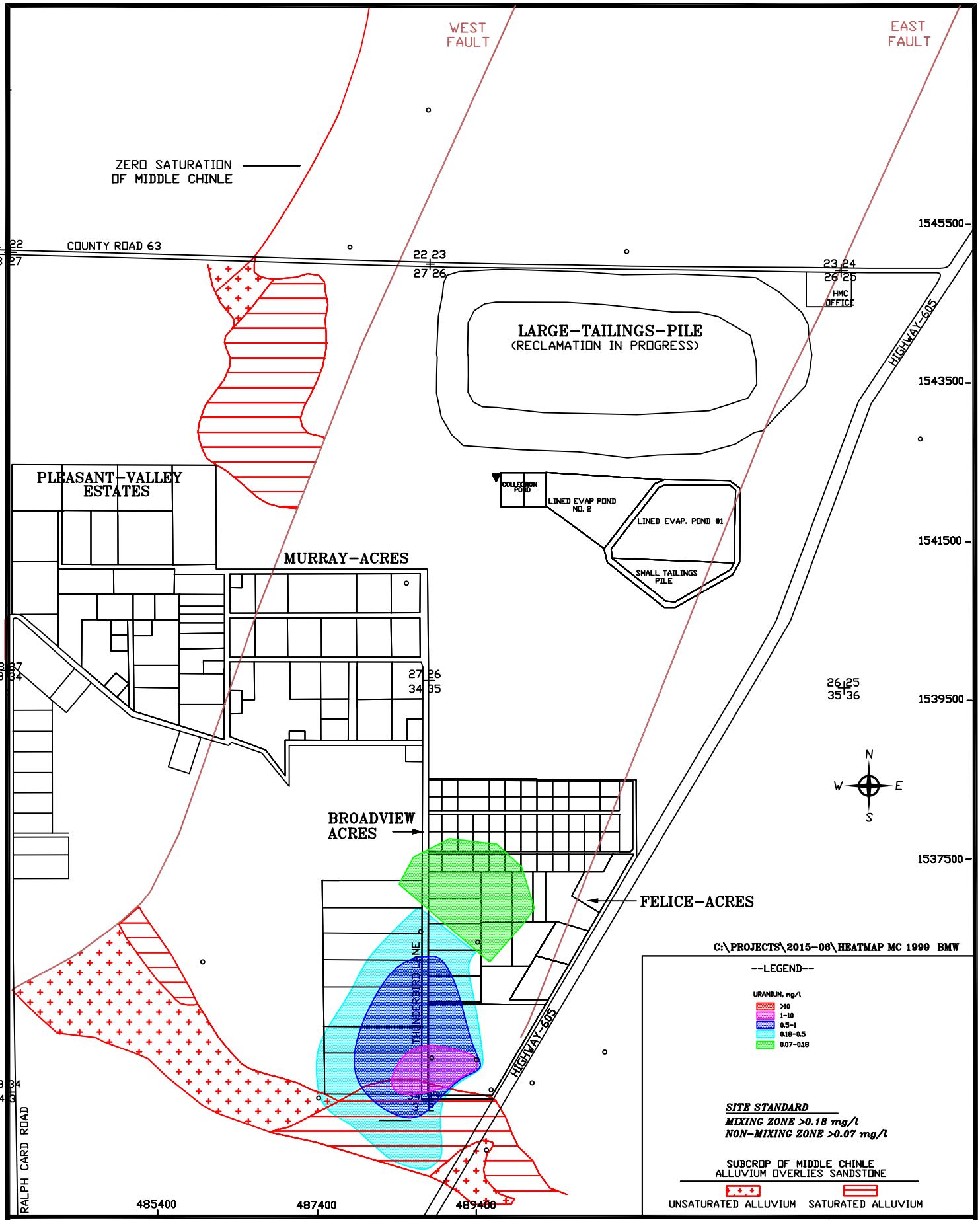
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/11/19

SCALE: 1"= 1600'

PAGE: 1.1-30

FIGURE 1.1-21. MIDDLE CHINLE URANIUM CONCENTRATIONS 1996



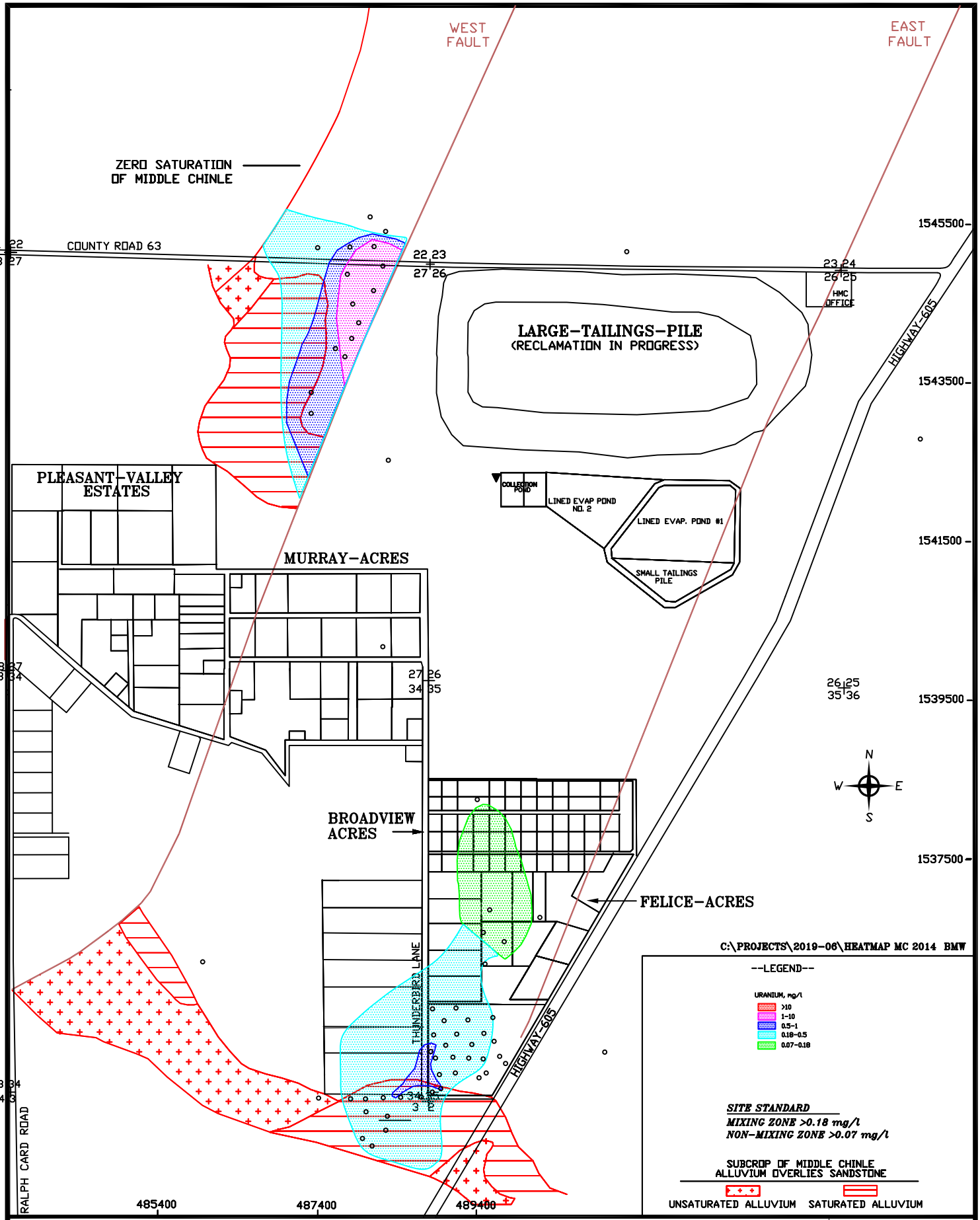
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

SCALE: 1"= 1600'

PAGE: 1.1-31

FIGURE 1.1-22. MIDDLE CHINLE URANIUM CONCENTRATIONS 1999



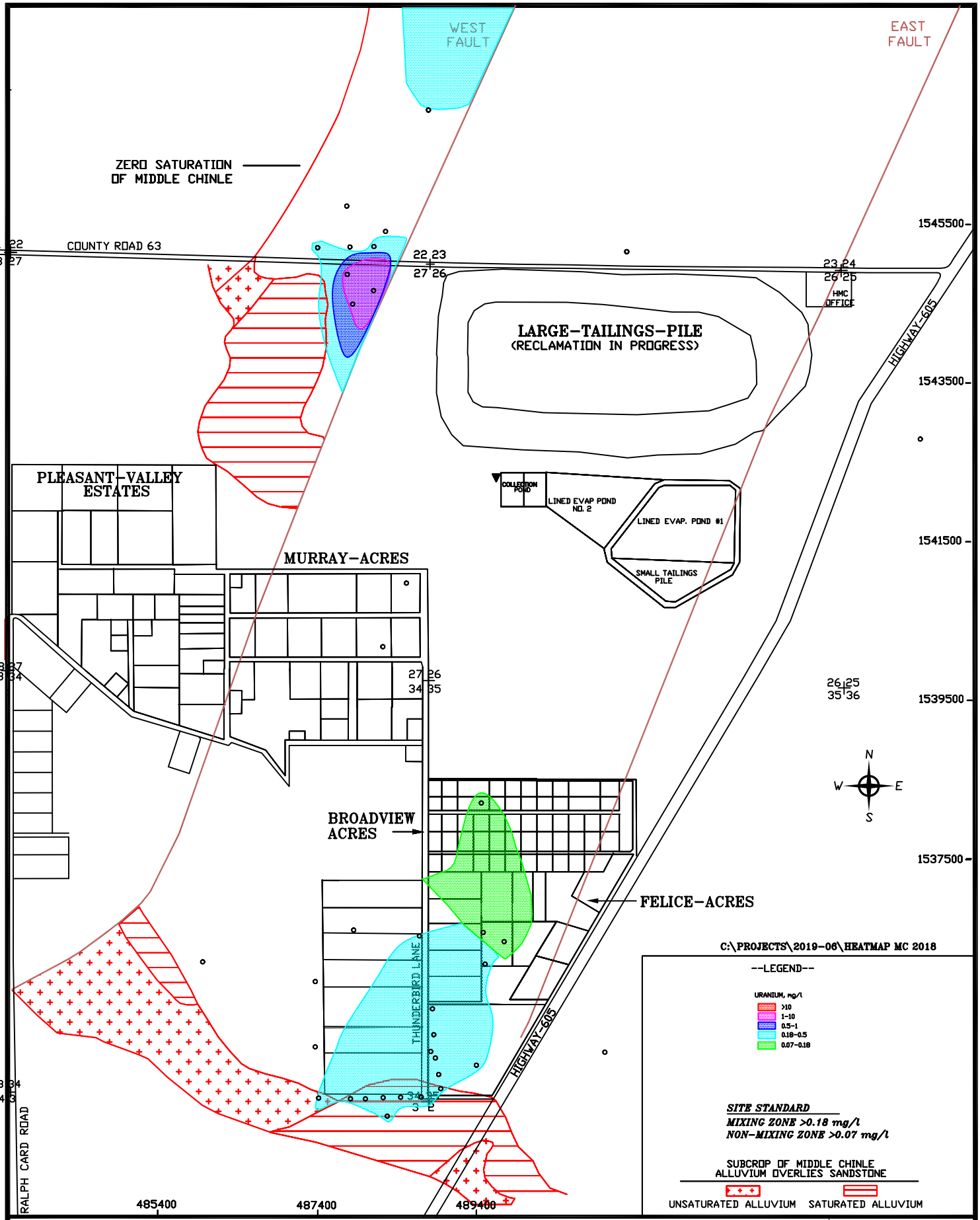
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

SCALE: 1"= 1600'

PAGE: 1.1-32

FIGURE 1.1-23. MIDDLE CHINLE URANIUM CONCENTRATIONS 2014



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

FIGURE 1.1-24. MIDDLE CHINLE URANIUM CONCENTRATIONS 2018

DATE: 3/1/19

SCALE: 1"= 1600'

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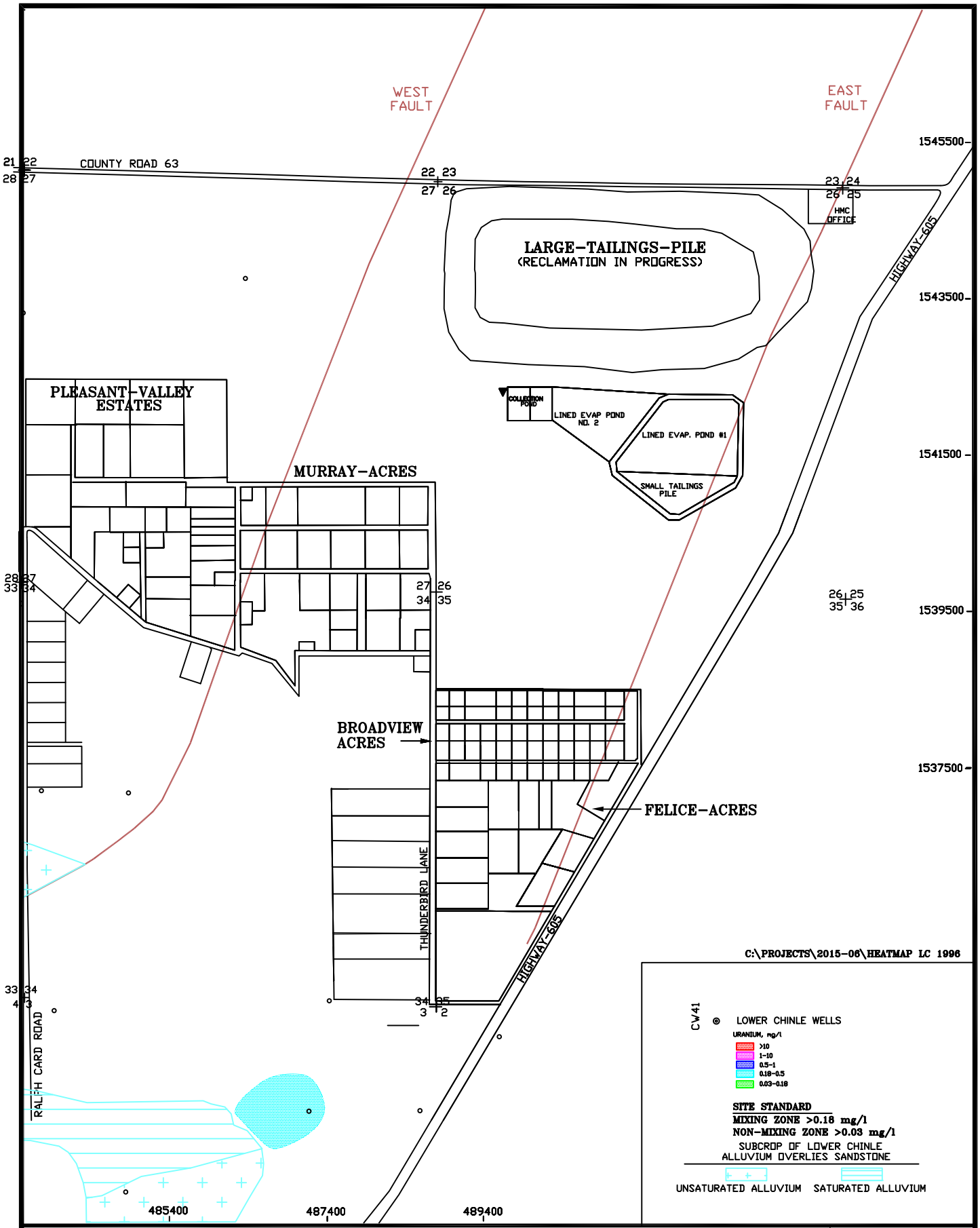

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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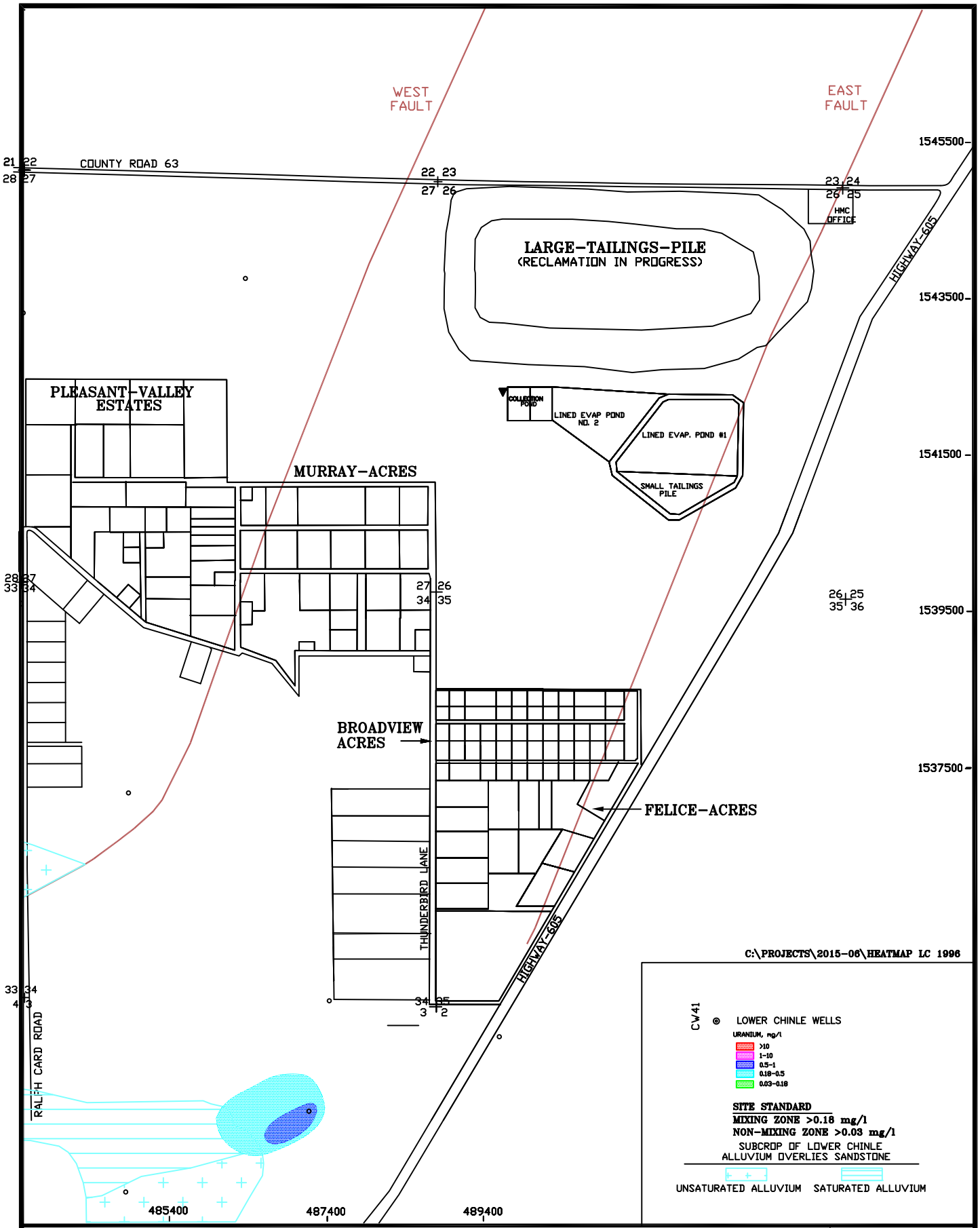
SCALE: 1"= 1600'

PAGE: 1.1-34

FIGURE 1.1-25. LOWER CHINLE URANIUM CONCENTRATIONS 1996



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

FIGURE 1.1-26. LOWER CHINLE URANIUM CONCENTRATIONS 1999

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SCALE: 1"= 1600'

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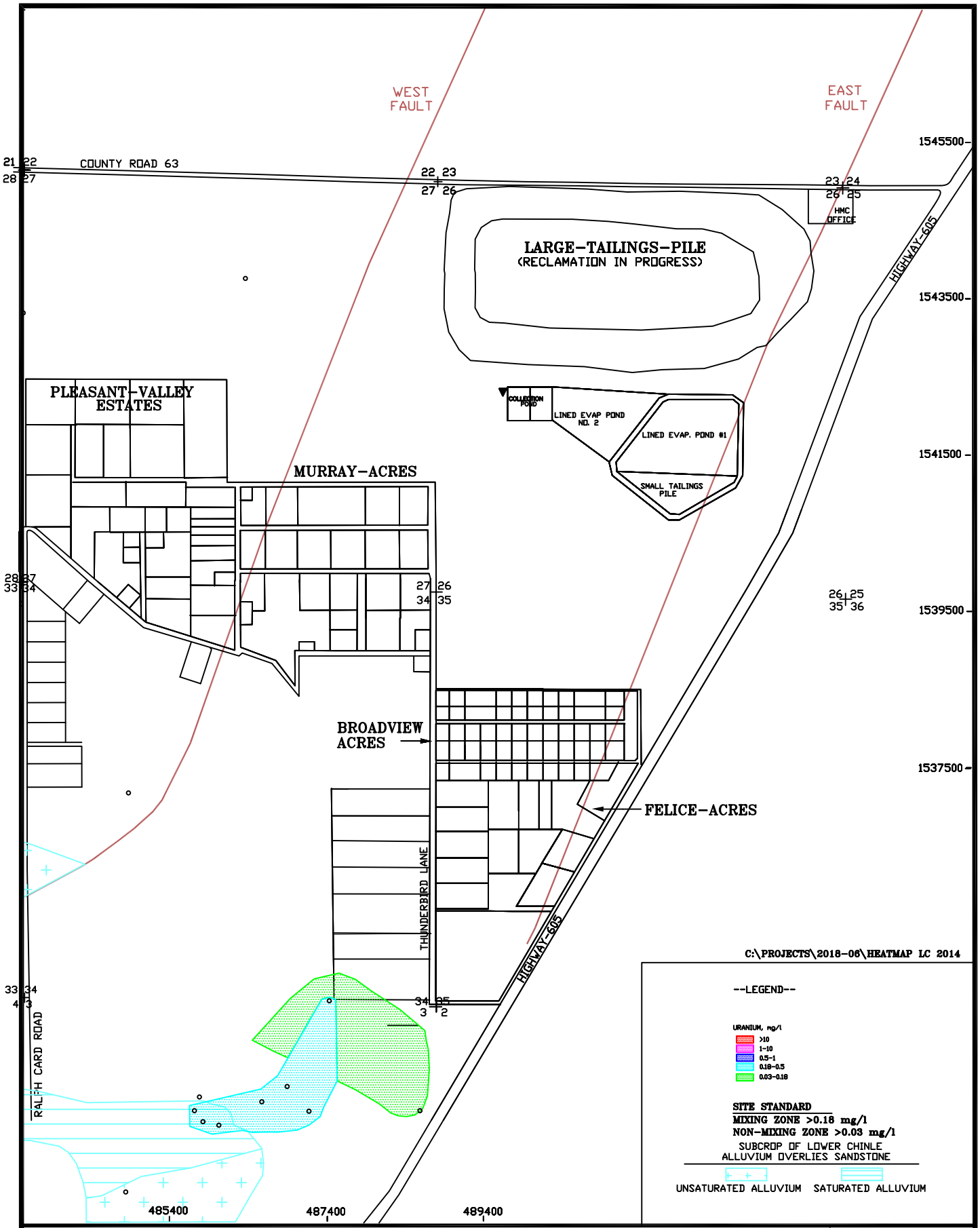

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-27. LOWER CHINLE URANIUM CONCENTRATIONS 2014

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SCALE: 1"= 1600'

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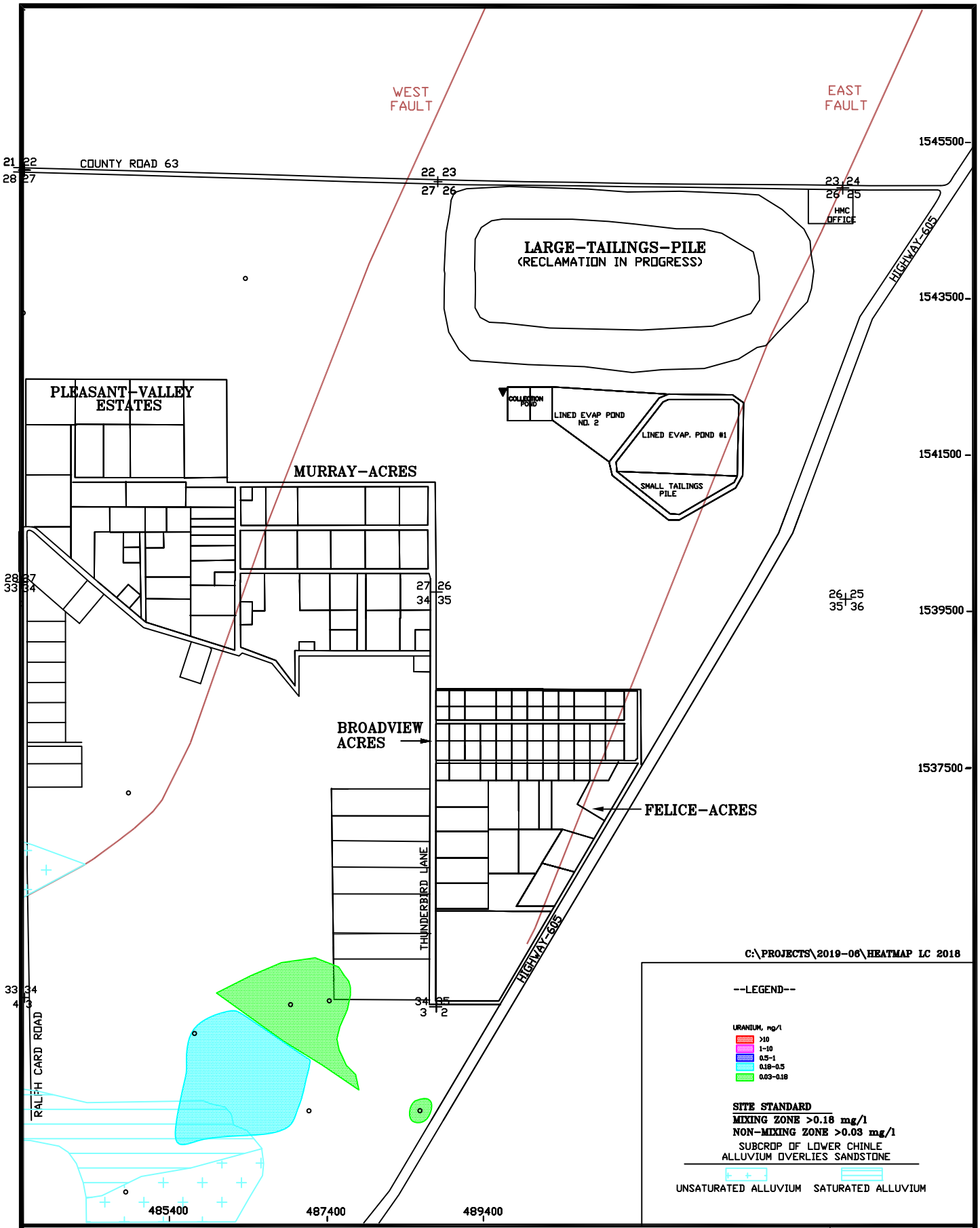

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-28. LOWER CHINLE URANIUM CONCENTRATIONS 2018

DATE: 2/18/18

SCALE: 1"= 1600'

PAGE: 1.1-37

1.2 INTRODUCTION

This report, as required by the New Mexico Environment Department (NMED) discharge plan DP-200 and the Nuclear Regulatory Commission (NRC) License SUA-1471, presents results of the 2018 annual groundwater monitoring program at Homestake's Grants Project. Homestake Mining Company (HMC) conducted uranium milling operations five miles northeast of Milan, New Mexico from 1958 to 1990 (see Figure 1.2-1). Referred to as the Grants Project or Grants site, HMC deposited uranium tailings from the alkaline leach (high pH) Grants mills into two unlined piles (Large and Small Tailings Piles) that overlie San Mateo alluvium. The San Mateo alluvium is simply referred to as the alluvium or alluvial aquifer in this report. In 1977, due to initial concerns about groundwater selenium levels, HMC installed a system of wells and pumps in order to inject fresh water into the alluvium at the property boundary and to withdraw contaminated water from the alluvium near the tailings. The groundwater restoration program has been divided into three areas: North Off-site, South Off-site and On-site. Figure 1.2-2 present limits of these three restoration areas.

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

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

Monitoring data for groundwater west of the project site is included in the 1995 through 2018 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 2018 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, 2016, 2017 and 2018.

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 through 2018 and therefore is not presented in this report as it was prior to the 2016 report. Appendix F presents the soil moisture content plots for the irrigation area instruments and Appendix G gives the meteorological data for the Grants site for 2018.

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

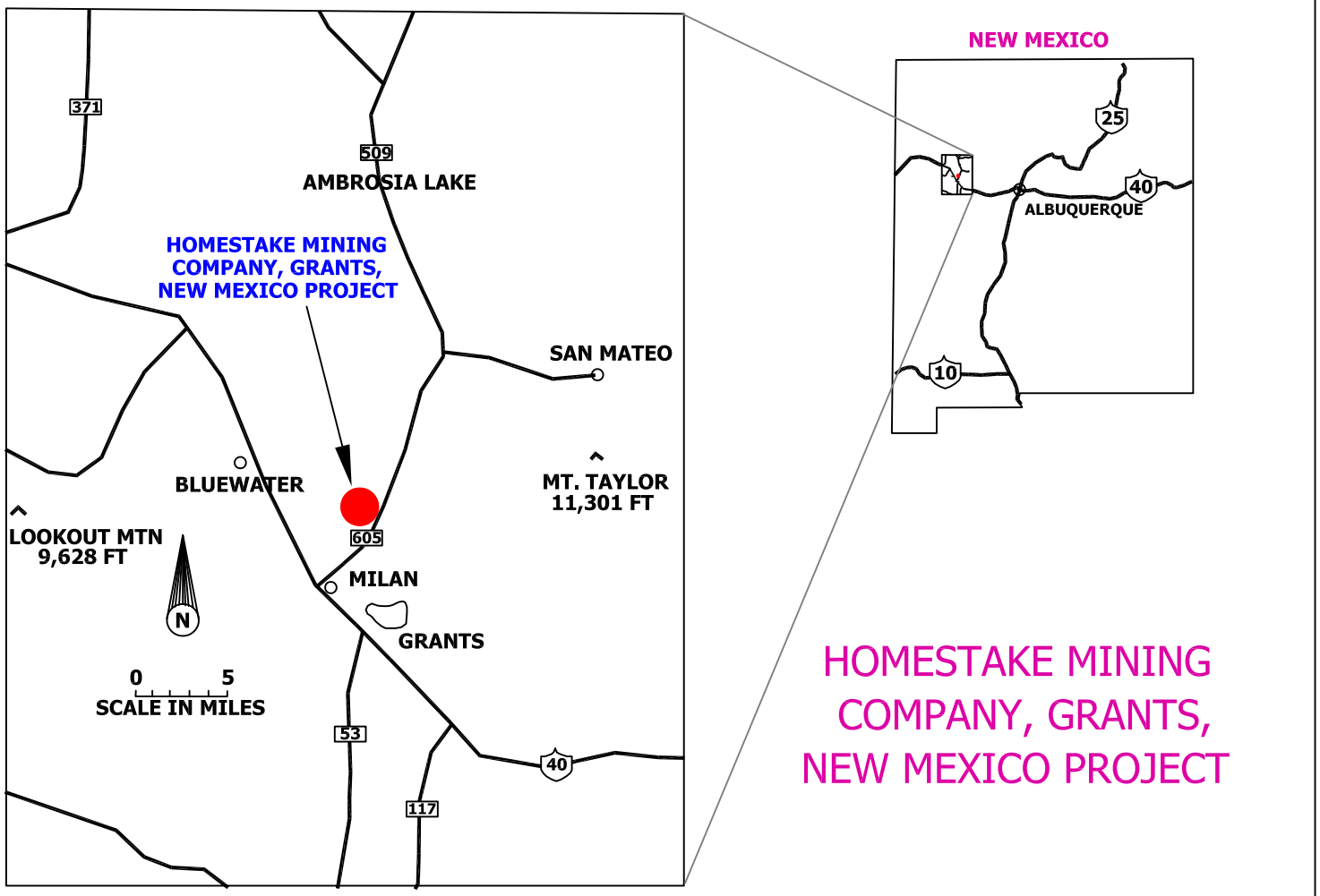

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FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

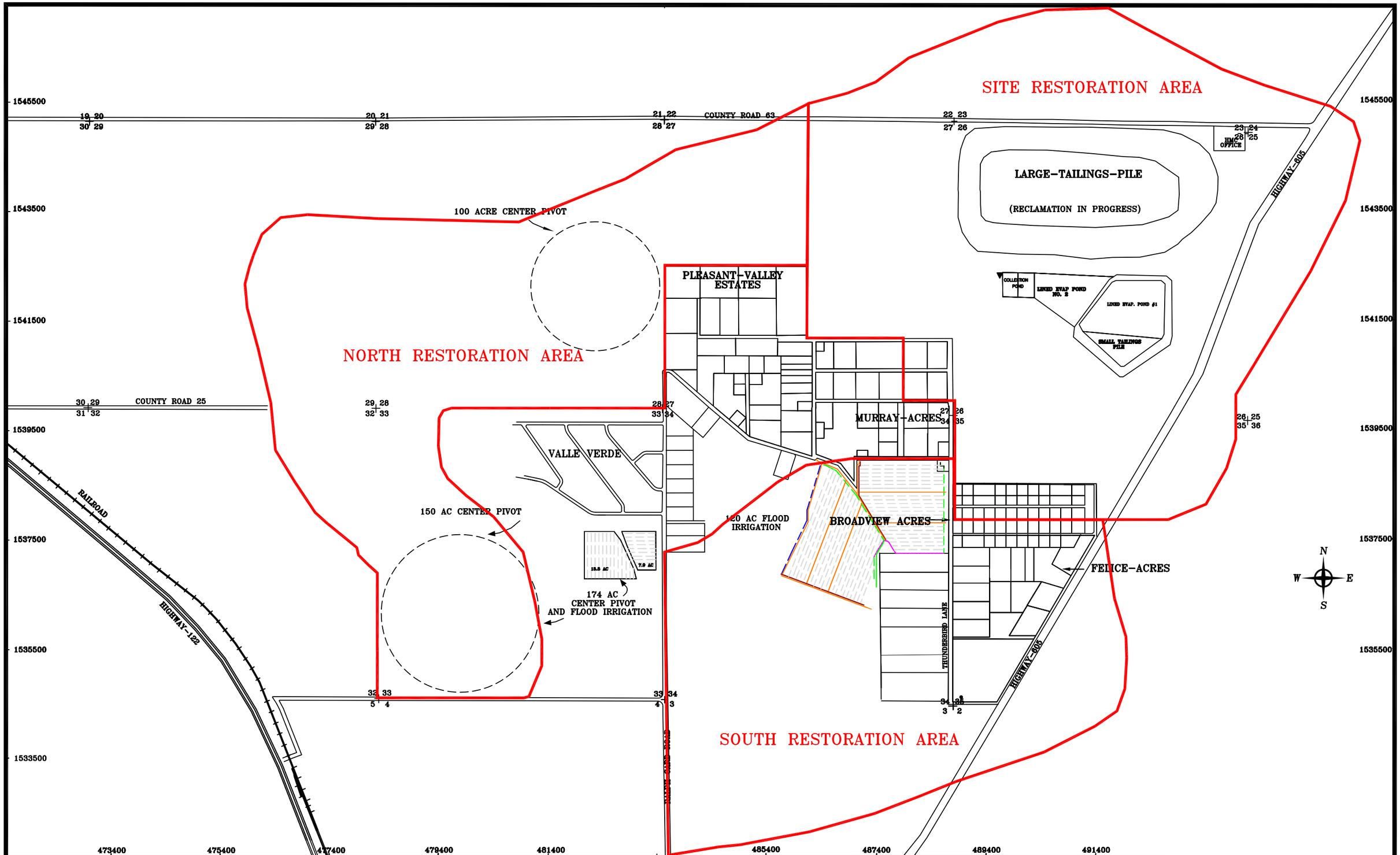

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FIGURE 1.2-2. RESTORATION AREAS DESIGNATION MAP

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2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 7.38 inches at the Grants Project site in 2018 is below normal precipitation for Grants, New Mexico. This below normal condition would be expected to cause water levels at the Grants site to decline. Appendix G gives the meteorological data for 2018 for the Grants site including an annual wind rose plot.

The Grants Project groundwater remediation system consists of collection of contaminated groundwater near the tailings piles, collection of slightly contaminated groundwater Off-site and down-gradient injection of treated and/or fresh water. The treated water starting in late 2015 consisted of a mixture of R.O. product, zeolite treated and fresh water that was mixed in the post treatment tank (PTT). These collection and injection systems continued to operate in 2018, along with the reverse osmosis (R.O.) plant and the zeolite treatment of Off-site water, which are used to treat and manage the majority of collected groundwater. The R.O. plant produces product water that is of much better quality than the natural alluvial water, and it is used as injection water in most areas of the Grants Project restoration program. The zeolite treatment removes slightly elevated uranium concentrations from the Off-site water and is also used for injection water. Figure 2.1-1 on page 2.1-15 shows the location of the present (end of 2018) injection and collection systems along with their starting dates of operation. Water collected from the On-Site is pumped to the R.O. plant while water collected from the Off-site is pumped to the zeolite treatment or discharged into lined collection ponds or one of three lined evaporation ponds (light blue areas).

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

2.1.1 R.O. AND ZEOLITE TREATMENT

Reverse osmosis (R.O.) and zeolite beds are utilized to treat water at the GRP. R.O. is used to treat the On-site collected water while zeolite is used to remove the uranium from the Off-site water.

2.1.1.1 R.O. PLANT

The R.O. plant utilizes a lime/caustic pre-treatment and clarification unit. The R.O. plant was switched in mid-2015 from the use of sand filters to microfiltration. 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 when all of units are operating and 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) (2000-2018)				
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

R.O. Plant Performance (GPM) (cont'd) (2000-2018)				
Year	Input	Output		
	Collection Wells	Tailings Collection	R.O. Injection	Brine
2012	267	0	182	50
2013	236	0	148	47
2014	235	0	165	47
2015	228	0	112	52
2016	584	8	449	141
2017	497	3	407	108
2018	445	0.5	350	85

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.

2.1.1.2 ZEOLITE BEDS

The zeolite beds have been used since 2016 to remove the uranium from the Off-site collection water because uranium is the only site constituent that exceeds the site standards in this collected water. The 300Z has a design capacity of 300 gpm while the 1200Z has four trains with a total design capacity of 1200 gpm. The actual treatment capacity is estimated to be 1050 gpm considering the time required to regenerate the zeolite beds. This allows this water to be used as an input to the PTT and mixed with R.O. product water and fresh water prior to injecting it back into the groundwater. The following tabulation list the inputs to the 1200Z and 300Z treatment systems and the rates of treated and regeneration water for 2016 through 2018 and shows that the average treated water rate has varied from 233 to 267 gpm.

Zeolite Treatment Performance (GPM) (2016-2018)				
Year	Input		Output	
	1200 Zeolite	300 Zeolite	Zeolite Treated Water	Regeneration
2016	152	115	233	34
2017	247	56	253	50
2018	259	37	267	29

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 491 gpm during 2018, slightly less than its 2017 rate.

Up-gradient alluvial aquifer collection north of County Road 63 from the P wells ceased after May of 2013. Collection from the South and North Off-site areas were treated with the zeolite process starting in 2016 and continued in 2018. Upper Chinle aquifer collection continued from wells CE2, CE5, CE6, CE7, CE11 and CE12 in 2018 (red X symbols located south of the collection ponds), and Upper Chinle wells CE15, CE15A and CE19 were added as input to the R.O. plant in 2017. Four of the tailings sumps (N-1, N-3 W-1 and W-2) were input to the R.O. plant for part of 2018.

2.1.2.1 ALLUVIAL AQUIFER COLLECTION

Figure 2.1-1 shows the locations of six lines of alluvial aquifer collection wells (red x symbols). The S and D-lines are adjacent to the LTP while the B-line is between the LTP and the collection and evaporation ponds. 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 2018. The L-line south of the STP continued to operate in 2018 and includes collection wells 521, 522 and 639, which are located on the east side of Highway 605 (see Figure 4.1-1 for location). The L-line collection was switched to R.O. supply at the end of July 2016 and therefore stopping the collection for re-injection. Alluvial water is pumped from these lines of collection wells to the R.O. plant. Figure 2.1-2 on page 2.1-16 graphically presents collection rates for the last

seven years at the Grants Project. The On-Site alluvial collection system operated at an average rate of 279 gpm in 2018.

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, CE12, CE15, CE15A and CE19, which are located on the south and north sides of the collection ponds and just north of Broadview Acres. Collection from Upper Chinle well CE2 started in 1999 and is expected to continue for several years. Collection from wells CE5 and CE6 started in August 2006 while pumping from wells CE11 and CE12 was initiated in October of 2006. Upper Chinle wells CE15, CE15A and CE19 were initially pumped in 2017. These wells were used to supply water to the R.O. for 2018. Additionally, wells B15, B16, B20, B31, B32, T25, T26, T27, T28, T30 and T32 were pumped in 2018. 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 130 gpm. Figure 2.1-2 also shows the collection rate for the Middle Chinle collection well CW62. Well CW62 was added to the On-Site collection system in May 2016 and continued in 2018. The yearly average collection rate from the Middle Chinle aquifer was 34 gpm.

2.1.2.3 OFF-SITE COLLECTION

The former irrigation systems were operated as Off-site collection from 2000 through 2012 (see Figure 2.1-1 for locations of former irrigation areas). Some of the Section 3 and 35 South Off-site and Section 28 North Off-site collection wells were operated in 2016 through 2018 to supply water for the zeolite treatment. Figure 2.1-1 shows the Off-site collection wells that were used in 2018. South collection wells 490, 866, 869, Q2, Q3, Q5, Q11, Q23, Q27, Q30, R1, R2, R3, R4, R5, R10, R11, R18, R20, R22, R68, Y1, Y7, Y13 and Y23 were pumped for the zeolite treatment of this Off-site water. North Off-site collection wells 634, 659, 890, H1, H2A, H7, H7B, H12, H16, H17, H24 and H26 were pumped for the zeolite treatment of this Off-site water during 2018.

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 2018 (cyan) are presented in Figure 2.1-3 which shows that 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 2018 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 more than the volume of water collection On-site for the same period.

The 2013 Irrigation Report, ERG and Hydro-Engineering, LLC 2013, presents the monitoring results through 2013 for the irrigation areas while the groundwater monitoring results for 2018 in the irrigation areas is presented in this report. This data shows no effects on the uranium and selenium concentrations in the underlying groundwater from the HMC irrigation/land treatment program, except for possibly a small increase in uranium in the Section 34 groundwater which has returned to near the pre-irrigation concentration. Appendix F presents the plots of the soil moisture instruments. No soil moisture concentrations were measured in 2018 from the lysimeters because the early October 2017 attempt to collect samples from the lysimeters did not produce any water samples.

2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM GROUNDWATER

Table 2.1-1 (page 2.1-21) presents the quantities of chemical constituents extracted from the On-site groundwater system, the tailings piles and the toe drains. The groundwater collection system has produced an average pumping rate of 274 gpm for the entire period between 1978 and 2018. 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 2018 was computed by multiplying the average concentration of a particular constituent for each source of water (groundwater, toe drains and tails collection) by the volume of water pumped for each during that year. The quantities of constituents collected by aquifer and area are presented in Table 2.1-2 for 2018 with 7,000 and 11,000 pounds of uranium and molybdenum removed from the Grants On-site groundwater in 2018. This table lists the total for the On-site and the sum of the Off-site quantities for 2016 through 2018, showing that the On-site collection of water the last three years has been 1.8 times the Off-site collection.

Figure 2.1-4 presents the volume of water and the pounds of uranium removed by the On-site and Off-site collection systems from 2000 through 2018. 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 injection into the groundwater. The site standards are listed at the top of Table 2.1-3 and all compliant water were less than the site standards in 2018 except for molybdenum concentrations on March 29 and April 25 and uranium on April 25. An evaluation of these exceedances was submitted to the NRC (see ML 18159A037, June 4, 2018 in ADAMS). Section 4 of this report presents the monitoring in the North Off-site area where injection water with low concentrations of molybdenum and uranium could most likely be detected from the SP2 exceedances above. Alluvial wells 634, 890, H1, H7, H7B, H12, H16, and H17 were sampled in June and August of 2018 and show only small variations that would be expected in this area where groundwater is being restored. Therefore, the injection water with the small exceedances could not be detected in the North Off-site area where it was injected.

Field and weekly samples have been used to aid in the tracking of the SP2 compliant water quality. Table 2.1-4 presents the SP2 data including the field and weekly water quality data for 2018. This table shows that weekly samples were collected during May through August to better define the variations in SP2 water quality during this time period.

Table 2.1-5 presents the R.O. feed water and the R.O. product (SP1) water quality for 2018 and all of the SP1 water quality is less than the site standard concentrations except for molybdenum concentrations in March 29 and April 25 and uranium in April 25. The higher molybdenum and uranium results for SP1 values show that the RO treatment caused the exceedance in the SP2 compliant water. The blue highlighted data shows the values that exceed the standard. The SP1

molybdenum concentration for the September RO sample also exceeded the site standard but did not cause the SP2 sample to exceed the site standard.

The zeolite treated water is monitored at three locations prior to being discharged to the PTT to be mixed with the R.O. product and/or fresh water. Table 2.1-6 gives the treated zeolite water quality for these three locations. The treated water is monitored from the 300 zeolite, the 1200 zeolite for Trains 1&2 and the 1200 zeolite for Trains 3&4. The blue highlighted concentration in Table 2.1-6 shows which values exceed the site standards. Molybdenum concentration from the zeolite exceeded the site standards from the 300Z for the September 13 sample with a value of 0.186 mg/l. The site field molybdenum value of 0.19 mg/l supports the laboratory value. Some work was being done on the 300Z at this time which may have resulted in the higher concentration. The molybdenum concentration for the SP2 September integrated sample of the water that was injected into the groundwater was small at 0.012 mg/l showing that the higher value from the 300 zeolite did not result in exceedance in the PTT injection water.

The uranium, selenium, chloride, sulfate and TDS concentrations were below the site standard for all zeolite samples taken during 2018. None of the radium226 plus radium228 and thorium230 activity and vanadium concentrations exceeded the site standards for the zeolite during 2018.

2.1.3 INJECTION

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

In 2003, approximately 2100 feet of four-inch corrugated slotted polyethylene pipe was installed at a depth of approximately 6 feet below land surface west of the Large Tailings Pile to serve as a horizontal infiltration line (see green line on Figure 2.1-1). A filter sock was placed over the pipe thus negating the need for a sandpack. Water is currently being injected into this injection line (S injection line) at three locations. The 2018 injection rate for this horizontal injection line is included in the On-site alluvial injection rates, and was 57 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 through 2018. Injection into EMA1 with fresh water started in December, 2005 and continued with treated and/or fresh water in 2018.

Figure 2.1-5 (page 2.1-17) presents treated and/or fresh-water injection rates for the last seven years. An average of 280 gpm, or a total of 144 million gallons, was injected during 2018 into the On-site alluvial aquifer.

2.1.3.2 R.O. PRODUCT

The R.O. product water mixed with fresh water had supplied water to the EMA2 through EMA5 infiltration lines to the south and west of the collection ponds. Until October, 2005, R.O. product water was discharged into the X line and injected into wells X1 through X10, X28 through

X31 and into wells K2, K6, KA through KE, KM, KN, C4, C13, C5, C3R and PM. Fresh-water injection was commenced after that date for these wells. R.O. product and fresh water was switched to injection lines EMA2 through EMA5 in October 2005. Treated and/or fresh water supplied injection water from the Post Treatment Tank in 2016 through 2018. Figure 2.1-5 shows the rates of R.O. product water produced, which averaged 350 gpm in 2018 for a total of 180 million gallons. Table 2.1-3 presents the water quality results for the Post Treatment Tank injection monitoring point, SP2 (monitors mixture of R.O. product, fresh water and zeolite treated water prior to injection) while Table 2.1-4 presents the weekly and field water quality for SP2. Table 2.1-5 presents the R.O. feed water and R.O. product (SP1) water quality for 2018.

2.1.3.3 ZEOLITE TREATED WATER

The zeolite treated water is mixed with the R.O. product and fresh water in the PTT prior to use of this water for injection into the groundwater to aid the groundwater restoration program. The zeolite treated water rate for 2018 averaged 267 gpm for the year.

2.1.3.4 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 2018 average of 18 gpm. On-site injection

into dual completed Upper Chinle wells C18 through C21 in the subcrop area was started in 2016.

2.1.3.5 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 4 gpm in 2018 (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. Injection into dual completion Middle Chinle wells M30, M31 and M36 was started in 2016.

2.1.3.6 SECTIONS 28 AND 29 INJECTION

The fresh-water injection in Sections 28 and 29 was initiated in March of 2002 to impede movement of groundwater with modest contaminant concentrations in Section 28 until North Off-site water extraction can reduce these low concentrations. Eight infiltration lines were added in 2005 in Sections 27 and 28 to replace the injection wells and adjust the location of this injection. Injection into lines NPV1 through NPV5 (5 of the 8 infiltration lines) was started on July 27, 2005 while injection into NPV6 was started in December 2005. Fresh water injection into alluvial wells 633 and 655 was restarted in June of 2010. Three additional fresh water infiltration lines (NPV9, NPV10, and NPV11) were added in 2011 to better contain the front of the Section 28 uranium plume. San Andres well 951 was replaced by San Andres well 951R as the fresh water supply in April of 2012. PTT water was also used to supply this injection starting in 2016 and well 951R was used only through April of 2018. The injection rate averaged 318 gpm for 2018 with a total injected volume of 164 million gallons. Figure 2.1-5 presents the monthly injection rates into wells and infiltration lines located in Sections 28 and 29.

2.1.3.7 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 2018. San Andres well 943 was ceased to be used as a fresh water supply well on May 18, 2017 except during the 943 pump test in January of 2018. No pumping from well CW28 occurred in 2018 to supply injection water for wells 848 and 868. Injection into three additional infiltration lines (FA2, RCR8, and RCR9) was started in 2011 while injection into infiltration lines FA3 and FA4 were started in 2013.

Figure 2.1-5 presents the combined monthly injection rates for Sections 34, 35 and 3 treated and/or fresh-water injection lines and wells (see brown diamond symbols on Figure 2.1-5). This injection effort is associated with the groundwater restoration of the Sections 3 and 35 areas. Water collected from wells in Sections 3 and 35 was used in the zeolite treatment systems. During 2018, the yearly average injection rate in Sections 34, 35 and 3 was 162 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 as fresh water during the initial stages of restoration, and therefore, re-injection was a beneficial use of this slightly contaminated groundwater. Water collected from the L-line to the south of the Small Tailings Pile and wells 521, 522 and 639 was used for re-injection into the alluvial aquifer through July in 2016. No collection for re-injection occurred in 2018. 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 conditions have typically been presented in this section of the APR but is expanded and presented in Section 3 of this report. The quantities of constituents collected from the tailings is still presented in Table 2.1-1 in this section as it had been done in the past but the discussion of the collected quantities from the toe drains and dewatering wells will be discussed in Section 3.

2.1.6 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 has been 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 77 million gallons (average rate of 149 gpm) of water was delivered to the evaporation pond system in 2018 in addition to the 15 million gallons (average rate of 28 gpm) of natural precipitation added to the pond. The net evaporation from the evaporation system averaged 200 gpm in 2018, compared to 225 gpm in 2017 and the change in storage in the evaporation ponds in 2018 was a decline of 23 gpm.

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.

2.1.7 YEARLY OPERATIONAL RATES

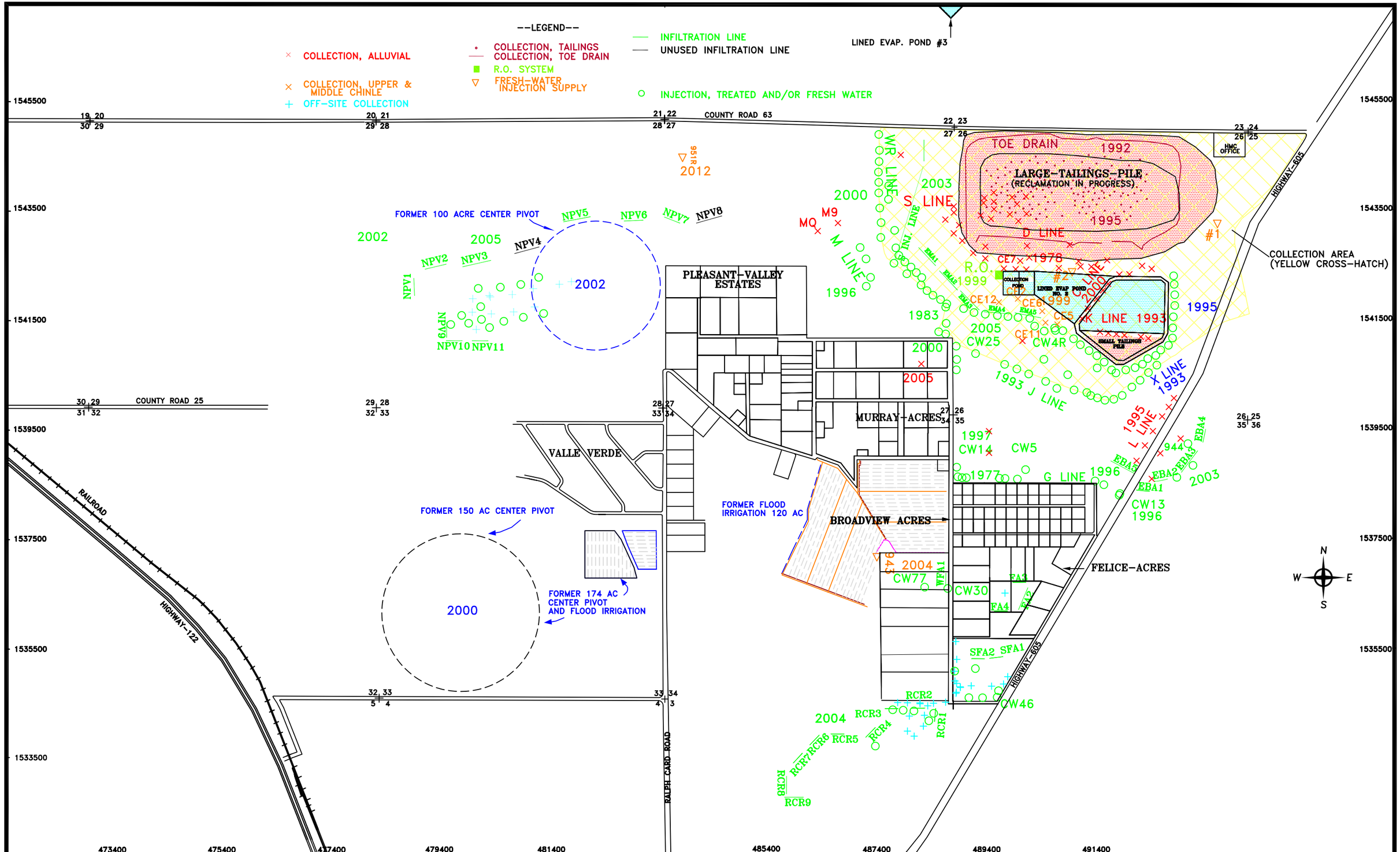
A tabulation of yearly operational rates and volumes is presented below, and a summary of the yearly operational rates is also presented in Figure 2.1-6. This figure gives the average yearly rates for each aquifer on the left side and shows where the quantity of water was pumped in 2018. A rate of 0.5 gpm in 2018 was pumped to the RO plant from the LTP while 8.3 gpm was discharged to the evaporation ponds. A total rate of 8.8 gpm for the toe drain and zero gpm for dewatering wells from the LTP supplied this water under the source control. Estimated seepage and change in saturated storage are also given for the LTP. The RO plant and zeolite inputs and discharges and the input and removal rates from the Collection Ponds rates are presented in Figure 2.1-6.

Major Collection and Injection Flows and Volumes During 2018

Aquifer System	Injection		Collection		Seepage from LTP	
	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Alluvial	760	391,800,000	519	267,550,000	20	10,310,000
Upper Chinle	39	20,110,000	130	67,020,000	--	--
Middle Chinle	50	25,780,000	90	46,550,000	--	--
Lower Chinle	--	--	0	0	--	--
San Andres	--	--	296	152,590,000	--	--
Tailings	--	--	8.8	4,540,000	--	--

Major Treatment and Disposal Flows and Volumes During 2018

Treatment/Disposal System	Feed/Input Rate		Treated Water Discharge		Evap/Disposal Discharge	
	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Reverse Osmosis	491	253,120,000	350	180,430,000	85	43,820,000
Zeolite	296	152,590,000	267	137,640,000	29	14,950,000
Evaporation Ponds	149	76,967,000	--	--	--	--
Collection Ponds	62	31,960,000	--	--	33	17,010,000



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DATE: 2/11/19

FIGURE 2.1-1. LOCATION OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES, 2018

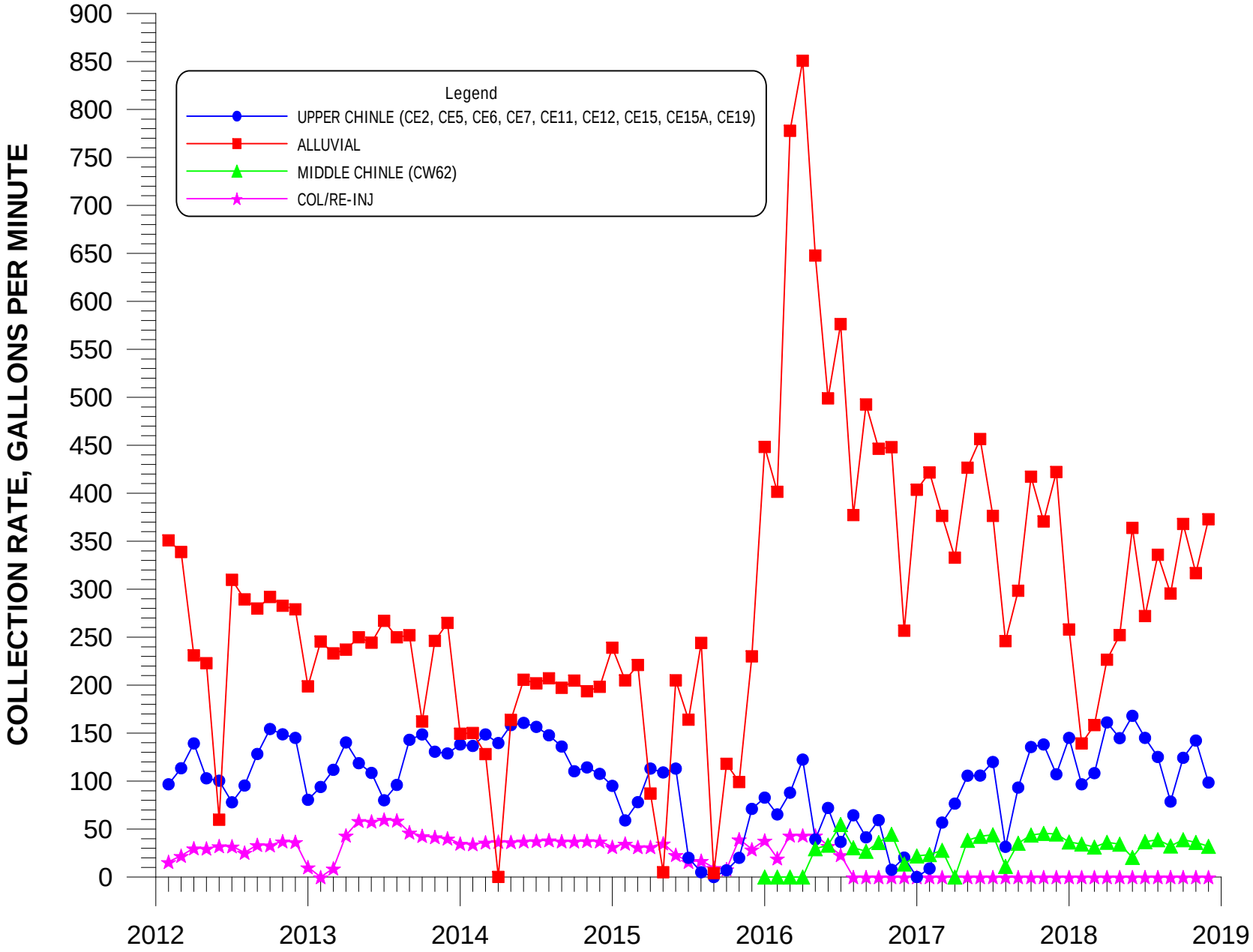


FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

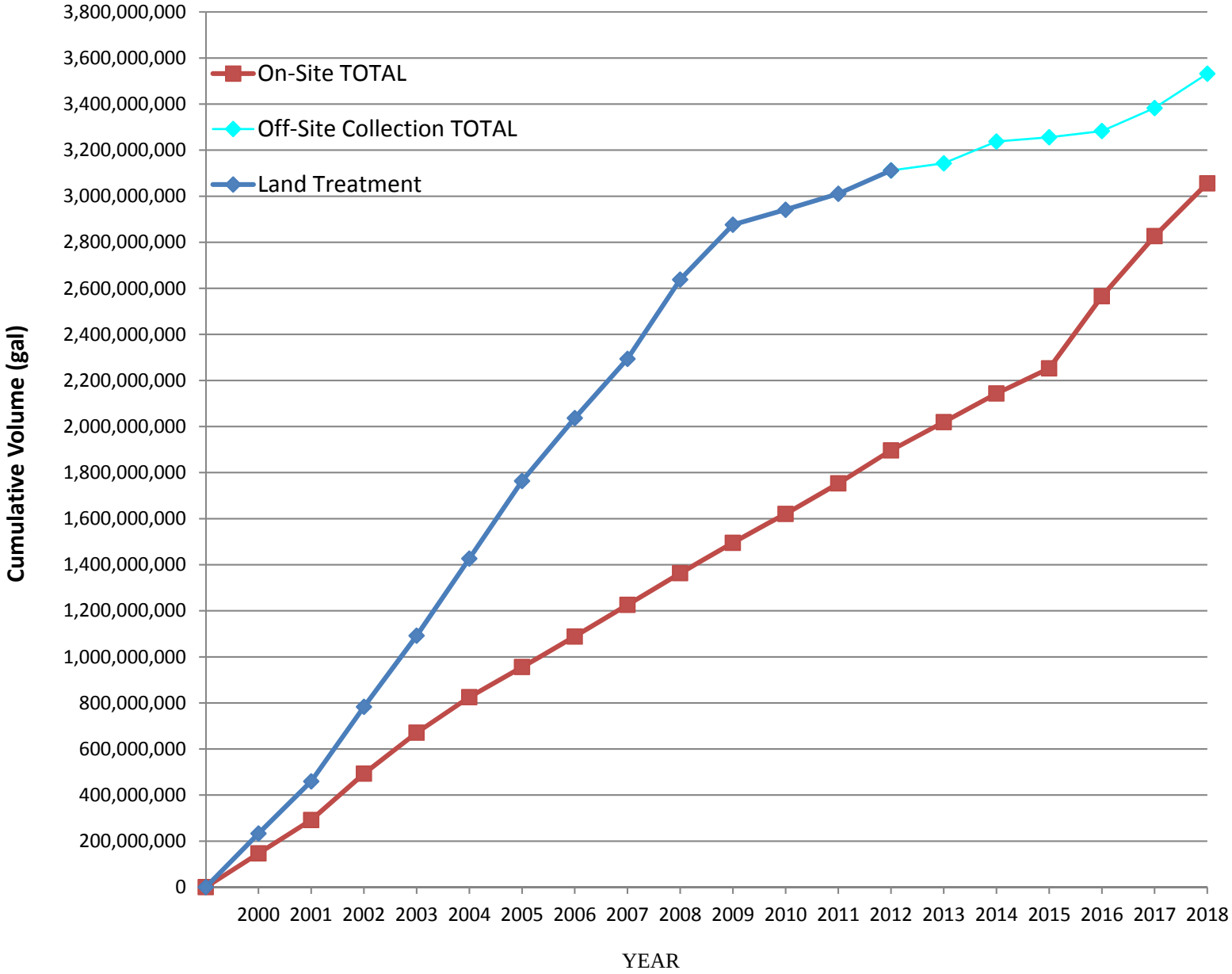


Figure 2.1-3. Cumulative Volume of Land Treatment, On-Site and Off-Site Collection from 2000 to Present

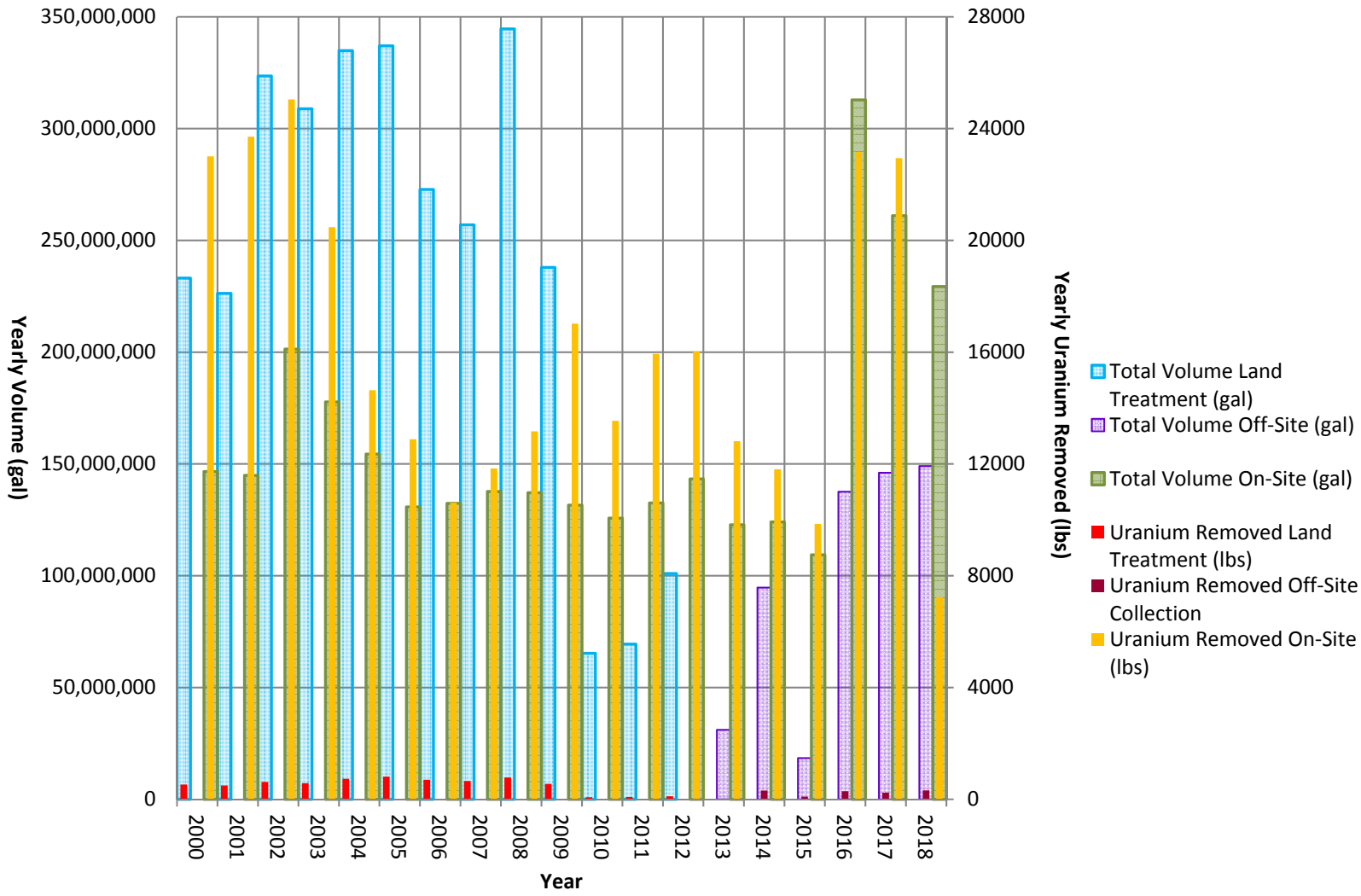


Figure 2.1-4. Yearly Quantity of Groundwater and Uranium Removed

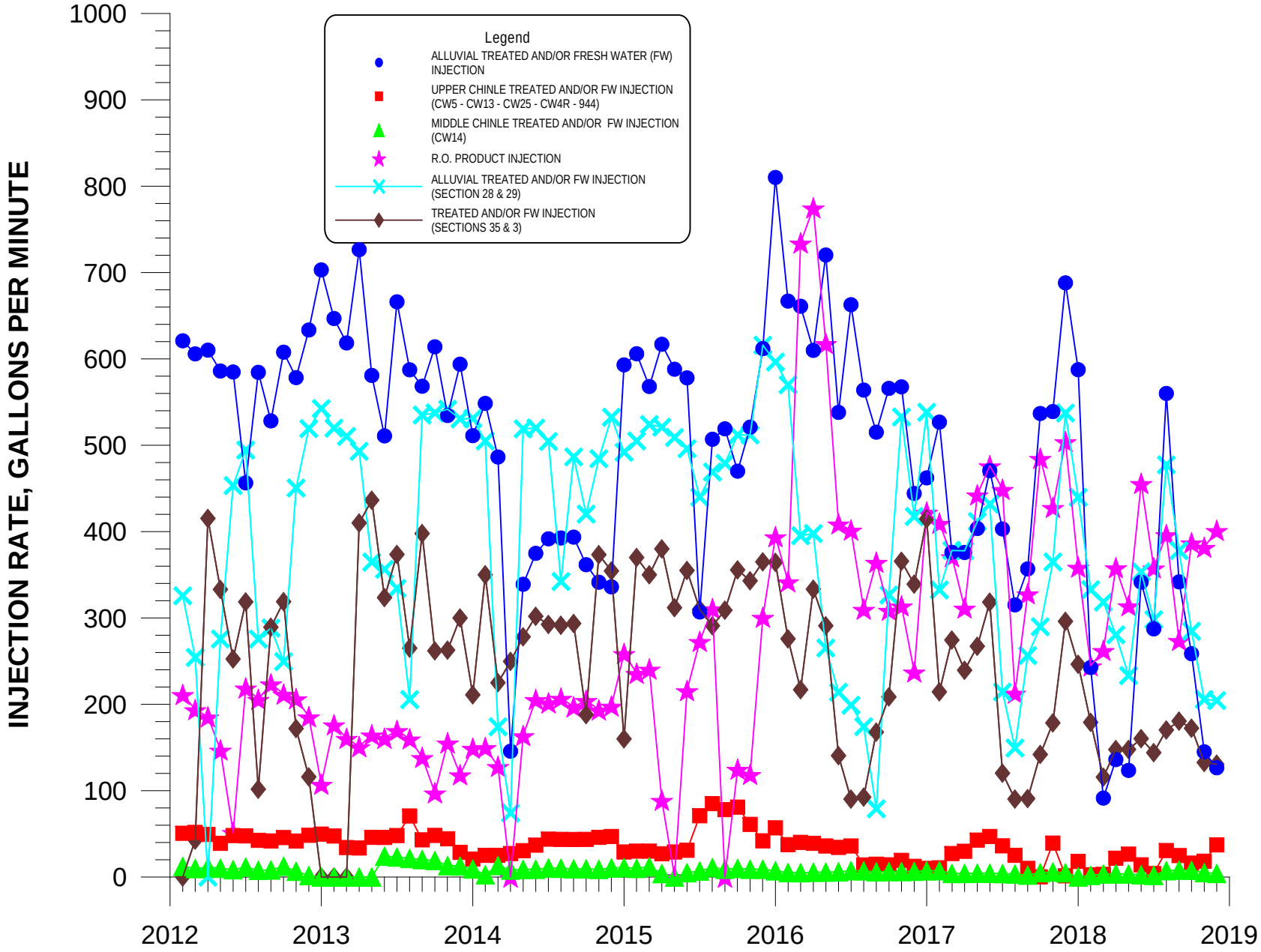
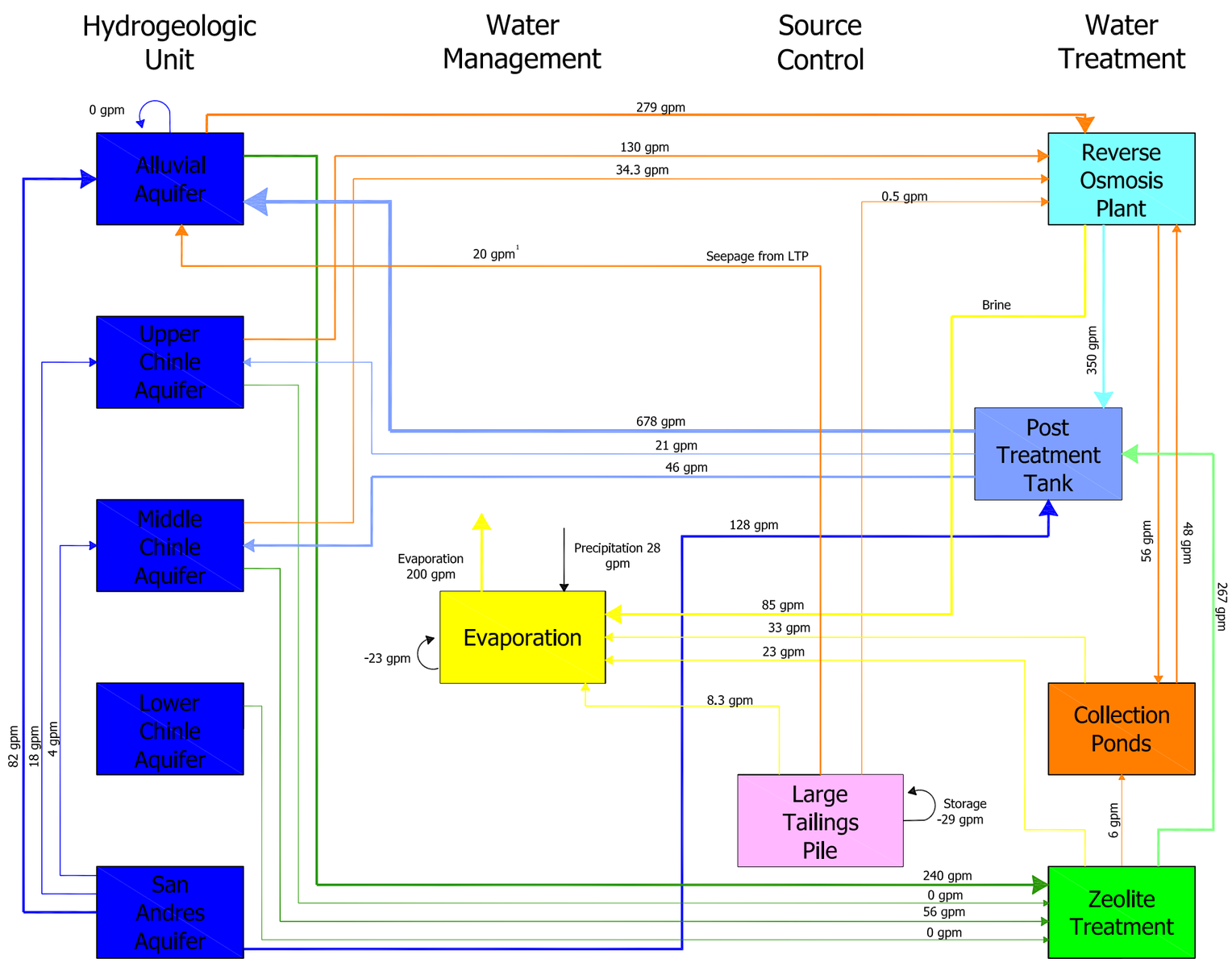


FIGURE 2.1-5. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.



LEGEND:

Flow Range (gpm= gallons per minute)

- 0-10 gpm
- 11-50 gpm
- 51-100 gpm
- 101-500 gpm
- >500 gpm

Restoration Strategy

- Zeolite Feed
- Zeolite Treated Water
- Evaporation
- Reverse Osmosis Treatment
- Fresh Water
- Post Treatment Tank

Note [1]: LTP seepage based on the water balance.

C:\PROJECTS\2019-06
FIG 2-1-13.DWG
DATE: 2/11/19

FIGURE 2.1-6. 2018 MAJOR OPERATIONAL FLOWS

TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED ON-SITE.

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. AMT. (MG/L)	SULFATE (SO4) CONC. AMT. (LB)	URANIUM (U) CONC. AMT. (MG/L)	URANIUM (U) CONC. AMT. (LB)	MOLYBDENUM (MO) CONC. AMT. (MG/L)	MOLYBDENUM (MO) CONC. AMT. (LB)	SELENIUM (SE) CONC. AMT. (MG/L)	SELENIUM (SE) CONC. 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

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

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. AMT. (MG/L)	(LB)	URANIUM (U) CONC. AMT. (MG/L)	(LB)	MOLYBDENUM (MO) CONC. AMT. (MG/L)	(LB)	SELENIUM (SE) CONC. AMT. (MG/L)	(LB)
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	2580	6758352	8.2	21397	14.5	37836	0.45	1174
2016	TOE	7553090	4756	299809	17.2	1085	36.7	2310	0.15	9
2016	TAILS	2678400	2891	64625	8.2	183	28.0	626	0.11	2
2017	G.W.	261047358	2104	4583987	10.5	22876	17.1	37256	0.66	1438
2017	TOE	5455170	3305	150473	13.9	633	26.9	1225	0.21	10
2017	TAILS	674300	4918	27677	14.7	83	32.5	183	0.70	4
2018	G.W.	229336854	1460	2794506	3.8	7235	5.5	10566	0.28	542
2018	TOE	4530130	4708	178002	17.5	662	36.6	1384	0.27	10
2018	TAILS	0	4918	0	14.7	0	32.5	0	0.70	0
SUM G.W.		5,902,723,003		182,302,048		1,053,102		1,283,626		66,850
SUM TOE		411,617,731		29,576,281		124,996		265,101		4,871
SUM TAILS		493,302,302		20,155,515		76,460		211,831		725
COMBINED SUM		6,807,643,036		232,033,843		1,254,558		1,760,558		72,446

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, 2016-2018

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. AMT. (MG/L)	(LB)	URANIUM (U) CONC. AMT. (MG/L)	(LB)	MOLYBDENUM (MO) CONC. AMT. (MG/L)	(LB)	SELENIUM (SE) CONC. AMT. (MG/L)	(LB)
				ON-SITE						
2016	ALLUVIAL	252,263,429	2988	6,290,907	10.71	22,549	17.62	37,097	0.63	1,326
2016	UPPER CHINLE	31,671,500	789	208,557	1.64	434	1.31	346	0.07	19
2016	MIDDLE CHINLE	11,874,100	1500	148,652	1.77	175	1.62	161	0.30	30
2017	ALLUVIAL	191,759,248	2508	4,014,348	13.93	22,296	22.86	36,585	0.85	1,361
2017	UPPER CHINLE	52,140,210	794	345,424	1.11	481	1.05	455	0.07	29
2017	MIDDLE CHINLE	17,147,900	1567	224,216	1.15	164	0.84	120	0.27	39
2018	ALLUVIAL	144,785,813	1772	2,141,062	5.46	6,593	8.28	10,005	0.38	465
2018	UPPER CHINLE	66,858,941	729	406,855	0.81	453	0.80	445	0.06	31
2018	MIDDLE CHINLE	17,692,100	1670	246,589	1.28	189	0.78	115	0.31	46
				OFF-SITE						
2016	SOUTH ALLUVIAL	51,861,620	694	300,389	0.34	149	0.03	13	0.04	16
2016	SOUTH UPPER CHINLE	1,665,970	683	9,497	0.08	1	0.03	0	0.02	0
2016	SOUTH MIDDLE CHINLE	12,307,920	670	68,824	0.32	32	0.03	3	0.04	4
2016	SOUTH LOWER CHINLE	423,300	604	2,134	0.16	1	0.03	0	0.03	0
2016	NORTH ALLUVIAL	71,335,211	702	417,945	0.18	107	0.03	18	0.04	24
2017	SOUTH ALLUVIAL	60,739,450	690	349,594	0.31	155	0.03	14	0.03	16
2017	SOUTH UPPER CHINLE	0		0		0		0		0
2017	SOUTH MIDDLE CHINLE	15,175,960	699	88,524	0.30	38	0.03	4	0.04	5
2017	SOUTH LOWER CHINLE	0		0		0		0		0
2017	NORTH ALLUVIAL	70,145,000	724	423,829	0.14	84	0.03	18	0.03	20
2018	SOUTH ALLUVIAL	69,828,478	800	466,340	0.32	189	0.04	23	0.04	23
2018	SOUTH UPPER CHINLE	0	708	0	0.07	0	0.03	0	0.02	0
2018	SOUTH MIDDLE CHINLE	28,432,465	776	184,217	0.30	71	0.01	3	0.05	12
2018	SOUTH LOWER CHINLE	0		0		0		0		0
2018	NORTH ALLUVIAL	50,803,376	796	337,655	0.13	55	0.02	9	0.07	29
SUM ON-SITE		786,193,241		14,026,609		53,334		85,329		3,345
SUM OFF-SITE		432,718,750		2,648,946		882		105		149
COMBINED SUM		1,218,911,991		16,675,556		54,216		85,434		3,494

Table 2.1-3 Compliant (SP2) Water Quality Data

Sample Point Name	Date	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Ue (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard		**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
SP2	1/30/18	113	607	1170	0.0321	0.000518	0.01	0.019
	2/26/18	194	698	1690	0.0236	0.00382	0.005	0.009
	3/29/18	123	441	1060	0.037	0.00598	**0.236**	0.019
	3/29/18				0.037		**0.271**	
	4/25/2018	119	456	1040	**0.186**	0.03	**0.28**	0.186
	5/4/2018	187	628	1570	0.0164	0.00265	<0.03	0.007
	5/10/2018	194	665	1630	0.013	0.0021	0.005	0.007
	5/17/2018	127	440	1070	0.0153	0.00246	0.009	0.006
	5/24/2018	187	571	1490	0.012	0.00188	0.005	0.006
	5/31/2018	126	542	1100	0.035	0.00568	0.006	0.014
	6/7/2018	122	534	1120	0.009	0.00147	0.008	0.015
	6/14/2018	121	515	1140	0.008	0.00121	0.01	0.013
	6/21/2018	118	515	1130	0.014	0.00218	0.012	0.014
	6/28/2018	160	513	1360	0.0104	0.00168	0.003	0.005
	7/5/2018	186	608	1640	0.0115	0.00186	0.003	0.005
	7/12/2018	131	619	1270	0.019	0.00313	0.071	0.019
	7/19/2018	119	525	1160	0.014	0.00229	0.022	0.016
	7/26/2018	150	690	1460	0.012	0.00193	0.007	0.020
	8/2/2018	138	719	1430	0.023	0.00378	0.007	0.025
	8/9/2019	142	712	1440	0.043	0.00694	0.045	0.025
	8/30/2018	124	692	1280	0.024	0.0038	0.027	0.025
	9/28/2018	133	726	1410	0.018	0.00294	0.012	0.023
	10/23/2018	115	539	1160	0.008		0.0071	0.018
	11/1/2018	84	273	741	0.005	0.00083	0.003	0.003
	11/8/2018	83	269	269	0.005	0.00085	0.003	0.003
	11/15/2018	76	248	666	0.005	0.00079	0.002	0.003
	11/20/2018	139	466	1180	0.010	0.00153	0.003	0.005
	11/29/2018	85	274	735	0.005	0.00073	0.003	0.003
	12/27/2018	80	255	706	0.005	0.00081	0.002	0.003

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 (pCi/l)	Ra226e (pCi/l)	Ra228 (pCi/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.3**		**0.02**
SP2	1/30/18	1.5	<0.2	0.2	<2.3	1	<2.5	<0.1	0.09	<0.01
	2/26/18	1.7	0.4	0.2	<1.9	1.1	<2.3	<0.2	0.09	<0.01
	3/29/18	1.4	<0.2	0.1	<1.9	0.9	<2.1	<0.1	0.07	<0.01
	3/29/18									
	4/25/2018	1.3	0.2	0.2	<1.8	1.1	<2.0	<0.1	0.1	<0.01
	5/4/2018									
	5/10/2018	1.8	0.3	0.2	<2.4	1.4	<2.7	<0.1	0.09	<0.01
	5/17/2018	1.5	0.4	0.2	2.2	1.2	2.6	<0.1	0.08	<0.01
	5/24/2018	1.6	0.3	0.2	<1.9	0.9	<2.2	<0.1	0.05	<0.01
	5/31/2018	1.9	0.3	0.2	<1.7	0.8	<2.0	<0.2	0.08	<0.01
	6/7/2018	1.7	<0.2	0.1	3.6	1.2	<3.8	<0.2	0.1	<0.01
	6/14/2018	1.7	0.2	0.1	<2.0	1.2	<2.2	<0.2	0.06	<0.01
	6/21/2018	1.6	0.4	0.1	<2.3	1.2	<2.7	<0.1	0.06	<0.01
	6/28/2018	1.5	0.5	0.2	<1.9	1.1	<2.4	0.009	0.07	<0.01
	7/5/2018	1.8	0.3	0.1	<1.5	0.9	<1.8	<0.1	0.09	<0.01
	7/12/2018	1.9	0.2	0.2	1.9	1.1	2.1	<0.1	0.09	<0.01
	7/19/2018	1.8	<0.2	0.2	<2.1	1.3	<2.3	<0.2	0.100	<0.001
	7/26/2018	1.9	<0.1	0.1	<2.7	1.6	<2.8	<0.2	0.100	<0.001
	8/2/2018	1.8	<0.2	0.1	<2	0.09	<2.2	<0.2	0.090	<0.001
	8/9/2019	2	<0.2	0.1	<2.1	1	<2.3	<0.1	0.100	<0.001
	8/30/2018	1.9	<0.2	0.1	<2.4	1.4	<2.6	<0.1	0.060	<0.001
	9/28/2018	1.7	<0.2	0.1	<2.2	1.3	<2.4	<0.1	0.060	<0.003
	10/23/2018									
	11/1/2018									
	11/8/2018									
	11/15/2018									
	11/20/2018									
	11/29/2018	0.9	<0.2	0.1	3.9	1	<4.1	<0.1	0.070	<0.0005
	12/27/2018									

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

Table 2.1-4 Weekly and Field (SP2) Water Quality Data

		Field Parameters				Lab Data						
Sample Point Name	Date	pH(f) (units)	Temp. (°C)	Cond. (µmhos/cm)	KPA U (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	U (mg/l)	Ue (mg/l)	Mo (mg/l)	Se (mg/l)
Site Standard						**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
SP2	1/30/18	7.60	16.1	1643	0.035	113	607	1170	0.0321	0.000518	0.01	0.019
	2/26/18	7.84	18.6	2249	0.00382	194	698	1690	0.0236	0.000382	0.005	0.009
	3/29/18	7.52	18.2	1721	0.043	123	441	1060	0.037	0.00598	**0.236**	0.019
	3/29/18								0.037		**0.271**	
	4/25/2018	7.18	14.2	1451	0.175	119	456	1040	**0.186**	0.03	**0.28**	0.186
	5/4/2018	7.31	18.4		0.017	187	628	1570	0.0164	0.00265	<0.03	0.007
	5/10/2018	7.13	12.3	2236	0.014	194	665	1630	0.013	0.0021	0.005	0.007
	5/17/2018	6.98	18.1	1607	0.012	127	440	1070	0.015	0.00246	0.009	0.006
	5/24/2018	7.35	17.9	2115	0.009	187	571	1490	0.012	0.00188	0.005	0.006
	5/31/2018	6.48	22.2	1832	0.031	126	542	1100	0.035	0.00568	0.006	0.014
	6/7/2018	6.81	18.4	1607	0.023	122	534	1120	0.009	0.00147	0.008	0.015
	6/14/2018	6.68	20.7	1615	0.01	121	515	1140	0.008	0.00121	0.01	0.013
	6/21/2018	7.49	19.7	1586	0.017	118	515	1130	0.014	0.00218	0.012	0.014
	6/28/2018	7.17	21.3	1876	0.012	160	513	1360	0.0104	0.00168	0.003	0.005
	7/5/2018	7.22	21.6	2243	0.01	186	608	1640	0.0115	0.00186	0.003	0.005
	7/12/2018	6.8	20.9	1781	0.025	131	619	1270	0.019	0.00313	0.071	0.019
	7/19/2018	6.95	2.8	1638	0.014	119	525	1160	0.014	0.00229	0.022	0.016
	7/26/2018	6.79	21.5	2025	0.009	150	690	1460	0.012	0.00193	0.007	0.020
	8/2/2018					138	719	1430	0.023	0.00378	0.007	0.025
	8/9/2018	7	20.2	1972	0.044	142	712	1440	0.043	0.00694	0.045	0.025
	8/30/2018	7.17	21	1797	0.024	124	692	1280	0.024	0.0038	0.027	0.025
	9/28/2018	7.44	19.9	1931	0.022	133	726	1410	0.018	0.00294	0.012	0.023
	10/23/2018	7.62	17.7	1615	0.022	115	539	1160	0.008		0.0071	0.018
	11/1/2018	7.68	18.6	1091	0.006	84	273	741	0.005	0.00083	0.003	0.003
	11/8/2018	7.83	15.5	1070	0.01	83	269	269	0.005	0.00085	0.003	0.003
	11/15/2018	7.98	16	1014	0.006	76	248	666	0.005	0.00079	0.002	0.003
	11/20/2018	7.11	13.1	1656	0.008	139	466	1180	0.010	0.00153	0.003	0.005
	11/29/2018	7.5	17.2	1101	0.006	85	274	735	0.005	0.00073	0.003	0.003
	12/27/2018	8.19	13.8	1061	0.005	80	255	706	0.005	0.00081	0.002	0.003

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

Table 2.1-4 Weekly and Field (SP2) Water Quality Data (cont.)

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra226e (pCi/l)	Ra228 (mg/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.3**		**0.02**
SP2	1/30/18	1.5	<0.2	0.2	<2.3	1	<2.5	<0.1	0.09	<0.01
	2/26/18	1.7	0.4	0.2	<1.9	1.1	<2.3	<0.2	0.09	<0.01
	3/29/18	1.4	<0.2	0.1	<1.9	0.9	<2.1	<0.1	0.07	<0.01
	3/29/18									
	4/25/2018	1.3	0.2	0.2	<1.8	1.1	<2.0	<0.1	0.1	<0.01
	5/4/2018									
	5/10/2018	1.8	0.3	0.2	<2.4	1.4	<2.7	<0.1	0.090	<0.01
	5/17/2018	1.5	0.4	0.2	2.2	1.2	2.6	<0.1	0.080	<0.01
	5/24/2018	1.6	0.3	0.2	<1.9	0.9	<2.2	<0.1	0.050	<0.01
	5/31/2018	1.9	0.3	0.2	<1.7	0.8	<2.0	<0.2	0.080	<0.01
	6/7/2018	1.7	<0.2	0.1	3.6	1.2	<3.8	<0.2	0.100	<0.01
	6/14/2018	1.7	0.2	0.1	<2.0	1.2	<2.2	<0.2	0.060	<0.01
	6/21/2018	1.6	0.4	0.1	<2.3	1.2	<2.7	<0.1	0.060	<0.01
	6/28/2018	1.5	0.5	0.2	<1.9	1.1	<2.4	0.009	0.07	<0.01
	7/5/2018	1.8	0.3	0.1	<1.5	0.9	<1.8	<0.1	0.09	<0.01
	7/12/2018	1.9	0.2	0.2	1.9	1.1	2.1	<0.1	0.09	<0.01
	7/19/2018	1.8	<0.2	0.2	<2.1	1.3	<2.3	<0.2	0.100	<0.001
	7/26/2018	1.9	<0.1	0.1	<2.7	1.6	<2.8	<0.2	0.100	<0.001
	8/2/2018	1.8	<0.2	0.1	<2	0.09	<2.2	<0.2	0.090	<0.001
	8/9/2018	2	<0.2	0.1	<2.1	1	<2.3	<0.1	0.100	<0.001
	8/30/2018	1.9	<0.2	0.1	<2.4	1.4	<2.6	<0.1	0.060	<0.001
	9/28/2018	1.7	<0.2	0.1	<2.2	1.3	<2.4	<0.1	0.060	<0.003
	10/23/2018									
	11/1/2018									
	11/8/2018									
	11/15/2018									
	11/20/2018									
	11/29/2018	0.9	<0.2	0.1	3.9	1	<4.1	<0.1	0.070	<0.0005
	12/27/2018									

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

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

		Field Parameters				Lab Data						
		pH(f)	Temp.	Cond.	KPA U	Cl	SO4	TDS	U	Ue	Mo	Se
Sample Point Name	**Date**	**(units)**	**(°C)**	**(µmhos/cm)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**
Site Standard						**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
RO CLAR FEED	2/26/18	8.27	11.3	3548		216	1410	2730	**2.59**	0.418	**4.53**	0.291
	5/2/2018	7.79	13.4	3936		233	**1510**	**3100**	**4.97**	0.80	**6.51**	0.275
RO SP1	1/30/18	7.71	16.3	4253	0.009	4	5	30	0.0083	0.00134	0.018	<0.001
	2/26/18	7.57	17.6	1613	0.011	5	6	27	0.0034		0.015	0.002
	3/29/18	7.29	17.9	3782	0.059	24	126	234	0.0525	0.00847	**0.455**	0.031
	4/25/2018	6.83	14.2	4348	0.384	25	139	286	**0.398**	0.064	**0.58**	0.030
	5/4/2018	5.2	17.2	3784	0.009	5	5	35	0.007	0.001	<0.03	<0.005
	5/10/2018	5	20.5	6037	0.007	13	8	43	0.006	0.001	0.016	0.001
	5/17/2018	5.37	16.8	9098	0.005	10	4	47	0.009	0.001	0.013	<0.001
	5/24/2018	4.86	17.4	4203	0.003	9	3	33	0.004	0.001	0.012	<0.001
	5/31/2018	5.4	19	1134	0.008	15	3	58	0.008	0.001	0.013	<0.001
	6/7/2018	6.58	21.8	1591	0.022	123	536	1120	0.009	0.001	0.008	0.015
	6/14/2018	6.58	20.3	1616	0.009							
	6/21/2018	5.61	17.5	1083	0.037	12	14	65	0.028	0.005	0.062	0.003
	6/28/2018	7.21	22.4	1928	0.019	163	525	1350	0.012	0.002	0.003	0.005
	7/5/2018	7.04	21.4	2246	0.009	189	608	1640	0.012	0.002	0.003	0.005
	7/12/2018	6.66	20.9	1771	0.027	130	617	1260	0.021	0.003	0.07	0.019
	7/19/2018	6.81	20.6	1631	0.013	117	522	1150	0.015	0.00236	0.023	0.017
	7/26/2018	6.49	20.5	2042	0.01	150	694	1470	0.013	0.002	0.006	0.020
	8/2/2018					10	2	37	0.001	0.0002	0.004	<0.001
	8/9/2018	6.43	18.7	1397	0.004	15	22	73	0.002	0.0003	0.012	0.001
	8/30/2018	5.6	20.9	8915	0.015	9	14	47	0.014	0.0023	0.054	0.002
	9/28/2018	6.01	19.8	2463	0.039	19	65	146	0.036	0.006	**0.264**	0.010
	10/23/2018	6.51	18.1	2224	0.05	11	51	113	0.041		0.035	0.004
	11/1/2018	7.95	18	4748	0.01	4	7	30	0.0071	0.0011	0.011	<0.001
	11/8/2018	5.94	14.4	1626	0.007	2	<1	14	0.0007	0.00011	0.003	<0.001
	11/15/2018	7.25	17.2	2542	0.014	213	716	1890	0.014	0.002	0.002	0.011
	11/20/2018	5.09	14.4	6696	0.001	2	<1	<10	0.001	0.0001	0.005	<0.001
	11/29/2018	8.35	19.1	1654	0.002	2	<1	<10	<0.0003	<0.00005	0.004	0.001
	12/27/2018	5.77	14.7	1651	0.001	2	<1	12	<0.0003	<0.00005	0.002	<0.001
LPRO #2 Product												
HPRO #1 Product												

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

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

Sample Point Name	Date	NO3 (mg/l)	Ra226 (mg/l)	Ra226e (pCi/l)	Ra228 (mg/l)	Ra228e (pCi/l)	Ra226+ Ra228	Th230 (mg/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.30**		**0.02**
RO CLAR FEED	2/26/2018	4	0.3	0.2	<-0.06	1.7	0.3	<0.1	0.1	<0.01
	5/2/2018									
RO SP1	1/30/2018	0.4	<0.2	0.2	<2.5	1	<2.7	<0.2	0.1	<0.01
	2/26/2018	0.5	<0.2	0.2	<1.9	1.1	<2.1	<0.1	0.1	<0.01
	3/29/2018	0.8	<0.2	0.1	1.9	0.8	<2.1	<0.1	0.05	<0.01
	4/25/2018	0.7	<0.2	0.1	<1.7	1.1	<1.9	<0.1	0.07	<0.01
	5/4/2018									
	5/10/2018	1.4	<0.2	0.2	<2.7	1.6	<2.9	<0.1	0.10	<0.01
	5/17/2018	0.9	0.2	0.1	<2.2	1.3	<2.4	<0.2	0.04	<0.01
	5/24/2018	0.5	<0.2	0.2	<1.8	1.2	<2.0	<0.2	0.08	<0.01
	5/31/2018	1.4	<0.3	0.2	<2.0	1.2	<2.3	<0.2	0.09	<0.01
	6/7/2018	1.7	<0.2	0.1	3.6	1.1	<3.8	<0.2	0.09	<0.01
	6/14/2018									
	6/21/2018	1.1	0.2	0.2	<2.8	1.7	<3.0	<0.1	0.07	<0.01
	6/28/2018	1.5	0.4	0.2	<1.7	1.1	<2.1	<0.2	0.10	<0.01
	7/5/2018	1.8	0.4	0.2	<1.3	1	<1.7	<0.05	0.07	<0.01
	7/12/2018	1.9	0.4	0.2	2.2	0.9	2.6	<.2	0.09	<0.01
	7/19/2018	1.7	<0.3	0.1	2.7	1.2	<3.0	<0.1	0.100	<0.001
	7/26/2018	1.9	<0.1	0.08	<2.5	1.5	<2.6	<0.1	0.07	<0.001
	8/2/2018	0.8	<0.3	0.2	<2.5	1.5	<2.8	<0.2	0.10	<0.001
	8/9/2018	1.1	<0.2	0.1	<2.4	1.5	<2.6	<0.2	0.08	<0.001
	8/30/2018	0.4	<0.2	0.1	<2.6	1.6	<2.8	<0.07	0.05	<0.001
	9/28/2018	0.8	<0.2	0.1	<2.2	1.3	<2.4	<0.1	0.09	<0.003
	10/23/2018									
	11/1/2018									
	11/8/2018									
	11/15/2018									
	11/20/2018									
	11/29/2018	0.3	<0.2	0.1	<1.1	0.7	<1.3	<0.2	0.08	<0.0005
	12/27/2018									

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

Table 2.1-6 Zeolite Treated Water Quality Data

		Field Parameters				Lab Data						
Sample Point Name	**Date**	**pH(f) (units)**	**Temp. (°C)**	**Cond. (µmhos**	**KPA U (mg/l)**	**U (mg/l)**	**Ue (mg/l)**	**Mo (mg/l)**	**Se (mg/l)**	**Cl (mg/l)**	**SO4 (mg/l)**	**TDS (mg/l)**
Site Standard						**0.16**		**0.1**	**0.32**	**250**	**1500**	**2734**
300Z	1/4/18	6.41	19.8	2611	0.021	0.0194	0.00313	0.017	0.032	161	1000	1760
	1/9/18	6.12	17.8	2165	0.035	0.033	0.00533	0.02	0.033	160	960	1730
	1/16/18	5.99	15.4	1540	0.028	0.0317	0.00512	0.013	0.03	161	1020	1810
	4/25/2018	5.75	14.1	2647	0.087	0.0868	0.014	0.053	0.049	201	1260	2250
	4/27/2018	6.07	16.2	2710		0.0488	0.00788	0.05	0.046	201	1260	2290
	5/1/2018	5.82	18.2	2711	0.023	0.0229	0.0037	0.021	0.046	190	1210	2270
	5/8/2018	6.19	20.5	2440	0.02	0.016	0.00258	0.029	0.029	179	1070	1930
	5/15/2018				0.015	0.0178	0.00288	0.02	0.049	172	1190	2090
	5/22/2018	7.01	14.4	1976	0.041	0.0333	0.00538	0.017	0.034	119	795	1510
	7/2/2018	5.00	20.6	2416	0.132	0.146	0.0235	0.017	0.024	156	903	1730
	7/10/2018	5.87	21.7	2730	0.093	0.0815	0.0132	0.046	0.046	197	1270	2260
	7/17/2018	6.06	20.7	2645	0.07	0.0609	0.00983	0.042	0.041	184	1170	2200
	7/23/2018	6.40	9.6	2678	0.073	0.0959	0.0155	0.045	0.042	185	1200	2190
	9/13/2018	6.10	16.6	2652		0.0111	0.00179	**0.186**	0.045	186	1230	2200
1200Z Trains 1&2	1/4/18	5.37	19	2213	0.031	0.0276	0.00446	0.006	0.04	150	964	1700
	1/9/18	5.46	17.6	2228	0.024	0.0153	0.00247	0.007	0.039	156	984	1730
	1/16/18	6.02	17.0	2240	0.013	0.0145	0.00234	0.015	0.034	151	934	1750
	1/23/18	6.40	14.7	2243	0.08	0.0304	0.00491	0.016	0.037	171	1010	1810
	1/30/18	6.34	15.9	2286	0.056	0.0551	0.0089	0.019	0.034	170	1030	1830
	2/7/18	6.52	12.1	2324	0.056	0.0718	0.0116	0.017	0.035	178	1060	1880
	2/11/18	6.62	11.8	2320	0.061	0.0592	0.00956	0.017	0.032	173	1110	1960
	5/31/2018	3.44	19.2	2474	0.085	0.0755	0.0122	<0.001	0.041	172	1120	1840
	6/5/2018					0.0201	0.00325	0.004	0.042	163	1010	1840
	6/12/2018	5.57	22.0	2542	0.01	0.0045	0.00073	0.011	0.046	164	1060	1940
	7/10/2018	5.41	23.4	5112	0.022	0.0144	0.00233	0.012	0.036	173	1180	2080
	7/12/2018	5.79	22.2	2623	0.01	0.0073	0.00117	0.008	0.039	159	1040	1910
	7/17/2018	5.97	20.8	2460	0.004	0.0049	0.0008	0.006	0.038	160	1040	110
	7/23/2018	6.18	10.5	2423	0.004	0.0071	0.00115	0.007	0.04	165	1040	1870
	8/1/2018	5.86	20.9	3448	0.022	0.0211	0.00341	0.007	0.043	161	1060	1880
	8/6/2018	5.67	20.3	2468	0.041	0.041	0.0066	0.005	0.044	161	1060	1890
	8/16/2018	5.75	18.2	2470	0.015							
	8/23/2018	3.54	18.2	2420	0.061	0.0636	0.0103	<0.001	0.039	166	1100	1900
	8/30/2018	3.86	16.8	2417	0.011							
	9/6/2018	5.51	17.0	2479		0.0012	0.0002	0.01	0.044	169	1100	1990
	9/12/2018	5.72	19.2	2536	0.005	0.0025	0.0004	0.026	0.042	175	1160	2020
	9/20/2018	5.86	20.2	2492	0.003	0.0013	0.00021	0.015	0.051	168	1100	1930
	9/28/2018	5.84	18.8	2675	0.003	0.0014	0.00022	0.016	0.046	163	1070	2000
	10/4/2018	5.72	18.0	2474	0.003	0.0013	0.00021	0.011	0.046	166	1070	1910
	10/12/2018	5.73	18.4	2584	0.007	0.0055	0.00089	<0.013	0.049	162	1040	1950
	10/17/2018					0.0098	0.00158	0.013	0.049	153	1010	1920
1200Z Trains 3&4	1/4/18	6.49	18.2	2321	0.031	0.0281	0.00454	0.004	0.042	147	981	1750
	1/9/18	6.05	17.7	2316	0.046	0.0437	0.00706	0.004	0.044	152	999	1760
	1/16/18	5.98	17.5	2255	0.051	0.0565	0.00912	0.007	0.037	153	980	1760
	1/23/18	6.38	14.7	2240	0.114	0.0808	0.013	0.007	0.036	160	980	1760
	1/30/18	6.41	18.9	2208	0.097	0.104	0.0168	0.01	0.035	158	981	1780
	2/7/18	7.28	12.7	2224	0.097	0.157	0.0254	0.011	0.037	167	1000	1770
	2/11/18	7.25	7.3	2264	0.121	0.11	0.0177	0.007	0.032	162	1060	1810
	8/1/2018	3.60	19.5	2492	0.057	0.0578	0.00932	<0.001	0.042	161	1060	1860
	8/9/2018	5.31	19.2	2443	0.017	0.0122	0.00197	0.002	0.045	161	1070	1930
	8/16/2018	5.75	18.2	2470	0.015	0.0132	0.00213	0.007	0.043	163	1070	1920
	8/23/2018	5.74	17.3	2442	0.022	0.0213	0.00344	0.007	0.04	159	1030	1870
	8/30/2008	5.85	16.6	2511	0.035							
	9/6/2018	5.91	16.3	2464		0.0562	0.00906	0.01	0.04	163	1050	1900
	9/12/2018	5.75	18.8	2488	0.114	0.0913	0.0149	0.01	0.042	167	1100	1910
	12/27/2018	5.96	11.6	2111	0.063	0.0585	0.00944	0.012	0.032	141	864	1650

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

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

Sample Point Name	Date	NO3 (mg/l)	Ra226 (pCi/l)	Ra226e (pCi/l)	Ra228 (pCi/l)	Ra228e (pCi/l)	Ra226 + Ra228	Th230 (pCi/l)	Th230e (pCi/l)	V (mg/l)
Site Standard		**12**					**5**	**0.3**		**0.02**
300Z	1/4/18	2.2	<0.2	0.2	<1.4	0.8	<1.6	<0.2	0.1	<0.01
	1/9/18	2	<0.2	0.1	<2.3	1.4	<2.5	<0.2	0.1	<0.01
	1/16/18	2.2	0.2	0.1	<2.0	1.2	<2.2	<0.1	0.1	<0.01
	4/25/2018	3.2	<0.2	0.1	<1.6	1	<1.8	<0.1	0.1	<0.01
	4/27/2018									
	5/1/2018	3.3	0.2	0.1	<1.5	0.8	<1.7	<0.1	0.08	<0.01
	5/8/2018	2.1	<0.2	0.1	<1.8	0.8	<2.0	<0.2	0.1	<0.01
	5/15/2018	2.6	0.3	0.2	<2.2	1.2	<2.5	<0.1	0.05	<0.01
	5/22/2018	1.2	0.4	0.2	<2.3	1.1	<2.7	<0.2	0.1	<0.01
	7/2/2018	1.8	<0.2	0.1	<1.9	0.9	<2.1	<0.1	0.06	<0.01
	7/10/2018	3.6	<0.2	0.2	8.7	2.1	<8.9	<0.2	0.1	<0.002
	7/17/2018	2.7	0.2	0.1	<1.2	0.7	<1.4	<0.1	0.06	<0.001
	7/23/2018	3	<0.2	0.2	<2.2	1.3	<2.4	<0.1	0.06	<0.001
	9/13/2018	3.4	<0.2	0.1	4.9	1.3	<5.1	<0.2	0.1	0.004
1200Z Trains 1&2	1/4/18	2.4	<0.2	0.1	<1.3	0.8	<1.5	<0.2	0.1	<0.01
	1/9/18	2.4	0.2	0.1	<2.2	1.2	<2.4	<0.2	0.1	<0.01
	1/16/18	2.2	0.1	0.1	<1.7	1.1	<1.8	<0.2	0.1	<0.01
	1/23/18	2.4	<0.2	0.1	2.5	1	<2.7	<0.2	0.1	<0.01
	1/30/18	2.3	0.3	0.2	<1.9	1.2	<2.2	0.2	0.1	<0.01
	2/7/18	2.1	0.2	0.1	<1.5	0.7	<1.7	<0.2	0.06	<0.01
	2/11/18	2	0.2	0.1	<1.8	1.1	<2.0	<0.1	0.08	<0.01
	5/31/2018	2.6	<0.2	0.1	<1.7	1	<1.9	0.2	0.2	<0.01
	6/5/2018	2.6	<0.2	0.1	<2.0	1.6	<2.2	<0.2	0.1	<0.01
	6/12/2018	2.6	0.2	0.2	<2.1	1.3	<2.3	<0.1	0.03	<0.01
	6/18/2018		0.2		<2.3		<2.5	<0.2		
	7/10/2018	2.8	<0.3	0.2	3.8	1.5	<4.1	<0.1	0.05	0.003
	7/12/2018	2.8	0.2	0.1	2.1	0.8	<2.2	<0.1	0.07	
	7/17/2018	2.8	<0.2	0.1	<1.3	0.8	<1.5	<0.2	0.1	<0.001
	7/23/2018									
	8/1/2018	2.4	<0.3	0.2	<1.9	1.2	<2.2	<0.2	0.08	<0.001
	8/6/2018	2.4	<0.2	0.2	<2.8	1.6	<3	<0.1	0.07	<0.001
	8/16/2018									
	8/23/2018	2.9	<0.2	0.1	<1.4	0.8	<1.6	<0.6	0.4	0.002
	8/30/2018									
	9/6/2018	2.9	<0.1	0.07	<1.9	1.2	<2.0	<0.1	0.06	<0.001
	9/12/2018	2.8	<0.2	0.1	<2.6	1.5	<2.8	<0.1	0.04	<0.001
	9/20/2018	2.5	<0.3	0.2	<2.6	1.6	<2.9	<0.1	0.07	<0.001
	9/28/2018	2.6	<0.2	0.1	<2.4	1.3	<2.6	<0.2	0.1	<0.003
	10/4/2018	2.5	<0.2	0.1	<2.6	1.5	<2.8	<0.09	0.06	<0.001
	10/12/2018	2.5	<0.2	0.1	<2	1	<2.2	<0.1	0.07	<0.01
	10/17/2018	2.5	<0.2	0.1	<1.6	0.9	<1.8	<0.1	0.06	<0.0005
1200Z Trains 3&4	1/4/18	2.2	<0.2	0.2	<1.5	0.9	<1.7	<0.2	0.1	<0.01
	1/9/18	2.1	0.2	0.1	<2.3	1.3	<2.5	<0.1	0.08	<0.01
	1/16/18	2	0.2	0.1	<1.9	1.1	<2.1	0.3	0.2	<0.01
	1/23/18	2.3	<0.2	0.1	<1.1	1	<1.3	0.2	0.2	<0.01
	1/30/18	2.4	<0.2	0.1	<1.9	1.2	<2.1	<0.1	0.1	<0.01
	2/7/18	2.2	0.2	0.2	1.9	1.1	2.1	<0.2	0.1	<0.01
	2/11/18	2.3	<0.2	0.1	<1.9	1.2	<2.1	<0.3	0.2	<0.01
	8/1/2018	2.8	<0.2	0.1	<1.7	0.8	<1.9	<0.2	0.08	<0.001
	8/9/2018	2.8	<0.2	0.1	<2.2	1.3	<2.4	<0.2	0.07	<0.001
	8/16/2018	2.7	<0.2	0.1	<1.9	1	<2.1	<0.1	0.1	<0.001
	8/23/2018	2.6	<0.2	0.1	1.6	0.9	<1.8	<0.1	0.08	0.001
	8/30/2008									
	9/6/2018	2.5	<0.1	0.08	<1.9	1.2	<2.0	<0.1	0.07	<0.001
	9/12/2018	2.5	<0.2	0.1	<2.9	1.7	<3.1	<0.1	0.06	<0.001
	12/27/2018									

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

2.2 FUTURE OPERATION

Groundwater quality restoration in 2018 will continue as a combination of fresh-water, zeolite treated water, and R.O. product injection to maintain the overall piezometric gradient reversal between the lines of injection (M Line, WR Line, J Line and X Line) and contaminated water collection near the tailings piles. The reverse osmosis (R.O.) plants are rated at a capacity of 1200 gpm but is projected to operate at approximately 800 gpm averaged over the entire year with the new plant addition. When the plants are operated at full capacity, approximately 570 gpm of R.O. product would be produced for injection into the groundwater and approximately 130 gpm of brine reject would be discharged to the evaporation ponds. The operation of the R.O. plant in 2019 is projected to be 300 gpm due to the limited available evaporation capacity with the re-lining of EP1. The input design capacity of the zeolite is 1500 gpm but is projected to operate at approximately 1040 gpm over the year with full operation. The operation of the zeolite treatment is also expected to be limited to a capacity of 300 gpm in 2019 due to the re-lining of EP1.

Collection from Upper Chinle wells CE2, CE5, CE6, CE7, CE11, CE12, CE15 and CE19 will continue to intercept contaminants in this aquifer in 2019. 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 2019. 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 2019. Operation of the South collection and injection in the northeast portion of Section 3 and South Felice Acres should continue in 2019. The addition of a few additional collection wells in central Section 3 should be added in 2019. The North Off-site operation of collection and injection should continue in 2019. Treated and fresh-water injection will mainly be into linear lines of injection wells but some injection into other injection wells and infiltration lines will continue to be utilized in 2019 to restore these areas of low level aquifer contamination. Treated and fresh-water injection will be continued in Sections 35 and 3 in 2019 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 will provide water treatment for collection water from Off-site areas. Zeolite treated water will be combined with R.O. product water and fresh water for injection into the alluvial and Chinle aquifers.

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3.0 TAILINGS MONITORING

The tailings monitoring program includes numerous Large Tailings Pile (LTP) wells that were monitored to define water quality and water level conditions and changes during 2018. Figure 3.1-1 shows the locations of the tailings wells for the LTP with Figures 3.1-1A and 3.1-1B showing expanded mapping of the west and east halves of the LTP, respectively. Figure 3.1-2 shows the locations of the tailings wells monitored during 2018 and shows the locations of toe drains and the sumps that are also monitored for tailings water quality. Figures 3.1-3 and 3.1-4 present volumes of water removed from the LTP by the toe drains and previous dewatering efforts. Figure 3.1-5 presents an example cross section for the LTP and illustrates the typical transition from sandy or coarser tailings deposited on the perimeter of the LTP to the slime or fine-grained tailings deposited on the interior of the LTP. The LTP was constructed by building a starter berm around the perimeter and the location of this berm is between 530 and 610 feet from the south end of the cross section shown in Figure 3.1-5. The method of tailings deposition using a cyclone resulted in the segregation of the fine-grained slimes with much lower permeability tailings on the interior of the LTP, and as indicated in Figure 3.1-2, a distinction is made between the slime and sand tailings and the wells installed in each tailings type. Cross Section A-A' in Figure 3.1-5 also shows the approximate location of the toe drain corridor and the expected potentiometric surface in the tailings.

3.1 TAILINGS OPERATIONS

Tailings well locations are shown on Figures 3.1-1, 3.1-1A and 3.1-1B. The tailings wells on the outslope of the LTP are shown on Figure 3.1-1 while the wells on top of the LTP are shown on Figures 3.1-1A and 3.1-1B for the west and east half of the LTP respectively. These two figures show locations for wells that have been abandoned, wells permitted to be abandoned, former injection wells, dewatering wells and monitoring wells.

The historical collection of water from the tailings and toe drains is presented in Figures 3.1-3 and 3.1-4. No tailings dewatering wells were operated during 2018, while the pumping rates from the collection sumps for the toe drains continue to decline with time as shown in Figure 3.1-4. These declining toe drain collection rates reflect the diminishing thickness of saturated tailings and also result in a reduced rate of uranium mass removal by the toe drains.

3.1.1 TAILINGS WELL COMPLETIONS

Table 3.1-1 presents basic information for the tailings wells located on the LTP. This table indicates well coordinates, well depth, casing diameter, water level, measuring point in feet above land surface and elevation, and casing perforation interval. Six new tailings wells were drilled in 2018 and these wells are indicated as the six WME wells shown on Figures 3.1-1A, 3.1-1B and 3.1-2. The WME series of wells have screen length of five feet with a total well depth that is typically 4 to 12 feet below the 2018 water level elevation in the tailings. Numerous wells were abandoned on the LTP in 2018 and a notation is included in Table 3.1-1 to indicate wells that have been abandoned.

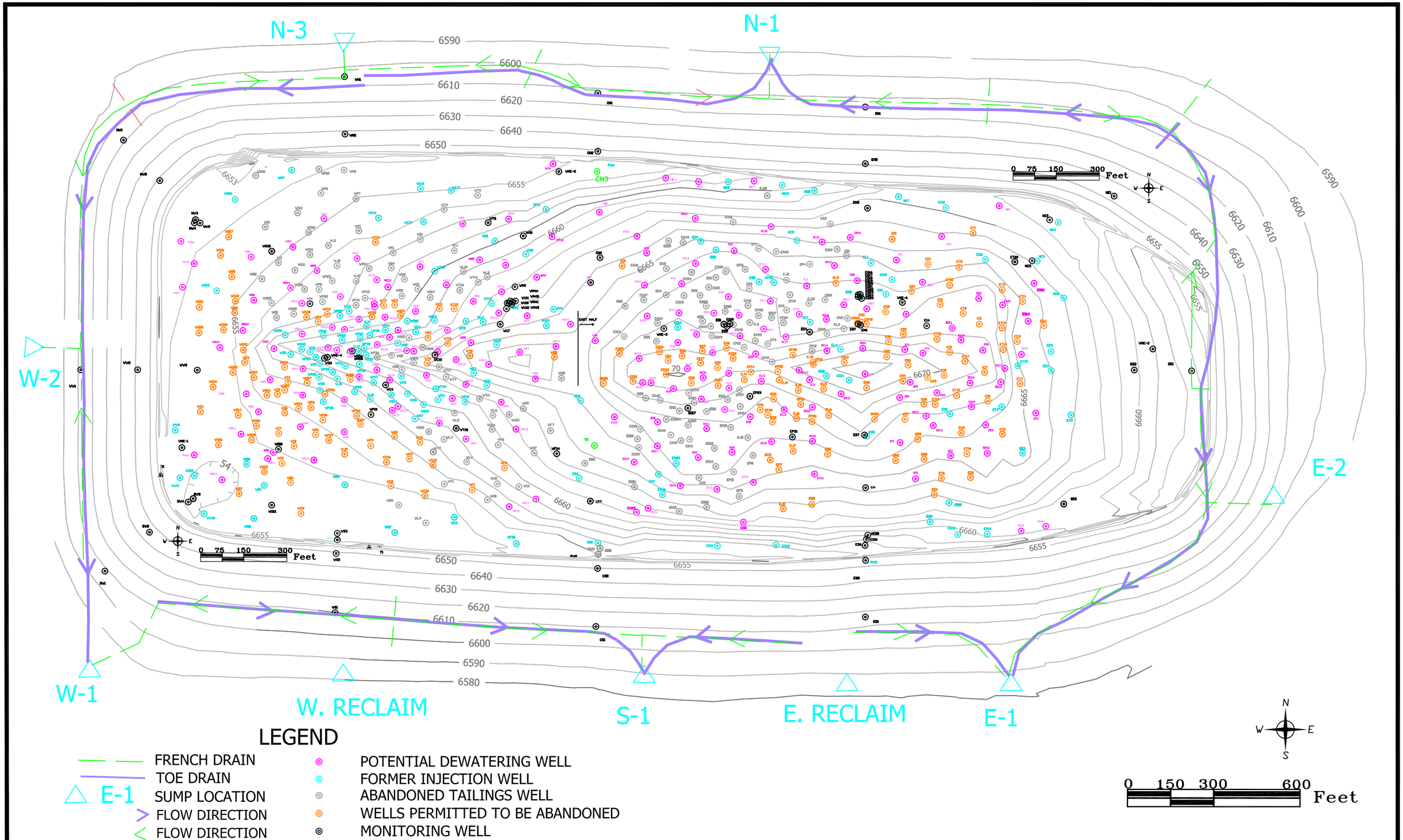


FIGURE 3.1-1. TAILINGS WELL LOCATIONS, 2018

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

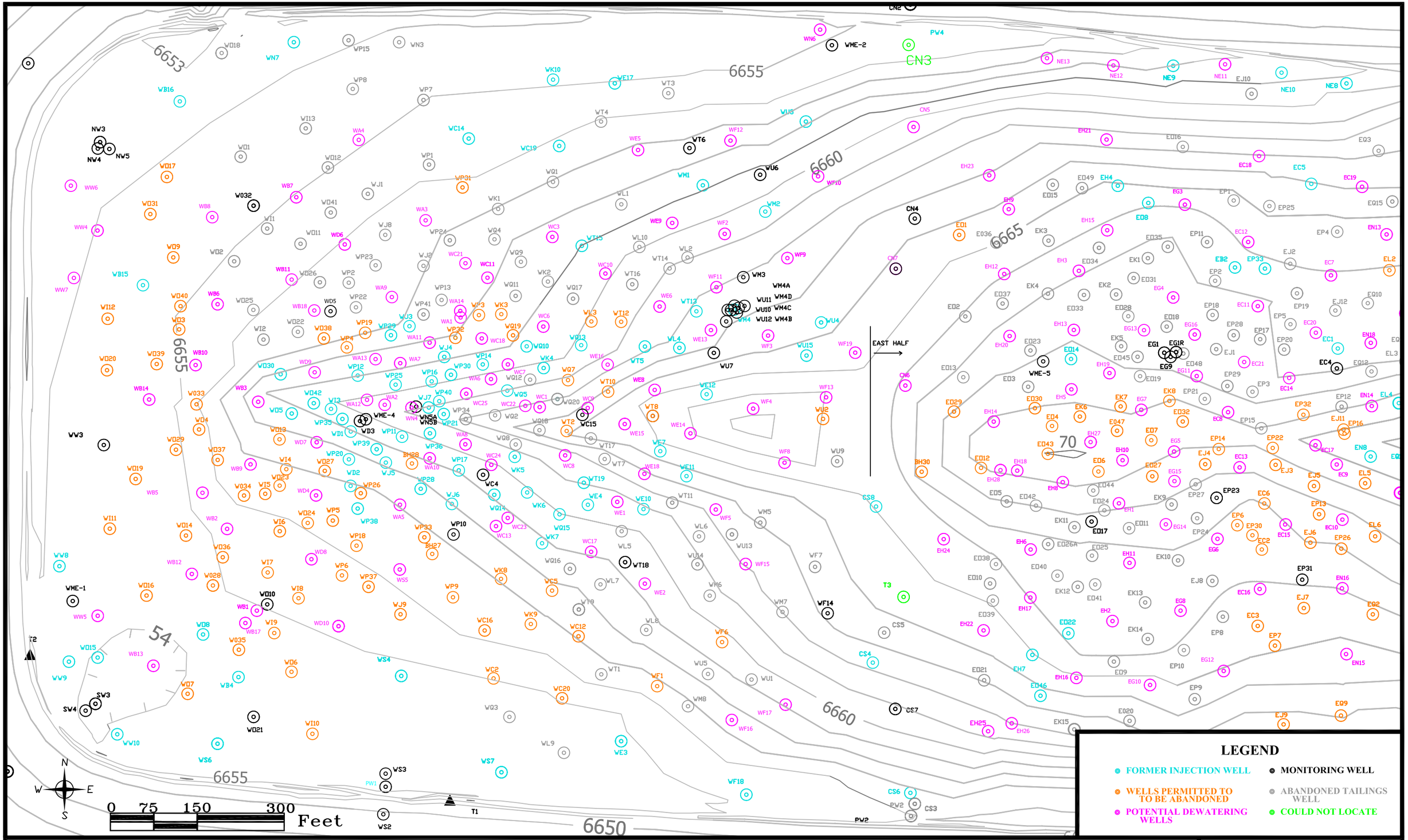


FIGURE 3.1-1A. LOCATION OF TAILINGS WELLS IN WEST HALF OF LTP

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

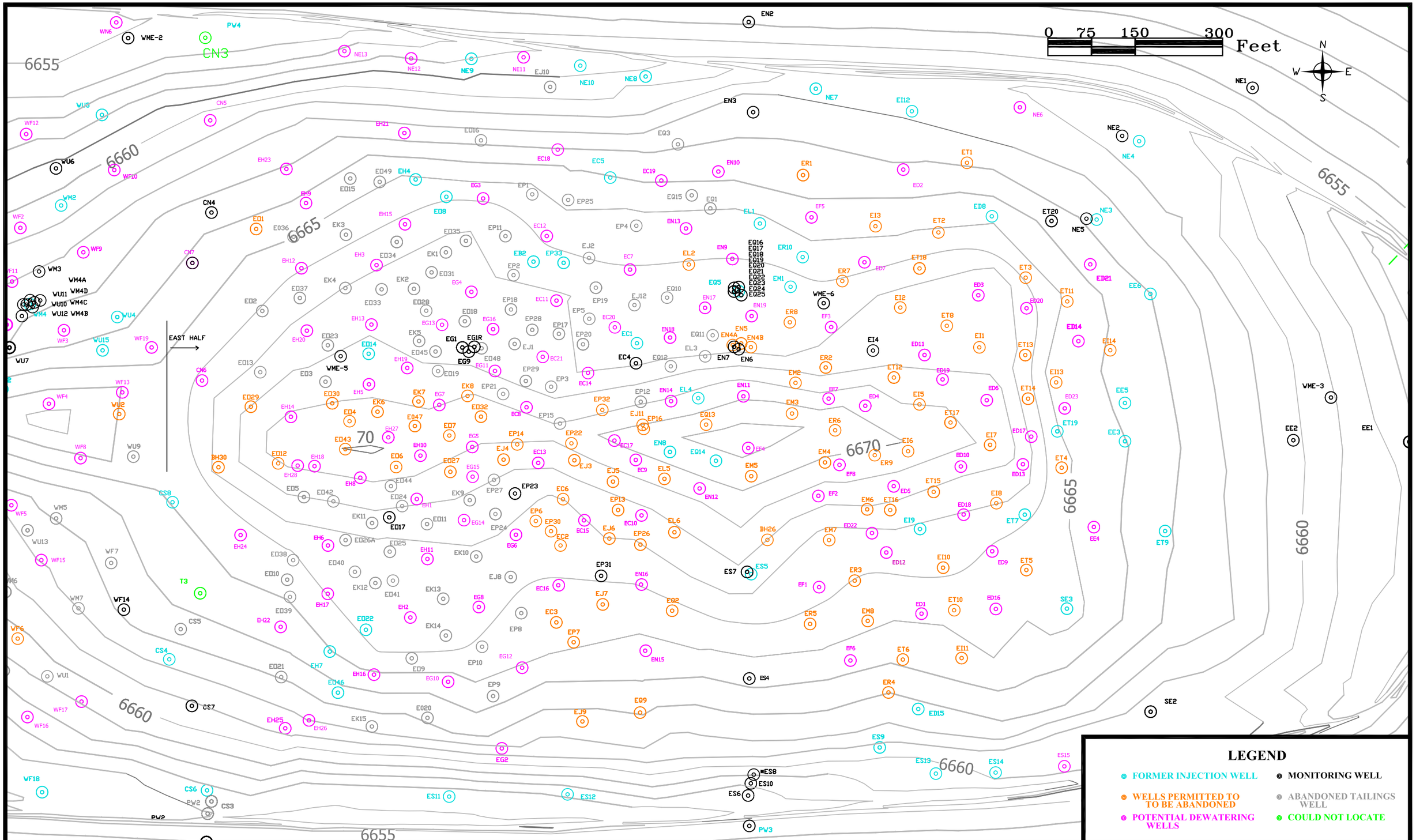
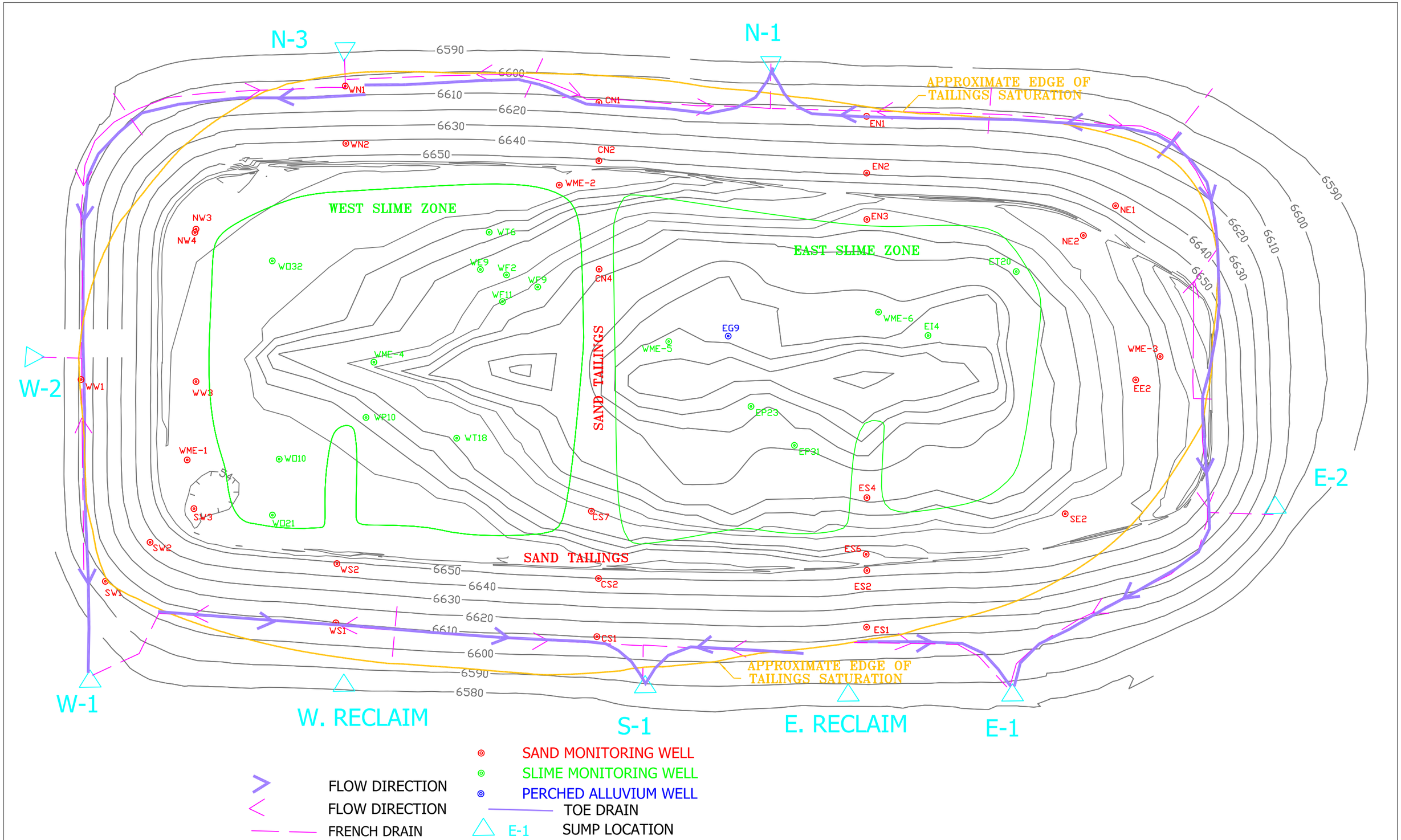


FIGURE 3.1-1B. LOCATION OF TAILINGS WELLS IN EAST HALF OF LTP

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO



SCALE: 1" = 300'

C:\PROJECTS\2018-06 TAILINGS-MONITORING-2018

DATE: 3/13/19

FIGURE 3.1-2. TAILINGS WELLS MONITORED IN 2018

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

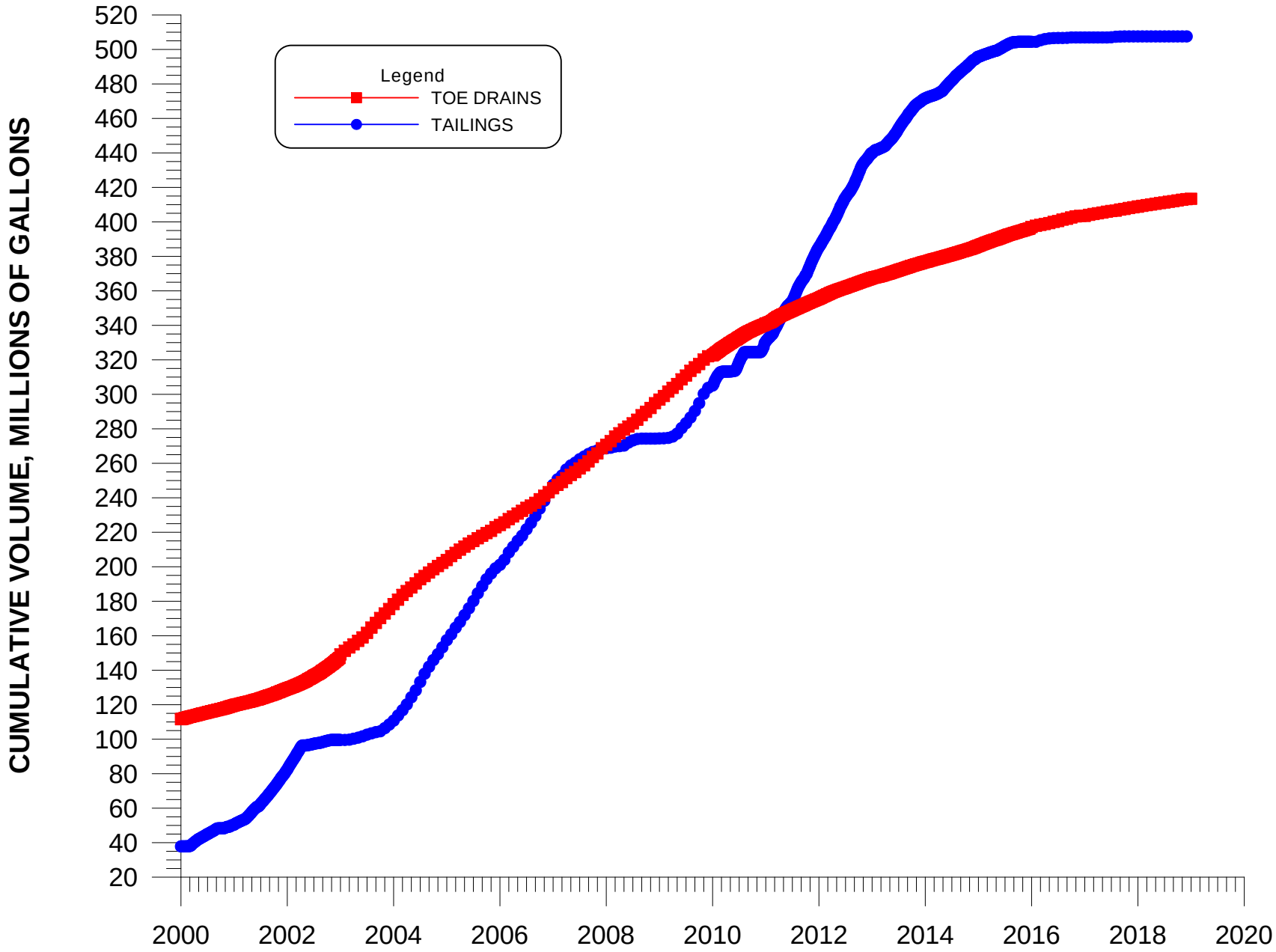


FIGURE 3.1-3. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

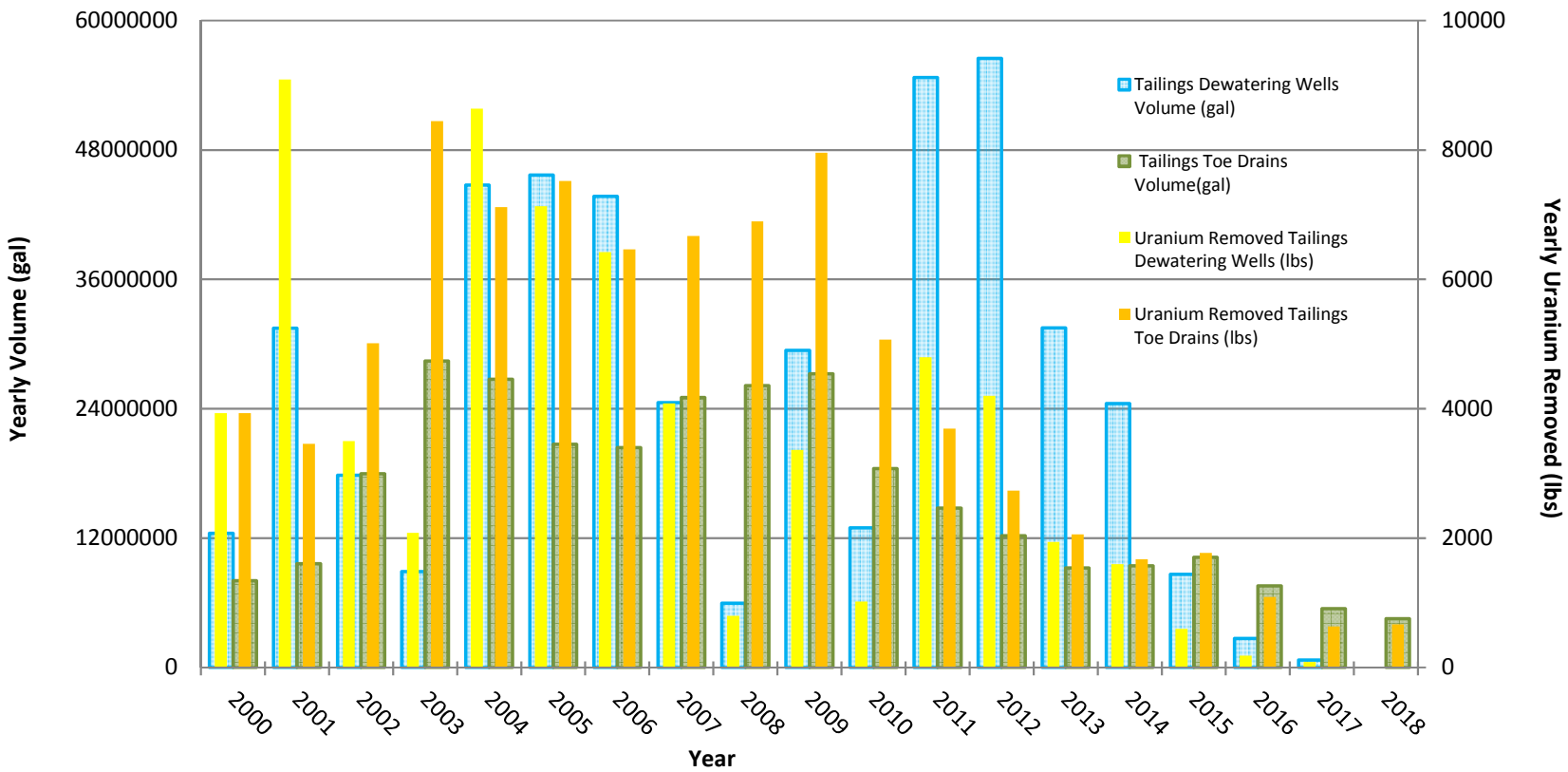
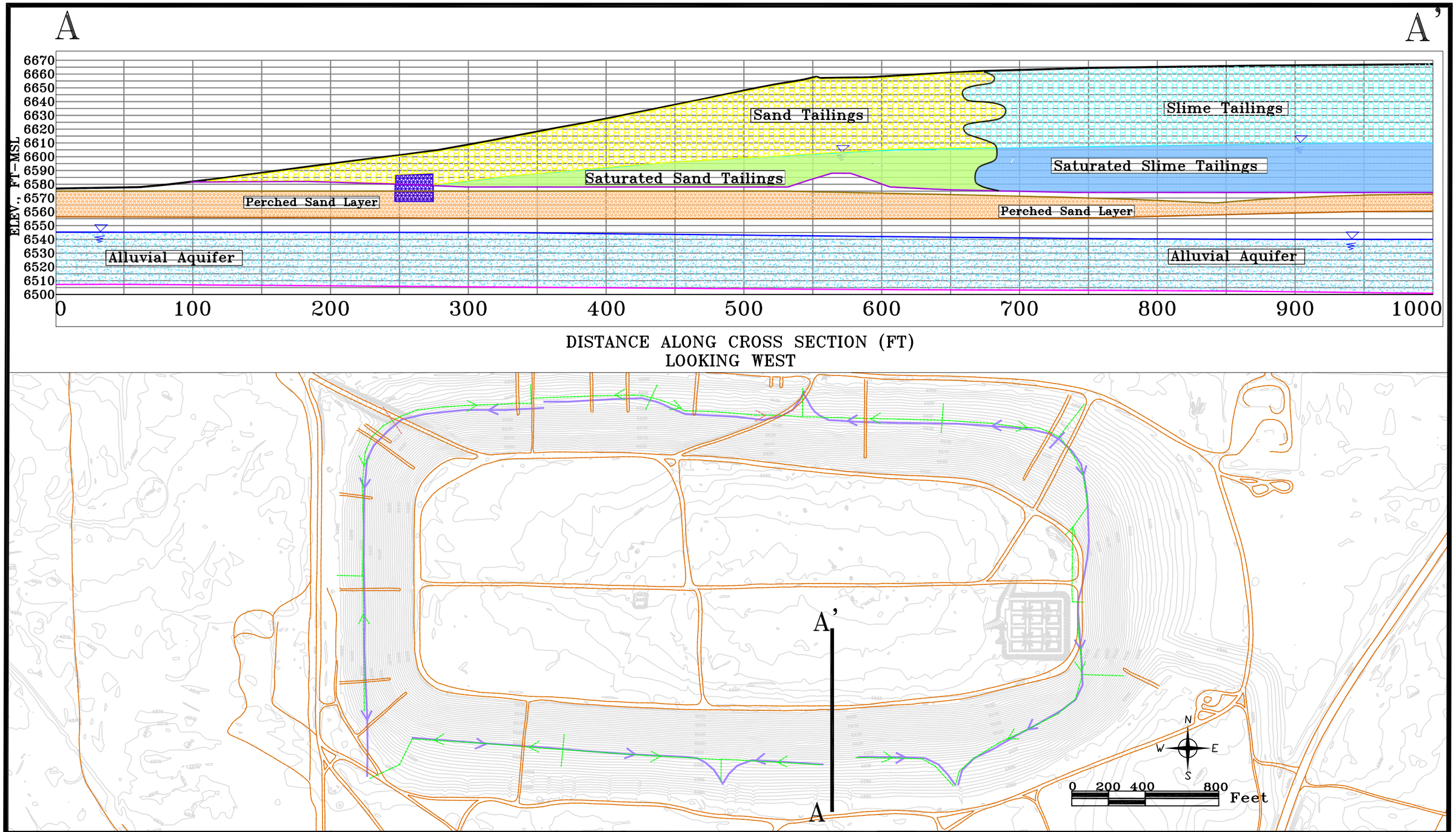


Figure 3.1-4. Yearly Quantity of Tailings Water and Uranium Removed



LEGEND

- LAND SURFACE
- BASE OF TAILINGS
- TOP OF PERCHED SAND
- BASE OF PERCHED SAND
- BASE OF ALLUVIUM
- TAILINGS WATER-LEVEL ELEVATION
- ALLUVIAL WATER-LEVEL ELEVATION
- TOE DRAIN CORRIDOR
- TOE DRAIN
- FRENCH DRAIN

REVISIONS No.	DATE	MADE BY	DATE	DRAWN BY
1			3-2019	TGM
2				
3				
4				

Homestake Mining Company
Grants, New Mexico

FIGURE 3.1-5
TAILINGS CROSS SECTION A-A'

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE.

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
BH26	2.0	1543722	491784	5.0	6674.33	98.00	69.60	6604.73	80-90	70-90
BH27	2.0	1543708	489997	3.3	6660.93	51.30	38.74	6622.19	56-66	46-66
BH28	2.0	1543867	489962	3.9	6665.59	21.10	21.35	6644.24	30-40	20-40
BH30	4.0	1543848	490841	5.6	6671.60	89.20	79.93	6591.67	77-87	-
CN1	2.0	1544856	490822	2.2	6615.01	35.00	16.50	6598.51	22-32	5-32
CN2	2.0	1544654	490822	2.8	6658.17	87.10	57.50	6600.67	60-80	5-80
CN3	3.0	1544584	490819	1.3	6656.72	90.50	47.90	6608.82	47-87	5-87
CN4	3.0	1544283	490823	2.1	6666.22	96.40	63.63	6602.59	57-97	7-97
CN5	5.0	1544447	490826	3.1	6660.02	113.70	52.10	6607.92	31-111	21-111
CN6	5.0	1544000	490818	2.7	6668.04	116.80	61.19	6606.85	35-115	25-115
CN7	5.0	1544204	490798	3.3	6667.88	116.00	83.00	6584.88	36-116	-
CS1	2.0	1543001	490815	0.9	6608.30	34.80	21.17	6587.13	25-35	5-35
CS2	2.0	1543202	490820	4.8	6651.98	78.30	58.74	6593.24	55-75	5-75
* CS3	2.0	1543273	490823	2.0	6657.64	87.30	47.81	6609.83	67-87	5-87
CS4	5.0	1543583	490773	3.7	6667.63	99.80	53.40	6614.23	61-101	0-101
* CS5	2.0	1543574	490776	2.1	6666.03	42.70	43.60	6622.43	10-40	0-40
CS6	5.0	1543292	490822	1.2	6657.30	97.70	45.70	6611.60	55-95	0-95
CS7	5.0	1543437	490796	3.8	6664.69	99.90	70.04	6594.65	61-101	0-101
CS8	5.0	1543789	490779	3.4	6668.98	116.00	58.89	6610.09	36-116	-
EB2	5.0	1544200	491381	2.6	6672.24	115.70	70.14	6602.10	31-111	21-111
EC1	5.0	1544063	491559	1.0	6668.50	113.00	38.20	6630.30	15-110	-
EC2	5.0	1543717	491428	4.0	6669.78	110.90	61.18	6608.60	15-110	-
EC3	5.0	1543585	491423	4.4	6668.11	110.00	58.84	6609.27	15-110	15-110
EC4	5.0	1544030	491559	3.6	6670.14	44.20	94.00	6576.14	20-40	15-40
EC5	5.0	1544346	491513	3.1	6667.10	110.00	15.32	6651.78	30-110	20-110
EC6	5.0	1543798	491432	4.8	6668.69	115.60	78.28	6590.41	33-113	23-113
EC7	5.0	1544190	491549	2.5	6668.92	115.10	80.80	6588.12	33-113	23-113
EC8	5.0	1543954	491371	4.9	6672.41	116.55	100.60	6571.81	44-114	34-114
EC9	5.0	1543866	491561	2.6	6672.25	116.00	66.60	6605.65	36-116	26-116
EC10	5.0	1543768	491567	3.3	6670.99	116.00	69.00	6601.99	36-116	26-116
EC11	5.0	1544137	491422	3.3	6670.26	116.00	89.00	6581.26	36-116	26-116
EC12	5.0	1544249	491406	3.1	6669.05	116.00	99.10	6569.95	36-116	26-116
EC13	5.0	1543860	491391	3.2	6670.40	116.00	40.50	6629.90	34-114	24-114
EC14	5.0	1544014	491476	2.0	6670.23	116.00	35.80	6634.43	36-116	26-116

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
EC15	5.0	1543762	491470	2.1	6669.75	118.00	92.40	6577.35	38-118	28-118
EC16	5.0	1543650	491426	2.0	6668.81	118.00	64.30	6604.51	38-118	28-118
EC17	5.0	1543898	491522	2.9	6672.48	117.00	29.80	6642.68	37-117	27-117
EC18	5.0	1544393	491426	2.7	6667.28	120.00	51.65	6615.63	60-120	50-120
EC19	5.0	1544332	491612	2.0	6666.79	120.00	58.60	6608.19	60-120	50-120
EC20	5.0	1544071	491514	1.9	6669.17	120.00	67.00	6602.17	60-120	-
EC21	5.0	1544035	491400	1.1	6669.02	120.00	76.50	6592.52	60-120	-
ED1	5.0	1543597	492047	4.4	6666.62	97.00	40.30	6626.32	15-95	5-95
ED2	5.0	1544361	492014	5.0	6665.47	113.60	36.30	6629.17	30-110	20-110
ED3	5.0	1544149	492147	2.6	6670.66	114.60	67.50	6603.16	32-112	22-112
ED4	5.0	1543958	491953	3.0	6671.97	115.20	74.80	6597.17	33-113	23-113
ED5	5.0	1543818	492005	3.0	6671.44	116.20	81.50	6589.94	33-113	23-113
ED6	5.0	1543969	492159	2.0	6670.82	118.15	84.10	6586.72	46-116	36-116
ED7	5.0	1544208	491952	1.9	6668.44	118.55	67.20	6601.24	45-115	35-115
ED8	5.0	1544284	492172	3.4	6668.51	114.00	30.04	6638.47	35-115	25-115
ED9	5.0	1543707	492170	3.1	6670.49	115.00	41.70	6628.79	36-116	26-116
ED10	5.0	1543853	492117	3.2	6672.16	116.00	65.50	6606.66	36-116	26-116
ED11	5.0	1544046	492054	3.6	6671.78	116.00	23.20	6648.58	36-116	26-116
ED12	5.0	1543706	491989	3.3	6669.97	116.00	48.20	6621.77	36-116	26-116
ED13	5.0	1543858	492222	2.6	6669.70	118.00	42.80	6626.90	38-118	28-118
ED14	5.0	1544070	492319	2.3	6667.38	112.00	28.10	6639.28	32-112	22-112
ED15	5.0	1543437	492049	2.6	6667.42	114.00	61.40	6606.02	34-114	24-114
ED16	5.0	1543609	492176	---	6669.02	115.00	39.30	6629.72	35-115	25-115
ED17	5.0	1543953	492295	---	6667.89	115.00	41.90	6625.99	35-115	25-115
ED18	5.0	1543770	492125	3.2	6667.19	120.00	62.90	6604.29	60-120	50-120
ED19	5.0	1544001	492096	3.3	6670.86	120.00	66.50	6604.36	60-120	50-120
ED20	5.0	1544121	492238	3.9	6670.42	116.00	62.10	6608.32	56-116	46-116
ED21	5.0	1544201	492341	3.0	6667.67	120.00	50.10	6617.57	60-120	50-120
ED22	5.0	1543748	491935	2.0	6669.48	120.00	54.90	6614.58	60-120	50-120
ED23	5.0	1543905	492239	3.2	6669.48	120.00	79.40	6590.08	60-120	50-120
EE1	2.0	1543894	492887	0.0	6635.07	---	68.95	6566.12	45-65	5-65
EE2	2.0	1543895	492687	2.5	6667.84	87.80	65.00	6602.84	55-75	5-75
EE3	2.0	1543894	492398	1.3	6665.05	25.60	24.72	6640.33	5-23	0-23
EE4	5.0	1543749	492346	5.6	6669.82	113.00	84.20	6585.62	30-110	20-110
EE5	5.0	1543964	492398	5.5	6668.72	112.70	69.37	6599.35	31-111	21-111

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
EE6	5.0	1544149	492442	4.6	6667.72	113.00	23.30	6644.42	31-111	21-111
EF1	5.0	1543645	491870	5.0	6671.48	115.10	54.60	6616.88	32-112	60-112
EF2	5.0	1543801	491873	4.9	6672.98	116.00	88.90	6584.08	34-114	24-114
EF3	5.0	1544094	491892	3.4	6670.29	115.00	23.90	6646.39	35-115	25-115
EF4	5.0	1543885	491750	3.2	6674.58	116.00	44.10	6630.48	36-116	26-116
EF5	5.0	1544282	491861	3.2	6668.82	116.00	49.60	6619.22	36-116	26-116
EF6	5.0	1543520	491928	3.4	6668.41	116.00	54.70	6613.71	36-116	26-116
EF7	5.0	1543970	491891	2.5	6671.28	117.00	54.70	6616.58	37-117	27-117
EF8	5.0	1543856	491909	---	6671.75	118.00	83.50	6588.25	38-118	28-118
EG1	5.0	1544058	491260	3.1	6671.21	116.37	34.60	6636.61	22-112	20-112
EG1R	5.0	1544059	491281	3.2	6671.11	115.70	76.78	6594.33	32-112	20-112
EG2	5.0	1543370	491330	2.5	6664.53	111.40	95.80	6568.73	30-110	20-110
EG3	5.0	1544312	491297	1.8	6667.97	117.90	83.90	6584.07	45-115	35-115
EG4	5.0	1544156	491283	5.0	6672.05	116.70	66.30	6605.75	44-114	34-114
EG5	5.0	1543886	491276	3.2	6671.78	116.00	63.50	6608.28	36-116	26-116
EG6	5.0	1543736	491352	3.3	6669.98	116.00	85.90	6584.08	36-116	26-116
EG7	5.0	1543959	491220	2.9	6671.06	116.00	65.20	6605.86	36-116	26-116
EG8	5.0	1543613	491288	3.5	6669.79	116.00	53.80	6615.99	36-116	26-116
EG9	5.0	1544051	491272	2.9	6670.08	112.00	109.11	6560.97	102-112	92-112
EG10	5.0	1543487	491239	2.0	6667.62	118.00	45.60	6622.02	38-118	28-118
EG11	5.0	1544018	491317	2.3	6670.65	116.00	32.10	6638.55	36-116	26-116
EG12	5.0	1543508	491364	3.2	6668.58	117.00	66.80	6601.78	37-117	27-117
EG13	5.0	1544067	491229	1.5	6669.87	120.00	74.10	6595.77	60-120	-
EG14	5.0	1543750	491274	1.7	6669.27	120.00	74.60	6594.67	60-120	-
EG15	5.0	1543836	491278	2.0	6670.53	120.00	64.10	6606.43	60-120	-
EG16	5.0	1544089	491313	---	6670.27	120.00	87.10	6583.17	60-120	-
EH1	5.0	1543794	491176	2.8	6671.13	116.90	97.80	6573.33	34-114	24-114
EH2	5.0	1543594	491167	3.5	6669.72	114.40	91.30	6578.42	31-111	21-111
EH3	5.0	1544203	491112	2.6	6669.98	115.70	74.30	6595.68	33-113	23-113
EH4	5.0	1544342	491179	5.1	6670.09	115.70	10.53	6659.56	32-112	22-112
EH5	5.0	1543996	491104	2.6	6670.14	116.10	79.90	6590.24	44-114	34-114
EH6	5.0	1543718	491032	5.0	6671.68	113.00	84.10	6587.58	43-113	33-113
EH7	5.0	1543538	491027	3.5	6668.57	113.00	46.20	6622.37	43-113	33-113
EH8	5.0	1543836	491084	3.1	6672.31	116.00	90.70	6581.61	36-116	26-116

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
EH9	5.0	1544308	490993	3.3	6669.53	116.00	39.90	6629.63	36-116	26-116
EH10	5.0	1543872	491189	3.2	6672.46	116.00	100.00	6572.46	36-116	26-116
EH11	5.0	1543696	491201	3.5	6670.01	116.00	40.80	6629.21	36-116	26-116
EH12	5.0	1544193	490985	3.3	6669.87	116.00	31.50	6638.37	36-116	26-116
EH13	5.0	1544099	491106	1.8	6669.79	119.00	65.00	6604.79	39-119	29-119
EH14	5.0	1543940	490966	2.3	6671.39	119.00	35.00	6636.39	39-119	29-119
EH15	5.0	1544269	491162	3.0	6670.08	118.00	83.20	6586.88	38-118	28-118
EH16	5.0	1543497	491106	3.1	6665.06	120.00	51.90	6613.16	60-120	50-120
EH17	5.0	1543632	491030	3.2	6668.83	120.00	48.20	6620.63	60-120	50-120
EH18	5.0	1543853	491005	---	6672.33	120.00	41.50	6630.83	60-120	50-120
EH19	5.0	1544016	491171	3.0	6671.61	120.00	63.90	6607.71	60-120	50-120
EH20	5.0	1544081	490997	---	6670.11	120.00	43.30	6626.81	60-120	50-120
EH21	5.0	1544430	491163	---	6666.88	120.00	57.90	6608.98	60-120	50-120
EH22	5.0	1543585	490965	2.0	6666.46	120.00	49.80	6616.66	60-120	50-120
EH23	5.0	1544358	490952	2.0	6665.81	120.00	53.40	6612.41	60-120	50-120
EH24	5.0	1543723	490924	---	6667.78	110.00	62.60	6605.18	50-110	45-110
EH25	5.0	1543404	490956	2.4	6664.32	110.00	88.10	6576.22	50-110	45-110
EH26	5.0	1543418	490997	---	6663.00	120.00	---	---	60-120	-
EH27	5.0	1543904	491133	---	6671.00	120.00	93.60	6577.40	60-120	-
EH28	5.0	1543855	490978	---	6670.00	120.00	---	---	60-120	-
EI1	2.0	1544058	492148	0.6	6668.00	90.00	3.53	6664.47	30-90	20-90
EI2	2.0	1544126	492013	0.5	6668.00	90.00	1.90	6666.10	30-90	20-90
EI3	2.0	1544266	491970	0.6	6665.00	90.00	5.21	6659.79	30-90	20-90
EI4	3.0	1544053	491965	0.5	6668.00	92.00	40.30	6627.70	32-92	22-92
EI5	3.0	1543960	492045	0.6	6670.00	93.00	1.86	6668.14	33-93	23-93
EI6	2.0	1543880	492026	---	6670.00	90.00	---	---	30-90	0-20
EI7	2.0	1543891	492167	---	6669.00	90.00	---	---	30-90	0-20
EI8	2.0	1543791	492177	---	6668.00	90.00	---	---	30-90	20-90
EI9	2.0	1543747	492046	---	6668.00	90.00	54.91	6613.09	30-90	20-90
EI10	2.0	1543680	492086	---	6667.00	90.00	---	---	30-90	20-90
EI11	2.0	1543525	492118	---	6666.00	2.00	---	---	30-90	20-90
EI12	2.0	1544463	492032	---	6663.00	85.00	2.00	6661.00	25-85	15-85
EI13	2.0	1543998	492280	---	6666.00	90.00	---	---	0-30	0-30
EI14	2.0	1544053	492373	---	6665.00	85.00	---	---	25-85	15-85
* EJ1	2.0	1544064	491351	0.8	6668.00	90.00	1.40	6666.60	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
* EJ2	4.0	1544212	491478	0.7	6667.00	90.00	---	---	30-90	20-90
EJ3	2.0	1543864	491453	---	6670.00	90.00	---	---	30-90	20-90
EJ4	2.0	1543865	491331	---	6669.00	90.00	---	---	30-90	20-90
EJ5	2.0	1543828	491519	---	6669.00	90.00	---	---	30-90	20-90
EJ6	2.0	1543730	491513	---	6668.00	90.00	---	---	30-90	20-90
EJ7	2.0	1543617	491502	---	6666.00	90.00	---	---	30-90	20-90
* EJ8	2.0	1543664	491344	---	6667.00	90.00	---	---	30-90	20-90
EJ9	2.0	1543416	491467	---	6664.00	90.00	---	---	30-90	20-90
* EJ10	2.0	1544505	491412	---	6661.00	85.00	---	---	25-85	15-85
EJ11	2.0	1543925	491570	---	6670.00	90.00	---	---	30-90	20-90
* EJ12	2.0	1544130	491550	---	6667.00	90.00	---	---	30-90	20-90
* EK1	2.0	1544221	491232	0.8	6668.00	85.00	3.15	6664.85	25-85	15-85
* EK2	4.0	1544159	491177	0.4	6668.00	90.00	---	---	30-90	20-90
* EK3	4.0	1544252	491061	0.7	6667.00	90.00	---	---	30-90	20-90
* EK4	4.0	1544160	491060	0.5	6668.00	90.00	---	---	30-90	20-90
* EK5	4.0	1544069	491186	0.5	6667.00	90.00	---	---	30-90	20-90
EK6	4.0	1543948	491115	0.7	6670.00	90.00	---	---	30-90	20-90
EK7	4.0	1543965	491185	0.6	6670.00	90.00	---	---	30-90	20-90
EK8	4.0	1543975	491269	0.6	6670.00	90.00	---	---	30-90	20-90
* EK9	2.0	1543796	491273	---	6669.00	90.00	---	---	30-90	20-90
* EK10	2.0	1543699	491284	---	6668.00	90.00	---	---	30-90	20-90
* EK11	2.0	1543757	491106	3.3	6668.00	90.00	4.10	6663.90	30-90	20-90
* EK12	2.0	1543654	491111	3.1	6667.00	90.00	3.00	6664.00	30-90	20-90
* EK13	2.0	1543627	491228	---	6667.00	90.00	---	---	30-90	20-90
* EK14	2.0	1543563	491232	---	6667.00	90.00	---	---	30-90	20-90
* EK15	2.0	1543407	491105	---	6663.00	90.00	---	---	30-90	20-90
EL1	4.0	1544271	491772	0.7	6666.00	87.00	2.70	6663.30	27-87	17-87
EL2	4.0	1544201	491650	0.7	6667.00	90.00	---	---	30-90	20-90
* EL3	4.0	1544043	491678	0.6	6668.00	90.00	---	---	30-90	20-90
EL4	4.0	1543971	491666	1.0	6670.00	90.00	61.90	6608.10	30-90	20-90
EL5	2.0	1543832	491608	---	6670.00	90.00	---	---	30-90	20-90
EL6	2.0	1543741	491625	---	6669.00	90.00	---	---	30-90	20-90
EM1	3.0	1544162	491824	0.7	6667.00	90.00	1.63	6665.37	30-90	20-90
EM2	3.0	1543997	491833	0.6	6670.00	90.00	2.15	6667.85	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
EM3	4.0	1543945	491827	0.6	6671.00	90.00	1.24	6669.76	30-90	20-90
EM4	2.0	1543861	491883	---	6671.00	90.00	---	---	30-90	20-90
EM5	2.0	1543839	491755	---	6671.00	90.00	---	---	30-90	20-90
EM6	2.0	1543781	491958	---	6669.00	90.00	---	---	30-90	20-90
EM7	2.0	1543708	491862	---	6668.00	90.00	---	---	30-90	20-90
EM8	2.0	1543587	491956	---	6666.00	90.00	---	---	30-90	20-90
EN1	2.0	1544809	491752	4.0	6618.86	38.40	30.75	6588.11	25-35	5-35
EN2	2.0	1544611	491752	2.2	6651.61	69.30	51.10	6600.51	50-70	5-70
EN3	3.0	1544456	491753	4.6	6667.51	93.20	62.00	6605.51	50-90	5-90
EN4A	2.0	1544059	491748	6.8	6673.50	33.30	31.42	6642.08	32-52	22-52
EN4B	2.0	1544059	491748	6.8	6673.51	96.60	31.31	6642.20	69-99	66-99
EN5	5.0	1544065	491739	5.8	6672.42	105.00	19.90	6652.52	15-105	-
EN6	2.0	1544055	491735	6.7	6673.59	40.00	18.40	6655.19	20-40	-
EN7	5.0	1544059	491727	0.6	6668.27	41.00	17.92	6650.35	20-40	15-40
EN8	5.0	1543878	491610	2.6	6672.87	113.00	23.80	6649.07	33-113	23-113
EN9	5.0	1544209	491725	2.3	6668.50	116.80	50.50	6618.00	34-114	24-114
EN10	5.0	1544359	491701	2.4	6666.34	114.50	63.00	6603.34	32-112	22-112
EN11	5.0	1543970	491746	1.9	6671.46	118.00	61.30	6610.16	45-115	35-115
EN12	5.0	1543818	491673	1.9	6671.34	116.00	61.90	6609.44	46-116	36-116
EN13	5.0	1544263	491644	3.1	6664.14	116.00	82.50	6581.64	36-116	26-116
EN14	5.0	1543966	491620	3.4	6672.13	116.00	47.10	6625.03	36-116	26-116
EN15	5.0	1543537	491575	3.0	6669.02	116.00	98.30	6570.72	36-116	26-116
EN16	5.0	1543651	491569	2.0	6668.86	118.00	64.60	6604.26	38-118	28-118
EN17	5.0	1544126	491678	1.9	6668.85	118.00	58.90	6609.95	38-118	28-118
EN18	5.0	1544075	491622	---	6670.36	120.00	72.20	6598.16	60-120	50-120
EN19	5.0	1544112	491762	---	6670.65	120.00	66.40	6604.25	60-120	50-120
EO1	2.0	1544261	490917	---	6665.00	90.00	47.40	6617.60	30-90	20-90
* EO2	2.0	1544121	490917	---	6666.00	90.00	32.53	6633.47	30-90	20-90
* EO3	2.0	1543999	491025	---	6667.00	90.00	29.52	6637.48	30-90	20-90
EO4	2.0	1543931	491067	---	6670.00	90.00	---	---	30-90	20-90
* EO5	2.0	1543801	490989	---	6668.00	90.00	29.78	6638.22	30-90	20-90
EO6	2.0	1543853	491147	---	6669.00	90.00	22.37	6646.63	30-90	20-90
EO7	2.0	1543907	491238	---	6670.00	90.00	---	---	30-90	20-90
EO8	2.0	1544317	491233	2.0	6667.00	90.00	36.00	6631.00	30-90	20-90
* EO9	2.0	1543524	491174	2.0	6667.00	90.00	---	---	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
* EO10	2.0	1543659	490960	---	6667.00	90.00	31.30	6635.70	30-90	20-90
* EO11	2.0	1543755	491200	---	6668.00	90.00	---	---	30-90	20-90
EO12	2.0	1543859	490944	---	6670.00	90.00	---	---	30-90	20-90
* EO13	2.0	1544016	490914	---	6668.00	90.00	---	---	30-90	20-90
EO14	2.0	1544047	491099	---	6670.00	90.00	58.58	6611.42	30-90	20-90
* EO15	2.0	1544348	491068	---	6666.00	90.00	27.00	6639.00	30-90	20-90
* EO16	2.0	1544413	491293	---	6664.00	90.00	---	---	30-90	20-90
EO17	2.0	1543766	491135	---	6670.00	80.00	60.41	6609.59	50-80	40-80
* EO18	2.0	1544103	491265	---	6670.00	90.00	---	---	30-90	20-90
* EO19	2.0	1544017	491219	---	6668.00	90.00	---	---	30-90	20-90
* EO20	2.0	1543422	491201	---	6664.00	90.00	---	---	30-90	20-90
* EO21	2.0	1543492	490950	---	6664.00	90.00	41.80	6622.20	30-90	20-90
EO22	2.0	1543573	491095	---	6667.00	90.00	---	---	40-90	30-90
* EO23	2.0	1544062	491030	---	6670.00	80.00	41.83	6628.17	40-80	30-80
* EO24	2.0	1543786	491157	---	6670.00	80.00	26.87	6643.13	30-80	20-80
* EO25	2.0	1543707	491136	---	6669.00	80.00	32.60	6636.40	30-80	20-80
* EO26A	2.0	1543727	491060	---	6669.00	80.00	32.15	6636.85	30-80	20-80
EO27	2.0	1543844	491240	---	6669.00	90.00	38.60	6630.40	40-90	30-90
* EO28	2.0	1544121	491198	---	6670.00	90.00	38.60	6631.40	40-90	30-90
EO29	2.0	1543956	490897	---	6669.00	90.00	50.19	6618.81	40-90	-
EO30	2.0	1543962	491037	---	6670.00	90.00	51.13	6618.87	40-90	-
* EO31	2.0	1544187	491208	---	6668.00	90.00	51.35	6616.65	40-90	-
EO32	2.0	1543939	491292	---	6670.00	90.00	---	---	40-90	-
* EO33	2.0	1544158	491122	---	6668.00	90.00	54.85	6613.15	40-90	-
* EO34	2.0	1544239	491148	---	6667.00	90.00	---	---	40-90	-
* EO35	2.0	1544241	491267	---	6668.00	90.00	52.10	6615.90	40-90	-
* EO36	2.0	1544248	490971	---	6666.00	90.00	---	---	40-90	30-90
* EO37	2.0	1544142	490981	---	---	90.00	---	---	40-90	30-90
* EO38	2.0	1543693	490970	---	6666.00	90.00	44.00	6622.00	50-90	40-90
* EO39	2.0	1543630	490965	---	6666.00	90.00	43.00	6623.00	50-90	40-90
* EO40	2.0	1543673	491076	---	6667.00	90.00	44.00	6623.00	50-90	40-90
* EO41	2.0	1543658	491141	---	6667.00	90.00	46.00	6621.00	50-90	40-90
* EO42	2.0	1543794	491039	---	6669.00	90.00	47.99	6621.01	40-90	-
EO43	2.0	1543883	491060	---	6672.00	90.00	---	---	40-90	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
* EO44	2.0	1543820	491138	---	6671.00	90.00	---	---	40-90	-
* EO45	2.0	1544051	491214	---	6669.00	90.00	---	---	40-90	-
EO46	2.0	1543465	491047	---	6665.00	90.00	63.30	6601.70	-	-
EO47	2.0	1543923	491179	---	6670.00	90.00	---	---	-	-
* EO48	2.0	1544057	491293	---	6668.00	90.00	---	---	-	-
* EO49	2.0	1544342	491119	---	6665.00	90.00	57.38	6607.62	-	-
* EP1	2.0	1544321	491380	---	6666.00	90.00	---	---	30-90	20-90
* EP2	2.0	1544182	491348	---	6668.00	90.00	---	---	30-90	20-90
* EP3	2.0	1543990	491413	---	6668.00	90.00	57.60	6610.40	30-90	20-90
* EP4	2.0	1544267	491559	---	6665.00	90.00	41.94	6623.06	30-90	20-90
* EP5	2.0	1544107	491478	---	6667.00	90.00	31.38	6635.62	30-90	20-90
EP6	2.0	1543760	491387	---	6668.00	90.00	46.70	6621.30	30-90	20-90
EP7	2.0	1543552	491452	---	6666.00	90.00	57.00	6609.00	30-90	20-90
* EP8	2.0	1543602	491362	---	6667.00	90.00	---	---	30-90	20-90
* EP9	2.0	1543459	491313	---	6665.00	90.00	---	---	30-90	20-90
* EP10	2.0	1543544	491294	---	6667.00	90.00	---	---	30-90	20-90
* EP11	2.0	1544249	491334	---	6667.00	90.00	---	---	30-90	20-90
* EP12	2.0	1543965	491567	---	6669.00	85.00	36.23	6632.77	35-85	25-85
EP13	2.0	1543730	491514	2.0	6667.00	90.00	40.23	6626.77	40-90	30-90
EP14	2.0	1543891	491355	---	6669.00	90.00	40.50	6628.50	40-90	30-90
* EP15	2.0	1543927	491428	---	6670.00	90.00	---	---	40-90	30-90
EP16	2.0	1543918	491572	---	6671.00	90.00	42.90	6628.10	40-90	30-90
* EP17	2.0	1544081	491426	---	6668.00	90.00	34.80	6633.20	40-90	30-90
* EP18	2.0	1544123	491344	---	6668.00	90.00	39.70	6628.30	40-90	-
* EP19	2.0	1544161	491490	---	6667.00	90.00	58.71	6608.29	40-90	-
* EP20	2.0	1544063	491468	---	6667.00	90.00	33.27	6633.73	40-90	-
* EP21	2.0	1543978	491331	---	6669.00	90.00	39.99	6629.01	-	-
EP22	2.0	1543893	491448	---	6670.00	90.00	---	---	40-90	-
EP23	2.0	1543807	491351	---	6668.00	90.00	54.56	6613.44	40-90	-
* EP24	2.0	1543772	491317	---	6668.00	90.00	---	---	40-90	-
* EP25	2.0	1544311	491442	---	6666.00	90.00	39.80	6626.20	40-90	-
EP26	2.0	1543719	491566	---	6668.00	90.00	---	---	40-90	-
* EP27	2.0	1543831	491315	---	6669.00	90.00	34.98	6634.02	40-90	-
* EP28	2.0	1544088	491380	---	6667.00	90.00	---	---	40-90	-
* EP29	2.0	1544000	491369	---	6668.00	90.00	---	---	40-90	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
EP30	2.0	1543743	491413	---	6667.00	90.00	---	---	40-90	-
EP31	2.0	1543666	491499	---	6667.00	90.00	56.51	6610.49	40-90	-
EP32	2.0	1543951	491501	---	6669.00	90.00	---	---	40-90	-
EP33	2.0	1544203	491434	---	6667.00	90.00	---	---	-	-
* EQ1	2.0	1544297	491686	---	6666.00	90.00	---	---	30-90	20-90
EQ2	2.0	1543606	491621	---	6667.00	90.00	50.57	6616.43	30-90	20-90
* EQ3	2.0	1544407	491631	---	6664.00	90.00	24.36	6639.64	30-90	20-90
EQ5	2.0	1544107	491478	---	6667.00	90.00	---	---	40-90	30-90
EQ9	2.0	1543431	491566	---	6664.00	90.00	---	---	30-90	20-90
* EQ10	2.0	1544144	491612	---	6667.00	90.00	51.50	6615.50	50-90	40-90
* EQ11	2.0	1544079	491690	---	6667.00	90.00	---	---	40-90	-
* EQ12	2.0	1544026	491618	---	6668.00	90.00	42.00	6626.00	40-90	-
EQ13	2.0	1543926	491679	---	6672.00	90.00	46.00	6626.00	40-90	-
EQ14	2.0	1543863	491696	---	6672.00	90.00	55.44	6616.56	40-90	-
* EQ15	2.0	1544319	491654	---	6666.00	90.00	40.10	6625.90	40-90	-
EQ16	2.0	1544165	491729	2.0	6667.00	95.00	52.65	6614.35	85-95	83-95
EQ17	4.0	1544162	491735	---	6667.00	130.00	125.05	6541.95	120-130	118-130
EQ18	2.0	1544148	491739	---	6667.00	95.00	61.79	6605.21	85-95	83-95
EQ19	2.0	1544154	491727	---	6667.00	60.00	44.09	6622.91	50-60	48-60
EQ20	2.0	1544159	491745	---	6667.00	60.00	43.89	6623.11	50-60	48-60
EQ21	2.0	1544173	491747	---	6667.00	95.00	62.28	6604.72	85-95	83-95
EQ22	2.0	1544173	491734	---	6667.00	60.00	43.90	6623.10	50-60	48-60
EQ23	2.0	1544176	491722	---	6667.00	95.00	63.05	6603.95	85-95	83-95
EQ24	2.0	1544184	491738	---	6667.00	60.00	43.91	6623.09	50-60	48-60
EQ25	2.0	1544160	491727	---	6667.00	80.00	49.93	6617.07	70-80	68-80
ER1	2.0	1544354	491845	---	6665.00	90.00	---	---	30-90	20-90
ER2	2.0	1544024	491884	---	6669.00	90.00	---	---	30-90	20-90
ER3	2.0	1543658	491934	---	6667.00	90.00	35.30	6631.70	30-90	20-90
ER4	2.0	1543466	491992	---	6664.00	90.00	---	---	30-90	20-90
ER5	2.0	1543583	491858	---	6666.00	90.00	47.45	6618.55	30-90	20-90
ER6	2.0	1543916	491901	---	6672.00	90.00	---	---	30-90	20-90
ER7	2.0	1544172	491913	---	6667.00	90.00	26.50	6640.50	30-90	20-90
ER8	2.0	1544101	491823	---	6667.00	90.00	---	---	40-90	-
ER9	2.0	1543873	491969	---	6670.00	90.00	---	---	40-90	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
ER10	2.0	1544213	941845	---	6667.00	90.00	36.10	6630.90	40-90	-
ES1	2.0	1543035	491751	1.3	6615.18	49.10	30.10	6585.08	40-50	5-50
ES2	2.0	1543231	491753	1.9	6655.30	76.00	76.00	6579.30	60-80	5-80
ES3	2.0	1543302	491749	2.4	6660.23	86.40	64.00	6596.23	70-90	5-90
ES4	5.0	1543484	491753	4.4	6665.80	99.10	69.52	6596.28	62-102	0-102
ES5	3.0	1543684	491751	2.7	6670.59	96.70	76.51	6594.08	58-98	5-98
ES6	5.0	1543293	491751	1.2	6674.95	97.50	66.09	6608.86	57-97	0-97
ES7	2.0	1543673	491749	2.1	6669.98	35.80	35.80	6634.18	10-37	0-37
ES8	2.0	1543304	491758	2.7	6659.72	36.20	34.98	6624.74	10-38	0-38
ES9	5.0	1543374	491981	4.9	6663.04	113.70	58.80	6604.24	32-112	22-112
ES10	2.0	1543317	491753	---	6660.06	90.00	56.40	6603.66	40-90	-
ES11	2.0	1543280	491200	2.0	6659.00	120.00	67.00	6592.00	60-120	50-120
ES12	4.5	1543290	491440	2.0	6659.00	120.00	60.00	6599.00	60-120	50-120
ES13	4.5	1543340	492200	2.0	6661.00	120.00	72.00	6589.00	60-120	50-120
ES14	4.5	1543350	492300	2.0	6662.00	120.00	87.00	6575.00	60-120	50-120
ES15	4.5	1543360	492420	2.0	6662.00	120.00	87.00	6575.00	60-120	50-120
ES16	4.5	1543380	492500	2.0	6662.00	120.00	67.00	6595.00	60-120	50-120
ET1	2.0	1544375	492127	---	6664.00	90.00	---	---	30-90	20-90
ET2	2.0	1544255	492078	---	6666.00	90.00	---	---	30-90	20-90
ET3	2.0	1544178	492228	---	6666.00	90.00	32.10	6633.90	30-90	20-90
ET4	2.0	1543851	492289	---	6666.00	90.00	33.12	6632.88	30-90	20-90
ET5	2.0	1543676	492229	---	6666.00	90.00	51.58	6614.42	30-90	20-90
ET6	2.0	1543522	492017	---	6665.00	90.00	41.60	6623.40	30-90	20-90
ET7	2.0	1543771	492226	---	6667.00	90.00	33.00	6634.00	30-90	20-90
ET8	2.0	1544095	492092	---	6668.00	90.00	25.46	6642.54	30-90	20-90
ET9	2.0	1543743	492467	---	6664.00	90.00	---	---	30-90	20-90
ET10	2.0	1543607	492105	---	6666.00	85.00	34.12	6631.88	35-85	25-85
ET11	2.0	1544137	492299	---	6665.00	80.00	---	---	30-80	20-80
ET12	2.0	1544006	492001	---	6669.00	90.00	---	---	40-90	-
ET13	2.0	1544045	492227	---	6667.00	90.00	---	---	40-90	-
ET14	2.0	1543970	492232	---	6667.00	90.00	---	---	40-90	-
ET15	2.0	1543810	492070	---	6668.00	90.00	---	---	40-90	-
ET16	2.0	1543779	491995	---	6668.00	90.00	---	---	40-90	-
ET17	2.0	1543929	492099	---	6670.00	90.00	---	---	40-90	-
ET18	2.0	1544194	492045	---	6667.00	90.00	---	---	40-90	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
ET19	2.0	1543914	492282	---	6666.00	90.00	59.58	6606.42	40-90	-
ET20	2.0	1544275	492272	---	6664.00	90.00	70.64	6593.36	40-90	-
NE1	2.0	1544499	492617	1.0	6648.82	67.30	48.63	6600.19	55-75	5-75
NE2	5.0	1544400	492505	0.9	6660.98	92.00	60.90	6600.08	51-91	0-91
NE3	3.0	1544274	492347	4.8	6667.44	94.30	56.00	6611.44	50-92	7-92
NE4	2.0	1544391	492511	1.8	6661.63	27.90	12.25	6649.38	10-30	0-30
NE5	5.0	1544279	492332	3.2	6667.00	156.80	76.71	6590.29	50-110	43-112
NE6	5.0	1544470	492218	2.7	6664.10	113.50	42.50	6621.60	32-112	22-112
NE7	5.0	1544500	491873	2.6	6664.13	113.60	40.20	6623.93	31-111	21-111
NE8	5.0	1544523	491574	4.1	6663.01	113.90	55.40	6607.61	32-112	22-112
NE9	5.0	1544553	491274	2.5	6657.89	114.30	54.90	6602.99	32-112	22-112
NE10	2.0	1544545	491460	2.0	6660.00	120.00	---	---	60-120	-
NE11	4.5	1544560	491350	2.0	6660.00	120.00	59.00	6601.00	60-120	50-120
NE12	4.5	1544550	491170	2.0	6660.00	120.00	64.10	6595.90	60-120	50-120
NE13	4.5	1544560	491060	2.0	6659.00	120.00	56.50	6602.50	60-120	50-120
NW1	2.0	1544698	489173	1.8	6609.59	33.20	32.82	6576.77	20-30	5-30
NW2	2.0	1544556	489298	2.3	6643.72	94.30	81.35	6562.37	70-90	5-90
NW3	5.0	1544416	489423	1.1	6655.01	93.90	70.34	6584.67	52-92	0-92
NW4	2.0	1544407	489419	2.4	6656.15	33.70	33.70	6622.45	10-30	0-30
NW5	5.0	1544408	489433	2.7	6657.58	149.80	42.72	6614.86	39-79	32-75
PW1	5.0	1543305	489914	3.1	6657.34	91.80	50.50	6606.84	50-90	5-90
* PW2	5.0	1543252	490823	3.4	6658.85	88.20	51.80	6607.05	45-85	5-85
PW3	5.0	1543282	491751	3.0	6659.79	93.80	12.10	6647.69	55-95	5-95
PW4	5.0	1544605	490821	4.0	6658.98	79.70	52.53	6606.45	40-80	5-80
SE2	5.0	1543427	492442	3.7	6661.37	94.20	67.90	6593.47	50-90	0-90
SE3	3.0	1543608	492296	4.3	6668.70	95.10	72.69	6596.01	54-94	5-94
SW1	2.0	1543194	489108	3.5	6599.83	32.30	24.25	6575.58	20-30	5-30
SW2	2.0	1543329	489263	3.9	6637.87	52.30	44.05	6593.82	29-49	5-49
SW3	5.0	1543449	489415	1.2	6681.41	84.50	66.12	6615.29	42-82	0-82
SW4	2.0	1543434	489398	3.0	6655.82	38.80	16.82	6639.00	10-38	0-38
T3	4.0	1543632	490809	1.2	6665.68	56.20	55.70	6609.98	-	-
WA1	5.0	1544114	490044	3.0	6660.37	112.40	40.90	6619.47	33-113	23-113
WA2	5.0	1543968	489914	4.0	6662.52	115.00	46.80	6615.72	32-112	22-112
WA3	5.0	1544291	489982	1.6	6658.32	114.30	77.60	6580.72	32-112	22-112

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WA4	5.0	1544428	489870	2.5	6657.10	115.00	83.30	6573.80	45-115	35-115
WA5	5.0	1543796	489941	4.4	6662.28	115.00	37.00	6625.28	45-115	35-115
WA6	5.0	1543987	490056	4.0	6661.45	116.00	101.10	6560.35	36-116	26-116
WA7	5.0	1544040	489940	3.1	6659.26	116.00	64.50	6594.76	36-116	26-116
WA8	5.0	1543897	490053	3.0	6663.89	116.00	86.20	6577.69	36-116	26-116
WA9	5.0	1544154	489928	3.1	6659.41	116.00	63.00	6596.41	36-116	26-116
WA10	5.0	1543876	489992	---	6662.92	118.00	64.10	6598.82	38-118	28-118
WA11	5.0	1544075	489992	2.3	6658.29	117.00	68.50	6589.79	37-117	27-117
WA12	5.0	1543976	489886	2.4	6659.46	110.00	71.70	6587.76	50-110	40-110
WA13	5.0	1544047	489899	1.4	6658.14	120.00	70.10	6588.04	60-120	-
WA14	5.0	1544130	490045	---	6658.34	120.00	---	---	60-120	-
WB1	5.0	1543612	489694	3.0	6658.30	112.00	50.30	6608.00	31-111	21-111
WB2	5.0	1543752	489645	2.3	6657.75	113.00	68.60	6589.15	32-112	22-112
WB3	5.0	1543971	489692	4.3	6657.77	116.20	30.00	6627.77	32-112	22-112
WB4	5.0	1543498	489660	4.5	6659.20	114.60	88.90	6570.30	33-113	23-113
WB5	5.0	1543818	489599	2.1	6657.36	113.00	88.80	6568.56	32-112	22-112
WB6	5.0	1544139	489625	2.6	6657.99	115.70	21.18	6636.81	32-112	22-112
WB7	5.0	1544325	489760	2.6	6657.40	112.00	86.10	6571.30	32-112	22-112
WB8	5.0	1544292	489619	2.3	6654.79	116.00	82.30	6572.49	46-116	36-116
WB9	5.0	1543866	489683	3.0	6659.72	116.00	63.80	6595.92	36-116	26-116
WB10	5.0	1544036	489588	3.0	6657.39	116.00	82.90	6574.49	36-116	26-116
WB11	5.0	1544185	489753	3.4	6659.30	116.00	65.20	6594.10	36-116	26-116
WB12	5.0	1543708	489558	2.6	6657.88	120.00	96.50	6561.38	60-120	50-120
WB13	5.0	1543515	489518	2.0	6657.63	120.00	95.20	6562.43	60-120	50-120
WB14	5.0	1543972	489513	2.0	6656.62	120.00	65.10	6591.52	60-120	50-120
WB15	5.0	1544181	489490	2.0	6656.47	120.00	55.00	6601.47	60-120	50-120
WB16	5.0	1544439	489614	2.0	6655.82	110.00	91.00	6564.82	50-110	45-110
WB17	5.0	1543591	489674	2.0	6658.16	110.00	59.80	6598.36	50-110	45-110
WB18	5.0	1544131	489793	2.6	6658.71	110.00	42.60	6616.11	50-110	45-110
WC1	5.0	1543964	490182	2.7	6664.22	115.00	79.10	6585.12	32-112	20-112
WC2	5.0	1543491	490104	3.6	6658.62	115.00	64.35	6594.27	31-111	21-111
WC3	5.0	1544262	490201	3.1	6661.07	115.70	82.20	6578.87	33-113	23-113
WC4	5.0	1543843	490088	0.4	6662.86	112.30	19.10	6643.76	32-112	22-112
WC5	5.0	1543647	490198	4.9	6662.70	117.80	81.70	6581.00	46-116	36-116
WC6	5.0	1544103	490187	3.2	6661.78	116.00	90.10	6571.68	36-116	26-116

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WC7	5.0	1544038	490126	3.2	6660.53	116.00	98.00	6562.53	36-116	26-116
WC8	5.0	1543881	490227	2.9	6666.68	116.00	88.60	6578.08	36-116	26-116
WC9	5.0	1543962	490265	3.2	6664.74	116.00	22.10	6642.64	36-116	26-116
WC10	5.0	1544196	490296	3.2	6662.40	116.00	102.50	6559.90	36-116	26-116
WC11	5.0	1544188	490091	3.2	6661.06	116.00	82.10	6578.96	36-116	26-116
WC12	5.0	1543568	490249	2.9	6659.93	116.00	76.20	6583.73	36-116	26-116
WC13	5.0	1543758	490107	3.5	6662.20	116.00	22.30	6639.90	36-116	26-116
WC14	5.0	1544428	490059	3.4	6658.57	116.00	104.00	6554.57	36-116	26-116
WC15	5.0	1543951	490256	---	6664.06	76.00	45.49	6618.57	36-76	26-76
WC16	5.0	1543581	490088	2.7	6658.78	118.00	28.36	6630.42	38-118	28-118
WC17	5.0	1543714	490271	1.6	6658.74	120.00	57.70	6601.04	31-120	21-120
WC18	5.0	1544083	490082	2.3	6659.98	115.00	110.00	6549.98	35-115	25-115
WC19	5.0	1544415	490216	2.8	6658.63	120.00	75.70	6582.93	60-120	50-120
WC20	5.0	1543462	490224	3.3	6658.75	120.00	84.30	6574.45	60-120	50-120
WC21	5.0	1544214	491154	2.6	6659.90	110.00	78.20	6581.70	50-110	40-110
WC22	5.0	1544014	490097	2.0	6659.54	110.00	65.60	6593.94	50-110	45-110
WC23	5.0	1543774	490125	2.0	6661.58	110.00	92.30	6569.28	50-110	45-110
WC25	5.0	1543966	490157	---	6656.00	120.00	78.70	6577.30	-	-
WD1	5.0	1543920	489857	5.1	6665.31	41.80	36.01	6629.30	20-40	15-40
WD2	5.0	1543825	489854	4.0	6662.50	44.10	27.94	6634.56	20-40	10-40
WD3	5.0	1543937	489873	3.2	6662.83	44.10	31.10	6631.73	20-40	10-40
WD4	5.0	1543810	489796	3.6	6661.67	115.70	87.30	6574.37	32-112	22-112
WD5	5.0	1544130	489821	3.0	6659.81	115.60	44.80	6615.01	33-113	23-113
WD6	5.0	1544244	489847	3.1	6658.38	116.00	17.90	6640.48	36-116	26-116
WD7	5.0	1543901	489799	3.2	6662.30	116.00	82.70	6579.60	36-116	26-116
WD8	5.0	1543702	489789	3.0	6658.71	116.00	38.90	6619.81	36-116	26-116
WD9	5.0	1544025	489793	3.2	6659.69	116.00	34.80	6624.89	36-116	26-116
WD10	5.0	1543587	489835	3.3	6658.82	118.00	60.80	6598.02	38-118	28-118
WE1	5.0	1543800	490315	6.2	6667.50	112.70	36.10	6631.40	30-110	20-110
WE2	5.0	1543659	490364	3.5	6663.02	112.00	64.40	6598.62	32-112	22-112
WE3	5.0	1543389	490326	2.1	6657.21	112.00	80.50	6576.71	31-111	21-111
WE4	5.0	1543795	490267	3.0	6663.70	83.60	30.10	6633.60	33-113	23-113
WE5	5.0	1544409	490352	2.5	6658.98	116.00	69.50	6589.48	46-116	36-116
WE6	5.0	1544138	490392	1.9	6663.26	116.00	53.20	6610.06	46-116	36-116

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WE7	5.0	1543886	490387	2.1	6667.20	116.00	27.00	6640.20	46-116	36-116
WE8	5.0	1543994	490381	3.3	6666.20	116.00	89.70	6576.50	36-116	26-116
WE9	5.0	1544282	490412	3.0	6661.96	116.00	56.83	6605.13	36-116	26-116
WE10	5.0	1543788	490361	3.0	6664.94	116.00	40.59	6624.35	36-116	26-116
WE11	5.0	1543846	490437	3.4	6667.69	116.00	28.00	6639.69	36-116	26-116
WE12	5.0	1543985	490469	3.5	6667.22	116.00	54.06	6613.16	36-116	26-116
WE13	5.0	1544098	490477	3.3	6666.17	116.00	32.16	6634.01	36-116	26-116
WE14	5.0	1543934	490457	2.0	6668.14	118.00	62.10	6606.04	38-118	28-118
WE15	5.0	1543934	490329	2.1	6665.93	118.00	83.50	6582.43	38-118	28-118
WE16	5.0	1544036	490302	---	6663.25	120.00	52.50	6610.75	60-120	50-120
WE17	5.0	1544517	490316	3.3	6658.59	120.00	58.20	6600.39	60-120	50-120
WE18	---	1543841	490361	---	6665.39	0.00	37.70	6627.69	60-120	-
WF1	5.0	1543484	490385	0.5	6659.91	110.00	41.20	6618.71	31-111	21-111
WF2	5.0	1544261	490502	3.7	6660.82	111.80	63.70	6597.12	28-108	18-108
WF3	5.0	1544085	490574	2.3	6666.04	114.50	33.80	6632.24	32-112	22-112
WF4	5.0	1543966	490544	2.4	6668.17	116.00	36.50	6631.67	46-116	36-116
WF5	5.0	1543789	490487	1.8	6665.36	116.00	83.20	6582.16	46-116	36-116
WF6	5.0	1543557	490495	2.2	6662.08	118.50	35.30	6626.78	46-116	36-116
WF7	5.0	1543688	490656	2.9	6665.78	116.00	66.00	6599.78	36-116	26-116
WF8	5.0	1543868	490605	3.2	6668.59	116.00	46.70	6621.89	36-116	26-116
WF9	5.0	1544221	490610	3.2	6665.70	116.00	65.25	6600.45	36-116	26-116
WF10	5.0	1544362	490663	3.1	6663.39	116.00	39.50	6623.89	36-116	26-116
WF11	5.0	1544171	490488	2.9	6664.84	116.00	57.30	6607.54	36-116	26-116
WF12	5.0	1544425	490512	3.3	6655.65	116.00	39.50	6616.15	36-116	26-116
WF13	5.0	1543981	490676	1.9	6667.05	118.00	54.20	6612.85	38-118	28-118
WF14	5.0	1543609	490680	1.9	6664.63	118.00	40.90	6623.73	38-118	28-118
WF15	5.0	1543695	490537	2.0	6663.69	118.00	33.90	6629.79	38-118	28-118
WF16	5.0	1543426	490517	---	6660.58	120.00	40.80	6619.78	60-120	50-120
WF17	5.0	1543450	490605	2.0	6660.88	120.00	94.80	6566.08	60-120	55-120
WF18	5.0	1543292	490539	---	6657.48	110.00	50.10	6607.38	50-110	45-110
WF19	5.0	1544058	490727	---	6666.33	120.00	---	---	60-120	-
* WI1	2.0	1544272	489712	---	6656.00	90.00	---	---	30-90	20-90
* WI2	2.0	1544081	489705	---	6657.00	90.00	---	---	30-90	20-90
WI3	2.0	1543961	489822	---	6661.00	90.00	---	---	30-90	20-90
WI4	2.0	1543857	489745	---	6658.00	90.00	42.25	6615.75	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WI5	2.0	1543814	489708	---	6657.00	90.00	68.80	6588.20	30-90	20-90
WI6	2.0	1543749	489733	---	6657.00	90.00	18.48	6638.52	30-90	20-90
WI7	2.0	1543678	489713	---	6657.00	90.00	58.91	6598.09	30-90	20-90
WI8	2.0	1543633	489766	---	6657.00	90.00	53.84	6603.16	30-90	20-90
WI9	2.0	1543574	489724	---	6656.00	90.00	52.30	6603.70	30-90	20-90
WI10	2.0	1543400	489790	---	6655.00	90.00	---	---	30-90	20-90
WI11	2.0	1543754	489440	---	6654.00	85.00	---	---	25-85	15-85
WI12	2.0	1544117	489436	---	6654.00	85.00	---	---	25-85	15-85
* WI13	2.0	1544445	489778	---	6655.00	90.00	3.70	6651.30	30-90	20-90
* WJ1	2.0	1544332	489885	---	6657.00	90.00	---	---	30-90	20-90
* WJ2	2.0	1544208	489982	---	6658.00	90.00	---	---	30-90	20-90
WJ3	2.0	1544104	489957	---	6658.00	90.00	---	---	30-90	20-90
WJ4	2.0	1544051	490017	---	6660.00	90.00	---	---	30-90	20-90
WJ5	2.0	1543868	489917	---	6659.00	90.00	49.99	6609.01	30-90	20-90
WJ6	2.0	1543797	490030	---	6659.00	90.00	40.48	6618.52	30-90	20-90
WJ7	2.0	1543963	489991	---	6662.00	90.00	---	---	30-90	20-90
* WJ8	2.0	1544260	489915	---	6657.00	90.00	---	---	30-90	20-90
WJ9	2.0	1543600	489940	---	6657.00	90.00	34.62	6622.38	30-90	20-90
* WK1	2.0	1544306	490111	---	6658.00	90.00	---	---	30-90	20-90
* WK2	2.0	1544181	490196	---	6660.00	90.00	---	---	30-90	20-90
WK3	2.0	1544125	490115	---	6659.00	90.00	---	---	30-90	20-90
WK4	2.0	1544032	490189	---	6661.00	90.00	---	---	30-90	20-90
WK5	2.0	1543878	490139	---	6662.00	90.00	---	---	30-90	20-90
WK6	2.0	1543817	490160	---	6661.00	90.00	---	---	30-90	20-90
WK7	2.0	1543729	490186	---	6660.00	90.00	39.88	6620.12	30-90	20-90
WK8	2.0	1543667	490117	---	6653.00	90.00	50.26	6602.74	30-90	20-90
WK9	2.0	1543589	490167	---	6658.00	90.00	41.03	6616.97	30-90	20-90
WK10	2.0	1544488	490208	---	6657.00	85.00	49.63	6607.37	25-85	15-85
* WL1	2.0	1544314	490323	---	6659.00	90.00	---	---	30-90	20-90
* WL2	2.0	1544222	490438	---	6662.00	90.00	---	---	30-90	20-90
WL3	2.0	1544112	490272	---	6661.00	90.00	---	---	30-60	20-90
WL4	2.0	1544066	490424	---	6664.00	90.00	---	---	30-90	20-90
* WL5	2.0	1543750	490324	---	6661.00	90.00	47.50	6613.50	30-90	20-90
* WL6	2.0	1543741	490457	---	6667.00	90.00	---	---	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
* WL7	2.0	1543658	490287	---	6659.00	90.00	---	---	30-90	20-90
* WL8	2.0	1543579	490366	---	6659.00	90.00	---	---	30-90	20-90
* WL9	2.0	1543367	490224	---	6655.00	90.00	45.50	6609.50	30-90	20-90
* WL10	2.0	1544240	490355	---	6661.00	90.00	---	---	30-90	20-90
WM1	2.0	1544347	490464	---	6660.00	90.00	---	---	30-90	20-90
WM2	2.0	1544302	490572	---	6661.00	90.00	---	---	30-90	20-90
WM3	2.0	1544189	490534	---	6661.43	90.00	33.80	6627.63	30-90	20-90
WM4	2.0	1544132	490518	---	6664.00	90.00	31.80	6632.20	30-90	20-90
WM4A	2.0	1544139	490518	---	---	90.00	---	---	-	-
WM4B	2.0	1544127	490523	---	---	90.00	---	---	-	-
WM4C	2.0	1544135	490526	---	---	90.00	---	---	-	-
WM4D	2.0	1544139	490536	---	---	90.00	---	---	-	-
* WM5	2.0	1543765	490563	---	6664.00	90.00	---	---	30-90	20-90
* WM6	2.0	1543639	490476	---	6661.00	90.00	---	---	30-90	20-90
* WM7	2.0	1543610	490601	---	6663.00	90.00	---	---	30-90	20-90
* WM8	2.0	1543447	490438	---	6658.00	85.00	---	---	25-85	15-85
WME-1	4.0	1543621	489392	1.7	6659.23	57.30	53.60	6605.63	51-56	47-56
WME-2		1544575	490685	2.1	6661.05	64.60	58.49	6602.56	58-63	54-63
WME-6		1544134	491794	1.9	6671.50	67.25	54.75	6616.75	61-66	57-66
WME-4		1543960	490041	2.0	6662.31	67.60	58.18	6604.13	61-66	57-66
WME-3		1543980	492772	2.1	6664.31	67.15	62.13	6602.18	66-71	63-71
WME-5		1544032	491065	2.0	6672.35	77.32	70.75	6601.60	70-75	67-75
WN1	2.0	1544914	489942	1.4	6606.68	38.50	19.15	6587.53	10-35	5-35
WN2	2.0	1544714	489942	1.5	6644.32	63.30	54.10	6590.22	55-75	5-75
* WN3	5.0	1544597	489941	2.3	6654.48	86.70	5.60	6648.88	45-85	0-85
WN4	5.0	1543958	489961	3.0	6662.78	142.40	53.00	6609.78	40-100	33-97
WN5A	2.0	1543966	489968	2.8	6663.53	58.10	24.68	6638.85	32-52	27-52
WN5B	2.0	1543965	489969	2.7	6663.36	100.80	44.27	6619.09	70-100	68-100
WN6	5.0	1544610	490673	4.5	6656.60	114.60	48.20	6608.40	32-112	22-112
WN7	5.0	1544597	489764	4.0	6658.03	114.50	50.40	6607.63	32-112	22-112
* WO1	2.0	1544397	489666	---	6655.00	90.00	---	---	30-90	20-90
* WO2	2.0	1544216	489655	---	6656.00	90.00	---	---	30-90	20-90
WO3	2.0	1544098	489560	---	6656.00	90.00	---	---	30-90	20-90
WO4	2.0	1543925	489594	---	6656.00	90.00	---	---	30-90	20-90
WO5	2.0	1543953	489754	---	6660.00	90.00	---	---	30-90	20-90
WO6	2.0	1543507	489754	---	6656.00	90.00	43.06	6612.94	30-90	25-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WO7	2.0	1543469	389574	---	6655.00	90.00	51.44	6603.56	30-90	25-90
WO8	2.0	1543571	489601	---	6656.00	90.00	52.10	6603.90	30-90	25-90
WO9	2.0	1544223	489549	---	6655.00	90.00	---	---	30-90	25-90
WO10	2.0	1543623	489712	---	6657.00	80.00	60.70	6596.30	50-80	40-80
* WO11	2.0	1544246	489769	---	6656.00	90.00	---	---	30-90	20-90
* WO12	2.0	1544378	489816	---	6656.00	90.00	---	---	30-90	20-90
WO13	2.0	1543908	489733	---	6658.00	90.00	---	---	40-90	30-90
WO14	2.0	1543742	489571	---	6655.00	90.00	---	---	40-90	30-90
WO15	2.0	1543530	489419	2.0	6654.00	90.00	53.46	6600.54	40-90	30-90
WO16	2.0	1543640	489503	2.0	6653.00	90.00	44.85	6608.15	40-90	30-90
WO17	2.0	1544360	489539	2.0	6653.00	90.00	49.50	6603.50	40-90	30-90
* WO18	2.0	1544575	489634	2.0	6651.00	90.00	45.80	6605.20	40-90	30-90
WO19	2.0	1543840	489485	2.0	6653.00	90.00	52.80	6600.20	40-90	30-90
WO20	2.0	1544028	489435	---	6653.00	90.00	58.90	6594.10	40-90	30-90
WO21	2.0	1543429	489688	2.0	6653.00	90.00	59.72	6593.28	40-90	30-90
* WO22	2.0	1544694	489765	---	6657.00	90.00	---	---	40-90	35-90
WO23	2.0	1543828	489733	---	6657.00	90.00	---	---	40-90	35-90
WO24	2.0	1543764	489782	---	6657.00	90.00	37.60	6619.40	40-90	-
* WO25	2.0	1544132	489688	---	6656.00	90.00	40.21	6615.79	-	-
* WO26	2.0	1544180	489803	---	6657.00	90.00	45.18	6611.82	-	-
WO27	2.0	1543854	489811	---	6658.00	90.00	35.73	6622.27	-	-
WO28	2.0	1543656	489618	---	6655.00	90.00	48.82	6606.18	40-90	-
WO29	2.0	1543890	489554	---	6656.00	0.00	---	---	-	-
WO30	2.0	1544021	489735	---	6659.00	90.00	34.02	6624.98	40-90	-
WO31	2.0	1544297	489510	---	6666.00	90.00	53.75	6612.25	40-90	-
WO32	2.0	1544312	489688	---	6655.00	90.00	64.72	6590.28	40-90	-
WO33	2.0	1543969	489590	---	6656.00	90.00	---	---	40-90	-
WO34	2.0	1543811	489672	---	6657.00	90.00	---	---	40-90	-
WO35	2.0	1543545	489663	---	6655.00	90.00	---	---	40-90	-
WO36	2.0	1543705	489635	---	6656.00	90.00	---	---	-	-
WO37	2.0	1543873	489626	---	6657.00	90.00	---	---	-	-
WO38	2.0	1544083	489810	---	6657.00	90.00	---	---	-	-
WO39	2.0	1544038	489521	---	6655.00	90.00	---	---	-	-
WO40	2.0	1544138	489562	---	6655.00	90.00	---	---	-	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
* WO41	2.0	1544300	489821	---	6656.00	90.00	---	---	-	-
WO42	2.0	1543971	489792	---	6660.00	90.00	---	---	-	-
* WP1	2.0	1544383	489991	---	6657.00	90.00	---	---	30-90	20-90
* WP2	2.0	1544179	489852	---	6657.00	90.00	---	---	30-90	20-90
WP3	2.0	1544123	490077	---	6659.00	90.00	---	---	30-90	20-90
WP4	2.0	1544067	489849	---	6659.00	90.00	---	---	30-90	20-90
WP5	2.0	1543768	489825	---	6658.00	90.00	58.86	6599.14	30-90	20-90
WP6	2.0	1543673	489841	---	6657.00	90.00	52.53	6604.47	30-90	20-90
* WP7	2.0	1544494	489981	2.0	6656.00	90.00	51.00	6605.00	30-90	20-90
* WP8	2.0	1544514	489859	---	6655.00	90.00	55.73	6599.27	30-90	20-90
WP9	2.0	1543636	490032	---	6666.00	90.00	---	---	40-90	30-90
WP10	2.0	1543744	490033	2.0	6658.00	90.00	64.26	6593.74	40-90	30-90
WP11	2.0	1543913	489945	---	6661.00	90.00	---	---	40-90	30-90
WP12	2.0	1544018	489868	---	6660.00	90.00	---	---	40-90	30-90
* WP13	2.0	1544149	490012	---	6658.00	90.00	44.24	6613.76	40-90	30-90
WP14	2.0	1544038	490084	---	6660.00	90.00	38.20	6621.80	40-90	30-90
* WP15	2.0	1544598	489852	---	6655.00	90.00	60.02	6594.98	40-90	30-90
WP16	2.0	1544009	489996	---	6660.00	90.00	65.55	6594.45	40-90	35-90
WP17	2.0	1543855	490043	2.0	6659.00	90.00	31.09	6627.91	40-90	35-90
WP18	2.0	1543725	489866	---	6657.00	90.00	38.70	6618.30	40-90	35-90
WP19	2.0	1544092	489881	2.0	6657.00	90.00	40.30	6616.70	40-90	30-90
WP20	2.0	1543473	489853	2.0	6658.00	90.00	25.10	6632.90	40-90	30-90
WP21	2.0	1543952	489853	2.0	6661.00	90.00	23.80	6637.20	40-90	30-90
* WP22	2.0	1544136	489865	---	6657.00	90.00	50.60	6606.40	40-90	-
* WP23	2.0	1544209	489899	---	6657.00	90.00	45.77	6611.23	40-90	-
* WP24	2.0	1544252	490027	---	6658.00	90.00	42.36	6615.64	40-90	-
WP25	2.0	1544003	489933	---	6660.00	90.00	46.17	6613.83	40-90	-
WP26	2.0	1543815	489873	---	6657.00	90.00	33.79	6623.21	40-90	-
WP28	2.0	1543823	489977	---	6658.00	90.00	35.20	6622.80	40-90	-
WP29	2.0	1543890	489554	---	6658.00	90.00	61.05	6596.95	-	-
WP30	2.0	1544019	490029	---	6660.00	90.00	34.30	6625.70	40-90	-
WP31	2.0	1544343	490049	---	6657.00	90.00	18.15	6638.85	40-90	-
WP32	2.0	1544084	490037	---	6659.00	90.00	---	---	-	-
WP33	2.0	1543739	489983	---	6657.00	90.00	---	---	40-90	-
* WP34	2.0	1543943	490055	---	6663.00	90.00	---	---	40-90	-

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WP35	2.0	1543943	489842	---	6660.00	90.00	---	---	40-90	-
WP36	2.0	1543919	489993	---	6661.00	90.00	---	---	40-90	-
WP37	2.0	1543654	489887	---	6656.00	90.00	---	---	-	-
WP38	2.0	1543789	489868	---	6657.00	90.00	---	---	-	-
WP39	2.0	1543891	489901	---	6659.00	90.00	---	---	-	-
WP40	2.0	1543974	490009	---	6661.00	90.00	---	---	-	-
* WP41	2.0	1544124	489982	---	6658.00	90.00	---	---	-	-
* WQ1	2.0	1544353	490205	---	6658.00	90.00	---	---	30-90	20-90
* WQ2	2.0	1543950	490105	---	6663.00	90.00	---	---	30-90	20-90
* WQ3	2.0	1543429	490130	---	6655.00	90.00	46.00	6609.00	30-90	20-90
* WQ4	2.0	1544254	490104	---	6658.00	90.00	---	---	40-90	30-90
WQ5	2.0	1543992	490126	---	6662.00	90.00	---	---	40-90	30-90
WQ7	2.0	1544011	490231	2.0	6661.00	90.00	32.35	6628.65	40-90	30-90
* WQ8	2.0	1543900	490141	---	6662.00	90.00	---	---	40-90	30-90
* WQ9	2.0	1544214	490150	---	6659.00	90.00	---	---	40-90	35-90
WQ10	2.0	1544069	490160	---	6660.00	90.00	32.95	6627.05	40-90	-
* WQ11	2.0	1544156	490141	---	6659.00	90.00	34.98	6624.02	40-90	-
* WQ12	2.0	1544011	490166	---	6661.00	90.00	51.30	6609.70	40-90	-
WQ13	2.0	1544071	490254	---	6661.00	90.00	31.54	6629.46	-	-
WQ14	2.0	1543812	490104	---	6660.00	90.00	30.25	6629.75	40-90	-
WQ15	2.0	1543779	490216	---	6661.00	90.00	---	---	40-90	-
* WQ16	2.0	1543685	490234	---	6659.00	90.00	---	---	40-90	-
* WQ17	2.0	1544151	490240	---	6660.00	90.00	32.45	6627.55	40-90	-
* WQ18	2.0	1543924	490182	---	6664.00	90.00	---	---	50-100	-
WQ19	2.0	1544088	490136	---	6659.00	90.00	---	---	40-90	-
* WQ20	2.0	1543978	490213	---	6663.00	90.00	---	---	-	-
WS1	2.0	1543049	489909	0.7	6607.11	36.90	10.25	6596.86	27-37	5-37
WS2	2.0	1543255	489911	2.2	6649.44	77.30	57.45	6591.99	55-75	5-75
WS3	2.0	1543325	489915	2.4	6656.62	79.70	43.10	6613.52	60-80	5-80
WS4	5.0	1543494	489944	4.0	6659.57	89.40	59.13	6600.44	53-93	0-93
WS5	5.0	1543681	489940	3.7	6660.58	90.90	35.60	6624.98	52-92	0-92
WS6	5.0	1543385	489626	2.4	6657.23	113.30	45.70	6611.53	31-111	21-111
WS7	5.0	1543336	490118	4.4	6659.12	114.50	42.50	6616.62	32-112	22-112
* WT1	2.0	1543502	490289	---	6667.00	90.00	47.25	6619.75	30-90	20-90

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WT2	2.0	1543923	490229	---	6665.00	90.00	---	---	30-90	20-90
* WT3	2.0	1544506	490404	---	6657.00	90.00	60.21	6596.79	30-90	20-90
* WT4	2.0	1544457	490288	---	6657.00	90.00	---	---	30-90	20-90
WT5	2.0	1544069	490364	---	6663.00	90.00	---	---	30-90	20-90
WT6	2.0	1544412	490441	2.0	6657.00	90.00	53.34	6603.66	40-90	30-90
* WT7	2.0	1543874	490294	---	6664.00	90.00	31.66	6632.34	40-90	30-90
WT8	2.0	1543949	490377	---	6667.00	90.00	62.03	6604.97	40-90	30-90
* WT9	2.0	1543614	490250	2.0	6659.00	90.00	33.00	6626.00	40-90	30-90
WT10	2.0	1543991	490300	2.0	6663.00	90.00	29.29	6633.71	40-90	35-90
* WT11	2.0	---	---	---	6663.00	100.00	37.80	6625.20	40-90	-
WT13	2.0	1544129	490453	---	6663.00	90.00	---	---	40-90	35-90
* WT14	2.0	1544203	490406	---	6662.00	90.00	---	---	40-90	35-90
WT15	2.0	1544243	490255	---	6660.00	90.00	56.63	6603.37	40-90	-
* WT16	2.0	1544176	490342	---	6661.00	90.00	34.20	6626.80	40-90	-
* WT17	2.0	1543910	490270	---	6665.00	90.00	29.70	6635.30	50-100	-
WT18	2.0	1543696	490330	---	6660.00	90.00	66.62	6593.38	40-90	-
WT19	2.0	1543833	490258	---	6662.00	90.00	---	---	-	-
* WU1	2.0	1543493	490548	---	6666.00	90.00	49.97	6616.03	30-90	20-90
WU2	2.0	1543944	490671	---	6667.00	90.00	37.00	6630.00	30-90	20-90
WU3	2.0	1544457	490642	---	6659.00	90.00	---	---	30-90	20-90
WU4	2.0	1544110	490668	2.0	6664.00	90.00	36.00	6628.00	40-90	35-90
* WU5	2.0	1543503	490473	---	6660.00	90.00	---	---	40-90	30-90
WU6	2.0	1544365	490563	2.0	6661.00	90.00	37.60	6623.40	40-90	30-90
WU7	2.0	1544057	490483	0.9	6663.08	90.00	41.00	6622.08	30-90	20-90
WU9	2.0	1543871	490696	2.0	6666.00	90.00	41.00	6625.00	40-90	30-90
WU10	2.0	1544132	490507	1.3	6663.00	90.00	35.10	6627.90	40-90	-
WU11	2.0	1544132	490512	1.4	6663.00	90.00	35.20	6627.80	40-90	-
WU12	2.0	1544035	490520	1.6	6663.00	90.00	34.15	6628.85	40-90	-
* WU13	2.0	1543744	490514	---	6663.00	90.00	---	---	40-90	-
* WU14	2.0	1543693	490455	---	6661.00	90.00	---	---	40-90	-
WW1	2.0	1543894	489023	2.7	6603.09	33.00	23.45	6579.64	20-30	5-30
WW2	2.0	1543894	489222	2.9	6643.64	64.90	64.90	6578.74	45-65	5-65
WW3	3.0	1543893	489423	5.4	6659.54	80.50	49.72	6609.82	48-88	5-88
WW4	5.0	1544269	489422	3.0	6657.00	114.90	40.80	6616.20	32-112	22-112
WW5	5.0	1543605	489420	5.0	6659.24	115.90	71.20	6588.04	33-113	23-113

* = abandoned

Table 3.1-1. WELL DATA FOR TAILINGS WELLS ON THE LARGE TAILINGS PILE. (cont'd.)

WELL NAME	CASING DIAMETER (in)	NORTH. COORD.	EAST. COORD.	STICKUP (ft)	MP ELEV. (ft-msl)	TOTAL DEPTH (ft-mp)	DEPTH TO WATER (ft-mp)	WATER LEVEL ELEVATION (ft-msl)	CASING PERFORATIONS (ft-lsd)	SAND PACK (ft-lsd)
WW6	4.5	1544350	489380	2.0	6656.00	120.00	75.10	6580.90	60-120	50-120
WW7	4.5	1544190	489380	2.0	6656.00	120.00	80.60	6575.40	60-120	50-120
WW8	4.5	1543680	489350	2.0	6656.00	120.00	90.00	6566.00	60-120	50-120
WW9	4.5	1543680	489380	2.0	6656.00	120.00	90.00	6566.00	60-120	50-120
WW10	4.5	1543400	489460	2.0	6656.00	120.00	80.00	6576.00	60-120	50-120

* = abandoned

3.2 TAILINGS WATER LEVELS

The volume of water collected from the tailings dewatering wells (light blue bars) and the toe drains (green bars) are presented on Figure 3.1-4. There was no active dewatering of the LTP during 2018. The tailings flushing injection was discontinued in mid-2015 and the tailings dewatering rates in 2016 and 2017 were approximately 5 gpm and 1.3 gpm, respectively. Because the recent dewatering rates are very small and the tailings flushing injection was discontinued more than three years prior to this reporting, the changes in tailings water levels in 2018 are almost entirely a result of natural slime and sand tailings exchange and natural drainage from the tailings. The final cover has not been constructed on the top of the LTP and the natural recharge is greater than will occur when reclamation is complete. However, the top of the LTP has been graded and shaped to prevent significant ponding and the typical recharge is expected to be dramatically less than the equivalent of one inch of recharge over the top of the LTP or approximately 5 gpm.

The typical decline in tailings water levels during 2018 was approximately two feet (see Table A.1-1 in Appendix A and Figure 3.2-1). This has resulted in a slight reduction in the saturated footprint of the LTP area. An analysis of the water volume change in the saturated tailings in the LTP indicates a reduction of approximately 15,161,000 gallons over 2018 which equates to a reduction rate of approximately 28.8 gpm. The composite discharge from the toe drains during 2018 was approximately 8.8 gpm and this indicates that the effective LTP seepage rate was approximately 20 gpm or the difference between water volume change rate and toe drain discharge rate.

The volume of water collected from the tailings dewatering wells (light blue bars) and the toe drains (green bars) are presented on Figure 3.1-4 to show the changes in collection rate with time. 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. Prior to mid-2015, the dewatering rates ranged up to 105 gpm. With the discontinuation of flushing injection, the potential yields from dewatering wells have decreased dramatically.

3.2.1 TAILINGS WATER LEVEL CHANGES

Numerous wells were monitored for water level change during 2018 and the water-level elevations for years 2009 through 2018 are presented Figures 3.2-2 through 3.2-7 with a general grouping by area.

Wells CN1, CN2, CS1 and CS2 are located on the north (CN1 and CN2) and south (CS1 and CS2) outslopes of the LTP roughly at the east to west midpoint of the LTP, and the measured water levels since 2009 are presented in Figure 3.2-2. A strong declining trend in water-level elevation has been occurring in all four sand tailings wells since mid-2015 although there have been some erratic measurements in wells CN2 and CS1. The abrupt water level decline in well CN2 in late 2017 with a return to a higher water level in late 2018 is believed to be a result in erroneous readings during the last few months of 2017 and most of 2018. Water level declines in wells CN1 and CS2 have been at roughly 2.5 and 3.0 feet/year, respectively for approximately two years. There are higher water-level elevations in the slime area to the east of these wells and the horizontal drainage from the slimes is likely supplying tailings water to support the water levels in the perimeter wells.

Wells EE2, NE1, NE2 and SE2 are located on the eastern side of the LTP and the measured water levels since 2009 are presented in Figure 3.2-3. A declining trend in water-level elevation has been occurring in all four wells since mid-2015. The strongest declining trend occurred in well NE1 which is located on the northeast outslope of the LTP. There are higher water-level elevations in the slime area to the west of these wells and the horizontal drainage from the slimes is likely supplying tailings water to support the water levels in the perimeter wells.

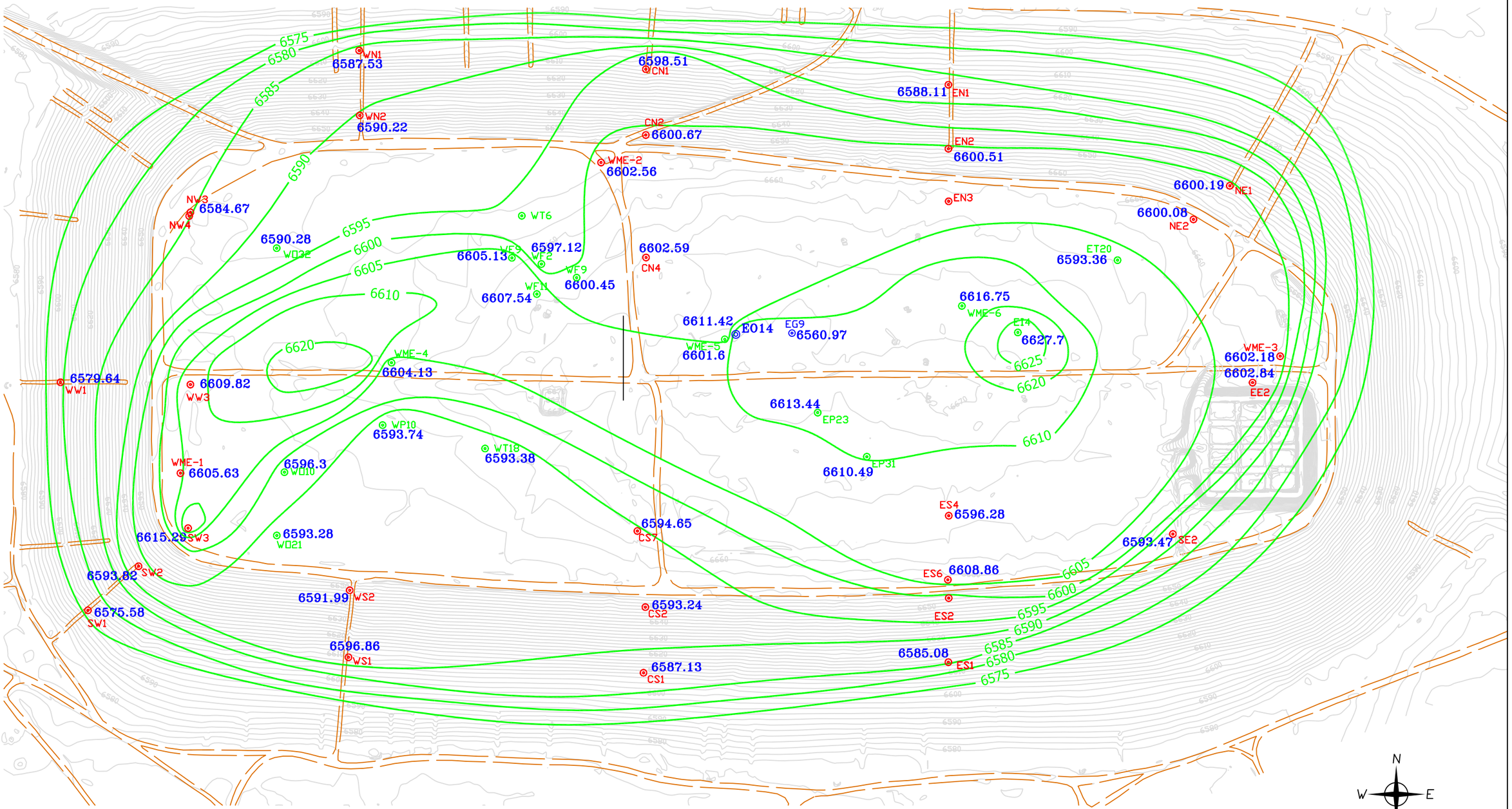
Sand tailings wells EN1, EN2, ES1 and ES1 are located on the north (EN1 and EN2) and south (ES1 and ES2) outslopes of the LTP roughly at the east to west midpoint of the eastern cell of the LTP, and the measured water levels since 2009 are presented in Figure 3.2-4. A strong declining trend in water-level elevation since 2015 has been occurring in well EN2 with a milder trend in well EN1. Water level changes in the two southern wells since 2015 have been somewhat erratic with no significant trends.

Sand tailings wells WN1, WN2, WS1 and WS1 are located on the north (WN1 and WN2) and south (WS1 and WS2) outslopes of the LTP roughly at the east to west midpoint of

the western cell of the LTP, and the measured water levels since 2009 are presented in Figure 3.2-5. A strong declining trend in water-level elevation since 2015 has been occurring in wells WN2 and WS2 with a slightly milder declining trend in well WN1. The water-level elevation in well WS1 has been erratic with a relatively modest decline since 2015, and there is a gradient reversal between wells WS1 and WS2 since 2017. This gradient reversal is not consistent with the general radially outward tailings water flow direction from the slime areas in the tailings, and is likely a result of the water level in well WS1 being affected by proximity to the southern toe drain. With the measured water-level elevation in well WS1 likely affected by the toe drains, it is not representative of the tailings and is not honored in the contouring in Figure 3.2-5.

Wells SW1, SW2, WO10 and WW1 are located on the western and southwestern side of the LTP and the measured water levels since 2009 are presented in Figure 3.2-6. A relatively mild declining water-level elevation trend is occurring in all four wells since mid-2015. A mound in the potentiometric surface occurs in the western side of the slime tailings in the western half of the LTP, and past water level measurements are used in the contouring of the residual mound shown in Figure 3.2-1. The horizontal outward movement of tailings water from the slime tailings to the sand tailings on the LTP outslopes reduces the rate of water level decline in the area represented by wells SW1, SW2, and WW1. With the very small permeability of the slime tailings, there are also likely confining layers in the slimes that restrict vertical tailings water movement and cause partial or local perching of tailings water within the slime tailings.

Slime tailings wells WE9, WF2, WF9 and WF11 are located in the northeastern portion of the western slime cell of the LTP and the measured water levels since 2009 are presented in Figure 3.2-7. There is a limited number of measurements between 2011 and 2018, but there is a declining water level trend in all wells during 2018. The water-level elevations have declined by approximately 24 to 33 feet since the flushing program was discontinued.



LEGEND

6587.13 CS1 — SAND WELL LOCATION AND 2018 WATER-LEVEL ELEVATION

WT18 6593.38 — SLIME WELL LOCATION AND 2018 WATER-LEVEL ELEVATION

EG9 6560.97 — PERCHED WELL LOCATION AND 2018 WATER-LEVEL ELEVATION

6605 — WATER-LEVEL ELEVATION CONTOUR

N W E S

0 150 300 600 Feet

FIGURE 3.2-1. WATER-LEVEL ELEVATIONS OF THE LTP, FALL 2018, FT-MSL

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

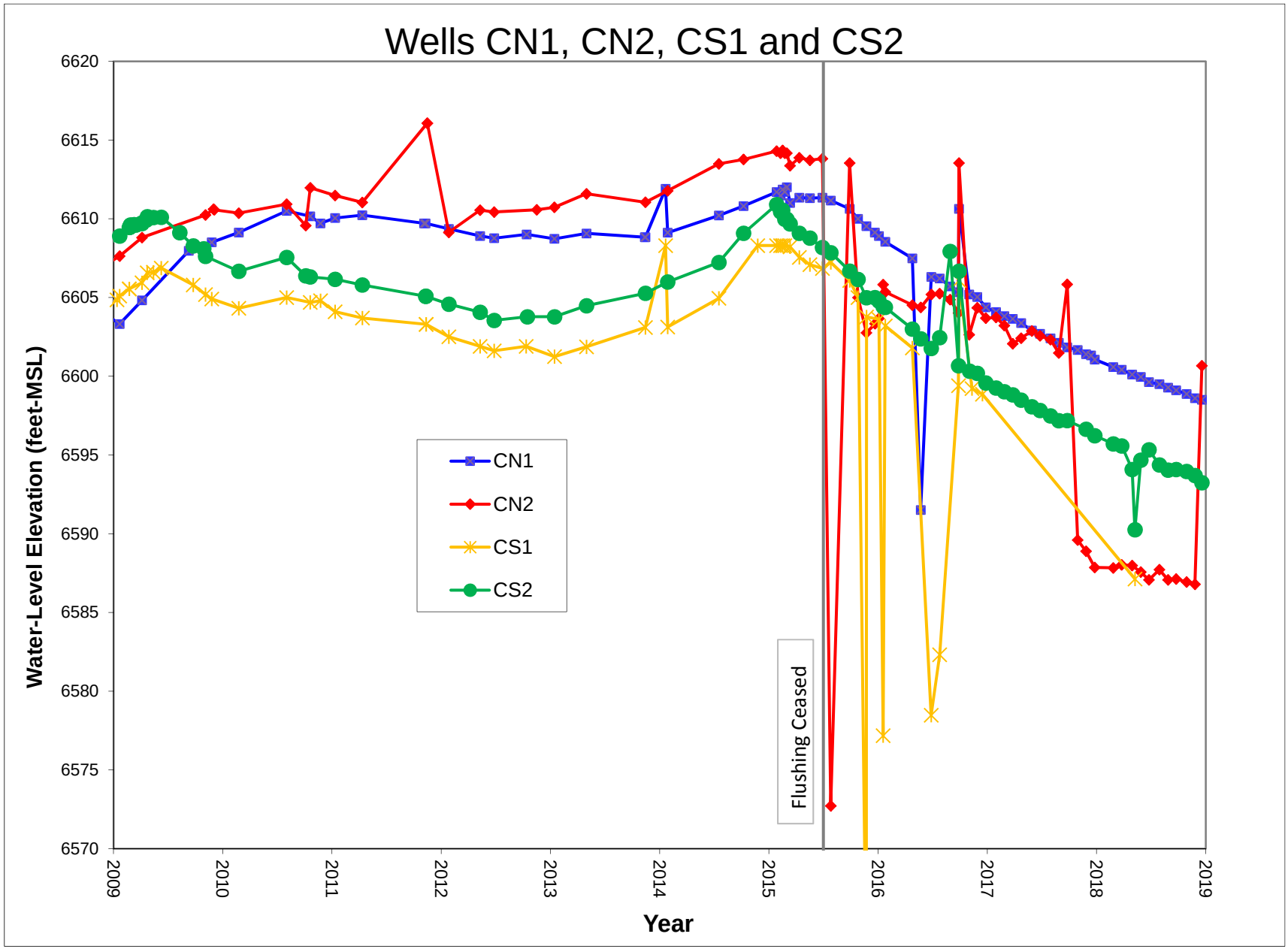


Figure 3.2-2. Water-Level Elevation ForTailings Wells CN1, CN2, CS1 and CS2

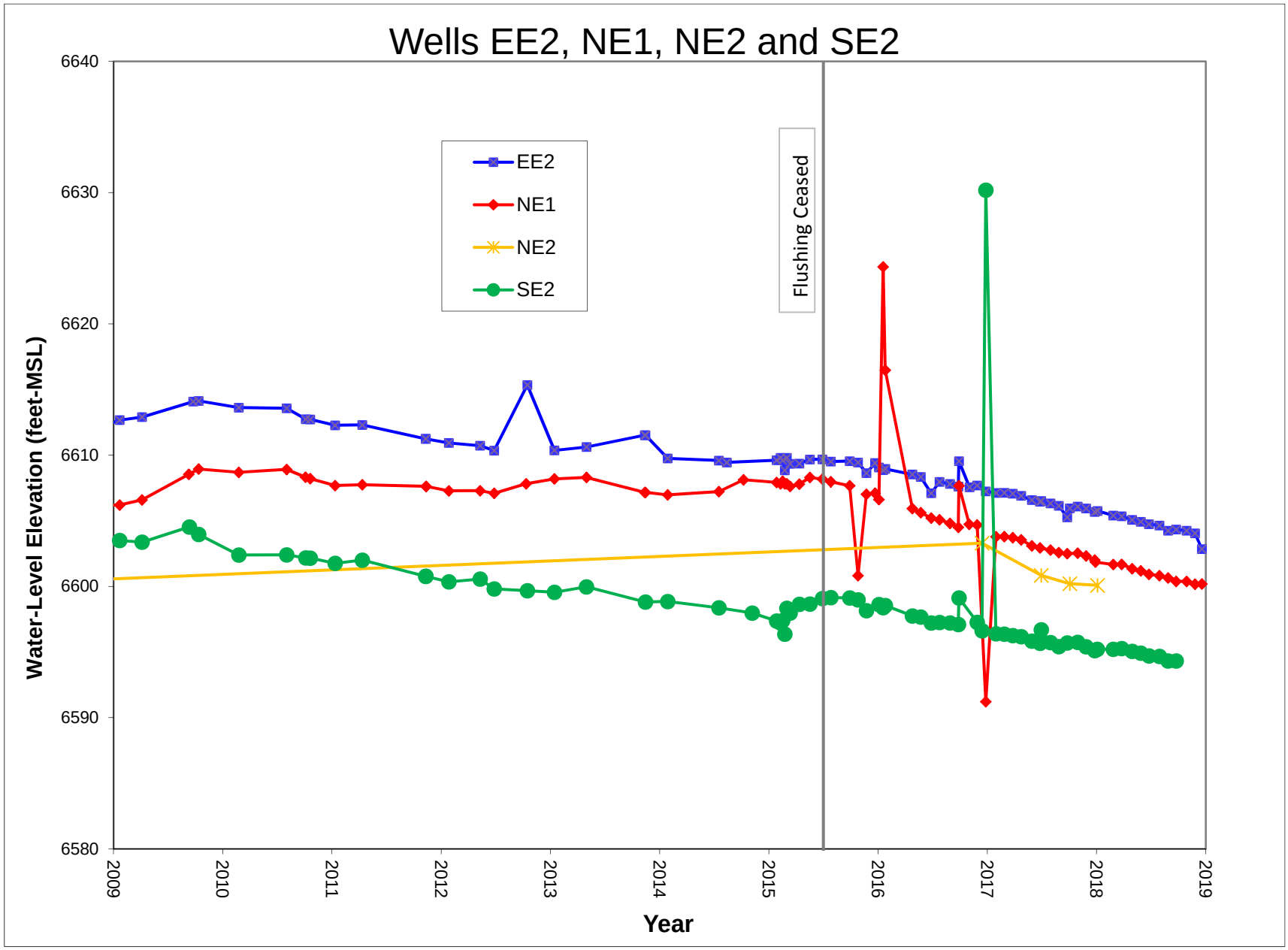


Figure 3.2-3. Water-Level Elevation ForTailings Wells EE2, NE1, NE2 and SE2

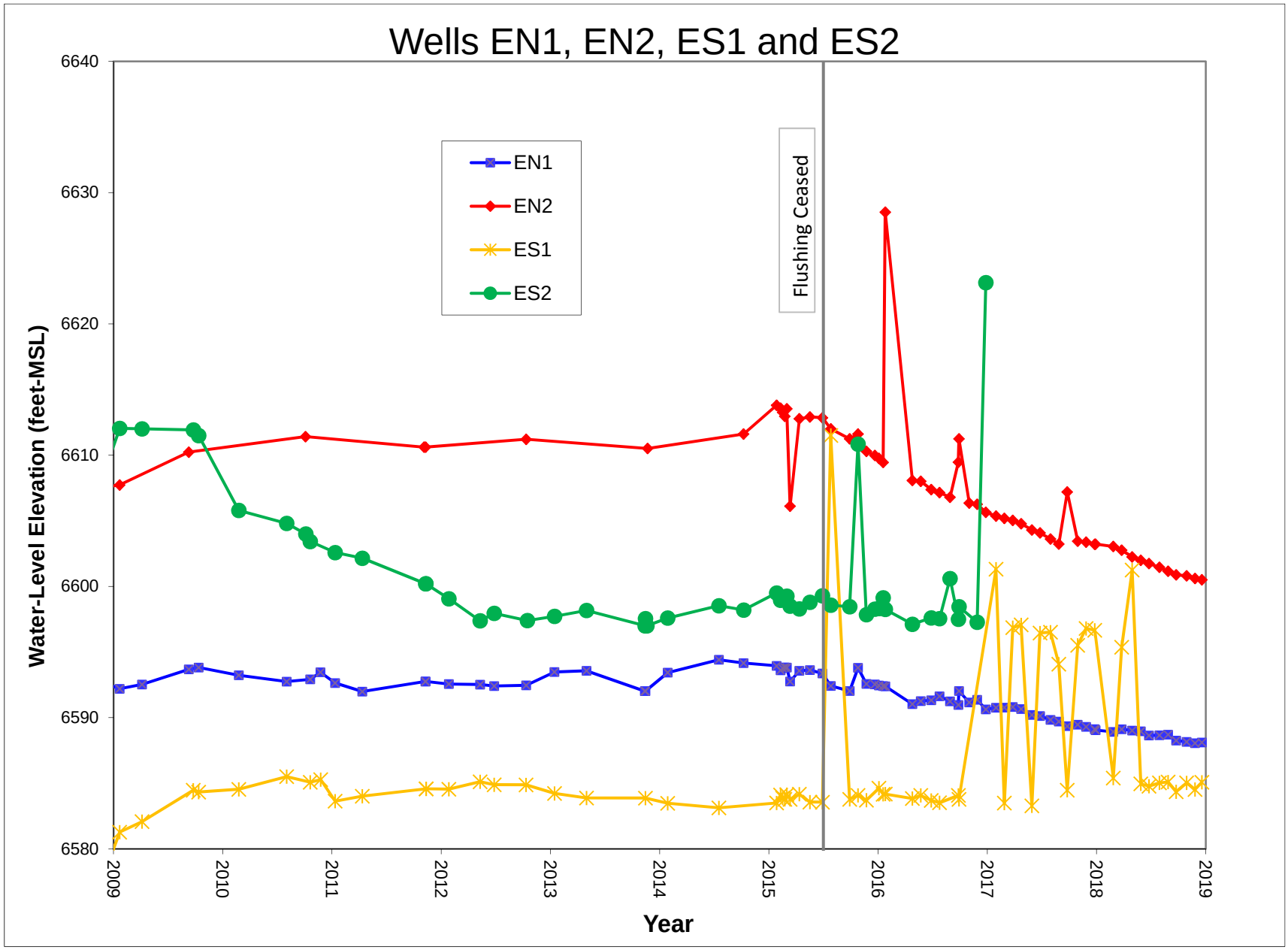


Figure 3.2-4. Water-Level Elevation For Tailings Wells EN1, EN2, ES1 and ES2

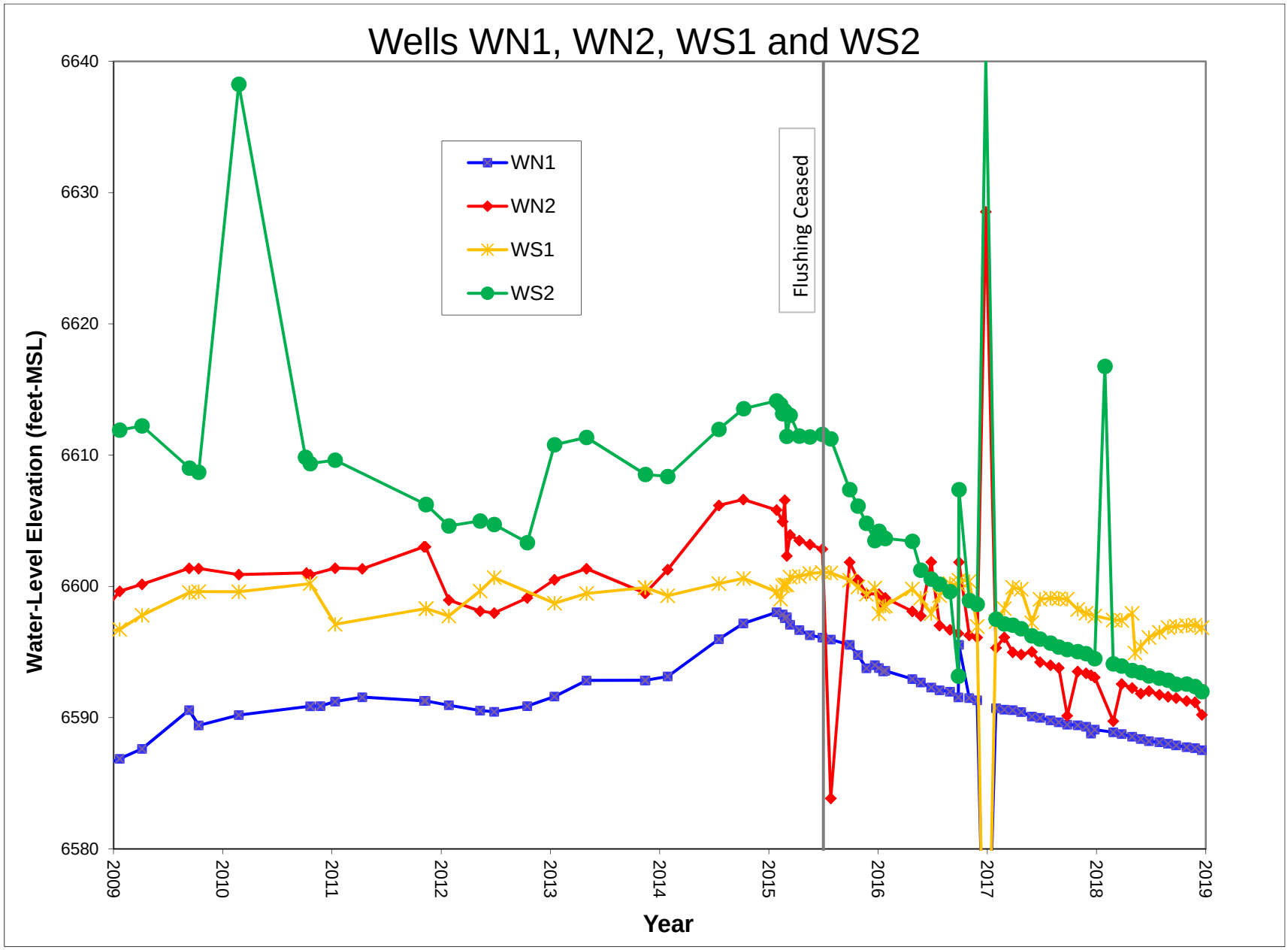


Figure 3.2-5. Water-Level Elevation For Tailings Wells WN1, WN2, WS1 and WS2

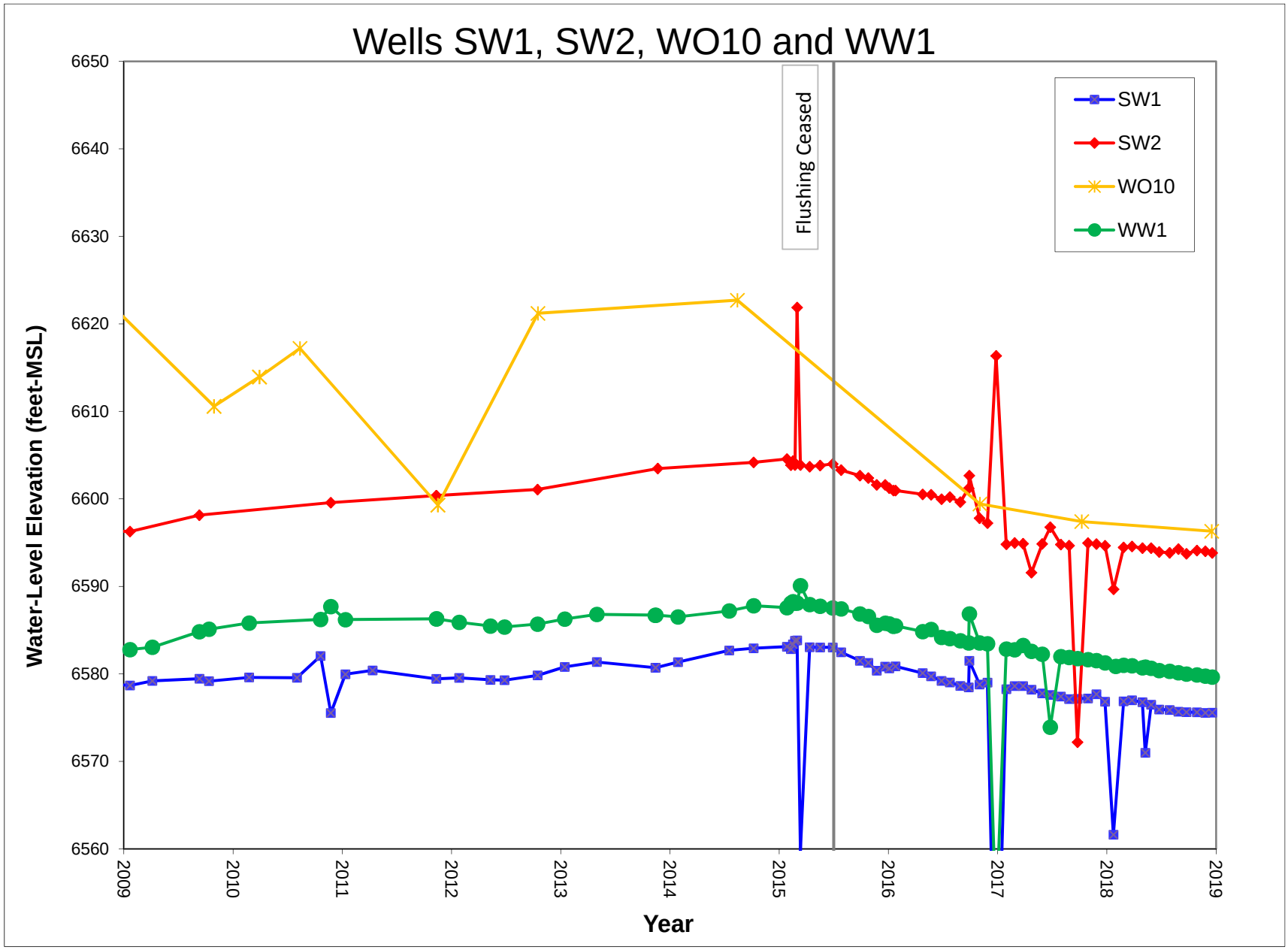


Figure 3.2-6. Water-Level Elevation For Tailings Wells SW1, SW2, WO10 and WW1

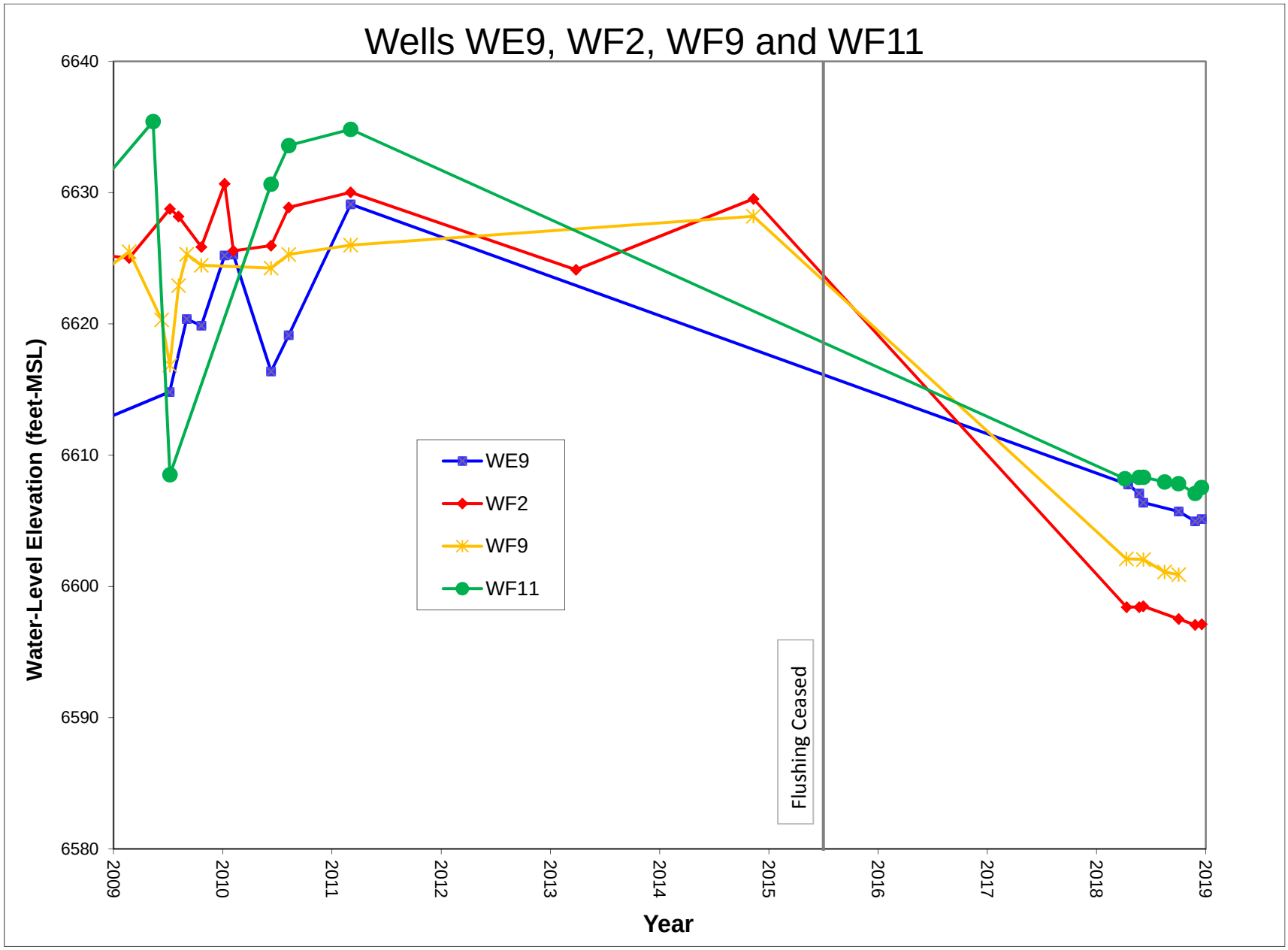


Figure 3.2-7. Water-Level Elevation For Tailings Wells WE9, WF2, WF9 and WF11

3.3 TAILINGS WATER QUALITY

Table 2.1-1 presents the quantity of constituents collected from the tailings wells since dewatering began. Tables B.1-1 and B.1-2 of Appendix B present chemical analyses of tailings well water during 2018. Uranium is a key water quality indicator constituent for the tailings solution. A series of five uranium concentration mapping figures are presented to convey the changes in uranium in the LTP with time. Figure 3.3-1 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 uranium concentration was present. The green pattern shows the area of 20 to 30 mg/l uranium concentration and the cyan color shows where uranium concentrations were less than 10 mg/l. Figures 3.3-2, 3.3-3, 3.3-4 and 3.3-5 present the tailings solution uranium concentrations for 2004, 2008, 2015 and 2018 respectively. These figures show the decline in uranium concentrations with time. Figures 3.3-6 through 3.3-26 present graphs of uranium, molybdenum and selenium concentration over time for selected tailings wells, toe drain sumps, and a well completed in the perched sand beneath the LTP. Table 3.3-1 presents estimated average uranium, molybdenum and selenium concentrations for the water in the saturated portion of the LTP. The average constituent concentrations are calculated using concentration contours and mapping of the saturated thickness in the LTP. Surface modeling software (QUICKSURF) is used to multiply the constituent concentration surface by the saturated thickness distribution over the LTP and that product is then divided by the saturated volume in the LTP to determine the average concentration.

3.3.1 URANIUM CONCENTRATION MAPPING

Figures 3.3-1 through 3.3-5 were developed using measured uranium concentrations in samples from tailings wells in conjunction with operational configurations for the flushing injection and tailings dewatering wells. As an example, the generally circular areas of lower concentration shown in Figure 3.3-1 are located at operating injection wells or groups of injection wells. Figures 3.3-2, 3.3-3 and 3.3-4 show the expansion of these areas of the LTP that have been flushed with the injection water. The injection wells were not sampled during the

operation of the flushing program but each injection well had an area of influence and these areas gradually merged with the flushing progress as shown in Figures 3.3-2, 3.3-3 and 3.3-4.

Following the cessation of injection in mid-2015, there was redistribution and exchange of resident water within the LTP and Figure 3.3-5 presents the tailings solution uranium concentration for the tailings in 2018. Because there has been no active injection since mid-2015, the decay of the mounds in the potentiometric surface around injection wells and the associated redistribution of tailings solution allows representative samples to be collected from the former injection wells as well as former dewatering wells and monitoring wells. The pattern of uranium concentrations shown in Figure 3.3-5 reflects this redistribution.

3.3.2 SAND TAILINGS WATER QUALITY

A series of graphs presenting uranium, molybdenum and selenium concentration over time were developed for selected wells in the LTP. For the sand tailings, these graphs are presented in Figures 3.3-6 through 3.3-16 with concentration data for two wells included on each graph. The grouping of wells for each graph is based on general location and the nature of the tailings in the area of the well. The uranium concentrations for the two wells are shown with blue or cyan lines and symbols, and the molybdenum concentrations are shown with red or orange lines and symbols. The selenium concentrations are typically much smaller than uranium concentrations and are plotted with dark and light green lines with the scale on the right axis as shown on the series of graphs.

Figures 3.3-6 and 3.3-7 present uranium, molybdenum and selenium concentration over time for well pairs CN1 and CN2, and CS1 and CS2. These well pairs are located at the north and south ends, respectively, of the central sand dike in the LTP (see Figure 3.1-2). For well CN1, both the uranium and molybdenum concentration were erratic through 2013 with a declining concentration trend that likely indicates a change in the flushing program that caused additional flushing progress after 2013 (see Figure 3.3-6). The selenium concentration was also erratic with a declining trend beginning in 2016. The constituent concentrations in well CN2 were generally lower than those in CN1 with a declining trend in uranium and molybdenum concentration beginning in 2015. For wells CS1 and CS2, the constituent concentrations declined rapidly after initial sampling in 2000 and 2001, but increased beginning in 2007 (see Figure 3.3-7). The initial decline was likely a result of nearby testing and operation of the

flushing program. For well CS1, the uranium and molybdenum concentrations exhibit a declining trend beginning in 2009 and 2010.

Figures 3.3-8 through 3.3-11 present uranium, molybdenum and selenium concentration over time for well pairs located along the perimeter sand dike on the northeast, east and southeast sides of the LTP (see Figure 3.1-2). Figure 3.3-8 shows a declining trend in uranium and molybdenum concentration in wells EN1 and EN2 since initial sampling in 2005 and 2000, respectively. Figure 3.3-9 shows a declining trend in uranium and molybdenum concentration in well NE2 with a limited number of samples. The uranium and molybdenum concentration in well NE1 is somewhat erratic with a declining trend since 2016. Wells EE2 and SE2 are located on the east side and southeast corner of the LTP, respectively, and the constituent concentrations show a declining trend since 2004 (see Figure 3.3-10) that is likely reflective of the flushing program impacts. Although the majority of the flushing injection occurred in the slime tailings, the horizontal movement outward from the slime tailings resulted in significant flushing in the surrounding sand tailings. Wells ES4 and ES6 are located on the southeast side of the LTP and the constituent concentrations showed a typical declining trend until 2011 (see Figure 3.3-11). Since 2011, the uranium and molybdenum concentrations have increased in both wells. This increase is likely due to higher concentrations moving into the sand tailings in this area from the surrounding slime tailings.

Figures 3.3-12 through 3.3-15 present uranium, molybdenum and selenium concentration over time for well pairs located along the perimeter sand dike on the northwest, west and southwest sides of the LTP (see Figure 3.1-2). Figure 3.3-12 shows a declining trend in uranium and molybdenum concentration in wells SW1 and SW2 since approximately 2009 and 2015, respectively. In contrast, the selenium concentration in both wells has been erratic and at relatively high concentration since late 2014 or earlier Figure 3.3-13 shows a declining trend in uranium and molybdenum concentration in wells WN1 and WN2 since the initial sampling with some stabilization of concentration since approximately 2014. The selenium concentration in well WN1 was erratic since 2014 while the concentrations in well WN2 remained at relatively low levels. The dramatic reduction in uranium and molybdenum concentrations in wells WN1 and WN2 since 2007 is indicative of significant flushing impacts in the northwestern perimeter sand dike area. Wells WS1 and WS2 are located on the southwest side of the LTP and the

constituent concentrations show generally erratic changes since late 2010 (see Figure 3.3-14). For well WS2, the uranium and molybdenum concentration reductions since the initial sampling are likely indicative of flushing impacts. As described previously, the flushing injection in the slime tailings resulted in some degree of flushing of the perimeter sand dikes with horizontal tailings water movement. Wells WW1 and WW3 are located on the west side of the LTP and the constituent concentrations showed a decline since 2010 or before (see Figure 3.3-15). The selenium concentration in well WW1 is greater than the typical concentration in the tailings, but there has been a significant reduction since 2010.

Figure 3.3-16 presents uranium, molybdenum and selenium concentration over time for two wells (CN4 and CS7) located along the central sand dike between the east and west cells of the LTP (see Figure 3.1-2). There was a dramatic reduction in constituent concentrations between 2005 and late 2006 in well CS7 that likely resulted from flushing injection, and this was followed by an abrupt increase that may have indicated a change in flushing operations. Since late 2007, the constituent concentration changes in well CS7 have been modest while the constituent concentrations in well CN4 have generally increased over the period of record.

3.3.3 TOE DRAIN DISCHARGE WATER QUALITY

The toe drain system around the perimeter of the LTP collects tailings water draining from the tailings and possibly tailings seepage water in the perched sand layer and discharges the impacted water to sumps. Figures 3.3-17 and 3.3-18 present uranium, molybdenum and selenium concentration over time for the East 1 and West 1 sumps, and the North 1 and South 1 sumps respectively. The constituent concentrations for the four sumps have declined significantly from levels that were present prior to the flushing program. The discharge rates to the sumps have also declined as the drainage from the LTP continues and the saturated footprint shrinks. Since 2016, the uranium concentration in the discharge from the sumps has stabilized or has a small declining trend. With the exception of erratic concentration changes in the West 1 sump discharge, the molybdenum concentrations in the sumps has typically stabilized or shown a gradual decline since 2016. The selenium concentration in the toe drain discharge has declined since 1996, but exhibited a dramatic increase shortly after flushing injection began followed by a declining trend through the end of flushing (see Figures 3.3-17 and 3.3-18).

3.3.4 SLIME TAILINGS WATER QUALITY

Figures 3.3-19 and 3.3-20 present uranium, molybdenum and selenium concentration over time for former injection well pairs EI4 and ET20, and EP23 and EP21, respectively. These well pairs are located at the eastern cell of the LTP (see Figure 3.1-2). For well ET20, both the uranium and molybdenum concentration increased since the initial sample in late 2016 while the constituent concentrations in well EI4 were relatively stable (see Figure 3.3-19). The uranium and molybdenum concentration also increased in well EP23 since late 2016 with the constituent concentrations in well EP31 remaining relatively stable (see Figure 3.3-20).

Figures 3.3-21 through 3.3-25 present uranium, molybdenum and selenium concentration over time for five well pairs located in the western cell of the LTP (see Figure 3.1-2). Figure 3.3-21 shows a declining trend in constituent concentrations in former dewatering wells WE9 and WF2 between late 2009 and mid-2012, with a gradual increasing trend since 2013. Figure 3.3-22 shows erratic constituent concentration in wells WF9 and WF11 between early 2009 and mid-2012, with an increasing uranium and molybdenum concentration in well WF9 since mid-2012. Monitoring wells WO10 and WO21 are located in the southwest portion of the slime tailings area in the west cell of the LTP and the constituent concentrations in Well WO10 showed a significant decline through 2014 reflecting the flushing progress (see Figure 3.3-23). The changes in constituent concentrations in well WO21 were relatively minor between 2009 and 2018. Figure 3.3-24 illustrates a dramatic contrast between constituent concentration in former injection well WP10 and monitoring well WME-4. There are a limited number of samples available for each well and the constituent concentrations in well WP10 are relatively low indicating successful flushing of the slime tailings in the area (see Figure 3.3-24). In contrast, the uranium and molybdenum concentrations in well WME-4 are more than an order of magnitude greater than those in well WP10. This large disparity in constituent concentration in wells that are less than 200 feet apart may indicate that the flushing injection water did not reach well WME-4, or possibly that the smaller completion interval of well WME-4 is within a layer that was not impacted by flushing. Figure 3.3-25 presents constituent concentrations for monitoring wells WT6 and WT18 which are located in the slime tailings area in the western cell of the LTP. There was significant flushing progress in well WT6 indicated by the initial sampling in mid-2008. There was a dramatic increase in molybdenum concentration in well

WT6 from 2011 through 2012. Well WT18 was formerly an injection well and the constituent concentrations are reflective of an area where flushing was effective.

Figure 3.3-26 presents constituent concentrations for well EG-9 which is located in the slime tailings area in the eastern cell of the LTP. Well EG-9 is completed in the perched sand layer beneath the tailings, and like tailings wells, the water quality is representative of tailings solution with significant impacts by the flushing program.

3.3.5 AVERAGE TAILINGS COC CONCENTRATION ESTIMATES

Table 3.3-1 presents estimated uranium, molybdenum and selenium concentrations for the tailings water in the saturated portion of the LTP. These estimated average concentrations were calculated using mapping of uranium, molybdenum and selenium concentrations in the LTP along with the potentiometric surface shown in Figure 3.2-1. The estimation of average uranium concentration began in 2006 and estimation of average molybdenum concentration began in 2010. The average selenium concentrations in the saturated tailings are relatively small and were only estimated for 2018. The estimated average uranium and molybdenum concentrations decreased dramatically during active flushing of the LTP, but recent changes have been modest. A slight increase in average concentrations between 2017 and 2018 and between 2016 and 2015 is likely reflective of the interpretation of constituent concentration contours for differing water sample distributions over the LTP rather than an actual increase in constituent concentrations. With the cessation of tailings flushing and the expectation of only limited future dewatering, the future changes in the average uranium and molybdenum concentrations in the LTP are expected to be less pronounced than past changes. However, the rates of seepage from the tailings are expected to be very heterogeneous with the seepage rates from the sand tailings areas being larger, so there is some potential for average concentration changes resulting from redistribution between slimes and sands.

