HOMESTAKE
Grants Project

Homestake Mining Company of California

David W. Pierce
Closure Manager

31 March 2020

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ATTN: Mr. Ron C. Linton
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ATTN: Ms. Ashlynne Winton
Ground Water Quality Bureau
New Mexico Environment Department
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Santa Fe, NM 87502-5469

RE: 2019 Annual Monitoring Report / Performance Review, In Accordance with Nuclear Regulatory Commission Docket No. 40-8903, License No. SUA 1471, and New Mexico Environmental Department DP-200 Ground Water Discharge Plan

Mr. Linton and Ms. Winton:

Pursuant to US Nuclear Regulatory Commission License SUA-1471, Docket 40-8903, License Condition 35(E) and in accordance with the ground water discharge permit DP-200 issued by the New Mexico Environmental Department, please find enclosed copies of the Annual Monitoring Report/ Performance Review for 2019 for Homestake Mining Company's Grants Reclamation Project. Included in each report copy is a CD containing an electronic PDF file version of the report.

HMC noted in the past hat monitoring conditions on the site are subject to change and may require periodic judgement decisions relative to the ability to supply certain data to meet the Table 2 – Groundwater Monitoring Program (8-99) requirements, as modified by NRC License Amendment 54 (ML19220A181) and Tables 2-1 and 2-2 in the new plan outlines the water quality sampling frequency and parameters monitored.

With respect to the well monitoring requirements outlined in Table 2 in the 8-99 plan, monitoring wells 446, 491, 492, 942, and SUB1 were not sampled in 2019; the wells are either obstructed, not accessible, or supply inadequate water for sampling. We had recommended, as part of the new Groundwater Compliance Monitoring Plan, that these wells be replaced by alternate wells for monitoring in this area. With respect to the well monitoring requirements in the 2019 plan that was approved in November, Deep Well #1R was not operational, pumps in wells 639, CF4, and K9 were not working 2019, only a H list were collected from wells 540, 845, 846, and 869 prior to the approval of the new plan and one of the quarterly H list sample from well DD2 was not collected due to inaccessibility of the area.

Thank you for your time and attention on this matter. If you or anyone on your staff has any questions, please contact me at the Grants office at 505.287.4456, extension 34, or call me directly on my cell phone at 505.238.9701.

Respectfully,

David W. Pierce
Closure Manager
Homestake Mining Company of California
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2019 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, 2020

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FOR HOMESTAKE'S GRANTS PROJECT

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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 (HMC) 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.

HMC's long-term goal is to restore the aquifer water quality to levels as close as practicable to the up-gradient site background levels. The groundwater corrective action program (CAP) was updated and submitted to the regulatory agencies (NRC and NMED) in December (Homestake 2019). 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 2019. 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 2019) and Hydro-Engineering 2003b &

2010b reports should be reviewed for details of the geologic setting and aquifer conditions on the site. Three 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 township and range for the land sections referenced are described in Section 1.2. 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. The restoration systems were operated at reduced rates during 2019 to reduce the volume of water requiring evaporation and allow dewatering and relining of Evaporation Pond No. 1 (EP1) in 2020. 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 was used for irrigation. Starting in 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 selected wells in the well field were operated most of 2019 at reduced rates. 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. Wells in the H well field are completed only in the alluvial aquifer and the collection is occurring from wells located west of well CW-32 on left side of Cross-section B-B'. Wells in the H well field were operated for most of 2019 with the collection water treated through the zeolite system.

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 by reducing contaminant concentrations to or below site standard 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 Pile 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 concentration 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 2009, respectively, showing only a small area in the tailings area in 1999 with selenium concentrations above 5 mg/L while no measured concentrations are above this level in 2009. The area in Section 3 with elevated selenium concentration in 1999 was restored prior to 2009. Figure 1.1-9 gives the selenium patterns for 2014 which shows slightly larger patterns in the LTP area and a smaller pattern in the L area than those in 2009. Selenium patterns for 2019 are presented in Figure 1.1-10 and show that selenium restoration is only needed in the tailings area and north of the L area which is located southeast of the STP.

Uranium became the most important parameter for restoration at the Grants site after significant restoration of selenium concentration and with the establishment of new uranium standards in the mid 2000's. Figure 1.1-11 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. Well symbols show where uranium concentrations were measured in 1976. The elevated concentrations in Broadview Acres migrated through the Upper Chinle aquifer to this area and were then conveyed to the alluvial aquifer near the Upper Chinle subcrop. This figure also shows 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 1.1-12 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 portion of the subdivision where concentrations were slightly above the site standard (see Figure 1.1-13). Well symbols are shown on this figure where uranium measurements were made in 1999. Uranium concentrations in a small area in the northeast portion of Murray Acres also exceeded the site standard in 1999, but the maximum concentration in this area was 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 Off-site area while the area of concentrations exceeding the site standard extended down to the west-center portion of Section 33. The 2009 uranium concentration patterns are presented in Figure 1.1-14 and show that concentrations in southern Felice Acres and the northeast portion of Section 3 have been reduced to below 0.5 mg/L. By 2009, the area of concentrations greater than the site standard that extended into west-central portion of Section 33 was pulled back approximately one mile to the western portion of Section 28. Some increase in uranium concentrations in the Felice Acres and in Section 27 were observed in 2014 (see Figure 1.1-15) due to the reduction and ceasing of irrigation prior to 2014. The On-site area of concentrations above 0.16 mg/L is fairly similar in 2009 and 2014. The 2019 uranium concentration patterns are presented in Figure 1.1-16 and show the extent of the uranium concentration greater than 0.16 mg/L in Section 28 was reduced from 2014 to 2019. The restoration of the area in the northeast portion of Murray Acres was maintained in 2019.

The uranium concentrations for five different years are presented for the Upper Chinle aquifer in Figures 1.1-17 through 1.1-21 (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 and this area is shown on Cross-section B-B' in the area of well CW-4.

Figures 1.1-22 through 1.1-26 show a sequence of uranium concentration mapping for the Middle Chinle aquifer and the measured concentrations showed some improvement in the South Felice Acres area with no area of concentrations above 0.5 mg/L in 2019. Collection in the Middle Chinle in 2019 was mainly in the R and Y well fields in the South Off-site area and in 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 area.

The elevated uranium concentrations in the Lower Chinle aquifer were first defined in 1996 and are presented in Figure 1.1-27. 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 1.1-28) to lower levels in 2009 (see Figure 1.1-29). Figures 1.1-30 and 1.1-31 give similar maps for the Lower Chinle aquifer for 2014 and 2019.

An average of 139 gallons per minute (gpm) was pumped into the On-site alluvial treated and/or fresh-water injection systems in 2019. An additional 58 gpm of treated and/or fresh water was injected into the On-site Upper and Middle Chinle aquifer systems. An average rate of 236 gpm of R.O. product water was pumped to the PTT and mixed with zeolite treated water and/or fresh water prior to injection into the groundwater in 2019. Production of significant quantities of R.O.

product water started in July of 1999 with consistent operation from 2000 through 2019 except during equipment repair periods or during treatment plant upgrade or expansion.

In 2019, the average collection rate for the On-site alluvial aquifer was 198 gpm. No collection for re-injection of alluvial aquifer water was done in 2019. The On-Site Upper Chinle aquifer collection program consisted of pumping wells CE2, CE5, CE6, CE11, CE12, CE15 and CE19 at an average composite rate of 88 gpm in 2019. The up-gradient alluvial aquifer collection system was not operated in 2019, while average rates of 5.6 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 2019 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 concentration 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 Evaporation Pond No. 2 (EP2). There are also two wells in northern Felice Acres and several wells in southern Felice Acres subdivision with measured uranium concentrations 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 the one well located in Murray Acres was not done in 2019 due to the reduction of 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 2019 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 nitrate concentrations above the site standard and is likely caused by tailings seepage. The nitrate standard has typically been 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. This demonstrates that radium is only a constituent of concern under the LTP.

No vanadium concentrations exceeded the alluvial site standard in 2019 except for wells in the LTP and STP. Concentrations of this constituent have been adequately restored to below the site standard except in the immediate area of the LTP and STP.

Thorium-230 levels observed in 2019 were less than the site standard except for levels in the alluvium immediately under the LTP. The mobility of this constituent has been very limited and elevated activities only occur in close proximity to the tailings. However, the analytical results for this constituent vary significantly at the low observed levels that are approaching laboratory detection limits. With the potential for erratic analytical results, slightly higher values should not be considered significant until supported by additional monitoring. The monitoring records for thorium-230 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 2019. 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 2019 in Upper Chinle well CW5 just north of Broadview Acres and also in Upper Chinle well 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 2019. 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 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 within the footprint of 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 exceeded the Upper Chinle site standard in 2019 in numerous wells near the LTP and Collection ponds, in one Upper Chinle well north of Broadview Acres, in one well in Broadview Acres and in two wells in Felice Acres. Restoration of these elevated values should result from the existing and additional Upper Chinle collection well operation combined with the well CW5 and well CW25 injection efforts. The continual decline in uranium concentrations to or below the site standard in Upper Chinle wells, 494 and CE15A, in the Broadview and Felice Acres areas is the most important Upper Chinle water quality change in 2019. Continued monitoring of Upper Chinle well CE9 in Broadview Acres and well CW78 in central Felice Acres is necessary to determine if collection from well CE15 will capture the impacted groundwater or if additional corrective action is needed in the area.

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 in one well north of Broadview Acres in the Upper Chinle aquifer during 2019. Restoration for these locations should occur from continued and expanded collection efforts and well CW5 and well CW25 injection activities.

All nitrate concentrations observed in 2019 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.

All vanadium, radium-226 plus radium-228 and thorium-230 results for the Upper Chinle in 2019 were less than the corresponding 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 2019 is very similar to that of recent years with a depression in western South Felice Acres resulting from the pumping in 2019. 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 2019.

Water quality in the Middle Chinle aquifer is generally good and all sulfate concentrations are less than the site standards in 2019 except for two 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 one well in Murray Acres and wells located in Broadview and Felice Acres that are above the non-mixing zone background value. There are also two wells west of the West Fault with TDS concentration greater than the mixing zone standard. Chloride concentrations in the Middle Chinle aquifer did not exceed the site standard in 2019.

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 reduced with the collection in this area during 2019. The decline in uranium concentrations in 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 impacted groundwater by HMC will reduce these elevated concentrations in Felice Acres and Broadview

Acres. The uranium site standard is also exceeded in several wells west of the West Fault but the levels in these wells were reduced in 2019 with the CW62 collection. Continued pumping of well CW62 should reduce the uranium concentration 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 6.3-14A). The mixing zone selenium site standard is exceeded in three wells west of the West Fault but concentrations decreased in 2019. Molybdenum concentration in four wells west of the West Fault in the Middle Chinle aquifer is 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 necessary restoration 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 an important indicator of a reduction in impacts.

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 levels of concern. All radium, vanadium and thorium-230 concentrations in the Lower Chinle aquifer were at low levels in 2019.

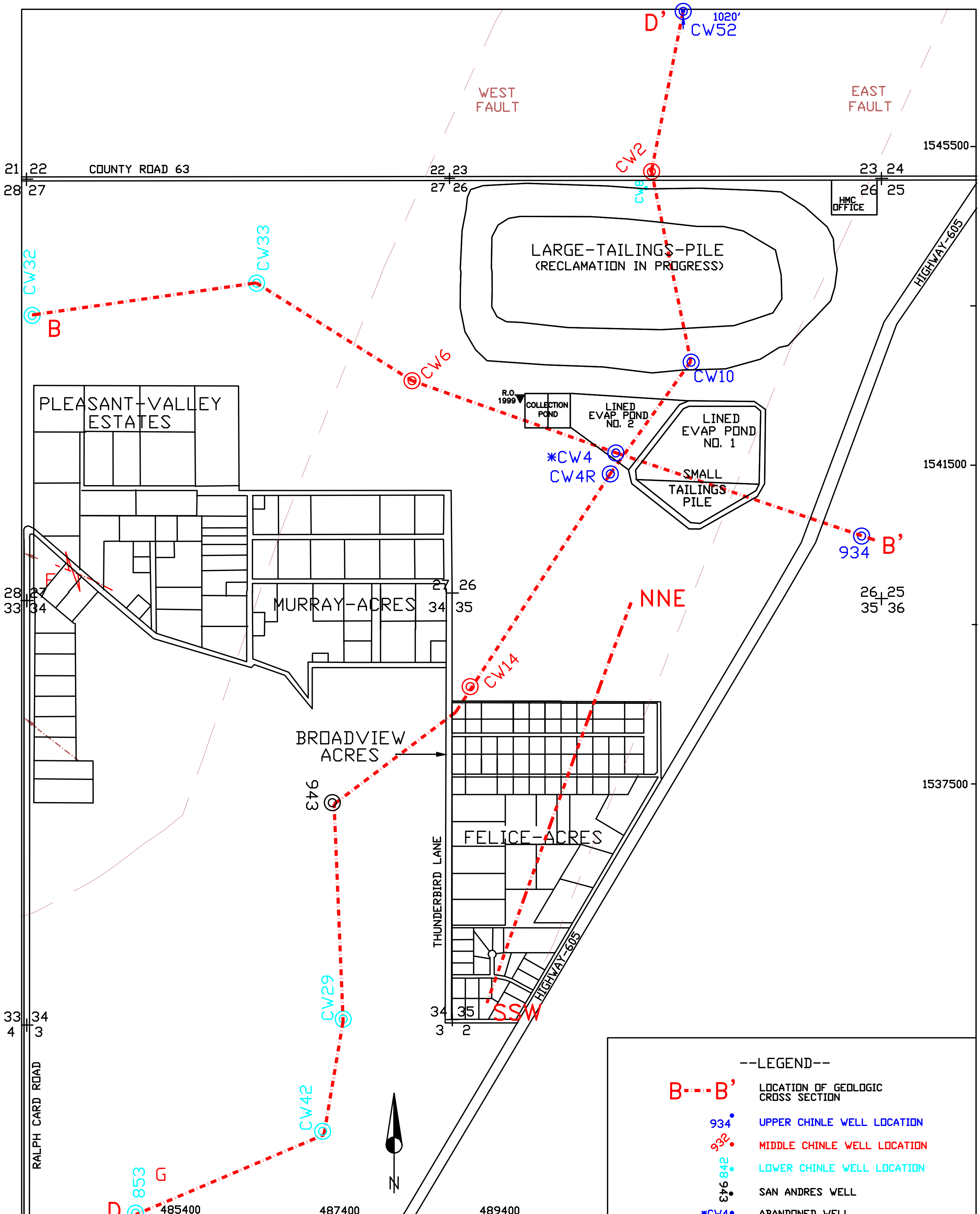

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FIGURE 1.1-1. LOCATIONS OF GEOLOGIC CROSS SECTIONS

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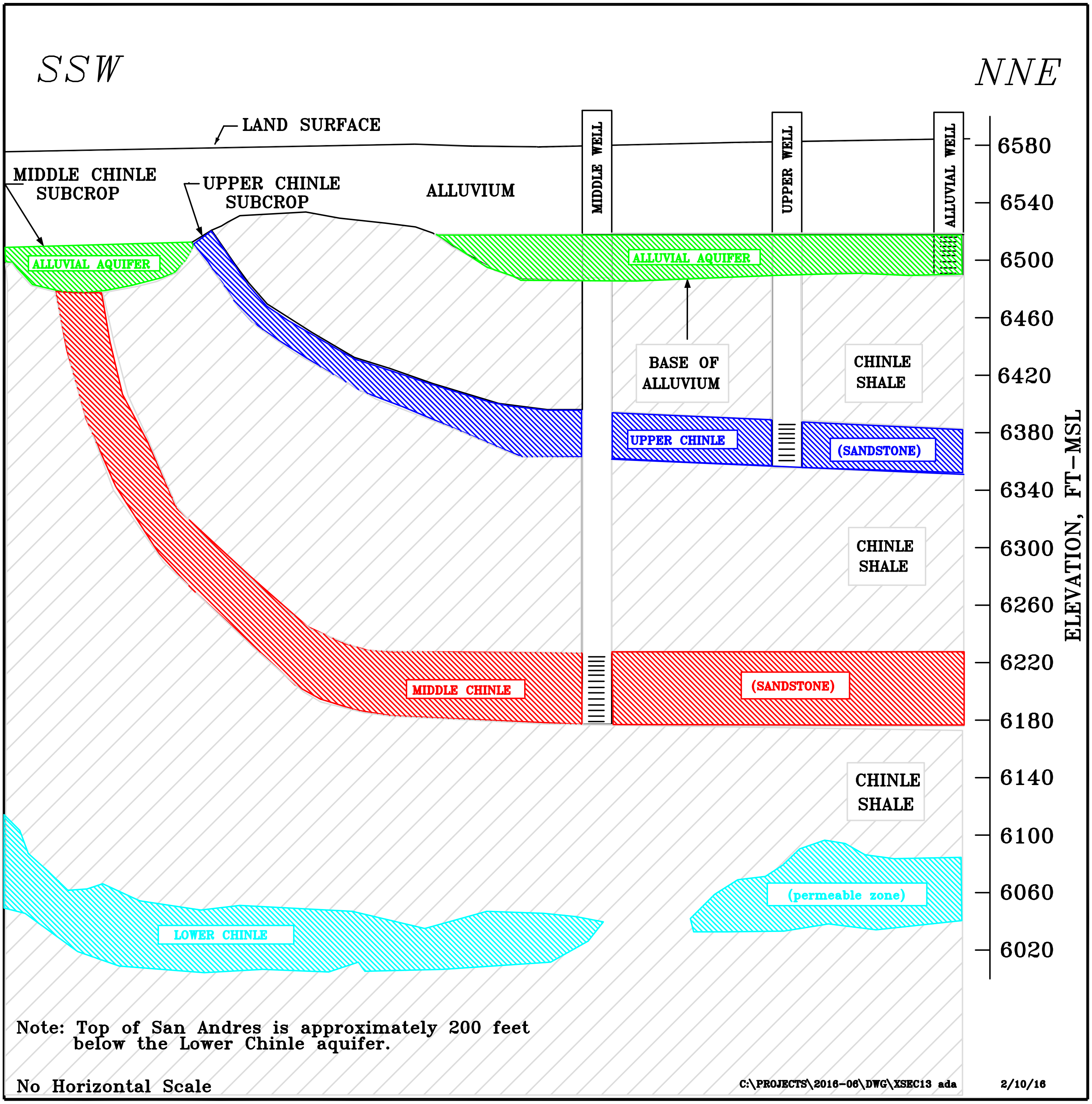
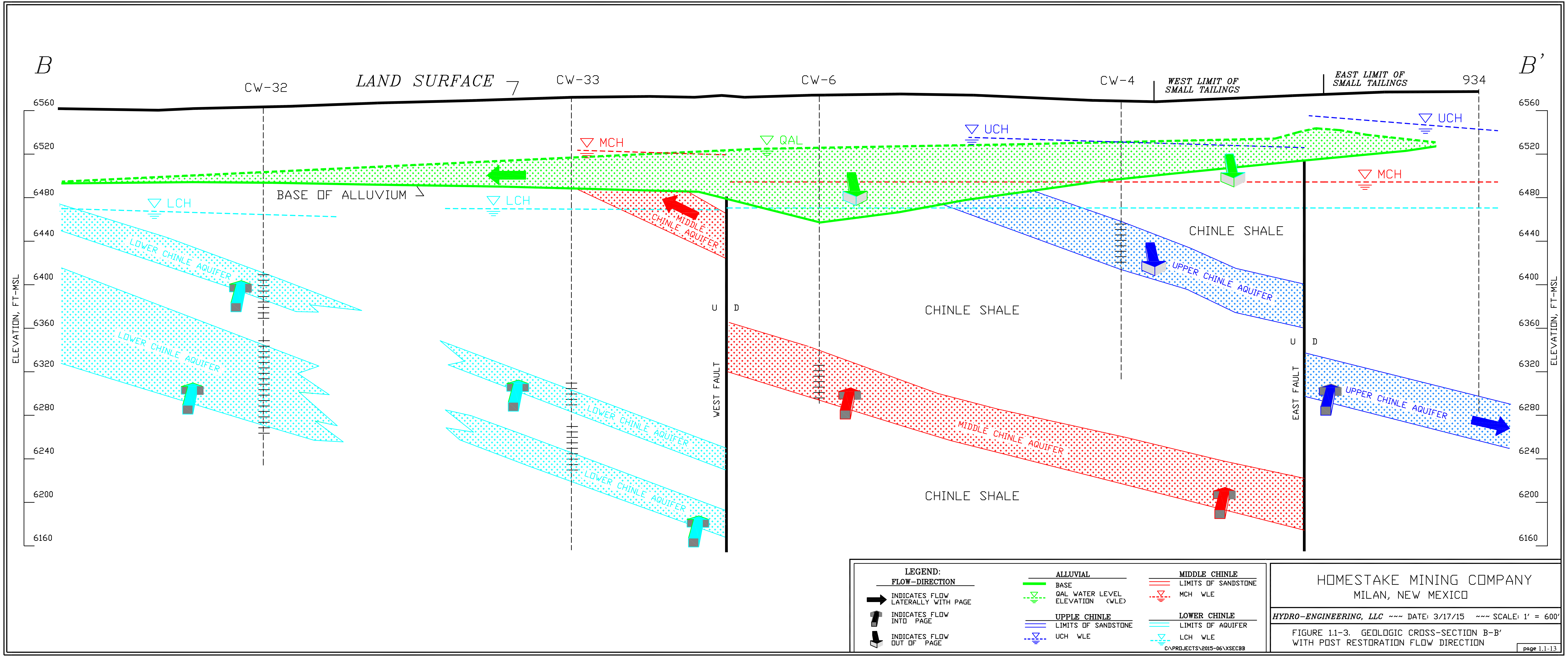


FIGURE 1.1-2. TYPICAL GEOLOGIC CROSS SECTION


B
B'
LAND SURFACE
CW-32
CW-33
CW-6
CW-4
WEST LIMIT OF SMALL TAILINGS
EAST LIMIT OF SMALL TAILINGS
934
6560
6520
6480
6440
6400
6360
6320
6280
6240
6200
6160
ELEVATION, FT-MSL
MCH
QAL
UCH
LCH
BASE OF ALLUVIUM
MIDDLE CHINLE AQUIFER
LOWER CHINLE AQUIFER
UPPER CHINLE AQUIFER
CHINLE SHALE
WEST FAULT
EAST FAULT
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INDICATES FLOW LATERALLY WITH PAGE
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ALLUVIAL
BASE
QAL WATER LEVEL ELEVATION (WLE)
UPPLE CHINLE
LIMITS OF SANDSTONE
UCH WLE
MIDDLE CHINLE
LIMITS OF SANDSTONE
MCH WLE
LOWER CHINLE
LIMITS OF AQUIFER
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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
page 1.1-13

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

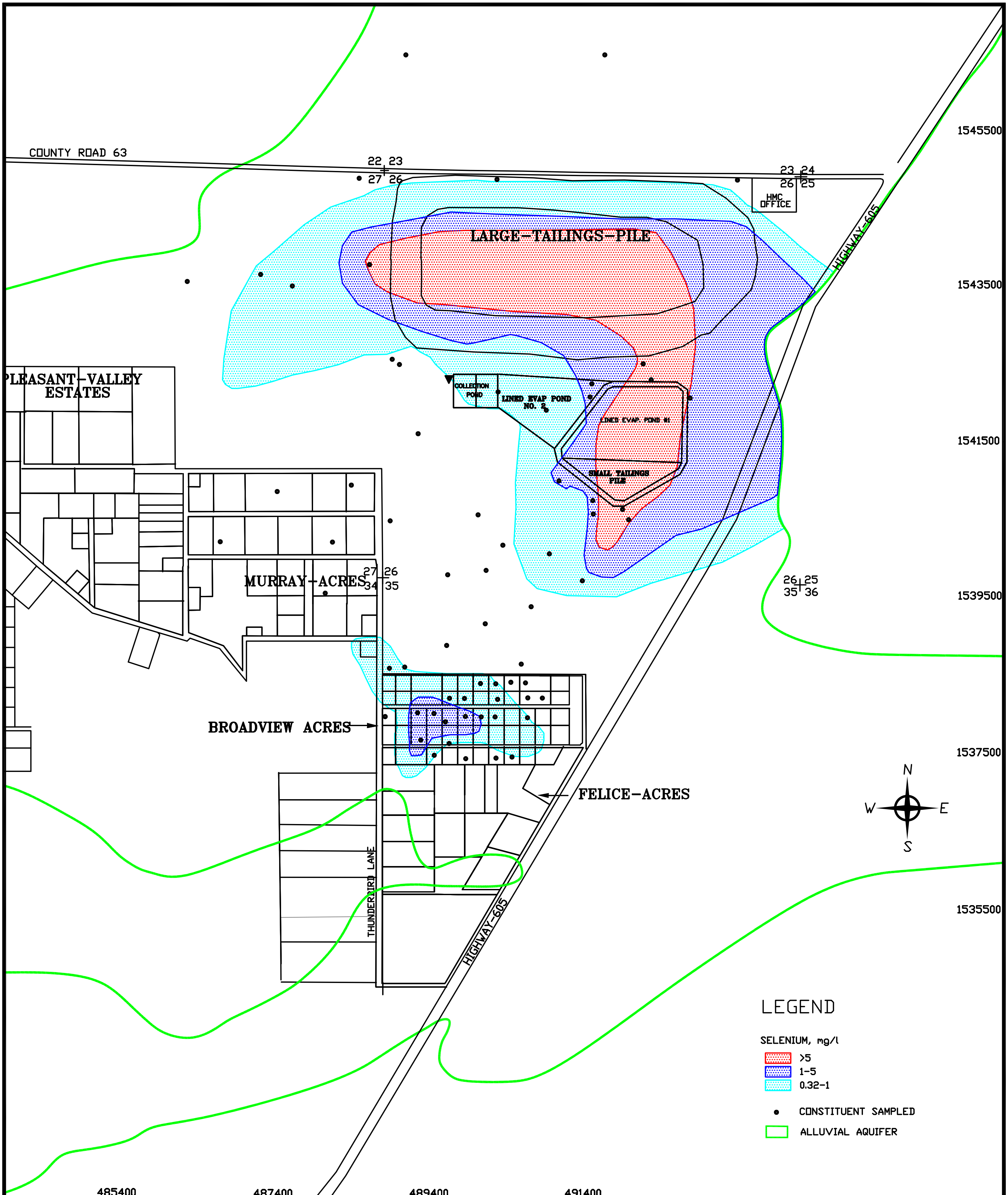

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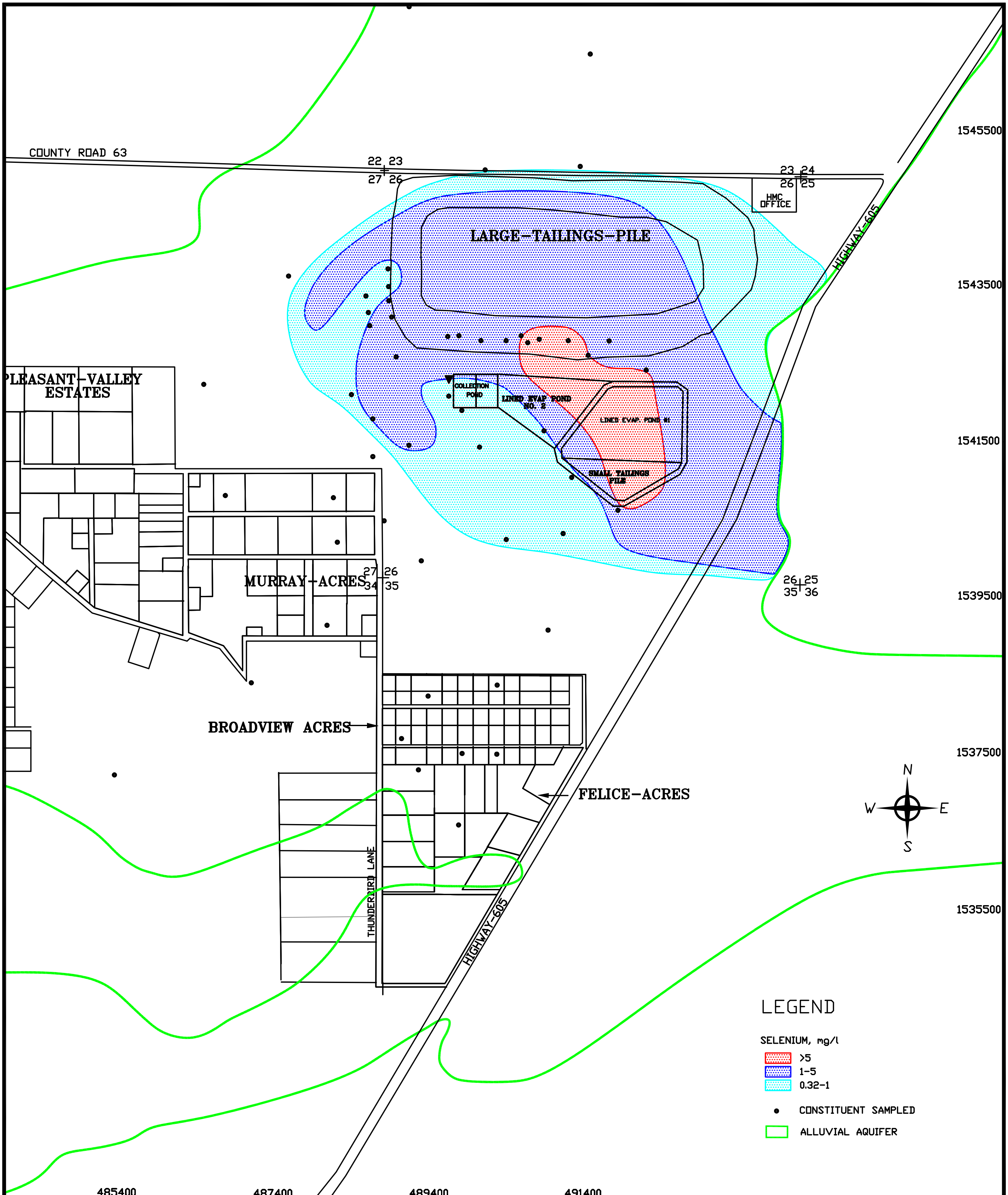
FIGURE 1.1-5. ALLUVIAL SELENIUM CONCENTRATIONS, 1976



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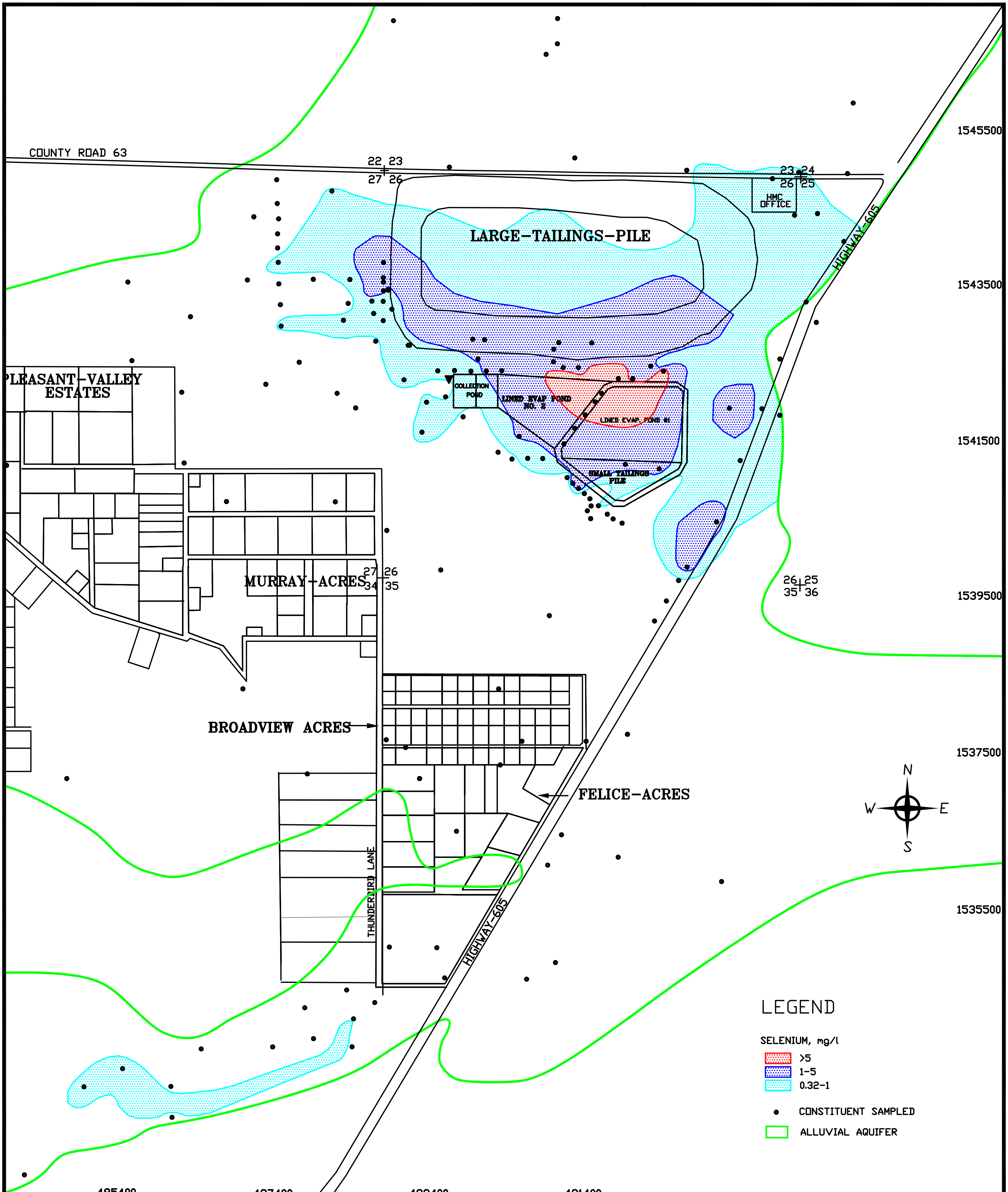
DATE: 1/30/2020

FIGURE 1.1-6. ALLUVIAL SELENIUM CONCENTRATIONS, 1988



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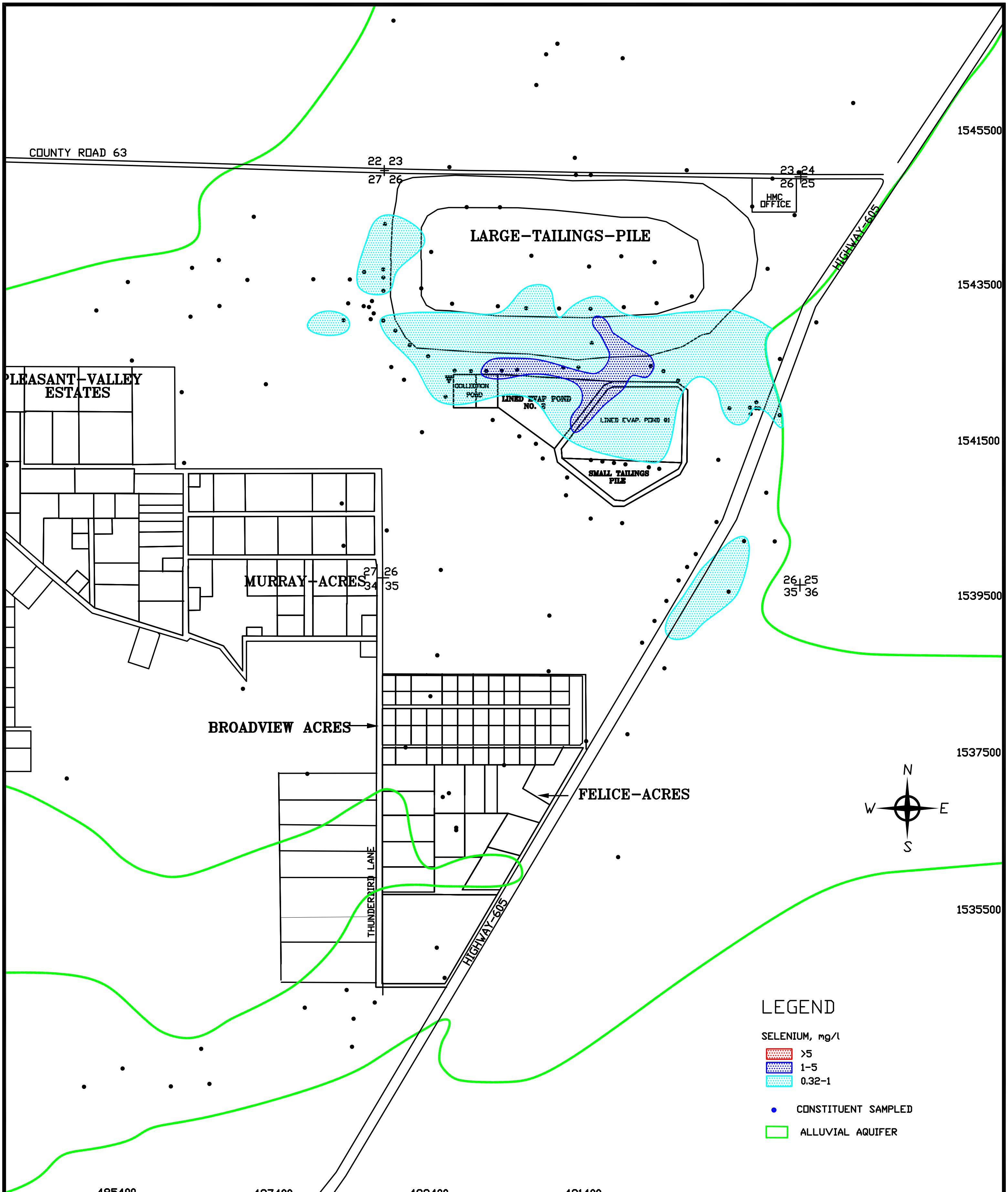
DATE: 1/30/2020

FIGURE 1.1-7. ALLUVIAL SELENIUM CONCENTRATIONS, 1999



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DATE: 1/31/2020

FIGURE 1.1-8. ALLUVIAL SELENIUM CONCENTRATIONS, 2009

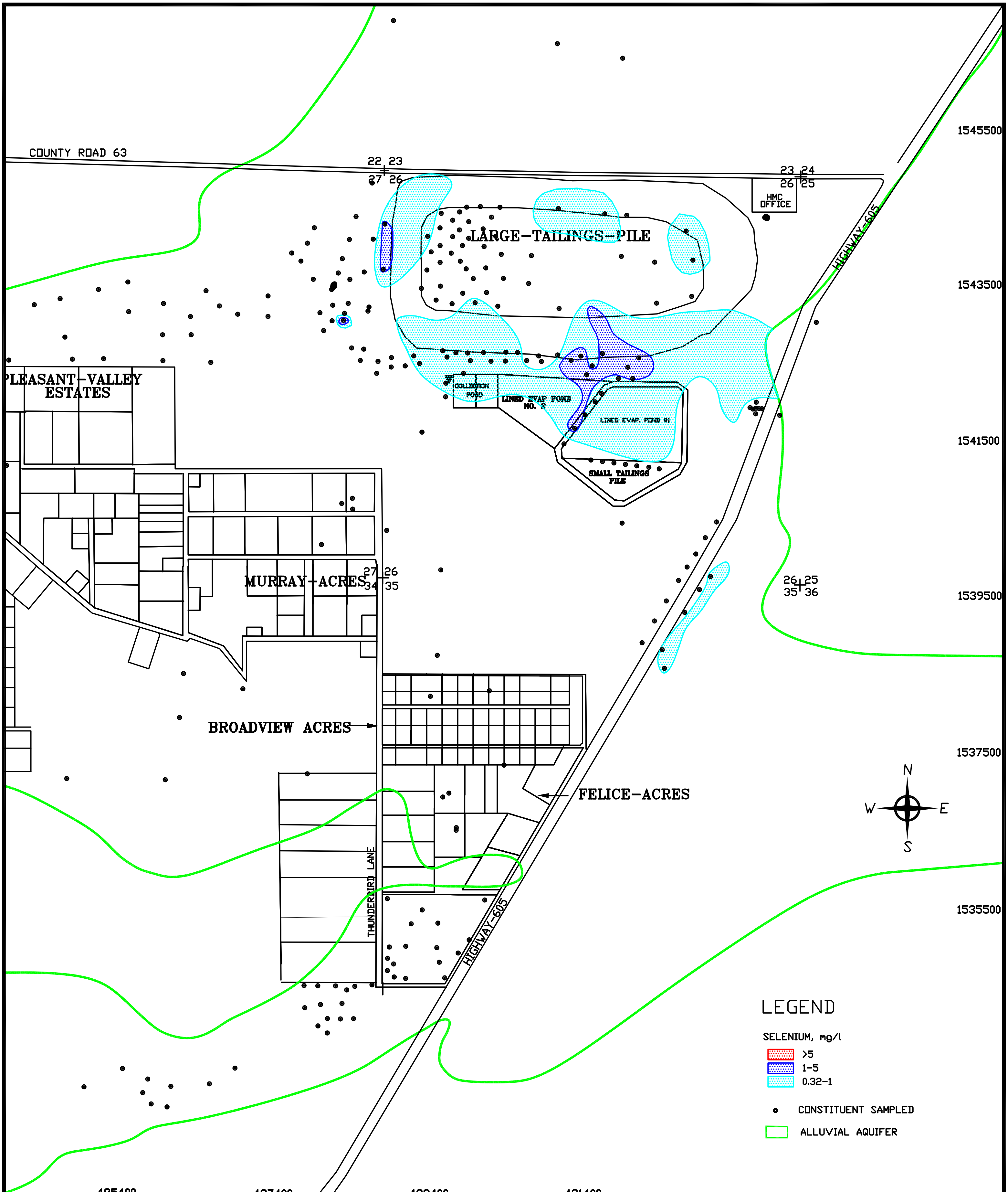

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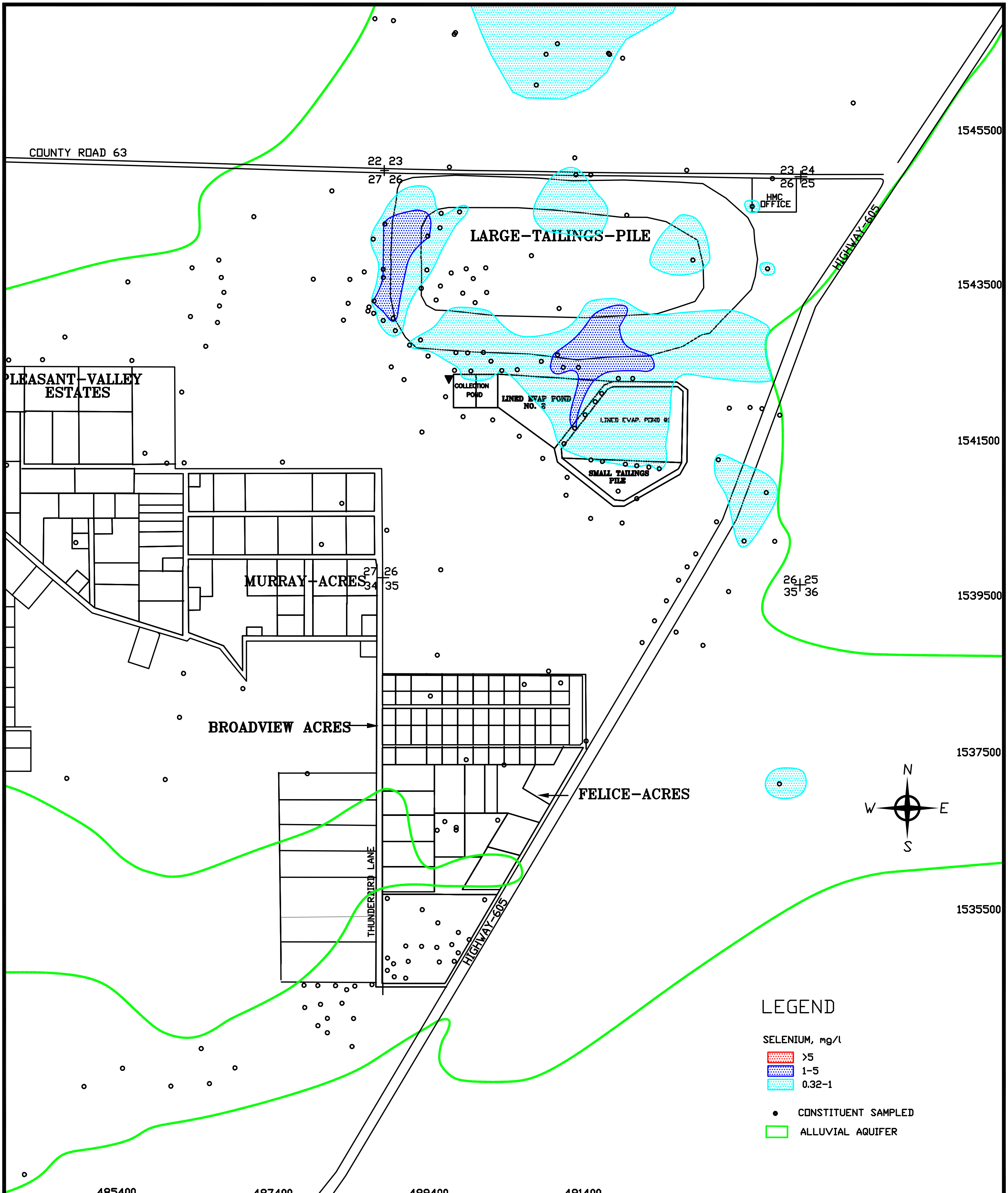
FIGURE 1.1-9. ALLUVIAL SELENIUM CONCENTRATIONS, 2014



SCALE: 1"=1600'

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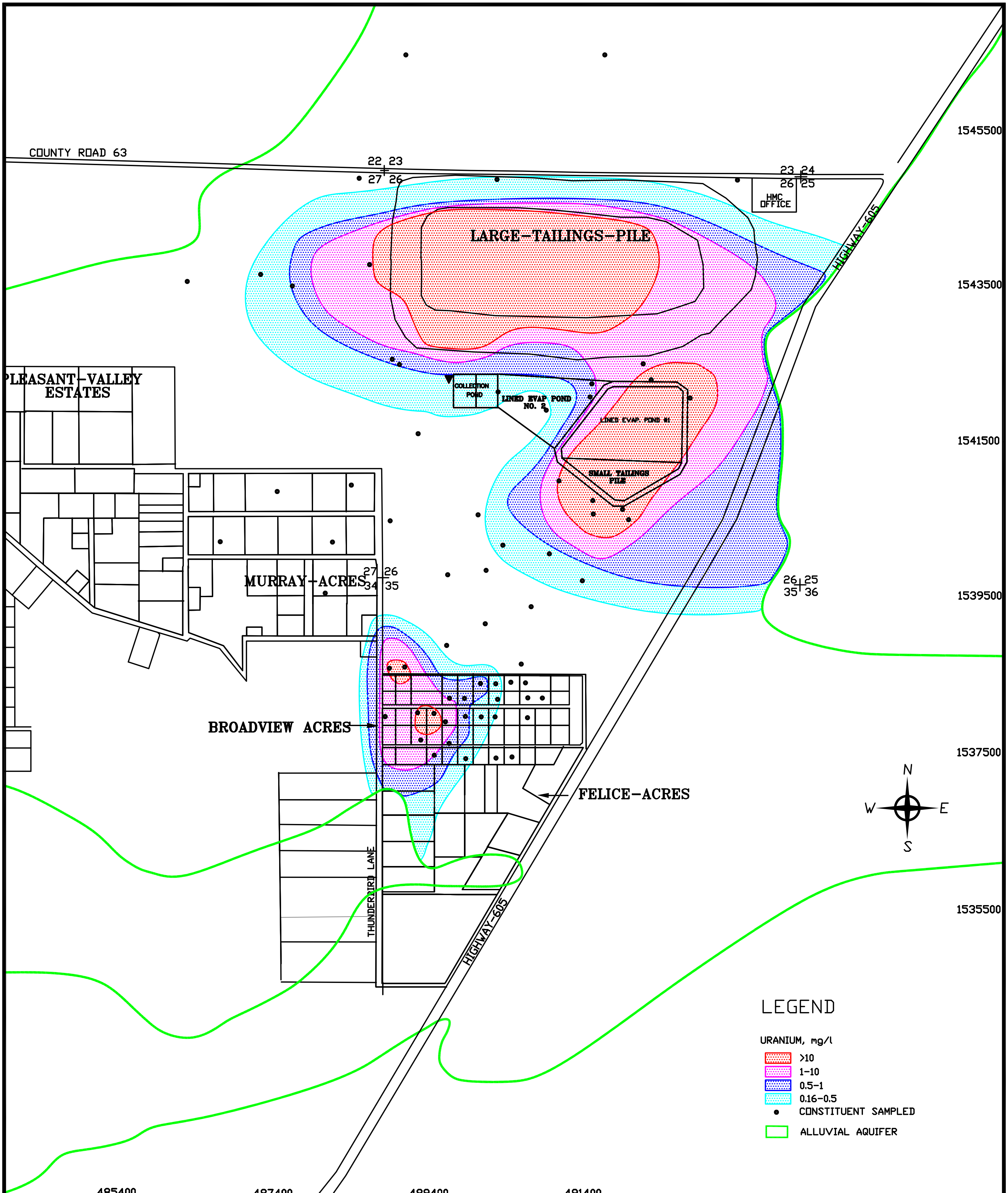
FIGURE 1.1-10. ALLUVIAL SELENIUM CONCENTRATIONS, 2019



SCALE: 1"=1600'	FIGURE 1.1-11. ALLUVIAL URANIUM CONCENTRATIONS, 1976
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DATE: 1/31/2020	

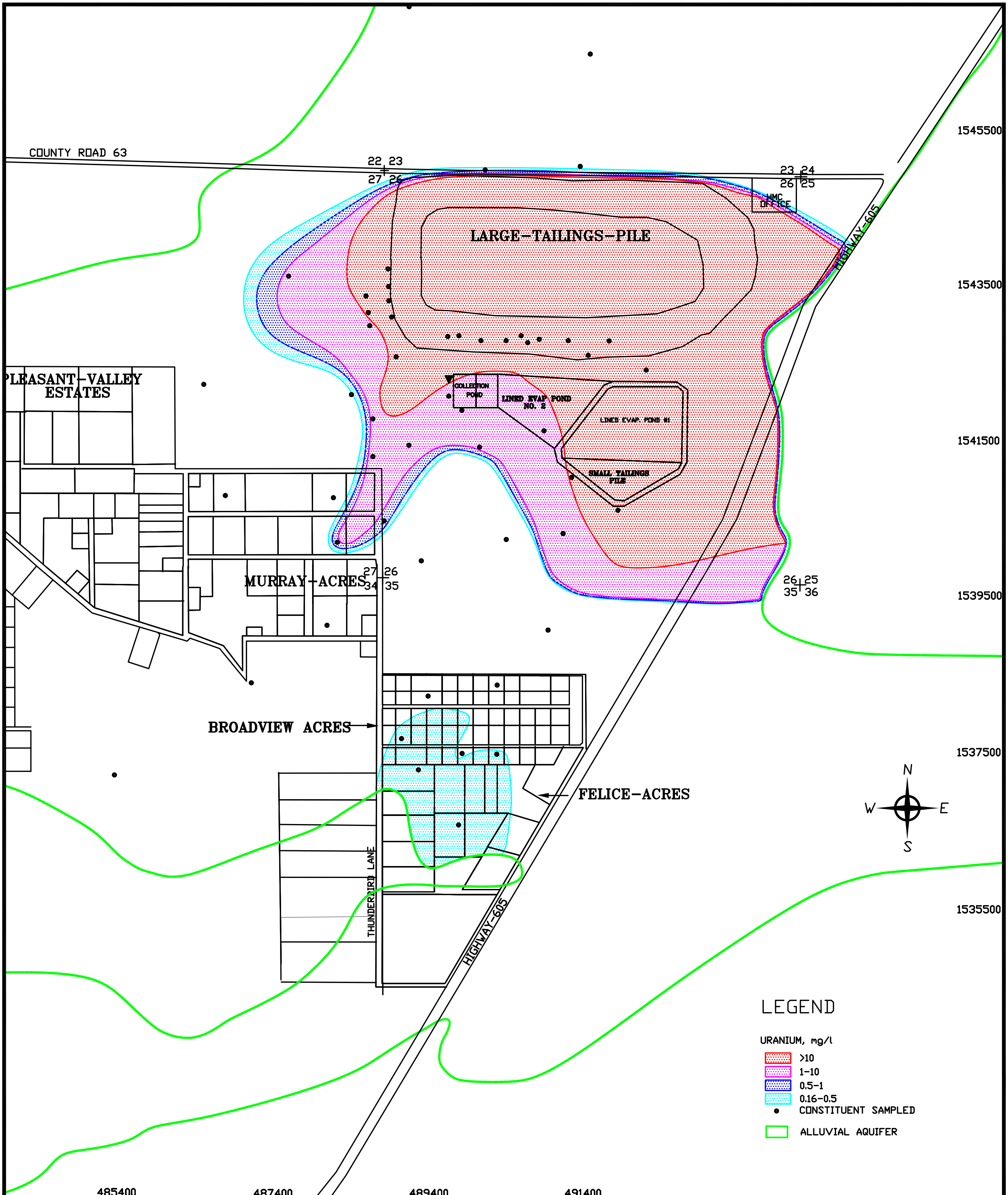

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FIGURE 1.1-12. ALLUVIAL URANIUM CONCENTRATIONS, 1988

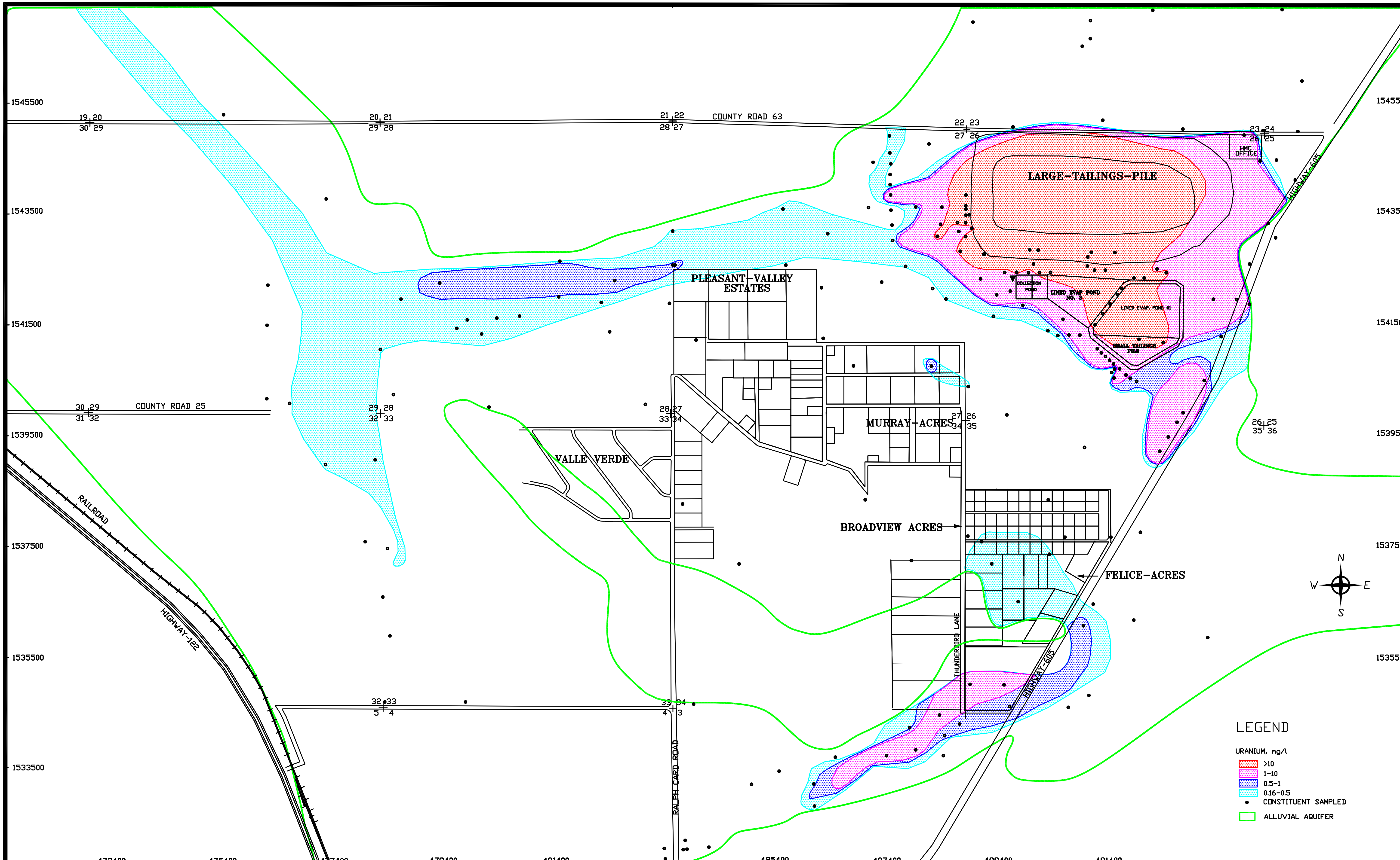

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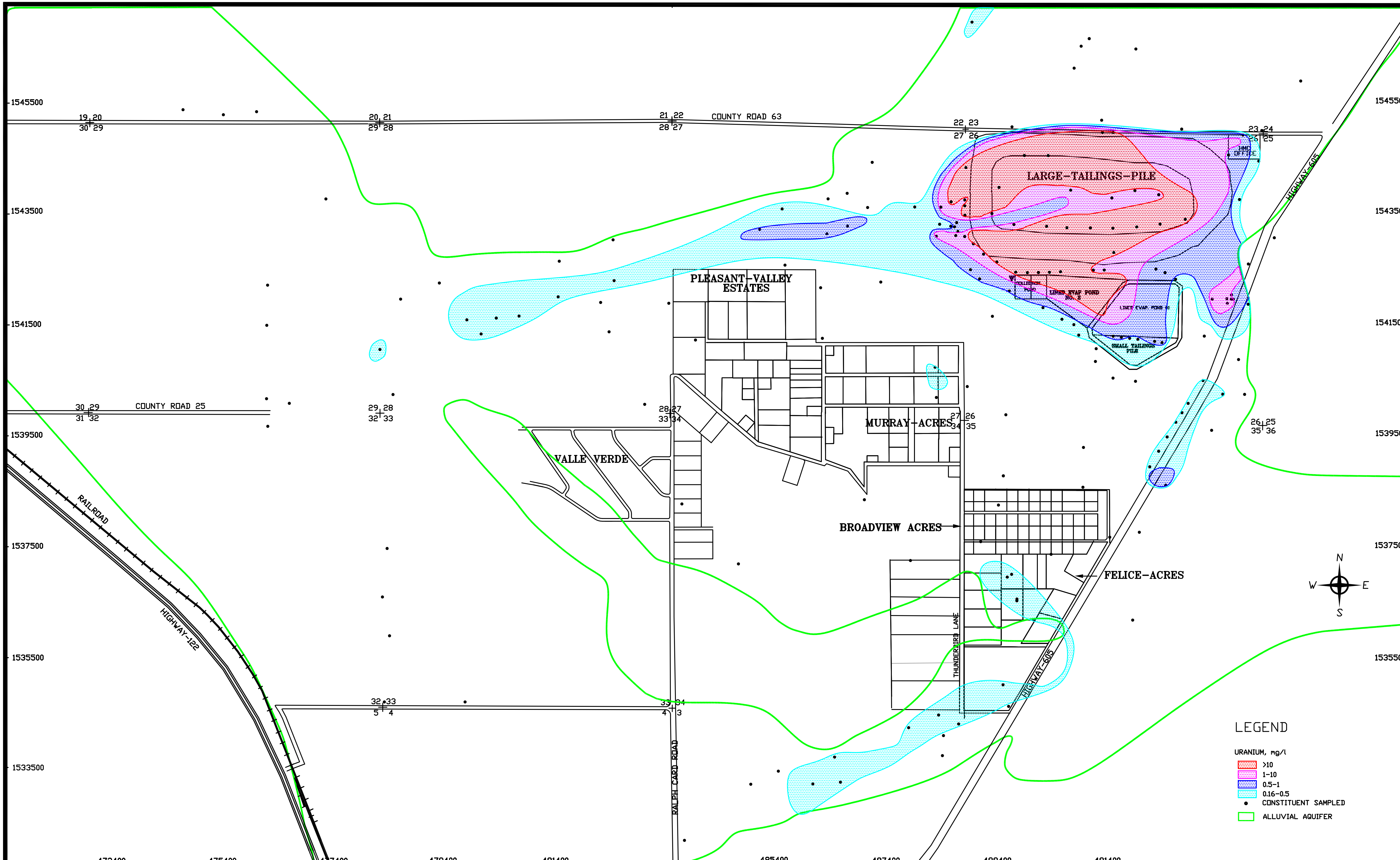
FIG. 1.1-13. ALLUVIAL URANIUM CONCENTRATIONS, 1999



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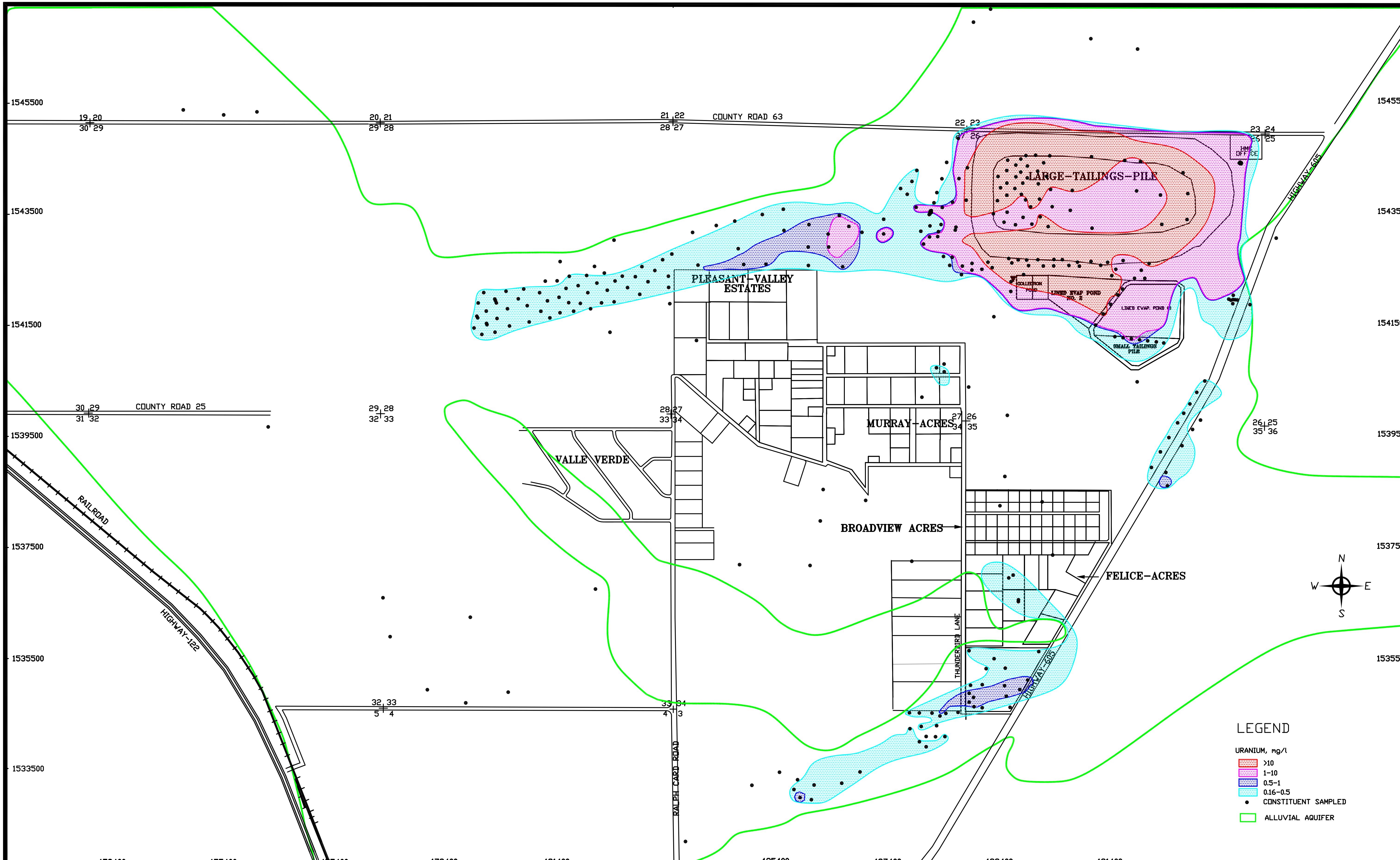
DATE: 2/28/19

FIG. 1.1-14. ALLUVIAL URANIUM CONCENTRATIONS, 2009



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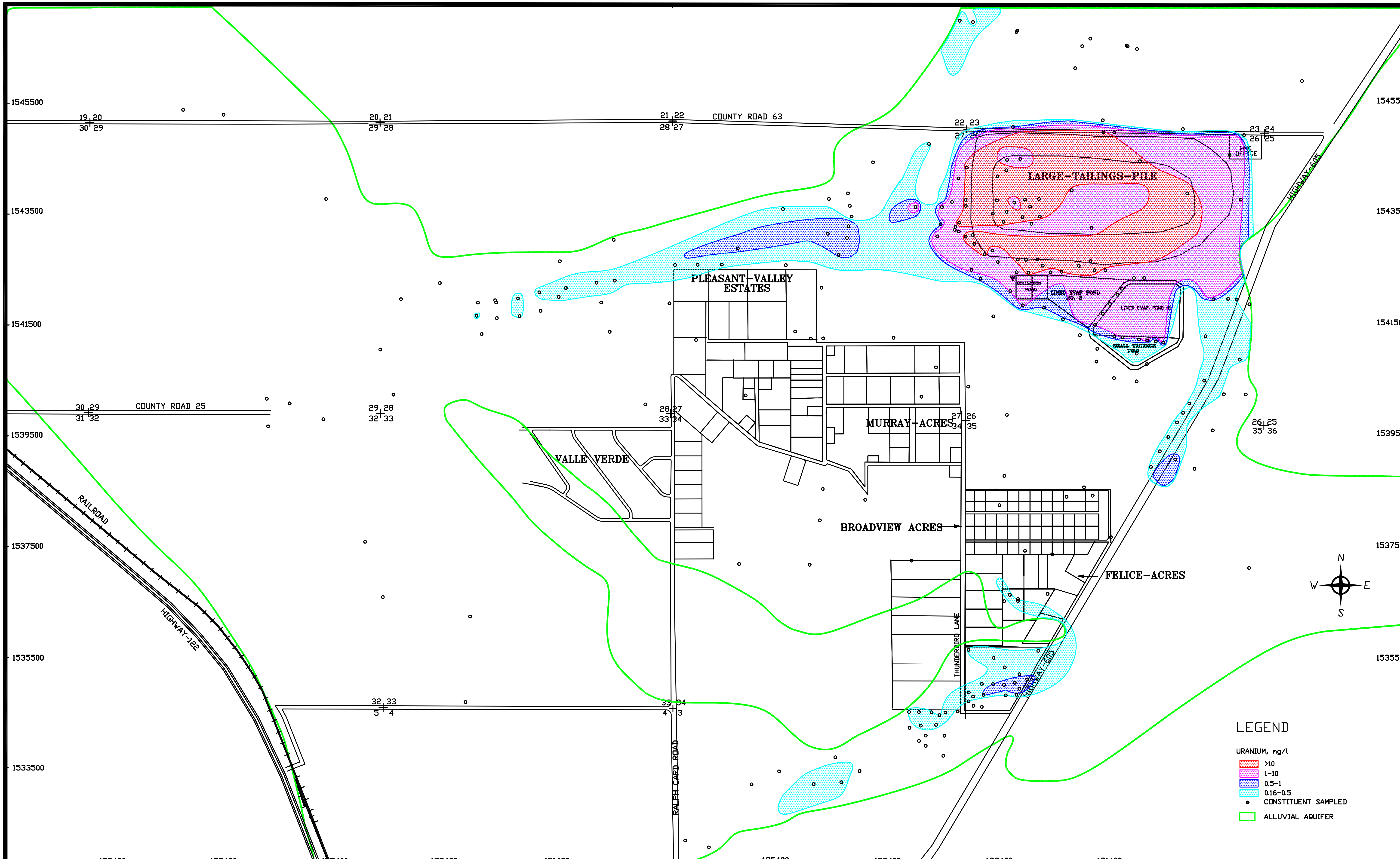
DATE: 2/28/19

FIGURE 1.1-15. ALLUVIAL URANIUM CONCENTRATIONS, 2014



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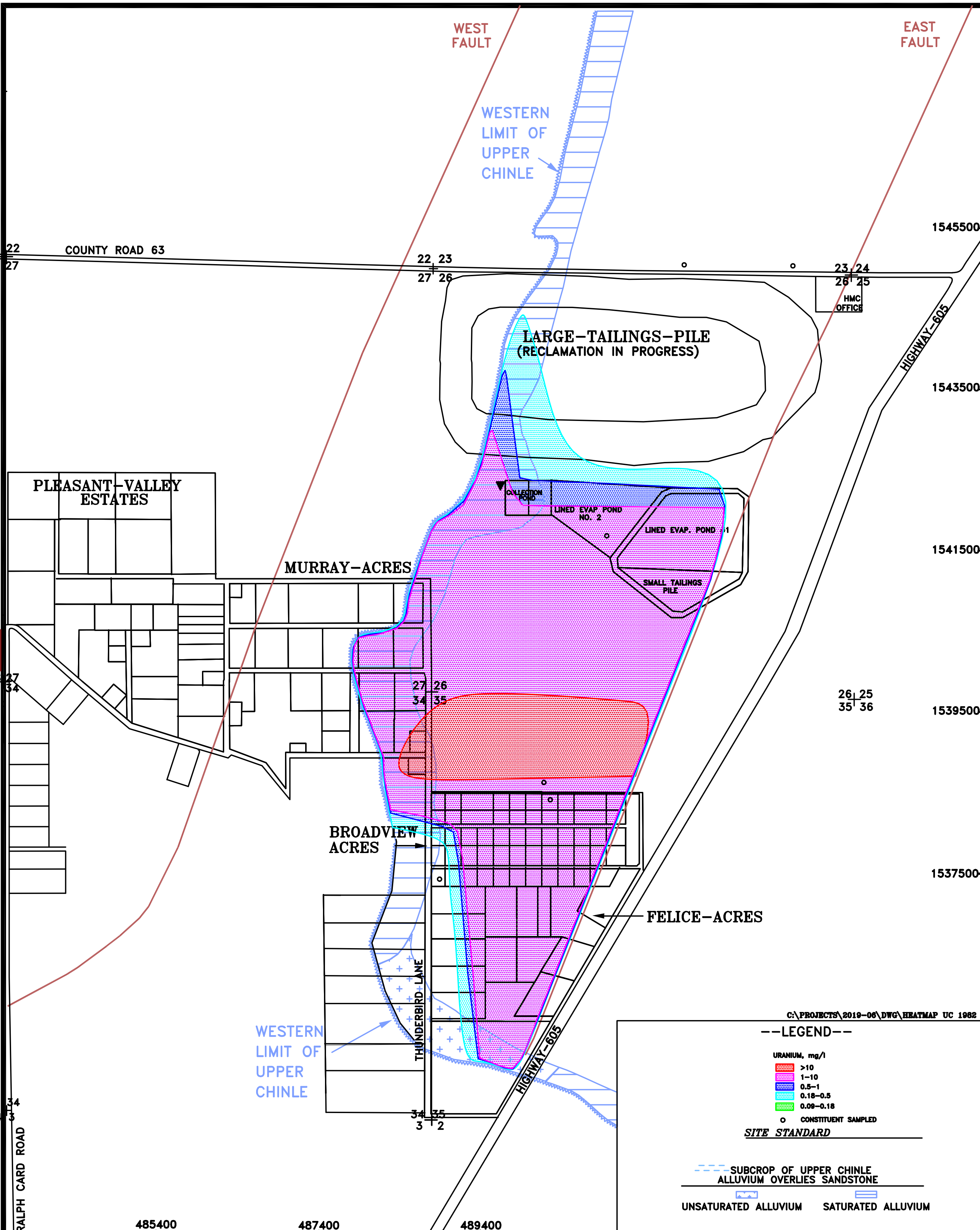
DATE: 2/28/19

FIG. 1.1-16. ALLUVIAL URANIUM CONCENTRATIONS, 2019



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

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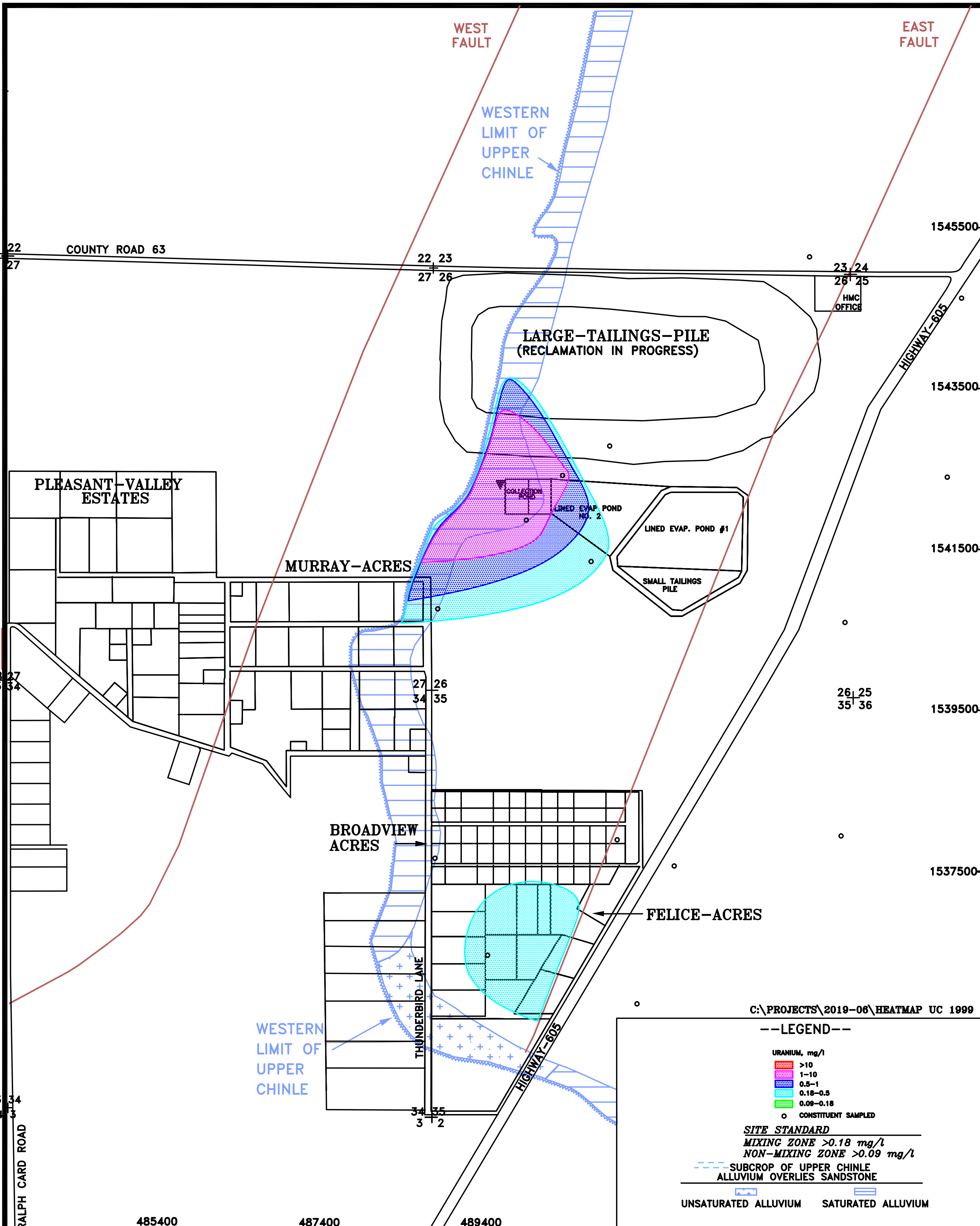
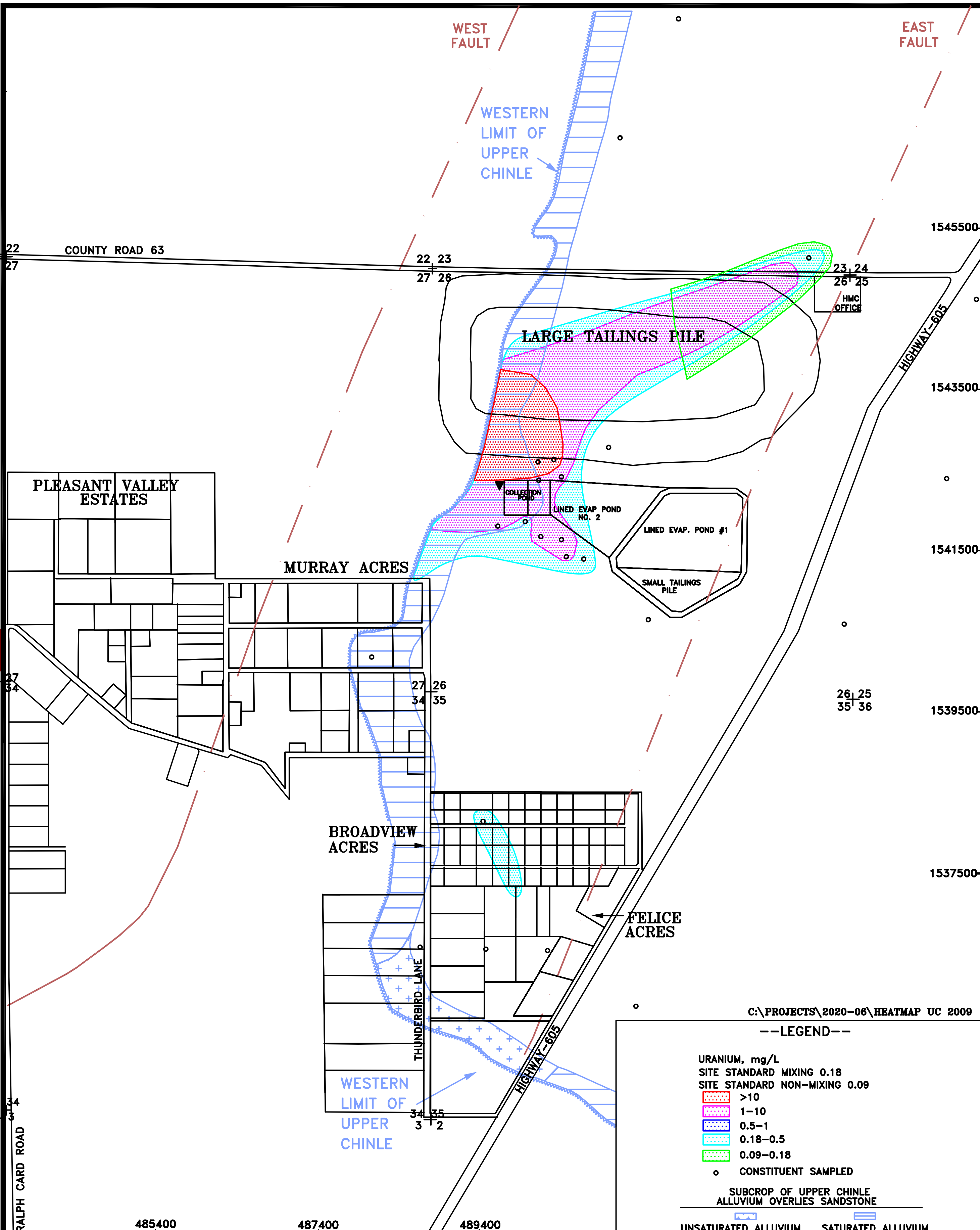
SCALE: 1"= 1600'

FIGURE 1.1-17 UPPER CHINLE URANIUM CONCENTRATIONS, 1982

PAGE: 1.1-27



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W	DATE: 3/1/19
FIGURE 1.1–18 UPPER CHINLE URANIUM CONCENTRATIONS, 1999	SCALE: 1"= 1600'
	PAGE: 1.1–28



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

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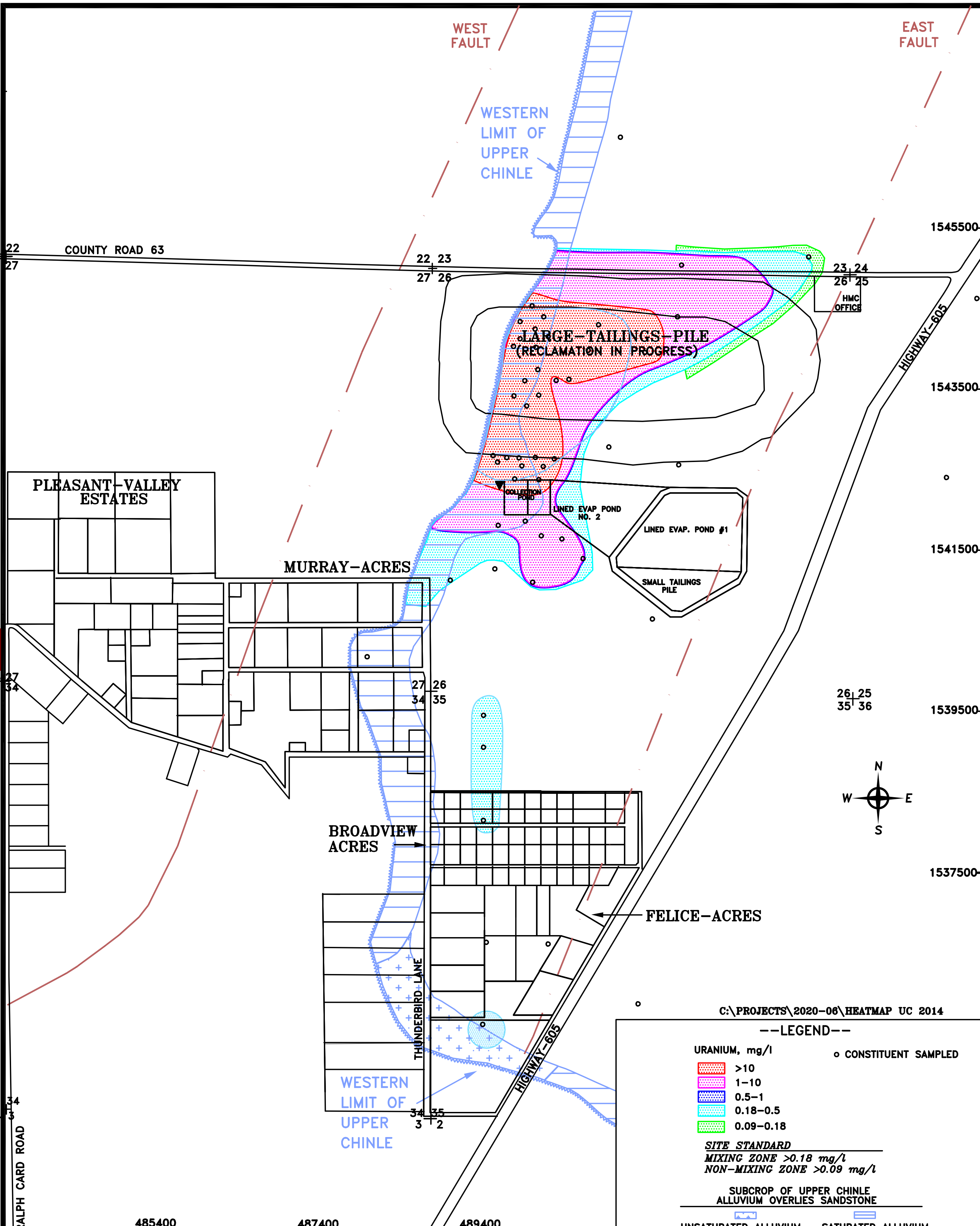
SCALE: 1"= 1600'

FIGURE 1.1-19 UPPER CHINLE URANIUM CONCENTRATIONS, 2009

PAGE: 1.1-29



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

FIGURE 1.1-20 UPPER CHINLE URANIUM CONCENTRATIONS, 2014

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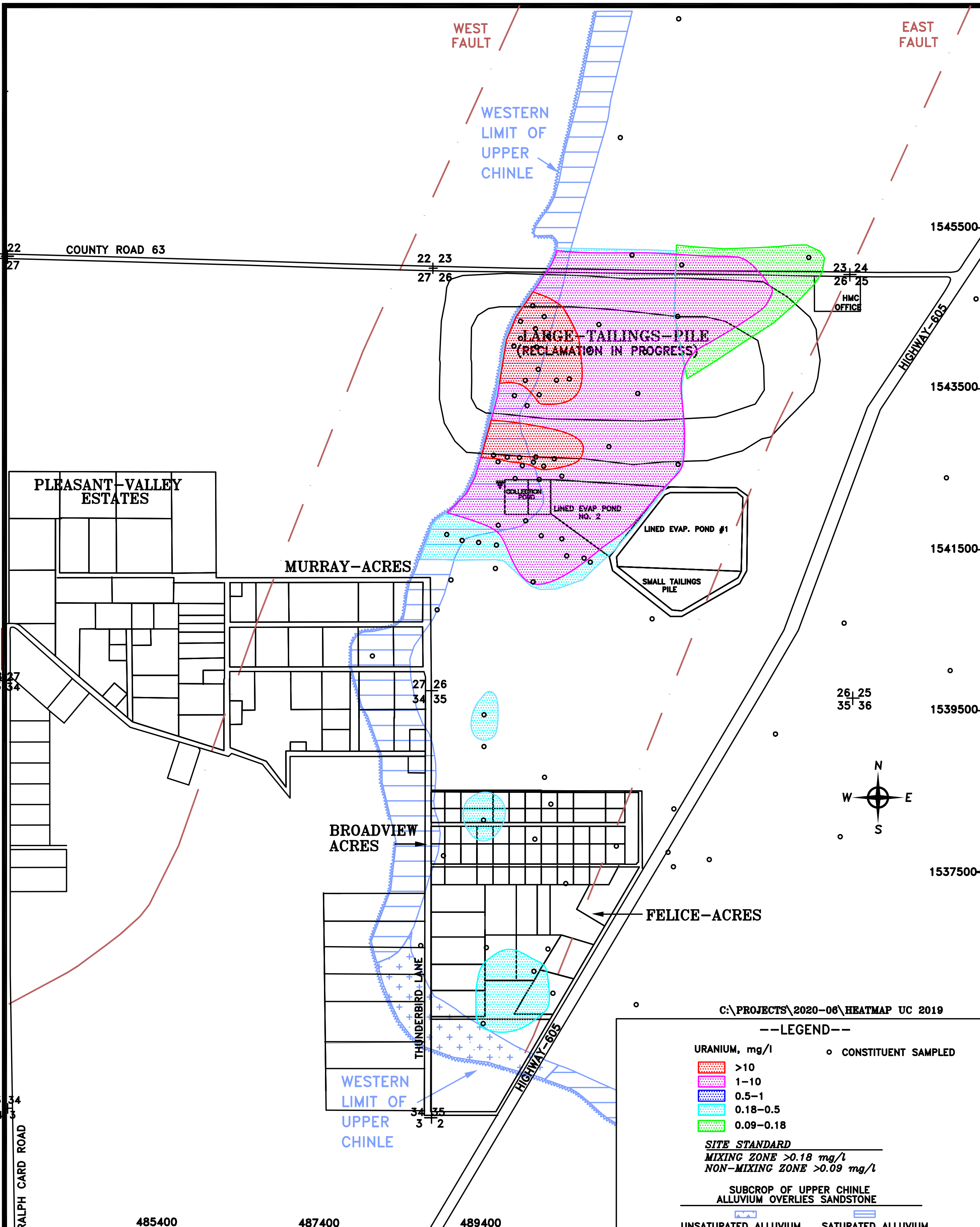
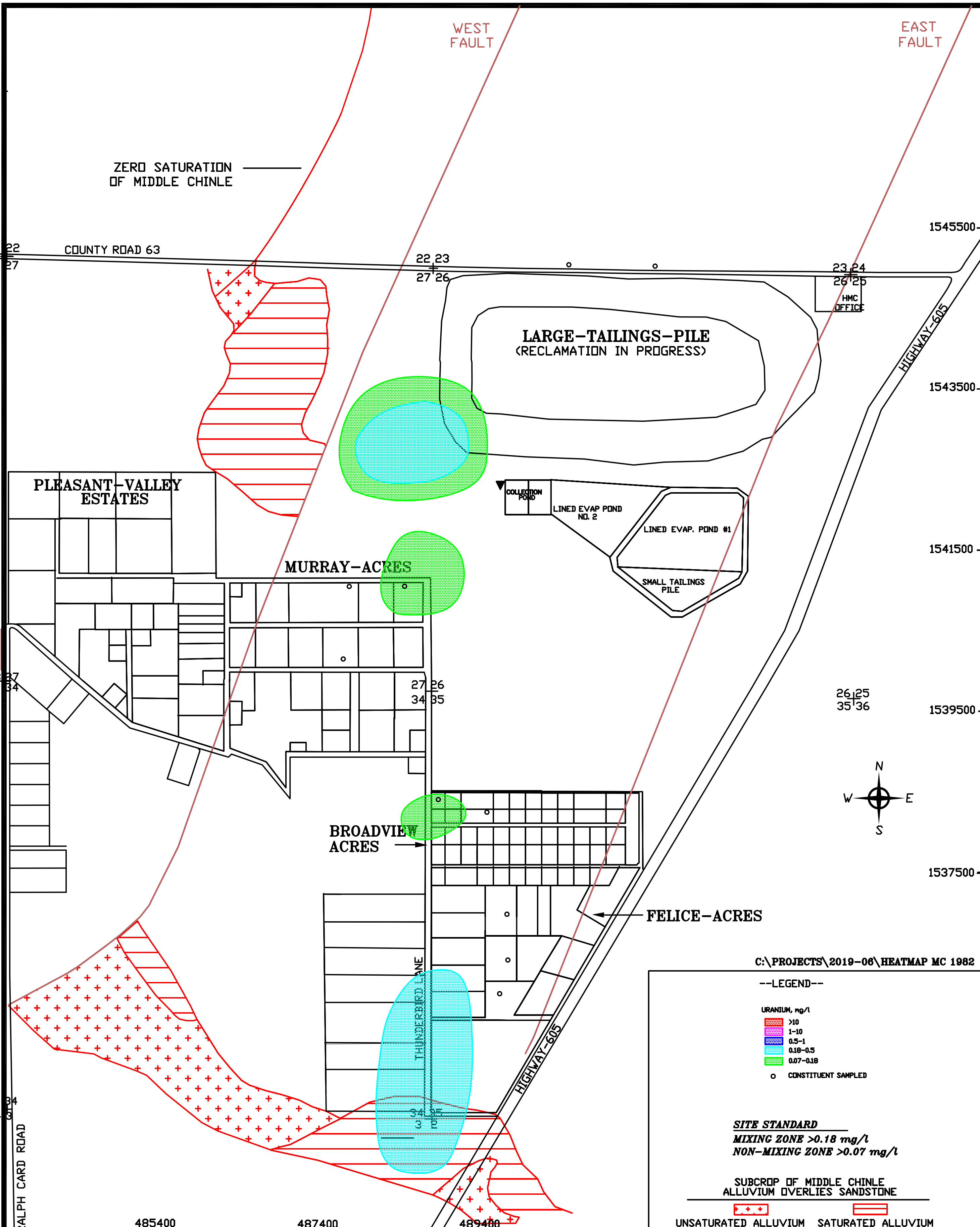
SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/31/2020
FIGURE 1.1-21. UPPER CHINLE URANIUM CONCENTRATIONS, 2019	SCALE: 1"= 1600'
	PAGE: 1.1-31



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

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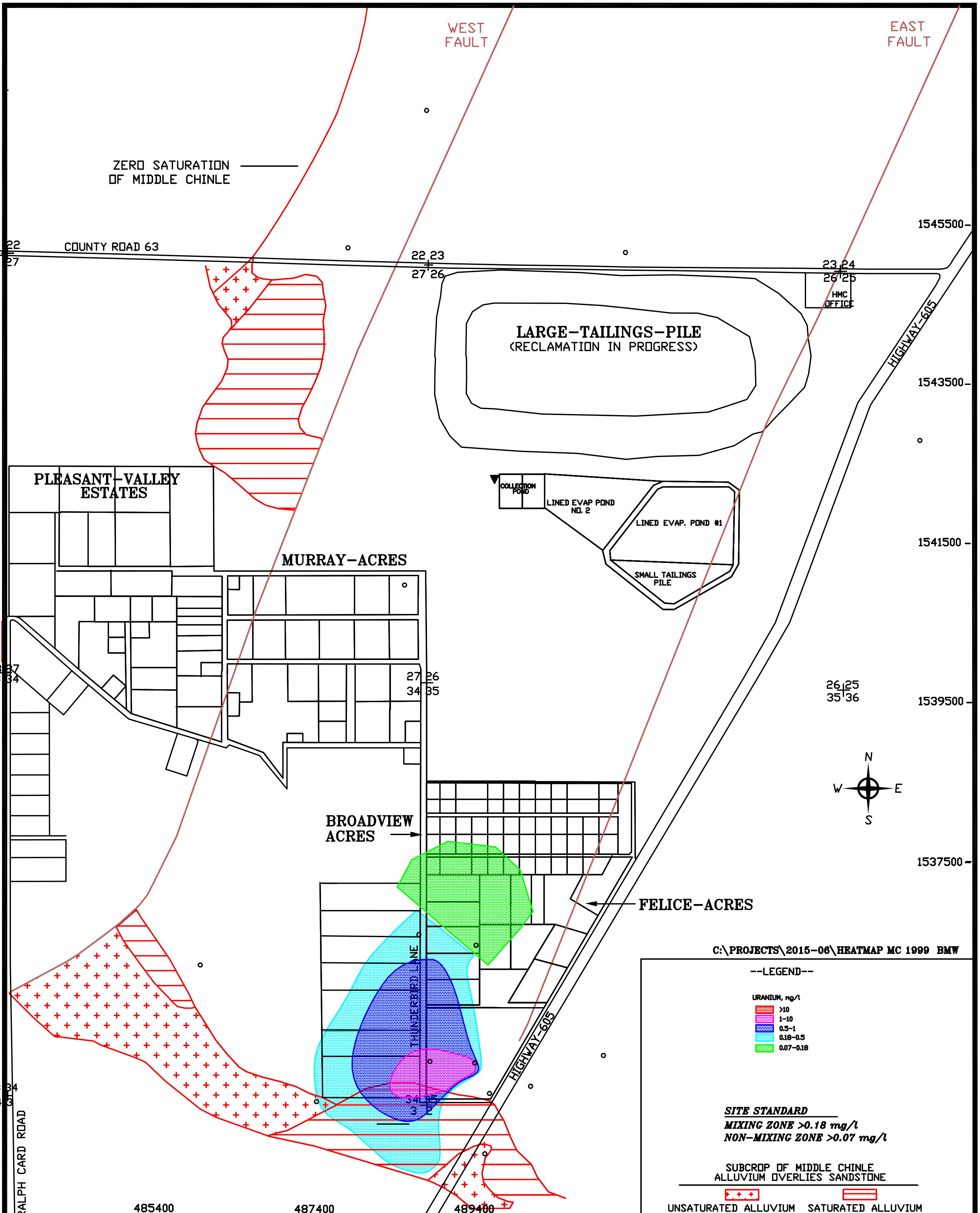
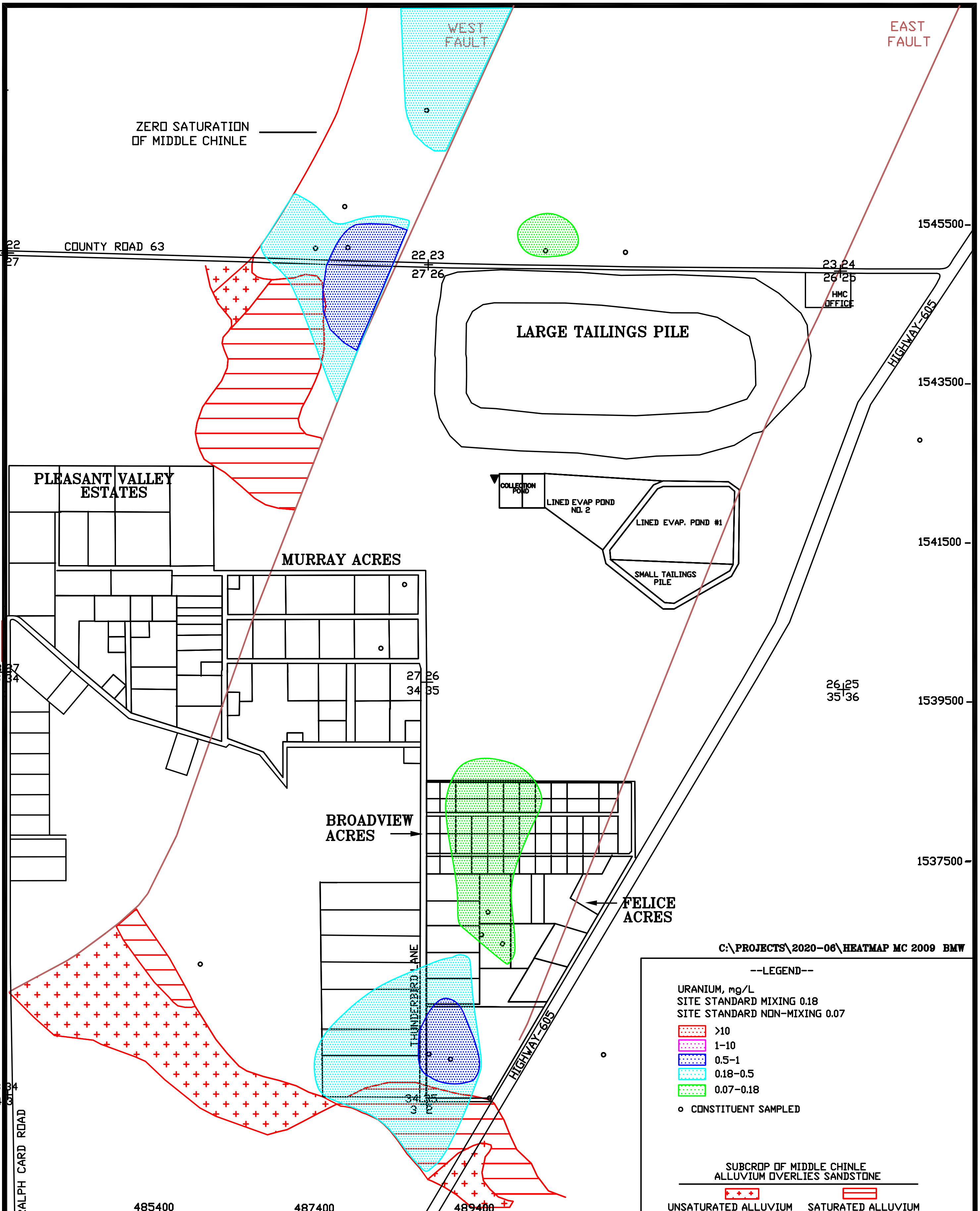
FIGURE 1.1-22. MIDDLE CHINLE URANIUM CONCENTRATIONS 1982

SCALE: 1"= 1600'

PAGE: 1.1-32



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 3/1/19**
FIGURE 1.1–23. MIDDLE CHINLE URANIUM CONCENTRATIONS 1999	**SCALE: 1"= 1600'**
	PAGE: 1.1–33

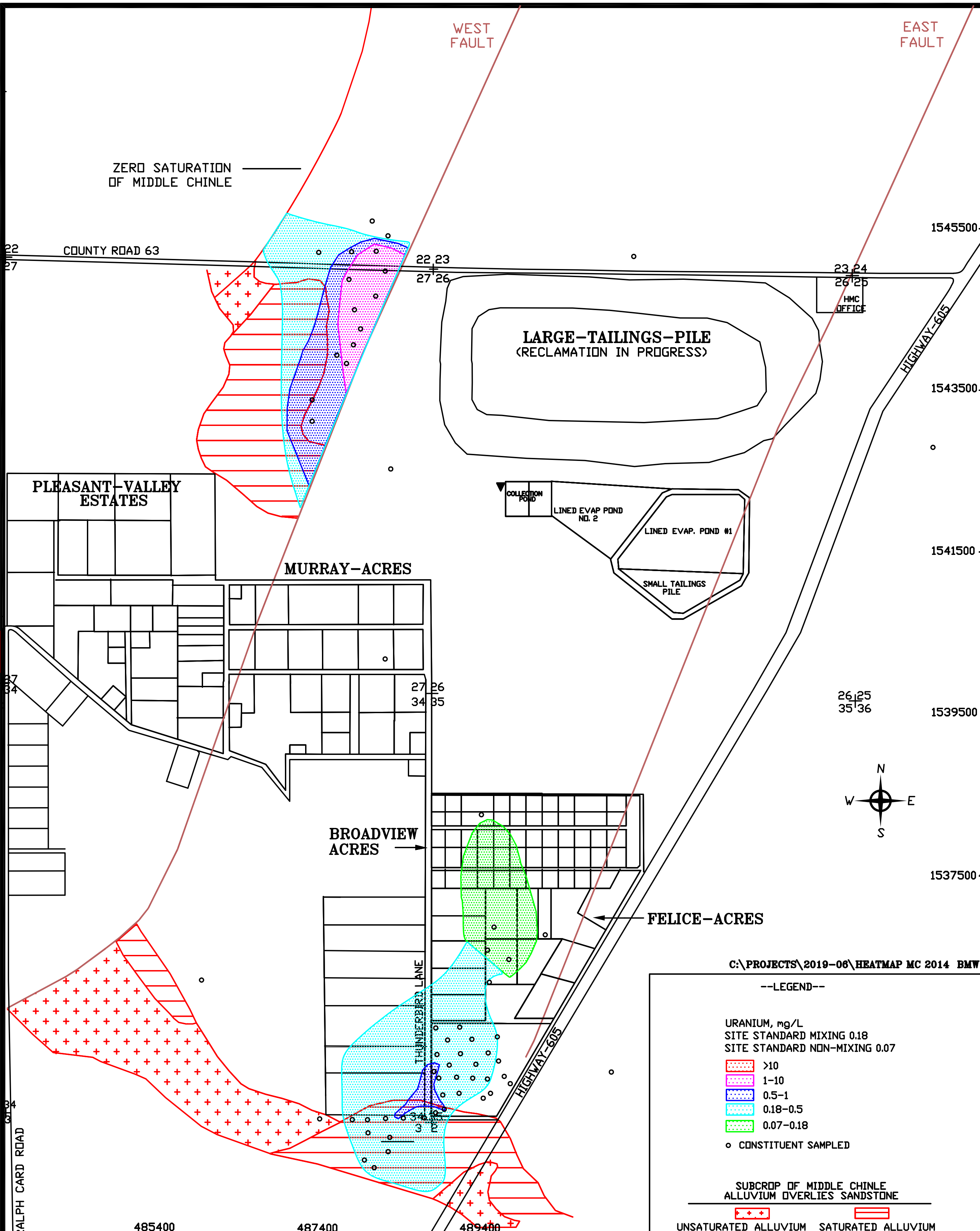


HOMESTAKE SITE AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 3/1/19

FIGURE 1.1-24. MIDDLE CHINLE URANIUM CONCENTRATIONS 2009

SCALE: 1"= 1600'



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

FIGURE 1.1-25. MIDDLE CHINLE URANIUM CONCENTRATIONS 2014

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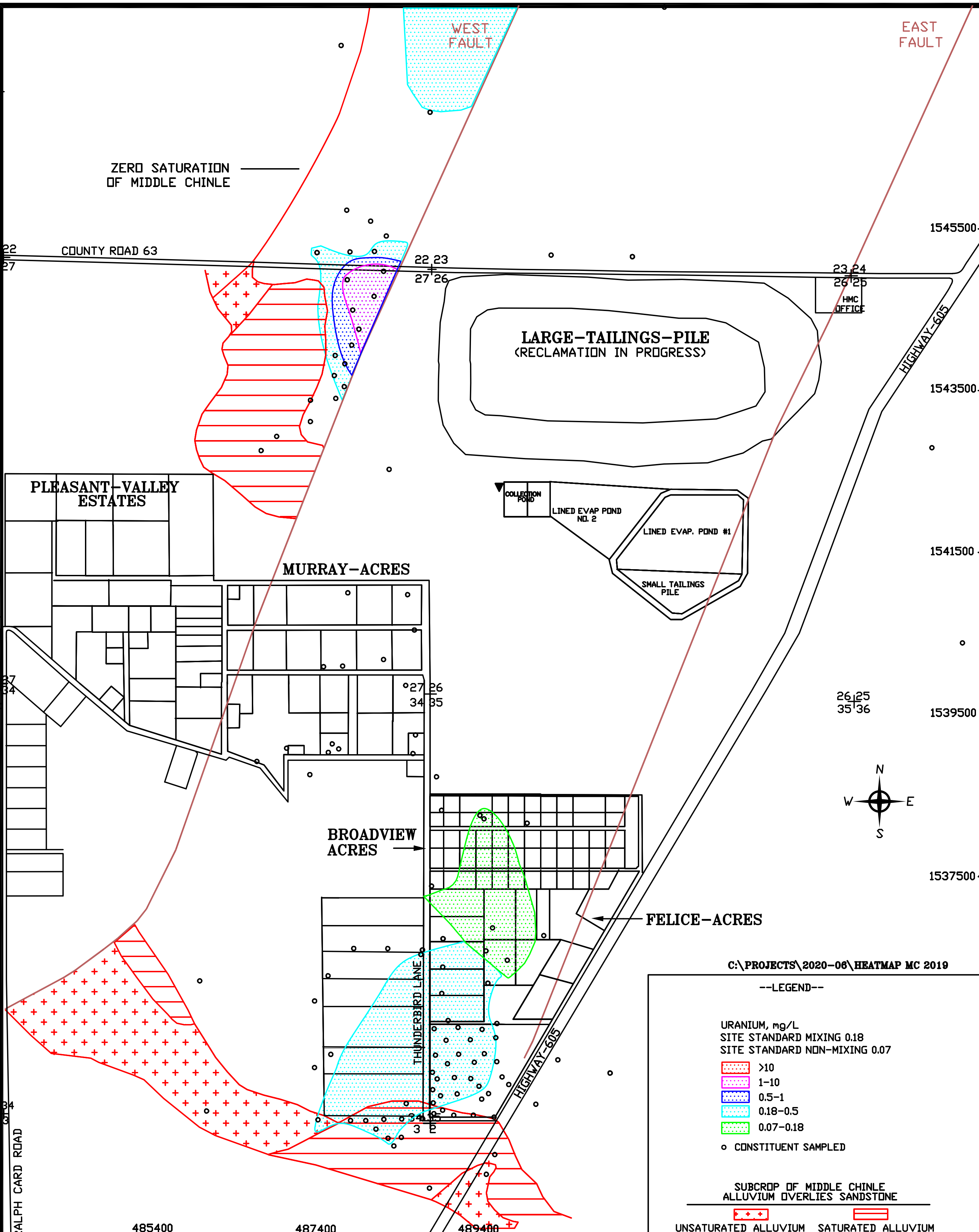

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-26. MIDDLE CHINLE URANIUM CONCENTRATIONS 2019

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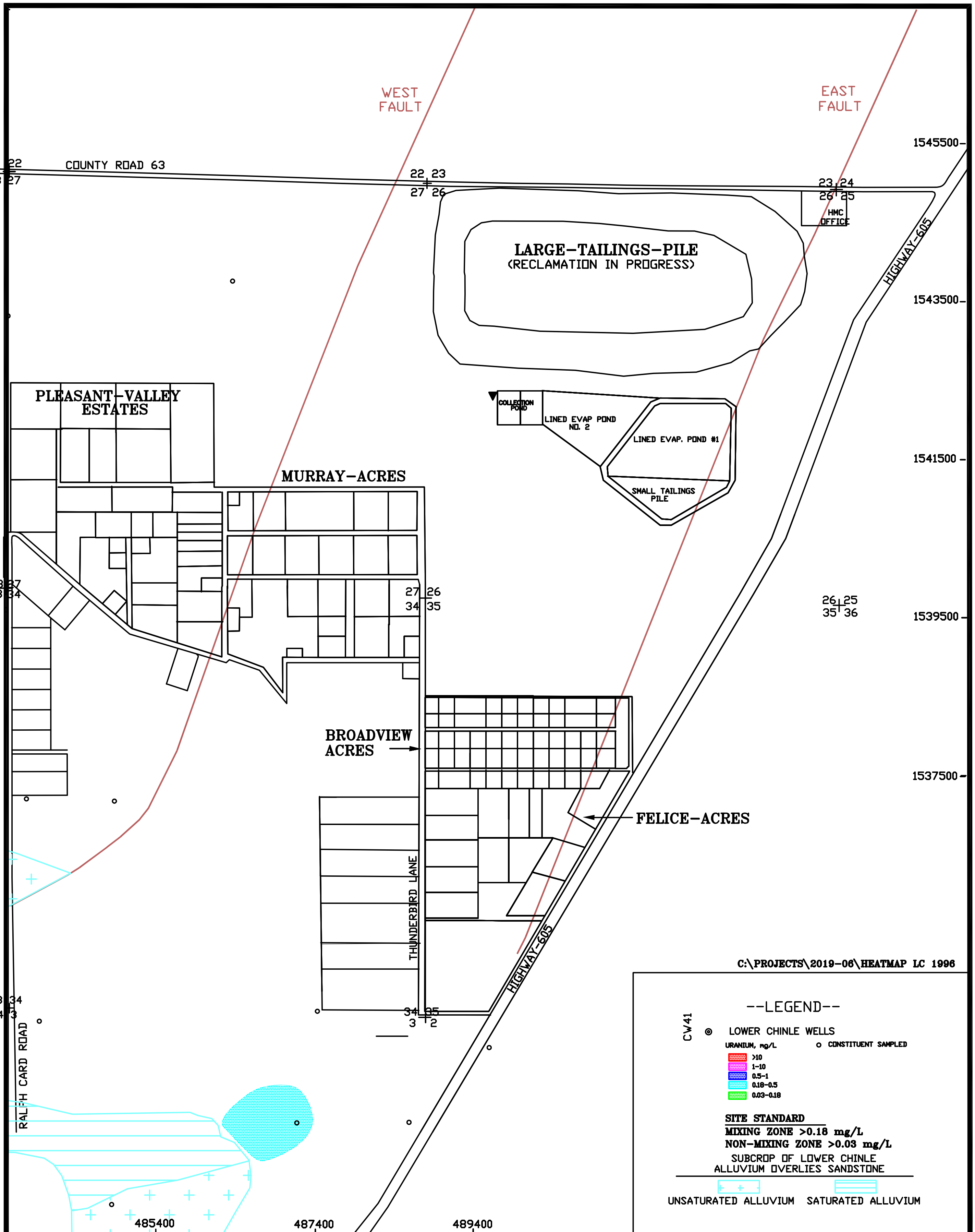

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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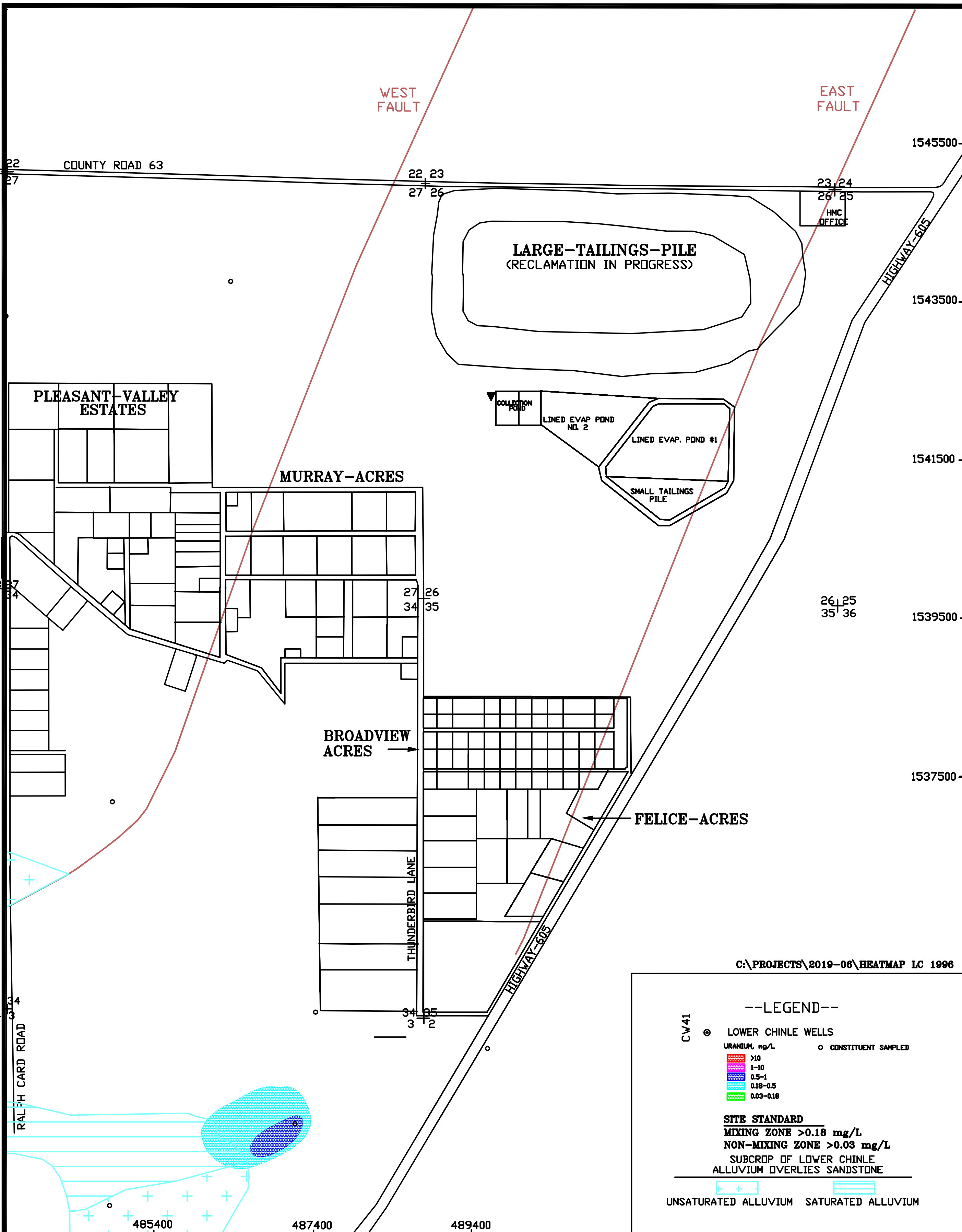
SCALE: 1"= 1600'

FIGURE 1.1–27. LOWER CHINLE URANIUM CONCENTRATIONS 1996



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

FIGURE 1.1-28. LOWER CHINLE URANIUM CONCENTRATIONS 1999

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SCALE: 1"= 1600'
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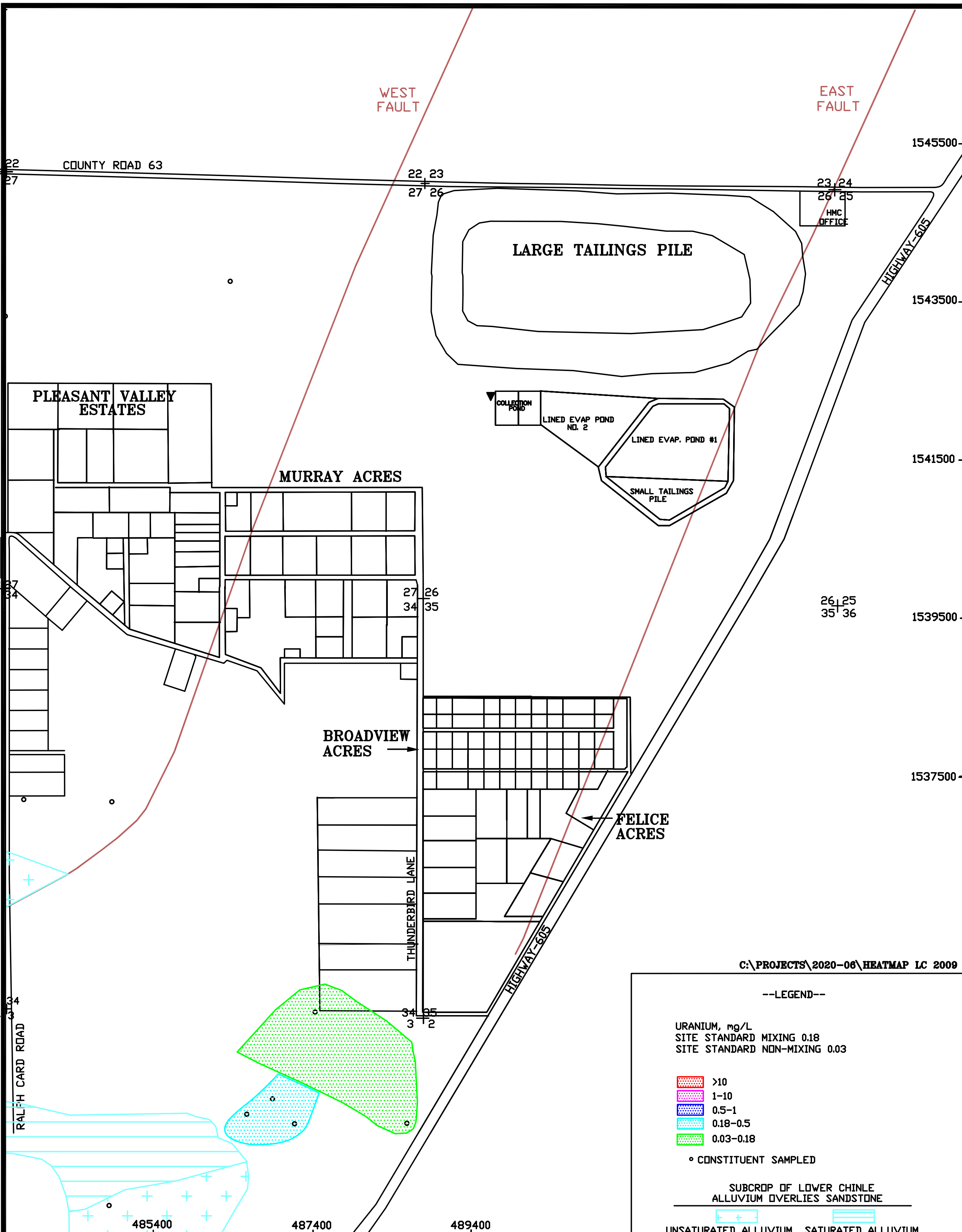

HOMESTAKE SITE AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-29. LOWER CHINLE URANIUM CONCENTRATIONS 2009

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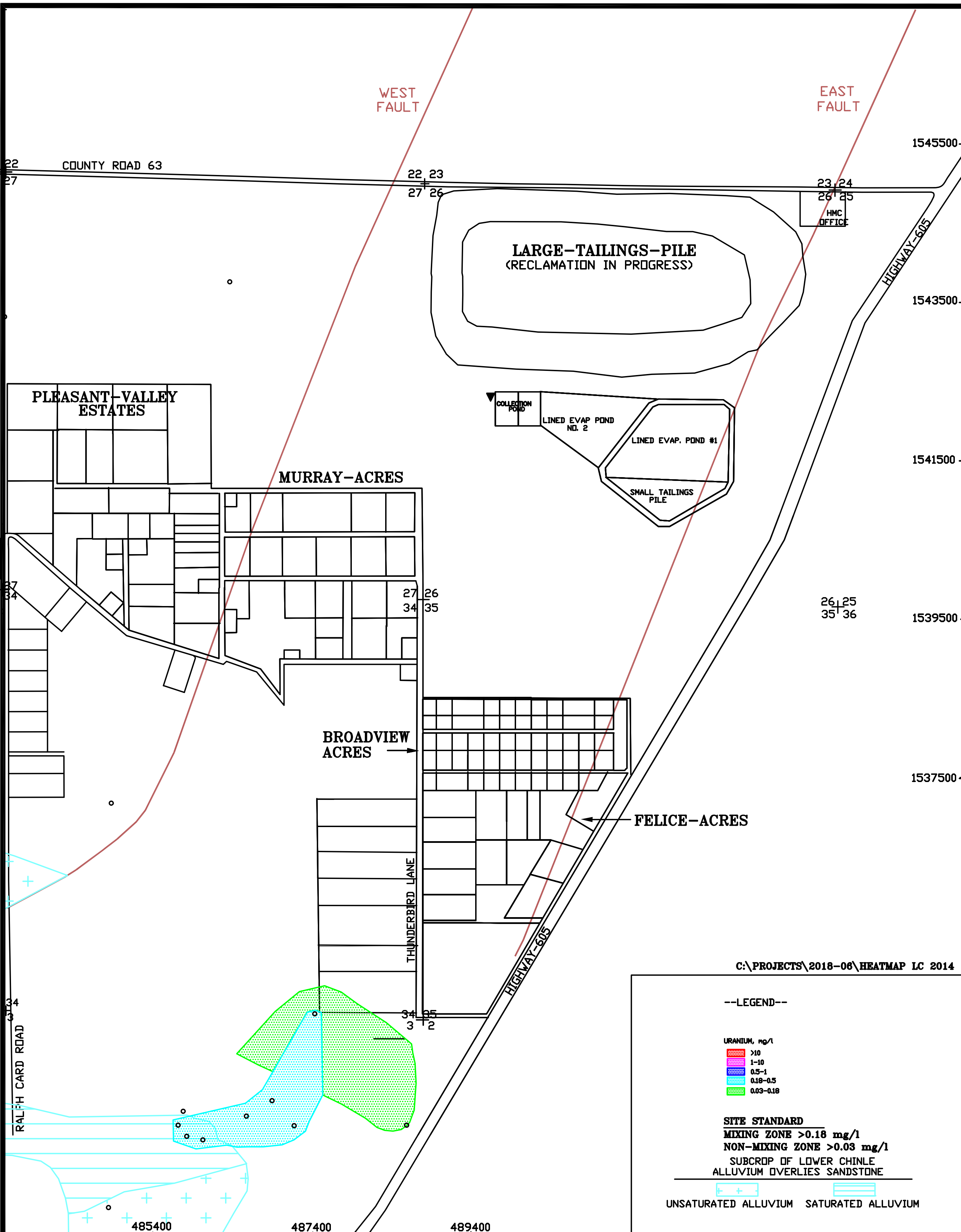

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1.1-30. LOWER CHINLE URANIUM CONCENTRATIONS 2014

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SCALE: 1"= 1600'

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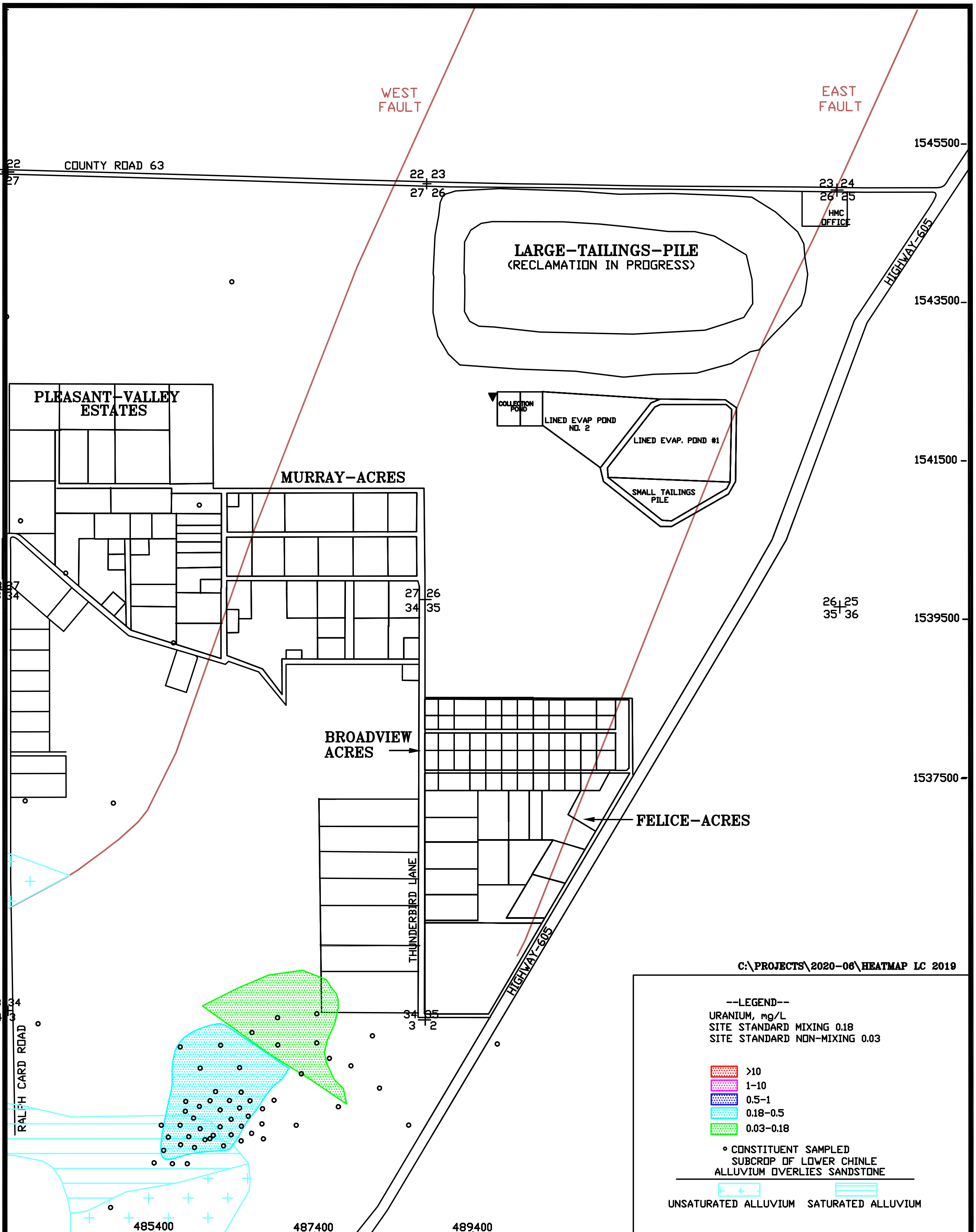

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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FIGURE 1.1-31. LOWER CHINLE URANIUM CONCENTRATIONS 2019

SCALE: 1"= 1600'

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 2019 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, Grants Reclamation Project (GRP) 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. Land Sections 28, 33, 34 and 35 referenced in this report are located in Township 12N, Range 10W, and Section 3 referenced in this report is located in Township 11N, Range 10W.

Monitoring data for groundwater west of the project site is included in the 1995 through 2019 reports (see Appendix A for water levels and Appendix B for water quality). This area was designated the "West Area" and was so labeled on the figures in the annual reports prior to 2003. The 2003 through 2019 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

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, 2018 and 2019.

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 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 2019 and therefore is not presented in this report as it was prior to the 2016 report. Appendix F gives the meteorological data for the Grants site for 2019. No soil moisture data was collected in 2019 from the irrigation area instruments.

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

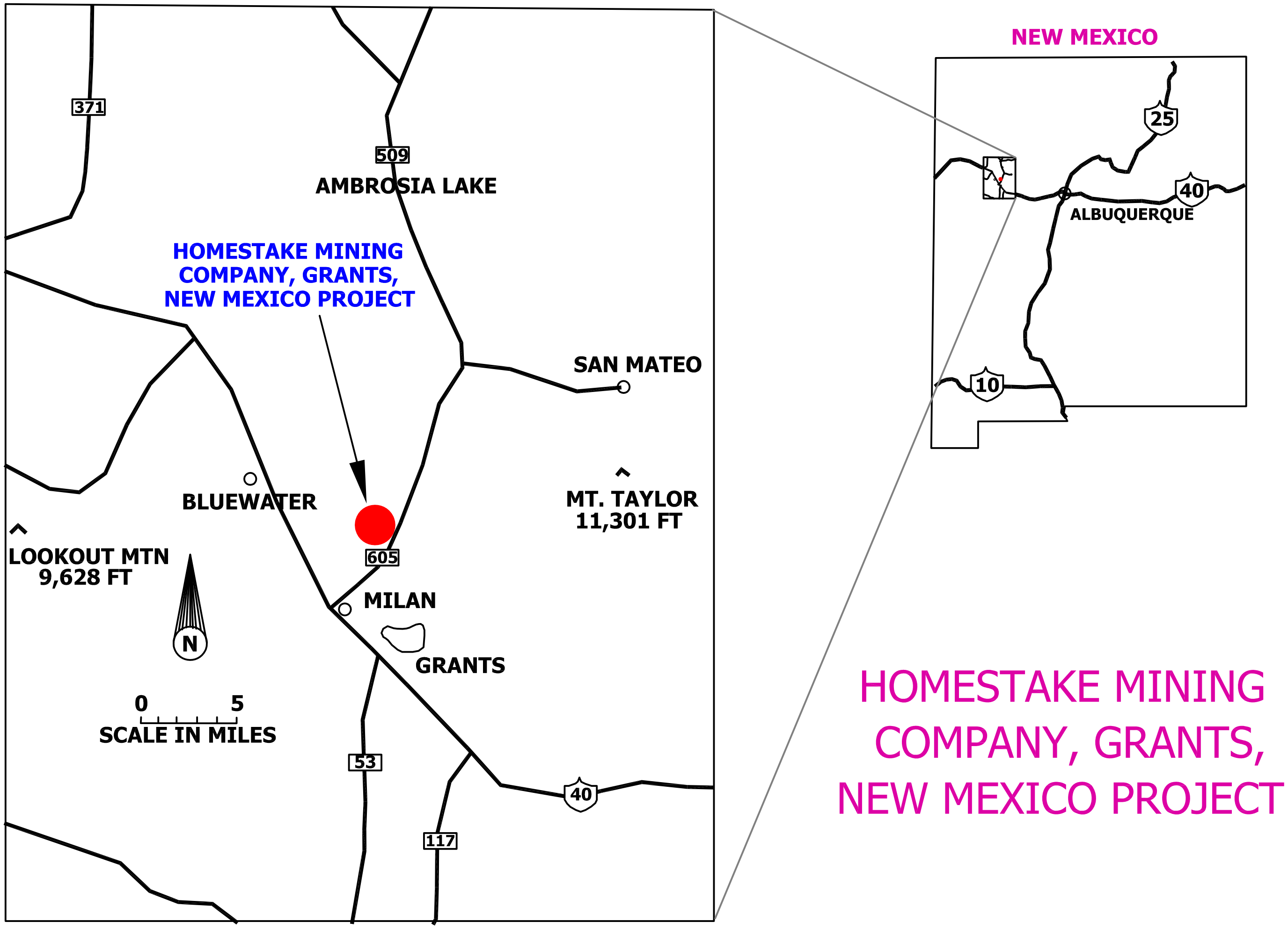

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FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

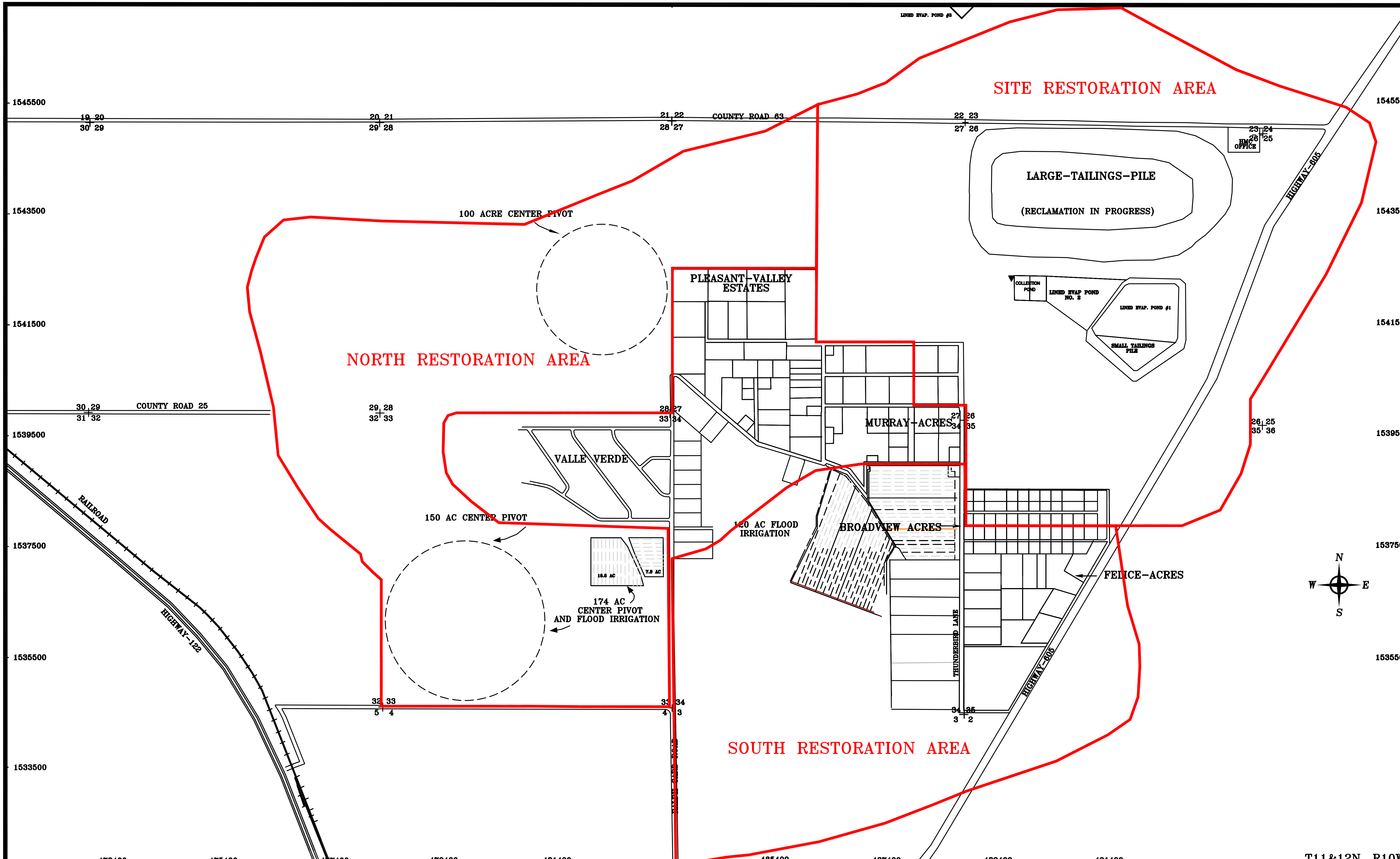

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FIGURE 1.2–2. RESTORATION AREAS DESIGNATION MAP

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GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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GROUNDWATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

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TABLES

2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 10.03 inches at the Grants Project site in 2019 is near normal precipitation for Grants, New Mexico. This normal precipitation condition would be expected to cause natural water levels at the Grants site to be fairly steady. Appendix F gives the meteorological data for 2019 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. Starting in late 2015, the treated water 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 2019, 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 water treatment and injection rates for 2019 were smaller due to the limited evaporation capacity for disposal of R.O. brine and zeolite regeneration water. The R.O. plant produces product water that is of much better quality than the natural alluvial water, and it is used as injection water in most areas of the Grants Project restoration program. The zeolite treatment removes slightly elevated uranium concentrations from the Off-site water and the treated water is also used for injection water. Figure 2.1-1 on page 2.1-15 shows the location of the present (end of 2019) 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

R.O. treatment 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. The second high-pressure unit 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. Only one of the 300 gpm R.O. units was typically used at one time during 2019 due to limitations on brine discharge to the evaporation system. The R.O. product water from the five units is discharged to the PTT where it is mixed with zeolite treated water 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) (2000-2019)				
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

R.O. Plant Performance (GPM) (cont'd)				
(2000-2019)				
Year	Input		Output	
	Collection Wells	Tailings Collection	R.O. Injection	Brine
2005	250	6.4	198	49
2006	257	2.1	184	48
2007	262	0	204	55
2008	264	3.1	194	60
2009	251	0.3	171	60
2010	240	0	166	59
2011	257	1.4	170	58
2012	267	0	182	50
2013	236	0	148	47
2014	235	0	165	47
2015	228	0	112	52
2016	584	8	449	141
2017	497	3	407	108
2018	445	0.5	350	85
2019	314	0	236	57

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 2019 and shows that the average treated water rate has varied from 126 to 267 gpm.

Zeolite Treatment Performance (GPM) (2016-2019)				
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
2019	160	0	126	34

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 in 2016. The R.O. plant was operated at an average rate of 314 gpm during 2019, which is less than its 2018 rate.

Up-gradient alluvial aquifer collection north of County Road 63 from the P wells ceased after May of 2013. Collection water from the South and North Off-site areas was treated with the zeolite process starting in 2016 and this continued in 2019. Upper Chinle aquifer collection continued from wells CE2, CE5, CE6, CE11, CE12, CE15 and CE19 in 2019 (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. None of the tailings sumps were input to the R.O. plant during 2019.

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 2019. The L-line south of the STP continued to operate in 2019 and includes collection wells 521 and 522, 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 therefore stopping the collection for re-injection program. Alluvial groundwater 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 eight years at the Grants Project. The On-Site alluvial collection system operated at an average rate of 198 gpm in 2019.

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, CE11, CE12, CE15 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. With the exception of wells CE7 and CE15A, the Upper Chinle wells were operated to supply water to the R.O. for 2019. Additionally, wells B16, B20, B31 and B32 were pumped in 2019. 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 88 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 2019. The yearly average collection rate from the Middle Chinle aquifer was 28 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 2019 to supply water for the zeolite treatment. Figure 2.1-1 shows the Off-site collection wells that were used in 2019. South collection wells 490, 866, 869, Q2, Q3, Q5, Q11, Q28, R2, R3, R4, R5, R10, R18, R22, 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, H12, H16, H17 and H24 were pumped for the zeolite treatment of this Off-site water during 2019.

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 2019 (cyan) are presented in Figure 2.1-3 which shows that greater than 3.6 billion gallons of water have been pumped from the Off-site collection wells. Prior to 2013, the Off-site collection water volume was applied to land treatment while the 2013 through 2019 volumes of collection are shown with a cyan line and symbols 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 water from the On-site collection treated by the R.O. plant since 2000. The volume of Off-site collection water is more than the volume of On-site collection water 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 2019 in the irrigation areas are 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 and temporary increase in uranium in the Section 34 groundwater. The uranium concentration in the area has returned to near the pre-irrigation concentration. No data were obtained from the soil moisture instruments in 2019. No soil moisture samples were collected from the lysimeters in 2019 because the early October 2017 attempt to collect samples from the lysimeters was unsuccessful.

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 On-site groundwater collection system has produced an average pumping rate of 275 gpm for the entire period between 1978 and 2019. 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 2019 was computed by multiplying the average concentration of a particular constituent for each source of water (groundwater, toe drains and tailings collection) by the volume of water pumped for each groundwater source during that year. The quantities of constituents collected by aquifer and area are presented in Table 2.1-2 for 2019 with 10,400 and 19,000 pounds of uranium and molybdenum, respectively, removed from the Grants On-site groundwater in 2019. This table lists the total for the

On-site and the sum of the Off-site quantities for 2017 through 2019, showing that the On-site collection of water the last three years has been 1.7 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 2019. The light blue, purple and green bars show the comparison of the water volumes for each area during 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 mass of uranium removed by Off-site collection is small in comparison to the uranium mass 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 constituent concentrations in all SP2 water samples were less than the corresponding site standards in 2019.

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 2019. This table shows that weekly samples were not collected during 2019 because the SP2 water quality during this time period was compliant.

Table 2.1-5 presents the R.O. feed water and the R.O. product (SP1) water quality for 2019 and all of the SP1 water quality analyses meet the site standards. Exceedances of site standards in the table would be highlighted in blue had they occurred.

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. Blue highlighting in Table 2.1-6 would indicate values exceeding the site standards had that occurred. The uranium, selenium, molybdenum, chloride, sulfate and TDS concentrations were below the site standard for all zeolite samples taken during 2019. None of the radium-226 plus radium-228 and thorium-230 activity and vanadium concentrations exceeded the site standards for the zeolite during 2019.

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 ponds (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 2019 injection rate for this horizontal injection line is included in the On-site alluvial injection rates, and was 90 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 the lines were not used in 2016 through 2019. Injection into EMA1 with fresh water started in December, 2005 and continued with treated and/or fresh water in 2019.

Figure 2.1-5 (page 2.1-19) presents treated and/or fresh-water injection rates for the last eight years. An average of 139 gpm, or a total of 75 million gallons, was injected into the On-site alluvial aquifer during 2019.

2.1.3.2 R.O. PRODUCT

The R.O. product water mixed with fresh water was supplied 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 commenced after that date for these wells. The switch to supply of R.O. product and fresh water to injection lines EMA2 through EMA5 occurred in October 2005. The supply of a mixture of treated and/or fresh water for injection was from the Post Treatment Tank from 2016 through 2019. Figure 2.1-5 shows the rates of R.O. product water produced, which averaged 236 gpm in 2019 for a total of 128 million gallons. R.O. product rates are also included in the individual treated injection rates. 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 2019.

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 2019 averaged 126 gpm for the year.

2.1.3.4 UPPER CHINLE AQUIFER INJECTION

Hydro-Engineering (2003b) and the Updated Corrective Action Program (2019) 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, CW5, CW13 and CW25, with an overall 2019 average of 24 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 3 gpm in 2019 (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 in September and October in 2019. The injection rate averaged 147 gpm for 2019 with a total injected volume of 79 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 in 2019. Use of San Andres well 943as a fresh water supply well ended on May 18, 2017 except during the 943 pump test in January of 2018. No pumping from well CW28 occurred in 2019 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 treated in the zeolite systems. During 2019, the yearly average injection rate in Sections 34, 35 and 3 was 109 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 treated through the R.O. plant starting in August 2016. Prior to R.O. treatment, this water was re-injected into areas with higher concentrations of contaminants in order to enhance restoration near the LTP. 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 comparatively 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 2019. 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 the ponds 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 have been pumped to the R.O. plant as feed water. During tailings dewatering, the majority of the extracted tailings water was discharged 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. In past years, this transfer was mainly through the turbo mister forced evaporation spray system. The forced evaporation system has transitioned to APEX evaporators and these floating evaporators have replaced the spray evaporation system on the No.2 Evaporation pond. Once the planned re-lining of the No. 1 Evaporation Pond is completed in 2020, the forced evaporation system will consist of APEX or similar type floating evaporators with possibly limited use of turbo mister units. A total of 66 million gallons (average rate of 121 gpm) of water was delivered to the evaporation pond system in 2019 in addition to the 21 million gallons (average rate of 38 gpm) of natural precipitation added to the pond. The net evaporation from the evaporation system averaged 174 gpm in 2019, compared to 200 gpm in 2018 and the change in storage in the evaporation ponds in 2019 was a decline of 15 gpm. The evaporation pond disposal rate in 2019 was limited by the necessary reduction of water volume in the No. 1 Evaporation Pond to allow re-lining in 2020.