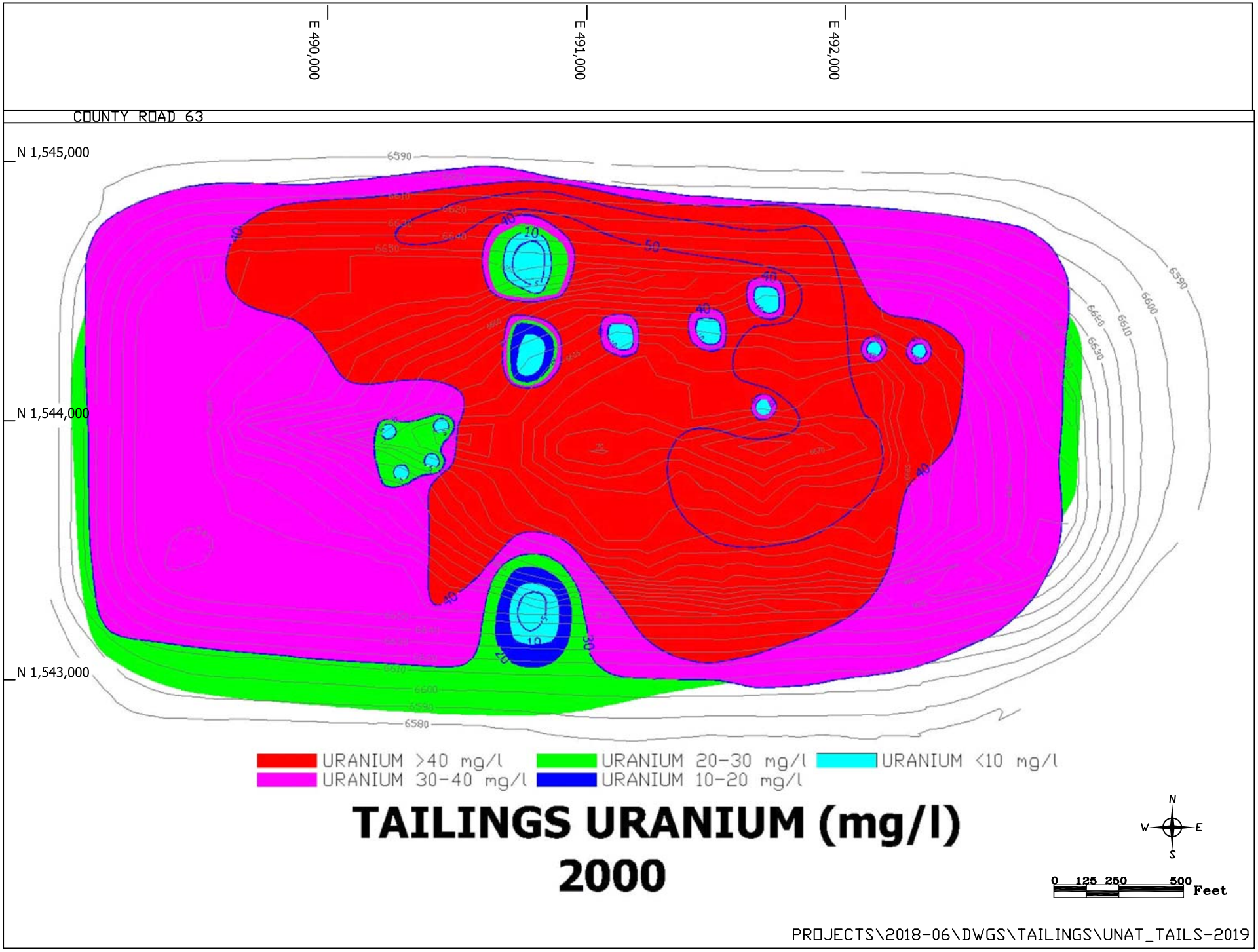


FIGURE 3.3-1. TAILINGS SOLUTION URANIUM CONCENTRATION, 2000

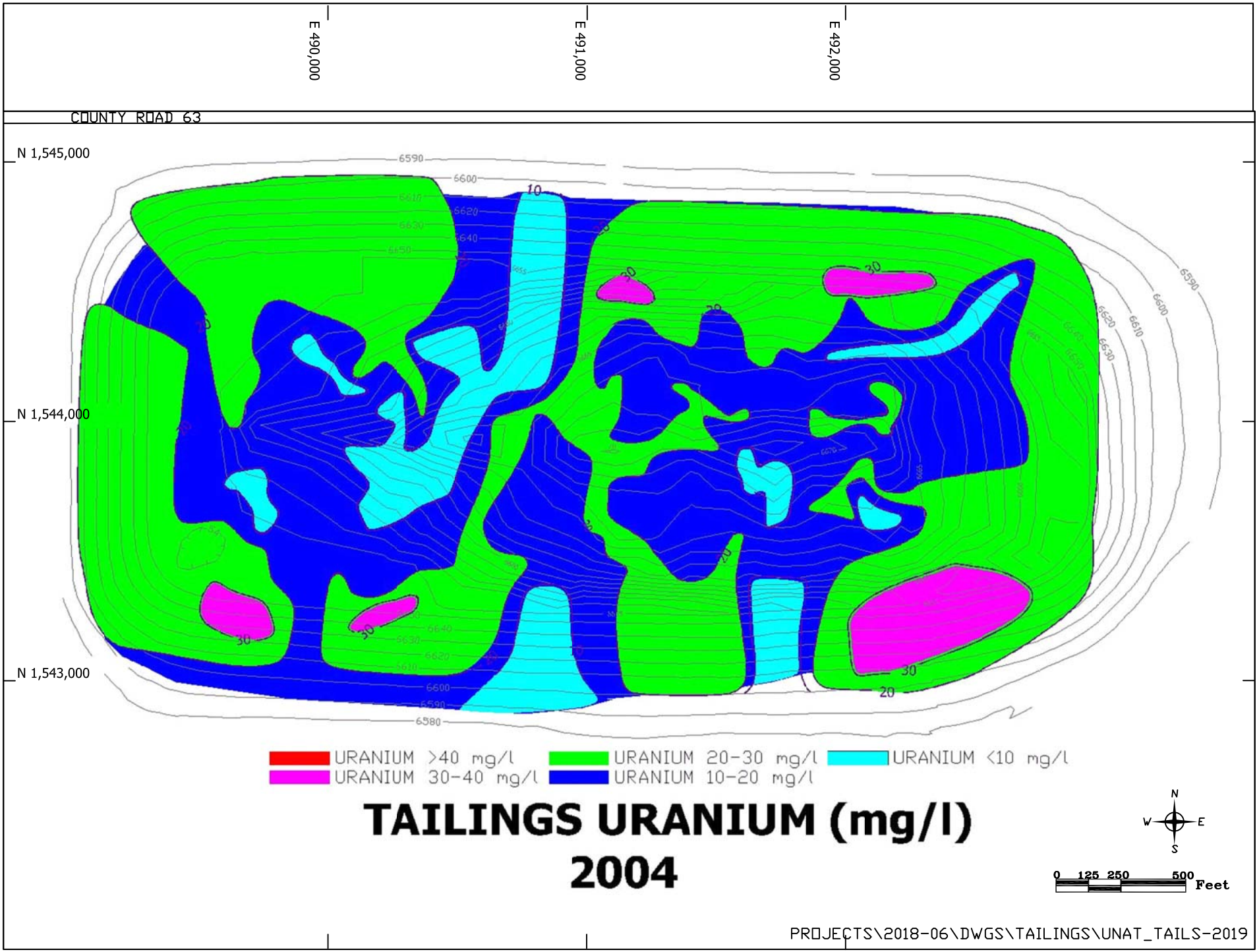


FIGURE 3.3-2. TAILINGS SOLUTION URANIUM CONCENTRATION, 2004

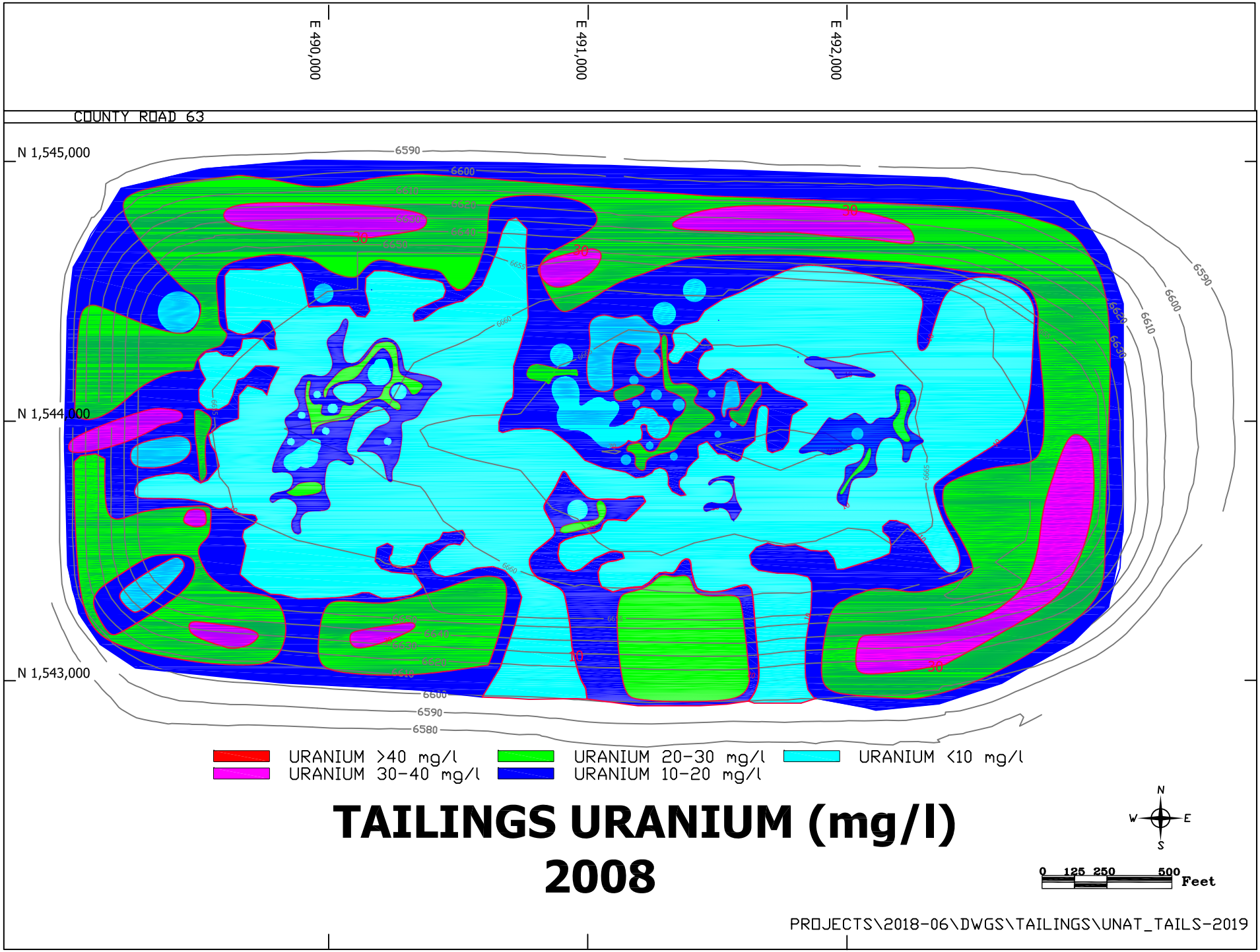


FIGURE 3.3-3. TAILINGS SOLUTION URANIUM CONCENTRATION, 2008

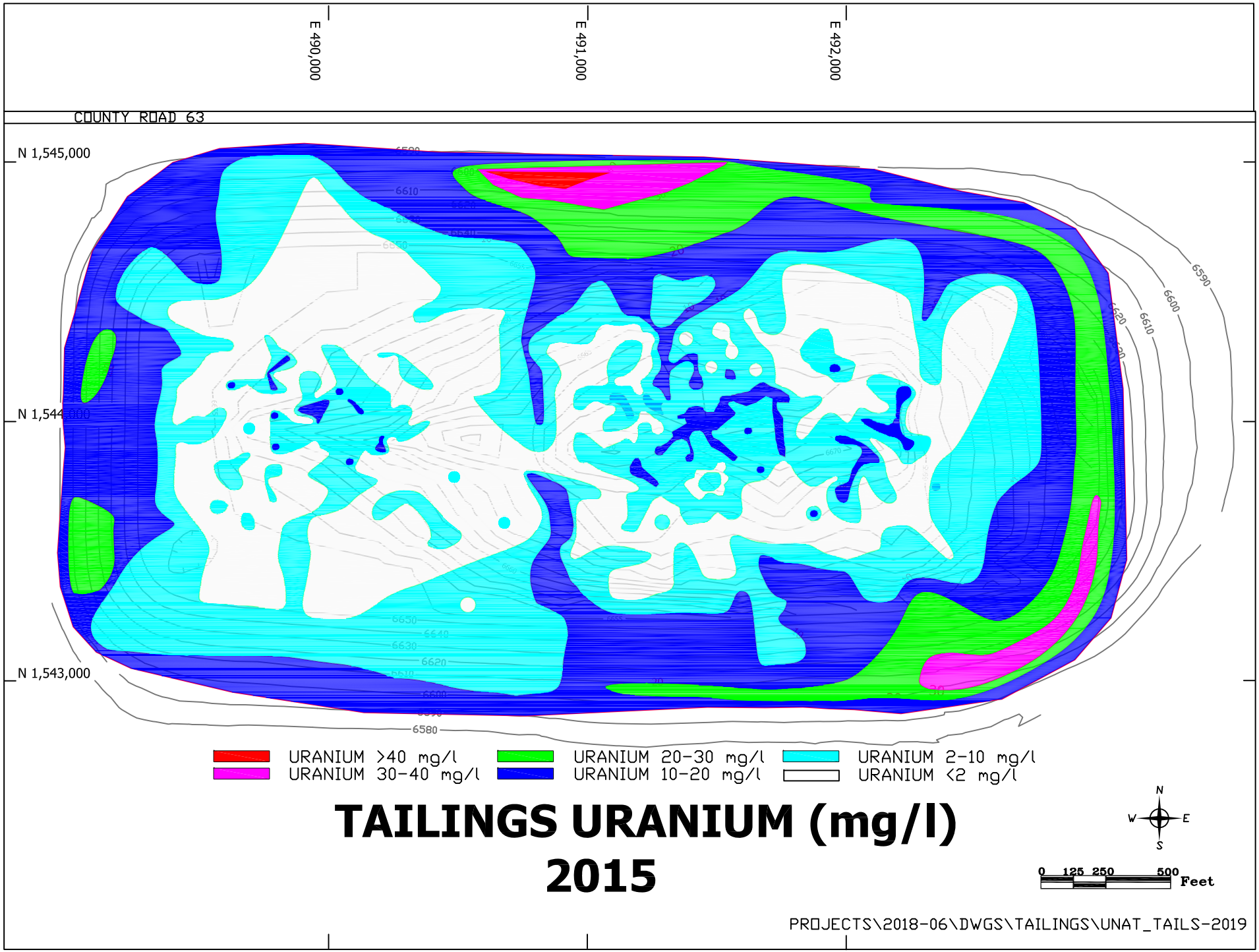


FIGURE 3.3-4. TAILINGS SOLUTION URANIUM CONCENTRATION, 2015

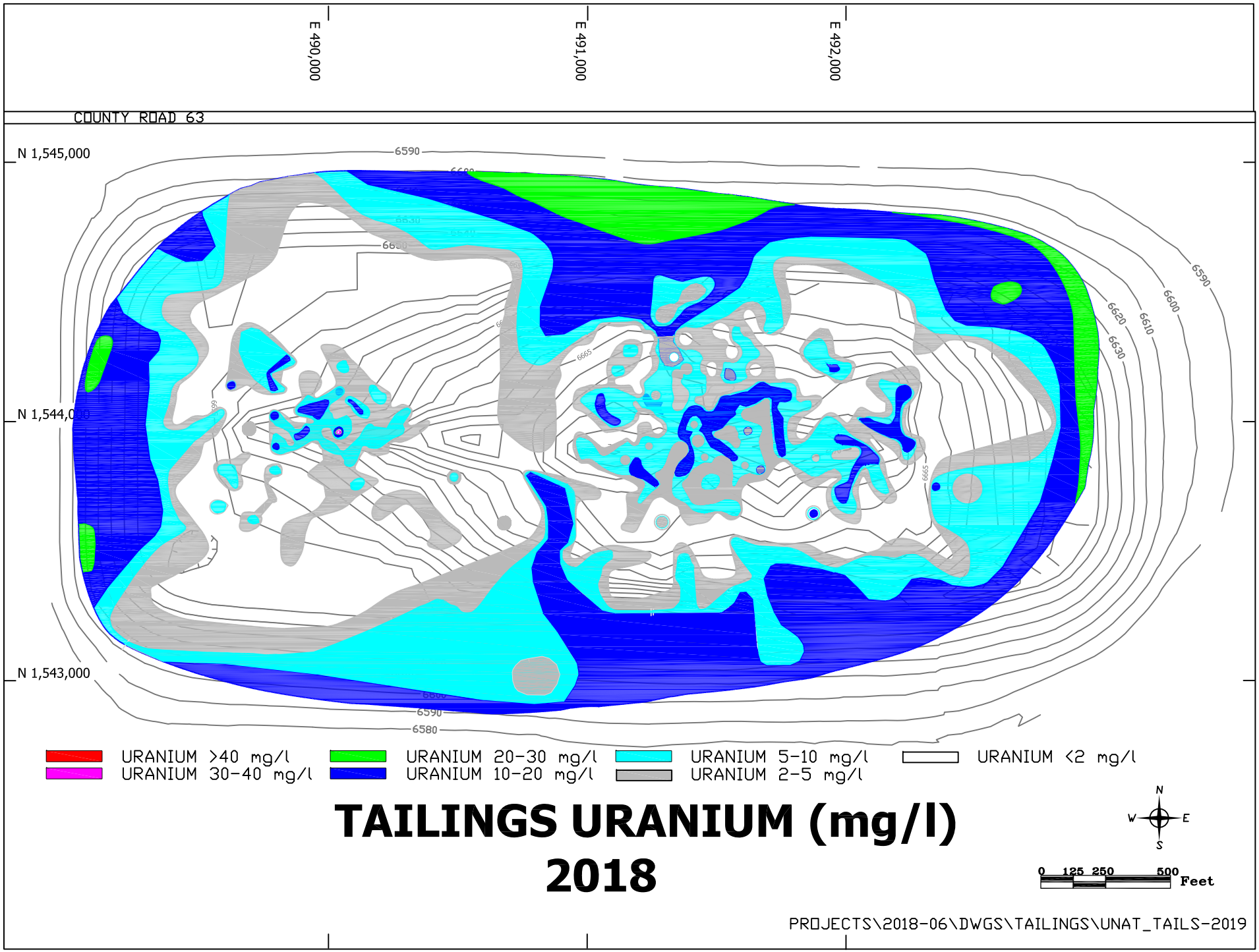


FIGURE 3.3-5. TAILINGS SOLUTION URANIUM CONCENTRATION, 2018

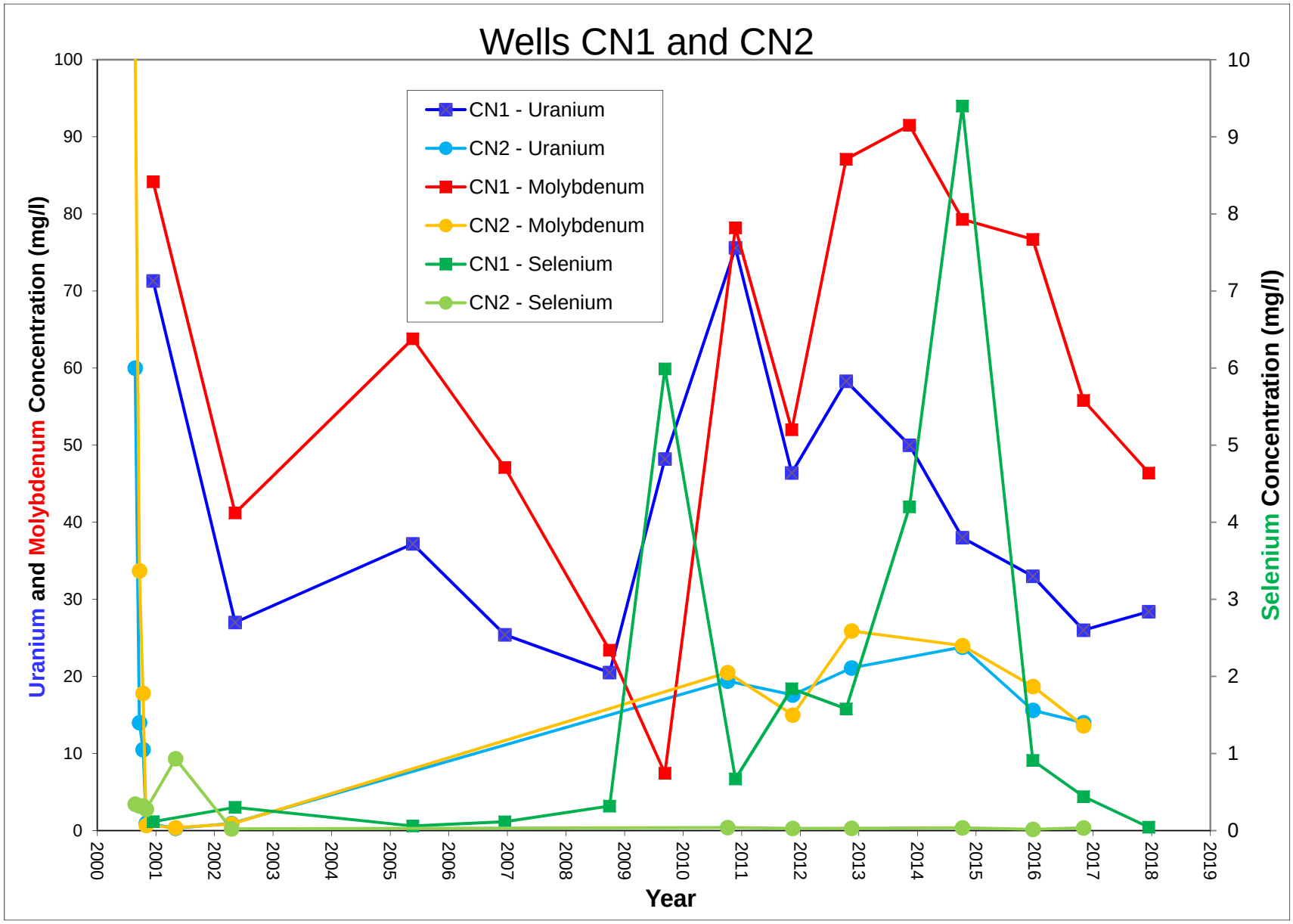


Figure 3.3-6. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells CN1 and CN2

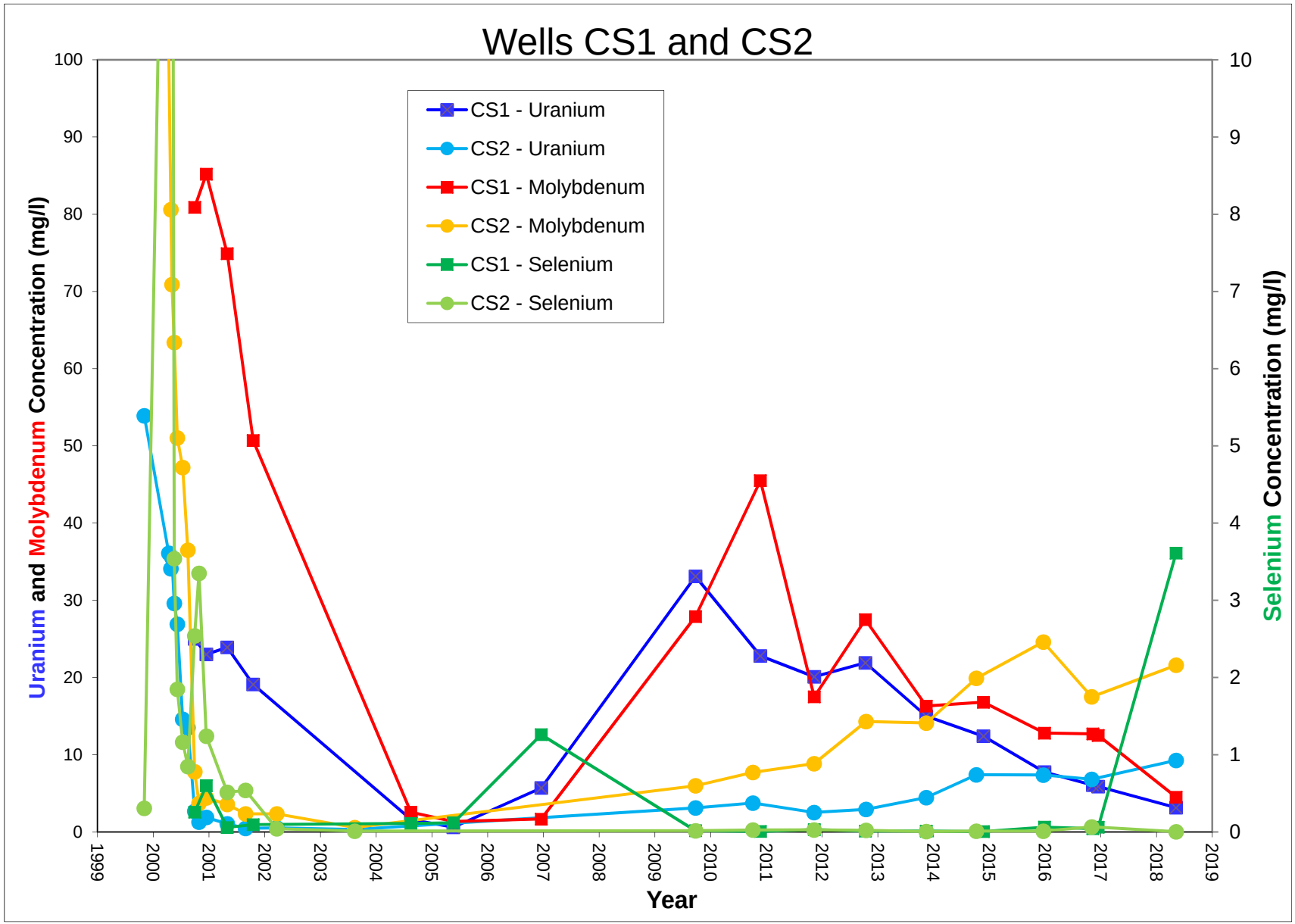


Figure 3.3-7. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells CS1 and CS2

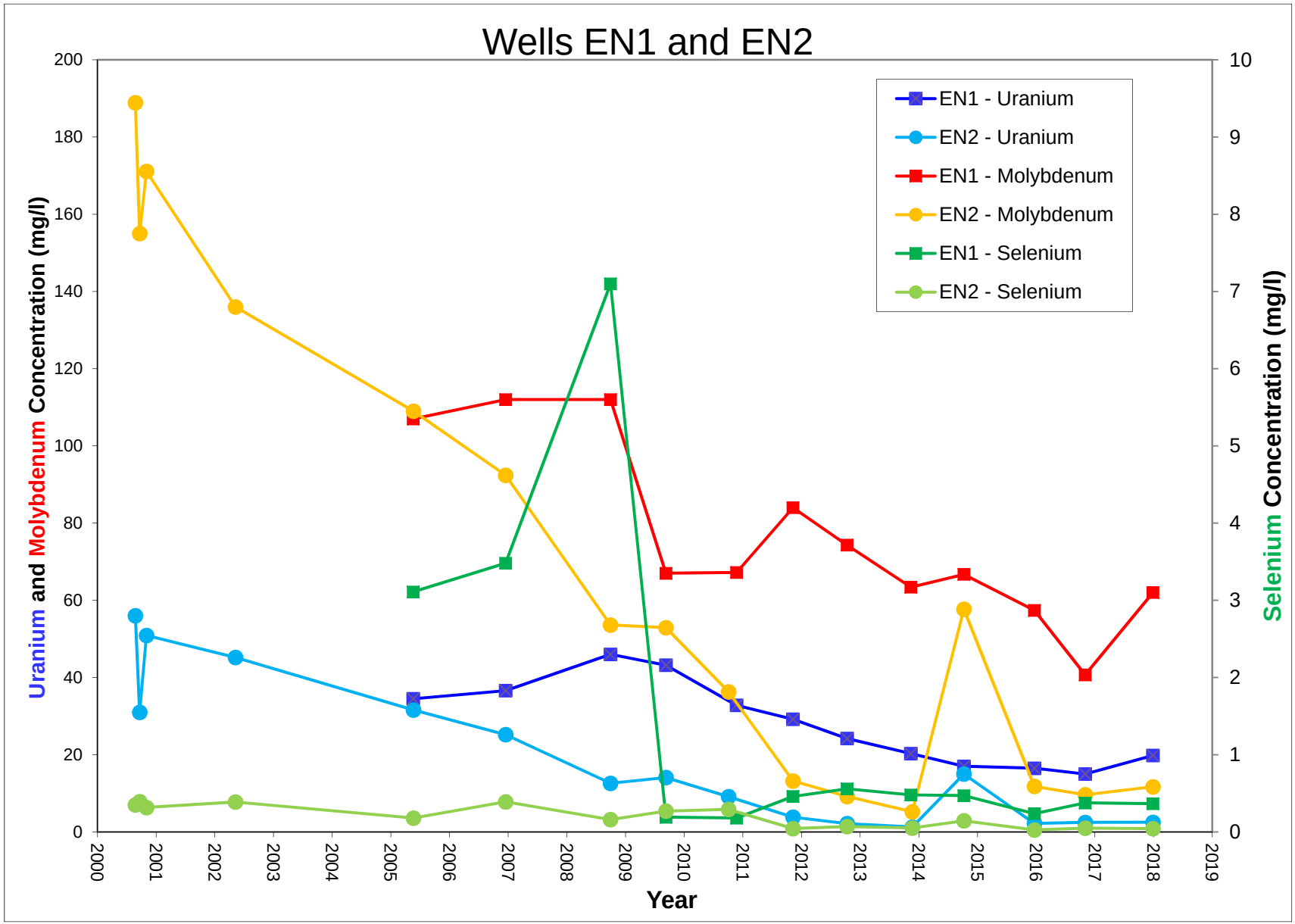


Figure 3.3-8. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells EN1 and EN2

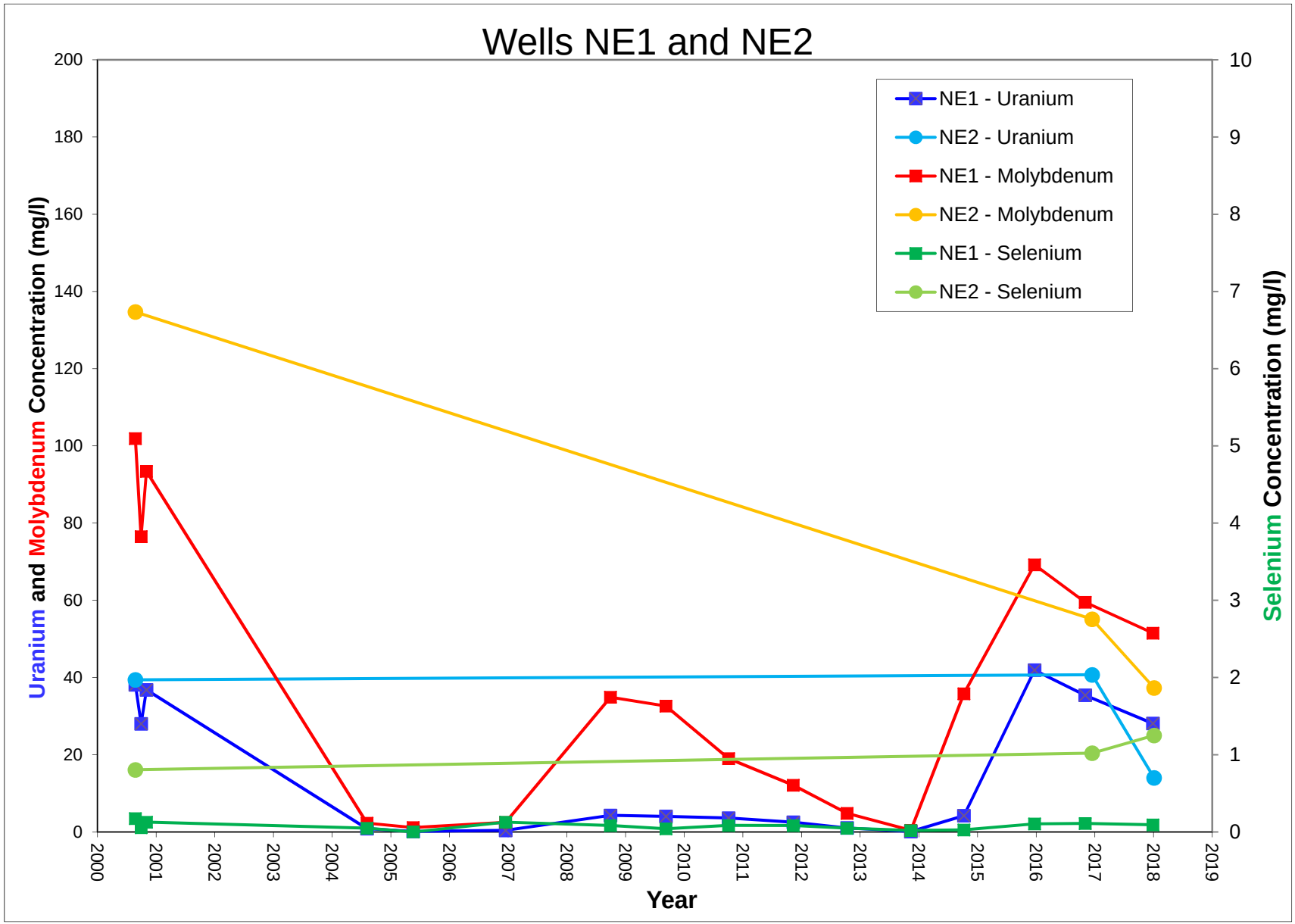


Figure 3.3-9. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells NE1 and NE2

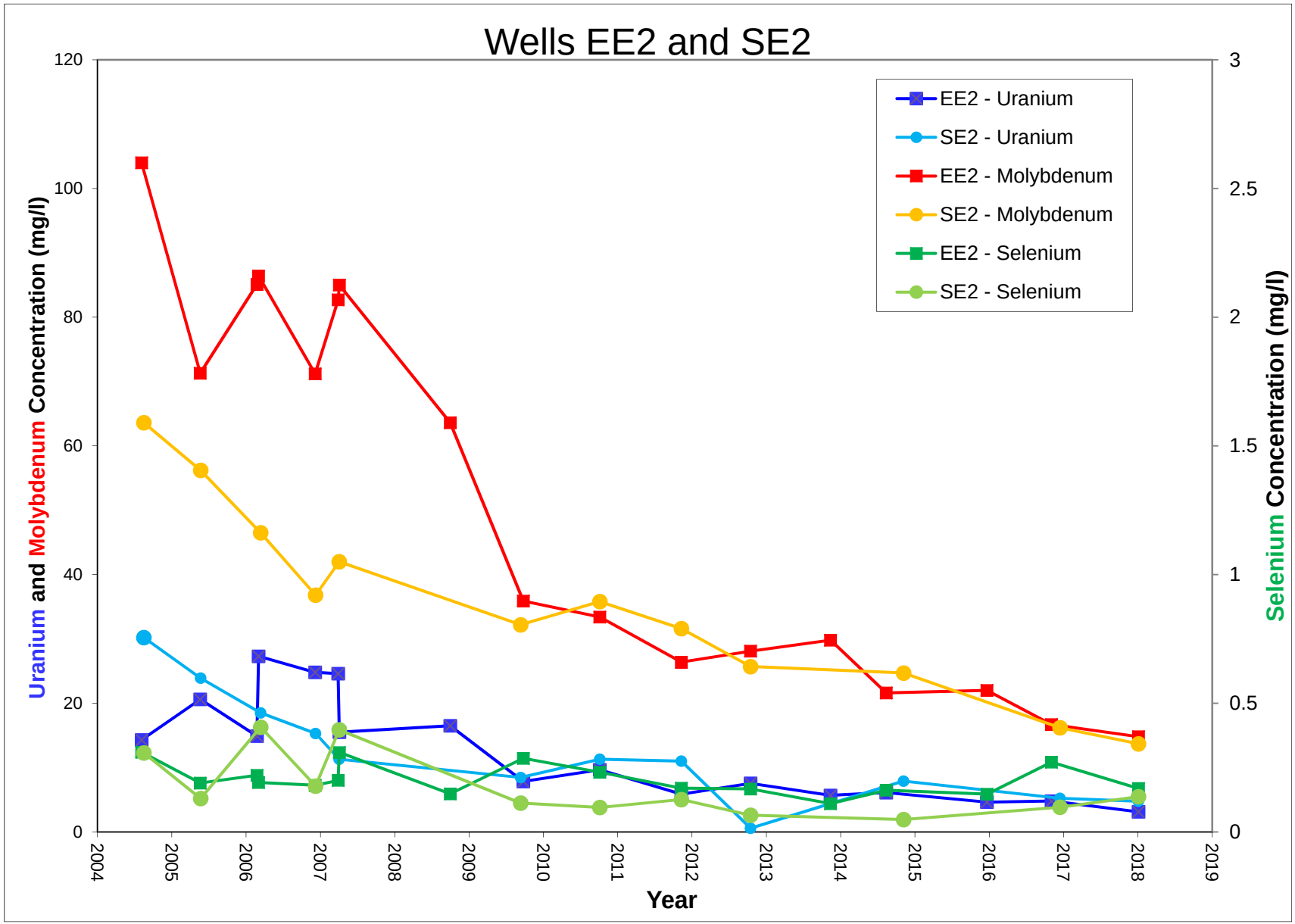


Figure 3.3-10. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells EE2 and SE2

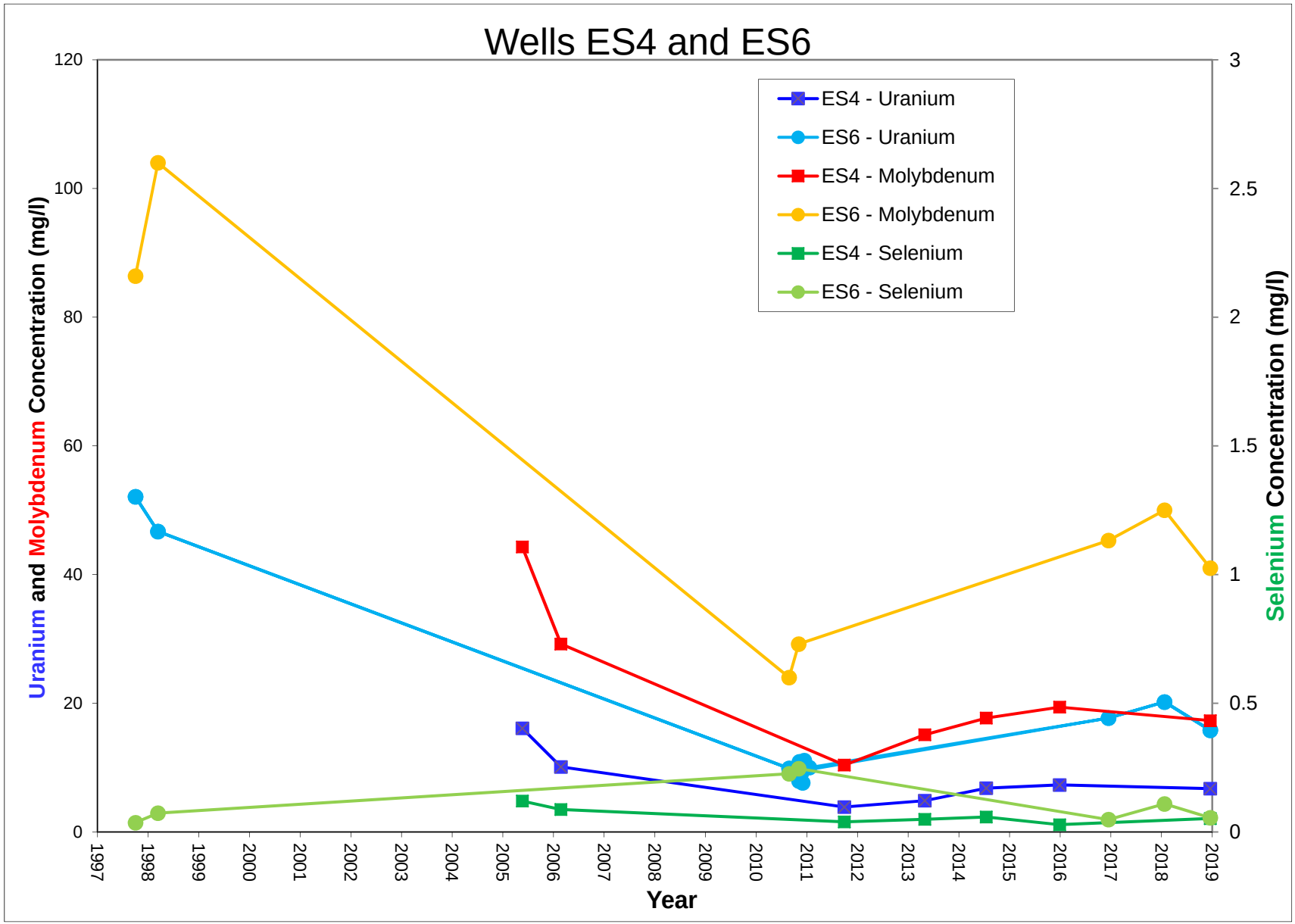


Figure 3.3-11. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells ES4 and ES6

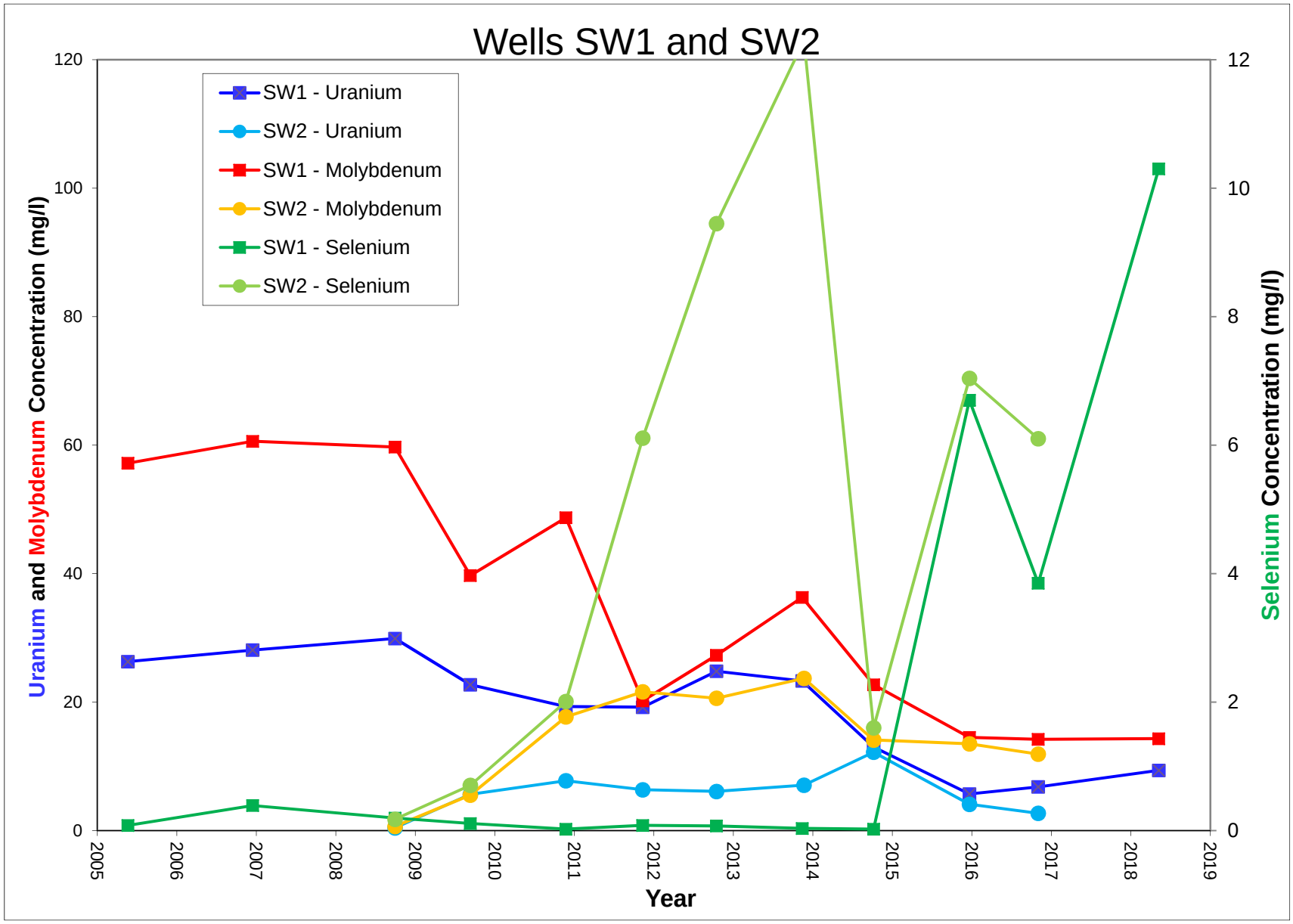


Figure 3.3-12. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells SW1 and SW2

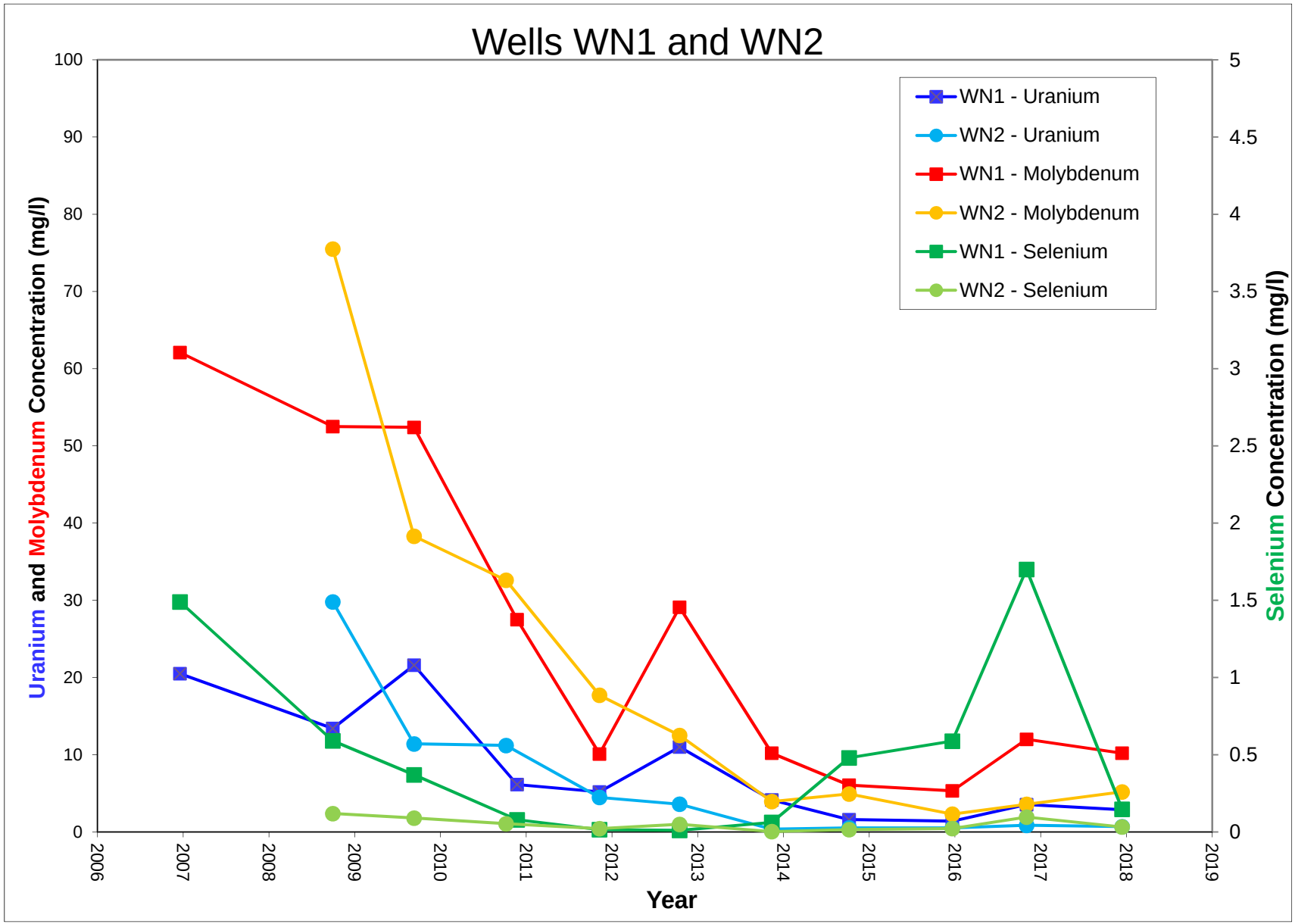


Figure 3.3-13. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WN1 and WN2

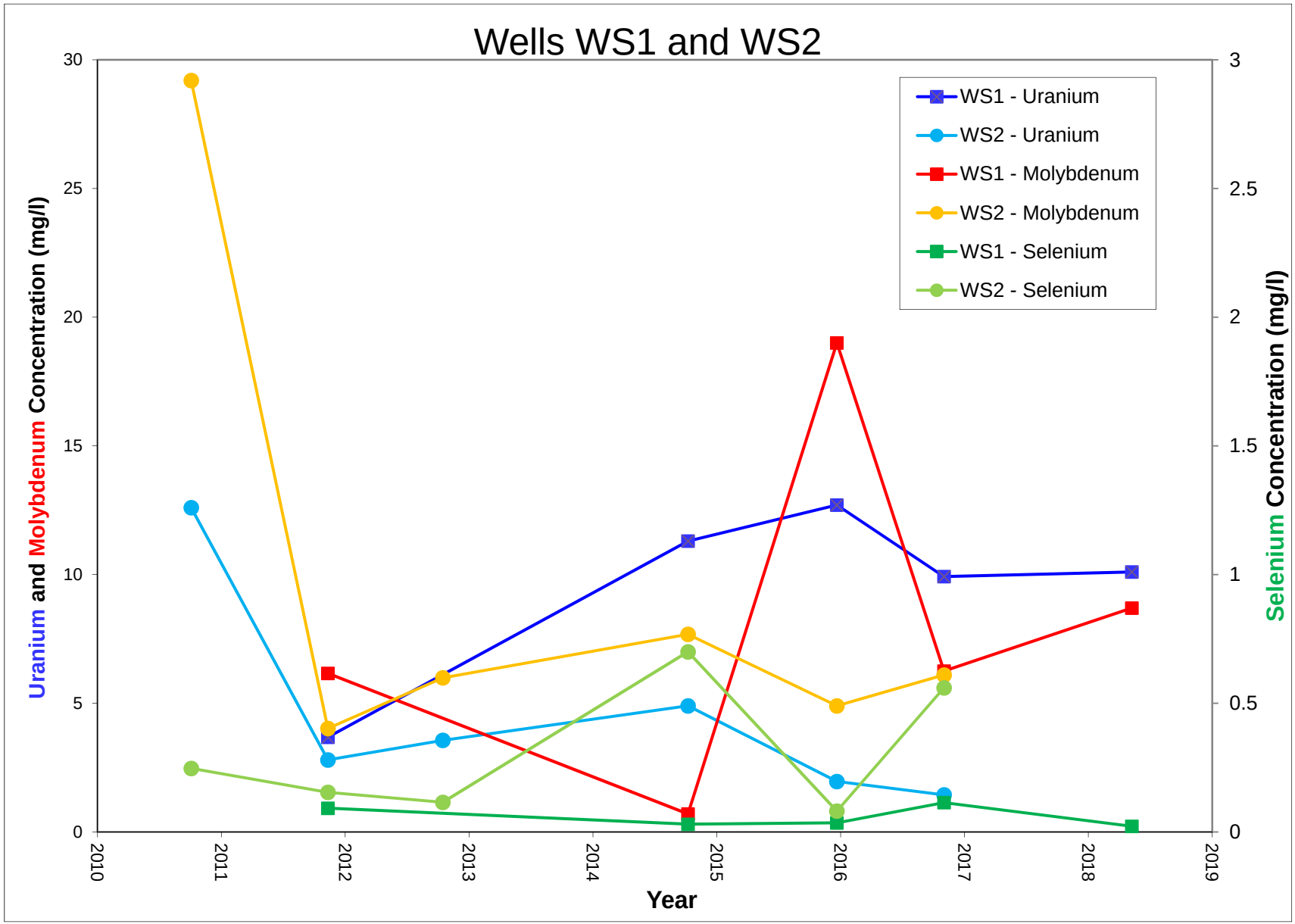


Figure 3.3-14. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WS1 and WS2

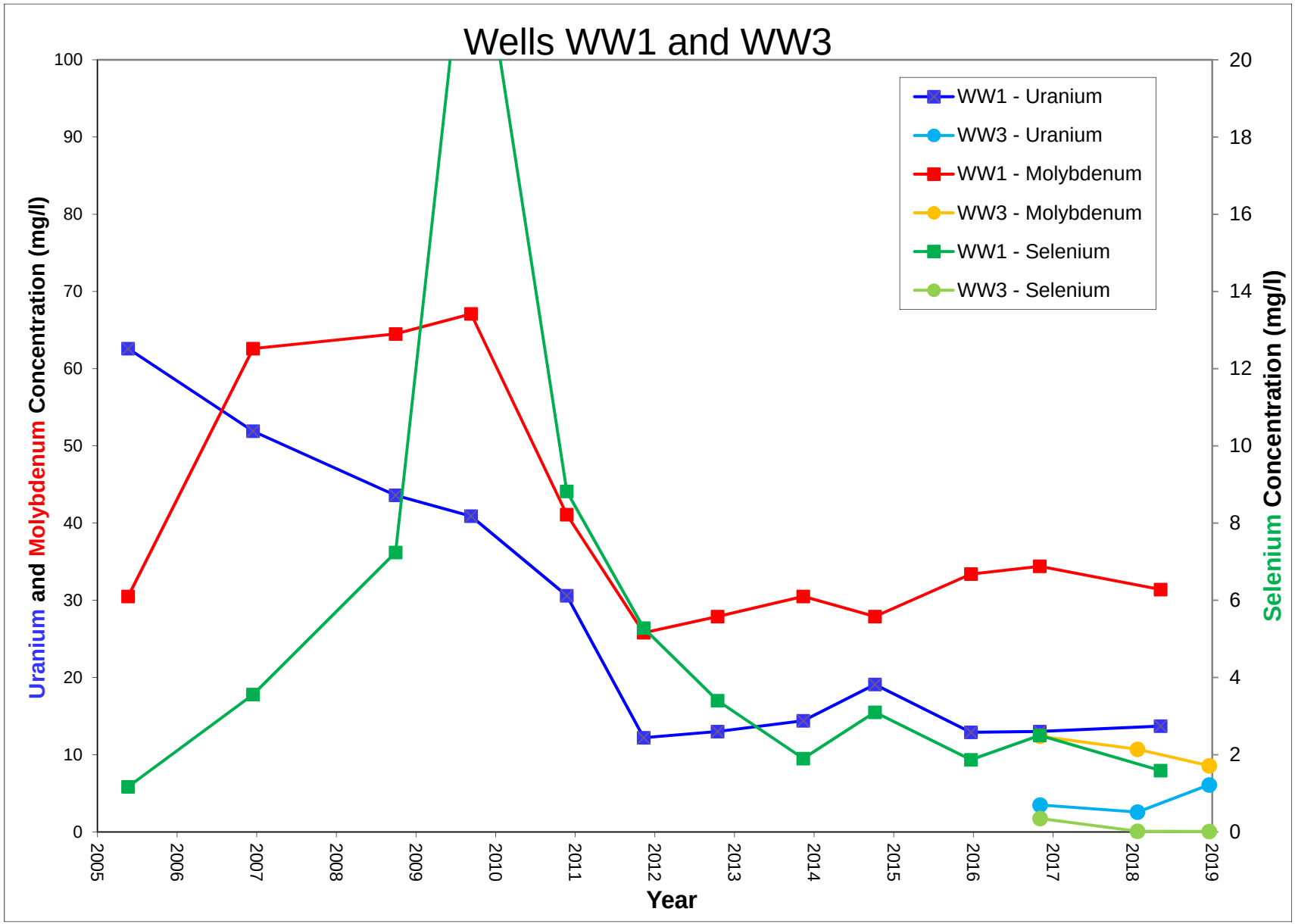


Figure 3.3-15. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WW1 and WW3

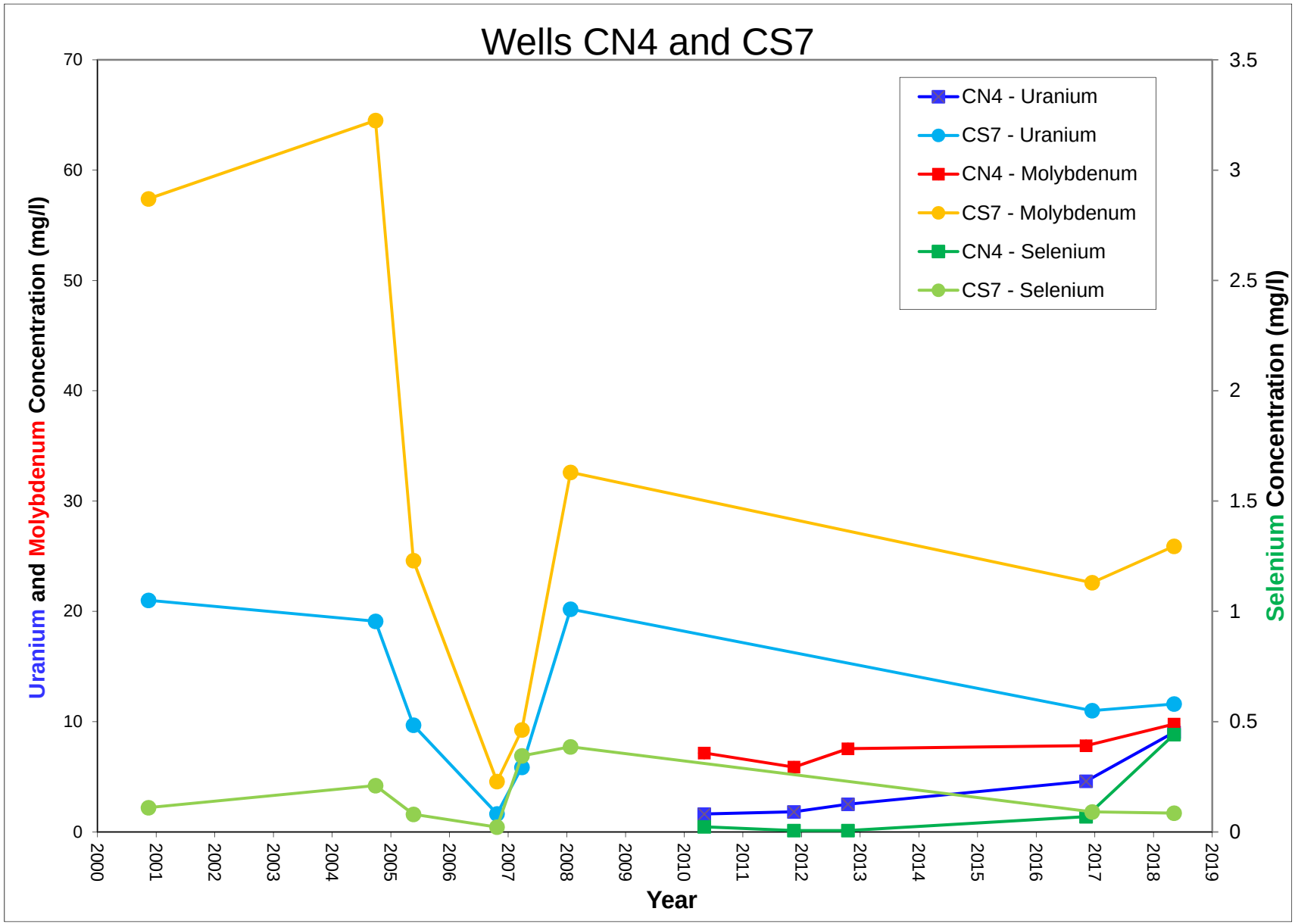


Figure 3.3-16. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells CN4 and CS7

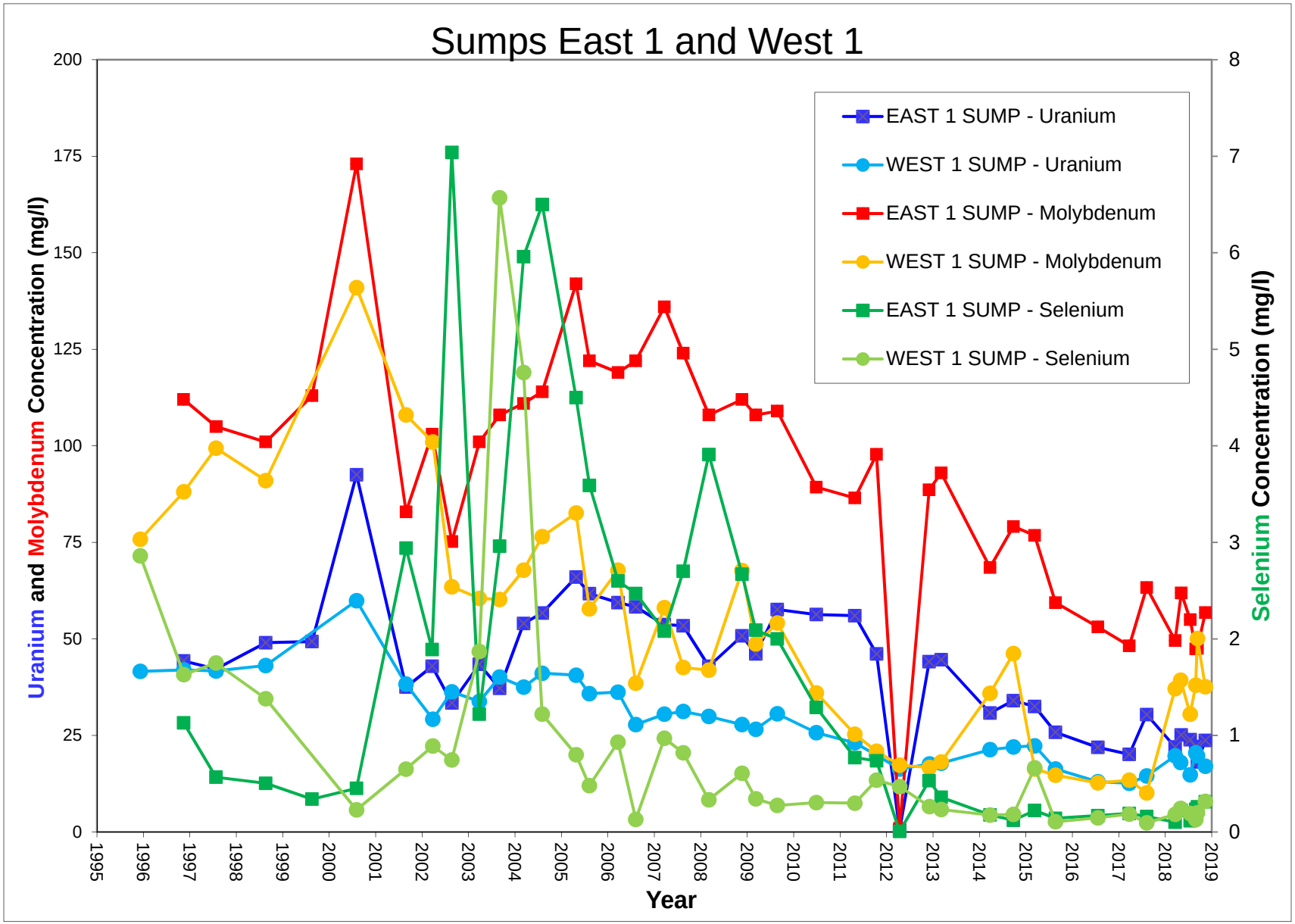


Figure 3.3-17. Uranium, Molybdenum and Selenium Concentrations for East 1 and West 1 Sumps

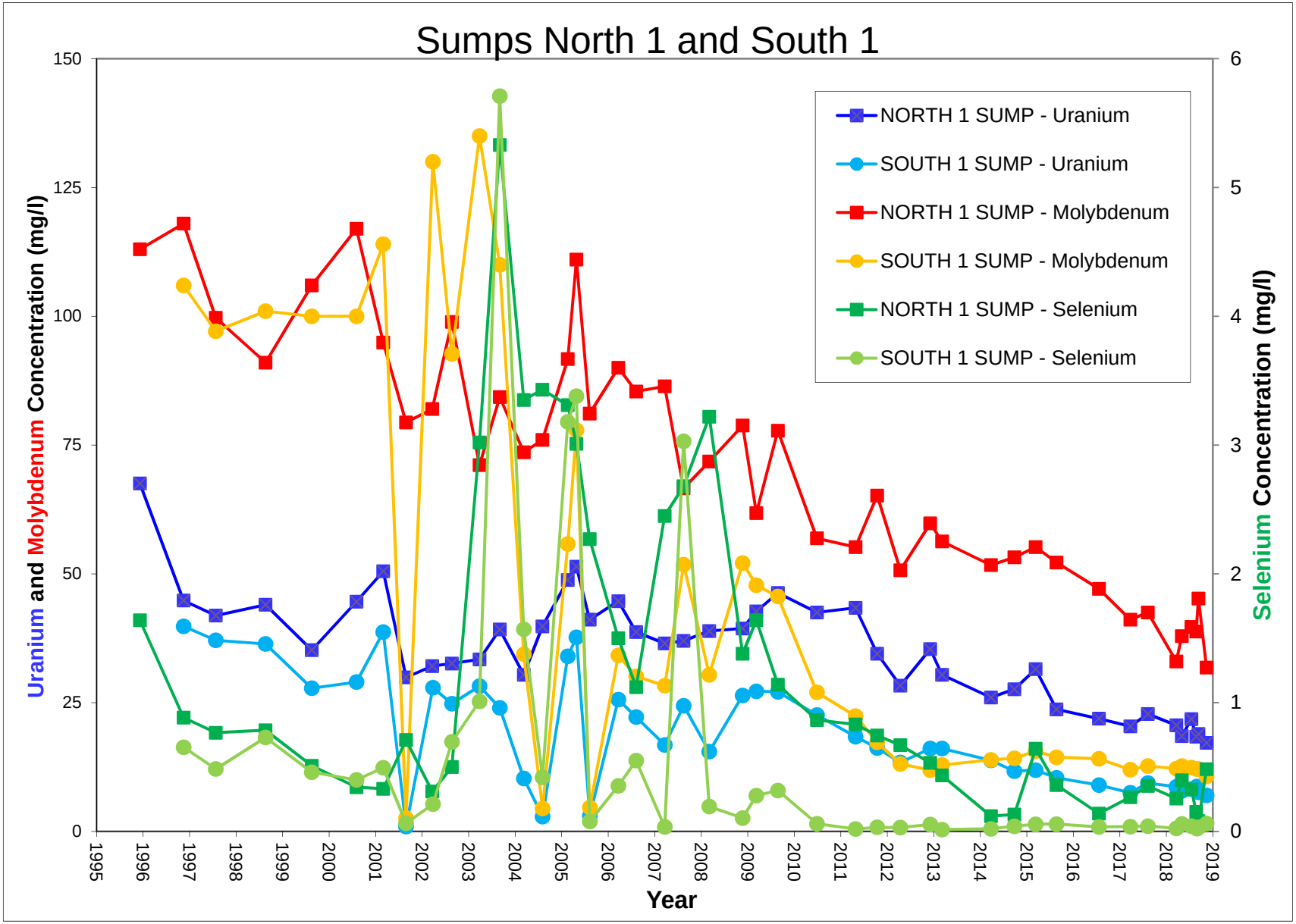


Figure 3.3-18. Uranium, Molybdenum and Selenium Concentrations for North 1 and South 1 Sumps

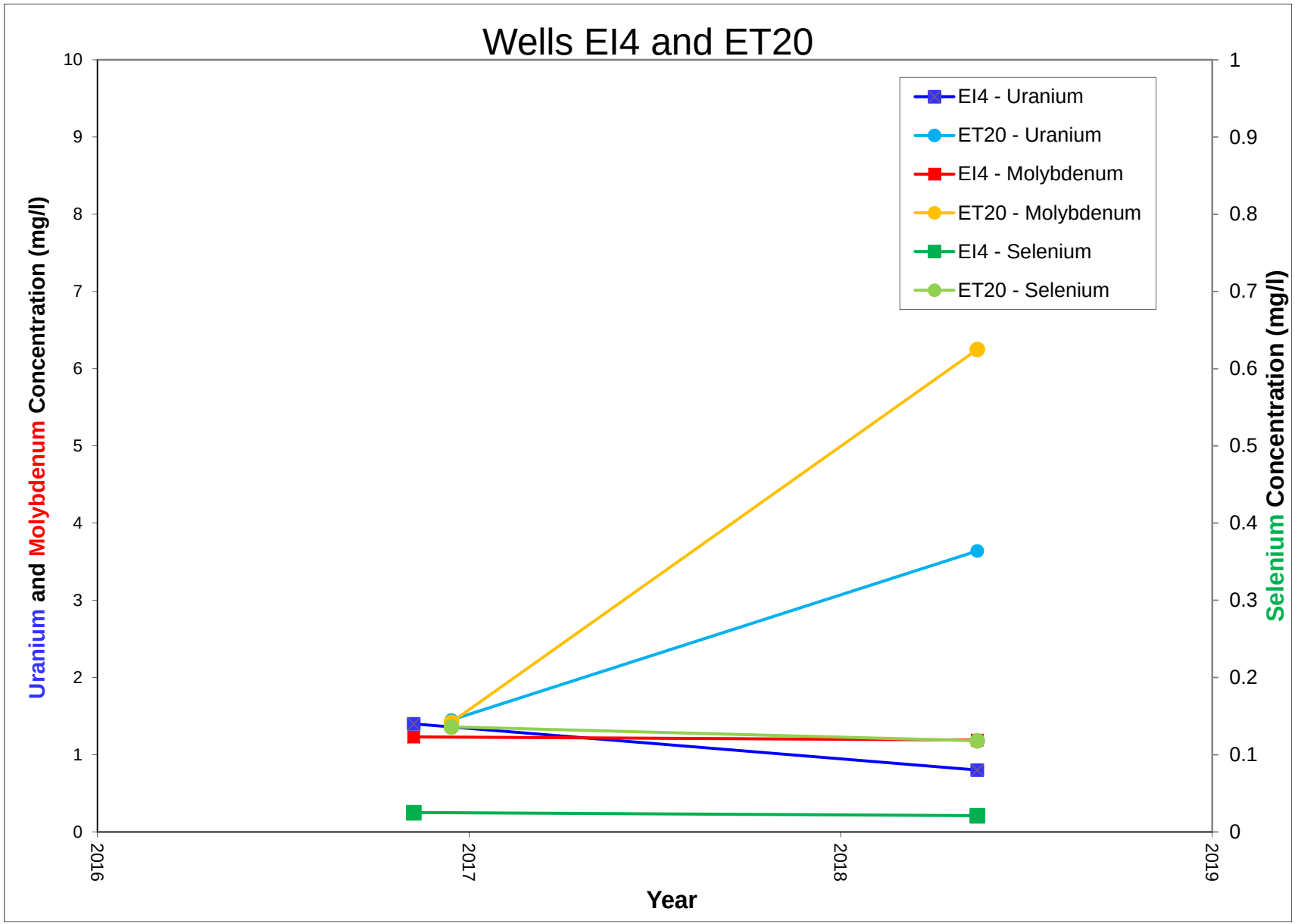


Figure 3.3-19. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells EI4 and ET20

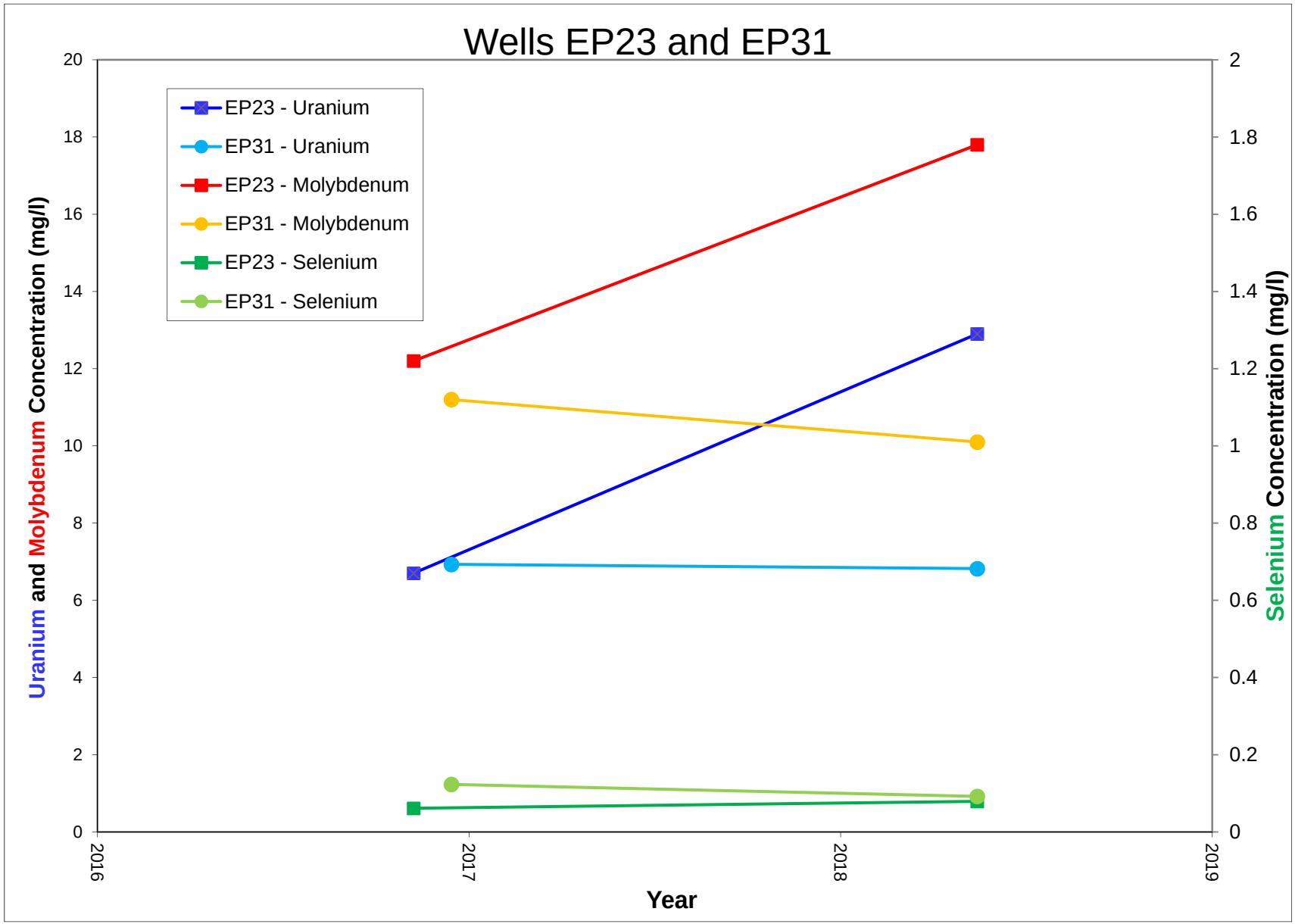


Figure 3.3-20. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells EP23 and EP31

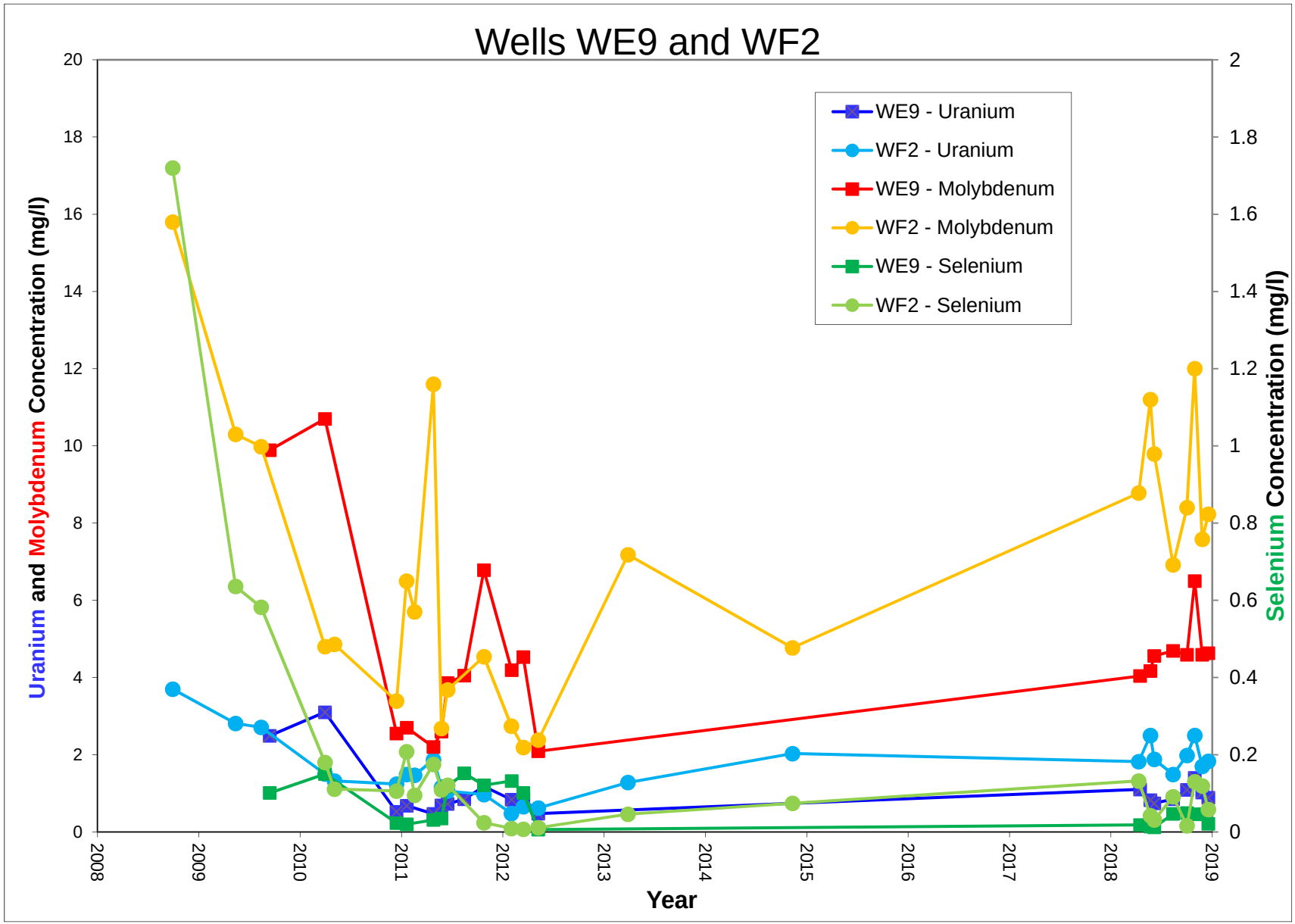


Figure 3.3-21. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WE9 and WF2

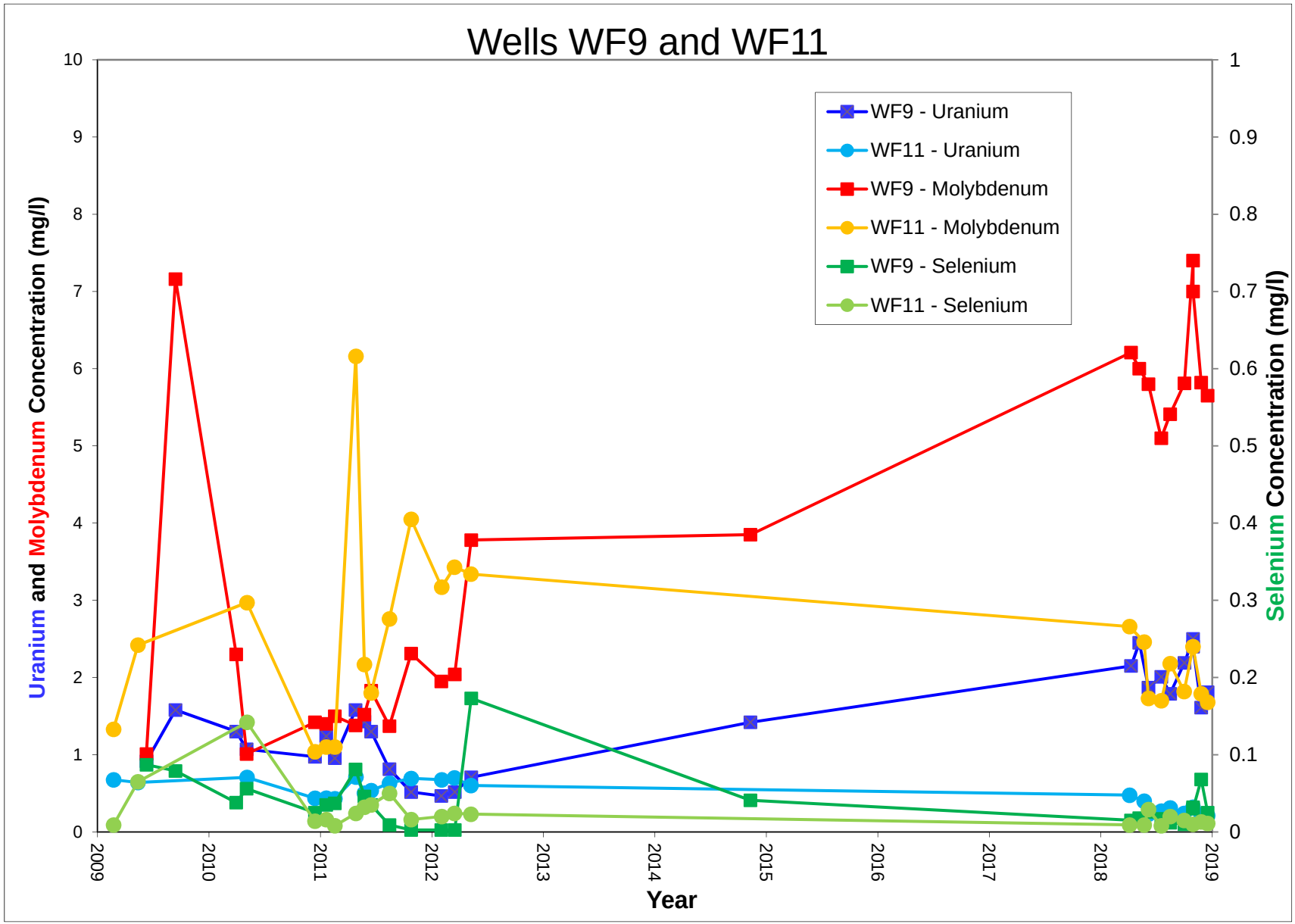


Figure 3.3-22. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WF9 and WF11

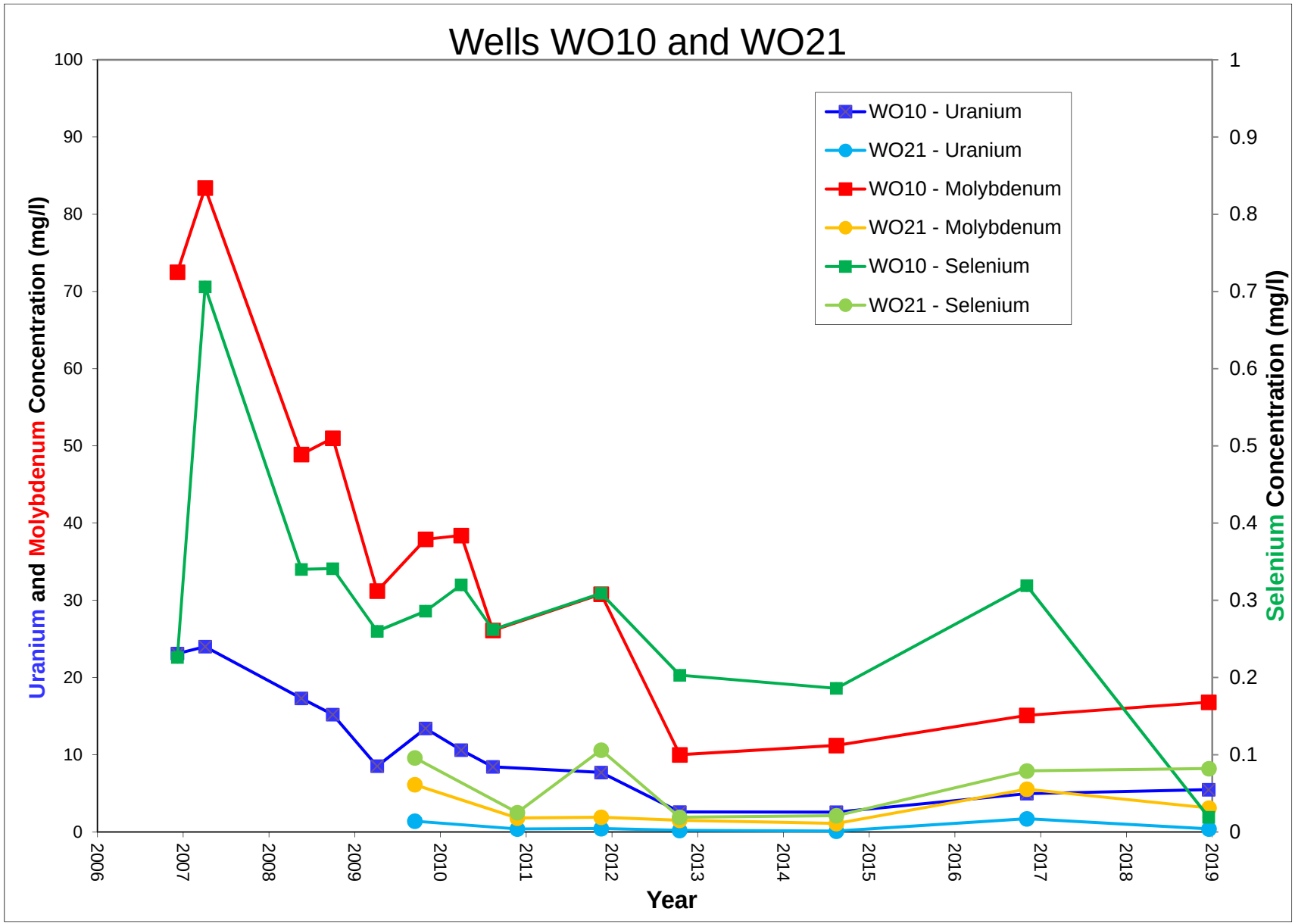


Figure 3.3-23. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WO10 and WO21

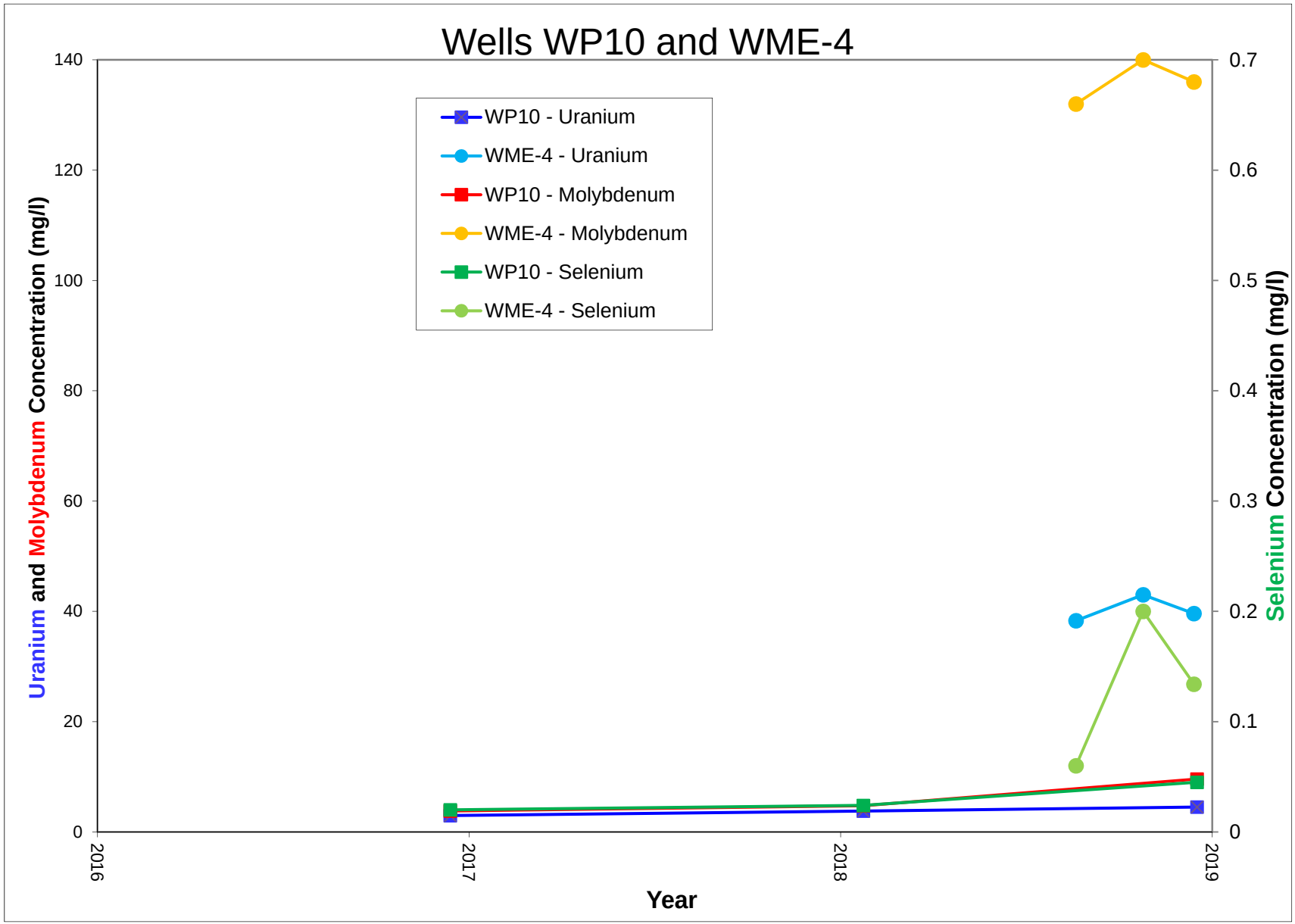


Figure 3.3-24. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WP10 and WME-4

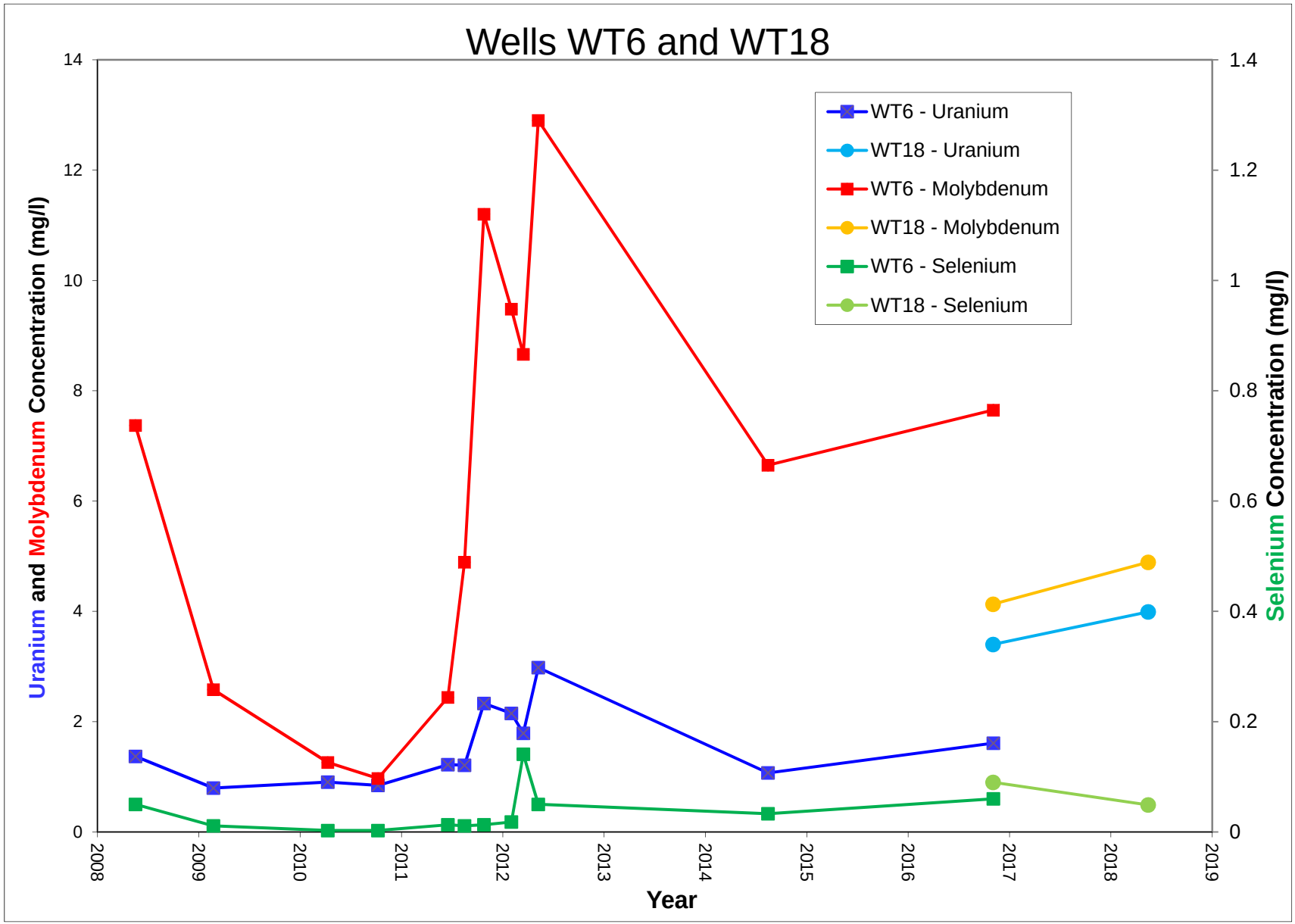


Figure 3.3-25. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WT6 and WT18

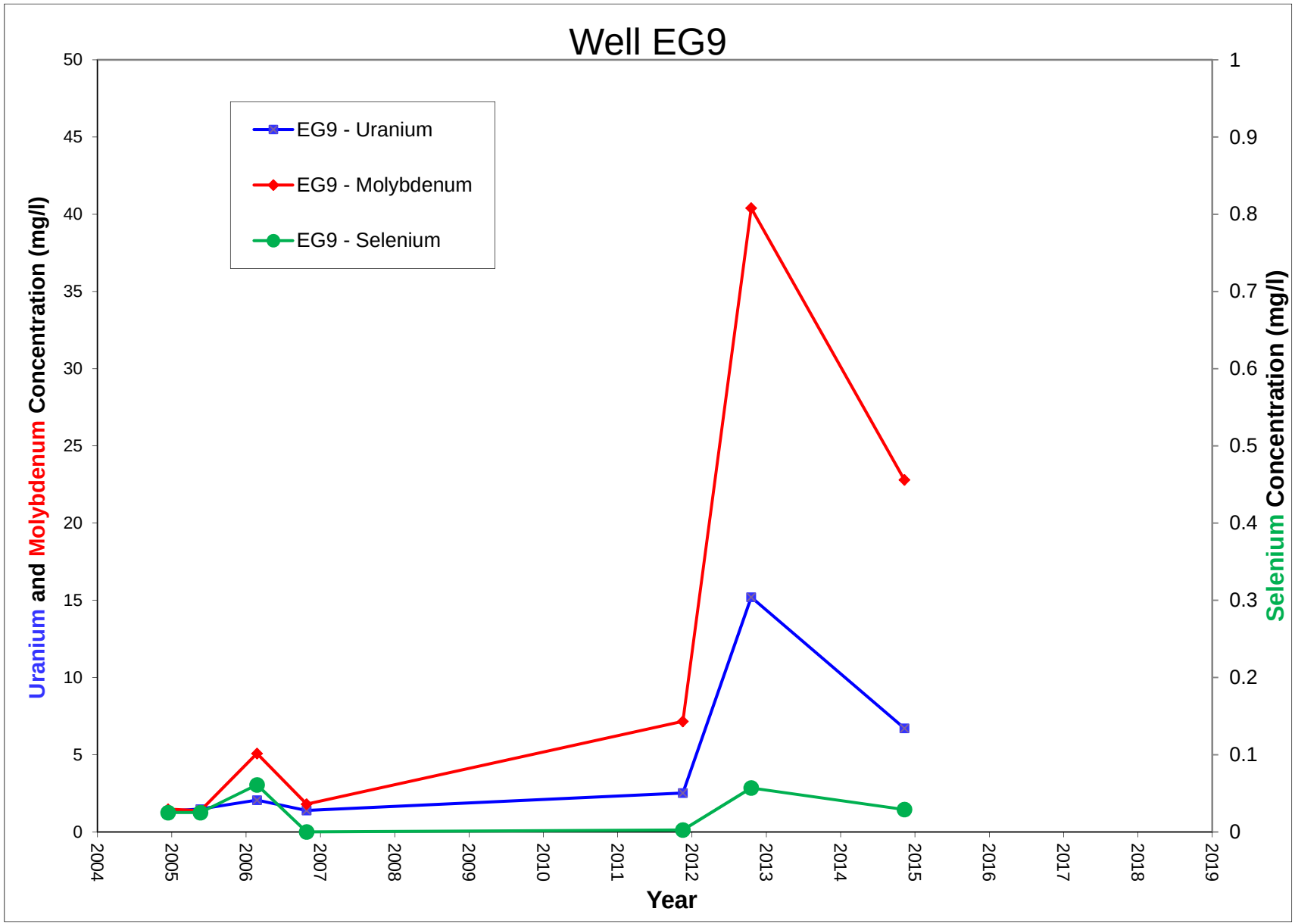


Figure 3.3-26. Uranium, Molybdenum and Selenium Concentrations for Perched Sand Well EG9

TABLE 3.3-1. ESTIMATED AVERAGE URANIUM, MOLYBDENUM AND SELENIUM CONCENTRATIONS FOR THE LTP

Area	Saturated Volume (cubic feet)	Total Water Volume (gallons)	Unat * Saturated Volume (mg/l * cubic feet)	Average Unat Conc. (mg/l)	Moly * Saturated Volume (mg/l * cubic feet)	Average Moly Conc. (mg/l)	Se * Saturated Volume (mg/l * cubic feet)	Average Se Conc. (mg/l)
2006 - Estimate								
Sand	77,157,018	80,798,829	1,335,000,000	17.30				
Slimes	139,758,190	83,631,301	1,329,600,000	9.51				
Total	216,915,208	164,430,130	2,664,600,000	12.28				
2007								
Sand	77,157,018	80,798,829	1,249,100,000	16.19				
Slimes	139,758,190	83,631,301	1,287,800,000	9.21				
Total	216,915,208	164,430,130	2,536,900,000	11.70				
2008								
Sand	94,922,795	99,403,151	1,413,800,000	14.89				
Slimes	153,286,550	91,726,672	920,905,576	6.01				
Total	248,209,345	191,129,822	2,334,705,576	9.41				
2009								
Sand	102,218,044	107,042,736	1,346,200,000	13.17				
Slimes	152,943,835	91,521,591	810,147,132	5.30				
Total	255,161,879	198,564,327	2,156,347,132	8.45				
2010								
Sand	102,740,335	107,589,679	1,286,700,000	12.52	2,897,000,000	28.20		
Slimes	145,865,021	87,285,629	718,350,126	4.92	1,608,100,000	11.02		
Total	248,605,356	194,875,307	2,005,050,126	8.07	4,505,100,000	18.12		
2011								
Sand	107,638,906	112,719,462	1,147,300,000	10.66	2,548,600,000	23.68		
Slimes	144,830,473	86,666,555	641,596,854	4.43	1,577,800,000	10.89		
Total	252,469,379	199,386,017	1,788,896,854	7.09	4,126,400,000	16.34		
2012								
Sand	106,011,831	111,015,589	1,100,000,000	10.38	2,368,500,000	22.34		
Slimes	144,790,994	86,642,931	541,074,539	3.74	1,472,400,000	10.17		
Total	250,802,825	197,658,520	1,641,074,539	6.54	3,840,900,000	15.31		
2013								
Sand	106,226,948	111,240,860	972,629,548	9.16	2,299,700,000	21.65		
Slimes	144,852,116	86,679,506	514,455,035	3.55	1,459,800,000	10.08		
Total	251,079,064	197,920,366	1,487,084,583	5.92	3,759,500,000	14.97		
2014								
Sand	111,406,209	116,664,582	991,820,057	8.90	2,439,700,000	21.90		
Slimes	149,395,092	89,398,023	490,956,792	3.29	1,461,900,000	9.79		
Total	260,801,301	206,062,605	1,482,776,849	5.69	3,901,600,000	14.96		
2015								
Sand	101,569,653	106,363,741	835,649,839	8.23	2,154,600,000	21.21		
Slimes	143,921,106	86,122,390	476,402,234	3.31	1,417,000,000	9.85		
Total	245,490,759	192,486,130	1,312,052,073	5.34	3,571,600,000	14.55		
2016								
Sand	76,083,797	79,674,952	670,422,842	8.81	1,662,000,000	21.84		
Slimes	90,918,919	54,405,881	298,542,406	3.28	858,781,569	9.45		
Total	167,002,716	134,080,833	968,965,248	5.80	2,520,781,569	15.09		
2017								
Sand	69,004,696	72,261,718	535,171,616	7.76	1,245,100,000	18.04		
Slimes	87,007,632	52,065,367	283,993,784	3.26	821,451,955	9.44		
Total	156,012,328	124,327,085	819,165,400	5.25	2,066,551,955	13.25		
2018								
Sand	59,534,566	62,344,598	453,383,206	7.62	1,104,200,000	18.55	12,407,796	0.21
Slimes	78,245,048	46,821,837	279,020,346	3.57	734,892,138	9.39	4,290,629	0.05
Total	137,779,614	109,166,434	732,403,552	5.32	1,839,092,138	13.35	16,698,425	0.12

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4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2018 monitoring results for the alluvial aquifer. The alluvial aquifer immediately underlies the Grants Project site and is therefore the most important groundwater system at the Grants Project site. The section describing well completions is presented first, and is followed by several report sections presenting water-level and water-quality information. Three additional alluvial maps have been added to present the well information in areas where data is too dense for the initial 1” = 1600’ map. The scale of the additional maps is 1” = 500’. The locations of the additional maps are shown on the 1600 scale map (Figure 4.1-1) and they are the On-Site (OS, Figure 4.1-1A), South Off-Site (SOS, Figure 4.1-1B) and North Off-Site (NOS, Figure 4.1-1C). OS, SOS and NOS have been added to these figure titles. The boundaries of the restoration areas are presented on Figure 1.2-2. The edges of the OS, SOS and NOS maps are not set the same as the restoration boundaries.

4.1 ALLUVIAL WELL COMPLETIONS

No new alluvial wells were drilled and no new additional infiltration lines were installed during 2018. 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 2018. Figure 4.1-1A shows the wells in the OS area while Figures 4.1-1B and 4.1-1C show the SOS and NOS area wells respectively. Wells labeled in black were used only for monitoring and black labeled infiltration lines were not used in 2018. Figure 4.1-1 is plotted at a scale of 1" = 1600' while the other figures are plotted at a scale of 1” =500’. Alluvial wells 914, 920, 921, 922, 950, DD3, DD4, DD6 and DD7 are located outside, and north of, the area presented on Figure 4.1-1. These upgradient wells are shown on Figure 4.3-1 in the alluvial water quality 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 2018. Figure 4.1-1B shows that South collection alluvial wells 490, 866, Q2, Q3, Q5, Q11, Q23, Q27, Q30, R1, R2, R3 R4, R5, R10, R11, R18, R20 and R22 were pumped in 2018. Figure 4.1-1C shows that North collection alluvial wells 634, 659, 890, H1, H2A, H7, H7B, H12, H16, H17,

H24 and H26 were pumped in 2018. This water was pumped to the zeolite for treatment during 2018. Table 4.1-1 presents basic well data for alluvial wells located on the Grants Project that have been used to define the alluvial groundwater hydrology. Many additional alluvial wells outside of the Grants Project have also been used for that purpose. The basic well data table presents the location, well depth, casing diameter, water-level information, depth to the base of the alluvium and casing perforation intervals for each well.

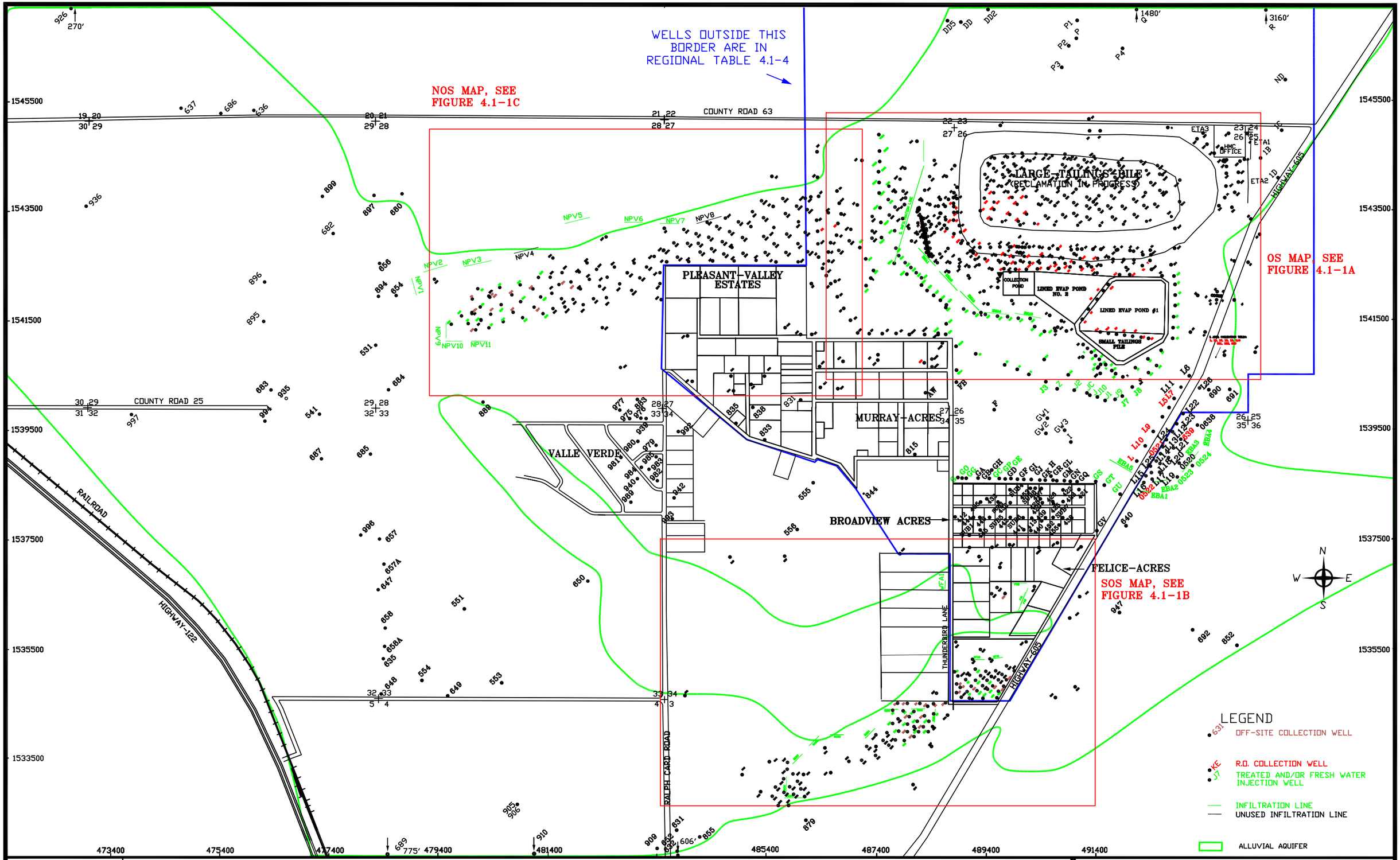
Table 4.1-2 presents the same type of basic well data for alluvial wells in the Broadview and Felice Acres subdivisions. These two subdivisions are located just south of the Homestake property. Figure 4.1-1 shows the locations of the subdivision wells. Table 4.1-3 presents similar basic data for alluvial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

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

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

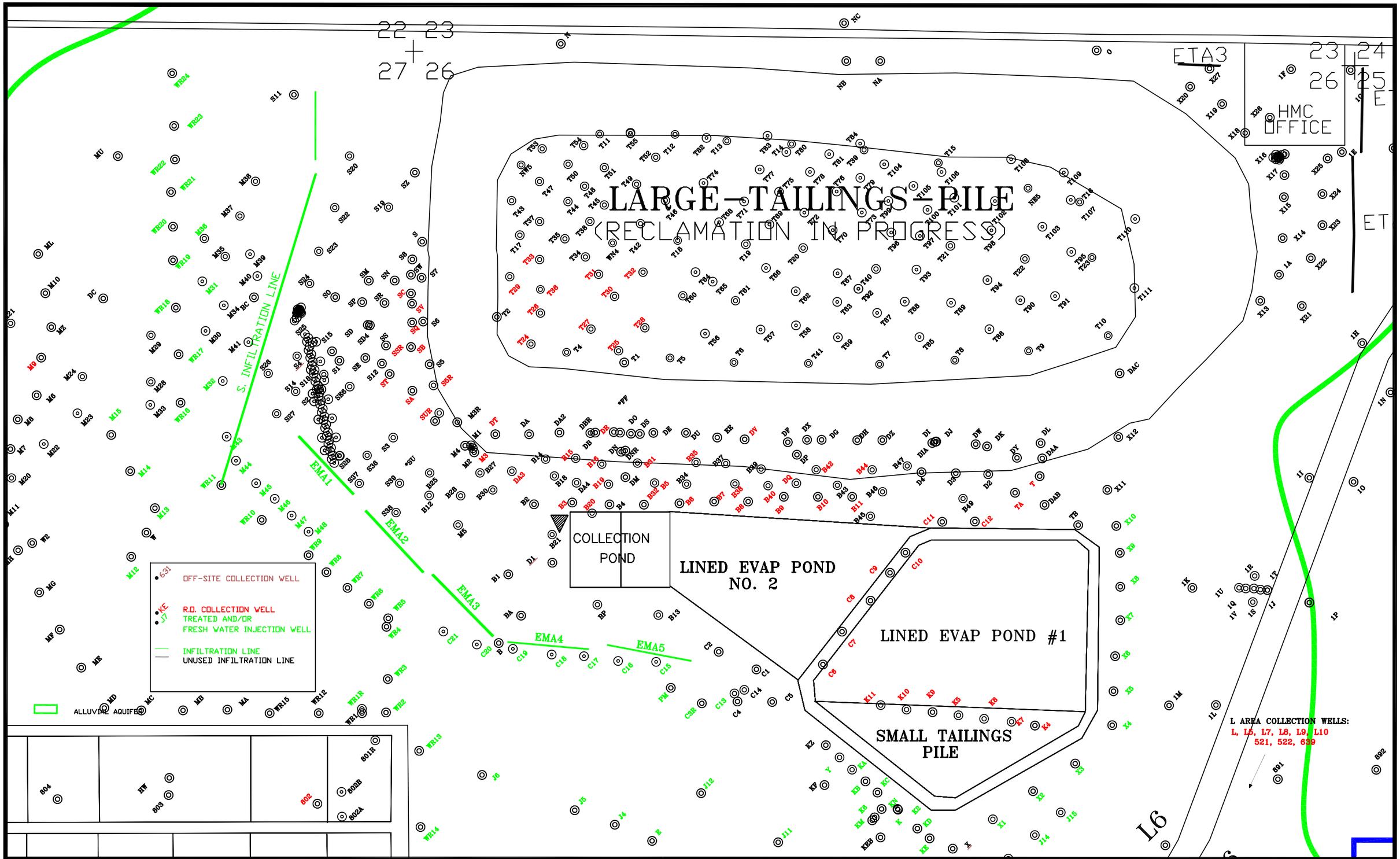
The green line in Figures 4.1-1 and 4.1-2 shows the limits of the alluvial aquifer with alluvial saturation existing inside these limits where the base of the alluvium is lower. The 2014 alluvial water level elevation was used in drawing the aquifer limits. The aquifer limits were updated with the 2014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

The base elevation of the alluvium rises on the western side of Figure 4.1-2 and causes the western limit of the alluvial aquifer to exists on the west side of this figure. The alluvial aquifer extends to the south of this figure in Sections 4 and 5.



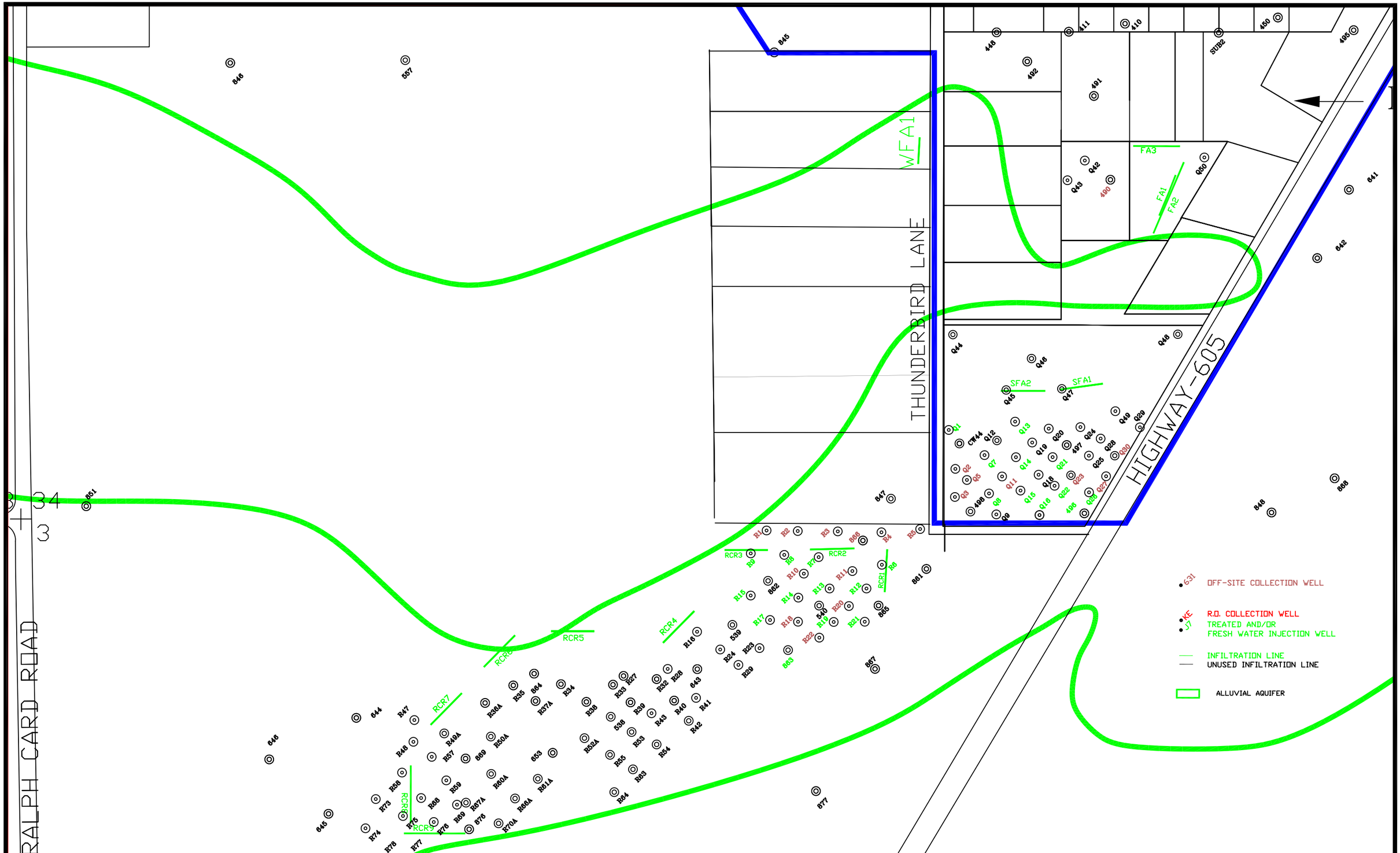
SCALE: 1"=1600'
C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.1-1 ALLUVIAL WELL LOCATIONS, 2018



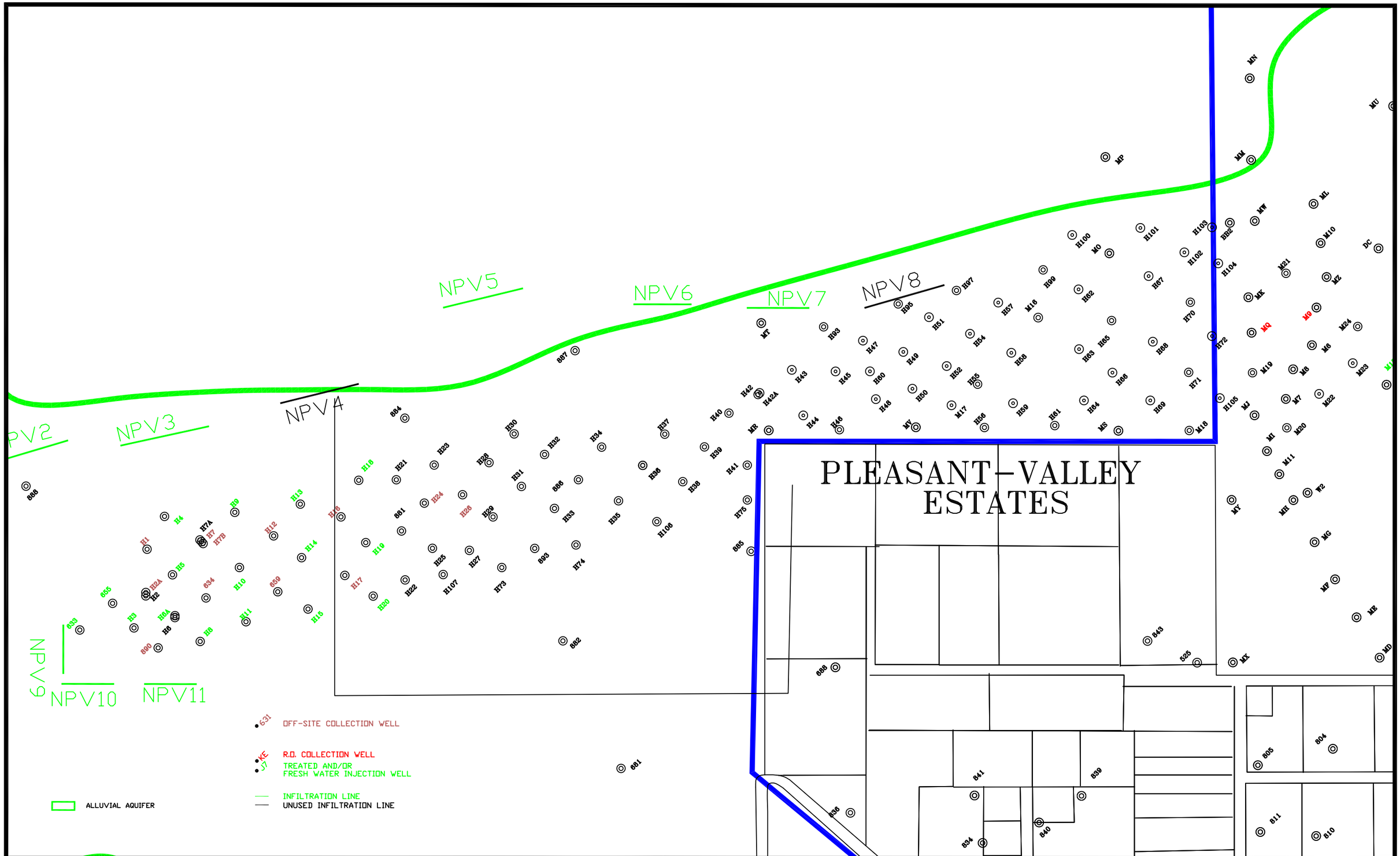
SCALE: 1"=500'
C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.1-1A. ALLUVIAL WELL LOCATIONS, OS, 2018



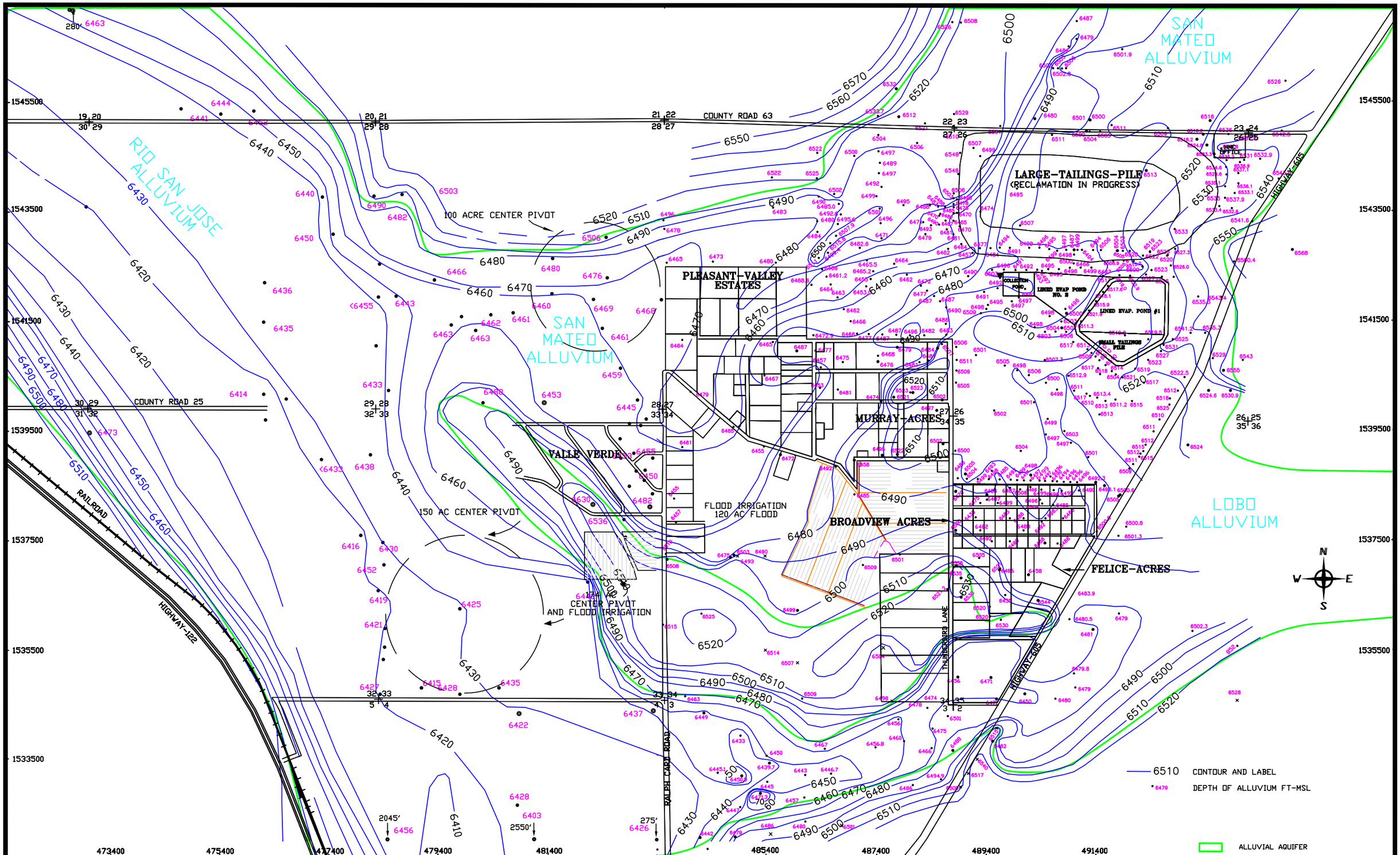
SCALE: 1"=500'
C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/17/2019

FIGURE 4.1-1B. ALLUVIAL WELL LOCATIONS, SOS, 2018



SCALE: 1"=500'
C:\PROJECTS\2019-06
1600QAL18
DATE: 1/18/2019

FIGURE 4.1-1C. ALLUVIAL WELL LOCATIONS, NOS, 2018



SCALE: 1"=1600'
C:\PROJECTS\2015-06 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	12/26/2018	40.30	6541.76	2.5	6582.06	55	6524.6 A	25-65	17.2
0691	1540276	493860	66.0	5.0	12/26/2018	45.50	6543.31	2.9	6588.81	55	6530.9 A	26-66	12.4
0891	1540904	493751	54.0	5.0	2/7/2018	38.50	6542.62	2.1	6581.12	50	6529.0 A	24-54	13.6
0892	1540954	494317	50.0	5.0	12/5/2018	41.25	6545.96	2.0	6587.21	42	6543.2 A	30-50	2.8
1A	1543790	493768	61.0	5.0	4/4/2018	37.29	6548.14	2.9	6585.43	47	6535.5 A	39-51	12.6
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	12/5/2018	37.53	6550.46	2.5	6587.99	43	6542.5 A	34-54	8.0
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	9/19/2017	35.00	6549.31	2.1	6584.31	43	6539.2 A	34-54	10.1
1F	1544952	493831	61.8	5.0	2/13/2018	38.95	6548.43	1.8	6587.38	54	6531.6 A	30-60	16.8
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	12/5/2018	55.40	6530.99	1.8	6586.39	43	6541.6 A	25-55	0.0
1I	1542627	493928	49.8	5.0	12/5/2018	49.80	6548.55	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	4/4/2018	36.79	6547.34	1.0	6584.13	47	6536.1 A	30-55	11.2
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	2/12/2018	28.29	6547.24	1.3	6575.53	33	6541.2 A	25-54	6.0
1N	1543100	494396	45.6	5.0	12/5/2018	31.82	6559.03	2.4	6590.85	25	6563.5 A	15-44	0.0
1O	1542592	494175	44.0	5.0	12/5/2018	44.00	6550.94	0.8	6594.94	29	6565.1 A	14-34	0.0
1P	1541902	493924	52.8	5.0	12/5/2018	38.05	6547.19	2.6	6585.24	35	6547.6 A	20-40	0.0
1Q	1541993	493619	56.0	5.0	1/16/2017	33.05	6550.06	1.9	6583.11	56	6525.2 A	36-56	24.9
1R	1542071	493623	56.0	5.0	1/16/2017	34.50	6551.49	1.3	6585.99	56	6528.7 A	36-56	22.8
1S	1541920	493614	56.0	5.0	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	1/16/2017	32.88	6552.03	1.7	6584.91	56	6527.2 A	36-56	24.8
1U	1542001	493542	44.2	4.0	1/16/2017	34.54	6551.68	3.2	6586.22	---	--- A	-	---
1V	1541982	493579	61.4	5.0	1/16/2017	33.20	6551.74	1.7	6584.94	---	--- A	-	---
* A1	1542365	491539	55.6	4.0	1/12/1994	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	3/7/2018	36.22	6534.68	2.4	6570.90	60	6508.5 A	49-69	26.2
B1	1542071	489370	90.9	5.0	12/26/2018	41.40	6530.25	0.6	6571.65	82	6489.1 A	62-82	41.2
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	5/1/2017	87.30	6486.99	2.6	6574.29	77	6494.7 A	58-78	0.0
B4	1542471	489942	88.8	5.0	4/9/2018	41.02	6533.64	7.4	6574.66	82	6485.3 A	63-83	48.4
B5	1542474	490141	91.0	5.0	5/1/2017	56.67	6516.79	1.4	6573.46	81	6491.1 A	62-82	25.7
B6	1542478	490341	90.0	5.0	4/27/2018	62.74	6514.95	2.0	6577.69	80	6495.7 A	63-83	19.3
B7	1542488	490540	87.0	5.0	4/9/2018	29.56	6544.84	2.2	6574.40	77	6495.2 A	53-78	49.6

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
B8	1542488	490734	87.0	5.0	4/10/2018	49.11	6526.64	2.3	6575.75	77	6496.5 A	53-78	30.2
B9	1542514	490935	86.0	5.0	4/10/2018	47.61	6528.56	2.2	6576.17	76	6498.0 A	51-78	30.6
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	3/20/2018	42.04	6535.35	2.2	6577.39	77	6498.2 A	42-80	37.2
B12	1542524	488915	100.0	5.0	12/26/2018	40.15	6532.87	2.2	6573.02	91	6479.8 A	30-100	53.0
B13	1541841	490223	80.0	5.0	12/26/2018	41.00	6529.04	3.1	6570.04	72	6494.9 A	30-80	34.1
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	4/17/2018	40.44	6535.87	2.0	6576.31	72	6502.3 A	60-120	33.6
B16	1542705	489900	120.0	4.5	4/16/2018	39.98	6535.39	2.0	6575.37	83	6490.4 A	60-120	45.0
B17	1542659	489493	95.0	4.5	---	---	---	2.0	6574.31	---	--- 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	1542819	488938	110.0	4.5	---	---	---	1.3	6574.25	---	--- 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	4/17/2018	40.84	6535.12	2.0	6575.96	83	6491.0 A	60-100	44.2
B32	1542598	490201	120.0	4.5	5/3/2017	46.01	6529.38	2.0	6575.39	93	6480.4 A	60-120	49.0
B33	1542709	490269	85.0	4.5	---	---	---	2.4	6575.46	---	--- A	45-85	---
B34	1542601	490388	90.0	4.5	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	4/17/2018	39.70	6537.16	2.0	6576.86	90	6484.9 A	50-90	52.3
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	5/2/2017	69.37	6506.30	2.0	6575.67	80	6493.7 A	40-80	12.6
B39	1542667	490816	80.0	4.5	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	4/10/2018	42.73	6533.16	2.0	6575.89	80	6493.9 A	40-80	39.3
B41	1542656	490998	85.0	4.5	---	---	---	1.8	6578.13	---	--- A	40-85	---
B42	1542679	491060	80.0	4.5	4/10/2018	42.10	6536.87	2.0	6578.97	80	6497.0 A	40-80	39.9
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	4/10/2018	40.08	6538.52	2.0	6578.60	80	6496.6 A	40-80	41.9
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	1542395	491633	80.0	4.5	---	---	---	2.0	6579.68	---	--- 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	12/25/2017	42.17	6529.41	1.7	6571.58	76	6493.9 A	64-78	35.5
BB2	1543791	486213	56.6	4.0	11/15/2002	53.36	6520.44	0.6	6573.80	---	--- A	42-62	---
BC	1543655	487910	82.8	4.0	12/26/2018	38.20	6536.41	2.6	6574.61	75	6497.0 A	63-83	39.4
BP	1541882	489841	85.4	4.0	3/7/2018	38.64	6533.66	3.0	6572.30	75	6494.3 A	40-85	39.4
* 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	3/21/2017	35.40	6536.46	0.8	6571.86	67	6504.1 A	41-68	32.4
C2	1541630	490566	76.0	5.0	3/7/2018	32.75	6532.27	0.9	6565.02	66	6498.1 A	42-67	34.2
* 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	3/7/2018	33.22	6536.63	0.8	6569.85	62	6507.1 A	43-63	29.6
C6	1541533	491142	80.8	5.0	3/7/2018	60.88	6524.01	1.6	6584.89	72	6511.3 A	34-74	12.7
C7	1541734	491280	72.4	5.0	3/31/2017	45.49	6538.95	1.5	6584.44	61	6521.9 A	25-65	17.0
C8	1541906	491415	78.1	5.0	3/7/2018	51.20	6533.29	1.6	6584.49	67	6515.9 A	31-71	17.4
C9	1542075	491545	77.0	5.0	3/7/2018	58.10	6526.45	1.5	6584.55	65	6518.1 A	27-67	8.4
C10	1542182	491629	71.6	5.0	9/20/2018	55.67	6529.59	2.7	6585.26	65	6517.6 A	30-70	12.0
C11	1542376	491844	68.2	5.0	3/7/2018	56.78	6524.60	2.4	6581.38	60	6519.0 A	35-65	5.6
C12	1542375	492029	63.5	5.0	3/7/2018	32.14	6548.41	2.6	6580.55	55	6523.0 A	34-64	25.5
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	12/5/2018	43.50	6527.40	1.0	6570.90	80	6489.9 A	58-90	37.5
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	4/5/2018	39.12	6535.24	2.6	6574.36	72	6499.8 A	30-81	35.4
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	12/26/2018	40.05	6531.26	2.7	6571.31	---	--- A	45-65	---
DD	1546989	488943	78.5	4.0	12/13/2018	48.68	6543.91	1.9	6592.59	83	6507.7 A	40-80	36.2
DD2	1547439	489251	94.3	5.0	12/13/2018	46.15	6547.13	2.0	6593.28	80	6511.3 A	50-90	35.8
DD3	1548273	489592	69.9	4.0	12/13/2018	48.70	6552.24	3.6	6600.94	67	6530.3 A	40-70	21.9
DD4	1547675	489466	81.5	4.0	12/13/2018	48.20	6551.23	3.8	6599.43	80	6515.6 A	42-82	35.6
DD5	1547013	488704	68.0	4.0	12/13/2018	50.00	6545.35	3.6	6595.35	65	6526.8 A	58-68	18.6
DD6	1547340	488377	35.0	4.0	12/13/2018	35.00	6560.81	3.2	6595.81	35	6557.6 A	25-35	3.2
DD7	1547606	488129	24.2	4.0	12/13/2018	24.20	6572.63	4.1	6596.83	20	6572.8 A	14-24	0.0
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	4/5/2018	48.16	6535.65	2.7	6583.81	99	6482.1 A	59-99	53.5
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

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
DX	1542838	491074	90.0	6.0	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	6/13/2018	52.48	6538.05	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
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	12/26/2018	35.27	6529.55	1.2	6564.82	62	6501.6 A	45-65	27.9
FB	1540417	488857	62.0	4.0	9/12/2018	35.72	6529.94	2.0	6565.66	58	6505.7 A	43-58	24.3
* 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	12/26/2018	37.10	6525.69	1.8	6562.79	62	6499.0 A	45-65	26.7
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	12/26/2018	38.40	6527.61	1.8	6566.01	67	6497.2 A	50-120	30.4
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	12/3/2018	36.34	6526.42	1.3	6562.76	67	6494.5 A	55-65	32.0
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	9/18/2018	37.37	6529.39	2.4	6566.76	67	6497.4 A	50-120	32.0
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	3/2/2018	38.86	6529.11	1.8	6567.97	70	6496.2 A	50-120	32.9
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

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
GU	1538367	491854	80.0	5.0	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	12/26/2018	51.05	6526.33	2.5	6577.38	74	6500.9 A	62-82	25.5
GW1	1539755	490530	73.0	5.0	12/26/2018	36.60	6528.67	1.0	6565.27	65	6499.3 A	48-73	29.4
GW2	1539471	490497	75.0	5.0	12/26/2018	37.10	6528.98	1.0	6566.08	68	6497.1 A	47-75	31.9
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
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	9/27/2018	37.10	6530.10	1.6	6567.20	68	6497.6 A	52-72	32.5
IW-1S	1543422	488225	63.0	4.0	---	---	---	---	6573.45	---	--- A	38-58	---
IW-1D	1543443	488206	85.0						6574.57	---	--- A	60-80	---
IW-2D	1543401	488218	83.0	4.0	---	---	---	---	6573.79	---	--- A	58-78	---
IW-2S	1543373	488232	59.0						6573.93	---	--- A	34-54	---
IW-3D	1543352	488226	79.0	4.0	---	---	---	---	6574.66	---	--- A	54-74	---
IW-3S	1543329	488242	59.0						6574.08	---	--- A	34-54	---
IW-4D	1543309	488236	86.0	4.0	---	---	---	---	6574.11	---	--- A	61-81	---
IW-4S	1543286	488251	66.0						6573.55	---	--- A	41-61	---
IW-5D	1543264	488245	90.0	4.0	---	---	---	---	6574.85	---	--- A	65-85	---
IW-5S	1543239	488261	64.0						6574.90	---	--- A	39-59	---
IW-6S	1543195	488270	62.0	4.0	---	---	---	---	6574.43	---	--- A	37-57	---
IW-6D	1543218	488255	84.5						6574.27	---	--- A	59.5-79.	---
IW-7D	1543174	488265	82.0	4.0	---	---	---	---	6574.02	---	--- A	57-77	---
IW-7S	1543151	488280	60.0						6574.94	---	--- A	35-55	---
IW-8S	1543110	488289	58.0	4.0	---	---	---	---	6574.20	---	--- A	33-53	---
IW-8D	1543129	488274	80.0						6574.53	---	--- A	55-75	---
IW-9D	1543088	488283	77.0	4.0	---	---	---	---	6574.23	---	--- A	52-72	---
IW-9S	1543064	488298	58.0						6573.36	---	--- A	33-53	---
IW-10D	1543043	488292	81.0	4.0	---	---	---	---	6573.46	---	--- A	56-76	---
IW-10S	1543018	488307	58.0						6573.72	---	--- A	33-53	---
IW-11D	1542998	488302	78.0	4.0	---	---	---	---	6574.14	---	--- A	53-73	---
IW-11S	1542974	488317	60.0						6573.56	---	--- A	35-55	---
IW-12D	1542953	488312	85.0	4.0	---	---	---	---	6573.76	---	--- A	60-80	---
IW-12S	1542929	488327	65.0						6574.11	---	--- A	40-60	---
IW-13D	1542908	488321	84.0	4.0	---	---	---	---	6573.43	---	--- A	59-79	---
IW-13S	1542883	488337	65.0						6573.36	---	--- A	40-60	---
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-15S	1542796	488355	67.0	4.0	---	---	---	---	6573.76	---	--- A	42-62	---
IW-15D	1542818	488340	87.0						6573.22	---	--- A	62-82	---
IW-16D	1542775	488350	89.0	4.0	---	---	---	---	6573.98	---	--- A	64-84	---
IW-16S	1542752	488365	67.0						6573.94	---	--- A	42-62	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
IW-17D	1542731	488359	97.0	4.0	---	---	---	---	6573.69	---	--- A	72-92	---
IW-17S	1542709	488373	69.0						6573.48	---	--- A	44-64	---
J	1540174	491302	65.6	4.0	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
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	7/18/2018	57.49	6544.53	2.5	6602.02	80	6519.5 A	65-85	25.0
K5	1541269	491935	86.4	5.0	7/18/2018	70.07	6531.66	2.8	6601.73	80	6518.9 A	55-85	12.7
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	2/8/2018	62.71	6538.82	2.0	6601.53	79	6520.5 A	56-86	18.3
K8	1541250	492081	86.0	5.0	7/18/2018	60.44	6540.05	2.0	6600.49	78	6520.5 A	66-86	19.6
K9	1541287	491787	86.0	5.0	4/4/2018	62.65	6537.69	2.0	6600.34	79	6519.3 A	56-86	18.3
K10	1541305	491638	87.0	5.0	7/18/2018	61.44	6539.37	2.0	6600.81	81	6517.8 A	47-87	21.6
K11	1541325	491490	84.0	5.0	7/18/2018	78.12	6522.49	2.0	6600.61	78	6520.6 A	64-84	1.9
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	3/22/2018	28.92	6540.81	1.5	6569.73	50	6518.2 A	40-60	22.6

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
KF	1540870	491169	63.5	5.0	2/12/2018	32.33	6537.88	2.2	6570.21	50	6518.0 A	30-60	19.9
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	2/12/2018	34.96	6536.76	1.2	6571.72	---	--- A	-	---
L	1538970	492150	67.0	4.0	4/4/2018	56.09	6518.88	0.8	6574.97	59	6515.2 A	46-66	3.7
L5	1539946	492730	60.2	5.0	4/25/2018	55.11	6520.96	1.3	6576.07	50	6524.8 A	25-55	0.0
L6	1540526	493110	51.1	5.0	4/5/2018	30.75	6543.89	2.1	6574.64	50	6522.5 A	25-55	21.4
L7	1540113	492842	67.8	5.0	4/5/2018	57.87	6518.74	2.3	6576.61	62	6512.3 A	36-66	6.4
L8	1539773	492621	73.9	5.0	4/5/2018	57.62	6518.87	2.1	6576.49	65	6509.4 A	32-72	9.5
L9	1539509	492463	74.9	5.0	4/5/2018	51.44	6525.79	2.2	6577.23	64	6511.0 A	43-73	14.8
L10	1539250	492310	74.2	5.0	4/5/2018	48.68	6528.15	2.0	6576.83	63	6511.8 A	53-73	16.3
L11	1540323	492965	70.0	4.5	4/24/2017	32.77	6543.28	2.0	6576.05	70	6504.1 A	30-70	39.2
L12	1539507	492810	75.0	4.5	5/16/2017	50.61	6536.33	2.0	6586.94	70	6514.9 A	55-75	21.4
L13	1539233	492633	75.0	4.5	5/19/2017	51.61	6533.80	2.0	6585.41	75	6508.4 A	35-75	25.4
L14	1538972	492514	75.0	4.5	5/19/2017	47.26	6533.58	2.0	6580.84	60	6518.8 A	35-75	14.7
L15	1538701	492324	75.0	4.5	4/24/2017	45.25	6533.15	2.0	6578.40	70	6506.4 A	35-75	26.8
L16	1538579	492286	75.0	4.5	5/16/2017	46.83	6532.67	2.0	6579.50	70	6507.5 A	35-75	25.2
L17	1538761	492424	75.0	4.5	---	---	---	2.0	6578.52	70	6506.5 A	35-75	---
L18	1538927	492582	75.0	4.5	---	---	---	2.0	6582.32	70	6510.3 A	35-75	---
L19	1538768	492575	75.0	4.5	4/24/2017	47.25	6533.80	2.0	6581.05	70	6509.1 A	35-75	24.8
L20	1539033	492736	75.0	4.5	4/24/2017	49.68	6534.96	2.0	6584.64	70	6512.6 A	35-75	22.3
L21	1539211	492827	75.0	4.5	---	---	---	2.0	6586.62	70	6514.6 A	55-75	---
L22	1539822	493033	70.0	4.5	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	5/16/2017	53.23	6536.03	2.0	6589.26	70	6517.3 A	30-70	18.8
L24	1539361	492700	70.0	4.5	4/24/2017	53.31	6534.76	2.0	6588.07	70	6516.1 A	30-70	18.7
L25	1538880	492409	70.0	4.5	4/24/2017	46.07	6533.47	2.0	6579.54	70	6507.5 A	30-70	25.9
L26	1540306	493302	60.0	4.5	4/25/2017	35.12	6544.55	2.0	6579.67	---	--- A	20-60	---
M1	1542797	489157	103.4	4.0	1/3/1989	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	4/4/2018	39.44	6536.66	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	12/26/2018	43.10	6532.24	3.2	6575.34	84	6488.1 A	60-90	44.1
M6	1543097	486674	110.0	5.0	12/26/2018	61.00	6514.04	2.2	6575.04	65	6507.9 A	60-110	6.2
M7	1542790	486523	83.0	5.0	12/26/2018	56.45	6516.40	2.4	6572.85	71	6499.4 A	63-83	17.0
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

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
M9	1543310	486699	103.0	5.0	12/26/2018	63.40	6513.41	3.5	6576.81	78	6495.3 A	63-103	18.1
M10	1543677	486723	88.0	5.0	12/26/2018	61.75	6511.61	2.3	6573.36	86	6485.1 A	58-88	26.6
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
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	10/1/2018	65.45	6510.68	2.0	6576.13	97	6477.1 A	60-100	33.6
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	12/26/2018	85.00	6487.22	1.0	6572.22	85	6486.2 A	70-85	1.0
MB	1541296	487512	90.0	4.0	3/2/2018	41.91	6530.15	1.0	6572.06	85	6486.1 A	60-90	44.1
MC	1541304	487264	100.0	4.0	12/26/2018	44.20	6527.86	1.0	6572.06	95	6476.1 A	70-100	51.8

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
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	12/26/2018	46.90	6525.38	1.0	6572.28	110	6461.3 A	90-110	64.1
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	12/26/2018	51.15	6522.77	1.0	6573.92	110	6462.9 A	90-110	59.8
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	12/26/2018	60.00	6512.94	1.8	6572.94	60	6511.1 A	40-60	1.8
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	12/26/2018	53.30	6519.40	2.3	6572.70	80	6490.4 A	56-76	29.0
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	12/5/2018	62.65	6514.91	1.9	6577.56	42	6533.7 A	23-63	0.0
MQ	1543173	486326	98.0	5.0	9/19/2017	72.20	6502.10	1.6	6574.30	88	6484.7 A	58-98	17.4
MU	1544461	487143	80.0	5.0	12/6/2018	41.11	6533.08	1.5	6574.19	72	6500.7 A	50-80	32.4
MW	1543802	486346	85.0	5.0	12/26/2018	44.60	6530.31	1.9	6574.91	83	6490.0 A	35-85	40.3
MX	1541287	486244	103.0	5.0	8/2/2018	50.22	6518.39	1.7	6568.61	94	6472.9 A	63-103	45.5
MY	1542200	486213	112.0	5.0	12/6/2018	55.68	6517.88	3.0	6573.56	102	6468.6 A	72-112	49.3
MZ	1543485	486757	92.0	5.0	12/26/2018	64.00	6512.64	3.0	6576.64	84	6489.6 A	60-92	23.0
N	1545101	489665	92.0	4.0	8/29/2018	40.72	6543.25	0.9	6583.97	80	6503.1 A	54-94	40.2
NA	1545000	491488	91.4	5.0	8/30/2018	45.37	6545.61	1.1	6590.98	80	6509.9 A	50-90	35.7
NB	1545000	491296	96.4	5.0	8/30/2018	47.77	6545.53	3.5	6593.30	80	6509.8 A	50-90	35.7
NC	1545220	491282	95.0	4.0	12/26/2018	40.61	6545.22	0.8	6585.83	85	6500.0 A	65-95	45.2
ND	1545927	494872	70.0	4.0	3/7/2018	41.06	6551.83	1.1	6592.89	65	6526.8 A	50-70	25.0
NE5	1544279	492332	156.8	5.0	6/30/2017	76.71	6590.29	3.2	6667.00	150	--- T	50-110	---
										150	6513.8 A	135-155	76.5
NW5	1544408	489433	149.8	5.0	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	8/29/2018	40.08	6547.75	1.3	6587.83	77	6509.5 A	40-70	38.2
P	1546691	491058	109.1	4.0	4/30/2018	40.07	6547.19	1.7	6587.26	107	6478.6 A	82-112	68.6
P1	1547017	491060	105.0	6.0	12/26/2018	47.93	6544.54	0.8	6592.47	105	6486.7 A	60-105	57.9
P2	1546555	490912	105.0	6.0	3/6/2018	41.98	6547.81	0.9	6589.79	105	6483.9 A	60-105	63.9
P3	1546159	490785	95.0	5.0	3/6/2018	41.61	6548.34	2.2	6589.95	85	6502.8 A	55-95	45.6
P4	1546504	491899	92.0	5.0	3/6/2018	41.02	6548.50	3.6	6589.52	84	6501.9 A	52-92	46.6
PM	1541426	490292	81.9	4.0	1/12/2004	12.33	6555.09	1.8	6567.42	---	--- A	-	---
PMW-1D	1543104	488249	73.0	2.0	---	---	---	---	6575.81	---	--- A	58-68	---
PMW-3D	1542780	488318	92.0						6575.05	---	--- A	77-87	---
PMW-2S	1542957	488282	61.0						6575.31	---	--- A	46-56	---
PMW-1S	1543104	488249	58.0						6575.81	---	--- A	43-53	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
PMW-3S	1542781	488318	73.0	2.0	---	---	---	---	6575.07	---	--- A	58-68	---
PMW-2D	1542957	488282	76.0						6575.35	---	--- A	61-71	---
Q	1548693	492153	98.3	4.0	12/3/2018	42.10	6551.72	2.3	6593.82	100	6491.5 A	72-102	60.2
R	1550372	494514	85.0	4.0	12/3/2018	39.90	6564.13	0.3	6604.03	95	6508.7 A	60-90	55.4
S	1543871	488816	72.2	4.0	12/26/2018	44.22	6536.95	2.0	6581.17	75	6504.2 A	52-72	32.8
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	7/11/2018	38.86	6534.86	2.0	6573.72	100	6471.7 A	90-100	63.1
S3	1542857	488714	122.6	5.0	12/26/2018	41.35	6533.43	6.2	6574.78	116	6452.6 A	80-120	80.9
S4	1543344	488359	112.4	5.0	12/26/2018	40.50	6534.79	2.3	6575.29	108	6465.0 A	50-110	69.8
S5	1543269	488923	115.0	5.0	12/25/2017	42.78	6531.91	1.0	6574.69	105	6468.7 A	54-106	63.2
S5R	1543150	488938	115.0	5.0	2/14/2018	42.32	6538.17	1.9	6580.49	109	6469.6 A	55-115	68.6
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	12/26/2018	40.35	6538.04	1.9	6578.39	70	6506.5 A	48-78	31.6
S12	1543297	488628	93.0	5.0	1/17/2018	47.55	6531.30	2.1	6578.85	80	6496.7 A	53-93	34.6
S14	1543120	488152	90.0	4.5	1/3/2018	38.80	6536.60	2.0	6575.40	90	6483.4 A	50-90	53.2
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	12/26/2018	40.52	6537.45	2.0	6577.97	80	6496.0 A	40-80	41.5
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	12/26/2018	39.68	6540.60	2.0	6580.28	46	6532.3 A	40-80	8.3
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	4/17/2014	31.89	6544.00	2.0	6575.89	80	6493.9 A	40-80	50.1
										80	6493.9 A	40-80	50.1
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

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
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	2/14/2018	31.41	6548.90	1.0	6580.31	115	6464.3 A	100-130	84.6
SB	1543371	488811	125.0	5.0	2/14/2018	52.02	6529.07	0.9	6581.09	115	6465.2 A	100-130	63.9
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
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-2D	1543585	488165	95.0	2.0	---	---	---	---	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	---
SDR-4S			70.0						6574.32	---	--- A	55-70	---
SDR-1S	1543571	488169							6574.22	---	--- A	55-70	---
SE	1543301	488550	111.8	5.0	10/4/2017	65.80	6512.19	0.5	6577.99	88	6489.5 A	50-90	22.7
SE4	1543308	488560	105.3	2.0	2/23/2009	45.78	6532.22	---	6578.00	---	--- A	-	---
SE6	1543244	488615	92.0	5.0	1/16/2018	43.26	6535.65	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	5/2/2018	44.48	6534.26	0.7	6578.74	---	--- A	-	---
SMW-5S	1543538	488159	70.0	2.0	---	---	---	---	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-4S	1543570	488179	70.0						6574.33	---	--- A	55-70	---
SMW-4D			95.0							---	--- A	75-95	---
SMW-3S	1543565	488161	70.0						6574.52	---	--- A	55-70	---
SMW-3D			95.0						6574.51	---	--- A	75-95	---
SMW-2	1543564	488184	85.0						6574.23	---	--- A	65-85	---
SMW-1	1543570	488164							6574.39	---	--- A	65-85	---
SN	1543752	488716	67.5	4.0	12/26/2018	42.66	6536.60	1.1	6579.26	---	--- A	-	---
SO	1543652	488381	92.3	5.0	5/2/2018	45.10	6533.69	0.6	6578.79	---	--- A	-	---
SP	1543630	488531	94.4	4.0	12/25/2017	40.70	6537.96	2.0	6578.66	---	--- A	-	---
SQ	1543507	488814	95.0	5.0	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	1/18/2018	45.48	6533.83	2.2	6579.31	96	6481.1 A	55-97	52.7
* 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	3/22/2018	42.62	6538.10	2.6	6580.72	106	6472.1 A	35-115	66.0
SV	1543676	488813	78.2	6.0	2/14/2018	41.91	6537.34	1.7	6579.25	100	6477.6 A	55-105	59.8

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
SW	1543783	488812	81.9	6.0	5/2/2018	47.40	6533.89	2.9	6581.29	75	6503.4 A	35-80	30.5
SX	1544510	489025	45.0	5.0	---	---	---	1.0	6581.49	40	6540.5 A	20-40	---
SZ	1544367	488833	62.6	5.0	12/26/2018	40.87	6540.60	2.2	6581.47	60	6519.3 A	40-70	21.3
T	1542536	492260	70.2	4.0	9/18/2018	36.83	6542.40	2.4	6579.23	68	6508.8 A	61-71	33.6
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	12/11/2018	114.00	6550.82	1.6	6664.82	180	6483.2 A	100-186	67.6
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	3/12/2018	118.86	6540.81	2.0	6659.67	142	6515.7 A	130-160	25.1
T8	1543296	491914	162.0	5.0	3/12/2018	120.33	6541.28	2.6	6661.61	158	6501.0 A	132-162	40.3
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	8/3/2017	91.20	6568.76	2.3	6659.96	142	6515.7 A	108-148	53.1
T11	1544585	489887	193.0	5.0	3/29/2017	114.42	6542.39	2.7	6656.81	160	6494.1 A	113-193	48.3
T12	1544583	490317	200.0	5.0	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	3/12/2018	120.70	6544.59	---	6665.29	150	--- A	120-150	---
T16	1544276	492718	140.0	5.0	3/12/2018	113.56	6546.42	660.0	6659.98	132	-132.0 A	120-140	6678.4
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	6/6/2018	125.81	6541.95	2.5	6667.76	162	6503.3 A	137-167	38.7
T20	1543935	491048	170.0	5.0	12/11/2018	130.86	6539.83	1.5	6670.69	162	6507.2 A	140-170	32.6
T21	1543951	491882	170.0	5.0	3/8/2018	127.99	6542.01	1.3	6670.00	163	6505.7 A	140-170	36.3
T22	1543876	492311	165.0	5.0	12/11/2018	123.42	6543.77	2.1	6667.19	160	6505.1 A	120-165	38.7
T23	1543901	492805	140.0	5.0	6/7/2018	115.41	6545.70	---	6661.11	140	--- A	120-140	---
T24	1543387	489494	200.0	4.5	1/18/2018	138.12	6518.91	2.0	6657.03	---	--- A	140-200	---
T25	1543352	489996	200.0	4.5	1/18/2018	125.27	6532.07	2.0	6657.34	---	--- A	140-200	---
T26	1543567	489550	200.0	4.5	1/18/2018	149.23	6507.43	2.0	6656.66	---	--- A	140-200	---
T27	1543474	489837	200.0	4.5	1/18/2018	125.78	6531.36	2.0	6657.14	---	--- A	140-200	---
T28	1543484	490145	200.0	4.5	3/14/2018	119.84	6538.87	2.0	6658.71	---	--- A	140-200	---
T29	1543774	489375	200.0	4.5	3/14/2018	124.43	6532.28	2.0	6656.71	---	--- A	140-200	---
T30	1543663	489972	200.0	4.5	1/22/2018	125.28	6534.34	2.0	6659.62	---	--- A	140-200	---
T31	1543789	489881	200.0	4.5	4/19/2018	122.62	6536.41	2.0	6659.03	---	--- A	140-200	---
T32	1543801	490134	200.0	4.5	1/23/2018	121.15	6540.46	2.0	6661.61	---	--- A	140-200	---
T33	1543872	489545	200.0	4.5	1/30/2018	122.16	6533.63	2.0	6655.79	---	--- A	140-200	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
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	1/23/2018	106.43	6549.01	2.0	6655.44	170	6483.4 A	130-170	65.6
T37	1544089	489545	200.0	4.5	3/30/2017	116.13	6540.39	2.0	6656.52	---	--- A	140-200	---
T38	1544089	489832	200.0	4.5	---	---	---	2.0	6658.46	---	--- A	140-200	---
T39	1544498	491669	150.0	5.0	3/12/2018	120.00	6545.31	---	6665.31	150	--- A	120-150	---
T40	1543819	491466	170.0	5.0	3/8/2018	130.18	6540.09	2.3	6670.27	165	6503.0 A	140-170	37.1
T41	1543278	491079	160.0	5.0	6/6/2018	96.05	6563.91	3.2	6659.96	155	6501.8 A	130-160	62.1
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	1/30/2018	121.85	6535.67	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	1/30/2018	116.60	6540.61	2.0	6657.21	---	--- A	120-180	---
T48	1544291	489795	180.0	4.5	4/19/2018	123.16	6534.40	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	3/30/2017	114.88	6541.62	2.0	6656.50	---	--- A	140-200	---
T51	1544397	489914	200.0	4.5	3/14/2018	121.18	6536.16	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	1/30/2018	115.32	6541.66	2.0	6656.98	---	--- A	115-175	---
T54	1544523	489796	200.0	4.5	6/7/2018	115.32	6541.78	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	---

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
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	---
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	---

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
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	---
TA	1542471	492426	62.4	5.0	9/26/2017	41.70	6538.60	2.4	6580.30	55	6522.9 A	35-65	15.7
TB	1542351	492616	64.4	5.0	9/26/2017	39.20	6544.37	1.9	6583.57	55	6526.7 A	35-65	17.7
TDR-1D	1543397	488249	83.0	2.0	---	---	---	---	6576.86	---	--- A	68-78	---
TDR-2D	1543240	488239	85.0						6576.28	---	--- A	70-80	---
TDR-2S		488240	67.0						6576.07	---	--- A	52-62	---
TDR-3D	1543130	488284	74.0						6576.16	---	--- A	59-69	---
TDR-3S			59.0						6576.15	---	--- A	44-54	---
TDR-4D	1543060	488259	75.5						6575.12	---	--- A	60.5-70.	---
TDR-4S		488258	60.5							---	--- A	45.5-55.	---
TDR-5D	1542852	488303	87.0						6574.71	---	--- A	62-82	---
TDR-5S		488302	59.0							---	--- A	44-54	---
TDR-1S	1543397	488249							6576.86	---	--- A	44-54	---
W	1542302	487297	99.3	4.0	12/6/2018	44.00	6528.14	0.3	6572.14	117	6454.8 A	58-118	73.3
W2	1542251	486654	79.1	4.0	3/2/1998	56.21	6515.29	0.9	6571.50	---	--- A	-	---
WME-9	1540825	492081	73.2	---	11/14/2018	57.40	6543.42	2.0	6600.82	---	--- A	-	---
WME-10	1544032	491065	76.7	---	11/14/2018	60.00	6542.83	2.0	6602.83	---	--- 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

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
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
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	12/5/2018	33.25	6538.36	1.7	6571.61	---	--- A	-	---
X1	1540671	492129	54.0	5.0	8/12/2002	7.50	6566.04	3.9	6573.54	47	6522.6 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	9/18/2018	37.33	6548.75	2.9	6586.08	49	6534.2 A	37-57	14.5
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

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
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-2	1544459	493758	45.0	2.0	---	---	---	---	6585.44	---	--- A	35-45	---
XDR-3	1544456	493767							6585.37	---	--- A	35-45	---
XDR-1	1544450	493758							6585.28	---	--- A	35-45	---
XDR-4	1544447	493767							6585.41	---	--- 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	493778		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 U	60-95	18.7
										60	6500.0 A	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	4/9/2018	41.91	6525.66	0.0	6567.57	---	--- A	-	---
SUB3	1538280	489420	84.0	6.0	12/3/2018	40.64	6516.43	0.0	6557.07	72	6485.1 A	56-72	31.4
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	2.0	6568.00	110	6456.0 A	270-310	36.3
										110	6296.0 M	270-310	196.3
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	2/20/2018	38.09	6524.57	0.0	6562.66	40	6522.7 A	-	1.9
										40	6497.7 U	-	26.9
										40	6326.7 M	270-300	197.9
0490	1536553	489752	63.0	4.0	12/5/2017	29.10	6533.32	0.0	6562.42	75	6487.4 A	20-80	45.9
0491	1537031	489658	63.0	4.0	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	12/26/2018	50.52	6512.10	2.0	6562.62	89	6471.6 A	64-94	40.5
0498	1534661	488953	150.0	6.0	8/23/2018	64.98	6495.61	2.0	6560.59	80	6478.6 M	130-150	17.0
										80	6478.6 A	70-110	17.0
CW44	1535048	488891	208.0	6.0	8/1/2018	59.57	6501.17	2.5	6560.74	94	6464.2 A	-	36.9
										94	6428.2 M	69-208	72.9
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	8/20/2018	80.53	6481.15	2.0	6561.68	97	6462.7 A	60-100	18.5
Q3	1534743	488865	108.0	4.5	8/20/2018	80.98	6478.76	2.0	6559.74	108	6449.7 A	60-100	29.0
Q5	1534829	488945	100.0	4.5	11/29/2018	79.82	6481.66	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	12/26/2018	53.70	6507.10	2.0	6560.80	100	6458.8 A	60-100	48.3

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	2/26/2018	50.41	6510.92	2.0	6561.33	100	6459.3 A	60-100	51.6
Q11	1534859	489134	100.0	4.5	8/20/2018	82.53	6478.49	2.1	6561.02	100	6458.9 A	60-100	19.6
Q12	1535058	489102	102.0	4.5	8/23/2018	86.10	6475.02	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	2/27/2018	49.77	6511.92	1.3	6561.69	100	6460.4 A	60-100	51.5
Q19	1535053	489306	100.0	4.5	8/23/2018	58.12	6504.05	1.9	6562.17	100	6460.3 A	60-100	43.8
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	12/26/2018	47.36	6516.90	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	8/20/2018	88.20	6476.68	2.4	6564.88	100	6462.5 A	60-100	14.2
Q28	1535076	489696	100.0	4.5	2/27/2018	49.22	6514.72	2.2	6563.94	100	6461.7 A	60-100	53.0
Q29	1535140	489920	89.0	4.5	12/26/2018	51.30	6515.16	2.0	6566.46	89	6475.5 A	60-100	39.7
Q30	1534970	489778	100.0	4.5	2/26/2018	66.42	6499.71	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 U	40-80	27.3
										61	6501.9 A	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	12/26/2018	53.53	6507.80	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	12/26/2018	50.74	6517.10	2.0	6567.84	73	6492.8 U	65-105	24.3
										73	6492.8 A	65-105	24.3
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 4.1-3. 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	8/2/2018	89.22	6473.50	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	12/3/2018	37.32	6518.81	1.2	6556.13	70	6484.9 A	35-75	33.9
0845	1537280	487833	65.0	4.0	12/26/2018	36.00	6521.05	1.7	6557.05	55	6500.4 A	45-65	20.7
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	12/26/2018	35.99	6527.44	0.1	6563.43	63	6500.3 A	-	27.1
										63	6463.3 U	66-155	64.1
HW	1540920	487435	115.0	6.0	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	9/25/2017	51.80	6518.20	---	6570.00	---	--- A	-	---
0688	1541257	483955	105.0	5.0	12/3/2018	58.68	6503.94	2.9	6562.62	95	6464.7 A	65-105	39.2
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 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0520	1538934	492935	75.0	5.0	12/26/2018	53.70	6532.32	0.3	6586.02	68	6517.7 A	35-75	14.6
0521	1539104	492588	75.0	5.0	2/7/2018	55.20	6529.24	2.5	6584.44	65	6516.9 A	35-75	12.3
0522	1538640	492437	77.0	5.0	2/7/2018	51.40	6529.13	2.8	6580.53	68	6509.7 A	37-77	19.4
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	3/5/2018	65.46	6483.48	2.0	6548.94	95	6451.9 A	50-90	31.5
										95	6413.9 L	130-170	69.5
0539	1534014	487596	210.0	6.0	12/26/2018	210.00	6345.32	2.0	6555.32	100	6453.3 A	50-70	0.0
										100	6453.3 A	80-100	0.0
										100	6378.3 L	170-210	0.0
0540	1534125	488091	90.0	6.0	12/26/2018	57.00	6498.91	2.7	6555.91	80	6473.2 A	30-90	25.7
0541	1539831	477236	120.0	5.0	12/26/2018	90.85	6464.77	2.0	6555.62	112	6441.6 A	78-118	23.2
0551	1536272	479881	135.0	5.0	12/26/2018	99.00	6448.30	2.1	6547.30	115	6430.2 A	95-135	18.1
0553	1534923	480563	130.0	5.0	12/26/2018	104.10	6443.38	2.0	6547.48	128	6417.5 A	90-125	25.9
0554	1534967	479107	140.0	5.0	12/26/2018	106.70	6440.47	1.9	6547.17	118	6427.3 A	90-125	13.2
0555	1538572	486236	100.0	5.0	2/6/2018	47.52	6509.62	2.5	6557.14	100	6454.6 A	60-90	55.0
0556	1538006	486184	100.0	5.0	2/6/2018	54.00	6502.02	2.4	6556.02	95	6458.6 A	60-90	43.4
0557	1537204	486000	65.0	5.0	2/10/2016	41.55	6512.22	2.5	6553.77	55	6496.3 A	45-65	16.0
0631	1532234	483756	118.0	6.0	12/26/2018	83.33	6457.77	2.2	6541.10	109	6429.9 A	58-118	27.9
0632	1531850	483767	110.0	6.0	12/26/2018	83.22	6458.08	1.4	6541.30	102	6437.9 A	70-110	20.2
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	12/26/2018	71.14	6488.93	2.8	6560.07	95	6462.3 A	80-100	26.7
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	9/12/2018	111.32	6463.88	2.5	6575.20	118	6454.7 A	104-124	9.2
0638	1539628	493265	75.0	5.0	12/26/2018	48.73	6536.83	0.0	6585.56	65	6520.6 A	35-75	16.3
0639	1539370	492961	80.0	5.0	4/2/2018	54.20	6533.68	2.5	6587.88	71	6514.4 A	35-80	19.3
0640	1537790	491961	84.0	5.0	12/26/2018	47.45	6532.52	2.2	6579.97	77	6500.8 A	64-84	31.7
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	12/26/2018	69.60	6474.30	2.0	6543.90	102	6439.9 A	55-110	34.4
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	12/26/2018	72.76	6470.59	1.5	6543.35	91	6450.9 A	60-100	19.7

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	12/26/2018	104.90	6447.01	1.4	6551.91	132	6418.5 A	80-140	28.5
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	12/26/2018	102.90	6440.39	0.3	6543.29	115	6428.0 A	84-124	12.4
0650	1536779	482135	109.0	4.5	12/26/2018	81.73	6465.38	2.2	6547.11	103	6441.9 A	89-109	23.5
0652	1531170	483779	88.0	5.0	12/5/2018	84.14	6454.01	1.5	6538.15	79	6457.7 A	60-88	0.0
0653	1533283	486570	206.0	6.0	12/26/2018	65.28	6479.69	1.6	6544.97	97	6446.4 A	69-206	33.3
										97	6408.4 L	-	71.3
0654	1541994	478636	120.0	4.5	12/26/2018	74.41	6476.09	1.4	6550.50	106	6443.1 A	60-120	33.0
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	12/26/2018	88.00	6466.07	---	6554.07	88	--- A	6-88	---
0657	1537497	478392	128.0	6.0	12/26/2018	100.05	6451.76	2.2	6551.81	120	6429.6 A	87-128	22.1
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	12/26/2018	107.50	6442.68	0.4	6550.18	129	6420.8 A	89-130	21.9
0659	1541689	480772	101.0	4.5	12/26/2018	66.82	6493.35	2.0	6560.17	97	6461.2 A	61-101	32.2
0680	1543850	478746	80.0	4.5	12/5/2018	72.92	6485.95	2.0	6558.87	75	6481.9 A	50-80	4.1
0681	1540676	482734	117.0	6.0	12/26/2018	62.68	6497.84	2.1	6560.52	111	6447.4 A	67-117	50.4
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	3/8/2018	89.91	6466.13	2.0	6556.04	140	6414.0 A	80-120	52.1
0684	1540273	478499	143.0	6.0	5/1/2018	89.02	6464.26	2.0	6553.28	118	6433.3 A	83-143	31.0
0685	1539098	478170	100.0	4.5	12/26/2018	96.78	6459.79	1.7	6556.57	116	6438.9 A	60-100	20.9
0686	1545319	475438	115.0	4.5	9/12/2018	112.94	6465.86	1.8	6578.80	136	6441.0 A	75-115	24.9
0687	1539011	477276	102.0	6.0	12/26/2018	93.30	6462.66	2.2	6555.96	120	6433.8 A	62-102	28.8
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	7/25/2018	63.42	6521.40	2.5	6584.82	80	6502.3 A	58-90	19.1
0846	1537219	484730	75.0	4.0	12/3/2018	43.82	6505.10	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	12/5/2018	83.49	6462.95	3.3	6546.44	80	6463.1 A	41-91	0.0
0852	1535610	493989	74.0	5.0	12/5/2018	60.42	6529.72	2.5	6590.14	70	6517.7 A	54-74	12.1
0855	1532111	484184	105.0	5.0	12/26/2018	73.37	6467.74	2.1	6541.11	97	6442.0 A	70-105	25.7
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	12/26/2018	51.95	6504.23	3.3	6556.18	97	6455.9 A	63-103	48.3
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	4/2/2018	65.12	6481.60	1.9	6546.72	78	6466.9 A	44-84	14.7
0865	1534123	488429	97.0	5.0	3/8/2018	61.71	6495.07	2.2	6556.78	88	6466.6 A	37-97	28.5
0866	1534494	488340	120.0	5.0	8/22/2018	79.68	6478.44	1.8	6558.12	80	6476.3 A	33-113	2.1

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
0867	1533762	488409	88.0	5.0	12/5/2018	60.54	6495.36	2.0	6555.90	86	6467.9 A	48-88	27.5
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	12/26/2018	67.44	6477.05	1.7	6544.49	99	6443.8 A	44-94	33.3
* 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	12/26/2018	66.61	6477.65	1.9	6544.26	85	6457.4 A	58-88	20.3
0877	1533068	488067	70.0	5.0	12/5/2018	63.83	6489.25	1.9	6553.08	65	6486.2 A	58-68	3.1
0879	1532401	486104	70.0	5.0	12/5/2018	66.57	6477.98	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	12/26/2018	69.17	6495.87	2.0	6565.04	103	6460.0 A	76-96	35.8
0882	1541404	482396	110.0	4.5	2/5/2018	70.02	6491.14	2.0	6561.16	98	6461.2 A	70-110	29.9
0883	1540097	483039	100.0	5.0	12/26/2018	58.90	6498.23	1.9	6557.13	96	6459.3 A	60-90	39.0
0884	1542677	481498	90.0	5.0	2/5/2018	76.19	6489.91	1.0	6566.10	85	6480.2 A	58-88	9.8
0885	1541919	483474	100.0	5.0	12/26/2018	63.34	6501.30	1.5	6564.64	95	6468.1 A	70-100	33.2
0886	1542327	482487	90.0	5.0	12/26/2018	65.78	6498.77	1.5	6564.55	87	6476.1 A	60-90	22.7
0887	1543063	482469	67.0	5.0	12/5/2018	61.40	6506.33	1.5	6567.73	60	6506.2 A	42-67	0.1
0888	1542285	479335	105.0	5.0	12/26/2018	77.57	6479.76	1.1	6557.33	90	6466.2 A	75-105	13.5
0889	1540047	480222	65.0	5.0	12/5/2018	47.82	6501.81	1.5	6549.63	60	6488.2 A	35-65	13.6
0890	1541365	480088	101.0	5.0	8/28/2018	74.33	6484.10	1.7	6558.43	93	6463.7 A	81-101	20.4
0893	1541934	482244	98.0	4.5	12/26/2018	66.11	6497.86	2.1	6563.97	93	6468.9 A	78-98	29.0
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	10/3/2017	83.20	6470.64	2.4	6553.84	116	6435.4 A	61-101	35.2
0896	1542246	476237	113.0	5.0	10/3/2017	84.60	6471.01	2.0	6555.61	117	6436.6 A	73-113	34.4
0897	1543819	478237	93.0	4.0	12/5/2018	79.08	6483.17	2.0	6562.25	70	6490.3 A	63-93	0.0
0899	1543801	477288	110.0	4.0	11/28/2018	99.81	6471.03	2.0	6570.84	120	6448.8 A	70-110	22.2
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 A	80-135	27.5
										112	6426.9 L	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	2/14/2018	47.73	6594.27	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	---	5.0	11/29/2018	40.92	6583.08	1.9	6624.00	---	--- A	-	---
0922	1555200	492500	---	6.0	2/19/2018	52.90	6568.80	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	5/7/2018	94.88	6463.24	2.6	6558.12	125	6430.5 A	95-132	32.7
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	7/19/2018	53.02	6522.16	0.0	6575.18	95	6480.2 A	70-100	42.0
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	6652.00	95	6557.0 A	85-95	---
0993	1537920	483677	102.0	5.0	---	---	---	0.0	6650.00	98	6552.0 A	85-98	---
0994	1539700	476240	144.0	6.0	11/28/2018	90.82	6464.18	0.0	6555.00	---	--- A	95-110	---
0996	1537621	477989	138.0	5.0	11/28/2018	86.58	6465.94	1.7	6552.52	136	6414.8 A	126-136	51.1
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	8/28/2018	72.38	6486.87	2.0	6559.25	98	6459.3 A	78-98	27.6
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	2/1/2018	75.82	6484.05	2.0	6559.87	88	6469.9 A	66-88	14.2
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	8/28/2018	68.56	6490.98	2.0	6559.54	102	6455.5 A	82-102	35.4
H7A	1542002	480322	100.0	4.5	12/26/2018	70.26	6488.83	2.0	6559.09	100	6457.1 A	80-100	31.7
H7B	1541933	480350	98.0	4.5	8/28/2018	67.71	6491.67	2.0	6559.38	98	6459.4 A	78-98	32.3
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	8/28/2018	60.03	6503.59	2.0	6563.62	100	6461.6 A	80-100	42.0
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	8/28/2018	62.29	6495.69	2.0	6557.98	92	6464.0 A	72-92	31.7
H17	1541782	481151	99.0	4.5	6/21/2018	72.61	6490.75	2.0	6563.36	99	6462.4 A	79-99	28.4
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	8/28/2018	68.32	6497.55	2.0	6565.87	100	6463.9 A	80-100	33.7
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	8/28/2018	83.03	6483.78	2.0	6566.81	98	6466.8 A	78-98	17.0
H27	1541924	481863	96.0	4.5	3/28/2017	69.14	6496.11	2.0	6565.25	96	6467.3 A	76-96	28.9
H28	1542427	481976	97.0	4.5	3/28/2017	68.22	6497.16	2.0	6565.38	97	6466.4 A	77-97	30.8

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
H29	1542117	481997	100.0	4.5	3/28/2017	65.41	6496.59	2.0	6562.00	100	6460.0 A	80-100	36.6
H30	1542590	482118	92.0	4.5	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	8/28/2018	67.56	6497.50	2.0	6565.06	95	6468.1 A	75-95	29.4
H32	1542470	482295	98.0	4.5	3/28/2017	67.82	6497.29	2.0	6565.11	98	6465.1 A	78-98	32.2
H33	1542162	482347	98.0	4.5	3/28/2017	68.60	6497.48	2.0	6566.08	98	6466.1 A	78-98	31.4
H34	1542415	482618	96.0	4.5	3/29/2017	67.85	6498.34	2.0	6566.19	96	6468.2 A	76-96	30.2
H35	1542209	482713	97.0	4.5	3/29/2017	67.70	6497.23	2.0	6564.93	97	6465.9 A	77-97	31.3
H36	1542405	482853	100.0	4.5	2/12/2018	47.38	6512.58	2.0	6559.96	100	6458.0 A	80-100	54.6
H37	1542586	482972	96.0	4.5	3/29/2017	61.71	6498.85	2.0	6560.56	96	6462.6 A	76-96	36.3
H38	1542314	483081	93.0	4.5	3/29/2017	63.31	6499.18	2.0	6562.49	93	6467.5 A	73-93	31.7
H39	1542517	483204	100.0	4.5	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	2/12/2018	64.56	6499.77	2.0	6564.33	100	6462.3 A	80-100	37.4
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	8/28/2018	65.39	6501.97	2.0	6567.36	95	6470.4 A	75-95	31.6
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	2/1/2018	67.80	6501.45	2.0	6569.25	95	6472.3 A	75-95	29.2
H56	1542625	484804	95.0	4.5	11/3/2017	63.37	6506.12	2.0	6569.49	95	6472.5 A	75-95	33.6
H57	1543338	484884	90.0	4.5	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	11/3/2017	61.94	6508.55	2.0	6570.49	89	6479.5 A	69-89	29.1
H62	1543413	485343	100.0	4.5	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	11/3/2017	64.62	6510.00	2.0	6574.62	93	6479.6 A	73-93	30.4
H71	1542939	485966	91.0	4.5	11/3/2017	62.90	6509.42	2.0	6572.32	91	6479.3 A	71-91	30.1
H72	1543147	486104	90.0	4.5	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	3/29/2017	66.29	6498.96	2.0	6565.25	93	6470.3 A	73-93	28.7
H93	1543202	483884	100.0	4.5	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	12/26/2018	62.94	6505.97	2.0	6568.91	100	6466.9 A	80-100	39.1
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	3/29/2017	65.97	6498.78	2.0	6564.75	94	6468.8 A	74-94	30.0
H107	1541784	481742	98.0	4.5	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	12/26/2018	60.93	6509.66	1.4	6570.59	100	6469.2 A	60-100	40.5
M17	1542752	484617	100.0	4.5	---	---	---	2.0	6569.21	95	6472.2 A	80-100	---
M18	1542607	485970	88.0	4.5	3/29/2017	60.52	6511.76	2.0	6572.28	88	6482.3 A	68-88	29.5
MO	1543620	485518	88.0	4.5	12/26/2018	62.06	6510.83	2.0	6572.89	80	6490.9 A	45-85	20.0
MP	1544164	485492	80.0	5.0	12/5/2018	63.92	6510.56	2.1	6574.48	50	6522.4 A	33-63	0.0
MR	1542609	483574	100.0	5.0	12/26/2018	65.99	6500.27	1.8	6566.26	100	6464.5 A	54-94	35.8
MS	1542607	485570	82.0	5.0	12/6/2018	60.53	6510.14	1.5	6570.67	89	6480.2 A	52-82	30.0
MT	1543221	483531	98.0	4.5	12/6/2018	60.64	6506.79	2.3	6567.43	87	6478.1 A	34-94	28.7
MV	1542618	484418	105.0	4.5	12/26/2018	64.92	6504.86	1.3	6569.78	95	6473.5 A	75-105	31.4
R1	1534551	487790	120.0	5.0	12/26/2018	49.63	6505.49	2.0	6555.12	84	6469.1 A	80-120	36.4
										84	6469.1 M	80-120	36.4
R2	1534548	487968	115.0	5.0	8/22/2018	79.34	6474.82	2.0	6554.16	83	6469.2 M	75-115	5.7
										83	6469.2 A	75-115	5.7

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	12/4/2018	52.25	6503.48	2.0	6555.73	88	6465.7 M	100-140	37.8
										88	6465.7 A	60-80	37.8
R4	1534541	488446	130.0	5.0	8/22/2018	102.18	6456.60	2.0	6558.78	84	6472.8 M	90-130	0.0
										84	6472.8 A	90-130	0.0
R5	1534560	488666	125.0	5.0	8/22/2018	103.11	6454.64	2.0	6557.75	71	6484.8 A	65-125	0.0
										71	6484.8 M	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	2/20/2018	58.30	6496.92	2.0	6555.22	83	6470.2 A	60-120	26.7
R11	1534320	488280	120.0	4.5	8/22/2018	113.11	6445.34	2.0	6558.45	70	6486.5 M	60-120	0.0
										70	6486.5 A	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	3/5/2018	67.01	6488.99	2.0	6556.00	87	6467.0 A	60-100	22.0
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	3/5/2018	62.09	6494.25	2.0	6556.34	80	6474.3 A	60-100	19.9
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	3/5/2018	73.10	6484.04	2.0	6557.14	91	6464.1 A	60-100	19.9
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	4/5/2017	63.25	6487.90	2.0	6551.15	100	6449.2 A	60-100	38.8
R47	1533470	485780	160.0	4.5	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 L	100-160	---
										100	6443.2 A	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 A	110-150	42.4
										107	6436.0 L	110-150	42.4
R60A	1533163	486219	107.0	4.5	---	---	---	2.0	6544.99	---	--- A	60-107	---
R61A	1533135	486485	100.0	4.5	---	---	---	2.0	6544.69	95	6447.7 A	60-100	---
R63	1533189	487028	95.0	4.5	---	---	---	2.0	6549.92	95	6452.9 A	75-95	---
R64	1533059	486921	95.0	4.5	---	---	---	2.0	6548.15	85	6461.2 A	75-95	---
R65A	1533056	486614	95.0	4.5	---	---	---	2.0	6545.64	95	6448.6 A	75-95	---
R66A	1533023	486355	100.0	4.5	---	---	---	2.0	6545.33	---	--- A	60-100	---
R67A	1532999	486075	90.0	4.5	---	---	---	2.0	6544.38	90	6452.4 A	70-90	---
R68	1533025	485819	160.0	4.5	10/10/2014	69.44	6475.41	2.0	6544.85	99	6443.9 L	100-160	31.6
										99	6443.9 A	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 L	100-160	27.5
										96	6447.4 A	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 A	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 L	110-150	31.4
R74	1532852	485502	140.0	4.5	12/26/2018	69.88	6474.15	2.4	6544.03	104	6437.6 A	100-140	36.5
										104	6437.6 L	100-140	36.5
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 A	100-140	39.9
										106	6436.8 L	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
R80	1533169	485471	120.0	4.5	---	---	---	2.0	6543.72	---	--- L	80-120	---
										---	--- A	80-120	---

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

4.2 ALLUVIAL WATER LEVELS

4.2.1 WATER-LEVEL ELEVATION - ALLUVIAL

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

Figures 4.2-1, 4.2-1A, 4.2-1B and 4.2-1C present the fall of 2018 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 2018 groundwater flow patterns in the alluvial aquifer are very similar to those observed in the fall of 2014. The ridge in the piezometric surface west of the LTP is attributable to continued injection of water into the injection wells and lines in 2018 (see Figure 4.1-1 for locations). The water-level elevations and flow directions indicate the extent of the area of the alluvial aquifer from which groundwater is drawn by the collection system. The area of collection is between the treated water injection area and the collection wells, where groundwater is flowing back to the collection wells. The area underlying the LTP is also within the collection area, because alluvial groundwater in this area flows to the collection wells. The collection area also extends from the southeast corner of the STP through the injection ridge to the zero saturation line to the east.

The water-level elevations in Section 3 overall decreased in 2018 with the collection and treated water injection (see Figure 4.2-1B). Water-level also decreased a few feet in Section 33 (see the western half of Figure 4.2-1), likely due to less than average recharge. The water levels in Section 28 also generally decreased a few feet in 2018 due to the Section 28 Off-site collection.

Several wells have been drilled in the past 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 2018 to define the amount of limited groundwater that exists near the saturation boundary.

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

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

4.2.2 WATER-LEVEL CHANGE - ALLUVIAL

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

Water levels in the alluvial aquifer upgradient of the LTP have been fairly stable during the last year except for a gradual declining trend in DD wells. Figures 4.2-3 and 4.2-3A present water-level elevation data for up-gradient wells DD, ND, P, Q and R and DD2, DD3, DD4 and DD5 respectively. A very slight increasing trend was observed in up-gradient well ND

during 2018. The lower and much larger water level elevations measured in 2018 are outliers based on the adjacent data.

Water-level elevation data are presented for two sets of wells monitored for the purpose of detection of a reversal of water-surface gradient near the S line of the collection system. These wells (SP and SO) are located just northeast of the majority of the S line of collection wells. Figure 4.2-4 graphically illustrates that the alluvial hydraulic gradient is very flat in the area of wells SM, SN, SO and SP. Water-level rises were observed in wells SM, SN, SO and SP in 2003 and 2004 due to injection of fresh water into the injection line with overall a very gradual decline in water levels in 2016 through 2018. The water levels actually indicate a very flat gradient between wells SP and SO for 2018. 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 level elevations at these four wells (see Figures 4.2-1A) shows that they are located on the northern edge of the depression developed by the RO collection wells and therefore the gradient in this area is mainly to the south into the RO collection depression.

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

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

The alluvial water levels north of Murray Acres gradually declined in 2018 in wells M7, MO and MX (see Figure 4.2-7) while and overall small rise occurred in well MR. The lower water-level elevation in well M9 in early 2018 was due to the pumping of water from this collection well to the RO plant.

Wells B and BA are monitored in order to define the reversal in the groundwater gradient between the M and J injection lines and the D collection line. Figure 4.2-8 presents water-level elevation data for wells B and BA and indicates a reversal gradient between these two wells in 2018. Increased collection rate upgradient of these two wells in 2018 caused water

level declines in these two wells. Figure 4.2-9 presents water-level elevation plots for alluvial wells B12, D1 and M5, which are located near the lined collection ponds. Water-level elevations in the alluvial aquifer near the Small Tailings collection system are presented on Figure 4.2-10 for reversal wells DZ and KZ. Well DZ is near the D collection line and well KZ is close to the K injection line and, therefore, is naturally down-gradient of well DZ. This plot shows that, during late 2009 and again in 2014 and some of 2015 and 2018, the reversal of the groundwater gradient was lost between the line of injection and line of collection. Additional collection in 2016 and 2017 reversed this gradient and caused the water levels to decline but some additional collection is needed between the LTP and STP in 2019.

Figure 4.2-11 presents water-level elevation data for wells C10, C12, K4 and L6. This data reflects the changes in water levels near the STP. Injection of treated water has caused the higher water-level elevations observed in well L6 with steady levels in 2011 through 2016 and a decline in 2017 and fairly steady water level in 2018. Figure 4.2-12 shows the water-level elevation plots for wells K5, K8, K9 and X.

Water-level elevations in the alluvial aquifer north of the Broadview Acres injection system declined in 2018. The pumping in Felice Acres for South Off-Site collection supply caused overall steady water level in well 497 in 2018 (see water levels for wells 497, F, GH, Q48 and SUB3 on Figure 4.2-13).

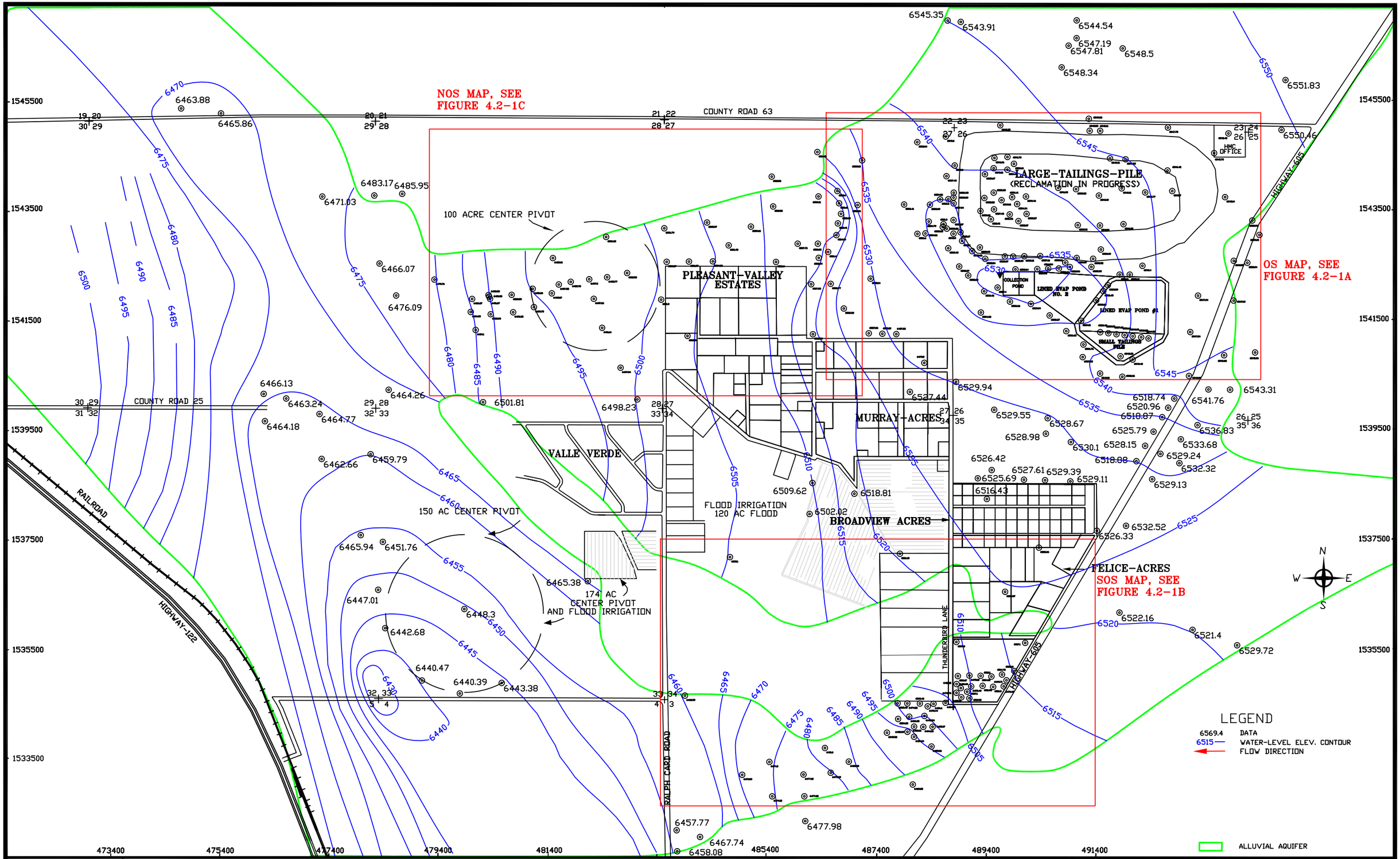
Water levels in the former flood irrigation area south of Murray Acres were fairly steady in alluvial wells 555, 556, 557, 844, 845 and 846 during 2018 (see Figure 4.2-14).

Figure 4.2-15 presents water-level hydrographs for five wells in Section 3. Water levels were steady in 2018 in wells 631 and 646, declined in well 644 and varied in well 862 due to the Off-site pumping and injection in the northeast corner of Section 3. Figure 4.2-15A presents water-level elevations for five of the R wells with variable levels 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 2018 overall slightly rose in this area. Water-level hydrographs for six wells just west of the former Section 28 irrigation area are presented on Figure 4.2-16A.

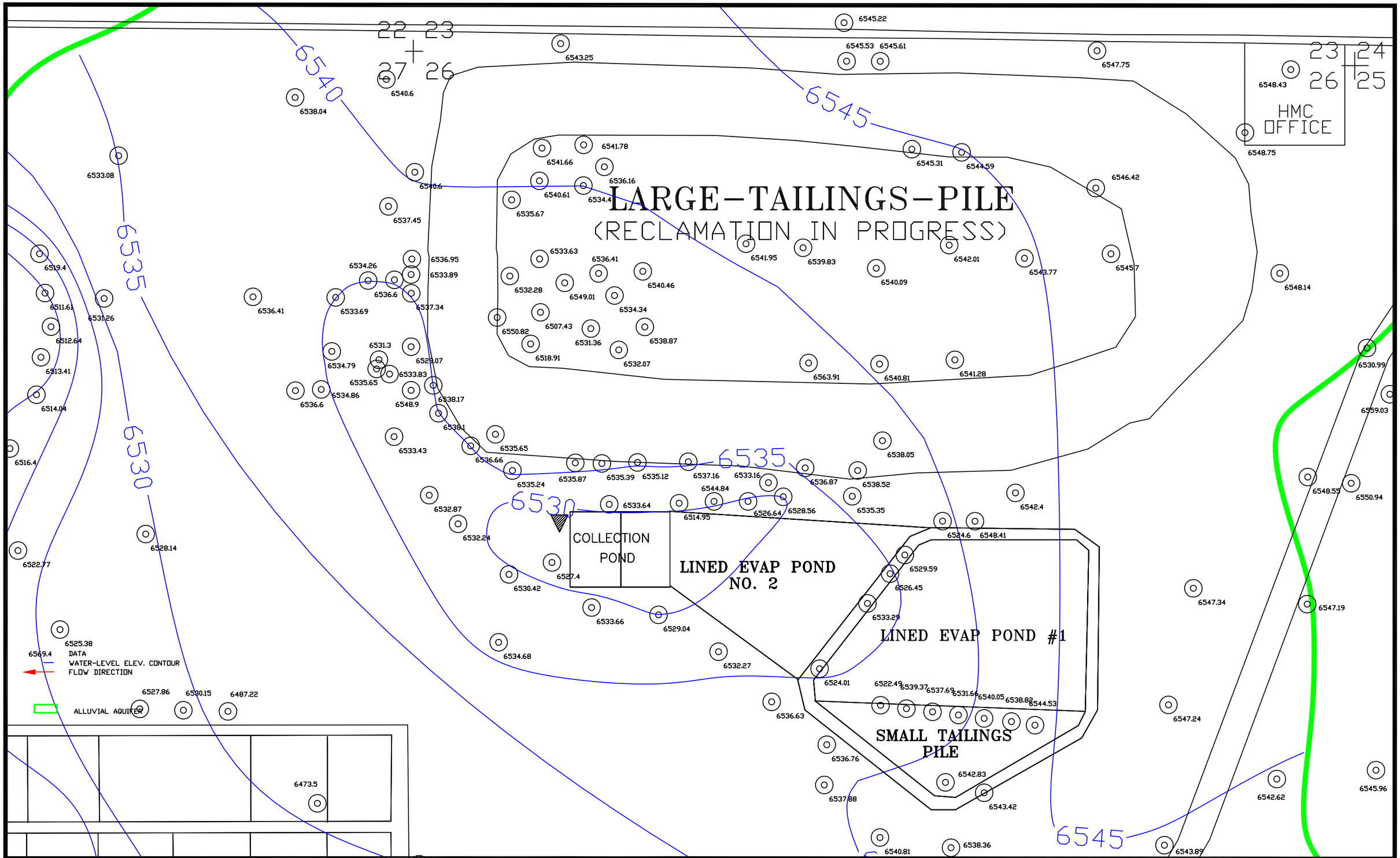
Figure 4.2-17 presents the water- level time plots for two wells in Section 20, one in Section 29 and two wells in Section 32. Water levels gradually declined in 2018 except for well 994 which had variable water levels.

Figure 4.2-18 presents the water-level plots for the Section 33 wells. Water levels gradually declined except for a steady level in well 650. No pumping from the Section 33 wells has been done after 2012 and is not expected to be done in the future.



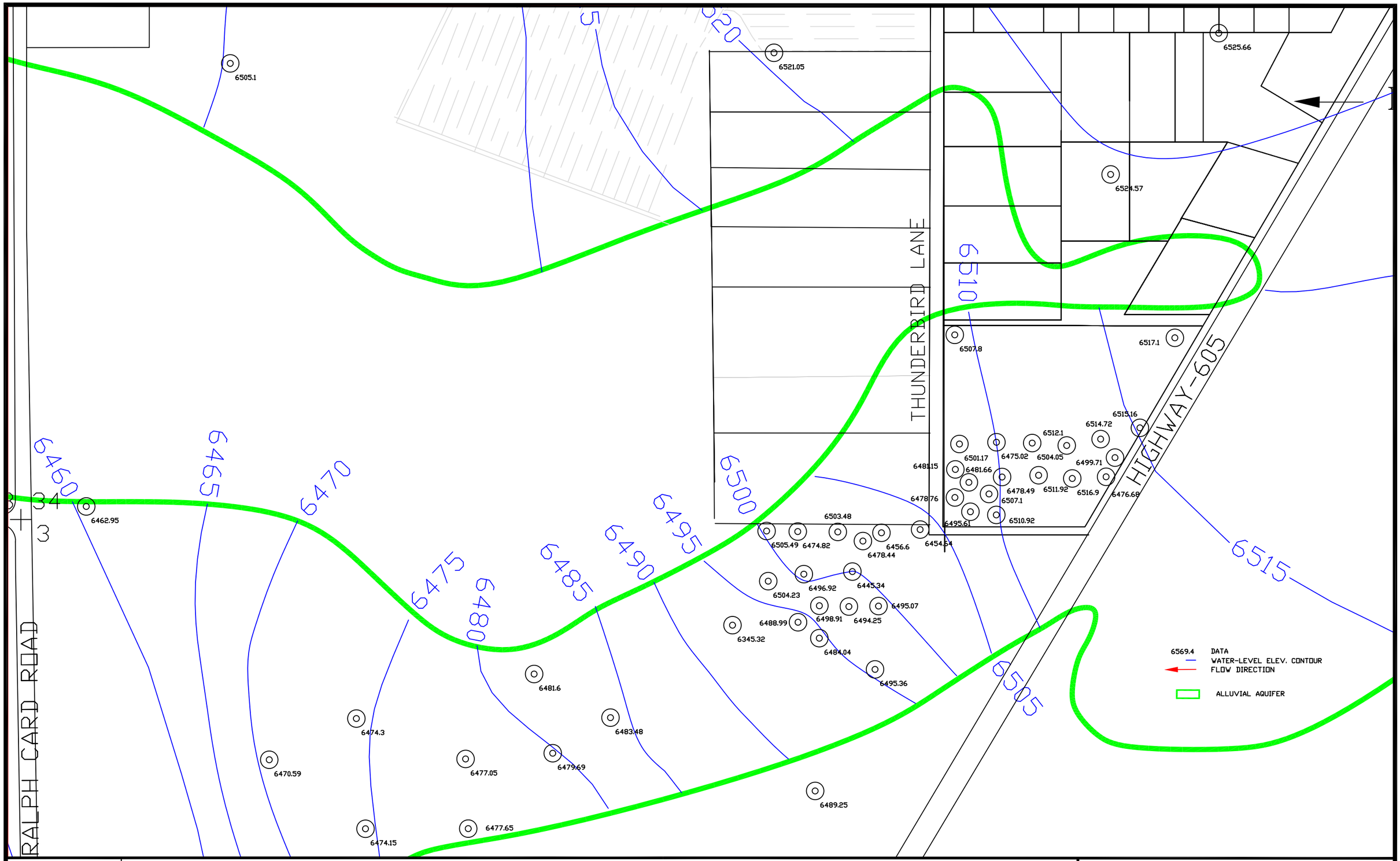
SCALE: 1"=1600'
C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.2-1. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, FALL 2018, FT-MSL



SCALE: 1"=500'
C:\PROJECTS\2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.2-1A. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, OS, FALL 2018, FT-MSL



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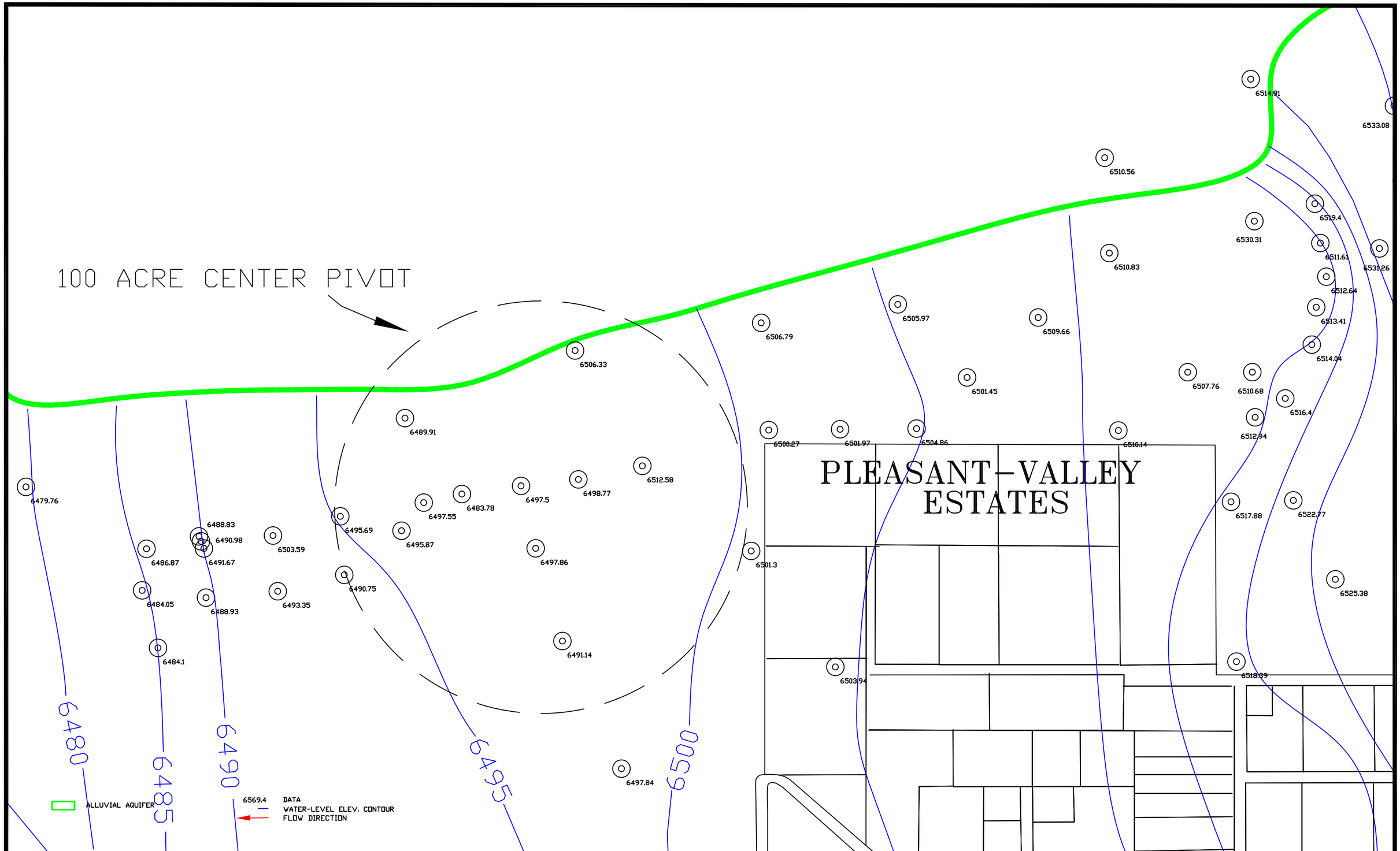
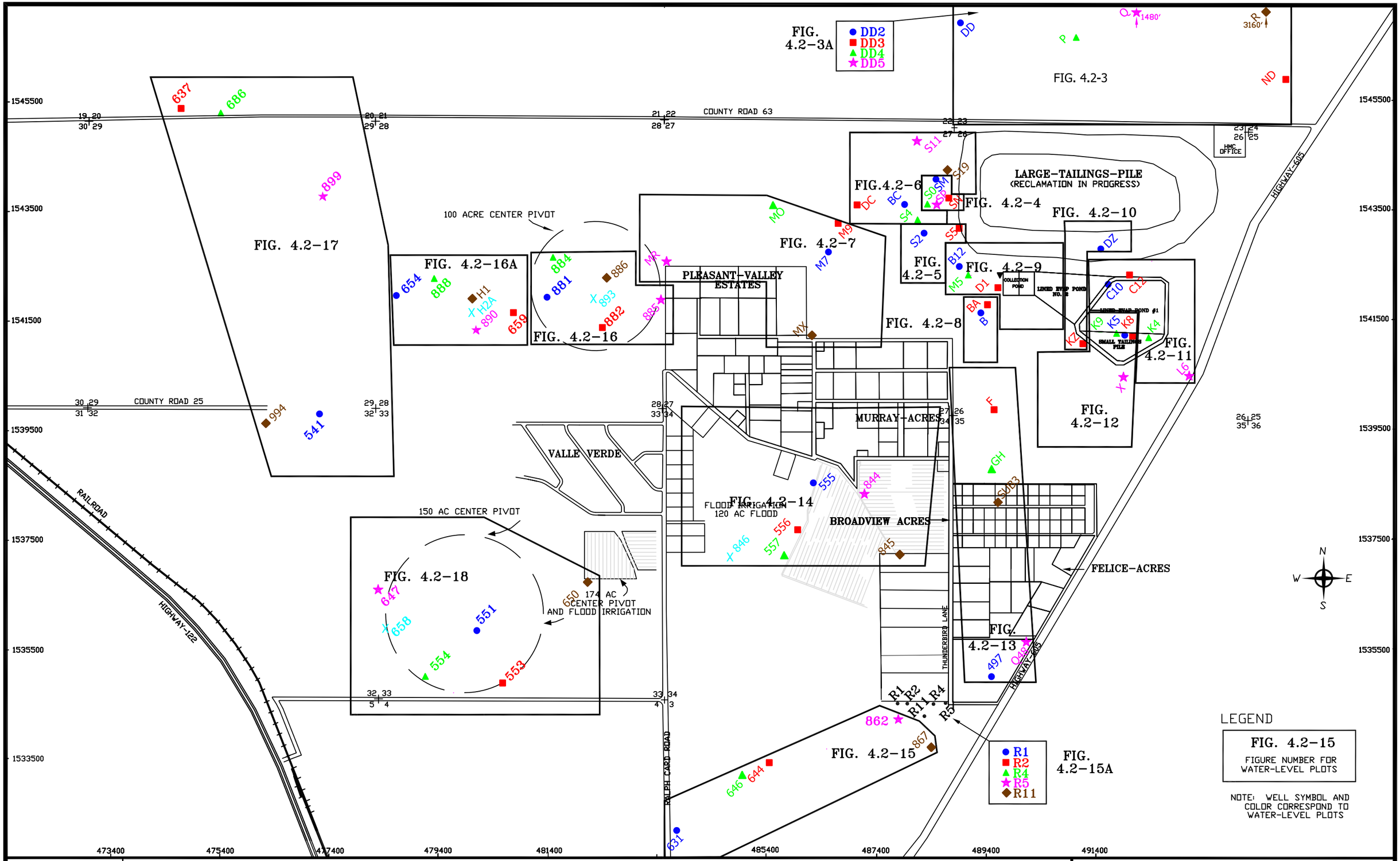
DATE: 1/17/2019

FIGURE 4.2-1B. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, SOS, FALL 2018, FT-MSL



SCALE: 1"=500'
C:\PROJECTS\2019-06 1600QAL18
DATE: 1/18/2019

FIGURE 4.2-1C. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, NOS, FALL 2018, FT-MSL



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C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.2-2. LOCATION OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS, 2018

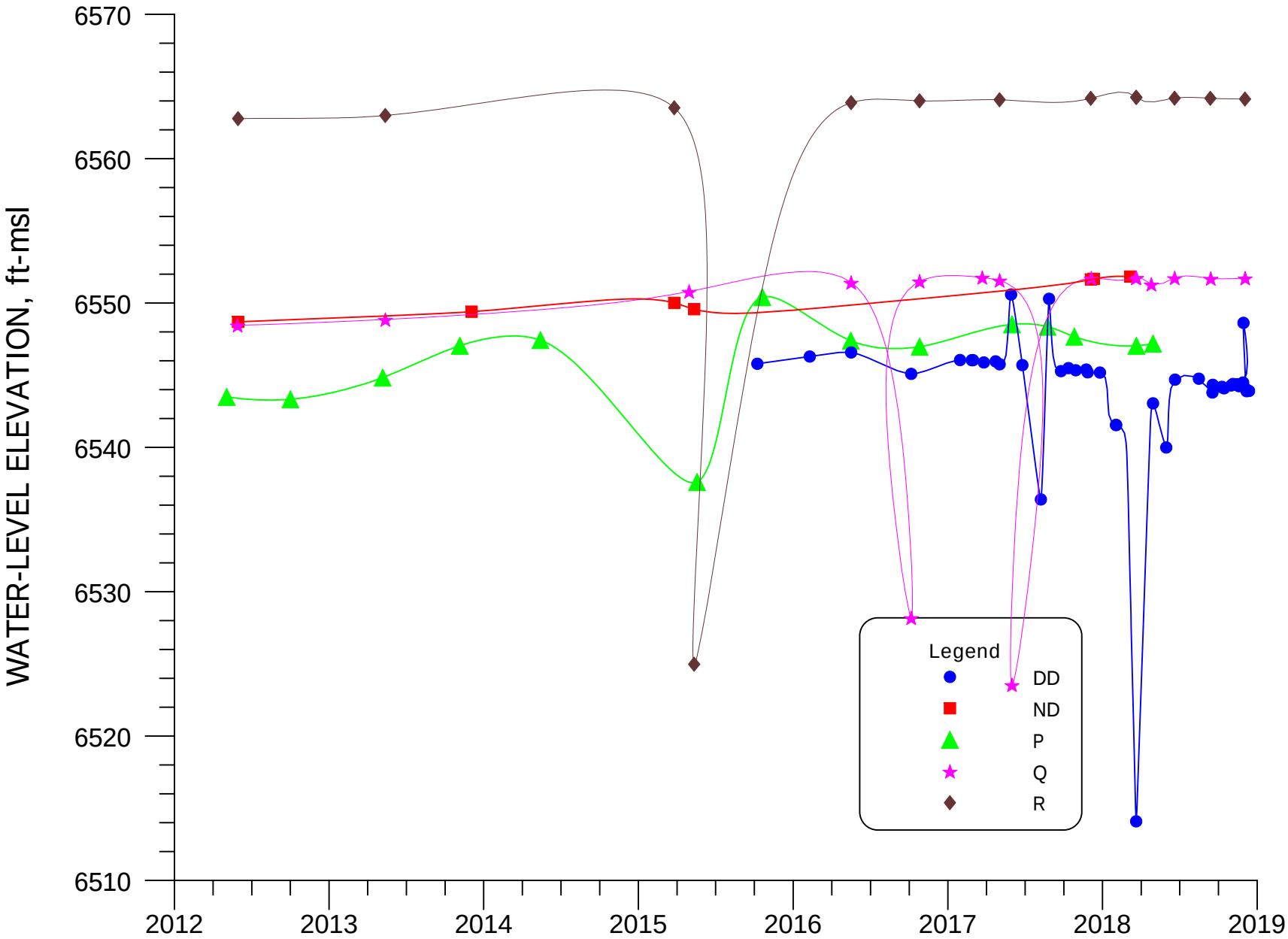


FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS DD, ND, P, Q AND R.

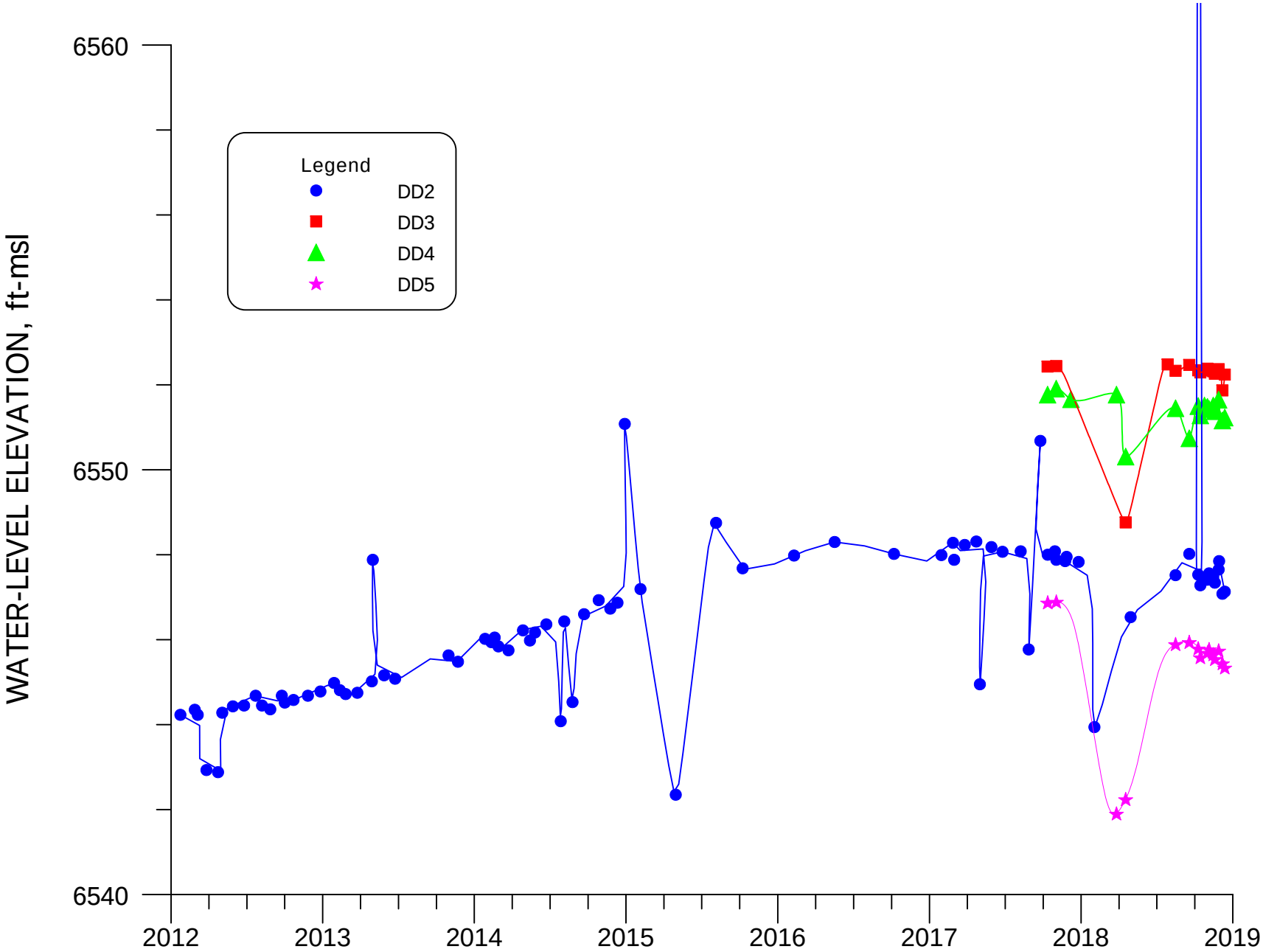


FIGURE 4.2-3A. WATER-LEVEL ELEVATION FOR WELLS DD2, DD3, DD4 AND DD5.

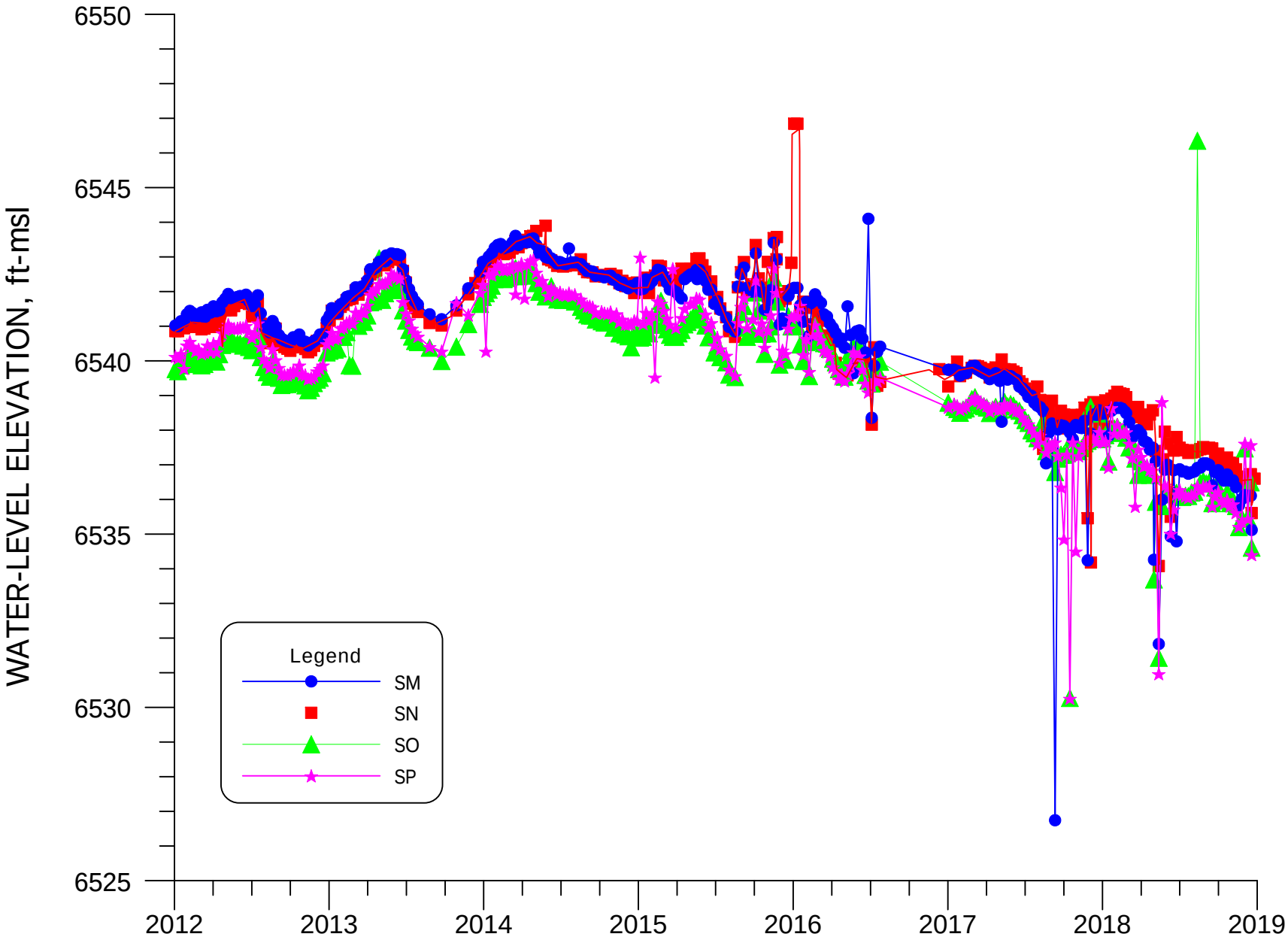


FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SM, SN, SO, AND SP.

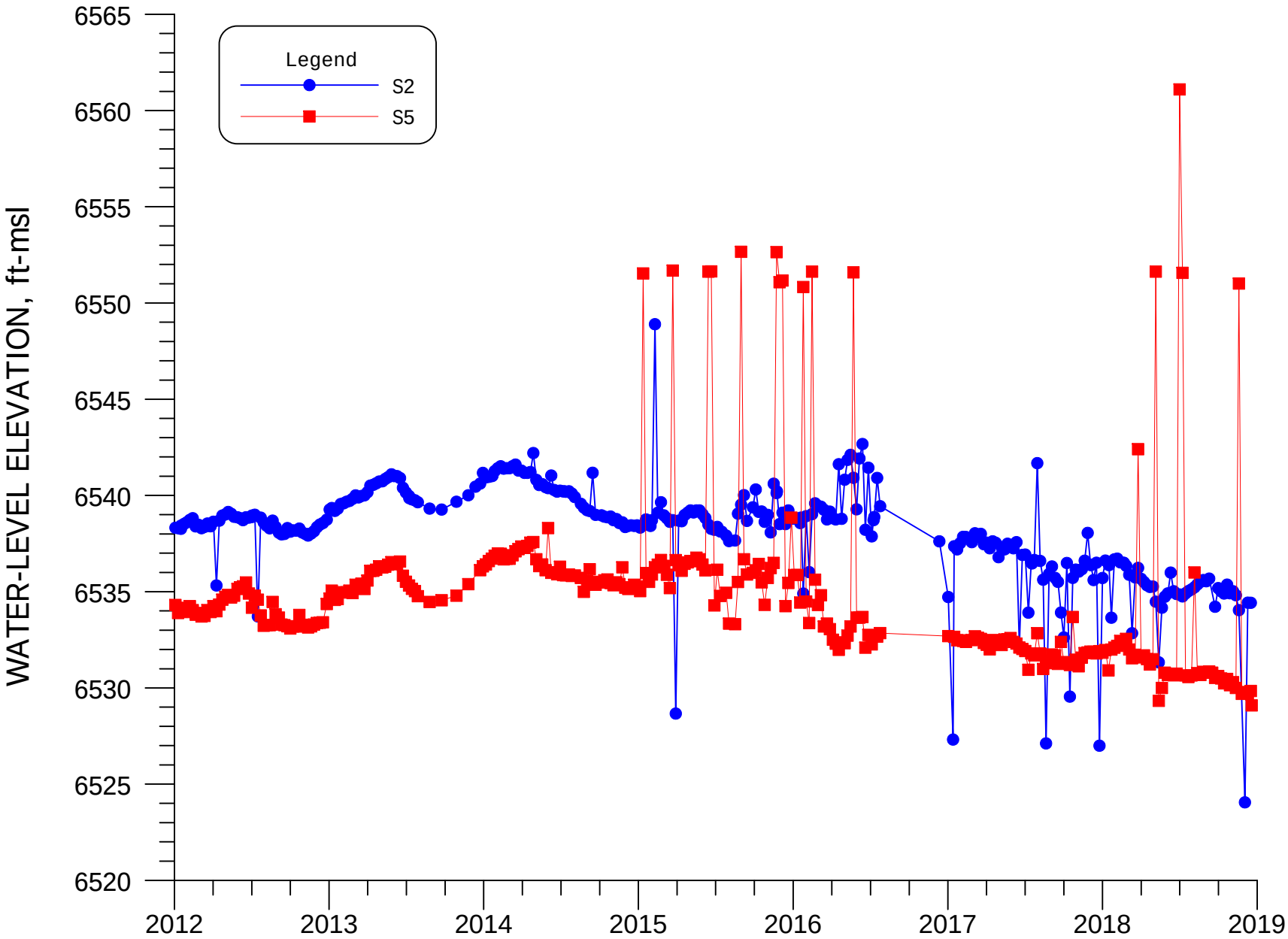


FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S2 AND S5.

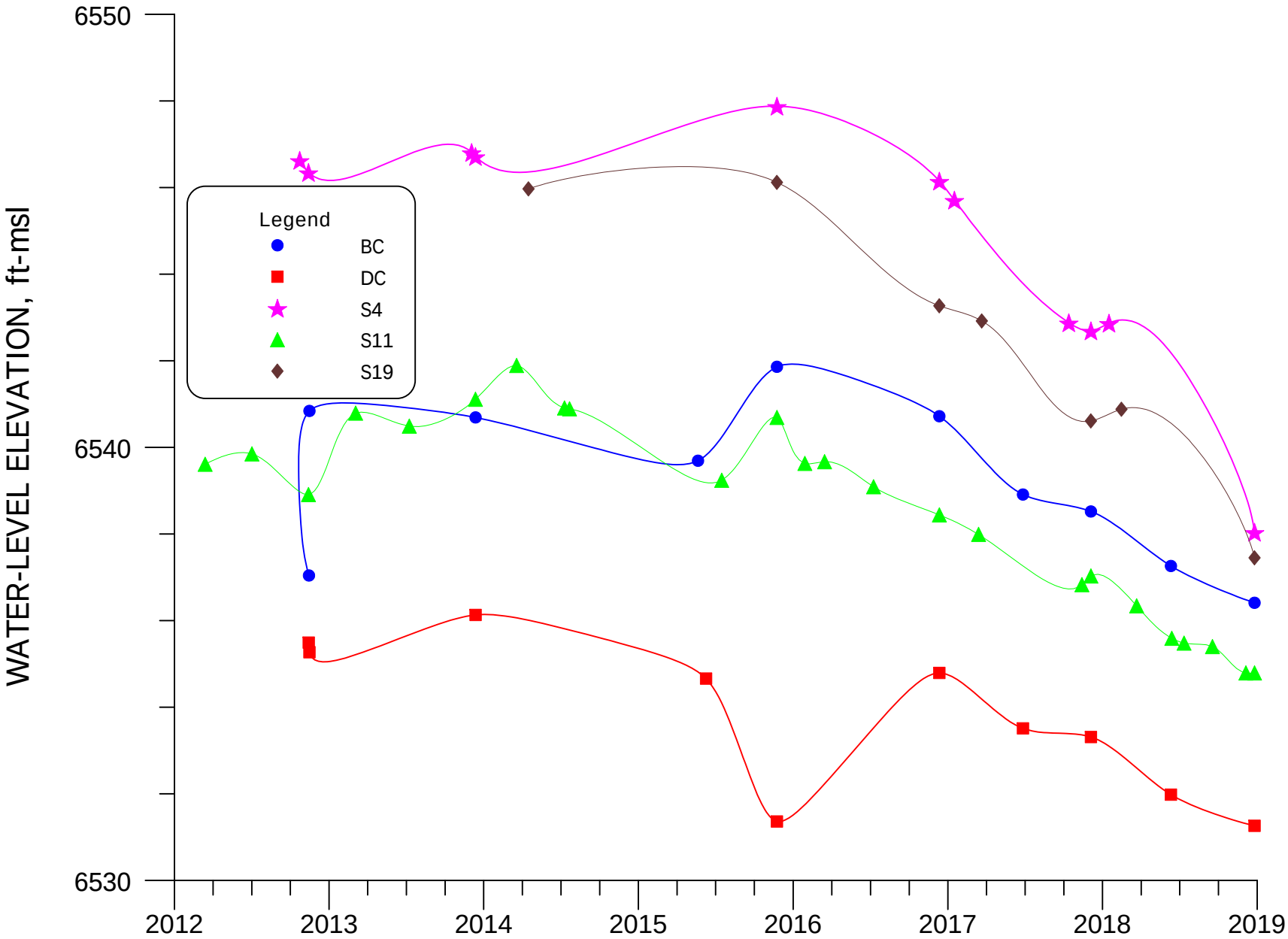


FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, S4, S11, AND S19.

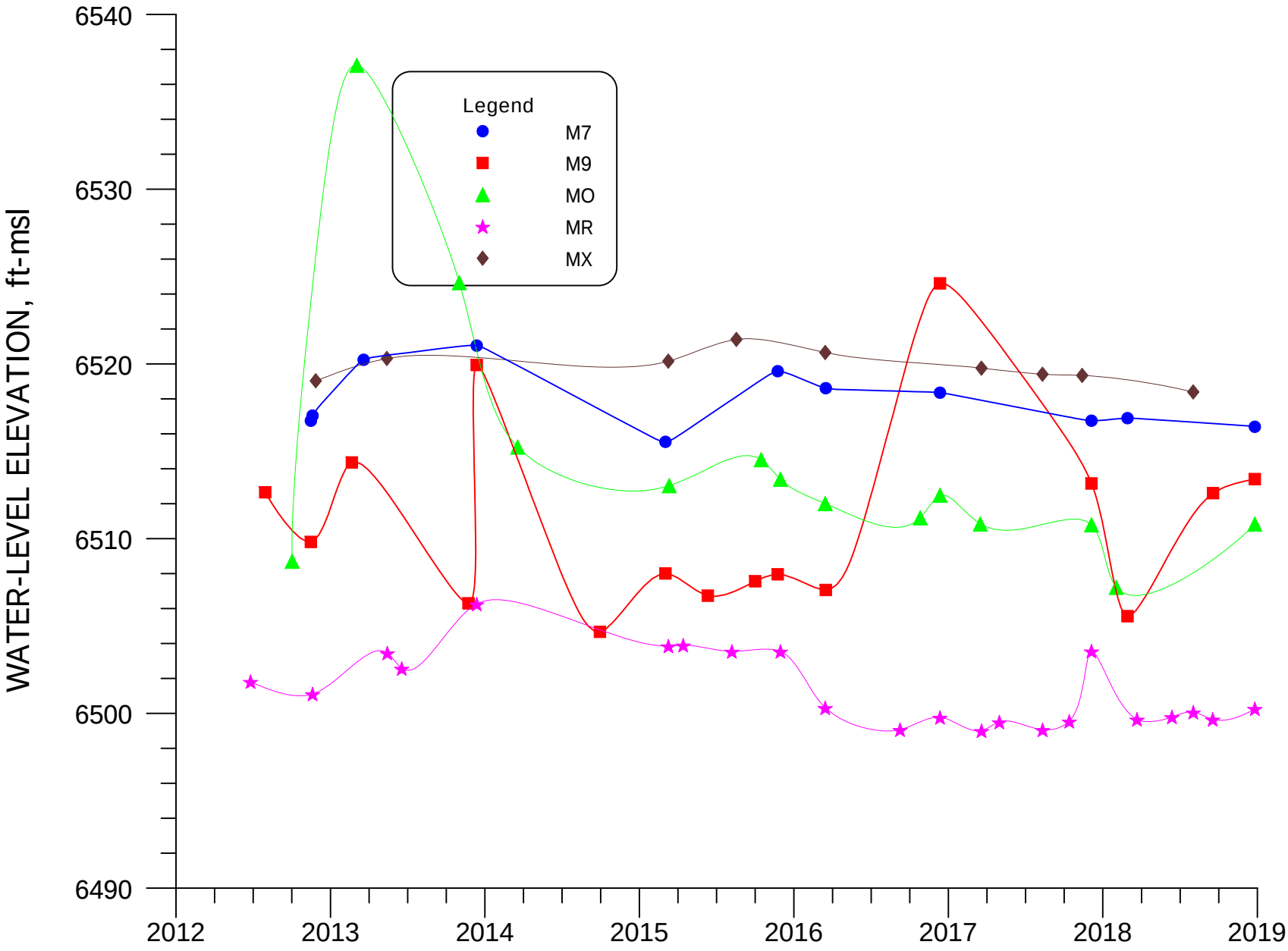


FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS M7, M9, MO, MR AND MX.

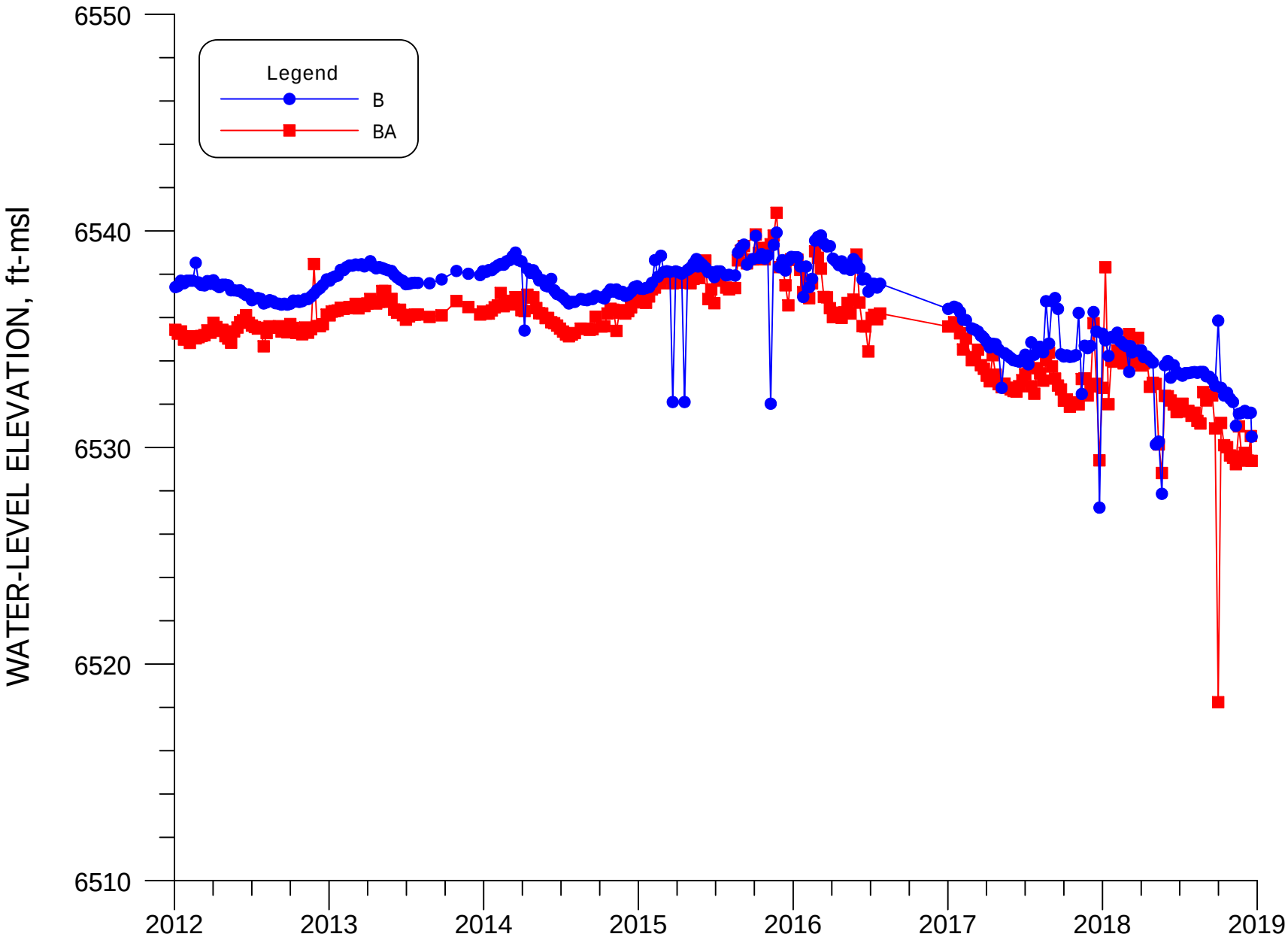


FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.

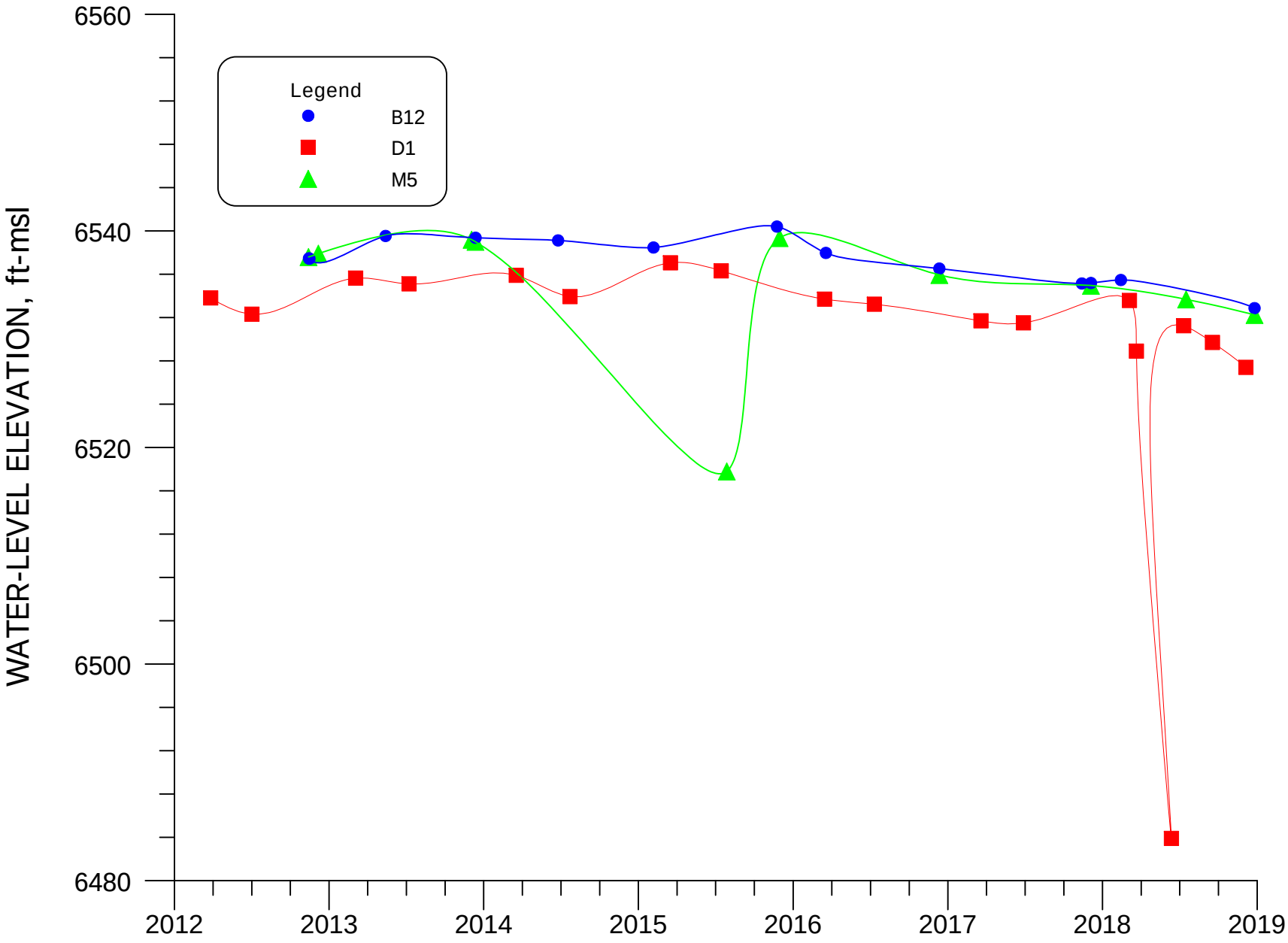


FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS B12, D1, AND M5.

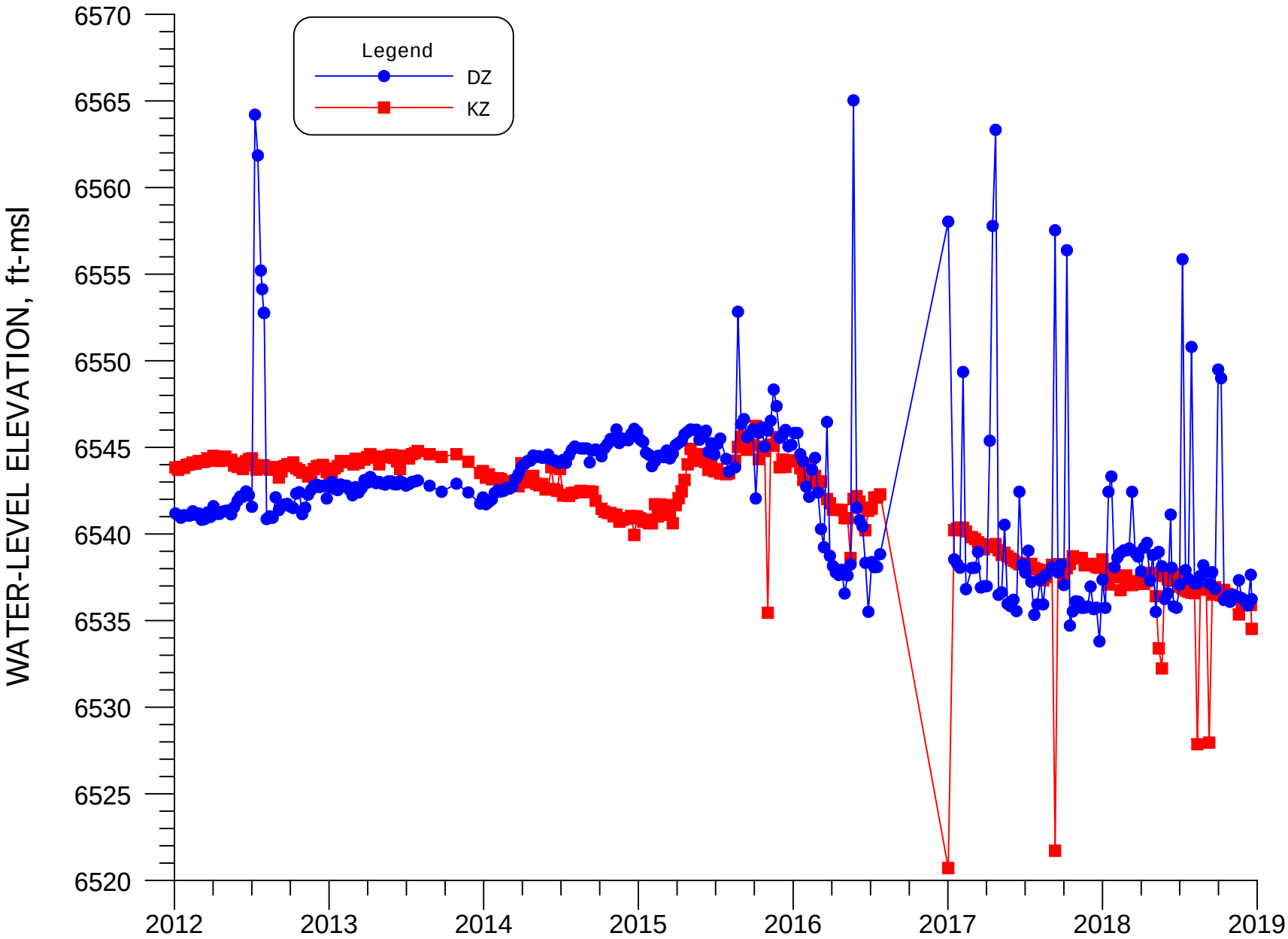


FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

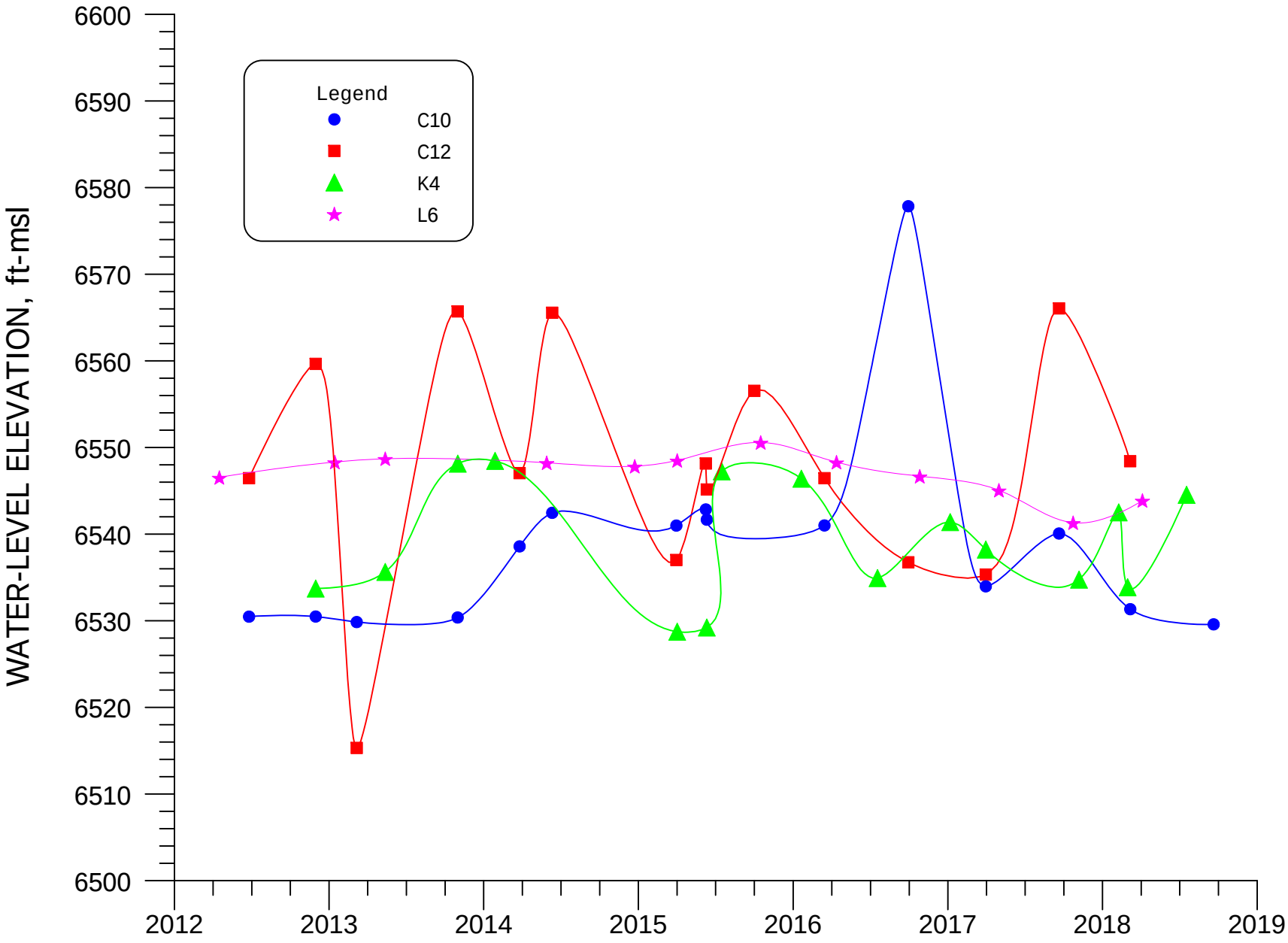


FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS C10, C12, K4 AND L6.

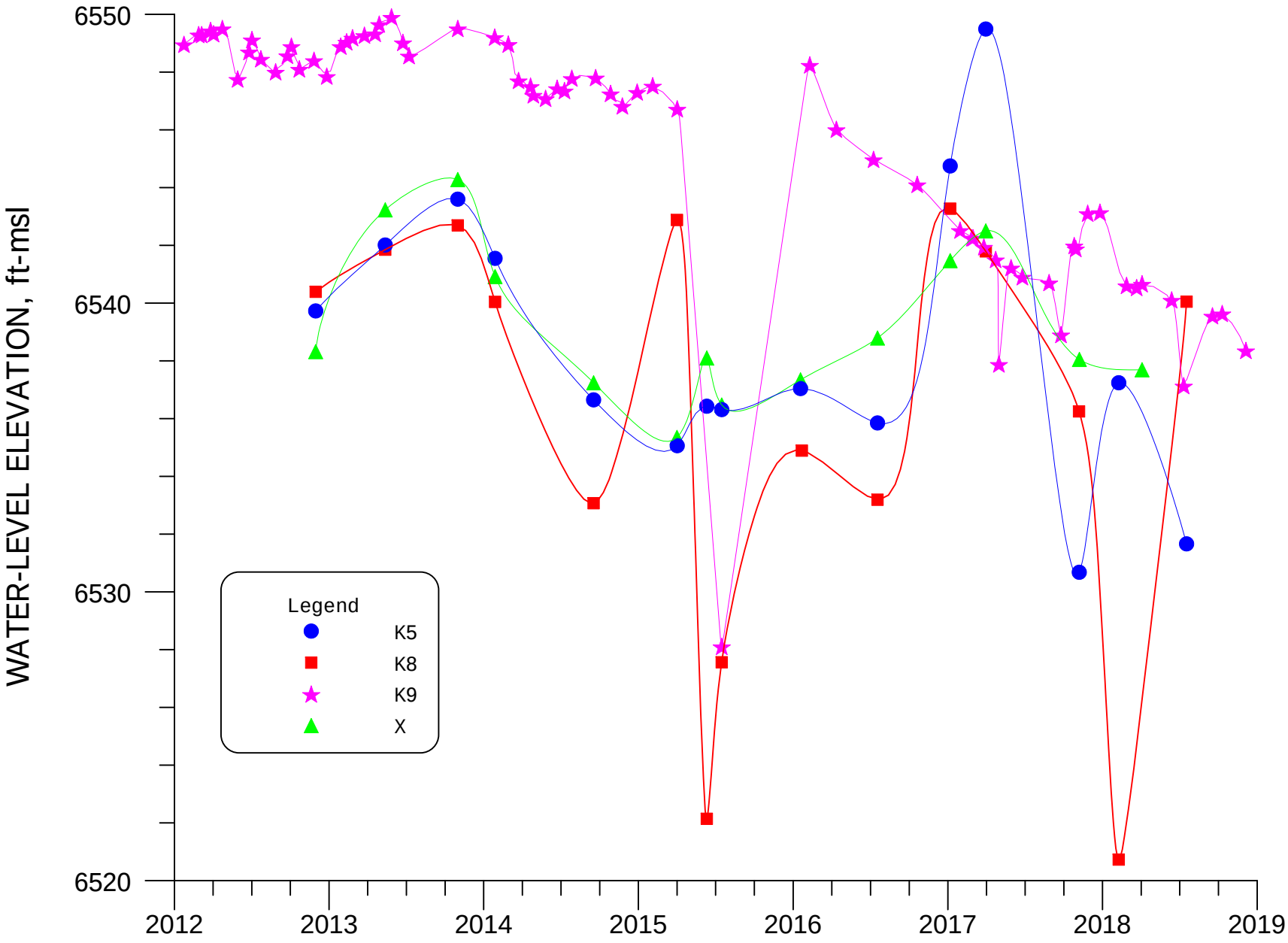


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS K5, K8, K9, AND X.

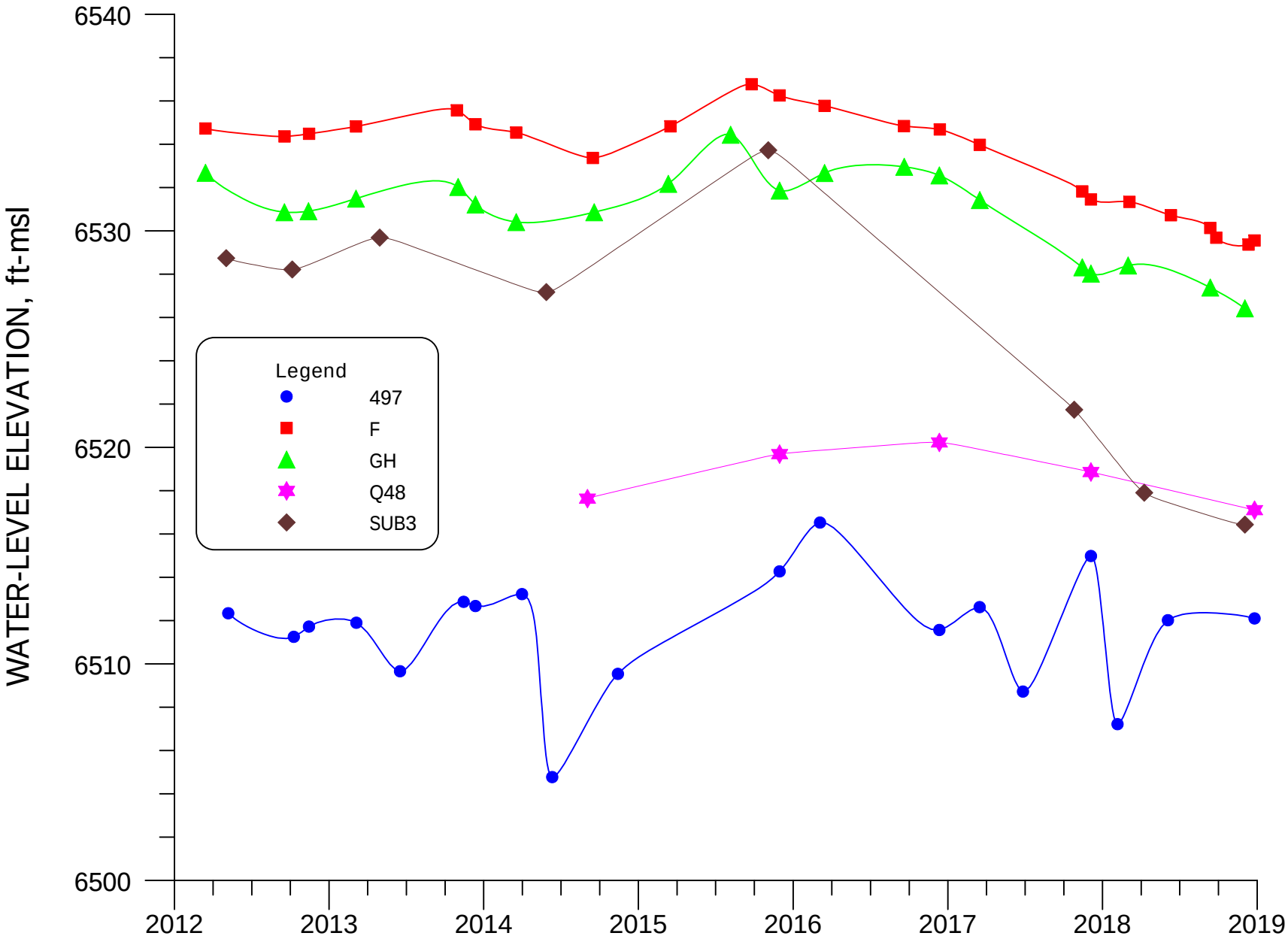


FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 497, F, GH, Q48 AND SUB3.

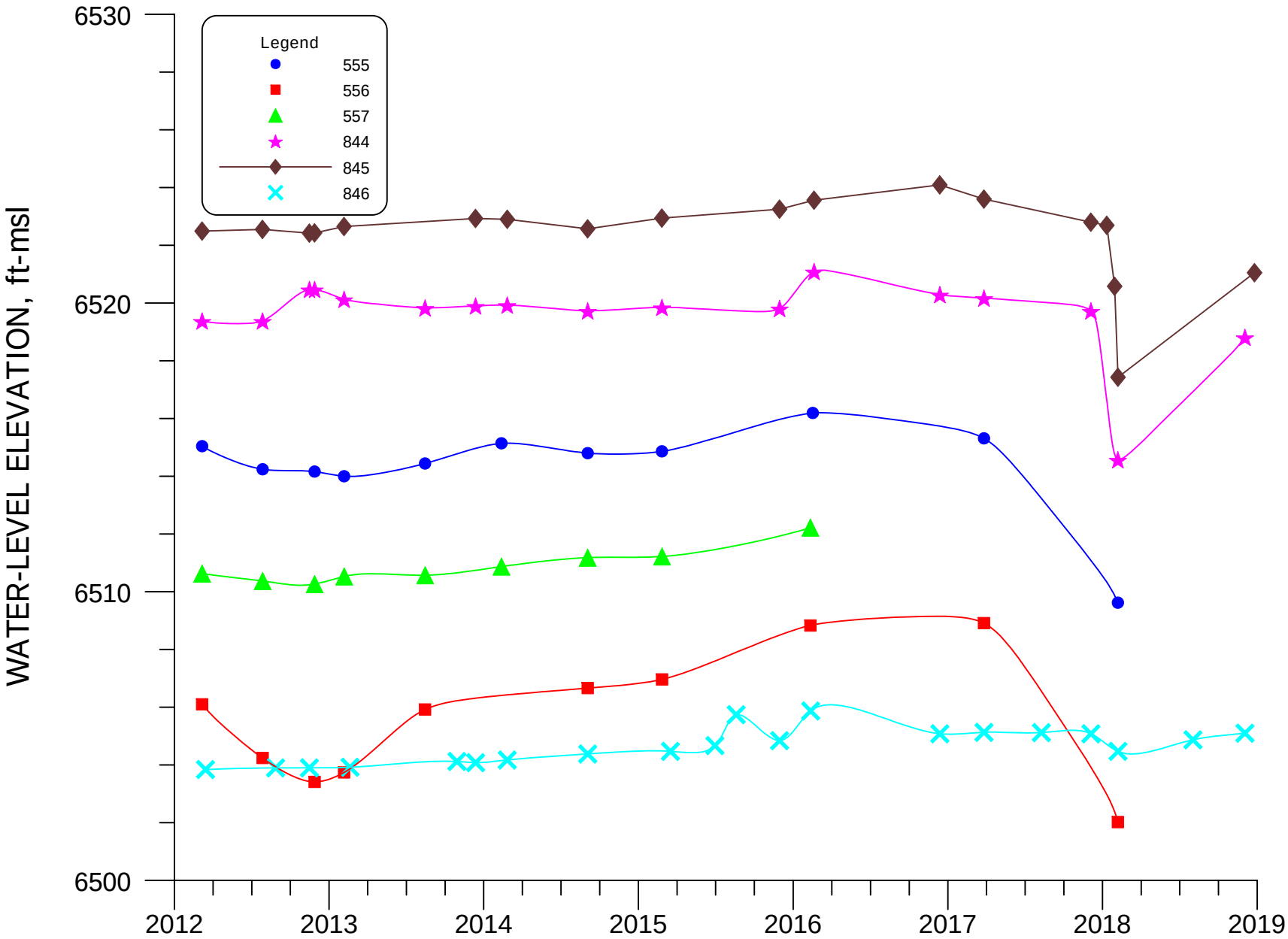


FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 555, 556, 557, 844, 845, AND 846.

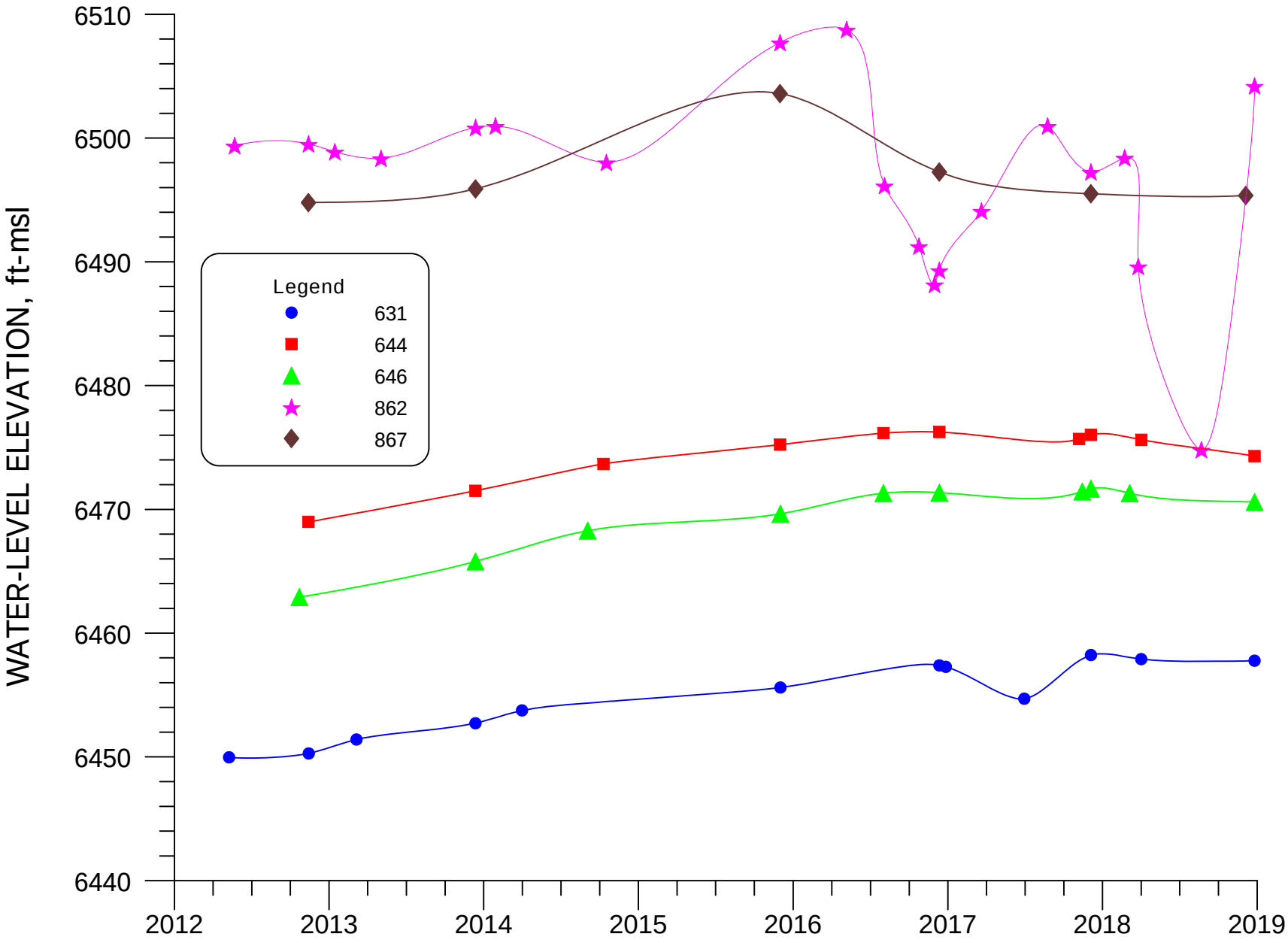


FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 631, 644, 646, 862 AND 867.

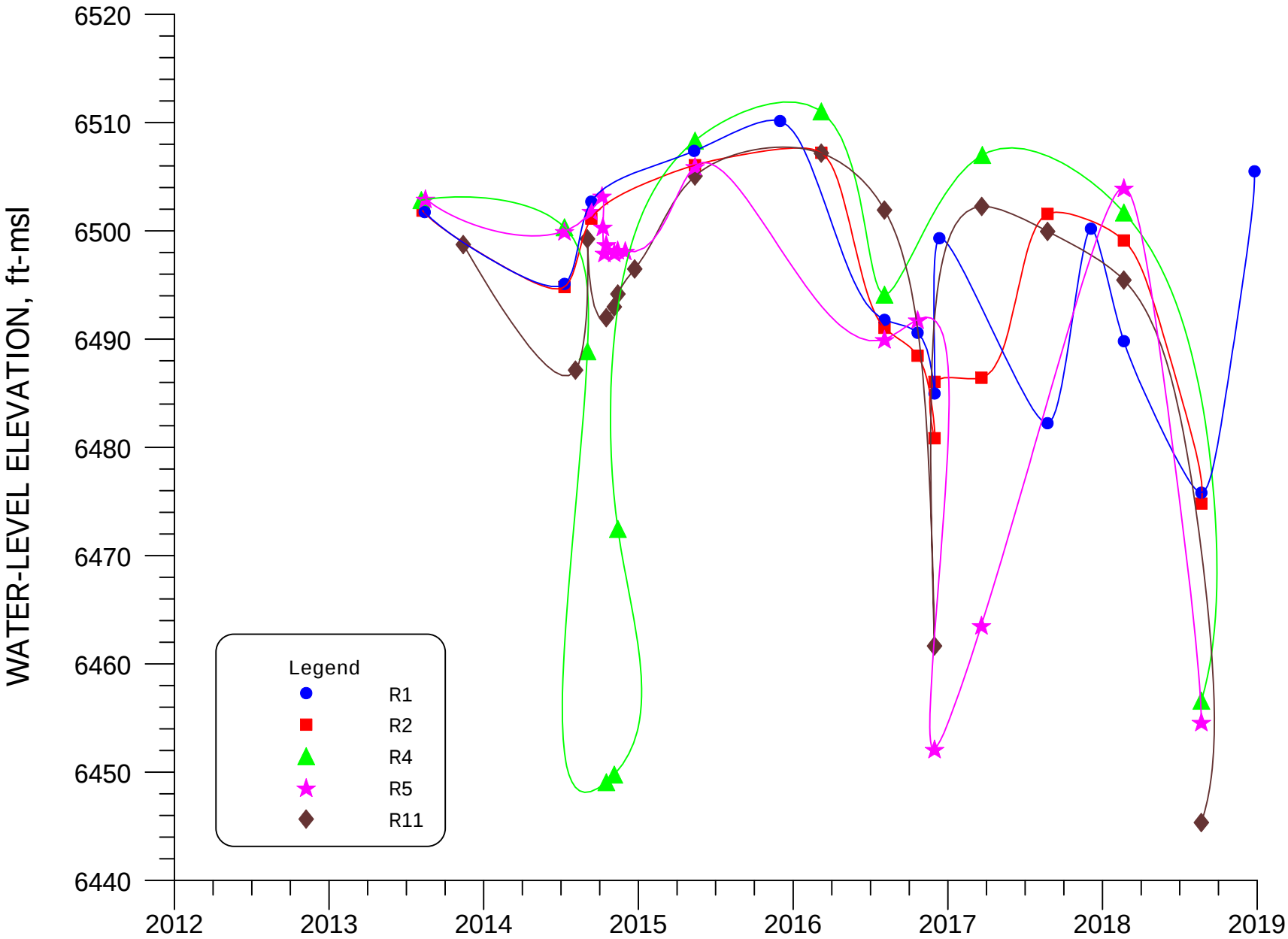


FIGURE 4.2-15A. WATER-LEVEL ELEVATION FOR WELLS R1, R2, R4, R5, AND R11.

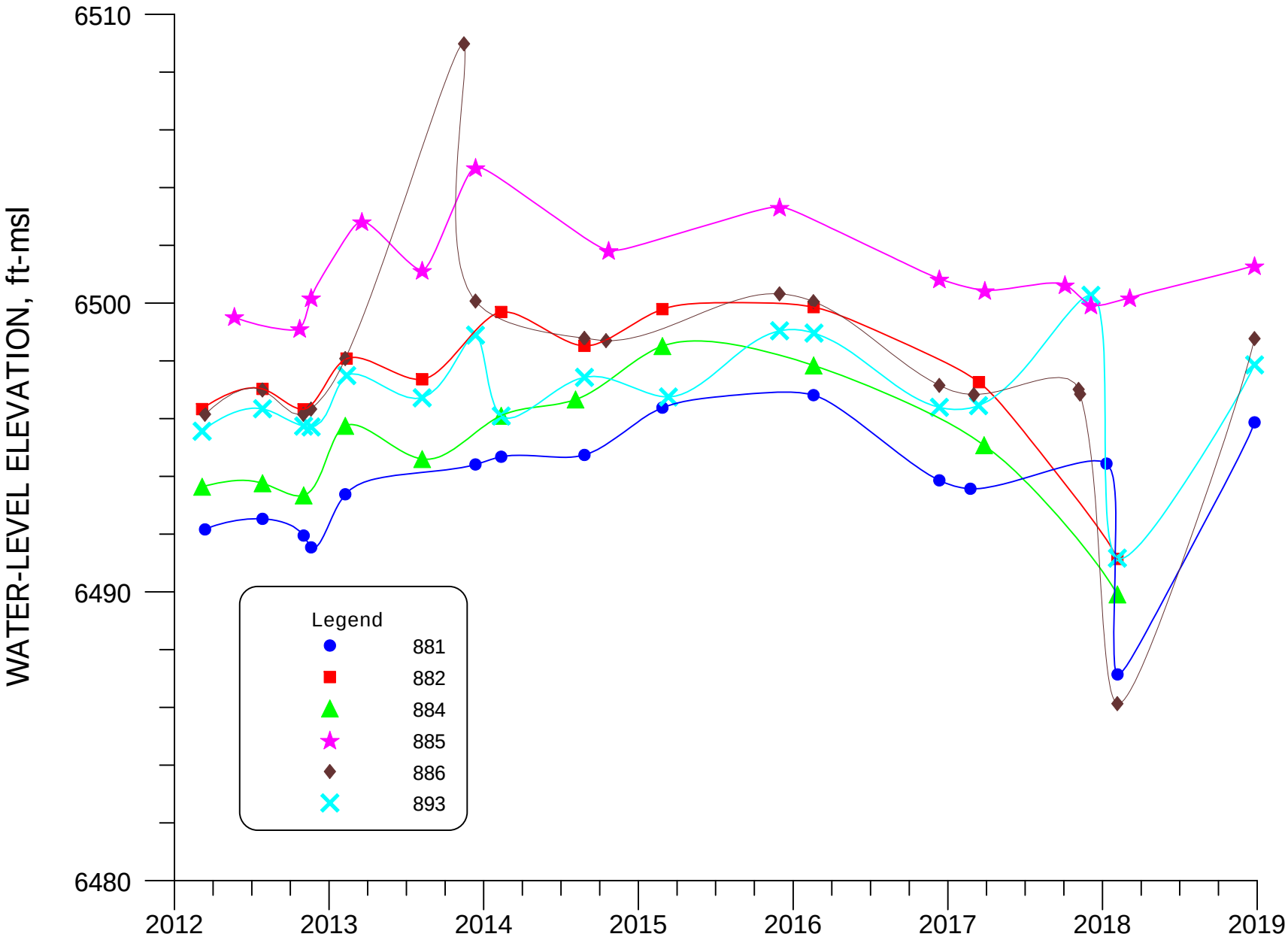


FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 882, 884, 885, 886, AND 893.

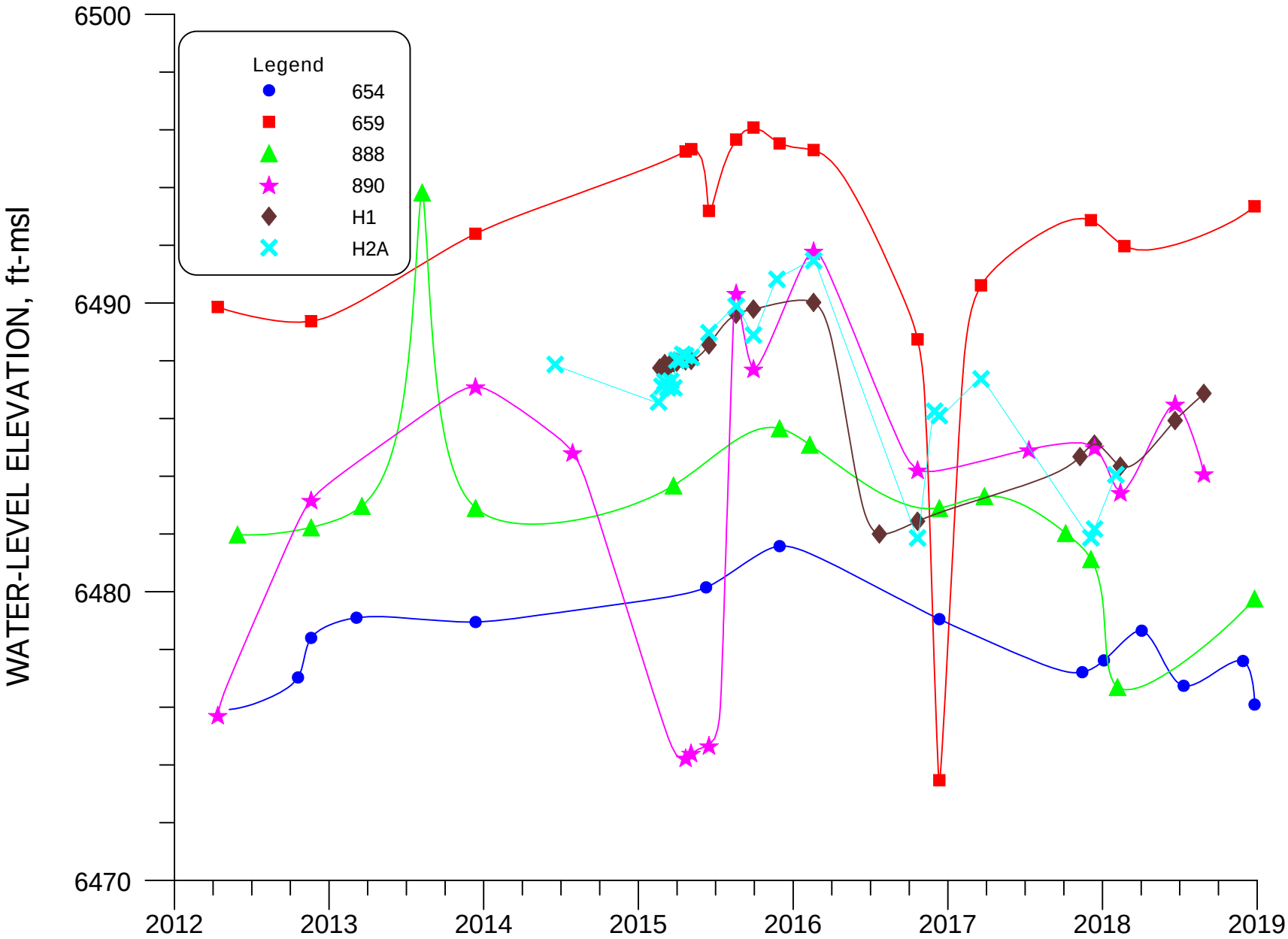


FIGURE 4.2-16A. WATER-LEVEL ELEVATION FOR WELLS 654, 659, 888, 890, H1, AND H2A.

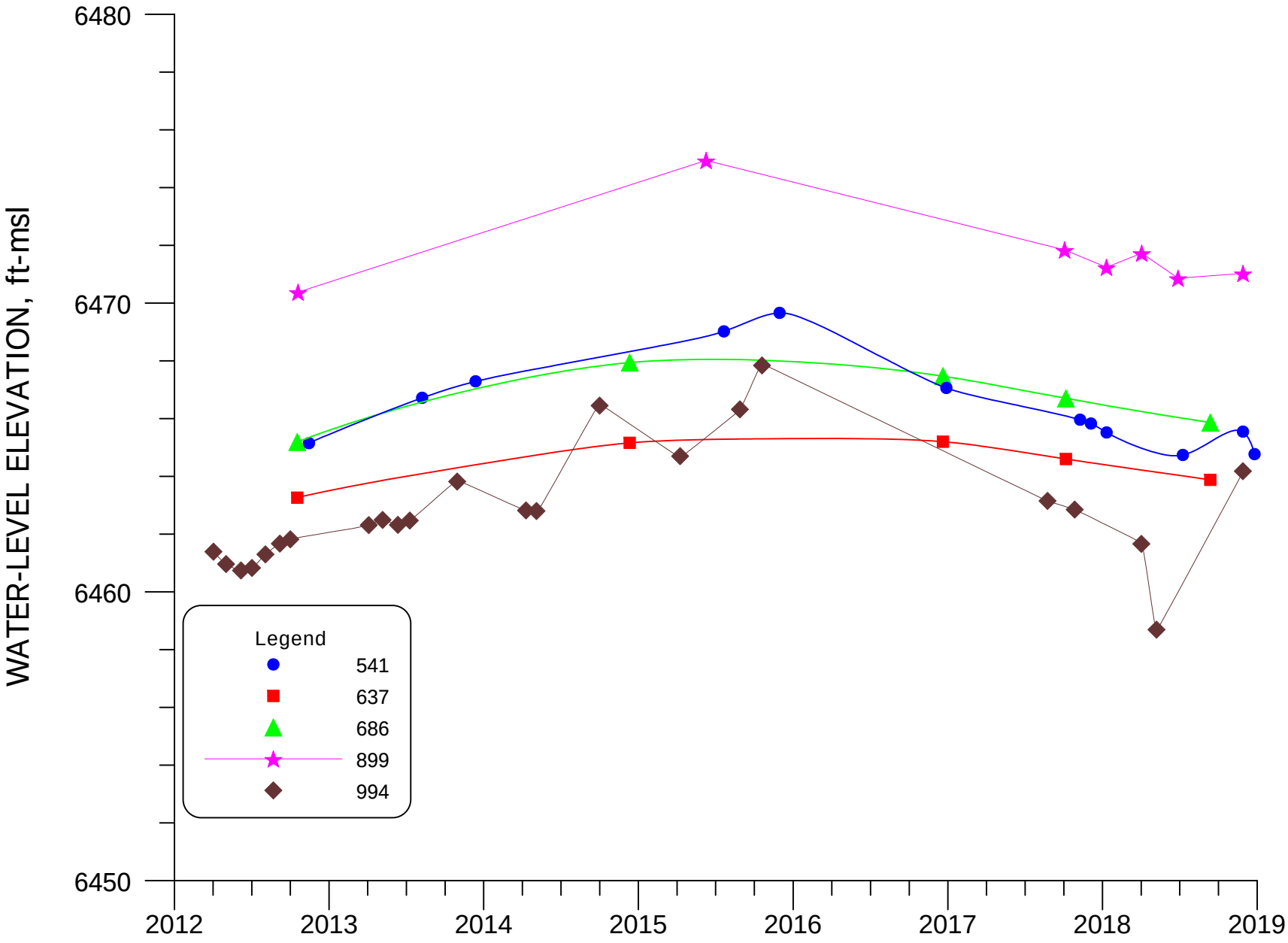


FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 541, 637, 686, 899 AND 994.

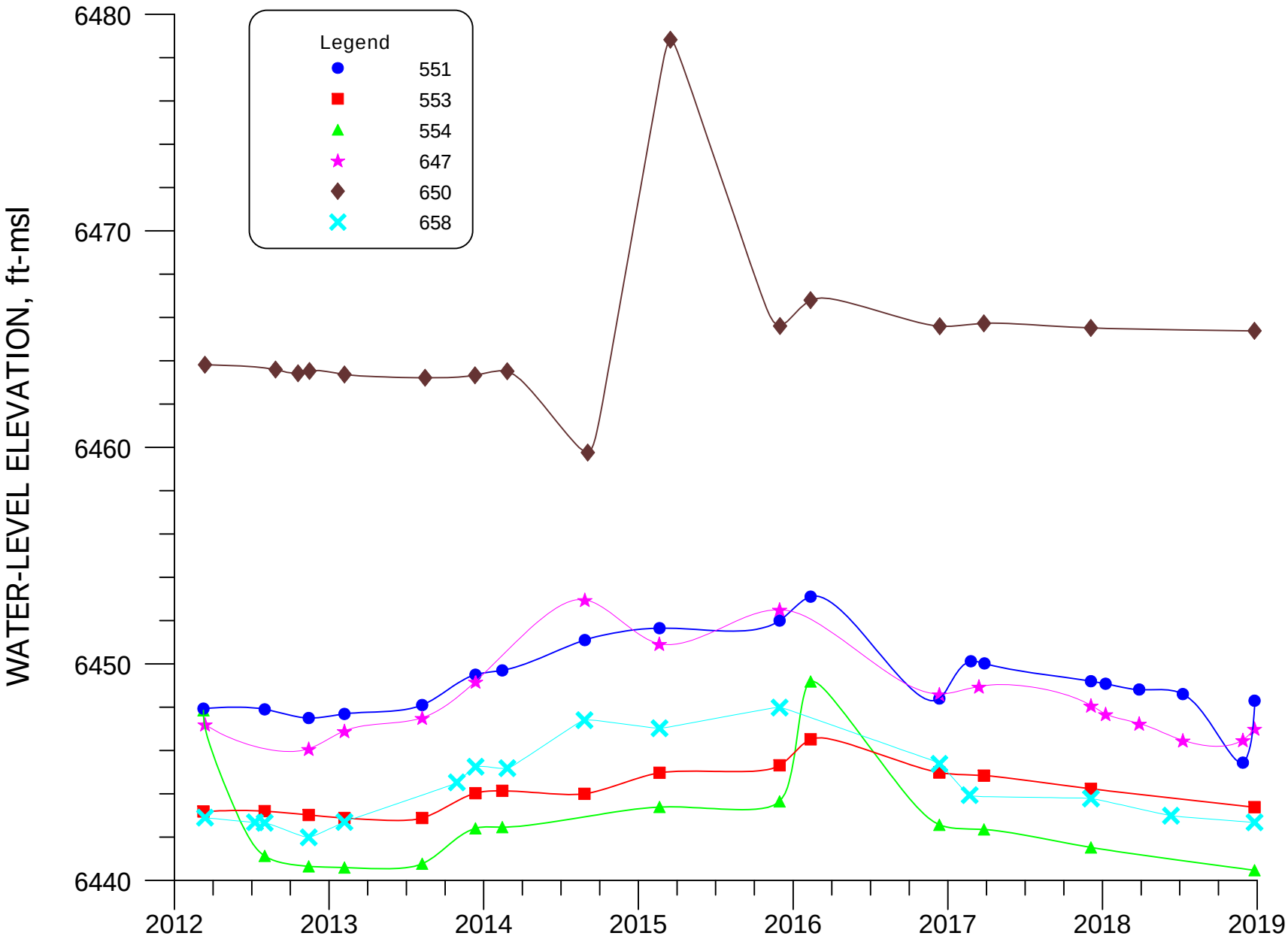


FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 551, 553, 554, 647, 650 AND 658.

4.3 ALLUVIAL WATER QUALITY

This section presents the 2018 water-quality data for the alluvial aquifer. The major general water quality constituents that are typically measured at this site are sulfate, chloride and TDS. Sulfate concentrations are used as the primary indicator where contaminant remediation remains to be completed. Selenium, uranium and molybdenum are the primary metals of concern at this site. Nitrate, radium, vanadium and thorium are also discussed in the monitoring report, but these constituents are of only minor concern at the Grants site. Tables B.4-1 through B.4-6 in Appendix B present the 2018 alluvial water-quality data for each well.

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 in 2005. 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 4.3-1. Alluvial site standards for the Grants Project are for all of the alluvial aquifer at the Grants Project.

Background alluvial aquifer water-quality conditions at the Grants site are those found up-gradient or north of the Large Tailings Pile (see Figure 4.3-1). These conditions in the San Mateo alluvium have been monitored since 1976. Groundwater flow in the San Mateo alluvial system is generally from the northeast to the southwest. Lobo Creek joins San Mateo Creek in the Felice Acres subdivision area at the Homestake site, although neither creek has a well-defined surface flow channel in this area. Surface-water flow occurs only after extreme precipitation events and then generally only within some reaches of the channels.

Hydrographs of up-gradient wells that have been used to define the background hydrologic conditions of the alluvial aquifer are presented in Sections 4.2 and 4.3 of this report. Wells DD, DD2, DD3, DD4, DD5, ND, P, P1, P2, P3, P4, Q and R, located just north of the Large Tailings Pile, have been used for monitoring alluvial background water quality and are

called the near up-gradient wells. Additional near up-gradient wells, DD3, DD4, DD5, DD6 and DD7 were drilled in 2017 with wells DD6 and DD7 on the southwest side of EP3 being dry, as expected. Well DD3 was drilled on the northeast and up-gradient side of EP3 while well DD4 was drilled on the southeast side and northeast of well DD2. Well DD5 was drilled on the southwest side of EP3 but near the southern corner where the alluvium is saturated. Wells DD6 and DD7 were drilled on the southwest side of EP3 and to the northwest of well DD5.

Additional alluvial background wells located farther north have also been sampled (wells 914, 920, 921, 922 and 950, see Figure 4.3-1 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 4.3-1 presents the latest 2018 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. Data from three EPA wells (N-15, N-16 and N-17) are also shown on this figure in the far upgradient area. The upgradient monitoring wells DD2, DD4 and DD5 have the highest near upgradient uranium concentrations and would have resulted in a higher site standard if their values had been used in setting the standard. Concentration versus time plots for near up-gradient wells DD, DD2, DD3, DD4, DD5, ND, P, P2, P3, Q and R are presented later in this section.

The patterns on Figure 4.3-2 show where the selenium concentrations in the alluvial aquifer exceeded background in 1980, 1990, 2000, 2010 and 2018 from the mine discharge water. Movement of selenium concentrations in this area are not thought to be retarded and therefore moving essentially at the groundwater velocity. Similar patterns for uranium concentrations show that the uranium in the alluvial aquifer from the mine discharge is moving at a much slower rate (see Figure 4.3-3). Uranium concentrations in well DD also were close to the background level over all of this period but are not from the mine discharge because well DD is located two more miles farther down gradient. Wells R and Q between well DD and the far upgradient wells do not show any effects on their uranium concentrations from the mine discharge.

The 95th percentile of the historical background alluvial aquifer water-quality data for the Grants site was defined by ERG (1999a and 1999b). These documents, along with a hydrologic support document (Hydro-Engineering 2001c), were submitted to the NRC in 2001

with a request to adjust some of the site standards based on the full range of natural background conditions. The 95th percentile was used to define the upper limit of background. Background data for a ten year period of 1995 through 2004 was used to determine the 95th percentile values. The cumulative database for all of the background wells more adequately defines background concentrations, and this expanded database, based on near-up-gradient wells, was utilized in the two ERG (1999a and 1999b) studies. A tabulation of alluvial standards for the Grants Project area constituents is included in Figure 4.3-1.

The concentrations in the alluvial up-gradient wells[1] sampled during 2018 are tabulated in Table 4.3-2 with a list of the site standards that were established from data from the near up-gradient wells[2]. As shown by the present data, there is a large natural areal variability in the background water quality.

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 2018 are presented on Figure 4.3-1C. 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 4.3-1C. 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 4.3-1D, 4.3-1E and 4.3-1F. As shown on Figures 4.3-1D, 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 2018 except for three wells in Section 34. Sulfate concentrations were similar in Section 3 and South Felice Acres in 2018 and are

presented in Figure 4.3-1E. 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 4.3-1F). Down-gradient of the Grants Project site, the sulfate concentrations are all within the natural range of background except for the three wells south of Murray Acres and Pleasant Valley and, therefore, no water-quality restoration with respect to sulfate is necessary beyond the immediate Grants Project area except for these three wells. These three wells need their concentration reduced.

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

Figure 4.3-3 presents sulfate concentrations plotted versus time for near up-gradient background wells DD, ND, P, P3, Q and R. Fairly steady concentrations occurred in up-gradient well DD in 2013 through 2015 while its 2016 and 2017 values indicated an overall increasing trend followed by steady concentrations on 2018. The historical values for these wells show similar periods of short term increasing and decreasing trends in the alluvial aquifer. The changes in sulfate concentration in these wells are well within the range previously observed for sulfate in the up-gradient wells except for the higher concentrations in well DD during the last few years. Figure 4.3-3A presents sulfate concentrations plotted versus time for near up-gradient well DD2 and newly installed wells DD3, DD4 and DD5. A gradual increasing trend concentrations occurred in up-gradient well DD2 in 2012 through 2015 while steady concentrations were observed in 2016 through 2018. Some of these increases could be due to the influx of groundwater with higher sulfate concentrations into this area up-gradient of Homestake's background wells. The alluvial site standard is presented on each of the water quality plots for comparison with the water quality data.

Sulfate concentrations immediately west of the LTP in alluvial wells S2, S4, S11, S19 and SA were fairly steady in 2018, except for a decline in collection well SA (see Figure 4.3-4). Figure 4.3-5 presents sulfate concentrations plotted versus time for alluvial wells H55, M6, MO, MQ, MR and MX situated further west of the LTP. Figure 4.3-6 presents sulfate concentration versus time plots for alluvial wells 802, B15, D1, M3 and S3. The large decrease in sulfate concentrations were observed in well D1 in 2016, followed by steady concentrations in 2017 and 2018. Figure 4.3-7 presents time plots of sulfate concentrations for wells T, T2, T19, T23, T41 and T54. Figure 4.3-8 presents plots of sulfate concentrations versus time for alluvial wells on the west side of the STP. Figure 4.3-9 presents sulfate concentrations versus time for alluvial wells on the STP and the south side of the STP. Figure 4.3-10 shows the sulfate concentrations for the STP collection wells K4, K5, K7 and K8 and monitoring wells 1A and 1K.

Time plots of sulfate concentrations in L collection wells and monitoring well L6 located southeast of the STP are presented on Figure 4.3-11. This figure shows a decline in sulfate concentration in 2018 in well 522.

Figure 4.3-12 presents sulfate concentration time plots for wells to the north, east and in Broadview Acres for alluvial wells F, FB, GH, GN, SUB2 and SUB3. Figures 4.3-13 and 4.3-13A present sulfate concentrations versus time for Felice Acres alluvial wells 490, 497, 498, Q2, Q3, Q5, Q12 and Q27.

Figure 4.3-14 contains time plots of sulfate concentrations for wells in and near the former flood irrigation area in Section 34 for alluvial wells 555, 556, 557, 844, 845 and 846. This plot shows that sulfate concentrations in water taken from alluvial wells 555, 556, 557 and 846 were fairly steady in 2018 while a gradual decline was observed in wells 844 and 845. Sulfate concentrations are higher than the site standard in alluvial wells 555, 844 and 846. The sulfate concentrations in well 846 are not thought to be from the Section 34 irrigation. The changes in the last few years in the other wells could be showing the small effect on sulfate concentrations from the former flood irrigation.

Figures 4.3-15 and 4.3-15A present the sulfate concentration time plots for wells in Section 3 (see Figure 4.3-2 for the location of these wells). Sulfate concentrations in the Section 3 alluvial wells have been fairly steady over the last few years.

The sulfate concentrations in water from five wells within and near the former Section 28 center pivot irrigation area and Pleasant Valley monitoring well 688 are presented on

Figure 4.3-16 while Figure 4.3-16A presents sulfate concentrations for six wells located west of the Section 28 irrigation area where initial restoration is occurring. The sulfate concentrations in these wells generally were steady in 2018 due to the injection of treated water injection.

Figure 4.3-17 presents sulfate concentrations with time for six 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 four wells are near or downgradient of the confluence. The time variations of sulfate concentrations in water sampled from five wells in Section 33 Center Pivot area are plotted on Figure 4.3-18. Sulfate concentrations in well 551 declined in 2015 and were fairly steady until a very gradual increase was observed in 2018. Sulfates had been steady the last three years in well 551 prior to the gradual increase in 2018. The 2015 decline is thought to be due to the ceasing (2009) of the irrigation.

4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during 2018 are presented on Figures 4.3-19, 4.3-19A, 4.3-19B and 4.3-19C. Based on an updated statistical analysis, TDS concentration must exceed 2734 mg/l before it is considered elevated beyond the naturally occurring range. A light green pattern is shown on Figures 4.3-19, 4.3-19A, 4.3-19B and 4.3-19C to indicate where the TDS concentrations exceed the 2734 mg/l site background standard. None of the observed concentrations in the west half of Figure 4.3-19 exceed this level. The TDS concentrations near the tailings exceed 2734 mg/l and to the west and south of the LTP. A significant portion of the alluvial aquifer underlying the Large Tailings area exceeds 10,000 mg/l (see Figure 4.3-19A). A zone of 2000 mg/l or greater TDS concentration extends to the west of the LTP through the eastern half of Section 28 (see Figure 4.3-19C). Additional areas of TDS concentrations greater than 2000 mg/l exists in the southern portion of Pleasant Valley Estates, the southern portion of Murray Acres, the eastern portion of Valle Verde and to the south of this area (see Figure 4.3-19). The only other areas of TDS concentrations above 2000 mg/l is an area in southern Felice Acres and a small area to the west of this area. Only the areas closely proximal to the two tailings piles and a small area west of the Large Tailings and areas east of Valle Verde and south of the Murray Acres require groundwater quality restoration to meet the site TDS background standard.

TDS time concentration plots were developed for the same grouping of wells as those prepared for sulfate (see Figure 4.3-2 for groupings of wells with TDS plots). Figures 4.3-20 and 4.3-20A presents the TDS concentrations versus time for the up-gradient wells. TDS concentrations were steady in well DD in 2013 through 2015 and gradually increased in 2016 through 2018. TDS in wells DD2 and Q gradually increased in 2015 through 2018 while concentrations in the remainder of the upgradient wells remained fairly steady.

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

The TDS concentrations in the Felice Acres alluvial wells are presented in Figures 4.3-30 and 4.3-30A. TDS concentrations for the former flood irrigation area alluvial wells are presented in Figure 4.3-31. Fairly steady TDS concentrations were observed in these wells in 2018 with a small decline in wells 557, 844, 845 and 846 and steady concentrations in wells 555 and 556. The prior increases in TDS concentrations in recent years in wells 555, 844 and 845 could be due to the flood irrigation in this area which ceased after the 2012 season.

Figures 4.3-32 and 4.3-32A present time plots of TDS concentrations for five wells located in Section 3 and five of the R collection wells. TDS concentrations for the former Section 28 irrigation monitoring wells and Pleasant Valley monitoring well 688 were overall stable in 2018 (see Figure 4.3-33). The observed changes in these wells in 2013 through 2015 could be due to ceasing irrigation in Section 28 but could be due to freshwater injection proximal to these wells. The TDS in the freshwater injection source increased in 2012 due to the switch from San Andres well 951 to well 951R. Some of the TDS variations could be due to past irrigation in this area. TDS concentrations in alluvial wells just west of the Section 28 former irrigation area are presented on Figure 4.3-33A.

TDS concentrations in alluvial wells in Sections 20, 29 and 32 are presented on Figure 4.3-34 while Figure 4.3-35 presents TDS concentrations in the Section 33 alluvial wells with a gradual increase in TDS in 2018 in well 551. This plot shows fairly steady concentrations in these wells in 2016 and 2017 after the decline in well 551 in 2015. These concentrations are

within the natural variations observed in this area but prior concentrations to 2015 in well 551 are thought to be showing the very small effect from the past Section 33 irrigation which ceased after the 2009 season.

4.3.3 CHLORIDE - ALLUVIAL

Chloride concentration is another important indicator of tailings seepage because of the conservative nature of this constituent and the fact that up-gradient concentrations are low. Chloride concentrations measured during 2018 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. The fresh-water injection systems have used water with chloride concentrations of approximately 200 mg/l, whereas the R.O. product chloride concentration is less than 10 mg/l and the typical treated water from the PTT is 150 mg/l. The alluvial aquifer around and underlying the LTP contains chloride concentrations in excess of the State drinking water standard of 250 mg/l (site standard). Measurement of chloride concentration in alluvial groundwater is useful in defining areas where the treated water has migrated in the alluvial aquifer. A light green pattern on Figures 4.3-36, 4.3-36A, 4.3-36B and 4.3-36-C is used to illustrate where concentrations exceed 250 mg/l. The limited areal extent of the green pattern on these figures show that the need for groundwater-quality restoration with respect to chloride is limited to the immediate area of the tailings and two wells in Section 34. Chloride concentrations in the alluvial water in the western half of Figure 4.3-36 have not typically exceeded 250 mg/l. None of the alluvial wells just north of the northern boundary of Pleasant Valley exceed the site standard in 2018 (see Figure 4.3-36C).

Figures 4.3-37 and 4.3-37A presents chloride concentrations versus time for ten up-gradient wells. Analysis of the data on this figure shows overall steady chloride concentrations in 2018 except a very gradual decline in wells DD2 and Q.

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

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

Figures 4.3-47 and 4.3-47A present the chloride concentration-time plots for wells in Felice Acres.

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

The plots of chloride concentration versus time in Section 3 wells are presented on Figures 4.3-49 and 4.3-49A. Figure 4.3-50 presents a plot of the variation of chloride concentrations with time in Section 28 wells and Pleasant Valley monitoring well 688. The increases in the Section 28 wells shortly after 2012 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 six wells west of the Section 28 irrigation area are presented on Figure 4.3-50A. Chloride concentrations in this active area of groundwater restoration overall gradually declined in recent years.

Chloride concentrations in the Sections 20, 29 and 32 monitoring wells are presented on Figure 4.3-51 while Figure 4.3-52 presents time plots of chloride concentrations in the Section 33 wells. The 2017 chloride concentrations were generally stable in the Section 33 wells while concentration in well 551 increased in 2018 after staying lower following the decrease in 2015. Overall the chloride concentrations in these wells are slightly higher in 2009 through 2015 than observed in previous years. Slightly higher chloride concentrations could be showing a very small effect from the Section 33 irrigation but it also could be a small natural change. The higher levels prior to 2015 in well 551 are likely due to the irrigation while the 2018 higher values are thought to be due to variations in alluvial water upgradient of the Section 33 irrigation. Chloride concentration in well 996, which is upgradient of the Section 33 irrigation area, is showing a very gradual rising trend for the last six years.

4.3.4 URANIUM - ALLUVIAL

Uranium is considered an important groundwater constituent at this site due to the significant levels in the tailings seepage. Uranium data and contours for 2018 are presented on Figure 4.3-53. The light green pattern on Figure 4.3-53 shows where uranium concentrations exceed 0.16 mg/l, the statistical upper range of background from previous statistical analysis of the 1995-2004 data. The uranium values inside three areas outlined on Figure 4.3-53 are posted on additional uranium figures due to the density of the new wells in these three areas. Figures 4.3-53A, 4.3-53B and 4.3-53C present the OS, SOS and NOS areas respectively.

Uranium concentrations exceed background in the area of the LTP and STP and west of the LTP (see Figure 4.3-53A). Uranium concentrations extend to the west of the LTP through the eastern half of Section 28 with numerous new wells in the NOS area (see Figure 4.3-53C). All of the uranium concentrations in the west half of Section 28 have been reduced to below the site standard except for one well which exceeded 0.16 mg/l in August but was slightly less than this value two other times in 2018. This exceedance indicates that a small amount of additional restoration is needed at well H12. Uranium concentrations in Sections 29 and 32 also reflect a contribution from the Rio San Jose alluvial system in Section 20, but the maximum level observed in these wells in 2018 was 0.11 mg/l. The zones of moderately elevated concentrations join together and the combined area extends down-gradient approximately one mile into the western side of Section 33.

Uranium concentrations greater than 0.16 mg/l are also present near the L collection wells south of the STP. Uranium concentrations in the L wells were overall similar in 2018 to values observed in 2017.

Additional areas, where uranium concentrations in the alluvium are greater than 0.16 mg/l, exist in Felice Acres and to the southwest into Section 3 (see Figure 4.3-53B). The area of elevated concentrations extends approximately 3800 feet to the southwest of the southwest corner of Felice Acres. Significant progress toward restoration was made in the northeast corner of Section 3 with the collection and injection into the R well field in 2014 with some additional restoration needed in 2019. Concentrations slightly increased in 2018 in this area with a slightly larger area above the limit of the exceedance. The uranium concentration in another small area in the northeast portion of Murray Acres at well 802 has been restored with the two values

measured in 2018 near 0.1 mg/l. Additional restoration is needed in each of these areas except well 802 with respect to uranium.

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

Figure 4.3-54 presents uranium concentrations plotted versus time for up-gradient wells DD, ND, P, P3, Q and R. The uranium concentrations in wells P, Q and R have been fairly steady during the last few years except for the higher value from well DD in April of 2018. It is likely the higher results are not from well DD but no sample switch could be determined. Figure 4.3-54A presents uranium concentrations plotted versus time for near up-gradient well DD2 and newly installed wells DD3, DD4 and DD5. A gradual decreasing trend concentrations occurred in up-gradient well DD2 in 2012 through 2015 while overall steady concentrations were observed in 2016 through 2018. Some of these changes could be due to the influx of groundwater with lower uranium concentrations into this area up-gradient of Homestake's background wells. The alluvial site standard is presented on each of the water quality plots for comparison with the water quality data.

Uranium concentrations in wells west and southwest of the LTP are presented in Figures 4.3-55 through 4.3-57. Plots of uranium concentration versus time are presented on Figure 4.3-58 for alluvial wells on and near the LTP. Figures 4.3-59 and 4.3-59A present plots of uranium concentration versus time for wells C2, C6, C8, C10, C11 and C12 on the west side of the STP. The second of these two plots contains all of the historical data for these C wells and shows that uranium concentrations in this area exceeded 100 mg/l historically. Figures 4.3-60 through 4.3-61 present plots of uranium concentration versus time for additional wells on and near the STP and well 1A east of the LTP. Uranium concentrations in water from alluvial wells in the L area are presented on Figure 4.3-62.

Figures 4.3-63 and 4.3-63A present uranium concentrations versus time for six wells near and in Broadview Acres with the second of these two plots showing all of the historical uranium data for these six wells. Uranium concentrations have been restored from near 10 mg/l in this area. Figures 4.3-64 and 4.3-64A present the uranium concentration time plots for Felice

Acres wells. Figure 4.3-64A shows small declines in uranium concentrations in collection wells Q2, Q3, Q5, Q12 and Q27 in 2018. Figure 4.3-65 presents uranium concentrations for wells in the former flood irrigation area. Uranium concentrations had declined in well 844 for the last previous few years but has become fairly steady for the last three years. The previous higher uranium concentrations in well 844 may have defined the effects of irrigation on this area of the alluvial groundwater. Uranium concentrations in the remainder of these wells in this area have been fairly steady except the 2016 value from well 556 which is an outlier.

The uranium concentrations for wells in Section 3 southwest of Felice Acres are plotted on Figures 4.3-66 and 4.3-66A. The uranium concentrations in the R collection wells in northeast corner of Section 3 became fairly steady in 2018 except for a continuation of a decline in wells R3 and R11 due to the collection of alluvial water and injection of treated water in the northeast portion of Section 3.

Uranium concentrations from five Section 28 wells and Pleasant Valley well 688 are plotted on Figure 4.3-67. Uranium concentrations from six wells west of the Section 28 irrigation are plotted on Figure 4.3-67A. Uranium concentrations declined to below the alluvial site standard in each of these wells in 2017 and 2018 except for a value near the site standard in well H12. This area of the alluvial aquifer is considered adequately restored except for the area near well H12. Concentrations from well 888 which is down gradient of the restoration area and continued to decline in 2018. Collection from the western H wells can be ceased with North Off-site collection and injection shifting to the east.

Uranium concentration time plots for wells in Sections 20, 29 and 32 are presented on Figure 4.3-68. These wells are completed in the Rio San Jose alluvium upgradient and down gradient of the confluence with the San Mateo alluvium in Section 29. Uranium concentrations in wells located in Section 33 are relatively small and are plotted on Figure 4.3-69. Concentrations have remained low with steady values in wells 551, 647, 649, 658 and 996 during 2018. Wells 647 and 996 are upgradient of the Section 33 irrigation area and their slightly higher values are not caused by the Section 33 irrigation. No increase was observed in the Section 33 wells for uranium which indicate no uranium effects on the groundwater from the Section 33 irrigation. The small variation observed in the Section 33 wells are well within the concentrations upgradient of this area.

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. 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 east of the STP in the area north of the L collection wells. 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, ND, P, P3, Q and R. There has been a small amount of variation in the selenium concentrations in up-gradient wells for last few years except an increasing trend in well P3. The concentrations in the farthest near upgradient wells Q and R are larger than the remainder of these wells and seem to be fairly steady the last nine years after a long gradual increasing trend. The 2017 and 2018 values from well P3 indicates an increasing trend is occurring at this well. A small increase in the selenium concentration in well DD was observed in 2016 and 2017 while the 2018 concentrations are steady. Figure 4.3-71A presents selenium concentrations plotted versus time for near up-gradient well DD2 and newly installed wells DD3, DD4 and DD5. Very small concentrations have been observed in up-gradient well DD2. Some of these changes could be due to the influx of groundwater with higher selenium concentrations into this area up-gradient of Homestake's background wells. The alluvial site standard is presented on each of the water quality plots for comparison with the water quality data.

Figures 4.3-72 through 4.3-74 show selenium concentrations in water from alluvial wells located west and southwest of the LTP. Figure 4.3-75 presents plots of selenium concentrations for wells on and near the LTP. The selenium concentrations for wells located on and near the STP and east of the LTP are plotted on Figures 4.3-76 through 4.3-78. Figure 4.3-79 presents selenium concentration for wells 522, L, L5, L6, L8 and L10.

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

Selenium concentrations are presented for wells in the former flood irrigation area adjacent to Murray Acres on Figure 4.3-82. This plot shows continuing low selenium concentrations in monitoring wells in this area of the alluvial aquifer. Fairly steady values were observed in these wells in 2018. This data does not indicate that the flood irrigation affected the selenium concentrations in the groundwater in the area of this irrigation.

Selenium concentrations for the Section 3 wells are plotted on Figures 4.3-83 and 4.3-83A. The selenium concentration in these R collection wells was small prior to the start of the collection in this area in 2014 and they stayed low during 2015 through 2018.

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

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

4.3.6 MOLYBDENUM - ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during 2018. 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 2018 to demonstrate that the molybdenum concentrations are less

than 0.03 mg/l. A lower detection limit was used for most of 2018 which shows that these concentrations are generally much less than 0.03 mg/l. 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 in any location under the LTP in 2018 with only a few of the LTP wells 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 4.3-87C) 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.

Figures 4.3-88 and 4.3-88A presents molybdenum concentration for the up-gradient wells DD, DD2, DD3, DD4, DD5, ND, P, P3, Q and R. Concentrations have remained low in these ten wells in 2018 except the outlier in well DD in April.

Molybdenum concentrations are presented in Figures 4.3-89 through 4.3-91 for the alluvial aquifer to the west and southwest of the LTP. Figure 4.3-92 presents molybdenum concentrations for wells on and near the LTP. Molybdenum concentrations in wells on and near the STP and one well east of the LTP are presented on Figures 4.3-93 through 4.3-95. Figure 4.3-96 present molybdenum concentrations in wells 522, L, L5, L6, L8 and L10, which are located further to the southeast of the STP.

Molybdenum concentrations in alluvial wells located north, east and in Broadview Acres are plotted on Figure 4.3-97. Figures 4.3-98 and 4.3-98A present the molybdenum concentrations for the Felice Acres wells. The decline in molybdenum concentrations in 2018 is due to the use of a lower detection limit in the laboratory.

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

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

4.3.7 NITRATE - ALLUVIAL

The presence of relatively large nitrate concentrations up-gradient of the Grants site has resulted in a site background standard of 12 mg/l (see Table 3.1-1). A statistical analysis of the up-gradient data 1995 through 2004 produced the nitrate concentration of 12 mg/l based on the 95th percentile of background. Figures 4.3-104, 4.3-104A, 4.3-104B and 4.3-104C present nitrate concentrations measured in 2018 in the alluvial aquifer. Figure 4.3-104A list the nitrate values for the wells near the LTP and STP, showing that six of these wells slightly exceed the site standard. The nitrate concentrations north and up-gradient of the tailings ultimately impact the nitrate concentrations down-gradient of the LTP. It is difficult to determine whether seepage from the tailings has any significant impact on the nitrate concentrations in this area, because the naturally higher concentrations up-gradient of the LTP makes modestly elevated nitrate concentrations indistinguishable from background. Also the recent seepage from the LTP contains much smaller nitrate concentrations

Nitrate concentrations exceed 12 mg/l in an area between the LTP and STP which are likely due to seepage from the tailings. Nitrate concentration above 12 mg/l also exists in one well southeast of Valle Verde. 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. Figures 4.3-105 and 4.3-105A presents the nitrate concentrations for the background wells. Concentrations in these wells have been relatively stable in 2018 except for an increasing trend in well P3. 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 eleven years. A small increasing trend has been observed in wells DD and P3 recently.

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

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

Nitrate concentrations in and near the former flood irrigation area are presented on Figure 4.3-116. Nitrate concentrations in well 846 are higher than the other five wells shown on this figure and shows an overall increase in 2008 through 2012 and a decrease from this peak in 2013 through 2018. 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 2018 except for a gradual decline in 844 in recent years. This could possibly be showing a small amount of change in the nitrate groundwater concentration from the irrigation.

Nitrate concentrations in Section 3 wells are presented on Figure 4.3-117. Nitrate concentrations for the Section 28 wells are presented on Figure 4.3-118. Figure 4.3-119 presents nitrate concentrations in wells 637, 654, 686, 899 and 994. Nitrate concentrations in the Section 33 wells are presented on Figure 4.3-120 and were steady in 2018.

4.3.8 RADIUM-226 AND RADIUM-228 - ALLUVIAL

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

Measured activities of radium-226 in alluvial wells beneath the LTP exceed 10 pCi/l. Some higher radium-228 values were measured in 2018, such as the values of 4.3 and 5.0 pCi/l for wells 557 and 845 (see Figure 4.3-121B). Typical historical values for these wells are near or below 1 pCi/l and these 2018 values are thought to be laboratory outliers. These higher radium-228 values should not be given any significance. No radium concentrations beyond the LTP area are in exceedance of the standard in 2018 except the 5.2 value from well 845. 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 2018 are shown on Figures 4.3-122, 4.3-122A, 4.3-122B and 4.3-122C. None of the vanadium concentrations in 2018 exceeded the site standard of 0.02 mg/l except for values in the area of the LTP and STP. Well X was the only well that routinely contained a vanadium concentration above the site standard prior to restoration of that area and was measured at 0.01 mg/l in 2018. Therefore, none of the alluvial wells outside of the tailings areas are expected to contain vanadium concentrations above the site standard of 0.02 mg/l in the future. Injection of treated water has effectively restored groundwater quality in the area near well X. Vanadium concentrations, in four alluvial wells located within the footprint of the LTP, one well near the southwest corner of the LTP and two wells located in the area of STP, were above the site standard for vanadium in 2018. The ongoing corrective action program will restore vanadium concentrations in these areas.

4.3.10 THORIUM-230 - ALLUVIAL

Figures 4.3-123, 4.3-123A, 4.3-123B and 4.3-123C presents the 2018 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 2018 and wells 1A, M3 and NC outside of the LTP. The result from wells 1A and NC are likely outliers. 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 2018 in three 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 2018 were less than the site standard except for the three wells noted above. Therefore, only the alluvial aquifer underneath the LTP requires restoration relative to this parameter.