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 2019. A rate of 5.6 gpm in 2019 was pumped from the LTP toe drains and discharged to the evaporation ponds. Estimated seepage based on the LTP water balance 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 2019						
	Injection		Collection		Seepage from LTP	
Aquifer System	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Alluvial	527	285,340,000	327	177,050,000	15	8,120,000
Upper Chinle	37	20,030,000	88	47,650,000	--	--
Middle Chinle	21	11,370,000	60	32,220,000	--	--
Lower Chinle	--	--	0	0	--	--
San Andres	--	--	223	120,740,000	--	--
Tailings	--	--	5.6	3,080,000	--	--

Major Treatment and Disposal Flows and Volumes During 2019						
	Feed/Input Rate		Treated Water Discharge		Evap/Disposal Discharge	
Treatment/Disposal System	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)	Rate (gpm)	Volume (gallons)
Reverse Osmosis	342	185,330,000	236	127,780,000	57	30,860,000
Zeolite	160	86,630,000	126	68,220,000	34	18,409,000
Evaporation Ponds	121	65,298,000	--	--	--	--
Collection Ponds	52	28,150,000	--	--	27	14,620,000

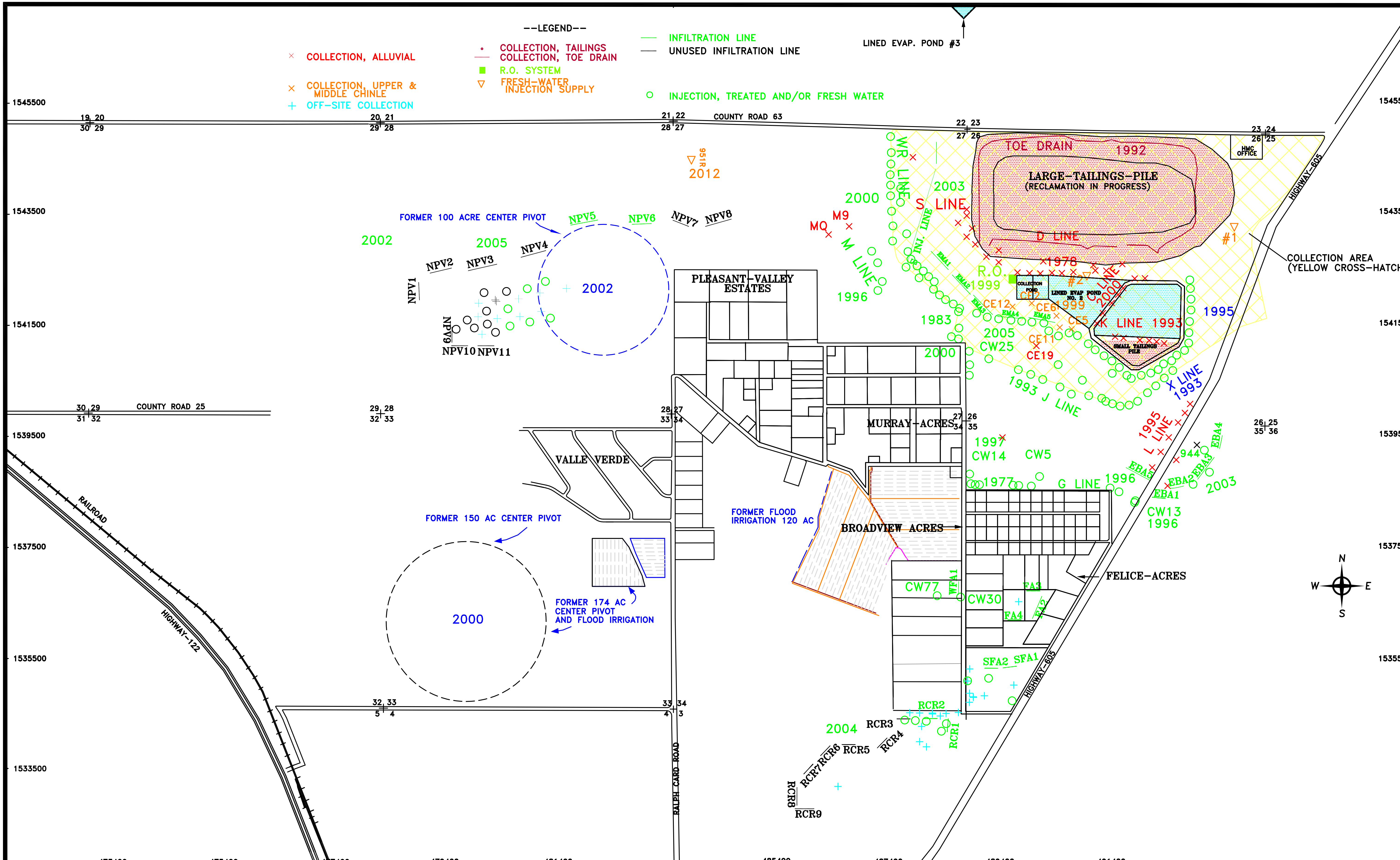

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FIGURE 2.1-1. LOCATION OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES, 2019

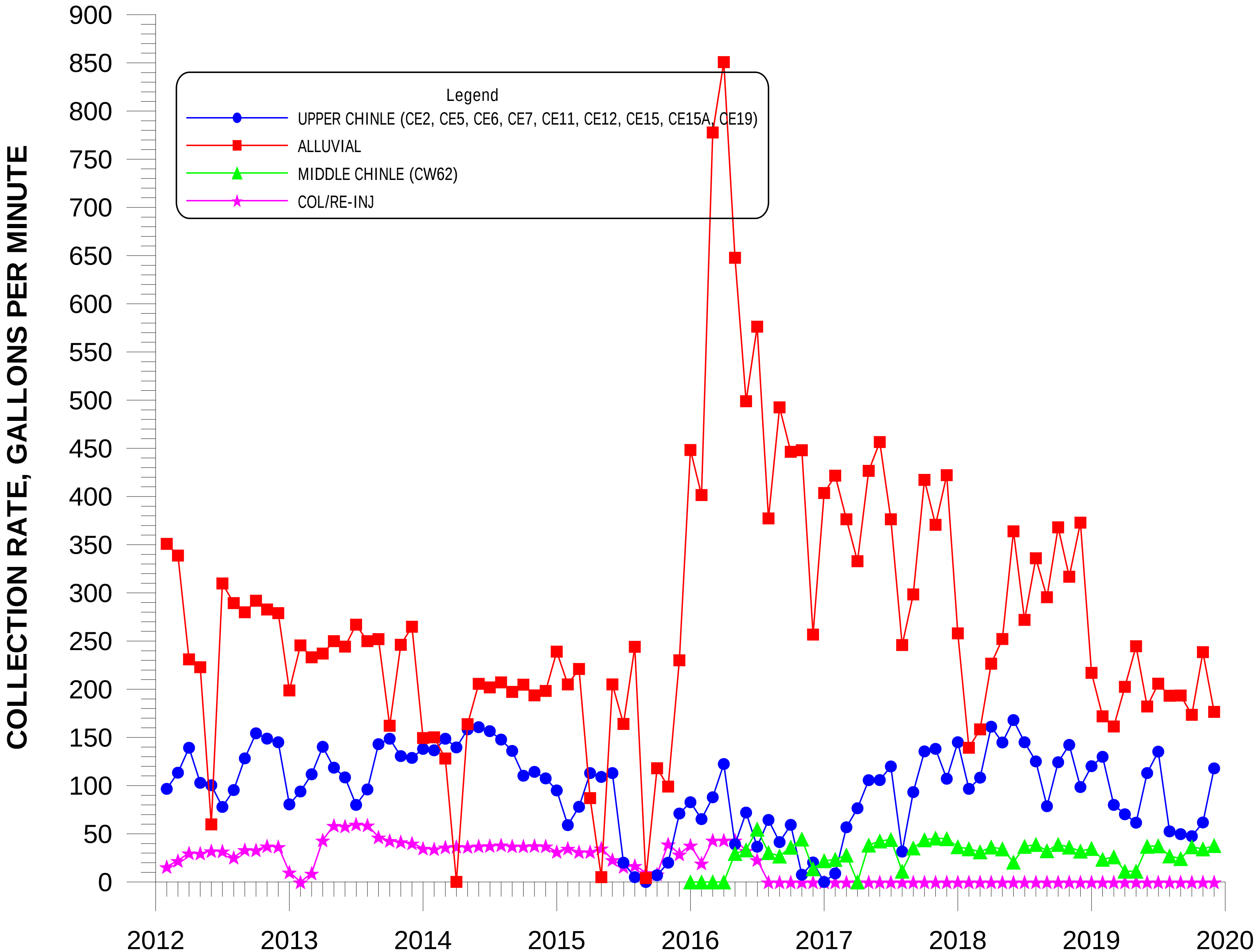

FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

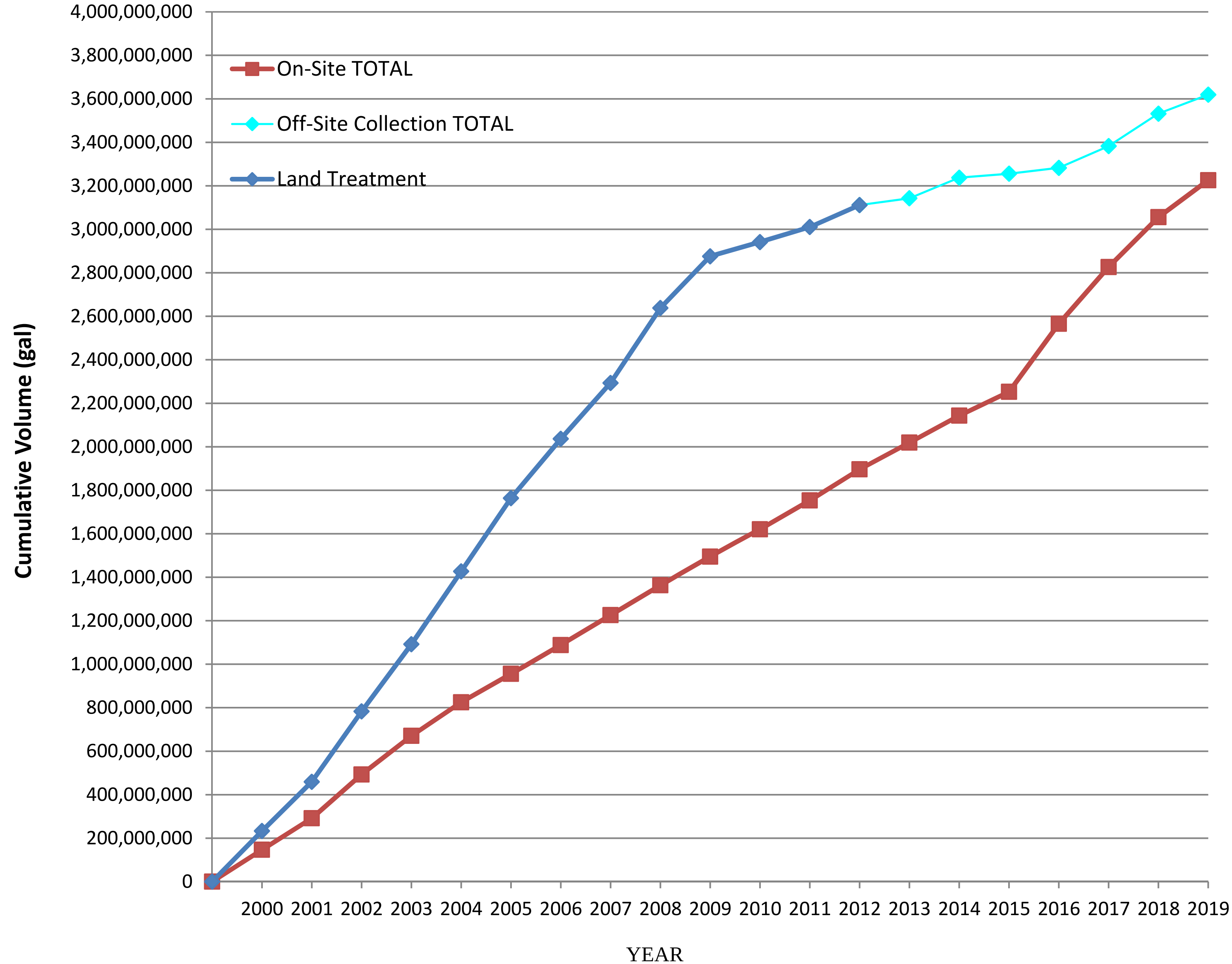

Figure 2.1-3. Cumulative Volume of Land Treatment, On-Site and Off-Site Collection from 2000 to Present

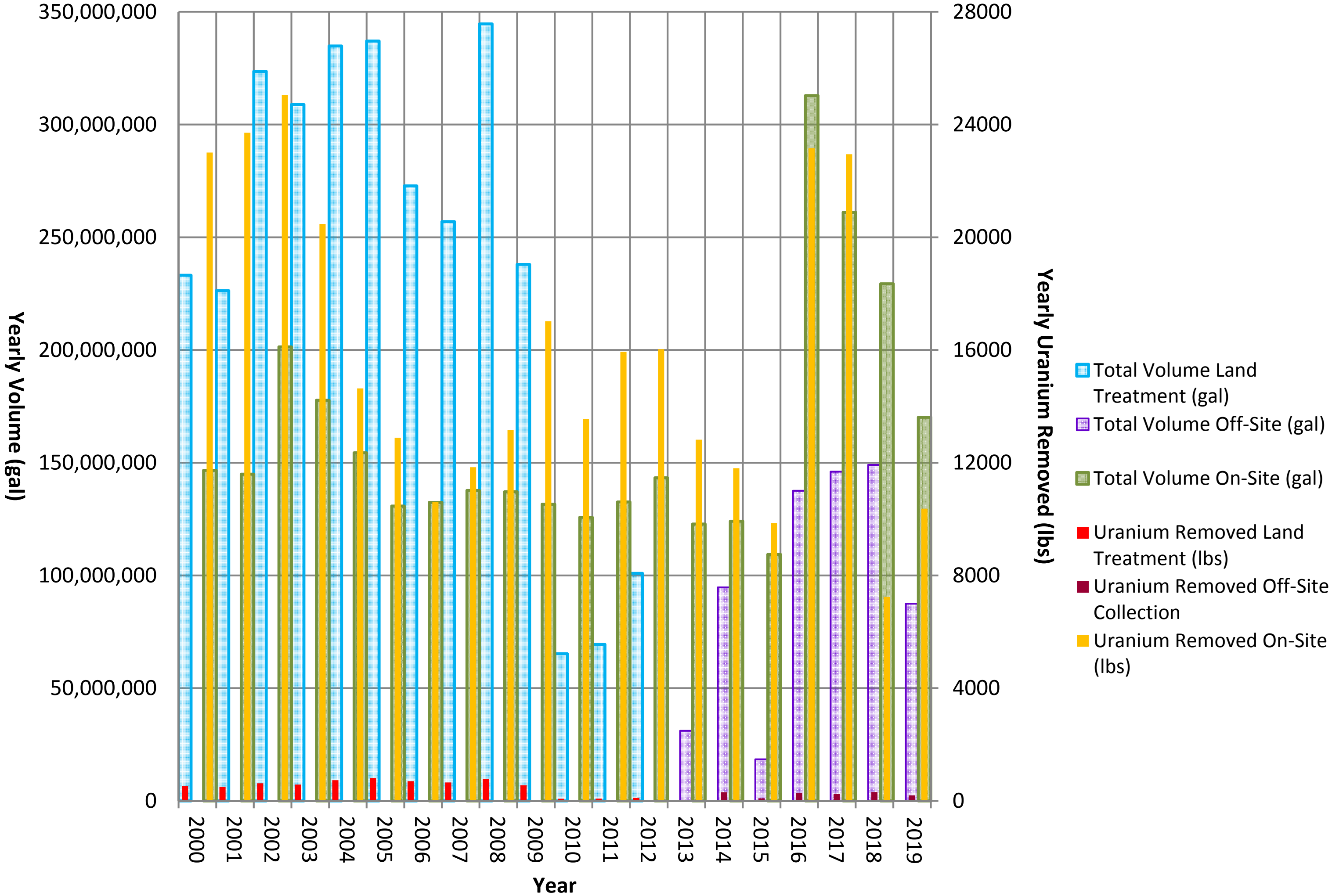

Figure 2.1-4. Yearly Quantity of Groundwater and Uranium Removed

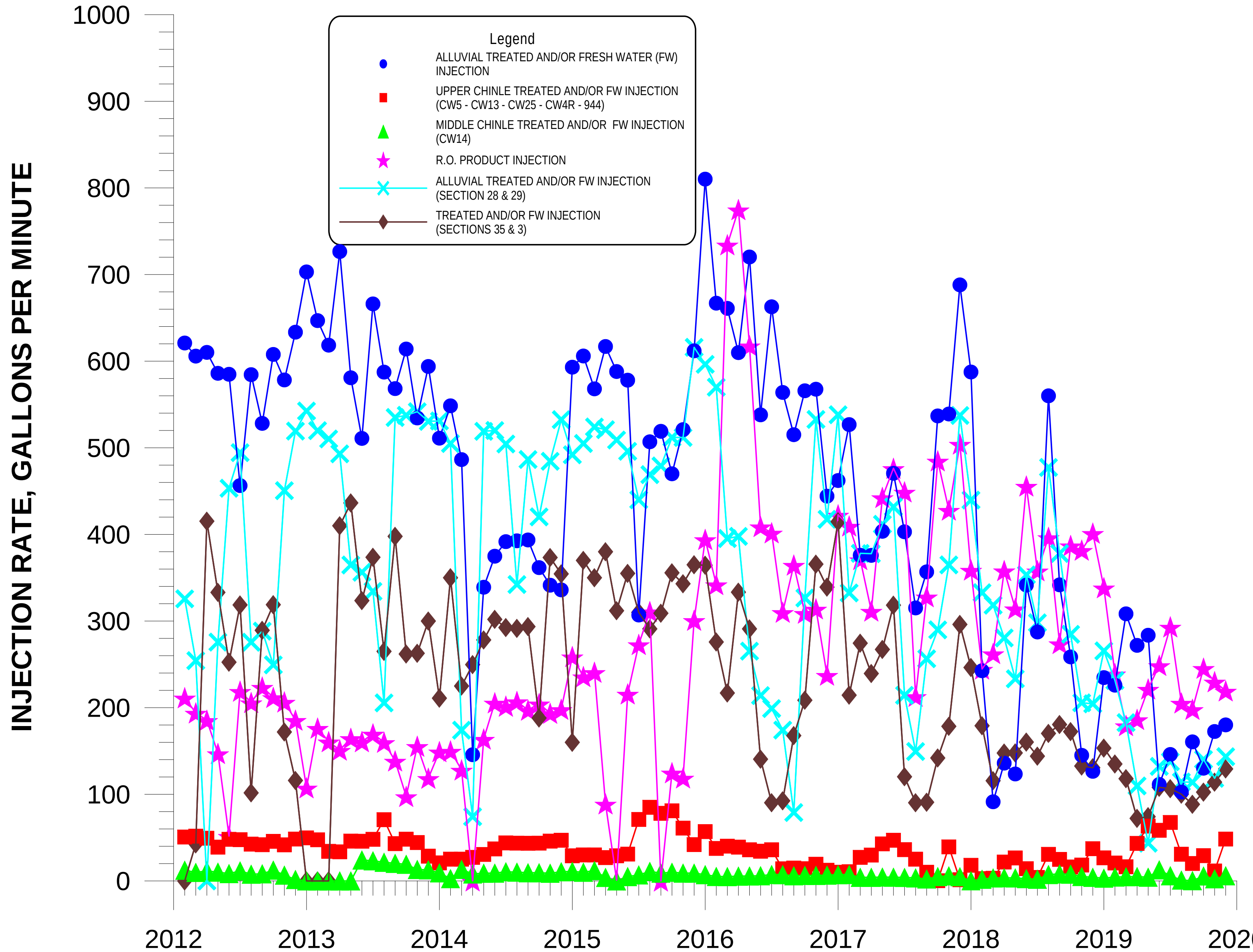

FIGURE 2.1-5. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.

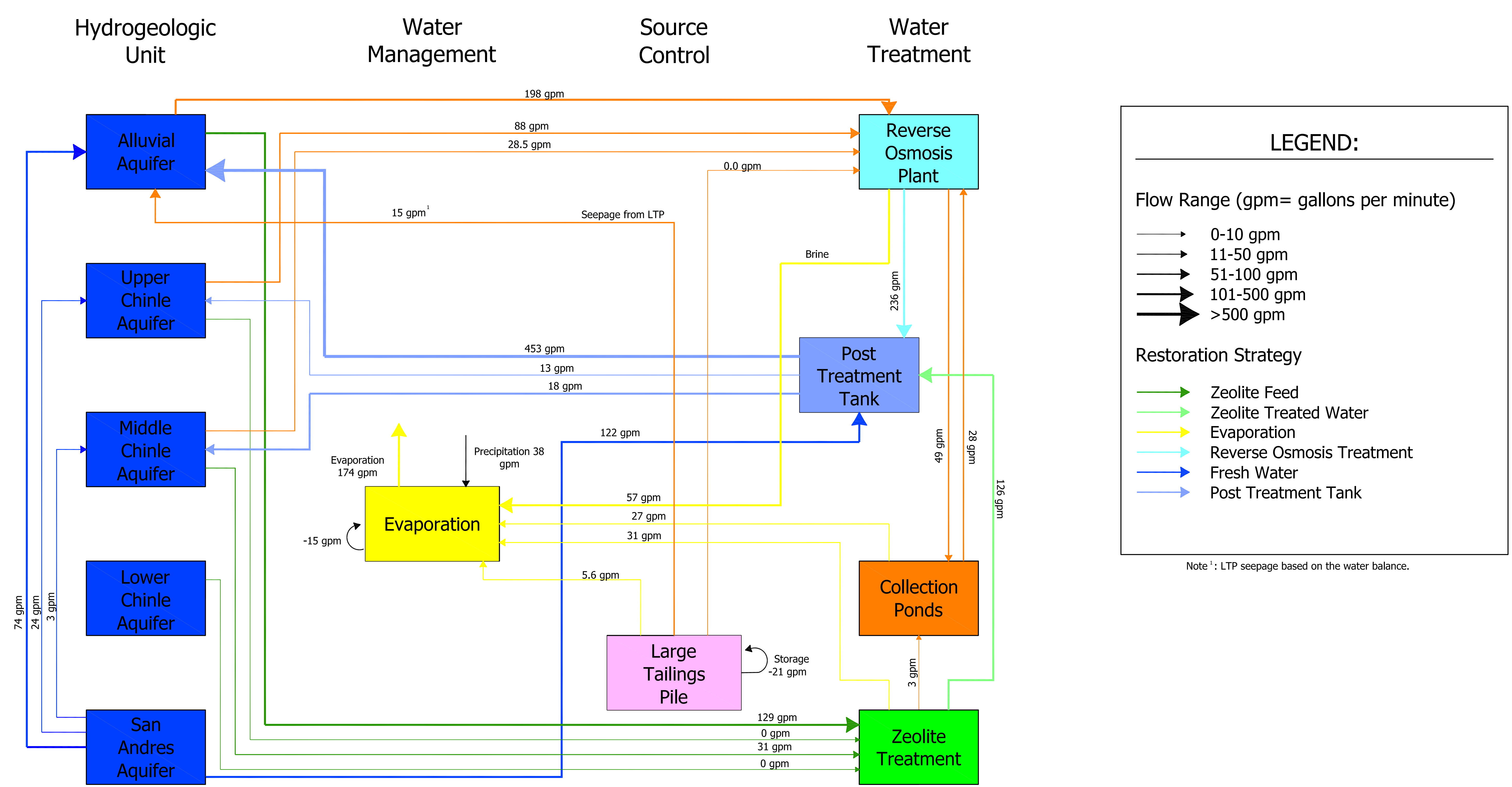

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FIGURE 2.1-6. 2019 MAJOR OPERATIONAL FLOWS

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

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

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

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
2012	G.W.	143304728	3070	3671785	13.4	16027	16.8	20093	0.62	742
2012	TOE	12201316	6476	659465	26.8	2729	48.9	4980	0.43	44
2012	TAILS	56486600	2632	1240823	8.9	4196	26.2	12352	0.17	80
2013	G.W.	122813790	2793	2862836	12.5	12813	16.2	16605	0.73	748
2013	TOE	9211575	6453	496105	26.7	2053	53.3	4098	0.35	27
2013	TAILS	31489800	2448	643368	7.5	1958	23.6	6202	0.12	32
2014	G.W.	124070324	2570	2661212	11.4	11805	15.8	16361	0.63	652
2014	TOE	9427490	5683	447149	21.2	1668	46.0	3619	0.15	12
2014	TAILS	24487100	2788	569782	7.8	1594	27.1	5538	0.16	33
2015	G.W.	109360371	3100	2829437	10.8	9857	14.1	12869	0.83	758
2015	TOE	10222310	5252	448076	20.7	1766	41.2	3515	0.30	26
2015	TAILS	8644000	2891	208565	8.2	592	28.0	2020	0.11	8
2016	G.W.	312653024	2590	6758352	8.2	21397	14.5	37836	0.45	1174
2016	TOE	7553090	4756	299809	17.2	1085	36.7	2310	0.15	9
2016	TAILS	2678400	2891	64625	8.2	183	28.0	626	0.11	2
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
2019	G.W.	170189842	2185	3103584	7.3	10369	13.4	19033	0.49	696
2019	TOE	3024380	4959	125172	15.4	389	42.4	1070	0.20	5
SUM G.W.		6,072,912,845		185,405,632		1,063,471		1,302,660		67,546
SUM TOE		414,642,111		29,701,453		125,385		266,171		4,876
SUM TAILS		493,302,302		20,155,515		76,460		211,831		725
COMBINED SUM		6,980,857,258		235,262,599		1,265,316		1,780,662		73,147

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, 2017-2019

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
				ON-SITE						
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
2019	ALLUVIAL	107,089,394	2848	2,545,237	10.89	9,730	20.54	18,355	0.70	622
2019	UPPER CHINLE	47,674,449	864	343,728	1.19	472	1.34	535	0.08	33
2019	MIDDLE CHINLE	15,426,000	1667	214,619	1.29	166	1.12	144	0.32	41
				OFF-SITE						
2017	SOUTH ALLUVIAL	60,739,450	690	349,594	0.31	155	0.03	14	0.03	16
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 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
2019	SOUTH ALLUVIAL	44,241,529	805	297,252	0.31	113	0.01	4	0.04	14
2019	SOUTH MIDDLE CHINLE	16,853,311	740	104,142	0.28	39	0.00	0	0.04	5
2019	SOUTH LOWER CHINLE	0		0		0		0		0
2019	NORTH ALLUVIAL	26,409,500	877	193,224	0.20	43	0.03	6	0.05	10
SUM ON-SITE		660,574,055		10,482,077		40,546		66,759		2,666
SUM OFF-SITE		382,629,069		2,444,776		788		81		134
COMBINED SUM		1,043,203,124		12,926,853		41,333		66,840		2,800

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	1/29/19	165	766	1750	0.0582	0.00939	0.009	0.02
	2/27/19	92	475	949	0.029		0.0047	0.016
	3/26/2019	236	771	1970	0.0125		0.001	0.009
	4/30/19	207	937	1980	0.0433	0.00699	0.01	0.023
	5/31/19	136	438	1150	0.0094	0.00152	0.009	0.004
	6/25/2019	137	580	1190	0.0102	0.00164	0.011	0.015
	7/31/2019	20	53	156	0.0024	0.00039	0.011	<0.001
	8/21/2019	197	940	1930	0.025	0.00395	0.008	0.021
	9/25/2019	4	8	38	0.003	0.00042	0.009	<0.001
	10/30/2019	128	416	1130	0.009	0.00148	0.011	0.004
	11/26/2019	176	567	1520	0.011	0.00183	0.008	0.002
	12/26/2019	175	566	1540	0.011	0.00172	0.007	0.005

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 (pCi/L)	Th230e (pCi/L)	V (mg/L)
Site Standard		**12**					**5**	**0.3**		**0.02**
SP2	1/29/19									
	2/27/19									
	3/26/2019									
	4/30/19	2	<0.1	0.09	<1	1	<1.1	<.2	0.1	<0.01
	5/31/19	1.3	0.2	0.1	2.1	1.1	2.3	<0.1	0.06	<0.01
	6/25/2019	1.4	0.2	0.2	<1.6	0.9	<1.8	<0.1	0.07	<0.01
	7/31/2019	0.7	<0.2	0.1	<2.5	1.5	<2.7	<0.07	0.040	<0.01
	8/21/2019	1.7	0.2	0.1	<1.4	0.9	<1.6	<0.1	0.050	<0.01
	9/25/2019	0.9	<0.2	0.1	2.8	1.2	<3	<0.1	0.070	<0.01
	10/30/2019									
	11/26/2019	1.4	<0.1	0.2	1.6	0.8	<1.7	<0.1	0.070	<0.01
	12/26/2019	1.4	0.3	0.2	<1.8	1.1	<2.1	<0.2	0.090	<0.01

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)	Mo(f) (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	1/29/19	7.96	14	2304	0.059	0	165	766	1750	0.0582	0.00939	0.009	0.02
	2/27/19	7.12	15.1	1338	0.022	0	92	475	949	0.029		0.0047	0.016
	3/26/2019	7.14	16.4	2611	0.015	0	236	771	1970	0.0125		0.001	0.009
	4/30/2019	7.15	17.7	2536	0.043	0.01	207	937	1980	0.0433	0.00699	0.01	0.023
	5/31/2019	7.34	17.9	1633	0.043	0	136	438	1150	0.0094	0.00152	0.009	0.004
	6/25/2029	6.49	19.6	1647	0.009	0.01	137	580	1190	0.0102	0.00164	0.011	0.015
	7/31/2019	6.44	12.5	268	0.005	0	20	53	156	0.0024	0.00039	0.011	<0.001
	8/21/2019	6.69	21.9	2671	0.024	0.02	197	940	1930	0.025	0.00395	0.008	0.021
	9/25/2019	5.85	17.5	53	0.005	0.01	4	8	38	0.003	0.00042	0.009	<0.001
	10/30/2019	7.54	13.7	1454	0.008	0	128	416	1130	0.009	0.00148	0.011	0.004
	11/26/2019	6.89	15	1934	0.011	0.01	176	567	1520	0.011	0.00183	0.008	0.002
	12/26/2019	7.37	16.8	2146	0.005	0.02	175	566	1540	0.011	0.00172	0.007	0.005

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 (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**
SP2	1/29/19									
	2/27/19									
	3/26/2019									
	4/30/2019	2	<0.1	0.09	<1	1	<1.1	<0.2	0.1	<0.01
	5/31/2019	1.3	0.2	0.1	2.1	1.1	2.3	<0.1	0.06	<0.01
	6/25/2029	1.4	0.2	0.2	<1.6	0.9	<1.8	<0.1	0.07	<0.01
	7/31/2019	0.7	<0.2	0.1	<2.5	1.5	<2.7	<0.07	0.040	<0.01
	8/21/2019	1.7	0.2	0.1	<1.4	0.9	<1.6	<0.1	0.050	<0.01
	9/25/2019	0.9	<0.2	0.1	2.8	1.2	<3	<0.1	0.070	<0.01
	10/30/2019									
	11/26/2019	1.4	<0.1	0.2	1.6	0.8	<1.7	<0.1	0.070	<0.01
	12/26/2019	1.4	0.3	0.2	<1.8	1.1	<2.1	<0.2	0.090	<0.01

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

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

Sample Point Name	Date	Field Parameters pH(f) (units)	Temp. (°C)	Cond. (µmhos/cm)	KPA U (mg/L)	Mo(f) (mg/L)	Lab Data Cl (mg/L)	SO4 (mg/L)	TDS (mg/L)	U (mg/L)	Ue (mg/L)	Mo (mg/L)	Se (mg/L)
Site Standard							**250**	**1500**	**2734**	**0.16**		**0.1**	**0.32**
RO CLAR FEED	4/18/19	7.74	12.9	4869			**278**	**1940**	**3910**	**6.1**	0.98	**10.1**	**0.327**
	5/23/19	8.03	14.9	6035			**338**	**2430**	**4820**	**8.51**	1.37	**16.6**	**0.66**
RO SP1	1/29/19	5.62	13.6	19	0.004	0	1	1	13	0.0026	0.00036	0.006	<0.001
	2/27/2019	6.7	15	222	0.008	0.01	14	57	129	0.0074	-	0.009	<0.005
	3/26/2019	5.34	14.9	18	0.002	0	2	2	<10	0.001	0.00010	0.009	<0.001
	4/30/2019	8.24	18.5	30	0.002	0.02	4	3	17	0.001	0.00008	0.018	<0.001
	5/31/2019	8.08	18.5	55	0.002	0.03	5	4	35	0.006	0.00099	0.019	0.001
	6/25/2019	6.73	20.7	48	0.002	0.02	5	4	29	0.002	0.00034	0.023	0.001
	7/31/2019	5.98	13.7	34	0.003	0.02	4	3	19	0.002	0.0002	0.017	<0.001
	8/21/2019	6.27	13.5	34	0.011	0.01	11	32	94	0.009	0.0015	0.012	<0.001
	9/25/2019	6.73	17.9	32	0.006	0.02	3	2	24	0.002	0.0003	0.01	<0.001
	10/30/2019	9.39	14.8	31	0.001		4	2	25	0.001	0.0001	0.015	<0.001
	11/26/2019	6.08	14.4	38	0.014	0.03	3	5	26	0.011	0.002	0.029	0.001
	12/26/2019	10.48	16.1	131	0.011	0.03	3	4	65	0.014	0.002	0.046	<0.001
LPRO #2 Product	4/22/2019	5.33	15.2	38			3	4	22	0.0051	0.00082	0.019	<0.001
	5/23/2019	6.12	15.8	71			5	16	39	0.0047	0.00077	0.092	0.004
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 (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	0.30		0.02
RO CLAR FEED	4/18/19	4.4	0.2	0.2	<2.5	1.4	<2.7	<0.003	0.08	<0.01
	5/23/19									
RO SP1	1/29/19									
	2/27/2019									
	3/26/2019									
	4/30/2019	0.4	<0.1	0.1	<1.5	1.5	<1.6	<0.1	0.07	<0.01
	5/31/2019	0.8	<0.2	0.1	<2.1	1.1	<2.3	<0.9	0.05	<0.01
	6/25/2019	0.9	<0.2	0.1	<1.5	0.9	<1.7	<0.1	0.06	<0.01
	7/31/2019	0.5	0.3	0.2	<2.1	1.2	<2.4	<0.03	0.04	<0.01
	8/21/2019	0.6	0.2	0.1	<1.5	0.9	<1.7	<0.1	0.06	<0.01
	9/25/2019	0.7	<0.2	0.1	2.7	1.1	<2.8	<0.1	0.07	<0.01
	10/30/2019									
	11/26/2019	0.5	<0.2	0.1	1.3	0.7	<1.5	<0.1	0.07	<0.01
	12/26/2019	0.4	<0.2	0.2	<1.9	1	<2.1	<0.2	0.10	<0.01

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

Table 2.1-6 Zeolite Treated Water Quality Data

Sample Point Name	Date	Field Parameters pH(f) (units)	Temp. (°C)	Cond. (µmhos	KPA U (mg/L)	Mo(f) (mg/L)	Lab Data 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	NO 2019 OPERATION												
1200Z Trains 1&2	10/16/19	6.15	14	2503			0.0293	0.00474	0.045	0.046	164	1090	1990
1200Z Trains 3&4	1/3/19	6.29	19.4	2097	0.082	0	0.0739	0.0119	0.012	0.033	140	906	1650
	1/9/19	5.72	11.8	2163	0.104	0	0.102	0.0165	0.01	0.03	145	943	1690
	1/17/19	5.73	10.6	2373	0.13	0	0.14	0.0226	0.033	0.04	161	964	1770
	1/29/19	5.97	11.5	2329	0.129	0	0.127	0.0206	0.012	0.037	157	974	1830
	2/6/19	4.07	11.0	2346	0.082	0	0.0698	0.0113	0.002	0.039	158	1010	1810
	2/13/19	4.11	13.0	3974	0.114	0	0.122	0.0196	0.002	0.039	164	1030	1850
	2/21/19	5.89	12.0	2427	0.013	0.1	0.0073	0.00118	0.045	0.039	159	1070	1960
	2/27/19	5.51	14.6	2436	0.011	0	0.014		0.018	0.047	160	1060	1940
	3/6/2019	5.83	13.4	2410	0.012	0	0.021		0.013	0.048	159	1060	1900
	3/13/2019	5.85			0.022	0.02	0.036		0.013	0.041	161	1060	1920
	4/17/2019	6.85	12.5	2478	0.029	0.01	0.0274	0.00442	0.011	0.037	154	1180	1980
	4/25/2019	6.55	16.0	2501	0.052	0.03	0.0578	0.00932	0.02	0.039	164	1120	2010
	6/13/2019	5.71	16.7	2437	0.034	0.01	0.0377	0.00609	0.013	0.044	160	1090	1930
	6/20/2019	6.11	17.4	2438	0.019	0.02	0.0200	0.00323	0.014	0.040	162	1090	1950
	6/25/2029	5.87	17.9	2445	0.019	0	0.0202	0.00327	0.015	0.040	163	1100	1950
	7/23/2019	5.73	18.3	2356	0.033	0.02	0.0311	0.00501	0.01	0.038	161	1070	1900
	8/8/2019	5.95	18.4	2462	0.035	0	0.0362	0.00584	0.005	0.038	160	1050	1950
	8/15/2019	5.60	18.9	2405	0.016	0	0.0183	0.00295	0.005	0.039	156	1030	1890
	8/21/2019	5.57	18.1	2411	0.015	0.01	0.0158	0.00255	0.01	0.027	158	1040	1900
	9/12/2019	5.78	18.7	2517	0.011	0	0.0123	0.00198	0.008	0.034	164	1080	2030
	9/18/2019	5.85	16.9	2434	0.022		0.0181	0.00292	0.007	0.04	160	1050	1960
	12/11/2019	5.95	13.0	2598	0.028	0	0.0374	0.00604	0.014	0.046	172	1160	2040

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	NO 2019 OPERATION									
1200Z Trains 1&2										
1200Z Trains 3&4	1/3/19									
	1/9/19									
	1/17/19									
	1/29/19									
	2/6/19									
	2/13/19									
	2/21/19									
	2/27/19									
	3/6/2019									
	3/13/2019									
	4/17/2019									
	4/25/2019									
	6/13/2019									
	6/20/2019									
	6/25/2029									
	7/23/2019									
	8/8/2019									
	8/15/2019	1.9	<0.2	0.1	<2	1.2	<2.2	<0.1	0.06	<0.01
	8/21/2019	1.9	0.2	0.1	<1.4	0.9	<1.6	<0.1	0.06	<0.01
	9/12/2019									
	9/18/2019									
	12/11/2019									

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

2.2 FUTURE OPERATION

Groundwater quality restoration in 2020 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 300 gpm averaged over the entire year. 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 2020 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 80 gpm in 2020 due to the re-lining of EP1.

Collection from Upper Chinle wells CE2, CE5, CE6, CE11, CE12, CE15 and CE19 will continue to intercept contaminants in this aquifer in 2020. Injection into Upper Chinle wells 944, 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 2020. 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 will be restricted in 2020 during the re-lining of EP1. Operation of the South collection and injection in the northeast portion of Section 3 and South Felice Acres should be re-started in late 2020. The North Off-site operation of collection and injection should also be re-started in late 2020. Limited treated and fresh-water injection will mainly be into injection wells on the down gradient side of the restoration area in 2020 to decrease the movement of the plumes.

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.

SECTION 3

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MONITORING/PERFORMANCE REVIEW
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

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MONITORING/PERFORMANCE REVIEW FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

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TABLES

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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 2019. 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 2019 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 and 2019, 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 a screen length of five feet with a total well depth that is typically 4 to 12 feet below the 2018 and 2019 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.

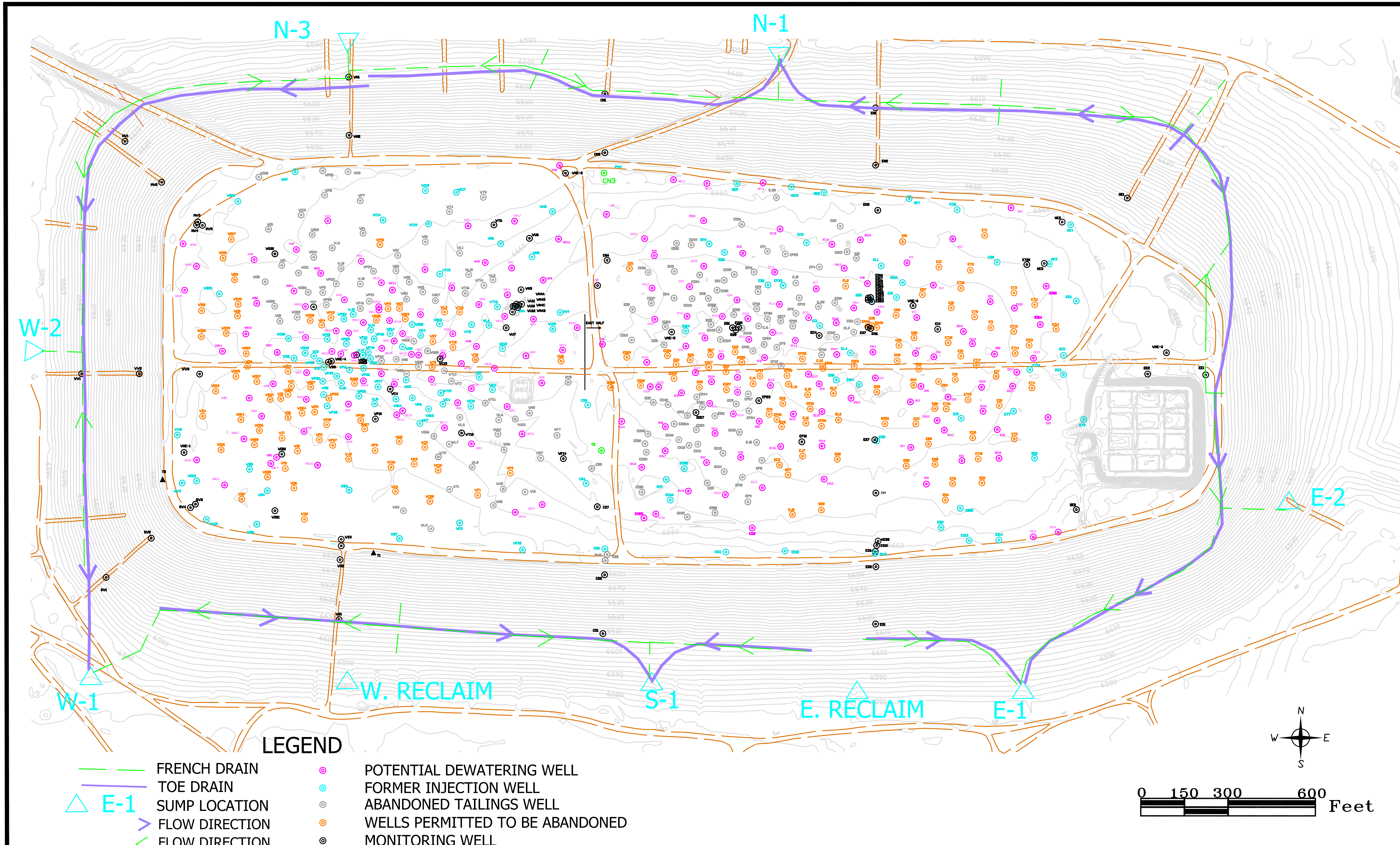


FIGURE 3.1-1. TAILINGS WELL LOCATIONS, 2019

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

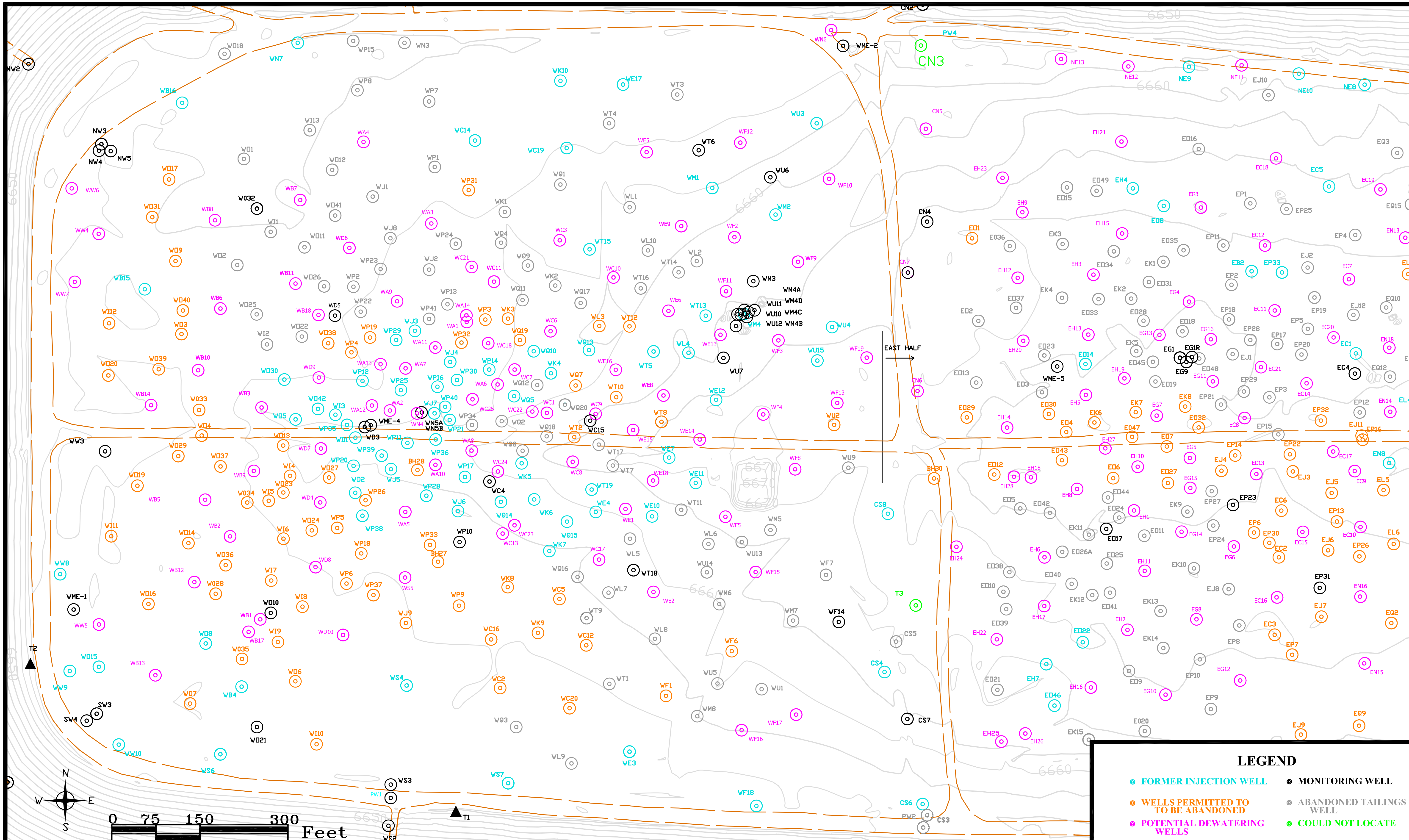


FIGURE 3.1-1A. LOCATION OF TAILINGS WELLS IN WEST HALF OF LTP

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

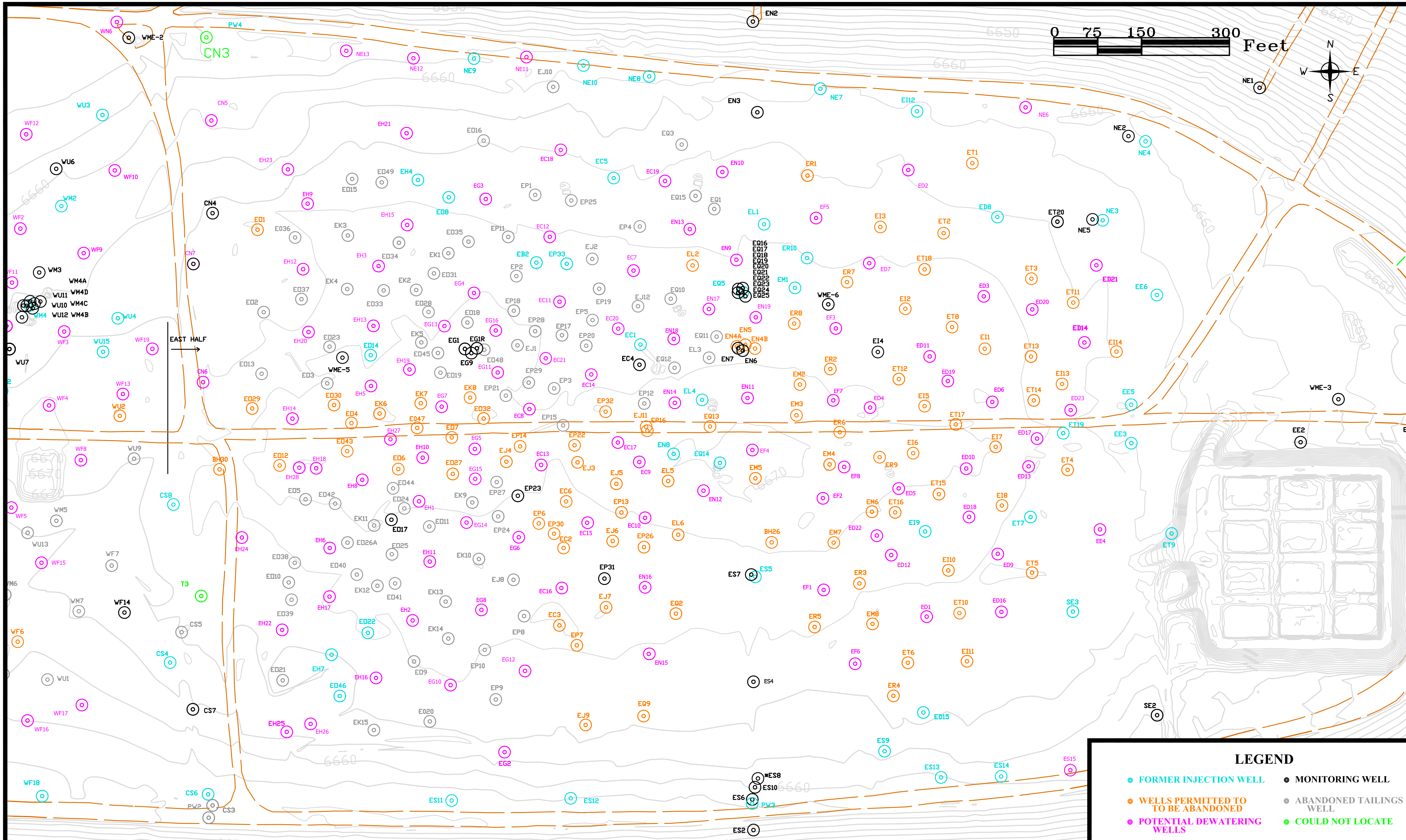
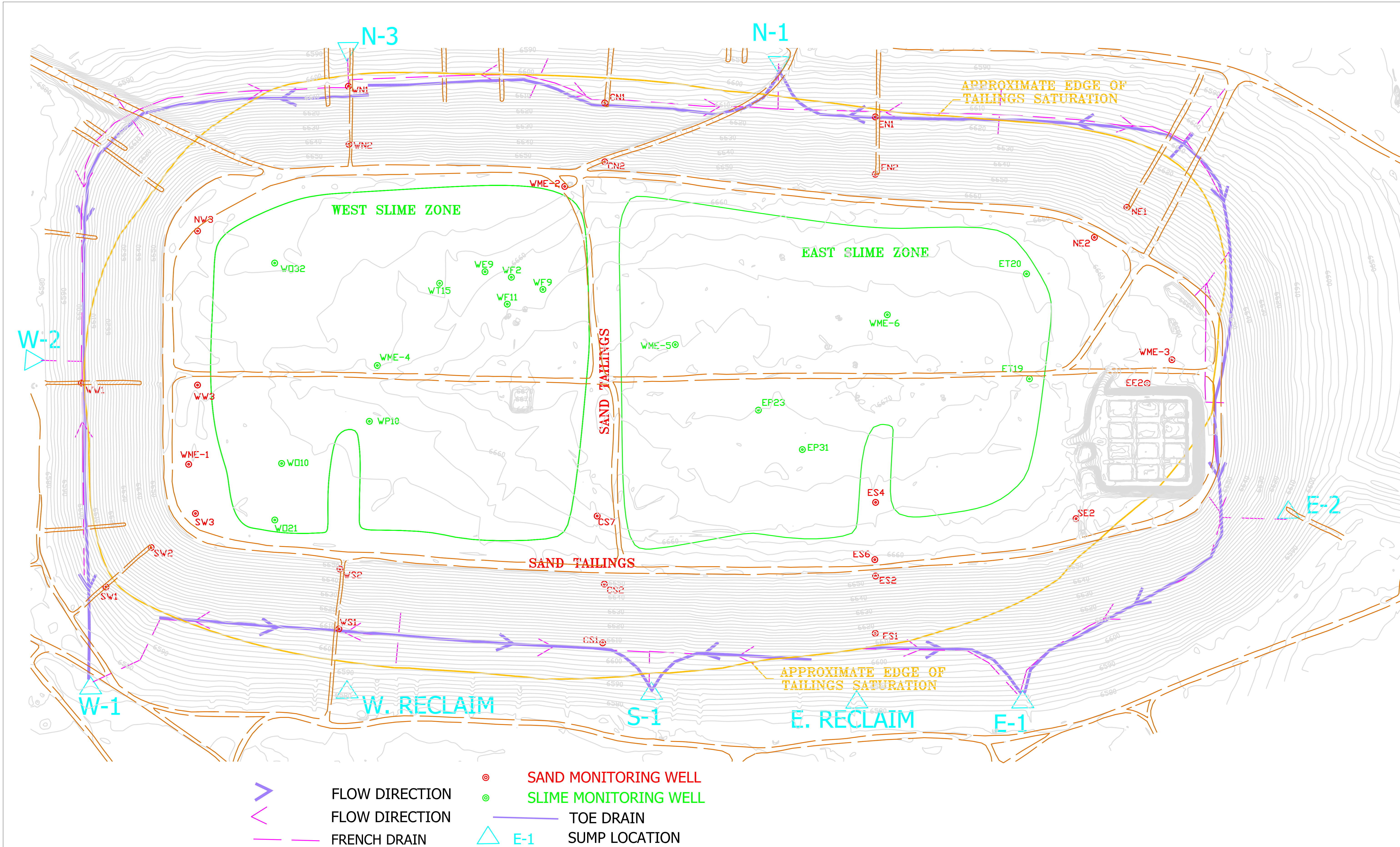


FIGURE 3.1-1B. LOCATION OF TAILINGS WELLS IN EAST HALF OF LTP

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO



SCALE: 1" = 300'

C:\PROJECTS\2020-06\DWGS TAILINGS-MONITORING-2019

DATE: 2/10/2020

FIGURE 3.1-2. TAILINGS WELLS MONITORED IN 2019

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

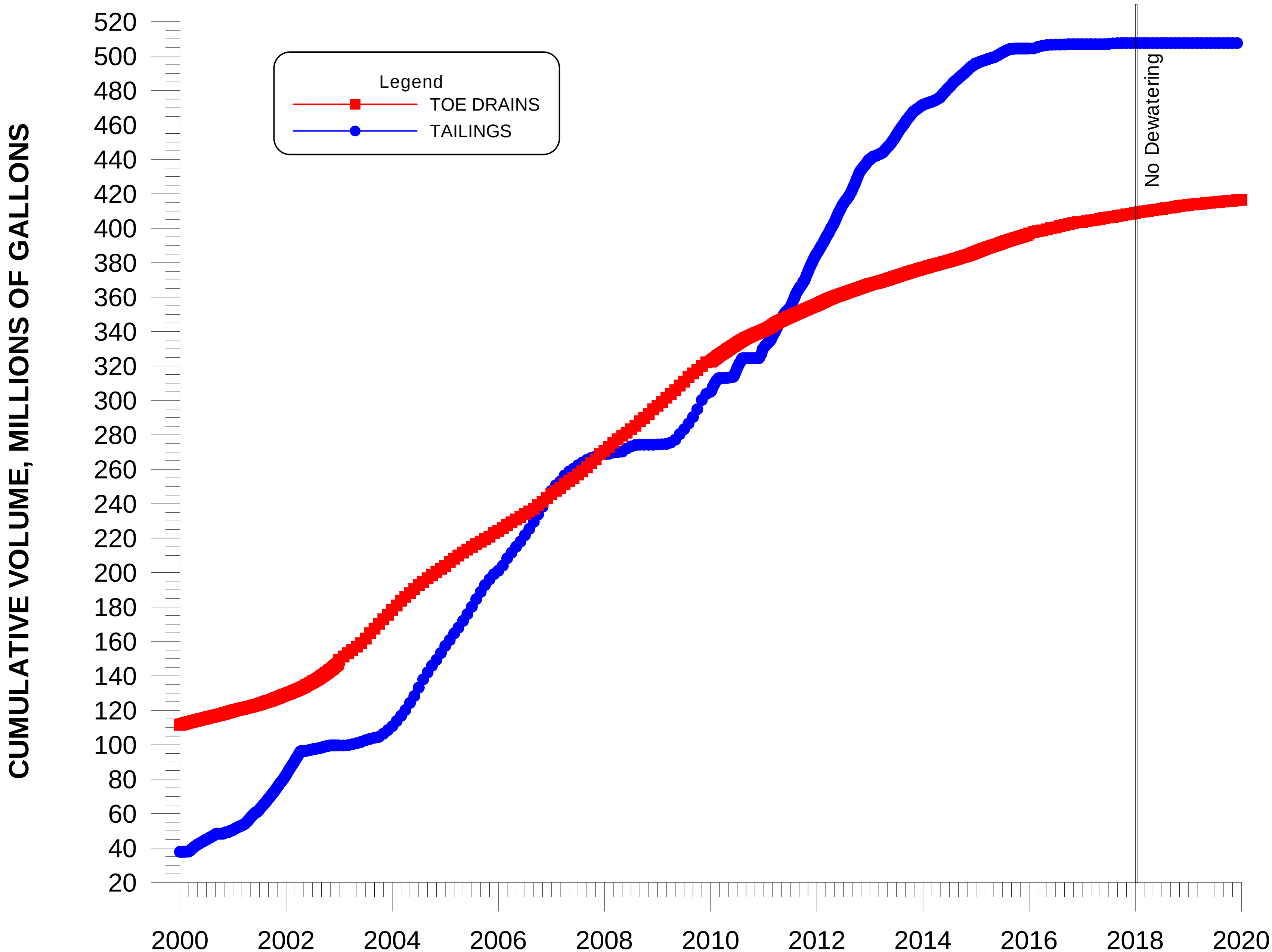


FIGURE 3.1-3. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

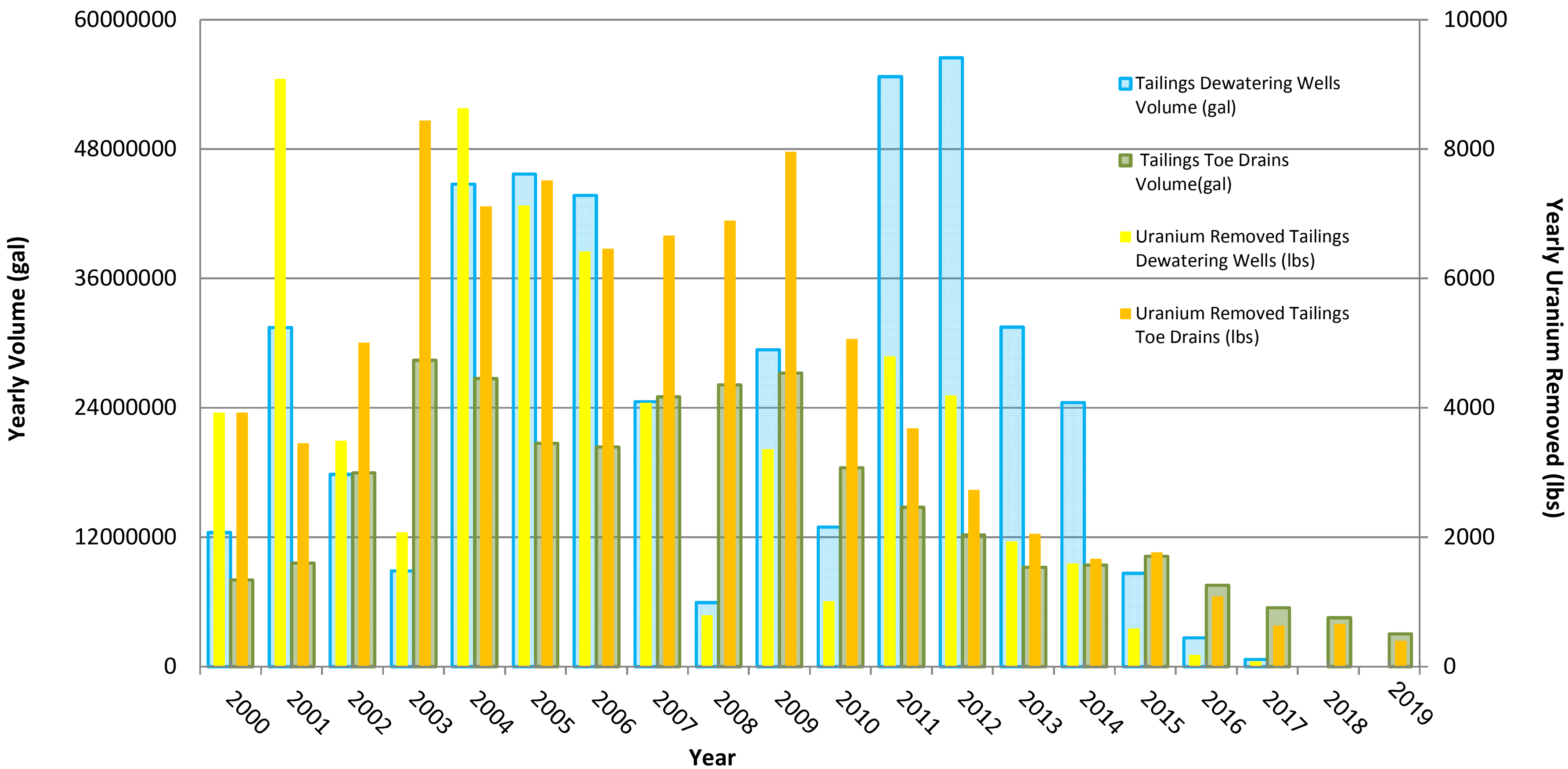
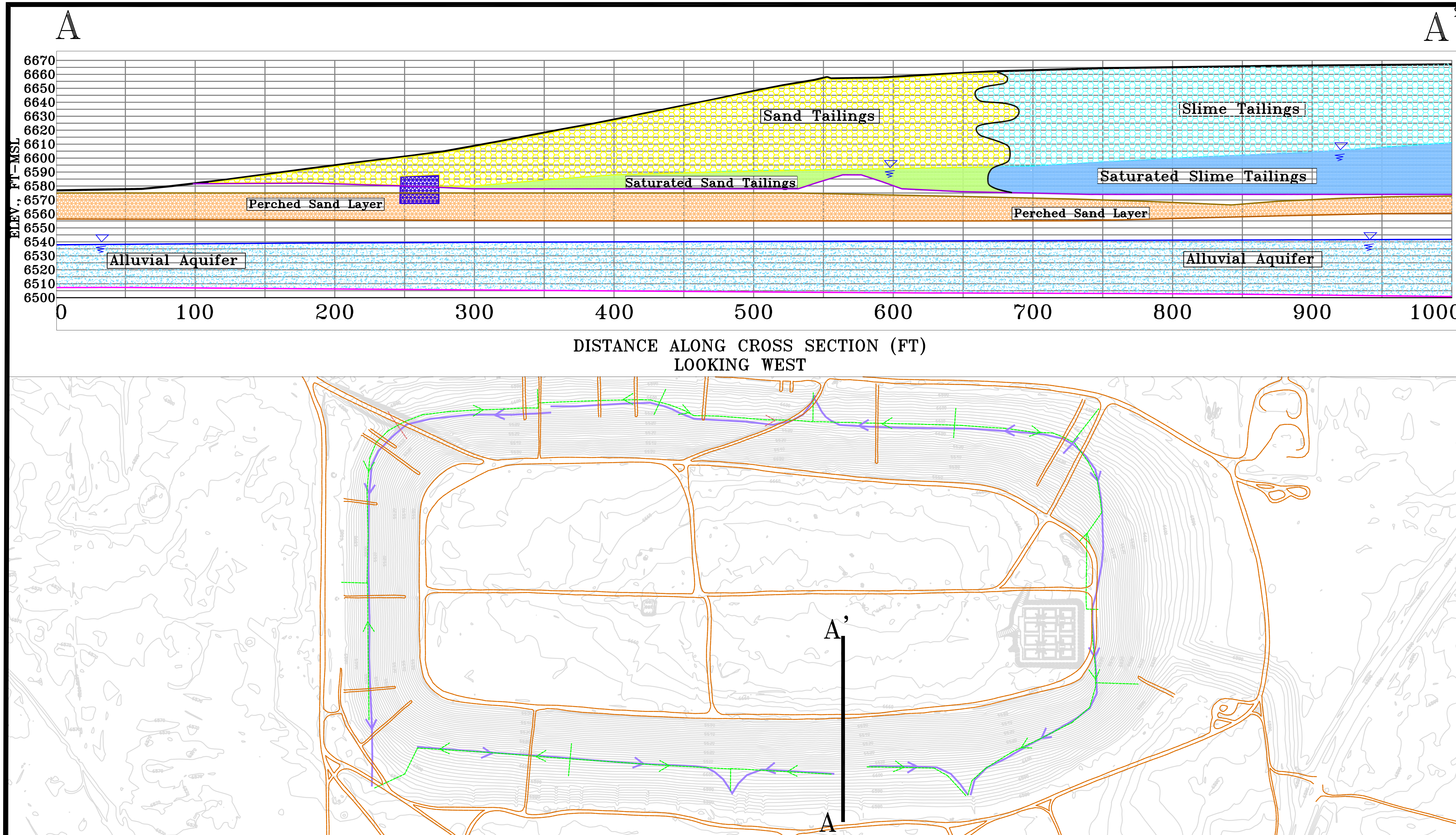


Figure 3.1-4. Yearly Quantity of Tailings Water and Uranium Removed



LEGEND

Black line	LAND SURFACE
Purple line	BASE OF TAILINGS
Olive line	TOP OF PERCHED SAND
Orange line	BASE OF PERCHED SAND
Magenta line	BASE OF ALLUVIUM
Cyan line	TAILINGS WATER-LEVEL ELEVATION
Blue line	ALLUVIAL WATER-LEVEL ELEVATION
Blue box	TOE DRAIN CORRIDOR
Lavender line	TOE DRAIN
Green dashed line	FRENCH DRAIN

REVISIONS No.	DATE	MADE BY
1		
2		
3		
4		

DATE: 2-2020

DRAWN BY: TGM

Homestake Mining Company
Grants, New Mexico

FIGURE 3.1-5
TAILINGS CROSS SECTION A-A'

3.1-9

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	18.36	6596.65	22-32	5-32
CN2	2.0	1544654	490822	2.8	6658.17	87.10	72.34	6585.83	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	17.00	6591.30	25-35	5-35
CS2	2.0	1543202	490820	4.8	6651.98	78.30	60.25	6591.73	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	69.00	6595.69	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	65.07	6602.77	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	31.60	6587.26	25-35	5-35
EN2	2.0	1544611	491752	2.2	6651.61	69.30	52.95	6598.66	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	54.75	6615.25	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	58.15	6609.85	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	56.40	6610.60	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	30.16	6585.02	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	70.84	6594.96	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	6660.00	97.50	67.20	6592.80	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	55.80	6610.20	40-90	-
ET20	2.0	1544275	492272	---	6664.00	90.00	65.80	6598.20	40-90	-
NE1	2.0	1544499	492617	1.0	6648.82	67.30	50.04	6598.78	55-75	5-75
NE2	5.0	1544400	492505	0.9	6660.98	92.00	63.70	6597.28	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	66.41	6588.60	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	71.41	6589.96	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	24.77	6575.06	20-30	5-30
SW2	2.0	1543329	489263	3.9	6637.87	52.30	44.46	6593.41	29-49	5-49
SW3	5.0	1543449	489415	1.2	6656.00	84.50	63.02	6592.98	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	60.05	6601.91	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	64.20	6596.62	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	65.80	6599.90	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	57.70	6607.14	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	54.60	6604.63	51-56	47-56
WME-2		1544575	490685	2.1	6661.05	64.60	60.18	6600.87	58-63	54-63
WME-6		1544134	491794	1.9	6671.50	67.25	54.59	6616.91	61-66	57-66
WME-4		1543960	490041	2.0	6662.31	67.60	58.20	6604.11	61-66	57-66
WME-3		1543980	492772	2.1	6664.31	67.15	63.31	6601.00	66-71	63-71
WME-5		1544032	491065	2.0	6672.35	77.32	65.51	6606.84	70-75	67-75
WN1	2.0	1544914	489942	1.4	6606.68	38.50	20.08	6586.60	10-35	5-35
WN2	2.0	1544714	489942	1.5	6644.32	63.30	54.55	6589.77	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	61.50	6595.50	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	60.87	6592.13	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	66.30	6591.70	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	9.86	6597.25	27-37	5-37
WS2	2.0	1543255	489911	2.2	6649.44	77.30	58.48	6590.96	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	48.45	6611.55	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	24.46	6578.63	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	50.79	6608.75	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 and 2019. 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 2019 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 estimated at two gpm.

The typical decline in tailings water levels during 2019 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 with a more pronounced reduction in the saturated footprint in the southeast corner of the LTP. An analysis of the water volume change in the saturated tailings in the LTP indicates a reduction of approximately 10,794,000 gallons over 2019 which equates to a reduction rate of approximately 20.5 gpm. The composite discharge from the toe drains during 2019 was approximately 5.6 gpm and this indicates that the effective LTP seepage rate was approximately 14.9 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 and the subsequent lowering of the potentiometric surface, the potential yields from dewatering wells decreased dramatically and no further dewatering well operation is anticipated.

3.2.1 TAILINGS WATER LEVEL CHANGES

Numerous wells were monitored for water level change during 2019 and the water-level elevations for years 2009 through 2019 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 changes in well CN2 since late 2017 may reflect the well completion to below the base of the tailings that creates contact with the underlying perched sand. Well WME-2 is located approximately 160 feet south and east of well CN2 and the higher water-level elevations presented in Figure 3.2-2 indicate the horizontal drainage from the interior tailings is likely supplying tailings water to support the water levels in the perimeter wells. The water levels in wells CN2 and CS1 were not honored in the contouring in Figure 3.2-1.

Wells EE2, NE1, NE2, SE2 and WME-3 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 five wells since mid-2015 or since ceasing injection into the tailings (well WME-3 installed in 2018). There are higher water-level elevations in the slime area to the west of these wells and the horizontal drainage from the slimes is supplying tailings water to support the water levels in the perimeter wells.

Sand tailings wells EN1, EN2, ES1 and ES2 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 well WME-6 is in the slime tailings south of well EN2. The measured water levels for the wells 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. The water-level elevation in the slime tailings well WME-6 is higher than that in the sand tailings wells and is relatively steady.

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 well WME-4 is in the slime tailings between wells WN2 and WS2. The measured water levels in the wells 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 the gradient reversal between wells WS1 and WS2 is not consistent with the general radially outward tailings water flow direction from the slime areas in the tailings indicated by the higher water level in well WME-4. With the measured water-level elevation in well WS1 likely affected by proximity to the toe drains, it is not representative of the tailings and is not honored in the contouring in Figure 3.2-1.

Wells SW1, SW2, WO10, WW1, WW3 and WME-1 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 six 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 are a limited number of measurements between 2011 and 2018, but there is a declining water level trend in all wells during from 2018 through 2019. The water-level elevations have declined by approximately 24 to 33 feet since the flushing program was discontinued.

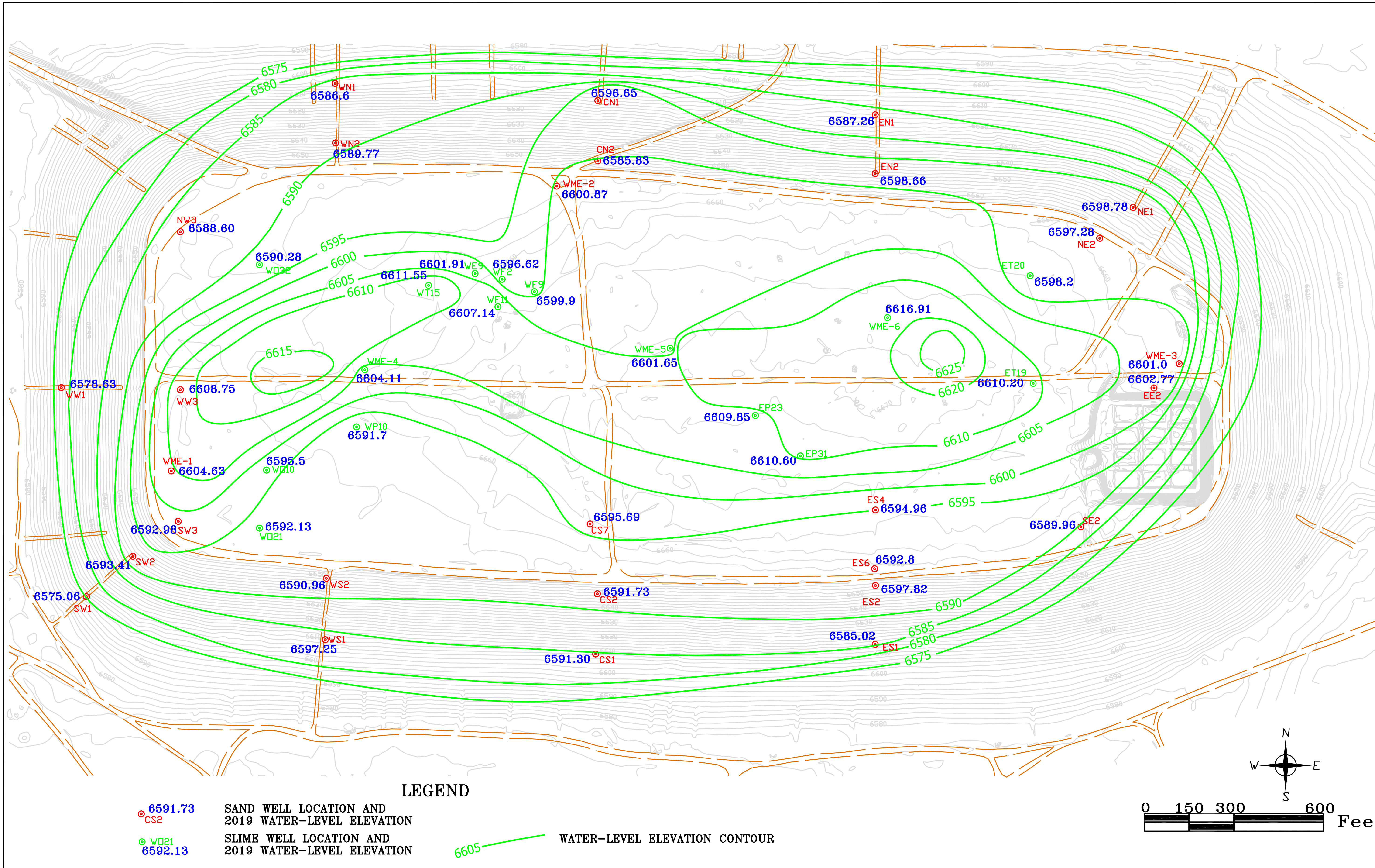


FIGURE 3.2-1. WATER-LEVEL ELEVATIONS OF THE LTP, FALL 2019, FT-MSL

HOMESTAKE MINING COMPANY
GRANTS, NEW MEXICO

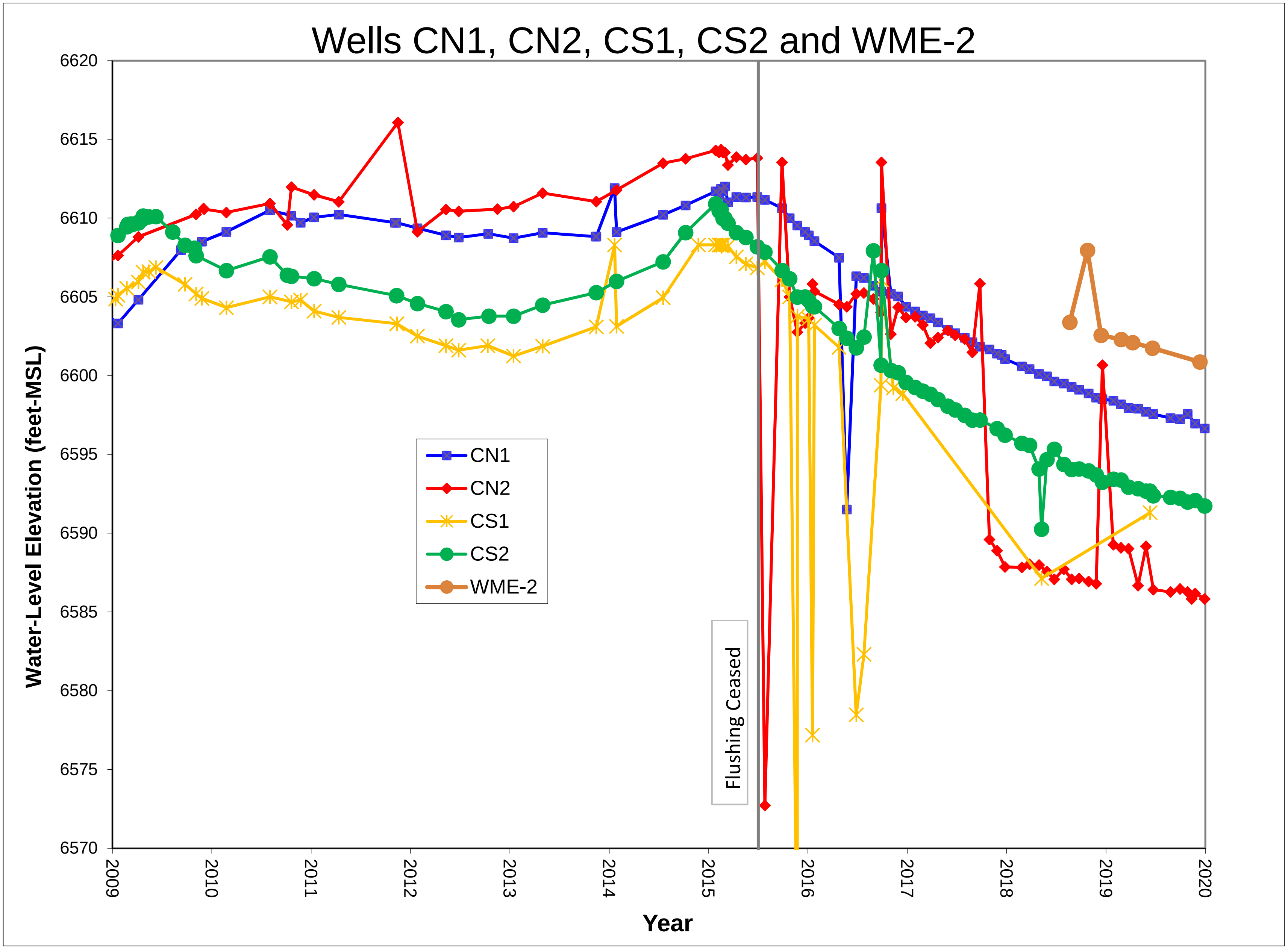


Figure 3.2-2. Water-Level Elevation ForTailings Wells CN1, CN2, CS1, CS2 and WME-2

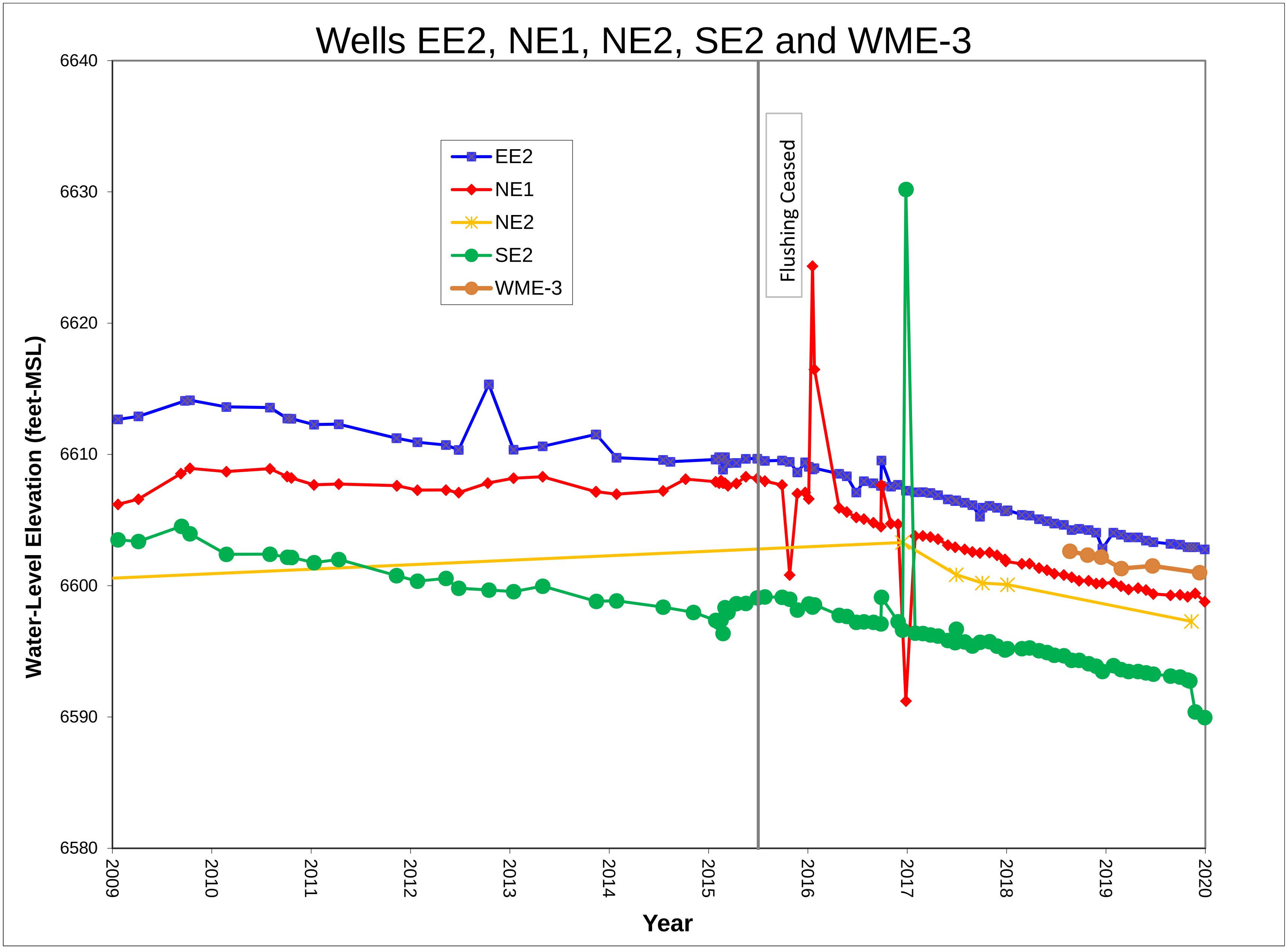


Figure 3.2-3. Water-Level Elevation ForTailings Wells EE2, NE1, NE2, SE2 and WME-3

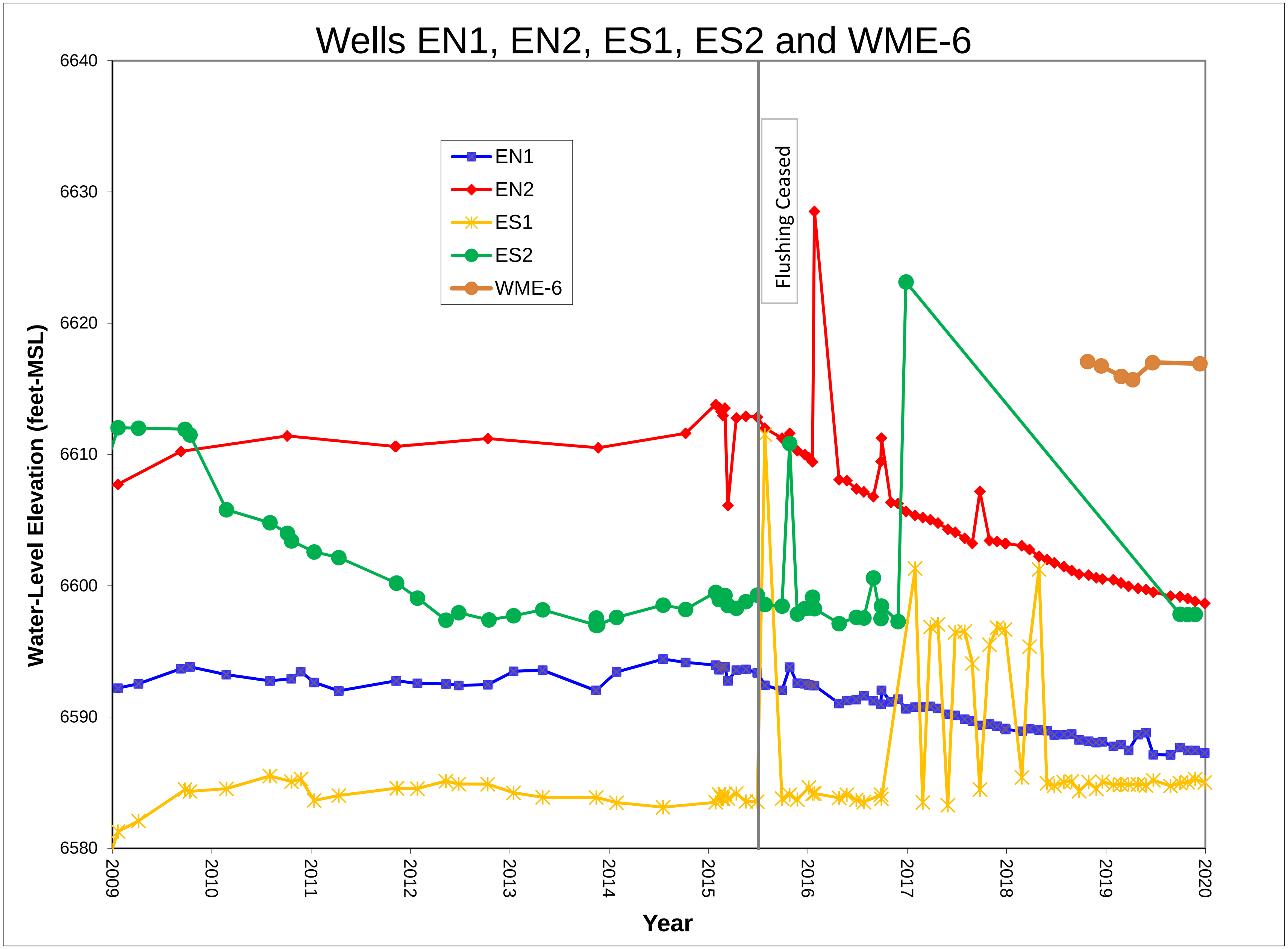


Figure 3.2-4. Water-Level Elevation For Tailings Wells EN1, EN2, ES1, ES2 and WME-6

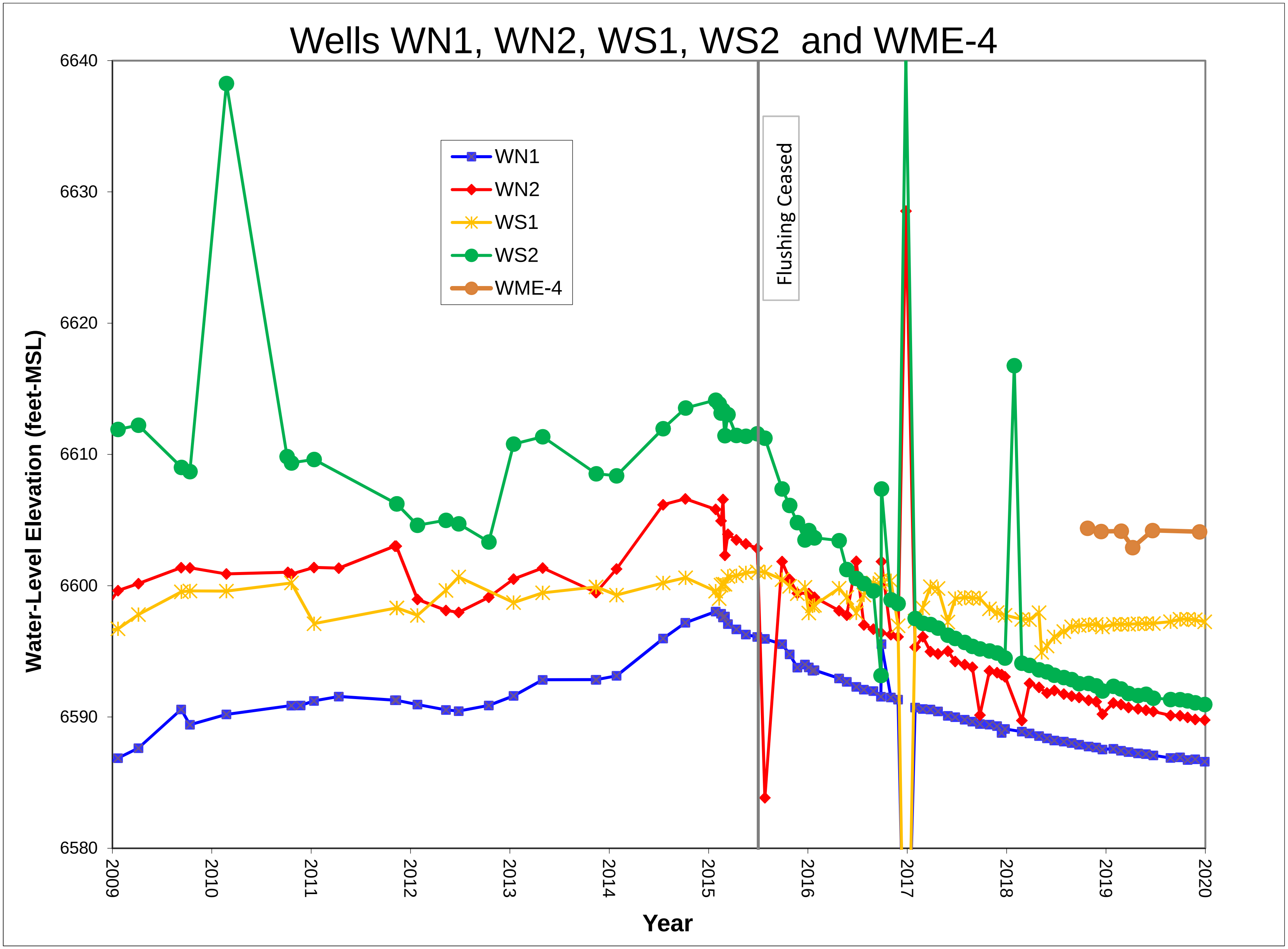


Figure 3.2-5. Water-Level Elevation For Tailings Wells WN1, WN2, WS1, WS2 and WME-4

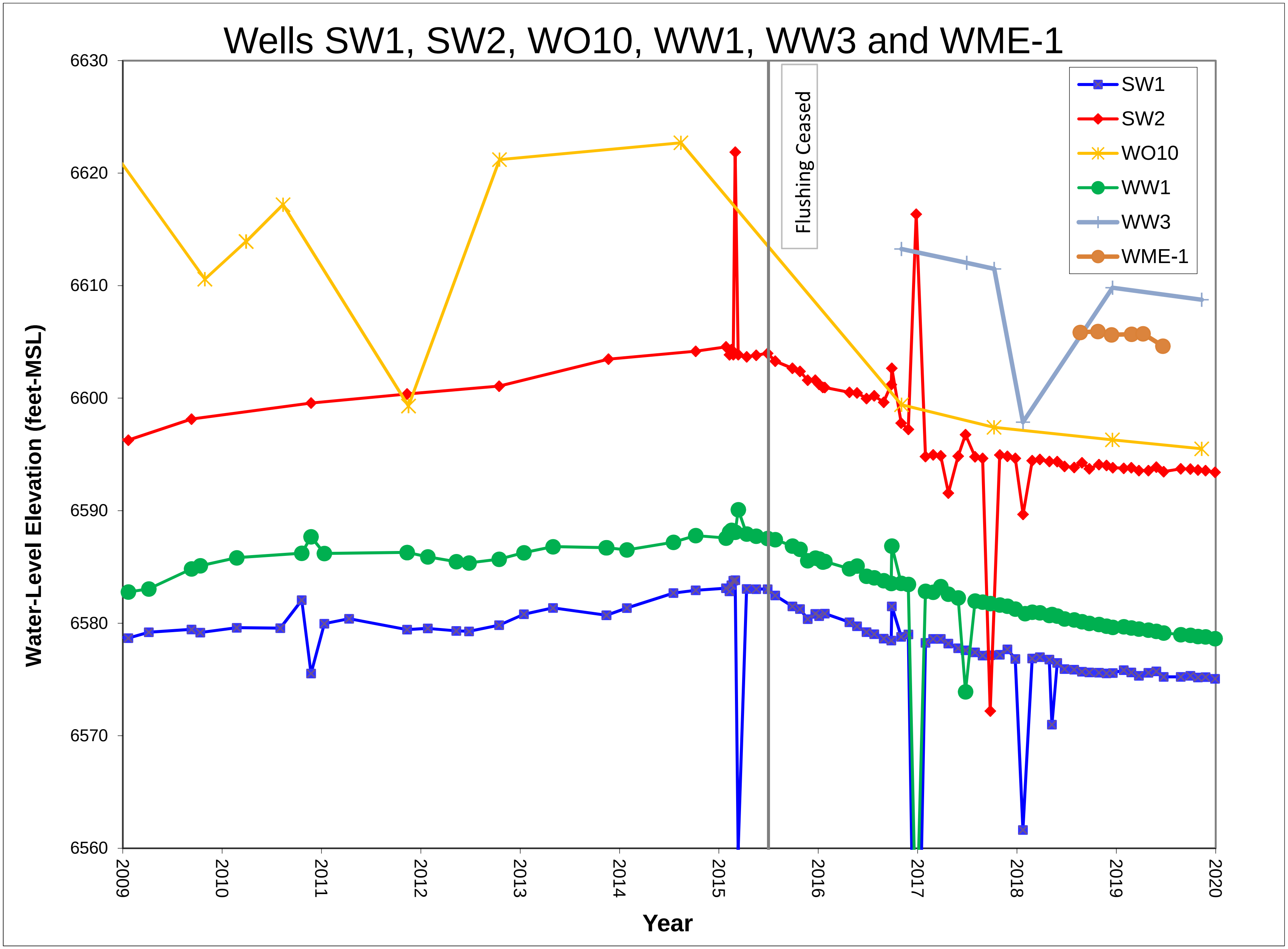


Figure 3.2-6. Water-Level Elevation For Tailings Wells SW1, SW2, WO10, WW1, WW3 and WME-1

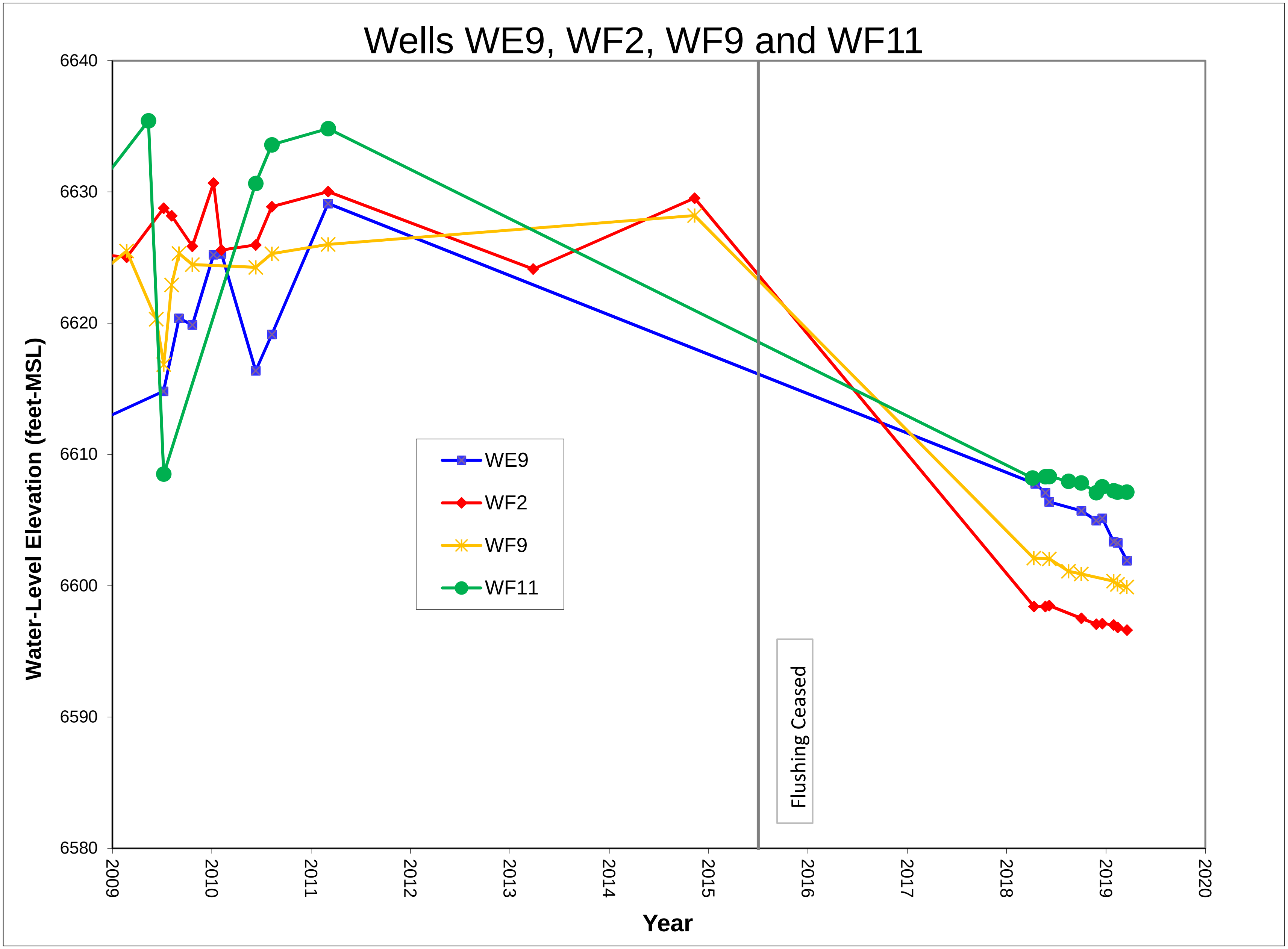


Figure 3.2-7. Water-Level Elevation For Tailings Wells WE9, WF2, WF9 and WF11

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 2019. 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 tailings 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 2019 respectively. These figures show the decline in uranium concentrations with time. Figures 3.3-6 through 3.3-27 present graphs of uranium, molybdenum and selenium concentration over time for selected tailings wells and toe drain sumps. 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 2019. 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. There is also a significant reduction of saturated footprint of the LTP since 2015 (see Figure 3.3-4).

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 3.3-17 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-hand 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. No water samples were collected from wells CN1 and CN2 in 2019. 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. There was an increase in molybdenum concentration in well EE2 in 2019 but levels are still reflective of effective flushing. 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). After 2011, the uranium and molybdenum concentrations increased in both wells and this was followed by a declining concentration trend since early 2018. The increase was likely due to higher concentrations moving into the sand tailings in this area from the surrounding slime tailings followed by stabilization or decline when the higher concentration waters have been flushed or redistributed.

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 southwest, west and northwest sides of the LTP (see Figure 3.1-2). Figure 3.3-12 shows a declining trend in uranium and molybdenum concentration in well SW1 since approximately 2009. In contrast, the selenium concentration in well SW1 has been erratic and at relatively high concentration since late 2014. Figure 3.3-12 also shows constituent concentrations in well MWE-1 which is located in sand tailings near the crest of the southwest corner of the LTP. Uranium, molybdenum and selenium concentrations in the well have been relatively steady since 2018 with a molybdenum concentration that is significantly greater than that in well SW1. 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. No samples were taken from the wells in 2018 and 2019. 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 (WME-2 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 WME-2 are relatively stable and indicative of tailings that have been effectively flushed.

Figure 3.3-17 presents uranium, molybdenum and selenium concentration over time for wells WME-3 and SW3 which are located along the east crest of the LTP and in the southwest corner of the LTP, respectively (see Figure 3.1-2). With the exception of a significant decrease in molybdenum concentration in well SW3 after sampling in 2016, uranium, molybdenum and selenium concentrations have been relatively stable in both wells. The constituent concentrations are indicative of tailings that have been effectively flushed.

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 3.3-18 and 3.3-19 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 declining trend. With the exception of erratic concentration changes in the West 1 sump discharge, the molybdenum concentration 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 3.3-18 and 3.3-19).

3.3.4 SLIME TAILINGS WATER QUALITY

Figures 3.3-20 and 3.3-21 present uranium, molybdenum and selenium concentration over time for former injection well pairs EI4 and ET20, and EP23 and EP31, 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 with a slight decline since 2018. Constituent concentrations in well EI4 were relatively stable through 2018 with no sample taken in 2019 (see Figure 3.3-20). The uranium and molybdenum concentration also increased in well EP23 since late 2016 with the constituent concentrations in well EP31 remaining relatively stable through 2018 (see Figure 3.3-21).

Figures 3.3-22 through 3.3-26 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 3.3-22 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 or stable levels since 2013. Figure 3.3-23 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. Recent constituent concentrations in both wells have been relatively stable. 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 3.3-24). The changes in constituent concentrations in well WO21 were relatively minor between 2009 and 2019. Figure 3.3-25 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 3.3-25). In contrast, the uranium and molybdenum concentrations in well WME-4 are roughly 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 3.3-26 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 3.3-27 presents constituent concentrations for slime tailings wells WME-5 and WME-6 which are located in the eastern slime area of the LTP. The wells were first sampled in late 2018 and the constituent concentrations have been relatively stable with the exception of a decrease in selenium concentration and an increase in molybdenum concentration in well WME-5 from the earliest samples. The constituent concentrations in both wells are indicative of areas that were partially flushed during the tailings 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 and 2019. 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 (see Table 3.3-1) 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 no 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. This is supported by the changes in estimated drainable water volume presented in Table 3.3-1 with the majority of the year-to-year water volume reduction since 2016 occurring in the sand tailings.

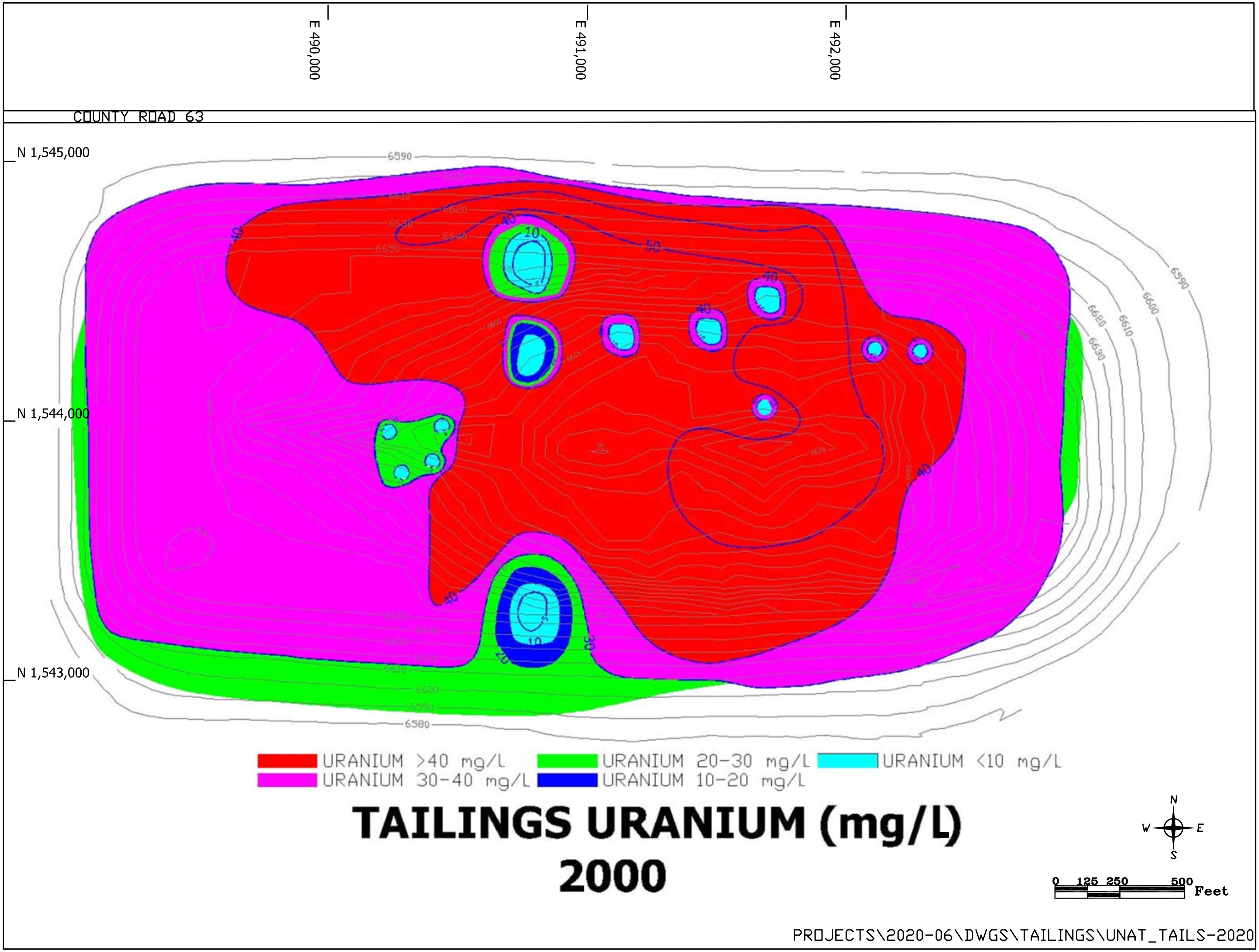


FIGURE 3.3-1. TAILINGS SOLUTION URANIUM CONCENTRATION, 2000

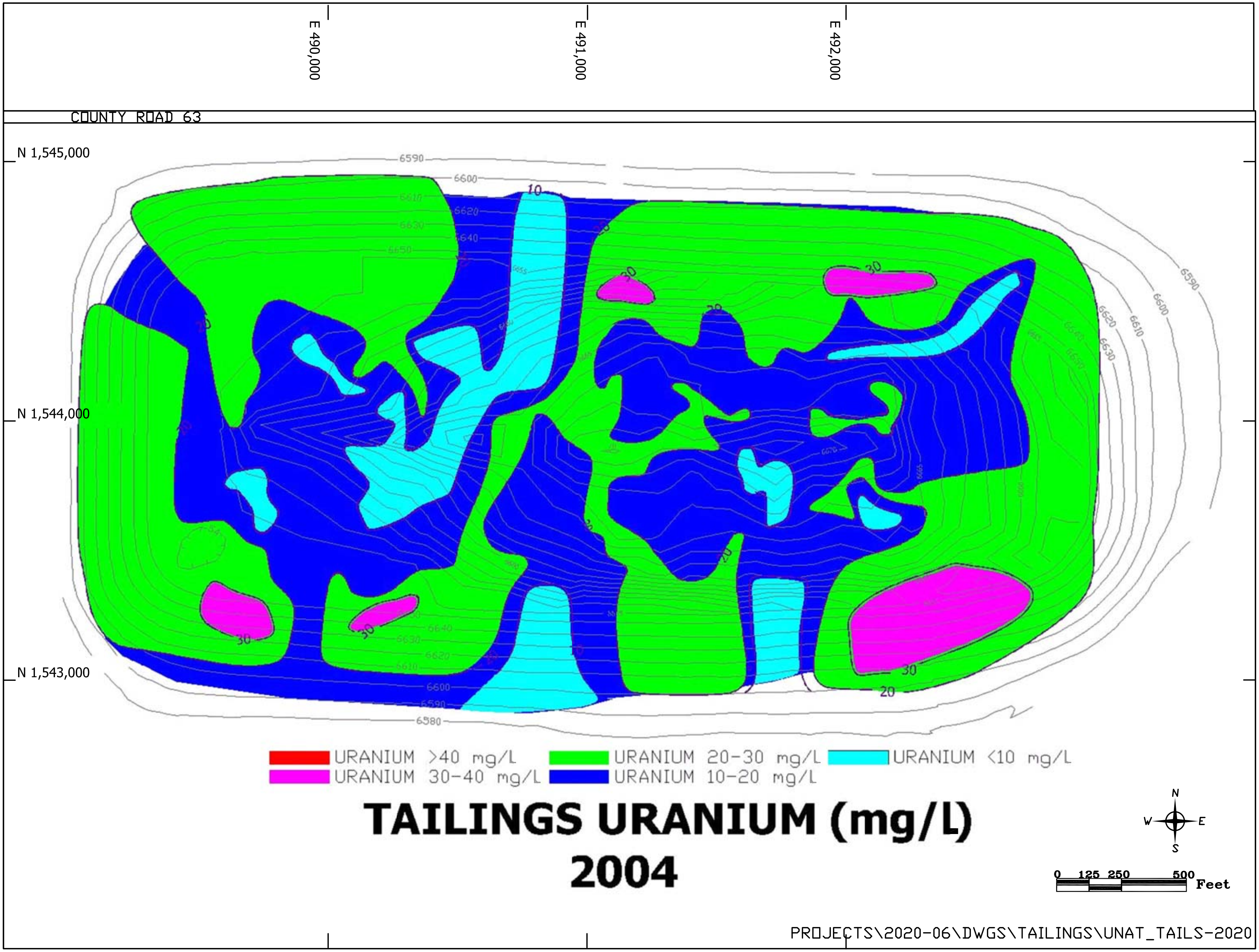


FIGURE 3.3-2. TAILINGS SOLUTION URANIUM CONCENTRATION, 2004

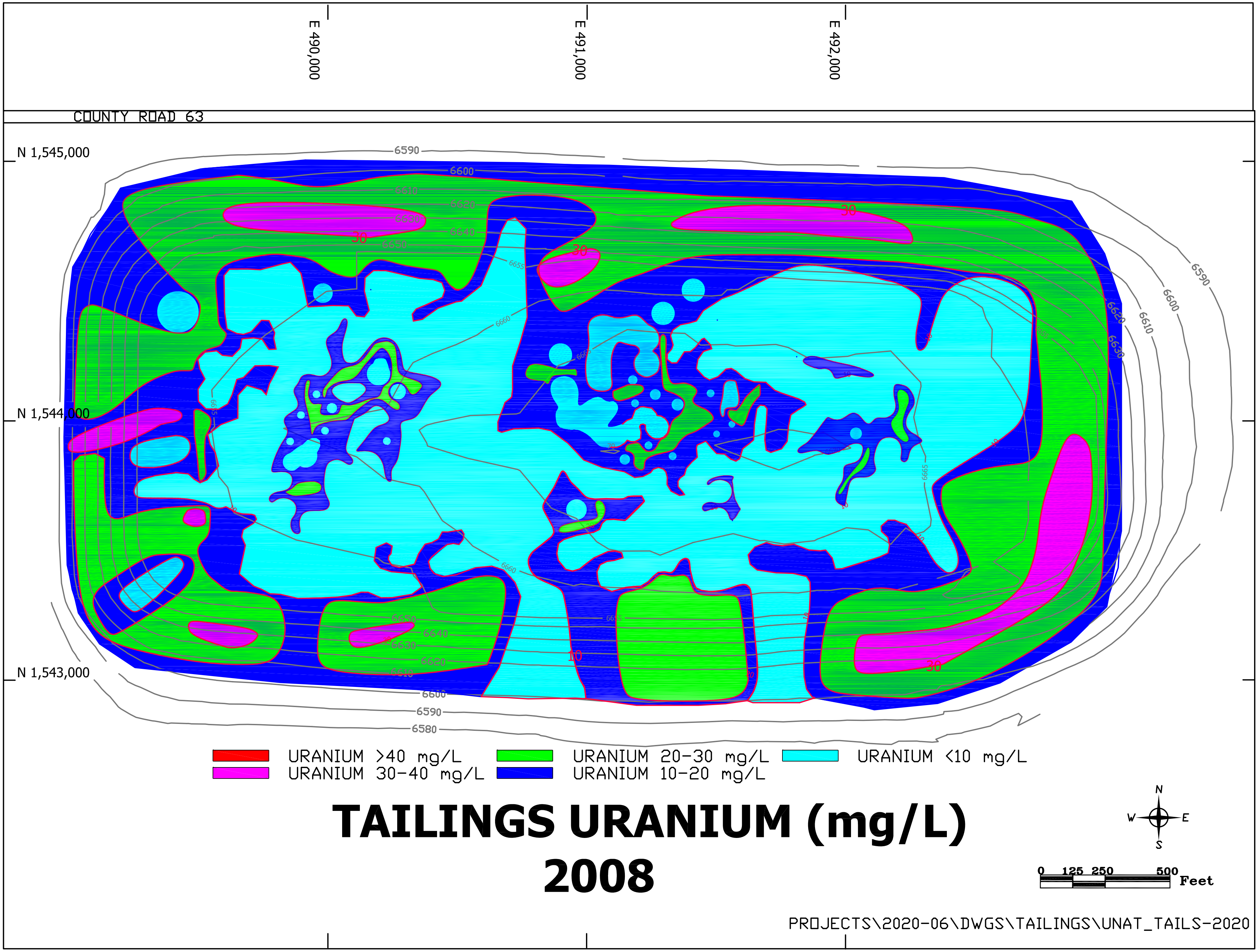


FIGURE 3.3-3. TAILINGS SOLUTION URANIUM CONCENTRATION, 2008

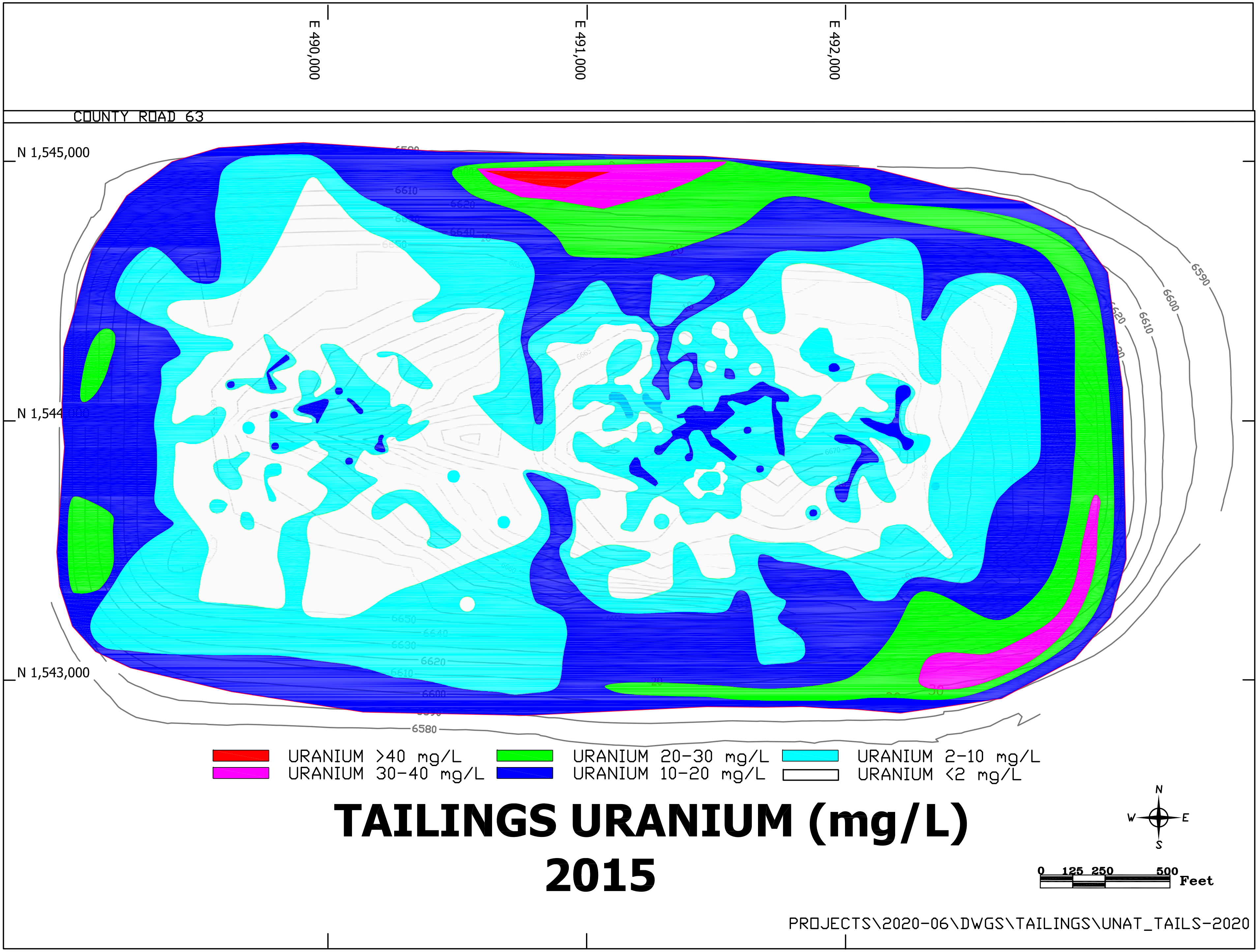


FIGURE 3.3-4. TAILINGS SOLUTION URANIUM CONCENTRATION, 2015

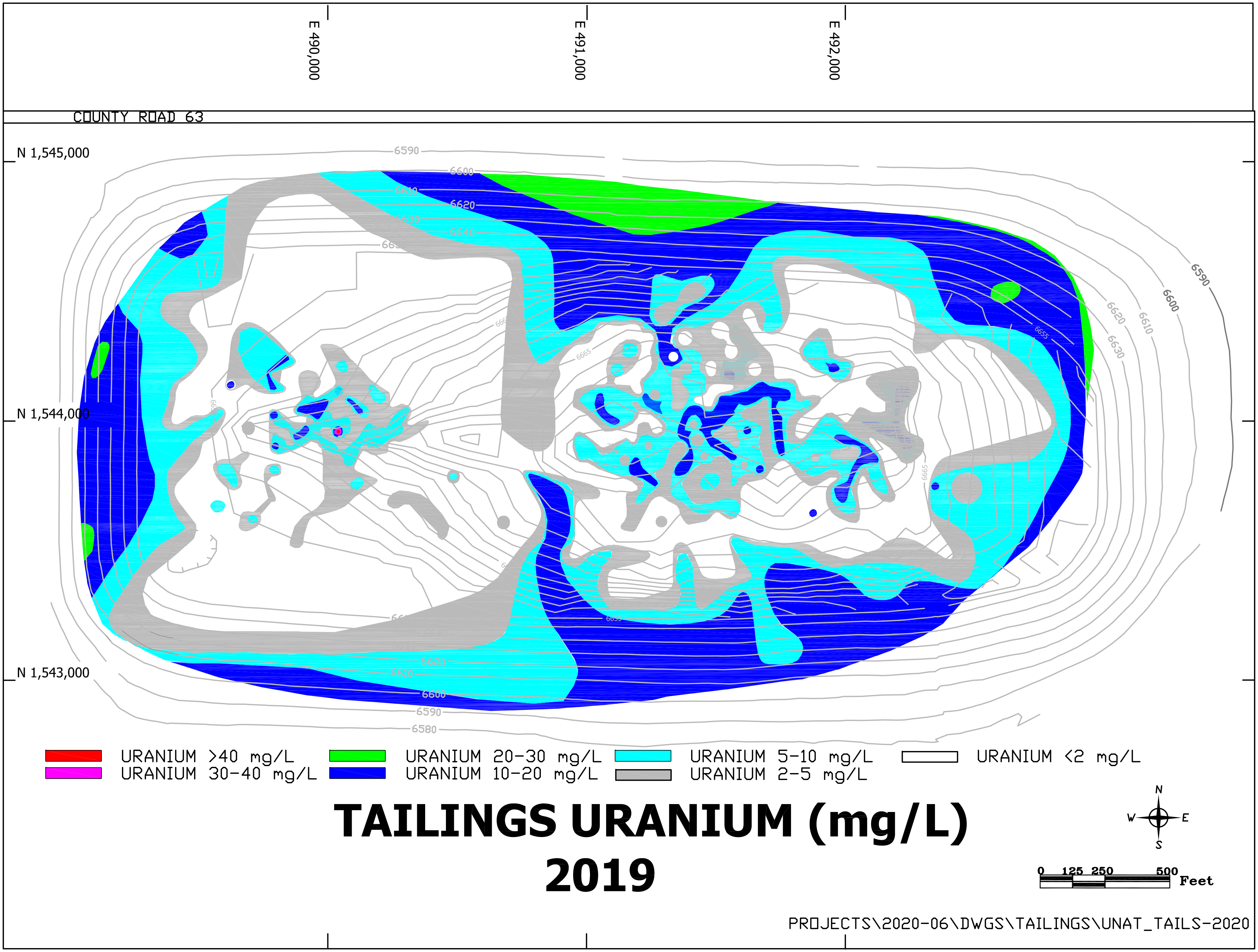


FIGURE 3.3-5. TAILINGS SOLUTION URANIUM CONCENTRATION, 2019

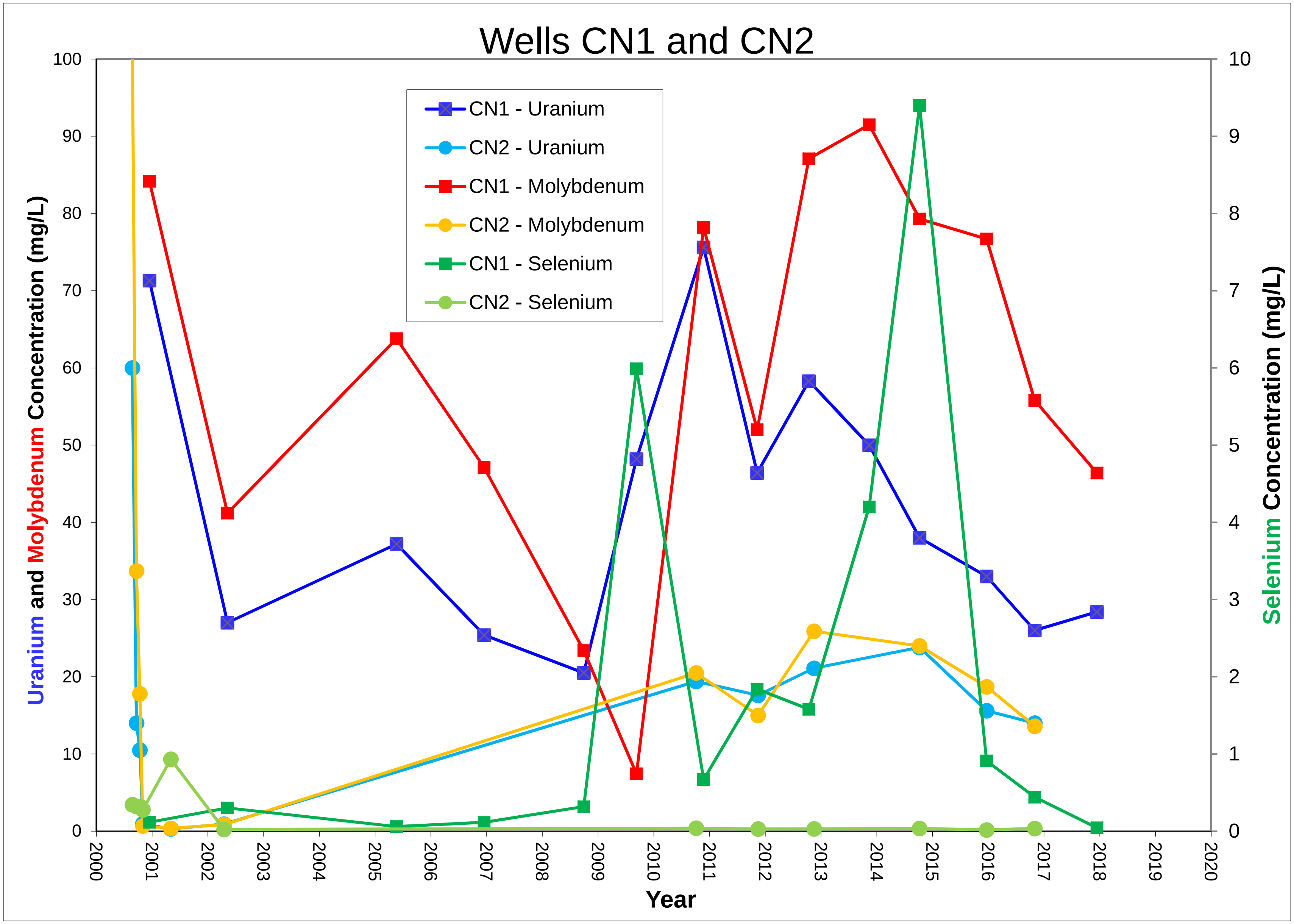


Figure 3.3-6. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells CN1 and CN2

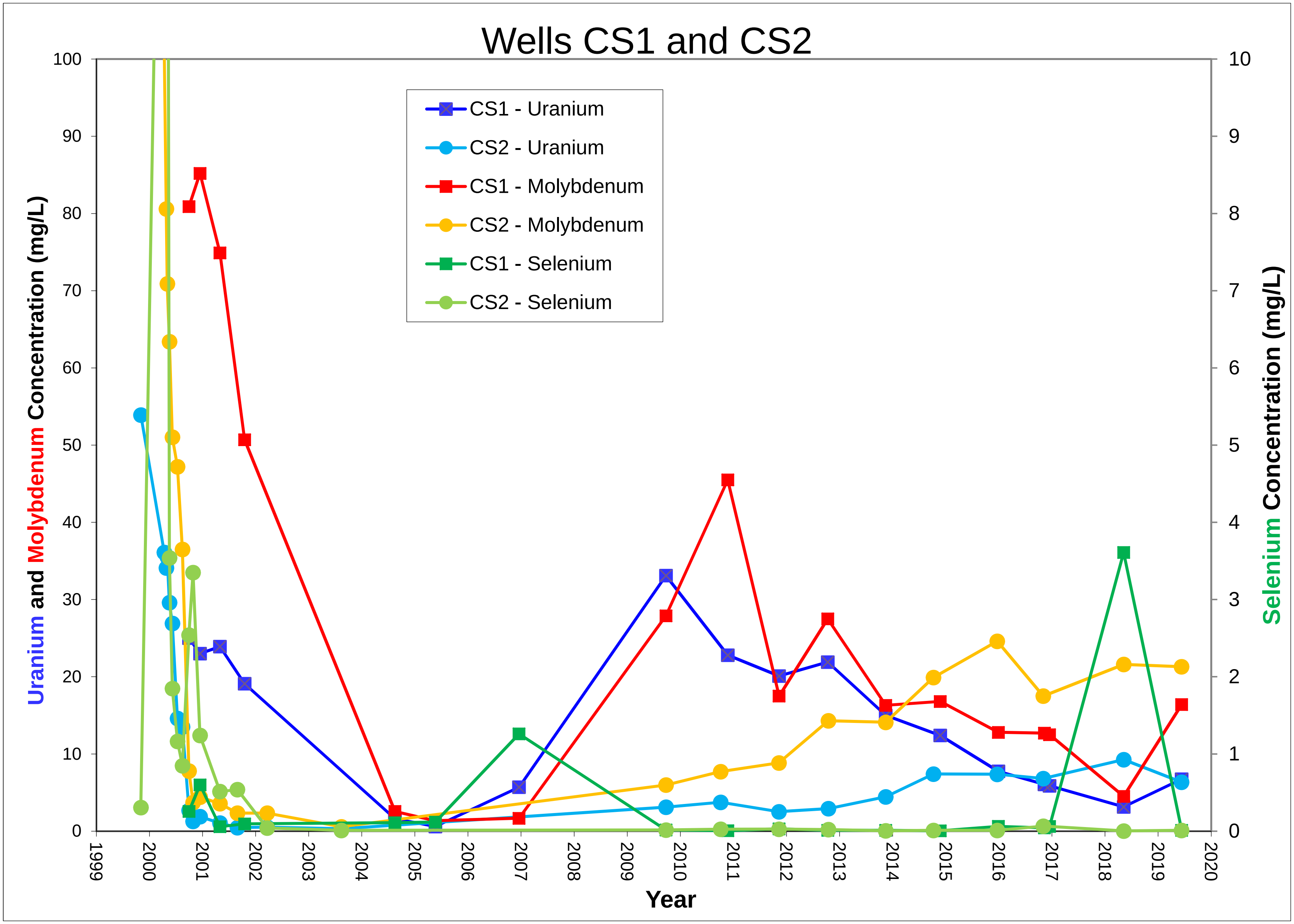


Figure 3.3-7. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells CS1 and CS2

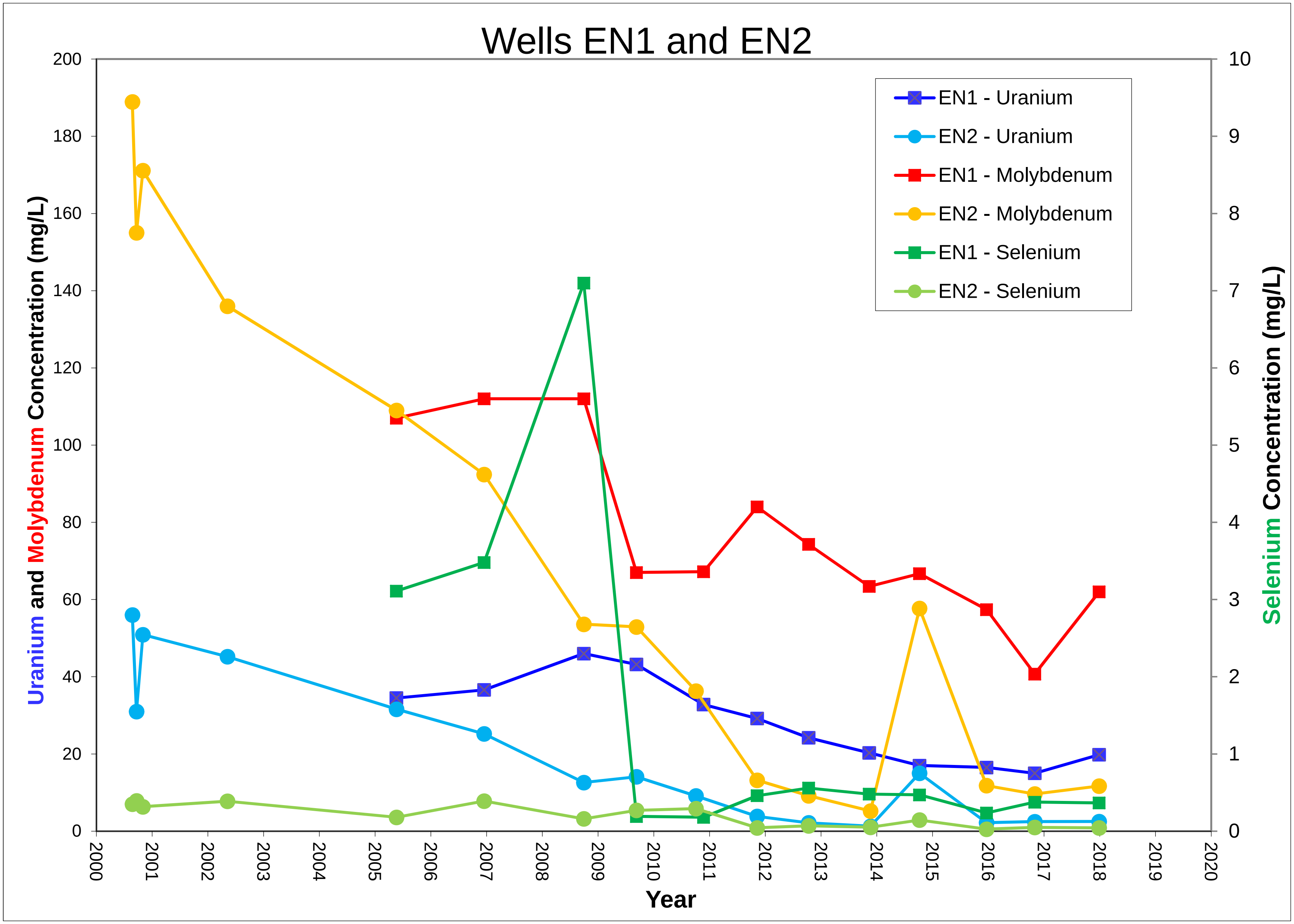


Figure 3.3-8. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells EN1 and EN2

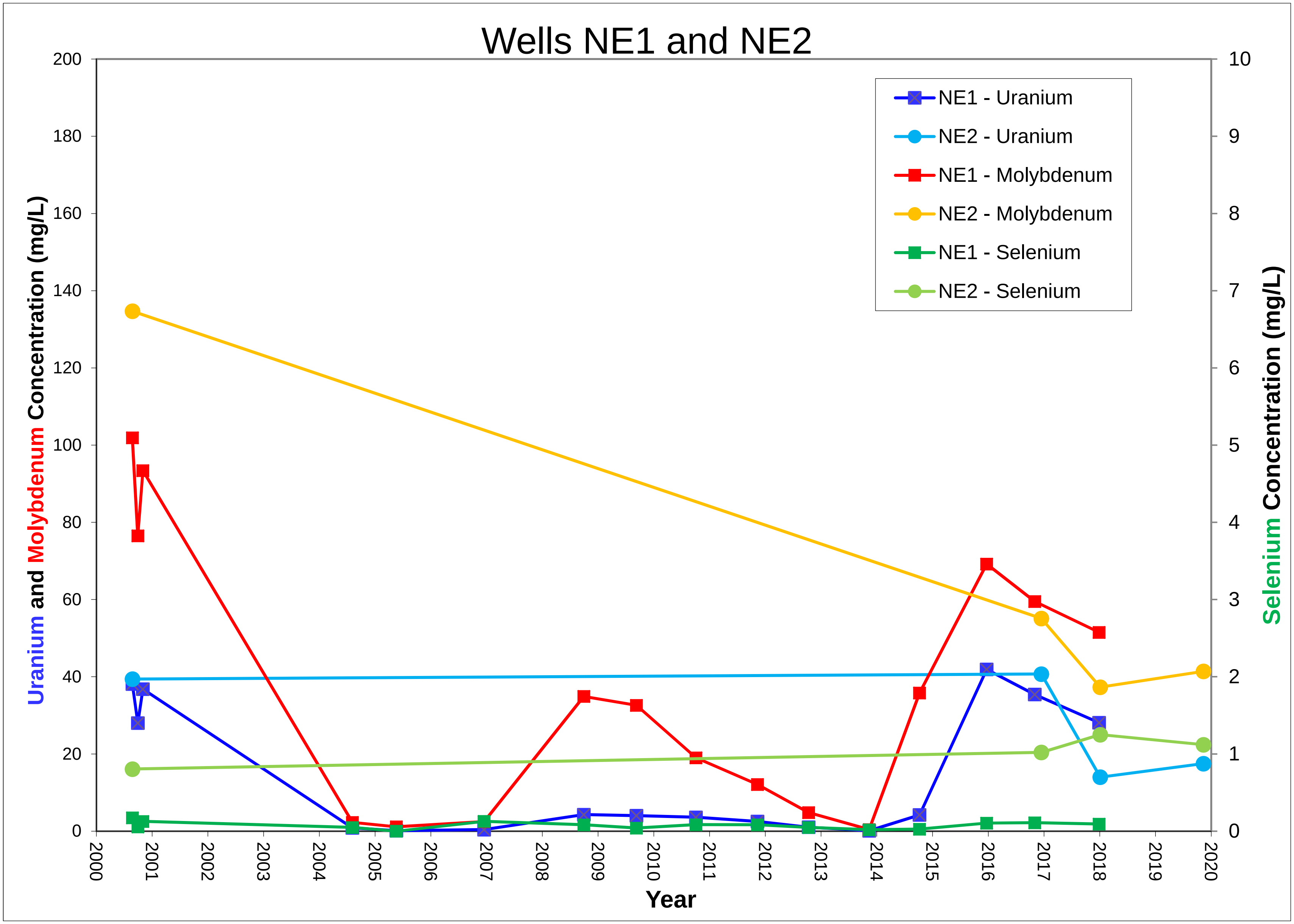


Figure 3.3-9. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells NE1 and NE2

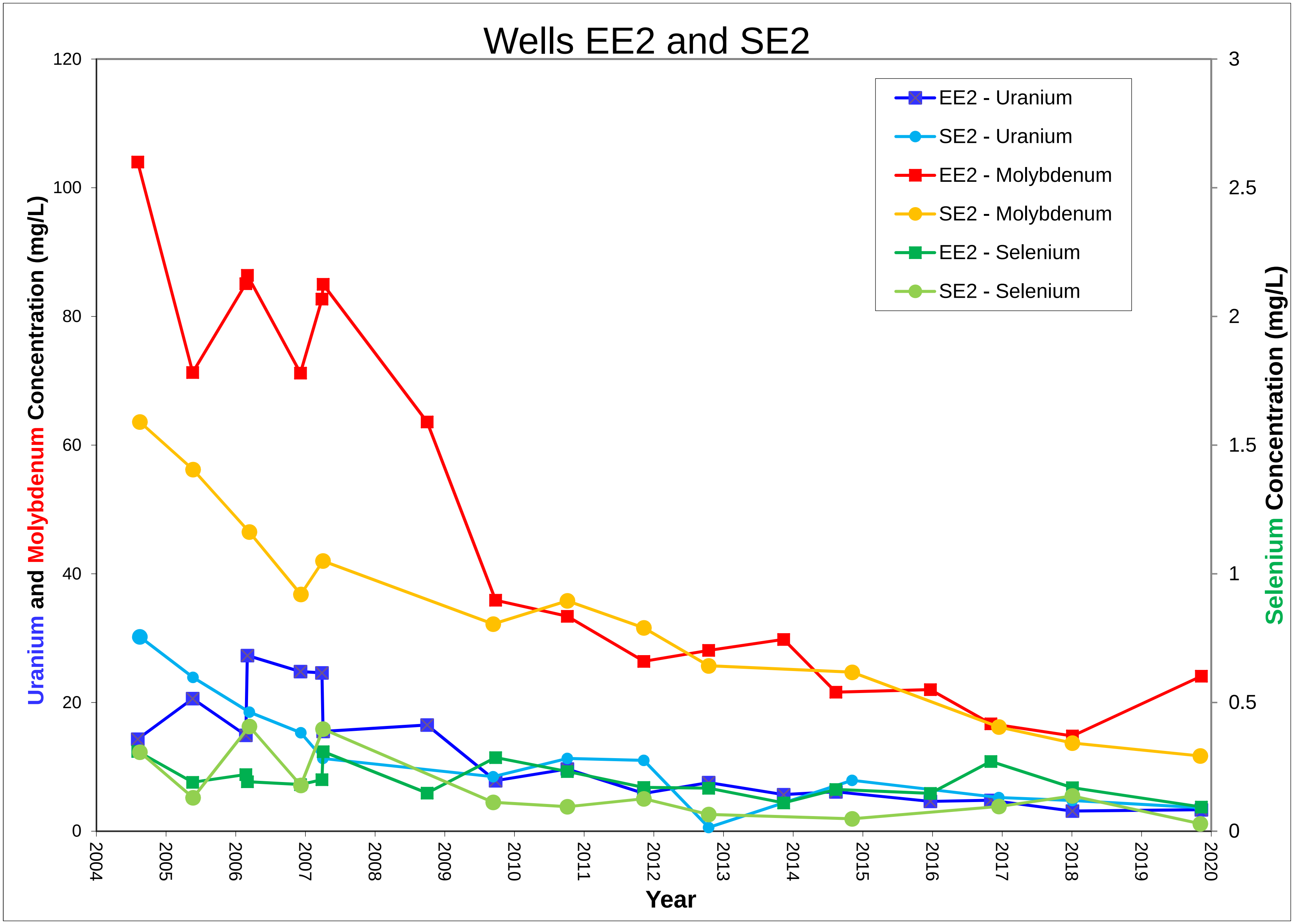


Figure 3.3-10. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells EE2 and SE2

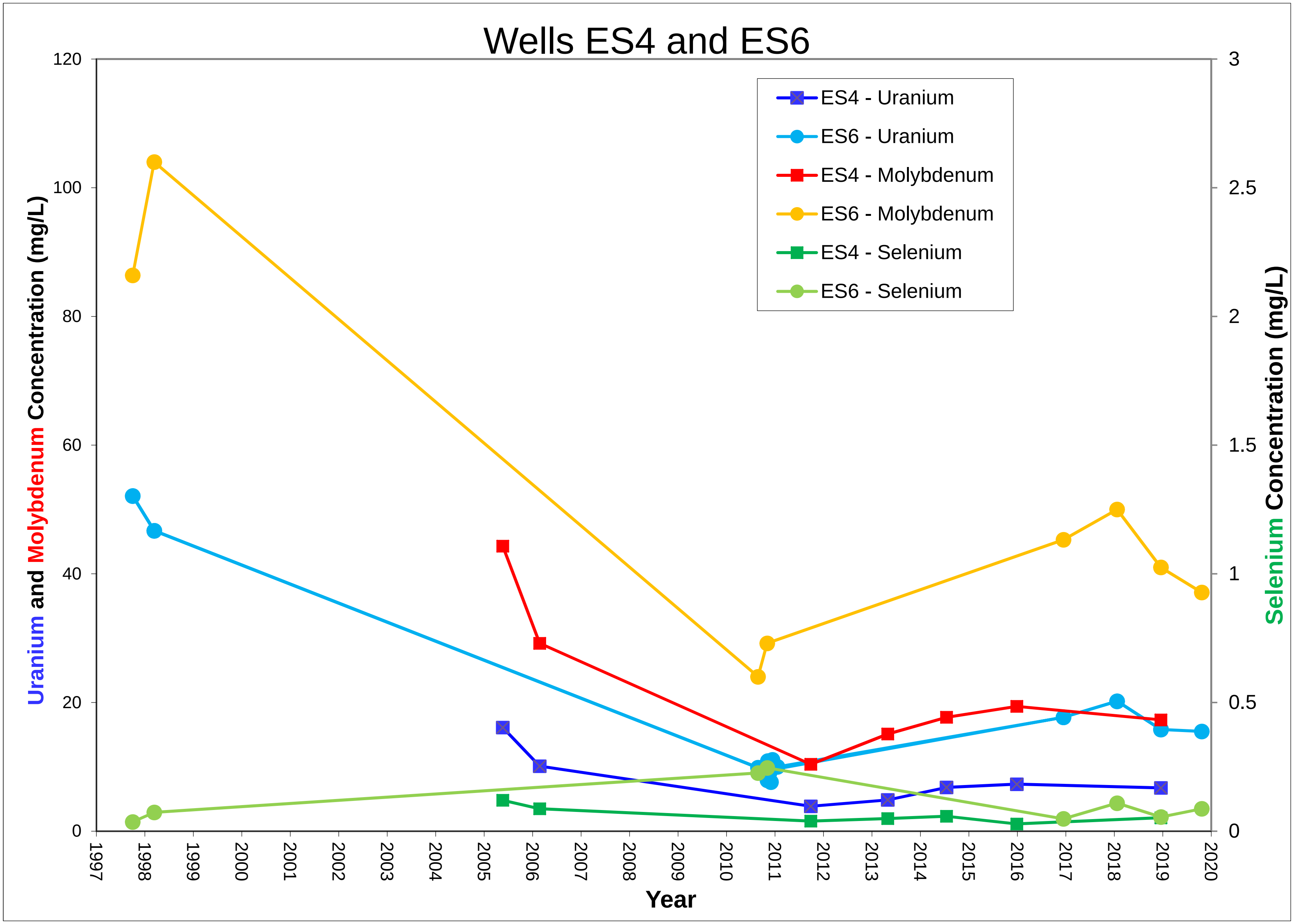


Figure 3.3-11. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells ES4 and ES6

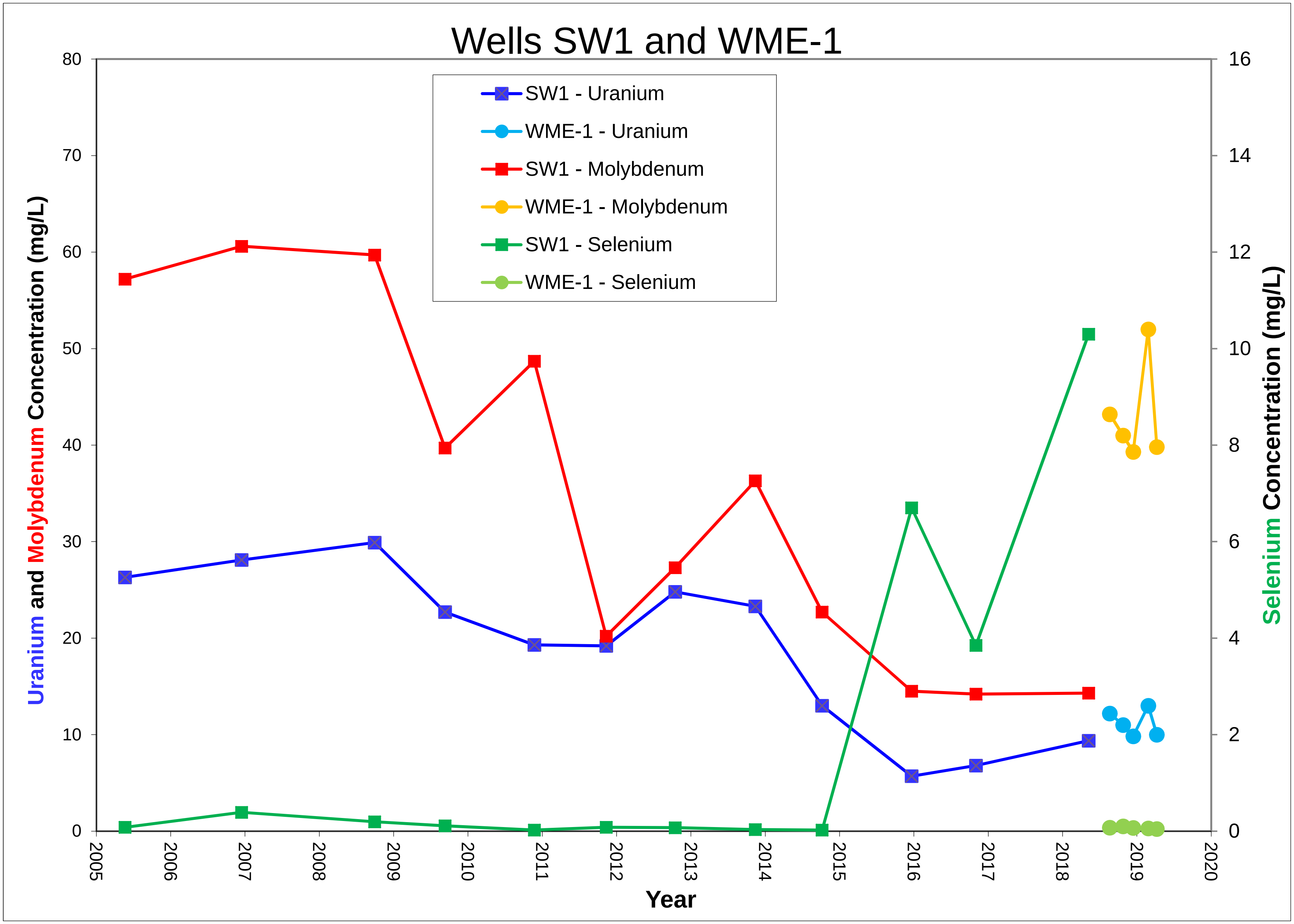


Figure 3.3-12. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells SW1 and WME-1

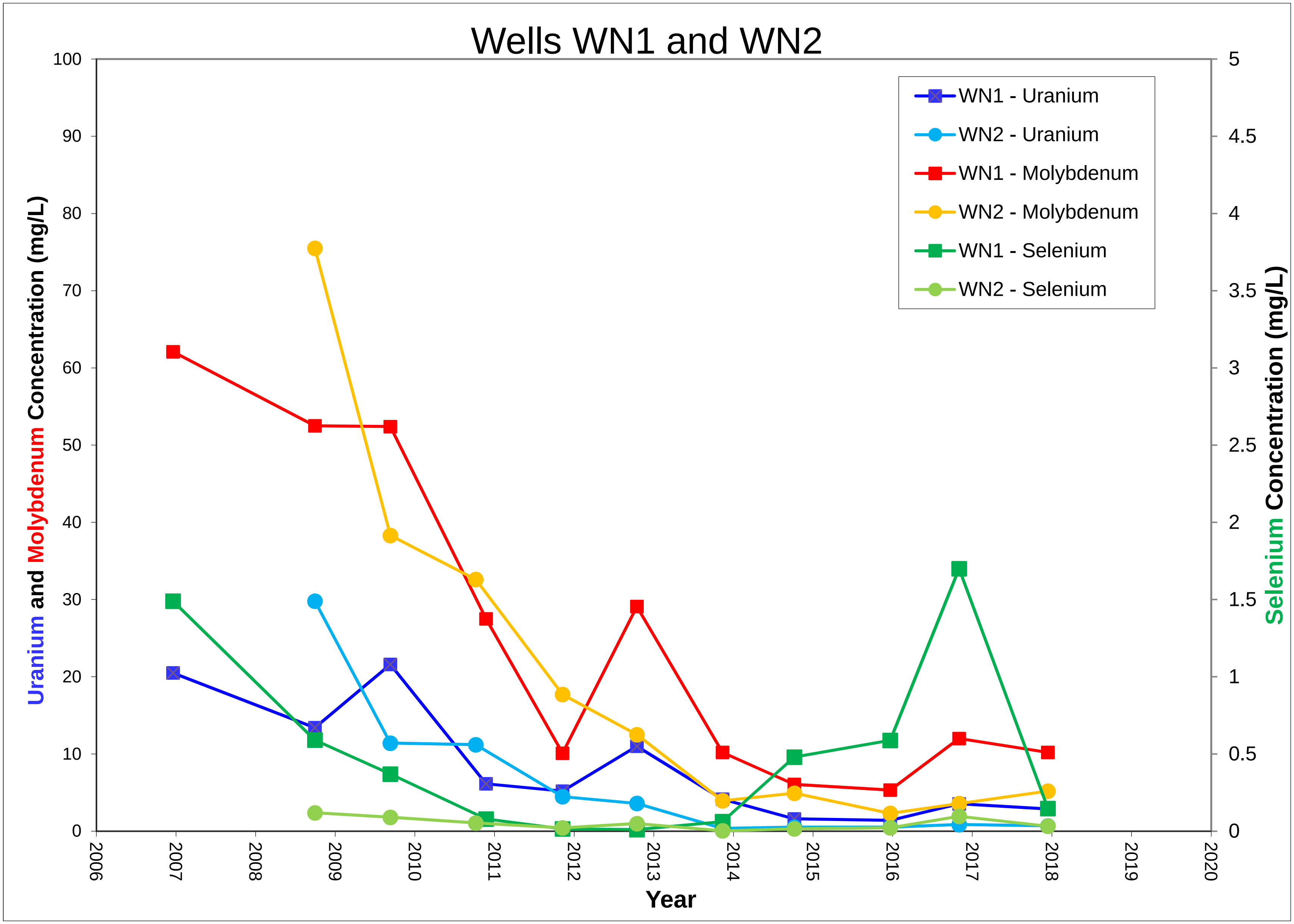


Figure 3.3-13. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WN1 and WN2

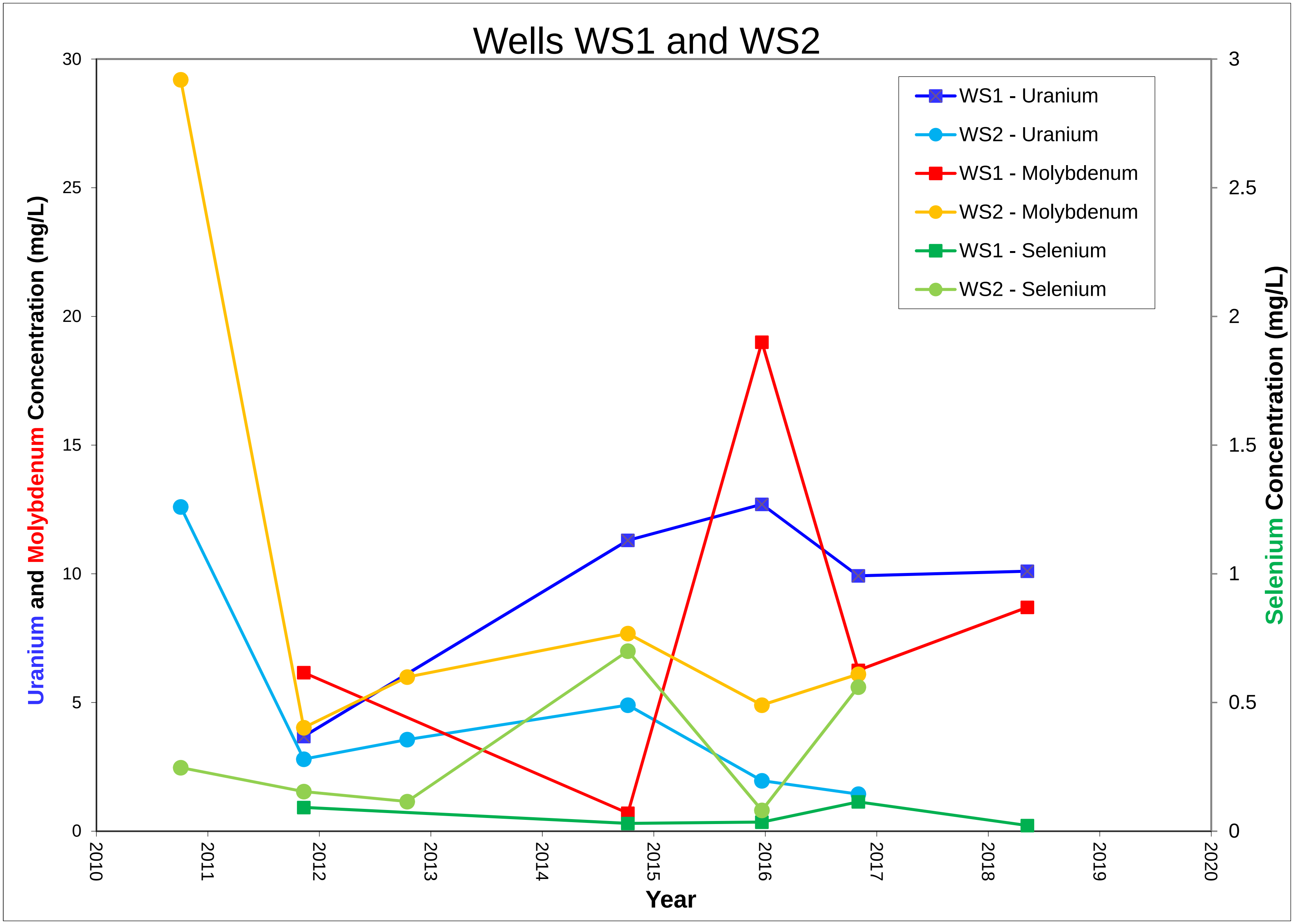


Figure 3.3-14. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WS1 and WS2

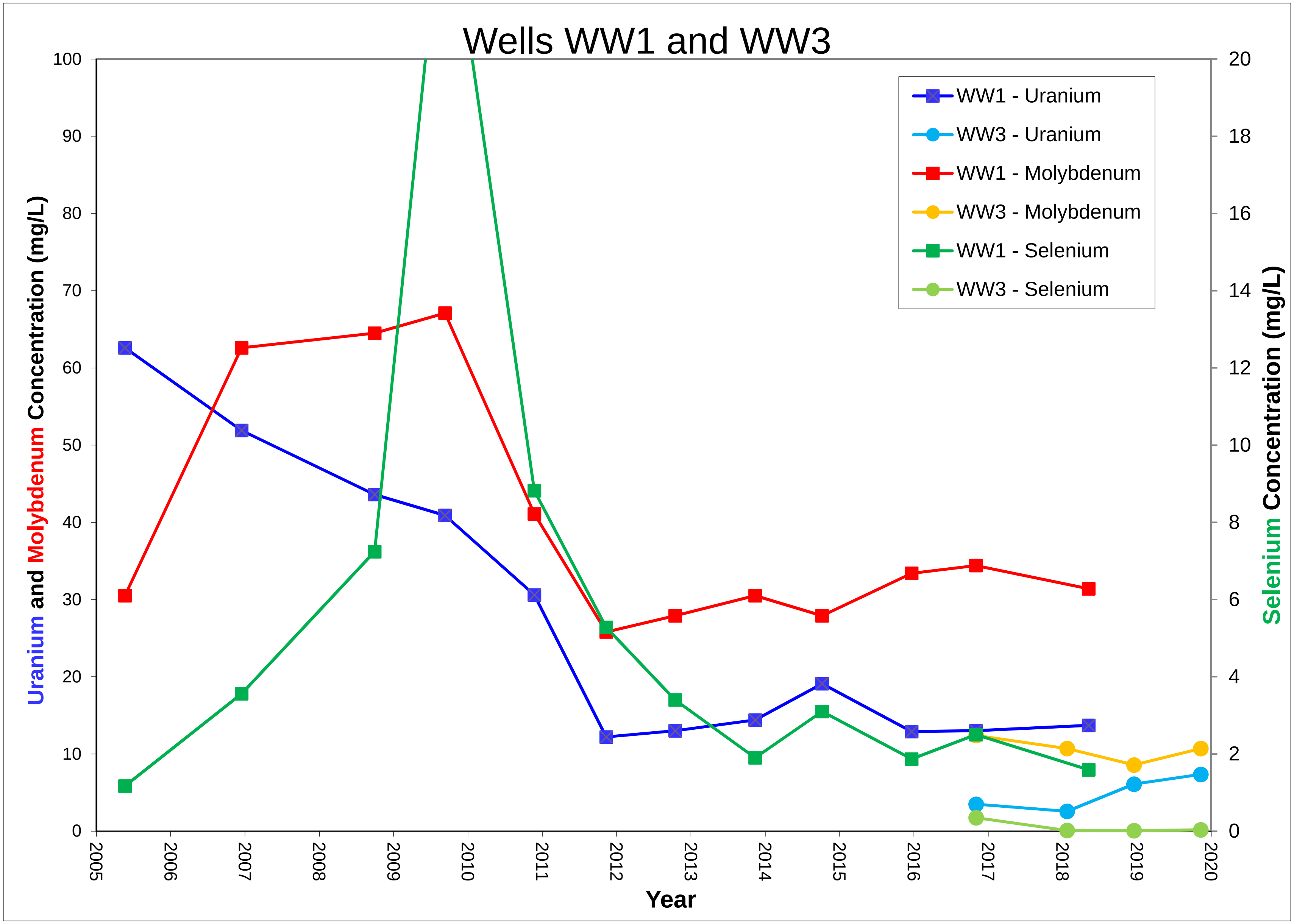


Figure 3.3-15. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WW1 and WW3

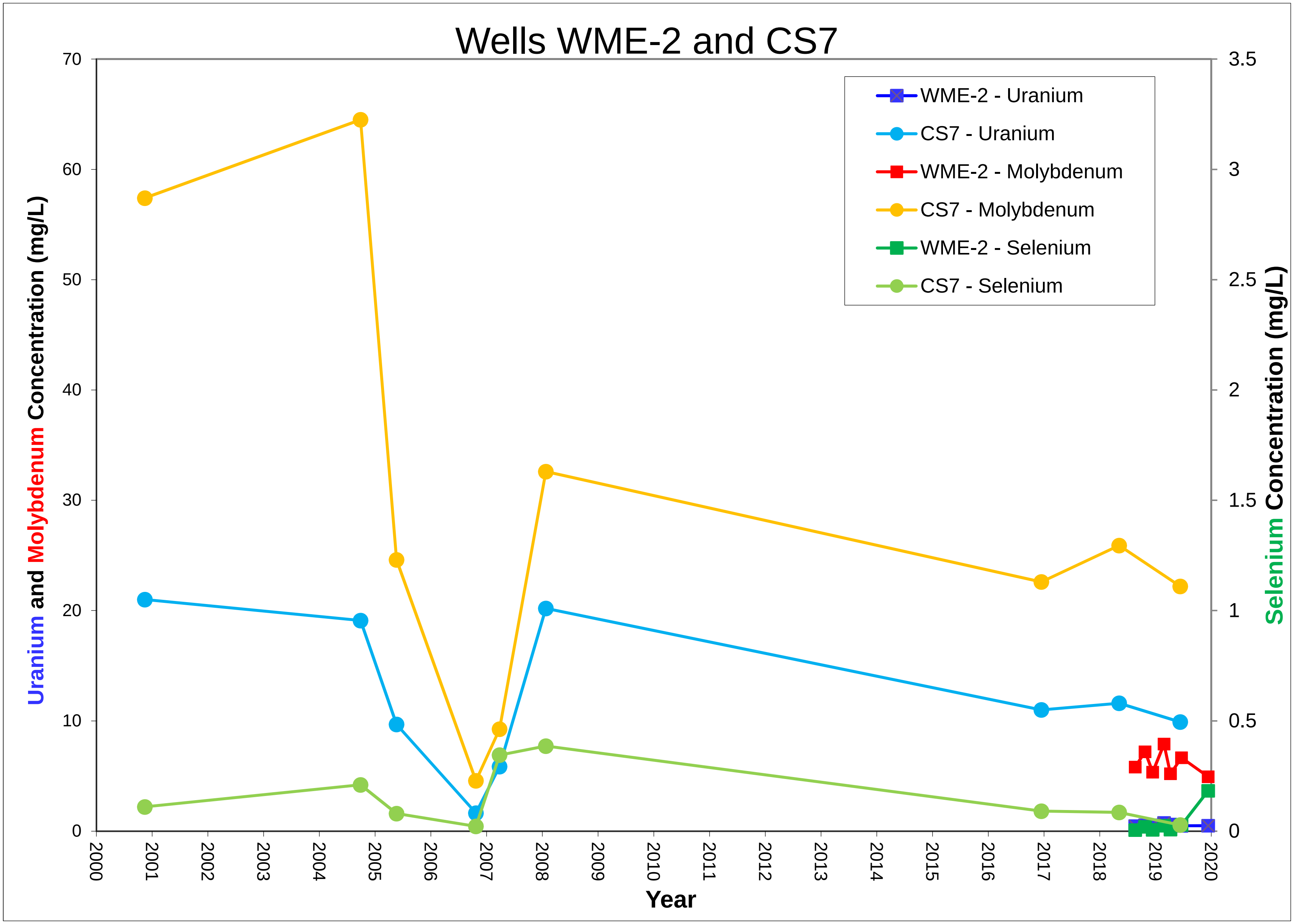


Figure 3.3-16. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WME-2 and CS7

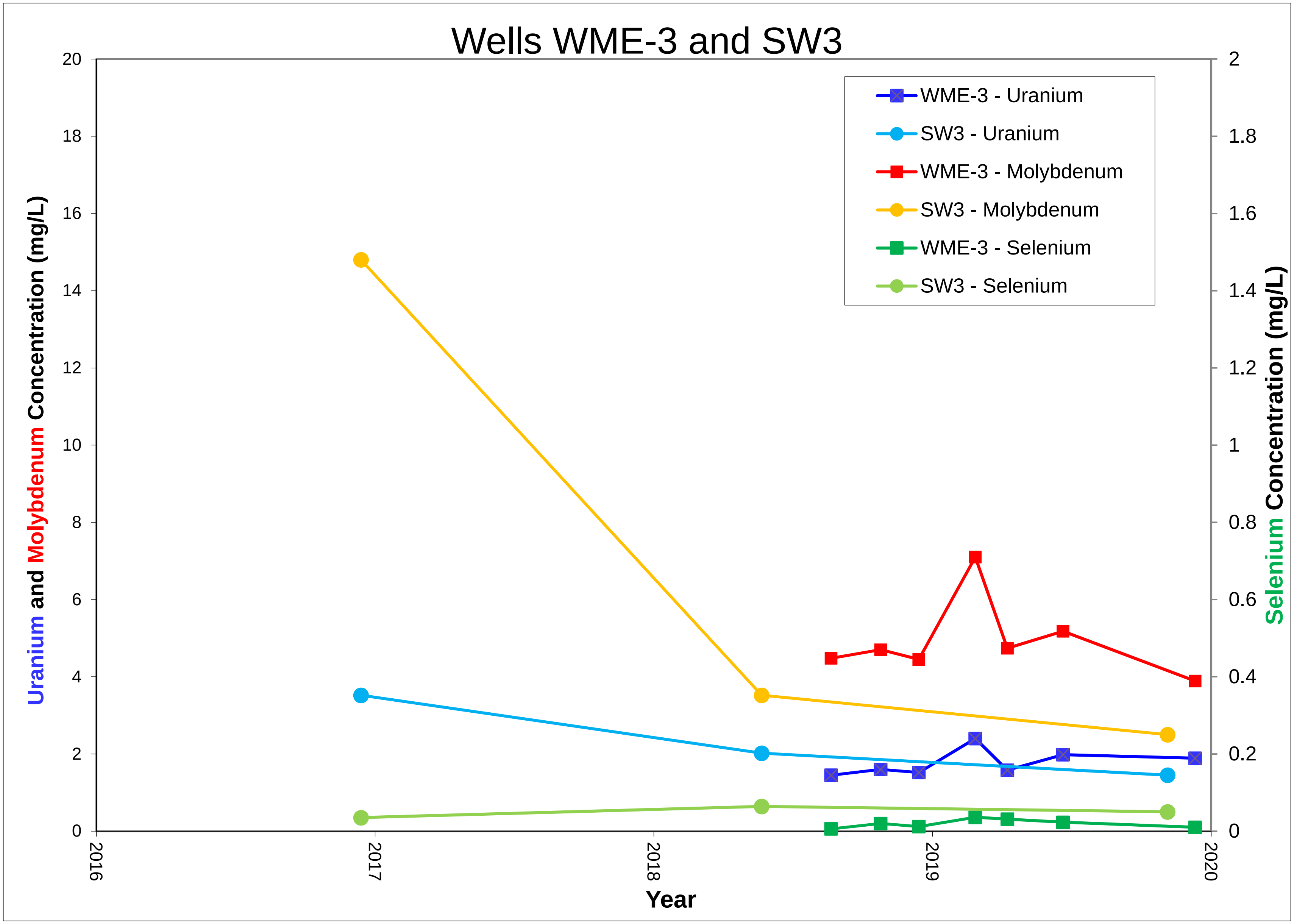


Figure 3.3-17. Uranium, Molybdenum and Selenium Concentrations for Sand Tailings Wells WME-3 and SW3