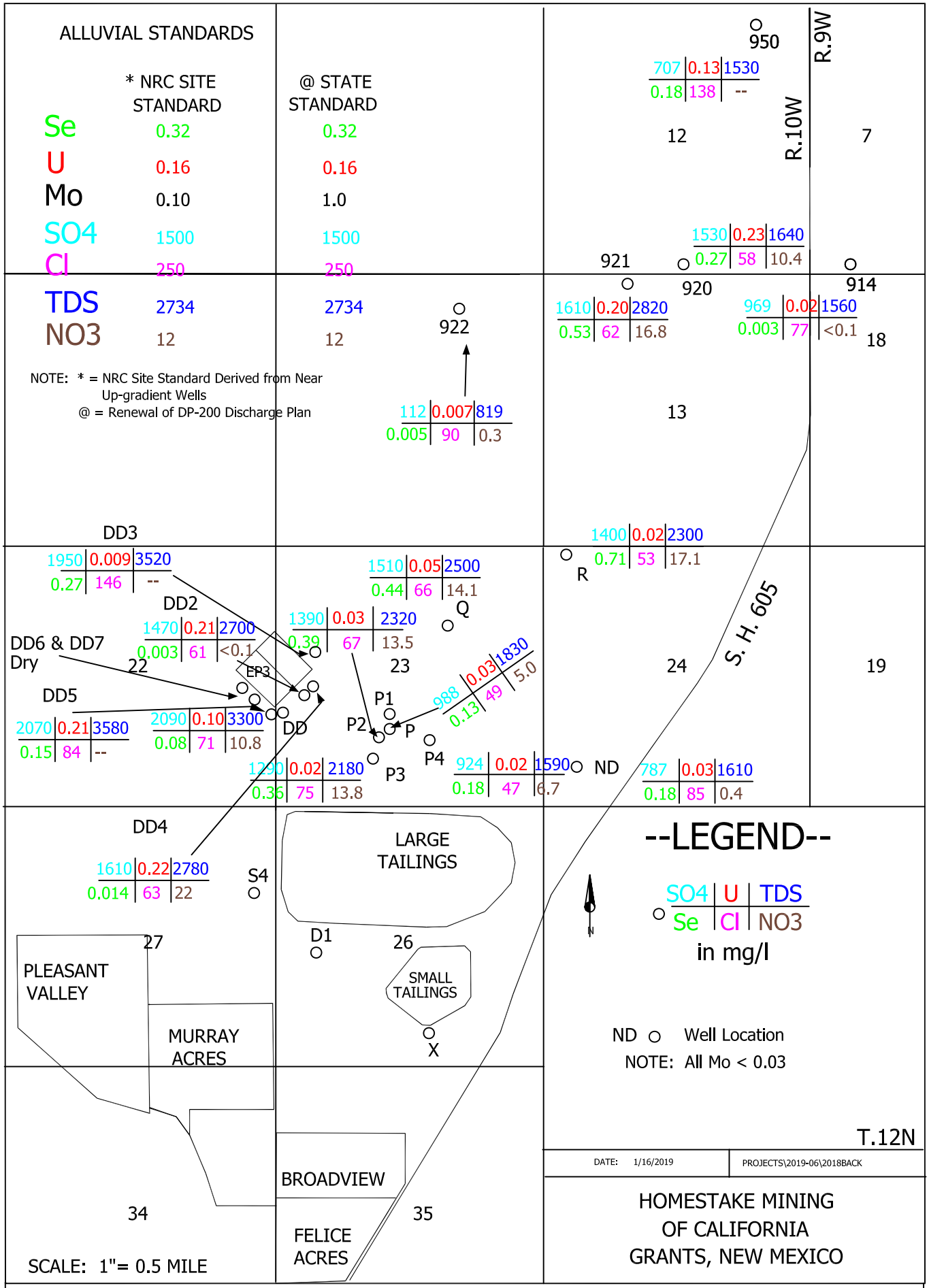


FIGURE 4.3-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2018

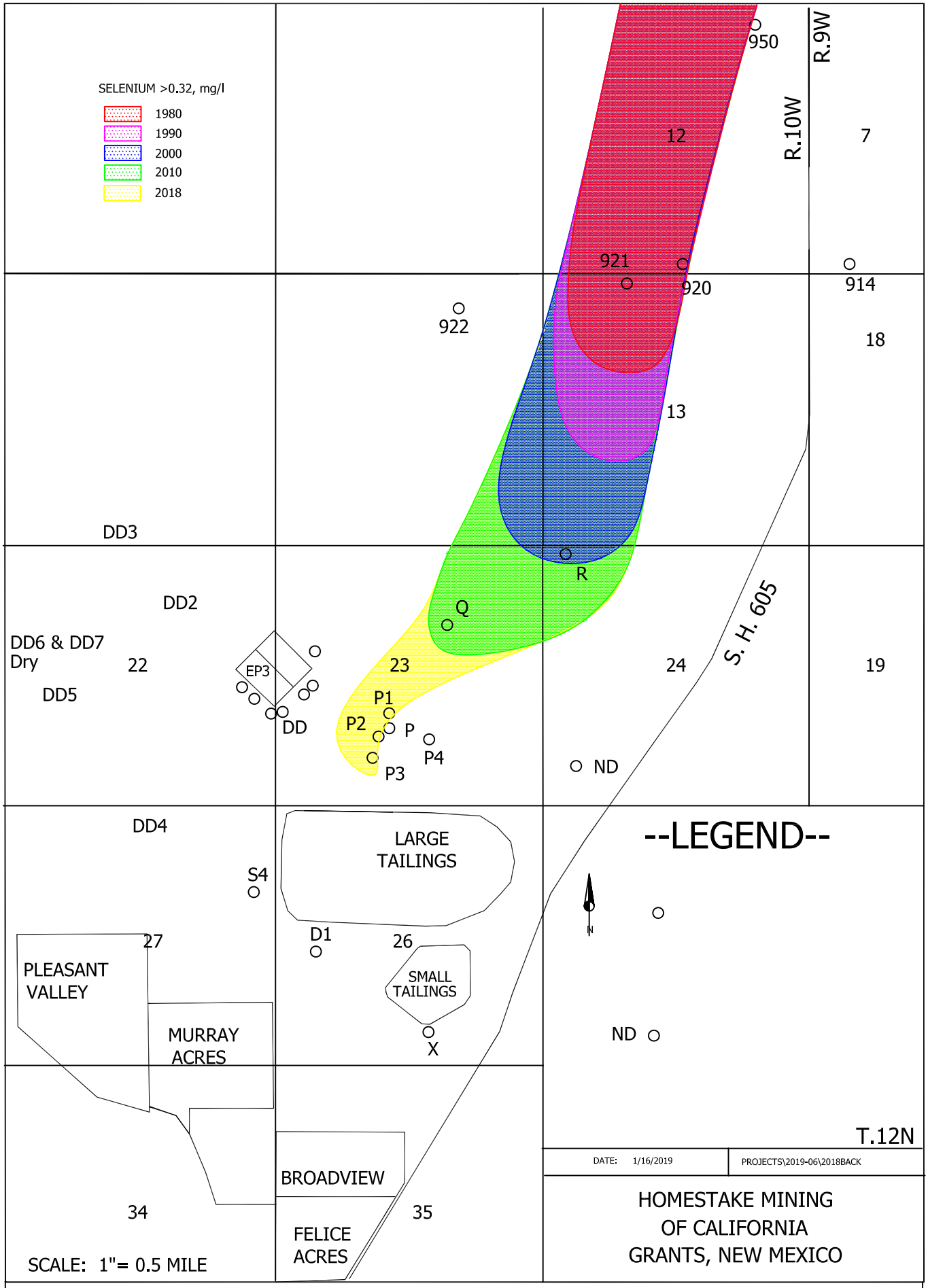


FIGURE 4.3-1A. EXTENT OF ALLUVIAL SELENIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR

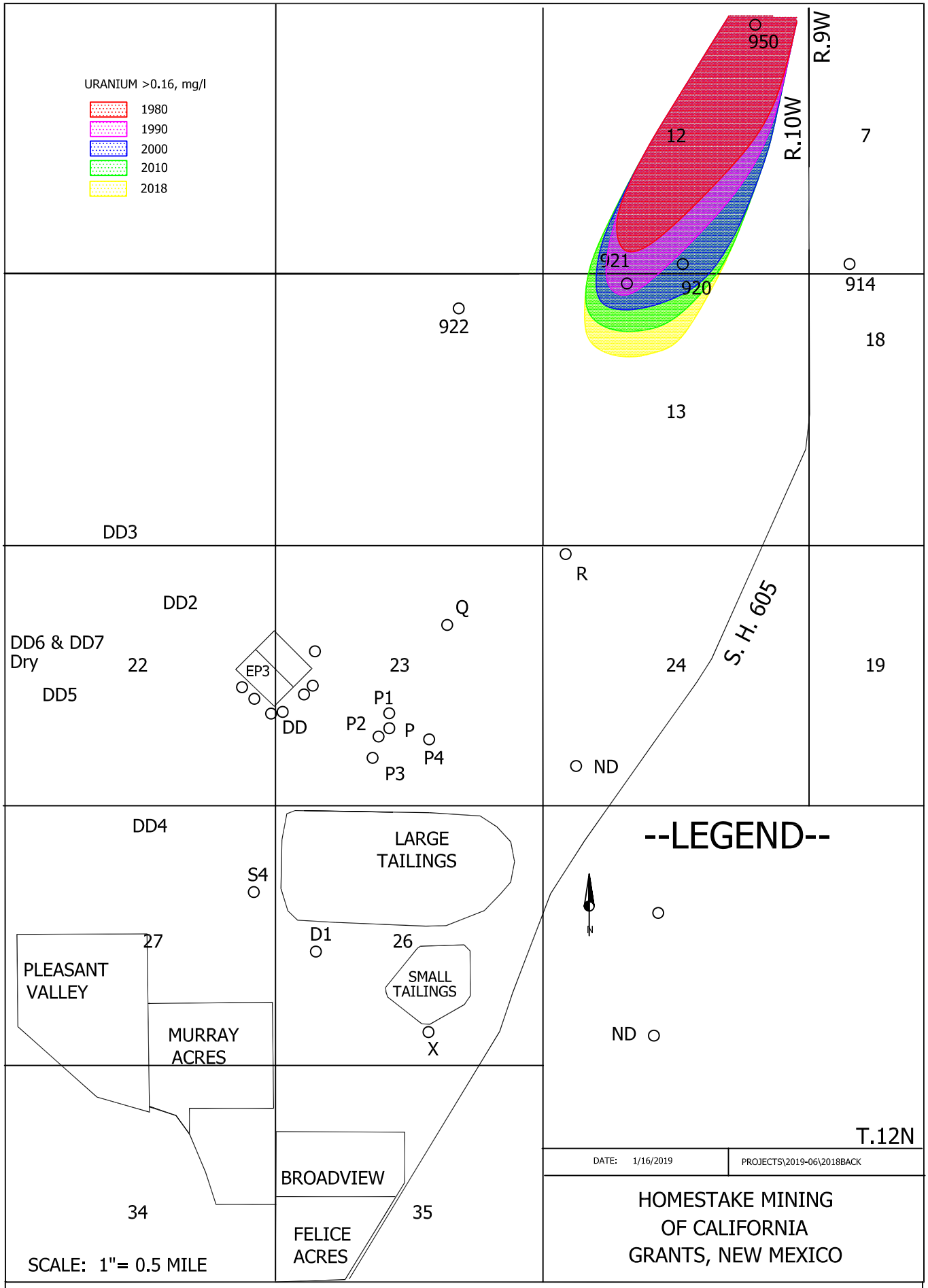
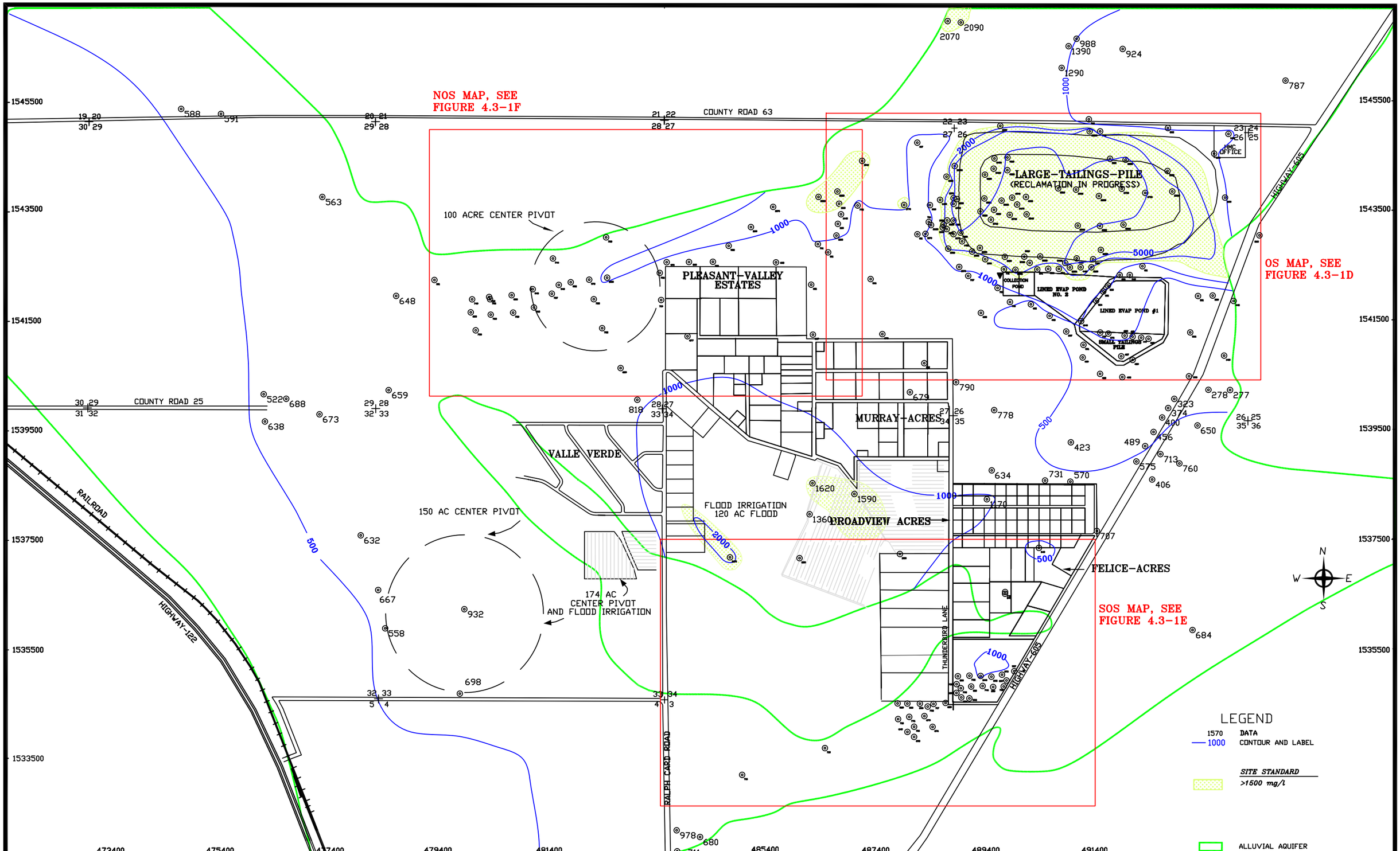


FIGURE 4.3-1B. EXTENT OF ALLUVIAL URANIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR



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C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.3-1C. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l

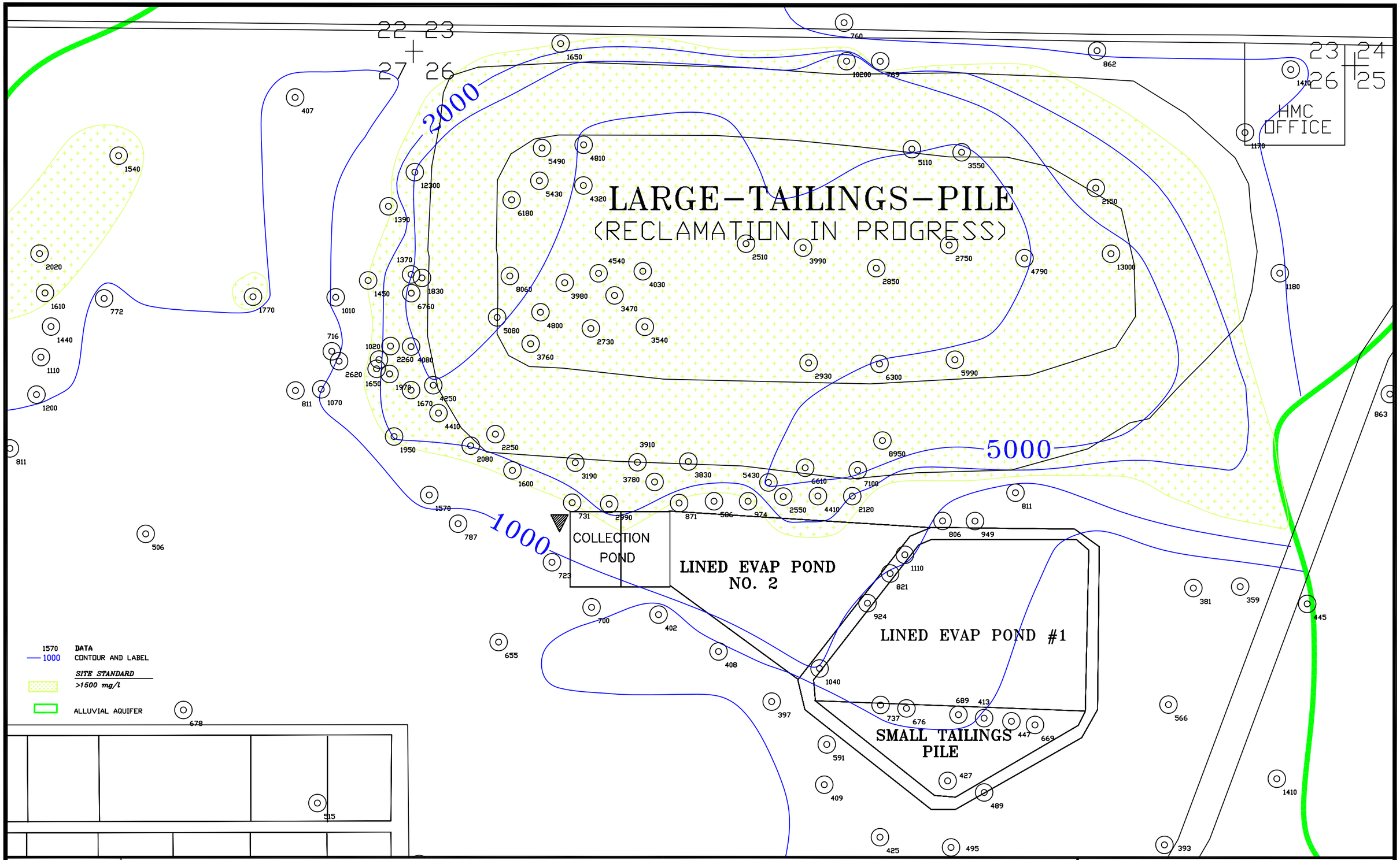

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FIGURE 4.3-1D. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l

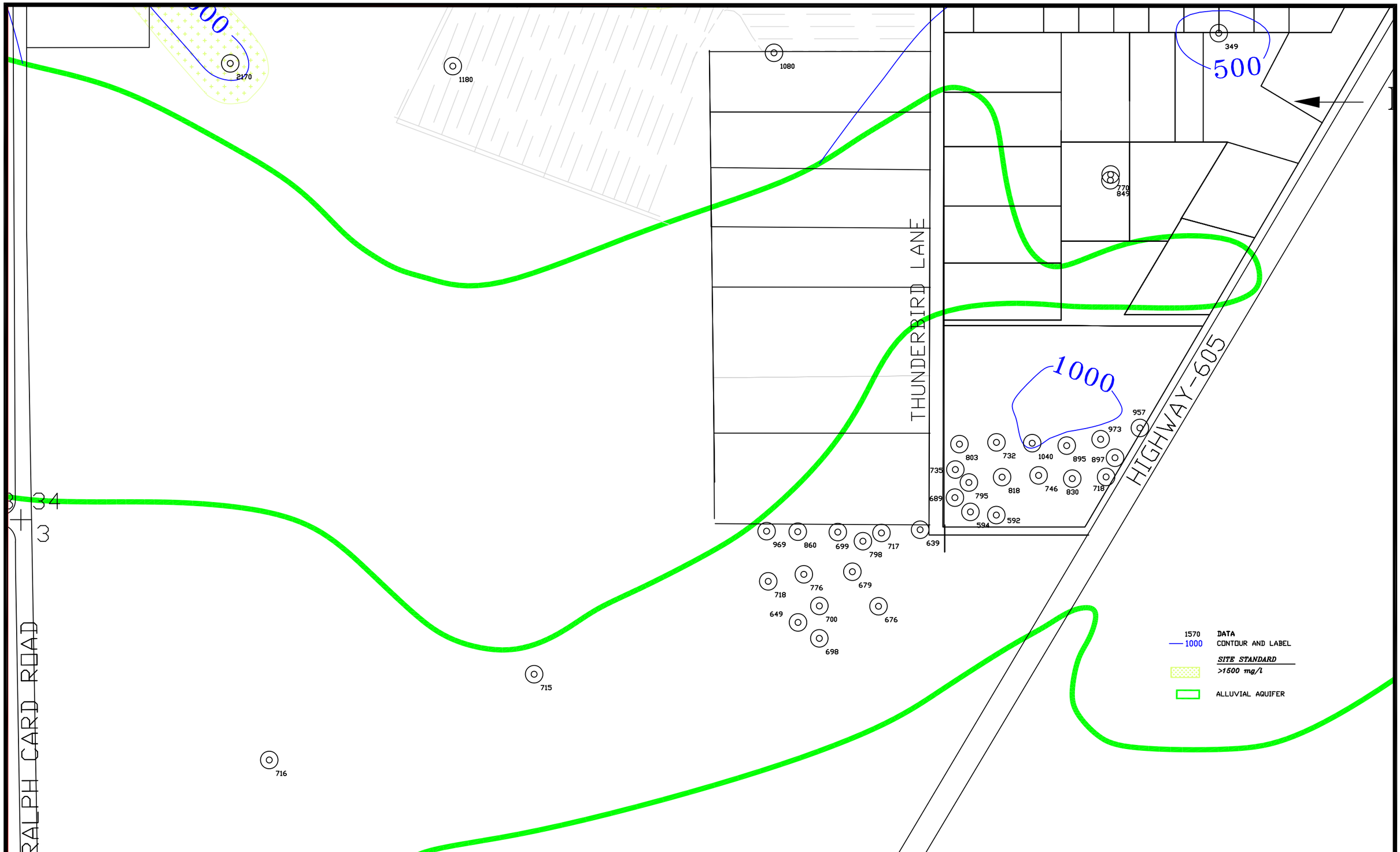

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FIGURE 4.3-1E. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l

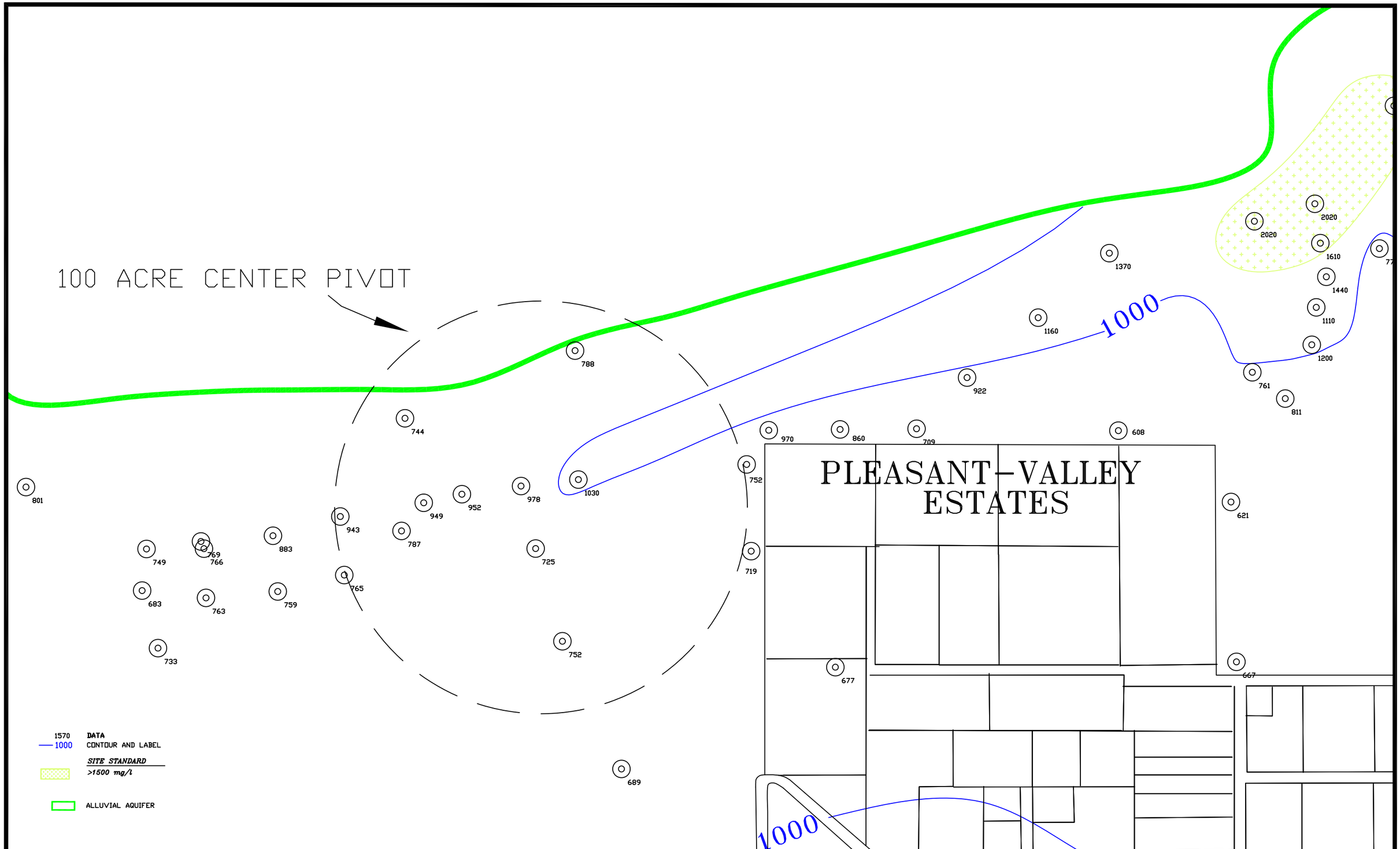

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FIGURE 4.3-1F. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

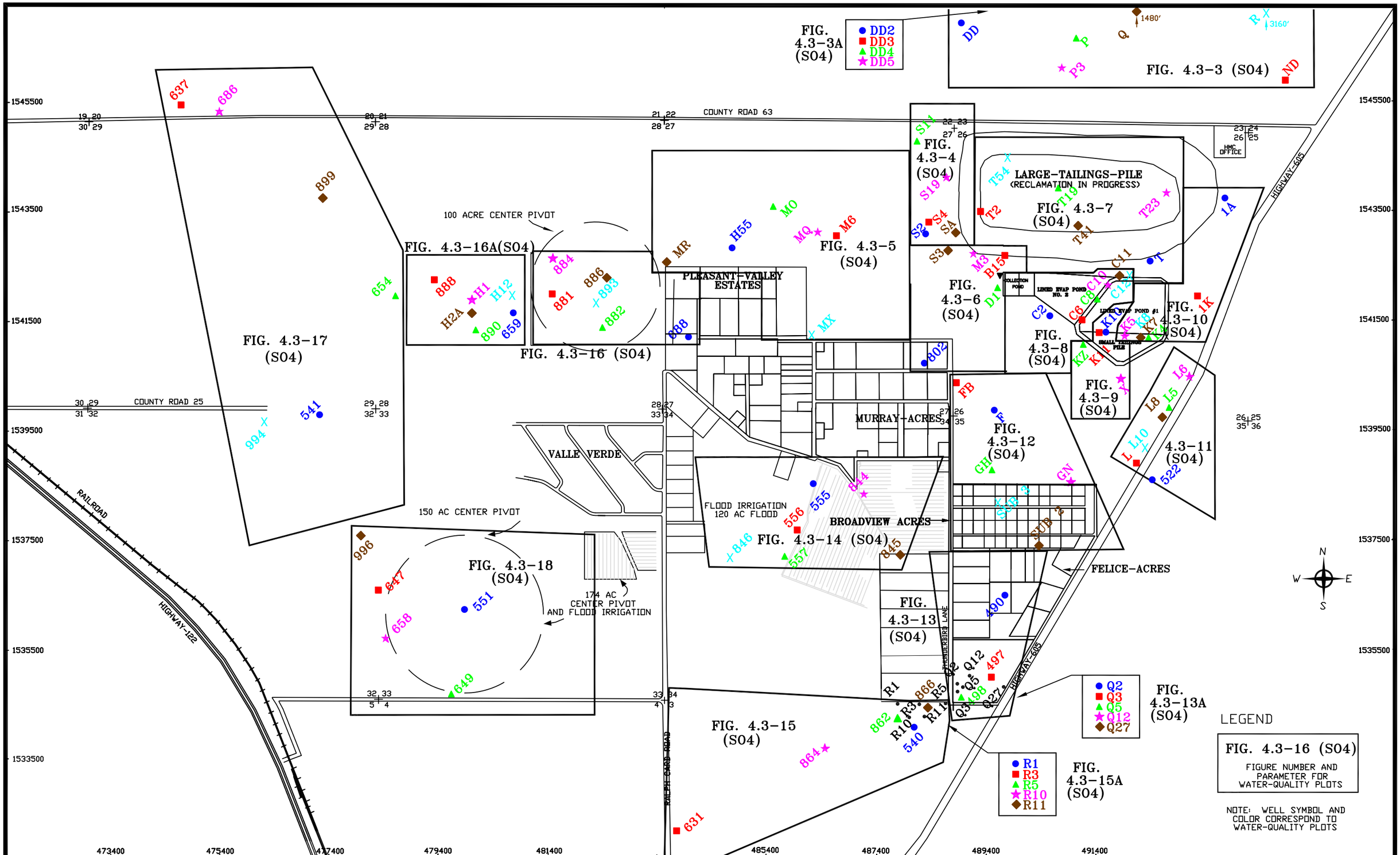

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FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS, 2018

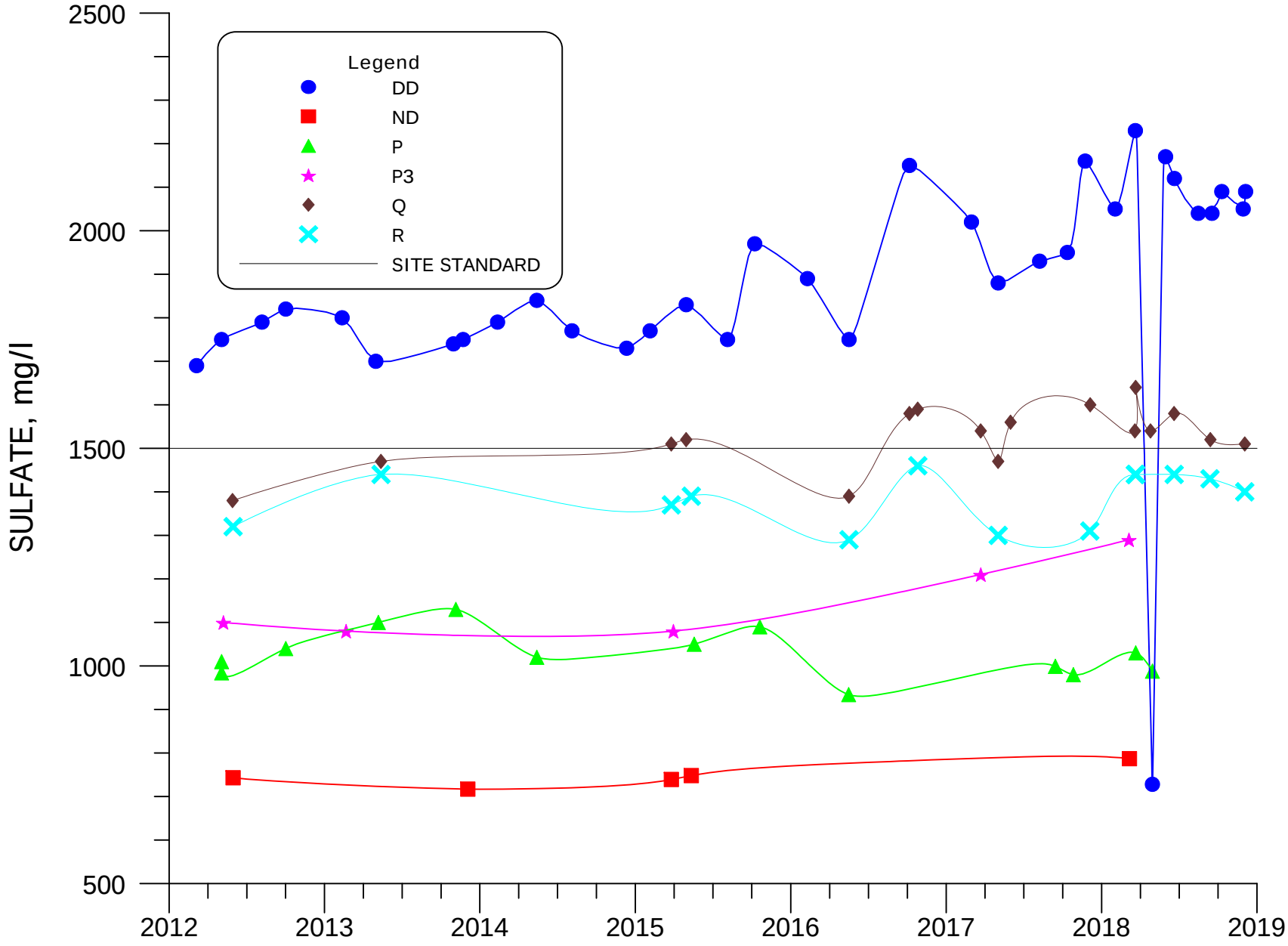

FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

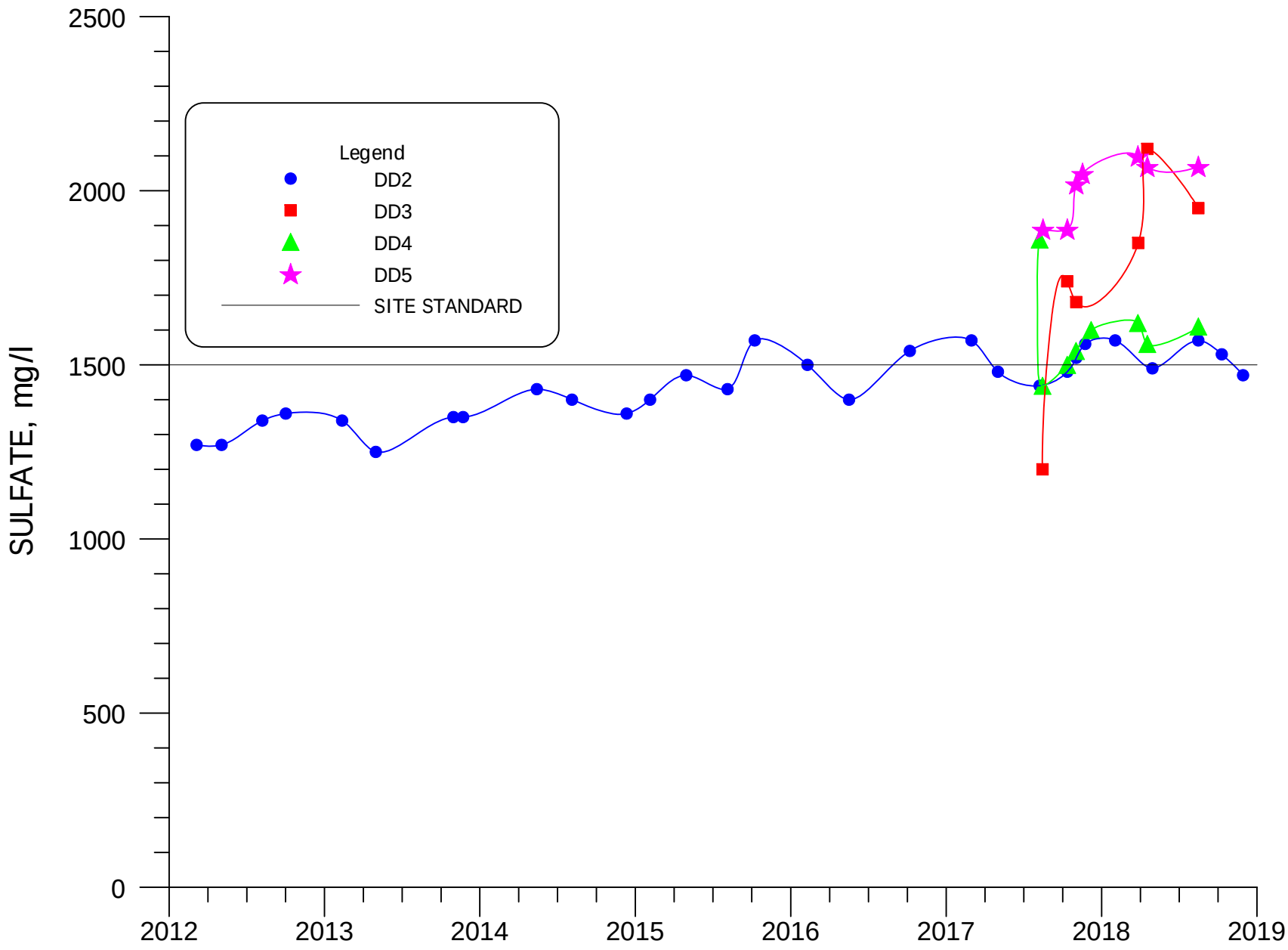

FIGURE 4.3-3A. SULFATE CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

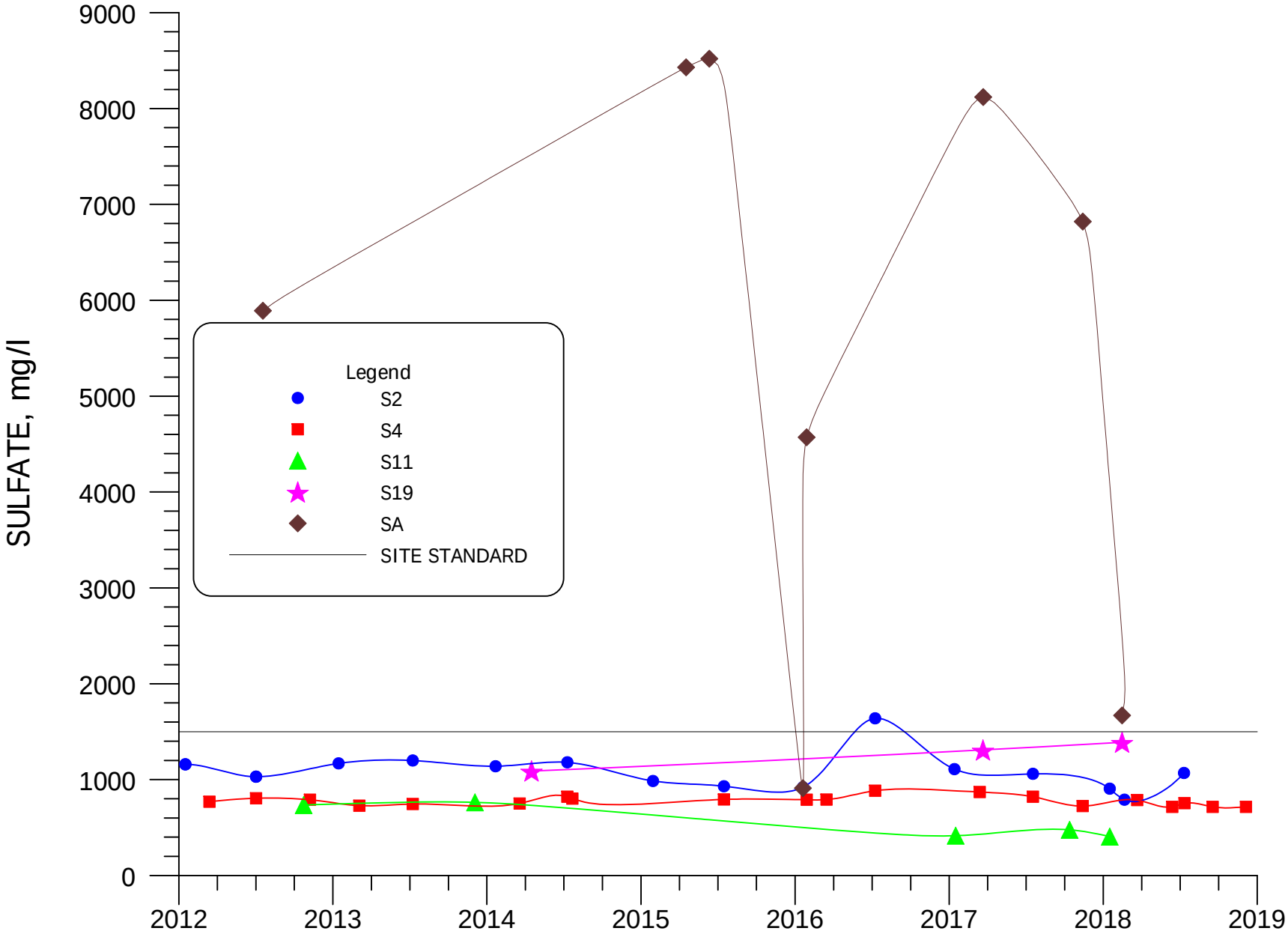

FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

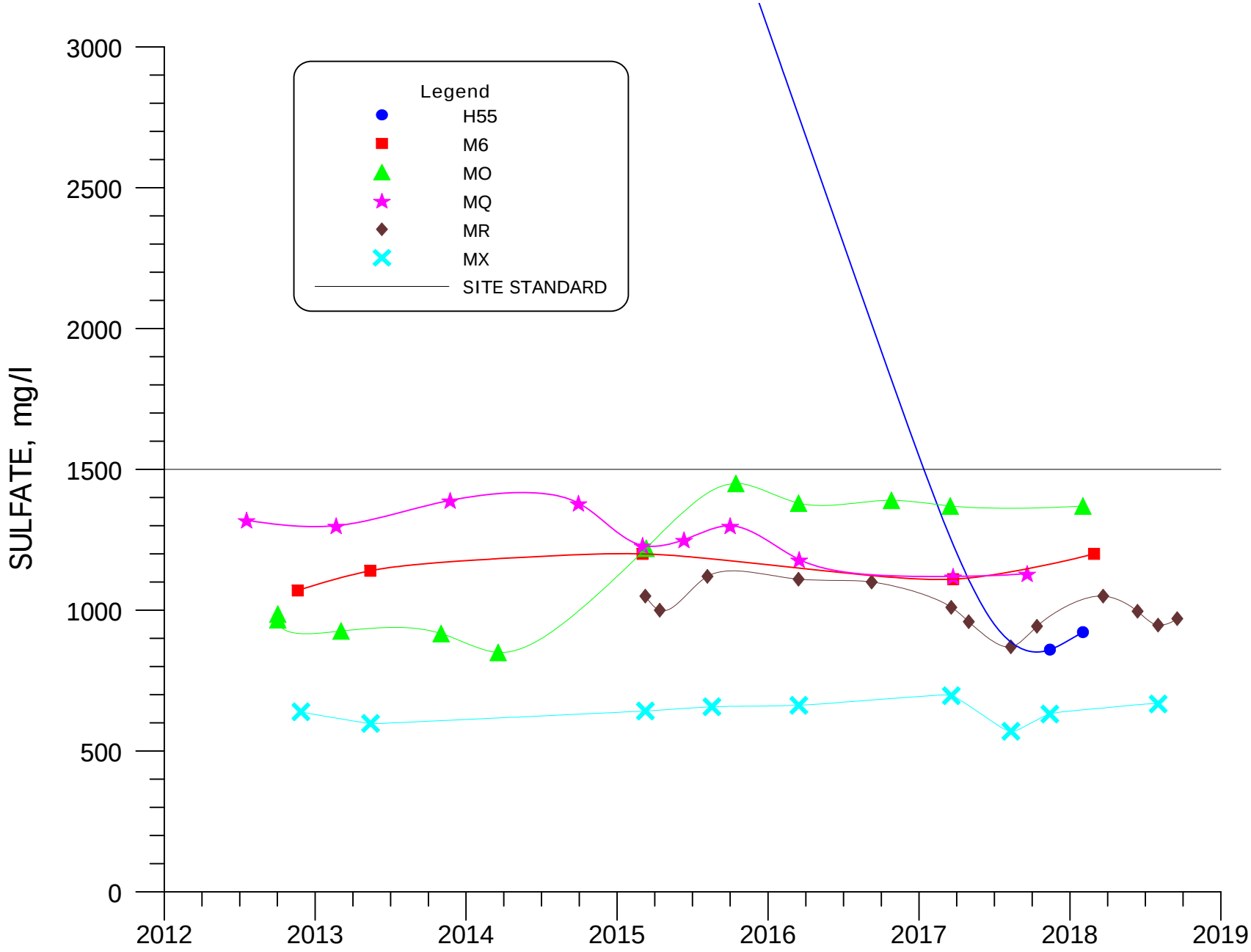

FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

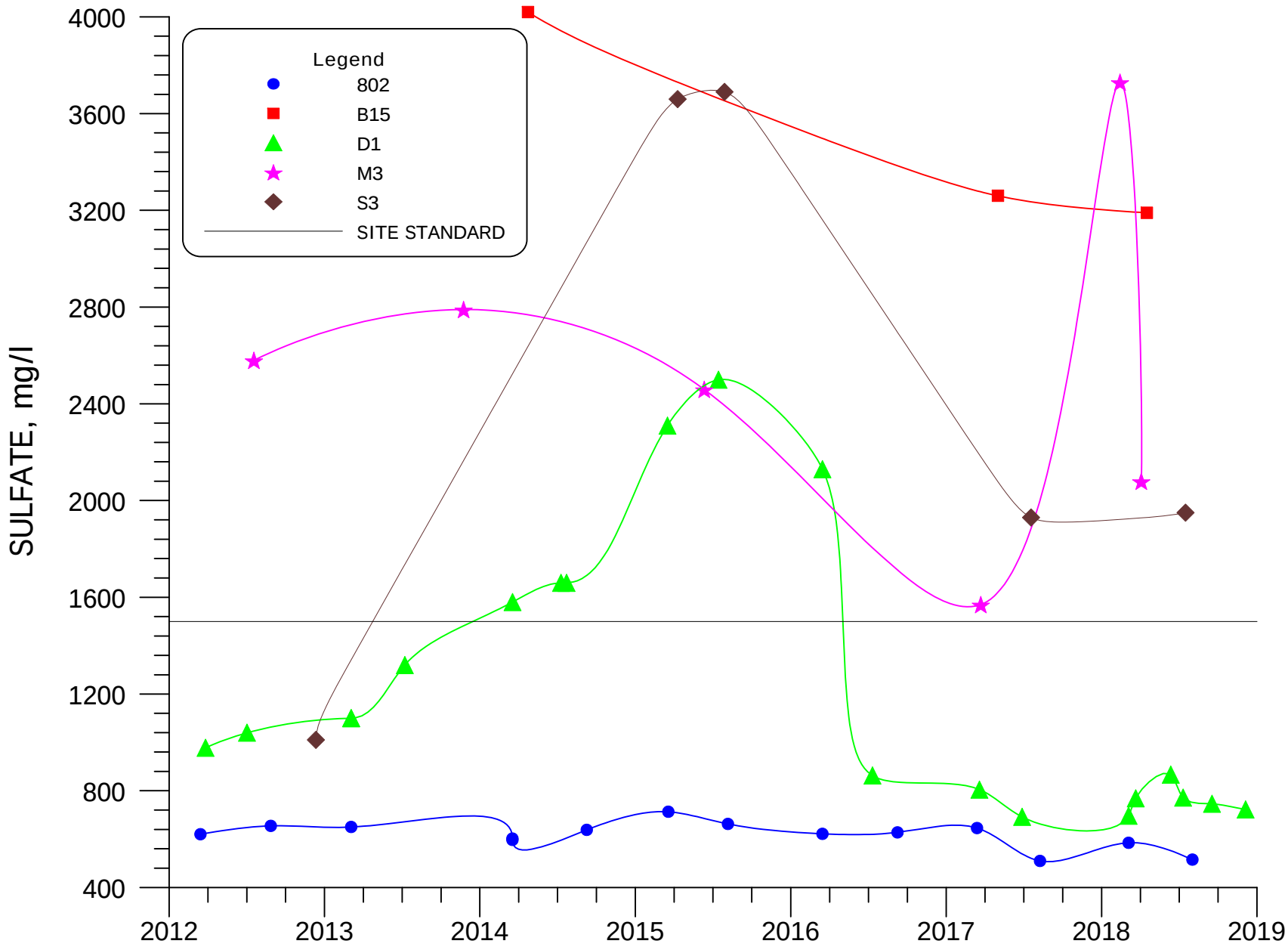

FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

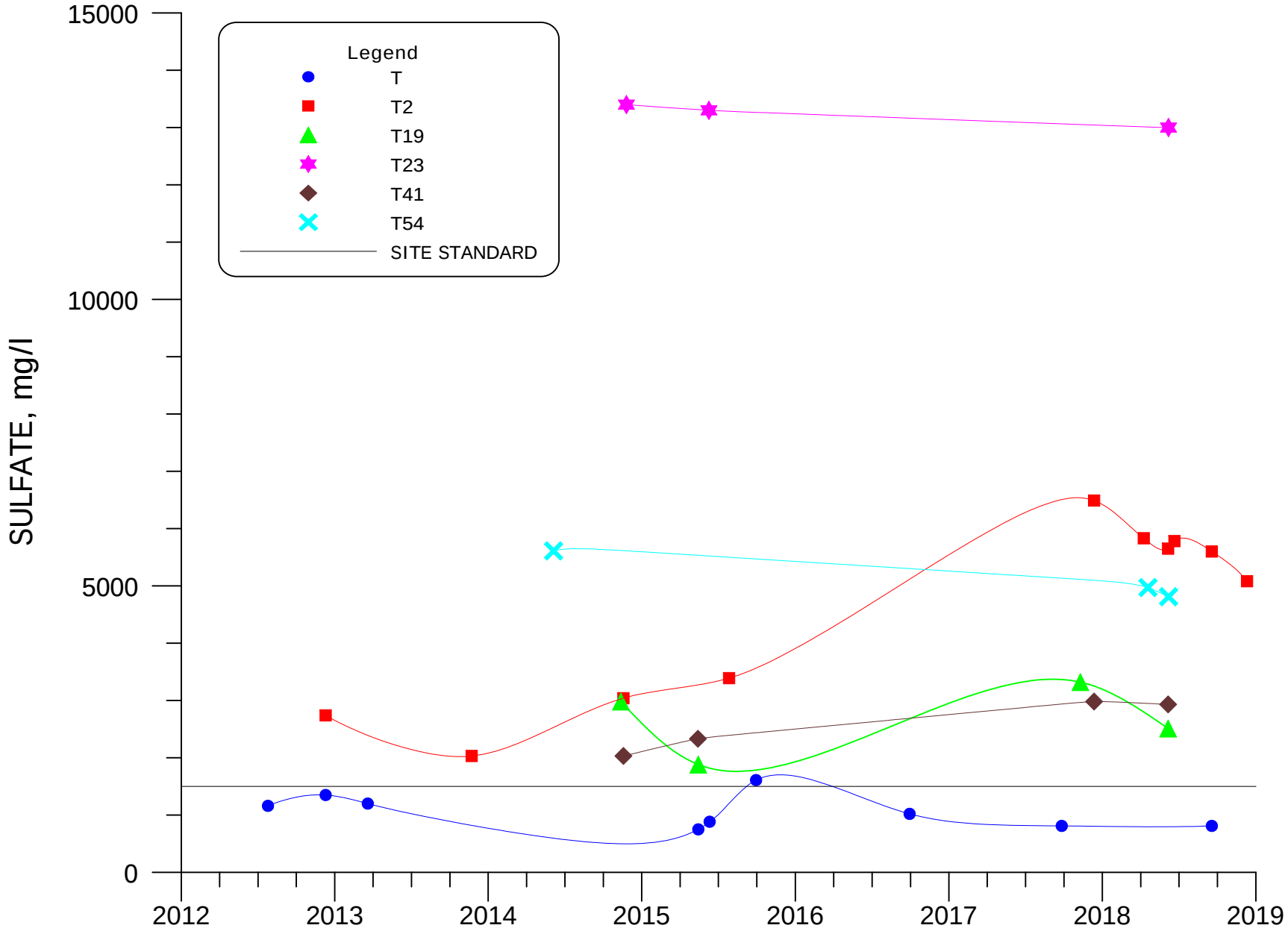

FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

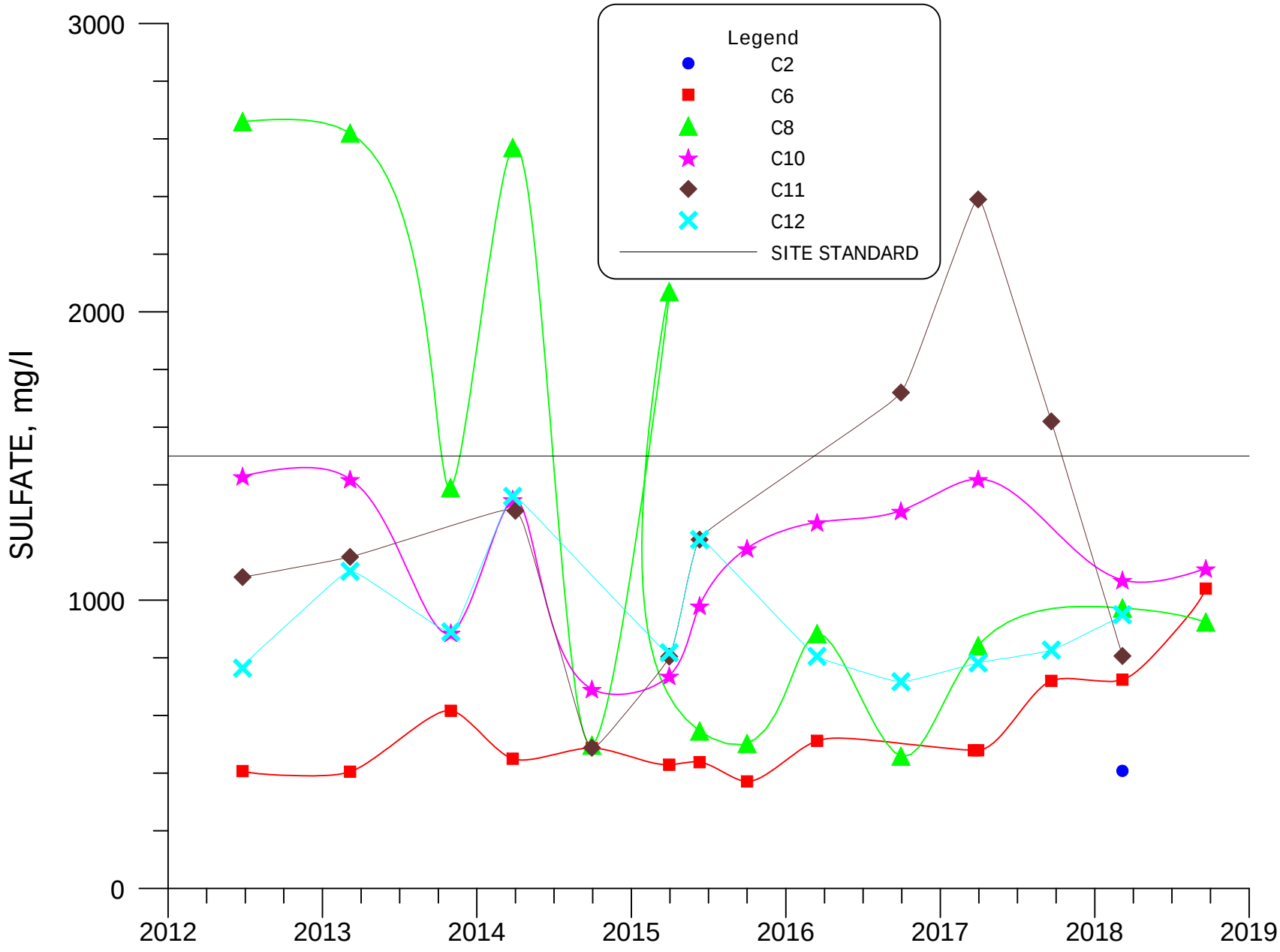

FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

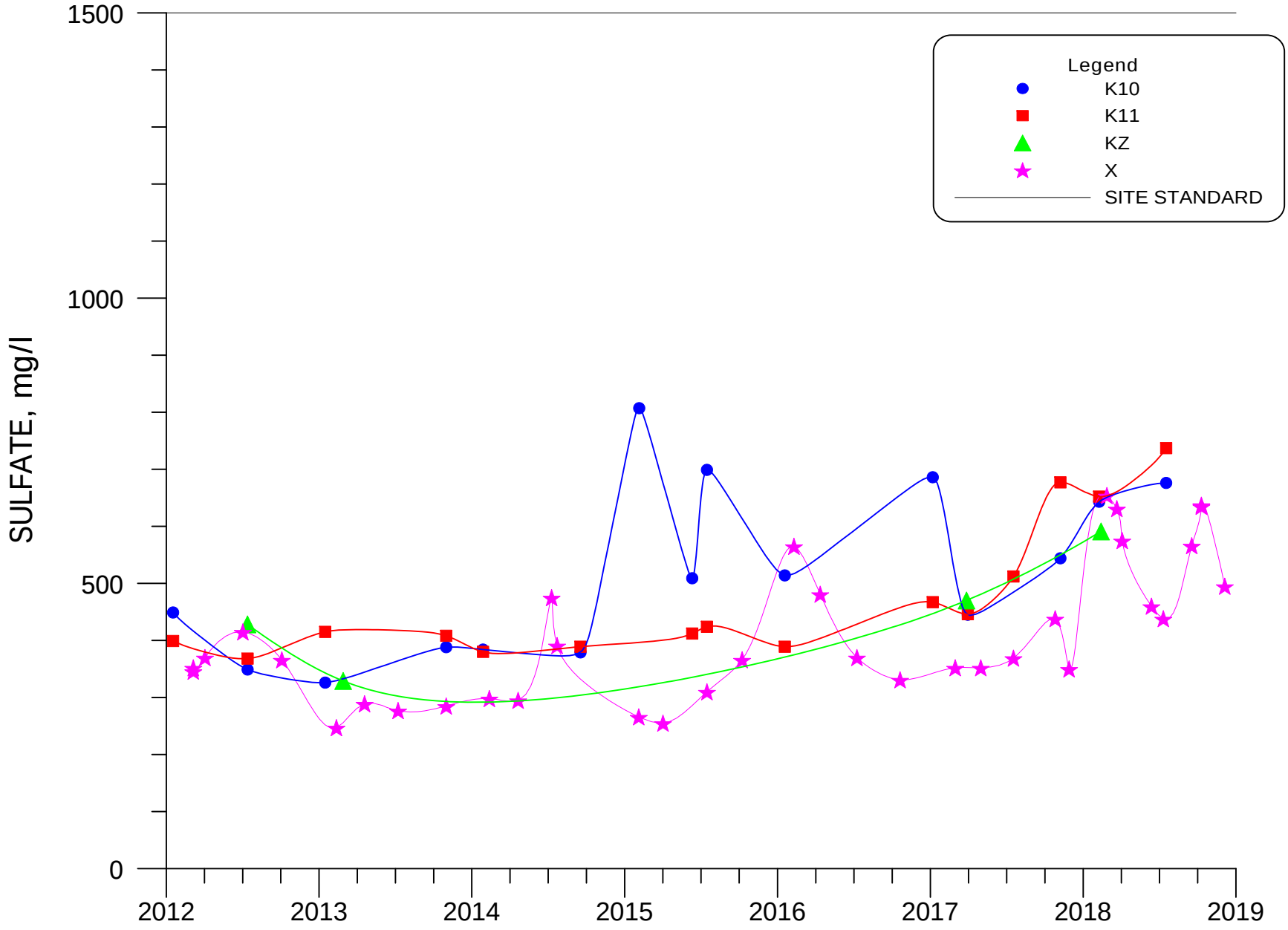

FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

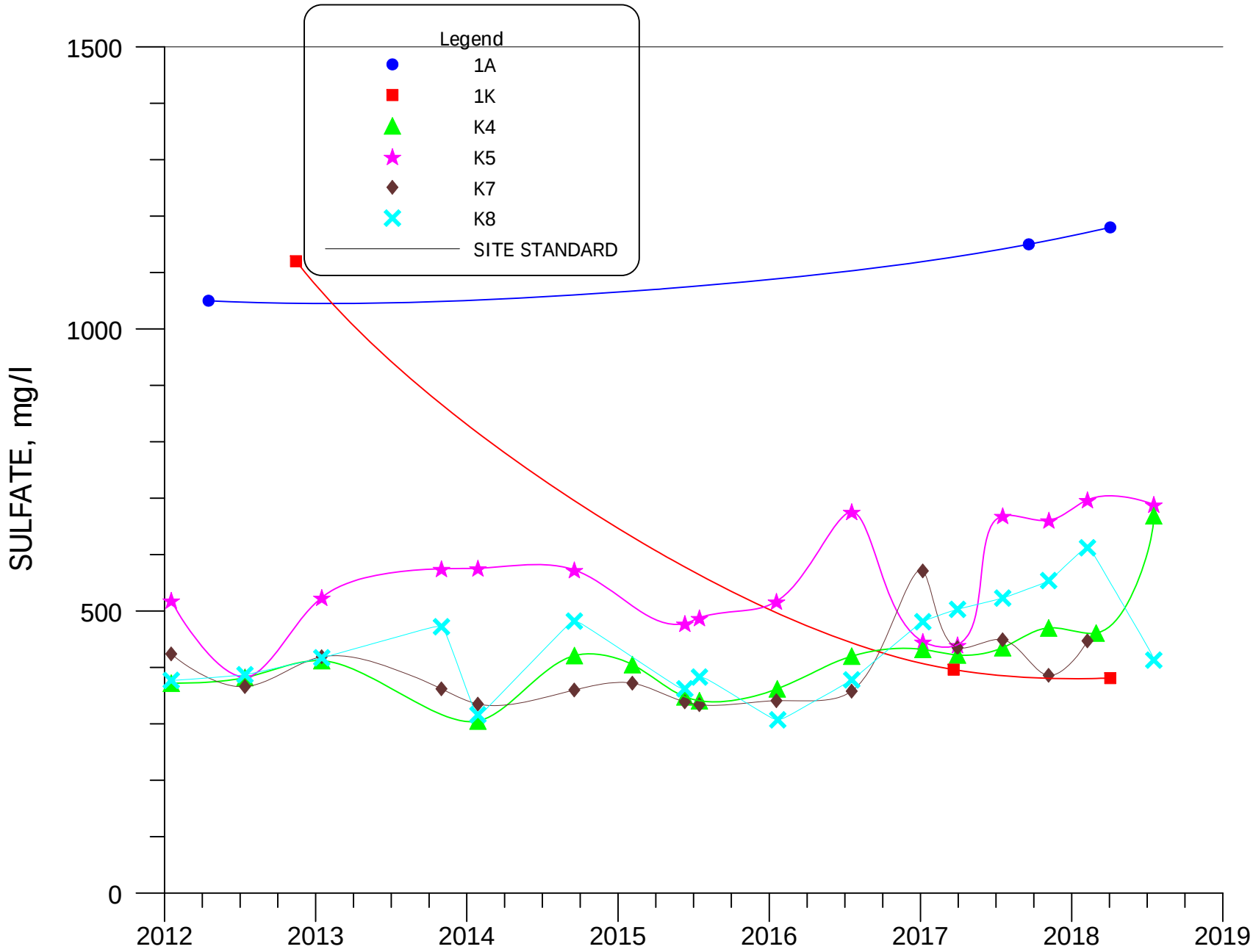

FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

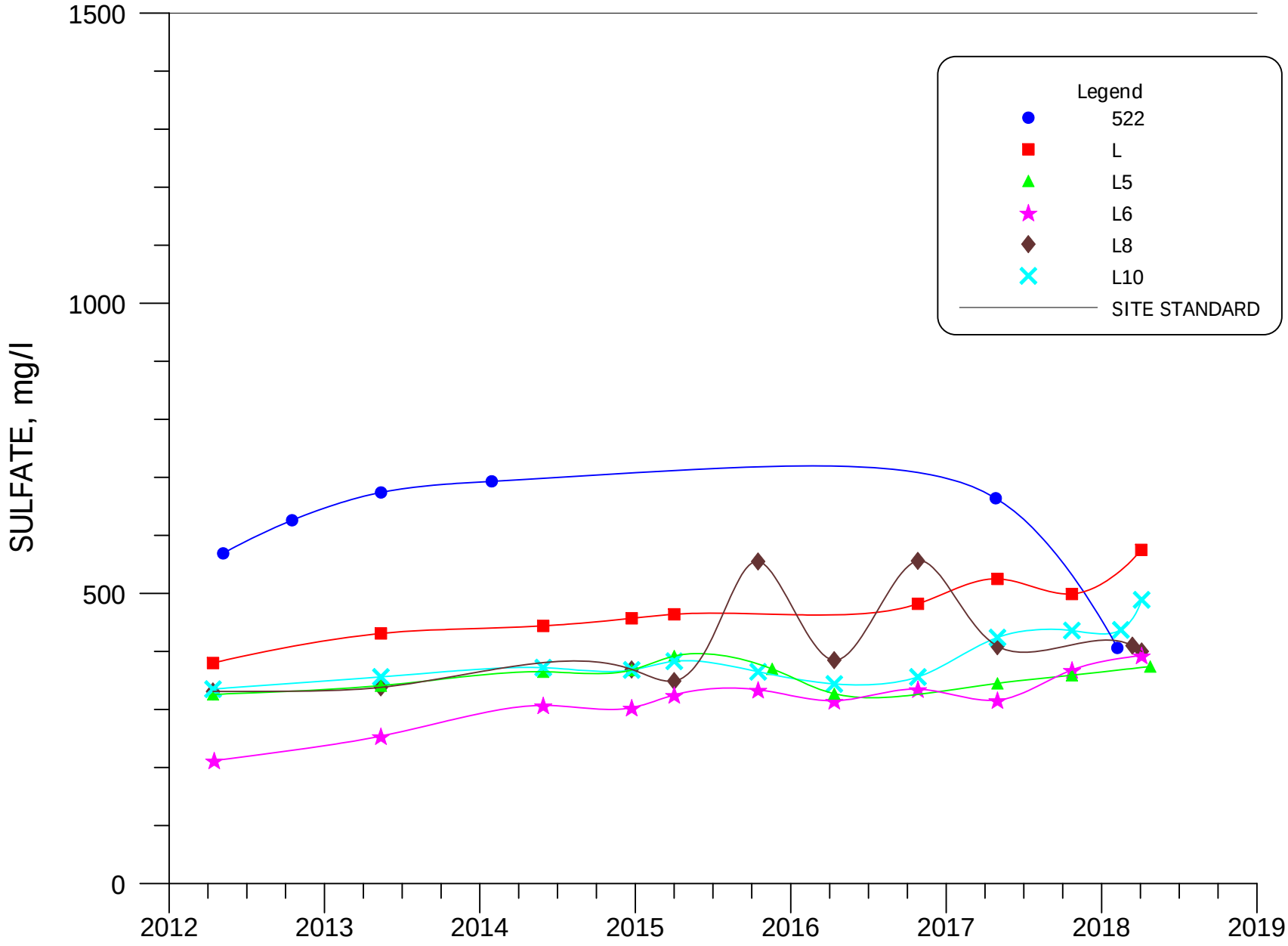

FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

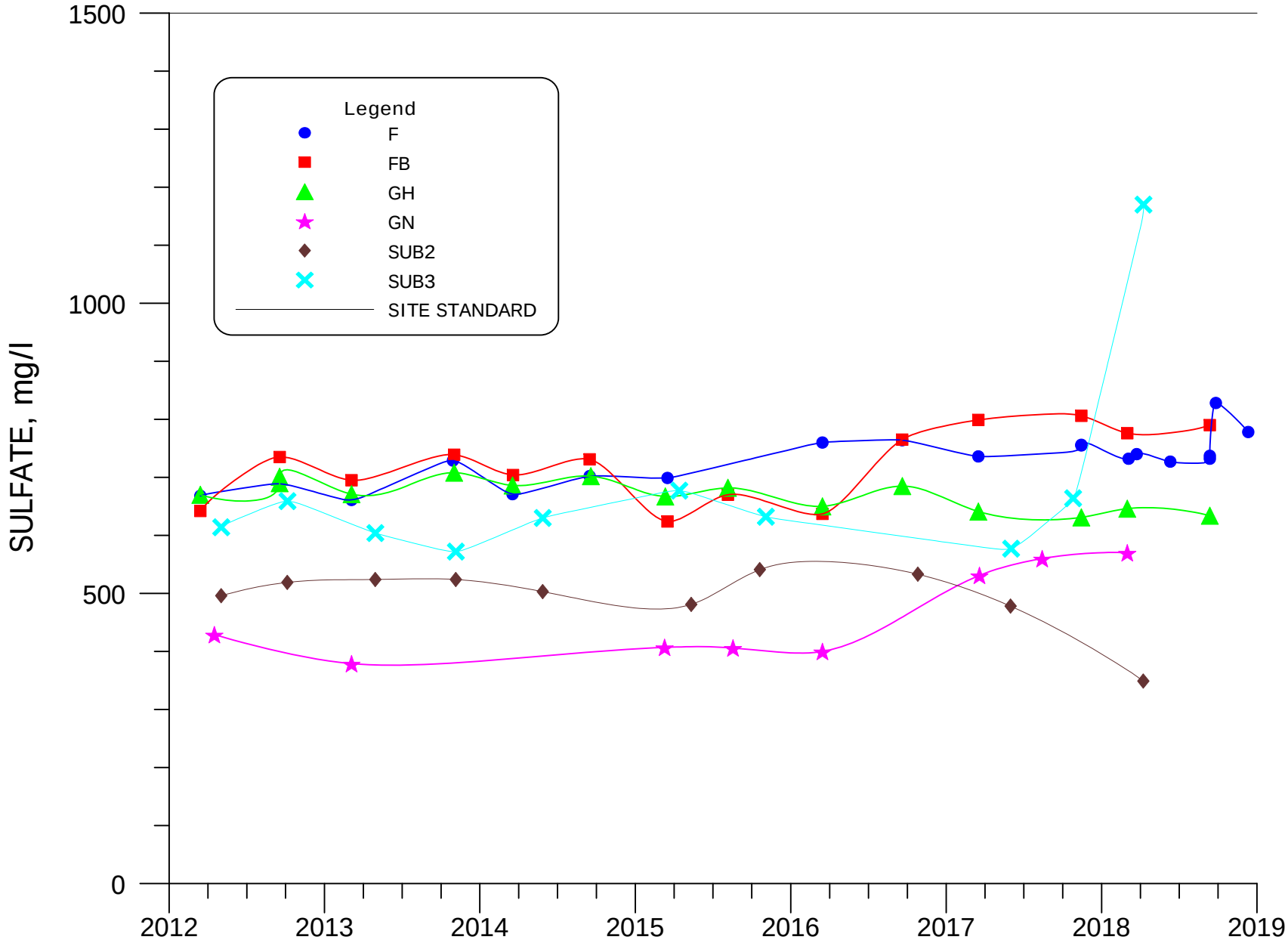

FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

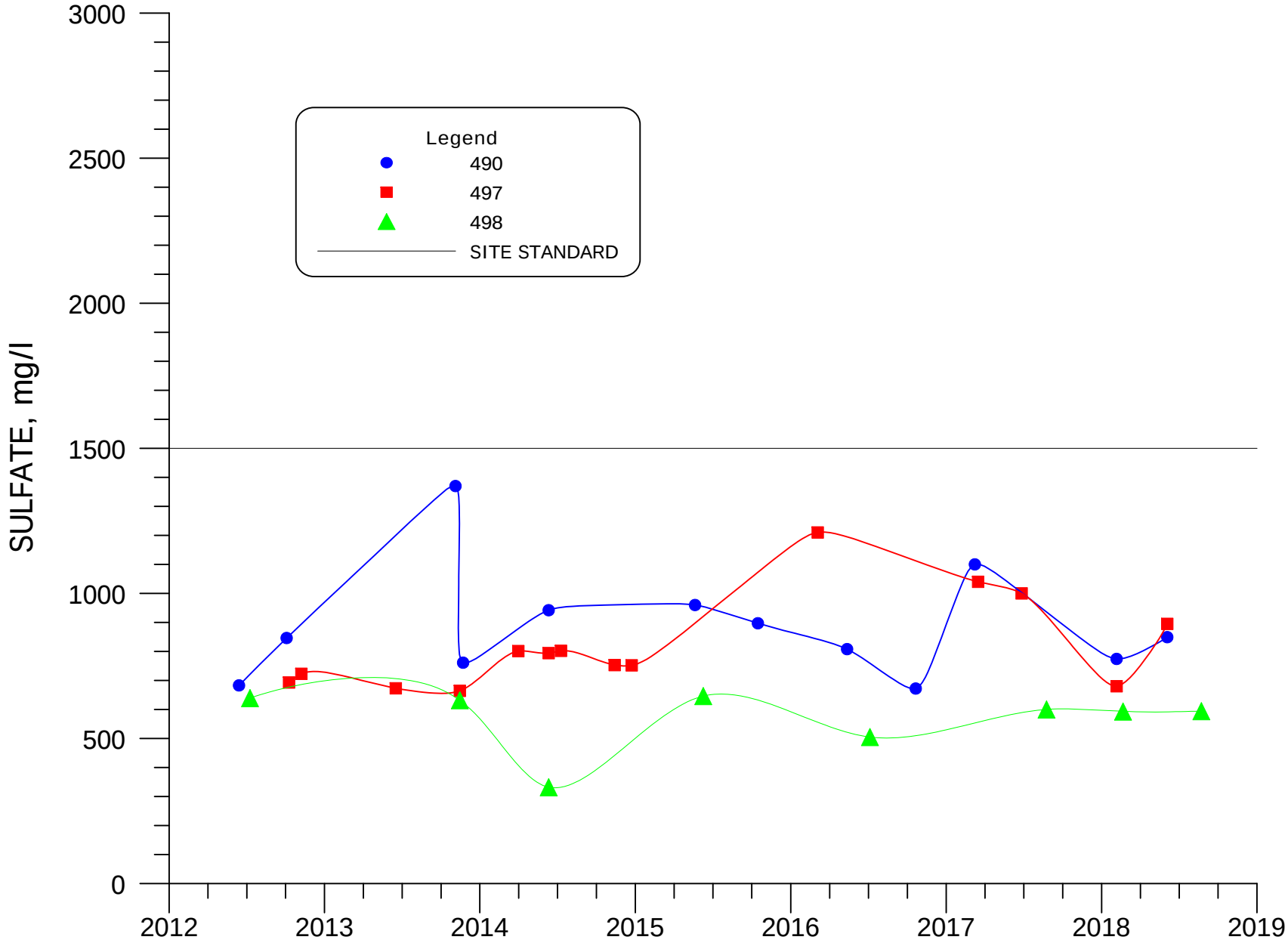

FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

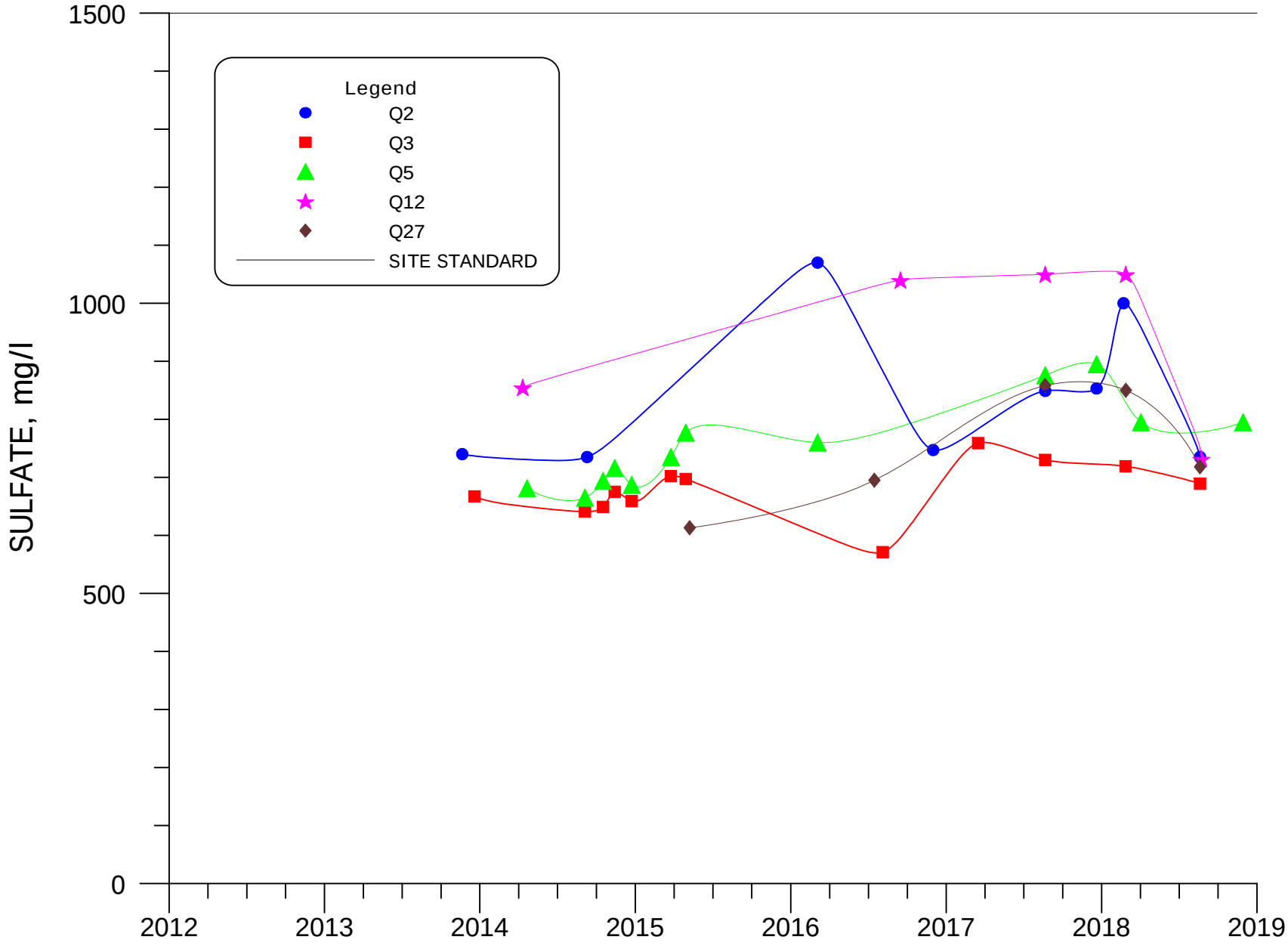

FIGURE 4.3-13A. SULFATE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

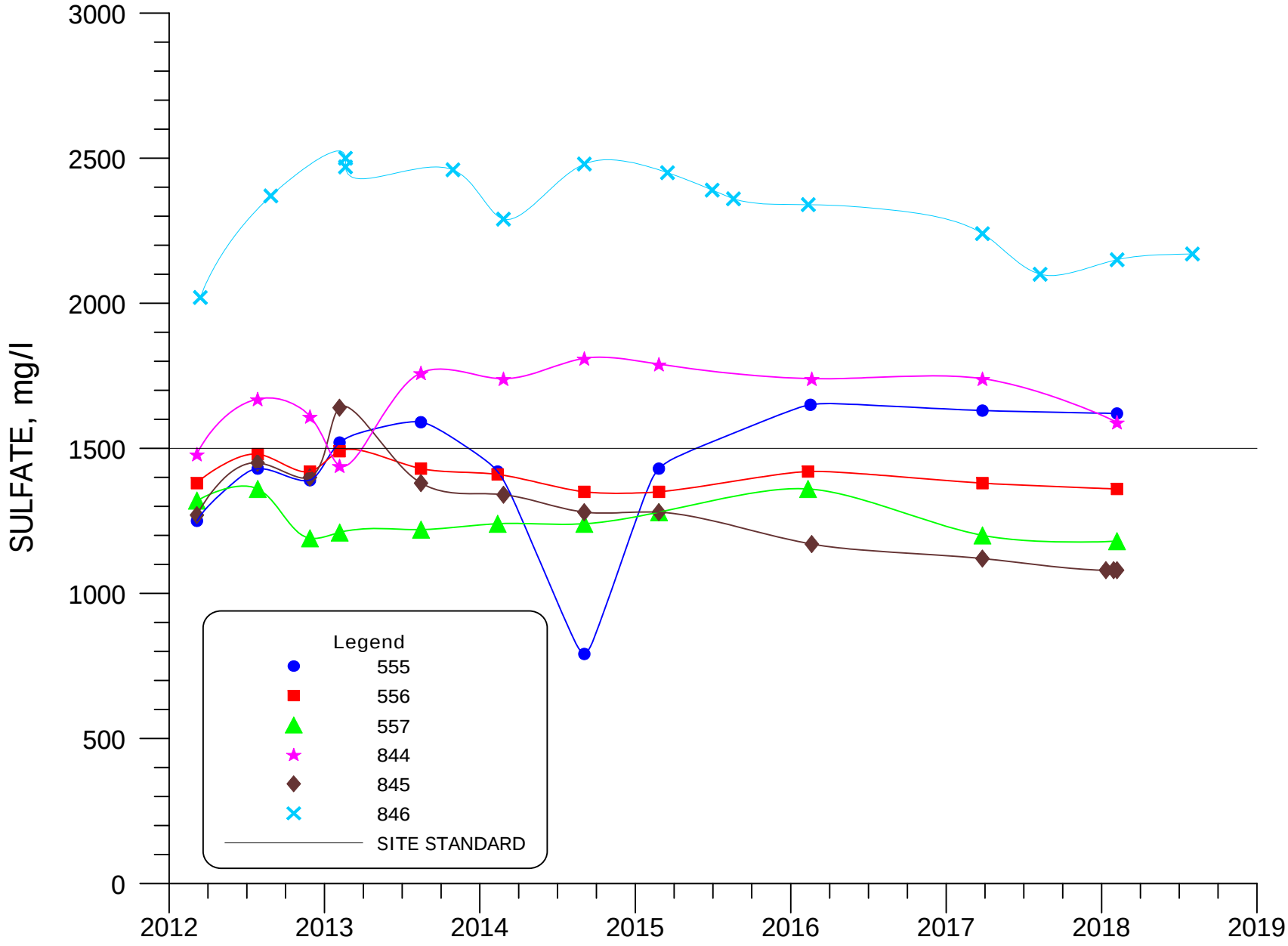

FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

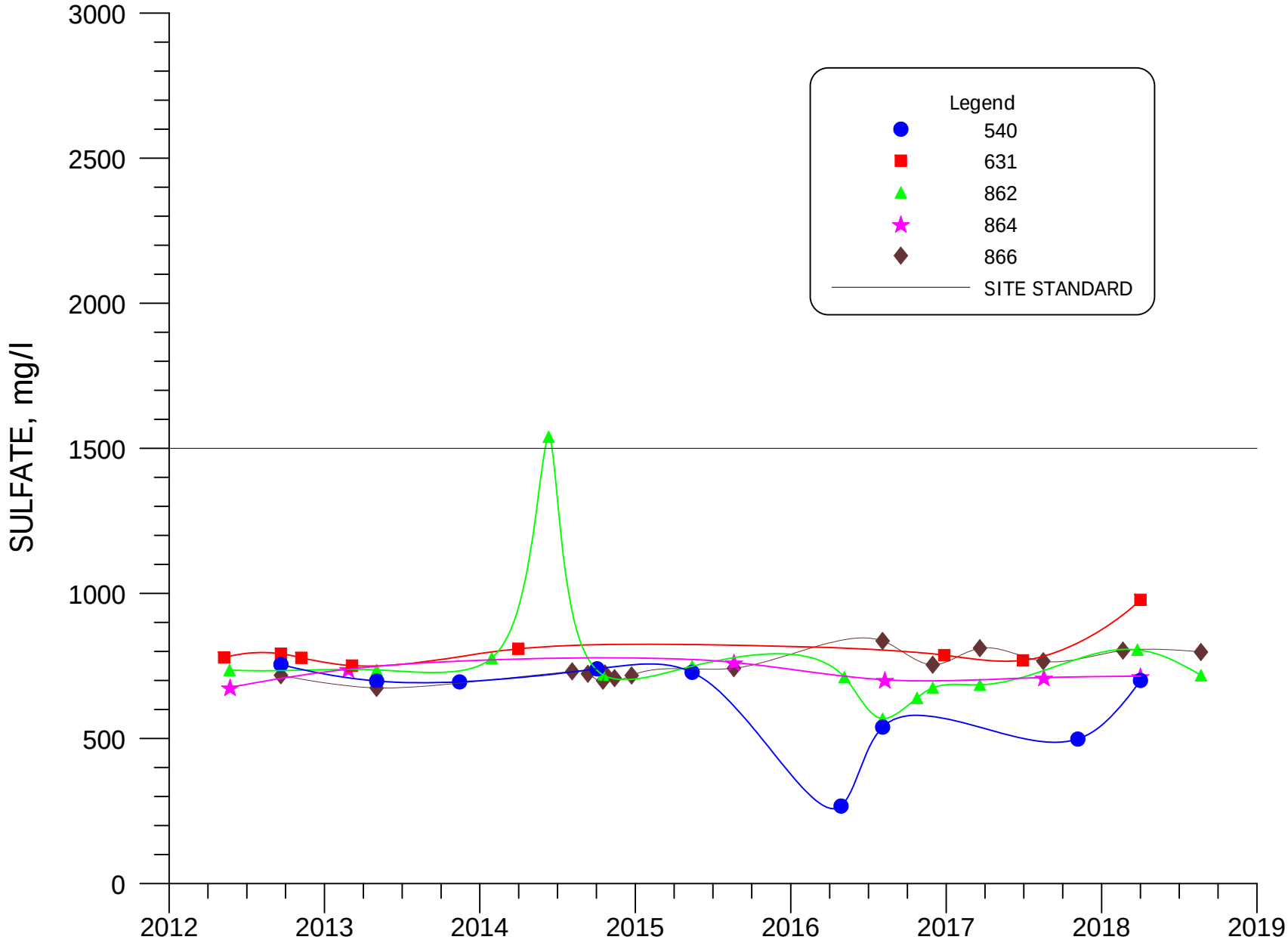

FIGURE 4.3-15. SULFATE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

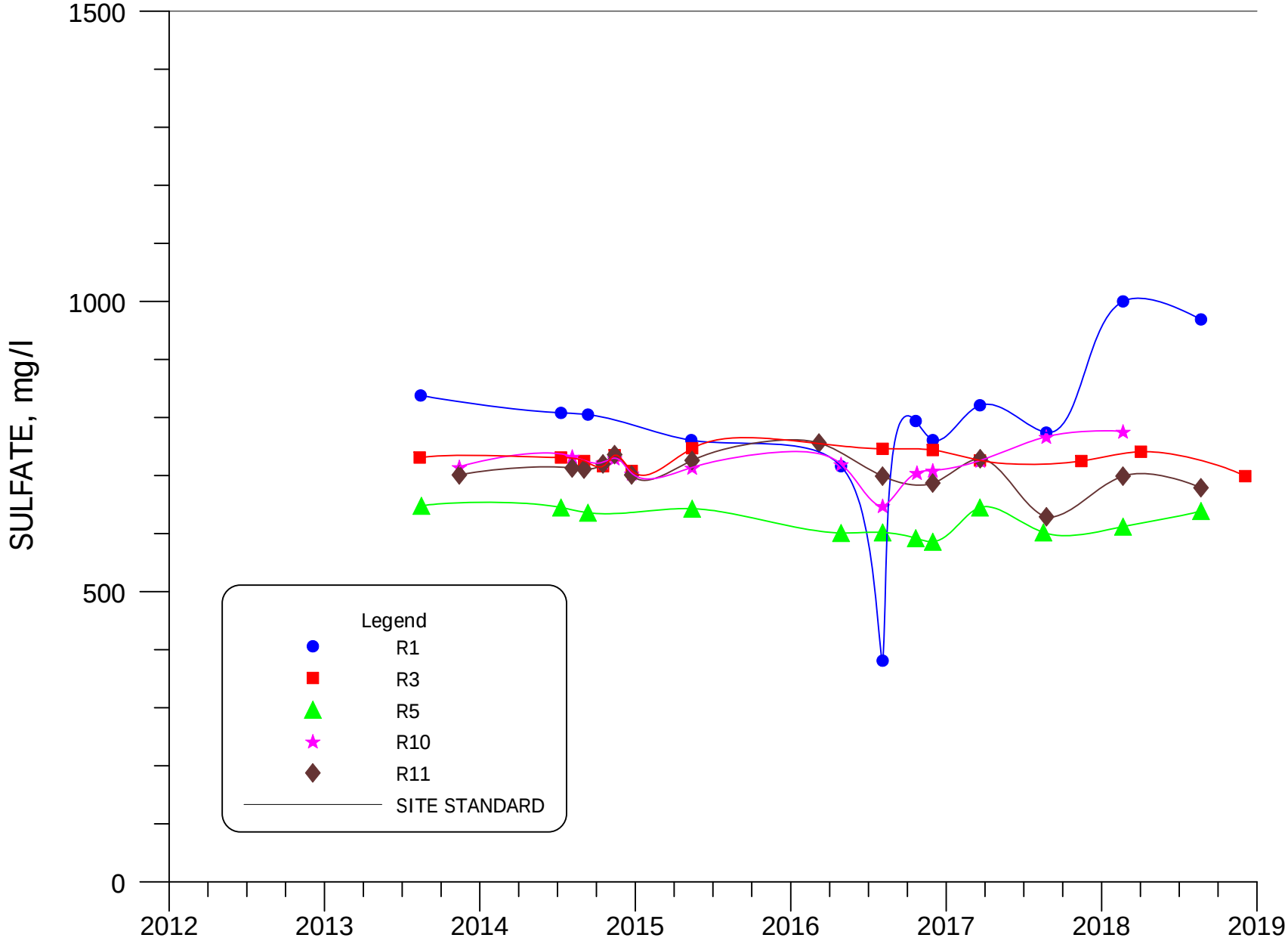

FIGURE 4.3-15A. SULFATE CONCENTRATIONS FOR WELLS R1, R3, R5, R10, AND R11.

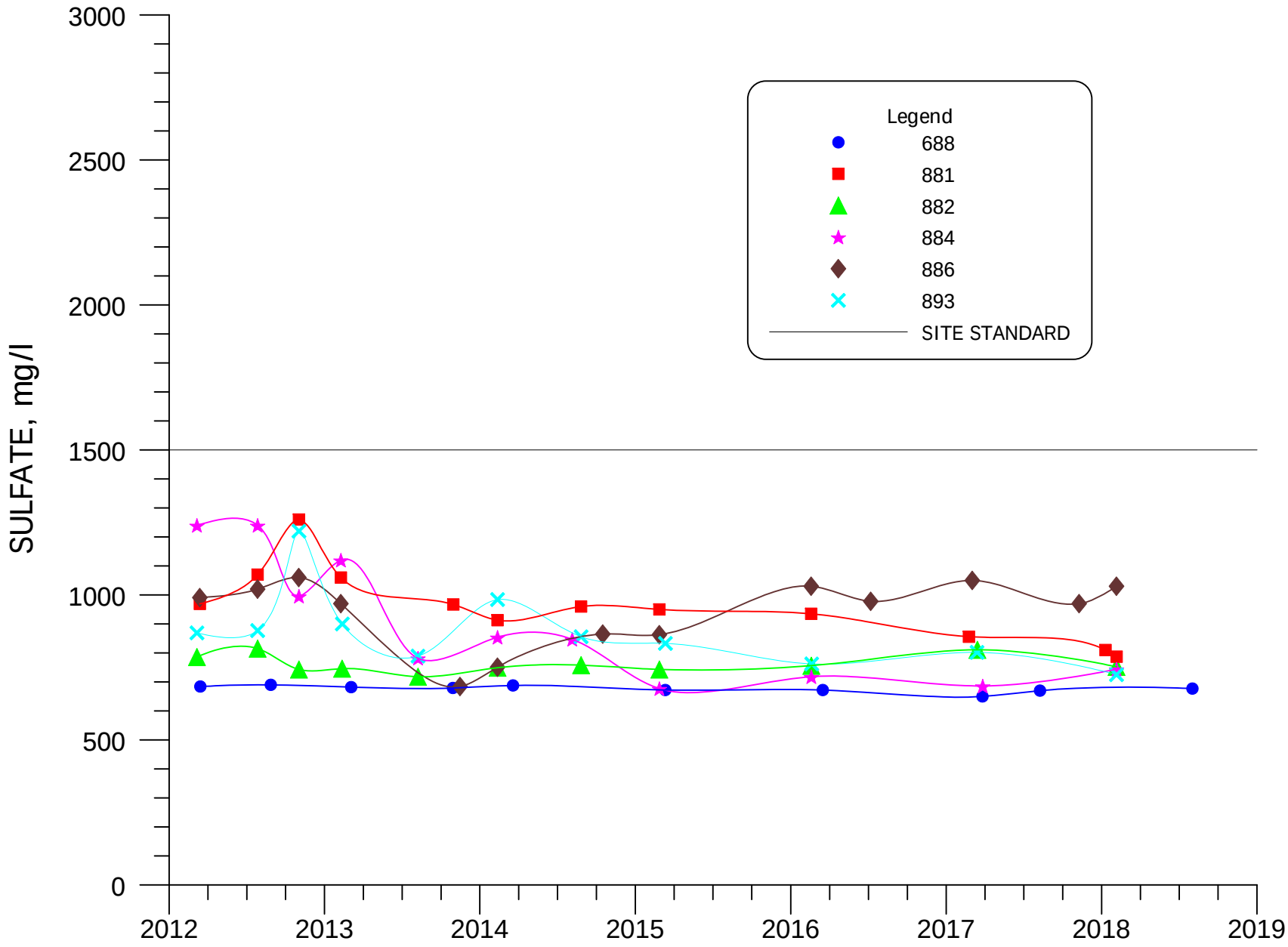

FIGURE 4.3-16. SULFATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

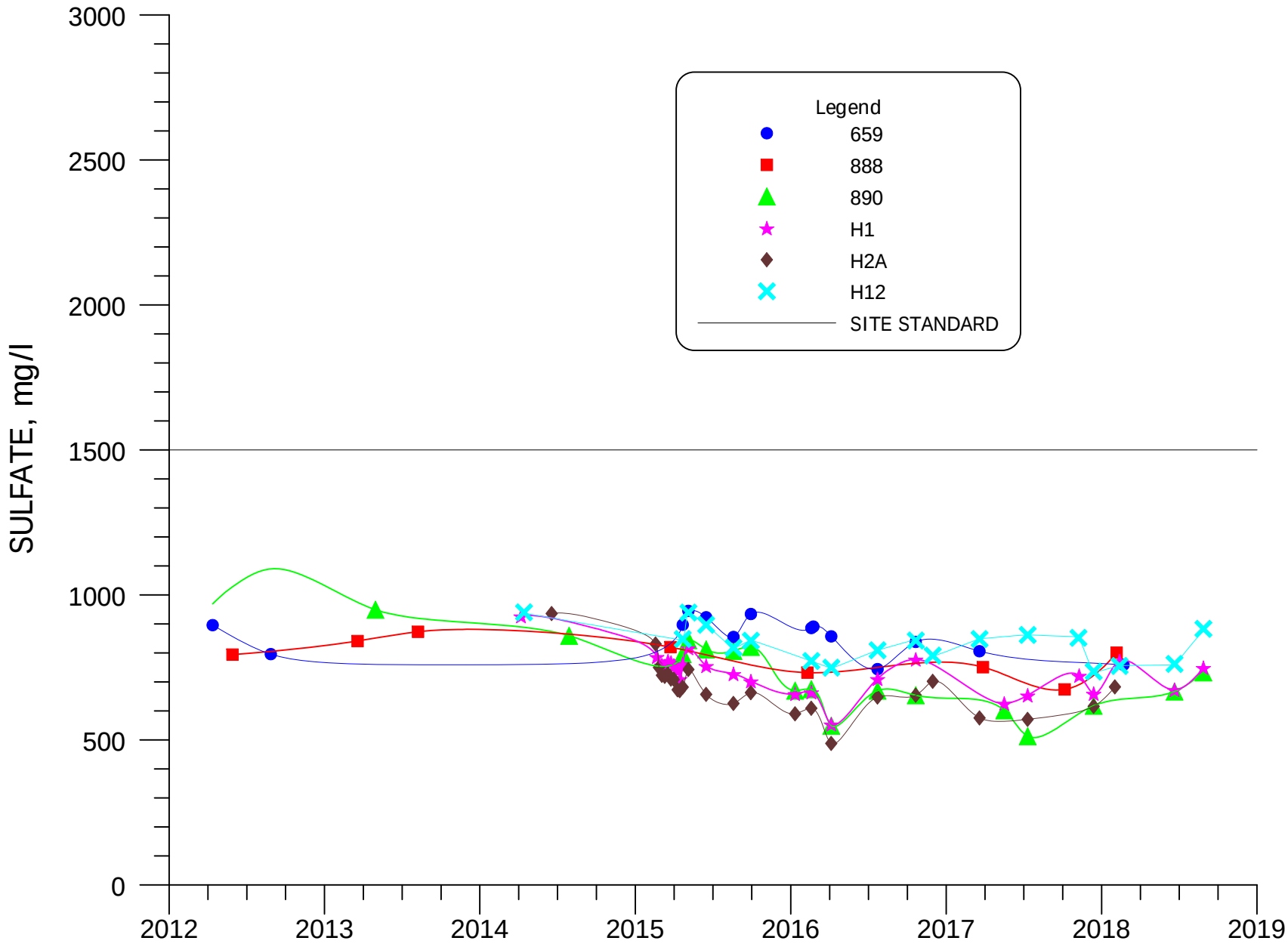

FIGURE 4.3-16A. SULFATE CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

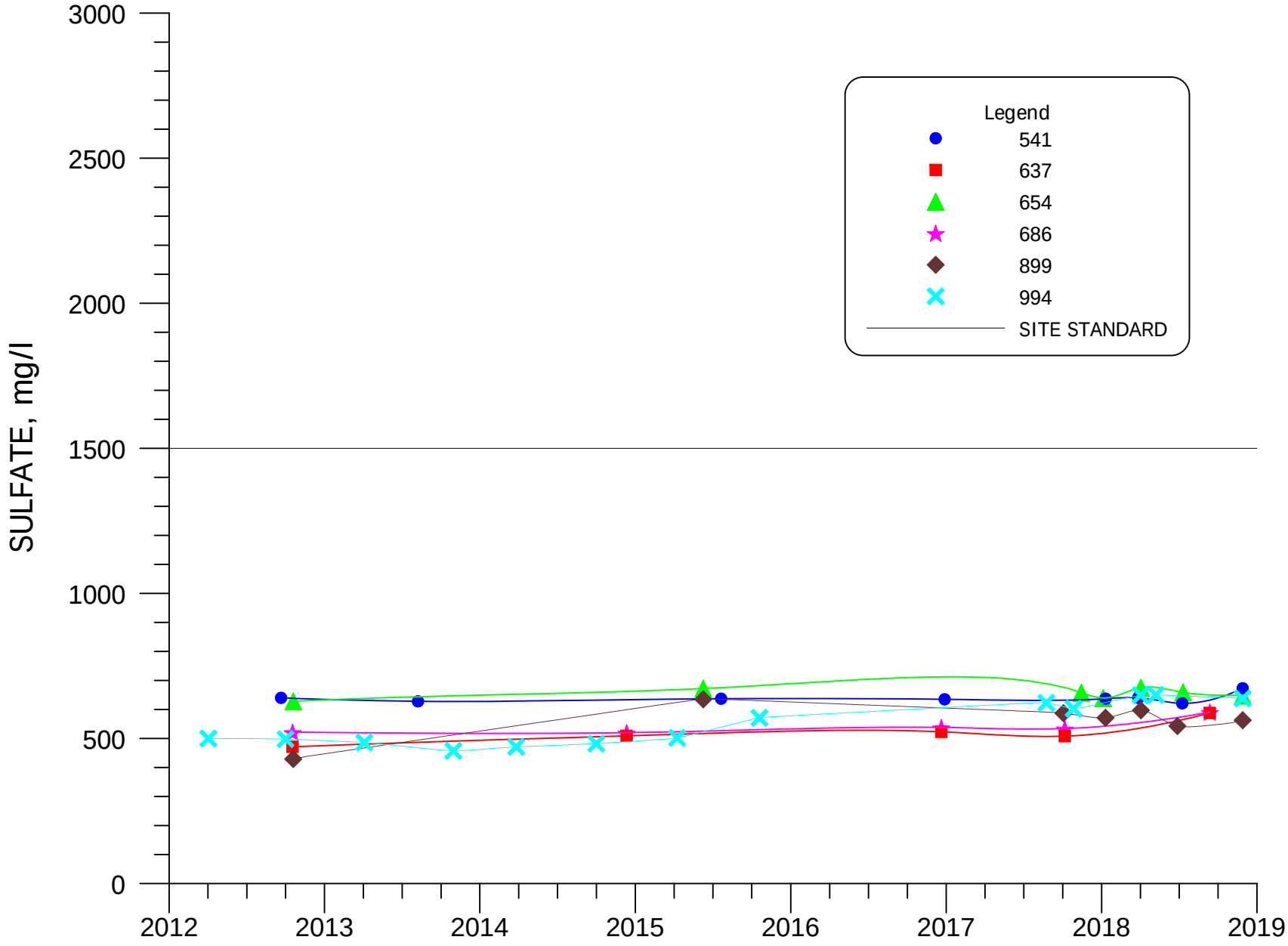

FIGURE 4.3-17. SULFATE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

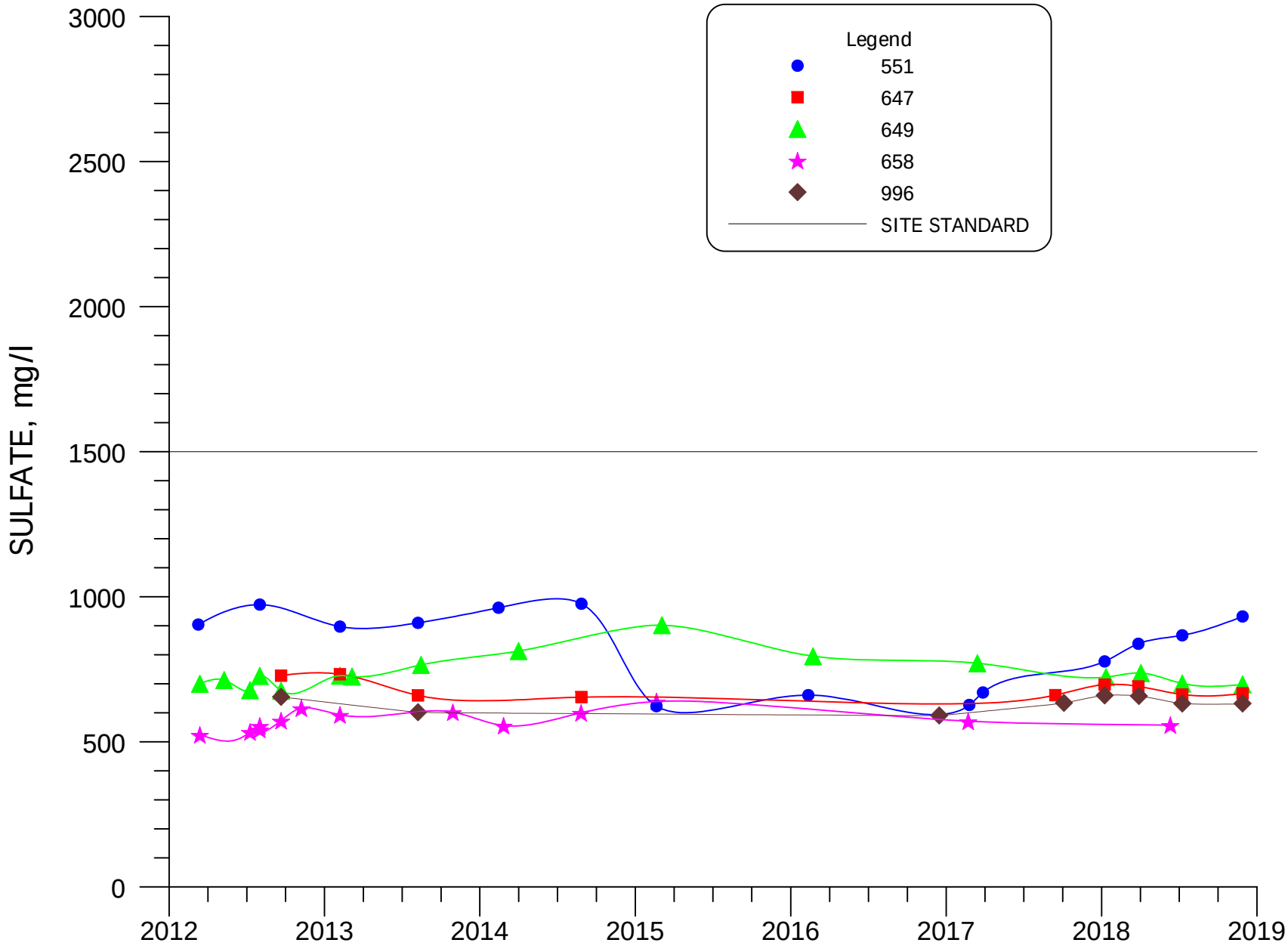

FIGURE 4.3-18. SULFATE CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

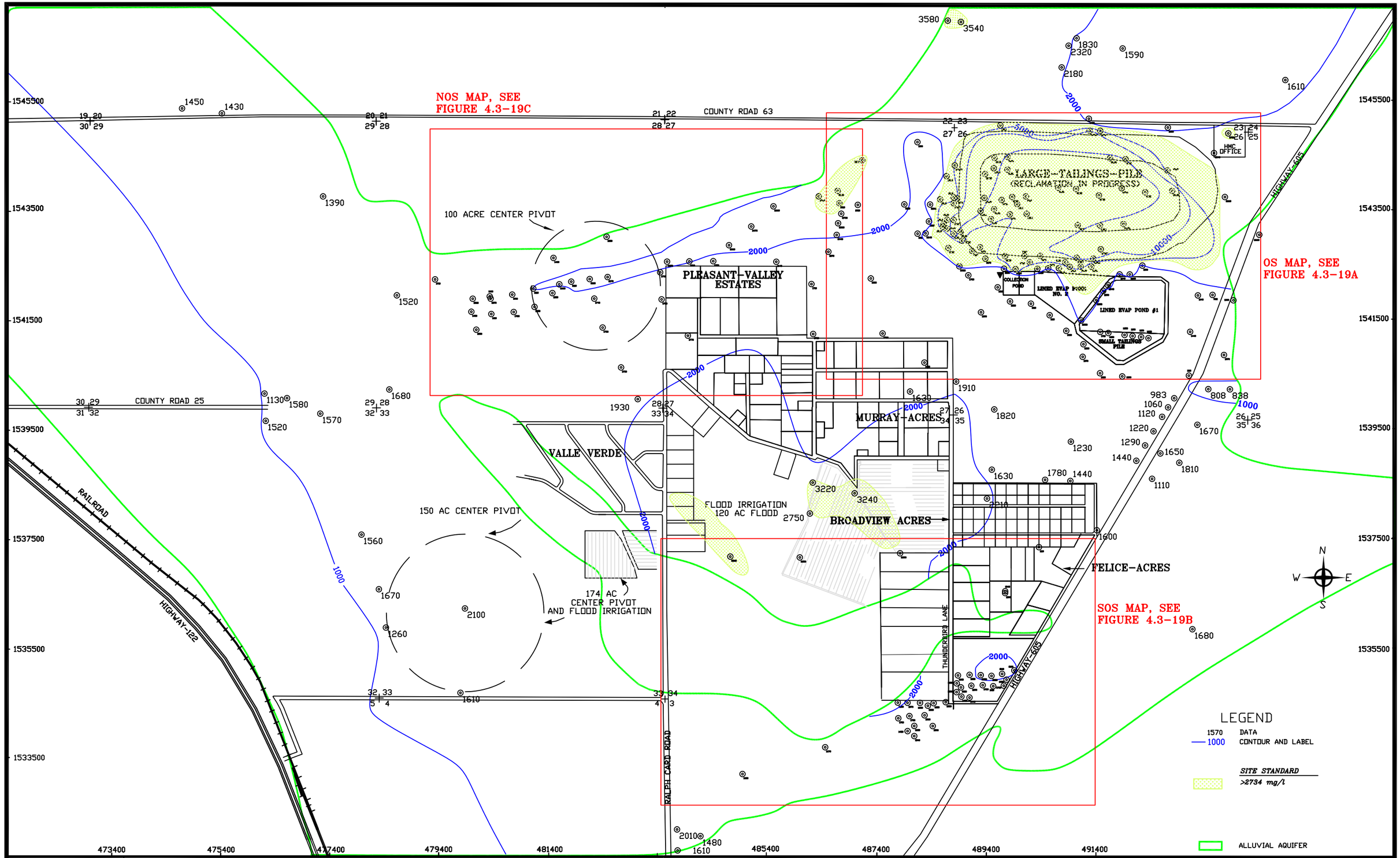

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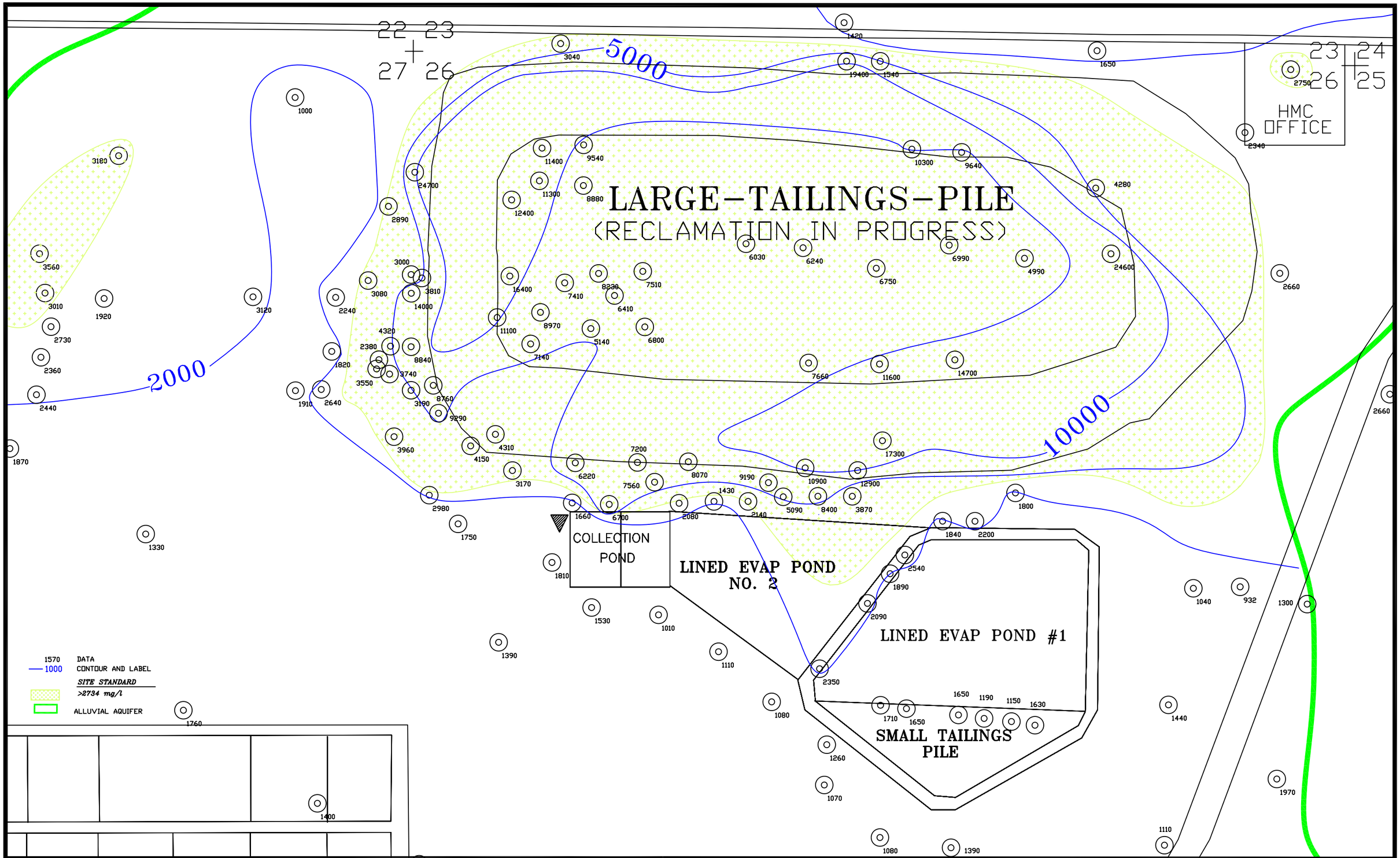
FIGURE 4.3-19. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l



SCALE: 1"=500'
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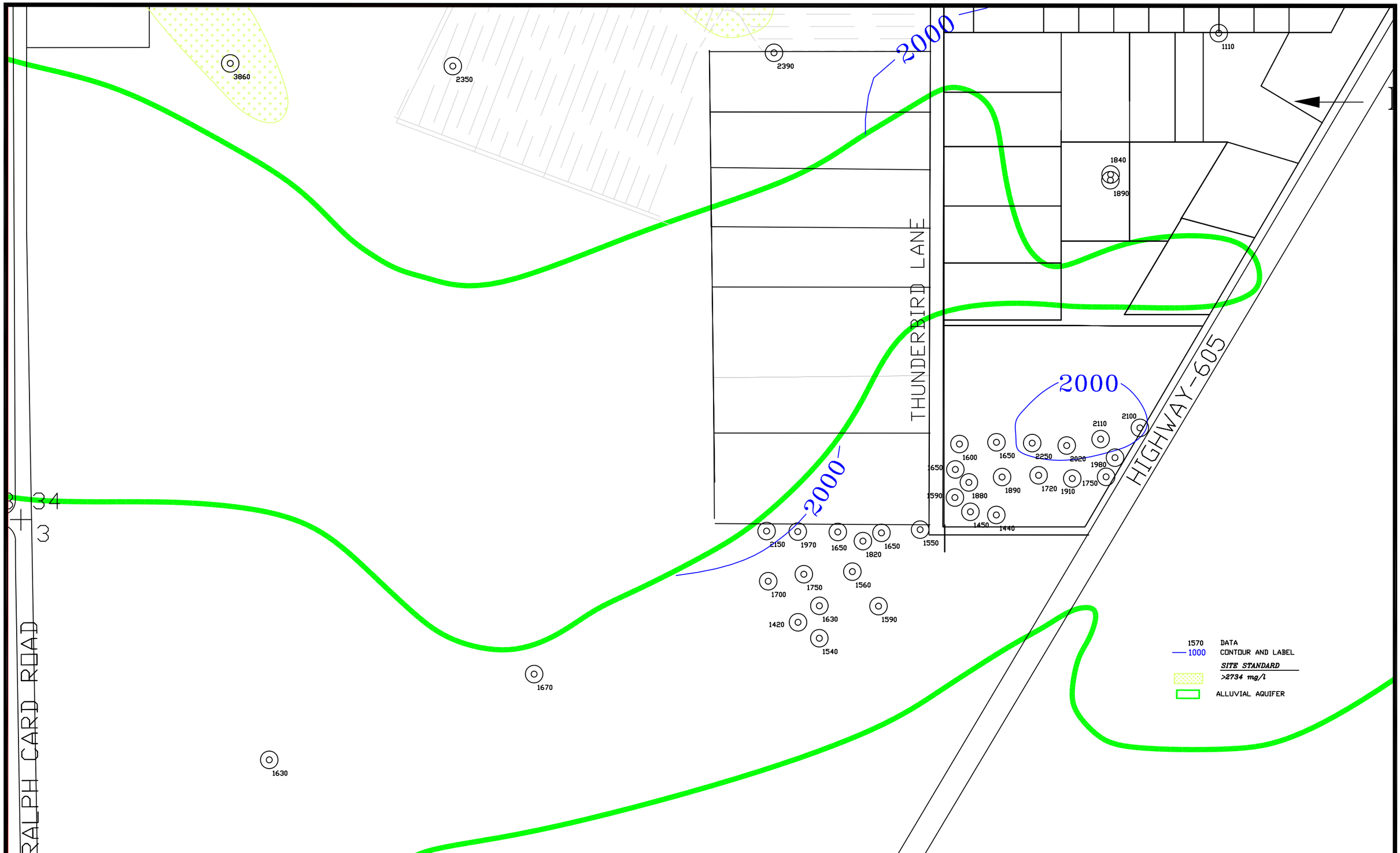
FIGURE 4.3-19A. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l



SCALE: 1"=500'
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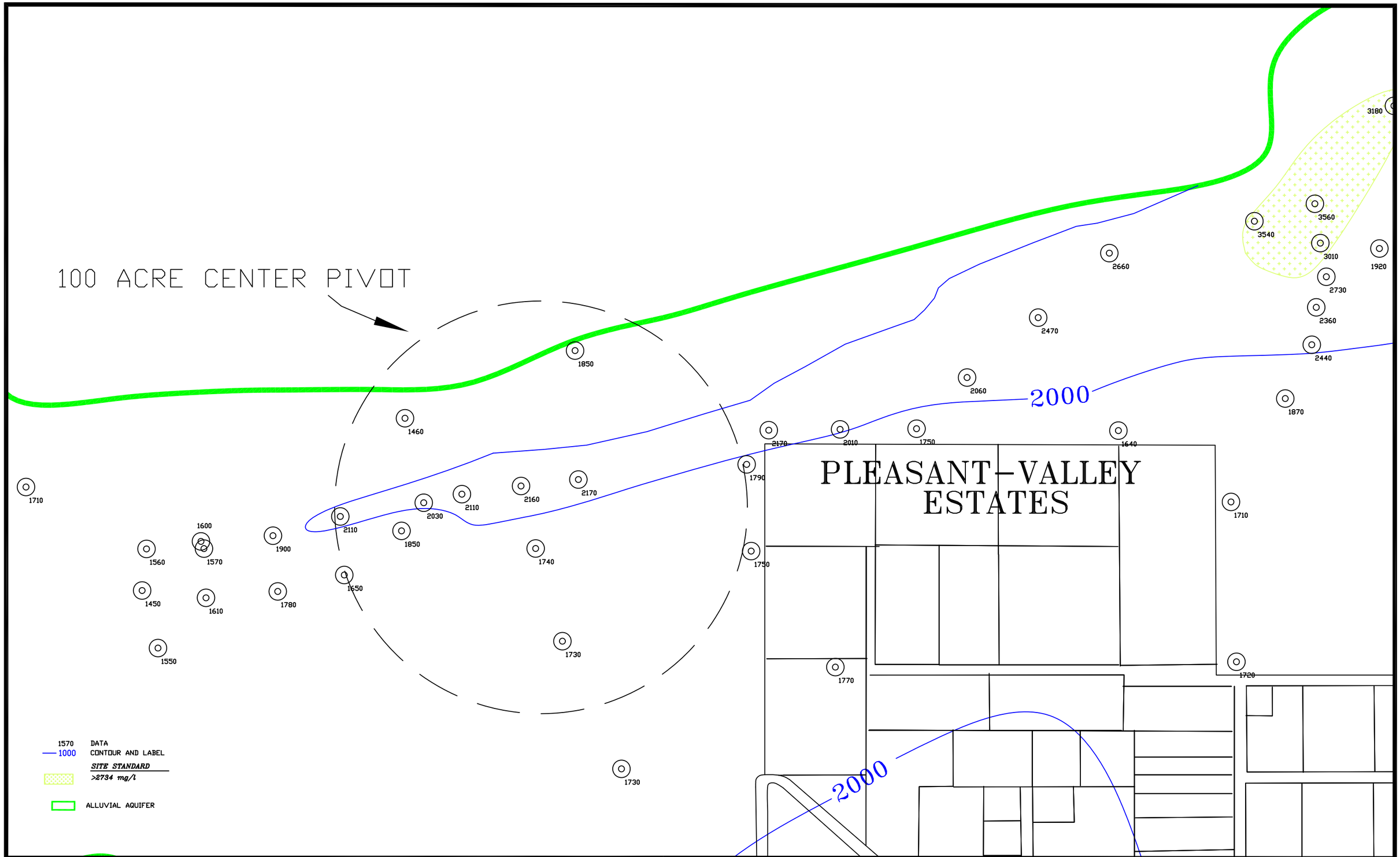
DATE: 1/17/2019

FIGURE 4.3-19B. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'
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DATE: 1/18/2019

FIGURE 4.3-19C. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

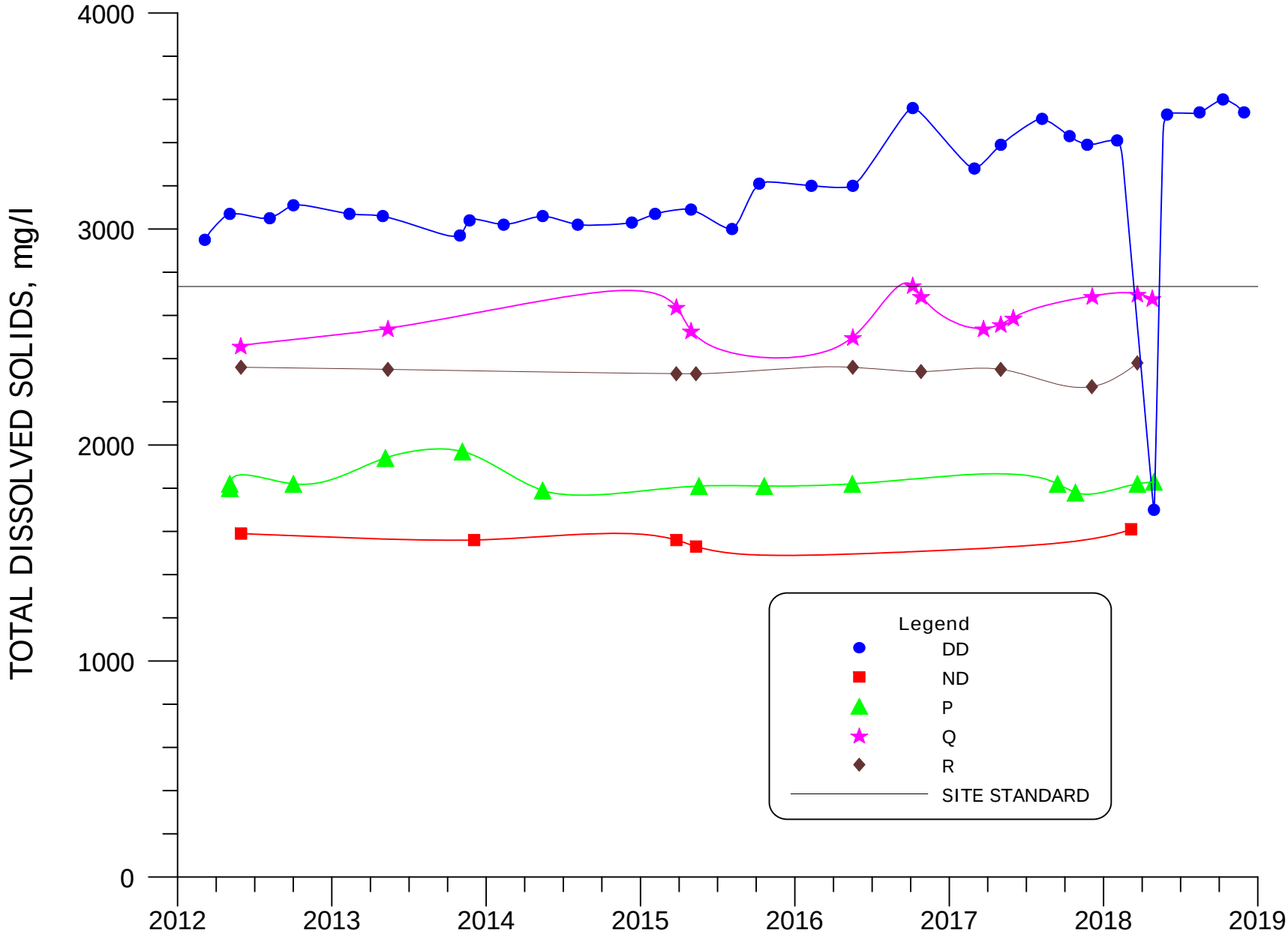

FIGURE 4.3-20. TDS CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q AND R.

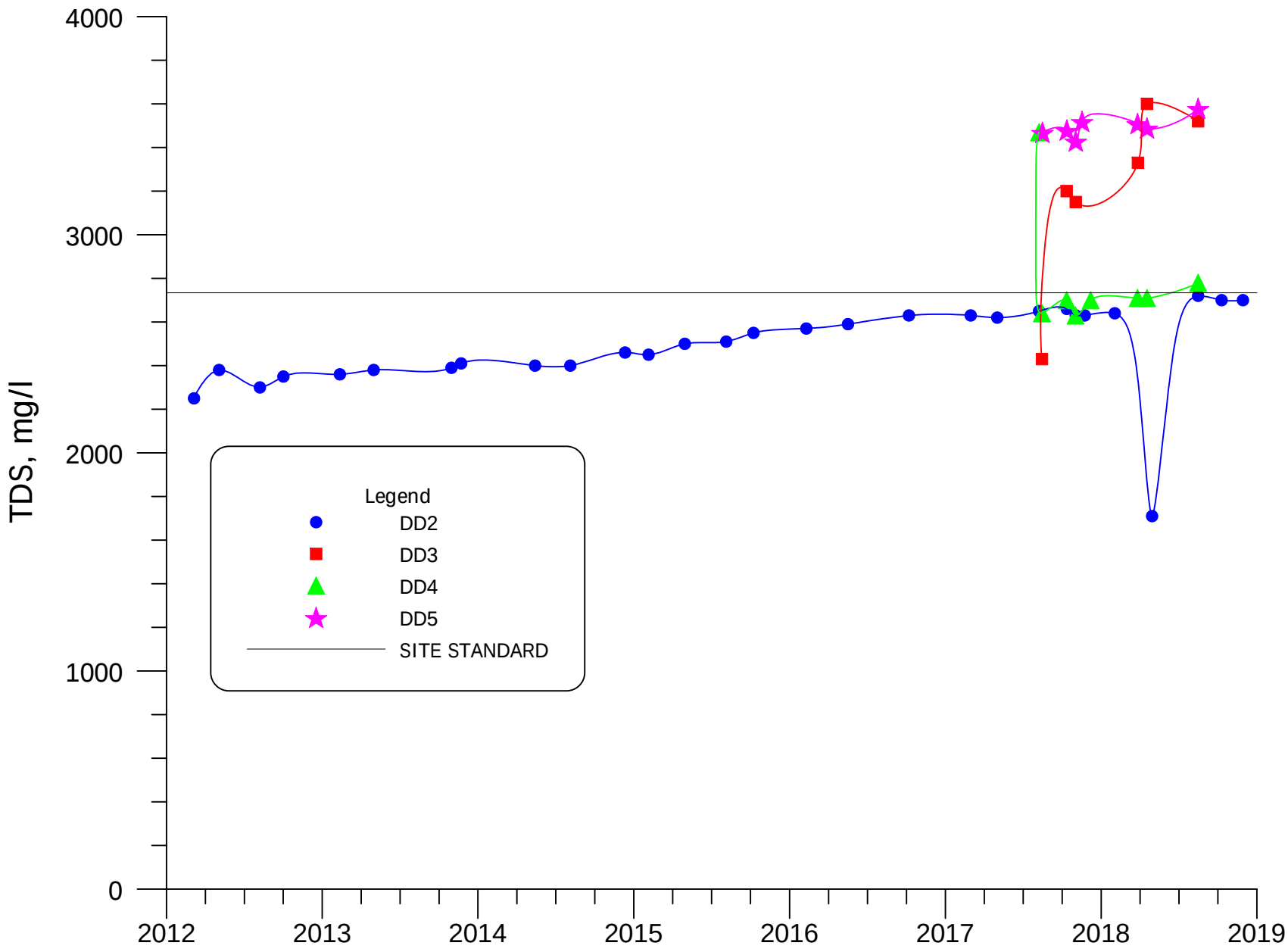

FIGURE 4.3-20A. TDS CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

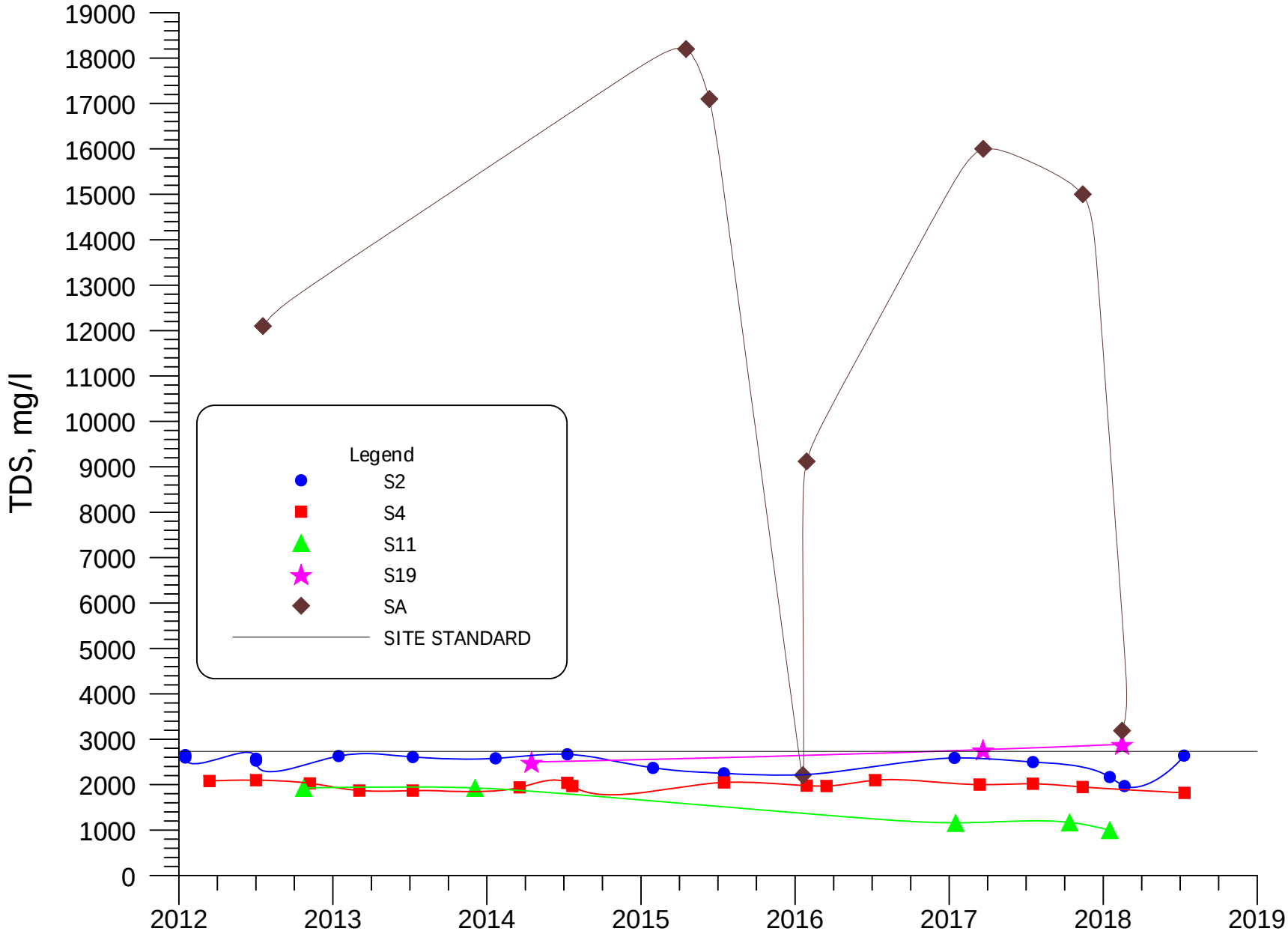

FIGURE 4.3-21. TDS CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

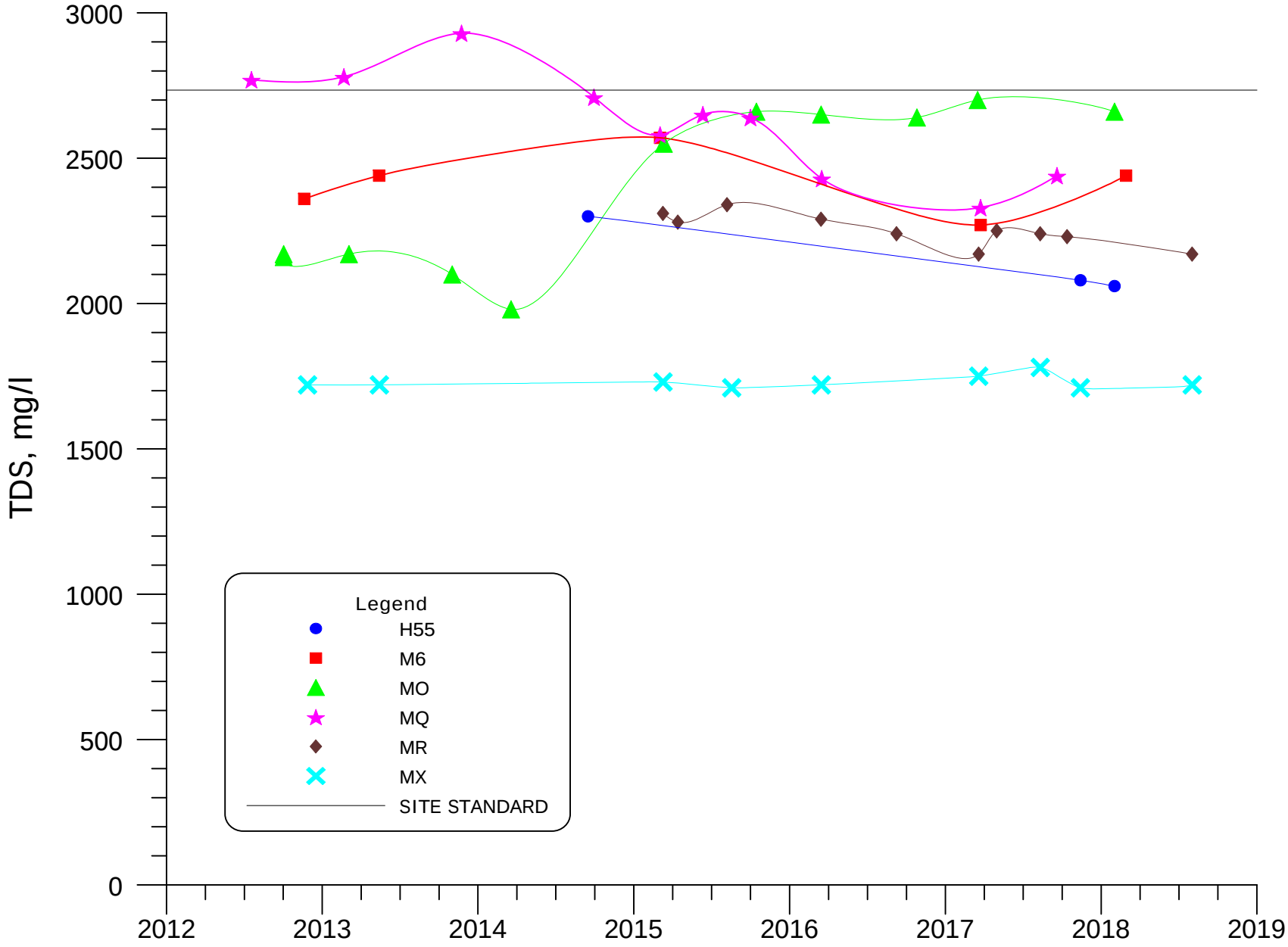

FIGURE 4.3-22. TDS CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

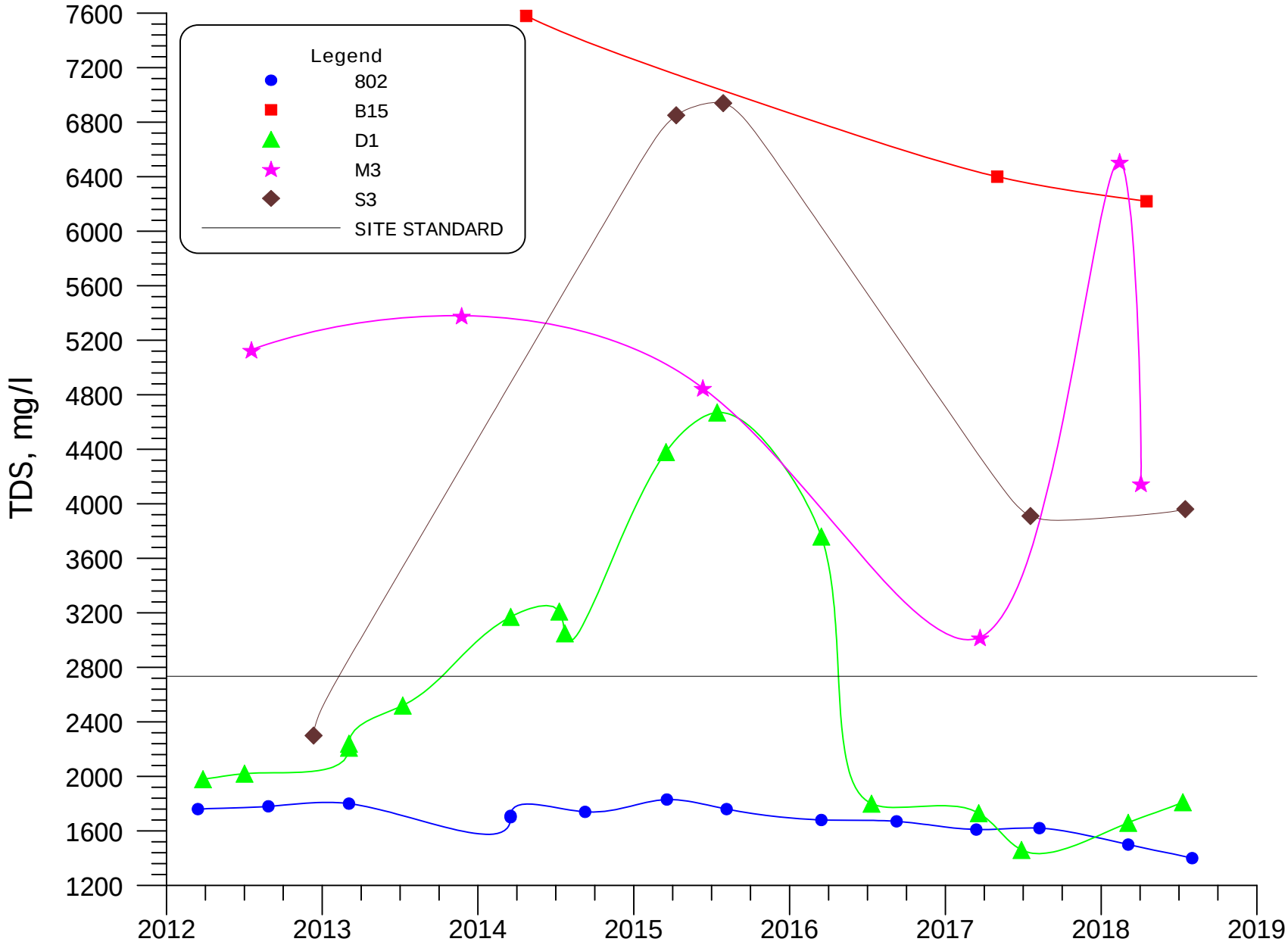

FIGURE 4.3-23. TDS CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

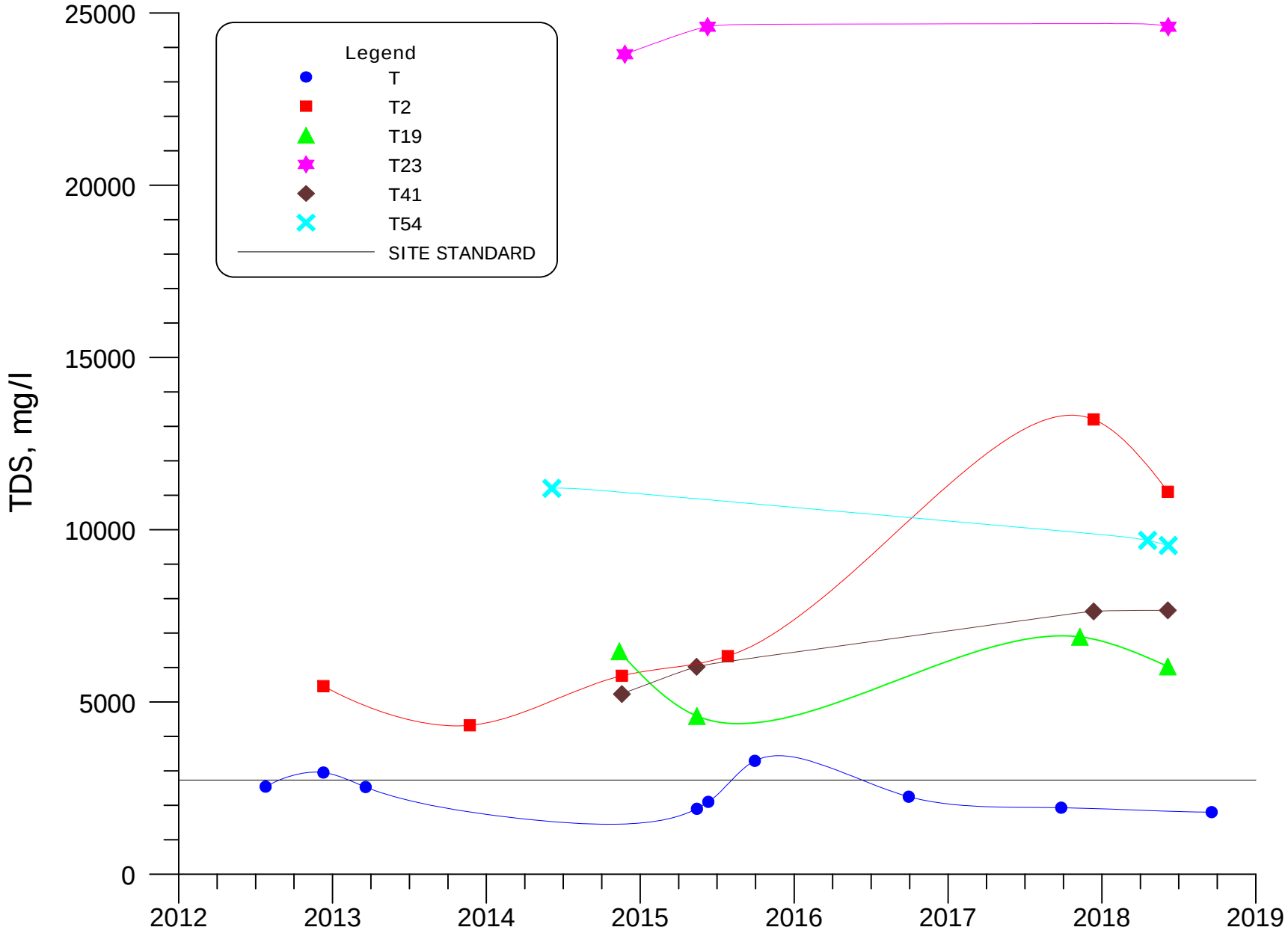

FIGURE 4.3-24. TDS CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

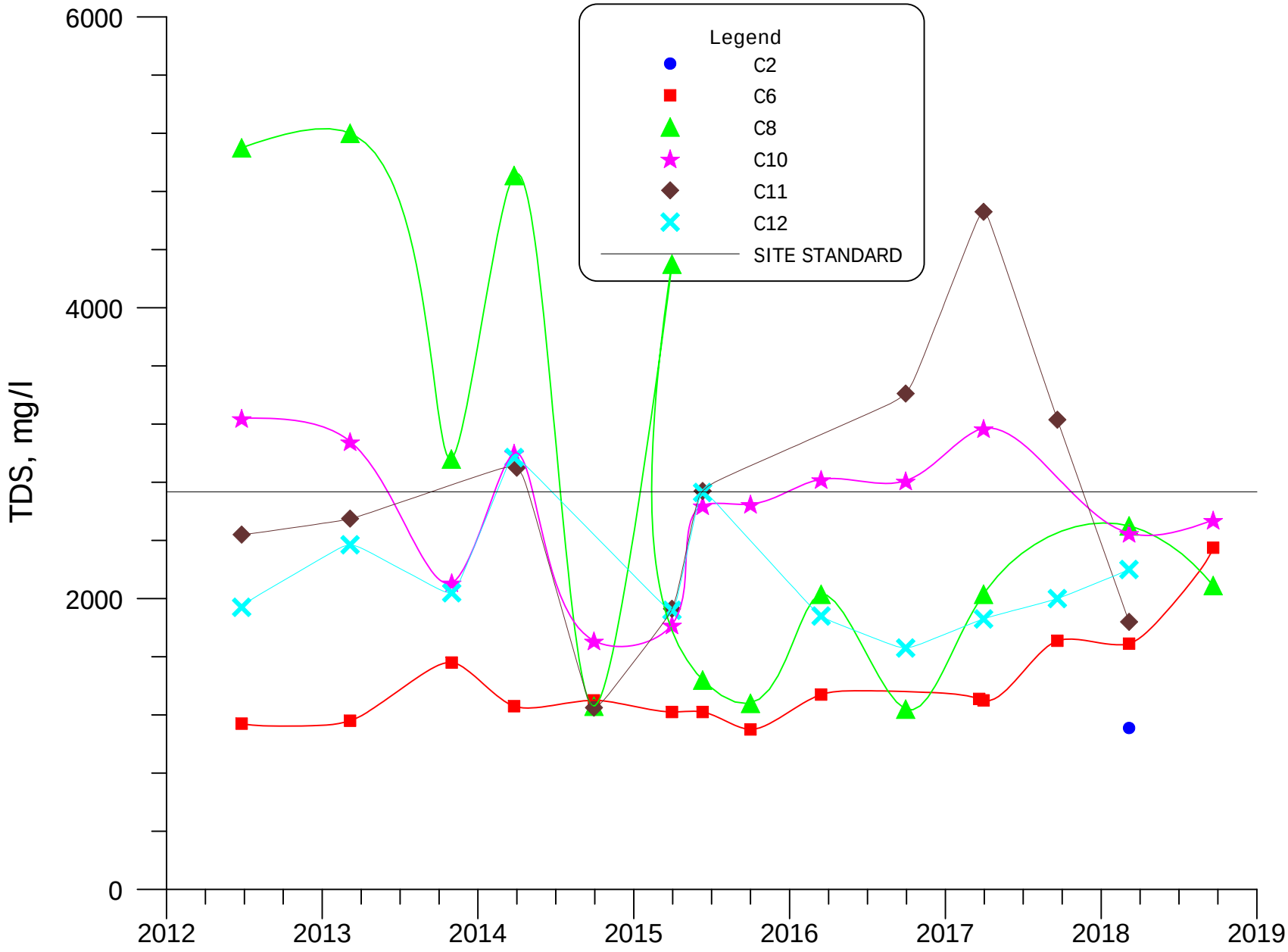

FIGURE 4.3-25. TDS CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

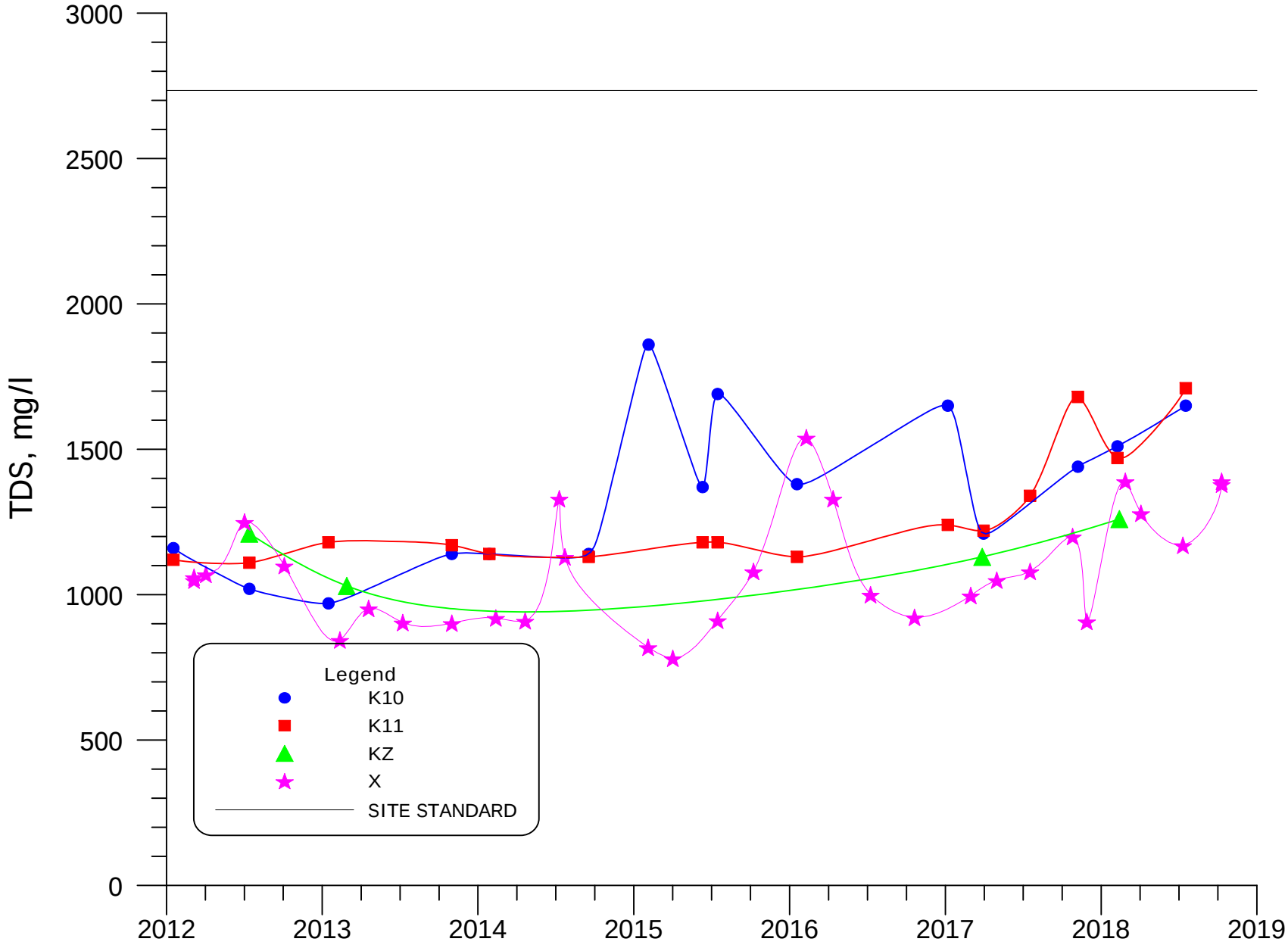

FIGURE 4.3-26. TDS CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

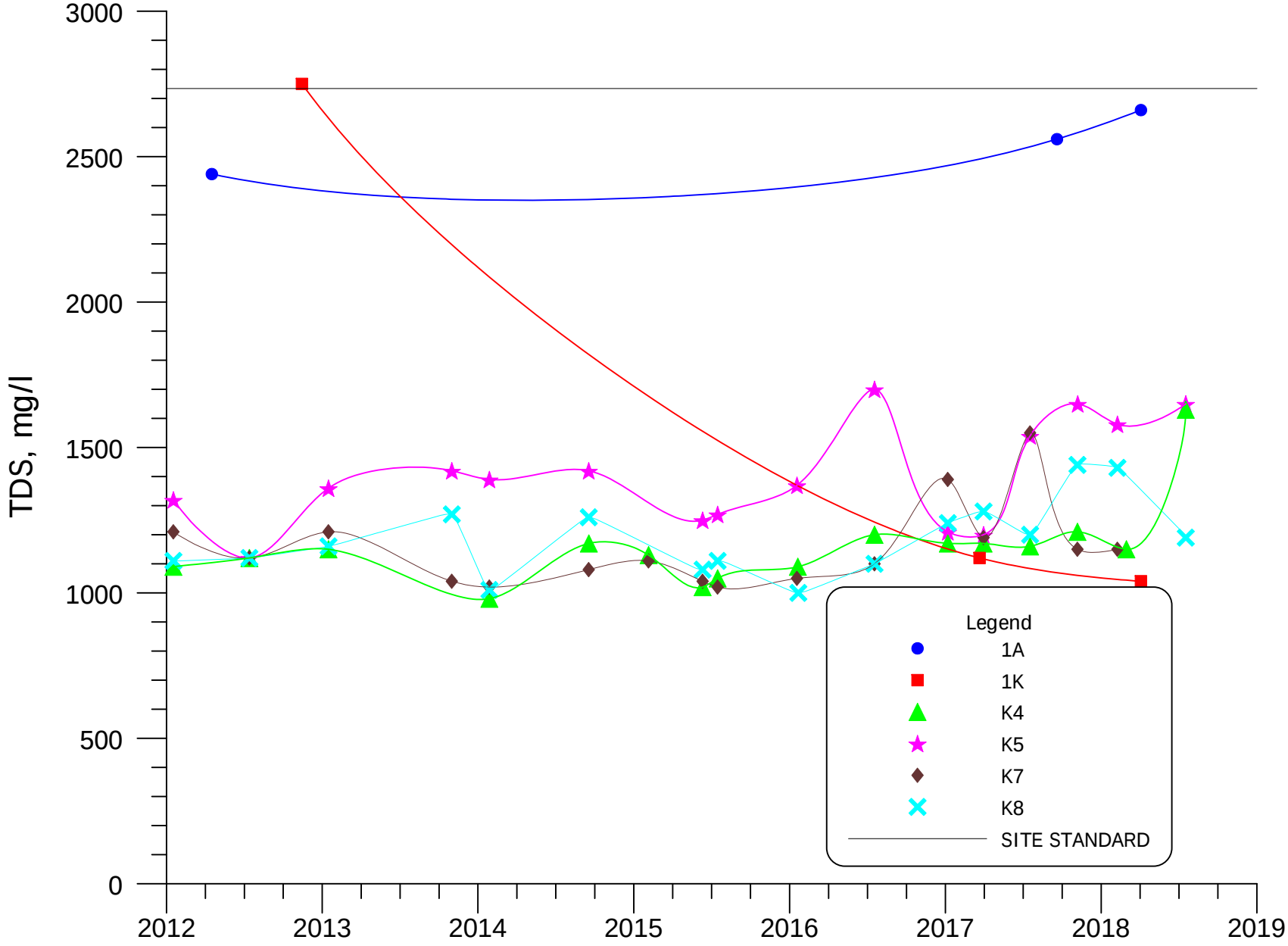

FIGURE 4.3-27. TDS CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

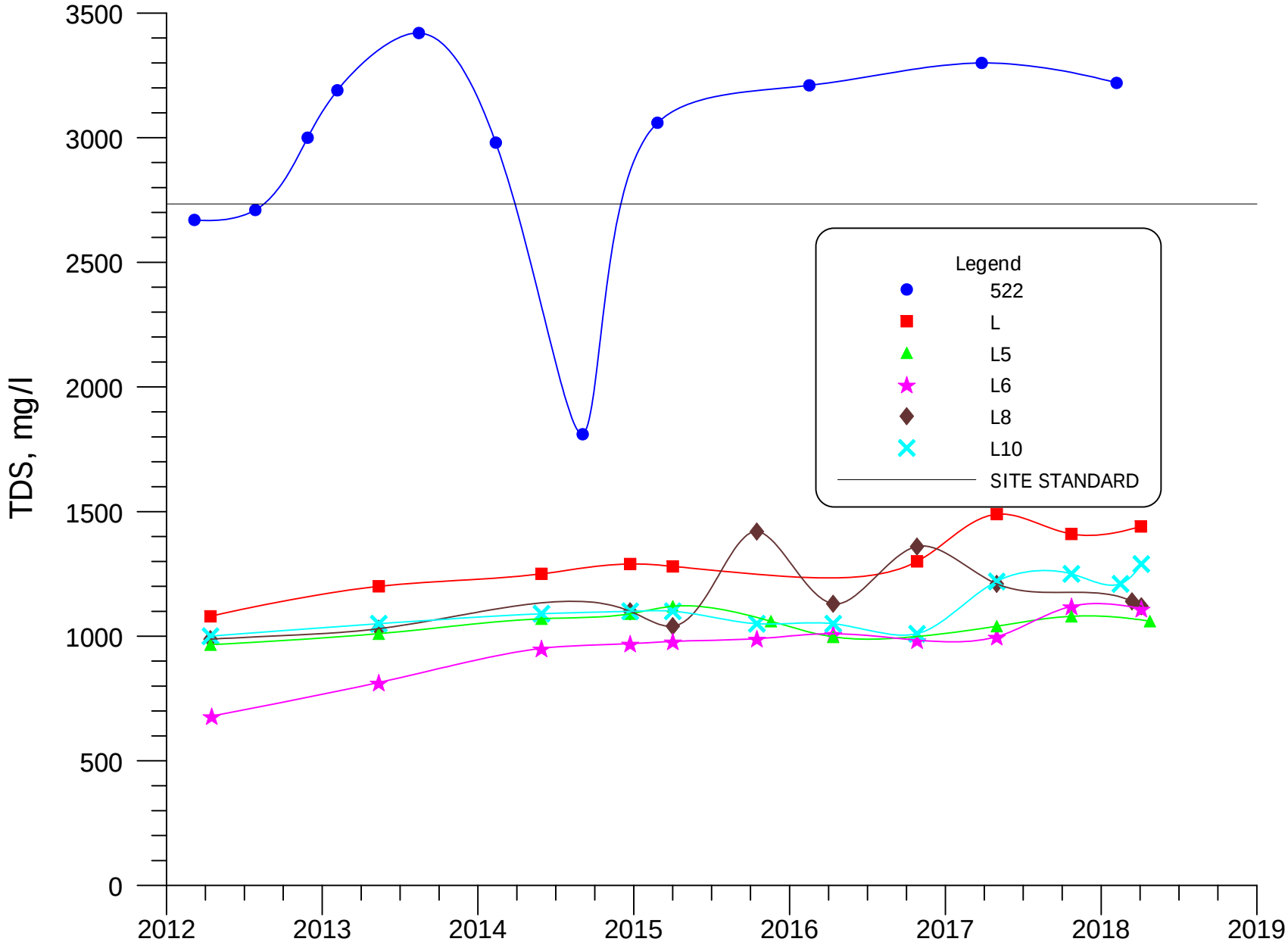

FIGURE 4.3-28. TDS CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

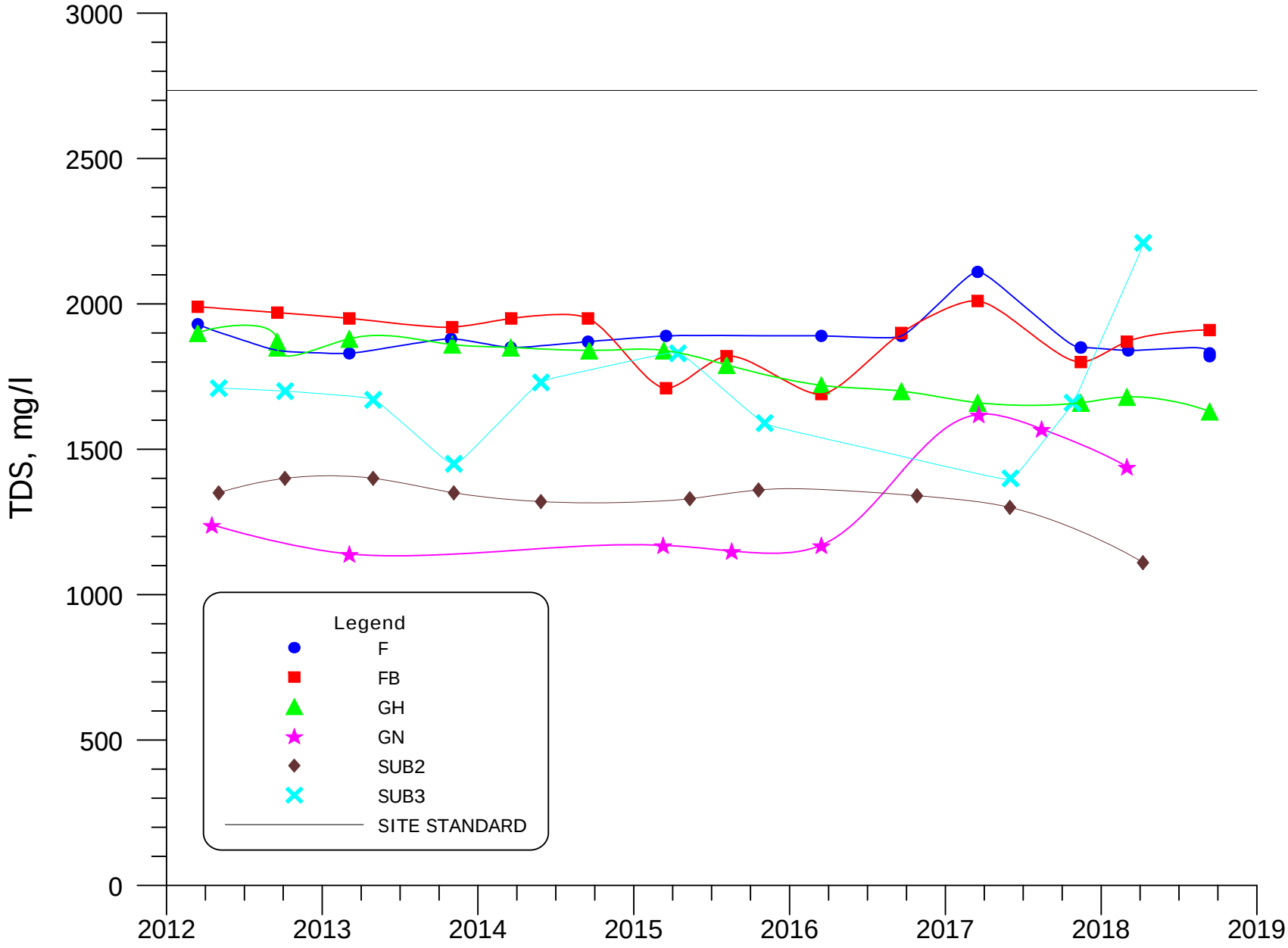

FIGURE 4.3-29. TDS CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

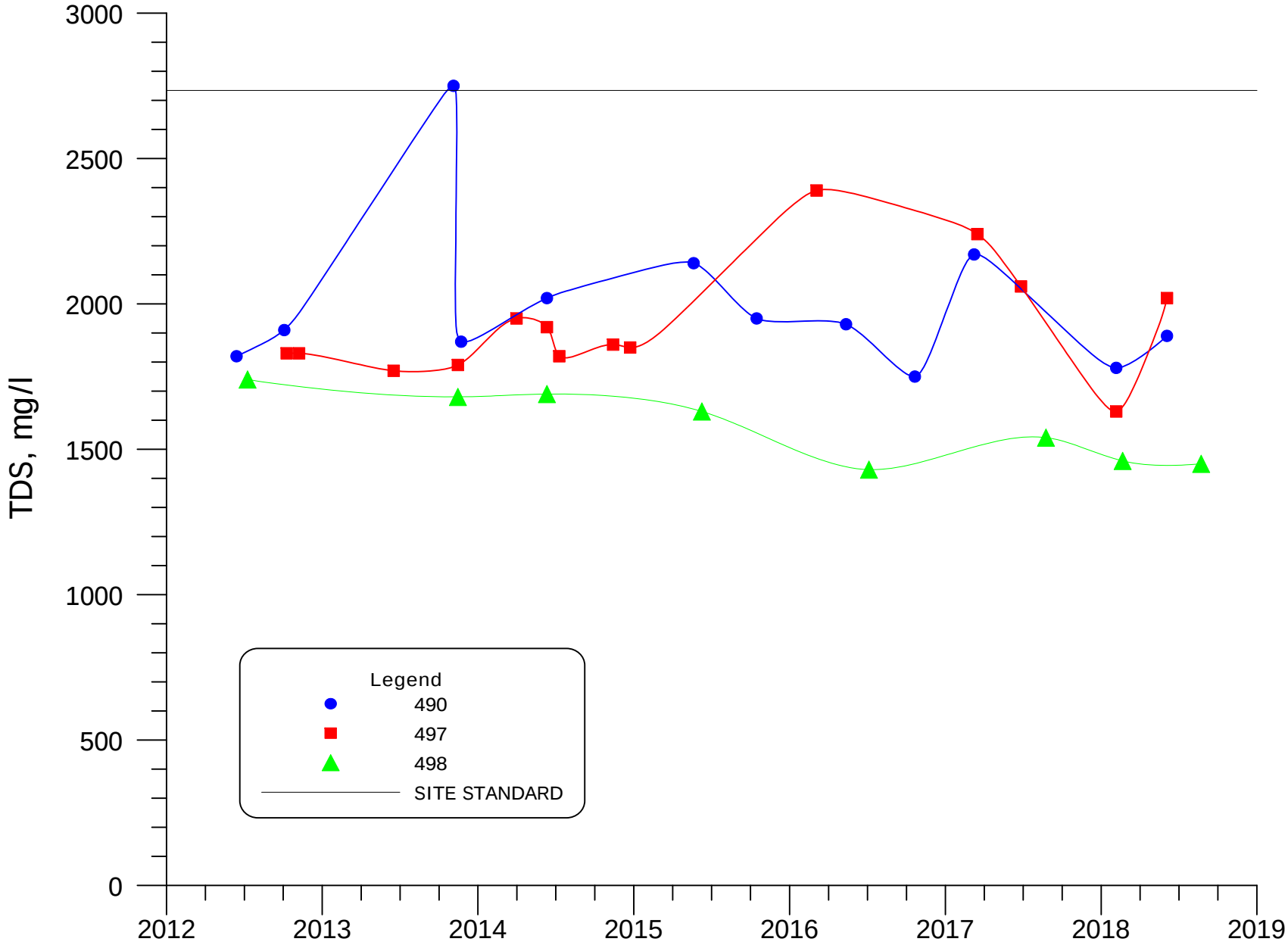

FIGURE 4.3-30. TDS CONCENTRATIONS FOR WELLS 490, 497 AND 498.

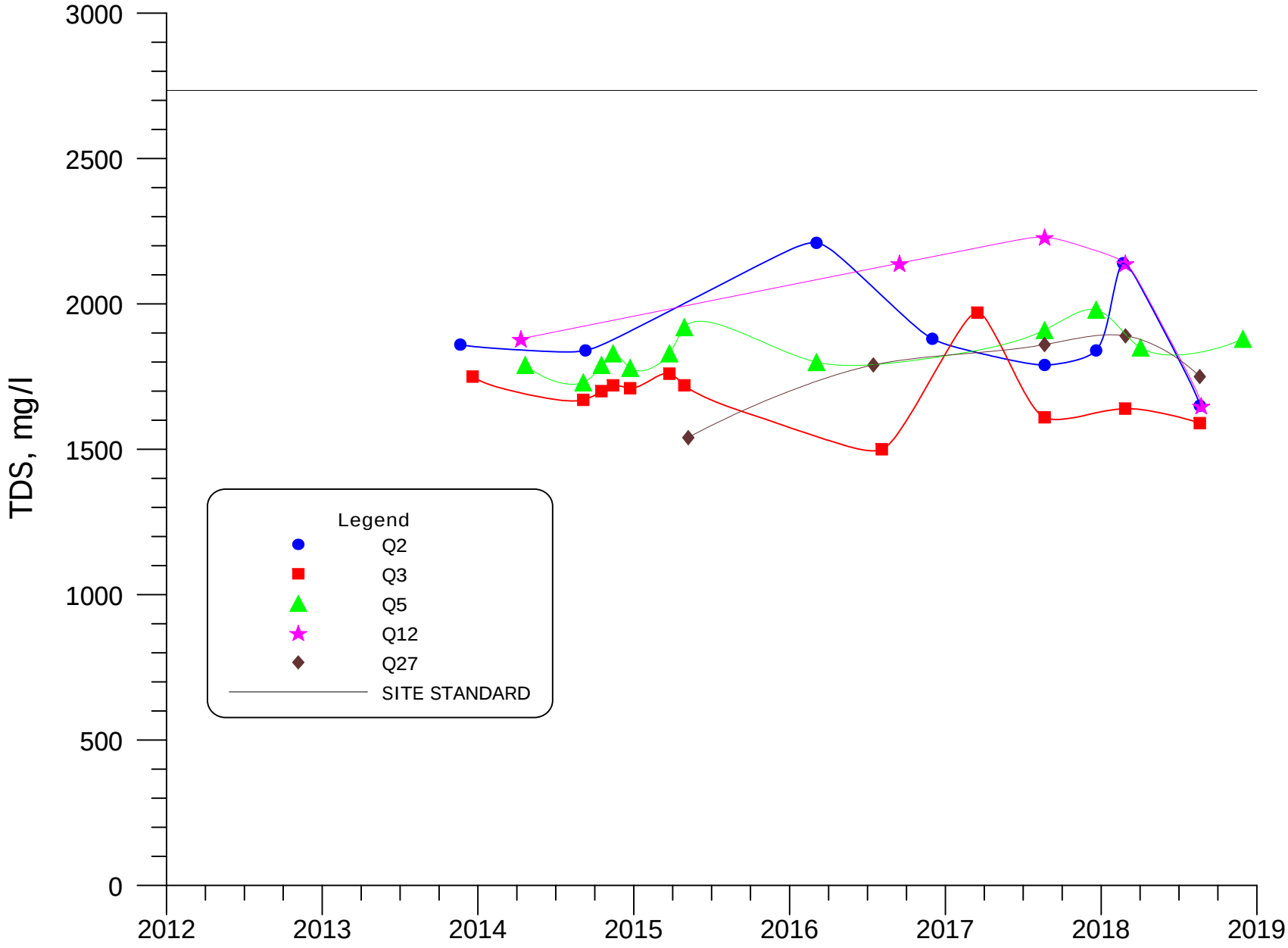

FIGURE 4.3-30A. TDS CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

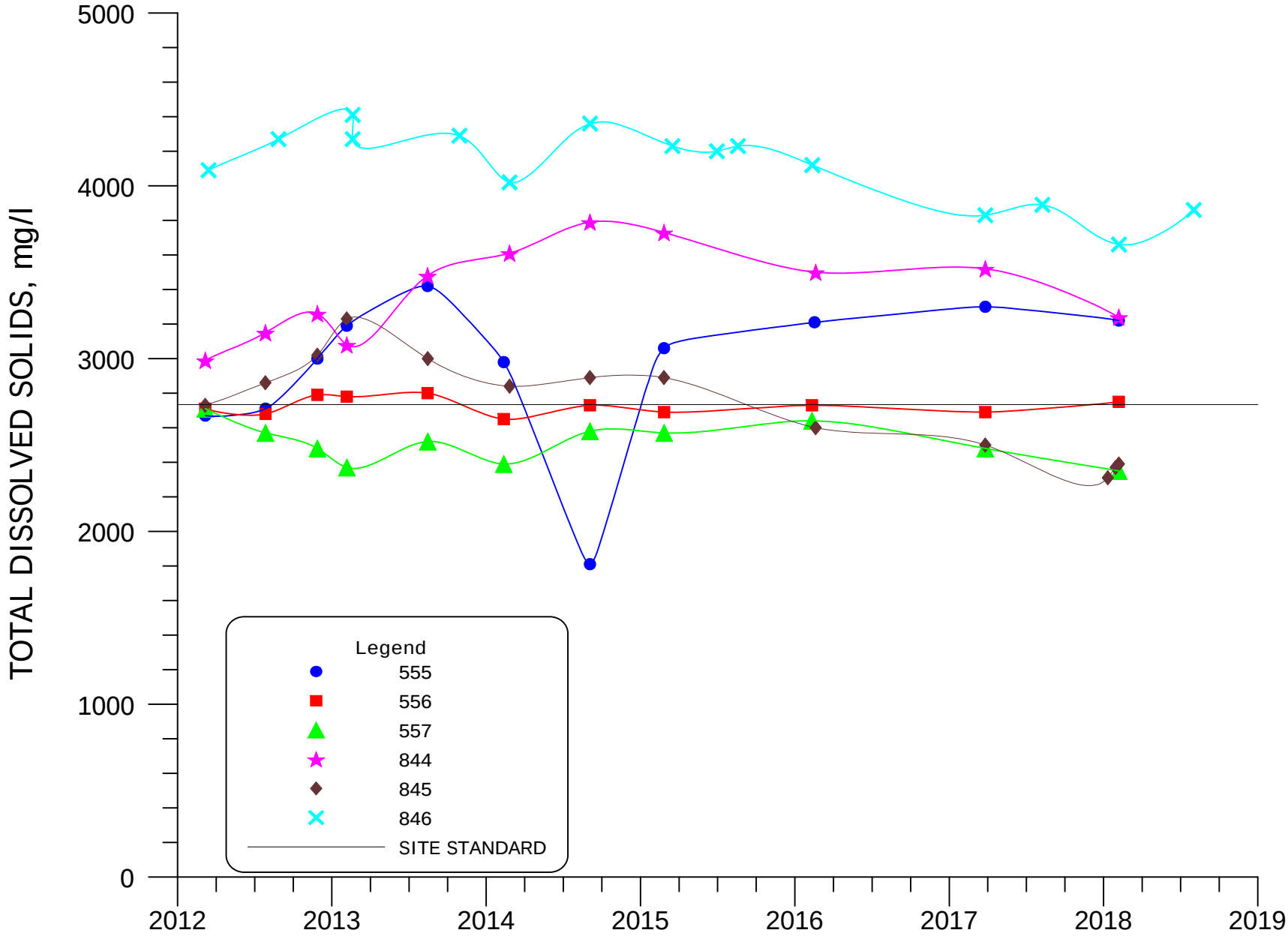

FIGURE 4.3-31. TDS CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

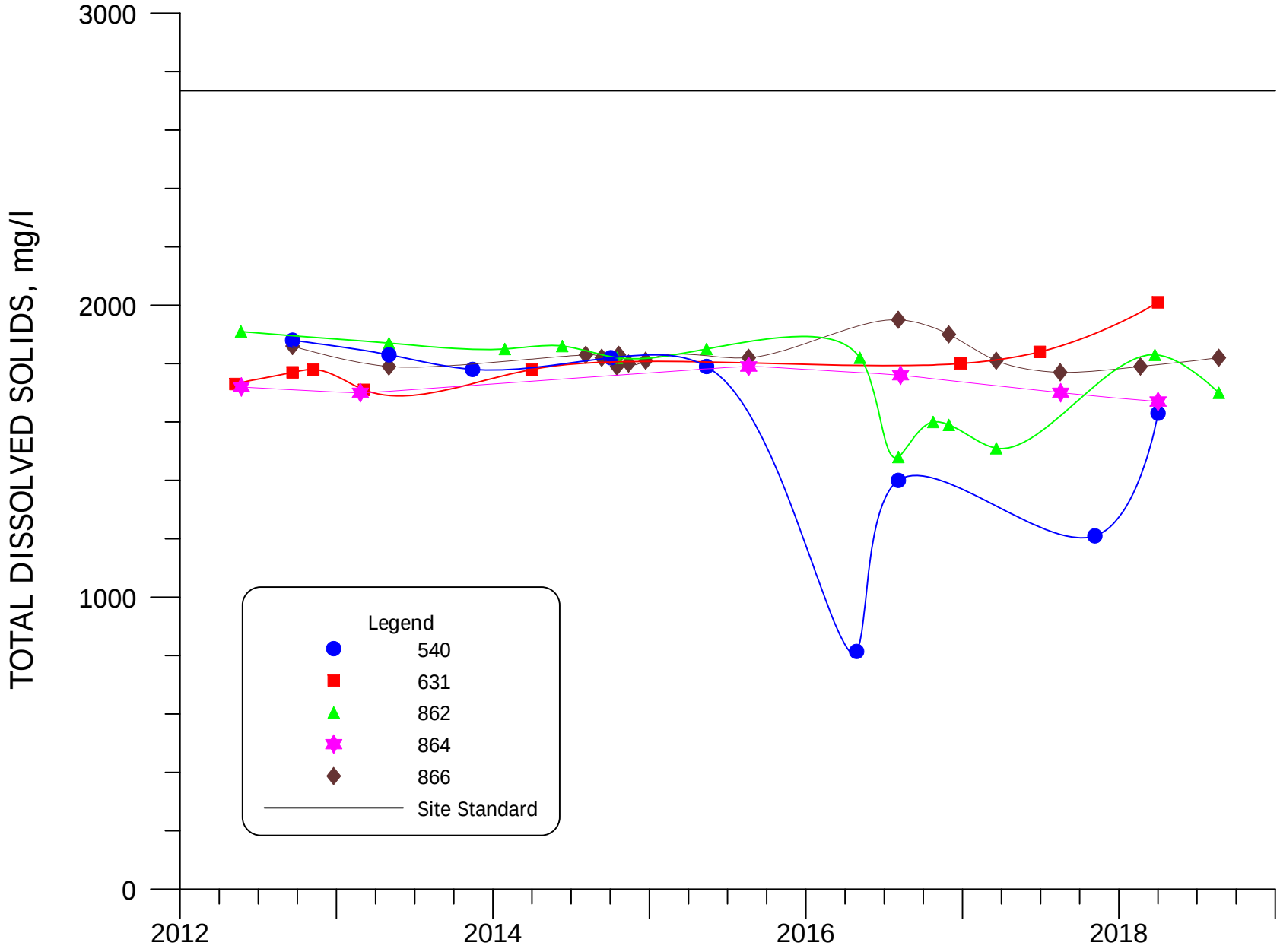

FIGURE 4.3-32. TDS CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

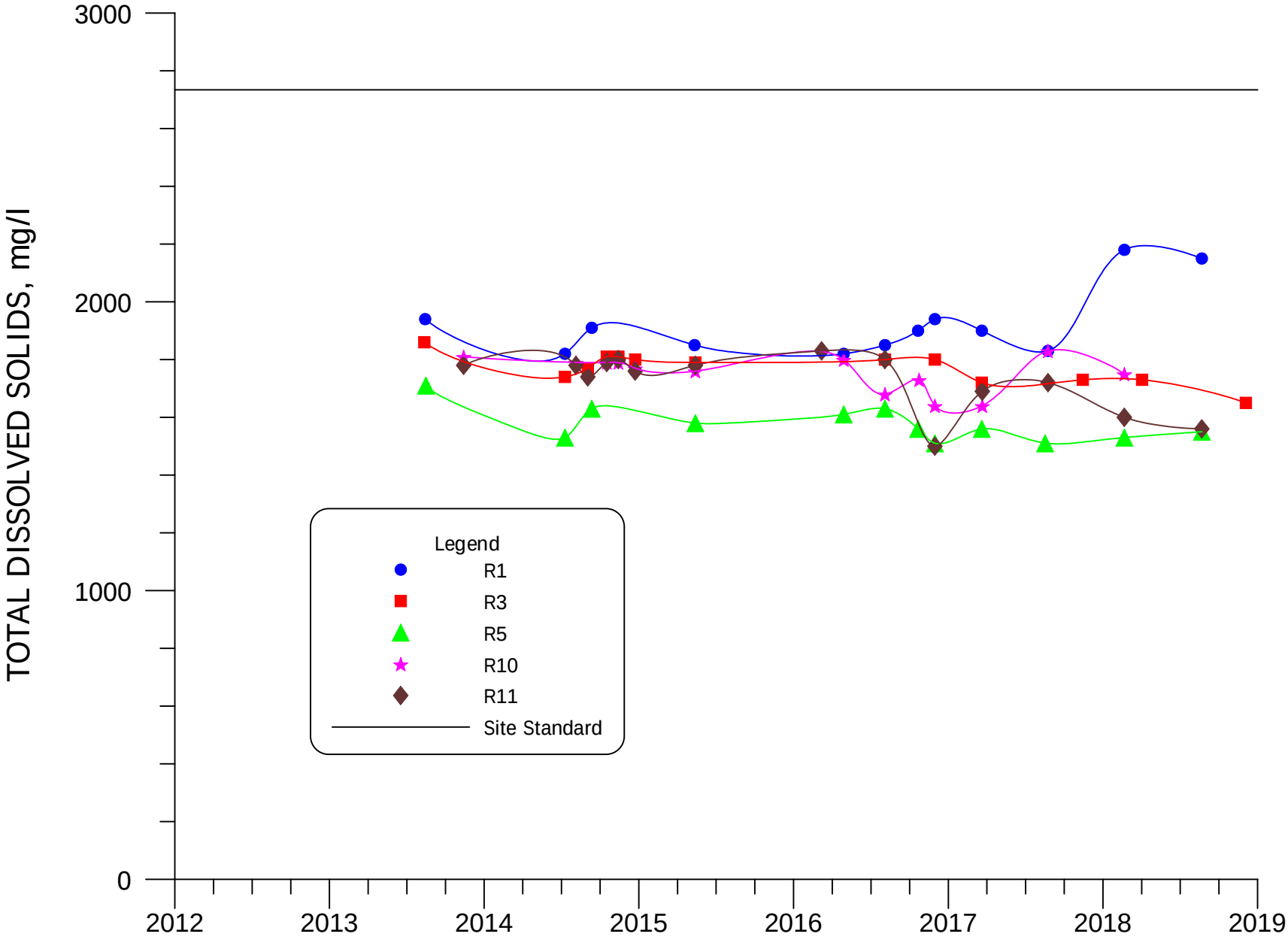

FIGURE 4.3-32A. TDS CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

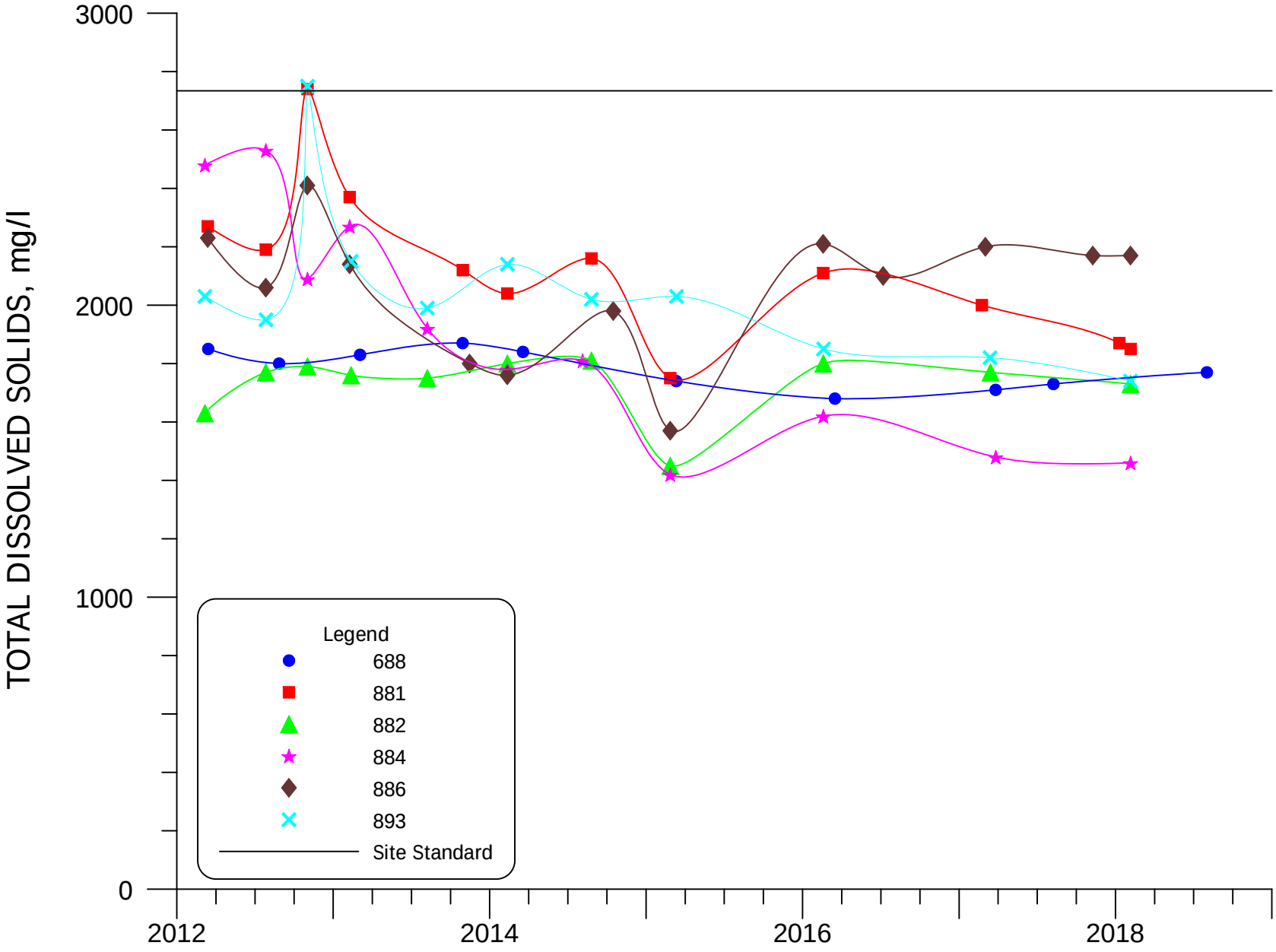

FIGURE 4.3-33. TDS CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

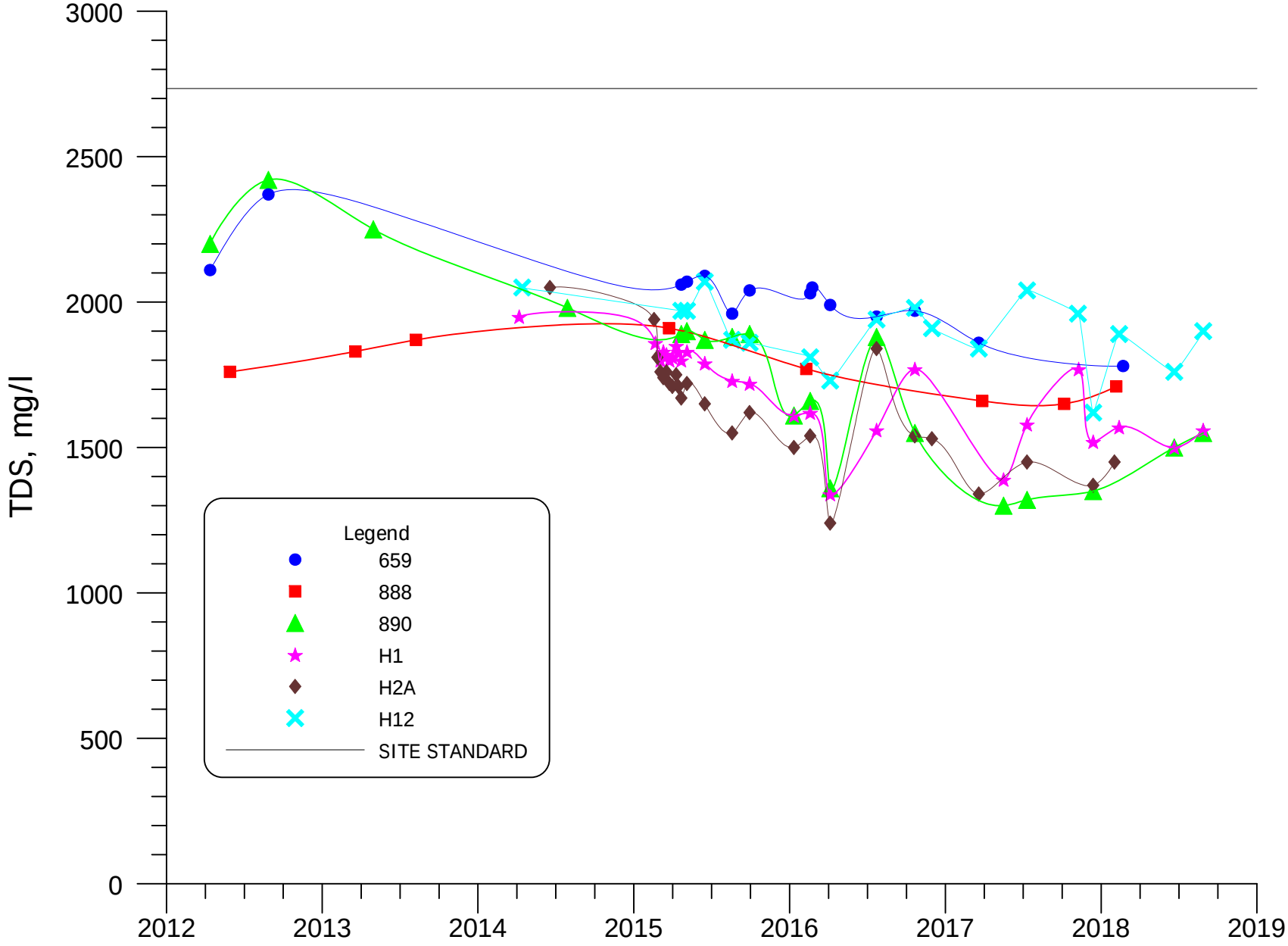

FIGURE 4.3-33A. TDS CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

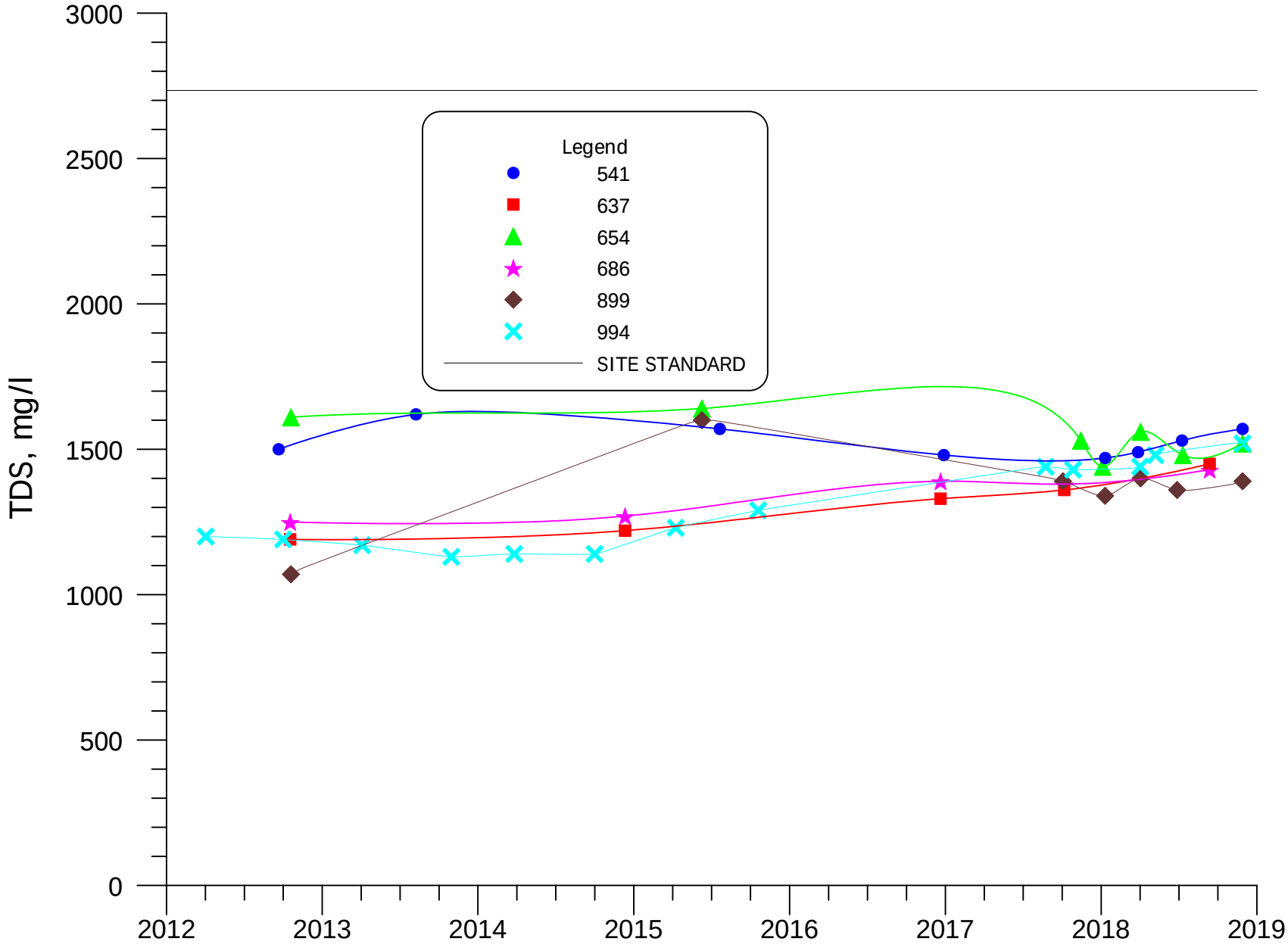

FIGURE 4.3-34. TDS CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

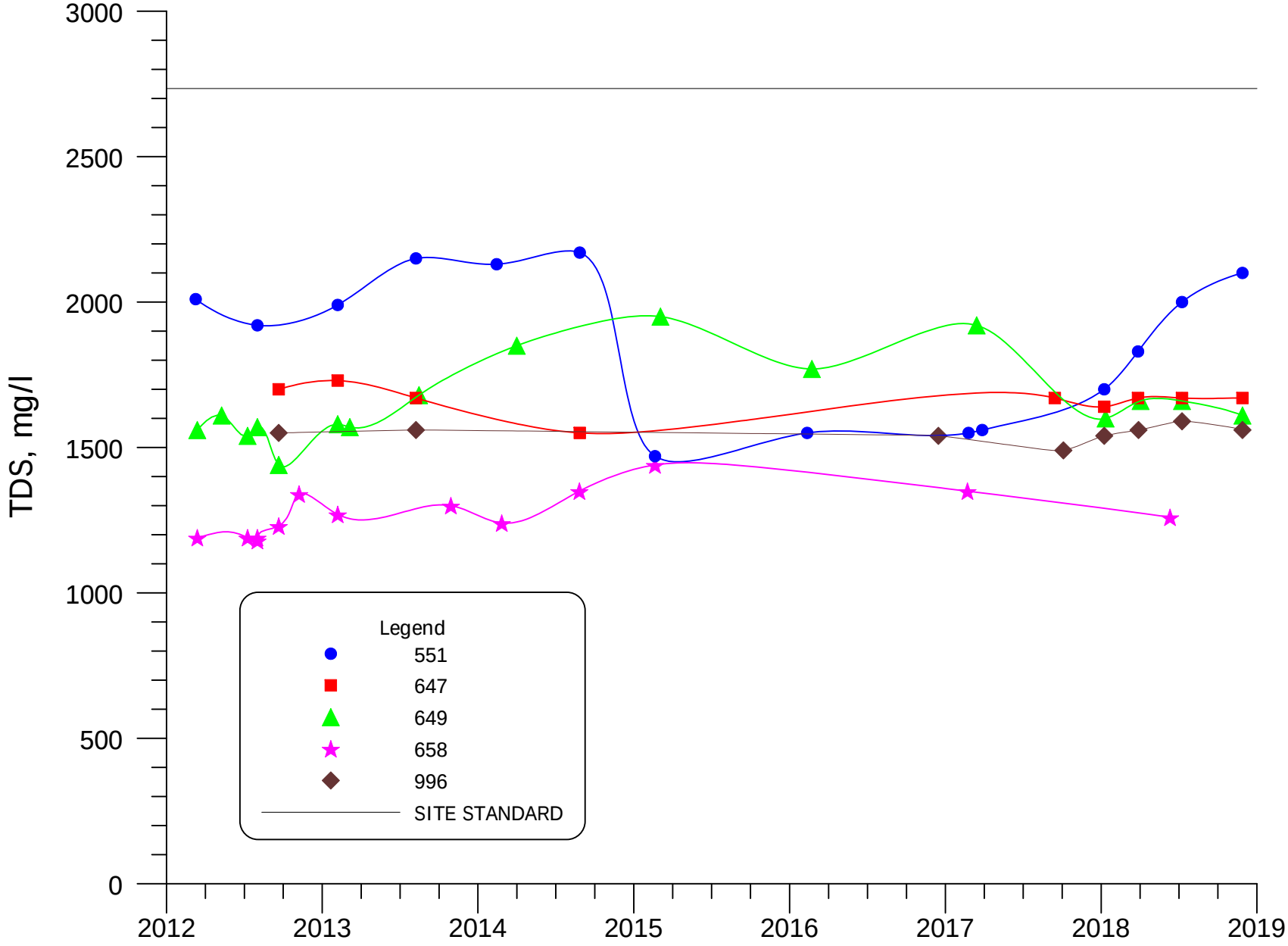

FIGURE 4.3-35. TDS CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

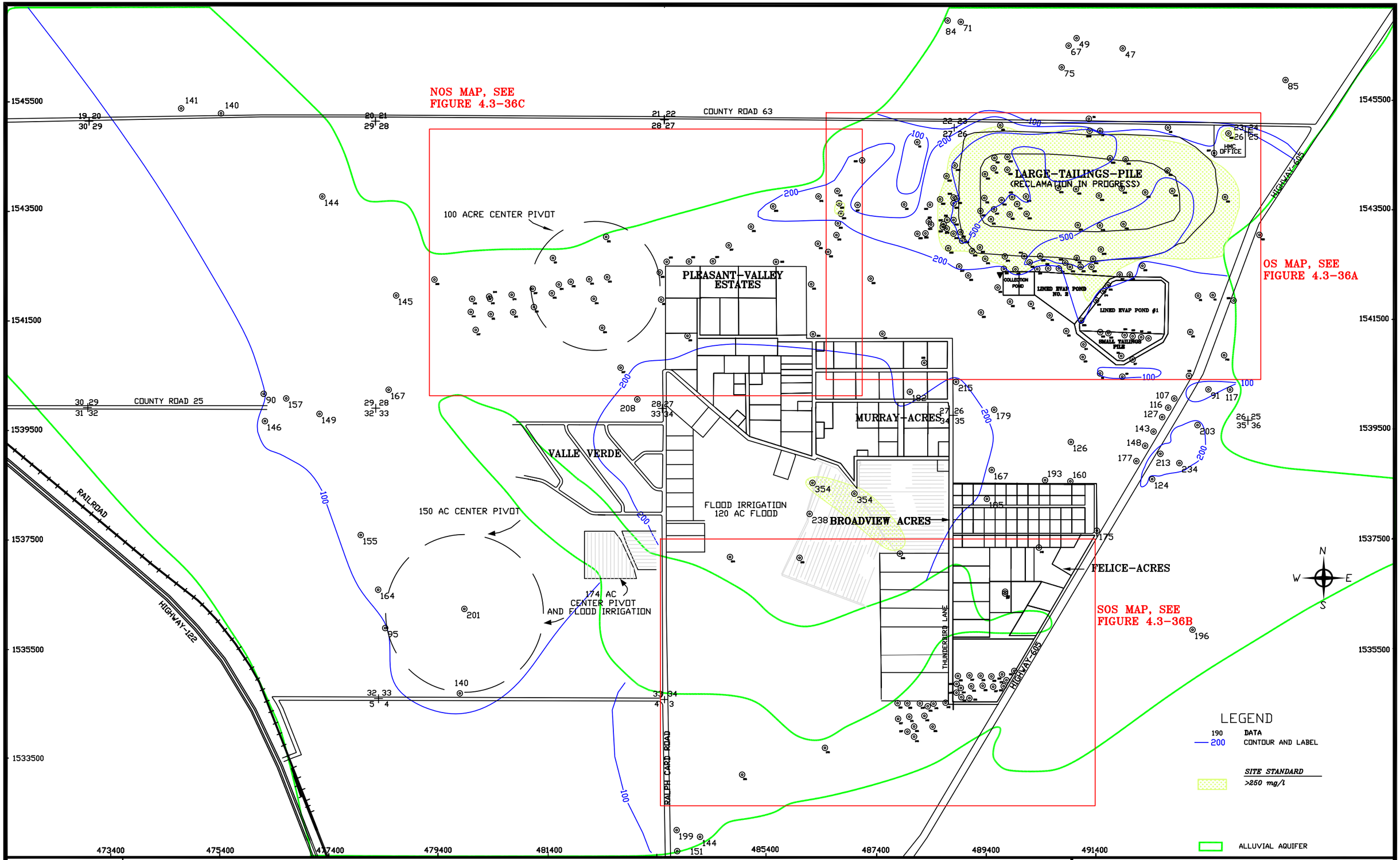

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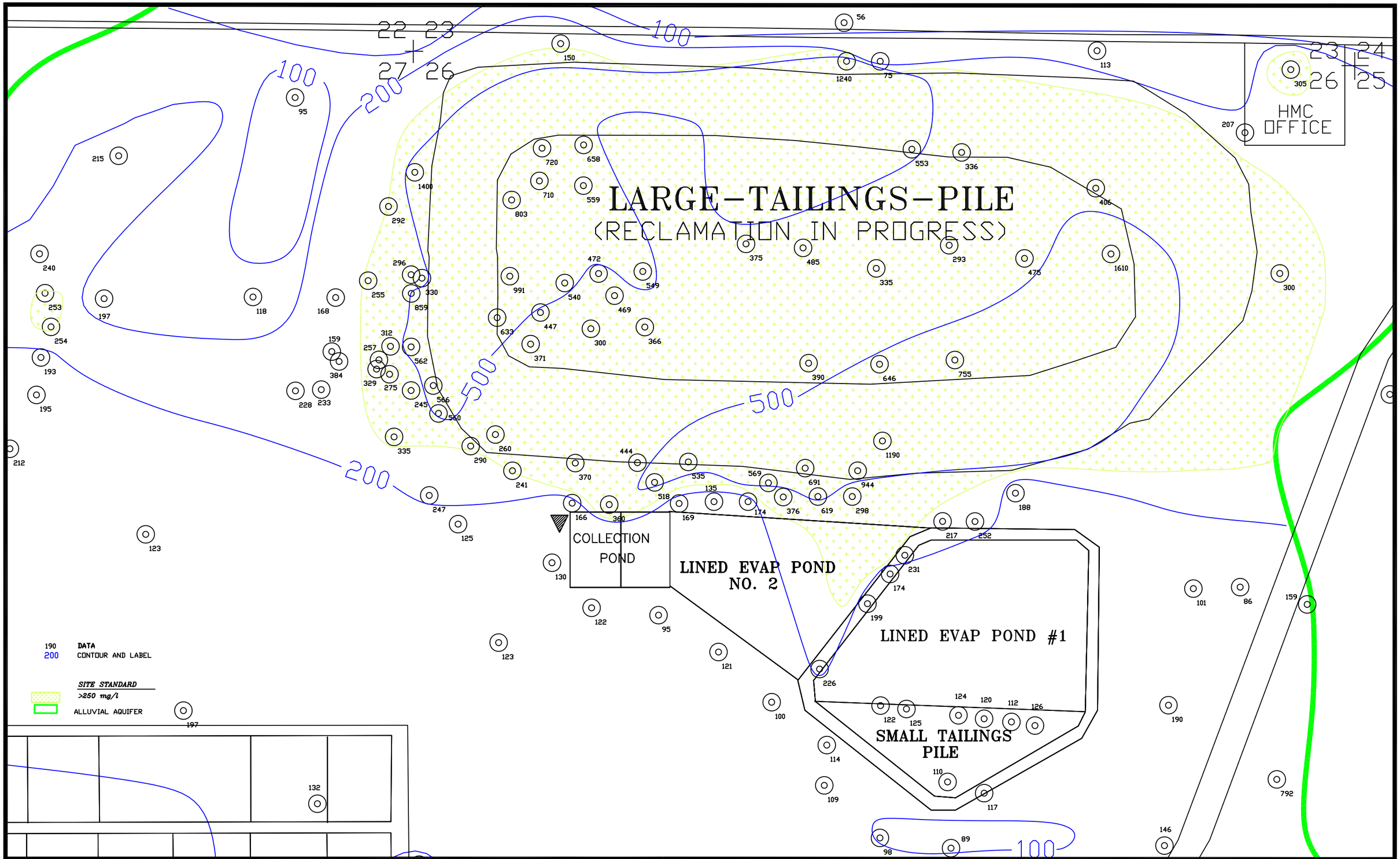
FIGURE 4.3-36. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l



SCALE: 1"=500'
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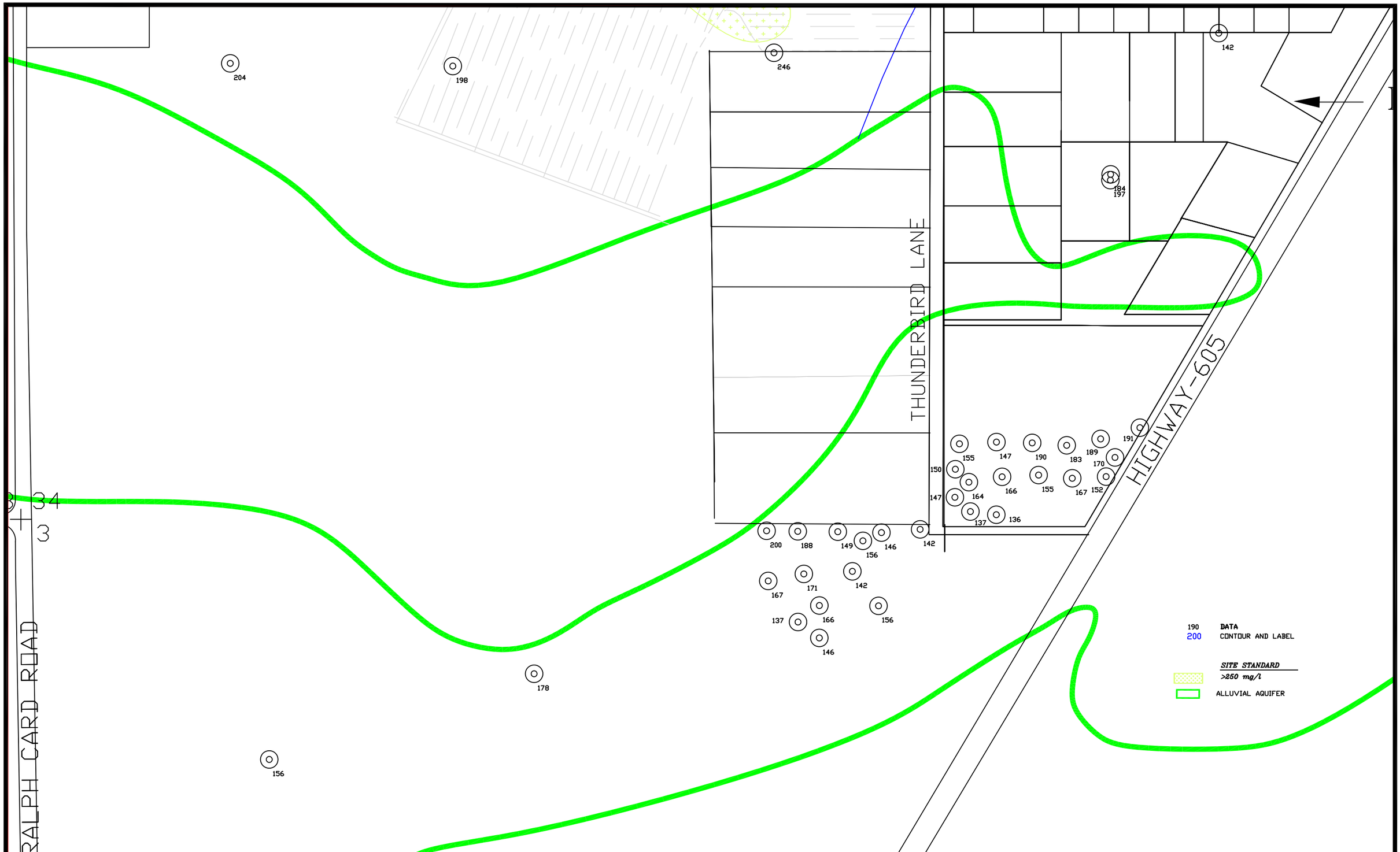
FIGURE 4.3-36A. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l



SCALE: 1"=500'
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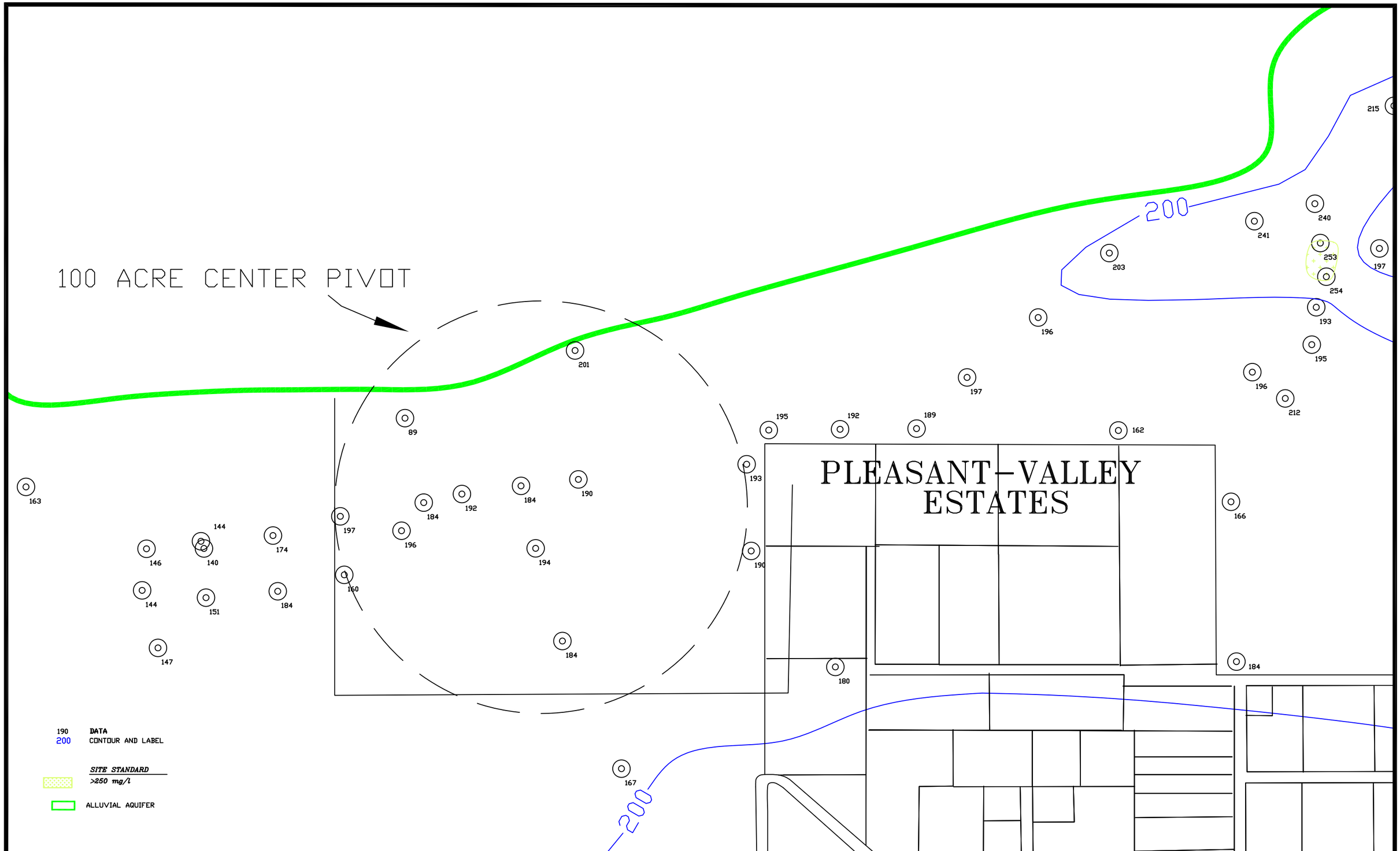
FIGURE 4.3-36B. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'
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FIGURE 4.3-36C. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

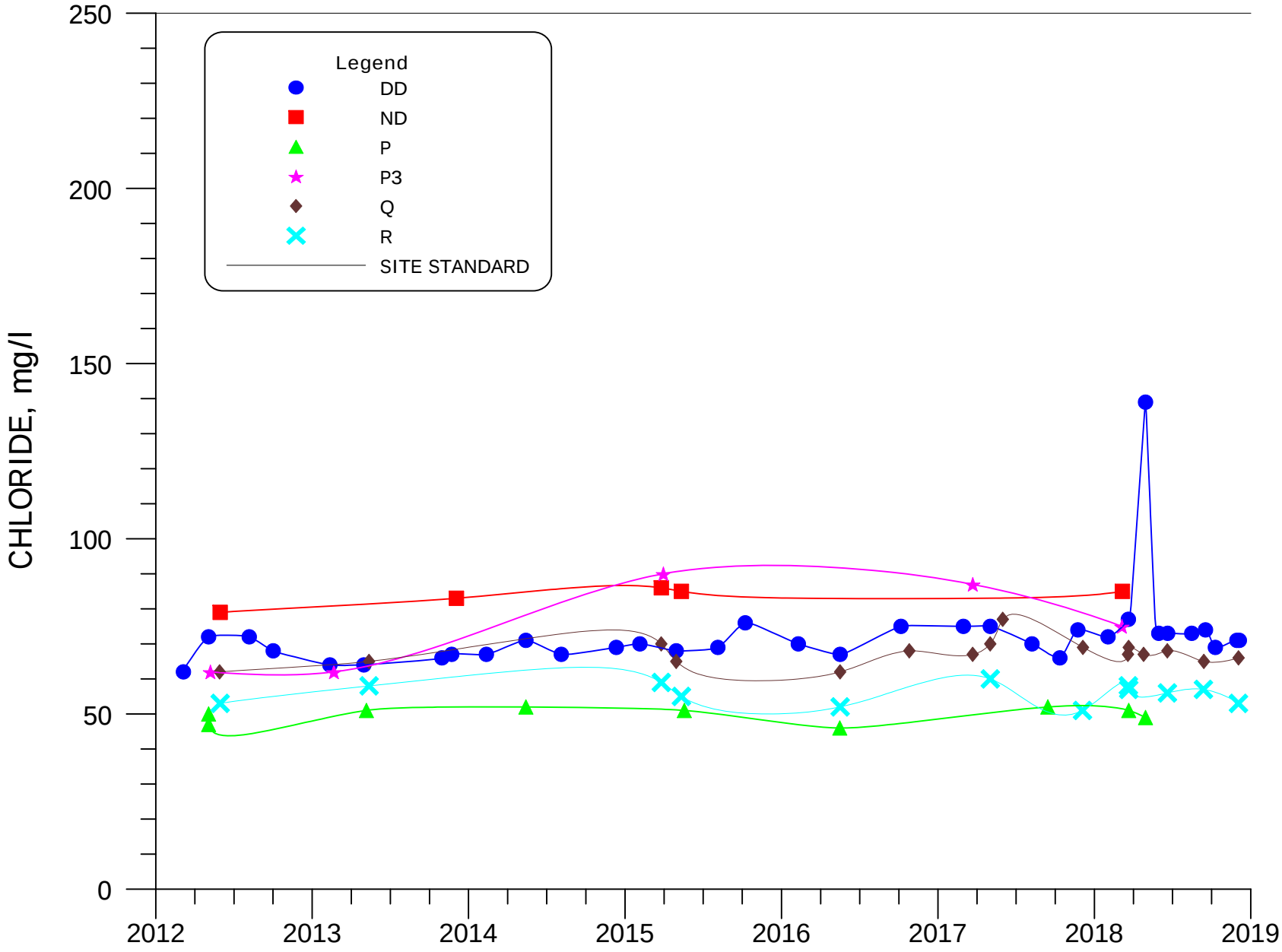

FIGURE 4.3-37. CHLORIDE CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

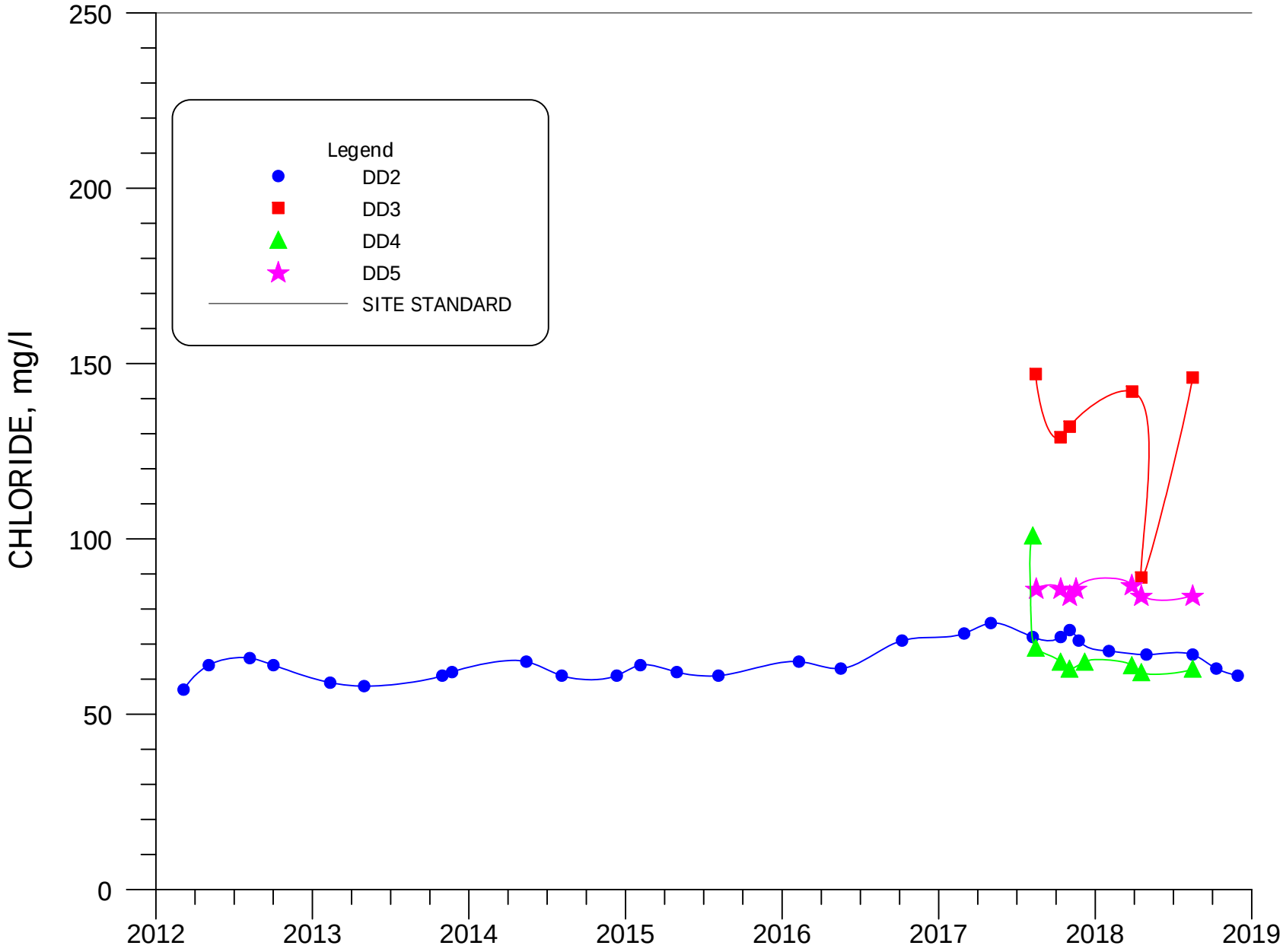

FIGURE 4.3-37A. CHLORIDE CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

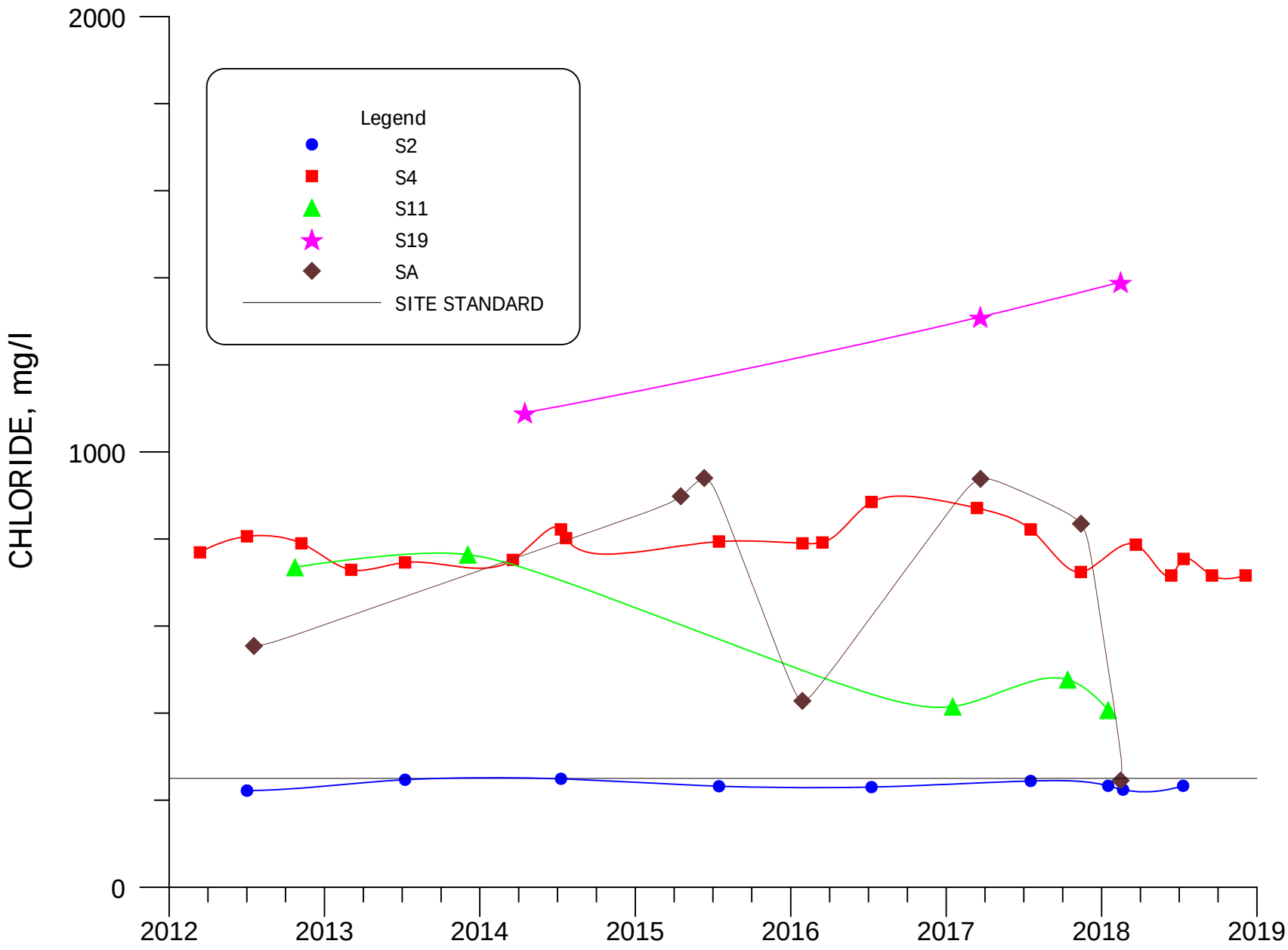

FIGURE 4.3-38. CHLORIDE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

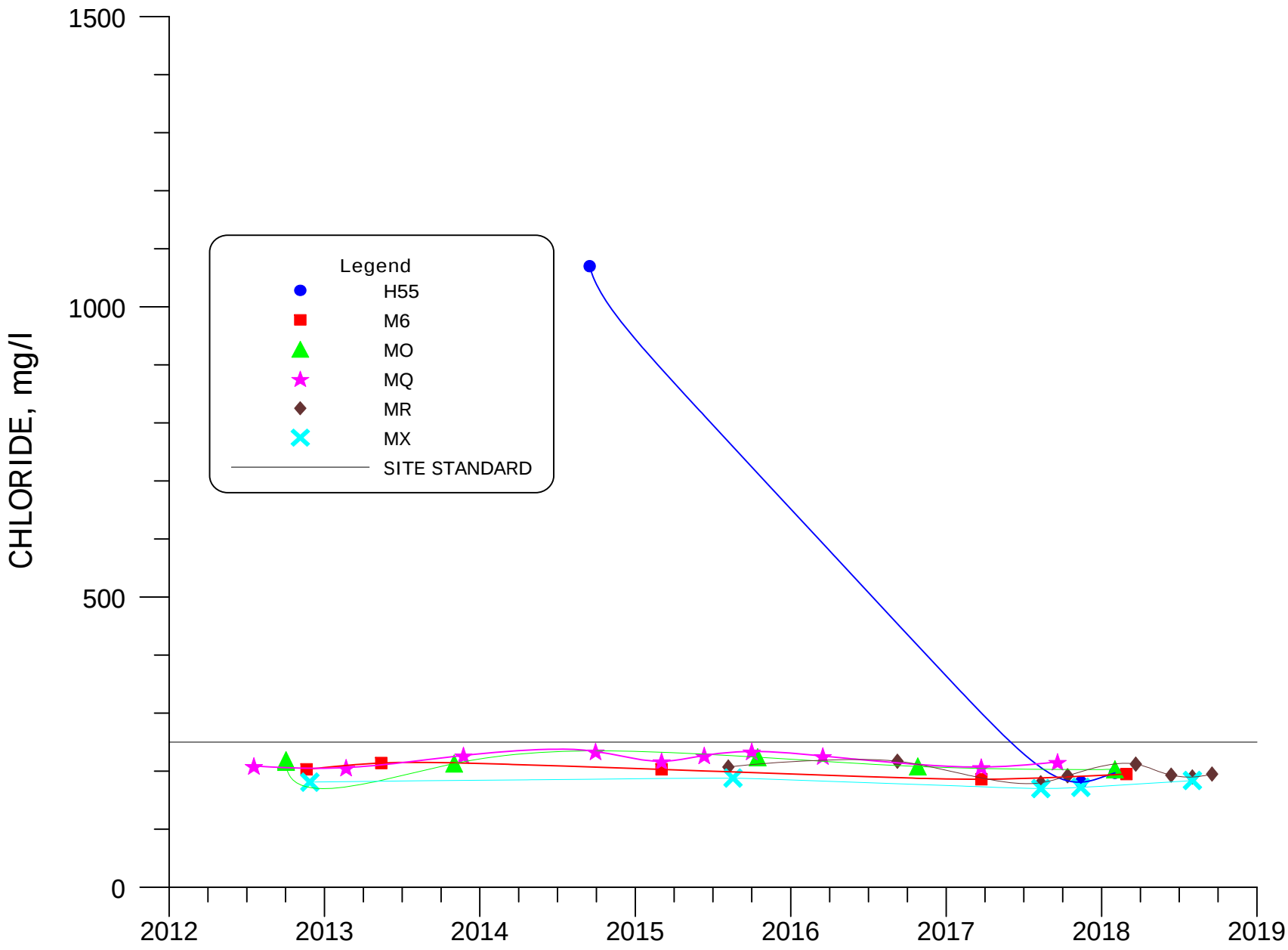

FIGURE 4.3-39. CHLORIDE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

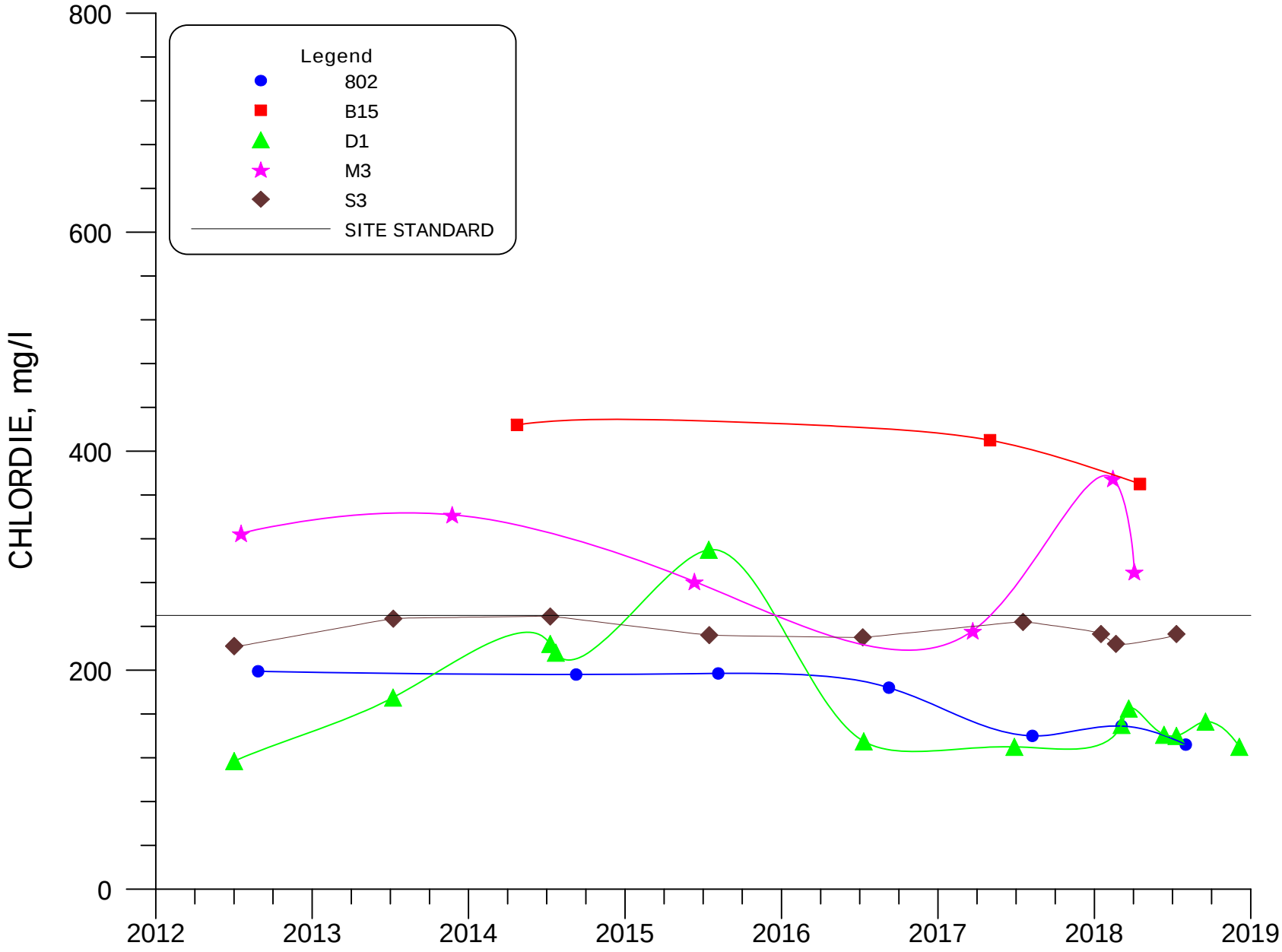

FIGURE 4.3-40. CHLORIDE CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

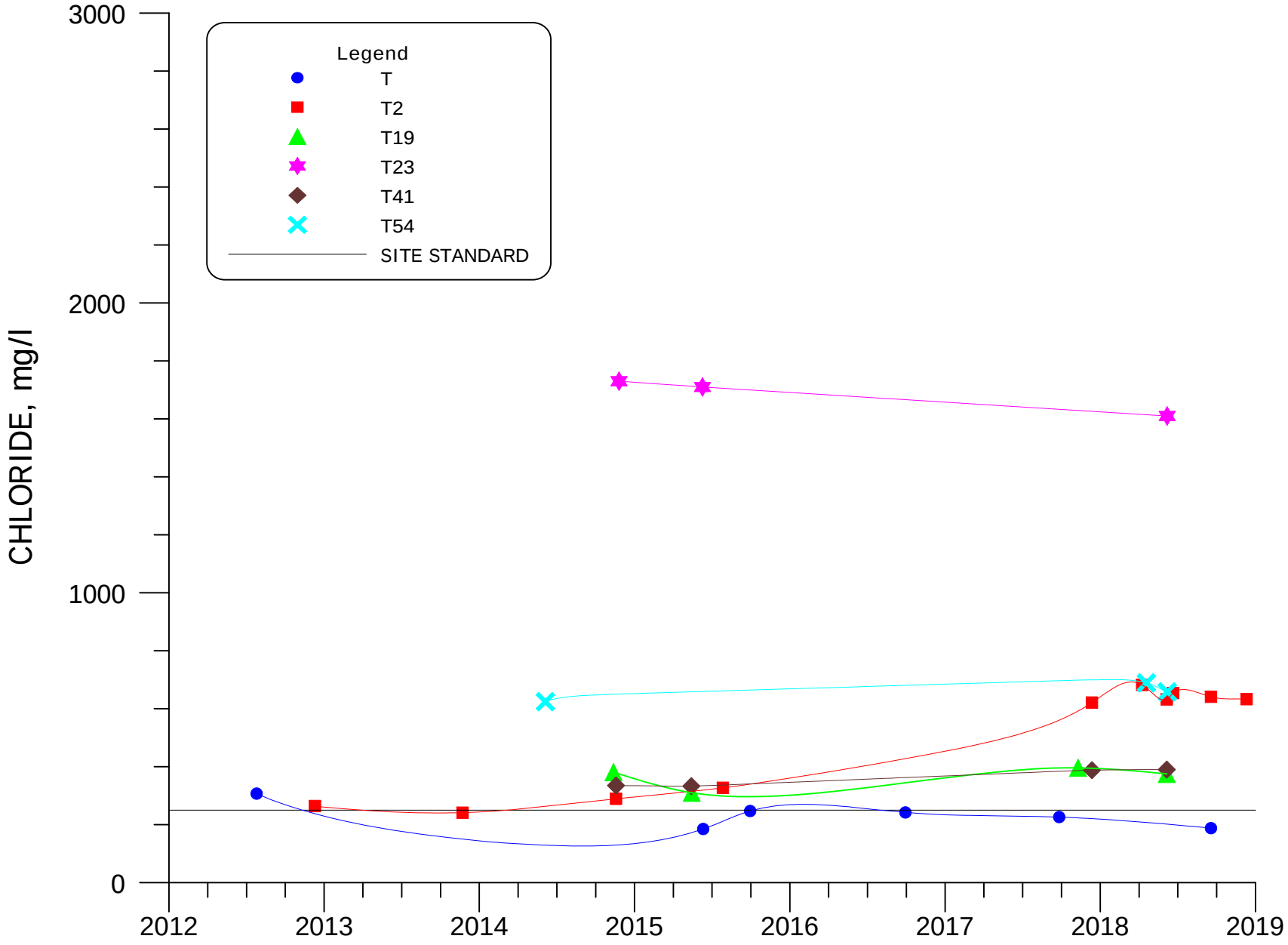

FIGURE 4.3-41. CHLORIDE CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

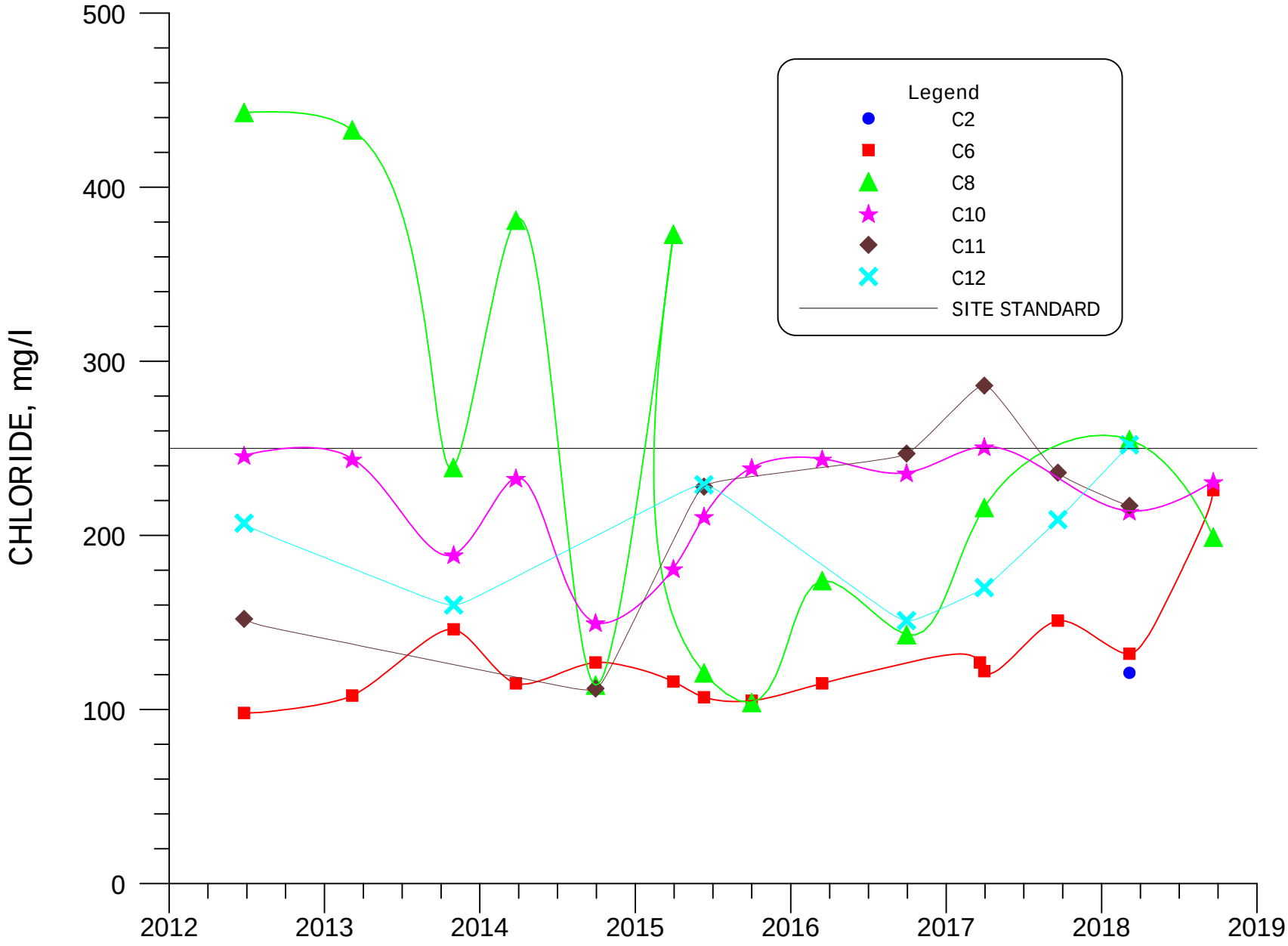

FIGURE 4.3-42. CHLORIDE CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

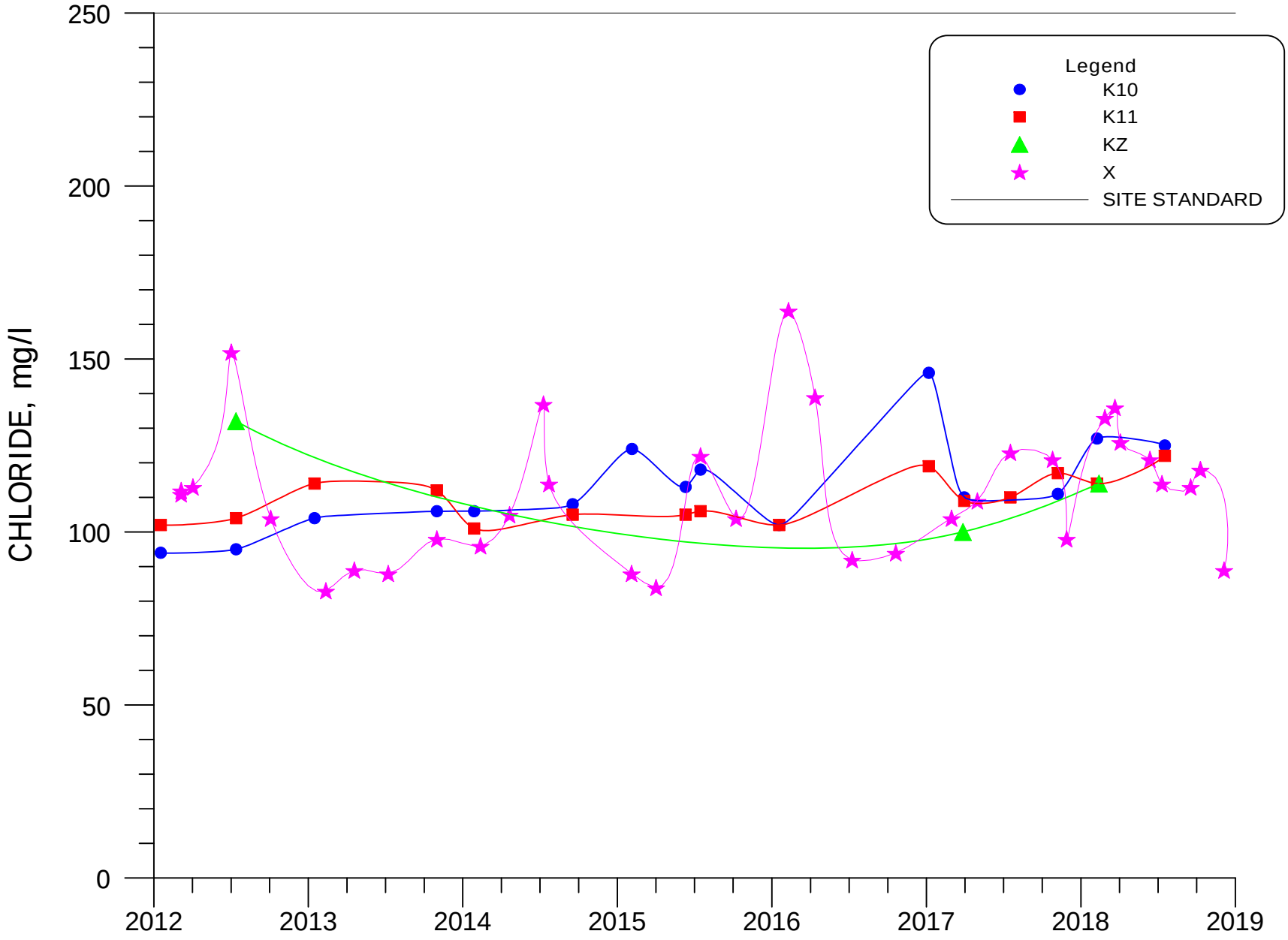

FIGURE 4.3-43. CHLORIDE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

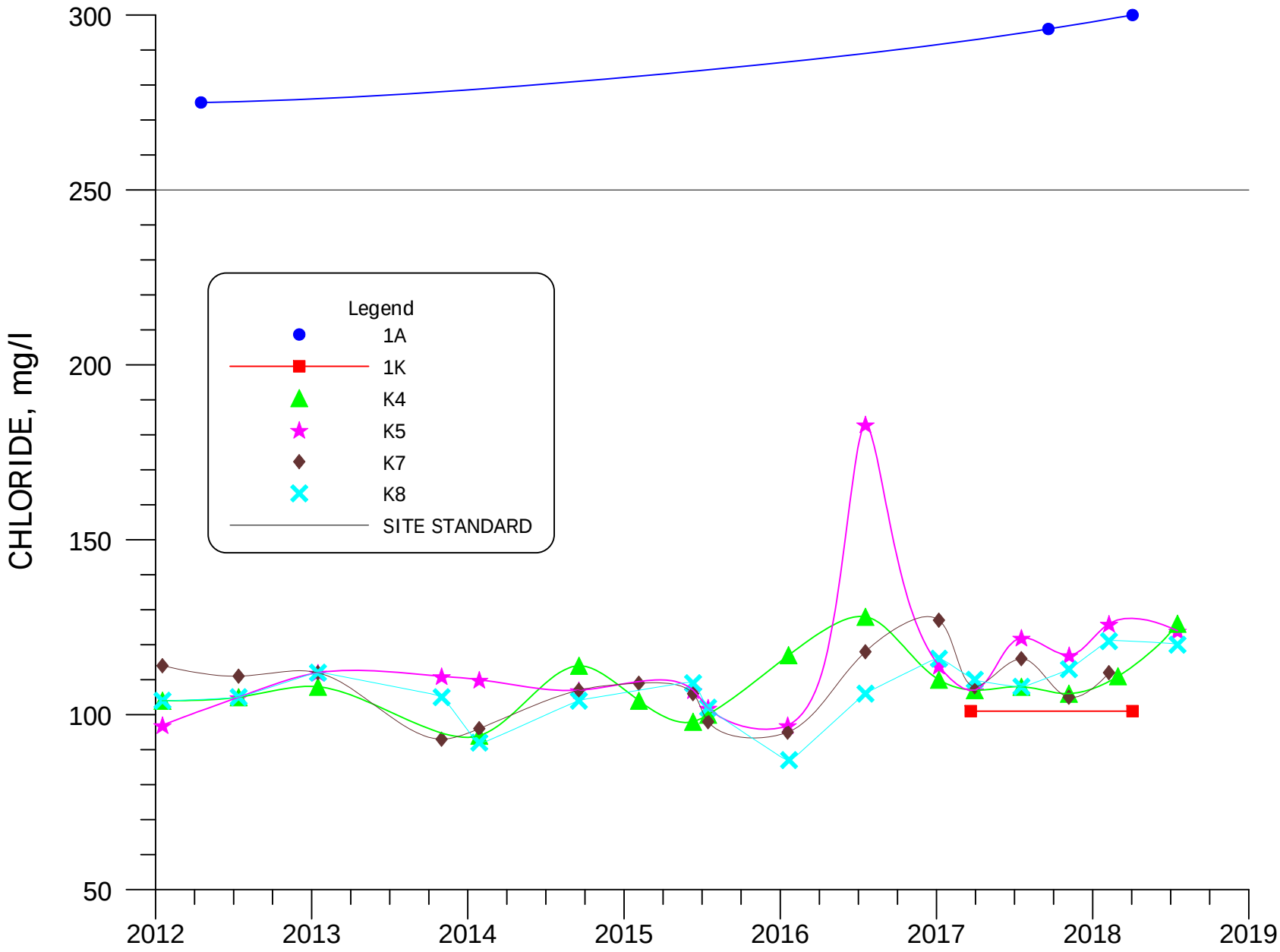

FIGURE 4.3-44. CHLORIDE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

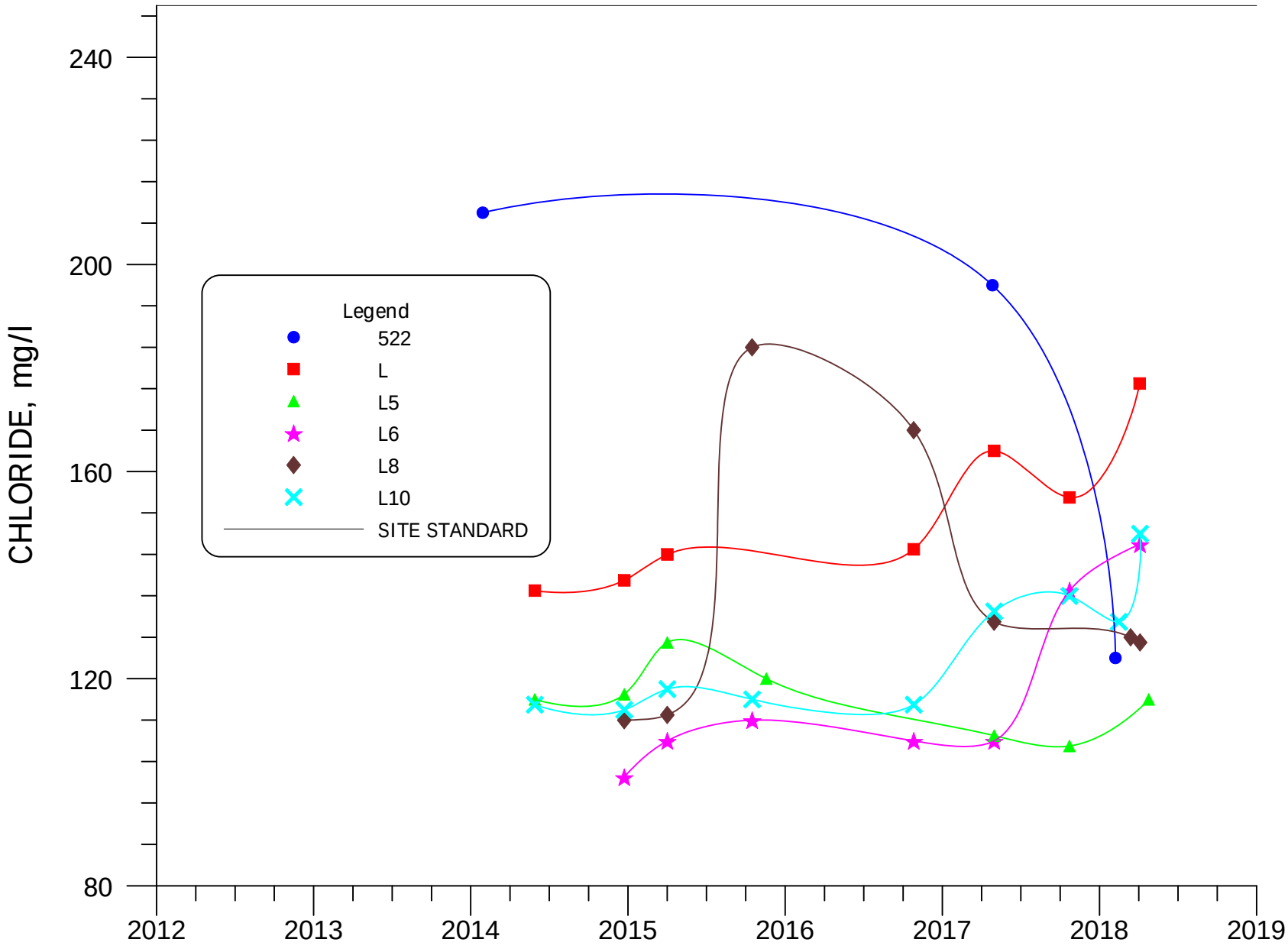

FIGURE 4.3-45. CHLORIDE CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

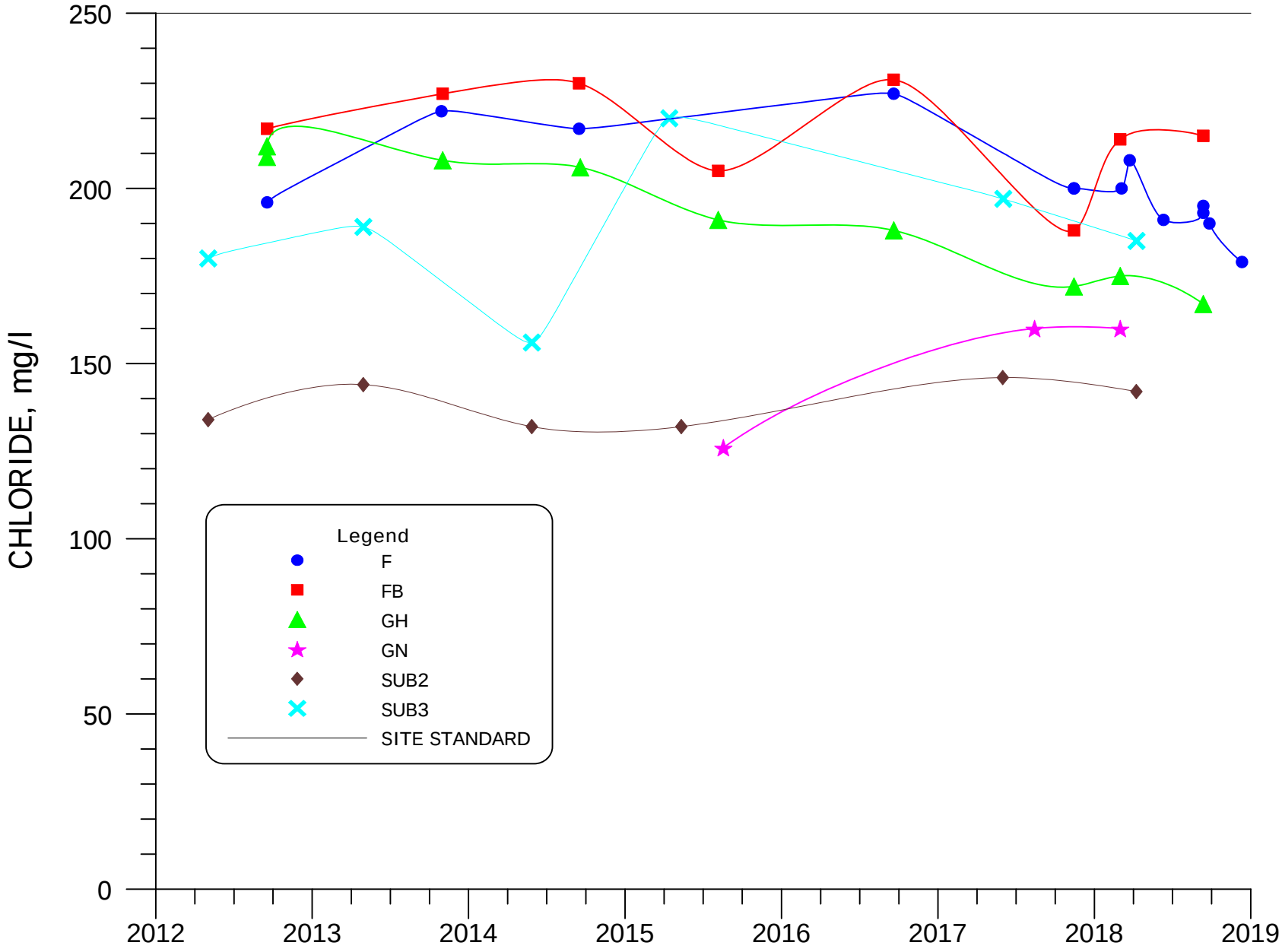

FIGURE 4.3-46. CHLORIDE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

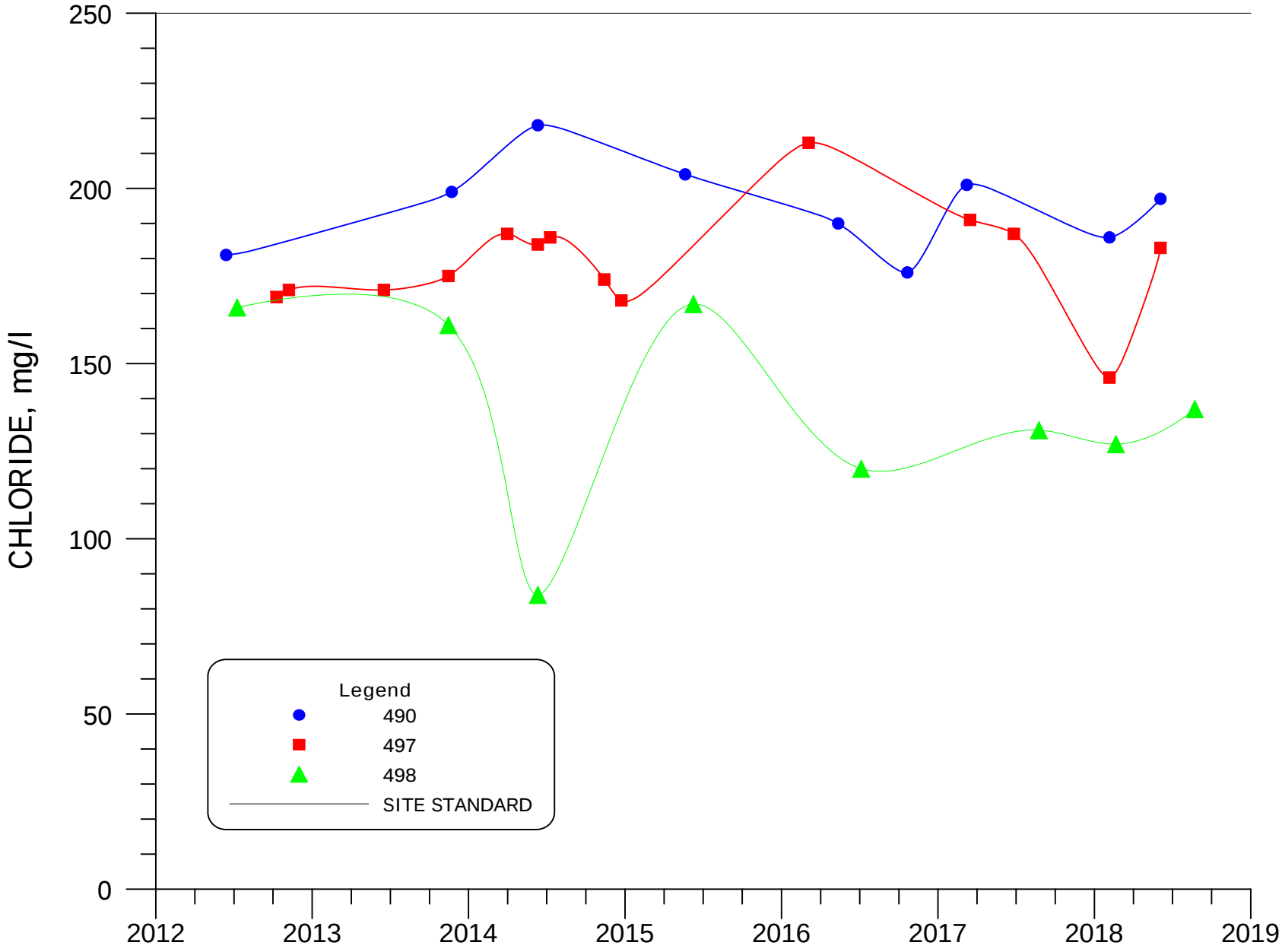

FIGURE 4.3-47. CHLORIDE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

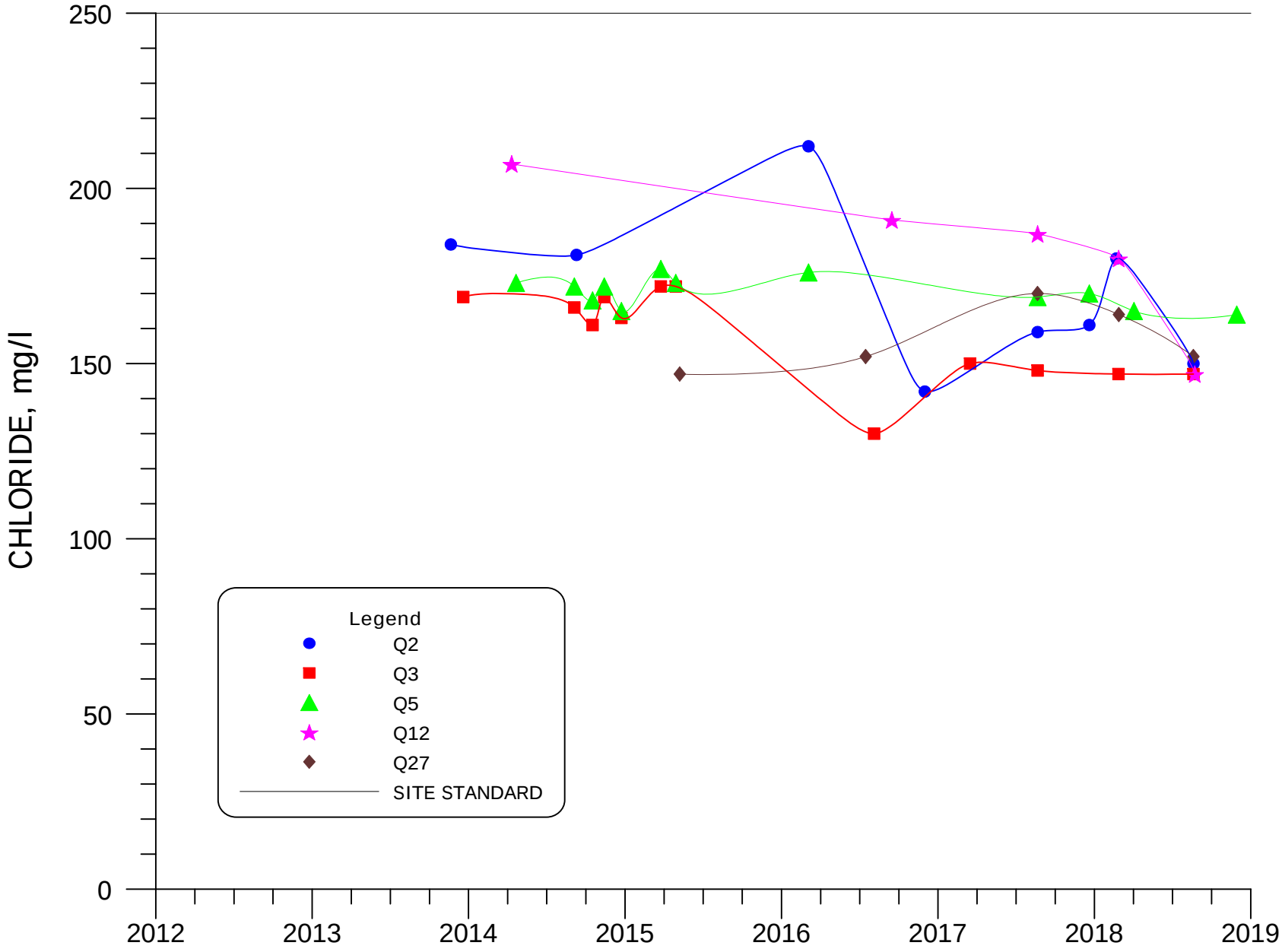

FIGURE 4.3-47A. CHLORIDE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

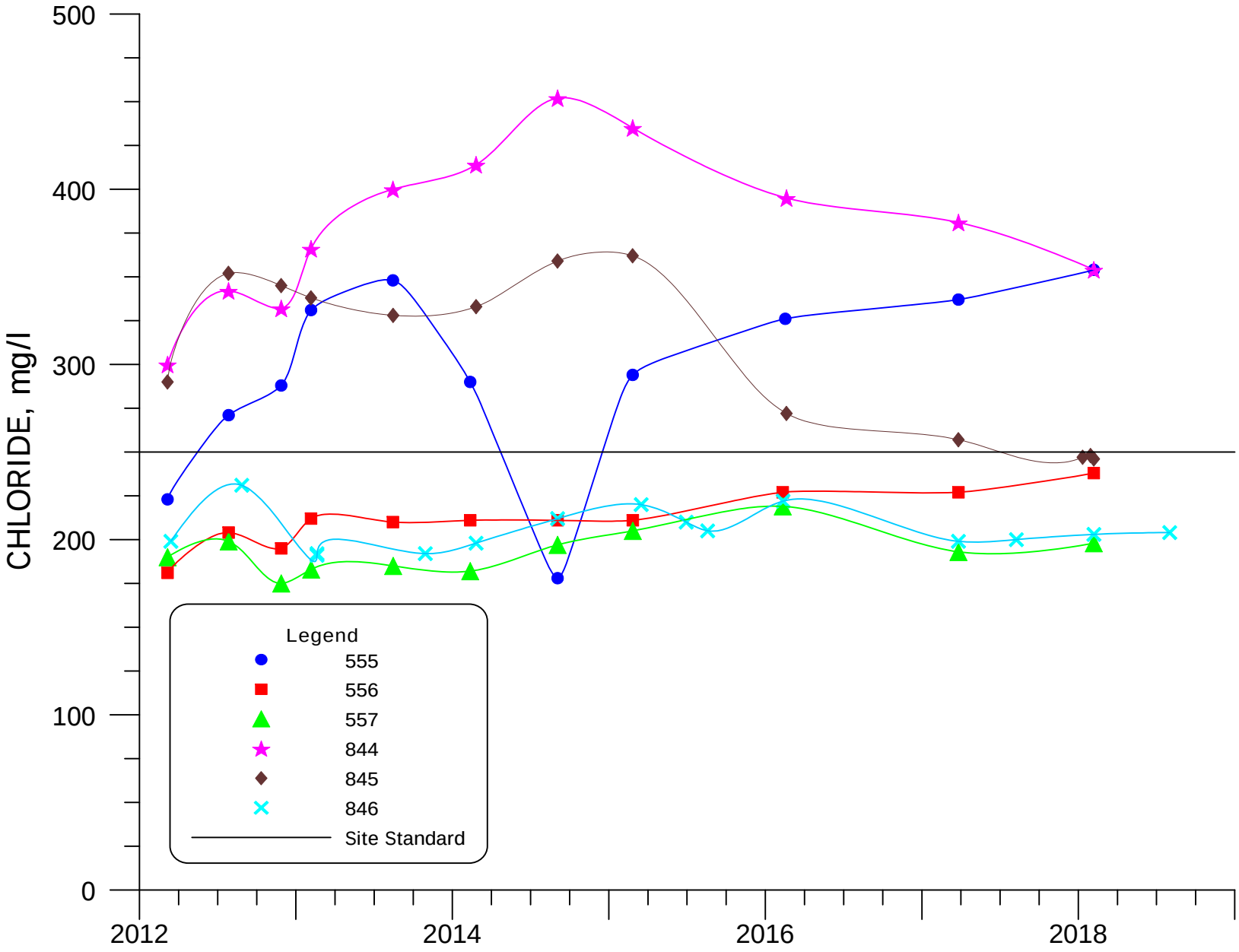

FIGURE 4.3-48. CHLORIDE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

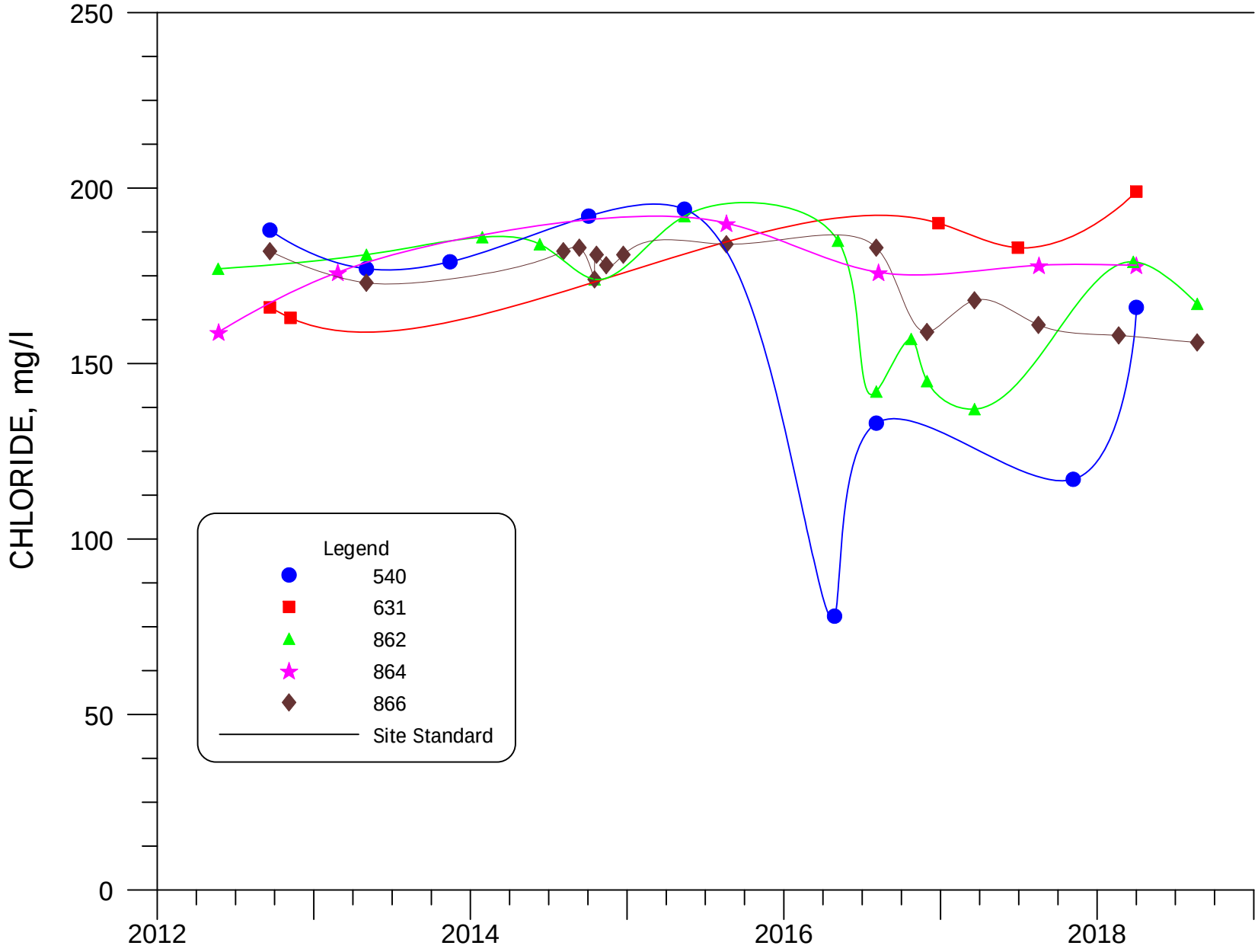

FIGURE 4.3-49. CHLORIDE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

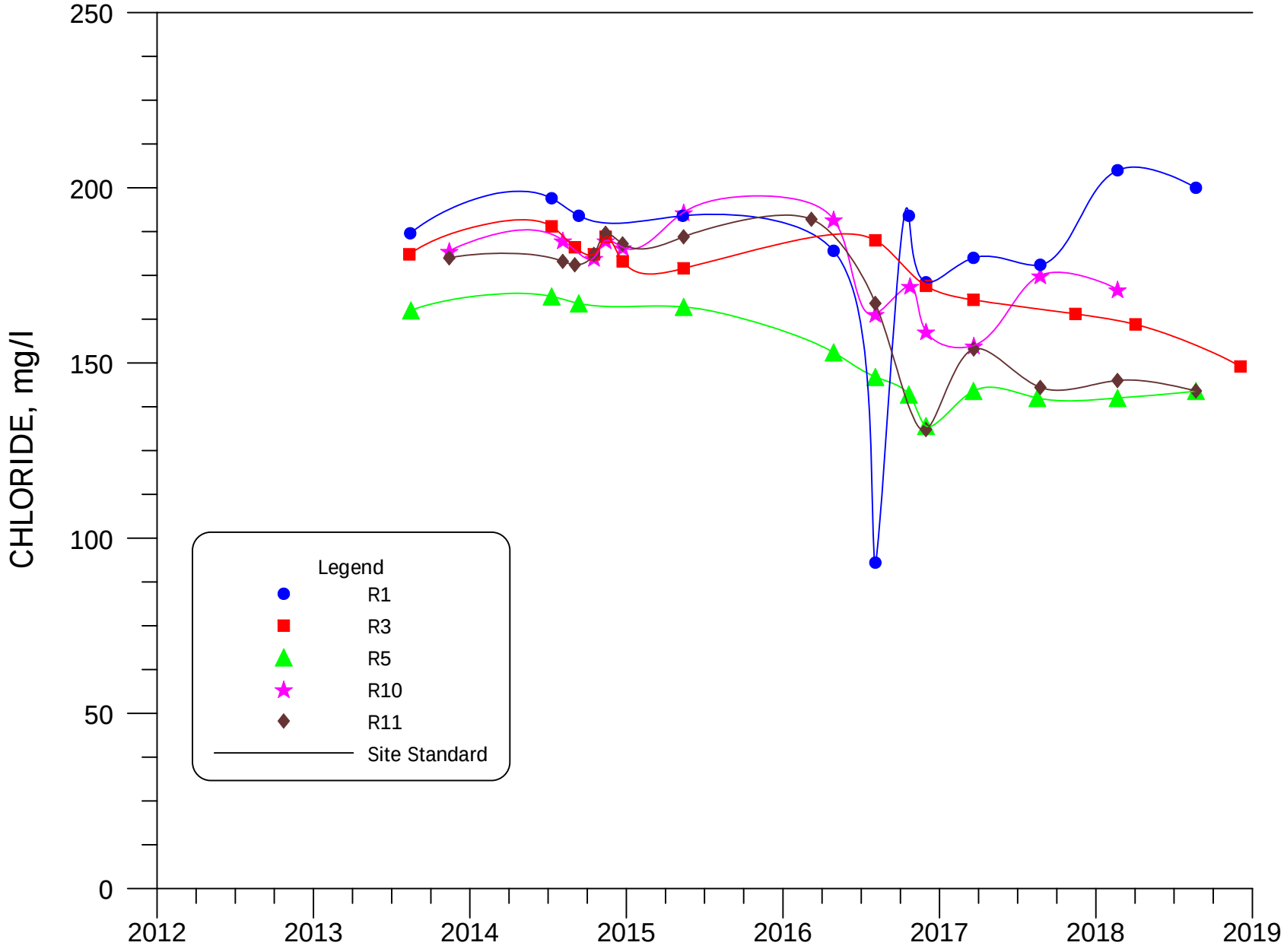

FIGURE 4.3-49A. CHLORIDE CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

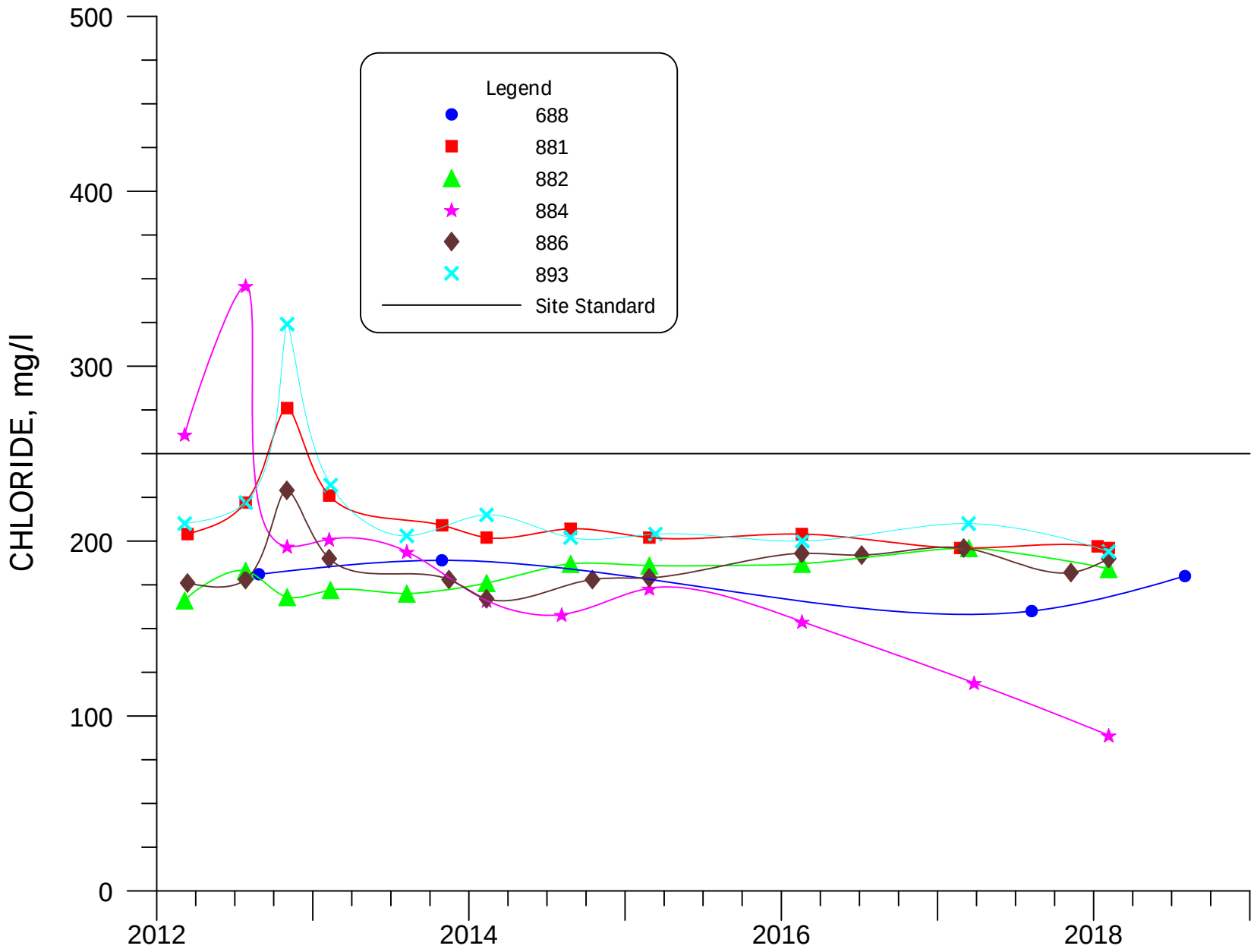

FIGURE 4.3-50. CHLORIDE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

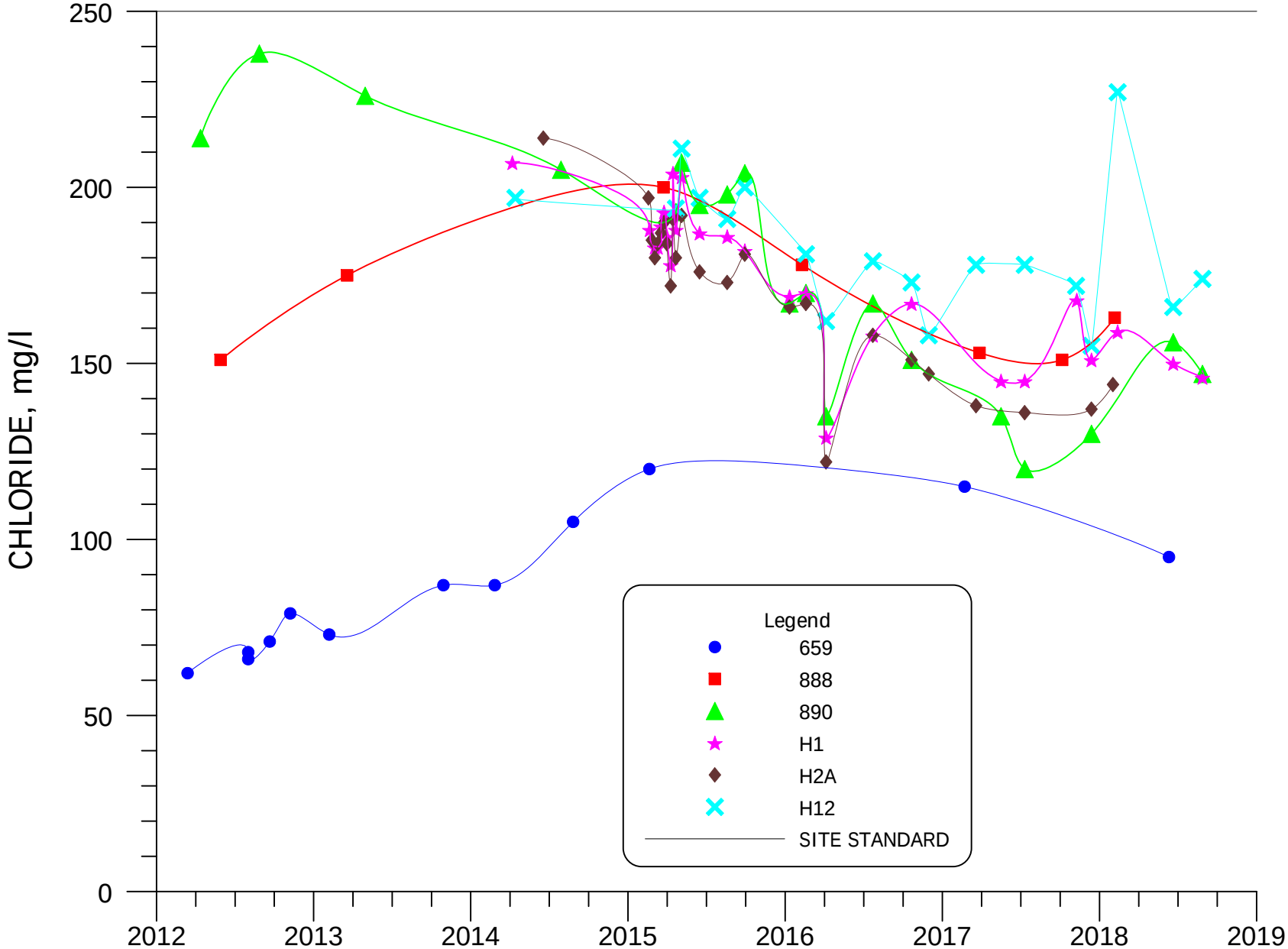

FIGURE 4.3-50A. CHLORIDE CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

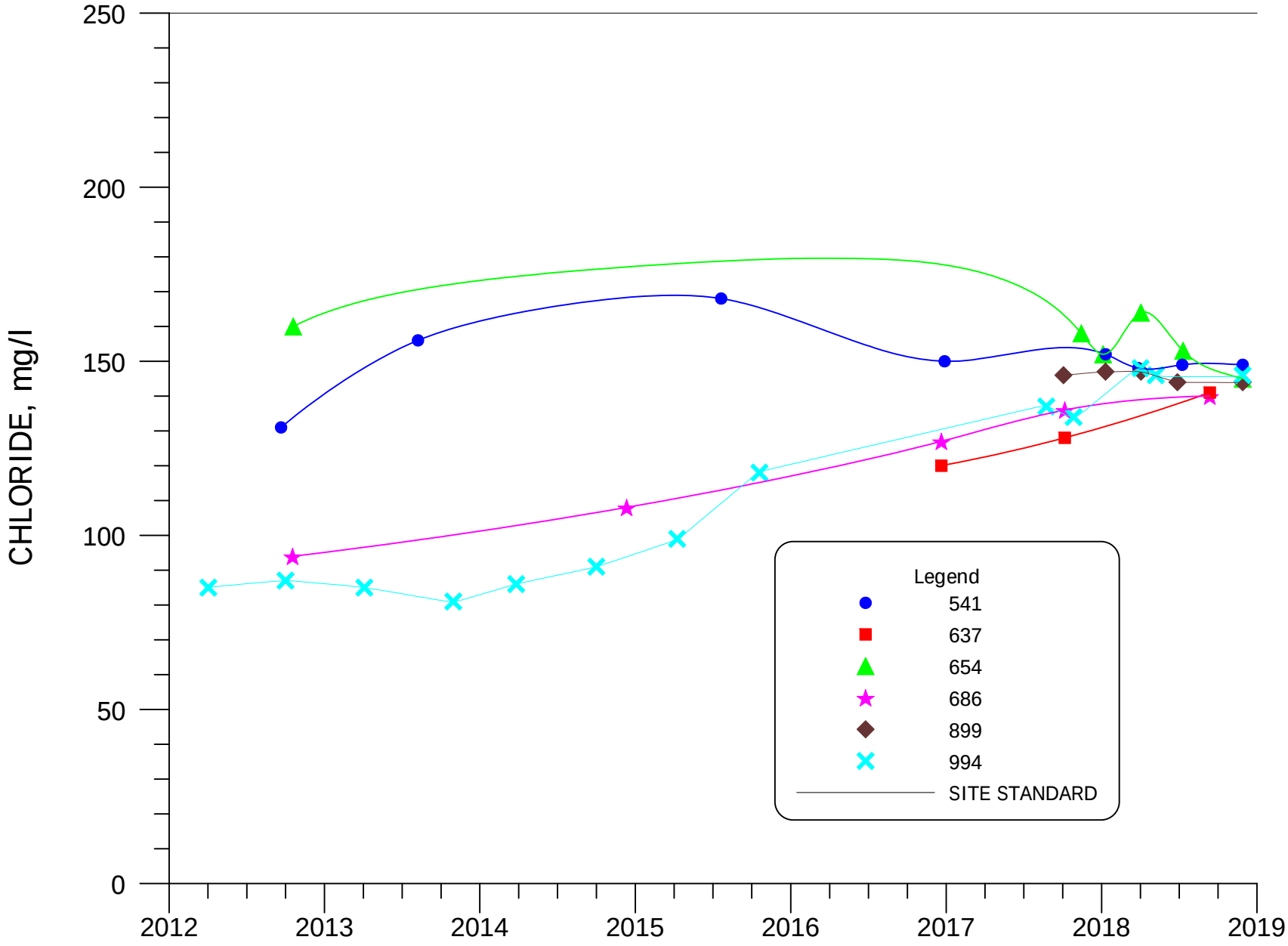

FIGURE 4.3-51. CHLORIDE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

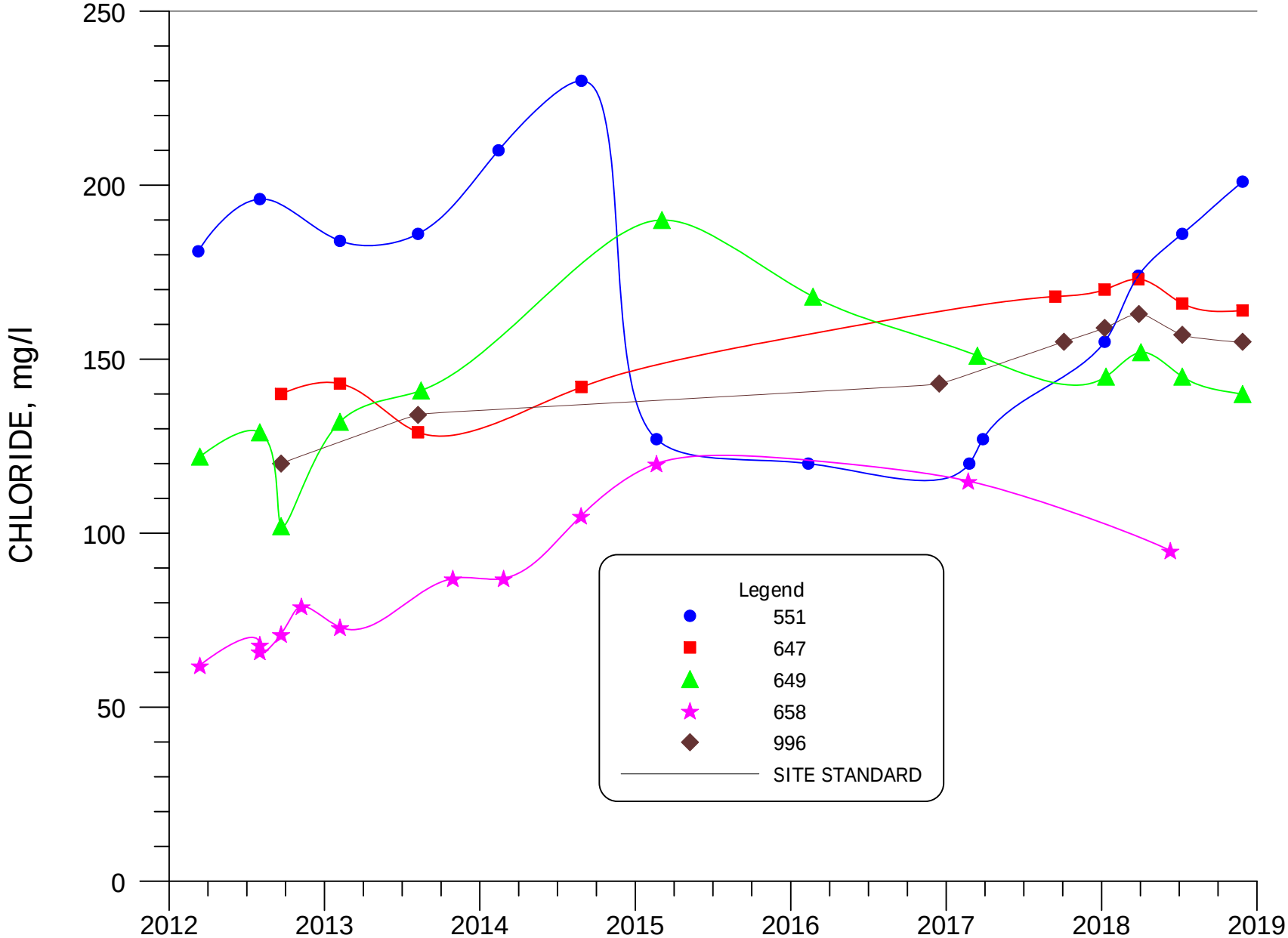

FIGURE 4.3-52. CHLORIDE CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

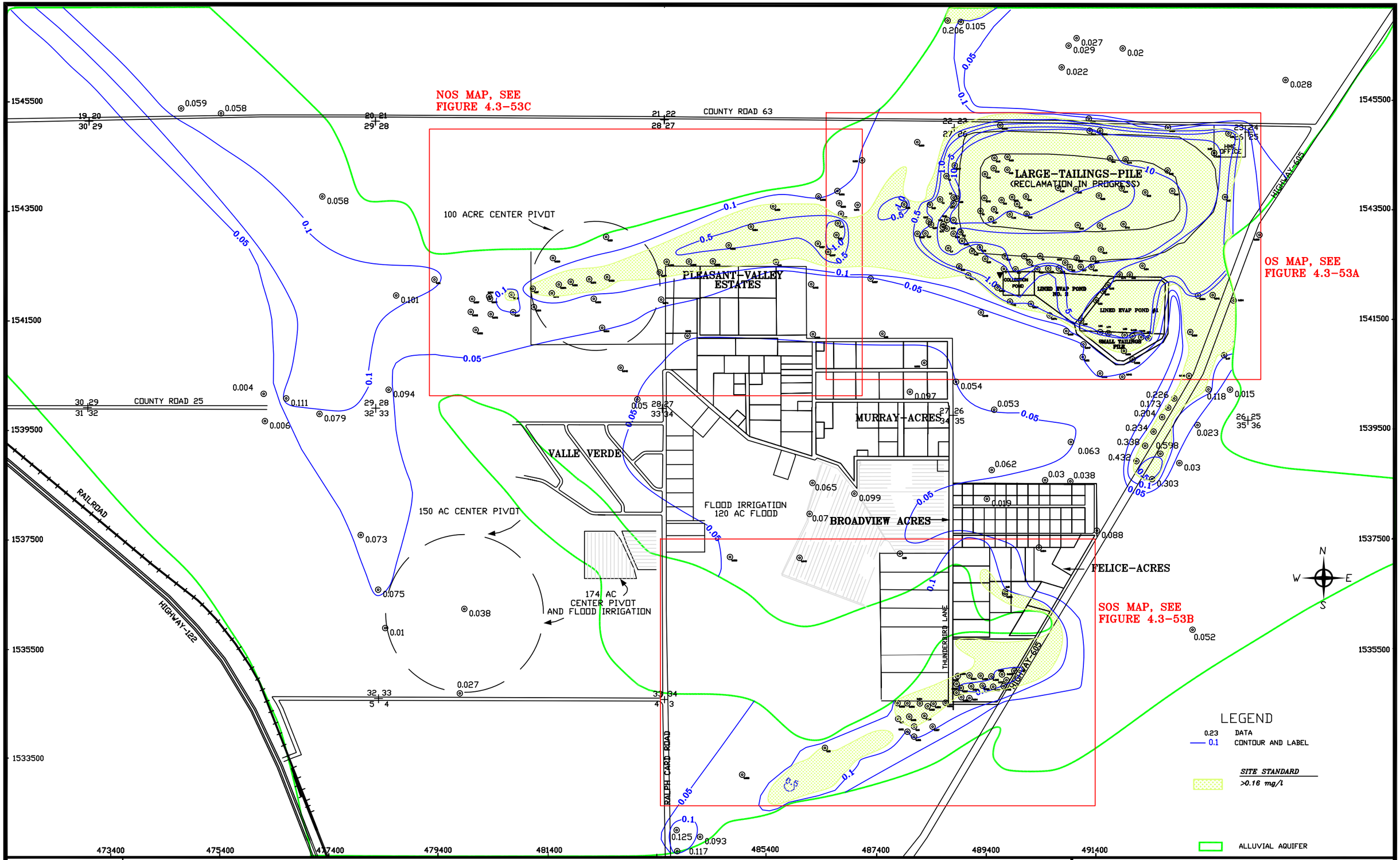

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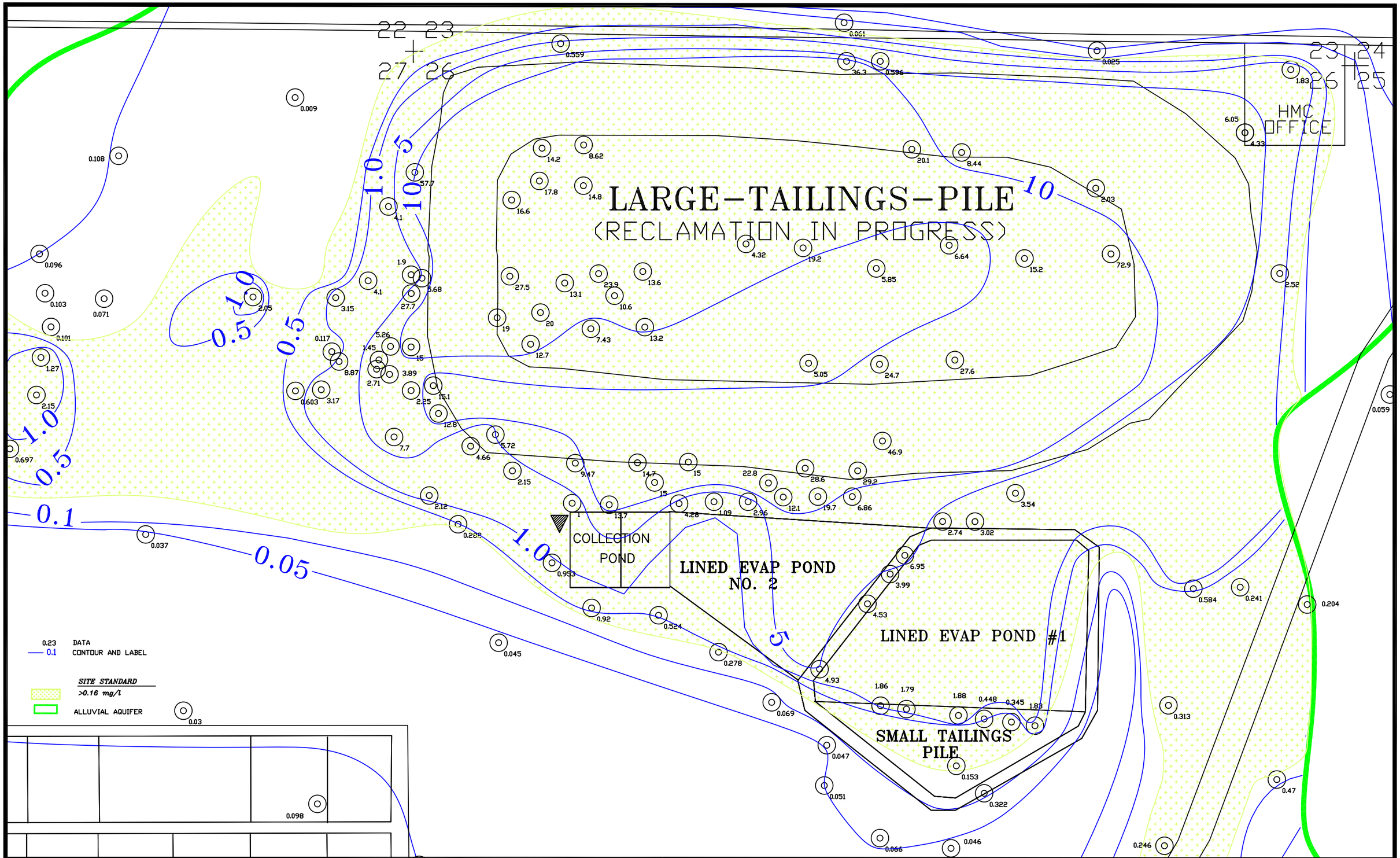
FIGURE 4.3-53. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l



SCALE: 1"=500'
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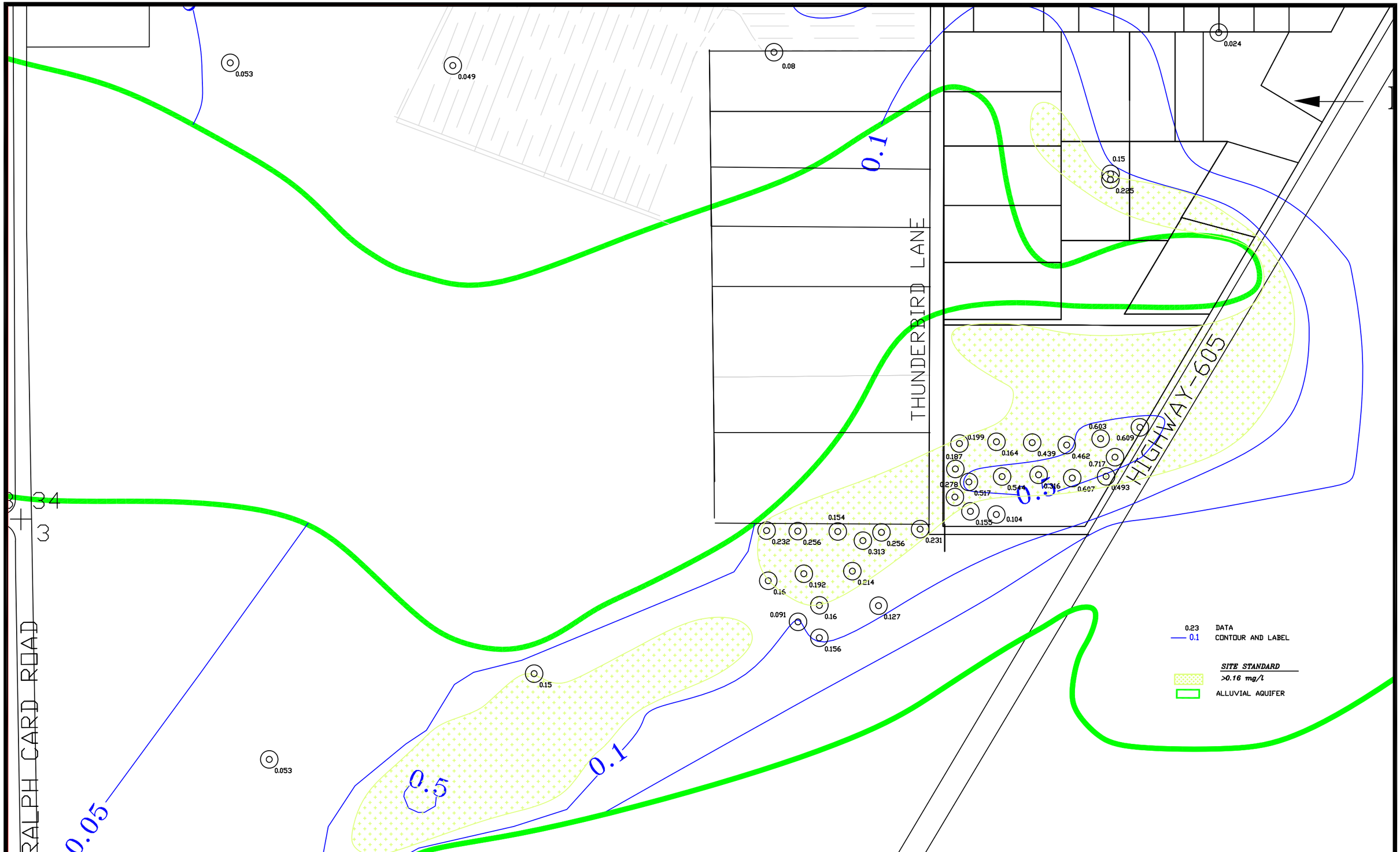
DATE: 1/31/2019

FIGURE 4.3-53A. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l



SCALE: 1"=500'
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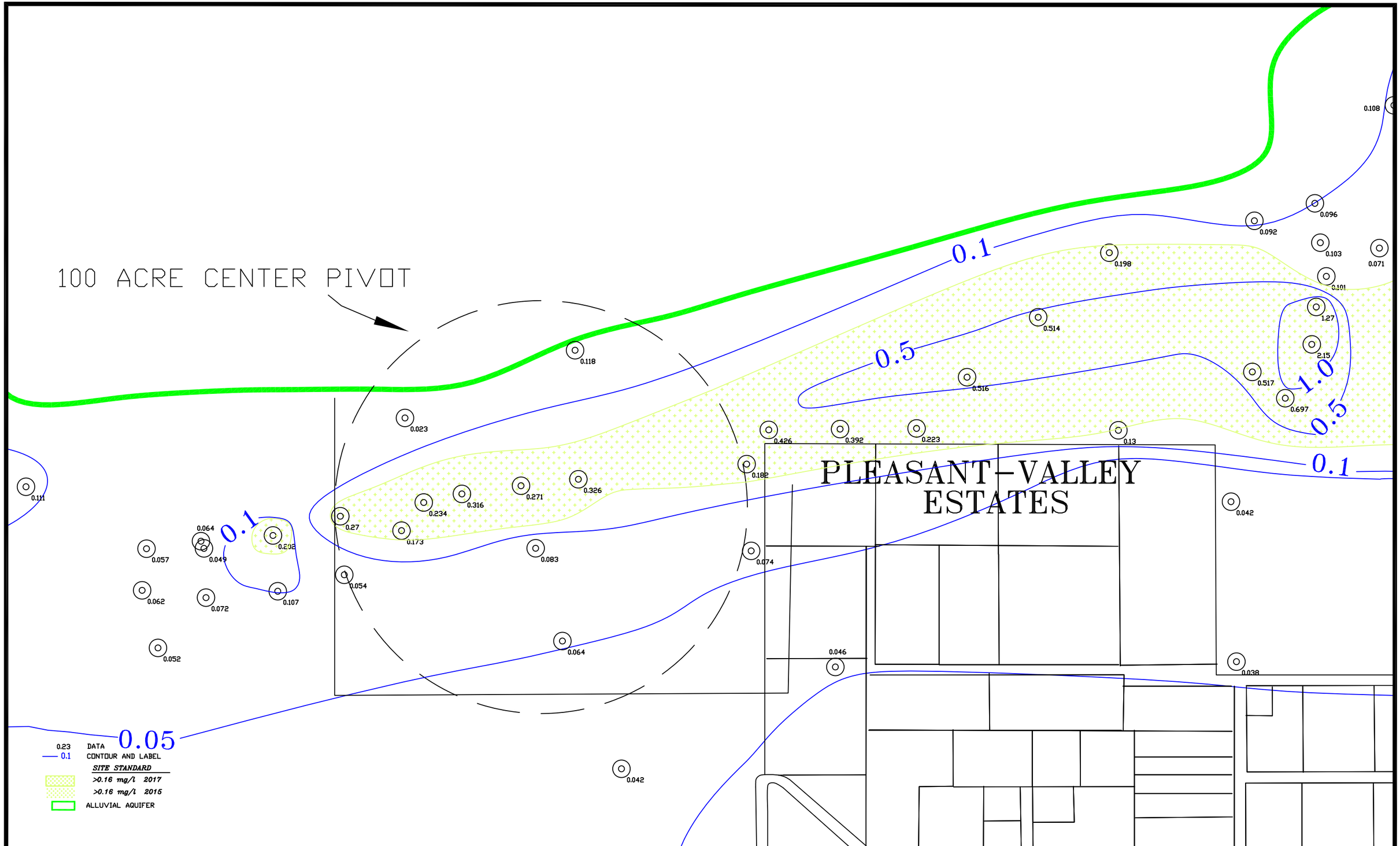
DATE: 1/17/2019

FIGURE 4.3-53B. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'
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DATE: 1/18/2019

FIGURE 4.3-53C. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

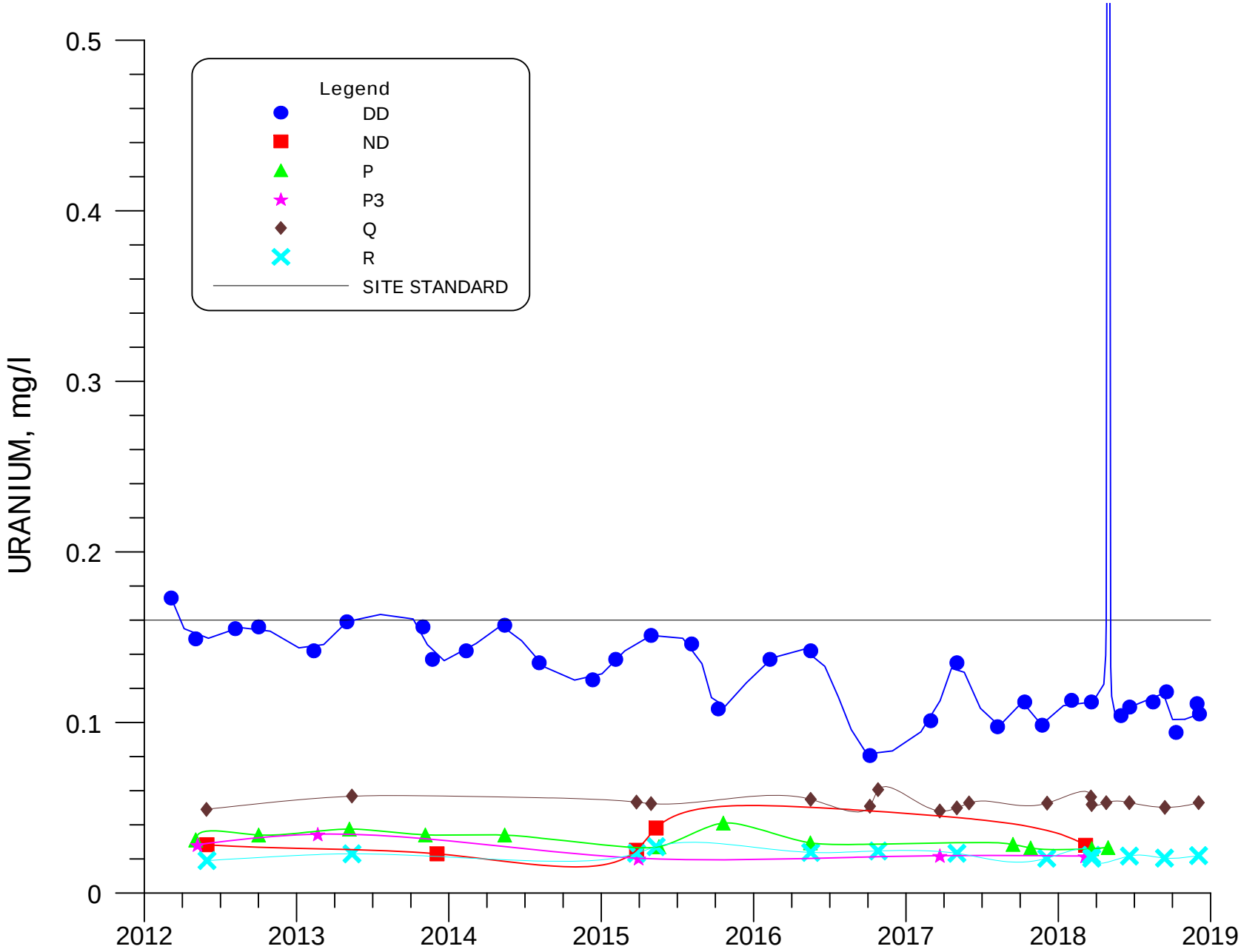

FIGURE 4.3-54. URANIUM CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

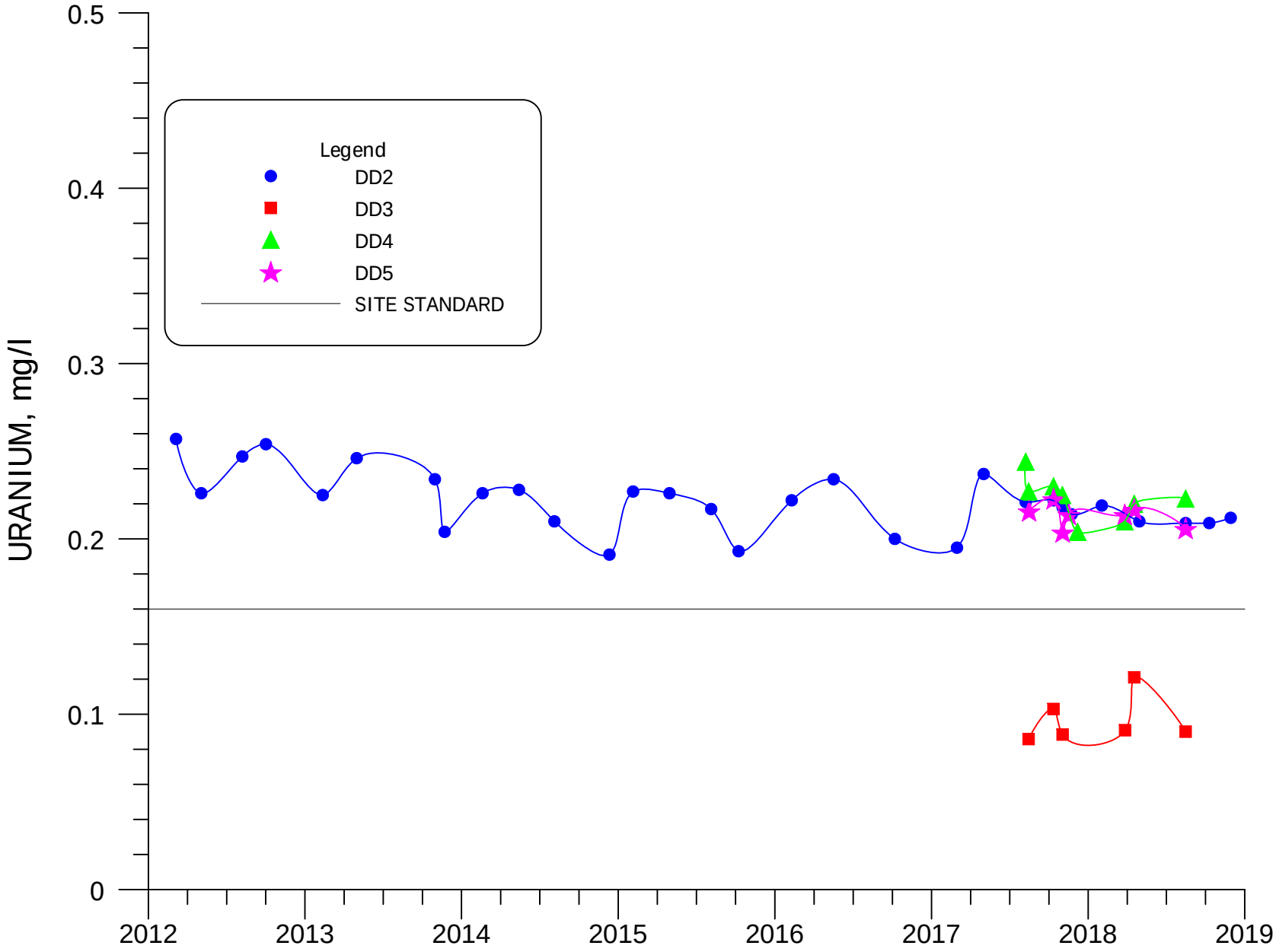

FIGURE 4.3-54A. URANIUM CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

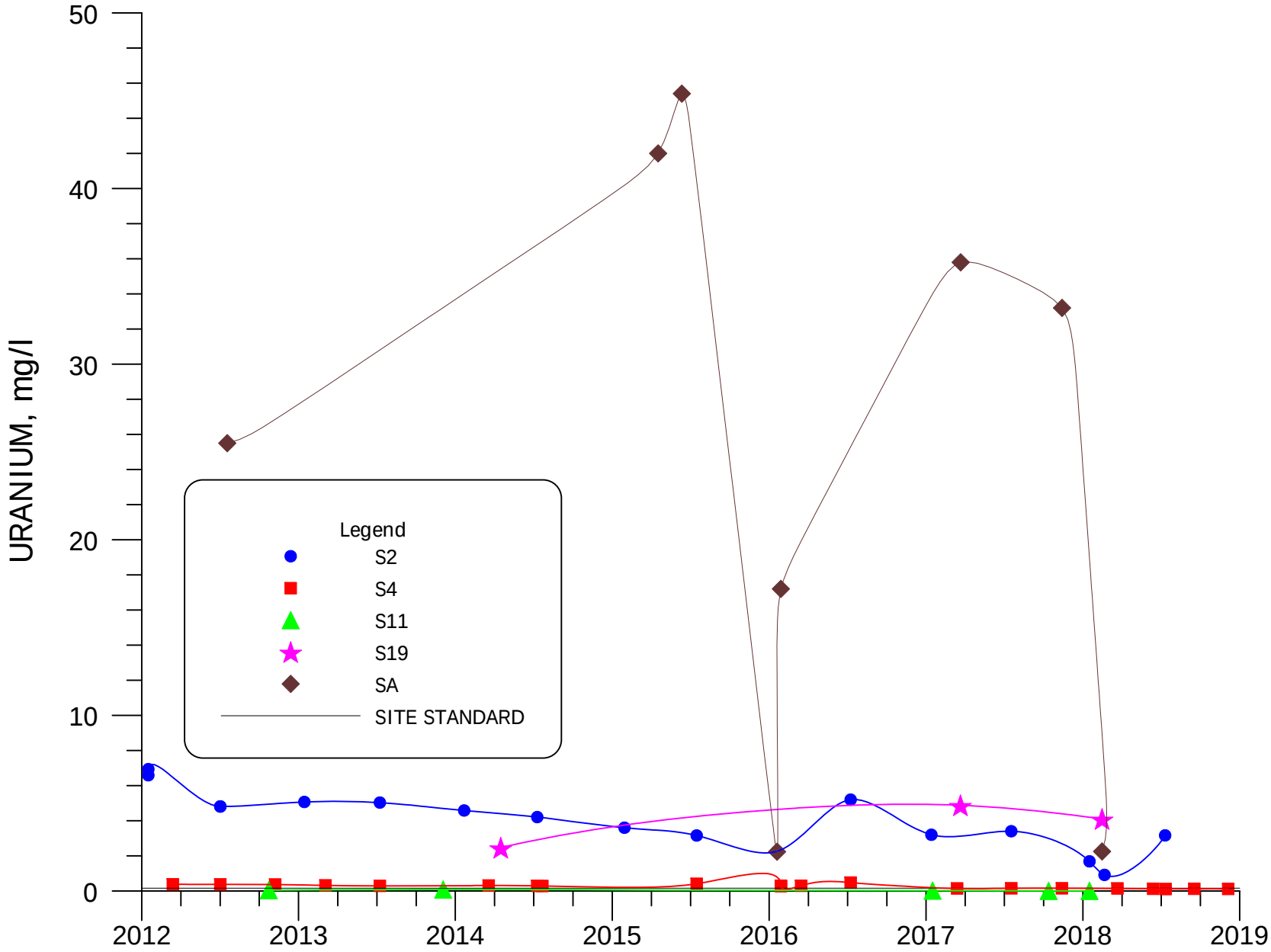

FIGURE 4.3-55. URANIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

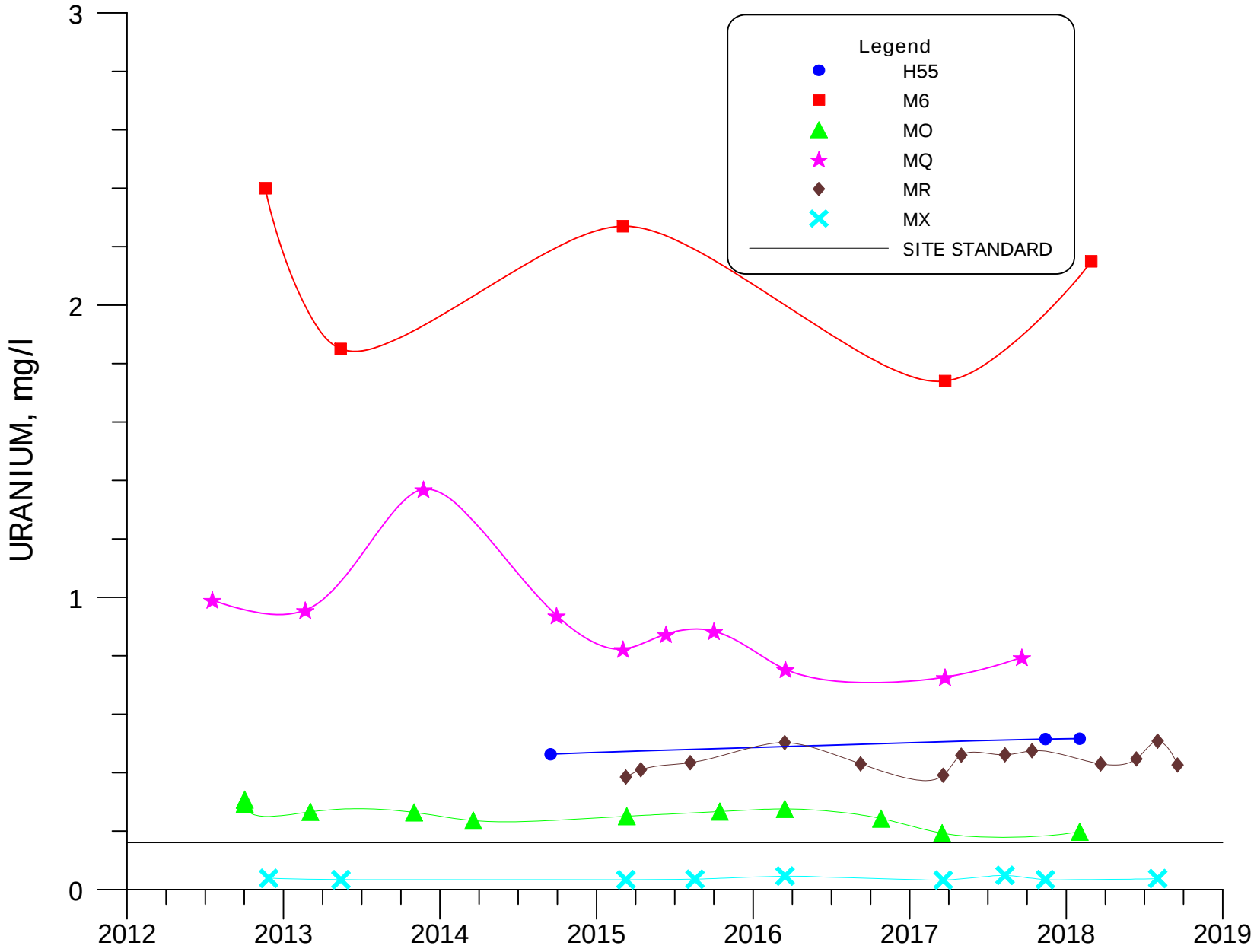

FIGURE 4.3-56. URANIUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

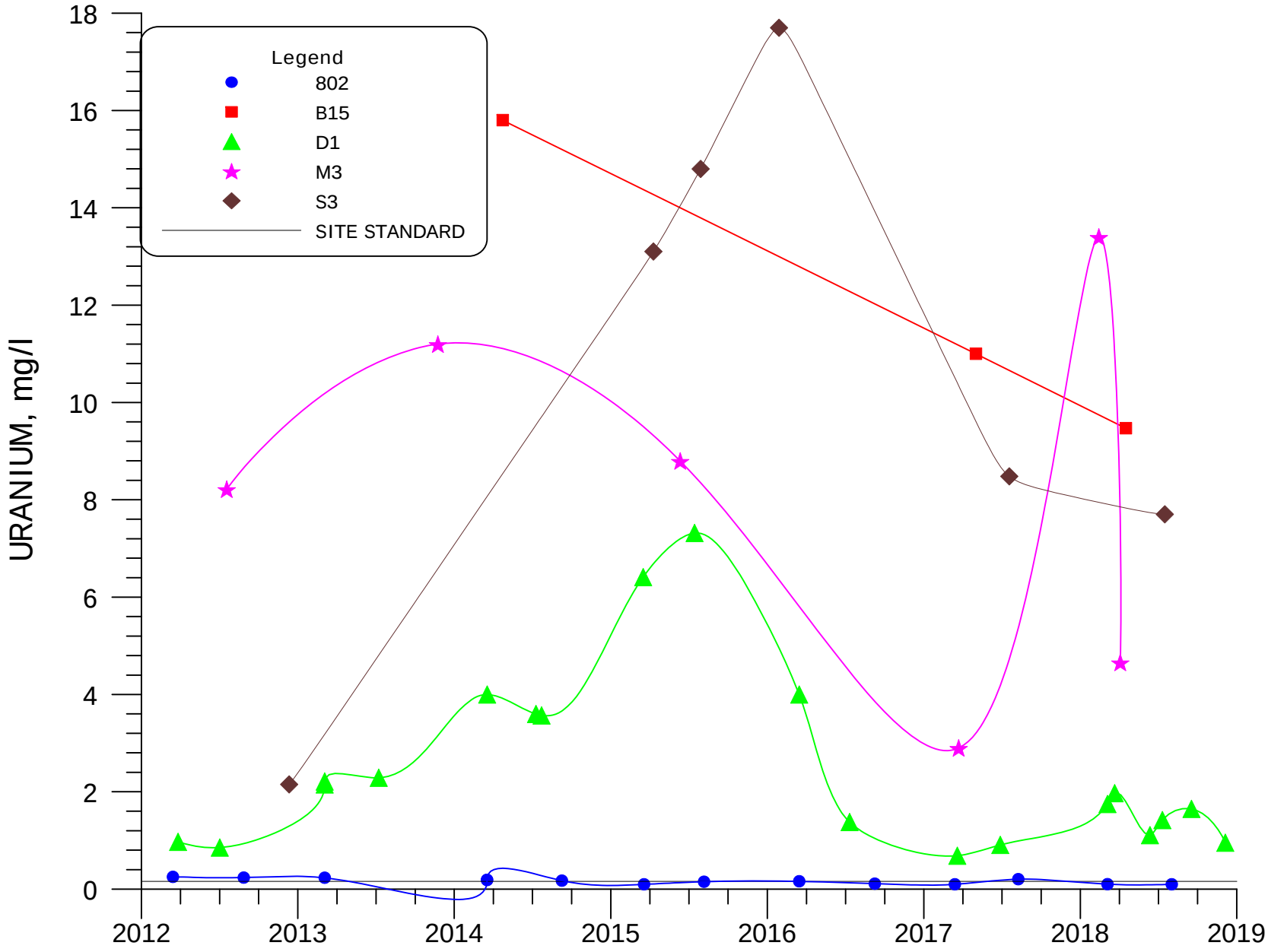

FIGURE 4.3-57. URANIUM CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

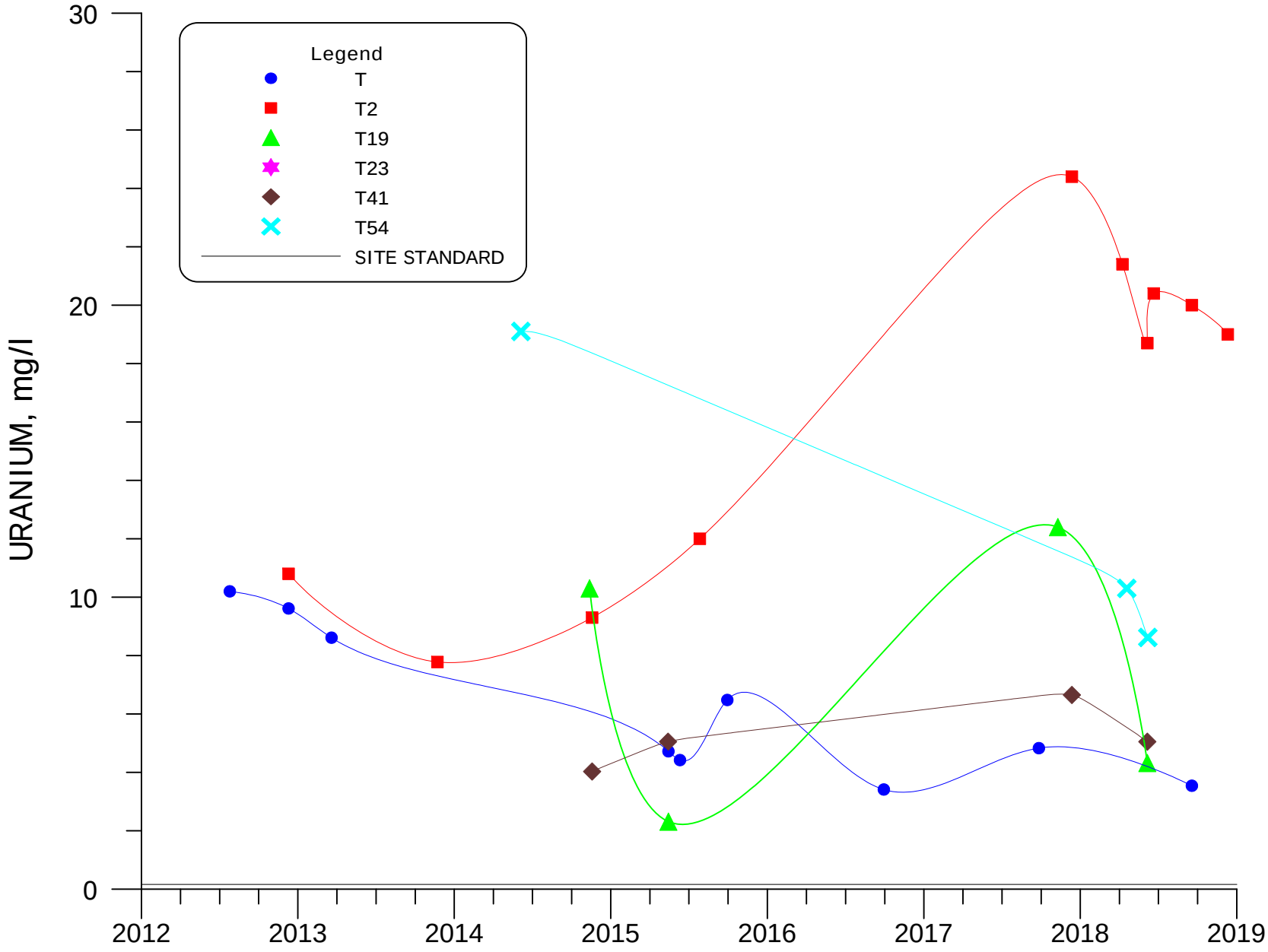

FIGURE 4.3-58. URANIUM CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

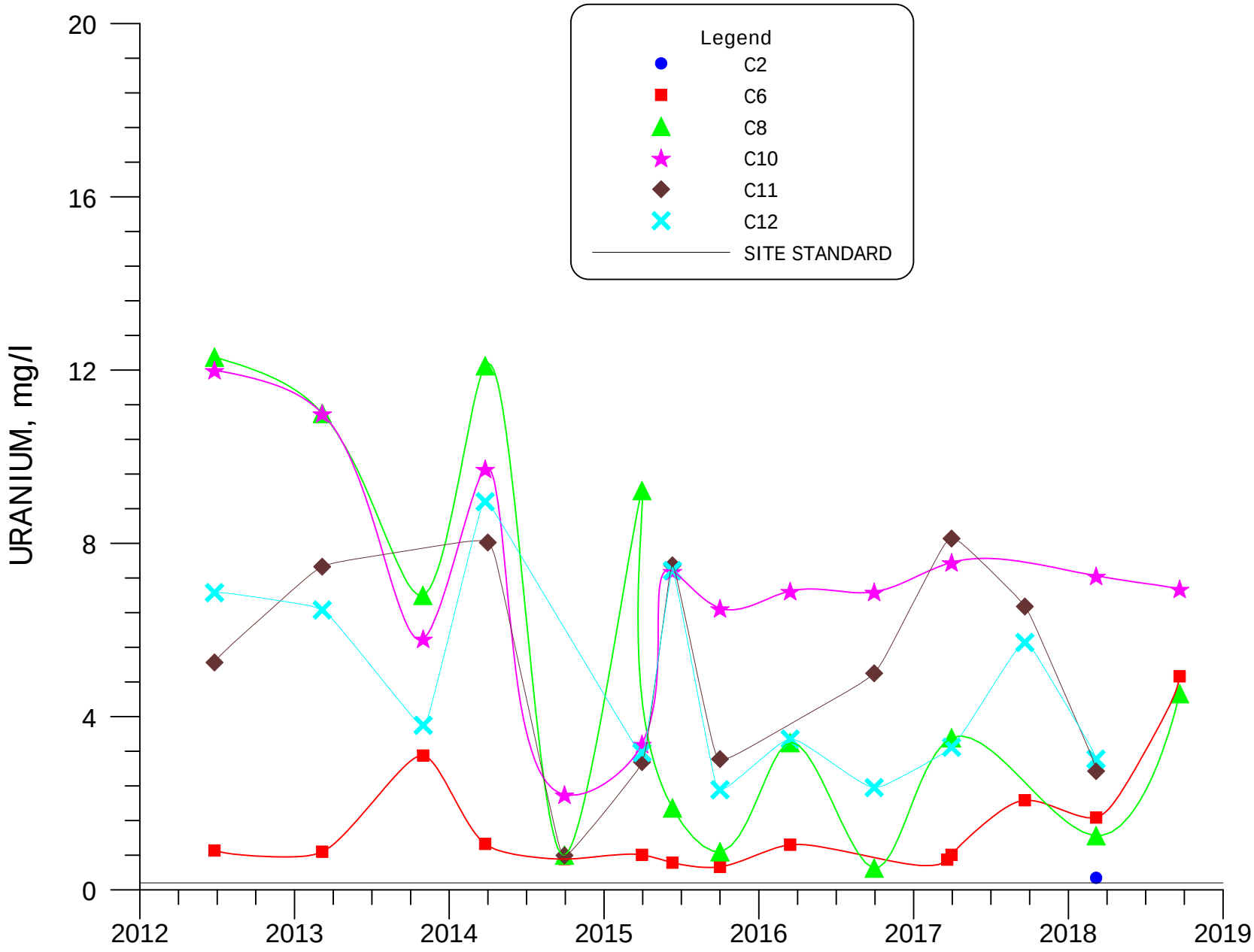

FIGURE 4.3-59. URANIUM CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

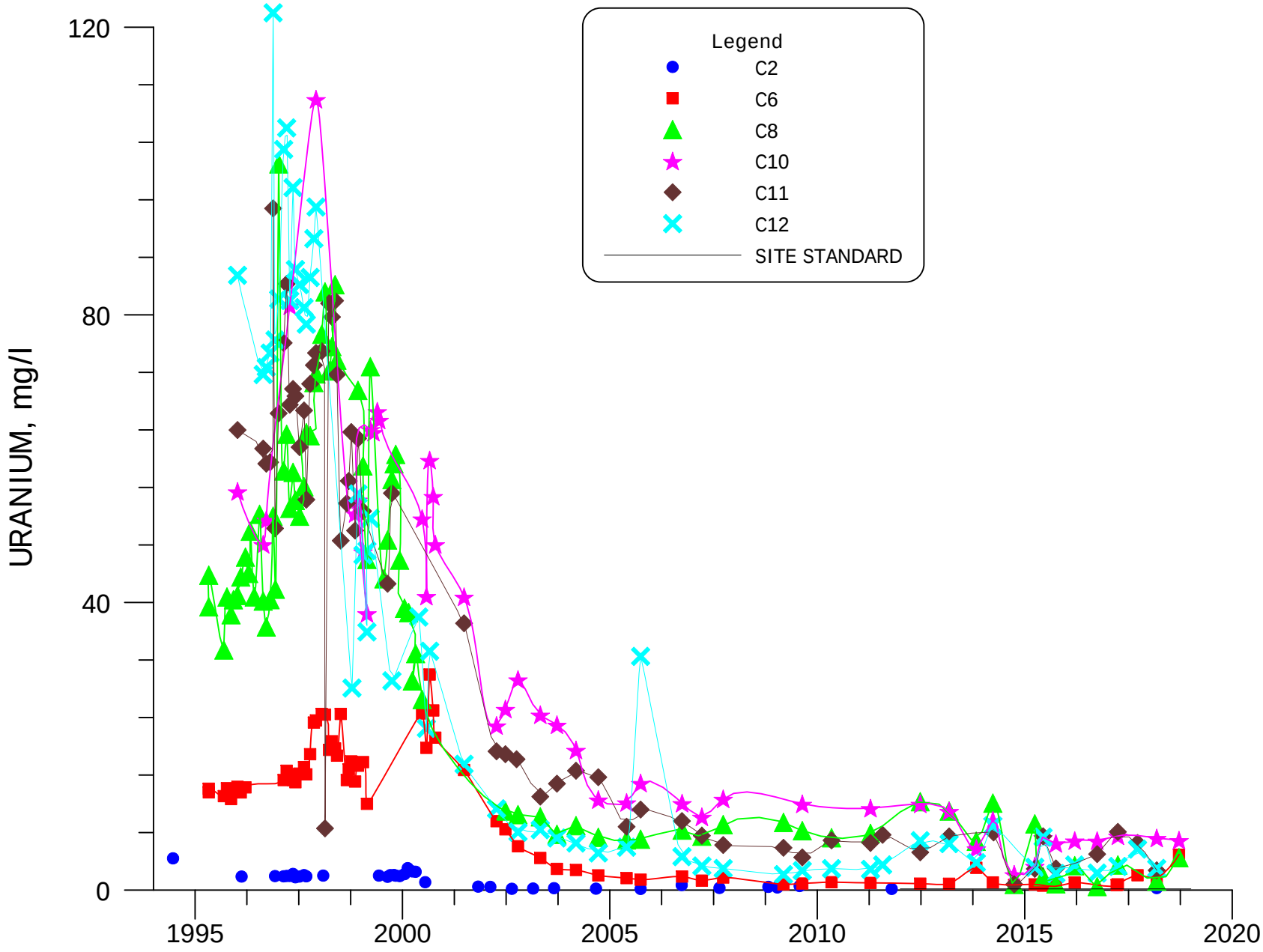

FIGURE 4.3-59A. URANIUM CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12 FOR ALL HISTORICAL DATA.