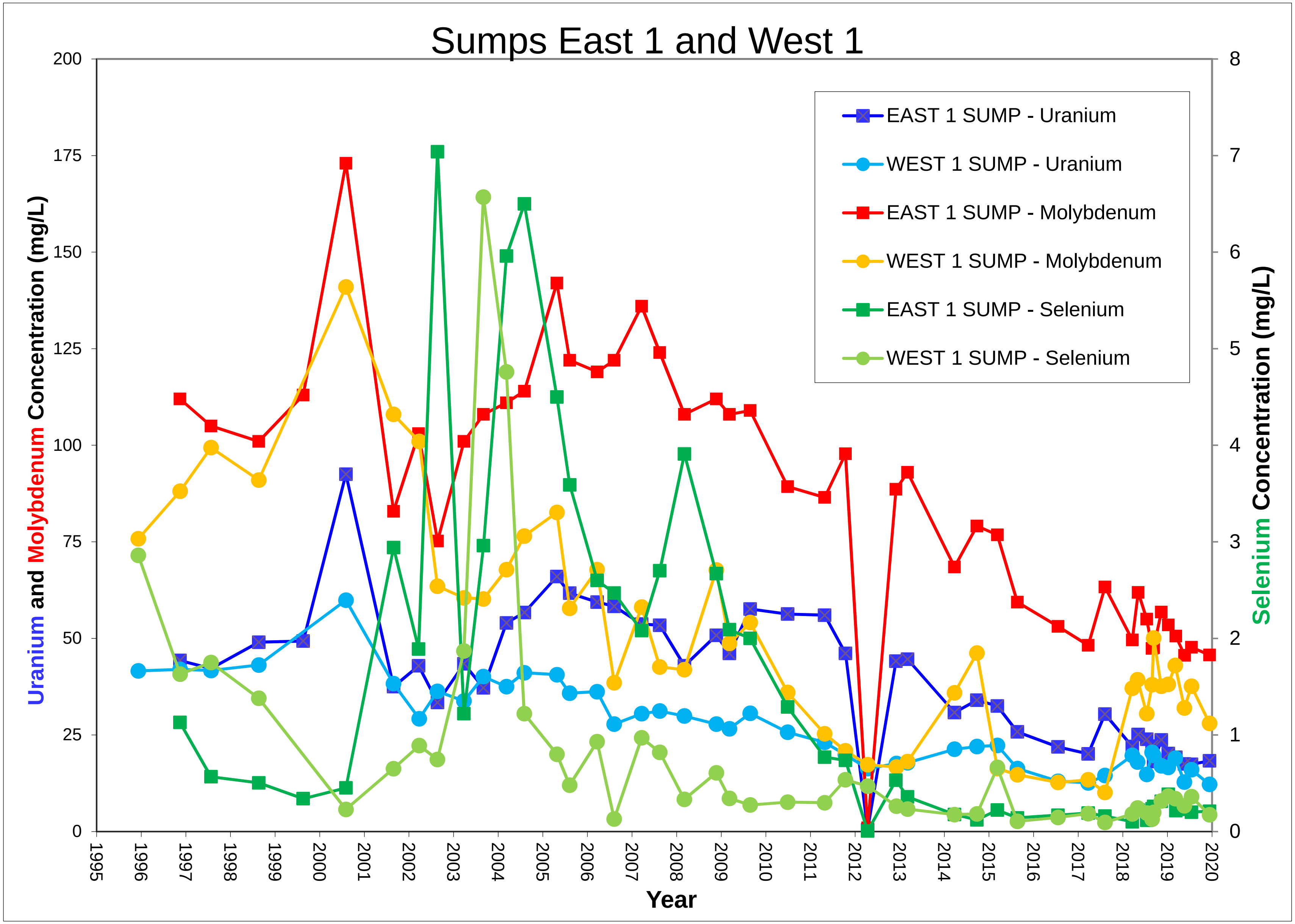


Figure 3.3-18. Uranium, Molybdenum and Selenium Concentrations for East 1 and West 1 Sumps

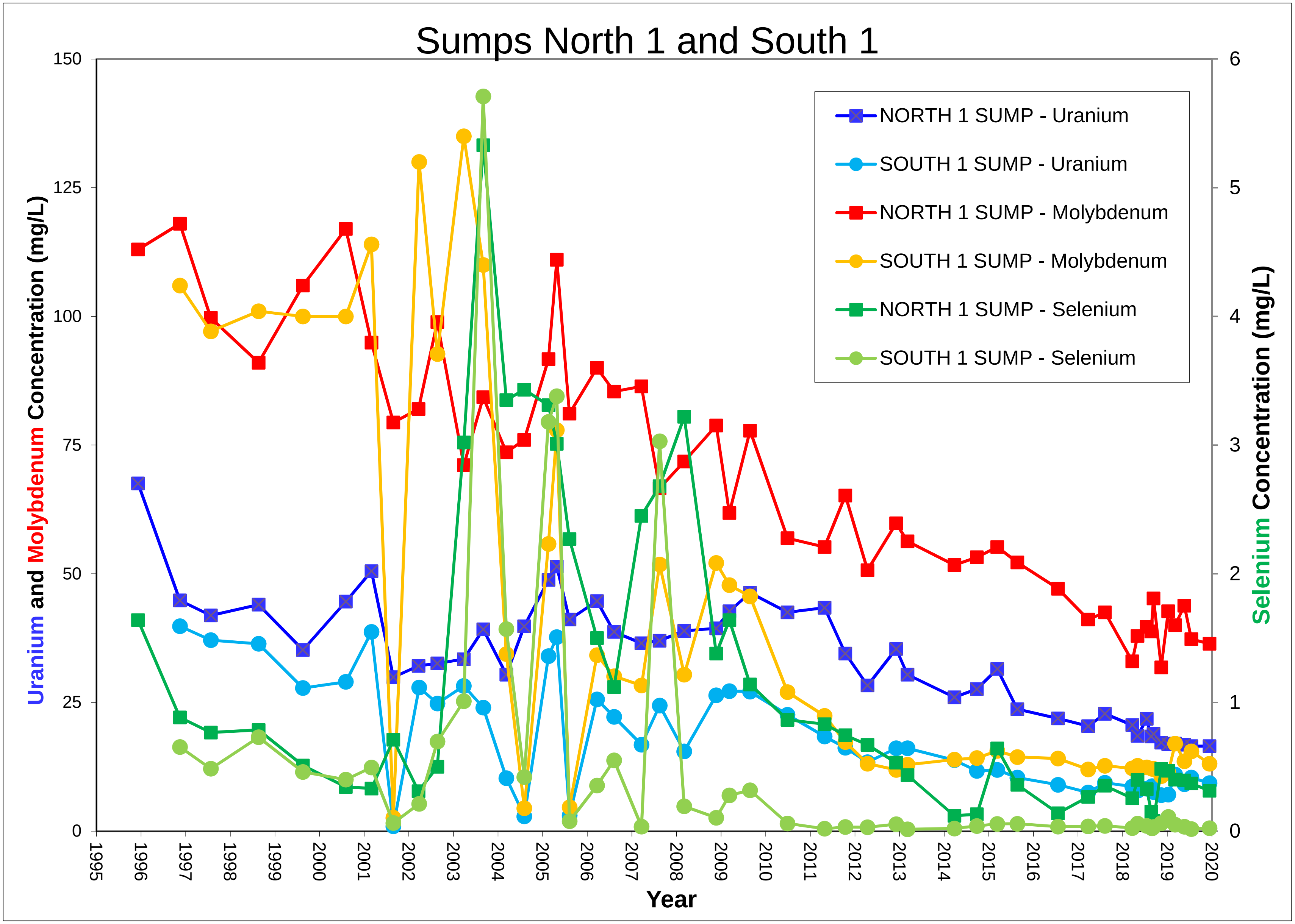


Figure 3.3-19. Uranium, Molybdenum and Selenium Concentrations for North 1 and South 1 Sumps

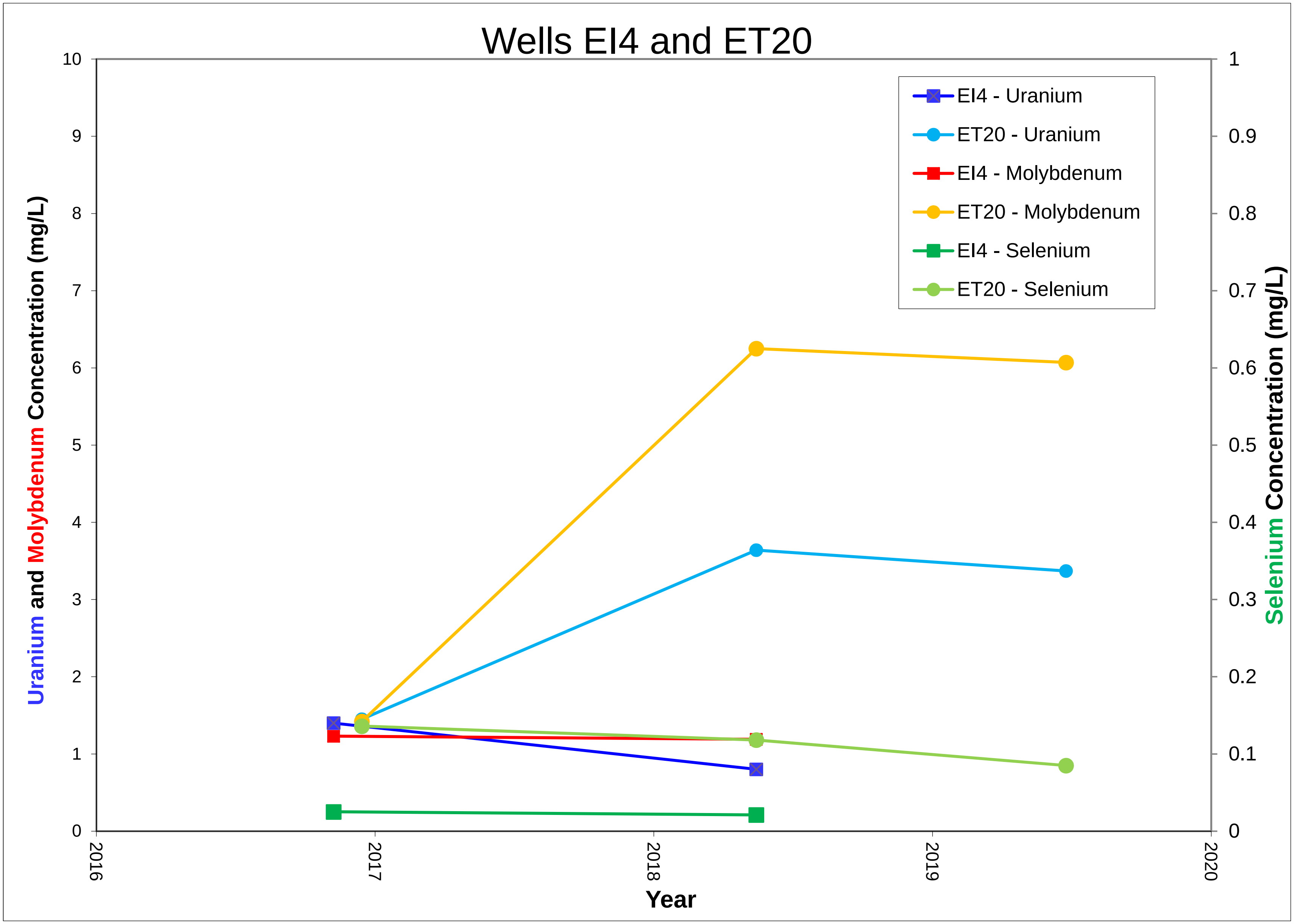


Figure 3.3-20. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells EI4 and ET20

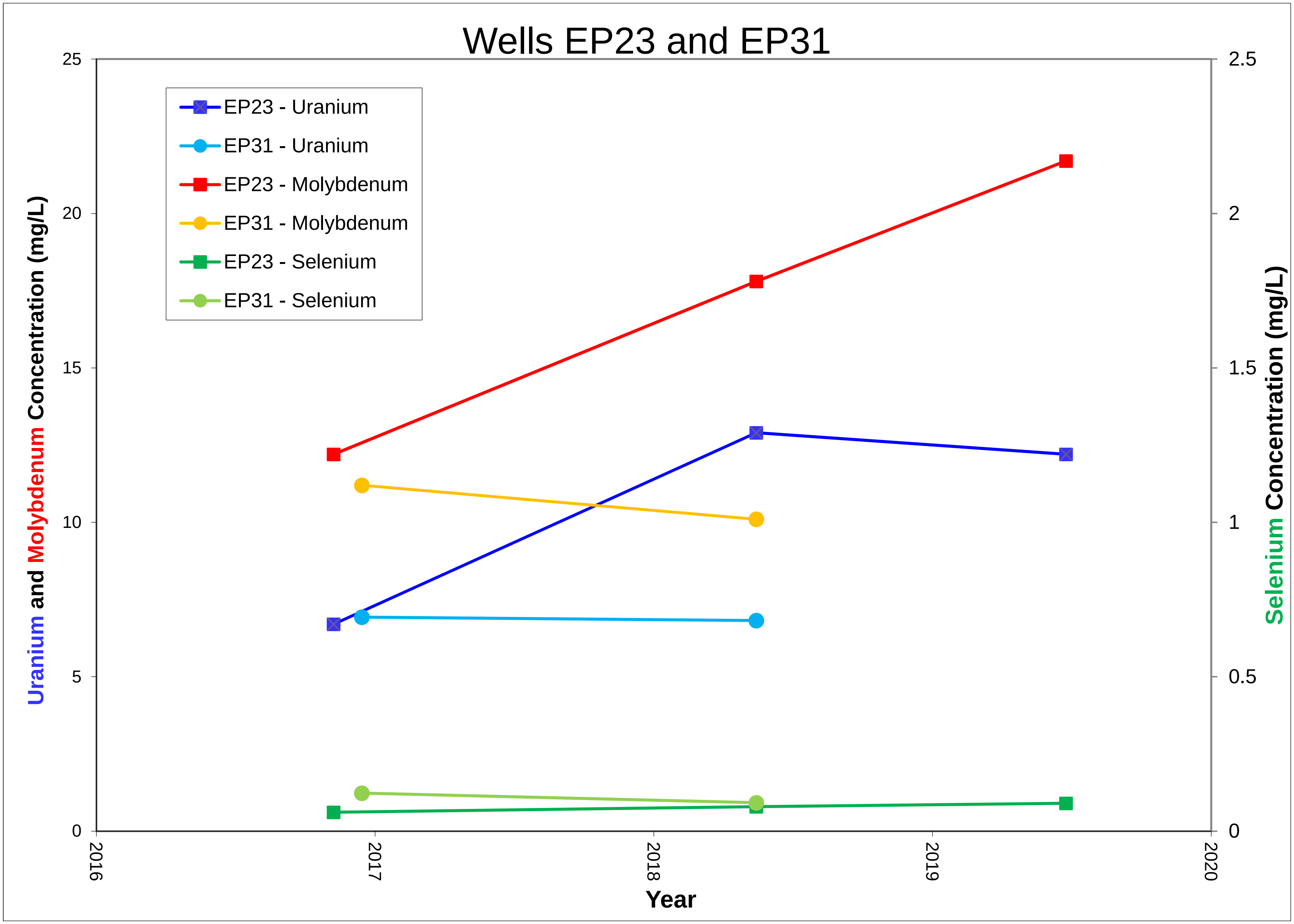


Figure 3.3-21. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells EP23 and EP31

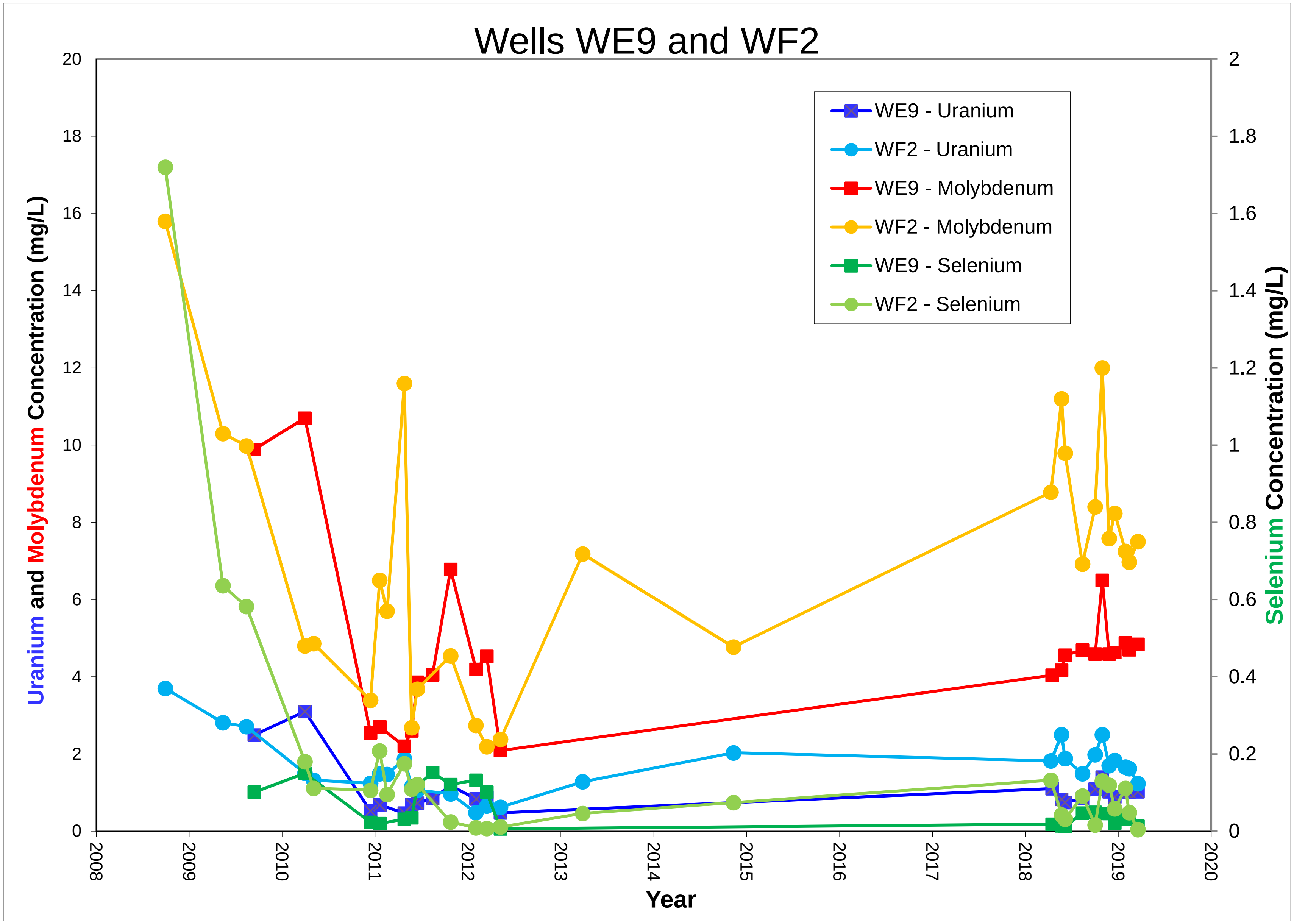


Figure 3.3-22. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WE9 and WF2

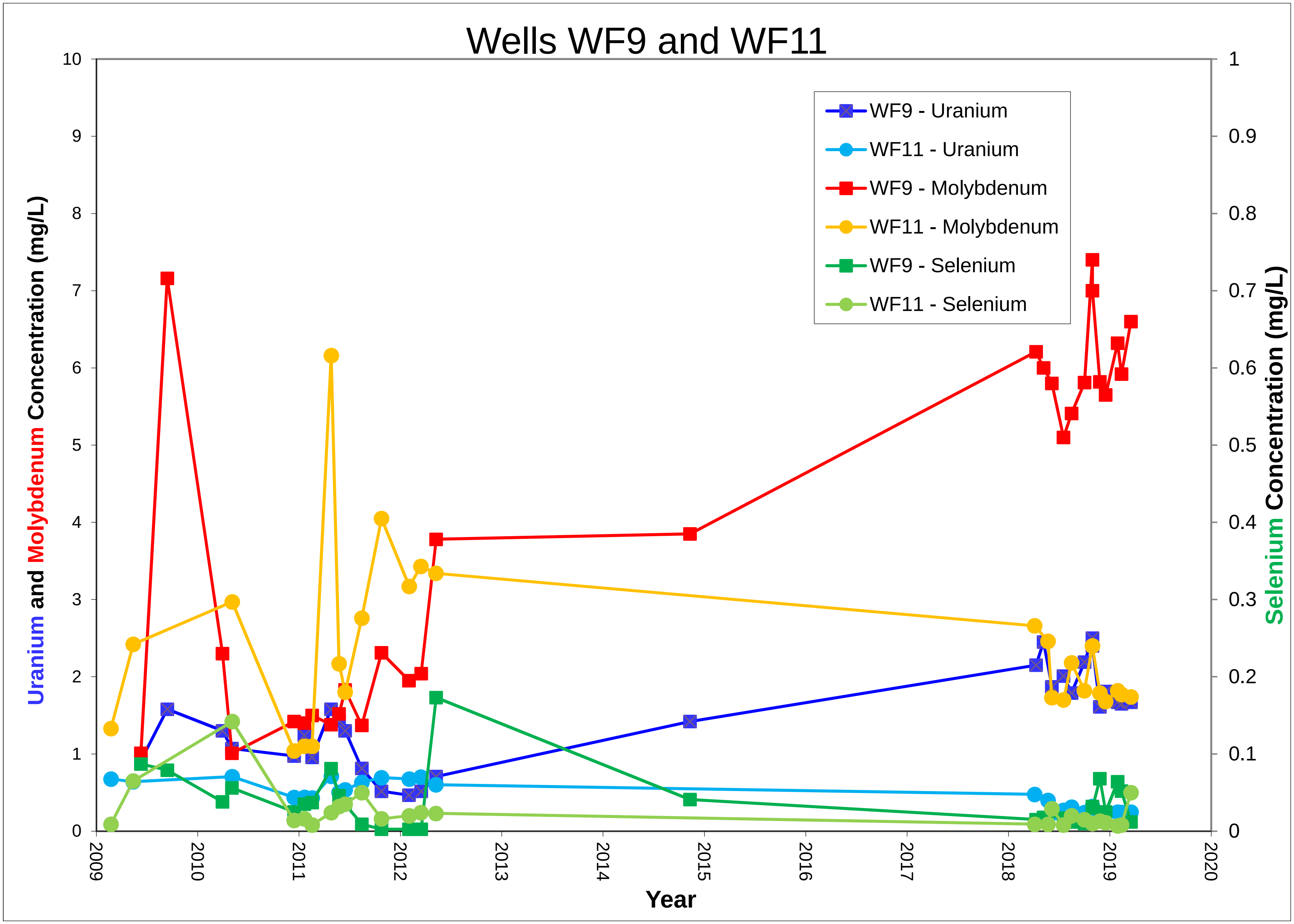


Figure 3.3-23. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WF9 and WF11

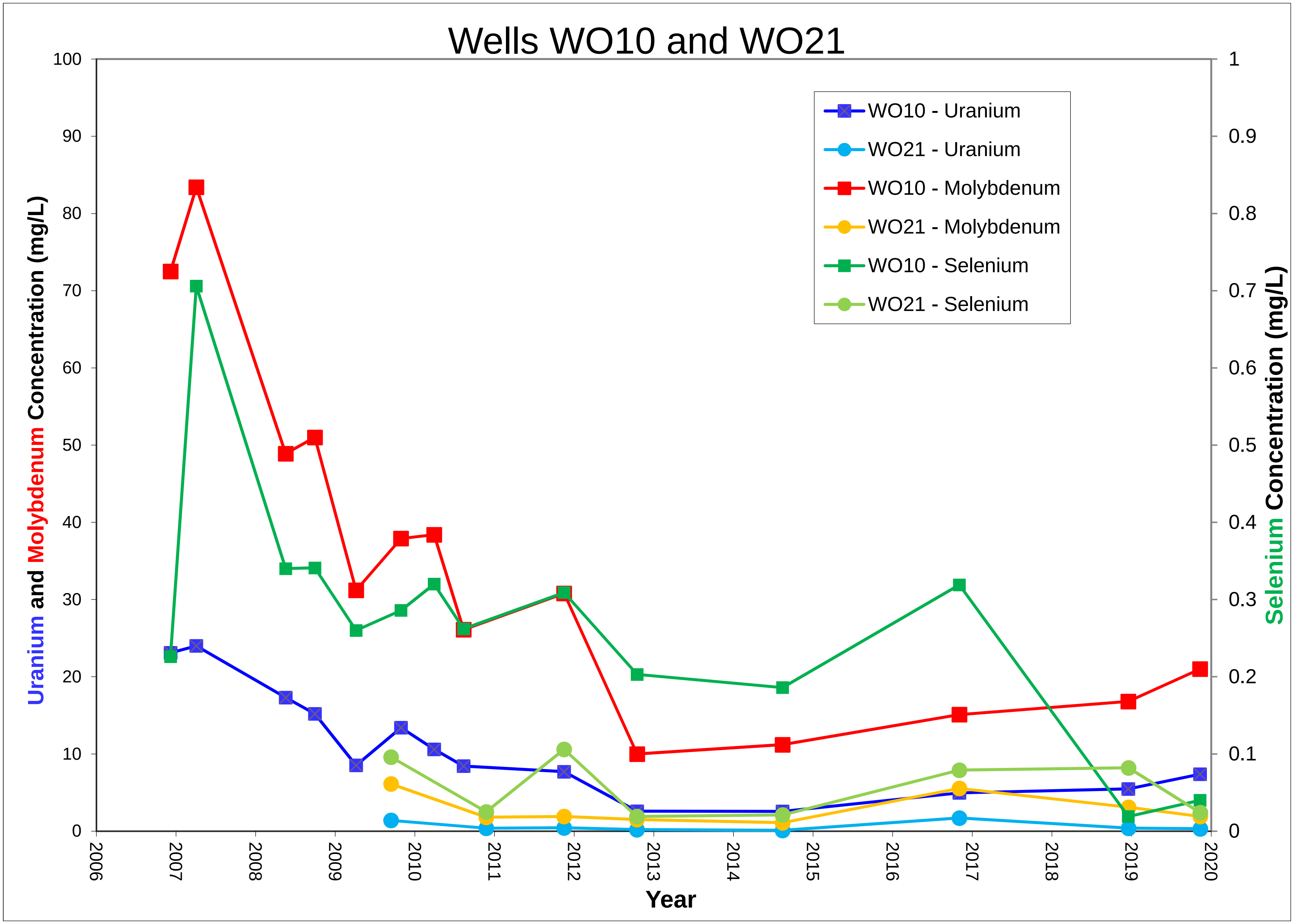


Figure 3.3-24. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WO10 and WO21

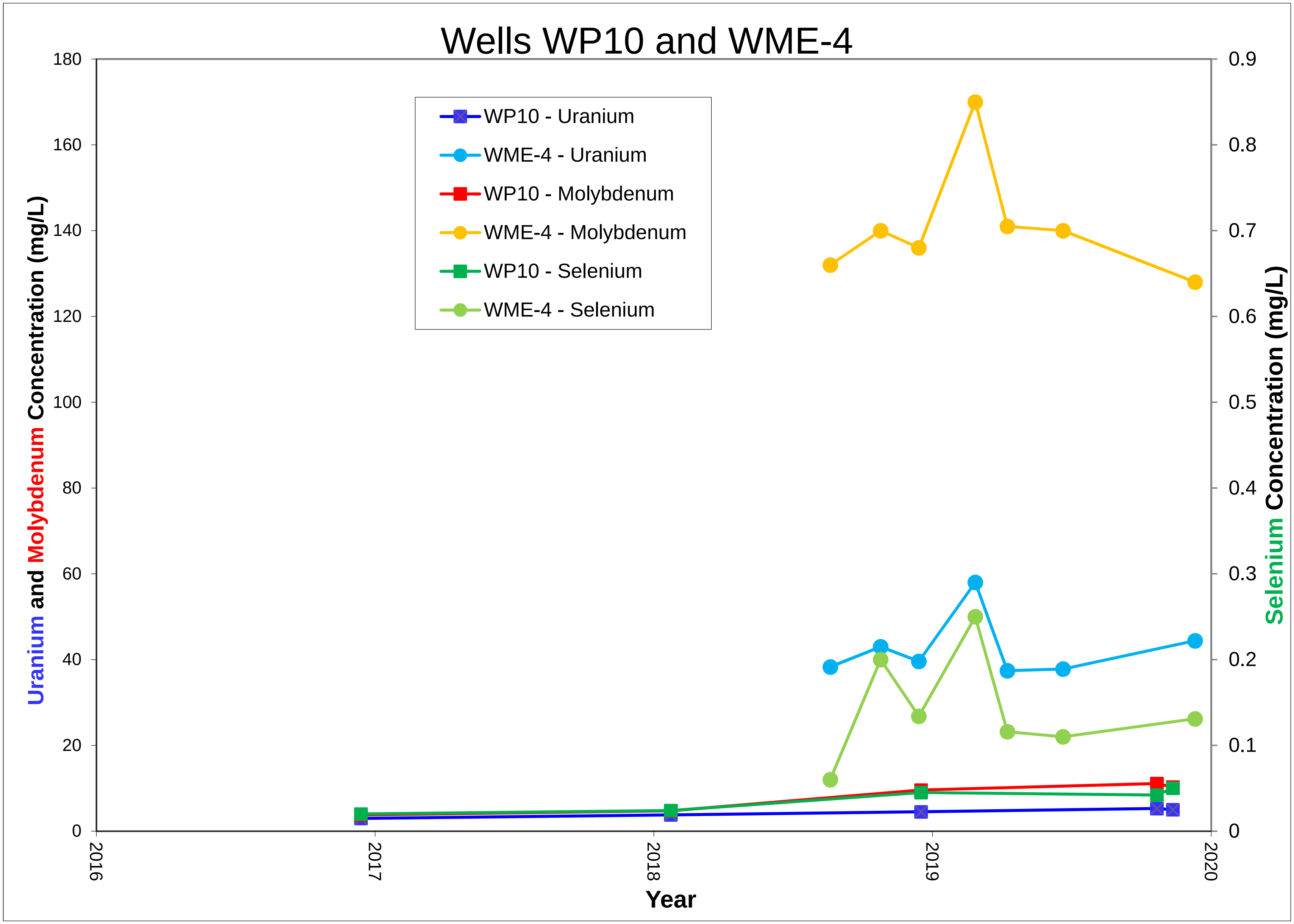


Figure 3.3-25. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WP10 and WME-4

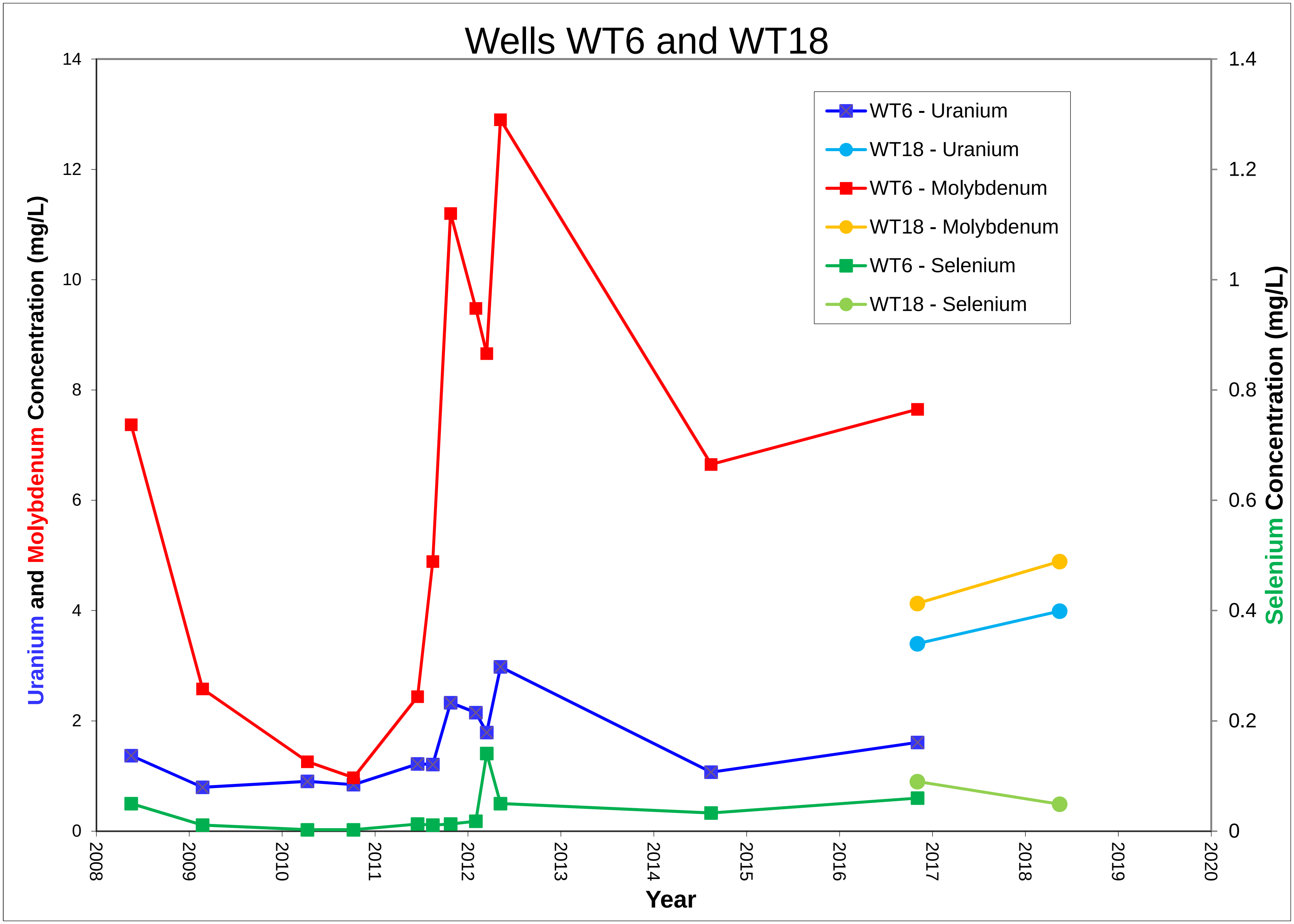


Figure 3.3-26. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WT6 and WT18

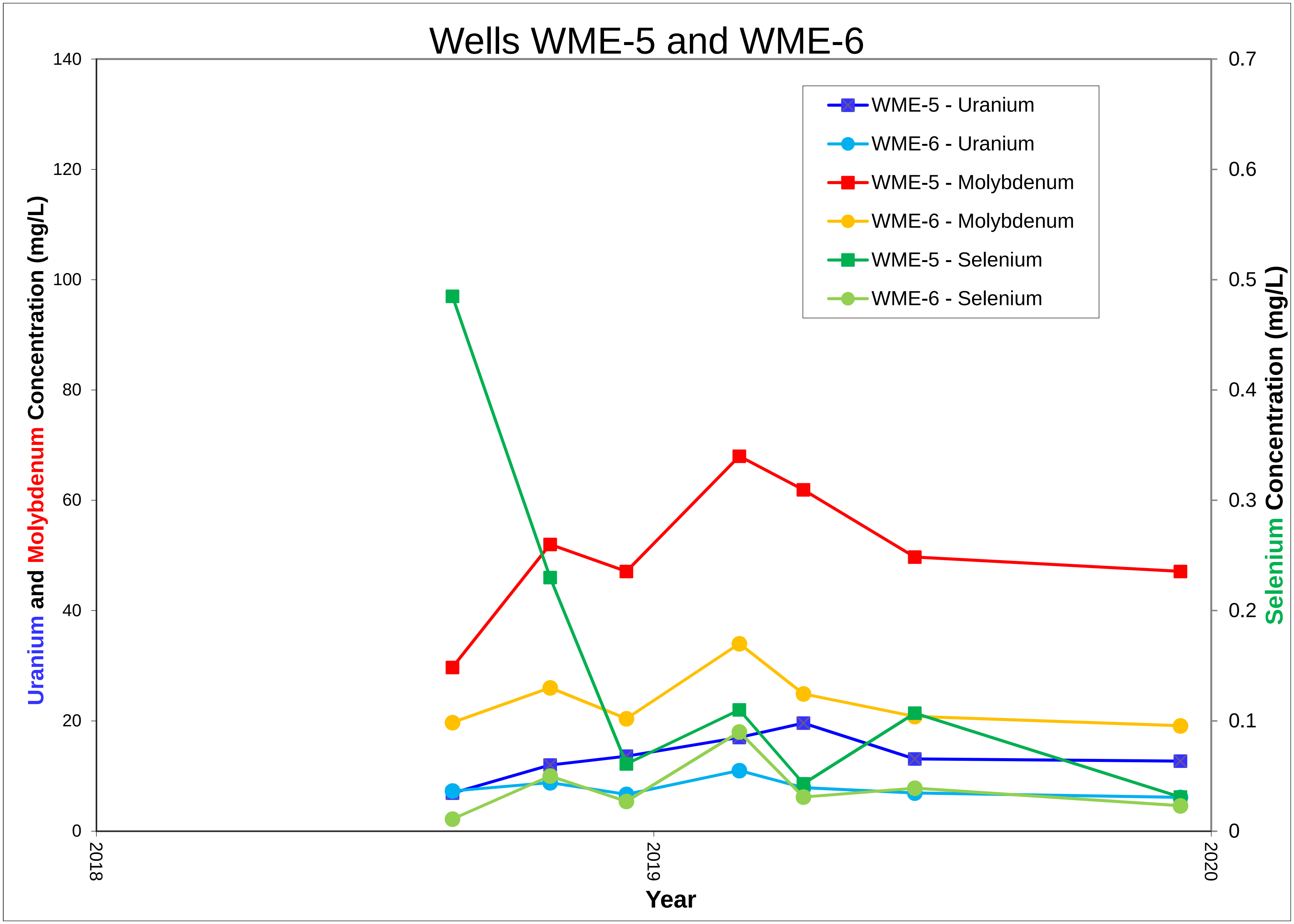


Figure 3.3-27. Uranium, Molybdenum and Selenium Concentrations for Slime Tailings Wells WME-5 and WME-6

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

Area	Saturated Volume (cubic feet)	Drainable 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
2019								
Sand	51,301,159	53,722,574	375,095,530	7.31	887,410,054	17.30	6,807,448	0.13
Slimes	74,614,665	44,649,416	274,488,652	3.68	743,999,446	9.97	3,822,215	0.05
Total	125,915,824	98,371,989	649,584,182	5.16	1,631,409,500	12.96	10,629,663	0.08

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TABLES

4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2019 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

Ten new alluvial wells were drilled and no new additional infiltration lines were installed during 2019. Alluvial wells BK1c, BK1f, BK2c, BK2f, Q51 and WME-18 through WME-22 were added in 2019. 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 2019. 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 2019. 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 up-gradient 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 2019. Figure 4.1-1B shows that South collection alluvial wells 490, 866, 869, Q2, Q3, Q5, Q11, Q28, R2, R3, R4, R5, R10, R18 and R22 were pumped in 2019. Figure 4.1-1C shows that North collection alluvial wells 634, 659, 890, H1, H2A, H12, H16, H17 and H24 were pumped in 2019. This water was pumped to the zeolite for treatment during 2019 but collection rate was limited due to the restrictions on water discharged to the evaporation ponds. 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.

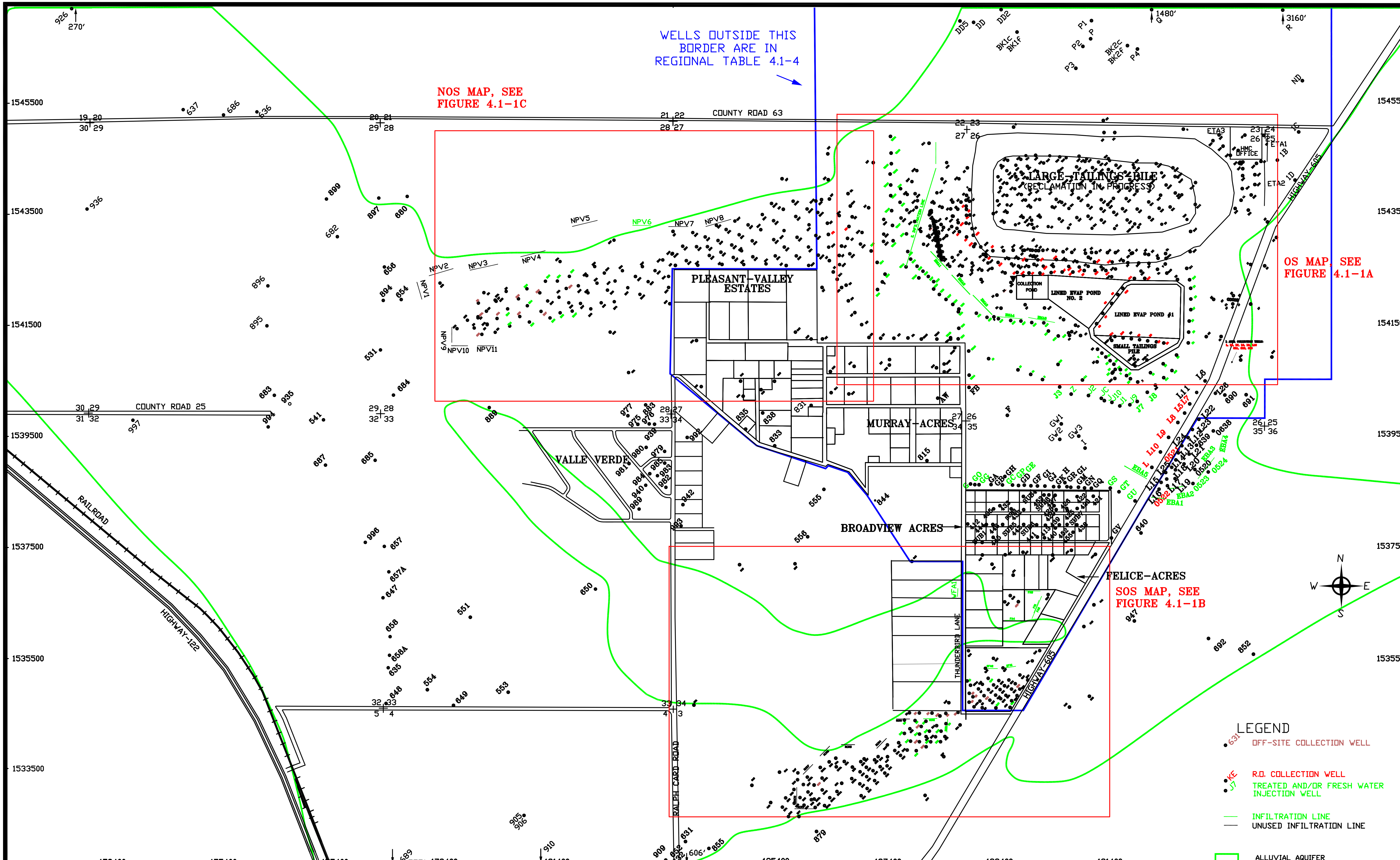
Table 4.1-2 presents the same type of basic well data for alluvial wells in the Broadview and Felice Acres subdivisions. These two subdivisions are located just south of the Homestake property. Figure 4.1-1 shows the locations of the subdivision wells. Table 4.1-3 presents similar basic data for alluvial 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 mapping of the base of the alluvium was adjusted in the area near the northeast corner of the LTP due to additional drilling in this area.

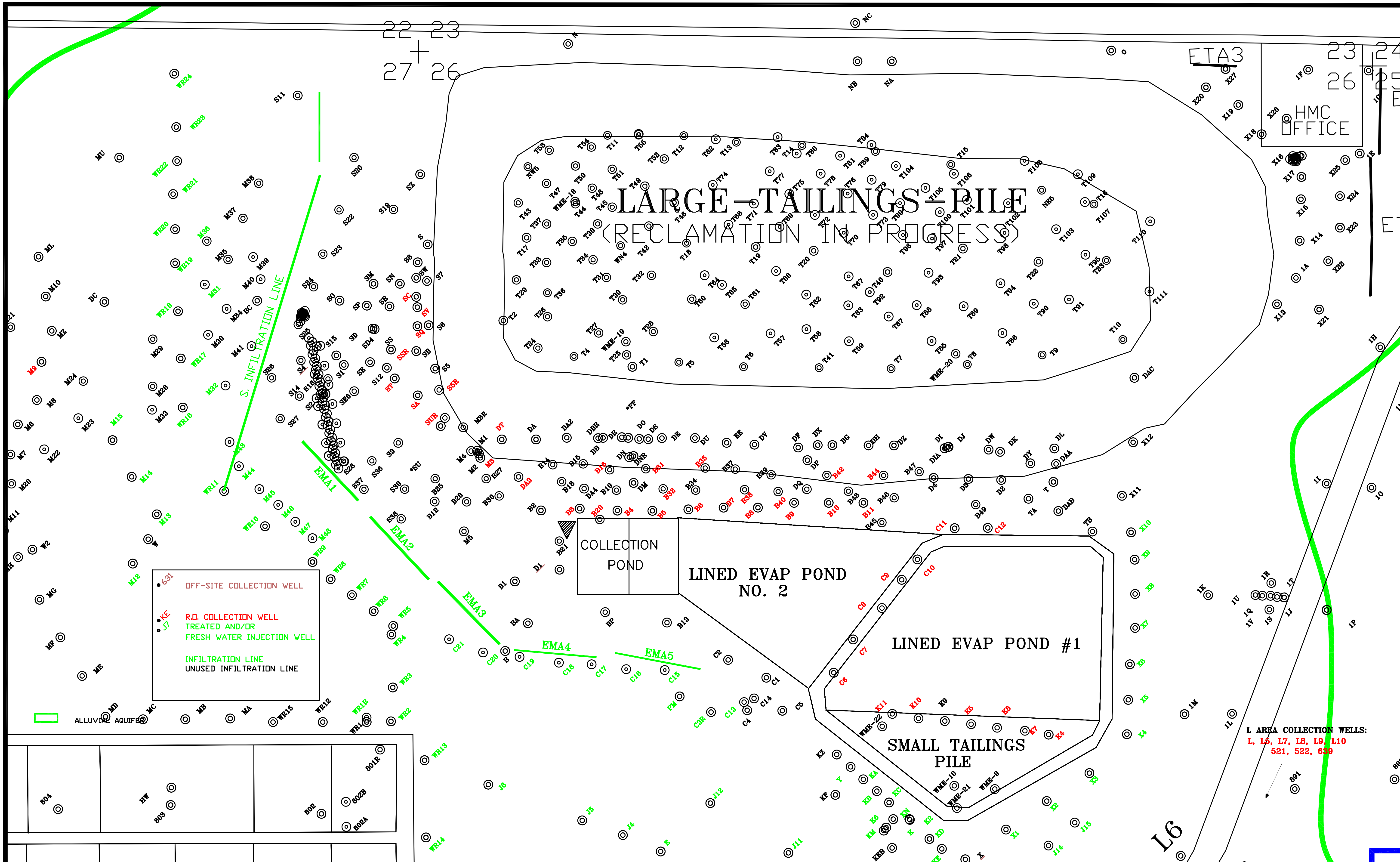
The green line in Figures 4.1-1 and 4.1-2 shows the limits of the alluvial aquifer with alluvial saturation existing inside these limits where the base of the alluvium is lower. The 2014 alluvial water level elevation was used in drawing the aquifer limits. The aquifer limits were updated with the 2014 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 results in the western limit of the alluvial aquifer as shown on the west side of this figure. The alluvial aquifer extends to the south of this figure in Sections 4 and 5.



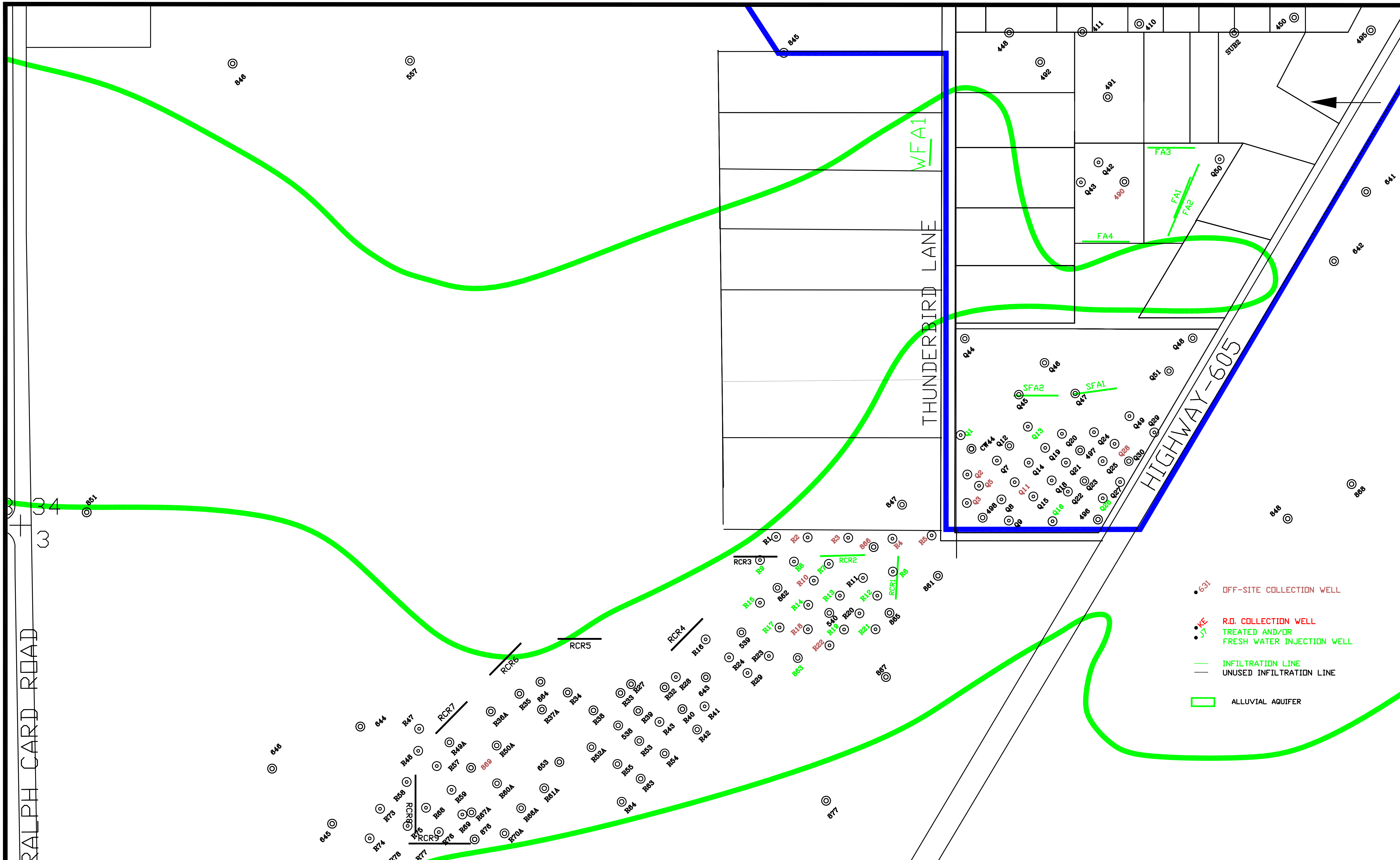
SCALE: 1"=1600'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/17/2020

FIGURE 4.1-1 ALLUVIAL WELL LOCATIONS, 2019



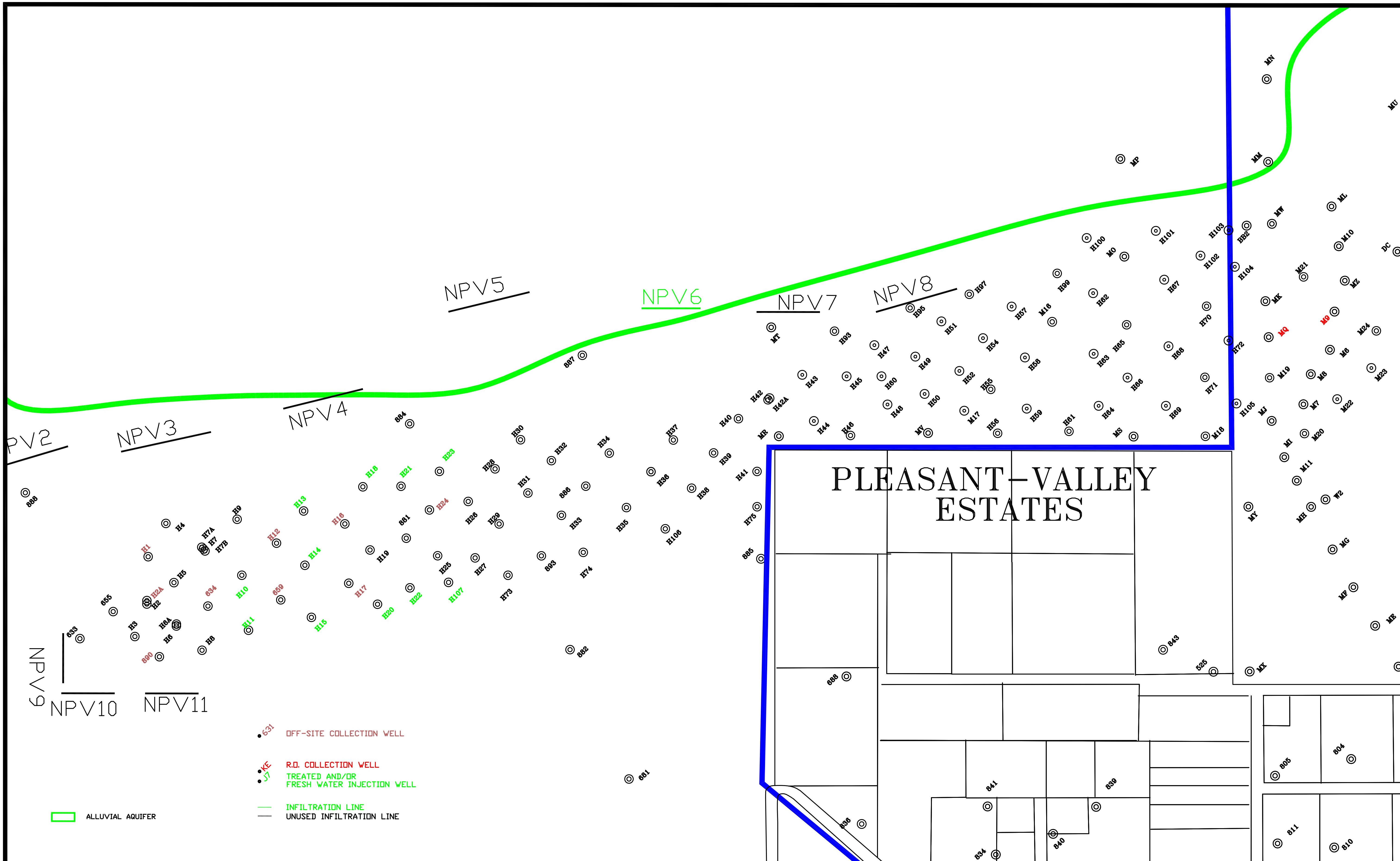
SCALE: 1"=500'
C:\PROJECTS\2020-06
1600QAL19
DATE: 1/13/2020

FIGURE 4.1-1A. ALLUVIAL WELL LOCATIONS, OS, 2019



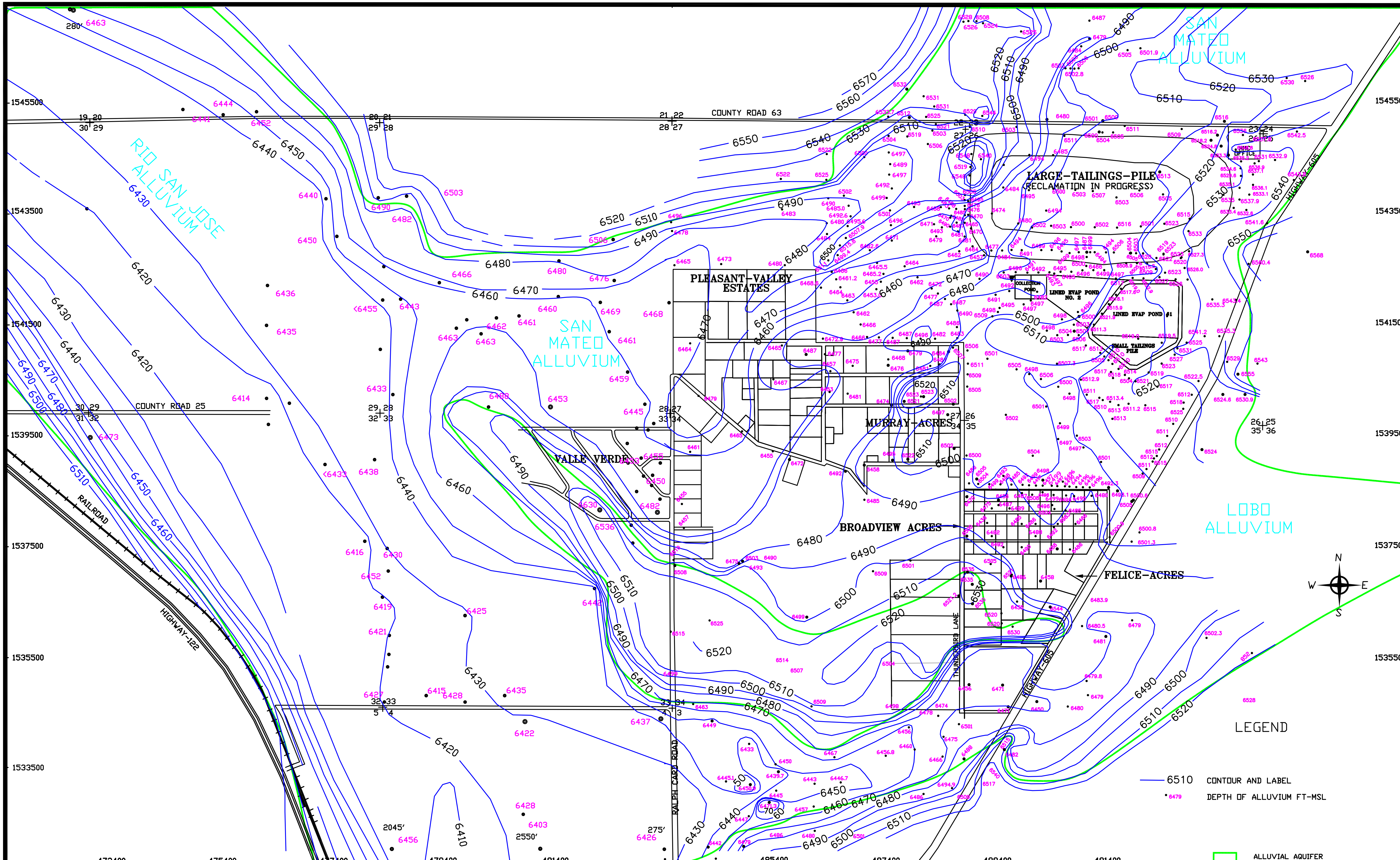
SCALE: 1"=500'
C:\PROJECTS\ 2020-06 1600QAL19
DATE: 1/10/2020

FIGURE 4.1-1B. ALLUVIAL WELL LOCATIONS, SOS, 2019



SCALE: 1"=500'
C:\PROJECTS\ 2020-06 16000AL19
DATE: 1/17/2020

FIGURE 4.1-1C. ALLUVIAL WELL LOCATIONS, NOS, 2019



SCALE: 1"=1600'
C:\PROJECTS\2020-06
1600QAL19
DATE: 3/5/2020

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	12/18/2019	41.48	6540.58	2.5	6582.06	55	6524.6 A	25-65	16.0
0691	1540276	493860	66.0	5.0	12/18/2019	46.34	6542.47	2.9	6588.81	55	6530.9 A	26-66	11.6
0891	1540904	493751	54.0	5.0	3/27/2019	36.81	6544.31	2.1	6581.12	50	6529.0 A	24-54	15.3
0892	1540954	494317	50.0	5.0	12/18/2019	42.60	6544.61	2.0	6587.21	42	6543.2 A	30-50	1.4
1A	1543790	493768	61.0	5.0	4/2/2019	37.51	6547.92	2.9	6585.43	47	6535.5 A	39-51	12.4
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	12/18/2019	37.50	6550.49	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	9/30/2019	38.97	6548.41	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	12/18/2019	30.65	6555.74	1.8	6586.39	43	6541.6 A	25-55	14.2
1I	1542627	493928	49.8	5.0	12/18/2019	34.45	6563.90	1.3	6598.35	35	6562.1 A	27-47	1.8
1J	1541986	493695	50.3	5.0	12/16/2019	40.50	6544.90	1.8	6585.40	40	6543.6 A	30-50	1.3
1K	1541992	493275	55.6	5.0	4/2/2019	21.40	6562.73	1.0	6584.13	47	6536.1 A	30-55	26.6
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	2/19/2019	31.62	6543.91	1.3	6575.53	33	6541.2 A	25-54	2.7
1N	1543100	494396	45.6	5.0	12/18/2019	31.91	6558.94	2.4	6590.85	25	6563.5 A	15-44	0.0
1O	1542592	494175	44.0	5.0	12/18/2019	44.70	6550.24	0.8	6594.94	29	6565.1 A	14-34	0.0
1P	1541902	493924	52.8	5.0	12/18/2019	49.47	6535.77	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	1/9/2019	36.56	6549.66	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	12/30/2019	39.97	6530.93	2.4	6570.90	60	6508.5 A	49-69	22.4
B1	1542071	489370	90.9	5.0	12/18/2019	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	11/1/2019	58.24	6516.42	7.4	6574.66	82	6485.3 A	63-83	31.2
B5	1542474	490141	91.0	5.0	5/1/2017	56.67	6516.79	1.4	6573.46	81	6491.1 A	62-82	25.7
B6	1542478	490341	90.0	5.0	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	12/9/2019	44.74	6529.66	2.2	6574.40	77	6495.2 A	53-78	34.5

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
B8	1542488	490734	87.0	5.0	12/9/2019	46.52	6529.23	2.3	6575.75	77	6496.5 A	53-78	32.8
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	12/17/2019	41.45	6531.57	2.2	6573.02	91	6479.8 A	30-100	51.7
B13	1541841	490223	80.0	5.0	12/18/2019	37.95	6532.09	3.1	6570.04	72	6494.9 A	30-80	37.1
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	10/28/2019	46.20	6530.11	2.0	6576.31	72	6502.3 A	60-120	27.8
B16	1542705	489900	120.0	4.5	10/28/2019	60.75	6514.62	2.0	6575.37	83	6490.4 A	60-120	24.3
B17	1542659	489493	95.0	4.5	10/28/2019	42.80	6531.51	2.0	6574.31	---	--- A	55-95	---
B18	1542652	489634	120.0	4.5	10/28/2019	45.60	6530.53	2.0	6576.13	70	6504.1 A	60-120	26.4
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	10/28/2019	59.40	6516.56	2.0	6575.96	83	6491.0 A	60-100	25.6
B32	1542598	490201	120.0	4.5	10/28/2019	46.10	6529.29	2.0	6575.39	93	6480.4 A	60-120	48.9
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	12/30/2019	42.00	6529.58	1.7	6571.58	76	6493.9 A	64-78	35.7
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	12/17/2019	39.37	6535.24	2.6	6574.61	75	6497.0 A	63-83	38.2
BK1c	1546812	489728	52.0	---	6/10/2019	44.25	6539.75	0.0	6584.00	---	--- A	47-52	---
BK1f	1546834	489743	57.0	---	6/10/2019	44.79	6539.21	0.0	6584.00	---	--- A	52-57	---
BK2c	1546567	491717	83.5	---	6/10/2019	40.29	6551.71	0.0	6592.00	---	--- A	58.5-63.	---
BK2f	1546553	491732	79.0	---	6/10/2019	40.06	6551.94	0.0	6592.00	---	--- A	74-79	---
BP	1541882	489841	85.4	4.0	12/13/2019	43.00	6529.30	3.0	6572.30	75	6494.3 A	40-85	35.0
* 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	12/16/2019	38.83	6533.03	0.8	6571.86	67	6504.1 A	41-68	29.0
C2	1541630	490566	76.0	5.0	3/27/2019	34.33	6530.69	0.9	6565.02	66	6498.1 A	42-67	32.6
* 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	3/27/2019	34.82	6535.03	0.8	6569.85	62	6507.1 A	43-63	28.0
C6	1541533	491142	80.8	5.0	11/1/2019	78.17	6506.72	1.6	6584.89	72	6511.3 A	34-74	0.0
C7	1541734	491280	72.4	5.0	11/1/2019	44.96	6539.48	1.5	6584.44	61	6521.9 A	25-65	17.5
C8	1541906	491415	78.1	5.0	11/1/2019	59.77	6524.72	1.6	6584.49	67	6515.9 A	31-71	8.8
C9	1542075	491545	77.0	5.0	11/1/2019	56.51	6528.04	1.5	6584.55	65	6518.1 A	27-67	10.0
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	11/5/2019	43.08	6538.30	2.4	6581.38	60	6519.0 A	35-65	19.3
C12	1542375	492029	63.5	5.0	11/1/2019	25.26	6555.29	2.6	6580.55	55	6523.0 A	34-64	32.3
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	10/28/2019	10.40	6560.70	0.5	6571.10	60	6510.6 A	40-120	50.1
C19	1541648	489392	120.0	4.5	10/28/2019	18.60	6551.31	0.5	6569.91	80	6489.4 A	40-120	61.9
C20	1541673	489187	110.0	4.5	10/28/2019	17.20	6552.96	0.5	6570.16	70	6499.7 A	50-110	53.3
C21	1541747	488996	100.0	4.5	10/28/2019	26.24	6545.75	0.5	6571.99	90	6481.5 A	40-100	64.3
* D	1542127	490118	89.7	4.0	7/5/2011	37.10	6535.79	0.8	6572.89	90	6482.1 A	71-91	53.7
D1	1542140	489615	89.4	4.0	7/19/2019	43.13	6527.77	1.0	6570.90	80	6489.9 A	58-90	37.9
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

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
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
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	12/17/2019	41.80	6529.51	2.7	6571.31	---	--- A	45-65	---
DD	1546989	488943	78.5	4.0	10/28/2019	48.88	6543.71	1.9	6592.59	83	6507.7 A	40-80	36.0
DD2	1547439	489251	94.3	5.0	10/28/2019	46.10	6547.18	2.0	6593.28	80	6511.3 A	50-90	35.9
DD3	1548273	489592	69.9	4.0	10/23/2019	48.65	6552.29	3.6	6600.94	67	6530.3 A	40-70	22.0
DD4	1547675	489466	81.5	4.0	10/23/2019	48.15	6551.28	3.8	6599.43	80	6515.6 A	42-82	35.7
DD5	1547013	488704	68.0	4.0	10/23/2019	50.45	6544.90	3.6	6595.35	65	6526.8 A	58-68	18.1
DD6	1547340	488377	35.0	4.0	6/13/2019	35.00	6560.81	3.2	6595.81	35	6557.6 A	25-35	3.2
DD7	1547606	488129	24.2	4.0	6/13/2019	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

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
	DT	1542871	489293	72.3	5.0	12/30/2019	56.58	6527.23	2.7	6583.81	99	6482.1 A	59-99	45.1
	DU	1542879	490380	84.6	5.0	7/6/1988	51.56	6539.51	2.9	6591.07	81	6507.2 A	61-81	32.3
	DV	1542826	490702	80.0	5.0	8/28/2006	54.64	6530.96	2.9	6585.60	77	6505.7 A	60-80	25.3
	DW	1542818	492029	73.4	5.0	12/5/2000	2.50	6586.16	3.6	6588.66	59	6526.1 A	45-60	60.1
	DX	1542838	491074	90.0	6.0	8/2/1999	61.80	6530.18	1.0	6591.98	80	6511.0 A	60-90	19.2
	DY	1542737	492271	65.7	5.0	12/5/2000	1.50	6579.11	2.3	6580.61	56	6522.3 A	15-65	56.8
	DZ	1542834	491501	81.8	5.0	12/30/2019	55.40	6535.13	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	12/18/2019	36.00	6528.82	1.2	6564.82	62	6501.6 A	45-65	27.2
	FB	1540417	488857	62.0	4.0	9/23/2019	37.23	6528.43	2.0	6565.66	58	6505.7 A	43-58	22.8
*	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	12/18/2019	39.05	6523.74	1.8	6562.79	62	6499.0 A	45-65	24.8
	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	12/18/2019	38.60	6527.41	1.8	6566.01	67	6497.2 A	50-120	30.2
	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	9/30/2019	35.57	6527.19	1.3	6562.76	67	6494.5 A	55-65	32.7
	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	3/5/2019	39.73	6528.24	1.8	6567.97	70	6496.2 A	50-120	32.1
	GO	1538663	488973	122.3	4.0	4/3/2000	4.00	6559.00	1.6	6563.00	75	6486.4 A	50-120	72.6
	GP	1538649	489752	121.4	4.0	12/5/2000	5.00	6559.87	2.1	6564.87	68	6494.8 A	50-120	65.1

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
GQ	1538599	491067	70.0	4.0	12/13/2010	1.40	6566.76	0.9	6568.16	71	6496.3 A	50-70	70.5
GR	1538619	490619	85.0	4.0	12/23/1991	36.55	6528.66	1.0	6565.21	75	6489.2 A	50-85	39.5
GS	1538597	491408	86.4	5.0	12/5/2000	33.00	6541.31	2.0	6574.31	80	6492.3 A	50-85	49.0
GT	1538534	491565	84.0	5.0	12/5/2000	8.30	6567.87	2.1	6576.17	76	6498.1 A	60-84	69.8
GU	1538367	491854	80.0	5.0	3/7/2002	15.00	6560.65	2.0	6575.65	73	6500.7 A	60-80	60.0
GV	1537701	491428	83.0	5.0	12/18/2019	51.90	6525.48	2.5	6577.38	74	6500.9 A	62-82	24.6
GW1	1539755	490530	73.0	5.0	12/18/2019	37.40	6527.87	1.0	6565.27	65	6499.3 A	48-73	28.6
GW2	1539471	490497	75.0	5.0	12/18/2019	39.85	6526.23	1.0	6566.08	68	6497.1 A	47-75	29.2
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	12/18/2019	37.75	6529.45	1.6	6567.20	68	6497.6 A	52-72	31.9
IW-1D	1543443	488206	85.0	4.0	---	---	---	---	6574.57	---	--- A	60-80	---
IW-1S	1543422	488225	63.0						6573.45	---	--- A	38-58	---
IW-2S	1543373	488232	59.0	4.0	---	---	---	---	6573.93	---	--- A	34-54	---
IW-2D	1543401	488218	83.0						6573.79	---	--- A	58-78	---
IW-3S	1543329	488242	59.0	4.0	---	---	---	---	6574.08	---	--- A	34-54	---
IW-3D	1543352	488226	79.0						6574.66	---	--- A	54-74	---
IW-4D	1543309	488236	86.0	4.0	---	---	---	---	6574.11	---	--- A	61-81	---
IW-4S	1543286	488251	66.0						6573.55	---	--- A	41-61	---
IW-5S	1543239	488261	64.0	4.0	---	---	---	---	6574.90	---	--- A	39-59	---
IW-5D	1543264	488245	90.0						6574.85	---	--- A	65-85	---
IW-6D	1543218	488255	84.5	4.0	---	---	---	---	6574.27	---	--- A	59.5-79.	---
IW-6S	1543195	488270	62.0						6574.43	---	--- A	37-57	---
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-8D	1543129	488274	80.0	4.0	---	---	---	---	6574.53	---	--- A	55-75	---
IW-8S	1543110	488289	58.0						6574.20	---	--- A	33-53	---
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-14D	1542863	488330	90.0	4.0	---	---	---	---	6573.04	---	--- A	65-85	---

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-14S	1542839	488346	69.0	4.0	---	---	---	---	6573.10	---	--- A	44-64	---
IW-15D	1542818	488340	87.0	4.0	---	---	---	---	6573.22	---	--- A	62-82	---
IW-15S	1542796	488355	67.0						6573.76	---	--- A	42-62	---
IW-16S	1542752	488365	67.0	4.0	---	---	---	---	6573.94	---	--- A	42-62	---
IW-16D	1542775	488350	89.0						6573.98	---	--- A	64-84	---
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	7/9/2019	80.96	6521.06	2.5	6602.02	80	6519.5 A	65-85	1.5
K5	1541269	491935	86.4	5.0	7/9/2019	82.50	6519.23	2.8	6601.73	80	6518.9 A	55-85	0.3
K6	1540689	491459	58.0	5.0	3/6/2002	13.00	6557.07	2.0	6570.07	---	--- A	33-58	---
K7	1541232	492237	86.0	5.0	7/11/2019	62.68	6538.85	2.0	6601.53	79	6520.5 A	56-86	18.3
K8	1541250	492081	86.0	5.0	11/5/2019	79.97	6520.52	2.0	6600.49	78	6520.5 A	66-86	0.0
K9	1541287	491787	86.0	5.0	11/22/2019	63.97	6536.37	2.0	6600.34	79	6519.3 A	56-86	17.0
K10	1541305	491638	87.0	5.0	11/5/2019	62.88	6537.93	2.0	6600.81	81	6517.8 A	47-87	20.1
K11	1541325	491490	84.0	5.0	7/9/2019	64.18	6536.43	2.0	6600.61	78	6520.6 A	64-84	15.8
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

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
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	3/26/2019	31.09	6538.64	1.5	6569.73	50	6518.2 A	40-60	20.4
KF	1540870	491169	63.5	5.0	3/26/2019	34.19	6536.02	2.2	6570.21	50	6518.0 A	30-60	18.0
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	12/30/2019	36.15	6535.57	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	11/22/2019	47.09	6528.98	1.3	6576.07	50	6524.8 A	25-55	4.2
L6	1540526	493110	51.1	5.0	10/21/2019	33.27	6541.37	2.1	6574.64	50	6522.5 A	25-55	18.8
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	12/17/2019	29.80	6547.43	2.2	6577.23	64	6511.0 A	43-73	36.4
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

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
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	12/18/2019	44.00	6531.34	3.2	6575.34	84	6488.1 A	60-90	43.2
M6	1543097	486674	110.0	5.0	12/17/2019	61.80	6513.24	2.2	6575.04	65	6507.9 A	60-110	5.4
M7	1542790	486523	83.0	5.0	12/17/2019	57.60	6515.25	2.4	6572.85	71	6499.4 A	63-83	15.8
M8	1542960	486567	83.0	5.0	9/5/2000	33.71	6541.52	2.4	6575.23	57	6515.8 A	53-83	25.7
M9	1543310	486699	103.0	5.0	12/17/2019	65.10	6511.71	3.5	6576.81	78	6495.3 A	63-103	16.4
M10	1543677	486723	88.0	5.0	2/19/2019	62.05	6511.31	2.3	6573.36	86	6485.1 A	58-88	26.3
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	9/30/2019	36.00	6538.91	2.0	6574.91	80	6492.9 A	80-110	46.0
M31	1543745	487620	120.0	4.5	10/28/2019	40.40	6535.53	2.0	6575.93	80	6493.9 A	70-120	41.6
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	---

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
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	12/17/2019	44.45	6527.77	1.0	6572.22	85	6486.2 A	70-85	41.5
MB	1541296	487512	90.0	4.0	3/5/2019	43.57	6528.49	1.0	6572.06	85	6486.1 A	60-90	42.4
MC	1541304	487264	100.0	4.0	12/17/2019	45.85	6526.21	1.0	6572.06	95	6476.1 A	70-100	50.2
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	12/17/2019	48.50	6523.78	1.0	6572.28	110	6461.3 A	90-110	62.5
MG	1541972	486694	110.0	4.0	9/5/2000	1.72	6571.36	1.0	6573.08	110	6462.1 A	90-110	109.3
MH	1542208	486569	110.0	4.0	12/17/2019	52.75	6521.17	1.0	6573.92	110	6462.9 A	90-110	58.3
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	12/17/2019	54.35	6518.59	1.8	6572.94	60	6511.1 A	40-60	7.5
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	12/17/2019	54.50	6518.20	2.3	6572.70	80	6490.4 A	56-76	27.8
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	12/17/2019	64.30	6513.26	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	12/17/2019	44.32	6529.87	1.5	6574.19	72	6500.7 A	50-80	29.2
MW	1543802	486346	85.0	5.0	12/17/2019	64.45	6510.46	1.9	6574.91	83	6490.0 A	35-85	20.5
MX	1541287	486244	103.0	5.0	8/21/2019	51.30	6517.31	1.7	6568.61	94	6472.9 A	63-103	44.4
MY	1542200	486213	112.0	5.0	10/14/2019	57.11	6516.45	3.0	6573.56	102	6468.6 A	72-112	47.9
MZ	1543485	486757	92.0	5.0	12/17/2019	65.15	6511.49	3.0	6576.64	84	6489.6 A	60-92	21.8
N	1545101	489665	92.0	4.0	8/29/2019	41.60	6542.37	0.9	6583.97	80	6503.1 A	54-94	39.3
NA	1545000	491488	91.4	5.0	8/29/2019	46.02	6544.96	1.1	6590.98	80	6509.9 A	50-90	35.1
NB	1545000	491296	96.4	5.0	8/29/2019	48.45	6544.85	3.5	6593.30	80	6509.8 A	50-90	35.0
NC	1545220	491282	95.0	4.0	12/18/2019	41.54	6544.29	0.8	6585.83	85	6500.0 A	65-95	44.3
ND	1545927	494872	70.0	4.0	12/11/2019	40.61	6552.28	1.1	6592.89	65	6526.8 A	50-70	25.5
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	8/28/2019	40.48	6547.35	1.3	6587.83	77	6509.5 A	40-70	37.8
P	1546691	491058	109.1	4.0	5/1/2019	38.50	6548.76	1.7	6587.26	107	6478.6 A	82-112	70.2
P1	1547017	491060	105.0	6.0	12/18/2019	43.44	6549.03	0.8	6592.47	105	6486.7 A	60-105	62.4
P2	1546555	490912	105.0	6.0	3/27/2019	42.11	6547.68	0.9	6589.79	105	6483.9 A	60-105	63.8
P3	1546159	490785	95.0	5.0	3/27/2019	42.15	6547.80	2.2	6589.95	85	6502.8 A	55-95	45.0

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
P4	1546504	491899	92.0	5.0	3/27/2019	39.14	6550.38	3.6	6589.52	84	6501.9 A	52-92	48.5
PM	1541426	490292	81.9	4.0	1/12/2004	12.33	6555.09	1.8	6567.42	---	--- A	-	---
PMW-3S	1542781	488318	73.0	2.0	---	---	---	---	6575.07	---	--- A	58-68	---
PMW-3D	1542780		92.0						6575.05	---	--- A	77-87	---
PMW-2S	1542957	488282	61.0						6575.31	---	--- A	46-56	---
PMW-1D	1543104	488249	73.0						6575.81	---	--- A	58-68	---
PMW-1S			58.0							---	--- A	43-53	---
PMW-2D	1542957	488282	76.0						6575.35	---	--- A	61-71	---
Q	1548693	492153	98.3	4.0	5/1/2019	41.83	6551.99	2.3	6593.82	100	6491.5 A	72-102	60.5
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	12/17/2019	47.70	6533.47	2.0	6581.17	75	6504.2 A	52-72	29.3
S1	1543288	488401	85.0	2.0	12/30/2019	41.18	6534.01	5.3	6575.19	85	6484.9 A	60-85	49.1
S2	1543127	488299	100.0	3.0	12/30/2019	41.15	6532.57	2.0	6573.72	100	6471.7 A	90-100	60.8
S3	1542857	488714	122.6	5.0	12/17/2019	42.60	6532.18	6.2	6574.78	116	6452.6 A	80-120	79.6
S4	1543344	488359	112.4	5.0	12/17/2019	42.10	6533.19	2.3	6575.29	108	6465.0 A	50-110	68.2
S5	1543269	488923	115.0	5.0	12/30/2019	46.12	6528.57	1.0	6574.69	105	6468.7 A	54-106	59.9
S5R	1543150	488938	115.0	5.0	11/14/2019	49.10	6531.39	1.9	6580.49	109	6469.6 A	55-115	61.8
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	12/17/2019	41.13	6537.26	1.9	6578.39	70	6506.5 A	48-78	30.8
S12	1543297	488628	93.0	5.0	1/16/2019	44.38	6534.47	2.1	6578.85	80	6496.7 A	53-93	37.7
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	12/17/2019	41.70	6536.27	2.0	6577.97	55	6521.0 A	40-80	15.3
S20	1544463	488461	80.0	4.5	4/16/2014	30.59	6547.76	2.0	6578.35	80	6496.4 A	40-80	51.4
S21	1544896	488670	80.0	4.5	12/17/2019	39.75	6540.53	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	---

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
S33	1543951	488570	80.0	4.5	---	---	---	2.0	6576.24	---	--- A	40-80	---
S34	1543064	488657	115.0	4.5	---	---	---	2.0	6575.92	---	--- A	55-115	---
S36	1542755	488559	90.0	4.5	4/22/2014	34.86	6540.77	2.0	6575.63	90	6483.6 A	50-90	57.1
S37	1542609	488516	90.0	4.5	9/11/2014	34.24	6538.05	2.0	6572.29	90	6480.3 A	50-90	57.8
S38	1542443	488727	90.0	4.5	9/11/2014	34.90	6538.06	2.0	6572.96	90	6481.0 A	50-90	57.1
S39	1542596	488744	90.0	4.5	4/8/2014	34.02	6540.41	2.0	6574.43	90	6482.4 A	50-90	58.0
S40	1542934	488778	115.0	4.5	---	---	---	2.0	6575.73	---	--- A	55-115	---
SA	1543122	488811	123.7	5.0	12/30/2019	47.90	6532.41	1.0	6580.31	115	6464.3 A	100-130	68.1
SB	1543371	488811	125.0	5.0	12/9/2019	48.31	6532.78	0.9	6581.09	115	6465.2 A	100-130	67.6
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-4S	1543570	488179	70.0	2.0	---	---	---	---	6574.32	---	--- A	55-70	---
SDR-1S	1543571	488169							6574.22	---	--- A	55-70	---
SDR-2D	1543585	488165	95.0						6574.67	---	--- A	75-95	---
SDR-2S			70.0							---	--- A	55-70	---
SDR-3D	1543583	488176	95.0						6574.24	---	--- A	75-95	---
SDR-3S			70.0						6574.23	---	--- A	55-70	---
SDR-4D	1543570	488179	95.0						6574.39	---	--- A	55-70	---
SE	1543301	488550	111.8	5.0	10/4/2017	65.80	6512.19	0.5	6577.99	88	6489.5 A	50-90	22.7
SE4	1543308	488560	105.3	2.0	2/23/2009	45.78	6532.22	---	6578.00	---	--- A	-	---
SE6	1543244	488615	92.0	5.0	1/15/2019	44.13	6534.78	2.3	6578.91	---	--- A	-	---
SIW-D	1543575	488174	95.0	2.0	---	---	---	---	6573.40	---	--- A	75-95	---
SIW-S	1543578	488169	75.0	2.0	---	---	---	---	6573.54	---	--- A	55-75	---
SM	1543748	488566	86.0	5.0	12/30/2019	44.22	6534.52	0.7	6578.74	---	--- A	-	---
SMW-3D	1543565	488161	95.0	2.0	---	---	---	---	6574.51	---	--- A	75-95	---
SMW-1	1543570	488164	85.0						6574.39	---	--- A	65-85	---
SMW-5S	1543538	488159	70.0						6574.31	---	--- A	55-70	---
SMW-4S	1543570	488179							6574.33	---	--- A	55-70	---
SMW-5D	1543539	488159	95.0						6574.29	---	--- A	75-95	---
SMW-3S	1543565	488161	70.0						6574.52	---	--- A	55-70	---
SMW-6	1543596	488183	85.0						6574.32	---	--- A	65-85	---
SMW-2	1543564	488184							6574.23	---	--- A	65-85	---
SMW-4D	1543570	488179	95.0						6574.33	---	--- A	75-95	---
SN	1543752	488716	67.5	4.0	12/30/2019	44.10	6535.16	1.1	6579.26	---	--- A	-	---
SO	1543652	488381	92.3	5.0	12/30/2019	45.00	6533.79	0.6	6578.79	---	--- A	-	---
SP	1543630	488531	94.4	4.0	12/30/2019	44.80	6533.86	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

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
SS	1543374	488666	101.0	5.0	12/30/2019	47.10	6531.28	1.2	6578.38	90	6487.2 A	51-101	44.1
ST	1543215	488688	97.0	5.0	12/30/2019	47.00	6532.31	2.2	6579.31	96	6481.1 A	55-97	51.2
* 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	12/9/2019	47.23	6533.49	2.6	6580.72	106	6472.1 A	35-115	61.4
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
SW	1543783	488812	81.9	6.0	6/11/2019	45.70	6535.59	2.9	6581.29	75	6503.4 A	35-80	32.2
SX	1544510	489025	45.0	5.0	---	---	---	1.0	6581.49	40	6540.5 A	20-40	---
SZ	1544367	488833	62.6	5.0	12/17/2019	42.62	6538.85	2.2	6581.47	60	6519.3 A	40-70	19.6
T	1542536	492260	70.2	4.0	12/10/2019	39.10	6540.13	2.4	6579.23	68	6508.8 A	61-71	31.3
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	6/4/2019	116.00	6548.82	1.6	6664.82	180	6483.2 A	100-186	65.6
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	12/10/2019	120.85	6544.44	---	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	6/4/2019	126.85	6540.91	2.5	6667.76	162	6503.3 A	137-167	37.7
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	6/4/2019	116.10	6545.01	---	6661.11	140	--- A	120-140	---
T24	1543387	489494	200.0	4.5	1/15/2019	139.75	6517.28	2.0	6657.03	---	--- A	140-200	---
T25	1543352	489996	200.0	4.5	10/28/2019	122.30	6535.04	2.0	6657.34	---	--- A	140-200	---
T26	1543567	489550	200.0	4.5	1/15/2019	120.15	6536.51	2.0	6656.66	---	--- A	140-200	---
T27	1543474	489837	200.0	4.5	10/28/2019	121.40	6535.74	2.0	6657.14	---	--- A	140-200	---
T28	1543484	490145	200.0	4.5	9/30/2019	118.55	6540.16	2.0	6658.71	---	--- 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
T29	1543774	489375	200.0	4.5	1/17/2019	121.13	6535.58	2.0	6656.71	---	--- A	140-200	---
T30	1543663	489972	200.0	4.5	10/28/2019	123.00	6536.62	2.0	6659.62	---	--- A	140-200	---
T31	1543789	489881	200.0	4.5	1/16/2019	120.98	6538.05	2.0	6659.03	---	--- A	140-200	---
T32	1543801	490134	200.0	4.5	10/28/2019	123.70	6537.91	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	---
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	1/15/2019	123.51	6531.93	2.0	6655.44	170	6483.4 A	130-170	48.5
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	6/4/2019	67.95	6592.01	3.2	6659.96	155	6501.8 A	130-160	90.3
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	1/17/2019	118.93	6538.59	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	10/28/2019	118.40	6539.66	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	1/30/2019	117.57	6539.64	2.0	6657.21	---	--- A	120-180	---
T48	1544291	489795	180.0	4.5	1/30/2019	118.35	6539.21	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	1/30/2019	116.58	6540.40	2.0	6656.98	---	--- A	115-175	---
T54	1544523	489796	200.0	4.5	6/5/2019	116.55	6540.55	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	---

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
T65	1543743	490532	180.0	4.5	---	---	---	2.0	6664.86	180	6482.9 A	140-180	---
T66	1543821	490837	180.0	4.5	---	---	---	2.0	6669.08	180	6487.1 A	140-180	---
T67	1543791	491245	180.0	4.5	---	---	---	2.0	6670.75	180	6488.8 A	140-180	---
T68	1544082	490569	180.0	4.5	---	---	---	2.0	6666.45	180	6484.5 A	140-180	---
T69	1544069	490856	180.0	4.5	---	---	---	2.0	6668.52	180	6486.5 A	140-180	---
T70	1544036	491217	160.0	4.5	---	---	---	2.0	6670.67	160	6508.7 A	120-160	---
T71	1544200	490712	160.0	4.5	---	---	---	2.0	6667.54	160	6505.5 A	120-160	---
T72	1544137	491055	160.0	4.5	---	---	---	2.0	6670.03	160	6508.0 A	120-160	---
T73	1544137	491383	160.0	4.5	---	---	---	2.0	6669.85	160	6507.9 A	120-160	---
T74	1544306	490480	160.0	4.5	---	---	---	2.0	6662.57	160	6500.6 A	120-160	---
T75	1544255	490911	160.0	4.5	---	---	---	2.0	6669.55	160	6507.6 A	120-160	---
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	---

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
T101	1544222	491911	160.0	4.5	---	---	---	2.0	6668.43	160	6506.4 A	120-160	---
T102	1544203	492143	160.0	4.5	---	---	---	2.0	6669.85	160	6507.9 A	120-160	---
T103	1544056	492413	160.0	4.5	---	---	---	2.0	6666.69	160	6504.7 A	120-160	---
T104	1544412	491511	160.0	4.5	---	---	---	2.0	6666.09	160	6504.1 A	120-160	---
T105	1544289	491678	160.0	4.5	---	---	---	2.0	6668.99	160	6507.0 A	120-160	---
T106	1544369	491838	160.0	4.5	---	---	---	2.0	6667.00	160	6505.0 A	120-160	---
T107	1544209	492576	160.0	4.5	---	---	---	2.0	6662.80	160	6500.8 A	120-160	---
T108	1544441	492235	160.0	4.5	---	---	---	2.0	6664.75	160	6502.8 A	120-160	---
T109	1544366	492536	160.0	4.5	---	---	---	2.0	6662.90	160	6500.9 A	120-160	---
T110	1544209	492576	160.0	4.5	---	---	---	2.0	6660.29	160	6498.3 A	120-160	---
T111	1543706	492939	160.0	4.5	---	---	---	2.0	6660.29	160	6498.3 A	120-160	---
TA	1542471	492426	62.4	5.0	12/10/2019	39.39	6540.91	2.4	6580.30	55	6522.9 A	35-65	18.0
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-1S			59.0							---	--- A	44-54	---
TDR-3S	1543130	488284							6576.15	---	--- A	44-54	---
TDR-3D			74.0						6576.16	---	--- A	59-69	---
TDR-2D	1543240	488239	85.0						6576.28	---	--- A	70-80	---
TDR-2S		488240	67.0						6576.07	---	--- A	52-62	---
TDR-5S	1542852	488302	59.0						6574.71	---	--- A	44-54	---
TDR-5D		488303	87.0							---	--- A	62-82	---
TDR-4S	1543060	488258	60.5						6575.12	---	--- A	45.5-55.	---
TDR-4D		488259	75.5							---	--- A	60.5-70.	---
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	---	12/13/2019	57.38	6543.44	2.0	6600.82	---	--- A	-	---
WME-10	1540988	491910	76.7	4.0	12/13/2019	60.54	6542.29	2.0	6602.83	---	--- A	-	---
WME-19	1543363	491802	138.0	4.0	---	---	---	1.9	6665.08	---	--- A	133-138	---
WME-18	1544138	489665	154.0	4.0				2.6	6659.12	---	--- A	149-154	---
WME-20	1543415	490033	154.0	4.0	---	---	---	3.1	6659.43	---	--- A	149-154	---
WME-21	1540798	491855	72.0	4.0				2.7	6600.15	---	--- A	67-72	---
WME-22	1541258	491434	74.0	4.0				2.9	6603.44	---	--- A	69-74	---
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

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
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	12/17/2019	26.30	6541.89	1.1	6568.19	85	6482.1 A	55-85	59.8
WR13	1541068	488861	70.0	5.0	12/5/2000	18.98	6550.19	3.2	6569.17	60	6506.0 A	50-60	44.2
WR14	1540638	488863	70.0	5.0	5/28/2003	15.50	6551.41	2.3	6566.91	61	6503.6 A	50-60	47.8
WR15	1541280	488016	70.0	4.0	5/28/2003	10.90	6560.29	0.0	6571.19	75	6496.2 A	60-75	64.1
WR16	1543051	487495	122.3	5.0	1/29/2003	6.54	6566.24	1.9	6572.78	100	6470.9 A	40-120	95.4
WR17	1543328	487485	124.4	5.0	1/29/2003	2.45	6570.64	2.2	6573.09	75	6495.9 A	40-120	74.7
WR18	1543597	487465	73.6	5.0	1/29/2003	2.97	6569.94	2.2	6572.91	70	6500.7 A	20-70	69.2
WR19	1543873	487458	87.8	5.0	1/29/2003	3.31	6571.62	2.2	6574.93	74	6498.7 A	25-85	72.9
WR20	1544059	487449	102.3	5.0	1/29/2003	3.98	6570.49	2.1	6574.47	80	6492.4 A	42-102	78.1
WR21	1544241	487449	88.9	5.0	1/29/2003	6.28	6569.77	2.1	6576.05	77	6497.0 A	28-88	72.8
WR22	1544434	487462	91.5	5.0	1/29/2003	3.44	6574.45	2.4	6577.89	86	6489.5 A	30-90	85.0
WR23	1544632	487445	94.3	5.0	1/29/2003	1.72	6574.75	2.2	6576.47	77	6497.3 A	32-92	77.5
WR24	1544938	487438	89.2	5.0	1/29/2003	2.04	6586.63	3.0	6588.67	82	6503.7 A	50-90	83.0
X	1540512	491892	50.7	4.0	10/28/2019	33.60	6538.01	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

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
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	12/11/2019	37.85	6548.23	2.9	6586.08	49	6534.2 A	37-57	14.0
X19	1544753	493437	63.0	5.0	11/17/2006	32.46	6552.74	4.2	6585.20	56	6525.1 A	33-63	27.7
X20	1544855	493256	71.0	5.0	4/16/2012	38.54	6547.19	5.0	6585.73	64	6516.8 A	31-71	30.4
X21	1543606	493894	55.0	5.0	12/5/2000	38.99	6547.34	2.7	6586.33	51	6532.6 A	35-55	14.7
X22	1543874	493946	56.0	5.0	12/5/2000	39.21	6546.49	2.6	6585.70	50	6533.1 A	36-56	13.4
X23	1544064	494012	56.0	5.0	12/5/2000	38.96	6546.98	2.8	6585.94	47	6536.1 A	36-56	10.8
X24	1544244	494011	56.0	5.0	12/5/2000	39.94	6545.78	2.6	6585.72	46	6537.1 A	36-56	8.7
X25	1544445	494042	53.0	5.0	12/5/2000	39.41	6546.22	2.8	6585.63	46	6536.9 A	33-53	9.3
X26	1544693	493702	53.0	5.0	12/5/2000	35.34	6552.30	2.8	6587.64	43	6541.8 A	33-53	10.5
X27	1544953	493374	71.0	5.0	11/17/2006	39.75	6545.55	6.0	6585.30	64	6515.4 A	31-71	30.2
X28	1540545	491971	56.0	5.0	8/12/2002	8.30	6561.66	2.0	6569.96	48	6520.0 A	16-56	41.7
X29	1540735	492256	51.0	5.0	8/12/2002	4.00	6566.03	2.0	6570.03	43	6525.0 A	11-51	41.0
X30	1540897	492493	51.0	5.0	8/12/2002	3.00	6569.53	2.0	6572.53	43	6527.5 A	11-51	42.0
X31	1541052	492731	51.0	5.0	8/12/2002	8.00	6566.13	2.0	6574.13	44	6528.1 A	11-51	38.0
XDR-1	1544450	493758	45.0	2.0	---	---	---	---	6585.28	---	--- A	35-45	---
XDR-2	1544459								6585.44	---	--- A	35-45	---
XDR-3	1544456	493767							6585.37	---	--- A	35-45	---
XDR-4	1544447								6585.41	---	--- A	35-45	---
XIW	1544453	493762	45.0	4.0	---	---	---	---	6583.09	---	--- A	35-45	---
XMW-2	1544451	493731	45.0	2.0	---	---	---	---	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	---
XMW-1	1544452	493746		2.0					6585.26	---	--- 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	6/27/2019	38.00	6521.66	0.0	6559.66	75	6484.7 A	90-105	37.0
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	7/11/2019	43.20	6528.80	0.9	6572.00	92	6479.1 A	72-102	49.7
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	4/2/2019	43.46	6524.11	0.0	6567.57	---	--- A	-	---
SUB3	1538280	489420	84.0	6.0	4/2/2019	46.69	6510.38	0.0	6557.07	72	6485.1 A	56-72	25.3
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							
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	4/29/2019	41.45	6521.21	0.0	6562.66	40	6522.7 A	-	0.0
										40	6497.7 U	-	23.5
										40	6326.7 M	270-300	194.5
0490	1536553	489752	63.0	4.0	6/3/2019	45.15	6517.27	0.0	6562.42	75	6487.4 A	20-80	29.8
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	3/25/2019	52.04	6510.48	1.6	6562.52	86	6474.9 A	53-93	35.6
0497	1535039	489503	94.0	5.0	12/18/2019	51.20	6511.42	2.0	6562.62	89	6471.6 A	64-94	39.8
0498	1534661	488953	150.0	6.0	4/9/2019	54.23	6506.36	2.0	6560.59	80	6478.6 M	130-150	27.8
										80	6478.6 A	70-110	27.8
CW44	1535048	488891	208.0	6.0	3/25/2019	55.51	6505.23	2.5	6560.74	94	6464.2 A	-	41.0
										94	6428.2 M	69-208	77.0
Q1	1535125	488830	106.0	4.5	3/25/2019	41.32	6520.29	2.0	6561.61	106	6453.6 A	70-110	66.7
Q2	1534903	488867	97.0	4.5	8/27/2019	55.60	6506.08	2.0	6561.68	97	6462.7 A	60-100	43.4
Q3	1534743	488865	108.0	4.5	4/15/2019	53.07	6506.67	2.0	6559.74	108	6449.7 A	60-100	56.9
Q5	1534829	488945	100.0	4.5	11/11/2019	53.50	6507.98	2.8	6561.48	---	--- A	60-100	---
Q7	1534981	489034	100.0	4.5	3/25/2019	54.05	6507.12	1.3	6561.17	100	6459.9 A	60-100	47.3
Q8	1534762	489059	100.0	4.5	12/18/2019	46.65	6514.15	2.0	6560.80	100	6458.8 A	60-100	55.3
Q9	1534643	489101	100.0	4.5	8/26/2019	53.51	6507.82	2.0	6561.33	100	6459.3 A	60-100	48.5
Q11	1534859	489134	100.0	4.5	8/26/2019	54.20	6506.82	2.1	6561.02	100	6458.9 A	60-100	47.9

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
Q12	1535058	489102	102.0	4.5	8/26/2019	53.90	6507.22	2.0	6561.12	---	--- A	60-100	---
Q13	1535173	489208	100.0	4.5	3/25/2019	40.02	6522.12	2.0	6562.14	100	6460.1 A	60-100	62.0
Q14	1534969	489213	100.0	4.5	3/25/2019	33.06	6528.91	1.7	6561.97	100	6460.3 A	60-100	68.6
Q15	1534779	489239	100.0	4.5	6/24/2019	54.25	6508.00	2.1	6562.25	100	6460.2 A	60-100	47.9
Q16	1534639	489347	102.0	4.5	3/25/2019	54.86	6508.42	2.0	6563.28	97	6464.3 A	60-100	44.1
Q18	1534869	489342	100.0	4.5	6/24/2019	49.15	6512.54	1.3	6561.69	100	6460.4 A	60-100	52.1
Q19	1535053	489306	100.0	4.5	8/23/2019	53.42	6508.75	1.9	6562.17	100	6460.3 A	60-100	48.5
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	6/24/2019	52.30	6510.79	2.3	6563.09	100	6460.8 A	60-100	50.0
Q22	1534806	489433	100.0	4.5	6/24/2019	52.25	6510.54	2.9	6562.79	100	6459.9 A	60-100	50.7
Q23	1534851	489534	100.0	4.5	12/18/2019	48.25	6516.01	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	6/24/2019	51.35	6513.16	2.5	6564.51	100	6462.0 A	60-100	51.2
Q26	1534769	489630	100.0	4.5	6/24/2019	52.40	6512.43	---	6564.83	100	--- A	60-100	---
Q27	1534861	489727	100.0	4.5	8/23/2019	54.20	6510.68	2.4	6564.88	100	6462.5 A	60-100	48.2
Q28	1535076	489696	100.0	4.5	8/27/2019	52.54	6511.40	2.2	6563.94	100	6461.7 A	60-100	49.7
Q29	1535140	489920	89.0	4.5	12/18/2019	52.45	6514.01	2.0	6566.46	89	6475.5 A	60-100	38.5
Q30	1534970	489778	100.0	4.5	8/27/2019	53.75	6512.38	2.0	6566.13	---	--- A	60-100	---
Q42	1536662	489606	80.0	4.5	6/5/2019	40.98	6523.50	1.6	6564.48	61	6501.9 A	40-80	21.6
										61	6501.9 U	40-80	21.6
Q43	1536550	489507	80.0	4.5	6/5/2019	39.70	6523.49	1.8	6563.19	80	6481.4 A	40-80	42.1
Q44	1535671	488864	110.0	4.5	12/18/2019	54.34	6506.99	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	6/5/2019	51.10	6510.60	2.0	6561.70	---	--- A	70-110	---
Q47	1535356	489516	110.0	4.5	6/4/2019	52.22	6508.94	2.0	6561.16	---	--- A	70-110	---
Q48	1535653	490120	105.0	4.5	12/18/2019	51.70	6516.14	2.0	6567.84	73	6492.8 U	65-105	23.3
										73	6492.8 A	65-105	23.3
Q49	1535232	489780	100.0	4.5	6/4/2019	51.25	6513.46	1.7	6564.71	---	--- A	60-100	---
Q50	1536680	490288	85.0	4.5	6/6/2019	44.97	6523.96	2.0	6568.93	43	6523.9 A	45-85	0.0
										43	6505.9 U	45-85	18.0
Q51	1535486	490003	76.0	4.0	---	---	---	2.5	6500.00	---	--- A	46-76	---

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	8/21/2019	88.02	6474.70	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	12/18/2019	38.25	6517.88	1.2	6556.13	70	6484.9 A	35-75	33.0
0845	1537280	487833	65.0	4.0	12/18/2019	36.80	6520.25	1.7	6557.05	55	6500.4 A	45-65	19.9
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	12/18/2019	37.10	6526.33	0.1	6563.43	63	6500.3 A	-	26.0
										63	6463.3 U	66-155	63.0
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	6/27/2019	53.45	6516.55	---	6570.00	---	--- A	-	---
0688	1541257	483955	105.0	5.0	12/18/2019	60.30	6502.32	2.9	6562.62	95	6464.7 A	65-105	37.6
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
0460	1537148	493921	114.2	5.0	7/12/2019	68.10	6526.90	---	6595.00	---	--- A	-	---
0520	1538934	492935	75.0	5.0	12/18/2019	54.51	6531.51	0.3	6586.02	68	6517.7 A	35-75	13.8
0521	1539104	492588	75.0	5.0	2/13/2019	56.36	6528.08	2.5	6584.44	65	6516.9 A	35-75	11.1
0522	1538640	492437	77.0	5.0	2/13/2019	51.73	6528.80	2.8	6580.53	68	6509.7 A	37-77	19.1
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	---	---	5/9/2019	83.05	6470.74	2.0	6553.79	---	--- A	-	---
* 0533	---	---	195.0	---	---	---	---	0.0	6520.00	---	--- A	-	---
0538	1533486	486899	170.0	6.0	4/22/2019	66.84	6482.10	2.0	6548.94	95	6451.9 A	50-90	30.2
										95	6413.9 L	130-170	68.2
0539	1534014	487596	210.0	6.0	12/17/2019	27.31	6528.01	2.0	6555.32	100	6453.3 A	50-70	74.7
										100	6453.3 A	80-100	74.7
										100	6378.3 L	170-210	149.7
0540	1534125	488091	90.0	6.0	12/17/2019	61.05	6494.86	2.7	6555.91	80	6473.2 A	30-90	21.7
0541	1539831	477236	120.0	5.0	12/18/2019	91.10	6464.52	2.0	6555.62	112	6441.6 A	78-118	22.9
0551	1536272	479881	135.0	5.0	12/18/2019	98.95	6448.35	2.1	6547.30	115	6430.2 A	95-135	18.1
0553	1534923	480563	130.0	5.0	12/18/2019	104.20	6443.28	2.0	6547.48	128	6417.5 A	90-125	25.8
0554	1534967	479107	140.0	5.0	12/18/2019	106.15	6441.02	1.9	6547.17	118	6427.3 A	90-125	13.7
0555	1538572	486236	100.0	5.0	2/4/2019	41.78	6515.36	2.5	6557.14	100	6454.6 A	60-90	60.7
0556	1538006	486184	100.0	5.0	4/16/2019	42.43	6513.59	2.4	6556.02	95	6458.6 A	60-90	55.0
0557	1537204	486000	65.0	5.0	2/4/2019	42.87	6510.90	2.5	6553.77	55	6496.3 A	45-65	14.6
0631	1532234	483756	118.0	6.0	12/17/2019	84.03	6457.07	2.2	6541.10	109	6429.9 A	58-118	27.2
0632	1531850	483767	110.0	6.0	12/17/2019	83.97	6457.33	1.4	6541.30	102	6437.9 A	70-110	19.4
0633	1541467	479642	83.0	8.0	2/25/2019	72.63	6484.93	0.0	6557.56	95	6462.6 A	11-83	22.4
0634	1541652	480362	103.0	4.5	12/17/2019	70.48	6489.59	2.8	6560.07	95	6462.3 A	80-100	27.3
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	9/30/2019	112.29	6462.91	2.5	6575.20	118	6454.7 A	104-124	8.2
0638	1539628	493265	75.0	5.0	12/18/2019	49.91	6535.65	0.0	6585.56	65	6520.6 A	35-75	15.1
0639	1539370	492961	80.0	5.0	4/2/2019	55.46	6532.42	2.5	6587.88	71	6514.4 A	35-80	18.0
0640	1537790	491961	84.0	5.0	12/18/2019	84.00	6495.97	2.2	6579.97	77	6500.8 A	64-84	0.0
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	12/18/2019	71.04	6472.86	2.0	6543.90	102	6439.9 A	55-110	33.0
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

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
0646	1533246	484953	100.0	5.0	12/17/2019	74.05	6469.30	1.5	6543.35	91	6450.9 A	60-100	18.4
0647	1536623	478308	140.0	4.5	12/18/2019	104.60	6447.31	1.4	6551.91	132	6418.5 A	80-140	28.8
0648	1534730	478343	120.0	4.5	12/18/2019	120.10	6427.69	2.0	6547.79	120	6425.8 A	80-120	1.9
0649	1534730	479798	124.0	4.5	12/18/2019	102.85	6440.44	0.3	6543.29	115	6428.0 A	84-124	12.5
0650	1536779	482135	109.0	4.5	12/18/2019	81.91	6465.20	2.2	6547.11	103	6441.9 A	89-109	23.3
0652	1531170	483779	88.0	5.0	12/18/2019	84.42	6453.73	1.5	6538.15	79	6457.7 A	60-88	0.0
0653	1533283	486570	206.0	6.0	12/18/2019	66.80	6478.17	1.6	6544.97	97	6446.4 A	69-206	31.8
										97	6408.4 L	-	69.8
0654	1541994	478636	120.0	4.5	12/18/2019	74.43	6476.07	1.4	6550.50	106	6443.1 A	60-120	33.0
0655	1541620	479830	96.0	8.0	10/28/2019	73.00	6485.18	---	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	12/18/2019	99.56	6452.25	2.2	6551.81	120	6429.6 A	87-128	22.6
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	12/18/2019	106.92	6443.26	0.4	6550.18	129	6420.8 A	89-130	22.5
0659	1541689	480772	101.0	4.5	12/17/2019	70.22	6489.95	2.0	6560.17	97	6461.2 A	61-101	28.8
0680	1543850	478746	80.0	4.5	12/17/2019	73.65	6485.22	2.0	6558.87	75	6481.9 A	50-80	3.3
0681	1540676	482734	117.0	6.0	12/18/2019	64.11	6496.41	2.1	6560.52	111	6447.4 A	67-117	49.0
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	4/16/2019	90.31	6465.73	2.0	6556.04	140	6414.0 A	80-120	51.7
0684	1540273	478499	143.0	6.0	5/6/2019	86.25	6467.03	2.0	6553.28	118	6433.3 A	83-143	33.8
0685	1539098	478170	100.0	4.5	12/18/2019	95.55	6461.02	1.7	6556.57	116	6438.9 A	60-100	22.1
0686	1545319	475438	115.0	4.5	9/30/2019	114.12	6464.68	1.8	6578.80	136	6441.0 A	75-115	23.7
0687	1539011	477276	102.0	6.0	12/18/2019	68.30	6487.66	2.2	6555.96	120	6433.8 A	62-102	53.8
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	12/18/2019	44.00	6504.92	0.8	6548.92	65	6483.1 A	40-65	21.8
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	12/18/2019	82.68	6463.76	3.3	6546.44	80	6463.1 A	41-91	0.6
0852	1535610	493989	74.0	5.0	12/18/2019	69.65	6520.49	2.5	6590.14	70	6517.7 A	54-74	2.8
0855	1532111	484184	105.0	5.0	12/17/2019	73.40	6467.71	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	12/17/2019	57.75	6498.43	3.3	6556.18	97	6455.9 A	63-103	42.5
0863	1533867	487912	110.0	5.0	4/29/2019	63.10	6493.46	2.5	6556.56	94	6460.1 A	63-103	33.4
0864	1533735	486464	95.0	5.0	4/2/2019	66.61	6480.11	1.9	6546.72	78	6466.9 A	44-84	13.2
0865	1534123	488429	97.0	5.0	4/29/2019	61.10	6495.68	2.2	6556.78	88	6466.6 A	37-97	29.1

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
0866	1534494	488340	120.0	5.0	11/12/2019	59.01	6499.11	1.8	6558.12	80	6476.3 A	33-113	22.8
0867	1533762	488409	88.0	5.0	12/17/2019	62.33	6493.57	2.0	6555.90	86	6467.9 A	48-88	25.7
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	12/18/2019	68.85	6475.64	1.7	6544.49	99	6443.8 A	44-94	31.9
* 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	12/18/2019	68.60	6475.66	1.9	6544.26	85	6457.4 A	58-88	18.3
0877	1533068	488067	70.0	5.0	12/18/2019	64.80	6488.28	1.9	6553.08	65	6486.2 A	58-68	2.1
0879	1532401	486104	70.0	5.0	12/18/2019	68.05	6476.50	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	12/17/2019	73.35	6491.69	2.0	6565.04	103	6460.0 A	76-96	31.7
0882	1541404	482396	110.0	4.5	2/7/2019	63.20	6497.96	2.0	6561.16	98	6461.2 A	70-110	36.7
0883	1540097	483039	100.0	5.0	12/17/2019	59.85	6497.28	1.9	6557.13	96	6459.3 A	60-90	38.0
0884	1542677	481498	90.0	5.0	2/7/2019	70.00	6496.10	1.0	6566.10	85	6480.2 A	58-88	16.0
0885	1541919	483474	100.0	5.0	12/17/2019	66.10	6498.54	1.5	6564.64	95	6468.1 A	70-100	30.4
0886	1542327	482487	90.0	5.0	12/17/2019	69.72	6494.83	1.5	6564.55	87	6476.1 A	60-90	18.8
0887	1543063	482469	67.0	5.0	12/17/2019	62.56	6505.17	1.5	6567.73	60	6506.2 A	42-67	0.0
0888	1542285	479335	105.0	5.0	12/18/2019	77.60	6479.73	1.1	6557.33	90	6466.2 A	75-105	13.5
0889	1540047	480222	65.0	5.0	12/18/2019	66.00	6483.63	1.5	6549.63	60	6488.2 A	35-65	0.0
0890	1541365	480088	101.0	5.0	10/28/2019	73.90	6484.53	1.7	6558.43	93	6463.7 A	81-101	20.8
0893	1541934	482244	98.0	4.5	12/17/2019	69.85	6494.12	2.1	6563.97	93	6468.9 A	78-98	25.3
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	12/18/2019	80.34	6481.91	2.0	6562.25	70	6490.3 A	63-93	0.0
0899	1543801	477288	110.0	4.0	10/14/2019	101.32	6469.52	2.0	6570.84	120	6448.8 A	70-110	20.7
0905	1532700	480850	120.0	5.0	5/9/2012	102.00	6443.00	0.0	6545.00	120	6425.0 A	100-120	18.0
0906	1532900	480450	---	---	8/29/1995	74.65	6462.75	0.0	6537.40	---	--- A	-	---
0909	1531900	483400	140.0	4.0	5/12/2015	84.49	6454.41	0.0	6538.90	112	6426.9 L	80-135	27.5
										112	6426.9 A	80-135	27.5
0910	1528800	481150	138.0	5.0	---	---	---	0.0	6535.00	132	6403.0 A	120-134	---
0912	1471000	478250	---	---	---	---	---	0.0	6530.00	---	--- A	-	---
0913	1555800	500950	---	8.0	1/24/1996	38.40	6604.60	0.3	6643.00	---	--- A	-	---

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
0914	1555500	500850	---	6.0	2/20/2019	48.25	6593.75	1.4	6642.00	---	--- A	-	---
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	2/4/2019	40.69	6583.31	1.9	6624.00	---	--- A	-	---
0922	1555200	492500	---	6.0	2/12/2019	49.51	6572.19	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	5/7/2019	92.10	6466.02	2.6	6558.12	125	6430.5 A	95-132	35.5
0936	1543621	472978	160.0	5.0	---	---	---	0.0	6573.38	160	6413.4 A	100-160	---
0939	1539751	483202	97.0	8.0	7/25/1996	59.31	6497.69	2.3	6557.00	---	--- A	-	---
0940	1538651	483040	70.0	---	7/24/1996	57.30	6495.70	8.8	6553.00	---	--- A	-	---
0942	1538306	483703	100.0	6.0	---	---	---	0.0	6550.20	95	6455.2 A	85-95	---
0947	1536206	491841	100.0	4.0	7/19/2018	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	5/30/2019	93.90	6461.10	0.0	6555.00	---	--- A	95-110	---
0996	1537621	477989	138.0	5.0	10/11/2019	95.23	6457.29	1.7	6552.52	136	6414.8 A	126-136	42.5
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	-	---

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
1014	---	---	---	9.0	---	---	---	0.0	0.00	---	--- A	-	---
1015	---	---	---	6.0	---	---	---	0.0	0.00	---	--- A	-	---
1018	---	---	---	5.0	---	---	---	0.0	0.00	---	--- A	-	---
1020	---	---	---	5.0	1/18/1996	15.17	-15.17	0.0	0.00	---	--- A	-	---
1021	---	---	---	---	1/18/1996	18.00	-18.00	0.0	0.00	---	--- A	-	---
H1	1541931	480022	98.0	4.5	10/28/2019	75.45	6483.80	2.0	6559.25	98	6459.3 A	78-98	24.6
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	12/17/2019	76.45	6483.42	2.0	6559.87	88	6469.9 A	66-88	13.6
H3	1541482	479947	92.0	4.5	10/28/2019	74.45	6482.65	2.0	6557.10	92	6463.1 A	72-92	19.6
H4	1542118	480122	99.0	4.5	10/28/2019	72.80	6484.80	2.0	6557.60	99	6456.6 A	79-99	28.2
H5	1541786	480167	99.0	4.5	10/28/2019	73.45	6484.99	2.0	6558.44	99	6457.4 A	79-99	27.6
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	10/28/2019	70.40	6487.17	2.0	6557.57	100	6455.6 A	80-100	31.6
H7	1541974	480333	102.0	4.5	10/28/2019	70.83	6488.71	2.0	6559.54	102	6455.5 A	82-102	33.2
H7A	1542002	480322	100.0	4.5	12/17/2019	71.77	6487.32	2.0	6559.09	100	6457.1 A	80-100	30.2
H7B	1541933	480350	98.0	4.5	10/28/2019	69.90	6489.48	2.0	6559.38	98	6459.4 A	78-98	30.1
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	10/28/2019	70.15	6490.47	2.0	6560.62	97	6461.6 A	77-97	28.8
H10	1541828	480550	100.0	4.5	10/28/2019	67.60	6490.96	2.0	6558.56	100	6456.6 A	80-100	34.4
H11	1541517	480586	97.0	4.5	10/28/2019	68.60	6490.82	2.0	6559.42	97	6460.4 A	77-97	30.4
H12	1542007	480744	100.0	4.5	10/28/2019	71.40	6492.22	2.0	6563.62	100	6461.6 A	80-100	30.6
H13	1542183	480842	100.0	4.5	5/28/2019	70.40	6492.02	2.0	6562.42	100	6460.4 A	80-100	31.6
H14	1541884	480906	100.0	4.5	3/25/2019	37.66	6521.19	2.0	6558.85	100	6456.9 A	80-100	64.3
H15	1541590	480941	97.0	4.5	10/28/2019	67.75	6492.66	2.0	6560.41	97	6461.4 A	77-97	31.3
H16	1542116	481129	92.0	4.5	11/12/2019	66.75	6491.23	2.0	6557.98	92	6464.0 A	72-92	27.3
H17	1541782	481151	99.0	4.5	2/21/2019	71.84	6491.52	2.0	6563.36	99	6462.4 A	79-99	29.2
H18	1542325	481231	93.0	4.5	2/25/2019	14.71	6546.06	2.0	6560.77	93	6465.8 A	73-93	80.3
H19	1541970	481270	91.0	4.5	10/28/2019	69.25	6493.29	2.0	6562.54	91	6469.5 A	71-91	23.8
H20	1541664	481314	86.0	4.5	10/28/2019	63.60	6494.08	2.0	6557.68	86	6469.7 A	66-86	24.4
H21	1542330	481444	95.0	4.5	10/28/2019	70.20	6494.20	2.0	6564.40	95	6467.4 A	75-95	26.8
H22	1541756	481496	94.0	4.5	10/28/2019	67.20	6494.33	2.0	6561.53	94	6465.5 A	74-94	28.8
H23	1542412	481663	95.0	4.5	10/28/2019	70.10	6494.86	2.0	6564.96	95	6468.0 A	75-95	26.9
H24	1542195	481605	100.0	4.5	10/28/2019	71.80	6494.07	2.0	6565.87	100	6463.9 A	80-100	30.2
H25	1541937	481652	100.0	4.5	10/28/2019	70.10	6494.69	2.0	6564.79	100	6462.8 A	80-100	31.9
H26	1542244	481823	98.0	4.5	7/29/2019	71.70	6495.11	2.0	6566.81	98	6466.8 A	78-98	28.3
H27	1541924	481863	96.0	4.5	10/28/2019	70.20	6495.05	2.0	6565.25	96	6467.3 A	76-96	27.8

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			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
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
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	8/28/2019	69.33	6495.73	2.0	6565.06	95	6468.1 A	75-95	27.7
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	8/28/2019	52.11	6507.85	2.0	6559.96	100	6458.0 A	80-100	49.9
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	10/28/2019	67.50	6499.86	2.0	6567.36	95	6470.4 A	75-95	29.5
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	3/5/2019	62.88	6506.37	2.0	6569.25	95	6472.3 A	75-95	34.1
H56	1542625	484804	95.0	4.5	10/28/2019	63.80	6505.69	2.0	6569.49	95	6472.5 A	75-95	33.2
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

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
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
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	10/28/2019	66.30	6508.32	2.0	6574.62	93	6479.6 A	73-93	28.7
H71	1542939	485966	91.0	4.5	10/28/2019	64.65	6507.67	2.0	6572.32	91	6479.3 A	71-91	28.3
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	12/17/2019	64.86	6504.05	2.0	6568.91	100	6466.9 A	80-100	37.1
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	10/28/2019	67.30	6495.06	2.0	6562.36	98	6462.4 A	78-98	32.7
M16	1543252	485112	93.3	5.0	12/17/2019	62.06	6508.53	1.4	6570.59	100	6469.2 A	60-100	39.3
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	12/17/2019	62.90	6509.99	2.0	6572.89	80	6490.9 A	45-85	19.1
MP	1544164	485492	80.0	5.0	12/17/2019	64.82	6509.66	2.1	6574.48	50	6522.4 A	33-63	0.0
MR	1542609	483574	100.0	5.0	12/17/2019	68.98	6497.28	1.8	6566.26	100	6464.5 A	54-94	32.8
MS	1542607	485570	82.0	5.0	12/17/2019	61.34	6509.33	1.5	6570.67	89	6480.2 A	52-82	29.2
MT	1543221	483531	98.0	4.5	12/17/2019	60.55	6506.88	2.3	6567.43	87	6478.1 A	34-94	28.8
MV	1542618	484418	105.0	4.5	12/17/2019	67.15	6502.63	1.3	6569.78	95	6473.5 A	75-105	29.1
R1	1534551	487790	120.0	5.0	12/17/2019	55.85	6499.27	2.0	6555.12	84	6469.1 A	80-120	30.2
										84	6469.1 M	80-120	30.2
R2	1534548	487968	115.0	5.0	8/28/2019	55.05	6499.11	2.0	6554.16	83	6469.2 M	75-115	30.0

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
R2	1534548	487968	115.0	5.0	8/28/2019	55.05	6499.11	2.0	6554.16	83	6469.2 A	75-115	30.0
R3	1534546	488196	140.0	5.0	11/11/2019	54.40	6501.33	2.0	6555.73	88	6465.7 A	60-80	35.6
										88	6465.7 M	100-140	35.6
R4	1534541	488446	130.0	5.0	8/28/2019	56.58	6502.20	2.0	6558.78	84	6472.8 A	90-130	29.4
										84	6472.8 M	90-130	29.4
R5	1534560	488666	125.0	5.0	8/28/2019	55.55	6502.20	2.0	6557.75	71	6484.8 M	65-125	17.5
										71	6484.8 A	65-125	17.5
R6	1534356	488448	130.0	5.0	3/25/2019	38.42	6521.22	2.0	6559.64	68	6489.6 M	110-130	31.6
										68	6489.6 A	50-90	31.6
R7	1534399	488087	145.0	5.0	3/25/2019	31.52	6523.29	2.0	6554.81	74	6478.8 M	125-145	44.5
										74	6478.8 A	65-105	44.5
R8	1534412	487891	145.0	5.0	3/25/2019	34.16	6520.00	2.0	6554.16	94	6458.2 A	65-105	61.8
R9	1534420	487700	120.0	4.5	3/25/2019	33.61	6522.14	2.0	6555.75	104	6449.8 A	60-120	72.4
R10	1534305	488003	120.0	4.5	8/28/2019	58.05	6497.17	2.0	6555.22	83	6470.2 A	60-120	27.0
R11	1534320	488280	120.0	4.5	12/17/2019	62.11	6496.34	2.0	6558.45	70	6486.5 M	60-120	9.9
										70	6486.5 A	60-120	9.9
R12	1534220	488360	120.0	4.5	3/25/2019	36.82	6520.13	2.0	6556.95	66	6489.0 A	60-120	31.2
										66	6489.0 M	60-120	31.2
R13	1534220	488150	120.0	4.5	3/25/2019	43.18	6513.71	2.0	6556.89	96	6458.9 A	60-120	54.8
R14	1534168	487971	100.0	4.5	3/25/2019	33.91	6522.88	2.0	6556.79	83	6471.8 A	60-100	51.1
R15	1534180	487700	100.0	4.5	3/25/2019	37.64	6518.59	2.0	6556.23	98	6456.2 A	60-100	62.4
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	3/25/2019	40.38	6514.84	2.0	6555.22	95	6458.2 A	60-100	56.6
R18	1534030	487970	100.0	4.5	11/12/2019	63.30	6492.70	2.0	6556.00	87	6467.0 A	60-100	25.7
R19	1534029	488173	100.0	4.5	3/25/2019	48.62	6507.88	2.0	6556.50	90	6464.5 A	60-100	43.4
R20	1534120	488260	100.0	4.5	4/29/2019	61.25	6495.09	2.0	6556.34	80	6474.3 A	60-100	20.8
R21	1534031	488350	100.0	4.5	3/25/2019	31.52	6524.05	2.0	6555.57	88	6465.6 A	60-100	58.5
R22	1533940	488091	100.0	4.5	4/29/2019	62.85	6494.29	2.0	6557.14	91	6464.1 A	60-100	30.2
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	---

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
R35	1533668	486345	90.0	4.5	---	---	---	2.0	6545.26	90	6453.3 A	70-90	---
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 A	100-160	29.0
										98	6444.5 L	100-160	29.0
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436.0 L	110-150	42.4
										107	6436.0 A	110-150	42.4
R60A	1533163	486219	107.0	4.5	---	---	---	2.0	6544.99	---	--- A	60-107	---
R61A	1533135	486485	100.0	4.5	---	---	---	2.0	6544.69	95	6447.7 A	60-100	---
R63	1533189	487028	95.0	4.5	---	---	---	2.0	6549.92	95	6452.9 A	75-95	---
R64	1533059	486921	95.0	4.5	---	---	---	2.0	6548.15	85	6461.2 A	75-95	---
R65A	1533056	486614	95.0	4.5	---	---	---	2.0	6545.64	95	6448.6 A	75-95	---
R66A	1533023	486355	100.0	4.5	---	---	---	2.0	6545.33	---	--- A	60-100	---
R67A	1532999	486075	90.0	4.5	---	---	---	2.0	6544.38	90	6452.4 A	70-90	---
R68	1533025	485819	160.0	4.5	10/10/2014	69.44	6475.41	2.0	6544.85	99	6443.9 A	100-160	31.6
										99	6443.9 L	100-160	31.6
R69	1532987	486024	160.0	4.5	4/8/2014	70.53	6474.82	2.0	6545.35	96	6447.4 A	100-160	27.5
										96	6447.4 L	100-160	27.5
R70A	1532881	486261	105.0	4.5	---	---	---	2.0	6545.30	---	--- A	60-105	---

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
R73	1533019	485560	150.0	4.5	5/13/2015	69.92	6474.42	2.3	6544.34	99	6443.0 A	110-150	31.4
										99	6443.0 L	110-150	31.4
R74	1532852	485502	140.0	4.5	12/17/2019	71.38	6472.65	2.4	6544.03	104	6437.6 L	100-140	35.0
										104	6437.6 A	100-140	35.0
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	---	--- A	80-120	---
										---	--- L	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 2019 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 2019 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 2019 (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 2019 with the collection and treated water injection (see Figure 4.2-1B). Water-level elevations also decreased a few feet in Section 33 (see the western half of Figure 4.2-1), and this was likely due to less than average recharge. The water levels in Section 28 also generally decreased a few feet in 2019.

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 2019 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 down-gradient, 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 eight years of data to illustrate the recent trends.

Water levels in the alluvial aquifer up-gradient of the LTP have been fairly stable during the last year except for a gradual declining trend in the DD wells and a gradual rise in wells ND, P, P4 and Q. Figures 4.2-3 and 4.2-3A present water-level elevation data for up-gradient wells ND, P, P3, P4, Q and R and DD, DD2, DD3, DD4, DD5 and P2 respectively.

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 2019. The water levels actually indicate a very flat gradient between wells SP and SO for 2019. 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 Figure 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 operation of 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 four years due to a larger collection rate.

The alluvial water levels north of Murray Acres gradually declined in 2019 in wells H56, M7, M9, MO, MR and MX (see Figure 4.2-7) in 2019. 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 2019. The smaller collection rate up-gradient of these two wells in 2019 caused water level to be fairly steady in 2019. 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 STP 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 2014 and some of 2015, 2018 and 2019, 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. A slight reversal was generally maintained with the smaller collection rates in 2019.

Figure 4.2-11 presents water-level elevation data for wells C8, 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 levels in 2018 and 2019. Figure 4.2-12 shows the water-level elevation plots for wells K5, K8, K9 and X which shows a steady decline in the water levels in well X in 2019.

Water-level elevations in the alluvial aquifer north of the Broadview Acres injection system declined in 2019. The pumping in Felice Acres for South Off-Site collection supply caused overall steady water level in well 497 in 2019 and a very gradual decline in well Q48 to the north (see water levels for wells 497, F, GH, Q48 and SUB3 on Figure 4.2-13). Figure 4.2-13A shows an overall small decline in water levels in alluvial wells Q7, Q15, Q21, Q27 and Q29 since 2015.

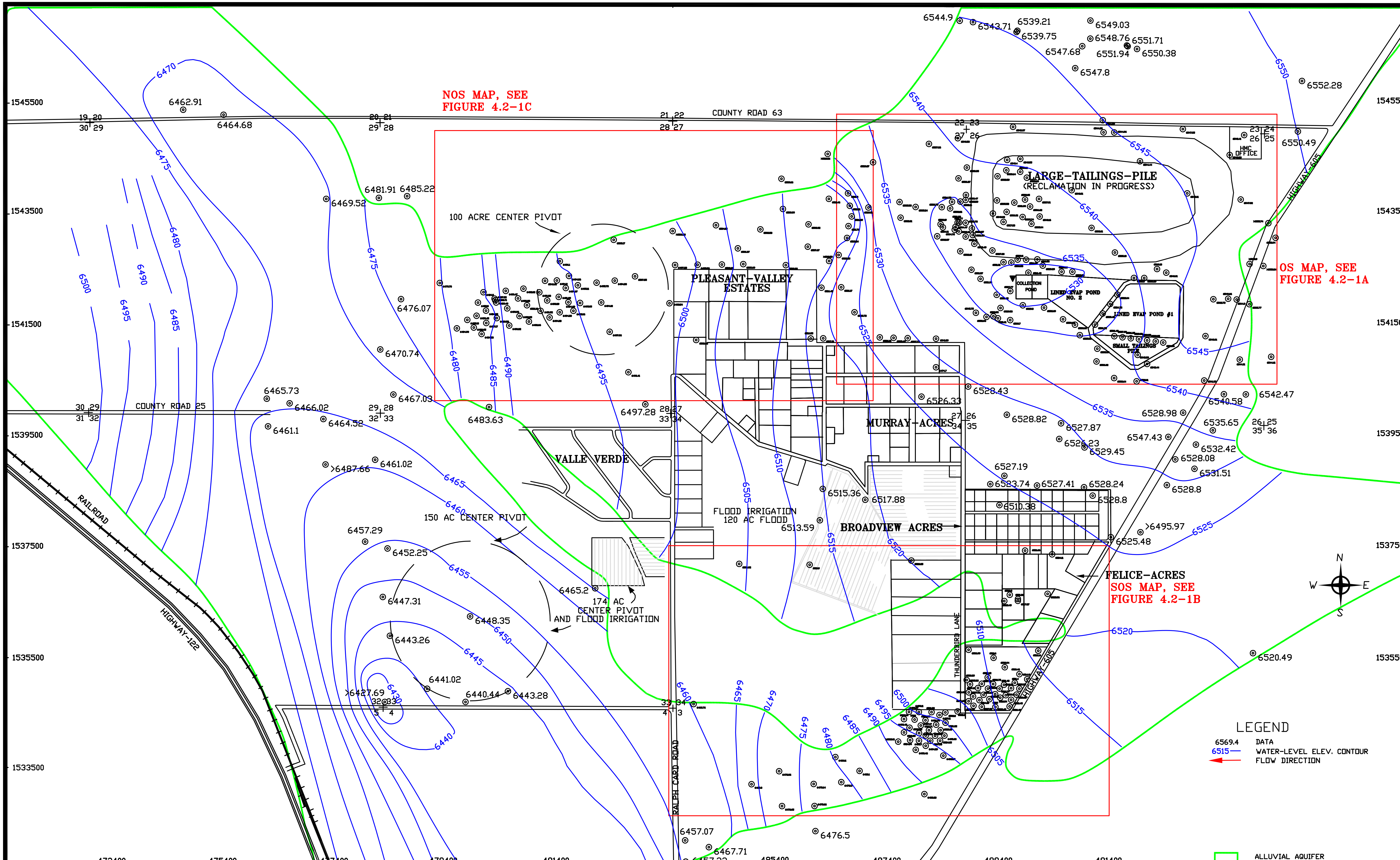
Water levels in the former flood irrigation area south of Murray Acres in alluvial wells 555, 556, 557, 844, 845 and 846 during 2019 (see Figure 4.2-14) gradually declined in wells 557, 644 and 845 while levels rose in wells 555, 556 and 846. The abrupt drop in water levels in wells 555, 556, 844 and 845 during the sampling performed in early 2018 is attributed to a malfunctioning or improperly calibrated water-level meter. Similar water-level drops occurred during the same sampling cycle in wells located in the North Off-site area (see 4.2-16). The water-level drop during the sampling cycle was of similar magnitude in the affected wells and occurred in wells representing a very large area. Therefore, the affected water-level measurements are considered erroneous because there were no significant changes in alluvial collection rates that could have plausibly caused a relatively uniform temporary water-level change over such a large area.

Figure 4.2-15 presents water-level hydrographs for five wells in Section 3. Water levels gradually declined in these wells in 2019. 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. The water-level drop in early 2018 in wells 881 and 886 is attributed to the instrument problem discussed above. Water levels in 2019 overall slightly declined 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 and shows an overall decline in these water levels in 2019.

Figure 4.2-17 presents the water-level time plots for two wells in Section 20, one well in Section 29 and two wells in Section 32. Water levels gradually declined in these wells in 2019.

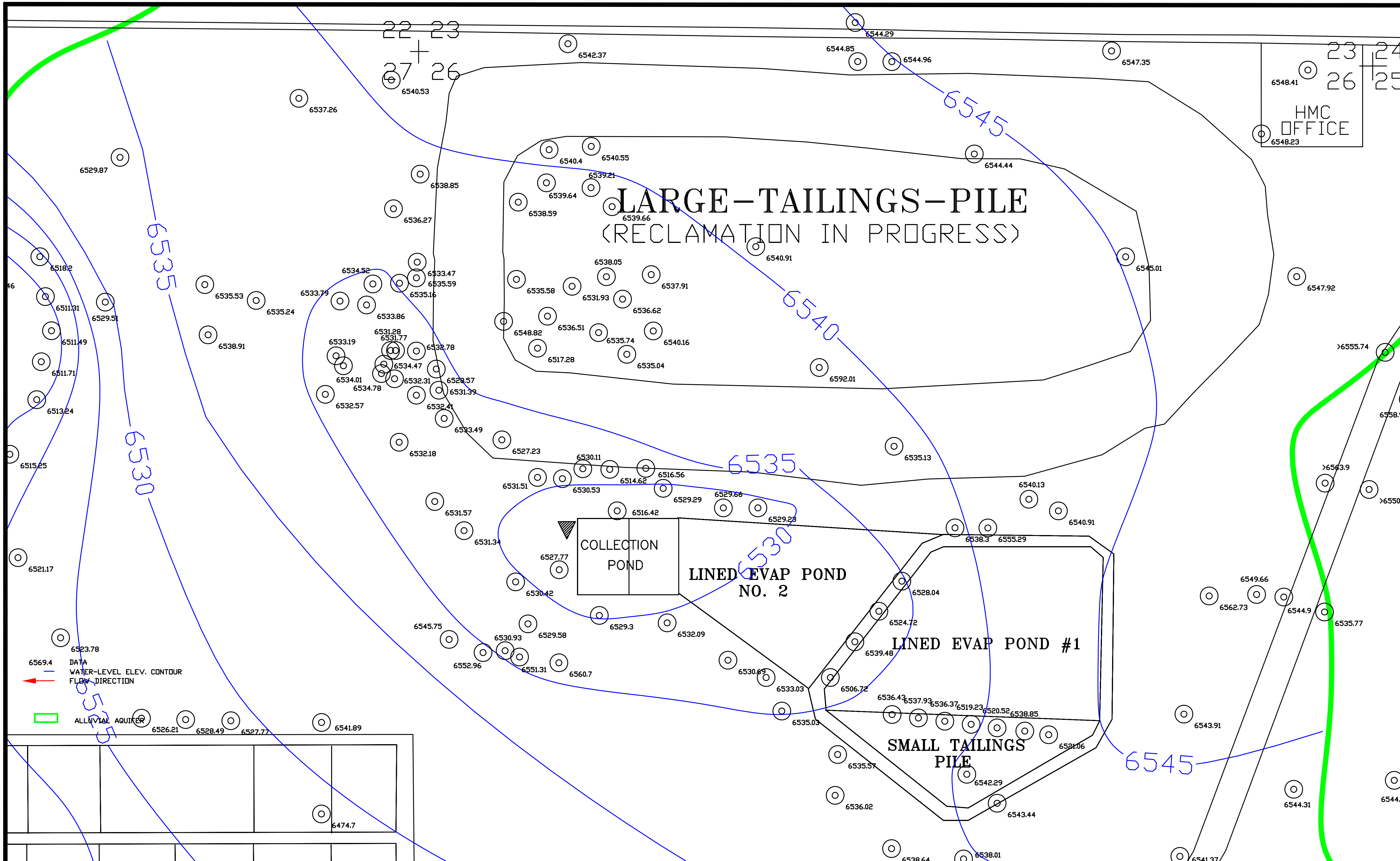
Figure 4.2-18 presents the water-level plots for the Section 33 wells. Water levels were fairly steady in these wells in 2019. No pumping other than for sample collection from the Section 33 wells was done after 2012 and no future pumping operations are anticipated.



SCALE: 1"=1600'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/22/2020

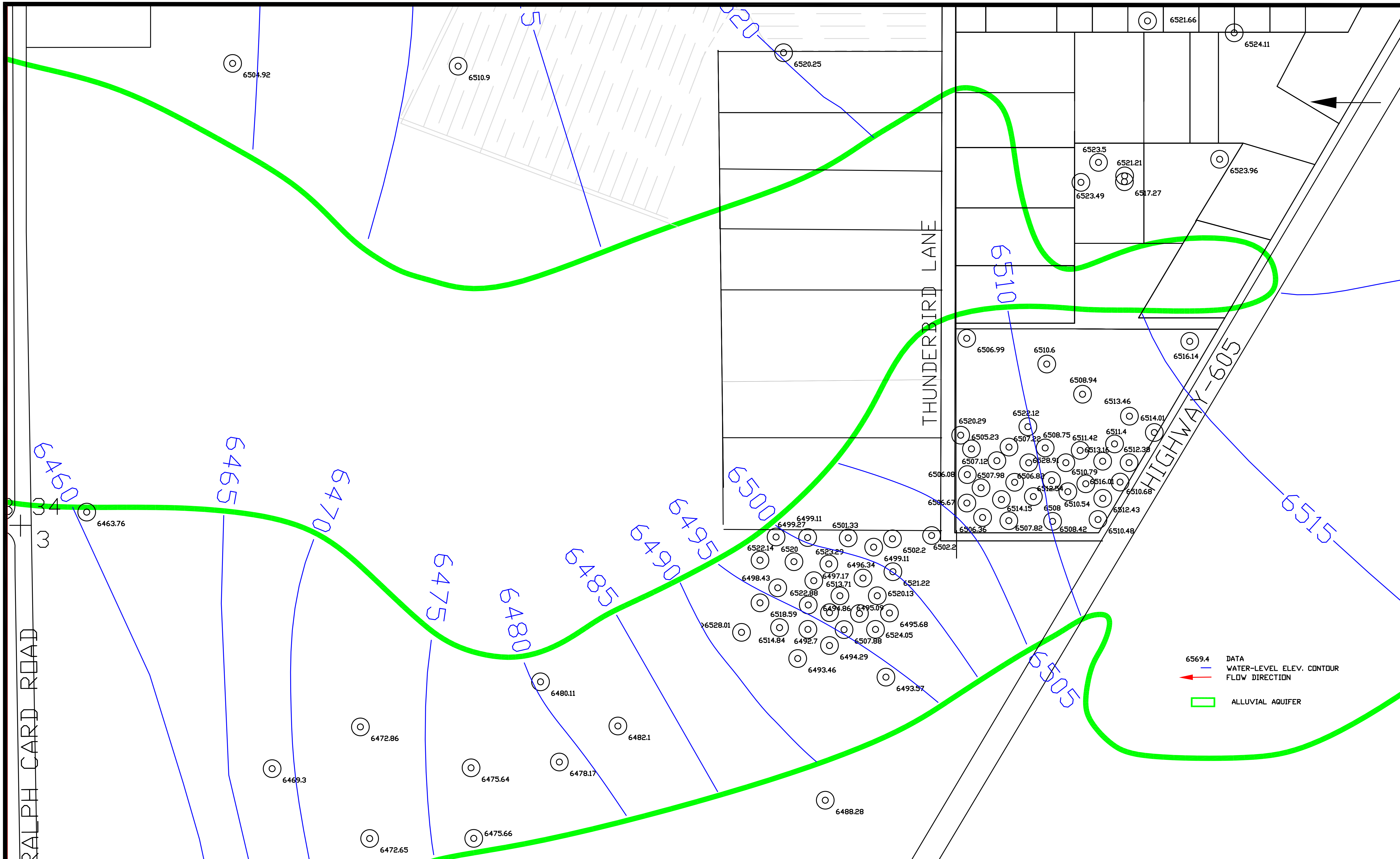
FIGURE 4.2-1. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, FALL 2019, FT-MSL

4.2-6



SCALE: 1"=500'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/13/2020

FIGURE 4.2-1A. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, OS, FALL 2019, FT-MSL



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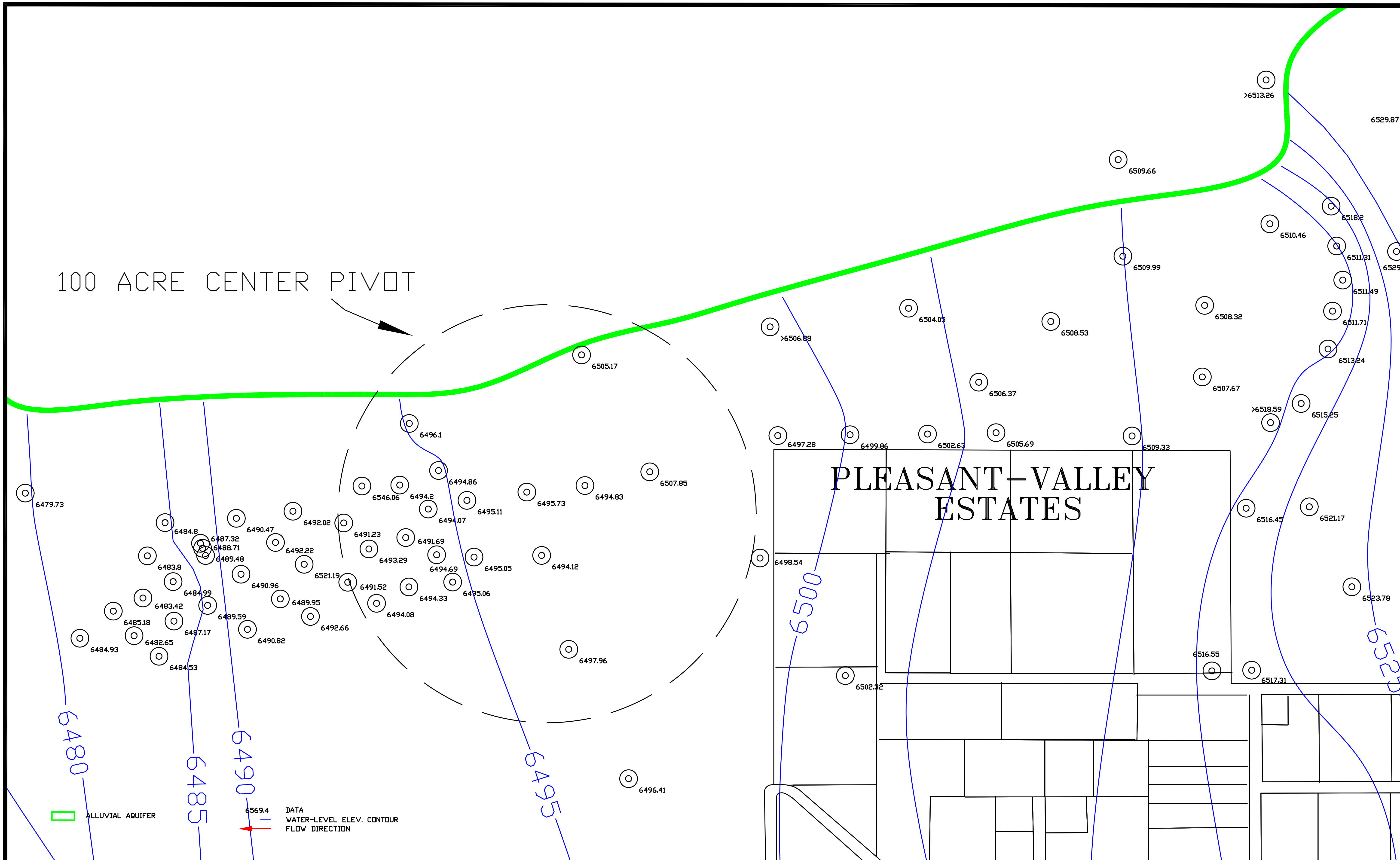
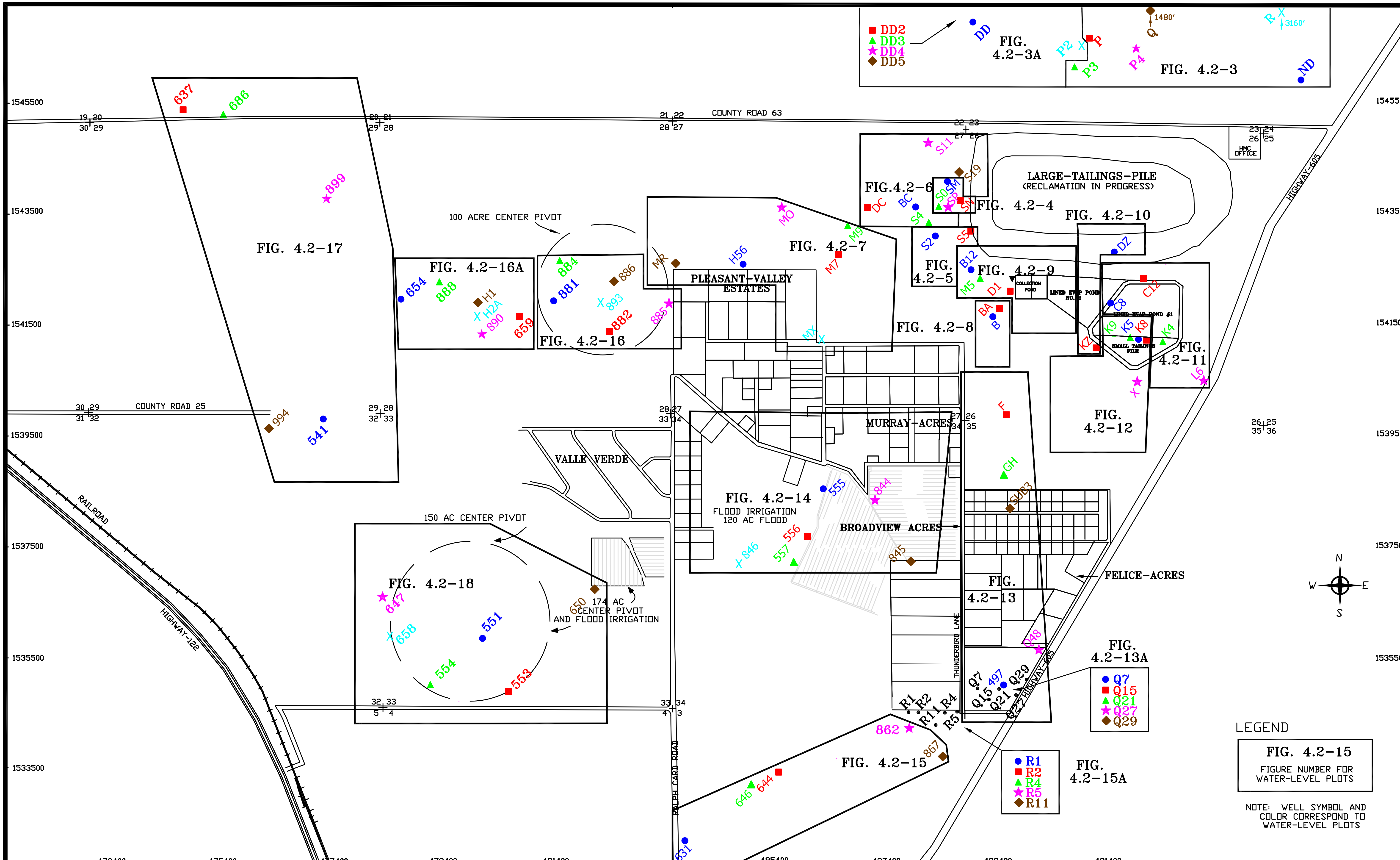
1600QAL19
DATE: 1/10/2020

FIGURE 4.2-1B. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, SOS, FALL 2019, FT-MSL



SCALE: 1"=500'
C:\PROJECTS\2020-06
1600QAL19
DATE: 1/10/2020

FIGURE 4.2-1C. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, NOS, FALL 2019, FT-MSL



SCALE: 1"=1600'
C:\PROJECTS\2020-06 1600QAL19
DATE: 1/2/2020

FIGURE 4.2-2. LOCATION OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS, 2019

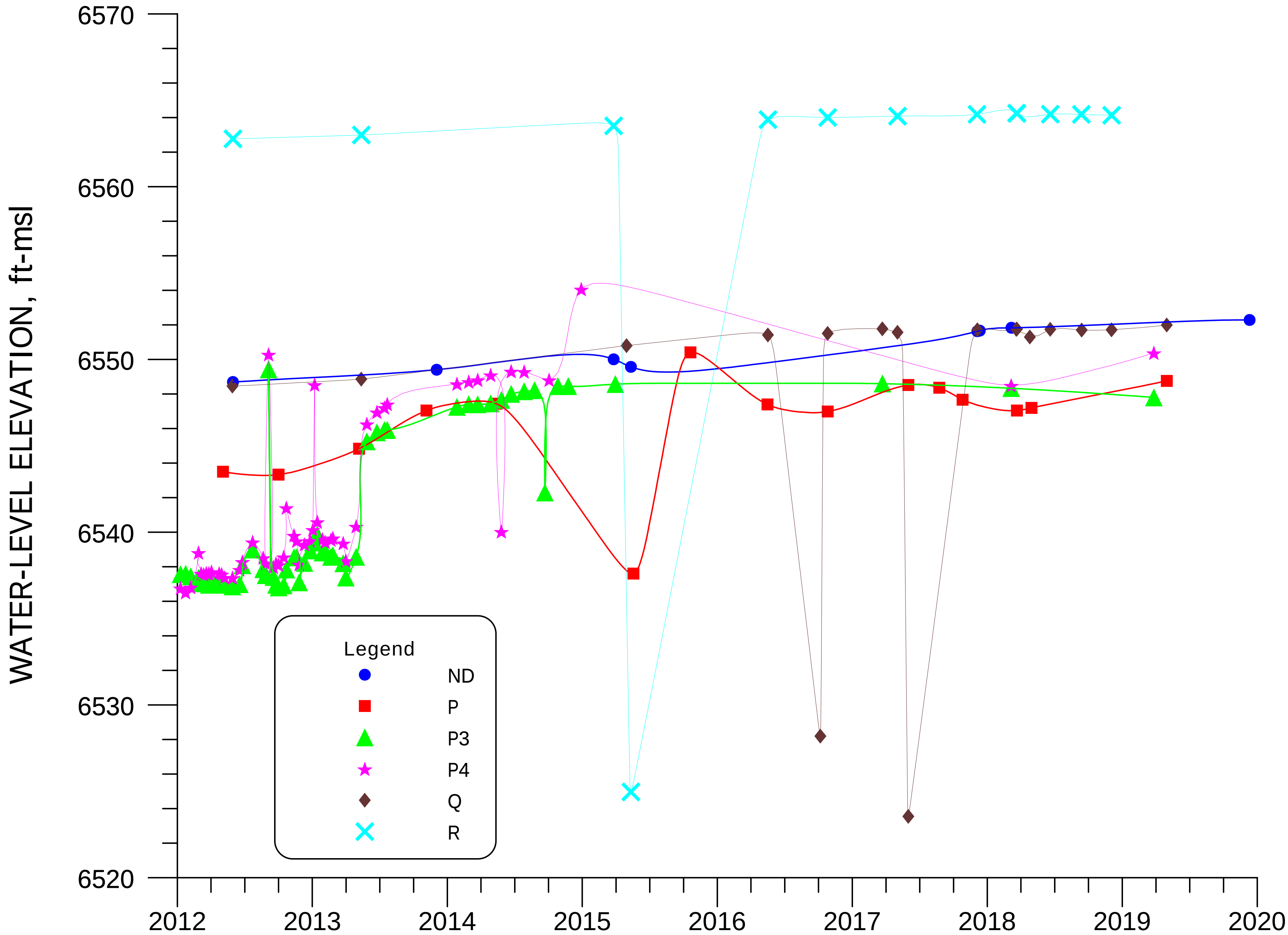


FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS ND, P, P3, P4, Q AND R.

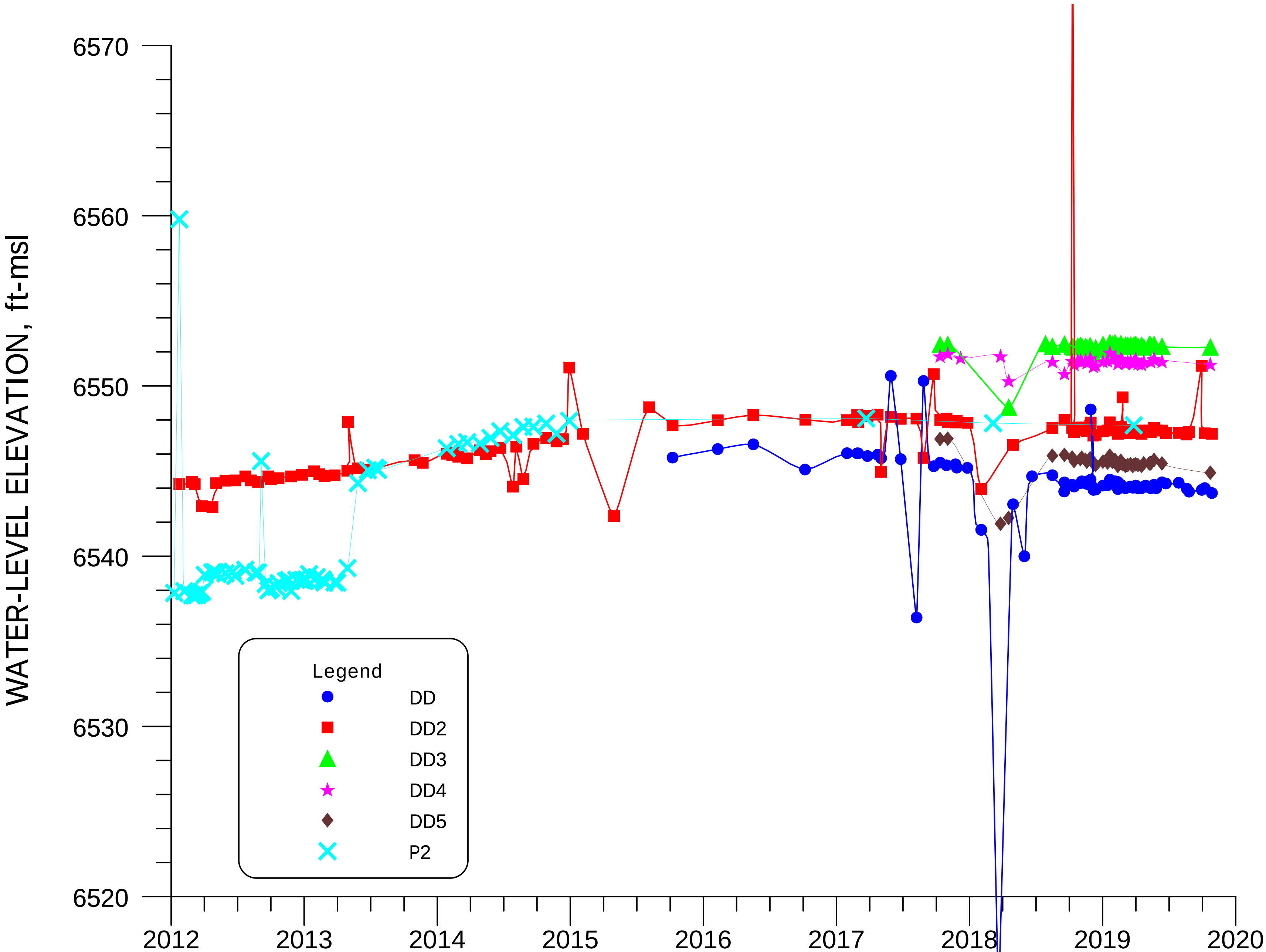


FIGURE 4.2-3A. WATER-LEVEL ELEVATION FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

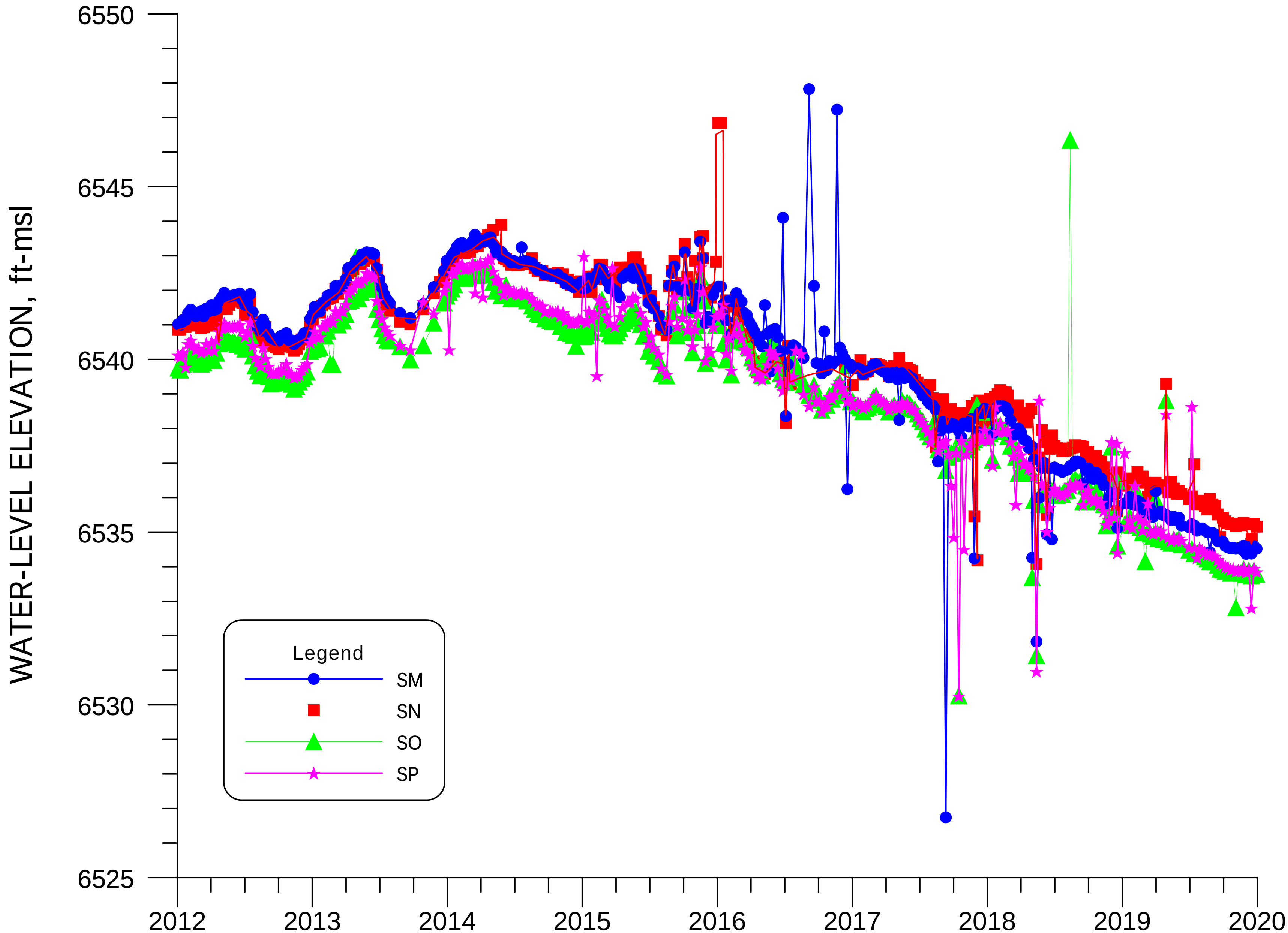


FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SM, SN, SO, AND SP.

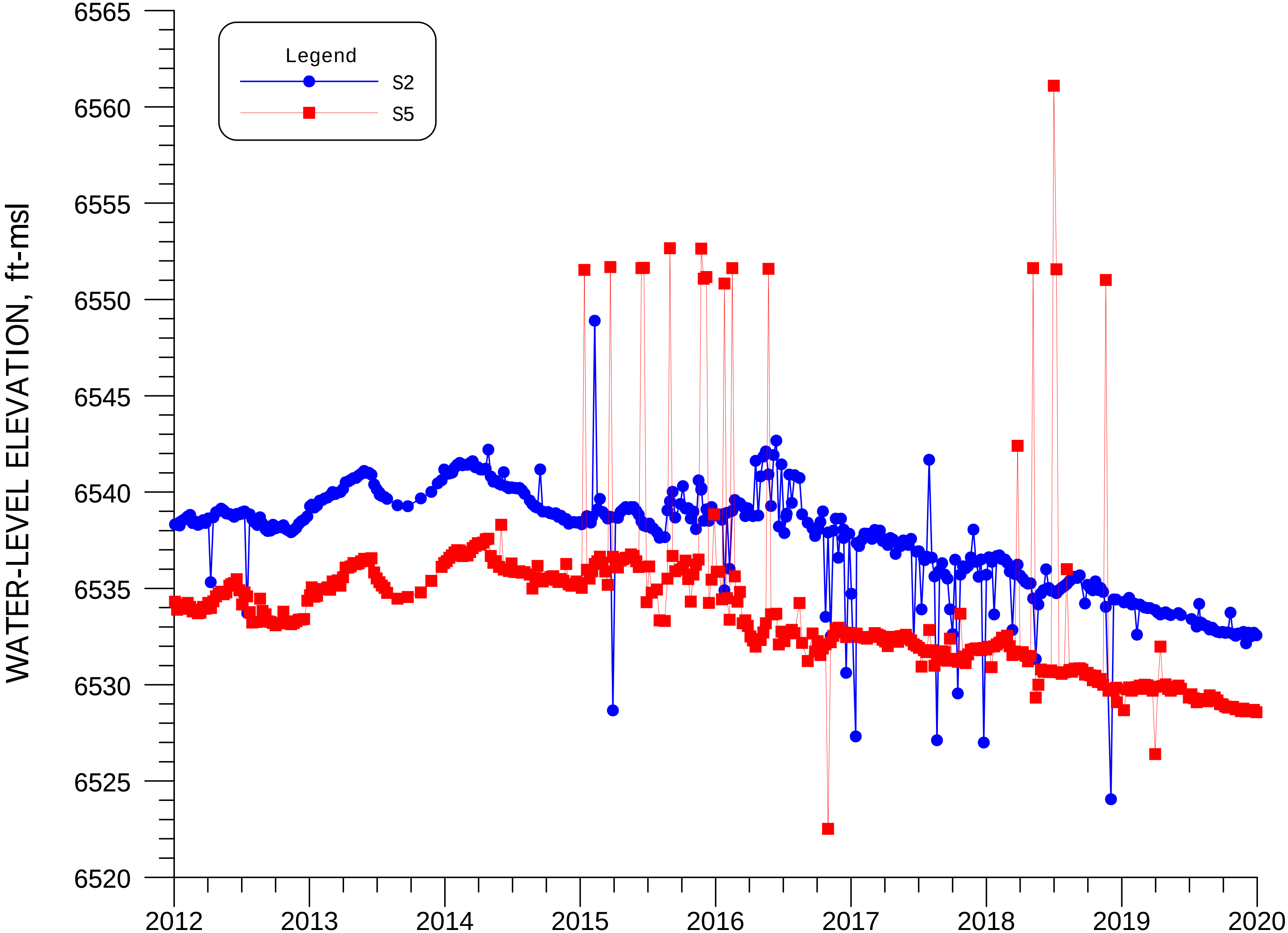


FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S2 AND S5.

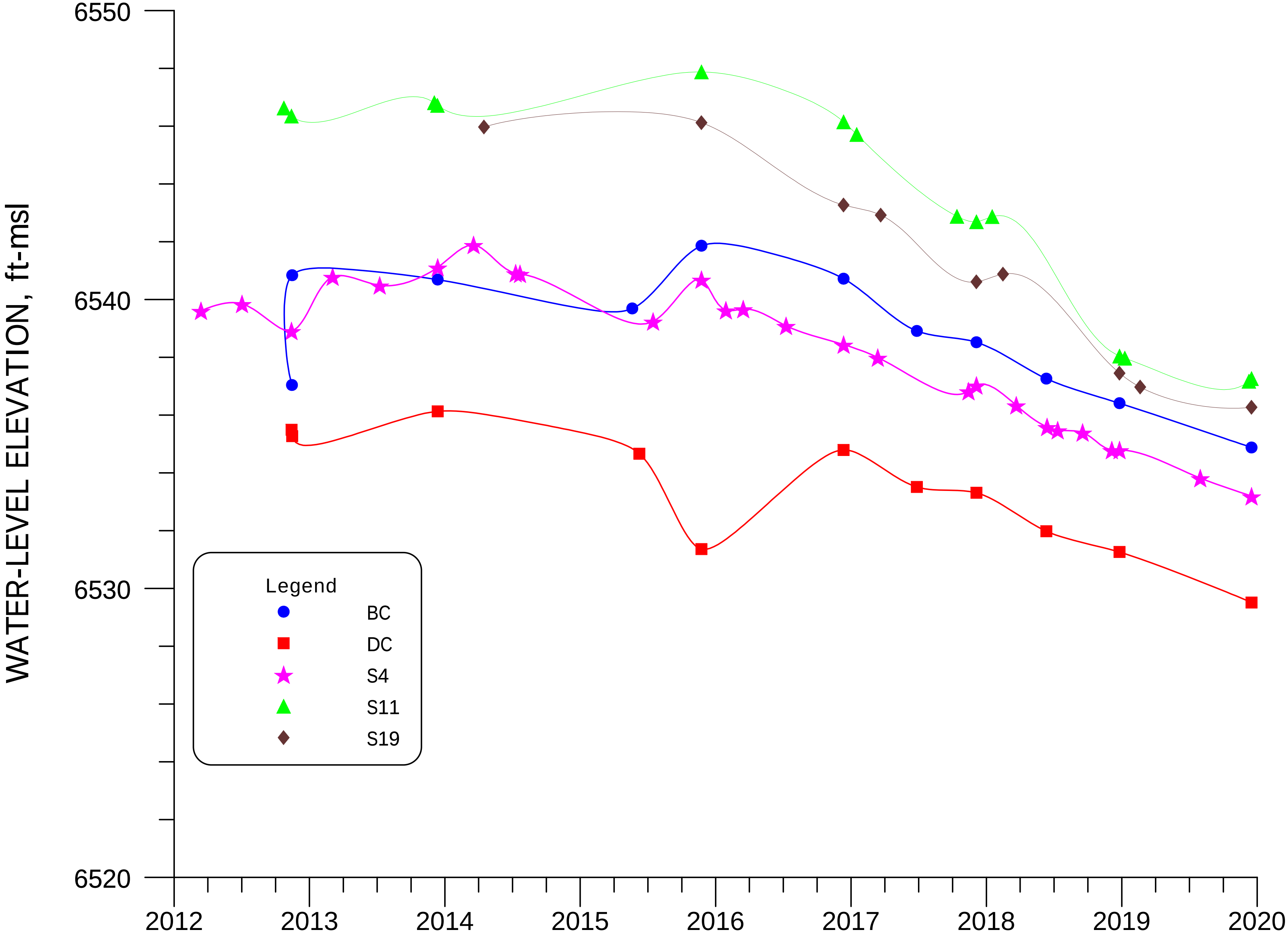


FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, S4, S11 AND S19.

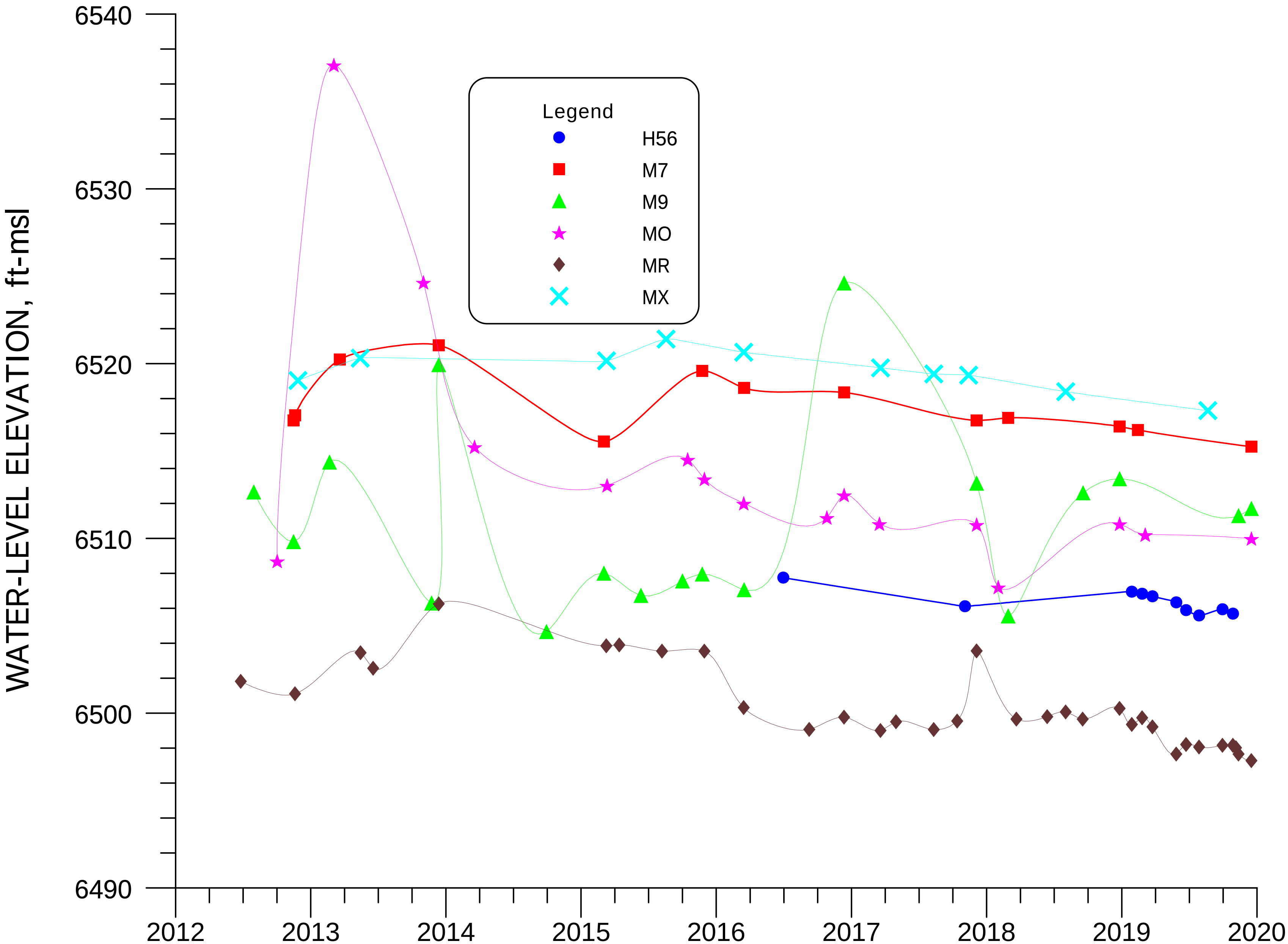


FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS H56, M7, M9, MO, MR AND MX.

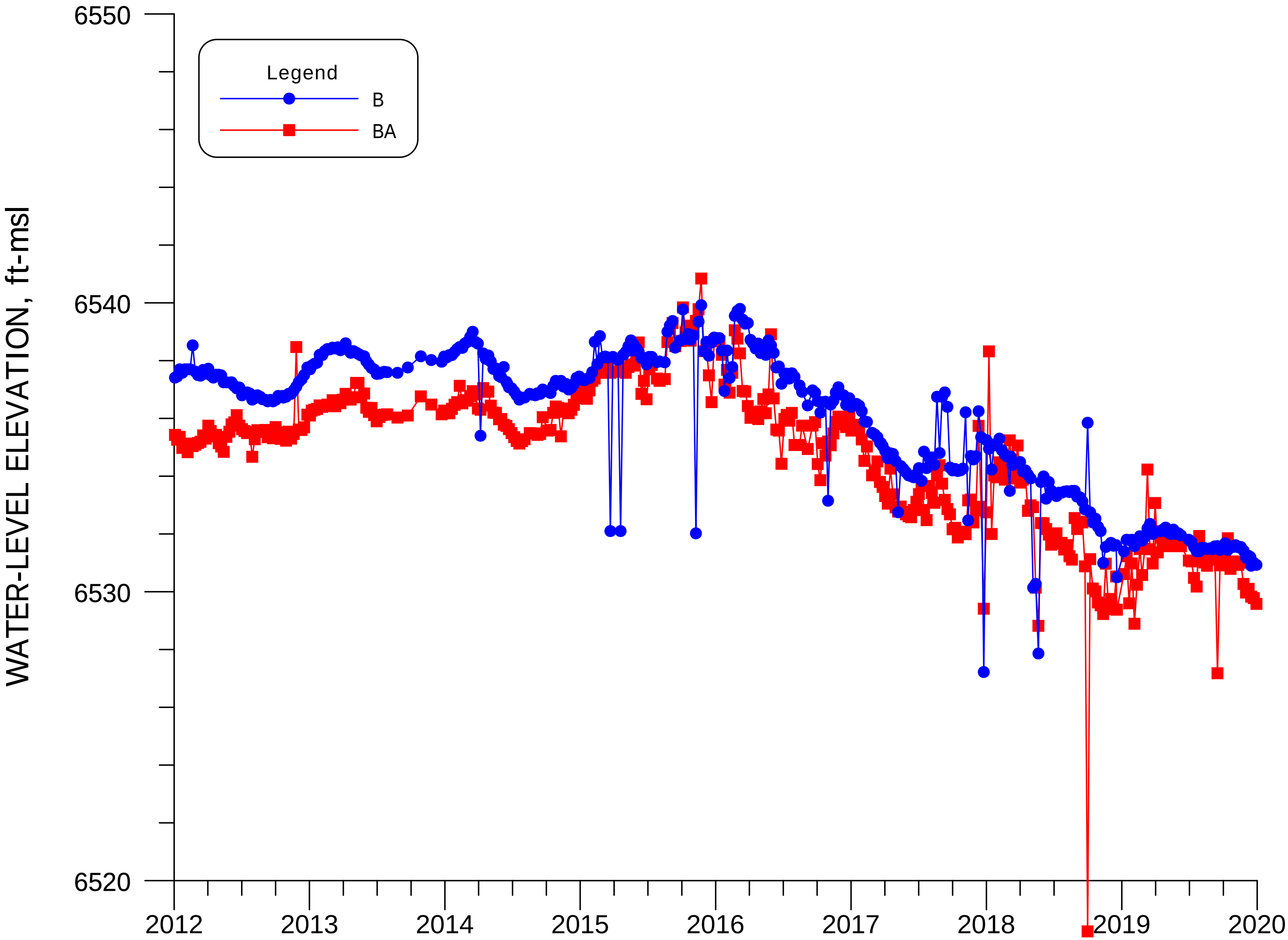


FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.

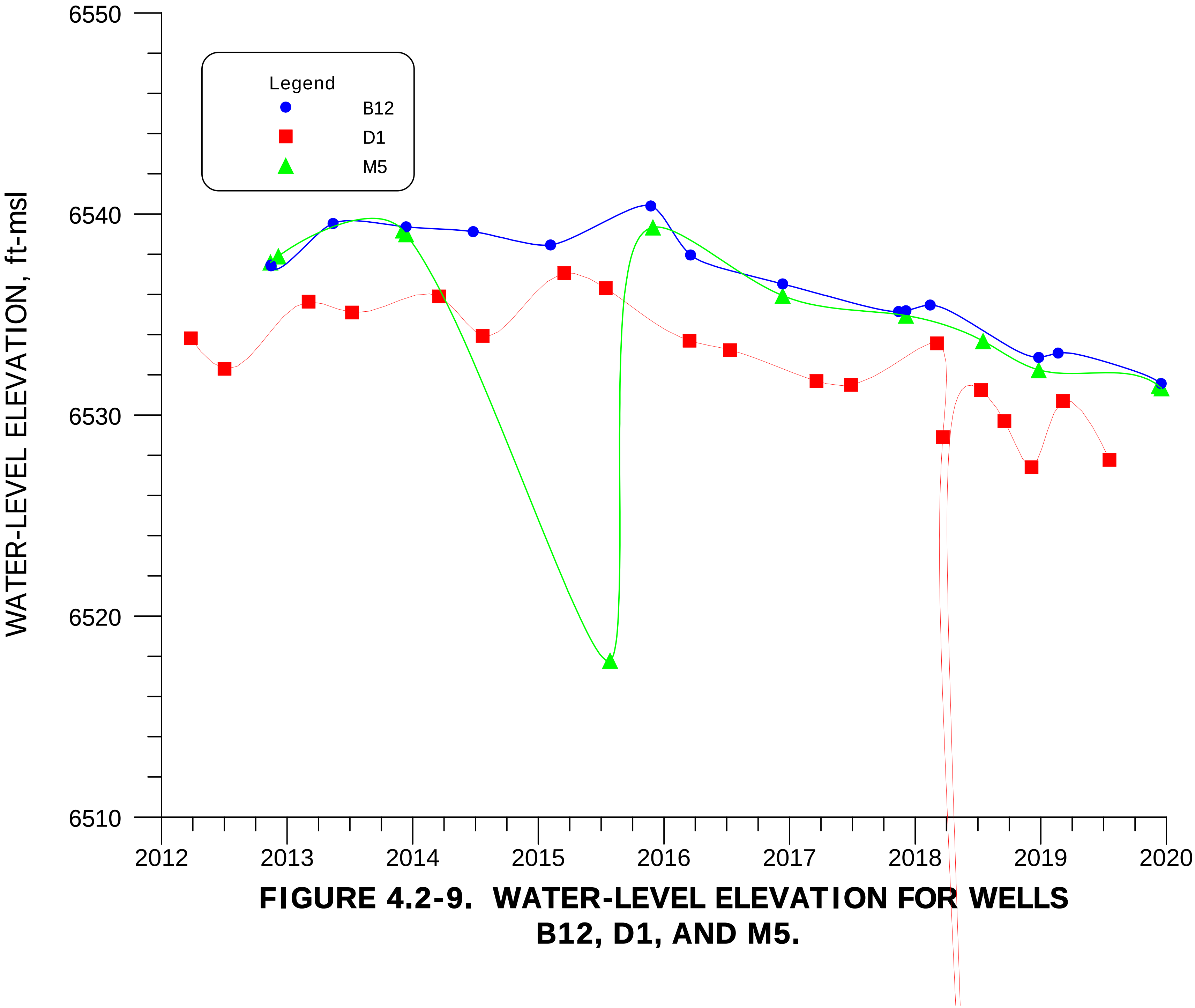


FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS B12, D1, AND M5.

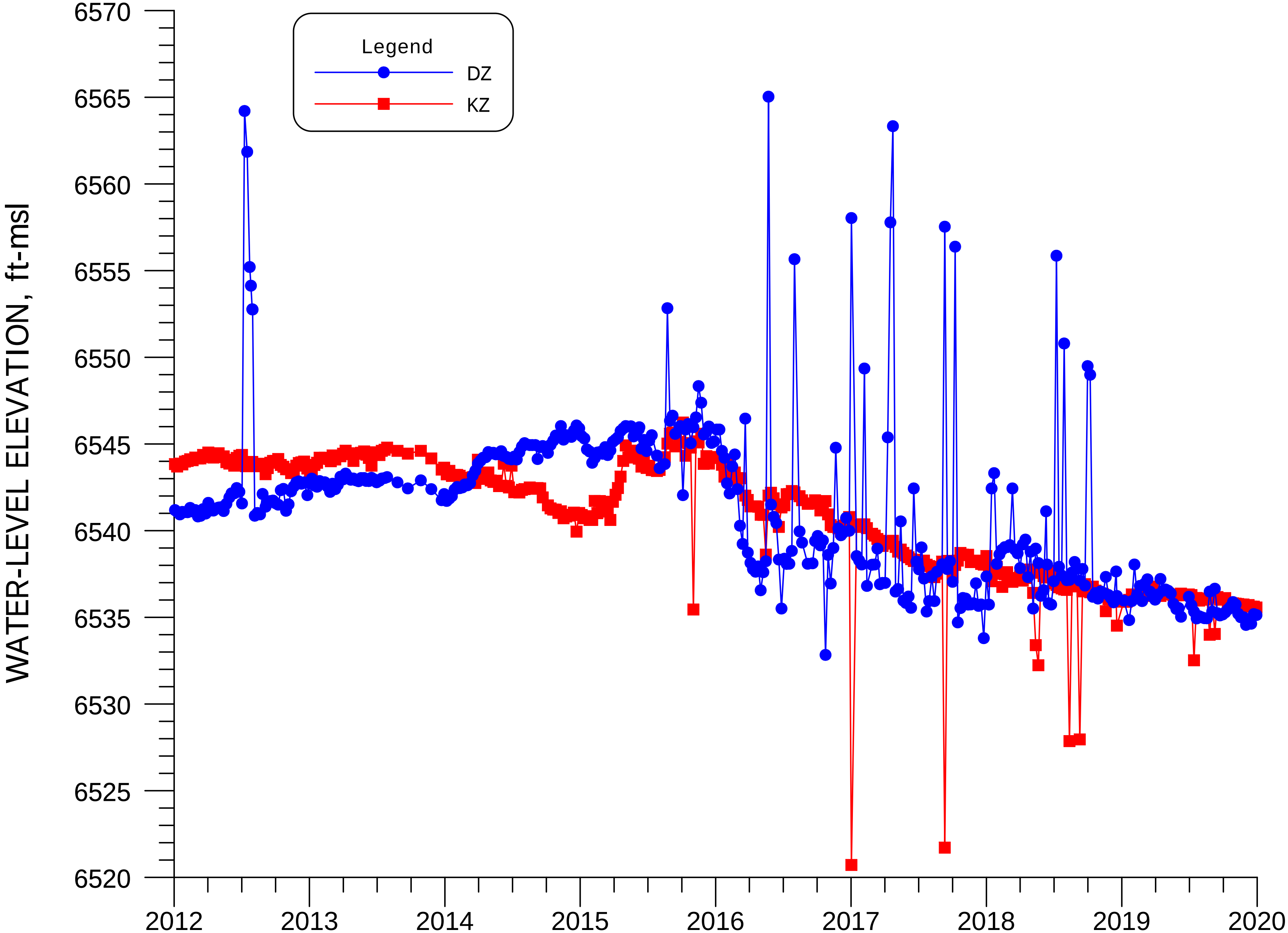


FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

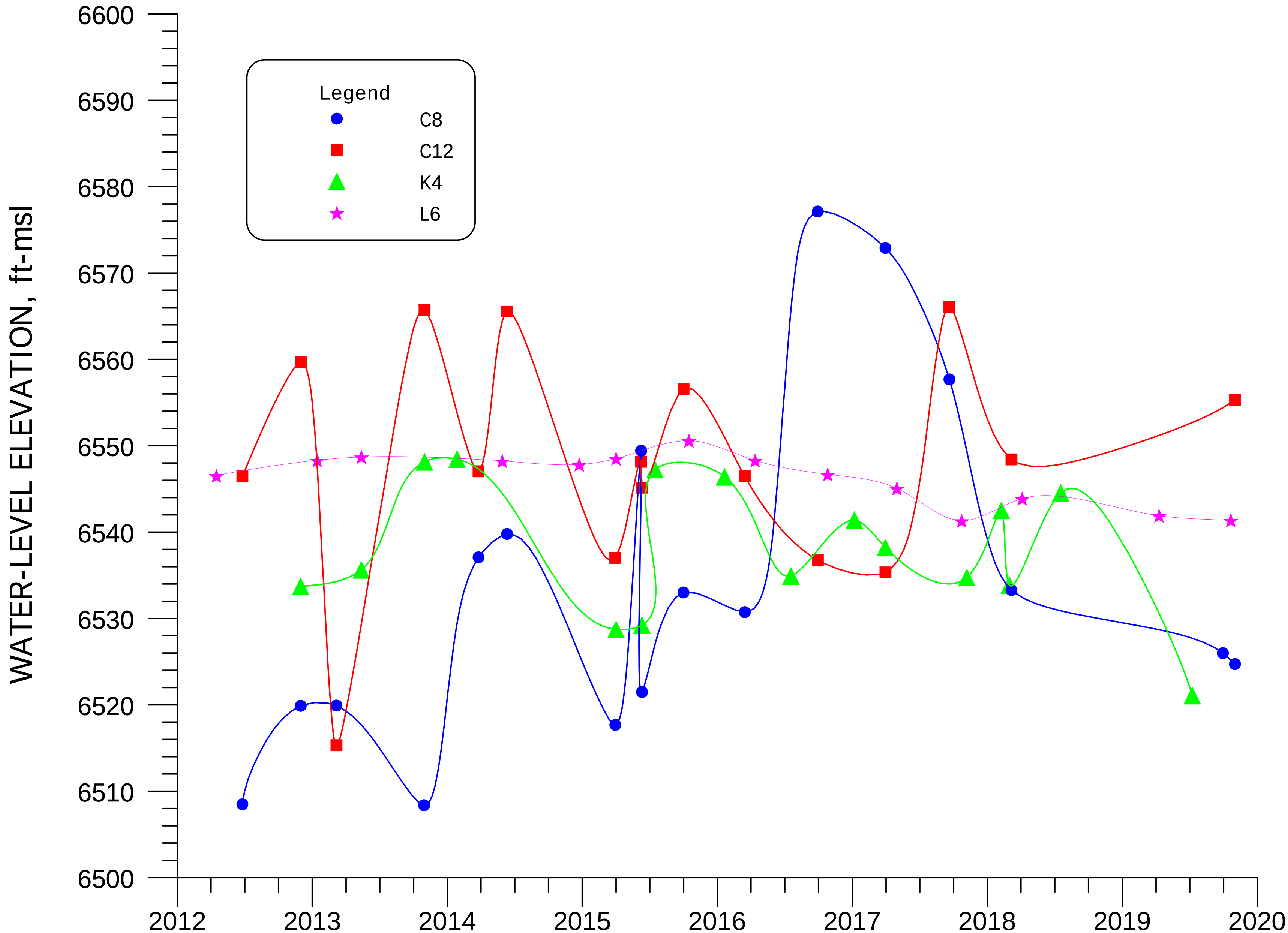


FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS C8, C12, K4 AND L6.

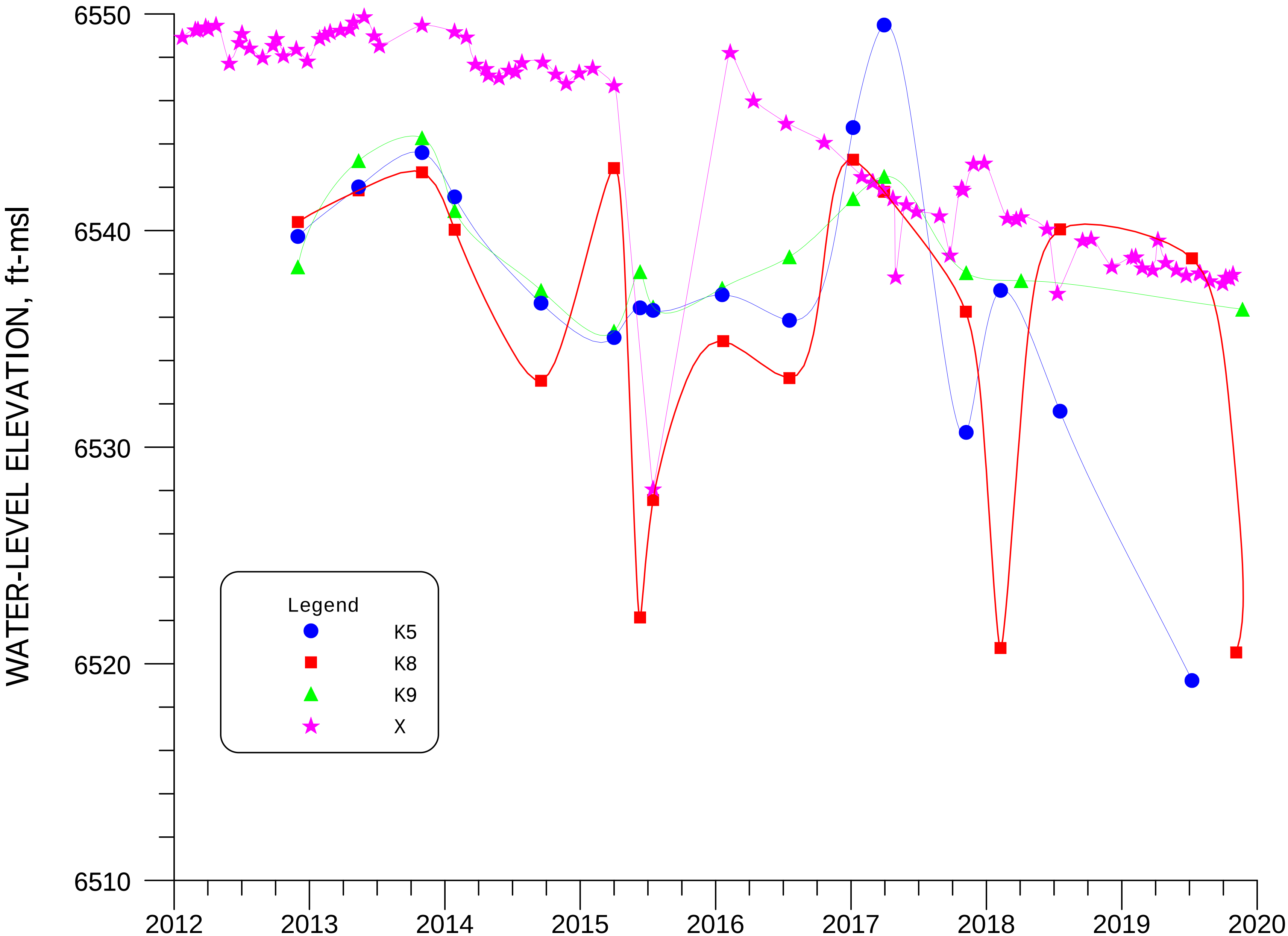


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS K5, K8, K9, AND X.

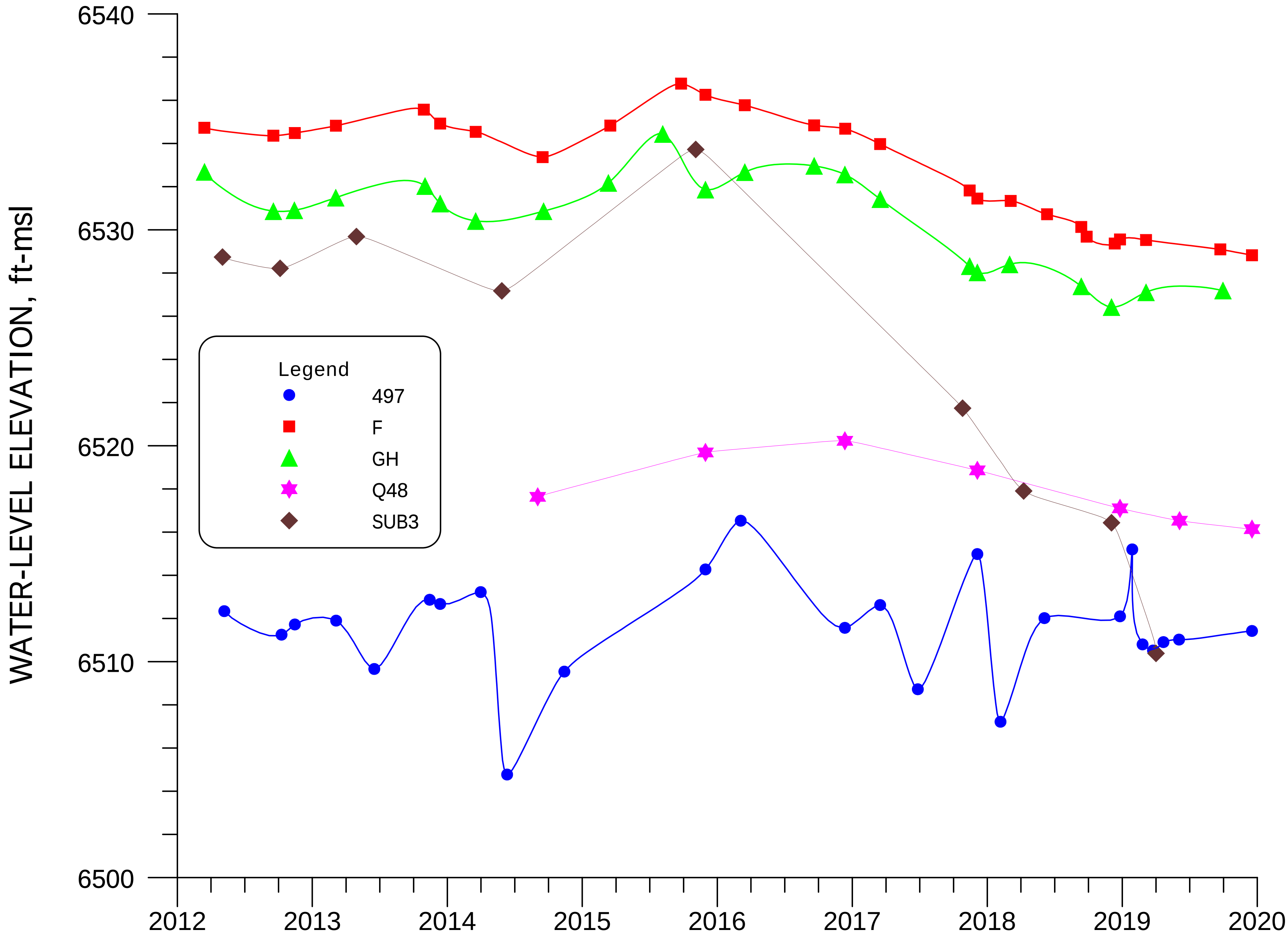


FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 497, F, GH, Q48 AND SUB3.

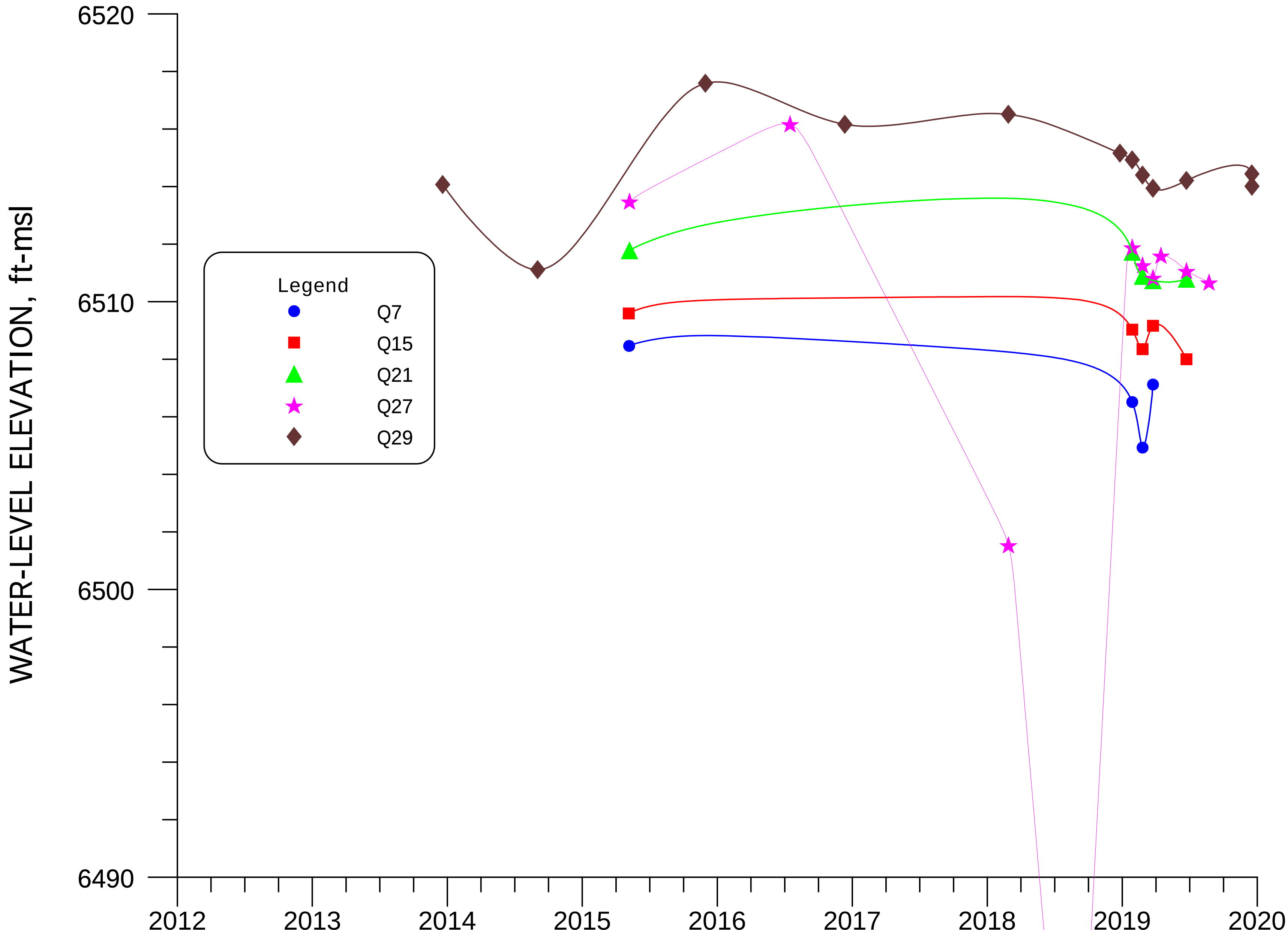


FIGURE 4.2-13A. WATER-LEVEL ELEVATION FOR WELLS Q7, Q15, Q21, Q27 AND Q29.

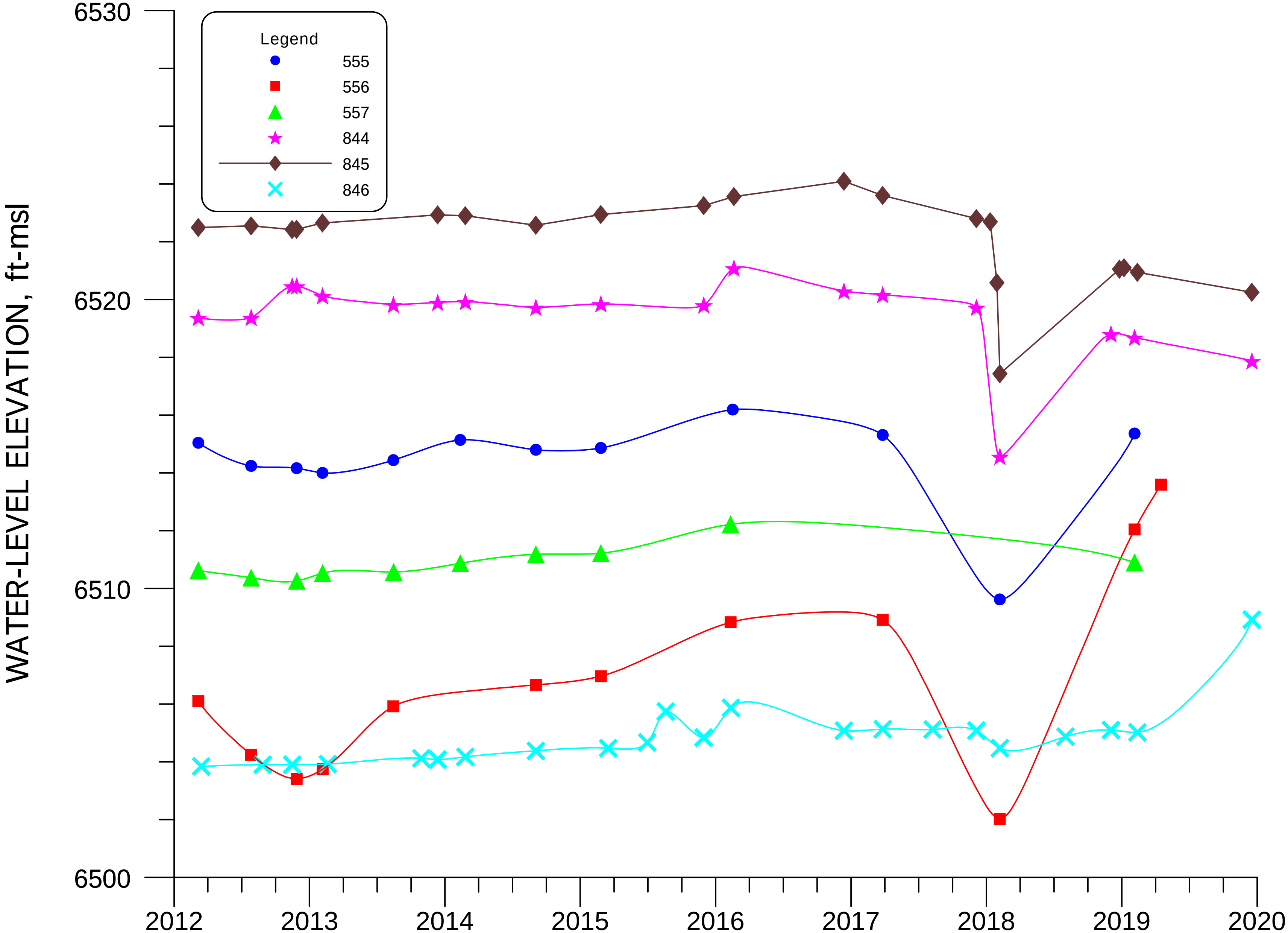


FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 555, 556, 557, 844, 845, AND 846.

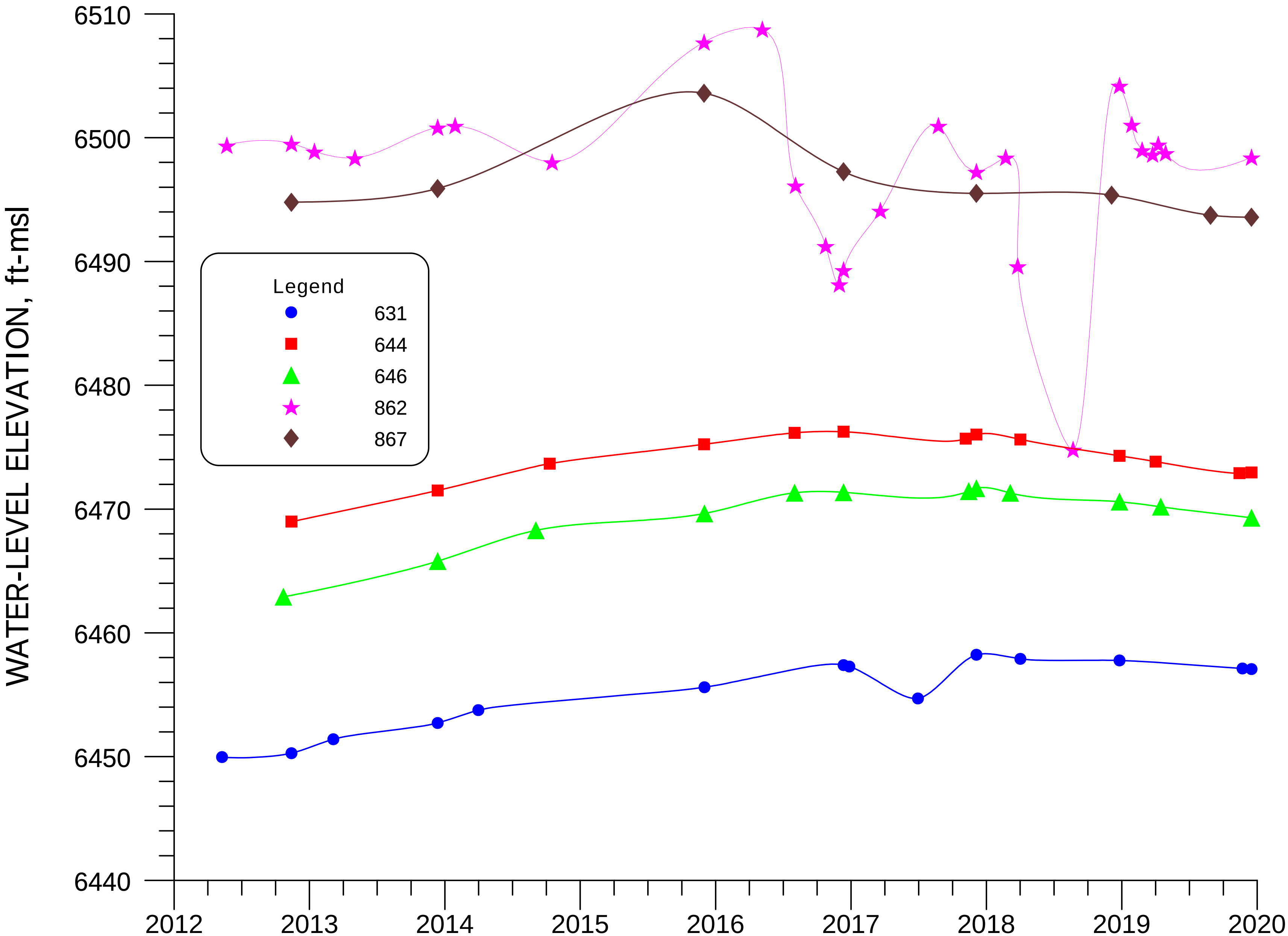


FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 631, 644, 646, 862 AND 867.

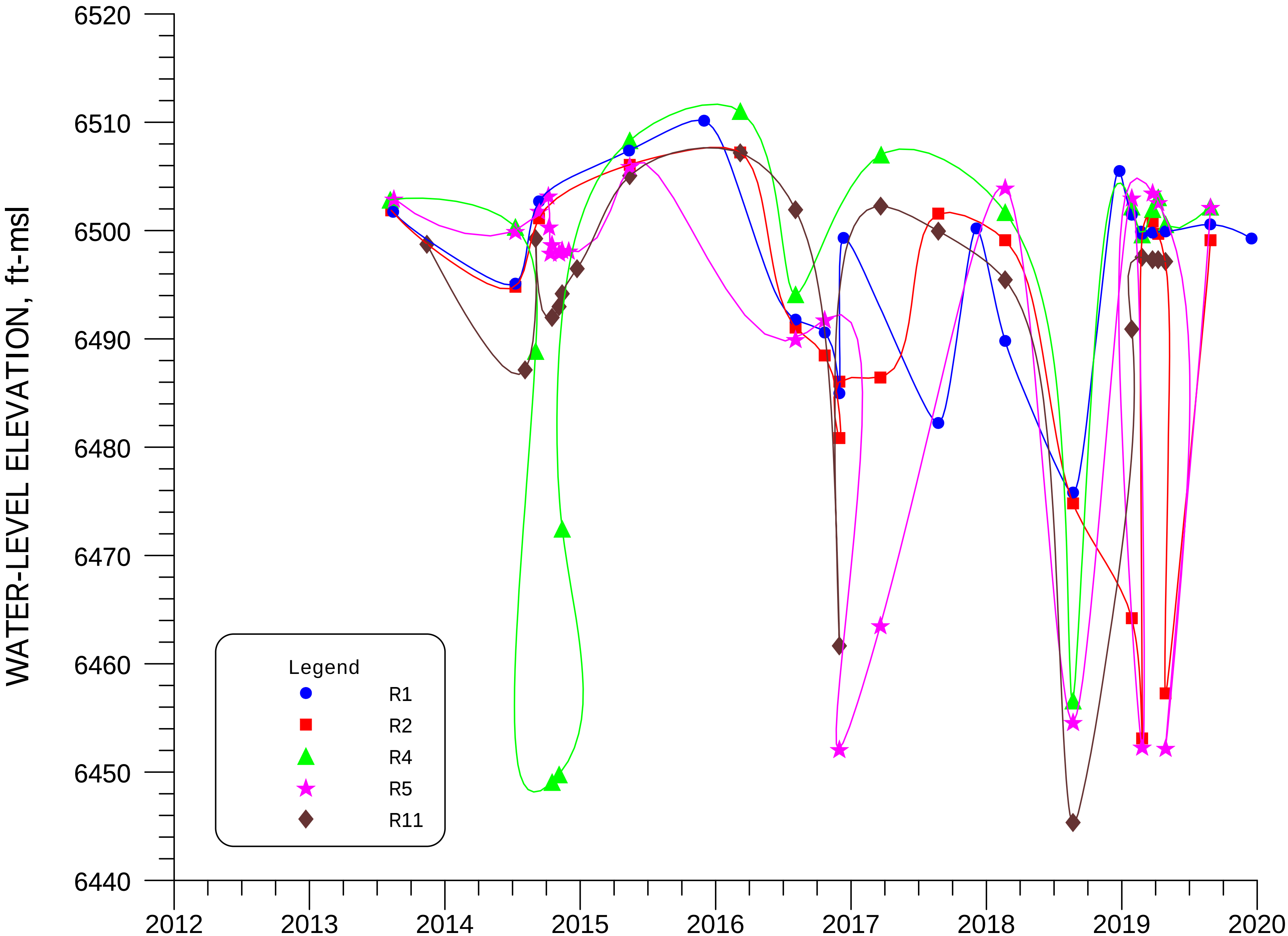


FIGURE 4.2-15A. WATER-LEVEL ELEVATION FOR WELLS R1, R2, R4, R5 AND R11.

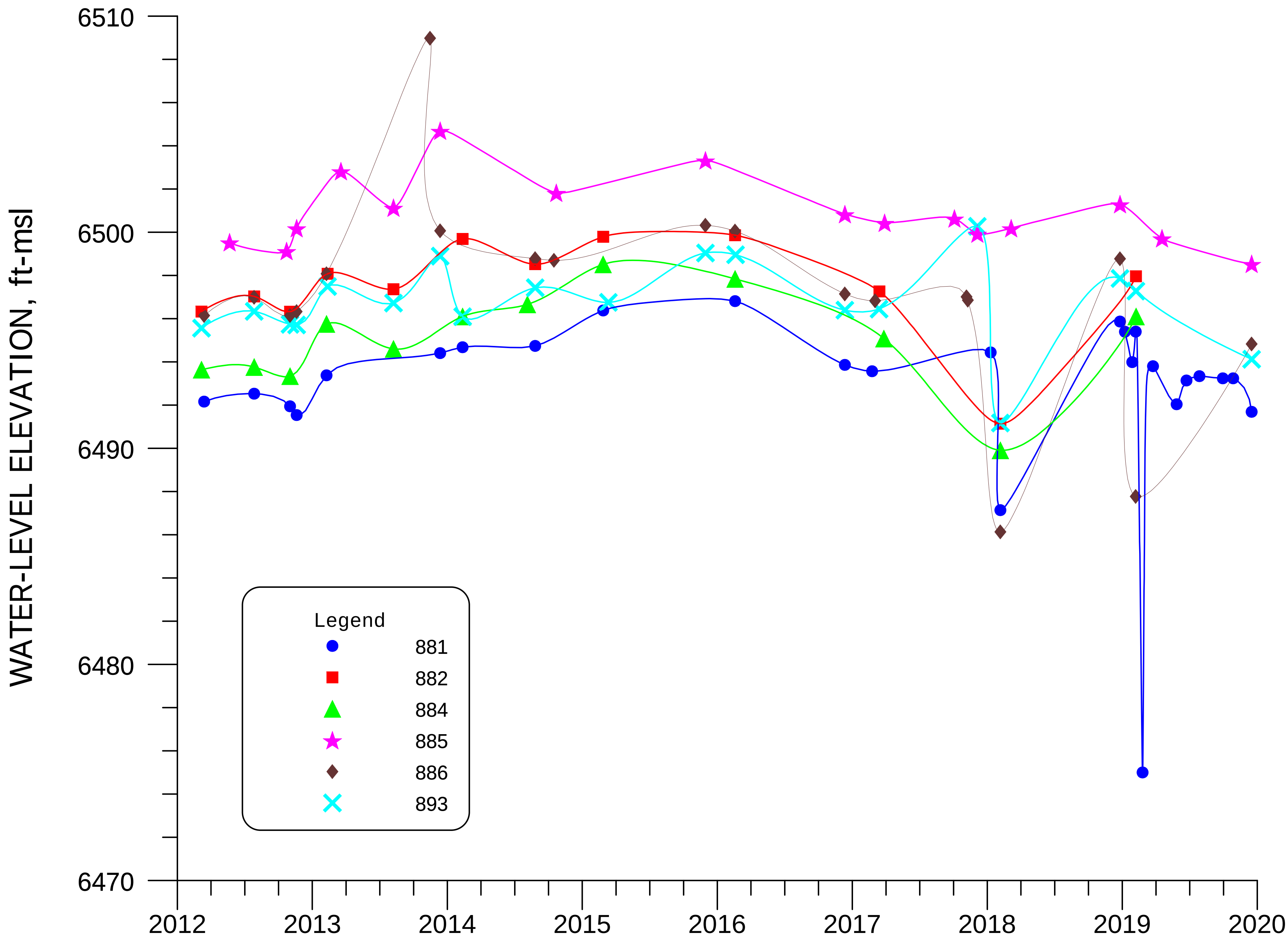


FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 882, 884, 885, 886 AND 893.

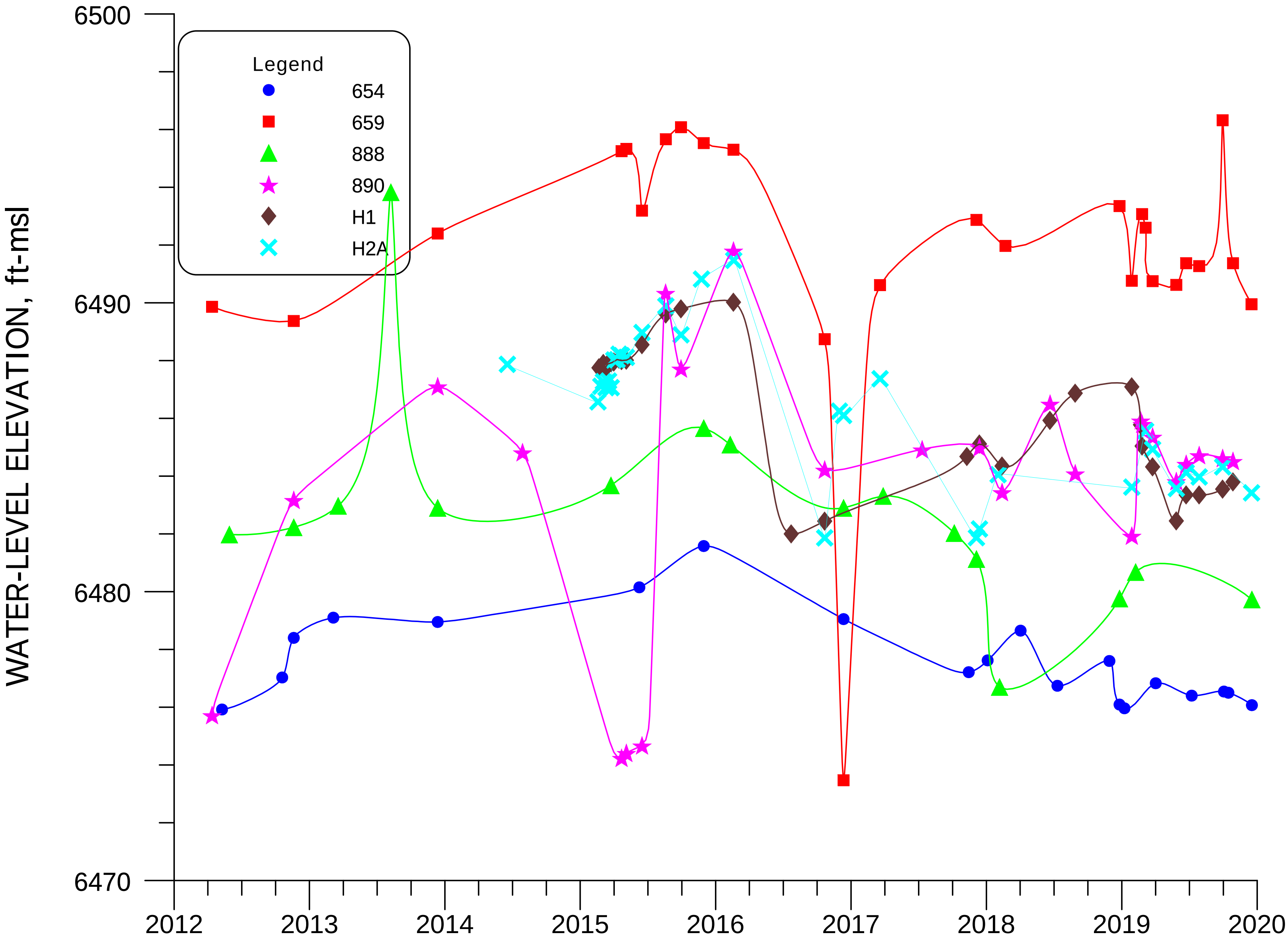


FIGURE 4.2-16A. WATER-LEVEL ELEVATION FOR WELLS 654, 659, 888, 890, H1 AND H2A.

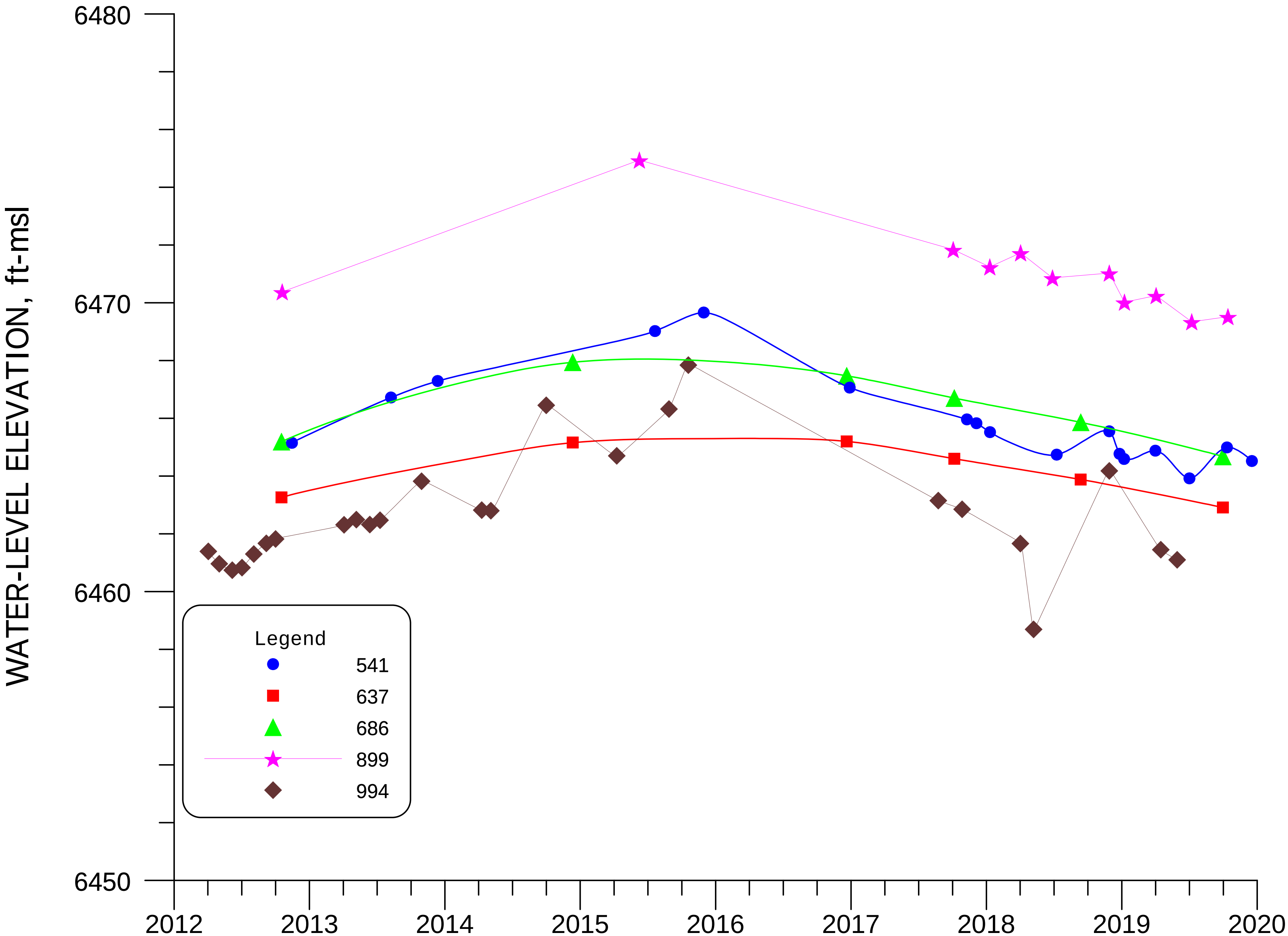


FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 541, 637, 686, 899 AND 994.

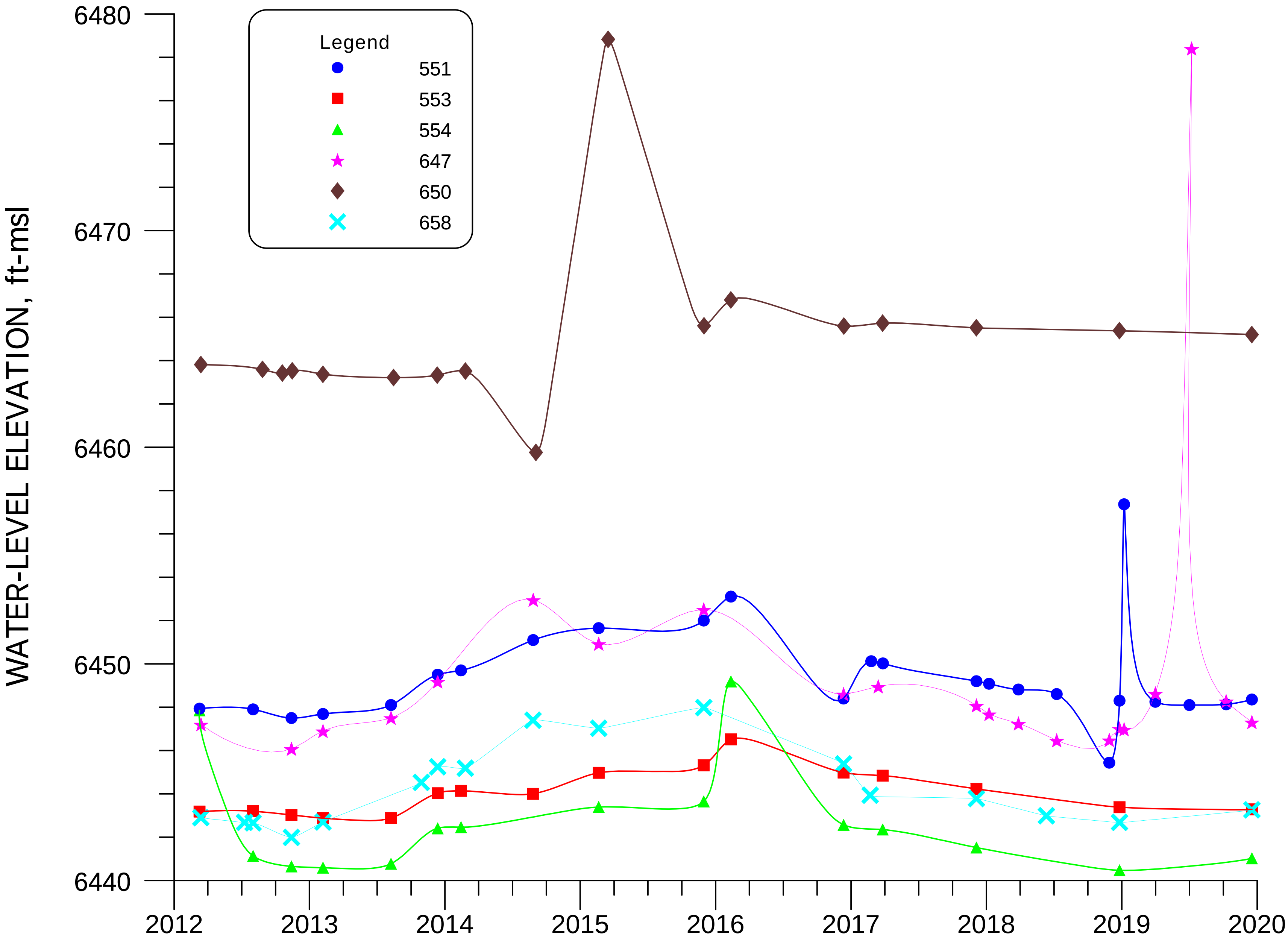


FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 551, 553, 554, 647, 650 AND 658.

4.3 ALLUVIAL WATER QUALITY

This section presents the 2019 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 2019 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 HMC 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 HMC 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. Four additional near up-gradient wells were added in 2019 with one pair (BK1c and BK1f) of these wells located approximately 800 feet to the east and southeast of well DD and the second pair (BK2c and BK2f) of these wells located slightly greater than 200 feet west and northwest of well P4.

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. The EPA has added three wells (N-15, N-16 and N-17) in the far up-gradient area for additional data in this area.

Figure 4.3-1 presents the latest 2019 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. The water quality from the pair (BK2c and BK2f) of alluvial wells just west of well P4 shows that the deeper and slightly finer grain completion at well BK2f has a much smaller selenium concentration (0.04 mg/L) than that of well BK2c (0.32 mg/L) with a shallower and coarser grain completion. Based on soil concentration and water quality measurements, Arcadis (2019) concluded the smaller selenium concentration in BK2f is due to reduced conditions caused by pyrite in the alluvial material. The very small selenium concentrations in wells DD2 and DD4 are thought to be a result of reduced conditions also. The BK2 data indicates that the fully penetrating well P4 is a mixture of the smaller and larger selenium concentrations in the two BK2 wells. The large selenium difference in up-gradient wells P and P2 are likely due to the differing reducing conditions in these two nearby wells. The selenium concentrations in the other new well pair (BK1c and BK1f) are the same indicating similar conditions vertically at this location.

The patterns on Figure 4.3-1A show where the selenium concentrations in the alluvial aquifer exceeded background in 1980, 1990, 2000, 2010 and 2019 potentially from mine discharge water and/or other up-gradient sources. Movement of selenium in this area is not thought to be retarded by adsorption and therefore movement is essentially at the groundwater velocity unless selenium mobility is affected by reducing conditions. The reducing conditions in the area of well P and well DD makes the selenium front variable, but the pattern in Figure 4.3-1A is drawn to show the position without the effects of the reducing conditions. Similar patterns developed for uranium concentrations show that the uranium in the alluvial aquifer from the mine discharge and/or other up-gradient sources is moving at a much slower rate (see Figure 4.3-1B). Uranium concentrations in well DD also were close to the background level over all of this period but are not from up-gradient sources because well DD is located two more miles farther down-gradient. Wells R and Q located between well DD and the far up-gradient wells do not show any effects on their uranium concentrations from the up-gradient sources. The up-gradient monitoring wells DD2, DD4 and DD5 have the highest near up-gradient 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, P4, Q and R are presented later in this section.

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 2019 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 2019 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 Figure 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 2019 except for two wells in Section 34. Sulfate concentrations were similar in Section 3 and South Felice Acres in 2019 with only one well with a sulfate concentration above 1000 mg/L (see 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 two 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 two wells. The sulfate concentration in these two wells needs to be reduced.

Plots of constituent concentration 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 ND, P, P3, P4, Q and R. Fairly steady concentrations occurred in these up-gradient wells in recent years except for a gradual increasing trend in wells P2 and P3 and a 2019 increase in well ND. 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 wells DD, DD3 and DD5 during the last few years. Figure 4.3-3A presents sulfate concentrations plotted versus time for near up-gradient wells DD, DD2, DD3, DD4, DD5 and P2. Sulfate concentrations in well DD in 2016 and 2017 indicated an overall increasing trend followed by steady concentrations in 2018 and 2019. A gradual increasing concentration trend occurred in up-gradient well DD2 in 2012 through 2015 while steady concentrations were observed in 2016 through 2019. Small concentration increases in well P2 were observed in 2018 and 2019. Some of these increases could be due to the influx of groundwater with higher sulfate concentrations into this area up-gradient of HMC'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 2019, except for the return to higher concentrations in collection well SA (see Figure 4.3-4) and a small increase in well S19. 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. Sulfate concentration in these wells has been fairly steady during 2019. Figure 4.3-6 presents sulfate concentration versus time plots for alluvial wells 802, B12, B16, D1 and M3. A large decrease in sulfate concentration was observed in well D1 in 2016, followed by steady concentrations in 2017 through 2019. A large increase was observed in the sulfate concentration in collection well M3 in 2019. Figure 4.3-7 presents time plots of sulfate concentrations for wells B42, T2, T19, T23, T41 and T54 which show a decline in sulfate concentrations in wells T2 and T54 in 2019. Figure 4.3-8 presents plots of sulfate concentration versus time for alluvial wells on the west side of the STP which shows a small decline in 2019 in wells C8, C11 and C12. Figure 4.3-9 presents sulfate concentration versus time for alluvial wells on the STP and the south side of the STP which shows an overall small decline in these concentrations. Figure 4.3-10 shows the sulfate concentrations for the STP collection wells K4, K5, K7 and K8 and monitoring wells 1A and 1K which indicate a slight concentration increase in some of the wells on the south side of EP1.

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 steady sulfate concentration in 2019 in well 521.

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. A higher concentration was measured in well SUB3 in 2019 that was similar to the value measured in 2018. 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 Q30. A gradual decline in concentration was observed in 2019 in wells Q3, Q5 and Q30.

Figure 4.3-14 contains time plots of sulfate concentrations for alluvial wells 555, 556, 557, 844, 845 and 846 located in and near the former flood irrigation area in Section 34. This plot shows that sulfate concentrations in samples from alluvial wells 555, 556 and 846 were fairly steady in 2019 while a gradual decline was observed in wells 557, 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 except for an increase in well R1.

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 the last two years except for a very small increase in wells 890 and H2A.

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 up-gradient of the San Mateo confluence while the other four wells are near or down-gradient of the confluence. A very small increase in sulfate was observed in 2019 in well 654 just down-gradient of the Section 28 restoration area. 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 through 2019. Sulfates had been steady the prior three years in well 551 prior to this gradual increase.

The western North Off-site post closure wells 541, 551, 647, 649, 654, 899 and 996 have been monitored quarterly for the last two years. The sulfate concentrations observed in these wells for the last two years have been steady except the gradual increase observed in sulfate concentrations in well 551 during the last two years and the small increase observed in well 654 concentrations in 2019. These concentration variations are thought to be natural and not affected by the past tailings seepage or restoration operations.

4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during 2019 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 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. TDS concentration in a significant portion of the alluvial aquifer underlying the LTP 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 exist 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 with seven wells in southern Felice Acres, in one well in northern Felice Acres and in one well to the west of this area. Only the areas closely proximate 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 TDS site 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 present the TDS concentrations versus time for the up-gradient wells. The TDS in well DD3 has increased during the last two years while TDS concentrations have gradually increased in wells DD, DD2, DD4, DD5, ND, P2, P3 and Q.

Figures 4.3-21 through 4.3-24 present TDS concentrations plotted versus time for wells on, near and west of the LTP. Plots of TDS concentrations on and near the STP and in one well east of the LTP are presented in Figures 4.3-25 through 4.3-27. TDS concentrations in samples 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 which show small variations in TDS in these wells for the last few years. 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 2019 with a small decline in wells 844, 845 and 846 and fairly steady concentrations in wells 555, 556 and 557. 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. The TDS increased in well R1 during the last two years similar to the increase in sulfate in this well. TDS concentrations for the former Section 28 irrigation monitoring wells and Pleasant Valley monitoring well 688 were generally stable in 2019 (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 also be due to freshwater injection proximate 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 which shows a small increase in wells 890 and H2A in 2019.

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 and 2019 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. The variations observed in post closure wells 541, 551, 647, 649, 654, 899 and 996 over last two years of monitoring have shown natural variations in the TDS concentrations.

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 2019 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 shows that the need for groundwater-quality restoration with respect to chloride is limited to the immediate area of the tailings and in the area of three wells in Section 34. Chloride concentrations in the alluvial water in the western half of

Figure 4.3-36 have not typically exceeded 250 mg/L. None of the alluvial wells just north of the northern boundary of Pleasant Valley exceed the site standard in 2019 (see Figure 4.3-36C).

Figures 4.3-37 and 4.3-37A presents chloride concentrations versus time for twelve up-gradient wells. Analysis of the data on this figure shows overall steady chloride concentrations in 2019 except a very gradual increase in well DD3.

Figures 4.3-38 through 4.3-40 present time plots of chloride concentration for wells west and southwest of the LTP with a steady decline observed in collection well B16 during the last few years. Chloride concentrations in wells on and near the LTP are presented on Figure 4.3-41 with the main change in these wells being a decline in well T54. 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. A decline in the chloride concentration in wells C8, C11 and C12 was observed in 2019. The chloride concentrations in water collected from the L line collection wells are presented in Figure 4.3-45, showing a fairly steady concentration in well 521 in 2019.

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, showing fairly steady concentrations.

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 concentration in wells 844 and 845 indicates that the effects from irrigation are dissipating while the increase in well 556 in 2019 could be showing a small residual irrigation effect in this area.

The plots of chloride concentration versus time in Section 3 wells are presented on Figures 4.3-49 and 4.3-49A. The small increase in chloride concentrations in 2019 in wells R1, R3 and R10 is likely due to reduced collection and injection in this area during 2019. 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 area of active groundwater restoration gradually declined in recent years but a small increase was observed in wells 890 and H2A in 2019.

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 2019 chloride concentrations were generally stable in the Section 33 wells except for the increase in concentrations in well 551 from 2018 through 2019 after lower values from 2015 through 2017. Chloride concentrations in these wells were slightly higher from 2009 through 2015 than levels observed in previous years. Slightly higher chloride concentrations could be showing a very small effect from the Section 33 irrigation but it could also be a small natural change. The higher levels in 2019 are thought to be due to variations in alluvial water up-gradient of the Section 33 irrigation. Chloride concentration in well 996, which is up-gradient of the Section 33 irrigation area, was showing a very gradual rising trend for six years prior to steady values for the last two years. The chloride concentrations observed in the seven post closure wells (541, 551, 647, 649, 654, 899 and 996) for the last two years are considered natural and not affected by seepage.

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 2019 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). Elevated 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 samples from three wells which exceeded 0.16 mg/L in 2019. These exceedances show that additional restoration is needed at wells 659, H2A and H12, but restoration should occur quickly after the relining of EP1 is complete and collection resumes. 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 2019 was less than the site standard of 0.16 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. The depression in the alluvial piezometric surface in the southwest portion of Section 33 prevents concentrations from moving farther to the south in the alluvial aquifer.

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 in 2019 were generally similar to values observed in 2018.

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 decreased in 2019 in this area with a slightly smaller area exceeding the site standard. The uranium concentration in another small area in the northeast portion of Murray Acres at well 802 has been restored with the two measured values in 2019 near 0.1 mg/L. Additional restoration with respect to uranium is needed in each of these areas except the area of well 802.

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 ND, P, P3, P4, Q and R. The uranium concentrations in these wells have been fairly steady during the last few years. Figure 4.3-54A presents uranium concentrations plotted versus time for near up-gradient wells DD, DD2, DD3, DD4, DD5 and P2. A gradual decreasing concentration trend occurred in up-gradient wells DD and DD2 in 2012 through 2015 while overall steady concentrations were observed in 2016 through 2019. Some of these changes could be due to the influx of groundwater with lower uranium concentrations into this area up-gradient of HMC'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 with a steady decline observed in wells T2 and T54 in 2019. Figures 4.3-59 and 4.3-59A present plots of uranium concentration versus time for wells B13, C2, C6, C8, C11 and C12 located on the west side of the STP. The second of these two plots presents all of the historical data for these C wells showing 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. Large variations in concentration have been observed in these STP area wells in recent years. Uranium concentrations in water from alluvial wells in the L area are presented on Figure 4.3-62 which shows a very gradual decline in 2019 in uranium in well 521.

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 levels 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 Q3, Q5, Q12 and Q30 in 2019. Figure 4.3-65 presents uranium concentrations for wells in the former flood irrigation area. Uranium concentrations had declined in well 844 for the previous few years but have become fairly steady for the last four 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 2019 except for a continuation of a decline in well R5 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 with additional restoration needed at wells 881 and 886. 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 while values in wells 659, H2A and H12 have increased in 2019 due to reduced collection. This area of the alluvial aquifer is considered adequately restored except for the areas near these three wells. Concentrations from well 888, which is down-gradient of the restoration area, continued to decline in 2019. Collection from some of the western H series wells will be needed in the future.

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 up-gradient and down-gradient of the confluence with the San Mateo alluvium in Section 29 and concentrations have stayed fairly steady except for a small increase in well 654 in 2019. Uranium concentrations in wells located in Section 33 are relatively small (see Figure 4.3-69). Concentrations have remained low with steady values in the western portion of the North Off-site post closure monitoring wells 541, 551, 647, 649, 654, 899 and 996 during the two years of monitoring except for the small increase in well 654 in 2019. Wells 647 and 996 are up-gradient 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 indicates no uranium effects on the groundwater from the Section 33 irrigation. The small variations observed in the Section 33 wells are within the range of concentrations up-gradient 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 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. The green pattern north of the LTP shows where selenium concentrations exceed the site standard of 0.32

mg/L due to mine discharge and other up-gradient sources. These higher selenium concentrations are likely starting to affect the concentrations on the north side of the LTP.

A 0.1 mg/L selenium concentration contour surrounds 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 two values above 0.1 mg/L near the center of Section 27. 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 area 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 ND, P, P3, P4, Q and R while Figure 4.3-71A presents selenium concentrations plotted versus time for near up-gradient wells DD, DD2, DD3, DD4, DD5 and P2. There have been small variations in the selenium concentration in up-gradient wells for last few years with an increasing trend in wells DD3, ND, P2, P3 and P4. The concentrations in the northernmost near up-gradient wells Q and R are larger than the remainder of these wells except for the recent values from wells DD3, P2 and P3. Selenium concentration in wells Q and R were fairly steady the last ten years after a long gradual increasing trend. A small increase in the selenium concentration in well DD was observed in 2016 with steady concentrations since this increase. Some of these changes are likely due to the influx of groundwater with higher selenium concentrations into this area up-gradient of HMC'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 concentration exhibited variability in wells located on and near the STP and east of the LTP as shown on Figures 4.3-76 through

4.3-78. Figure 4.3-79 presents selenium concentration for wells 521, L, L5, L6, L8 and L10, with a decline in the concentration in well 521 occurring during the last two years.

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

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 and steady selenium concentrations in monitoring wells in this area of the alluvial aquifer. This data indicates that the flood irrigation did not affect the selenium concentrations in the groundwater in this area.

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 2019. A small increase in selenium was observed in 2019 in well R1.

The selenium concentrations in alluvial water in Section 28 have been fairly steady with time. 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. These two plots show steady and small concentrations in wells 541, 551, 647, 649, 654, 899 and 996, which are the seven western North Off-site post closure wells

4.3.6 MOLYBDENUM – ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during 2019. 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, this parameter is not important in the western wells. Numerous samples were taken from these wells in 2019 to demonstrate that the molybdenum concentrations are less than 0.03 mg/L with all of the western wells less than this value except the alluvial molybdenum concentration of 0.07 mg/L in the well in the center of the Section 33 center pivot. The previous seven molybdenum concentrations measured in this well are less than one tenth of this value showing that this value is an outlier. A lower detection limit was used for most of the 2018 and all of the 2019 measurements 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 2019 with only three of the LTP area 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 the site standard of 0.10 mg/L. 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, P2, P3, P4, Q and R. Concentrations have remained low in these twelve wells in 2019 with the use of a smaller detection limit.

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 with higher levels in this area and no consistent trend. 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. These plots show variable concentrations with no consistent trend. Figure 4.3-96 presents molybdenum concentrations in wells 521, L, L5, L6, L8 and L10, which are located further to the southeast of the STP. The molybdenum concentration in well 521 decreased over the last three years.

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. A small increase in molybdenum concentrations in 2019 was observed in well 490.

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 wells presented on the third figure and Section 33 wells on the fourth figure. The data for the seven post closure monitoring wells (541, 551, 647, 649, 654, 899 and 996) shows that the molybdenum concentrations have been small for the last two years. The larger value from well 551 in the fourth quarter of 2019 should not be given any significance unless future monitoring confirms this level.

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 2019 in the alluvial aquifer. The pattern on Figure 4.3-104 shows that nitrate concentrations exceed the site standard to the north of the LTP and these higher concentrations will be moving into the LTP area in the future. Some of the nitrate concentrations to the north of the LTP are small due to reduced conditions at the well. Figure 4.3-104A presents the nitrate values for the wells near the LTP and STP, showing that two of these wells exceed the site standard in 2019. The nitrate concentrations north and up-gradient of the tailings will 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 some portions of the LTP and an area between the LTP and STP, and these exceedances are likely due to seepage from the tailings. Nitrate concentration above 12 mg/L has generally existed in one well southeast of Valle Verde but was not measured in 2019. 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 2019 except for an increasing trend in well DD3. Nitrate concentrations in up-gradient wells farther to the north have been slightly larger than the site standard but not as large as values in well DD3. Overall, the nitrate concentration in near up-gradient wells Q and R has been steady the last twelve years. A small increasing concentration 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 B42, T2, T19, T23, T41 and T54, which are located on and near the LTP. A large decline in the nitrate concentrations has been observed the last few years in well T23. Nitrate concentrations in wells on and near the STP and in 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 which shows that all of these values are steady and significantly below the site standard.

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 with all of these levels below the site standard.

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 show a decrease from 2012 through 2018. Well 846 is down-gradient of the flood irrigation area and is 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 2019 except for a gradual decline in well 844 and a gradual increase in well 555 in recent years. This could possibly be showing a minor 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 2019. All of nitrate concentrations from the wells in these four figures are below the site standard. The nitrate concentration for the last two years in the seven western portion North Off-site post closure monitoring wells has been small and relatively steady.

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^{o} angle and in magenta. The State standard for radium-226 plus radium-228 is 30 pCi/L, while the NRC site standard is 5 pCi/L.

Measured activities of radium-226 in alluvial wells beneath the LTP exceed 10 pCi/L. No radium-226 plus radium-228 values exceeded 5 pCi/L in 2019 outside of the LTP (see Figures 4.3-121, 4.3-121A, 4.3-121B and 4.3-121C). Single higher radium-228 values should not be given any significance. Past data has shown that radium is not mobile in the alluvial aquifer at this site. In 2008, the laboratory started 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 2019 are shown on Figures 4.3-122, 4.3-122A, 4.3-122B and 4.3-122C. None of the vanadium concentrations in 2019 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 2019. Therefore, none of the alluvial wells outside of the immediate 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 and in one well near the southern corner of the STP were above the site standard for vanadium in 2019. The ongoing corrective action program will restore vanadium concentrations in these areas. Higher detection limits at or above the site standard were used in 2019 for six wells (859, GN, H2A, H55, MO and MQ) located some distance from the LTP and STP. Previous measurements from these wells and other alluvial wells located outside of the LTP area show that the actual vanadium concentrations should be less than the site standard.

4.3.10 THORIUM-230 - ALLUVIAL

Figures 4.3-123, 4.3-123A, 4.3-123B and 4.3-123C present the 2019 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 has been significant in some of the alluvial wells underneath the LTP. 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 2019 in two 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 2019 were less than the site standard in 2019. Samples from the three wells near the LTP that contained thorium-230 in 2018 above the site standard were all significantly below the site standard in 2019. Therefore, only the alluvial aquifer underneath the LTP requires restoration for thorium-230.

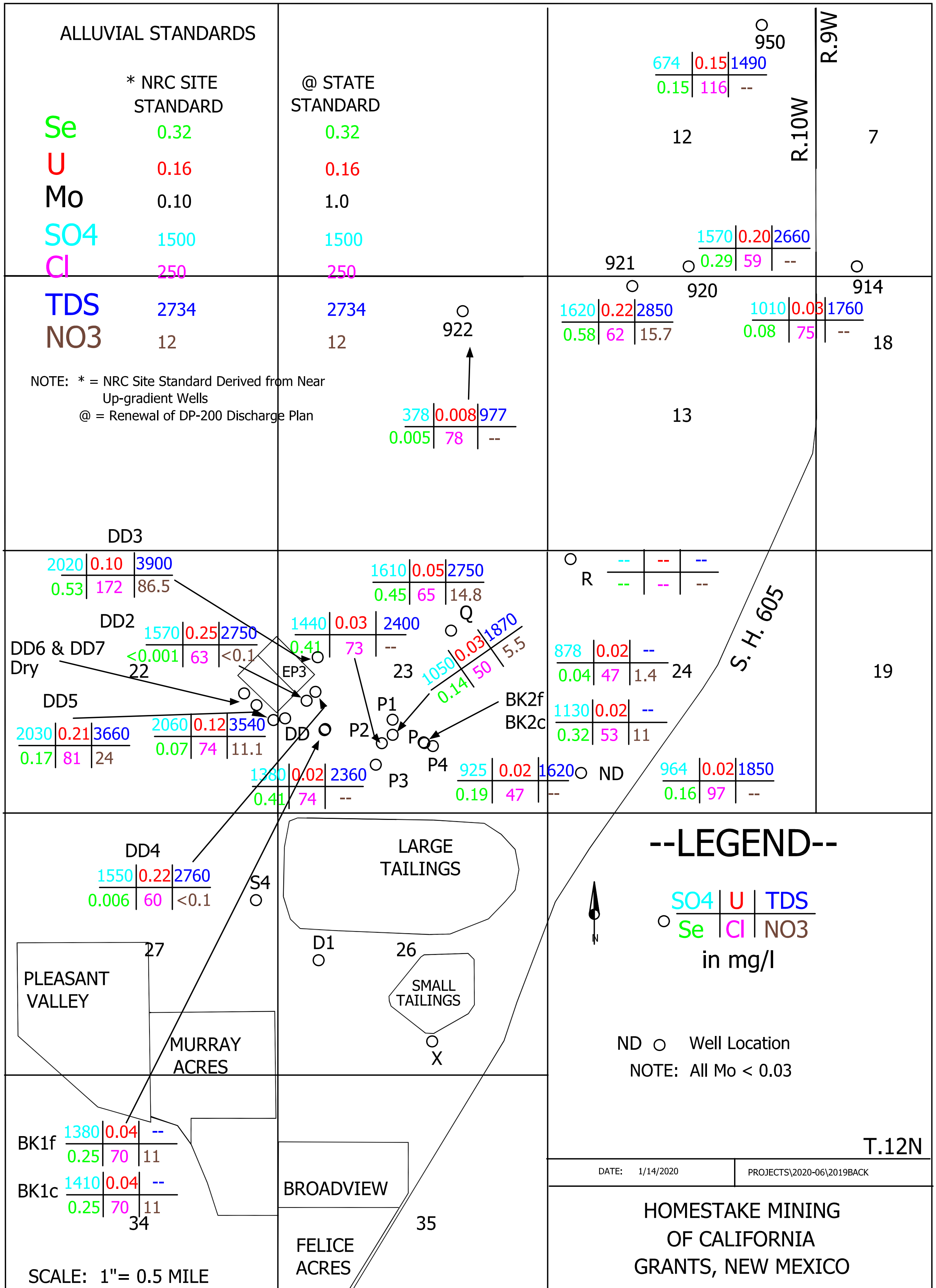


FIGURE 4.3-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2019

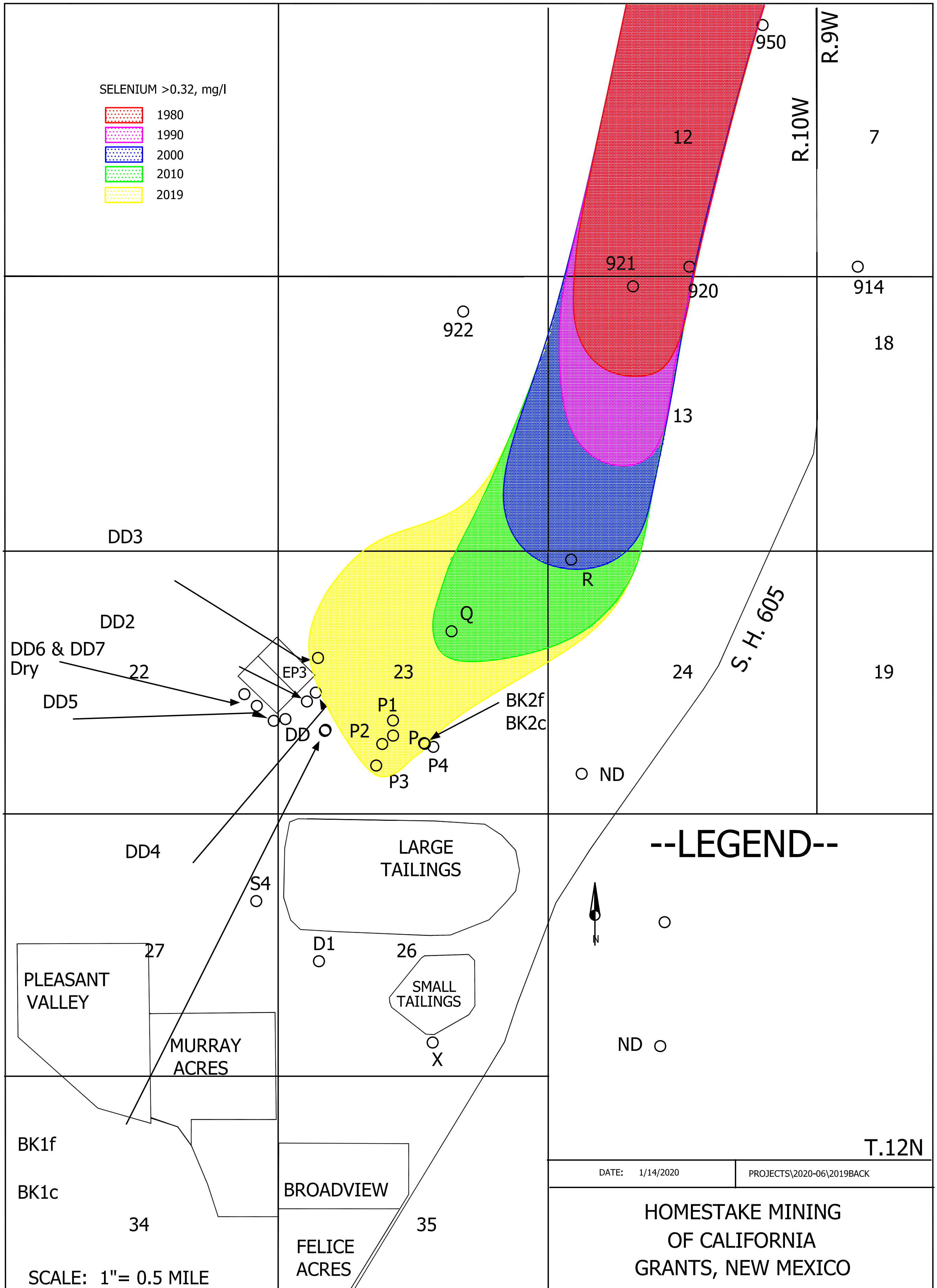


FIGURE 4.3-1A. EXTENT OF ALLUVIAL SELENIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR

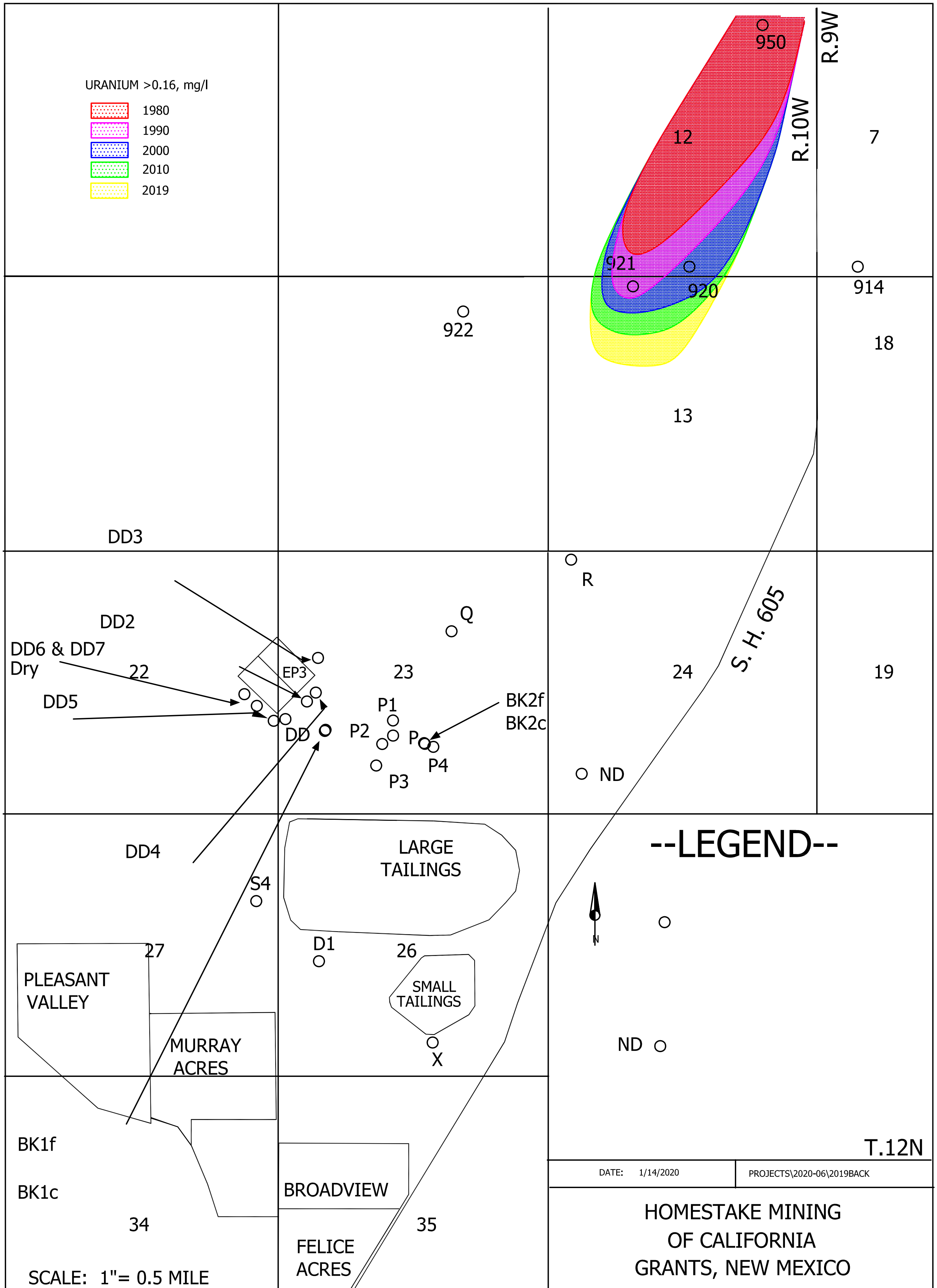


FIGURE 4.3-1B. EXTENT OF ALLUVIAL URANIUM CONCENTRATIONS ABOVE BACKGROUND, BY YEAR

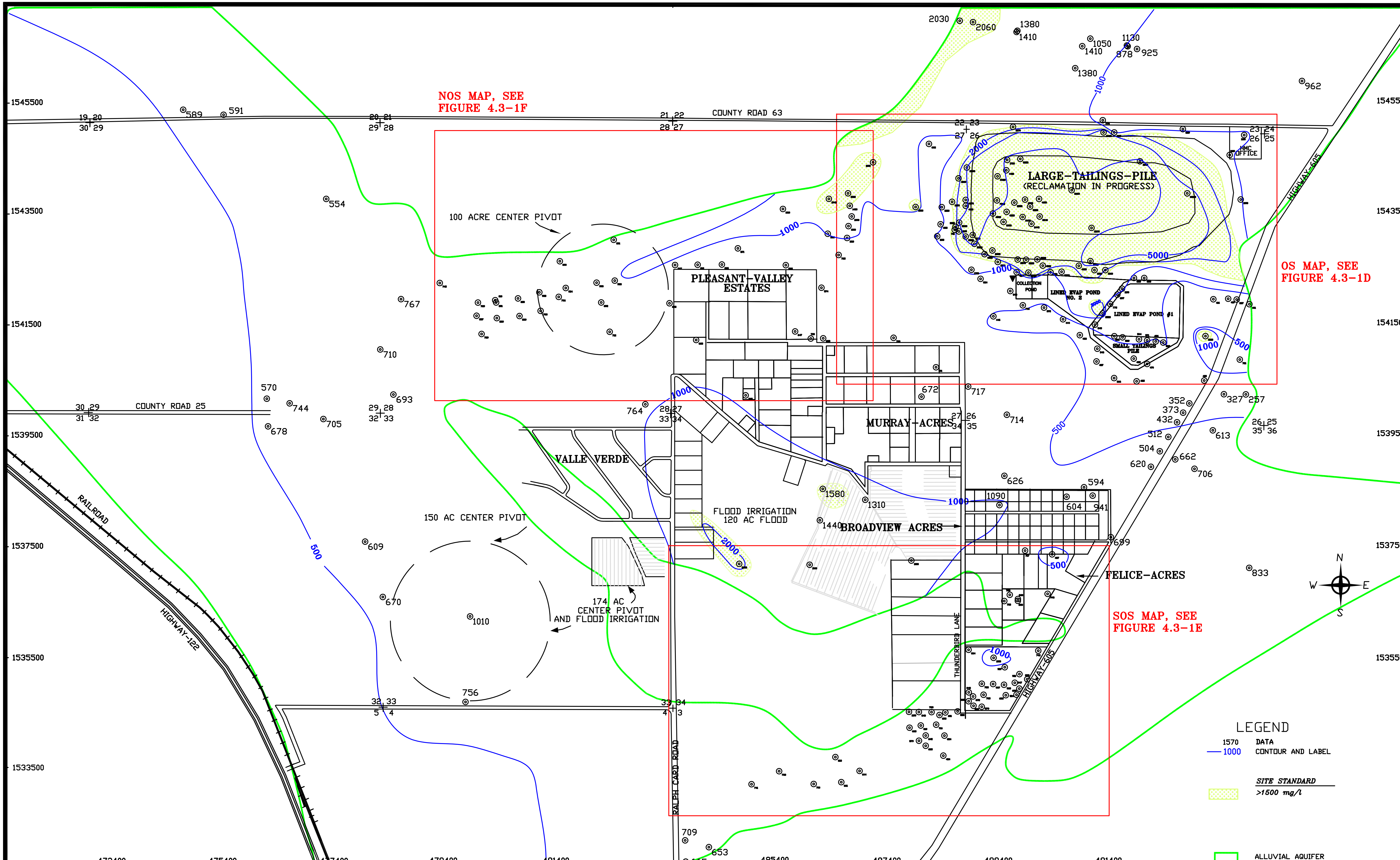


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FIGURE 4.3-1C. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

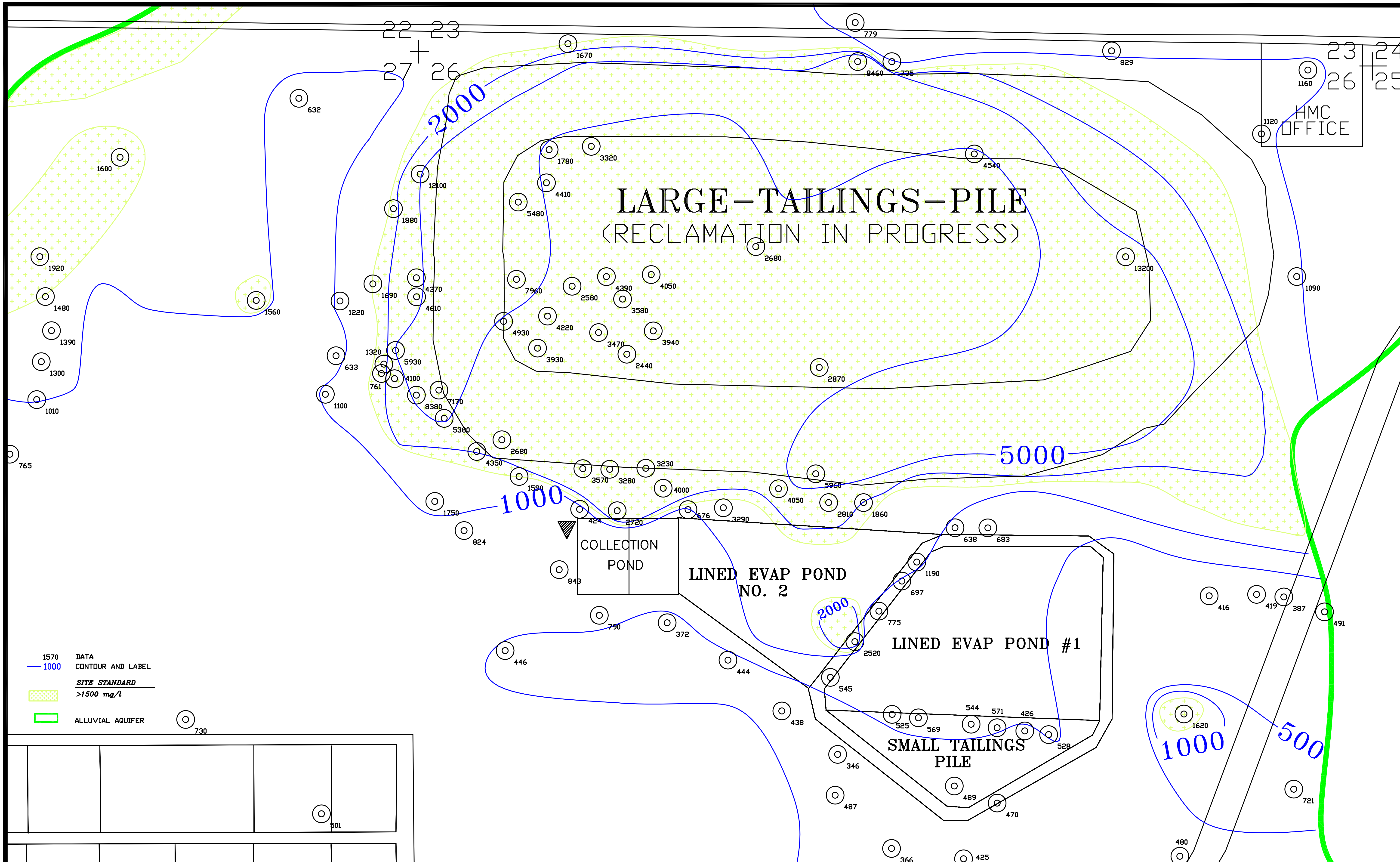

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FIGURE 4.3-1D. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

4.3-26

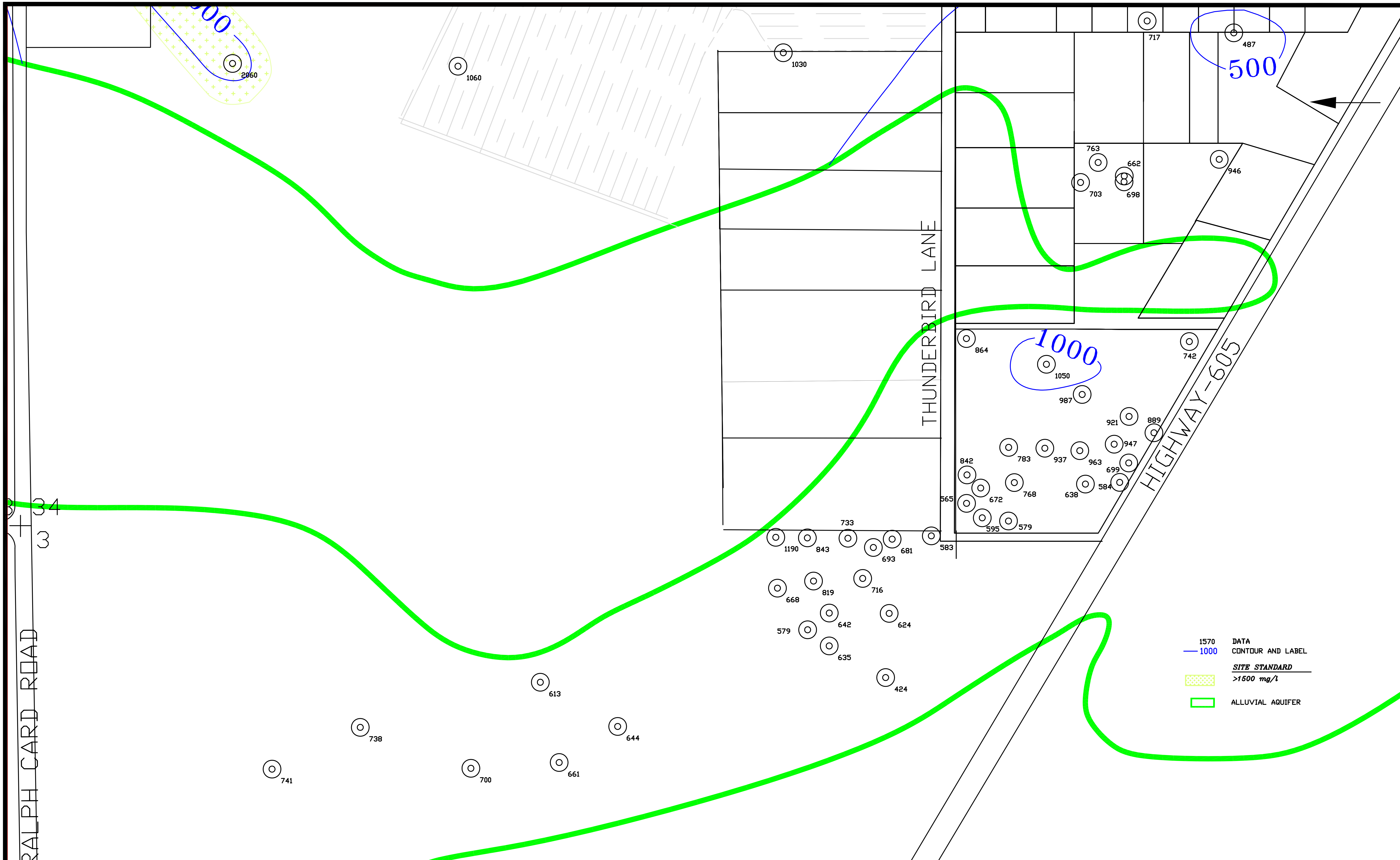

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FIGURE 4.3-1E. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

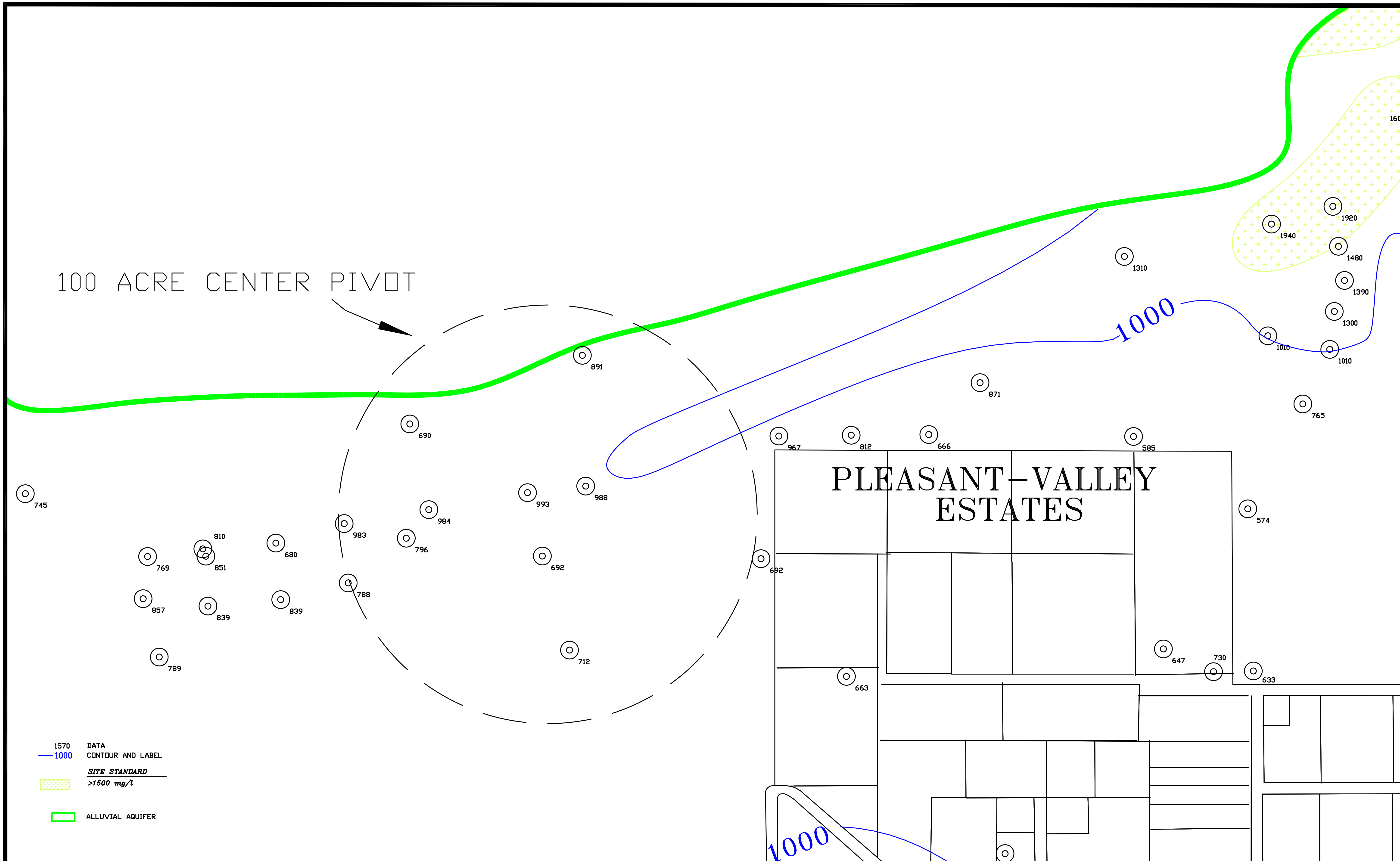

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FIGURE 4.3-1F. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

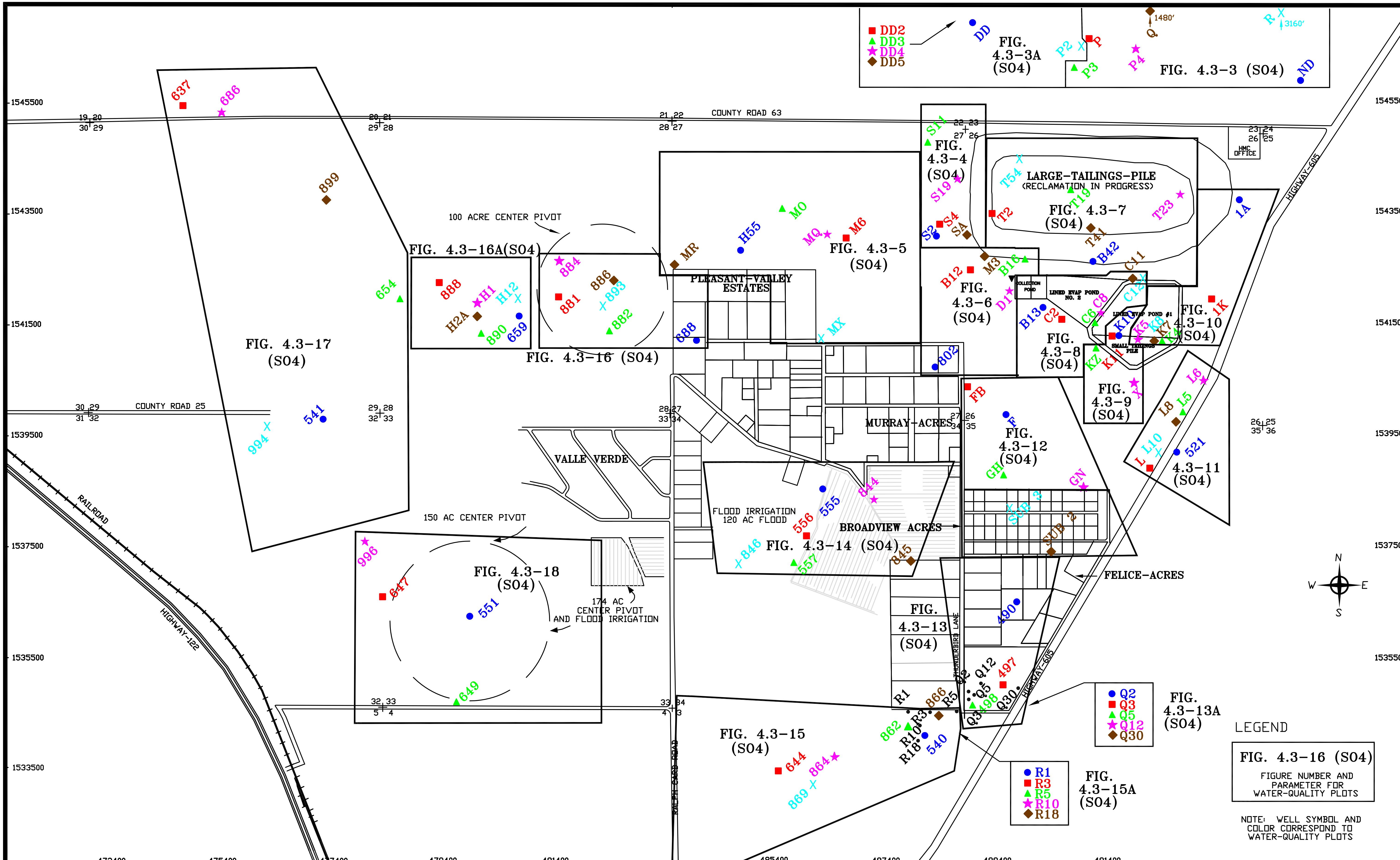

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FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS, 2019