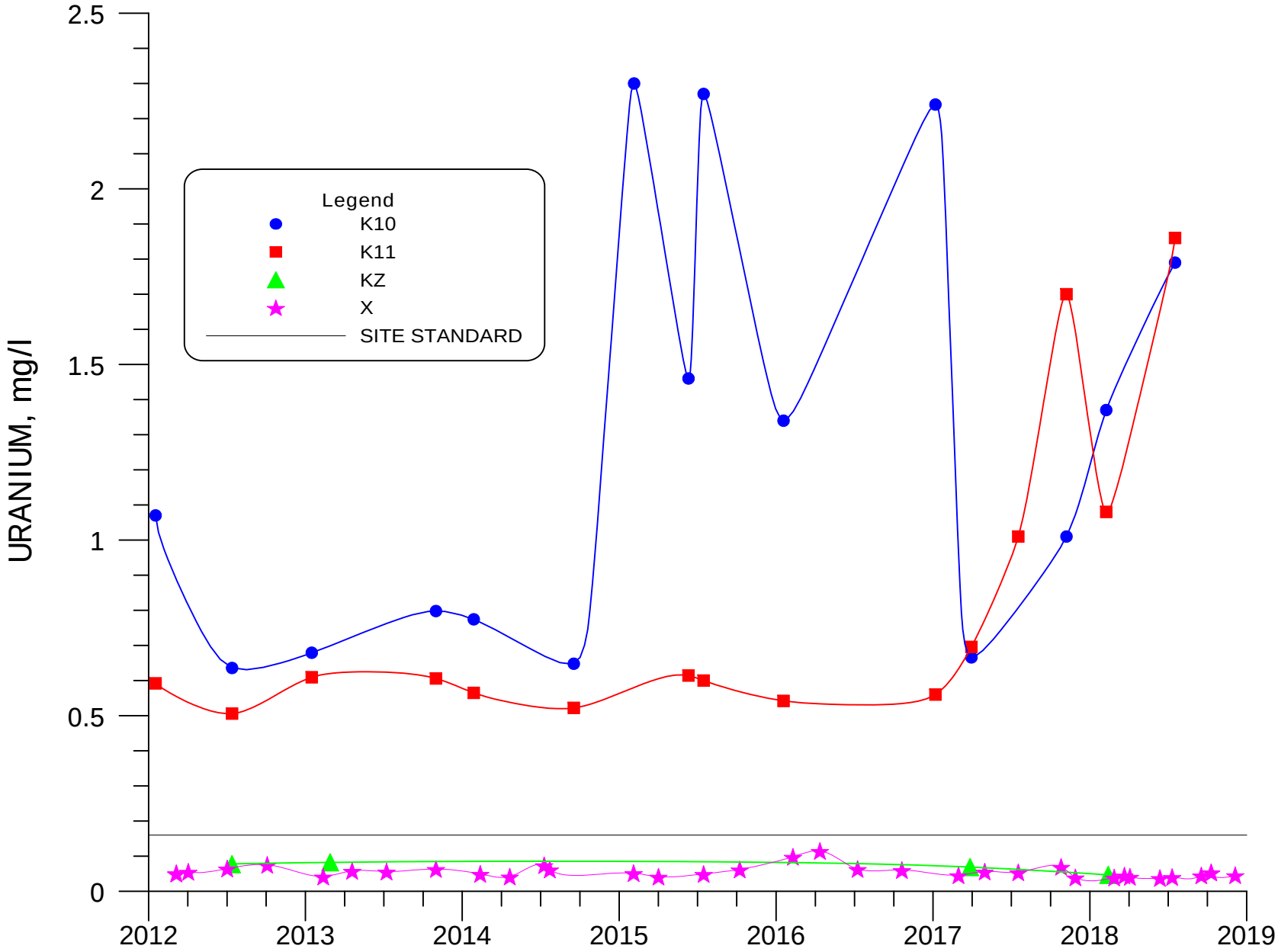

FIGURE 4.3-60. URANIUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

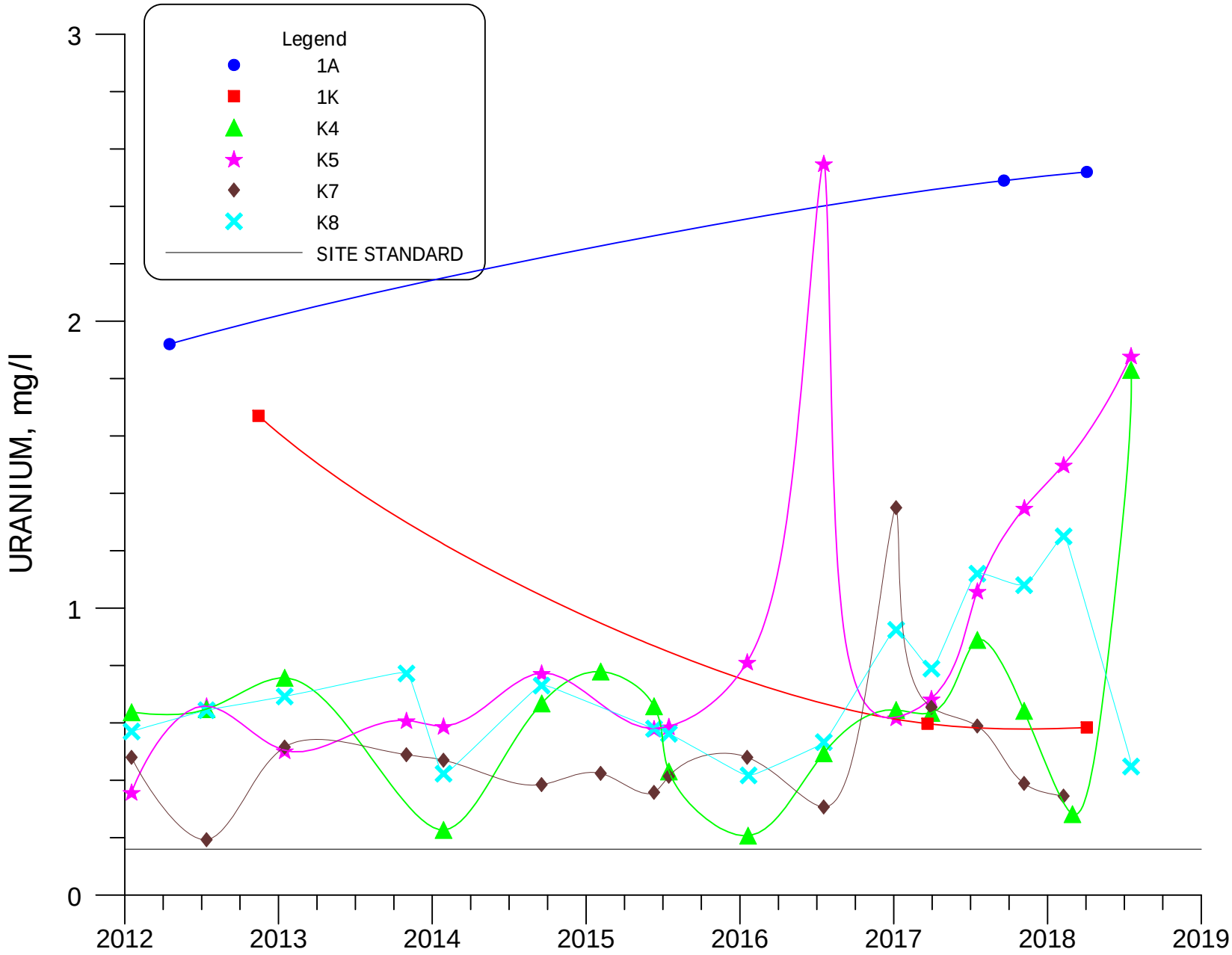

FIGURE 4.3-61. URANIUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

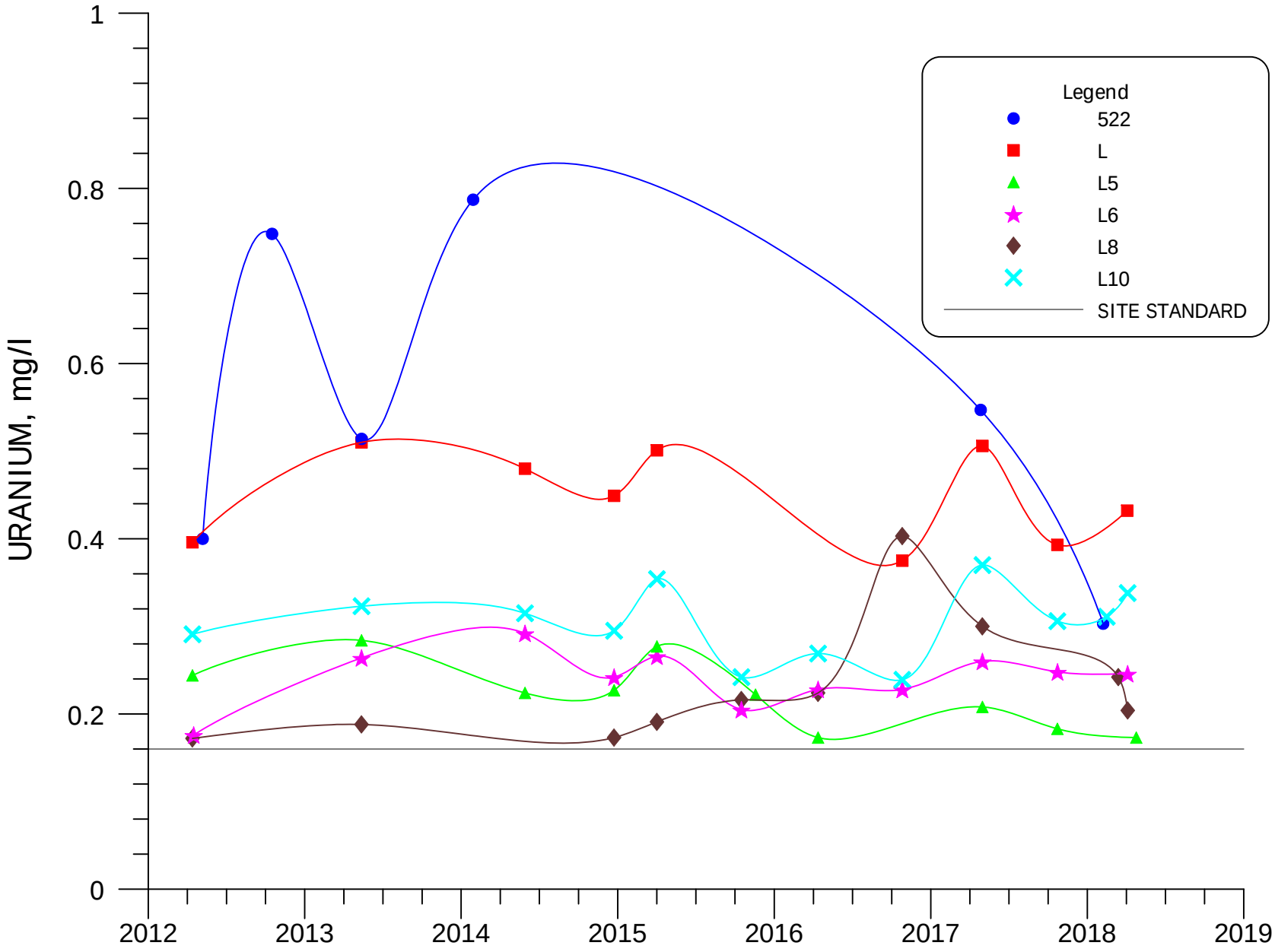

FIGURE 4.3-62. URANIUM CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

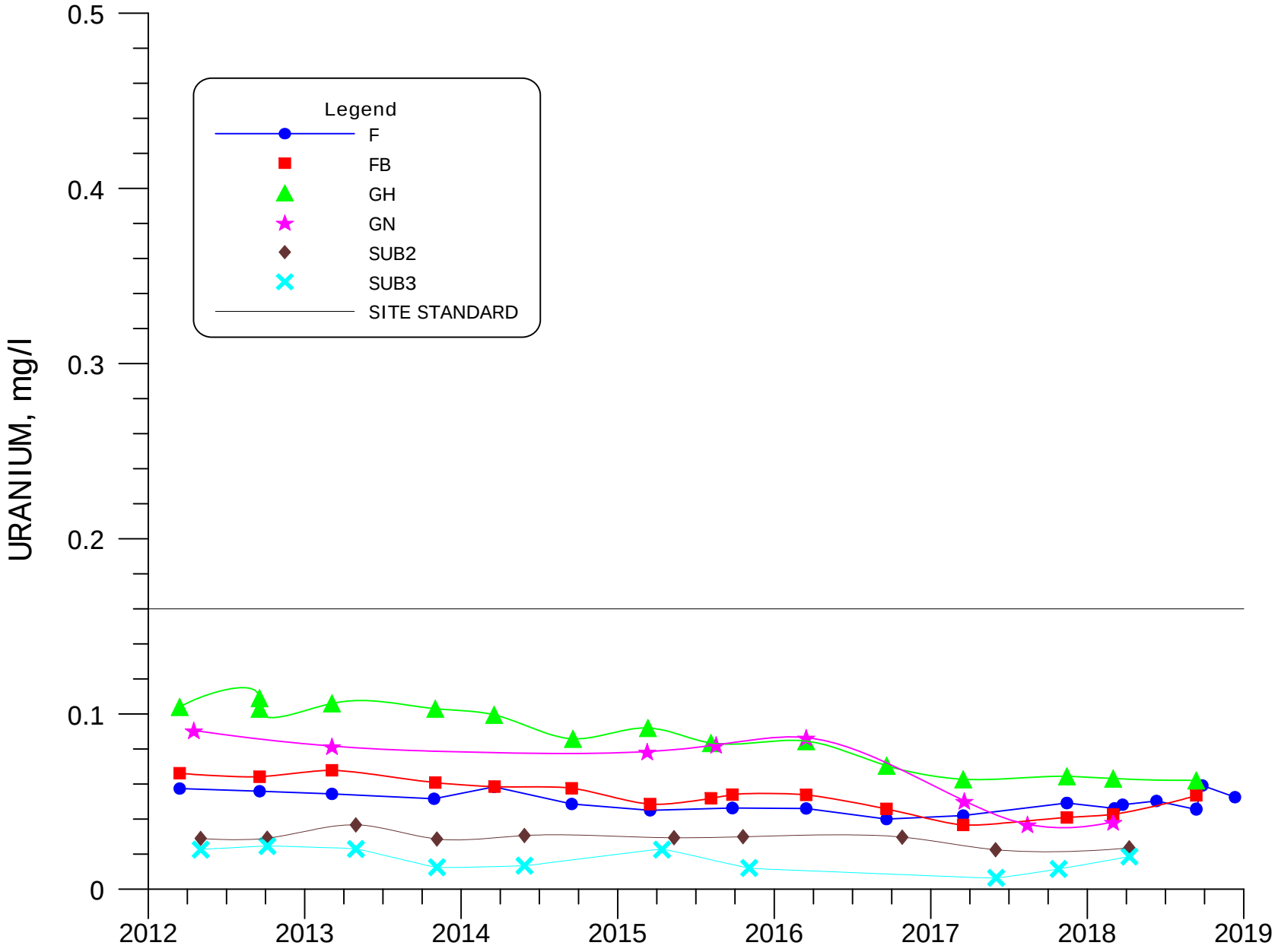

FIGURE 4.3-63. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

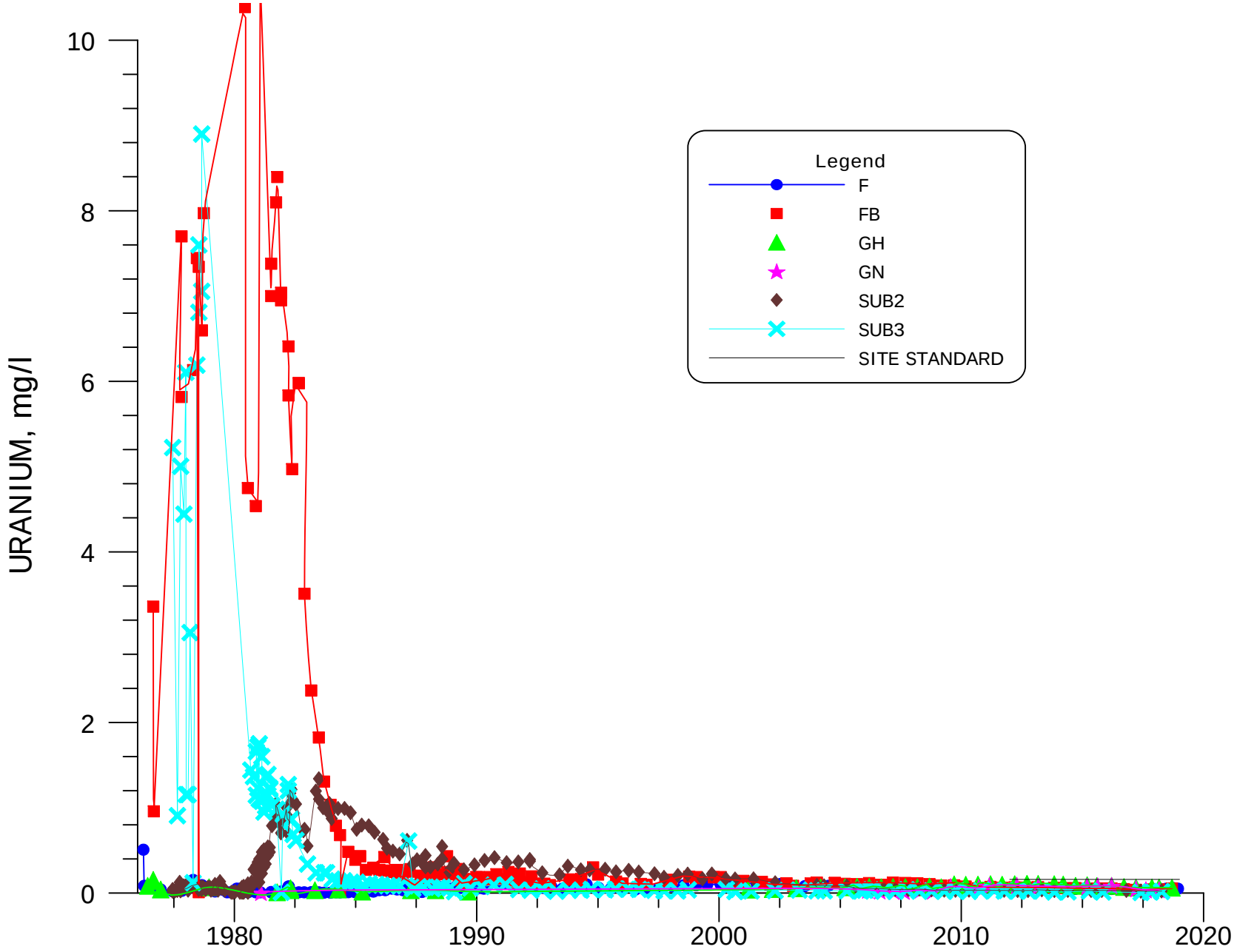

FIGURE 4.3-63A. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3 FOR ALL HISTORICAL DATA.

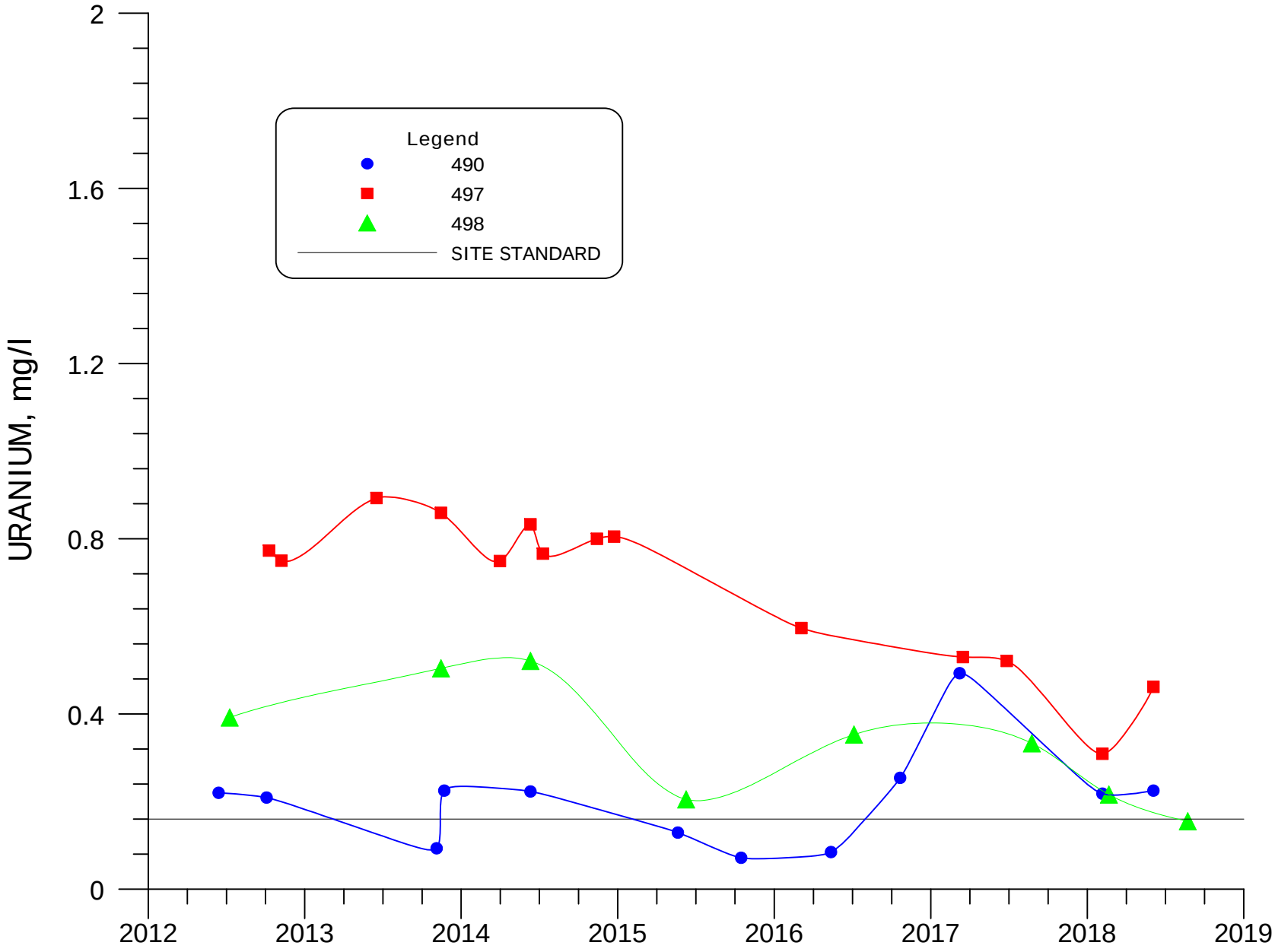

FIGURE 4.3-64. URANIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

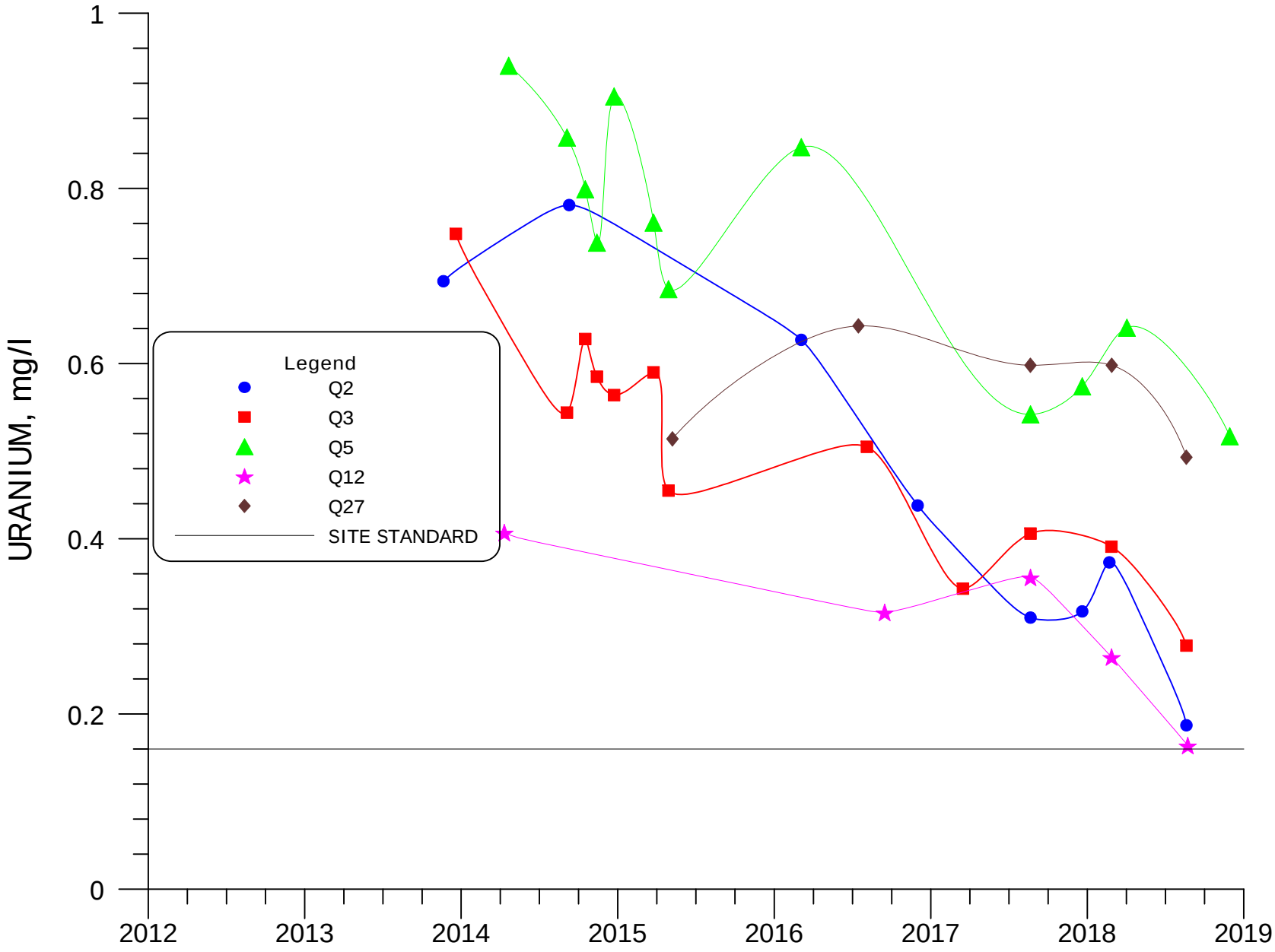

FIGURE 4.3-64A. URANIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

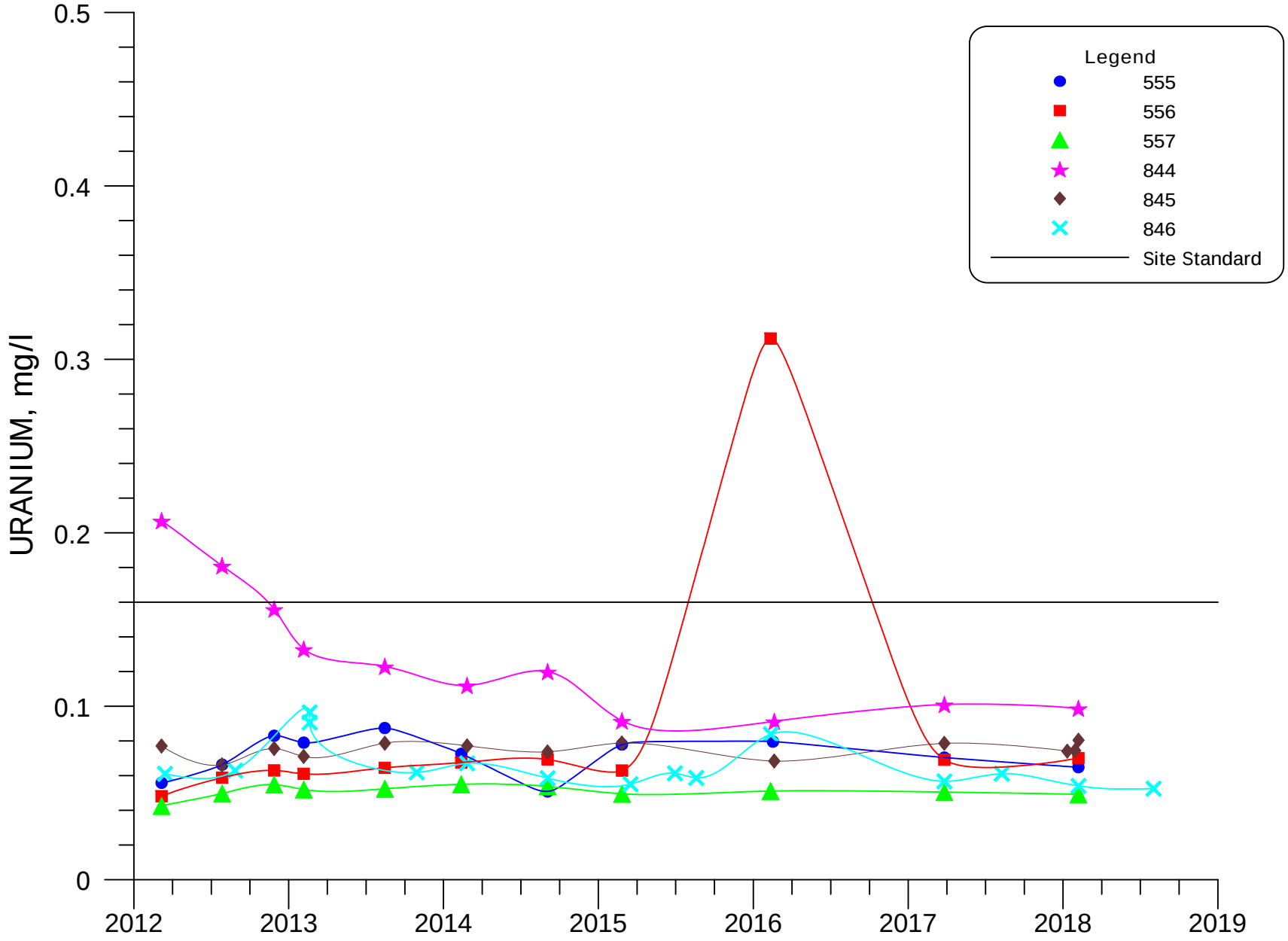

FIGURE 4.3-65. URANIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

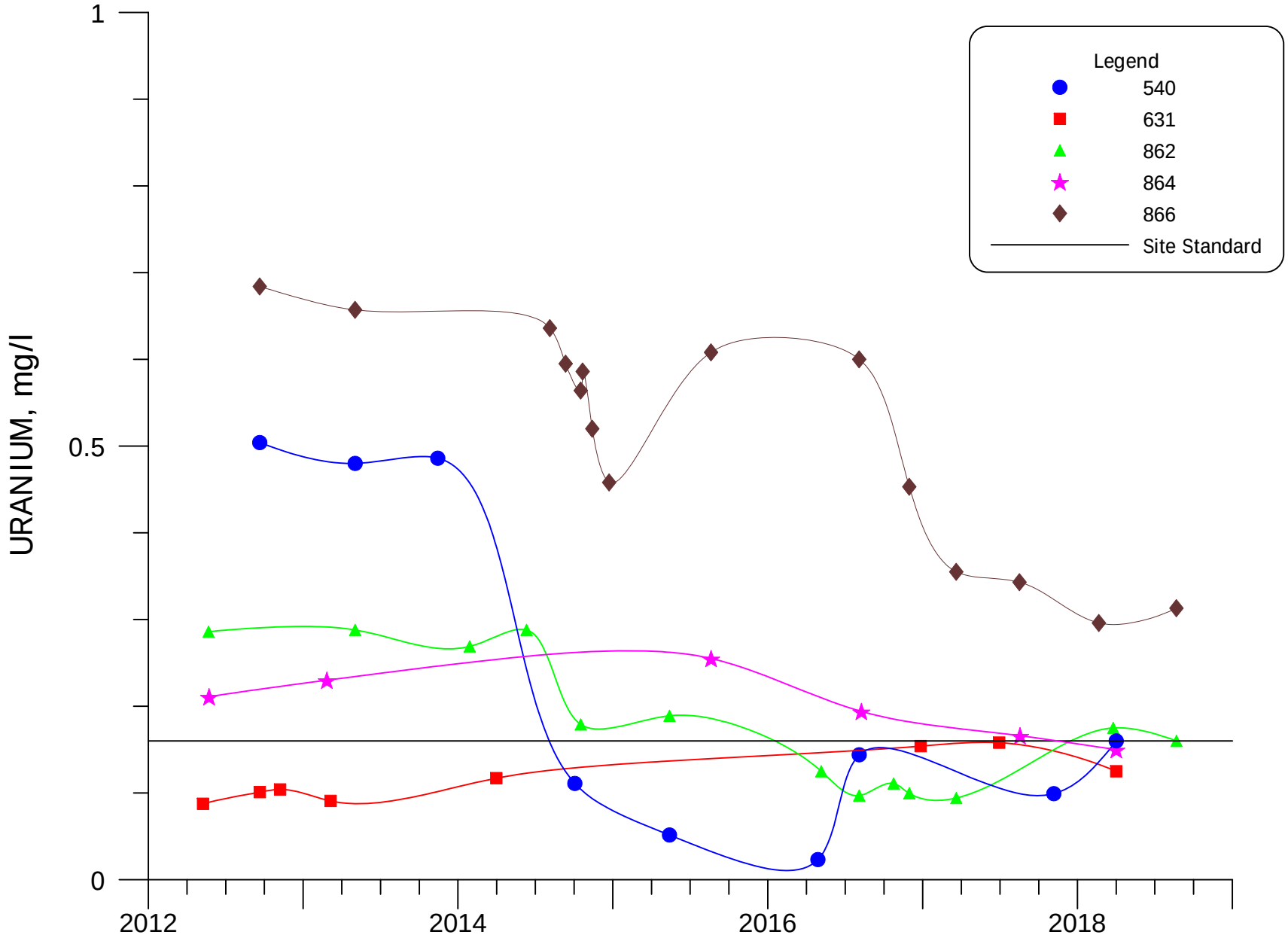

FIGURE 4.3-66. URANIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

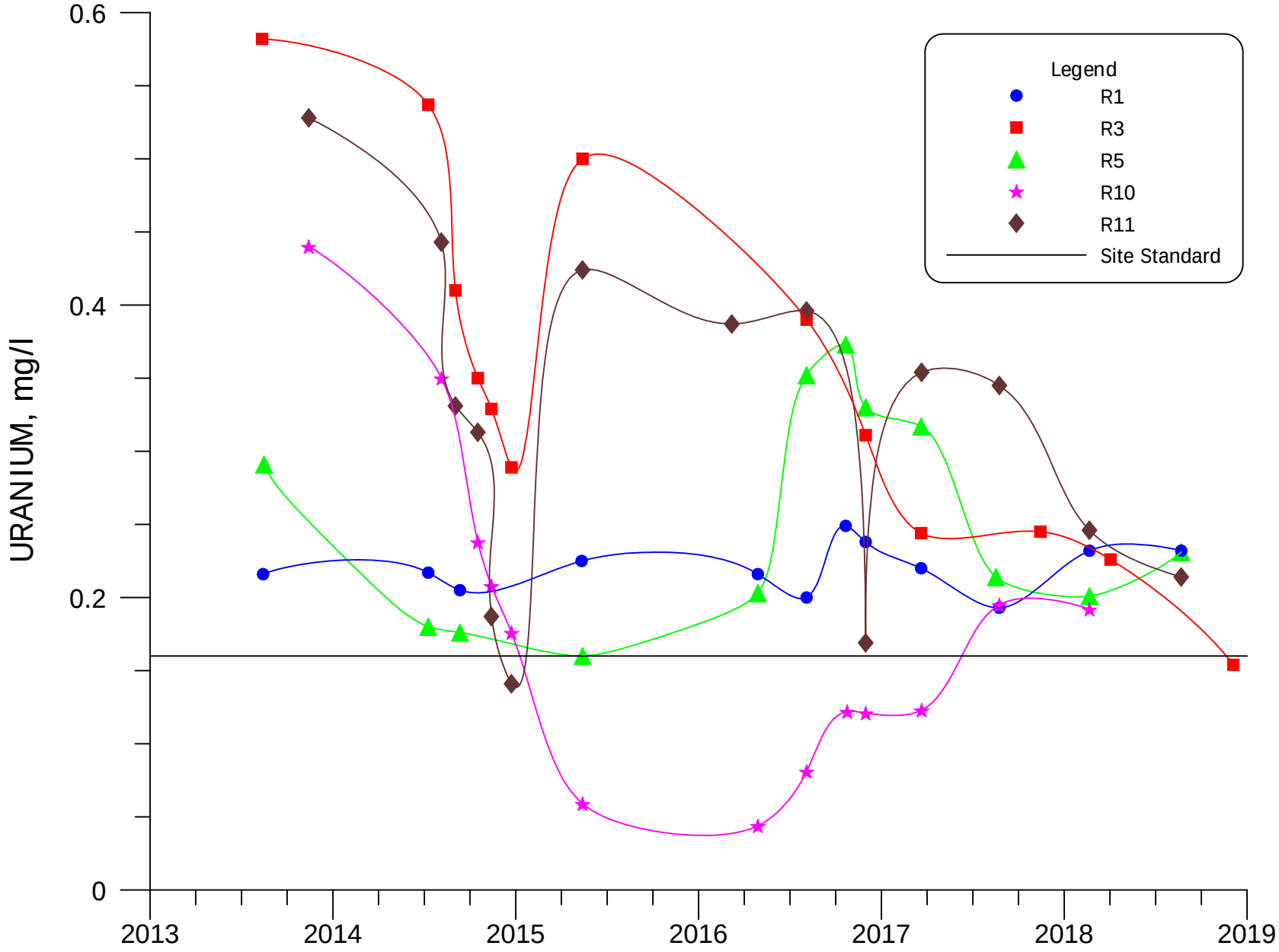

FIGURE 4.3-66A. URANIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

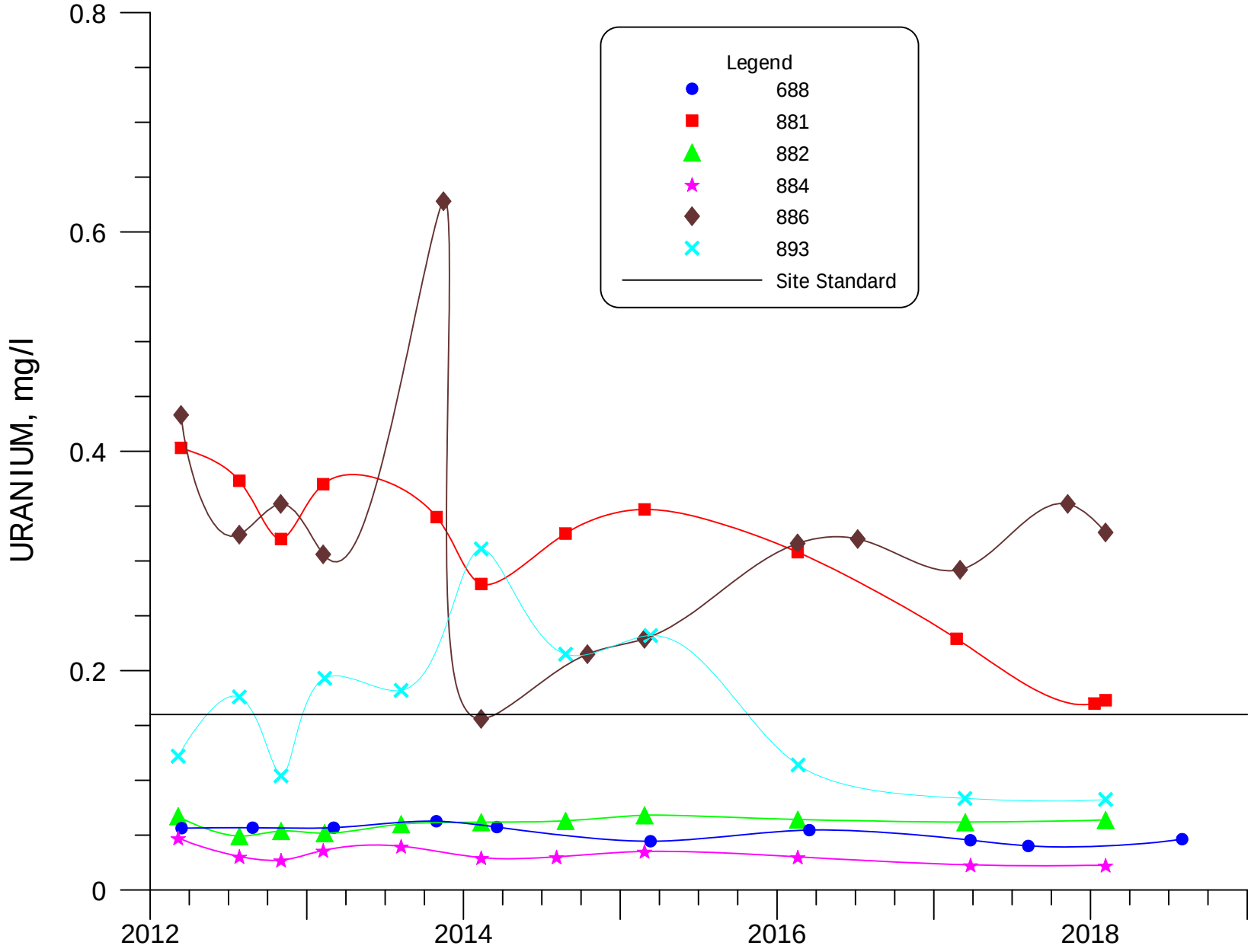

FIGURE 4.3-67. URANIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

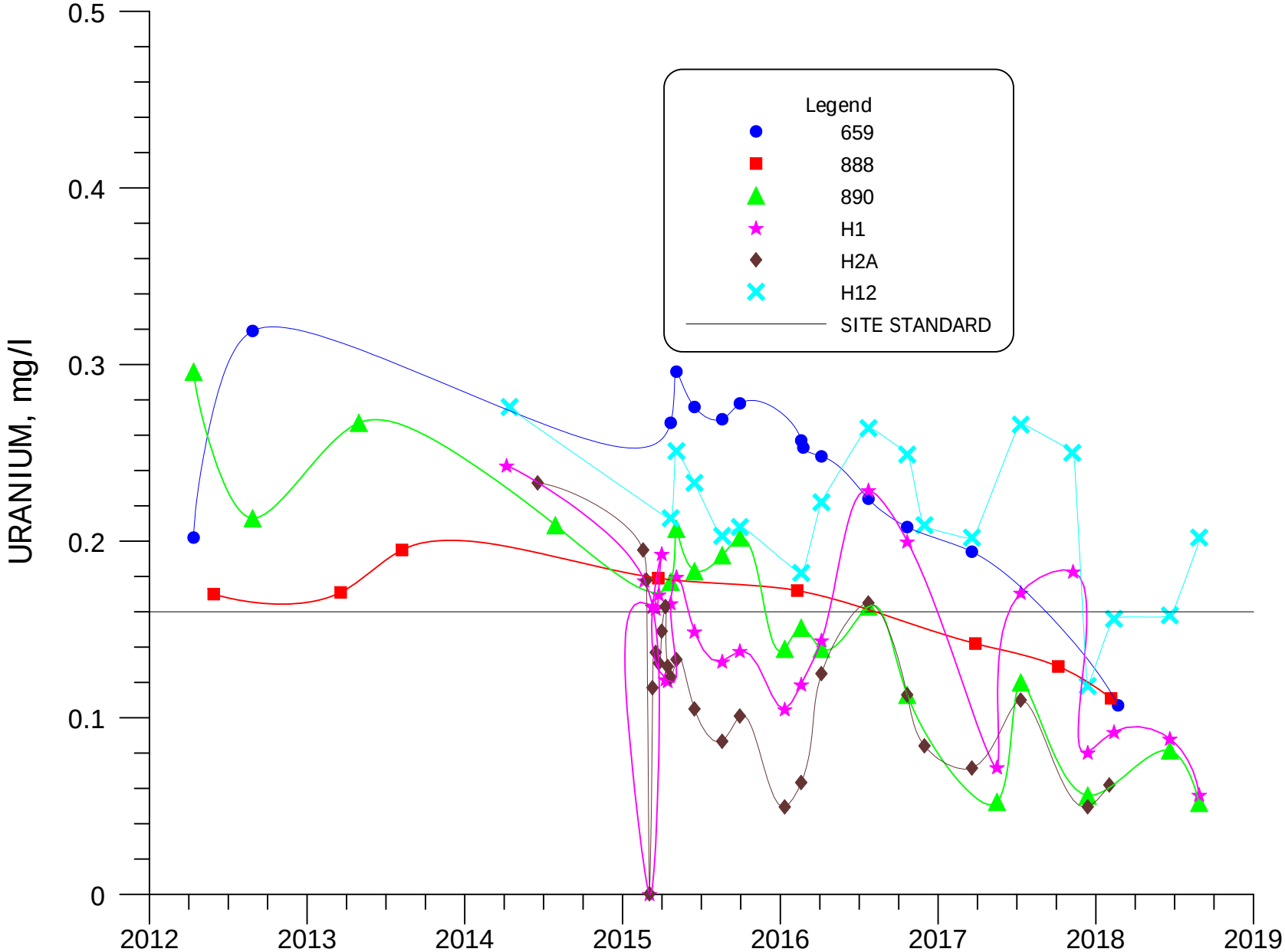

FIGURE 4.3-67A. URANIUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

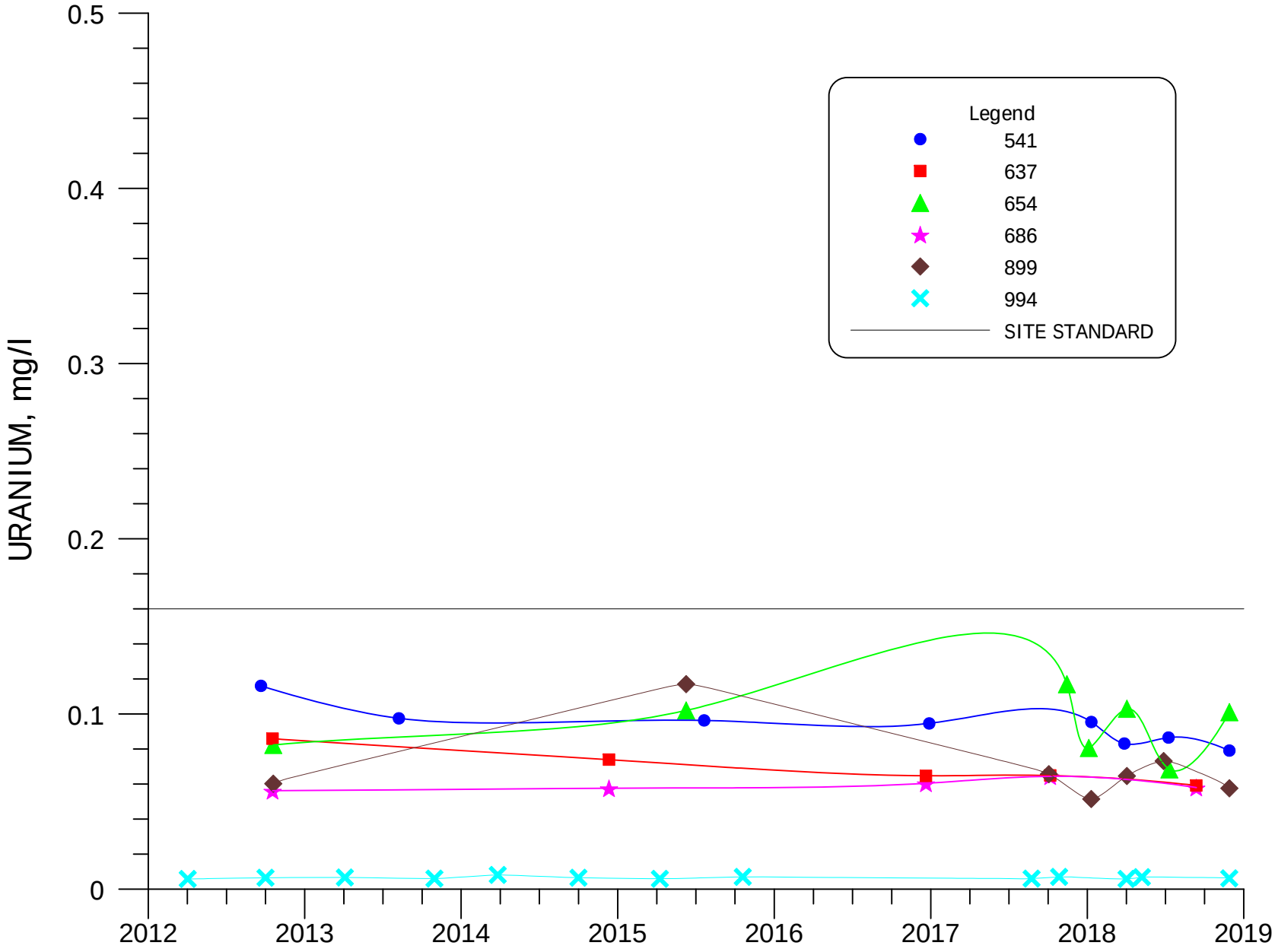

FIGURE 4.3-68. URANIUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

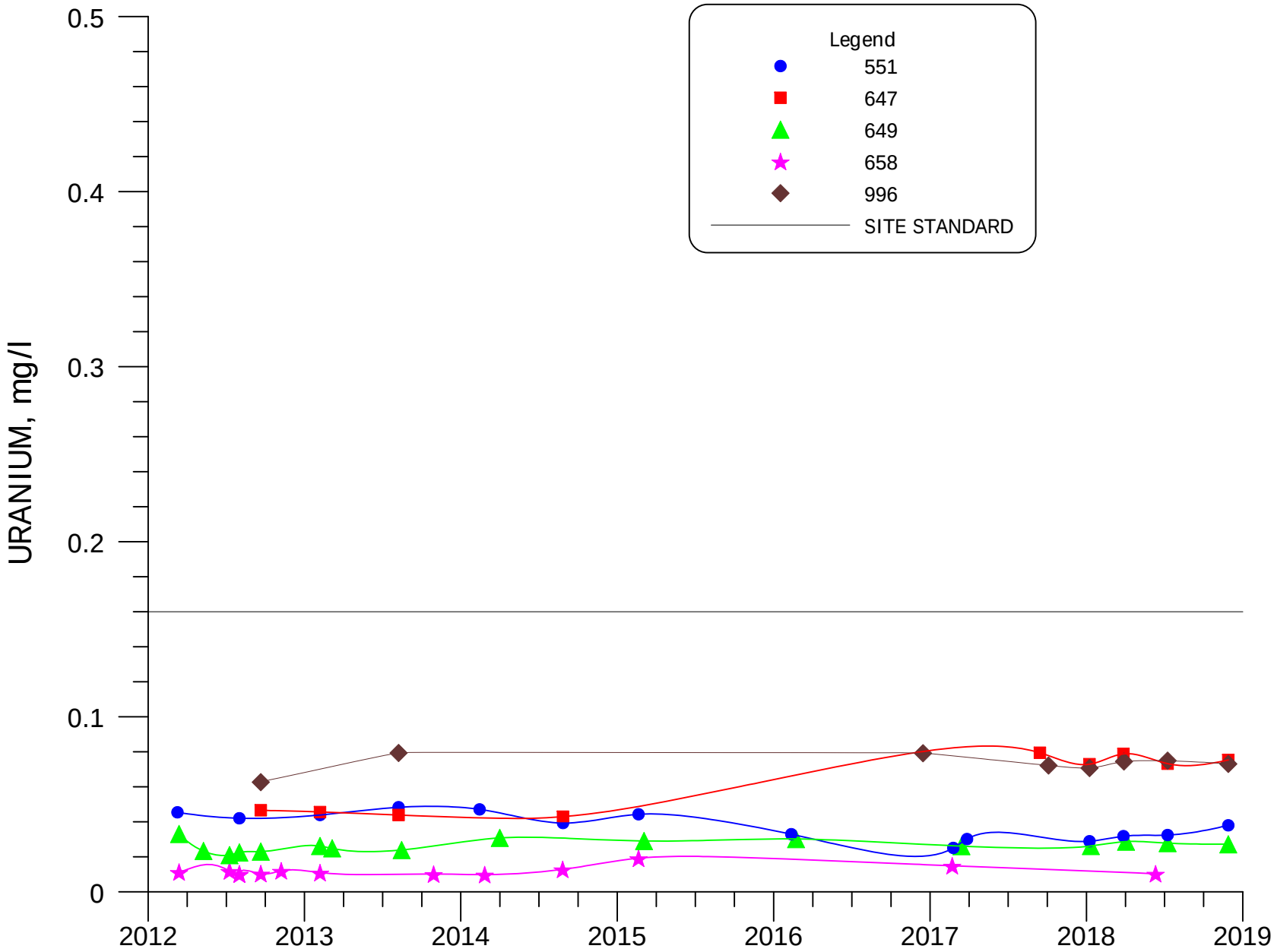

FIGURE 4.3-69. URANIUM CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

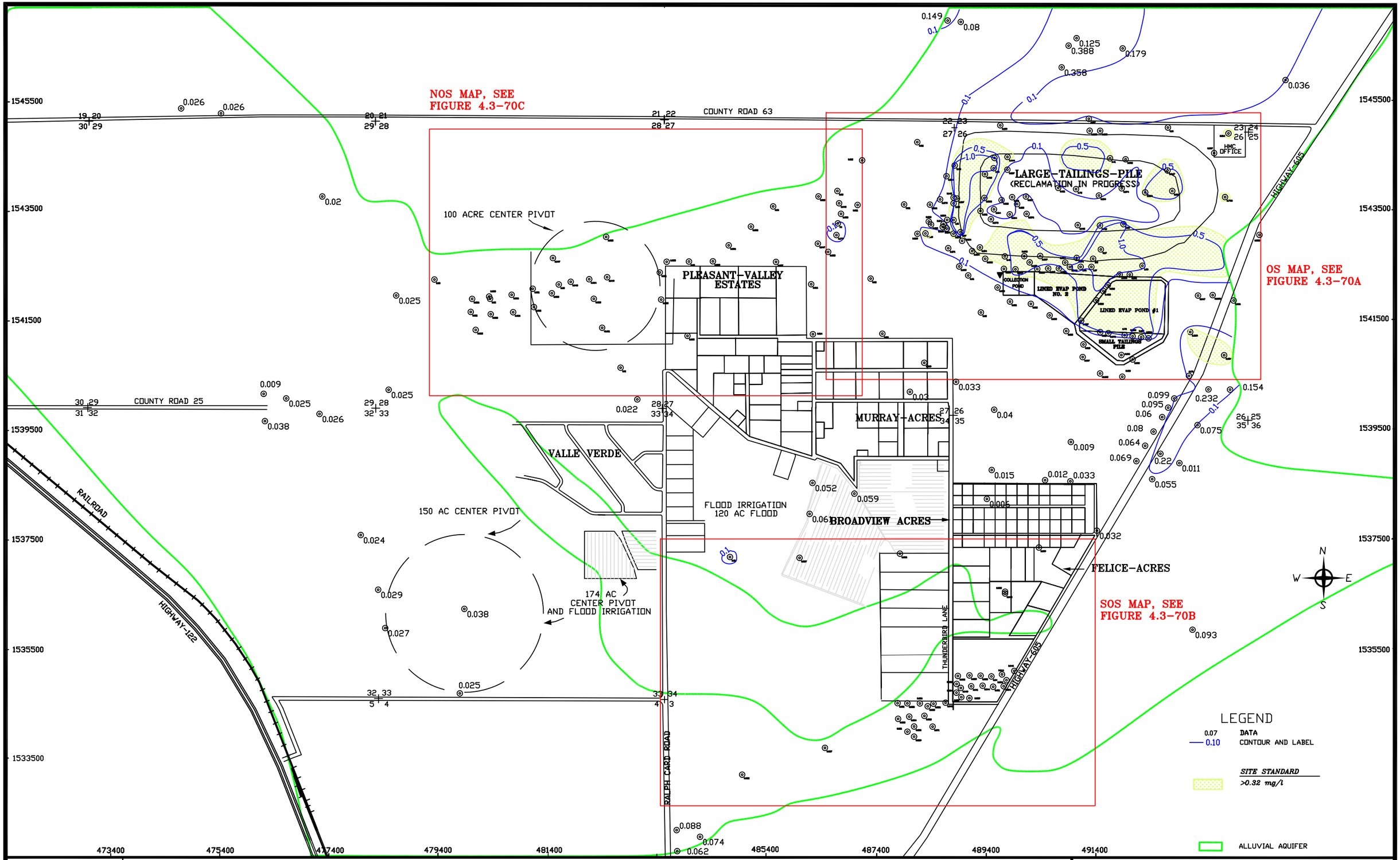

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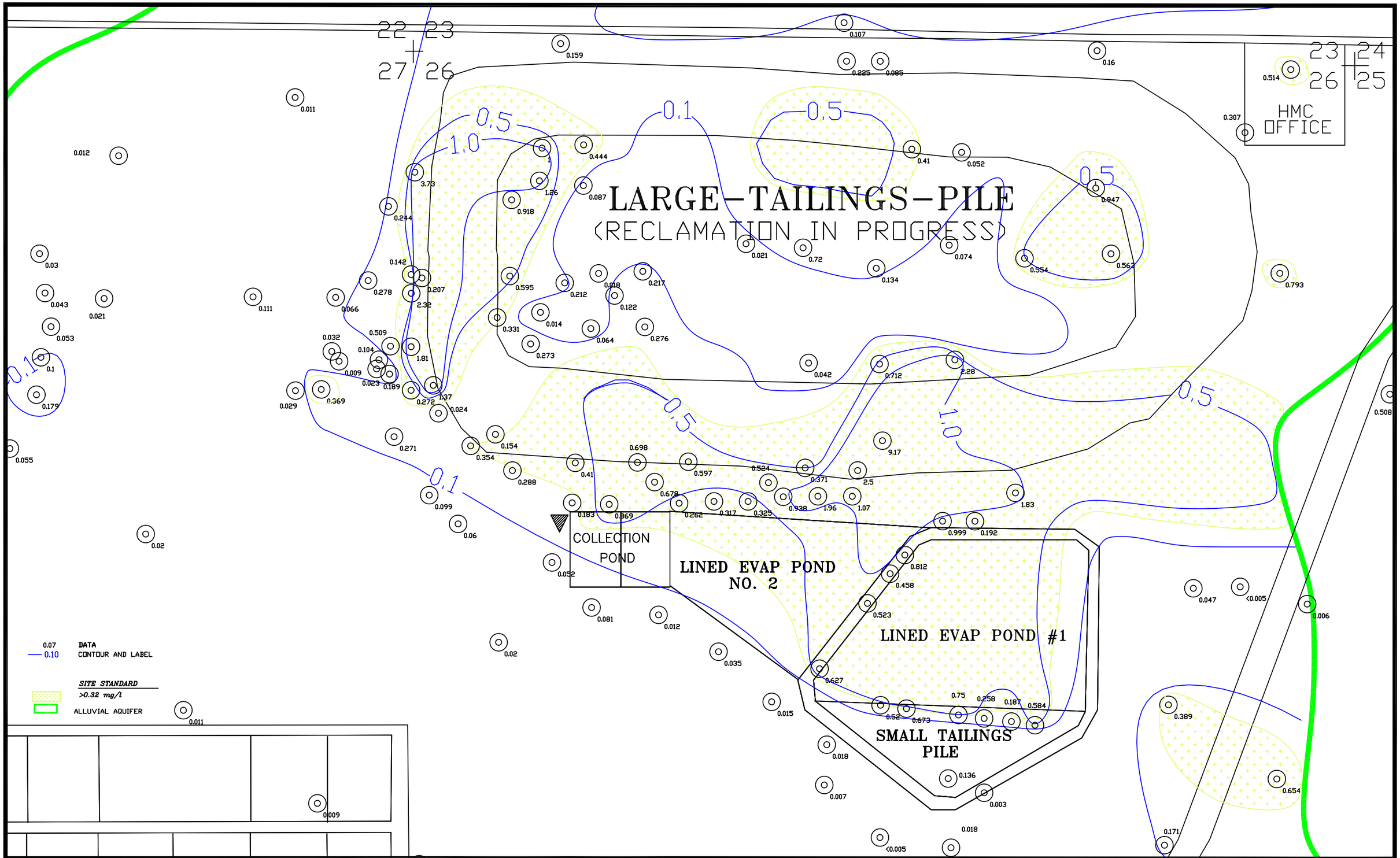
FIGURE 4.3-70. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018 mg/l



SCALE: 1"=500'
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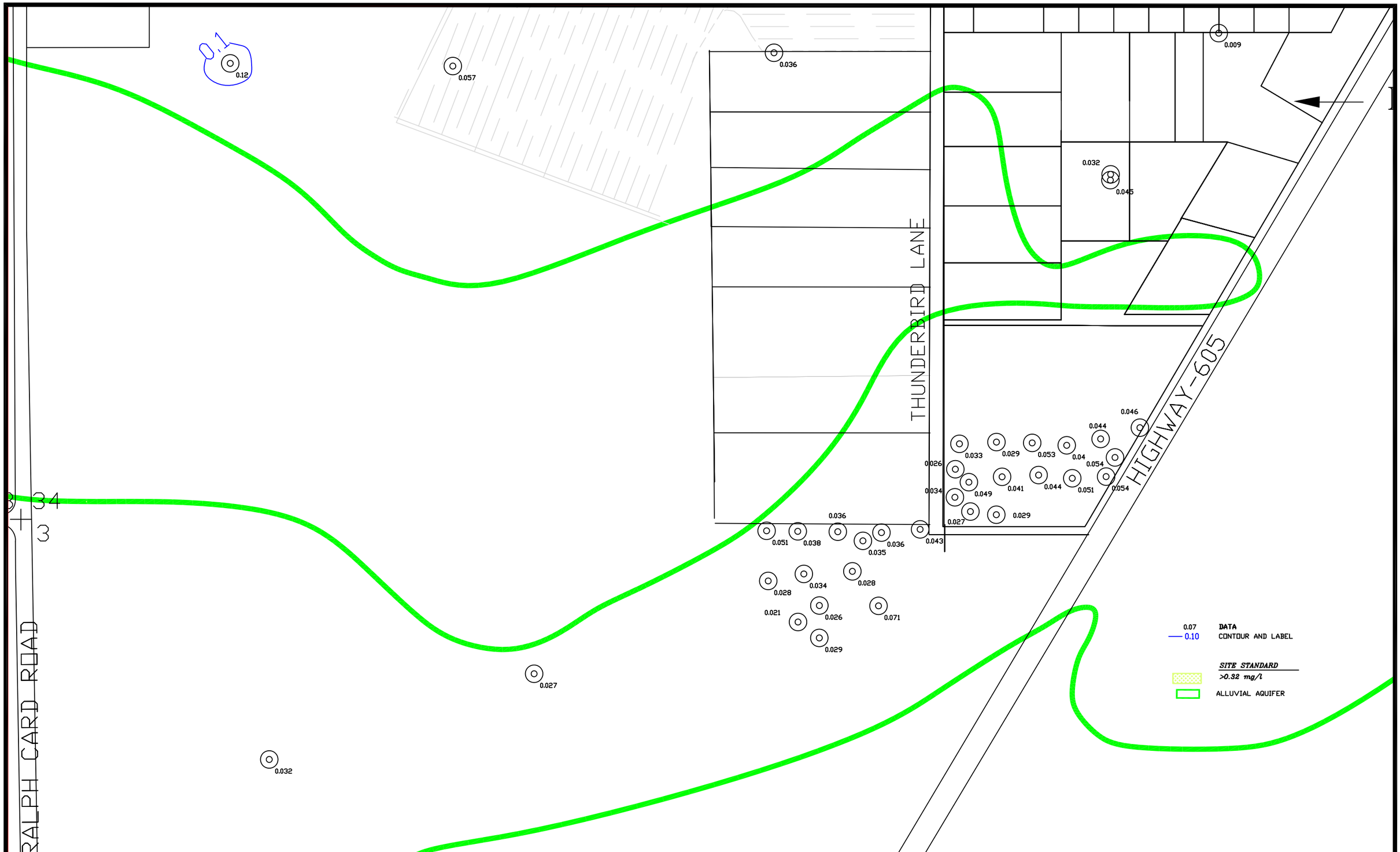
FIGURE 4.3-70A. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l



SCALE: 1"=500'
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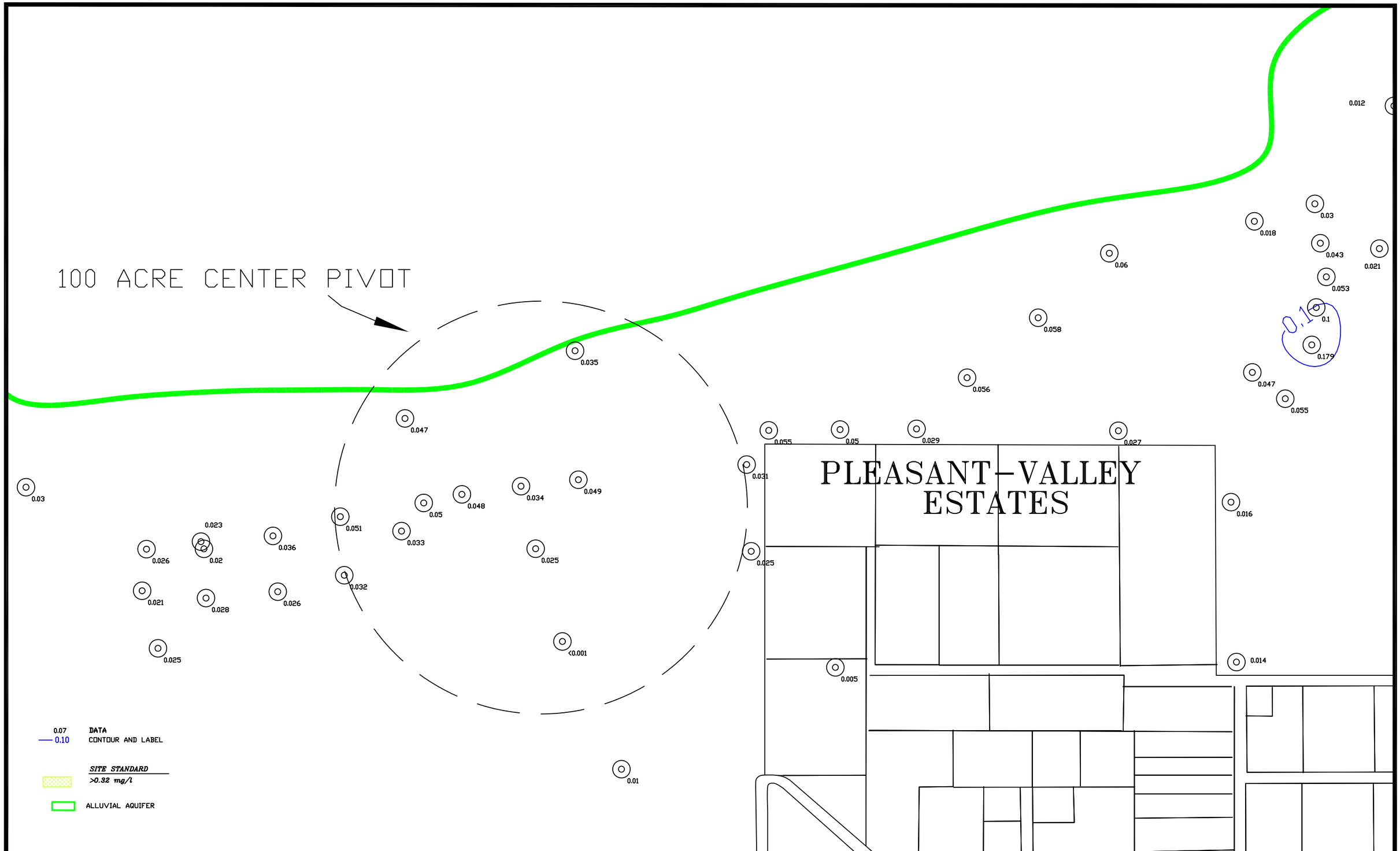
FIGURE 4.3-70B. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'
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FIGURE 4.3-70C. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

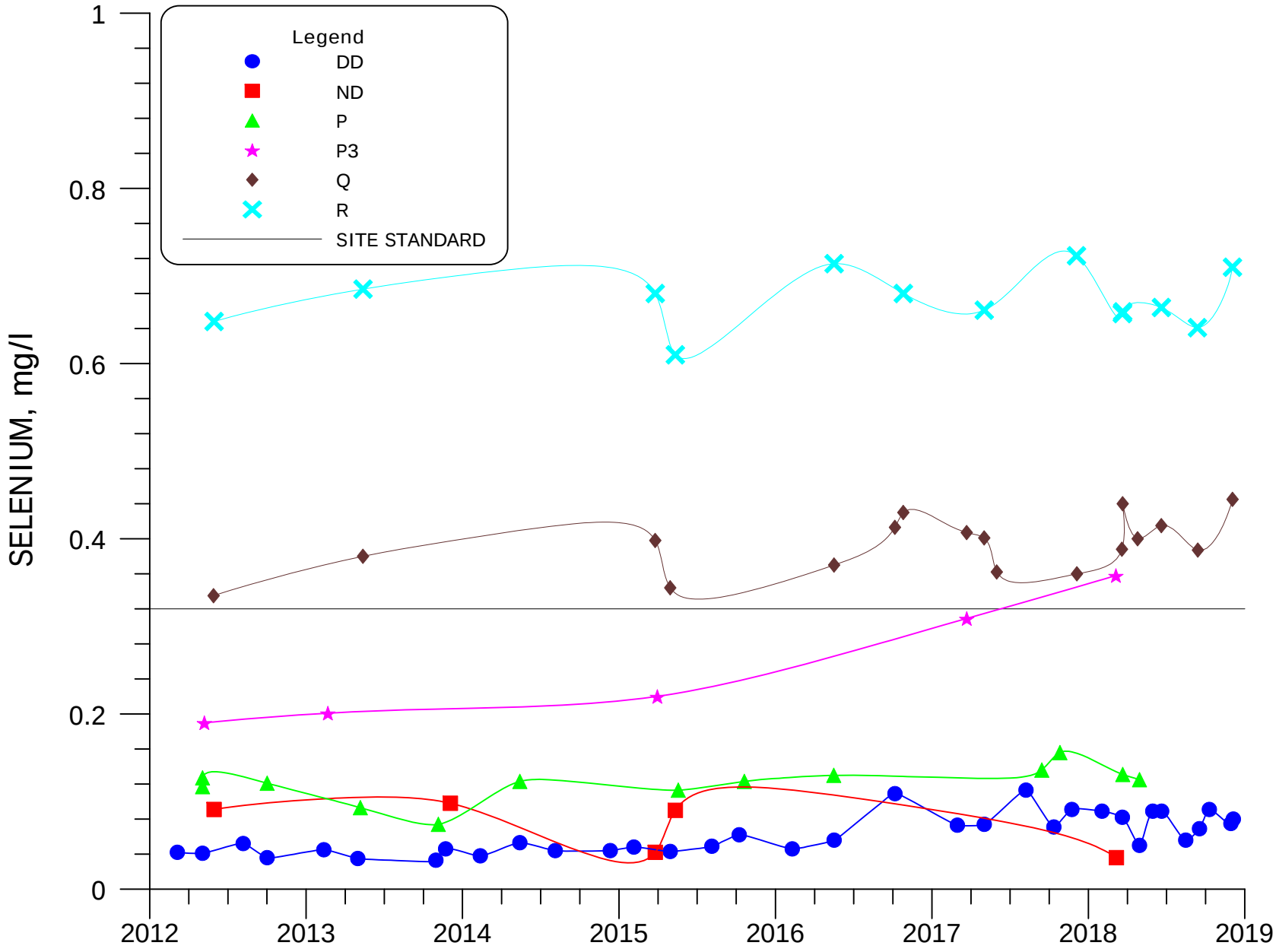


FIGURE 4.3-71. SELENIUM CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

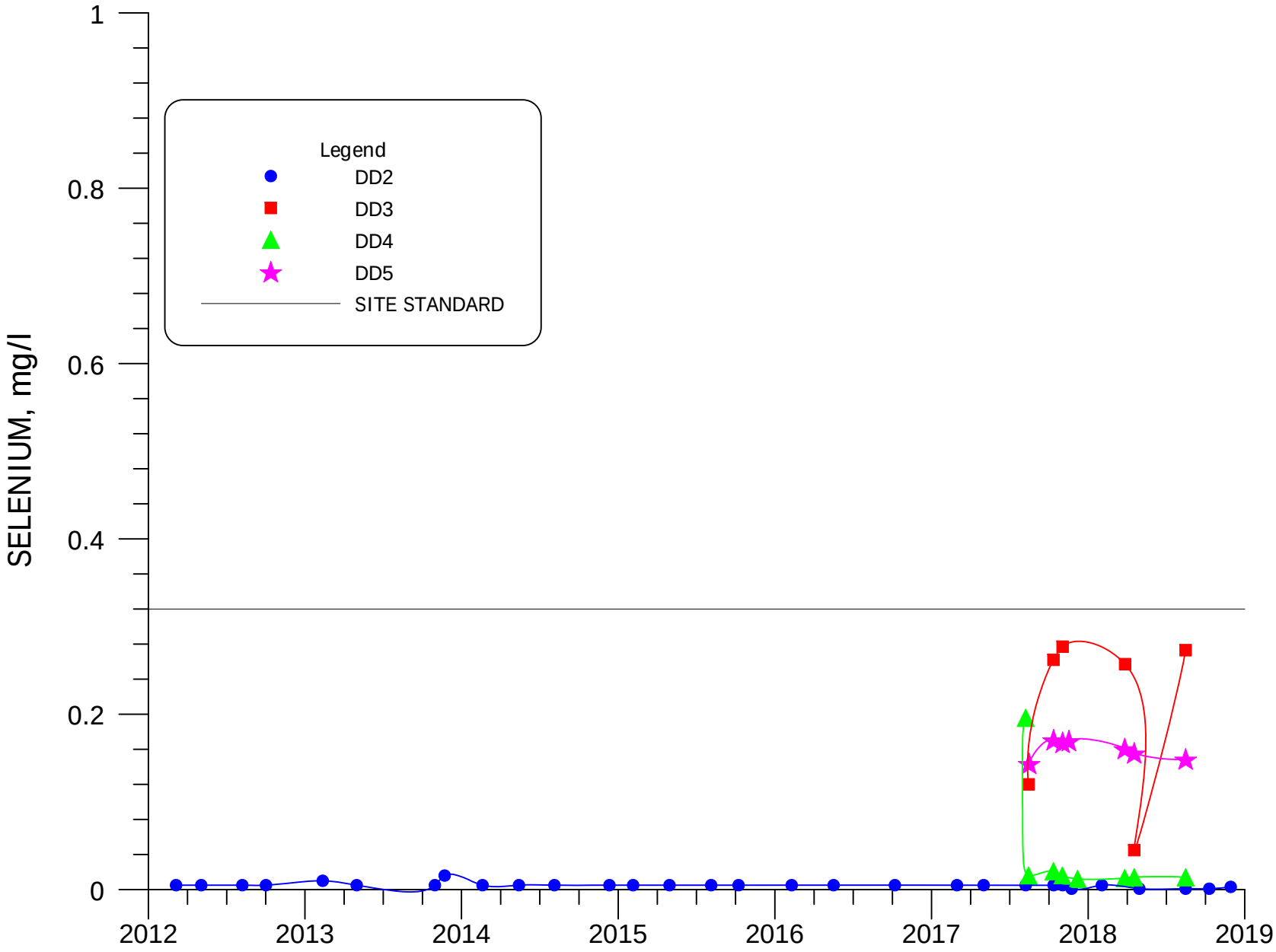


FIGURE 4.3-71A. SELENIUM CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

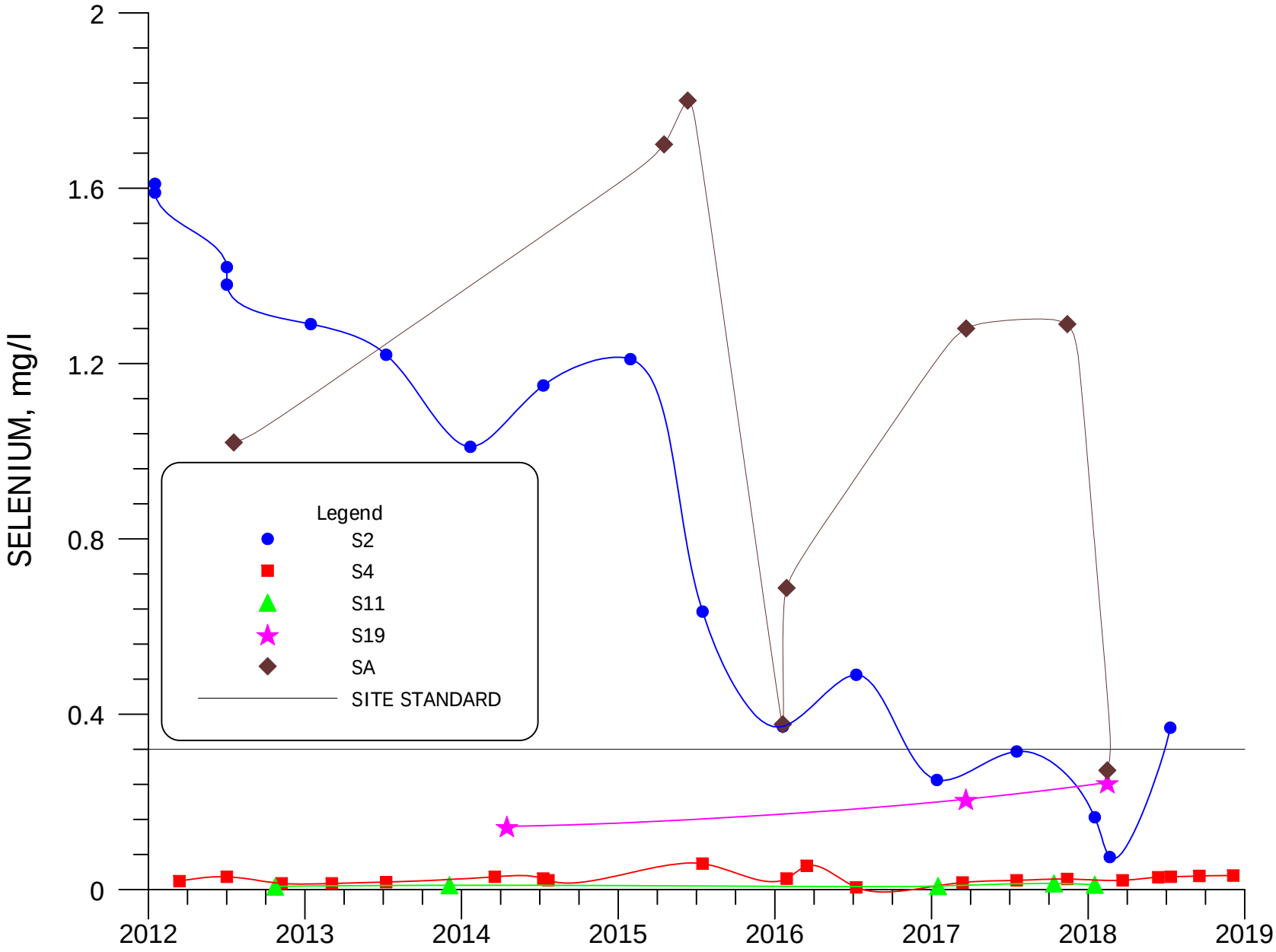


FIGURE 4.3-72. SELENIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

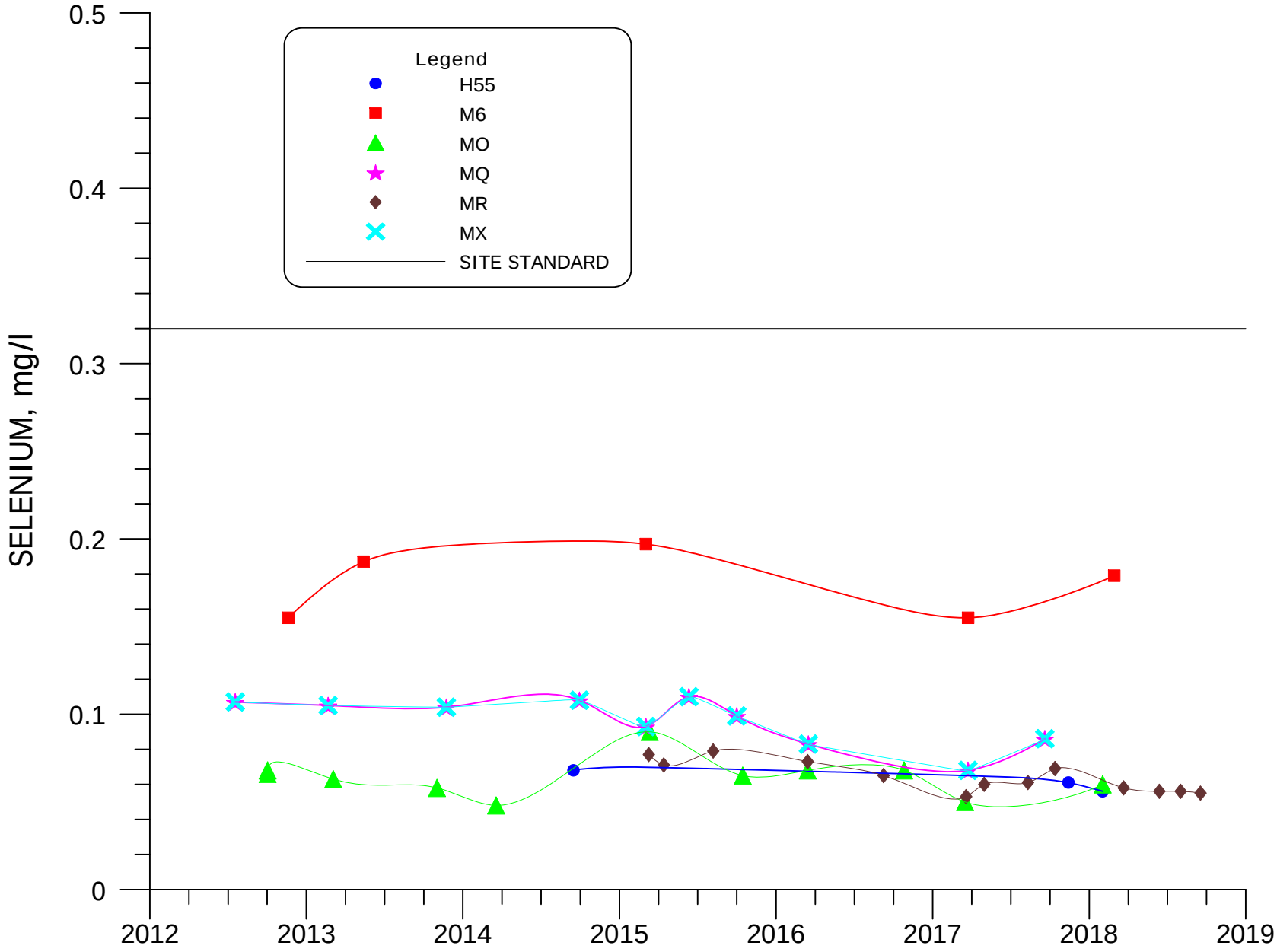


FIGURE 4.3-73. SELENIUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

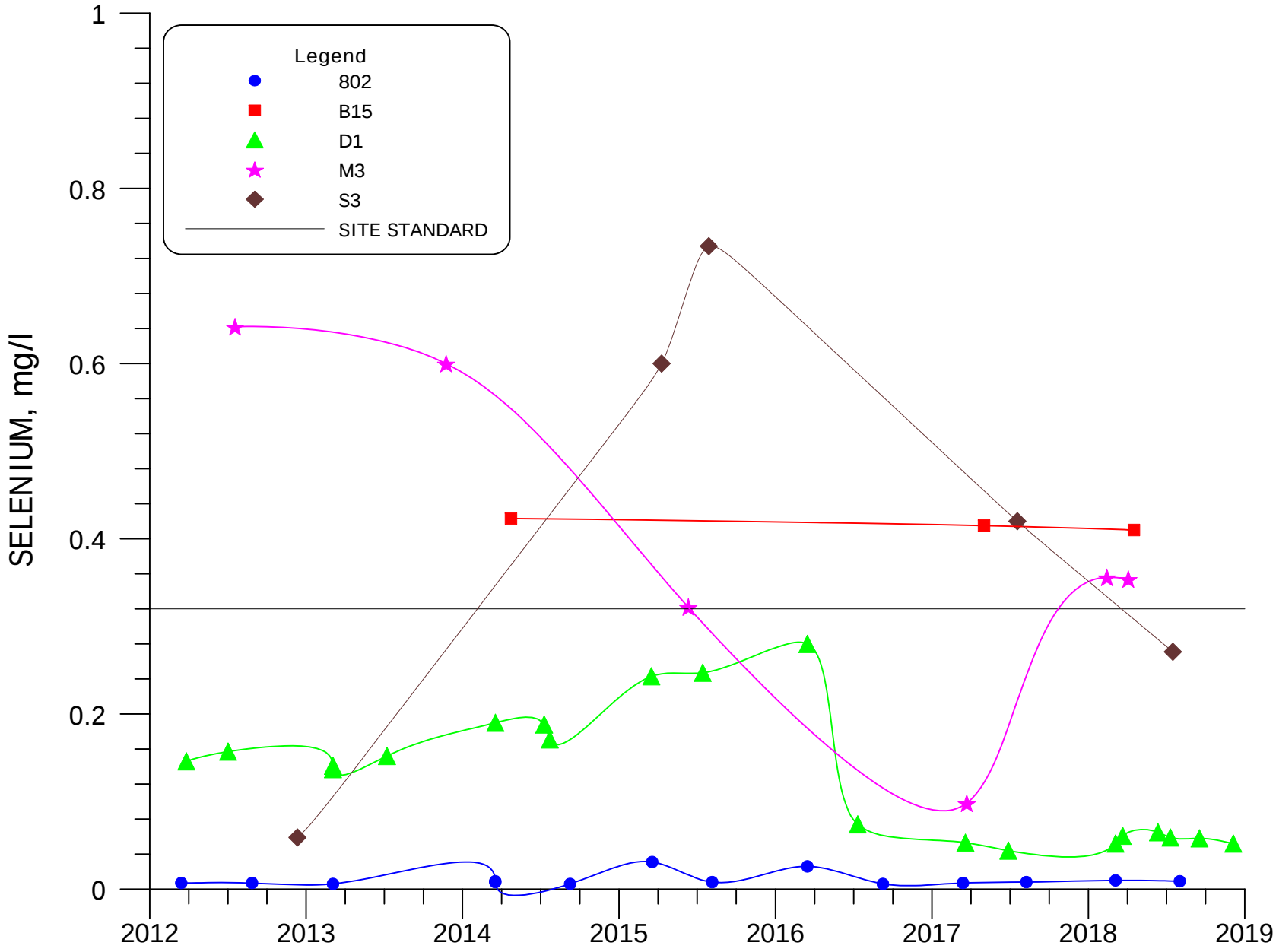


FIGURE 4.3-74. SELENIUM CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

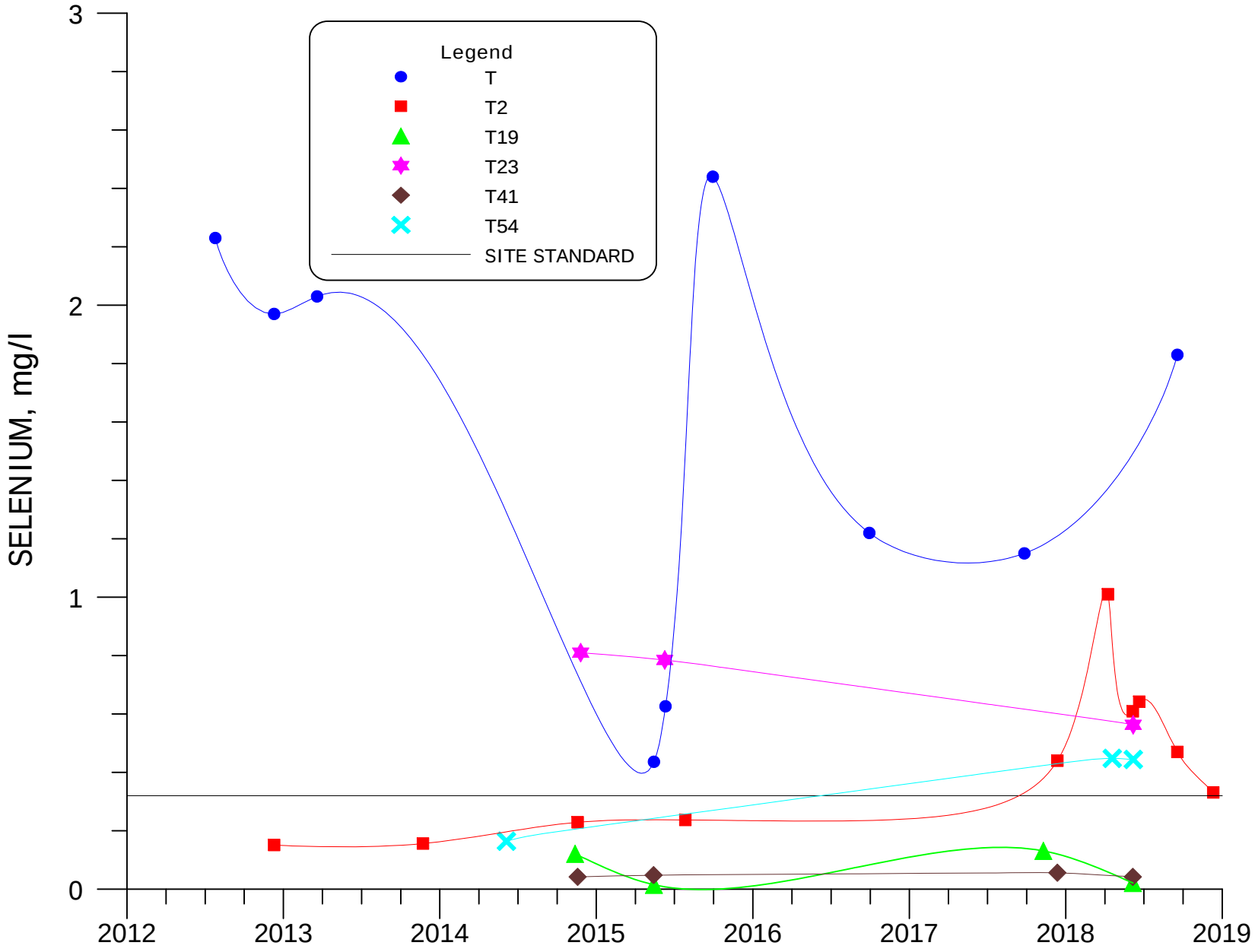


FIGURE 4.3-75. SELENIUM CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

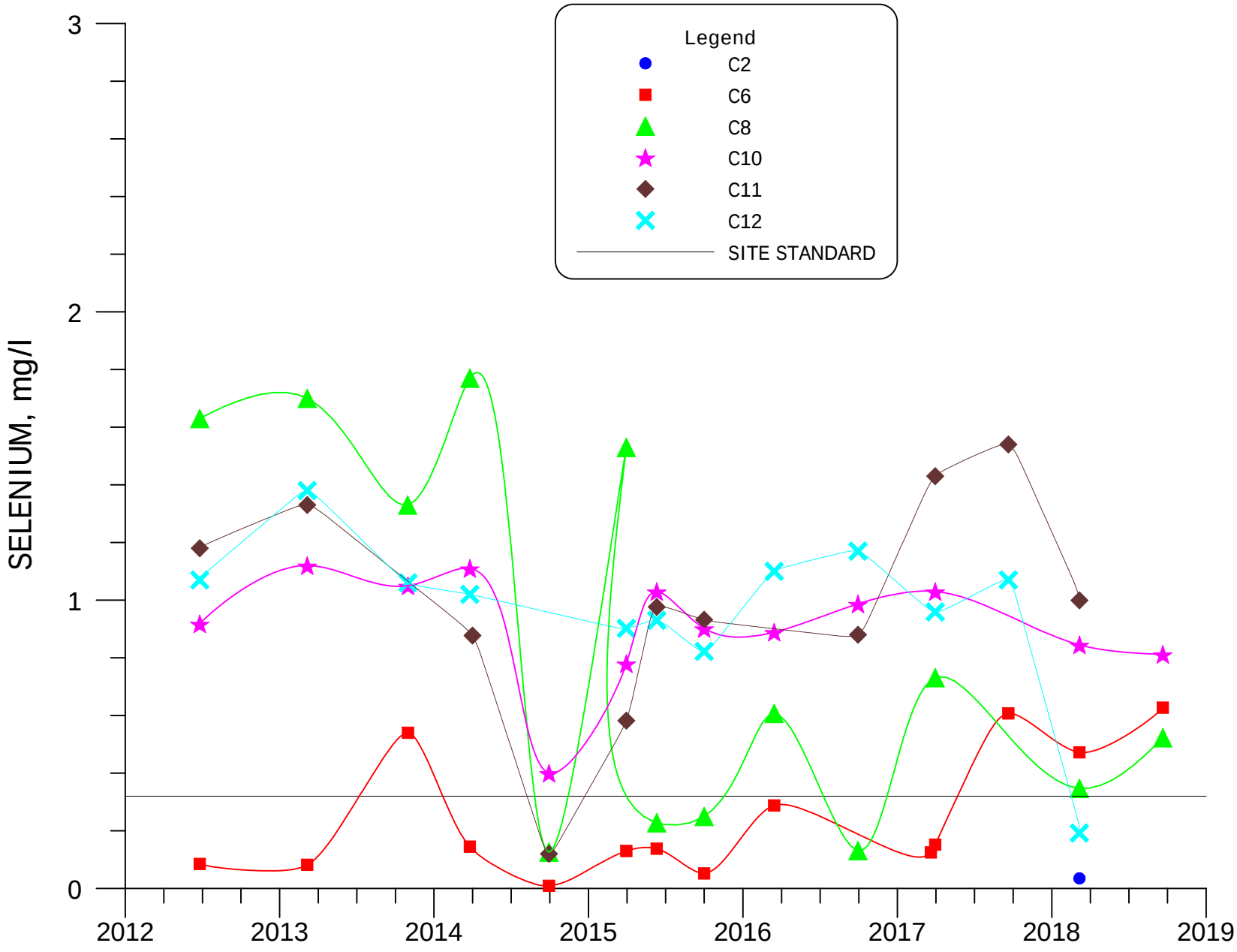


FIGURE 4.3-76. SELENIUM CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

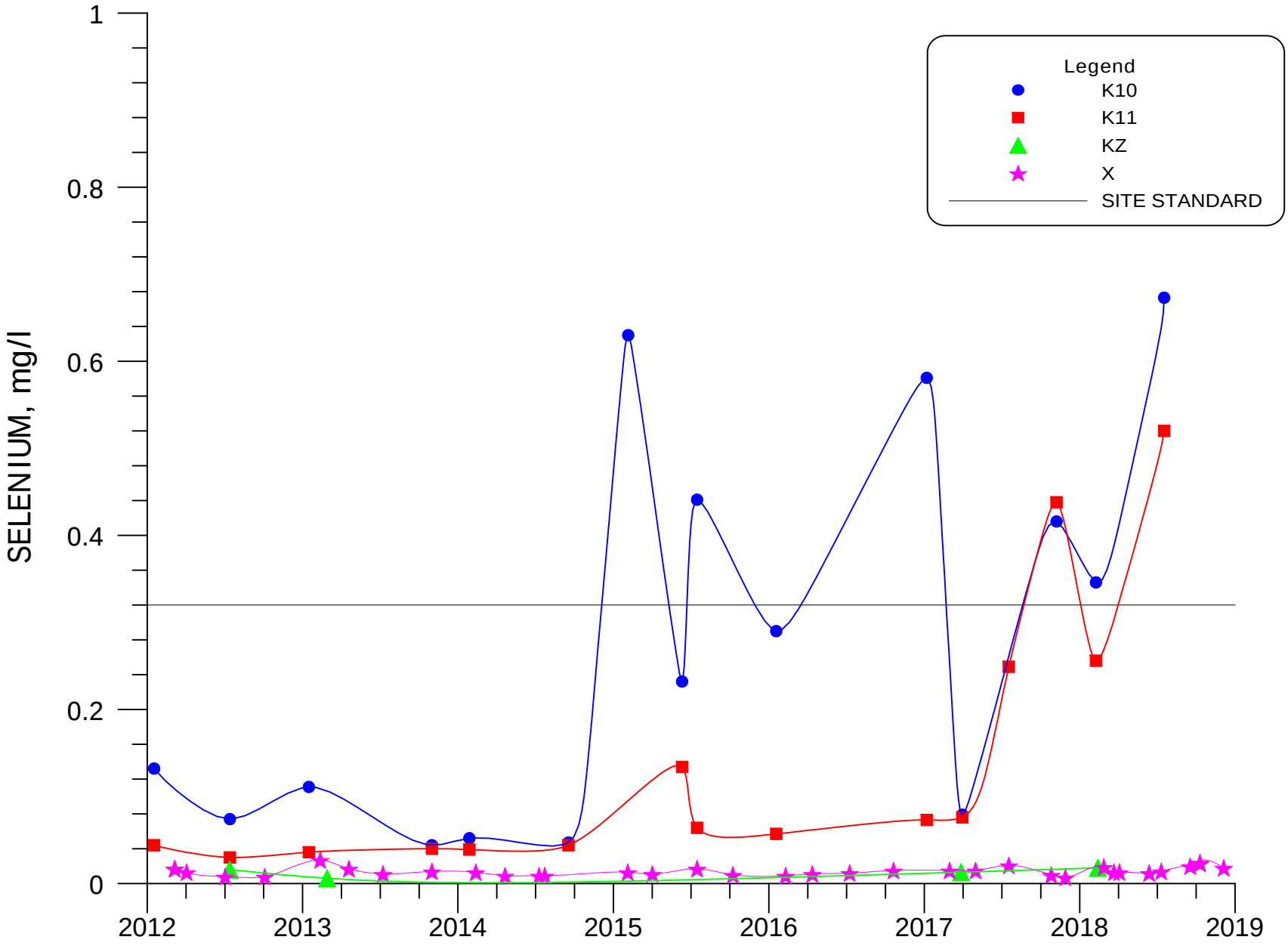


FIGURE 4.3-77. SELENIUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

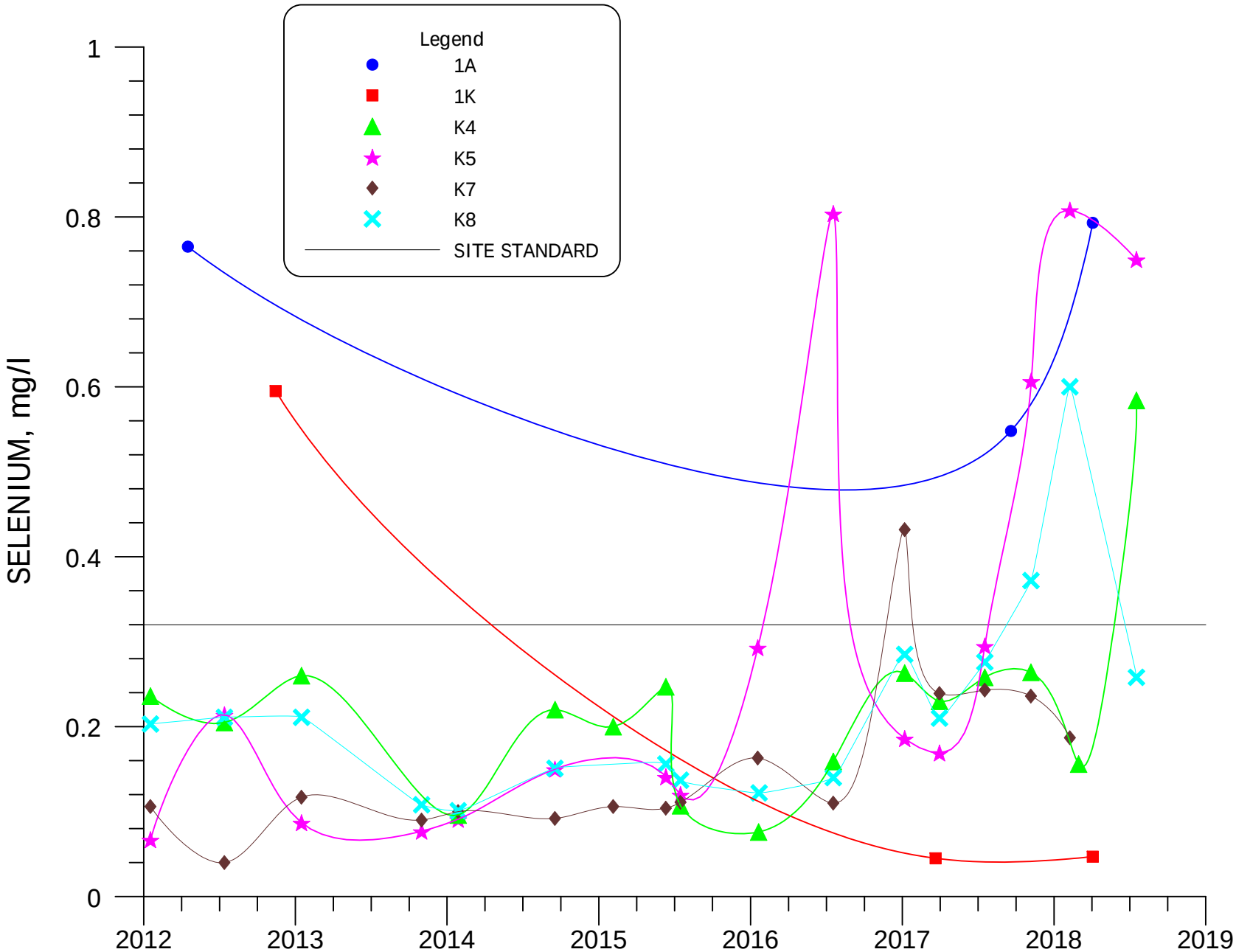


FIGURE 4.3-78. SELENIUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

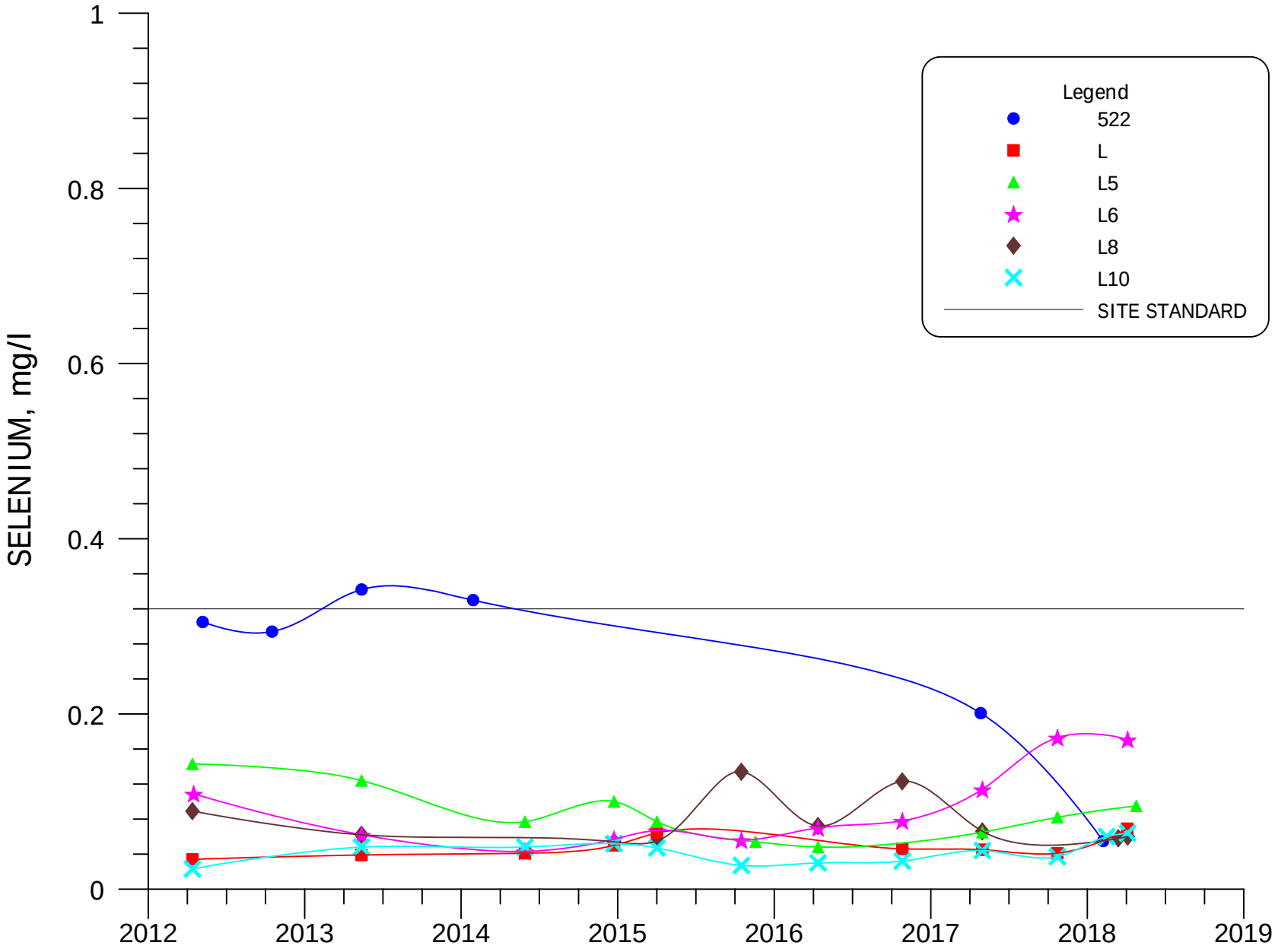


FIGURE 4.3-79. SELENIUM CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

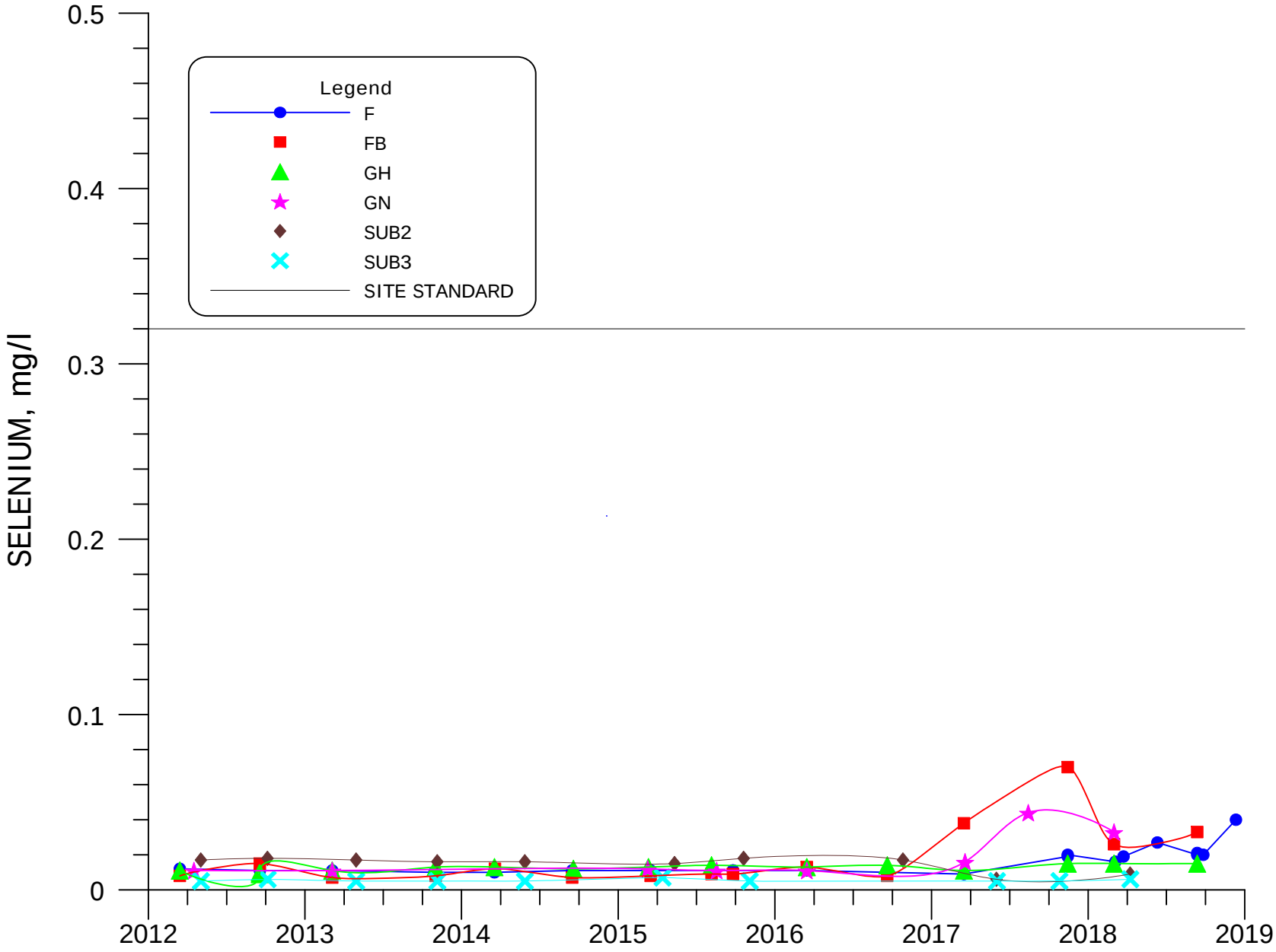


FIGURE 4.3-80. SELENIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

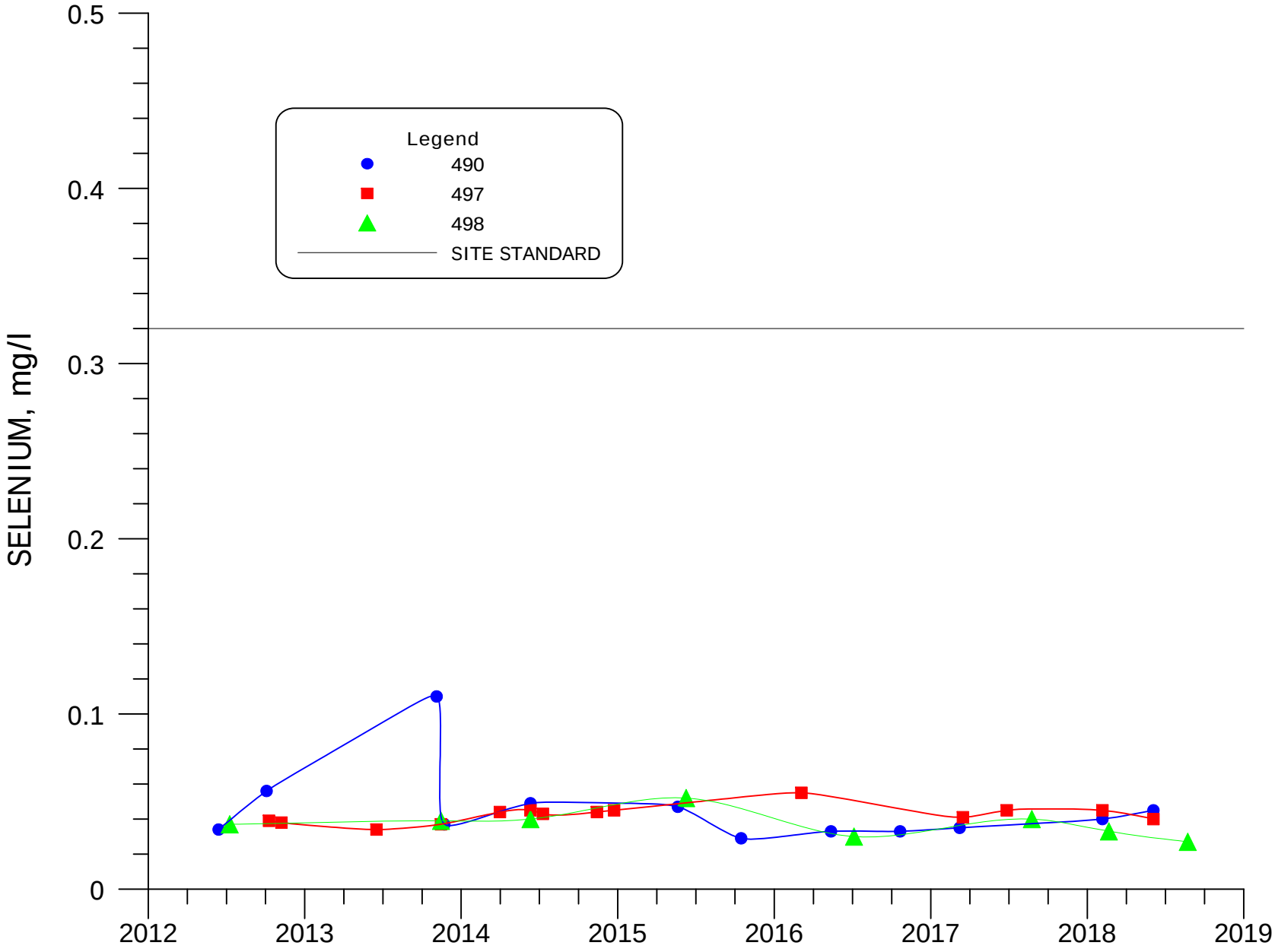


FIGURE 4.3-81. SELENIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

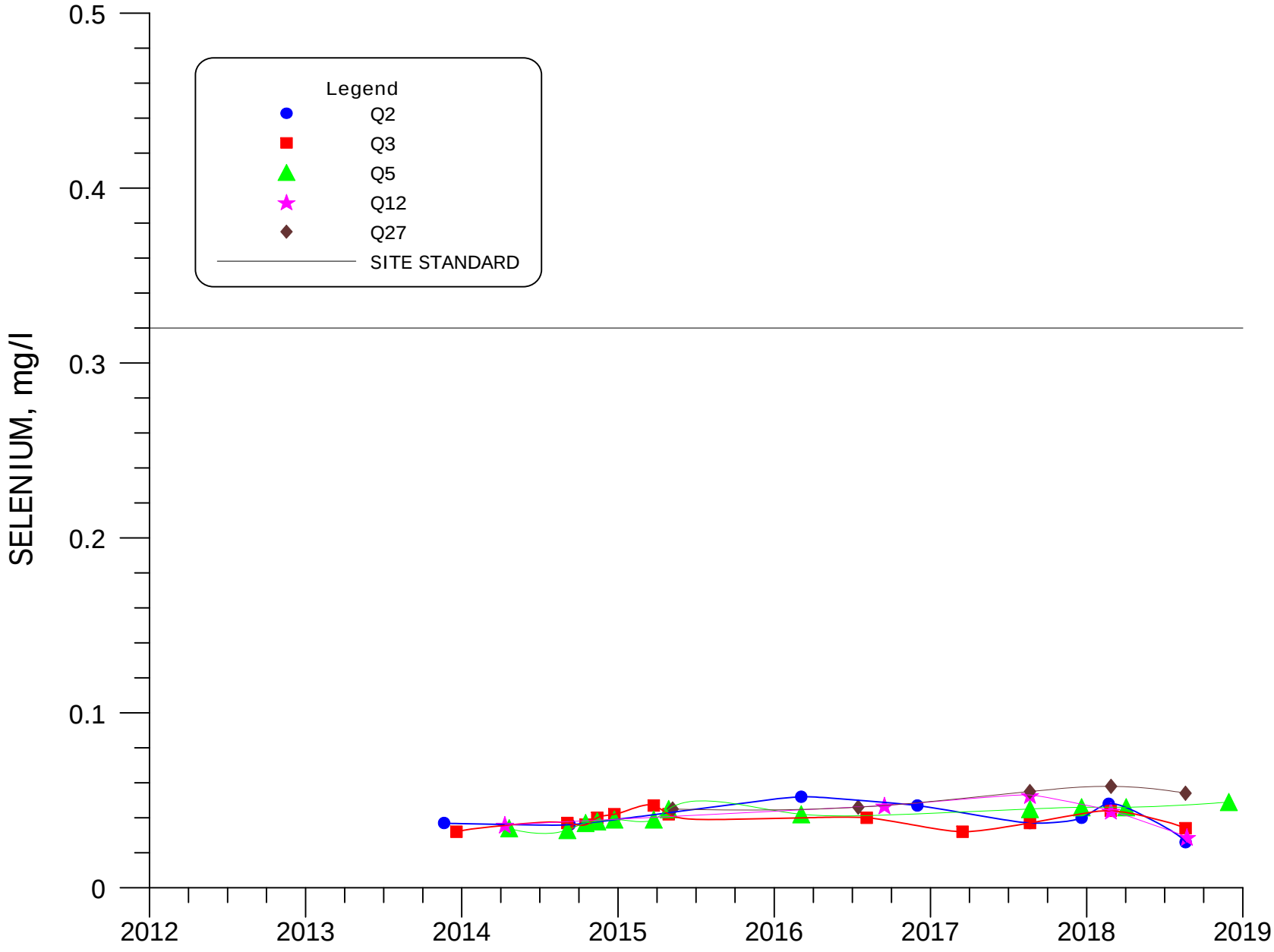


FIGURE 4.3-81A. SELENIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

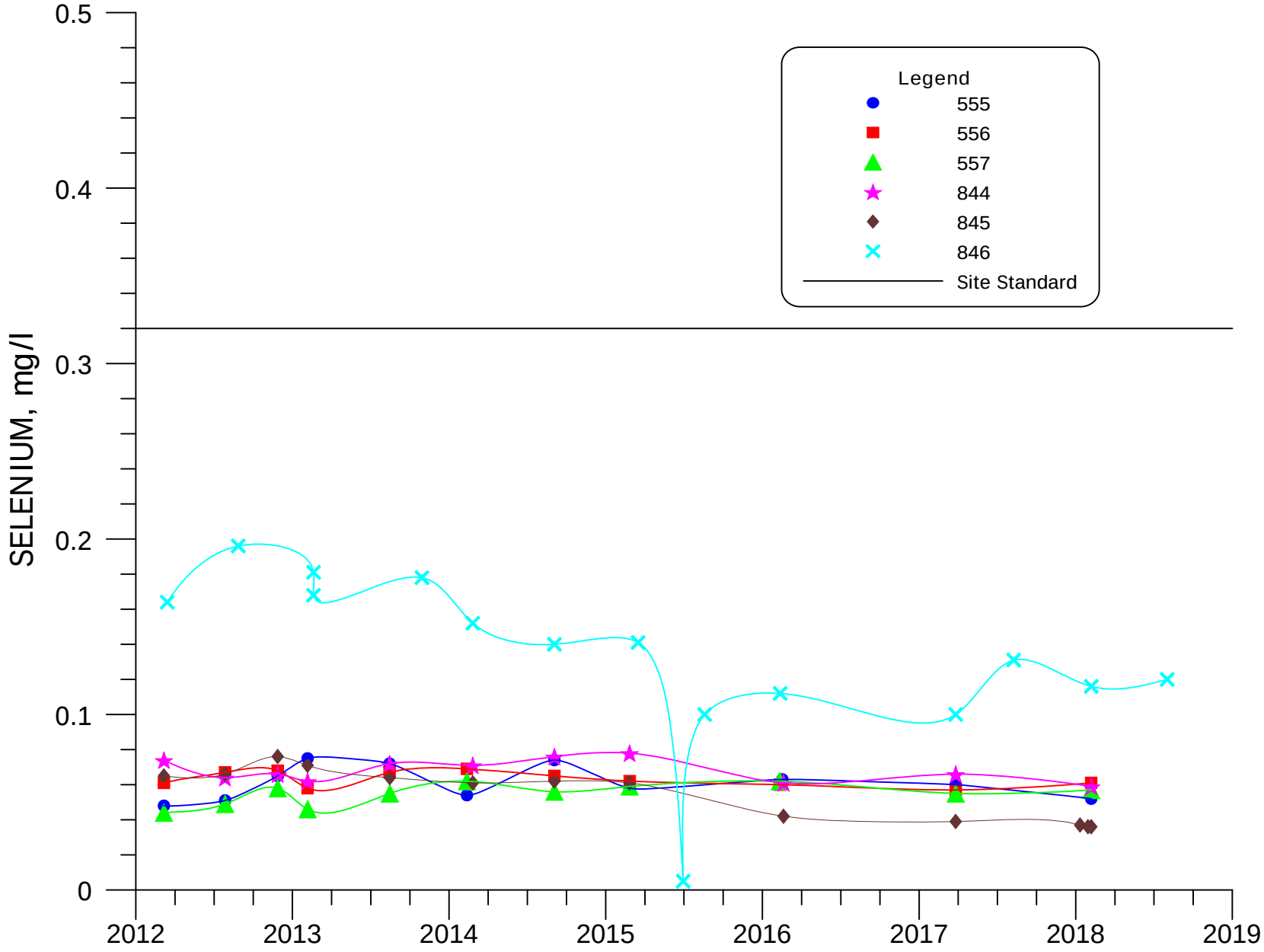


FIGURE 4.3-82. SELENIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

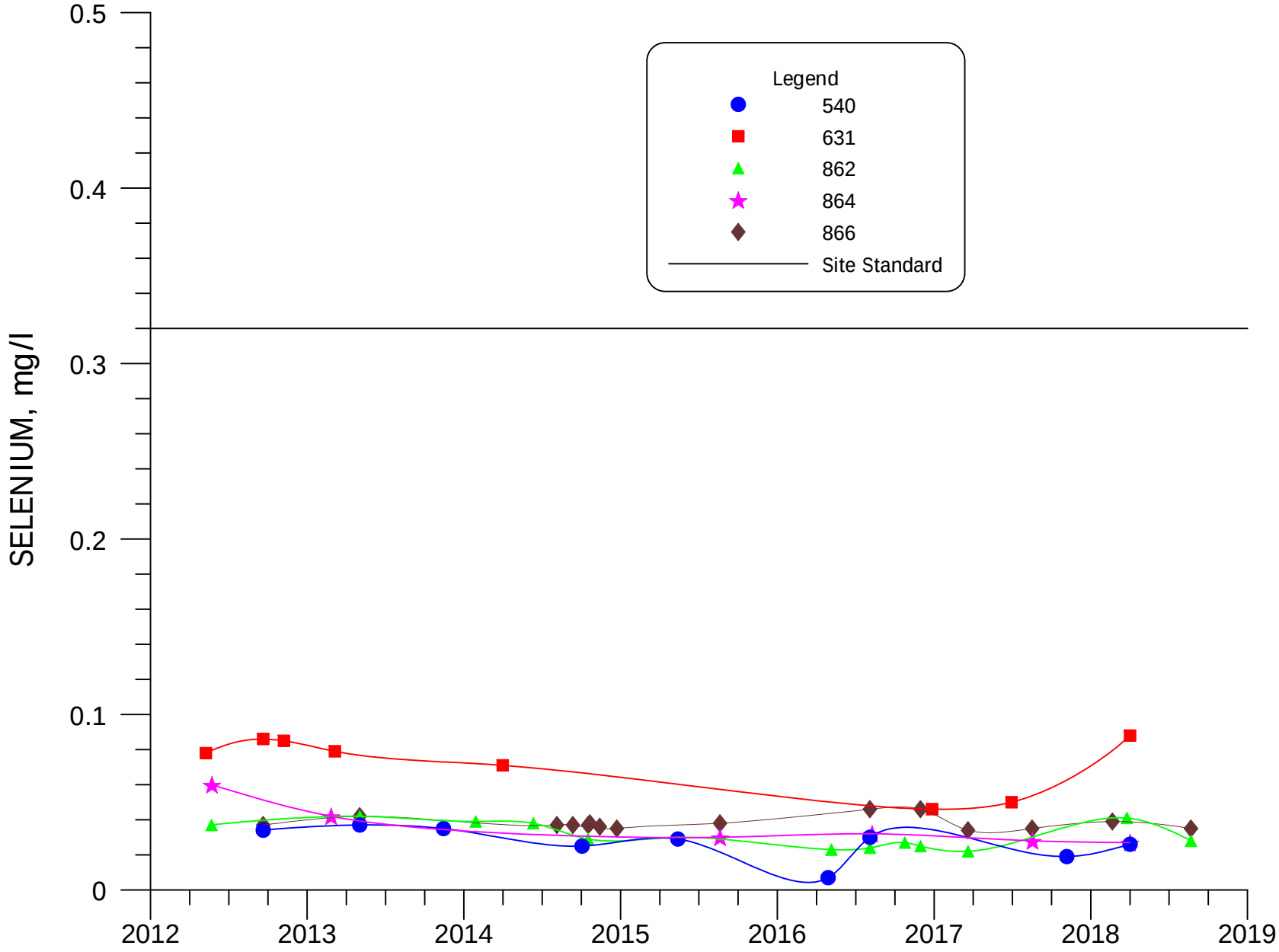


FIGURE 4.3-83. SELENIUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

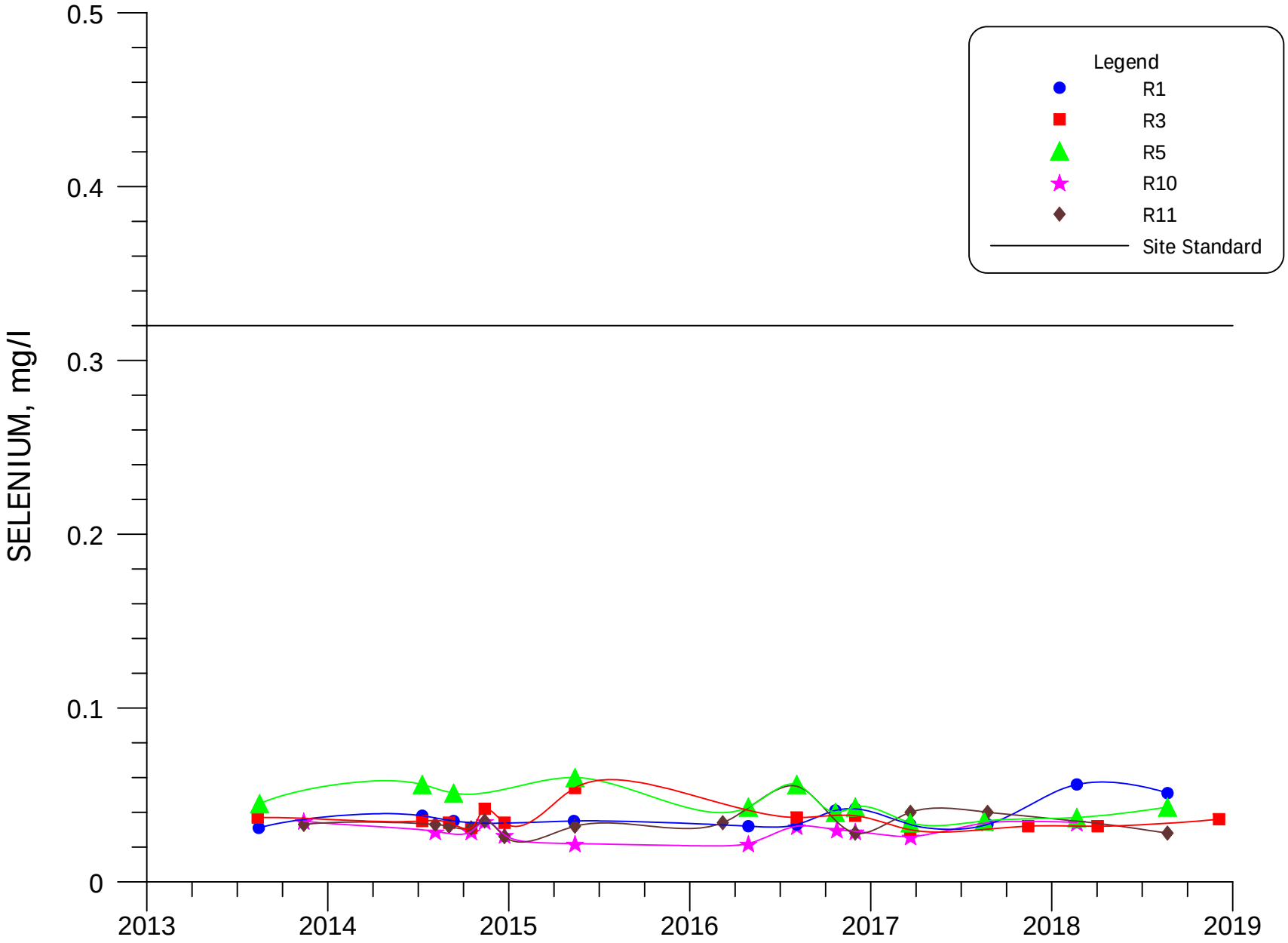


FIGURE 4.3-83A. SELENIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

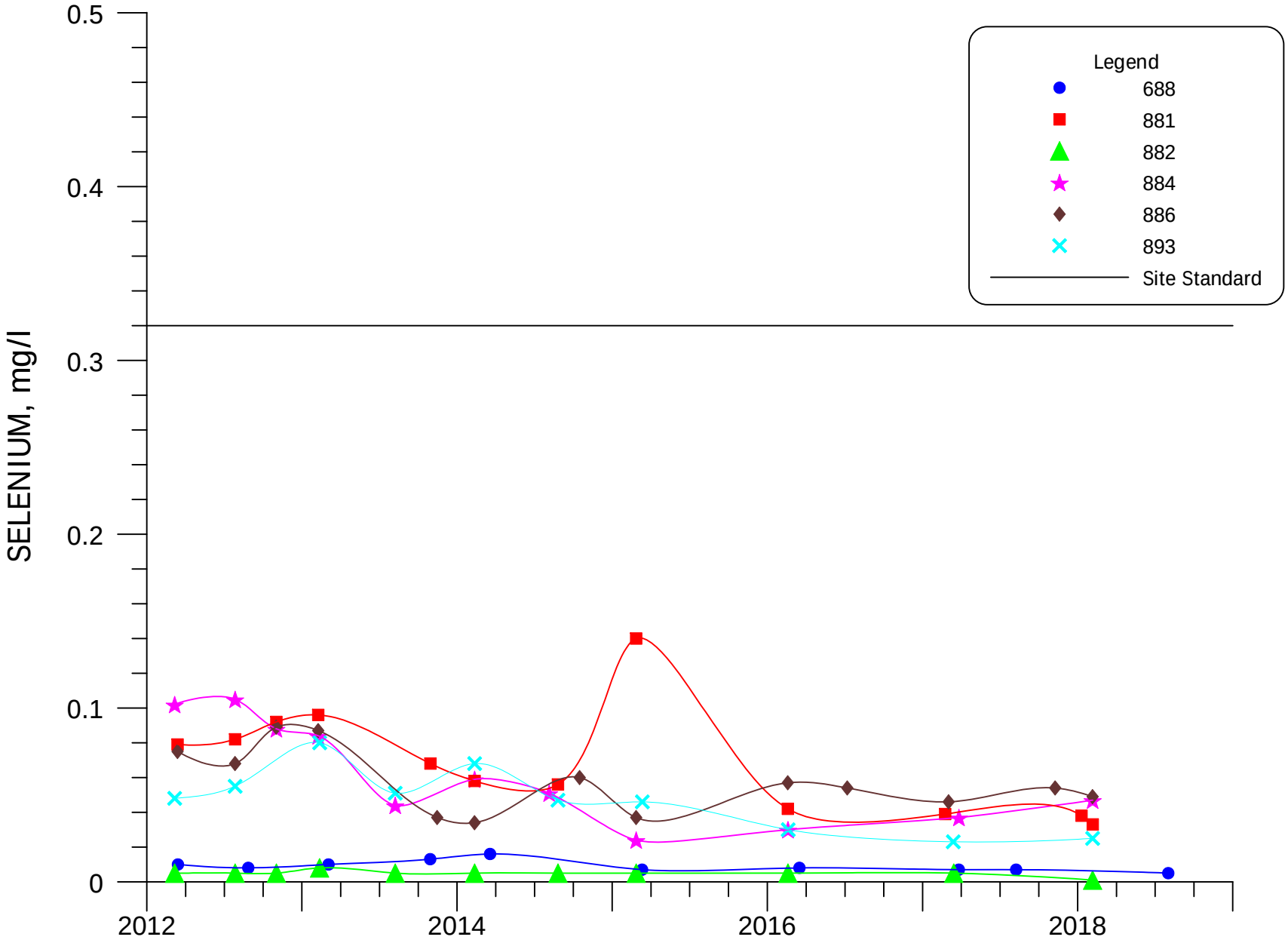


FIGURE 4.3-84. SELENIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

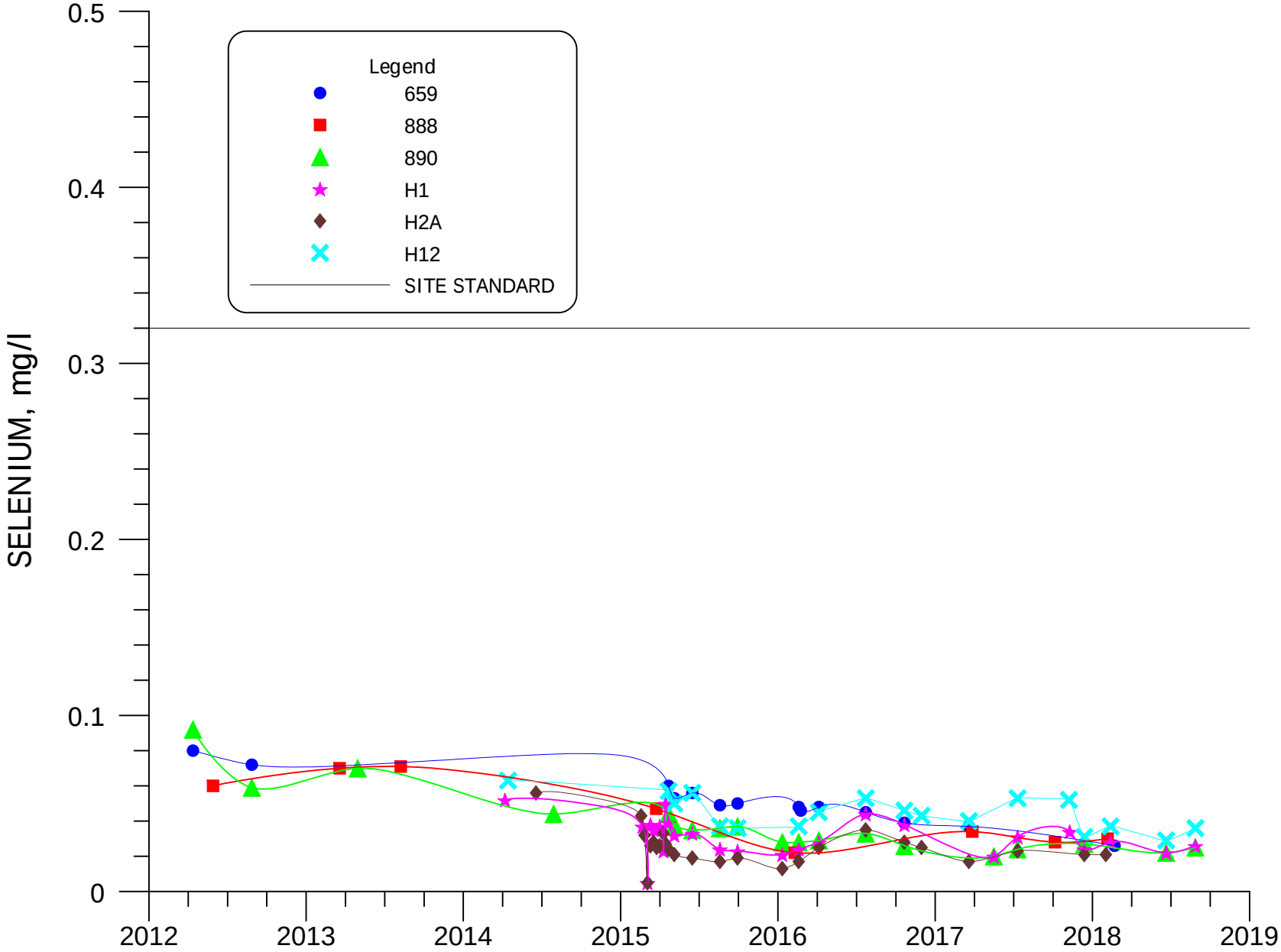


FIGURE 4.3-84A. SELENIUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

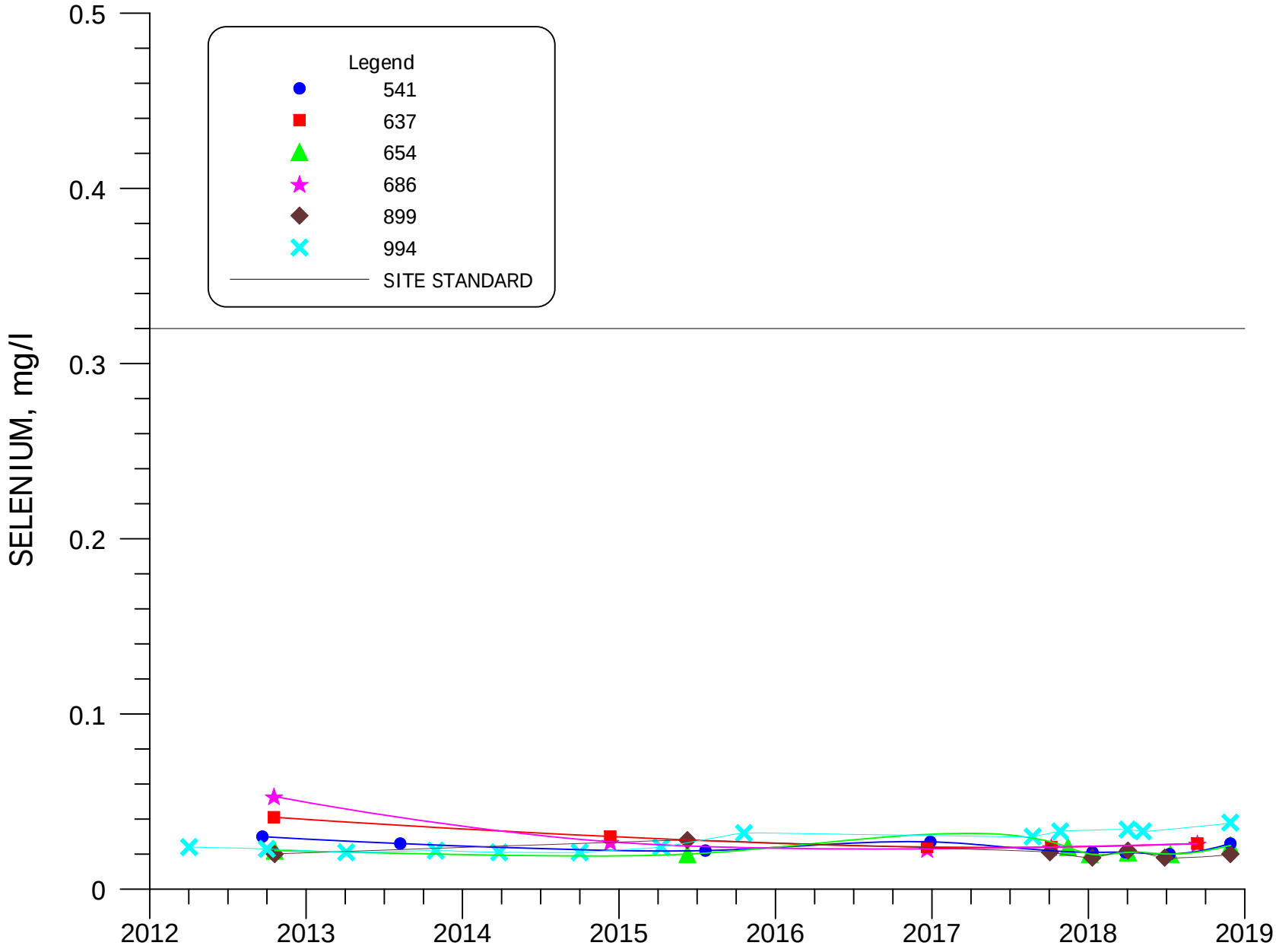


FIGURE 4.3-85. SELENIUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

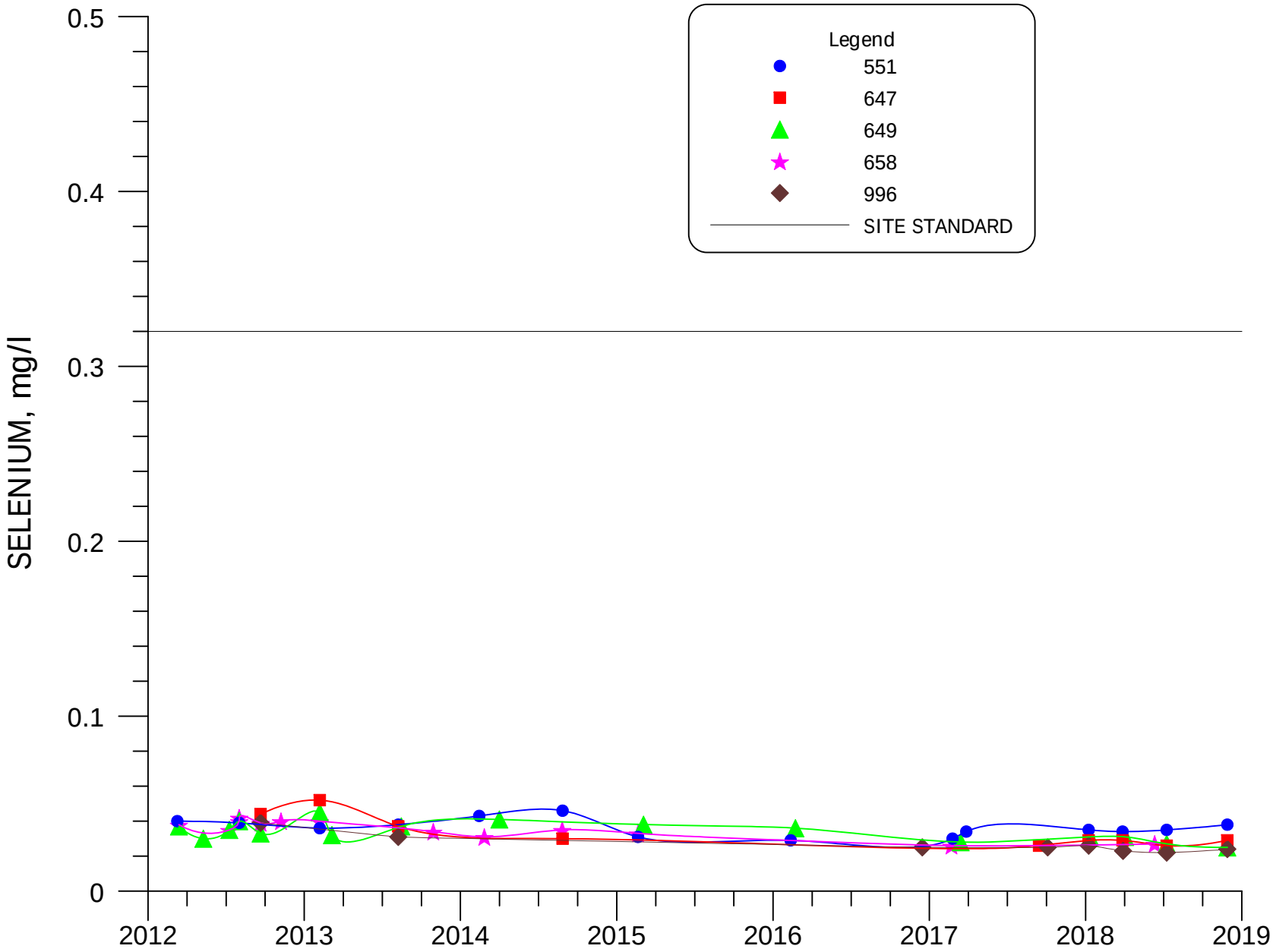
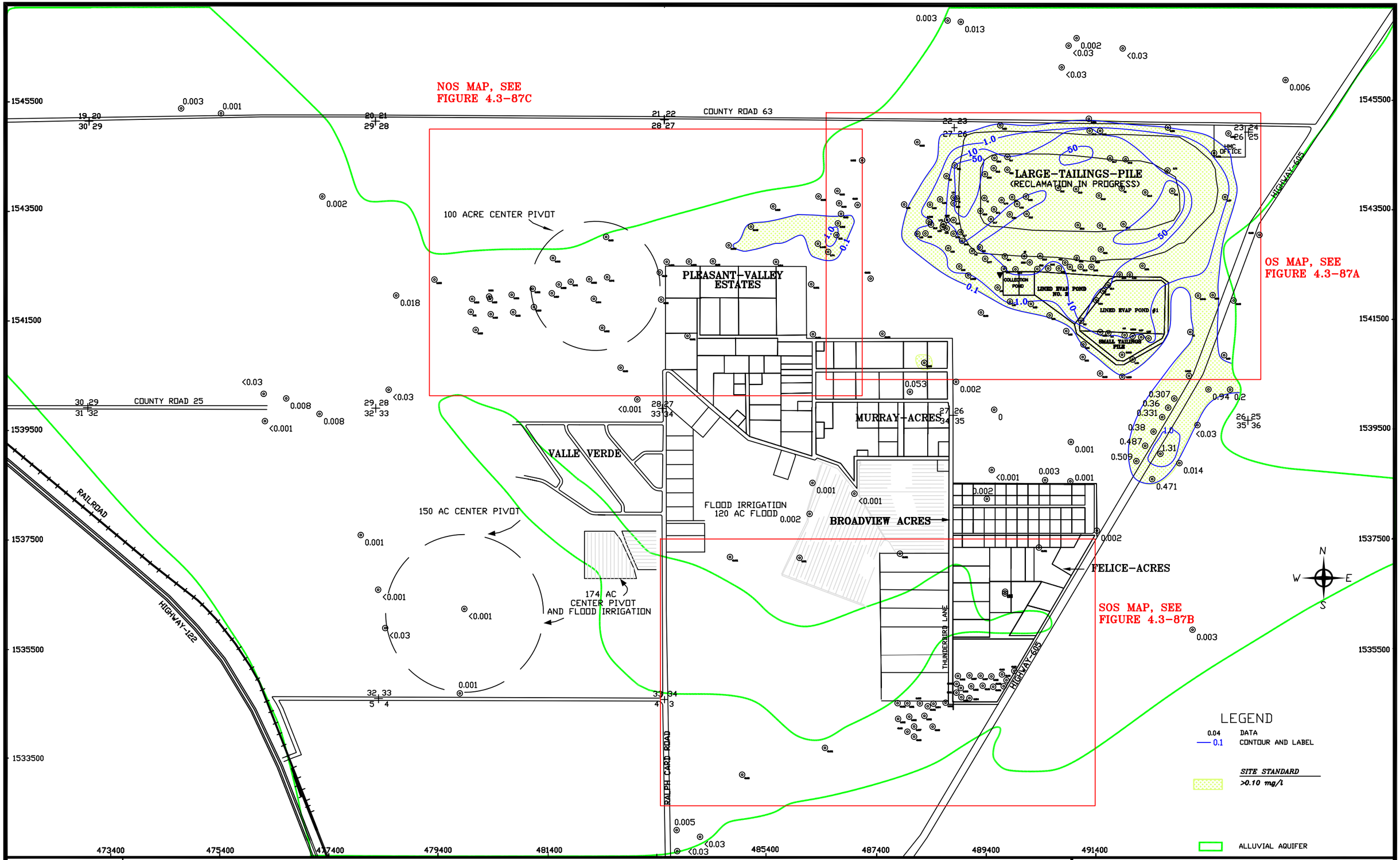
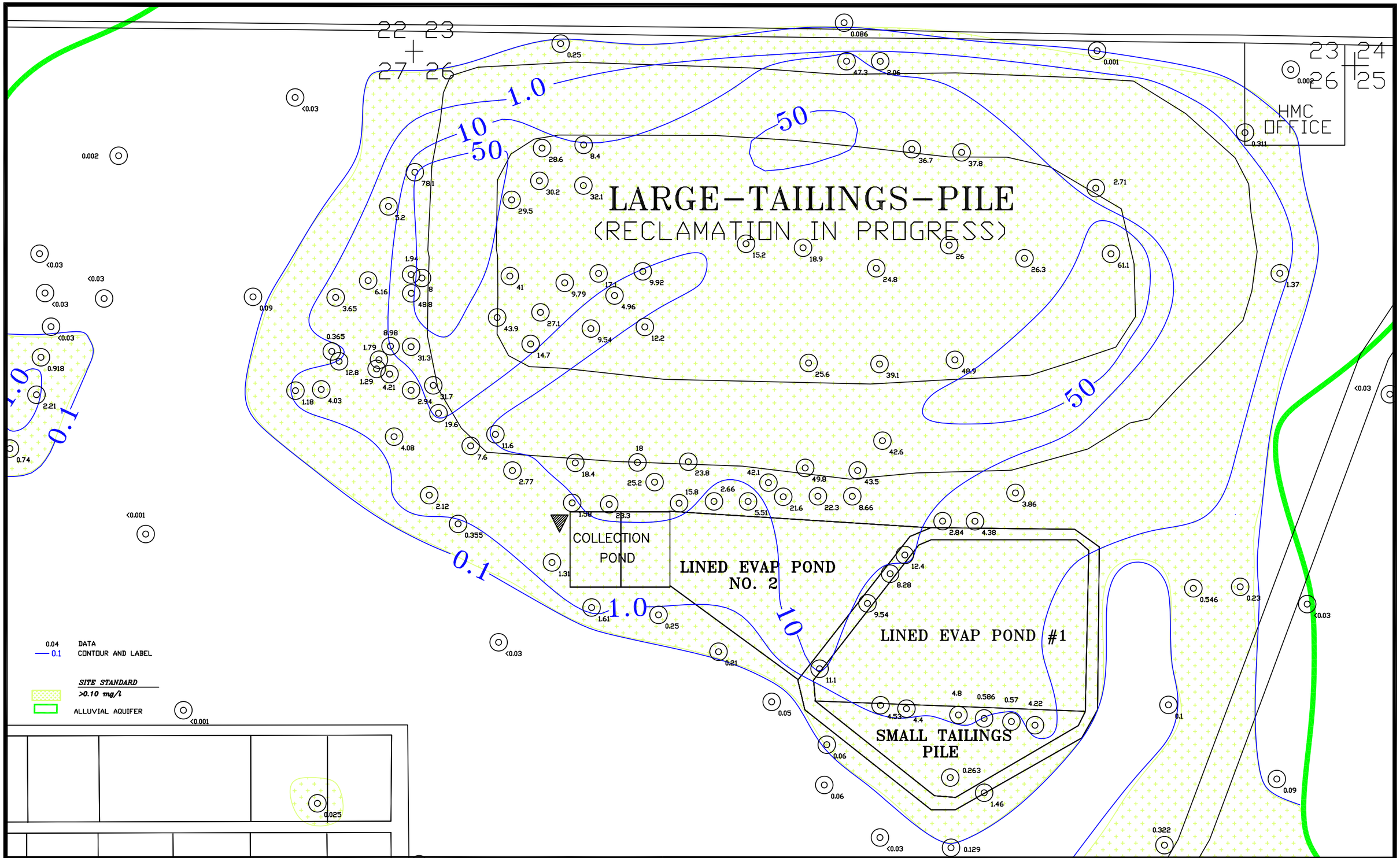


FIGURE 4.3-86. SELENIUM CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.



SCALE: 1"=1600'
C:\PROJECTS\2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.3-87. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l



SCALE: 1"=500'
C:\PROJECTS\ 2019-06 1600QAL18
DATE: 1/31/2019

FIGURE 4.3-87A. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l

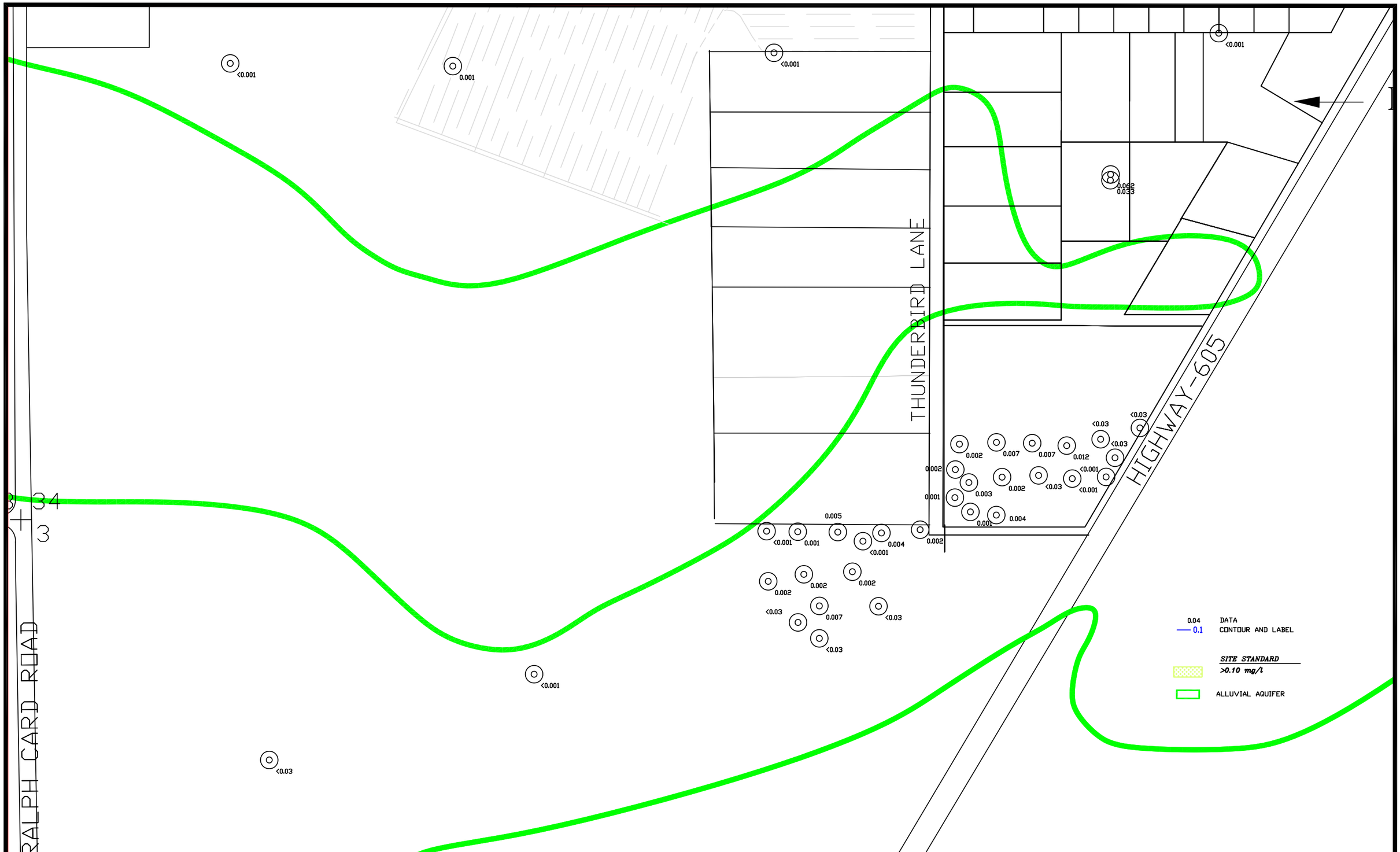


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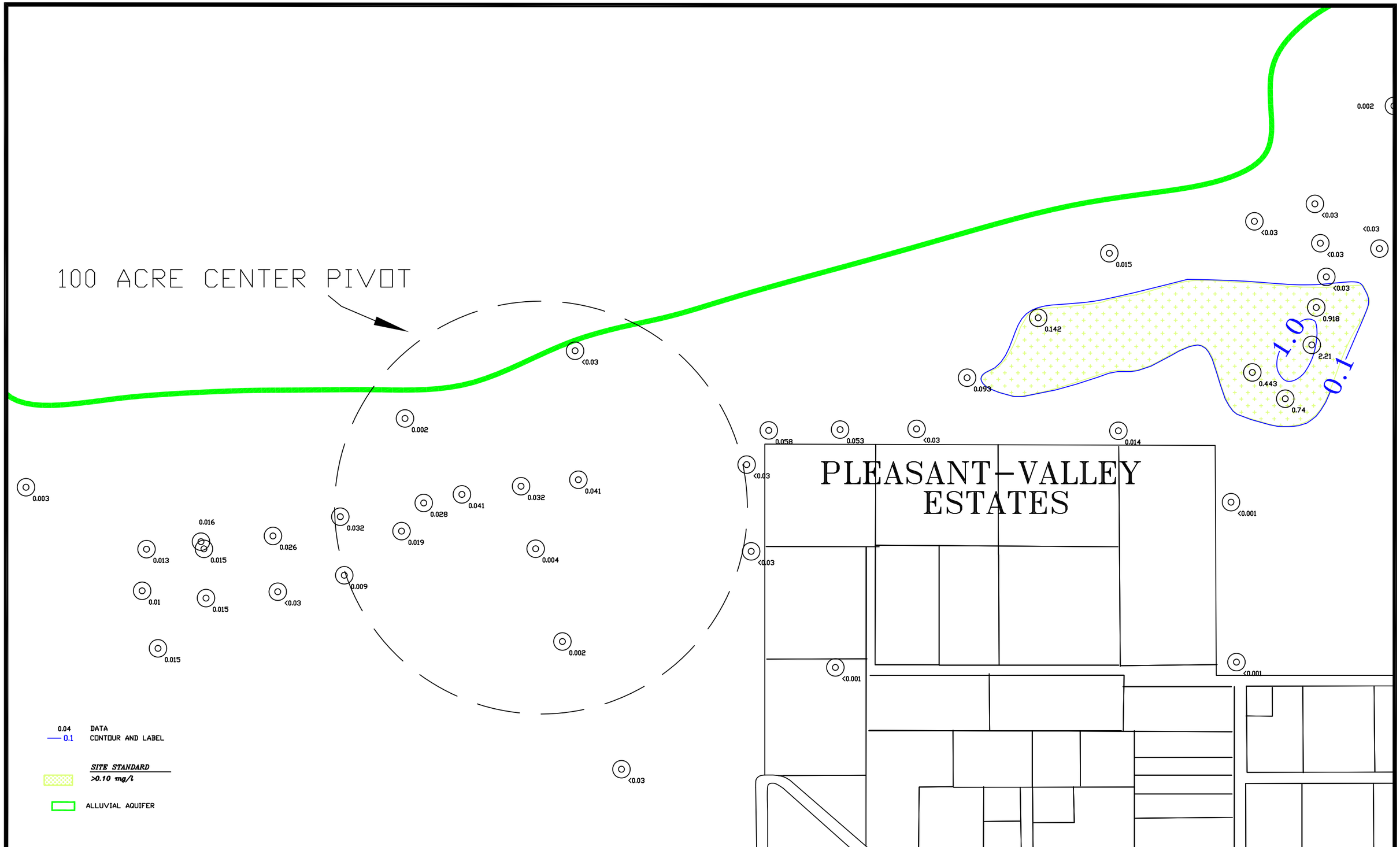
FIGURE 4.3-87B. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'
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FIGURE 4.3-87C. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

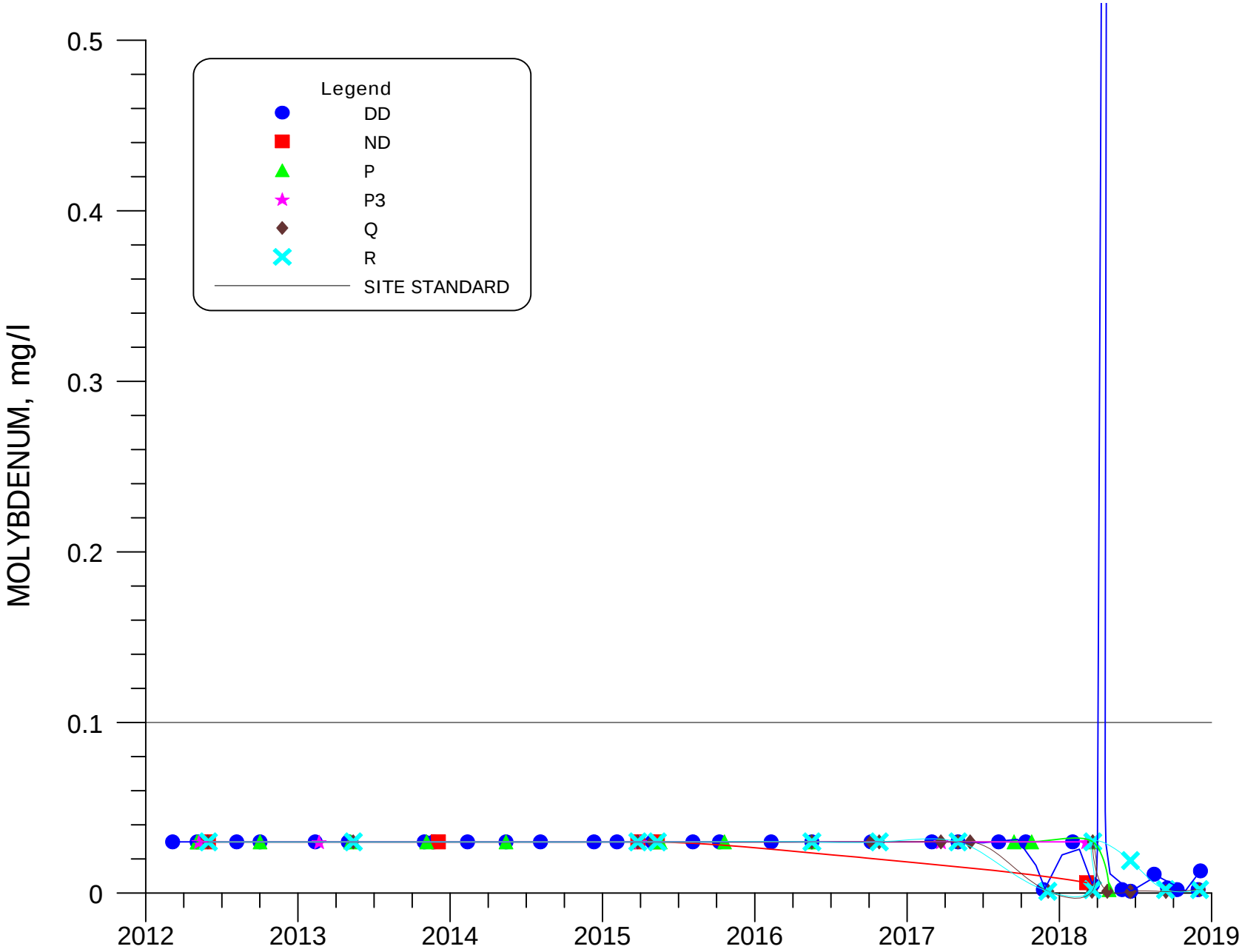

FIGURE 4.3-88. MOLYBDENUM CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

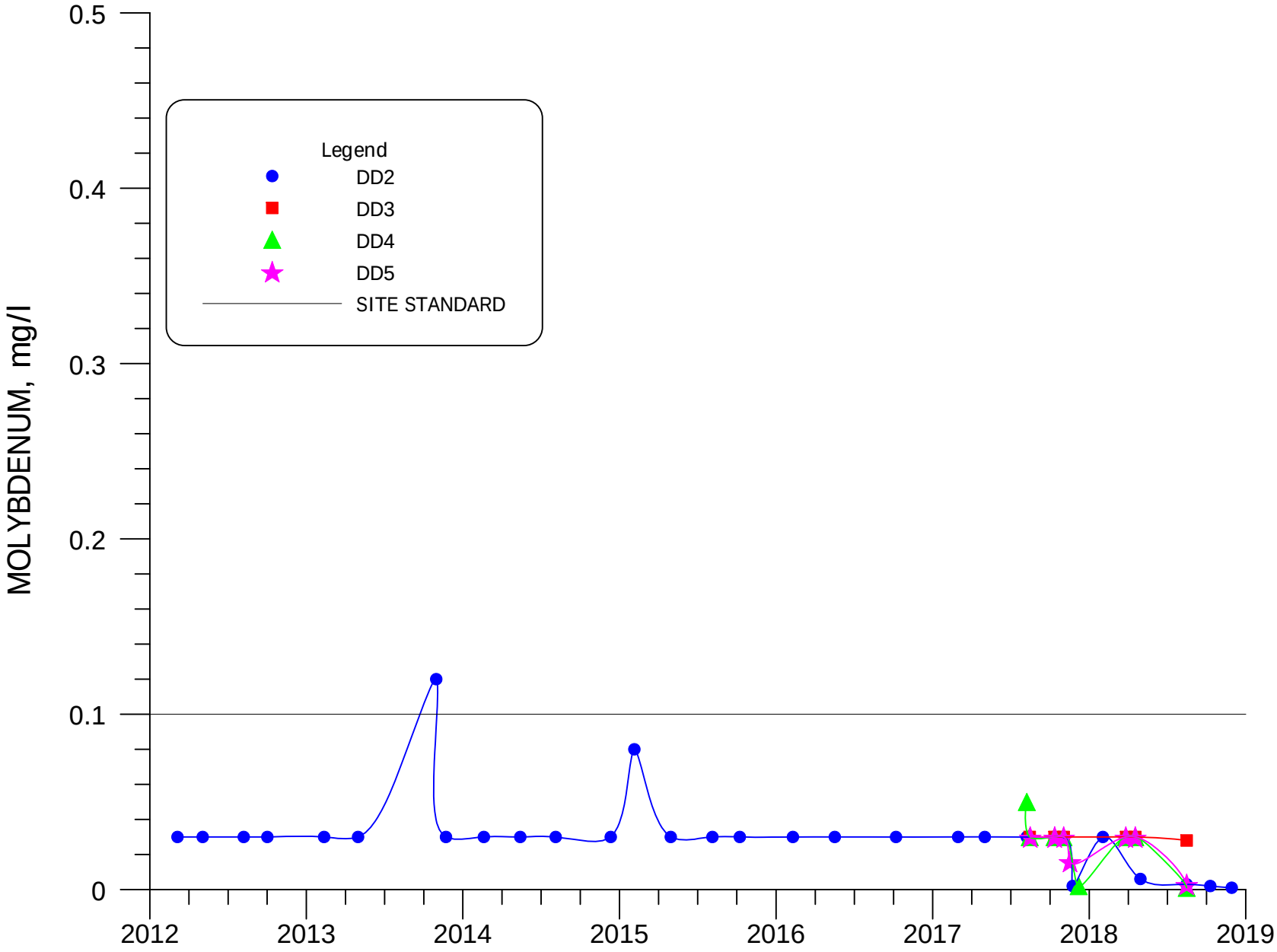

FIGURE 4.3-88A. MOLYBDENUM CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

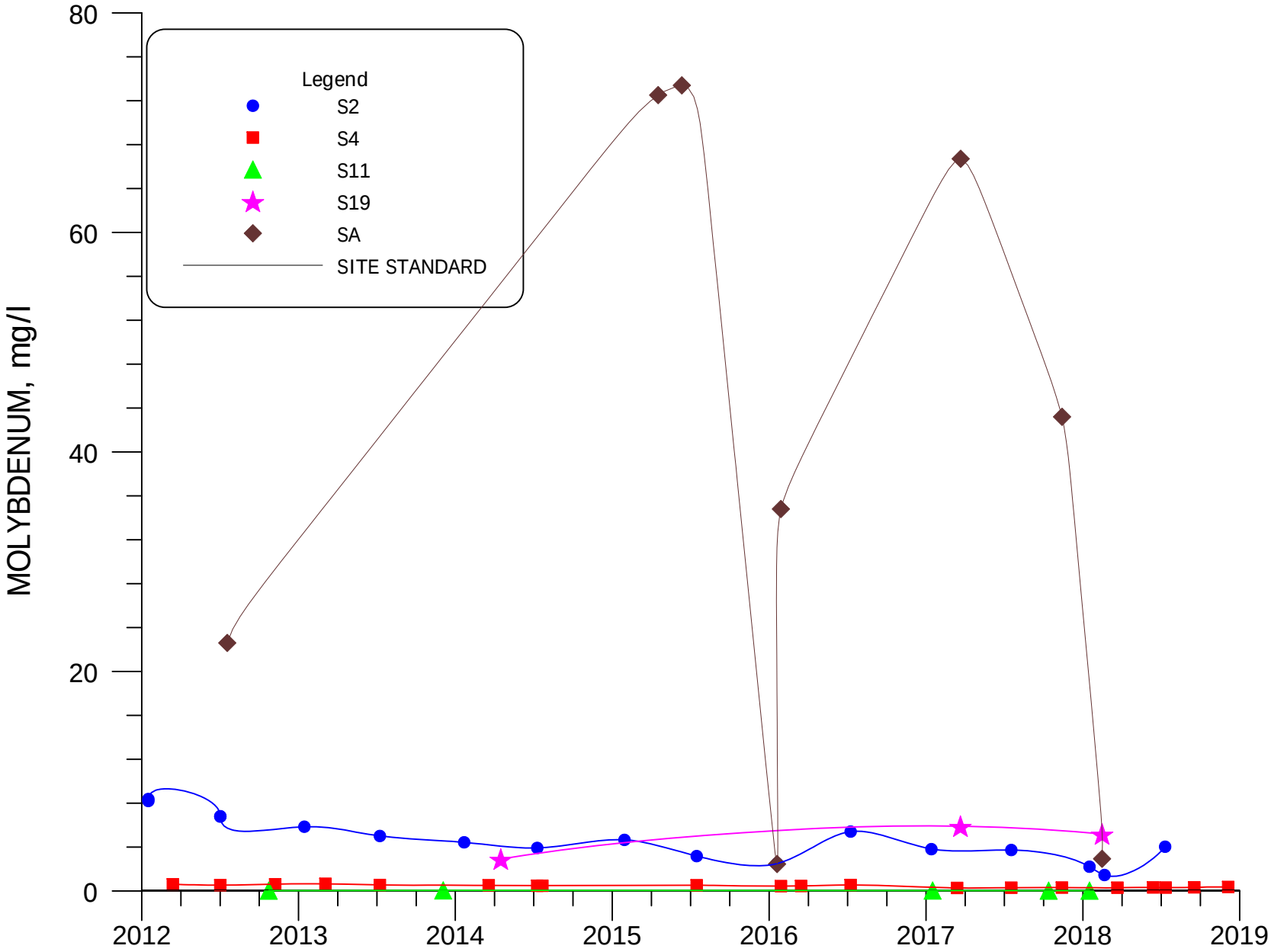

FIGURE 4.3-89. MOLYBDENUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

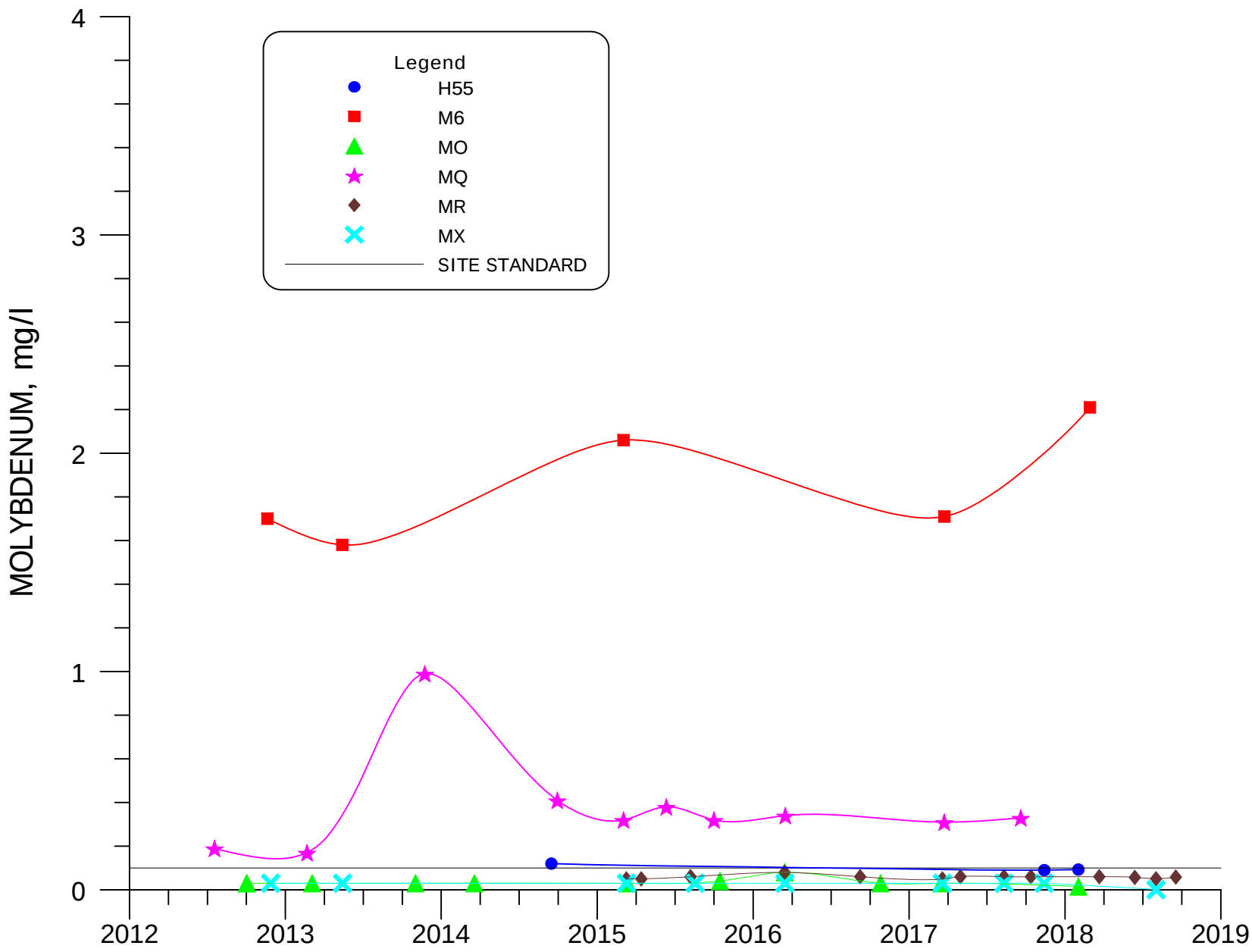

FIGURE 4.3-90. MOLYBDENUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

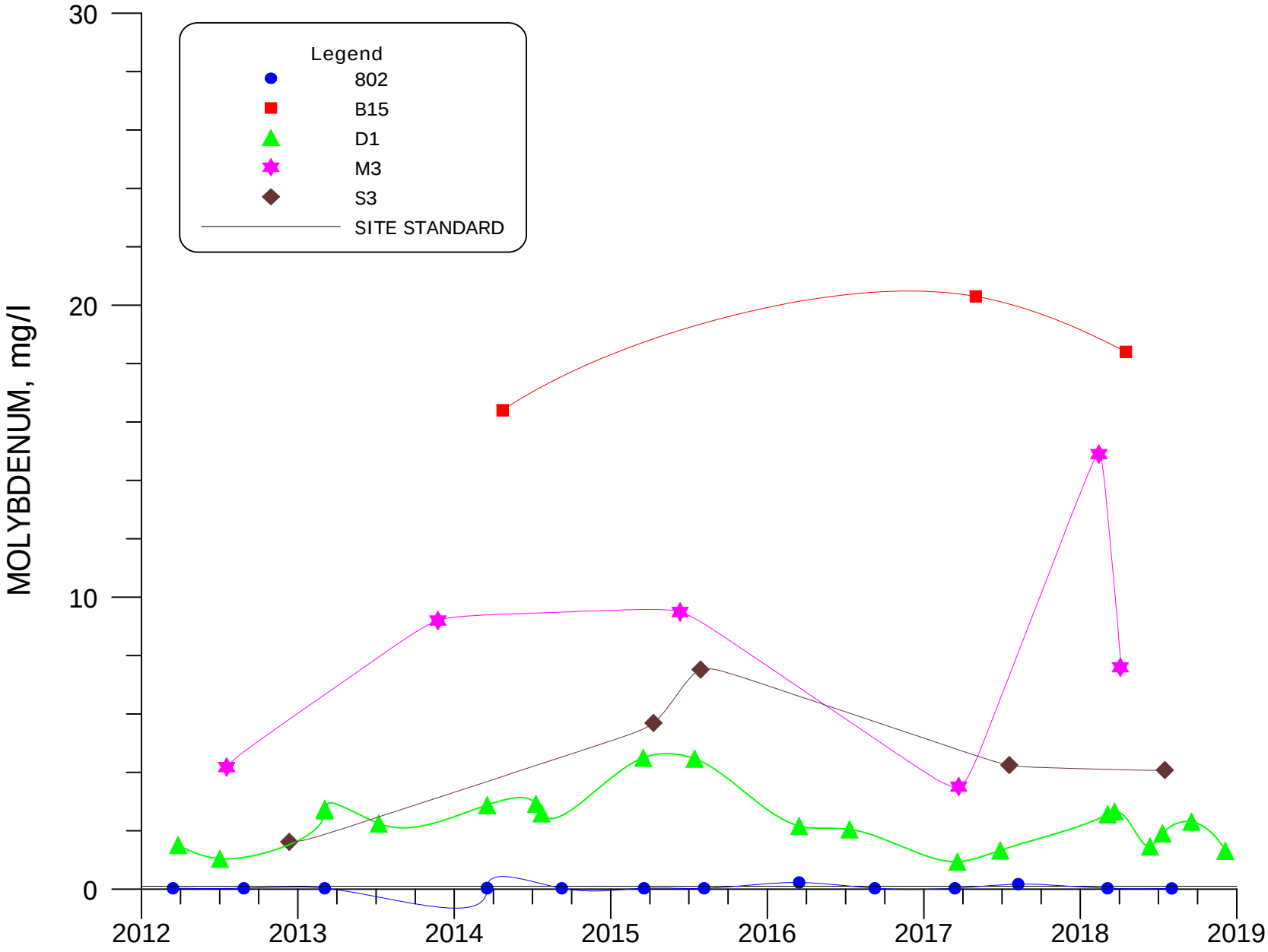

FIGURE 4.3-91. MOLYBDENUM CONCENTRATIONS FOR WELLS 802, B15, D1, M3 AND S3.

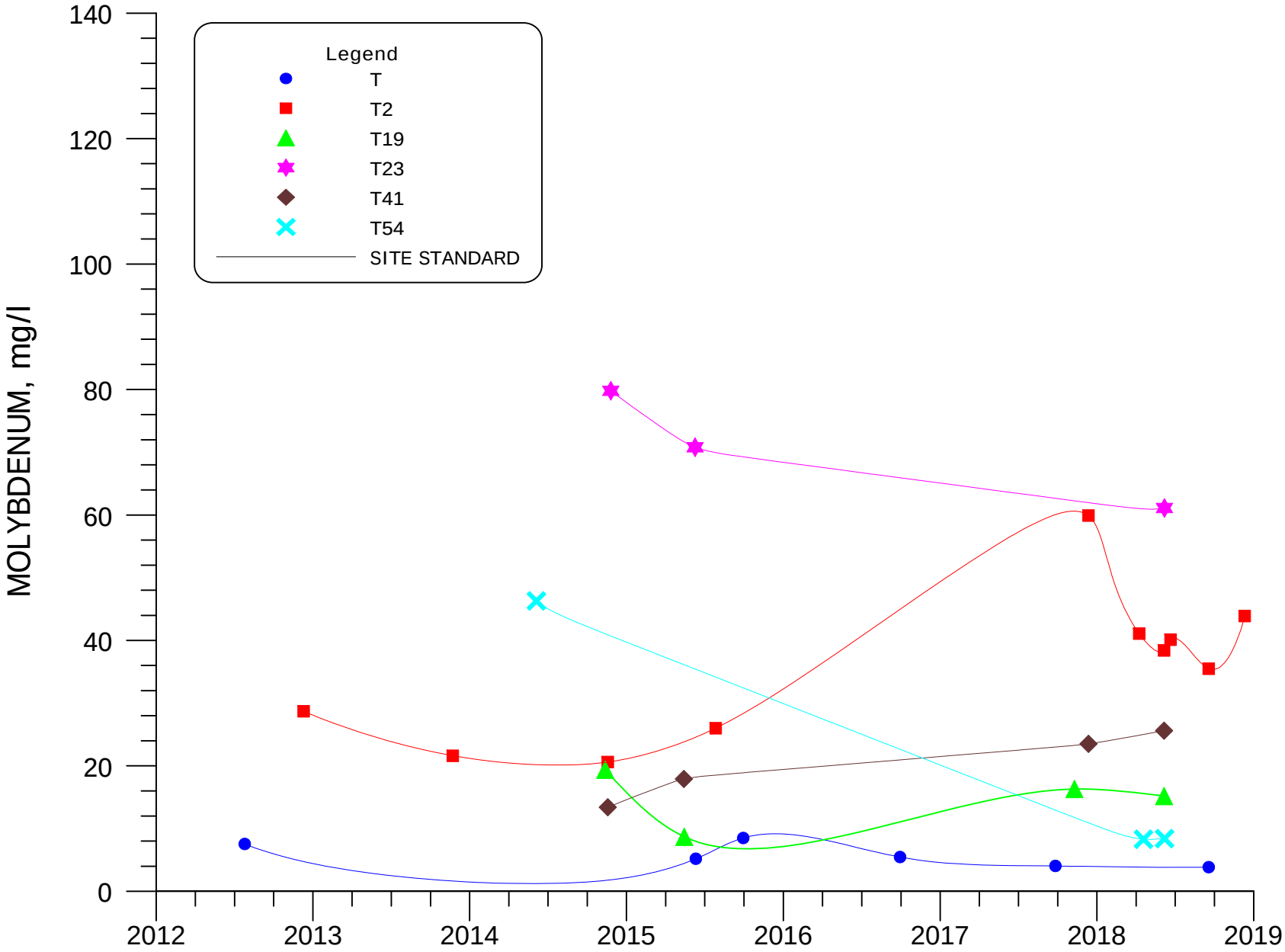

FIGURE 4.3-92. MOLYBDENUM CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

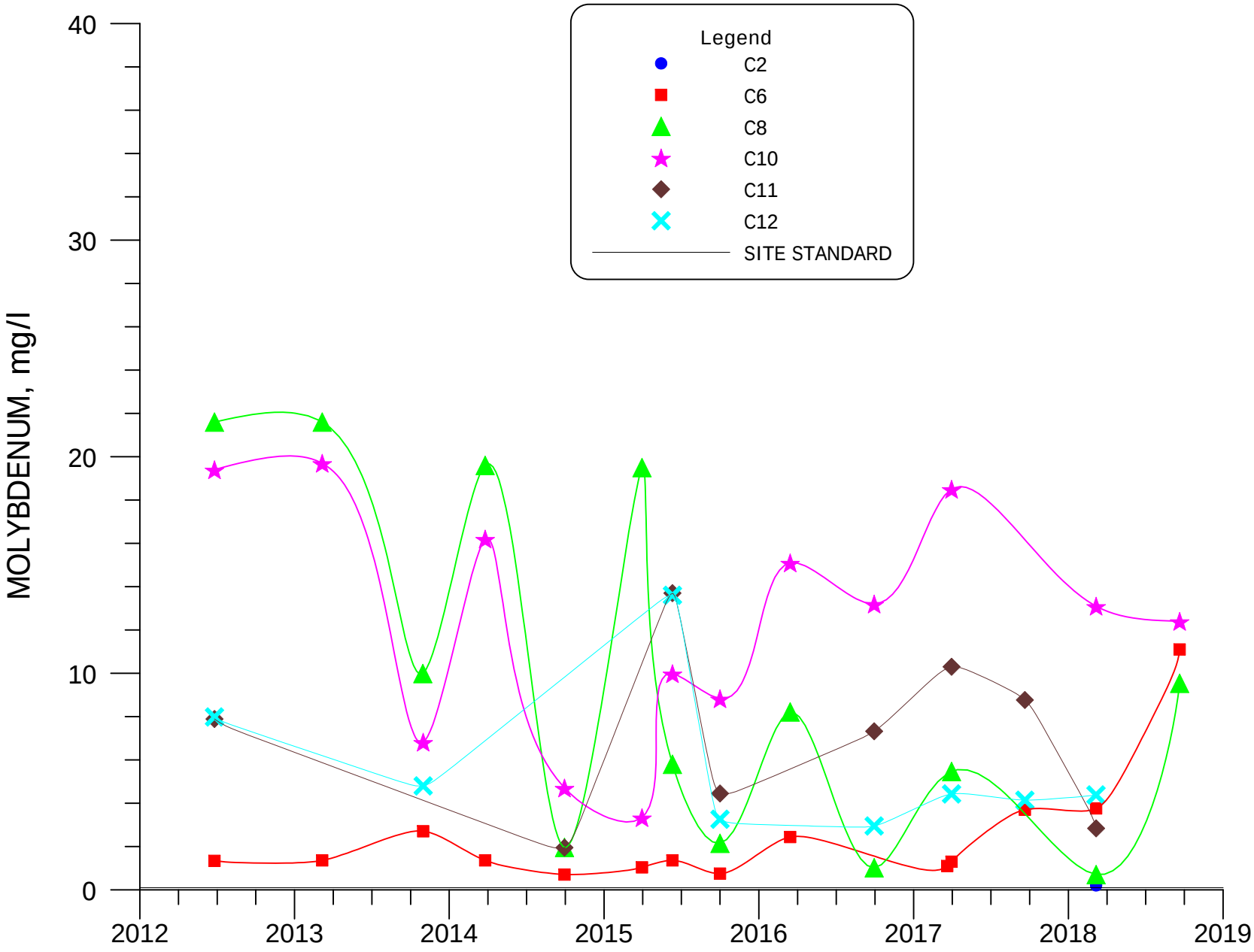

FIGURE 4.3-93. MOLYBDENUM CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

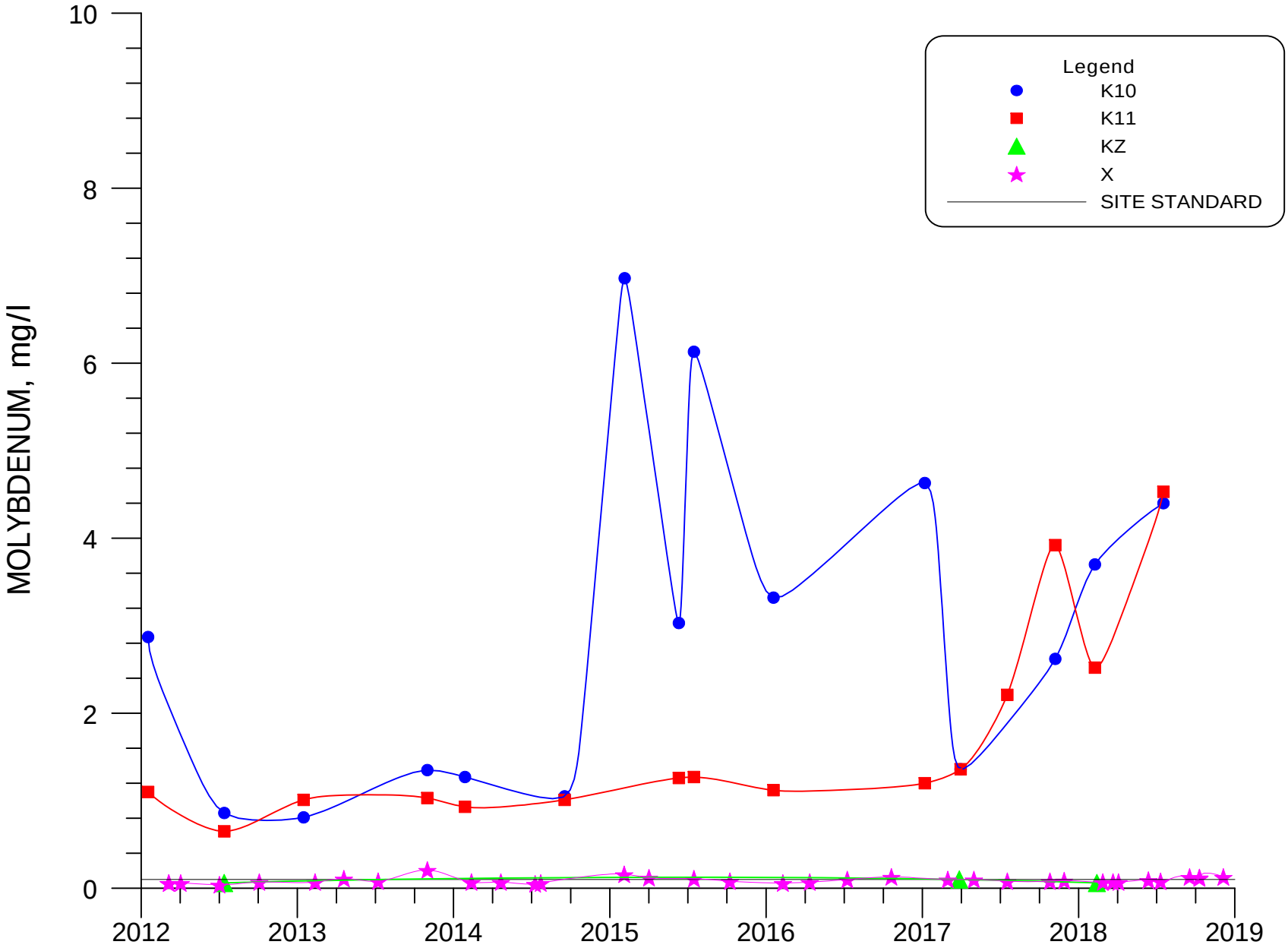

FIGURE 4.3-94. MOLYBDENUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

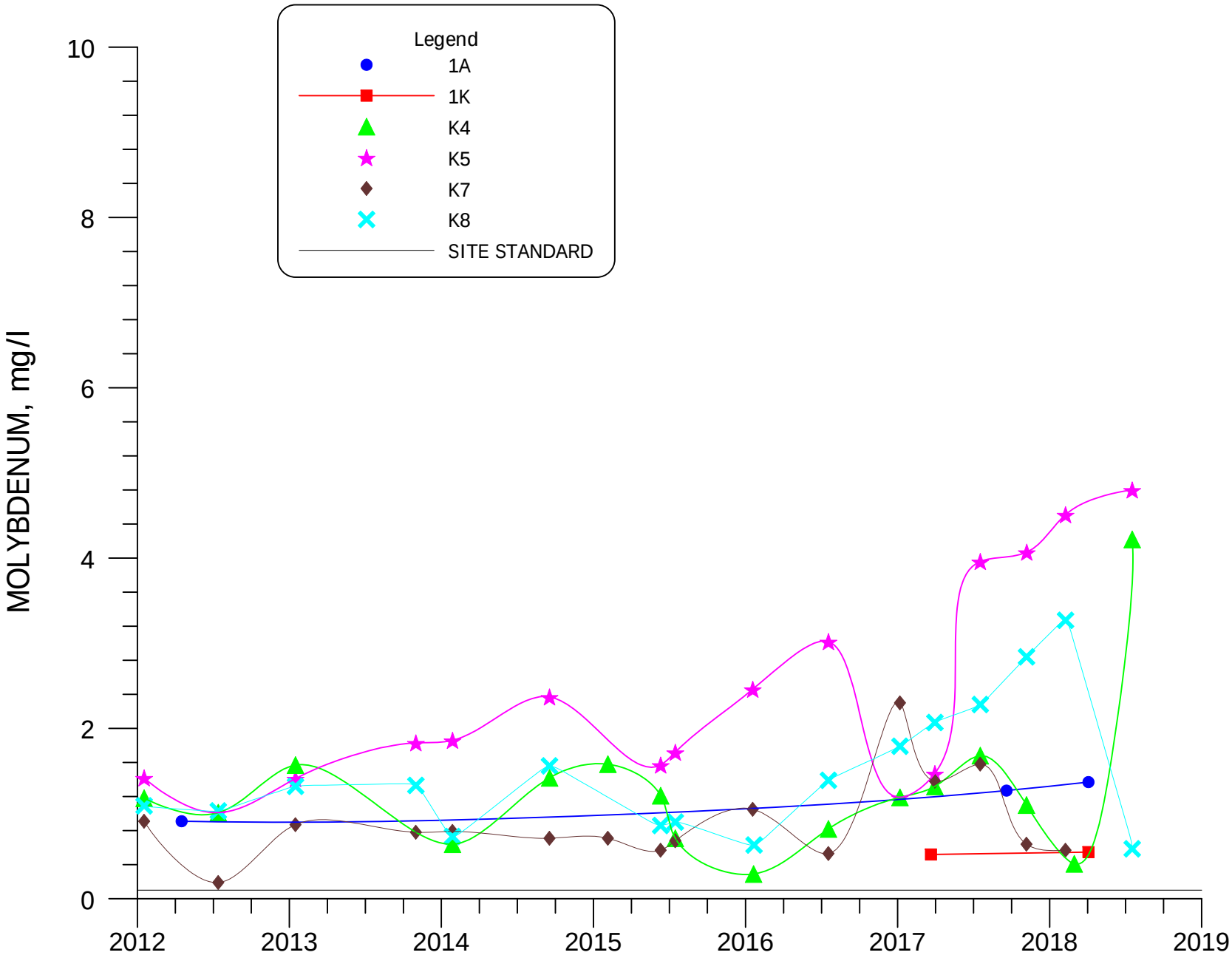

FIGURE 4.3-95. MOLYBDENUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

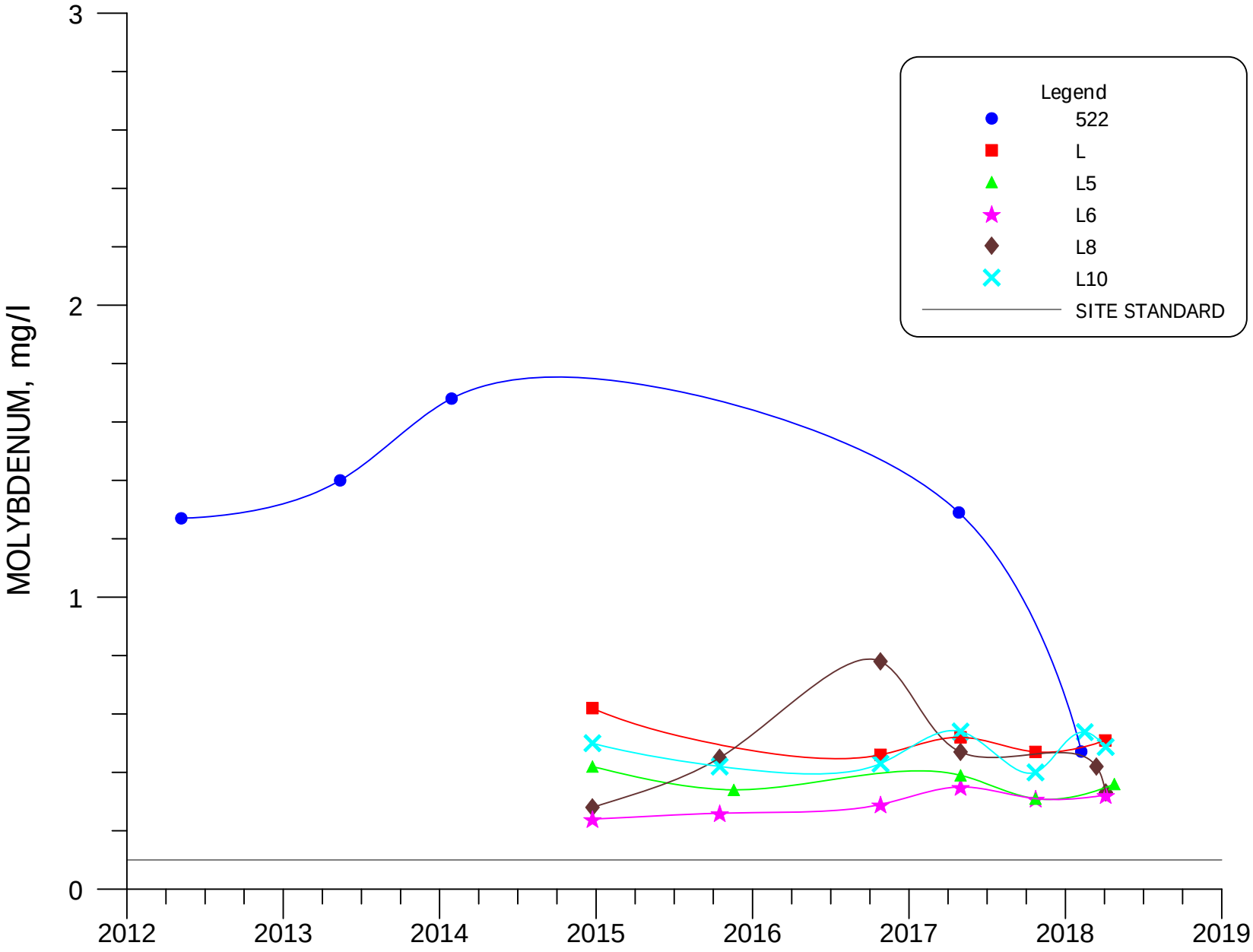

FIGURE 4.3-96. MOLYBDENUM CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

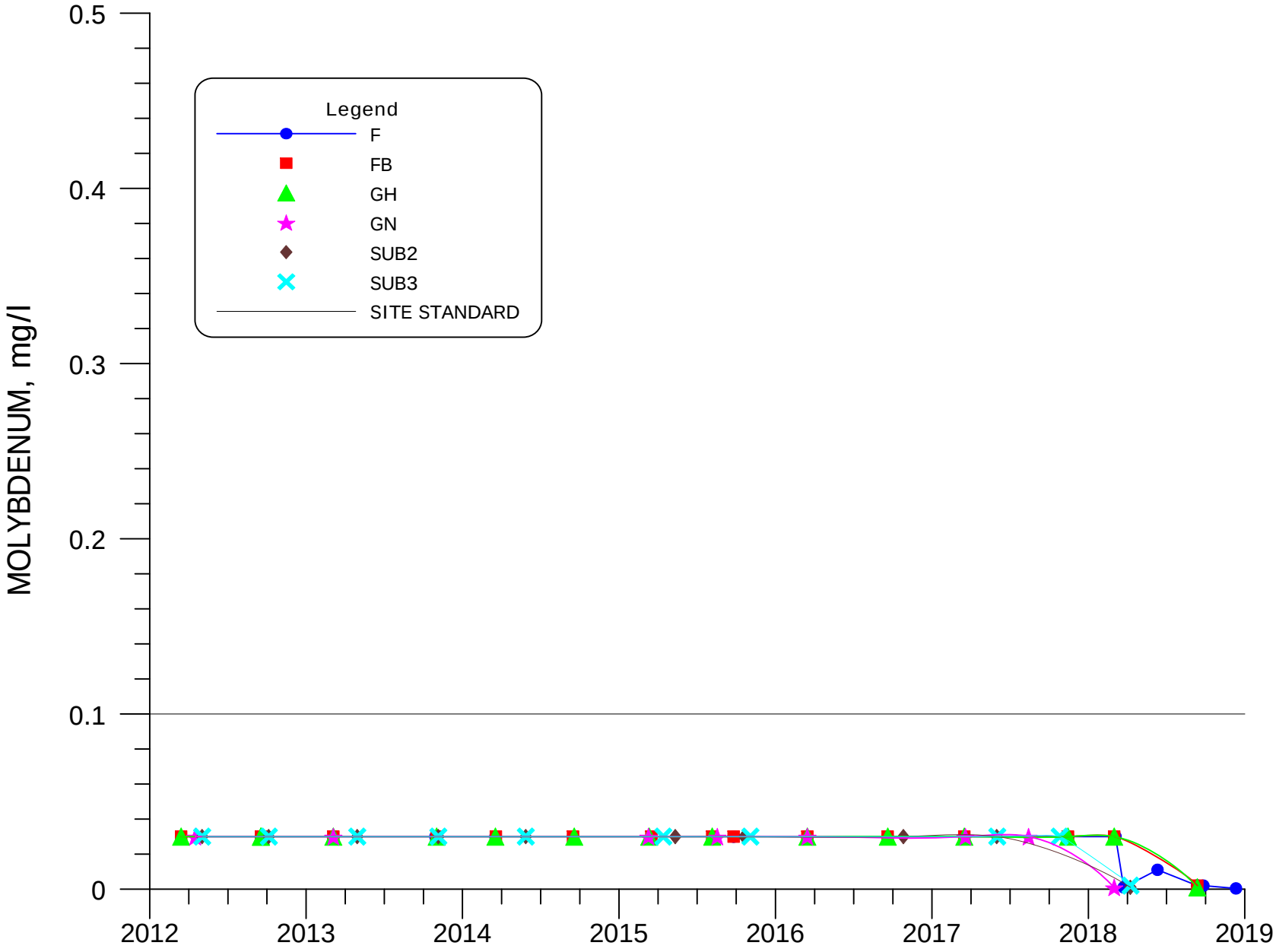

FIGURE 4.3-97. MOLYBDENUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

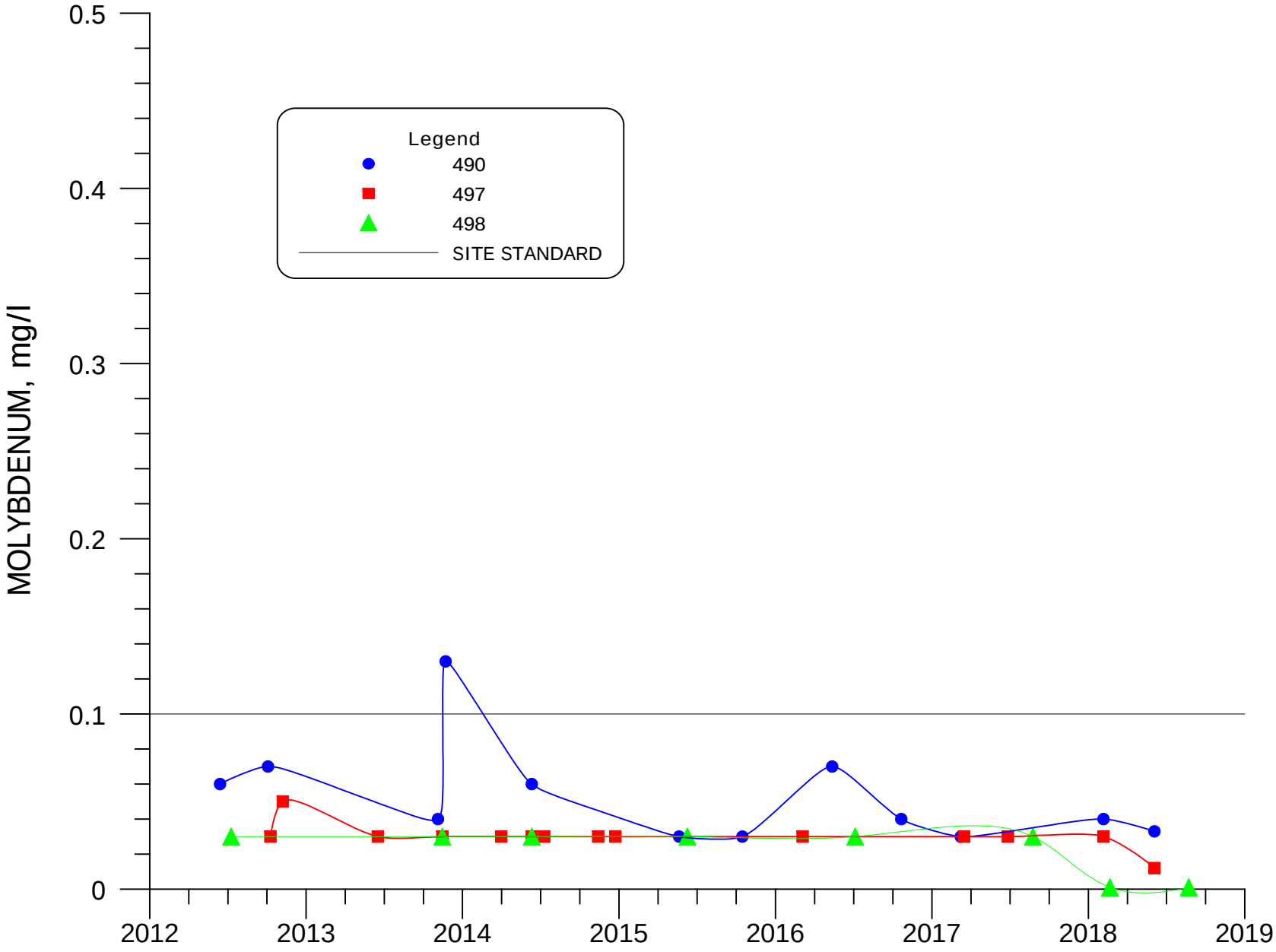

FIGURE 4.3-98. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

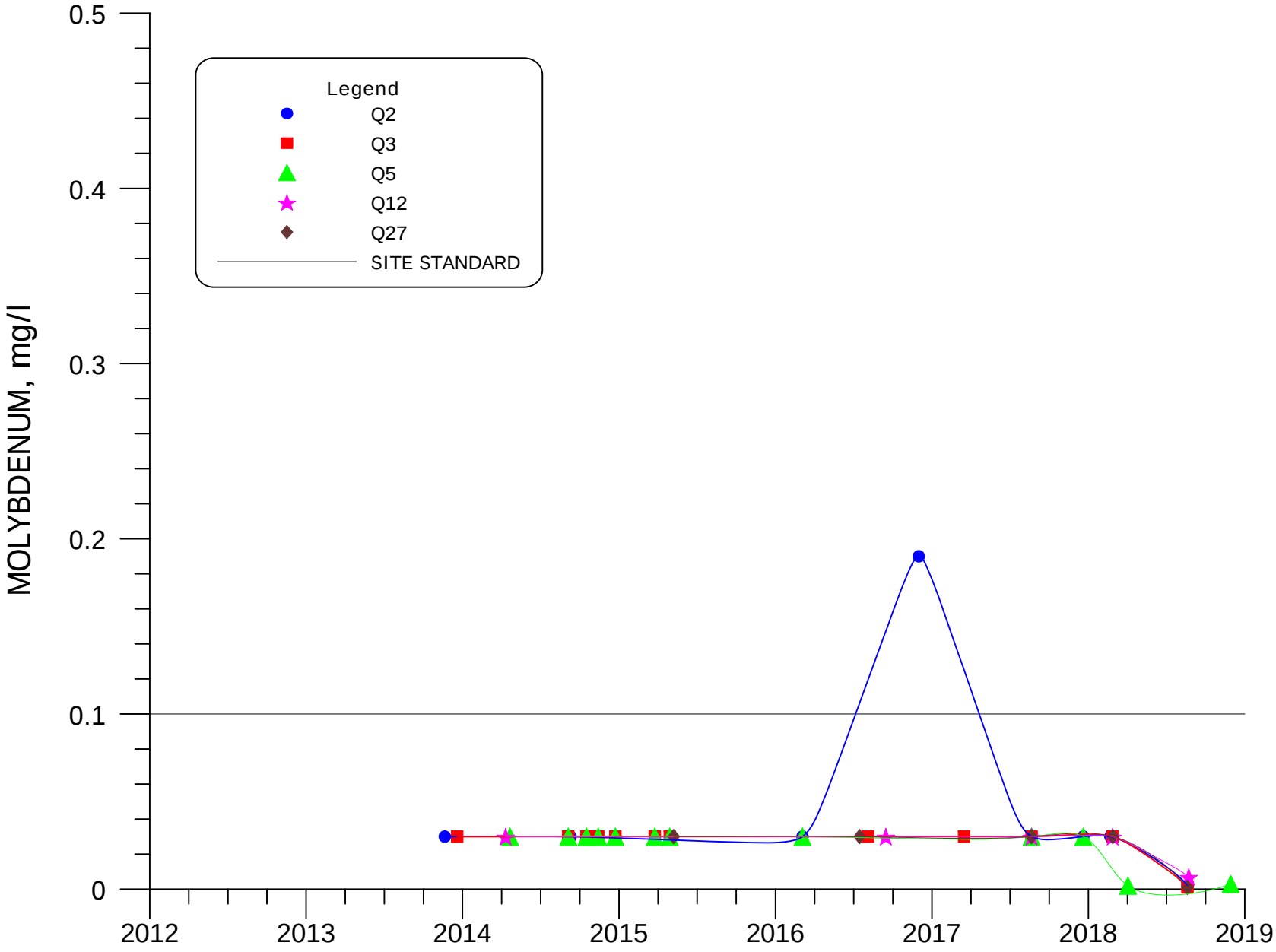

FIGURE 4.3-98A. MOLYBDENUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q27.

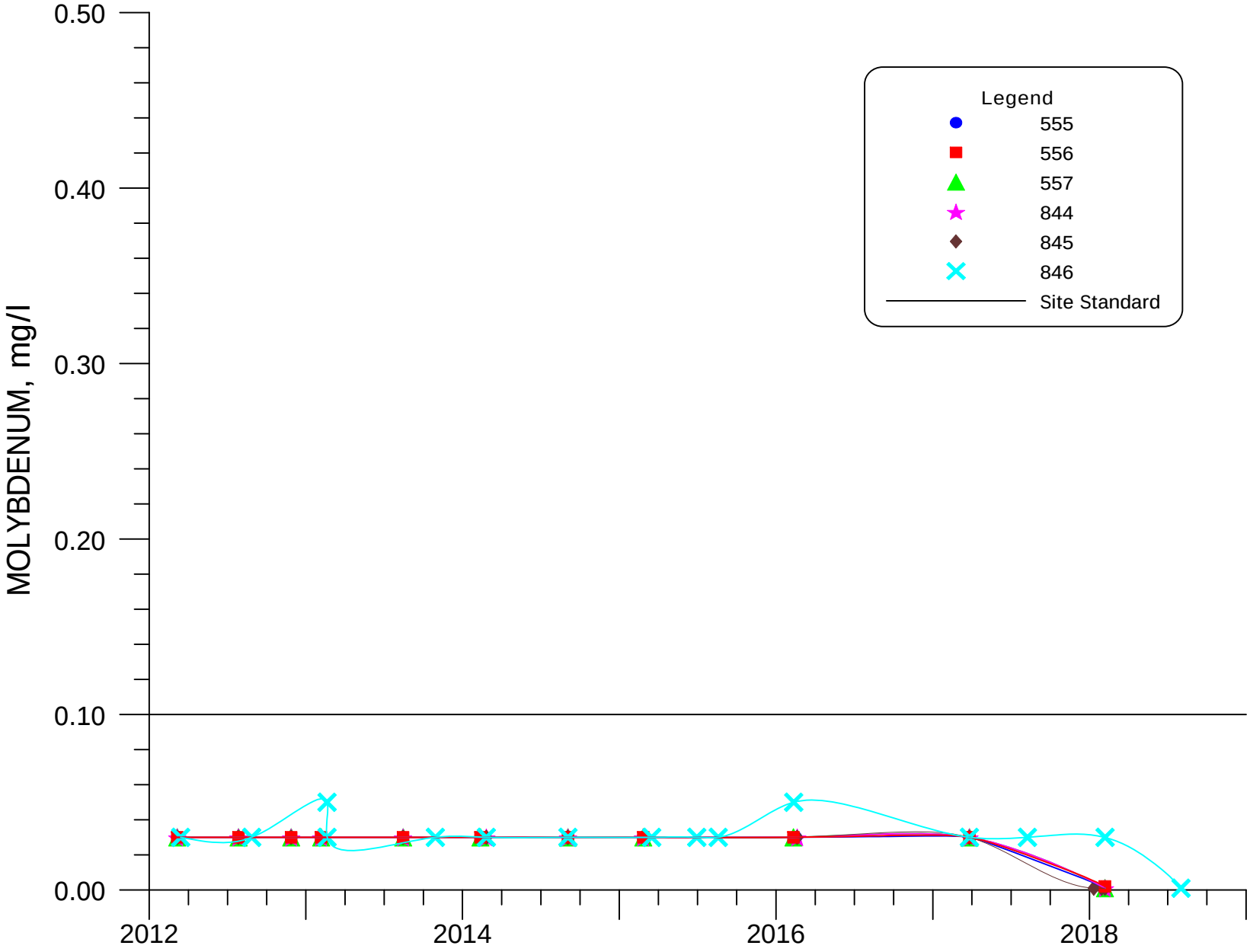

FIGURE 4.3-99. MOLYBDENUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

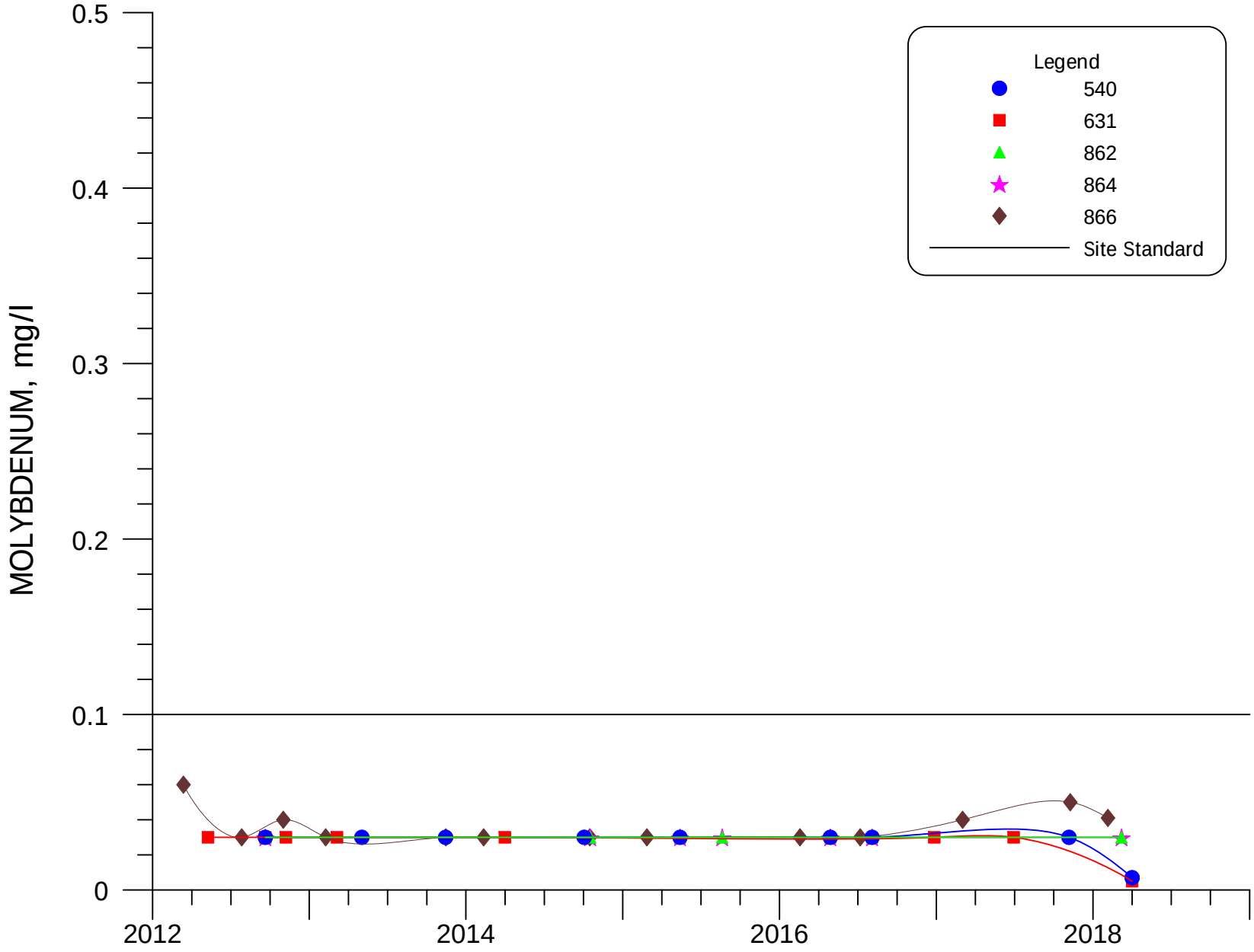

FIGURE 4.3-100. MOLYBDENUM CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

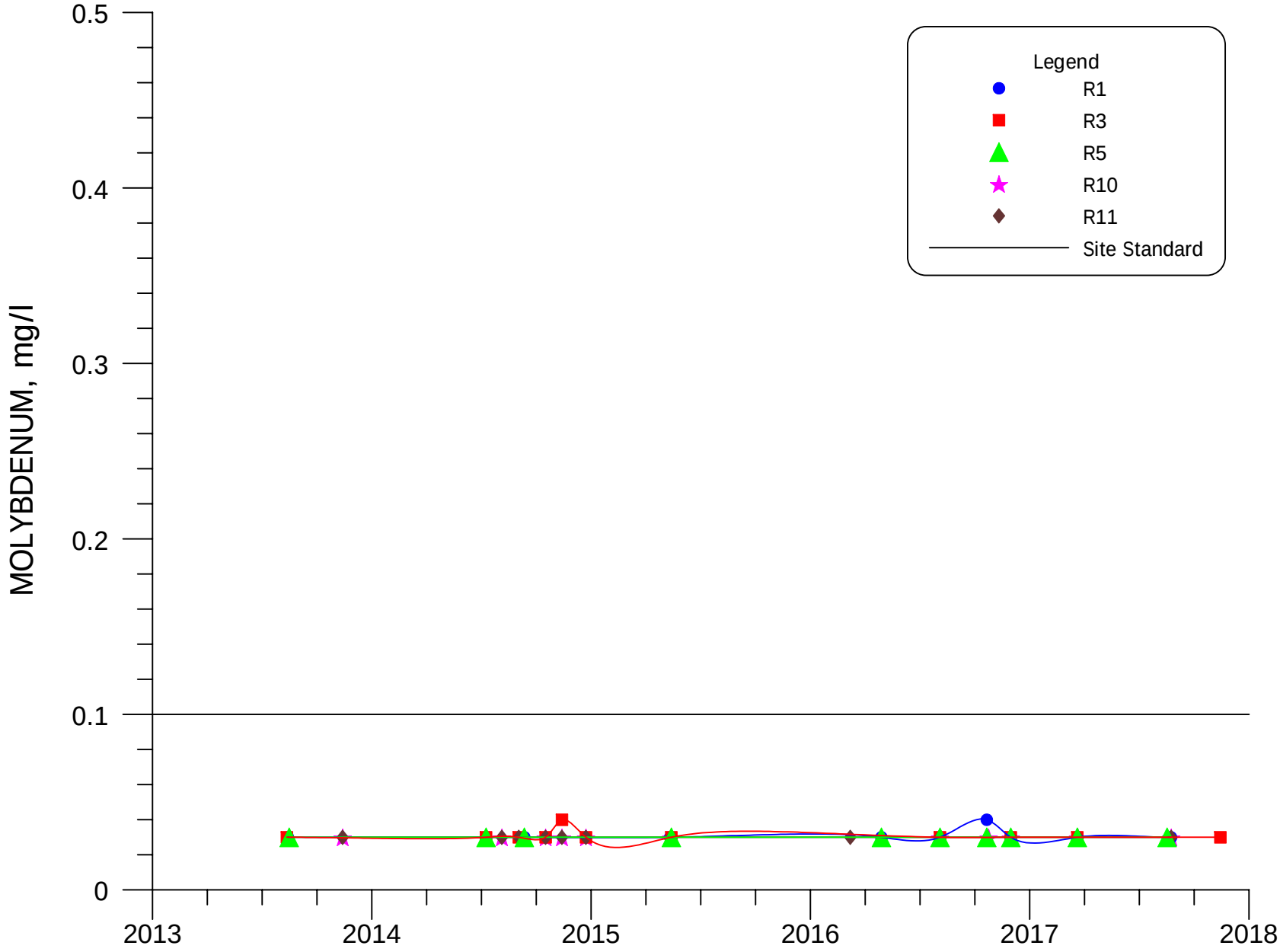

FIGURE 4.3-100A. MOLYBDENUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R11.

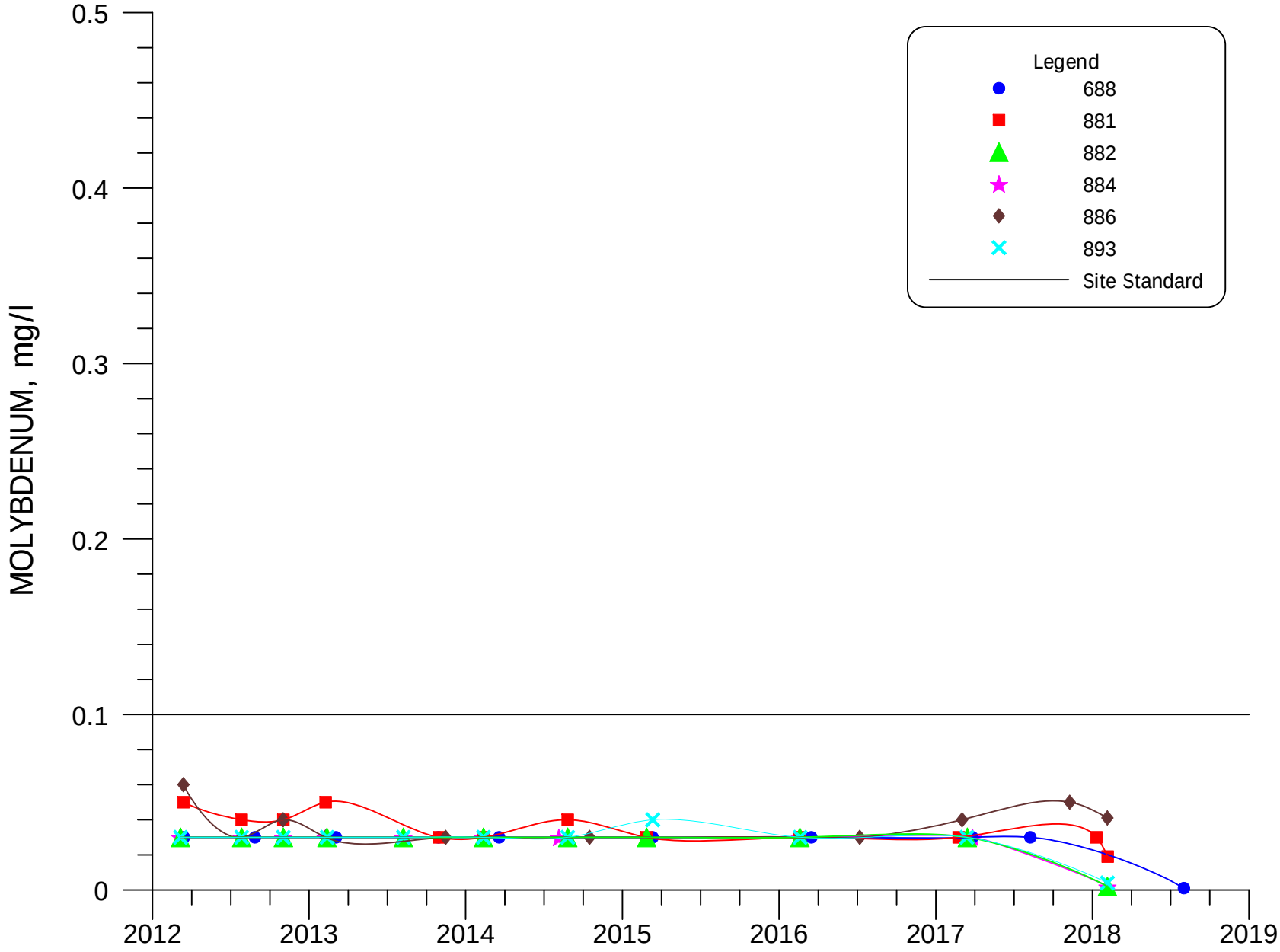

FIGURE 4.3-101. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

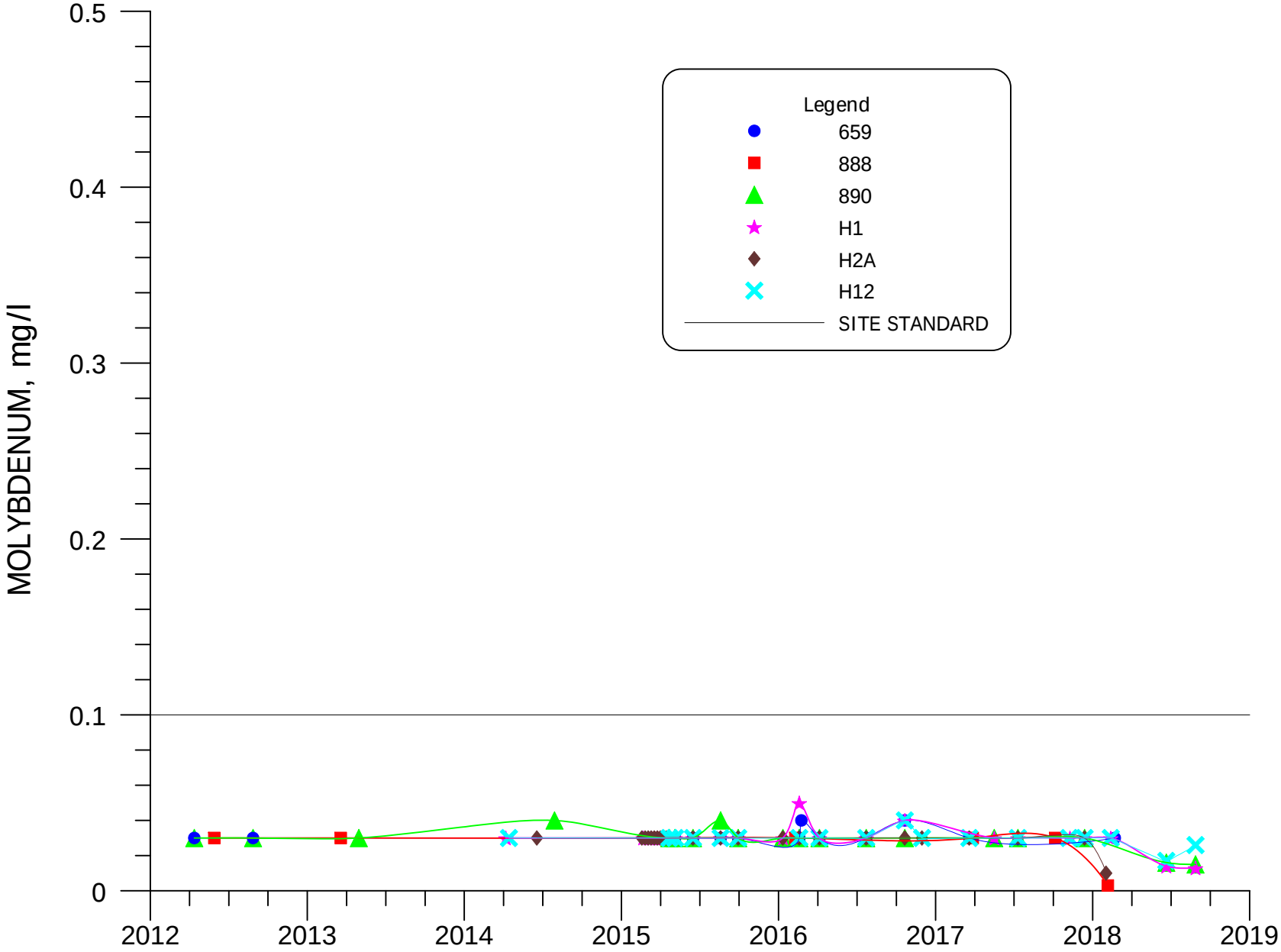

FIGURE 4.3-101A. MOLYBDENUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

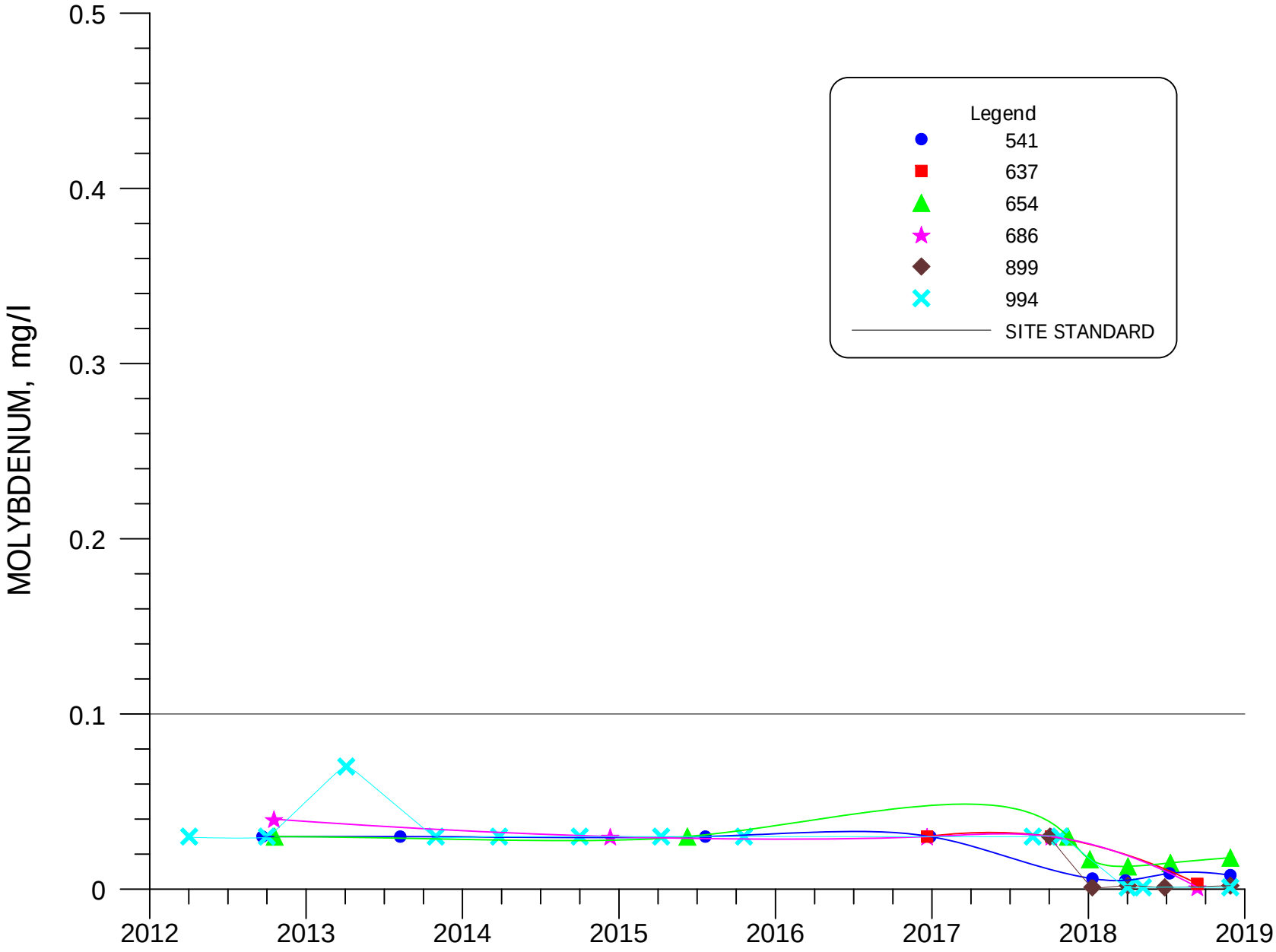

FIGURE 4.3-102. MOLYBDENUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

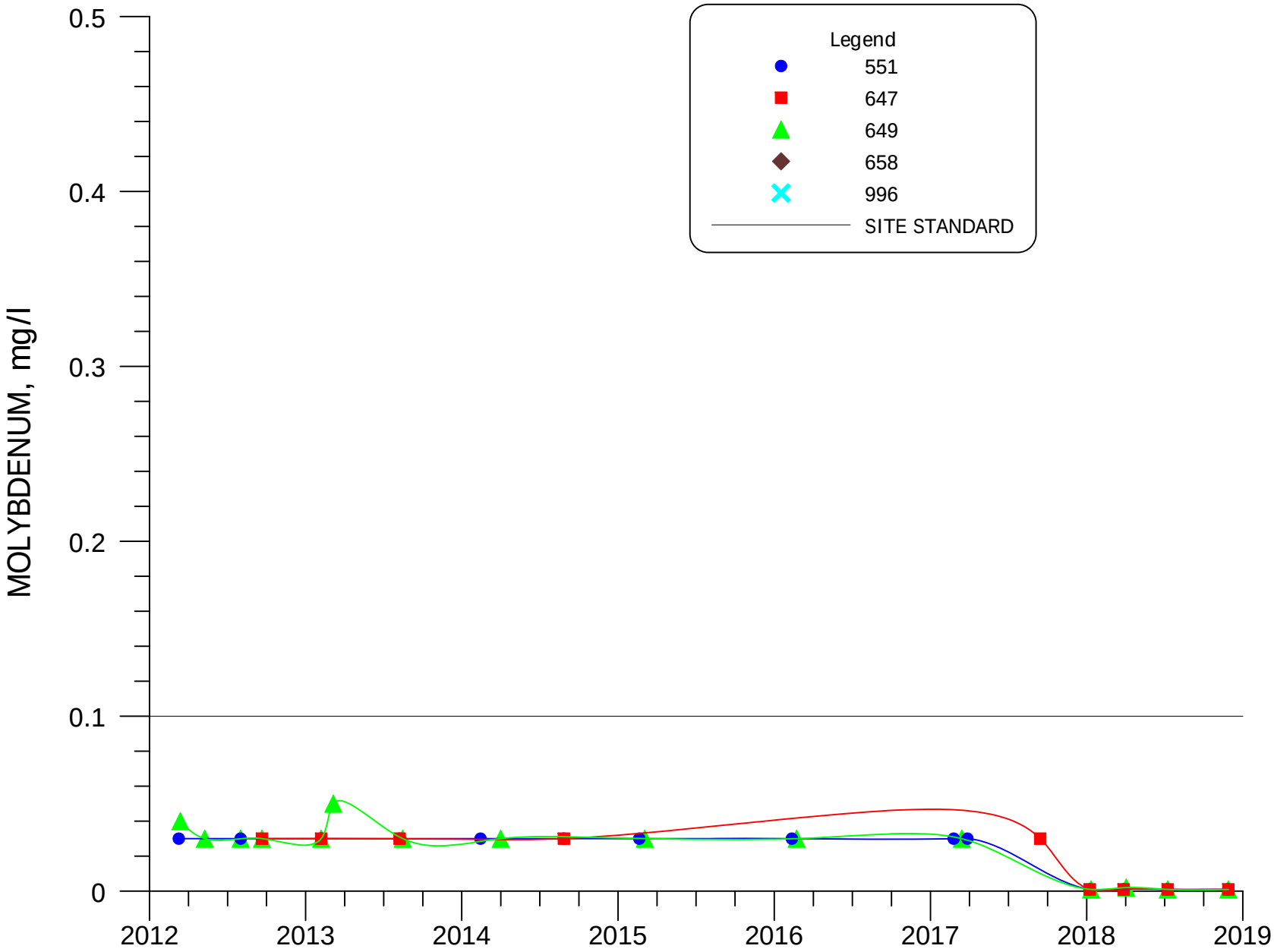

FIGURE 4.3-103. MOLYBDENUM CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

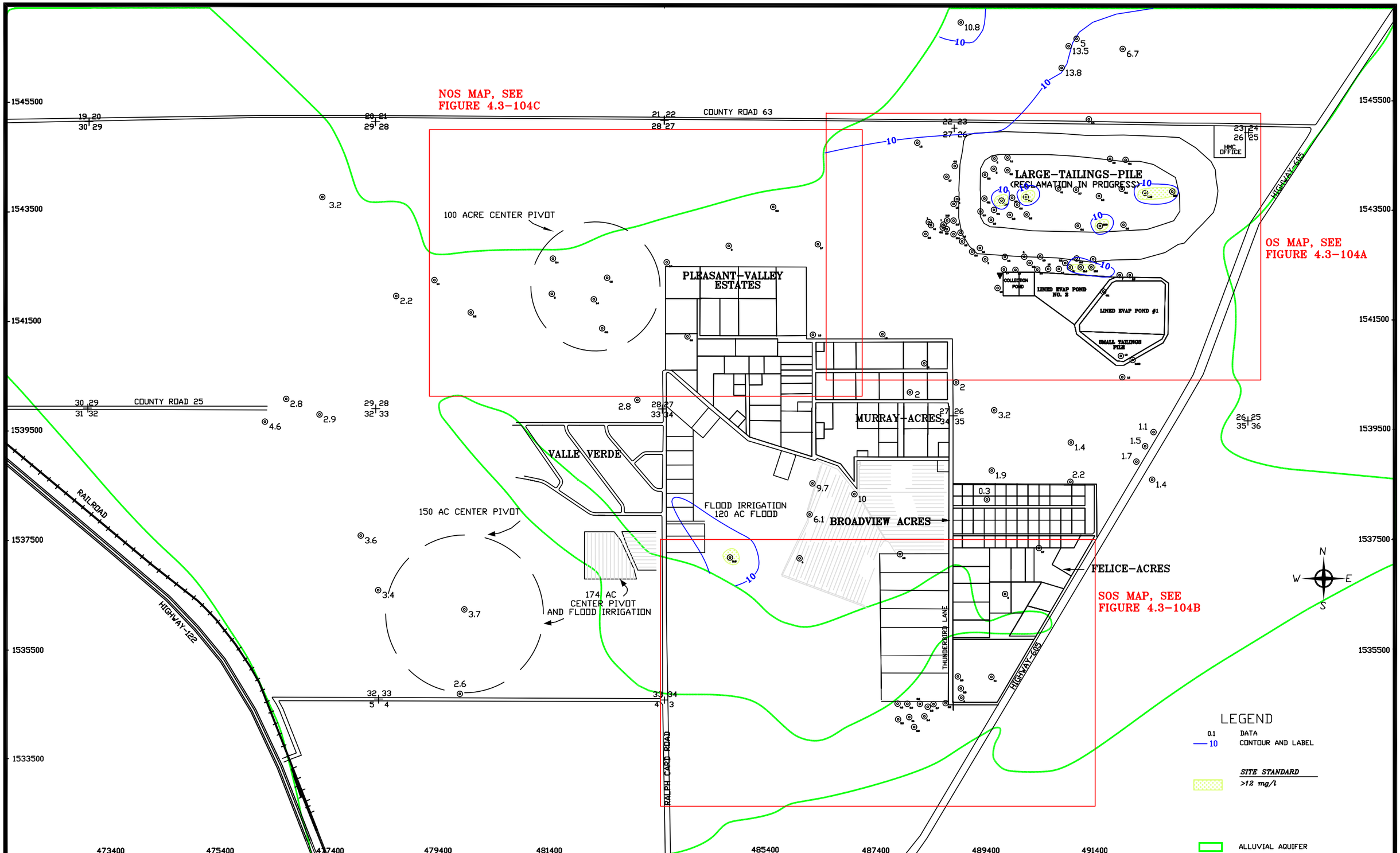

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FIGURE 4.3-104. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l

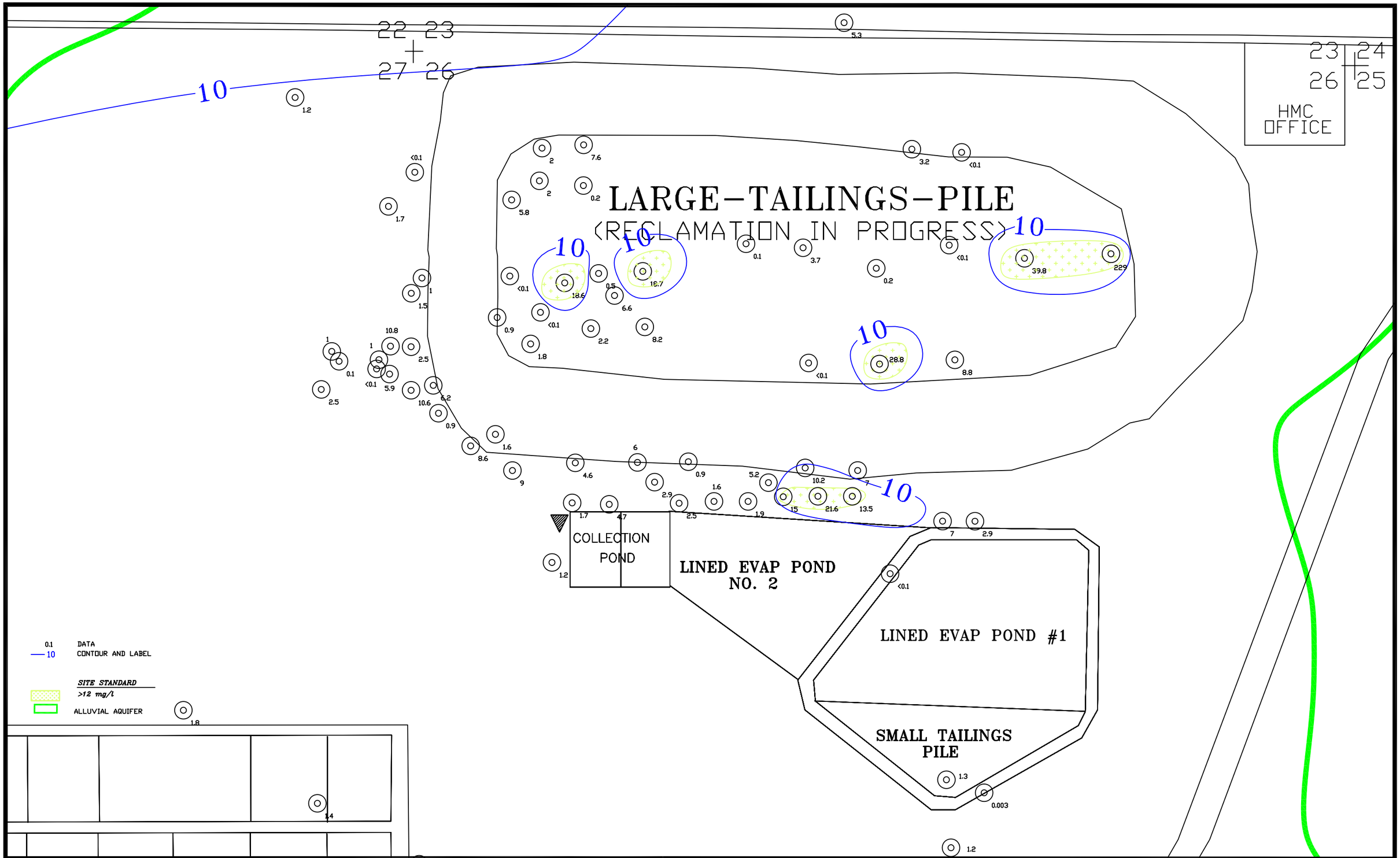

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FIGURE 4.3-104A. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l

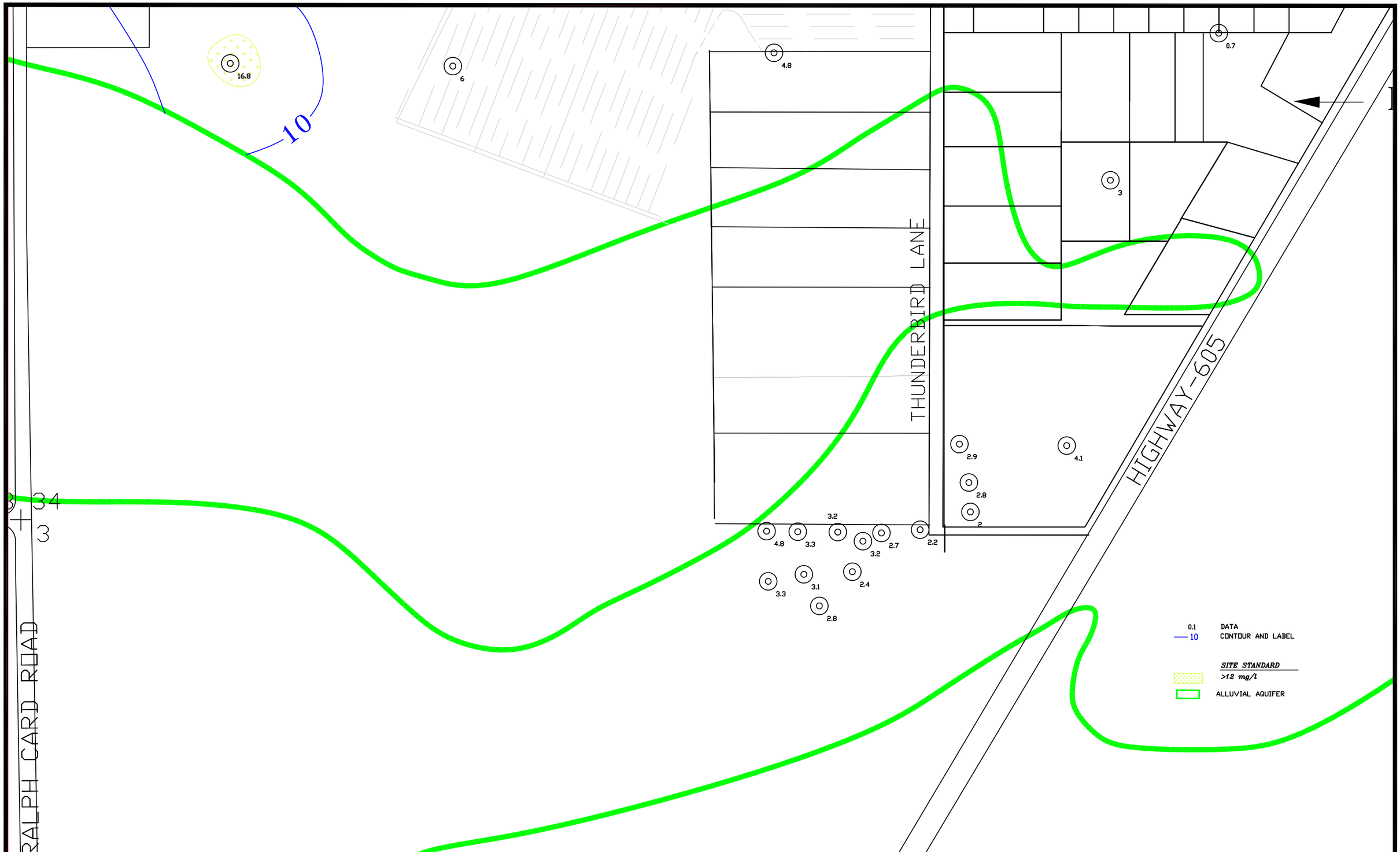

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FIGURE 4.3-104B. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l

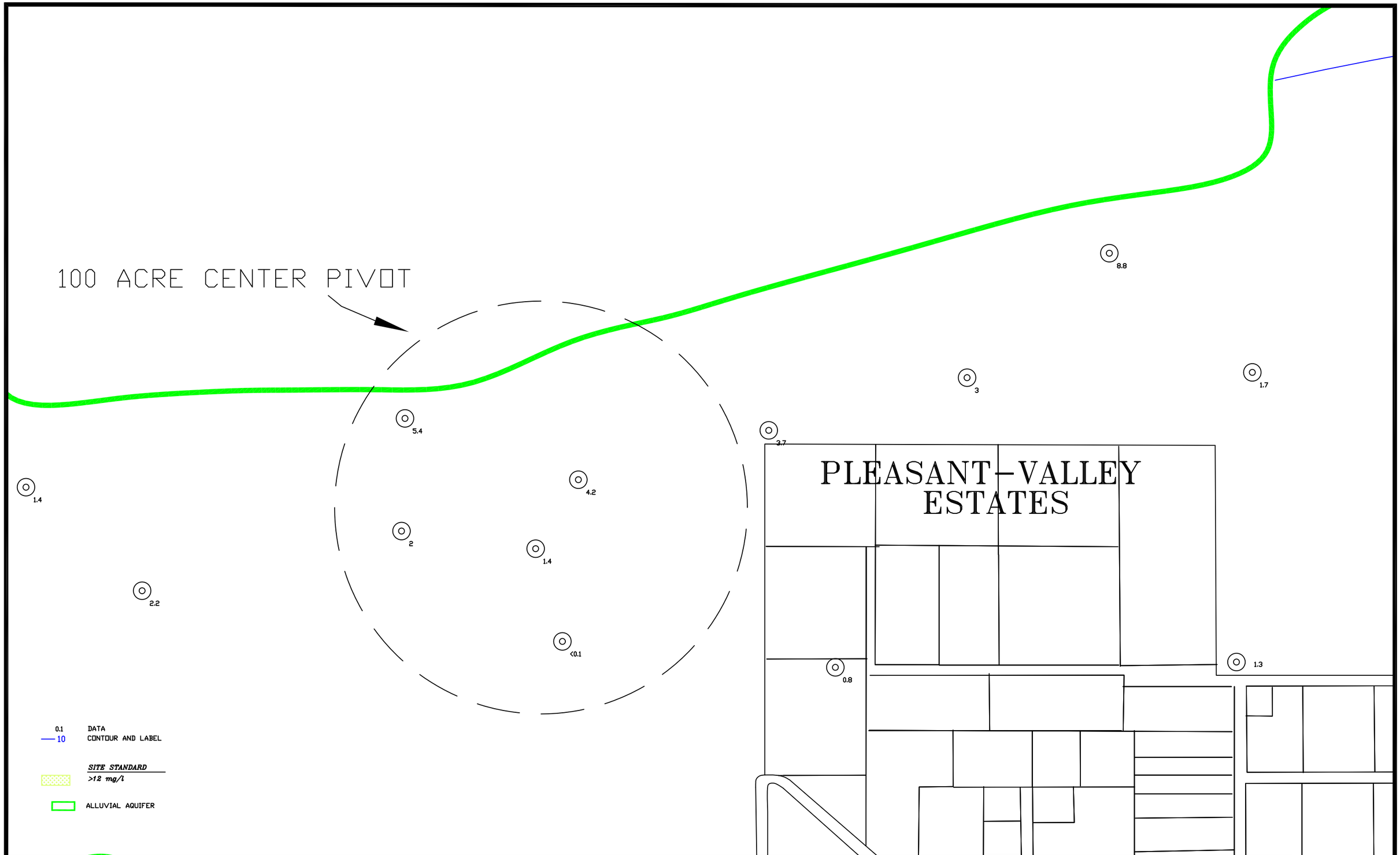

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FIGURE 4.3-104C. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

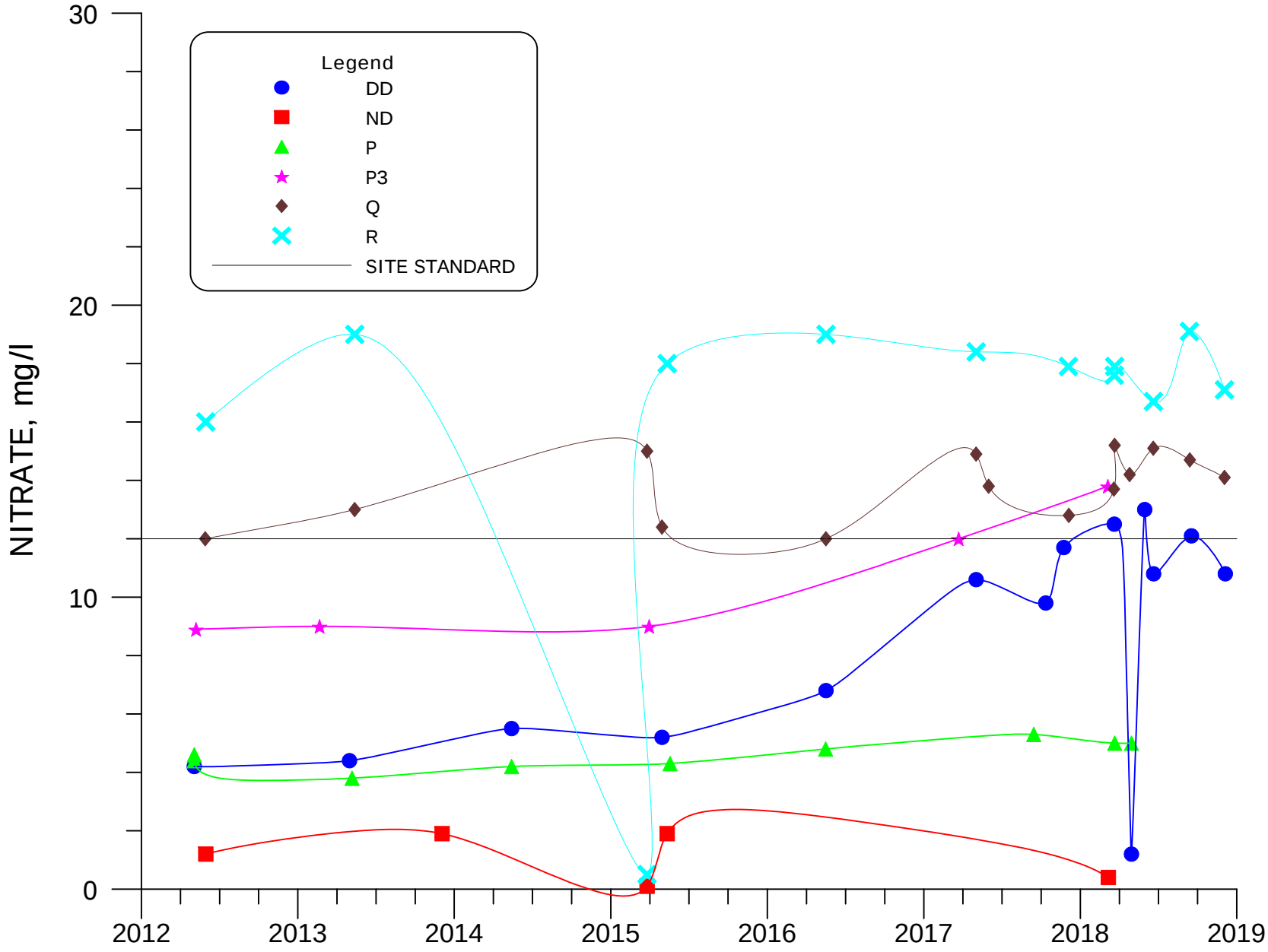

FIGURE 4.3-105. NITRATE CONCENTRATIONS FOR WELLS DD, ND, P, P3, Q, AND R.