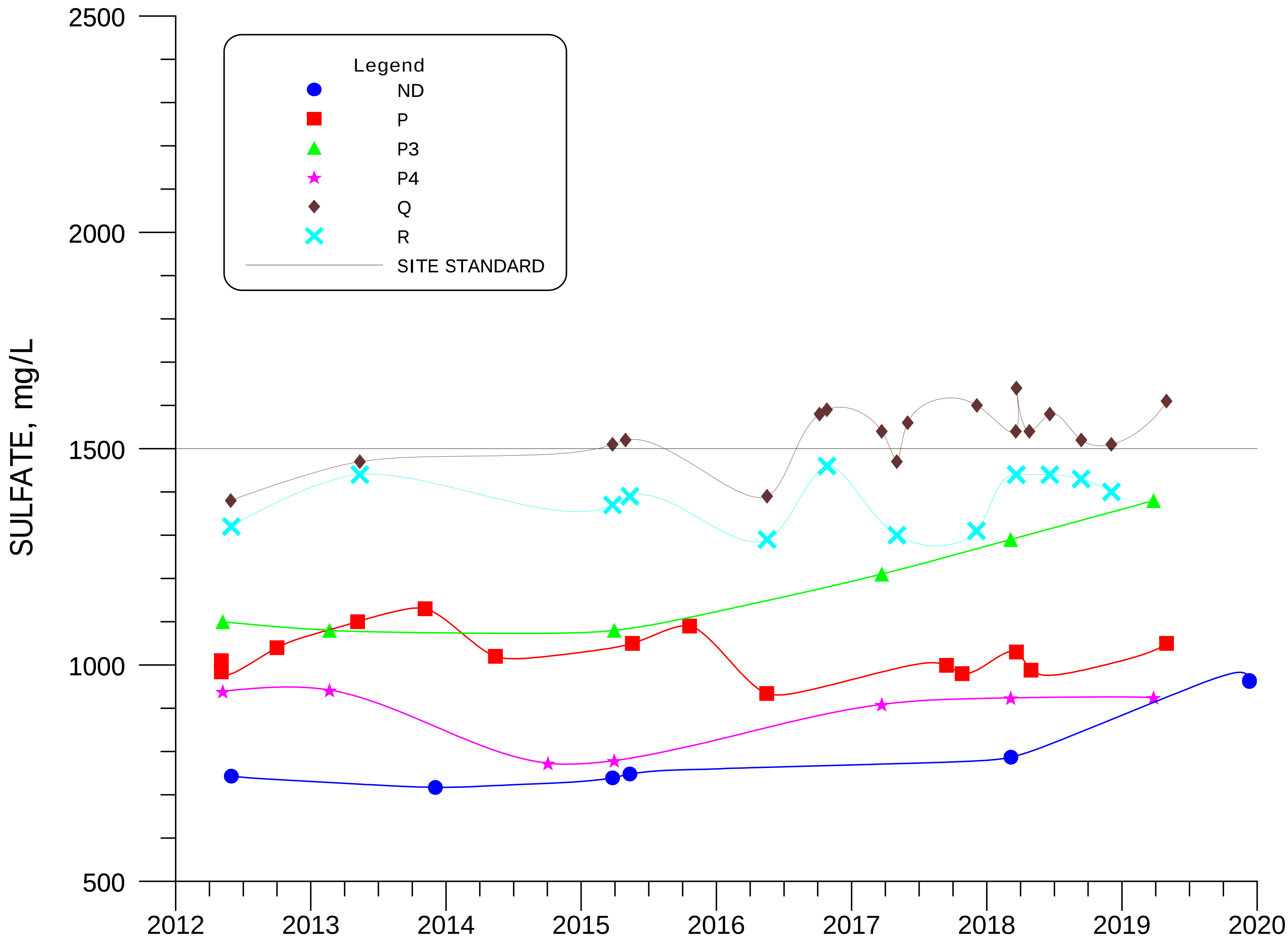

FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

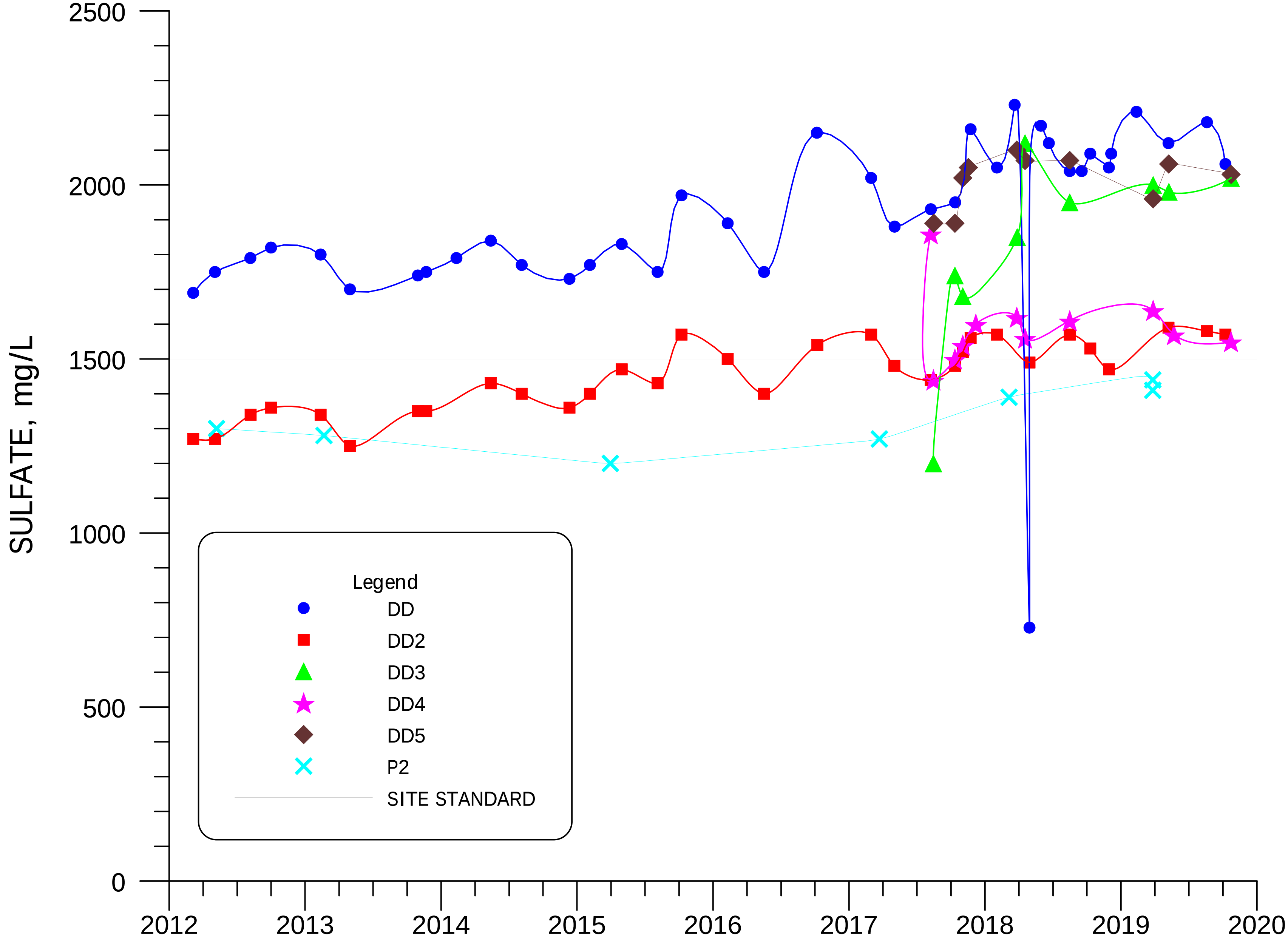

FIGURE 4.3-3A. SULFATE CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

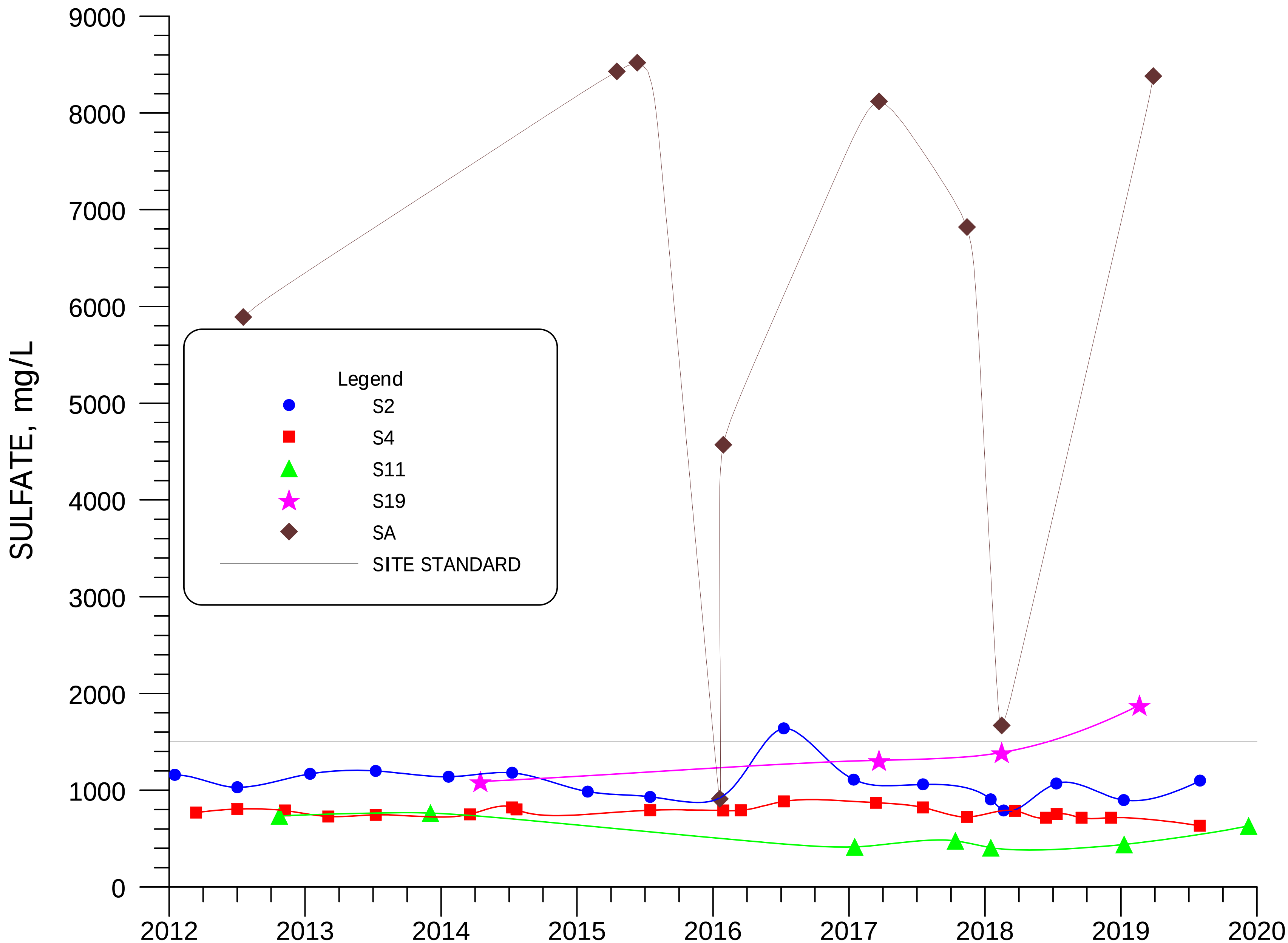

FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

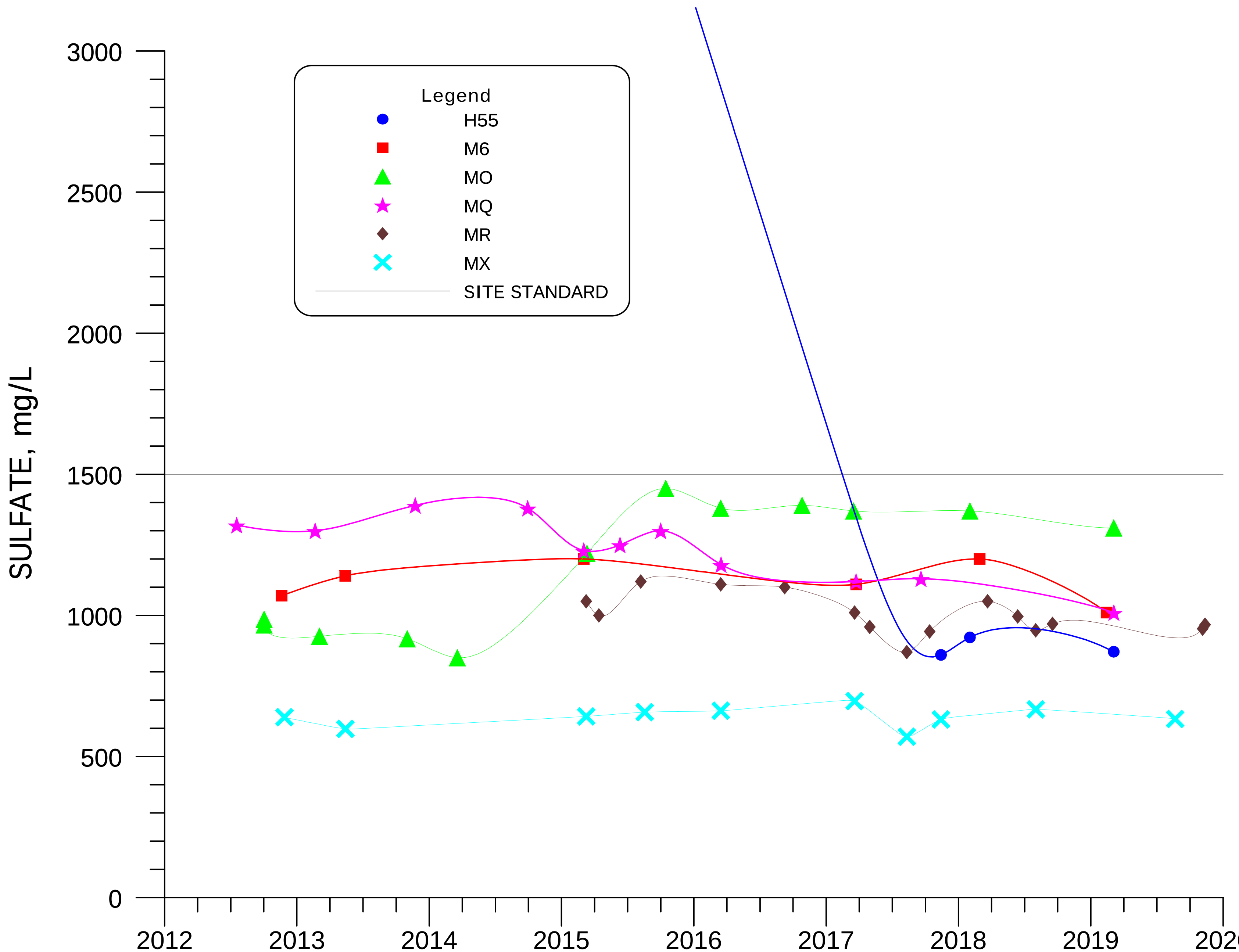

FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

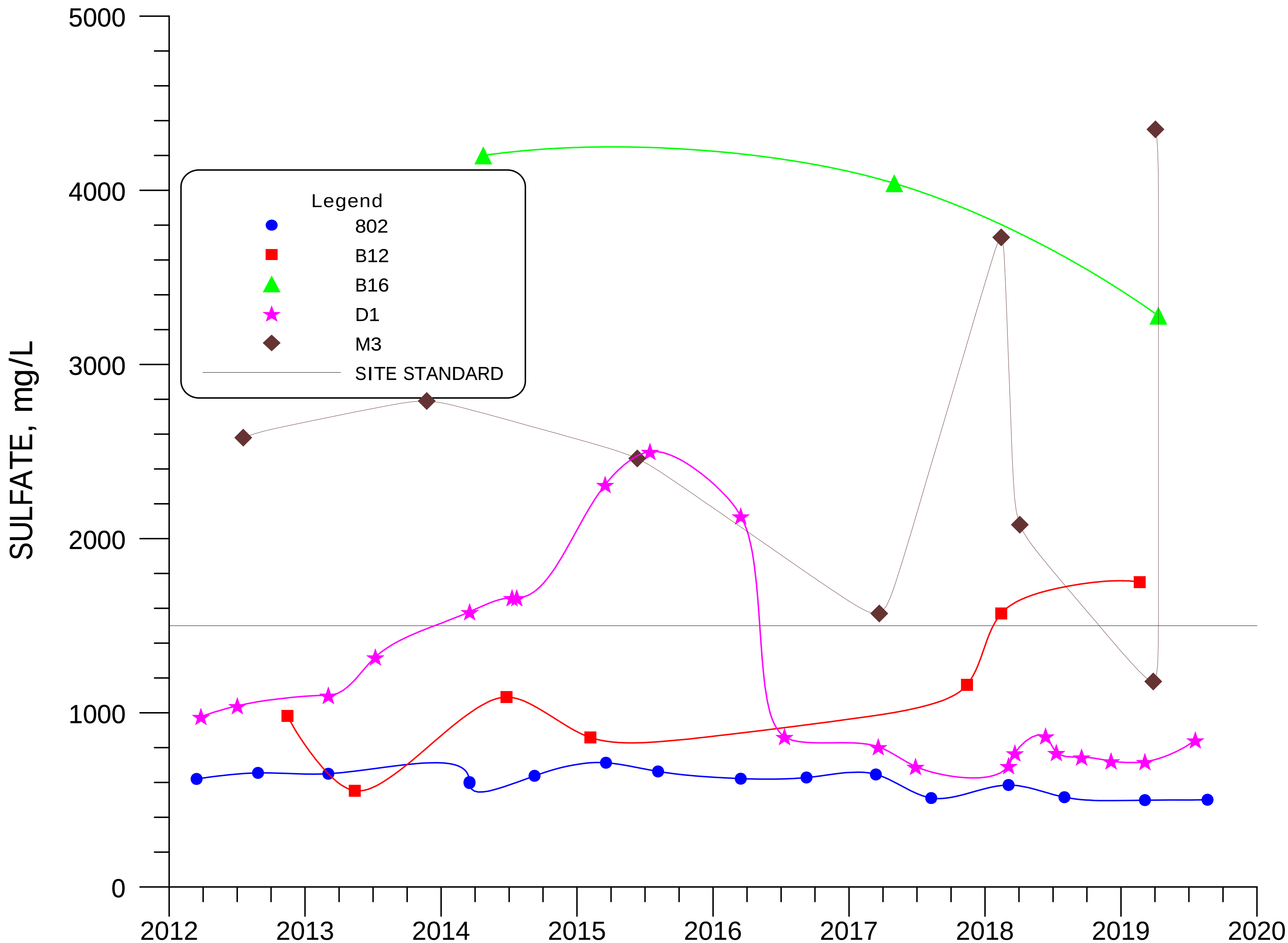

FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

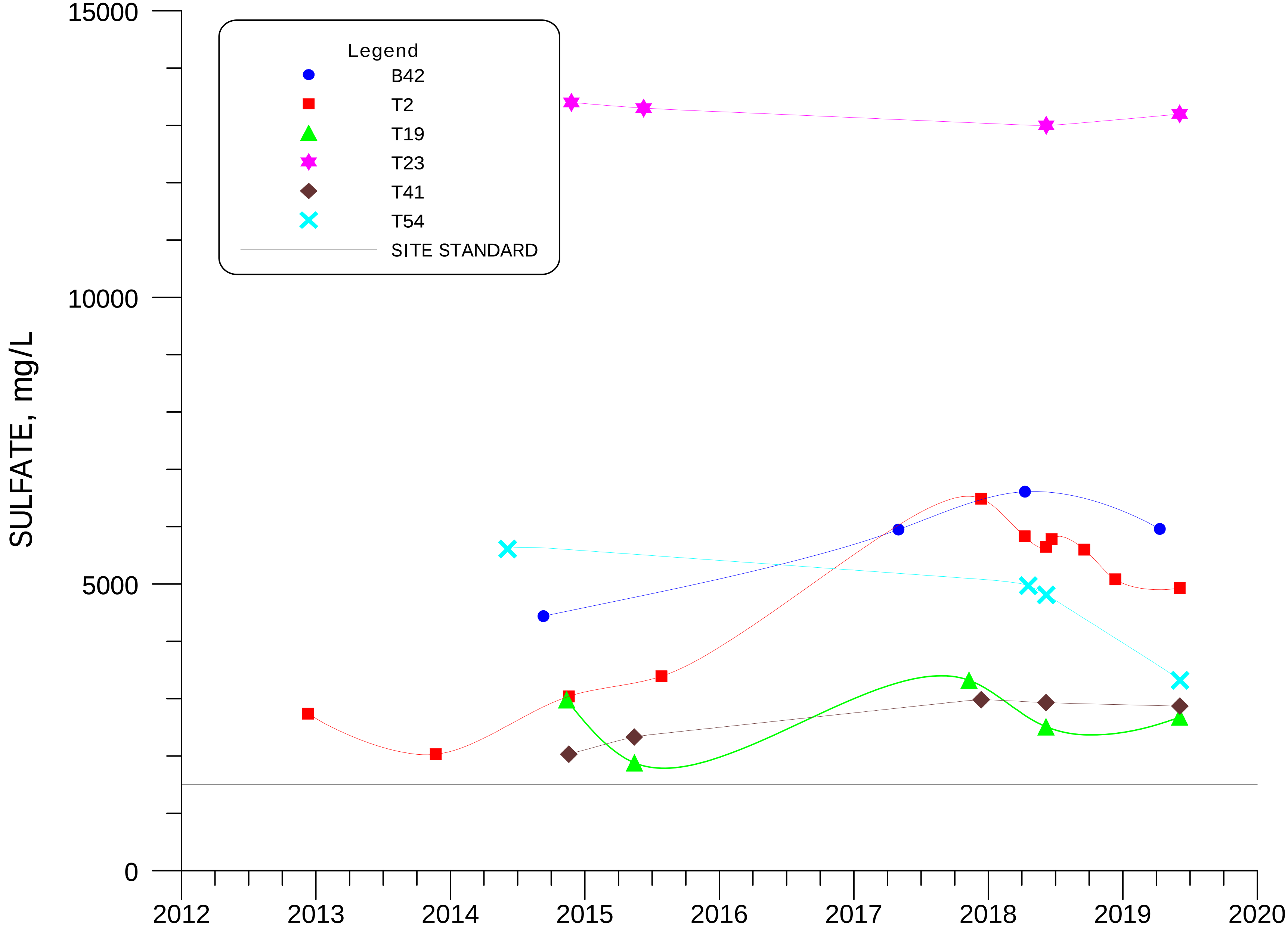

FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

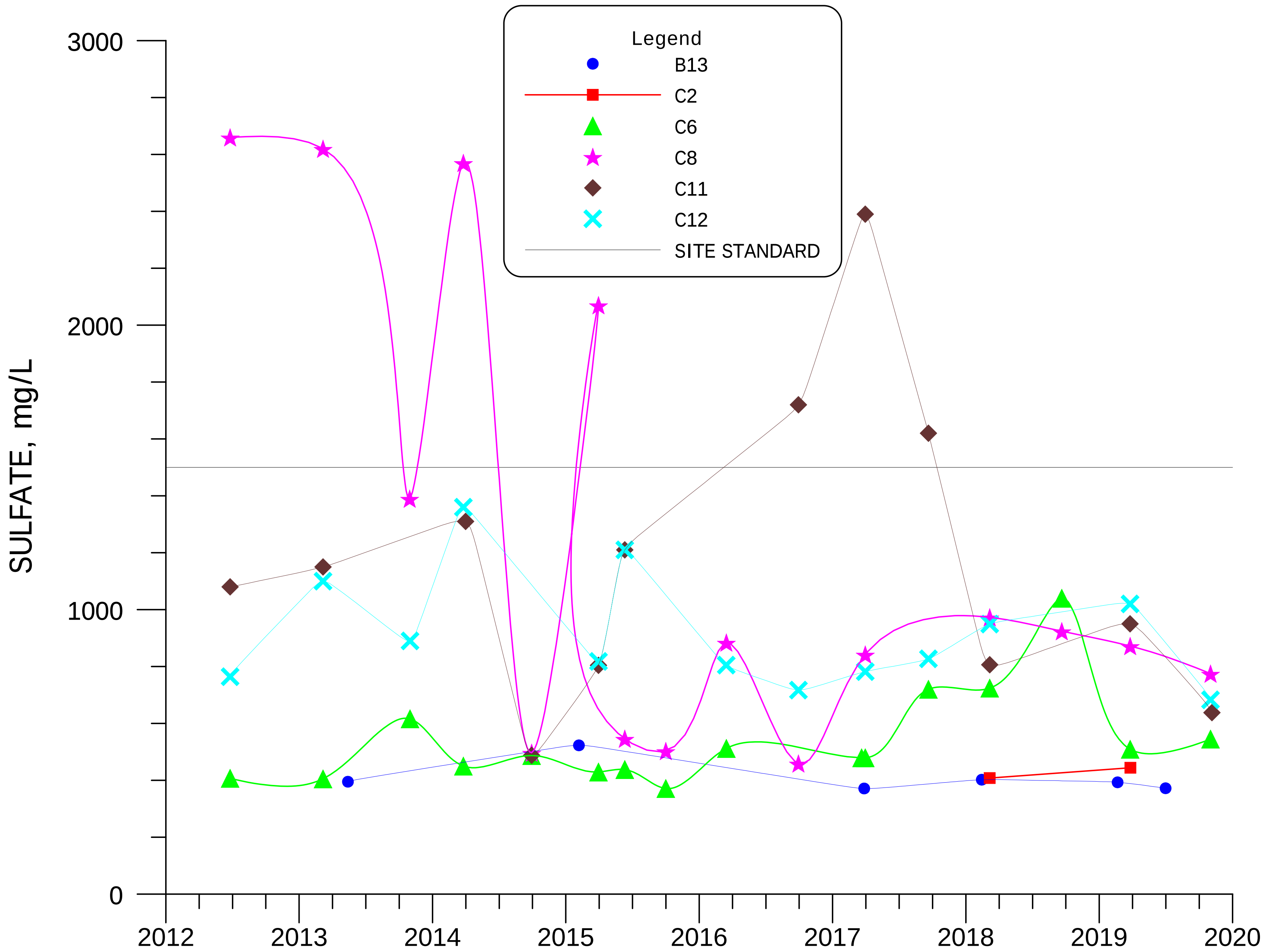

FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

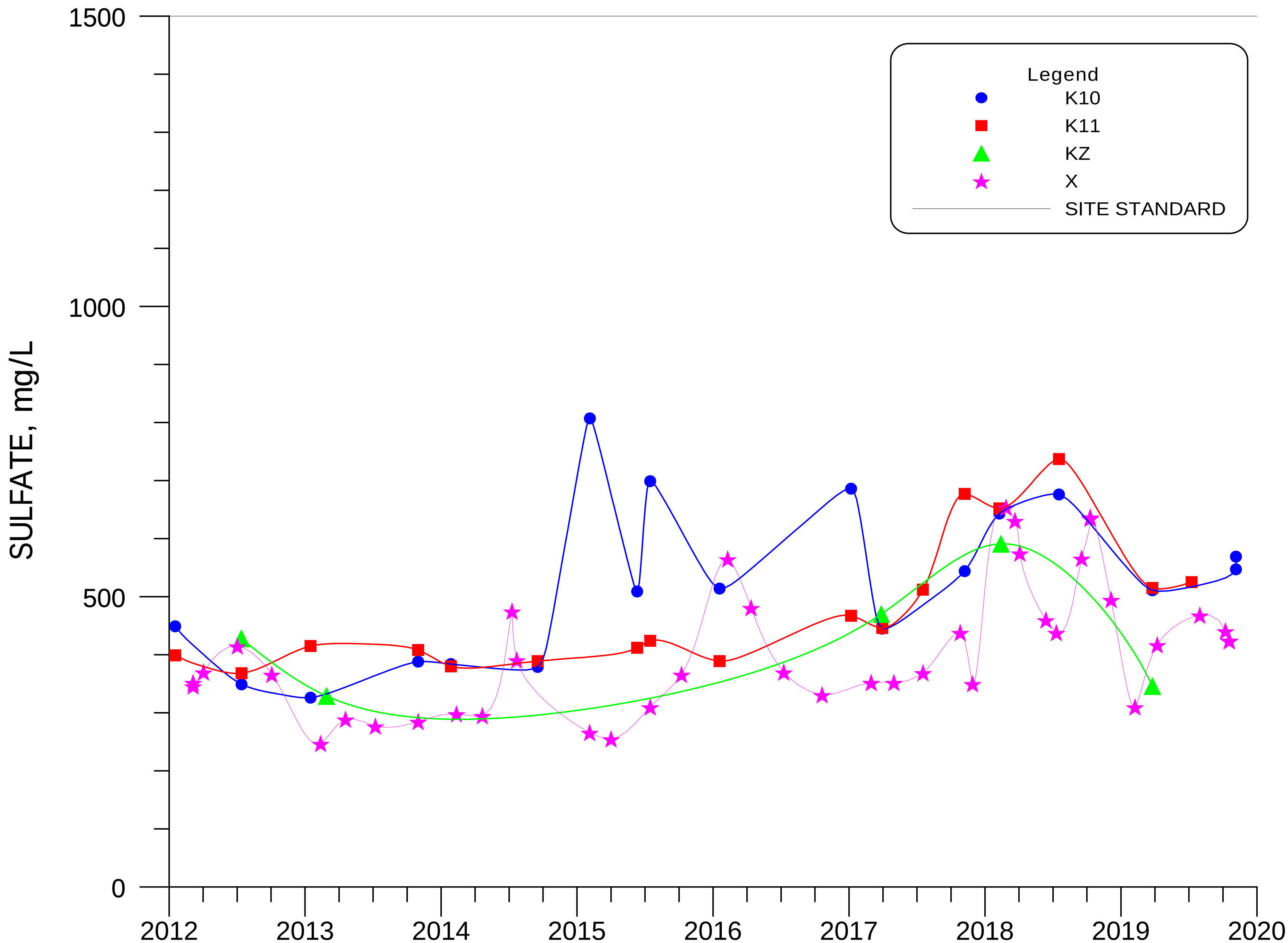

FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

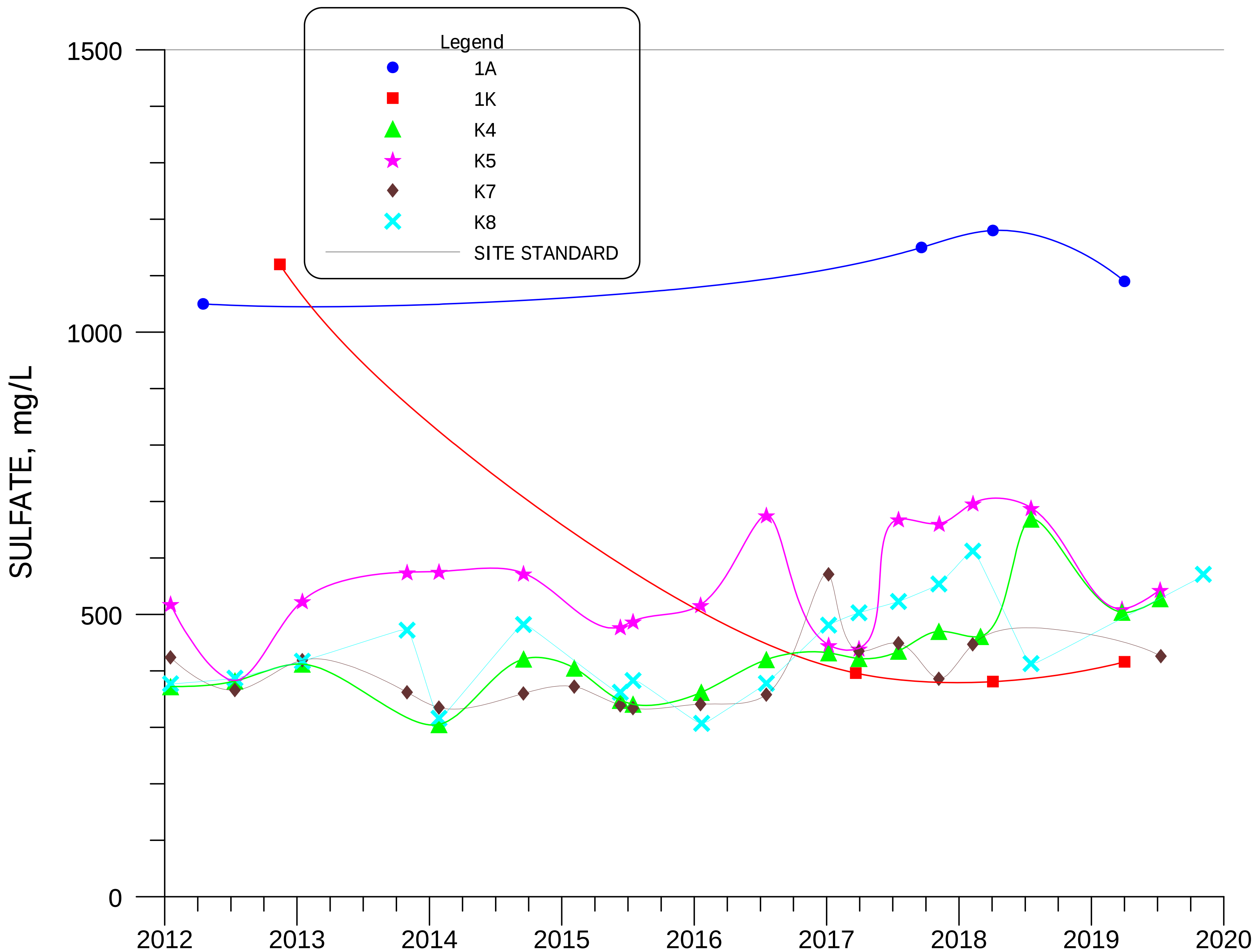

FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

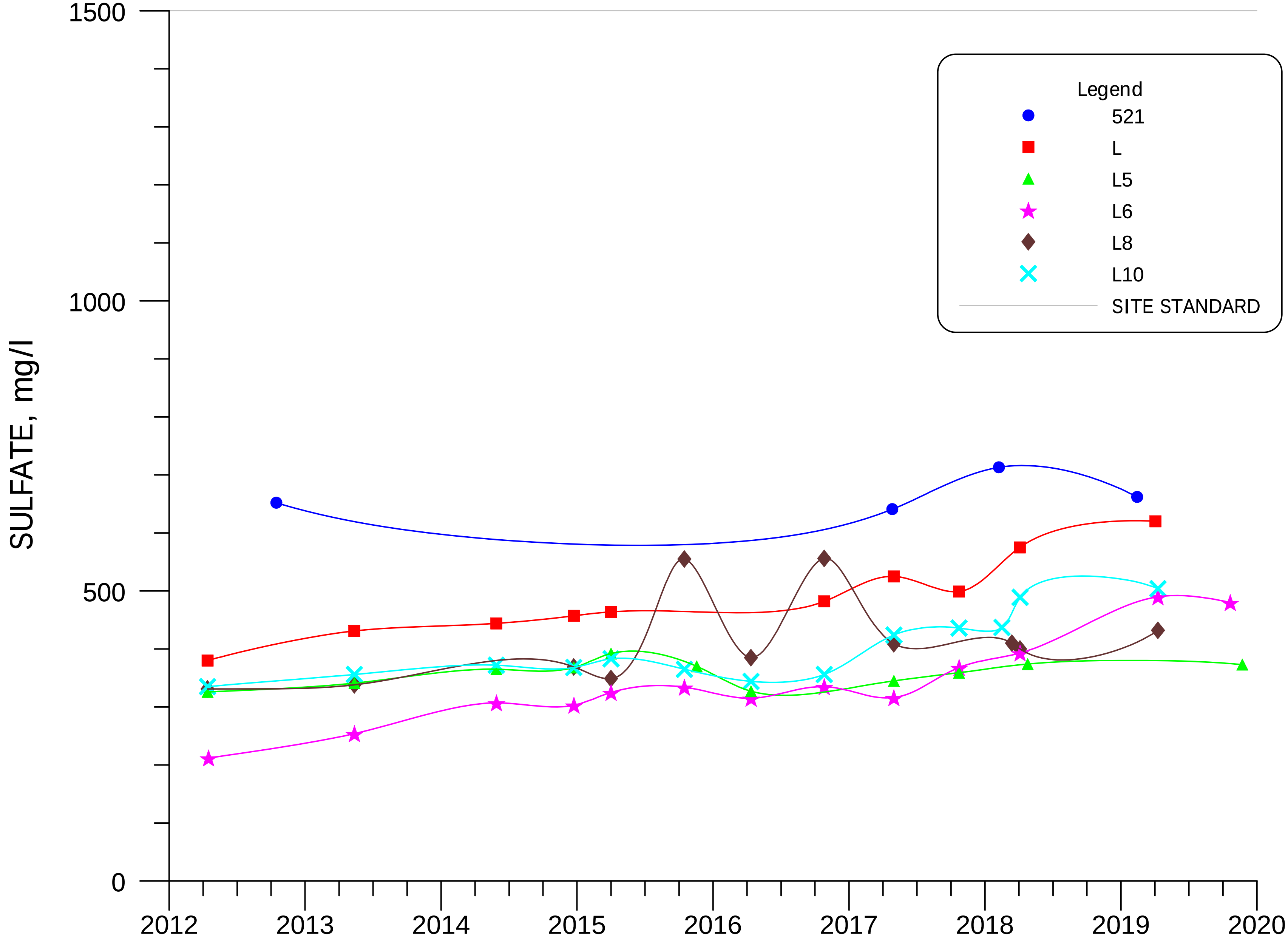

FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

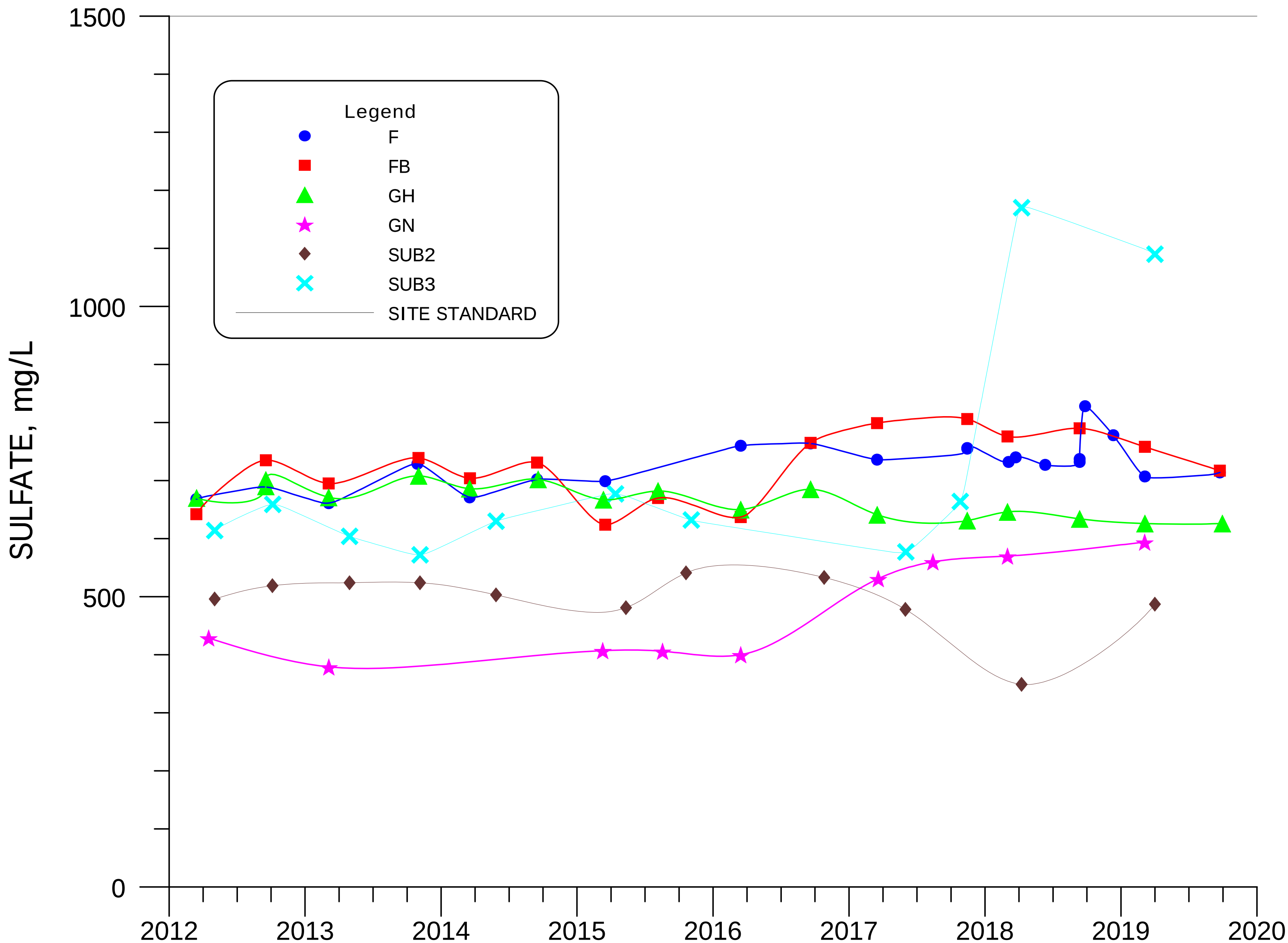

FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

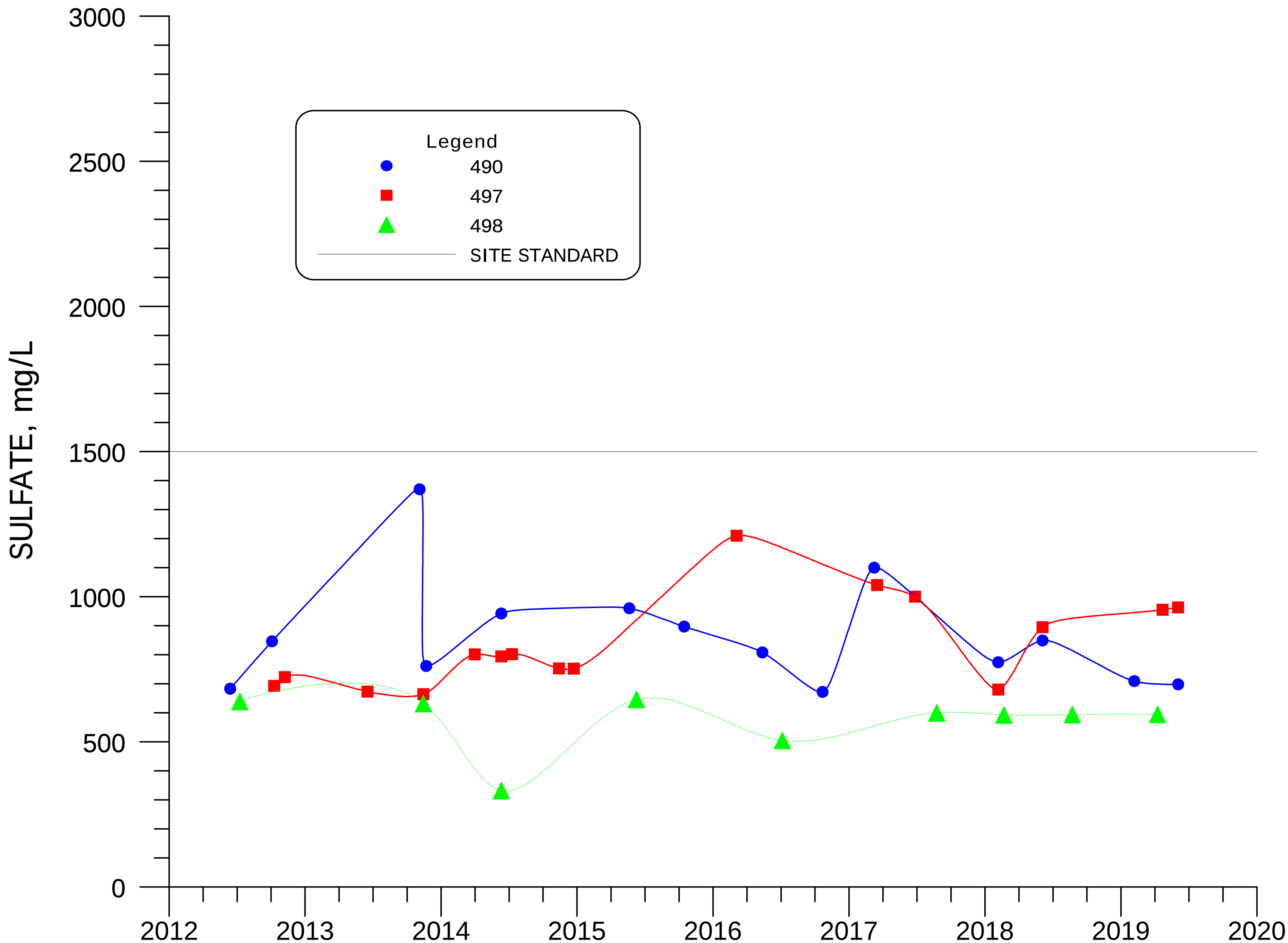

FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

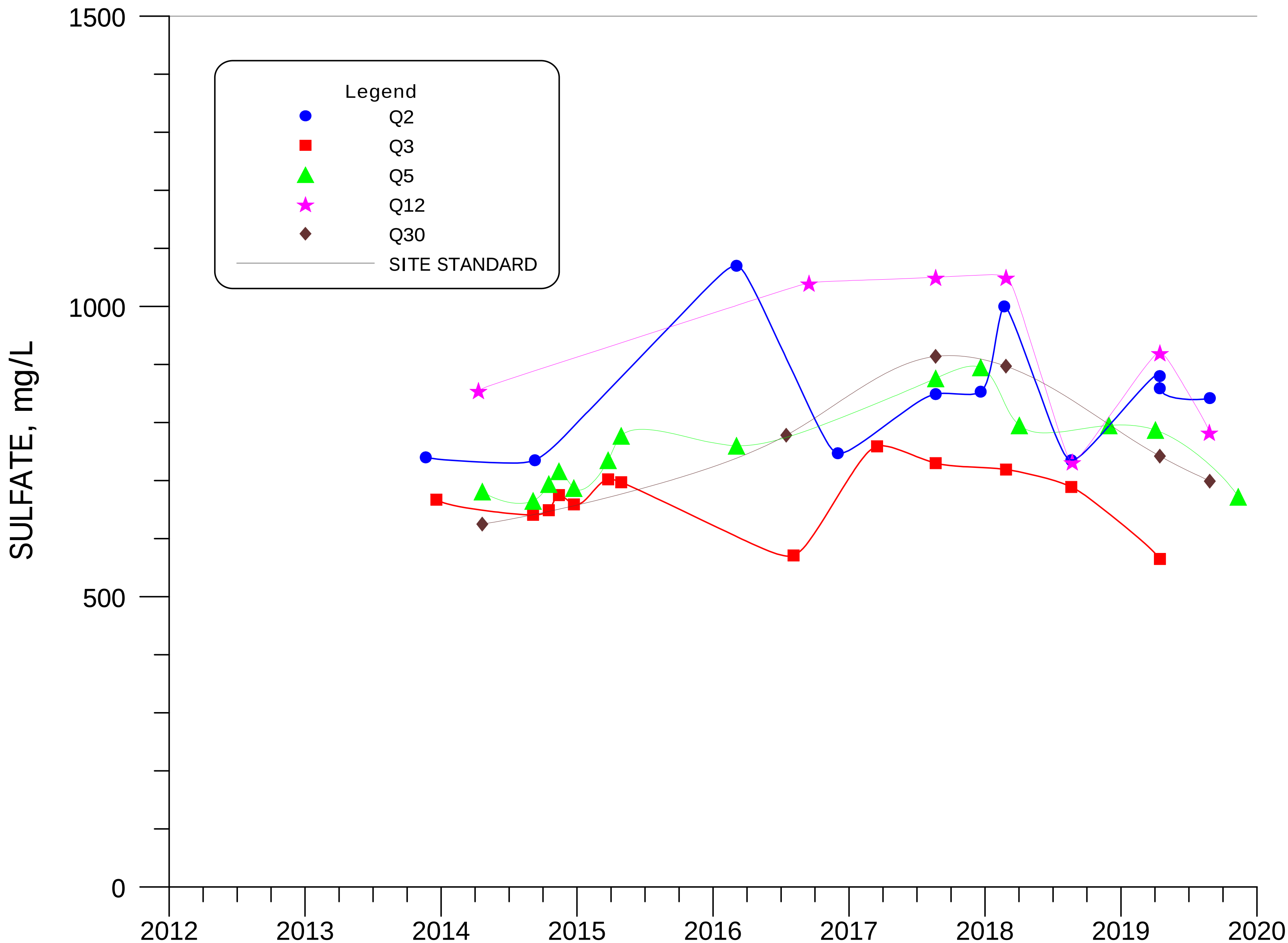

FIGURE 4.3-13A. SULFATE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q30.

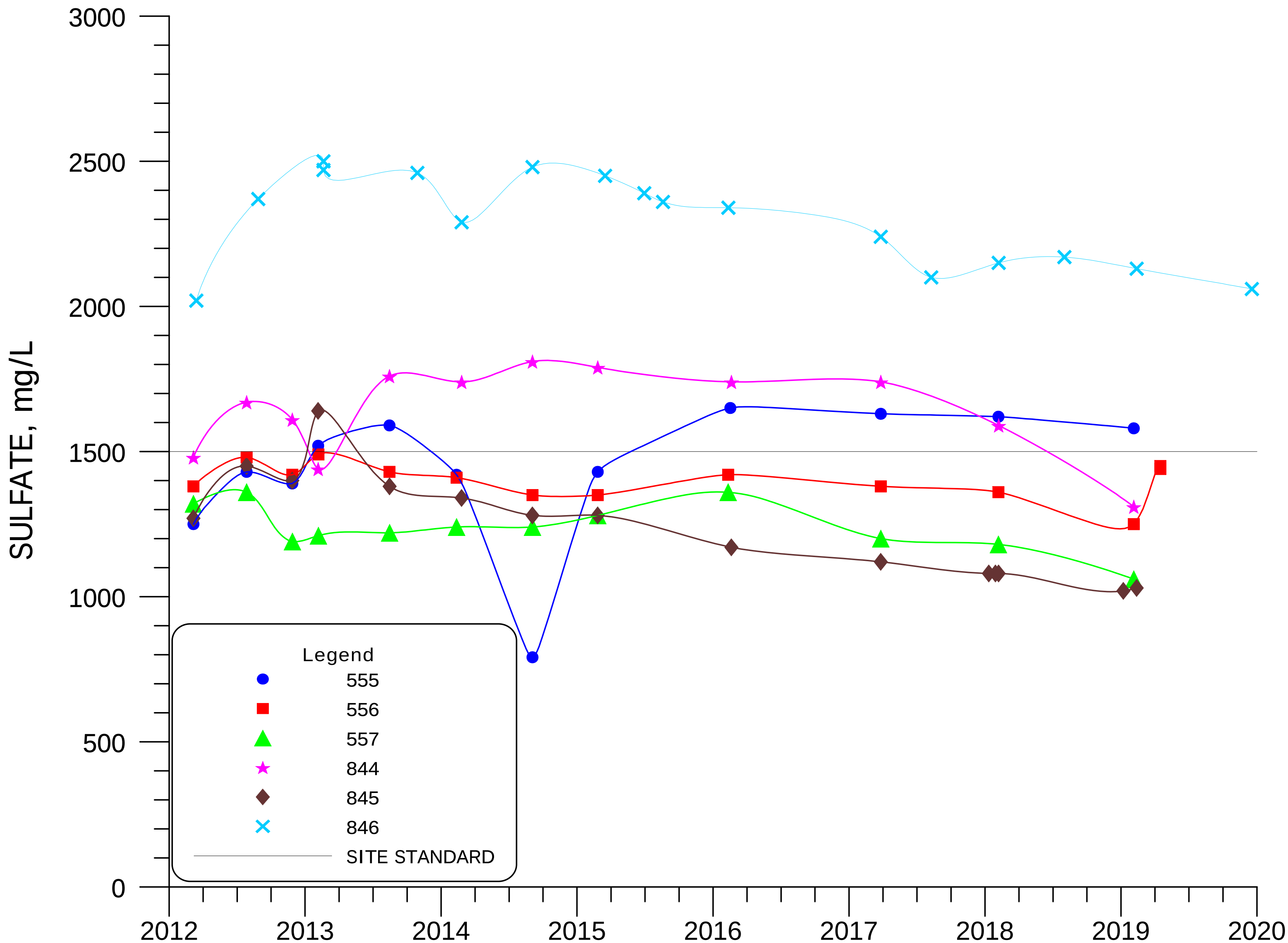

FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

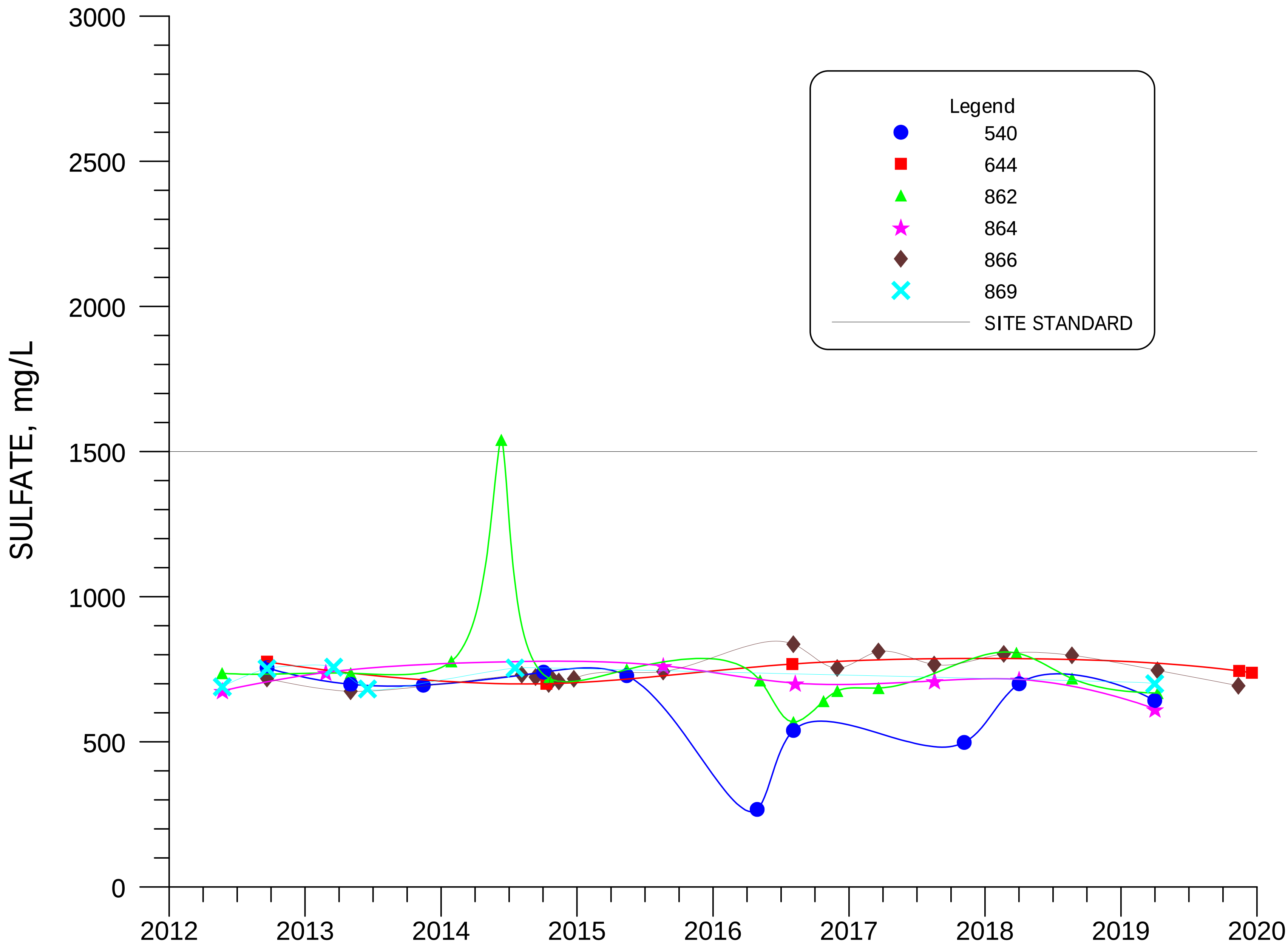

FIGURE 4.3-15. SULFATE CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

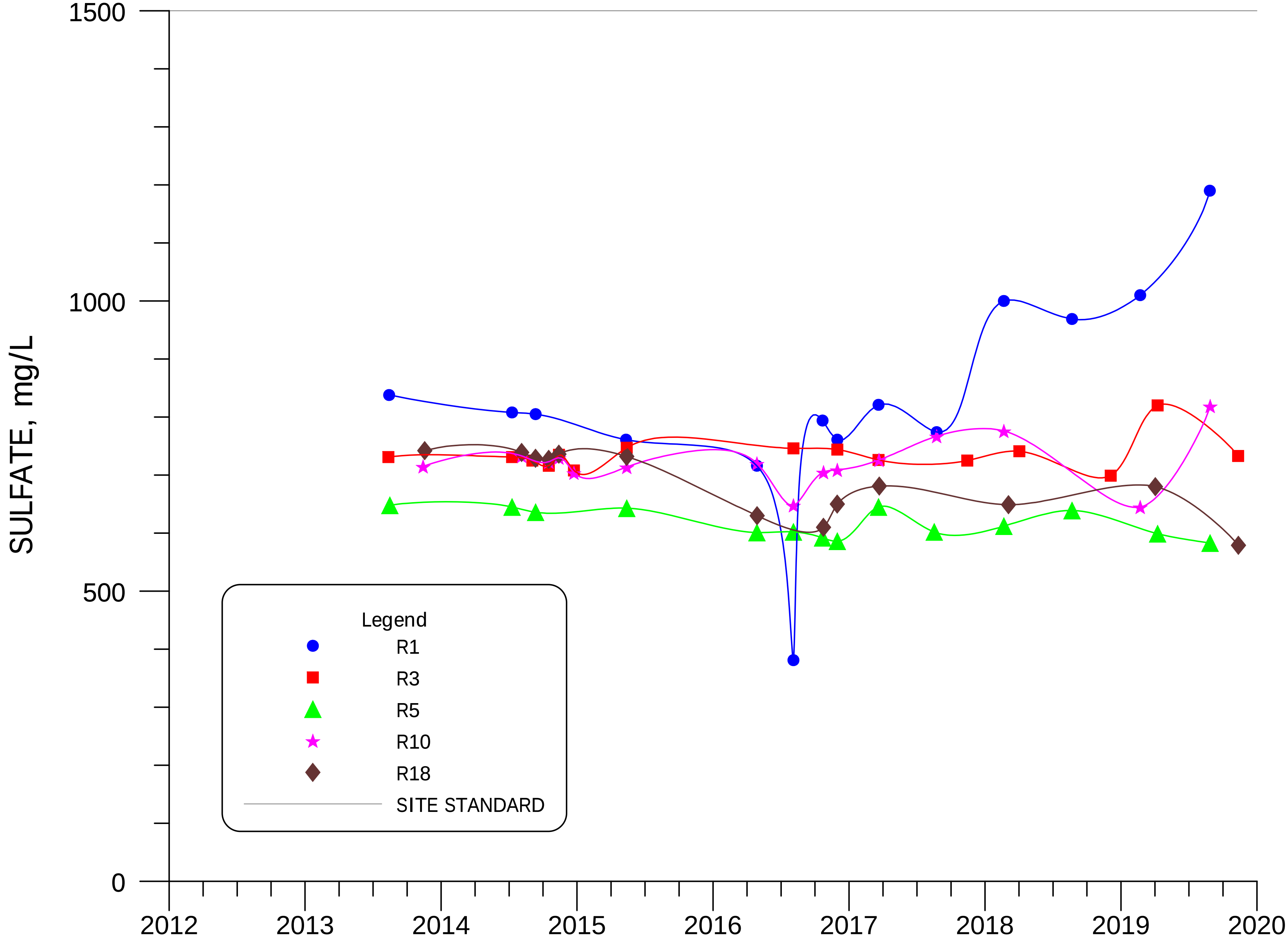

FIGURE 4.3-15A. SULFATE CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

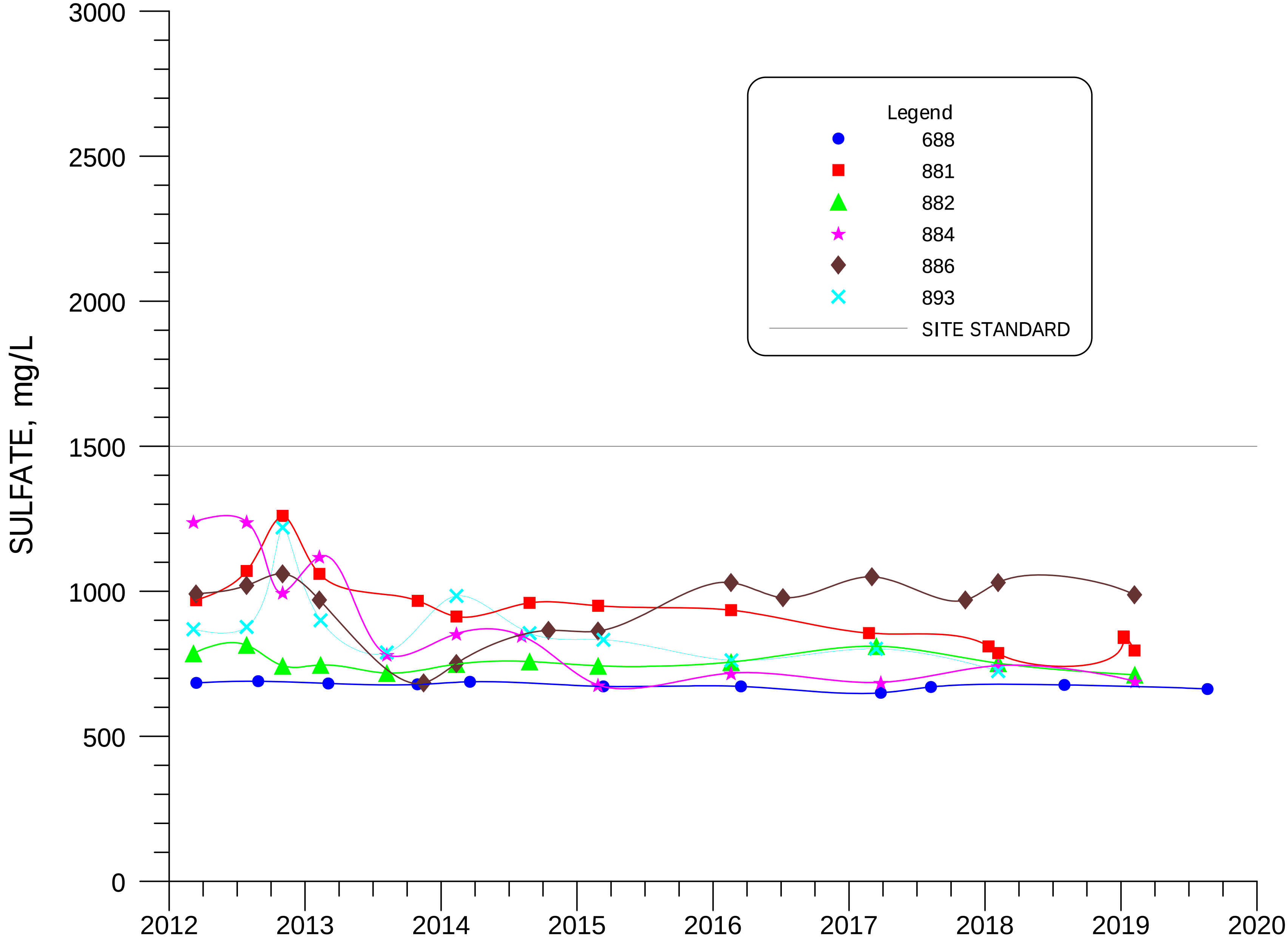

FIGURE 4.3-16. SULFATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

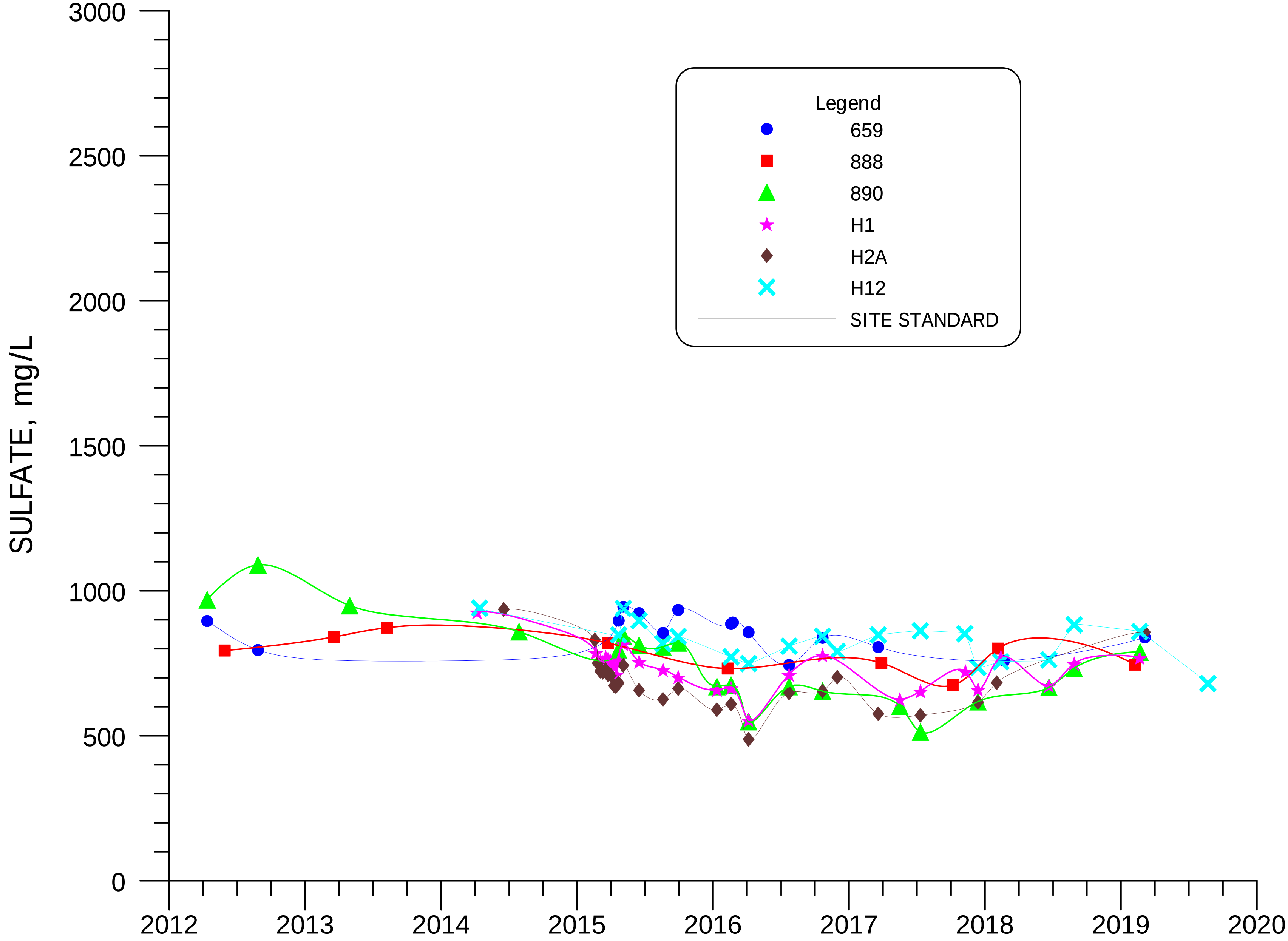

FIGURE 4.3-16A. SULFATE CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

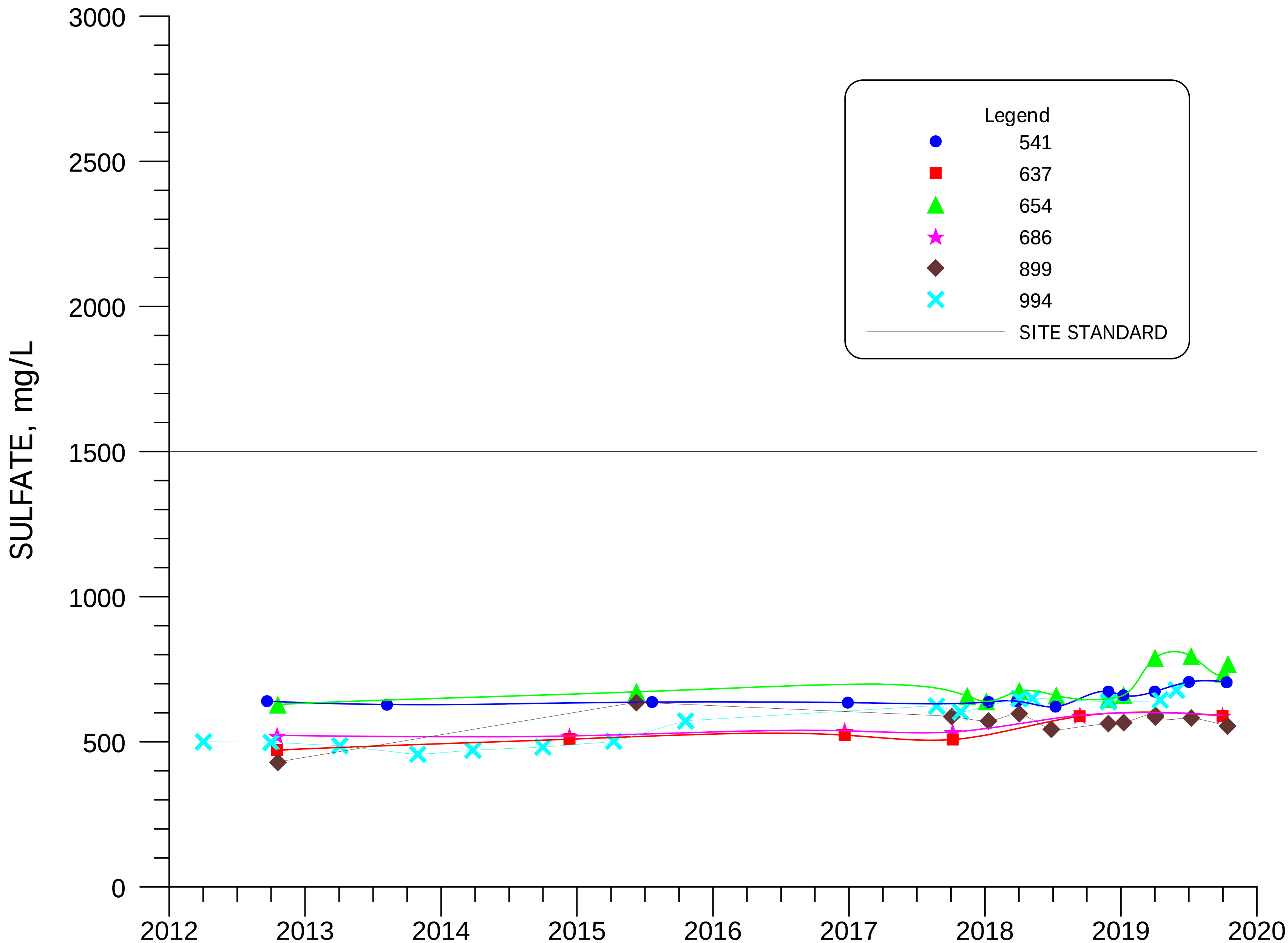

FIGURE 4.3-17. SULFATE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

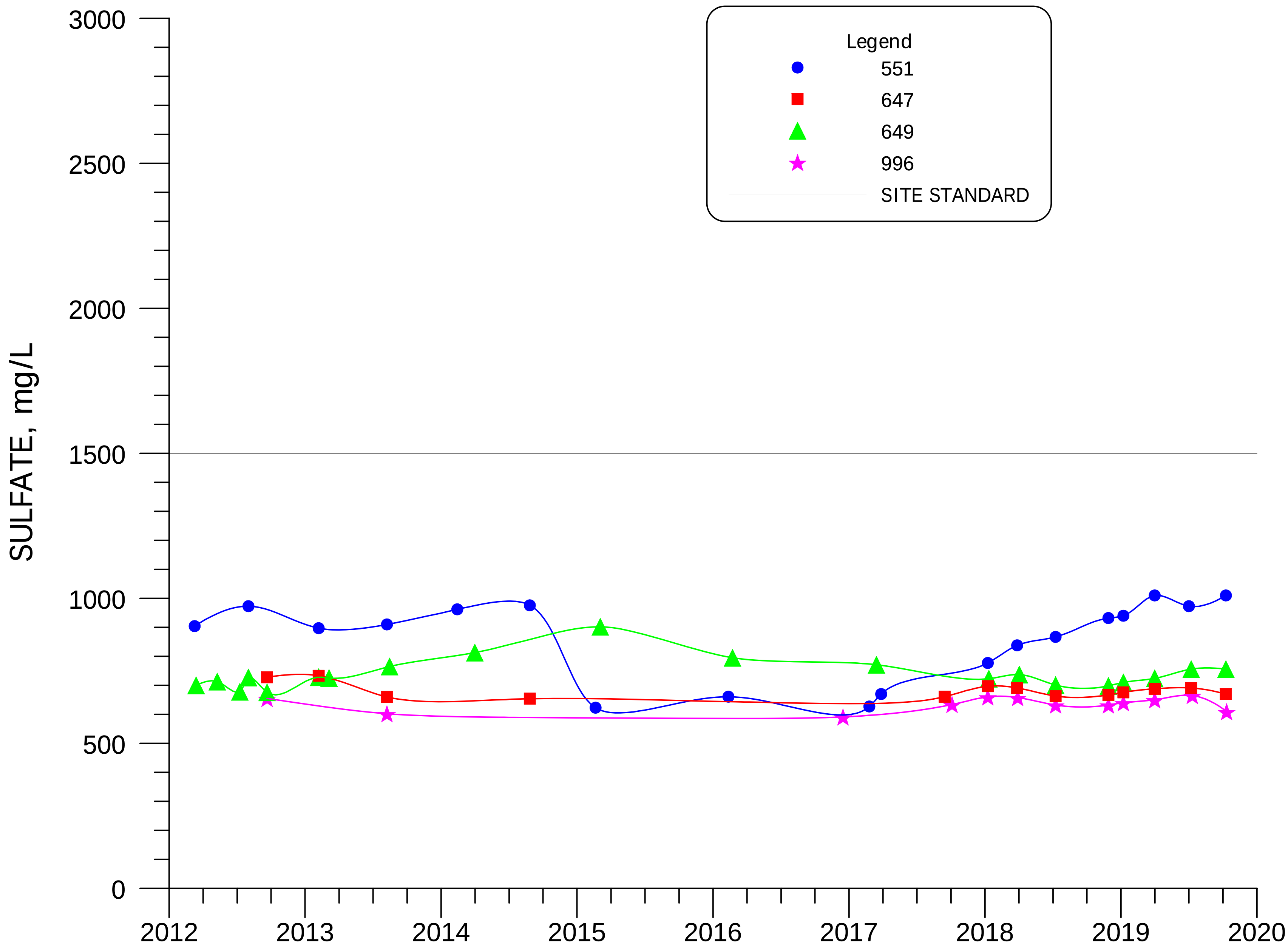

FIGURE 4.3-18. SULFATE CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

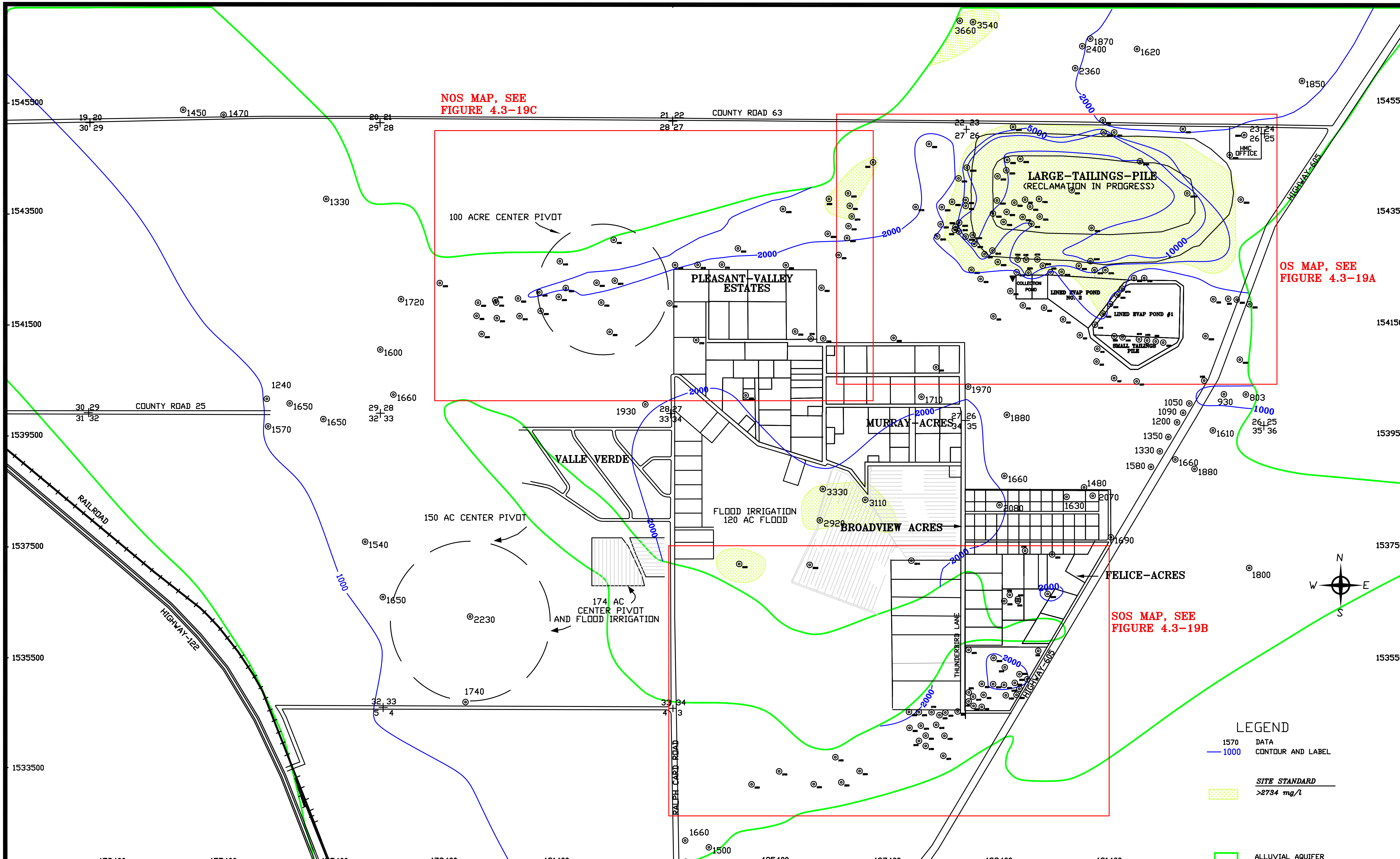

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FIGURE 4.3-19. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

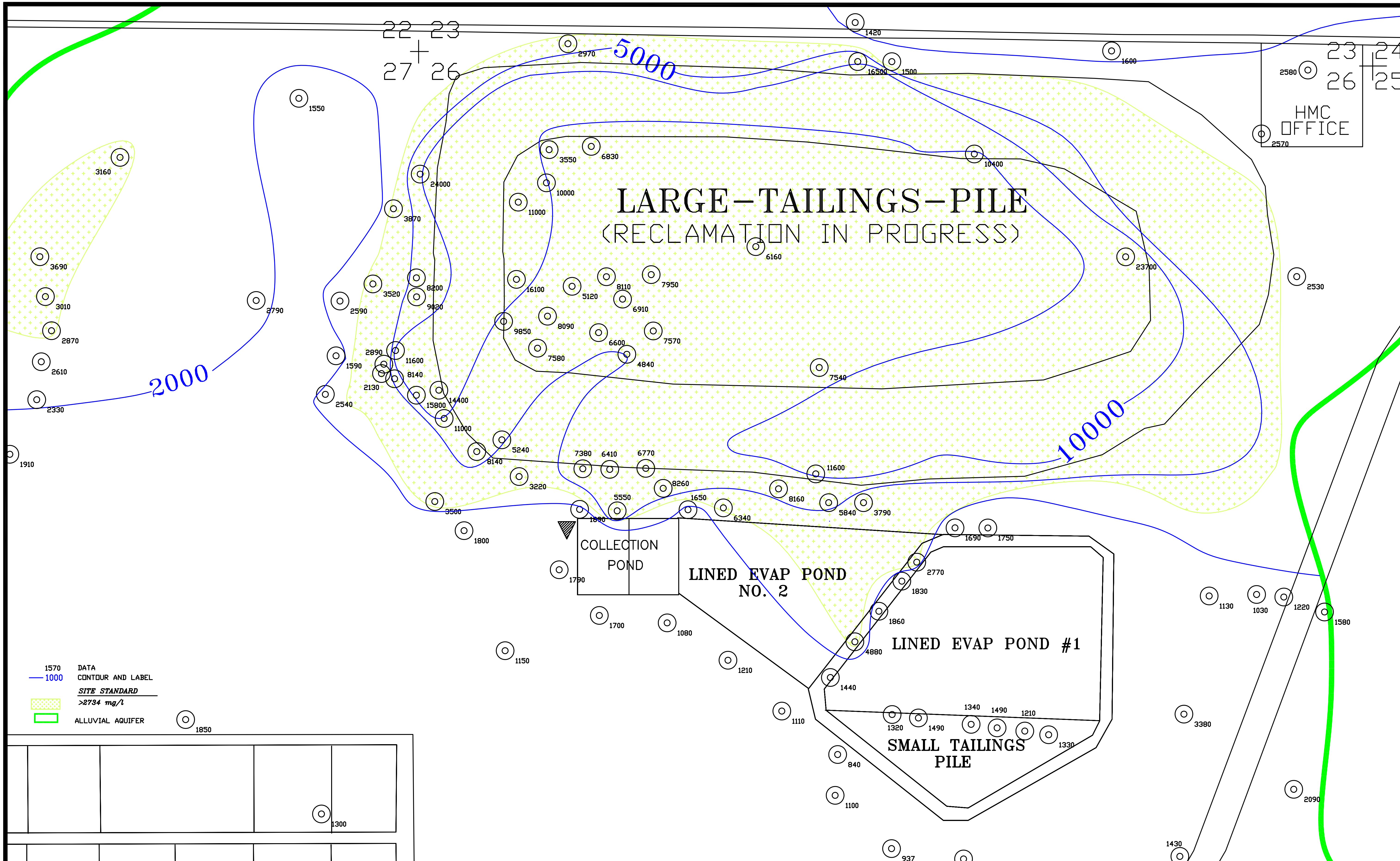

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FIGURE 4.3-19A. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

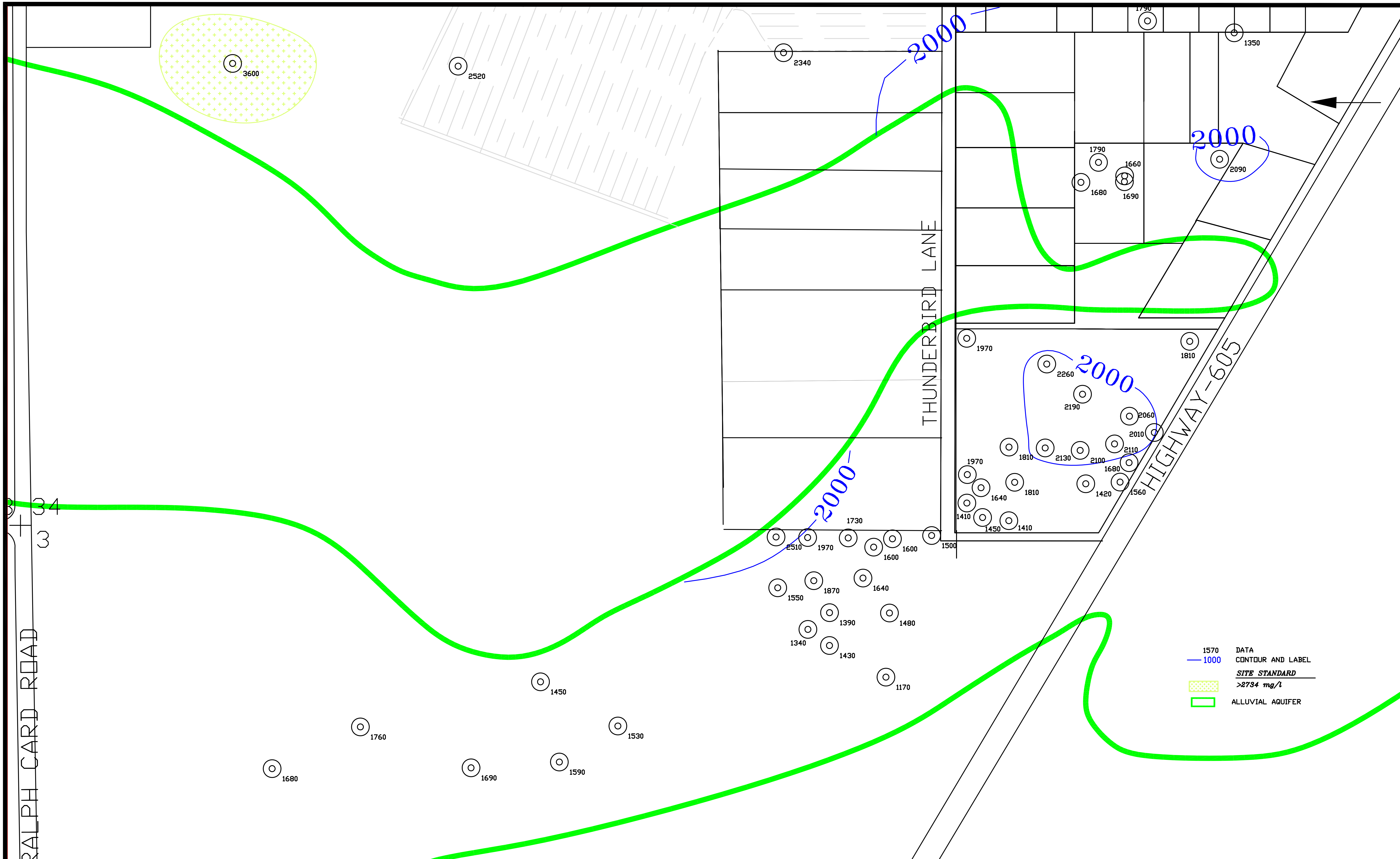

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FIGURE 4.3-19B. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

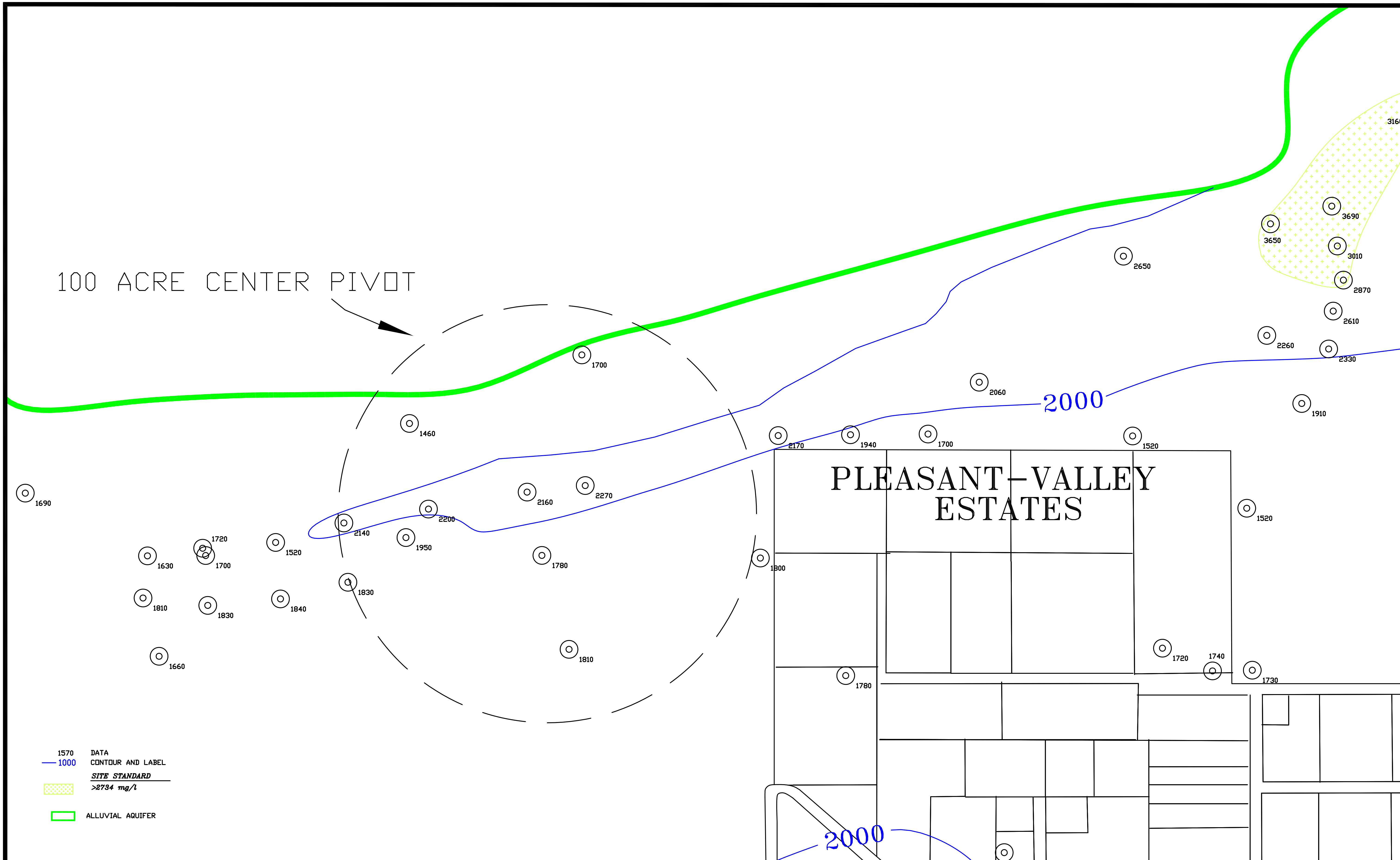

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FIGURE 4.3-19C. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

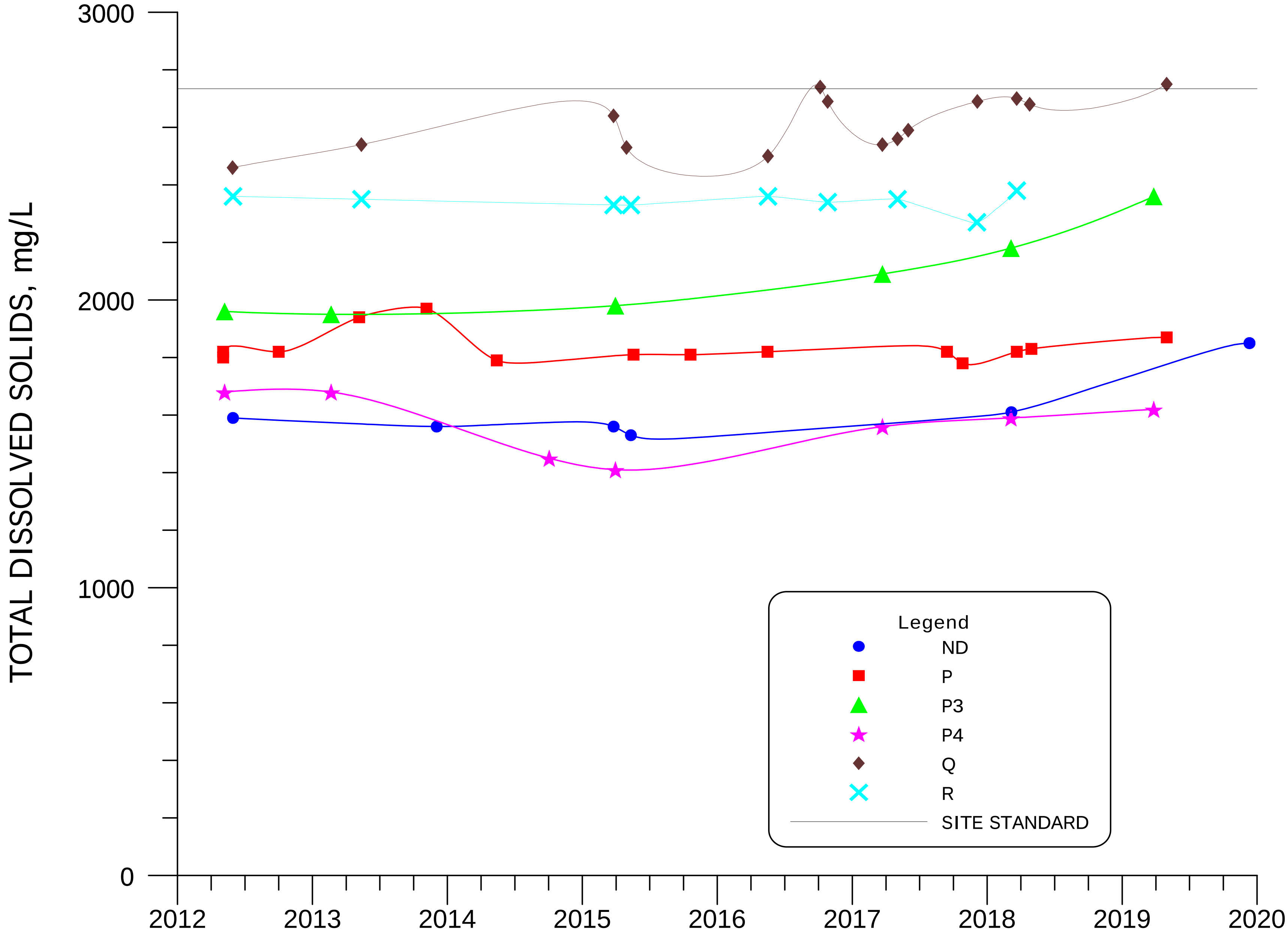

FIGURE 4.3-20. TDS CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

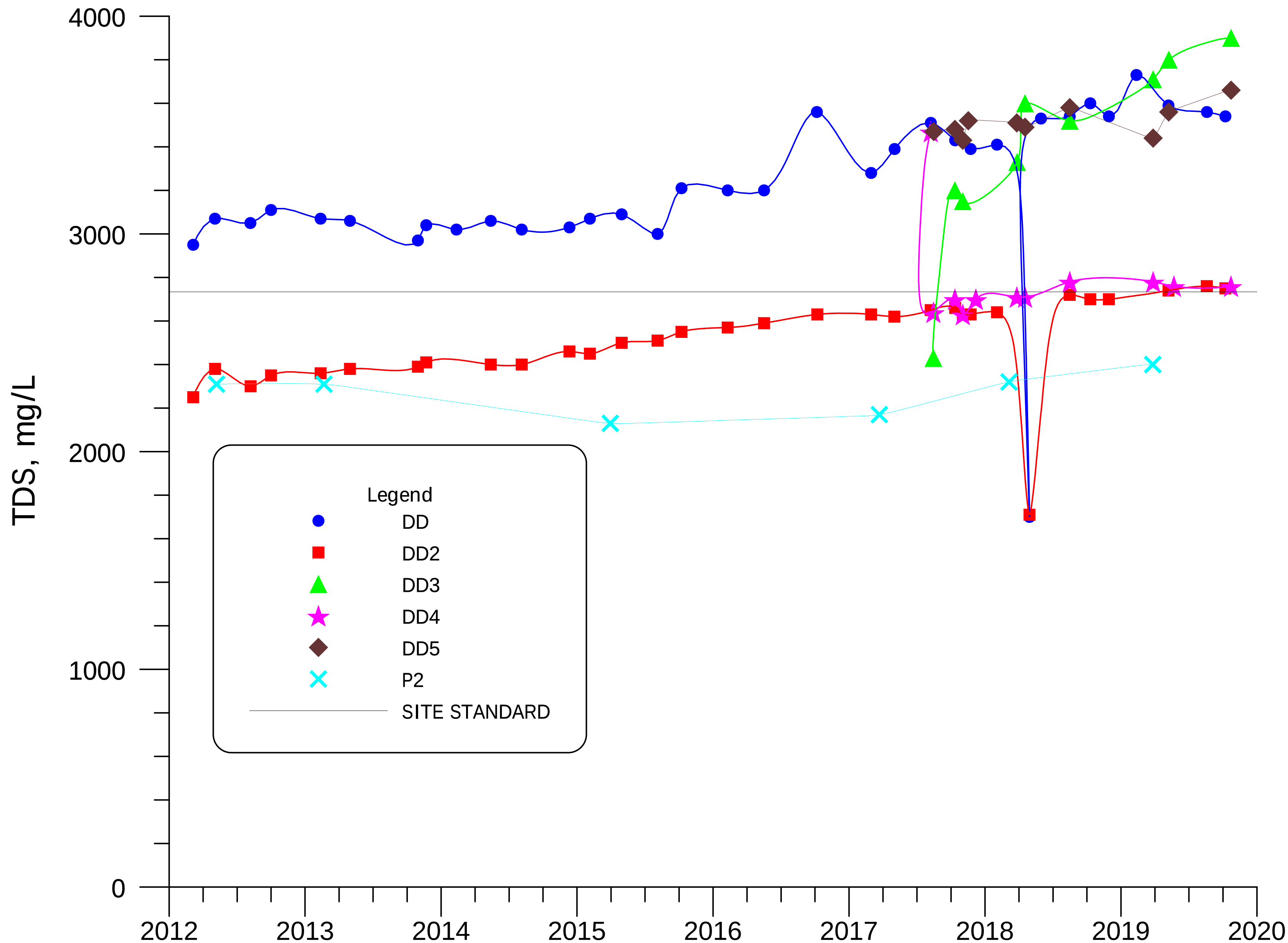

FIGURE 4.3-20A. TDS CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

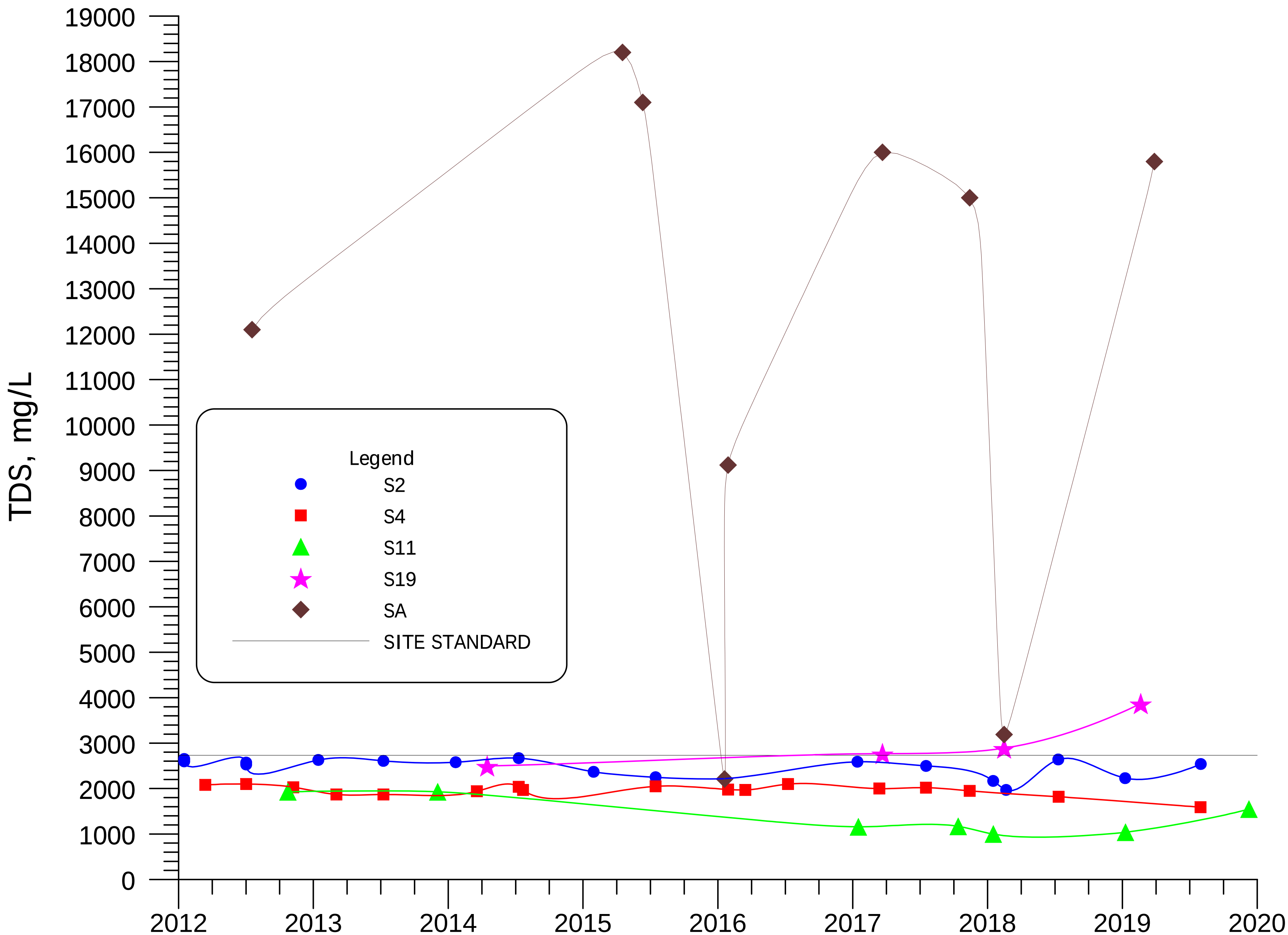

FIGURE 4.3-21. TDS CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

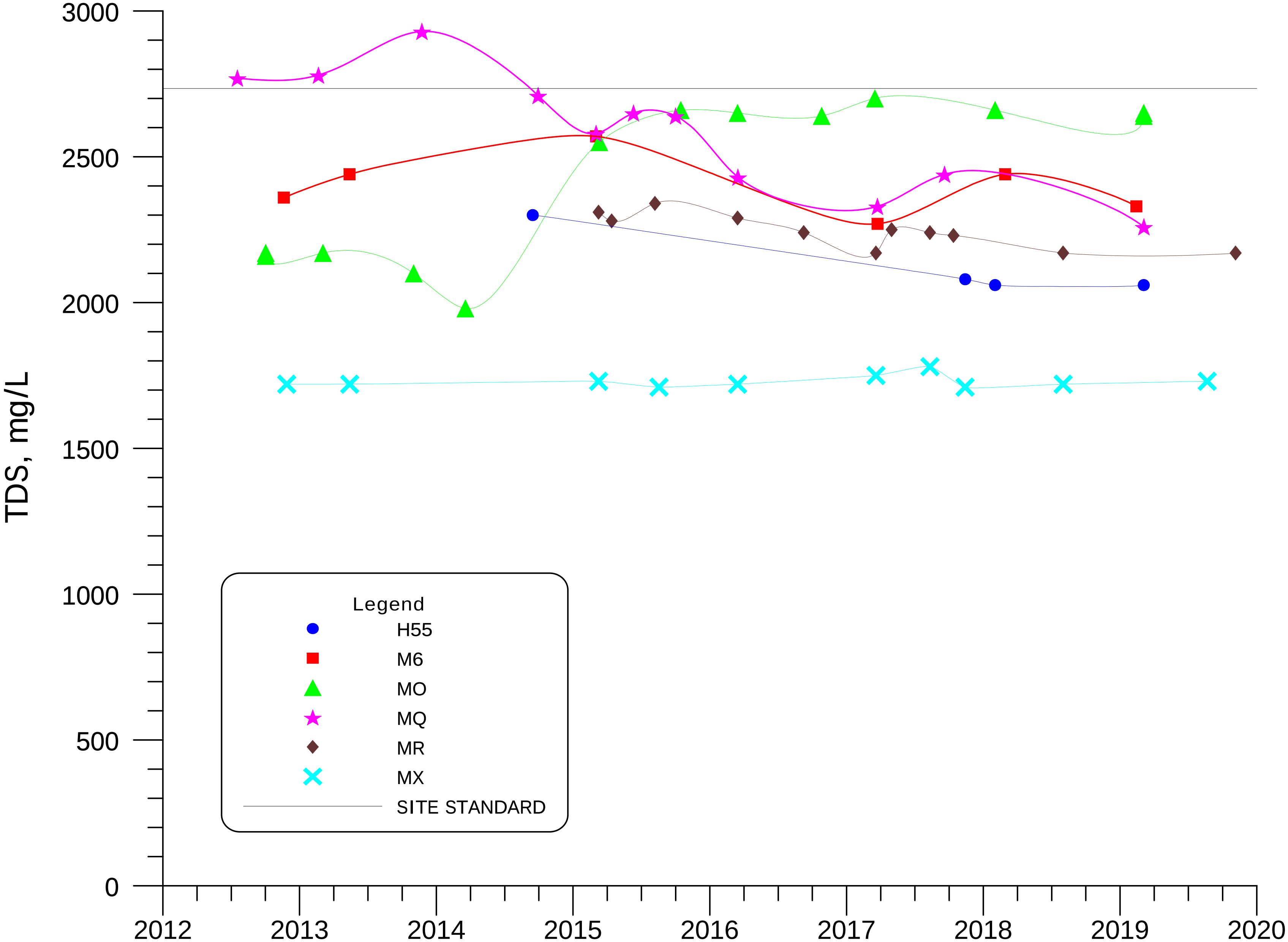

FIGURE 4.3-22. TDS CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

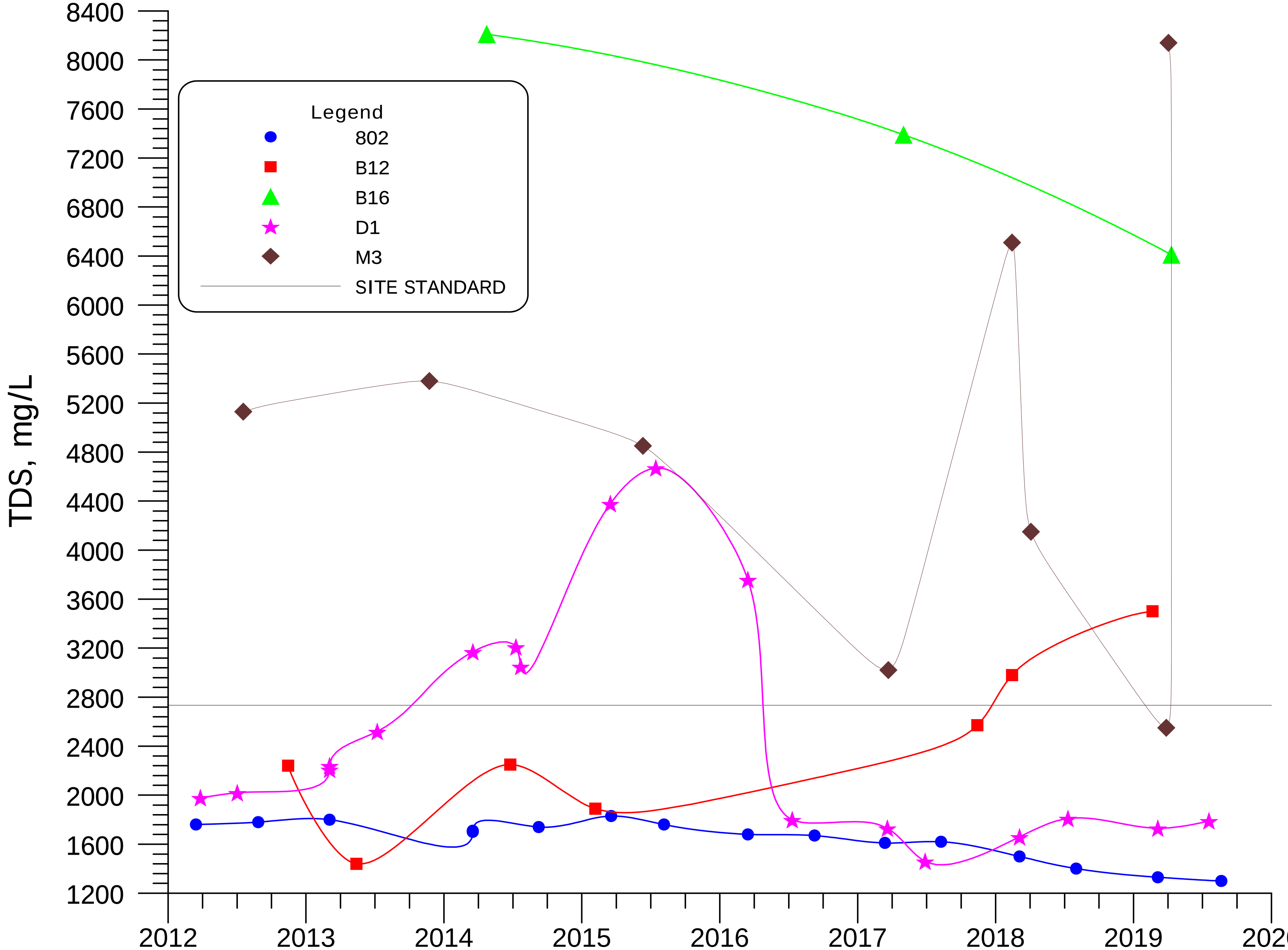

FIGURE 4.3-23. TDS CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

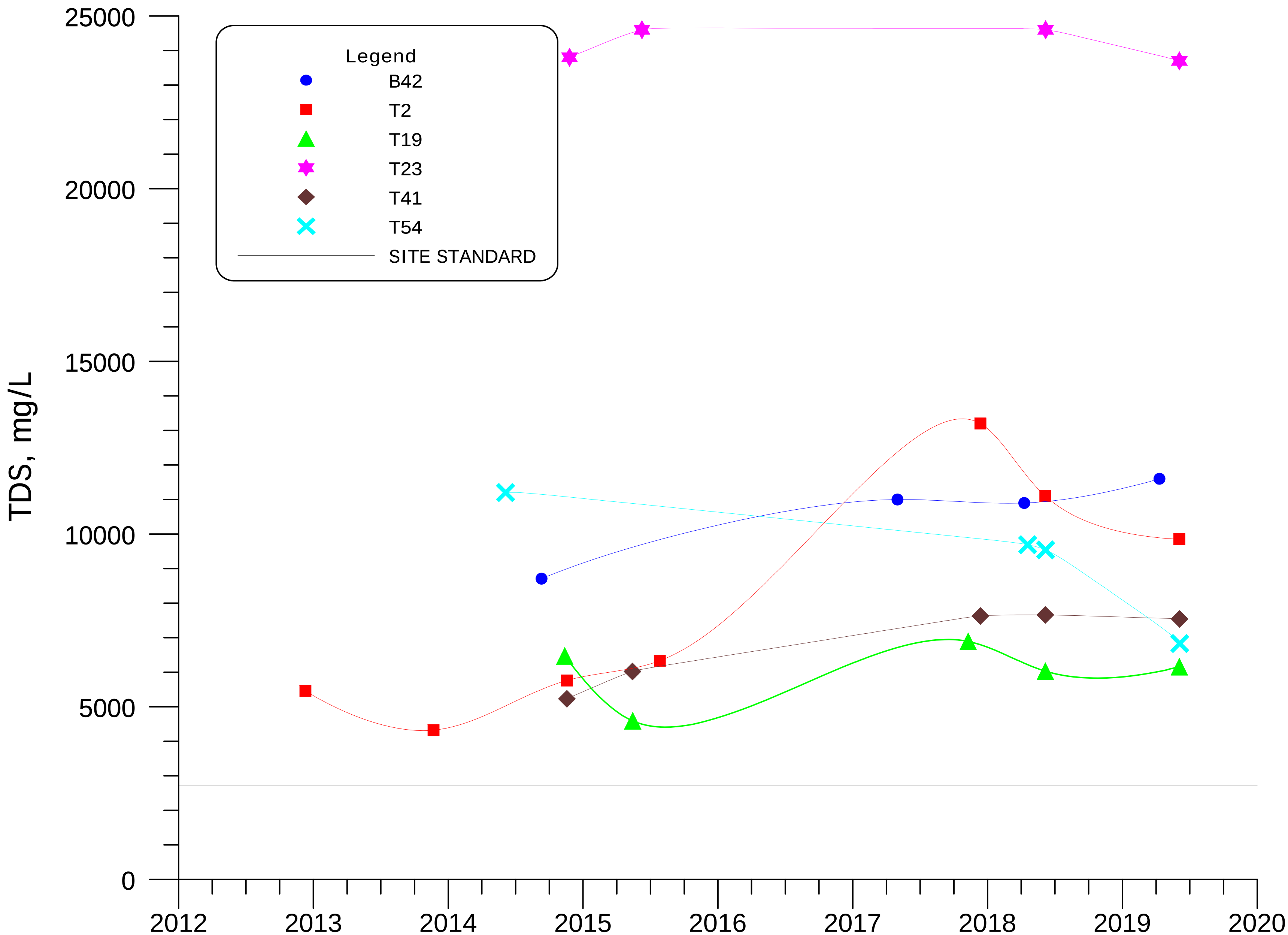

FIGURE 4.3-24. TDS CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

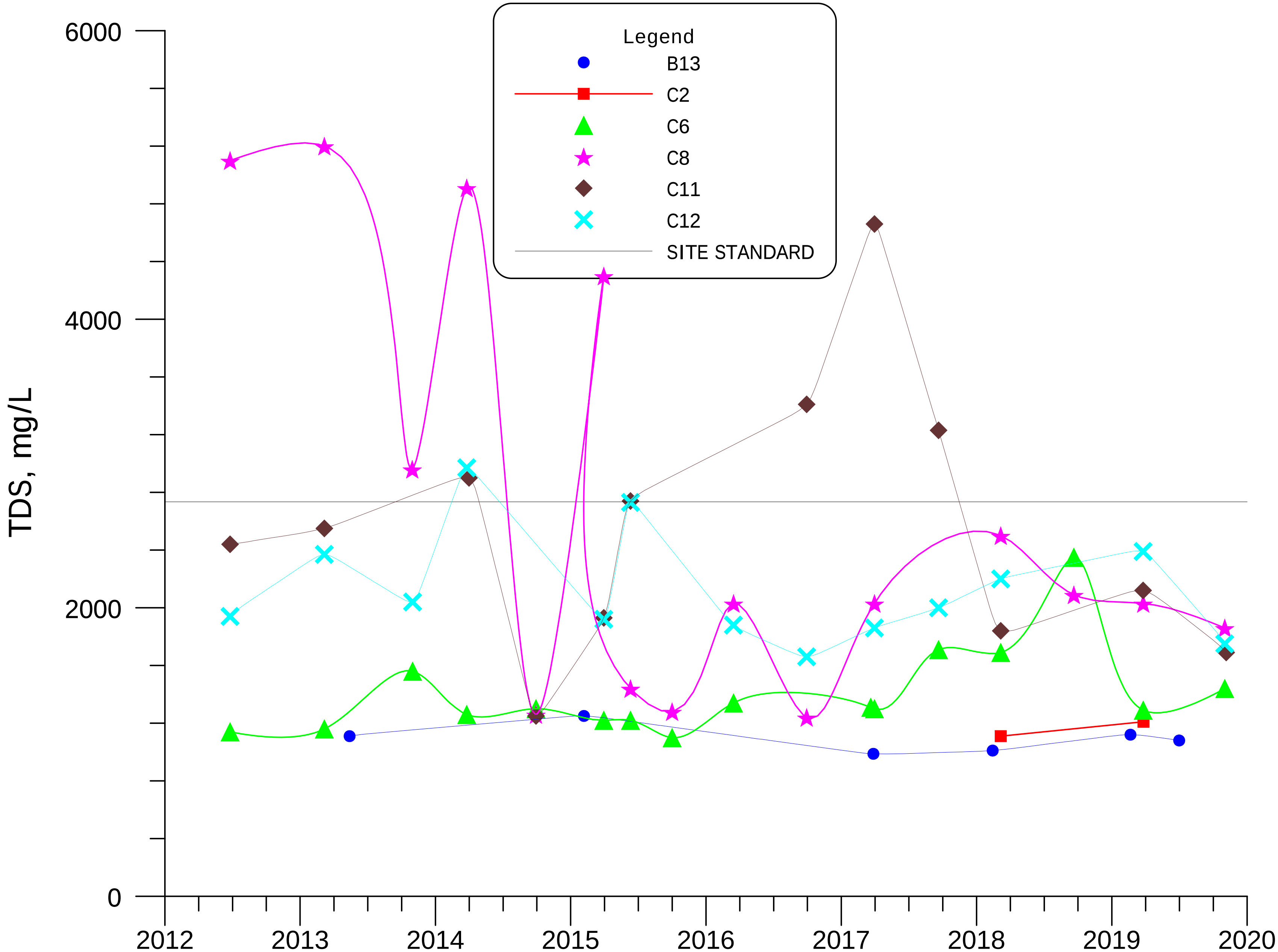

FIGURE 4.3-25. TDS CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

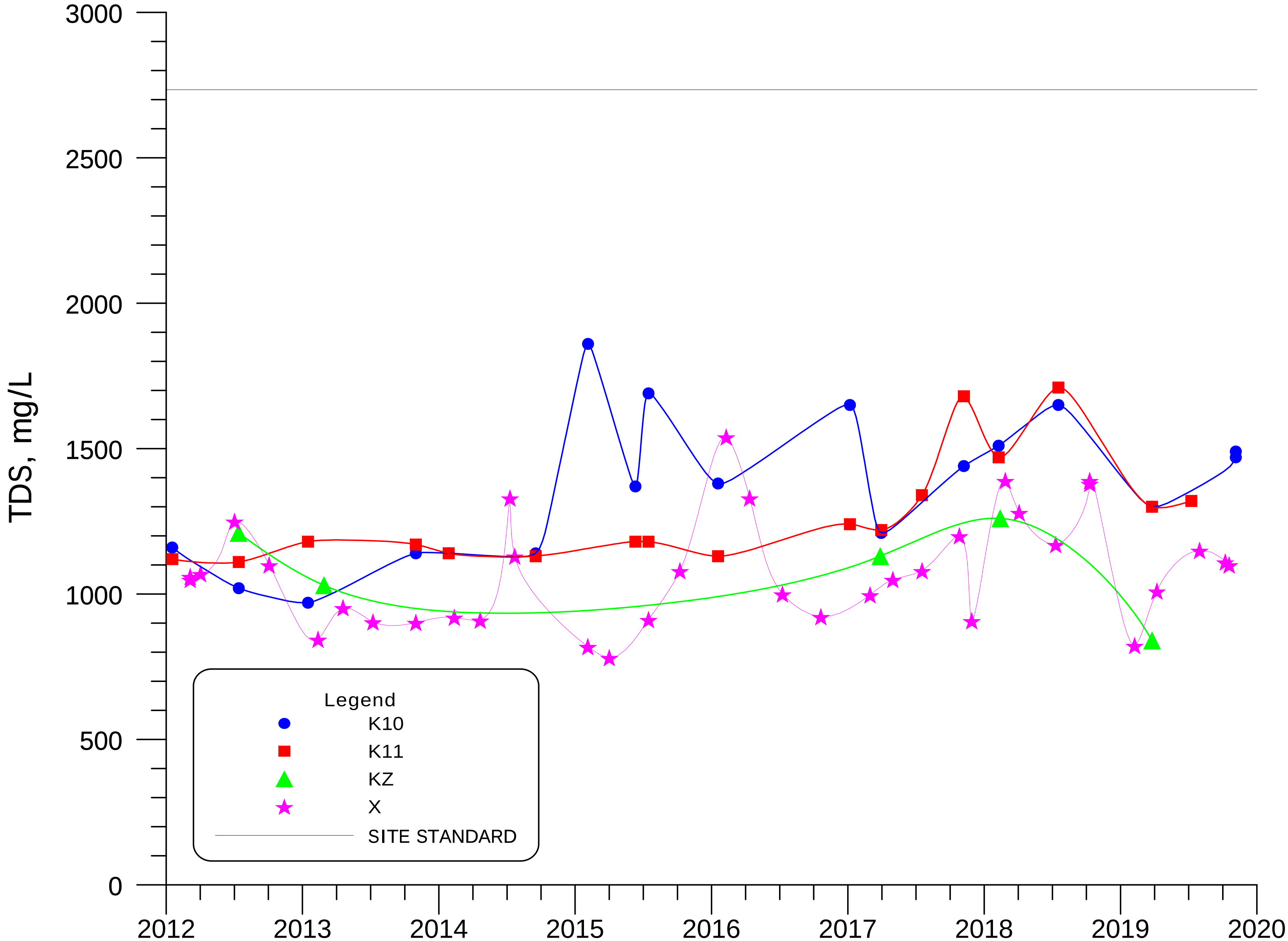

FIGURE 4.3-26. TDS CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

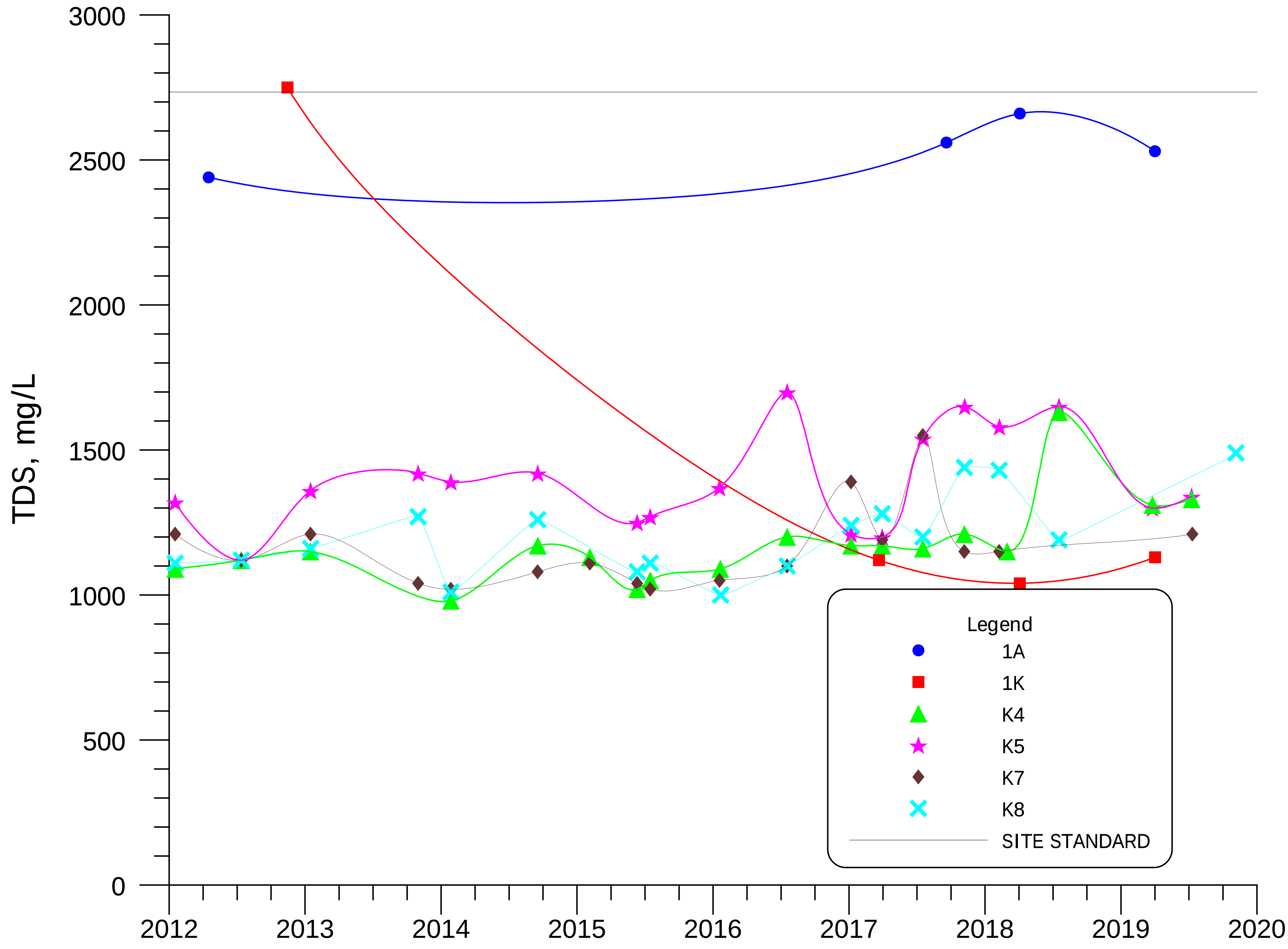

FIGURE 4.3-27. TDS CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

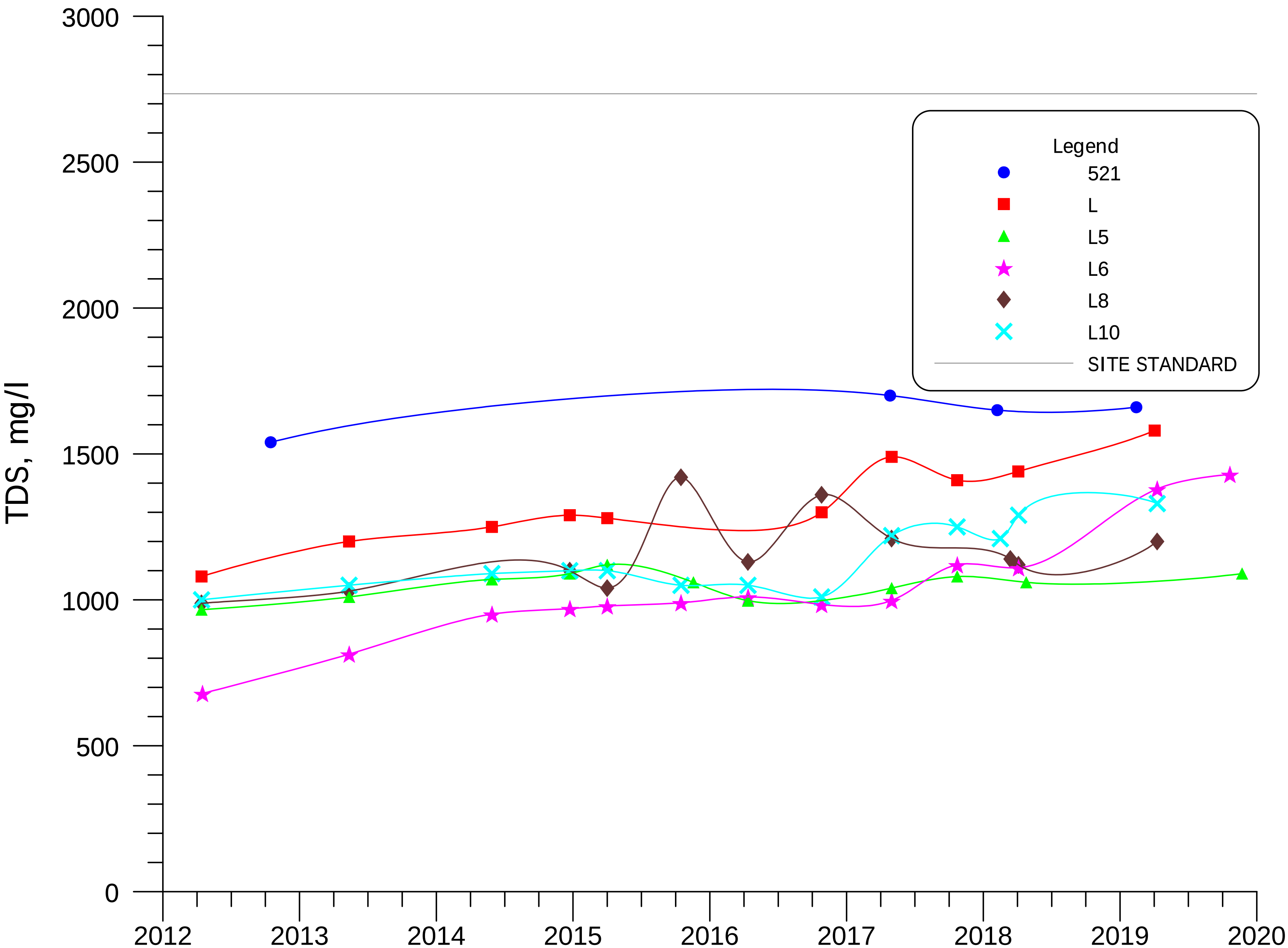

FIGURE 4.3-28. TDS CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

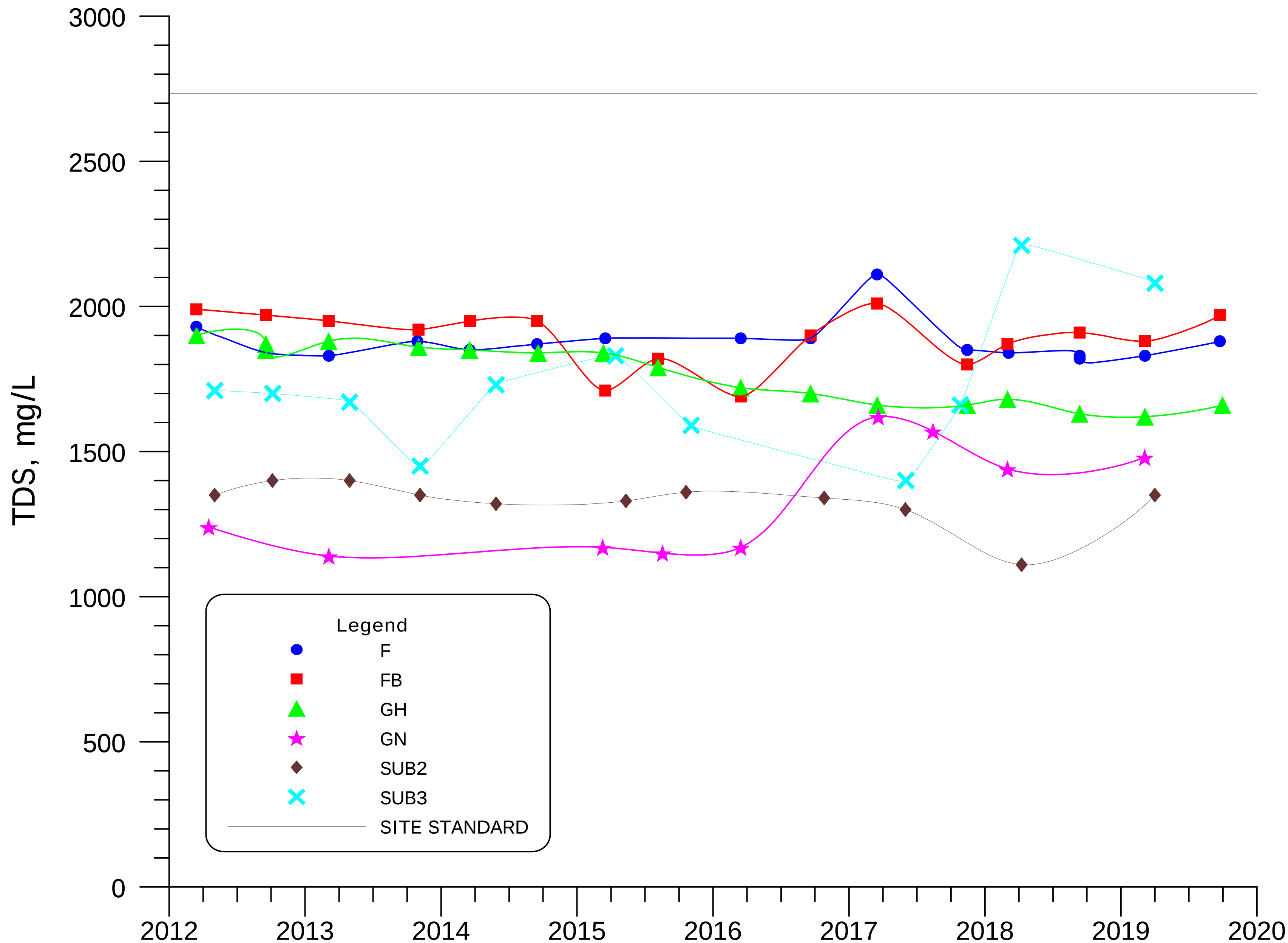

FIGURE 4.3-29. TDS CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

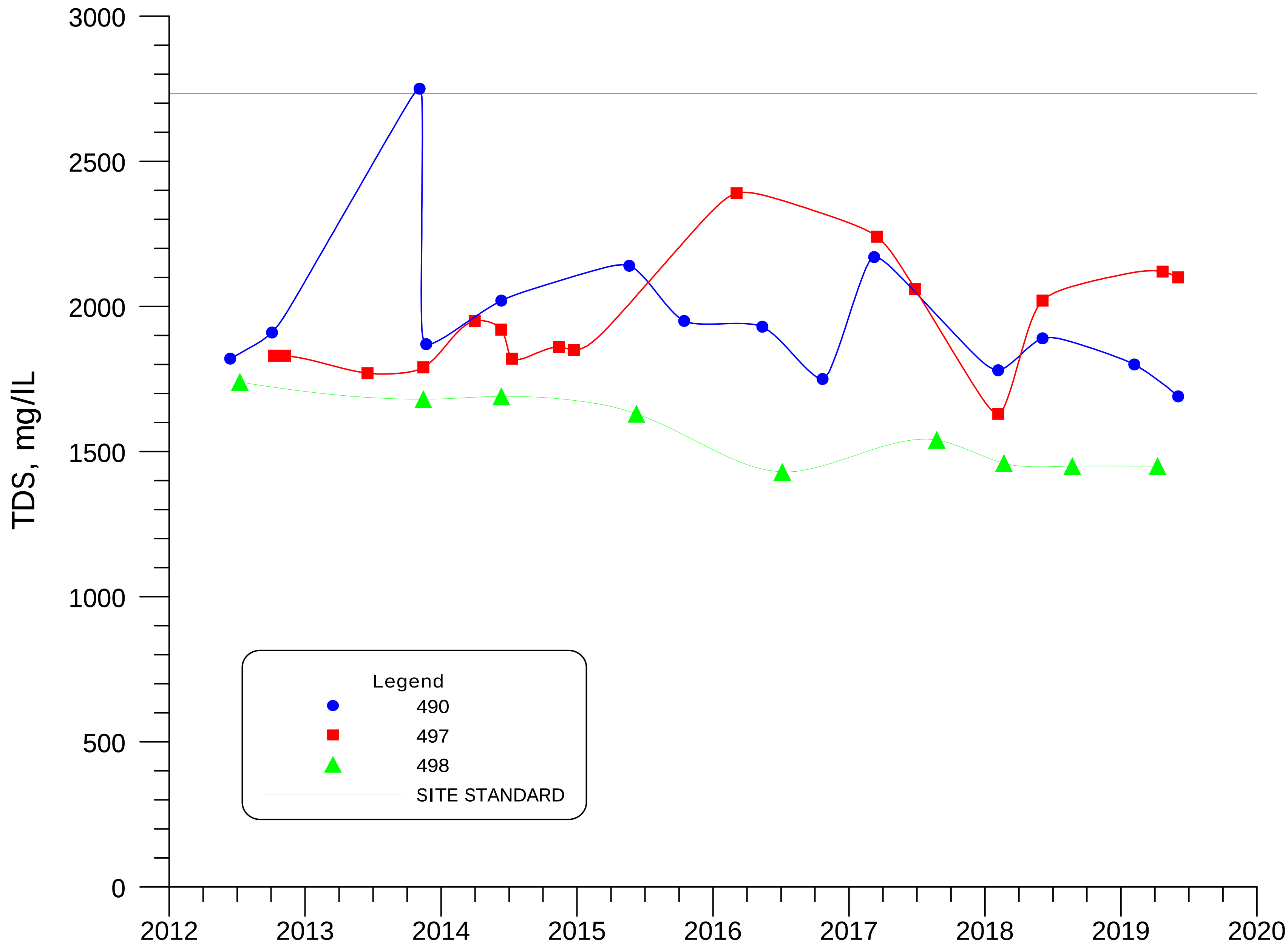

FIGURE 4.3-30. TDS CONCENTRATIONS FOR WELLS 490, 497 AND 498.

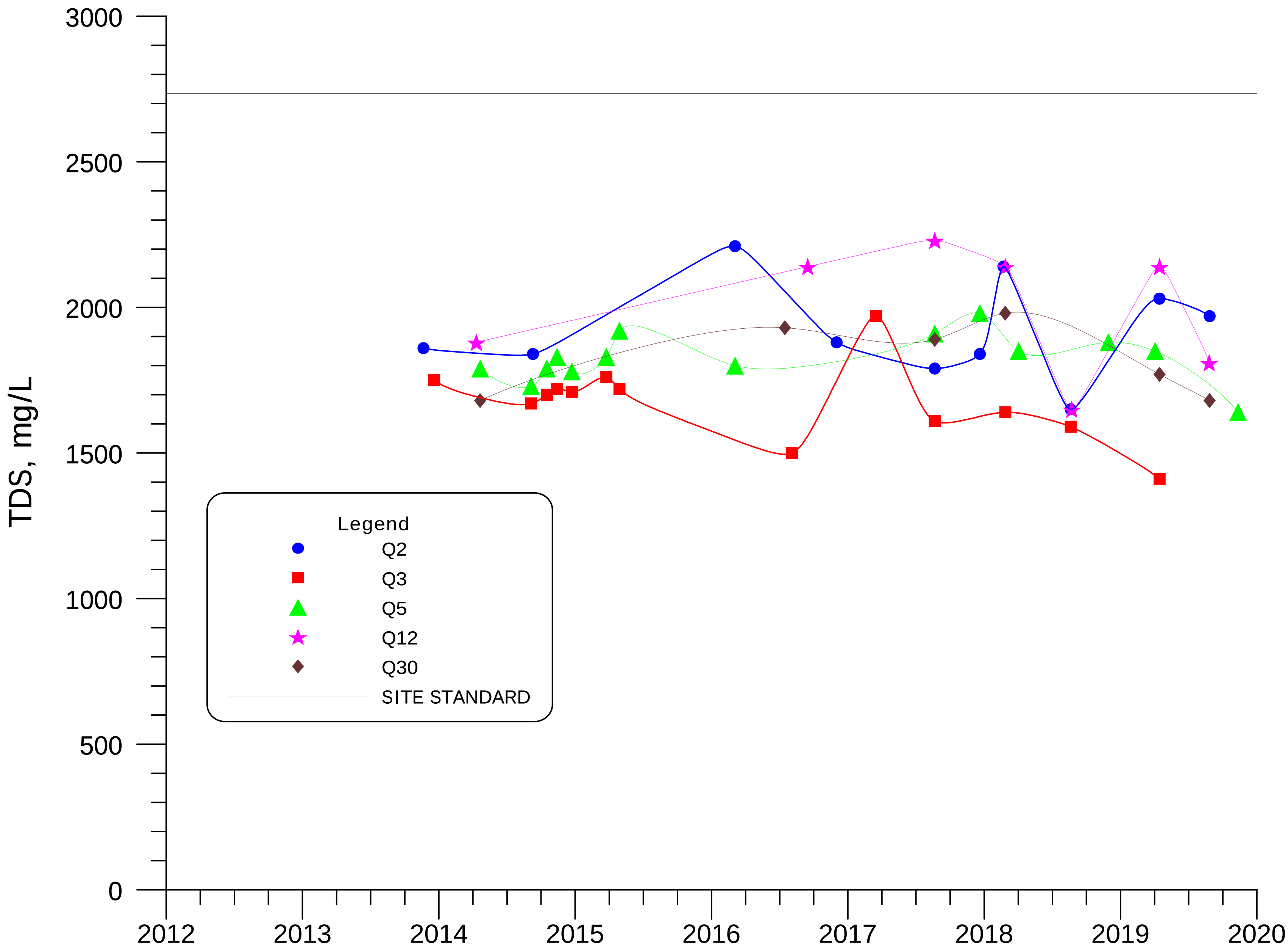

FIGURE 4.3-30A. TDS CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q18 AND Q30.

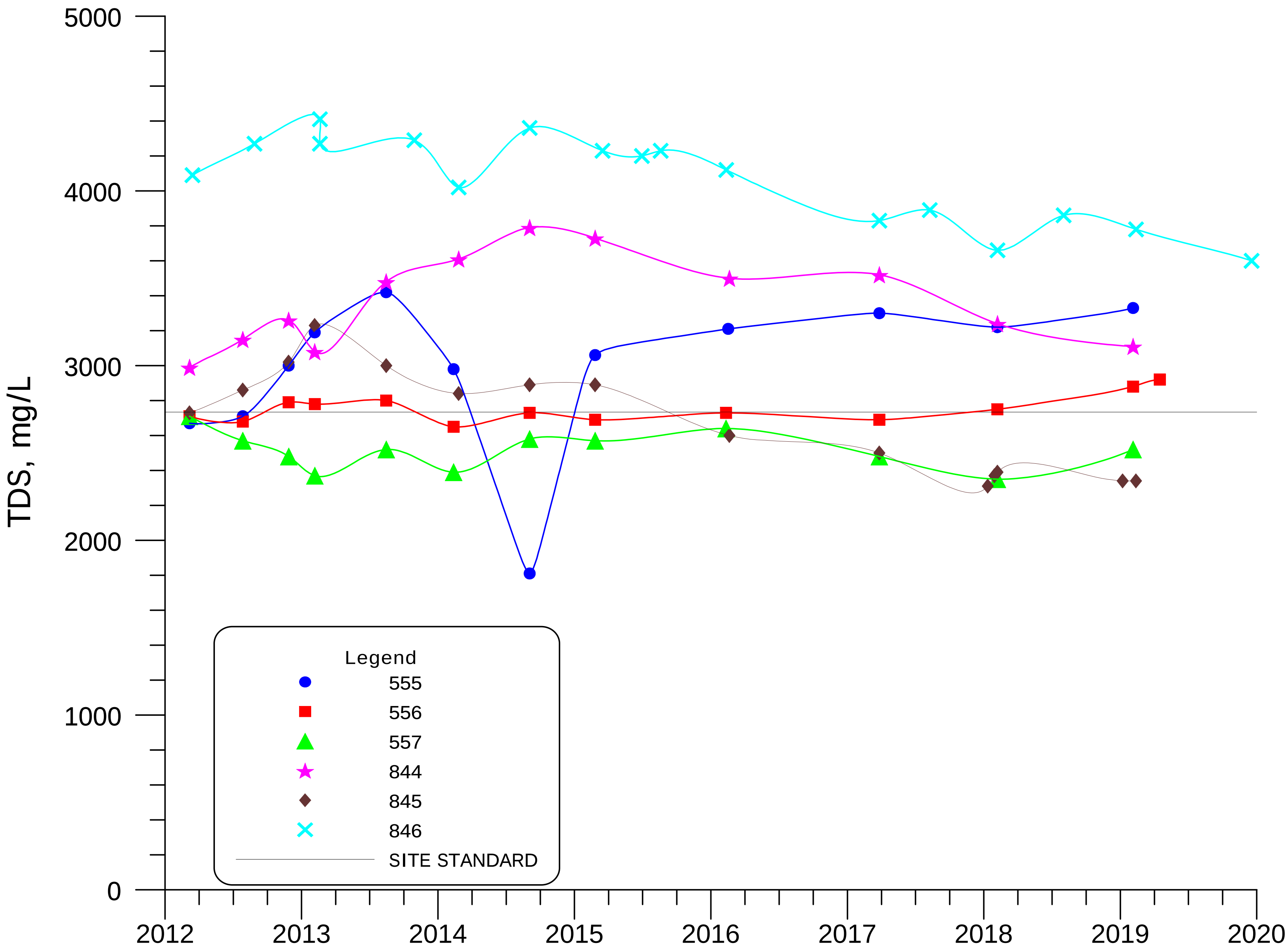

FIGURE 4.3-31. TDS CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845 AND 846.

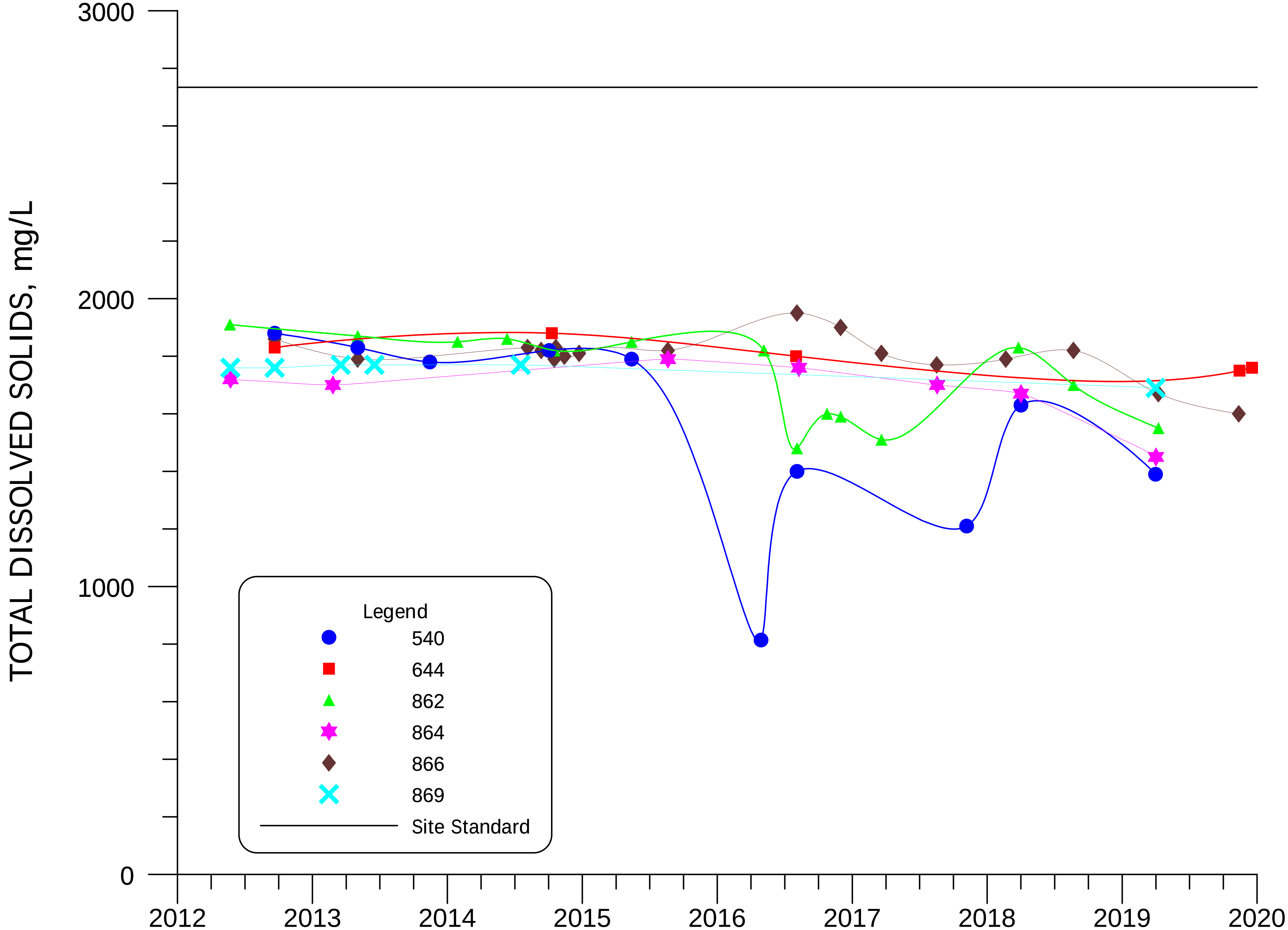

FIGURE 4.3-32. TDS CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

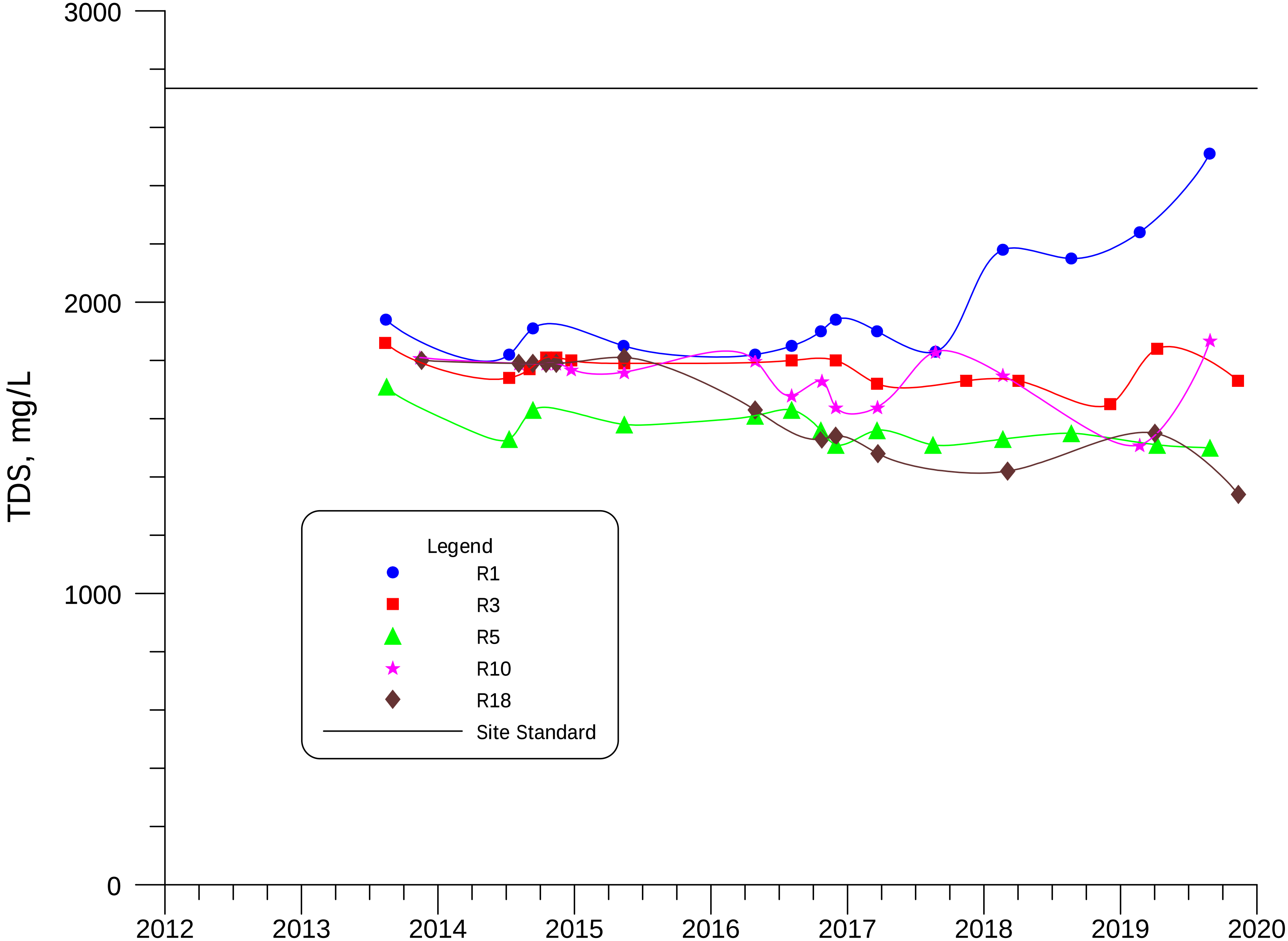

FIGURE 4.3-32A. TDS CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

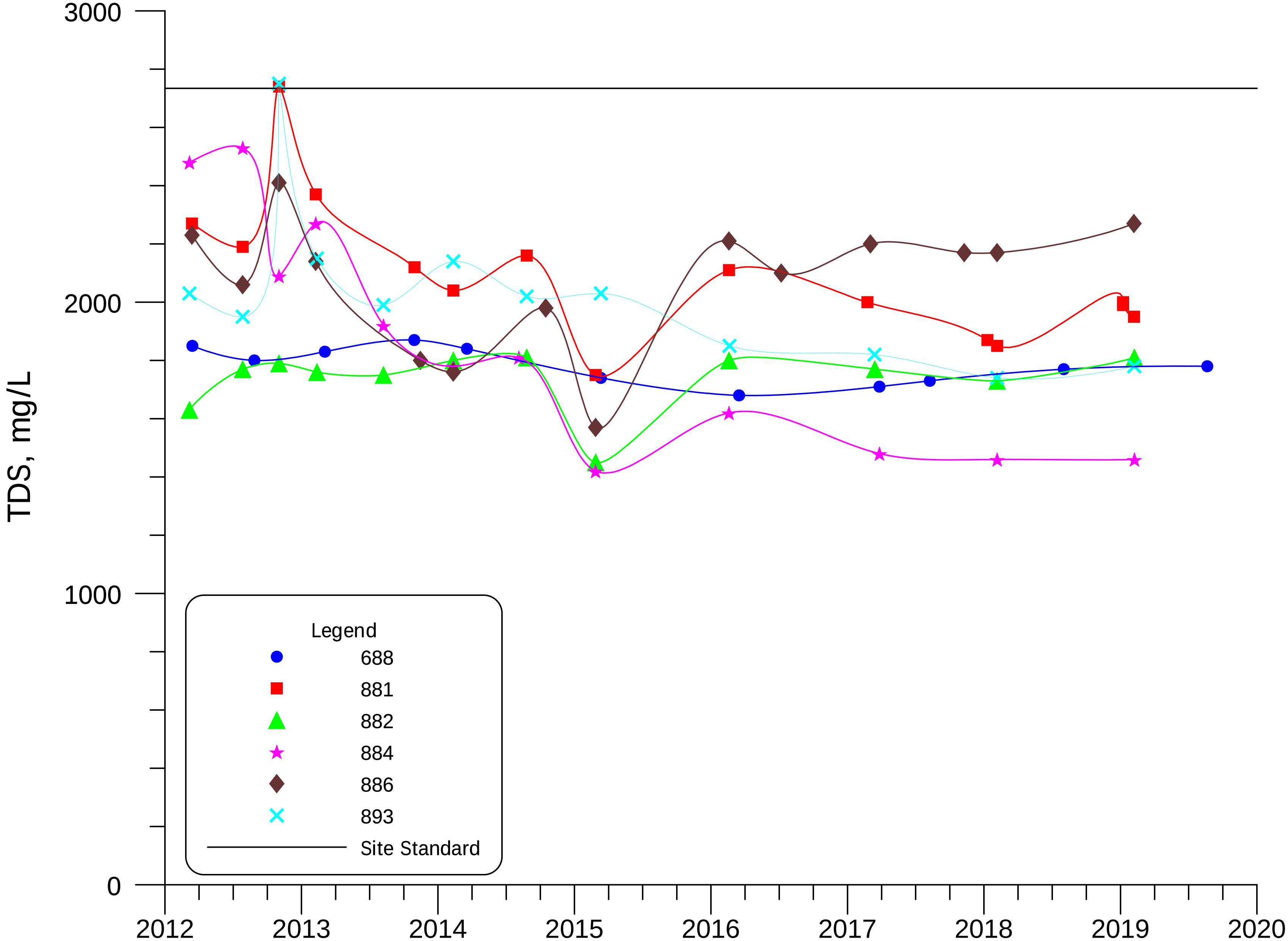

FIGURE 4.3-33. TDS CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

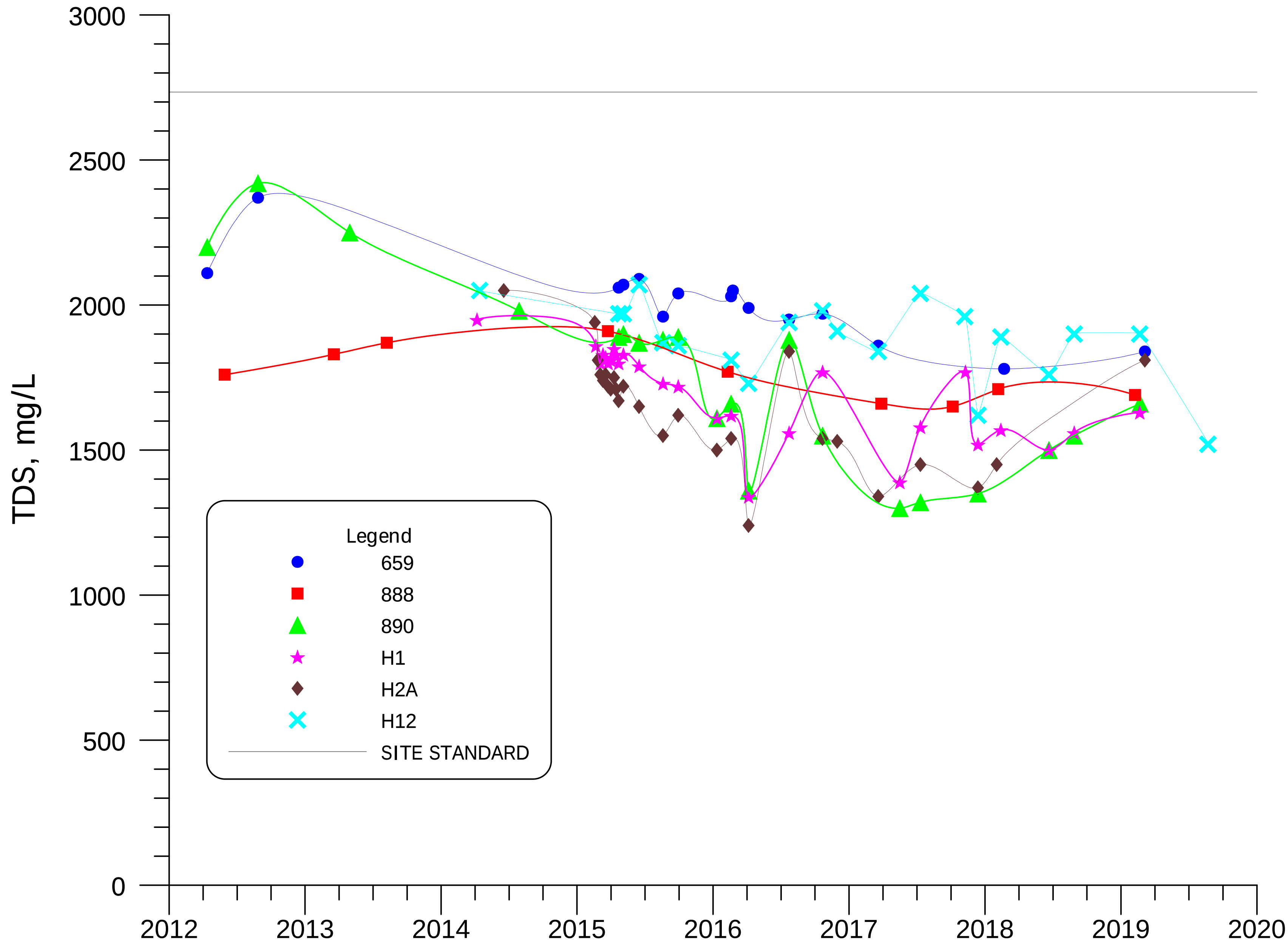

FIGURE 4.3-33A. TDS CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

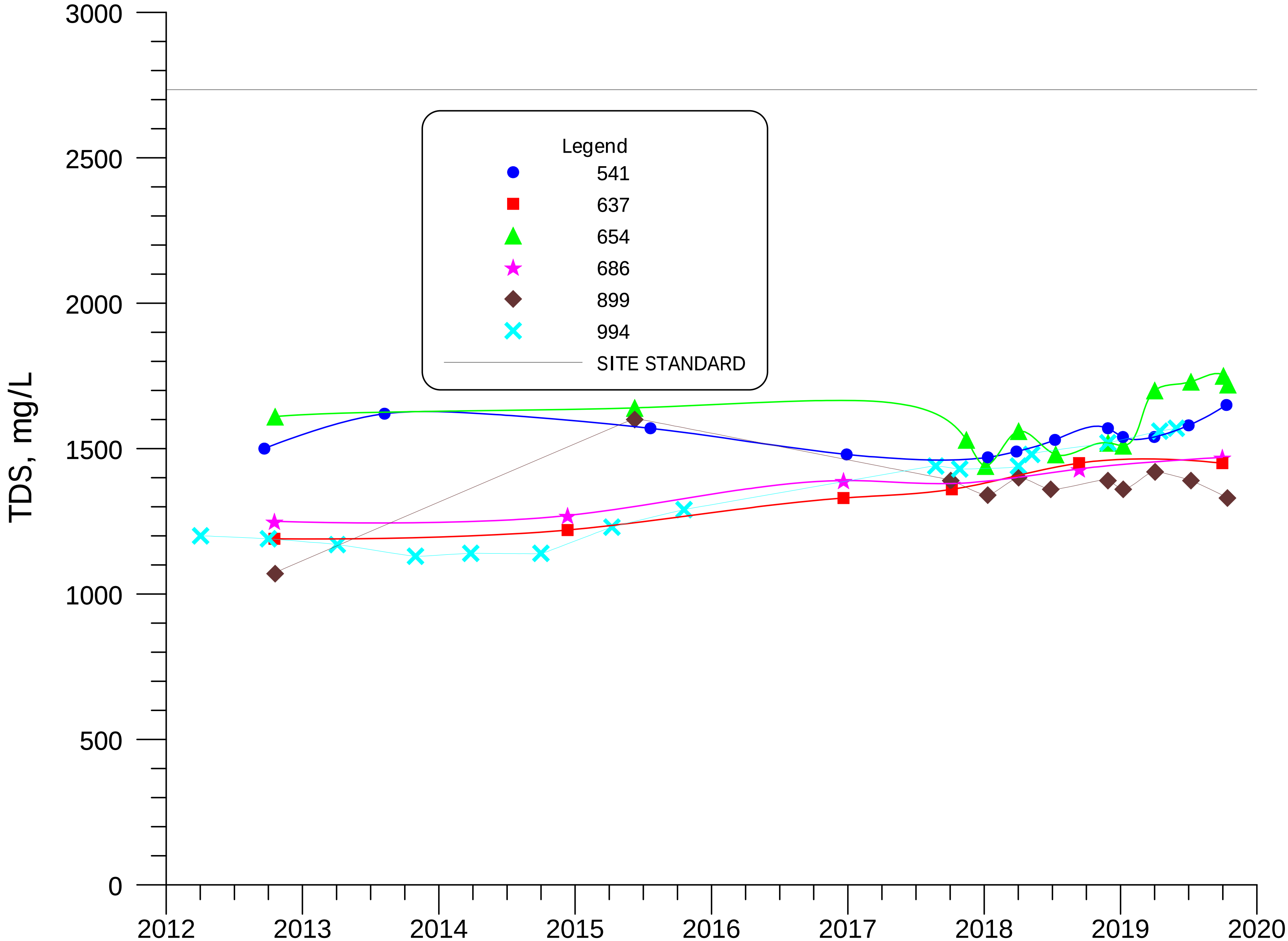

FIGURE 4.3-34. TDS CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

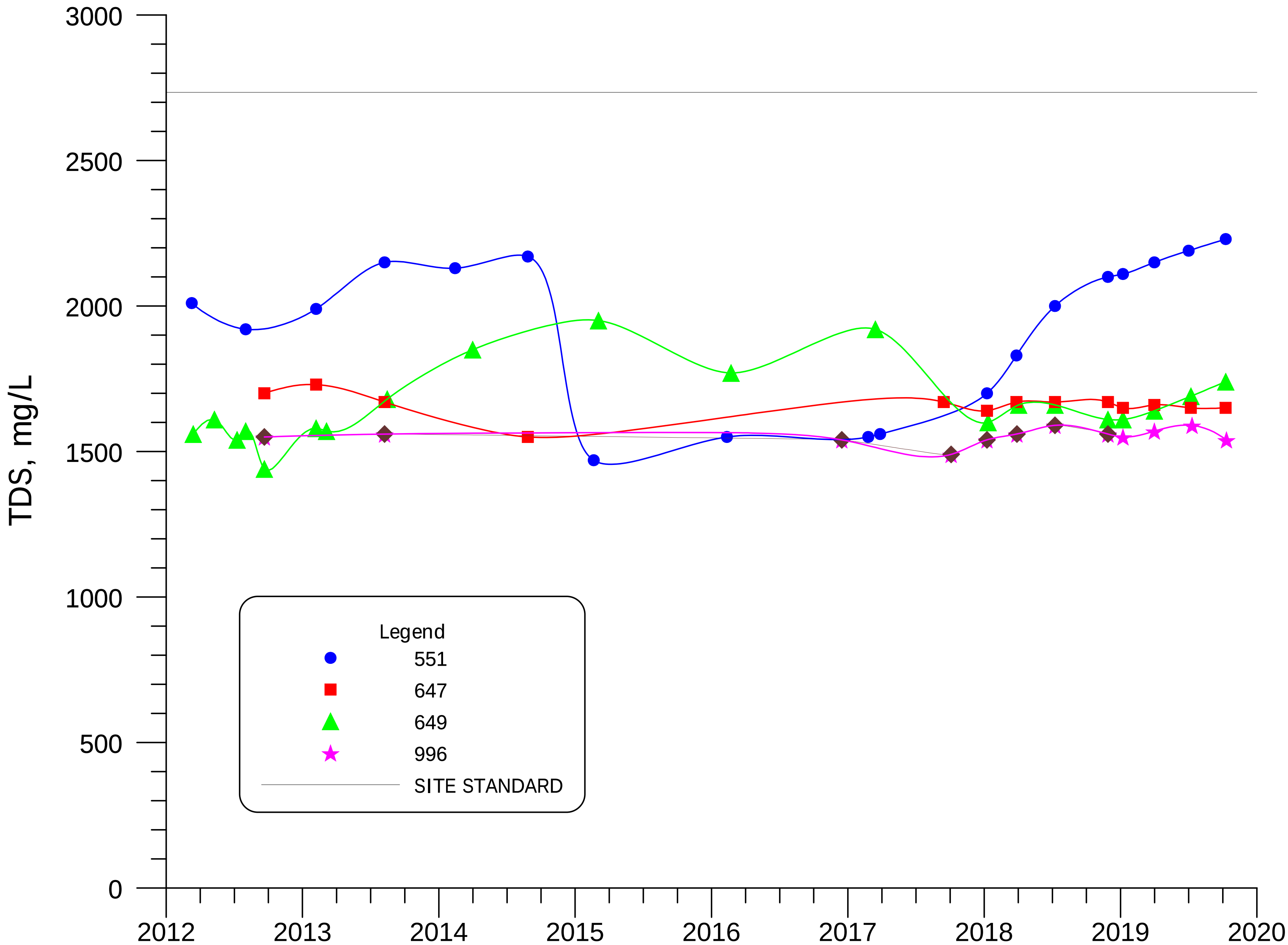

FIGURE 4.3-35. TDS CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

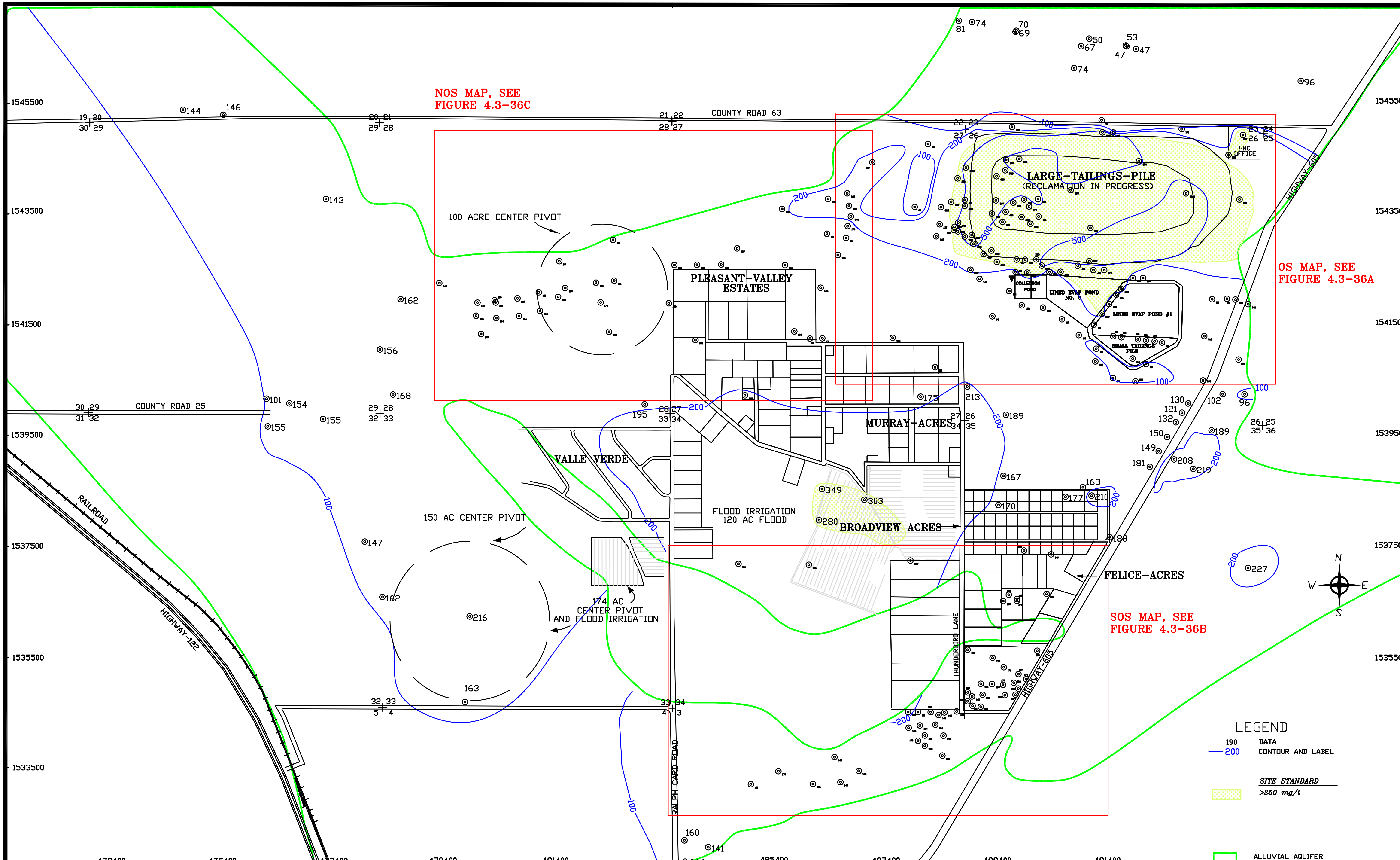

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FIGURE 4.3-36. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

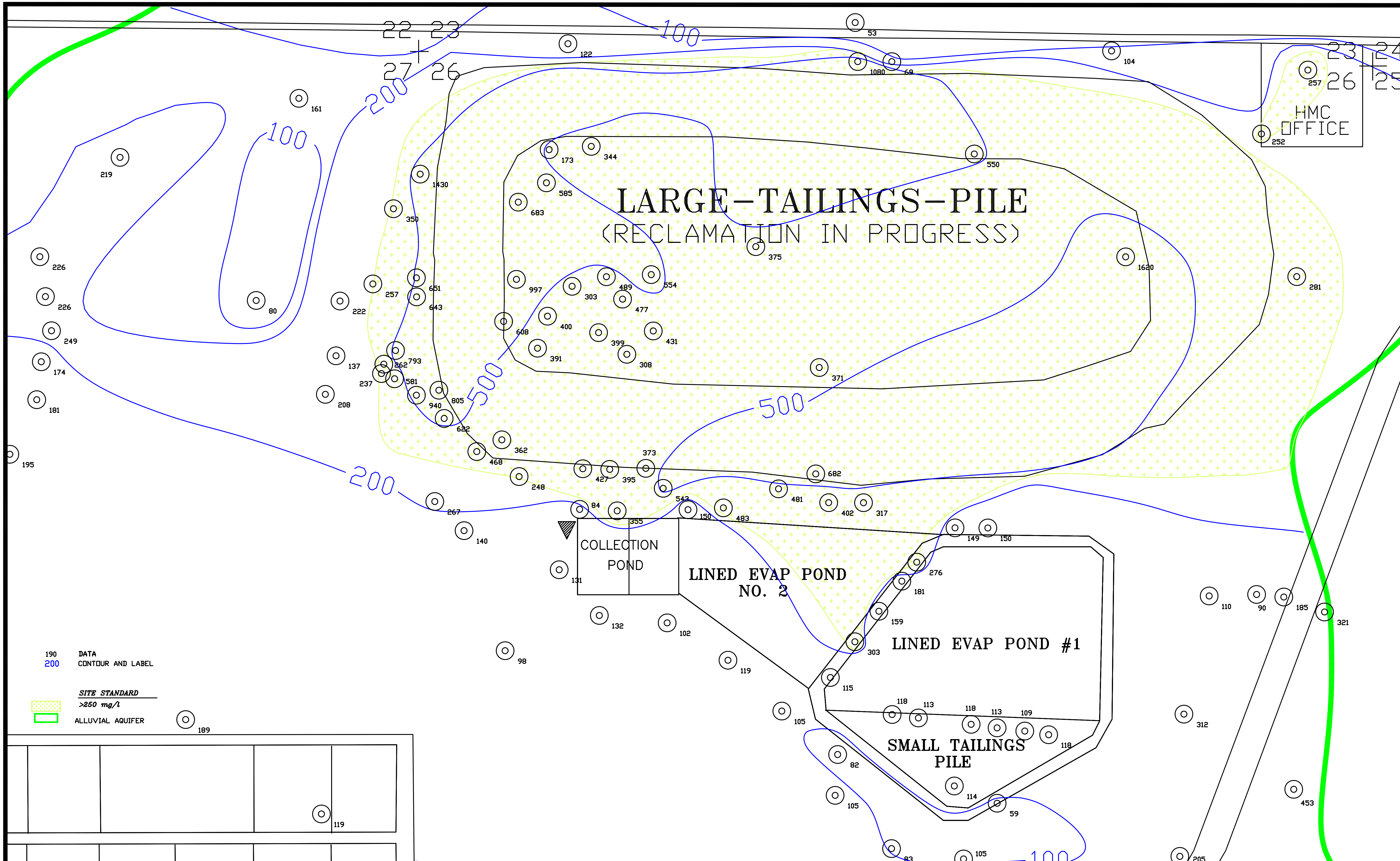

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FIGURE 4.3-36A. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

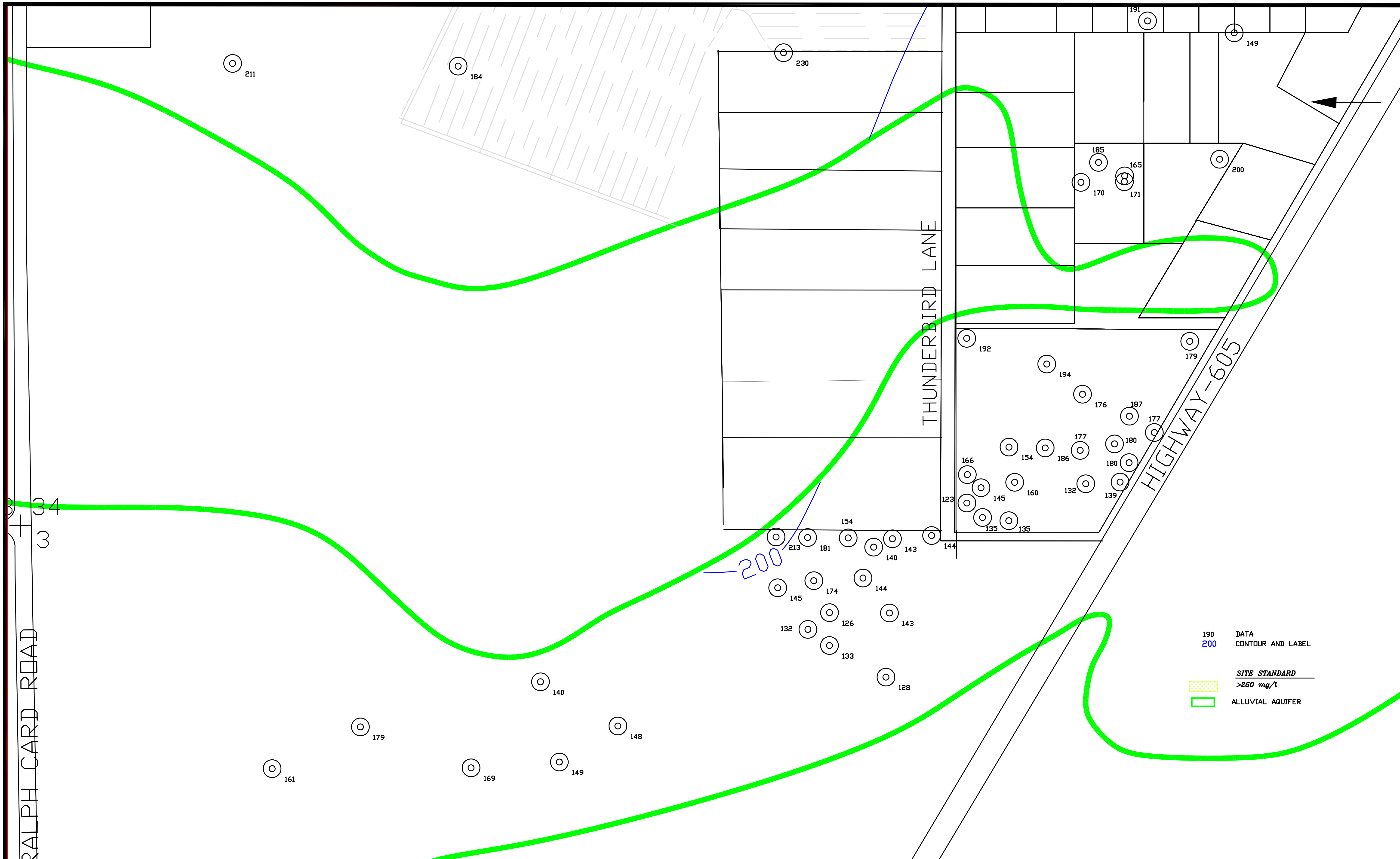

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FIGURE 4.3-36B. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

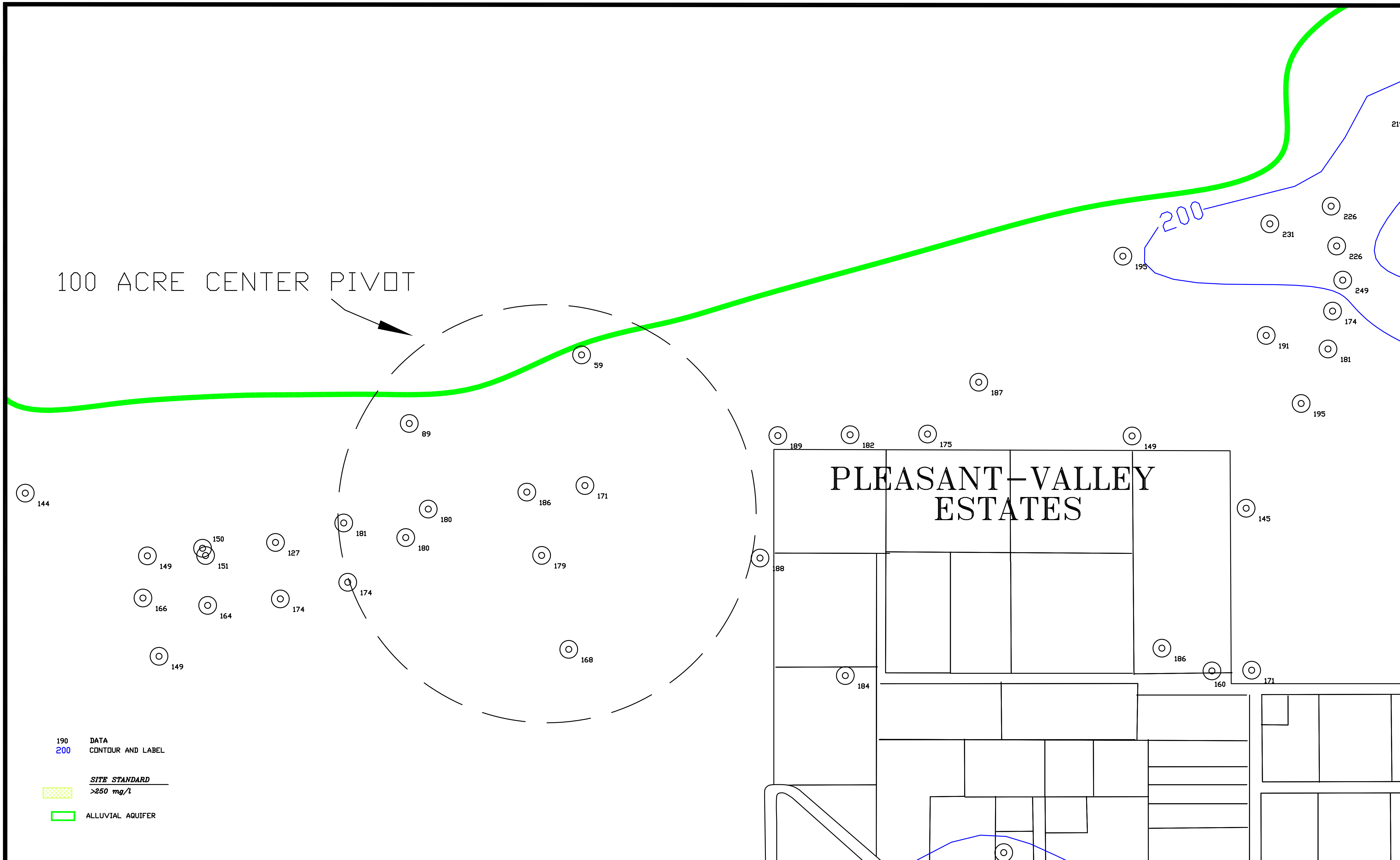

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FIGURE 4.3-36C. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

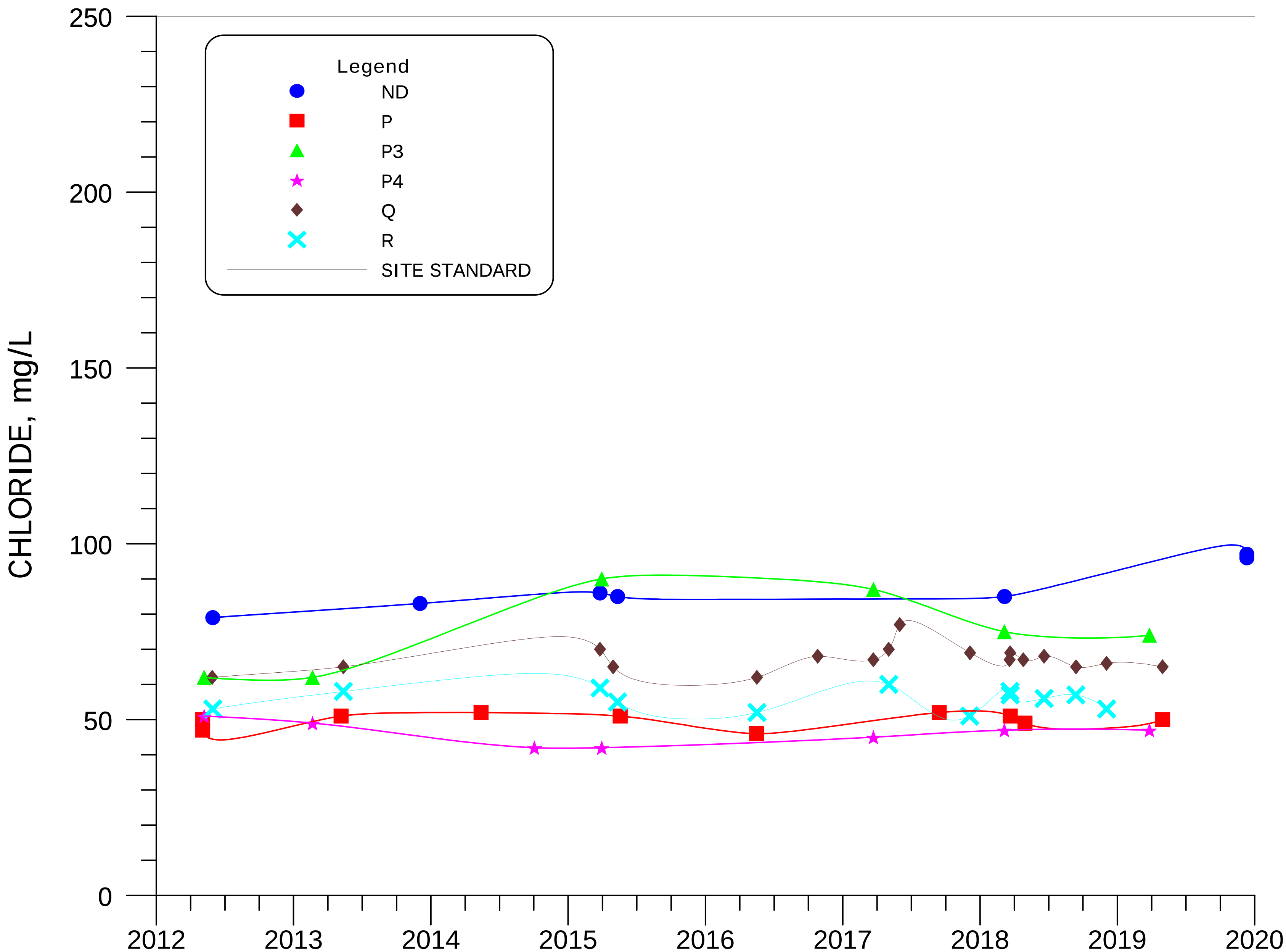

FIGURE 4.3-37. CHLORIDE CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

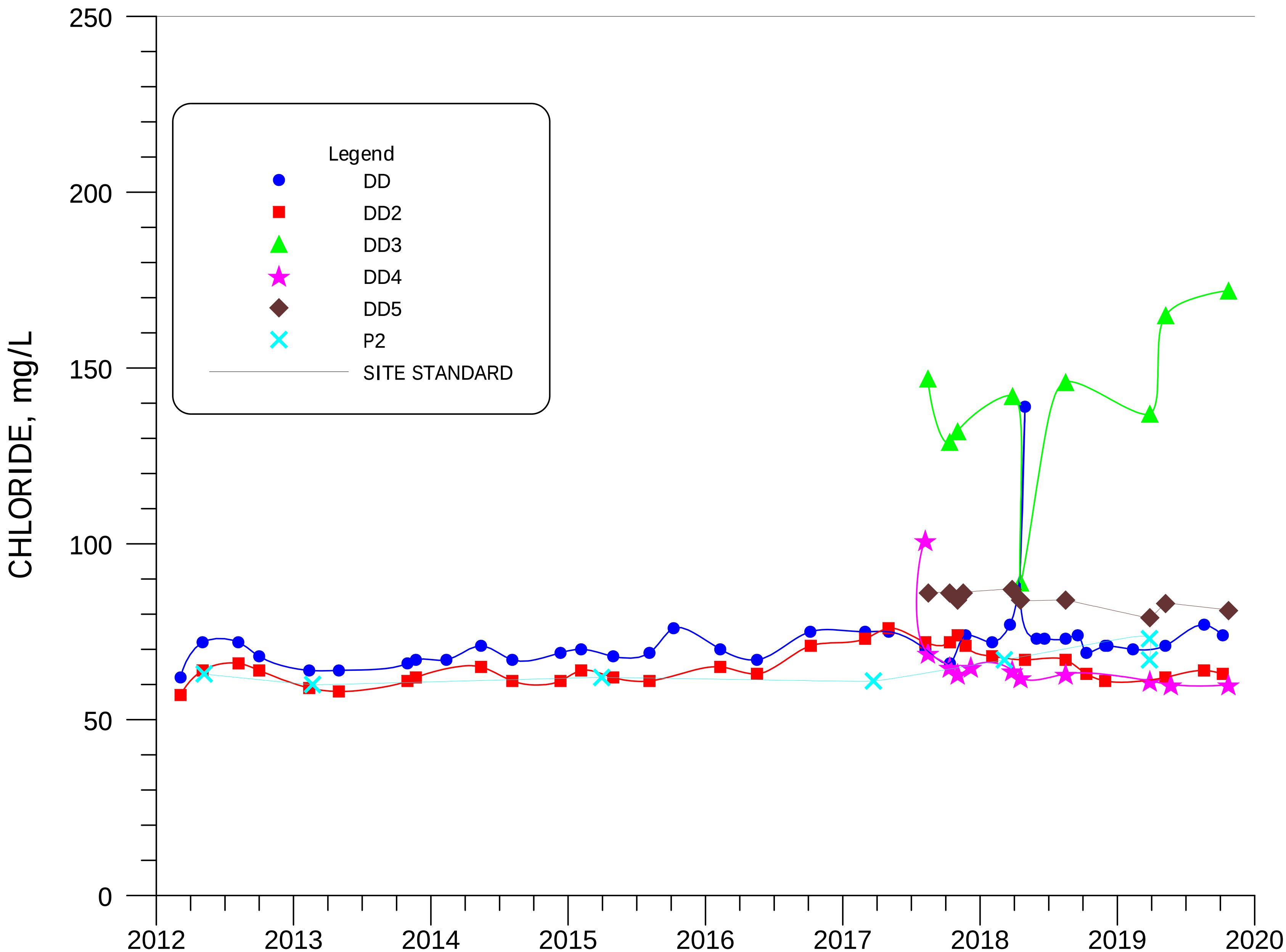

FIGURE 4.3-37A. CHLORIDE CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

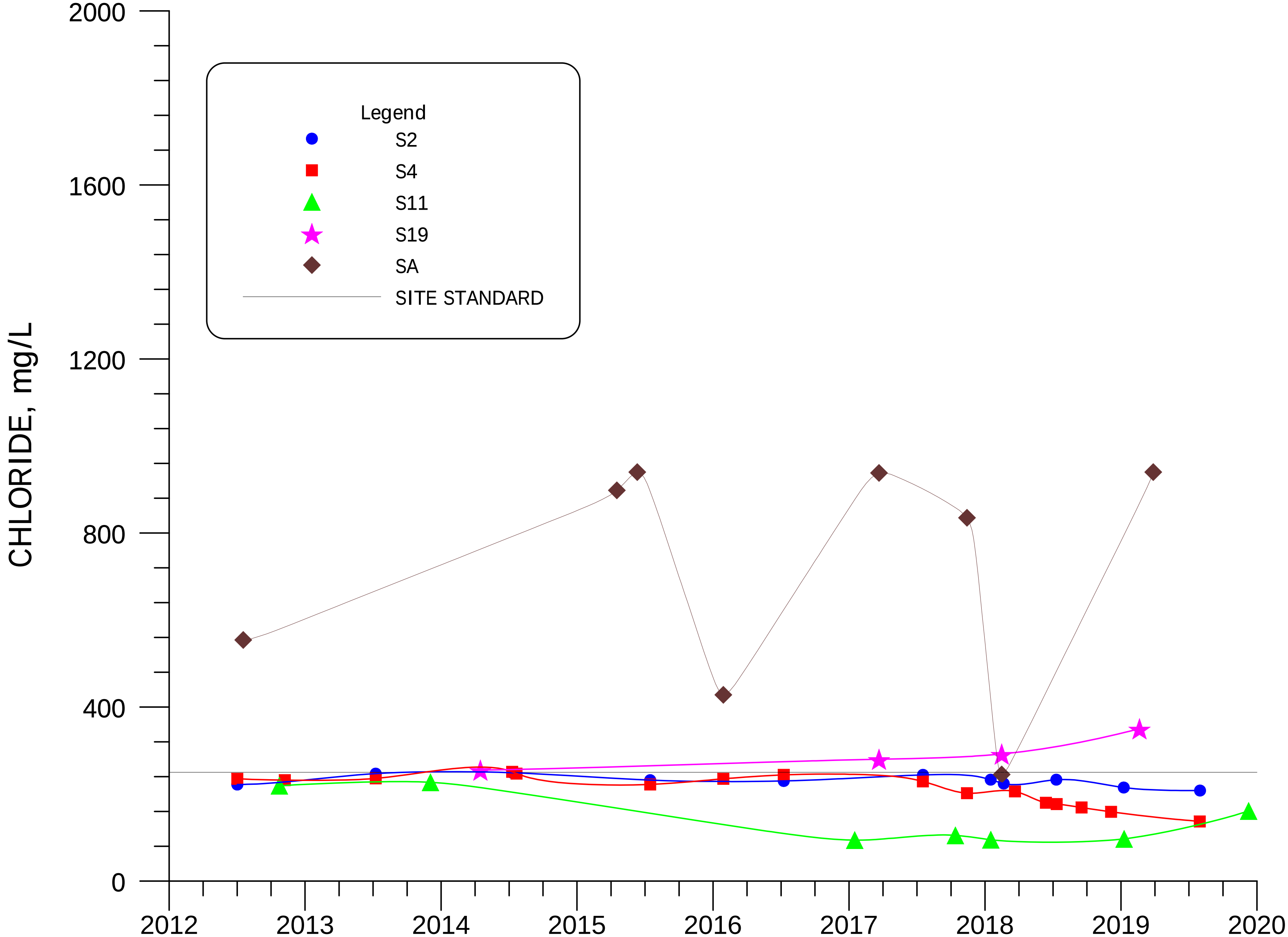

FIGURE 4.3-38. CHLORIDE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

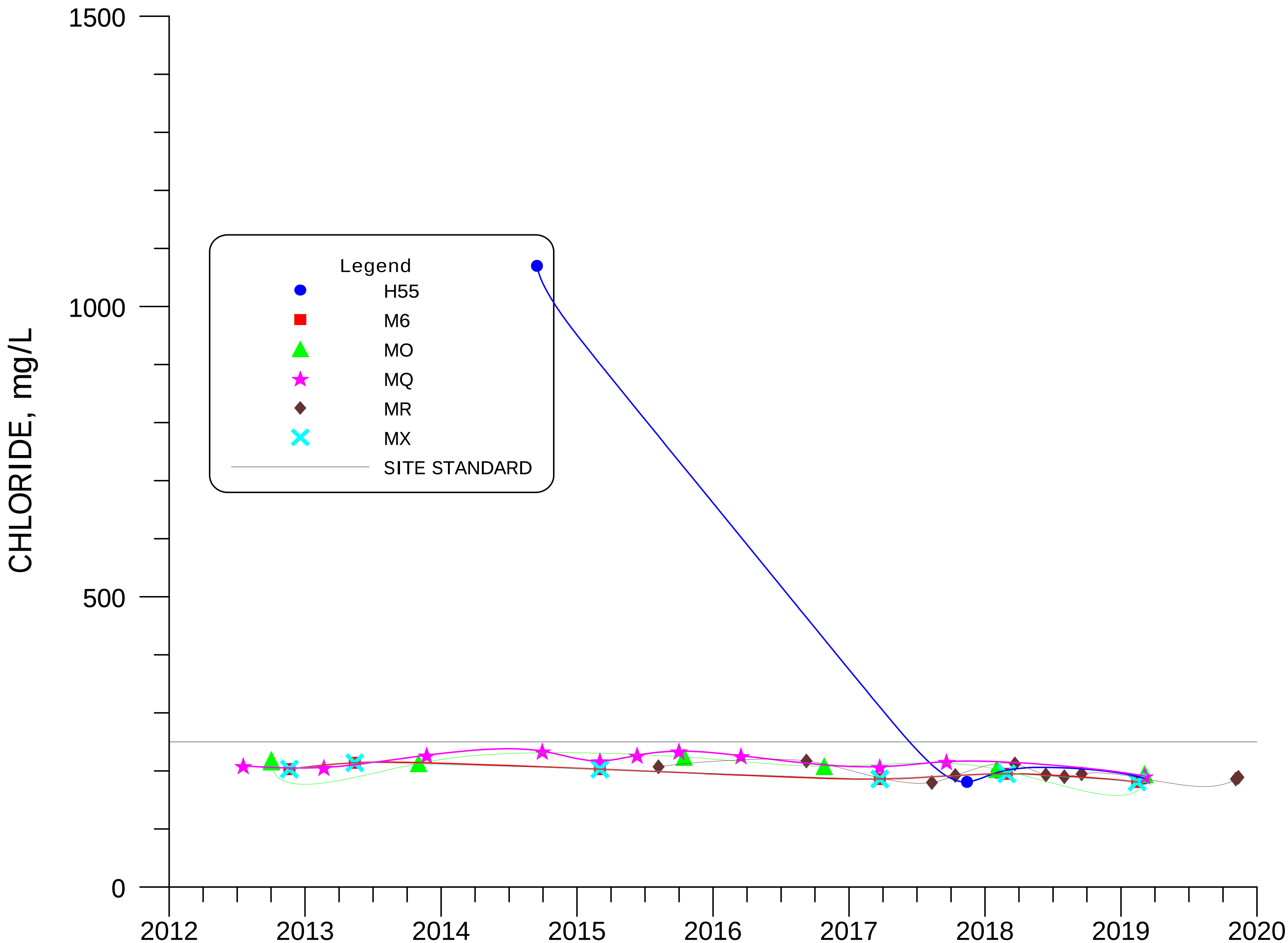

FIGURE 4.3-39. CHLORIDE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

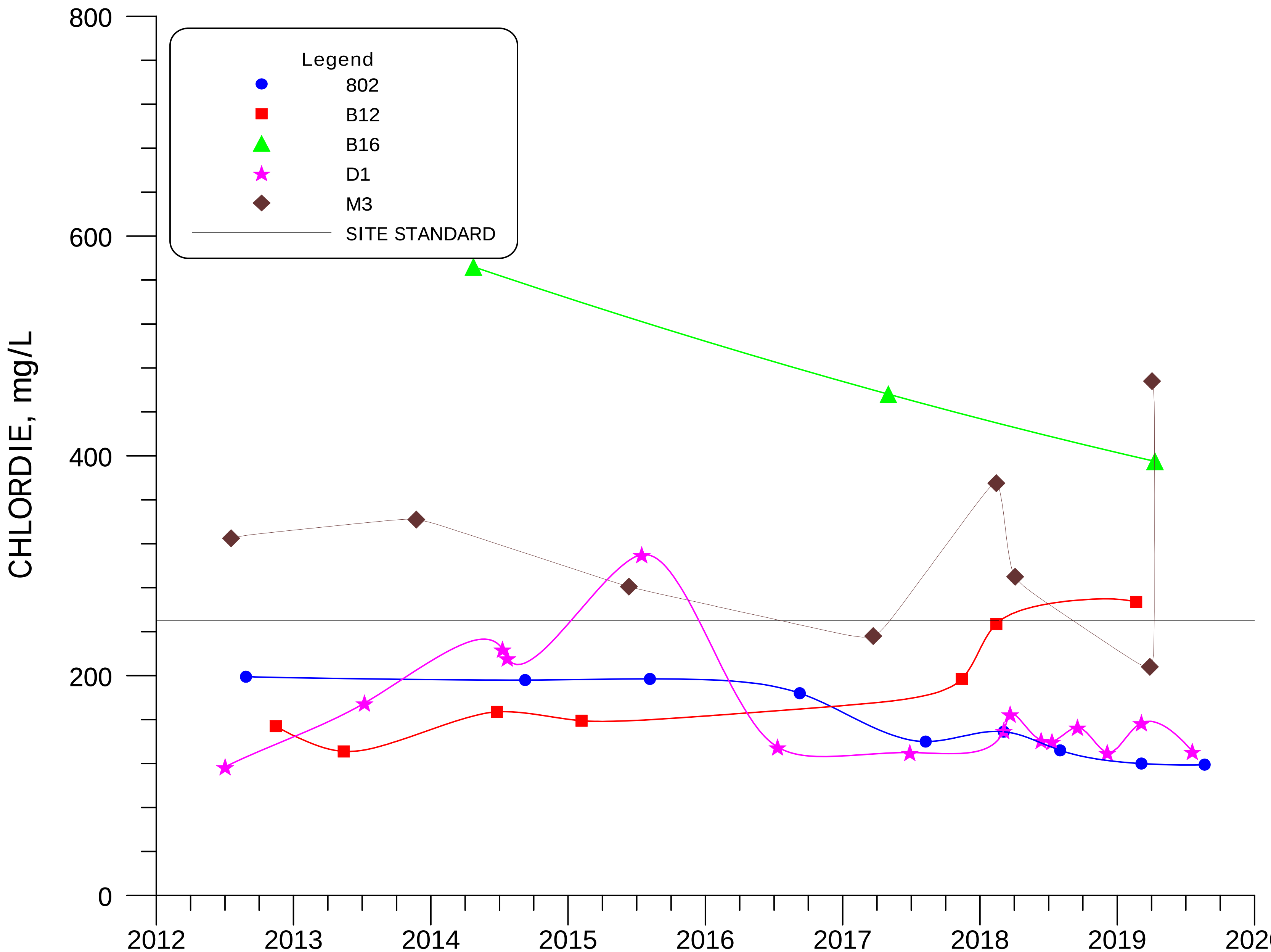

FIGURE 4.3-40. CHLORIDE CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

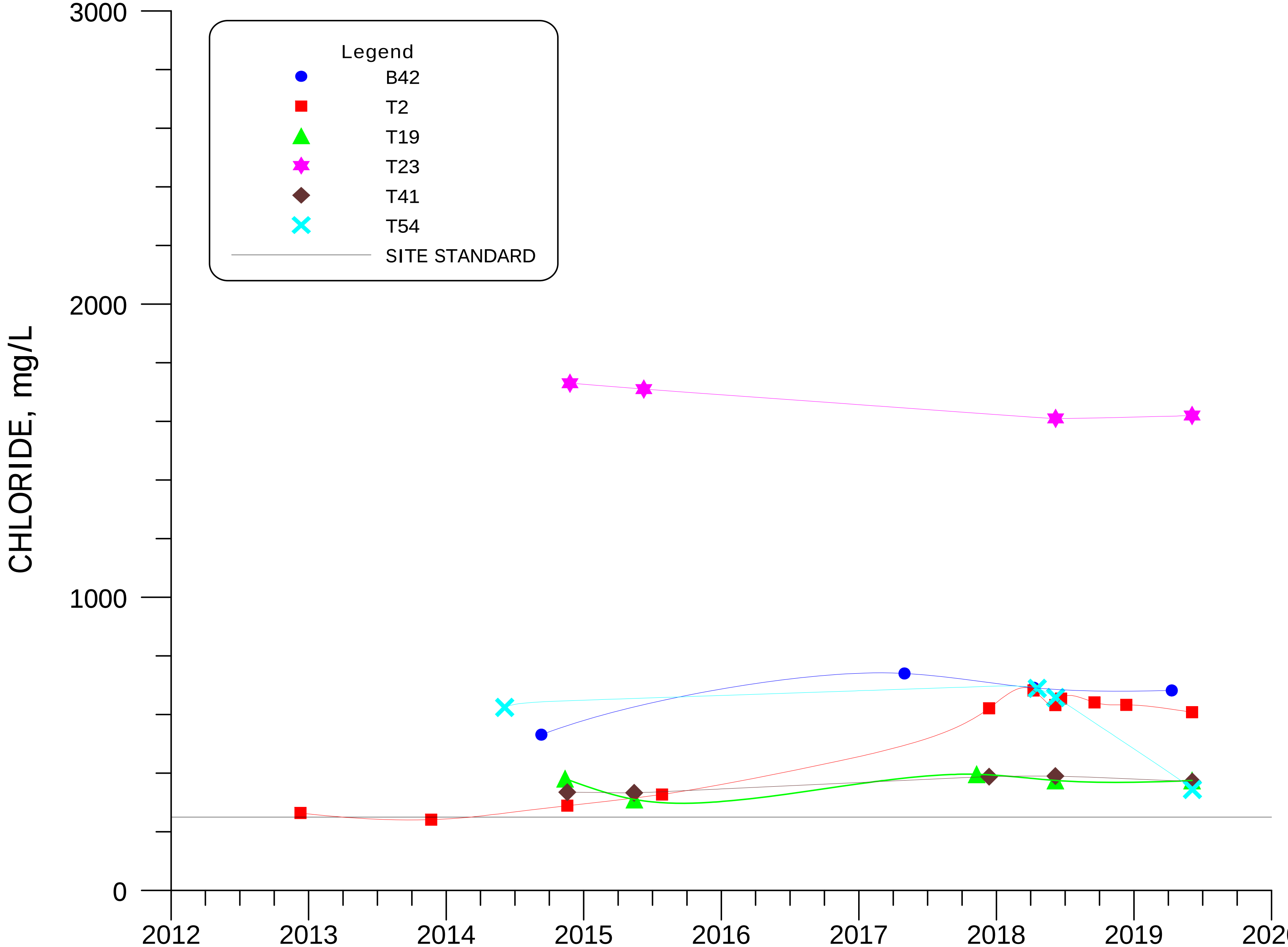

FIGURE 4.3-41. CHLORIDE CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

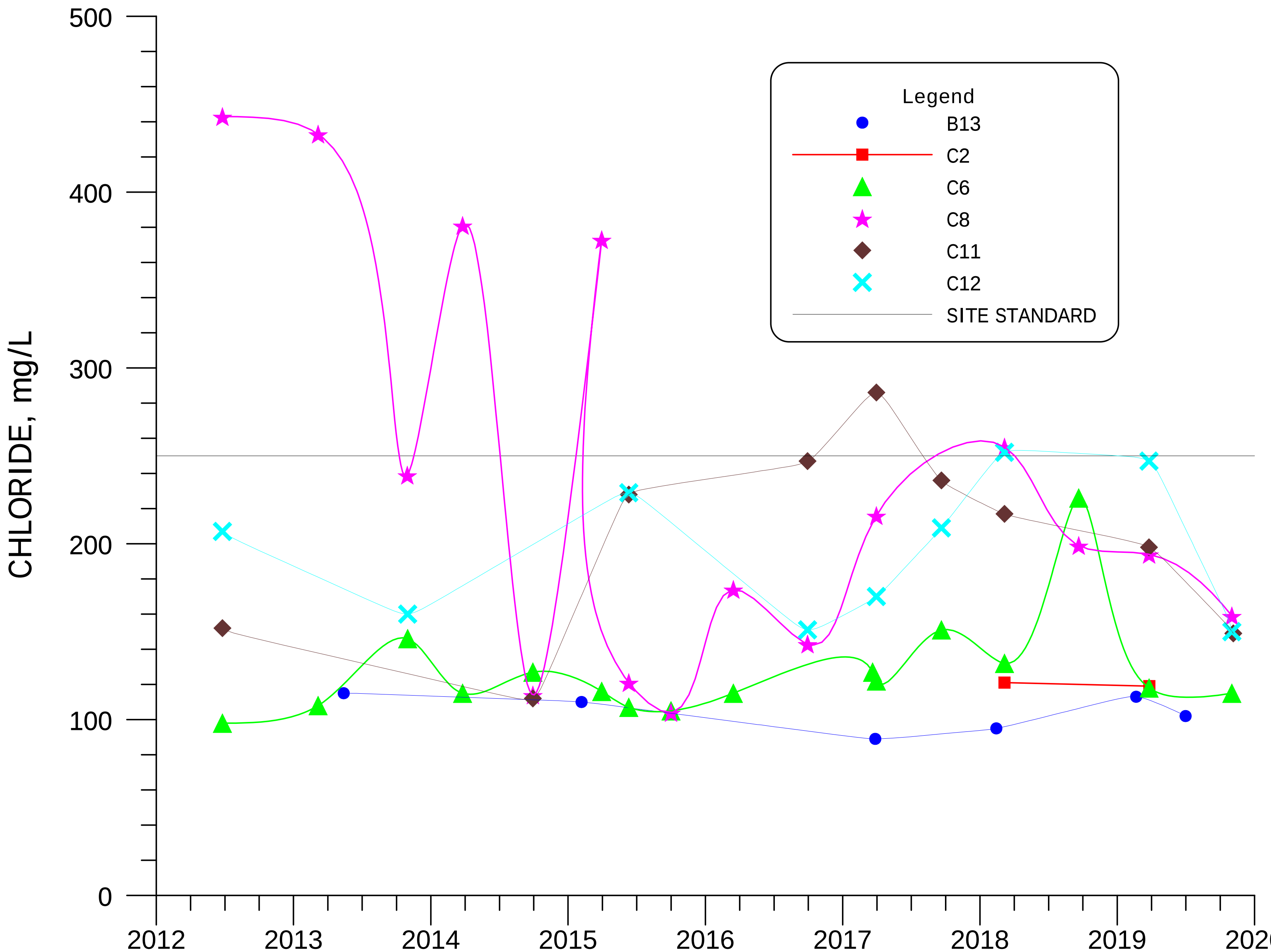

FIGURE 4.3-42. CHLORIDE CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

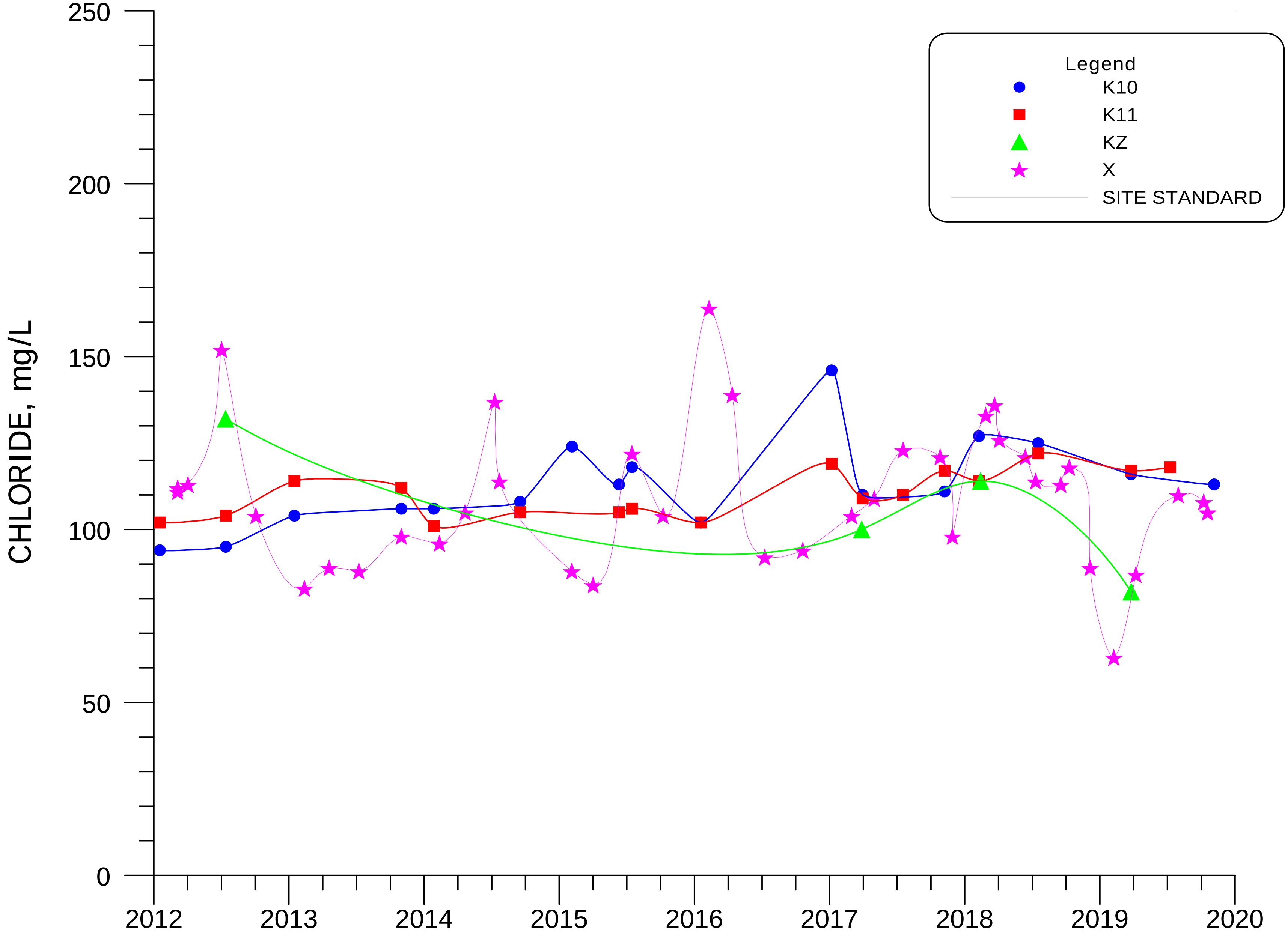

FIGURE 4.3-43. CHLORIDE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

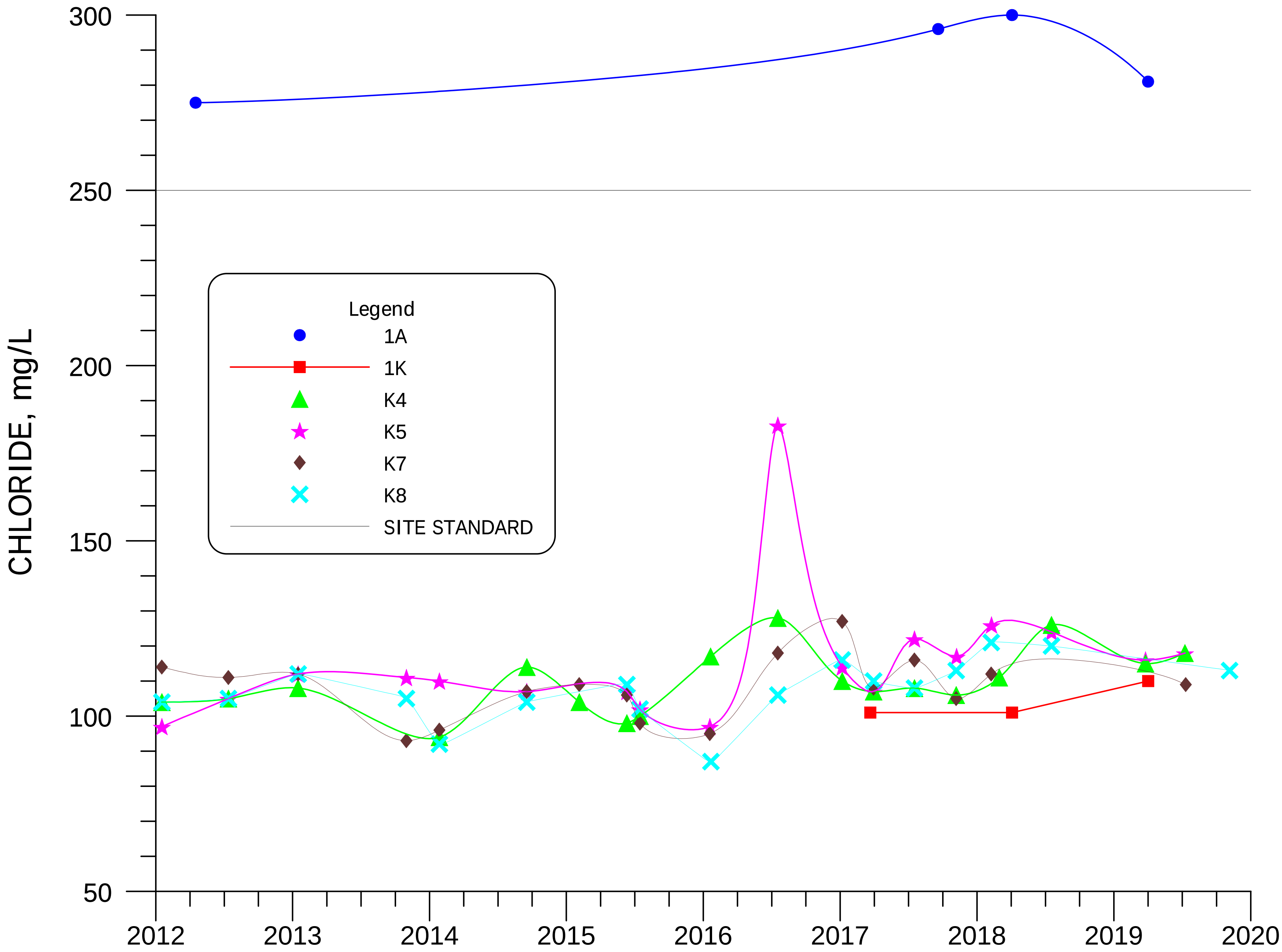

FIGURE 4.3-44. CHLORIDE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

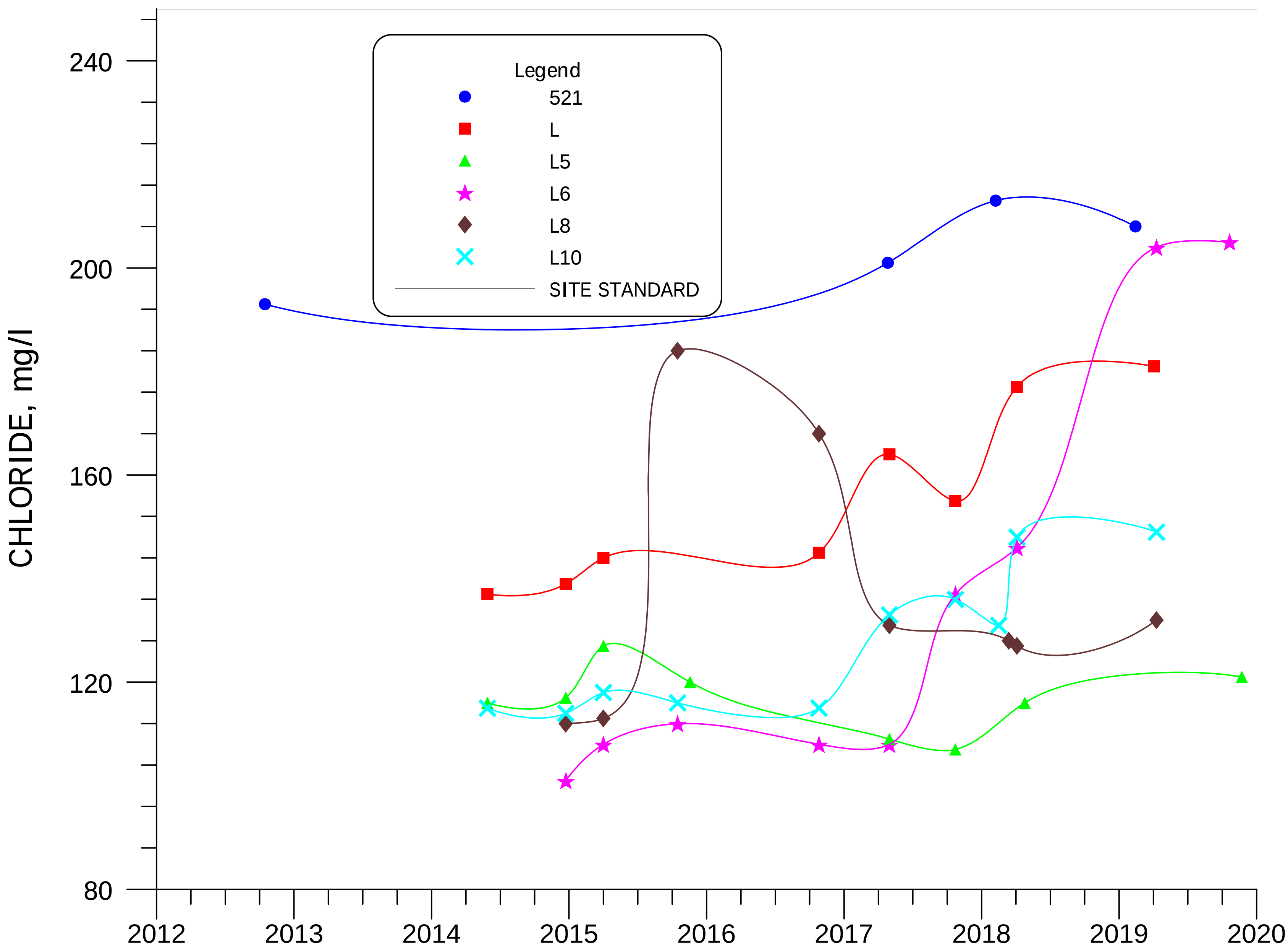

FIGURE 4.3-45. CHLORIDE CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

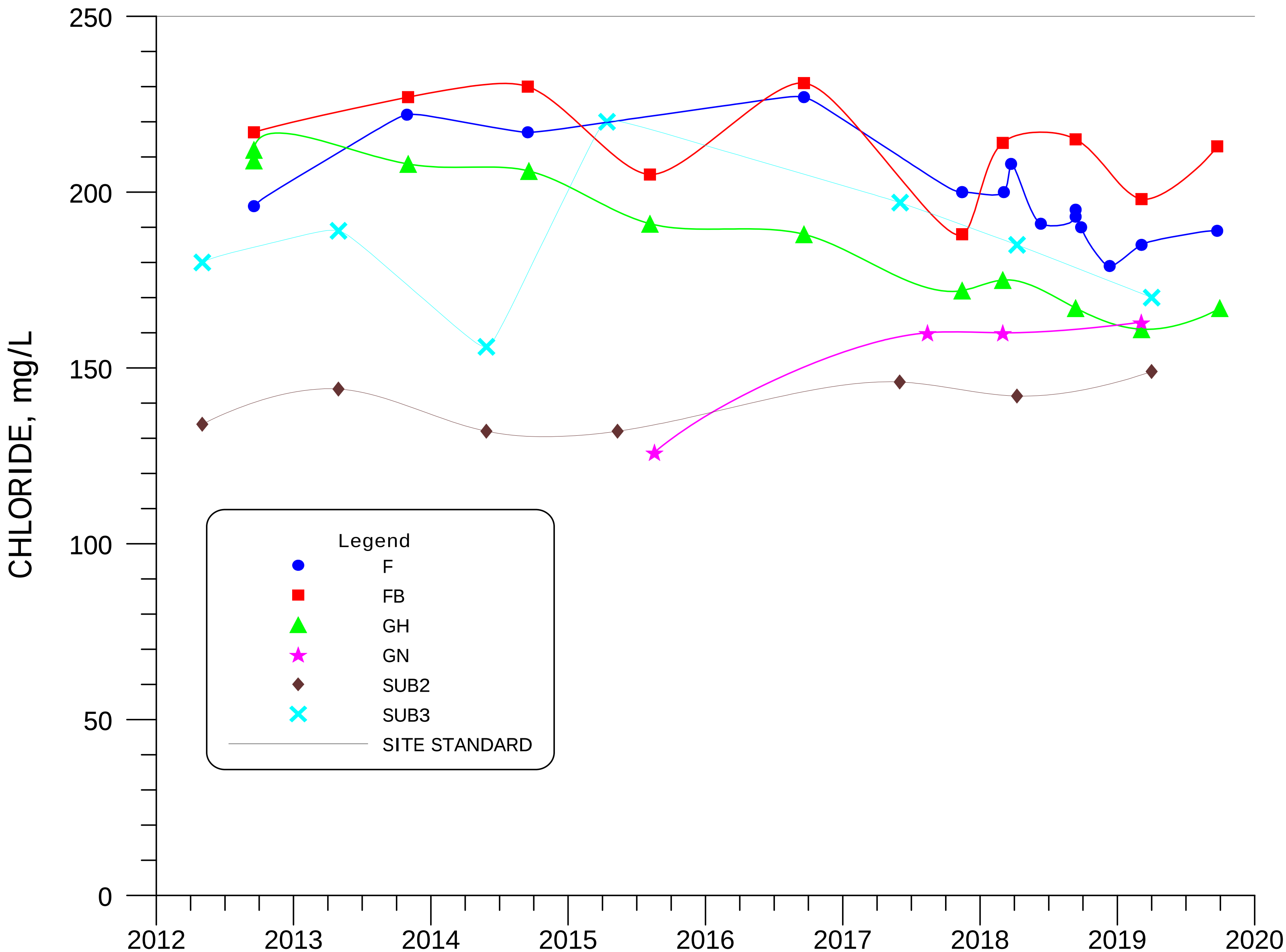

FIGURE 4.3-46. CHLORIDE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

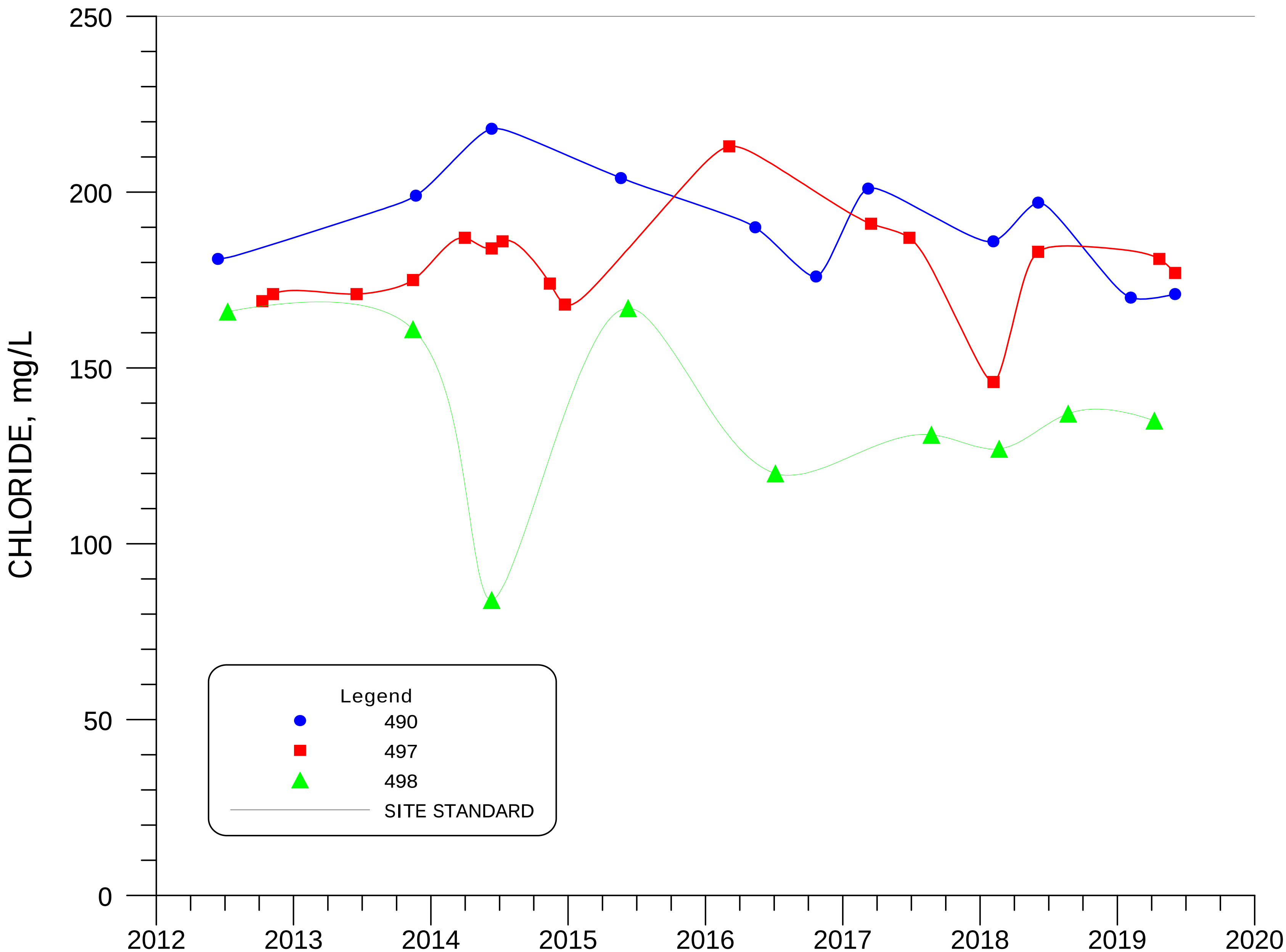

FIGURE 4.3-47. CHLORIDE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

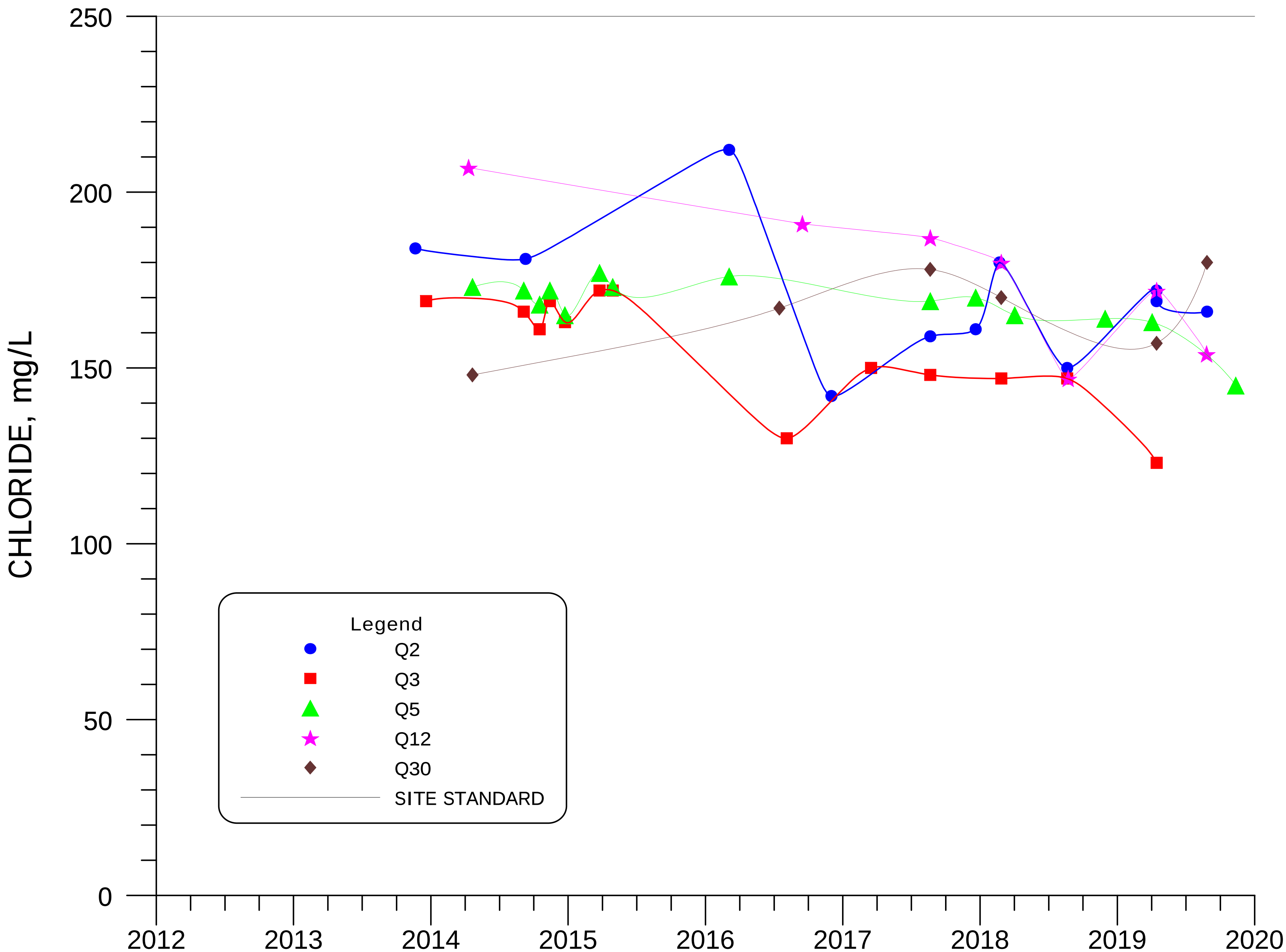

FIGURE 4.3-47A. CHLORIDE CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q30.

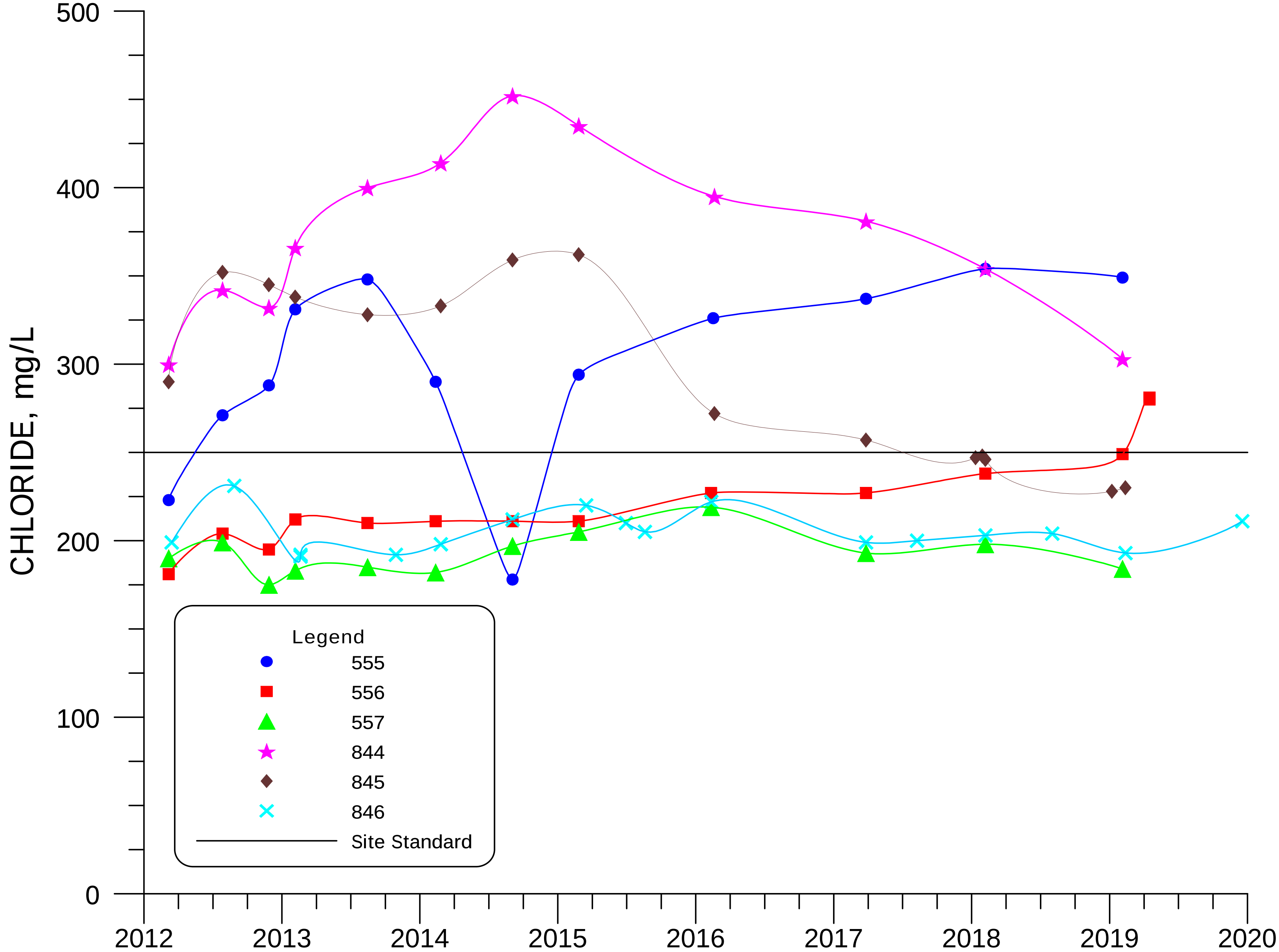

FIGURE 4.3-48. CHLORIDE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845 AND 846.

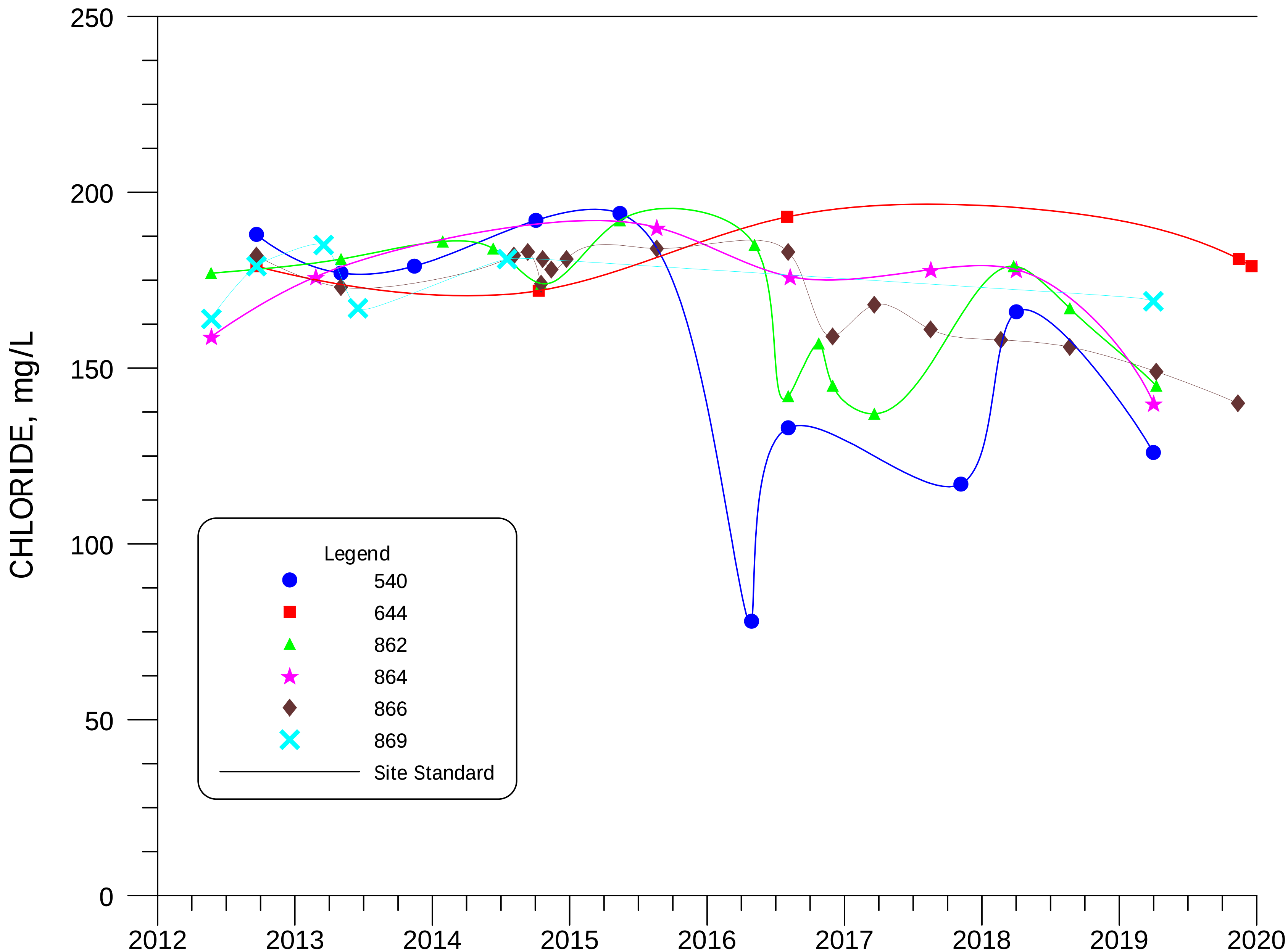

FIGURE 4.3-49. CHLORIDE CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

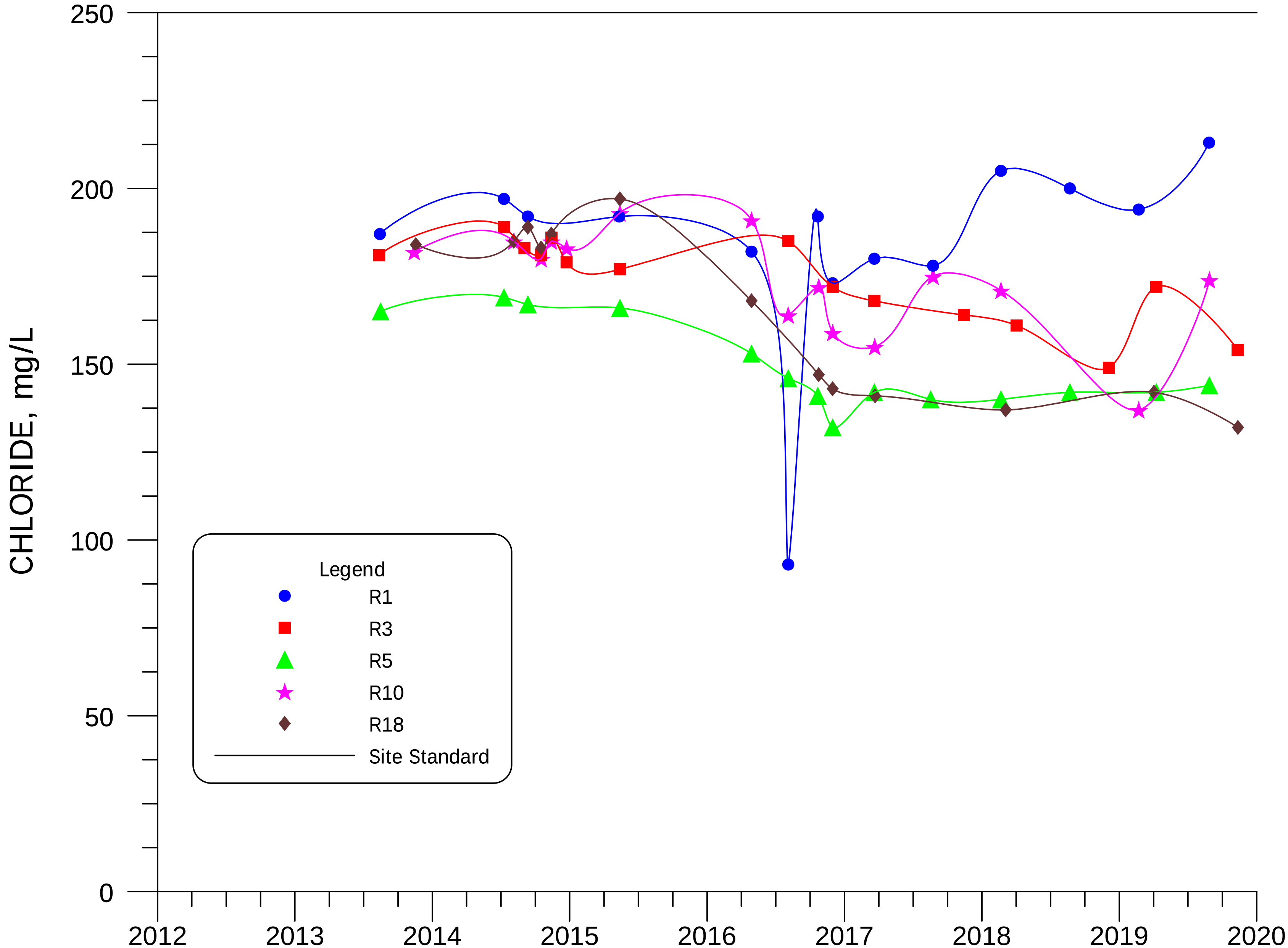

FIGURE 4.3-49A. CHLORIDE CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

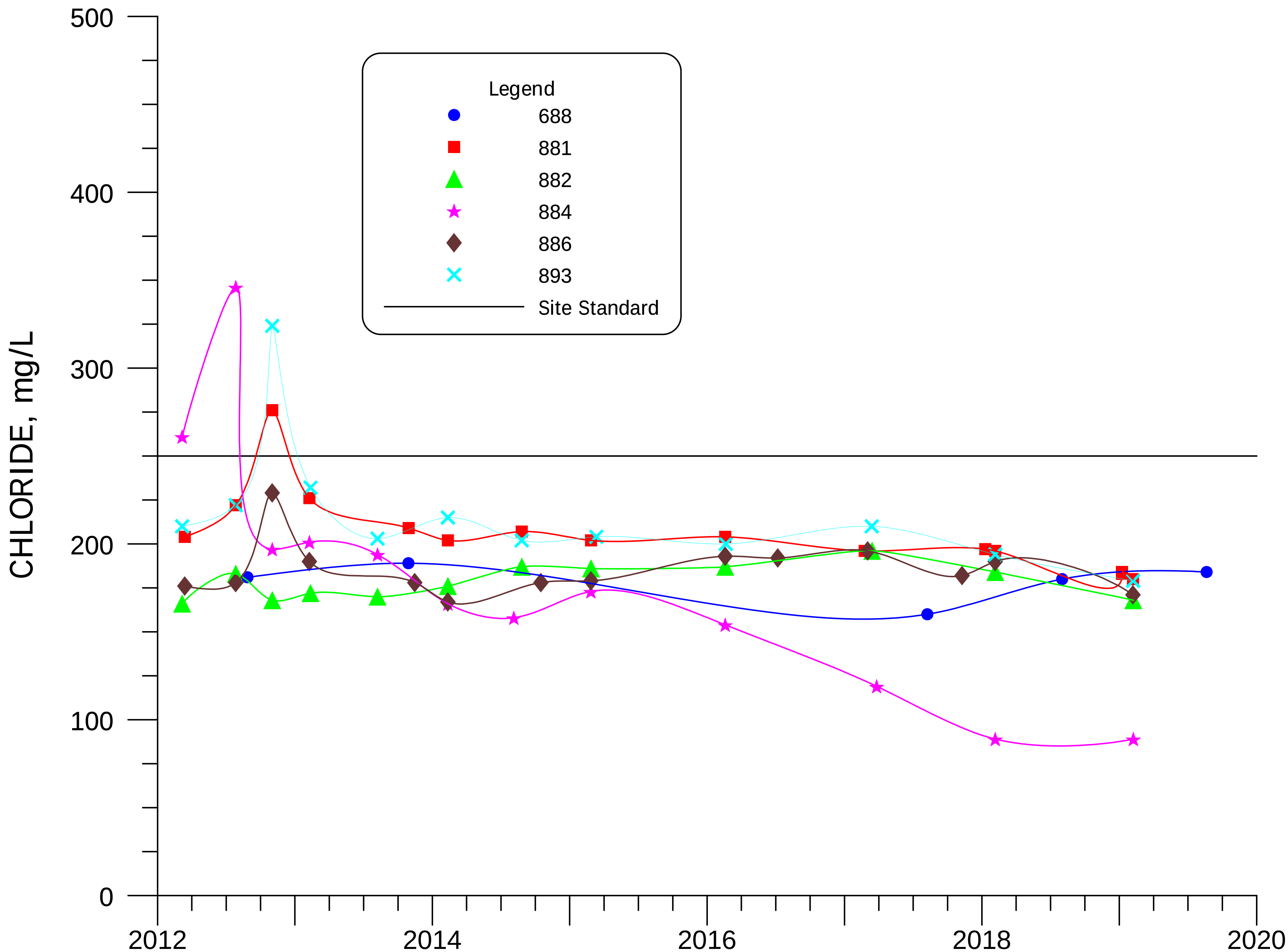

FIGURE 4.3-50. CHLORIDE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

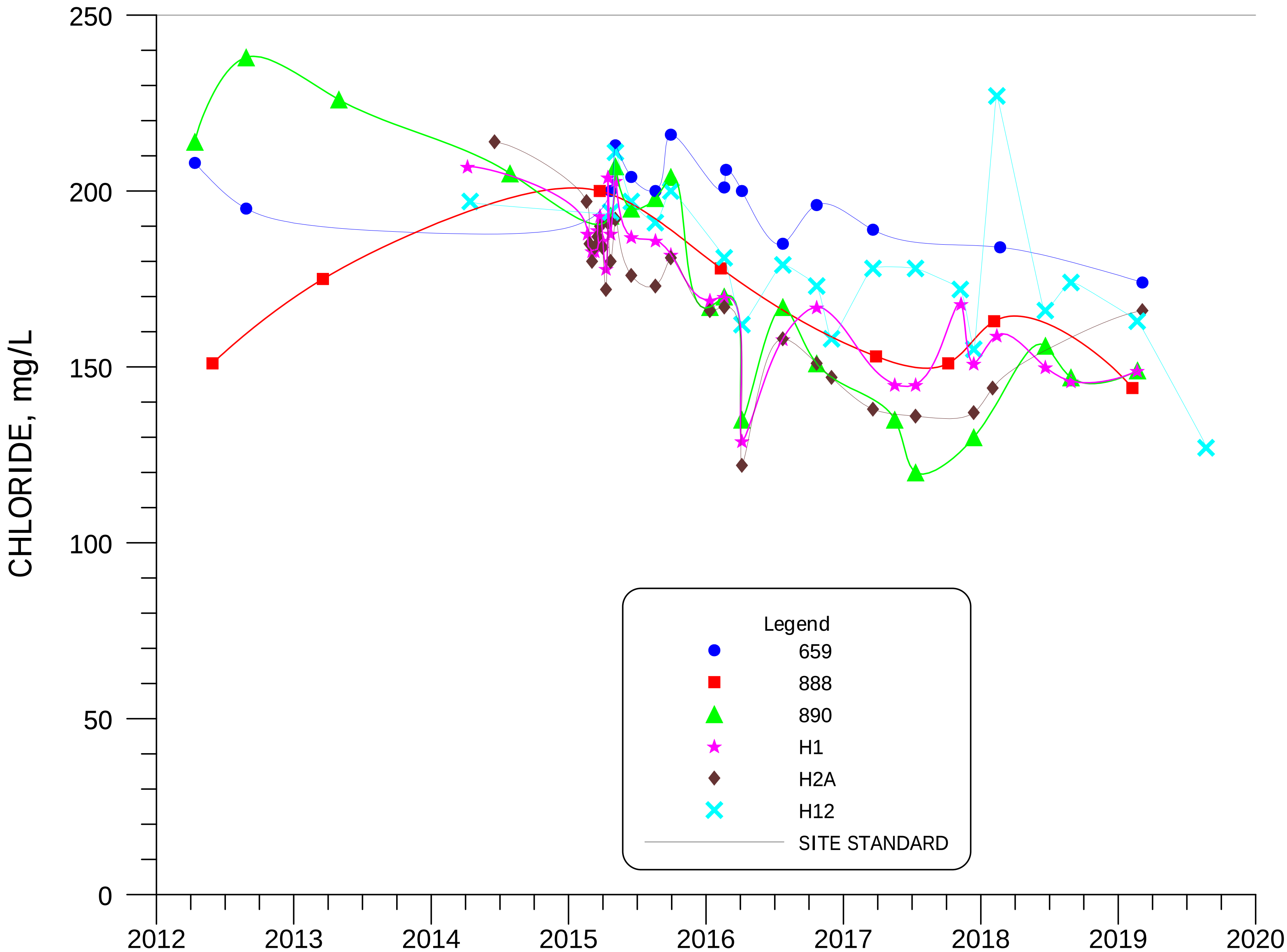

FIGURE 4.3-50A. CHLORIDE CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

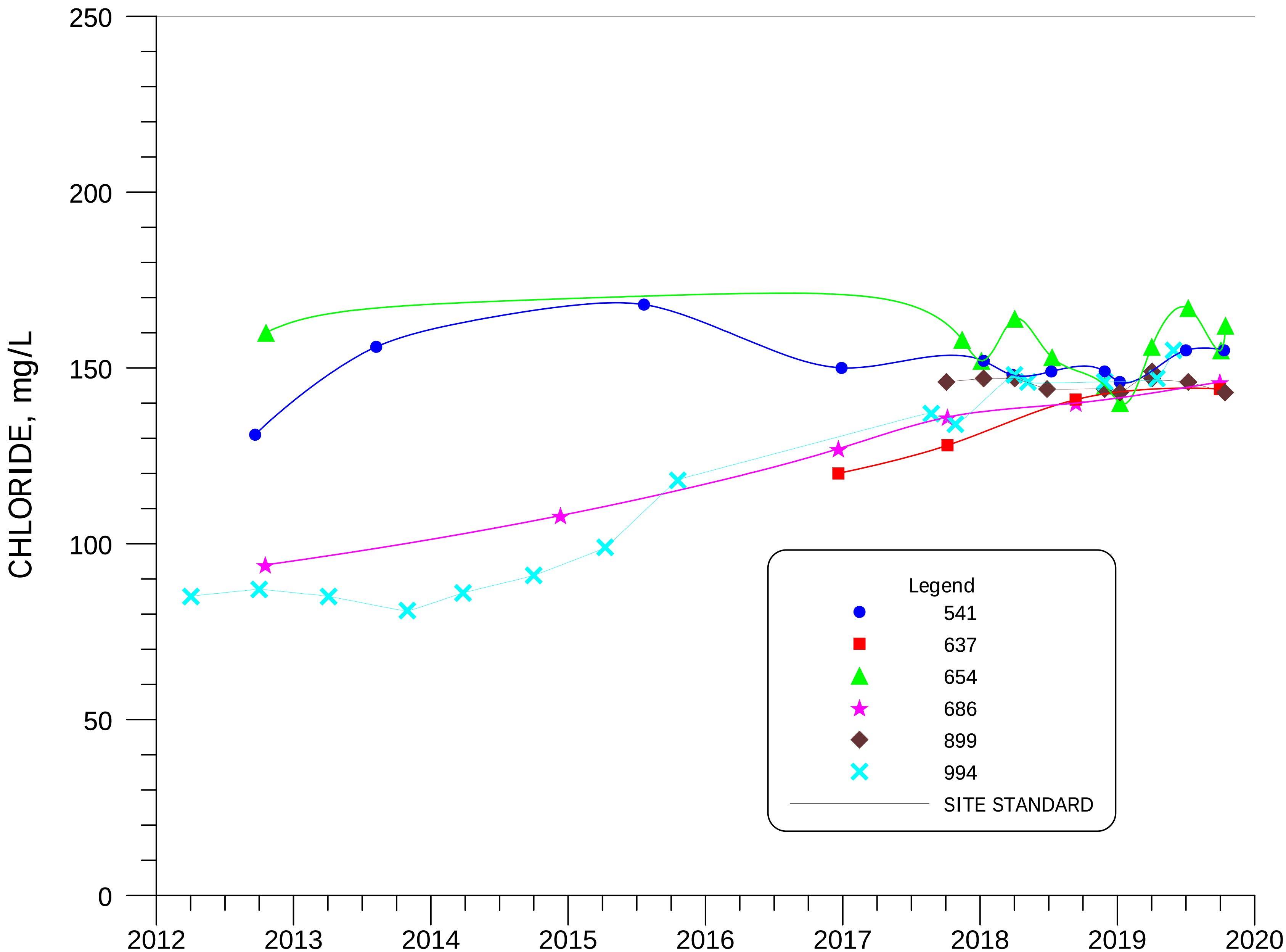

FIGURE 4.3-51. CHLORIDE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

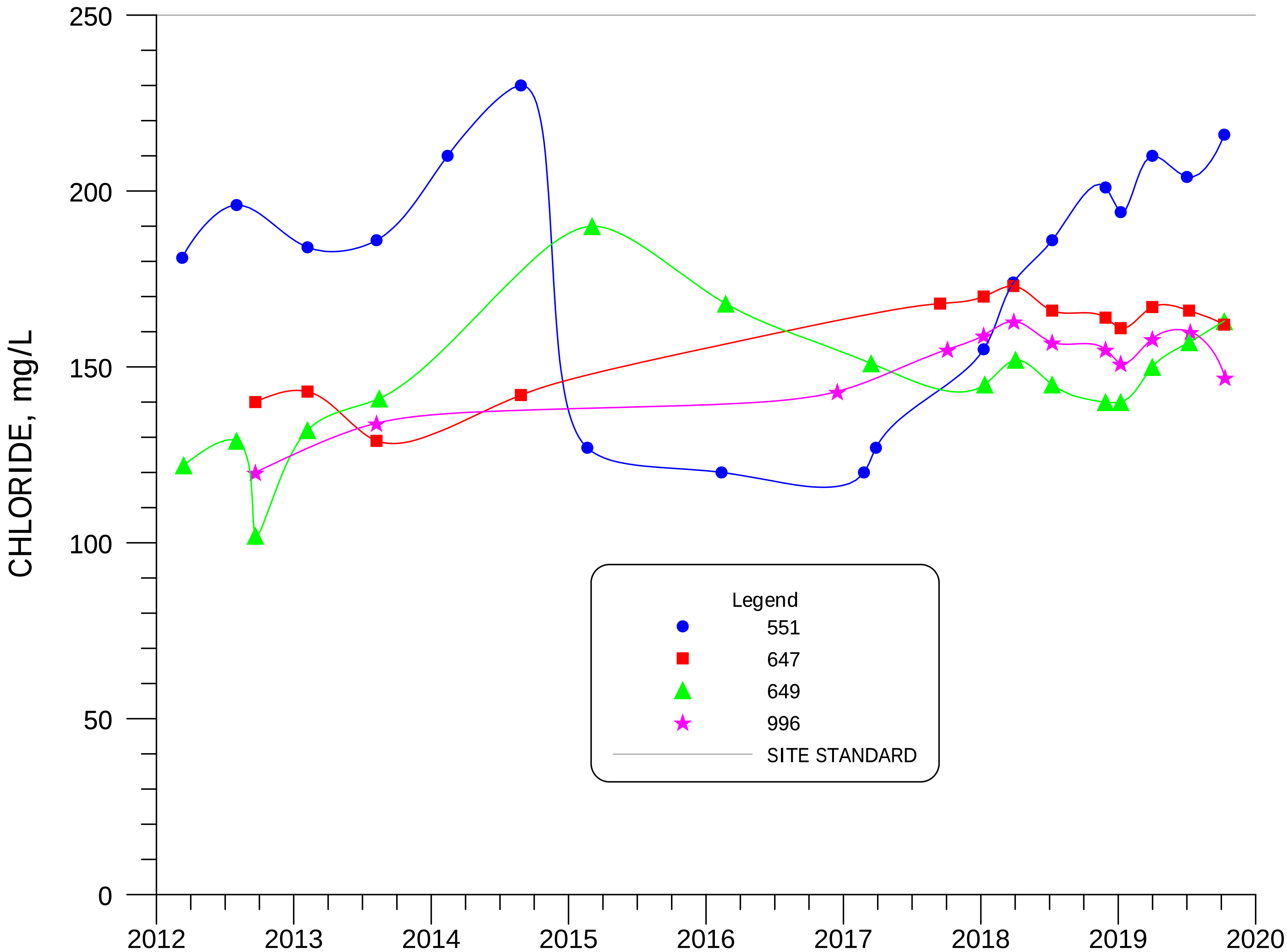

FIGURE 4.3-52. CHLORIDE CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

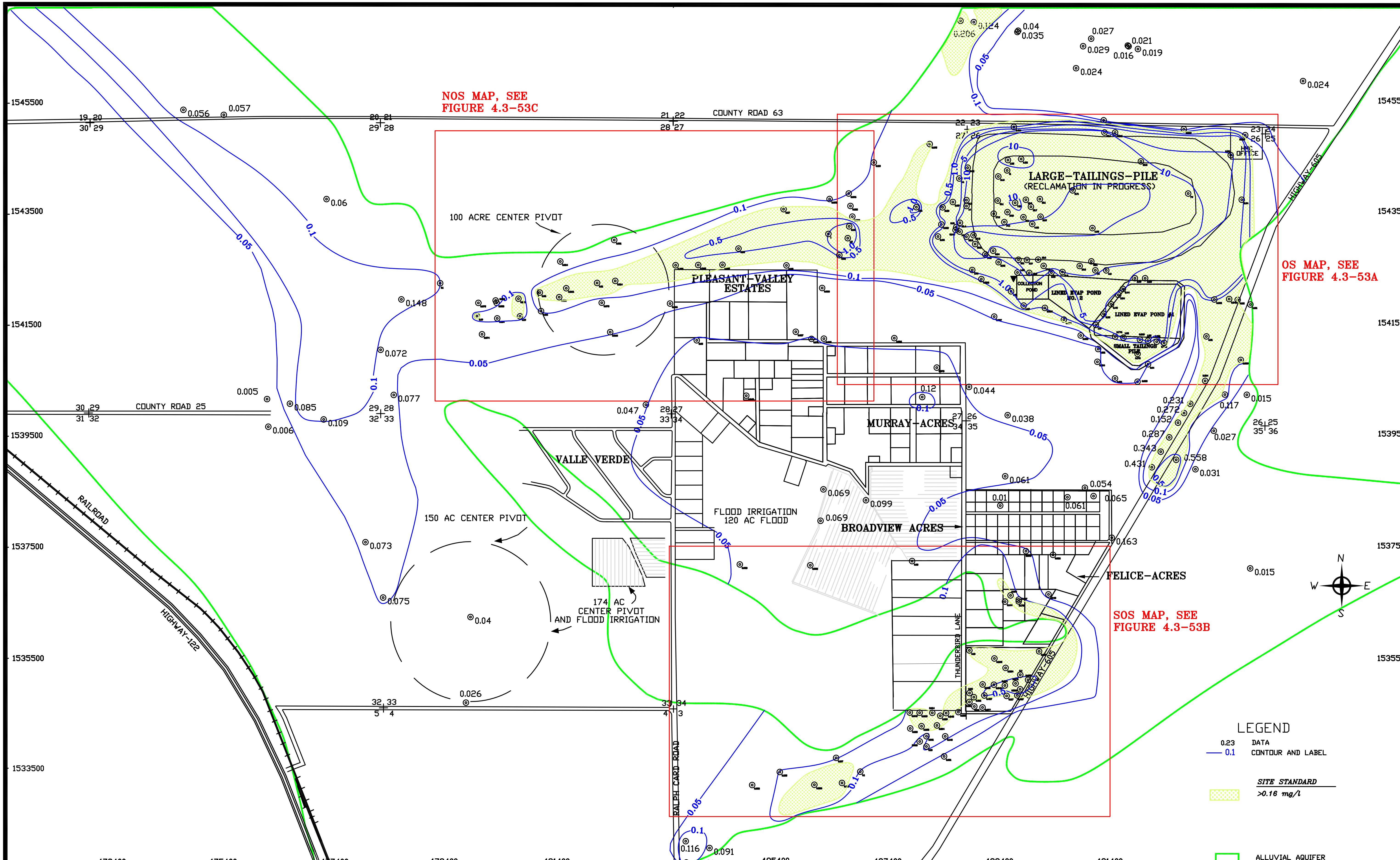

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FIGURE 4.3-53. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

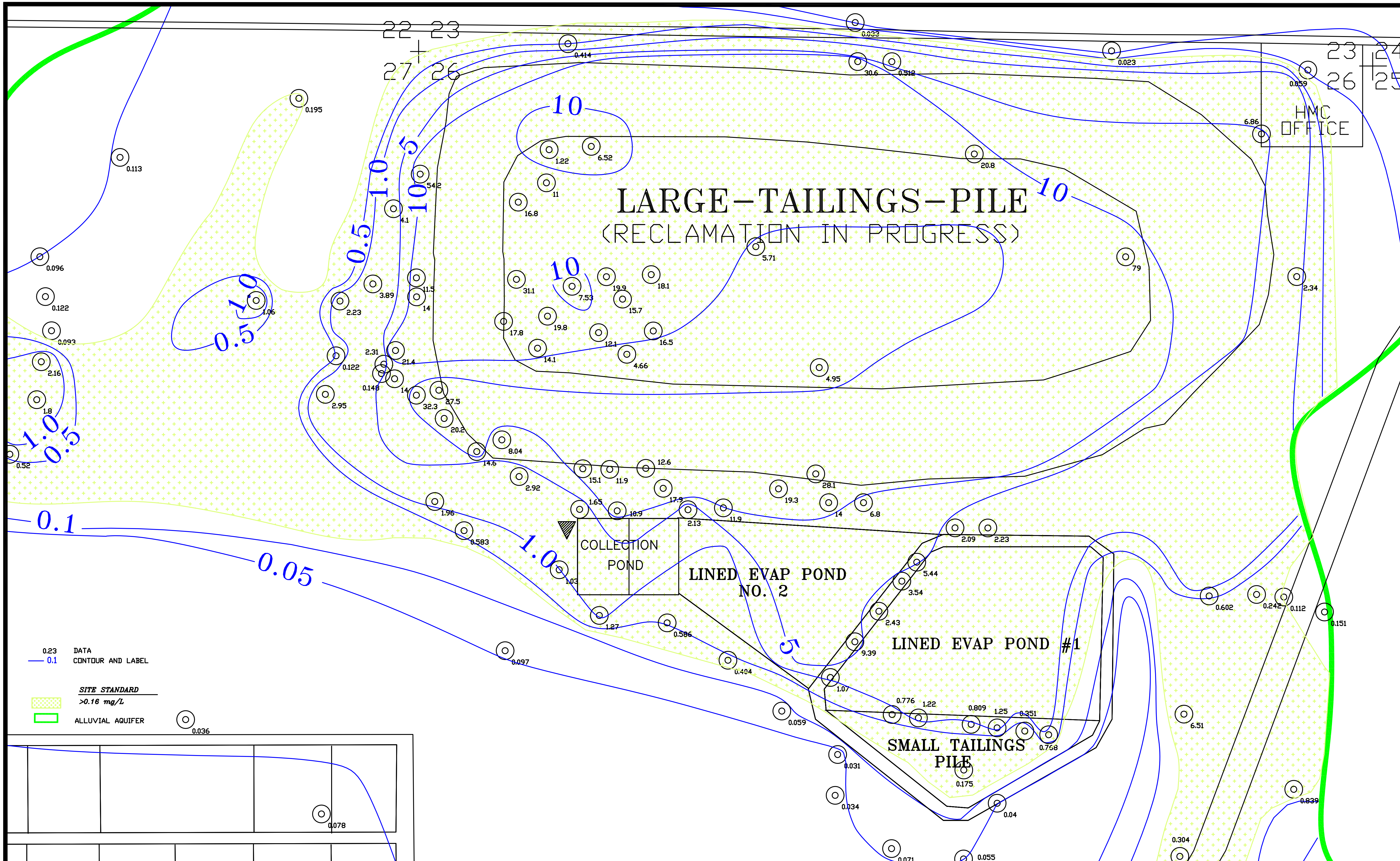

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FIGURE 4.3-53A. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

4.3-99

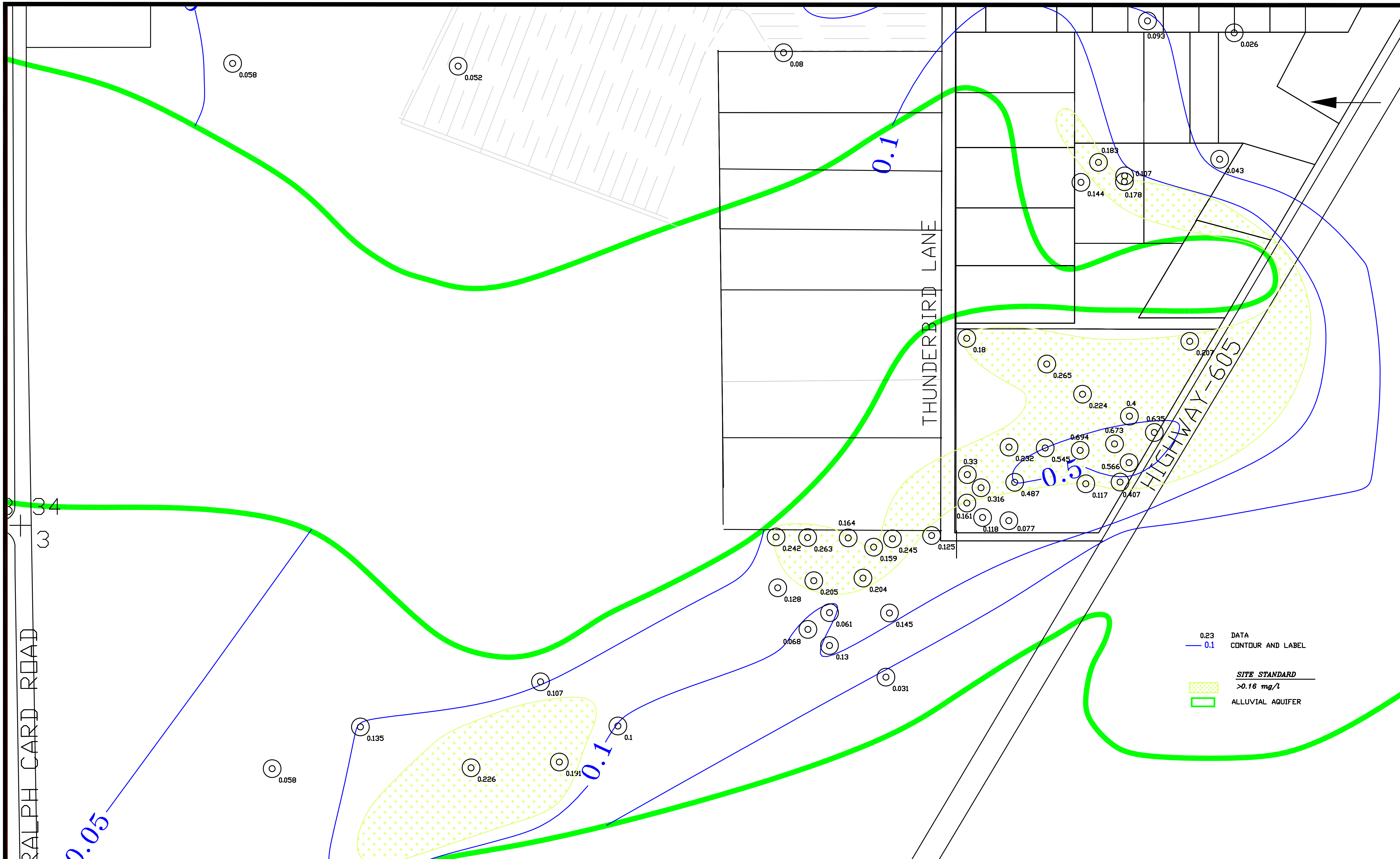

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FIGURE 4.3-53B. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

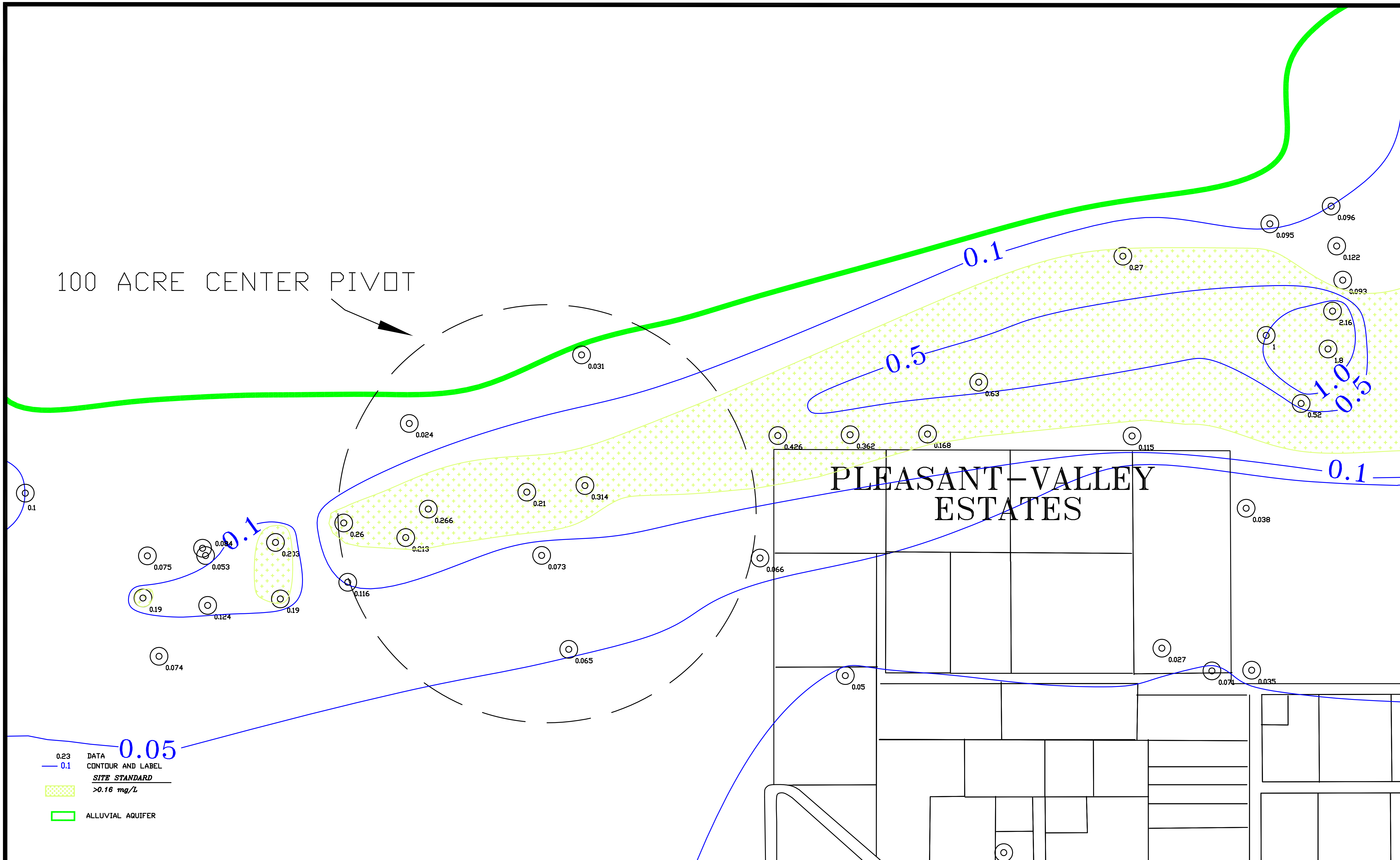

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FIGURE 4.3-53C. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

4.3-101

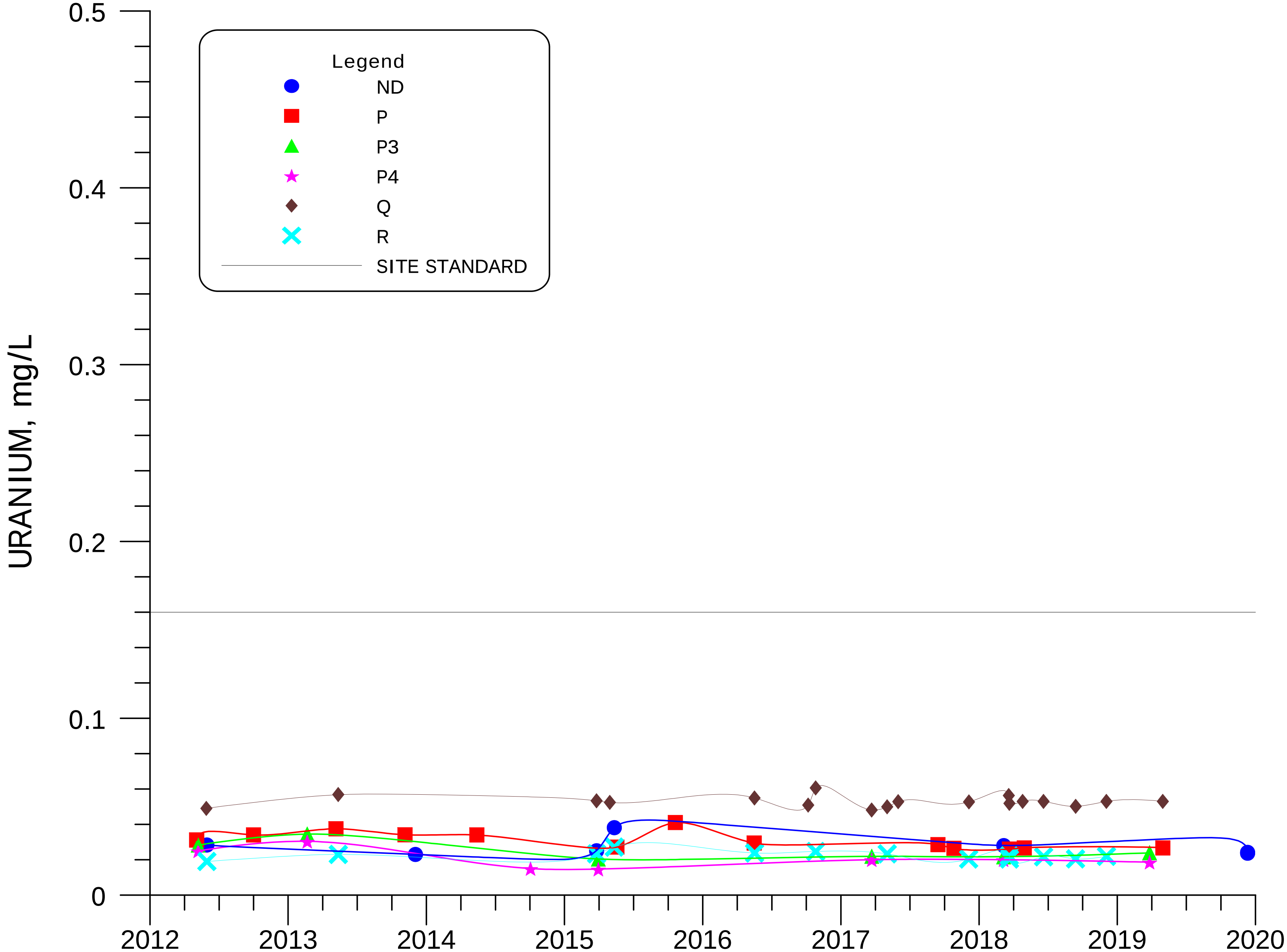

FIGURE 4.3-54. URANIUM CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

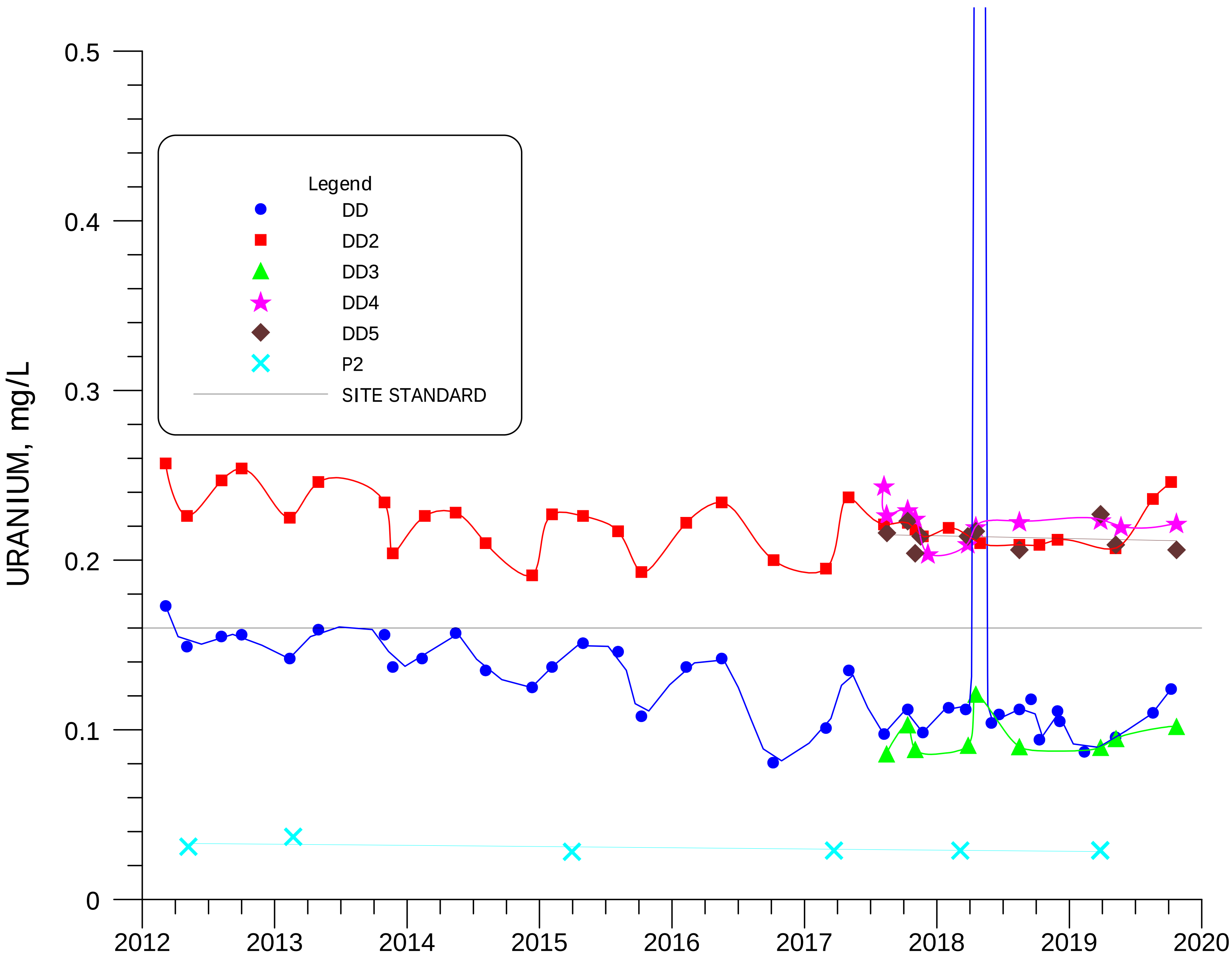

FIGURE 4.3-54A. URANIUM CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

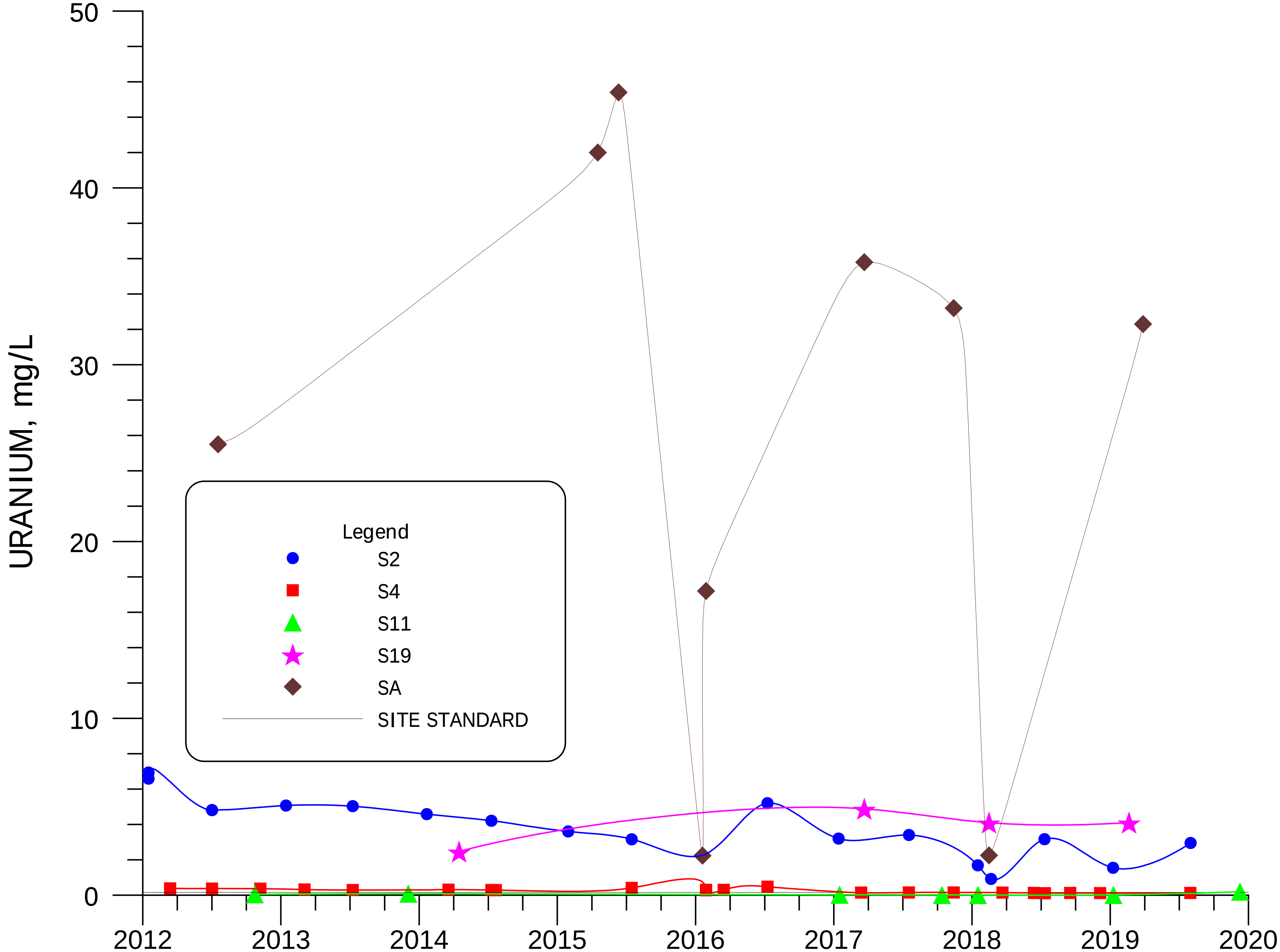

FIGURE 4.3-55. URANIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

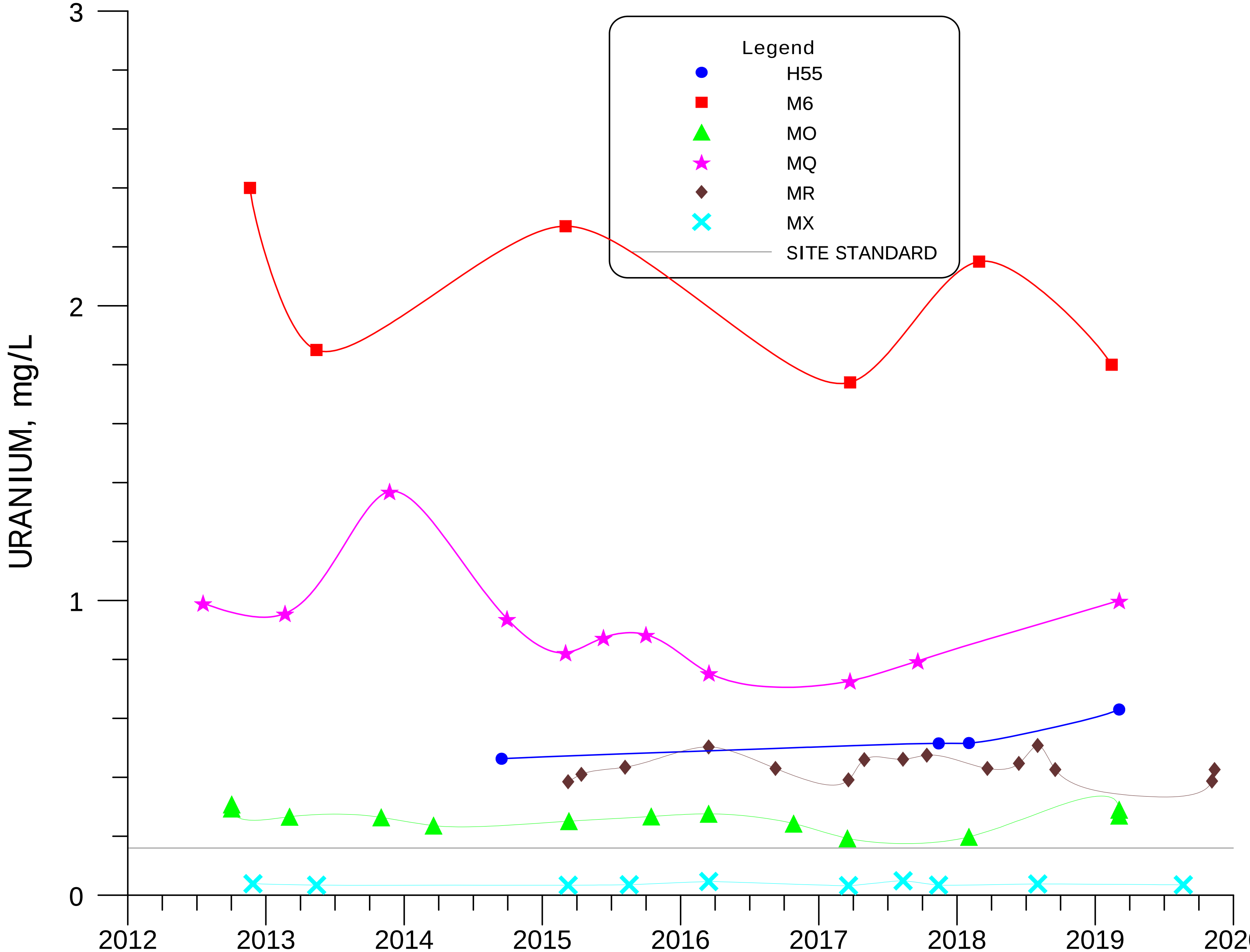

FIGURE 4.3-56. URANIUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

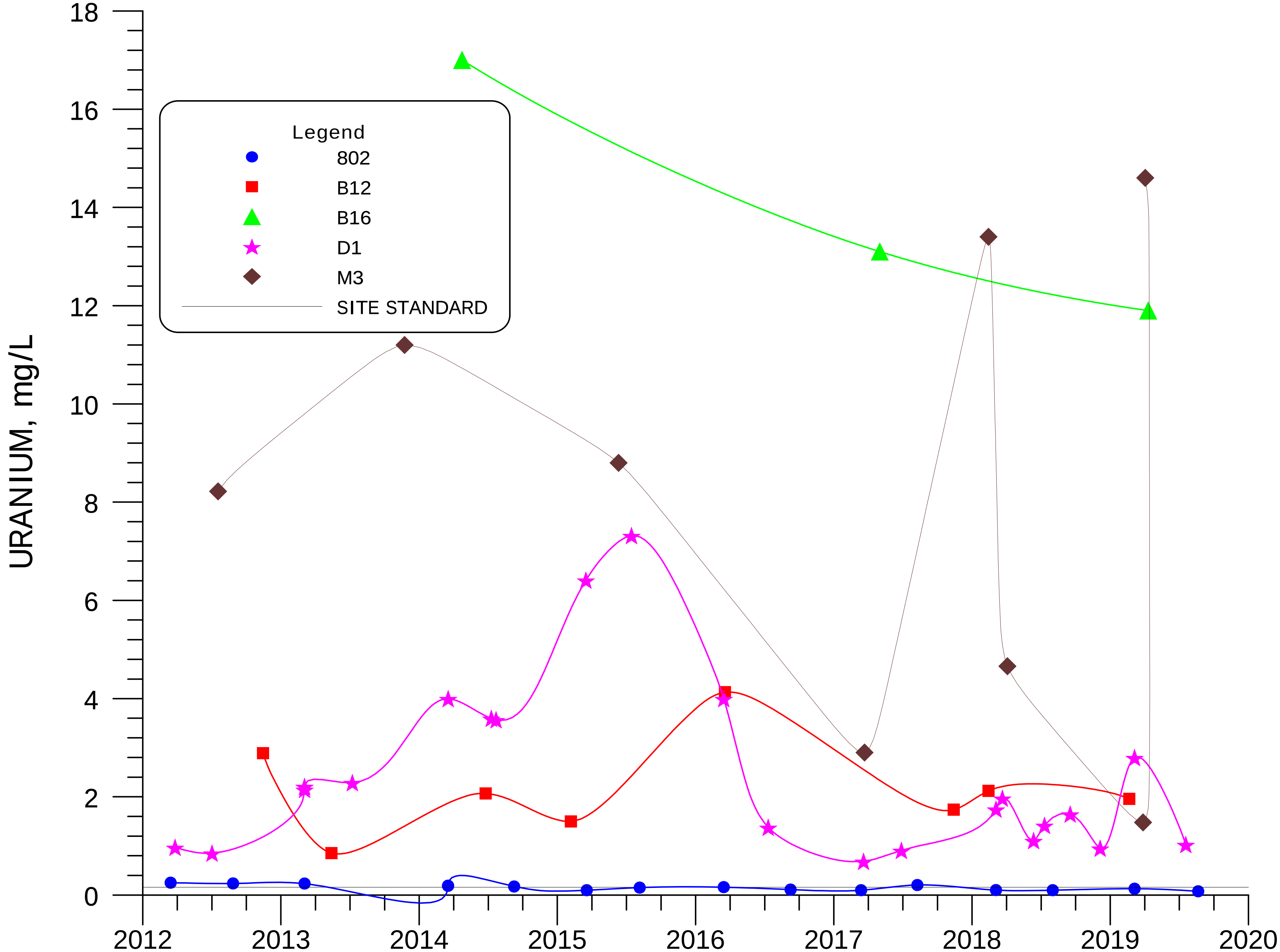

FIGURE 4.3-57. URANIUM CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

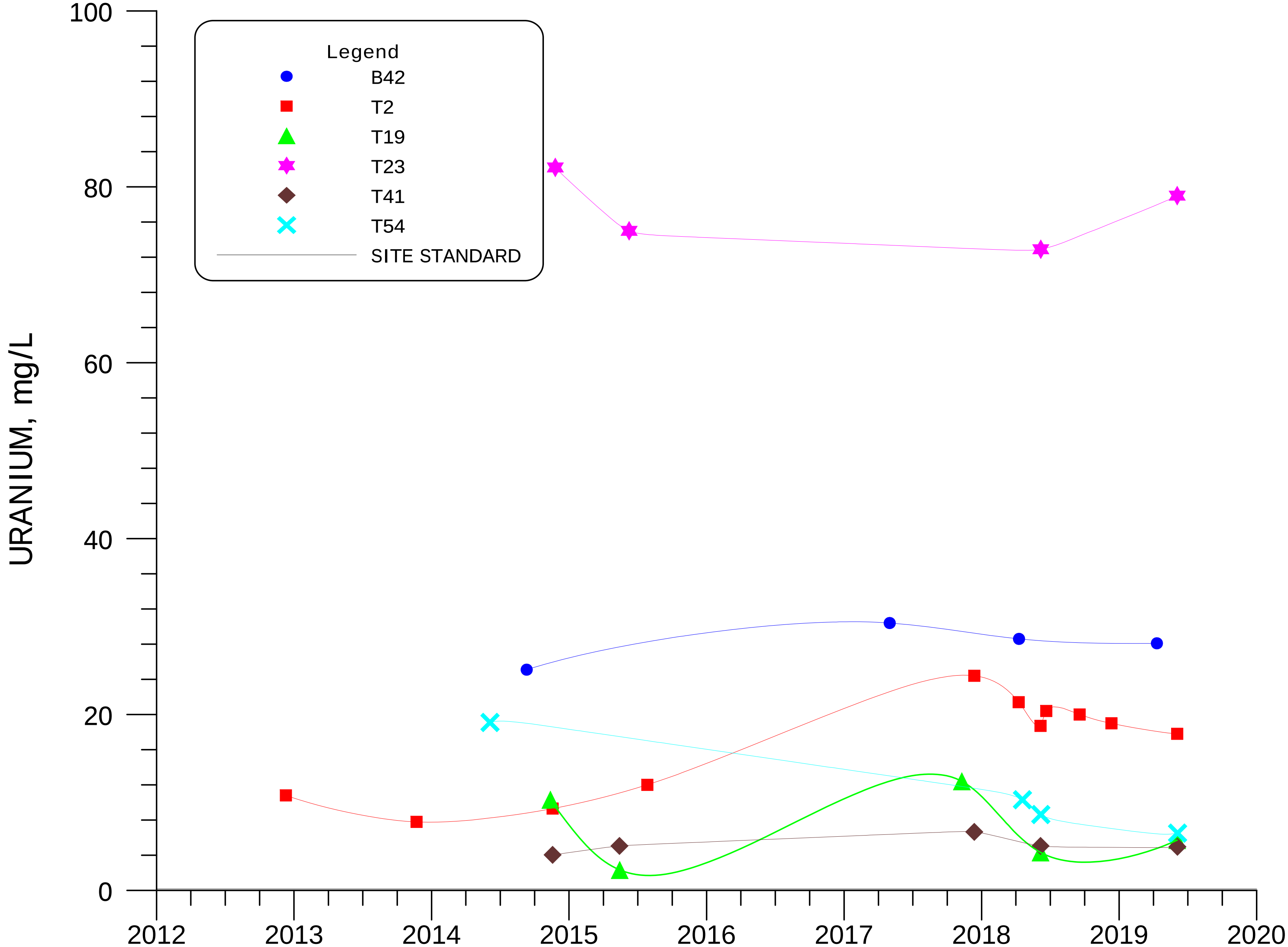

FIGURE 4.3-58. URANIUM CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

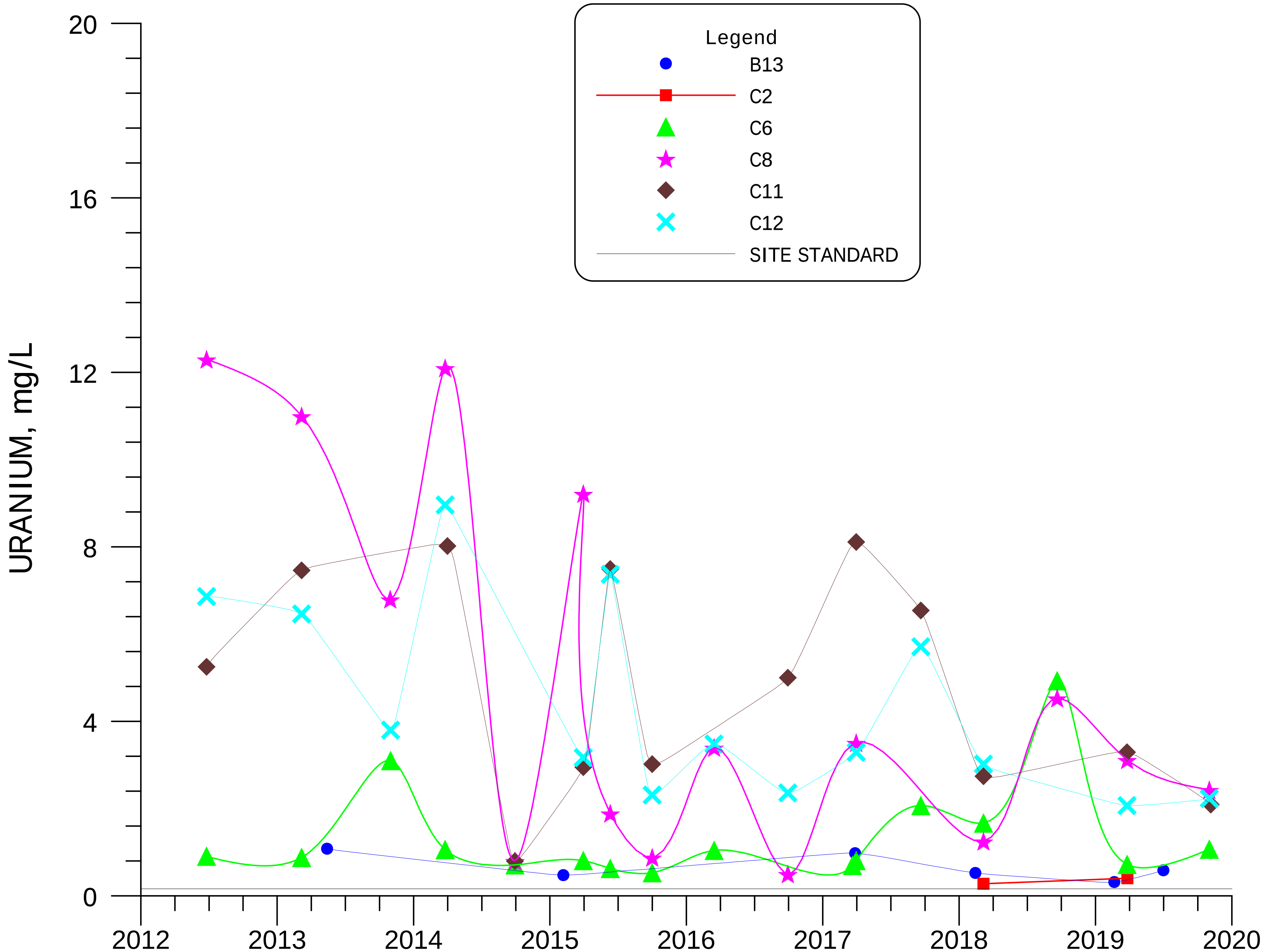

FIGURE 4.3-59. URANIUM CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

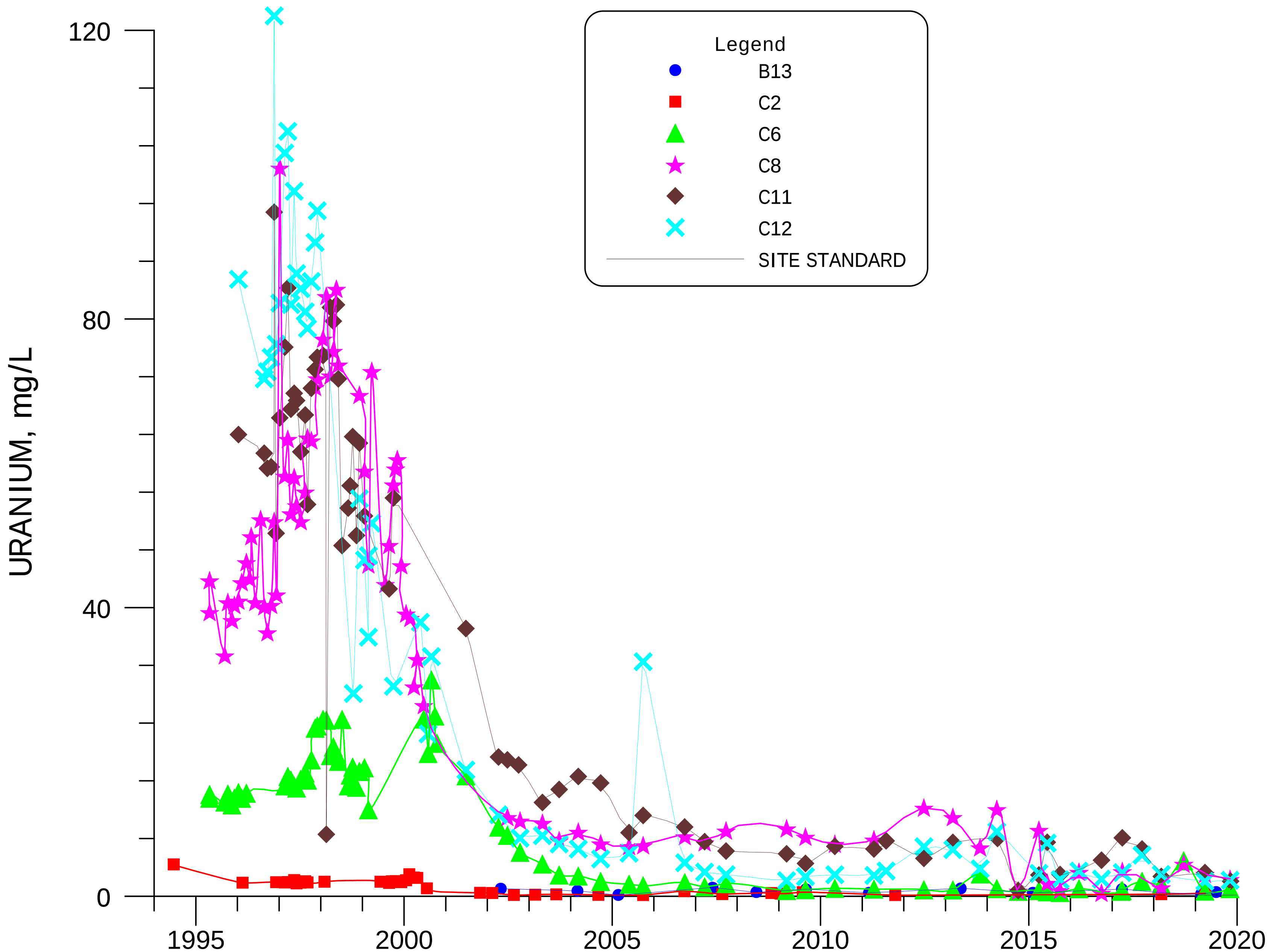

FIGURE 4.3-59A. URANIUM CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12 FOR ALL HISTORICAL DATA.

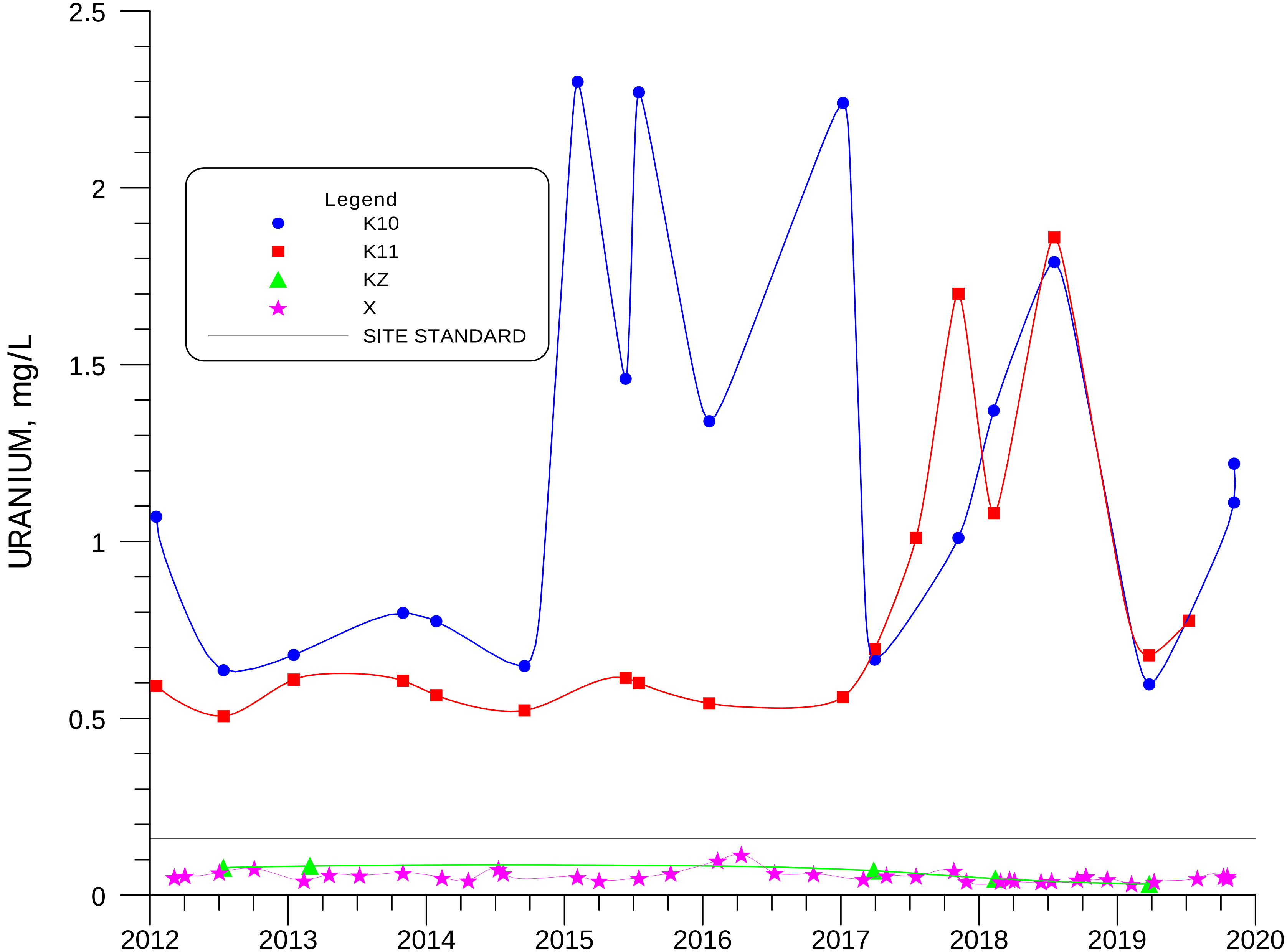

FIGURE 4.3-60. URANIUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

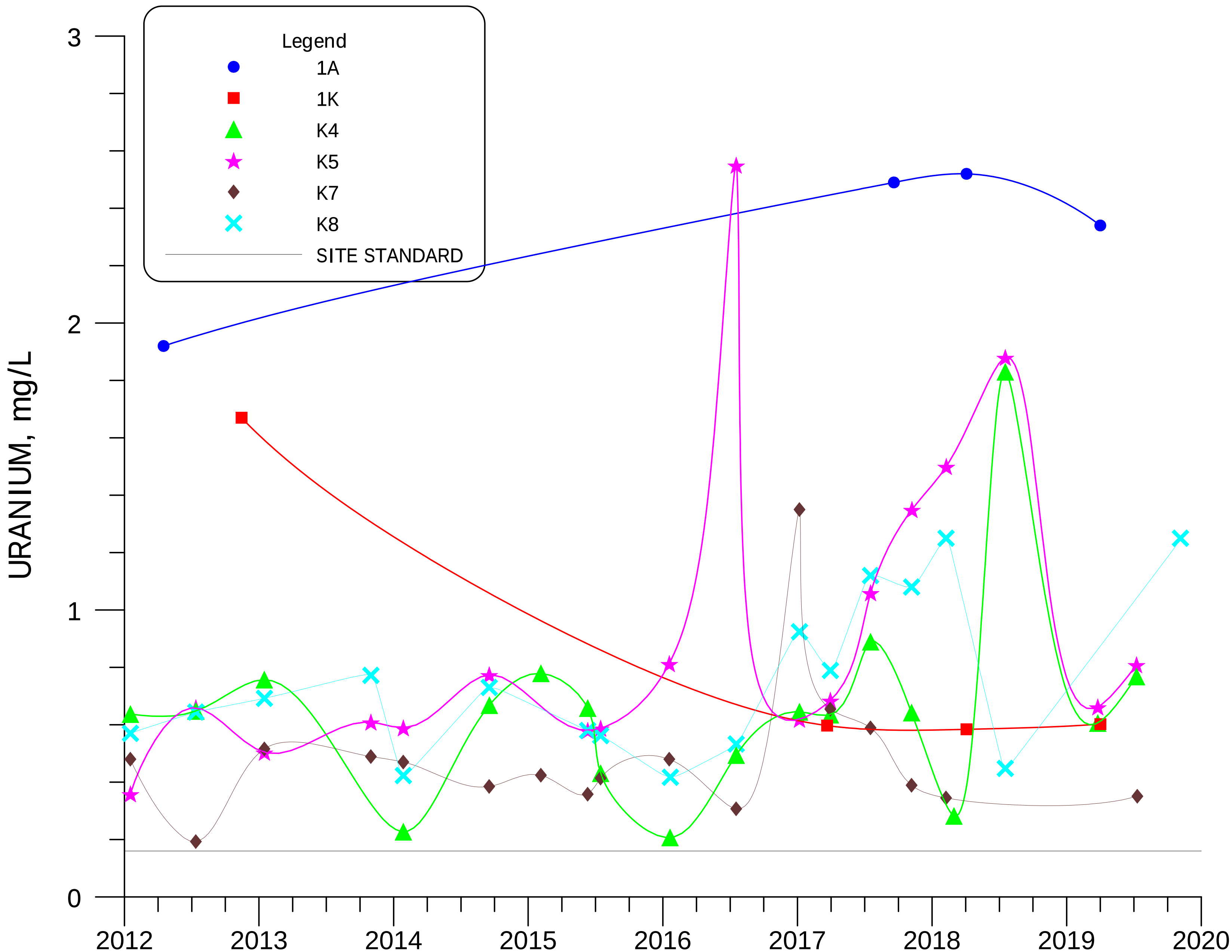

FIGURE 4.3-61. URANIUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

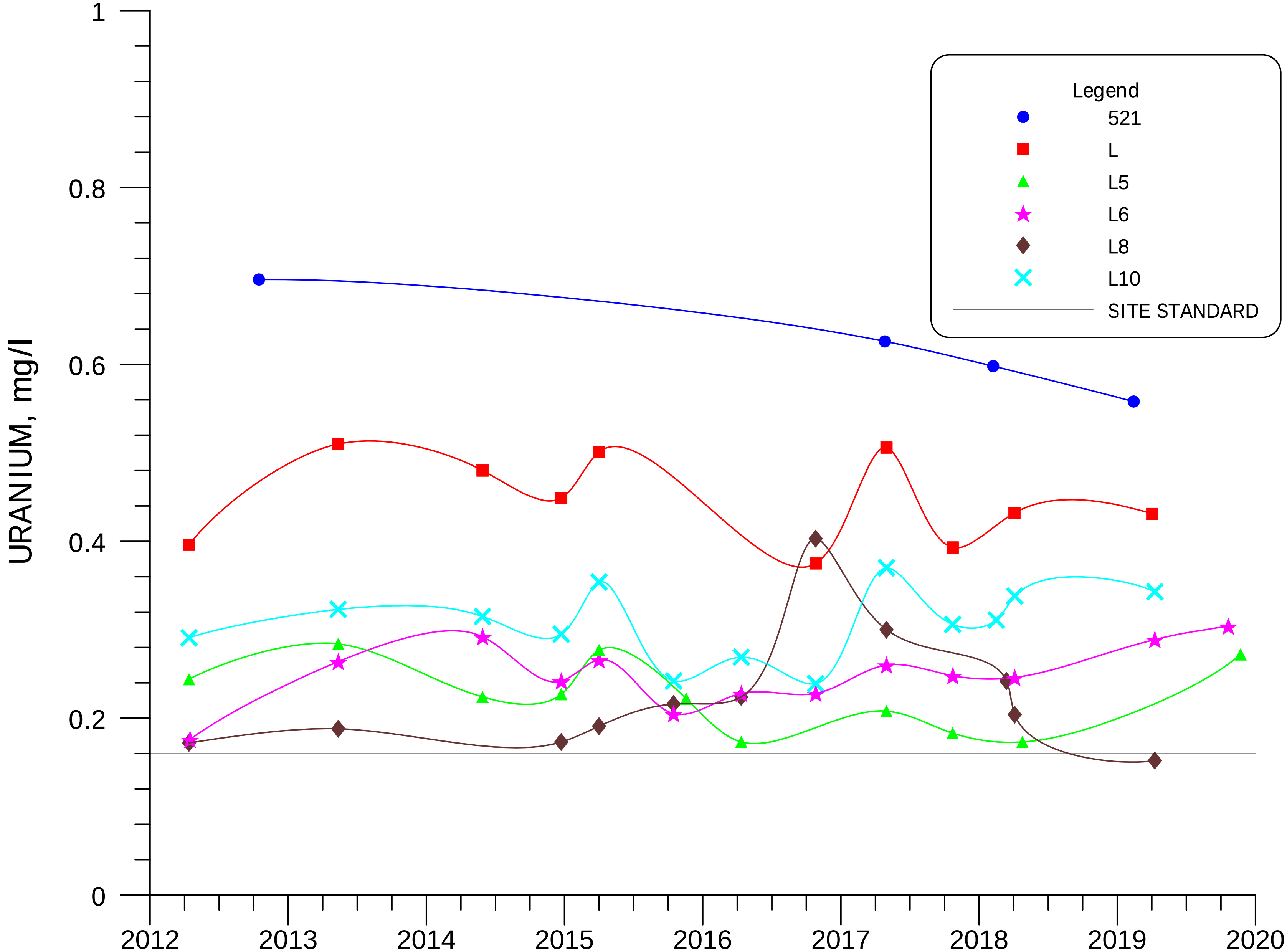

FIGURE 4.3-62. URANIUM CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

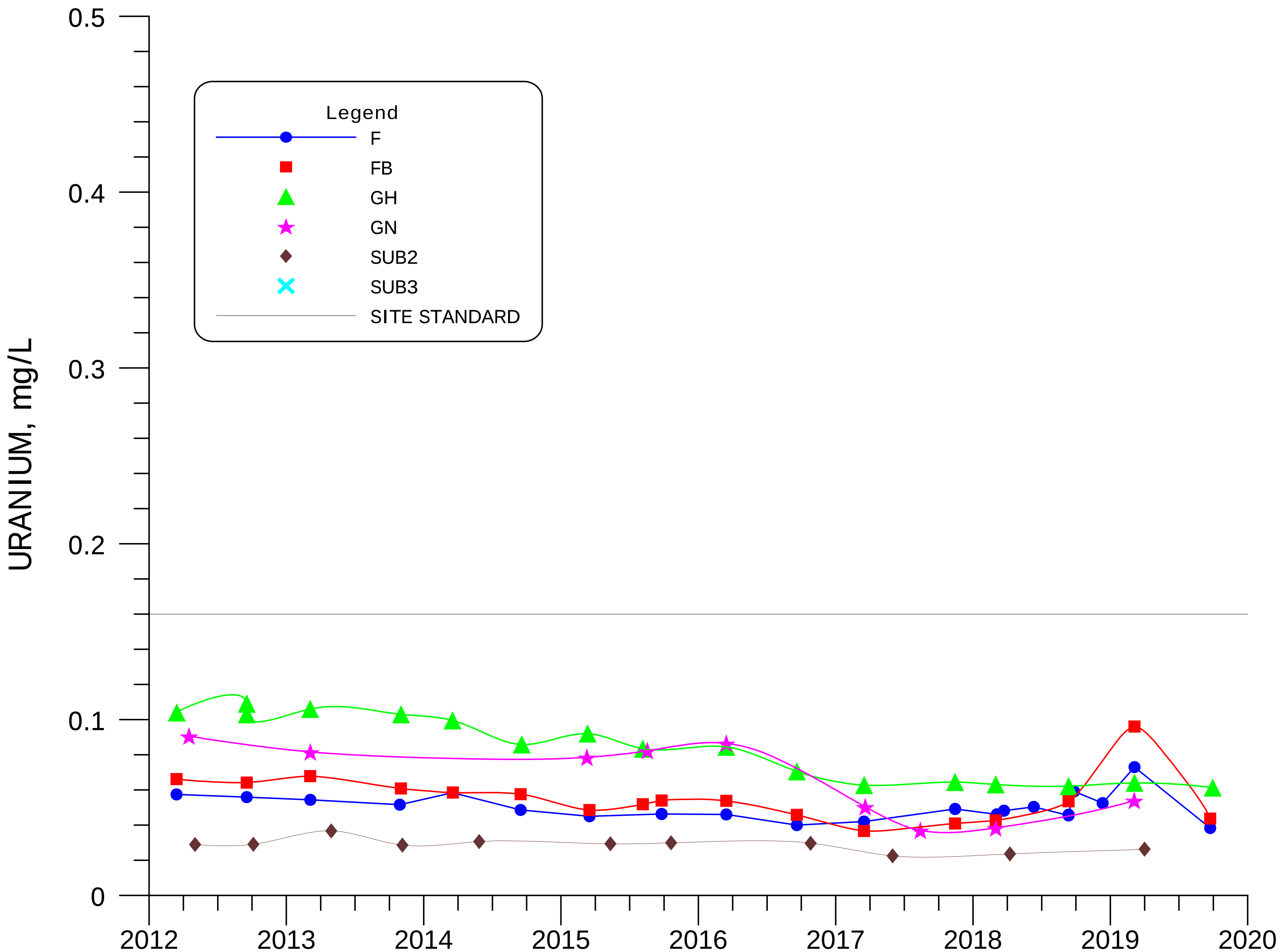

FIGURE 4.3-63. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

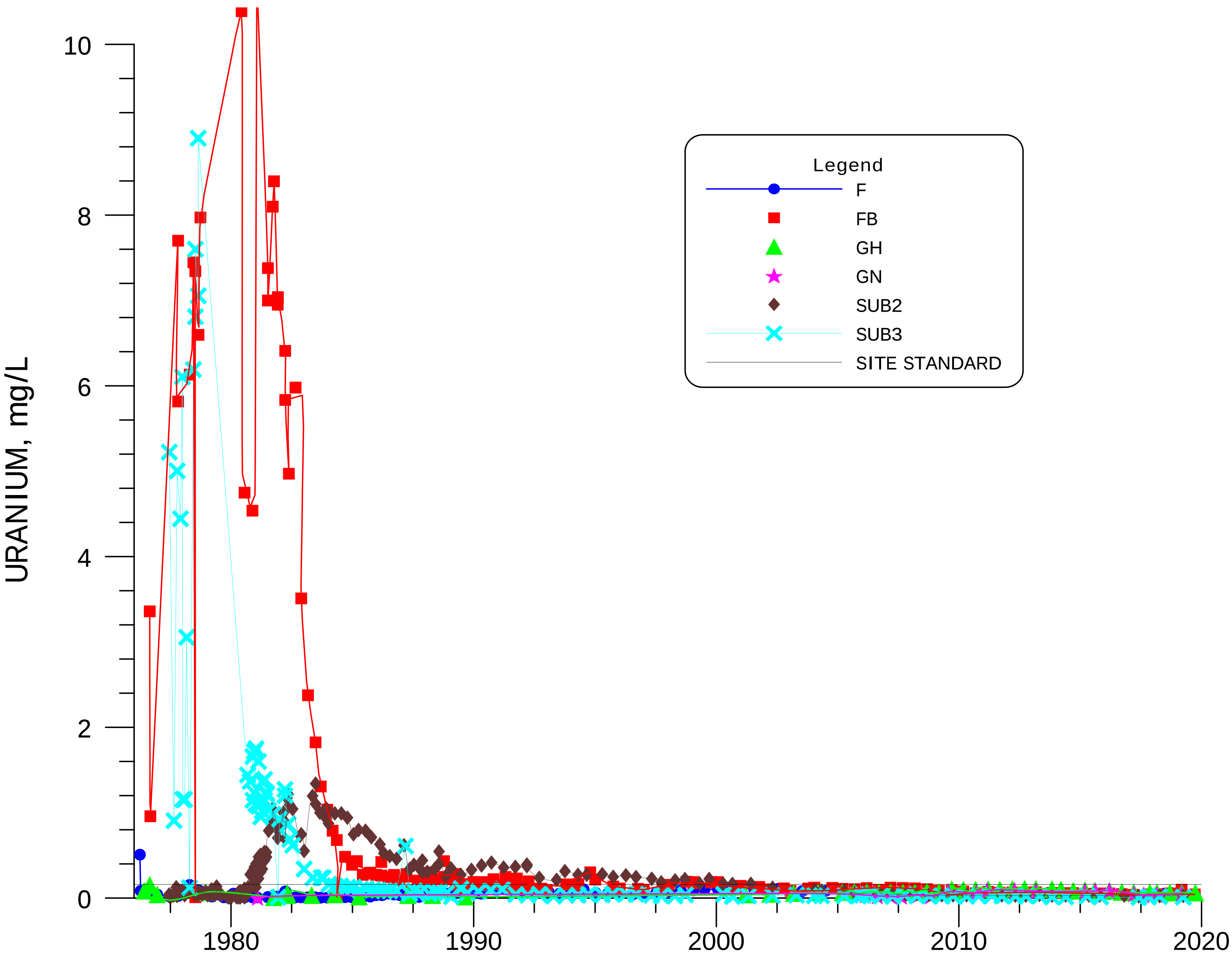

FIGURE 4.3-63A. URANIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3 FOR ALL HISTORICAL DATA.