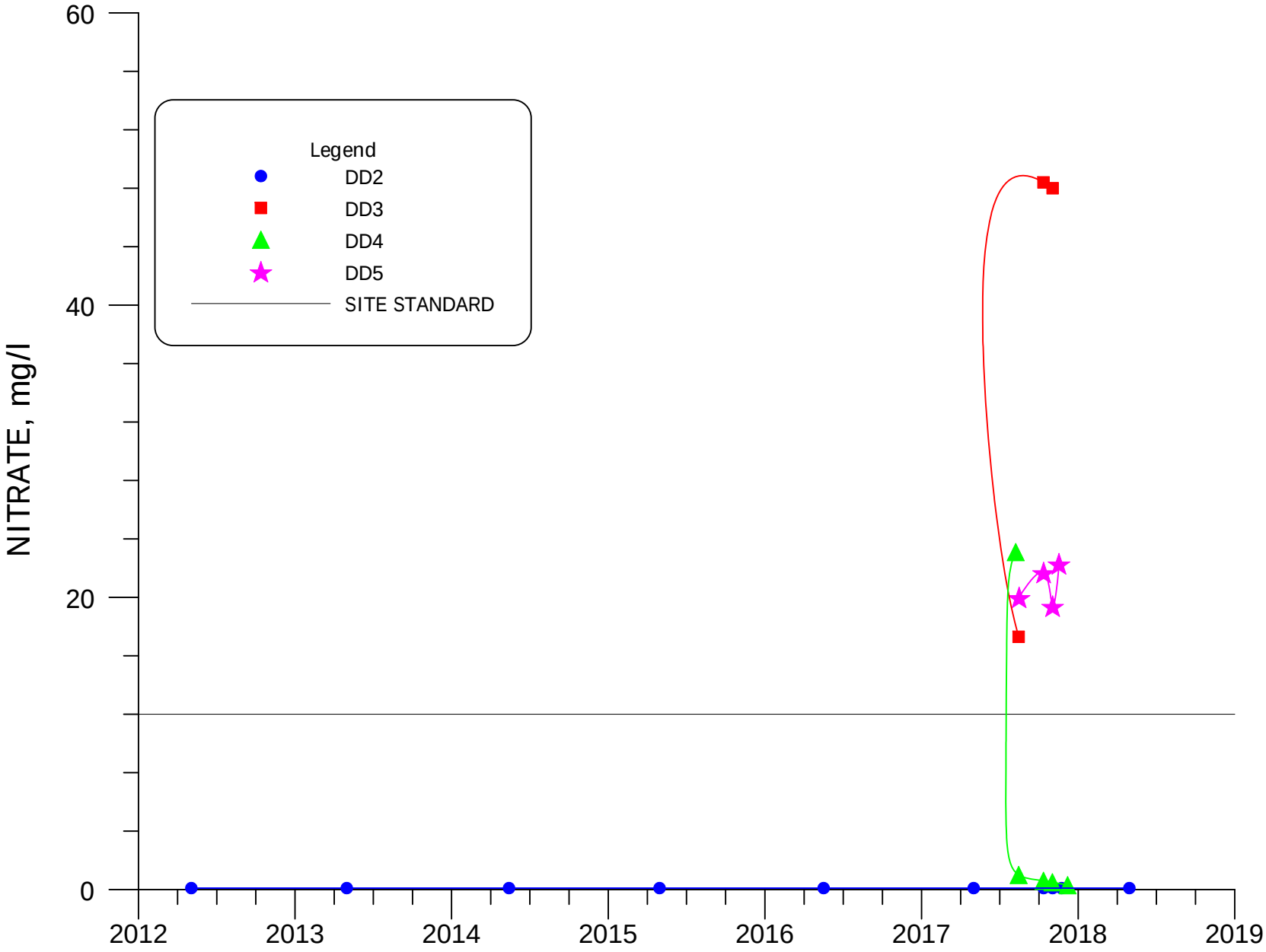

FIGURE 4.3-105A. NITRATE CONCENTRATIONS FOR WELLS DD2, DD3, DD4 AND DD5.

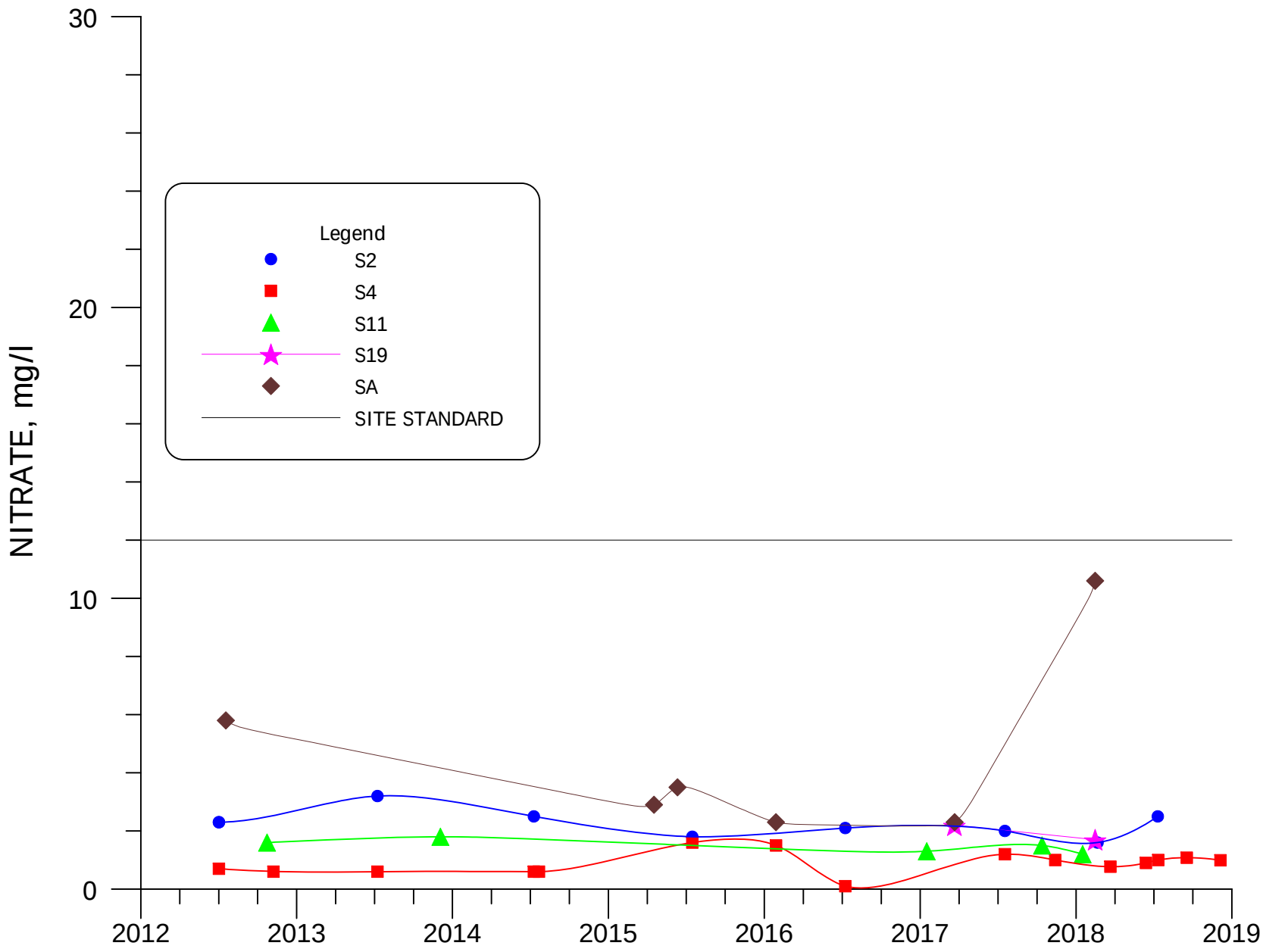

FIGURE 4.3-106. NITRATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

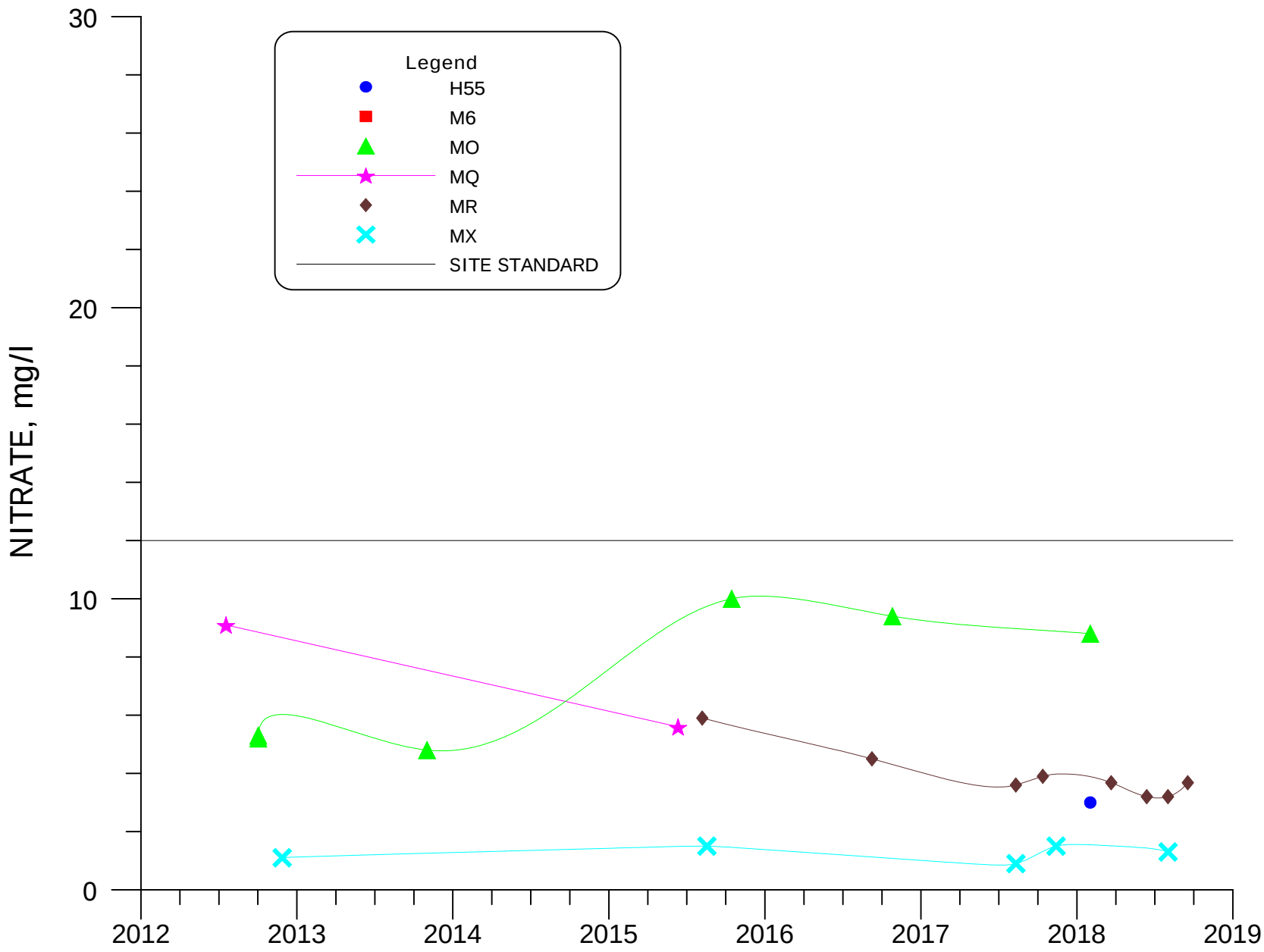

FIGURE 4.3-107. NITRATE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

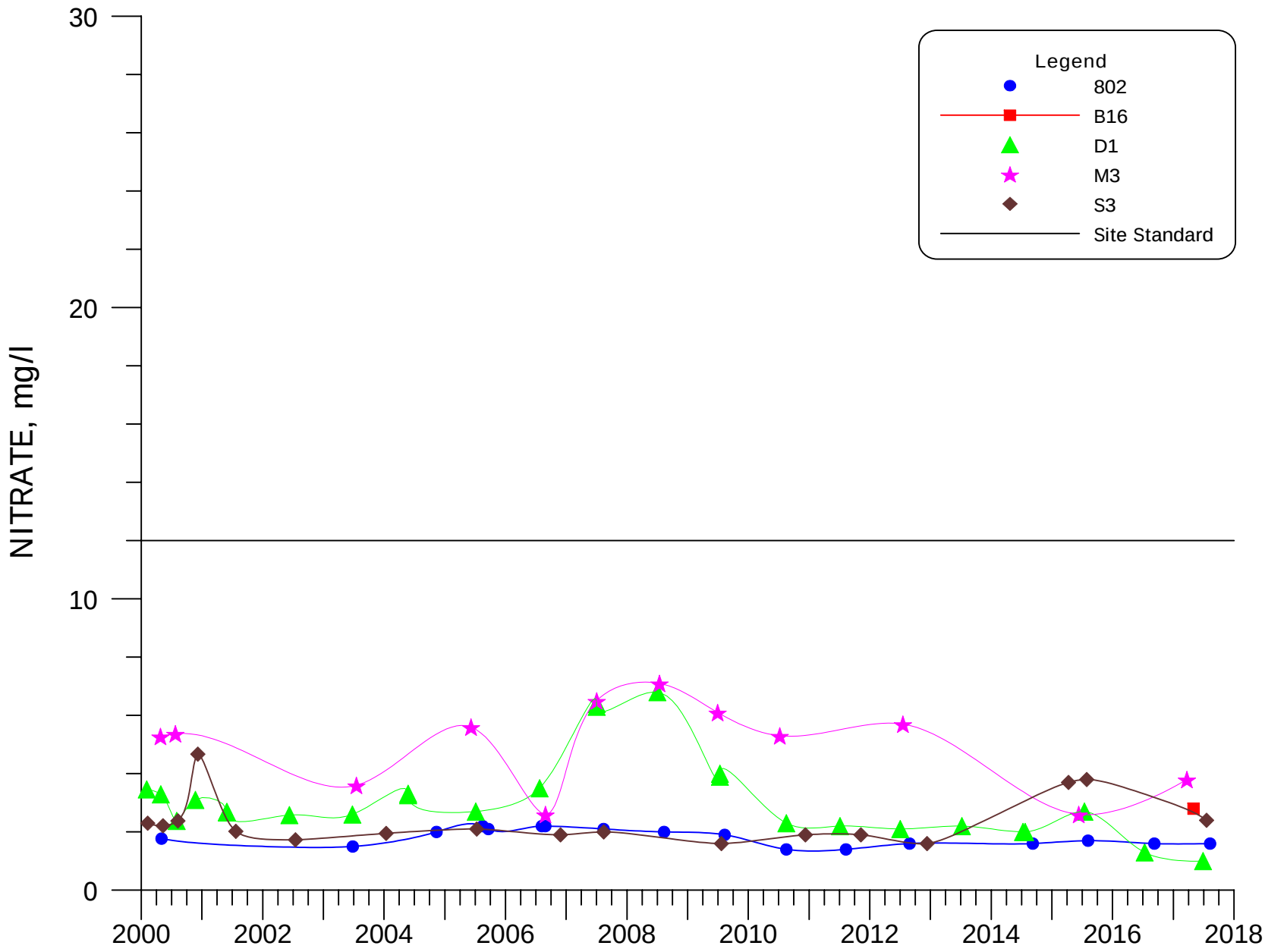

FIGURE 4.3-108. NITRATE CONCENTRATIONS FOR WELLS 802, B16, D1, M3 AND S3.

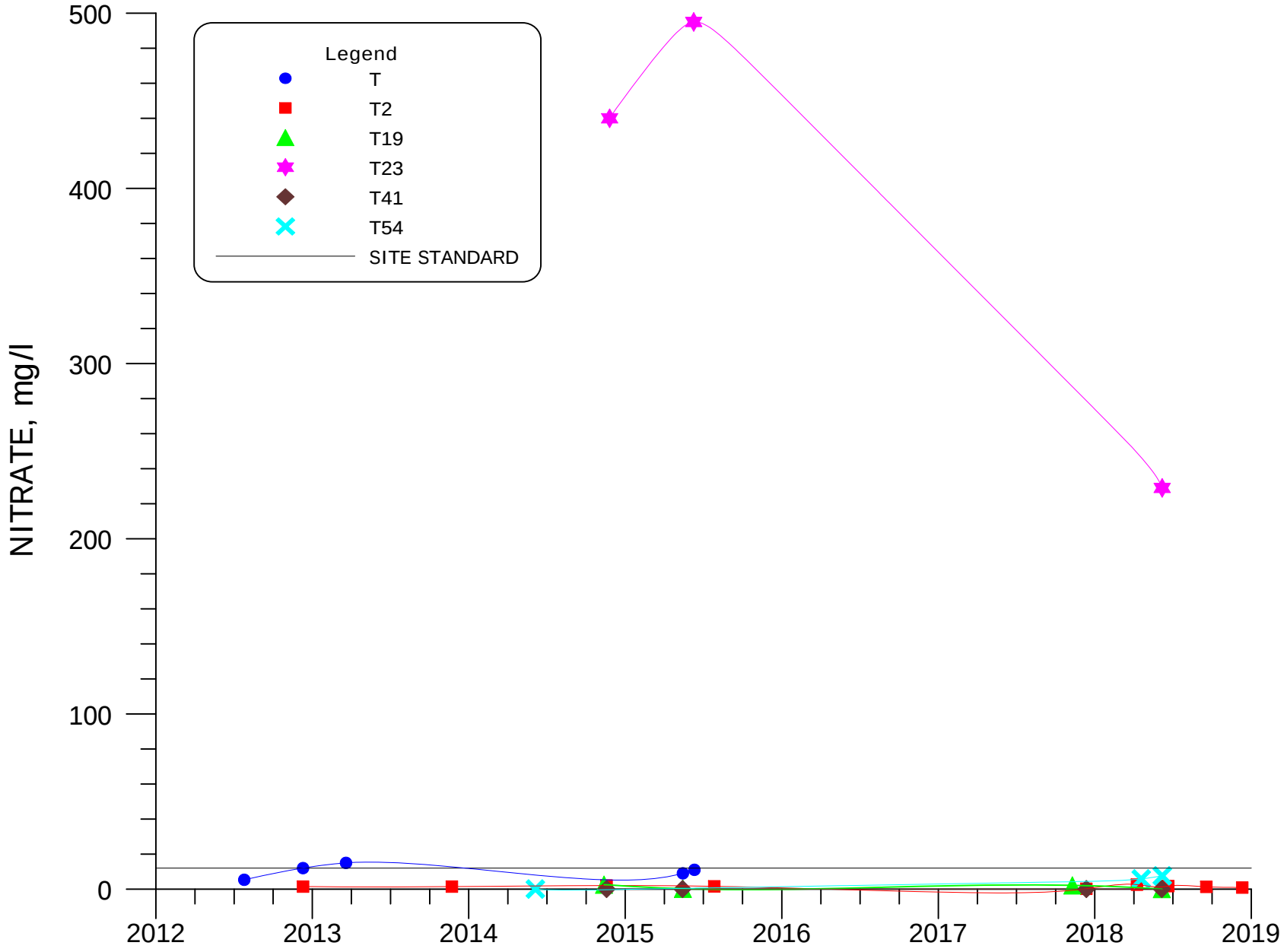

FIGURE 4.3-109. NITRATE CONCENTRATIONS FOR WELLS T, T2, T19, T23, T41 AND T54.

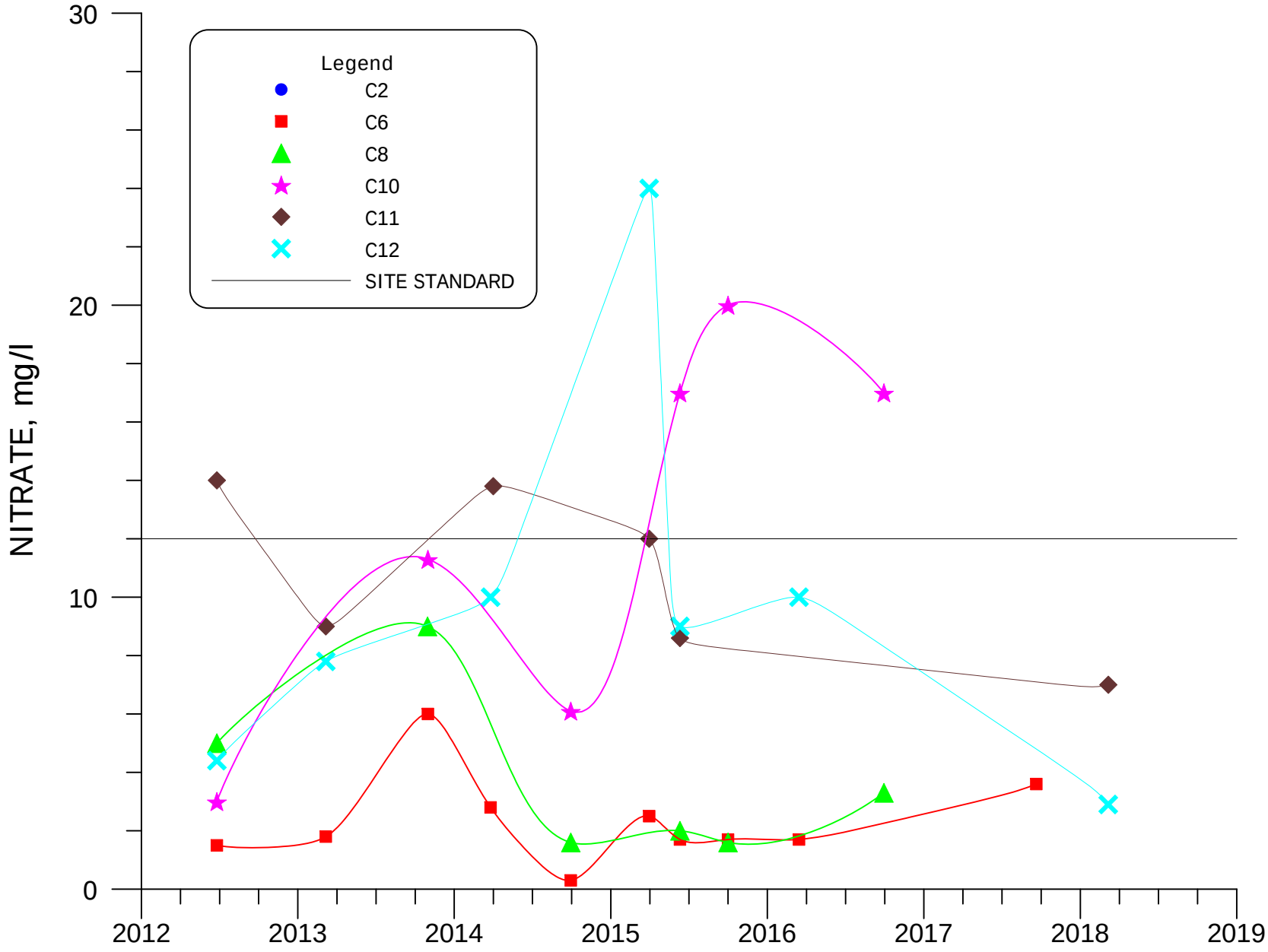

FIGURE 4.3-110. NITRATE CONCENTRATIONS FOR WELLS C2, C6, C8, C10, C11 AND C12.

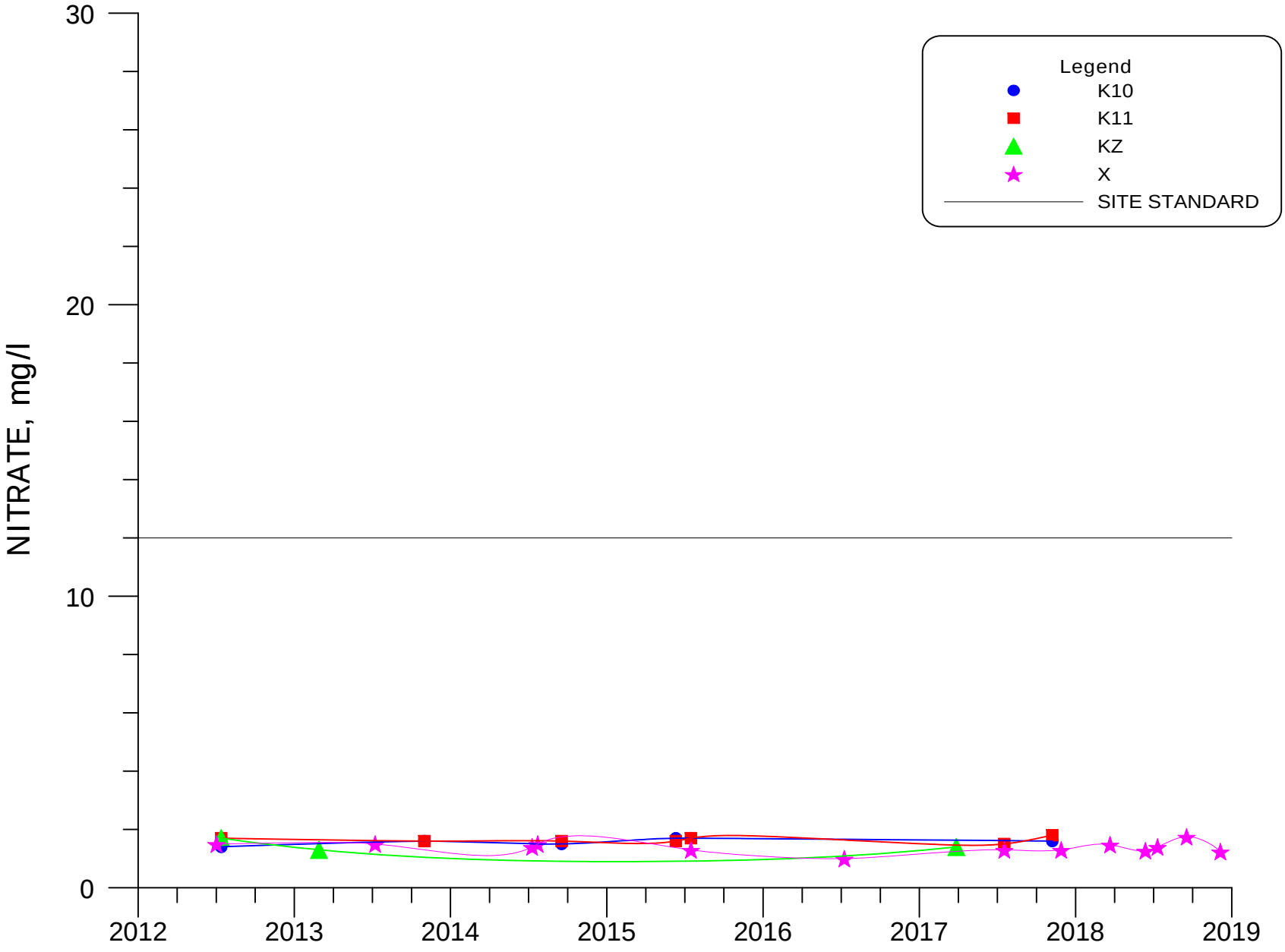

FIGURE 4.3-111. NITRATE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

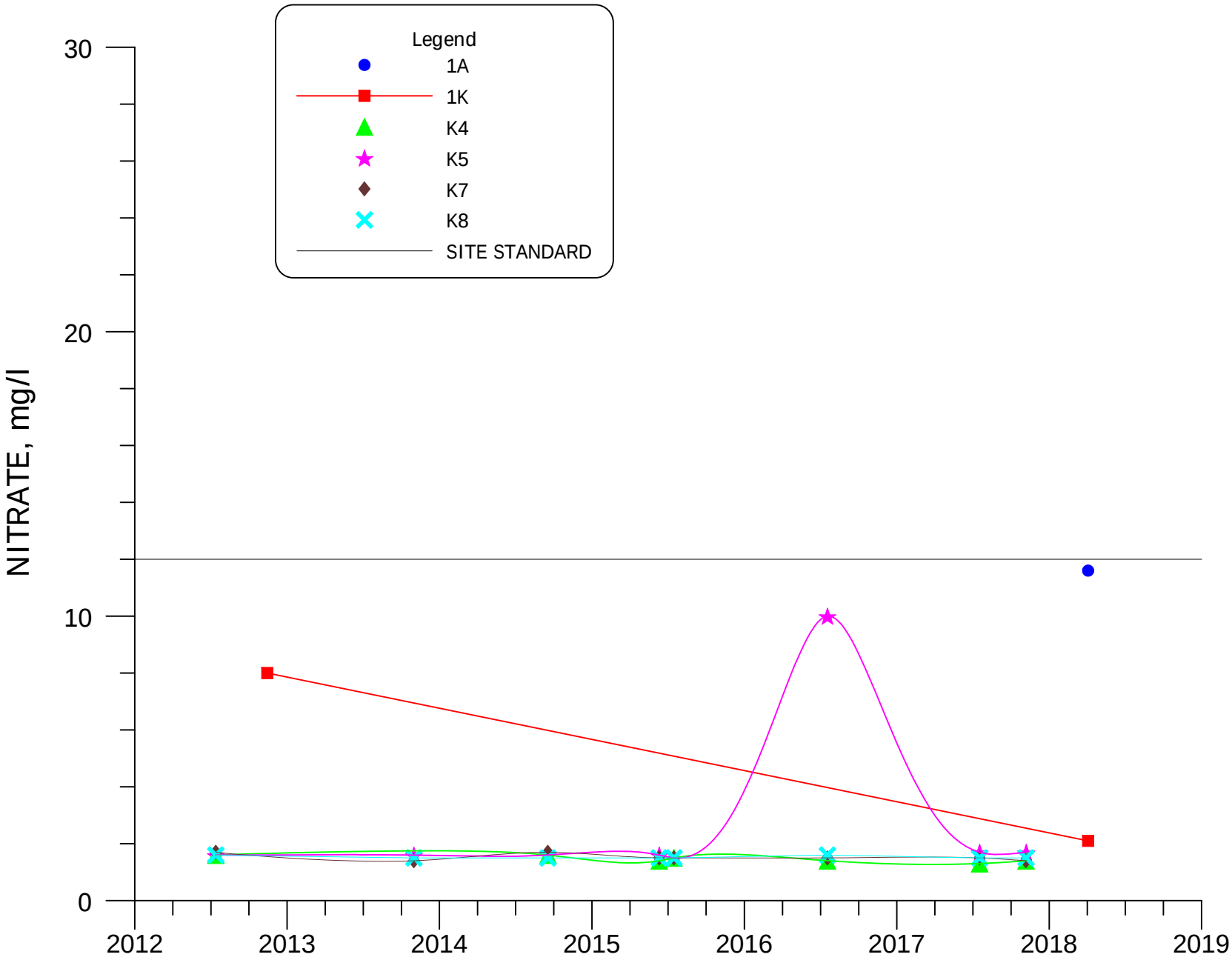

FIGURE 4.3-112. NITRATE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

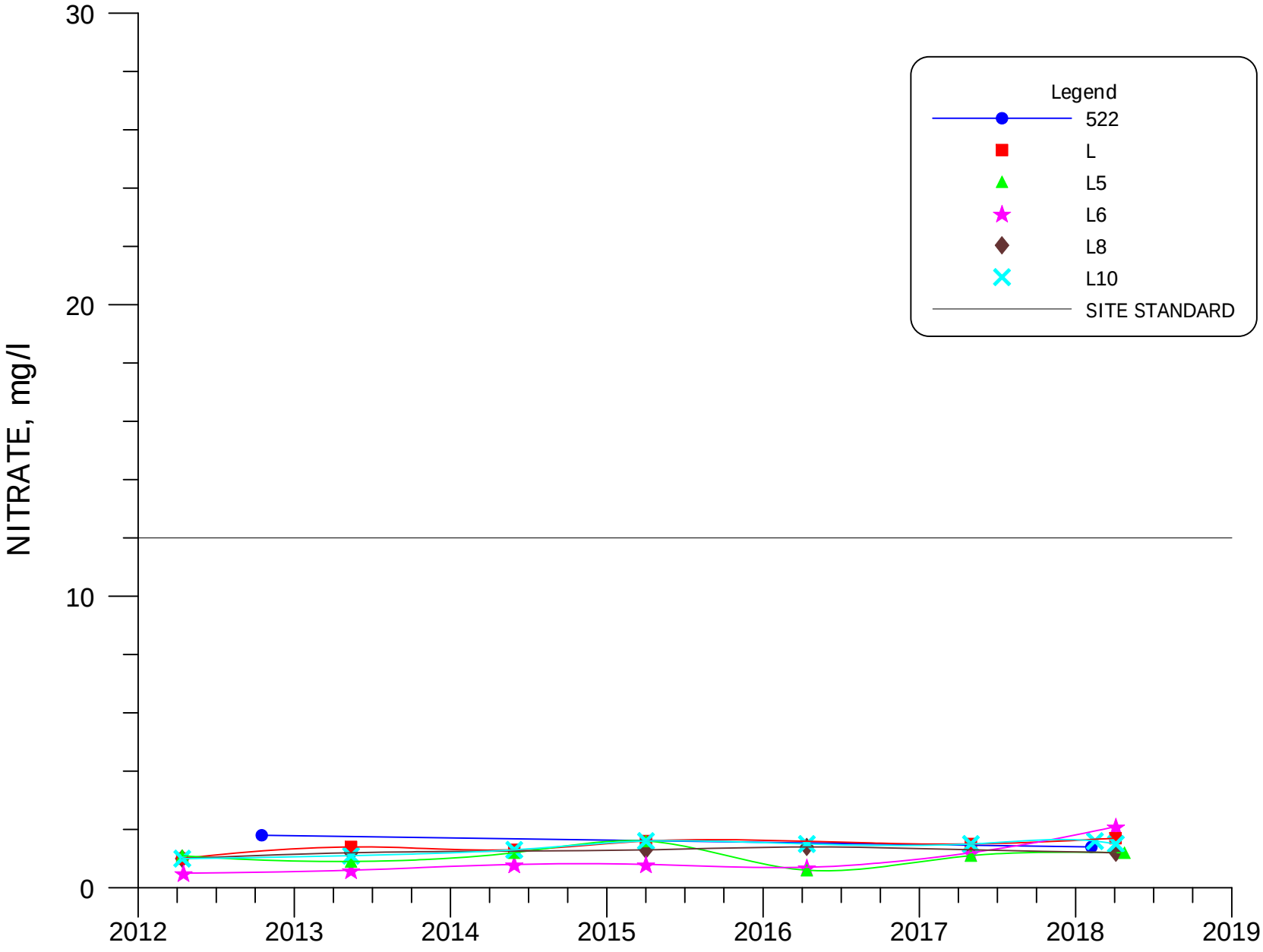

FIGURE 4.3-113. NITRATE CONCENTRATIONS FOR WELLS 522, L, L5, L6, L8 AND L10.

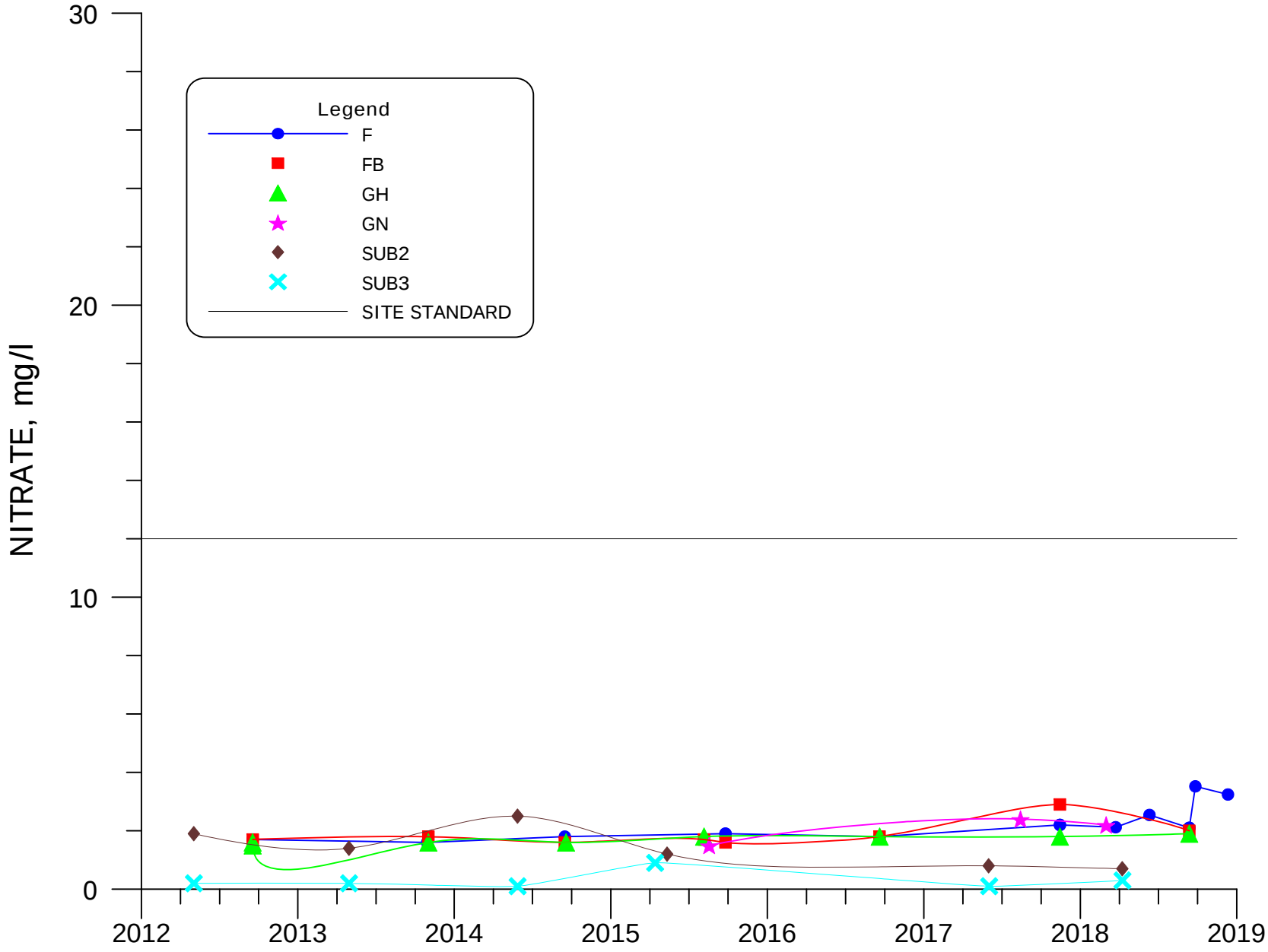

FIGURE 4.3-114. NITRATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

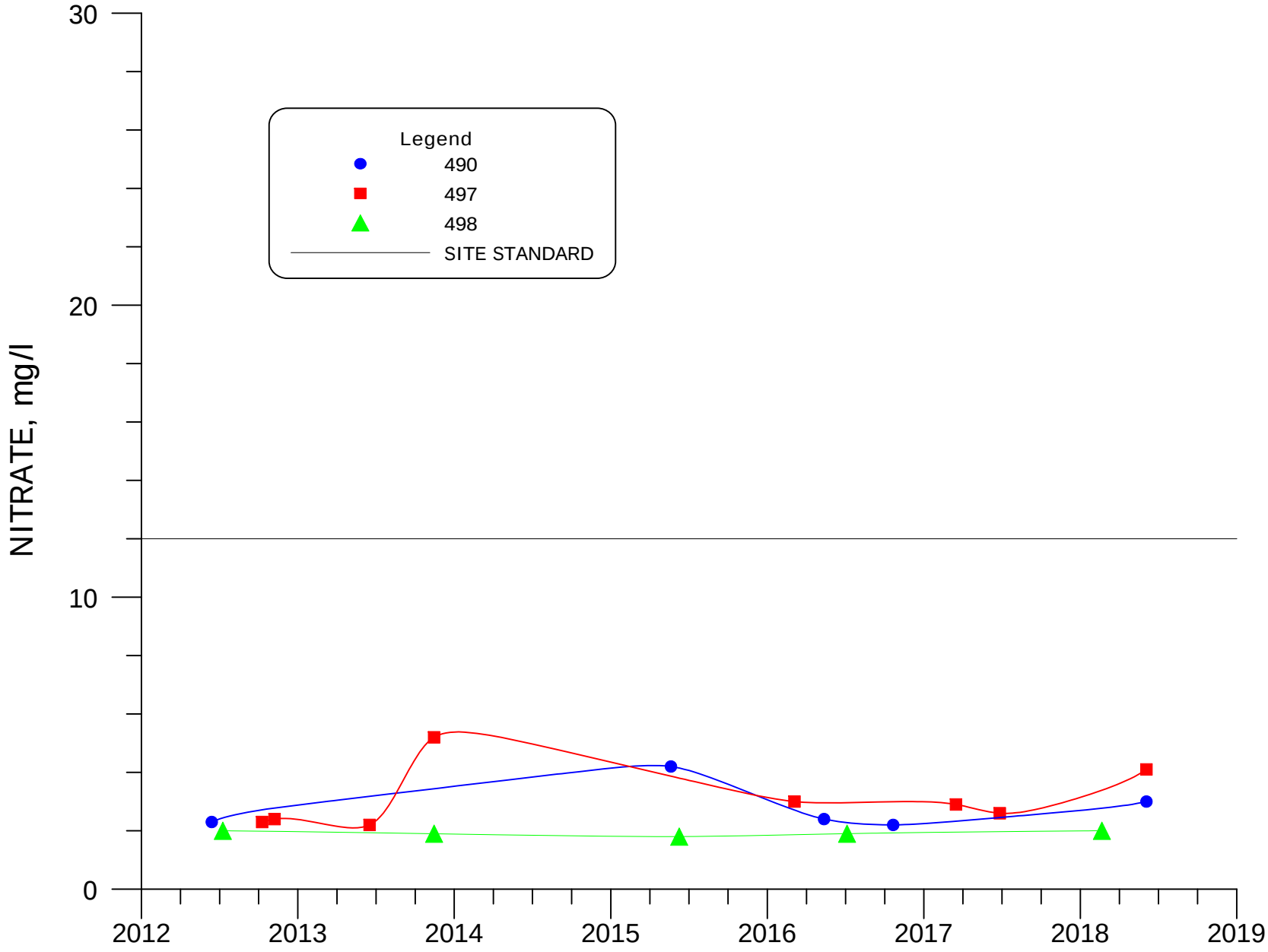

FIGURE 4.3-115. NITRATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

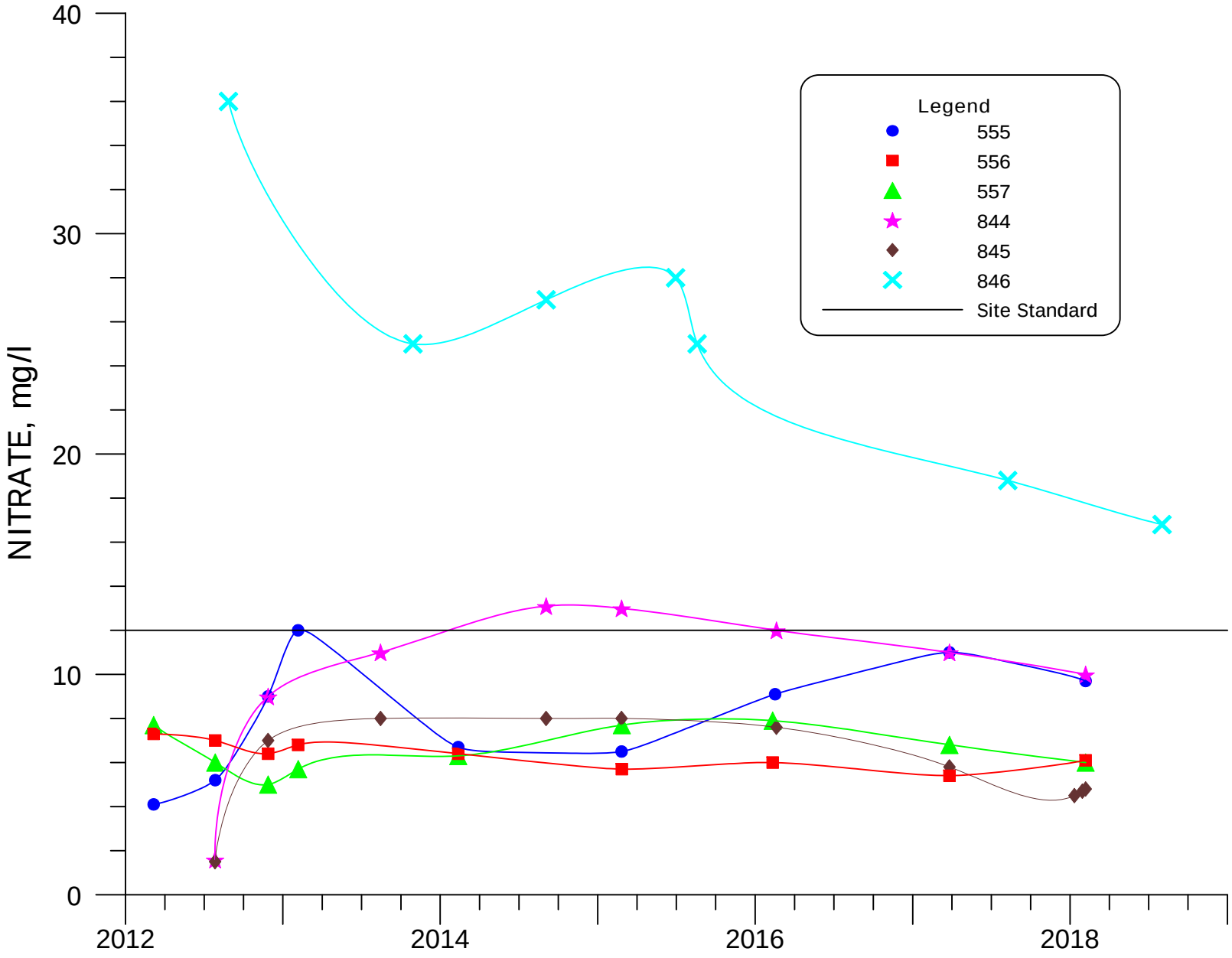

FIGURE 4.3-116. NITRATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

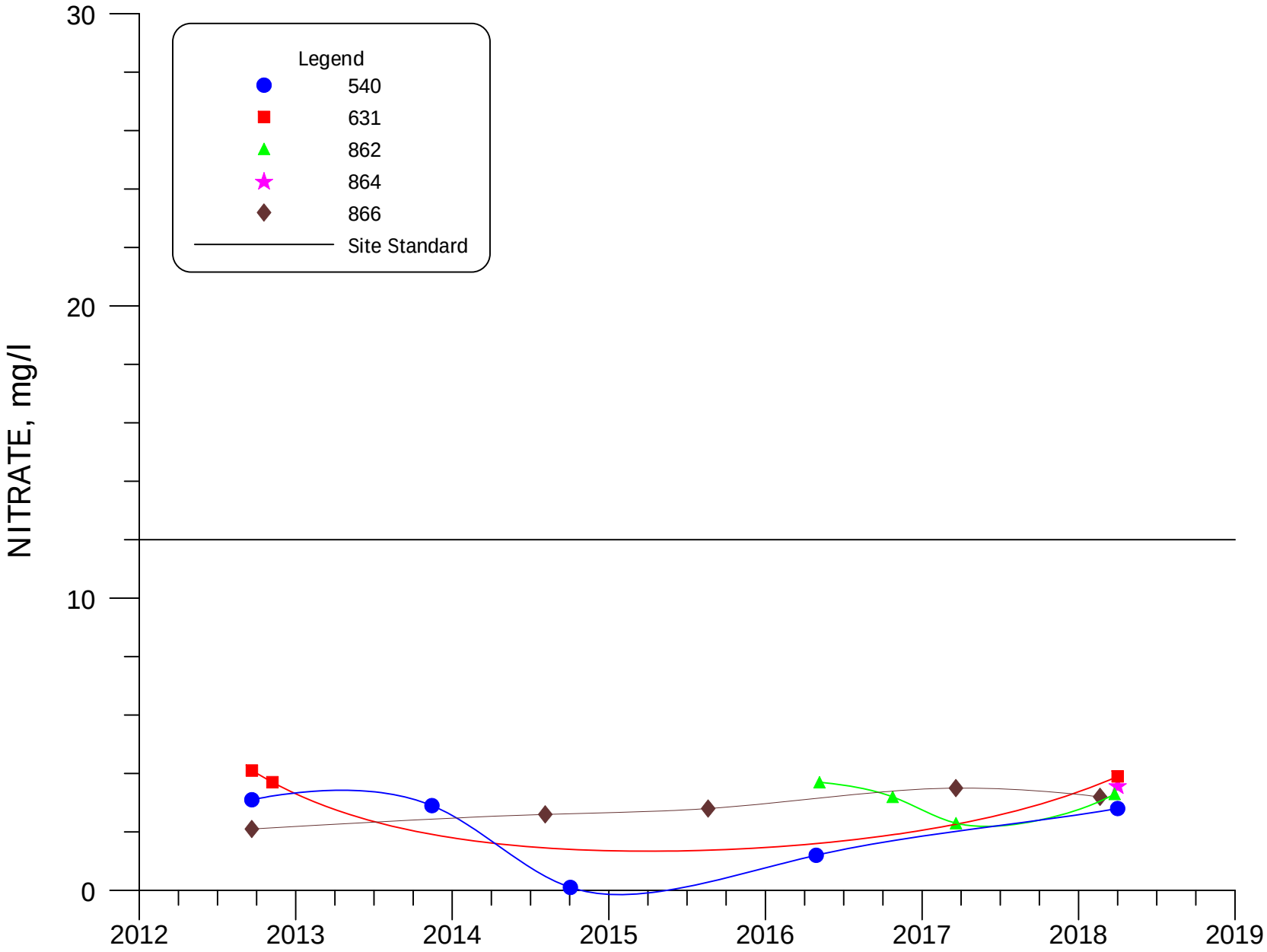

FIGURE 4.3-117. NITRATE CONCENTRATIONS FOR WELLS 540, 631, 862, 864 AND 866.

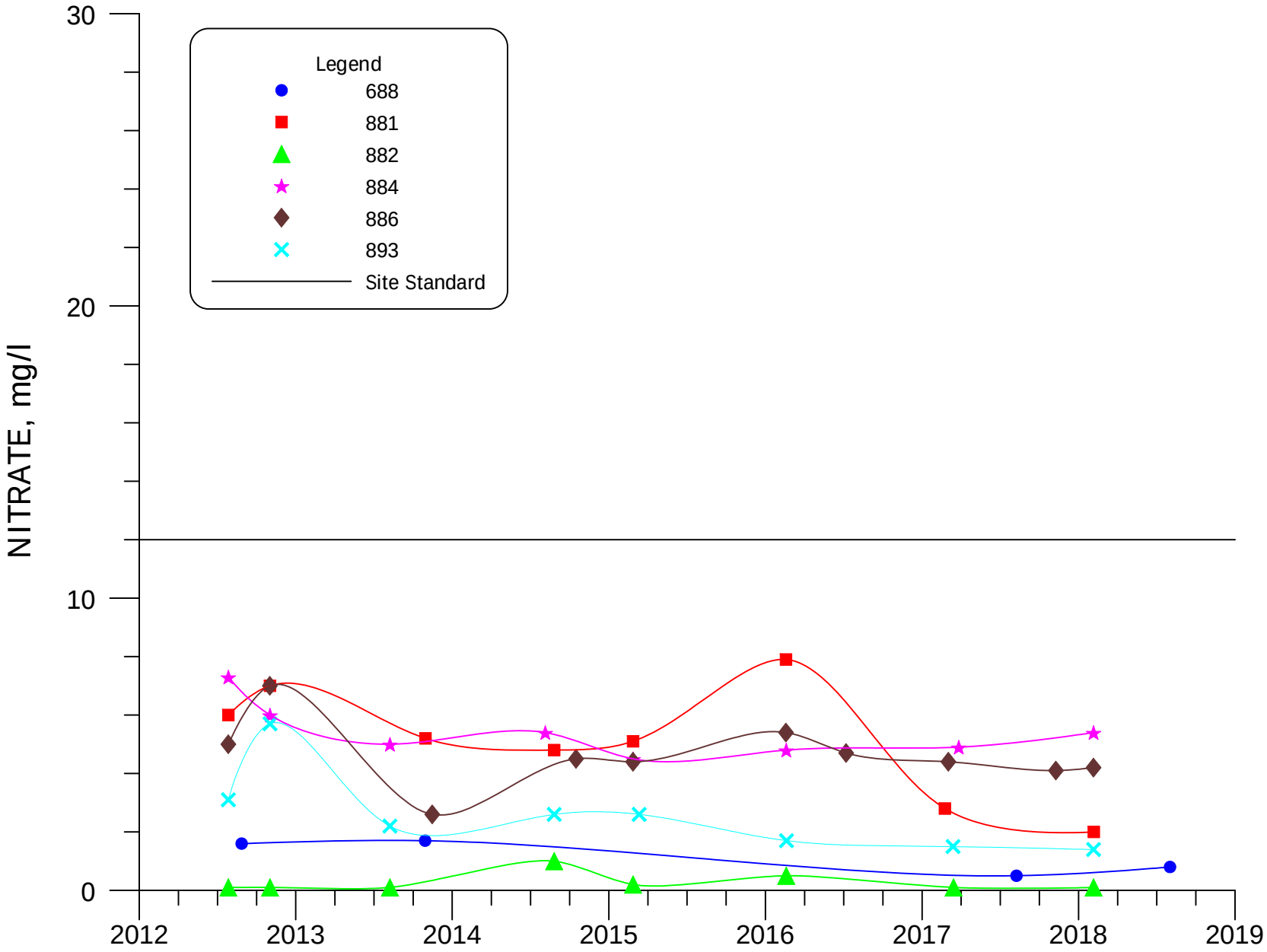

FIGURE 4.3-118. NITRATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

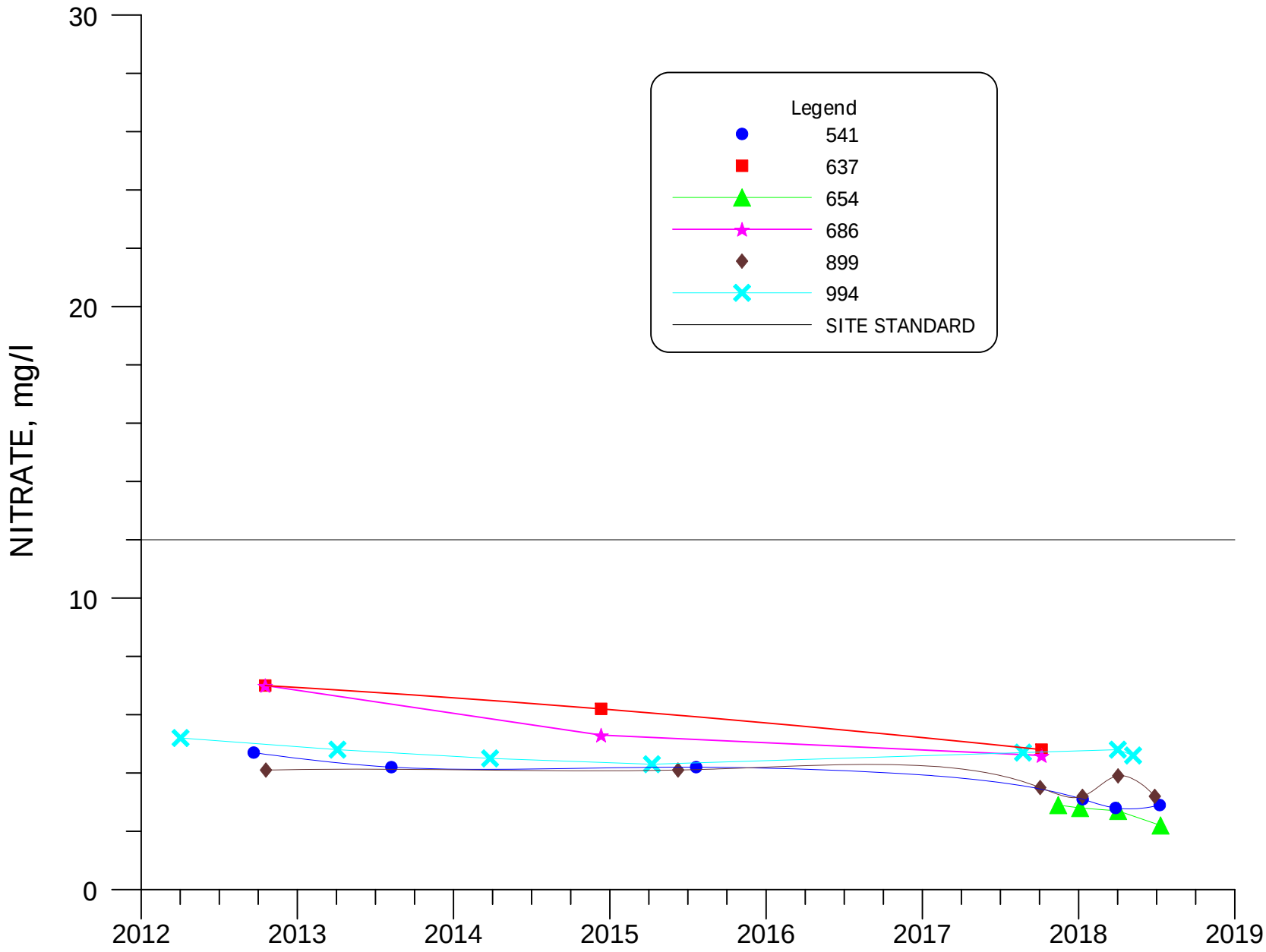

FIGURE 4.3-119. NITRATE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 AND 994.

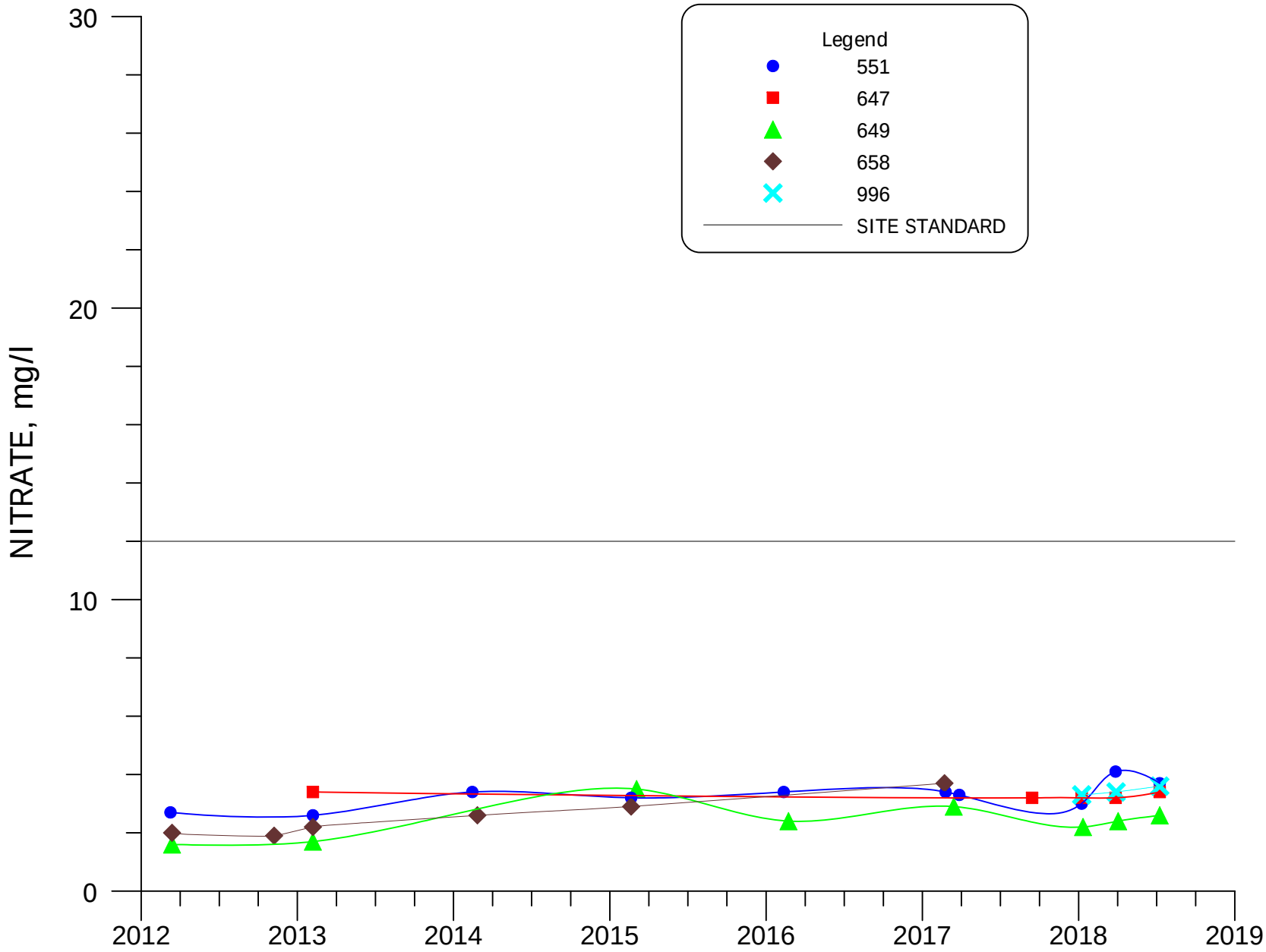

FIGURE 4.3-120. NITRATE CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.

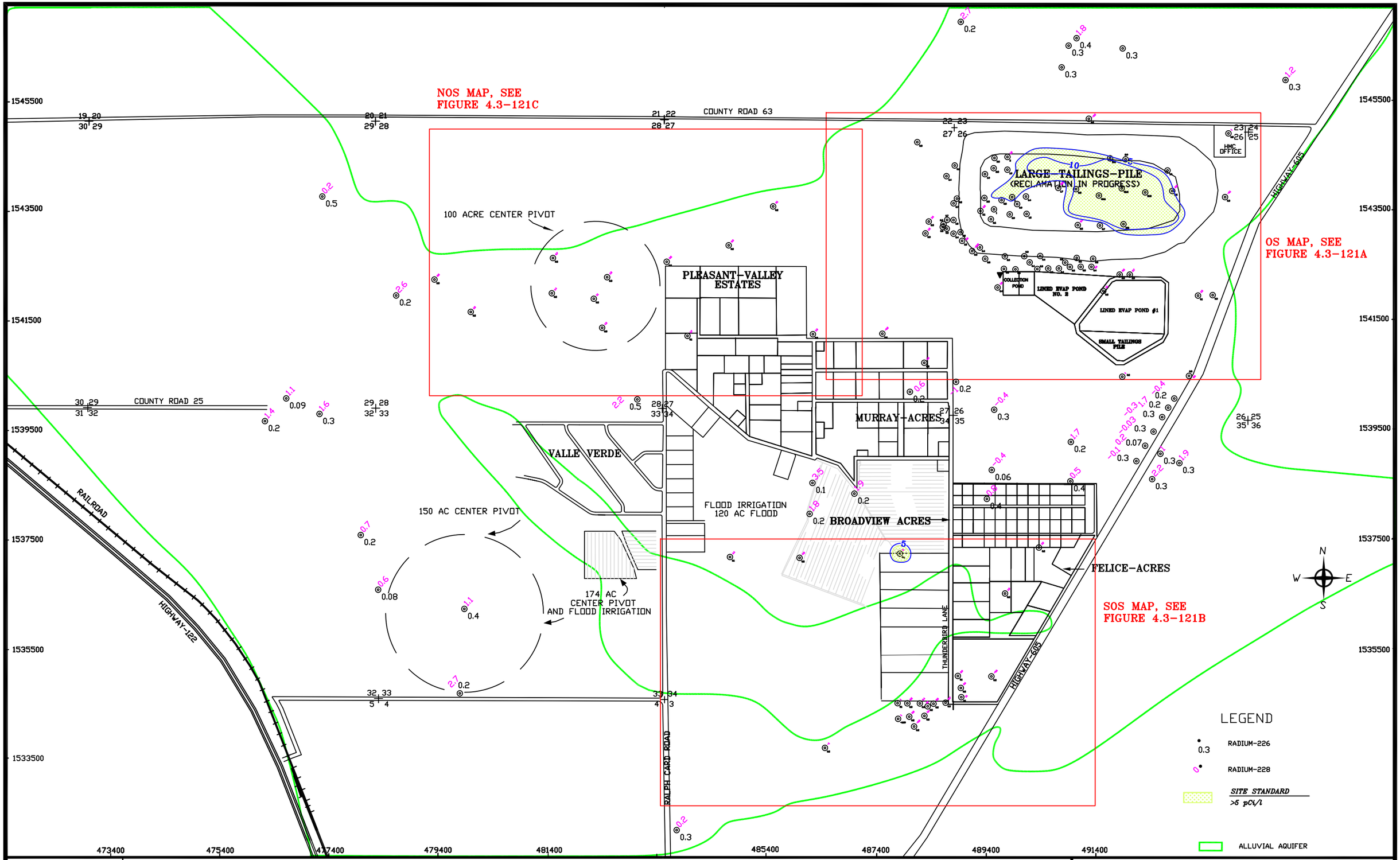

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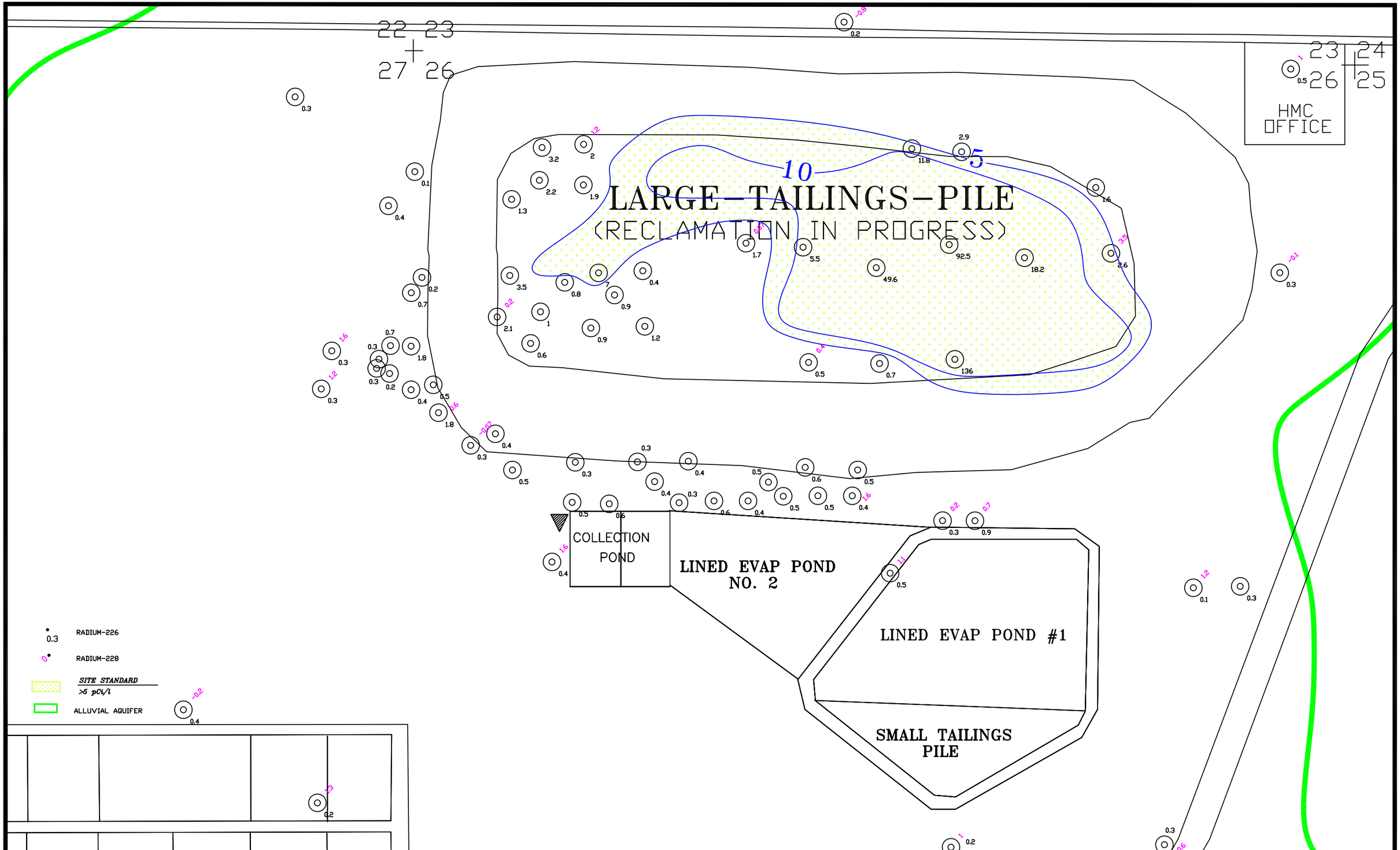
FIGURE 4.3-121. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, pCi/l



SCALE: 1"=500'
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FIGURE 4.3-121A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, pCi/l

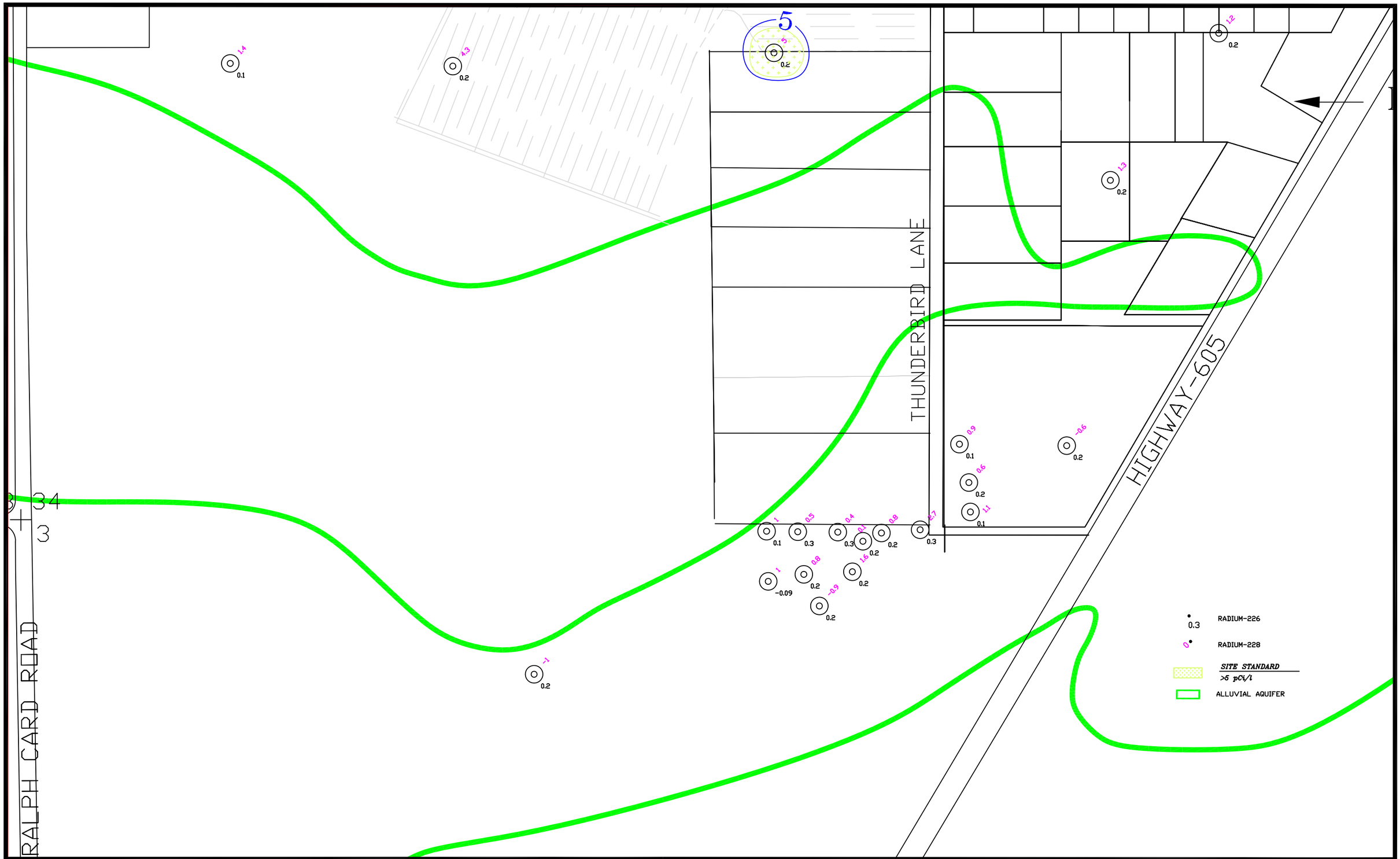

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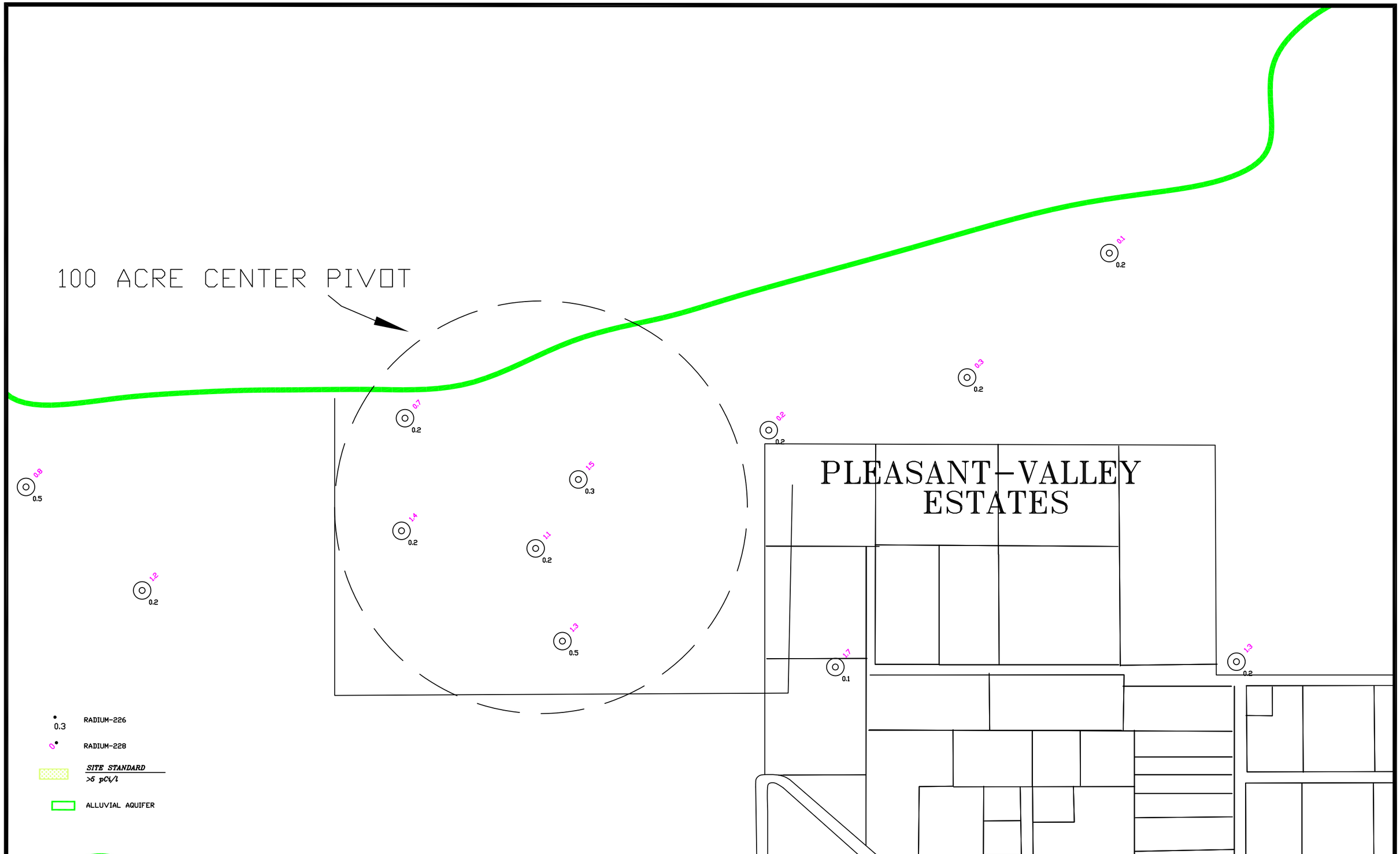
FIGURE 4.3-121B. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, pCi/l



SCALE: 1"=500'
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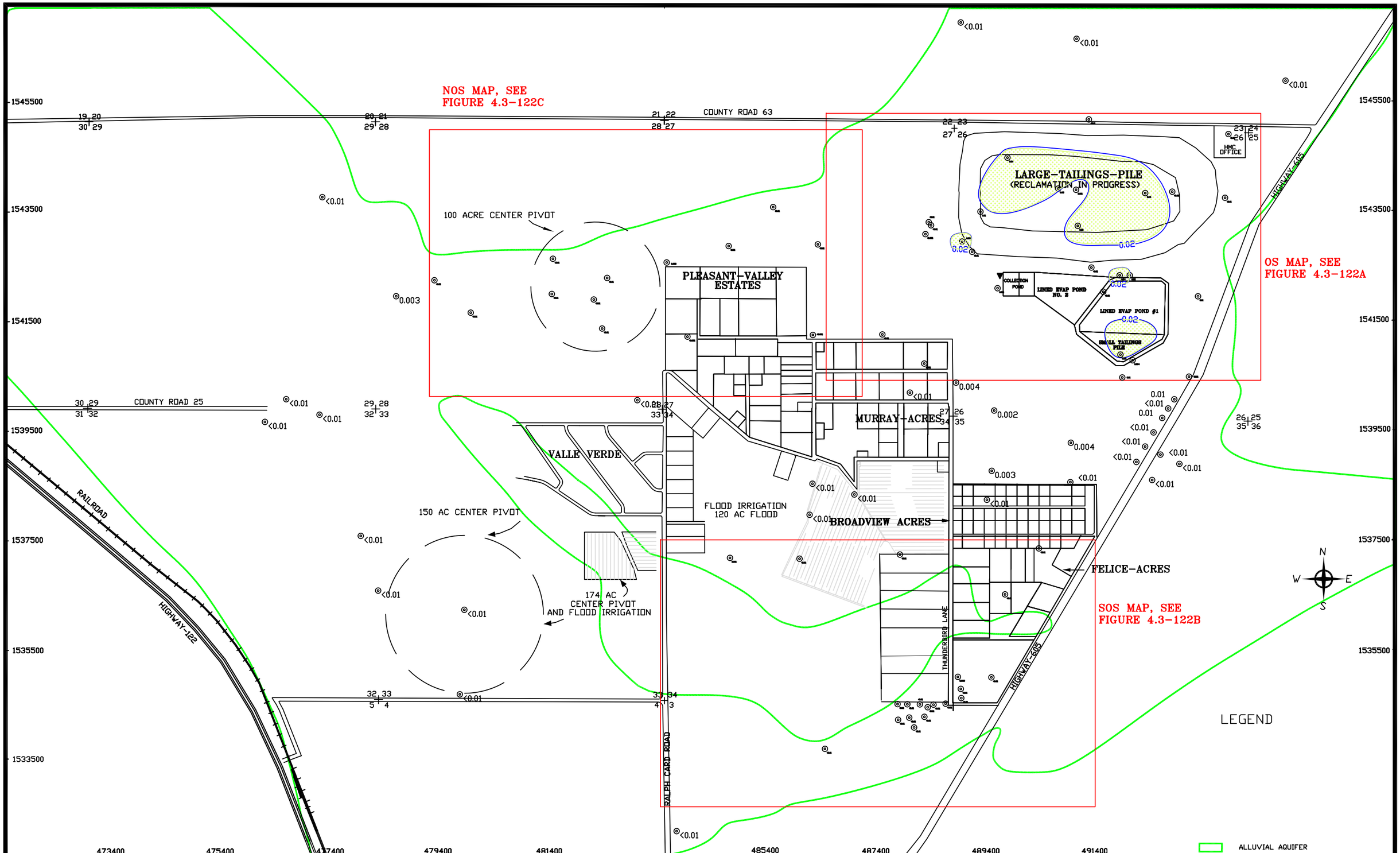
FIGURE 4.3-121C. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, pCi/l



SCALE: 1"=1600'
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FIGURE 4.3-122. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, mg/l

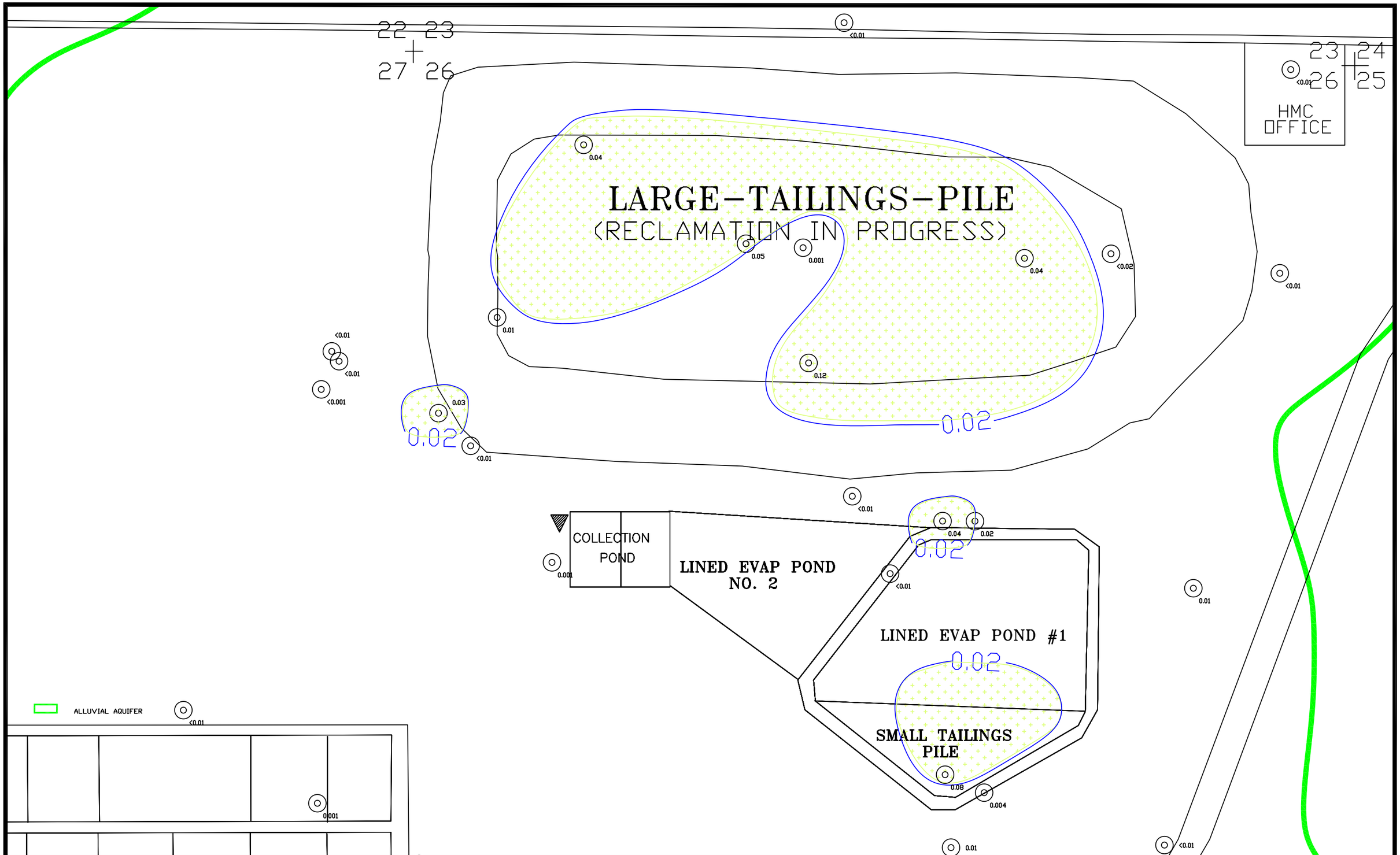

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FIGURE 4.3-122A. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l

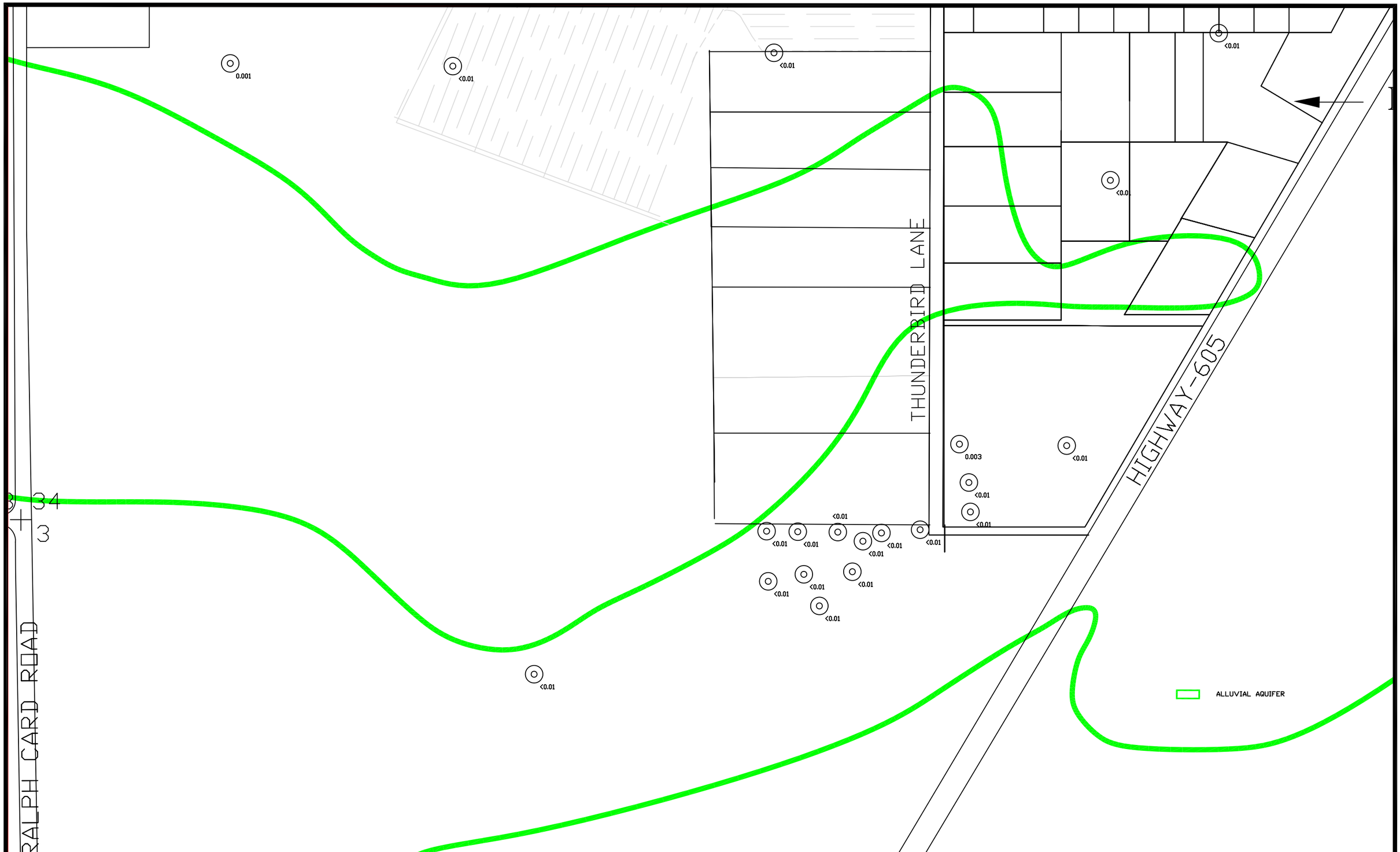

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FIGURE 4.3-122B. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l

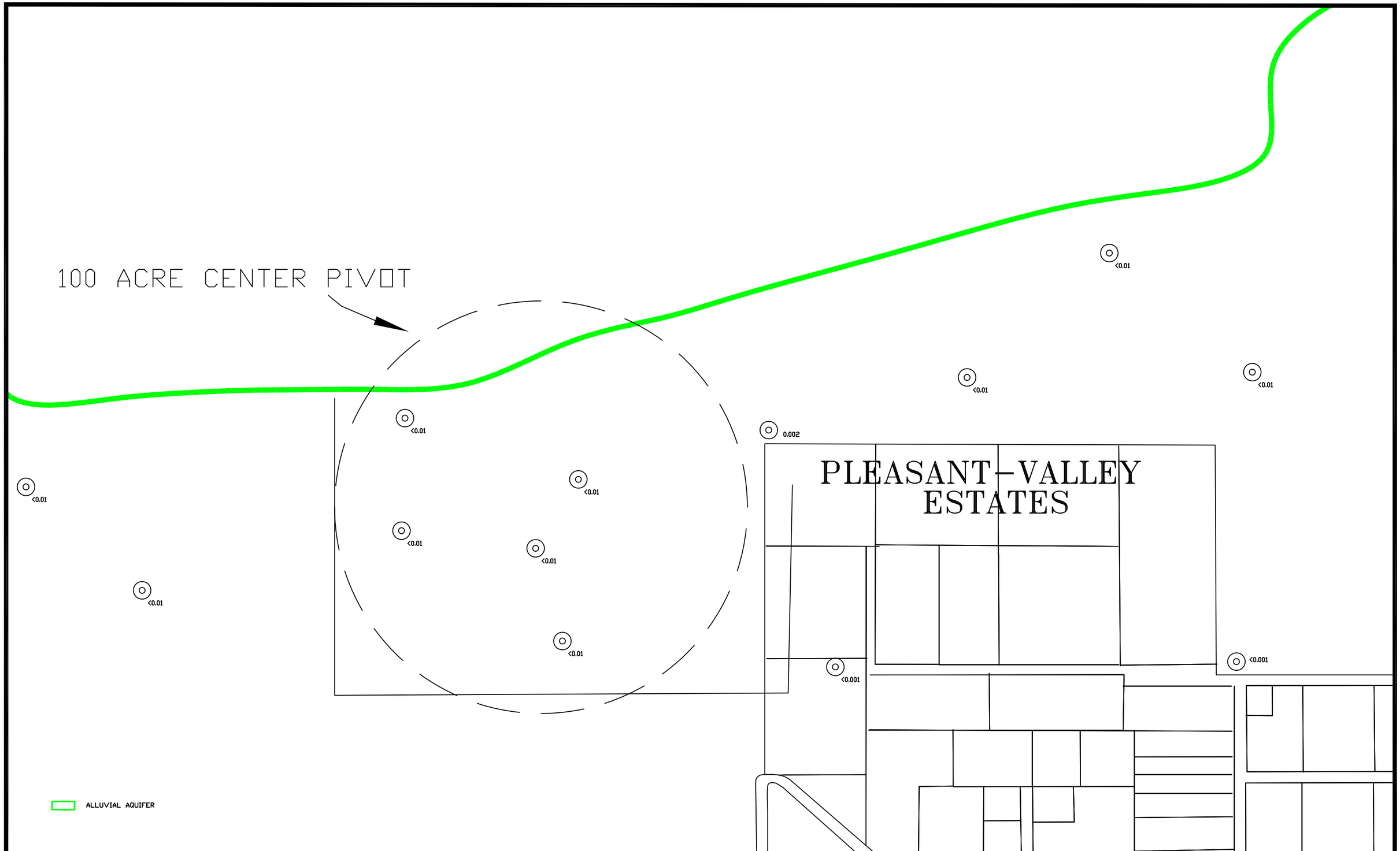

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FIGURE 4.3-122C. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

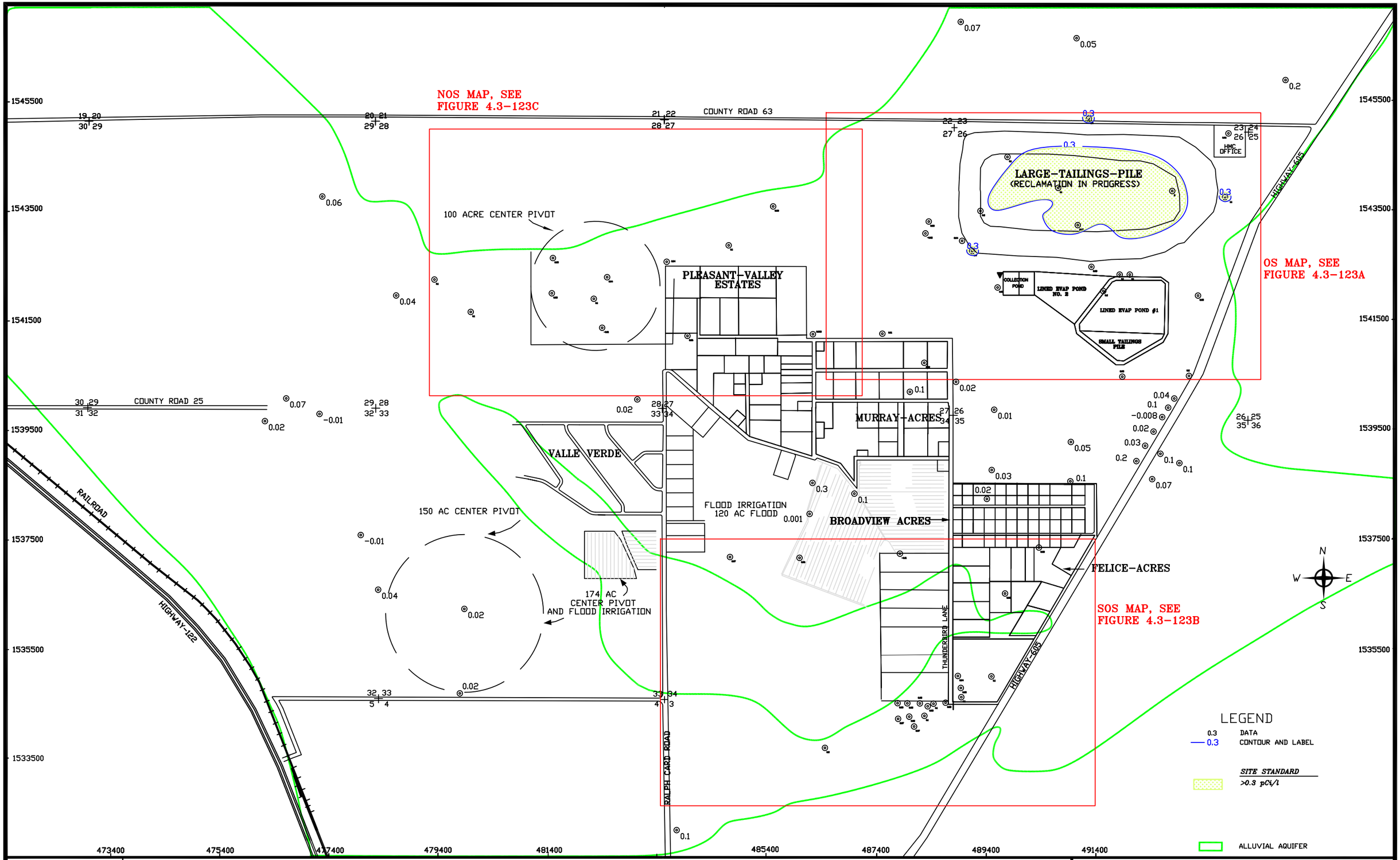

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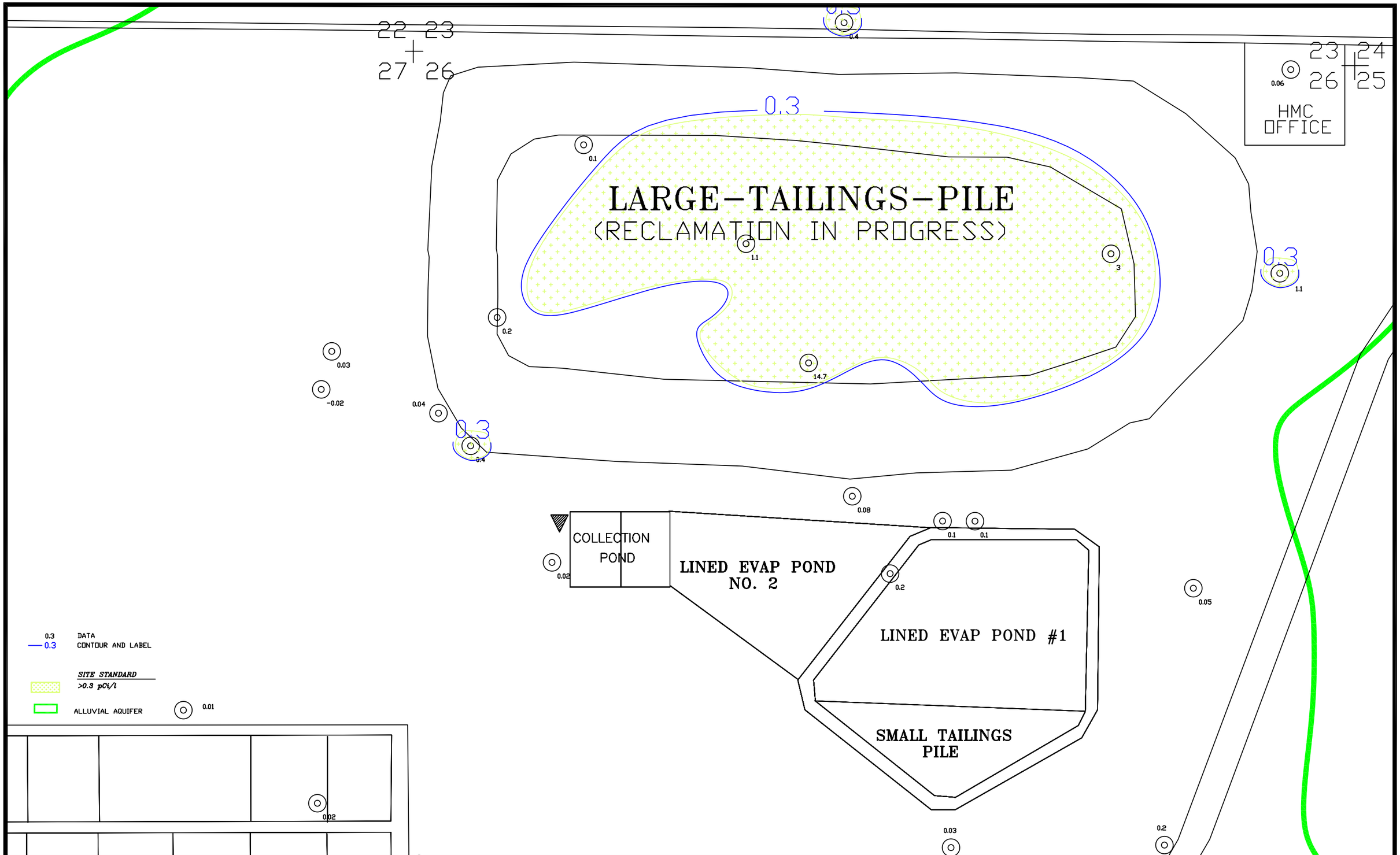
FIGURE 4.3-123. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2018, pCi/l



SCALE: 1"=500'
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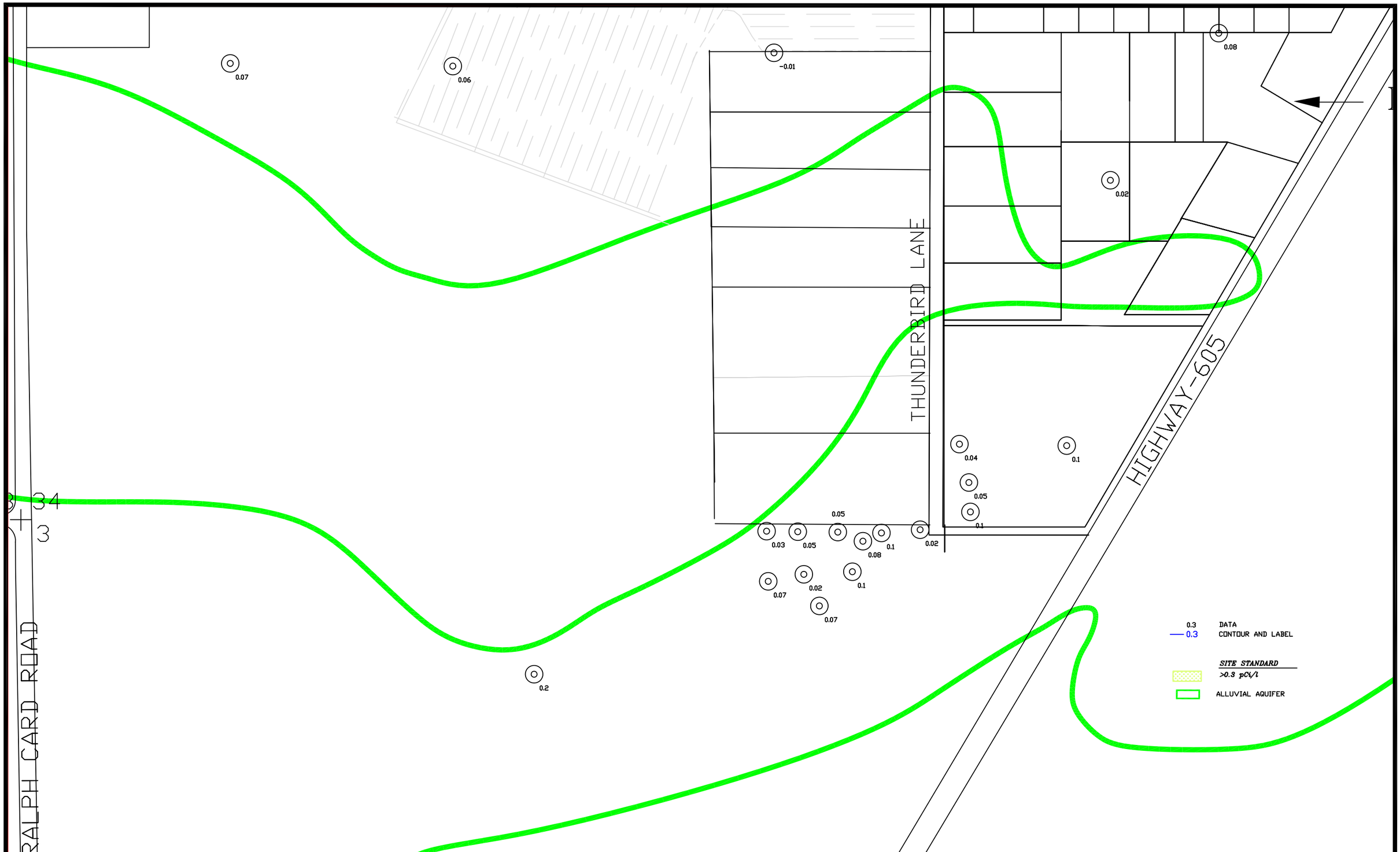
FIGURE 4.3-123A. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2018, mg/l



SCALE: 1"=500'
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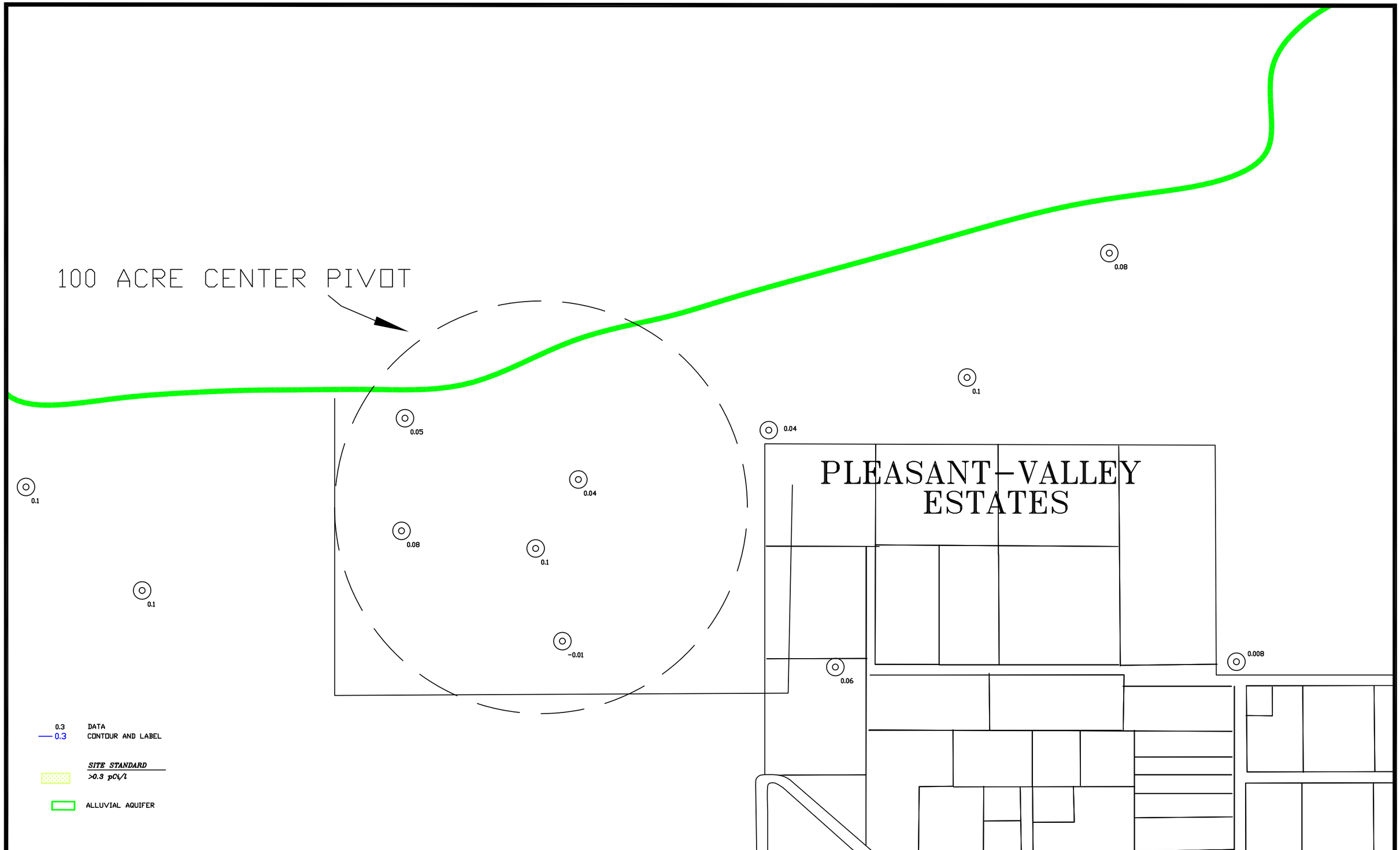
FIGURE 4.3-123B. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2018, mg/l



SCALE: 1"=500'	
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FIGURE 4.3-123C. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2018, mg/l

TABLE 4.3-1. 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

TABLE 4.3-2 2018 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	0.08	0.10	0.002	2090	71	3300	10.8
DD2	0.003	0.21	<0.001	1470	61	2700	<0.1
DD3	0.27	0.09	0.028	1950	146	3520	-
DD4	0.014	0.22	<0.001	1610	63	2780	-
DD5	0.15	0.21	0.003	2070	84	3580	-
ND	0.18	0.03	0.01	787	85	1610	0.4
P	0.13	0.03	0.002	988	49	1830	5.0
P2	0.39	0.03	<0.03	1390	67	2320	13.5
P3	0.36	0.02	<0.03	1290	75	2180	13.8
P4	0.18	0.02	<0.03	924	47	1590	6.7
Q	0.44	0.05	0.002	1510	66	250	14.1
R	0.71	0.02	0.002	1400	53	2300	17.1
FAR UP-GRADIENT WELLS							
914	0.003	0.02	0.002	969	77	1560	<0.1
920	0.27	0.23	0.001	1530	58	2640	10.4
921	0.54	0.21	0.003	1650	64	2770	16.8
922	0.005	0.007	0.004	112	90	819	0.3
950	0.18	0.13	<0.03	707	138	1530	-

[1] Wells DD, DD2, DD3, DD4, DD5, P, P2, P3, P4, Q, R, 914, 920, 921 and 950 are up-gradient wells sampled in 2018.
[2] Wells DD, ND, P, P1, P2, P3, P4, Q and R were used to establish site standards.

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GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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5.0 UPPER CHINLE AQUIFER MONITORING

Numerous Upper Chinle wells were monitored in 2018 to define conditions in this aquifer and define Upper Chinle restoration for the year.

5.1 UPPER CHINLE WELL COMPLETIONS

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

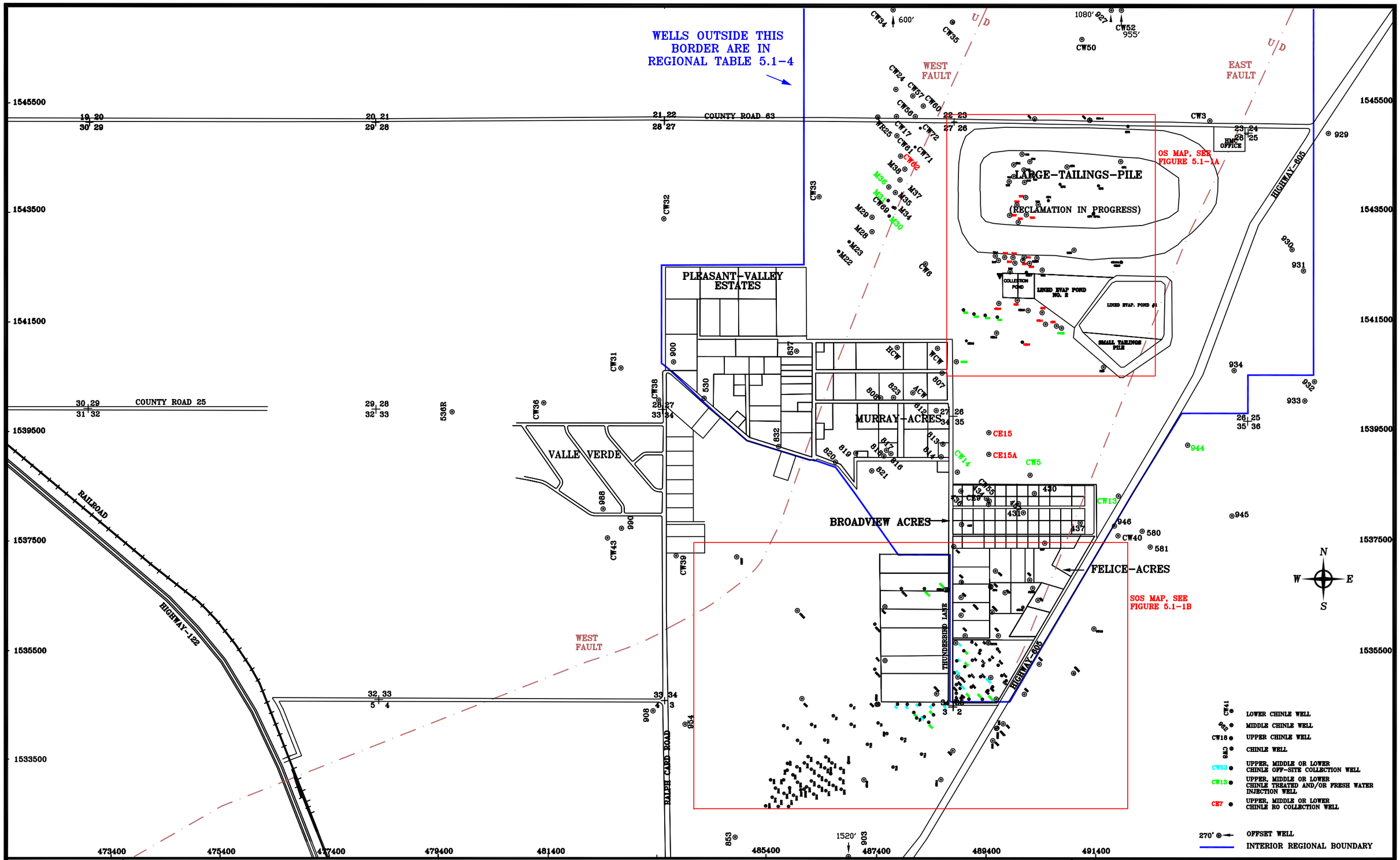
Table 5.1-2 presents basic well data for Chinle wells in Broadview Acres and Felice Acres. Table 5.1-3 presents similar data for Murray Acres and Pleasant Valley Estates Chinle wells. Wells that are not located within the immediate Grants Project property or within the four subdivision boundaries are denoted on Table 5.1-4 as the regional Chinle wells (see Figure 5.1-1 for inner regional boundary shown in blue). Figure 5.1-1A shows the locations of the On-Site Chinle wells while Figure 5.1-1B presents the Chinle well locations for the South Off-Site wells. No Upper, Middle and Lower Chinle wells were drilled by HMC in 2018.

The location of Upper Chinle wells and the areal extent of the Upper Chinle aquifer at the Grants Project are shown on Figures 5.1-2 and 5.1-2A. Upper Chinle wells 944, C18, C19, C20, C21, CW4R, CW5, CW13 and CW25 are shown in green to denote that these are treated and/or fresh-water injection wells. Upper Chinle wells B15, B16, B19, B31, B32, CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A, CE19, T25, T27, T28, T30 and T32 were pumped to supply the R.O. plant in 2018 and are shown in red.

Figure 5.1-2 also shows the location of the West and East Faults. A blue dot pattern is used to show the limits of the Upper Chinle sandstone where Chinle shale exists between the sandstone and the alluvium. Figure 1.1-2 presents a typical geologic cross section to show the relative position of the alluvial and Chinle aquifers (see Figure 1.1-1 for the location of this cross

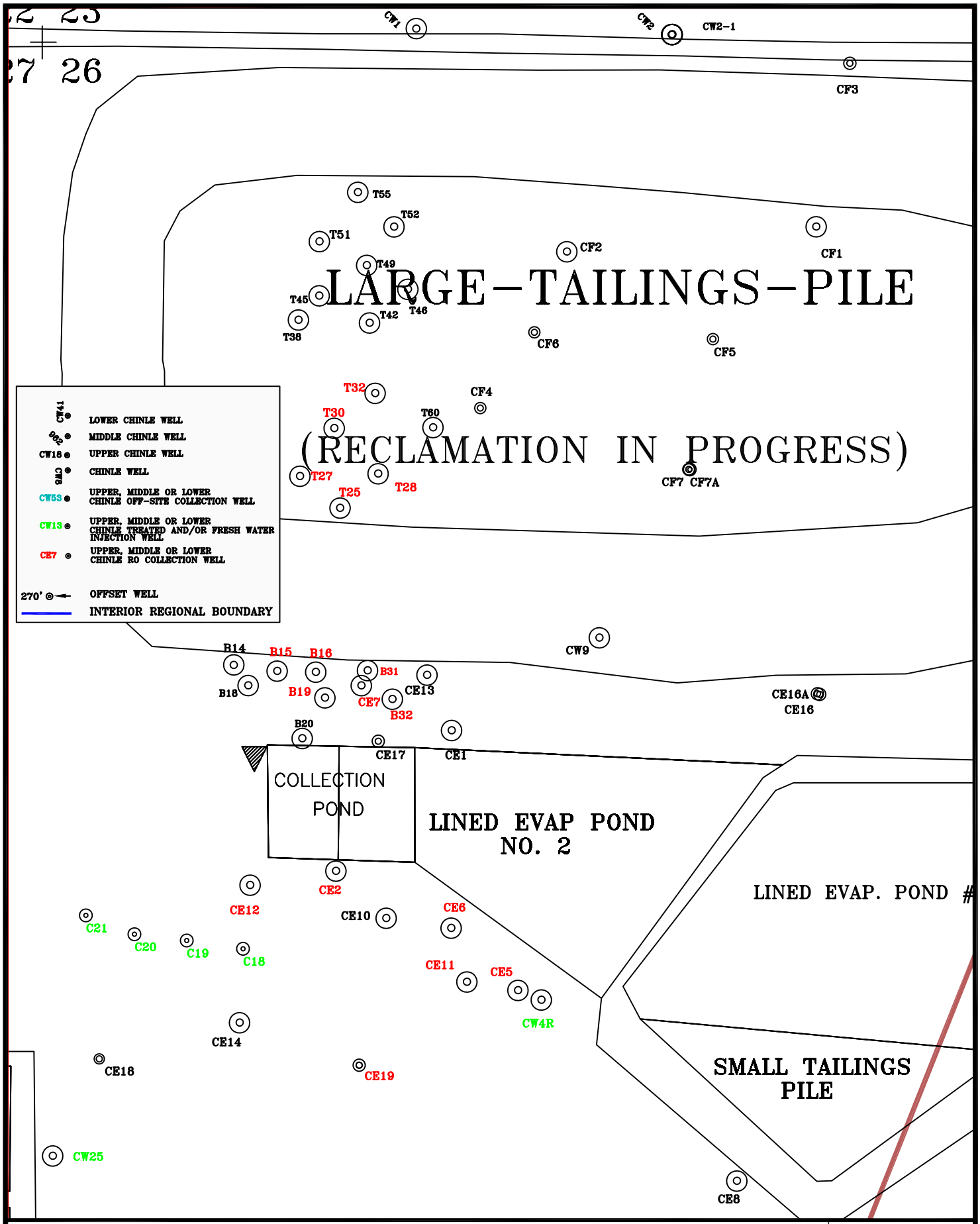
section). Figures 1.1-3 and 1.1-4 present additional geologic cross sections which show the relative position of the Chinle aquifers (see Figure 1.1-1 for the locations of these cross sections).

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



SCALE: 1"=1600'
C:\PROJECTS\2019-06 BASE18chinle.DWG
DATE: 1/14/2019

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS, 2018



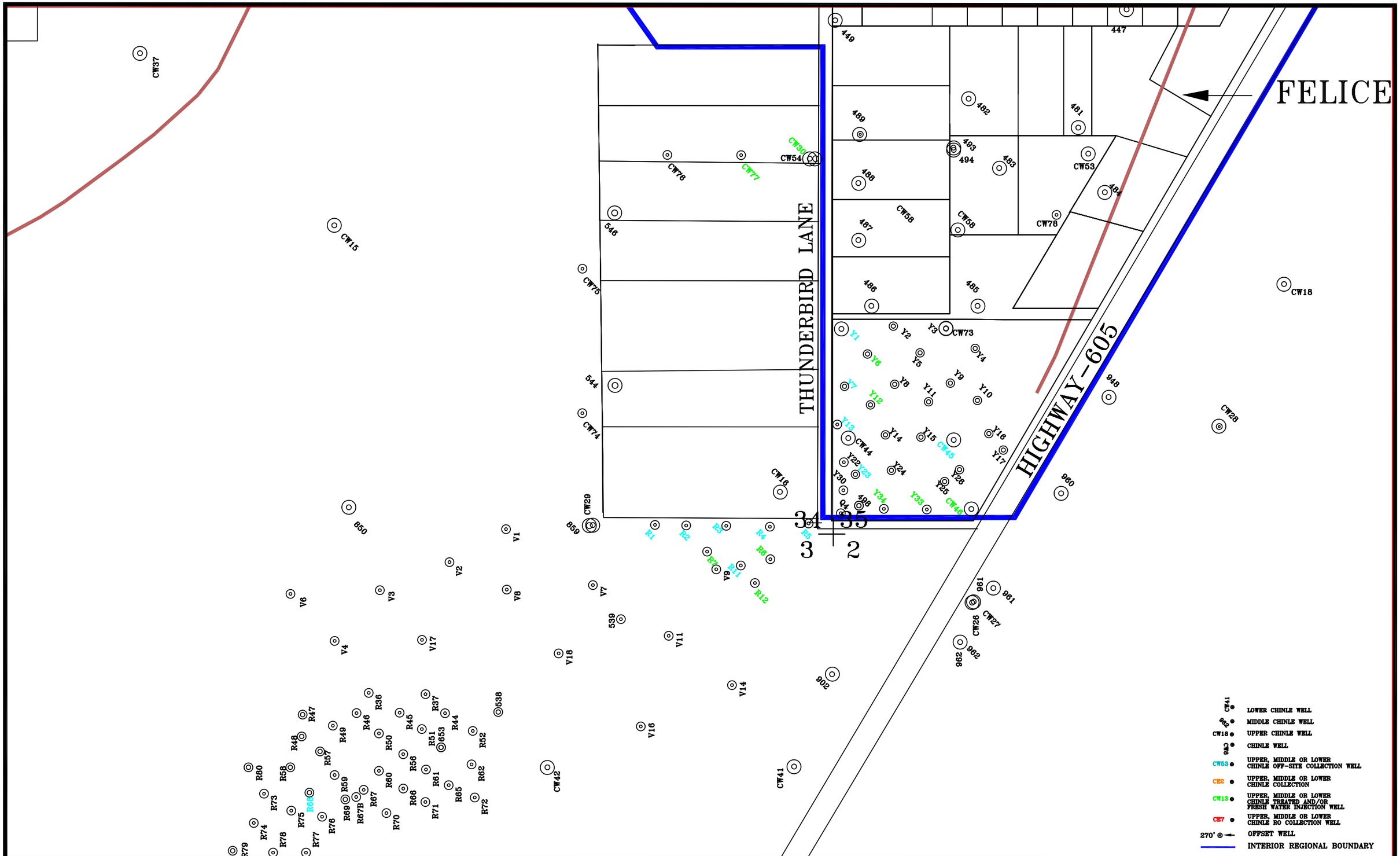
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-1A. CHINLE AQUIFER WELL LOCATIONS, OS, 2018

DATE: 10/15/18

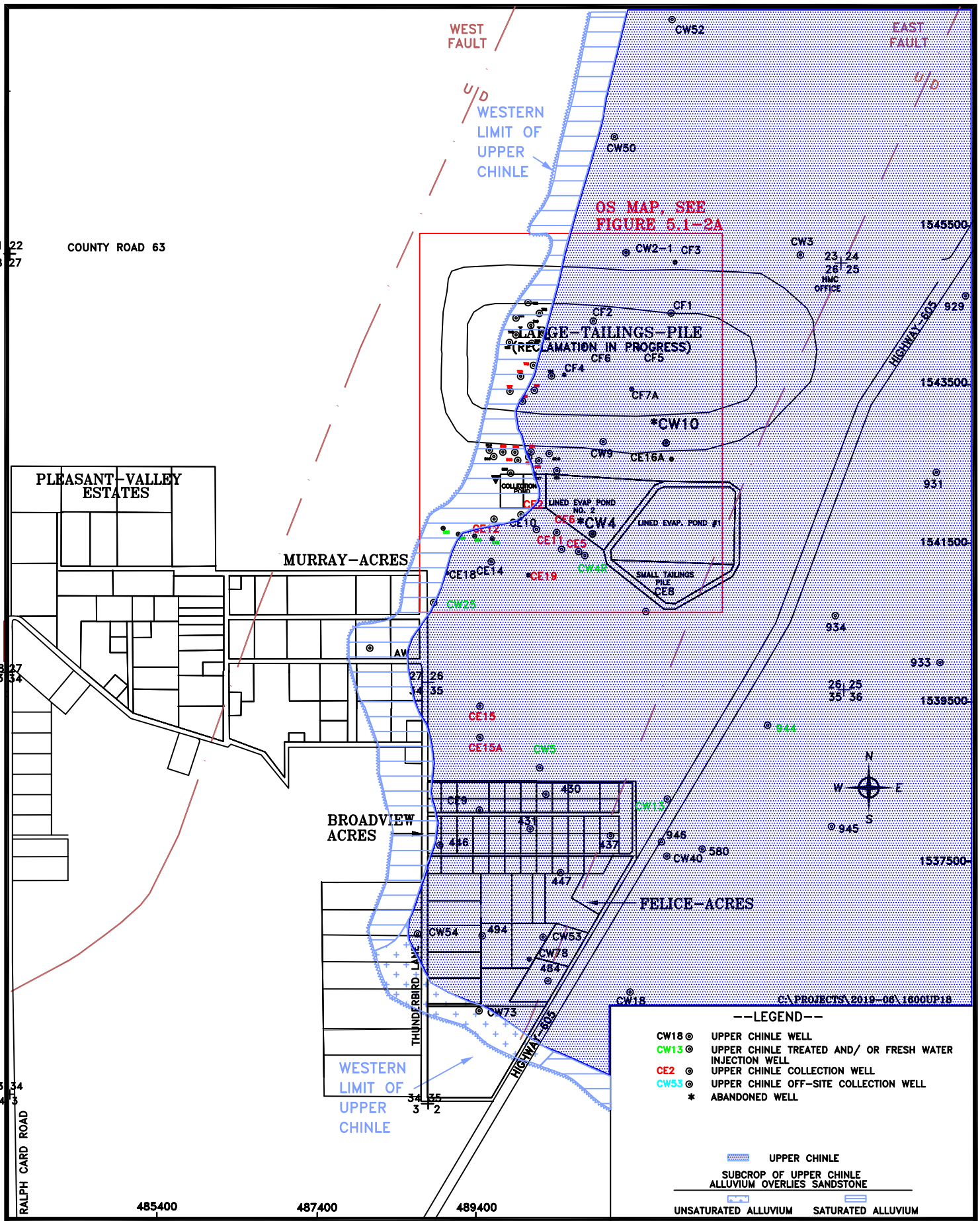
SCALE: 1"=500'

PAGE: 5.1-4



SCALE: 1"=500'
C:\PROJECTS\2019-06 BASE18chinle.DWG
DATE: 3/8/19

FIGURE 5.1-1B CHINLE AQUIFER WELL LCOATIONS, SOS, 2018



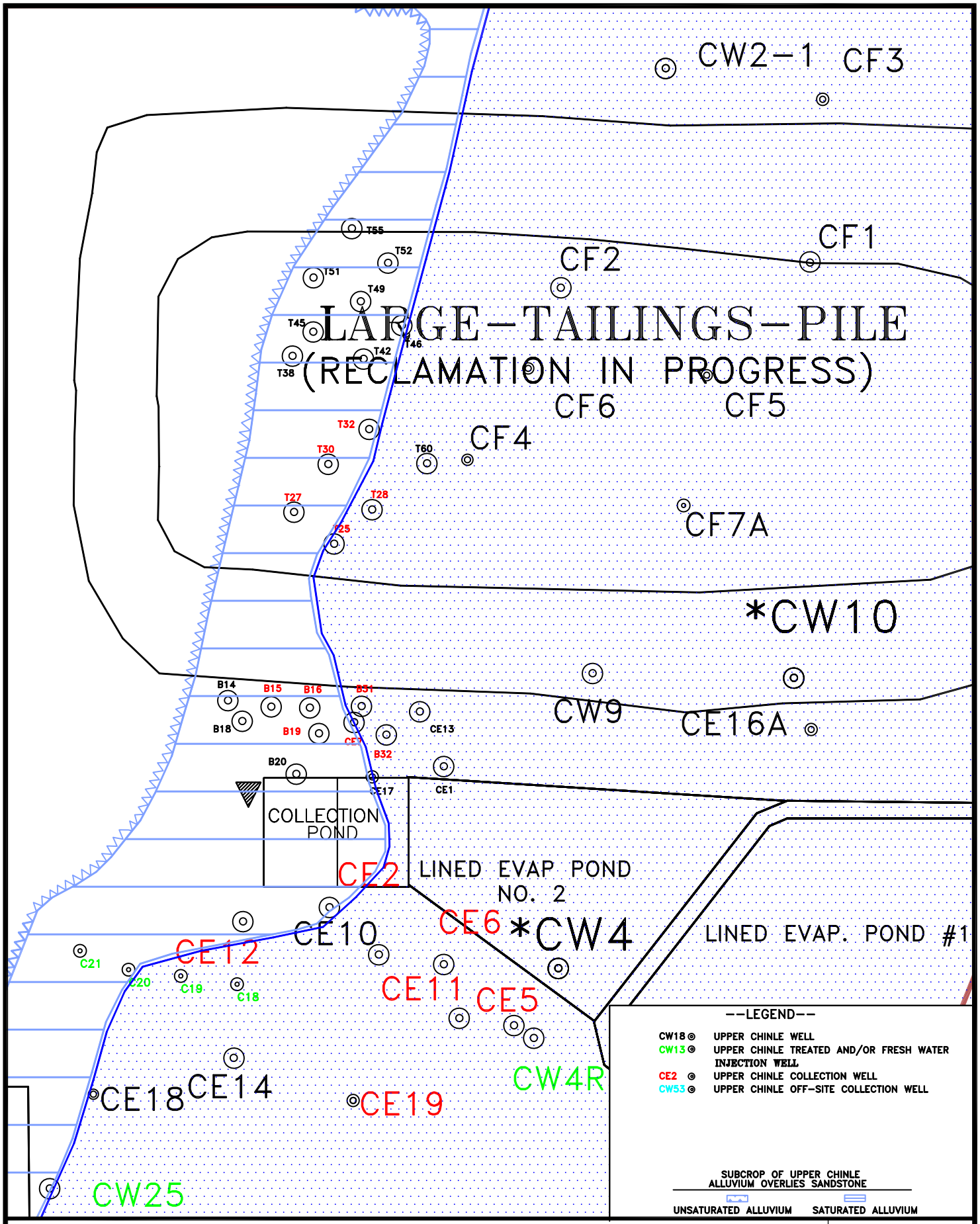
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-2 LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, 2018

DATE: 1/15/2019

SCALE: 1"= 1600'

PAGE: 5.1-6



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

DATE: 1/11/2019

FIGURE 5.1-2A. LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, OS, 2018

SCALE: 1"= 500'

PAGE: 5.1-7

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

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL 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	12/26/2018	107.00	6491.54	0.0	6598.54	30	6569	A -	---
										335	6264	M 330-400	Middle
0931	1542461	495207	366.7	6.0	12/26/2018	68.30	6542.26	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	4/17/2018	40.44	6535.87	2.0	6576.31	72	6502	A 60-120	Alluvium
										72	6502	U 60-120	Upper
B16	1542705	489900	120.0	4.5	4/16/2018	39.98	6535.39	2.0	6575.37	83	6490	A 60-120	Alluvium
										83	6490	U 60-120	Upper
B17	1542659	489493	95.0	4.5	---	---	---	2.0	6574.31	---	---	U 55-95	Upper
										---	---	A 55-95	Alluvium
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	U 60-120	Upper
										90	6482	A 60-120	Alluvium
B31	1542710	490103	120.0	4.5	4/17/2018	40.84	6535.12	2.0	6575.96	83	6491	A 60-100	Alluvium
										83	6491	U 60-100	Upper
B32	1542598	490201	120.0	4.5	5/3/2017	46.01	6529.38	2.0	6575.39	93	6480	U 60-120	Upper
										93	6480	A 60-120	Alluvium
C18	1541616	489614	120.0	4.5	---	---	---	0.5	6571.10	---	---	U 40-120	Upper
										60	6511	A 40-120	Alluvium
C19	1541648	489392	120.0	4.5	---	---	---	0.5	6569.91	---	---	U 40-120	Upper
										80	6489	A 40-120	Alluvium
C20	1541673	489187	110.0	4.5	---	---	---	0.5	6570.16	---	---	U 50-110	Upper
										70	6500	A 50-110	Alluvium
C21	1541747	488996	100.0	4.5	---	---	---	0.5	6571.99	---	---	U 40-100	Upper
										90	6481	A 40-100	Alluvium
CE1	1542475	490434	137.0	5.0	12/26/2018	14.29	6555.90	4.4	6570.19	75	6491	A -	---
										106	6460	U 98-138	Upper
CE2	1541923	489979	119.7	5.0	9/20/2018	73.71	6502.64	1.8	6576.35	74	6501	A -	---
										74	6501	U 78-118	Upper
CE5	1541453	490695	140.0	5.0	7/18/2018	49.48	6519.07	1.6	6568.55	63	6504	A -	---
										103	6464	U 100-140	Upper
CE6	1541698	490433	140.0	6.0	7/18/2018	97.82	6467.37	1.5	6565.19	75	6489	U -	Upper
CE7	1542652	490079	120.0	6.0	12/26/2018	46.55	6529.44	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	12/26/2018	43.82	6525.88	1.7	6569.70	166	6402	U 160-200	Upper
CE10	1541737	490177	130.0	6.0	12/26/2018	49.34	6521.52	2.3	6570.86	80	6489	U 90-130	Upper
CE11	1541487	490494	140.0	6.0	7/18/2018	101.12	6464.30	1.6	6565.42	90	6474	U 100-140	Upper
CE12	1541867	489642	120.0	6.0	7/18/2018	78.55	6493.68	2.1	6572.23	80	6490	U 80-120	Upper
CE13	1542693	490338	129.2	6.0	12/26/2018	46.49	6528.15	1.7	6574.64	95	6478	U 90-130	Upper
CE14	1541326	489600	130.0	5.0	12/26/2018	39.81	6529.64	2.0	6569.45	80	6487	U 90-130	Upper
CE15	1539507	489460	130.0	5.0	12/26/2018	46.42	6519.66	2.0	6566.08	77	6487	U 90-130	Upper
CE15A	1539111	489459	130.0	4.5	12/26/2018	40.73	6524.08	2.0	6564.81	75	6488	U 90-130	Upper
										75	6488	A -	---
CE16	1542618	491883	130.0	4.5	12/21/2016	39.50	6541.67	2.0	6581.17	---	---	C 90-130	Chinle
										76	6503	A -	---
CE16A	1542619	491873	0.0	---	6/28/2018	47.59	6532.45	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	U 90-130	Upper
										94	6480	A -	---
CE18	1541185	489048	130.0	4.5	6/13/2018	37.84	6531.04	2.0	6568.88	74	6493	A -	---
										74	6493	U 90-130	Upper
CE19	1541160	490070	130.0	4.5	6/14/2018	130.00	6438.83	2.0	6568.83	88	6479	A -	---
										88	6479	U 90-130	Upper
CF1	1544456	491868	285.0	5.0	6/7/2018	132.01	6533.90	2.8	6665.91	230	6433	U 240-285	Upper
CF2	1544358	490888	260.0	5.0	6/7/2018	121.21	6544.95	2.0	6666.16	220	6444	U 220-260	Upper
CF3	1545099	491918	166.0	4.5	12/26/2018	49.98	6536.81	2.0	6586.79	156	6429	U 146-166	Upper
CF4	1543680	490520	197.0	4.5	12/26/2018	69.82	6593.87	2.0	6663.69	166	6496	U 177-197	Upper
										166	6496	A -	---
CF5	1544013	491463	233.0	4.5	6/18/2018	137.40	6534.06	2.0	6671.46	163	6506	A -	---
										222	6447	U 213-233	Upper
CF6	1544040	490759	205.0	4.5	6/7/2018	115.95	6551.48	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	12/26/2018	139.48	6528.63	2.0	6668.11	160	6506	A -	---
										220	6446	U 225-265	Upper
CW1	1545235	490295	325.0	5.0	12/5/2017	106.56	6478.66	0.7	6585.22	105	6480	A -	---
										272	6313	M 212-323	Middle
CW2	1545212	491302	355.0	5.0	8/2/2018	123.19	6462.29	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/26/2018	94.66	6490.82	1.7	6585.48	85	6499	A -	---
										136	6448	U 243-253	Upper
CW3	1545200	493496	235.0	5.0	12/3/2018	56.54	6530.64	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	12/3/2018	56.54	6530.64	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	9/25/2017	46.50	6522.23	1.3	6568.73	61	6506	A -	---
										104	6463	U 102-142	Upper
CW5	1538729	490221	170.0	5.0	10/30/2017	28.70	6540.64	1.6	6569.34	65	6503	A -	---
										137	6431	U 135-170	Upper
CW6	1542588	488301	282.0	4.0	12/26/2018	76.10	6499.54	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	12/26/2018	60.56	6531.27	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	10/30/2017	6.70	6570.00	2.7	6576.70	230	6344	U 225-265	Upper
										378	6196	M -	---
CW14	1538786	488884	360.9	6.0	7/31/2017	2.30	6563.79	2.9	6566.09	56	6507	A -	---
										66	6497	U -	---
										310	6253	M 278-358	Middle
CW17	1545279	487771	108.0	5.0	12/26/2018	61.84	6527.48	3.1	6589.32	73	6513	A -	---
										85	6501	M 83-103	Middle
CW24	1545773	487760	118.0	5.0	12/26/2018	48.89	6539.78	3.0	6588.67	61	6525	A -	---
										65	6521	M 78-118	Middle
CW25	1540802	488866	102.0	5.0	12/5/2017	48.10	6519.10	3.0	6567.20	53	6511	A -	---
										53	6511	U 62-102	Upper
CW33	1543814	486347	347.0	6.0	12/26/2018	106.14	6468.75	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	12/26/2018	51.90	6542.50	3.2	6594.40	20	6571	A -	---
										40	6551	M 33-63	Middle
CW35	1547001	488794	120.0	5.0	12/26/2018	50.71	6540.46	1.9	6591.17	63	6526	A -	---
										90	6499	M 93-118	Middle
CW50	1546687	491159	170.0	5.0	12/26/2018	47.50	6541.06	3.0	6588.56	128	6458	U 130-170	Upper
CW52	1548171	491887	180.0	5.0	12/26/2018	38.53	6553.87	2.0	6592.40	138	6452	U 140-180	Upper
CW56	1545279	488115	130.0	5.0	8/29/2018	67.84	6520.02	2.6	6587.86	51	6534	A -	---
										98	6487	M 90-110	Middle
CW57	1545654	488070	140.0	5.0	12/26/2018	47.93	6536.97	2.1	6584.90	55	6528	A -	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW57	1545654	488070	140.0	5.0	12/26/2018	47.93	6536.97	2.1	6584.90	101	6482	M 100-140	Middle
CW60	1545470	488262	150.0	5.0	12/26/2018	45.80	6538.40	2.8	6584.20	50	6531	A -	---
										114	6467	M 100-140	Middle
CW61	1544927	487779	130.0	5.0	12/26/2018	57.02	6525.81	2.2	6582.83	62	6519	A -	---
										108	6473	M 90-130	Middle
CW62	1544555	487847	150.0	5.0	7/9/2018	79.30	6500.56	1.9	6579.86	60	6518	A -	---
										134	6444	M 130-150	Middle
CW69	1543638	487679	180.0	4.5	---	---	---	2.0	6576.42	---	---	C 160-180	Chinle
										66	6508	A -	---
CW71	1544724	488111	140.0	4.5	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	12/26/2018	70.82	6509.31	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	1/18/2018	125.27	6532.07	2.0	6657.34	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T27	1543474	489837	200.0	4.5	1/18/2018	125.78	6531.36	2.0	6657.14	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T28	1543484	490145	200.0	4.5	3/14/2018	119.84	6538.87	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	3/14/2018	119.84	6538.87	2.0	6658.71	---	---	A 140-200	Alluvium
T30	1543663	489972	200.0	4.5	1/22/2018	125.28	6534.34	2.0	6659.62	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T32	1543801	490134	200.0	4.5	1/23/2018	121.15	6540.46	2.0	6661.61	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
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	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T46	1544210	490262	200.0	4.5	6/3/2014	114.24	6546.41	2.0	6660.65	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T49	1544304	490100	200.0	4.5	6/3/2014	111.80	6546.59	2.0	6658.39	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T51	1544397	489914	200.0	4.5	3/14/2018	121.18	6536.16	2.0	6657.34	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
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	---	---	A 135-195	Alluvium
										---	---	U 135-195	Upper
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	12/26/2018	51.74	6534.72	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	A	60-95	Alluvium
										60	6500	U	60-95	Upper
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	12/26/2018	38.55	6524.57	1.2	6563.12	---	---	U	90-130	Upper
CW55	1538283	489471	360.0	6.0	12/26/2018	56.96	6507.20	2.3	6564.16	260	6302	M	-	Middle
							Felice Acres							
0481	1536820	490210	320.0	4.0	6/11/2014	75.65	6492.35	2.0	6568.00	110	6456	A	270-310	Alluvium
										270	6296	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	2/20/2018	38.09	6524.57	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	12/3/2018	70.23	6490.05	0.9	6560.28	40	6519	A -	---
										65	6494	U -	---
										236	6323	M 270-300	Middle
0494	1536689	489494	85.0	5.0	12/3/2018	37.43	6522.71	0.6	6560.14	40	6520	A -	---
										65	6495	U 65-85	Upper
0498	1534661	488953	150.0	6.0	2/20/2018	51.56	6509.03	2.0	6560.59	80	6479	A 70-110	Alluvium
										80	6479	M 130-150	Middle
CW44	1535048	488891	208.0	6.0	8/1/2018	59.57	6501.17	2.5	6560.74	94	6464	A -	Alluvium
										130	6428	M 69-208	Middle
CW45	1535036	489494	193.0	5.0	12/26/2018	54.79	6506.52	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	12/26/2018	17.77	6547.17	3.0	6564.94	110	6452	U 117-157	Upper
CW58	1536230	489520	305.0	4.5	12/26/2018	70.59	6490.21	2.0	6560.80	45	6514	U -	---
										45	6514	A -	---
										226	6333	M 265-305	Middle
CW73	1535670	489450	100.0	4.5	12/26/2018	51.43	6512.02	2.0	6563.45	68	6493	U 80-100	Upper
										68	6493	A -	---
CW78	1536319	490080	160.0	4.5	12/26/2018	17.74	6549.41	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	A 40-80	Alluvium
										61	6502	U 40-80	Upper
Q48	1535653	490120	105.0	4.5	12/26/2018	50.74	6517.10	2.0	6567.84	73	6493	A 65-105	Alluvium
										73	6493	U 65-105	Upper
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	8/1/2018	163.69	6397.75	2.0	6561.44	77	6482	A -	---
										77	6482	U -	---
										172	6387	M 220-260	Middle
Y2	1535678	489151	250.0	4.5	12/26/2018	71.41	6490.20	2.9	6561.61	64	6495	A -	---
										66	6493	U -	---
										198	6361	M 210-250	Middle
Y3	1535660	489440	280.0	4.5	12/26/2018	71.28	6492.10	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	U -	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
Y4	1535558	489612	260.0	4.5	12/1/2014	82.68	6480.46	2.4	6563.14	64	6497	A -	---
										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	8/1/2018	162.03	6398.40	2.5	6560.43	90	6468	A -	---
										158	6400	M 180-220	Middle
Y8	1535349	489161	240.0	4.5	12/26/2018	68.89	6492.58	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	12/26/2018	73.31	6492.87	4.4	6566.18	72	6490	U -	---
										72	6490	A -	---
										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	2/21/2018	71.16	6489.68	2.0	6560.84	106	6453	A -	---
										140	6419	M 172-212	Middle
Y14	1535057	489113	200.0	4.5	12/26/2018	54.88	6506.14	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	12/26/2018	63.84	6500.79	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	2/26/2018	52.01	6509.29	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	12/26/2018	69.21	6493.46	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	12/26/2018	60.30	6499.75	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	11/30/2017	67.56	6492.44	0.0	6560.00	---	---	M -	Middle
0823	1540150	487720	265.0	6.0	---	---	---	0.0	6561.00	---	---	M 257-267	Middle
										40	6521	A -	---
ACW	1540235	488070	325.0	6.0	12/26/2018	73.73	6490.07	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	12/26/2018	35.99	6527.44	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	12/26/2018	76.16	6491.21	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	3/5/2018	65.46	6483.48	2.0	6548.94	95	6452	A 50-90	Alluvium
										133	6414	L 130-170	Lower
0539	1534014	487596	210.0	6.0	12/26/2018	210.00	6345.32	2.0	6555.32	100	6453	A 50-70	Alluvium
										100	6453	A 80-100	---
										175	6378	L 170-210	Lower
0544	1535653	487969	80.0	4.0	---	---	---	---	6558.00	60	---	M 60-80	Middle
0546	1536330	487560	160.0	5.0	7/19/2010	72.50	6486.50	---	6559.00	80	---	M 130-160	Middle
0546R	1536330	487560	160.0	5.0	---	---	---	---	---	---	---	U -	Upper
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	12/26/2018	65.28	6479.69	1.6	6544.97	97	6446	A 69-206	Alluvium
										135	6408	L -	Lower
0850	1534652	486044	54.0	5.0	12/26/2018	53.90	6495.25	3.2	6549.15	37	6509	A -	---
										37	6509	M 29-54	Middle
0853	1532124	484824	95.0	5.0	12/26/2018	71.80	6469.58	1.7	6541.38	60	6480	L 55-95	Lower
										60	6480	A -	---
0859	1534549	487426	83.0	5.0	12/26/2018	60.65	6492.11	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	M 78-102	Middle
										72	6488	A -	---
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	---	---	12/26/2018	106.83	6488.17	1.0	6595.00	---	---	M -	Middle
										---	---	C -	Chinle
0929	1544684	495585	320.0	5.0	2/7/2018	60.71	6531.86	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

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
0937	1542180	471478	182.0	5.0	---	---	---	0.0	6578.00	70	6508	A -	---
										160	6418	L 95-182	Lower
0944	1539280	493091	300.0	5.0	12/26/2017	47.00	6541.61	1.6	6588.61	64	6523	A -	---
										252	6335	U 220-280	Upper
0945	1537986	493900	300.0	---	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	6630.00	---	---	L -	Lower
0969	1529400	488450	---	---	---	---	---	0.0	6640.00	---	---	L -	Lower
0970	1529100	488500	---	5.0	---	---	---	0.0	6660.00	---	---	L -	Lower
0988	1538124	483423	155.0	5.0	7/18/1996	59.86	6589.14	1.3	6649.00	18	6630	A -	---
										152	6496	L 152-155	Lower
0990	1537600	482750	---	---	---	---	---	0.5	6550.00	---	---	L -	Lower
CW15	1536259	485961	134.6	5.0	12/26/2018	71.70	6479.62	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	12/26/2018	23.45	6549.20	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	A -	---
										50	6511	M -	---
										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	12/26/2018	73.50	6498.18	1.9	6571.68	90	6480	A -	---
										110	6460	U -	---
										294	6276	M 280-360	Middle
CW29	1534551	487435	290.0	5.0	12/26/2018	76.90	6475.32	1.7	6552.22	52	6499	A -	---

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
CW29	1534551	487435	290.0	5.0	12/26/2018	76.90	6475.32	1.7	6552.22	52	6499	M -	---
										228	6323	L 230-270	Lower
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	12/26/2018	85.52	6474.74	2.0	6560.26	111	6447	A -	---
										254	6304	L 136-156	Lower
										254	6304	L 291-311	---
										254	6304	L 231-271	---
CW32	1543413	483523	300.0	6.0	12/26/2018	147.64	6419.64	1.7	6567.28	77	6489	A -	---
										157	6409	L 158-188	Lower
										157	6409	L 218-303	---
CW36	1540053	481329	180.0	5.0	12/26/2018	77.04	6474.05	2.8	6551.09	96	6452	A -	---
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	12/26/2018	62.30	6488.87	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	12/26/2018	28.80	6550.14	2.6	6578.94	75	6501	A -	---
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	12/26/2018	78.20	6477.21	1.5	6555.41	59	6495	A -	---
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	12/26/2018	69.40	6479.38	0.0	6548.78	98	6451	A -	---
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	12/26/2018	68.71	6480.08	2.0	6548.79	57	6490	L 81-101	Lower
										57	6490	A -	---
CW54	1536645	488675	103.1	5.0	12/26/2018	31.52	6527.03	2.2	6558.55	70	6486	C 60-100	Chinle
CW74	1535188	487376	130.0	4.5	12/26/2018	66.05	6487.36	3.1	6553.41	40	6510	A -	---
										100	6450	M 90-130	Middle
CW75	1536012	487376	190.0	4.5	12/26/2018	66.82	6486.76	1.8	6553.58	59	6493	A -	---
										136	6416	M 150-190	Middle
CW76	1536661	487861	270.0	4.5	12/26/2018	66.05	6490.56	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	12/26/2018	49.63	6505.49	2.0	6555.12	84	6469	M 80-120	Middle
										84	6469	A 80-120	Alluvium
R2	1534548	487968	115.0	5.0	2/20/2018	55.05	6499.11	2.0	6554.16	83	6469	A 75-115	Alluvium
										83	6469	M 75-115	Middle

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
R3	1534546	488196	140.0	5.0	12/4/2018	52.25	6503.48	2.0	6555.73	88	6466	A 60-80	Alluvium
										88	6466	M 100-140	Middle
R4	1534541	488446	130.0	5.0	2/20/2018	57.08	6501.70	2.0	6558.78	84	6473	A 90-130	Alluvium
										84	6473	M 90-130	Middle
R5	1534560	488666	125.0	5.0	2/20/2018	53.76	6503.99	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	M 110-130	Middle
										68	6490	A 50-90	Alluvium
R7	1534399	488087	145.0	5.0	8/16/2013	54.21	6500.60	2.0	6554.81	74	6479	A 65-105	Alluvium
										74	6479	M 125-145	Middle
R11	1534320	488280	120.0	4.5	2/20/2018	63.00	6495.45	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	A 60-120	Alluvium
										66	6489	M 60-120	Middle
R36	1533594	486157	200.0	4.5	8/3/2016	69.05	6476.41	2.0	6545.46	92	6451	A -	---
										146	6397	L 160-200	Lower
R37	1533586	486481	200.0	4.5	8/10/2016	68.66	6478.18	2.0	6546.84	92	6453	A -	---
										143	6402	L 160-200	Lower
R44	1533478	486593	200.0	4.5	8/10/2016	68.99	6478.60	2.0	6547.59	100	6446	A -	---
										130	6416	L 160-200	Lower
R45	1533481	486334	200.0	4.5	8/3/2016	68.62	6477.81	2.0	6546.43	80	6464	A -	---
										130	6414	L 160-200	Lower
R46	1533478	486088	200.0	4.5	8/2/2016	68.44	6477.80	2.0	6546.24	---	---	L 160-200	Lower
										90	6454	A -	---
R47	1533470	485780	160.0	4.5	12/20/2013	75.59	6471.58	2.0	6547.17	103	6442	A 100-160	Alluvium
										103	6442	L 100-160	Lower
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	12/26/2018	70.14	6475.85	2.0	6545.99	109	6435	A -	---
										109	6435	L 160-200	Lower
R50	1533362	486216	200.0	4.5	4/3/2017	66.41	6479.21	2.0	6545.62	100	6444	A -	---
										120	6424	L 160-200	Lower
R51	1533387	486460	200.0	4.5	8/3/2016	68.09	6478.41	2.0	6546.50	120	6425	A -	---
										140	6405	L 160-200	Lower
R52	1533377	486751	200.0	4.5	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	L 75-135	Lower
										99	6446	A 75-135	Alluvium
R58	1533170	485710	160.0	4.5	4/8/2014	70.98	6473.47	2.0	6544.45	98	6444	L 100-160	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
R58	1533170	485710	160.0	4.5	4/8/2014	70.98	6473.47	2.0	6544.45	98	6444	A 100-160	Alluvium
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	L 110-150	Lower
										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	12/26/2018	68.65	6476.88	2.0	6545.53	105	6439	L 140-180	Lower
										105	6439	A -	---
R67B	1533000	486086	145.0	4.5	---	---	---	2.0	6544.87	100	6443	L 105-145	Lower
R68	1533025	485819	160.0	4.5	10/10/2014	69.44	6475.41	2.0	6544.85	99	6444	A 100-160	Alluvium
										99	6444	L 100-160	Lower
R69	1532987	486024	160.0	4.5	4/8/2014	70.53	6474.82	2.0	6545.35	96	6447	A 100-160	Alluvium
										96	6447	L 100-160	Lower
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	12/26/2018	69.88	6474.15	2.4	6544.03	104	6438	L 100-140	Lower
										104	6438	A 100-140	Alluvium
R75	1532922	485716	140.0	4.5	5/13/2015	69.14	6475.74	2.3	6544.88	98	6445	A 100-140	Alluvium
										98	6445	L 100-140	Lower
R76	1532888	485891	140.0	4.5	5/13/2015	68.37	6476.72	2.3	6545.09	106	6437	L 100-140	Lower
										106	6437	A 100-140	Alluvium
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
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	12/26/2018	76.00	6476.11	2.0	6552.11	220	6330	L 230-270	Lower
V2	1534339	486618	270.0	4.5	12/26/2018	74.15	6475.94	2.0	6550.09	210	6338	L 230-270	Lower
V3	1534192	486207	260.0	4.5	8/22/2017	74.60	6475.55	2.2	6550.15	240	6308	L 220-260	Lower
V4	1533890	485961	240.0	4.5	8/22/2017	70.00	6475.43	2.1	6545.43	200	6343	L 200-240	Lower
V6	1534156	485710	260.0	4.5	7/10/2018	75.05	6472.38	2.4	6547.43	220	6325	L 220-260	Lower
V7	1534208	487436	270.0	4.5	12/26/2018	78.20	6477.03	2.0	6555.23	---	---	L 230-270	Lower
										80	6473	A -	---
V8	1534183	486945	260.0	4.5	12/26/2018	73.25	6478.24	2.0	6551.49	100	6449	A -	---
										210	6339	L 220-260	Lower
V9	1534298	488140	280.0	4.5	12/26/2018	78.43	6477.26	2.0	6555.69	---	---	L 240-280	Lower
										70	6484	A -	---
V11	1533919	487868	270.0	4.5	12/26/2018	78.25	6477.65	2.0	6555.90	---	---	L 230-270	Lower
										60	6494	A -	---
V14	1533638	488229	240.0	4.5	12/26/2018	79.40	6476.29	2.0	6555.69	---	---	L 200-240	Lower
										80	6474	A -	---
V16	1533402	487709	220.0	4.5	12/26/2018	74.20	6477.78	2.0	6551.98	80	6470	A -	---
										200	6350	L 180-220	Lower
V17	1533896	486461	240.0	4.5	12/26/2018	74.10	6476.05	2.0	6550.15	---	---	L 200-240	Lower
										100	6448	A -	---
V18	1533819	487241	240.0	4.5	12/26/2018	74.45	6476.93	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

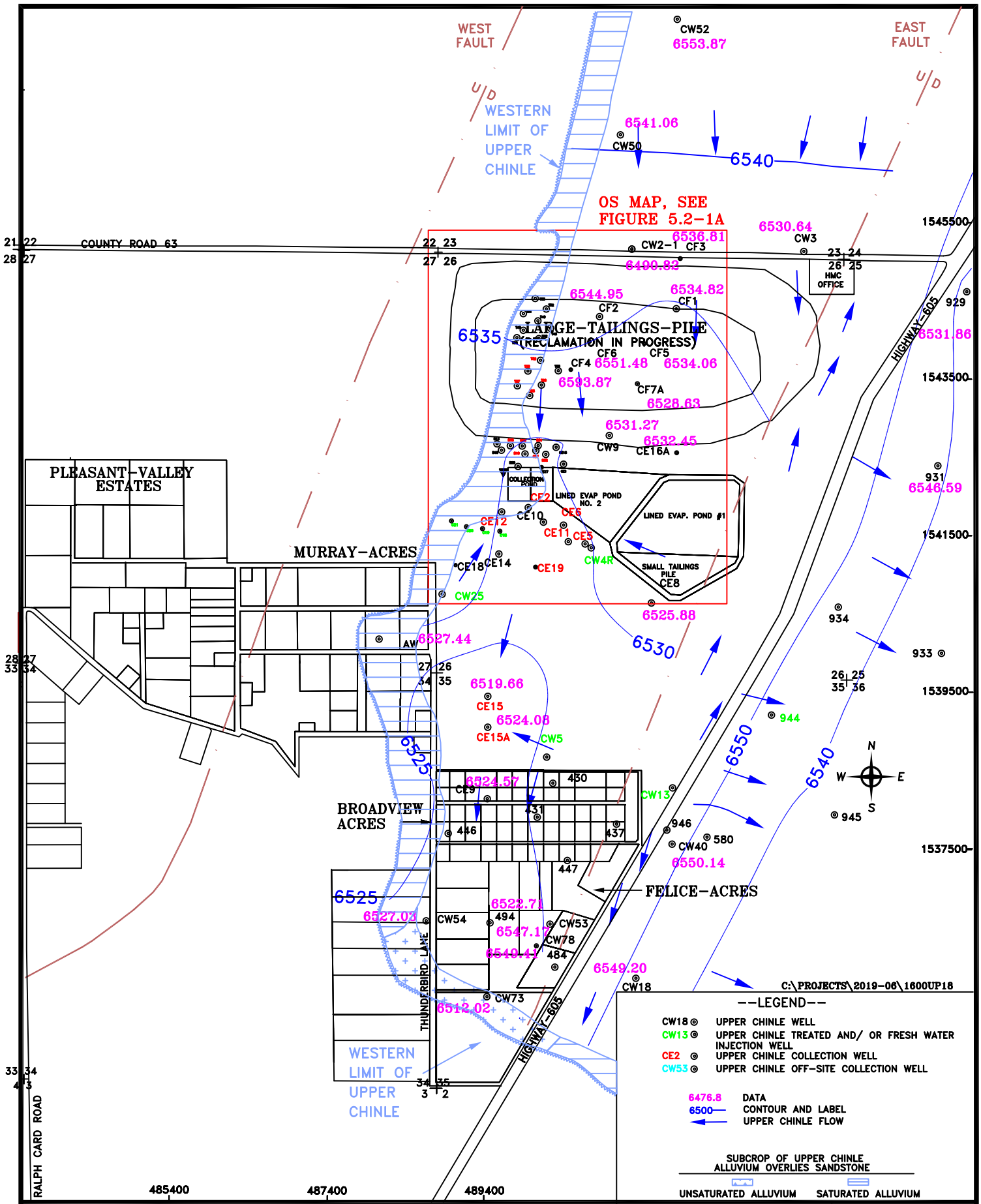
5.2 UPPER CHINLE WATER LEVELS

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 2018. The blue arrows on Figure 5.2-1 show the direction of ground-water flow, which is greatly influenced by the fresh-water injection into the Upper Chinle at wells C18, C19, C20, C21, CW4R, CW5, CW13 and CW25 and collection from wells B15, B16, B19, B31, B32, CE2, CE5, CE6, CE7, CE11, CE12, CE15, CE15A, CE19, T25, T27, T28, T30, T32 and T51. Well CW13, an injection well on the east side of the East Fault, is in the high permeability zone of the Upper Chinle aquifer that parallels the East Fault. This high permeability zone extends to a distance of at least 1000 feet parallel and adjacent to the East Fault near well CW18. Injection of fresh water has created a piezometric-surface mound along the east side of the East Fault. The permeability is much smaller at greater distances to the east of the East Fault and, therefore, an easterly gradient occurs in the Upper Chinle away from the East Fault near injection well CW13. The CW13 injection affects water levels on the west side of the East Fault in the area of Upper Chinle wells CW53 and CW78 in Felice Acres. Water level changes in well CW53 respond quickly to change in levels in well CW13 showing that a good connection exists in the Upper Chinle where the East Fault pinches out south of well CW53.

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

Figure 5.2-2 shows the location of the Upper Chinle wells that are used to monitor water-level changes with time. Figure 5.2-3 presents water-level elevations for Upper Chinle wells 494, CE2, CE7, CE10, CW3 and CW50. Figure 5.2-4 presents the water-level elevation

changes for the Upper Chinle wells east of the East Fault. The variation in water levels in wells 929, 931, CW18 and CW53 were due to variations in injection rates into well CW13 during 2018. Water levels from well CW53 were included with these wells because water levels in well CW53 responds similar to the wells east of the East Fault.



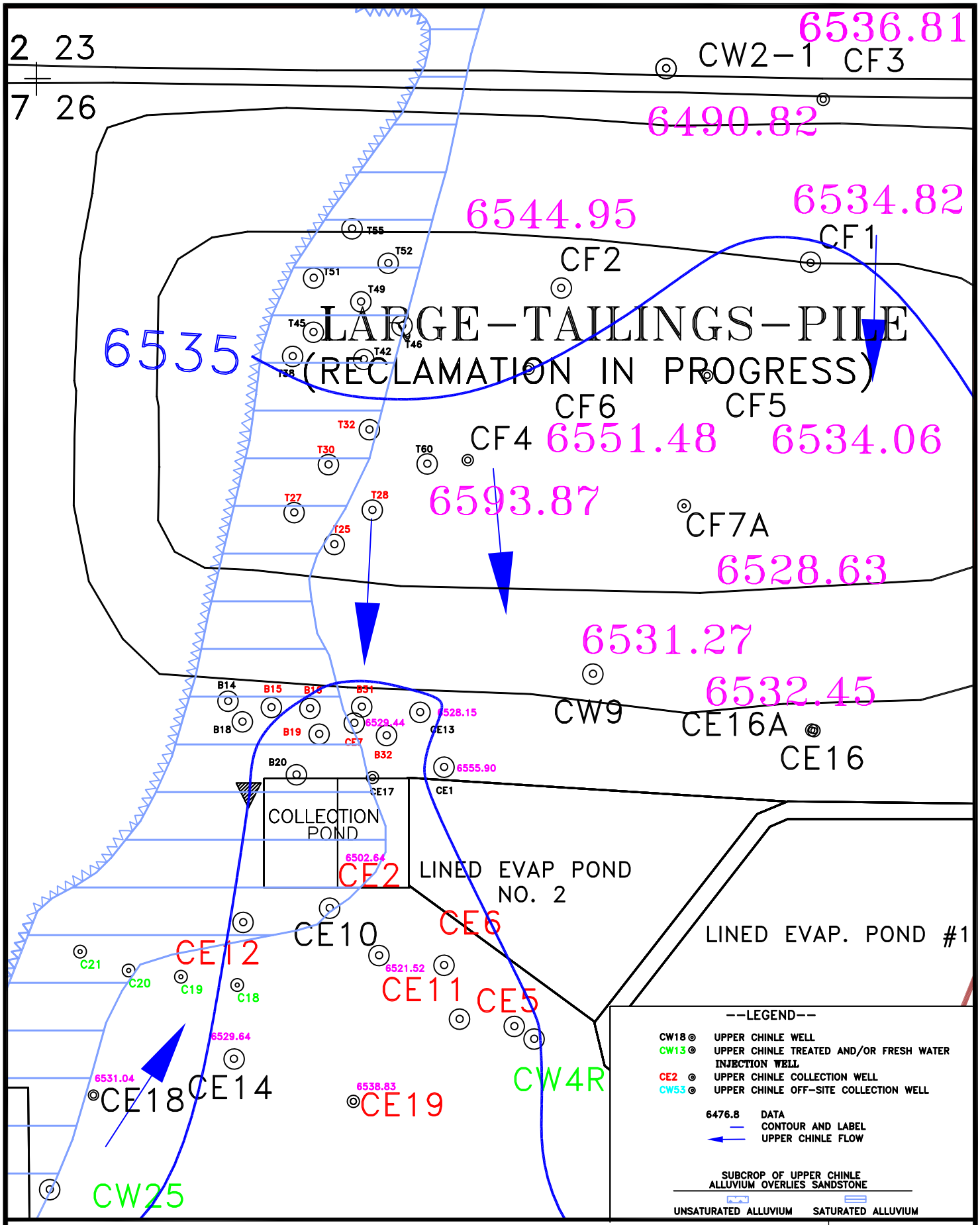
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.2-1. WATER-LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2018, FT-MSL

SCALE: 1"= 1600'

PAGE: 5.2-3



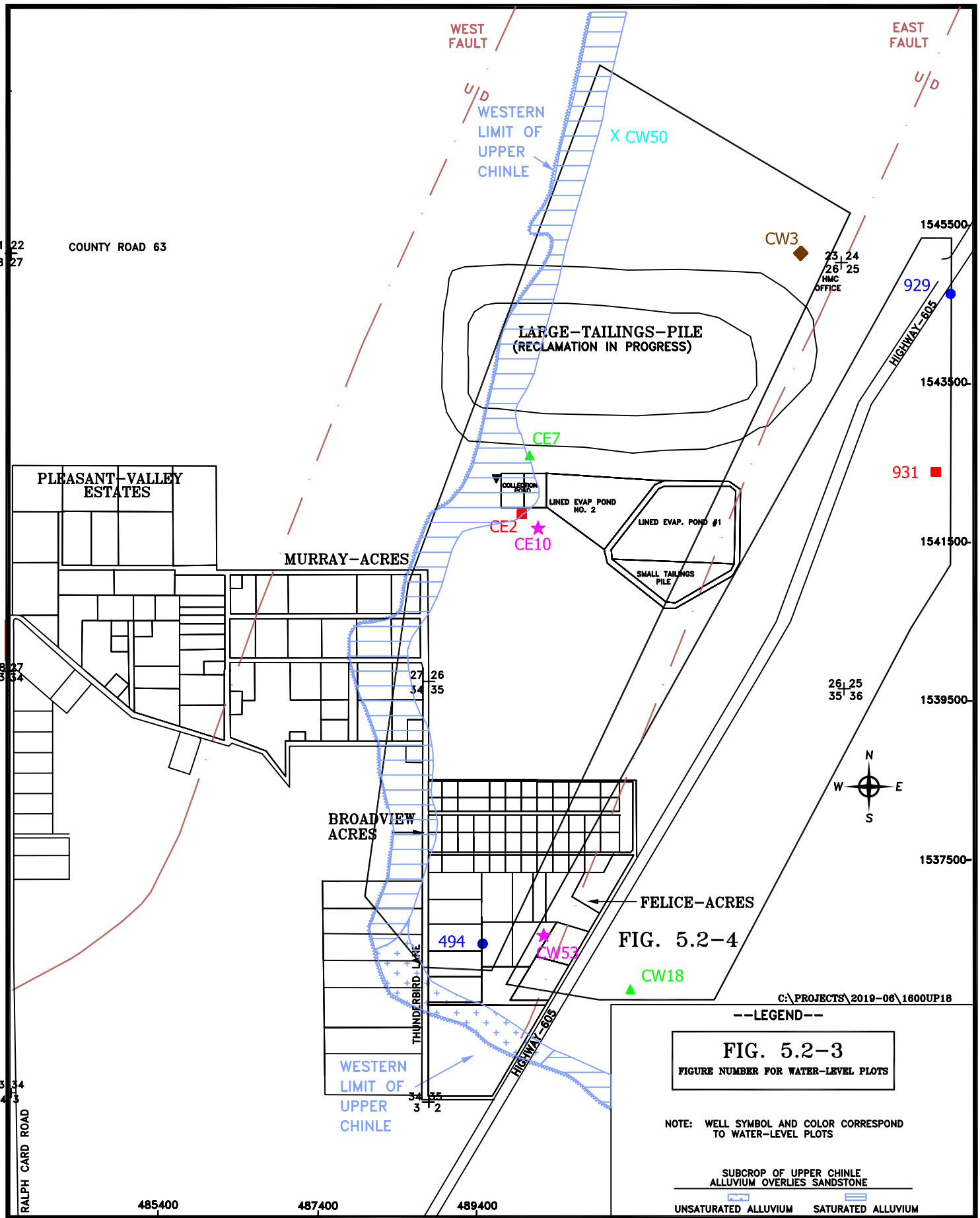
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/11/2019

FIGURE 5.2-1A. WATER LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, OS, FALL 2018, FT-MSL

SCALE: 1"= 500'

PAGE: 5.2-4



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

FIGURE 5.2-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2018

DATE: 1/15/2019

SCALE: 1"= 1600'

PAGE: 5.2-5

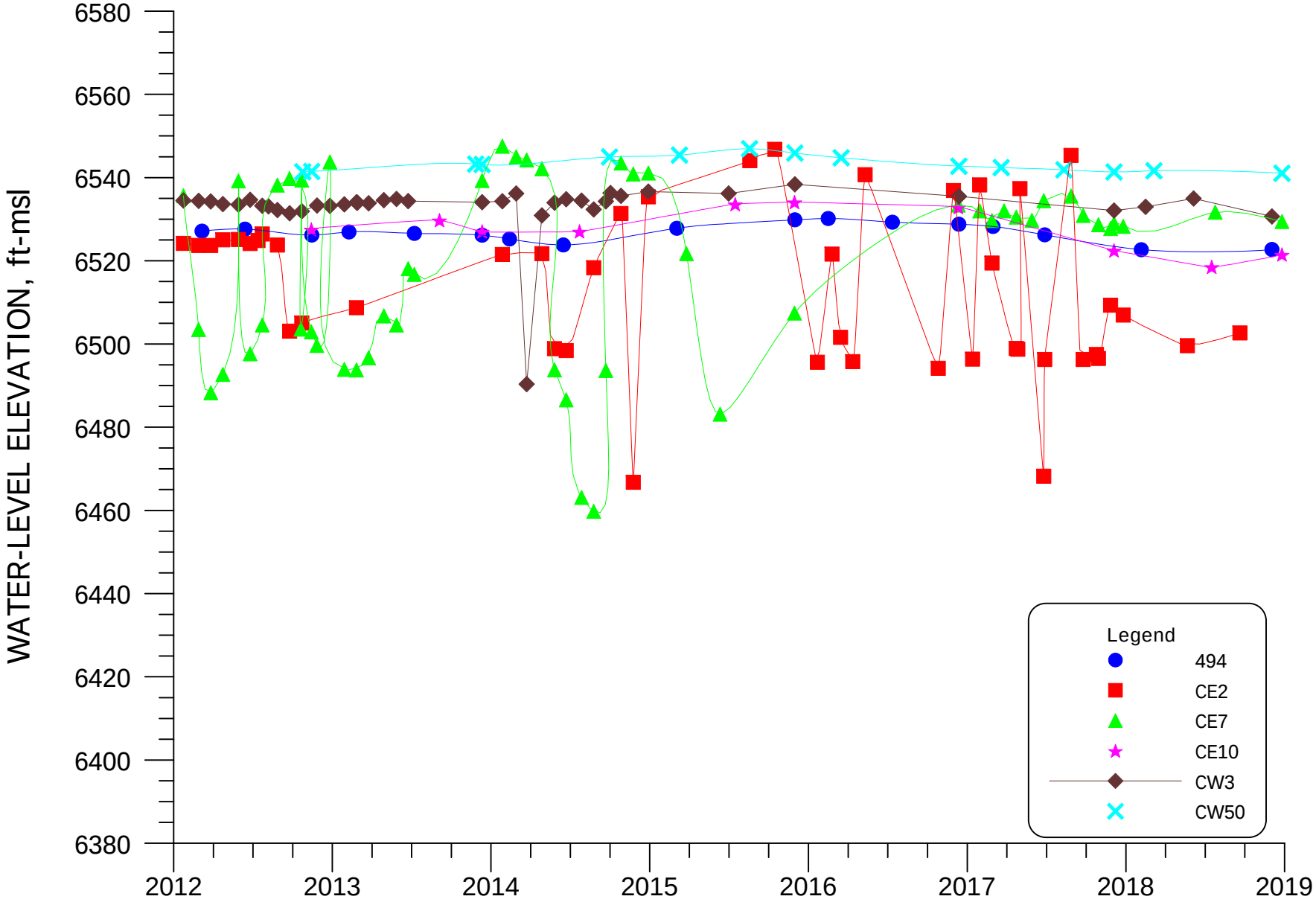


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CE7, CE10, CW3, AND CW50

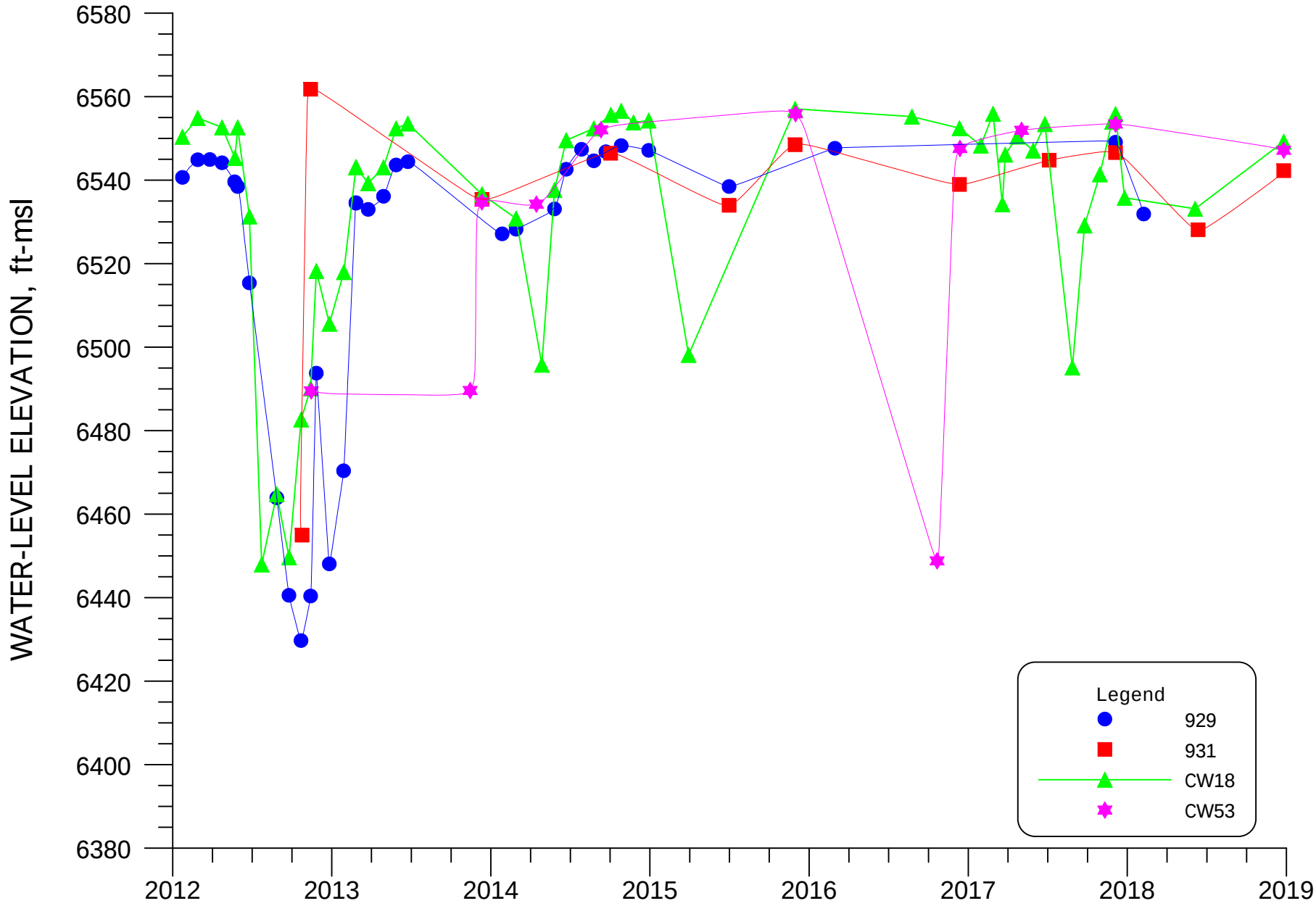


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, CW 18 AND CW53

5.3 UPPER CHINLE WATER QUALITY

The Upper Chinle aquifer site standards are initially defined in this subsection because they are needed to show where restoration is needed in this aquifer and for use in evaluating Upper Chinle groundwater restoration. Water-quality data for 2018 for the Chinle aquifers is presented in Tables B.5-1 and B.5-2 of Appendix B. The basic well data is presented in Tables 5.1-1 through 5.1-4 and Figures 5.1-2 and 5.1-2A show locations of the Upper Chinle wells.

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 Upper Chinle wells used in establishing the Chinle site standards are shown on Figure 5.3-1 with a blue box around the well name showing which Upper Chinle wells were used to define the non-mixing zone site standard. The yellow pattern on this figure shows the mixing zone for the Upper Chinle aquifer. The Upper Chinle wells used in conjunction with the Middle and Lower Chinle wells (see Figures 6.3-1 and 7.3-1 for the Middle and Lower Chinle wells respectively used) in establishing the mixing zone site standards are shown with a red box around their well names. Table 5.3-1 presents Chinle mixing zone site standards and the non-mixing zone Upper Chinle site standards. This table also presents the 2018 data for the Chinle mixing zone wells and the Upper Chinle non-mixing zone 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 2018 are less than the site standard in all Upper Chinle wells except for wells near the southern portion of the LTP. Uranium concentrations exceed the site standard in wells near the LTP, one well just north of Broadview Acres and two wells in Felice Acres. Molybdenum concentrations in the Upper Chinle aquifer exceed the site standard in wells in close proximity to the tailings piles and well CE15.

5.3.2 SULFATE - UPPER CHINLE

Figures 5.3-1A and 5.3-1B present sulfate concentrations in the Upper Chinle aquifer during 2018. Figure 5.3-1B has been added for the presentation of the new wells in the LTP area due to the density of these wells. Therefore Figure 5.3-1B should be used for the viewing of the concentrations in the area inside the red box on Figure 5.3-1A. Only wells near the LTP area exceeded the site standard for the mixing zone of 1750 mg/l (see Figure 5.3-1 for the mixing zone area). The non-mixing zone site standard of 914 mg/l in the Upper Chinle in 2018 is also exceeded in the eastern portion of the LTP. Upper Chinle site standards based on background data are presented for sulfate in the legend of Figures 5.3-1A and 5.3-1B. These site standards have a greater than sign in front of the numeric value which is associated with the pattern for the particular zone. Therefore, only an area in the LTP to the collection ponds requires restoration in the mixing zone and an area to the east in the non-mixing zone. The information regarding the analysis of background results that were used to develop the background and related site standards are presented previously in this section 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, CE8, CE9, CE15 AND CE19 are grouped together on the water-quality time plots, whereas the non-mixing zone wells 929, 931, CW3 and CW18 are grouped together on a second plot.

Figure 5.3-3 presents sulfate concentrations versus time for the mixing zone group of wells listed above. The sulfate concentrations in water sampled from each of these wells in 2018 are less than the mixing-zone site standard (see Figure 5.3-3). A plot of sulfate concentrations versus time for non-mixing zone Upper Chinle wells 929, 931, CW3 and CW18 is presented on Figure 5.3-4 (see Figure 5.3-2 for location of these wells).

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 2018. Figure 5.3-5A should be used similar

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

Figure 5.3-6 presents TDS concentrations for mixing zone Upper Chinle wells 494, CE2, CE8, CE9, CE15 AND CE19. A time plot of TDS concentrations for non-mixing zone wells 929, 931, CW3 and CW18 is presented in Figure 5.3-7.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2018 are presented on Figures 5.3-8 and 5.3-8A. In the up-gradient Upper Chinle well CW50, chloride concentrations are less than 100 mg/l. Typical measured chloride concentrations are between 100 and 220 mg/l in the Upper Chinle aquifer, because this range encompasses natural variations and the range of chloride concentrations in the injection water. Concentrations near the subcrop located under the LTP and down to the northern side of the Collection Ponds exceed 250 mg/l and require restoration in this area. The highest chloride concentrations exist in the area of the western portion of the LTP. Chloride concentrations east of the East Fault naturally increase due to the slower movement of ground water with increasing distance east of the East Fault and are not attributable to the Grants site.

The chloride concentrations in water collected from mixing zone Upper Chinle wells 494, CE2, CE8, CE9, CE15 AND CE19 are presented on Figure 5.3-9. The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10.

5.3.4 URANIUM - UPPER CHINLE

Uranium is an important parameter for identifying impacts to the Upper Chinle aquifer. Figures 5.3-11 and 5.3-11A presents contours of uranium concentrations in the Upper Chinle aquifer for 2018. 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 2018. One uranium value exceeds the mixing zone site standard of 0.18 mg/l just north of Broadview Acres and two values in Felice Acres also exceed this site standard. These concentrations are expected to gradually decrease to below background concentrations with the ongoing ground water-quality restoration efforts in the LTP area and the collection just north of Broadview Acres.

Plots of uranium concentrations versus time for Upper Chinle wells 494, CE2, CE8, CE9, CE15 AND CE19 are presented on Figure 5.3-12 (see Figure 5.3-2 for location of these wells). Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells 929, 931, CW3 and CW18.

5.3.5 SELENIUM - UPPER CHINLE

Contours of selenium concentrations for 2018 in the Upper Chinle aquifer are presented on Figures 5.3-14 and 5.3-14A. These figures show that the selenium concentrations are less than the mixing-zone site standard of 0.14 mg/l with the exception of wells in and near the subcrop area near the LTP and extending down to the Collection Ponds. The non-mixing zone site standard of 0.06 mg/l is not exceeded in 2018.

Figure 5.3-15 presents selenium concentrations for wells 494, CE2, CE8, CE9, CE15 and CE19. Adequate restoration has been obtained in this area of the in Upper Chinle. Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells 929, 931, CW3 and CW18.

5.3.6 MOLYBDENUM - UPPER CHINLE

Figures 5.3-17 and 5.3-17A present the molybdenum concentrations in the Upper Chinle aquifer during 2018. Molybdenum concentrations near and underlying the LTP exceeded both the mixing and non-mixing zone site standards. Concentrations are greater than 1.0 mg/l in a region extending from the Upper Chinle-alluvium subcrop area, below the LTP, toward the east

side of the LTP and to the south of Evaporation Pond 2 and the Collection Ponds. Additional restoration is needed in this area, and should be accomplished after the alluvial aquifer is restored in the subcrop area. The site standard is exceeded in one well just north of Broadview Acres. All molybdenum concentrations from Broadview Acres to the south and east of the East Fault in the Upper Chinle aquifer are equal or below the site standards in 2018.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. Figure 5.3-19 contains time plots of molybdenum concentrations for wells 929, 931, CW3 and CW18.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2018 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 2018. All measured nitrate concentrations in the Upper Chinle aquifer in 2018 are less than the site standard except a value for well T32 of 18.7 mg/l. 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 2018. In the future, nitrate concentrations in the Upper Chinle aquifer are not expected to be significant because of the very limited extent of elevated concentrations in the alluvial aquifer. Therefore, a nitrate site standard for the non-mixing zone for the Upper Chinle aquifer has not been set and is not considered necessary.

5.3.8 RADIUM-226 AND RADIUM-228 - UPPER CHINLE

All radium concentrations in the Upper Chinle aquifer have been low in past years. Radium values slightly exceed 5 pCi/l in the Upper Chinle aquifer in the western portion of the LTP which will easily be decreased below this value during restoration of this area. Figures 5.3-21 and 5.3-21A present the radium-226 and the radium-228 values measured in 2018. The largest radium-226 concentration measured in the Upper Chinle wells in 2018 was 3.7 pCi/l in

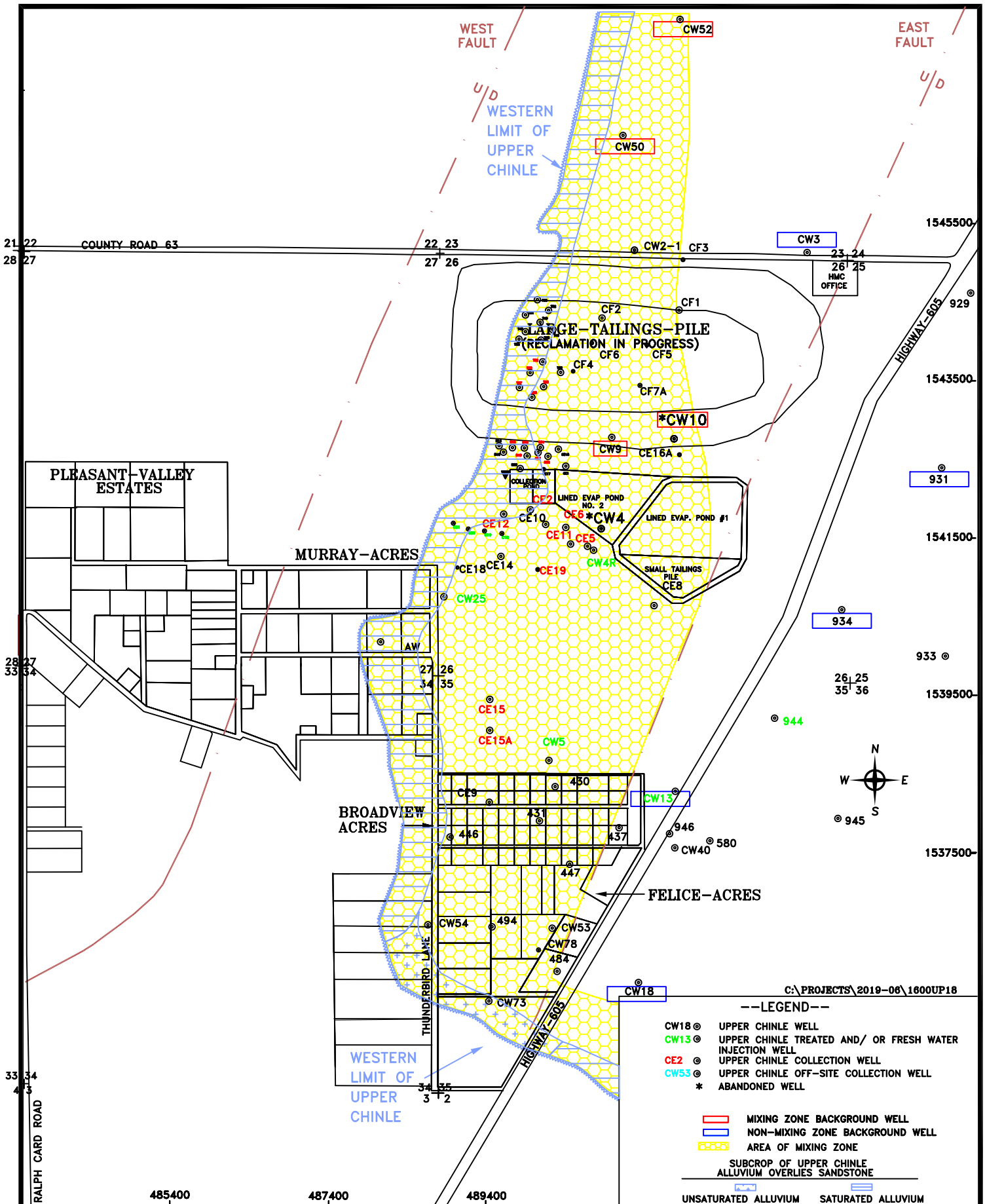
well CW3 and this value is thought to be an outlier based on other values in the Upper Chinle aquifer. The largest radium-228 value was 2.9 pCi/l in well CW18. Historical data has shown that radium-226 and radium-228 are not present at concentrations that are significant outside the LTP in the Upper Chinle aquifer at the Homestake site. No concentration plots were prepared for radium because observed concentrations have been low. A radium site standard for the Upper Chinle aquifer has not been established.

5.3.9 VANADIUM - UPPER CHINLE

Vanadium concentrations have always been low in the Upper Chinle aquifer except in the area of the LTP where they are slightly above the site standard. The occurrence of significant concentrations in the Upper Chinle aquifer is unlikely because this constituent is not present at elevated concentrations in the alluvial aquifer with the exception of the immediate tailings area. Figure 5.3-22 shows that all of the 2018 measured vanadium concentrations are equal to or less than 0.01 mg/l except for a slightly higher value in well CW3. 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 2018 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2018 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.



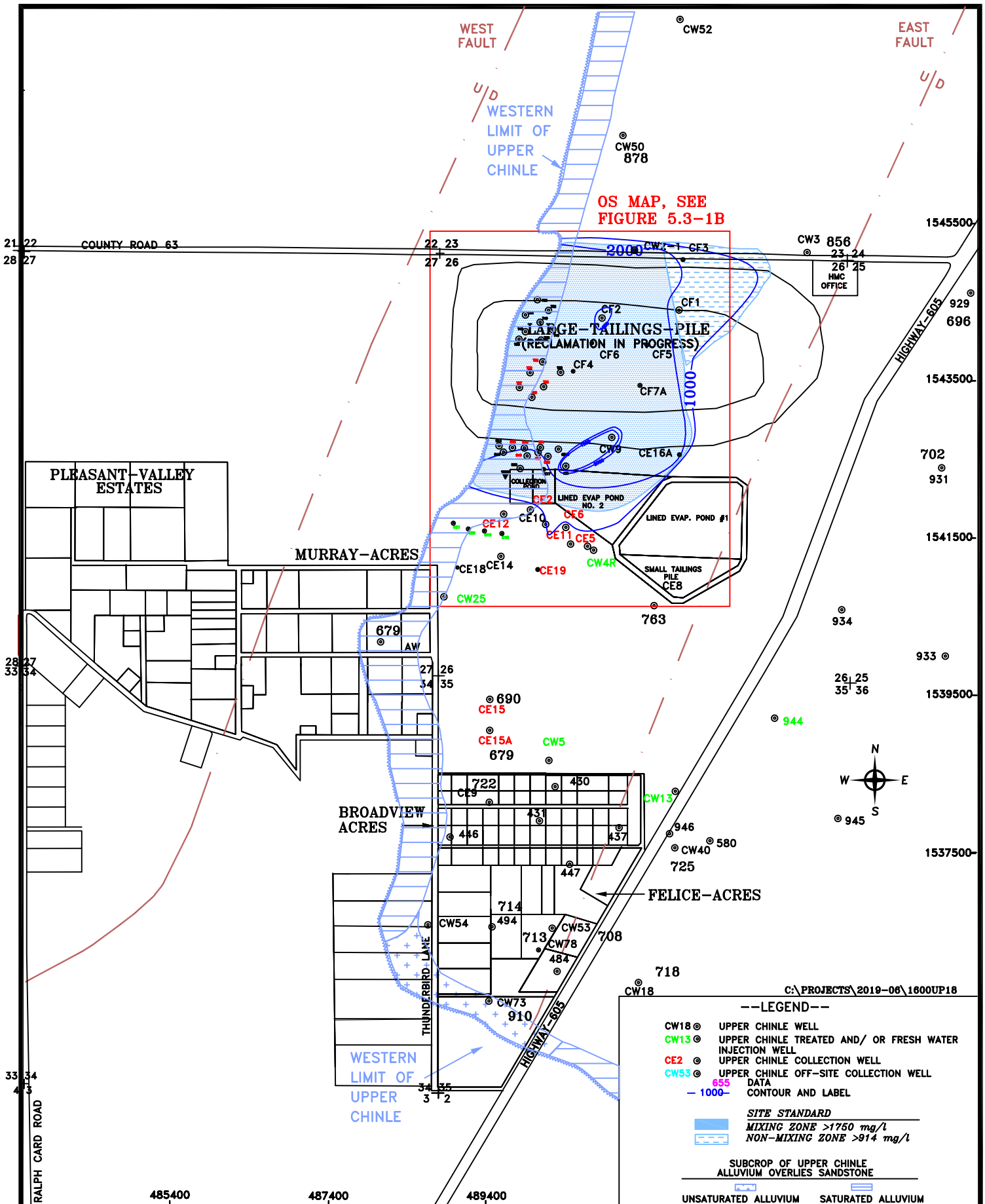
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-1. UPPER CHINLE WELLS USED FOR SITE STANDARDS AND UPPER CHINLE MIXING ZONE

SCALE: 1"= 1600'

PAGE: 5.3-7



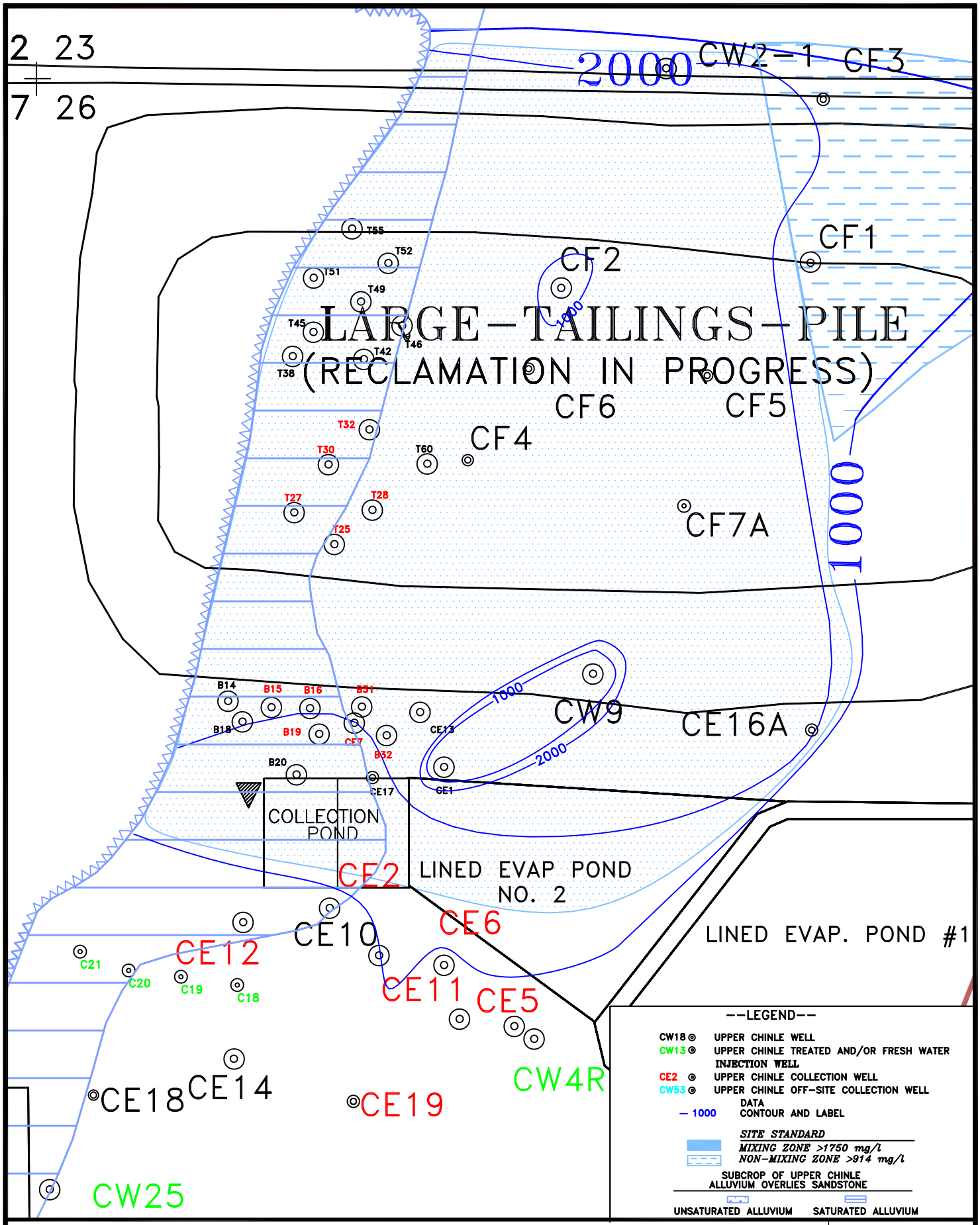
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-1A. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-8



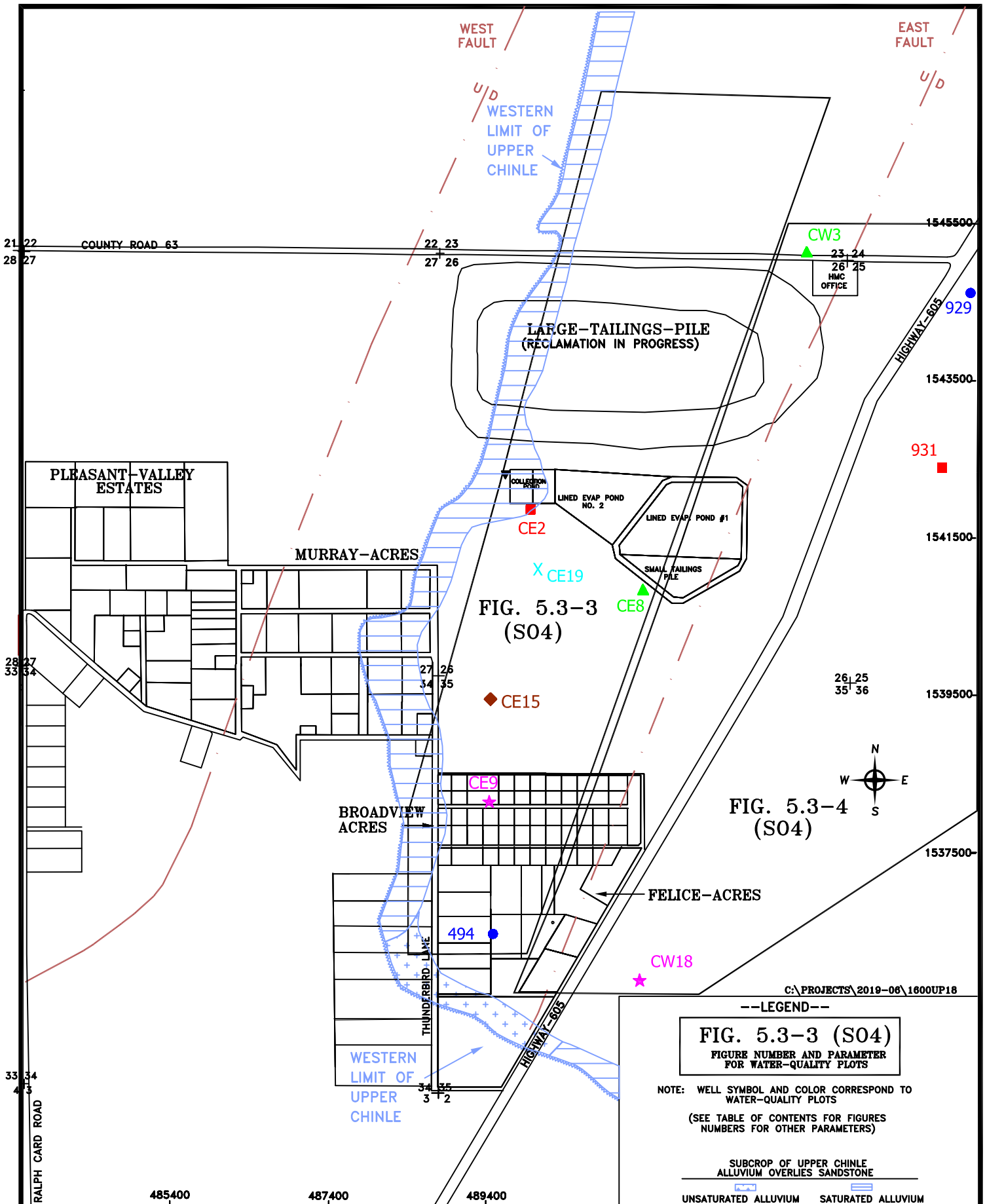
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/11/2019

FIGURE 5.3-1B. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-9



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

DATE: 1/15/2019

FIGURE 5.3-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2018

SCALE: 1"= 1600'

PAGE: 5.3-10

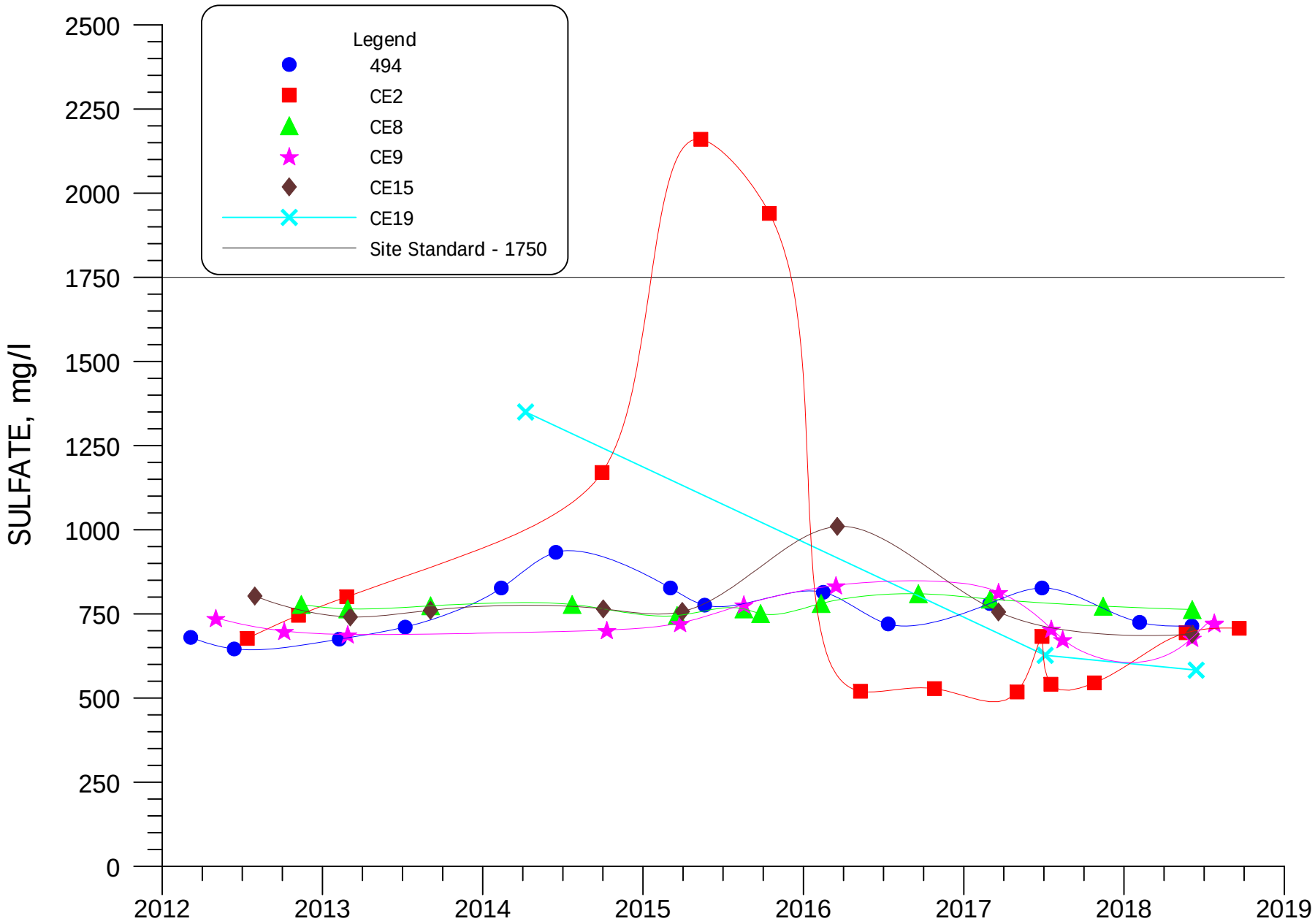


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

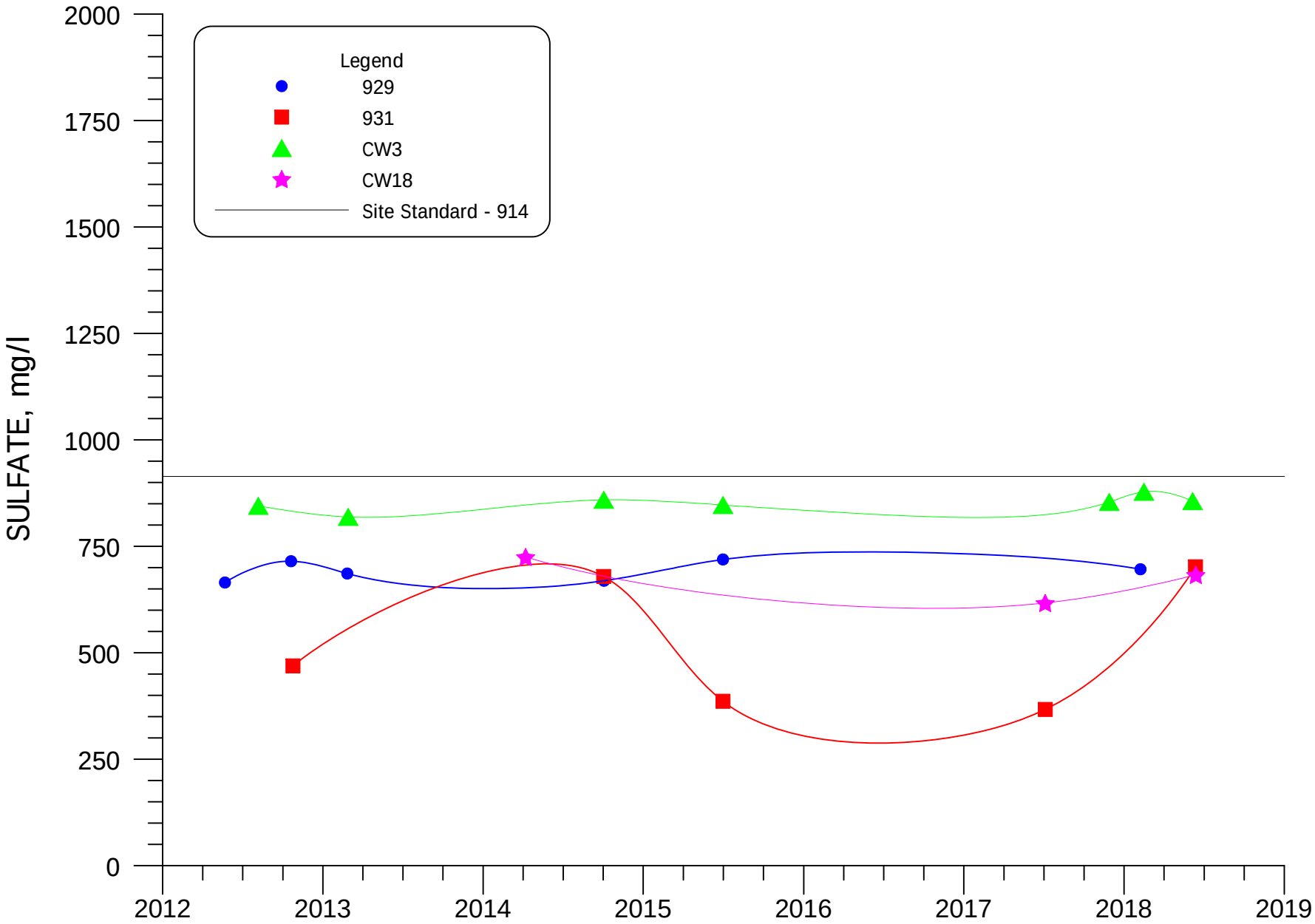
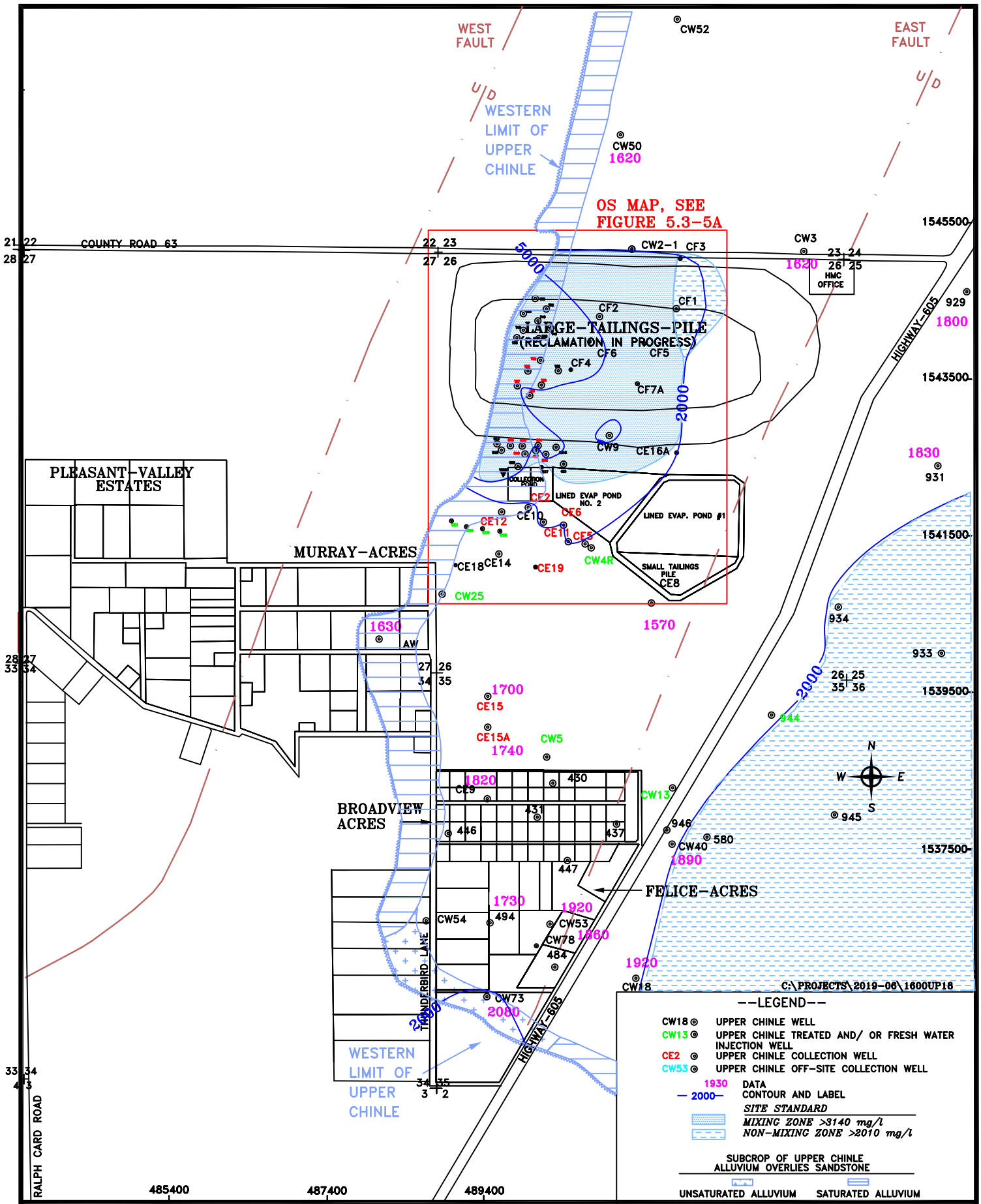


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18



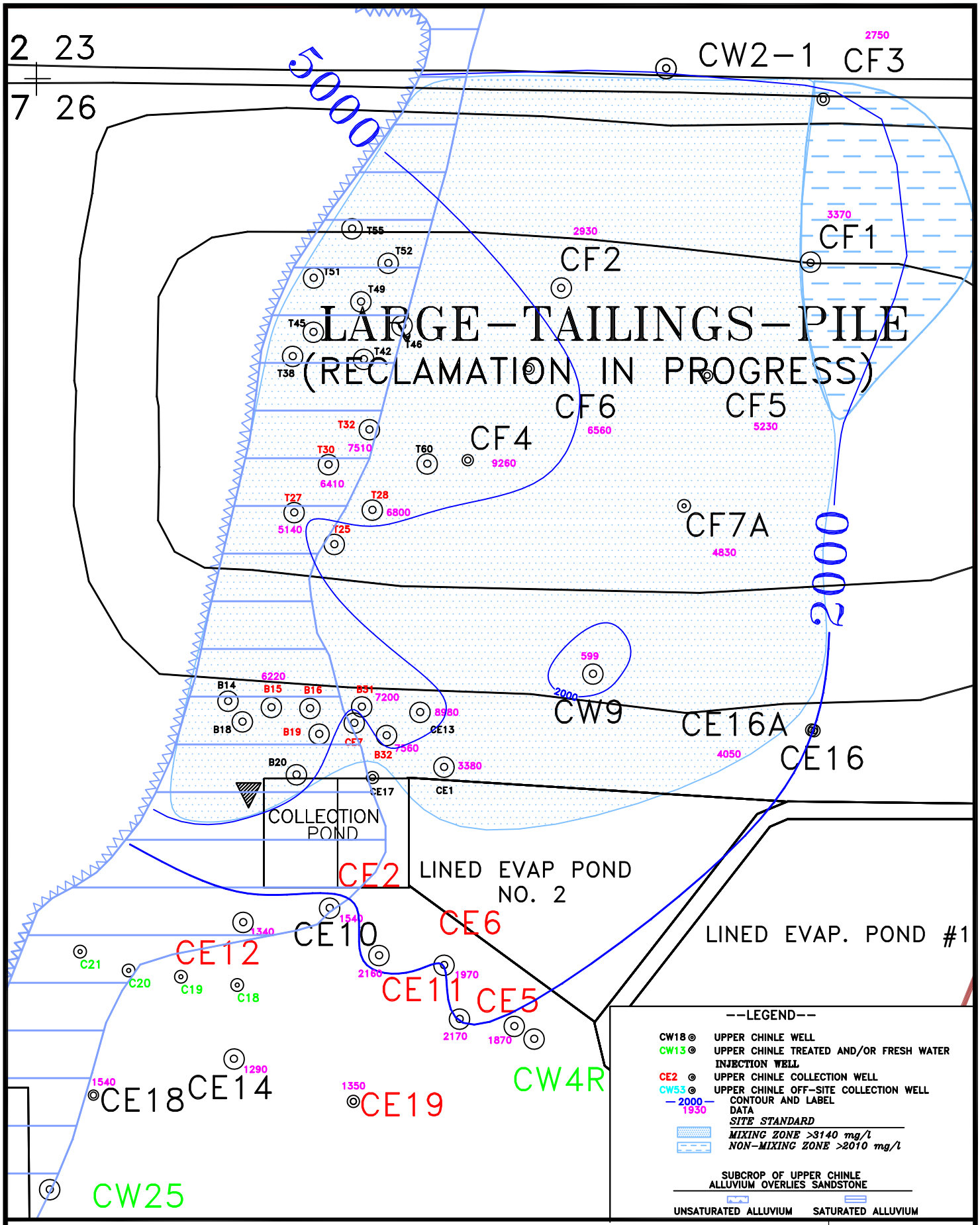
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

DATE: 1/15/2019

SCALE: 1"= 1600'

PAGE: 5.3-13



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

DATE: 1/11/2019

FIGURE 5.3-5A. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-14

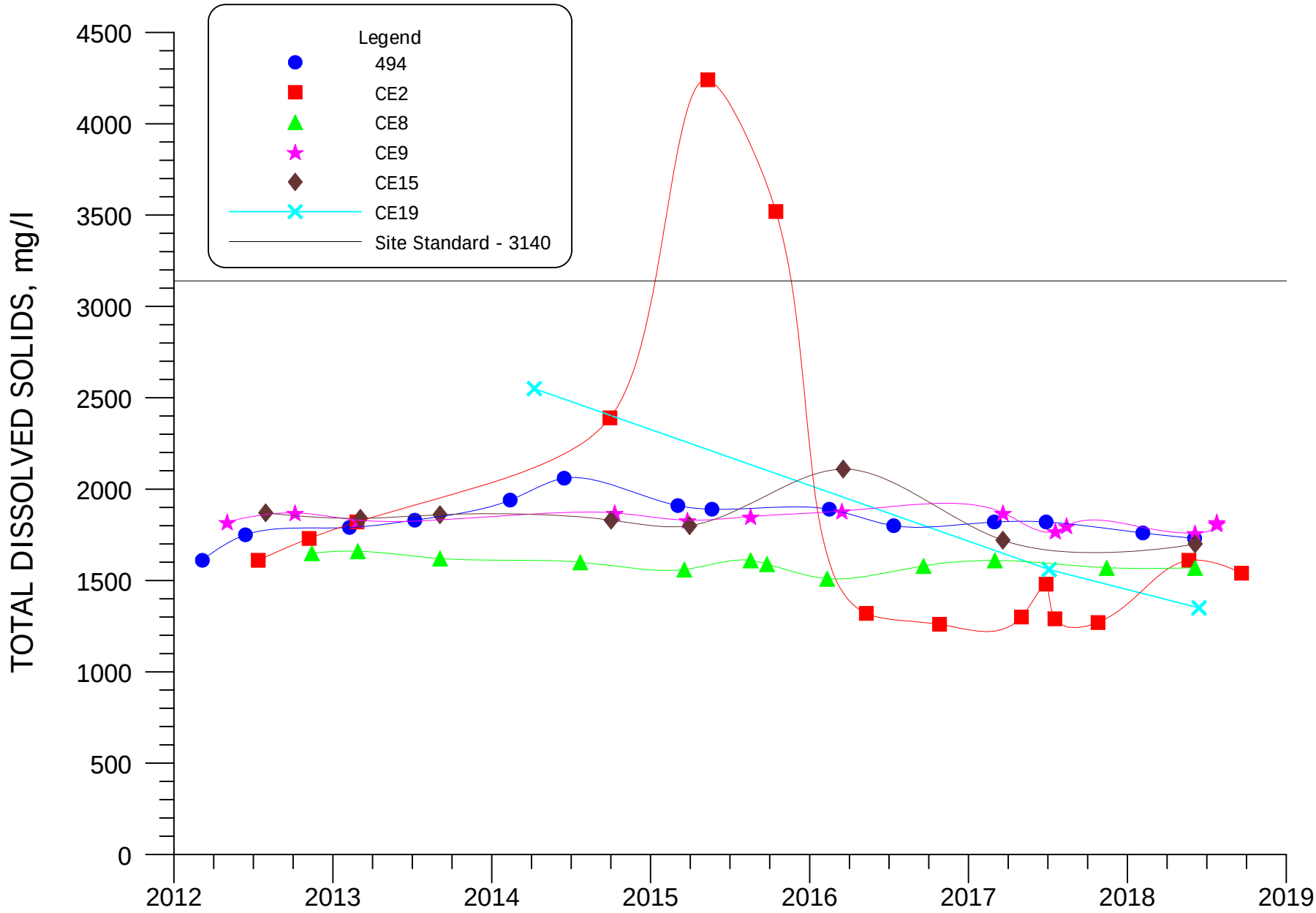


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

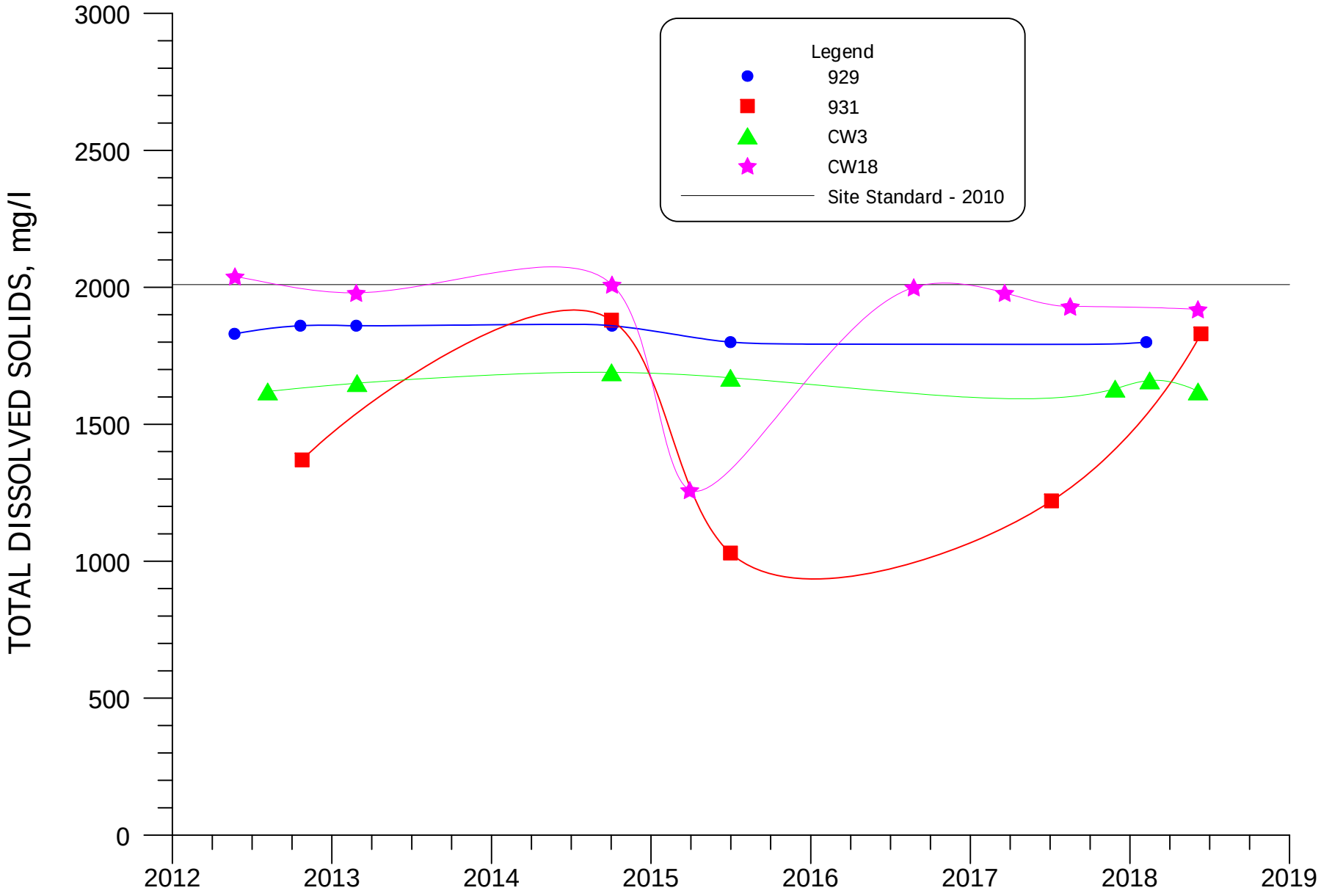
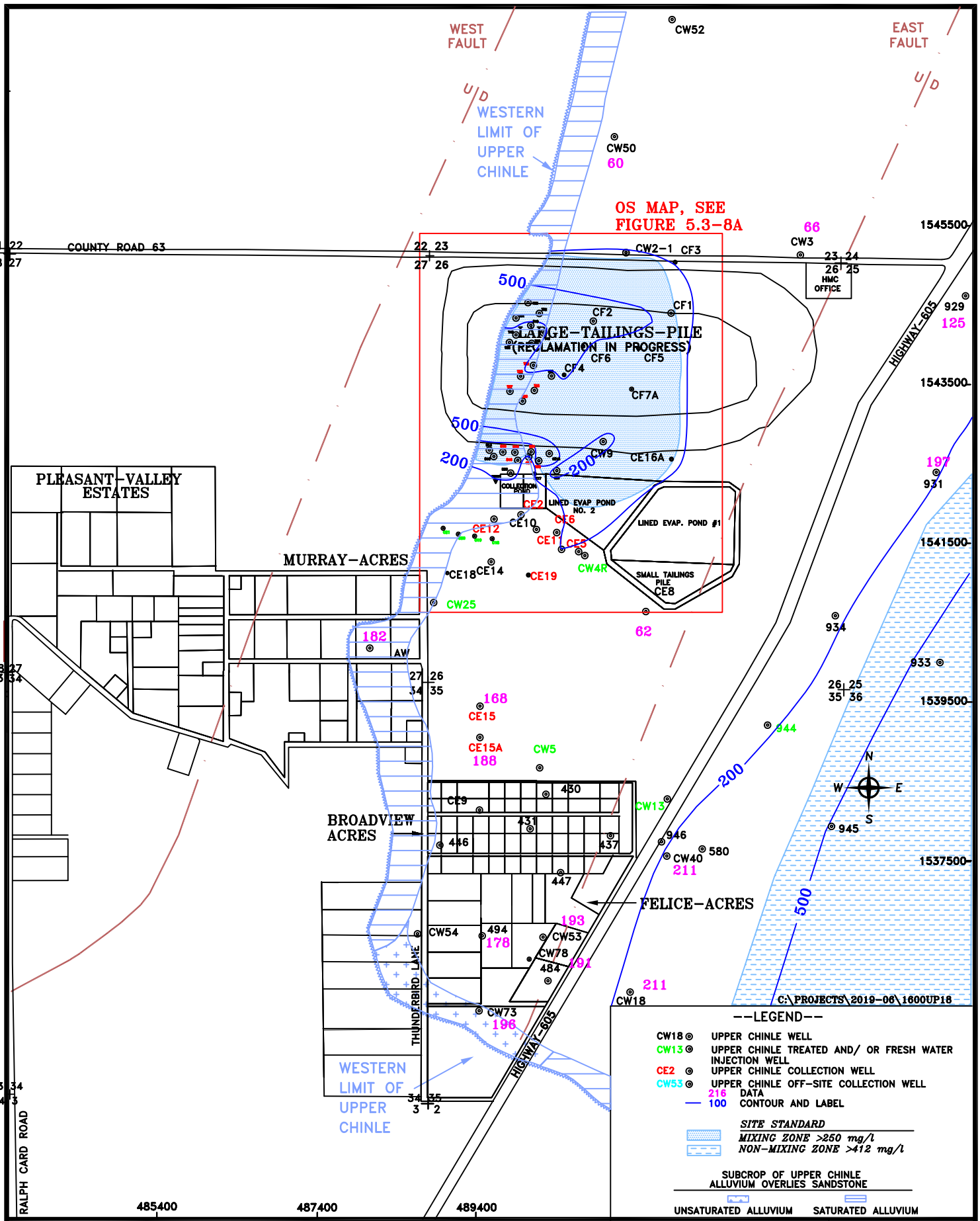


FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18



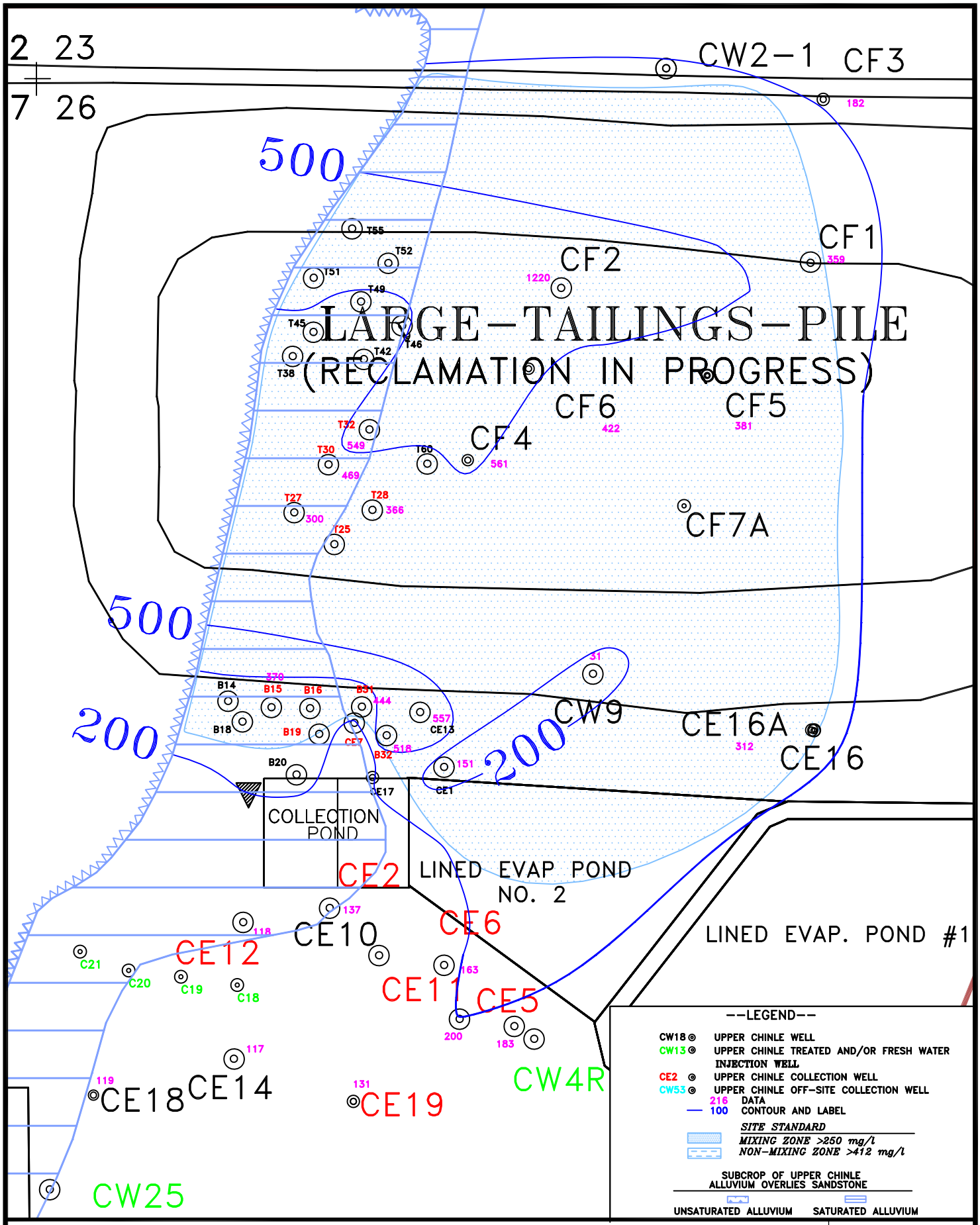
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-17



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

DATE: 10/15/18

FIGURE 5.3-8A. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-18

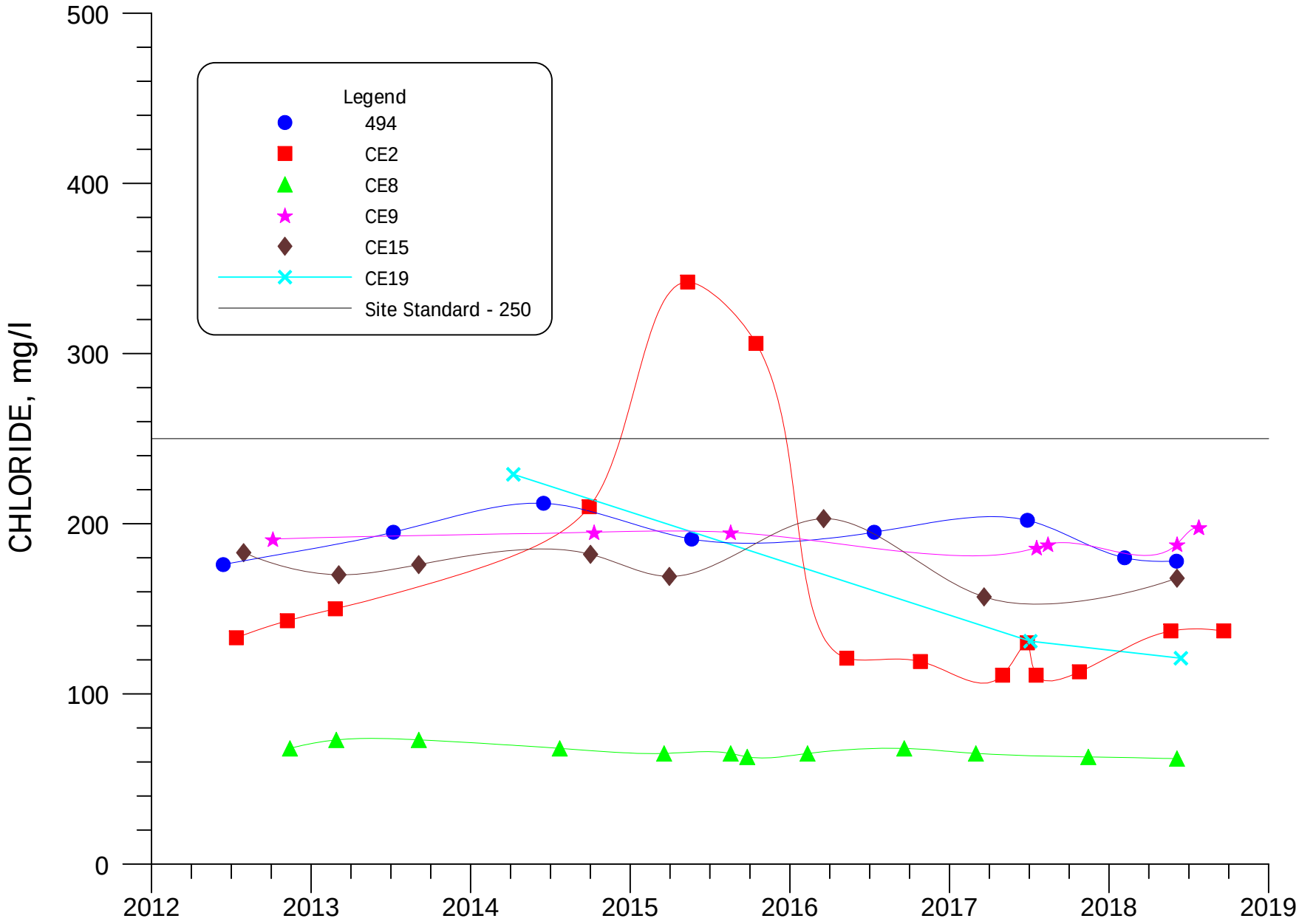


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

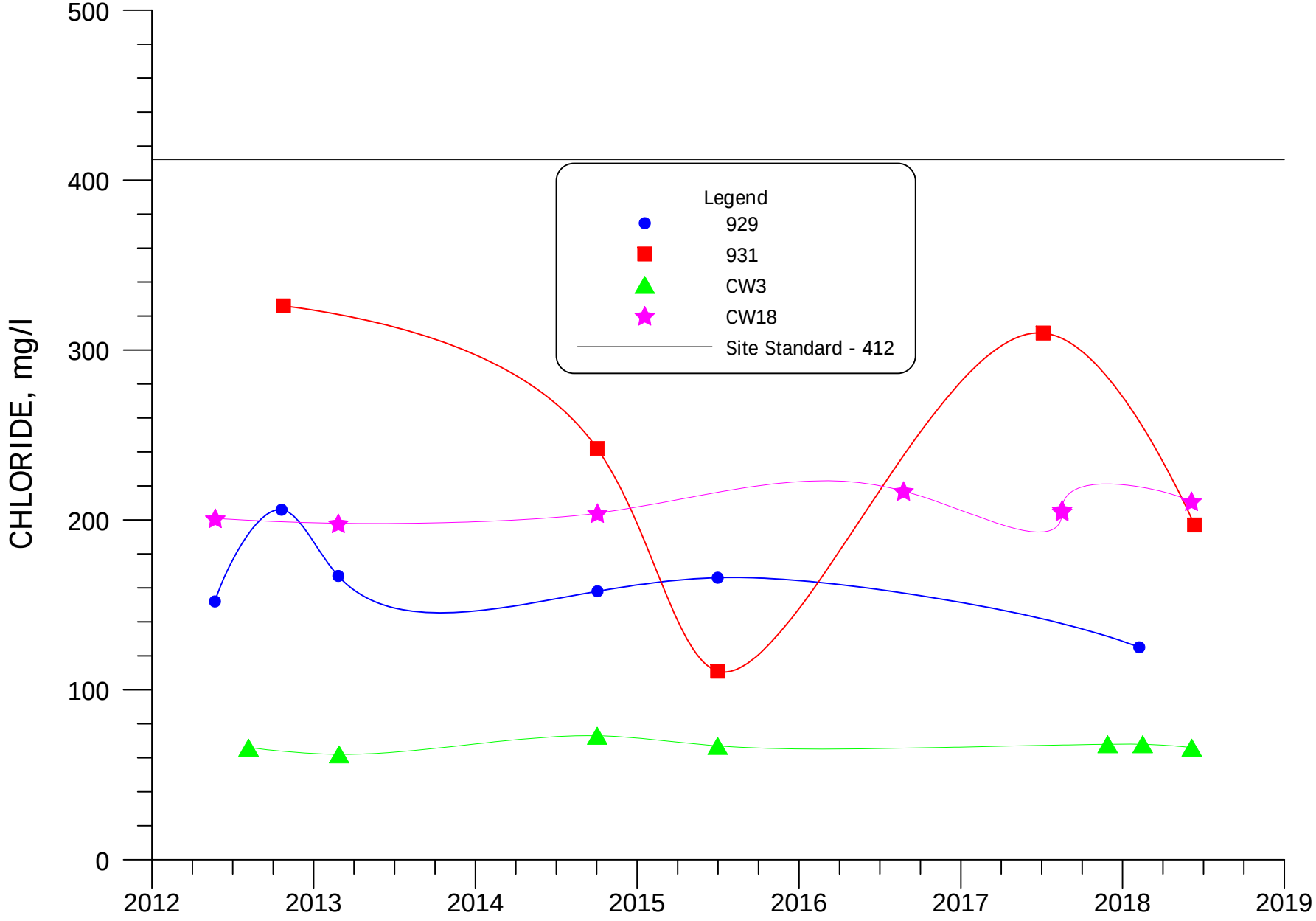
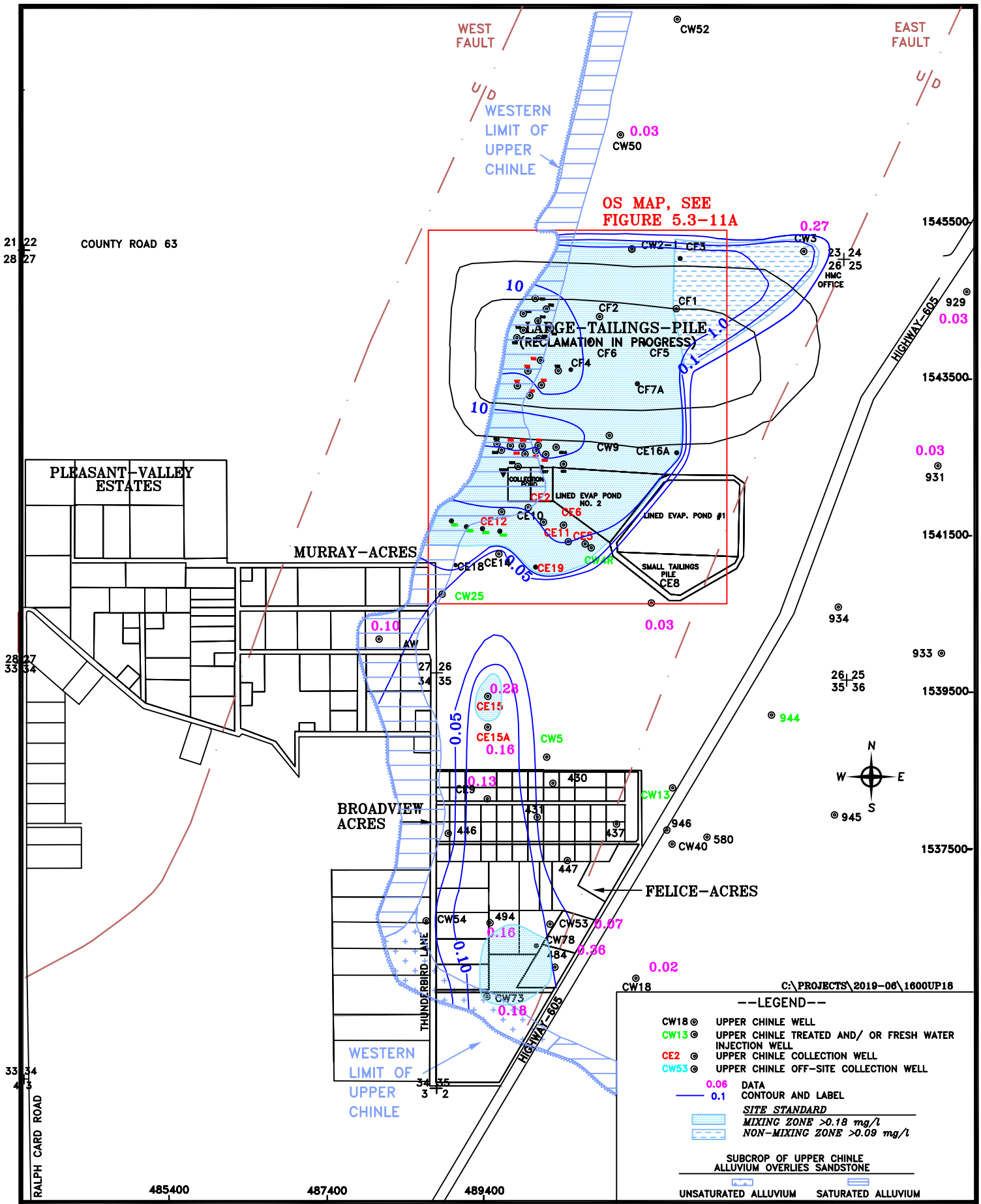


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18

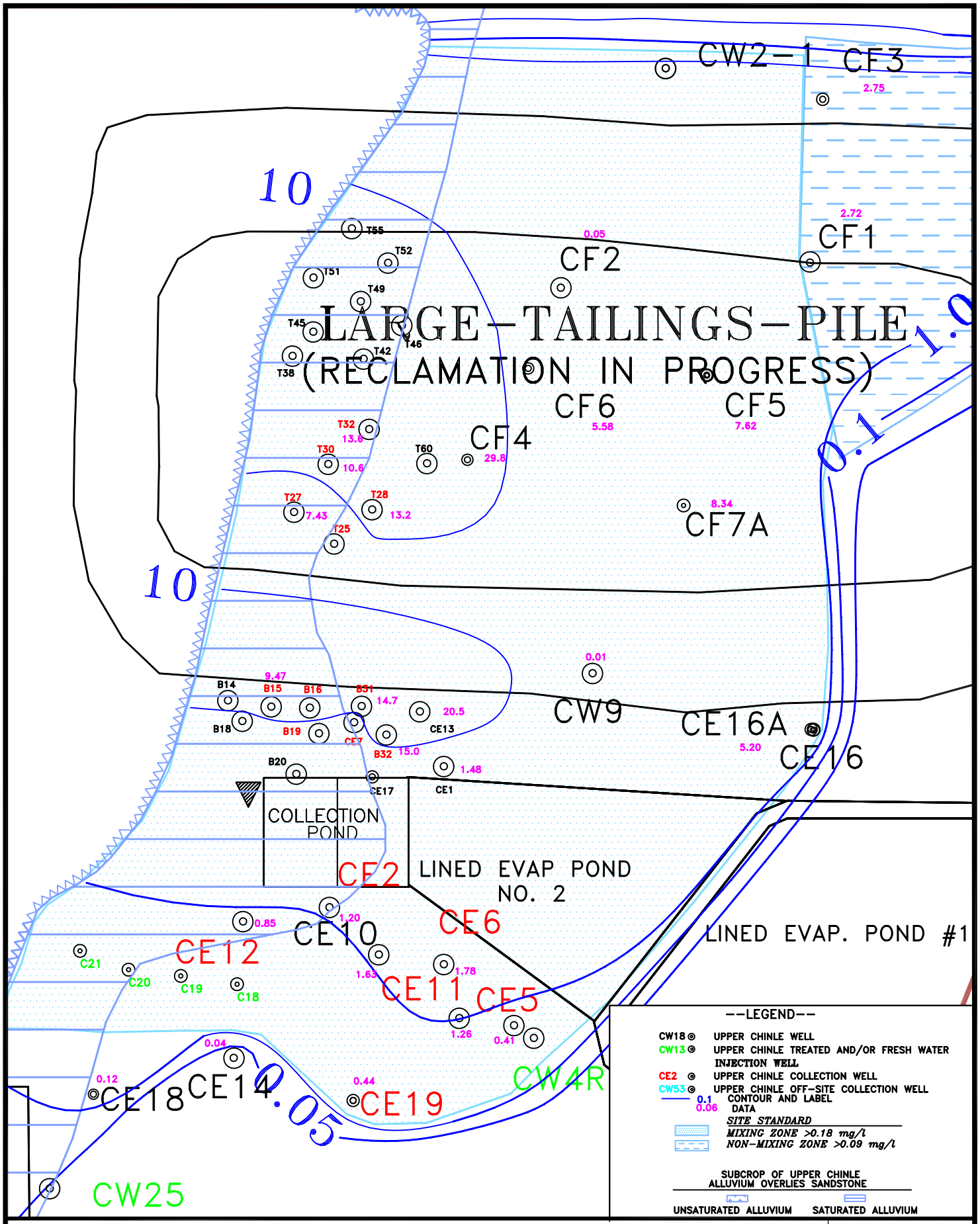


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'



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

DATE: 10/15/18

FIGURE 5.3-11A. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-22

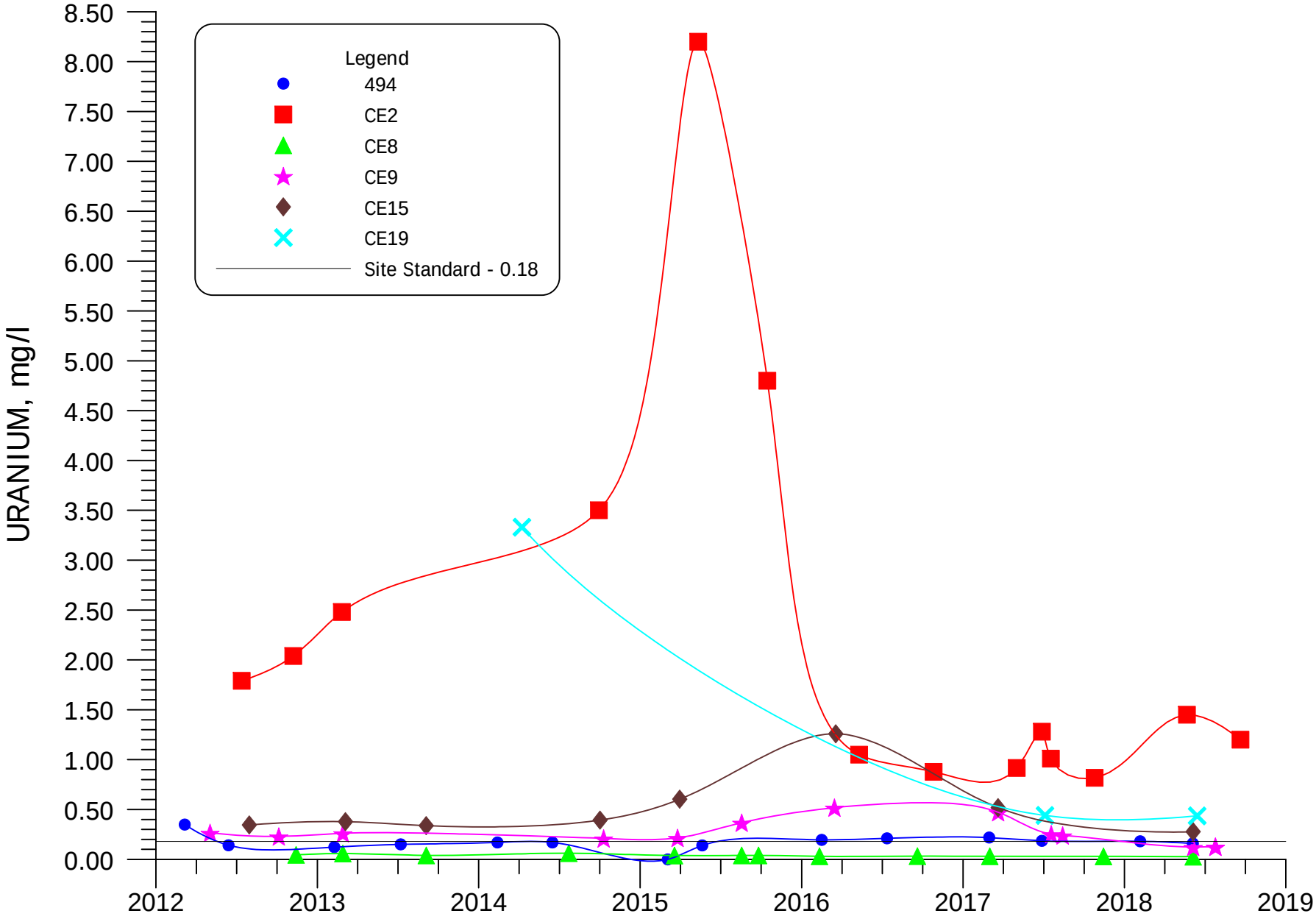


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

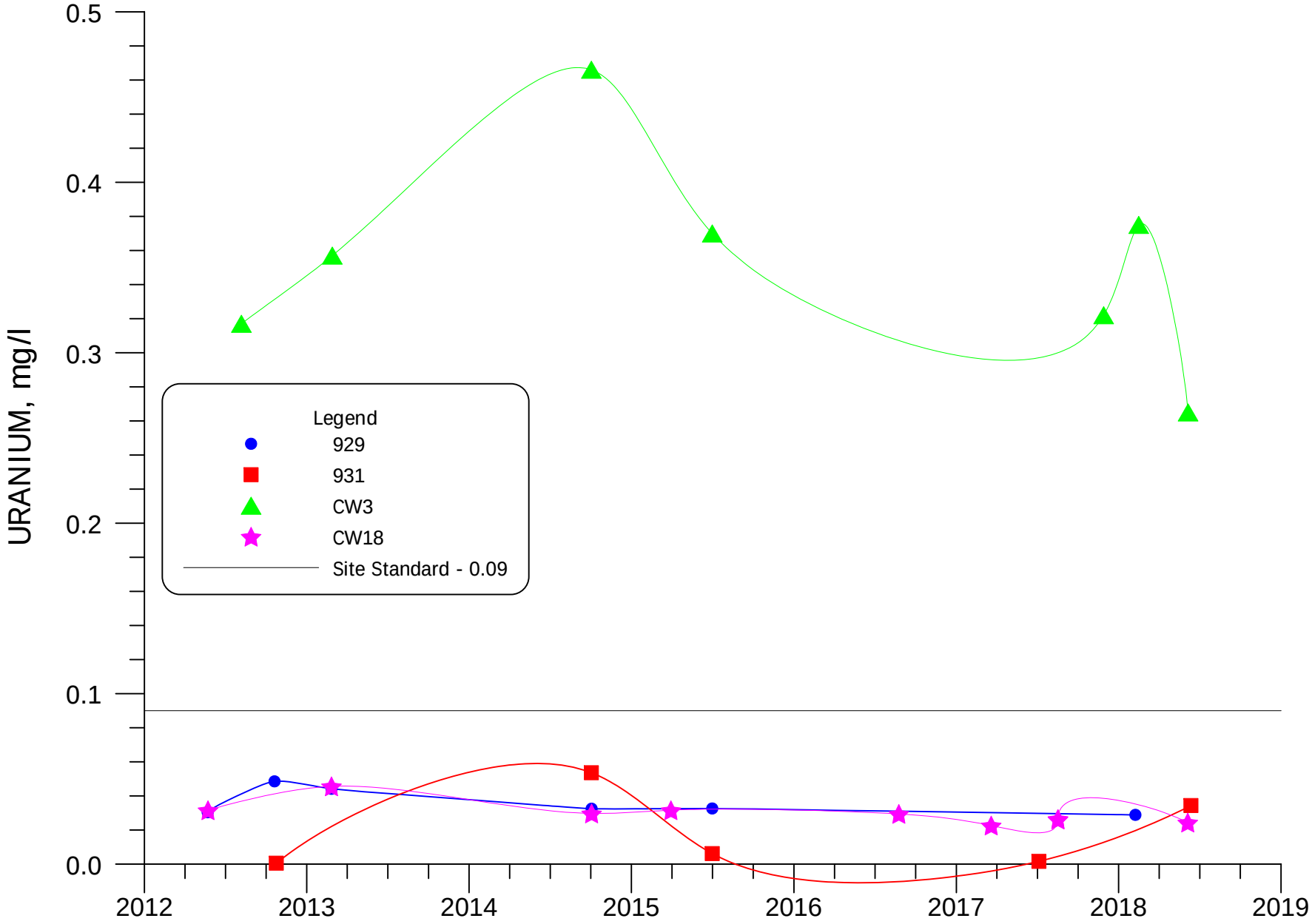
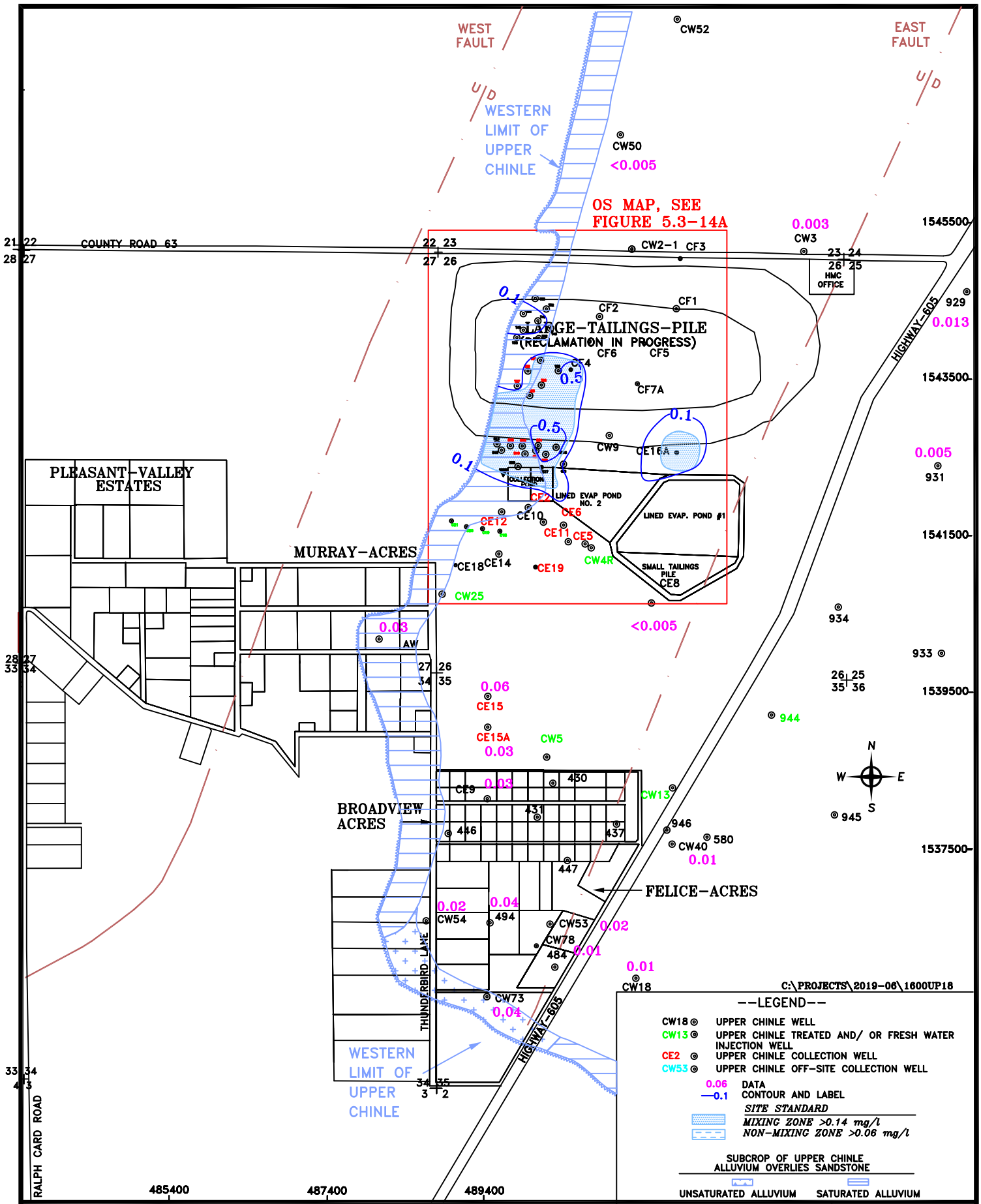


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18



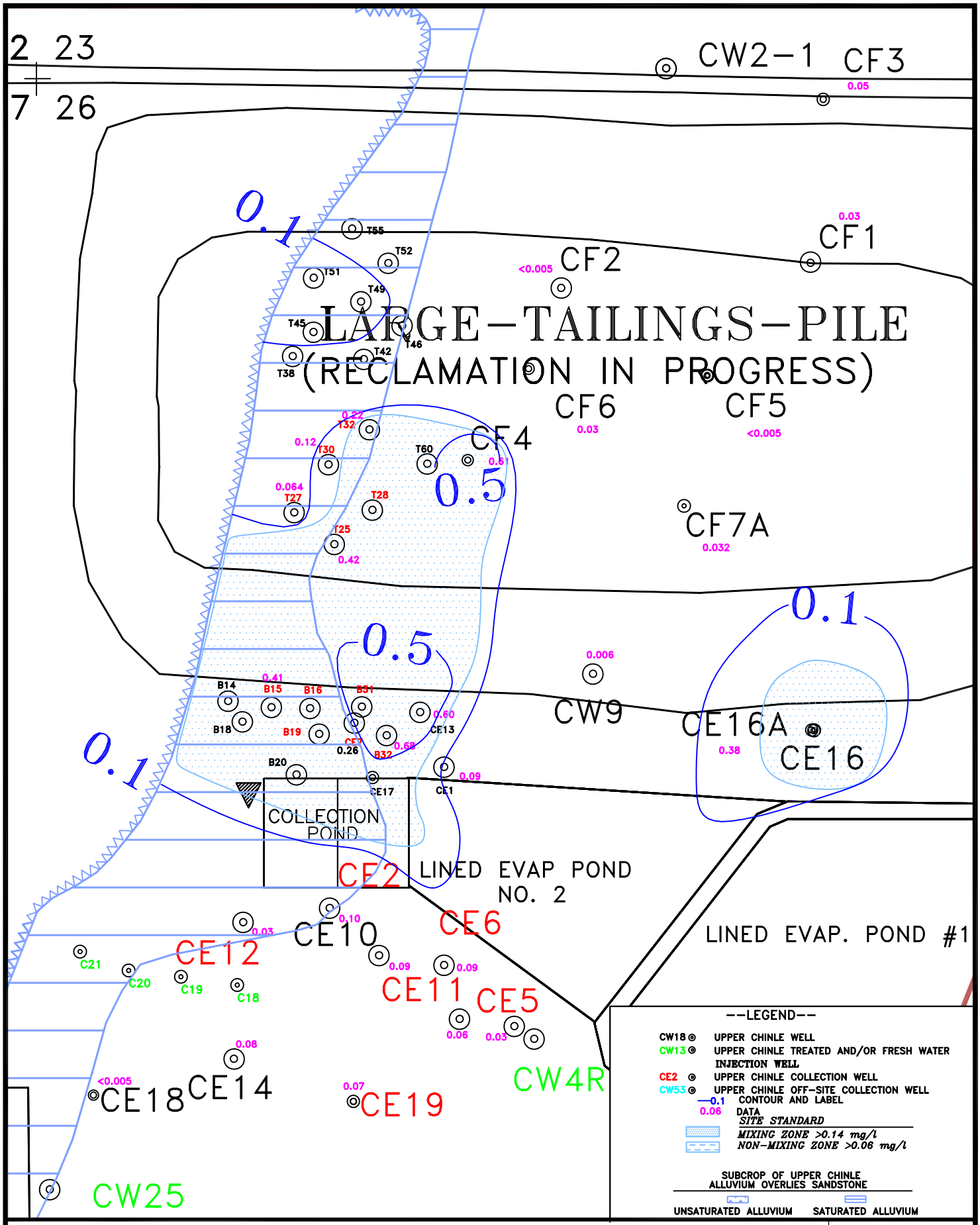
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-25



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

DATE: 1/11/2019

FIGURE 5.3-14A. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-26

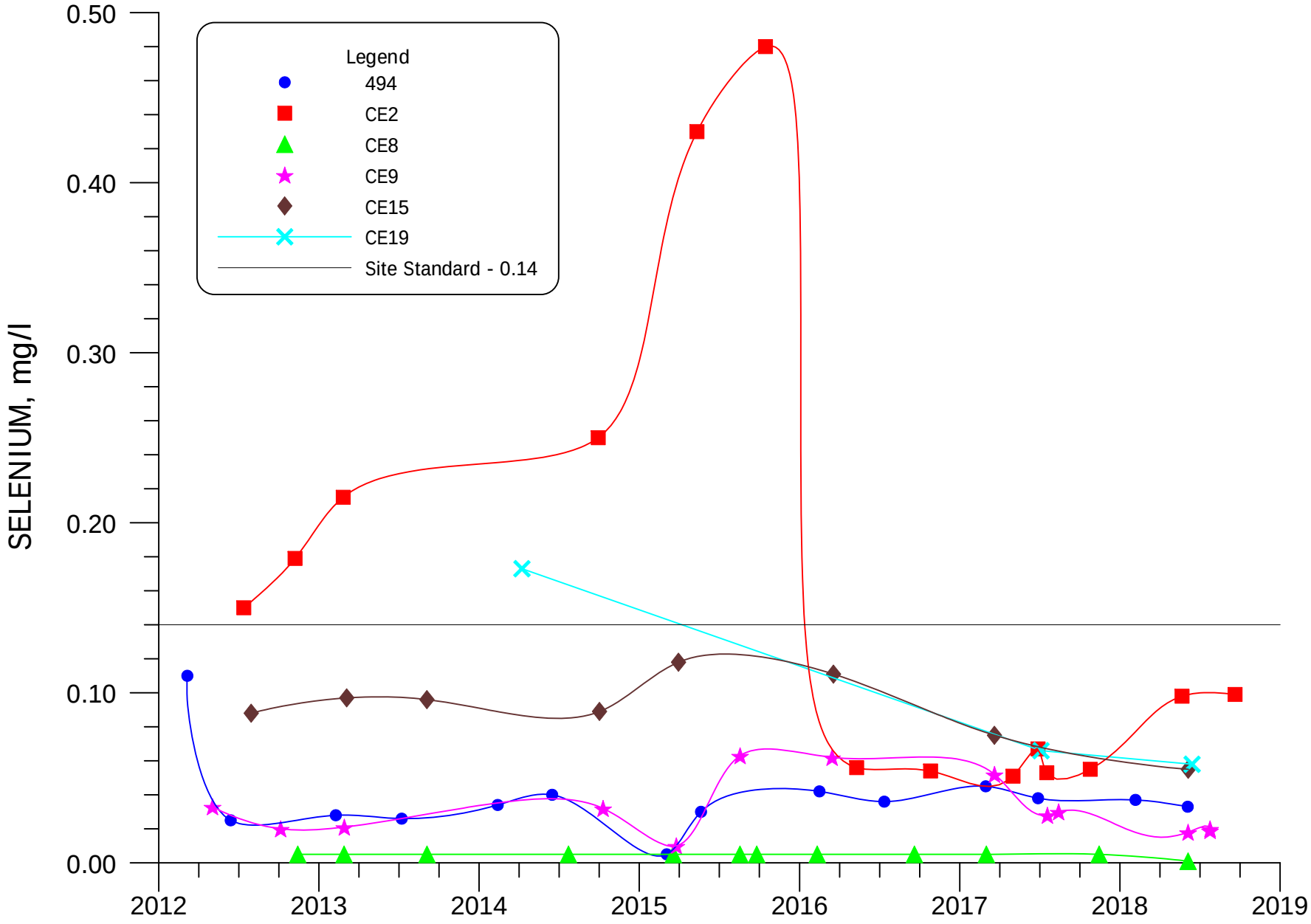


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

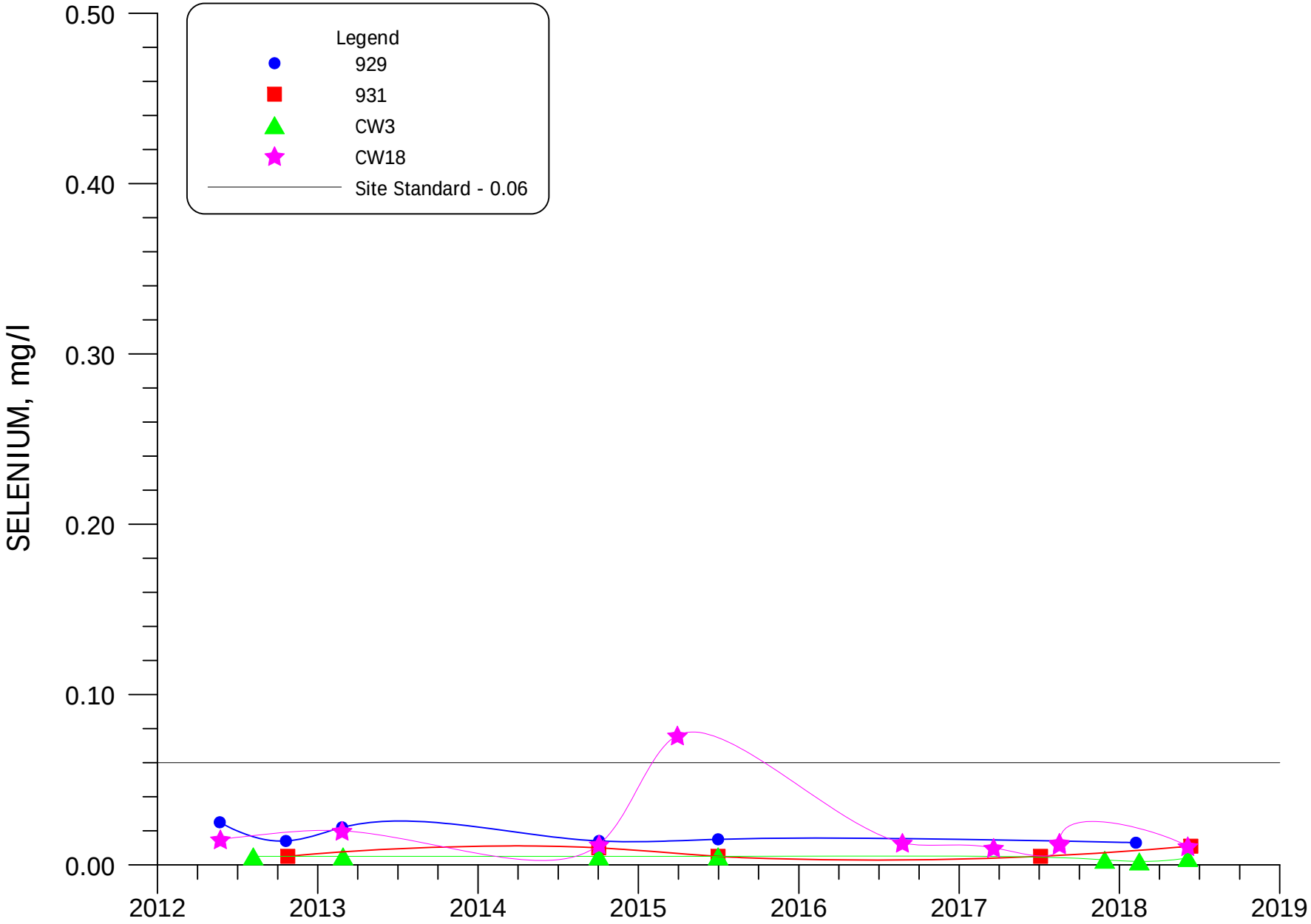
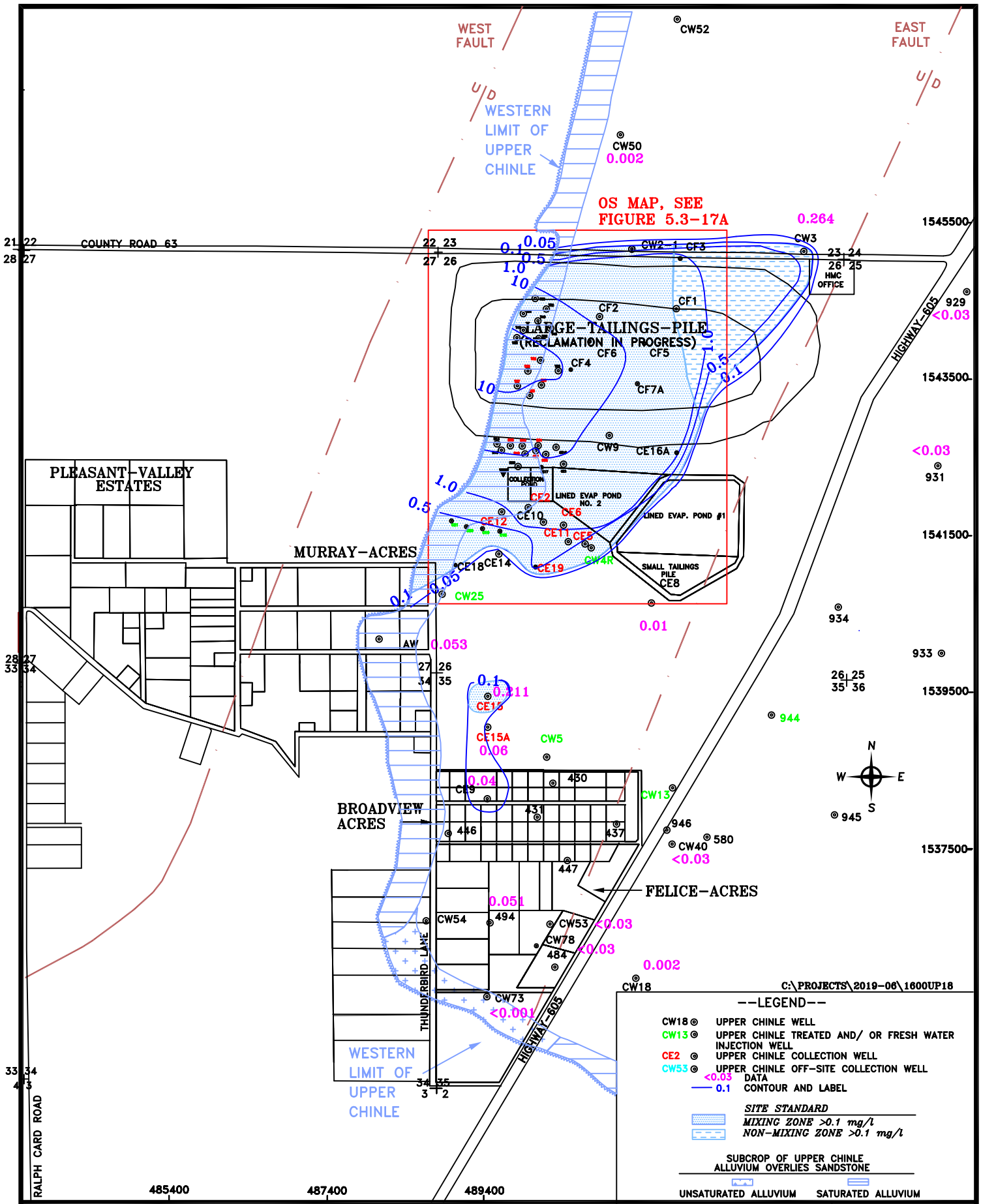


FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18



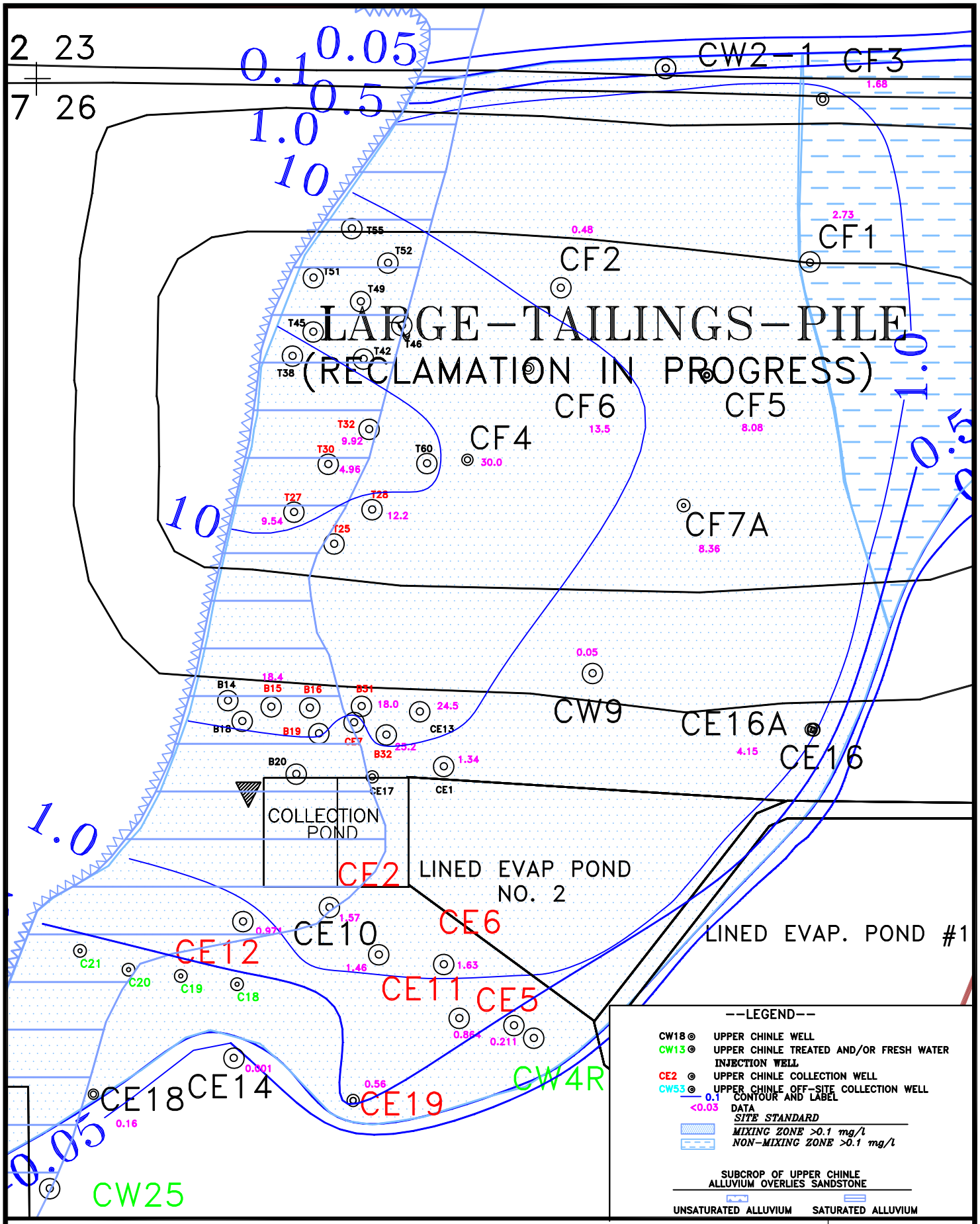
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/15/2019

FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-29



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

DATE: 1/11/2019

FIGURE 5.3-17A. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-30

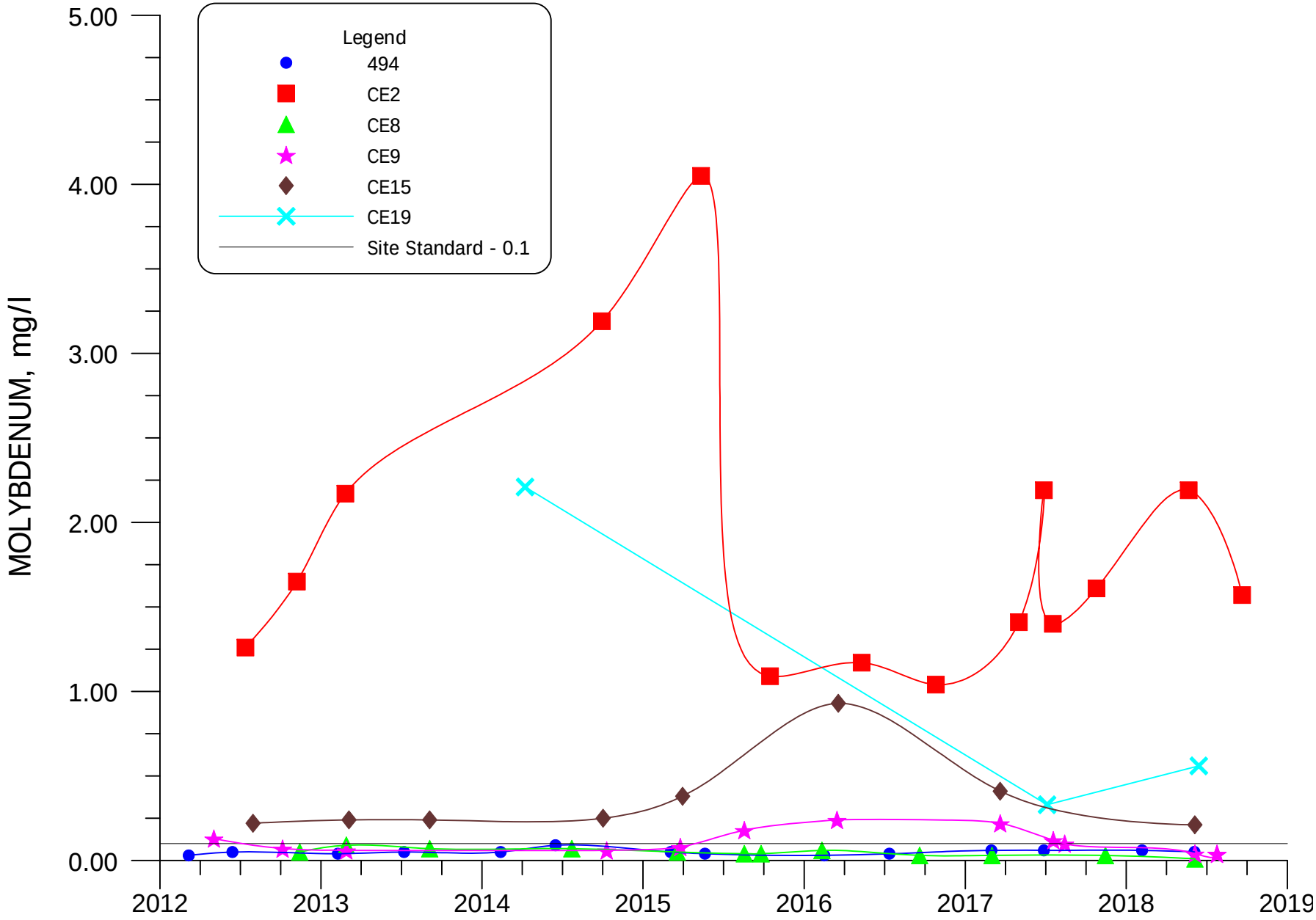


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

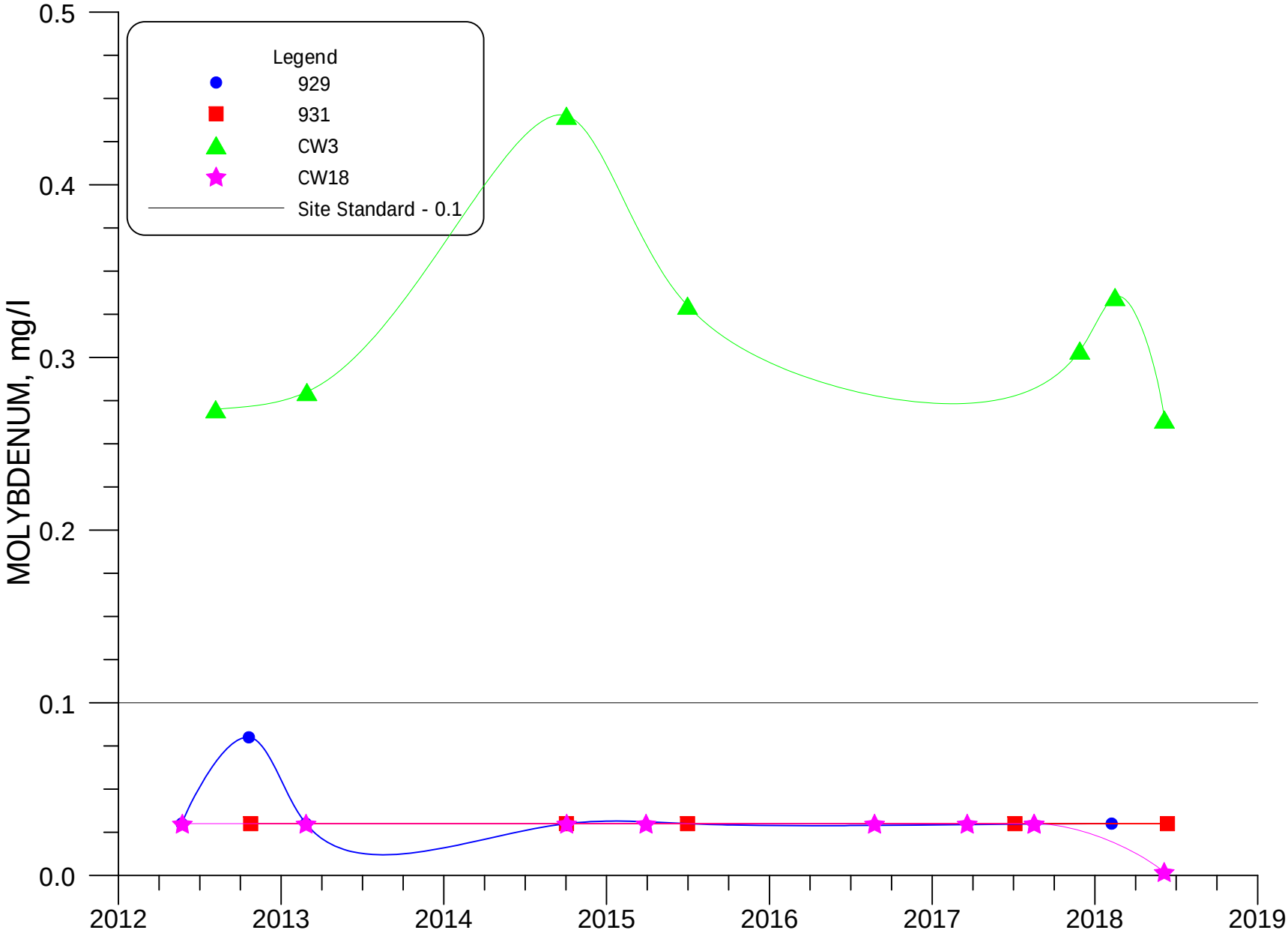
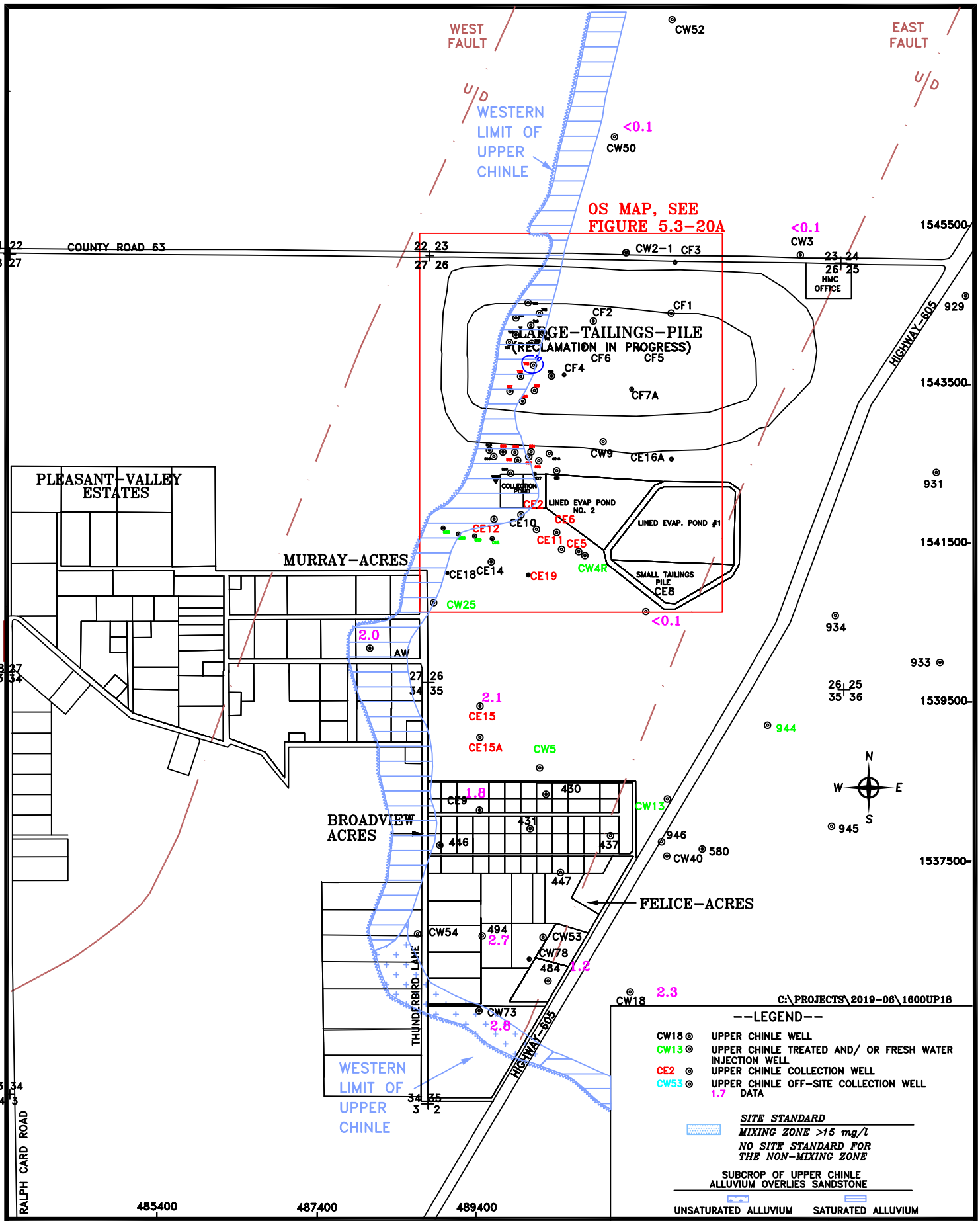


FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3 AND CW18



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

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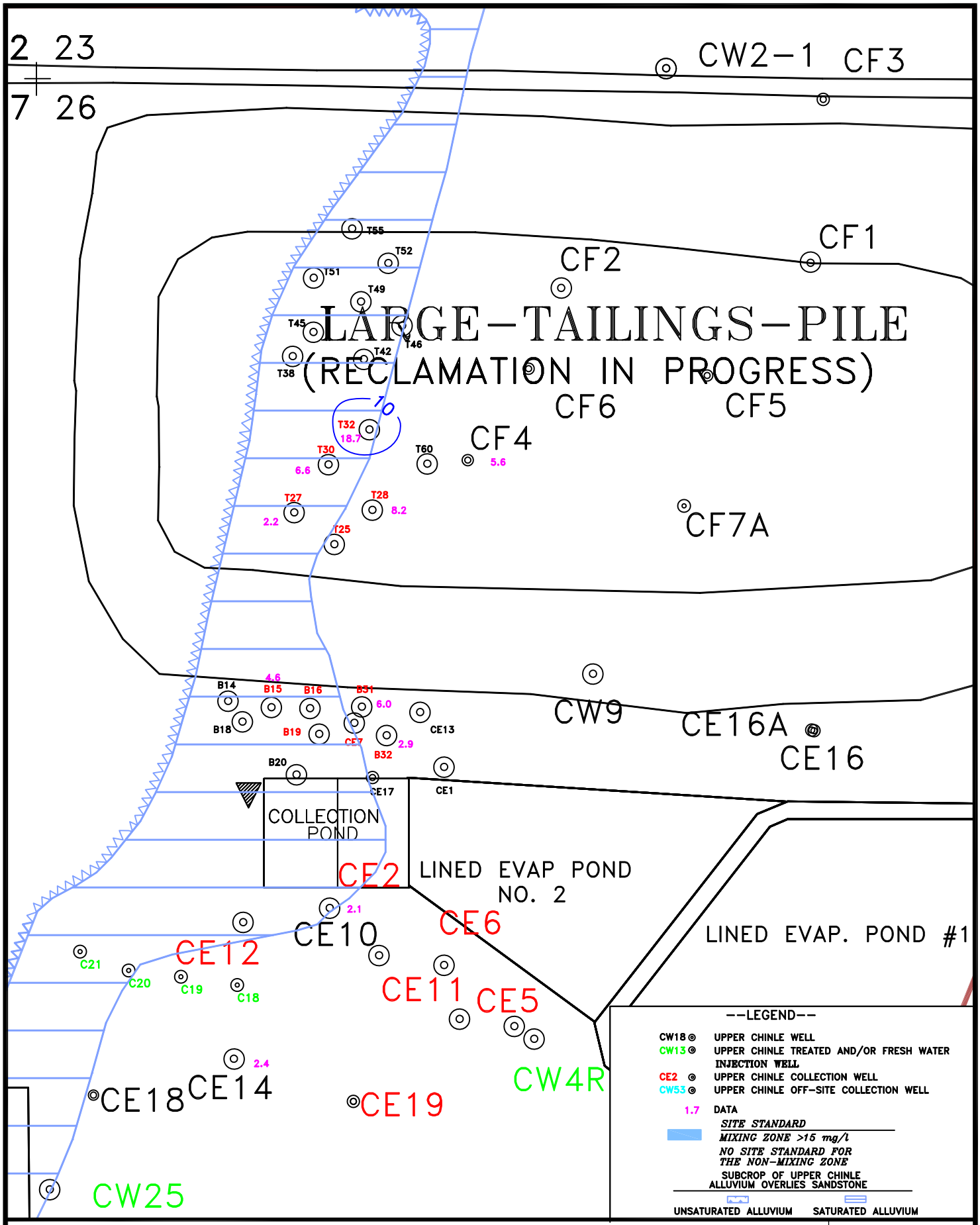
FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-33



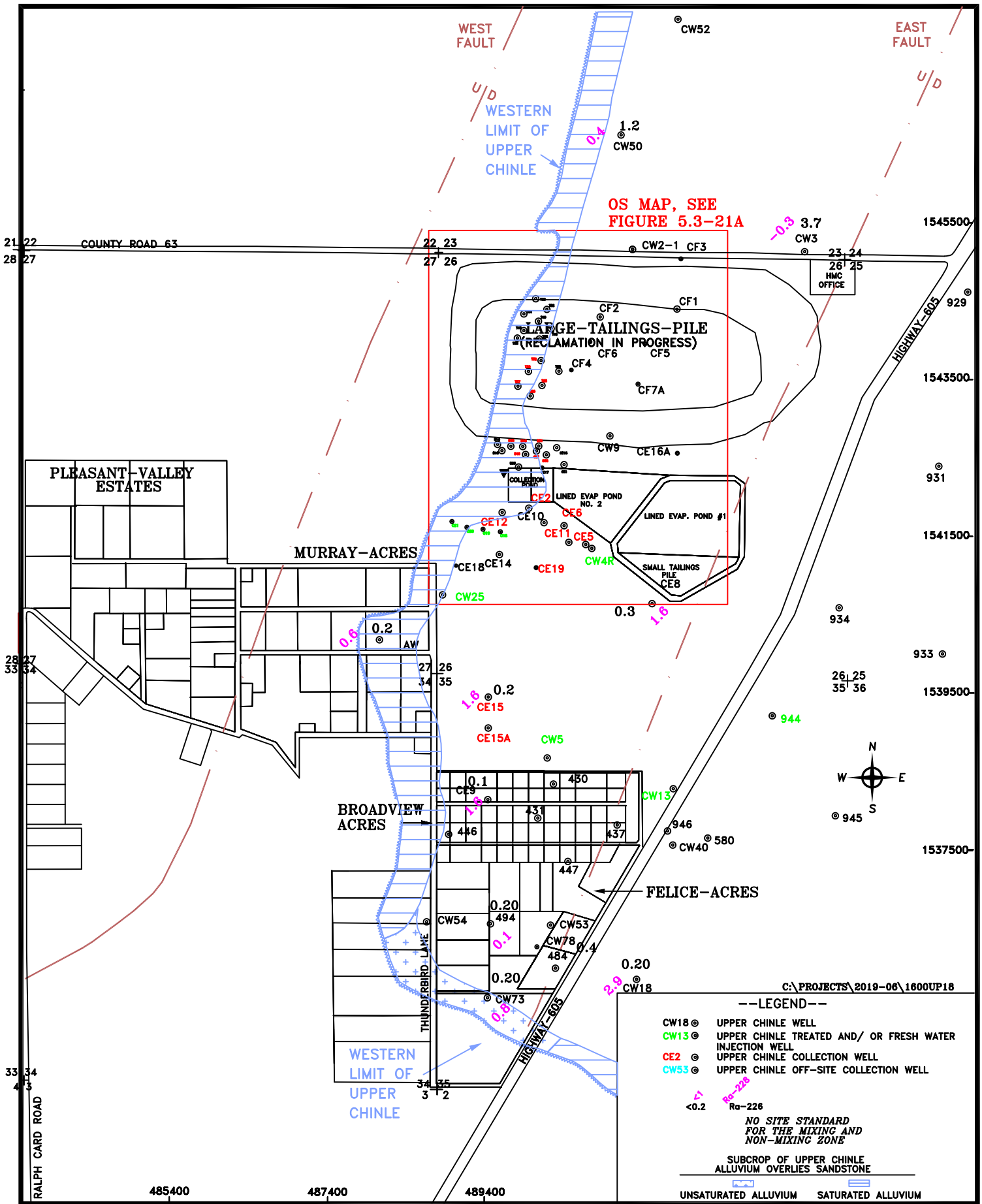
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/11/2019

FIGURE 5.3-20A. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, mg/l

SCALE: 1"= 500'

PAGE: 5.3-34



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, 2018, pCi/l

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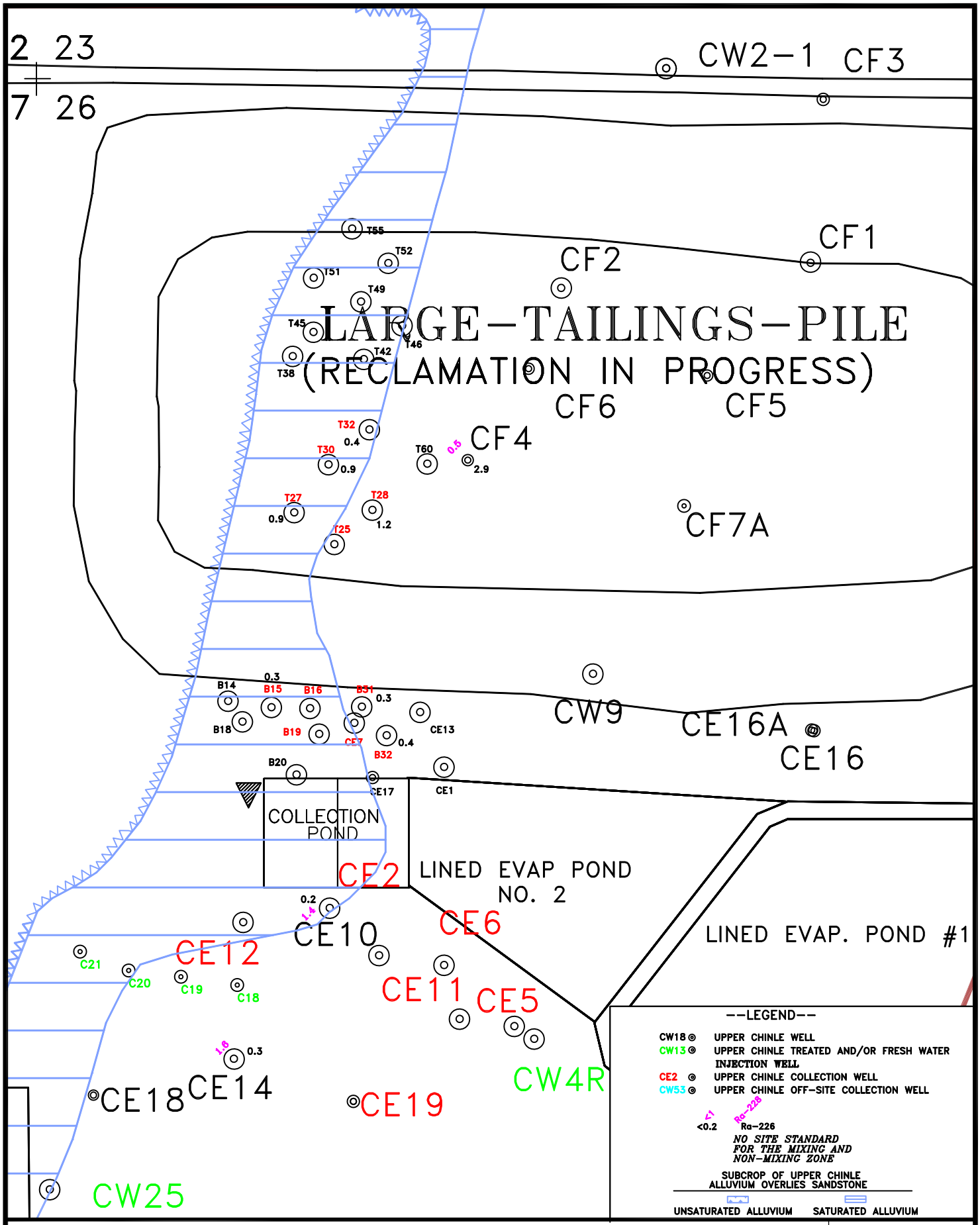
SCALE: 1"= 1600'

PAGE: 5.3-35



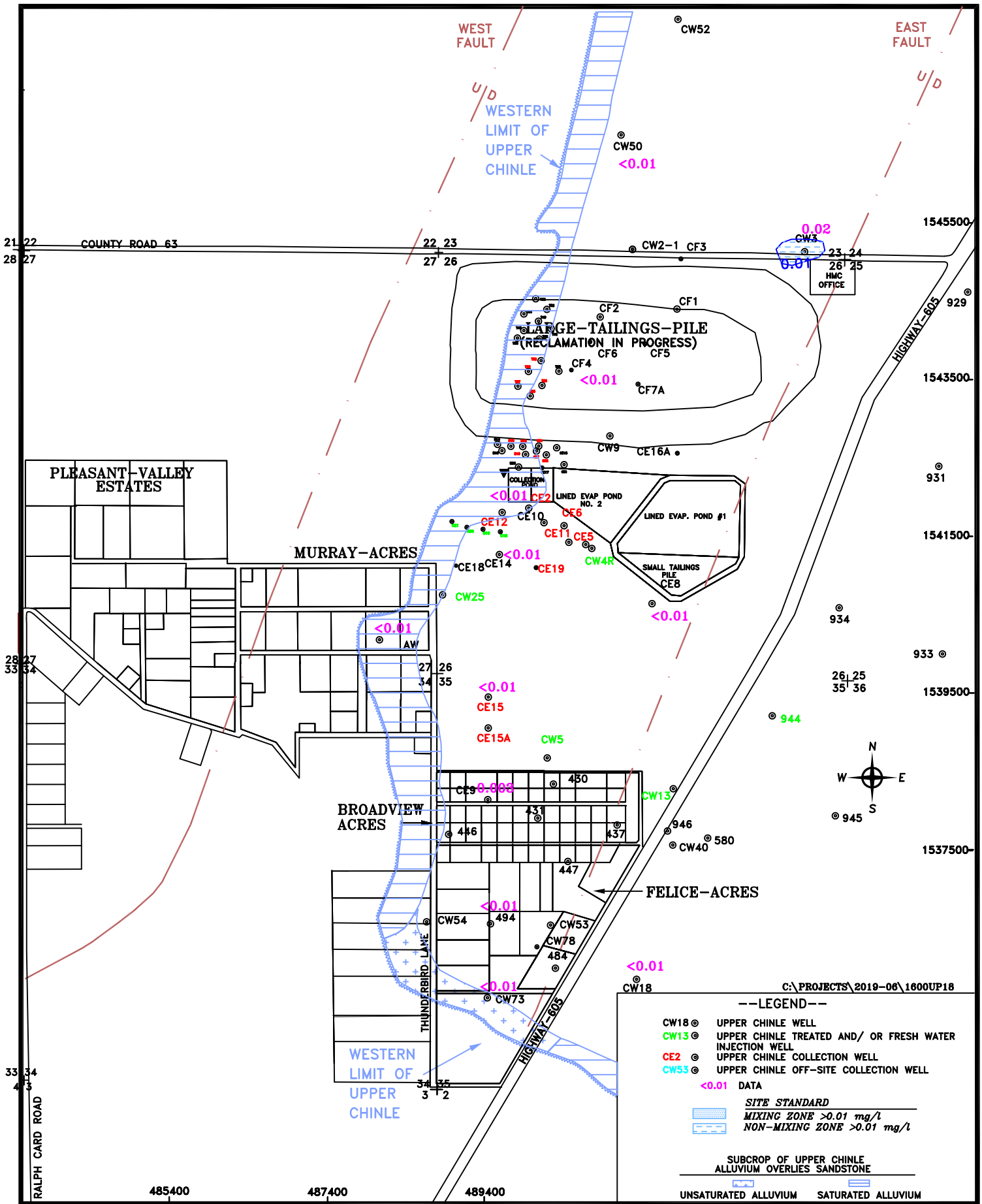
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/11/2019

FIGURE 5.3-21A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2018, pCi/l

SCALE: 1"= 500'

PAGE: 5.3-36



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

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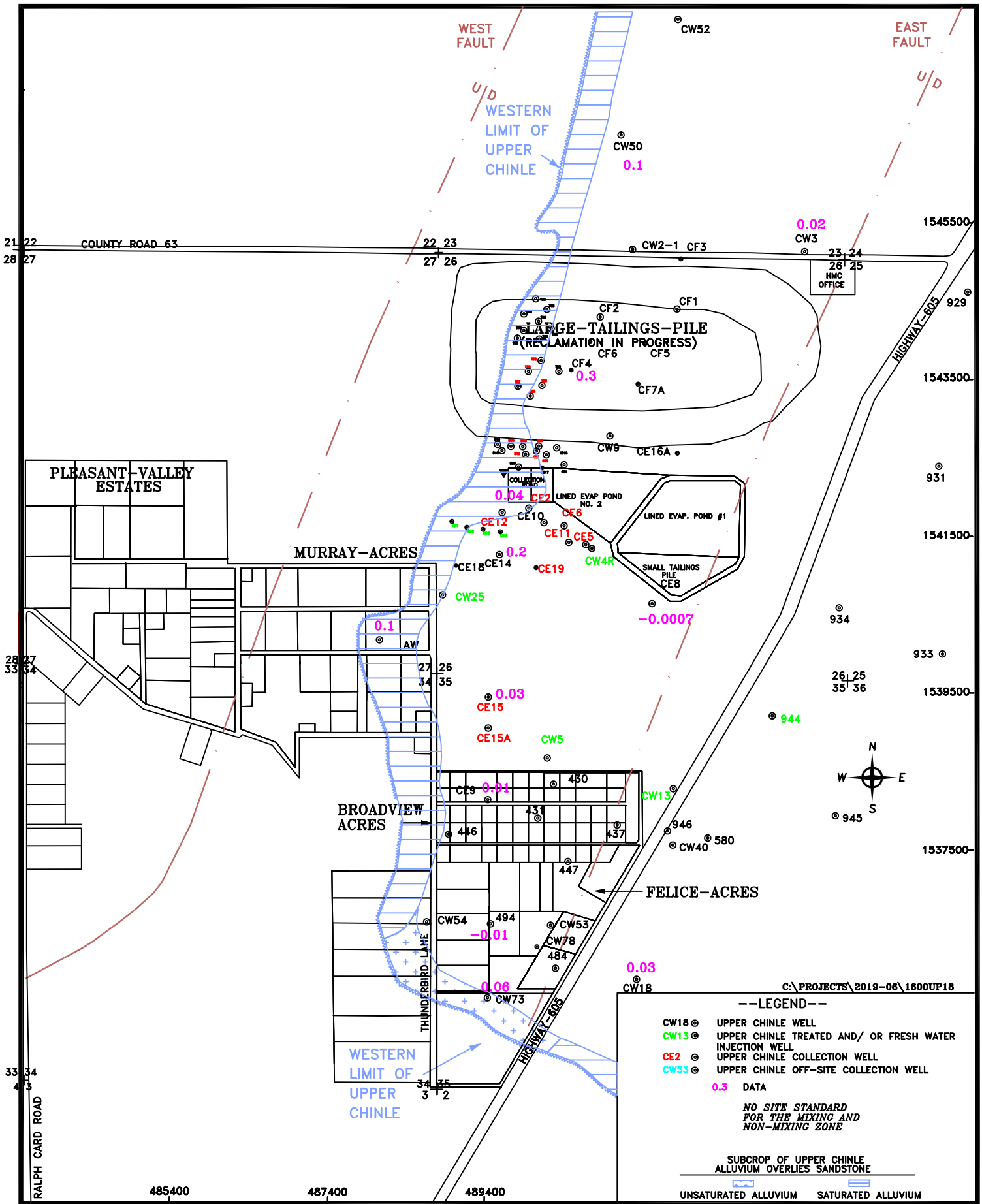
FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, mg/l

SCALE: 1"= 1600'

PAGE: 5.3-37



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

DATE: 1/15/2019

FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2018, pCi/l

SCALE: 1"= 1600'

PAGE: 5.3-38

TABLE 5.3-1. UPPER CHINLE SITE STANDARDS AND 2018 BACKGROUND UPPER CHINLE DATA

	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
CHINLE MIXING ZONE WELLS								
CW9	<0.005	0.011	0.05	599	251	31	-	-
CW50	<0.001	0.025	0.002	1620	878	60	<0.1	-
CW52	-	-	-	-	-	-	-	-
CW15	0.01	0.028	<0.03	1590	824	29	-	-
CW24	0.04	0.12	<0.03	3150	1820	74	-	-
CW35	0.066	0.175	0.004	2340	1310	68	2.6	-
CW36	<0.001	0.009	0.003	1570	806	84	-	-
CW37	0.067	0.028	<0.03	1940	1070	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.041	0.045	0.001	2610	1370	225	8.2	-
UPPER CHINLE NON-MIXING ZONE WELLS								
931	0.011	0.034	<0.03	1830	702	197	-	-
934	-	-	-	-	-	-	-	-
CW18	0.011	0.024	0.002	1920	718	211	2.3	-

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

SECTION 6

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GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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6.2 MIDDLE CHINLE WATER LEVELS 6.2-1
6.3 MIDDLE CHINLE WATER QUALITY AND SITE STANDARDS 6.3-1
6.3.1 SULFATE - MIDDLE CHINLE 6.3-2
6.3.2 TOTAL DISSOLVED SOLIDS - MIDDLE CHINLE 6.3-3
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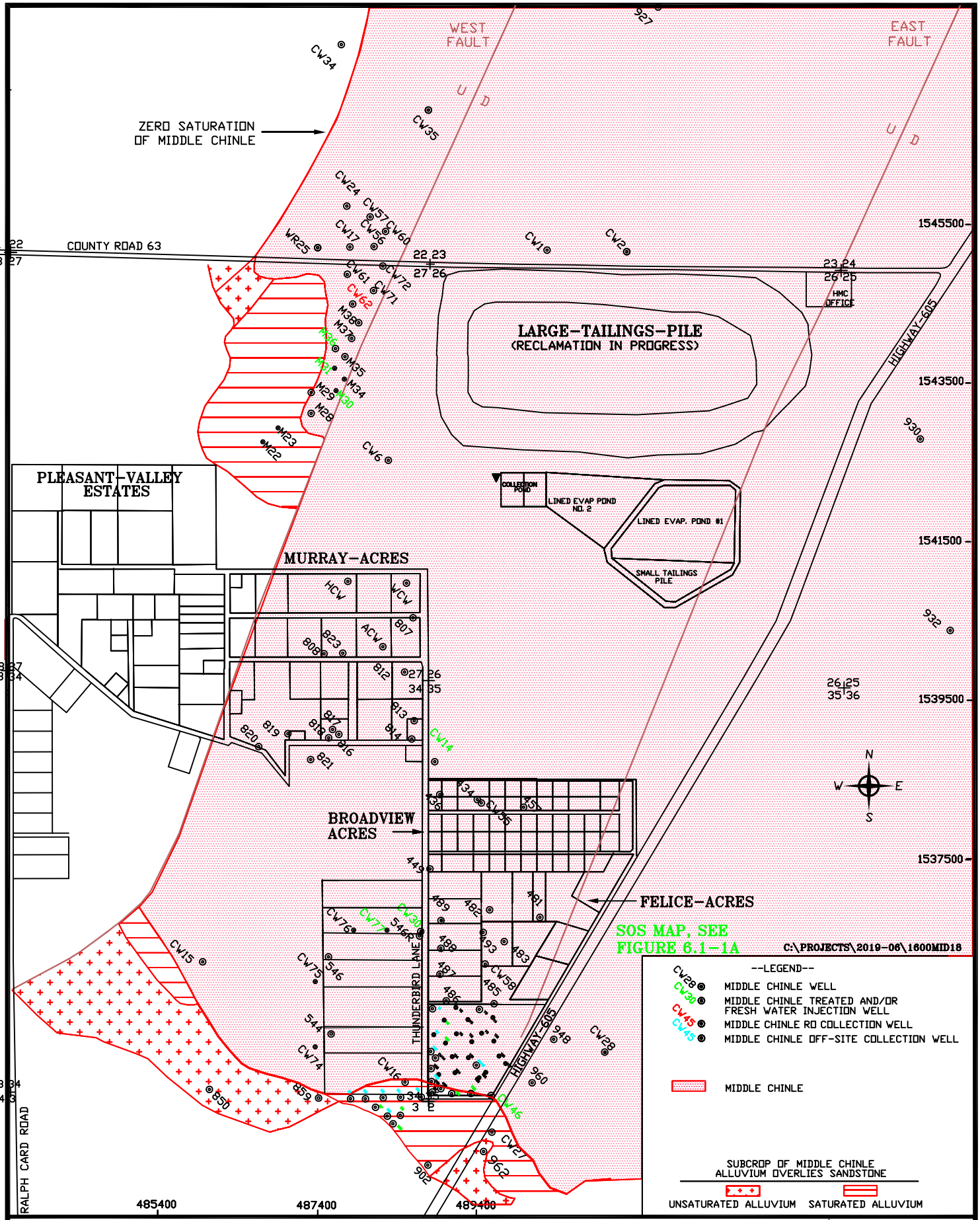
6.0 MIDDLE CHINLE AQUIFER MONITORING

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 groundwater 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 2018.