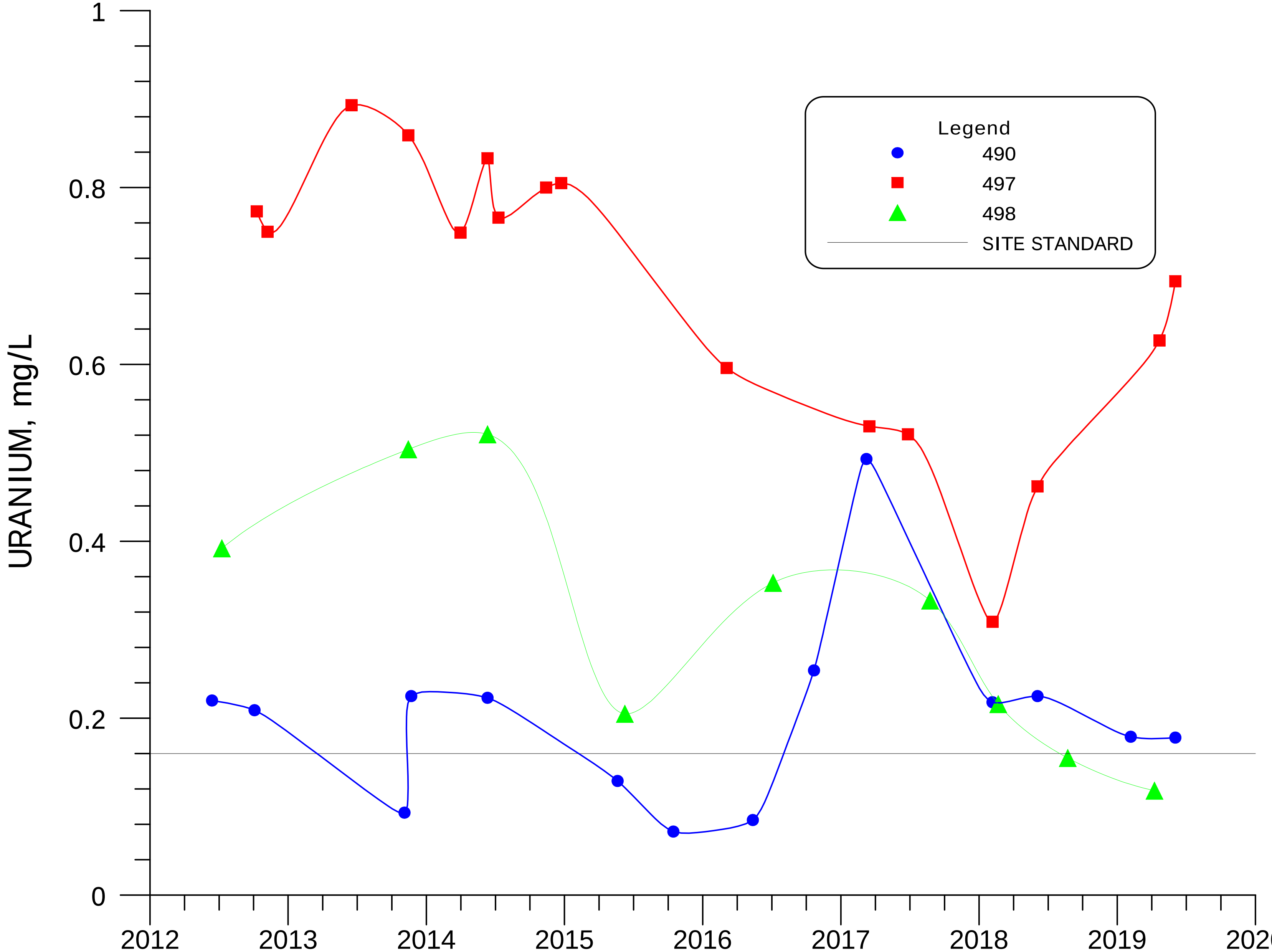

FIGURE 4.3-64. URANIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

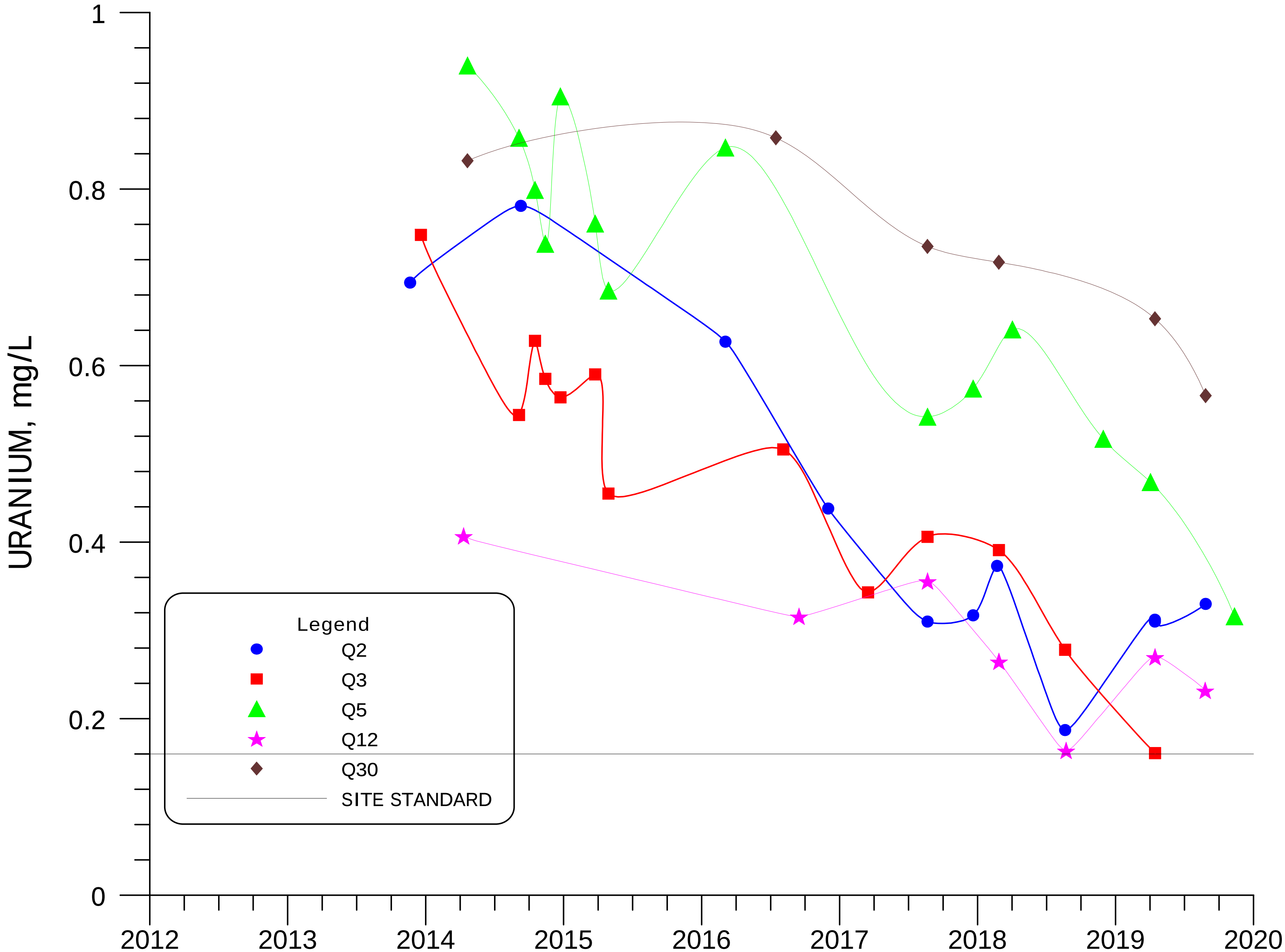

FIGURE 4.3-64A. URANIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q30.

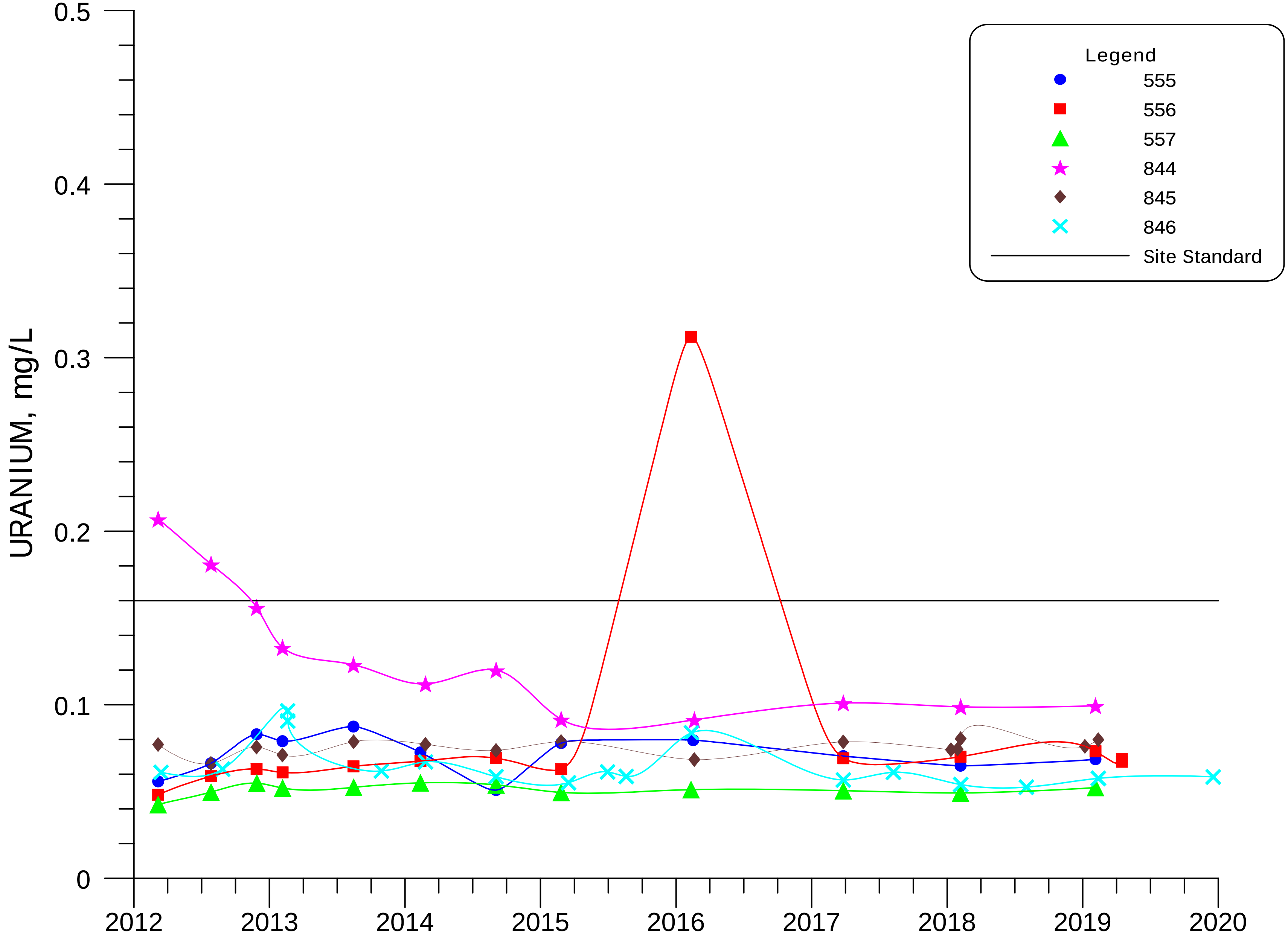

FIGURE 4.3-65. URANIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

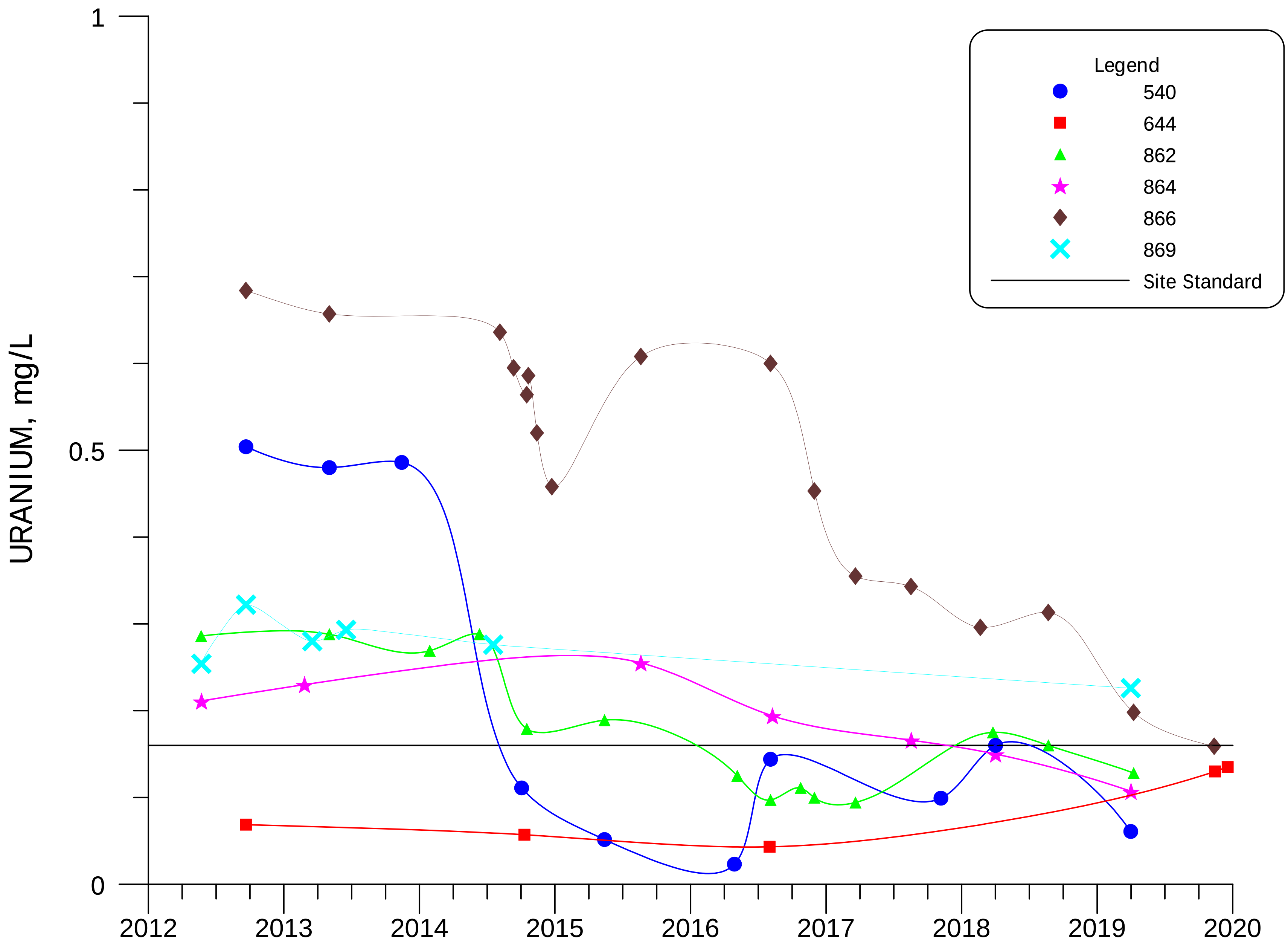

FIGURE 4.3-66. URANIUM CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

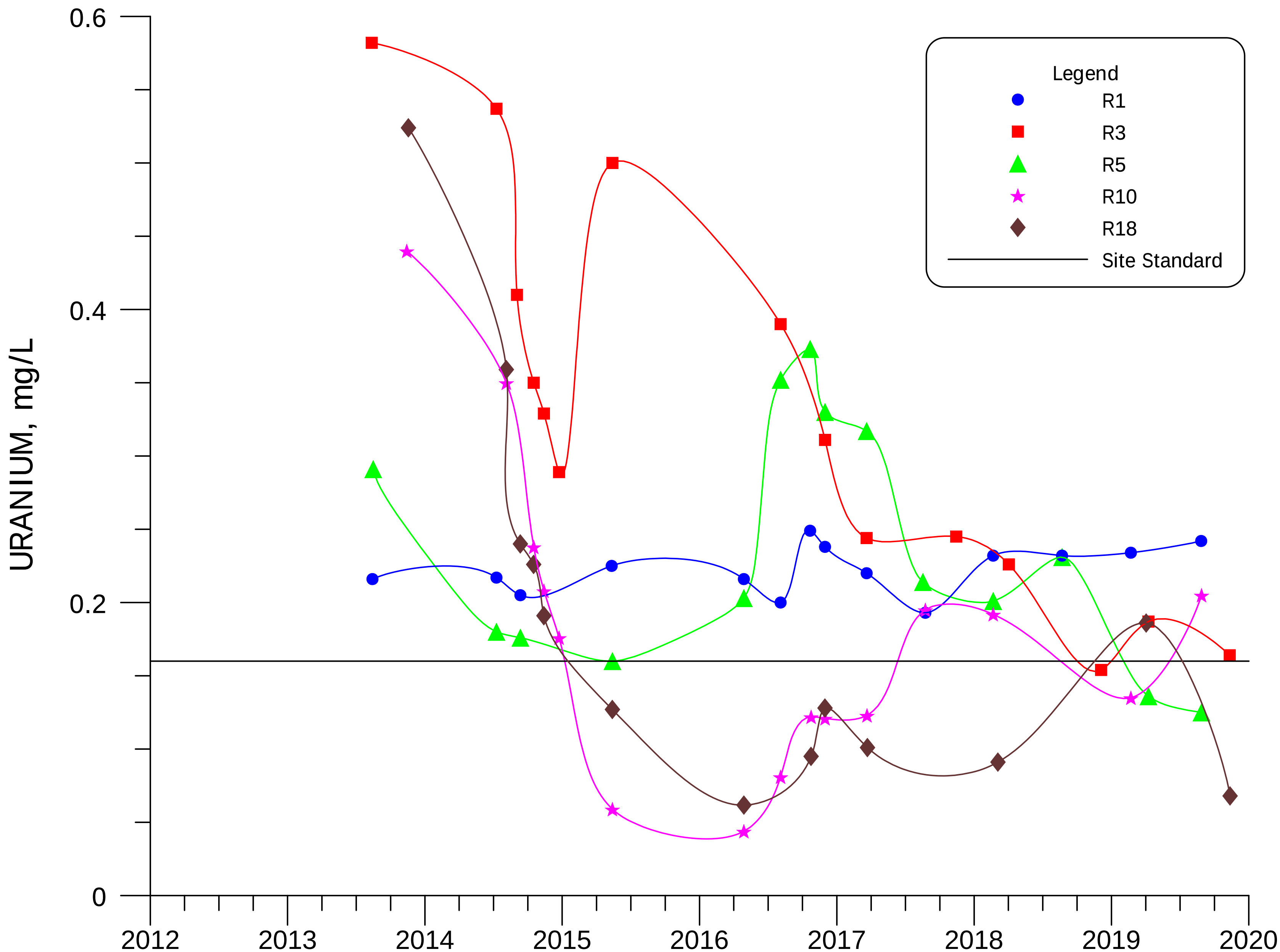

FIGURE 4.3-66A. URANIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

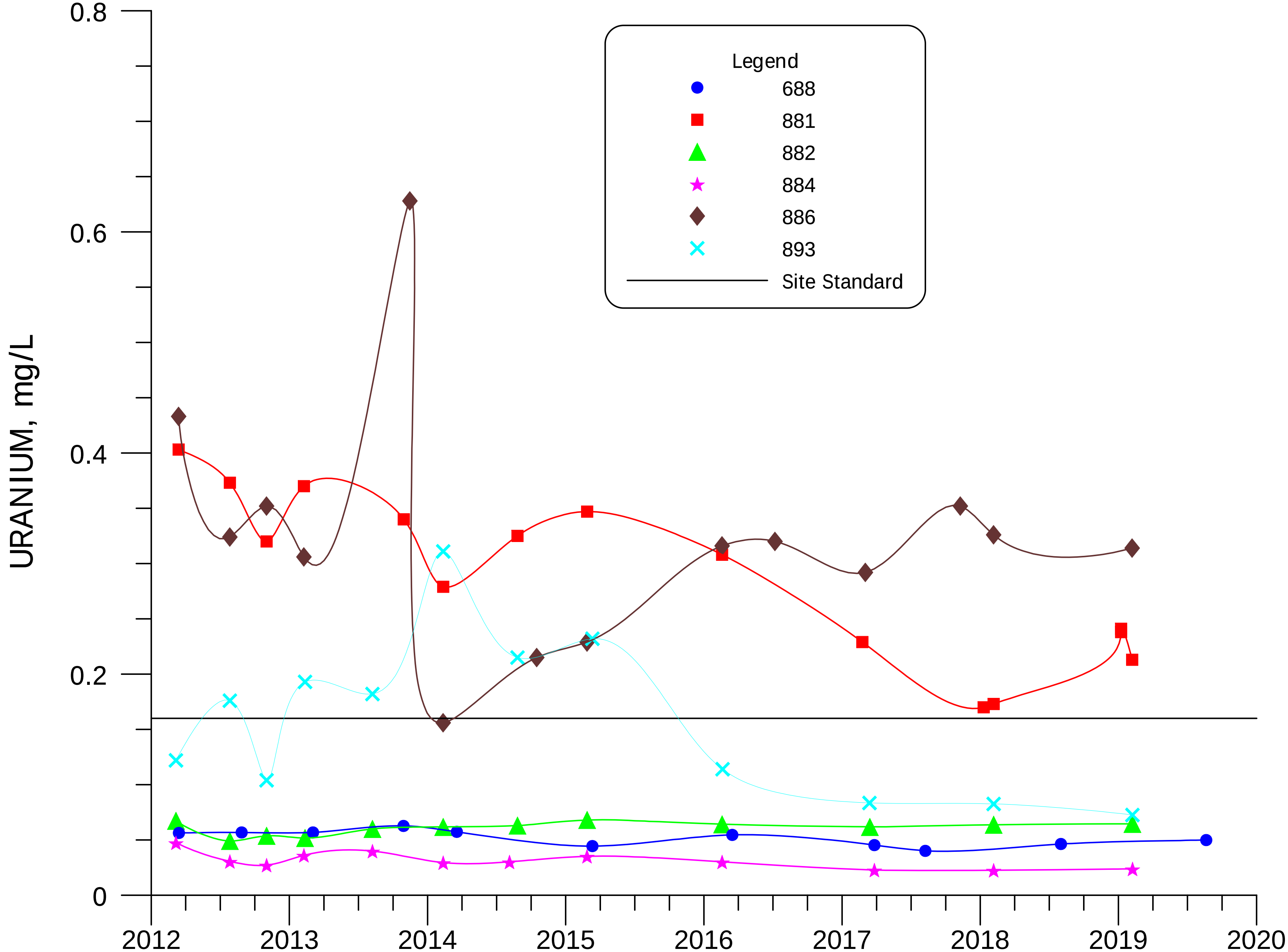

FIGURE 4.3-67. URANIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

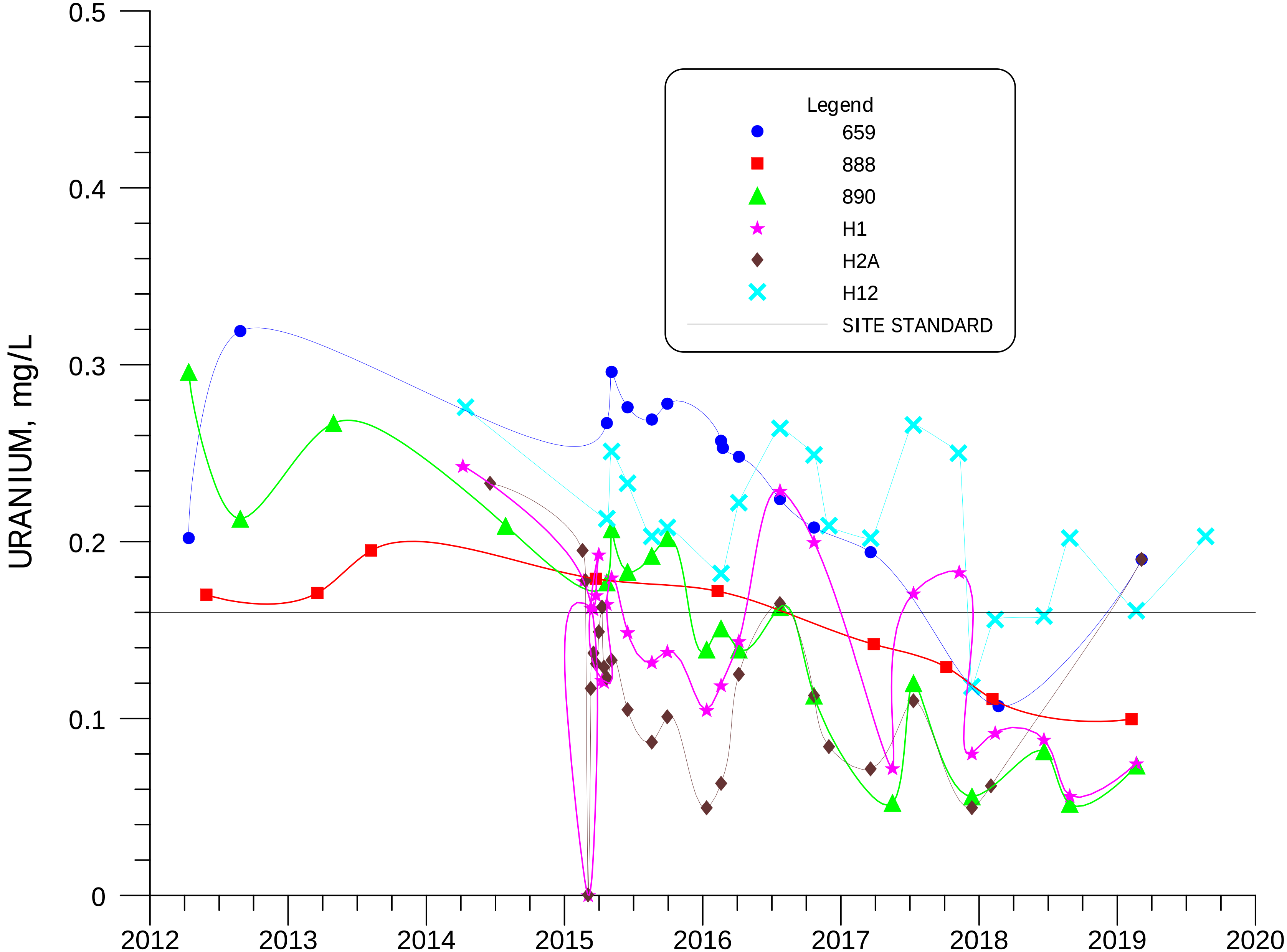

FIGURE 4.3-67A. URANIUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

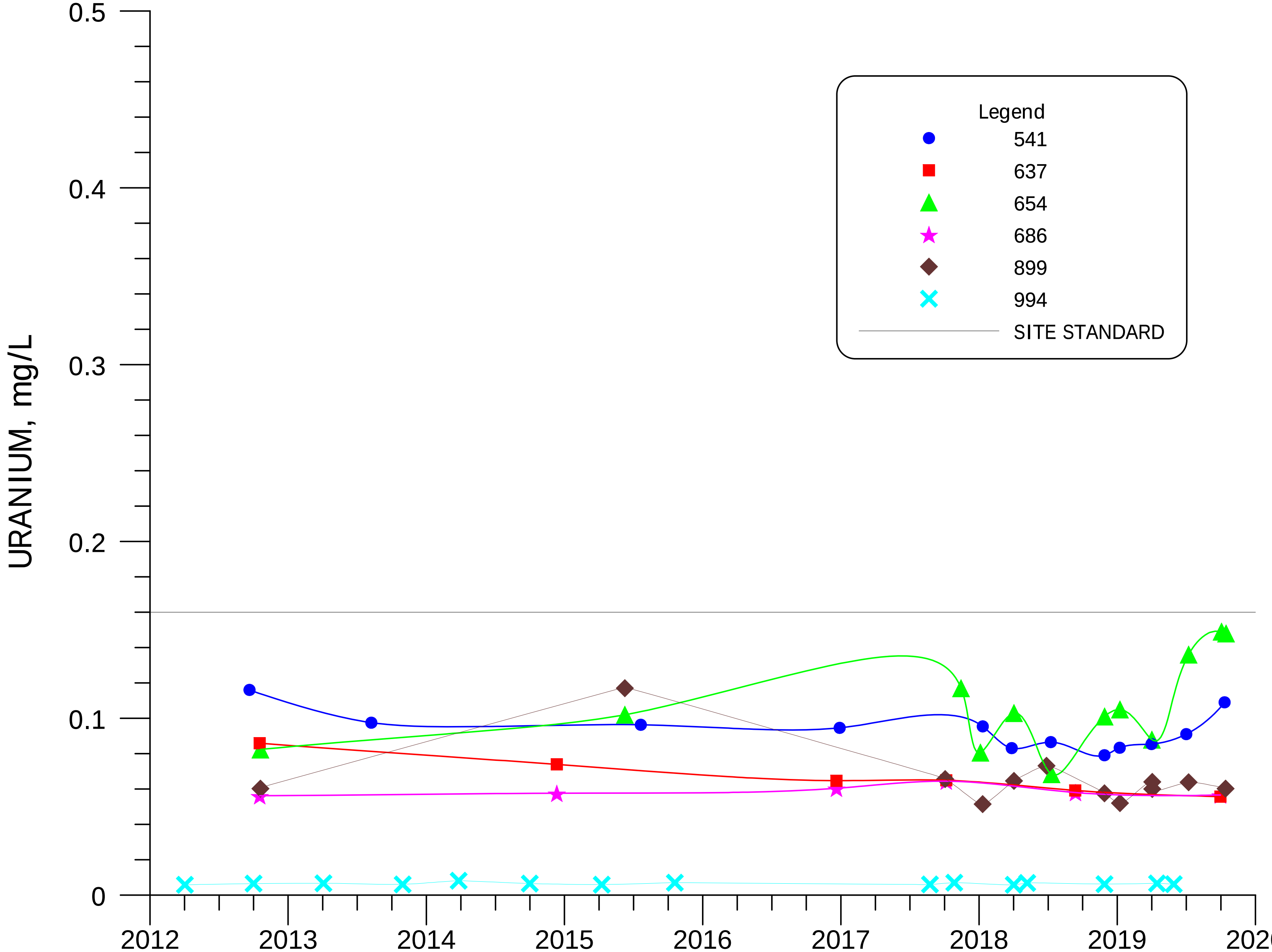

FIGURE 4.3-68. URANIUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

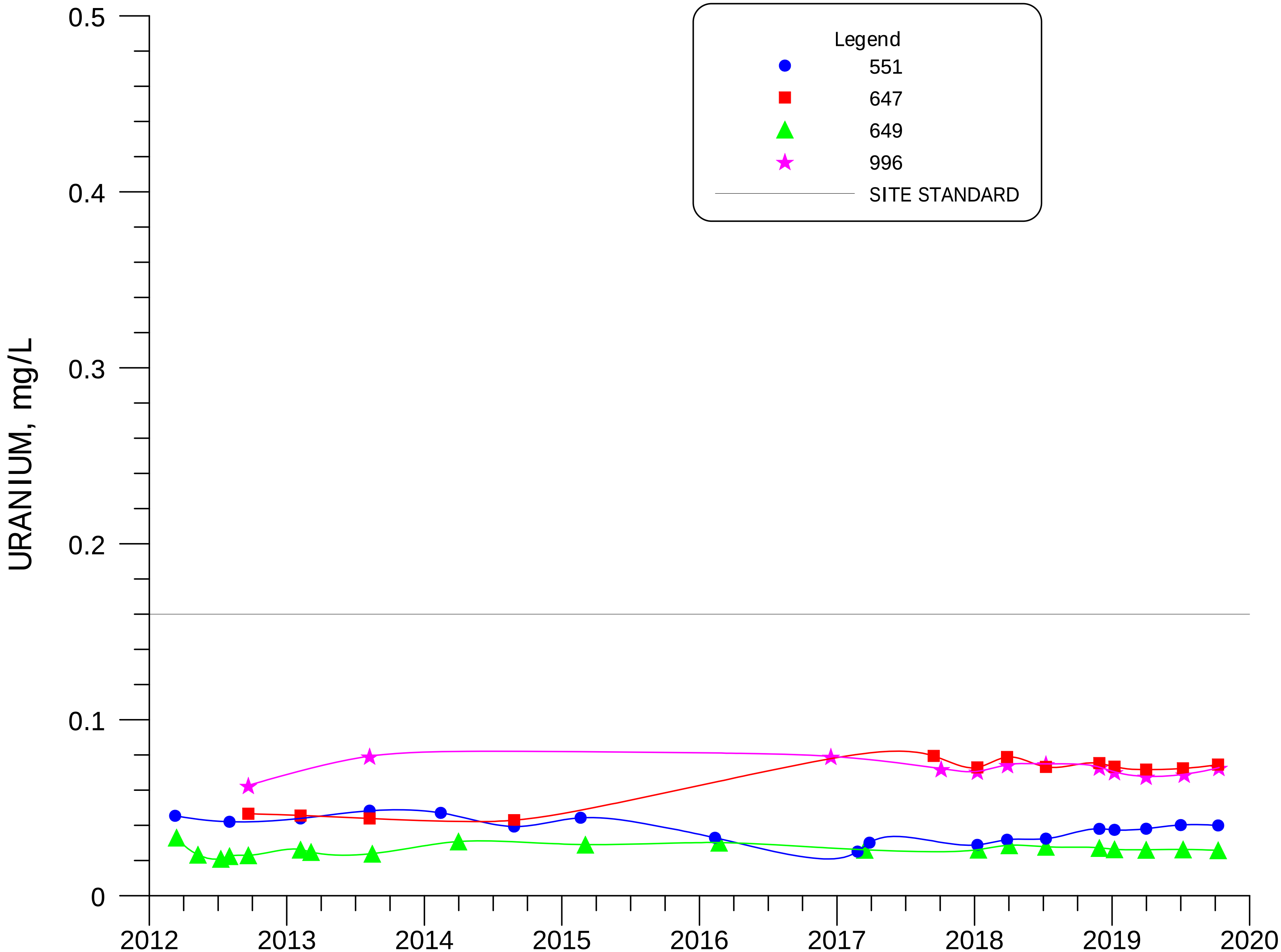

FIGURE 4.3-69. URANIUM CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

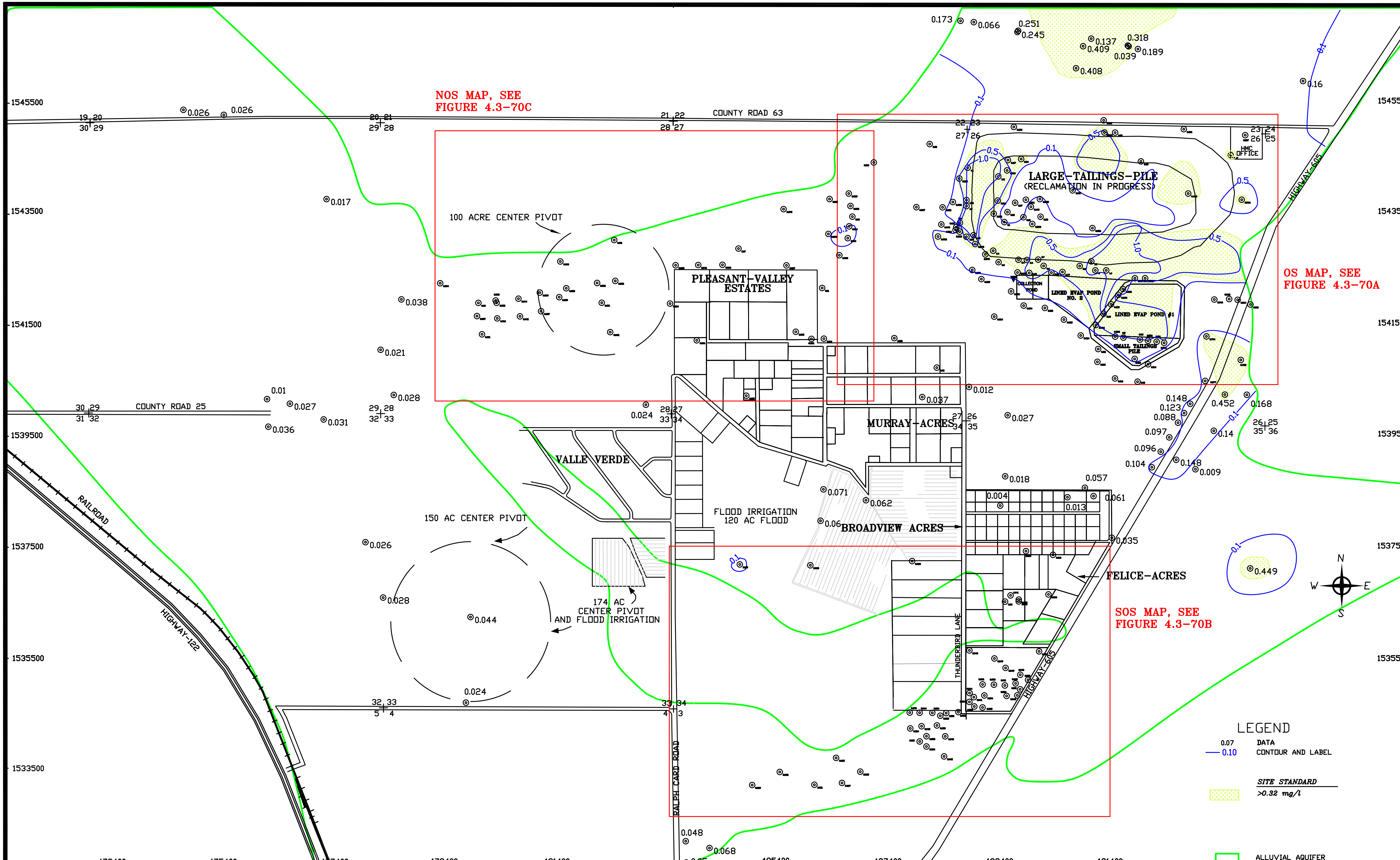

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FIGURE 4.3-70. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

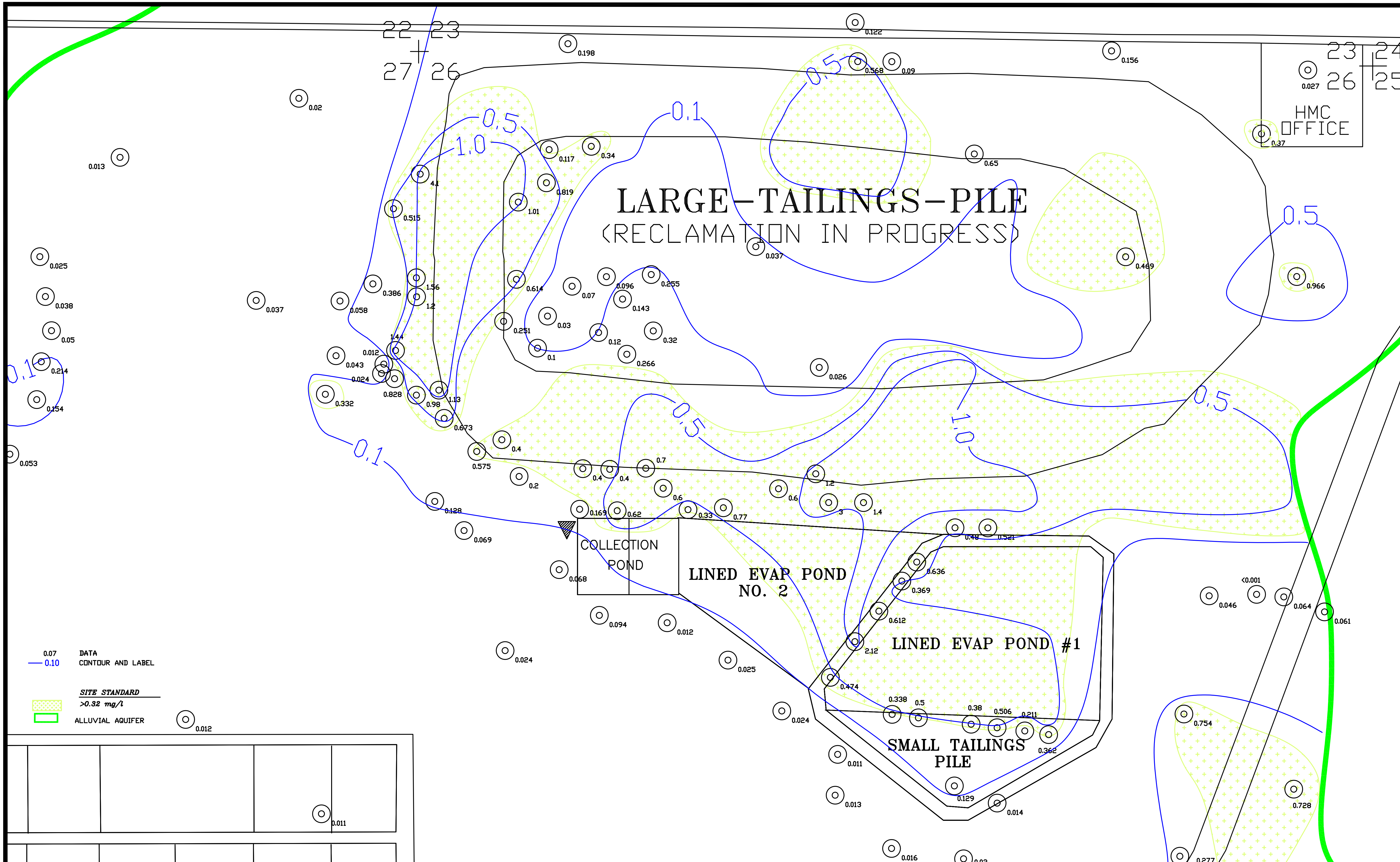

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FIGURE 4.3-70A. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

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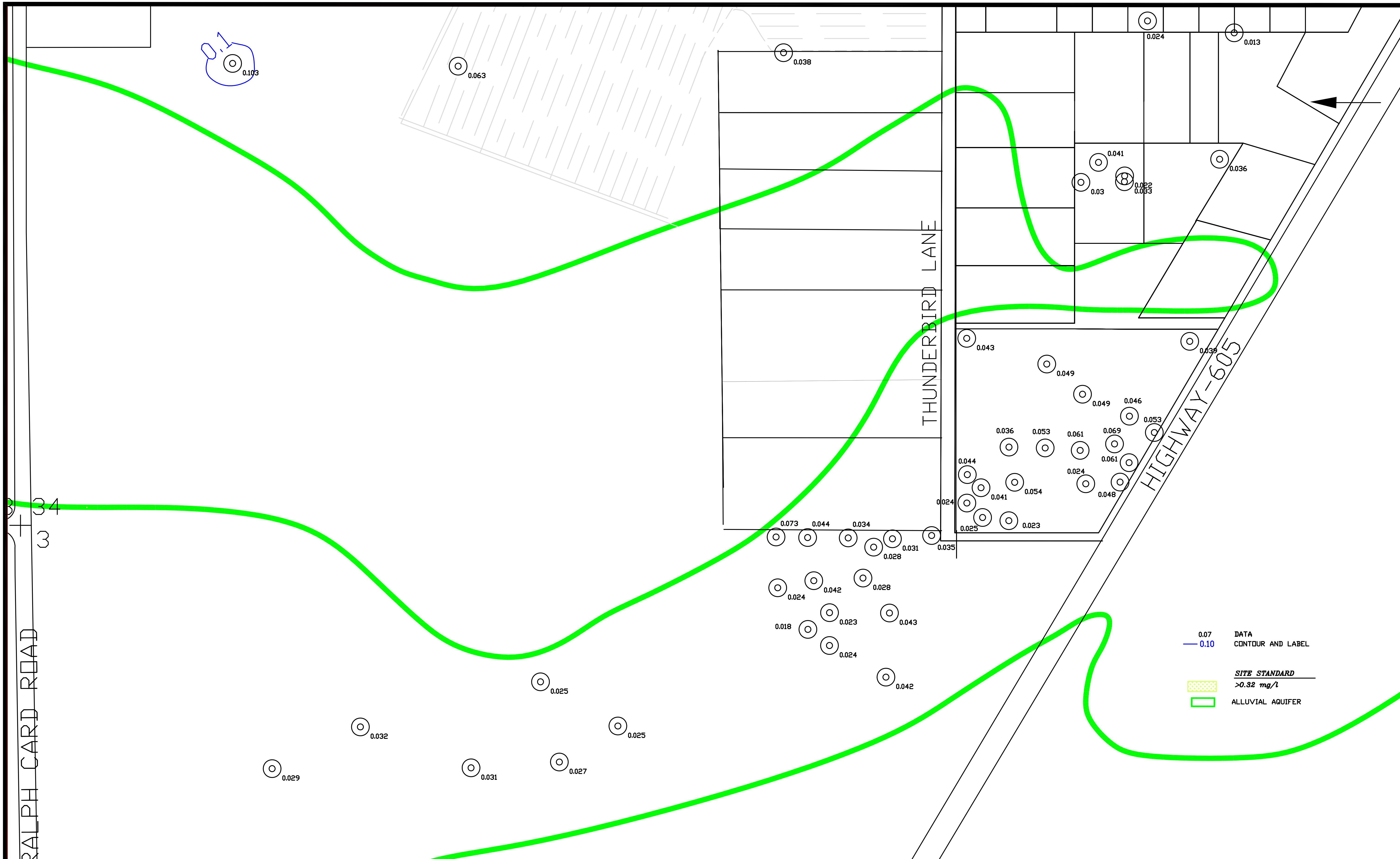

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FIGURE 4.3-70B. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

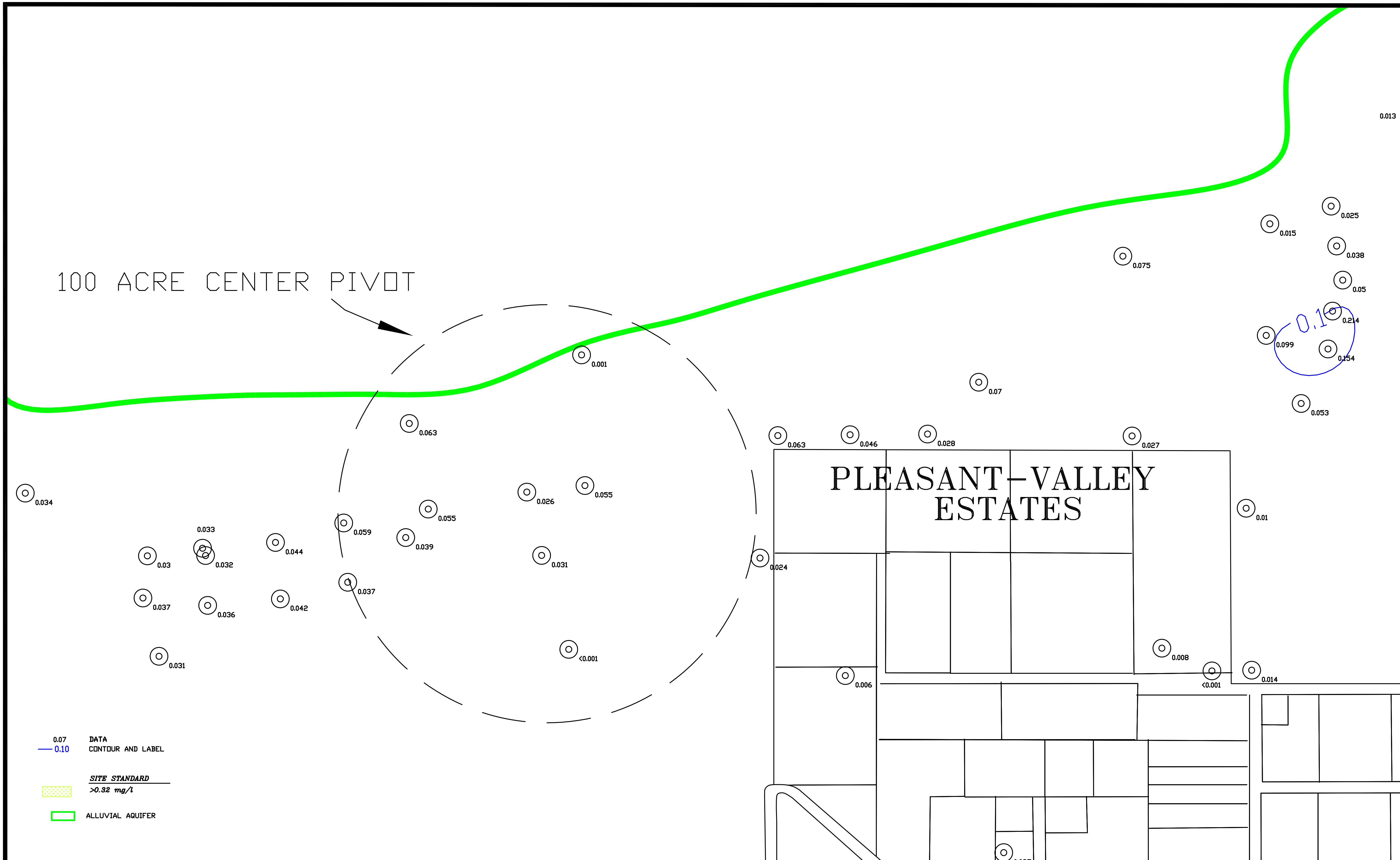

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FIGURE 4.3-70C. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

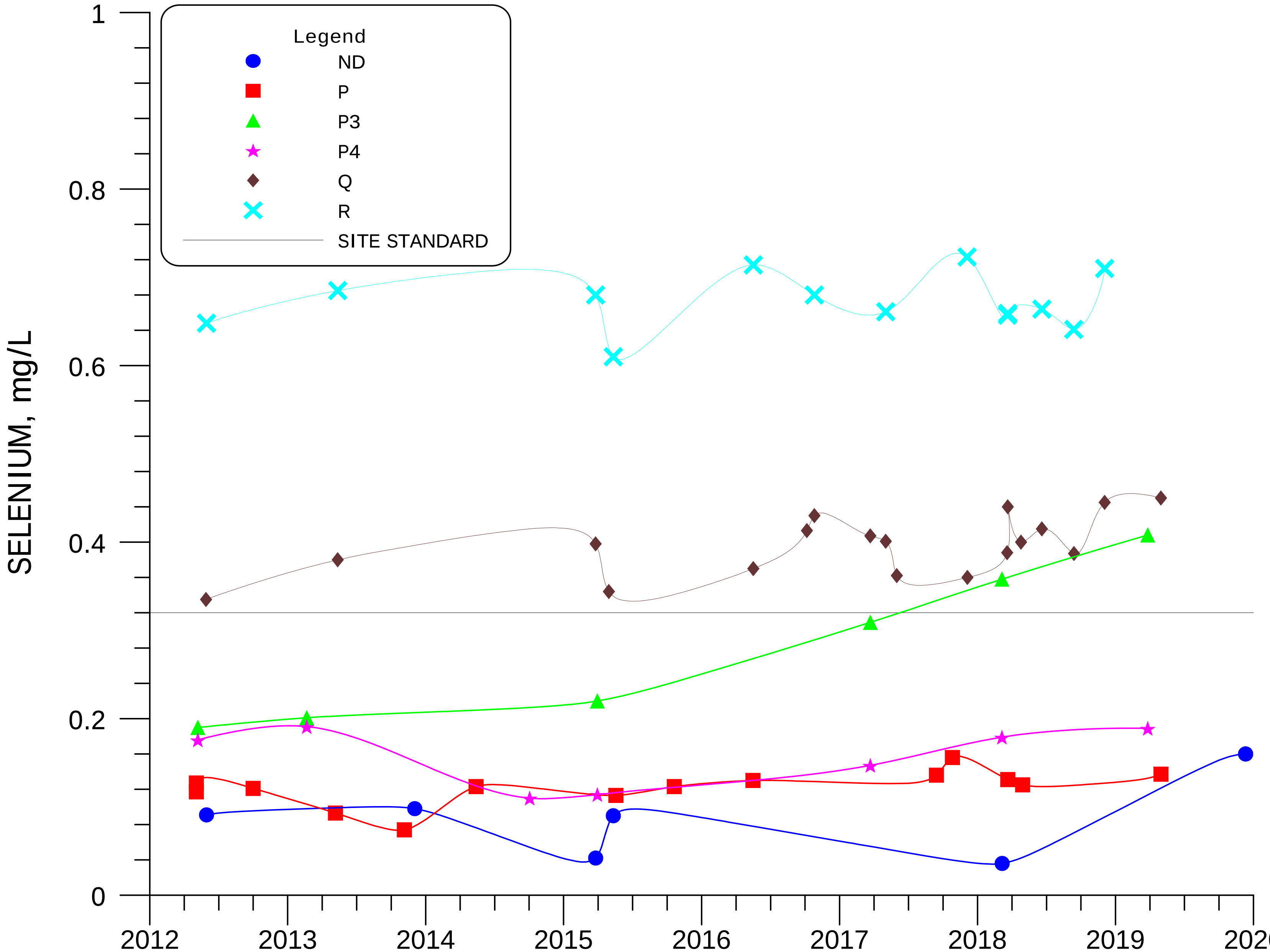

FIGURE 4.3-71. SELENIUM CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

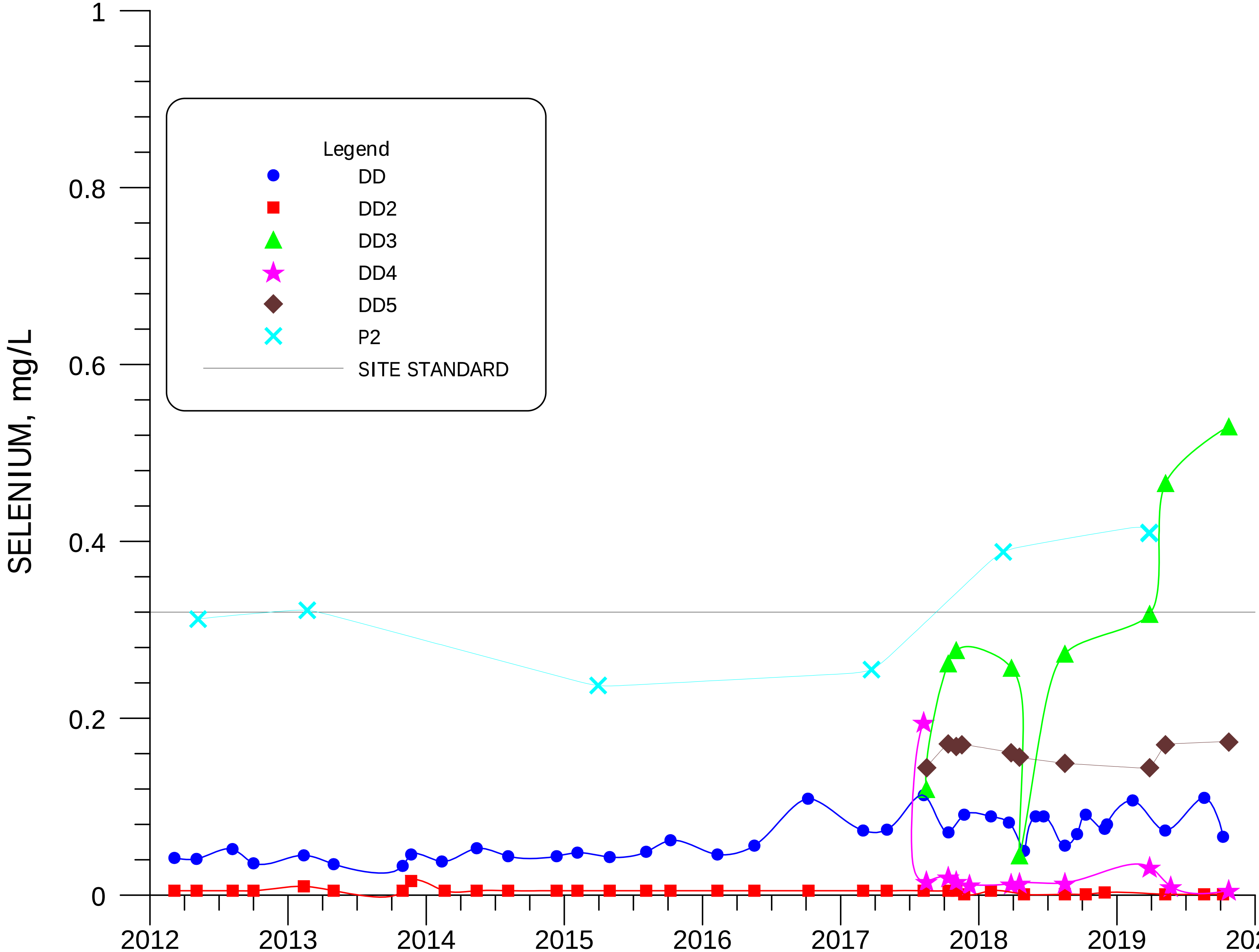

FIGURE 4.3-71A. SELENIUM CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

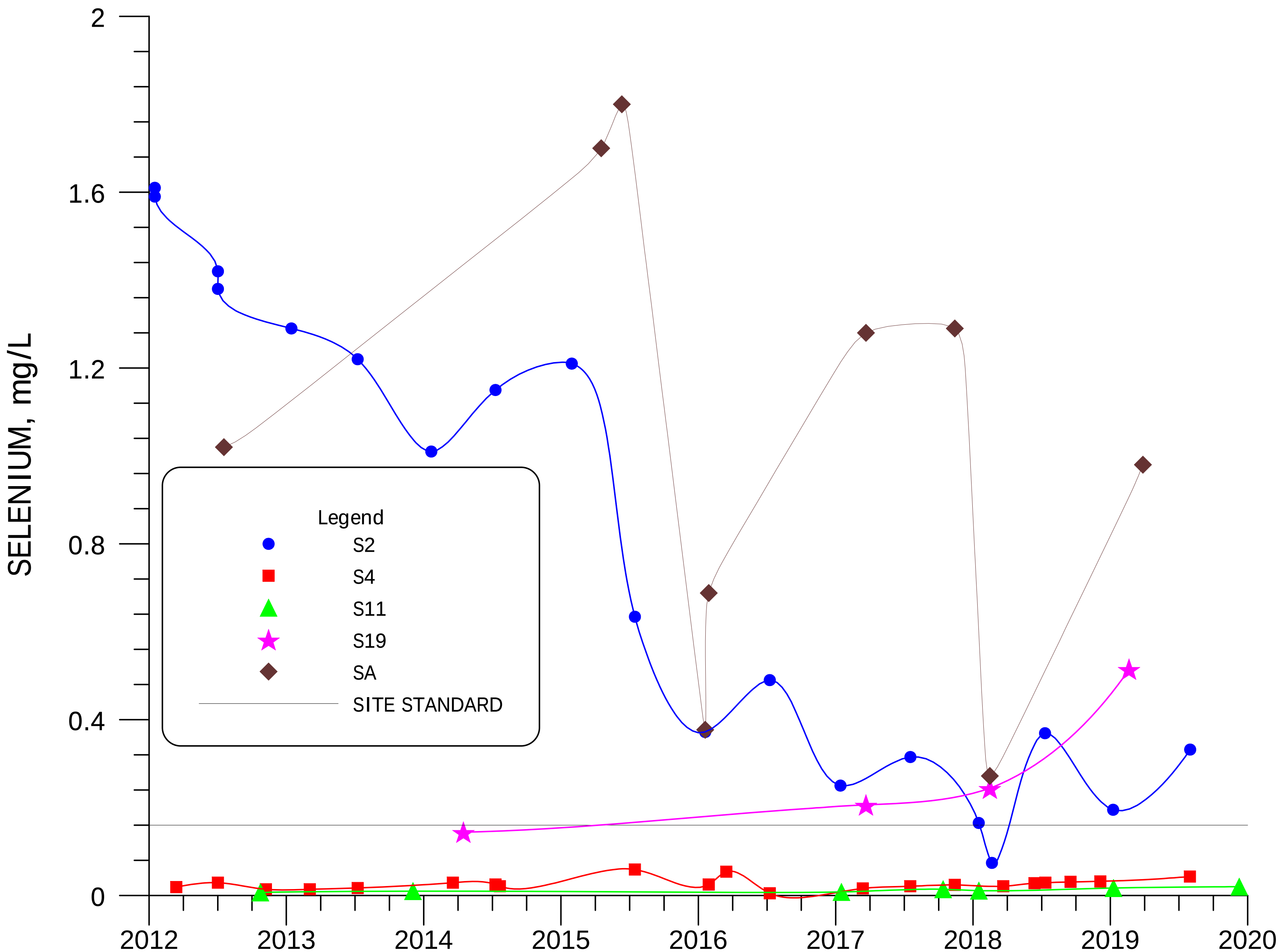

FIGURE 4.3-72. SELENIUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

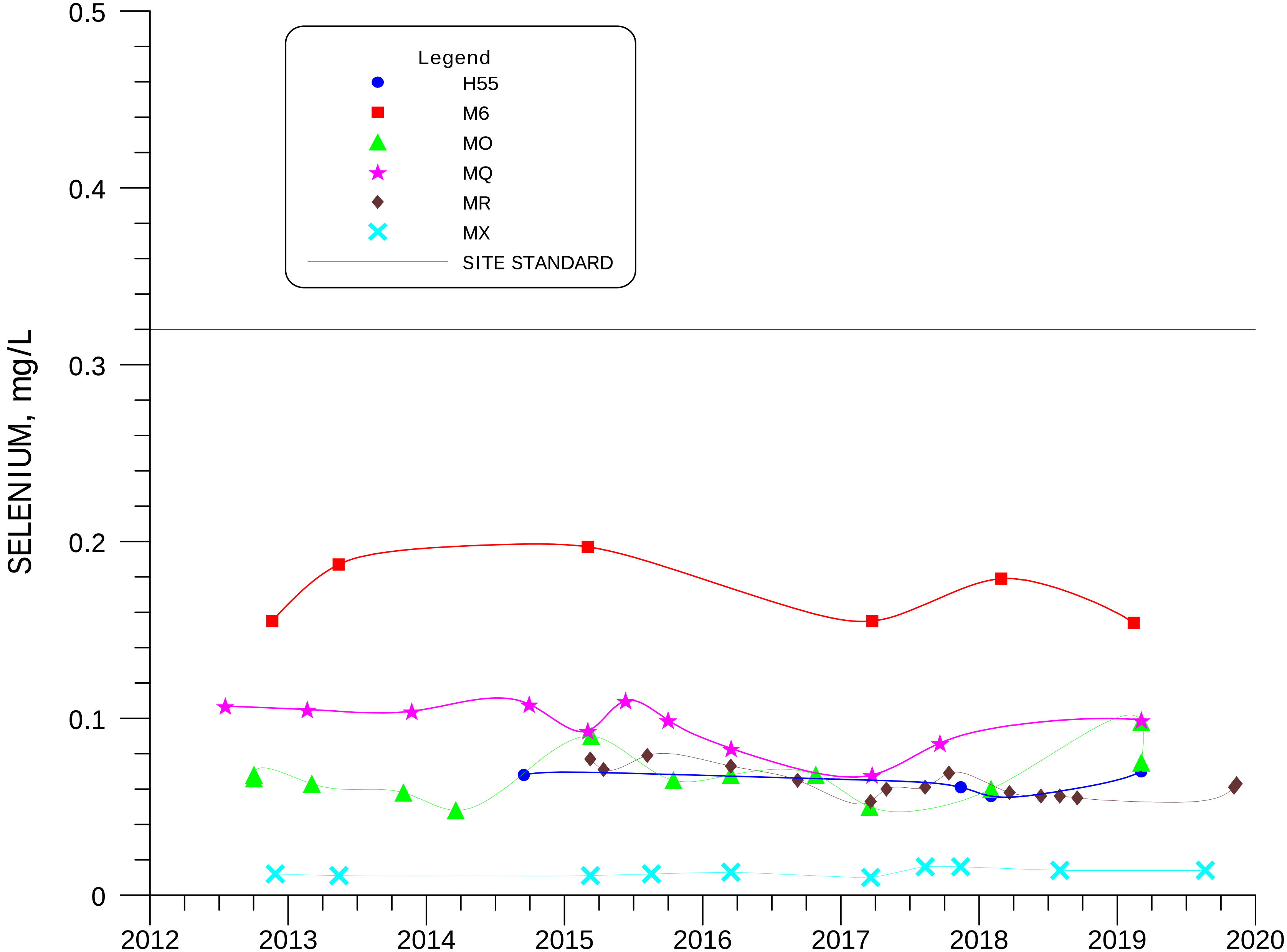

FIGURE 4.3-73. SELENIUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

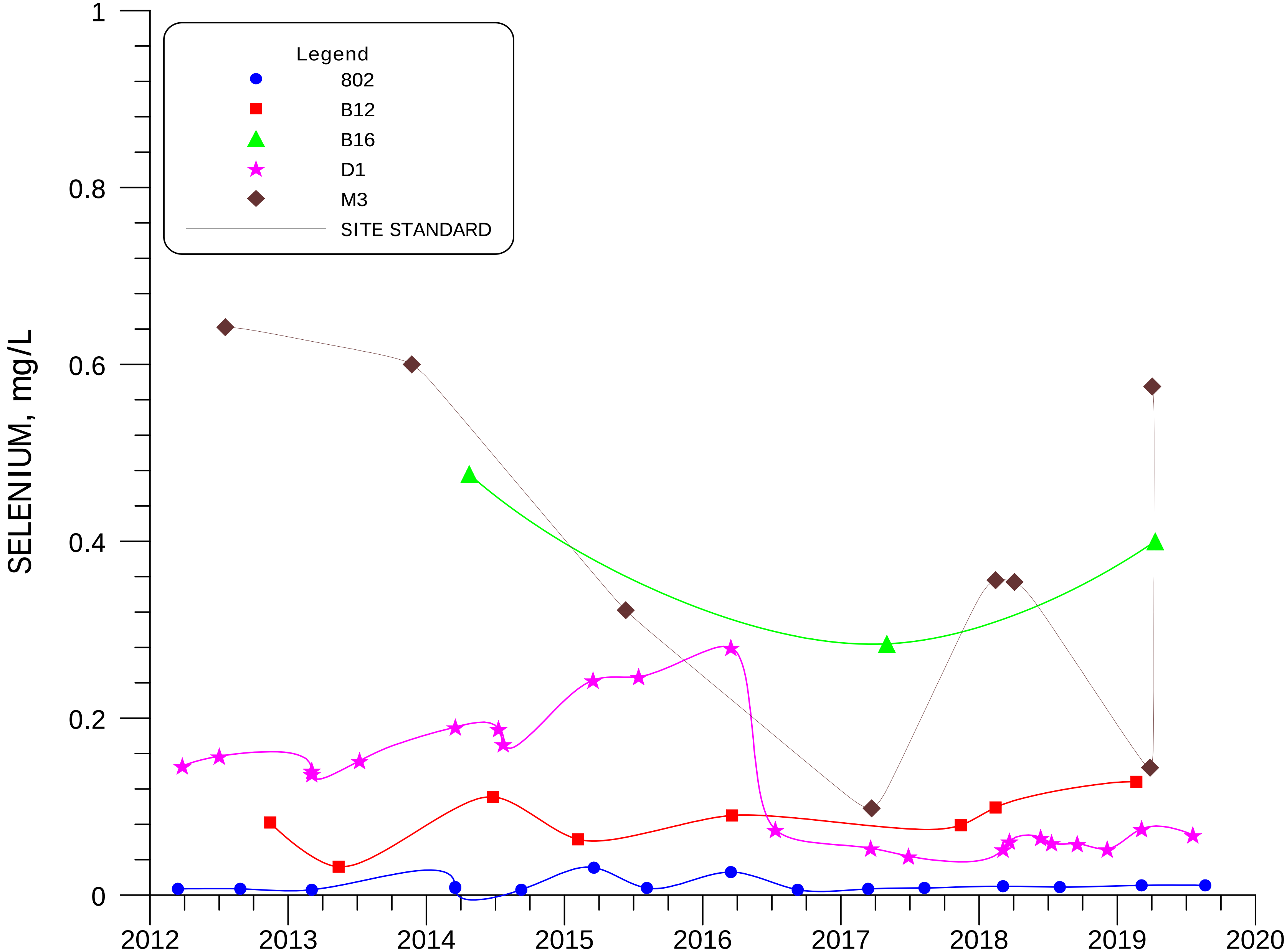

FIGURE 4.3-74. SELENIUM CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

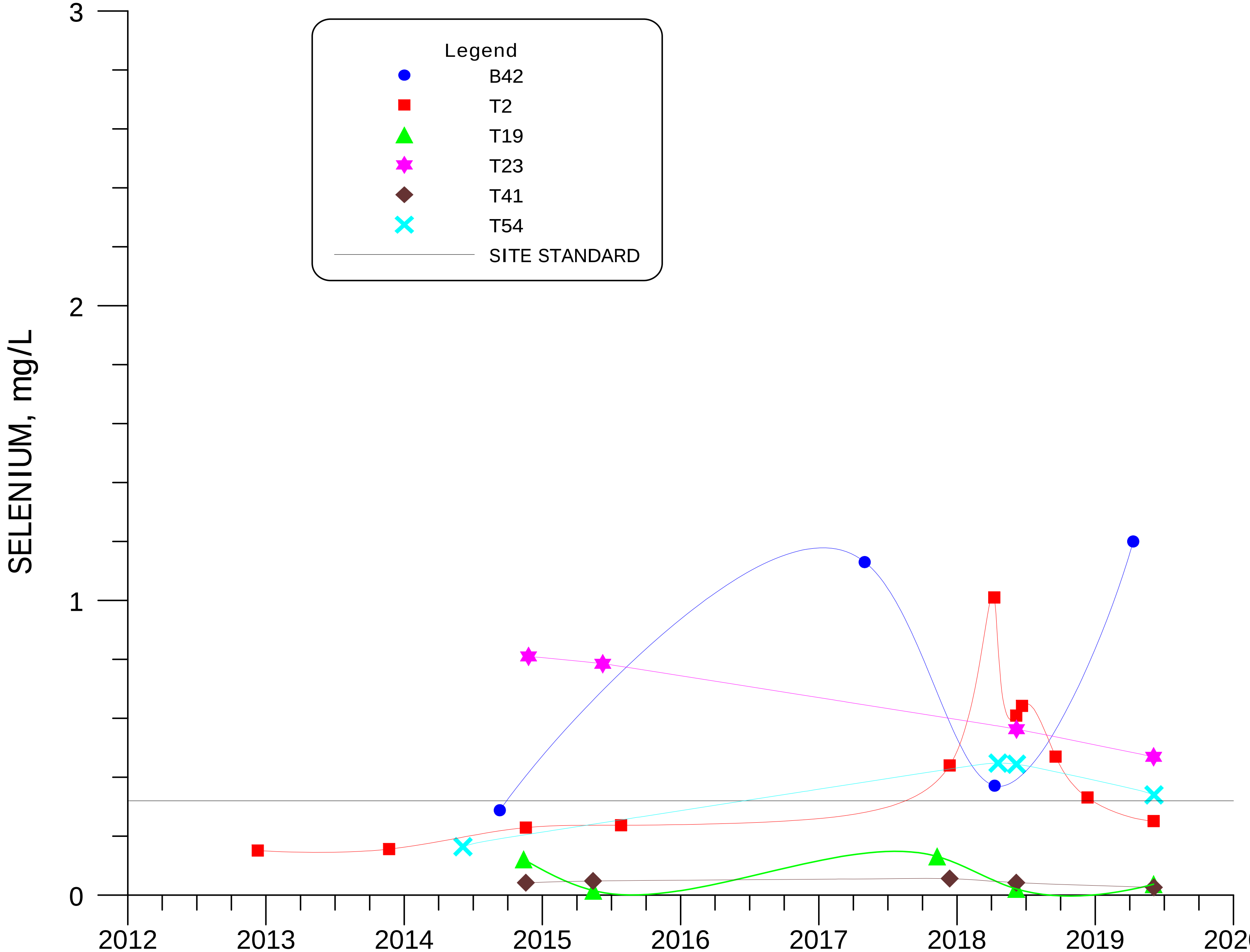

FIGURE 4.3-75. SELENIUM CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

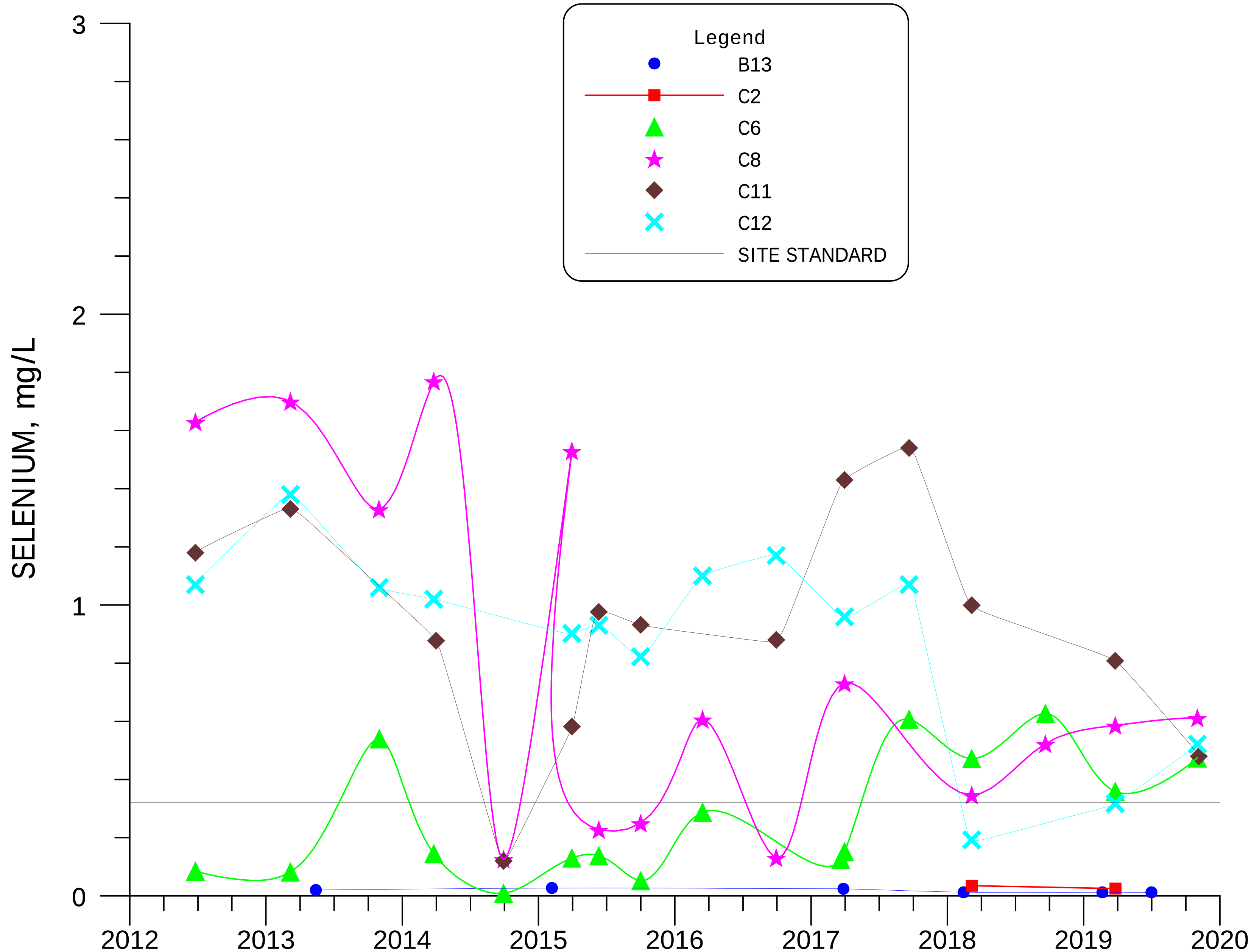

FIGURE 4.3-76. SELENIUM CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

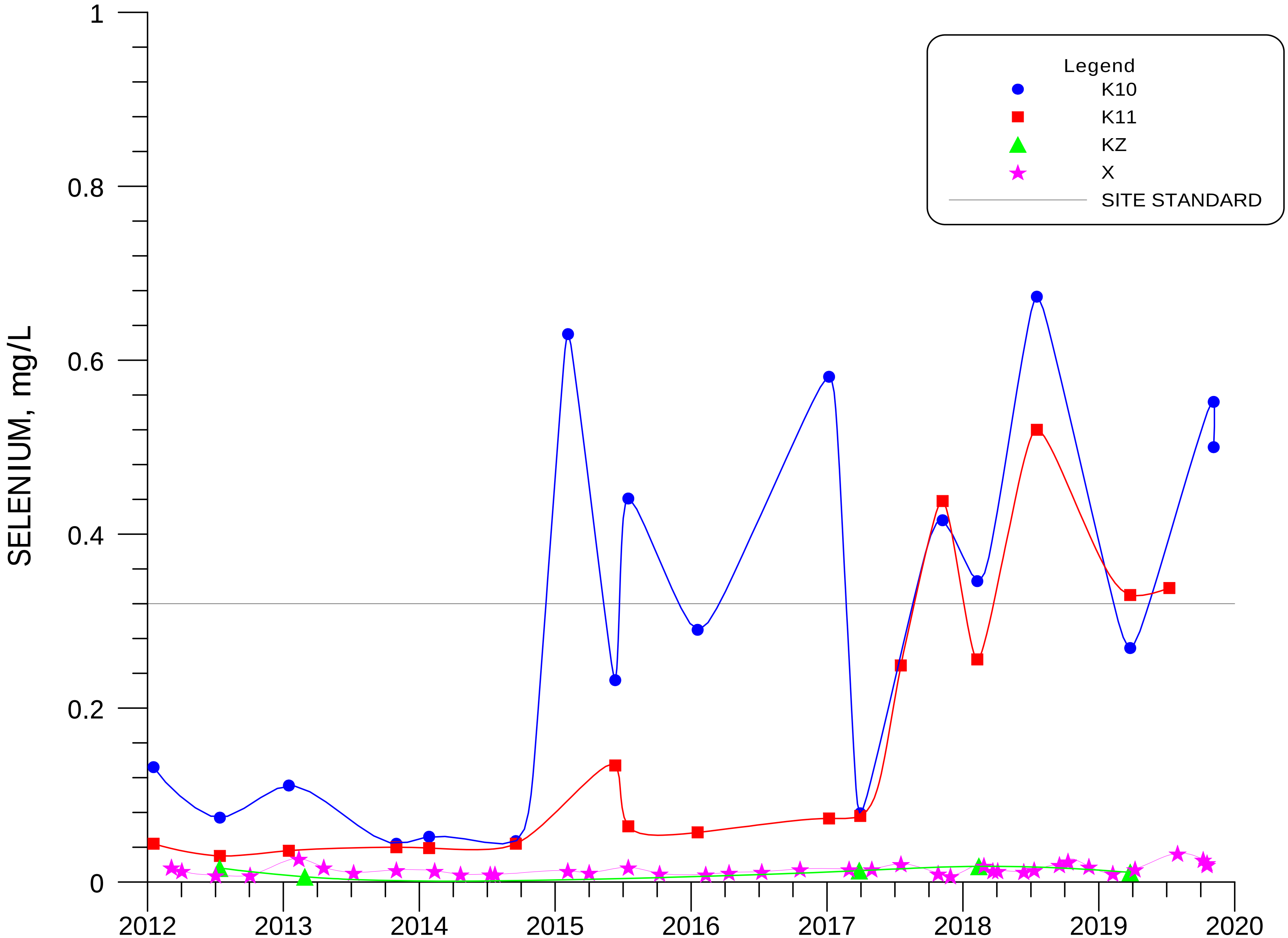

FIGURE 4.3-77. SELENIUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

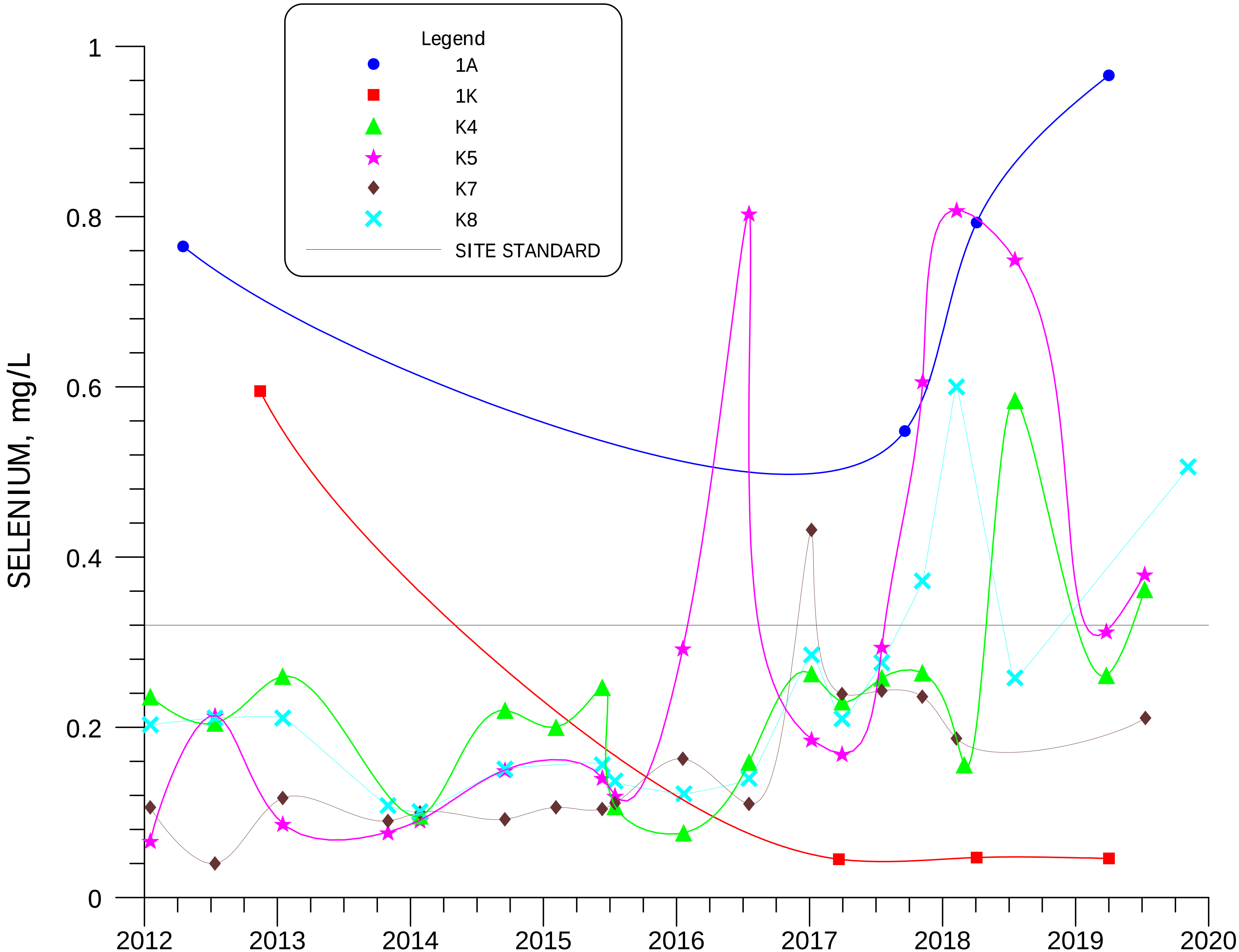

FIGURE 4.3-78. SELENIUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

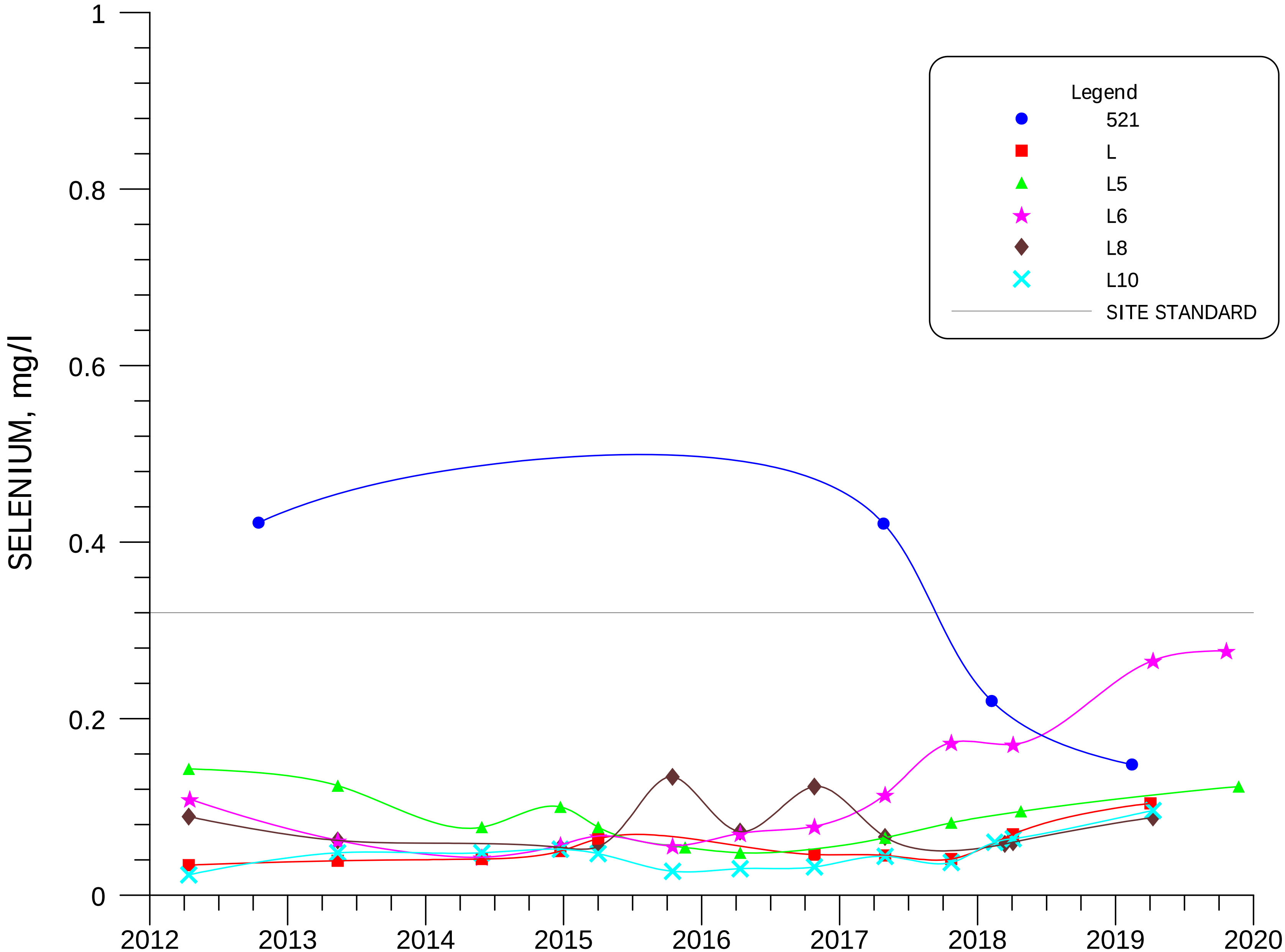

FIGURE 4.3-79. SELENIUM CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

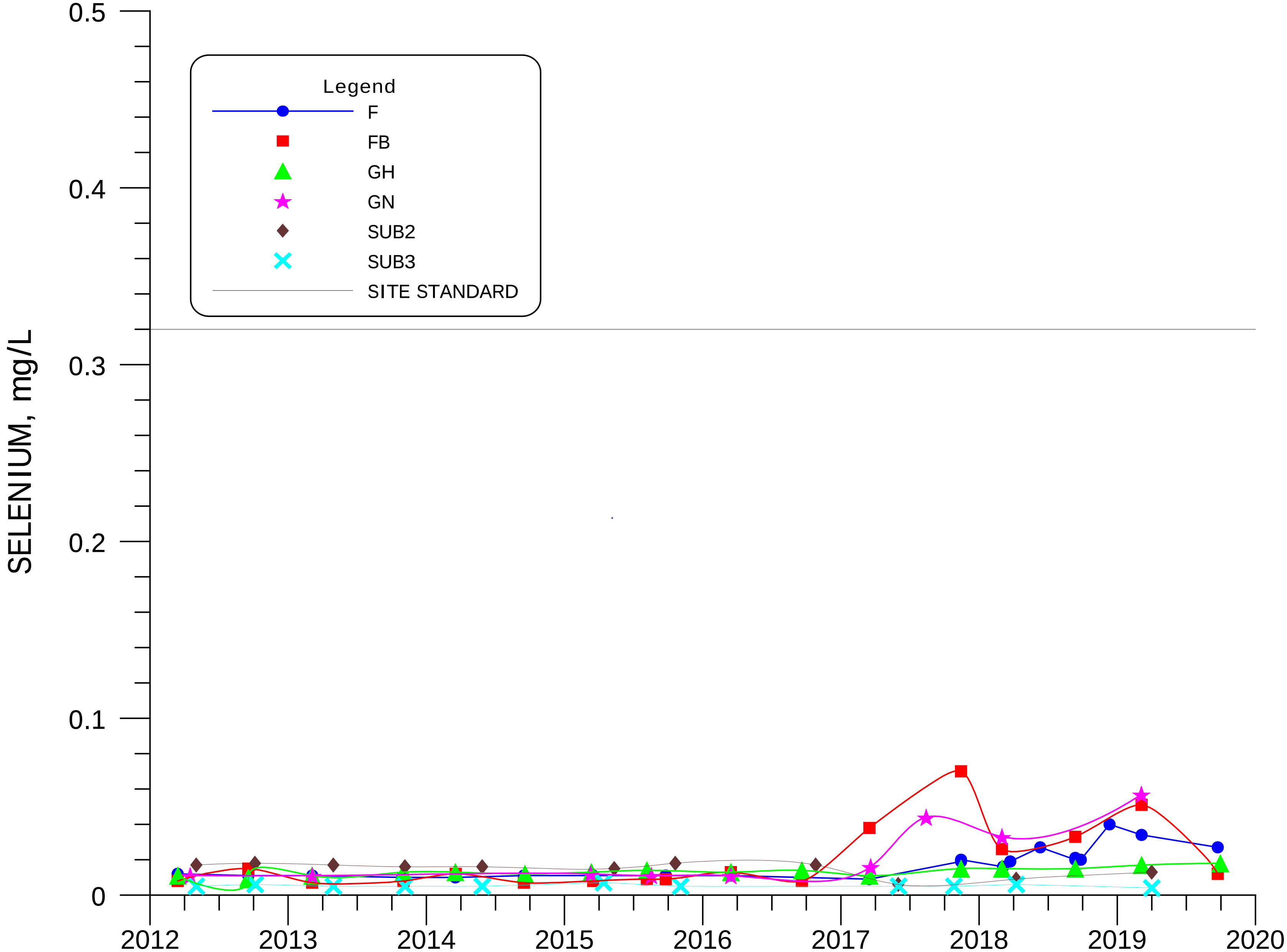

FIGURE 4.3-80. SELENIUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

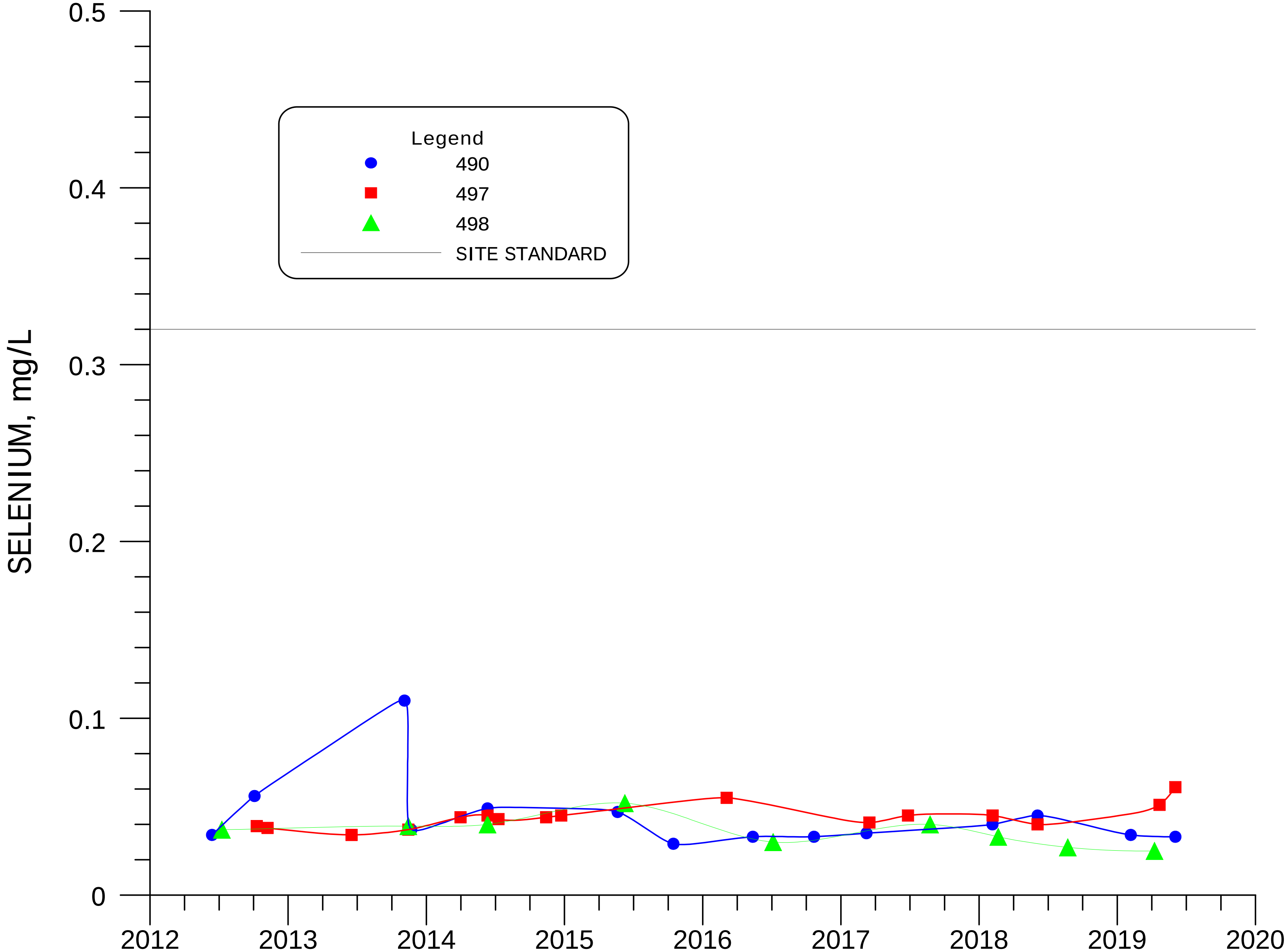

FIGURE 4.3-81. SELENIUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

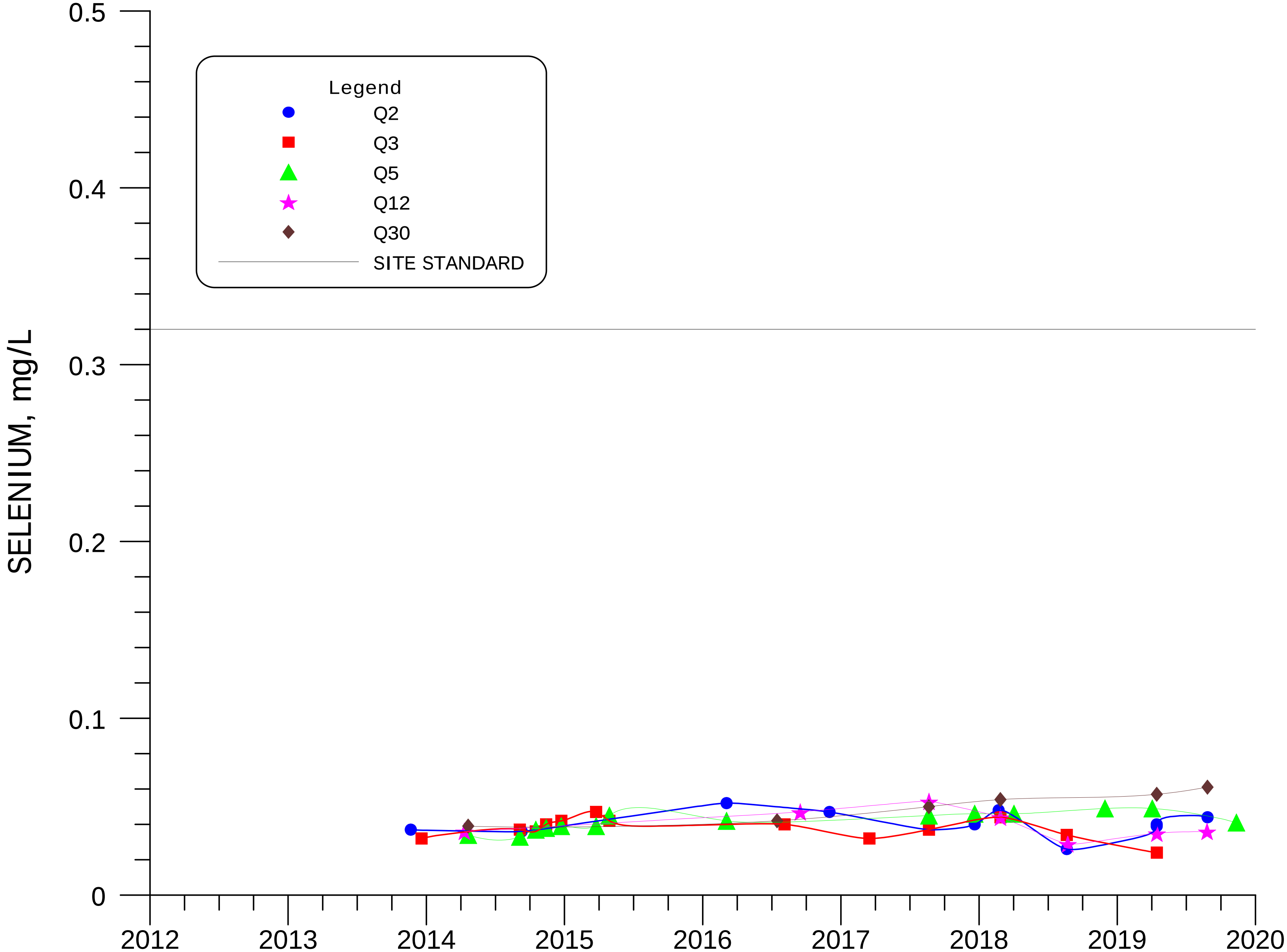

FIGURE 4.3-81A. SELENIUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q30.

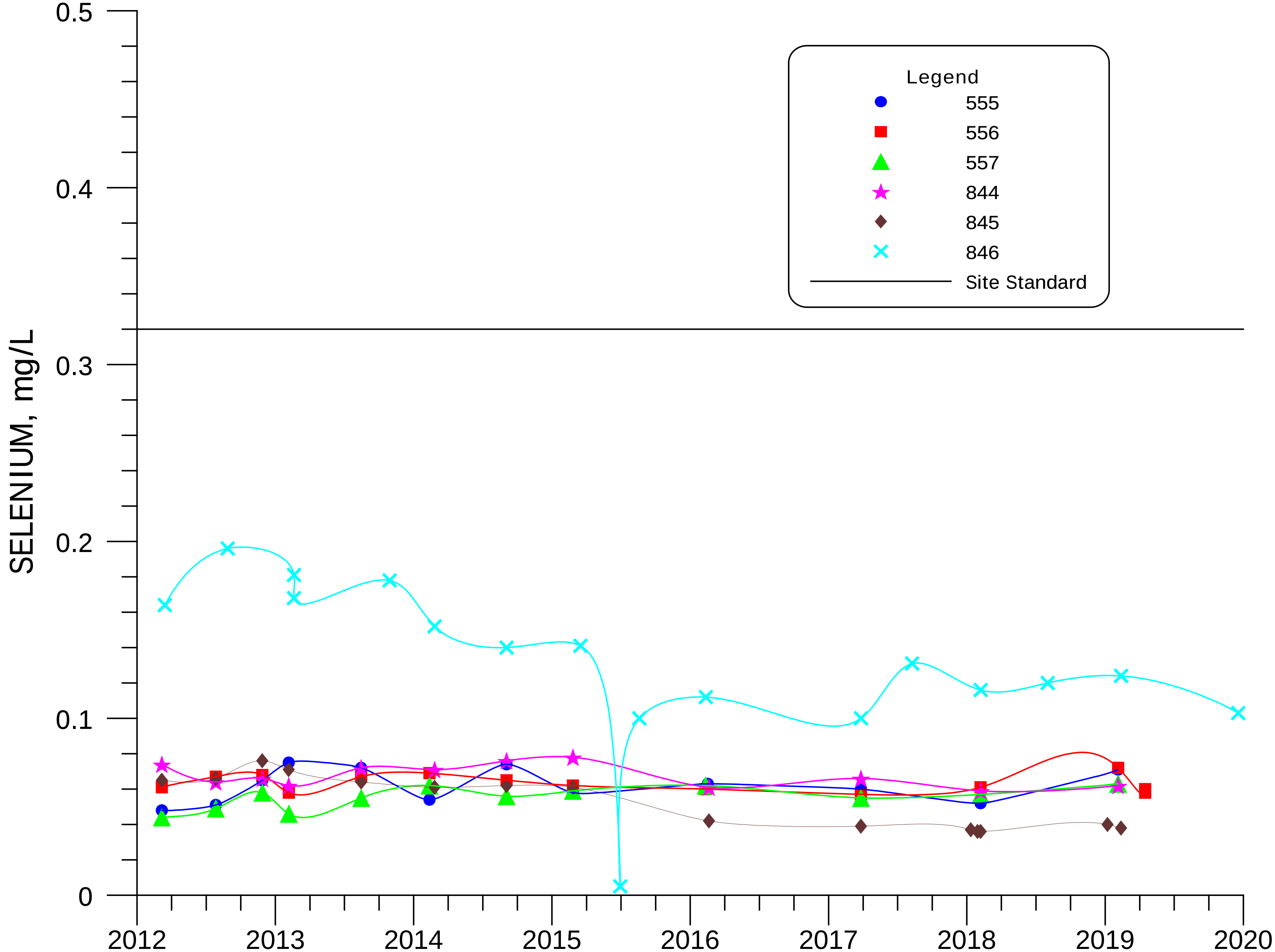

FIGURE 4.3-82. SELENIUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

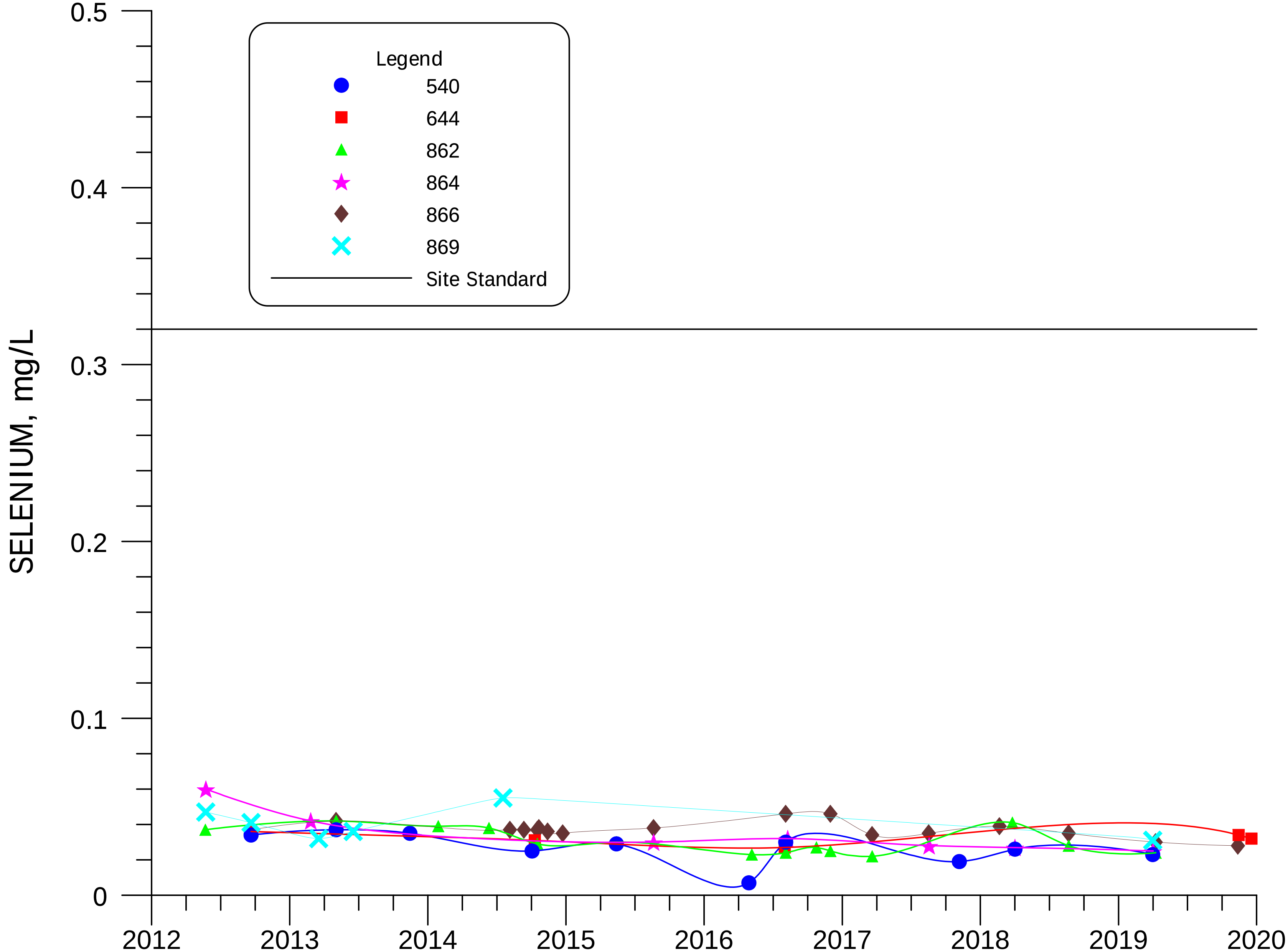

FIGURE 4.3-83. SELENIUM CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

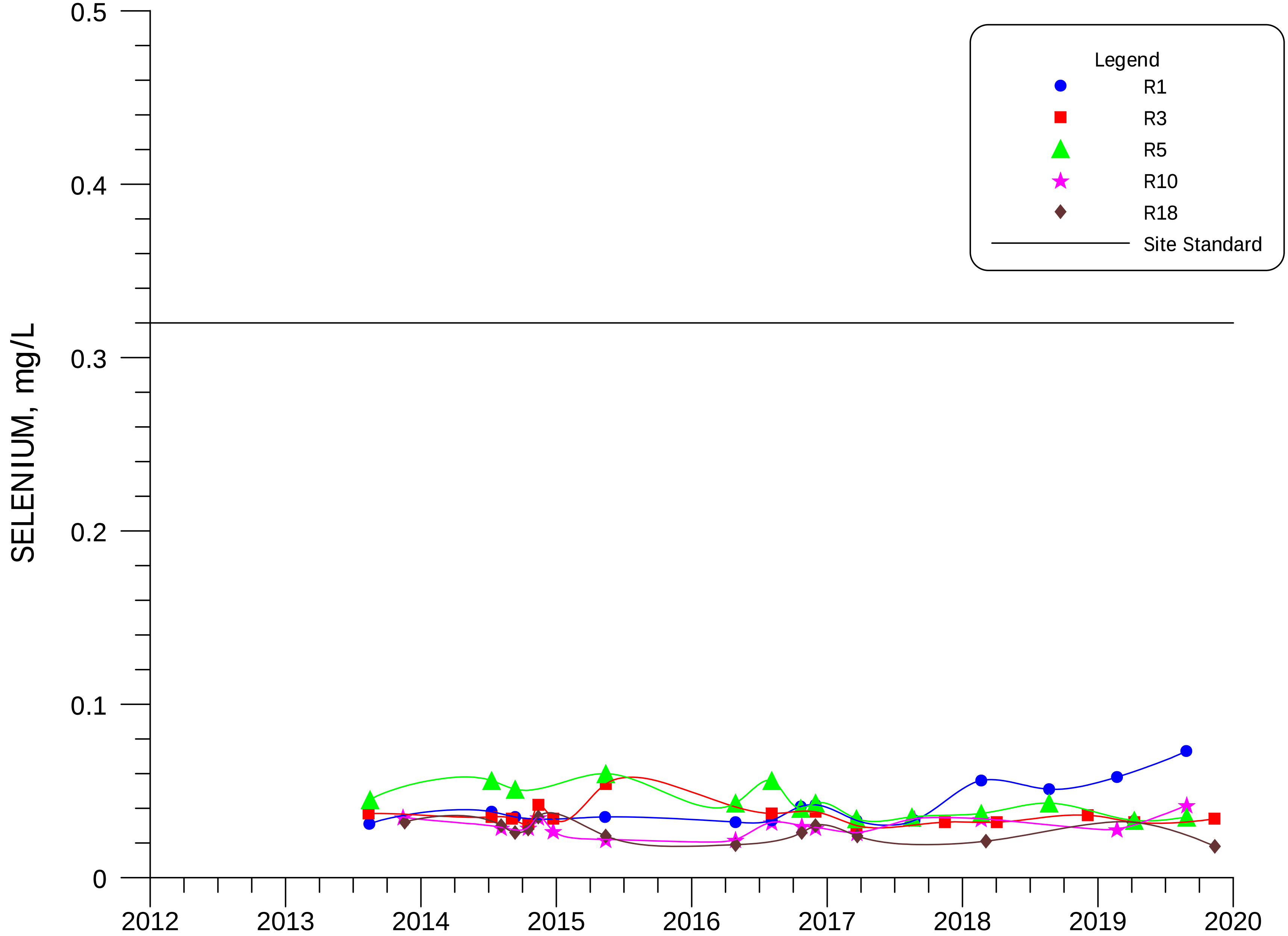

FIGURE 4.3-83A. SELENIUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

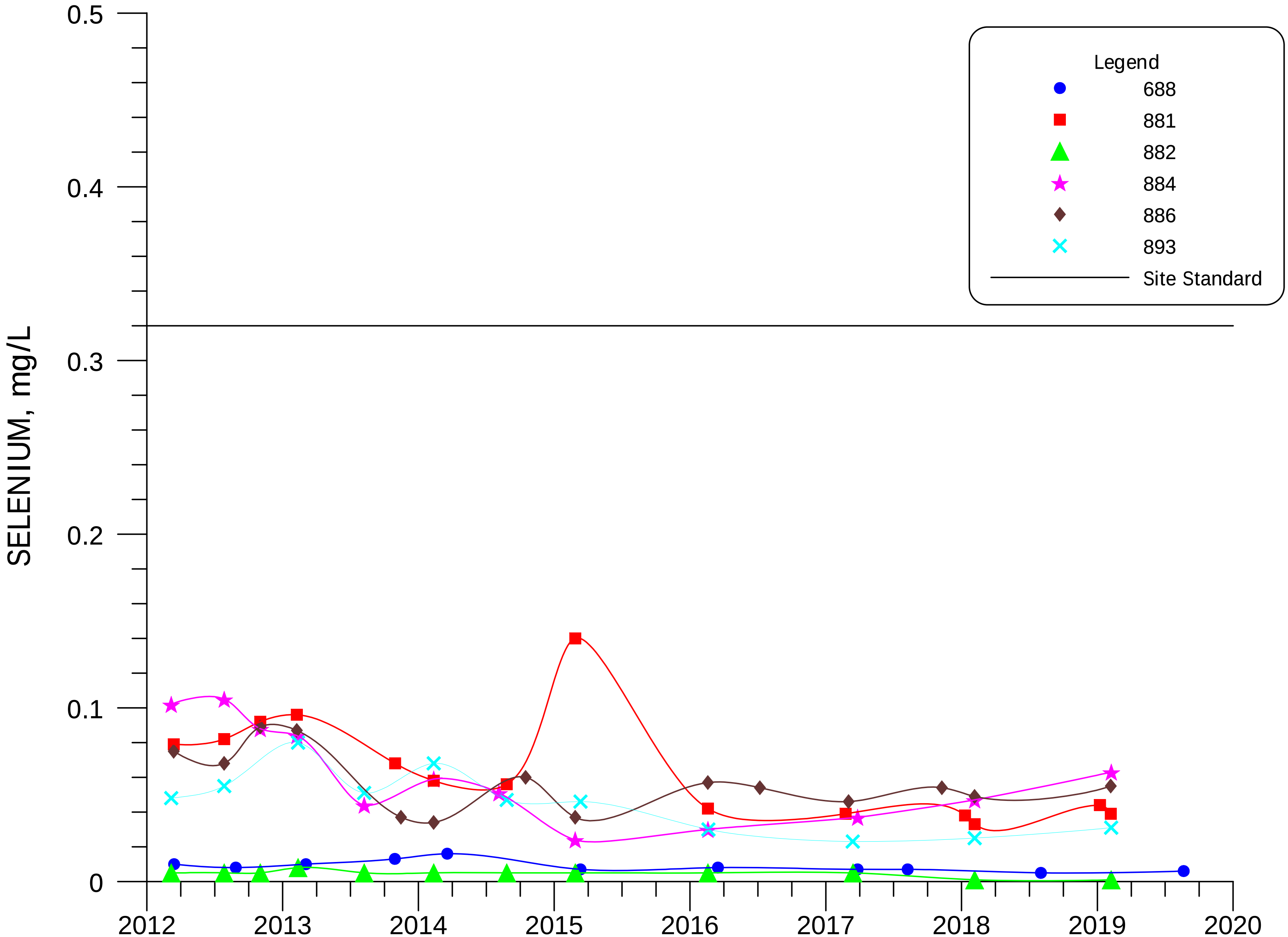

FIGURE 4.3-84. SELENIUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886, AND 893.

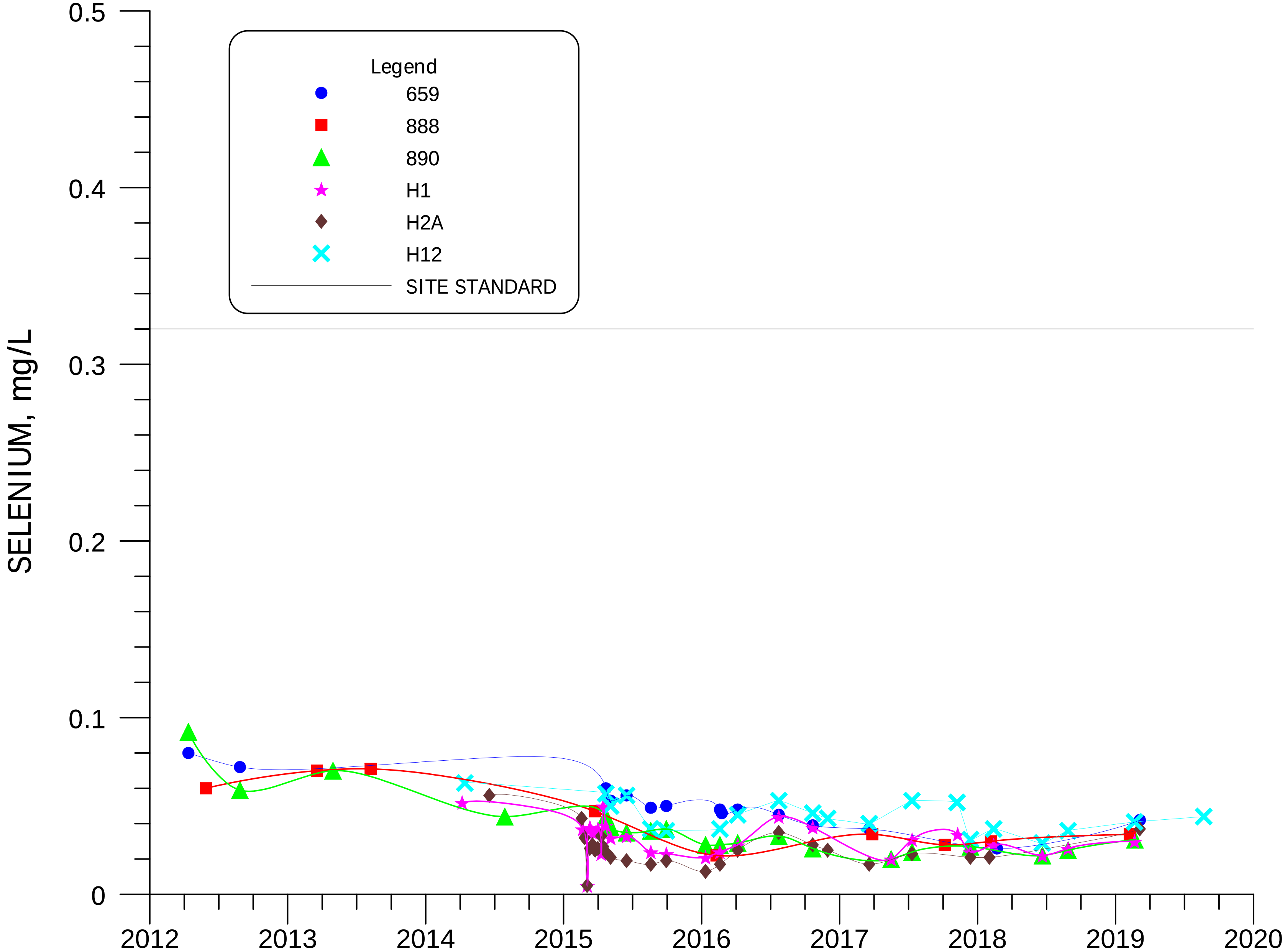

FIGURE 4.3-84A. SELENIUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

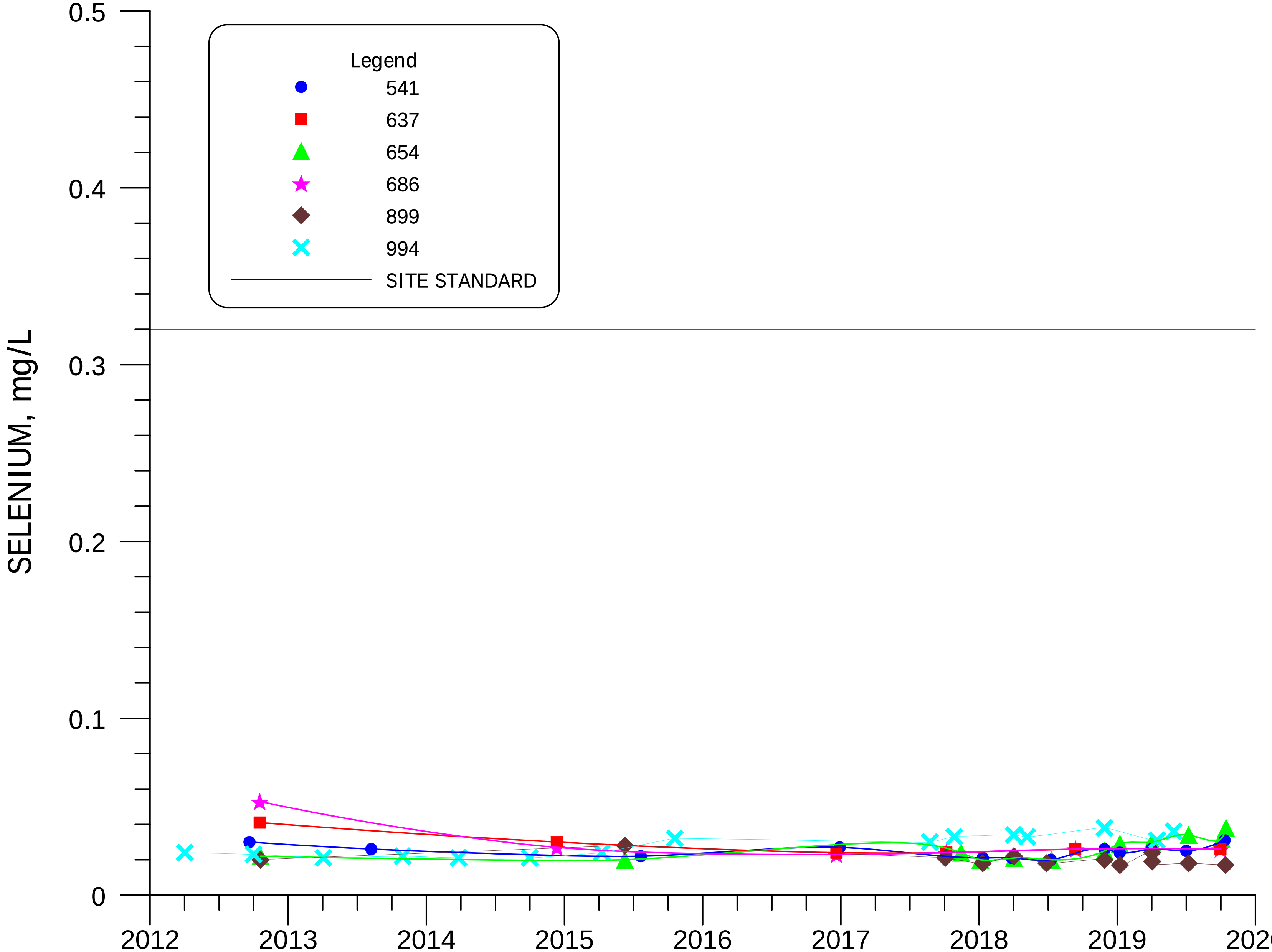

FIGURE 4.3-85. SELENIUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

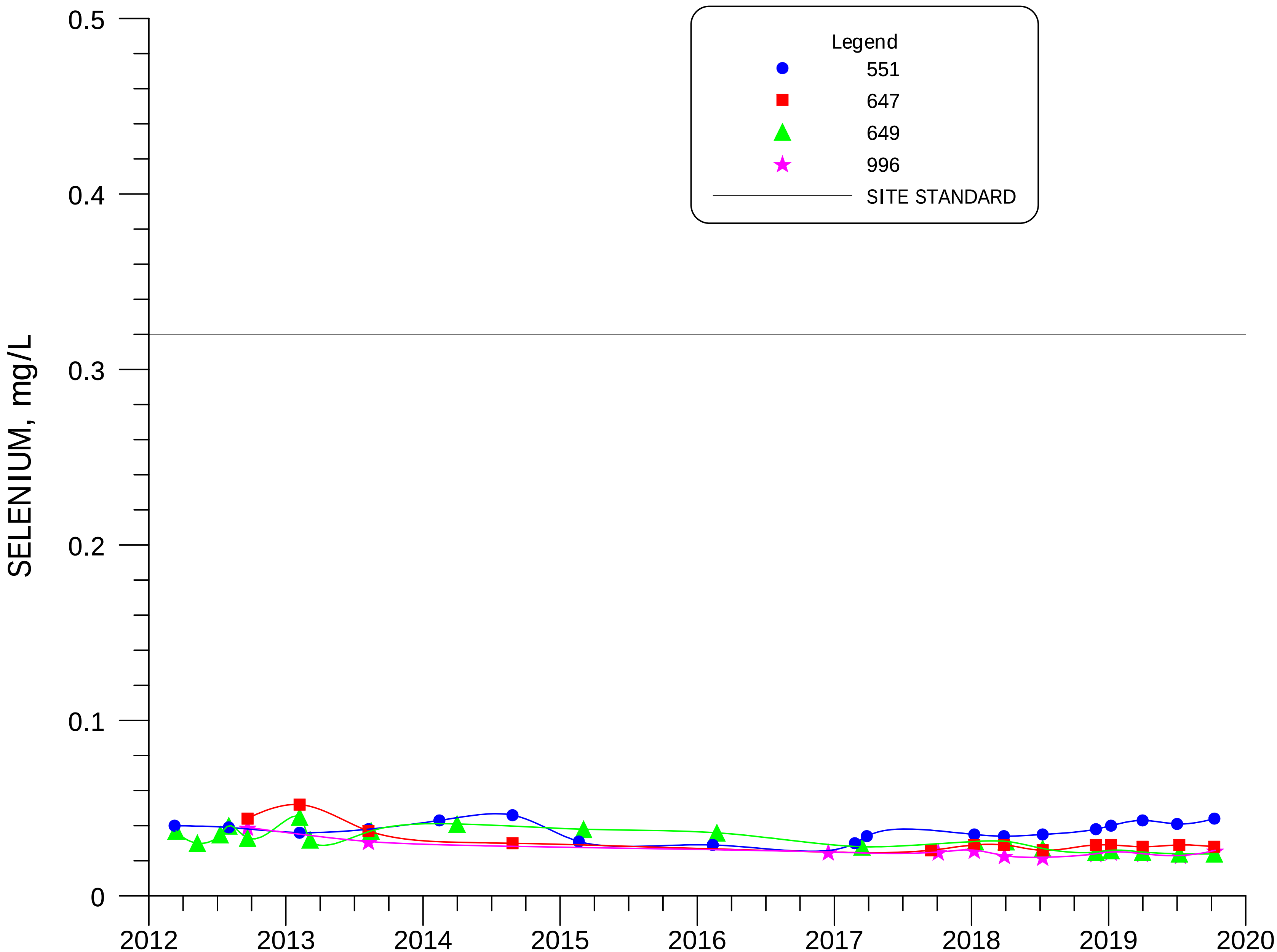

FIGURE 4.3-86. SELENIUM CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

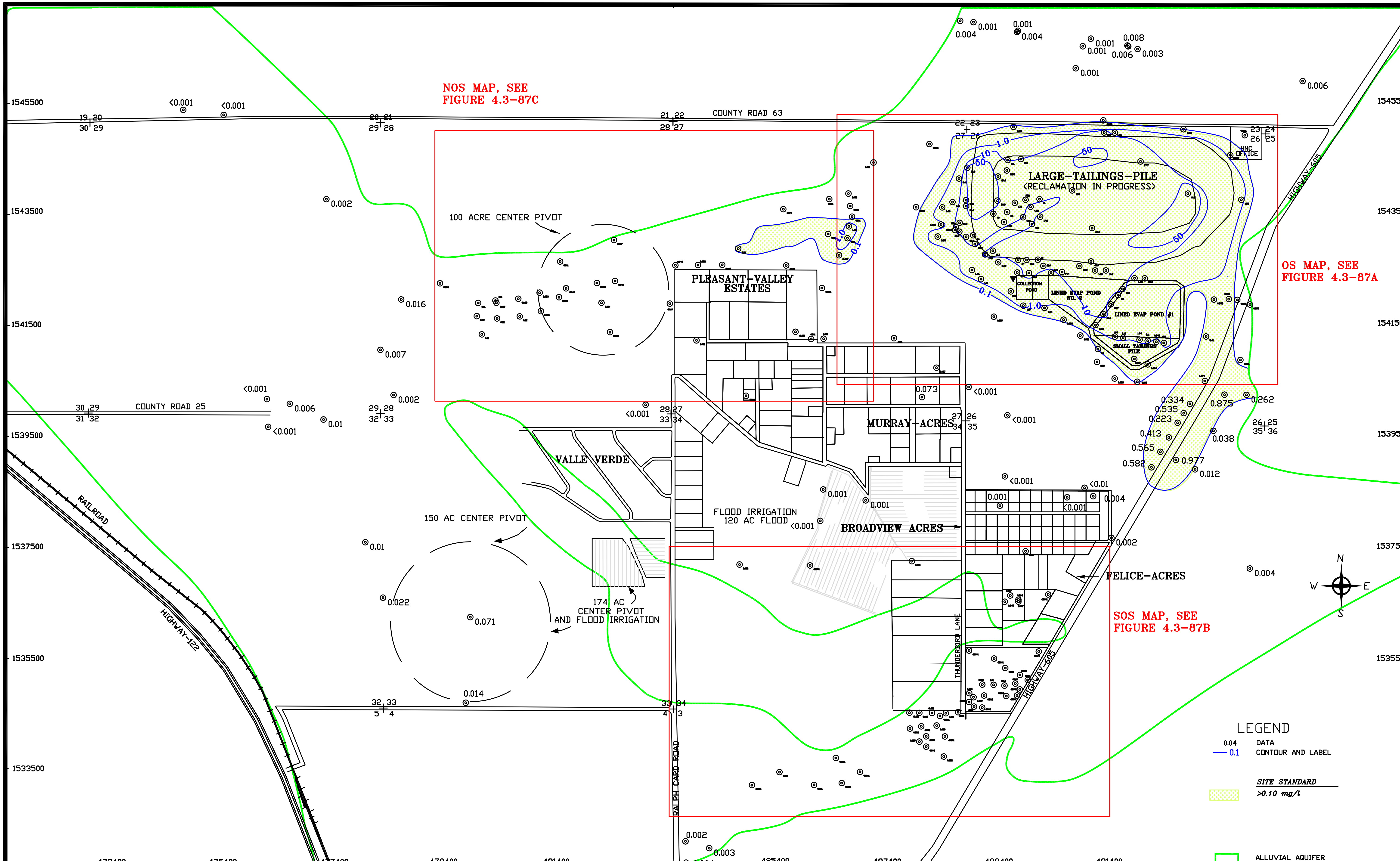

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FIGURE 4.3-87. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

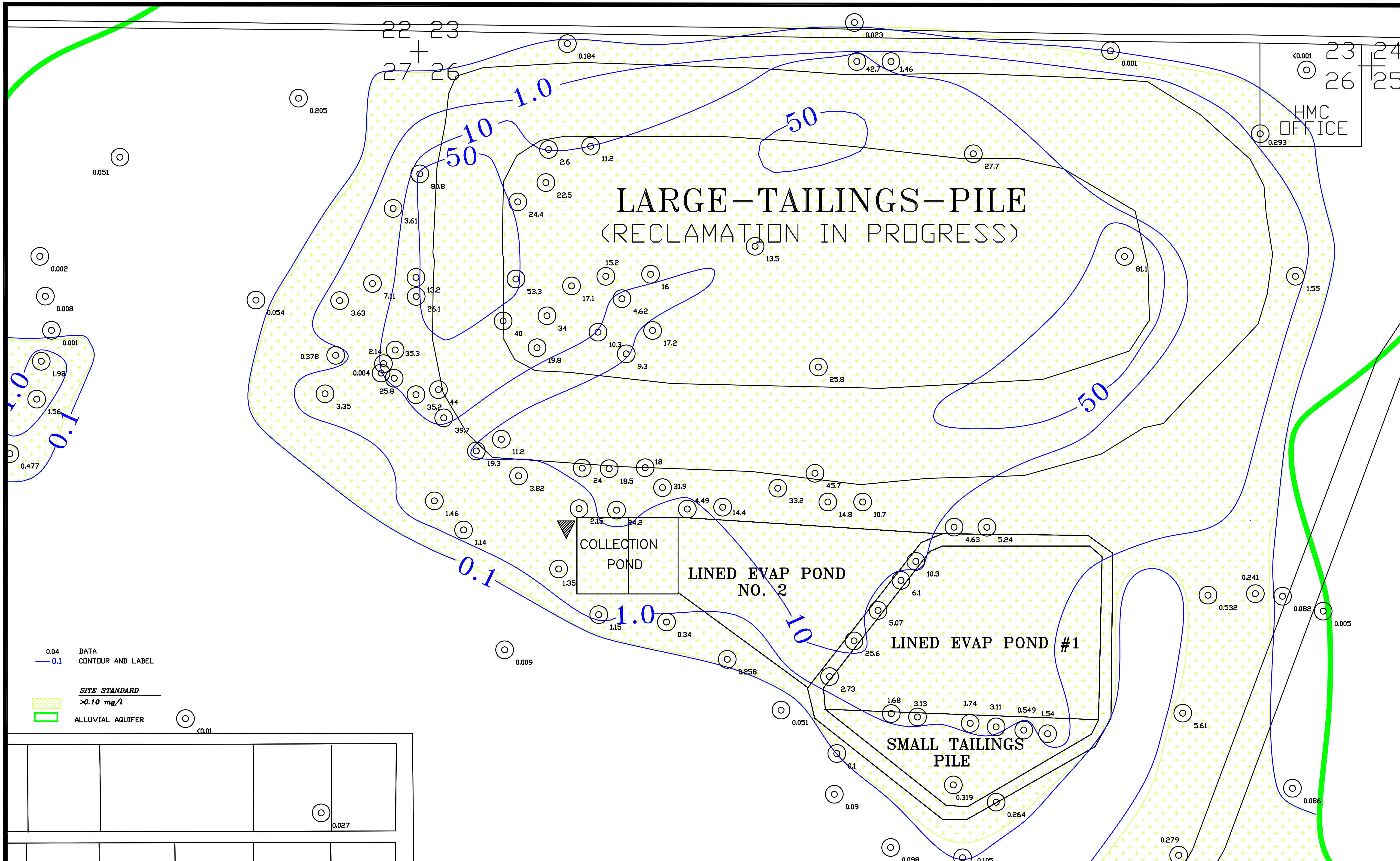

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FIGURE 4.3-87A. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

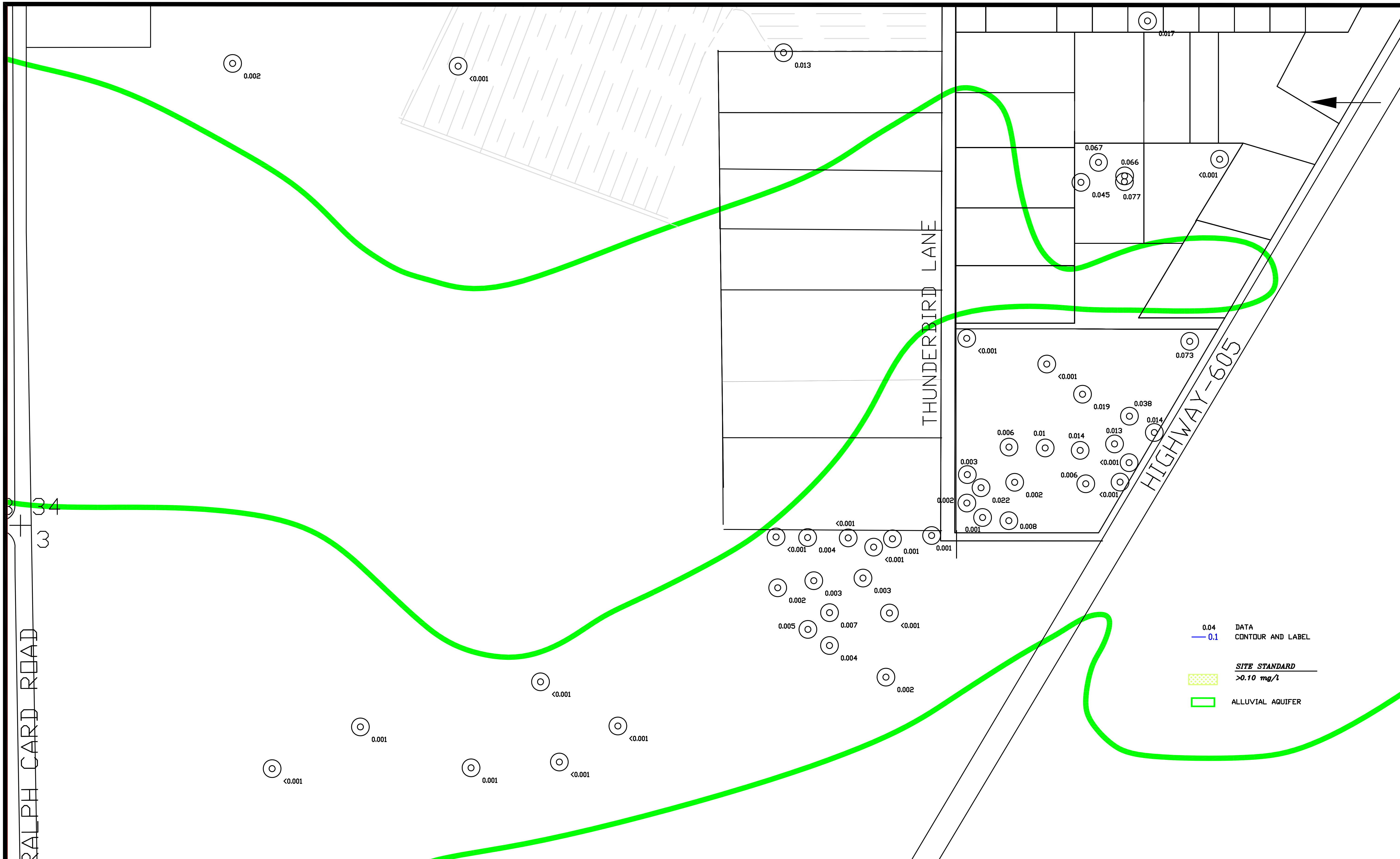

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FIGURE 4.3-87B. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

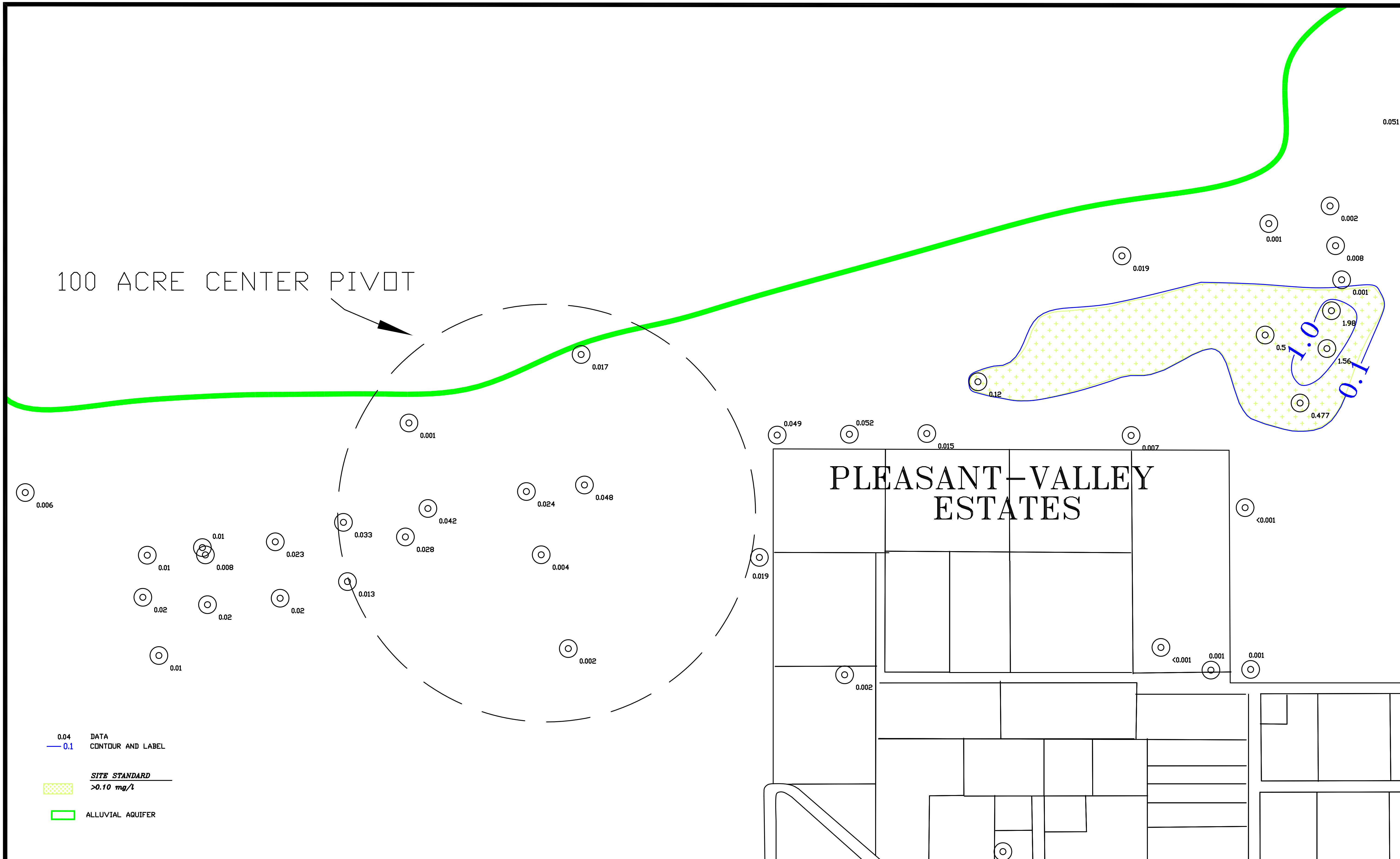

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FIGURE 4.3-87C. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

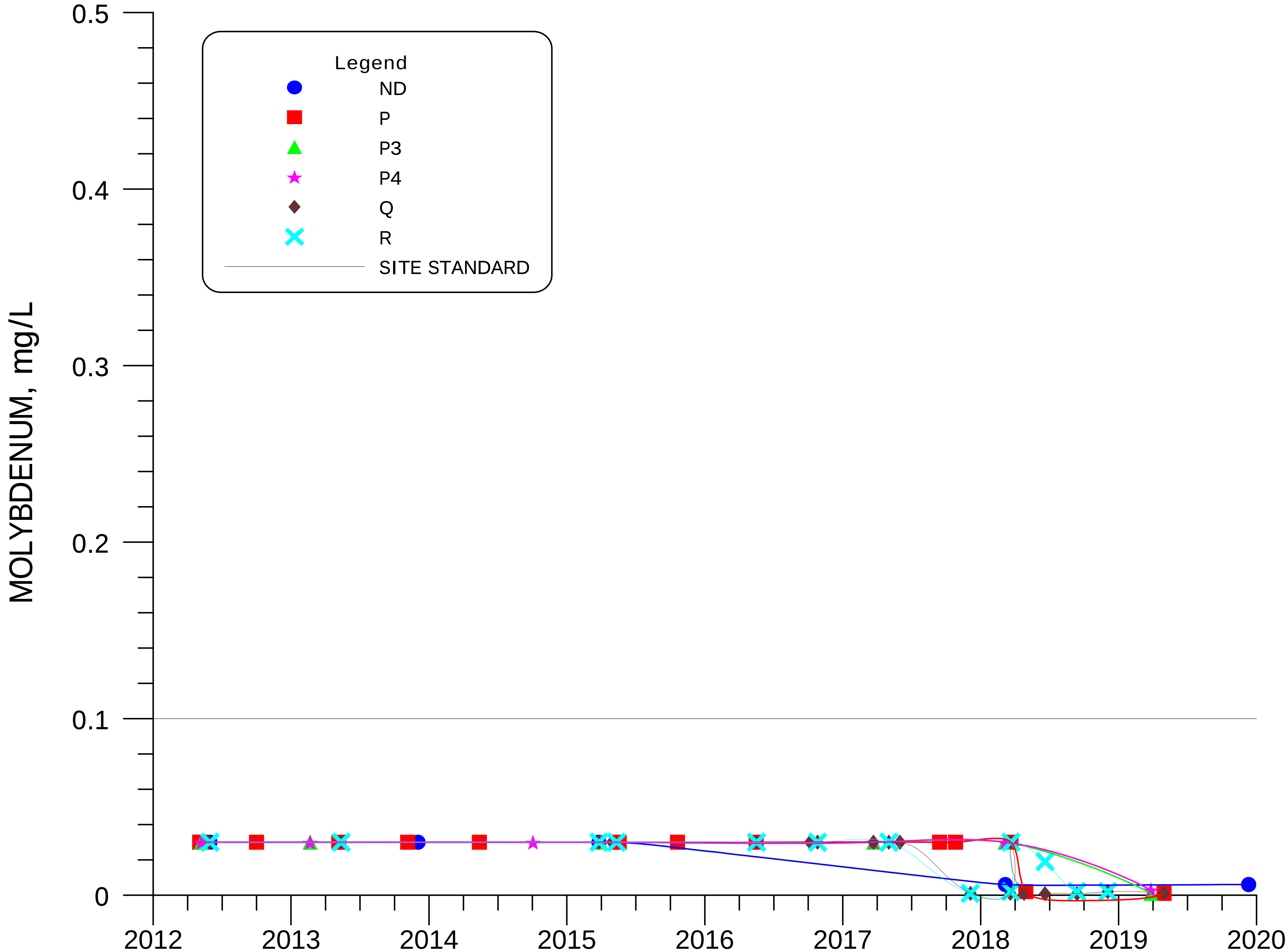

FIGURE 4.3-88. MOLYBDENUM CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q, AND R.

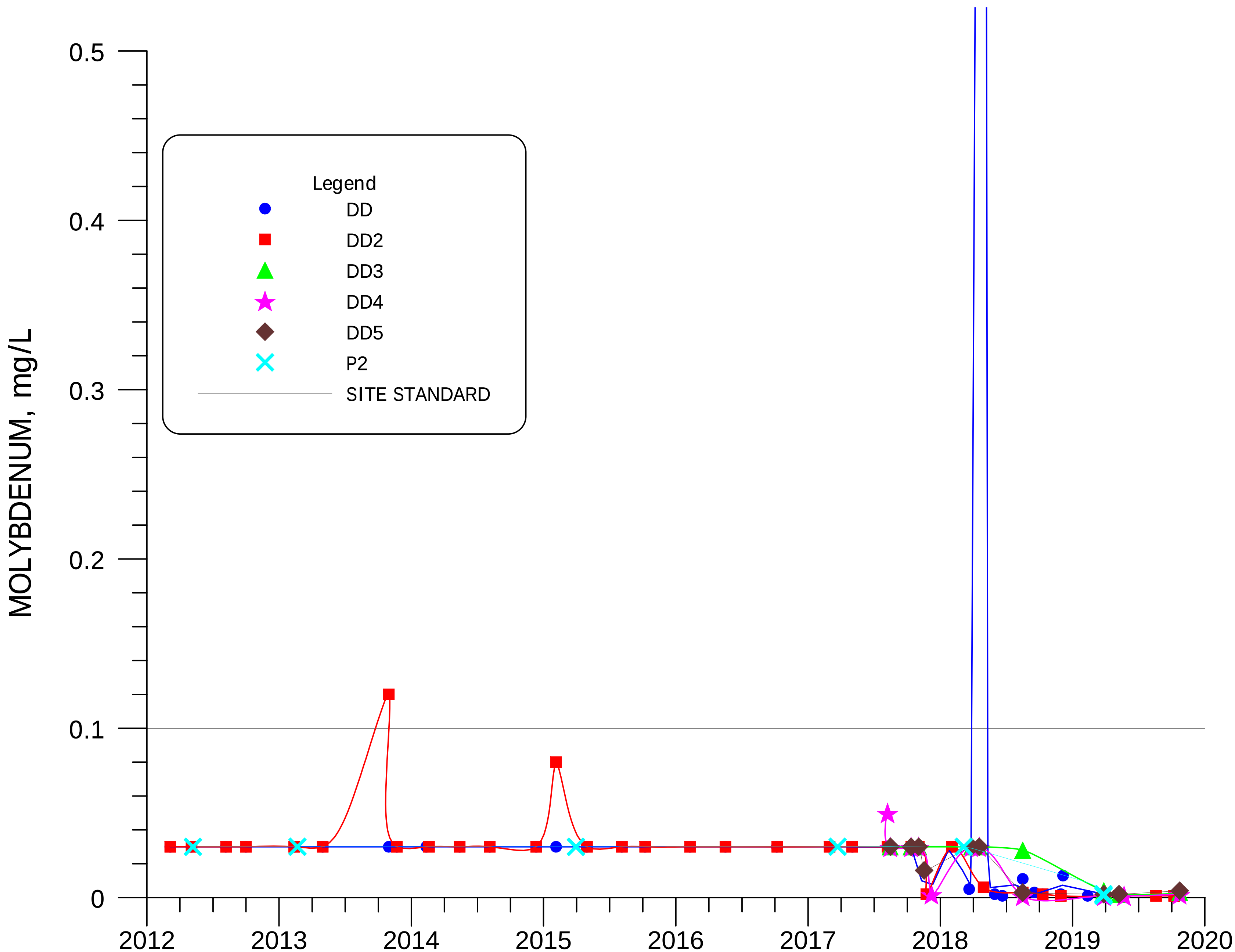

FIGURE 4.3-88A. MOLYBDENUM CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

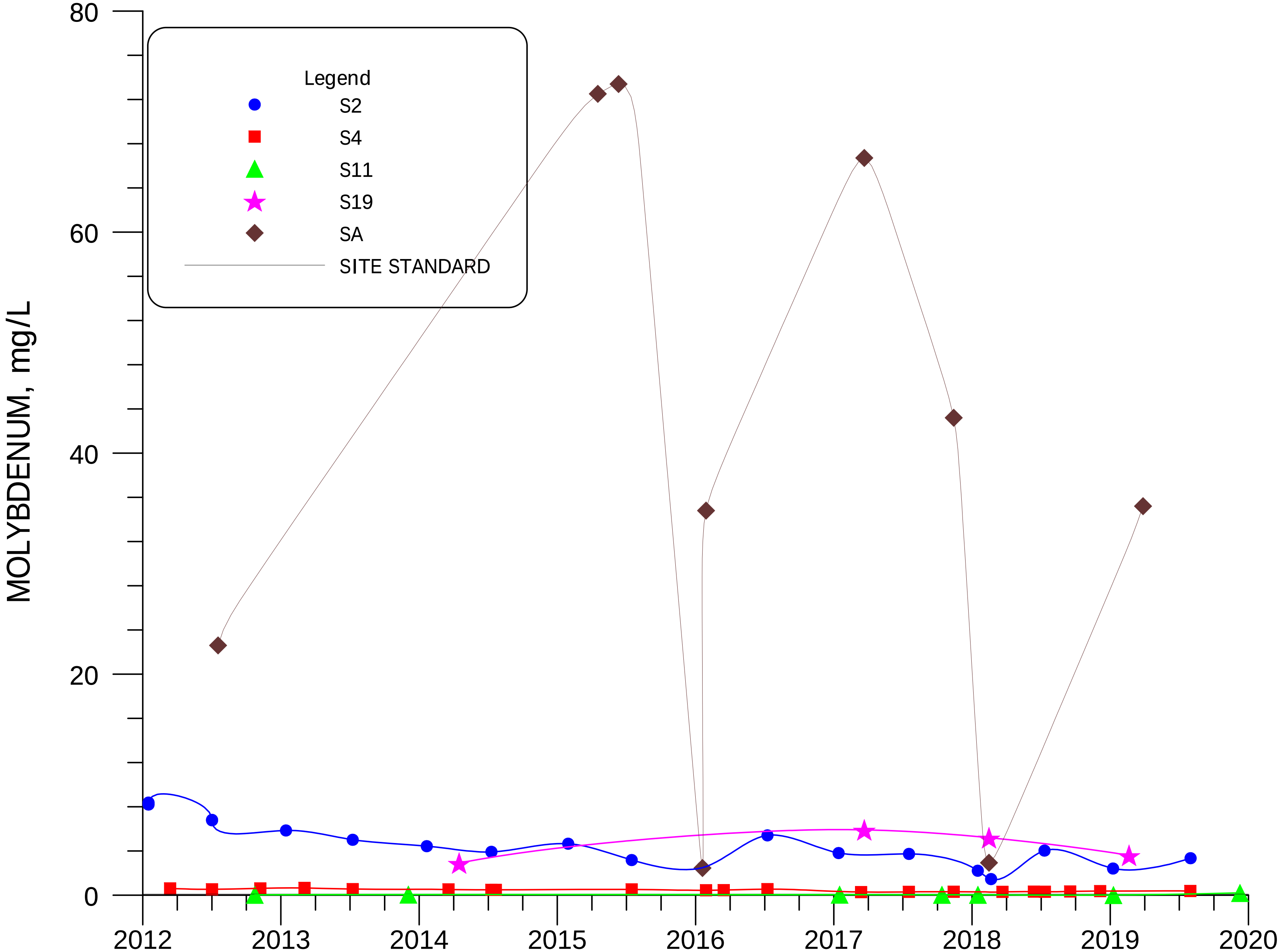

FIGURE 4.3-89. MOLYBDENUM CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

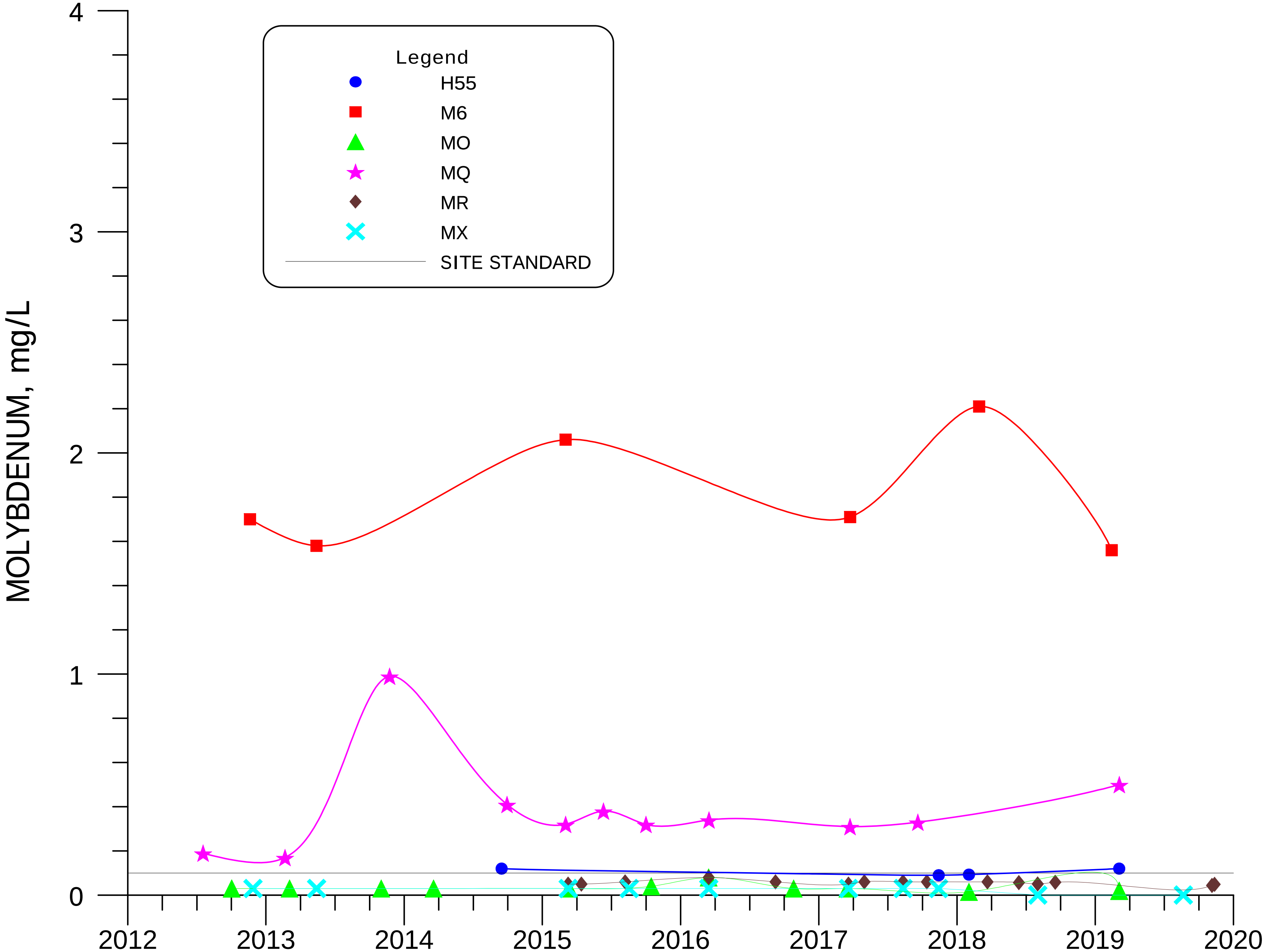

FIGURE 4.3-90. MOLYBDENUM CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

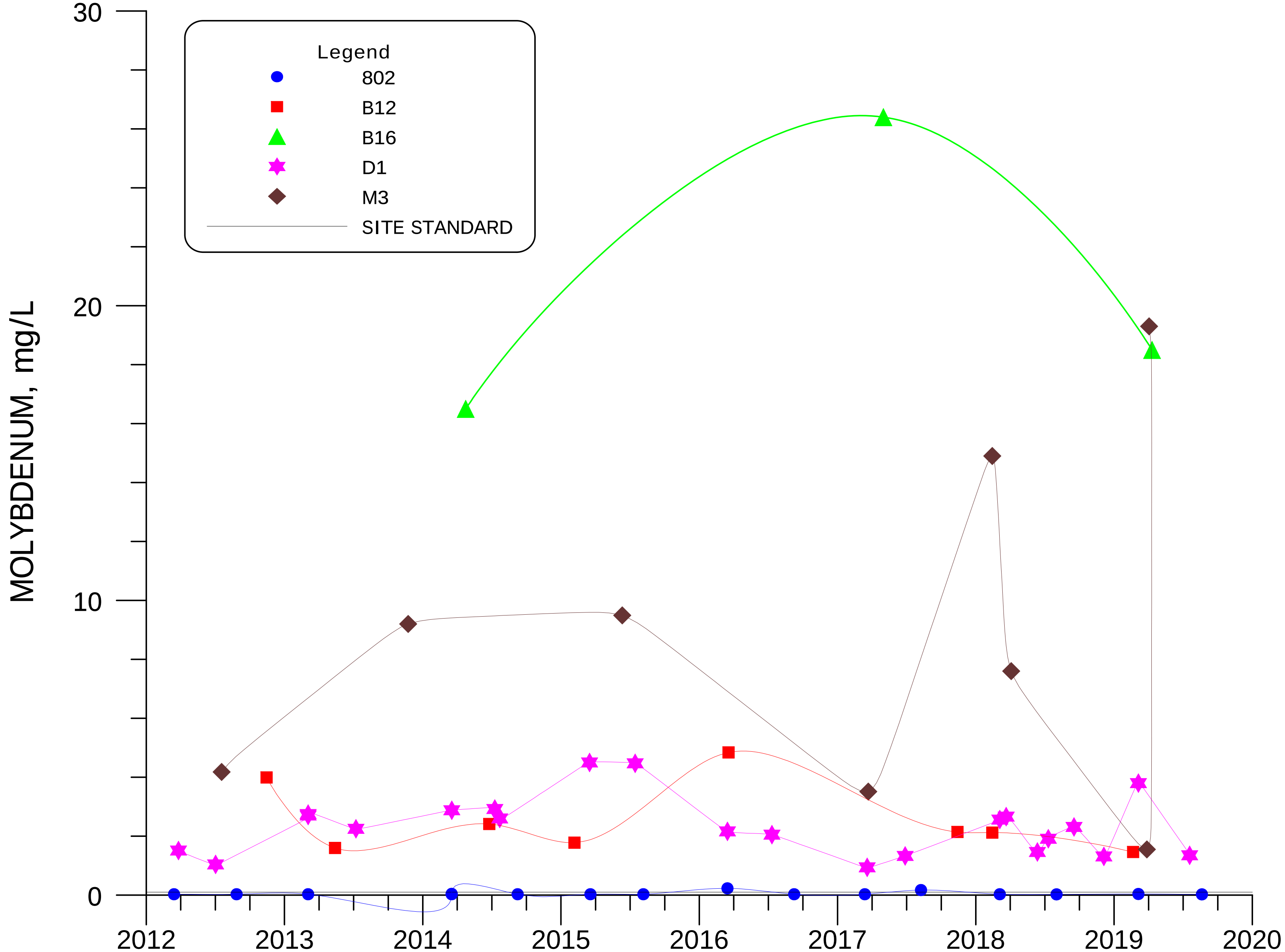

FIGURE 4.3-91. MOLYBDENUM CONCENTRATIONS FOR WELLS 802, B12, B16, D1 AND M3.