Wells CW14, CW30, CW46, CW77, M30, M31, M36, R6, R7, R12, Y6, Y12, Y33 and Y34 were used for treated and/or fresh-water injection in 2018. Middle Chinle wells CW45, R1, R2, R3, R4, R5, R11, Y1, Y7, Y13 and Y23 were used as South collection wells in 2018 for the zeolite treatment process. Well CW62 was used as an On-site Middle Chinle collection well to the R.O. plant in 2018.



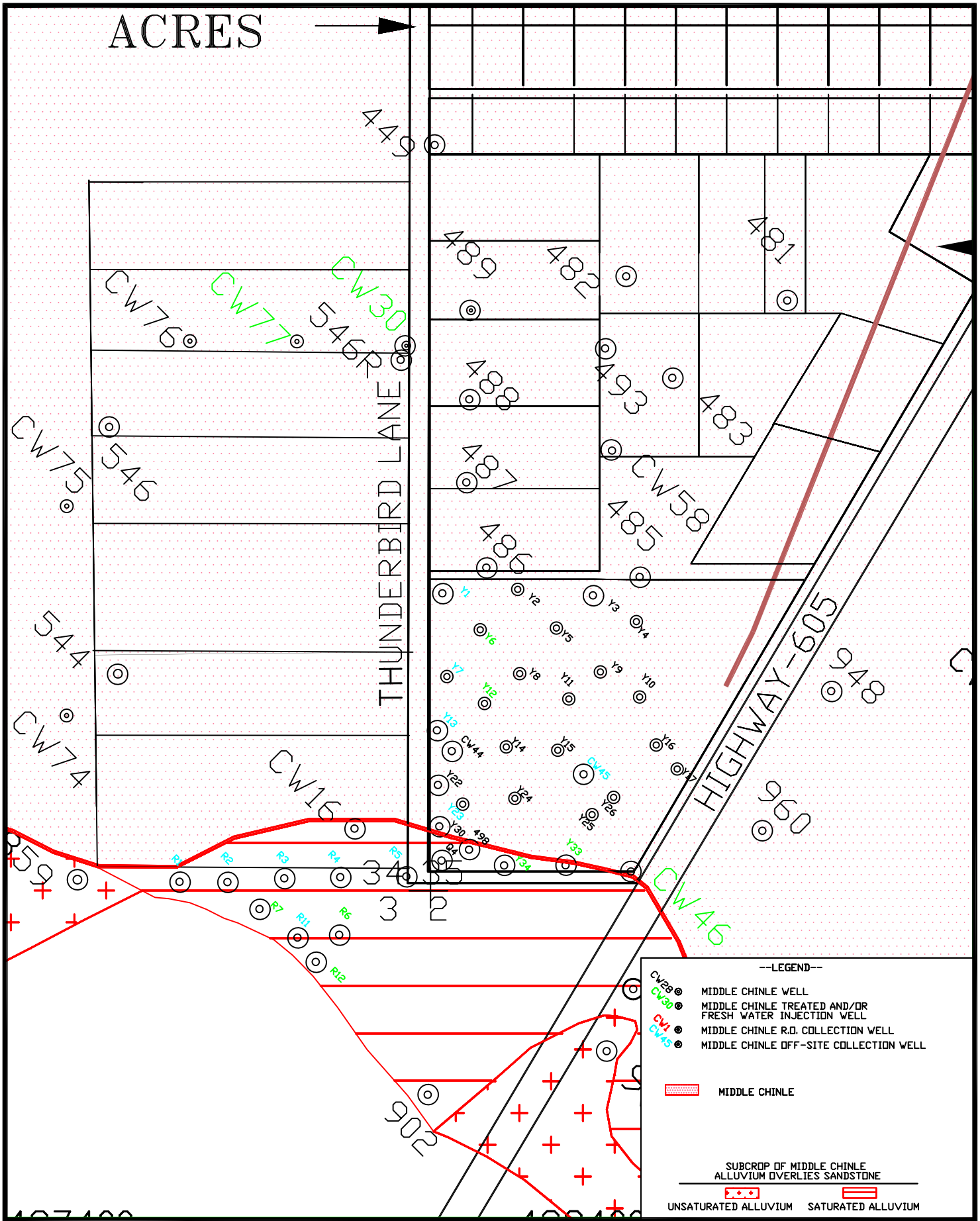
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

6.1-1 LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, 2018

DATE: 1/11/2019

SCALE: 1"=1600'

PAGE: 6.1-2



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

DATE: 9/17/18

6.1-1A. LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2018

SCALE: 1"=500'

PAGE: 6.1-3

6.2 MIDDLE CHINLE WATER LEVELS

Water levels in Homestake's Upper, Middle and Lower Chinle wells are presented in Appendix A. Fall 2018 water-level elevation contours for the Middle Chinle aquifer are presented on Figures 6.2-1 and 6.2-1A. The hydraulic gradient in the Middle Chinle aquifer is steeper in its alluvial subcrop area in the southern portion of Felice Acres in the Y well area. A depression from pumping Middle Chinle South Collection wells Y1, Y7, Y13 and Y23 extends 1000 feet to the northeast of collection well Y1 in the fall of 2018. 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 groundwater flow in the Middle Chinle aquifer. Flow on the east side of the East Fault is toward well CW28 near the East Fault.

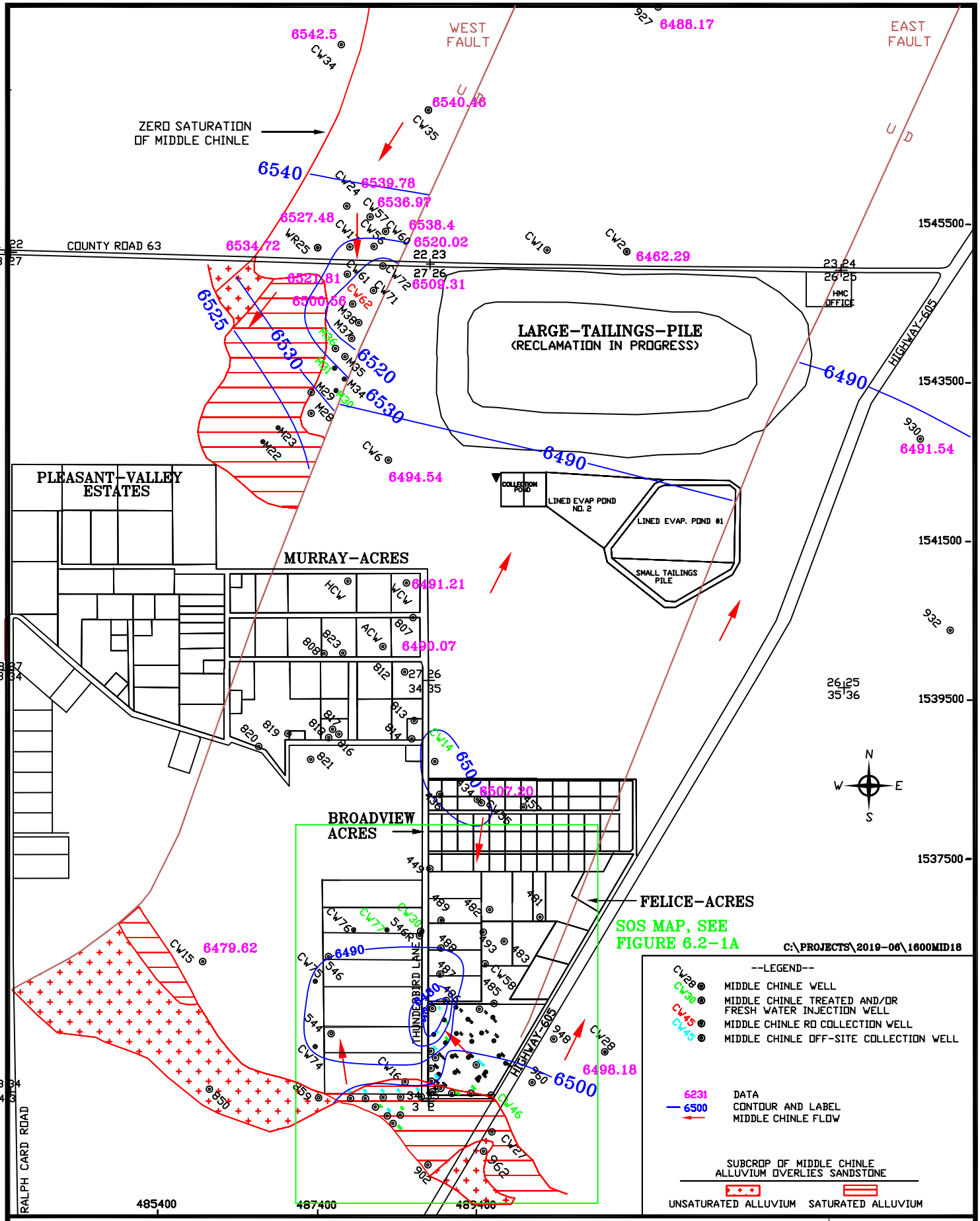
Groundwater flow west of the West Fault in the Middle Chinle aquifer is mainly to the southwest, and it discharges into the alluvial aquifer. The offset of the Middle Chinle sandstone by the faults causes the Middle Chinle aquifers to act as separate aquifers on each side of the faults with significant difference in water-level elevations. 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 through 2018. The remainder of the Middle Chinle aquifer is recharged by the alluvial aquifer south of Felice Acres.

The injection of treated and/or fresh water into wells CW14 (north of Broadview Acres) and wells CW30 and CW77 (west of Felice Acres) has created groundwater mounds in their respective areas. These mounds cause the groundwater 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 groundwater is not readily connected on each side of these faults.

Figure 6.2-2 shows the locations of the Middle Chinle wells that are used to monitor water-level changes with time. The colors and symbols used on this figure are the same as those used on the water-level elevation time plots. Figure 6.2-3 presents the water-level elevation changes versus time in Middle Chinle wells 493, CW28, CW45, CW58, CW75 and CW76.

Water levels in well CW75 did not decline as much as they did in well CW76, indicating smaller transmitting ability in the Middle Chinle in the area of well CW75 than in the area of well CW76. Pump test on these two wells show that well CW76 will yield a much higher rate than well CW75.

The water-level plots for the Middle Chinle wells located west of the West Fault and wells CW2 and ACW are presented on Figure 6.2-4. Water levels had been gradually increasing in the Middle Chinle aquifer west of the West Fault but the CW62 pumping in 2016 through 2018 caused the water levels in the Middle Chinle aquifer west of the West Fault to decline. Water levels declined and rose in Middle Chinle well ACW in 2018, which is thought to be due variations in the South Felice Acres pumping. Water levels are expected to continue to gradually decrease in wells ACW and CW2 as a result of the South Felice pumping in the future. As expected, the pumping of well CW62 west of the West Fault did not cause any drawdown in water level in well CW2 which is situated east of the West Fault.



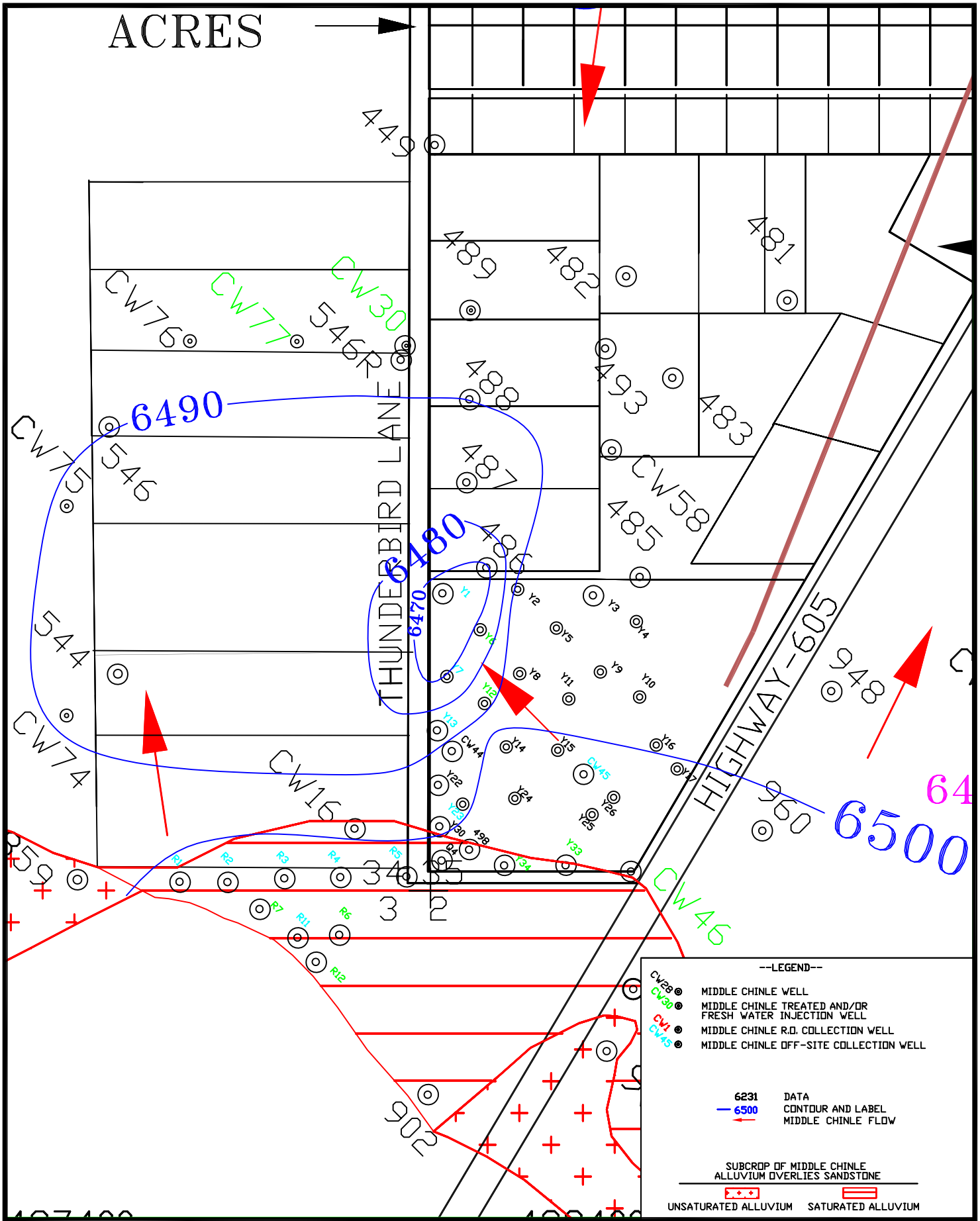
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2018, FT-MSL

DATE: 1/11/2019

SCALE: 1"=1600'

PAGE: 6.2-3



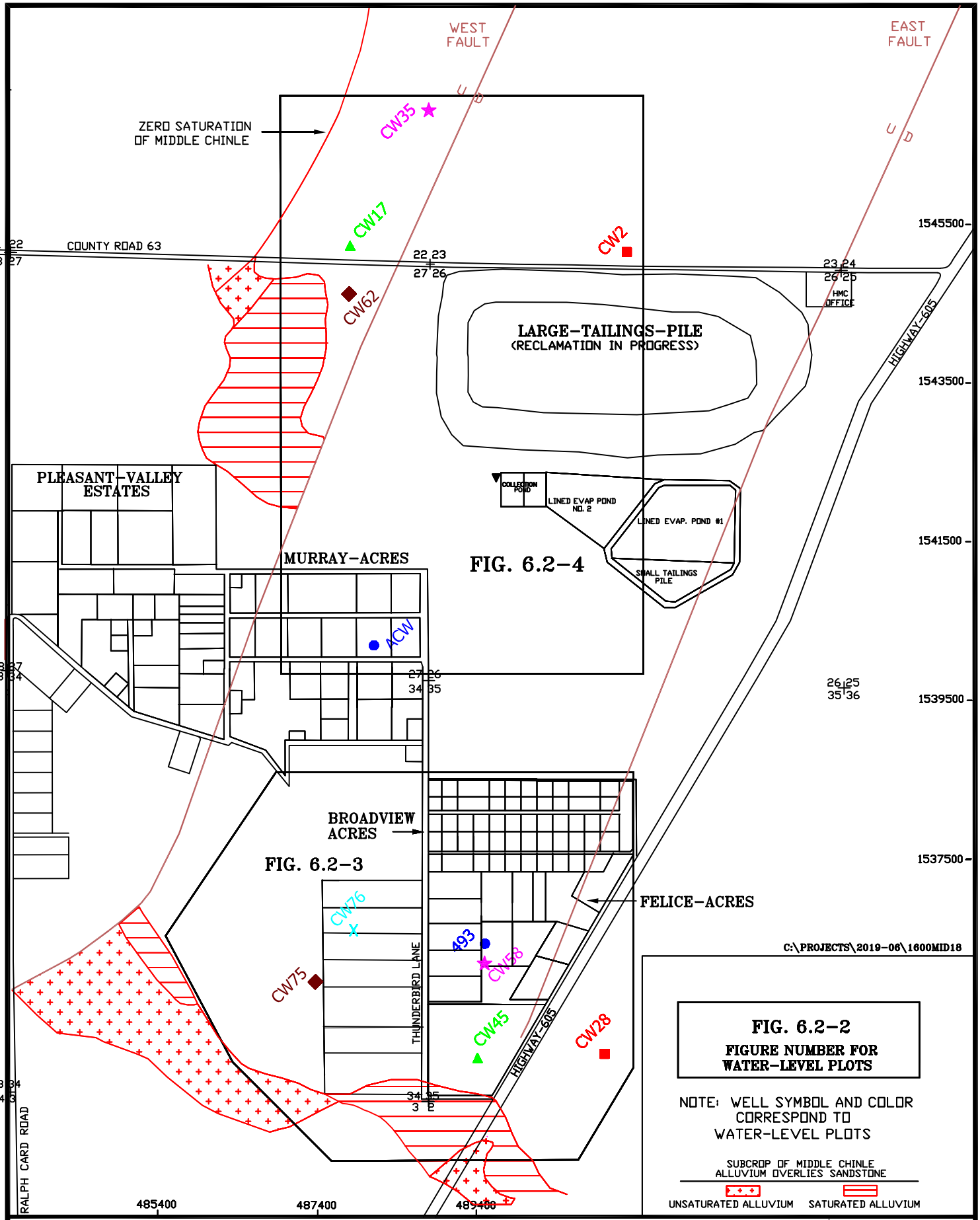
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.2-1A. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2018, SOS, FT-MSL

DATE: 1/11/2019

SCALE: 1"=500'

PAGE: 6.2-4



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

DATE: 1/11/2019

SCALE: 1"=1600'

PAGE: 6.2-5

FIGURE 6.2-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-LEVEL PLOTS, 2018

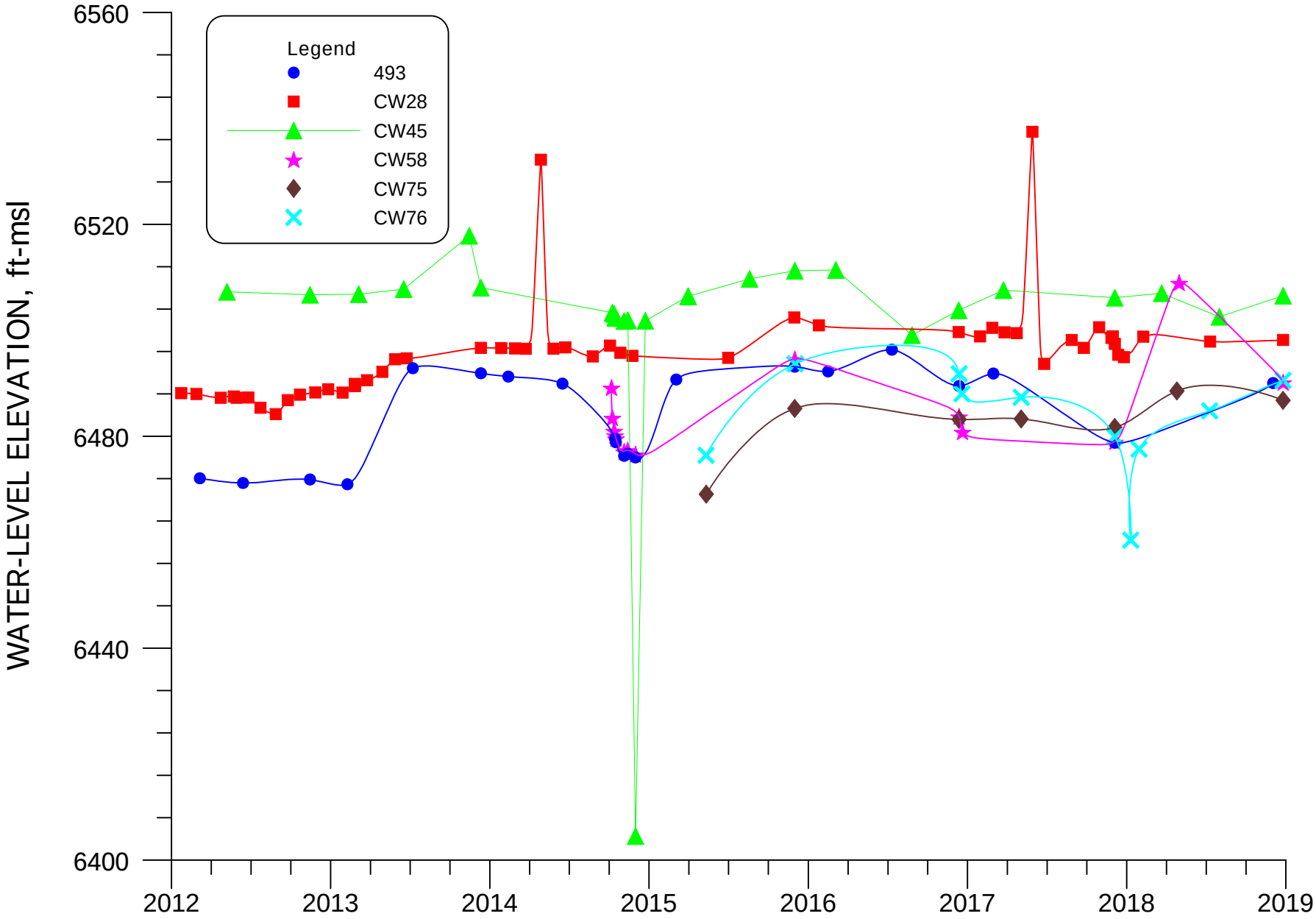


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, CW28, CW45, CW58, CW75 AND CW76

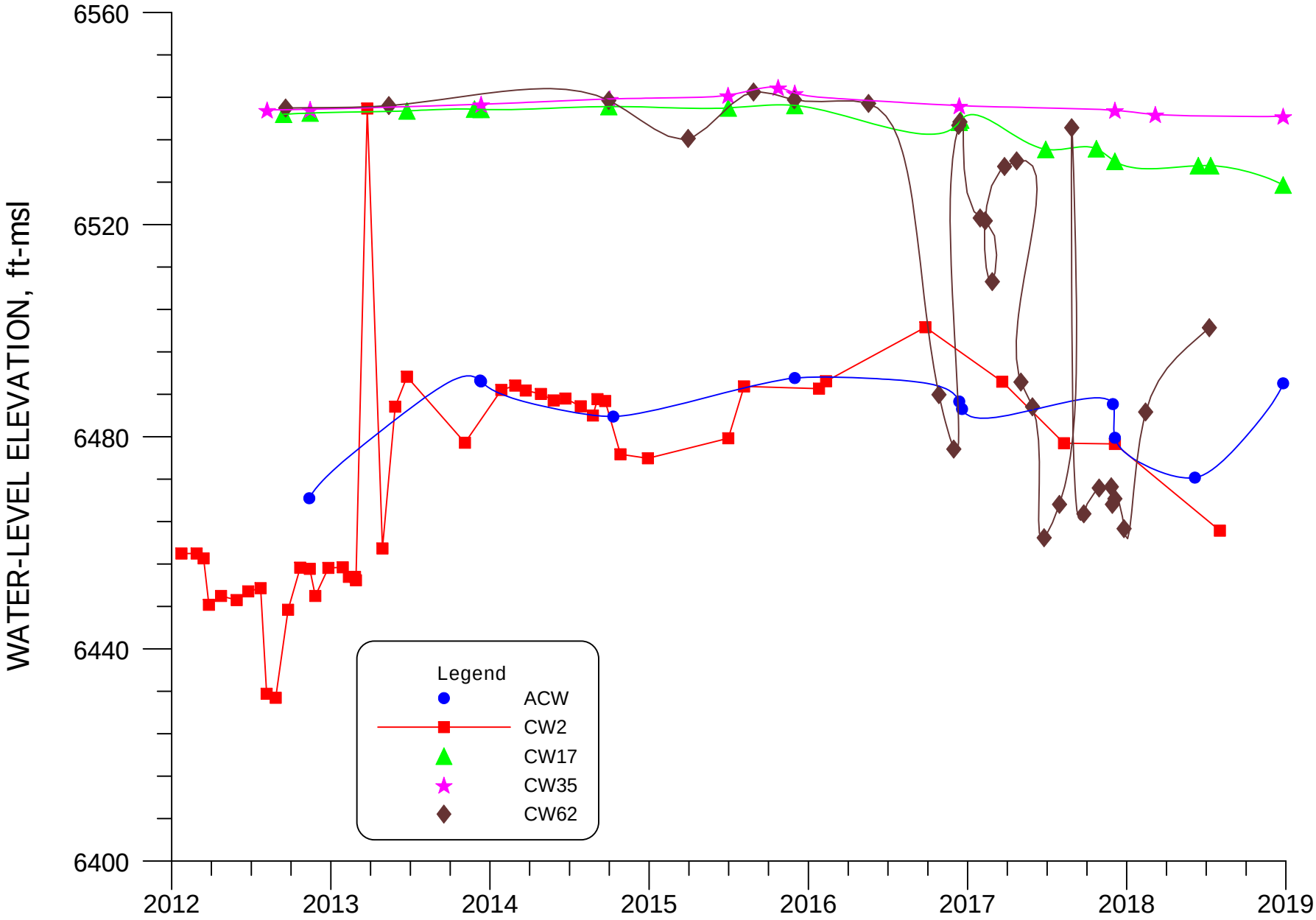


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS ACW, CW2, CW17, CW35, AND CW62

6.3 MIDDLE CHINLE WATER QUALITY

The 2018 water-quality data for Homestake's Middle Chinle aquifer wells is presented with the other Chinle aquifer wells in Tables B.5-1 and B.5-2 of Appendix B. The Chinle aquifer water-quality results for subdivision wells are also presented in these tables. The basic well data for the Middle Chinle aquifer wells is presented in Tables 5.1-1 through 5.1-4 in the Upper Chinle aquifer monitoring section (Section 5). Several Middle Chinle wells were sampled in 2018 to further define the concentration changes in the Middle Chinle aquifer.

The Middle Chinle wells used in establishing the Chinle site standards are shown on Figure 6.3-1 with a blue box around the well name showing which Middle Chinle wells were used to define the non-mixing zone site standard. The yellow pattern on this figure shows the mixing zone for the Middle Chinle aquifer. The Middle Chinle wells used in conjunction with the Upper and Lower Middle Chinle wells (see Figures 5.3-1 and 7.3-1 for the Upper and Lower Chinle wells respectively used) in establishing the mixing zone site standards are shown with a red box around their well names. Table 6.3-1 presents Chinle mixing zone site standards and the non-mixing zone Middle Chinle site standards. This table also presents the 2018 data for the Chinle mixing zone wells and the Middle Chinle non-mixing zone wells.

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 2018 are within the site standard except for four wells west of the West Fault which are slightly above the standard. Likewise, five TDS concentrations in the Middle Chinle aquifer in 2018 exceed the site standard west of the West Fault. Uranium concentrations are above site standards in western Broadview Acres and Felice Acres and west of the West Fault. The concentrations in well CW35 in the northern portion of the Middle Chinle west of the West Fault are natural due to the groundwater flow to the south in this area. Uranium concentrations in well CW35 have been slightly above the site standard at times in the past. Selenium concentrations also exceed the site standard in one Felice Acres area well and four wells west of the West Fault. The only significant molybdenum concentrations identified in the Middle Chinle aquifer are in wells that are west of the West Fault.

6.3.1 SULFATE - MIDDLE CHINLE

Figures 6.3-1A and 6.3-1B present sulfate concentration contours for the Middle Chinle aquifer for 2018 and the sulfate site standard concentrations are given in the legend of these figures. Figure 6.3-1A presents sulfate concentrations of the Middle Chinle wells in south Felice Acres and the R collection wells in the northeast portion of Section 3. All mixing-zone sulfate concentrations in the Middle Chinle aquifer are below the site standard of 1750 mg/l except for four wells west of the West Fault. Sulfate concentrations in the area of well CW62, which is located west of the West Fault have been restored by the collection of Middle Chinle water from this well for RO treatment except for wells CW24, CW60, CW72 and WR25. 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 6.3-1B at a scale of 1” = 500’ and all of these values are less than the site standard.

Figure 6.3-2 shows the locations of the Middle Chinle wells for which time concentration plots were developed for this report. The sulfate figure number is shown in the group area to define the figure number for each group of wells. Four groups of wells for the Middle Chinle aquifer are presented to show the concentration changes with time. The colors and symbols on Figure 6.3-2 correspond to those used in the concentration time plots.

Figure 6.3-3 presents sulfate concentrations for the mixing zone Middle Chinle wells 498, CW15, CW17, CW35 AND CW45. All of the 2018 concentrations on this plot are below the site standard which is shown on the plots for ease in comparison. The Middle Chinle concentrations for wells CW56, CW60, CW61, CW62 and CW72 are presented in Figure 6.3-3A for these mixing zone Middle Chinle wells west of the West Fault and Figure 6.3-3B for mixing zone wells CW58, Y1, Y7, Y13 and Y23 in Felice Acres. Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 493, ACW, CW2 and CW55 located between the two faults and wells 930 and CW28 east of the East Fault.

6.3.2 TOTAL DISSOLVED SOLIDS - MIDDLE CHINLE

Total dissolved solids (TDS) and sulfate are used to define changes in major constituents at the Grants Project site. Figures 6.3-5 and 6.3-5A present contours of TDS concentrations for the Middle Chinle aquifer during 2018 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). Five of the wells west of the West Fault exceed the TDS site standard and four wells in Broadview, Felice and Murray Acres exceed the non-mixing zone standard.

Background data for the Middle Chinle aquifer were used to determine TDS site standards of 3140 and 1560 mg/l for the mixing and non-mixing zones, respectively. All of the TDS values measured in Middle Chinle aquifer water were less than these values in 2018, except for wells 483, ACW, CW24, CW55, CW60, CW62, CW72, WCW and WR25.

Plots of TDS concentrations for Middle Chinle wells 498, CW15, CW17, CW35 and CW45 are presented in Figure 6.3-6. The TDS concentrations are presented for RO collection well CW62 and nearby Middle Chinle wells CW56, CW60, CW61 and CW72 (see Figure 6.3-6A). 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. Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 493, 930, ACW, CW2, CW28 and CW55.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figures 6.3-8 and 6.3-8A present chloride concentrations in the Middle Chinle aquifer during 2018. None of the concentrations exceeded the site standard of 250 mg/l for the mixing and non-mixing zones of the Middle Chinle aquifer except values from wells ACW and CW72. Therefore, in general chloride concentrations are not useful for defining the degree of, or the need for, restoration of the Middle Chinle aquifer.

Time plots of chloride concentration are presented on Figure 6.3-9 for Middle Chinle wells 498, CW15, CW17, CW35 AND CW45. A second set of chloride concentration plots for

the Middle Chinle wells west of the West Fault is presented in Figure 6.3-9A. An additional plot of chloride concentrations for the Middle Chinle wells in South Felice Acres was added in Figure 6.3-9B. The fourth chloride concentration plot for the Middle Chinle aquifer is presented in Figure 6.3-10 for wells 493, 930, ACW, CW2, CW28 and CW55.

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 groundwater 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 2018. An area of concentrations greater than the mixing-zone site standard exists in the western portion of Felice Acres and the northeast portion of Section 3 (see Figure 6.3-11A). The blowup of South Felice Acres and the northeast portion of Section 3 in Figure 6.3-11A presents the uranium posting of the Y wells and the R collection wells in this area. Uranium concentrations in the Middle Chinle aquifer, west of the West Fault, northwest of the LTP, naturally exceed 0.18 mg/l but values in several wells have increased above this level from the movement of alluvial water in the subcrop to these wells. Flow in the Middle Chinle aquifer west of the West Fault moves from the area near well CW35 toward the subcrop area to the south. Uranium concentrations exceed 0.07 mg/l (non-mixing zone site standard) in an area of the Middle Chinle aquifer in northern Felice Acres and western Broadview Acres.

Figure 6.3-12 presents uranium concentration plots versus time for Middle Chinle wells 498, CW15, CW17, CW35 AND CW45 (see Figure 6.3-2 for well locations). The uranium concentration plots for the Middle Chinle wells in the mixing zone west of the West Fault are presented on Figure 6.3-12A. Figure 6.3-12B shows the concentrations in pumping South Felice wells Y1, Y7, Y13 and Y23. The uranium concentration plots for the Middle Chinle wells in the non-mixing zone are presented on Figure 6.3-13.

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 2018, except for four wells west of the West Fault (see Figure 6.3-14). 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 with time for the mixing zone Middle Chinle wells 498, CW15, CW17, CW35 AND CW45 are presented in Figure 6.3-15. The selenium concentrations in wells CW56, CW60, CW61, CW62 and CW72 are shown in Figure 6.3-15A. Figure 6.3-15B shows that the South Felice Middle Chinle collection wells contain selenium concentrations that have already been restored to levels below the site standard.

Figure 6.3-16 presents the selenium concentrations for Middle Chinle wells in the non-mixing zone. The connection between the alluvial aquifer and the Middle Chinle aquifer south of Felice Acres is the cause for the elevated concentrations in well 493.

6.3.6 MOLYBDENUM - MIDDLE CHINLE

The 2018 molybdenum concentrations in the Middle Chinle aquifer are presented on Figures 6.3-17 and 6.3-17A. None of the molybdenum concentrations for 2018 exceed the site standard of 0.10 mg/l except for four wells west of the West Fault.

Figure 6.3-18 presents the molybdenum concentrations with time for Middle Chinle wells 498, CW15, CW17, CW35 AND CW45, while Figure 6.3-18A shows the molybdenum concentrations for wells CW56, CW60, CW61, CW62 AND CW72. The molybdenum

concentrations are below the site standard in the Middle Chinle in the Felice Acres area (see Figures 6.3-18 and 6.3-18B). Figure 6.3-19 presents the molybdenum concentrations with time for wells 493, 930, ACW, CW2, CW28 and CW55.

6.3.7 NITRATE - MIDDLE CHINLE

Nitrate concentrations have always been low in the Middle Chinle aquifer and Figure 6.3-20 presents the nitrate concentrations in the Middle Chinle aquifer for 2018. 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

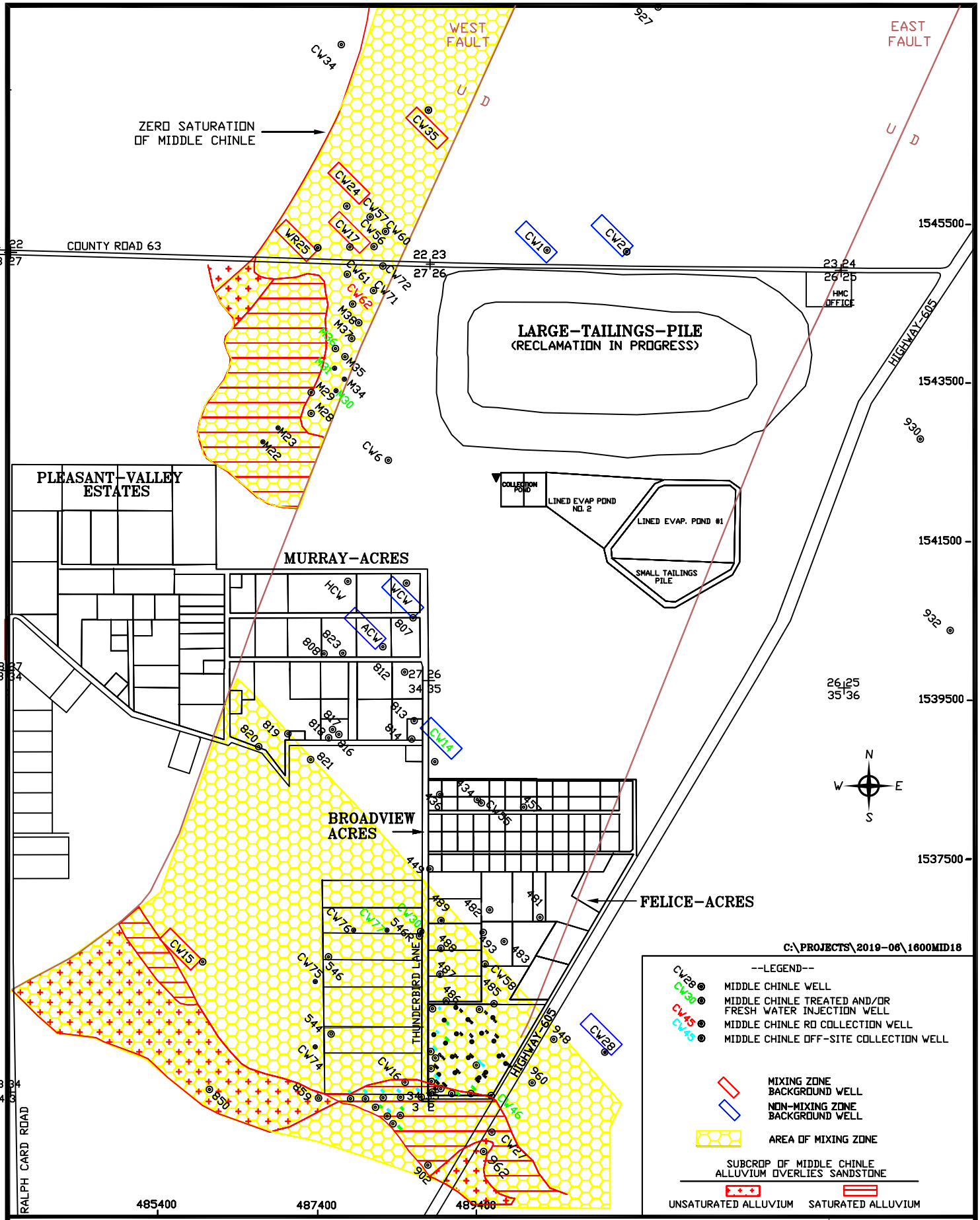
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. All of the radium-226 and radium-228 values measured in 2018 were very small except radium-228 result from well CW32 which is considered an outlier. Radium-226 and radium-228 are not important parameters relative to the Middle Chinle aquifer and a site standard is not warranted and has not been set for these two constituents.

6.3.9 VANADIUM - MIDDLE CHINLE

Vanadium concentrations in the Middle Chinle aquifer have always been low. Previous monitoring of vanadium in the Middle Chinle aquifer has demonstrated that vanadium is not a significant parameter in this aquifer. Monitoring of vanadium for the Middle Chinle should be eliminated, because only a few low values have previously been detected in the alluvial aquifer near the tailings piles. All of the 2018 vanadium measurements for the Middle Chinle aquifer are at or 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. All of the thorium-230 values measured in 2018 were very small at values of 0.3 pCi/l or less. These thorium-230 levels are consistent with concentrations previously measured in the Middle Chinle aquifer, which shows that thorium-230 is not an important parameter in the Middle Chinle aquifer and thus a site standard has not been set.



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SCALE: 1"=1600'

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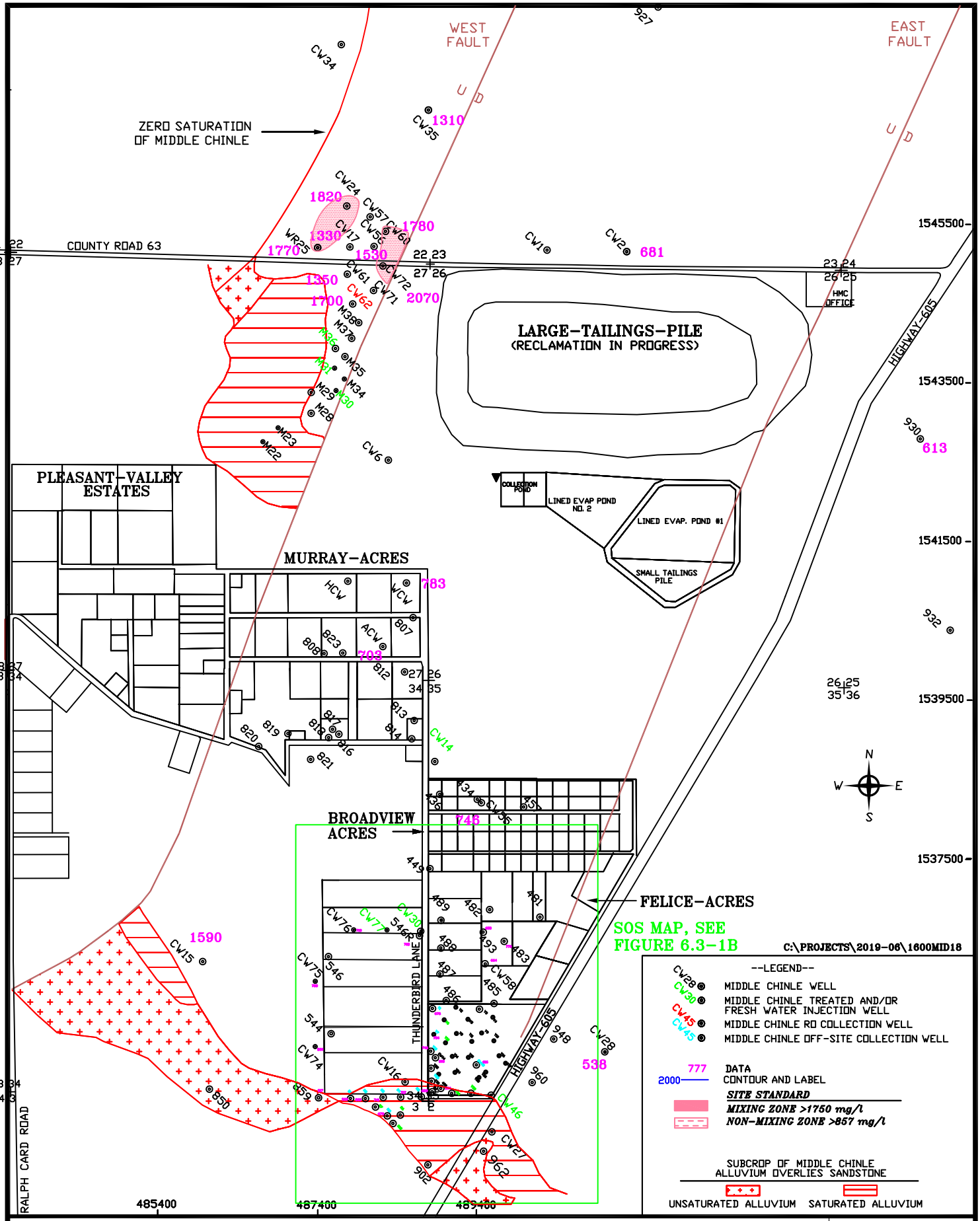
FIGURE 6.3-1. MIDDLE CHINLE WELLS USED FOR SITE STANDARD AND MIDDLE CHINLE MIXING ZONE



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

FIGURE 6.3-1A. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l

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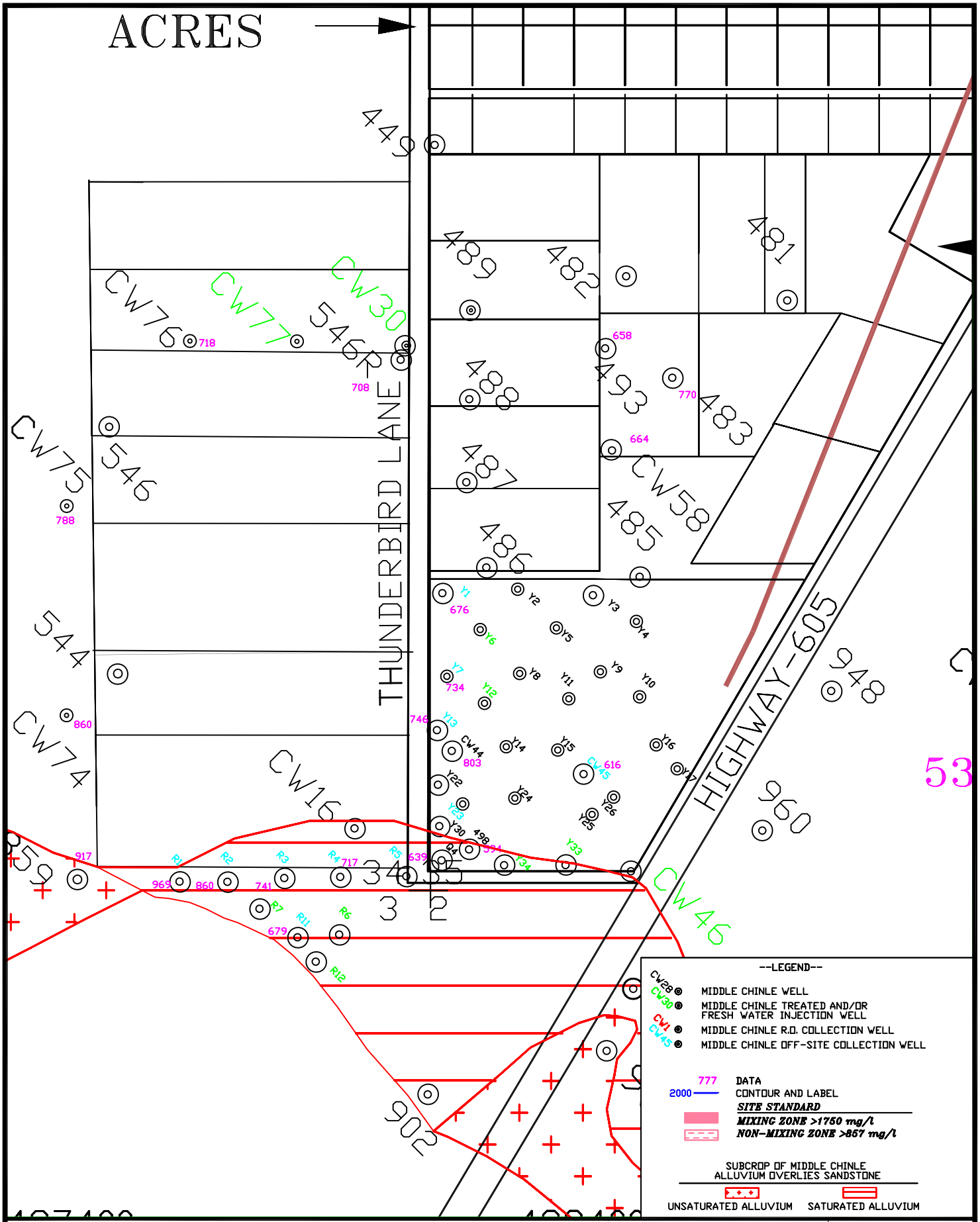

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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FIGURE 6.3-1B. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, SOS, mg/l

SCALE: 1"=500'

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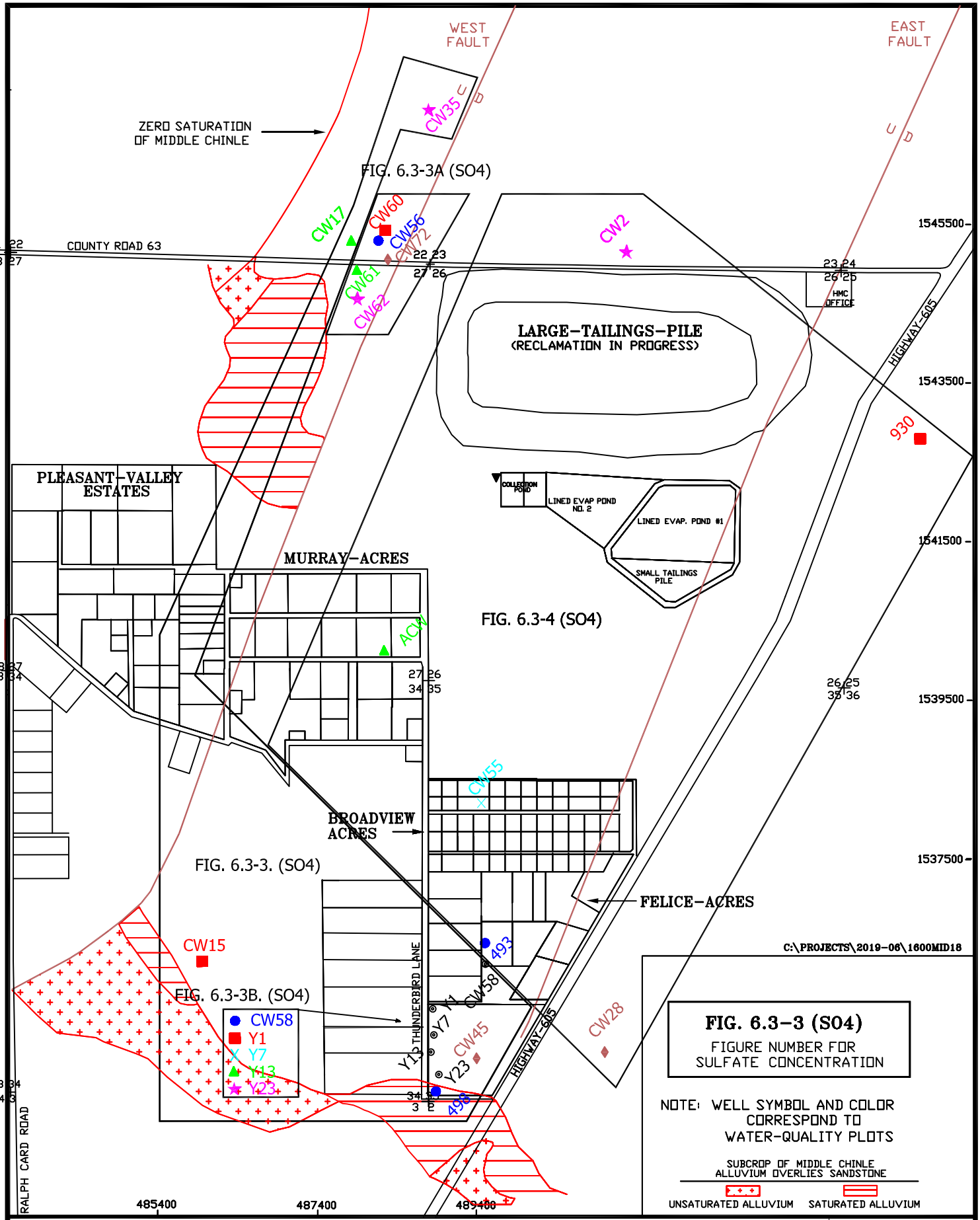

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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SCALE: 1"=1600'

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FIGURE 6.3-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-QUALITY PLOTS, 2018

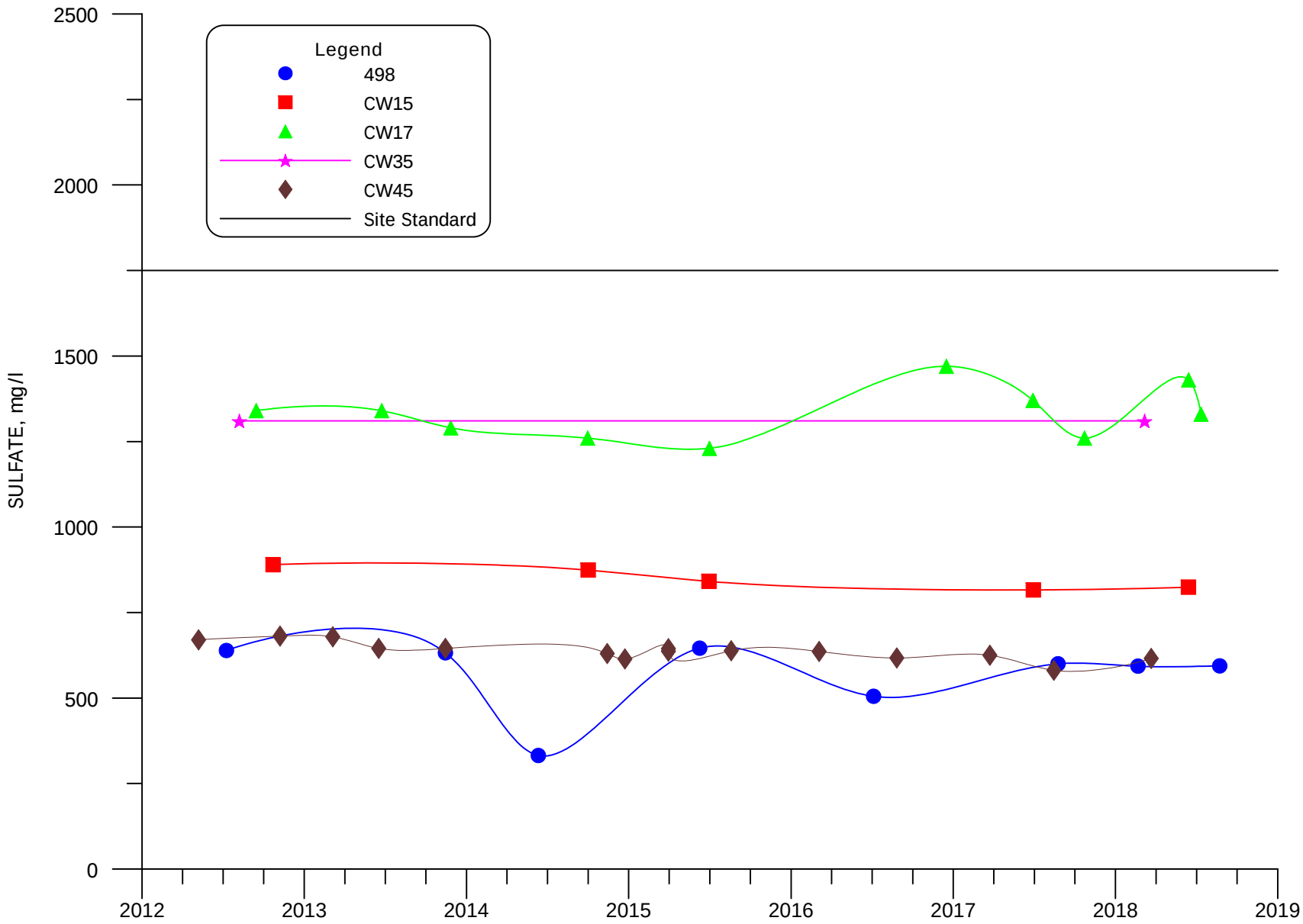

FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

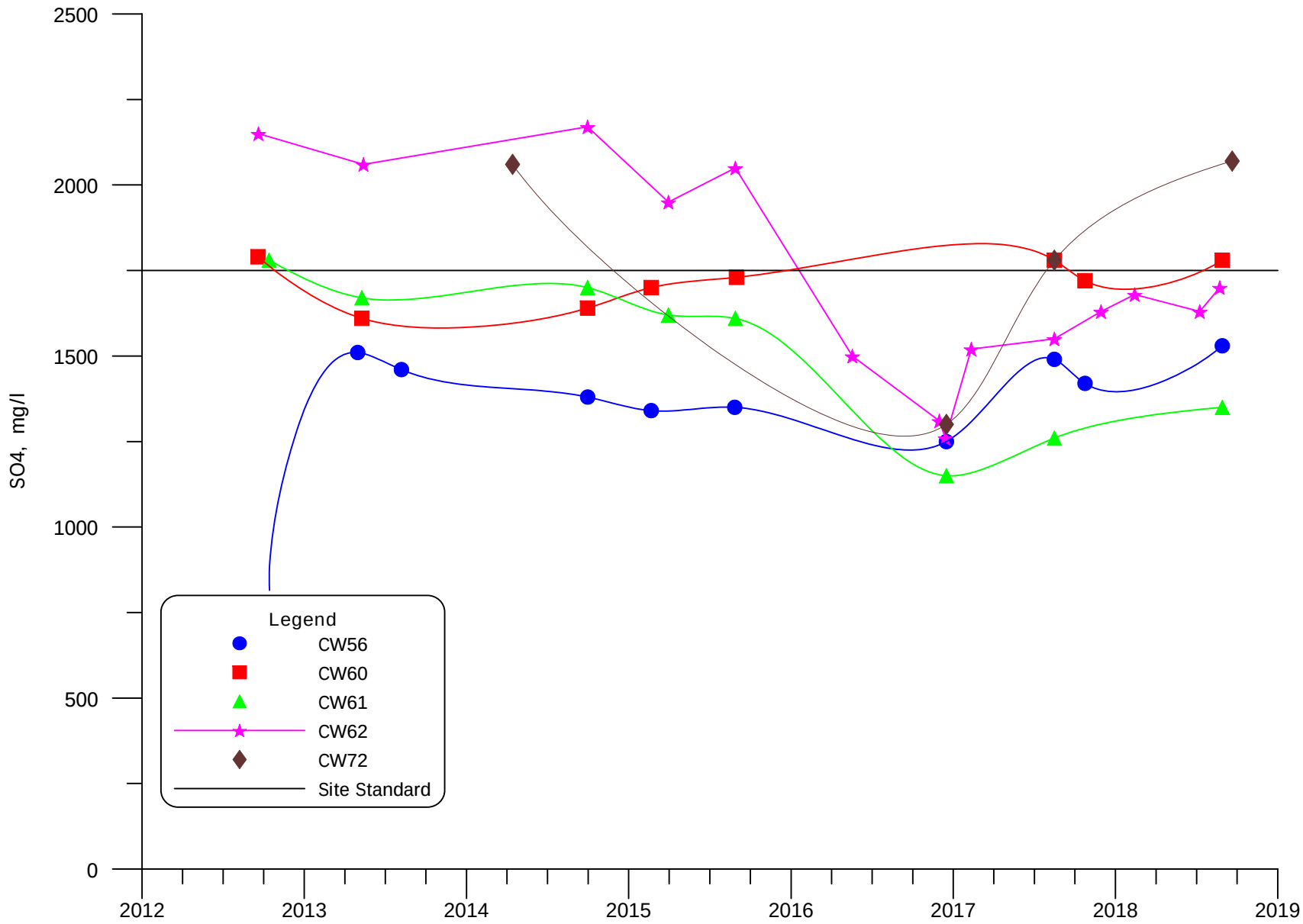

FIGURE 6.3-3A. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

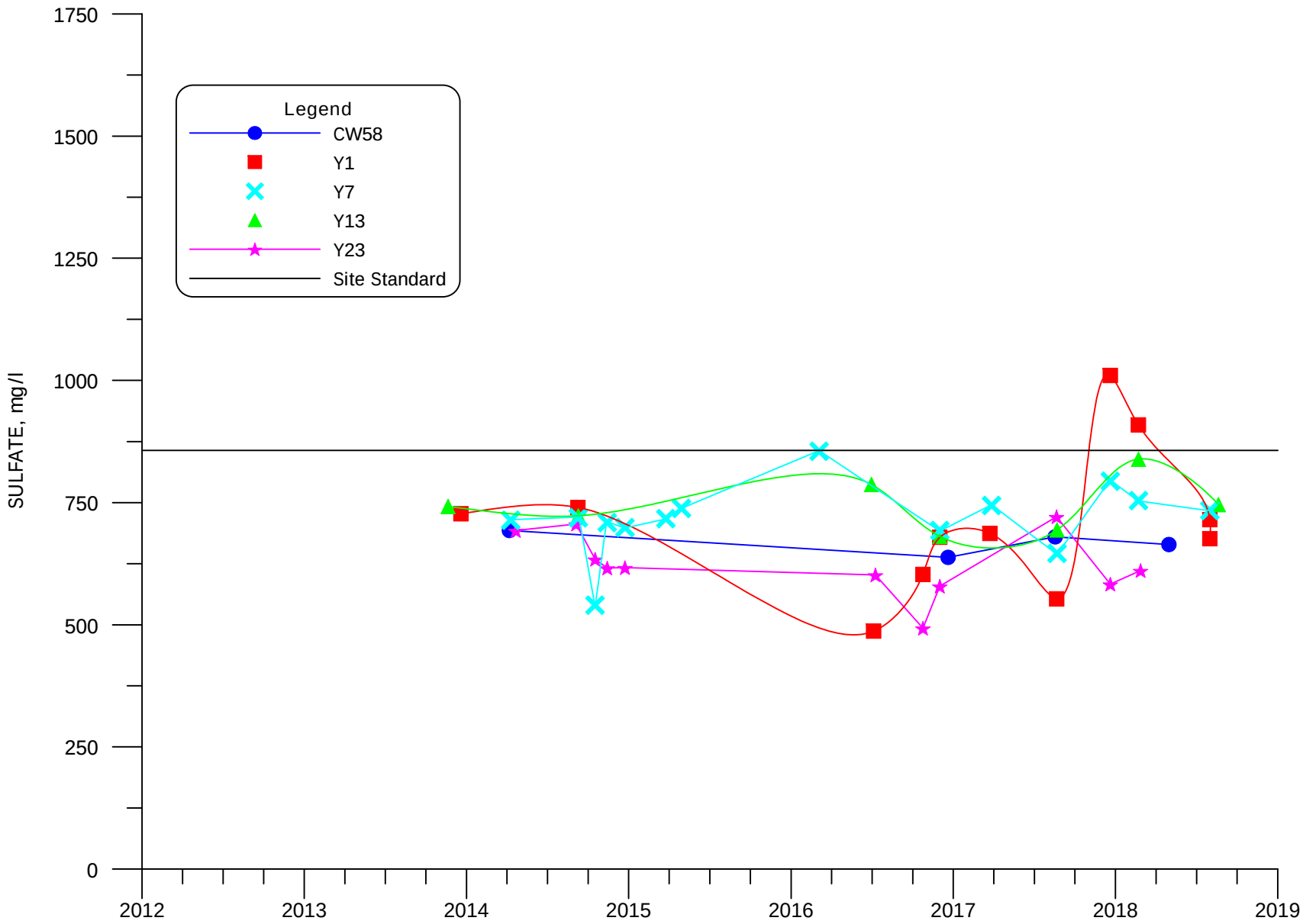

FIGURE 6.3-3B. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

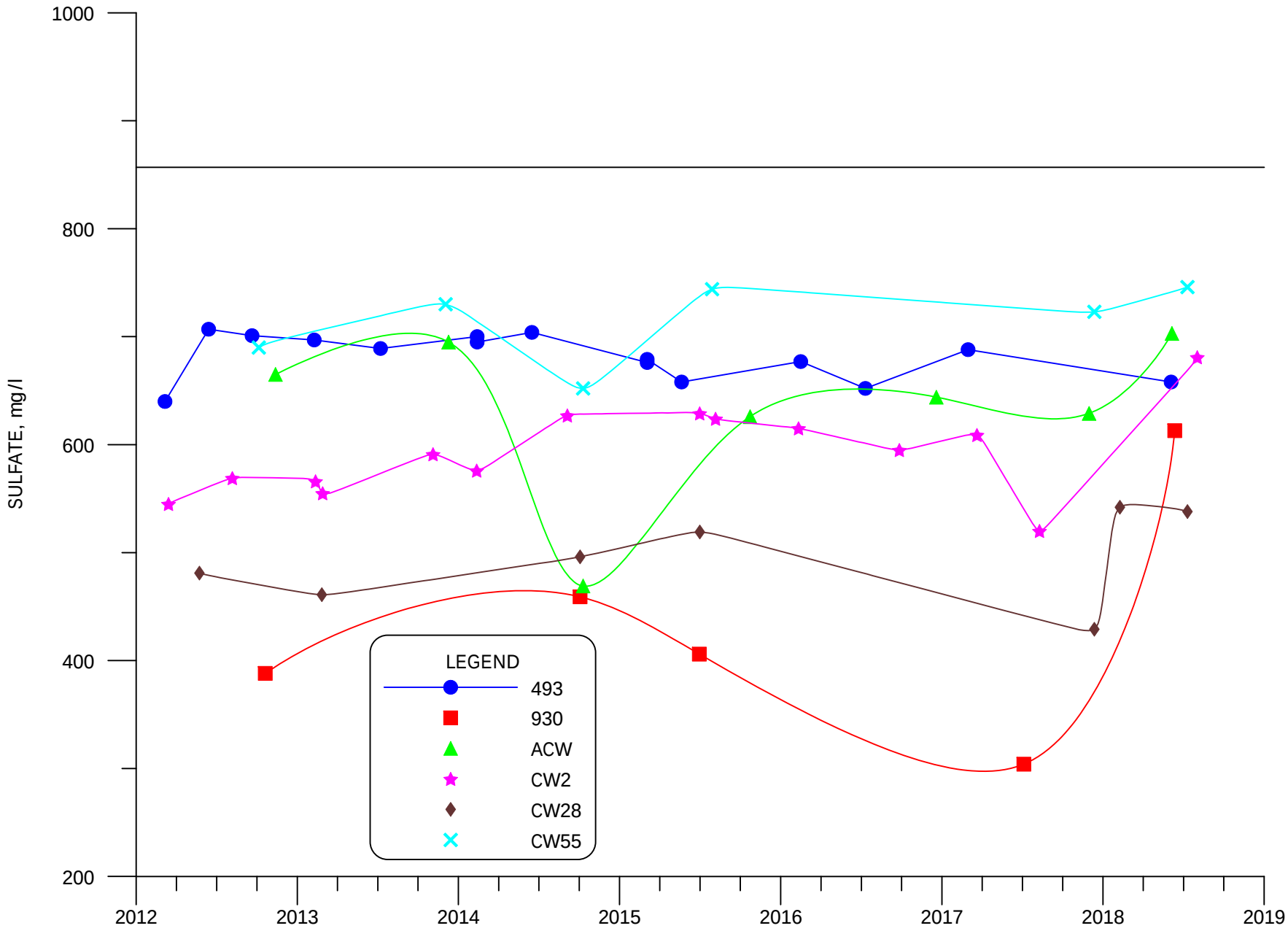

FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

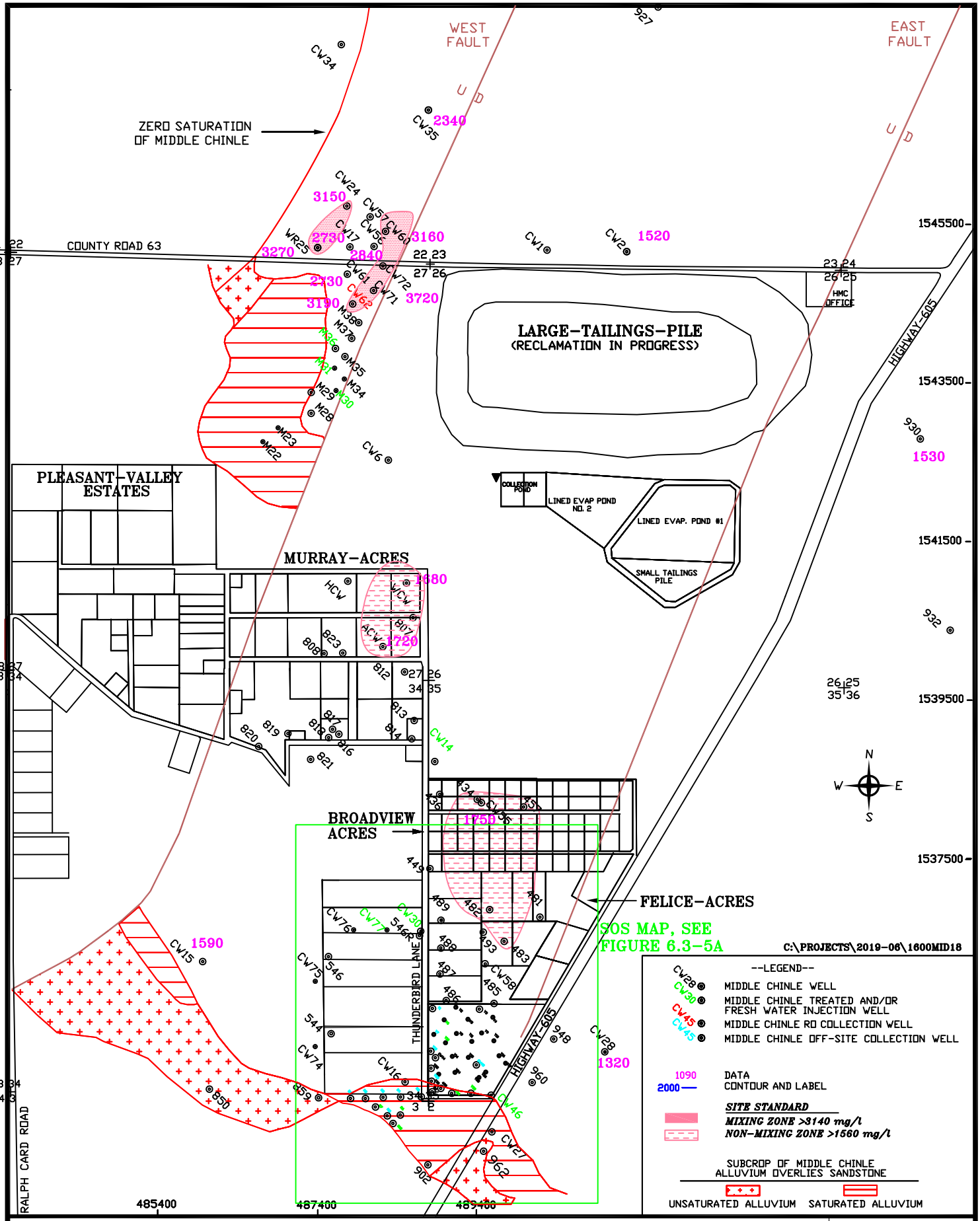

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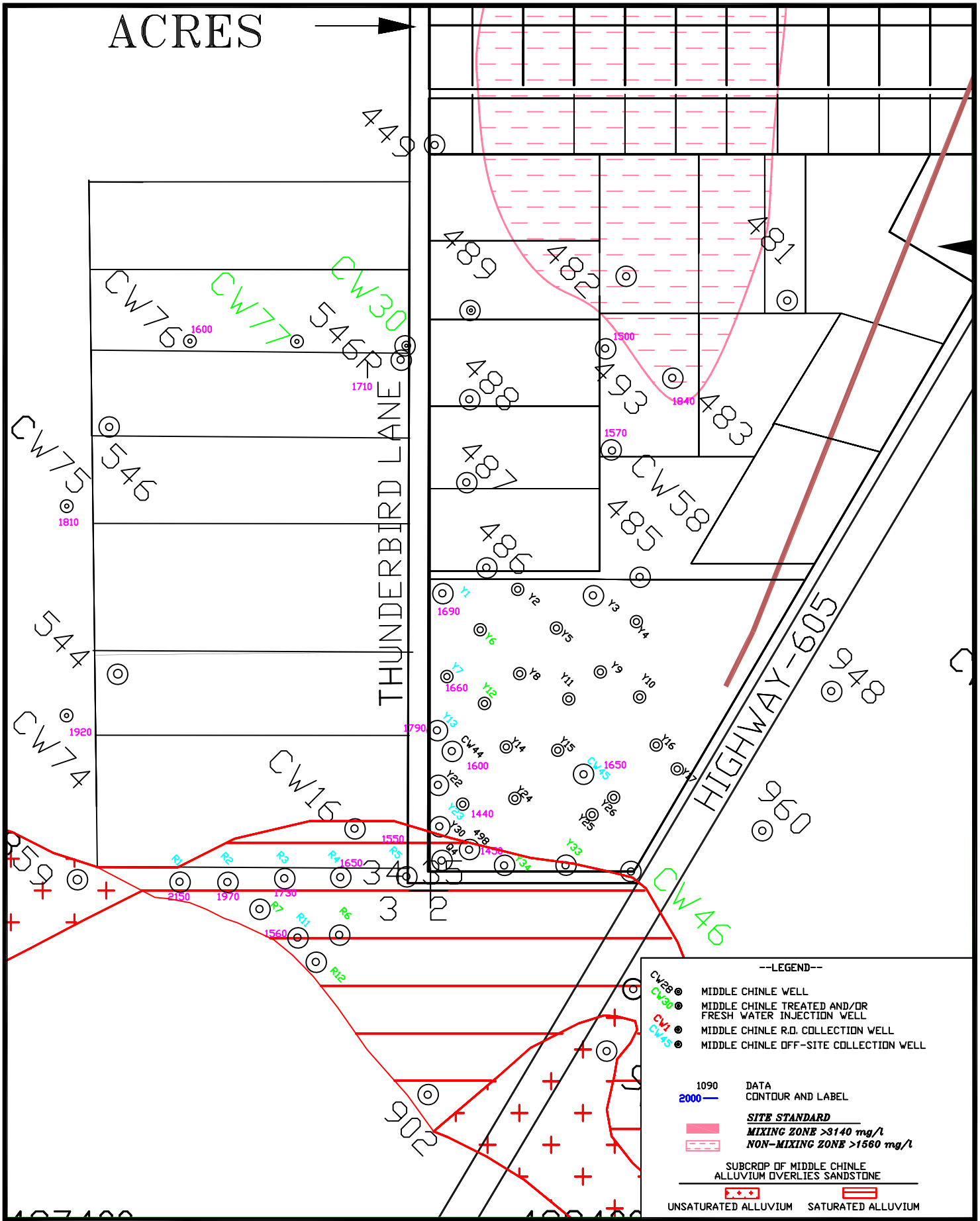
FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l



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

FIGURE 6.3-5A. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, SOS, mg/l

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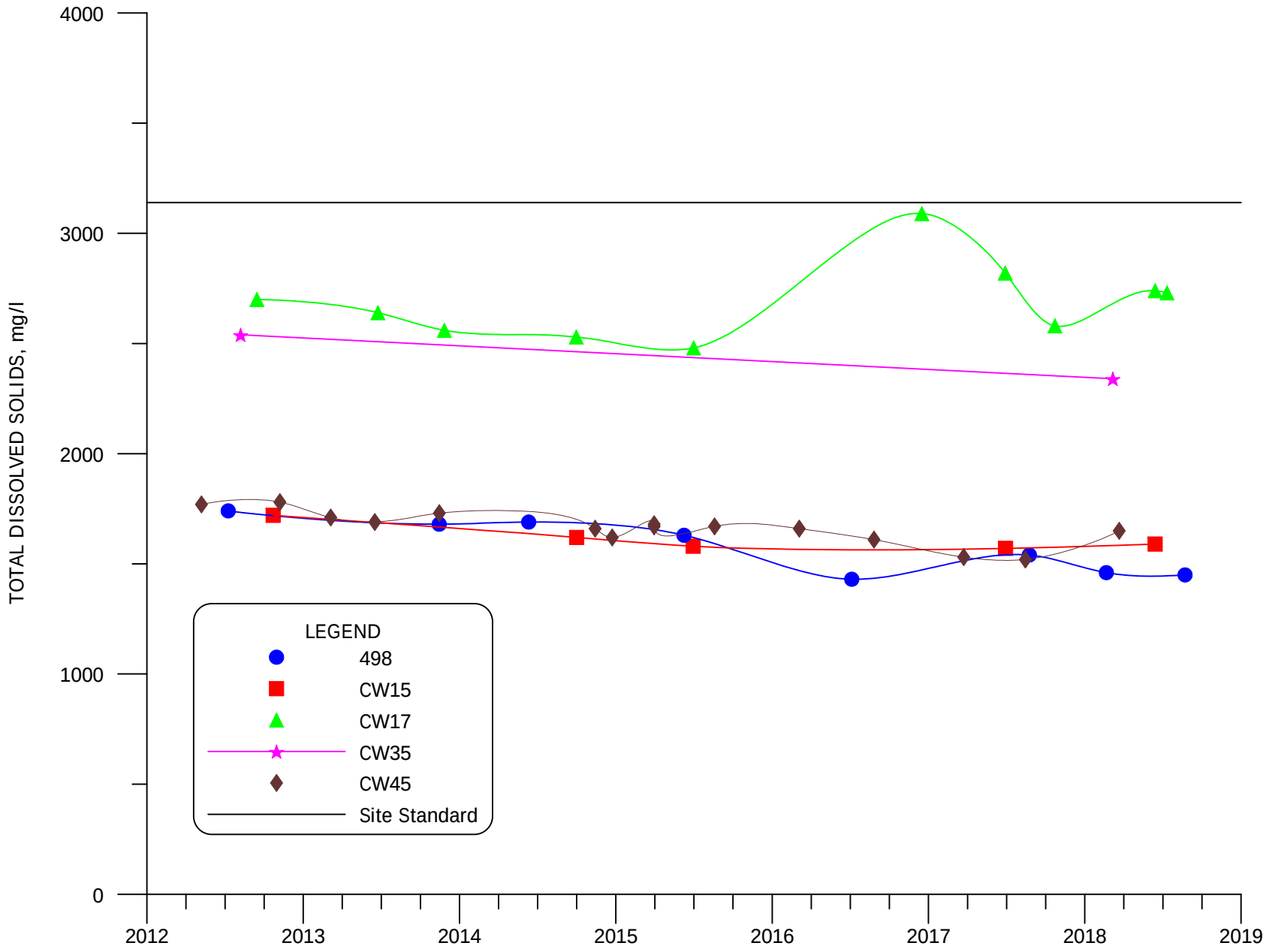


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

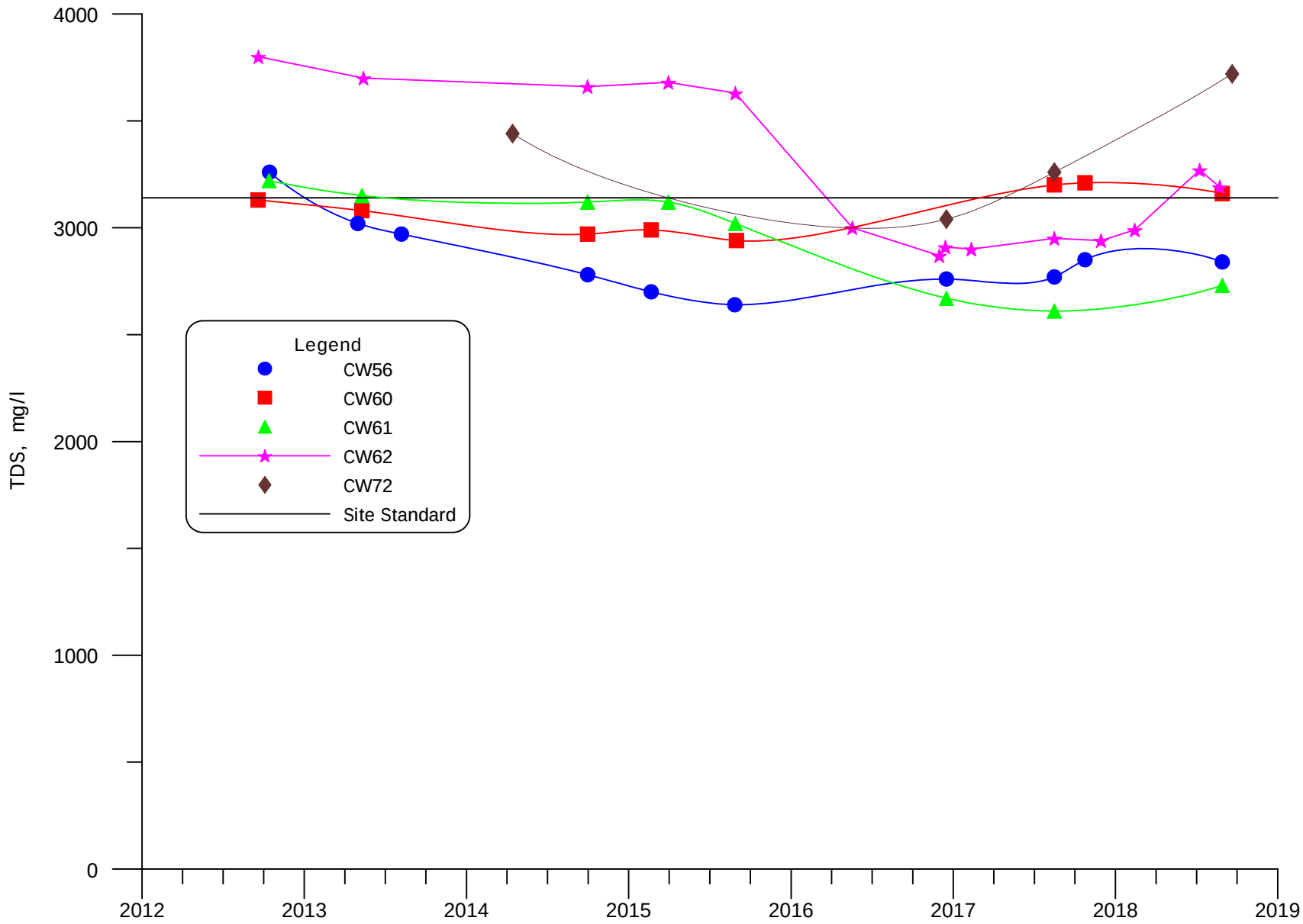


FIGURE 6.3-6A. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

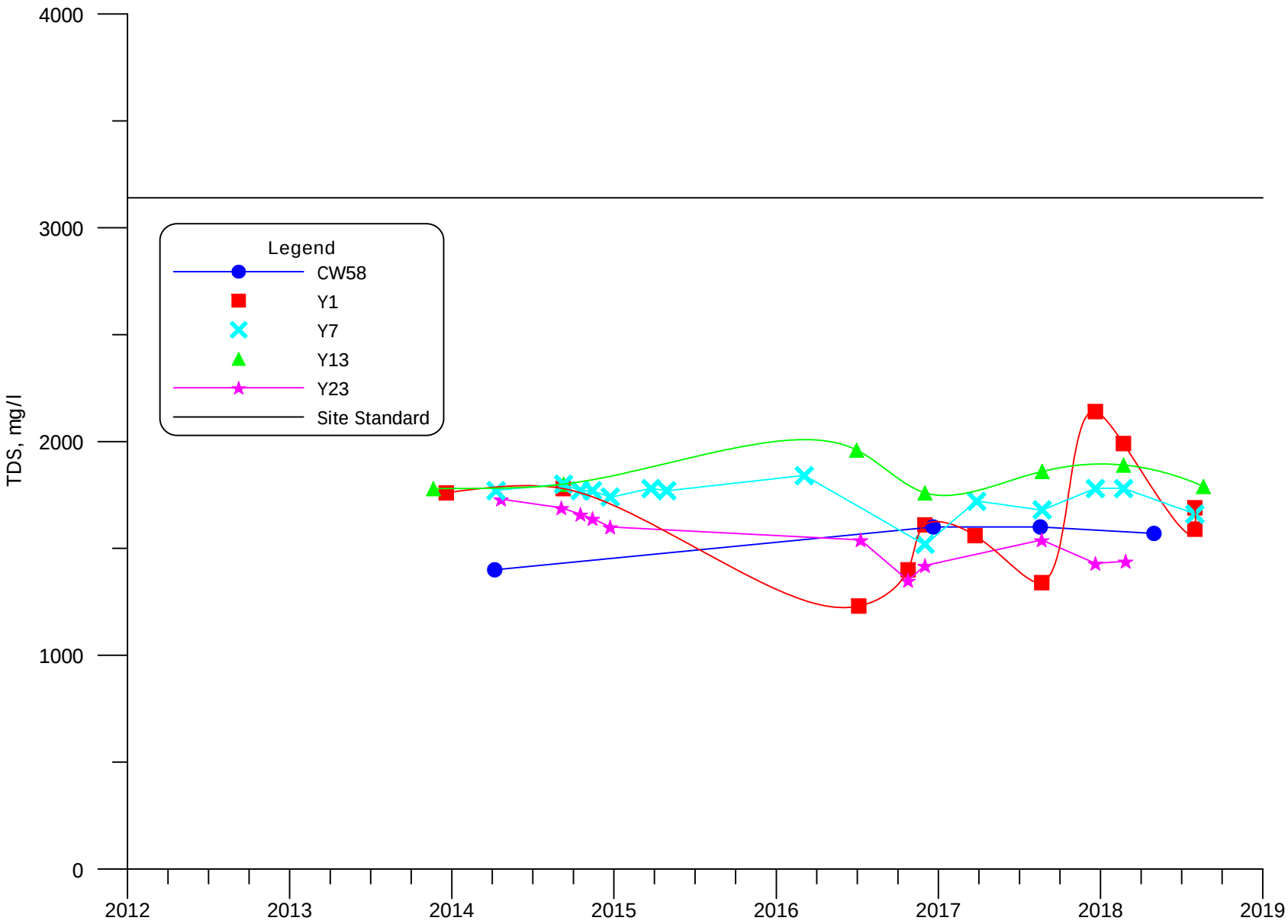


FIGURE 6.3-6B. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

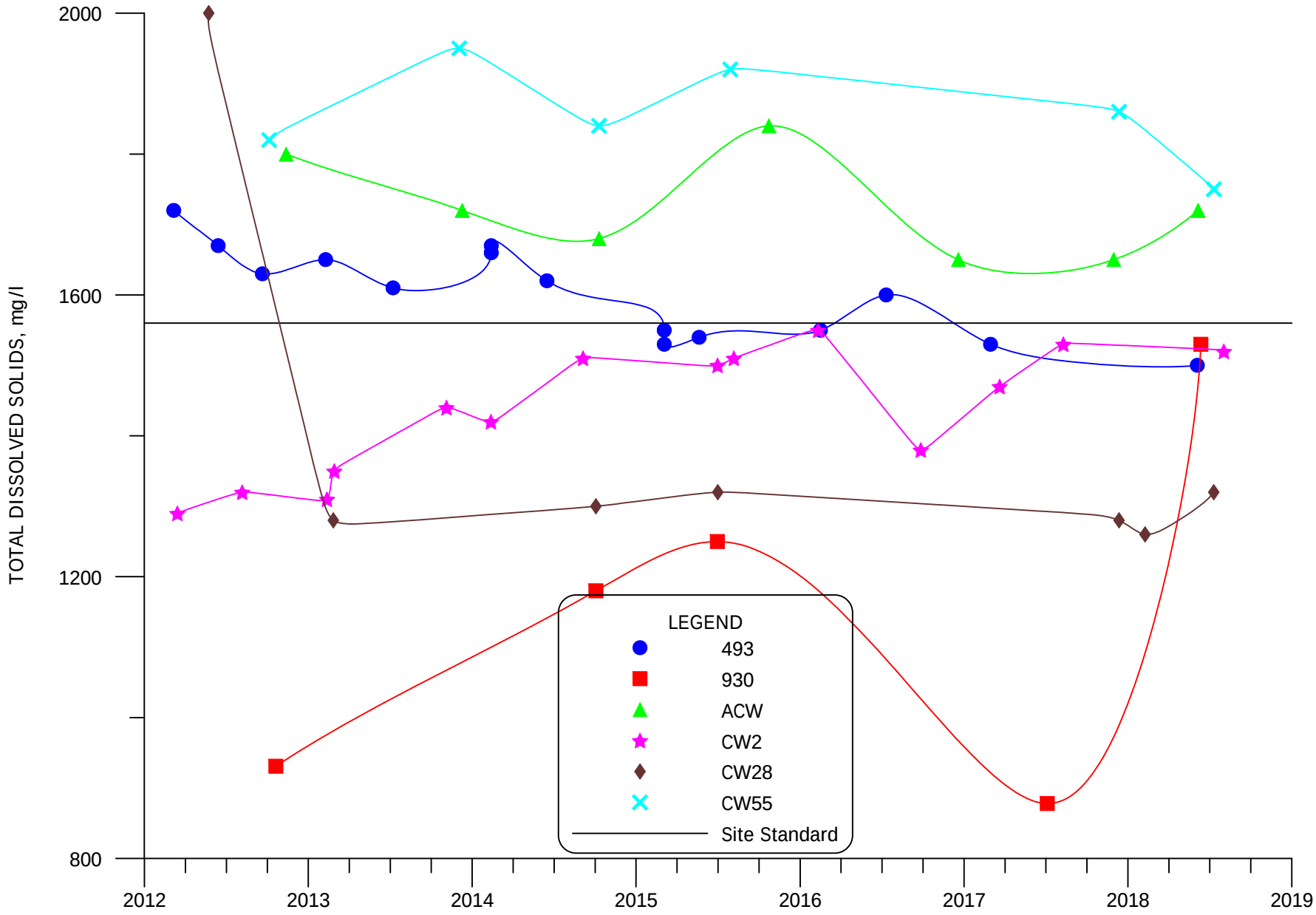
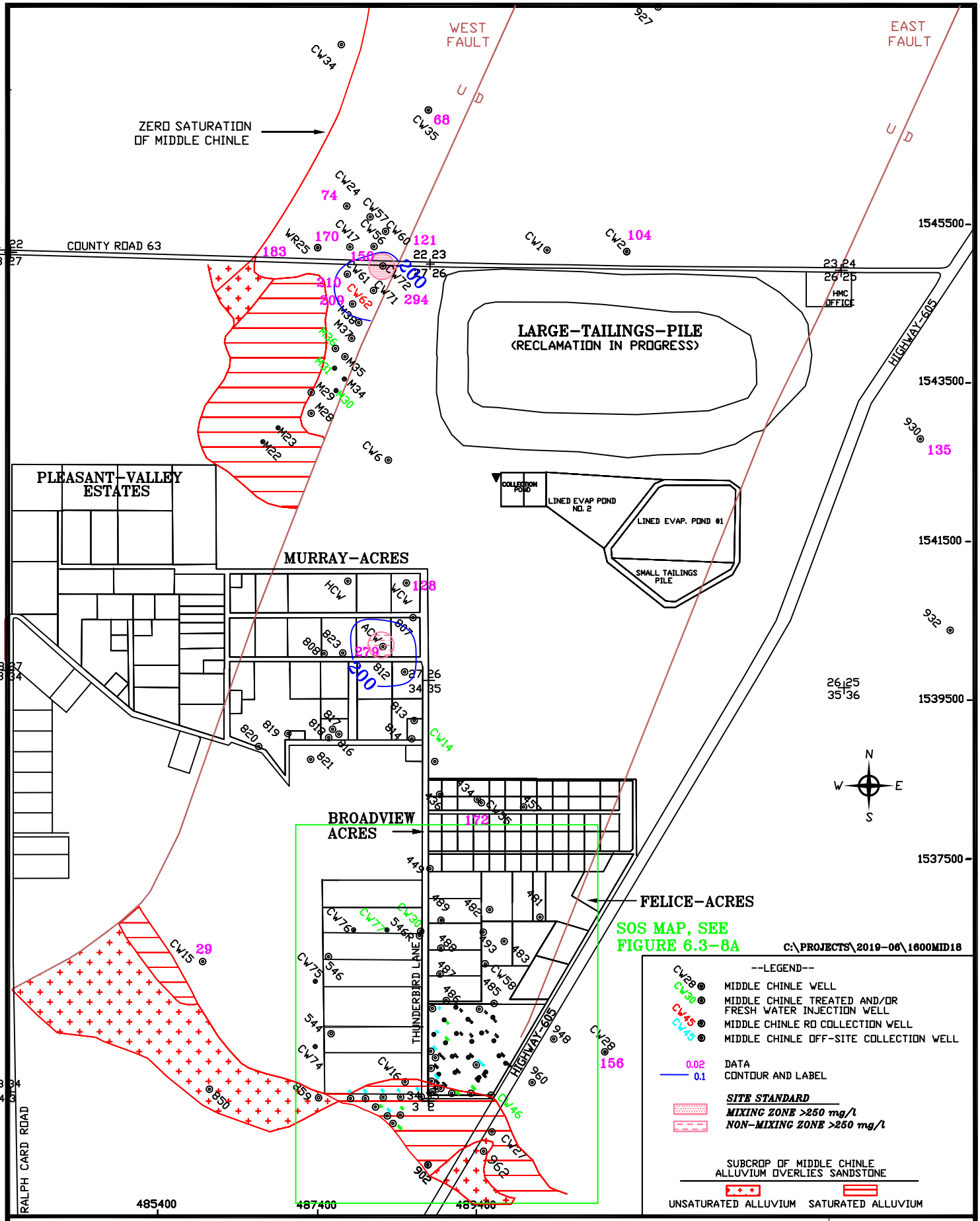


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



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

FIGURE 6.3-8. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l

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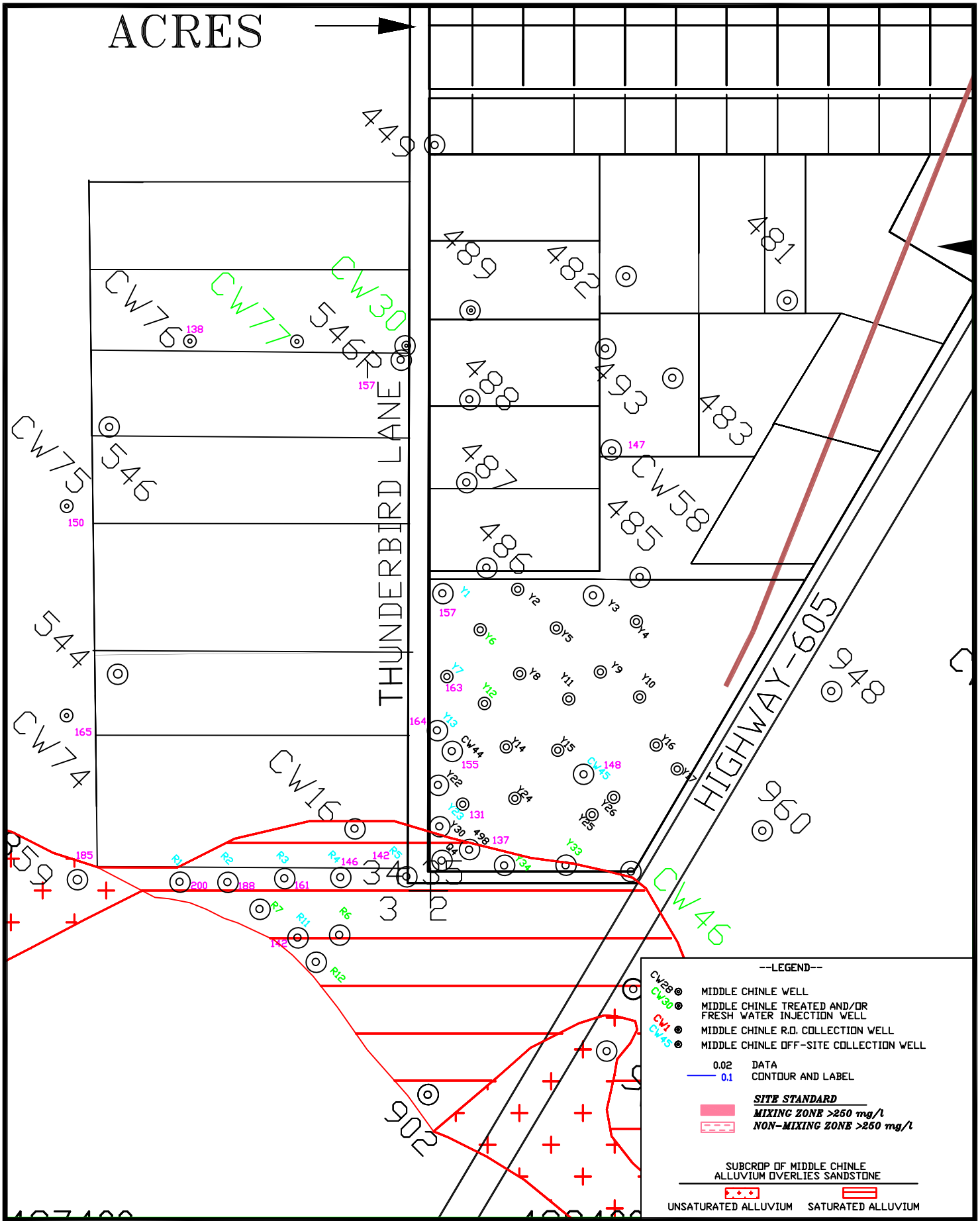

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-8A. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, SOS, mg/l

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SCALE: 1"=500'

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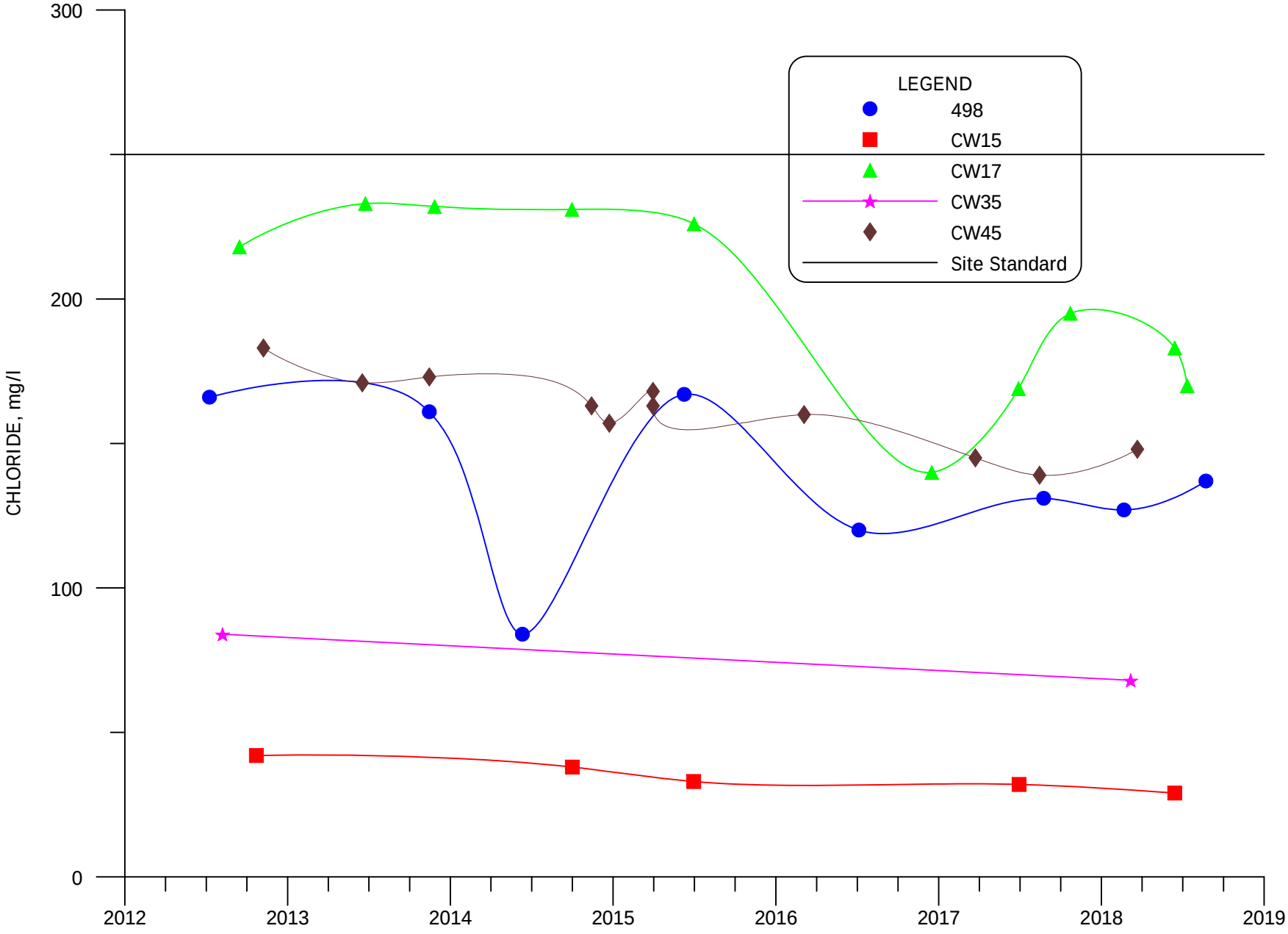

FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

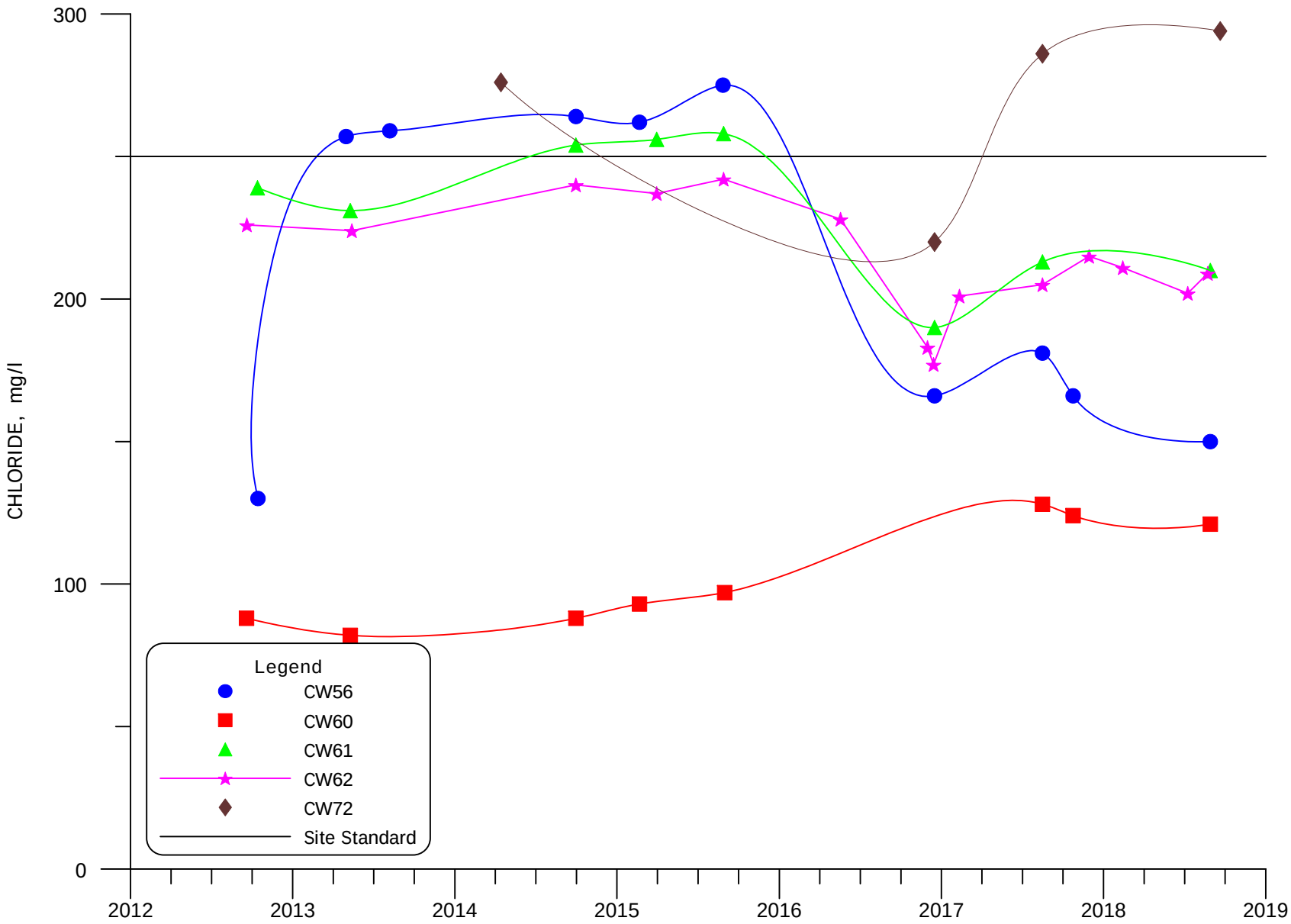

FIGURE 6.3-9A. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

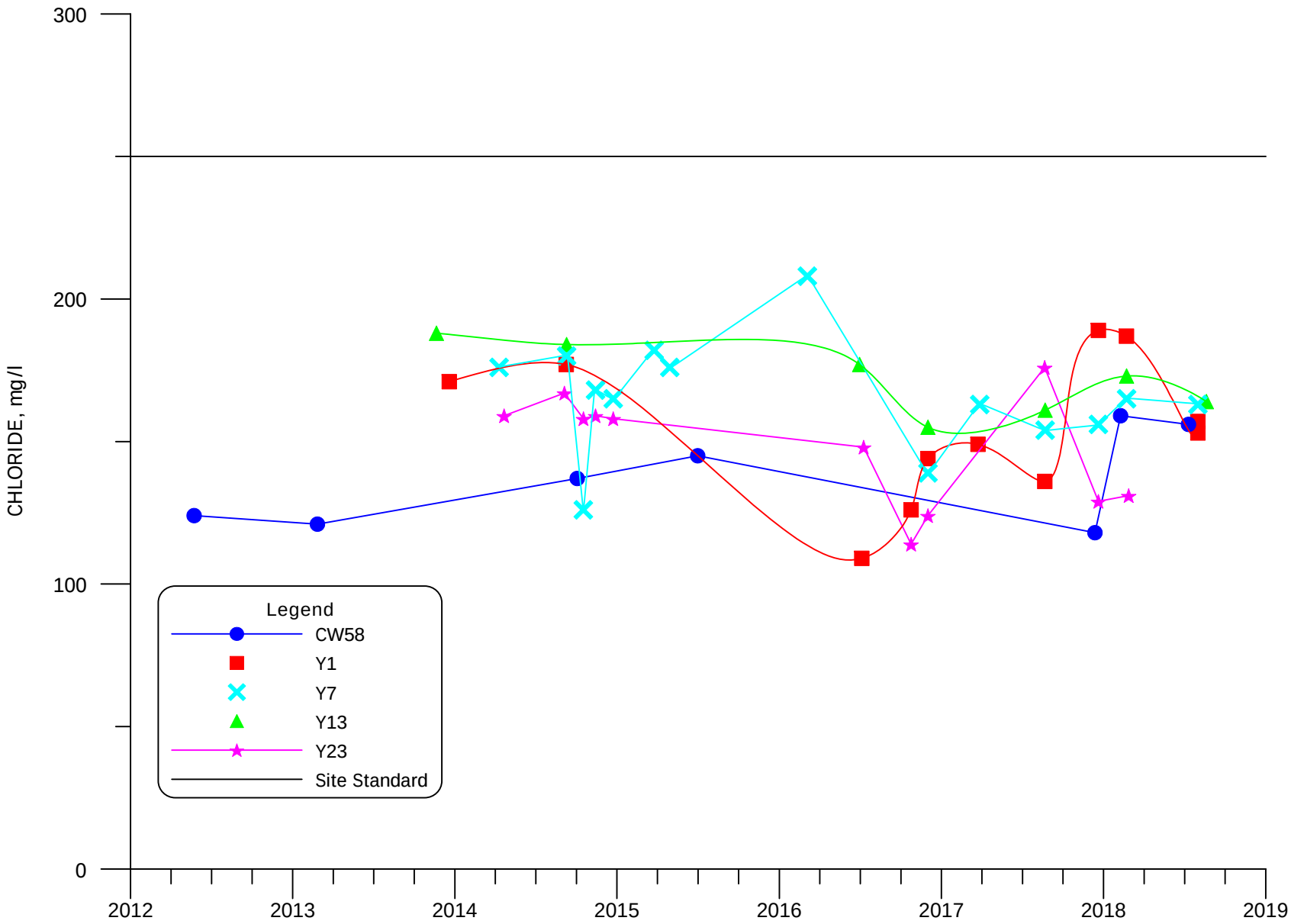

FIGURE 6.3-9B. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

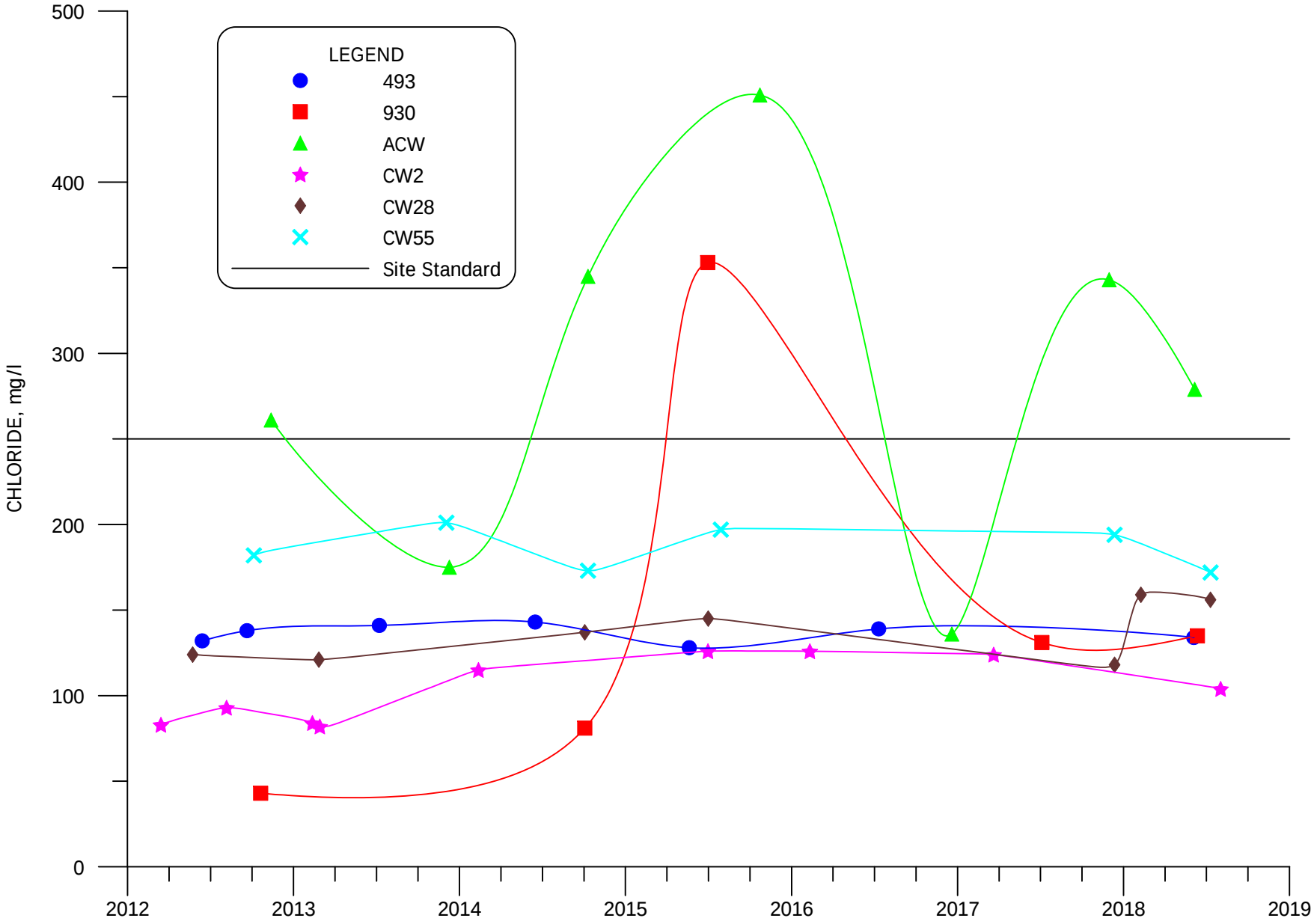

FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

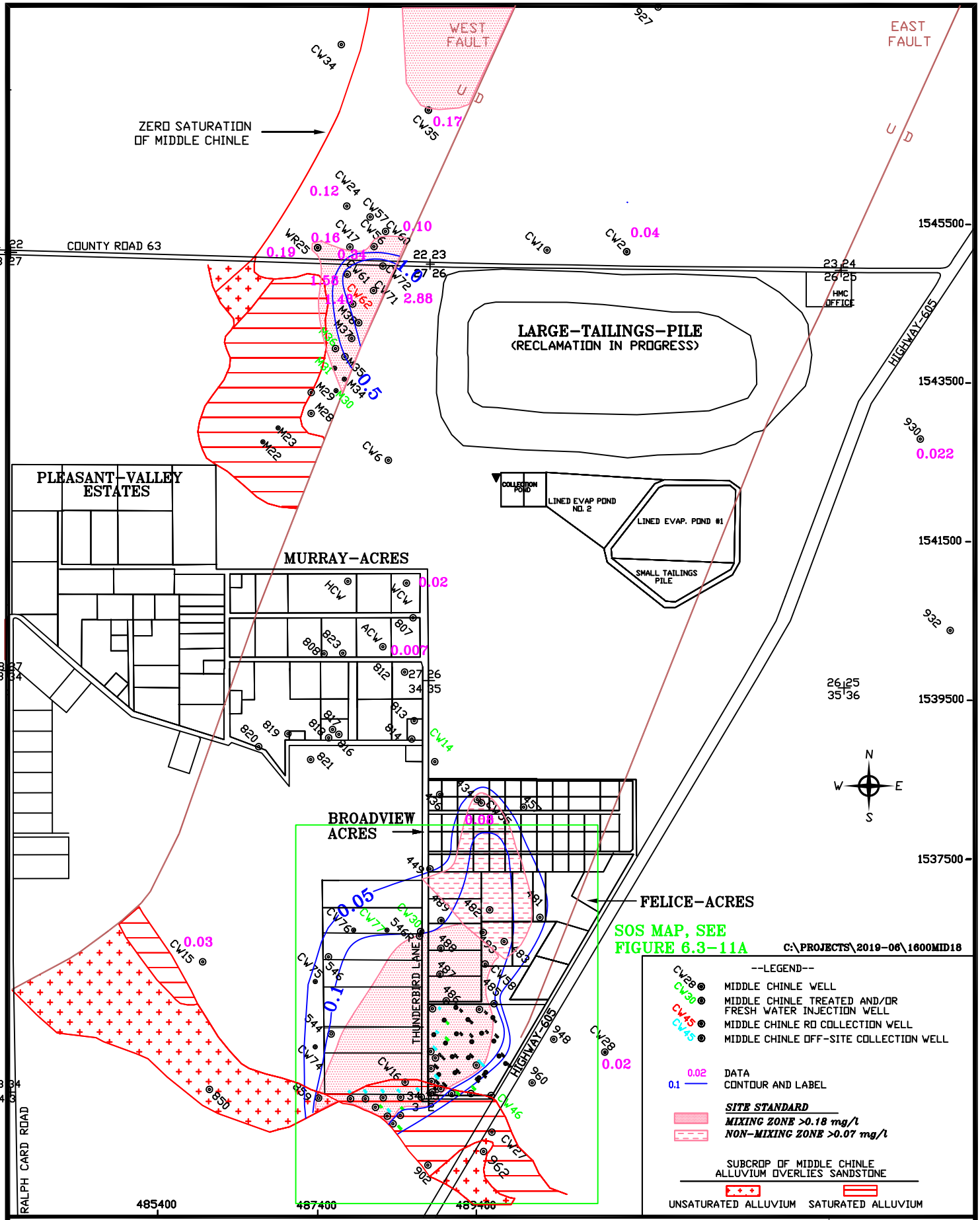

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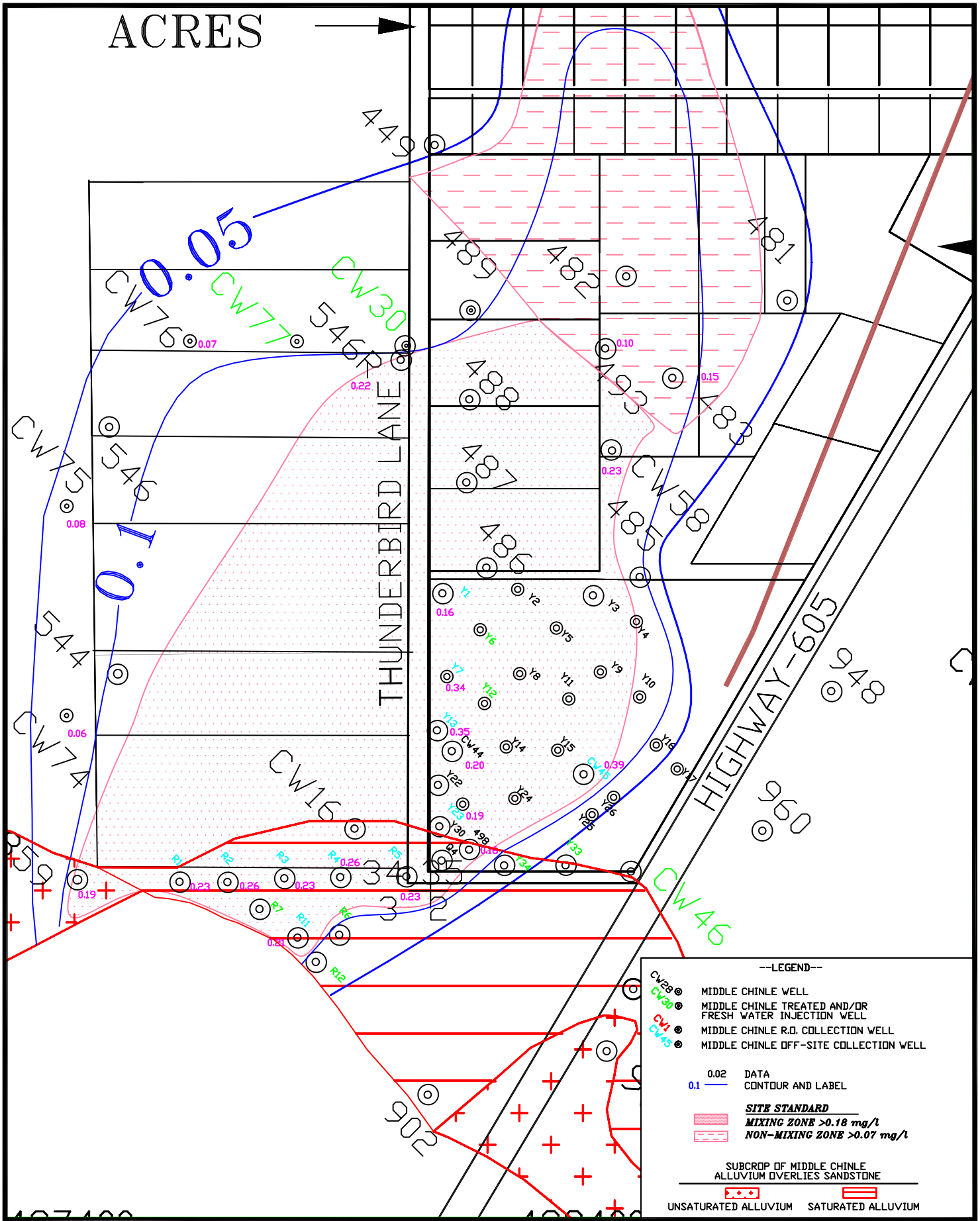
FIGURE 6.3-11. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l



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

FIGURE 6.3-11A. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2018, mg/l

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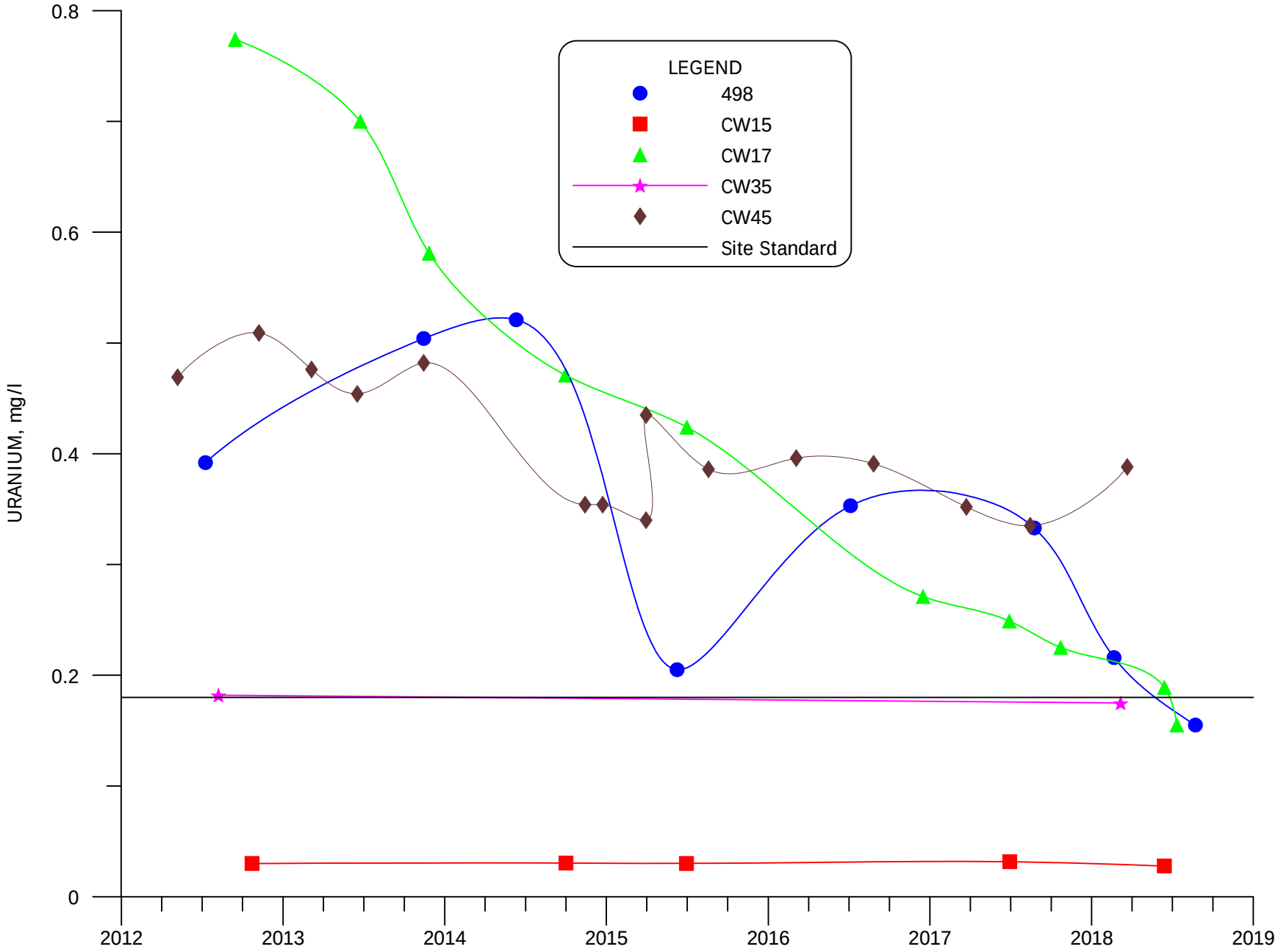

FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

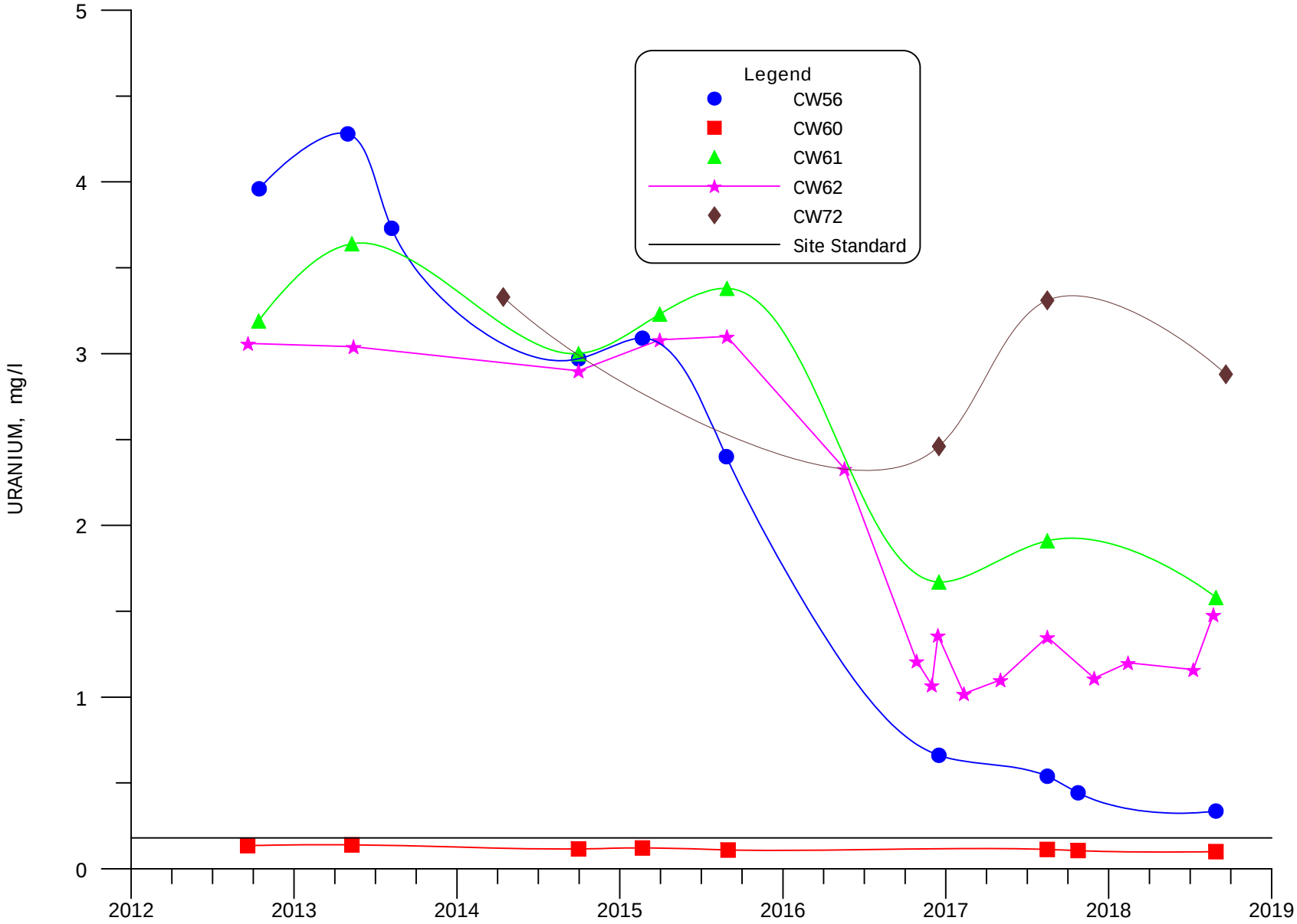

FIGURE 6.3-12A. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

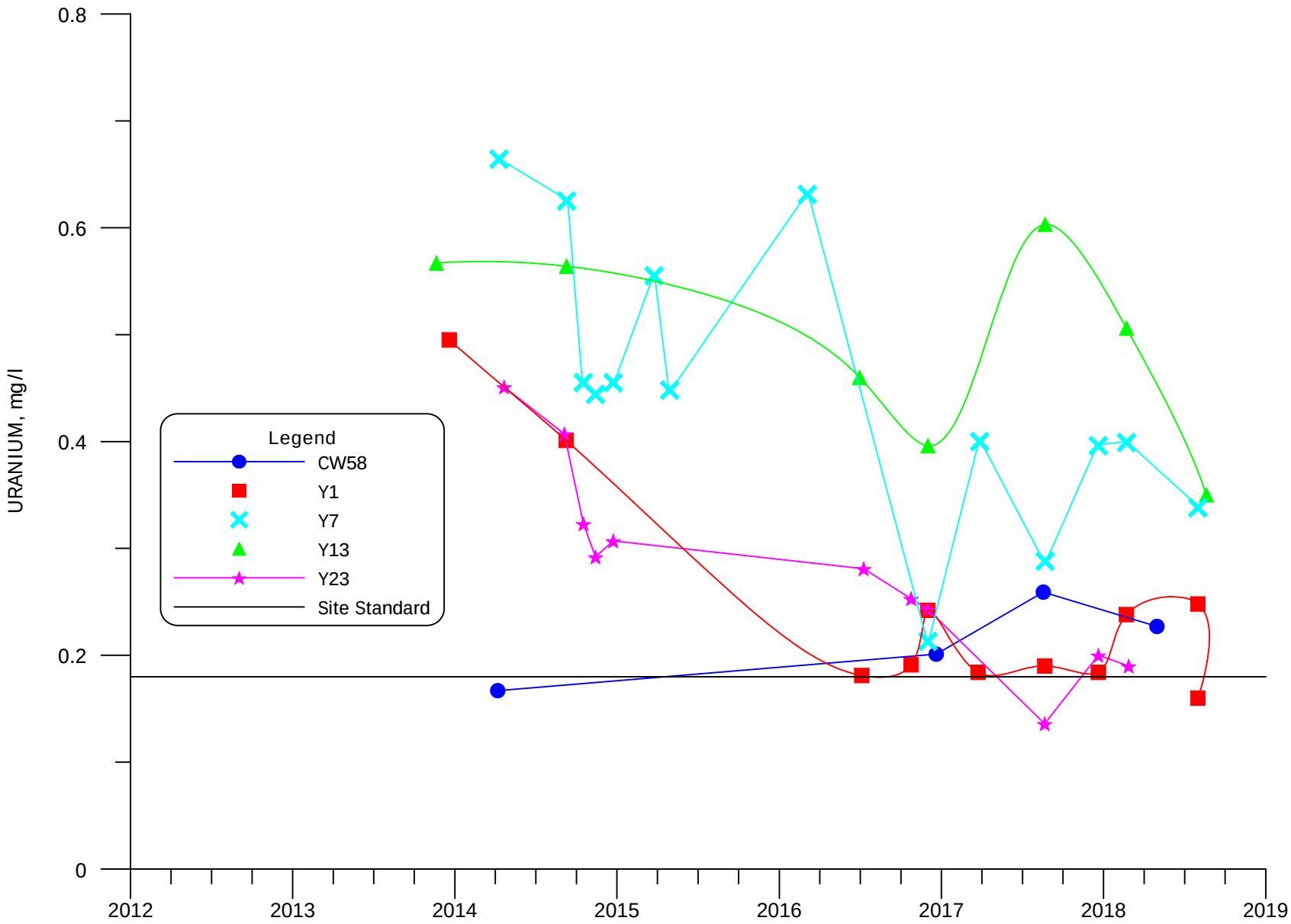

FIGURE 6.3-12B. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

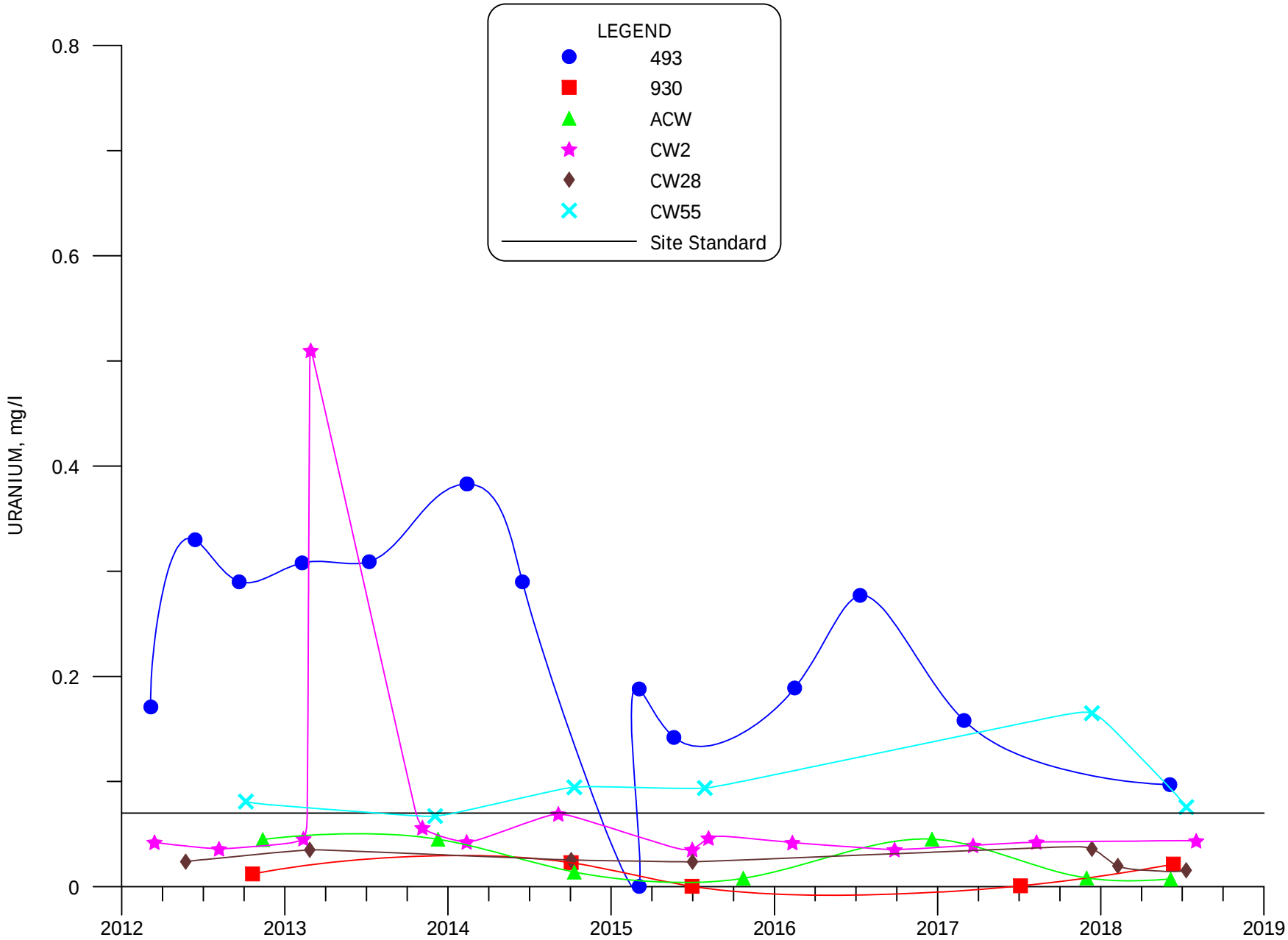

FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

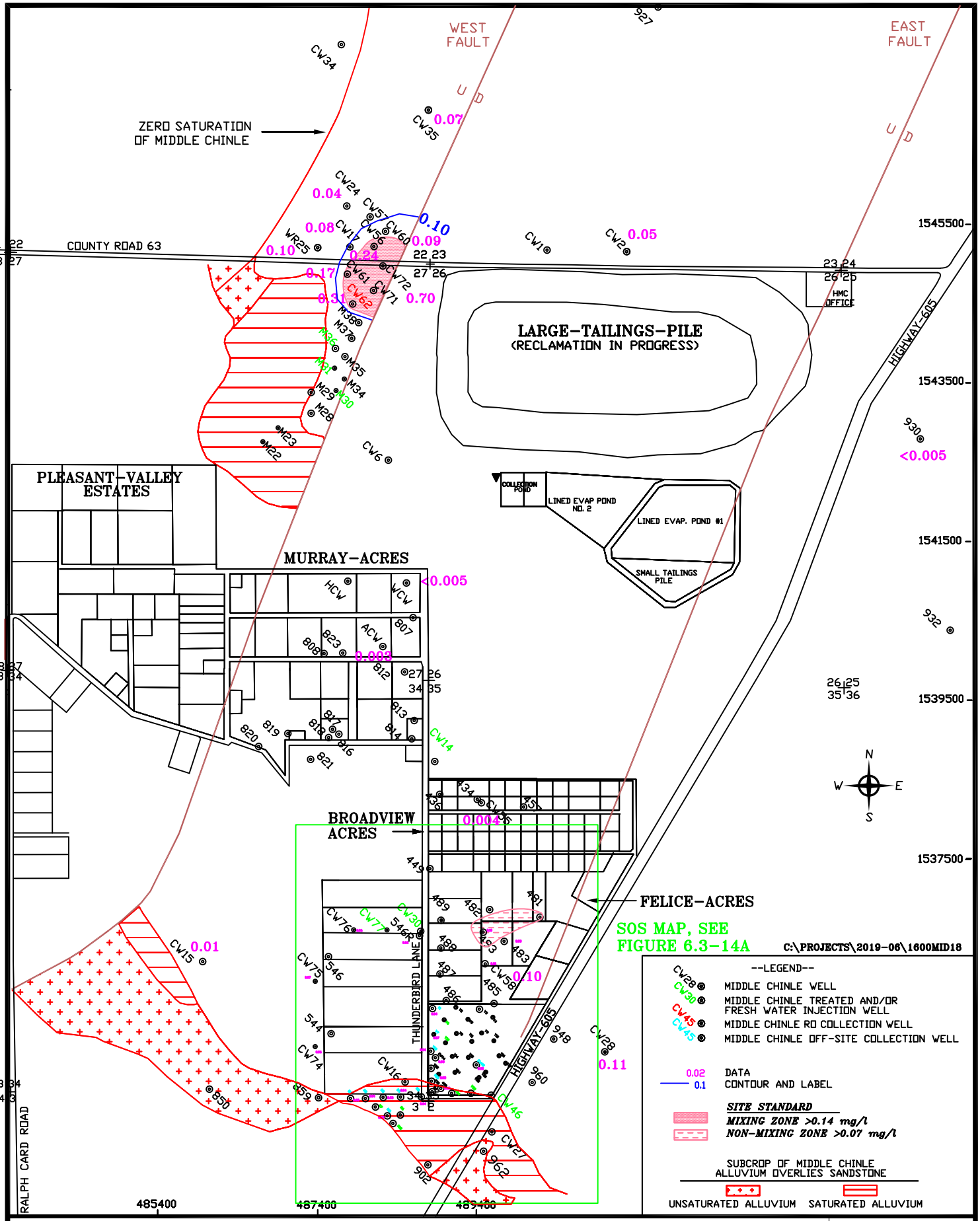

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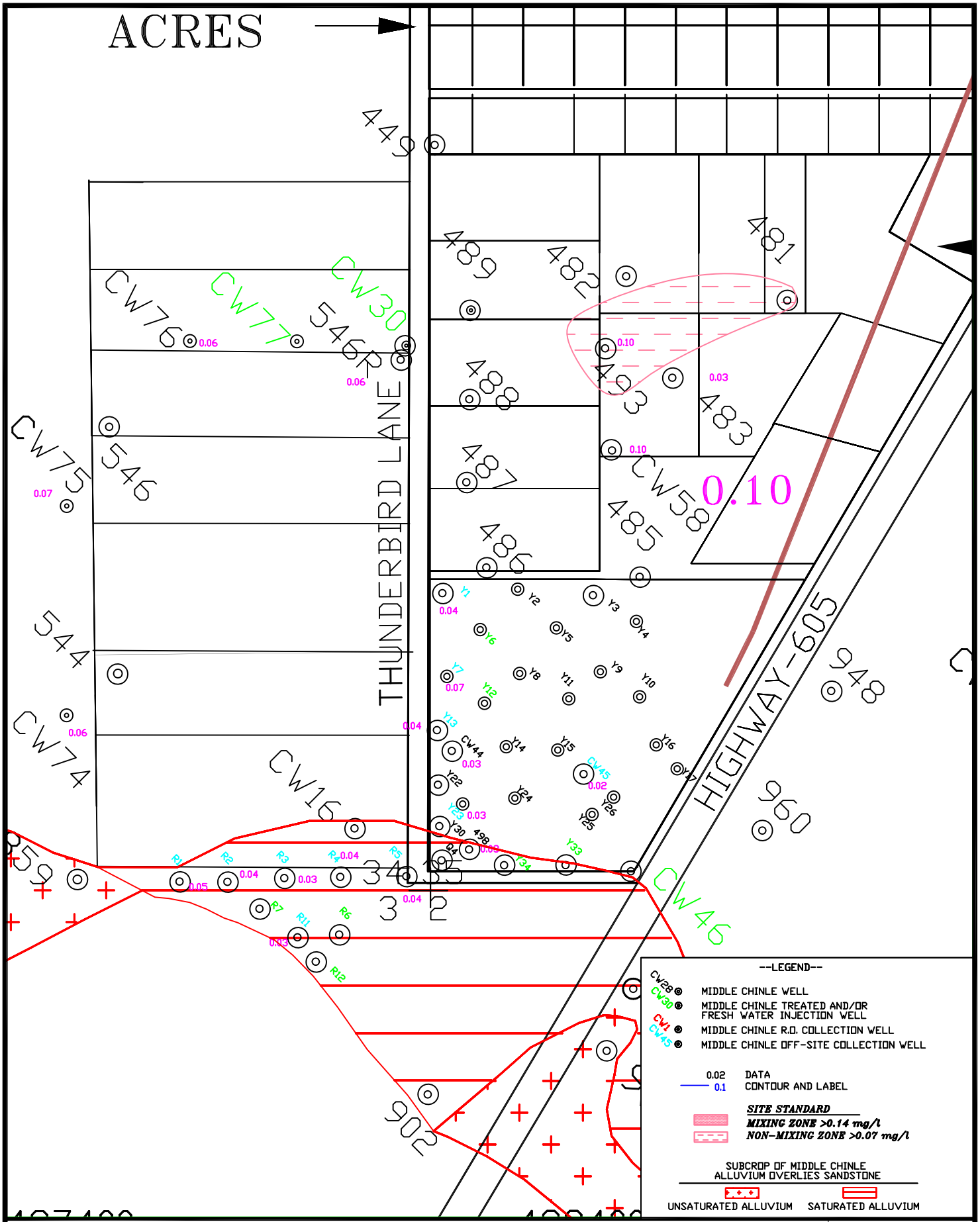
FIGURE 6.3-14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l



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

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FIGURE 6.3-14A. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2018, mg/l

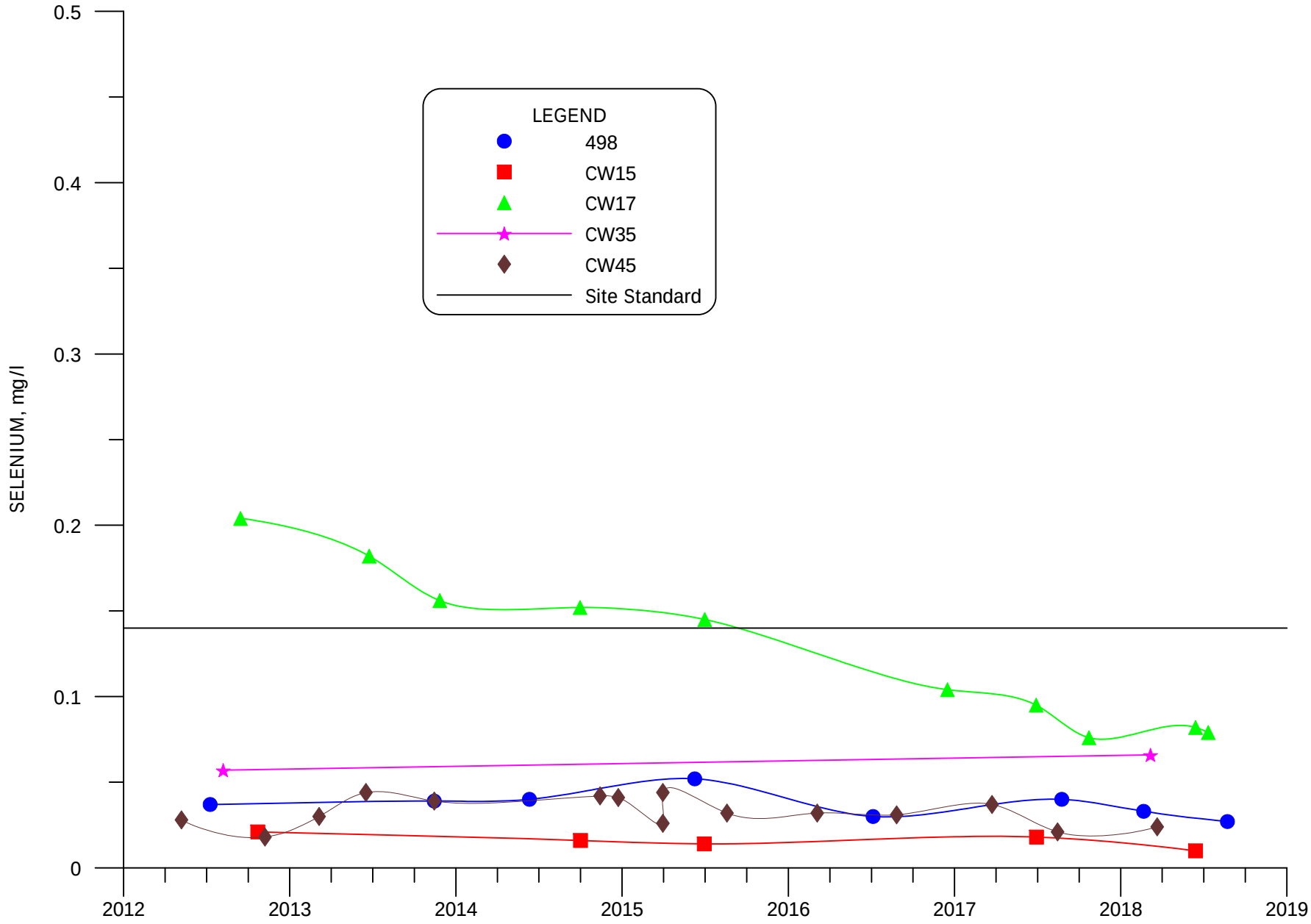

FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

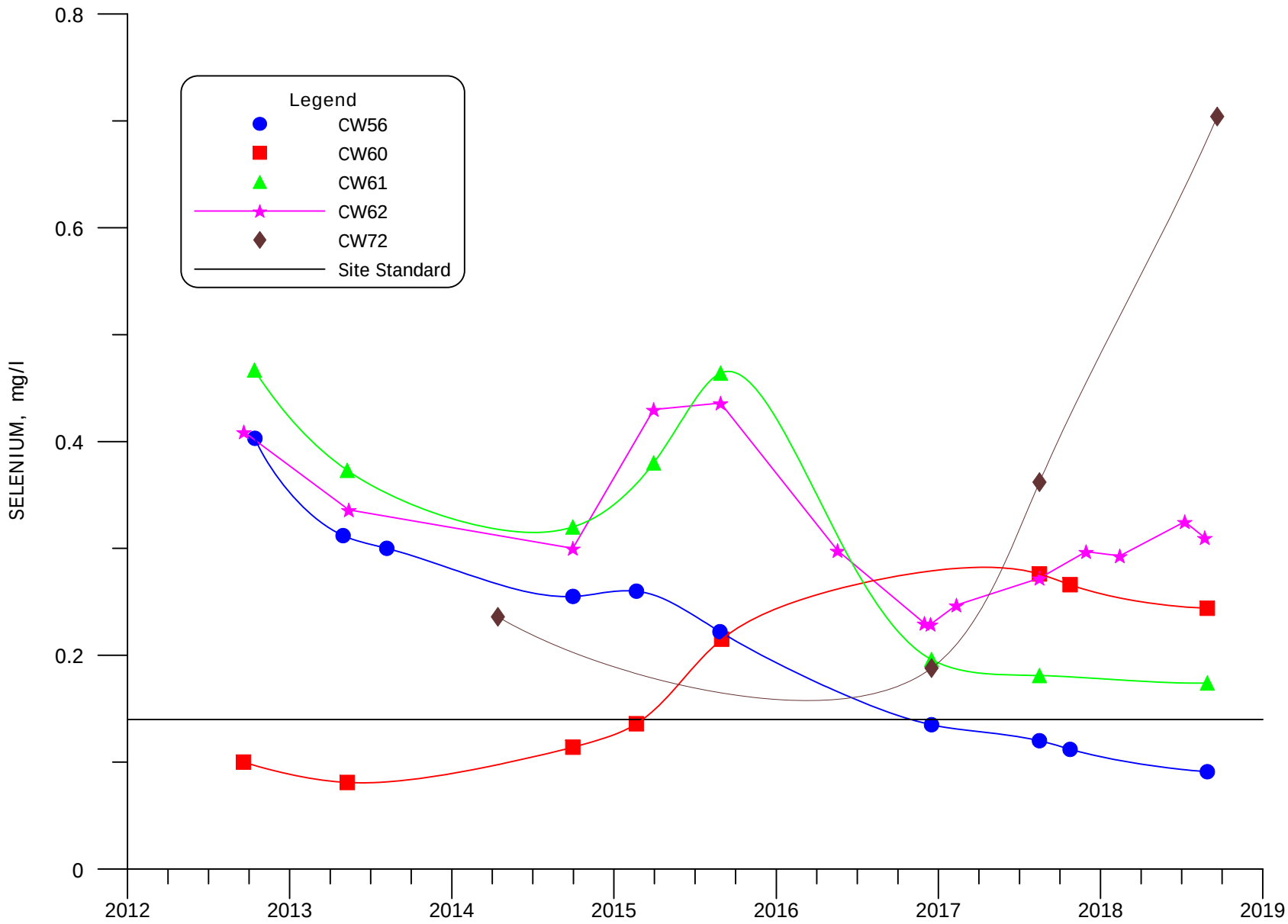

FIGURE 6.3-15A. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

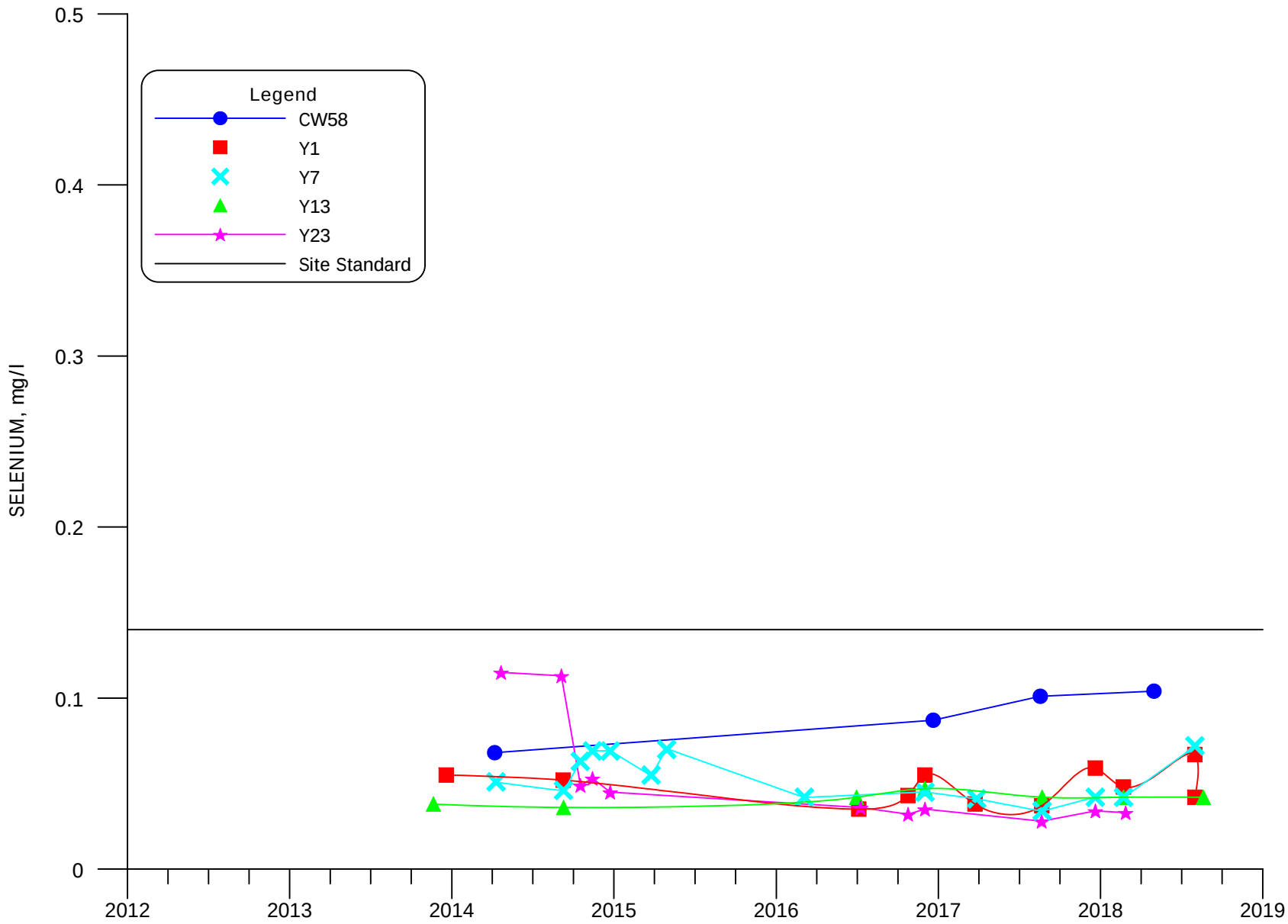

FIGURE 6.3-15B. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

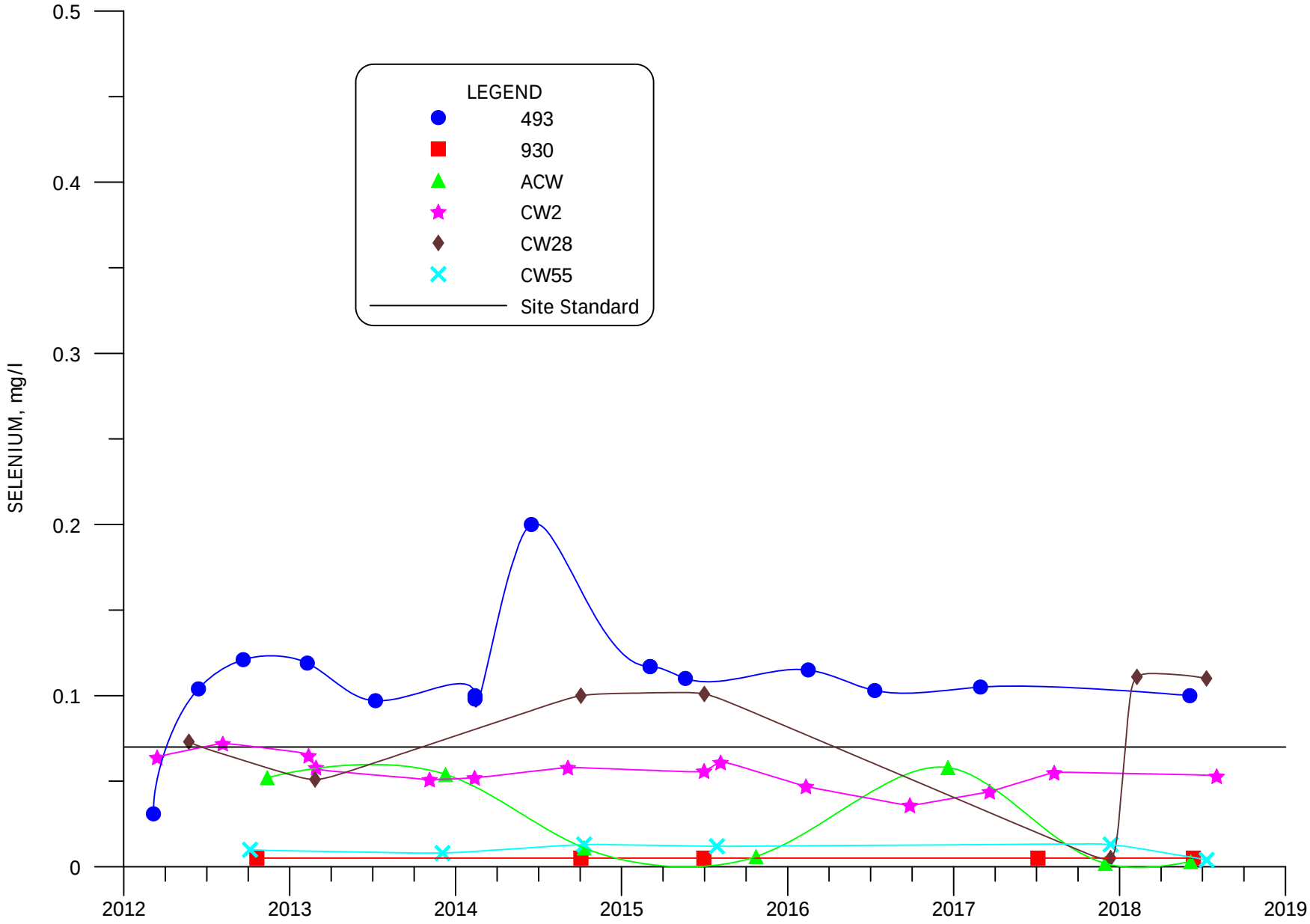

FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

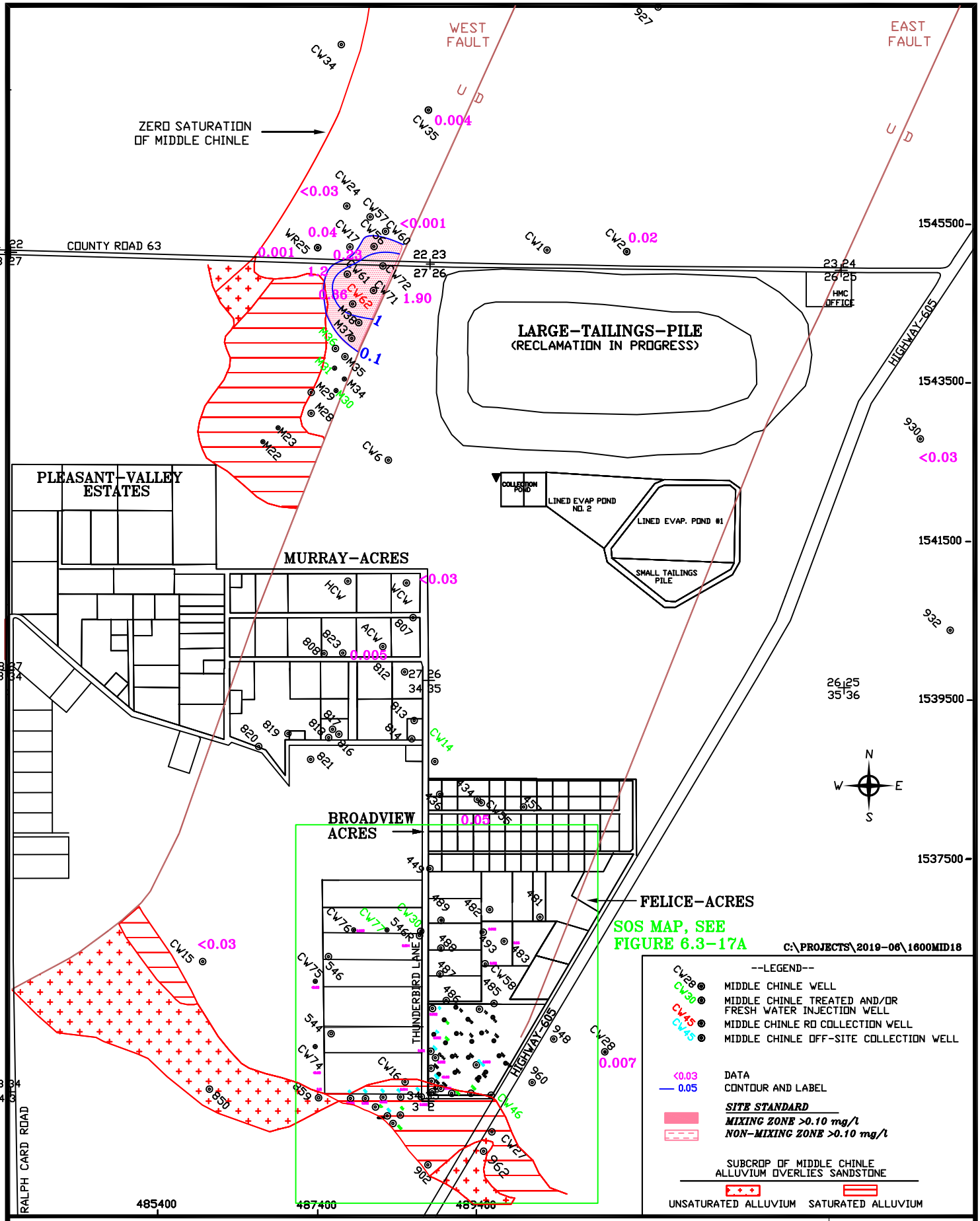

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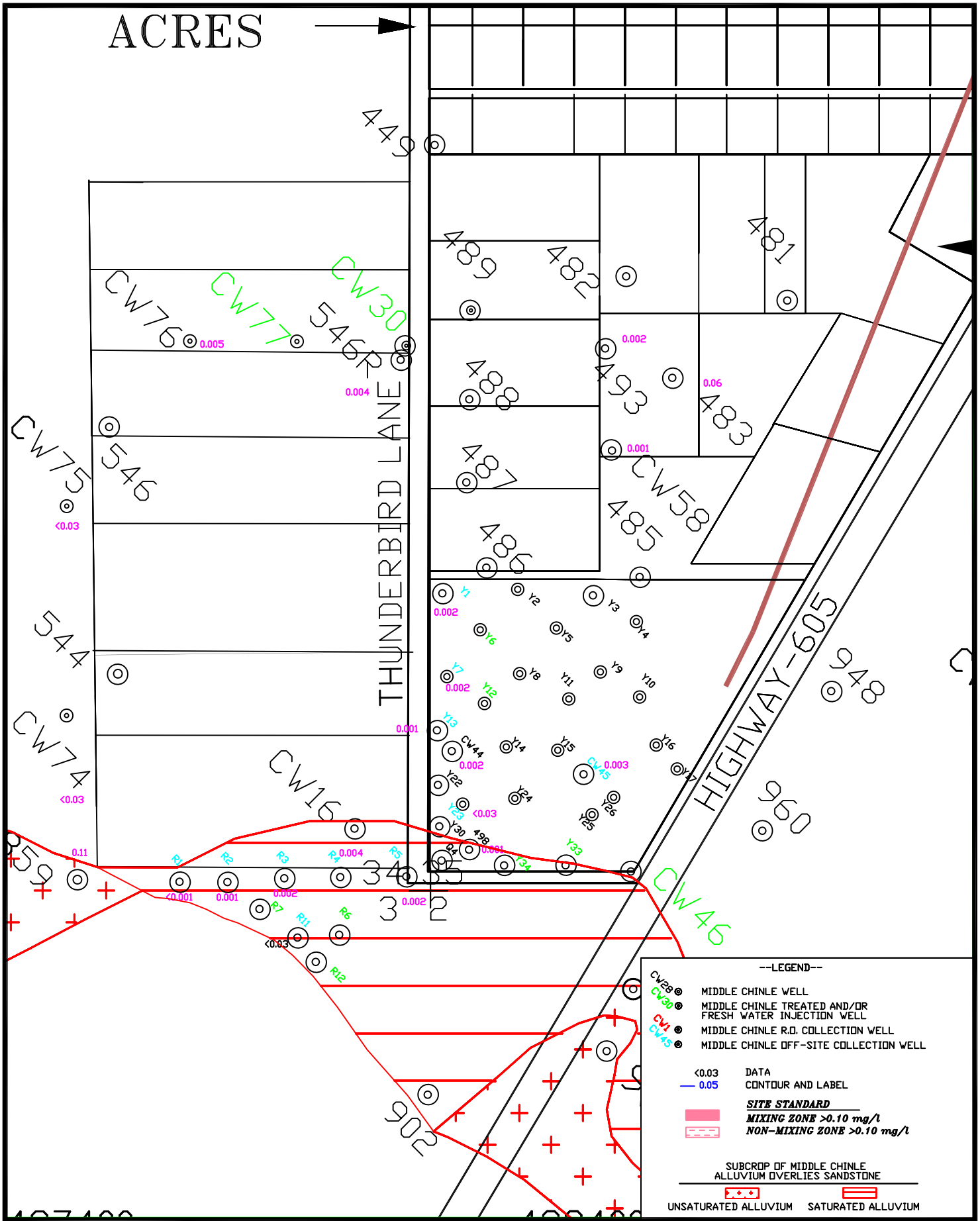
FIGURE 6.3-17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l



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

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SCALE: 1"=500'

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FIGURE 6.3-17A. MOLYBDENUM OF THE MIDDLE CHINLE AQUIFER, SOS, 2018, mg/l

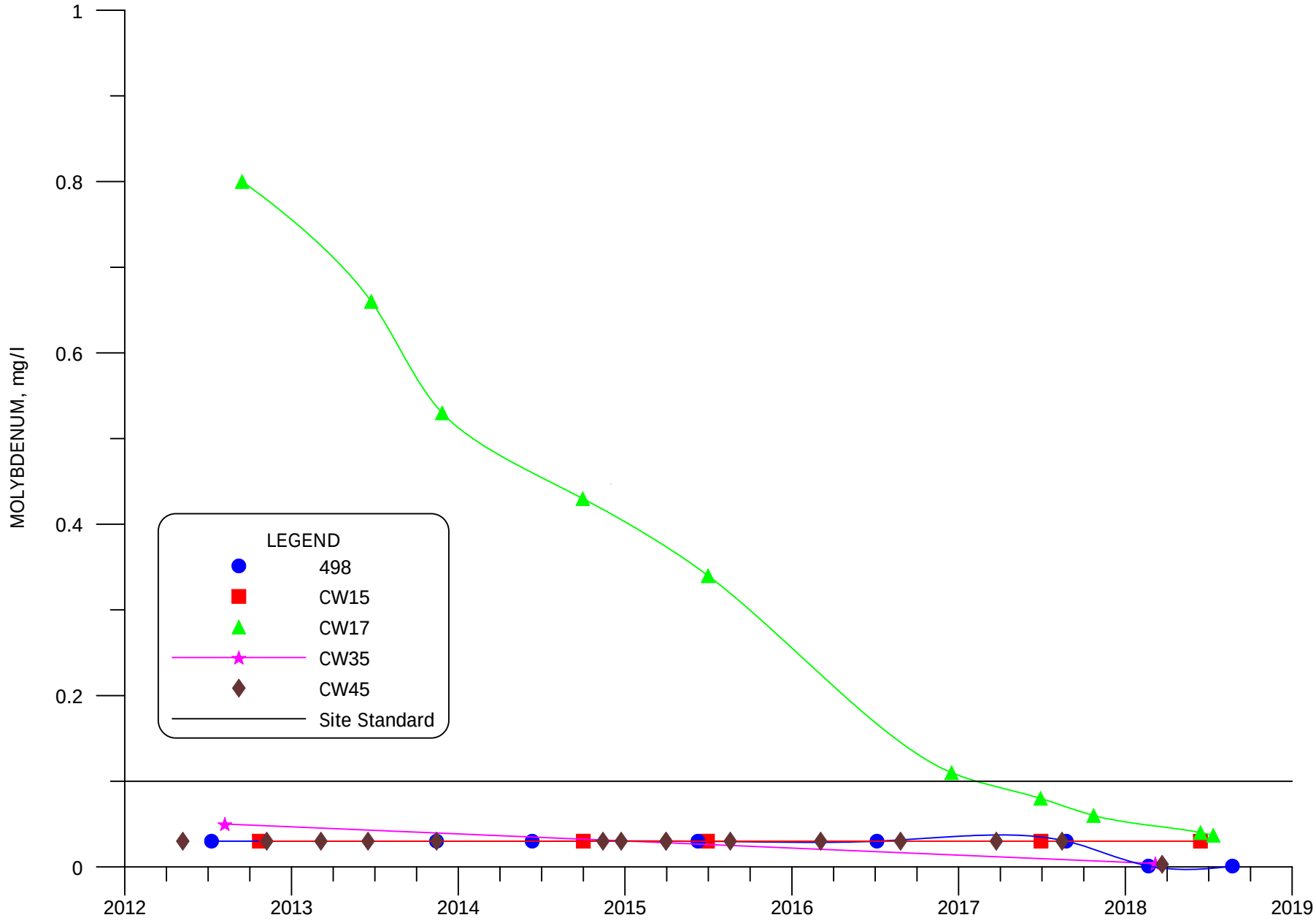

FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

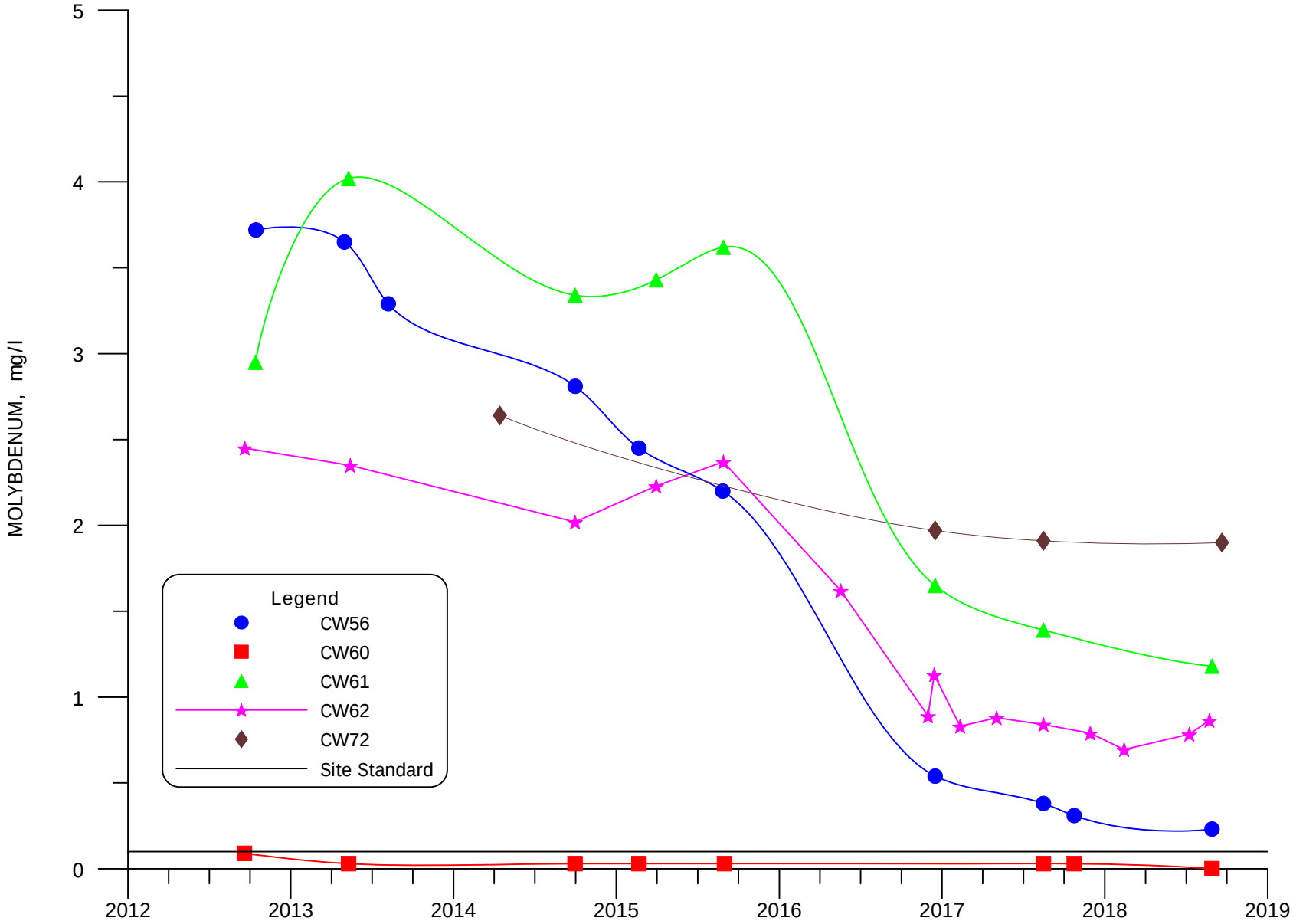

FIGURE 6.3-18A. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

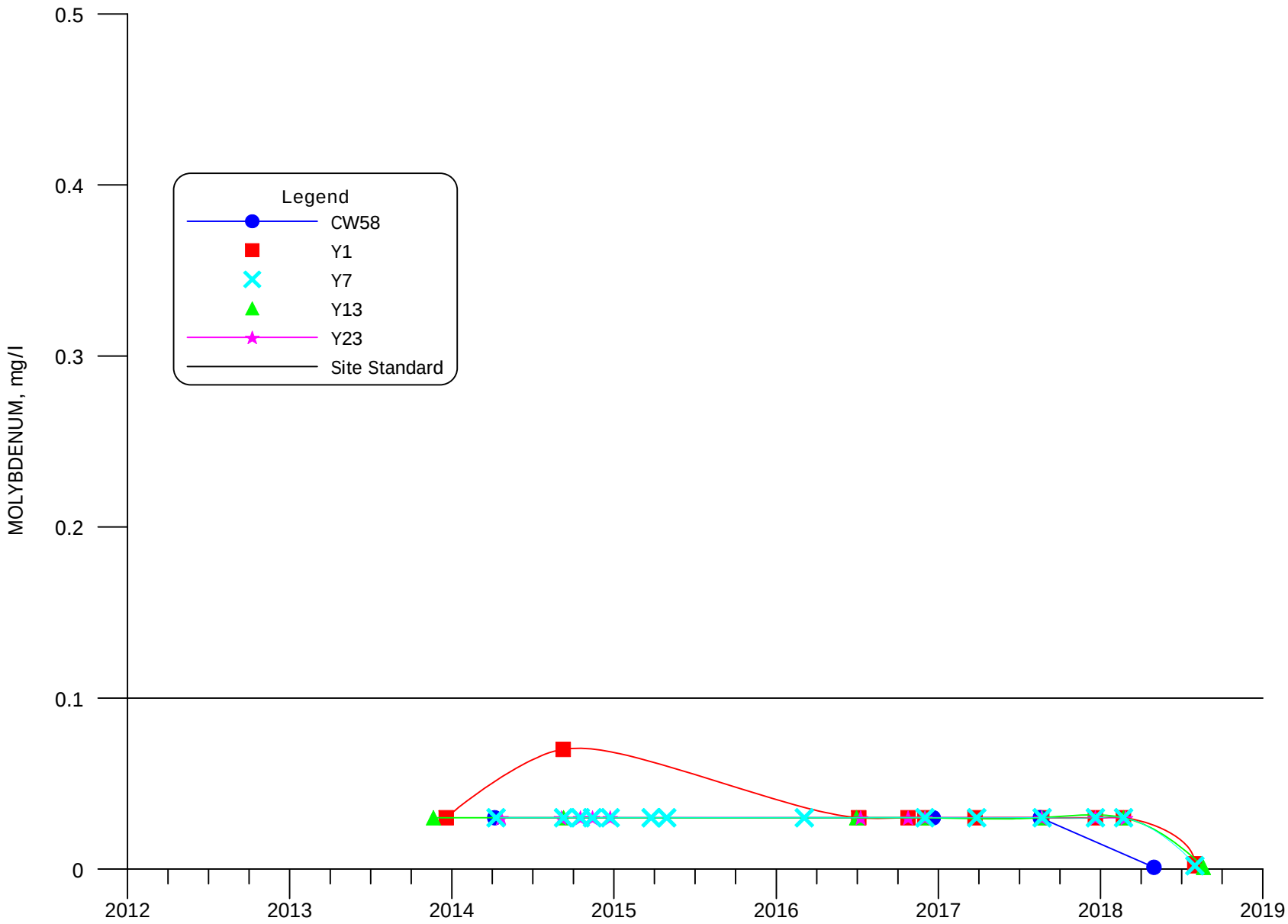

FIGURE 6.3-18B. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, Y1, Y7, Y13 AND Y23

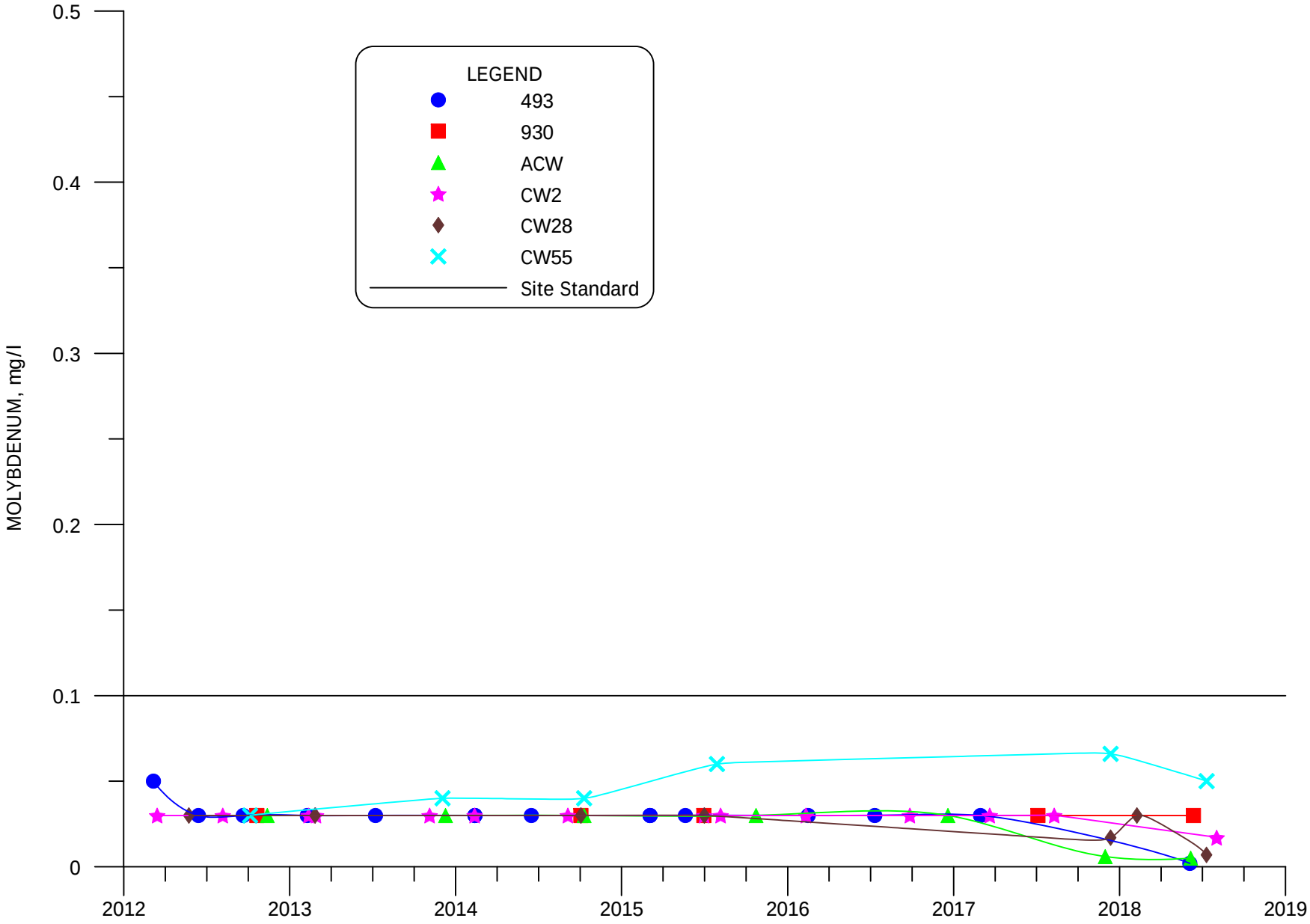

FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

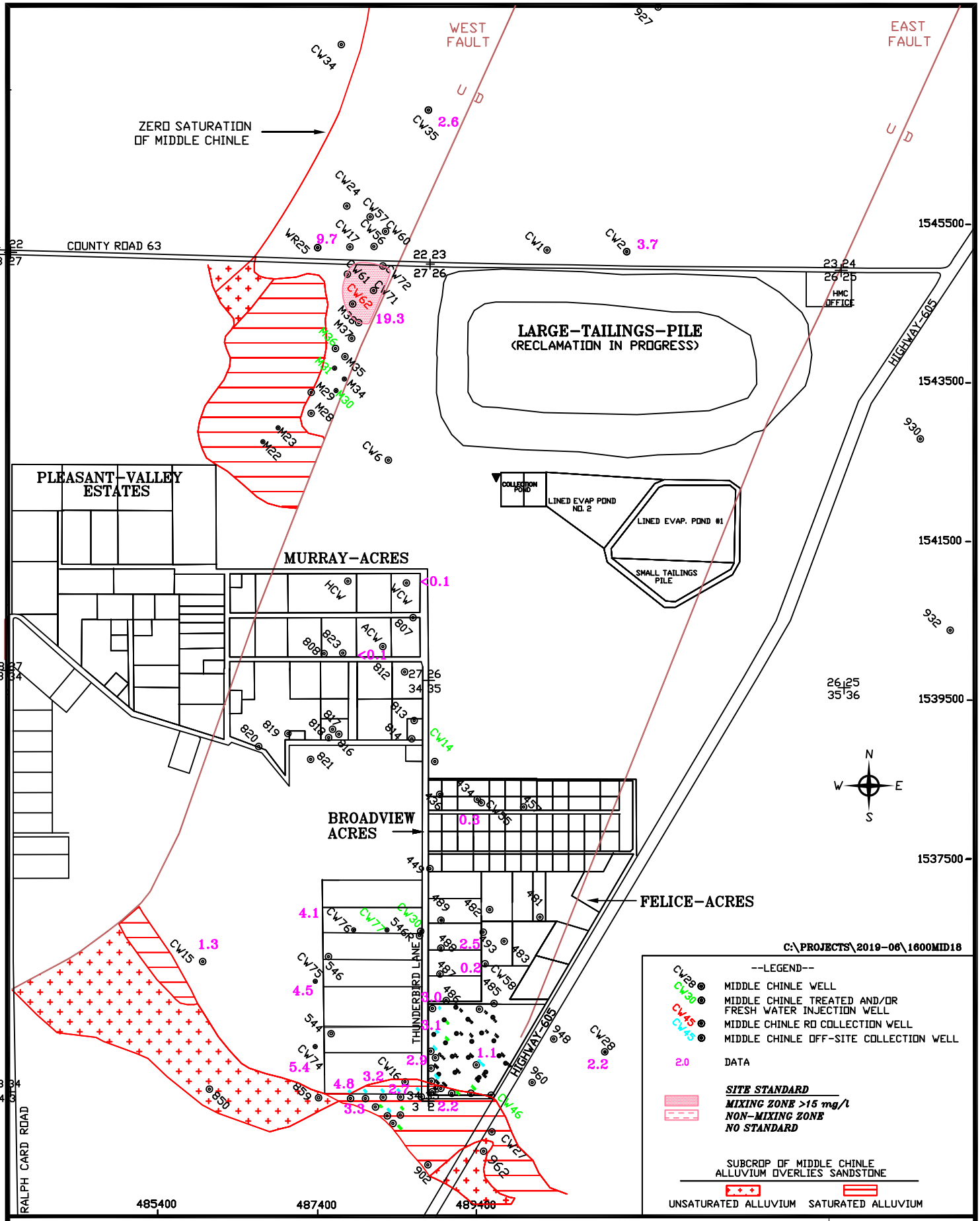

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FIGURE 6.3-20. NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2018, mg/l

DATE: 1/11/2019

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TABLE 6.3-1. MIDDLE CHINLE SITE STANDARDS AND 2018 BACKGROUND MIDDLE CHINLE DATA

	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
Middle Chinle Non-Mixing	0.07	0.07	0.10	1560	857	250	*	*
CHINLE MIXING ZONE WELLS								
CW9	<0.005	0.011	0.05	599	251	31	-	-
CW50	<0.001	0.025	0.002	1620	878	60	<0.1	-
CW52	-	-	-	-	-	-	-	-
CW15	0.01	0.028	<0.03	1590	824	29	-	-
CW24	0.12	0.13	<0.03	3150	1820	74	-	-
CW35	0.066	0.175	0.004	2340	1310	68	2.6	-
CW36	<0.001	0.009	0.003	1570	806	84	-	-
CW37	0.067	0.028	<0.03	1940	1070	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.041	0.045	0.001	2610	1370	225	8.2	-
MIDDLE CHINLE NON-MIXING ZONE WELLS								
ACW	0.003	0.007	0.005	1720	703	279	<0.1	<0.01
CW1	-	-	-	-	-	-	-	-
CW2	0.05	0.04	0.02	1520	681	104	3.7	0.01
CW28	0.11	0.02	0.007	1320	538	156	2.2	0.01
WCW	<0.005	0.02	<0.03	1680	783	128	<0.1	-

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

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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. No new Lower Chinle wells were drilled in 2018 and only Lower Chinle well R68 was used for south collection in 2018.

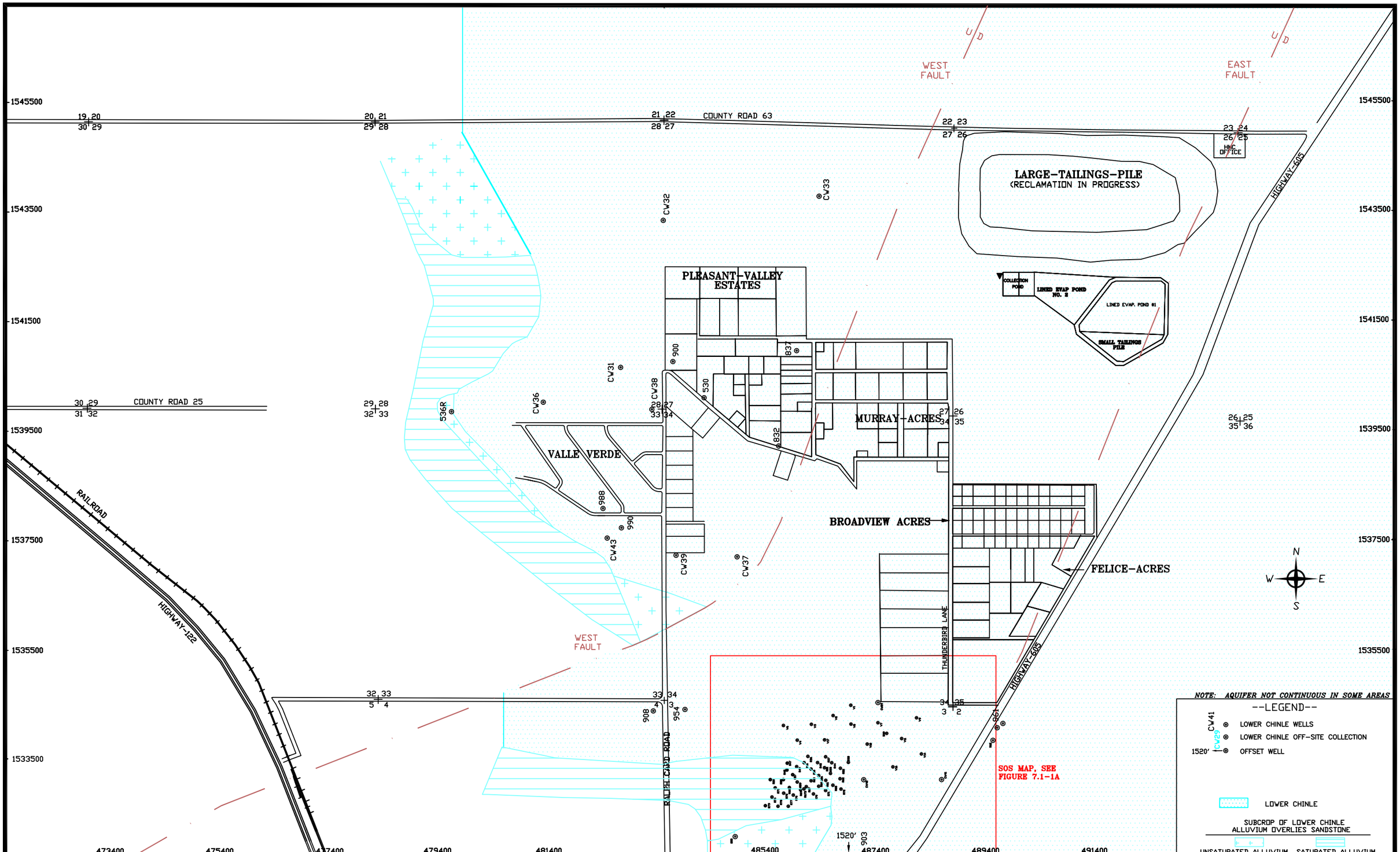

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FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, 2018

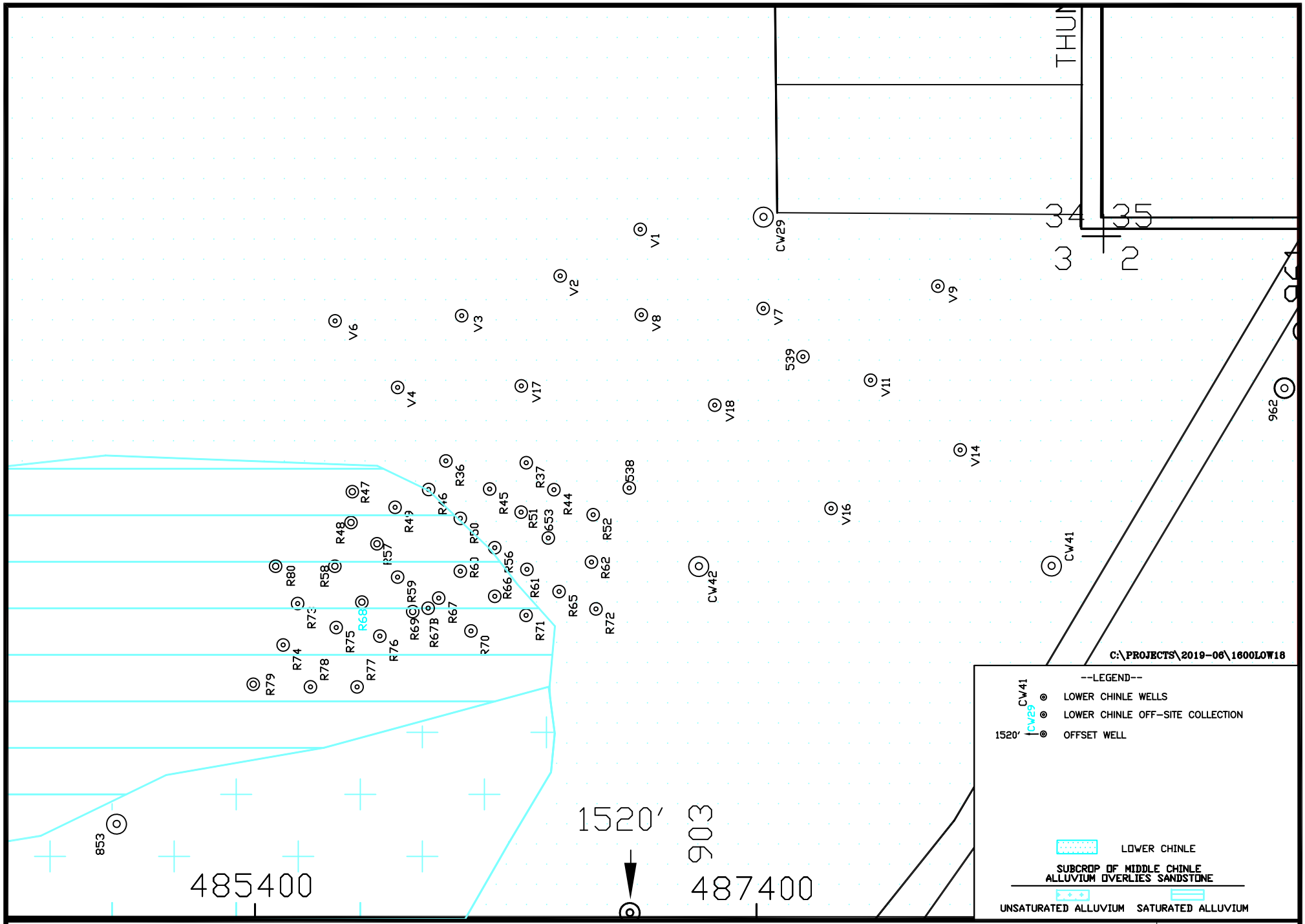

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FIGURE 7.1-1A. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2018

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SCALE: 1"=500'

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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 2018 water-level elevation contours. The West and East Faults are also shown on Figure 7.2-1. The approximate alluvial-Lower Chinle subcrop areas are also shown on this figure. Flow west of the West Fault in the Lower Chinle is mainly to the northeast. Flow between the two faults is to the northeast in the area of the tailings. The flow is to the northwest in the southern portion of the Lower Chinle aquifer between the faults. The northwesterly flow direction in this area indicates that the Lower Chinle water moves across the West Fault in the area west of Broadview Acres. The highest water-level elevations in Section 3 are in or near the subcrop area of the Lower Chinle showing that the alluvial aquifer is recharging the Lower Chinle aquifer in this area.

The Lower Chinle wells for which water-level time plots were prepared are shown on Figure 7.2-2. Water levels are presented for Lower Chinle wells 853, CW29, CW41, CW42, V6 and V9 on Figure 7.2-3. Figure 7.2-4 presents water-level elevations versus time for Lower Chinle wells CW31, CW32, CW33, CW36, CW37 and CW43 (see Figure 7.2-2 for location of these wells).

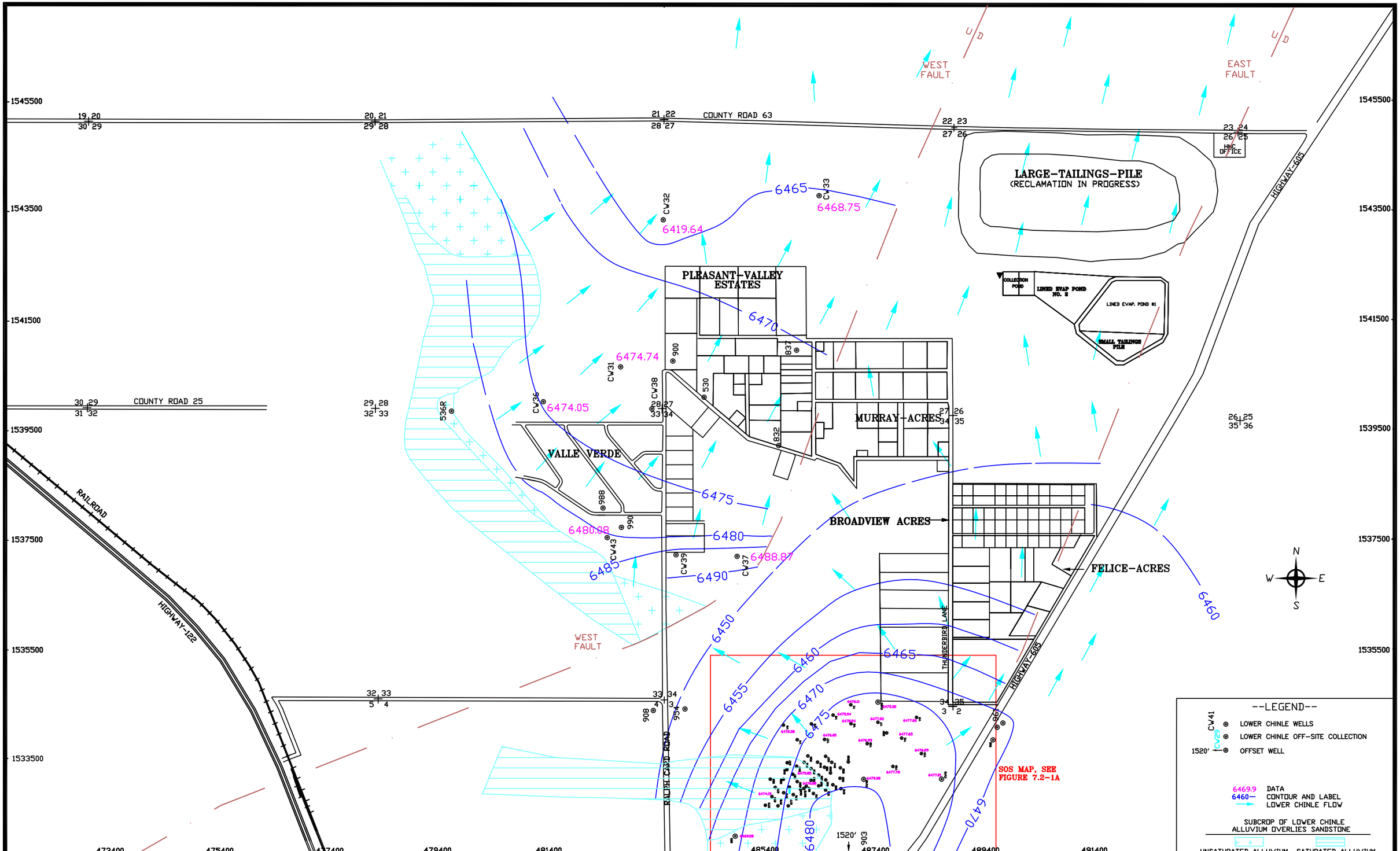

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FIGURE 7.2-1 WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, 2018, FT-MSL

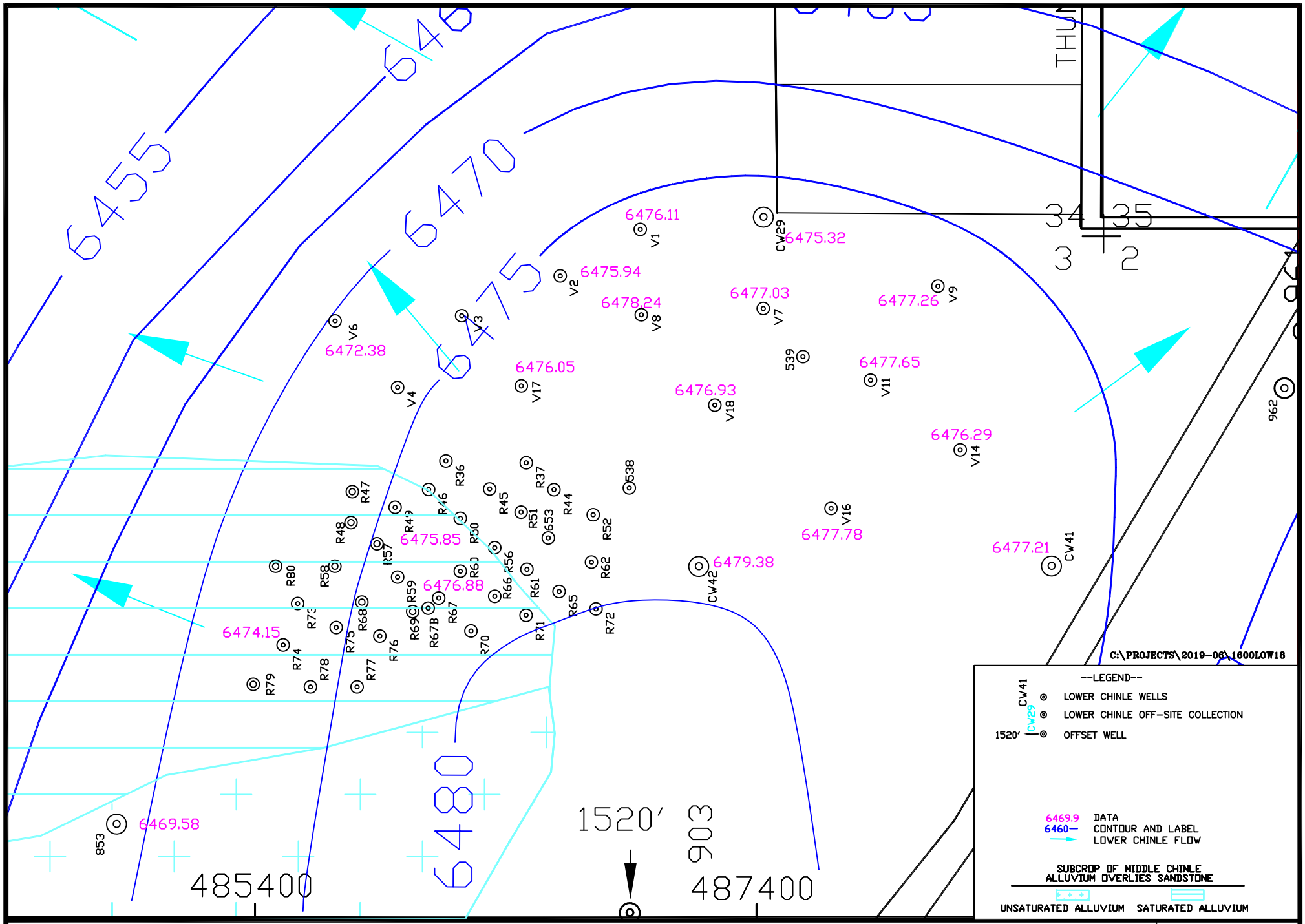

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FIGURE 7.2-1A. WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2018, FT-MSL

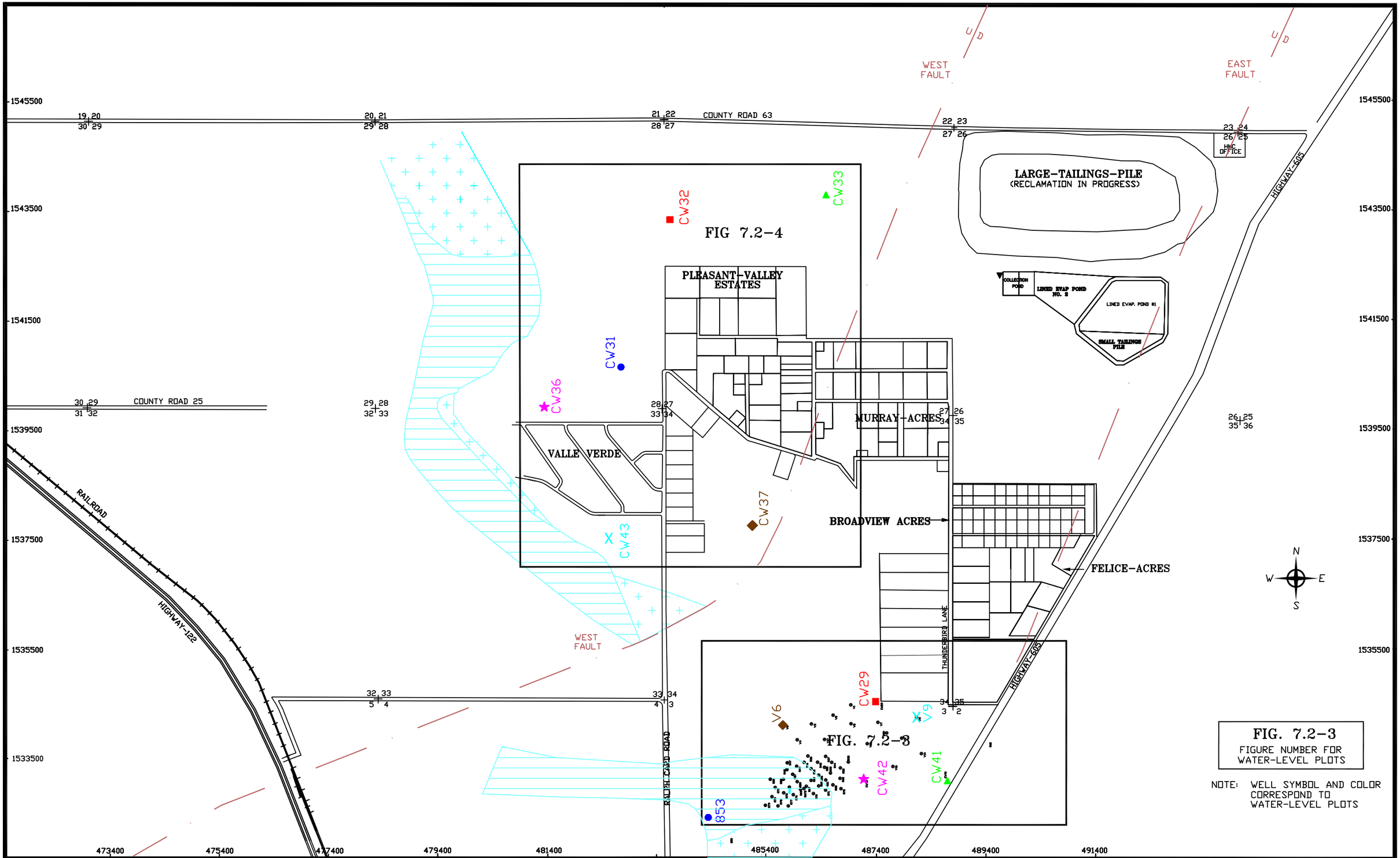

FIG. 7.2-3
FIGURE NUMBER FOR WATER-LEVEL PLOTS

NOTE: WELL SYMBOL AND COLOR CORRESPOND TO WATER-LEVEL PLOTS

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FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2018

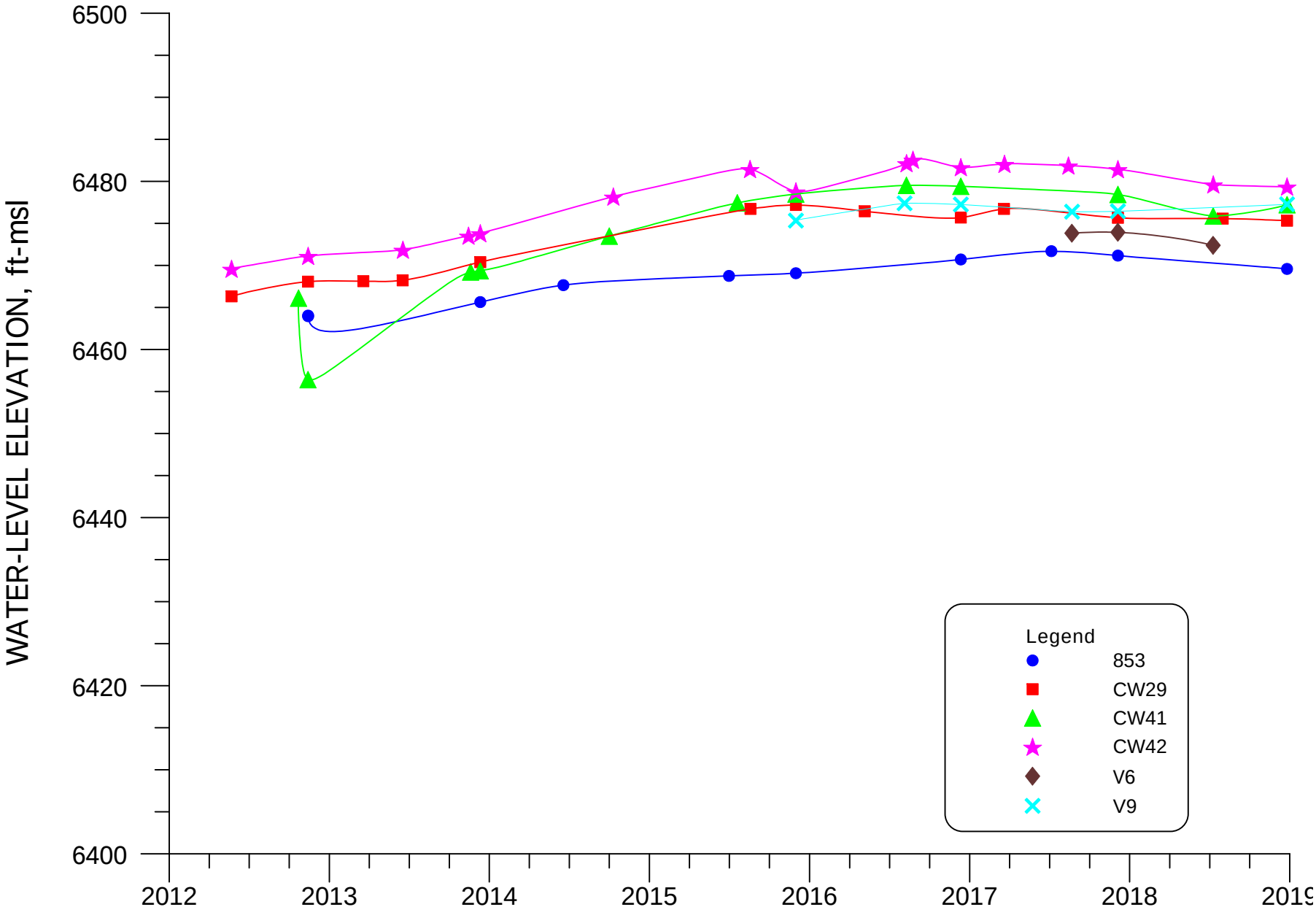

FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 853, CW29, CW41, CW42, V6 AND V9.

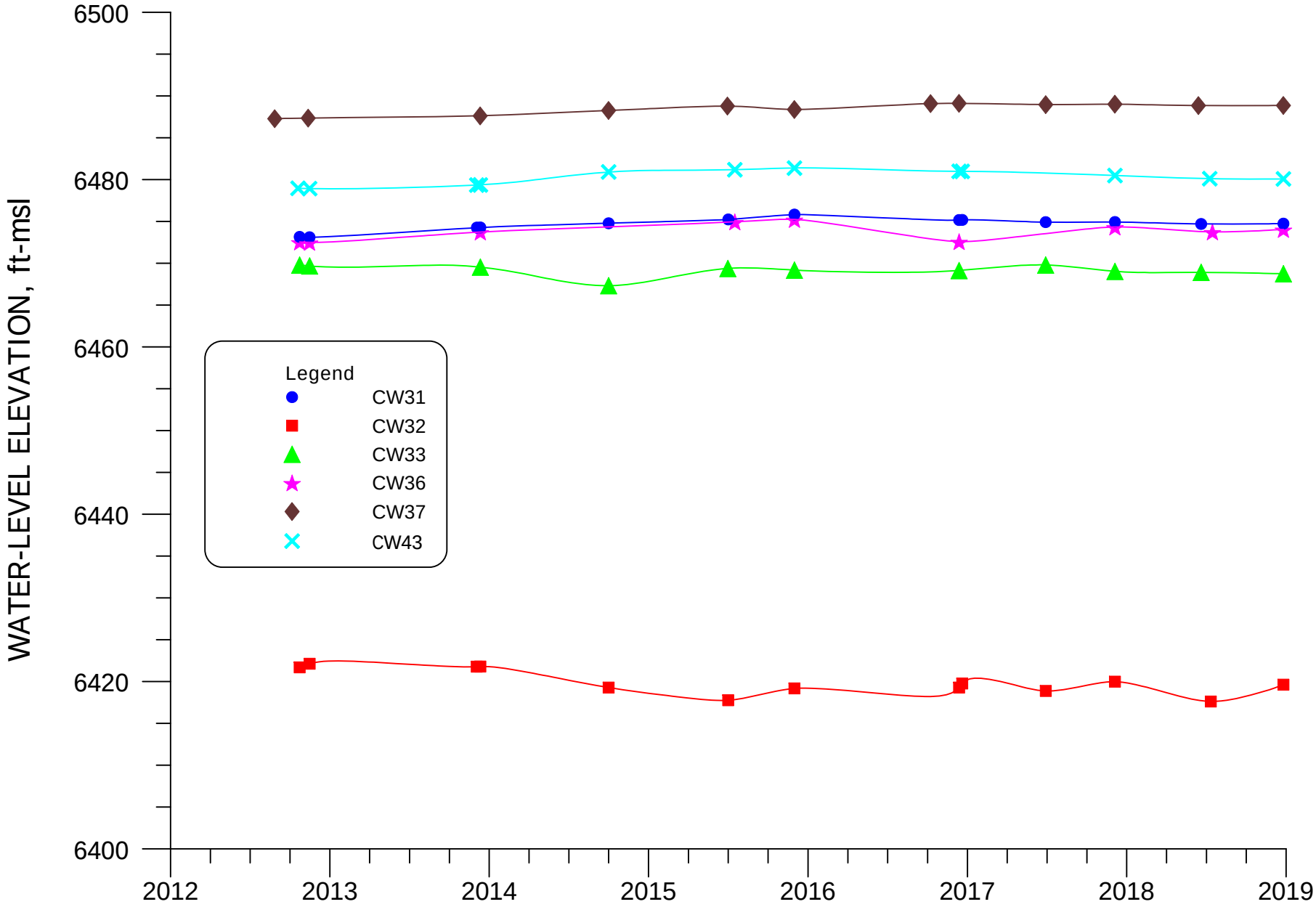

FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW36, CW37, AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2018 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 is presented in Tables 5.1-1 through 5.1-4, and the orientation of the well name on Figures 5.1-1, 5.1-1A and 5.1-1B indicates which of the Chinle wells are completed in the Lower Chinle.

The Lower Chinle wells used in establishing the Chinle site standards are shown on Figure 7.3-1 with a blue box around the well name showing which Lower Chinle wells were used to define the non-mixing zone site standard. The yellow pattern on this figure shows the mixing zone for the Lower Chinle aquifer. The Lower Chinle wells used in conjunction with the Upper and Middle Chinle wells (see Figures 5.3-1 and 6.3-1 for the Upper and Middle Chinle wells respectively used) in establishing the mixing zone site standards are shown with a red box around their well names. Table 7.3-1 presents Chinle mixing zone site standards and the non-mixing zone Lower Chinle site standards. This table also presents the 2018 data for the Chinle mixing zone wells and the Lower Chinle non-mixing zone wells.

Constituent concentrations in the Lower Chinle aquifer exceed background conditions only in Section 3, except for some natural exceedances in the far down-gradient wells. Sulfate concentrations in the Lower Chinle aquifer are within the NRC standards except in far down-gradient where concentrations exceed the relevant non-mixing background value. Uranium concentrations exceed the NRC site standards only in the northeastern and central portions of Section 3 and the southern portion of Section 34. Molybdenum concentrations in the Lower Chinle aquifer are much less than 0.1 mg/l.

7.3.1 SULFATE – LOWER CHINLE

Figures 7.3-1A and 7.3-1B presents contours of sulfate concentrations in the Lower Chinle aquifer during 2018. Lower Chinle standards based on background data are presented for sulfate in the legend of Figures 7.3-1A and 7.3-1B. None of the Lower Chinle concentrations in the mixing zone (see Figure 7.3-1 for the Lower Chinle mixing zone area) 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 and shows that data for mixing zone Lower Chinle wells CW36, CW37, CW42, CW43, V1 and V6 are grouped together on the water-quality time plots, and data for non-mixing zone wells CW29, CW31, CW32, CW33 and CW41 are presented on a second plot. Well V1 was included with the mixing zone wells because it has a calcium concentration slightly above the non-mixing zone level. Figure 7.3-3 presents sulfate concentrations plotted versus time for the Lower Chinle mixing-zone wells. Sulfate concentrations plotted for Lower Chinle wells CW29, CW31, CW32, CW33 and CW41 are presented on Figure 7.3-4 (see Figure 7.3-2 for location of these wells) with the non-mixing zone standard.

7.3.2 TOTAL DISSOLVED SOLIDS – LOWER CHINLE

Figures 7.3-5 and 7.3-5A presents the total dissolved solids (TDS) concentrations in the Lower Chinle aquifer during 2018. All concentrations for 2018 were less than the non-mixing zone site standard value of 4140 mg/l. Concentrations are thought to naturally exceed this level farther down-gradient as shown by the cyan pattern. The TDS concentration naturally increases down-gradient due to the low permeability and correspondingly slow movement of water through this shale aquifer. All TDS concentrations on Figure 7.3-5A are less than the mixing zone standard of 3140 mg/l. Figures 7.3-6 and 7.3-7 present TDS concentrations for the mixing zone and non-mixing zone Lower Chinle wells respectively.

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 2018 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 2018. Uranium concentrations in the Lower Chinle exceeded the mixing-zone background concentration in the central portion of Section 3, while three wells exceeded the non-mixing zone background concentration. Uranium concentrations plotted versus time for Lower Chinle wells CW36, CW37, CW42, CW43, V1 and V6 are presented on Figure 7.3-9. The uranium concentrations in all of the Lower Chinle non-mixing zone wells with data presented on Figure 7.3-10 have remained at low levels with higher values in well CW29.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2018 are presented on Figures 7.3-11 and 7.3-11A. None of the selenium concentrations in water from the Lower Chinle wells exceeded the site standards. The mixing and non-mixing zone site standards are 0.14 and 0.32 mg/l, respectively, for the Lower Chinle aquifer.

Figure 7.3-12 presents selenium concentration versus time plots for wells CW36, CW37, CW42, CW43, V1 and V6. Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW29, CW31, CW32, CW33 and CW41.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2018 were generally very small with a few value less than 0.03 mg/l which was the old detection limit used in early 2018 and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2018 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 2018 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 2018. Nitrate concentrations from the tailings seepage are not expected to be significant in the future and therefore the potential in the Lower Chinle aquifer does not exist due to the very limited extent of elevated concentrations in the alluvial aquifer.

7.3.8 RADIUM-226 AND RADIUM-228 – LOWER CHINLE

All radium concentrations for 2018 were low in the Lower Chinle aquifer except a value of 6.4 pCi/l for well CW32 which is considered a laboratory outlier. Radium-226 and radium-228 are not important parameters relative to the Lower Chinle aquifer; therefore, a site standard for the Lower Chinle has not been set. These low levels of radium do not warrant the development of a figure presenting areal distribution of radium. Radium-228 analysis is typically more erratic than other constituents but the available data shows that radium-226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the Homestake site.

7.3.9 VANADIUM - LOWER CHINLE

Vanadium concentrations have always been low in the Lower Chinle aquifer. Significant concentrations in the Lower Chinle aquifer would not be expected because concentrations of this constituent have only been slightly elevated in the alluvial aquifer near the tailings. Vanadium concentrations in the Lower Chinle aquifer have never been large enough to support consideration of this constituent for setting a site standard.

7.3.10 THORIUM-230 – LOWER CHINLE

Thorium-230 concentrations have never been significant in the Lower Chinle aquifer and, therefore, should be dropped from the Lower Chinle monitoring list and eliminated from consideration as a Lower Chinle standard. No plots of thorium-230 concentrations with time were prepared, because concentrations have historically been low.

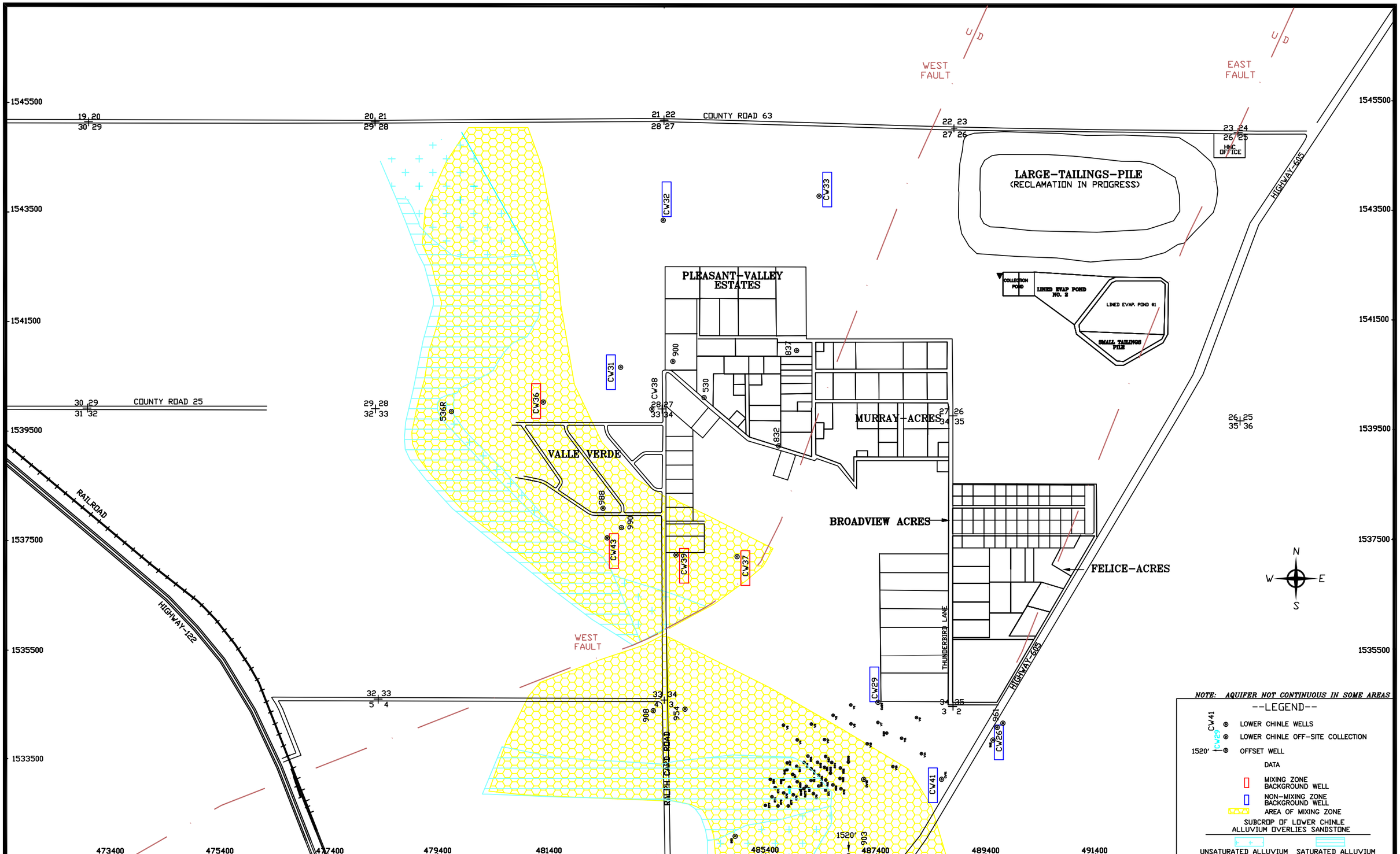

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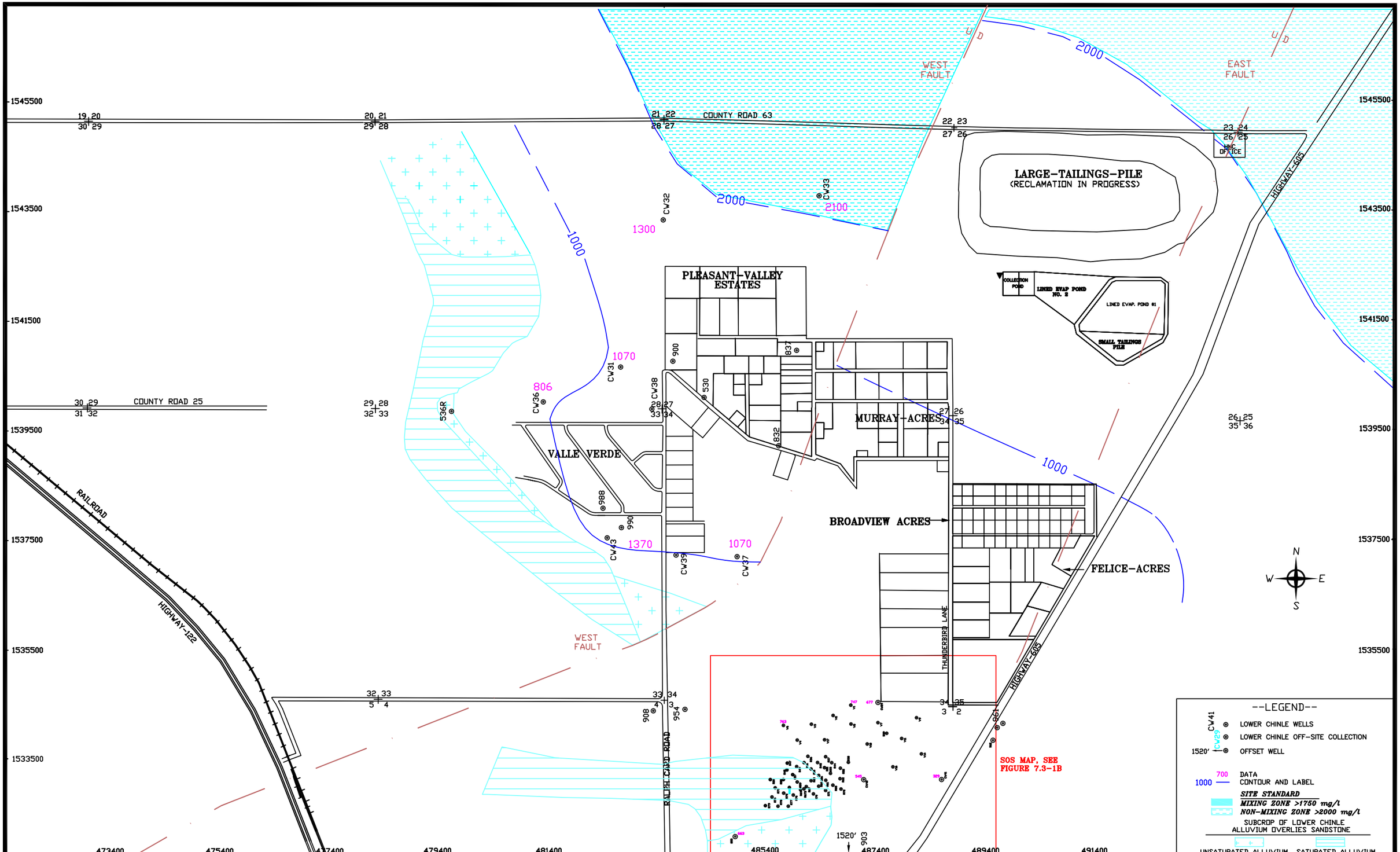
FIGURE 7.3-1. LOCATION OF LOWER CHINLE WELLS USED FOR SITE STANDARDS AND LOWER CHINLE MIXING ZONE



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DATE: 1/14/2019

FIGURE 7.3-1A. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2018, mg/l

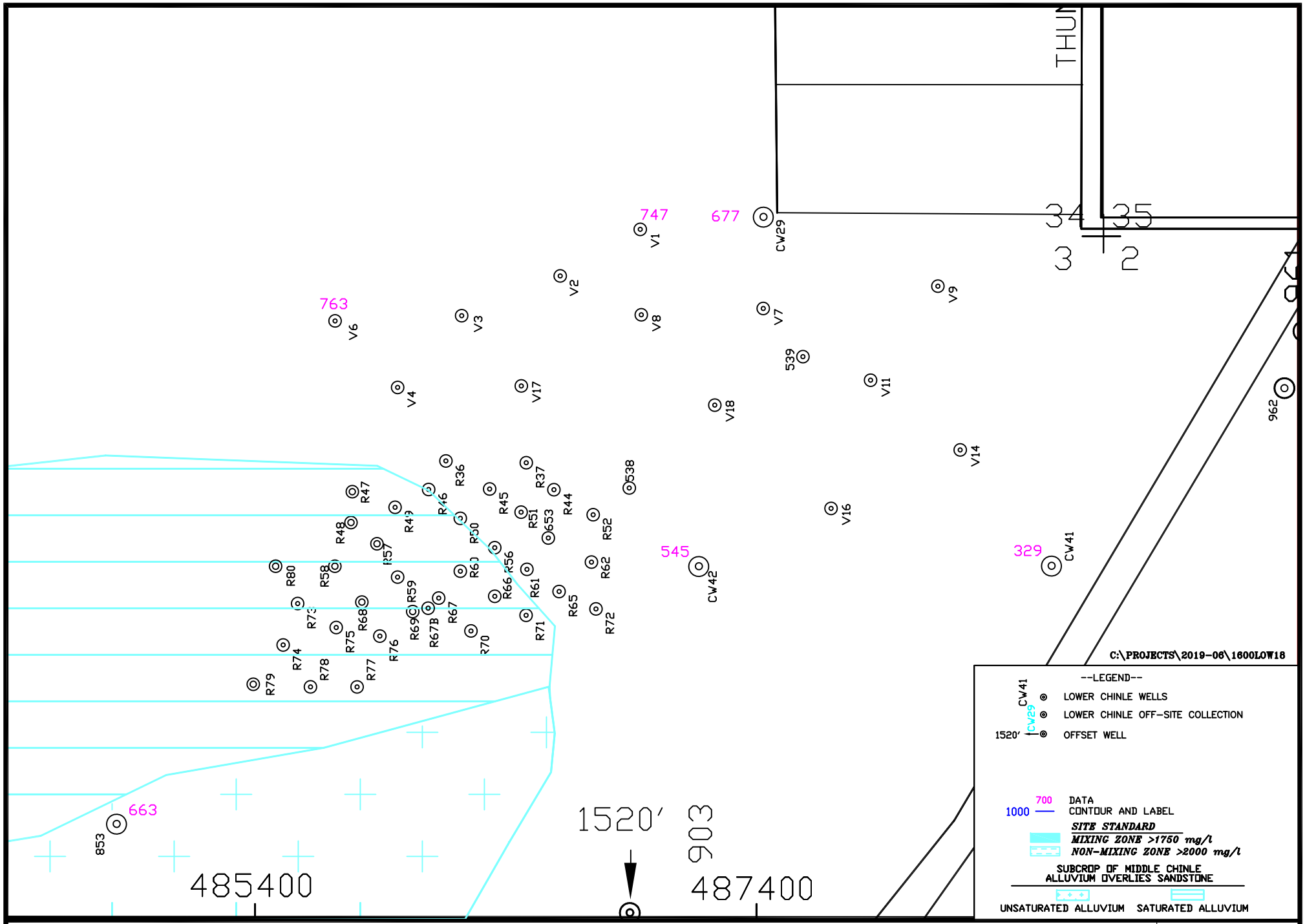

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FIGURE 7.3-1B. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2018, mg/l

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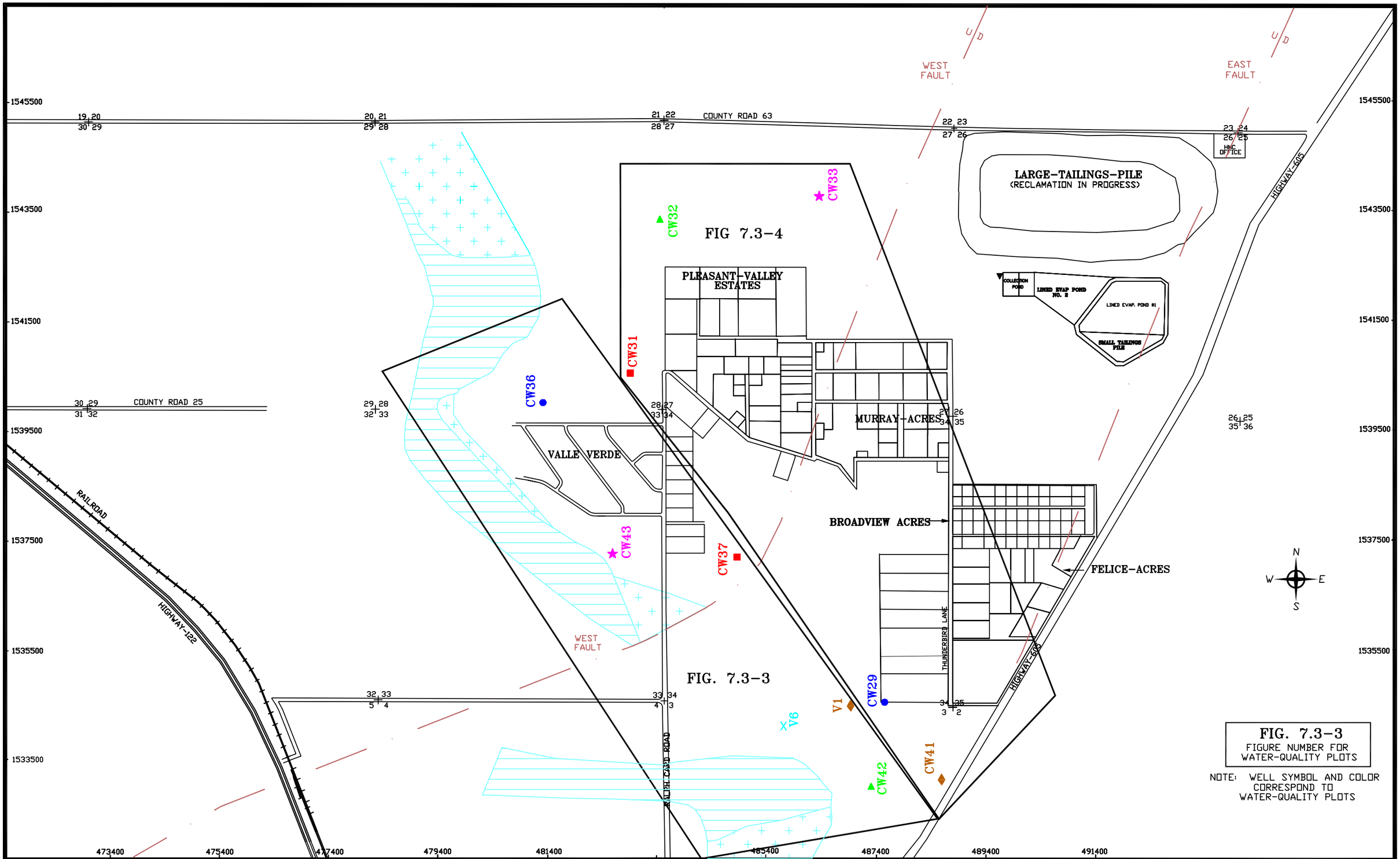
SCALE: 1"=500'

PAGE: 7.3-7



SCALE: 1" = 1600'
C:\PROJECTS\2019-06\1600LOW18
DATE: 1/14/2019

FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2018

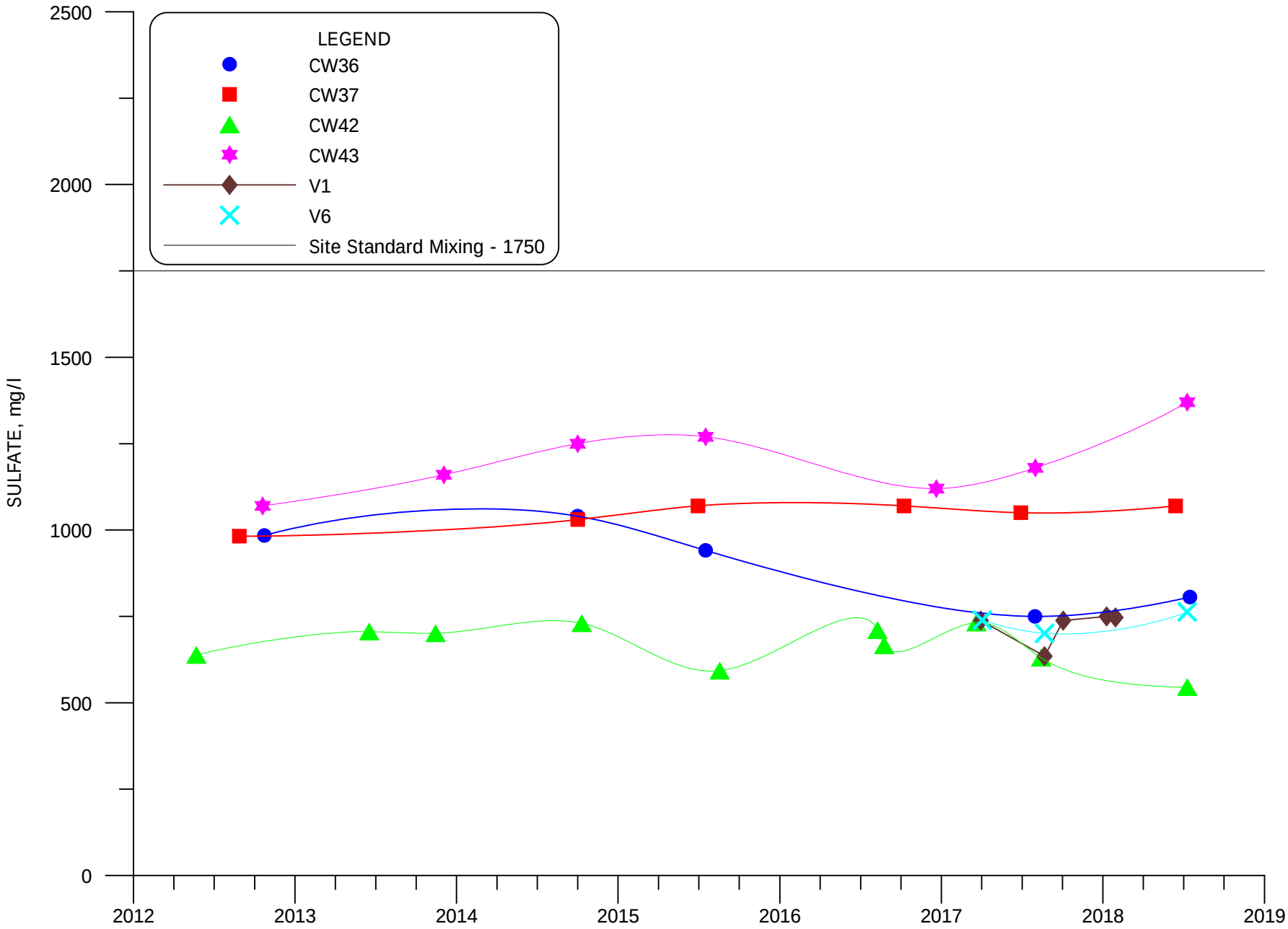


FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43, V1 AND V6

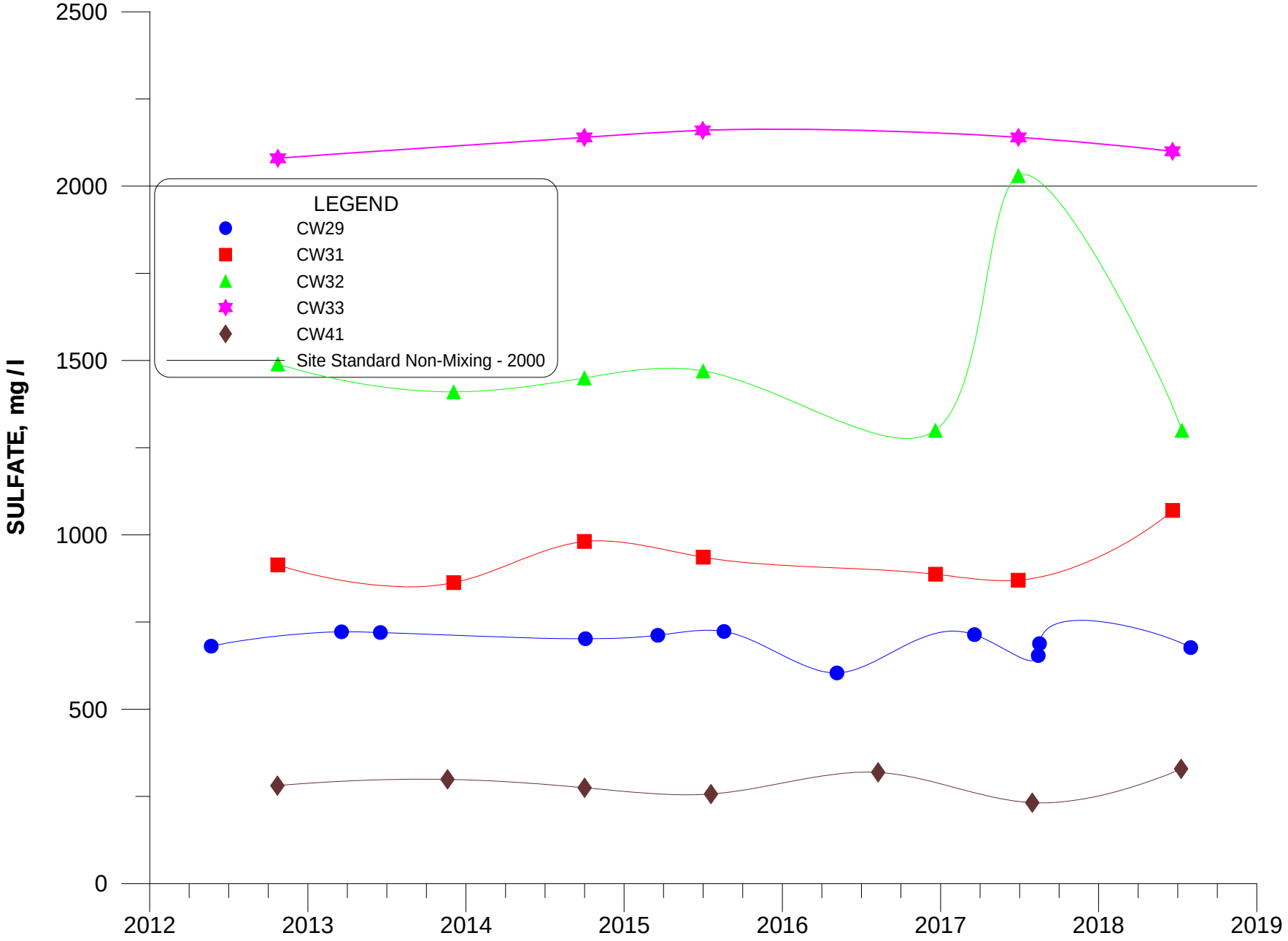
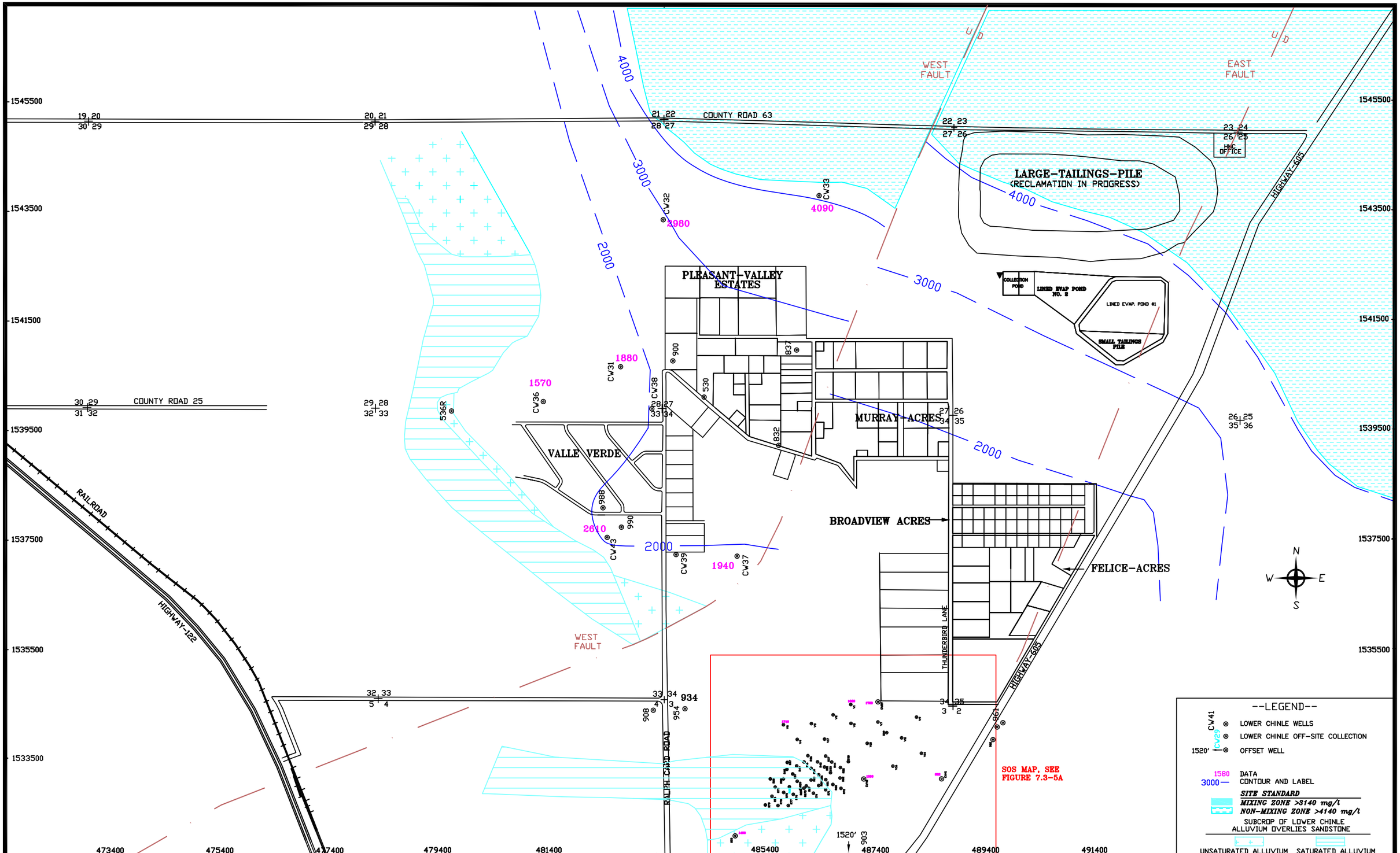
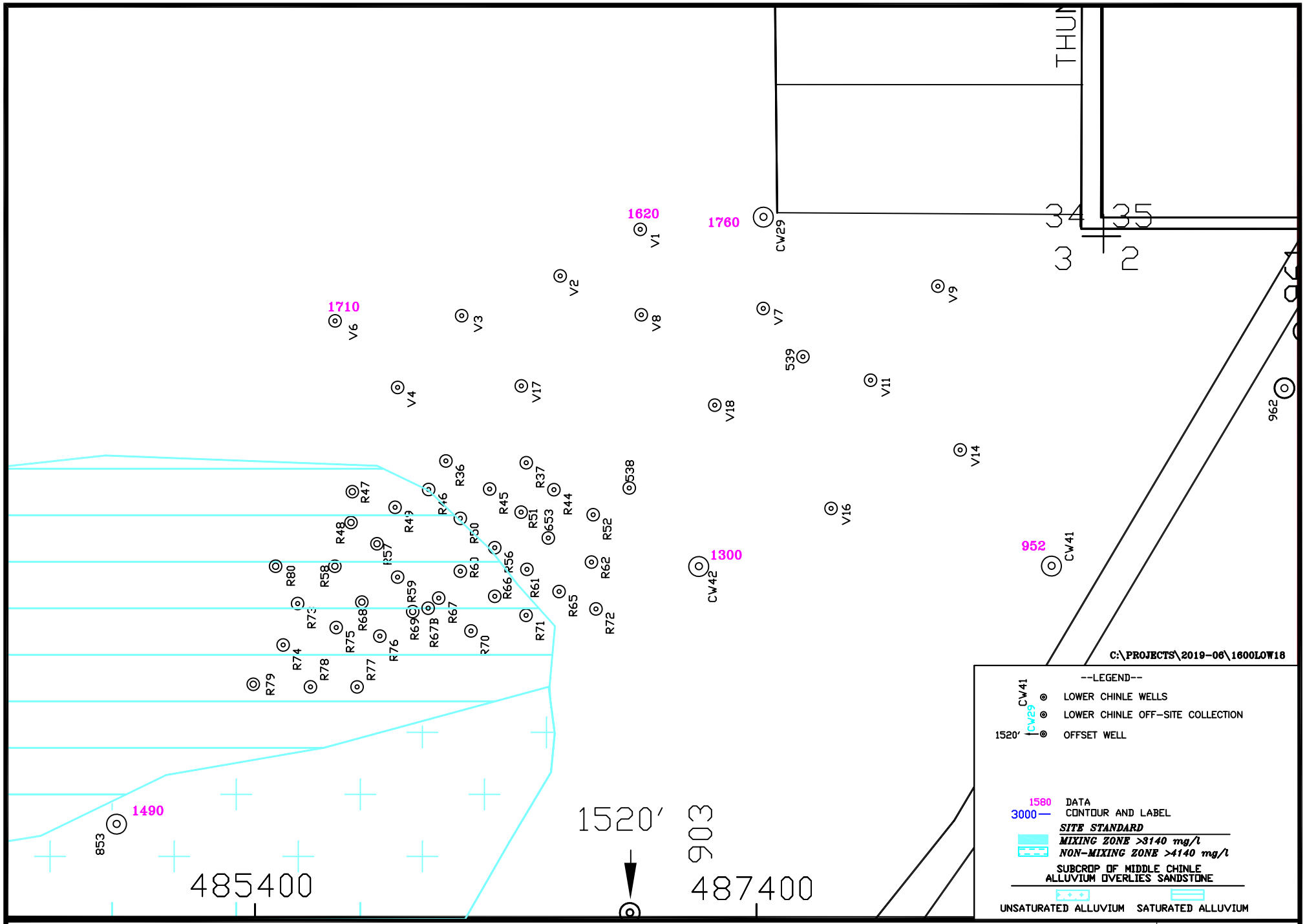


FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1" = 1600'
C:\PROJECTS\2019-06\1600LOW18
DATE: 1/14/2019

FIGURE 7.3-5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2018, 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, 2018, mg/l

DATE: 10/1/2018

SCALE: 1"=500'

PAGE: 7.3-12

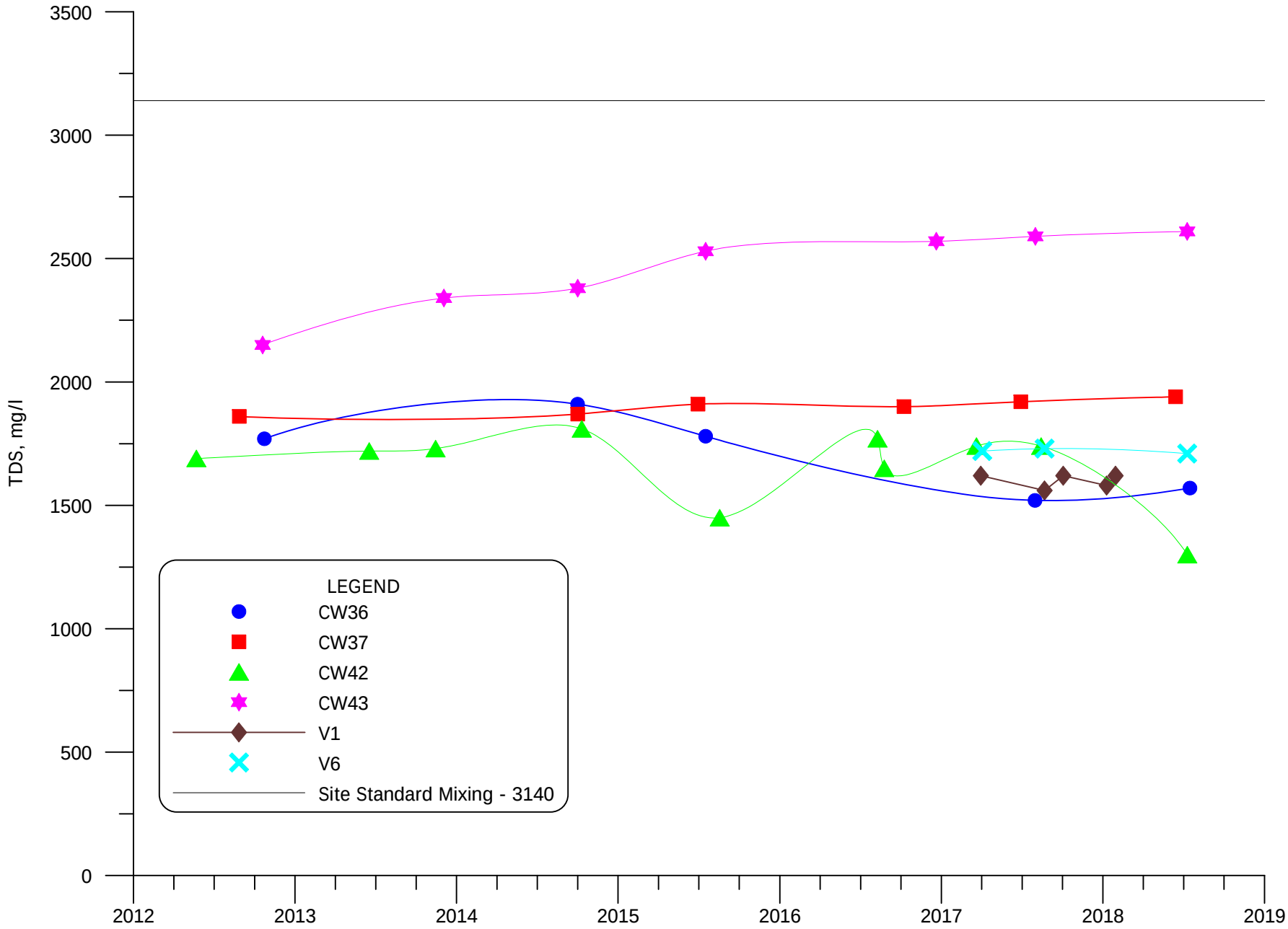


FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43, V1 AND V6

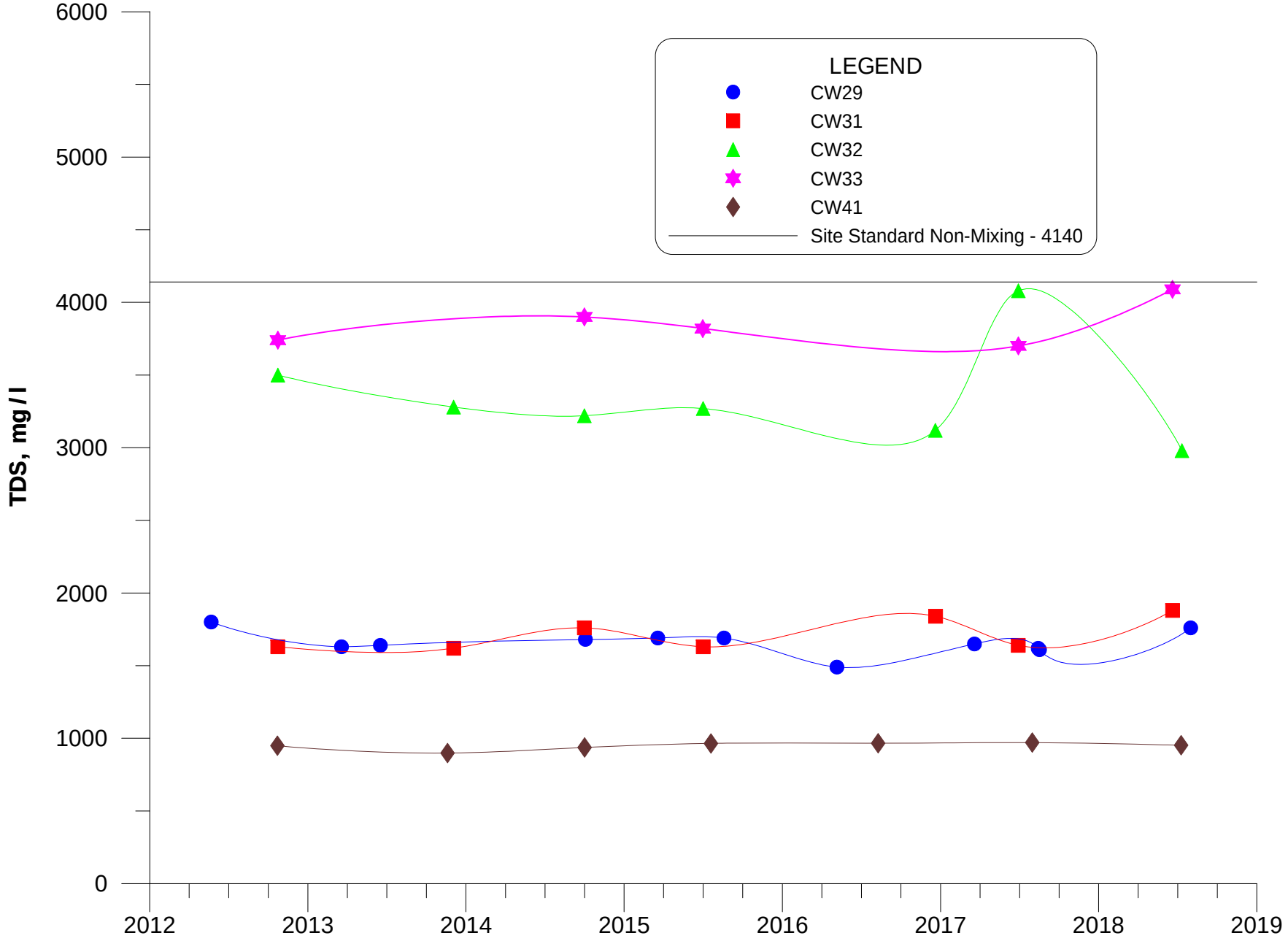
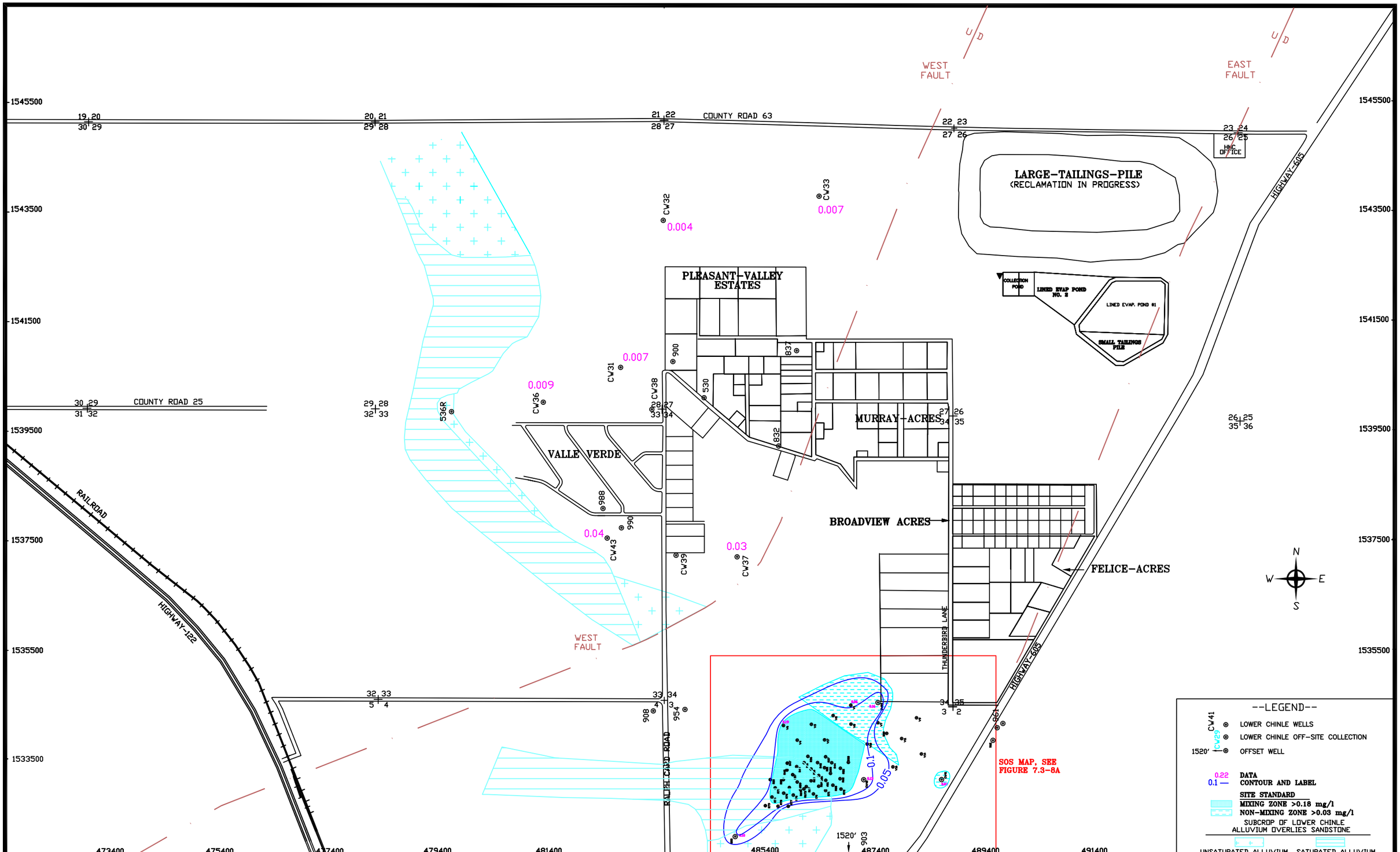
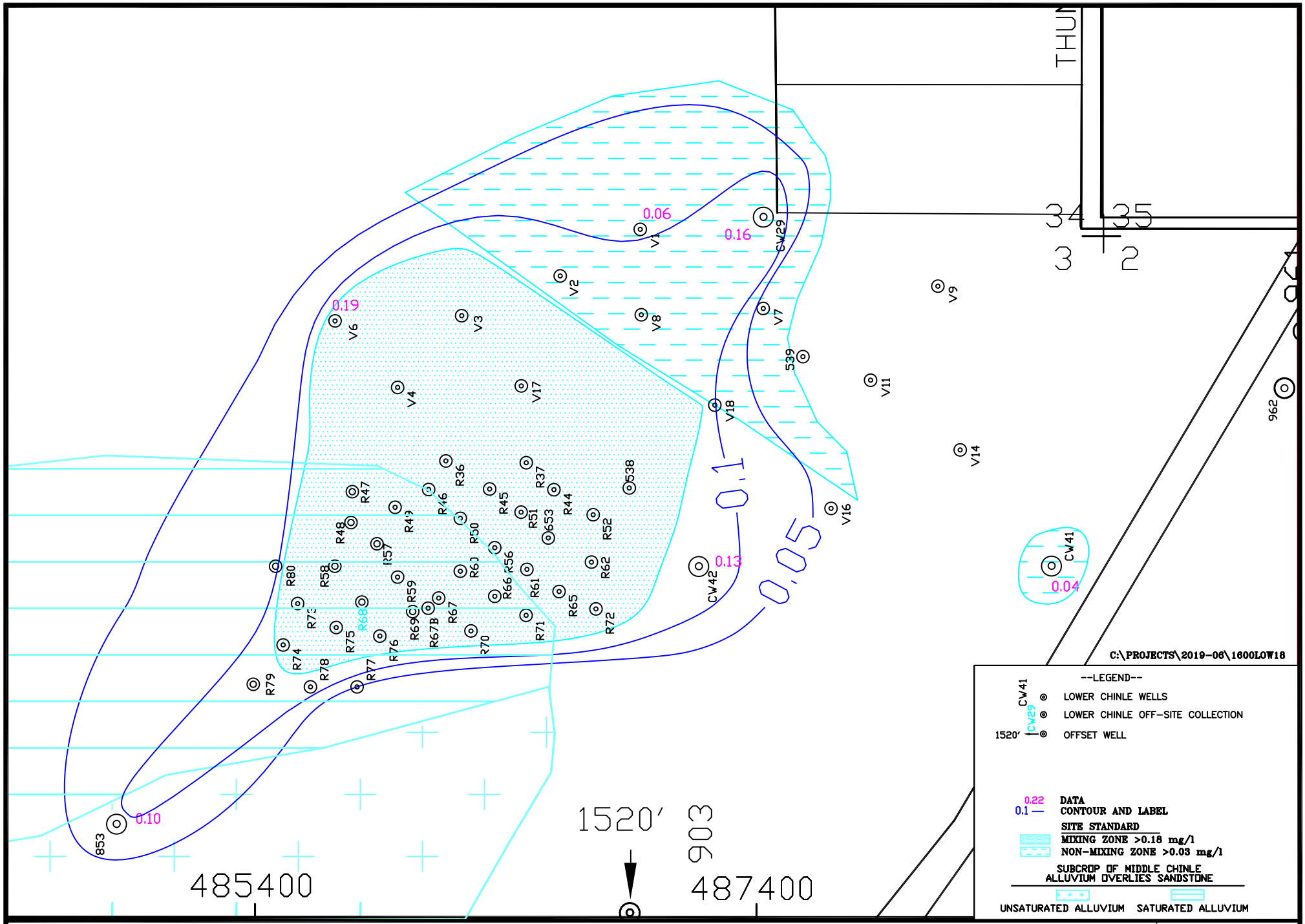


FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1" = 1600'
C:\PROJECTS\2019-06\1600LOW18
DATE: 1/14/2019

FIGURE 7.3-8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2018, mg/l



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

FIGURE 7.3-8A. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2018, mg/l

DATE: 1/11/2019

SCALE: 1"=500'

PAGE: 7.3-16

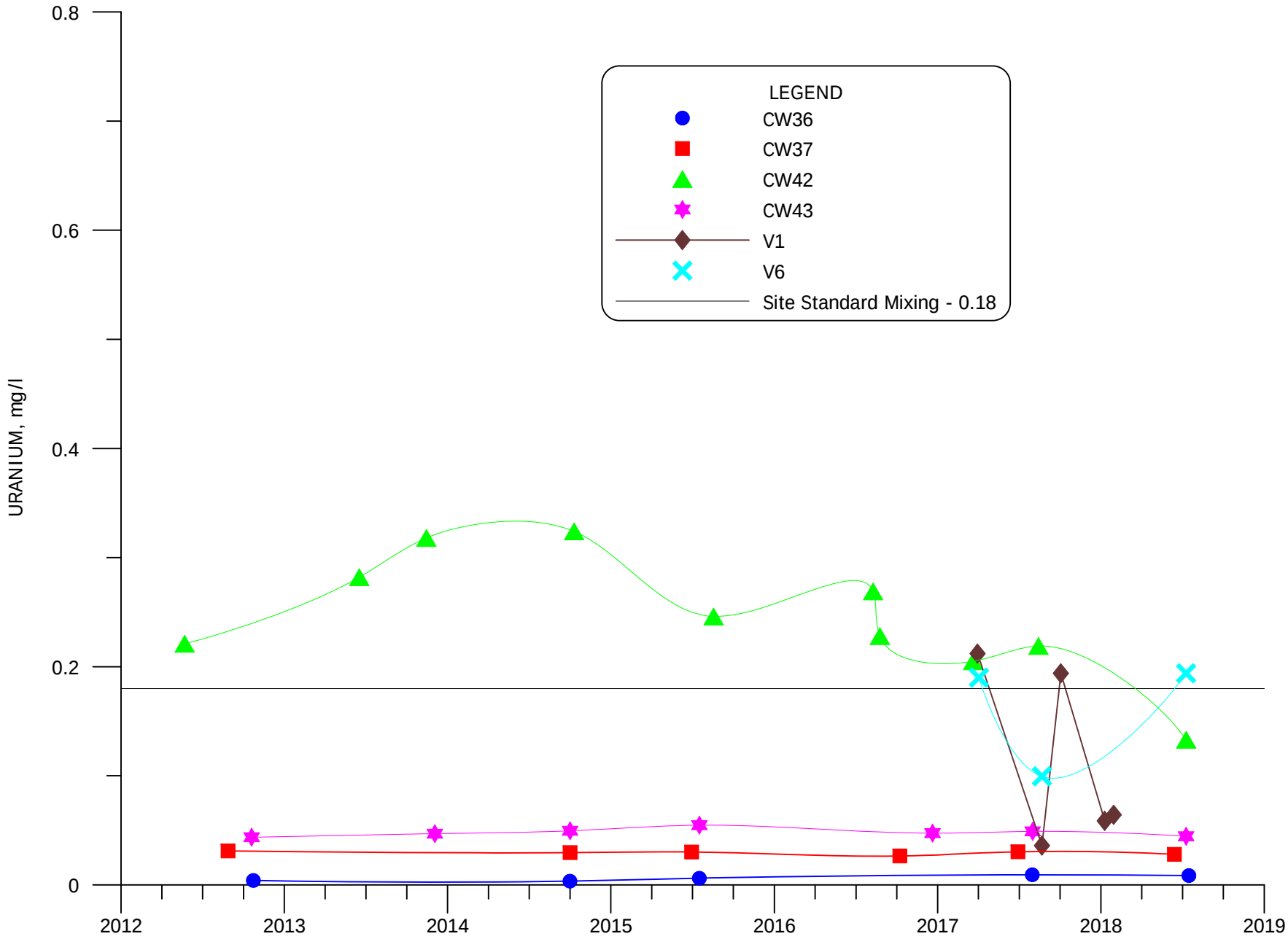


FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43, V1 AND V6

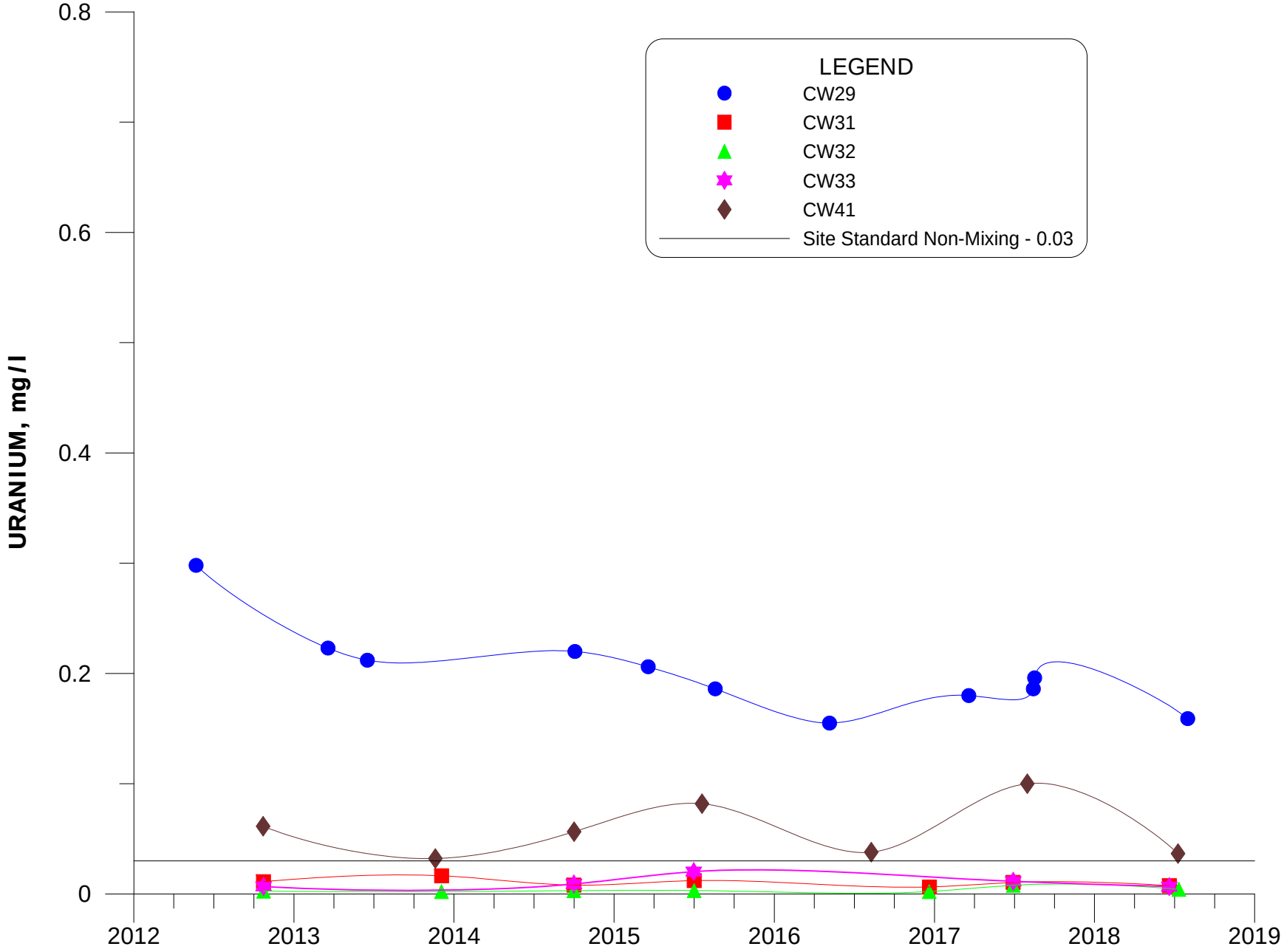
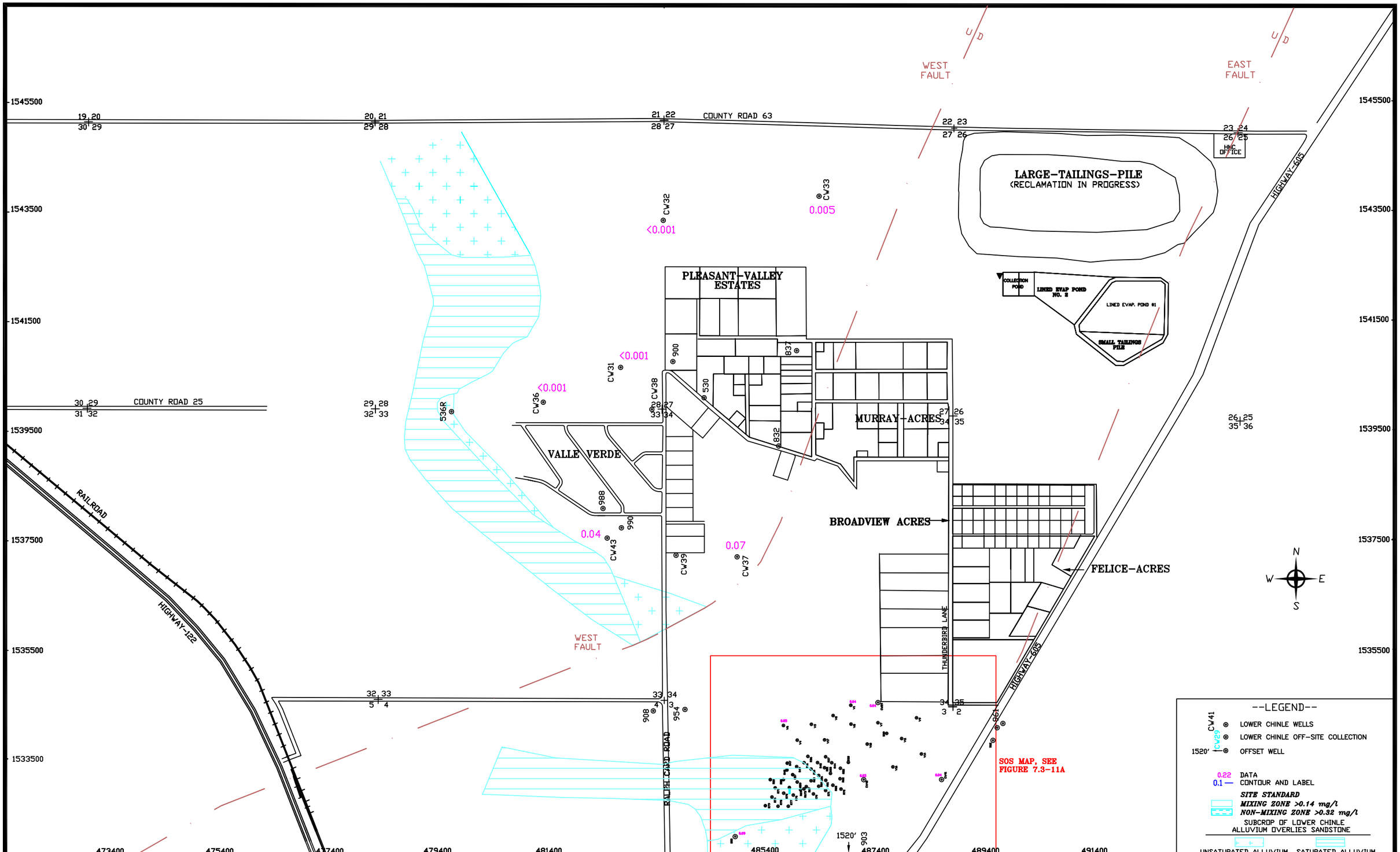
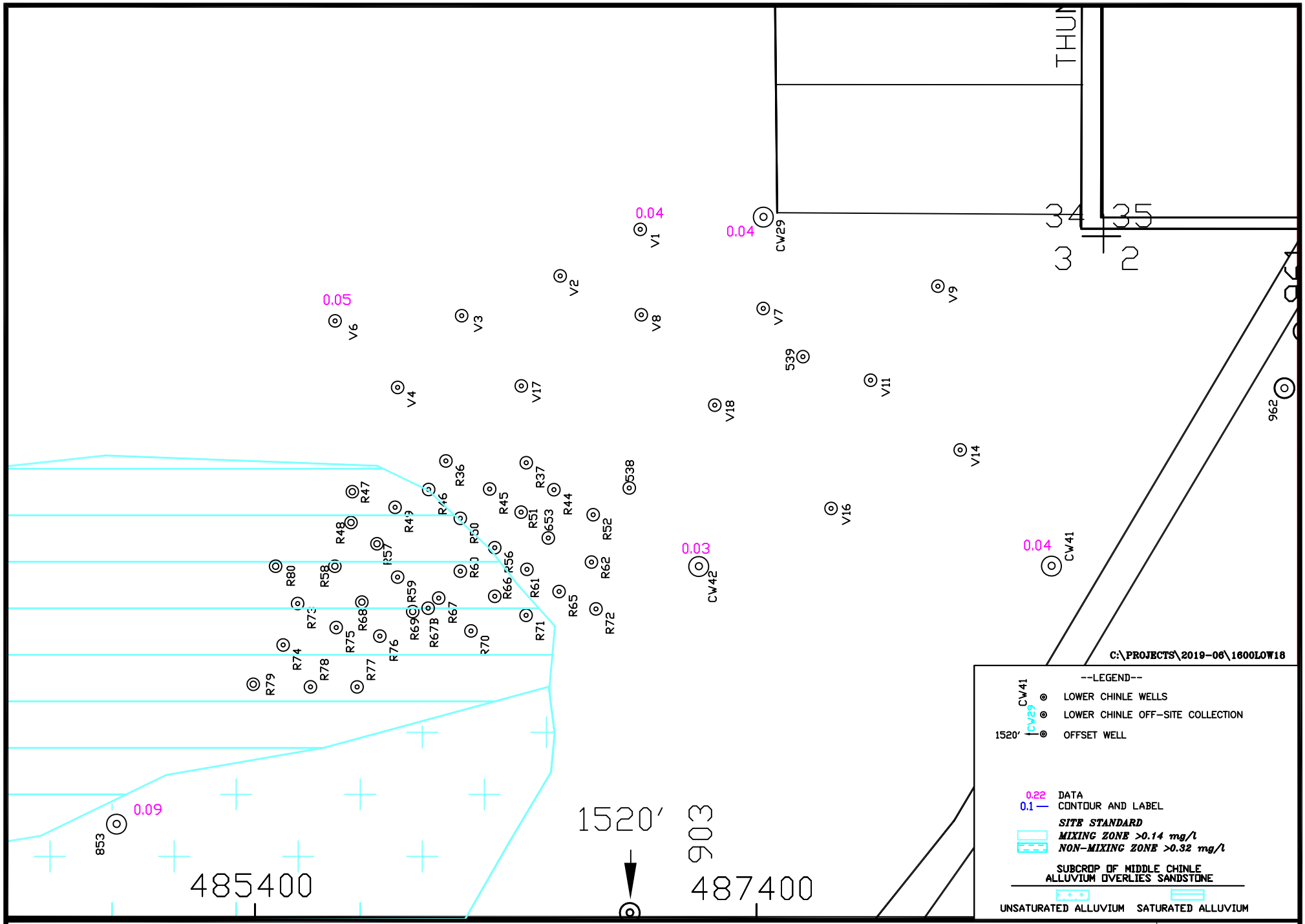


FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1" = 1600'
C:\PROJECTS\2019-06\1600LOW18
DATE: 1/14/2019

FIGURE 7.3-11. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2018, mg/l



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

FIGURE 7.3-11A. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2018, mg/l

DATE: 10/1/2018

SCALE: 1"=500'

PAGE: 7.3-20

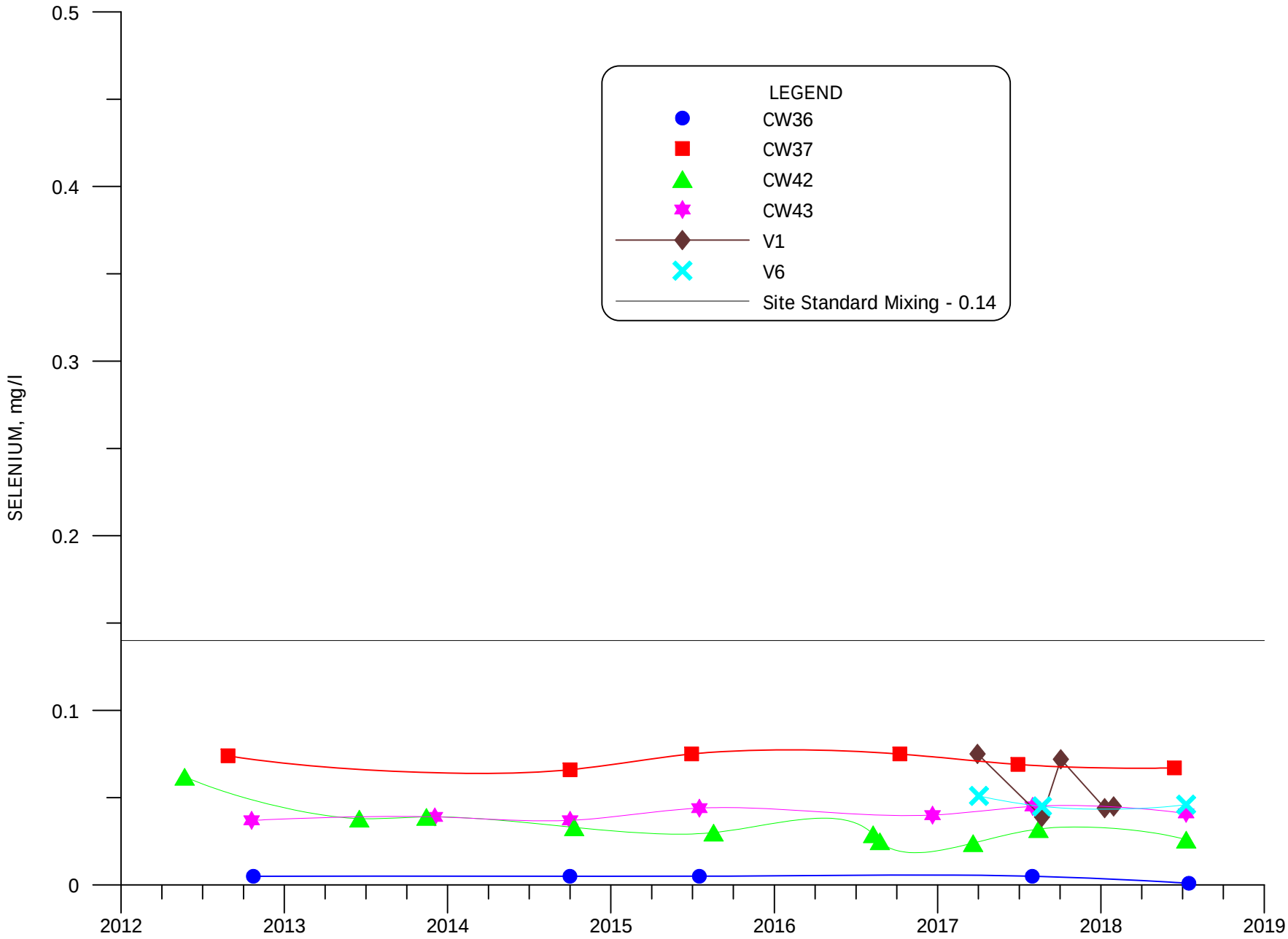


FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW36, CW37, CW42, CW43, V1 AND V6

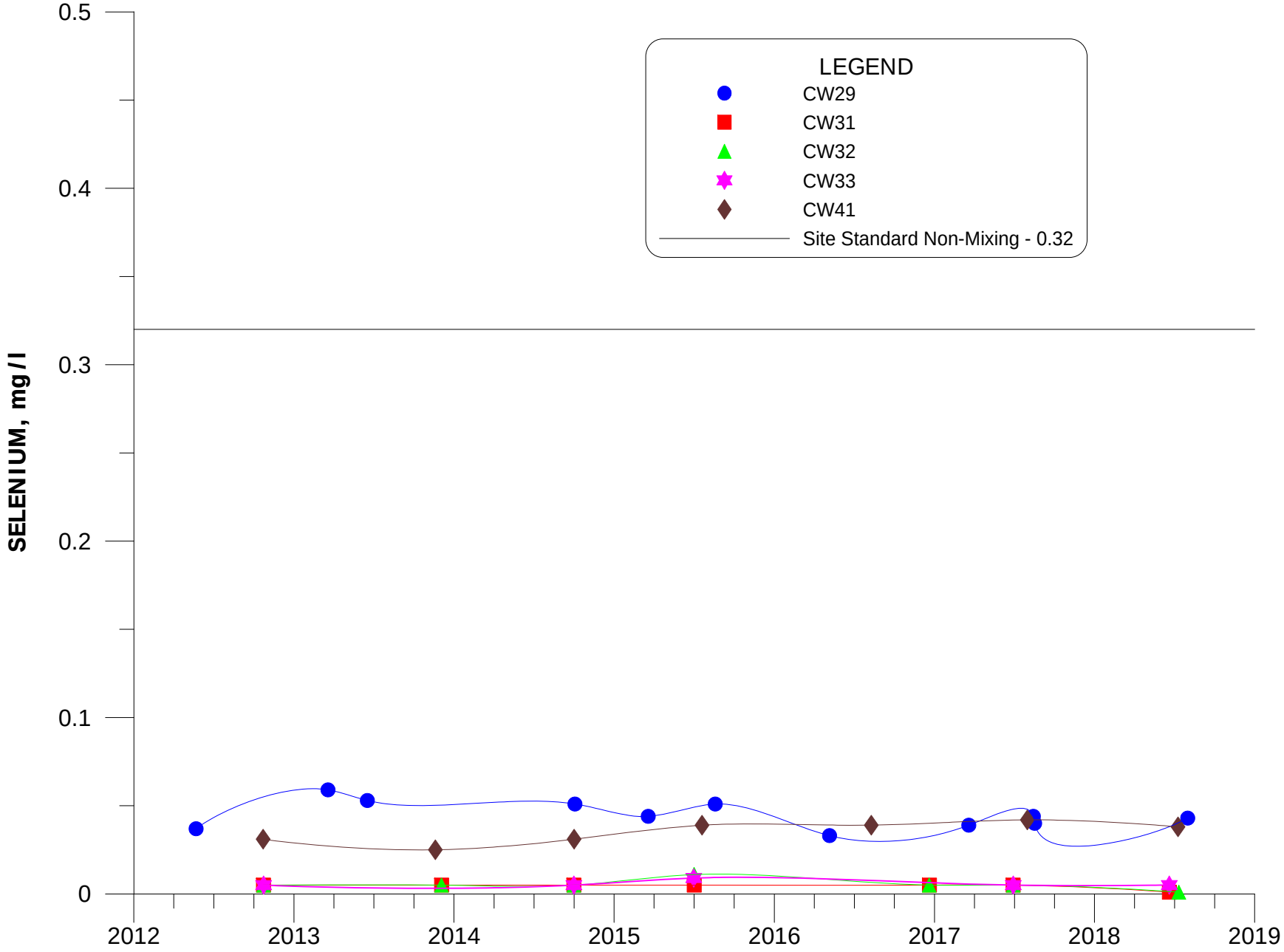


FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW31, CW32, CW33 AND CW41.

TABLE 7.3-1. LOWER CHINLE SITE STANDARDS AND 2018 BACKGROUND LOWER CHINLE DATA

	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
Lower Chinle Non-Mixing	0.32	0.03	0.10	4140	2000	634	*	*
CHINLE MIXING ZONE WELLS								
CW9	<0.005	0.011	0.05	599	251	31	-	-
CW50	<0.001	0.025	0.002	1620	878	60	<0.1	-
CW52	-	-	-	-	-	-	-	-
CW15	0.01	0.028	<0.03	1590	824	29	-	-
CW24	0.12	0.13	<0.03	3150	1820	74	-	-
CW35	0.066	0.175	0.004	2340	1310	68	2.6	-
CW36	<0.001	0.009	0.003	1570	806	84	-	-
CW37	0.067	0.028	<0.03	1940	1070	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.041	0.045	0.001	2610	1370	225	8.2	-
LOWER CHINLE NON-MIXING ZONE WELLS								
CW26	-	-	-	-	-	-	-	-
CW29	0.04	0.16	0.002	1760	677	157	3.0	0.01
CW31	<0.001	0.007	0.01	1880	1070	64	-	-
CW32	<0.001	0.004	0.002	2980	1300	416	<0.1	-
CW33	0.005	0.007	0.008	4090	2100	468	-	-
CW41	0.04	0.04	0.005	952	329	96	3.6	0.01

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

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8.0 SAN ANDRES AQUIFER MONITORING

8.1 SAN ANDRES WELL COMPLETIONS AND WATER LEVELS

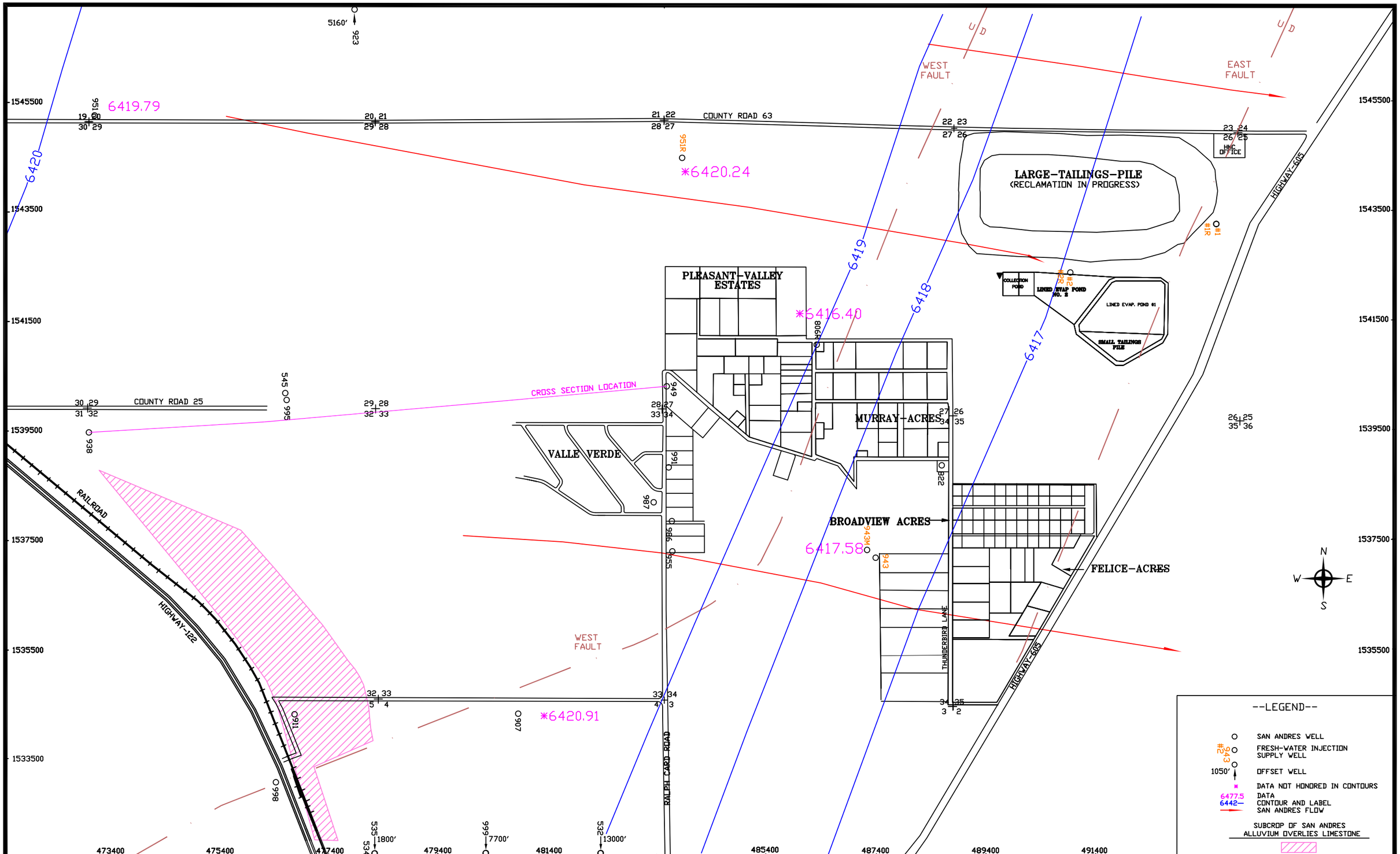
The San Andres aquifer is the most important regional aquifer in the Grants Project area. The Chinle Formation, which exists between the alluvium and the San Andres, is approximately 800 feet thick at the Homestake tailings site and is primarily a shale with a few sandstone lenses. Therefore, the alluvial aquifer and the San Andres aquifer are separated by a very thick aquitard. The difference in piezometric head between the alluvial and San Andres aquifers is in the range of 80 to 100 feet, which confirms that the flow between the two systems is restricted by the limited permeability of the Chinle Formation. The San Andres and alluvial aquifers are only in direct contact in the western portion of the area presented on Figure 8.1-1 (see magenta pattern area). With no areas of direct communication within the area where the alluvial aquifer is impacted by the Homestake tailings seepage, and only very limited hydraulic communication through the Chinle shale, the San Andres aquifer is not affected by the Grants Project tailings seepage. The San Andres aquifer has been used as the source for fresh-water injection into the alluvium and Chinle aquifers at the Grants Project, and as a result, a monitoring program was established for the San Andres aquifer.

Table 8.1-1 presents well completion information for the San Andres wells in this area. Homestake's two deep wells within the project area are San Andres wells, #1 Deep and #2 Deep. Well #1 Deep was not used in 2017 and 2018 and drilling replacement well #1R Deep was started in late 2017 and completed in early 2018. These wells are used to supply the fresh-water to the PTT for the treated water injection systems around the GRP. 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 through early 2018. San Andres well 943 has been used as the fresh water injection supply for the injection system in Sections 3 and 34 and Felice Acres and its use as a fresh water injection supply was ceased on May 18, 2017. San Andres monitoring well 943M was drilled in December 2017 and located 217 feet northwest of well 943. Abandonment of San Andres well 928 was initiated in late 2017 and completed in 2018 while well 943 was abandoned in July of 2018. Replacement wells #1R and #2R were drilled in 2018. San Andres well #1 Deep was abandoned in early 2019.

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.

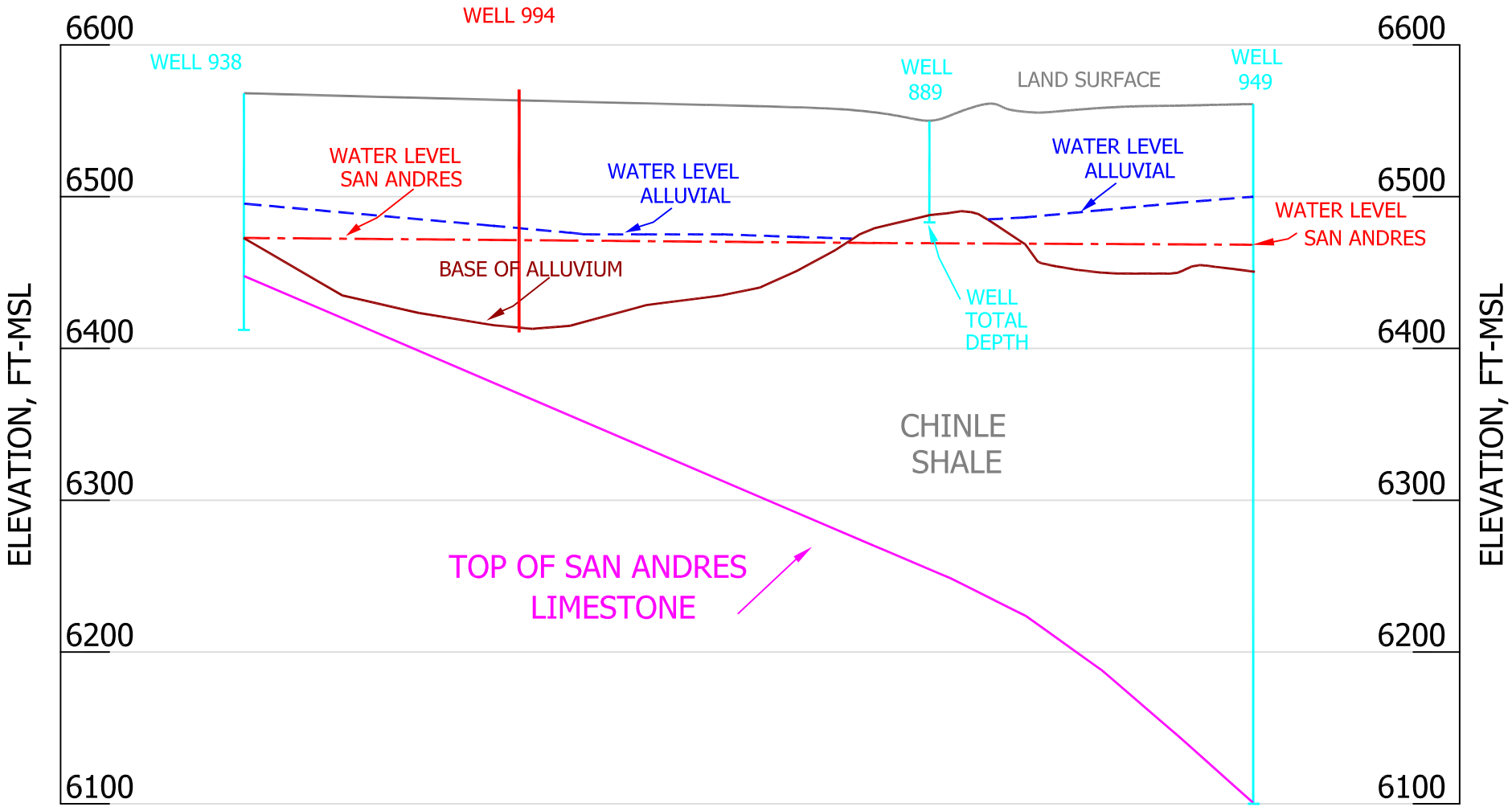
The water-level elevations measured during 2018 (Figure 8.1-1) show a very flat piezometric surface with the gradient being from the west-northwest to the east-southeast. The continuity of the gradient in this area indicates that the East and West faults do not significantly affect the ground water flow 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 flow direction from Figure 14 in Baldwin and Anderholm (1992) was taken into account in drawing the water level contours. An asterisk is added to the water-level elevation values that were not honored in drawing the contours on the map.

The water-level change in the San Andres aquifer with time is shown in Figure 8.1-3 and shows overall fairly steady water levels for this period. Water levels in the San Andres had generally declined from 2000 to 2012 at a rate of 3 feet per year but has since been fairly steady.



SCALE: 1" = 1000'
C:\PROJECTS\2019-06\1600SAN18
DATE: 2/4/19

FIGURE 8.1-1. LOCATION OF SAN ANDRES WELLS AND WATER-LEVEL ELEVATION FOR THE SAN ANDRES AQUIFER, 2018, 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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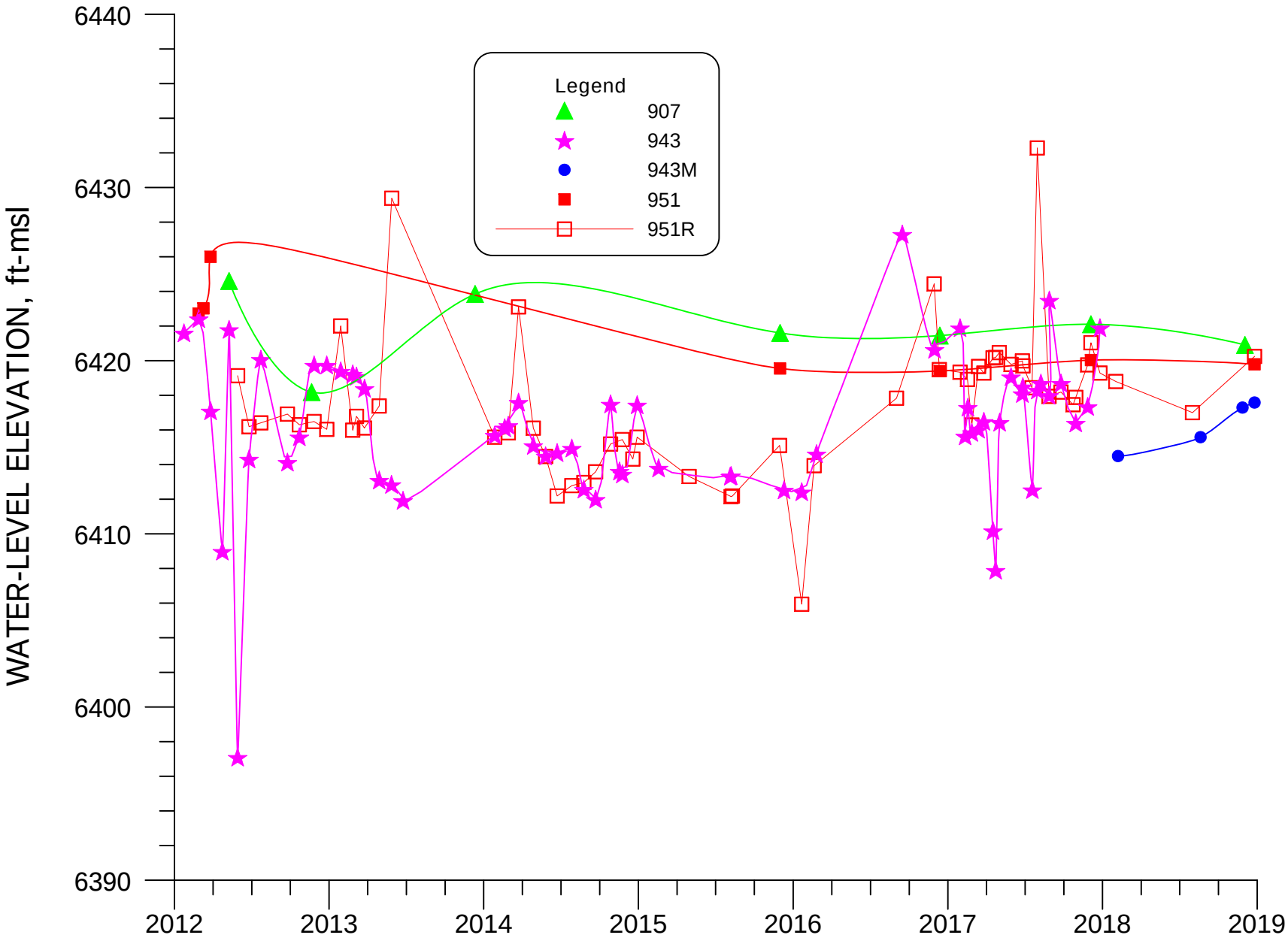


FIGURE 8.1-3. WATER-LEVEL ELEVATION FOR SAN ANDRES WELLS 907, 943, 943M, 951 AND 951R.

TABLE 8.1-1. WELL DATA FOR THE SAN ANDRES WELLS.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO TOP OF SAN ANDRES (FT-LSD)	ELEV. TO TOP OF SAN ANDRES (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	
#1 Dee	1543307	493633	1000.0	10.0	12/5/2017	152.300	6431.46	0.0	6583.76	130	6454	A	---
										303	6281	U	---
										433	6151	M	---
										597	5987	L	---
										955	5629	S	919-999
#1R DE	1543308	493633	1025.0	14.0	---	---	---	2.4	6589.39	---	---	S	955-1025
#2 Dee	1542424	490972	870.0	---	7/12/2018	173.740	6401.92	0.0	6575.66	110	6466	A	---
										800	5776	S	-
#2R DE	1542424	2713881	870.0	14.0	---	---	---	1.5	6579.19	---	---	S	800-870
0806R	1541177	486264	600.0	16.0	12/3/2018	149.990	6416.40	---	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	12/3/2018	124.690	6420.91	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	---	---	12/5/2017	157.699	6411.10	0.0	6568.80	95	6474	A	---
										120	6449	S	-
0943	1537222	487407	978.0	18.0	12/26/2017	134	6421.91	0.0	6555.91	704	5852	S	703-978
0943M	1537358	487238	800.0	6.0	12/26/2018	138.520	6417.58	2.3	6556.10	710	5844	S	740-800
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	12/26/2018	153.910	6419.79	0.9	6573.70	110	6463	A	---
										227	6346	S	241-275
0951R	1544500	484100	525.0	8.0	12/26/2018	156.539	6420.24	1.0	6576.78	65	6511	A	---
										420	6156	S	415-525

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)	
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	---
										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	3/15/2018	128.220	6521.78	0.0	6650.00	---	---	S	-
0999	1524230	480187	180.0	16.0	3/15/2018	111.389	6415.61	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

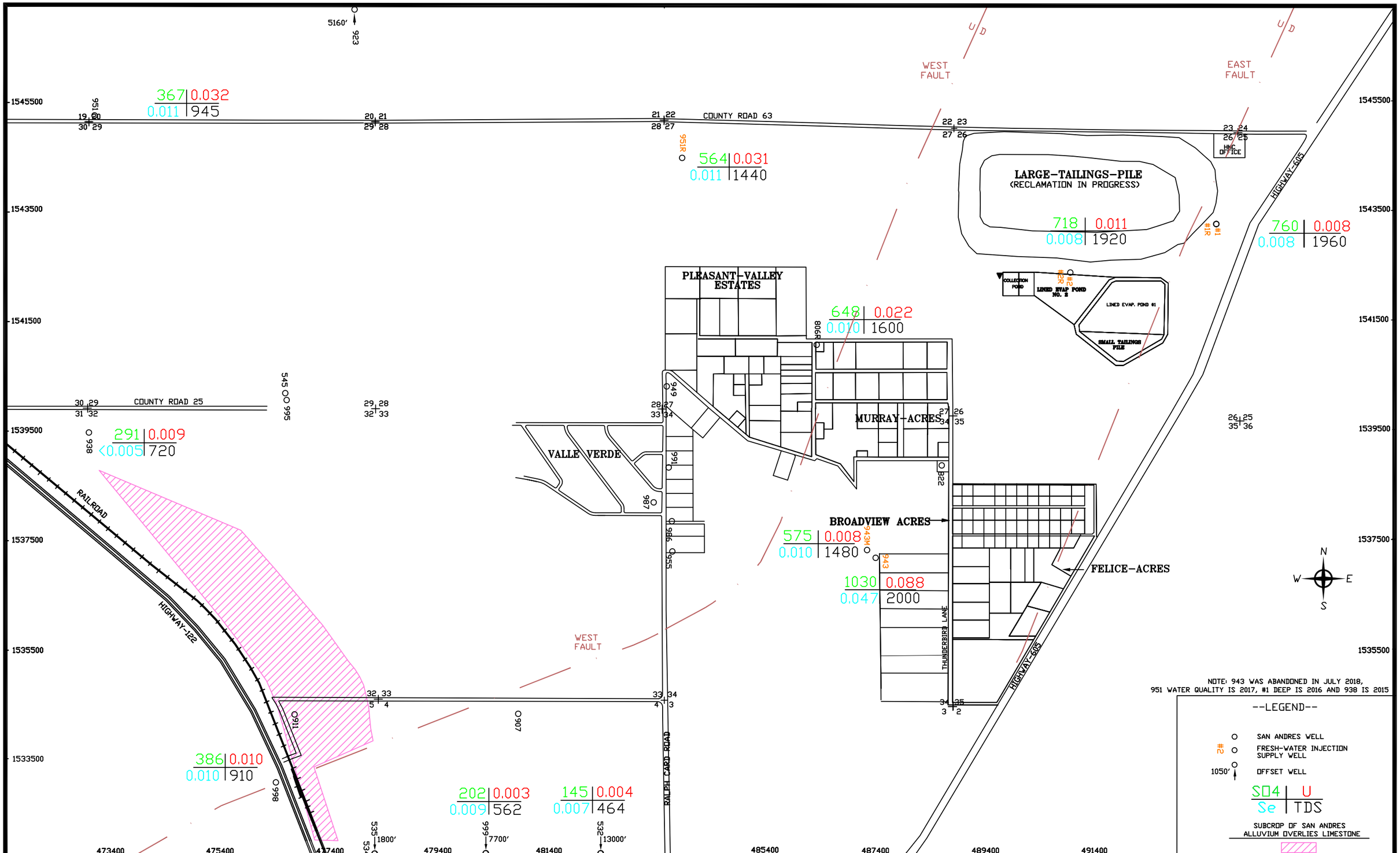
Figure 8.2-1 presents the most recent water-quality data for the San Andres aquifer. Tables B.6-1 and B.6-2 in Appendix B present the tabulation of the water-quality data for the San Andres aquifer. Additional San Andres monitoring is presented in Figure 8.2-1 and shows the 2018 data for sulfate, TDS, uranium and selenium concentrations in the San Andres aquifer. HMC committed to additional monitoring in the San Andres aquifer relative to well 943 abandonment in July of 2018. The additional quarterly monitoring of wells 943M, 951R and #2 Deep were obtained but the semiannual samples from wells 806R, 949, 955 and 991 were not obtained. The second half of 2018 sample from well 806R was not completed because irrigation from this well had ceased for the year when collection of the sample was attempted. The owner of well 949 would not give permission to sample this well while the owners were not home when attempts to sample well 955 were made in the second half of 2018. A pitless adapter exists in well 991 which will require owner permission to be removed prior to obtaining a sample from this well in 2019.

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 464 to 2000 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 major constituent concentrations from the recharge area down dip is expected. Uranium concentrations were generally small in all of the San Andres wells monitored during 2018 with the largest value of 0.088 and 0.03 mg/l in wells 943 and 951R respectively. The 2017 uranium value of 0.11 mg/l from well 806R is shown to be an outlier with the confirmed smaller values in 2018. Uranium concentrations in well 943 are much greater than those in San Andres well 943M because leakage into well 943 from an overlying aquifer had affected the concentration in well 943 prior to its abandonment. Selenium concentrations in the San Andres aquifer vary from <0.005 to 0.011 mg/l except for the effected concentration in well 943 of 0.047 mg/l. All measured molybdenum concentrations are less than 0.03 mg/l.

Figure 8.2-2 presents sulfate concentrations with time for Homestake's wells 943, 943M, 951, 951R, #1 Deep and #2 Deep wells. This data shows that sulfate concentrations in 2018 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 through early 2018. Additional monitoring indicated that the higher sulfate concentrations in well 943 were due to leakage in well 943 from an overlying aquifer. Figure 8.2-3 presents the sulfate concentrations with time for San Andres wells 532, 806R, 998 and 999. Updated sulfate concentrations for wells 532, 998, 999, 951R, 806R and #2 Deep were obtained and are consistent with previous data.

Figures 8.2-4 through 8.2-7 presents TDS and chloride concentrations with time for Homestake's and other San Andres wells for these two additional major constituents. The TDS data shows an increase in 2016 through early 2018 in well 943 similar to the sulfate increase.

Uranium and selenium plots are also developed for these two group of San Andres wells and presented in Figures 8.2-8 through 8.2-11. The uranium and selenium concentrations in well 943 show small increases in concentrations in 2016 through early 2018 due to the leakage in well 943. The increase in uranium concentration in well 806R in 2017 is not supported by other constituents and is shown to be an outlier with the 2018 value.



SCALE: 1" = 1000'
C:\PROJECTS\2019-06\1600SAN18
DATE: 2/4/19

FIGURE 8.2-1. LOCATION OF SAN ANDRES WELLS AND WATER QUALITY DATA FOR THE SAN ANDRES AQUIFER 2018, mg/l

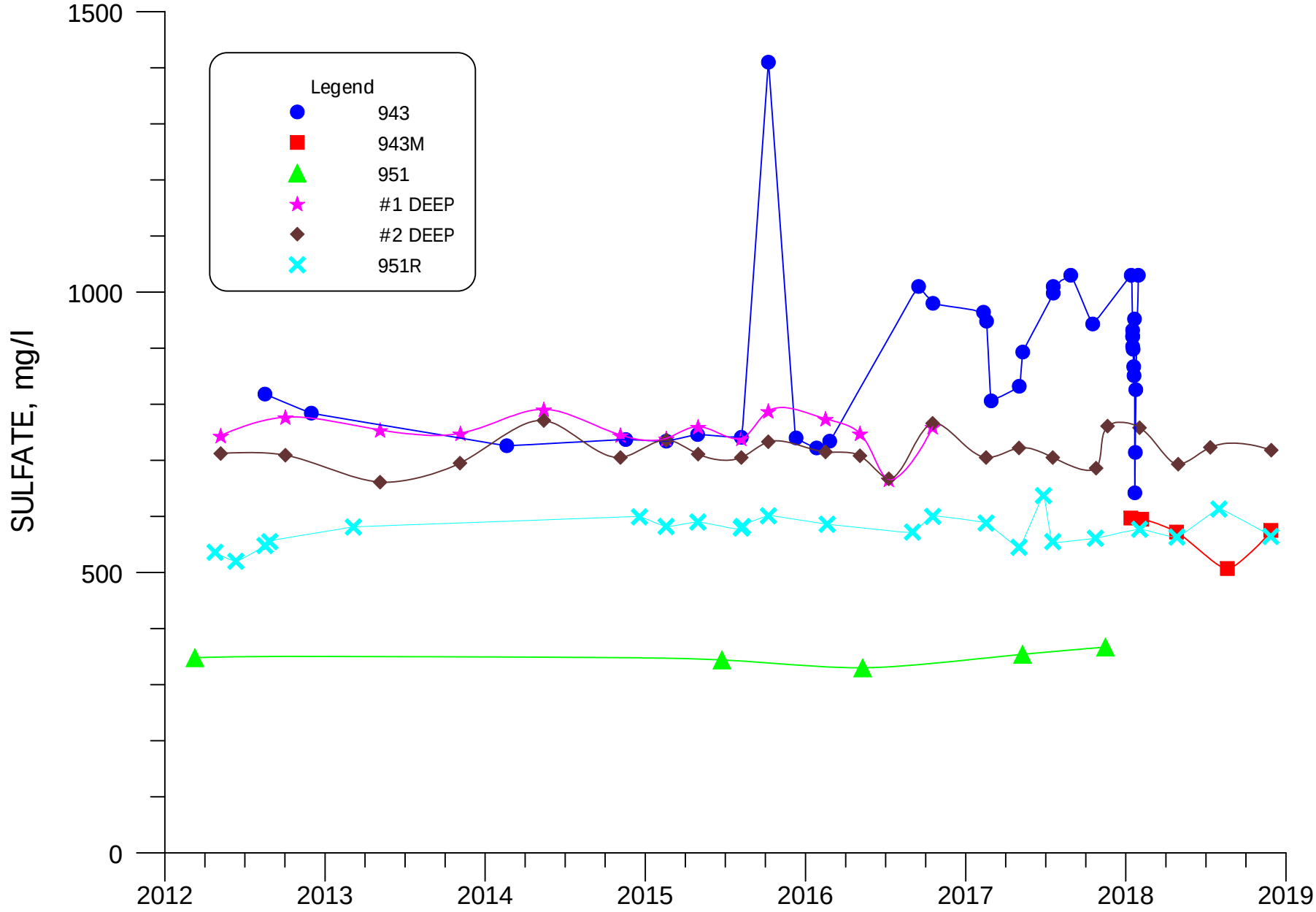


FIGURE 8.2-2. SULFATE CONCENTRATIONS FOR WELLS 943, 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

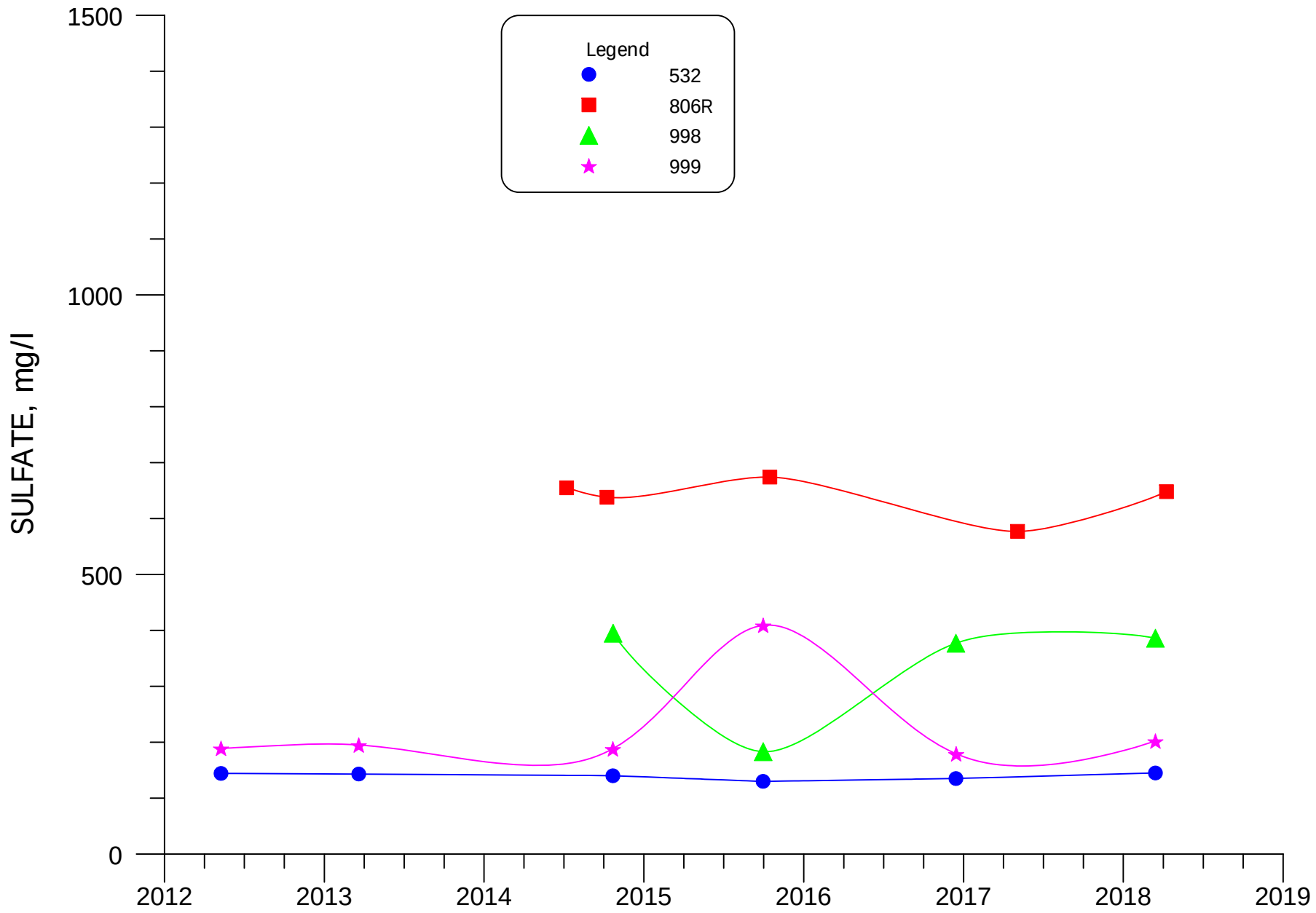


FIGURE 8.2-3. SULFATE CONCENTRATIONS FOR WELLS 532, 806R, 998 AND 999.

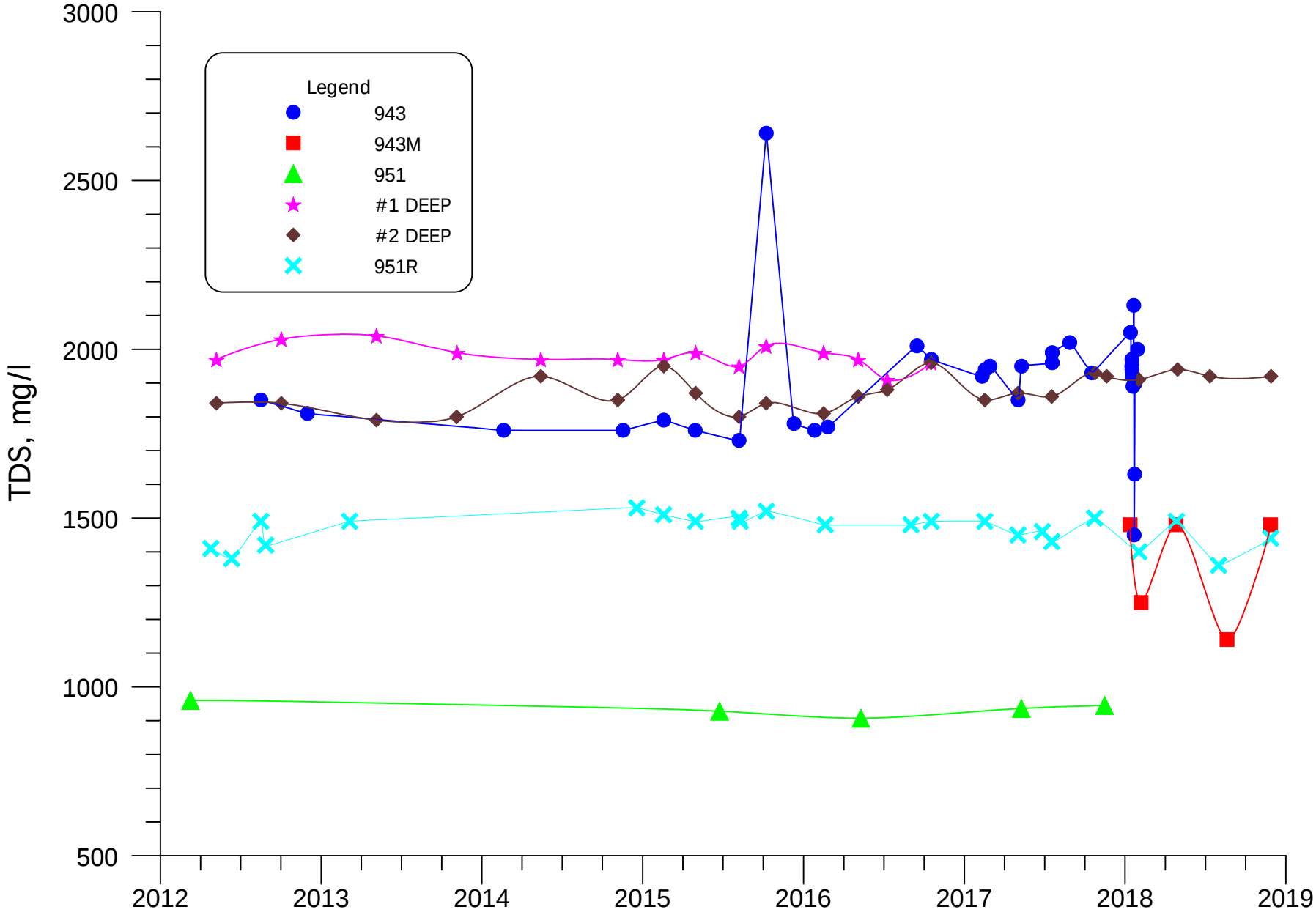


FIGURE 8.2-4. TDS CONCENTRATIONS FOR WELLS 943, 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

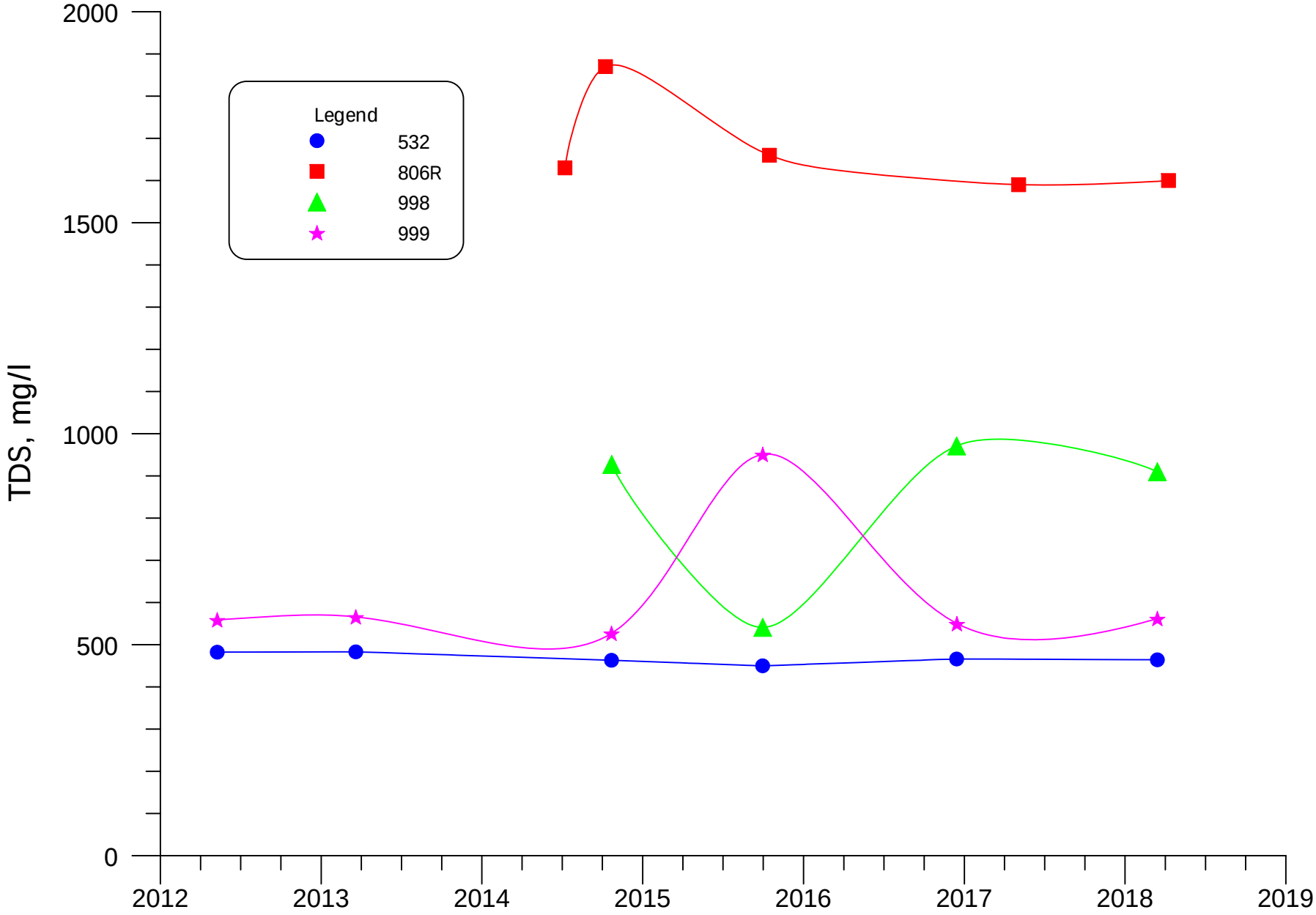


FIGURE 8.2-5. TDS CONCENTRATIONS FOR WELLS 532, 806R, 998 AND 999.

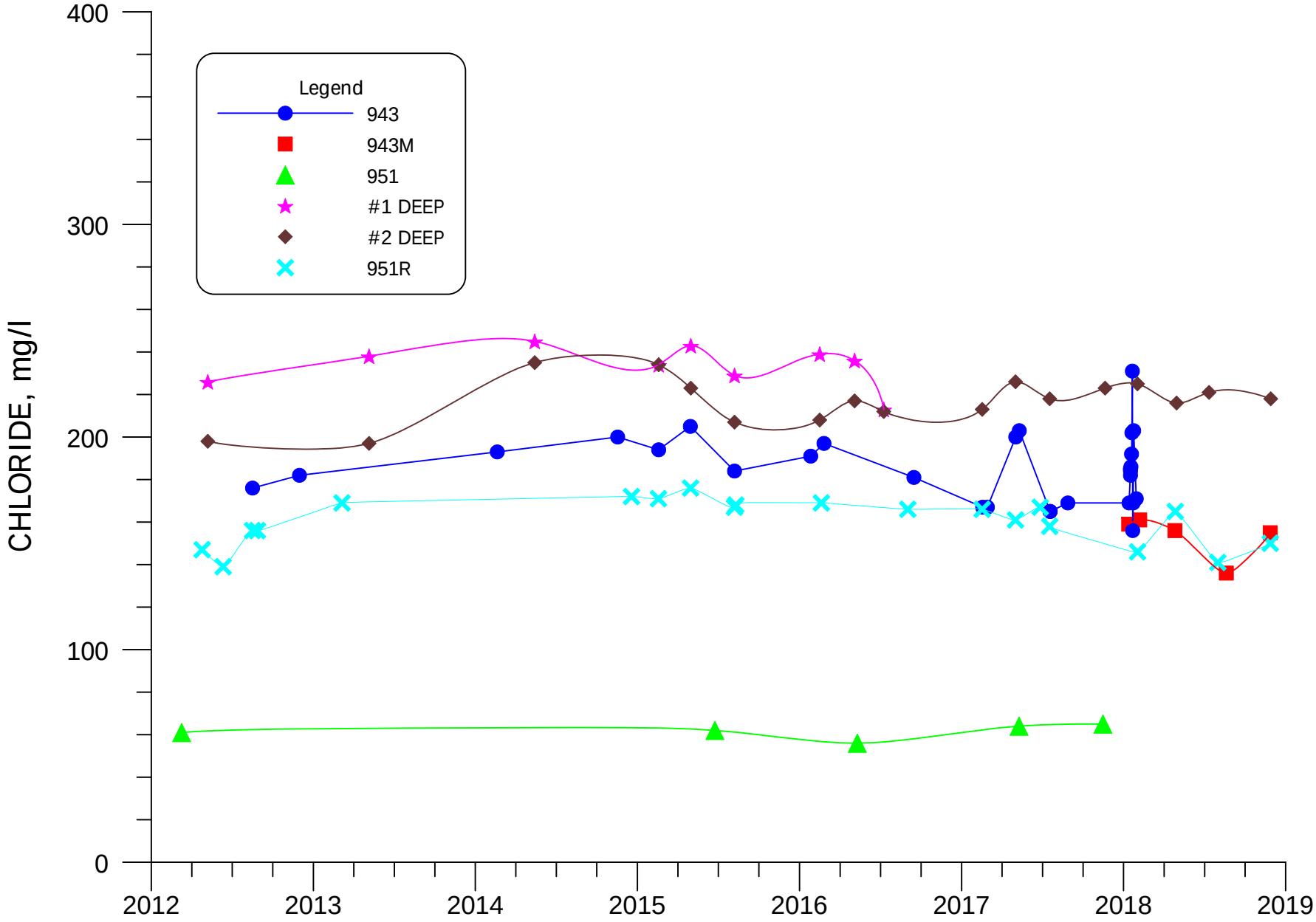


FIGURE 8.2-6. CHLORIDE CONCENTRATIONS FOR WELLS 943, 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

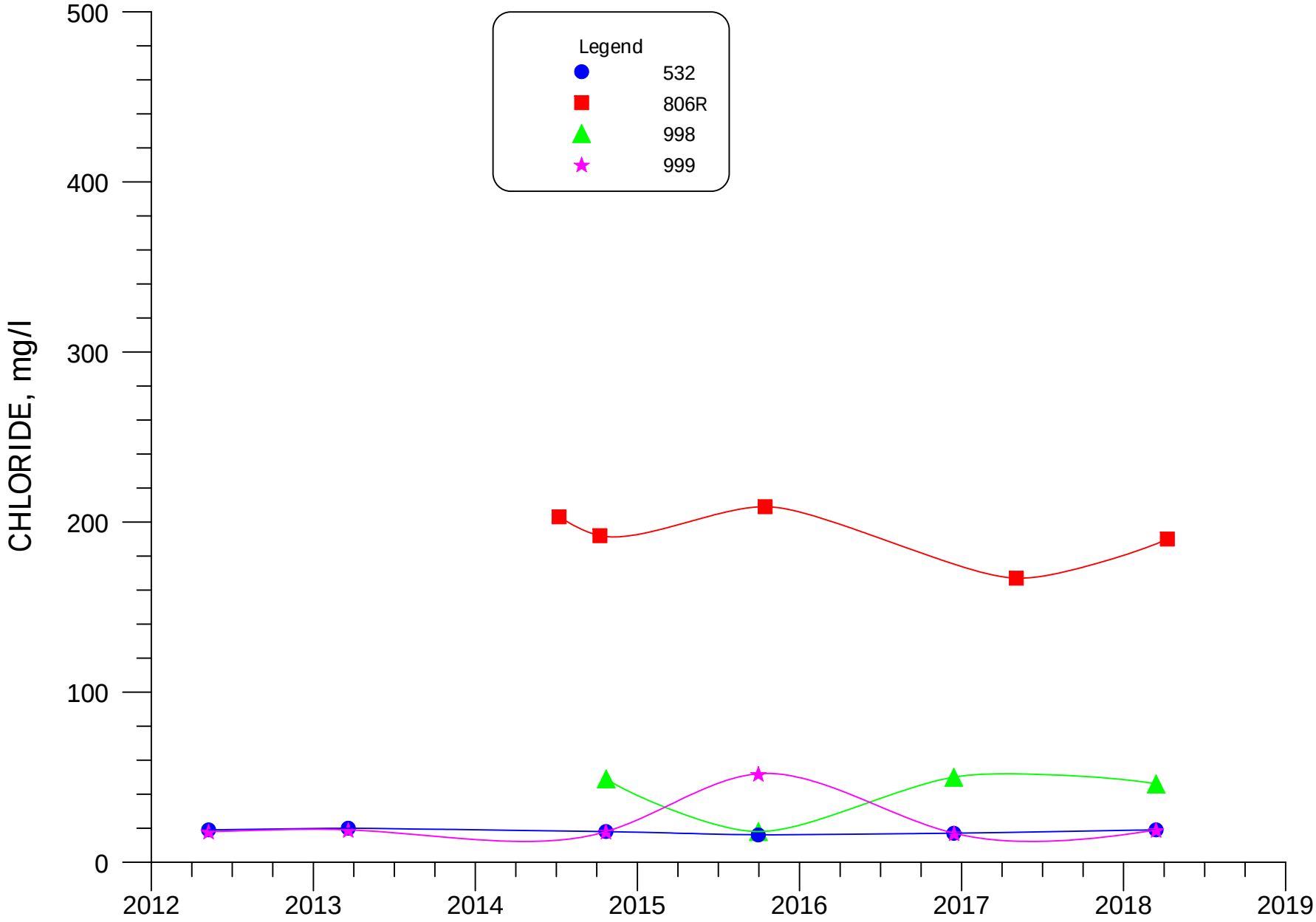


FIGURE 8.2-7. CHLORIDE CONCENTRATIONS FOR WELLS 532, 806R, 998 AND 999.

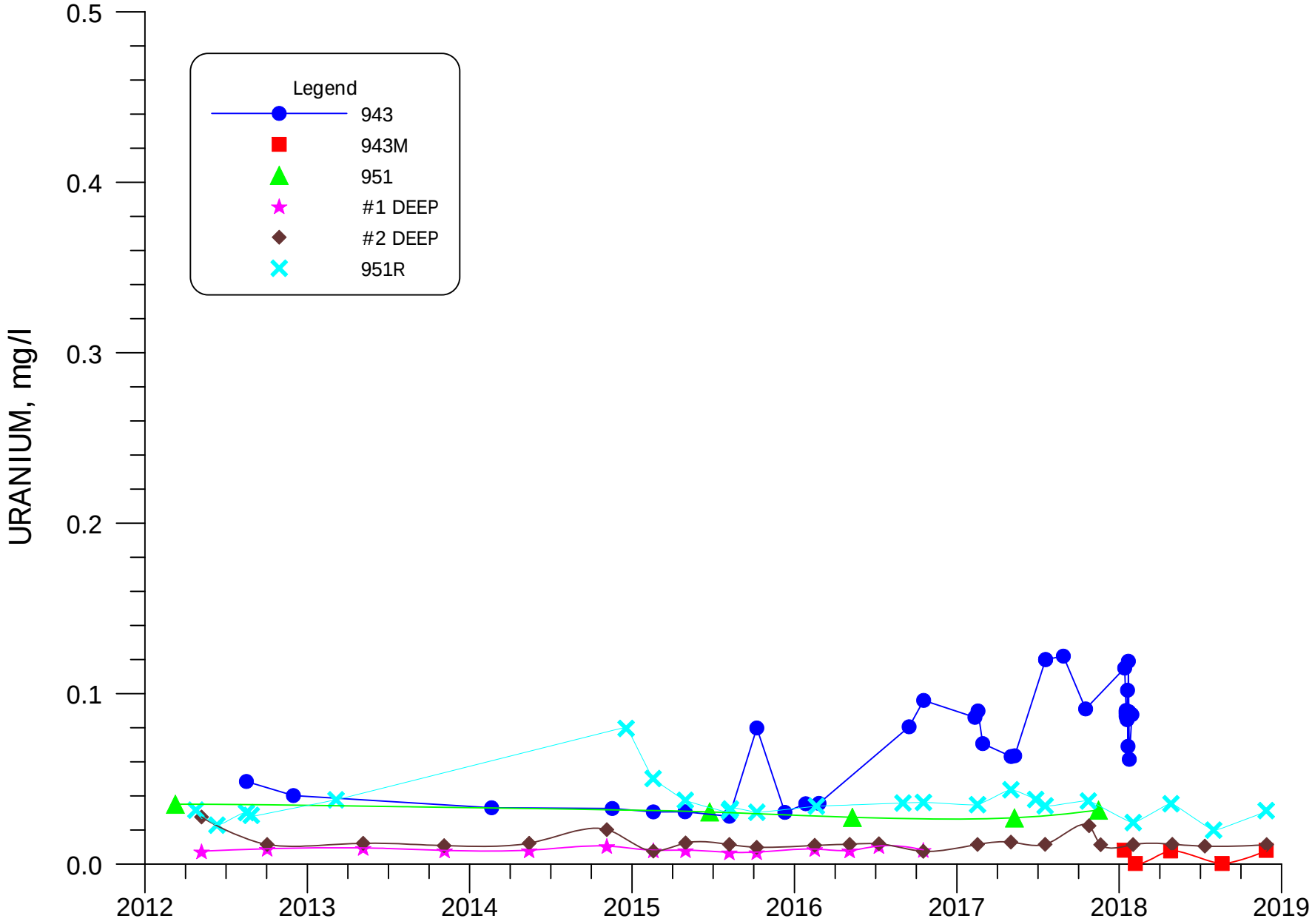


FIGURE 8.2-8. URANIUM CONCENTRATIONS FOR WELLS 943, 943M, 951, 951R, #1 DEEP AND #2 DEEP.

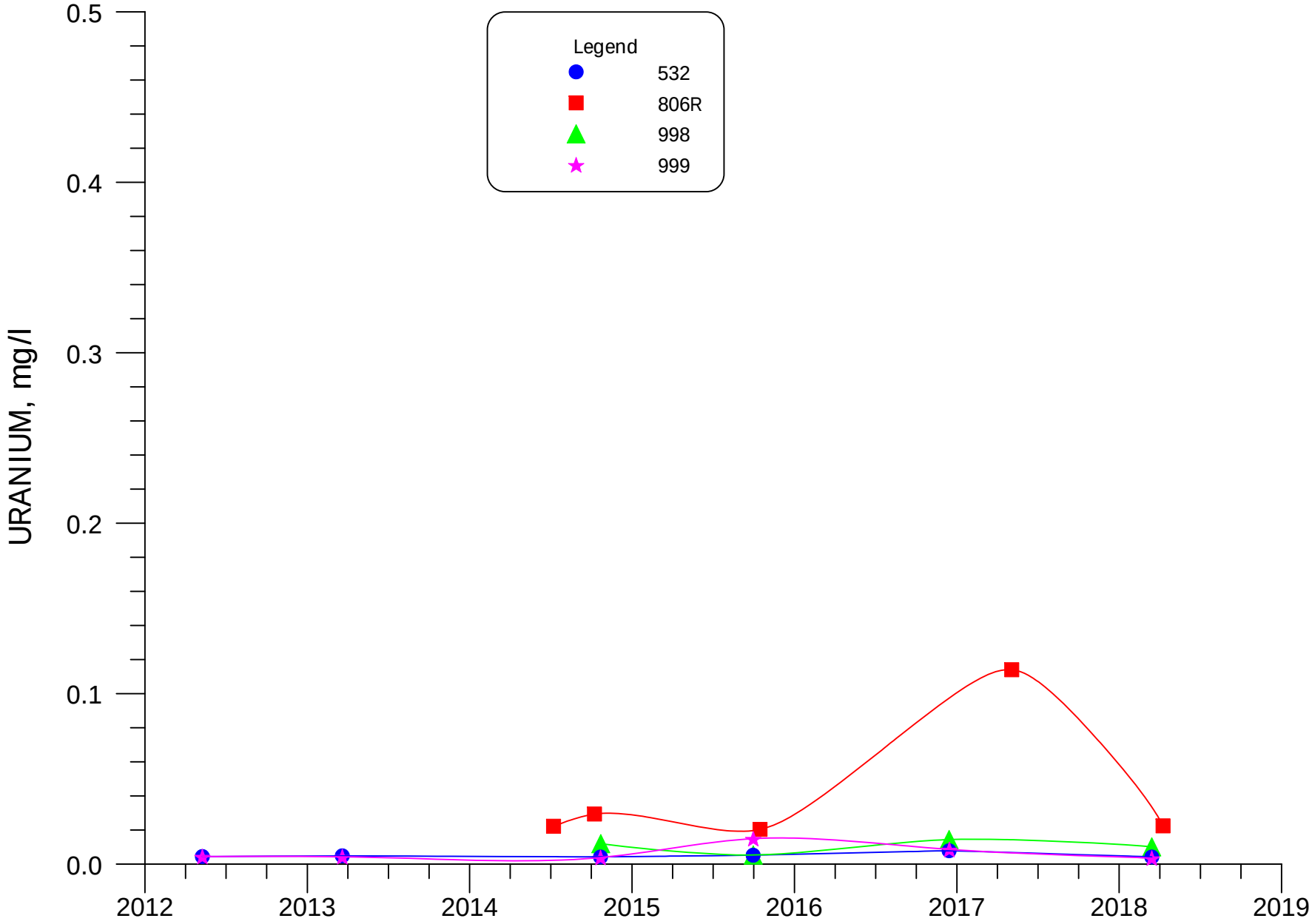


FIGURE 8.2-9. URANIUM CONCENTRATIONS FOR WELLS 532, 806R, 998 AND 999.

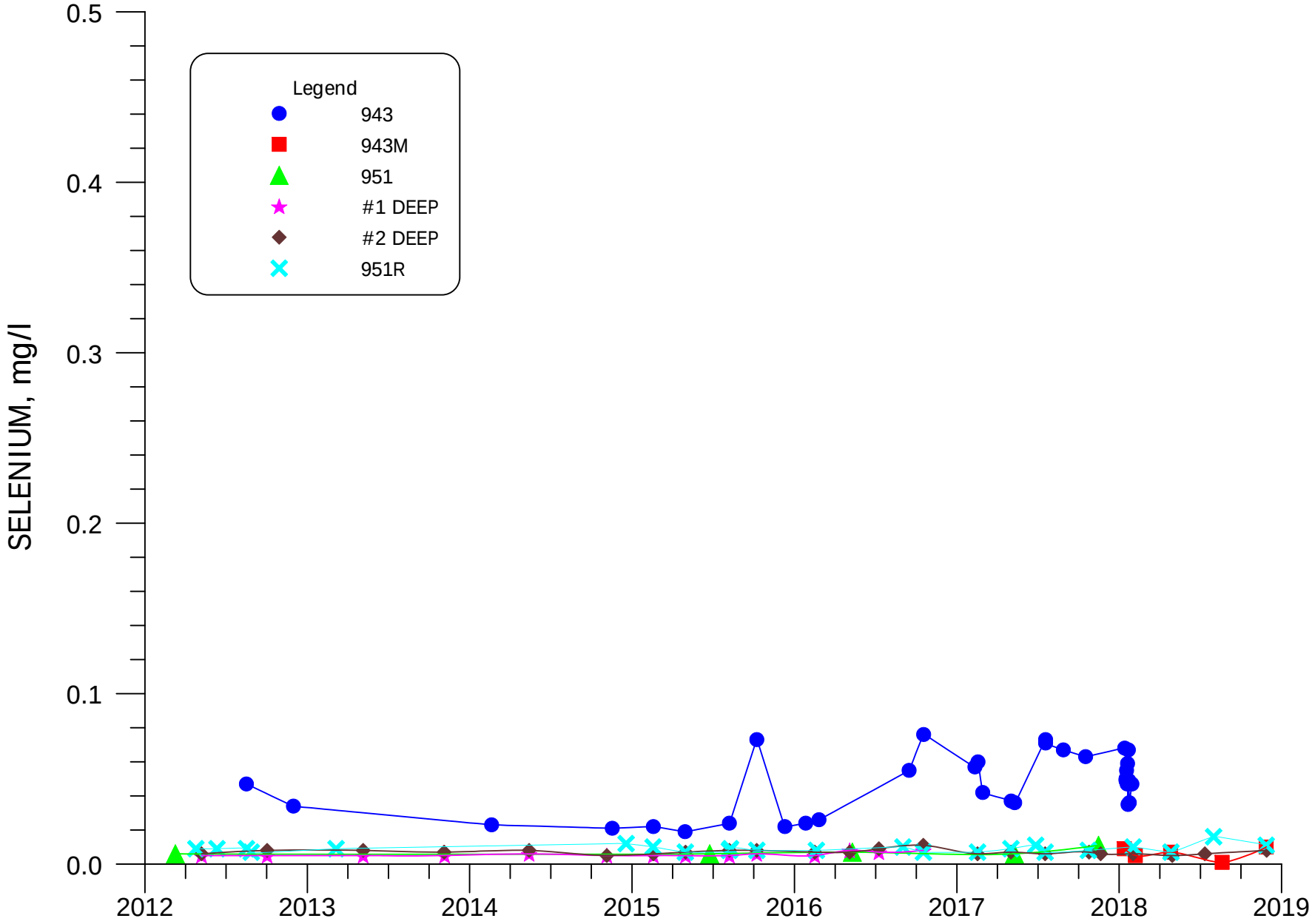


FIGURE 8.2-10. SELENIUM CONCENTRATIONS FOR WELLS 943, 943M, 951, 951R, #1 DEEP AND #2 DEEP.

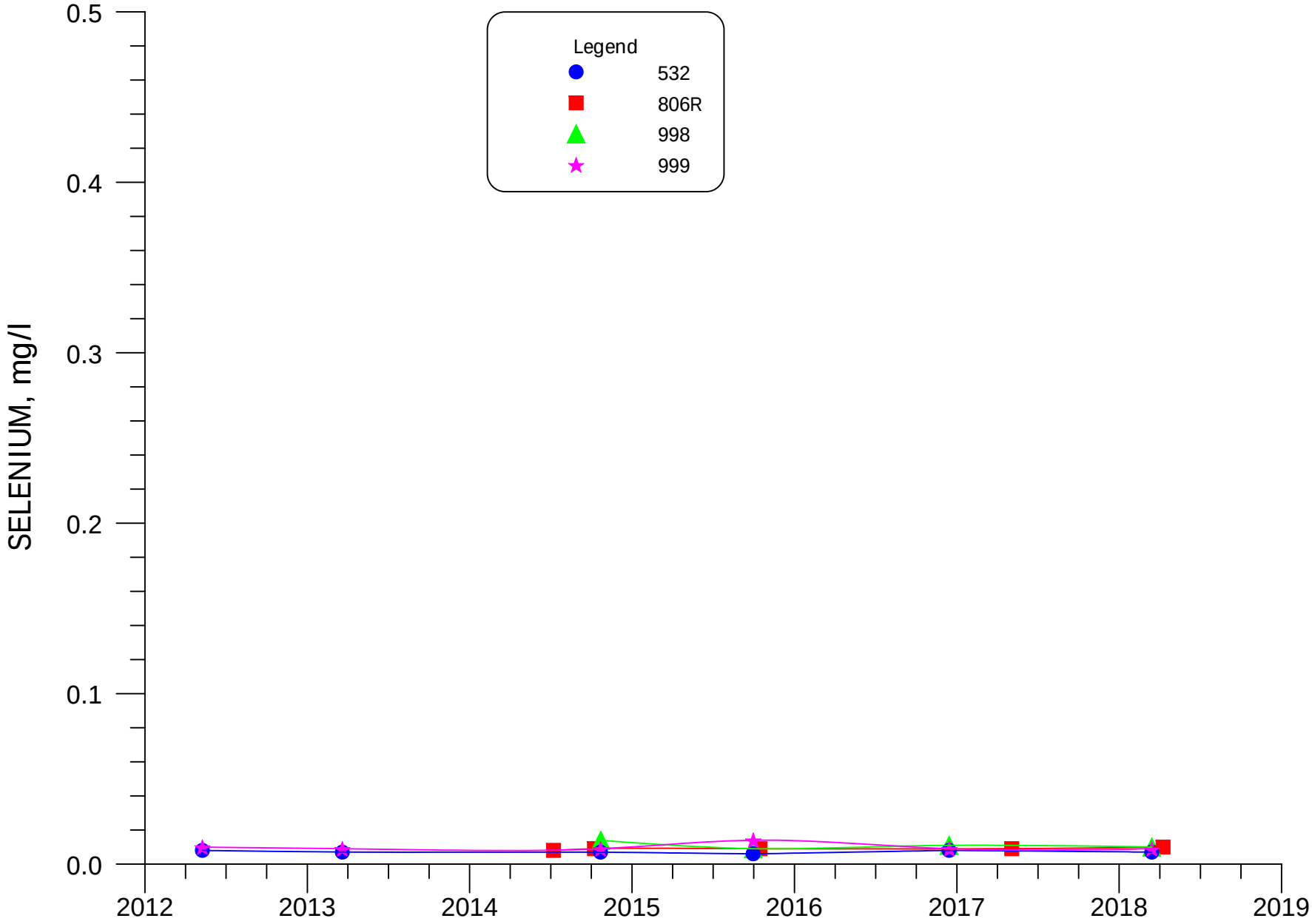


FIGURE 8.2-11. SELENIUM CONCENTRATIONS FOR WELLS 532, 806R, 998 AND 999.

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APPENDIX A

WATER LEVELS

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A.4-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER A.4-1

Table A.1-1. WATER LEVELS FOR THE TAILINGS WELLS

WATER LEVEL ELEVATION (FT-MSL)

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CN1		
2/26/2018	14.42	6600.59
3/26/2018	14.59	6600.42
4/30/2018	14.90	6600.11
5/29/2018	15.05	6599.96
6/25/2018	15.38	6599.63
7/30/2018	15.51	6599.50
8/28/2018	15.73	6599.28
9/24/2018	15.90	6599.11
10/29/2018	16.13	6598.88
11/26/2018	16.40	6598.61
12/19/2018	16.50	6598.51
CN2		
2/26/2018	70.34	6587.83
3/26/2018	70.14	6588.03
4/30/2018	70.19	6587.98
5/29/2018	70.60	6587.57
6/25/2018	71.10	6587.07
7/30/2018	70.45	6587.72
8/28/2018	71.10	6587.07
9/24/2018	71.04	6587.13
10/29/2018	71.23	6586.94
11/26/2018	71.38	6586.79
12/19/2018	57.50	6600.67
CN4		
5/8/2018	63.63	6602.59
CS1		
5/9/2018	21.17	6587.13
CS2		
2/26/2018	56.27	6595.71
3/26/2018	56.40	6595.58
4/30/2018	57.90	6594.08
5/9/2018	61.72	6590.26
5/29/2018	57.30	6594.68
6/25/2018	56.65	6595.33
7/30/2018	57.61	6594.37
8/28/2018	57.94	6594.04
9/24/2018	57.90	6594.08
10/29/2018	58.02	6593.96
11/26/2018	58.28	6593.70
12/19/2018	58.74	6593.24
CS7		
5/8/2018	70.04	6594.65
EE2		
1/4/2018	62.09	6605.75
2/26/2018	62.44	6605.40
3/26/2018	62.50	6605.34
4/30/2018	62.77	6605.07
5/29/2018	62.92	6604.92
6/25/2018	63.10	6604.74
7/30/2018	63.20	6604.64
8/28/2018	63.60	6604.24
9/24/2018	63.50	6604.34
10/29/2018	63.60	6604.24
11/26/2018	63.80	6604.04
12/19/2018	65.00	6602.84
EG9		
12/18/2018	109.11	6560.97
EI4		
5/15/2018	43.82	6624.18
12/6/2018	40.30	6627.70
EN1		
2/26/2018	29.94	6588.92
3/26/2018	29.74	6589.12
4/30/2018	29.84	6589.02
5/29/2018	29.90	6588.96
6/25/2018	30.22	6588.64
7/30/2018	30.20	6588.66
8/28/2018	30.15	6588.71
9/24/2018	30.60	6588.26
10/29/2018	30.70	6588.16
11/26/2018	30.80	6588.06
12/19/2018	30.75	6588.11
EN2		
2/26/2018	48.57	6603.04
3/26/2018	48.85	6602.76
4/30/2018	49.36	6602.25
5/29/2018	49.62	6601.99
6/25/2018	49.87	6601.74
7/30/2018	50.15	6601.46
8/28/2018	50.45	6601.16
9/24/2018	50.73	6600.88
10/29/2018	50.80	6600.81
11/26/2018	51.00	6600.61
12/19/2018	51.10	6600.51
EO14		
1/23/2018	62.02	6607.98
12/17/2018	58.58	6611.42
EP23		
5/15/2018	54.56	6613.44
EP31		
1/23/2018	60.90	6606.10
5/15/2018	56.51	6610.49
ES1		
2/26/2018	29.78	6585.40
3/26/2018	19.81	6595.37
4/30/2018	13.93	6601.25
5/29/2018	30.22	6584.96
6/25/2018	30.40	6584.78
7/30/2018	30.15	6585.03
8/28/2018	30.08	6585.10
9/24/2018	30.82	6584.36
10/29/2018	30.15	6585.03
11/26/2018	30.65	6584.53
12/19/2018	30.10	6585.08
ES2		
2/26/2018	> 76.00	< 6579.30
3/26/2018	> 76.00	< 6579.30
4/30/2018	> 76.00	< 6579.30
5/29/2018	58.56	6596.74
6/25/2018	> 76.00	< 6579.30
7/30/2018	> 76.00	< 6579.30
8/28/2018	> 76.00	< 6579.30
9/24/2018	> 76.00	< 6579.30
10/29/2018	> 76.00	< 6579.30
11/26/2018	> 76.00	< 6579.30
12/19/2018	> 76.00	< 6579.30
ES4		
1/30/2018	119.12	6546.68
12/18/2018	69.52	6596.28
ES6		
1/22/2018	68.87	6606.08
12/18/2018	66.09	6608.86
ET20		
5/15/2018	70.64	6593.36
NE1		
2/26/2018	47.15	6601.67
3/26/2018	47.14	6601.68
4/30/2018	47.47	6601.35
5/29/2018	47.64	6601.18
6/25/2018	47.90	6600.92
7/30/2018	48.00	6600.82
8/28/2018	48.18	6600.64
9/24/2018	48.44	6600.38
10/29/2018	48.44	6600.38
11/26/2018	48.65	6600.17
12/19/2018	48.63	6600.19
NE2		
1/4/2018	60.90	6600.08
NW3		
5/15/2018	70.34	6584.67
NW4		
2/26/2018	> 33.70	< 6622.45
3/26/2018	37.62	6618.53
4/30/2018	33.62	6622.53
5/29/2018	33.59	6622.56
6/25/2018	> 33.70	< 6622.45
7/30/2018	> 33.70	< 6622.45
8/28/2018	> 33.70	< 6622.45
9/24/2018	> 33.70	< 6622.45
10/29/2018	> 33.70	< 6622.45
11/26/2018	> 33.70	< 6622.45
12/19/2018	> 33.70	< 6622.45

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1. WATER LEVELS FOR THE TAILINGS WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SE2		
1/3/2018	66.16	6595.21
2/26/2018	66.16	6595.21
3/26/2018	66.10	6595.27
4/30/2018	66.31	6595.06
5/29/2018	66.45	6594.92
6/25/2018	66.66	6594.71
7/30/2018	66.70	6594.67
8/28/2018	67.05	6594.32
9/24/2018	67.05	6594.32
10/29/2018	67.30	6594.07
11/26/2018	67.50	6593.87
12/19/2018	67.90	6593.47
SW1		
1/23/2018	38.20	6561.63
2/26/2018	22.96	6576.87
3/26/2018	22.84	6576.99
4/30/2018	23.06	6576.77
5/9/2018	28.84	6570.99
5/29/2018	23.35	6576.48
6/25/2018	23.90	6575.93
7/30/2018	23.95	6575.88
8/28/2018	24.14	6575.69
9/24/2018	24.20	6575.63
10/29/2018	24.22	6575.61
11/26/2018	24.28	6575.55
12/19/2018	24.25	6575.58
SW2		
1/23/2018	48.20	6589.67
2/26/2018	43.42	6594.45
3/26/2018	43.31	6594.56
4/30/2018	43.49	6594.38
5/29/2018	43.50	6594.37
6/25/2018	43.93	6593.94
7/30/2018	44.03	6593.84
8/28/2018	43.61	6594.26
9/24/2018	44.14	6593.73
10/29/2018	43.77	6594.10
11/26/2018	43.85	6594.02
12/19/2018	44.05	6593.82
SW3		
5/22/2018	66.12	6615.29
WE9		
4/16/2018	54.20	6607.76
5/23/2018	54.88	6607.08
6/6/2018	55.58	6606.38
8/13/2018	57.31	6604.65
10/2/2018	56.25	6605.71
10/30/2018	56.45	6605.51
11/26/2018	57.00	6604.96
12/18/2018	56.83	6605.13
WF2		
4/11/2018	62.40	6598.42
5/23/2018	62.40	6598.42
6/6/2018	62.33	6598.49
8/13/2018	43.84	6616.98
10/2/2018	63.30	6597.52
10/30/2018	63.30	6597.52
11/26/2018	63.75	6597.07
12/18/2018	63.70	6597.12
WF9		
4/10/2018	63.60	6602.10
5/7/2018	63.47	6602.23
6/6/2018	63.65	6602.05
8/16/2018	64.60	6601.10
10/2/2018	64.80	6600.90
10/30/2018	65.00	6600.70
11/26/2018	65.30	6600.40
12/17/2018	65.25	6600.45
WF11		
4/5/2018	56.63	6608.21
5/23/2018	56.53	6608.31
6/6/2018	56.52	6608.32
8/16/2018	56.88	6607.96
10/1/2018	57.00	6607.84
10/30/2018	57.05	6607.79
11/26/2018	57.75	6607.09
12/17/2018	57.30	6607.54
WME-1		
8/21/2018	53.38	6605.85
10/25/2018	53.30	6605.93
12/14/2018	53.60	6605.63
WME-2		
8/21/2018	57.66	6603.39
10/25/2018	53.10	6607.95
12/14/2018	58.49	6602.56
WME-3		
8/21/2018	61.68	6602.63
10/25/2018	61.97	6602.34
12/14/2018	62.13	6602.18
WME-4		
10/25/2018	57.93	6604.38
12/14/2018	58.18	6604.13
WME-5		
10/25/2018	67.95	6604.40
12/14/2018	70.75	6601.60
WME-6		
10/25/2018	54.42	6617.08
12/14/2018	54.75	6616.75
WN1		
2/26/2018	17.79	6588.89
3/26/2018	17.93	6588.75
4/30/2018	18.13	6588.55
5/29/2018	18.30	6588.38
6/25/2018	18.47	6588.21
7/30/2018	18.55	6588.13
8/28/2018	18.66	6588.02
9/24/2018	18.79	6587.89
10/29/2018	18.93	6587.75
11/26/2018	19.00	6587.68
12/19/2018	19.15	6587.53
WN2		
2/26/2018	54.59	6589.73
3/26/2018	51.76	6592.56
4/30/2018	52.06	6592.26
5/29/2018	52.49	6591.83
6/25/2018	52.30	6592.02
7/30/2018	52.57	6591.75
8/28/2018	52.73	6591.59
9/24/2018	52.83	6591.49
10/29/2018	53.05	6591.27
11/26/2018	53.15	6591.17
12/19/2018	54.10	6590.22
WO10		
12/17/2018	60.70	6596.30
WO21		
12/18/2018	59.72	6593.28
WO32		
5/15/2018	64.72	6590.28
WP10		
1/23/2018	67.01	6590.99
12/17/2018	64.26	6593.74
WS1		
2/26/2018	9.67	6597.44
3/26/2018	9.69	6597.42
4/30/2018	9.16	6597.95
5/9/2018	12.18	6594.93
5/29/2018	11.70	6595.41
6/25/2018	11.00	6596.11
7/30/2018	10.60	6596.51
8/28/2018	10.24	6596.87
9/24/2018	10.14	6596.97
10/29/2018	10.09	6597.02
11/26/2018	10.06	6597.05
12/19/2018	10.25	6596.86
WS2		
1/29/2018	32.67	6616.77
2/26/2018	55.34	6594.10
3/26/2018	55.50	6593.94
4/30/2018	55.84	6593.60
5/29/2018	56.00	6593.44
6/25/2018	56.25	6593.19
7/30/2018	56.43	6593.01
8/28/2018	56.58	6592.86
9/24/2018	56.89	6592.55
10/29/2018	56.88	6592.56
11/26/2018	57.06	6592.38
12/19/2018	57.45	6591.99

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1. WATER LEVELS FOR THE TAILINGS WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
WT6											
1/30/2018	119.71	6537.29									
1/31/2018	52.70	6604.30									
12/18/2018	> 53.34	< 6603.66									
WT18											
5/15/2018	66.62	6593.38									
WW1											
1/31/2018	22.23	6580.86									
2/26/2018	22.10	6580.99									
3/26/2018	22.16	6580.93									
4/30/2018	22.39	6580.70									
5/9/2018	22.31	6580.78									
5/29/2018	22.45	6580.64									
6/25/2018	22.70	6580.39									
7/30/2018	22.79	6580.30									
8/28/2018	22.95	6580.14									
9/24/2018	23.10	6579.99									
10/29/2018	23.20	6579.89									
11/26/2018	23.34	6579.75									
12/19/2018	23.45	6579.64									
WW2											
2/26/2018	> 64.90	< 6578.74									
3/26/2018	> 64.90	< 6578.74									
4/30/2018	> 64.90	< 6578.74									
5/29/2018	> 64.90	< 6578.74									
6/25/2018	> 64.90	< 6578.74									
7/30/2018	> 64.90	< 6578.74									
8/28/2018	> 64.90	< 6578.74									
9/24/2018	> 64.90	< 6578.74									
10/29/2018	> 64.90	< 6578.74									
11/26/2018	> 64.90	< 6578.74									
12/19/2018	> 64.90	< 6578.74									
WW3											
1/23/2018	61.67	6597.87									
12/18/2018	49.72	6609.82									

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0690		
2/7/2018	42.81	6539.25
12/26/2018	40.30	6541.76
0691		
2/7/2018	59.00	6529.81
12/26/2018	45.50	6543.31
0891		
2/7/2018	38.50	6542.62
0892		
12/5/2018	41.25	6545.96
1A		
4/4/2018	37.29	6548.14
1C		
12/5/2018	37.53	6550.46
1F		
2/13/2018	38.95	6548.43
1H		
12/5/2018	> 55.40	< 6530.99
1I		
12/5/2018	> 49.80	< 6548.55
1K		
4/4/2018	36.79	6547.34
1M		
2/12/2018	28.29	6547.24
1N		
2/7/2018	35.89	6554.96
12/5/2018	31.82	6559.03
1O		
12/5/2018	> 44.00	< 6550.94
1P		
2/7/2018	4170.00	2415.24
12/5/2018	38.05	6547.19
B		
1/1/2018	35.65	6535.25
1/8/2018	35.95	6534.95
1/15/2018	36.67	6534.23
1/22/2018	35.80	6535.10
1/29/2018	35.84	6535.06
2/5/2018	35.60	6535.30
2/12/2018	36.00	6534.90
2/20/2018	36.15	6534.75
2/26/2018	36.22	6534.68
3/5/2018	37.41	6533.49
3/7/2018	36.22	6534.68
3/12/2018	36.51	6534.39
3/19/2018	36.42	6534.48
3/26/2018	36.44	6534.46
4/2/2018	36.41	6534.49
4/9/2018	36.73	6534.17
4/16/2018	36.70	6534.20
4/23/2018	36.85	6534.05
4/30/2018	36.98	6533.92
5/7/2018	40.76	6530.14
5/14/2018	40.63	6530.27
5/21/2018	43.04	6527.86
5/28/2018	37.10	6533.80
6/4/2018	36.91	6533.99
6/11/2018	37.68	6533.22
6/18/2018	37.10	6533.80
6/25/2018	37.40	6533.50
7/2/2018	37.50	6533.40
7/9/2018	37.59	6533.31
7/16/2018	37.47	6533.43
7/23/2018	37.47	6533.43
7/30/2018	37.44	6533.46
8/6/2018	37.42	6533.48
8/13/2018	37.45	6533.45
8/20/2018	37.41	6533.49
8/27/2018	37.41	6533.49
9/3/2018	37.61	6533.29
9/10/2018	37.63	6533.27
9/17/2018	37.77	6533.13
9/24/2018	38.05	6532.85
10/1/2018	35.05	6535.85
10/8/2018	38.15	6532.75
10/15/2018	38.50	6532.40
10/22/2018	38.37	6532.53
10/29/2018	38.65	6532.25
11/5/2018	38.80	6532.10
11/12/2018	39.90	6531.00
11/19/2018	39.35	6531.55
11/26/2018	39.30	6531.60
12/3/2018	39.21	6531.69
12/10/2018	39.31	6531.59
12/17/2018	39.29	6531.61
12/19/2018	40.40	6530.50
B1		
12/26/2018	41.40	6530.42
B4		
4/9/2018	41.02	6533.64
B6		
4/27/2018	62.74	6514.95
B7		
4/9/2018	29.56	6544.84
B8		
4/10/2018	49.11	6526.64
B9		
4/10/2018	47.61	6528.56
B11		
3/20/2018	42.04	6535.35
B12		
2/13/2018	37.55	6535.47
12/26/2018	40.15	6532.87
B13		
2/13/2018	32.61	6537.43
12/26/2018	41.00	6529.04
B15		
4/17/2018	40.44	6535.87
B16		
4/16/2018	39.98	6535.39
B31		
4/17/2018	40.84	6535.12
B35		
4/17/2018	39.70	6537.16
B40		
4/10/2018	42.73	6533.16
B42		
4/10/2018	42.10	6536.87
B44		
4/10/2018	40.08	6538.52

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
BA		
1/1/2018	38.83	6532.75
1/8/2018	33.26	6538.32
1/15/2018	39.58	6532.00
1/22/2018	37.56	6534.02
1/29/2018	37.62	6533.96
2/5/2018	37.10	6534.48
2/12/2018	37.51	6534.07
2/20/2018	37.70	6533.88
2/26/2018	37.25	6534.33
3/5/2018	36.34	6535.24
3/12/2018	37.66	6533.92
3/19/2018	37.52	6534.06
3/26/2018	36.52	6535.06
4/2/2018	37.80	6533.78
4/9/2018	37.70	6533.88
4/16/2018	37.60	6533.98
4/23/2018	38.78	6532.80
4/30/2018	38.59	6532.99
5/7/2018	38.65	6532.93
5/14/2018	41.44	6530.14
5/21/2018	42.76	6528.82
5/28/2018	39.20	6532.38
6/4/2018	39.21	6532.37
6/11/2018	39.41	6532.17
6/18/2018	39.60	6531.98
6/25/2018	39.95	6531.63
7/2/2018	39.92	6531.66
7/9/2018	39.56	6532.02
7/16/2018	39.91	6531.67
7/23/2018	39.89	6531.69
7/30/2018	40.12	6531.46
8/6/2018	39.97	6531.61
8/13/2018	40.35	6531.23
8/20/2018	40.47	6531.11
8/27/2018	39.03	6532.55
9/3/2018	39.41	6532.17
9/10/2018	39.16	6532.42
9/17/2018	39.18	6532.40
9/24/2018	40.70	6530.88
10/1/2018	53.34	6518.24
10/8/2018	40.45	6531.13
10/15/2018	41.47	6530.11
10/22/2018	41.57	6530.01
10/29/2018	41.95	6529.63
11/5/2018	42.05	6529.53
11/12/2018	42.35	6529.23
11/19/2018	40.61	6530.97
11/26/2018	42.00	6529.58
12/3/2018	41.83	6529.75
12/10/2018	42.19	6529.39
12/17/2018	41.05	6530.53
12/19/2018	42.20	6529.38
BC		
6/11/2018	37.35	6537.26
12/26/2018	38.20	6536.41
BP		
3/7/2018	38.64	6533.66
C2		
3/7/2018	32.75	6532.27
C5		
3/7/2018	33.22	6536.63
C6		
3/7/2018	60.88	6524.01
C8		
3/7/2018	51.20	6533.29
C9		
3/7/2018	58.10	6526.45
C10		
3/7/2018	53.92	6531.34
9/20/2018	55.67	6529.59
C11		
3/7/2018	56.78	6524.60
C12		
3/7/2018	32.14	6548.41
D1		
3/5/2018	37.33	6533.57
3/22/2018	42.00	6528.90
6/12/2018	87.00	6483.90
7/11/2018	39.66	6531.24
9/17/2018	41.20	6529.70
12/5/2018	43.50	6527.40
DA3		
4/5/2018	39.12	6535.24
DC		
6/11/2018	39.33	6531.98
12/26/2018	40.05	6531.26
DD		
2/2/2018	51.04	6541.55
2/2/2018	51.04	6541.55
3/21/2018	78.50	6514.09
4/30/2018	49.54	6543.05
5/31/2018	52.60	6539.99
6/21/2018	47.90	6544.69
8/16/2018	47.83	6544.76
9/17/2018	48.79	6543.80
9/18/2018	48.26	6544.33
10/10/2018	48.40	6544.19
10/10/2018	48.43	6544.16
10/15/2018	48.50	6544.09
11/1/2018	48.30	6544.29
11/5/2018	48.20	6544.39
11/15/2018	48.22	6544.37
11/19/2018	48.35	6544.24
11/29/2018	48.10	6544.49
11/29/2018	43.97	6548.62
12/5/2018	48.55	6544.04
12/7/2018	48.70	6543.89
12/13/2018	48.68	6543.91
DD2		
2/2/2018	49.34	6543.94
4/30/2018	46.75	6546.53
8/16/2018	45.76	6547.52
9/18/2018	45.26	6548.02
10/10/2018	45.75	6547.53
10/10/2018	15.61	6577.67
10/15/2018	46.00	6547.28
10/25/2018	45.83	6547.45
11/1/2018	45.87	6547.41
11/5/2018	45.72	6547.56
11/15/2018	45.80	6547.48
11/19/2018	45.94	6547.34
11/28/2018	45.63	6547.65
11/29/2018	45.43	6547.85
12/7/2018	46.20	6547.08
12/13/2018	46.15	6547.13
DD3		
4/18/2018	52.18	6548.76
7/28/2018	48.46	6552.48
8/16/2018	48.61	6552.33
9/18/2018	48.47	6552.47
10/10/2018	48.60	6552.34
10/15/2018	48.65	6552.29
10/25/2018	48.60	6552.34
11/1/2018	48.56	6552.38
11/5/2018	48.60	6552.34
11/15/2018	48.62	6552.32
11/19/2018	48.68	6552.26
11/28/2018	48.57	6552.37
12/7/2018	49.07	6551.87
12/13/2018	48.70	6552.24
DD4		
3/27/2018	47.66	6551.77
4/18/2018	49.12	6550.31
8/16/2018	47.98	6551.45
9/18/2018	48.69	6550.74
10/10/2018	47.93	6551.50
10/15/2018	48.15	6551.28
10/25/2018	47.92	6551.51
11/1/2018	47.95	6551.48
11/5/2018	48.00	6551.43
11/15/2018	47.92	6551.51
11/19/2018	48.05	6551.38
11/28/2018	47.78	6551.65
12/7/2018	48.27	6551.16
12/13/2018	48.20	6551.23

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
DD5		
3/27/2018	53.44	6541.91
4/18/2018	53.10	6542.25
8/16/2018	49.45	6545.90
9/18/2018	49.40	6545.95
10/10/2018	49.55	6545.80
10/15/2018	49.76	6545.59
11/1/2018	49.65	6545.70
11/5/2018	49.57	6545.78
11/15/2018	49.69	6545.66
11/19/2018	49.80	6545.55
11/28/2018	49.60	6545.75
12/7/2018	49.90	6545.45
12/13/2018	50.00	6545.35
DD6		
9/18/2018	> 35.00	< 6560.81
10/10/2018	> 35.00	< 6560.81
10/15/2018	> 35.00	< 6560.81
10/25/2018	> 35.00	< 6560.81
11/1/2018	> 35.00	< 6560.81
11/5/2018	> 35.00	< 6560.81
11/15/2018	> 35.00	< 6560.81
11/19/2018	> 35.00	< 6560.81
11/28/2018	> 35.00	< 6560.81
12/7/2018	> 35.00	< 6560.81
12/13/2018	> 35.00	< 6560.81
DD7		
9/18/2018	24.10	6572.73
10/10/2018	> 24.20	< 6572.63
10/15/2018	> 24.20	< 6572.63
10/25/2018	> 24.20	< 6572.63
11/1/2018	> 24.20	< 6572.63
11/5/2018	> 24.20	< 6572.63
11/15/2018	> 24.20	< 6572.63
11/19/2018	> 24.20	< 6572.63
11/28/2018	> 24.20	< 6572.63
12/7/2018	> 24.20	< 6572.63
12/13/2018	> 24.20	< 6572.63
DT		
4/5/2018	48.16	6535.65
DZ		
1/1/2018	53.17	6537.36
1/8/2018	54.80	6535.73
1/15/2018	48.10	6542.43
1/22/2018	47.21	6543.32
1/29/2018	52.45	6538.08
2/5/2018	51.90	6538.63
2/12/2018	51.64	6538.89
2/20/2018	51.48	6539.05
2/26/2018	51.48	6539.05
3/5/2018	51.36	6539.17
3/12/2018	48.10	6542.43
3/19/2018	51.62	6538.91
3/26/2018	51.84	6538.69
4/2/2018	52.69	6537.84
4/9/2018	51.32	6539.21
4/16/2018	51.05	6539.48
4/23/2018	53.21	6537.32
4/30/2018	51.75	6538.78
5/7/2018	55.02	6535.51
5/14/2018	51.56	6538.97
5/21/2018	52.40	6538.13
5/28/2018	54.29	6536.24
6/4/2018	53.96	6536.57
6/11/2018	49.41	6541.12
6/13/2018	52.48	6538.05
6/18/2018	54.72	6535.81
6/25/2018	54.80	6535.73
7/2/2018	53.45	6537.08
7/9/2018	34.67	6555.86
7/16/2018	52.61	6537.92
7/23/2018	53.11	6537.42
7/30/2018	39.73	6550.80
8/6/2018	53.39	6537.14
8/13/2018	53.37	6537.16
8/20/2018	52.95	6537.58
8/27/2018	52.34	6538.19
9/3/2018	52.71	6537.82
9/10/2018	53.41	6537.12
9/17/2018	52.74	6537.79
9/24/2018	53.70	6536.83
10/1/2018	41.04	6549.49
10/8/2018	41.54	6548.99
10/15/2018	54.35	6536.18
10/22/2018	54.13	6536.40
10/29/2018	54.45	6536.08
11/5/2018	54.04	6536.49
11/12/2018	54.12	6536.41
11/19/2018	53.20	6537.33
11/26/2018	54.24	6536.29
12/3/2018	54.42	6536.11
12/10/2018	54.66	6535.87
12/17/2018	52.89	6537.64
12/19/2018	54.30	6536.23
F		
3/5/2018	33.48	6531.34
6/11/2018	34.10	6530.72
9/12/2018	34.69	6530.13
9/26/2018	35.14	6529.68
12/11/2018	35.45	6529.37
12/26/2018	35.27	6529.55
FB		
3/2/2018	34.32	6531.34
9/12/2018	35.72	6529.94
GA		
12/26/2018	37.10	6525.69
GF		
12/26/2018	38.40	6527.61
GH		
3/2/2018	34.36	6528.40
9/12/2018	35.38	6527.38
12/3/2018	36.34	6526.42
GK		
9/18/2018	37.37	6529.39
GN		
3/2/2018	38.86	6529.11
GV		
9/18/2018	50.81	6526.57
12/26/2018	51.05	6526.33
GW1		
12/26/2018	36.60	6528.67
GW2		
12/26/2018	37.10	6528.98
I		
2/15/2018	34.97	6532.23
4/4/2018	35.06	6532.14
6/13/2018	36.20	6531.00
6/19/2018	36.24	6530.96
9/27/2018	37.10	6530.10
K4		
2/8/2018	59.50	6542.52
3/1/2018	68.16	6533.86
7/18/2018	57.49	6544.53
K5		
2/8/2018	64.49	6537.24
7/18/2018	70.07	6531.66
K7		
2/8/2018	62.71	6538.82
K8		
2/8/2018	79.76	6520.73
7/18/2018	60.44	6540.05
K9		
4/4/2018	62.65	6537.69
K10		
2/8/2018	70.43	6530.38
7/18/2018	61.44	6539.37
K11		
2/8/2018	73.34	6527.27
7/18/2018	78.12	6522.49
KEB		
3/22/2018	28.92	6540.81

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
KF		
2/12/2018	32.33	6537.88
KZ		
1/1/2018	33.19	6538.53
1/8/2018	34.00	6537.72
1/15/2018	34.64	6537.08
1/22/2018	33.74	6537.98
1/29/2018	33.80	6537.92
2/5/2018	34.20	6537.52
2/12/2018	34.20	6537.52
2/12/2018	34.96	6536.76
2/20/2018	34.24	6537.48
2/26/2018	34.12	6537.60
3/5/2018	34.51	6537.21
3/12/2018	34.67	6537.05
3/19/2018	34.51	6537.21
3/26/2018	34.45	6537.27
4/2/2018	34.35	6537.37
4/9/2018	34.60	6537.12
4/16/2018	34.45	6537.27
4/23/2018	33.96	6537.76
4/30/2018	34.10	6537.62
5/7/2018	35.31	6536.41
5/14/2018	38.33	6533.39
5/21/2018	39.49	6532.23
5/28/2018	34.15	6537.57
6/4/2018	34.34	6537.38
6/11/2018	34.42	6537.30
6/18/2018	34.04	6537.68
6/25/2018	34.25	6537.47
7/2/2018	34.76	6536.96
7/9/2018	34.85	6536.87
7/16/2018	34.99	6536.73
7/23/2018	35.05	6536.67
7/30/2018	35.11	6536.61
8/6/2018	35.14	6536.58
8/13/2018	43.86	6527.86
8/20/2018	34.87	6536.85
8/27/2018	34.89	6536.83
9/3/2018	34.94	6536.78
9/10/2018	43.76	6527.96
9/17/2018	35.22	6536.50
9/24/2018	34.80	6536.92
10/1/2018	35.06	6536.66
10/8/2018	35.28	6536.44
10/15/2018	34.95	6536.77
10/22/2018	35.18	6536.54
10/29/2018	35.40	6536.32
11/5/2018	35.34	6536.38
11/12/2018	35.39	6536.33
11/19/2018	36.37	6535.35
11/26/2018	35.67	6536.05
12/3/2018	35.61	6536.11
12/10/2018	35.68	6536.04
12/17/2018	35.82	6535.90
12/19/2018	37.20	6534.52
L		
4/4/2018	56.09	6518.88
L5		
4/25/2018	55.11	6520.96
L6		
4/5/2018	30.75	6543.89
L7		
2/15/2018	30.62	6545.99
4/5/2018	57.87	6518.74
L8		
3/14/2018	52.44	6524.05
4/5/2018	57.62	6518.87
L9		
3/14/2018	56.32	6520.91
4/5/2018	51.44	6525.79
L10		
2/15/2018	47.31	6529.52
4/5/2018	48.68	6528.15
M3		
4/4/2018	39.44	6536.66
M5		
7/17/2018	41.66	6533.68
12/26/2018	43.10	6532.24
M6		
2/28/2018	60.14	6514.90
12/26/2018	61.00	6514.04
M7		
2/28/2018	55.96	6516.89
12/26/2018	56.45	6516.40
M9		
2/28/2018	71.25	6505.56
9/18/2018	64.21	6512.60
12/26/2018	63.40	6513.41
M10		
2/28/2018	60.85	6512.51
12/26/2018	61.75	6511.61
M19		
4/4/2018	64.94	6511.19
6/21/2018	65.51	6510.62
10/1/2018	65.45	6510.68
MA		
12/26/2018	> 85.00	< 6487.22
MB		
3/2/2018	41.91	6530.15
MC		
12/26/2018	44.20	6527.86
MF		
12/26/2018	46.90	6525.38
MH		
12/26/2018	51.15	6522.77
MJ		
12/26/2018	> 60.00	< 6512.94
ML		
2/28/2018	51.62	6521.08
12/26/2018	53.30	6519.40
MN		
12/5/2018	62.65	6514.91
MU		
12/6/2018	41.11	6533.08
MW		
2/28/2018	59.72	6515.19
12/26/2018	44.60	6530.31
MX		
8/2/2018	50.22	6518.39
MY		
12/6/2018	55.68	6517.88
MZ		
2/28/2018	61.40	6515.24
12/26/2018	64.00	6512.64
N		
8/29/2018	40.72	6543.25
NA		
8/30/2018	45.37	6545.61
NB		
8/30/2018	47.77	6545.53
NC		
4/4/2018	40.66	6545.17
12/26/2018	40.61	6545.22
ND		
3/7/2018	41.06	6551.83

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
O		
8/29/2018	40.08	6547.75
P		
3/22/2018	40.22	6547.04
4/30/2018	40.07	6547.19
P1		
12/26/2018	47.93	6544.54
P2		
3/6/2018	41.98	6547.81
P3		
3/6/2018	41.61	6548.34
P4		
3/6/2018	41.02	6548.50
Q		
3/20/2018	42.08	6551.74
3/22/2018	42.06	6551.76
4/26/2018	42.52	6551.30
6/20/2018	42.08	6551.74
9/13/2018	42.12	6551.70
12/3/2018	42.10	6551.72
R		
3/21/2018	39.77	6564.26
3/22/2018	39.79	6564.24
6/20/2018	39.84	6564.19
9/12/2018	39.85	6564.18
12/3/2018	39.90	6564.13
S		
12/26/2018	44.22	6536.95
S2		
1/1/2018	38.01	6535.71
1/8/2018	37.10	6536.62
1/15/2018	37.18	6536.54
1/16/2018	37.34	6536.38
1/22/2018	40.07	6533.65
1/29/2018	37.04	6536.68
2/5/2018	37.00	6536.72
2/12/2018	37.20	6536.52
2/20/2018	37.22	6536.50
2/20/2018	37.22	6536.50
2/26/2018	37.38	6536.34
3/5/2018	37.84	6535.88
3/12/2018	40.88	6532.84
3/19/2018	37.98	6535.74
3/26/2018	37.48	6536.24
4/2/2018	38.05	6535.67
4/9/2018	38.22	6535.50
4/16/2018	38.38	6535.34
4/23/2018	38.47	6535.25
4/30/2018	38.45	6535.27
5/7/2018	39.24	6534.48
5/14/2018	42.39	6531.33
5/21/2018	39.55	6534.17
5/28/2018	38.98	6534.74
6/4/2018	38.81	6534.91
6/11/2018	37.73	6535.99
6/18/2018	38.70	6535.02
6/25/2018	38.84	6534.88
7/2/2018	38.86	6534.86
7/9/2018	38.97	6534.75
7/11/2018	38.86	6534.86
7/16/2018	38.81	6534.91
7/23/2018	38.69	6535.03
7/30/2018	38.60	6535.12
8/6/2018	38.49	6535.23
8/13/2018	38.34	6535.38
8/20/2018	38.21	6535.51
8/27/2018	38.11	6535.61
9/3/2018	38.18	6535.54
9/10/2018	38.04	6535.68
9/24/2018	39.50	6534.22
10/1/2018	38.53	6535.19
10/8/2018	38.70	6535.02
10/15/2018	38.82	6534.90
10/22/2018	38.35	6535.37
10/29/2018	38.80	6534.92
11/5/2018	38.70	6535.02
11/12/2018	38.90	6534.82
11/19/2018	39.68	6534.04
12/3/2018	49.66	6524.06
12/10/2018	39.29	6534.43
12/17/2018	39.30	6534.42
S3		
7/17/2018	40.37	6534.41
12/26/2018	41.35	6533.43
S4		
3/22/2018	38.95	6536.34
6/13/2018	39.70	6535.59
7/12/2018	39.81	6535.48
9/17/2018	39.89	6535.40
12/5/2018	40.50	6534.79
12/26/2018	40.50	6534.79
S5		
1/1/2018	42.86	6531.83
1/8/2018	42.72	6531.97
1/15/2018	43.78	6530.91
1/22/2018	42.70	6531.99
1/29/2018	42.60	6532.09
2/5/2018	42.50	6532.19
2/12/2018	42.25	6532.44
2/20/2018	42.40	6532.29
2/26/2018	42.14	6532.55
3/5/2018	42.69	6532.00
3/12/2018	43.15	6531.54
3/19/2018	42.97	6531.72
3/26/2018	32.29	6542.40
4/2/2018	43.10	6531.59
4/9/2018	43.00	6531.69
4/16/2018	43.19	6531.50
4/23/2018	43.47	6531.22
4/30/2018	43.20	6531.49
5/7/2018	23.06	6551.63
5/14/2018	45.36	6529.33
5/21/2018	44.69	6530.00
5/28/2018	43.90	6530.79
6/4/2018	44.02	6530.67
6/11/2018	44.00	6530.69
6/18/2018	44.03	6530.66
6/25/2018	43.95	6530.74
7/2/2018	13.59	6561.10
7/9/2018	23.12	6551.57
7/16/2018	44.04	6530.65
7/23/2018	44.12	6530.57
7/30/2018	44.04	6530.65
8/6/2018	38.69	6536.00
8/13/2018	43.92	6530.77
8/20/2018	44.02	6530.67
8/27/2018	43.85	6530.84
9/3/2018	43.90	6530.79
9/10/2018	43.84	6530.85
9/17/2018	43.90	6530.79
9/24/2018	44.17	6530.52
10/1/2018	44.07	6530.62
10/8/2018	44.20	6530.49
10/15/2018	44.45	6530.24
10/22/2018	44.22	6530.47
10/29/2018	44.55	6530.14
11/5/2018	44.39	6530.30
11/12/2018	44.69	6530.00
11/19/2018	23.68	6551.01
11/26/2018	45.00	6529.69
12/3/2018	44.90	6529.79
12/10/2018	44.99	6529.70
12/17/2018	44.85	6529.84
12/19/2018	45.60	6529.09
S5R		
2/14/2018	42.32	6538.17
S11		
1/16/2018	35.52	6542.87
12/26/2018	40.35	6538.04
S12		
1/17/2018	47.55	6531.30
S14		
1/3/2018	38.80	6536.60
S19		
2/14/2018	37.09	6540.88
12/26/2018	40.52	6537.45
S21		
12/26/2018	39.68	6540.60
SA		
2/14/2018	31.41	6548.90
SB		
2/14/2018	52.02	6529.07

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SE6		
1/16/2018	43.26	6535.65
SM		
1/1/2018	40.27	6538.47
1/8/2018	40.24	6538.50
1/15/2018	40.91	6537.83
1/22/2018	40.18	6538.56
1/29/2018	40.10	6538.64
2/5/2018	40.10	6538.64
2/12/2018	40.10	6538.64
2/20/2018	40.13	6538.61
2/26/2018	40.25	6538.49
3/5/2018	40.51	6538.23
3/12/2018	40.96	6537.78
3/19/2018	40.79	6537.95
3/26/2018	40.74	6538.00
4/2/2018	40.85	6537.89
4/9/2018	41.05	6537.69
4/16/2018	41.10	6537.64
4/23/2018	41.30	6537.44
4/30/2018	41.25	6537.49
5/2/2018	44.48	6534.26
5/7/2018	41.64	6537.10
5/14/2018	46.91	6531.83
5/21/2018	42.75	6535.99
5/28/2018	41.88	6536.86
6/4/2018	41.74	6537.00
6/11/2018	43.81	6534.93
6/18/2018	41.90	6536.84
6/25/2018	43.95	6534.79
7/2/2018	41.87	6536.87
7/9/2018	41.93	6536.81
7/16/2018	41.94	6536.80
7/23/2018	42.00	6536.74
7/30/2018	41.96	6536.78
8/6/2018	41.93	6536.81
8/13/2018	41.83	6536.91
8/20/2018	41.82	6536.92
8/27/2018	41.70	6537.04
9/3/2018	41.70	6537.04
9/10/2018	41.74	6537.00
9/17/2018	42.34	6536.40
9/24/2018	41.95	6536.79
10/1/2018	41.90	6536.84
10/8/2018	42.10	6536.64
10/15/2018	42.20	6536.54
10/22/2018	42.02	6536.72
10/29/2018	42.20	6536.54
11/5/2018	42.19	6536.55
11/12/2018	42.38	6536.36
11/19/2018	42.91	6535.83
11/26/2018	42.73	6536.01
12/3/2018	42.61	6536.13
12/10/2018	42.64	6536.10
12/17/2018	42.63	6536.11
12/19/2018	43.62	6535.12
SN		
1/1/2018	40.49	6538.77
1/8/2018	40.40	6538.86
1/15/2018	41.15	6538.11
1/22/2018	40.35	6538.91
1/29/2018	40.27	6538.99
2/5/2018	40.15	6539.11
2/12/2018	40.20	6539.06
2/20/2018	40.22	6539.04
2/26/2018	40.31	6538.95
3/5/2018	40.60	6538.66
3/12/2018	40.88	6538.38
3/19/2018	40.78	6538.48
3/26/2018	40.59	6538.67
4/2/2018	40.86	6538.40
4/9/2018	41.03	6538.23
4/16/2018	41.09	6538.17
4/23/2018	40.81	6538.45
4/30/2018	40.69	6538.57
5/7/2018	41.86	6537.40
5/14/2018	45.18	6534.08
5/21/2018	42.10	6537.16
5/28/2018	41.30	6537.96
6/4/2018	41.65	6537.61
6/11/2018	43.76	6535.50
6/18/2018	41.85	6537.41
6/25/2018	41.46	6537.80
7/2/2018	41.77	6537.49
7/9/2018	41.83	6537.43
7/16/2018	41.84	6537.42
7/23/2018	41.92	6537.34
7/30/2018	41.90	6537.36
8/6/2018	41.89	6537.37
8/13/2018	41.84	6537.42
8/20/2018	41.81	6537.45
8/27/2018	41.75	6537.51
9/3/2018	41.79	6537.47
9/10/2018	41.77	6537.49
9/17/2018	41.79	6537.47
9/24/2018	42.04	6537.22
10/1/2018	41.94	6537.32
10/8/2018	42.08	6537.18
10/15/2018	42.25	6537.01
10/22/2018	42.05	6537.21
10/29/2018	42.20	6537.06
11/5/2018	42.22	6537.04
11/12/2018	42.39	6536.87
11/19/2018	42.81	6536.45
11/26/2018	42.65	6536.61
12/3/2018	42.60	6536.66
12/10/2018	42.64	6536.62
12/17/2018	42.53	6536.73
12/19/2018	43.65	6535.61
12/26/2018	42.66	6536.60
SO		
1/1/2018	41.03	6537.76
1/8/2018	40.93	6537.86
1/15/2018	41.70	6537.09
1/22/2018	40.87	6537.92
1/29/2018	40.75	6538.04
2/5/2018	40.70	6538.09
2/12/2018	40.81	6537.98
2/20/2018	40.85	6537.94
2/26/2018	41.01	6537.78
3/5/2018	41.29	6537.50
3/12/2018	41.20	6537.59
3/19/2018	41.61	6537.18
3/26/2018	42.08	6536.71
4/2/2018	41.69	6537.10
4/9/2018	41.87	6536.92
4/16/2018	41.95	6536.84
4/23/2018	42.08	6536.71
4/30/2018	42.05	6536.74
5/2/2018	45.10	6533.69
5/7/2018	42.86	6535.93
5/14/2018	47.36	6531.43
5/21/2018	42.98	6535.81
5/28/2018	42.61	6536.18
6/4/2018	42.60	6536.19
6/11/2018	42.64	6536.15
6/18/2018	42.60	6536.19
6/25/2018	42.60	6536.19
7/2/2018	42.66	6536.13
7/9/2018	42.72	6536.07
7/16/2018	42.68	6536.11
7/23/2018	42.69	6536.10
7/30/2018	42.59	6536.20
8/6/2018	42.57	6536.22
8/13/2018	32.44	6546.35
8/20/2018	42.32	6536.47
8/27/2018	42.26	6536.53
9/3/2018	42.33	6536.46
9/10/2018	42.29	6536.50
9/17/2018	42.90	6535.89
9/24/2018	42.45	6536.34
10/1/2018	42.47	6536.32
10/8/2018	42.70	6536.09
10/15/2018	42.82	6535.97
10/22/2018	42.58	6536.21
10/29/2018	42.90	6535.89
11/5/2018	42.81	6535.98
11/12/2018	42.98	6535.81
11/19/2018	43.59	6535.20
11/26/2018	43.35	6535.44
12/3/2018	41.32	6537.47
12/10/2018	43.32	6535.47
12/17/2018	42.30	6536.49
12/19/2018	44.18	6534.61

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SP		
1/1/2018	41.00	6537.66
1/8/2018	40.98	6537.68
1/15/2018	41.73	6536.93
1/22/2018	40.01	6538.65
1/29/2018	40.75	6537.91
2/5/2018	40.50	6538.16
2/12/2018	40.74	6537.92
2/20/2018	40.75	6537.91
2/26/2018	40.71	6537.95
3/5/2018	41.04	6537.62
3/12/2018	41.45	6537.21
3/19/2018	42.86	6535.80
3/26/2018	41.21	6537.45
4/2/2018	41.42	6537.24
4/9/2018	41.70	6536.96
4/16/2018	41.66	6537.00
4/23/2018	41.80	6536.86
4/30/2018	41.82	6536.84
5/7/2018	42.02	6536.64
5/14/2018	47.69	6530.97
5/21/2018	39.84	6538.82
5/28/2018	42.25	6536.41
6/4/2018	42.31	6536.35
6/11/2018	43.64	6535.02
6/18/2018	42.94	6535.72
6/25/2018	42.50	6536.16
7/2/2018	42.38	6536.28
7/9/2018	42.51	6536.15
7/16/2018	42.57	6536.09
7/23/2018	42.61	6536.05
7/30/2018	42.53	6536.13
8/6/2018	42.50	6536.16
8/13/2018	42.27	6536.39
8/20/2018	42.39	6536.27
8/27/2018	42.27	6536.39
9/3/2018	42.30	6536.36
9/10/2018	42.28	6536.38
9/17/2018	42.86	6535.80
9/24/2018	42.54	6536.12
10/1/2018	42.44	6536.22
10/8/2018	42.70	6535.96
10/15/2018	42.77	6535.89
10/22/2018	42.67	6535.99
10/29/2018	42.85	6535.81
11/5/2018	42.79	6535.87
11/12/2018	43.04	6535.62
11/19/2018	43.44	6535.22
11/26/2018	43.30	6535.36
12/3/2018	41.04	6537.62
12/10/2018	43.22	6535.44
12/17/2018	41.08	6537.58
12/19/2018	44.25	6534.41
ST		
1/18/2018	45.48	6533.83
SUR		
2/15/2018	72.11	6508.61
3/22/2018	42.62	6538.10
SV		
2/14/2018	41.91	6537.34
SW		
5/2/2018	47.40	6533.89
SZ		
1/16/2018	39.11	6542.36
12/26/2018	40.87	6540.60
T		
9/18/2018	36.83	6542.40
T2		
4/9/2018	119.80	6545.02
6/21/2018	114.46	6550.36
9/18/2018	114.46	6550.36
12/11/2018	114.00	6550.82
T7		
3/12/2018	118.86	6540.81
T8		
3/12/2018	120.33	6541.28
T15		
3/12/2018	120.70	6544.59
T16		
3/12/2018	113.56	6546.42
T19		
6/6/2018	125.81	6541.95
T20		
3/8/2018	130.10	6540.59
3/14/2018	130.04	6540.65
3/23/2018	119.70	6550.99
6/27/2018	129.50	6541.19
9/24/2018	80.20	6590.49
12/11/2018	130.86	6539.83
T21		
3/8/2018	127.99	6542.01
T22		
3/8/2018	132.31	6534.88
4/3/2018	124.05	6543.14
6/27/2018	122.92	6544.27
9/24/2018	123.10	6544.09
12/11/2018	123.42	6543.77
T23		
6/7/2018	115.41	6545.70
T24		
1/18/2018	138.12	6518.91
T25		
1/18/2018	125.27	6532.07
T26		
1/18/2018	149.23	6507.43
T27		
1/18/2018	125.78	6531.36
T28		
1/28/2018	126.75	6531.96
3/14/2018	119.84	6538.87
T29		
1/28/2018	126.45	6530.26
3/14/2018	124.43	6532.28
T30		
1/22/2018	125.28	6534.34
T31		
1/30/2018	122.16	6536.87
4/19/2018	122.62	6536.41
T32		
1/23/2018	121.15	6540.46
T33		
1/30/2018	122.16	6533.63
T36		
1/23/2018	106.43	6549.01
T39		
3/12/2018	120.00	6545.31
T40		
3/8/2018	130.18	6540.09
T41		
6/6/2018	96.05	6563.91
T43		
1/30/2018	121.85	6535.67
T47		
1/30/2018	116.60	6540.61
T48		
1/30/2018	128.65	6528.91
3/14/2018	116.29	6541.27
4/19/2018	123.16	6534.40

* Drawdown Tube Pressure, # Transducer Reading

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Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/5/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
T51											
3/14/2018	121.18	6536.16									
T53											
1/30/2018	115.32	6541.66									
T54											
1/30/2018	104.11	6552.99									
6/7/2018	115.32	6541.78									
W											
12/6/2018	44.00	6528.14									
WME-9											
8/20/2018	56.30	6544.52									
11/14/2018	57.40	6543.42									
WME-10											
8/20/2018	58.78	6544.05									
11/14/2018	60.00	6542.83									
X											
2/26/2018	31.00	6540.61									
3/22/2018	31.07	6540.54									
4/4/2018	30.94	6540.67									
6/13/2018	31.50	6540.11									
7/11/2018	34.47	6537.14									
9/17/2018	32.05	6539.56									
10/10/2018	31.97	6539.64									
12/5/2018	33.25	6538.36									
X18											
9/18/2018	37.33	6548.75									

* Drawdown Tube Pressure, # Transducer Reading

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

WATER LEVEL ELEVATION (FT-MSL) 1/31/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0483		
2/20/2018	38.09	6524.57
0497		
2/5/2018	55.41	6507.21
6/4/2018	50.61	6512.01
12/26/2018	50.52	6512.10
0498		
2/20/2018	51.56	6509.03
8/23/2018	64.98	6495.61
0688		
8/2/2018	59.23	6503.39
12/3/2018	58.68	6503.94
0802		
8/2/2018	89.22	6473.50
0844		
2/6/2018	41.56	6514.57
12/3/2018	37.32	6518.81
0845		
1/11/2018	34.36	6522.69
1/29/2018	36.47	6520.58
2/6/2018	39.62	6517.43
12/26/2018	36.00	6521.05
AW		
4/5/2018	34.41	6529.02
12/26/2018	35.99	6527.44
CW44		
4/25/2018	35.33	6525.41
8/1/2018	59.57	6501.17
Q2		
2/21/2018	52.58	6509.10
8/20/2018	80.53	6481.15
Q3		
2/26/2018	51.17	6508.57
8/20/2018	80.98	6478.76
Q5		
4/3/2018	50.95	6510.53
11/29/2018	79.82	6481.66
Q8		
12/26/2018	53.70	6507.10
Q9		
2/26/2018	50.41	6510.92
Q11		
2/26/2018	50.69	6510.33
8/20/2018	82.53	6478.49
Q12		
2/26/2018	50.05	6511.07
8/23/2018	86.10	6475.02
Q18		
2/27/2018	49.77	6511.92
Q19		
2/27/2018	49.44	6512.73
8/23/2018	58.12	6504.05
Q23		
2/26/2018	51.12	6513.14
3/1/2018	53.75	6510.51
8/20/2018	73.90	6490.36
12/26/2018	47.36	6516.90
Q27		
2/27/2018	63.33	6501.55
8/20/2018	88.20	6476.68
Q28		
2/27/2018	49.22	6514.72
Q29		
2/27/2018	49.95	6516.51
12/26/2018	51.30	6515.16
Q30		
2/26/2018	66.42	6499.71
Q44		
12/26/2018	53.53	6507.80
Q48		
12/26/2018	50.74	6517.10
SUB2		
4/9/2018	41.91	6525.66
SUB3		
4/9/2018	39.16	6517.91
12/3/2018	40.64	6516.43

* Drawdown Tube Pressure, # Transducer Reading

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TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 1/31/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0520		
2/12/2018	51.91	6534.11
12/3/2018	53.78	6532.24
12/26/2018	53.70	6532.32
0521		
2/7/2018	55.20	6529.24
0522		
2/7/2018	51.40	6529.13
0538		
3/5/2018	65.46	6483.48
0539		
12/26/2018	> 210.00	< 6345.32
0540		
4/2/2018	58.62	6497.29
12/26/2018	57.00	6498.91
0541		
1/10/2018	90.10	6465.52
7/9/2018	90.88	6464.74
11/28/2018	90.07	6465.55
12/26/2018	90.85	6464.77
0551		
1/8/2018	98.22	6449.08
3/28/2018	98.49	6448.81
7/9/2018	98.69	6448.61
11/28/2018	101.86	6445.44
12/26/2018	99.00	6448.30
0553		
12/26/2018	104.10	6443.38
0554		
12/26/2018	106.70	6440.47
0555		
2/6/2018	47.52	6509.62
0556		
2/6/2018	54.00	6502.02
0631		
4/2/2018	83.20	6457.90
12/26/2018	83.33	6457.77
0632		
3/5/2018	84.48	6456.82
12/26/2018	83.22	6458.08
0634		
2/12/2018	71.95	6488.12
6/21/2018	69.48	6490.59
8/28/2018	67.12	6492.95
12/26/2018	71.14	6488.93
0637		
9/12/2018	111.32	6463.88
0638		
2/7/2018	52.15	6533.41
12/26/2018	48.73	6536.83
0639		
4/2/2018	54.20	6533.68
0640		
12/26/2018	> 47.45	< 6532.52
0644		
4/2/2018	68.28	6475.62
12/26/2018	69.60	6474.30
0646		
3/6/2018	72.05	6471.30
12/26/2018	72.76	6470.59
0647		
1/8/2018	104.22	6447.69
3/28/2018	104.66	6447.25
7/9/2018	105.44	6446.47
11/28/2018	105.42	6446.49
12/26/2018	104.90	6447.01
0649		
1/11/2018	34.50	6508.79
4/3/2018	102.46	6440.83
7/9/2018	103.59	6439.70
12/26/2018	102.90	6440.39
0650		
12/26/2018	81.73	6465.38
0652		
12/5/2018	84.14	6454.01
0653		
12/26/2018	65.28	6479.69
0654		
1/4/2018	72.88	6477.62
4/3/2018	71.85	6478.65
7/11/2018	73.76	6476.74
11/28/2018	72.90	6477.60
12/26/2018	74.41	6476.09
0656		
12/26/2018	> 88.00	< 6466.07
0657		
5/1/2018	100.90	6450.91
12/26/2018	100.05	6451.76
0658		
6/11/2018	107.19	6442.99
12/26/2018	107.50	6442.68
0659		
2/21/2018	68.20	6491.97
12/26/2018	66.82	6493.35
0680		
12/5/2018	72.92	6485.95
0681		
6/11/2018	63.21	6497.31
12/26/2018	62.68	6497.84
0683		
3/8/2018	89.91	6466.13
0684		
5/1/2018	89.02	6464.26
0685		
12/26/2018	96.78	6459.79
0686		
9/12/2018	112.94	6465.86
0687		
12/26/2018	> 93.30	< 6462.66
0692		
7/25/2018	63.42	6521.40
0846		
2/6/2018	44.45	6504.47
8/2/2018	44.05	6504.87
12/3/2018	43.82	6505.10
0851		
12/5/2018	83.49	6462.95
0852		
12/5/2018	60.42	6529.72
0855		
2/8/2018	85.07	6456.04
12/26/2018	73.37	6467.74

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/31/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0862		
2/22/2018	57.76	6498.42
3/26/2018	66.54	6489.64
8/22/2018	81.36	6474.82
12/26/2018	51.95	6504.23
0864		
4/2/2018	65.12	6481.60
0865		
3/8/2018	61.71	6495.07
0866		
8/22/2018	79.68	6478.44
0867		
12/5/2018	60.54	6495.36
0869		
12/26/2018	67.44	6477.05
0876		
12/26/2018	66.61	6477.65
0877		
12/5/2018	63.83	6489.25
0879		
12/5/2018	66.57	6477.98
0881		
1/10/2018	70.60	6494.44
2/5/2018	77.90	6487.14
12/26/2018	69.17	6495.87
0882		
2/5/2018	70.02	6491.14
0883		
2/5/2018	59.84	6497.29
12/26/2018	58.90	6498.23
0884		
2/5/2018	76.19	6489.91
0885		
3/6/2018	64.45	6500.19
12/26/2018	63.34	6501.30
0886		
2/5/2018	78.42	6486.13
12/26/2018	65.78	6498.77
0887		
3/6/2018	62.61	6505.12
12/5/2018	61.40	6506.33
0888		
2/5/2018	80.63	6476.70
12/26/2018	77.57	6479.76
0889		
12/5/2018	47.82	6501.81
0890		
2/12/2018	74.98	6483.45
6/21/2018	71.92	6486.51
8/28/2018	74.33	6484.10
0893		
2/5/2018	72.80	6491.17
12/26/2018	66.11	6497.86
0897		
12/5/2018	79.08	6483.17
0899		
1/10/2018	99.60	6471.24
4/3/2018	99.11	6471.73
6/28/2018	99.98	6470.86
11/28/2018	99.81	6471.03
0914		
2/14/2018	47.73	6594.27
0921		
2/6/2018	44.23	6579.77
2/6/2018	44.23	6579.77
11/29/2018	40.92	6583.08
0922		
2/9/2018	52.90	6568.80
2/19/2018	52.90	6568.80
0935		
5/7/2018	94.88	6463.24
0947		
7/19/2018	53.02	6522.16
0994		
4/2/2018	93.34	6461.66
5/8/2018	96.31	6458.69
11/28/2018	90.82	6464.18
0996		
1/8/2018	63.27	6489.25
7/9/2018	54.31	6498.21
11/28/2018	86.58	6465.94
H1		
2/12/2018	74.90	6484.35
6/21/2018	73.32	6485.93
8/28/2018	72.38	6486.87
H2A		
2/1/2018	75.82	6484.05
H7		
2/12/2018	83.88	6475.66
6/21/2018	72.31	6487.23
8/28/2018	68.56	6490.98
H7A		
12/26/2018	70.26	6488.83
H7B		
2/12/2018	88.12	6471.26
6/21/2018	69.32	6490.06
8/28/2018	67.71	6491.67
H12		
2/12/2018	86.40	6477.22
6/21/2018	87.16	6476.46
8/28/2018	60.03	6503.59
H16		
2/12/2018	64.36	6493.62
6/21/2018	63.66	6494.32
8/28/2018	62.29	6495.69
H17		
6/21/2018	72.61	6490.75
H24		
2/12/2018	71.92	6493.95
3/20/2018	69.41	6496.46
8/28/2018	68.32	6497.55
H26		
2/12/2018	70.16	6496.65
8/28/2018	83.03	6483.78
H31		
2/12/2018	65.56	6499.50
8/28/2018	67.56	6497.50
H36		
2/12/2018	47.38	6512.58
H41		
2/12/2018	64.56	6499.77

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/31/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
H46		
8/28/2018	65.39	6501.97
H55		
2/1/2018	67.80	6501.45
H95		
12/26/2018	62.94	6505.97
M16		
9/18/2018	61.29	6509.30
12/26/2018	60.93	6509.66
MO		
2/1/2018	65.67	6507.22
12/26/2018	62.06	6510.83
MP		
12/5/2018	63.92	6510.56
MR		
3/22/2018	66.60	6499.66
6/13/2018	66.46	6499.80
8/2/2018	66.19	6500.07
9/17/2018	66.60	6499.66
12/26/2018	65.99	6500.27
MS		
12/6/2018	60.53	6510.14
MT		
12/6/2018	> 60.64	< 6506.79
MV		
3/6/2018	71.74	6498.04
12/26/2018	64.92	6504.86
R1		
2/20/2018	65.31	6489.81
8/22/2018	79.30	6475.82
12/26/2018	49.63	6505.49
R2		
2/20/2018	55.05	6499.11
8/22/2018	79.34	6474.82
R3		
4/3/2018	52.20	6503.53
12/4/2018	52.25	6503.48
R4		
2/20/2018	57.08	6501.70
8/22/2018	102.18	6456.60
R5		
2/20/2018	53.76	6503.99
8/22/2018	103.11	6454.64
R10		
2/20/2018	58.30	6496.92
R11		
2/20/2018	63.00	6495.45
8/22/2018	113.11	6445.34
R18		
3/5/2018	67.01	6488.99
R20		
3/5/2018	62.09	6494.25
R22		
3/5/2018	73.10	6484.04
R74		
12/26/2018	69.88	6474.15

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS

WATER LEVEL ELEVATION (FT-MSL) 3/1/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0483		
2/20/2018	38.09	6524.57
0493		
6/4/2018	91.61	6468.67
12/3/2018	70.23	6490.05
0494		
2/5/2018	37.46	6522.68
6/4/2018	36.92	6523.22
12/3/2018	37.43	6522.71
0498		
2/20/2018	51.56	6509.03
8/23/2018	64.98	6495.61
0538		
3/5/2018	65.46	6483.48
0539		
12/26/2018	> 210.00	< 6345.32
0546R		
11/29/2018	---	---
0653		
12/26/2018	65.28	6479.69
0850		
12/26/2018	53.90	6495.25
0853		
6/12/2018	71.45	6469.93
12/26/2018	71.80	6469.58
0859		
6/12/2018	70.71	6482.05
12/26/2018	60.65	6492.11
0927		
12/26/2018	106.83	6488.17
12/26/2018	106.83	6488.17
0929		
2/7/2018	60.71	6531.86
0930		
6/12/2018	110.19	6488.35
12/26/2018	107.00	6491.54
0931		
6/12/2018	82.46	6528.10
12/26/2018	68.30	6542.26
ACW		
6/6/2018	91.51	6472.29
12/26/2018	73.73	6490.07
AW		
4/5/2018	34.41	6529.02
12/26/2018	35.99	6527.44
B15		
4/17/2018	40.44	6535.87
B16		
4/16/2018	39.98	6535.39
B31		
4/17/2018	40.84	6535.12
CE1		
6/19/2018	31.09	6539.10
12/26/2018	14.29	6555.90
CE2		
5/22/2018	76.75	6499.60
9/20/2018	73.71	6502.64
CE5		
7/18/2018	49.48	6519.07
CE6		
7/18/2018	97.82	6467.37
CE7		
7/25/2018	44.32	6531.67
12/26/2018	46.55	6529.44
CE8		
6/5/2018	44.76	6524.94
12/26/2018	43.82	6525.88
CE9		
6/5/2018	36.02	6527.10
7/25/2018	38.64	6524.48
12/26/2018	38.55	6524.57
CE10		
7/17/2018	52.31	6518.55
12/26/2018	49.34	6521.52
CE11		
7/18/2018	101.12	6464.30
CE12		
7/18/2018	78.55	6493.68
CE13		
7/17/2018	51.39	6523.25
12/26/2018	46.49	6528.15
CE14		
2/13/2018	36.08	6533.37
12/26/2018	39.81	6529.64
CE15		
6/5/2018	47.35	6518.73
12/26/2018	46.42	6519.66
CE15A		
5/2/2018	49.93	6514.88
12/26/2018	40.73	6524.08
CE16A		
6/28/2018	47.59	6532.45
CE18		
6/13/2018	37.84	6531.04
CE19		
6/14/2018	130.00	6438.83
CF1		
6/7/2018	132.01	6533.90
CF2		
6/7/2018	121.21	6544.95
CF3		
6/19/2018	50.44	6536.35
12/26/2018	49.98	6536.81
CF4		
6/7/2018	125.31	6538.38
12/26/2018	69.82	6593.87
CF5		
6/18/2018	137.40	6534.06
CF6		
6/7/2018	115.95	6551.48
CF7A		
6/18/2018	135.37	6532.74
12/26/2018	139.48	6528.63
CW2		
8/2/2018	123.19	6462.29

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/1/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CW2-1		
12/26/2018	94.66	6490.82
CW3		
2/15/2018	54.20	6532.98
6/6/2018	52.21	6534.97
12/3/2018	56.54	6530.64
CW6		
12/26/2018	76.10	6499.54
CW9		
6/18/2018	59.58	6532.25
12/26/2018	60.56	6531.27
CW15		
6/14/2018	96.35	6454.97
12/26/2018	71.70	6479.62
CW17		
6/14/2018	58.20	6531.12
7/12/2018	58.19	6531.13
12/26/2018	61.84	6527.48
CW18		
6/5/2018	39.51	6533.14
12/26/2018	23.45	6549.20
CW24		
6/14/2018	50.31	6538.36
12/26/2018	48.89	6539.78
CW28		
2/8/2018	72.87	6498.81
7/11/2018	73.81	6497.87
12/26/2018	73.50	6498.18
CW29		
8/1/2018	76.65	6475.57
12/26/2018	76.90	6475.32
CW31		
6/20/2018	85.56	6474.70
12/26/2018	85.52	6474.74
CW32		
7/12/2018	149.67	6417.61
12/26/2018	147.64	6419.64
CW33		
6/20/2018	105.98	6468.91
12/26/2018	106.14	6468.75
CW34		
12/26/2018	51.90	6542.50
CW35		
3/7/2018	50.41	6540.76
12/26/2018	50.71	6540.46
CW36		
7/16/2018	77.34	6473.75
12/26/2018	77.04	6474.05
CW37		
6/14/2018	62.32	6488.85
12/26/2018	62.30	6488.87
CW40		
6/19/2018	49.04	6529.90
12/26/2018	28.80	6550.14
CW41		
7/10/2018	79.52	6475.89
12/26/2018	78.20	6477.21
CW42		
7/10/2018	69.15	6479.63
12/26/2018	69.40	6479.38
CW43		
7/10/2018	68.68	6480.11
12/26/2018	68.71	6480.08
CW44		
4/25/2018	35.33	6525.41
8/1/2018	59.57	6501.17
CW45		
3/22/2018	54.30	6507.01
8/1/2018	58.76	6502.55
12/26/2018	54.79	6506.52
CW50		
3/6/2018	46.91	6541.65
12/26/2018	47.50	6541.06
CW52		
12/26/2018	38.53	6553.87
CW53		
12/26/2018	17.77	6547.17
CW54		
12/26/2018	31.52	6527.03
CW55		
7/11/2018	68.21	6495.95
12/26/2018	56.96	6507.20
CW56		
8/29/2018	67.84	6520.02
CW57		
12/26/2018	47.93	6536.97
CW58		
5/1/2018	51.78	6509.02
12/26/2018	70.59	6490.21
CW60		
8/29/2018	45.44	6538.76
12/26/2018	45.80	6538.40
CW61		
8/29/2018	52.43	6530.40
12/26/2018	57.02	6525.81
CW62		
2/13/2018	95.20	6484.66
7/9/2018	79.30	6500.56
CW72		
9/20/2018	60.00	6520.13
12/26/2018	70.82	6509.31
CW73		
5/3/2018	51.81	6511.64
12/26/2018	51.43	6512.02
CW74		
5/3/2018	64.12	6489.29
12/26/2018	66.05	6487.36
CW75		
4/26/2018	65.02	6488.56
12/26/2018	66.82	6486.76
CW76		
1/10/2018	96.22	6460.39
1/29/2018	79.05	6477.56
7/10/2018	71.80	6484.81
12/26/2018	66.05	6490.56
CW78		
5/3/2018	32.12	6535.03
12/26/2018	17.74	6549.41
Q48		
12/26/2018	50.74	6517.10
R1		
2/20/2018	65.31	6489.81
8/22/2018	79.30	6475.82
12/26/2018	49.63	6505.49

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/1/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
R2		
2/20/2018	55.05	6499.11
8/22/2018	79.34	6474.82
R3		
4/3/2018	52.20	6503.53
12/4/2018	52.25	6503.48
R4		
2/20/2018	57.08	6501.70
8/22/2018	102.18	6456.60
R5		
2/20/2018	53.76	6503.99
8/22/2018	103.11	6454.64
R11		
2/20/2018	63.00	6495.45
8/22/2018	113.11	6445.34
R49		
12/26/2018	70.14	6475.85
R67		
12/26/2018	68.65	6476.88
R74		
12/26/2018	69.88	6474.15
T25		
1/18/2018	125.27	6532.07
T27		
1/18/2018	125.78	6531.36
T28		
1/28/2018	126.75	6531.96
3/14/2018	119.84	6538.87
T30		
1/22/2018	125.28	6534.34
T32		
1/23/2018	121.15	6540.46
T51		
3/14/2018	121.18	6536.16
V1		
1/9/2018	75.13	6476.98
1/29/2018	79.37	6472.74
12/26/2018	76.00	6476.11
V2		
12/26/2018	74.15	6475.94
V6		
7/10/2018	75.05	6472.38
V7		
12/26/2018	78.20	6477.03
V8		
12/26/2018	73.25	6478.24
V9		
12/26/2018	78.43	6477.26
V11		
12/26/2018	78.25	6477.65
V14		
12/26/2018	79.40	6476.29
V16		
12/26/2018	74.20	6477.78
V17		
12/26/2018	74.10	6476.05
V18		
12/26/2018	74.45	6476.93
WCW		
6/13/2018	99.10	6468.27
12/26/2018	76.16	6491.21
WR25		
7/17/2018	50.23	6536.23
12/26/2018	51.74	6534.72
Y1		
2/21/2018	69.66	6491.78
8/1/2018	163.69	6397.75
Y2		
12/26/2018	71.41	6490.20
Y3		
12/26/2018	71.28	6492.10
12/26/2018	71.28	6492.10
Y7		
2/21/2018	69.72	6490.71
8/1/2018	162.03	6398.40
Y8		
12/26/2018	68.89	6492.58
Y10		
12/26/2018	73.31	6492.87
Y13		
2/21/2018	71.16	6489.68
Y14		
12/26/2018	54.88	6506.14
Y17		
12/26/2018	63.84	6500.79
Y23		
2/26/2018	52.01	6509.29
Y25		
12/26/2018	69.21	6493.46
Y30		
12/26/2018	60.30	6499.75

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.4-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER

WATER LEVEL ELEVATION (FT-MSL) 1/15/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
#2 DEEPWELL											
7/12/2018	173.74	6401.92									
0806R											
12/3/2018	149.99	6416.40									
0907											
12/3/2018	124.69	6420.91									
0943M											
2/6/2018	141.61	6414.49									
8/20/2018	140.52	6415.58									
11/27/2018	138.81	6417.29									
12/26/2018	138.52	6417.58									
0951											
12/26/2018	153.91	6419.79									
0951R											
2/1/2018	157.98	6418.80									
4/27/2018	130.01	6446.77									
8/1/2018	159.78	6417.00									
11/27/2018	525.00	6051.78									
12/26/2018	156.54	6420.24									
0998											
3/15/2018	128.22	6521.78									
0999											
3/15/2018	111.39	6415.61									

* Drawdown Tube Pressure, # Transducer Reading

APPENDIX B

WATER QUALITY

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GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

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

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CN4	5/8/2018	ENER	---	---	---	---	---	---	275	2080	5030	8068	---	---
CS1	5/9/2018	ENER	---	---	---	---	---	---	293	1200	3600	5168	---	---
CS2	5/9/2018	ENER	---	---	---	---	---	---	608	3780	7890	9797	---	---
CS7	5/8/2018	ENER	---	---	---	---	---	---	650	3900	8740	11220	---	---
EE2	1/4/2018	ENER	---	---	---	---	---	---	271	2030	5900	7872	---	---
EI4	5/15/2018	ENER	---	---	---	---	---	---	204	1290	2440	3426	---	---
	12/6/2018	ENER	---	---	---	---	---	---	208	1310	2680	3624	---	---
EP23	5/15/2018	ENER	---	---	---	---	---	---	371	2380	5100	7043	---	---
EP31	5/15/2018	ENER	---	---	---	---	---	---	328	2140	4440	6209	---	---
ES4	12/18/2018	ENER	---	---	---	---	---	---	318	2370	6110	8076	---	---
ES6	1/22/2018	ENER	---	---	---	---	---	---	1050	6490	14400	16390	---	---
	12/18/2018	ENER	---	---	---	---	---	---	813	5080	12800	18340	---	---
ET20	5/15/2018	ENER	---	---	---	---	---	---	181	1520	2950	4478	---	---
NE2	1/4/2018	ENER	---	---	---	---	---	---	845	5650	8610	12450	---	---
NW3	5/15/2018	ENER	---	---	---	---	---	---	272	1810	3470	5118	---	---
SE2	1/3/2018	ENER	---	---	---	---	---	---	260	1860	4750	6175	---	---
SW1	5/9/2018	ENER	---	---	---	---	---	---	731	3480	7440	9672	---	---
SW3	5/22/2018	ENER	---	---	---	---	---	---	315	1520	3090	4465	---	---
WE9	4/16/2018	ENER	8	7.0	6.0	1100	599	132	241	1400	---	4630	0.98	---
	5/23/2018	ENER	8	7.0	6.0	1040	615	115	241	1410	---	4592	0.93	---
	6/6/2018	ENER	8	6.0	6.0	1190	623	141	239	1370	---	4765	1.05	---
	8/13/2018	ENER	4	6.0	6.0	1100	616	186	246	1470	---	4977	0.90	---
	10/2/2018	ENER	6	6.0	6.0	1200	635	132	241	1500	---	4828	1.01	---
	10/30/2018	ENER	7	7.4	8.3	1500	678	154	237	1450	---	4851	1.25	---

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

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
WE9	11/26/2018	ENER	7	5.0	6.0	1160	642	167	235	1430	---	4913	0.98	---
	12/18/2018	ENER	6	4.0	5.0	1160	655	---	236	1470	---	4976	---	---
WF2	4/11/2018	ENER	5	6.0	6.0	1350	709	274	280	1730	---	5504	0.92	---
	5/23/2018	ENER	7	6.0	7.0	2020	911	331	333	2190	---	5816	1.10	---
	6/6/2018	ENER	6	6.0	6.0	1560	748	319	313	1940	---	6286	0.95	---
	8/13/2018	ENER	4	6.0	6.0	1370	651	279	260	1580	---	5421	1.00	---
	10/2/2018	ENER	4	6.0	7.0	1500	691	310	279	1710	---	5930	1.02	---
	10/30/2018	ENER	6	7.9	8.5	1800	773	259	280	1700	---	5570	1.23	---
	11/26/2018	ENER	6	6.0	6.0	1380	678	300	260	1550	---	5576	1.00	---
	12/18/2018	ENER	6	6.0	6.0	1420	742	---	281	1760	---	5982	---	---
WF9	4/10/2018	ENER	6	7.0	6.0	1190	598	159	291	1690	---	5098	0.90	---
	5/7/2018	ENER	9	8.0	6.0	1270	617	175	272	1590	---	5460	1.00	---
	6/6/2018	ENER	12	9.0	6.0	1280	604	175	279	1620	---	5112	1.00	---
	7/18/2018	ENER	10	8.0	5.0	1240	617	180	262	1540	---	---	0.99	---
	8/16/2018	ENER	9	7.0	5.0	1270	611	165	272	1550	---	5093	1.02	---
	10/2/2018	ENER	8	6.0	6.0	1290	590	176	275	1590	---	5028	1.01	---
	10/30/2018	ENER	10	8.7	7.0	1500	627	192	259	1560	---	5167	1.18	---
	10/30/2018	ENER	# 10	# 8.2	# 6.7	# 1400	# 622	# 188	# 258	# 1500	---	---	# 1.13	---
	11/26/2018	ENER	13	7.0	6.0	1280	609	209	249	1540	---	5245	1.02	---
	12/17/2018	ENER	9	6.0	5.0	1200	600	---	258	1570	---	5235	---	---
WF11	4/5/2018	ENER	11	8.0	6.0	926	534	94	228	1240	---	4155	0.94	---
	5/23/2018	ENER	13	8.0	7.0	867	532	93	216	1150	---	4065	0.94	---
	6/6/2018	ENER	18	7.0	5.0	812	523	38	220	1160	---	3876	0.92	---
	7/18/2018	ENER	14	7.0	5.0	922	532	52	211	1110	---	---	1.05	---
	8/16/2018	ENER	10	7.0	5.0	918	522	79	232	1240	---	3932	0.94	---
	10/1/2018	ENER	16	7.0	6.0	898	519	39	213	1130	---	3796	1.03	---
	10/30/2018	ENER	20	9.0	7.4	1100	526	45	211	1150	---	3785	1.24	---
	11/26/2018	ENER	28	10.0	6.0	836	537	20	211	1150	---	3896	0.98	---

Signifies Quality Control Sample

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

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
WF11	12/17/2018	ENER	27	9.0	6.0	803	537	---	212	1160	---	3878	---	---
WME-1	8/21/2018	ENER	6	< 1.0	20.0	7060	1480	1610	1680	8600	---	22493	1.01	---
	10/25/2018	ENER	2	1.0	18.0	6100	1450	1560	1710	8120	---	2108	0.91	---
	12/14/2018	ENER	11	0.4	17.0	6050	1700	1380	1640	7810	---	1617	0.93	---
WME-2	8/21/2018	ENER	5	2.0	6.0	1440	767	105	289	1570	---	4972	1.11	---
	10/25/2018	ENER	5	2.0	7.5	1500	779	127	284	1500	---	4420	1.17	---
	12/14/2018	ENER	6	1.0	5.0	1170	723	145	270	1480	---	5108	0.93	---
WME-3	8/21/2018	ENER	2	0.6	12.0	1500	978	423	192	1540	---	5831	0.97	---
	10/25/2018	ENER	1	0.4	6.8	1400	947	453	182	1470	---	4660	0.92	---
	12/14/2018	ENER	3	0.3	6.0	1260	700	440	149	1260	---	5211	0.97	---
WME-4	8/21/2018	ENER	14	< 1.0	30.0	9330	3810	4850	607	9710	---	398	0.92	---
	10/25/2018	ENER	5	2.0	28.0	9300	3970	4900	647	9910	---	3301	0.90	---
	12/14/2018	ENER	29	0.9	28.0	9370	3620	5200	583	9470	---	12695	0.92	---
WME-5	8/22/2018	ENER	2	< 1.0	37.0	2880	14	1910	206	2310	---	---	1.07	---
	10/25/2018	ENER	2	0.5	47.0	3800	284	2150	222	2800	---	8811	1.18	---
	12/14/2018	ENER	6	0.4	30.0	3290	576	2150	235	3100	---	11438	0.95	---
WME-6	8/22/2018	ENER	1	1.0	15.0	2860	1120	1450	349	2620	---	---	0.95	---
	10/25/2018	ENER	1	1.2	18.0	3900	1020	1550	348	2610	---	7860	1.28	---
	12/14/2018	ENER	6	0.7	13.0	2880	1280	1440	346	2630	---	186	0.94	---
WO10	12/17/2018	ENER	---	---	---	---	---	---	247	2260	6390	8455	---	---
WO21	12/18/2018	ENER	---	---	---	---	---	---	184	1070	2870	4190	---	---
WO32	5/15/2018	ENER	---	---	---	---	---	---	250	1490	3020	4236	---	---
WP10	1/23/2018	ENER	---	---	---	---	---	---	202	1280	2710	3492	---	---
	12/17/2018	ENER	---	---	---	---	---	---	204	1560	3460	4486	---	---
WS1	5/9/2018	ENER	---	---	---	---	---	---	920	6260	12300	---	---	---

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

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
WT18	5/15/2018	ENER	---	---	---	---	---	---	221	1390	2830	4289	---	---
WW1	5/9/2018	ENER	---	---	---	---	---	---	582	4430	10600	13520	---	---
WW3	1/23/2018	ENER	---	---	---	---	---	---	631	3100	6060	11320	---	---
	12/18/2018	ENER	---	---	---	---	---	---	374	2290	4690	5916	---	---

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

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CN4	5/8/2018	ENER	9.03	± 1.4600	9.780	0.441	---	---	---	---	---	---	---	---
CS1	5/9/2018	ENER	3.15	± 0.5090	4.510	3.610	---	---	---	---	---	---	---	---
CS2	5/9/2018	ENER	9.27	± 1.5000	21.600	< 0.005	---	---	---	---	---	---	---	---
CS7	5/8/2018	ENER	11.6	± 1.8700	25.900	0.085	---	---	---	---	---	---	---	---
EE2	1/4/2018	ENER	3.13	± 0.5060	14.800	0.169	---	---	---	---	---	---	---	---
EI4	5/15/2018	ENER	0.801	± 0.1290	1.190	0.021	---	---	---	---	---	---	---	---
	12/6/2018	ENER	0.754	± 0.1220	1.730	0.014	---	---	---	---	---	---	---	---
EP23	5/15/2018	ENER	12.9	± 2.0800	17.800	0.079	---	---	---	---	---	---	---	---
EP31	5/15/2018	ENER	6.82	± 1.1000	10.100	0.092	---	---	---	---	---	---	---	---
ES4	12/18/2018	ENER	6.72	± 1.0800	17.300	0.052	---	---	---	---	---	---	---	---
ES6	1/22/2018	ENER	20.2	± 3.2500	50.000	0.109	---	---	---	---	---	---	---	---
	12/18/2018	ENER	15.8	± 2.5500	41.000	0.055	---	---	---	---	---	---	---	---
ET20	5/15/2018	ENER	3.64	± 0.5880	6.250	0.118	---	---	---	---	---	---	---	---
NE2	1/4/2018	ENER	14.0	± 2.2600	37.300	1.250	---	---	---	---	---	---	---	---
NW3	5/15/2018	ENER	4.12	± 0.6650	6.420	0.035	---	---	---	---	---	---	---	---
SE2	1/3/2018	ENER	4.76	± 0.7690	13.700	0.137	---	---	---	---	---	---	---	---
SW1	5/9/2018	ENER	9.37	± 1.5100	14.300	10.300	---	---	---	---	---	---	---	---
SW3	5/22/2018	ENER	2.02	± 0.3260	3.520	0.064	---	---	---	---	---	---	---	---
WE9	4/16/2018	ENER	1.10	---	4.040	0.018	0.3	---	---	---	---	0.03	---	---
	5/23/2018	ENER	0.823	---	4.170	0.014	0.5	---	---	---	---	0.01	---	---
	6/6/2018	ENER	0.743	---	4.560	0.012	0.3	---	---	---	---	0.01	---	---
	8/13/2018	ENER	0.849	---	4.690	0.047	0.2	---	---	---	---	0.03	---	---
	10/2/2018	ENER	1.09	---	4.590	0.049	0.8	---	---	---	---	< 0.01	---	---
	10/30/2018	ENER	1.40	---	6.500	0.046	0.6	---	---	---	---	0.02	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
WE9	11/26/2018	ENER	1.02	---	4.590	0.046	0.8	---	---	---	---	< 0.01	---	---
	12/18/2018	ENER	0.885	---	4.630	0.021	0.3	---	---	---	---	< 0.01	---	---
WF2	4/11/2018	ENER	1.82	---	8.780	0.132	< 0.0	---	---	---	---	0.03	---	---
	5/23/2018	ENER	2.50	---	11.200	0.042	0.0	---	---	---	---	0.01	---	---
	6/6/2018	ENER	1.88	---	9.790	0.031	< 0.0	---	---	---	---	0.01	---	---
	8/13/2018	ENER	1.49	---	6.920	0.091	< 0.0	---	---	---	---	0.01	---	---
	10/2/2018	ENER	1.98	---	8.400	0.016	< 0.0	---	---	---	---	0.01	---	---
	10/30/2018	ENER	2.50	---	12.000	0.130	0.1	---	---	---	---	0.02	---	---
	11/26/2018	ENER	1.70	---	7.580	0.119	0.1	---	---	---	---	< 0.01	---	---
	12/18/2018	ENER	1.83	---	8.230	0.058	< 0.0	---	---	---	---	0.00	---	---
WF9	4/10/2018	ENER	2.15	---	6.210	0.015	0.0	---	---	---	---	0.07	---	---
	5/7/2018	ENER	2.45	---	6.000	0.018	0.2	---	---	---	---	0.06	---	---
	6/6/2018	ENER	1.87	---	5.800	0.026	0.2	---	---	---	---	0.06	---	---
	7/18/2018	ENER	2.01	---	5.100	0.017	0.1	---	---	---	---	0.07	---	---
	8/16/2018	ENER	1.79	---	5.410	0.012	0.0	---	---	---	---	0.08	---	---
	10/2/2018	ENER	2.19	---	5.810	0.010	0.0	---	---	---	---	0.09	---	---
	10/30/2018	ENER	2.50	---	7.400	0.032	0.1	---	---	---	---	0.12	---	---
	10/30/2018	ENER	# 2.40	---	# 7.000	# 0.030	# 0.1	---	---	---	---	# 0.11	---	---
	11/26/2018	ENER	1.61	---	5.820	0.068	0.1	---	---	---	---	0.03	---	---
	12/17/2018	ENER	1.81	---	5.650	0.025	0.0	---	---	---	---	0.07	---	---
WF11	4/5/2018	ENER	0.476	---	2.660	0.009	0.0	---	---	---	---	0.05	---	---
	5/23/2018	ENER	0.399	---	2.460	0.009	0.0	---	---	---	---	0.01	---	---
	6/6/2018	ENER	0.231	---	1.730	0.029	0.1	---	---	---	---	0.01	---	---
	7/18/2018	ENER	0.271	---	1.700	0.008	0.1	---	---	---	---	0.00	---	---
	8/16/2018	ENER	0.311	---	2.180	0.020	0.1	---	---	---	---	0.01	---	---
	10/1/2018	ENER	0.240	---	1.820	0.015	0.1	---	---	---	---	< 0.01	---	---
	10/30/2018	ENER	0.320	---	2.400	0.010	0.1	---	---	---	---	0.02	---	---
	11/26/2018	ENER	0.219	---	1.790	0.013	0.1	---	---	---	---	< 0.01	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
WF11	12/17/2018	ENER	0.210	---	1.680	0.011	0.1	---	---	---	---	< 0.01	---	---
WME-1	8/21/2018	ENER	12.2	---	43.200	0.074	2.0	---	---	---	---	0.05	---	---
	10/25/2018	ENER	11.0	---	41.000	0.100	2.5	---	---	---	---	0.20	---	---
	12/14/2018	ENER	9.84	---	39.300	0.068	1.9	---	---	---	---	0.06	---	---
WME-2	8/21/2018	ENER	0.465	---	5.810	0.005	< 0.0	---	---	---	---	0.02	---	---
	10/25/2018	ENER	0.540	---	7.200	0.020	< 0.0	---	---	---	---	0.04	---	---
	12/14/2018	ENER	0.536	---	5.350	0.006	< 0.0	---	---	---	---	0.00	---	---
WME-3	8/21/2018	ENER	1.45	---	4.480	0.006	< 0.0	---	---	---	---	0.01	---	---
	10/25/2018	ENER	1.60	---	4.700	0.020	< 0.0	---	---	---	---	0.04	---	---
	12/14/2018	ENER	1.52	---	4.450	0.012	< 0.0	---	---	---	---	0.02	---	---
WME-4	8/21/2018	ENER	38.3	---	132.000	0.060	0.0	---	---	---	---	0.07	---	---
	10/25/2018	ENER	43.0	---	140.000	0.200	< 0.0	---	---	---	---	0.40	---	---
	12/14/2018	ENER	39.6	---	136.000	0.134	0.0	---	---	---	---	0.00	---	---
WME-5	8/22/2018	ENER	6.90	---	29.700	0.485	0.0	---	---	---	---	1.22	---	---
	10/25/2018	ENER	12.0	---	52.000	0.230	0.0	---	---	---	---	2.60	---	---
	12/14/2018	ENER	13.6	---	47.100	0.061	0.2	---	---	---	---	0.85	---	---
WME-6	8/22/2018	ENER	7.30	---	19.700	0.011	0.0	---	---	---	---	0.01	---	---
	10/25/2018	ENER	8.80	---	26.000	0.050	0.1	---	---	---	---	0.10	---	---
	12/14/2018	ENER	6.68	---	20.400	0.027	0.1	---	---	---	---	0.01	---	---
WO10	12/17/2018	ENER	5.47	± 0.8830	16.800	0.019	---	---	---	---	---	---	---	---
WO21	12/18/2018	ENER	0.382	± 0.0616	3.100	0.082	---	---	---	---	---	---	---	---
WO32	5/15/2018	ENER	8.20	± 1.3200	2.910	1.140	---	---	---	---	---	---	---	---
WP10	1/23/2018	ENER	3.78	± 0.6100	4.730	0.024	---	---	---	---	---	---	---	---
	12/17/2018	ENER	4.50	± 0.7260	9.590	0.045	---	---	---	---	---	---	---	---
WS1	5/9/2018	ENER	10.1	± 1.6400	8.700	0.022	---	---	---	---	---	---	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
WT18	5/15/2018	ENER	3.99	± 0.6440	4.890	0.049	---	---	---	---	---	---	---	---
WW1	5/9/2018	ENER	13.7	± 2.2100	31.400	1.590	---	---	---	---	---	---	---	---
WW3	1/23/2018	ENER	2.57	± 0.4150	10.700	0.018	---	---	---	---	---	---	---	---
	12/18/2018	ENER	6.10	± 0.9850	8.580	0.013	---	---	---	---	---	---	---	---

TABLE B.2-1 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
East 1 Sump	3/20/2018	ENER	---	---	---	---	---	---	786	5800	15300	16700	---	---
	5/7/2018	ENER	2	3.0	20.0	5460	2440	1980	821	6020	---	18951	0.94	---
	7/16/2018	ENER	< 2	2.0	22.0	5470	2370	1850	796	5790	---	16663	0.98	---
	8/29/2018	ENER	---	---	---	---	---	---	694	5270	13800	17120	---	---
	9/11/2018	ENER	1	3.0	19.0	5020	2270	1730	726	5340	---	17399	0.97	---
	11/12/2018	ENER	---	---	---	---	---	---	914	---	---	20362	---	---
East 2 Sump	3/20/2018	ENER	---	---	---	---	---	---	695	5290	13400	14860	---	---
	5/7/2018	ENER	4	2.0	15.0	4280	1890	1590	684	5380	---	16587	0.87	---
	7/16/2018	ENER	2	1.0	17.0	5080	2110	1420	702	5300	---	16410	1.05	---
	8/29/2018	ENER	---	---	---	---	---	---	686	5210	12800	15960	---	---
	9/11/2018	ENER	3	2.0	16.0	4720	2130	1390	711	5280	---	16415	0.98	---
	11/12/2018	ENER	---	---	---	---	---	---	653	---	---	15730	---	---
East Reclaim	3/20/2018	ENER	---	---	---	---	---	---	588	4200	9420	11120	---	---
	8/29/2018	ENER	---	---	---	---	---	---	580	4220	9910	12630	---	---
North 1 Sump	3/20/2018	ENER	---	---	---	---	---	---	652	5080	11400	13150	---	---
	5/2/2018	ENER	6	5.0	12.0	4480	1930	888	634	4970	---	14561	1.07	---
	7/16/2018	ENER	5	5.0	14.0	4480	2000	923	656	5180	---	15081	1.03	---
	8/23/2018	ENER	---	---	---	---	---	---	607	4830	11000	13510	---	---
	9/10/2018	ENER	4	5.0	15.0	4570	2230	957	711	5660	---	16203	0.97	---
	11/12/2018	ENER	---	---	---	---	---	---	593	---	---	13484	---	---
North 3 SUMP	3/22/2018	ENER	---	---	---	---	---	---	663	4830	10600	12510	---	---
	5/3/2018	ENER	---	---	---	---	---	---	---	---	---	11330	---	---
	11/12/2018	ENER	---	---	---	---	---	---	620	---	---	13606	---	---
South 1 Sump	3/20/2018	ENER	---	---	---	---	---	---	374	2480	5230	6411	---	---
	5/3/2018	ENER	31	18.0	11.0	1800	982	48	370	2510	---	6926	1.02	---
	7/16/2018	ENER	22	15.0	10.0	1680	927	55	345	2300	---	6546	1.01	---
	8/29/2018	ENER	---	---	---	---	---	---	354	2400	4930	6773	---	---

TABLE B.2-1 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
South 1 Sump	9/11/2018	ENER	26	17.0	12.0	1670	921	63	355	2450	---	5574	0.97	---
	11/12/2018	ENER	---	---	---	---	---	---	333	---	---	6382	---	---
West 1 Sump	3/20/2018	ENER	---	---	---	---	---	---	700	5300	11900	12870	---	---
	5/2/2018	ENER	7	9.0	14.0	4540	2000	814	686	5280	---	15098	1.05	---
	7/16/2018	ENER	11	8.0	13.0	3300	1660	513	511	3890	---	11626	1.04	---
	8/29/2018	ENER	---	---	---	---	---	---	616	4860	11100	14040	---	---
	9/11/2018	ENER	4	6.0	15.0	5250	2390	1150	828	6730	---	17765	0.95	---
	11/12/2018	ENER	---	---	---	---	---	---	635	---	---	13858	---	---
West Reclaim	3/20/2018	ENER	---	---	---	---	---	---	340	2390	6190	7602	---	---
	8/29/2018	ENER	---	---	---	---	---	---	326	2330	6010	8269	---	---

TABLE B.2-2 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
East 1 Sump	3/20/2018	ENER	22.0	± 3.5500	49.600	0.101	---	---	---	---	---	---	---	---
	5/7/2018	ENER	25.1	---	61.900	0.222	< 0.0	---	---	---	---	0.10	---	---
	7/16/2018	ENER	23.9	---	55.000	0.116	0.1	---	---	---	---	0.10	---	---
	8/29/2018	ENER	22.1	± 3.5600	47.400	0.235	---	---	---	---	---	---	---	---
	9/11/2018	ENER	18.1	---	47.600	0.260	0.7	---	---	---	---	0.03	---	---
	11/12/2018	ENER	23.7	---	56.800	0.313	---	---	---	---	---	---	---	---
East 2 Sump	3/20/2018	ENER	15.4	± 2.4900	37.800	0.219	---	---	---	---	---	---	---	---
	5/7/2018	ENER	13.5	---	34.100	0.361	1.4	---	---	---	---	< 0.01	---	---
	7/16/2018	ENER	18.0	---	40.700	0.309	1.2	---	---	---	---	< 0.02	---	---
	8/29/2018	ENER	18.0	± 2.9000	40.500	0.313	---	---	---	---	---	---	---	---
	9/11/2018	ENER	14.6	---	40.000	0.312	0.8	---	---	---	---	0.01	---	---
	11/12/2018	ENER	14.0	---	37.600	0.343	---	---	---	---	---	---	---	---
East Reclaim	3/20/2018	ENER	13.0	± 2.1000	26.500	0.439	---	---	---	---	---	---	---	---
	8/29/2018	ENER	16.7	± 2.6900	33.900	0.151	---	---	---	---	---	---	---	---
North 1 Sump	3/20/2018	ENER	20.6	± 3.3200	33.000	0.255	---	---	---	---	---	---	---	---
	5/2/2018	ENER	18.5	---	37.900	0.398	0.1	---	---	---	---	0.03	---	---
	7/16/2018	ENER	21.8	---	39.700	0.326	0.1	---	---	---	---	0.04	---	---
	8/23/2018	ENER	18.4	± 2.9700	38.800	0.152	---	---	---	---	---	---	---	---
	9/10/2018	ENER	18.9	---	45.200	0.080	0.3	---	---	---	---	0.04	---	---
	11/12/2018	ENER	17.2	---	31.800	0.483	---	---	---	---	---	---	---	---
North 3 SUMP	3/22/2018	ENER	15.2	± 2.4600	30.900	0.139	---	---	---	---	---	---	---	---
	11/12/2018	ENER	15.1	---	34.100	0.307	---	---	---	---	---	---	---	---
South 1 Sump	3/20/2018	ENER	8.68	± 1.4000	12.200	0.024	---	---	---	---	---	---	---	---
	5/3/2018	ENER	7.86	---	12.700	0.059	0.2	---	---	---	---	< 0.01	---	---
	7/16/2018	ENER	8.25	---	12.400	0.041	0.3	---	---	---	---	< 0.02	---	---
	8/29/2018	ENER	8.75	± 1.4100	12.100	0.022	---	---	---	---	---	---	---	---
	9/11/2018	ENER	7.58	---	12.100	0.032	0.1	---	---	---	---	< 0.01	---	---

TABLE B.2-2 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
South 1 Sump	11/12/2018	ENER	6.99	---	10.700	0.061	---	---	---	---	---	---	---	---
West 1 Sump	3/20/2018	ENER	19.7	± 3.1900	37.100	0.182	---	---	---	---	---	---	---	---
	5/2/2018	ENER	18.0	---	39.300	0.244	1.1	---	---	---	---	0.04	---	---
	7/16/2018	ENER	14.8	---	30.500	0.191	0.4	---	---	---	---	0.03	---	---
	8/29/2018	ENER	20.5	± 3.3100	38.000	0.128	---	---	---	---	---	---	---	---
	9/11/2018	ENER	19.7	---	50.100	0.198	1.2	---	---	---	---	0.07	---	---
	11/12/2018	ENER	17.0	---	37.600	0.317	---	---	---	---	---	---	---	---
West Reclaim	3/20/2018	ENER	5.18	± 0.8370	15.600	0.145	---	---	---	---	---	---	---	---
	8/29/2018	ENER	4.38	± 0.7080	16.800	0.139	---	---	---	---	---	---	---	---

TABLE B.3-1 WATER QUALITY ANALYSES FOR THE LINED PONDS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
E Coll Pond	4/9/2018	ENER	---	---	---	---	---	---	449	3370	6050	7469	---	9.06
	6/28/2018	ENER	78	83.1	8.0	1380	336	10	364	2760	4720	6109	0.96	---
	10/9/2018	ENER	---	---	---	---	---	---	293	2100	3810	5121	---	---
Evap Pond 1	2/8/2018	ENER	---	---	---	---	---	---	3380	24900	45300	38520	---	9.43
	4/9/2018	ENER	---	---	---	---	---	---	4020	30900	56000	4806	---	9.46
	6/28/2018	ENER	14	420.0	53.0	15900	2070	1470	3560	27800	45500	4518	0.96	---
	10/9/2018	ENER	---	---	---	---	---	---	2780	21400	39200	39260	---	---
Evap Pond 2	2/8/2018	ENER	---	---	---	---	---	---	1260	9900	18500	19120	---	9.20
	4/9/2018	ENER	---	---	---	---	---	---	1540	12300	21100	2137	---	9.23
	6/28/2018	ENER	79	257.0	23.0	6120	966	137	1460	11800	21400	2084	0.95	---
	10/9/2018	ENER	---	---	---	---	---	---	1320	10400	18100	20870	---	---
Evap Pond 3A	2/8/2018	ENER	---	---	---	---	---	---	37200	15000	113000	94740	---	9.47
	4/16/2018	ENER	---	---	---	---	---	---	49800	25700	131000	112300	---	9.50
	6/28/2018	ENER	53	454.0	1120.0	88000	32500	32900	93200	18600	208000	15220	0.84	---
	10/9/2018	ENER	---	---	---	---	---	---	6720	42000	77100	63610	---	---
Evap Pond 3B	2/8/2018	ENER	---	---	---	---	---	---	16500	20600	80100	70820	---	9.54
	4/16/2018	ENER	---	---	---	---	---	---	18200	35800	99900	129300	---	9.56
	6/28/2018	ENER	48	674.0	366.0	53500	18900	19000	28000	23500	116000	11190	1.08	---
	10/9/2018	ENER	---	---	---	---	---	---	6260	40900	77600	63180	---	---
W Coll Pond	4/9/2018	ENER	---	---	---	---	---	---	451	3380	5840	7323	---	9.06
	6/28/2018	ENER	56	72.9	7.0	1180	242	30	328	2410	4120	5217	0.94	---
	10/9/2018	ENER	---	---	---	---	---	---	280	2000	3630	4908	---	---

TABLE B.3-2 WATER QUALITY ANALYSES FOR THE LINED PONDS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
E Coll Pond	4/9/2018	ENER	6.42	± 1.0400	13.000	0.510	---	---	---	---	---	---	---	---
	6/28/2018	ENER	4.62	± 0.7450	10.000	0.330	1.4	1.60	0.400	-0.5	1.5	< 0.01	1.00	0.20
	10/9/2018	ENER	3.72	± 0.6000	8.710	0.246	---	---	---	---	---	---	---	---
Evap Pond 1	2/8/2018	ENER	61.6	± 9.9500	63.300	0.630	---	---	---	---	---	---	---	---
	4/9/2018	ENER	80.3	± 13.0000	124.000	0.514	---	---	---	---	---	---	---	---
	6/28/2018	ENER	72.6	± 11.7000	65.300	0.800	< 0.1	1.60	0.500	0.9	1.1	< 0.06	0.60	1.20
	10/9/2018	ENER	50.2	± 8.1000	55.400	0.380	---	---	---	---	---	---	---	---
Evap Pond 2	2/8/2018	ENER	23.0	± 3.7100	34.900	0.951	---	---	---	---	---	---	---	---
	4/9/2018	ENER	26.0	± 4.2000	48.700	1.050	---	---	---	---	---	---	---	---
	6/28/2018	ENER	22.5	± 3.6300	43.800	0.827	3.7	1.90	1.200	0.6	1.4	< 0.03	0.60	1.50
	10/9/2018	ENER	19.4	± 3.1400	44.700	0.707	---	---	---	---	---	---	---	---
Evap Pond 3A	2/8/2018	ENER	376	± 60.7000	1220.000	0.660	---	---	---	---	---	---	---	---
	4/16/2018	ENER	455	± 73.5000	1490.000	0.790	---	---	---	---	---	---	---	---
	6/28/2018	ENER	922	± 149.0000	2820.000	1.080	0.2	18.90	3.700	20.9	4.2	0.20	1040.00	197.00
	10/9/2018	ENER	109	± 17.6000	115.000	0.394	---	---	---	---	---	---	---	---
Evap Pond 3B	2/8/2018	ENER	364	± 58.7000	550.000	0.370	---	---	---	---	---	---	---	---
	4/16/2018	ENER	368	± 59.3000	534.000	0.380	---	---	---	---	---	---	---	---
	6/28/2018	ENER	580	± 93.6000	772.000	0.360	< 0.1	28.70	5.500	140.0	24.8	< 0.10	394.00	74.90
	10/9/2018	ENER	123	± 19.8000	122.000	0.270	---	---	---	---	---	---	---	---
W Coll Pond	4/9/2018	ENER	6.24	± 1.0100	13.300	0.486	---	---	---	---	---	---	---	---
	6/28/2018	ENER	4.49	± 0.7250	10.100	0.342	3.0	0.40	0.100	1.3	1.0	< 0.01	0.60	1.00
	10/9/2018	ENER	3.80	± 0.6140	7.950	0.262	---	---	---	---	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0690	2/7/2018	ENER	---	---	---	---	---	---	91	278	808	1147	---	---
0691	2/7/2018	ENER	---	---	---	---	---	---	117	277	838	1261	---	---
0891	2/7/2018	ENER	---	---	---	---	---	---	792	1410	1970	2687	---	---
1A	4/4/2018	ENER	154	45.2	7.3	619	436	< 5	300	1180	2660	3307	0.95	7.52
1F	2/13/2018	ENER	210	53.9	2.0	648	388	< 5	305	1410	2750	3671	0.97	7.41
1K	4/4/2018	ENER	69	14.4	2.5	263	343	< 5	101	381	1040	1409	0.97	7.56
1M	2/12/2018	ENER	---	---	---	---	---	---	190	566	1440	2203	---	---
1N	2/7/2018	ENER	---	---	---	---	---	---	725	863	2660	3678	---	---
1P	2/7/2018	ENER	---	---	---	---	---	---	159	445	1300	1796	---	---
1U	1/16/2018	ENER	121	27.7	3.4	145	283	< 5	86	359	932	---	1.00	7.53
B	3/7/2018	ENER	---	---	---	---	---	---	123	655	1390	1848	---	---
B3	4/9/2018	ENER	175	46.9	4.9	304	437	< 5	166	731	1660	2134	0.95	7.37
B4	4/9/2018	ENER	150	58.1	5.0	2020	1180	< 5	360	2990	6700	8136	1.09	7.53
B6	4/27/2018	ENER	103	31.2	3.3	566	530	< 5	169	871	2080	2821	1.02	7.49
B7	4/9/2018	ENER	129	29.0	4.2	289	400	< 5	135	586	1430	4728	0.95	7.55
B8	4/10/2018	ENER	172	47.9	4.6	497	509	< 5	174	974	2140	2683	1.02	7.44
B9	4/10/2018	ENER	228	73.9	4.0	1340	864	< 5	376	2550	5090	5756	0.97	7.41
B10	4/10/2018	ENER	274	111.0	7.0	2280	1230	< 5	619	4410	8400	9062	0.94	7.44
B11	3/20/2018	ENER	148	38.7	7.7	641	434	< 5	201	1360	2640	3678	0.94	7.49
	4/10/2018	ENER	232	64.5	9.0	912	565	< 5	298	2120	3870	4691	0.92	7.43
B12	2/13/2018	ENER	---	---	---	---	---	---	247	1570	2980	3416	---	---
B13	2/13/2018	ENER	---	---	---	---	---	---	95	402	1010	1342	---	---
B15	4/17/2018	ENER	201	69.6	5.0	1760	1030	< 5	370	3190	6220	7552	0.98	7.34

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
B31	4/17/2018	ENER	194	70.0	6.0	2160	1210	< 5	444	3910	7200	9036	0.96	7.46
B32	4/17/2018	ENER	125	73.0	5.0	2340	1290	< 5	518	3780	7560	9294	1.00	7.75
B35	4/17/2018	ENER	50	42.4	5.0	2640	1470	35	535	3830	8070	9949	1.01	8.37
B40	4/10/2018	ENER	301	139.0	7.0	2830	1790	< 5	569	5430	9190	1083	0.94	7.23
B42	4/10/2018	ENER	424	194.0	8.0	3120	1970	< 5	691	6610	10900	1196	0.91	7.16
B44	4/10/2018	ENER	246	103.0	4.0	3840	1950	< 5	944	7100	12900	1378	0.91	7.46
BC	6/11/2018	ENER	---	---	---	---	---	---	118	1770	3120	3685	---	---
BP	3/7/2018	ENER	---	---	---	---	---	---	122	700	1530	2068	---	---
C2	3/7/2018	ENER	---	---	---	---	---	---	121	408	1110	1589	---	---
C5	3/7/2018	ENER	---	---	---	---	---	---	100	397	1080	1481	---	---
C6	3/7/2018	ENER	---	---	---	---	---	---	132	724	1690	2230	---	---
	9/20/2018	ENER	---	---	---	---	---	---	226	1040	2350	3251	---	---
C8	3/7/2018	ENER	---	---	---	---	---	---	255	973	2500	3478	---	---
	9/20/2018	ENER	---	---	---	---	---	---	199	924	2090	2960	---	---
C9	3/7/2018	ENER	148	36.6	5.0	630	792	< 5	251	927	2540	3508	0.96	7.54
	9/20/2018	ENER	---	---	---	---	---	---	174	821	1890	2703	---	---
C10	3/7/2018	ENER	---	---	---	---	---	---	214	1070	2450	3358	---	---
	9/20/2018	ENER	---	---	---	---	---	---	231	1110	2540	3624	---	---
C11	3/7/2018	ENER	100	24.3	5.3	458	359	< 5	217	806	1840	3472	0.93	7.25
C12	3/7/2018	ENER	121	31.1	6.0	546	472	< 5	252	949	2200	3182	0.93	7.41
D1	3/5/2018	ENER	---	---	---	---	---	---	150	697	1660	2235	---	---
	3/22/2018	ENER	183	43.0	4.0	335	434	< 5	165	769	---	2352	0.98	---
	6/12/2018	ENER	216	42.0	3.0	300	370	< 5	141	867	---	2414	0.97	---
	7/11/2018	ENER	197	41.6	3.7	322	404	< 5	140	772	1810	2328	1.02	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
D1	9/17/2018	ENER	189	40.0	3.0	291	440	< 5	153	746	---	2340	0.94	---
	12/5/2018	ENER	174	37.0	3.0	257	383	< 5	130	723	---	2184	0.91	---
DA3	4/5/2018	ENER	319	78.0	5.3	542	545	< 5	241	1600	3170	3701	0.94	7.48
DC	6/11/2018	ENER	---	---	---	---	---	---	197	772	1920	2565	---	---
DD	2/2/2018	ENER	---	---	---	---	---	---	72	2050	3410	3491	---	---
	3/21/2018	ENER	485	112.0	7.0	399	297	< 5	77	2230	---	3788	0.95	---
	4/30/2018	ENER	198	---	3.7	316	392	< 5	139	728	1700	2220	---	7.33
	5/31/2018	ENER	485	112.0	7.0	402	318	< 5	73	2170	3530	3811	0.97	7.30
	6/21/2018	ENER	514	105.0	6.0	370	329	< 5	73	2120	---	3824	0.98	---
	8/16/2018	ENER	---	---	---	---	---	---	73	2040	3540	3798	---	---
	9/17/2018	ENER	462	103.0	6.0	363	334	< 5	74	2040	---	3805	0.95	---
	10/10/2018	ENER	---	---	---	---	---	---	69	2090	3600	3906	---	---
	11/29/2018	ENER	---	---	---	---	---	---	71	2050	3540	3847	---	---
	12/5/2018	ENER	456	112.0	6.0	364	327	< 5	71	2090	---	3914	0.94	---
DD2	2/2/2018	ENER	---	---	---	---	---	---	68	1570	2640	2814	---	---
	4/30/2018	ENER	368	---	6.0	353	344	< 5	67	1490	1710	2994	---	7.11
	8/16/2018	ENER	---	---	---	---	---	---	67	1570	2720	2993	---	---
	10/10/2018	ENER	---	---	---	---	---	---	63	1530	2700	3051	---	---
	11/29/2018	ENER	---	---	---	---	---	---	61	1470	2700	3072	---	---
DD3	3/28/2018	ENER	---	---	---	---	---	---	142	1850	3330	---	---	---
	4/18/2018	ENER	---	---	---	---	---	---	89	2120	3600	3764	---	---
	7/28/2018	ENER	---	---	---	---	---	---	---	---	---	3528	---	---
	8/16/2018	ENER	---	---	---	---	---	---	146	1950	3520	3907	---	---
DD4	3/27/2018	ENER	---	---	---	---	---	---	64	1620	2710	2883	---	---
	4/18/2018	ENER	---	---	---	---	---	---	62	1560	2710	2993	---	---
	8/16/2018	ENER	---	---	---	---	---	---	63	1610	2780	3022	---	---
DD5	3/27/2018	ENER	---	---	---	---	---	---	87	2100	3510	3519	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
DD5	4/18/2018	ENER	---	---	---	---	---	---	84	2070	3490	3741	---	---
	8/16/2018	ENER	---	---	---	---	---	---	84	2070	3580	3769	---	---
DT	4/5/2018	ENER	305	70.1	6.0	931	758	< 5	260	2250	4310	4917	0.92	7.36
DZ	6/13/2018	ENER	---	---	---	---	---	---	1190	8950	17300	19070	---	---
F	3/5/2018	ENER	---	---	---	---	---	---	200	732	1840	2454	---	---
	3/24/2018	ENER	238	60.0	4.0	281	493	< 5	208	740	---	---	0.99	---
	6/11/2018	ENER	228	62.0	5.0	279	483	< 5	191	727	---	2498	1.00	---
	9/12/2018	ENER	234	62.0	4.5	278	516	< 5	193	732	1830	2441	0.99	---
	9/12/2018	ENER	# 234	# 61.9	# 4.6	# 281	# 517	# < 5	# 195	# 737	# 1820	---	# 0.99	---
	9/26/2018	ENER	260	60.0	5.0	261	456	< 5	190	828	---	2595	0.97	---
	12/11/2018	ENER	245	63.0	4.0	274	465	< 5	179	778	---	2561	1.01	---
FB	3/2/2018	ENER	---	---	---	---	---	---	214	776	1870	2454	---	---
	9/12/2018	ENER	243	63.8	6.0	282	468	< 5	215	790	1910	2506	0.98	---
GH	3/2/2018	ENER	---	---	---	---	---	---	175	646	1680	2215	---	---
	9/12/2018	ENER	199	54.8	4.3	261	497	< 5	167	634	1630	2211	0.99	---
GK	9/18/2018	ENER	---	---	---	---	---	---	193	731	1780	2398	---	---
GN	3/2/2018	ENER	159	48.5	7.7	240	368	< 5	160	570	1440	1986	1.00	7.31
GV	9/18/2018	ENER	---	---	---	---	---	---	175	707	1600	2188	---	---
I	2/15/2018	ENER	139	39.2	3.5	204	378	< 5	129	431	1230	1610	1.01	7.44
	4/4/2018	ENER	141	37.0	3.0	198	425	< 5	131	434	---	1770	0.94	---
	6/13/2018	ENER	---	---	---	---	---	---	125	413	1230	1709	---	---
	6/19/2018	ENER	151	36.0	3.0	192	431	< 5	129	428	---	1762	0.96	---
	9/27/2018	ENER	155	39.0	4.0	221	421	< 5	126	423	---	1746	1.06	---
K4	3/1/2018	ENER	---	---	---	---	---	---	111	461	1150	1616	---	---
	7/18/2018	ENER	---	---	---	---	---	---	126	669	1630	2231	---	---
K5	2/8/2018	ENER	---	---	---	---	---	---	126	697	1580	2194	---	---

Signifies Quality Control Sample

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
K5	7/18/2018	ENER	---	---	---	---	---	---	124	689	1650	2221	---	---
K7	2/8/2018	ENER	---	---	---	---	---	---	112	447	1150	1641	---	---
K8	2/8/2018	ENER	---	---	---	---	---	---	121	612	1430	2008	---	---
	7/18/2018	ENER	---	---	---	---	---	---	120	413	1190	1693	---	---
K10	2/8/2018	ENER	---	---	---	---	---	---	127	643	1510	2110	---	---
	7/18/2018	ENER	---	---	---	---	---	---	125	676	1650	2247	---	---
K11	2/8/2018	ENER	---	---	---	---	---	---	114	652	1470	1975	---	---
	7/18/2018	ENER	---	---	---	---	---	---	122	737	1710	2268	---	---
KEB	3/22/2018	ENER	---	---	---	---	---	---	98	425	1080	1373	---	---
KF	2/12/2018	ENER	---	---	---	---	---	---	109	409	1070	1388	---	---
KZ	2/12/2018	ENER	---	---	---	---	---	---	114	591	1260	1616	---	---
L	4/4/2018	ENER	152	35.3	4.7	276	393	< 5	177	575	1440	1865	0.96	7.43
L5	4/25/2018	ENER	101	24.2	3.6	212	351	< 5	116	374	1060	1518	0.96	7.56
L6	4/5/2018	ENER	115	24.6	4.9	205	317	< 5	146	393	1110	1496	0.95	7.40
L7	2/15/2018	ENER	67	16.2	4.3	243	314	< 5	103	319	977	1339	1.03	7.75
	4/5/2018	ENER	75	15.5	3.7	230	348	< 5	107	323	983	1347	0.97	7.69
L8	3/14/2018	ENER	---	---	---	---	---	---	128	410	1140	1612	---	---
	4/5/2018	ENER	103	23.6	3.9	242	351	< 5	127	400	1120	1504	0.99	7.67
L9	3/14/2018	ENER	---	---	---	---	---	---	141	449	1210	1687	---	---
	4/5/2018	ENER	121	27.7	4.5	237	346	< 5	143	456	1220	1622	0.97	7.51
L10	2/15/2018	ENER	118	30.5	4.7	229	325	< 5	131	437	1210	1586	1.01	7.52
	4/5/2018	ENER	137	32.3	4.0	228	372	< 5	148	489	1290	1581	0.95	7.43
M3	2/13/2018	ENER	356	103.0	7.0	1660	1160	< 5	375	3730	6510	7329	0.92	7.41
	4/4/2018	ENER	303	77.9	6.0	934	759	< 5	290	2080	4150	4955	0.97	7.54

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
M5	7/17/2018	ENER	---	---	---	---	---	---	125	787	1750	2250	---	---
M6	2/28/2018	ENER	---	---	---	---	---	---	195	1200	2440	3096	---	---
M7	2/28/2018	ENER	---	---	---	---	---	---	212	811	1870	2542	---	---
M9	2/28/2018	ENER	---	---	---	---	---	---	205	1190	2400	3007	---	---
	9/18/2018	ENER	---	---	---	---	---	---	193	1110	2360	2952	---	---
M10	2/28/2018	ENER	---	---	---	---	---	---	253	1610	3010	3488	---	---
M19	4/4/2018	ENER	233	59.0	5.0	262	488	< 5	196	753	---	2472	0.95	---
	6/21/2018	ENER	251	61.0	6.0	251	493	< 5	197	754	---	2498	0.97	---
	10/1/2018	ENER	252	65.0	7.0	279	492	< 5	196	761	---	2542	1.02	---
MB	3/2/2018	ENER	229	60.6	8.1	257	514	< 5	197	678	1760	2368	0.98	7.21
ML	2/28/2018	ENER	---	---	---	---	---	---	240	2020	3560	4032	---	---
MU	12/6/2018	ENER	---	---	---	---	---	---	215	1540	3180	3604	---	---
MW	2/28/2018	ENER	---	---	---	---	---	---	241	2020	3540	3971	---	---
MX	8/2/2018	ENER	229	57.6	6.4	261	519	< 5	184	667	1720	2357	1.00	---
MY	12/6/2018	ENER	---	---	---	---	---	---	166	621	1710	2323	---	---
MZ	2/28/2018	ENER	---	---	---	---	---	---	254	1440	2730	3279	---	---
N	8/29/2018	ENER	---	---	---	---	---	---	150	1650	3040	3574	---	---
NA	8/30/2018	ENER	---	---	---	---	---	---	75	769	1540	2187	---	---
NB	8/30/2018	ENER	---	---	---	---	---	---	1240	10200	19400	18730	---	---
NC	4/4/2018	ENER	156	27.1	3.0	212	182	< 5	56	760	1420	1672	0.94	7.65
ND	3/7/2018	ENER	47	11.7	1.0	457	378	< 5	85	787	1610	2577	0.92	7.66
O	8/29/2018	ENER	---	---	---	---	---	---	113	862	1650	2229	---	---
P	3/22/2018	ENER	234	47.4	4.9	253	236	< 5	51	1030	1820	2082	0.99	7.62
	4/30/2018	ENER	241	---	5.2	267	246	< 5	49	988	1830	2212	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
P2	3/6/2018	ENER	329	61.2	6.3	264	236	< 5	67	1390	2320	2681	0.95	7.55
P3	3/6/2018	ENER	300	54.1	5.1	266	236	< 5	75	1290	2180	2574	0.94	7.54
P4	3/6/2018	ENER	203	36.1	3.4	227	175	< 5	47	924	1590	1990	0.98	7.70
Q	3/20/2018	ENER	392	76.0	8.0	304	217	< 5	67	1540	---	1444	1.04	---
	3/22/2018	ENER	403	74.1	7.7	302	214	< 5	69	1640	2700	2825	0.99	7.36
	4/26/2018	ENER	406	74.7	7.4	286	223	< 5	67	1540	2680	2952	1.03	7.42
	6/20/2018	ENER	420	72.0	7.0	271	227	< 5	68	1580	---	3059	1.00	---
	9/13/2018	ENER	400	67.0	6.0	261	231	< 5	65	1520	---	2971	0.99	---
	12/3/2018	ENER	364	71.0	7.0	271	231	< 5	66	1510	---	2996	0.97	---
R	3/21/2018	ENER	329	58.0	5.0	305	152	< 5	58	1440	---	2732	1.01	---
	3/22/2018	ENER	332	55.0	4.5	315	152	< 5	57	1440	2380	2551	1.02	7.60
	6/20/2018	ENER	351	54.0	4.0	275	163	< 5	56	1440	---	2808	0.99	---
	9/12/2018	ENER	343	53.0	4.0	276	162	< 5	57	1430	---	2790	0.98	---
	12/3/2018	ENER	307	54.0	4.0	271	164	< 5	53	1400	---	2797	0.94	---
S1	3/20/2018	ENER	32	21.0	13.0	1800	919	69	384	2620	---	---	0.99	---
S2	1/16/2018	ENER	---	---	---	---	---	---	233	906	2170	2727	---	---
	2/20/2018	ENER	242	67.6	5.4	327	574	< 5	224	791	1970	6268	0.99	7.24
	7/11/2018	ENER	238	66.0	5.4	473	648	< 5	233	1070	2640	3398	0.96	---
S3	7/17/2018	ENER	---	---	---	---	---	---	335	1950	3960	4923	---	---
S4	3/22/2018	ENER	249	63.0	5.0	290	503	< 5	206	787	---	2553	0.99	---
	6/13/2018	ENER	236	60.0	4.0	278	530	< 5	180	716	---	2515	1.00	---
	7/12/2018	ENER	206	59.7	4.1	266	527	< 5	177	754	1820	2422	0.91	---
	9/17/2018	ENER	209	53.0	4.0	259	507	< 5	169	716	---	2417	0.93	---
	12/5/2018	ENER	201	54.0	4.0	250	489	< 5	159	716	---	2401	0.92	---
S5R	2/14/2018	ENER	72	51.0	7.0	2880	1460	75	566	4250	8760	5053	1.02	8.63
S7	2/14/2018	ENER	238	80.1	7.0	927	890	< 5	330	1830	3810	4546	0.95	7.45

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
S11	1/16/2018	ENER	117	34.8	6.5	145	277	< 5	95	407	1000	1311	0.96	7.43
S12	1/17/2018	ENER	266	69.2	5.1	442	590	< 5	257	1020	2380	2967	1.00	7.38
S14	1/3/2018	ENER	---	---	---	---	---	---	228	811	1910	2428	---	---
S19	2/14/2018	ENER	285	67.3	3.0	564	547	< 5	292	1390	2890	3509	0.96	7.31
SA	2/14/2018	ENER	331	86.9	6.0	558	472	< 5	245	1670	3190	3742	0.97	7.37
SB	2/14/2018	ENER	11	12.6	5.0	3110	1410	281	562	4080	8840	13990	1.03	9.23
SE6	1/16/2018	ENER	262	85.2	6.5	823	860	< 5	329	1650	3550	5853	0.97	7.51
SM	5/2/2018	ENER	---	---	---	---	---	---	255	1450	3080	3645	---	---
SO	5/2/2018	ENER	---	---	---	---	---	---	168	1010	2240	2876	---	---
ST	1/18/2018	ENER	356	94.6	7.6	737	621	< 5	275	1970	3740	4178	0.98	7.52
SUR	2/15/2018	ENER	53	20.0	< 5.0	3260	1660	350	552	4770	9420	1099	0.95	9.14
	3/22/2018	ENER	15	9.0	2.1	3300	1350	442	560	4410	9290	10890	1.00	9.53
SV	2/14/2018	ENER	15	20.0	8.0	4800	2560	518	859	6760	14000	15290	0.94	9.10
SW	5/2/2018	ENER	---	---	---	---	---	---	296	1370	3000	3725	---	---
SZ	1/16/2018	ENER	65	103.0	11.0	7900	5180	30	1400	12300	24700	23600	0.93	8.22
T	9/18/2018	ENER	---	---	---	---	---	---	188	811	1800	2837	---	---
T2	4/9/2018	ENER	138	104.0	8.0	3400	2210	32	682	5830	---	13523	0.92	---
	6/6/2018	ENER	134	109.0	8.0	3650	2360	< 5	632	5650	11100	13670	1.00	---
	6/21/2018	ENER	152	103.0	8.0	3340	2410	< 5	654	5780	---	13273	0.91	---
	9/18/2018	ENER	121	92.0	8.0	3670	2350	< 5	641	5600	---	13272	1.00	---
	12/11/2018	ENER	100	80.0	7.0	3440	2460	< 5	633	5080	---	13136	0.98	---
T7	3/12/2018	ENER	294	149.0	9.0	3180	1610	< 5	646	6300	11600	12810	0.94	7.39
T8	3/12/2018	ENER	24	30.3	21.8	4680	2200	1530	755	5990	14700	16700	0.89	9.79
T15	3/12/2018	ENER	4	1.9	< 4.0	3260	1940	1150	336	3550	9640	11890	0.93	9.77

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
T16	3/12/2018	ENER	268	69.3	4.0	975	597	< 5	406	2150	4280	5306	0.93	7.56
T19	6/6/2018	ENER	7	3.7	< 4.0	2280	1290	403	375	2510	6030	8252	1.03	---
T20	3/14/2018	ENER	253	72.3	7.0	1640	1170	< 5	377	3190	6240	7768	0.93	7.51
	3/23/2018	ENER	321	87.0	8.0	1930	1090	< 5	427	3800	---	8283	0.98	---
	6/27/2018	ENER	327	87.0	8.0	2010	1200	< 5	429	3730	---	8760	1.01	---
	9/24/2018	ENER	371	92.0	8.0	1960	1310	< 5	479	4000	---	9323	0.94	---
	12/11/2018	ENER	360	98.0	8.0	2060	1270	< 5	485	3990	---	9221	0.98	---
T21	3/8/2018	ENER	5	2.7	12.0	2420	1190	791	293	2750	6990	9017	0.95	9.84
T22	3/8/2018	ENER	61	27.9	8.0	1540	1240	< 5	288	2360	4990	6440	0.93	7.80
	4/3/2018	ENER	56	26.0	7.0	1660	1390	62	293	2420	---	7077	0.93	---
	6/27/2018	ENER	200	117.0	13.0	2810	1460	< 5	492	4570	---	10773	1.07	---
	9/24/2018	ENER	220	124.0	12.0	2320	1470	< 5	406	3770	---	9433	1.07	---
	12/11/2018	ENER	223	129.0	11.0	2680	1430	< 5	475	4790	---	9592	1.01	---
T23	6/7/2018	ENER	197	251.0	23.0	8010	3820	< 5	1610	13000	24600	2768	1.00	---
T24	1/18/2018	ENER	463	112.0	8.8	1580	1080	< 5	371	3760	7140	7462	0.95	7.40
T26	1/18/2018	ENER	441	139.0	9.0	2270	1530	< 5	447	4800	8970	9508	0.96	7.46
T27	1/18/2018	ENER	380	85.0	6.8	1140	880	< 5	300	2730	5140	5608	0.95	7.39
T28	3/14/2018	ENER	409	121.0	7.0	1520	971	< 5	366	3540	6800	7608	0.97	7.24
T29	3/14/2018	ENER	59	73.6	11.0	5000	3050	94	991	8060	16400	17910	0.91	8.48
T30	1/22/2018	ENER	560	129.0	7.4	1280	933	< 5	469	3470	6410	4019	0.94	7.42
T31	4/19/2018	ENER	573	158.0	10.0	2020	1210	< 5	472	4540	8230	9106	1.01	7.11
T32	1/23/2018	ENER	616	156.0	8.3	1610	1090	< 5	549	4030	7510	7962	0.97	7.11
T36	1/23/2018	ENER	576	147.0	8.0	1540	1080	< 5	540	3980	7410	7697	0.93	7.15
T39	3/12/2018	ENER	391	161.0	6.0	2680	2520	< 5	553	5110	10300	11840	0.91	7.34

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
T40	3/8/2018	ENER	9	7.7	10.0	2310	1080	728	335	2850	6750	8556	0.92	9.72
T41	6/6/2018	ENER	2	< 0.5	13.0	2990	961	1200	390	2930	7660	1055	1.02	---
T43	1/30/2018	ENER	10	36.6	7.0	4450	1750	276	803	6180	12400	14390	1.04	9.06
T47	1/30/2018	ENER	5	16.2	6.0	4260	1760	468	710	5430	11300	13620	1.05	9.35
T48	4/19/2018	ENER	78	43.0	8.0	3380	1840	163	559	4320	8880	11360	1.09	8.84
T53	1/30/2018	ENER	7	15.1	5.0	3970	1750	474	720	5490	11400	13620	0.97	9.37
T54	4/19/2018	ENER	4	9.5	9.0	3650	1010	362	689	4970	9690	12360	1.06	9.49
	6/7/2018	ENER	6	11.8	9.0	3470	1060	371	658	4810	9540	12250	1.03	---
W	12/6/2018	ENER	---	---	---	---	---	---	123	506	1330	1802	---	---
WME-9	8/20/2018	ENER	---	---	---	---	---	---	---	---	---	1930	---	---
	11/14/2018	ENER	75	22.0	5.0	315	429	< 5	117	489	---	1963	0.94	---
WME-10	8/20/2018	ENER	---	---	---	---	---	---	---	---	---	1604	---	---
	11/14/2018	ENER	129	27.0	3.0	183	347	< 5	110	427	---	1627	0.94	---
X	2/26/2018	ENER	---	---	---	---	---	---	133	654	1390	1856	---	---
	3/22/2018	ENER	182	43.0	6.0	205	282	< 5	136	631	---	1840	1.00	---
	4/4/2018	ENER	---	---	---	---	---	---	126	575	1280	1611	---	7.38
	6/13/2018	ENER	153	34.0	5.0	172	325	< 5	121	460	---	1659	0.98	---
	7/11/2018	ENER	153	34.1	4.7	168	321	< 5	114	438	1170	1621	1.01	7.42
	9/17/2018	ENER	168	36.0	5.0	156	265	< 5	113	566	---	1738	0.94	---
	10/10/2018	ENER	---	---	---	---	---	---	118	635	1380	1851	---	---
	10/10/2018	ENER	---	---	---	---	---	---	# 118	# 637	# 1390	---	---	---
	12/5/2018	ENER	146	34.0	4.0	136	287	< 5	89	495	---	1599	0.91	---
X18	9/18/2018	ENER	---	---	---	---	---	---	207	1170	2340	3143	---	---

Signifies Quality Control Sample

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0690	2/7/2018	ENER	0.118	± 0.0190	0.940	0.232	---	---	---	---	---	---	---	---
0691	2/7/2018	ENER	0.0146	± 0.0024	0.200	0.154	---	---	---	---	---	---	---	---
0891	2/7/2018	ENER	0.470	± 0.0758	0.090	0.654	---	---	---	---	---	---	---	---
1A	4/4/2018	ENER	2.52	± 0.4060	1.370	0.793	11.6	0.30	0.100	-0.1	1.0	< 0.01	1.10	0.20
1F	2/13/2018	ENER	1.83	± 0.2950	0.002	0.514	20.9	0.50	0.100	1.0	0.7	< 0.01	0.06	0.10
1K	4/4/2018	ENER	0.584	± 0.0943	0.546	0.047	2.1	0.10	0.200	1.2	0.8	0.01	0.05	0.09
1M	2/12/2018	ENER	0.313	± 0.0505	0.100	0.389	---	---	---	---	---	---	---	---
1N	2/7/2018	ENER	0.0594	± 0.0096	< 0.030	0.508	---	---	---	---	---	---	---	---
1P	2/7/2018	ENER	0.204	± 0.0329	< 0.030	0.006	---	---	---	---	---	---	---	---
1U	1/16/2018	ENER	0.241	± 0.0388	0.230	< 0.005	< 0.1	0.30	0.200	---	---	---	---	---
B	3/7/2018	ENER	0.0447	± 0.0072	< 0.030	0.020	---	---	---	---	---	---	---	---
B3	4/9/2018	ENER	1.000	± 0.0000	1.580	0.183	1.7	0.50	0.200	---	---	---	---	---
B4	4/9/2018	ENER	13.7	± 2.0000	23.300	0.869	4.7	0.60	0.200	---	---	---	---	---
B6	4/27/2018	ENER	4.28	± 0.6900	15.800	0.262	2.5	0.30	0.100	---	---	---	---	---
B7	4/9/2018	ENER	1.09	± 0.0000	2.660	0.317	1.6	0.60	0.200	---	---	---	---	---
B8	4/10/2018	ENER	2.96	± 0.4780	5.510	0.325	1.9	0.40	0.200	---	---	---	---	---
B9	4/10/2018	ENER	12.1	± 1.9500	21.600	0.938	15.0	0.50	0.200	---	---	---	---	---
B10	4/10/2018	ENER	19.7	± 3.1900	22.300	1.960	21.6	0.50	0.200	---	---	---	---	---
B11	3/20/2018	ENER	3.54	± 0.5720	6.070	0.653	10.6	0.30	0.100	1.6	0.9	< 0.01	0.08	0.09
	4/10/2018	ENER	6.86	± 1.1100	8.660	1.070	13.5	0.40	0.200	---	---	---	---	---
B12	2/13/2018	ENER	2.12	± 0.3420	2.120	0.099	---	---	---	---	---	---	---	---
B13	2/13/2018	ENER	0.524	± 0.0845	0.250	0.012	---	---	---	---	---	---	---	---
B15	4/17/2018	ENER	9.47	± 1.5300	18.400	0.410	4.6	0.30	0.100	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
B31	4/17/2018	ENER	14.7	± 2.3800	18.000	0.698	6.0	0.30	0.100	---	---	---	---	---
B32	4/17/2018	ENER	15.0	± 2.4200	25.200	0.678	2.9	0.40	0.200	---	---	---	---	---
B35	4/17/2018	ENER	15.0	± 2.4200	23.800	0.597	0.9	0.40	0.200	---	---	---	---	---
B40	4/10/2018	ENER	22.8	± 3.6800	42.100	0.524	5.2	0.50	0.200	---	---	---	---	---
B42	4/10/2018	ENER	28.6	± 4.6200	49.800	0.371	10.2	0.60	0.200	---	---	---	---	---
B44	4/10/2018	ENER	29.2	± 4.7100	43.500	2.500	7.0	0.50	0.200	---	---	---	---	---
BC	6/11/2018	ENER	2.05	± 0.3310	0.090	0.111	---	---	---	---	---	---	---	---
BP	3/7/2018	ENER	0.920	± 0.1490	1.610	0.081	---	---	---	---	---	---	---	---
C2	3/7/2018	ENER	0.278	± 0.0448	0.210	0.035	---	---	---	---	---	---	---	---
C5	3/7/2018	ENER	0.0694	± 0.0112	0.050	0.015	---	---	---	---	---	---	---	---
C6	3/7/2018	ENER	1.67	± 0.2690	3.760	0.472	---	---	---	---	---	---	---	---
	9/20/2018	ENER	4.93	± 0.7960	11.100	0.627	---	---	---	---	---	---	---	---
C8	3/7/2018	ENER	1.25	± 0.2020	0.710	0.347	---	---	---	---	---	---	---	---
	9/20/2018	ENER	4.53	± 0.7320	9.540	0.523	---	---	---	---	---	---	---	---
C9	3/7/2018	ENER	1.24	± 0.2000	0.808	0.071	< 0.1	0.50	0.200	1.1	1.2	< 0.01	0.20	0.30
	9/20/2018	ENER	3.99	± 0.6450	8.280	0.458	---	---	---	---	---	---	---	---
C10	3/7/2018	ENER	7.25	± 1.1700	13.100	0.845	---	---	---	---	---	---	---	---
	9/20/2018	ENER	6.95	± 1.1200	12.400	0.812	---	---	---	---	---	---	---	---
C11	3/7/2018	ENER	2.74	± 0.4420	2.840	0.999	7.0	0.30	0.100	0.2	1.0	0.04	0.10	0.10
C12	3/7/2018	ENER	3.02	± 0.4870	4.380	0.192	2.9	0.90	0.200	0.7	1.2	0.02	0.10	0.20
D1	3/5/2018	ENER	1.75	± 0.2830	2.560	0.052	---	---	---	---	---	---	---	---
	3/22/2018	ENER	1.97	---	2.660	0.061	1.5	---	---	---	---	0.00	---	---
	6/12/2018	ENER	1.11	---	1.460	0.065	1.1	---	---	---	---	< 0.01	---	---
	7/11/2018	ENER	1.42	± 0.2290	1.910	0.059	1.4	0.40	0.200	1.6	1.2	0.00	0.02	0.05

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
D1	9/17/2018	ENER	1.65	---	2.310	0.058	1.5	---	---	---	---	0.00	---	---
	12/5/2018	ENER	0.953	---	1.310	0.052	1.2	---	---	---	---	0.00	---	---
DA3	4/5/2018	ENER	2.15	± 0.3470	2.770	0.288	9.0	0.50	0.200	---	---	---	---	---
DC	6/11/2018	ENER	0.0711	± 0.0115	< 0.030	0.021	---	---	---	---	---	---	---	---
DD	2/2/2018	ENER	0.113	± 0.0183	< 0.030	0.089	---	---	---	---	---	---	---	---
	3/21/2018	ENER	0.112	---	0.005	0.082	12.5	---	---	---	---	< 0.01	---	---
	4/30/2018	ENER	1.50	± 0.2430	1.570	0.050	1.2	0.20	0.100	1.2	0.6	< 0.01	0.30	0.20
	5/31/2018	ENER	0.104	± 0.0169	0.002	0.089	13.0	0.20	0.100	2.7	1.0	< 0.01	0.07	0.08
	6/21/2018	ENER	0.109	---	0.001	0.089	10.8	---	---	---	---	< 0.01	---	---
	8/16/2018	ENER	0.112	± 0.0180	0.011	0.056	---	---	---	---	---	---	---	---
	9/17/2018	ENER	0.118	---	0.003	0.069	12.1	---	---	---	---	< 0.01	---	---
	10/10/2018	ENER	0.0942	± 0.0152	0.002	0.091	---	---	---	---	---	---	---	---
	11/29/2018	ENER	0.111	± 0.0179	0.002	0.075	---	---	---	---	---	---	---	---
	12/5/2018	ENER	0.105	---	0.013	0.080	10.8	---	---	---	---	< 0.01	---	---
DD2	2/2/2018	ENER	0.219	± 0.0354	< 0.030	< 0.005	---	---	---	---	---	---	---	---
	4/30/2018	ENER	0.210	± 0.0339	0.006	< 0.001	< 0.1	0.60	0.200	1.9	0.7	< 0.01	0.07	0.09
	8/16/2018	ENER	0.209	± 0.0337	0.003	< 0.001	---	---	---	---	---	---	---	---
	10/10/2018	ENER	0.209	± 0.0338	0.002	< 0.001	---	---	---	---	---	---	---	---
	11/29/2018	ENER	0.212	± 0.0342	< 0.001	0.003	---	---	---	---	---	---	---	---
DD3	3/28/2018	ENER	0.0909	± 0.0147	< 0.030	0.257	---	---	---	---	---	---	---	---
	4/18/2018	ENER	0.121	± 0.0196	< 0.030	0.045	---	---	---	---	---	---	---	---
	8/16/2018	ENER	0.0901	± 0.0145	0.028	0.273	---	---	---	---	---	---	---	---
DD4	3/27/2018	ENER	0.210	± 0.0339	< 0.030	0.013	---	---	---	---	---	---	---	---
	4/18/2018	ENER	0.220	± 0.0356	< 0.030	0.014	---	---	---	---	---	---	---	---
	8/16/2018	ENER	0.223	± 0.0360	< 0.001	0.014	---	---	---	---	---	---	---	---
DD5	3/27/2018	ENER	0.214	± 0.0345	< 0.030	0.161	---	---	---	---	---	---	---	---
	4/18/2018	ENER	0.217	± 0.0351	< 0.030	0.156	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
DD5	8/16/2018	ENER	0.206	± 0.0332	0.003	0.149	---	---	---	---	---	---	---	---
DT	4/5/2018	ENER	5.72	± 0.9230	11.600	0.154	1.6	0.40	0.200	---	---	---	---	---
DZ	6/13/2018	ENER	46.9	± 7.5700	42.600	9.170	---	---	---	---	---	---	---	---
F	3/5/2018	ENER	0.0461	± 0.0074	< 0.030	0.016	---	---	---	---	---	---	---	---
	3/24/2018	ENER	0.0482	---	0.001	0.019	2.1	---	---	---	---	0.00	---	---
	6/11/2018	ENER	0.0503	---	0.011	0.027	2.5	---	---	---	---	< 0.01	---	---
	9/12/2018	ENER	0.0455	± 0.0075	0.002	0.020	2.1	0.20	0.100	-1.0	1.5	0.00	0.03	0.05
	9/12/2018	ENER	# 0.0459	# ± 0.0075	# 0.002	# 0.021	# 2.1	# 0.30	# 0.100	# -0.4	# 1.7	# 0.00	# 0.01	# 0.05
	9/26/2018	ENER	0.0592	---	0.002	0.020	3.5	---	---	---	---	0.00	---	---
	12/11/2018	ENER	0.0525	---	0.000	0.040	3.2	---	---	---	---	0.00	---	---
FB	3/2/2018	ENER	0.0427	± 0.0069	< 0.030	0.026	---	---	---	---	---	---	---	---
	9/12/2018	ENER	0.0535	± 0.0087	0.002	0.033	2.0	0.20	0.100	-1.0	1.5	0.00	0.02	0.07
GH	3/2/2018	ENER	0.0631	± 0.0102	< 0.030	0.015	---	---	---	---	---	---	---	---
	9/12/2018	ENER	0.0621	± 0.0100	< 0.001	0.015	1.9	0.06	0.090	-0.4	1.5	0.00	0.03	0.06
GK	9/18/2018	ENER	0.0299	± 0.0048	0.003	0.012	---	---	---	---	---	---	---	---
GN	3/2/2018	ENER	0.0384	± 0.0062	0.001	0.033	2.2	0.40	0.200	0.5	1.2	< 0.01	0.10	0.10
GV	9/18/2018	ENER	0.0879	± 0.0142	0.002	0.032	---	---	---	---	---	---	---	---
I	2/15/2018	ENER	0.0766	± 0.0124	0.003	0.008	1.7	0.20	0.100	1.7	0.8	< 0.01	0.05	0.10
	4/4/2018	ENER	0.0735	---	0.001	0.008	1.5	---	---	---	---	0.00	---	---
	6/13/2018	ENER	0.0692	± 0.0112	< 0.030	0.008	---	---	---	---	---	---	---	---
	6/19/2018	ENER	0.114	---	0.001	0.007	1.3	---	---	---	---	0.00	---	---
	9/27/2018	ENER	0.0630	---	0.001	0.009	1.4	---	---	---	---	0.00	---	---
K4	3/1/2018	ENER	0.282	± 0.0455	0.410	0.156	---	---	---	---	---	---	---	---
	7/18/2018	ENER	1.83	± 0.2960	4.220	0.584	---	---	---	---	---	---	---	---
K5	2/8/2018	ENER	1.50	± 0.2420	4.510	0.808	---	---	---	---	---	---	---	---
	7/18/2018	ENER	1.88	± 0.3030	4.800	0.750	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
K7	2/8/2018	ENER	0.345	± 0.0557	0.570	0.187	---	---	---	---	---	---	---	---
K8	2/8/2018	ENER	1.25	± 0.2020	3.270	0.600	---	---	---	---	---	---	---	---
	7/18/2018	ENER	0.448	± 0.0723	0.586	0.258	---	---	---	---	---	---	---	---
K10	2/8/2018	ENER	1.37	± 0.2210	3.700	0.346	---	---	---	---	---	---	---	---
	7/18/2018	ENER	1.79	± 0.2880	4.400	0.673	---	---	---	---	---	---	---	---
K11	2/8/2018	ENER	1.08	± 0.1740	2.520	0.256	---	---	---	---	---	---	---	---
	7/18/2018	ENER	1.86	± 0.3000	4.530	0.520	---	---	---	---	---	---	---	---
KEB	3/22/2018	ENER	0.0657	± 0.0106	< 0.030	< 0.005	---	---	---	---	---	---	---	---
KF	2/12/2018	ENER	0.0514	± 0.0083	0.060	0.007	---	---	---	---	---	---	---	---
KZ	2/12/2018	ENER	0.0466	± 0.0075	0.060	0.018	---	---	---	---	---	---	---	---
L	4/4/2018	ENER	0.432	± 0.0697	0.509	0.069	1.7	0.30	0.200	-0.1	0.9	< 0.01	0.20	0.10
L5	4/25/2018	ENER	0.173	± 0.0280	0.360	0.095	1.2	0.20	0.200	1.7	1.0	< 0.01	0.10	0.10
L6	4/5/2018	ENER	0.246	± 0.0397	0.322	0.171	2.1	0.30	0.100	0.6	1.2	< 0.01	0.20	0.10
L7	2/15/2018	ENER	0.232	± 0.0374	0.340	0.098	1.1	0.20	0.100	3.2	1.1	0.01	0.03	0.08
	4/5/2018	ENER	0.226	± 0.0365	0.307	0.099	1.4	0.20	0.100	-0.4	1.4	0.01	0.04	0.06
L8	3/14/2018	ENER	0.242	± 0.0391	0.420	0.058	---	---	---	---	---	---	---	---
	4/5/2018	ENER	0.204	± 0.0329	0.331	0.060	1.2	0.30	0.100	-0.3	1.3	0.01	-0.01	0.04
L9	3/14/2018	ENER	0.236	± 0.0381	0.400	0.084	---	---	---	---	---	---	---	---
	4/5/2018	ENER	0.234	± 0.0377	0.380	0.080	1.1	0.30	0.100	0.0	1.2	< 0.01	0.02	0.08
L10	2/15/2018	ENER	0.311	± 0.0502	0.538	0.060	1.6	0.20	0.100	2.2	0.9	< 0.01	0.10	0.10
	4/5/2018	ENER	0.338	± 0.0546	0.487	0.064	1.5	0.07	0.100	0.2	1.3	< 0.01	0.03	0.09
M3	2/13/2018	ENER	13.4	± 2.1600	14.900	0.356	2.2	0.40	0.100	0.7	1.0	< 0.01	0.05	0.10
	4/4/2018	ENER	4.66	± 0.7520	7.600	0.354	8.6	0.30	0.100	-0.1	1.2	< 0.01	0.40	0.20
M5	7/17/2018	ENER	0.282	± 0.0455	0.355	0.060	---	---	---	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
M6	2/28/2018	ENER	2.15	± 0.3460	2.210	0.179	---	---	---	---	---	---	---	---
M7	2/28/2018	ENER	0.697	± 0.1120	0.740	0.055	---	---	---	---	---	---	---	---
M9	2/28/2018	ENER	0.997	± 0.1610	0.660	0.099	---	---	---	---	---	---	---	---
	9/18/2018	ENER	1.27	± 0.2050	0.918	0.100	---	---	---	---	---	---	---	---
M10	2/28/2018	ENER	0.103	± 0.0166	< 0.030	0.043	---	---	---	---	---	---	---	---
M19	4/4/2018	ENER	0.649	---	0.416	0.047	1.7	---	---	---	---	< 0.01	---	---
	6/21/2018	ENER	0.514	---	0.380	0.043	1.5	---	---	---	---	< 0.01	---	---
	10/1/2018	ENER	0.517	---	0.443	0.047	1.7	---	---	---	---	< 0.01	---	---
MB	3/2/2018	ENER	0.0303	± 0.0049	< 0.001	0.011	1.8	0.40	0.200	-0.2	1.1	< 0.01	0.01	0.06
ML	2/28/2018	ENER	0.0964	± 0.0156	< 0.030	0.030	---	---	---	---	---	---	---	---
MU	12/6/2018	ENER	0.108	± 0.0175	0.002	0.012	---	---	---	---	---	---	---	---
MW	2/28/2018	ENER	0.0918	± 0.0148	< 0.030	0.018	---	---	---	---	---	---	---	---
MX	8/2/2018	ENER	0.0382	± 0.0062	< 0.001	0.014	1.3	0.20	0.200	1.3	1.0	< 0.00	0.01	0.06
MY	12/6/2018	ENER	0.0418	± 0.0068	< 0.001	0.016	---	---	---	---	---	---	---	---
MZ	2/28/2018	ENER	0.101	± 0.0163	< 0.030	0.053	---	---	---	---	---	---	---	---
N	8/29/2018	ENER	0.559	± 0.0902	0.250	0.159	---	---	---	---	---	---	---	---
NA	8/30/2018	ENER	0.596	± 0.0962	2.060	0.085	---	---	---	---	---	---	---	---
NB	8/30/2018	ENER	36.3	± 5.8600	47.300	0.225	---	---	---	---	---	---	---	---
NC	4/4/2018	ENER	0.0607	± 0.0000	0.086	0.107	5.3	0.20	0.100	-0.8	1.2	< 0.01	0.40	0.20
ND	3/7/2018	ENER	0.0280	± 0.0045	0.006	0.036	0.4	0.30	0.100	1.2	1.4	< 0.01	0.20	0.20
O	8/29/2018	ENER	0.0245	± 0.0040	0.001	0.160	---	---	---	---	---	---	---	---
P	3/22/2018	ENER	0.0260	± 0.0042	< 0.030	0.131	5.0	0.30	0.200	---	---	---	---	---
	4/30/2018	ENER	0.0267	± 0.0043	0.002	0.125	5.0	0.40	0.200	1.8	0.8	< 0.01	0.05	0.09
P2	3/6/2018	ENER	0.0288	± 0.0046	< 0.030	0.388	13.5	0.30	0.200	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
P3	3/6/2018	ENER	0.0217	± 0.0035	< 0.030	0.358	13.8	0.30	0.200	---	---	---	---	---
P4	3/6/2018	ENER	0.0200	± 0.0032	< 0.030	0.179	6.7	0.30	0.200	---	---	---	---	---
Q	3/20/2018	ENER	0.0563	---	0.001	0.388	13.7	---	---	---	---	< 0.01	---	---
	3/22/2018	ENER	0.0518	± 0.0084	< 0.030	0.440	15.2	0.40	0.100	---	---	---	---	---
	4/26/2018	ENER	0.0530	± 0.0086	0.001	0.400	14.2	0.30	0.100	0.8	0.8	< 0.01	-0.03	0.06
	6/20/2018	ENER	0.0530	---	0.001	0.415	15.1	---	---	---	---	< 0.01	---	---
	9/13/2018	ENER	0.0502	---	0.001	0.387	14.7	---	---	---	---	< 0.01	---	---
	12/3/2018	ENER	0.0530	---	0.002	0.445	14.1	---	---	---	---	0.00	---	---
R	3/21/2018	ENER	0.0222	---	0.002	0.657	17.6	---	---	---	---	< 0.01	---	---
	3/22/2018	ENER	0.0204	± 0.0033	< 0.030	0.659	17.9	0.30	0.100	---	---	---	---	---
	6/20/2018	ENER	0.0217	---	0.019	0.664	16.7	---	---	---	---	< 0.01	---	---
	9/12/2018	ENER	0.0205	---	0.002	0.641	19.1	---	---	---	---	< 0.01	---	---
	12/3/2018	ENER	0.0219	---	0.002	0.710	17.1	---	---	---	---	< 0.01	---	---
S1	3/20/2018	ENER	8.87	---	12.800	0.009	0.1	---	---	---	---	< 0.01	---	---
S2	1/16/2018	ENER	1.68	± 0.2720	2.210	0.165	---	---	---	---	---	---	---	---
	2/20/2018	ENER	0.917	± 0.1480	1.450	0.074	1.6	0.20	0.200	1.7	1.0	< 0.01	0.08	0.10
	7/11/2018	ENER	3.17	± 0.5120	4.030	0.369	2.5	0.30	0.200	1.2	1.3	< 0.00	-0.02	0.04
S3	7/17/2018	ENER	7.70	± 1.2400	4.080	0.271	---	---	---	---	---	---	---	---
S4	3/22/2018	ENER	0.141	---	0.291	0.021	0.8	---	---	---	---	< 0.01	---	---
	6/13/2018	ENER	0.125	---	0.321	0.028	0.9	---	---	---	---	< 0.01	---	---
	7/12/2018	ENER	0.111	± 0.0180	0.301	0.029	1.0	0.30	0.200	1.6	1.0	< 0.00	0.03	0.06
	9/17/2018	ENER	0.123	---	0.339	0.031	1.1	---	---	---	---	< 0.01	---	---
	12/5/2018	ENER	0.117	---	0.365	0.032	1.0	---	---	---	---	< 0.01	---	---
S5R	2/14/2018	ENER	15.1	± 2.4400	31.700	1.370	6.2	0.50	0.200	---	---	---	---	---
S7	2/14/2018	ENER	5.68	± 0.9160	8.000	0.207	1.0	0.20	0.100	---	---	---	---	---
S11	1/16/2018	ENER	0.0090	± 0.0015	< 0.030	0.011	1.2	0.30	0.100	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
S12	1/17/2018	ENER	1.45	± 0.2340	1.790	0.104	1.0	0.30	0.200	---	---	---	---	---
S14	1/3/2018	ENER	0.603	± 0.0973	1.180	0.029	---	---	---	---	---	---	---	---
S19	2/14/2018	ENER	4.10	± 0.6620	5.200	0.244	1.7	0.40	0.100	---	---	---	---	---
SA	2/14/2018	ENER	2.25	± 0.3630	2.940	0.272	10.6	0.40	0.200	---	---	---	---	---
SB	2/14/2018	ENER	15.0	± 2.4200	31.300	1.810	2.5	1.80	0.500	---	---	---	---	---
SE6	1/16/2018	ENER	2.71	± 0.4380	1.290	0.023	< 0.1	0.30	0.100	---	---	---	---	---
SM	5/2/2018	ENER	4.10	± 0.6620	6.160	0.278	---	---	---	---	---	---	---	---
SO	5/2/2018	ENER	3.15	± 0.5080	3.650	0.066	---	---	---	---	---	---	---	---
ST	1/18/2018	ENER	3.89	± 0.6280	4.210	0.189	5.9	0.20	0.100	---	---	---	---	---
SUR	2/15/2018	ENER	15.1	± 2.4400	23.400	0.055	0.4	2.10	0.500	2.3	0.8	0.02	0.20	0.40
	3/22/2018	ENER	12.8	± 2.0700	19.600	0.024	0.9	1.80	0.400	0.6	0.8	0.03	0.04	0.20
SV	2/14/2018	ENER	27.7	± 4.4700	48.800	2.320	1.5	0.70	0.200	---	---	---	---	---
SW	5/2/2018	ENER	1.90	± 0.3070	1.940	0.142	---	---	---	---	---	---	---	---
SZ	1/16/2018	ENER	57.7	± 9.3200	78.100	3.730	< 0.1	0.10	0.100	---	---	---	---	---
T	9/18/2018	ENER	3.54	± 0.5710	3.860	1.830	---	---	---	---	---	---	---	---
T2	4/9/2018	ENER	21.4	---	41.100	1.010	2.6	---	---	---	---	< 0.01	---	---
	6/6/2018	ENER	18.7	± 3.0200	38.400	0.609	1.3	2.10	0.500	0.2	0.7	< 0.01	0.20	0.10
	6/21/2018	ENER	20.4	---	40.100	0.642	1.8	---	---	---	---	< 0.01	---	---
	9/18/2018	ENER	20.0	---	35.500	0.470	1.3	---	---	---	---	< 0.01	---	---
	12/11/2018	ENER	19.0	---	43.900	0.331	0.9	---	---	---	---	0.01	---	---
T7	3/12/2018	ENER	24.7	± 3.9900	39.100	0.712	28.8	0.70	0.200	---	---	---	---	---
T8	3/12/2018	ENER	27.6	± 4.4500	48.900	2.280	8.8	136.00	25.500	---	---	---	---	---
T15	3/12/2018	ENER	8.44	± 1.0000	37.800	0.052	< 0.1	2.90	0.700	---	---	---	---	---
T16	3/12/2018	ENER	2.03	± 0.3270	2.710	0.947	20.6	1.60	0.400	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
T19	6/6/2018	ENER	4.32	± 0.6970	15.200	0.021	0.1	1.70	0.400	0.1	1.3	0.05	1.10	0.20
T20	3/14/2018	ENER	8.46	± 1.3700	16.100	0.073	0.3	5.50	1.100	---	---	---	---	---
	3/23/2018	ENER	14.8	---	19.800	0.392	2.4	---	---	---	---	< 0.01	---	---
	6/27/2018	ENER	16.5	---	21.800	0.519	2.6	---	---	---	---	< 0.01	---	---
	9/24/2018	ENER	19.4	---	20.800	0.694	3.8	---	---	---	---	< 0.01	---	---
	12/11/2018	ENER	19.2	---	18.900	0.720	3.7	---	---	---	---	0.00	---	---
T21	3/8/2018	ENER	6.64	± 1.0700	26.000	0.074	< 0.1	92.50	17.500	---	---	---	---	---
T22	3/8/2018	ENER	5.66	± 0.9140	15.100	0.115	4.8	18.20	3.500	---	---	---	---	---
	4/3/2018	ENER	6.29	---	18.500	0.079	1.0	---	---	---	---	0.04	---	---
	6/27/2018	ENER	17.5	---	31.000	0.486	33.0	---	---	---	---	0.04	---	---
	9/24/2018	ENER	14.7	---	25.500	0.520	26.3	---	---	---	---	0.04	---	---
	12/11/2018	ENER	15.2	---	26.300	0.554	39.8	---	---	---	---	0.04	---	---
T23	6/7/2018	ENER	72.9	± 11.8000	61.100	0.563	229.0	2.60	0.600	3.5	1.3	< 0.02	3.00	0.60
T24	1/18/2018	ENER	12.7	± 2.0400	14.700	0.273	1.8	0.60	0.200	---	---	---	---	---
T26	1/18/2018	ENER	20.0	± 3.2300	27.100	0.014	< 0.1	1.00	0.300	---	---	---	---	---
T27	1/18/2018	ENER	7.43	± 1.2000	9.540	0.064	2.2	0.90	0.200	---	---	---	---	---
T28	3/14/2018	ENER	13.2	± 2.1300	12.200	0.276	8.2	1.20	0.300	---	---	---	---	---
T29	3/14/2018	ENER	27.5	± 4.4400	41.000	0.595	< 0.1	3.50	0.700	---	---	---	---	---
T30	1/22/2018	ENER	10.6	± 1.7200	4.960	0.122	6.6	0.90	0.200	---	---	---	---	---
T31	4/19/2018	ENER	23.9	± 3.8600	17.100	0.018	0.5	7.00	1.400	---	---	---	---	---
T32	1/23/2018	ENER	13.6	± 2.1900	9.920	0.217	18.7	0.40	0.100	---	---	---	---	---
T36	1/23/2018	ENER	13.1	± 2.1100	9.790	0.212	18.6	0.80	0.200	---	---	---	---	---
T39	3/12/2018	ENER	20.1	± 3.2400	36.700	0.410	3.2	11.80	2.300	---	---	---	---	---
T40	3/8/2018	ENER	5.85	± 0.9440	24.800	0.134	0.2	49.60	9.400	---	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
T41	6/6/2018	ENER	5.05	± 0.8150	25.600	0.042	< 0.1	0.50	0.200	0.4	0.8	0.12	14.70	2.80
T43	1/30/2018	ENER	16.6	± 2.6800	29.500	0.918	5.8	1.30	0.300	---	---	---	---	---
T47	1/30/2018	ENER	17.8	± 2.8700	30.200	1.260	2.0	2.20	0.500	---	---	---	---	---
T48	4/19/2018	ENER	14.8	± 2.3900	32.100	0.087	0.2	1.90	0.400	---	---	---	---	---
T53	1/30/2018	ENER	14.2	± 2.3000	28.600	1.000	2.0	3.20	0.700	---	---	---	---	---
T54	4/19/2018	ENER	10.3	± 1.6600	8.300	0.448	5.8	1.70	0.400	---	---	---	---	---
	6/7/2018	ENER	8.62	± 1.3900	8.400	0.444	7.6	2.00	0.500	1.2	0.9	0.04	0.10	0.20
W	12/6/2018	ENER	0.0371	± 0.0060	< 0.001	0.020	---	---	---	---	---	---	---	---
WME-9	11/14/2018	ENER	0.322	---	1.460	0.003	0.0	---	---	---	---	0.00	---	---
WME-10	11/14/2018	ENER	0.153	---	0.263	0.136	1.3	---	---	---	---	0.08	---	---
X	2/26/2018	ENER	0.0392	± 0.0063	0.070	0.019	---	---	---	---	---	---	---	---
	3/22/2018	ENER	0.0447	---	0.072	0.013	1.5	---	---	---	---	0.01	---	---
	4/4/2018	ENER	0.0412	± 0.0067	0.070	0.013	---	---	---	---	---	---	---	---
	6/13/2018	ENER	0.0380	---	0.093	0.012	1.3	---	---	---	---	0.01	---	---
	7/11/2018	ENER	0.0404	± 0.0065	0.078	0.014	1.4	0.20	0.200	1.0	1.1	0.01	0.03	0.05
	9/17/2018	ENER	0.0450	---	0.129	0.020	1.8	---	---	---	---	0.01	---	---
	10/10/2018	ENER	0.0537	± 0.0087	0.117	0.023	---	---	---	---	---	---	---	---
	10/10/2018	ENER	# 0.0536	# ± 0.0087	# 0.123	# 0.024	---	---	---	---	---	---	---	---
	12/5/2018	ENER	0.0459	---	0.129	0.018	1.2	---	---	---	---	0.01	---	---
X18	9/18/2018	ENER	4.33	± 0.6980	0.311	0.307	---	---	---	---	---	---	---	---

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0483	8/23/2018	ENER	---	---	---	---	---	---	184	770	1840	2426	---	---
0490	2/5/2018	ENER	---	---	---	---	---	---	186	774	1780	2254	---	---
	6/4/2018	ENER	204	56.1	7.0	327	407	< 5	197	849	1890	2524	0.97	---
0497	2/5/2018	ENER	---	---	---	---	---	---	146	680	1630	2049	---	---
	6/4/2018	ENER	253	68.8	6.8	328	481	< 5	183	895	2020	2670	1.03	---
0498	2/20/2018	ENER	152	37.6	5.7	255	382	< 5	127	593	1460	1848	0.98	7.56
	8/23/2018	ENER	---	---	---	---	---	---	137	594	1450	2028	---	---
0688	8/2/2018	ENER	235	53.5	5.0	260	524	< 5	180	677	1770	2362	0.99	---
0802	3/5/2018	ENER	---	---	---	---	---	---	149	585	1500	2066	---	---
	8/2/2018	ENER	179	45.8	4.6	224	489	< 5	132	515	1400	6910	1.00	---
0844	2/6/2018	ENER	319	111.0	3.7	519	410	< 5	354	1590	3240	3740	0.95	7.31
0845	1/11/2018	ENER	238	71.8	4.5	392	449	< 5	247	1080	2310	2871	0.95	7.43
	1/29/2018	ENER	248	74.5	4.9	423	442	< 5	248	1080	2370	2843	1.00	7.31
	2/6/2018	ENER	255	78.5	3.9	386	443	< 5	246	1080	2390	2850	0.98	7.32
AW	4/5/2018	ENER	190	55.0	5.5	248	422	< 5	182	679	1630	2085	0.95	7.34
CW44	4/25/2018	ENER	---	---	---	---	---	---	159	824	1800	2313	---	---
	8/1/2018	ENER	202	50.8	5.3	277	390	< 5	155	803	1600	2343	0.96	---
Q2	2/21/2018	ENER	---	---	---	---	---	---	180	1000	2140	2501	---	---
	8/20/2018	ENER	---	---	---	---	---	---	150	735	1650	4385	---	---
Q3	2/26/2018	ENER	---	---	---	---	---	---	147	719	1640	2448	---	---
	8/20/2018	ENER	---	---	---	---	---	---	147	689	1590	2137	---	---
Q5	4/3/2018	ENER	209	56.1	5.7	310	466	< 5	165	795	1850	2296	0.99	7.34
	11/29/2018	ENER	---	---	---	---	---	---	164	795	1880	2517	---	---
Q9	2/26/2018	ENER	---	---	---	---	---	---	121	627	1380	1838	---	---
	8/23/2018	ENER	---	---	---	---	---	---	136	592	1440	1981	---	---

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
Q11	2/26/2018	ENER	---	---	---	---	---	---	159	773	1760	2373	---	---
	8/20/2018	ENER	---	---	---	---	---	---	166	818	1890	2460	---	---
Q12	2/26/2018	ENER	---	---	---	---	---	---	180	1050	2140	2779	---	---
	8/23/2018	ENER	---	---	---	---	---	---	147	732	1650	2265	---	---
Q18	2/27/2018	ENER	---	---	---	---	---	---	155	746	1720	2294	---	---
Q19	2/27/2018	ENER	---	---	---	---	---	---	193	1060	2260	2857	---	---
	8/23/2018	ENER	---	---	---	---	---	---	190	1040	2250	2928	---	---
Q23	3/1/2018	ENER	---	---	---	---	---	---	175	929	2040	2591	---	---
	8/20/2018	ENER	---	---	---	---	---	---	167	830	1910	2446	---	---
Q27	2/27/2018	ENER	---	---	---	---	---	---	164	850	1890	2470	---	---
	8/20/2018	ENER	---	---	---	---	---	---	152	718	1750	2332	---	---
Q28	2/27/2018	ENER	---	---	---	---	---	---	189	973	2110	2707	---	---
Q29	2/27/2018	ENER	---	---	---	---	---	---	191	957	2100	2691	---	---
Q30	2/26/2018	ENER	---	---	---	---	---	---	170	897	1980	2569	---	---
SUB2	4/9/2018	ENER	117	37.8	4.2	200	426	< 5	142	349	1110	1359	0.96	7.44
SUB3	4/9/2018	ENER	239	79.3	8.7	337	254	< 5	185	1170	2210	2626	0.98	7.07

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0483	8/23/2018	ENER	0.150	± 0.0241	0.062	0.032	---	---	---	---	---	---	---	---
0490	2/5/2018	ENER	0.218	± 0.0351	0.040	0.040	---	---	---	---	---	---	---	---
	6/4/2018	ENER	0.225	± 0.0363	0.033	0.045	3.0	0.20	0.200	1.3	1.1	< 0.01	0.02	0.09
0497	2/5/2018	ENER	0.309	± 0.0498	< 0.030	0.045	---	---	---	---	---	---	---	---
	6/4/2018	ENER	0.462	± 0.0746	0.012	0.040	4.1	0.20	0.200	-0.6	1.2	< 0.01	0.10	0.10
0498	2/20/2018	ENER	0.216	± 0.0349	< 0.001	0.033	2.0	0.10	0.100	1.1	0.9	< 0.01	0.10	0.10
	8/23/2018	ENER	0.155	± 0.0250	0.001	0.027	---	---	---	---	---	---	---	---
0688	8/2/2018	ENER	0.0463	± 0.0075	< 0.001	0.005	0.8	0.10	0.100	1.7	0.9	< 0.00	0.06	0.10
0802	3/5/2018	ENER	0.101	± 0.0163	< 0.030	0.010	---	---	---	---	---	---	---	---
	8/2/2018	ENER	0.0983	± 0.0159	0.025	0.009	1.4	0.20	0.200	1.3	1.1	0.00	0.02	0.10
0844	2/6/2018	ENER	0.0988	± 0.0159	< 0.001	0.059	10.0	0.20	0.200	1.9	1.4	< 0.01	0.10	0.09
0845	1/11/2018	ENER	0.0741	± 0.0120	< 0.001	0.037	4.5	0.07	0.100	1.4	0.8	< 0.01	0.03	0.06
	1/29/2018	ENER	0.0744	± 0.0120	< 0.001	0.036	4.7	0.20	0.100	0.5	1.1	< 0.01	0.06	0.09
	2/6/2018	ENER	0.0804	± 0.0130	< 0.001	0.036	4.8	0.20	0.200	5.0	1.8	< 0.01	-0.01	0.10
AW	4/5/2018	ENER	0.0972	± 0.0157	0.053	0.030	2.0	0.20	0.100	0.6	1.1	< 0.01	0.10	0.10
CW44	4/25/2018	ENER	0.201	± 0.0324	< 0.030	0.029	---	---	---	---	---	---	---	---
	8/1/2018	ENER	0.199	± 0.0321	0.002	0.033	2.9	0.10	0.100	0.9	0.9	0.00	0.04	0.09
Q2	2/21/2018	ENER	0.373	± 0.0602	< 0.030	0.048	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.187	± 0.0302	0.002	0.026	---	---	---	---	---	---	---	---
Q3	2/26/2018	ENER	0.391	± 0.0631	< 0.030	0.044	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.278	± 0.0449	0.001	0.034	---	---	---	---	---	---	---	---
Q5	4/3/2018	ENER	0.641	± 0.1030	0.002	0.046	2.8	0.20	0.200	0.6	1.1	< 0.01	0.05	0.09
	11/29/2018	ENER	0.517	± 0.0835	0.003	0.049	---	---	---	---	---	---	---	---
Q9	2/26/2018	ENER	0.136	± 0.0220	< 0.030	0.025	---	---	---	---	---	---	---	---
	8/23/2018	ENER	0.104	± 0.0167	0.004	0.029	---	---	---	---	---	---	---	---

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
Q11	2/26/2018	ENER	0.439	± 0.0709	< 0.030	0.046	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.544	± 0.0878	0.002	0.041	---	---	---	---	---	---	---	---
Q12	2/26/2018	ENER	0.265	± 0.0428	< 0.030	0.044	---	---	---	---	---	---	---	---
	8/23/2018	ENER	0.164	± 0.0264	0.007	0.029	---	---	---	---	---	---	---	---
Q18	2/27/2018	ENER	0.316	± 0.0510	< 0.030	0.044	---	---	---	---	---	---	---	---
Q19	2/27/2018	ENER	0.456	± 0.0736	< 0.030	0.048	---	---	---	---	---	---	---	---
	8/23/2018	ENER	0.439	± 0.0708	0.007	0.053	---	---	---	---	---	---	---	---
Q23	3/1/2018	ENER	0.659	± 0.1060	< 0.030	0.055	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.607	± 0.0980	< 0.001	0.051	---	---	---	---	---	---	---	---
Q27	2/27/2018	ENER	0.598	± 0.0965	< 0.030	0.058	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.493	± 0.0796	< 0.001	0.054	---	---	---	---	---	---	---	---
Q28	2/27/2018	ENER	0.603	± 0.0974	< 0.030	0.044	---	---	---	---	---	---	---	---
Q29	2/27/2018	ENER	0.609	± 0.0983	< 0.030	0.046	---	---	---	---	---	---	---	---
Q30	2/26/2018	ENER	0.717	± 0.1160	< 0.030	0.054	---	---	---	---	---	---	---	---
SUB2	4/9/2018	ENER	0.0236	± 0.0038	< 0.001	0.009	0.7	0.20	0.100	1.2	0.8	< 0.01	0.08	0.10
SUB3	4/9/2018	ENER	0.0186	± 0.0030	0.002	0.006	0.3	0.40	0.200	0.8	0.8	< 0.01	0.02	0.08

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0520	2/12/2018	ENER	220	53.1	7.0	280	419	< 5	234	760	1810	2292	0.94	7.36
0521	2/7/2018	ENER	152	34.0	6.0	352	305	< 5	213	713	1650	2017	0.99	7.57
0522	2/7/2018	ENER	117	27.3	3.9	206	317	< 5	124	406	1110	1546	0.99	7.41
0540	4/2/2018	ENER	190	46.8	6.7	254	376	< 5	166	700	1630	2030	0.96	7.44
0541	1/10/2018	ENER	190	53.6	7.4	193	343	< 5	152	637	1470	1858	0.96	7.55
	3/28/2018	ENER	181	53.4	7.4	202	322	< 5	148	640	1490	---	0.98	7.55
	7/9/2018	ENER	184	53.6	7.5	201	342	< 5	149	621	1530	2017	0.98	---
	11/28/2018	ENER	---	---	---	---	---	---	149	673	1570	---	---	---
0551	1/8/2018	ENER	239	50.0	4.7	222	358	< 5	155	777	1700	2883	0.97	7.50
	3/28/2018	ENER	240	52.9	5.7	258	359	< 5	174	838	1830	2211	0.98	7.44
	7/9/2018	ENER	243	57.2	5.2	252	375	< 5	186	867	2000	2536	0.94	---
	11/28/2018	ENER	---	---	---	---	---	---	201	932	2100	2701	---	---
0555	2/6/2018	ENER	321	84.9	4.1	544	405	< 5	354	1620	3220	3859	0.93	7.33
0556	2/6/2018	ENER	263	74.2	4.0	507	396	< 5	238	1360	2750	3238	0.99	7.38
0557	2/6/2018	ENER	217	59.4	3.6	471	392	< 5	198	1180	2350	2922	0.99	7.58
0631	4/2/2018	ENER	217	49.4	7.1	345	353	< 5	199	978	2010	2027	0.94	7.61
0632	3/5/2018	ENER	---	---	---	---	---	---	151	711	1610	2168	---	---
0634	2/12/2018	ENER	---	---	---	---	---	---	167	832	1680	2079	---	---
	6/21/2018	ENER	---	---	---	---	---	---	162	698	1620	2120	---	---
	8/28/2018	ENER	---	---	---	---	---	---	151	763	1610	2179	---	---
0637	9/12/2018	ENER	---	---	---	---	---	---	141	588	1450	1905	---	---
0638	2/7/2018	ENER	---	---	---	---	---	---	203	650	1670	2138	---	---
0646	3/6/2018	ENER	---	---	---	---	---	---	156	716	1630	2221	---	---
0647	1/8/2018	ENER	223	59.7	5.9	193	392	< 5	170	697	1640	2043	0.95	7.52
	3/28/2018	ENER	210	57.8	6.2	222	397	< 5	173	691	1670	2034	0.97	7.48

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0647	7/9/2018	ENER	214	58.1	6.8	224	408	< 5	166	663	1670	2188	1.00	---
	11/28/2018	ENER	---	---	---	---	---	---	164	667	1670	2210	---	---
0649	1/11/2018	ENER	211	48.9	4.9	233	362	< 5	145	723	1600	1994	0.98	7.46
	4/3/2018	ENER	223	52.1	5.1	227	365	< 5	152	737	1660	1998	0.99	7.39
	7/9/2018	ENER	213	49.5	5.0	221	371	< 5	145	701	1660	2171	0.98	---
	11/28/2018	ENER	---	---	---	---	---	---	140	698	1610	2141	---	---
0654	1/4/2018	ENER	175	50.9	7.0	194	307	< 5	152	639	1440	1835	0.95	7.45
	4/3/2018	ENER	190	55.9	7.8	222	350	< 5	164	675	1560	1960	0.97	7.32
	7/11/2018	ENER	176	50.2	7.1	215	316	< 5	153	659	1480	2008	0.96	---
	11/28/2018	ENER	---	---	---	---	---	---	145	648	1520	---	---	---
0658	6/11/2018	ENER	---	---	---	---	---	---	95	558	1260	1745	---	---
0659	2/21/2018	ENER	---	---	---	---	---	---	184	759	1780	2149	---	---
0681	6/11/2018	ENER	---	---	---	---	---	---	167	689	1730	2386	---	---
0683	3/8/2018	ENER	---	---	---	---	---	---	90	522	1130	1561	---	---
0684	5/1/2018	ENER	---	---	---	---	---	---	167	659	1680	2196	---	---
0686	9/12/2018	ENER	---	---	---	---	---	---	140	591	1430	1903	---	---
0692	7/25/2018	ENER	---	---	---	---	---	---	196	684	1680	2296	---	---
0846	2/6/2018	ENER	---	---	---	---	---	---	203	2150	3660	4121	---	---
	8/2/2018	ENER	384	102.0	6.0	650	357	< 5	204	2170	3860	4447	0.98	---
0855	2/8/2018	ENER	---	---	---	---	---	---	144	680	1480	1883	---	---
0862	3/26/2018	ENER	215	54.7	6.7	295	397	< 5	179	806	1830	2244	0.99	7.42
	8/22/2018	ENER	---	---	---	---	---	---	167	718	1700	2283	---	---
0864	4/2/2018	ENER	183	45.4	6.3	286	409	< 5	178	715	1670	2112	0.95	7.48
0865	3/8/2018	ENER	---	---	---	---	---	---	156	676	1590	2124	---	---
0866	2/20/2018	ENER	202	51.0	6.3	317	372	< 5	158	803	1790	2194	1.03	7.39

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0866	8/22/2018	ENER	---	---	---	---	---	---	156	798	1820	2381	---	---
0881	1/10/2018	ENER	---	---	---	---	---	---	197	810	1870	2321	---	---
	2/5/2018	ENER	241	63.9	6.7	257	451	< 5	196	787	1850	2305	0.97	7.31
0882	2/5/2018	ENER	218	55.4	6.0	285	441	< 5	184	752	1730	2206	0.99	7.61
0883	2/5/2018	ENER	266	52.5	4.5	287	469	< 5	208	818	1930	2372	0.98	7.36
0884	2/5/2018	ENER	99	28.7	5.2	360	263	< 5	89	744	1460	1916	1.03	7.76
0885	3/6/2018	ENER	---	---	---	---	---	---	190	719	1750	2325	---	---
0886	2/5/2018	ENER	284	76.2	6.9	303	424	< 5	190	1030	2170	2618	1.00	7.45
0887	3/6/2018	ENER	---	---	---	---	---	---	201	788	1850	2419	---	---
0888	2/5/2018	ENER	208	62.7	6.6	248	352	< 5	163	801	1710	2052	0.97	7.57
0890	2/12/2018	ENER	---	---	---	---	---	---	---	---	---	1910	---	---
	6/21/2018	ENER	---	---	---	---	---	---	156	667	1500	2026	---	---
	8/28/2018	ENER	---	---	---	---	---	---	147	733	1550	2086	---	---
0893	2/5/2018	ENER	230	58.6	7.7	267	462	< 5	194	725	1740	2218	0.99	7.36
0899	1/10/2018	ENER	175	57.8	5.4	182	308	< 5	147	571	1340	1703	1.01	7.65
	4/3/2018	ENER	172	57.0	5.6	176	323	< 5	147	597	1400	1763	0.96	7.54
	6/28/2018	ENER	171	55.4	5.1	160	320	< 5	144	543	1360	1858	0.97	---
	11/28/2018	ENER	---	---	---	---	---	---	144	563	1390	1878	---	---
0914	2/14/2018	ENER	156	33.3	2.0	278	74	< 5	77	969	1560	1925	0.96	7.44
0920	2/6/2018	ENER	408	80.0	8.1	242	227	< 5	58	1530	2640	2748	1.01	7.41
0921	2/6/2018	ENER	394	72.7	7.0	326	211	< 5	64	1650	2770	2969	1.01	7.40
	11/29/2018	ENER	---	---	---	---	---	---	62	1610	2820	3225	---	---
0922	2/9/2018	ENER	2	1.0	2.4	313	498	31	90	112	819	1384	0.99	8.73
0935	5/7/2018	ENER	205	58.2	7.3	201	366	< 5	157	688	1580	2116	0.96	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0950	2/22/2018	ENER	23	4.7	1.2	522	239	6	165	714	1540	2138	1.03	8.22
	3/27/2018	ENER	35	5.4	1.4	515	280	< 5	142	727	1570	2159	1.03	7.98
	4/18/2018	ENER	---	---	---	---	---	---	138	707	1530	2308	---	---
0994	4/2/2018	ENER	245	50.3	4.3	143	334	< 5	148	649	1440	1789	0.97	7.37
	5/8/2018	ENER	227	55.3	4.3	155	342	< 5	146	650	1480	1937	0.97	---
	11/28/2018	ENER	---	---	---	---	---	---	146	638	1520	2048	---	---
0996	1/8/2018	ENER	204	56.2	6.0	195	365	< 5	159	660	1540	1913	0.96	7.83
	3/29/2018	ENER	194	57.5	7.2	221	372	< 5	163	658	1560	1938	0.99	7.51
	7/9/2018	ENER	198	55.1	6.4	207	385	< 5	157	632	1590	2067	0.98	---
	11/28/2018	ENER	---	---	---	---	---	---	155	632	1560	2089	---	---
H1	2/12/2018	ENER	---	---	---	---	---	---	159	772	1570	2040	---	---
	6/21/2018	ENER	---	---	---	---	---	---	150	673	1500	1999	---	---
	8/28/2018	ENER	---	---	---	---	---	---	146	749	1560	2095	---	---
H2A	2/1/2018	ENER	178	49.2	6.8	218	255	< 5	144	683	1450	1807	1.00	7.23
H7	2/12/2018	ENER	---	---	---	---	---	---	152	767	1600	2015	---	---
	6/21/2018	ENER	---	---	---	---	---	---	166	785	1770	2252	---	---
	8/28/2018	ENER	---	---	---	---	---	---	144	769	1600	2143	---	---
H7B	2/12/2018	ENER	---	---	---	---	---	---	164	857	1730	2116	---	---
	6/21/2018	ENER	---	---	---	---	---	---	167	782	1750	2286	---	---
	8/28/2018	ENER	---	---	---	---	---	---	140	766	1570	2044	---	---
H12	2/12/2018	ENER	---	---	---	---	---	---	227	755	1890	2266	---	---
	6/21/2018	ENER	---	---	---	---	---	---	166	762	1760	2279	---	---
	8/28/2018	ENER	---	---	---	---	---	---	174	883	1900	2540	---	---
H16	2/12/2018	ENER	---	---	---	---	---	---	191	1060	2100	2532	---	---
	6/21/2018	ENER	---	---	---	---	---	---	197	943	2110	2670	---	---
H17	2/12/2018	ENER	---	---	---	---	---	---	188	808	1760	2225	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
H17	6/21/2018	ENER	---	---	---	---	---	---	192	743	1840	2413	---	---
	8/28/2018	ENER	---	---	---	---	---	---	160	765	1650	2201	---	---
H24	3/20/2018	ENER	---	---	---	---	---	---	214	1050	2210	2626	---	---
	8/28/2018	ENER	---	---	---	---	---	---	184	949	2030	2637	---	---
H26	2/12/2018	ENER	---	---	---	---	---	---	195	1030	2100	2538	---	---
	8/28/2018	ENER	---	---	---	---	---	---	192	952	2110	2729	---	---
H31	2/12/2018	ENER	---	---	---	---	---	---	175	1030	2030	2502	---	---
	8/28/2018	ENER	---	---	---	---	---	---	184	978	2160	2773	---	---
H41	2/12/2018	ENER	---	---	---	---	---	---	193	752	1790	---	---	---
H46	8/28/2018	ENER	---	---	---	---	---	---	192	860	2010	2627	---	---
H55	2/1/2018	ENER	263	68.8	7.4	304	458	< 5	197	922	2060	2520	0.99	7.36
H71	2/12/2018	ENER	---	---	---	---	---	---	---	---	---	2250	---	---
M16	9/18/2018	ENER	---	---	---	---	---	---	196	1160	2470	3033	---	---
MO	2/1/2018	ENER	362	86.4	8.5	373	352	< 5	203	1370	2660	2963	1.04	7.46
MR	3/22/2018	ENER	279	74.0	8.0	322	449	< 5	212	1050	---	2818	0.97	---
	6/13/2018	ENER	289	71.0	7.0	290	470	< 5	193	996	---	2863	0.97	---
	8/2/2018	ENER	251	67.8	7.1	280	475	< 5	190	947	2170	2722	0.92	---
	9/17/2018	ENER	262	69.0	8.0	286	469	< 5	195	970	---	2819	0.94	---
MS	12/6/2018	ENER	---	---	---	---	---	---	162	608	1640	2228	---	---
MV	3/6/2018	ENER	---	---	---	---	---	---	189	709	1750	2316	---	---
R1	2/20/2018	ENER	254	64.8	6.9	348	410	< 5	205	1000	2180	2601	0.99	7.40
	8/22/2018	ENER	---	---	---	---	---	---	200	969	2150	2769	---	---
R2	2/20/2018	ENER	223	58.0	6.4	317	416	< 5	185	851	1940	2358	1.00	7.45
	8/22/2018	ENER	---	---	---	---	---	---	188	860	1970	2571	---	---
R3	4/3/2018	ENER	186	51.4	6.5	293	396	< 5	161	741	1730	2124	0.99	7.43

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
R3	12/4/2018	ENER	---	---	---	---	---	---	149	699	1650	2186	---	---
R4	2/20/2018	ENER	188	46.9	6.9	272	346	< 5	153	714	1640	2042	1.01	7.52
	8/22/2018	ENER	---	---	---	---	---	---	146	717	1650	2205	---	---
R5	2/20/2018	ENER	149	36.3	6.1	313	422	< 5	140	612	1530	1937	1.02	7.48
	8/22/2018	ENER	---	---	---	---	---	---	142	639	1550	2147	---	---
R10	2/20/2018	ENER	207	55.3	7.7	294	376	< 5	171	776	1750	2171	1.02	7.41
R11	2/20/2018	ENER	177	41.6	7.5	291	356	< 5	145	699	1600	2008	1.02	7.58
	8/22/2018	ENER	---	---	---	---	---	---	142	679	1560	2110	---	---
R18	3/5/2018	ENER	---	---	---	---	---	---	137	649	1420	1923	---	---
R22	3/5/2018	ENER	---	---	---	---	---	---	146	698	1540	2058	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0520	2/12/2018	ENER	0.0298	± 0.0048	0.014	0.011	1.1	0.30	0.100	1.9	0.8	< 0.01	0.10	0.10
0521	2/7/2018	ENER	0.598	± 0.0966	1.310	0.220	1.8	0.30	0.200	1.0	0.7	< 0.01	0.10	0.10
0522	2/7/2018	ENER	0.303	± 0.0489	0.471	0.055	1.4	0.30	0.100	2.2	1.1	< 0.01	0.07	0.09
0540	4/2/2018	ENER	0.160	± 0.0258	0.007	0.026	2.8	0.20	0.100	-0.9	1.1	< 0.01	0.07	0.09
0541	1/10/2018	ENER	0.0954	± 0.0154	0.006	0.021	3.1	0.10	0.100	0.6	1.1	< 0.01	0.10	0.10
	3/28/2018	ENER	0.0831	± 0.0134	0.005	0.021	2.8	0.10	0.100	1.0	1.1	< 0.01	0.30	0.20
	7/9/2018	ENER	0.0865	± 0.0140	0.009	0.020	2.9	0.30	0.200	1.6	1.2	< 0.01	-0.01	0.09
	11/28/2018	ENER	0.0791	± 0.0128	0.008	0.026	---	---	---	---	---	---	---	---
0551	1/8/2018	ENER	0.0289	± 0.0047	< 0.001	0.035	3.0	0.10	0.100	0.1	1.2	< 0.01	-0.01	0.07
	3/28/2018	ENER	0.0318	± 0.0051	< 0.001	0.034	4.1	0.20	0.100	0.9	1.1	< 0.01	0.02	0.06
	7/9/2018	ENER	0.0324	± 0.0052	0.001	0.035	3.7	0.40	0.200	1.1	1.0	< 0.01	0.02	0.10
	11/28/2018	ENER	0.0380	± 0.0061	< 0.001	0.038	---	---	---	---	---	---	---	---
0555	2/6/2018	ENER	0.0648	± 0.0105	0.001	0.052	9.7	0.10	0.200	3.5	1.4	< 0.01	0.30	0.20
0556	2/6/2018	ENER	0.0701	± 0.0113	0.002	0.061	6.1	0.20	0.100	1.8	1.4	< 0.01	0.00	0.10
0557	2/6/2018	ENER	0.0492	± 0.0079	0.001	0.057	6.0	0.20	0.200	4.3	1.6	< 0.01	0.06	0.10
0631	4/2/2018	ENER	0.125	± 0.0202	0.005	0.088	3.9	0.30	0.100	0.2	1.2	< 0.01	0.10	0.10
0632	3/5/2018	ENER	0.117	± 0.0188	< 0.030	0.062	---	---	---	---	---	---	---	---
0634	2/12/2018	ENER	0.0953	± 0.0154	< 0.030	0.025	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.105	± 0.0169	0.017	0.024	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.0721	± 0.0116	0.015	0.028	---	---	---	---	---	---	---	---
0637	9/12/2018	ENER	0.0592	± 0.0096	0.003	0.026	---	---	---	---	---	---	---	---
0638	2/7/2018	ENER	0.0229	± 0.0037	< 0.030	0.075	---	---	---	---	---	---	---	---
0646	3/6/2018	ENER	0.0531	± 0.0086	< 0.030	0.032	---	---	---	---	---	---	---	---
0647	1/8/2018	ENER	0.0729	± 0.0118	< 0.001	0.029	3.2	0.20	0.100	-2.0	1.2	< 0.01	0.04	0.10
	3/28/2018	ENER	0.0788	± 0.0127	< 0.001	0.029	3.2	0.10	0.100	0.8	1.0	< 0.01	0.07	0.08

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0647	7/9/2018	ENER	0.0732	± 0.0118	< 0.001	0.026	3.4	0.08	0.200	0.6	1.2	< 0.01	0.04	0.09
	11/28/2018	ENER	0.0753	± 0.0122	< 0.001	0.029	---	---	---	---	---	---	---	---
0649	1/11/2018	ENER	0.0262	± 0.0042	< 0.001	0.031	2.2	0.20	0.100	0.9	0.9	< 0.01	0.06	0.10
	4/3/2018	ENER	0.0287	± 0.0046	0.002	0.031	2.4	0.20	0.200	0.1	1.0	< 0.01	0.10	0.10
	7/9/2018	ENER	0.0278	± 0.0045	0.001	0.027	2.6	0.20	0.200	2.7	1.2	< 0.01	0.02	0.09
	11/28/2018	ENER	0.0272	± 0.0044	0.001	0.025	---	---	---	---	---	---	---	---
0654	1/4/2018	ENER	0.0806	± 0.0130	0.017	0.020	2.8	0.20	0.200	0.9	0.9	< 0.01	0.20	0.20
	4/3/2018	ENER	0.103	± 0.0166	0.013	0.021	2.7	0.20	0.100	-0.6	1.1	< 0.01	0.03	0.10
	7/11/2018	ENER	0.0684	± 0.0110	0.015	0.020	2.2	0.20	0.100	2.6	0.8	0.00	0.04	0.07
	11/28/2018	ENER	0.101	± 0.0164	0.018	0.025	---	---	---	---	---	---	---	---
0658	6/11/2018	ENER	0.0103	± 0.0017	< 0.030	0.027	---	---	---	---	---	---	---	---
0659	2/21/2018	ENER	0.107	± 0.0173	< 0.030	0.026	---	---	---	---	---	---	---	---
0681	6/11/2018	ENER	0.0423	± 0.0068	< 0.030	0.010	---	---	---	---	---	---	---	---
0683	3/8/2018	ENER	0.0037	± 0.0006	< 0.030	0.009	---	---	---	---	---	---	---	---
0684	5/1/2018	ENER	0.0939	± 0.0152	< 0.030	0.025	---	---	---	---	---	---	---	---
0686	9/12/2018	ENER	0.0580	± 0.0094	0.001	0.026	---	---	---	---	---	---	---	---
0692	7/25/2018	ENER	0.0521	± 0.0084	0.003	0.093	---	---	---	---	---	---	---	---
0846	2/6/2018	ENER	0.0540	± 0.0087	< 0.030	0.116	---	---	---	---	---	---	---	---
	8/2/2018	ENER	0.0525	± 0.0085	< 0.001	0.120	16.8	0.10	0.100	1.4	1.0	0.00	0.07	0.09
0855	2/8/2018	ENER	0.0932	± 0.0150	< 0.030	0.074	---	---	---	---	---	---	---	---
0862	3/26/2018	ENER	0.175	± 0.0282	0.001	0.041	3.3	-0.09	0.300	1.0	1.0	< 0.01	0.07	0.09
	8/22/2018	ENER	0.160	± 0.0257	0.002	0.028	---	---	---	---	---	---	---	---
0864	4/2/2018	ENER	0.150	± 0.0241	< 0.001	0.027	3.6	0.20	0.200	-1.0	1.3	< 0.01	0.20	0.10
0865	3/8/2018	ENER	0.127	± 0.0205	< 0.030	0.071	---	---	---	---	---	---	---	---
0866	2/20/2018	ENER	0.296	± 0.0478	< 0.001	0.039	3.2	0.20	0.200	0.1	1.1	< 0.01	0.08	0.10

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0866	8/22/2018	ENER	0.313	± 0.0505	< 0.001	0.035	---	---	---	---	---	---	---	---
0881	1/10/2018	ENER	0.170	± 0.0274	< 0.030	0.038	---	---	---	---	---	---	---	---
	2/5/2018	ENER	0.173	± 0.0278	0.019	0.033	2.0	0.20	0.200	1.4	0.7	< 0.01	0.08	0.09
0882	2/5/2018	ENER	0.0638	± 0.0103	0.002	< 0.001	< 0.1	0.50	0.200	1.3	0.7	< 0.01	-0.01	0.04
0883	2/5/2018	ENER	0.0497	± 0.0080	< 0.001	0.022	2.8	0.50	0.200	2.2	1.2	< 0.01	0.02	0.07
0884	2/5/2018	ENER	0.0226	± 0.0036	0.002	0.047	5.4	0.20	0.200	0.7	0.8	< 0.01	0.05	0.10
0885	3/6/2018	ENER	0.0738	± 0.0119	< 0.030	0.025	---	---	---	---	---	---	---	---
0886	2/5/2018	ENER	0.326	± 0.0526	0.041	0.049	4.2	0.30	0.200	1.5	0.7	< 0.01	0.04	0.10
0887	3/6/2018	ENER	0.118	± 0.0190	< 0.030	0.035	---	---	---	---	---	---	---	---
0888	2/5/2018	ENER	0.111	± 0.0179	0.003	0.030	1.4	0.50	0.200	0.8	0.7	< 0.01	0.10	0.10
0890	6/21/2018	ENER	0.0815	± 0.0132	0.016	0.022	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.0518	± 0.0084	0.015	0.025	---	---	---	---	---	---	---	---
0893	2/5/2018	ENER	0.0826	± 0.0133	0.004	0.025	1.4	0.20	0.200	1.1	0.6	< 0.01	0.10	0.10
0899	1/10/2018	ENER	0.0514	± 0.0083	0.001	0.018	3.2	0.10	0.200	0.4	1.1	< 0.01	0.07	0.10
	4/3/2018	ENER	0.0646	± 0.0104	0.002	0.022	3.9	0.10	0.100	-0.5	1.1	< 0.01	0.09	0.09
	6/28/2018	ENER	0.0731	± 0.0118	0.001	0.018	3.2	0.50	0.100	0.2	1.4	< 0.01	0.06	0.10
	11/28/2018	ENER	0.0576	± 0.0093	0.002	0.020	---	---	---	---	---	---	---	---
0914	2/14/2018	ENER	0.0022	± 0.0004	0.002	0.003	< 0.1	0.70	0.200	1.9	0.8	< 0.01	0.10	0.10
0920	2/6/2018	ENER	0.232	± 0.0375	0.001	0.273	10.4	0.20	0.100	1.8	1.3	< 0.01	0.03	0.09
0921	2/6/2018	ENER	0.211	± 0.0340	0.003	0.535	16.8	0.20	0.200	4.3	1.5	< 0.01	0.03	0.09
	11/29/2018	ENER	0.199	± 0.0321	0.003	0.530	---	---	---	---	---	---	---	---
0922	2/9/2018	ENER	0.0068	± 0.0011	0.039	0.005	0.3	0.10	0.100	1.7	1.2	< 0.01	0.07	0.10
0935	5/7/2018	ENER	0.111	± 0.0180	0.008	0.025	2.8	0.09	0.100	1.1	0.7	< 0.01	0.07	0.10
0950	2/22/2018	ENER	0.0391	± 0.0063	0.007	0.006	< 0.1	0.04	0.100	1.6	1.0	< 0.01	0.10	0.10

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0950	3/27/2018	ENER	0.147	± 0.0238	< 0.030	0.179	4.8	0.06	0.100	---	---	---	---	---
	4/18/2018	ENER	0.134	± 0.0217	< 0.030	0.177	---	---	---	---	---	---	---	---
0994	4/2/2018	ENER	0.0058	± 0.0009	< 0.001	0.034	4.8	0.30	0.100	0.4	1.3	< 0.01	0.10	0.10
	5/8/2018	ENER	0.0068	± 0.0011	< 0.001	0.033	4.6	0.20	0.200	1.4	0.8	< 0.01	0.02	0.09
	11/28/2018	ENER	0.0062	± 0.0010	< 0.001	0.038	---	---	---	---	---	---	---	---
0996	1/8/2018	ENER	0.0707	± 0.0114	< 0.001	0.026	3.3	0.30	0.100	-0.5	1.2	< 0.01	0.10	0.10
	3/29/2018	ENER	0.0744	± 0.0120	0.003	0.023	3.4	0.06	0.100	0.3	1.0	< 0.01	0.01	0.06
	7/9/2018	ENER	0.0749	± 0.0121	0.001	0.022	3.6	0.20	0.200	0.7	1.4	< 0.01	-0.01	0.08
	11/28/2018	ENER	0.0731	± 0.0118	0.001	0.024	---	---	---	---	---	---	---	---
H1	2/12/2018	ENER	0.0921	± 0.0149	< 0.030	0.028	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.0883	± 0.0143	0.014	0.022	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.0565	± 0.0091	0.013	0.026	---	---	---	---	---	---	---	---
H2A	2/1/2018	ENER	0.0619	± 0.0100	0.010	0.021	2.2	0.20	0.100	1.2	1.1	< 0.01	0.10	0.10
H7	2/12/2018	ENER	0.148	± 0.0239	< 0.030	0.043	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.158	± 0.0254	0.017	0.038	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.0641	± 0.0103	0.016	0.023	---	---	---	---	---	---	---	---
H7B	2/12/2018	ENER	0.120	± 0.0194	< 0.030	0.030	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.154	± 0.0248	0.035	0.040	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.0489	± 0.0079	0.015	0.020	---	---	---	---	---	---	---	---
H12	2/12/2018	ENER	0.156	± 0.0252	< 0.030	0.037	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.158	± 0.0256	0.017	0.029	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.202	± 0.0326	0.026	0.036	---	---	---	---	---	---	---	---
H16	2/12/2018	ENER	0.232	± 0.0374	< 0.030	0.054	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.270	± 0.0436	0.032	0.051	---	---	---	---	---	---	---	---
H17	2/12/2018	ENER	0.0896	± 0.0145	< 0.030	0.028	---	---	---	---	---	---	---	---
	6/21/2018	ENER	0.111	± 0.0178	0.011	0.034	---	---	---	---	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
H17	8/28/2018	ENER	0.0541	± 0.0087	0.009	0.032	---	---	---	---	---	---	---	---
H24	3/20/2018	ENER	0.328	± 0.0529	0.040	0.050	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.234	± 0.0377	0.028	0.050	---	---	---	---	---	---	---	---
H26	2/12/2018	ENER	0.292	± 0.0472	0.040	0.046	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.316	± 0.0509	0.041	0.048	---	---	---	---	---	---	---	---
H31	2/12/2018	ENER	0.117	± 0.0189	< 0.030	< 0.005	---	---	---	---	---	---	---	---
	8/28/2018	ENER	0.271	± 0.0438	0.032	0.034	---	---	---	---	---	---	---	---
H41	2/12/2018	ENER	0.182	± 0.0293	< 0.030	0.031	---	---	---	---	---	---	---	---
H46	8/28/2018	ENER	0.392	± 0.0632	0.053	0.050	---	---	---	---	---	---	---	---
H55	2/1/2018	ENER	0.516	± 0.0833	0.093	0.056	3.0	0.20	0.100	0.3	1.3	< 0.01	0.10	0.10
M16	9/18/2018	ENER	0.514	± 0.0829	0.142	0.058	---	---	---	---	---	---	---	---
MO	2/1/2018	ENER	0.198	± 0.0320	0.015	0.060	8.8	0.20	0.100	0.1	1.2	< 0.01	0.08	0.10
MR	3/22/2018	ENER	0.430	---	0.060	0.058	3.7	---	---	---	---	< 0.01	---	---
	6/13/2018	ENER	0.447	---	0.057	0.056	3.2	---	---	---	---	< 0.01	---	---
	8/2/2018	ENER	0.508	± 0.0820	0.051	0.056	3.2	0.20	0.200	0.2	0.9	< 0.00	0.04	0.08
	9/17/2018	ENER	0.426	---	0.058	0.055	3.7	---	---	---	---	0.00	---	---
MS	12/6/2018	ENER	0.130	± 0.0211	0.014	0.027	---	---	---	---	---	---	---	---
MV	3/6/2018	ENER	0.223	± 0.0360	< 0.030	0.029	---	---	---	---	---	---	---	---
R1	2/20/2018	ENER	0.232	± 0.0374	0.001	0.056	4.8	0.10	0.100	1.0	1.0	< 0.01	0.03	0.08
	8/22/2018	ENER	0.232	± 0.0375	< 0.001	0.051	---	---	---	---	---	---	---	---
R2	2/20/2018	ENER	0.238	± 0.0384	0.002	0.041	3.3	0.30	0.100	0.5	0.9	< 0.01	0.05	0.10
	8/22/2018	ENER	0.256	± 0.0413	0.001	0.038	---	---	---	---	---	---	---	---
R3	4/3/2018	ENER	0.226	± 0.0364	0.002	0.032	3.2	0.30	0.200	0.4	1.0	< 0.01	0.05	0.10
	12/4/2018	ENER	0.154	± 0.0248	0.005	0.036	---	---	---	---	---	---	---	---
R4	2/20/2018	ENER	0.160	± 0.0258	0.003	0.037	2.7	0.20	0.100	0.8	0.9	< 0.01	0.10	0.10

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
R4	8/22/2018	ENER	0.256	± 0.0414	0.004	0.036	---	---	---	---	---	---	---	---
R5	2/20/2018	ENER	0.201	± 0.0324	0.002	0.037	2.2	0.30	0.200	2.7	1.3	< 0.01	0.02	0.09
	8/22/2018	ENER	0.231	± 0.0373	0.002	0.043	---	---	---	---	---	---	---	---
R10	2/20/2018	ENER	0.192	± 0.0311	0.002	0.034	3.1	0.20	0.100	0.8	0.8	< 0.01	0.02	0.08
R11	2/20/2018	ENER	0.246	± 0.0397	0.005	0.035	2.4	0.20	0.100	1.6	0.7	< 0.01	0.10	0.10
	8/22/2018	ENER	0.214	± 0.0345	0.002	0.028	---	---	---	---	---	---	---	---
R18	3/5/2018	ENER	0.0911	± 0.0147	< 0.030	0.021	---	---	---	---	---	---	---	---
R22	3/5/2018	ENER	0.156	± 0.0252	< 0.030	0.029	---	---	---	---	---	---	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0483	8/23/2018	ENER	---	---	---	---	---	---	184	770	1840	2426	---	---
0493	6/4/2018	ENER	12	2.5	1.7	529	342	8	134	658	1500	2307	1.02	---
0494	2/5/2018	ENER	---	---	---	---	---	---	180	725	1760	2188	---	---
	6/4/2018	ENER	210	59.9	5.1	283	445	< 5	178	714	1730	2392	1.02	---
0498	2/20/2018	ENER	152	37.6	5.7	255	382	< 5	127	593	1460	1848	0.98	7.56
	8/23/2018	ENER	---	---	---	---	---	---	137	594	1450	2028	---	---
0546R	3/26/2018	ENER	53	13.1	3.6	516	402	< 5	158	707	1670	2263	1.01	7.73
	11/29/2018	ENER	---	---	---	---	---	---	157	708	1710	2554	---	---
0853	6/12/2018	ENER	---	---	---	---	---	---	136	663	1490	2086	---	---
0859	6/12/2018	ENER	---	---	---	---	---	---	185	917	2040	2748	---	---
0929	2/7/2018	ENER	---	---	---	---	---	---	125	696	1800	2534	---	---
0930	6/12/2018	ENER	---	---	---	---	---	---	135	613	1530	2391	---	---
0931	6/12/2018	ENER	---	---	---	---	---	---	197	702	1830	2634	---	---
ACW	6/6/2018	ENER	5	2.2	1.5	642	260	51	279	703	1720	2751	1.00	---
AW	4/5/2018	ENER	190	55.0	5.5	248	422	< 5	182	679	1630	2085	0.95	7.34
B15	4/17/2018	ENER	201	69.6	5.0	1760	1030	< 5	370	3190	6220	7552	0.98	7.34
B31	4/17/2018	ENER	194	70.0	6.0	2160	1210	< 5	444	3910	7200	9036	0.96	7.46
B32	4/17/2018	ENER	125	73.0	5.0	2340	1290	< 5	518	3780	7560	9294	1.00	7.75
CE1	6/19/2018	ENER	---	---	---	---	---	---	151	582	2970	1716	---	---
CE2	5/22/2018	ENER	152	40.1	3.5	330	378	< 5	137	694	1610	2215	1.03	---
	9/20/2018	ENER	---	---	---	---	---	---	137	707	1540	2151	---	---
CE5	7/18/2018	ENER	---	---	---	---	---	---	183	760	1870	2407	---	---
CE6	7/18/2018	ENER	---	---	---	---	---	---	163	906	1970	2548	---	---
CE8	6/5/2018	ENER	11	1.2	1.1	539	390	< 5	62	763	1570	2375	1.00	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CE9	6/5/2018	ENER	218	62.6	7.0	290	516	< 5	188	679	1760	2405	1.03	---
	7/25/2018	ENER	212	63.5	7.0	294	523	< 5	198	724	1810	2417	0.98	---
	7/25/2018	ENER	# 213	# 64.5	# 6.0	# 298	# 523	# < 5	# 198	# 722	# 1820	---	# 0.99	---
CE10	7/17/2018	ENER	---	---	---	---	---	---	143	1080	2160	2946	---	---
CE11	7/18/2018	ENER	---	---	---	---	---	---	200	960	2170	2778	---	---
CE12	7/18/2018	ENER	---	---	---	---	---	---	118	555	1340	1796	---	---
CE13	7/17/2018	ENER	---	---	---	---	---	---	557	4510	8980	10530	---	---
CE14	2/13/2018	ENER	144	35.1	3.6	240	394	< 5	117	537	1290	1680	0.98	7.40
CE15	6/5/2018	ENER	199	51.6	4.7	279	447	< 5	168	690	1700	2254	0.99	---
CE15A	5/2/2018	ENER	---	---	---	---	---	---	188	679	1740	2626	---	---
CE16A	6/28/2018	ENER	---	---	---	---	---	---	312	2150	4050	4711	---	---
CE18	6/13/2018	ENER	---	---	---	---	---	---	119	683	1540	2207	---	---
CE19	6/14/2018	ENER	---	---	---	---	---	---	121	583	1350	1839	---	---
CF1	6/7/2018	ENER	---	---	---	---	---	---	359	1880	3370	4333	---	---
CF2	6/7/2018	ENER	---	---	---	---	---	---	1220	678	2930	4886	---	---
CF3	6/19/2018	ENER	---	---	---	---	---	---	182	1490	2750	3463	---	---
CF4	6/7/2018	ENER	686	197.0	10.0	2260	1640	< 5	561	4860	9260	10310	1.03	---
CF5	6/18/2018	ENER	---	---	---	---	---	---	381	2800	5230	5829	---	---
CF6	6/7/2018	ENER	---	---	---	---	---	---	422	2970	6560	8873	---	---
CF7A	6/18/2018	ENER	---	---	---	---	---	---	353	2620	4830	5804	---	---
CW2	8/1/2018	ENER	---	---	---	---	---	---	---	---	---	2256	---	---
	8/2/2018	ENER	11	1.6	1.3	509	363	13	104	681	1520	---	0.97	---
CW3	2/15/2018	ENER	39	9.9	2.0	511	334	8	68	878	1660	2219	0.97	7.84

Signifies Quality Control Sample

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CW3	6/6/2018	ENER	42	9.6	1.7	534	345	< 5	66	856	1620	2390	1.03	---
CW9	6/18/2018	ENER	---	---	---	---	---	---	31	251	599	8931	---	---
CW15	6/14/2018	ENER	---	---	---	---	---	---	29	824	1590	2281	---	---
CW17	6/14/2018	ENER	---	---	---	---	---	---	183	1430	2740	3242	---	---
	7/12/2018	ENER	361	89.0	6.1	323	386	< 5	170	1330	2730	3224	1.01	---
CW18	6/5/2018	ENER	44	8.0	2.2	620	646	< 5	211	718	1920	2881	0.94	---
CW24	6/14/2018	ENER	---	---	---	---	---	---	74	1820	3150	3504	---	---
CW28	2/8/2018	ENER	---	---	---	---	---	---	159	542	1260	1887	---	---
	7/11/2018	ENER	8	1.4	1.4	446	276	6	156	538	1320	2020	0.98	---
CW29	8/1/2018	ENER	150	40.5	5.4	306	385	< 5	157	677	1760	2207	0.97	---
	8/1/2018	ENER	# 152	# 41.1	# 5.8	# 313	# 384	# < 5	# 157	# 676	# 1690	---	# 0.99	---
CW31	6/20/2018	ENER	---	---	---	---	---	---	64	1070	1880	2546	---	---
CW32	7/12/2018	ENER	157	56.0	7.9	770	531	< 5	416	1300	2980	4170	0.97	---
CW33	6/20/2018	ENER	---	---	---	---	---	---	468	2100	4090	5392	---	---
CW35	3/7/2018	ENER	284	68.2	4.7	325	394	< 5	68	1310	2340	2757	0.95	7.54
CW36	7/16/2018	ENER	---	---	---	---	---	---	84	806	1570	2063	---	---
CW37	6/14/2018	ENER	---	---	---	---	---	---	80	1070	1940	2464	---	---
CW40	6/19/2018	ENER	---	---	---	---	---	---	211	725	1890	2899	---	---
CW41	7/10/2018	ENER	14	3.8	2.8	324	330	< 5	96	329	952	1489	1.00	---
CW42	7/10/2018	ENER	129	32.2	5.7	232	329	< 5	126	545	1300	1756	0.94	---
CW43	7/10/2018	ENER	318	80.2	4.6	411	367	< 5	225	1370	2610	3260	0.99	---
CW44	4/25/2018	ENER	---	---	---	---	---	---	159	824	1800	2313	---	---
	8/1/2018	ENER	202	50.8	5.3	277	390	< 5	155	803	1600	2343	0.96	---
CW45	3/22/2018	ENER	119	41.6	5.3	321	492	< 5	148	616	1650	2034	0.93	7.48

Signifies Quality Control Sample

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
CW50	3/6/2018	ENER	179	45.3	3.8	262	317	< 5	60	878	1620	2087	0.95	7.75
CW53	5/1/2018	ENER	---	---	---	---	---	---	193	708	1920	2801	---	---
CW55	7/11/2018	ENER	44	9.0	3.4	554	491	5	172	746	1750	2536	0.95	---
CW56	8/29/2018	ENER	---	---	---	---	---	---	150	1530	2840	3351	---	---
CW58	5/1/2018	ENER	33	7.6	2.5	485	366	< 5	147	664	1570	2298	0.97	7.99
CW60	8/29/2018	ENER	---	---	---	---	---	---	121	1780	3160	3635	---	---
CW61	8/29/2018	ENER	---	---	---	---	---	---	210	1350	2730	3268	---	---
CW62	2/13/2018	ENER	407	93.6	6.0	406	355	< 5	211	1680	2990	3465	0.98	7.33
	7/9/2018	ENER	399	94.0	6.5	437	374	< 5	202	1630	3270	3921	1.02	---
	8/23/2018	ENER	---	---	---	---	---	---	209	1700	3190	3748	---	---
CW72	9/20/2018	ENER	---	---	---	---	---	---	294	2070	3720	4494	---	---
CW73	5/3/2018	ENER	248	64.6	5.0	331	466	< 5	196	910	2080	2694	1.00	---
CW74	5/3/2018	ENER	58	15.9	3.3	602	395	< 5	165	860	1920	2724	1.04	7.90
CW75	4/26/2018	ENER	13	2.2	2.2	649	381	< 5	150	788	1810	2721	1.08	8.29
CW76	1/10/2018	ENER	9	1.2	1.6	539	338	10	135	702	1580	2341	0.99	8.42
	1/29/2018	ENER	8	1.2	1.5	513	329	12	136	713	1580	2198	0.93	8.31
	7/10/2018	ENER	9	1.3	1.5	542	368	< 5	138	718	1600	2384	0.96	---
CW78	5/3/2018	ENER	93	23.4	3.5	552	578	< 5	191	713	1860	2641	1.03	7.60
R1	2/20/2018	ENER	254	64.8	6.9	348	410	< 5	205	1000	2180	2601	0.99	7.40
	8/22/2018	ENER	---	---	---	---	---	---	200	969	2150	2769	---	---
R2	2/20/2018	ENER	223	58.0	6.4	317	416	< 5	185	851	1940	2358	1.00	7.45
	8/22/2018	ENER	---	---	---	---	---	---	188	860	1970	2571	---	---
R3	4/3/2018	ENER	186	51.4	6.5	293	396	< 5	161	741	1730	2124	0.99	7.43
	12/4/2018	ENER	---	---	---	---	---	---	149	699	1650	2186	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
R4	2/20/2018	ENER	188	46.9	6.9	272	346	< 5	153	714	1640	2042	1.01	7.52
	8/22/2018	ENER	---	---	---	---	---	---	146	717	1650	2205	---	---
R5	2/20/2018	ENER	149	36.3	6.1	313	422	< 5	140	612	1530	1937	1.02	7.48
	8/22/2018	ENER	---	---	---	---	---	---	142	639	1550	2147	---	---
R11	2/20/2018	ENER	177	41.6	7.5	291	356	< 5	145	699	1600	2008	1.02	7.58
	8/22/2018	ENER	---	---	---	---	---	---	142	679	1560	2110	---	---
T27	1/18/2018	ENER	380	85.0	6.8	1140	880	< 5	300	2730	5140	5608	0.95	7.39
T28	3/14/2018	ENER	409	121.0	7.0	1520	971	< 5	366	3540	6800	7608	0.97	7.24
T30	1/22/2018	ENER	560	129.0	7.4	1280	933	< 5	469	3470	6410	4019	0.94	7.42
T32	1/23/2018	ENER	616	156.0	8.3	1610	1090	< 5	549	4030	7510	7962	0.97	7.11
V1	1/9/2018	ENER	49	10.4	4.0	467	287	< 5	130	750	1580	2143	0.98	7.92
	1/29/2018	ENER	49	10.2	4.0	495	310	< 5	150	747	1620	2059	0.99	7.62
V6	7/10/2018	ENER	154	36.6	5.6	306	364	< 5	173	763	1710	2351	0.90	---
WCW	6/13/2018	ENER	24	5.2	2.1	548	360	< 5	128	783	1680	2486	0.98	---
WR25	7/17/2018	ENER	---	---	---	---	---	---	183	1770	3270	3663	---	---
Y1	2/21/2018	ENER	---	---	---	---	---	---	187	909	1990	2411	---	---
	8/1/2018	ENER	29	6.2	2.3	528	418	7	153	715	1590	2468	0.95	---
Y7	2/21/2018	ENER	---	---	---	---	---	---	165	754	1780	2236	---	---
	8/1/2018	ENER	63	14.8	3.3	508	441	< 5	163	734	1660	2457	0.97	---
Y13	2/21/2018	ENER	---	---	---	---	---	---	173	839	1890	2316	---	---
	8/20/2018	ENER	---	---	---	---	---	---	164	746	1790	2449	---	---
Y23	2/26/2018	ENER	---	---	---	---	---	---	131	611	1440	1955	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0483	8/23/2018	ENER	0.150	± 0.0241	0.062	0.032	---	---	---	---	---	---	---	---
0493	6/4/2018	ENER	0.0971	± 0.0157	0.002	0.100	2.5	0.40	0.200	0.3	1.4	< 0.01	0.20	0.10
0494	2/5/2018	ENER	0.182	± 0.0294	0.060	0.037	---	---	---	---	---	---	---	---
	6/4/2018	ENER	0.160	± 0.0258	0.051	0.033	2.7	0.20	0.200	0.1	1.3	< 0.01	-0.01	0.08
0498	2/20/2018	ENER	0.216	± 0.0349	< 0.001	0.033	2.0	0.10	0.100	1.1	0.9	< 0.01	0.10	0.10
	8/23/2018	ENER	0.155	± 0.0250	0.001	0.027	---	---	---	---	---	---	---	---
0546R	3/26/2018	ENER	0.256	± 0.0413	< 0.030	0.053	2.7	0.20	0.100	---	---	---	---	---
	11/29/2018	ENER	0.223	± 0.0360	0.004	0.063	---	---	---	---	---	---	---	---
0853	6/12/2018	ENER	0.0787	± 0.0127	< 0.030	0.095	---	---	---	---	---	---	---	---
0859	6/12/2018	ENER	0.194	± 0.0313	0.110	0.035	---	---	---	---	---	---	---	---
0929	2/7/2018	ENER	0.0288	± 0.0046	< 0.030	0.013	---	---	---	---	---	---	---	---
0930	6/12/2018	ENER	0.0215	± 0.0035	< 0.030	< 0.005	---	---	---	---	---	---	---	---
0931	6/12/2018	ENER	0.0343	± 0.0055	< 0.030	0.011	---	---	---	---	---	---	---	---
ACW	6/6/2018	ENER	0.0072	± 0.0012	0.005	0.003	< 0.1	2.10	0.500	-0.1	0.7	< 0.01	0.07	0.10
AW	4/5/2018	ENER	0.0972	± 0.0157	0.053	0.030	2.0	0.20	0.100	0.6	1.1	< 0.01	0.10	0.10
B15	4/17/2018	ENER	9.47	± 1.5300	18.400	0.410	4.6	0.30	0.100	---	---	---	---	---
B31	4/17/2018	ENER	14.7	± 2.3800	18.000	0.698	6.0	0.30	0.100	---	---	---	---	---
B32	4/17/2018	ENER	15.0	± 2.4200	25.200	0.678	2.9	0.40	0.200	---	---	---	---	---
CE1	6/19/2018	ENER	1.48	± 0.2380	1.340	0.006	---	---	---	---	---	---	---	---
CE2	5/22/2018	ENER	1.45	± 0.2330	2.190	0.098	2.1	0.20	0.200	1.4	1.0	< 0.01	0.04	0.06
	9/20/2018	ENER	1.20	± 0.1940	1.570	0.099	---	---	---	---	---	---	---	---
CE5	7/18/2018	ENER	0.411	± 0.0663	0.211	0.029	---	---	---	---	---	---	---	---
CE6	7/18/2018	ENER	1.78	± 0.2880	1.630	0.085	---	---	---	---	---	---	---	---
CE8	6/5/2018	ENER	0.0275	± 0.0044	0.010	0.001	< 0.1	0.30	0.100	1.6	1.1	< 0.01	0.00	0.06

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CE9	6/5/2018	ENER	0.124	± 0.0201	0.041	0.018	1.8	0.30	0.100	-0.1	1.2	< 0.01	0.10	0.10
	7/25/2018	ENER	0.127	± 0.0205	0.039	0.020	1.9	0.20	0.200	0.8	1.0	0.00	0.02	0.07
	7/25/2018	ENER	# 0.127	# ± 0.0205	# 0.040	# 0.019	# 1.8	# 0.10	# 0.200	# 1.6	# 1.0	# 0.00	# 0.01	# 0.06
CE10	7/17/2018	ENER	1.63	± 0.2630	1.460	0.090	---	---	---	---	---	---	---	---
CE11	7/18/2018	ENER	1.26	± 0.2030	0.864	0.057	---	---	---	---	---	---	---	---
CE12	7/18/2018	ENER	0.847	± 0.1370	0.971	0.036	---	---	---	---	---	---	---	---
CE13	7/17/2018	ENER	20.5	± 3.3000	24.500	0.493	---	---	---	---	---	---	---	---
CE14	2/13/2018	ENER	0.0394	± 0.0064	0.001	0.081	2.4	0.30	0.100	1.6	0.7	< 0.01	0.20	0.10
CE15	6/5/2018	ENER	0.277	± 0.0448	0.211	0.055	2.1	0.20	0.100	1.6	1.1	< 0.01	0.03	0.08
CE15A	5/2/2018	ENER	0.159	± 0.0257	0.060	0.025	---	---	---	---	---	---	---	---
CE16A	6/28/2018	ENER	5.20	± 0.8400	4.150	0.421	---	---	---	---	---	---	---	---
CE18	6/13/2018	ENER	0.119	± 0.0192	0.160	0.008	---	---	---	---	---	---	---	---
CE19	6/14/2018	ENER	0.437	± 0.0706	0.560	0.058	---	---	---	---	---	---	---	---
CF1	6/7/2018	ENER	2.72	± 0.4400	2.730	< 0.005	---	---	---	---	---	---	---	---
CF2	6/7/2018	ENER	0.0485	± 0.0078	0.480	< 0.005	---	---	---	---	---	---	---	---
CF3	6/19/2018	ENER	2.75	± 0.4430	1.680	0.080	---	---	---	---	---	---	---	---
CF4	6/7/2018	ENER	29.8	± 4.8000	30.000	0.330	5.6	2.90	0.600	0.5	0.9	< 0.01	0.30	0.20
CF5	6/18/2018	ENER	7.62	± 1.2300	8.080	0.136	---	---	---	---	---	---	---	---
CF6	6/7/2018	ENER	5.58	± 0.9010	13.500	0.027	---	---	---	---	---	---	---	---
CF7A	6/18/2018	ENER	8.34	± 1.3500	8.360	0.032	---	---	---	---	---	---	---	---
CW2	8/2/2018	ENER	0.0437	± 0.0071	0.017	0.053	3.7	0.10	0.100	0.5	1.1	0.01	0.07	0.10
CW3	2/15/2018	ENER	0.375	± 0.0606	0.335	0.002	< 0.1	0.09	0.100	1.4	0.7	0.02	0.20	0.20
	6/6/2018	ENER	0.265	± 0.0428	0.264	0.004	< 0.1	3.70	0.800	-0.3	0.8	0.02	0.02	0.06

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CW9	6/18/2018	ENER	0.0113	± 0.0018	0.050	< 0.005	---	---	---	---	---	---	---	---
CW15	6/14/2018	ENER	0.0277	± 0.0045	< 0.030	0.010	---	---	---	---	---	---	---	---
CW17	6/14/2018	ENER	0.189	± 0.0305	0.040	0.082	---	---	---	---	---	---	---	---
	7/12/2018	ENER	0.155	± 0.0250	0.037	0.079	9.7	0.30	0.100	1.3	1.2	< 0.00	0.03	0.08
CW18	6/5/2018	ENER	0.0243	± 0.0039	0.002	0.011	2.3	0.20	0.100	2.9	1.1	< 0.01	0.03	0.10
CW24	6/14/2018	ENER	0.124	± 0.0200	< 0.030	0.043	---	---	---	---	---	---	---	---
CW28	2/8/2018	ENER	0.0197	± 0.0032	< 0.030	0.111	---	---	---	---	---	---	---	---
	7/11/2018	ENER	0.0156	± 0.0025	0.007	0.110	2.2	0.10	0.100	1.9	0.7	0.01	0.07	0.10
CW29	8/1/2018	ENER	0.159	± 0.0256	0.002	0.043	3.0	0.50	0.200	0.5	0.9	0.01	0.01	0.10
	8/1/2018	ENER	# 0.160	# ± 0.0259	# 0.002	# 0.042	# 3.0	# 0.10	# 0.100	# 0.6	# 0.9	# 0.01	# 0.05	# 0.10
CW31	6/20/2018	ENER	0.0074	± 0.0012	0.010	< 0.001	---	---	---	---	---	---	---	---
CW32	7/12/2018	ENER	0.0041	± 0.0007	0.002	< 0.001	< 0.1	1.00	0.200	5.4	1.5	< 0.00	0.10	0.10
CW33	6/20/2018	ENER	0.0066	± 0.0011	0.008	0.005	---	---	---	---	---	---	---	---
CW35	3/7/2018	ENER	0.175	± 0.0283	0.004	0.066	2.6	0.70	0.200	1.9	1.2	< 0.01	0.09	0.20
CW36	7/16/2018	ENER	0.0086	± 0.0014	0.003	< 0.001	---	---	---	---	---	---	---	---
CW37	6/14/2018	ENER	0.0281	± 0.0045	< 0.030	0.067	---	---	---	---	---	---	---	---
CW40	6/19/2018	ENER	0.0205	± 0.0033	< 0.030	0.011	---	---	---	---	---	---	---	---
CW41	7/10/2018	ENER	0.0366	± 0.0059	0.005	0.038	3.6	0.20	0.100	1.4	1.2	0.01	0.20	0.20
CW42	7/10/2018	ENER	0.133	± 0.0214	< 0.001	0.026	2.5	0.10	0.100	0.5	1.2	0.01	0.07	0.10
CW43	7/10/2018	ENER	0.0447	± 0.0072	0.001	0.041	8.2	0.10	0.100	3.1	0.9	< 0.00	0.05	0.09
CW44	4/25/2018	ENER	0.201	± 0.0324	< 0.030	0.029	---	---	---	---	---	---	---	---
	8/1/2018	ENER	0.199	± 0.0321	0.002	0.033	2.9	0.10	0.100	0.9	0.9	0.00	0.04	0.09
CW45	3/22/2018	ENER	0.388	± 0.0626	0.003	0.024	1.1	0.20	0.100	1.0	0.8	< 0.01	0.08	0.10
CW50	3/6/2018	ENER	0.0250	± 0.0040	0.002	< 0.001	< 0.1	1.20	0.300	0.4	1.1	< 0.01	0.10	0.10

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
CW53	5/1/2018	ENER	0.0705	± 0.0114	< 0.030	0.016	---	---	---	---	---	---	---	---
CW55	7/11/2018	ENER	0.0757	± 0.0122	0.050	0.004	0.3	0.30	0.100	2.9	0.8	0.00	0.04	0.10
CW56	8/29/2018	ENER	0.337	± 0.0545	0.231	0.091	---	---	---	---	---	---	---	---
CW58	5/1/2018	ENER	0.227	± 0.0367	0.001	0.104	1.7	0.20	0.100	0.7	0.8	< 0.01	0.01	0.06
CW60	8/29/2018	ENER	0.100	± 0.0162	< 0.001	0.244	---	---	---	---	---	---	---	---
CW61	8/29/2018	ENER	1.58	± 0.2550	1.180	0.174	---	---	---	---	---	---	---	---
CW62	2/13/2018	ENER	1.20	± 0.1940	0.695	0.293	17.4	0.30	0.100	2.1	0.9	< 0.01	0.06	0.09
	7/9/2018	ENER	1.16	± 0.1860	0.784	0.325	19.3	0.30	0.200	2.0	1.1	< 0.01	0.01	0.07
	8/23/2018	ENER	1.48	± 0.2390	0.864	0.310	---	---	---	---	---	---	---	---
CW72	9/20/2018	ENER	2.88	± 0.4650	1.900	0.704	---	---	---	---	---	---	---	---
CW73	5/3/2018	ENER	0.183	± 0.0295	< 0.001	0.049	2.8	0.20	0.100	0.8	0.9	< 0.01	0.06	0.07
CW74	5/3/2018	ENER	0.0644	± 0.0104	< 0.030	0.056	5.4	1.90	0.400	---	---	---	---	---
CW75	4/26/2018	ENER	0.0817	± 0.0132	< 0.030	0.067	4.5	0.50	0.200	---	---	---	---	---
CW76	1/10/2018	ENER	0.0715	± 0.0115	0.004	0.057	3.8	0.20	0.200	1.9	0.8	< 0.01	0.10	0.10
	1/29/2018	ENER	0.0653	± 0.0105	0.008	0.045	3.6	0.20	0.200	1.0	1.3	< 0.01	0.10	0.10
	7/10/2018	ENER	0.0743	± 0.0120	0.005	0.056	4.1	0.30	0.100	1.7	1.1	< 0.00	0.10	0.10
CW78	5/3/2018	ENER	0.359	± 0.0580	< 0.030	0.023	1.2	0.40	0.200	---	---	---	---	---
R1	2/20/2018	ENER	0.232	± 0.0374	0.001	0.056	4.8	0.10	0.100	1.0	1.0	< 0.01	0.03	0.08
	8/22/2018	ENER	0.232	± 0.0375	< 0.001	0.051	---	---	---	---	---	---	---	---
R2	2/20/2018	ENER	0.238	± 0.0384	0.002	0.041	3.3	0.30	0.100	0.5	0.9	< 0.01	0.05	0.10
	8/22/2018	ENER	0.256	± 0.0413	0.001	0.038	---	---	---	---	---	---	---	---
R3	4/3/2018	ENER	0.226	± 0.0364	0.002	0.032	3.2	0.30	0.200	0.4	1.0	< 0.01	0.05	0.10
	12/4/2018	ENER	0.154	± 0.0248	0.005	0.036	---	---	---	---	---	---	---	---
R4	2/20/2018	ENER	0.160	± 0.0258	0.003	0.037	2.7	0.20	0.100	0.8	0.9	< 0.01	0.10	0.10

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
R4	8/22/2018	ENER	0.256	± 0.0414	0.004	0.036	---	---	---	---	---	---	---	---
R5	2/20/2018	ENER	0.201	± 0.0324	0.002	0.037	2.2	0.30	0.200	2.7	1.3	< 0.01	0.02	0.09
	8/22/2018	ENER	0.231	± 0.0373	0.002	0.043	---	---	---	---	---	---	---	---
R11	2/20/2018	ENER	0.246	± 0.0397	0.005	0.035	2.4	0.20	0.100	1.6	0.7	< 0.01	0.10	0.10
	8/22/2018	ENER	0.214	± 0.0345	0.002	0.028	---	---	---	---	---	---	---	---
T27	1/18/2018	ENER	7.43	± 1.2000	9.540	0.064	2.2	0.90	0.200	---	---	---	---	---
T28	3/14/2018	ENER	13.2	± 2.1300	12.200	0.276	8.2	1.20	0.300	---	---	---	---	---
T30	1/22/2018	ENER	10.6	± 1.7200	4.960	0.122	6.6	0.90	0.200	---	---	---	---	---
T32	1/23/2018	ENER	13.6	± 2.1900	9.920	0.217	18.7	0.40	0.100	---	---	---	---	---
V1	1/9/2018	ENER	0.0588	± 0.0095	0.010	0.044	2.0	0.30	0.200	0.8	1.0	< 0.01	0.20	0.10
	1/29/2018	ENER	0.0643	± 0.0104	0.015	0.045	2.9	5.10	1.000	0.8	1.1	< 0.01	0.07	0.10
V6	7/10/2018	ENER	0.194	± 0.0314	0.002	0.046	3.4	0.30	0.100	2.6	0.8	0.01	0.02	0.09
WCW	6/13/2018	ENER	0.0186	± 0.0030	< 0.030	< 0.005	< 0.1	0.30	0.100	---	---	---	---	---
WR25	7/17/2018	ENER	0.192	± 0.0310	0.001	0.104	---	---	---	---	---	---	---	---
Y1	2/21/2018	ENER	0.238	± 0.0384	< 0.030	0.048	---	---	---	---	---	---	---	---
	8/1/2018	ENER	0.248	± 0.0399	0.003	0.067	2.8	0.10	0.100	1.0	1.0	0.00	0.03	0.10
Y7	2/21/2018	ENER	0.399	± 0.0644	< 0.030	0.042	---	---	---	---	---	---	---	---
	8/1/2018	ENER	0.338	± 0.0546	0.002	0.072	3.1	1.10	0.300	0.4	0.9	0.00	0.08	0.10
Y13	2/21/2018	ENER	0.506	± 0.0818	< 0.030	0.042	---	---	---	---	---	---	---	---
	8/20/2018	ENER	0.350	± 0.0565	0.001	0.042	---	---	---	---	---	---	---	---
Y23	2/26/2018	ENER	0.190	± 0.0306	< 0.030	0.033	---	---	---	---	---	---	---	---

TABLE B.6-1 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
#2 Deepwell	2/1/2018	ENER	---	---	---	---	---	---	225	758	1910	2419	---	---
	4/30/2018	ENER	232	---	12.9	313	539	< 5	216	693	1940	2558	---	---
	7/12/2018	ENER	---	---	---	---	---	---	221	723	1920	2590	---	---
	11/28/2018	ENER	---	---	---	---	---	---	218	718	1920	2564	---	---
0532	3/15/2018	ENER	79	30.0	2.3	31	238	< 5	19	145	464	7101	1.03	7.60
0806R	4/9/2018	ENER	218	68.6	10.8	196	421	< 5	190	648	1600	2040	0.98	7.32
0943	1/13/2018	ENER	80	22.6	4.5	546	321	< 5	169	1030	2050	2688	0.94	7.81
	1/16/2018	ENER	---	---	---	---	---	---	184	921	1950	2918	---	---
	1/16/2018	ENER	---	---	---	---	---	---	185	932	1950	2701	---	---
	1/16/2018	ENER	---	---	---	---	---	---	182	903	1970	2692	---	---
	1/16/2018	ENER	---	---	---	---	---	---	185	921	1940	2692	---	---
	1/17/2018	ENER	---	---	---	---	---	---	186	898	1920	2650	---	---
	1/18/2018	ENER	---	---	---	---	---	---	192	867	1890	2587	---	---
	1/19/2018	ENER	---	---	---	---	---	---	202	851	1920	2548	---	---
	1/20/2018	ENER	---	---	---	---	---	---	231	952	2130	2552	---	---
	1/21/2018	ENER	---	---	---	---	---	---	156	642	1450	2565	---	---
	1/22/2018	ENER	---	---	---	---	---	---	169	714	1630	2564	---	---
	1/23/2018	ENER	---	---	---	---	---	---	203	826	1900	2523	---	---
	1/29/2018	ENER	123	34.7	5.5	398	313	< 5	171	1030	2000	2580	0.84	7.68
0943M	1/12/2018	ENER	200	60.8	8.4	172	388	< 5	159	597	1480	1723	0.97	7.33
	2/6/2018	ENER	---	---	---	---	---	---	161	595	1250	1754	---	---
	4/26/2018	ENER	208	62.3	8.6	173	395	< 5	156	572	1480	2027	1.01	7.20
	8/20/2018	ENER	---	---	---	---	---	---	136	507	1140	1673	---	---
	11/27/2018	ENER	---	---	---	---	---	---	155	575	1480	2016	---	---
0951R	2/1/2018	ENER	---	---	---	---	---	---	146	577	1400	1810	---	---
	4/27/2018	ENER	188	62.5	9.7	188	407	< 5	165	563	1490	2008	0.99	7.24
	8/1/2018	ENER	---	---	---	---	---	---	141	613	1360	1875	---	---

TABLE B.6-1 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER (cont'd.)

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH (std. units)
0951R	11/27/2018	ENER	---	---	---	---	---	---	150	564	1440	1951	---	---
0998	3/15/2018	ENER	154	42.4	3.6	66	288	< 5	46	386	910	1219	0.99	7.41
0999	3/15/2018	ENER	98	31.2	2.7	40	243	< 5	19	202	562	1285	1.04	7.58

TABLE B.6-2 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
#2 Deepwell	2/1/2018	ENER	0.0114	± 0.0018	< 0.030	0.006	---	---	---	---	---	---	---	---
	4/30/2018	ENER	0.0116	± 0.0019	0.002	0.005	1.8	0.60	0.200	0.5	0.7	< 0.01	0.09	0.09
	7/12/2018	ENER	0.0105	± 0.0017	0.003	0.006	---	---	---	---	---	---	---	---
	11/28/2018	ENER	0.0114	± 0.0019	0.001	0.008	---	---	---	---	---	---	---	---
0532	3/15/2018	ENER	0.0042	± 0.0007	< 0.030	0.007	2.6	0.30	0.100	---	---	---	---	---
0806R	4/9/2018	ENER	0.0224	± 0.0036	0.002	0.010	3.6	0.60	0.200	1.2	0.7	< 0.01	0.01	0.10
0943	1/13/2018	ENER	0.115	± 0.0186	0.001	0.068	4.9	0.20	0.100	-0.5	1.0	< 0.01	0.10	0.10
	1/16/2018	ENER	0.0901	± 0.0145	< 0.030	0.049	---	---	---	---	---	---	---	---
	1/16/2018	ENER	0.0880	± 0.0142	< 0.030	0.050	---	---	---	---	---	---	---	---
	1/16/2018	ENER	0.0892	± 0.0144	< 0.030	0.049	---	---	---	---	---	---	---	---
	1/16/2018	ENER	0.0867	± 0.0140	< 0.030	0.050	---	---	---	---	---	---	---	---
	1/17/2018	ENER	0.0876	± 0.0141	< 0.030	0.055	---	---	---	---	---	---	---	---
	1/18/2018	ENER	0.0847	± 0.0137	< 0.030	0.047	---	---	---	---	---	---	---	---
	1/19/2018	ENER	0.102	± 0.0165	< 0.030	0.059	---	---	---	---	---	---	---	---
	1/20/2018	ENER	0.0691	± 0.0111	< 0.030	0.035	---	---	---	---	---	---	---	---
	1/21/2018	ENER	0.119	± 0.0192	< 0.030	0.067	---	---	---	---	---	---	---	---
	1/22/2018	ENER	0.0894	± 0.0144	< 0.030	0.049	---	---	---	---	---	---	---	---
	1/23/2018	ENER	0.0614	± 0.0099	< 0.030	0.036	---	---	---	---	---	---	---	---
	1/29/2018	ENER	0.0877	± 0.0142	0.008	0.047	4.8	0.20	0.100	0.9	1.0	< 0.01	0.09	0.10
0943M	1/12/2018	ENER	0.0081	± 0.0013	0.001	0.009	4.1	0.60	0.200	-0.4	1.1	< 0.01	0.10	0.10
	2/6/2018	ENER	< 0.0003	< 0.0001	< 0.030	< 0.005	---	---	---	---	---	---	---	---
	4/26/2018	ENER	0.0077	± 0.0012	< 0.001	0.007	4.1	0.40	0.100	0.3	0.8	< 0.01	0.06	0.10
	8/20/2018	ENER	< 0.0003	< 0.0001	0.002	< 0.001	---	---	---	---	---	---	---	---
	11/27/2018	ENER	0.0080	± 0.0013	0.001	0.010	---	---	---	---	---	---	---	---
0951R	2/1/2018	ENER	0.0243	± 0.0039	< 0.030	0.010	---	---	---	---	---	---	---	---
	4/27/2018	ENER	0.0354	± 0.0057	< 0.001	0.007	3.9	0.70	0.200	0.4	1.2	< 0.01	0.10	0.10
	8/1/2018	ENER	0.0199	± 0.0032	0.007	0.016	---	---	---	---	---	---	---	---

TABLE B.6-2 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
0951R	11/27/2018	ENER	0.0313	± 0.0051	0.010	0.011	---	---	---	---	---	---	---	---
0998	3/15/2018	ENER	0.0101	± 0.0016	< 0.030	0.010	3.5	0.30	0.100	---	---	---	---	---
0999	3/15/2018	ENER	0.0035	± 0.0006	< 0.030	0.009	2.7	0.10	0.100	---	---	---	---	---

APPENDIX C

ANNUAL ALARA AUDIT

ANNUAL ALARA AUDIT REPORT FOR 2018

Grants Operations
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February 28, 2019

ABSTRACT

The Annual ALARA Audit for 2018 was conducted by Janet Johnson, PhD, CHP on December 4 and 5, 2018 at the Homestake facility in Grants, New Mexico. Data for the first three quarters of 2018 were reviewed during the on-site audit. Fourth quarter 2018 data were not available at the time of the on-site audit but were reviewed subsequently, after receipt of laboratory reports and the November and December 2018 Monthly ALARA Reports. The audit was conducted in accordance with Section 2.3.3 of U. S. Nuclear Regulatory Guide 8.31 (RG 8.31) (USNRC, 2002a) and License Condition 42 of Radioactive Materials License SUA-1471, Amendment 52. 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) and instrument calibrations. The Standard Operating Procedures (SOPs) were reviewed by an outside contractor with input from the site Closure Manager and the Radiation Safety Officer.[1] All records were found in substantial compliance with the RG 8.31 guidance. The records were easily available, clear and transparent. The site is well maintained. The Radiation Safety Program at the Homestake facility is well-organized and implemented. There were no findings resulting from this ALARA audit. However, there are a few recommendations primarily regarding record-keeping and modifications to calculation spreadsheets.

[1] The Radioactive Materials License (RML) references a Radiation Protection Administrator (RPA). The RPA role was formerly performed by the site Closure Manager (CM). Radiation safety responsibilities now rest primarily with the contract Radiation Safety Officer (RSO) and Alternate RSO.

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1.0 INTRODUCTION

The Annual ALARA Audit (the Audit), required by License Condition 42 of Homestake Mining Company of California's (HMC) Grants Uranium Mill facility (NRC Materials License Number SUA-1471, Amendment 52), was conducted on December 4 and 5, 2018 at the facility in Grants, New Mexico, by Janet A. Johnson, PhD, Certified Health Physicist (CHP) in accordance with the provisions of the U. S. Nuclear Regulatory Commission's Regulatory Guide 8.31 (NRC, 2002a). Mr. Thomas Wohlford, site Closure Manager (CM) for Barrick as well as Mr. Randy Whicker, Radiation Safety Officer (RSO) and Mr. Chuck Farr, Alternate Radiation Safety Officer (ARSO) contracted through Environmental Restoration Group (ERG), were present at the Audit opening on December 4, 2018. In addition, Mr. William Archuleta, Senior Shift Supervisor and Radiation Safety Technician (RST), Mr. Kyle Martinez, RST, and Mr. Brad Bingham, Safety, Health, and Environmental Compliance Officer (SHECO) attended the opening meeting and assisted with the audit.

Mr. Tom Wohlford has been the CM since the first quarter of 2017. Mr. Randy Whicker, CHP, assumed the position of RSO in March 2017 through the Safety and Environmental Review Panel (SERP) process documented in March, 2017. The Homestake facility is in the process of a self-assessment as required by the Confirmatory Order modifying NRC License Number SUA-1471 issued by the NRC on March 28, 2017. License Amendment 52, issued on June 15, 2018 is the currently applicable License Amendment. However, License Amendment 51 was in effect for the first part of 2018. Homestake submitted an application for an updated license amendment in November 2018. The changes that are requested in that amendment application include (but are not limited to) deleting or amending conditions that are out of date such as revising the title of the Radiation Protection Administrator in the license to Radiation Safety Officer consistent with current usage and Regulatory Guide 8.31. The license amendment application notes that the Regulatory Guides referenced in the current license are designed to be applicable to operating uranium recovery facilities whereas the Homestake facility is no longer an operating facility. The Radiation Protection Program should be commensurate with current radiological conditions at the site. Revision 2 of the Radiation Protection Program Manual is designed to reflect the existing site conditions (HMC, 2016c) .

Homestake added two new permanent staff members in 2018: Health, Environment, and Safety Coordinator and a Site Hydrologist. Three new staff members were hired to fill existing positions for a total of 11 permanent staff members.

1.1 Site History

The HMC 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.

The facility consists of the decommissioned mill site, two tailings impoundments, three evaporation ponds a reverse osmosis plant and a zeolite groundwater treatment facility. The mill buildings have been decommissioned and disposed to backfilled trenches on site. Soil cleanup has been mostly completed except for areas near the evaporation impoundments. A radon barrier has been installed on the large tailings pile (LTP) 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 LTP 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 constructed in the RO facility in 2015 and 2016. Amendment 50 to License added the zeolite treatment facility as part of the Corrective Action Plan (CAP).

Homestake property in the vicinity of the facility covers approximately 14,000 acres. The NRC license boundary area covers 1074 acres and includes the LTP, Small Tailings Pile (STP), three Evaporation Ponds (EP-1, EP-2, and EP-3), two collection ponds (East and West), the RO facility, and two Zeolite systems as well as maintenance, warehouse and office areas. The "Restricted Area" is not defined in previously existing Site documentation; however, the Radiation Protection Program (RPP) Manual (HMC, 2018c) defines "restricted areas" in association with Radiation Work Permits (RWP) that require a temporary area of restricted access for specific projects as warranted at the discretion of the RSO. The "Controlled Area", also defined in the RPP Manual, consists of fenced areas that encompass major facilities (e.g. tailings piles, evaporation ponds, RO plant, and office complex). Appropriate signage is posted at major access points (e.g. radioactive materials caution signs and no trespassing warnings).

1.2 ALARA Audit Requirements

NRC Regulatory Guide 8.31 and License Condition 42 require an annual review of the radiation protection program (ALARA Audit) including following data:

- Employee exposure records
- Bioassay results
- Inspection log entries
- Training program activities
- Radiation safety meeting reports
- Radiological survey and sampling data
- Reports on overexposure of workers
- Operating procedures reviewed during the period covered by the audit.

In addition, the ALARA audit includes reviews of the following:

- Trends in personnel exposures, for identifiable categories of workers and types of operation activities
- Use, maintenance, and inspection of equipment for exposure control
- Recommendations to further reduce personnel exposures.

The qualifications and training of the health physics staff were also reviewed during the audit.

1.3 2018 Activities

Activities conducted in 2018 included continued groundwater collection and treatment, operation of the reverse osmosis (RO) system and operation of zeolite treatment units as well as general site maintenance and environmental and radiological monitoring. New membranes were installed in RO2 and RO3 during 2018. In the past, a mixture of clean water and treated water was used to flush the groundwater through tailings within the LTP via injection wells. The flushing operation was terminated in 2015. Water from groundwater extraction 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. At the time of the December 4-5, 2018 audit, the RO plant was running at approximately 600

gallons per minute. The RO plant removes all contaminants of concern from the groundwater. The original zeolite water treatment facility was designed to operate at a rate of approximately 300 gallons per minute. A new zeolite treatment unit with four additional treatment trains was added in 2016, theoretically increasing the total capacity by 1,200 gallons per minute; however, in practice, if all zeolite units are in operation, approximately 600 gallons of water per minute are treated. One of the zeolite treatment trains is normally undergoing regeneration at any given time. The Zeolite Facility removes uranium only. (At the time of the on-site audit, the zeolite systems were not operating due to frozen piping.)

Groundwater remediation is a three-pronged process. The evaporation ponds receive liquid waste streams from groundwater treatment processes at the site. The RO facility treats impacted on-site groundwater for many constituents of potential concern. The Zeolite units remove uranium only from impacted off-site groundwater.

1.4 Occupational Dose Summary

The personal monitoring protocol was modified in 2016, partially in response to a recommendation from the 2015 ALARA Audit. The protocol, defined in the RPP, requires badging of all Homestake workers with the exception of administrative staff who do not access Controlled Areas (HMC, 2018c). Contractors spending more than five consecutive days on site inside Controlled Areas, are badged. No internal committed effective doses from intake of radionuclides were calculated for workers in past years as there is limited potential for airborne radionuclide sources remaining on the site. An investigation involving breathing zone monitoring during activities associated with 2017 well abandonment on top of the LTP was conducted under a Radiation Work Permit (RWP) issued by the RSO. A previously discontinued procedure for occupational air monitoring (SOP 11) was re-activated and revised for assessment of ongoing airborne radioactive materials concentrations to which workers might be exposed. A comprehensive study of occupational exposures at the Site was conducted between December 2017 and May 2018. This study found a maximum calculated an annual total effective dose equivalent (TEDE) of 53 mrem, with approximately 40 mrem attributable to airborne particulates and radon decay products (Whicker, 2018).

The maximum quarterly occupational radiation deep dose for 2018, as measured by the Optically Stimulated Luminescent (OSL) badges, was 4 mrem. Nearly all badges show doses below the reporting limit of 1 mrem in a quarter. The exposure rate at the control badge location was measured and found to be typical for background in the area. Because internal doses are not routinely calculated, the measured deep dose has in the past been considered equivalent to the total effective dose equivalent (TEDE) for the year. In 2018, internal doses received during RWPs (based on breathing zone air monitoring) will be included in calculated TEDE values for the year, where applicable (i.e. for workers involved with RWPs where air monitoring was required by the RSO). (As of the date of this report, 2018 worker internal dose calculations have not been finalized and thus, only external dosimetry results are discussed herein.) 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 2017 calculated total effective dose equivalents (TEDEs) at HMC4 and HMC5, assumed to be representative of the nearest residents, were 46 mrem/y and 41 mrem/y, respectively, slightly lower that the calculated doses in 2016, 66 mrem/y for HMC-4 and 47 mrem/y for HMC-5 (HMC, 2018b). The 2018 public doses, reported in the Semi-Annual Environmental Monitoring Report for the second half of 2018 and reviewed when the report became available in February, 2019, were 52 mrem/y and 50 mrem/y for HMC-4 and HMC-5, respectively (HMC, 2019b).

The TEDE is calculated by summing the committed effective dose equivalents (CEDEs) 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 2017 dose calculations were reviewed and found to be accurate. More than 95 percent of the calculated dose to the nearest residents in 2017 was due to potential inhalation of radon decay products. The 2018 doses were reviewed when the Semi-Annual Report became available in February 2019. Radon constituted approximately 80% of the calculated TEDE, with direct radiation contributing the remaining 20%. Air particulates contribute a negligible amount to the annual dose, less than 1 mrem/yr. There are no apparent trends in public doses.

2.0 AUDIT RESULTS

The following sections describe the results of the on-site ALARA audit and review of documents, including the monthly ALARA reports (HMC, 2018a, 2019a).

2.1 Routine Operations

Routine operations at the HMC mill site in 2018 involved water treatment and maintenance of treatment systems and environmental monitoring. Bioassay and direct radiation monitoring programs for workers are conducted in accordance with the Homestake Radiation Protection Program Manual (RPP) and associated SOPs and, where applicable, with the requirements of specific Radiation Work Permits (RWPs) issued by the RSO.

2.1.1 Bioassay Data

Homestake Mining Company collects routine urine bioassay samples semi-annually from Homestake employees and contractors who spend more than five consecutive days on site and work inside the Controlled Area. In addition, bioassay samples mandated by RWPs are collected at the start of the activity and at termination. The samples are submitted to Energy Laboratories, Inc. (ELI) in Casper Wyoming for analysis for uranium. For the first part of 2018, the Casper, Wyoming laboratory transferred the uranium bioassay samples to the ELI laboratory

in Helena, Wyoming. The laboratory reports contained a very small notation to that effect. However, there was no indication on the copies of the chain of custody that the samples had been transferred. It is not clear whether they were logged in at the Casper facility then sent on to Helena or were sent to Helena without being logged in. In any case, the chain of custody should have noted the transfer.

A total of approximately 180 bioassay samples (not including spikes and blanks) from employees and contractors were submitted to ELI from January 1 through December 2018. A blank and a spiked sample were submitted with each batch of samples. The samples were accompanied by a standard Chain of Custody form. (As noted previously, the Chain of Custody form did not show the transfer of samples from the Casper laboratory to the Helena laboratory.) One designated sample from each batch was spiked at the Homestake facility to obtain a known concentration of 15 µg/L of uranium. In early 2019 Homestake discontinued that practice based on guidance in Reg. Guide 8.22, Revision 2 (NRC, 2014), which does not specify the need for spikes to be submitted to the laboratory.

It is difficult to track bioassay samples to document that all contractors who worked on the site for more than five consecutive days submitted both entry and termination samples because contractor workers come and go from the site without necessarily notifying radiation safety staff. However, a pending license amendment request will eliminate routine bioassay for such workers. Compliance with bioassay requirements of RWPs (where applicable) appears to be complete.

Federal regulations (10 CFR 19.13) require 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 2018; therefore, written notification is not mandatory; however, it is good practice to inform monitored workers of their badge and bioassay results. Workers are notified if the bioassay result exceeds the laboratory reporting limit. An absence of notification indicates no positive bioassay samples. A form, similar to NRC Form 5 is maintained in the file for each individual monitored employee, including a general statement regarding bioassay. The report is available to the employee on request.

The QA results for each batch of bioassay samples submitted to the laboratory and reports received to the date of the audit were reviewed. All spikes were within the required 30% of the nominal value. All blanks were less than 5 µg/L, the reporting limit. Three contractor urine samples were reported as above the reporting limit during 2018. An entry bioassay, taken in March prior to the individual working on the site, showed a uranium concentration of 19.8 µg/L. Two other members of that crew had bioassay results below the 5 µg/L laboratory reporting limit. A follow-up bioassay showed a concentration less than 5 µg/L. Since the elevated concentration was an entry bioassay, no further follow-up was required. The incident was reported in the April Monthly ALARA Report. The most likely cause of the elevated concentration was contamination in the lab or an intake at a previous job site. However, since the follow-up bioassay was below the reporting limit, it is likely that the anomaly was due to contamination. An April exit bioassay for another contractor showed a slightly elevated concentration at, 7.6 µg/L. No investigation was initiated in accordance with Regulatory Guide 8.22 (NRC, 2014) which requires such action at levels greater than 15 µg/L. No follow-up sample was obtained as the worker had left the site.

An exit bioassay taken on November 19, 2018 in conjunction with RWP #10-2018 for maintenance of the RO unit showed a uranium concentration in urine of 17.3 µg/L. The laboratory report was received after the December 4-5, 2018 on-site audit. The RSO conducted an investigation, as reported in a Technical Memorandum submitted to Homestake management in January, 2019 (Whicker, 2019). The report concluded that the anomalous measurement was due to sample contamination on the basis of airborne radioactivity concentrations as determined by breathing zone measurements and subsequent urine bioassays with results less than 1 µg/L.

2.1.2 Internal Doses

Aside from individuals working under RWPs, internal doses are not assessed because there is little potential for inhalation or ingestion of radioactive materials. Essentially, all potential sources of airborne particulate releases have been covered with radon barrier materials or water in the evaporation ponds. 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.

Studies conducted by the RSO in 2017 on the Large Tailings Pile (LTP), Zeolite Facilities and the Surface Ponds to assess potential worker exposures showed radon and particulate concentrations well below the 10 CFR 20 derived air concentrations (DACs). The RSO conducted a long-term study from December 2017 through May 2018 demonstrating that the maximum potential dose to a worker would be 53 mrem in a year, approximately 10% of the annual dose that would require monitoring (Whicker, 2018).

2.1.3 External Doses

All HMC employees (other than administrative staff) are badged using OSL dosimeters obtained from Landauer, Inc. Badges are exchanged quarterly. The protocol requires badging of HMC employees and contractors who are on site in the Controlled Area for more than five consecutive days. Nine badges were issued to Homestake employees. In 2018, badges were issued to contractors as necessary. The number of badges used in 2018 varied by quarter according to how many contractors were on site for more than five days. Contractor badges are stored on a badge board in the main office. Contractors sign their badges out each day and log them back in at the end of the work shift. The badge log forms were reviewed. Workers appear to be conscientious about logging badges in and out with only a few instances of badges (less than 5%) not logged out.

The maximum quarterly deep dose to a worker in 2018 was 4 mrem. Deep doses ranged from non-detect (ND) to a maximum of 4 mrem. Table 1 summarizes the dose records for the past 8 years.

The doses are recorded and filed annually on a form comparable to the NRC Form 5. Results are provided to individual workers upon request. Previously, the TEDE assigned to workers was limited to contributions from external deep dose equivalent as measured with OSL dosimeters. The CEDE has, in the past, been reported as zero since airborne radionuclide concentrations to which workers may be exposed are not expected to be elevated. The occupational exposures study conducted in 2018, described in Section 2.1.2, verified this expectation (Whicker, 2018). Doses to workers monitored under specific RWPs will be included

in the TEDE. Shallow and lens doses are also reported on the form but are not included in the assigned TEDE value. Individual Dose Reports are not required under 10CFR19.13(b)(1) since no worker doses exceeded 100 mrem per year; however, such notification of monitored workers is a good practice.

Table 1: Annual Deep Doses

	2011	2012	2013	2014	2015	2016	2017	2018
# Badges – Homestake	7	8	7	7	7	9	9	9
# Badges – contractor	55	65	62	114	171	135	74	68
Deep Dose Range (mrem/y)	3 – 59	All ND*	ND to 4	ND to 23	ND to 11	ND to 1	All ND	ND to 4
Mean Deep Dose (mrem/y)	28.2	NA**	NA	NA	NA	NA	NA	NA
Standard Deviation (mrem/y)	12.4	NA	NA	NA	NA	NA	NA	NA

*ND = non-detect
** NA = not applicable

Homestake instituted a reactivated and revised procedure for “Radiological Air Monitoring for Occupational Exposures” (SOP 11) in 2017. Sampling may be required under a RWP, or otherwise at the discretion of the RSO. A six-month study was conducted between December 2017 and May 2018 to address an “unresolved issue” from the September, 2017 NRC inspection (Whicker, 2018). The study which was conducted on the top of the LTP and STP, included, but was not limited to, the following elements:

- Hi-vol general particulate air samples
- Breathing zone samples
- Passive radon monitoring
- Passive external dose rate monitoring
- Durridge RAD7 radon gas monitoring at specified locations
- Radon progeny measurements using the Kusnetz method
- Gamma exposure rate scans of work areas with instruments cross-calibrated to a pressurized ion chamber

The estimated maximum potential occupational dose was 53 mrem/year with more than half of the dose from air particulates during non-routine work under RWPs. This is approximately 10% of the dose at which monitoring would be required. Therefore, the initial assessment from the short-term studies has been verified. However, it should be noted that SOP 11 allows for air monitoring at the discretion of the RSO. Dose assessments indicate that the potential for the annual radiation dose to a worker to exceed 500 mrem is very small, and the pending license amendment would, if approved, eliminate routine dosimetry, bioassay and air monitoring

specifications in the license. (This monitoring will be conducted only if required by the RSO under a RWP).

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 current 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 2018 safety meeting logs were reviewed and found to cover appropriate subjects. However, attendance was not adequately documented in the notebook.

The training records for the radiation safety staff were reviewed. The contract RSO, Mr. Randy Whicker, CHP, attended 40-hour RSO refresher training for uranium recovery facilities in June 2017 to fulfill the biennial refresher training specified in NRC Regulatory Guide 8.31. The two Radiation Technicians, Kyle Martinez and William Archuleta (along with other HMC employees) attended annual Radiation worker refresher training on December 8, 2017 and December 4, 2018 at the Grants site. The training was presented by the RSO. In addition, in 2017 Mr. Martinez and Mr. Archuleta were trained one-on-one by the RSO and ARSO to address the qualifications recommended in Reg Guide 8.31 for Radiation Safety Technicians. The individualized training, approximately 44 hours through December 2017, included: site walkover, general radiation worker training, review of past site activities, hands on instrument training, discussion of dose calculations, etc. Records of this training were reviewed by NRC inspectors and the quantity and content determined to be adequate given the low potential for radiological exposures and since the site is not an operational uranium mill.

Eleven Homestake employees received annual Radiation Worker Refresher Training on December 4, 2018. (One additional employee was trained on June 13, 2018.) The slide presentation was reviewed during the audit. The training is appropriate for the level of hazard at the site. The instructor went over completed tests with the students as part of the training. The tests were signed by the instructor. However, there was no signature on the test for the participant. An attendance sheet was signed by the participants acknowledging receipt of the "radiation safety training applicable to activities conducted at the HMC site in Grants NM."

Contractors receive annual radiation safety orientation through a video with additional information provided by ERG or Homestake radiation safety personnel. A total of 74 contractors were trained by video in 2018. Contractors and new employees complete a test prior to receiving a dosimeter. A sample of the tests was reviewed during the audit. The worker signs the test; however, it is not signed by the trainer. 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. As noted previously, maintaining up-to-date records on contractors is challenging given the temporary nature of their work on site. The trainer should sign each contractor test to verify that the individual received the information.

Homestake occasionally ships samples to laboratories under the “excepted package” (UN 2910) designation which does not necessitate following most of the Class 7 radioactive materials requirements except for training. The RSO and ARSO completed documented hazardous materials transportation training in 2017, within the required three year period. Samples were shipped out of the Homestake facility as “excepted packages” (UN 2910) four times in 2018 as documented in the Monthly ALARA Reports. On two occasions the shipment was prepared and surveyed by the ARSO. Two additional shipments were prepared by other individuals; one by a consultant, Mr. Todd Arrowood (Jacobs) and one by an ERG technician. In both cases, the individuals preparing the shipments had received hazardous materials transportation training within the three year requirement.

2.3 Inspection Reports

Water treatment and management systems are inspected daily. The inspection includes measurement of water levels in Evaporation Ponds 1 and 2 as well as the east and west collection ponds, the spray system, leak detection sumps, and well and tailings embankment conditions, toe sumps, etc. A sample of site inspection forms was reviewed. No issues were found.

The NRC conducted routine on-site inspections on March 26-28, 2018, August 27-30, 2018, and September 10-12, 2018. The inspections included a review of the 16 conditions in the Confirmatory Order (March 28, 2017) and previous NRC inspection findings. The March 26-28, 2018 inspection resulted in a Severity Level IV violation involving “failure to initiate plans within one week to survey for leakage and repair the liner …” (NRC, 2018a). The violations occurred in 2016 and 2017; however, the violation was treated as a non-cited violation because Homestake identified the problem, took short-term corrective actions as well as proposing long-term corrective actions. The NRC concluded that Homestake was otherwise “conducting decommissioning activities in accordance with regulatory and license requirements.”

The August and September inspections resulted in a non-cited violation related to discharge of liquid effluents in excess of license limits. The violation was self-reported and corrective actions were taken (NRC, 2018b).

Homestake entered into mediation with the NRC resulting in a Confirmatory Order issued in March 2017 that was incorporated into the license as LC 44. The Confirmatory Order required a site self-assessment that is ongoing. Some of the requirements in the Confirmatory Order have been completed; however, others remain open as noted by the NRC in its November 26, 2018 inspection report.

2.4 Contamination Surveys

Personal contamination surveys are conducted by individuals trained to perform the surveys by the radiation safety staff in accordance with the requirements of specific RWPs. There is no designated scan out station. This provision was revised in 2018 under the new RPP and respective definition of Restricted Areas based on the requirements of specific RWPs. The survey meters are stored in the radiation technician office. Surveys are conducted using a Ludlum Model 43-93 alpha probe coupled to a Model 2360 meter (or similar alpha survey instrument). The alpha count rate is recorded by hand on Form EDF-15, Personal Contamination Survey Log. According to Procedure SOP 12, the release limit for personal contamination is background.

Equipment release surveys are generally conducted by the RSTs using a Ludlum Model 43-93 alpha/beta probe coupled to a Model 2360 meter. Wipe tests are not necessary unless the measured surface activity exceeds the removable activity limit. The administrative limit is 200 disintegrations per minute (d/m) alpha or beta per 100 square centimeters (d/m-100 cm^2). Monitoring data are recorded on Form EDF-5 and are included in the documentation for the RWP. Several of the forms were reviewed during the audit and suggestions made for improvements (e.g., appropriate units for MDA). The method for determining the counting efficiency for alphas was clarified in that the count per disintegration, i.e., efficiency, is multiplied by a factor of 0.25 to account for actual scan efficiency in the field, as per ISO 7503-1 Annex.

Contamination surveys in clean areas were conducted quarterly during January and February but increased to weekly in March. All areas met the required limit. One area was slightly above the 200 d/m-100 cm^2 administrative limit in March. The “contamination” was demonstrated to be due to radon decay products.

2.5 Radiation Work Permits

Work areas under RWPs are designated as restricted areas with requirements for personal contamination and equipment release surveys unless otherwise specified. Twelve RWPs were issued in 2018 (through the date of this audit, 12-5-18). The RWPs are listed in Table 2, below:

Table 2. Radiation Work Permits Issued in 2018

ID	Issue Date	Title	Bioassay	Other monitoring	Workers trained	Closed
1-2018	3-12	Placing Decks in 1200 Zeolite System	no	Dosimetry, personal contamination survey; equipment release	5	4/5/18
2-2018	3-19	Pulling Spray and Old Lines from Evaporation Ponds 1&2	Yes (entry and exit)	Dosimetry; release surveys; personal contamination surveys	7	4/18
3-2018	3/21	Drilling Deep Well 2R	Yes (entry and exit)	Dosimetry; release surveys; personal contamination surveys	11	4/17
4-2018	4/12	Land Application Hotspot removal	No	Personal contamination surveys; equipment release surveys	5	4/25
5-2018	4-30	Sampling and Shipping Salt in EP-1	Yes (entry and exit)	Personal contamination and equipment release; dosimetry	5	5/3
6-2018	6-5	Leveling and Placing New Zeolite Media and Sand in	no	Dosimetry; personal and equipment release surveys; BZ	3	7/13

		1200 Zeolite System				
7-2018	6/13	Drilling and Handling Tailings from LTP and STP	Yes (entry and exit	Dosimetry; Personal and equipment release surveys; BZ	7	Not closed out
8-2018	8/20	Fixing Plugged Pipes in 300 Zeolite System	Yes (entry and exit)	Dosimetry; personal and equipment surveys; bz	3	Closed out but not signed off.
9-2018 Format changed in September	9/17	Drilling and Sampling on EP-1	Yes (entry and exit)	Personal contamination survey; gamma exposure rate survey; equipment release survey; BZ sampler worn by representative person	4	10/24
10-2018	11/5	Annual RO Maintenance	Yes (entry and exit)	Personal contamination survey; equipment release survey; BZ; dosimetry	6	11/19
11-2018	9/28	Cleaning Algae from 1200 Zeolite Plant	Yes (entry and exit)	Personnel contamination survey; equipment release survey; dosimetry; BZ	4	Open (as of 12/5/18)
12-2018	11/08	Installing Transfer Line from EP#2 to EP#3	no	Personal contamination and equipment release survey	6	Open (as of 12/5/18)

2.6 Radiological Effluent and Environmental Monitoring Data

The Semi-Annual Environmental Monitoring Reports for the periods July through December 2017 and January through June 2018 were reviewed prior to, and during the on-site audit. No issues with the environmental data were identified. The Semi-Annual Environmental Monitoring Report for July through December 2018 was made available after the on-site audit. The public dose calculations were reviewed.

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 (HMC, 2018a, 2019a). Radionuclide concentrations in airborne particulate matter are monitored at seven locations around the site, including four locations at the property boundary in the predominant wind directions, two locations at the boundary representing the nearest occupied residences, and one background location. Filters are exchanged weekly and composited quarterly for analysis by ELI for U-nat, Th-230, and Ra-226 as well as vanadium. The radionuclide data for 2018 were reviewed. No trends or anomalous results were observed. All concentrations were less than 1% of the 10CFR20, Appendix B effluent limits.

The environmental gamma dose rates for 2016, 2017, and 2018 are shown in Table 3. The 2018 gamma exposure rates were consistently slightly higher than for 2016 and 2017, including at the background location. The type of environmental monitor was changed in 2018 from Luxel Area to InLight X9. This may explain the slight increase in measured gamma dose rates in 2018.

Table 3: Environmental Gamma Monitoring Results

Location	Q1-Q2 2016	Q3-Q4 2016	2016 Total	Q1-Q2 2017	Q3-Q4 2017	2017 Total	Q1-Q2 2018	Q3-Q4 2018	2018 Total
	mrem	mrem	mrem	mrem	mrem	mrem	mrem	mrem	mrem
HMC 1	55	55	110	51	61	112	57.5	58.0	115.5
HMC 1A	50	56	106	52	60	112	56.8	59.9	118.7
HMC 2	53	61	114	58	63	121	70.3	63.5	133.8
HMC 3	60	58	118	51	59	110	58.0	65.6	123.6
HMC 4	56	48	104	59	69	128	61.1	68.8	129.9
HMC 5	57	60	117	59	66	125	65.6	65.1	130.7
HMC 6	55	59	114	55	65	120	67.3	62.3	129.6
HMC 16 Background	60	53	113	lost	54	108*	59.5	57.3	116.8

*2017 Q1-Q2 dose pro-rated for the entire year due to the loss of the Q1 environmental dosimeter.

Environmental radon gas concentrations were monitored at ten locations on the site or at the site perimeter as well as in the RO Building and the Mill Office Building using alpha track detectors supplied by Radonova Laboratories (Rapidos). Landauer Rad Trak detectors had been used until third quarter 2016 when Landauer discontinued the line. The Rapidos detectors have a lower detection limit and are designed specifically for environmental use. In the past, three detectors were placed at each location and the measured concentrations averaged. Based on experience using the Rapidos detectors with their greater sensitivity and reproducibility, two detectors are currently co-located at each monitoring location with the measured concentrations averaged.

The quarterly radon concentrations for 2017 and 2018 along with the annual average concentrations for 2016 through 2018 are shown in Table 4. As noted in previous ALARA Audits, the reported concentrations for the detectors deployed outdoors appear to have decreased significantly with the use of the Rapidos detectors (with the exception of 2016 Q4). However, the indoor measurements with the Rapidos detectors appear to be consistent with the Rad Trak measurements. Given the fact that no significant changes occurred on the site at the time of the switch to the Rapidos detector, it is possible that the observed “trend” is due to differences in the sensitivity of the detectors, particularly to Rn-220, in the outdoor environment.

As expected, the highest indoor radon concentrations (RO Building and office) occurred during the first and fourth quarters of 2017 and 2018 (fall/winter months) most likely due to generally reduced ventilation during colder months. The fourth quarter 2017 outdoor radon concentrations are consistently higher than for the previous three quarters. Elevated radon concentrations were also observed in 2016 (using the Rapidos detectors) indicating that this is probably a seasonal effect. The annual average radon concentrations in the RO plant decreased over the past three years. This may represent a trend or normal fluctuations due to differing weather

conditions. The Environmental Monitoring Program is described in detail in the Semi-Annual Environmental Monitoring Reports (Homestake, 2018b, 2019b).

Table 4: Quarterly Radon Gas Concentrations

Location	Radon Gas Concentration (pCi/L)										
	2016 Ave.	2017 Q1	2017 Q2	2017 Q3	2017 Q4	**2017 Ave.**	2018 Q1	2018 Q2	2018 Q3	2018 Q4	**2018 Ave.**
HMC1	**0.91**	0.64	0.64	0.50	1.15	**0.73**	0.83	0.42	0.86	1.1	**0.80**
HMC1A	**0.94**	0.64	0.47	0.37	0.99	**0.62**	0.75	0.45	0.64	1.08	**0.73**
HMC1OFF	**0.95**	0.69	0.60	0.37	1.06	**0.68**	0.79	0.45	0.79	1.15	**0.79**
HMC2	**0.97**	0.74	0.58	0.45	1.09	**0.72**	0.92	0.53	0.77	1.5	**0.93**
HMC3	**0.72**	0.53	0.42	0.50	0.83	**0.57**	0.75	0.48	0.64	0.96	**0.71**
HMC4	**1.1**	0.79	0.51	0.49	1.05	**0.71**	1.01	0.61	0.79	1.15	**0.89**
HMC5	**0.91**	0.66	0.57	0.47	1.01	**0.68**	0.85	0.49	0.82	1.2	**0.84**
HMC6	**0.92**	0.61	0.82	0.40	0.92	**0.69**	0.49	0.54	0.76	0.98	**0.69**
HMC7	**0.85**	0.69	0.57	0.45	1.05	**0.69**	0.84	0.41	0.77	1.2	**0.81**
HMC16	**0.49**	0.35	0.26	0.18	0.49	**0.32**	0.26	0.21	0.37	0.55	**0.35**
HMC Office	**1.46**	2.1	1.5	1.1	lost	**1.57**	2.3	1.4	1.9	2.6	**2.05**
R. O. Plant	**2.03**	1.3	1.45	1.35	2.2	**1.58**	1.35	0.77	1.5	1.5	**1.28**

Radon flux monitoring was performed on the Large and Small Tailings Piles in September and October 2017 (Homestake, 2017) and May 2018 (Homestake, 2018). The procedure for radon flux measurements was modified in 2017 in response to a NOV issued by the NRC resulting from the August 2016 routine inspection.

On September 21-22, 2017 one hundred radon flux canisters were placed on the Large Tailings Pond (LTP); one hundred canisters were placed on the Small Tailings Pond (STP) on October 12-13, 2017. The average measured flux on the top of the LTP was 46.6 pCi/m^2-s. The area-weighted average measured flux on the STP was 3.5 pCi/m^2-s. The area covered by Evaporation Pond 1 was assigned a flux of 0.0 pCi/m^2-s. Assuming no credit for the embankments of the LTP, the average flux exceeds the standard required by the license, 20 pCi/m^2-s. Homestake requested a variance from the flux standard for the top of the LTP as existing groundwater treatment and monitoring wells prevent placement of final radon barrier, and a dose assessment with MILDOS modeling indicates that a variance would not result in exceedances of public dose limits.

Radon flux measurements were conducted on the STP and LTP in May, 2018. The results were reported in the Semi-Annual Environmental Monitoring Report for the first half of 2018 (Homestake, 2018). A total of 100 flux canisters each were placed on the STP and the LTP. The average radon flux on the LTP was 51.3 pCi/m^2-s; on the STP, 12.7 pCi/m^2-s. The flux from the LTP exceeded the 20 pCi/m^2-s regulatory limit. Homestake has requested a variance from that standard from the NRC (HMC, 2017), but NRC requires more detail (NRC, 2017). A revised variance request cannot be developed until NRC makes a determination regarding HMC's 2018 proposal to revise the method for determining public dose from radon (HMC, 2018c). The data are not sufficient to determine a trend; however, it should be noted that the average flux on the STP was somewhat higher in 2018 than in 2017.

2.7 Instrument Calibration Record

The calibration dates on the instruments in service were checked with the records and the instrument calibration labels. The instruments identified by radiation safety staff as currently in use and their calibration dates are given in Table 5. All instruments in current use are in calibration with the calibration records maintained in a three-ring binder. Instruments are calibrated semi-annually in accordance with license conditions and previous license commitments. NRC Regulatory Guide 8.30 guidelines require annual calibration (NRC, 2002b). Homestake transitioned to use of Ludlum alpha/beta survey meter systems in 2018.

The instruments are checked for reproducibility daily when in use in accordance with Regulatory Guide 8.30. The Model 19 microR meters are checked against a Cs-137 source; alpha meters against a Th-230 source; and beta meters, against a Tc-99 source. Two Cs-137 sources are used for the daily checks. The nominal 4.44 µCi source is 25 years old; the nominal 1.275 µCi source is 35 years old. The activities were corrected for decay in 2016. However, the exposure rate check is used just to demonstrate reproducibility from day to day so the activity is not a critical factor.

Table 5: Instrument Current Calibration Dates

Instrument Type	Meter - Ludlum Model # (Serial #)	Probe - Ludlum Model # (serial #)	Most recent Calibration Date
Alpha/beta scaler	3030 (210768)	NA*	1/17/18 7/10/18
Pancake	Model 12 (145977)	Model 44-9 (151416)	09/19/17 Not used
MicroR meter	Model 19 (310400)	NA	4/11/18
MicroR meter	Model 19 (82709)	NA	10/30/18
Alpha	12 (102859)	43-5 (082781)	9/17/18
Pancake	12(227940)	44-9 (237615)	04/26/17 Not used
Alpha/Beta scaler	3030 (245268)	NA	9/13/18
Alpha/Beta survey meter	2360 (334038)	43-93 (372633)	2/14/18 8/30/18
Alpha/Beta survey meter	2360 (334005)	43-93 (372636)	2/14/15 9/17/18

*NA = not applicable

2.8 Review of Standard Operating Procedures and SERPs

Standard Operating Procedures are contained in the RPP Manual (HMC, 2018b) and the Homestake Manual of Standard Practices Policy Guidance Documents and Standard Operating Procedures. A single controlled copy of the document is maintained in the office of the CM. All procedures have undergone review as part of the self-assessment required under the Confirmatory Order (NRC, 2017) and License Amendment Number 49. Additional SOPs were developed or existing SOPs revised in 2018, including SOP 11 – Radiological Air Monitoring for Occupational Exposures (HP-1). A new Radiation Protection Program Manual has been developed and undergone revision in 2018 (HMC, 2018c).

Four Safety and Environmental Review Panel (SERP) evaluations were conducted in 2018 as described in Table 6. The SERPS were reviewed and found to be appropriate. However, the NRC in its November 26, 2018 inspection report concluded that more information "could have been provided" to assist inspectors and staff to understand the rationale and associated conclusions (NRC, 2018b).

Table 7: SERPs issued in 2018

ID	Subject	Results
SERP 18-01	Evaluation of proposed sampling and geochemical testing of alluvial aquifer and tailings waters and solids (WME)	License Amendment not required – may be approved by SERP
SERP 18-02	Evaluation of proposed relining of EP-1	RWP required; license amendment not required.
SERP 18-03	Re-seed land application areas with native vegetation to decrease dust	No RWP required; no cultural sites within the land application areas; no license amendment required.
SERP 18-04	Use of polymer to enhance flocculation in the clarifier to reduce the potential for microfiltration shut down due to fouling.	License Amendment not required

2.9 Source Leak Tests

Three sources used for instrument calibrations (Th-230, Tc-99, and Cs-137) are leak tested annually. The most recent leak tests were conducted on September 12, 2018 with the results reported in the August ALARA Report (dated September 12, 2018). All leak tests showed removable activity below the required 0.0005 µCi limit.

Sources that are not currently in use are stored in a locked source cabinet with "Caution, Radioactive Materials" signage. The exposure rates at the surface of the source cabinet, measured in January 2017, ranged from approximately 75 µR/hr at the front to a maximum of 250 µR/hr at the side. A wipe test performed on the source cabinet at that time showed alpha and beta counts in the range of background levels.

A total of 59 sources are listed in the 2018 inventory. The source inventory was checked in August, 2018. All sources were accounted for. The four sources currently in use, (Th-230 [15,520 d/m], Tc-99 [12,670 d/m], Cs-137 [1.275 µCi as of 10/6/80] and Cs-137 [4.44 µCi as of 10/26/90]), are stored in the source cabinet.

2.10 Review of Radiation Protection Data and Exposure Control

Radiation protection data, including personal dosimetry, bioassay results, and RWPs, indicated that the program is protective of worker radiation health. No deficiencies were found. The results of the bioassay and personal dosimetry monitoring are described in Sections 2.1.1 and 2.1.3, respectively.

Radon concentrations were measured in two occupied or potentially occupied locations on the site using alpha track detectors. The results are shown in Table 7. Radtrak detectors supplied by Landauer were used until third quarter 2016 when Landauer discontinued that line. Since that time, Rapidos detectors supplied by Radnova Laboratories have been used for both indoor and outdoor radon concentration measurements. The Rapidos detectors are more sensitive than the previously used Radtrak detectors and tend to be more consistent. As a result, rather than three detectors, as was the case previously, two radon detectors are deployed at the outdoor environmental monitoring locations and one each at indoor locations within the HMC office and RO plant. Measurements in the occupied indoor locations, are within the range of average indoor values for the United States, i.e. approximately 1 to 3 pCi/L. All annual average radon concentrations were less than the EPA guideline for residences. Radon concentrations in RO plant dropped significantly after the first quarter of 2015. Ventilation in the RO Building appears to be operating properly to control radon concentrations. The radon concentrations in the RO plant have decreased slightly over the past three years. It is not clear whether this is a trend or simply due to normal variation.

Table 7: Radon Concentrations for Monitored Indoor Locations

	HMC office (pCi/L)	**RO Plant (pCi/L)**
2015	2.0	2.5
2016	1.46	2.03
2017	1.57	1.58
2018	2.05	1.28

2.11 Unusual Events

The only unusual events reported in 2018 involved three urine bioassay measurements that exceeded the 5 µg/L reporting limit for the laboratory. One of the three was an entry bioassay at approximately 19 µg/L. Follow-up bioassay measurements showed results less than 5 µg/L. No further investigation was conducted. A second bioassay measurement was slightly above the reporting limit but less than the 15 µg/L level that would require investigation. One bioassay collected at termination of work under RWP 10-2018 showed a uranium concentration slightly above 17 µg/L. The incident was investigated and a report prepared (Whicker, 2019). Based on air monitoring data for the individual and subsequent bioassay measurements, the elevated bioassay was determined to be contamination either during sample collection or in the laboratory.

Homestake contracted with an outside consultant to review regulatory compliance issues in response to a NOV issued in April 2017 and a 2017 Confirmatory Order included in the NRC radioactive materials license. The review is ongoing.

2.12 Review of 2017 Audit Findings and Recommendations

The 2017 ALARA Audit contained four recommendations as follows:

1. Revise the monthly ALARA Report template to reflect the fact that two, rather than three, radon detectors are co-located at each measurement site.
   Completed

2. The monthly ALARA Reports are very useful and informative. It would be helpful to a reviewer put the report date in the footer.
   Recommendation still active.
3. The license or RWP SOP should define what is a "significant potential" for radiation exposure to eliminate confusion regarding when an RWP is required.
   Recommendation addressed in Revision 2 of the RPP.
4. Contractors and Homestake workers should sign the training test. The RSO or other individual conducting the training and grading the test should also sign or initial the test.
   Contractors and Homestake workers sign tests. Recommendation for trainer to sign tests is still active.

3.0 SUMMARY OF AUDIT

3.1 Findings

There were no Findings from this ALARA Audit. The ALARA program at the Homestake facility complies with license conditions, regulatory requirements and the guidance provided by US NRC Regulatory Guide 8.31 (NRC, 2002a). Regulatory Guide 8.31 requires the ALARA Audit to review of trends in personnel exposure. Quarterly doses for badged workers are very low, generally below the reporting limit, and have been consistent for the last five years. Therefore, there are no trends to report. There are no discernable trends in environmental radon, air particulates or direct radiation measurements. Public doses have also been generally consistent for the past five years. Homestake requested a change its method of calculating public dose from radon, the largest contributor to total dose, in a response to a Request for Additional Information (RAI) dated August 20, 2018 (HMC, 2018d).

3.2 Summary of Recommendations

There are several recommendations from this audit.

3.2.1 Develop a method for ensuring that safety meeting records are kept up-to-date.
3.2.2 Adjust the beta efficiency calculation to be consistent with the ISO requirements for lower energy betas.
3.2.3 Modify the air particulate and radon decay product spreadsheets to properly calculate efficiency based on 2π emission rate from the calibration source. (Note: This recommendation was satisfactorily addressed at the time of the audit.)
3.2.4 Include the instructor signature or initials on contractor tests.

3.3 Significant Improvements in 2018

The radiation protection program at the Homestake facility is well-designed and continues to operate at a high level of competence. The procedures and the Radiation Protection Program were reviewed in 2018 resulting in updated versions that are designed to ensure compliance with the license and 10 CFR Part 20.

4.0 REFERENCES

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APPENDIX D

INSPECTION OF TAILINGS PILES AND PONDS

AND

ELEVATION SURVEY OF THE SETTLEMENT MONUMENTS ON TOP OF THE LARGE TAILINGS PILE SETTLE

2018 Annual EOR Inspection

Annual Inspection of Tailings and Ponds

February 11, 2019

Prepared for:

Homestake Mining Company of California

Prepared by:

Stantec Consulting Services Inc.

Rev.	Description	Author		Quality Check		Independent Review	
0	Draft for HMC review	S. Downey	12/3/2018	J. Cumbers	1/21/2019	M. Davis	1/28/2019
1	Final	S. Downey	2/3/2019	J. Cumbers	2/5/2019		

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Executive Summary

This report documents the 2018 site visit and annual Engineer of Record (EOR) inspection of the tailings impoundments and evaporation ponds at the Homestake Mining Company of California (HMC) Grants Reclamation Project (GRP) site (Site), near Grants, New Mexico. Stantec Consulting Services Inc. (Stantec) serves as the EOR for the tailings facility. The site visit for this inspection was conducted by HMC and Stantec personnel on November 8, 2018. This report documents the first annual inspection by Stantec as the tailings EOR.

Stantec visually inspected the crests, toes, slopes, and liners along the crests of the three evaporation ponds (EP-1, EP-2, EP-3) as well as the tops and outslopes of both tailings piles (STP and LTP). The weather was sunny and breezy with temperatures in the mid-40s during the site visit. The ground surface was dry with no standing water.

Large Tailings Pile

Stantec staff walked the large tailings pile toe and crest during the inspection and observed the side slopes from both the toe and crest. There was evidence of animal burrows or damage from wildlife along the slopes of the Large Tailing Pile (LTP). The downdrains installed around the LTP perimeter appeared in good working condition along the side slopes and toe of the LTP. The buried French drains and sumps in the slopes and at the toe of the LTP continue to collect interstitial water draining from the LTP tailings. The top surface and crest of the LTP was generally in stable condition. Rilling was present (up to 1 foot deep) on the south/southeast and north portions of the LTP cover. Stantec also observed a sinkhole on the south side of the LTP near the crest by downdrain number 11. The sinkhole exited the LTP slope approximately 50 feet down from the crest and was approximately 10 inches in diameter at the crest.

HMC measures water level at the wells and piezometers on top of the LTP monthly, biannually, or annually, depending on the location. HMC took water level measurements on 50 piezometers or wells in 2018. Of the 50 locations with data in 2018, 36 also had data recorded in 2017. Stantec compared the water level elevations between 2018 and 2017 for these 36 locations. Thirty-two locations showed a decrease in water level elevation.

The 2018 settlement monument survey indicates that, of the 48 settlement monuments found and surveyed, 33 showed no change (0 feet), or minor settlement ranging from -0.01 to -0.06 feet (negative denotes settlement), compared with the 2017 survey. The other 15 monuments showed minor heaving since 2017, ranging from 0.01 feet to 0.05 feet. Stantec reviewed settlement monitoring data that was provided by HMC, which included data from 1993, and from 1996 to 2018 for settlement monitoring locations on the LTP. Data analysis of the information provided indicates minimal additional settlement (approximately 0.1 feet per year, or less) since 1999, excluding the 2016 data when a measurement error is believed to have occurred.

Small Tailings Pile

Rills were present along all of the downstream slopes of the Small Tailings Pile (STP) embankments around EP-1. Rills existed underneath the erosion control blanket on the north embankment. The east and north slopes generally had deeper rilling (6 to 8 inches deep). With the exception of the north embankment, the STP slopes are unprotected against erosion but are regraded regularly to correct rilling. Temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation could be considered to reduce the ongoing

slope maintenance. The STP met the required standard for the average radon flux from an operational impoundment, however elevated radon measurements appear to be due to wind erosion of the interim cover resulting in a thinner cover than was specified for the reclamation cover design.

There are significant slumps and benching under the EP-1 liner along the upstream slope near the southeast corner. This appears to result from wave action over time. The slumps and benching continued from the southeast corner to the north (along the east embankment) and to the west (along the south embankment). Weathering cracks are present along most of the liner.

Evaporation Pond 2

Portions of the toe of Evaporation Pond 2 (EP-2) and the crest were walked during the inspection. The upstream embankment slopes are lined with a dual HDPE liner system. The upstream embankment slopes and liner were in stable condition during the inspection. The pond crest and crest road were also in good condition during the inspection. The downstream embankment slopes are protected with a 2-inch gravel (basalt) material and were stable, with no major rilling observed. Stantec reviewed the leak detection and removal system (LDRS) pumping records for EP-2.

Evaporation Pond 3

Stantec walked the toe and crest of Evaporation Pond 3 (EP-3) during the inspection. The upstream embankment slopes and liner were in good condition. Salt deposition was present from being windblown onto the upstream slopes, generally on the east/southeast half of the ponds. The crest road grades away from the pond, and low areas (localized settlement) on the road exist on the west crest. The downstream embankment slopes are not protected and minor rilling exists along the downstream embankments, with more rilling present on the west/northwest embankment. Temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation could be considered to reduce the ongoing slope maintenance. Evidence of animal burrows were present along multiple embankments along the crest. The LDRS sump pumps had precipitate/salt build up at the outlet, where water is pumped back into the pond. Stantec reviewed the LDRS pumping records for EP-3.

Recommended Action Items

Section 9 includes recommended action items. Two action items were rated as “high” priority: (1) to grout the sinkhole observed on the crest of the LTP, and (2) to fill the rills and gullies on the interim top cover of the LTP with additional cover soil. Stantec recommends that annual tailings inspections continue on the current schedule, with the next inspection in November 2019. HMC site personnel should continue regular facility inspection and report changing conditions to the EOR. The action items in this report should be tracked throughout the year by HMC and the EOR for progress and reviewed during the 2019 inspection.

Abbreviations

ALR	action leakage rate
COC	constituent of concern
DOE	Department of Energy
DP	discharge permit
DSI	dam safety inspection
DSR	dam safety review
EAP	Emergency Action Plan
EOR	Engineer of Record
EP-1	Evaporation Pond 1
EP-2	Evaporation Pond 2
EP-3	Evaporation Pond 3
EPA	Environmental Protection Agency
F	Fahrenheit
gpd	gallons per day
gpm	gallons per minute
GRP	Grants Reclamation Project
HDPE	high density polyethylene
HMC	Homestake Mining Company
LDRS	leak detection removal system
LTP	Large Tailings Pile
NM	New Mexico
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of the State Engineer
NMPM	New Mexico Principal Meridian

NPL	National Priority List
NRC	Nuclear Regulatory Commission
O&M	operations and maintenance
PE	Professional Engineer
RO	reverse osmosis
SOP	standard operation procedure
STP	Small Tailings Pile
TDS	total dissolved solids
tpd	tons per day
UMTRCA	Uranium Mill Tailings Radiation Control Act

1.0 INTRODUCTION

This report documents the 2018 site visit and annual Engineer of Record (EOR) inspection of the tailings impoundments and evaporation ponds at the Homestake Mining Company of California (HMC) Grants Reclamation Project (GRP) site (Site). As EOR for the Site, Stantec is required to annually inspect the stability and functionality of the impoundments per Nuclear Regulatory Commission (NRC) Radioactive Materials License SUA-1471, Condition 12 and New Mexico Environment Department (NMED) Discharge Permit (DP) DP-200, Condition 52i. HMC and Stantec personnel conducted the site visit on November 8, 2018.

The GRP site (Site) is approximately 4.5 miles north of the Village of Milan, Cibola County, New Mexico, USA. New Mexico State Highway (NM) 605 is located east of the site and State Route 66 is located to the south-southwest. The main area of the site falls within Sections 22, 23, and 26 of Township 12 North, Range 10 West. HMC owns approximately 14,000 acres over 22 Township Sections (over 22 square miles), which includes the GRP site and surrounding areas.

This is the first annual inspection conducted by Stantec. Stantec reviewed previous inspection documentation for inspections conducted by the previous EOR (Alan Kuhn) from 2002 to 2017.

For reference purposes, the site typically operates in a modified NAVGD29 elevation datum. References to elevation in this document are based on the HMC control network. To convert to NAVD88, add 3.25 feet to the elevations presented in this report.

1.1 OPERATIONAL INFORMATION

Uranium milling operations occurred at the Homestake Facility from 1958 until 1990. Homestake's milling facilities were constructed and originally operated as two distinct partnerships, with Homestake Mining Company acting as the managing partner of both. The larger mill was organized as Homestake-Sapin Partners, with a nominal milling capacity of 1,750 tons per day (tpd). The smaller mill was organized as Homestake-New Mexico Partners with a nominal milling capacity of 1,650 tpd. Both mills were designed to be alkaline leach-caustic precipitation processes for concentrating uranium oxide from ores with average grades of 0.05 to 0.30 percent U_3O_8. The mills operated independently, each with its own tailings impoundments, until 1961, when the partnerships were merged. Homestake-Sapin Partners was the surviving organization. In 1968, United Nuclear Corporation acquired an interest in the partnership, which was bought out in 1981, leaving HMC as the sole owner. In 2001, Barrick Gold Corporation of North America purchased HMC.

Currently, the primary Site activity is containment and treatment of impacted groundwater through a groundwater restoration program. The objective of the groundwater restoration program is to restore concentrations of the constituents of concern (COCs) to levels that meet the site standards, which have been established for each of the impacted aquifers. The site COCs are uranium, selenium, molybdenum, sulfate, chloride, total dissolved solids (TDS), nitrate, vanadium, thorium-230, radium-226, and radium-228. The groundwater restoration project utilizes two zeolite treatment systems and a reverse osmosis (RO) treatment plant. Treatment residuals are managed in three evaporation ponds, which remove water and leave behind COCs as salts in the bottom of the ponds.

1.2 TAILINGS PILE AND EVAPORATION POND DESCRIPTIONS

Two tailings piles were constructed on the GRP site. The first and smaller of the two piles, Small Tailings Pile (STP), contains 1.22 million tons of tailings from ore milled under contracts with the federal government. It is located in the SE ¼ and SW ¼ of Section 26, Township 12 North, Range 10 West, NMPM.

The Large Tailings Pile (LTP), located in the N ½, Section 26, Township 12 North, Range 10 West, NMPM, contains comingled tailings from ore milled under both federal government (11.41 million tons) and commercial contracts (10.89 million tons). Until 1966, HMC deposited tailing material into only one cell of the LTP. Subsequently, HMC added a cell adjacent to and west of the first cell. From 1966 until 1990, tailings disposal alternated between the two cells (east and west) as necessary to maintain optimal operating conditions. Figure 1 shows the locations of the tailings piles and the other site features.

Three evaporation ponds (EP-1, EP-2, and EP-3) were built on site between 1990 and 2006 for the purpose of containing treated water from the groundwater treatment activities. The evaporation ponds were constructed to hold and evaporate water pumped from the collection wells of the groundwater restoration system and to increase storage and treatment to shorten the overall time required for groundwater restoration. Water is transferred between the three ponds as part of the overall water balance and management system. Additional information on the design and construction of the tailings piles and evaporation ponds are included in Section 6.0.

2.0 DOCUMENT AND DATA REVIEW

Stantec personnel reviewed relevant documents prior to and following the site visit. HMC provided Stantec with reports and data prepared for the site since the previous EOR inspection in 2017 (AKA, 2018). Data and documents received in 2018-2019 include:

- Piezometer readings (Hydro Engineering, 2019)
- Collection wells and drainage sumps data
- Leak detection sump discharge monitoring for EP-2 and EP-3 recorded weekly by HMC
- Pond levels recorded weekly by HMC
- Settlement monitoring survey of the LTP by Hammon Enterprises, Inc.
- Report of Annual Inspection of Tailing Impoundments and Ponds (AKA, 2018)

3.0 SITE VISIT

Stantec personnel conducting the inspection included the interim EOR Jason Cumbers, PE and Stephanie Downey, PE. Reginald Shirley (HMC Site Engineer) accompanied Stantec personnel during the site visit.

During the site visit, Stantec personnel met with HMC staff to assess and summarize the current site risks and controls of EP-1 and the upcoming re-lining project. An internal Risk Assessment discussion occurred on November 6, 2018 for the re-lining of EP-1. A site critical controls meeting was held on November 7, 2018.

Following the annual inspection, Stantec personnel discussed observations and action items with Reginald Shirley with HMC. Stantec and HMC agreed on the deficiencies found during the inspection and the necessary corrective actions. Section 9 summarizes these observations and recommended actions.

4.0 ANNUAL INSPECTIONS

Stantec personnel visually inspected the crests, toes, slopes, and liners along the crests of the three evaporation ponds (EP-1, EP-2, EP-3) as well as the tops and outslopes of both tailings piles (STP and LTP). The weather during the site visit was sunny and breezy with temperatures in the mid-40s. The ground surface was dry with no standing water. Appendix A includes tailings pile and pond inspection safety checklist forms.

4.1 SAFETY INSPECTION FORMS AND PHOTO LOG

Stantec utilized a standard dam safety inspection (DSI) form to record observations and other findings during the inspection. The inspection categories and items in the form provide a comprehensive evaluation in accordance with internationally-accepted industry practice. A form was completed for each structure listed above (Appendix A). Select photographs taken during the site visit are included in a photo log (Appendix B).

4.2 LARGE TAILINGS PILE

4.2.1 Inspection

Stantec personnel walked the large tailings pile toe and crest during the inspection and observed the side slopes from both the toe and crest. The tailings side slopes are covered with riprap (D_{50} = 8 inches) and natural vegetation and were in stable condition during the inspection. Windblown sediments existed near the top of the outslopes of the LTP, likely being blown from the top of the LTP over the crest. The windblown sediment caused the slopes to appear uneven or vary in grade from the top to the bottom of the slope. There was evidence of animal burrows or damage from wildlife along the slopes of the LTP. The downdrains installed around the LTP perimeter appeared in good working condition along the side slopes and toe of the LTP.

Water injection into the LTP ceased in 2015 (AKA, 2016). The buried French drains and sumps in the slopes and at the toe of the LTP continue to collect interstitial water draining from the LTP tailings. At the time of the inspection, the ground surface at the toe along the northeast and north slope had significant salts and precipitate. The ground surface at the toe on the north side was also wet along the top of the French drain. HMC notified Stantec that some sump pumps that connect to the French drains were not currently working during the time of the site visit.

The top surface and crest of the LTP was generally in stable condition. Rilling existed (up to 1 foot deep) on the south/southeast and north portions of the LTP cover. Stantec personnel observed a sinkhole on the south side of the LTP near the crest by downdrain number 11 (see photo 44 in Appendix B for general locations). The sinkhole exited the slope of the LTP approximately 50 feet down from the crest and was approximately 10 inches in diameter at the crest. This sinkhole was also present at Stantec's May 2018 site visit. Stantec provided HMC a contractor scope of work to repair the rilling and the sinkhole on the LTP top surface (Stantec, 2018a). Proposed repairs to the sinkhole also consist of grading the top surface and road to drain to the nearby downdrains, rather than draining to the low area that has developed around the sinkhole. Some downdrains also had sediment buildup at the inlets that should be cleaned to allow proper flow.

The zeolite facilities on the LTP appear stable with no apparent impact on the stability of the LTP. The side slopes near the 1200 gpm zeolite facility had rilling present. HMC recently installed new piping near the southwest corner of

the 1200 zeolite plant facilities. Stantec recommends repairing the berm at the toe and side slope above the installed piping (see Appendix B, Photo 11) where the berm material was partially removed, so that slope stability is not compromised.

4.2.2 Piezometer and Settlement Monitoring

HMC records tailings water level data for the LTP monthly. HMC measures water levels for the wells on top of the LTP monthly, biannually, or annually, depending on the location. HMC measured water level on 50 wells in 2018. Of the 50 locations with 2018 data, 36 also had data recorded in 2017. Stantec compared the water level elevations between 2018 and 2017 for these 36 locations. Thirty-two locations showed a decrease in water level elevation, ranging in an annual change of -0.12 feet to -11.58 feet with the average decrease being -3.36 feet. The other four locations (CN2, CN4, EP23, and EP31) showed an increase in water level elevation, ranging from 0.76 feet to 12.81 feet with the average increase being 5.8 feet. CN2 and CN4 are on the north slope and increased 12.8 and 7.4 feet respectively. Conversations with HMC personnel indicate the elevated water levels may be erroneous readings. The water levels at these well locations should continue to be monitored to confirm this. EP23 and EP31 are on top of the LTP in the SE quadrant. At CN2, the reading taken on 11/26/17 showed an elevation of 6586.79 feet, as compared to the 12/19/18 reading of 6600.67 feet amsl. The water levels at this location decreased near the end of 2017 and remained steady until the end of 2018 when the level increased dramatically in a one-month period. Stantec recommends that HMC monitor the north slope in that vicinity and the water levels, in the short-term, to confirm there are no impacts to slope stability. The average collection rate in the sumps was 8.8 gallons per minute (gpm) in 2018, down from the average of 10.4 gpm reported in the 2017 annual inspection report (AKA, 2018). Figure 1 shows the LTP monitoring well locations.

The 2018 settlement monument survey was conducted by Hammon Enterprises, Inc. on September 27 and 28, 2018. Of the 48 settlement monuments found and surveyed, 33 showed no change (0 feet), or minor settlement ranging from -0.01 to -0.06 feet (negative denotes settlement), compared with the 2017 survey. The other 15 monuments showed minor heaving since 2017, ranging from 0.01 feet to 0.05 feet. Five settlement monuments were reported missing (B3, B10, C8, C11, and D8). These monuments have been missing or have no data reported since 2008 or earlier.

HMC provided Stantec with settlement monitoring data from 1993, and from 1996 to 2018 for the settlement monitoring locations on the LTP. The complete set of survey monument elevations is included in Appendix C, along with plots grouping the settlement points together by lines (A through E). Settlement contours on Figure 2 show the cumulative settlement (in feet) measured to date.

Stantec consolidated and analyzed the data by plotting the cumulative settlement versus log time. The monument location with the largest and most consistent cumulative settlement was selected within each quadrant of the LTP (NW-A4, SW-D3, NE-B9, and SE-D7), as well as three locations from the C-line monuments (C3, C7, and X1). The C-line monuments show the highest cumulative settlement and lie along the centerline dividing the LTP into north and south. One monument was selected from each the east and west quadrants along this line along with X1. Based on review of the settlement data and comparison with the water level elevation contours provided by HMC, the greatest amounts of settlement have occurred in or near areas where the remaining saturation is greatest. The maximum cumulative settlements have been recorded near X1 and near C7. The trends in the dataset are inconsistent, potentially due to the past reinjection program. In general, the settlement data appears to indicate primary

consolidation of the tailings is complete, but long-term secondary consolidation (creep) continues in multiple locations within the LTP.

A systematic survey error likely occurred in 2016 that carried through all of the settlement measurements. This error resulted in the majority of the settlement monuments showing large heaving (up to 0.53 feet), rather than settlement (AKA, 2018). There has been minimal additional settlement (approximately 0.1 feet per year or less) since 1999, excluding the 2016 data. Settlement monitoring data and plots are included in Appendix C.

4.2.3 French Drain Tailings Sumps

HMC provided Stantec with the 2018 flow rate data for the sumps connected to the French drain located at the base of the tailings, near the near toe of the LTP. Figure 1 shows the French drain sump locations, including E-1, E-2, East Reclaim, N-1, S-1, W-1, and West Reclaim. The E-2 and West Reclaim sumps did not record flow during 2018. Cumulative flows for all sumps on a monthly basis ranged from 7.2 to 9.5 gpm, with an average cumulative monthly flow of 8.8 gpm. The flow rates do not appear to vary seasonally.

4.3 SMALL TAILINGS PILE

4.3.1 Inspection

Rills existed along all of the downstream slopes of the STP embankments around EP-1. Rills were present underneath the erosion control blanket on the north embankment. The east and north slopes generally had deeper rilling (6 to 8 inches deep). With the exception of the north embankment where erosion control blankets have been installed, the STP slopes are unprotected from erosion but are regraded regularly to correct the impacts from erosion. Temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation could be considered to reduce the ongoing maintenance of the outside slopes.

The overall averaged measured radon flux from the STP in 2018 was 12.7 pCi $m^{-2}s^{-1}$ (ERG, 2018), which is below the radon flux limit (20pCi $m^{-2}s^{-1}$) specified in 10 CFR 40 Appendix A. Although the STP met the required standard for the average radon flux from the operational impoundment, HMC has expressed concern regarding elevated 2018 radon flux measurements from the STP interim cover along the crest of the EP-1 east embankment. These elevated measurements appear to be due to wind erosion of the interim cover resulting in a thinner interim soil cover than was specified for the reclamation cover design. Stantec conducted radon calculations for this location and a significant increase in soil thickness is required to meet the 20pCi $m^{-2}s^{-1}$ standard. Additional fill is viable as a temporary solution to address the elevated radon flux; however, it may be most effective if combined with temporary erosion control measures to prevent windblown loss of interim cover soil.

4.3.2 Evaporation Pond 1

EP-1 is on top of the STP and is in operational condition. Stantec personnel walked portions of the toe and crest of EP-1 during the inspection. One evaporator was operating during the visit, and the south and west embankments were observed while driving in a truck to avoid the overspray.

There are significant slumps and benching under the EP-1 liner along the upstream slope near the southeast corner. This appears to result from wave action over time. The slumps and benching continued from the southeast corner to

the north (along the east embankment) and to the west (along the south embankment). Weathering cracks are present along most of the liner. Stantec completed a feasibility study to re-line EP-1, which was submitted to NMOSE and NMED for approval in December 2018 (Stantec, 2018b). Implementation of the re-lining would correct the side slopes.

For freeboard calculations, the pond depth from bottom to crest was assumed to be 15 feet, and the minimum freeboard requirement is 2 feet. Therefore, the maximum allowable water depth is 13 feet for EP-1. The maximum water depth recorded by site personnel in 2018 was 11.5 feet with a freeboard of 3.5 feet. The minimum freeboard requirement was not exceeded in 2018 for EP-1.

4.4 EVAPORATION POND 2

4.4.1 Inspection

Stantec personnel walked portions of the toe of Evaporation Pond 2 (EP-2) and the crest during the inspection. Five evaporators were operating on EP-2 during the visit, and personnel observed the south and east embankments while driving in a truck to avoid the overspray. The upstream embankment slopes are lined with a dual HDPE liner system. The upstream embankment slopes and liner were in good condition during the inspection. The pond crest and crest road were in good condition during the inspection. The downstream embankment slopes are protected with a 2-inch gravel (basalt) material and were in good condition, with no major rilling observed. There were small shrubs and vegetation growing on the downstream slopes. Where observed, the leak detection and removal system (LDRS) pumps were in good condition.

4.4.2 Data Review

In 2018, HMC recorded weekly leakage rates through the LDRS. The water may leak through the primary liner, which is then collected in sumps between the primary and secondary liners, and then pumped out from each sump. The water pumped out is discharged directly back into the pond. Water volume removed through the collection sumps are recorded weekly and records are maintained on site.

LDRS Zones 1 and 5 were offline in 2018, therefore no data was collected. The standpipe collapsed in each of these zones, and the sump pump could not be returned to the bottom of the pipe after it was removed for general maintenance. Zone 2 had high pumping rates above the Action Leakage Rate (ALR) (775 gpd/acre) from mid-March to the end of April, and again for three weeks in August. On October 29 and December 3, the pumping rates also exceeded the ALR. Leakage rates above the ALR for Zone 2 ranged from 998 to 3,191 gpd/acre. Zone 3 exceeded the ALR once on April 23, 2018, where the leakage rate was 1,186 gpd/acre. Zone 4 did not exceed the ALR in 2018, and leakage rates ranged from 0 to 54 gpd/acre.

For freeboard calculations, the pond depth from bottom to crest is assumed to be 25 feet, and the minimum freeboard requirement is 2 feet. Therefore, the maximum allowable water depth is 23 feet for EP-2. The maximum water depth recorded in 2018 was 22.1 feet with a freeboard of 2.9 feet. The minimum freeboard requirement was not exceeded for EP-2 in 2018.

4.5 EVAPORATION POND 3

4.5.1 Inspection

Stantec personnel walked the toe and crest of Evaporation Pond 3 (EP-3) during the inspection. The upstream embankment slopes are lined with a dual HDPE liner system. The upstream embankment slopes and liner were in good condition during the inspection. Salt deposition was present from being windblown onto the upstream slopes, generally on the east/southeast half of cells A & B. The pond crest and crest road were in good condition during the inspection. The crest road grades away from the pond, and low areas on the road exist on the west crest. Tire marks were present on the liner around the corners of the pond due to traffic driving on the crest road. Stantec recommends that HMC install traffic protection to each corner along the crest road to protect the liner, forcing traffic to turn outside of the exposed liner. The downstream embankment slopes are not protected and minor rilling exists along the downstream embankments, with more rilling present on the west/northwest embankment. Temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation could be considered to reduce the ongoing maintenance of the outside slopes.

Evidence of animal burrows exists along multiple embankments along the crest. The LDRS sump pumps had precipitate/salt build up present at the outlet, where water is pumped back into the pond.

4.5.2 Data Review

HMC recorded weekly leakage rates through the LDRS. In 2018, cells A-1, A-3, and A-4 were offline, and no measurements were recorded. The pump in each of these cells was removed for general maintenance, and the casing pipe collapsed. The sump pump could not be returned to the bottom of the LDRS. Cells A-2 and A-5 exceeded the ALR in late 2018. Weekly measurements from September 3 to December 10 for Cell A-2 shows leakage rates above the ALR for all measurements except one (the measurement on September 24 was below the ALR). The leakage rates range from 1,243 to 2,575 gpd/acre. Freeboard during this period ranged from 2.20 to 3.30 feet. Cell A-5 had four leakage rate measurements exceeding the ALR on September 10 and 17 and October 1 and 8. The leakage rates range from 919 to 1,400 gpd/acre and corresponded to freeboard levels of 2.20 to 2.75 feet.

Cells B-3, B-4, and B-5 exceeded the ALR during 2018. Cell B-3 exceeded the ALR in January for two measurements, and also one measurement in March. These leakage rate measurements range from 865 to 3,570 gpd/acre. Cell B-3 also exceeded the ALR in November and December 2018. These leakage rate measurements range from 811 to 1,151 gpd/acre and the freeboard in November and December ranged from 2.90 to 3.25 feet. The leakage rate measurements exceeding the ALR do not always correlate to lower freeboard values; however, leakage rates generally increase as the freeboard decreases (i.e., as the pond fills).

Cell B-4 exceeded the ALR from February 20 to early March. These exceedances were likely due to the pump being offline since the beginning of 2018 and catching up with the water that accumulated over the period. Cell B-5 exceeded the ALR on January 29 but was taken offline and replaced with a new pump. The ALR was exceeded for the measurement after the pump was replaced to remove the water that had accumulated while offline. Cell B-5 did not exceed the ALR for the remainder of 2018.

For freeboard calculations, the pond depth from bottom to crest was assumed to be 13.4 feet, and the minimum freeboard requirement is 2 feet. Therefore, the maximum water depth is 11.4 feet for EP-3. The maximum water

depth in 2018 for EP-3A was 11.2 feet with a freeboard of 2.2 feet. For EP-3B, the maximum water level was 11 feet with a freeboard of 2.4 feet. The minimum freeboard requirement was not exceeded throughout the year for EP-3 cells A and B.

5.0 REGULATORY REQUIREMENTS AND DESIGN CRITERIA

The GRP Site is a Title II Uranium Mill Tailings Radiation Control Act (UMTRCA) site licensed by the NRC under NRC License SUA-1471. The site also has a Discharge Permit (DP-200) with the State of New Mexico Environment Department and is a Federal Superfund site on the National Priority List (NPL) with the Environmental Protection Agency (EPA). The EOR is responsible for the geotechnical stability of the tailings and evaporation ponds. The NMOSE recently changed the status of the evaporation ponds from Low to Significant hazard potential, requiring the completion of Emergency Action Plans (EAP), Operations & Maintenance (O&M) manuals, dam breach and flood routing analysis.

General Strategy

- Tailings are enclosed in covered impoundments.
- Water treatment process water is contained on site in a series of lined evaporation ponds.

Dam Safety and Stability

- Meet current dam safety standards at time of design and construction per NRC, New Mexico Administrative Code (NMAC), and US Department of Energy (DOE).
- Barrick Tailings and Heap Leach Standards apply to the current configuration.
- Provide stability under unfavorable conditions caused by seepage, gravitational and earthquake stresses. Calculated Factors of Safety under these conditions to exceed the following NMAC, 2010; NRC, 2003; NRC, 2008; Barrick, 2016; and DOE, 1989 guidelines for the design of ponds or dams:
    - Long-term Static Stability = 1.5
    - End of Construction = 1.3
    - Post-Construction Liner Failure = 1.3
    - Pseudo-static Factor of Safety = 1.1
- NMOSE/NMED guidelines (NMAC, 2010) recommend design for a seismic event return period not less than 2,500 years for dams classified as significant hazard potential or high hazard potential dams whose sole purpose is for flood control. From HMC requirements (Barrick, 2016) the seismic event return period for high consequence of failure is 5,000 years.

Operations and Closure

- Construction of outer cover slopes is partially completed on the STP without erosion protection and completed with erosion protection for the LTP.
- Regular maintenance is conducted to repair erosional issues.
- Use of erosion protection on outside tailings pile slopes to protect against surface runoff, where required. Drainage ditches are also included to limit surface erosion.
- Integrity of pond liners inspected on a regular basis to prevent loss of containment.

6.0 DESIGN AND CONSTRUCTION

6.1 SITE GEOLOGY

The site is located in the southeastern part of the Colorado Plateau physiographic province and is mostly on the south flank of the San Juan Basin. This region experienced a minor degree of structural deformation (regional folding and block uplift) associated with formation of the Zuni Uplift, which is characterized by a northwest-trending anticline composed of Precambrian crystalline basement rocks overlain by Permian to Jurassic sedimentary rocks. These sedimentary rocks were uplifted during the Laramide Orogeny near the end of the Late Cretaceous through the Eocene, approximately 80 to 40 million years before present (Arcadis, 2013). Bedrock units at the site consist of the Glorietta Sandstone (Early Permian), San Andres Limestone (Early Permian), and Chinle Formation (Late Triassic). As a result of Laramide deformation, these bedrock units have a shallow northeastern dip direction of approximately 3 to 10 degrees (Kelley, 1967).

The surficial soils underlying the site consist of clay underlain by silty sand to sand with silt to a depth of 7 feet. The clay is low in plasticity, whereas the silty sand was non-plastic (CH2M, 2018). Geologic logs from wells installed on site indicate the alluvium thickness underneath the main area of the site, where the LTP is located, is up to 100 feet thick (CH2M, 2018). The alluvial aquifer consists of discontinuous layers of clay, silt, and sand.

6.2 LARGE TAILINGS PILE

The LTP contains an estimated 21 million tons of tailings in two cells. The tailings piped to the LTP were separated using hydrocyclone equipment. Hydrocycloning separated the tailings by grain size, into a coarse fraction comprised mostly of sand and a fine fraction that contained mostly silt and clay (commonly referred to as slime). The coarse fraction was deposited downstream of the dike crest to raise the dike, and the fine fraction was deposited in the process water ponds. The tailings liquid was recovered using two decant towers and the water reused in the mill process.

From 1966 until 1990, tailings disposal alternated between the two cells as necessary to maintain optimal operating conditions. The starter dike for the LTP was constructed in compacted 6-inch lifts of natural soils excavated from within the tailings impoundment area. The dike was constructed to a height of approximately 10 feet, a width of approximately 10-15 feet at the top, and 25-30 feet at the bottom. The impoundment's perimeter embankment was raised by the centerline method. The LTP includes a series of eight sumps around the perimeter of the pile, connected to a toe drain and French drain that collect tailings seepage.

Interim reclamation of the LTP ended in 1995. This work consisted of regrading the side slopes to 5:1 (horizontal: vertical) and covering these slopes with 3 feet of compacted radon barrier material (sandy clay) and 8 inches of rock. The top surface of the impoundment was covered with a minimum of 0.5 feet of interim soil cover. More soil cover has been added over the years, in 6-inch lifts, to select areas to reduce radon gas emissions. Numerous groundwater collection and monitoring wells are installed in the top of the LTP for remediating the underlying alluvial aquifer. The LTP presently covers approximately 170 acres and is approximately 100-feet tall.

6.3 SMALL TAILINGS PILE

The STP contains 1.22 million tons of tailings. Tailings deposited within this impoundment were contained entirely by an embankment composed of compacted natural soils. The embankment was compacted by heavy equipment and raised to a height of 20-25 feet. The crest was a minimum of 10-feet wide and the base was approximately 40-feet wide. The STP covers approximately 40 acres.

In 1987, HMC committed to contaminated soil cleanup of windblown tailings on site. From 1988 to 1994, the surficial 15 centimeters of approximately 1,200 acres were scraped and a portion was placed on the southern sides and top of the STP. EP-1 was constructed on top of the STP in 1990 and all visible tailings slimes were excavated and placed in the south portion of the STP. The pentagon-shaped STP holds EP-1 on the northern two-thirds of the pile and a contaminated soil and debris disposal area on the southern portion of the pile. After the off-pile soil cleanup was completed, the STP was partially reclaimed between 1993 and 1995 per the NRC-approved closure plan (AK Geoconsult, 1991). An average 1-foot thickness of clean borrow material was placed as an interim cover on the southern portion of the STP, outside of EP-1.

6.4 EVAPORATION POND 1

EP-1 was built in 1990 on top of the STP to assist in the dewatering of the LTP and to hold and evaporate water pumped from the collection wells of the groundwater restoration plan. The pond design was prepared by HMC's contractor, AK Geoconsult, and submitted to the NRC, NMED and NMOSE in June 1990, with approval granted thereafter (AK Geoconsult, 1990). NRC License Amendment No. 7 of SUA-1471 revised License Condition 35 and granted approval by the NRC for construction and operation of EP-1. Operation of the pond began in November 1990.

Construction and performance testing of the liner was completed in November 1990. HMC's contractor, AK GeoConsult, Inc., submitted a Certificate of Construction to the NMOSE on December 5, 1990 stating that the evaporation pond construction was complete. A Completion Report for the construction of EP-1 was transmitted to the NRC, NMED and NMOSE by letters dated April 5, 1991. Stantec has not reviewed formal as-built drawings of EP-1.

EP-1 is lined with a single liner composed of a Deery Oil Liner/fabric, a non-woven fabric impregnated and then overlain with a layer of No. 6 Deery Oil. No. 6 Deery Oil is a petroleum-based asphaltic blend that is applied after being heated to 370 to 400 ºF, and is the same oil commonly used for sealing cracks in road asphalt. HMC has performed repairs on the EP-1 liner over time, where holes or tears were identified in sub-aerial portions of the liner. Most recently in 2017, significant wear and tear was identified on the liner due to the age of the pond (28 years) beyond its design life expectancy (20 years). The total constructed area of EP-1, including bottom and side slopes, is 26.2 acres, with a capacity of approximately 285 acre-feet, allowing for 2 feet of freeboard. The pond depth is 13 feet. Currently water can be transferred from EP-1 to EP-2 or EP-3, when necessary.

EP-1 is the designated final resting place for all classified 11.e(2) uranium impacted material on site during final decommissioning and reclamation activities.

6.5 EVAPORATION POND 2

EP-2 was designed in 1994 by Bateman Engineering and AK GeoConsult, Inc. and constructed in 1995 by Nielsons, Inc. to increase storage and treatment capacity for contaminated groundwater as part of HMC's ongoing groundwater restoration program. Additional surface storage and evaporation capacity was required to increase contaminated groundwater pumping rates to shorten the overall time required for groundwater restoration. The pond and liner designs were prepared and submitted for approval to the NRC, NMED, and NMOSE. The NRC authorized construction and operation of the evaporation pond per License Amendment 19 and the associated new License Condition 39.

EP-2 is located between the STP on the east and the RO collection ponds on the west. The total constructed area of the evaporation pond, including bottom and side slopes, is approximately 17.5 acres with a maximum storage capacity of approximately 317.4 acre-feet. The maximum pond depth is 25 feet, and the freeboard requirement is a minimum of 2 feet. The pond has compacted earthen embankments created from the alluvial soil excavated from the pond area. The earthen embankment along the southern side of the pond, at its highest, is 20 feet above native ground surface. Water is transferred from the East Collection Pond to EP-2 and from EP-2 to EP-1 as needed. Water can also be transferred back to EP-2 from EP-1.

A two-part HDPE lining system was installed in the pond with a leak detection/drainage layer between the two HDPE liners. There are five leak detection cells. The HDPE liner consisted of an upper primary liner of a thickness of 60 millimeters and a secondary liner of 40 millimeters thickness. All seams were wedge-welded (hot-shoe welded) except for the corner and west tie-in seams. After installation, performance testing identified leak points in the primary liner and repairs were made before the pond was put in service.

HMC notified the NRC and the NMED on November 14, 2017 of identified pumping rates in portions of EP-2 leak detection system were pumping higher than the ALR of 775 gallons per day per acre foot of storage. This ALR is per the NRC License Condition 35D. Also, as per Condition 35D, the pumps are required to be activated whenever water levels within the leak detection sumps rises above one foot of hydraulic head. HMC indicated that, with respect to the exceedances, the secondary liner had remained effective and there was no discharge to the environment. HMC completed an investigation of the leak detection cells in EP-2 which determined that some submersible pumps and/or the hydraulic sensors to control pumping had failed. Replacement pumps and sensors were installed and HMC modified the Standard Operating Procedure (SOP) for the evaporation ponds to include manual water level measurements of the leak detection cells to confirm water levels are remaining below one foot of hydraulic head as per License Condition 35D.

During site decommissioning and reclamation activities, EP-2 may have to be used as final resting place for classified 11.e(2) uranium impacted material if there is not sufficient space in EP-1.

6.6 EVAPORATION POND 3

EP-3 was designed by Kleinfelder in October 2006 and approved by the NRC in August 2008 (Kleinfelder, 2006). Construction was completed for EP-3 in November 2010 and it was placed into operation January 2011. EP-3 consists of two cells (A and B) each with an approximate size of 13.3 acres (total of 26.6 acres). The maximum depth of EP-3 is 13.4 feet with a minimum freeboard requirement of 2 feet. The two cells provide a storage capacity of approximately 286 acre-feet for temporary retention and evaporation of contaminated groundwater. The pond is lined

with a dual HDPE liner and a HDPE geonet interstitial leak detection system. There are five leak detection systems for Basin A and five systems for Basin B. The primary liner is 60 millimeters thick and the secondary liner is 40 millimeters thick. The NRC-licensed boundary was extended to include EP-3. EP-3 will be decommissioned once site restoration activities are completed and the pond liner and any salts/sediments will be disposed of in the final closure cell of EP-1.

HMC notified the NRC and the NMED on November 14, 2017 of identified pumping rates in portions of EP-3 leak detection system were pumping higher than the ALR of 775 gallons per day per acre-foot of storage. This ALR is per the NRC License Condition 35D. Also, as per Condition 35D, the pumps must be activated whenever water levels within the leak detection sumps rises above one foot of hydraulic head. HMC indicated that, with respect to the exceedances, the secondary liner remained effective and there was no discharge to the environment. HMC completed an investigation of the leak detection cells in EP-3 which determined that some submersible pumps and/or the hydraulic sensors to control pumping failed. Replacement pumps and sensors were installed and HMC modified the SOP for the evaporation ponds to include manual water level measurements of the leak detection cells to confirm water levels remain below 1 foot of hydraulic head as per License Condition 35D.

7.0 DAM HAZARD CLASSIFICATION REVIEW

The three evaporation ponds were re-classified by the NMOSE from *low* hazard to *significant* hazard. The NMOSE recommends that dams classified as high or significant hazard be inspected at least every 5 years by a professional engineer licensed in the state of New Mexico. Dams classified as *low* do not require DSRs, per the NMOSE requirements. For dams classified as *low* or *significant*, NMOSE requires that the owner re-evaluate the hazard classification if a downstream development occurs. HMC internal policy requires a DSR every 7 years for facilities classified as *high* failure consequence in the transition phase. Stantec is scheduled to conduct a DSR for the GRP tailings in May 2019.

Stantec is conducting a dam breach analysis for Evaporation Ponds 1, 2, and 3, and is creating O&M Manuals and ERPs for each pond, as required by NMOSE regulations.

8.0 RECOMMENDED ACTION ITEMS

The tailings impoundments and three evaporation ponds are generally in stable condition, with the exceptions and recommendations described in the above sections. Stantec completed a feasibility study in 2018 to address the effects of the aging EP-1 liner. The EP-1 re-lining design report was submitted to NMOSE and NMED in December 2018 and is currently being reviewed. Construction is planned to begin as early as July 2019, pending NMOSE and NMED approvals. HMC should continue to observe EP-1 and note changes in the side slopes, conditions of the liner, and embankments.

Stantec advised HMC that managing erosion control through rill management and grade control is needed annually to maintain stability of the tailings impoundments and evaporation ponds. The sinkhole and drainage issues on the LTP should be addressed as soon as reasonably possible in 2019, and before the rainy season begins in mid to late summer. HMC should notify Stantec when this task is completed and send photos, survey data, etc. to Stantec. Stantec will visually inspect the changes during the next inspection or site visit. LTP cover repairs should be made to prevent further erosion. Cover placement and material specifications from the reclamation plan must be followed for cover placement.

HMC should continue to observe the LTP outslopes for signs of displacements and for rilling, ponding, or sediment buildup in the downdrains on the top surface. Specifically, Stantec recommends that HMC monitor the north slope and the water levels in the vicinity of piezometer locations CN2, CN4, EP23, and EP31, in the short-term, to confirm there are no impacts to slope stability. Stantec should be notified immediately if additional slumps, sinkholes, erosion through the interim cover, or other deformations are observed. The road surface and top surface of the LTP should be graded to drain to each downdrain, such that no low spots remain in between the downdrains, where water can pond and erode the cover.

HMC should protect the liner exposed at the corners of EP-3 to prevent damage to the liner due to vehicle traffic. To address ALR exceedances, HMC should consider repairs to the damaged leak detection pipes in EP-2 and EP-3 to reinstall the sump pumps so that water (additional head) does not build up on the secondary liners.

Recommendations from the 2018 site visit are outlined below as Action Items and are organized by priority. The timeframes for addressing items within each of the priority designations are:

- **Extreme** - 0 to 3 months
- **High** - 3 to 12 months
- **Medium** - 12 to 18 months
- **Low** - greater than 18 months, or when budgeted

Table 1. Recommended Action Items

Action Item No.	Action Item	Priority	2017 Inspection (AKA, 2018)	2018 Safety Inspection		
				Action Required	In Progress	Status as of January 2019
1	Fill (grout) sinkhole near LTP Downdrain 11 to prevent continued sideslope erosion and eliminate risk for loss of containment.	High	-	X	X	Grouted by HMC 01/31/2019.
2	Fill and compact additional soil over cover rilling on LTP to prevent tailings exposure. Follow existing reclamation plan specifications.	High	X	X	X	Borrow investigation initiated. Additional soil cover placement planned for 2019.
3	Remove surface sediment from near inlets for LTP Downdrains 1 and 2 to prevent clogging.	Medium	-	X	-	-
4	Protect existing settlement monuments on the LTP to prevent equipment damage.	Medium	X	X	X	-
5	Continue site-wide rill management and grade control to minimize erosion. Consider temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation to reduce the ongoing maintenance of the slopes.	Medium	X	X	X	Currently done on annual basis.
6	Regrade LTP interim cover access road to drain to downdrains in all locations around perimeter to prevent ponding and erosion.	Medium	X	X	X	Planned by HMC for 2019.
7	Monitor the LTP north slope and the water levels in the vicinity of piezometer locations CN2, CN4, EP23, and EP31, in the short-term, to confirm there are no impacts to slope stability	Medium		X	X	-
8	Maintain cover side slopes on STP. Consider temporary erosion control measures such as erosion control matting and wattles, gravel surfacing or temporary vegetation to reduce the ongoing maintenance of the slopes.	Low	X	X	-	-
9	Maintain perimeter berms on STP and LTP to prevent concentrated runoff and provide safe vehicle access.	Low	X	X	-	-
10	Install vehicle barriers near corners of EP-3 for liner protection where traffic is encroaching on the HDPE liner.	Low	-	X	-	-
11	Consider repairs to damaged LDRS piping for EP-2 and EP-3.	Low	-		-	

9.0 REFERENCES

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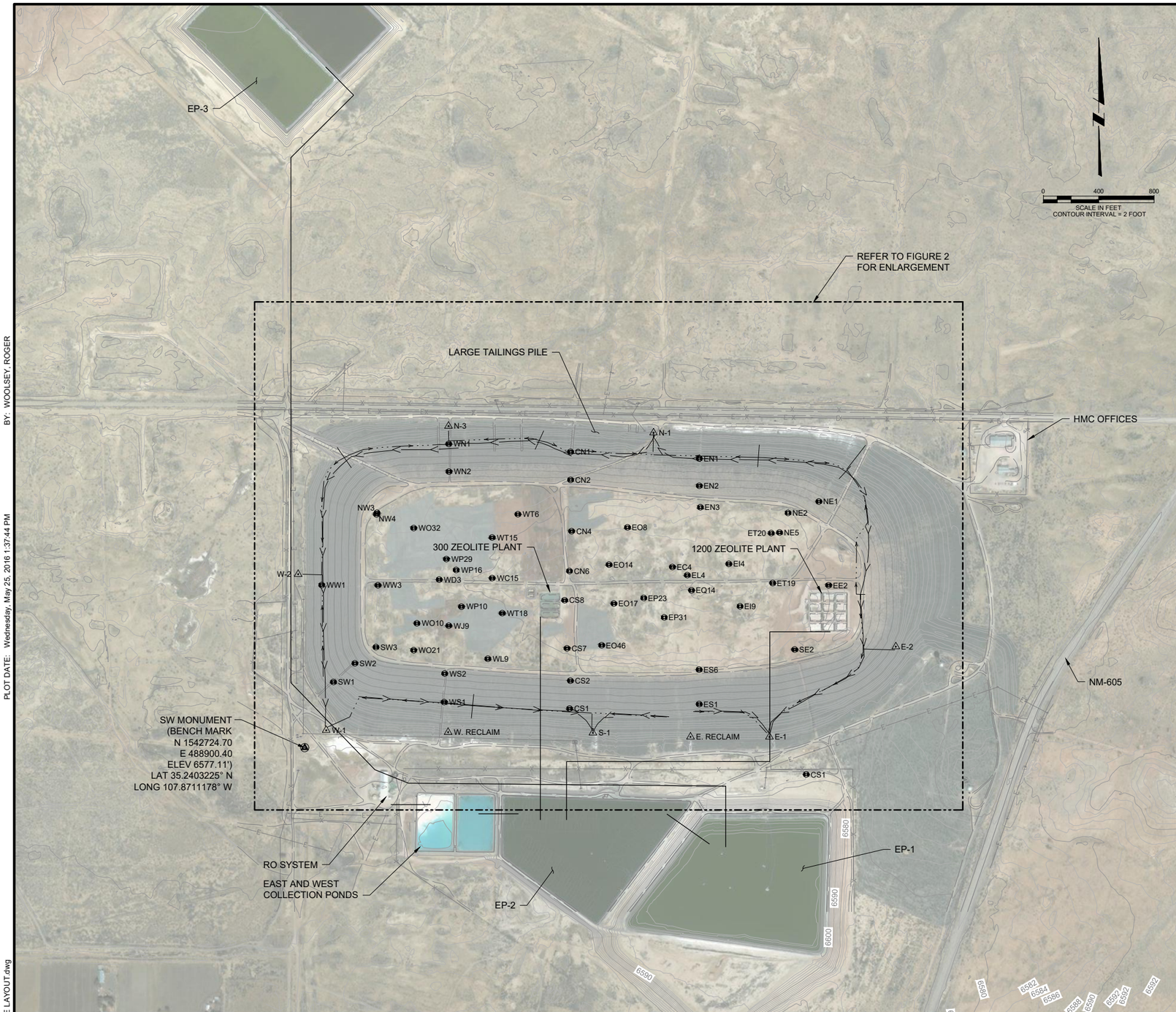
FIGURES



OVERALL SITE PLAN

LEGEND

	EXISTING GROUND CONTOURS
	EXISTING PIPE
	TOE-DRAIN
	FRENCH DRAIN
WN2	SAND AND SLIME WATER LEVEL WELL LOCATION AND IDENTIFICATION
N-1	SUMP LOCATION AND IDENTIFICATION

NOTES

1. EXISTING GROUND SURVEY FROM DECEMBER 12 & 13, 2017. CONTROL RE-ESTABLISHED MAY 23, 2018.
2. COORDINATES ARE REFERENCED TO THE N.M. WEST ZONE STATE PLANE GRID NAD27 AND ADJUSTED TO THE HSMC CONTROL NETWORK.
3. ELEVATIONS ARE REFERENCED TO NGVD29 AND ADJUSTED TO THE HSMC CONTROL NETWORK. ADD 3.25 TO REACH NAVD88.

REV	DATE	BY	DESCRIPTION
A	01/19	RW	ISSUED FOR CLIENT REVIEW

SCALE: 1" = 400'

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED S. DOWNEY
DRAWN S. JONES
CHECKED J. CUMBERS

Stantec

HOMESTAKE — Doing it right... ...Right to the end. — Grants Reclamation Project

GRANTS RECLAMATION PROJECT

2018 ANNUAL EOR INSPECTION
SITE LAYOUT

SHEET 1 OF 2

1

233001293

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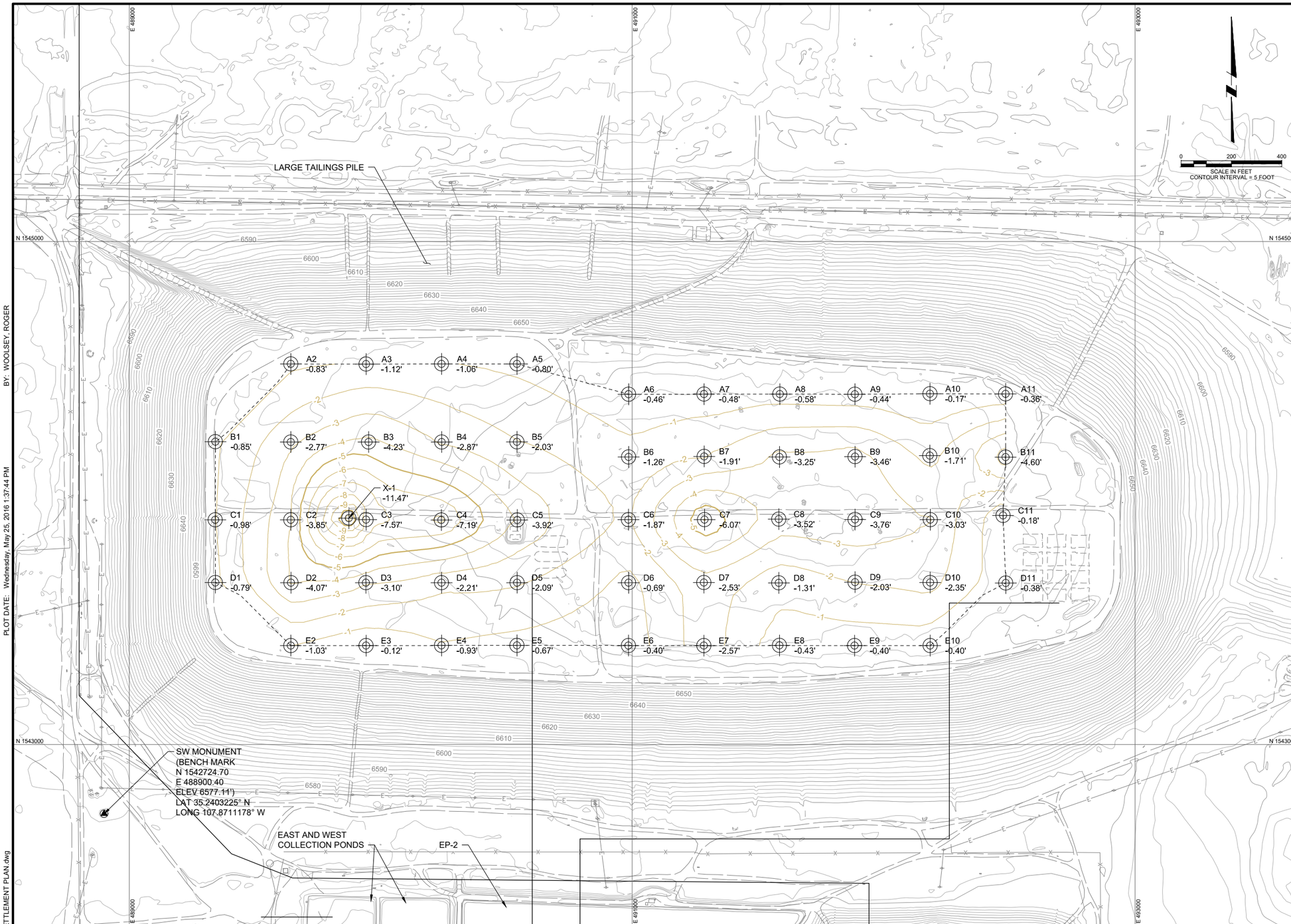
BY: WOOLSEY, ROGER



LEGEND

6630	EXISTING GROUND CONTOURS
-1	CUMULATIVE SETTLEMENT CONTOURS
	EXISTING PIPE
E	EXISTING POWER LINES
X	EXISTING FENCE
A1	SETTLEMENT MONUMENT
-0.83'	CUMULATIVE SETTLEMENT IN FEET, FROM 1993 TO 2018

NOTES

1. EXISTING GROUND SURVEY FROM DECEMBER 12 & 13, 2017. CONTROL RE-ESTABLISHED MAY 23, 2018.
2. COORDINATES ARE REFERENCED TO THE N.M. WEST ZONE STATE PLANE GRID NAD27 AND ADJUSTED TO THE HSMC CONTROL NETWORK.
3. ELEVATIONS ARE REFERENCED TO NGVD29 AND ADJUSTED TO THE HSMC CONTROL NETWORK. ADD 3.25 TO REACH NAVD88.

CUMULATIVE TOTAL SETTLEMENT CONTOURS

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SCALE: 1" = 200'

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED S. DOWNEY
DRAWN S. JONES
CHECKED J. CUMBERS

Stantec

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GRANTS RECLAMATION PROJECT

2018 ANNUAL EOR INSPECTION
CUMULATIVE TOTAL SETTLEMENT CONTOURS

SHEET 2 OF 2

2

233001293

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APPENDICES

Appendix A– SAFETY INSPECTION FORMS

Stantec

TAILINGS SAFETY INSPECTION

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project Structure (circle one): LTP Inspection Date: Nov 8, 2018

Inspector(s): J. Cumbers and S. Downey Weather Conditions: Sunny, windy 45-50° Ground Conditions: Dry

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments:

1. Tailings Top Cover

Is the general condition of cover adequate?	☐ N/A	☐ NO	☒ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Up to 1 ft deep on south side, present on north side of cover also.
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	Minor burrow activity noted
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☐ NO	☒ YES	limited

Additional Comments: Final rock cover constructed on portions of top surface

2. Tailings Crest/Crest Road

Is the general condition of crest surface/road adequate?	☐ N/A	☐ NO	☒ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☐ NO	☒ YES	Sinkhole on south side near downdrain #11, see note
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	
Evidence of surface cracks? Direction? Offset?	☐ N/A	☒ NO	☐ YES	
Evidence of lateral movement?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments: Sinkhole was present at same location during May 2018 site visit, ~10" diameter at surface, exits ~50 ft down slope

3. Tailings Side Slopes

Slope protection material: Riprap D50=6 inches; natural vegetation Uniform or benched slope: Uniform

Slope height: Slope gradient: 5:1

Is the general condition of slope protection inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☐ NO	☒ YES	On south slope where sinkhole exits the side slope
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☐ NO	☒ YES	Along toe, salts/precipitate evident along French drain
Evidence of seepage?	☐ N/A	☐ NO	☒ YES	Wet along top of French drain on north toe

Location(s)? 1. 2. 3. 4.

Measurable flow rate? 1. 2. 3. 4.

Clarity of seepage? 1. ☐ Clear ☐ Muddy 2. ☐ Clear ☐ Muddy 3. ☐ Clear ☐ Muddy 4. ☐ Clear ☐ Muddy

Evidence of wet areas? Location(s)? ☐ N/A ☐ NO ☒ YES Along french drains at toe on north side

Additional Comments: Windblown sediment present along top of slope, near crest. HMC notified Stantec that some sump pumps that connect to the French drains were not currently working during the time of the site visit.

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project Structure (circle one): LTP Inspection Date: Nov 8, 2018

4. Downdrain Structures

Outlet type: HDPE pipe dissipated by large riprap Other water removal systems:

Observed wet areas adjacent to outlet structure?	☐ N/A	☒ NO	☐ YES	
Evidence of displacement or potential disruption of flow in downstream channel?	☐ N/A	☒ NO	☒ YES	
Evidence of debris accumulation or vegetation growth in downstream channel?	☐ N/A	☐ NO	☒ YES	Some downdrains had sediment buildup at inlet

Additional Comments:

5. Instrumentation

Observed: Piezometers: ☒ NO ☐ YES Monitoring Wells: ☐ NO ☒ YES Settlement Monuments: ☐ NO ☒ YES

Other/Notes: Settlement monuments, wells, piping, zeolite treatment plants located on LTP top surface

6. General Observations and Recommendations

LTP in stable condition during inspection. Recommendation to fix surface water drainage issues near downdrains 11 and 12, where sinkhole is present and to fill sinkhole with grout and riprap.

Recommend repairing berm at toe of 1200 zeolite facility near where new piping was installed.

TAILINGS SAFETY INSPECTION

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project Structure (circle one): STP Inspection Date: November 8, 2018

Inspector(s): J. Cumbers and S. Downey Weather Conditions: Sunny, windy 45-50° Ground Conditions: Dry

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments:

1. Tailings Top Cover

Is the general condition of cover adequate?	☐ N/A	☐ NO	☒ YES	Interim cover
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

2. Tailings Crest/Crest Road

Is the general condition of crest surface/road adequate?	☐ N/A	☐ NO	☒ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	
Evidence of surface cracks? Direction? Offset?	☐ N/A	☒ NO	☐ YES	
Evidence of lateral movement?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

3. Tailings Side Slopes

Slope protection material: Sandy clay fill Uniform or benched slope: Uniform

Slope height: 20-25 feet Slope gradient: 5H:1V

Is the general condition of slope protection inadequate?	☐ N/A	☐ NO	☒ YES	No slope protection in place, except north slope
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Rilling present along all side slopes
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Evidence of seepage?	☐ N/A	☒ NO	☐ YES	

Location(s)? 1. 2. 3. 4.

Measurable flow rate? 1. 2. 3. 4.

Clarity of seepage? 1. ☐ Clear ☐ Muddy 2. ☐ Clear ☐ Muddy 3. ☐ Clear ☐ Muddy 4. ☐ Clear ☐ Muddy

Evidence of wet areas? Location(s)? ☐ N/A ☒ NO ☐ YES

Additional Comments: Rilling present under erosion mat on North embankment.

Facility: Grants Reclamation Project Structure (circle one): STP Inspection Date: November 8, 2018

4. Downdrain Structures

Outlet type: HDPE pipe dissipated by large riprap Other water removal systems: _____

Observed wet areas adjacent to outlet structure? ☐ N/A ☒ NO ☐ YES _____

Evidence of displacement or potential disruption of flow in downstream channel? ☐ N/A ☒ NO ☒ YES _____

Evidence of debris accumulation or vegetation growth in downstream channel? ☐ N/A ☒ NO ☐ YES _____

Additional Comments: _____

5. Instrumentation

Observed: Piezometers: ☒ NO ☐ YES Monitoring Wells: ☒ NO ☐ YES Inclinometers: ☒ NO ☐ YES

Other/Notes: _____

6. General Observations and Recommendations

_____

_____

_____

_____

Stantec

DAM SAFETY INSPECTION

Routine Visual Inspection Checklist for Embankment Dam

Facility: Grants Reclamation Project Structure: EP-1 Inspection Date: November 8, 2018

Inspector(s): J. Cumbers, S. Downey Weather Conditions: Sunny, windy 45°-50° Ground Conditions: Dry

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments: Single-lined pond

1. Upstream Slopes of Pond Embankments

Slope protection material: Liner Uniform or benched slope: Uniform

Slope height: 15-20 feet Slope gradient: 4H:1V, 10H:1V (north embankment)

Is the general condition of slope protection inadequate?	☐ N/A	☐ NO	☒ YES	Tears/holes in liner
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☐ NO	☒ YES	Sloughing and benching
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Sloughing under liner on NE and SE corners
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☐ NO	☒ YES	Salts
Evidence of operational activity in upstream area?	☐ N/A	☐ NO	☒ YES	Evaporators, transfer line to EP-1 pump
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

2. Pond Crest/Crest Road

Dam crest surface material: Road base, 1" minus gravel Crest width: 10-25 feet Safety berms: No

Dam constructed in stages?	☐ N/A	☒ NO	☐ YES	
Is the general condition of crest surface inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Rilling from crest through stormwater berm down slope
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of surface cracks? Direction? Offset?	☐ N/A	☒ NO	☐ YES	
Evidence of lateral movement?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-1 Inspection Date: November 8, 2018

3. Downstream Slopes of Pond Embankments

Slope protection material: Sandy clean fill Uniform or benched slope: Uniform

Slope height: 20-25 feet Slope gradient: 5H:1V

Is the general condition of slope protection inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Rilling present on all 4 embankment DS slopes (see additional comments)
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Evidence of operational activity in downstream area?	☐ N/A	☒ NO	☐ YES	
Evidence of seepage?	☐ N/A	☒ NO	☐ YES	

Location(s)? 1. 2. 3. 4.

Measurable flow rate? 1. 2. 3. 4.

Clarity of seepage? 1. ☐ Clear ☐ Muddy 2. ☐ Clear ☐ Muddy 3. ☐ Clear ☐ Muddy 4. ☐ Clear ☐ Muddy

Evidence of wet areas? Location(s)? ☐ N/A ☒ NO ☐ YES

Additional Comments: Rilling present under erosion mat on North embankment

4. Instrumentation

Observed: LDRS Sump Pumps: ☒ NO ☐ YES Staff Gauge: ☐ NO ☒ YES

Other/Notes:

5. General Observations and Recommendations

Stantec

DAM SAFETY INSPECTION

Routine Visual Inspection Checklist for Embankment Dam

Facility: Grants Reclamation Project Structure: EP-2 Inspection Date: November 8, 2018

Inspector(s): J. Cumbers, S. Downey Weather Conditions: Sunny, windy 45°-50° Ground Conditions: Dry

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments:

1. Upstream Slopes of Pond Embankments

Slope protection material: HDPE Liner Uniform or benched slope: Uniform

Slope height: 25 feet Slope gradient: 3H:1V; 5H:1V (east embankment)

Is the general condition of slope protection inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Evidence of operational activity in upstream area?	☐ N/A	☐ NO	☒ YES	Evaporators, transfer pipe
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

2. Pond Crest/Crest Road

Dam crest surface material: Road base, 1" minus gravel Crest width: 15 feet Safety berms: No

Dam constructed in stages?	☐ N/A	☒ NO	☐ YES	
Is the general condition of crest surface inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of surface cracks? Direction? Offset?	☐ N/A	☒ NO	☐ YES	
Evidence of lateral movement?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments: Crest width is 20 feet on east embankment (shared with EP-1).

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-2 Inspection Date: November 8, 2018

3. Downstream Slopes of Pond Embankments

Slope protection material: 2-inch gravel (basalt) Uniform or benched slope: Uniform

Slope height: Varies ~7 ft to 19 ft Slope gradient: 3H:1V

Is the general condition of slope protection inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Evidence of operational activity in downstream area?	☐ N/A	☐ NO	☒ YES	HDPE Pipe
Evidence of seepage?	☐ N/A	☒ NO	☐ YES	

Location(s)? 1. 2. 3. 4.

Measurable flow rate? 1. 2. 3. 4.

Clarity of seepage? 1. ☐ Clear ☐ Muddy 2. ☐ Clear ☐ Muddy 3. ☐ Clear ☐ Muddy 4. ☐ Clear ☐ Muddy

Evidence of wet areas? Location(s)? ☐ N/A ☒ NO ☐ YES

Additional Comments: Small shrubs growing on DS slopes

4. Instrumentation

Observed: LDRS Sump Pumps: ☐ NO ☒ YES Staff Gauge: ☐ NO ☒ YES

Other/Notes:

5. General Observations and Recommendations

DAM SAFETY INSPECTION

Routine Visual Inspection Checklist for Embankment Dam

Facility: Grants Reclamation Project Structure: EP-3 Inspection Date: November 8, 2018

Inspector(s): J. Cumbers, S. Downey Weather Conditions: Sunny, windy 45°-50° Ground Conditions: Dry

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments: Double-lined HDPE pond

1. Upstream Slopes of Pond Embankments

Slope protection material: HDPE Liner Uniform or benched slope: Uniform

Slope height: 14 feet Slope gradient: 3H:1V

Is the general condition of slope protection inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☒ N/A	☐ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☒ N/A	☐ NO	☐ YES	
Evidence of debris accumulation along the slope?	☒ N/A	☐ NO	☐ YES	
Evidence of operational activity in upstream area?	☐ N/A	☐ NO	☒ YES	Salt deposition, generally on East half
Vegetation?	☒ N/A	☐ NO	☐ YES	

Additional Comments:

2. Pond Crest/Crest Road

Dam crest surface material: Road base, 1" minus gravel Crest width: 15 ft Safety berms: No

Dam constructed in stages?	☐ N/A	☒ NO	☐ YES	
Is the general condition of crest surface inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	Crest grades away from pond. Low areas on West crest.
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☒ NO	☐ YES	
Evidence of animal burrows or damage from wildlife?	☐ N/A	☐ NO	☒ YES	1 on north side, near west most L.D.R.S sump, 1 on West side
Evidence of surface cracks? Direction? Offset?	☐ N/A	☒ NO	☐ YES	
Evidence of lateral movement?	☐ N/A	☒ NO	☐ YES	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments: Crest width between two cells in pond is approximately 10 feet.
Add traffic protection to corners to protect liner.

Stantec

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-3 Inspection Date: November 8, 2018

3. Downstream Slopes of Pond Embankments

Slope protection material: None Uniform or benched slope: Uniform

Slope height: ~10 feet Slope gradient: 5H:1V

Is the general condition of slope protection inadequate?	☒ N/A	☐ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☒ NO	☐ YES	
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Minor rilling, more on west side
Evidence of animal burrows or damage from wildlife?	☐ N/A	☒ NO	☐ YES	
Evidence of debris accumulation along the slope?	☐ N/A	☒ NO	☐ YES	
Evidence of operational activity in downstream area?	☐ N/A	☐ NO	☒ YES	Transfer line from EP-1 on D/S face, 16" HDPE pipe
Evidence of seepage?	☐ N/A	☒ NO	☐ YES	

Location(s)? 1. 2. 3. 4.

Measurable flow rate? 1. 2. 3. 4.

Clarity of seepage? 1. ☐ Clear ☐ Muddy 2. ☐ Clear ☐ Muddy 3. ☐ Clear ☐ Muddy 4. ☐ Clear ☐ Muddy

Evidence of wet areas? Location(s)? ☐ N/A ☐ NO ☐ YES

Additional Comments:

4. Instrumentation

Observed: LDRS Sump Pumps: ☐ NO ☒ YES Staff Gauge: ☐ NO ☒ YES

Other/Notes:

5. General Observations and Recommendations

Appendix B - PHOTO LOG

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 1

Photo Location:
LTP Toe North side

Survey Date:
11/8/2018

Comments:
Precipitate build up at toe of LTP

Photograph ID: 2

Photo Location:
LTP Toe

Survey Date:
11/8/2018

Comments:
French drain at toe of LTP

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 3

Photo Location:
LTP Toe

Survey Date:
11/8/2018

Comments:
LTP Slope

Photograph ID: 4

Photo Location:
LTP Surface

Survey Date:
11/8/2018

Comments:
Windblown sediment on LTP north slope

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 5

Photo Location:
LTP Surface

Survey Date:
11/8/2018

Comments:
Final Cover on LTP surface

Photograph ID: 6

Photo Location:
LTP Surface

Survey Date:
11/8/2018

Comments:
Final Cover on LTP surface

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 7

Photo Location:
LTP Surface

Survey Date:
11/8/2018

Comments:
LTP Crest Road

Photograph ID: 8

Photo Location:
LTP Surface Zeolite Facility

Survey Date:
11/8/2018

Comments:
Rilling on berms at zeolite facility

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 9

Photo Location:
LTP Surface

Survey Date:
11/8/2018

Comments:
Rilling on LTP interim cover

Photograph ID: 10

Photo Location:
LTP Crest Road

Survey Date:
11/8/2018

Comments:
Sinkhole on south side of LTP near crest

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 11

Photo Location:
LTP Surface Zeolite facility

Survey Date:
11/8/2018

Comments:
Portion of berm removed to install piping at Zeolite facility on LTP surface

Photograph ID: 12

Photo Location:
EP-1 North Embankment

Survey Date:
11/8/2018

Comments:
Erosion blanket on North Embankment of EP-1

Stantec

Photographic Log

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 13

Photo Location:
EP-1 North US Slope

Survey Date:
11/8/2018

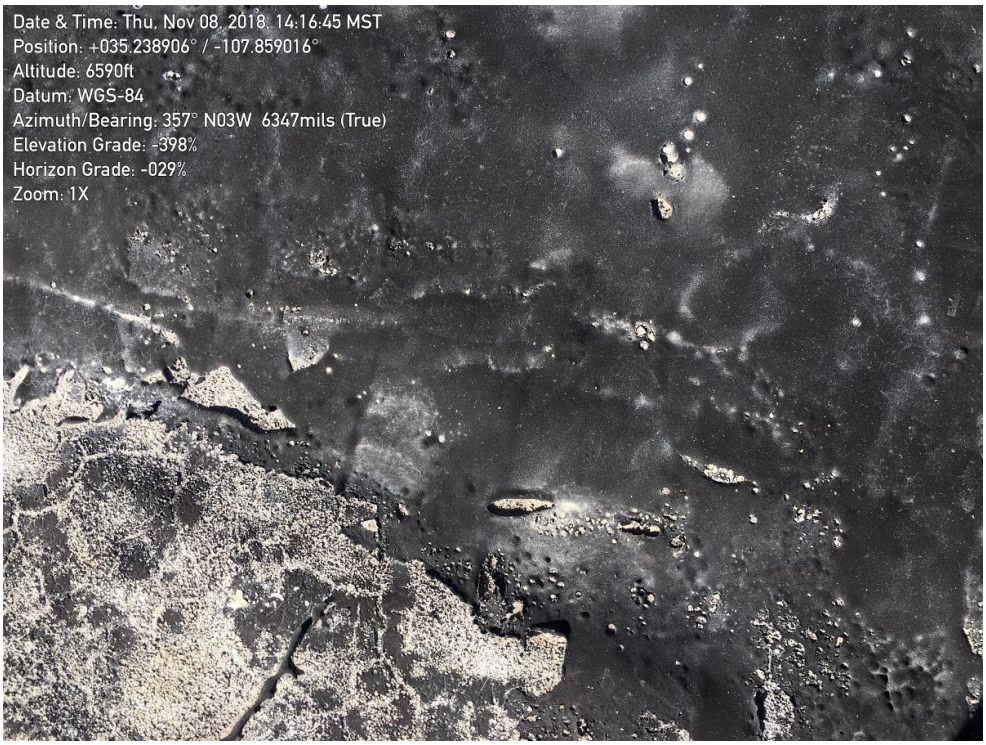
Comments:
Salt precipitate build up on upstream slope of north embankment

Photograph ID: 14

Photo Location:
EP-1 Liner

Survey Date:
11/8/2018

Comments:
Liner condition on EP-1



Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 15

Photo Location:
EP-1 North Embankment

Survey Date:
11/8/2018

Comments:
Transfer pipe and pump at EP-1

Photograph ID: 16

Photo Location:
EP-1 East Embankment

Survey Date:
11/8/2018

Comments:
Downstream slope condition on EP-1

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 17

Photo Location:
EP-1 North Embankment

Survey Date:
11/8/2018

Comments:
Salt precipitate build up on EP-1 US slope

Photograph ID: 18

Photo Location:
EP-1 East Embankment

Survey Date:
11/8/2018

Comments:
Rilling on downstream slope of EP-1

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 19

Photo Location:
EP-1 Southeast Corner

Survey Date:
11/8/2018

Comments:
Benching under liner at southeast corner of EP-1

Photograph ID: 20

Photo Location:
EP-1 South Embankment

Survey Date:
11/8/2018

Comments:
Benching under liner along south embankment

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 21

Photo Location:
STP/EP-1 South Embankment

Survey Date:
11/8/2018

Comments:
Downstream slope of STP/EP-1

Photograph ID: 22

Photo Location:
STP/EP-1 South Embankment

Survey Date:
11/8/2018

Comments:
Downstream slope of STP/EP-1

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 23

Photo Location:
EP-2

Survey Date:
11/8/2018

Comments:
Salt precipitate and rilling on west downstream slope of EP-1

Photograph ID: 24

Photo Location:
EP-2 North Embankment

Survey Date:
11/8/2018

Comments:
Downstream slope of EP-2 north embankment

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 25

Photo Location:
EP-2

Survey Date:
11/8/2018

Comments:
EP-2 evaporators in operation

Photograph ID: 26

Photo Location:
EP-2 South Embankment

Survey Date:
11/8/2018

Comments:
South upstream embankment of EP-2

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 27

Photo Location:
EP-2 South Embankment

Survey Date:
11/8/2018

Comments:
South downstream embankment of EP-2

Photograph ID: 28

Photo Location:
EP-3 SE Embankment

Survey Date:
11/8/2018

Comments:
Rilling on EP-3 by transfer pipe

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 29

Photo Location:
EP-3 SE Embankment

Survey Date:
11/8/2018

Comments:
Downstream Slope

Photograph ID: 30

Photo Location:
EP-3 NE Embankment

Survey Date:
11/8/2018

Comments:
Downstream Slope

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 31

Photo Location:
EP-3 NW Embankment

Survey Date:
11/8/2018

Comments:
Downstream Slope

Photograph ID: 32

Photo Location:
EP-3 SW Embankment

Survey Date:
11/8/2018

Comments:
Downstream Slope

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 33

Photo Location:
EP-3 Crest at south corner

Survey Date:
11/8/2018

Comments:
Crest/Road

Photograph ID: 34

Photo Location:
EP-3 Crest at south corner

Survey Date:
11/8/2018

Comments:
Crest/Road

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 35

Photo Location:
EP-3 Crest

Survey Date:
11/8/2018

Comments:
Salt precipitate buildup on liner

Photograph ID: 36

Photo Location:
EP-3 Pond level

Survey Date:
11/8/2018

Comments:
Freeboard and pond level markings in liner

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 37

Photo Location:
EP-3 Discharge pipe

Survey Date:
11/8/2018

Comments:
Transfer pipe from EP-1 to EP-3

Photograph ID: 38

Photo Location:
EP-3 SE Crest

Survey Date:
11/8/2018

Comments:
Crest/road

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 39

Photo Location:
EP-3

Survey Date:
11/8/2018

Comments:
Sump pump B1

Photograph ID: 40

Photo Location:
EP-3 Sump precipitate

Survey Date:
11/8/2018

Comments:
Precipitate from pumping water leaked through primary liner

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 41

Photo Location:
EP-3 crest

Survey Date:
11/8/2018

Comments:
Animal burrow

Photograph ID: 42

Photo Location:
EP-3 Crest

Survey Date:
11/8/2018

Comments:
Crest/road

Client:	**HMC**	**Project:**	**EOR Annual Inspection**
Site Name:	**Grants Reclamation Project**	**Site Location:**	**Grants, NM**

Photograph ID: 43

Photo Location:
Borrow area

Survey Date:
11/8/2018

Comments:
Potential borrow area west of EP-3

Photograph ID: 44

Photo Location:
LTP

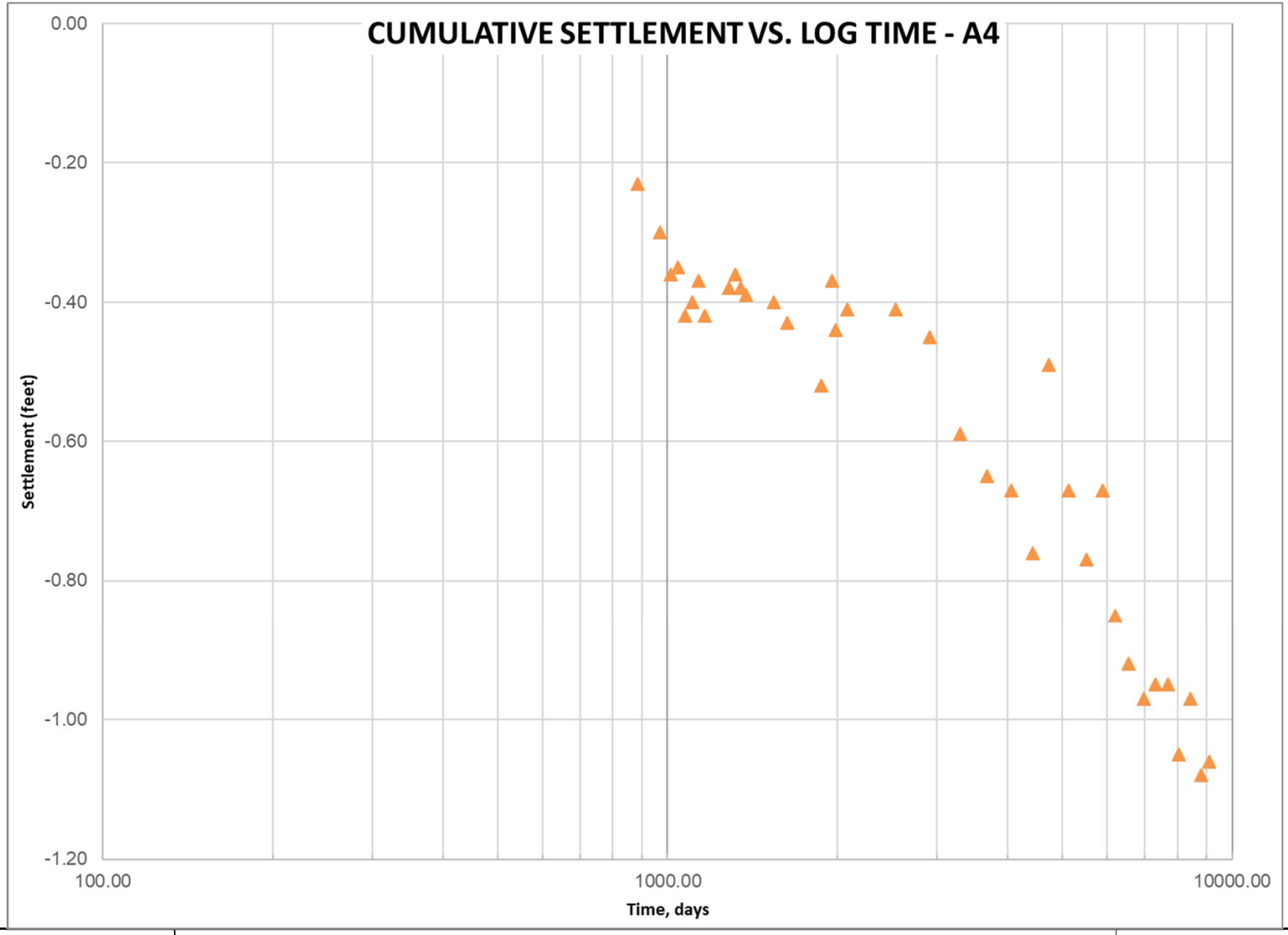
Survey Date:
1/23/2019

Comments:
LTP Aerial - SOW Maintenance

Appendix C– LTP SETTLEMENT DATA AND PLOTS

Date	10/23/1993	3/25/1996	6/18/1996	7/31/1996	8/30/1996	9/30/1996	11/1/1996	12/2/1996	12/31/1996	4/30/1997	6/2/1997	6/30/1997	8/1/1997	1/9/1998	4/8/1998	12/4/1998	3/1/1999	4/1/1999	7/1/1999
A2	6657.15	6657.02	6656.94	6656.85	6656.89	6656.84	6656.92	6656.90	6656.90	6656.92	6656.87	6656.92	6656.88	6656.81	6656.79	6656.77	6656.89	6656.83	6656.86
A3	6657.80	6657.38	6657.30	6657.26	6657.25	6657.22	6657.28	6657.20	6657.22	6657.23	6657.24	6657.27	6657.23	6657.22	6657.14	6657.12	6657.25	6657.18	6657.22
A4	6658.06	6657.83	6657.76	6657.70	6657.71	6657.64	6657.66	6657.69	6657.64	6657.68	6657.70	6657.68	6657.67	6657.66	6657.63	6657.54	6657.69	6657.62	6657.65
A5	6659.67	6659.33	6659.27	6659.23	6659.19	6659.17	6659.19	6659.18	6659.16	6659.22	6659.18	6659.28	6659.22	6659.15	6659.16	6659.08	6659.24	6659.19	6659.20
A6	6665.79	6665.77	6665.57	6665.68	6665.64	6665.59	6665.62	6665.58	6665.57	6665.71	6665.65	6665.67	6665.61	6665.63	6665.57	6665.59	6665.69	6665.62	6665.68
A7	6666.18	6666.21	6666.12	6666.09	6666.06	6666.06	6666.07	6666.05	6666.00	6666.06	6666.10	6666.05	6666.04	6666.03	6666.00	6665.98	6666.09	6666.05	6666.13
A8	6666.68	6666.71	6666.61	6666.53	6666.61	6666.55	6666.54	6666.57	6666.56	6666.51	6666.56	6666.59	6666.60	6666.55	6666.53	6666.50	6666.50		6666.63
A9	6666.41	6666.51	6666.38	6666.40	6666.34	6666.32	6666.31	6666.34	6666.35	6666.36	6666.33	6666.39	6666.28	6666.39	6666.26	6666.27	6666.27		6666.40
A10	6666.16	6666.52	6666.39	6666.40	6666.38	6666.34	6666.33	6666.36	6666.32	6666.37	6666.32	6666.44	6666.32	6666.30	6666.30	6666.28	6666.27		6666.42
A11	6663.97	6664.15	6664.03	6663.99	6663.98	6663.96	6663.99	6664.02	6663.87	6663.97	6664.06	6664.08	6663.96	6663.99	6663.93	6663.96	6663.94	6664.00	6664.09
B1	6656.99	6656.84	6656.75	6656.75	6656.69	6656.66	6656.72	6656.75	6656.63	6656.68	6656.66	6656.75	6656.66	6656.60	6656.59	6656.60	6656.66	6656.66	6656.67
B2	6660.66	6659.11	6658.98	6658.99	6658.94	6658.86	6658.94	6658.99	6658.84	6658.87	6658.82	6658.86	6658.76	6658.65	6658.66	6658.58	6658.68	6658.64	6658.66
B3	6663.21	6659.77	6659.66	6659.60	6659.59	6659.64	6659.54	6659.57	6659.42	6659.51	6659.54	6659.44	6659.42	6659.38	6659.28	6659.24	6659.36	6659.33	6659.35
B4	6664.78	6662.79	6662.67	6662.64	6662.65	6662.56	6662.64	6662.64	6662.51	6662.54	6662.63	6662.61	6662.57	6662.49	6662.45	6662.44	6662.56	6662.50	6662.53
B5	6666.77	6665.47	6665.42	6665.32	6665.36	6665.28	6665.39	6665.30	6665.27	6665.32	6665.28	6665.42	6665.34	6665.30	6665.27	6665.20	6665.35	6665.32	6665.35
B6	6669.34	6669.18	6669.13	6669.06	6669.03	6669.01	6668.97	6668.96	6668.98	6669.05	6668.95	6669.00	6668.90	6668.85	6668.81	6668.73	6668.88	6668.80	6668.84
B7	6673.15	6672.65	6672.48	6672.42	6672.37	6672.32	6672.30	6672.30	6672.23	6672.21	6672.21	6672.23	6672.17	6672.10	6671.96	6671.88	6671.88	6671.91	6671.93
B8	6671.24	6669.31	6669.13	6669.06	6669.02	6669.02	6668.98	6668.97	6668.94	6668.89	6668.91	6668.83	6668.84	6668.76	6668.67	6668.56	6668.58		6668.64
B9	6671.79	6669.71	6669.55	6669.51	6669.46	6669.41	6669.39	6669.38	6669.33	6669.31	6669.32	6669.23				6668.99	6668.94	6669.02	6669.05
B10	6671.75	6670.59	6670.48	6670.44	6670.41	6670.33	6670.37	6670.36	6670.33	6670.29	6670.34	6670.06	6670.27	6670.26	6670.12	6670.10	6670.12	6670.17	6670.22
B11	6666.00	6666.17	6666.05	6666.03	6666.01	6666.03	6665.97	6665.98	6665.96	6666.02	6666.03	6666.11	6665.96	6665.96	6665.97	6665.96	6665.96	6666.04	6666.11
C1	6657.40	6657.20	6657.12	6657.07	6657.05	6657.04	6657.06	6657.00	6657.00	6656.99	6657.03	6657.06	6657.04	6656.97	6656.95	6656.93	6656.85		6657.01
C2	6663.53	6660.71	6660.69	6660.65	6660.66	6660.54	6660.61	6660.49	6660.50	6660.48	6660.48	6660.48	6660.48	6660.39	6660.35	6660.25	6660.21		6660.35
C3	6671.82	6665.95	6665.73	6665.73	6665.65	6665.56	6665.59	6665.43	6665.42	6665.30	6665.31	6665.23	6665.23	6665.12	6665.00	6664.95	6664.87		6665.03
C4	6671.49	6667.26	6667.22	6667.15	6667.15	6667.07	6667.05	6667.03	6667.00	6666.95	6666.93	6666.99	6666.90	6666.85	6666.83	6666.77	6666.73		6666.86
C5	6674.67	6671.55	6671.53	6671.52	6671.52	6671.49	6671.46	6671.46	6671.42	6671.47	6671.45	6671.46	6671.46	6671.36	6671.34	6671.27	6671.28	6671.38	6671.40
C6	6672.27	6671.33	6671.29	6671.28	6671.25	6671.17	6671.18	6671.17	6671.16	6671.20	6671.13	6671.40	6671.06	6671.01	6670.97	6670.95	6670.97	6671.00	6671.05
C7	6676.13	6671.99	6671.76	6671.68	6671.52	6671.53	6671.46	6671.39	6671.41	6671.35	6671.25	6671.24	6671.13	6670.91	6670.87	6670.78	6670.71	6670.78	6670.80
C8	6675.39	6672.56	6672.47	6672.42	6672.38	6672.27	6672.26	6672.22	6672.21	6672.20	6672.16	6672.16	6672.17	6671.99	6671.96	6671.87	6671.89	6671.93	6671.97
C9	6674.67	6671.93	6671.90	6671.86	6671.82	6671.72	6671.69	6671.64	6671.70	6671.62	6671.68	6671.58	6671.56	6671.51	6671.49	6671.40	6671.41	6671.49	6671.54
C10	6675.00	6673.11	6673.01	6673.09	6673.05	6672.88	6672.92	6672.91	6672.89	6672.81	6672.86	6672.85	6672.83	6672.72	6672.69	6672.62	6672.61	6672.66	6672.71
C11	6666.81	6666.80	6666.84	6666.67	6666.69	6666.58	6666.63	6666.59	6666.55	6666.65	6666.63	6666.50	6666.60	6666.56	6666.57	6666.56	6666.56		6666.70
D1	6658.78	6658.57	6658.56	6658.51	6658.54	6658.47	6658.47	6658.59	6658.46	6658.47	6658.46	6658.47	6658.51	6658.42	6658.44	6658.36	6658.31		6658.44
D2	6659.19	6657.80	6657.80	6657.77	6657.81	6657.69	6657.73	6657.72	6657.65	6657.64	6657.64	6657.68	6657.60	6657.59	6657.55	6657.52	6657.48		6657.62
D3	6661.70	6659.53	6659.53	6659.41	6659.49	6659.40	6659.45	6659.39	6659.32	6659.39	6659.36	6659.48	6659.38	6659.36	6659.29	6659.27	6659.22		6659.33
D4	6662.82	6661.38	6661.38	6661.33	6661.36	6661.25	6661.32	6661.29	6661.31	6661.26	6661.31	6661.33	6661.28	6661.22	6661.21	6661.17	6661.11		6661.24
D5	6666.53	6665.12	6665.08	6665.03	6665.12	6664.98	6664.99	6665.09	6665.00	6665.03	6665.04	6665.12	6665.01	6665.00	6665.00	6664.95	6664.95		6665.07
D6	6669.14	6669.08	6669.05	6669.02	6669.07	6668.97	6668.99	6669.03	6669.01	6669.04	6669.03	6669.07	6669.02	6668.97	6668.97	6668.96	6668.96		6669.05
D7	6670.18	6668.64	6668.55	6668.51	6668.54	6668.45	6668.50	6668.47	6668.40	6668.50	6668.36	6668.36	6668.38	6668.26	6668.24	6668.14	6668.14		6668.25
D8	6670.97	6669.78	6669.71	6669.68	6669.76	6669.60	6669.69	6669.65	6669.63	6669.60	6669.65	6669.66							
D9	6670.62	6669.61	6669.56	6669.51	6669.57	6669.42	6669.53	6669.50	6669.37	6669.48	6669.47	6669.39	6669.42	6669.29	6669.24	6669.24	6669.17		6669.29
D10	6670.78	6669.57	6669.50	6669.51	6669.52	6669.38	6669.47	6669.45	6669.31	6669.37	6669.44	6669.38	6669.32	6669.21	6669.15	6669.09	6669.08		6669.19
D11	6665.66	6665.79	6665.62	6665.60	6665.66	6665.58	6665.62	6665.70	6665.56	6665.59	6665.61	6665.69	6665.64	6665.60	6665.58	6665.61	6665.59		6665.72
E2	6657.57	6657.15	6657.07	6657.10	6657.11	6657.04	6657.07	6657.05	6657.14	6657.04	6657.04	6657.06	6657.05	6657.03	6657.04	6657.00	6656.94		6657.07
E3	6657.82	6657.96	6657.92	6657.90	6657.97	6657.83	6657.92	6657.83	6657.83	6657.92	6657.87	6657.97	6657.89	6657.91	6657.90	6657.90	6657.86		6658.00
E4	6656.50	6656.19	6656.13	6656.14	6656.14	6656.09	6656.13	6656.11	6656.17	6656.15	6656.12	6656.03	6656.10	6656.12	6656.18	6656.09	6656.02		6656.16
E5	6661.16	6660.93	6660.87	6660.87	6660.83	6660.78	6660.85	6660.84	6660.84	6660.87	6660.85	6660.93	6660.81	6660.88	6660.86	6660.82	6660.80		6660.92
E6	6665.05	6664.96	6664.92	6664.86	6664.92	6664.83	6664.87	6664.84	6664.87	6664.93	6664.90	6664.94	6664.94	6664.84	6664.86	6664.86	6664.85		6664.95
E7	6666.84	6666.76	6666.88	6666.67	6666.72	6666.63	6666.73	6666.61	6666.64	6666.65	6666.67	6666.70	6666.71	6666.61	6666.64	6666.65	6666.60		6666.75
E8	6666.20	6666.14	6666.08	6666.03	6666.10	6666.01	6666.05	6665.98	6665.99	6666.06	6666.08	6666.11	6666.08	6666.02	6666.03	6666.02	6666.03		6666.18
E9	6665.53	6665.45	6665.37	6665.33	6665.39	6665.33	6665.36	6665.28	6665.30	6665.37	6665.34	6665.36	6665.37	6665.35	6665.39	6665.32	6665.34		6665.47
E10	6665.93	6665.96	6665.86	6665.81	6665.90	6665.83	6665.84	6665.86	6665.80	6665.92	6665.93	6665.87	6665.89	6665.81	6665.83	6665.81	6665.81		6665.95
X-1	6673.16	6664.04	6663.71	6663.59	6663.50	6663.39	6663.38	6663.19	6663.19	6662.94	6663.00	6662.94	6662.88	6662.66	6662.51	6662.43	6662.30		6662.45

Date	10/3/2000	10/10/2001	11/4/2002	11/24/2003	11/29/2004	12/6/2005	10/5/2006	11/8/2007	12/4/2008	12/1/2009	10/12/2010	10/1/2011	12/1/2012	11/4/2013	11/6/2014	11/6/2015	11/29/2016	11/29/2017	9/27/2018	
A2	6656.84	6656.79	6656.72	6656.74	6656.70	6656.69	6656.83	6656.78	6656.62	6656.79	6656.60	6656.50	6656.45	6656.45	6656.44	6656.32	6656.40	6656.29	6656.32	
A3	6657.20	6657.14	6657.01	6657.07	6657.08	6657.03	6655.16	6655.10										6656.71	6656.68	
A4	6657.65	6657.61	6657.47	6657.41	6657.39	6657.30	6657.57	6657.39	6657.29	6657.39	6657.21	6657.14	6657.09	6657.11	6657.11	6657.01	6657.09	6656.98	6657.00	
A5	6659.22	6659.19	6659.03	6659.03	6659.16	6659.12	6659.20	6659.16	6659.04	6659.18	6659.02	6658.96	6658.93	6658.95	6658.96	6658.87	6658.96	6658.87	6658.87	
A6	6665.68	6665.67	6665.53	6665.56	6665.66	6665.62	6665.68	6665.62	6665.53	6665.62	6665.48	6665.42	6665.40	6665.44	6665.43	6665.30	6665.42	6665.33	6665.33	
A7	6666.10	6666.08	6666.01	6665.99	6666.00	6666.05	6666.03	6666.04	6665.91	6666.05	6665.81	6665.84	6665.80	6665.83	6665.81	6665.67	6665.77	6665.67	6665.70	
A8	6666.61	6666.56	6666.49	6666.45	6666.44	6666.55	6666.54	6666.49	6666.33	6666.47	6666.31	6666.25	6666.21	6666.25	6666.21	6666.10	6666.21	6666.09	6666.10	
A9	6666.36	6666.38	6666.25	6666.25	6666.25	6666.38	6666.38	6666.31	6666.15	6666.28	6666.13	6666.07	6666.02	6666.07	6666.03	6665.94	6666.04	6665.92	6665.97	
A10	6666.30	6666.41	6666.30	6666.30	6666.29	6666.34	6666.33	6666.34	6666.15	6666.34	6666.18	6666.11	6666.06	6666.10	6666.06	6665.99	6666.07	6665.94	6665.99	
A11	6663.97	6664.07	6663.95	6663.94	6663.93	6663.95	6663.99	6664.00	6663.81	6664.00	6663.86	6663.78	6663.72	6663.78	6663.74	6663.68	6663.78	6663.65	6663.61	
B1	6656.65	6656.59	6656.50	6656.54	6656.52	6656.51	6656.45	6658.57	6656.44	6656.60	6656.43	6656.33	6656.31	6656.31	6656.26	6656.19	6656.26	6656.18	6656.14	
B2	6658.63	6658.53	6658.44	6658.48	6658.46	6658.45	6658.39	6658.41	6658.30	6658.44	6658.28	6658.16	6658.16	6658.16	6658.13	6657.99	6658.05	6657.92	6657.89	
B3	6659.29	6659.21	6659.09	6659.12	6659.12	6659.07	6658.98													
B4	6662.53	6662.49	6662.35	6662.36	6662.40	6662.33	6662.37	6662.38	6662.31	6662.42	6662.30	6662.16	6662.16	6662.16	6662.12	6662.01	6662.09	6661.97	6661.91	
B5	6665.38	6665.33	6665.22	6665.16	6665.32	6665.20	6665.08	6665.12	6665.02	6665.15	6664.99	6664.87	6664.87	6664.88	6664.84	6664.74	6664.85	6664.76	6664.74	
B6	6668.80	6668.75	6668.60	6668.64	6668.73	6668.69	6668.61	6668.64	6668.53	6668.63	6668.47	6668.40	6668.38	6668.36	6668.31	6668.16	6668.22	6668.10	6668.08	
B7	6671.87	6671.86	6671.77	6671.74	6671.71	6671.79	6671.69	6671.74	6671.60	6671.73	6671.50	6671.51	6671.51	6671.48	6671.44	6671.29	6671.37	6671.24	6671.24	
B8	6668.60	6668.53	6668.49	6668.45	6668.47	6668.56	6668.44	6668.44										6668.00	6667.99	
B9	6670.09	6668.94	6668.81	6668.83	6668.84	6668.98	6668.85	6668.87	6668.68	6668.83	6668.64	6668.59	6668.57	6668.58	6668.52	6668.41	6668.48	6668.37	6668.33	
B10	6670.08	6670.11	6670.02	6670.02	6670.03	6670.04														
B11	6666.01	6666.11	6666.00	6666.00	6666.00	6666.02	6665.94	6665.97	6665.81	6665.99	6665.83	6665.76	6665.73	6665.76	6665.68	6665.68	6665.68	6661.41	6661.40	*2018 survey states B11 was found buried 1.3 feet deep
C1	6657.00	6656.93	6656.83	6656.88	6656.86	6656.83	6656.77	6656.86	6656.73	6656.89	6656.90	6656.63	6656.64	6656.61	6656.62	6656.39	6656.52	6656.39	6656.42	
C2	6660.34	6660.24	6660.17	6660.23	6660.17	6660.21	6660.16	6660.16	6660.00	6660.20	6660.23	6659.93	6659.97	6659.95	6659.91	6659.71	6659.83	6659.72	6659.68	
C3	6665.00	6664.94	6664.84	6664.87	6664.91	6664.71	6664.78	6664.78	6664.68	6664.82	6664.87	6664.54	6664.56	6664.55	6664.48	6664.48	6664.38	6664.27	6664.25	
C4	6667.46	6666.85	6666.68	6666.72	6666.85	6666.69	6666.76	6666.72										6664.33	6664.30	
C5	6671.44	6671.34	6671.25	6671.22	6671.24	6671.31	6671.14	6671.18	6671.11	6671.24	6671.08	6671.02	6671.01	6671.02	6670.94	6670.75	6670.89	6670.74	6670.75	
C6	6671.02	6670.96	6670.82	6670.90	6670.84	6670.96	6670.91	6670.86	6670.75	6670.86	6670.69	6670.62	6670.62	6670.62	6670.54	6670.38	6670.50	6670.38	6670.40	
C7	6670.72	6670.67	6670.58	6670.54	6670.59	6670.61	6670.51	6670.55	6670.39	6670.57	6670.36	6670.32	6670.30	6670.32	6670.26	6670.04	6670.17	6670.06	6670.06	
C8	6671.96	6671.92	6671.89	6671.86	6671.88	6671.95	6671.80	6671.87												
C9	6671.47	6671.48	6671.43	6671.37	6671.40	6671.57	6671.42	6671.39	6671.22	6671.39	6671.39	6671.39	6671.39	6671.39	6671.39	6671.39	6671.39	6670.90	6670.91	
C10	6672.58	6672.58	6672.49	6672.49	6672.50	6672.52	6672.39	6672.42	6672.24	6672.42	6672.24	6672.16	6672.17	6672.20	6672.12	6671.97	6672.11	6671.96	6671.97	
C11	6666.61	6666.70	6666.60	6666.61	6666.63	6666.65	6666.60	6666.63												
D1	6658.44	6658.34	6658.29	6658.34	6658.32	6658.29	6658.23	6658.39	6658.25	6658.41	6658.39	6658.13	6658.17	6658.17	6658.18	6657.95	6658.09	6658.01	6657.99	
D2	6657.59	6657.52	6657.44	6657.48	6657.43	6657.50	6657.43	6657.47										6655.12	6655.12	
D3	6659.30	6659.24	6659.11	6659.16	6659.19	6659.13	6659.01	6659.06	6658.97	6659.04	6659.07	6658.85	6658.91	6658.87	6658.84	6658.66	6658.78	6658.65	6658.60	
D4	6661.26	6661.22	6661.07	6661.12	6661.25	6661.10	6661.12	6661.14	6661.03	6661.12	6661.11	6660.88	6660.93	6660.90	6660.89	6660.66	6660.76	6660.63	6660.61	
D5	6665.11	6665.02	6664.94	6664.93	6665.11	6664.99	6664.90	6664.95	6664.85	6664.93	6664.91	6664.68	6664.71	6664.66	6664.62	6664.44	6664.56	6664.46	6664.44	
D6	6669.05	6669.02	6668.88	6668.91	6668.87	6668.97	6668.88	6668.91	6668.79	6668.88	6668.85	6668.62	6668.68	6668.63	6668.59	6668.43	6668.55	6668.46	6668.45	
D7	6668.16	6668.12	6668.06	6668.00	6668.04	6668.07	6667.96	6668.04	6667.89	6668.02	6668.13	6667.89	6667.91	6667.86	6667.81	6667.64	6667.75	6667.66	6667.65	
D8																				
D9	6669.20	6669.20	6671.43	6669.05	6669.03	6669.20	6669.07	6669.08	6668.90	6669.05	6668.99	6668.80	6668.83	6668.76	6668.72	6668.57	6668.68	6668.59	6668.59	
D10	6669.03	6669.02	6668.95	6668.94	6668.93	6668.94	6668.83	6668.88	6668.67	6668.82	6668.75	6668.58	6668.64	6668.56	6668.53	6668.39	6668.51	6668.40	6668.43	
D11	6665.63	6665.72	6665.69	6665.64	6665.65	6665.68	6665.63	6665.70	6665.53	6665.71	6665.63	6665.53	6665.54	6665.49	6665.49	6665.23	6665.35	6665.24	6665.28	
E2	6657.06	6656.99	6656.92	6656.95	6656.93	6656.90	6656.94	6656.99	6656.83	6657.00	6656.89	6656.73	6656.75	6656.76	6656.76	6656.53	6656.66	6656.58	6656.54	
E3	6658.00	6657.99	6657.88	6657.91	6657.93	6657.88	6657.94	6657.99	6657.88	6658.00	6657.93	6657.79	6657.81	6657.83	6657.83	6657.63	6657.79	6657.73	6657.70	
E4	6656.18	6656.14	6655.96	6655.98	6656.10	6655.91	6656.04	6655.97	6655.84	6655.96	6655.86	6655.72	6655.73	6655.73	6655.75	6655.53	6655.67	6655.58	6655.57	
E5	6660.96	6660.89	6660.80	6660.79	6660.82	6660.80	6660.93	6660.89	6660.76	6660.85	6660.75	6660.71	6660.63	6660.63	6660.63	6660.43	6660.60	6660.50	6660.49	
E6	6664.98	6664.95	6664.85	6664.86	6664.84	6664.91	6665.10	6664.93	6664.84	6664.93	6664.84	6664.72	6664.75	6664.77	6664.77	6664.55	6664.72	6664.68	6664.65	
E7	6666.72	6666.70	6666.62	6666.58	6666.61	6666.66	6666.73	6666.62	6666.56	6666.68	6666.59	6666.46	6666.37	6666.43	6666.40	6666.15	6666.68	6664.28	6664.27	*2018 Survey states E7 was found partially disassembled, 1.94 ft higher if re-assembled
E8	6666.14	6666.12	6666.05	6666.02	6666.02	6666.12	6666.10	6666.07	6665.94	6666.07	6665.98	6665.85	6665.87	6665.87	6665.90	6665.66	6665.83	6665.78	6665.77	
E9	6665.43	6665.45	6665.14	6665.33	6665.32	6665.47	6665.51	6665.45	6665.27	6665.43	6665.34	6665.22	6665.24	6665.23	6665.25	6665.01	6665.19	6665.09	6665.13	
E10	6665.79	6665.90	6665.80	6665.79	6665.75	6665.80	6665.91	6665.85	6665.64	6665.83	6665.74	6665.61	6665.63	6665.62	6665.65	6665.42	6665.57	6665.48	6665.53	
X-1	6662.37	6662.27	6662.16	6662.21	6662.25	6662.04	6662.11	6662.14	6662.05	6662.21	6662.26	6661.93	6661.97	6661.96	6661.90	6661.90	6661.90	6661.74	6661.69	



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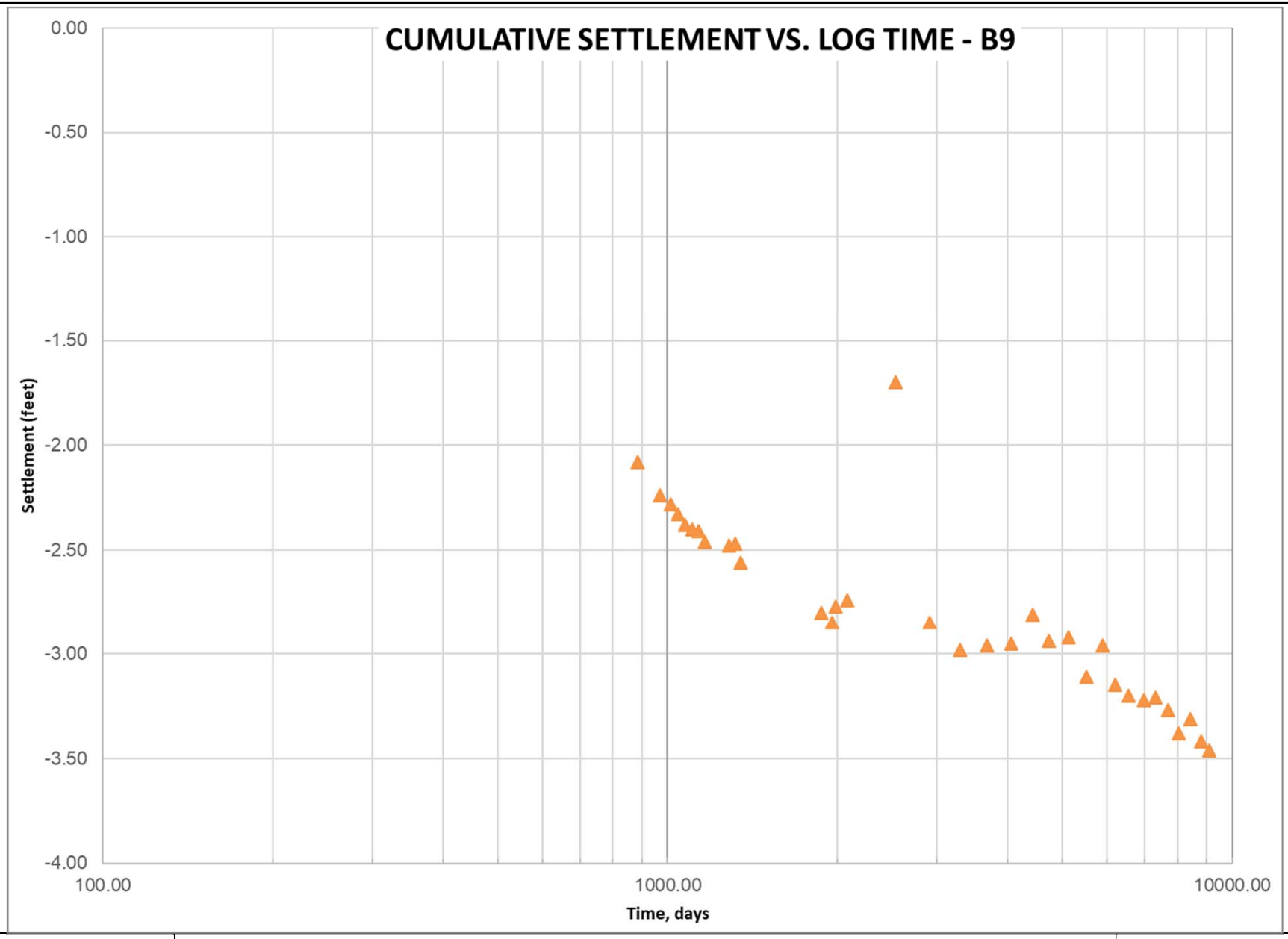
GRP EOR Annual Inspection
Cumulative Settlement Plot for A4

Stantec

Jan. 2019	C-3



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GRP EOR Annual Inspection
Cumulative Settlement Plot for B9

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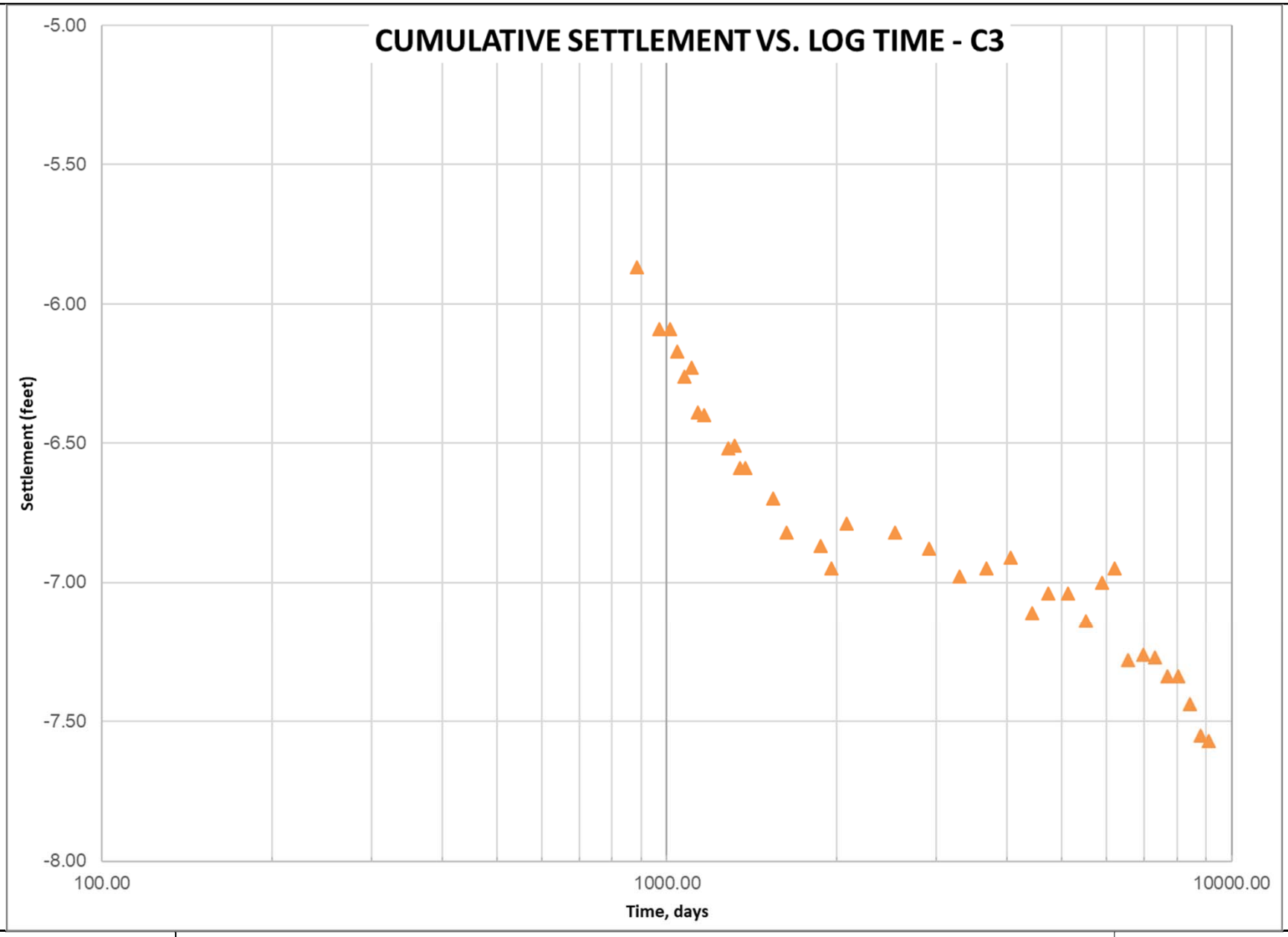
C-4



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GRP EOR Annual Inspection
Cumulative Settlement Plot for C3

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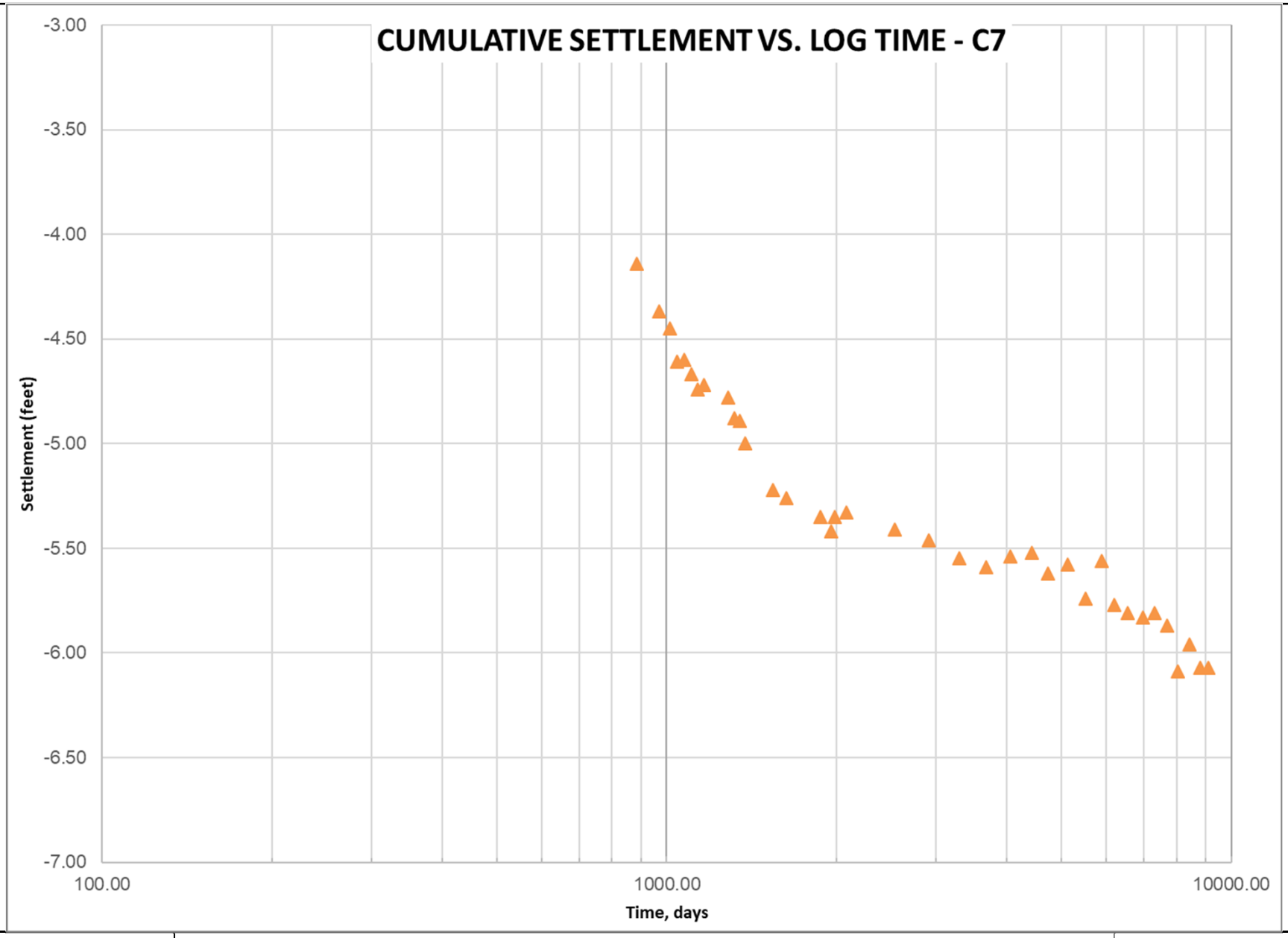
C-5



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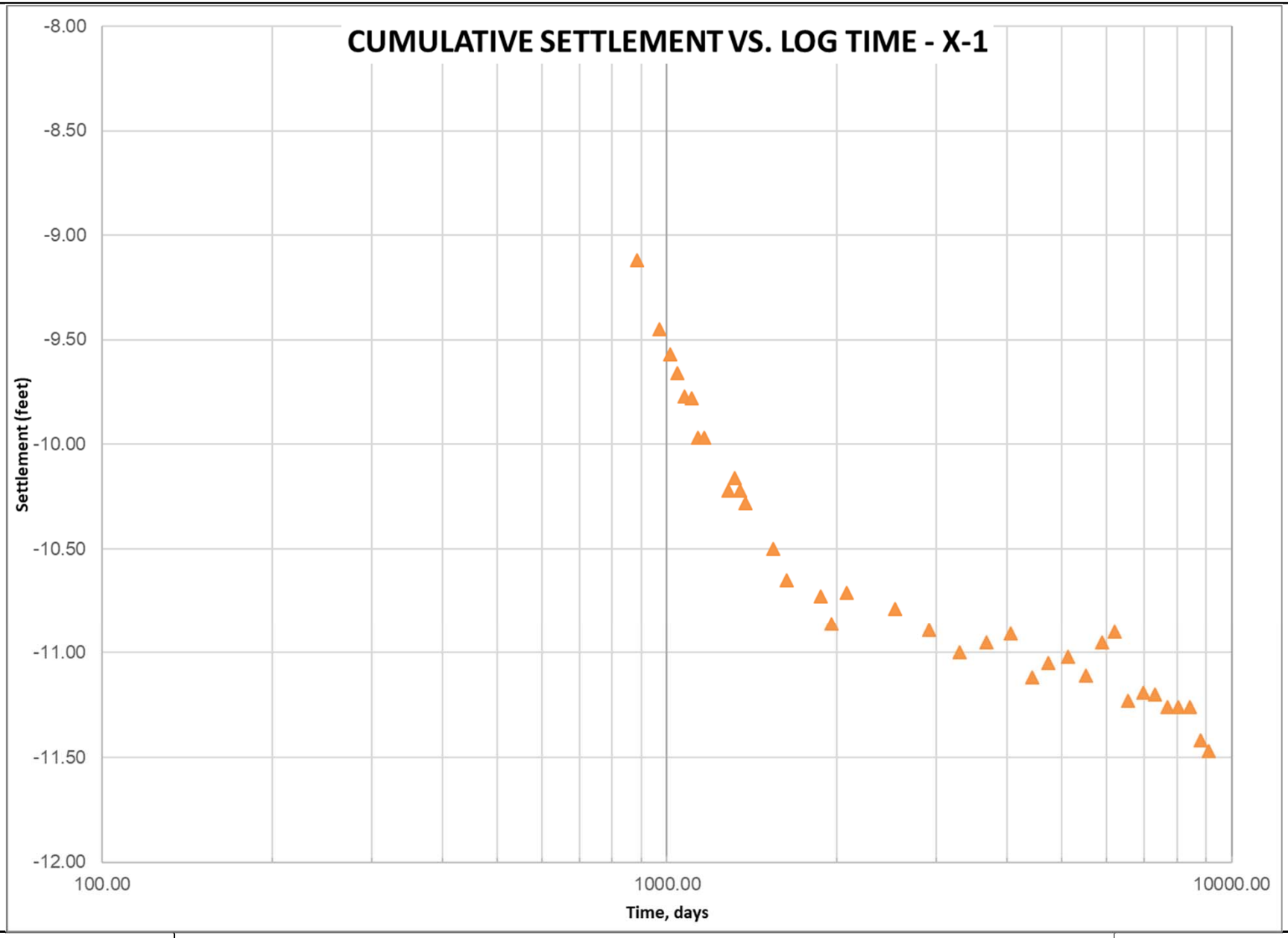
GRP EOR Annual Inspection
Cumulative Settlement Plot for C7

Stantec

Jan. 2019	C-6



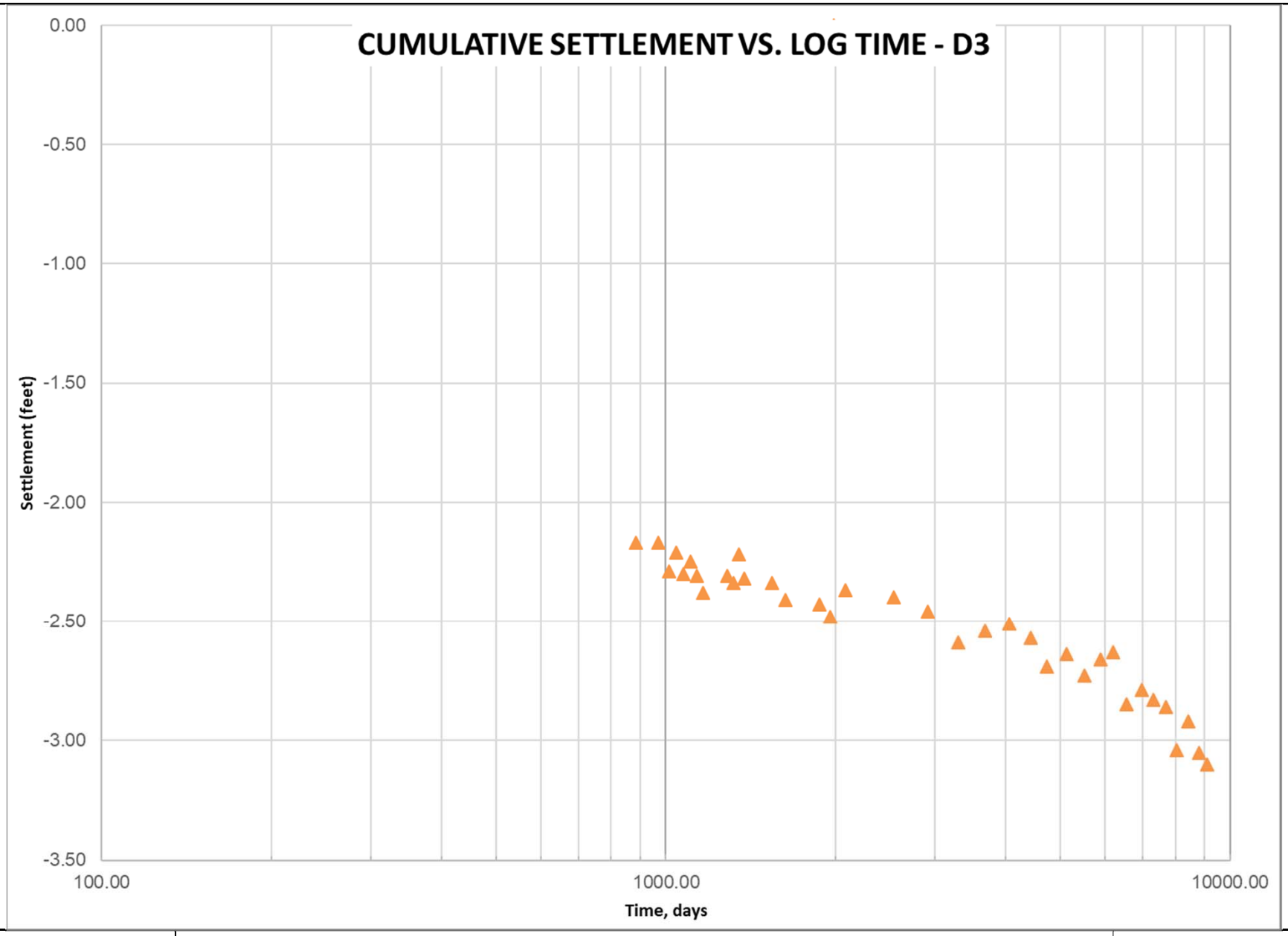
HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Cumulative Settlement Plot for X1

Stantec

Jan. 2019

C-7

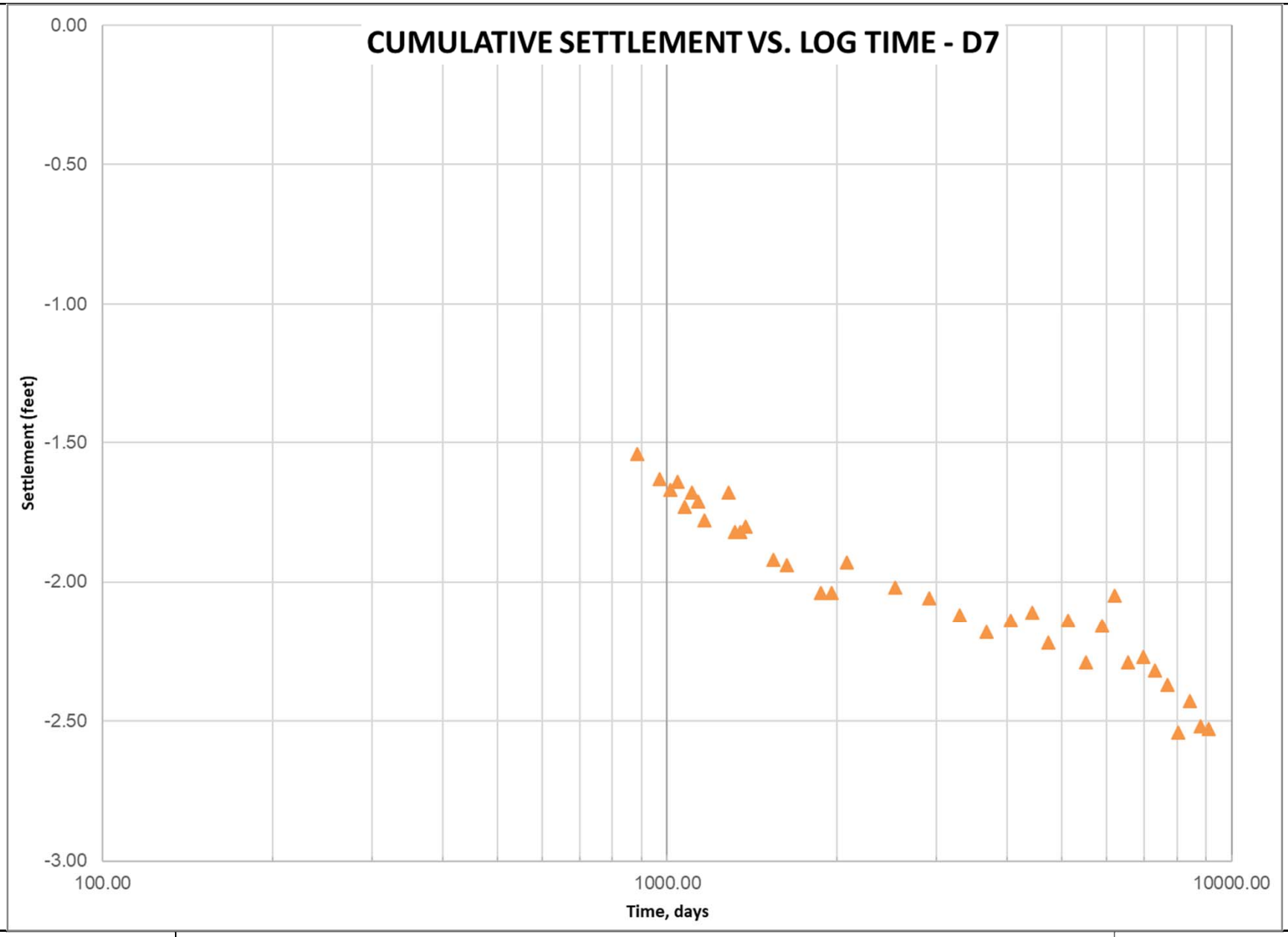


HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Cumulative Settlement Plot for D3

Stantec

Jan. 2019	C-8



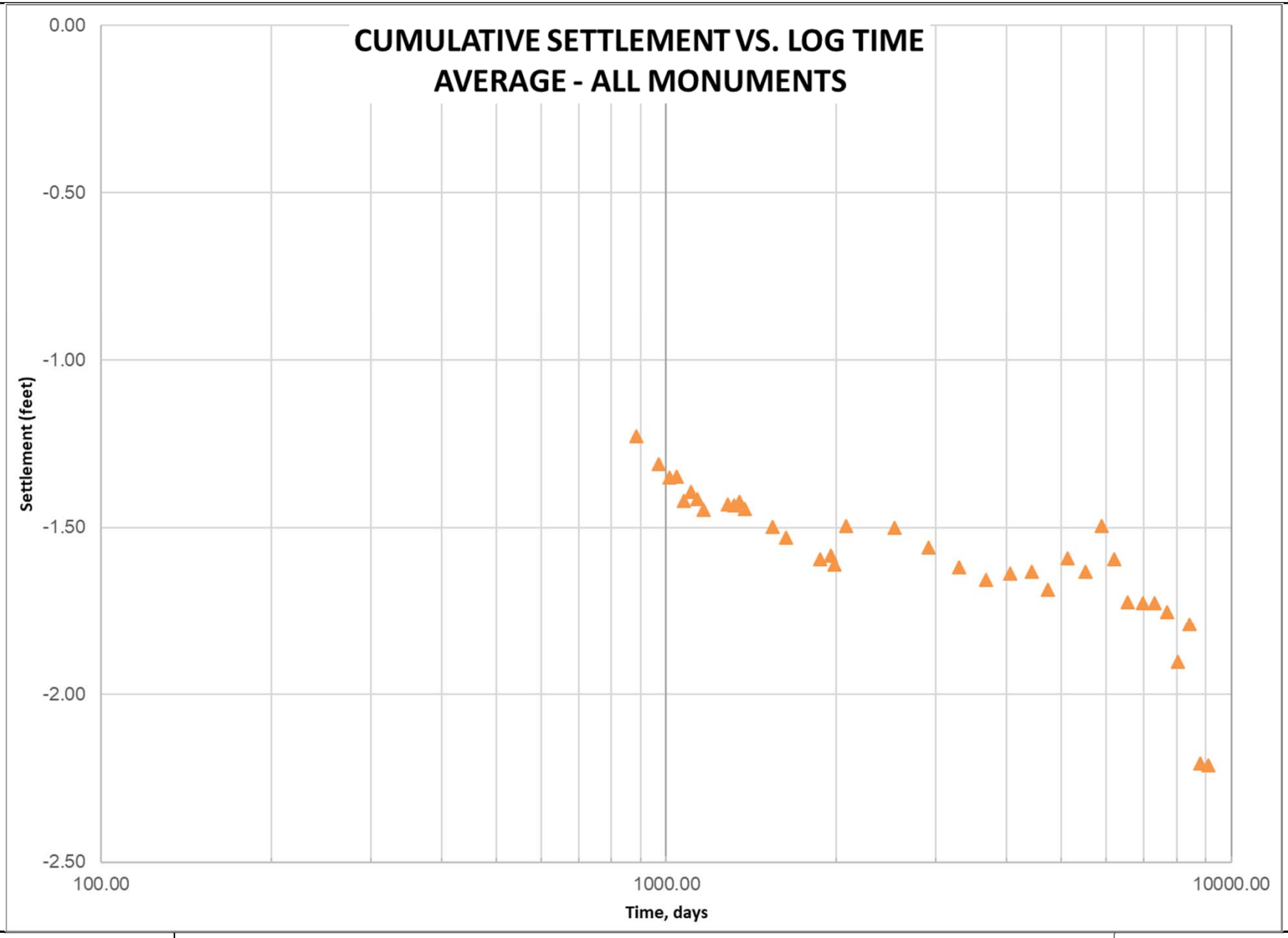
HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Cumulative Settlement Plot for D7

Stantec

Jan. 2019

C-9



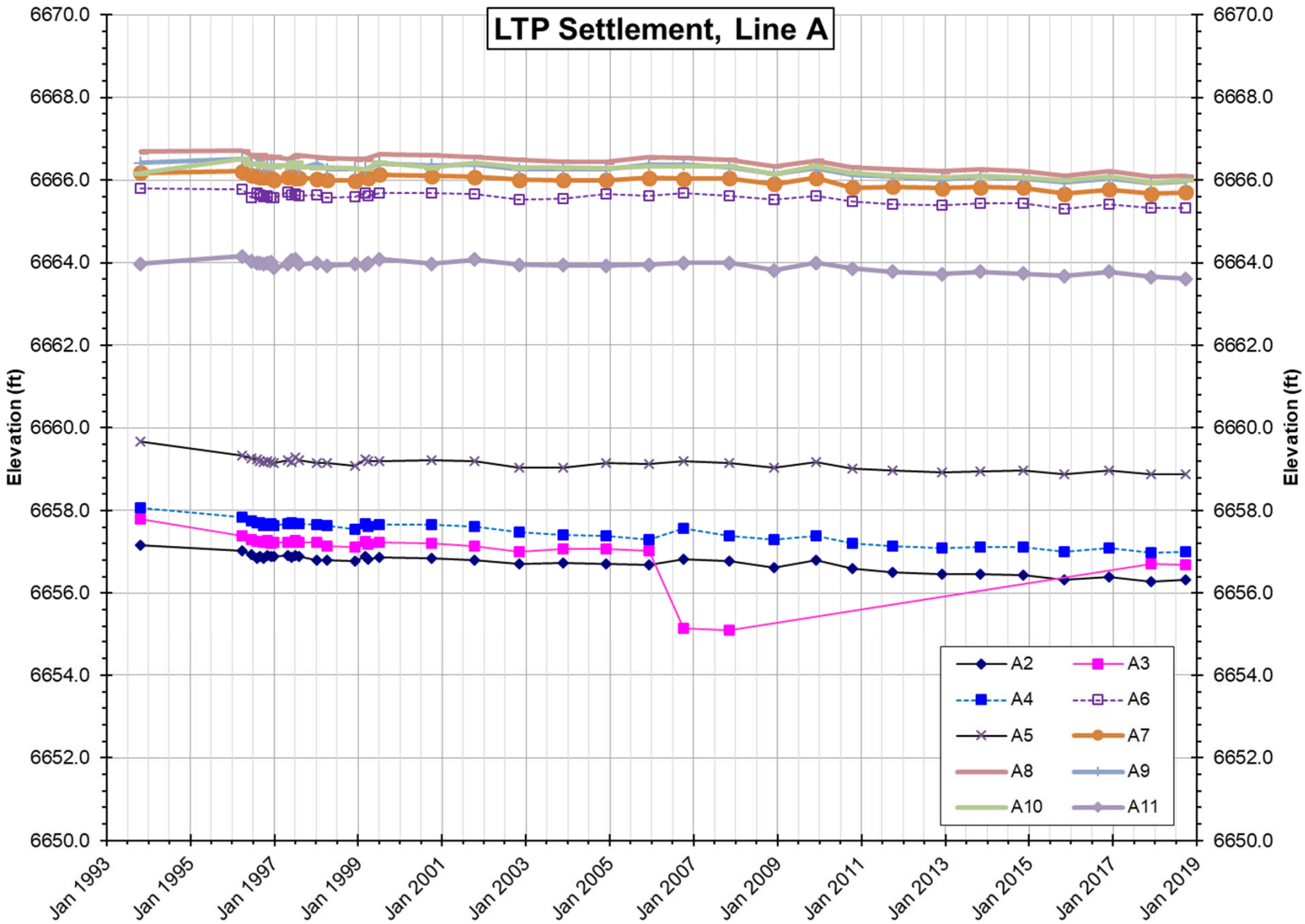
HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Cumulative Settlement Plot for Average of all Monuments

Stantec

Jan. 2019

C-10



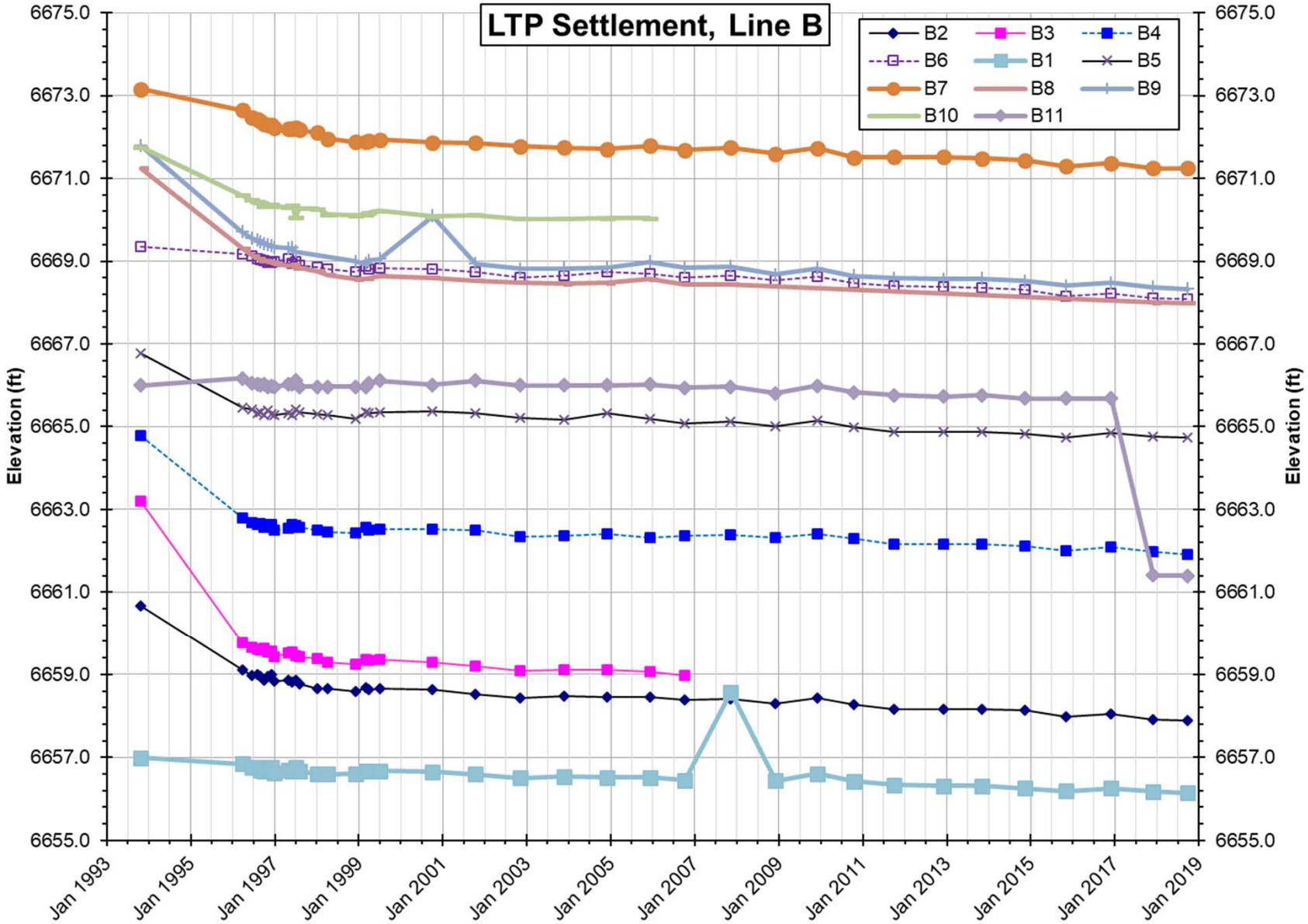
HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line A Monuments

Stantec

Jan. 2019

C-11



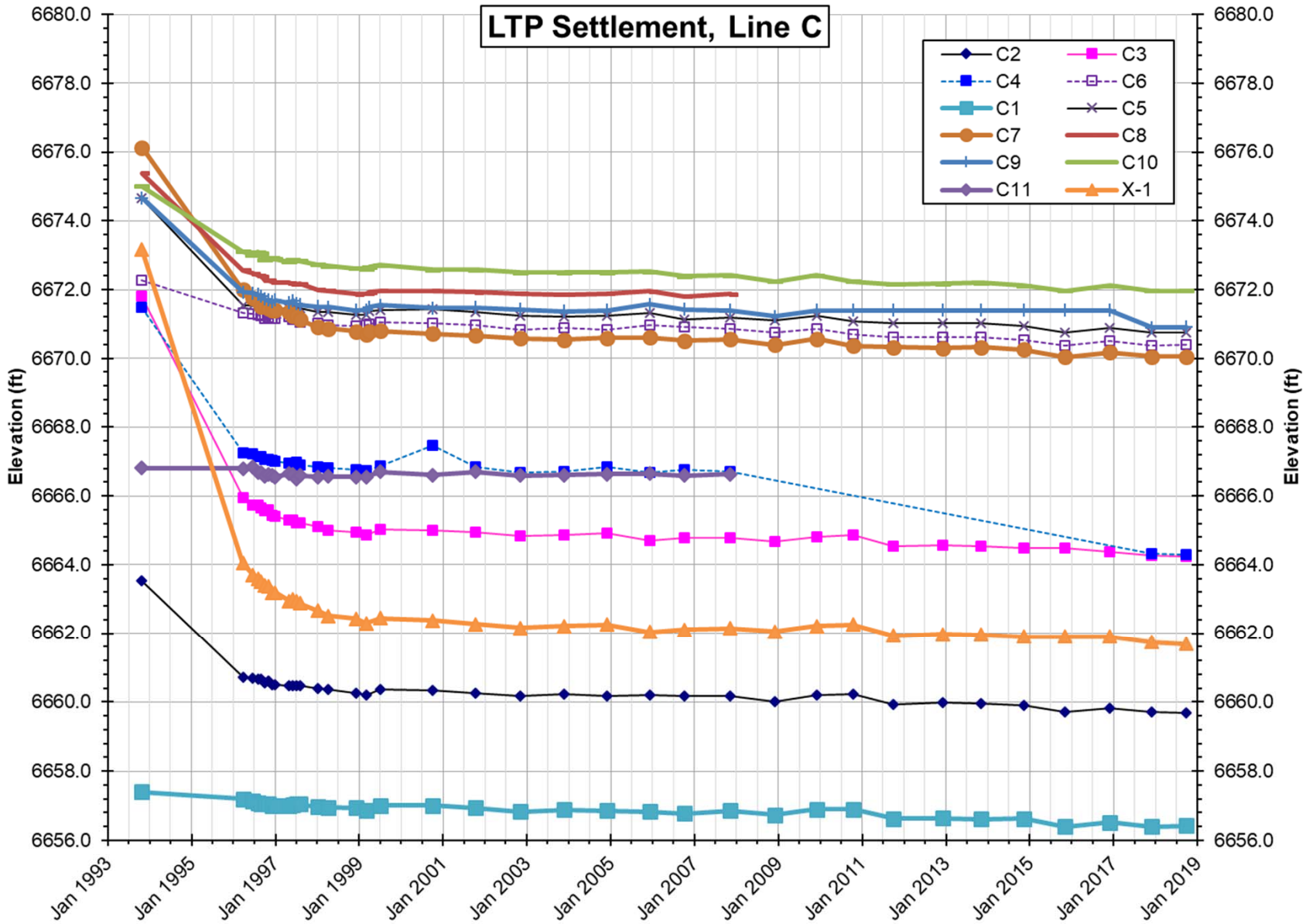
HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line B Monuments

Stantec

Jan. 2019

C-12

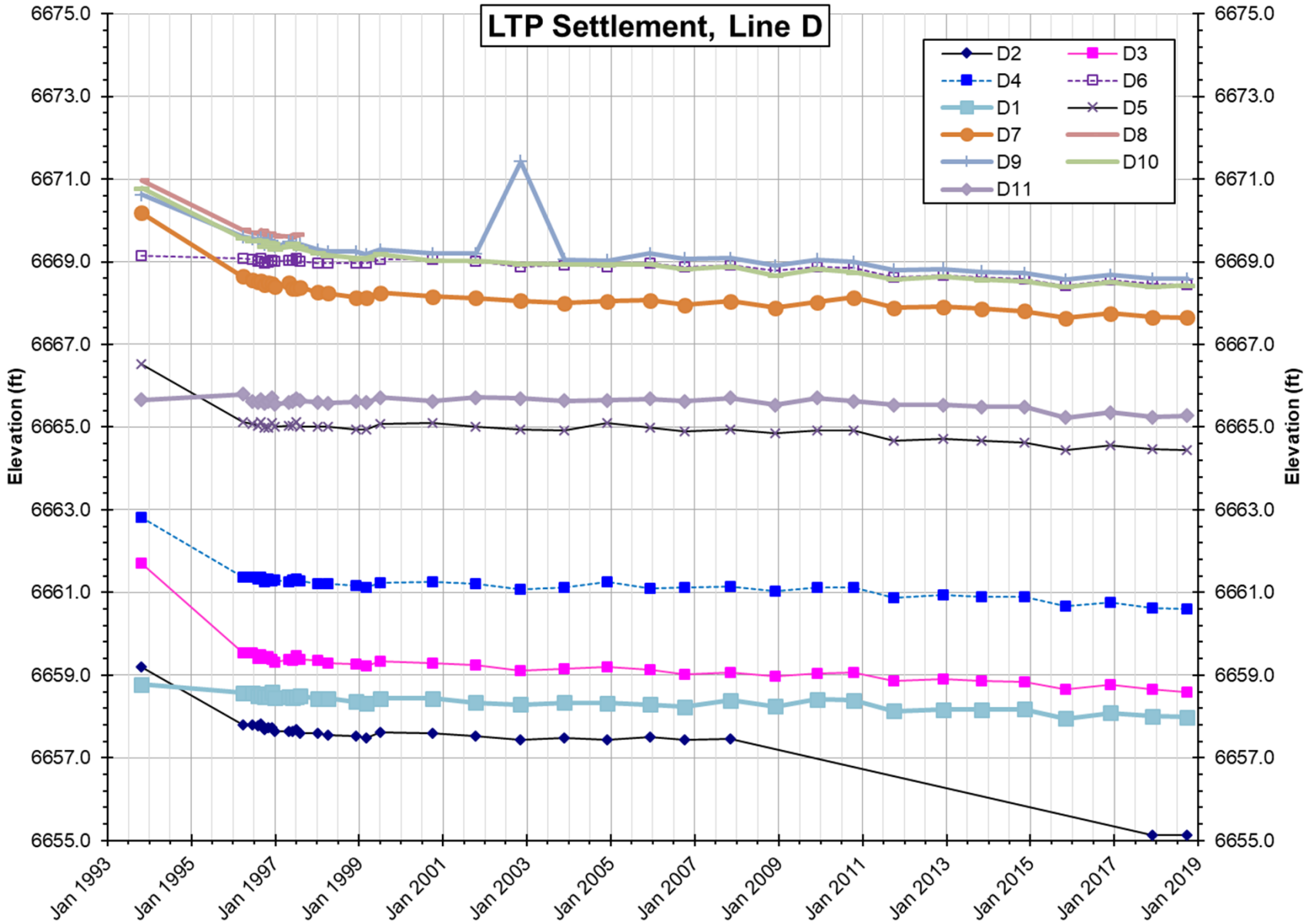


HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line C Monuments

Stantec

Jan. 2019	C-13

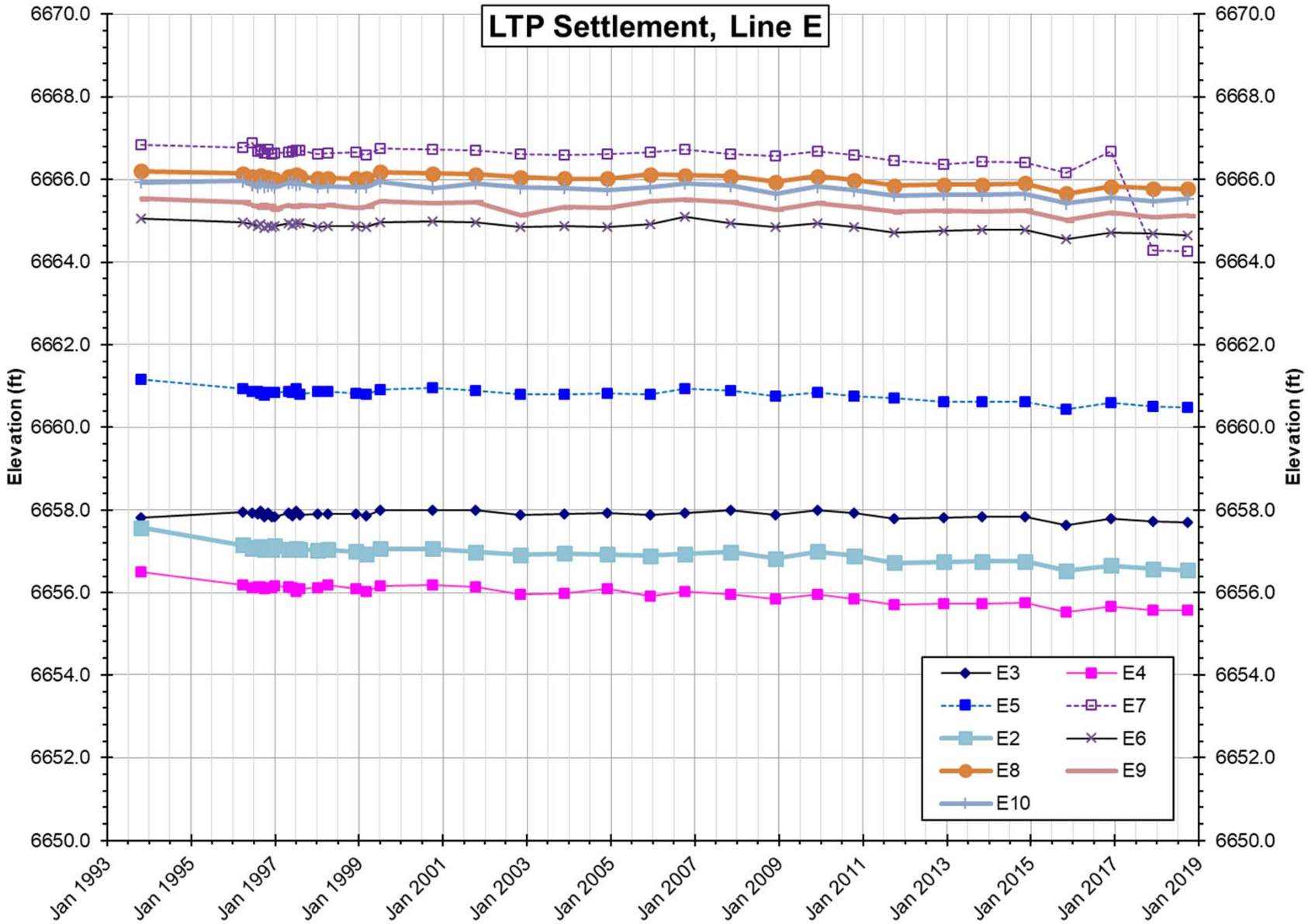


HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line D Monuments

Stantec

Jan. 2019	C-14



HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line E Monuments

Stantec

Jan. 2019	C-15

APPENDIX E

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

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GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

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Grants Reclamation Project

Land Use Review / Survey

Annual Report No. 17 - CY2018

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 seventeenth 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 2018 – Land Use – Homestake Properties

Homestake Mining Company of California (HMC) owns and controls a sizeable land area in and around the Grants Reclamation project. Over the last number of years, additional lands have been acquired as opportunity has arisen and acquisition of such lands are deemed appropriate in relation to ongoing ground-water remediation and restoration activities and final reclamation / closure of the site.

Much of the HMC lands held in the area that are not in immediate proximity to the tailings pile complex have been, and are continuing to be, utilized for livestock grazing on a lessor/lessee tenant arrangement. Much of the current land area within the immediate Site Boundary area containing the evaporation ponds, RO plant and both tailings pile areas and office / shop compound have been excluded from livestock grazing and other land use except those directly related to the ongoing ground-water restoration activities. These areas have been livestock fenced to exclude grazing; certain small areas in the southern and western portions of land within the Site Boundary are, however, seasonally utilized for livestock grazing.

Several small lot / small acreage parcels [e.g. residential lot(s)] held by HMC in the general area of the reclamation site are idle and are essentially not in use

except in certain instances where treated and/or fresh water injection and water collection is underway as part of the ongoing groundwater restoration program or are under agricultural use on selected lot(s). For example, Block 1 Lot 5 and Block 2 Lot 2 in Murray Acres were planted and irrigated in 2008 through 2018 with the Murray Acres San Andres irrigation well.

The other significant past land use activity situated on HMC-held lands in the area includes land treatment / crop irrigation utilized for crop production. Water used for irrigation was an integral part of the ongoing ground-water restoration and cleanup program for the project. Prior to 2002, HMC had 270 acres of land under irrigation consisting of flood irrigation area comprising 120 acres and a center pivot spray irrigation area comprising 150 acres. During 2002, an additional center pivot irrigation system was commissioned that comprises 60 acres. In 2003, an additional 24 acres of flood irrigation was added to the irrigation system in Section 33. In 2005, the 60 acre center pivot irrigation system was expanded by 40 acres to a total of 100 acres.

For 2013 through 2018, HMC lands were not crop irrigated except the two lots in Murray acres where San Andres water is used (see project location Figure 2.1-1 in report Section 2.1 of this annual report for location of the four areas with past irrigation activity).

3.0 2018 – 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. HMC paid for the water usage from the Village of Milan for the first ten years and has re-started paying for the water usage in late 2018.

An assessment of current land use in these four subdivision areas was undertaken in January 2019 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 2017 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 January 2019 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 2018. See Tables E-1 through E-5 for 2018 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, Pleasant Valley and Valle Verde 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 stated in the January 2019 field inventory that he does now want to be hooked up to the Village water supply system. HMC will pay for the hook-up of this residence.

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 hook-up. Additionally, those residents in the AOC area that arranged for Village hook-up 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 hook-up 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 now stated that he is interested in being hooked up to the Milan water system. This residential hook-up 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 2018, no residential properties remain to be addressed in terms of providing a domestic water supply hook-up. 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 now stated he is 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.

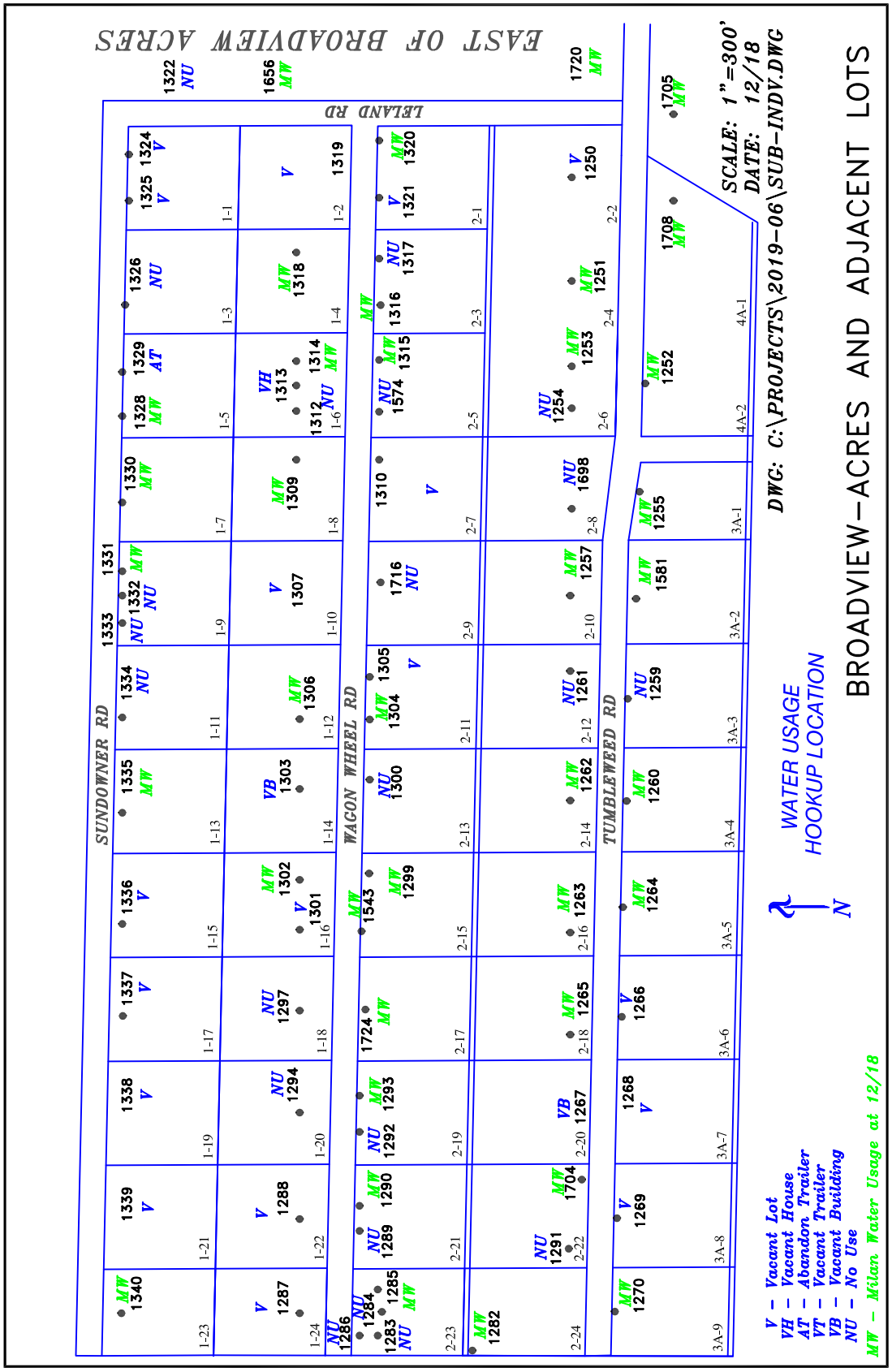

FIGURE E–1. BROADVIEW ACRES–LAND USE STATUS AND WATER USE

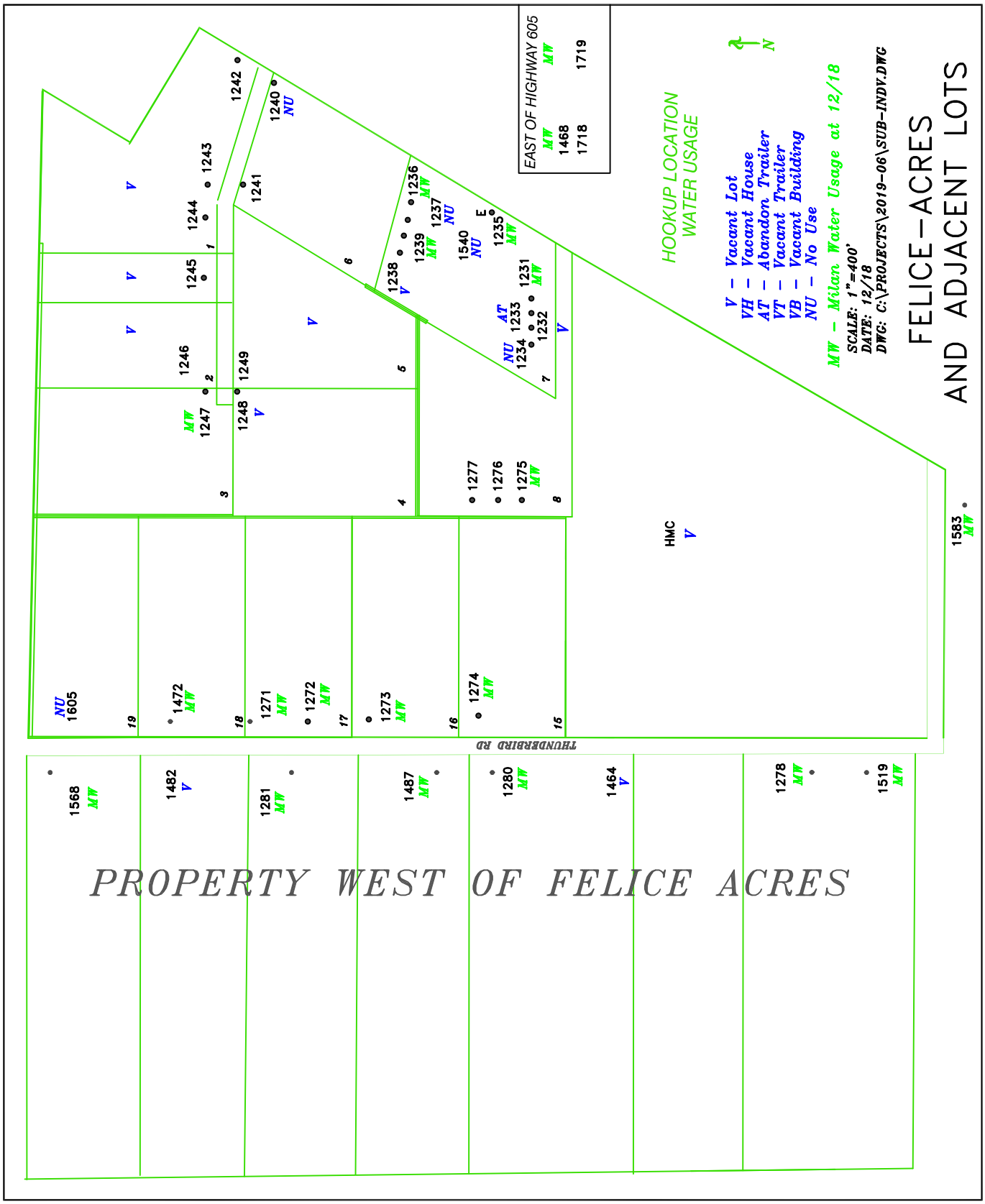

FIGURE E–2. FELICE ACRES – LAND USE STATUS AND WATER USE

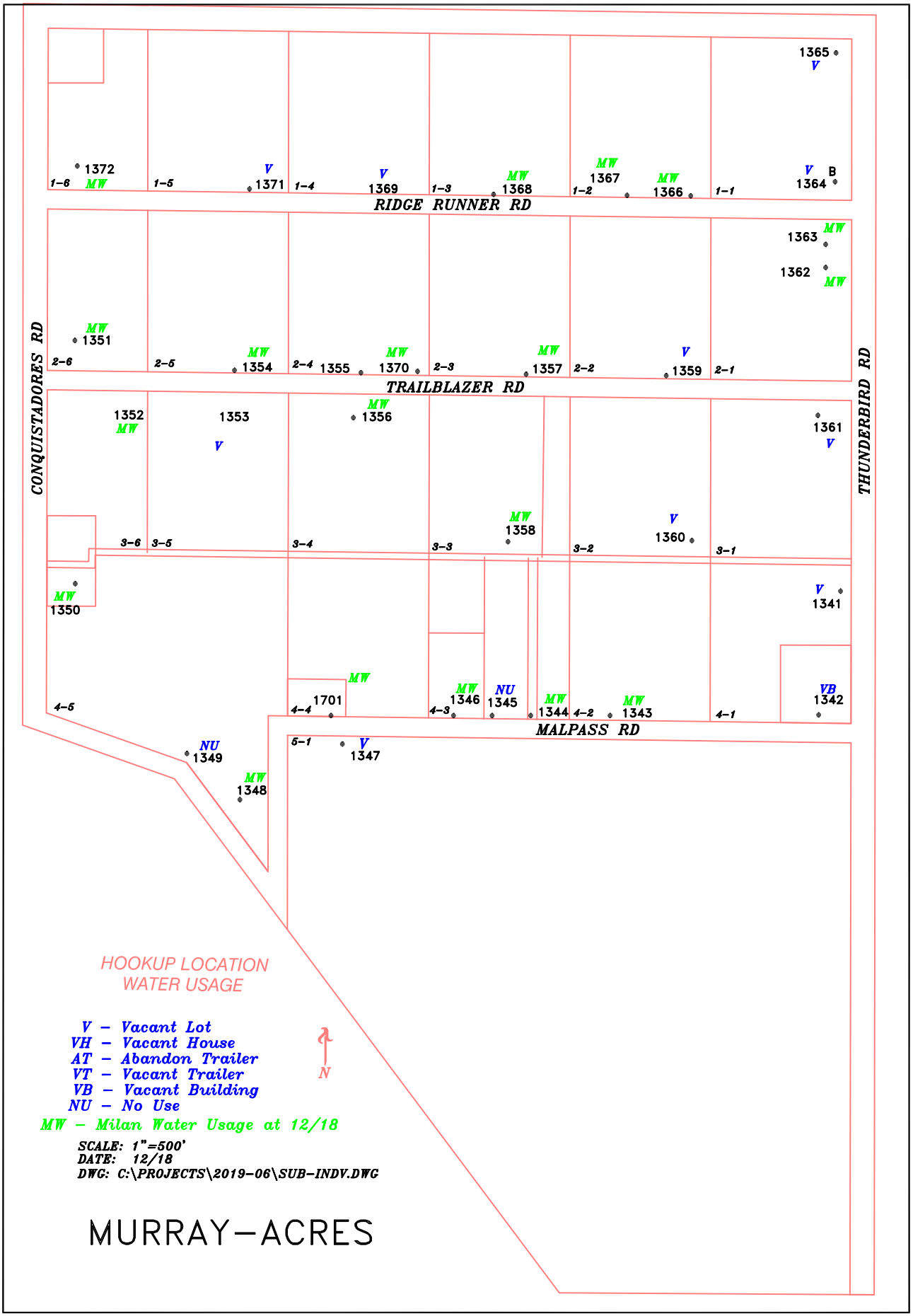

FIGURE E–3. MURRAY ACRES–LAND USE STATUS AND WATER USE

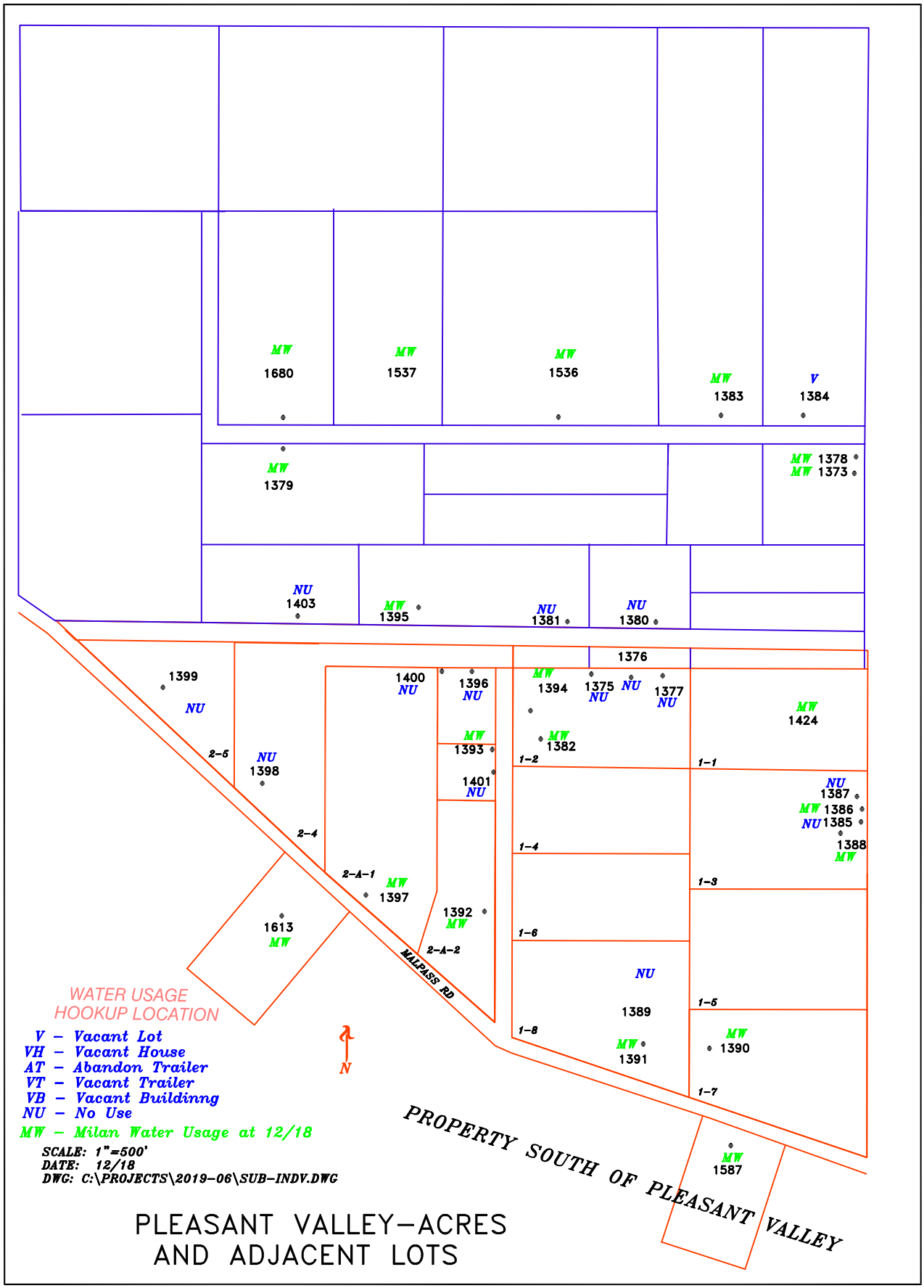

FIGURE E-4. PLEASANT VALLEY ESTATES-
LAND USE STATUS AND WATER USE

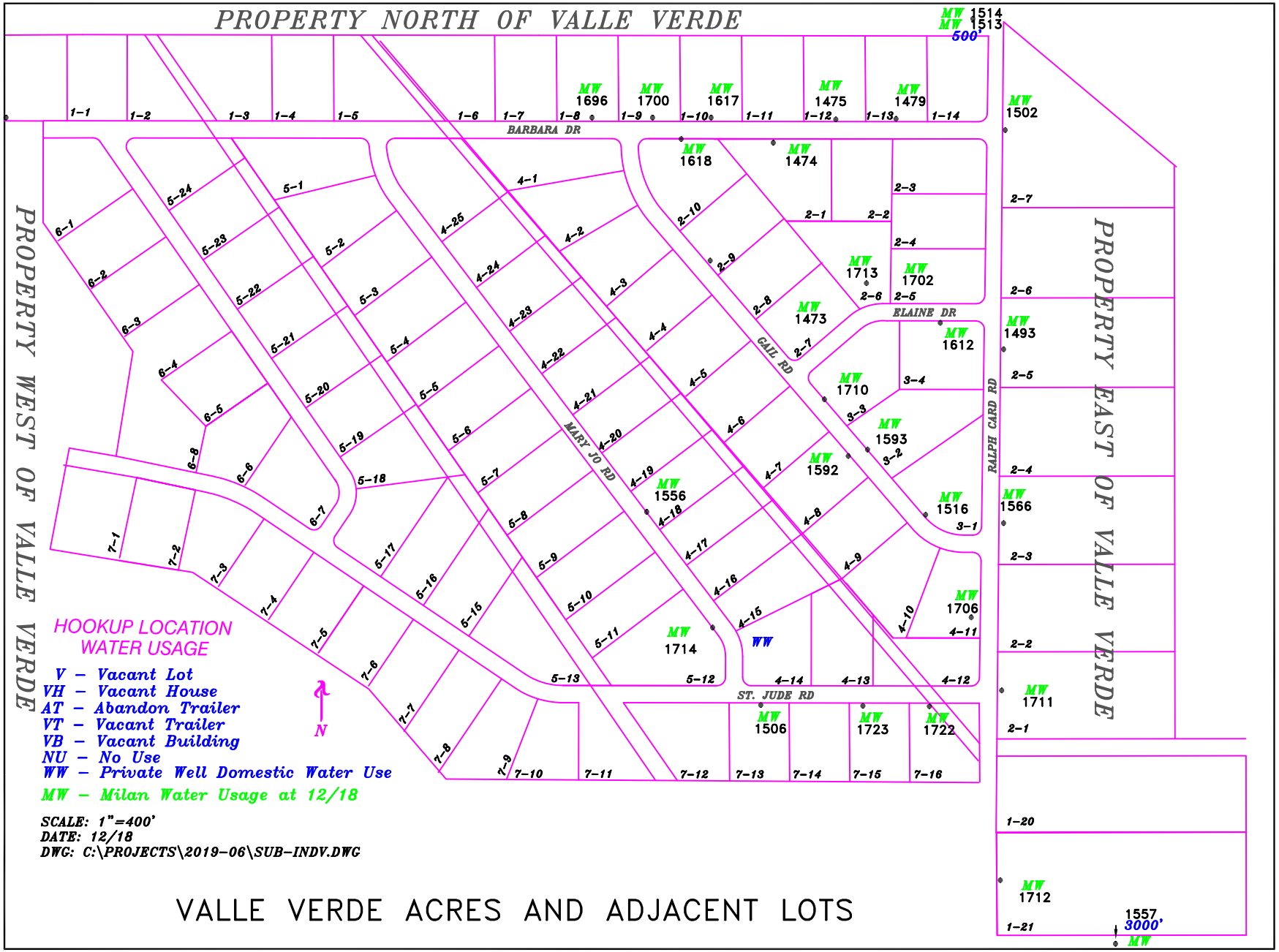

FIGURE E-5. VALLE VERDE ACRES-LAND USE STATUS AND WATER USE

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 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE
1 / 1	1324		
1 / 1	1325		
1 / 2	1319		
1 / 3	1326		
1 / 4	1318	X	X
1 / 5	1328	X	X
1 / 5	1329		
1 / 6	1312		
1 / 6	1313		
1 / 6	1314	X	X
1 / 7	1330	X	X
1 / 8	1309	X	X
1 / 9	1331	X	X
1 / 9	1332		
1 / 9	1333		
1 / 10	1307		
1 / 11	1334	X	
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	
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		
2 / 4	1251	X	X

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE
2 / 5	1315	X	X
2 / 5	1574		
2 / 6	1253	X	X
2 / 6	1254		
2 / 7	1310		
2 / 8	1698		
2 / 9	1308		
2 / 10	1257	X	X
2 / 11	1304	X	X
2 / 11	1305		
2 / 12	1261		
2 / 13	1300		
2 / 14	1262	X	X
2 / 15	1299	X	X
2 / 15	1543	X	X
2 / 16	1263	X	X
2 / 17	1724	X	X
2 / 18	1265	X	X
2 / 19	1292		
2 / 19	1293	X	X
2 / 20	1267		
2 / 21	1289		
2 / 21	1290	X	X
2 / 22	1291		
2 / 22	1704	X	X
2 / 23	1283		
2 / 23	1284		
2 / 23	1285	X	X
2 / 23	1286		
2 / 24	1282	X	X
3A / 1	1255	X	X
3A / 2	1581	X	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 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE
3A / 6	1266		
3A / 7	1268		
3A / 8	1269		
3A / 9	1270	X	X
4A / 1	1708	X	X
4A / 2	1252	X	X
	1705	X	X
EAST OF BROADVIEW ACRES			
	1322		
	1656	X	X
	1720	X	X

TABLE E-2 WATER USE OF MILAN WATER IN FELICE ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE
1	1242		
1	1243		
1	1244		
2	1245		
2	1246		
3	1247	X	X
4	1248		
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		
7	1238		X
7	1239	X	X
7	1540		
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 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 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 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 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		
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 2017 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 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	1385		
1 / 3	1386	X	X
1 / 3	1387		
1 / 3	1388	X	X
1 / 7	1390	X	X
1 / 8	1389		
1 / 8	1391	X	X
2 / 4	1398		
2 / 5	1399		
2 / A1	1397	X	X
2 / A2	1392	X	X
2 / A2	1393	X	X
2 / A2	1396		
2 / A2	1400		
2 / A2	1401		
	1373	X	X
	1378	X	X
	1379	X	X
	1380		
	1381		
	1383	X	X
	1384		
	1395	X	X
	1403		
	1536	X	X
	1537	X	X
	1680	X	X

PROPERTY SOUTH OF PLEASANT VALLEY ESTATES			
17 - 2	1587	X	X
11 - 2	1613	X	X

TABLE E-5 WATER USE IN VALLE VERDE AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2017 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2017	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2018
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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F.0 Introduction

Appendix F presents the information from the soil moisture instrumentation data for the former Section 34 flood area and the former Section 28 center pivot area.

F.1 Soil Moisture Instrumentation

In July of 2012, two types of soil moisture measurement devices were installed in the Section 34 flood area and the Section 28 center pivot. The Campbell Scientific CS655 is a water content reflectometer. This device measures volumetric water content, electrical conductivity and temperature in porous materials such as soil. The volumetric water content is calculated using the relationship between the travel time of electromagnetic waves along the rods. The electrical conductivity is determined by the signal attenuation of a known non-polarizing waveform and the temperature is measured by a thermistor attached to one of the rods.

The Campbell Scientific CS229 is a heat dissipation matric water potential sensor. The sensor indirectly measures soil water matric potential using an empirical relationship between heat dissipation and the soil water matric potential. The device has a heating element and a thermocouple encased in a porous ceramic cylinder. To measure the heat dissipation, the heating element is turned on for 30 seconds while the thermocouple takes a measurement at the beginning and at the end of the heating cycle. A decrease in the delta temperature indicates an increase in soil moisture content.

The termination of the irrigation program after the 2012 season has resulted in gradual drying of the soils in the irrigation areas. With the passing of more than six 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. The Section 34 moisture instruments did not record any data in 2018 while the Section 28 instruments recorded data through most of August of 2018 but had ceased recording due to the solar panel being stolen. Future changes in the moisture condition are expected to be relatively small and the continued monitoring of the soil moisture instruments is not expected to provide any information that is useful in managing the areas or evaluating the impacts of the past irrigation. The groundwater monitoring program will continue and is a more reliable means of detecting significant water quality impacts, if any, by the past irrigation. Because the soil moisture instruments are not expected to provide useful information in the future, and both the groundwater monitoring is a more reliable means of detecting impacts by the past irrigation, the operation and monitoring of the soil moisture instruments should be discontinued.

F.1.1 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. The

volumetric water content measurements and the electrical conductivity measurements for the Section 34 instruments are presented in Figure F-2 and Figure F-3, respectively, with no data collected after late 2017. For the CS229 instruments, the sensor for the 5 foot depth appears to have malfunctioned in October of 2013 and attempts to fix it were unsuccessful (see Figure F-4). The sensor for the 10 foot depth malfunctioned in August of 2015 and was not successfully fixed. The remaining CS229 and CS655sensors in the Section 34 instruments malfunctioned in late 2017 and attempts to fix them were unsuccessful and no data was recorded in 2018 due to malfunction of the instrumentation.

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.

F.1.2 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 depths of 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.

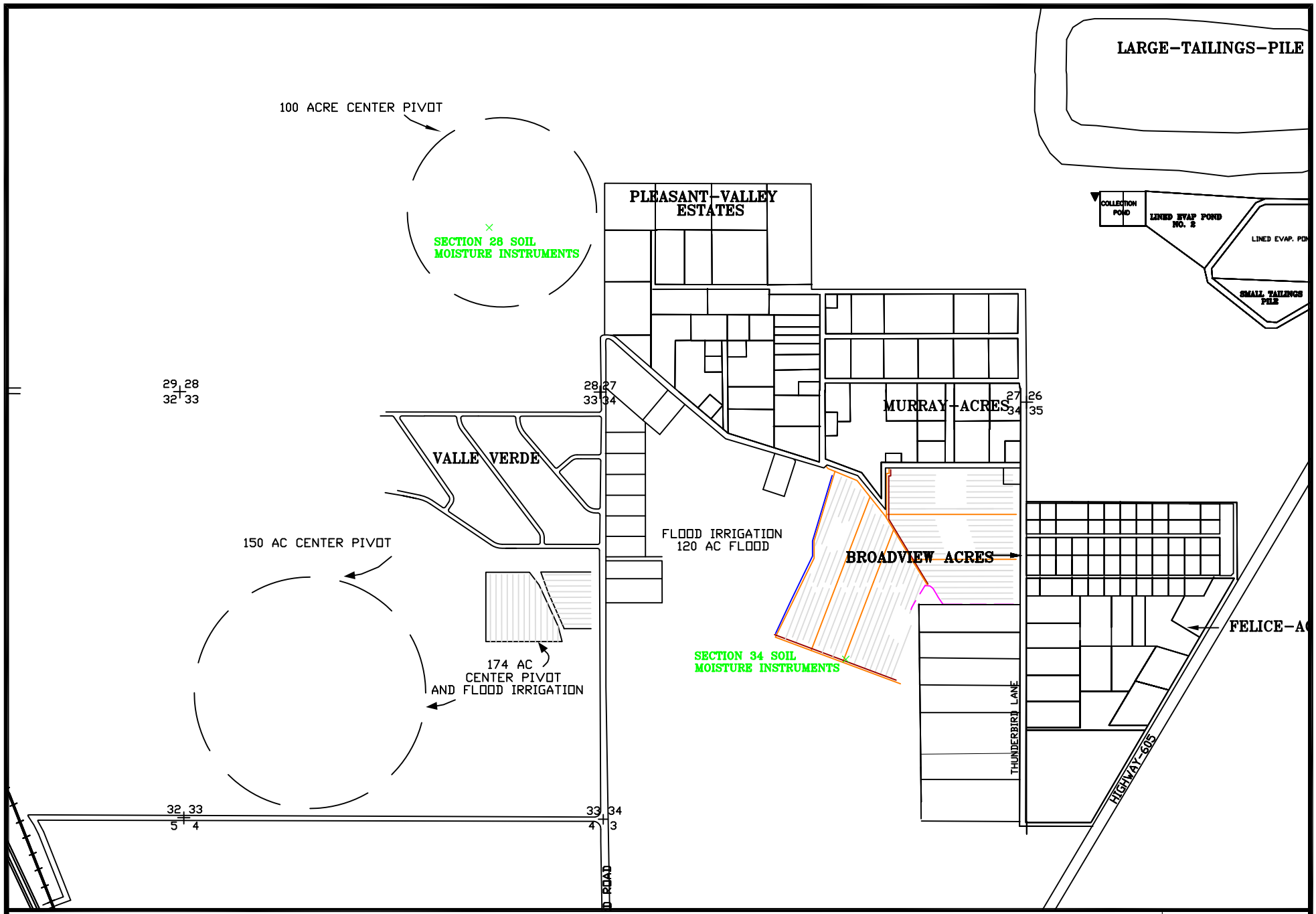
The volumetric water content is presented in Figure F-5. The sharp increase shown for all three depths early in the irrigation season is much larger than reasonable water content values. It is highly unlikely that the water content of the soil reached 78% at the 8 foot depth and is likely

due to the imprecision of the equipment beyond a certain range of measurement. The disturbance of the soil during instrument installation could also have contributed to anomalous readings shortly after installation. The inverse relationship between depth and water content is expected given the increase in clay content with depth. Data from the six foot interval was not recorded from the middle of November through the end of 2012 due to a wire to the data logger coming loose. The rate of decline for two to three weeks after irrigation is slightly steeper than the rate before and after this period, indicating some decrease in the moisture content shortly after irrigation ceased in each of the three depths. These measurements indicate movement of soil moisture through all three depths during the 2012 irrigation season. The decline in moisture content has been continuing since the end of 2012 at all three depths with a diminishing rate.

Figure F-6 presents the electrical conductivity measurements for Section 28. The trends shown follow a very similar pattern to the water content, however all three depths show a possible seasonal variation in conductivity that isn't correlated to water content. The larger rate of decline in the electrical conductivity for a few weeks after irrigation in 2012 was also observed.

The data collected from the CS229's in Section 28 is presented in Figure F-7. All three intervals showed an increase initially until a sharp decrease that coincides with the spike in water content and electrical conductivity. After the initial changes, the instrument at the 4 foot depth shows changes in moisture content after some of the center pivot irrigation cycles. The center pivot rotation rate was set at 1.5 days per revolution. Both the 6 and 8 foot depths show some variations during the irrigation with some overall decrease in the delta temperature in the last half of the irrigation season. The 4 foot depth showed more variation than the other depths with an increase in delta temperature after the irrigation ceased. A smaller increase in delta temperature at the 6 and 8 foot depths after irrigation also indicates a decrease in moisture content in these two deeper instrument depths after irrigation. A steady overall increasing trend in delta temperature has been observed at the 8 foot depth while the 4 foot and 6 foot intervals have shown a significantly higher level of variability. For the three sensor depths, only the sensor at a depth of 8 foot recorded data after 2016.

A very gradual decline in the water content was occurring for each of the Section 28 sensor depths in 2018 until a very small rise in the water content was observed in the 6 and 8 foot depths during April and early May. This portion of the 2018 data seems reasonable but then an abrupt change in the instrument readings for all three depths occurred in late May of 2018 and these abrupt water content changes are not realistic (see Figure F-5 and Figure F-6). The solar panel for the Section 28 instruments was stolen and the data logger ceased recording in late August of 2018.



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'

PAGE: F-4

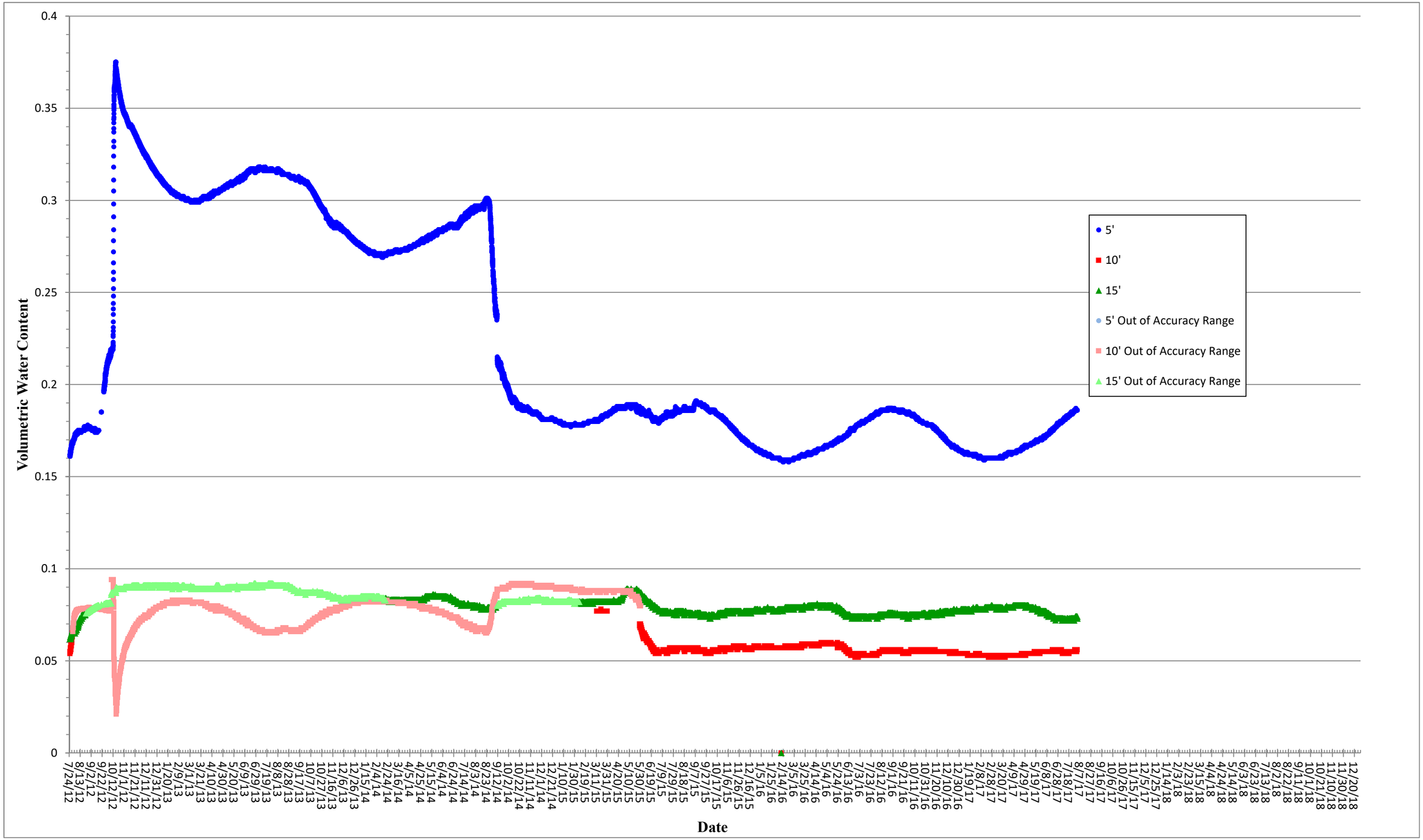


Figure F-2. Volumetric Water Content, Section 34 Flood Area

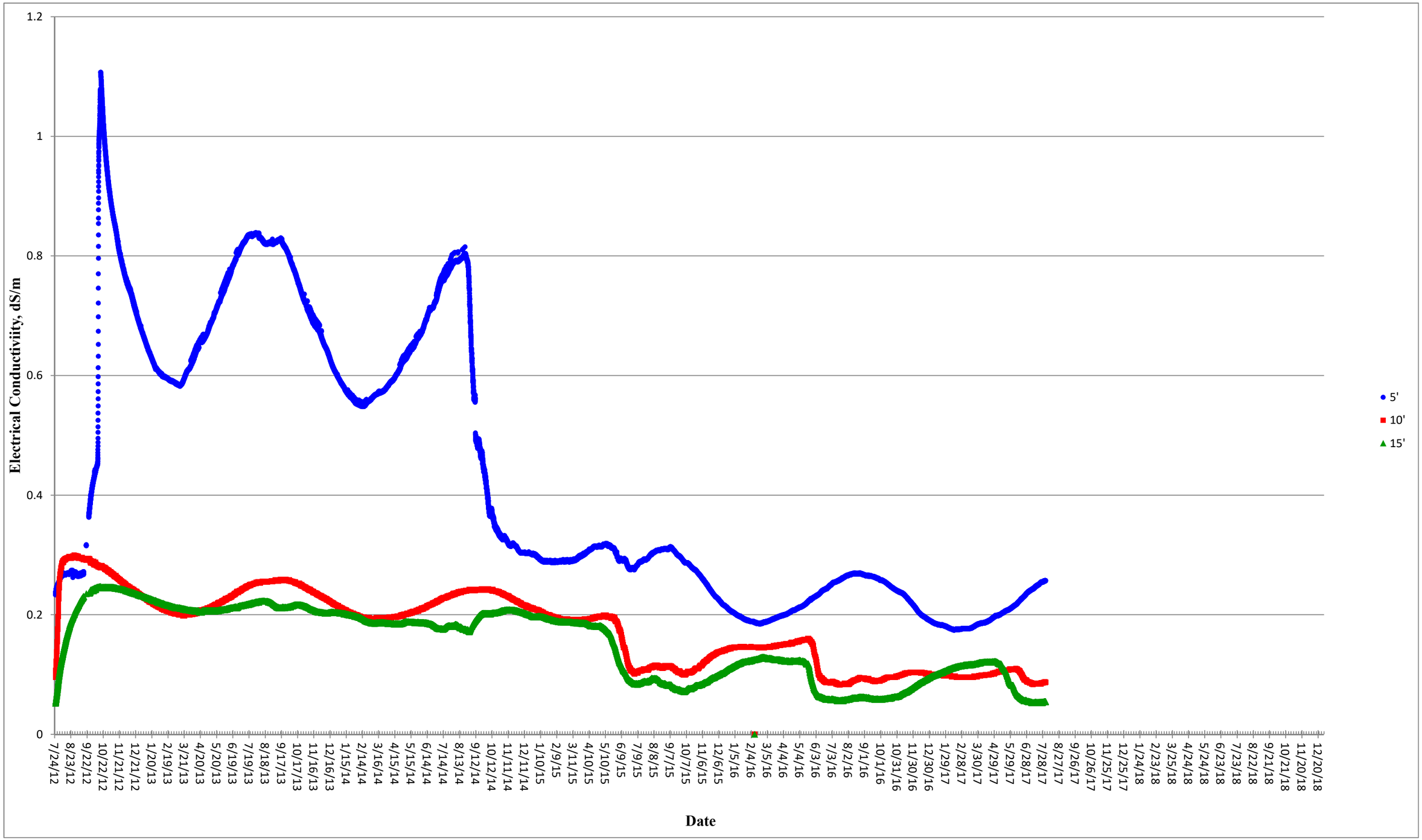


Figure F-3. Electrical Conductivity, Section 34 Flood Area

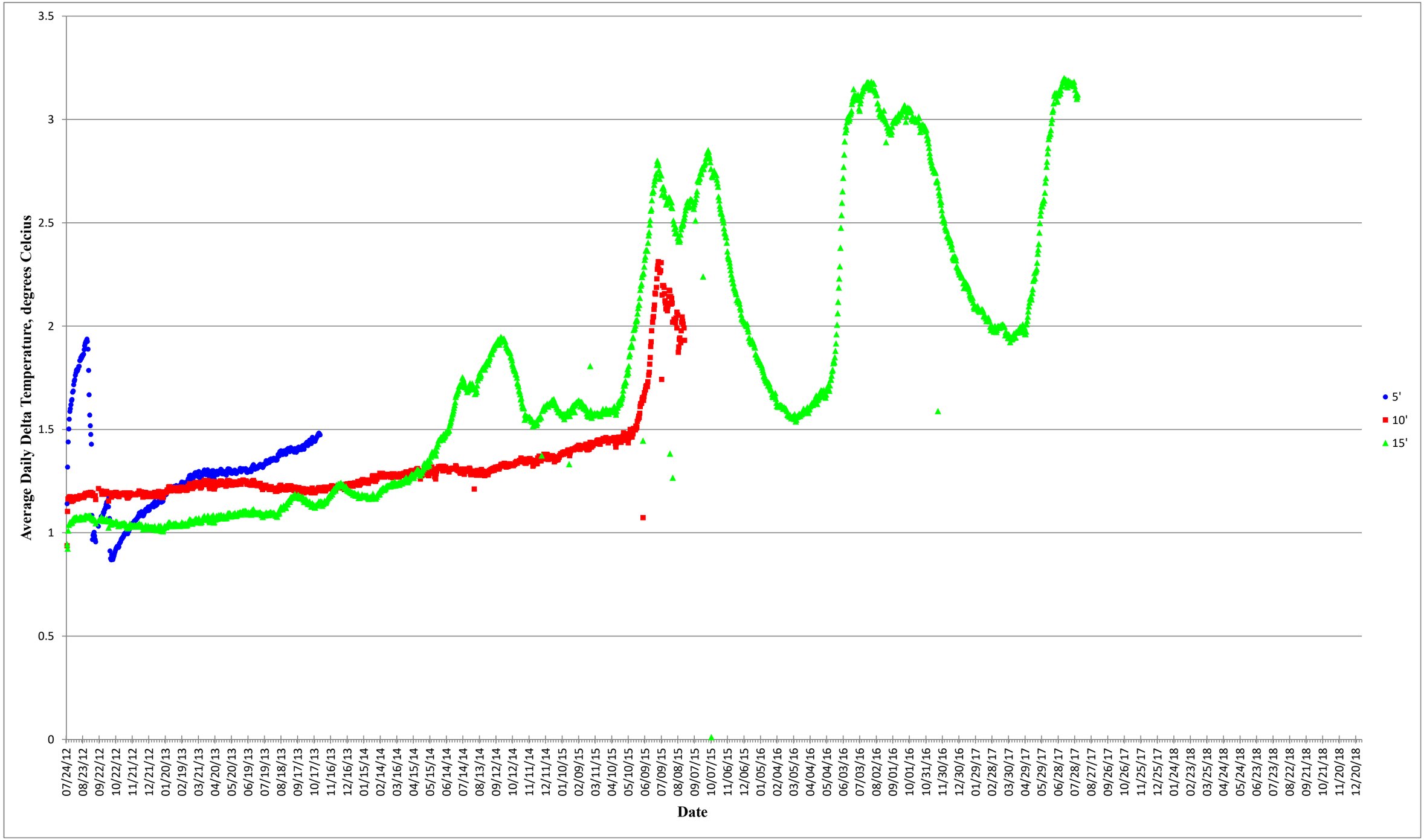


Figure F-4. Average Daily Delta Temperature, Section 34 Flood Area

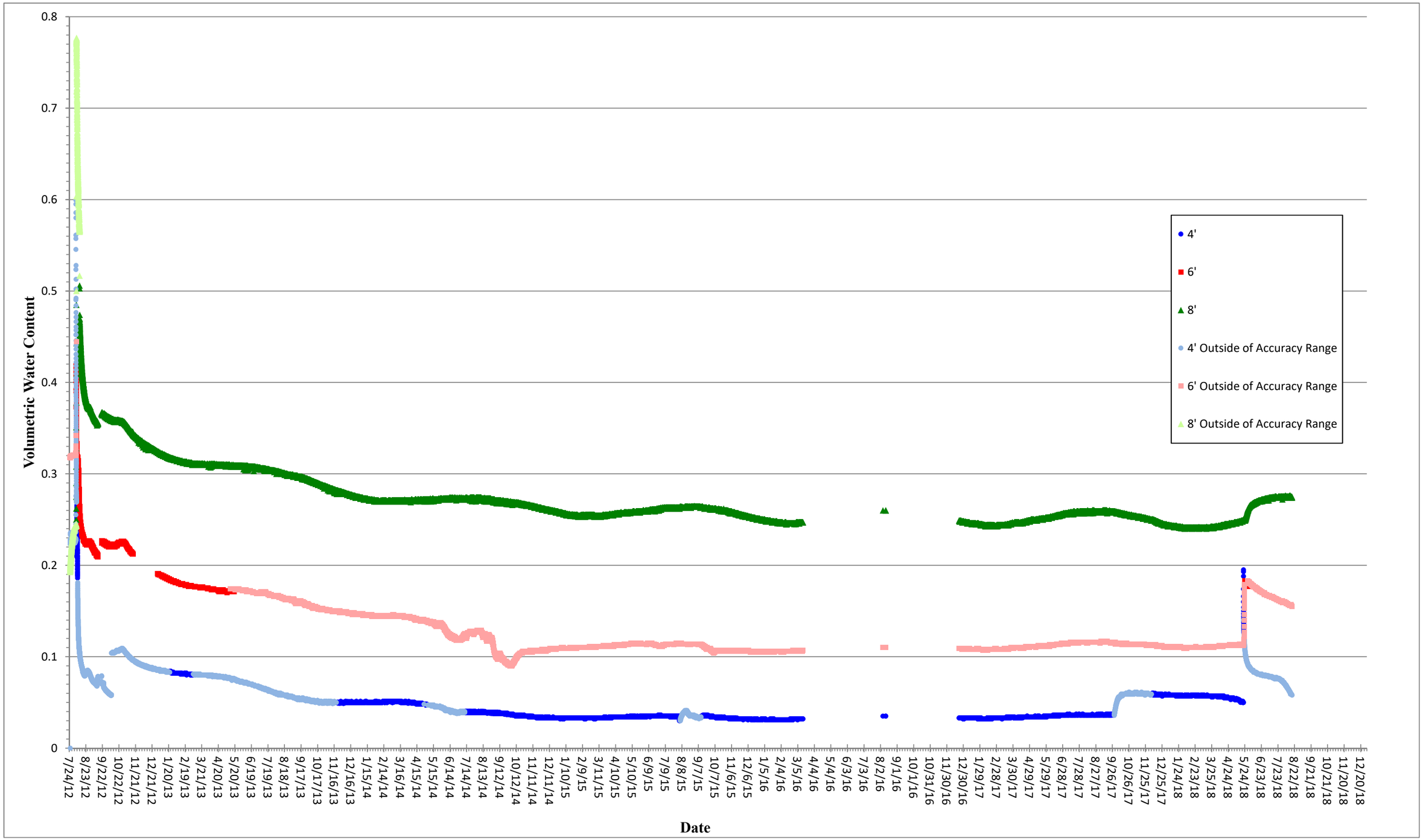


Figure F-5. Volumetric Water Content, Section 28 Center Pivot

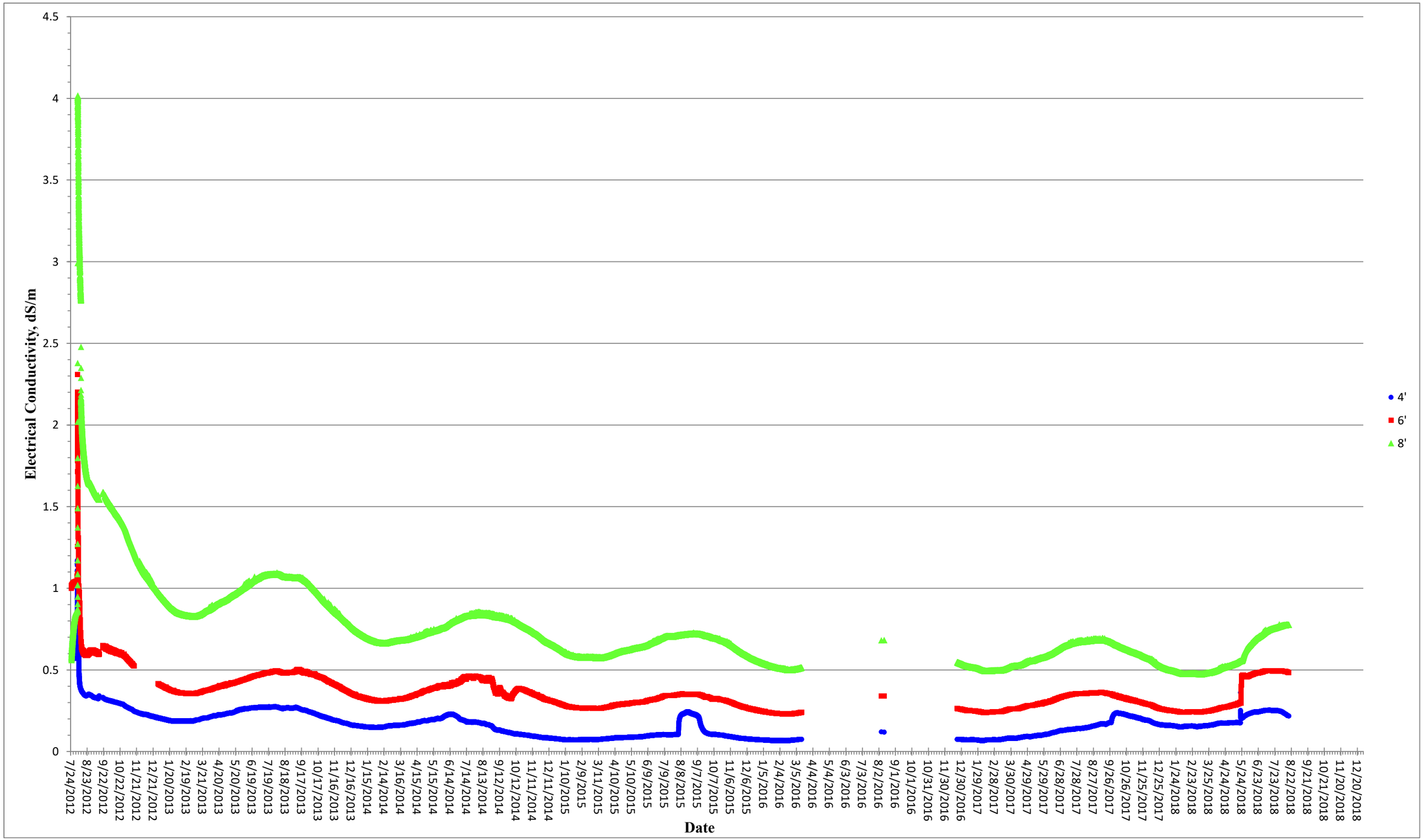


Figure F-6. Electrical Conductivity, Section 28 Center Pivot

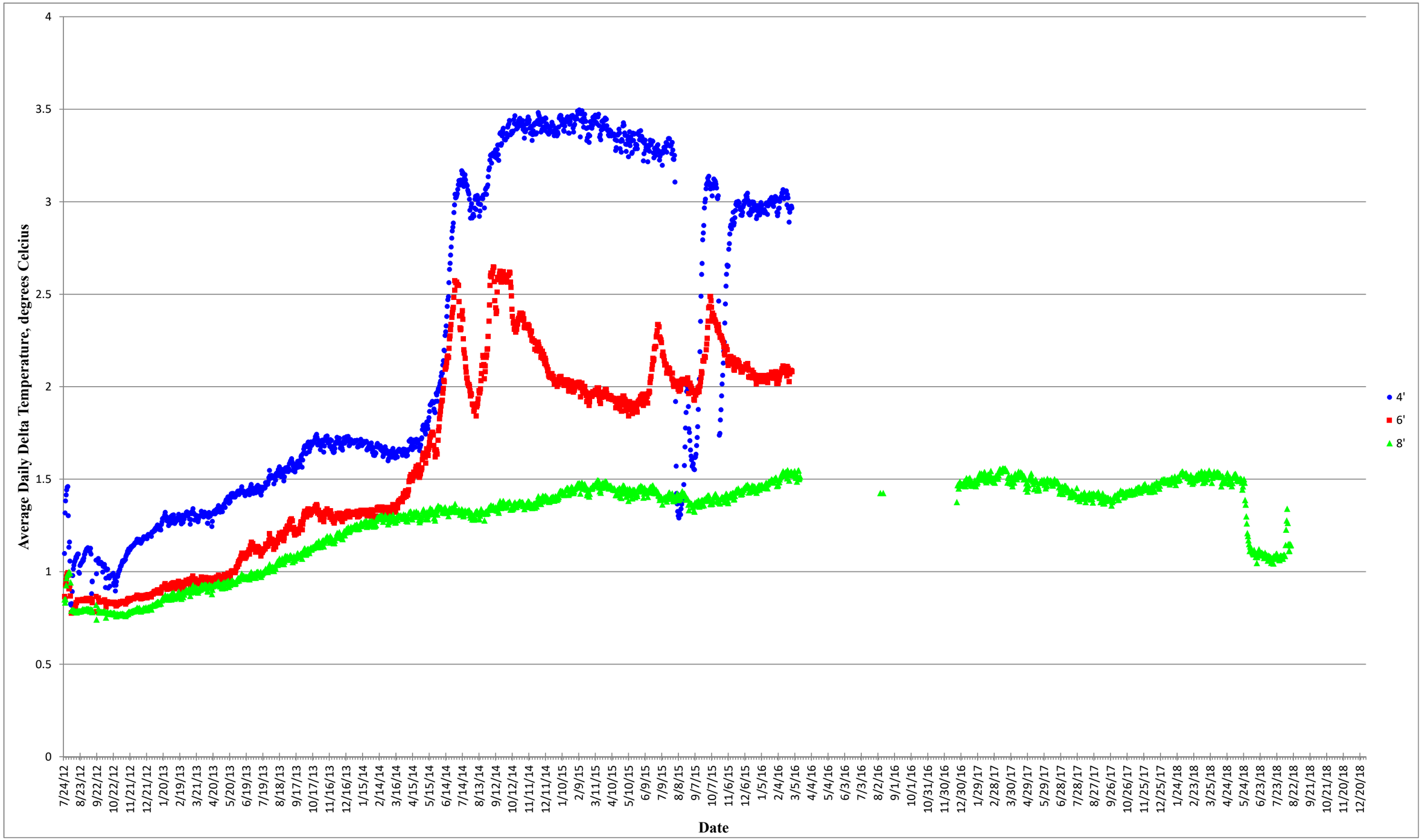


Figure F-7. Average Daily Delta Temperature, Section 28 Center Pivot

APPENDIX G

GRANTS RECLAMATION PROJECT
METEOROLOGICAL DATA SUMMARY

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METEOROLOGICAL DATA

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Grants Reclamation Project

Meteorological Data
CY2018

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 2018.

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 7.38 inches in 2018.

3.0 Temperature and Humidity

The maximum, minimum and mean monthly temperatures are presented in Table G-1. The maximum, minimum and mean monthly relative humidity for 2018 is presented in Table G-1.

4.0 Solar Radiation and Evaporation

The solar radiation measurements are presented in Table G-1. Table G-1 also presents an estimate of monthly potential evaporation based on available meteorological data.

Figure G-1. Grants Site 2018 Annual Wind Rose

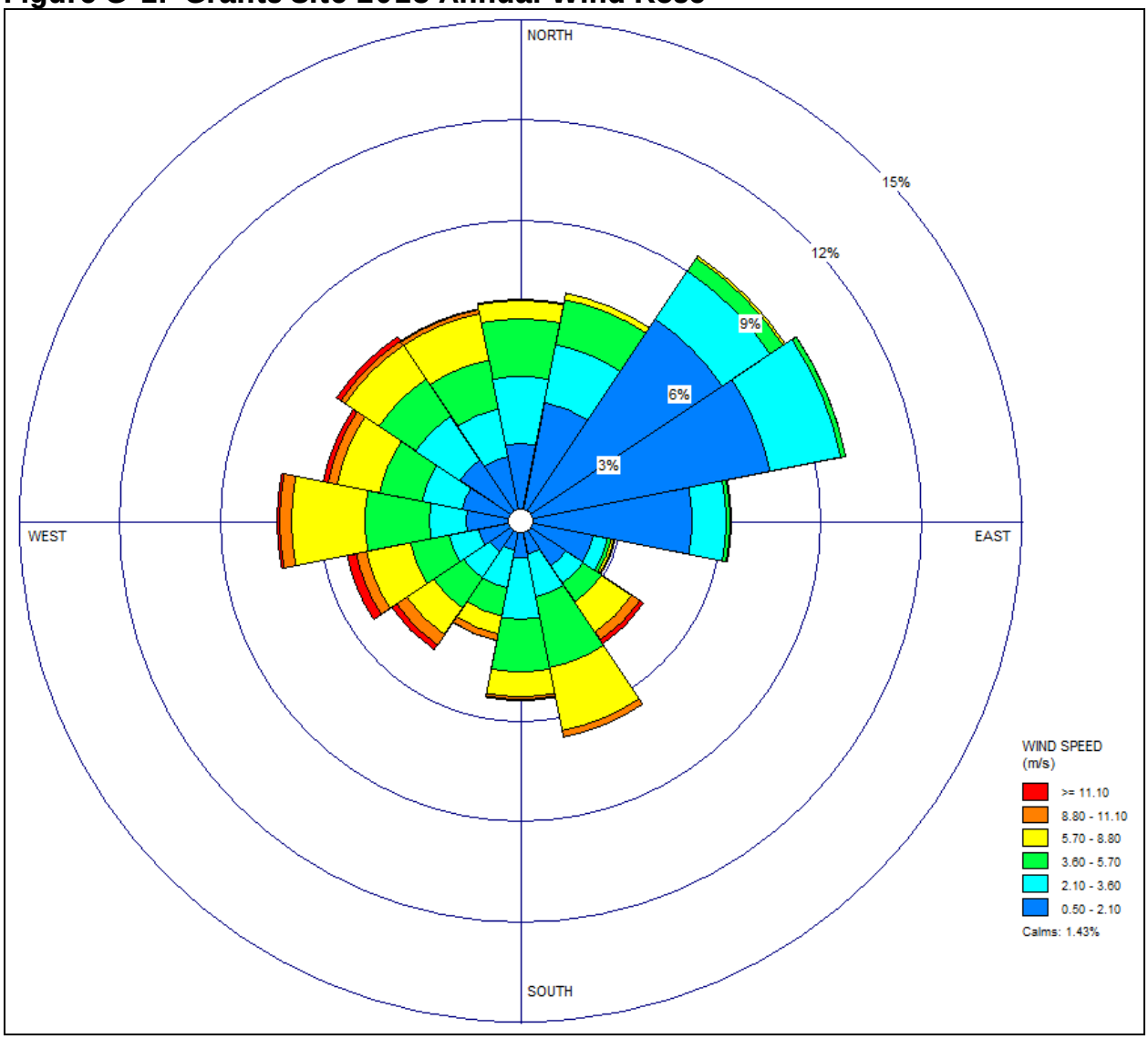

Table G-1. Grants Site 2018 Monthly Meteorological Data Summary

Month	Simple Stats	Wind Speed (m/s)	Air Temperature (c)	Relative Humidity (%)	Monthly Precipitation (in)	Net Solar Radiation (W/m²)	Average Daily Temp (c)	Calculated Heat Index	Evaporation Potential (cc/month)
Jan-17	*max*	11.1	17.1	90.3	0.06	101.7	0.00	0.00	0.00
	min	0.2	-17.1	7.0					
	mean	2.7	-0.3	43.4					
Feb-17	*max*	15.5	17.3	94.0	0.22	120.1	2.34	0.32	0.54
	min	0.2	-14.8	6.1					
	mean	3.5	2.3	45.2					
Mar-17	*max*	14.6	20.5	94.3	0.33	158.1	5.64	1.20	2.03
	min	0.2	-13.2	4.9					
	mean	3.6	5.6	36.1					
Apr-17	*max*	18.1	24.0	80.6	0.07	191.9	11.87	3.70	5.55
	min	0.0	-4.0	2.9					
	mean	4.8	11.9	21.3					
May-17	*max*	13.7	29.7	83.1	1.16	220.1	16.85	6.29	9.61
	min	0.0	-2.5	2.8					
	mean	3.6	16.8	20.3					
Jun-17	*max*	12.2	33.9	87.1	0.49	224.4	22.50	9.75	13.91
	min	0.2	6.9	4.4					
	mean	3.3	22.5	19.9					
Jul-17	*max*	12.5	33.2	91.8	1.13	188.9	22.71	9.89	14.30
	min	0.1	11.7	6.6					
	mean	3.1	22.7	41.0					
Aug-17	*max*	11.5	33.0	94.7	1.29	172.5	21.11	8.85	12.28
	min	0.1	8.7	7.4					
	mean	2.8	21.1	43.0					
Sep-17	*max*	8.8	29.2	91.0	1.04	153.6	18.05	6.99	8.96
	min	0.2	3.2	7.3					
	mean	2.4	18.1	39.7					
Oct-17	*max*	9.8	23.8	93.5	1.22	101.3	9.69	2.72	3.80
	min	0.2	-1.3	11.7					
	mean	3.1	9.7	60.8					
Nov-17	*max*	10.7	17.0	84.3	0.02	100.7	2.12	0.27	0.48
	min	0.3	-14.5	7.3					
	mean	2.7	2.1	39.3					
Dec-17	*max*	12.3	15.1	94.2	0.35	77.5	0.00	0.00	0.00
	min	0.3	-21.0	7.5					
	mean	2.7	-1.3	58.4					

Net solar radiation = $(1-\alpha) \times SR$

α = albedo (Earth average around 0.35. Typical desert sands average 0.4 and grassses average 0.25. Going with a 0.33.

SR = solar radiation [From HMC met station data]

Evaporation Potential (PET) = $1.6 \times (L/12) \times (N/30) \times (10\, T_{\alpha}/I)^{\alpha}$

T_{α} = Average daily temperature (degrees Celsius; if negative then value of 0) for month being calculated.

L = Average day length (in hours) of month being calculated.

N = number of days in month being calculated.

$\alpha = (6.75E\text{-}7) \times I^3 - (7.71E\text{-}5) \times I^2 + (1.792E\text{-}2) \times I + 0.49239$

α =	(a)	(b)	= a × b
	6.75E-07	124889.5	8.43E-02
	7.71E-05	2498.5	1.93E-01
	1.79E-02	50.0	8.96E-01
			0.49239
	α =		1.28E+00

$I = \Sigma$ *(for i = 1 to 12)* $(T_{\alpha i}/5)^{1.514}$ = Heat index which depends on the 12 monthly mean temperatures ($T_{\alpha i}$).

	I =	49.99