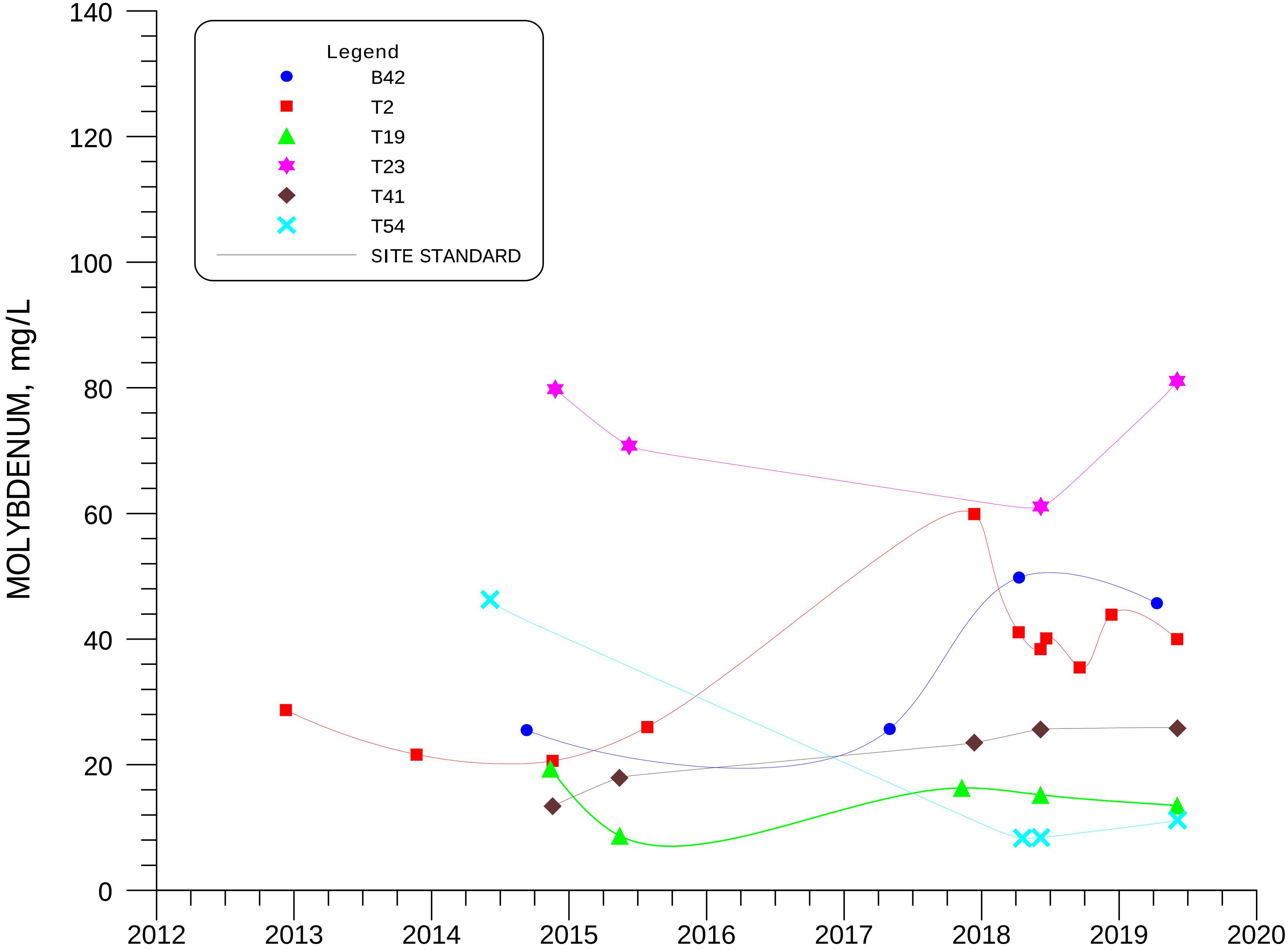

FIGURE 4.3-92. MOLYBDENUM CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

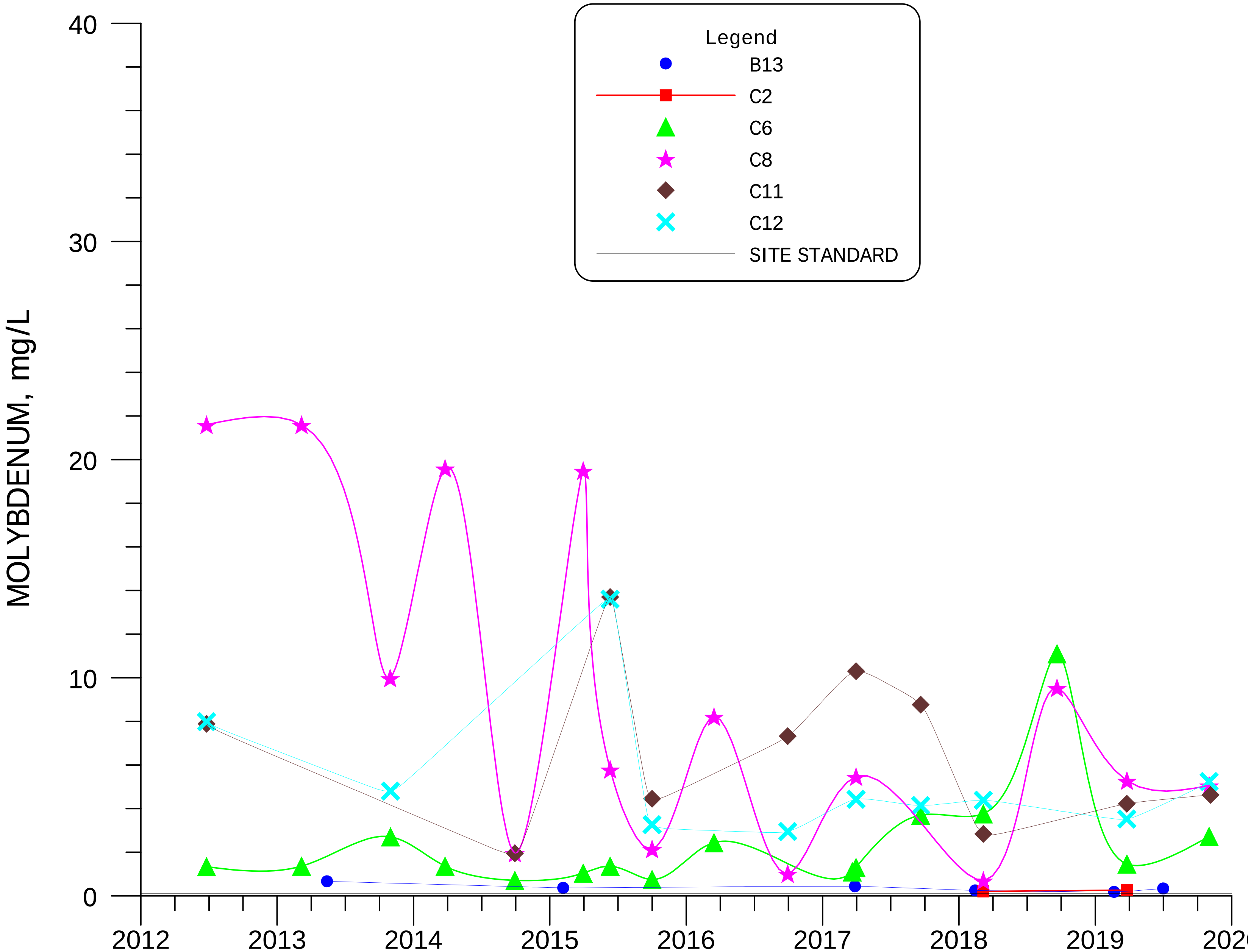

FIGURE 4.3-93. MOLYBDENUM CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

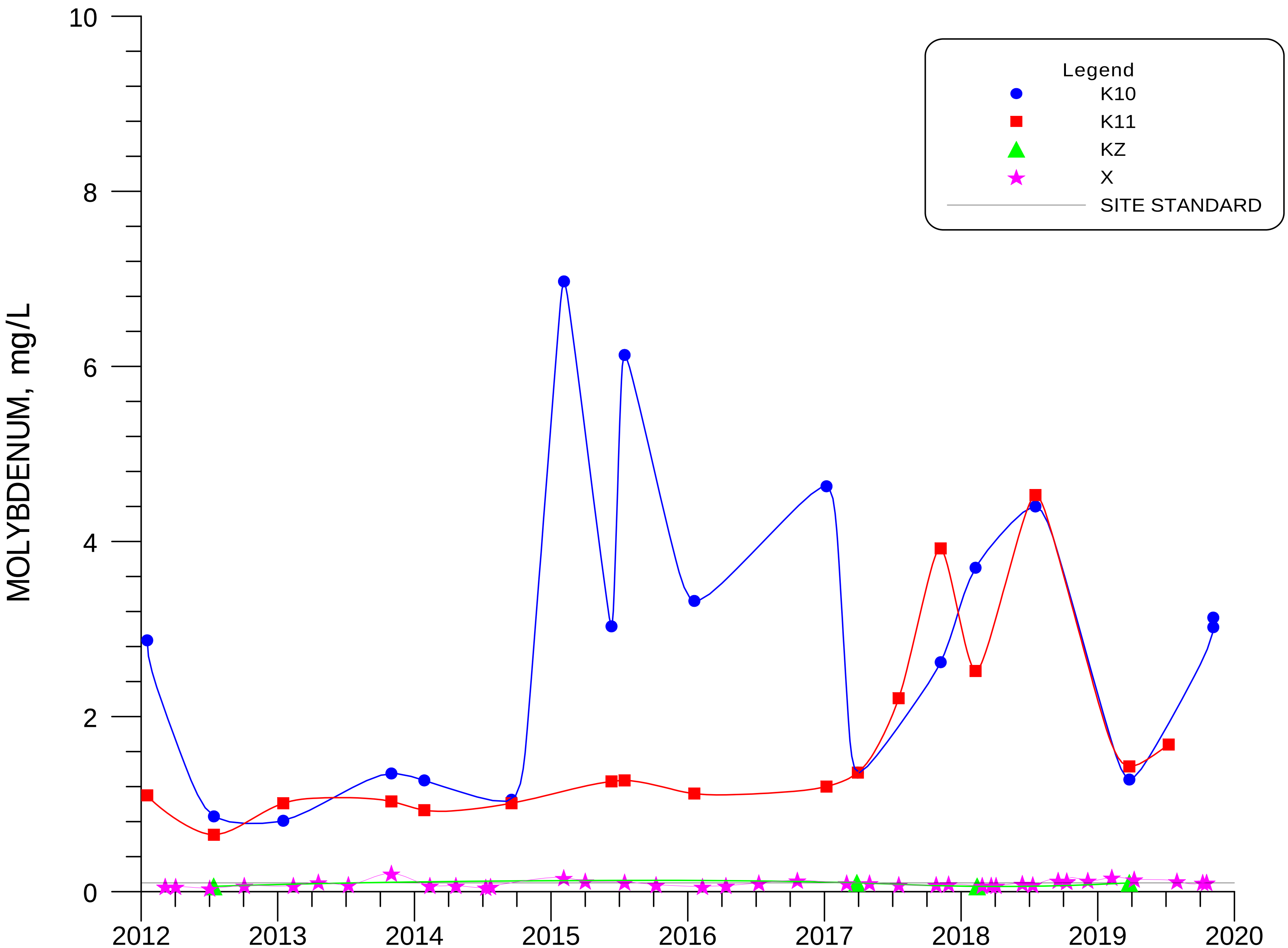

FIGURE 4.3-94. MOLYBDENUM CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

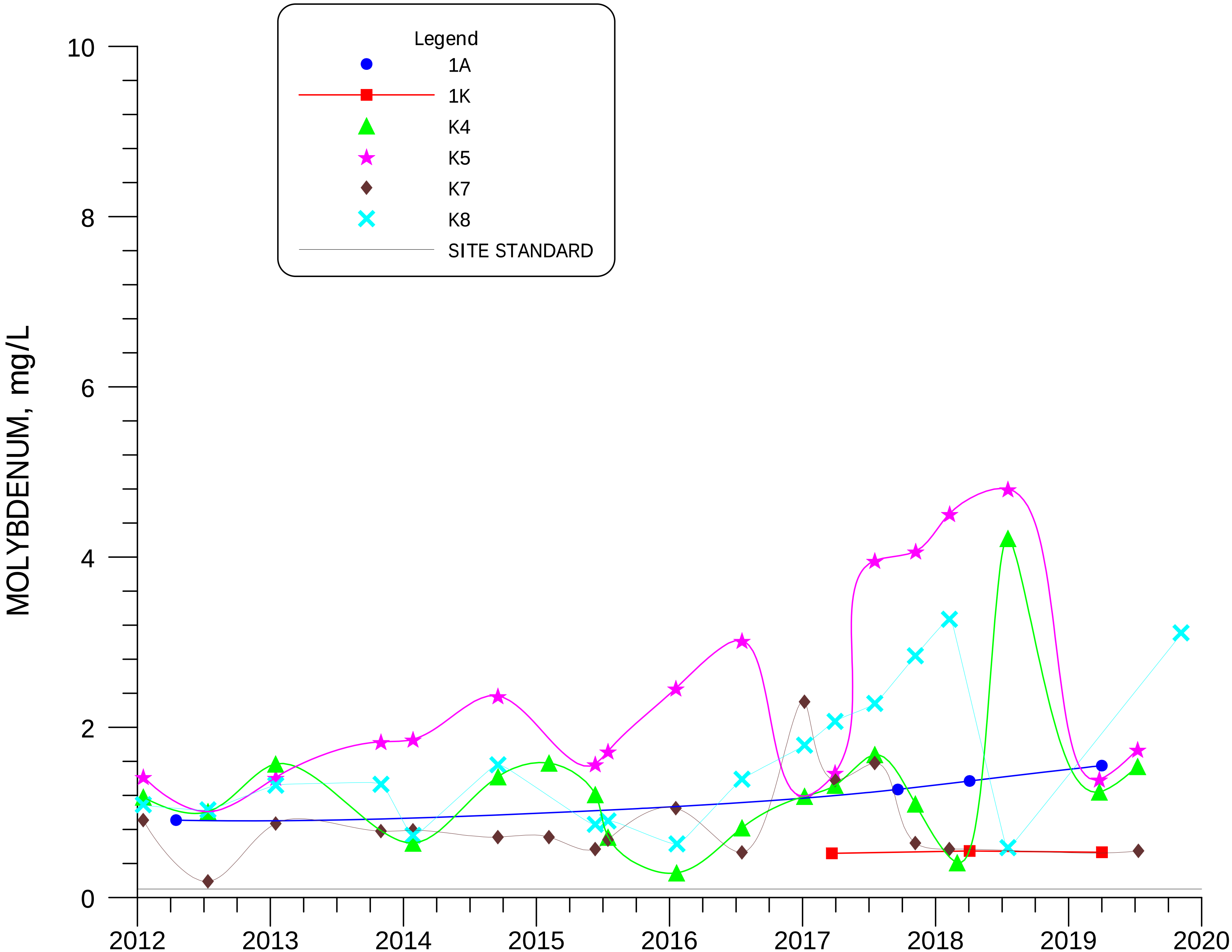

FIGURE 4.3-95. MOLYBDENUM CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

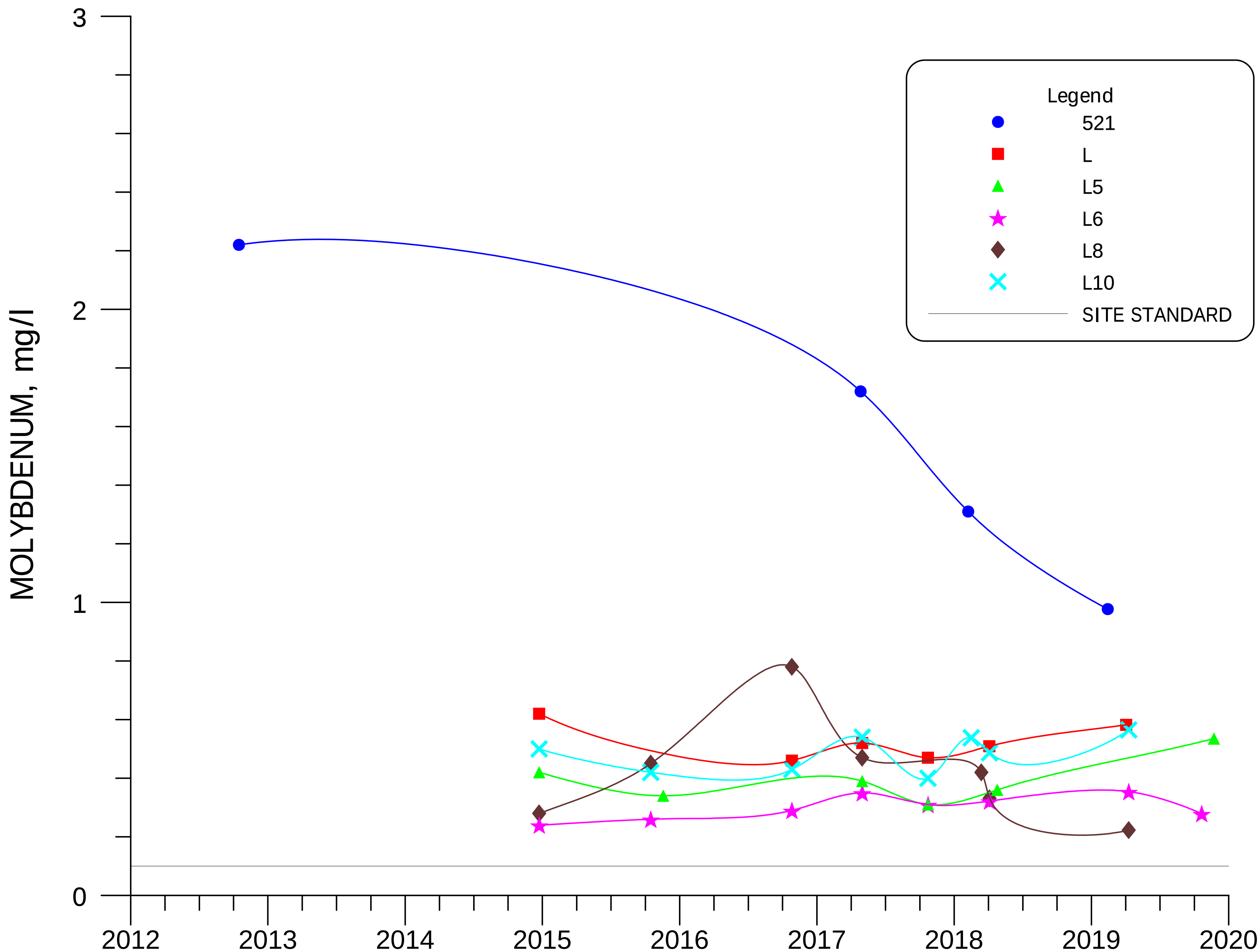

FIGURE 4.3-96. MOLYBDENUM CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

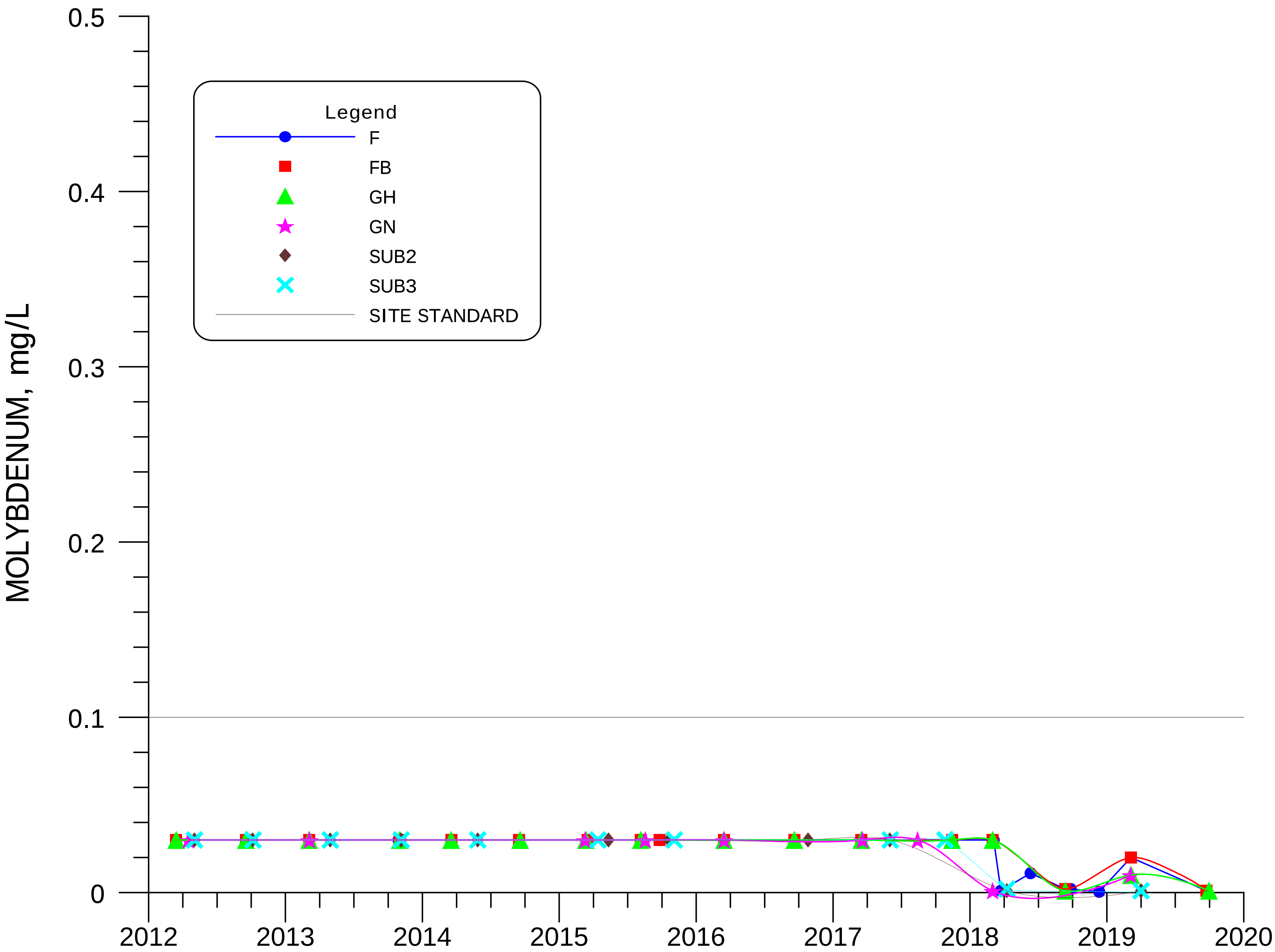

FIGURE 4.3-97. MOLYBDENUM CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

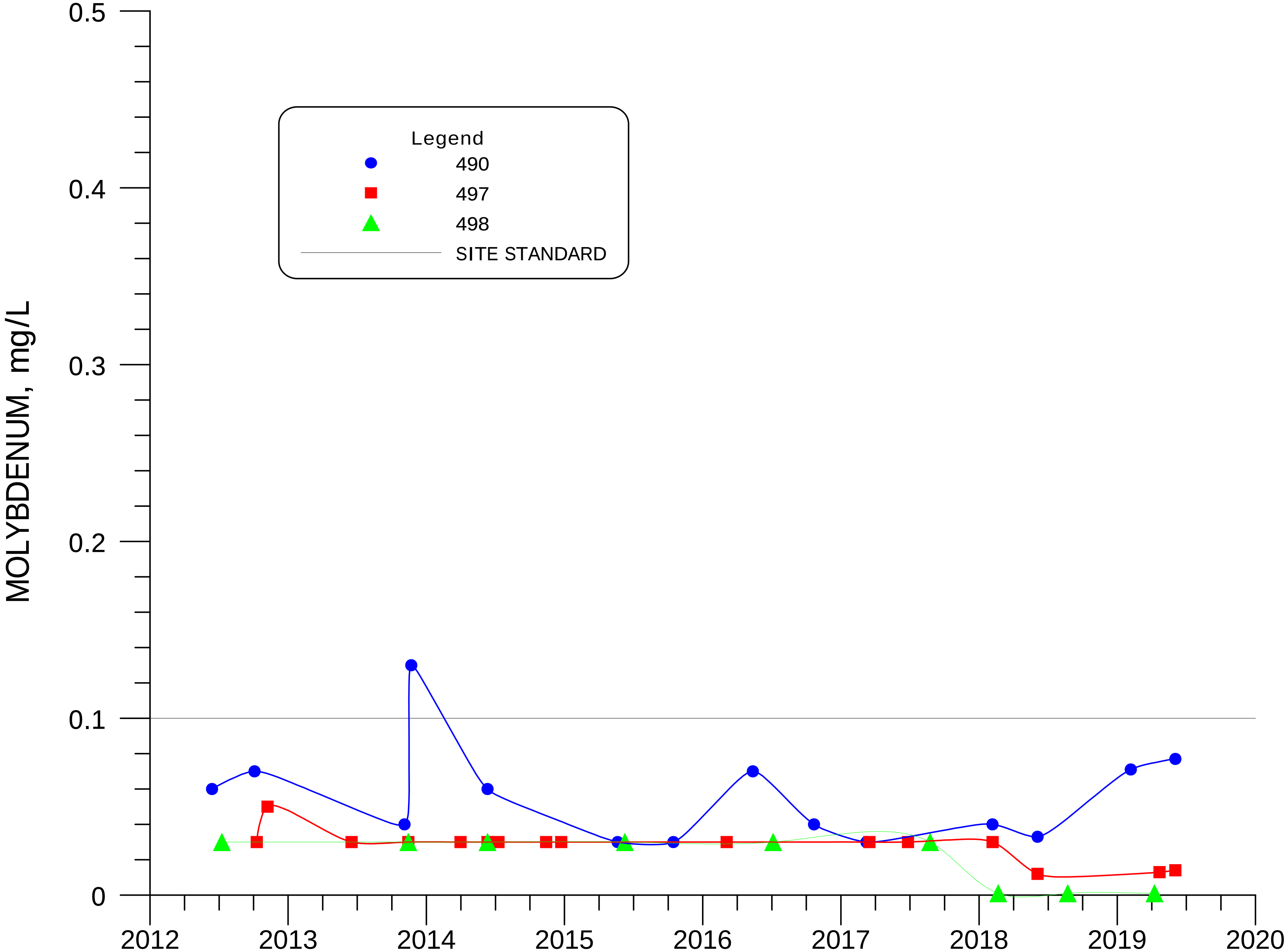

FIGURE 4.3-98. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 497 AND 498.

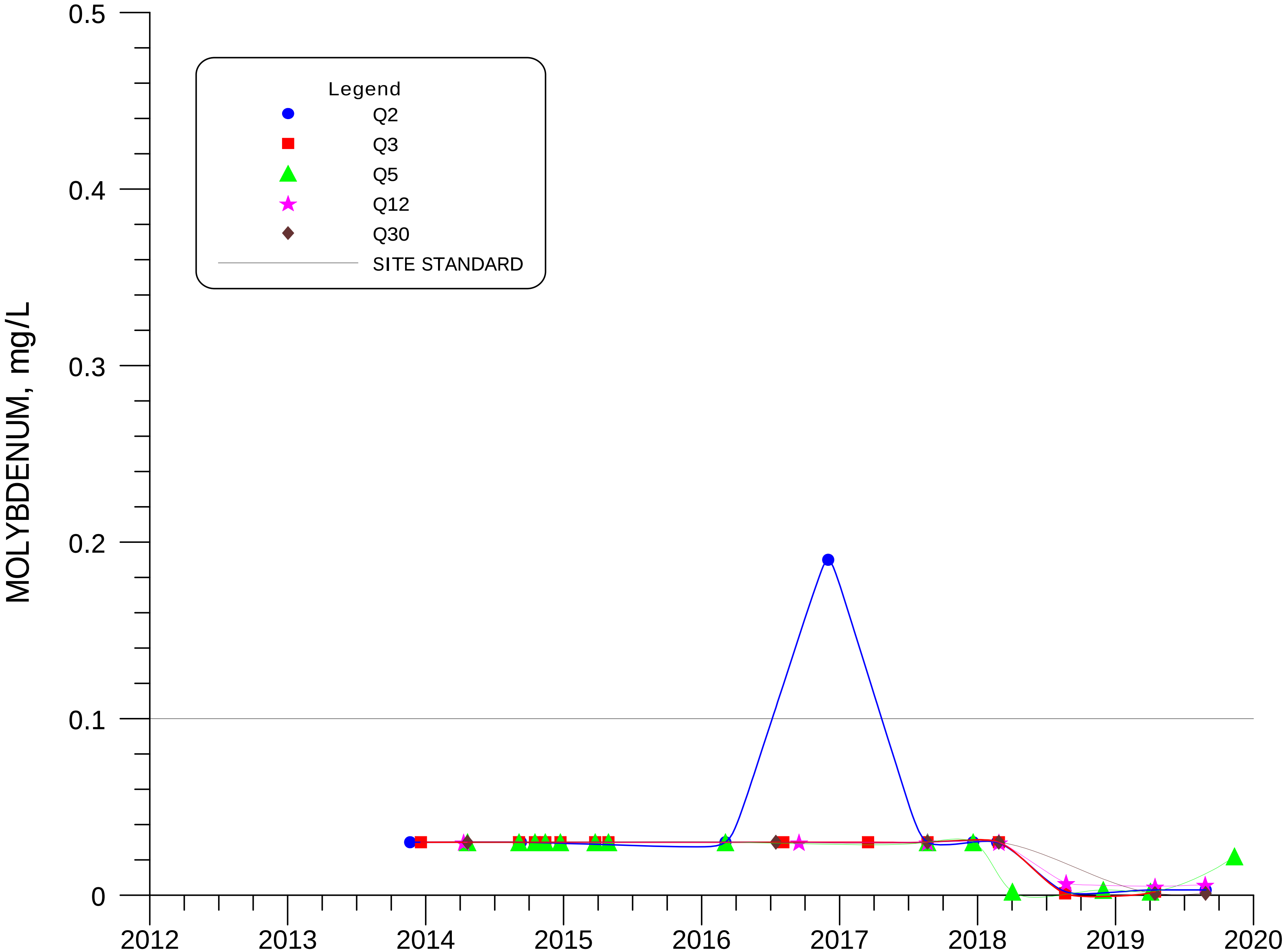

FIGURE 4.3-98A. MOLYBDENUM CONCENTRATIONS FOR WELLS Q2, Q3, Q5, Q12 AND Q30.

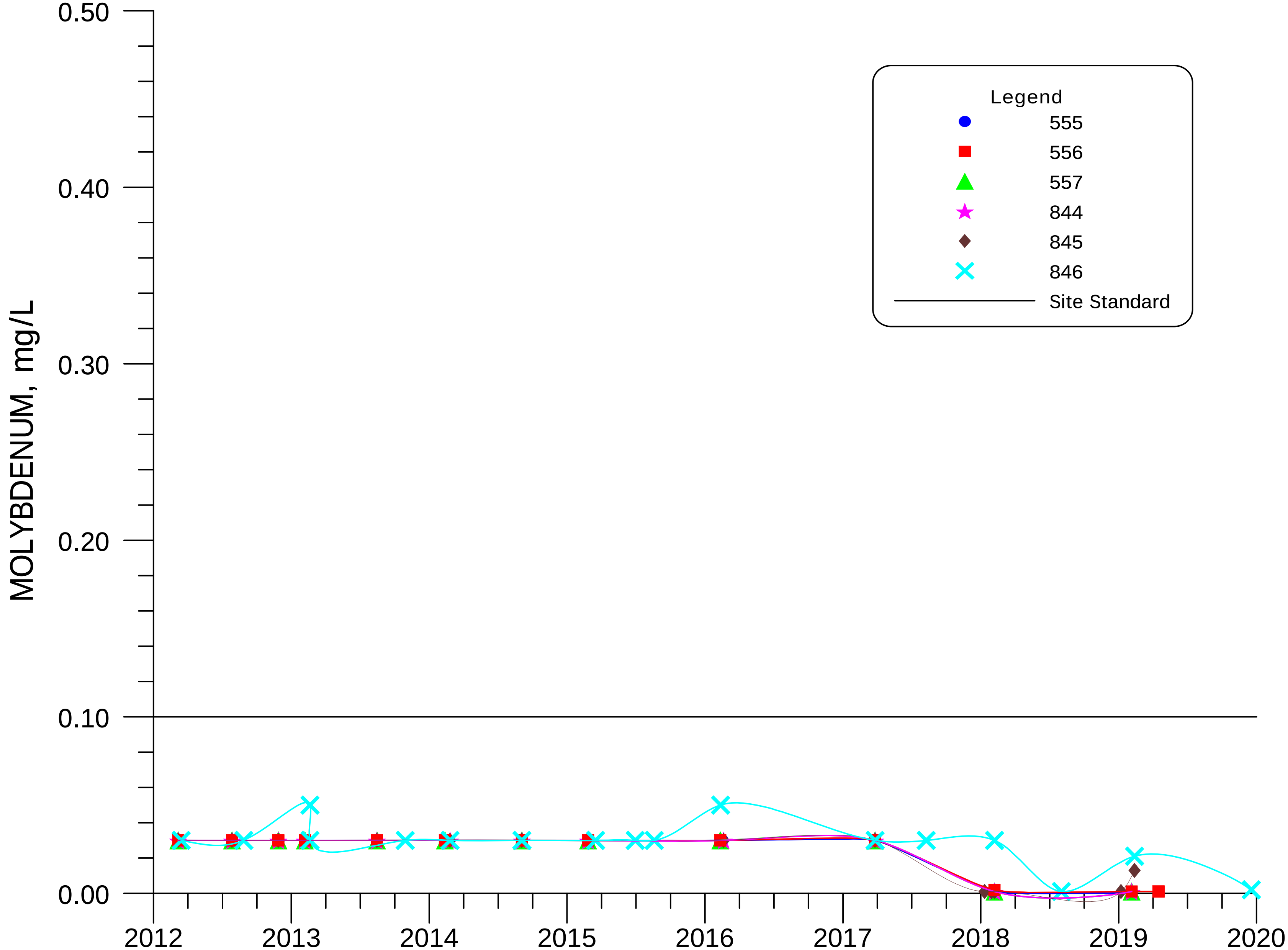

FIGURE 4.3-99. MOLYBDENUM CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

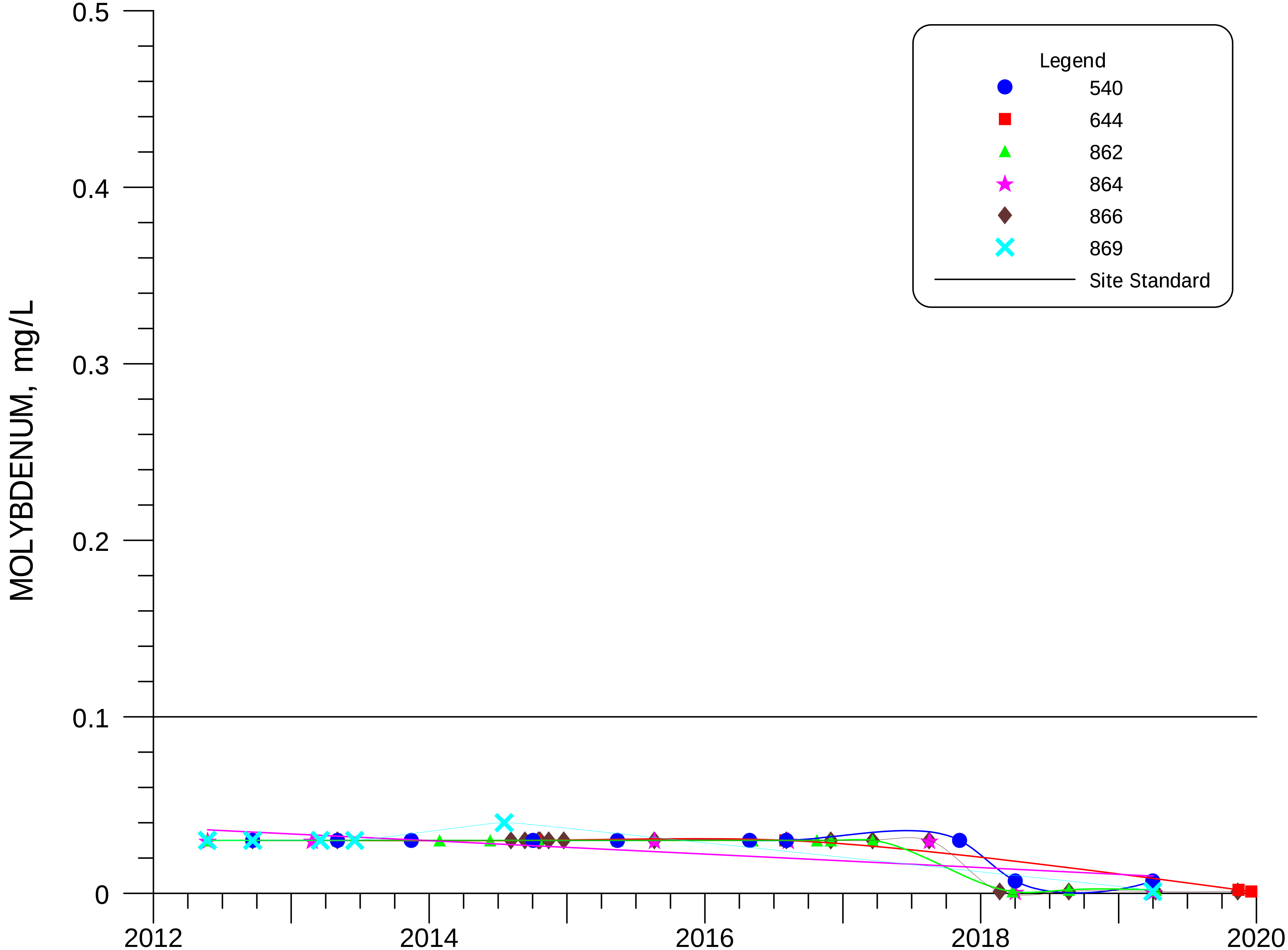

FIGURE 4.3-100. MOLYBDENUM CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

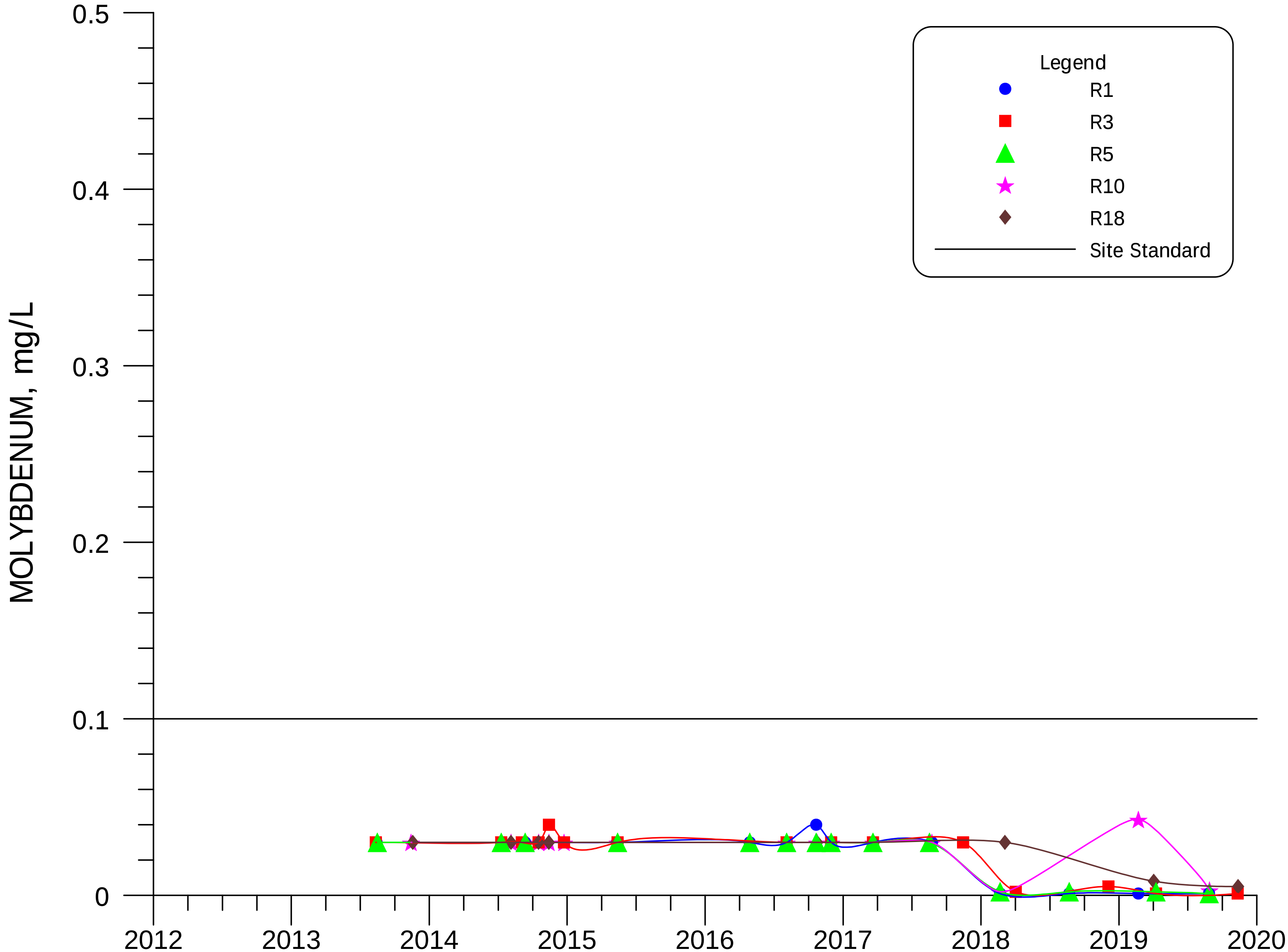

FIGURE 4.3-100A. MOLYBDENUM CONCENTRATIONS FOR WELLS R1, R3, R5, R10 AND R18.

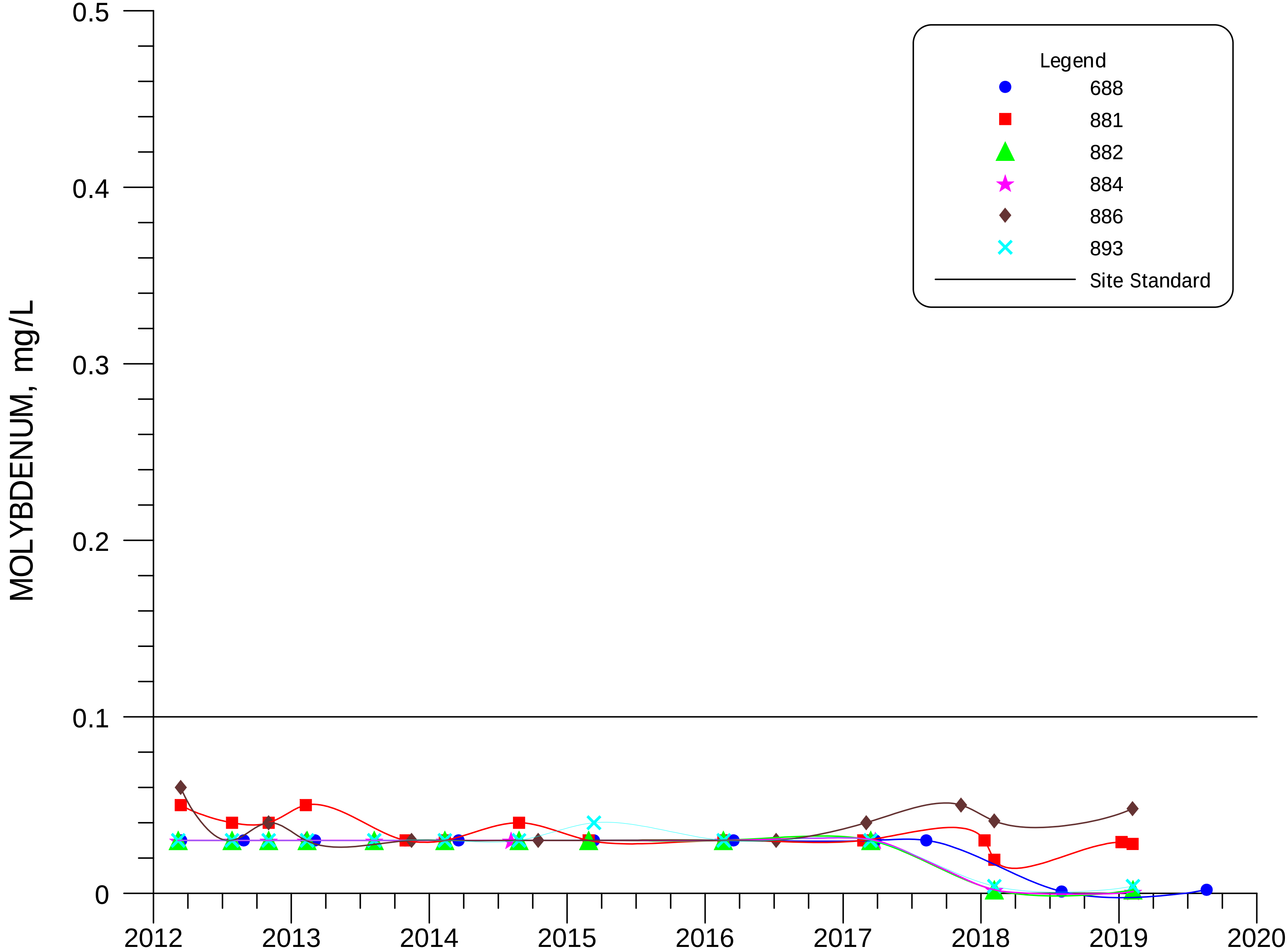

FIGURE 4.3-101. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

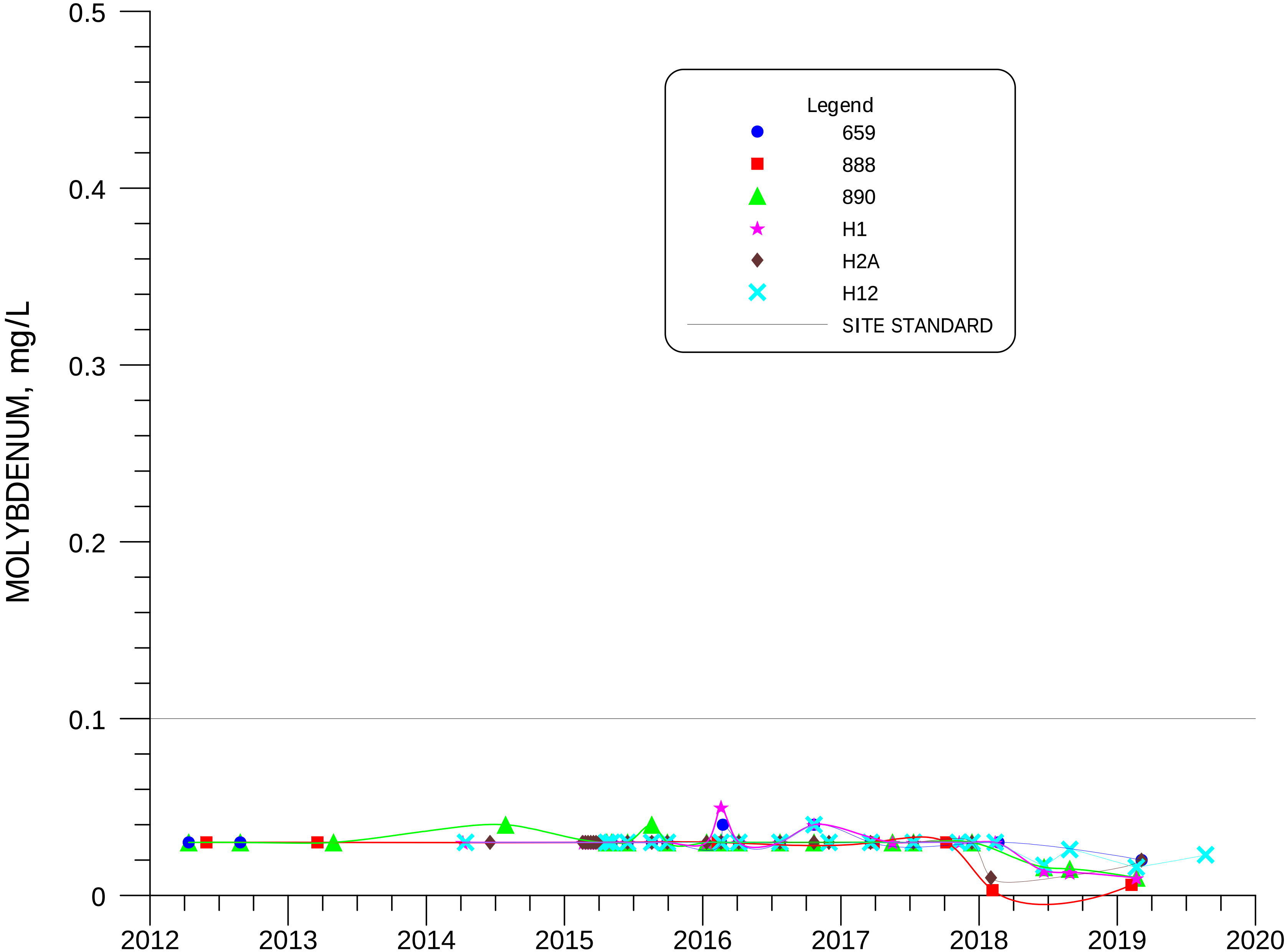

FIGURE 4.3-101A. MOLYBDENUM CONCENTRATIONS FOR WELLS 659, 888, 890, H1, H2A AND H12.

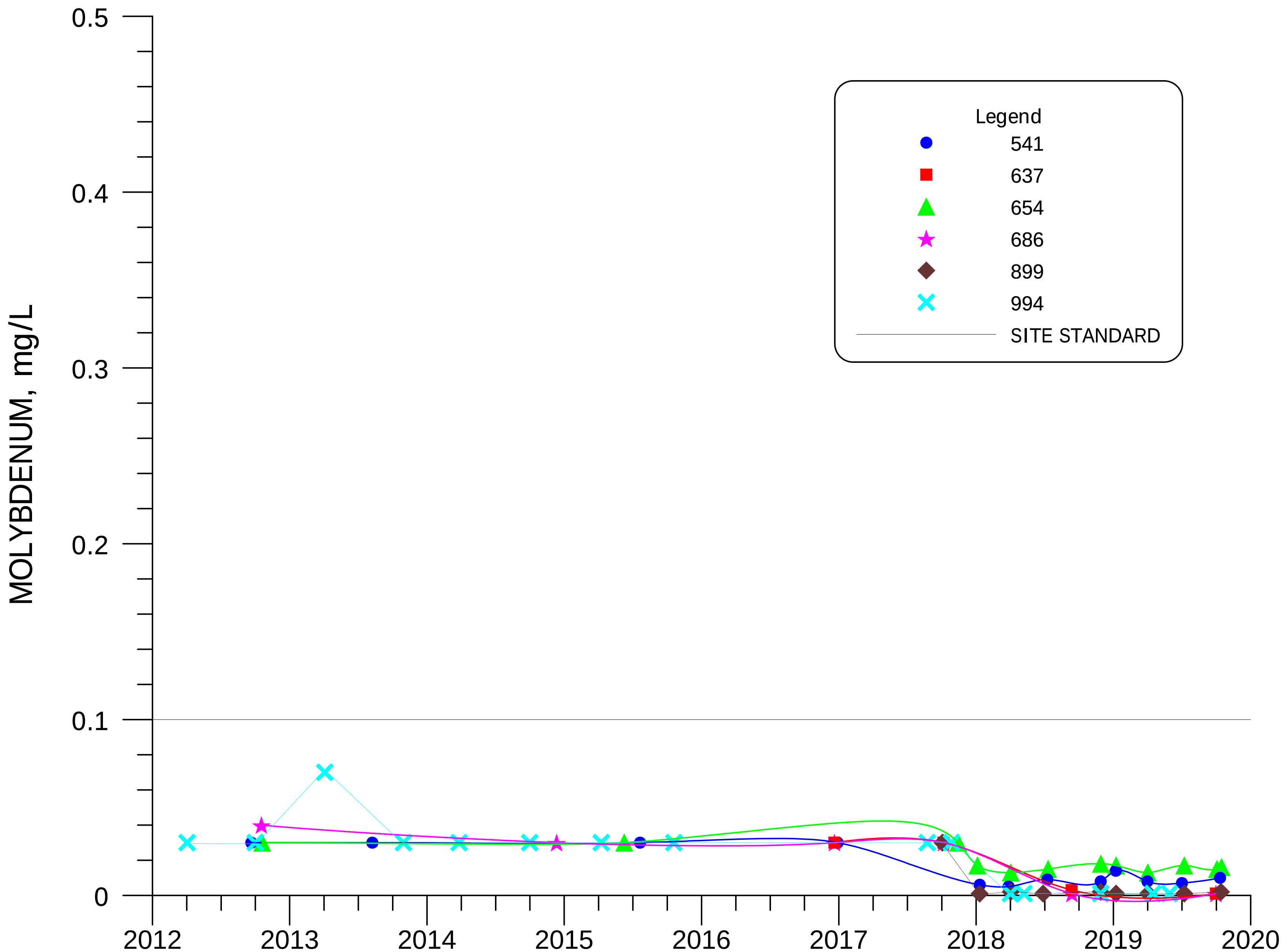

FIGURE 4.3-102. MOLYBDENUM CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 and 994.

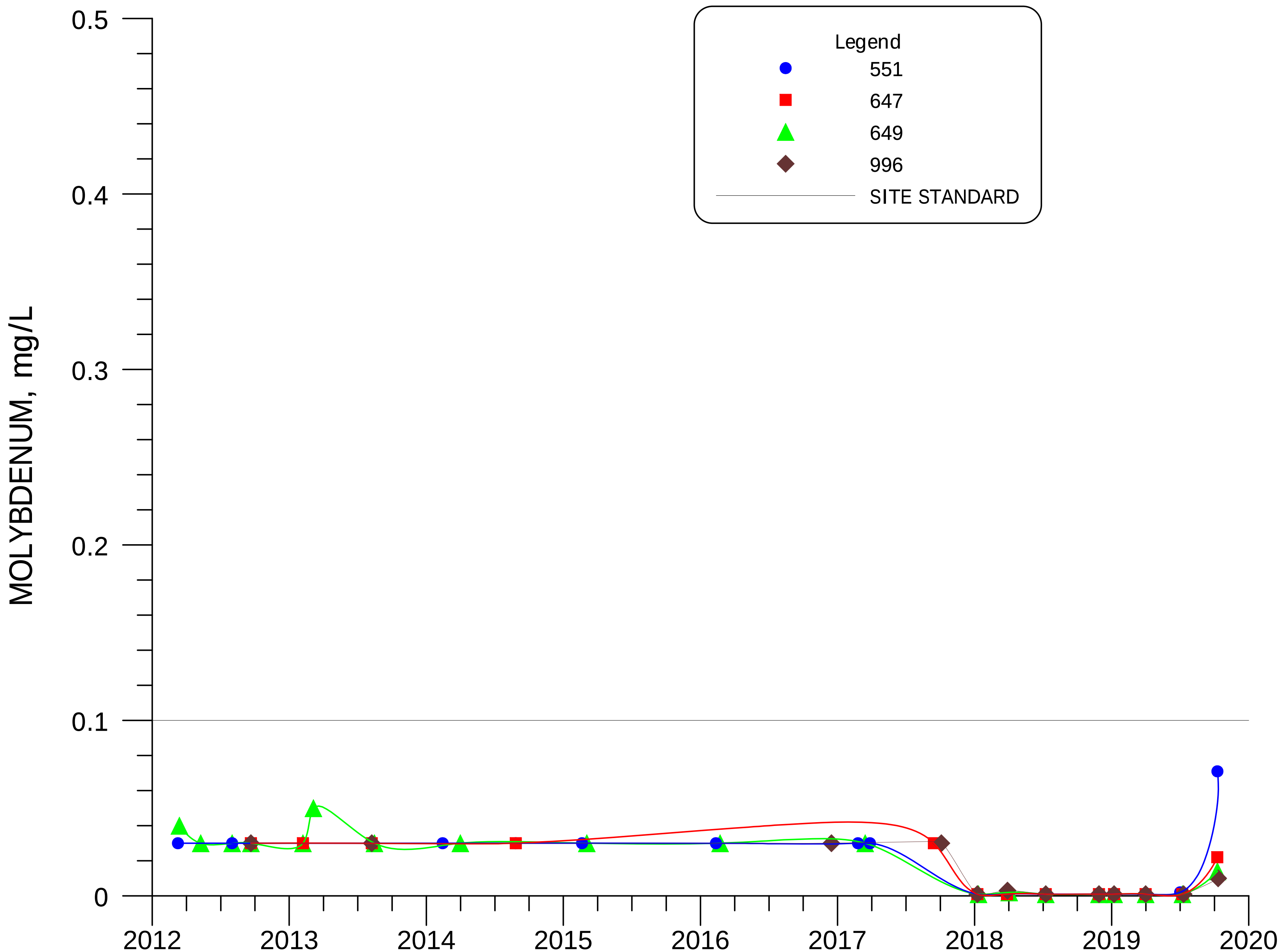

FIGURE 4.3-103. MOLYBDENUM CONCENTRATIONS FOR WELLS 551, 647, 649 AND 996.

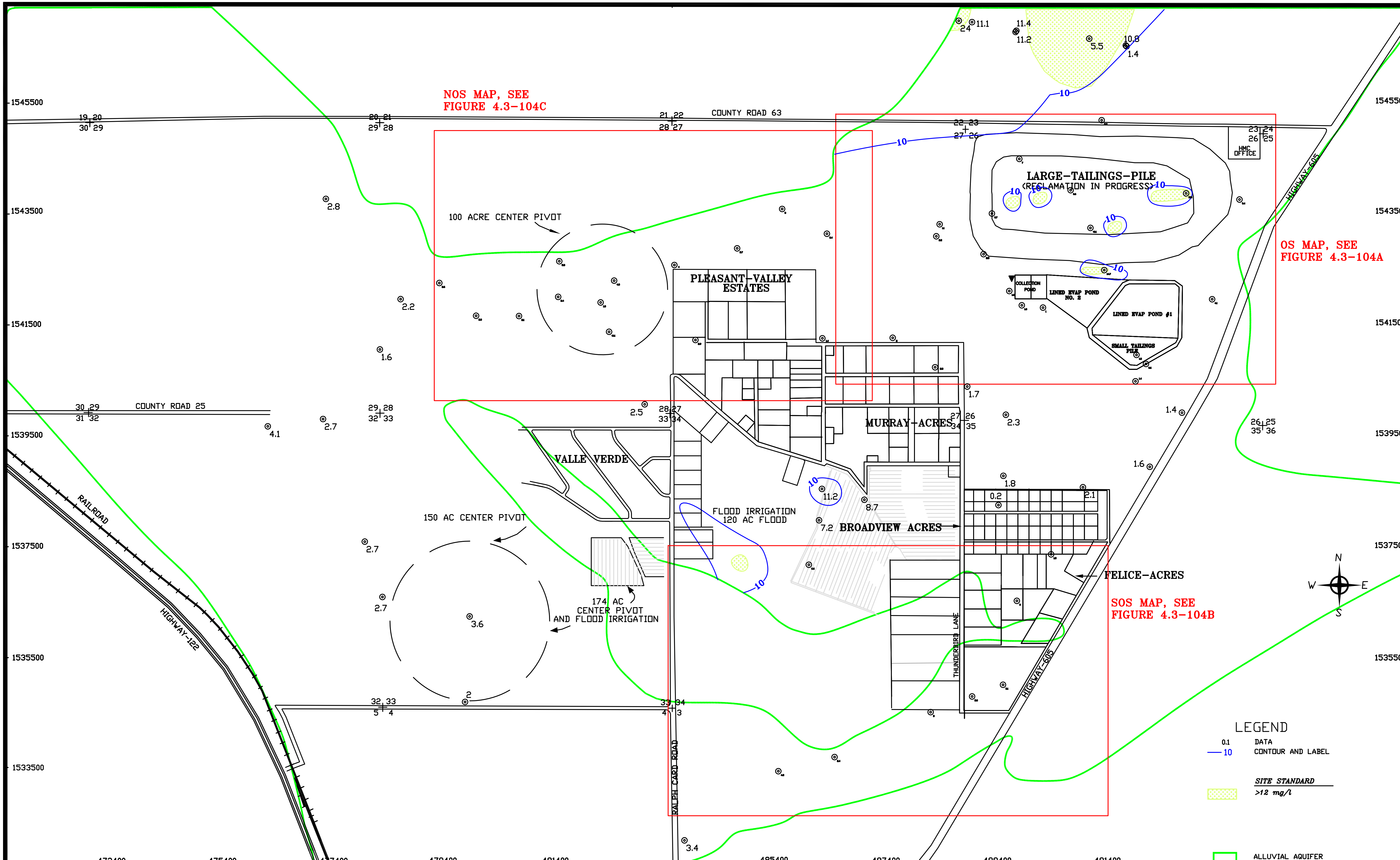

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FIGURE 4.3-104. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

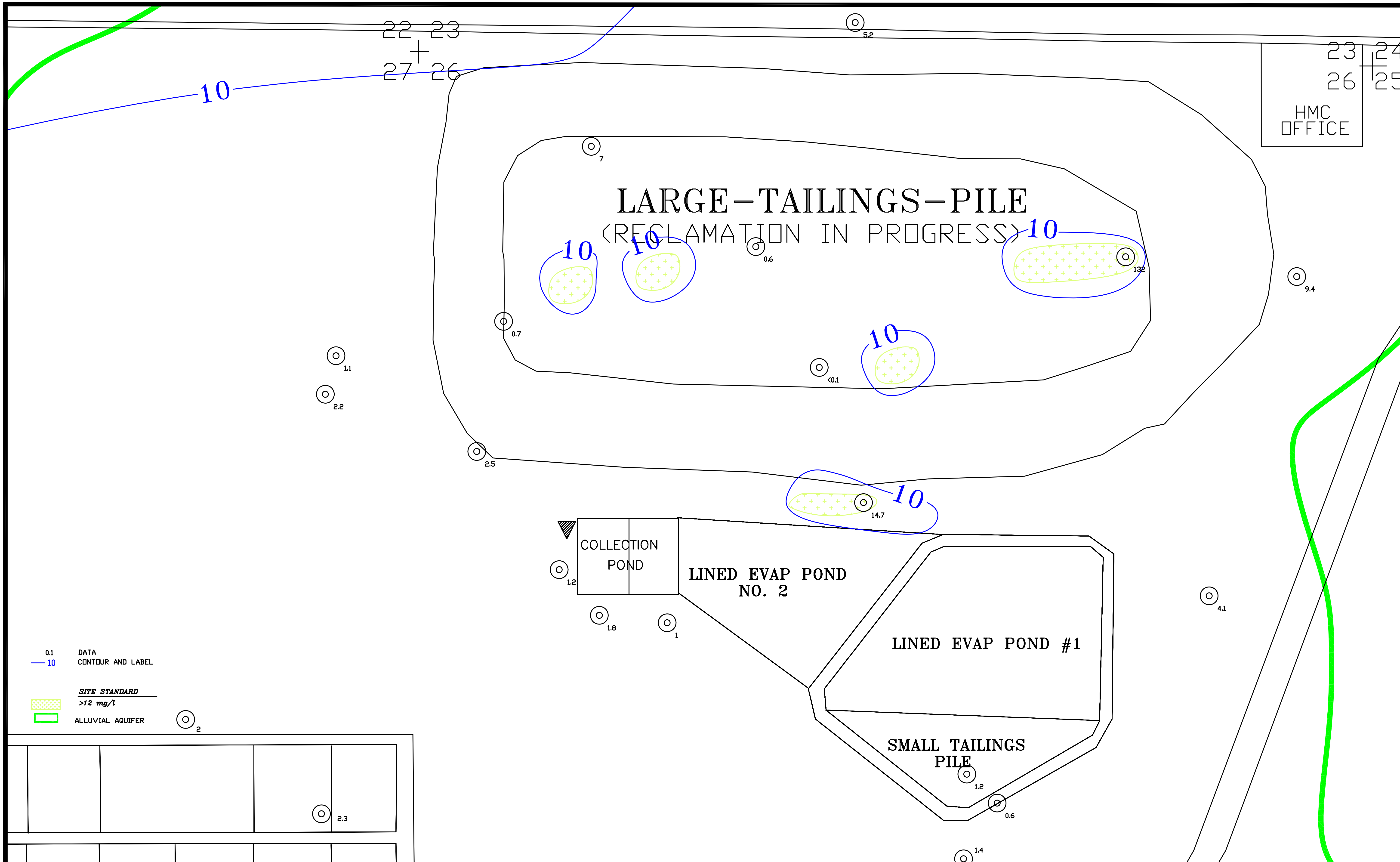

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FIGURE 4.3-104A. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

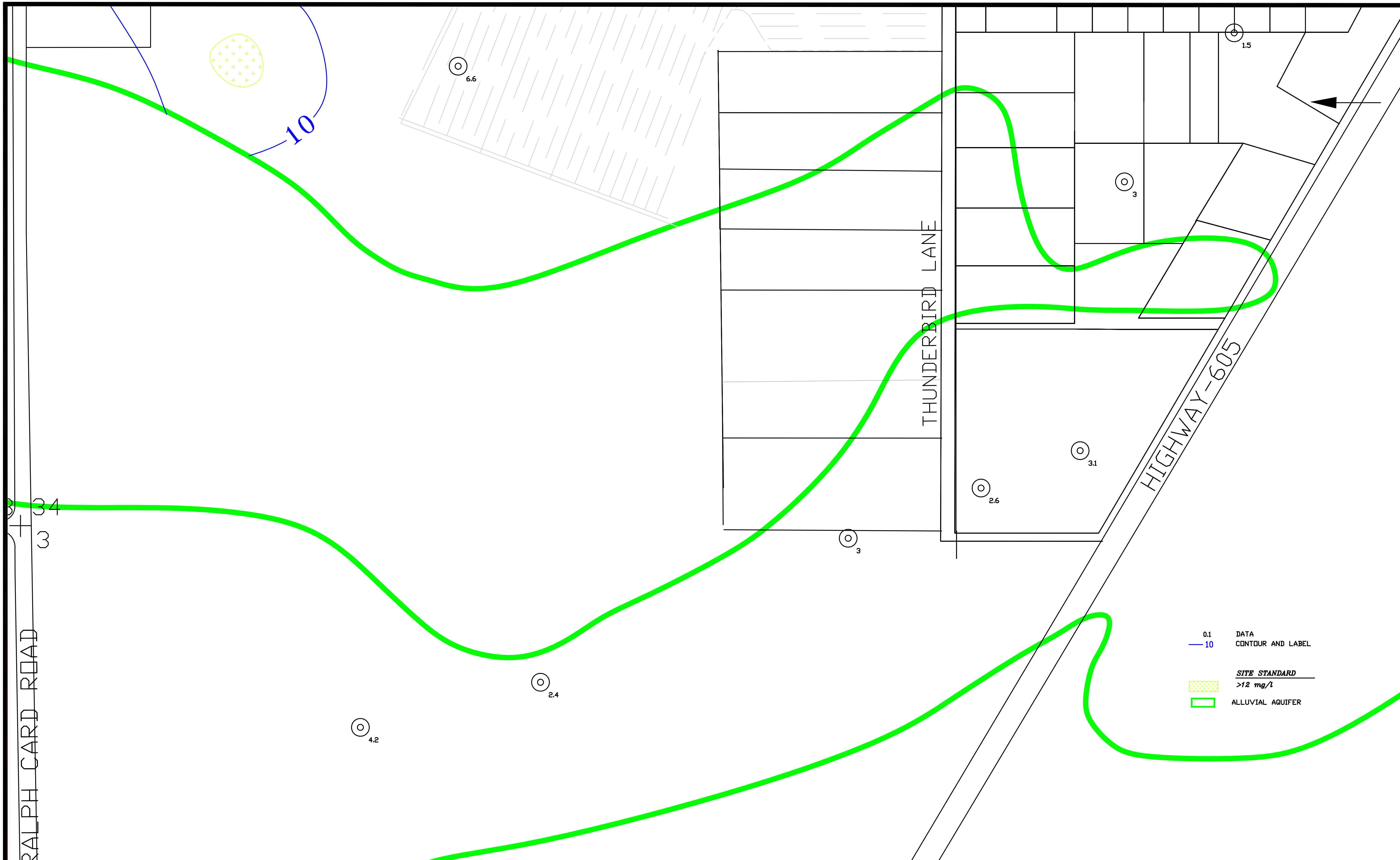

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FIGURE 4.3-104B. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L

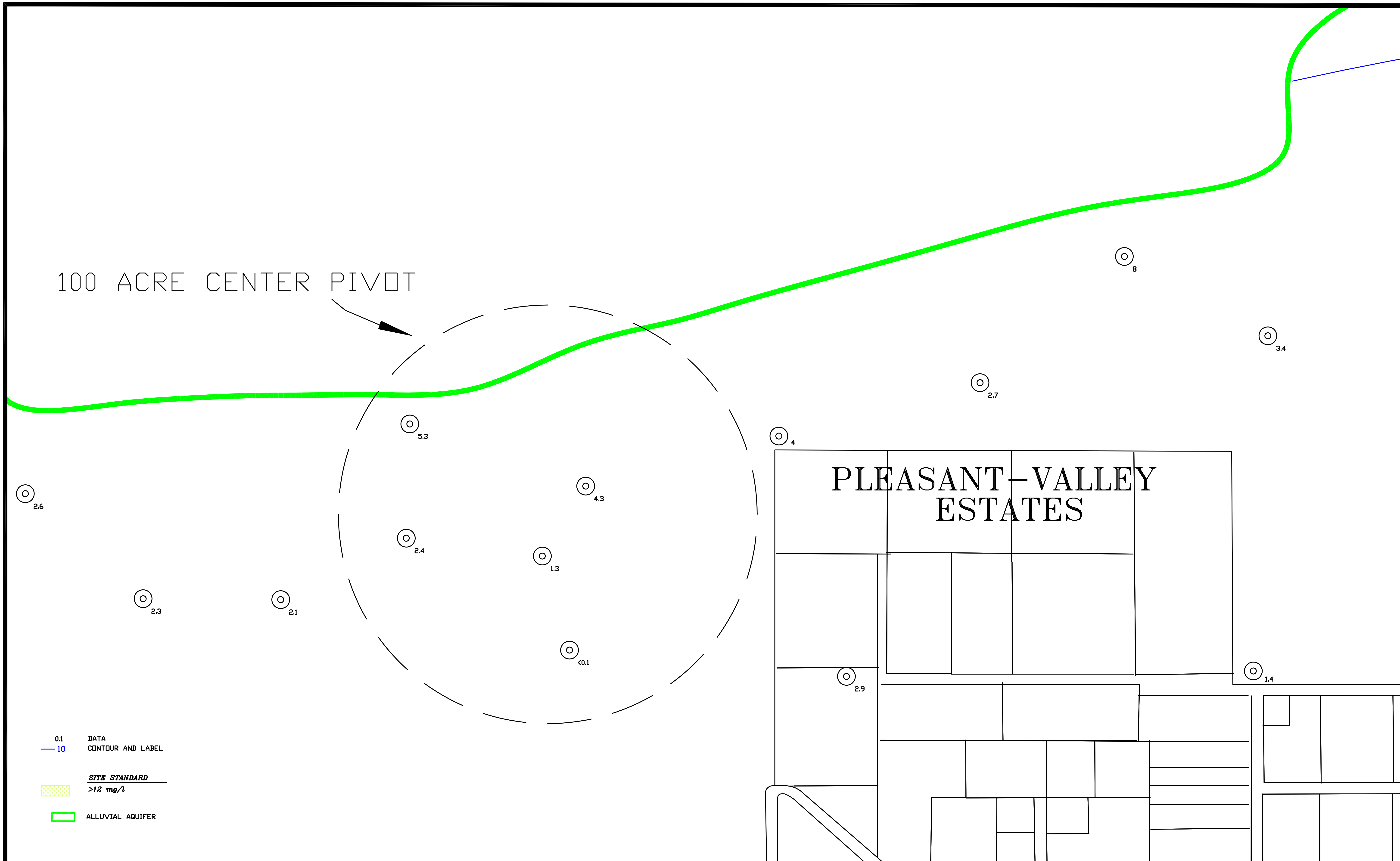

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FIGURE 4.3-104C. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

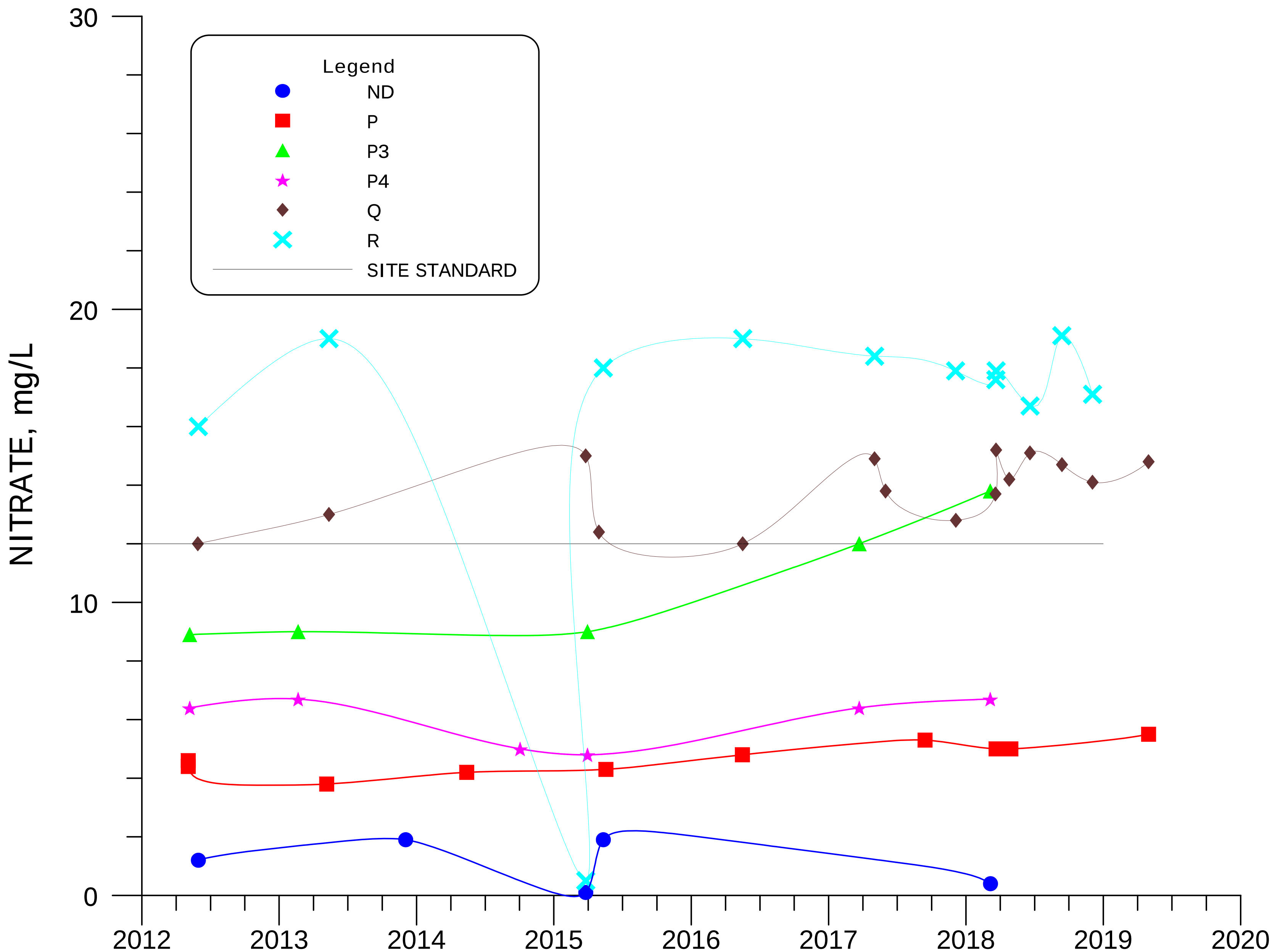


FIGURE 4.3-105. NITRATE CONCENTRATIONS FOR WELLS ND, P, P3, P4, Q AND R.

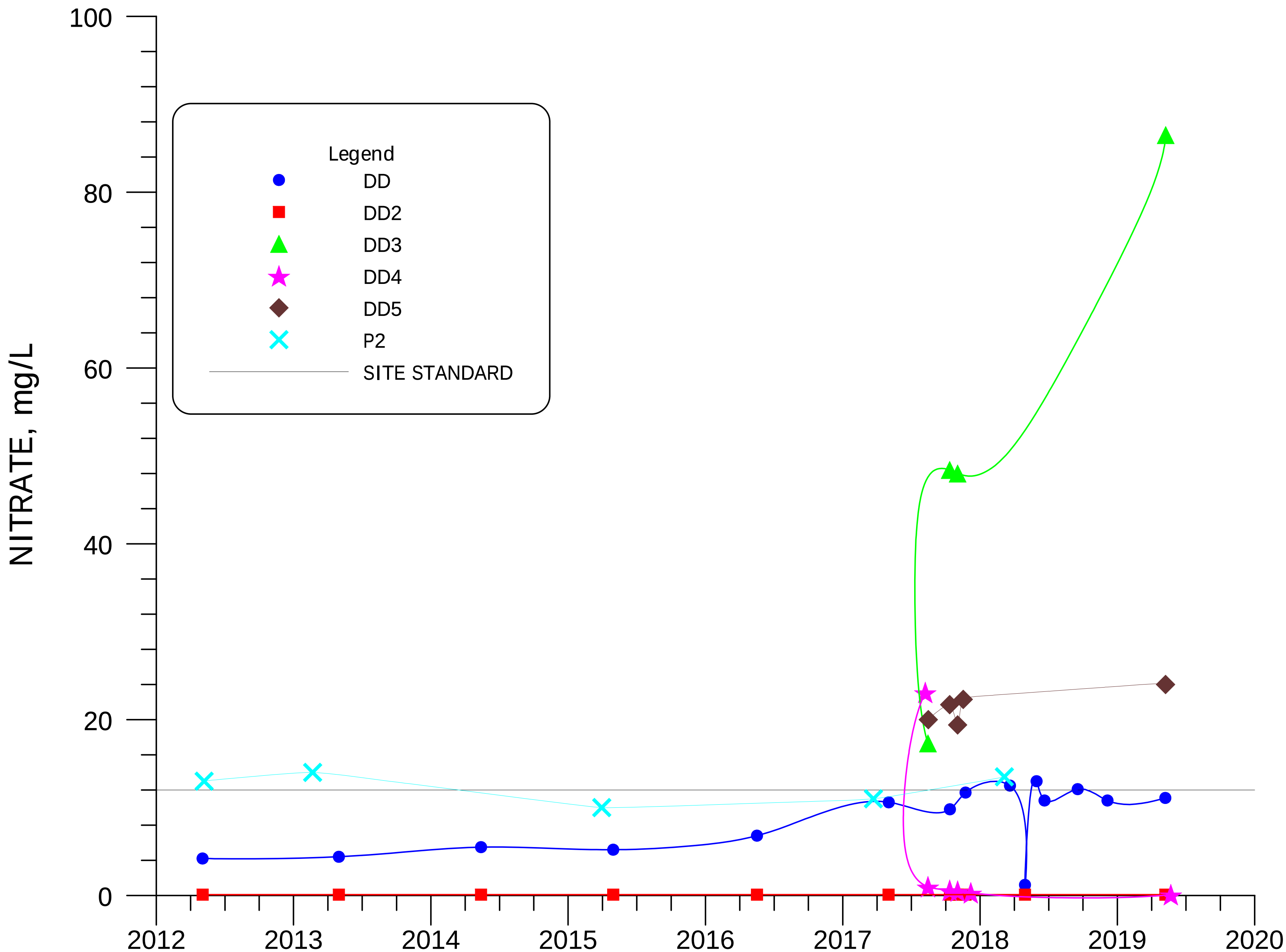


FIGURE 4.3-105A. NITRATE CONCENTRATIONS FOR WELLS DD, DD2, DD3, DD4, DD5 AND P2.

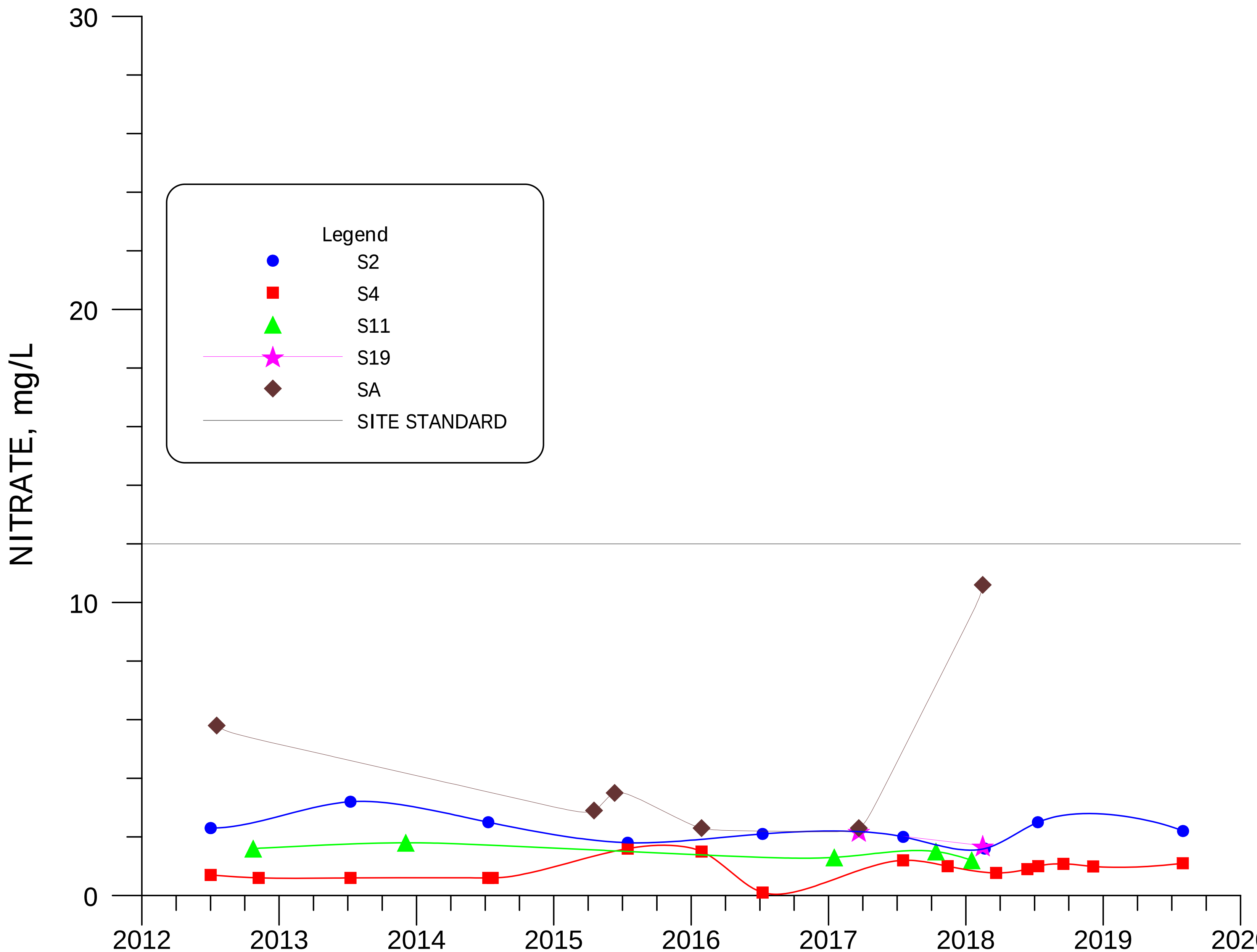


FIGURE 4.3-106. NITRATE CONCENTRATIONS FOR WELLS S2, S4, S11, S19 AND SA.

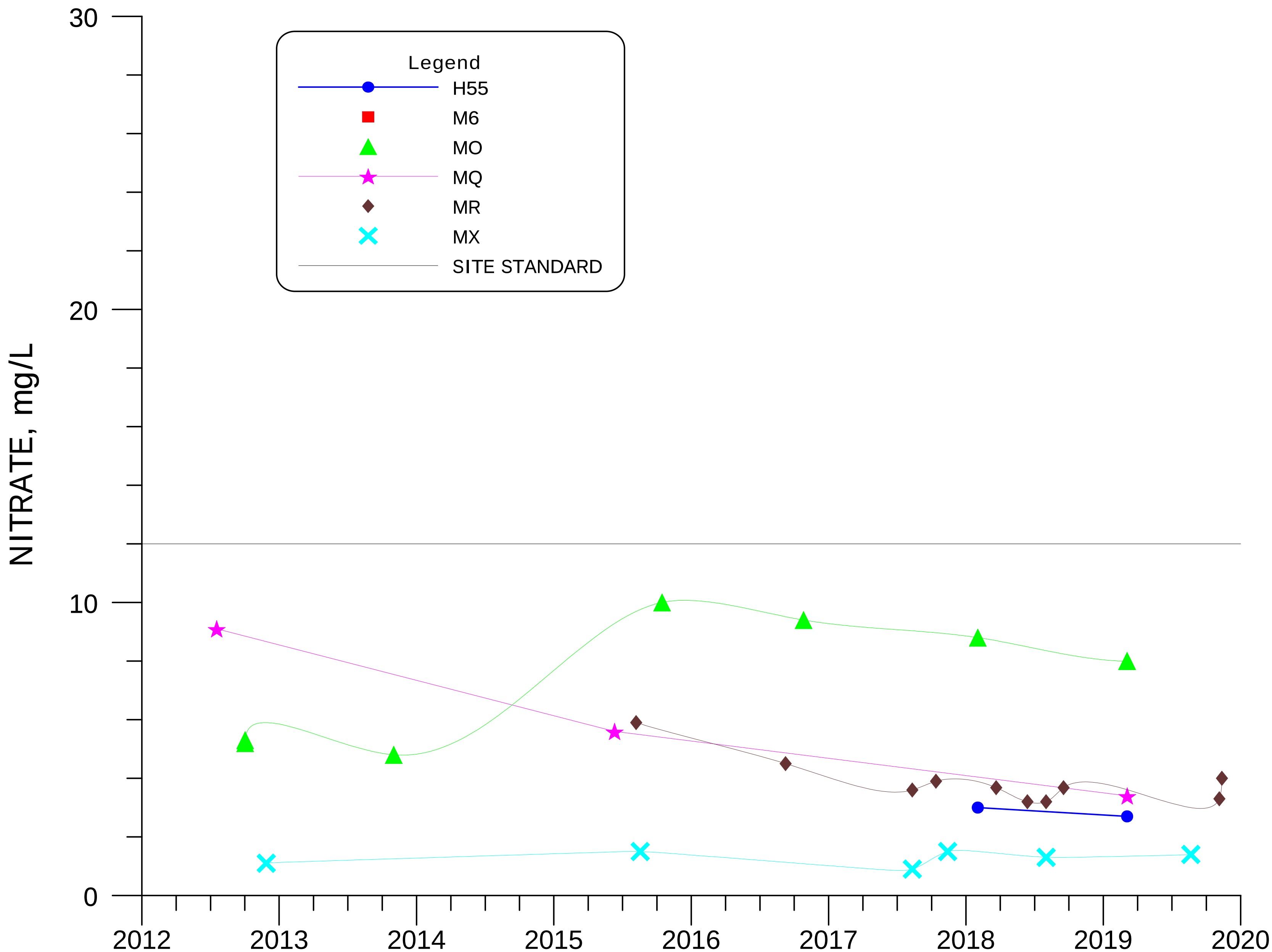


FIGURE 4.3-107. NITRATE CONCENTRATIONS FOR WELLS H55, M6, MO, MQ, MR AND MX.

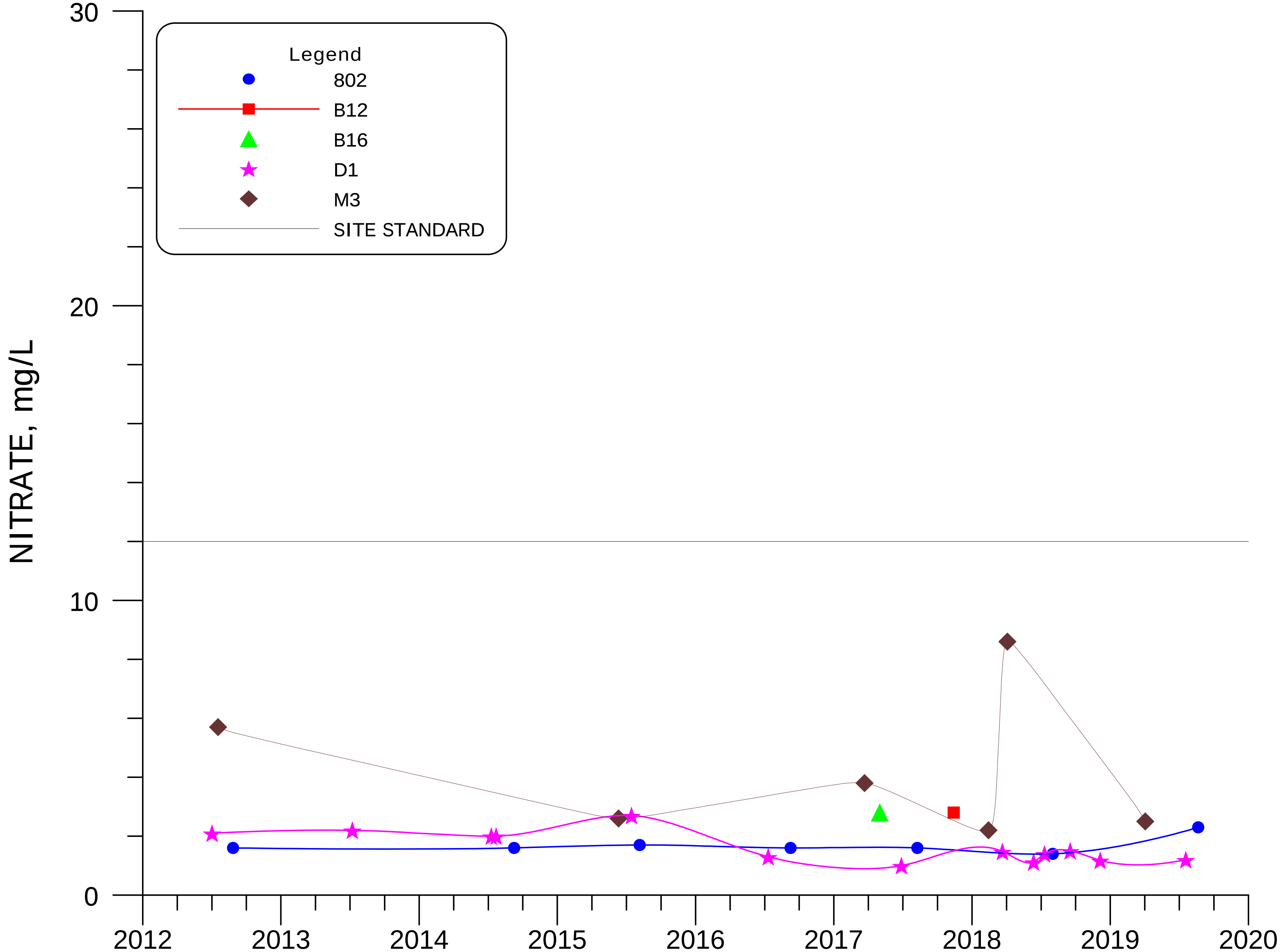


FIGURE 4.3-108. NITRATE CONCENTRATIONS FOR WELLS 802, B12, B15, D1 AND M3.

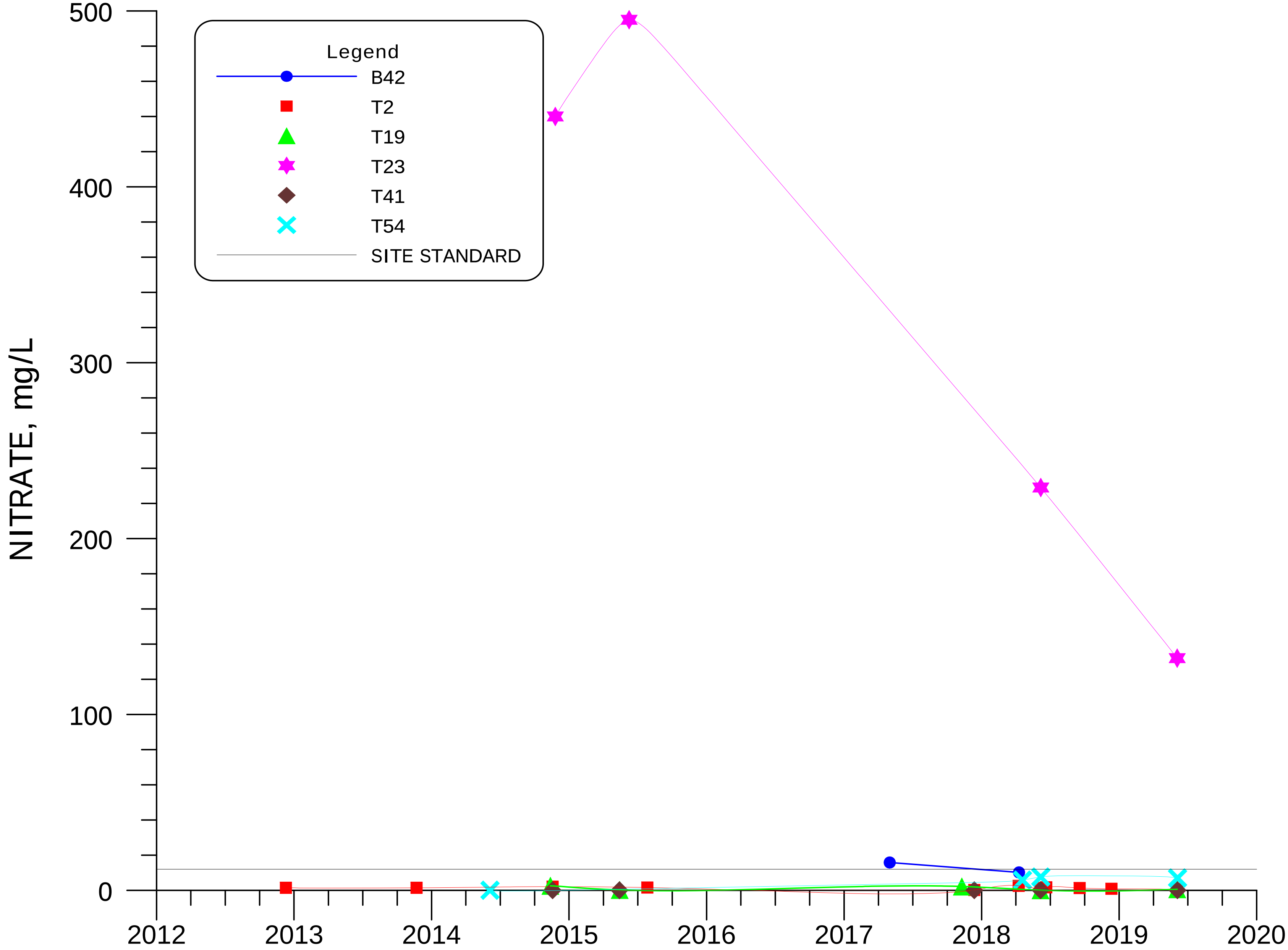


FIGURE 4.3-109. NITRATE CONCENTRATIONS FOR WELLS B42, T2, T19, T23, T41 AND T54.

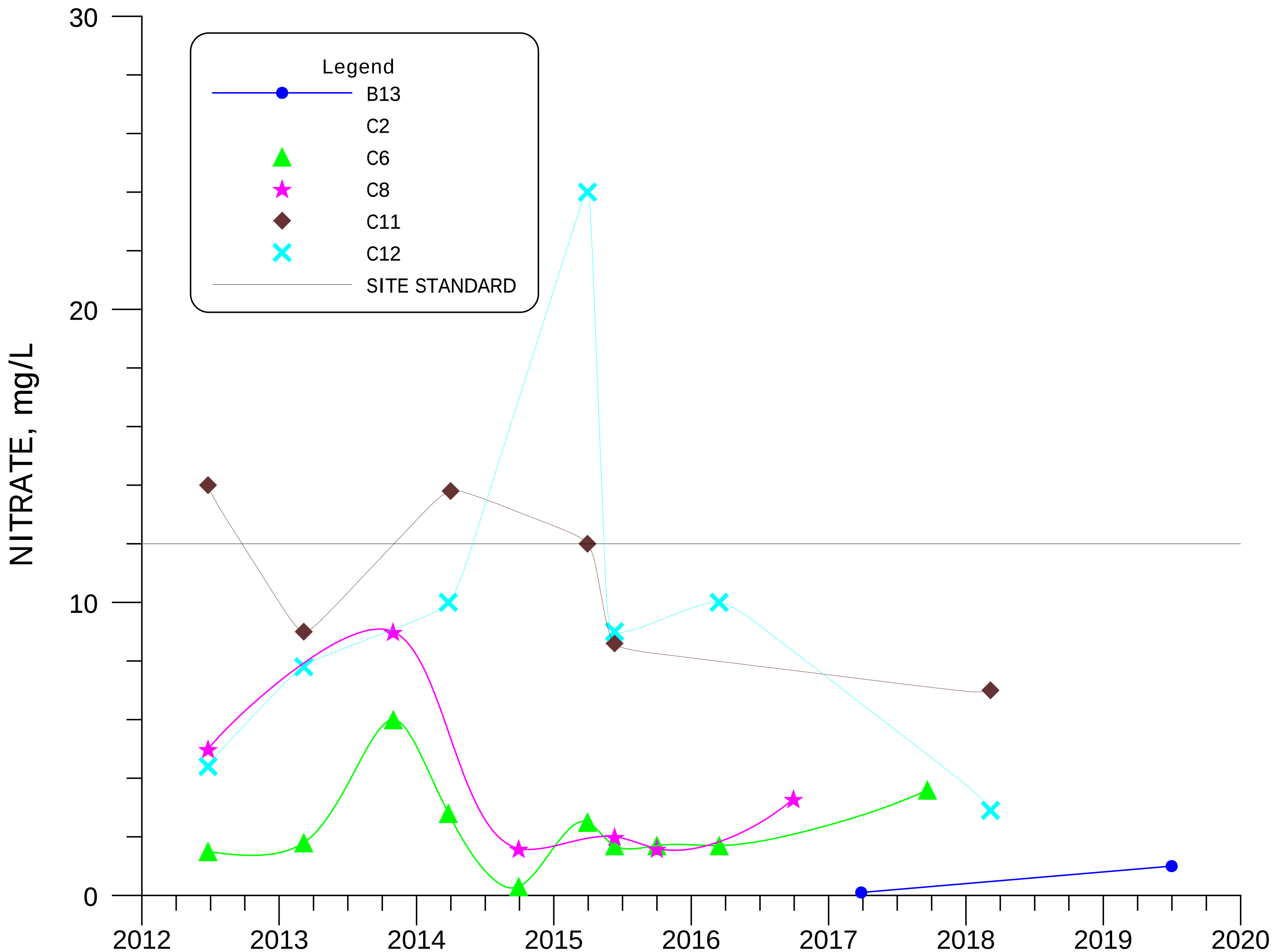


FIGURE 4.3-110. NITRATE CONCENTRATIONS FOR WELLS B13, C2, C6, C8, C11 AND C12.

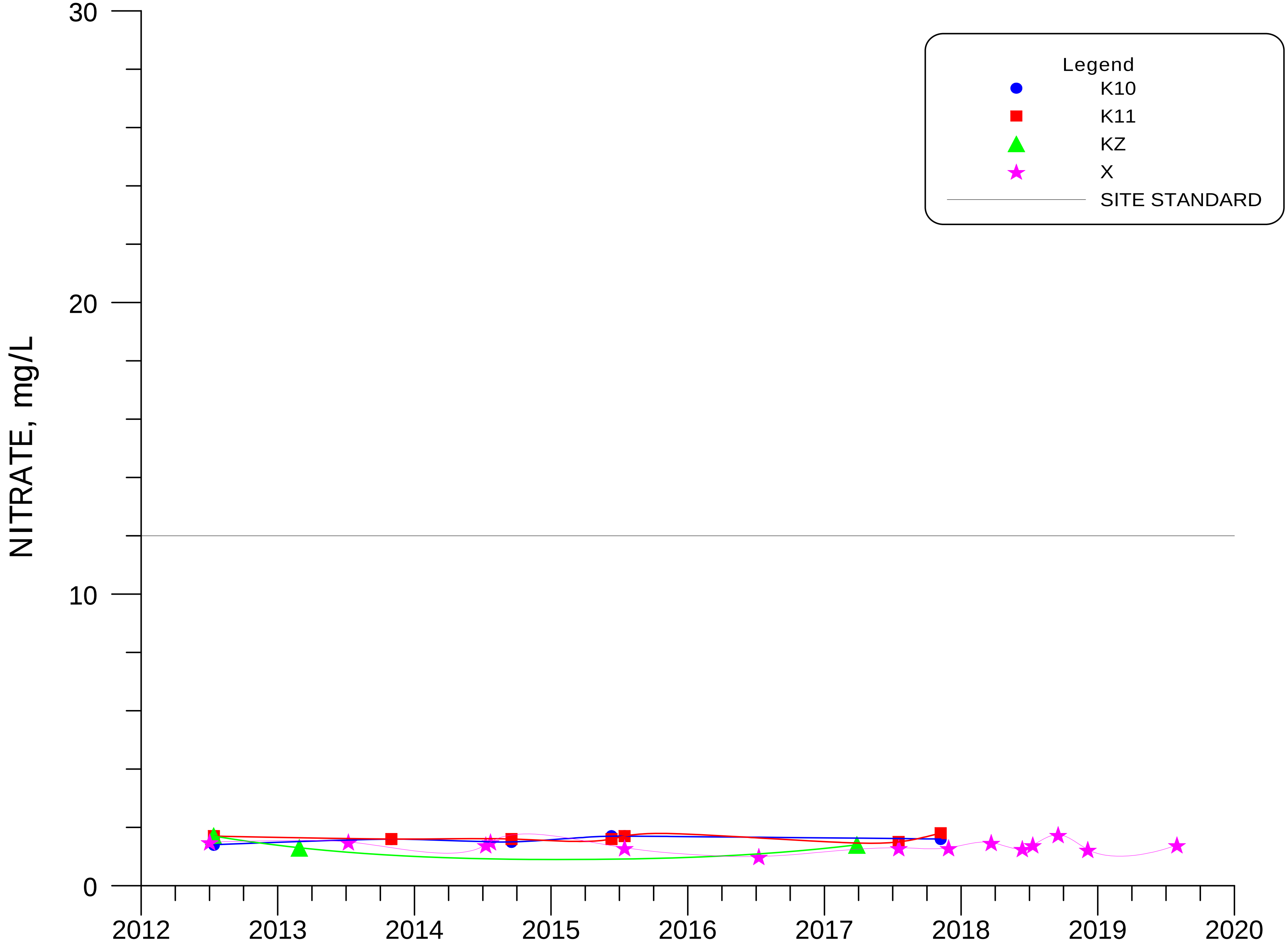


FIGURE 4.3-111. NITRATE CONCENTRATIONS FOR WELLS K10, K11, KZ AND X.

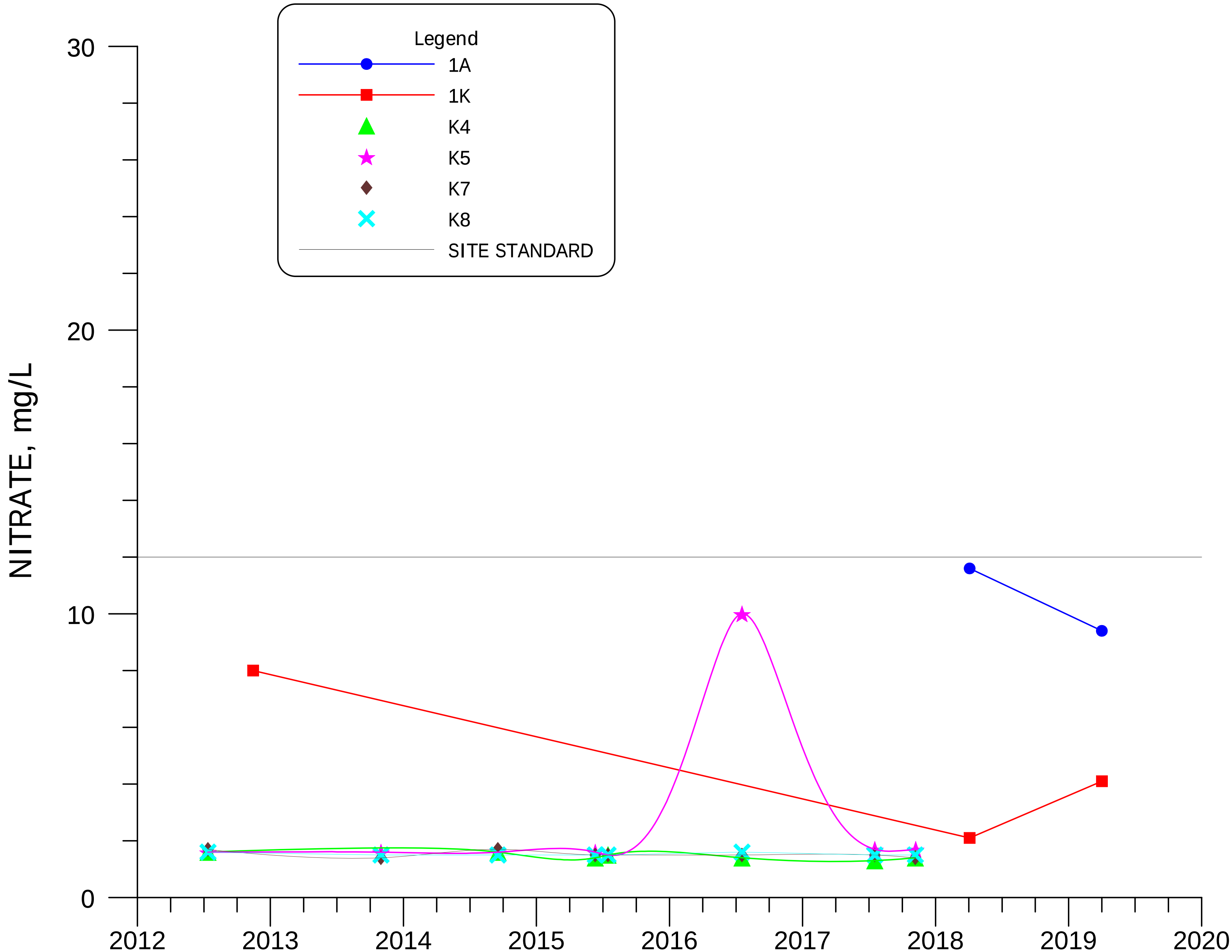


FIGURE 4.3-112. NITRATE CONCENTRATIONS FOR WELLS 1A, 1K, K4, K5, K7 AND K8.

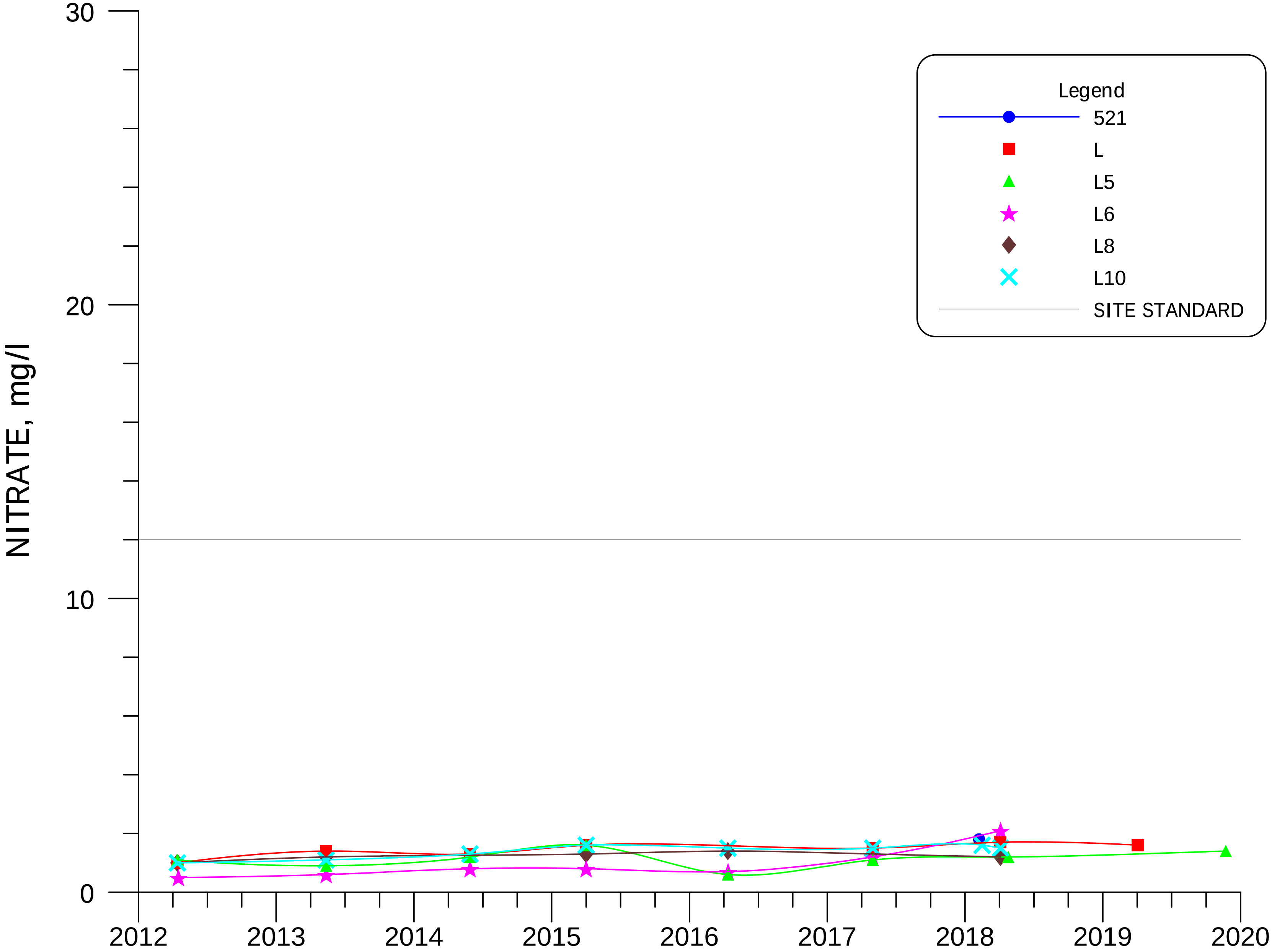


FIGURE 4.3-113. NITRATE CONCENTRATIONS FOR WELLS 521, L, L5, L6, L8 AND L10.

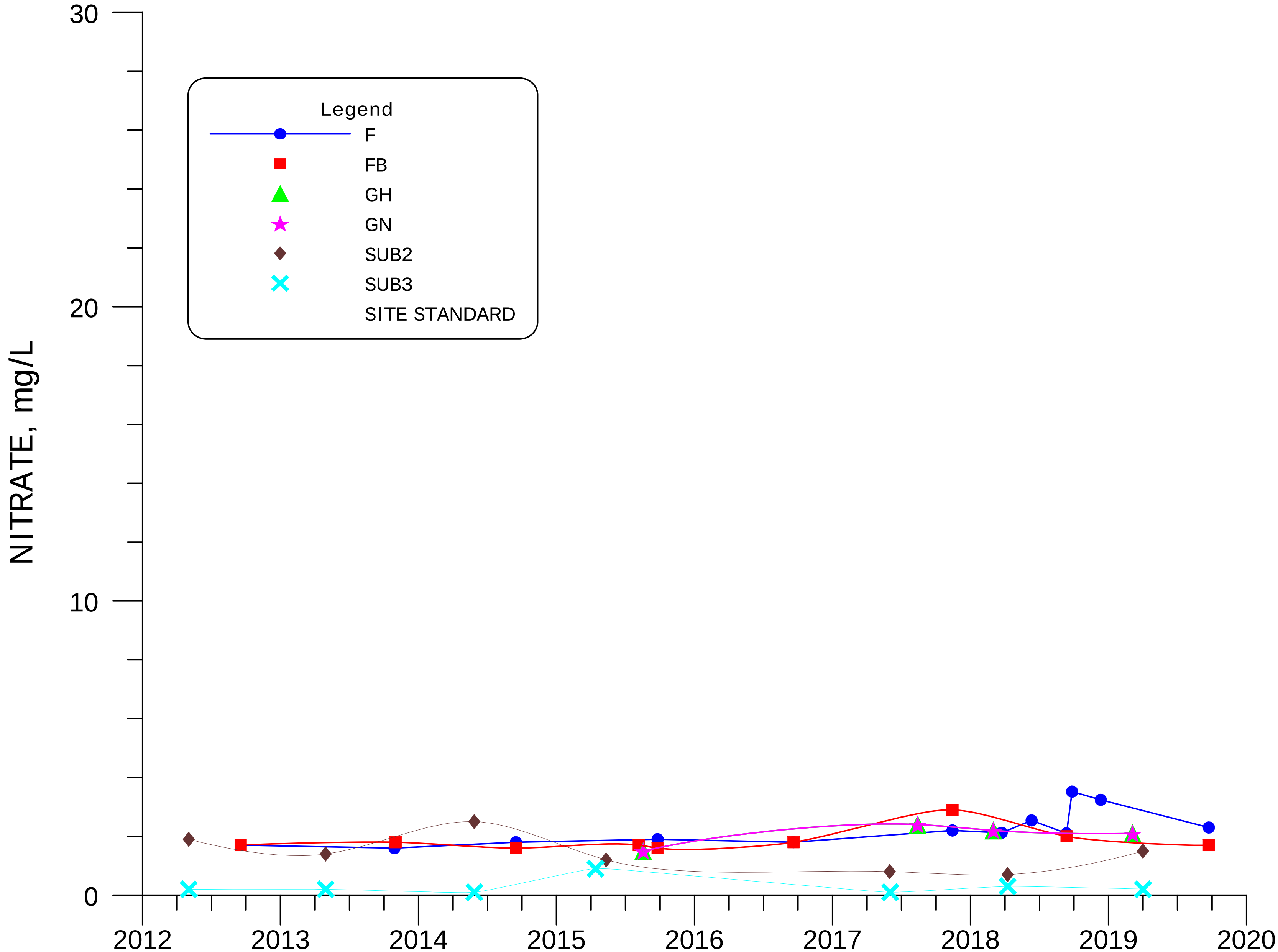


FIGURE 4.3-114. NITRATE CONCENTRATIONS FOR WELLS F, FB, GH, GN, SUB2 AND SUB3.

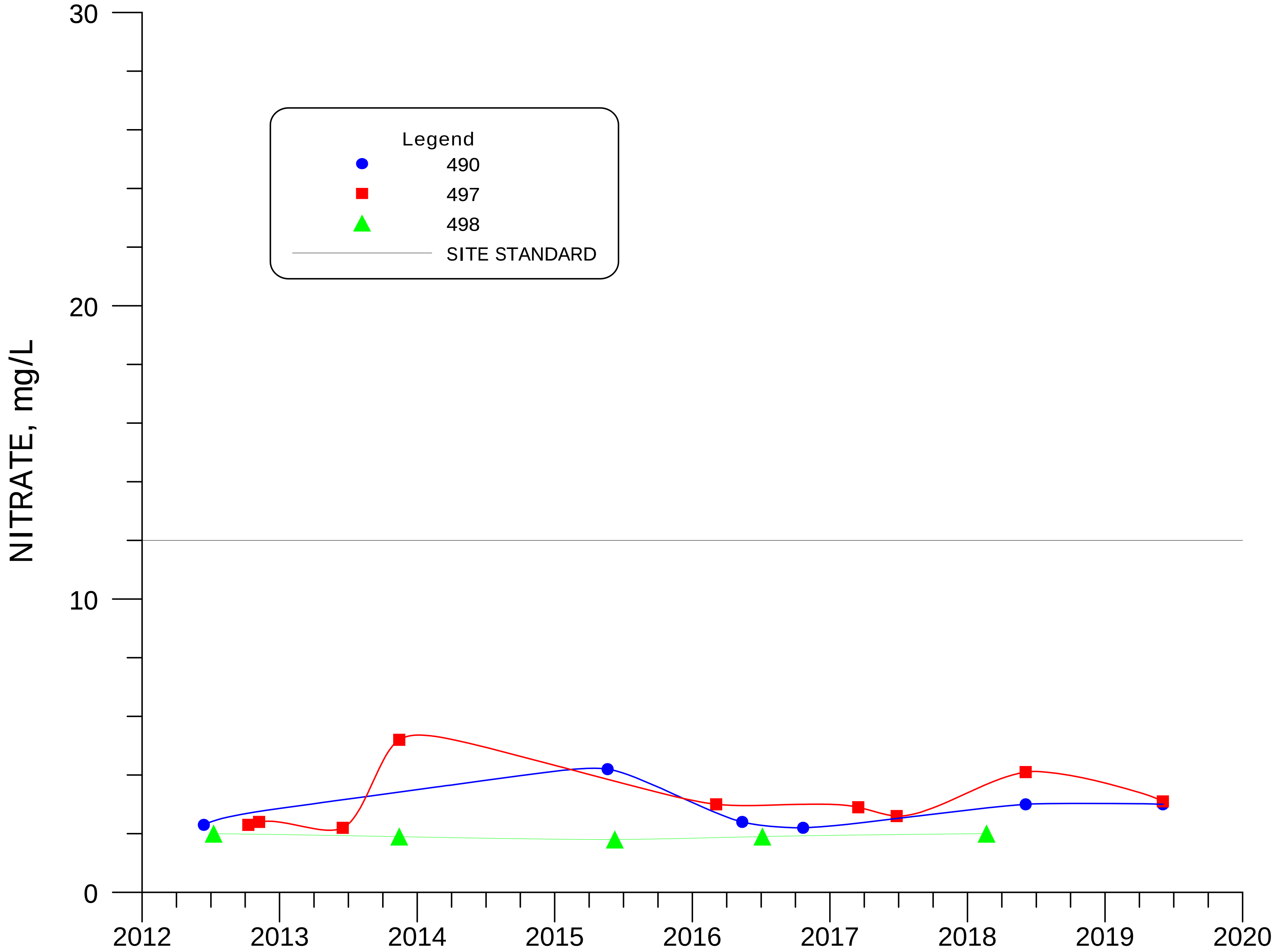


FIGURE 4.3-115. NITRATE CONCENTRATIONS FOR WELLS 490, 497 AND 498.

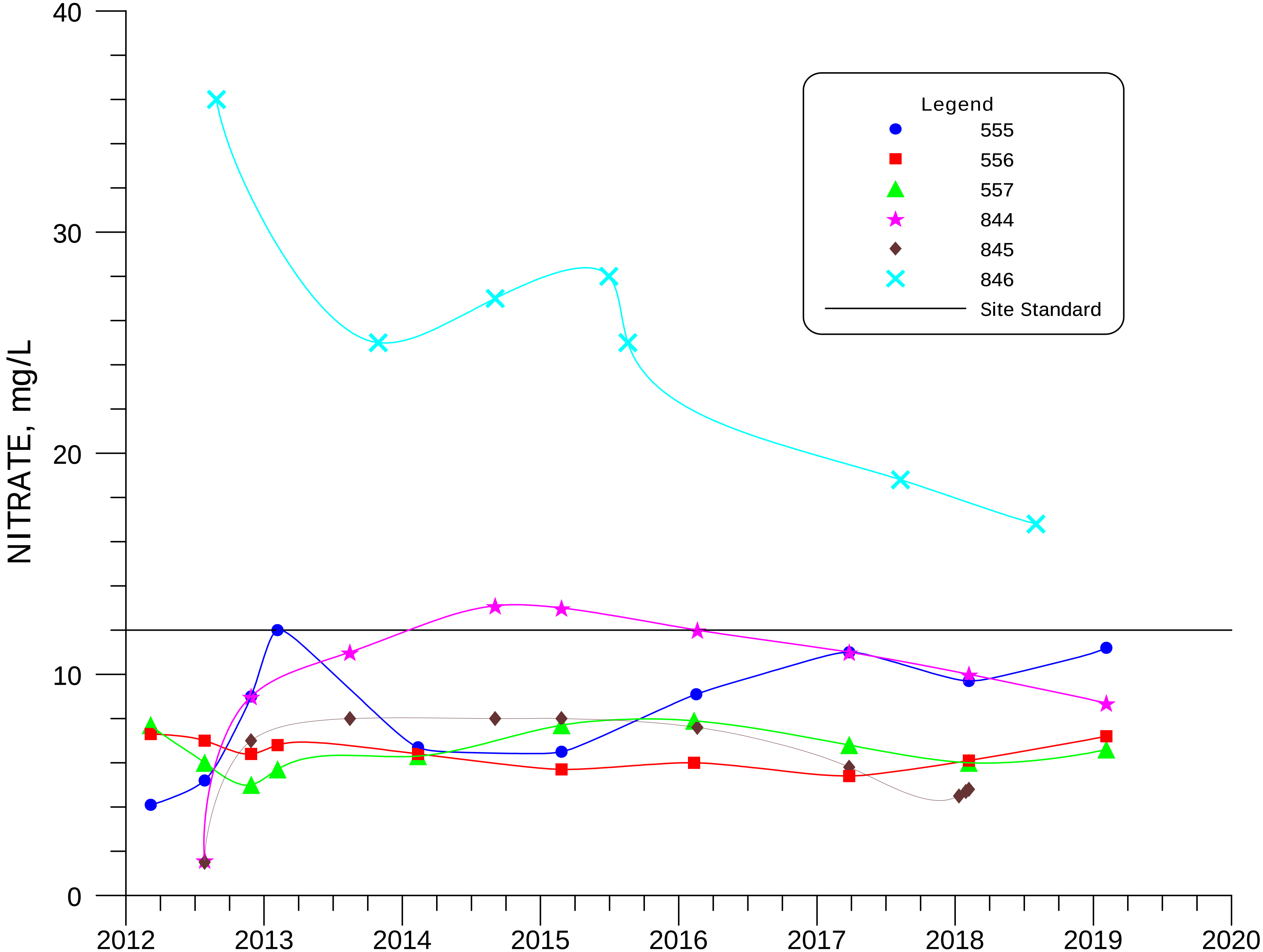


FIGURE 4.3-116. NITRATE CONCENTRATIONS FOR WELLS 555, 556, 557, 844, 845, AND 846.

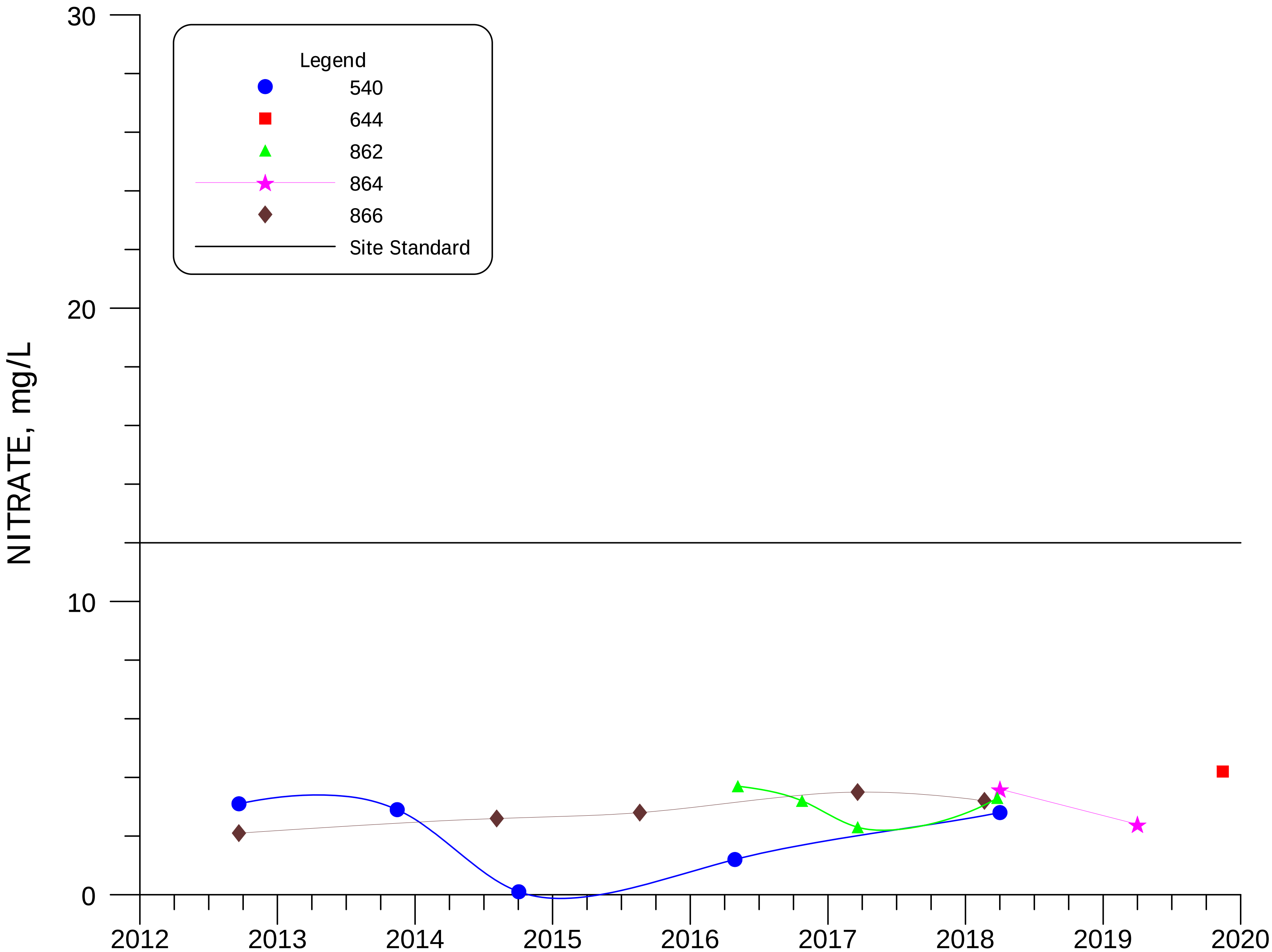


FIGURE 4.3-117. NITRATE CONCENTRATIONS FOR WELLS 540, 644, 862, 864, 866 AND 869.

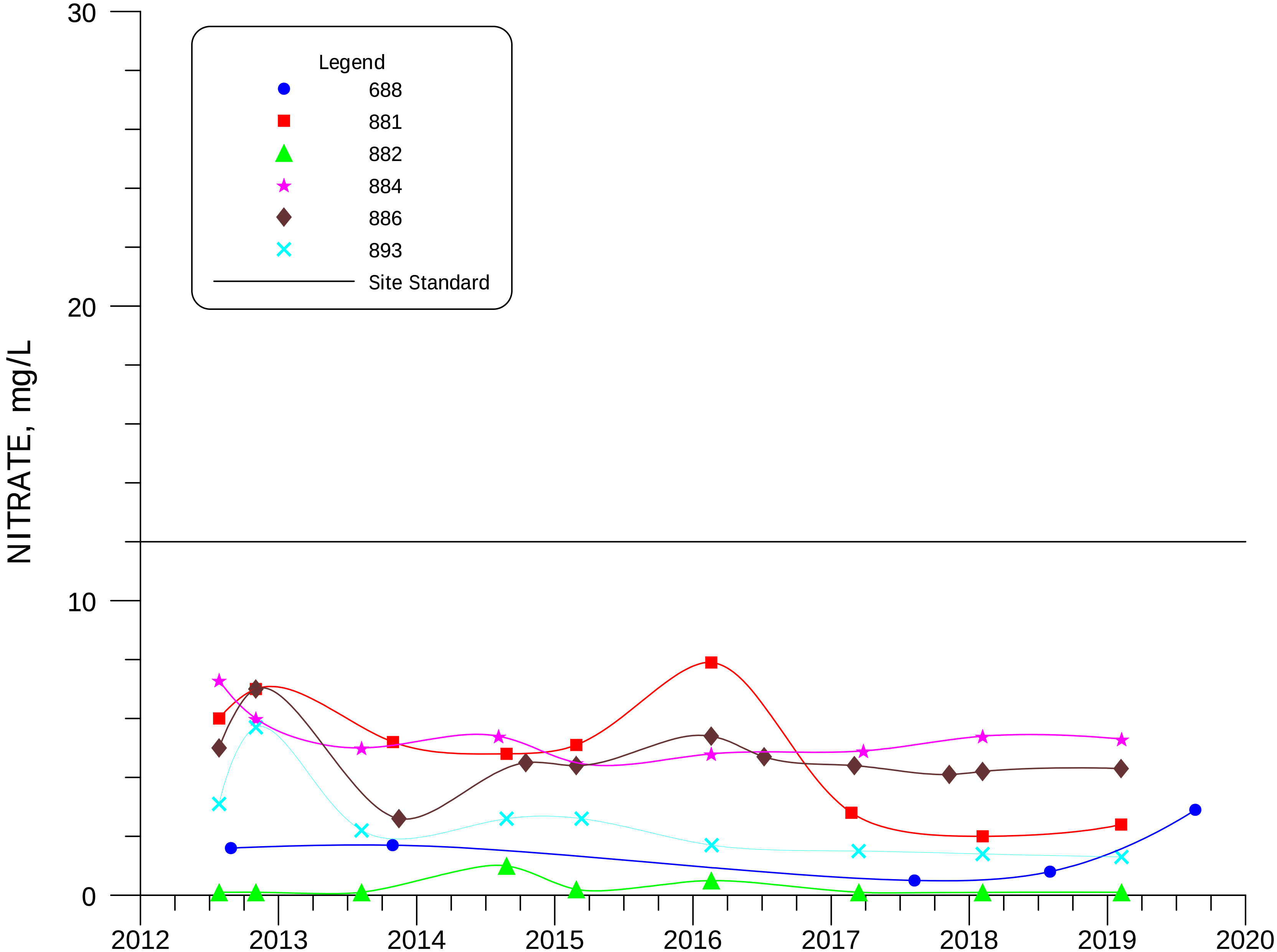


FIGURE 4.3-118. NITRATE CONCENTRATIONS FOR WELLS 688, 881, 882, 884, 886 AND 893.

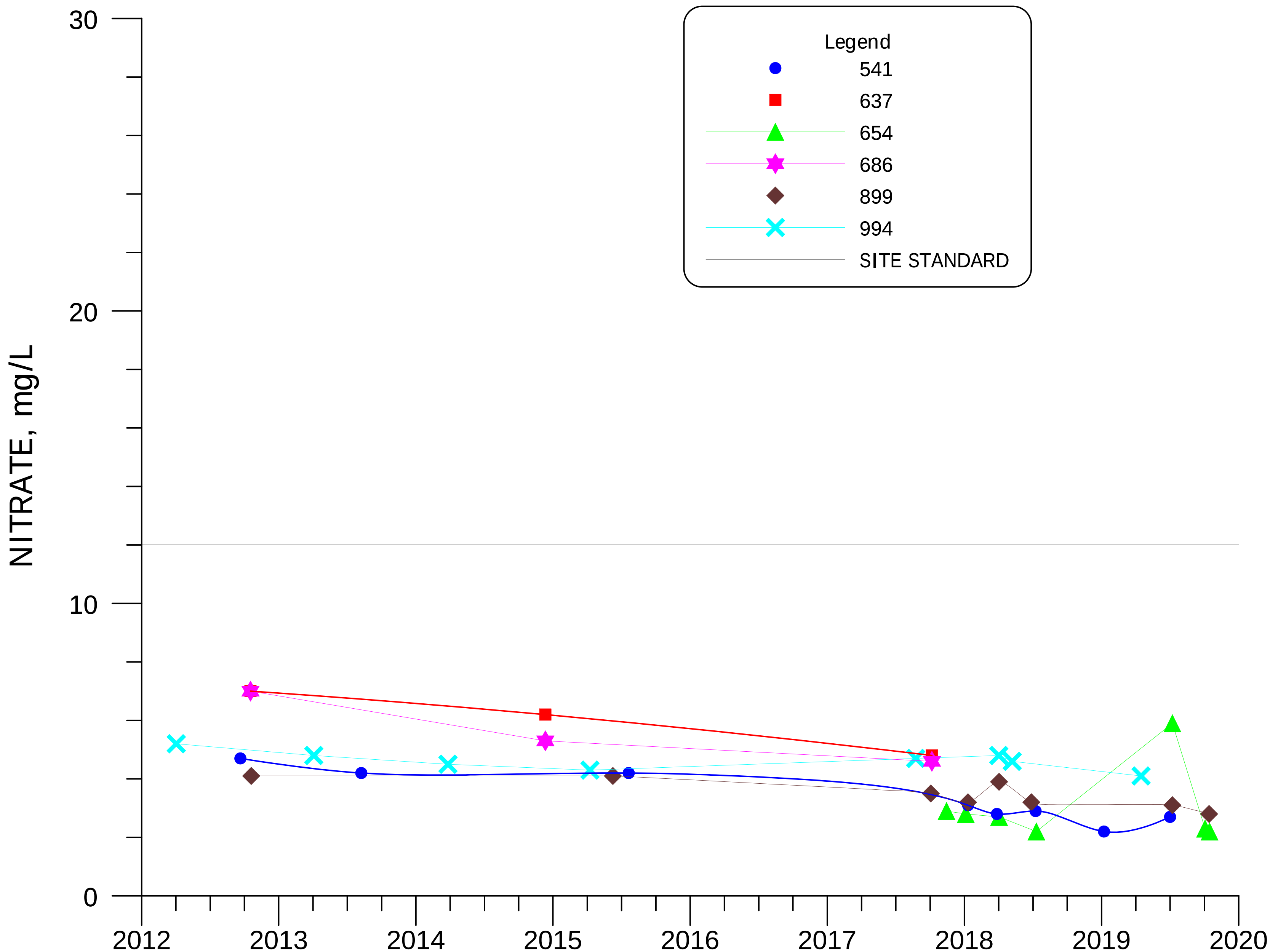


FIGURE 4.3-119. NITRATE CONCENTRATIONS FOR WELLS 541, 637, 654, 686, 899 AND 994.

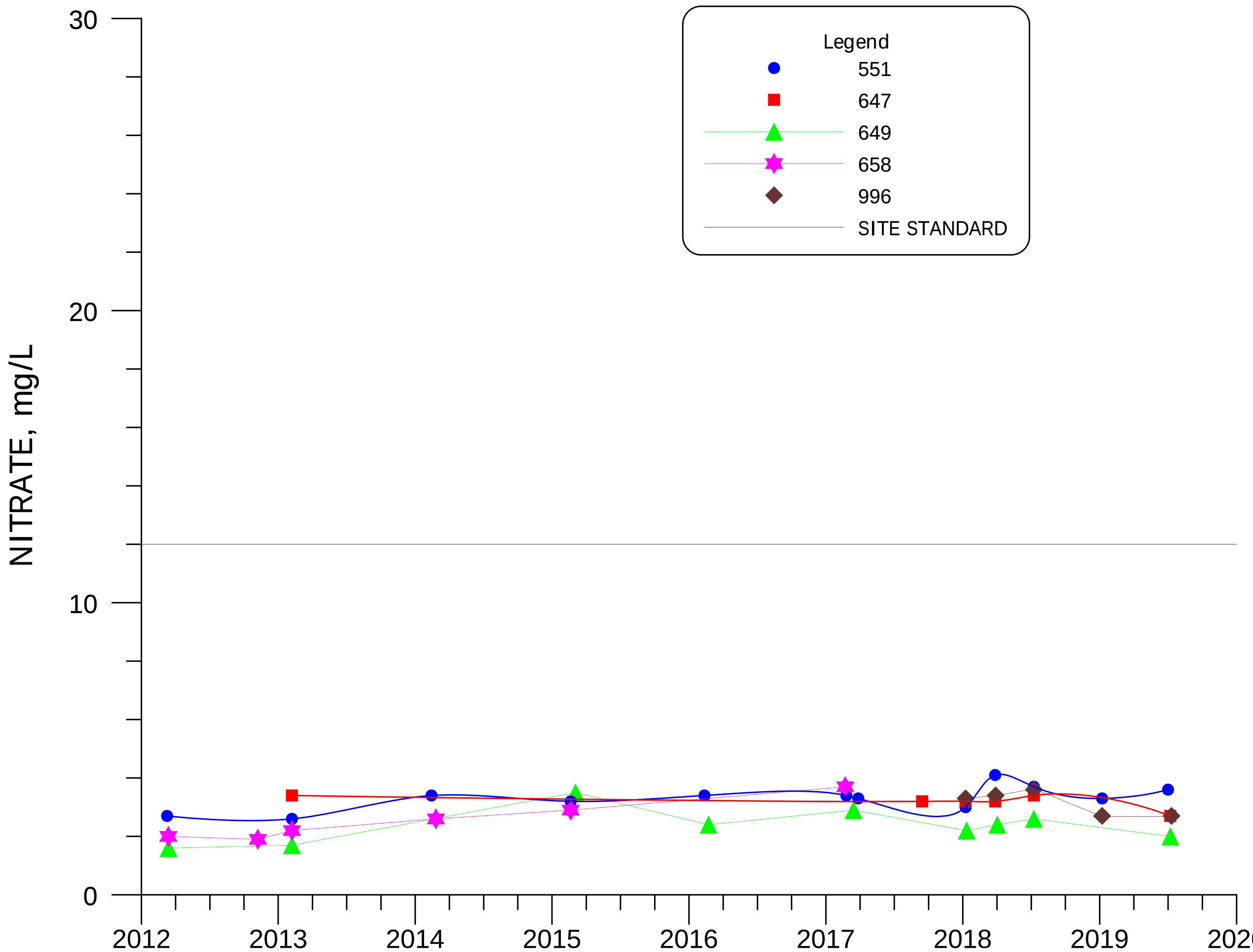
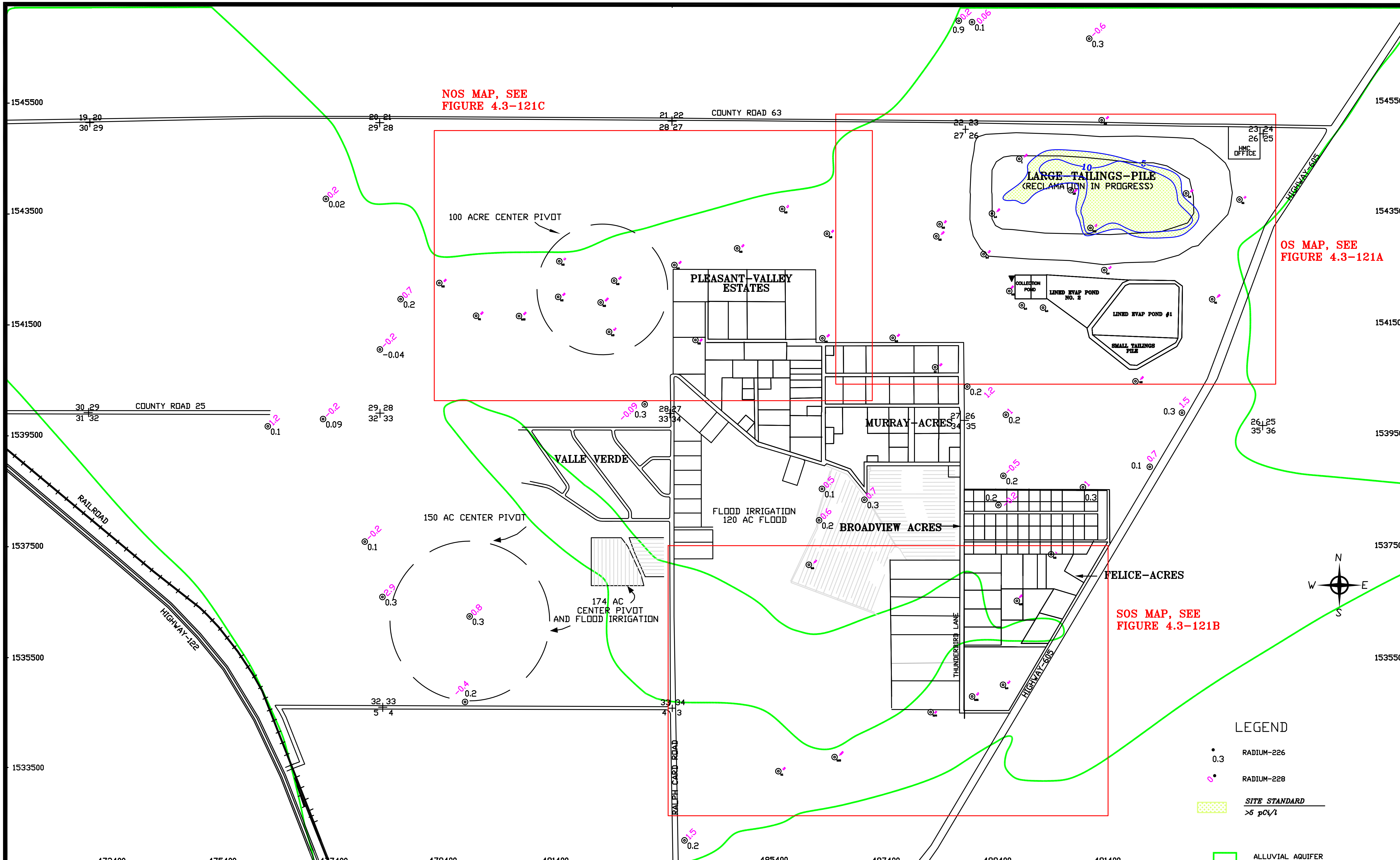


FIGURE 4.3-120. NITRATE CONCENTRATIONS FOR WELLS 551, 647, 649, 658 AND 996.



SCALE: 1"=1600'
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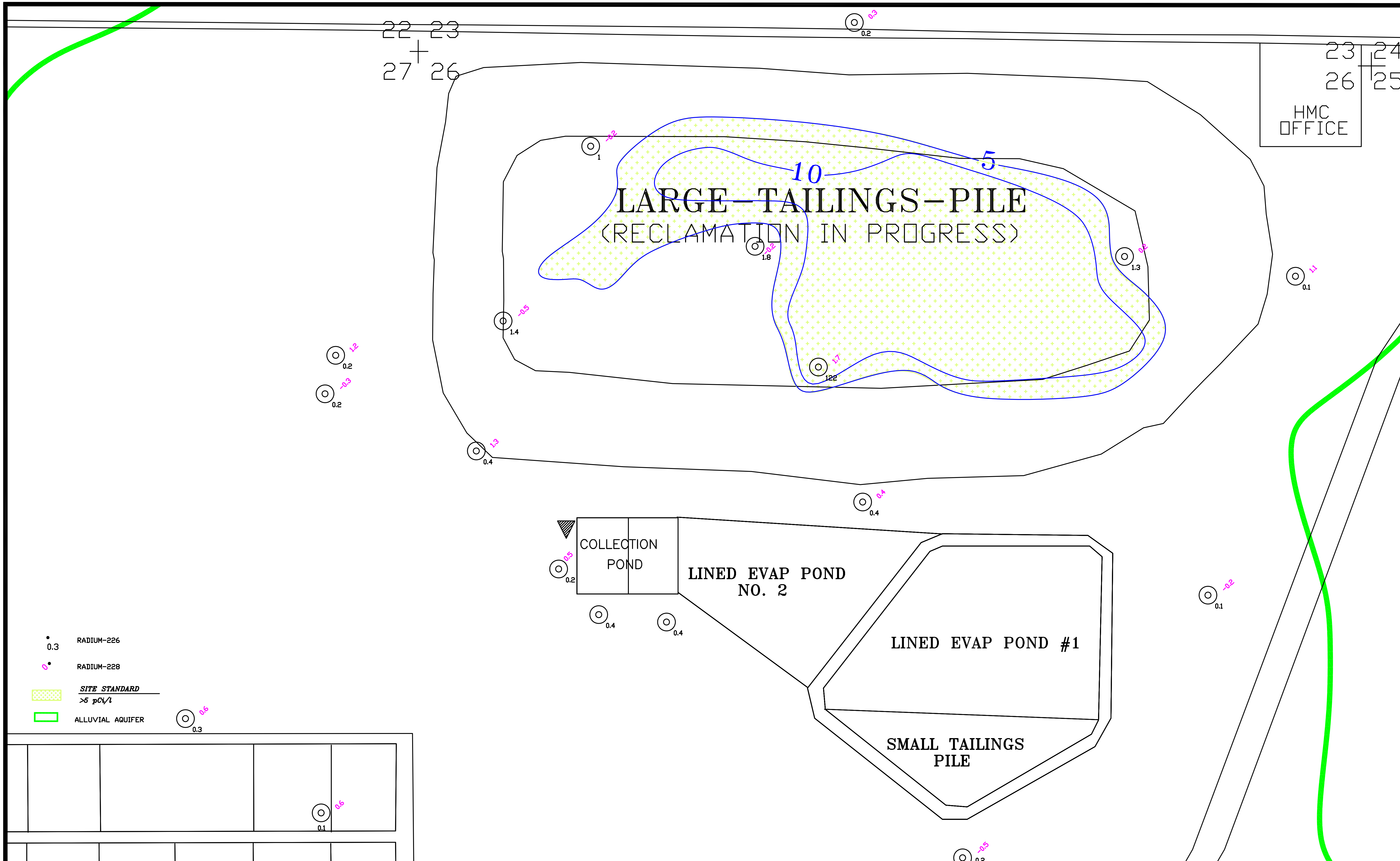
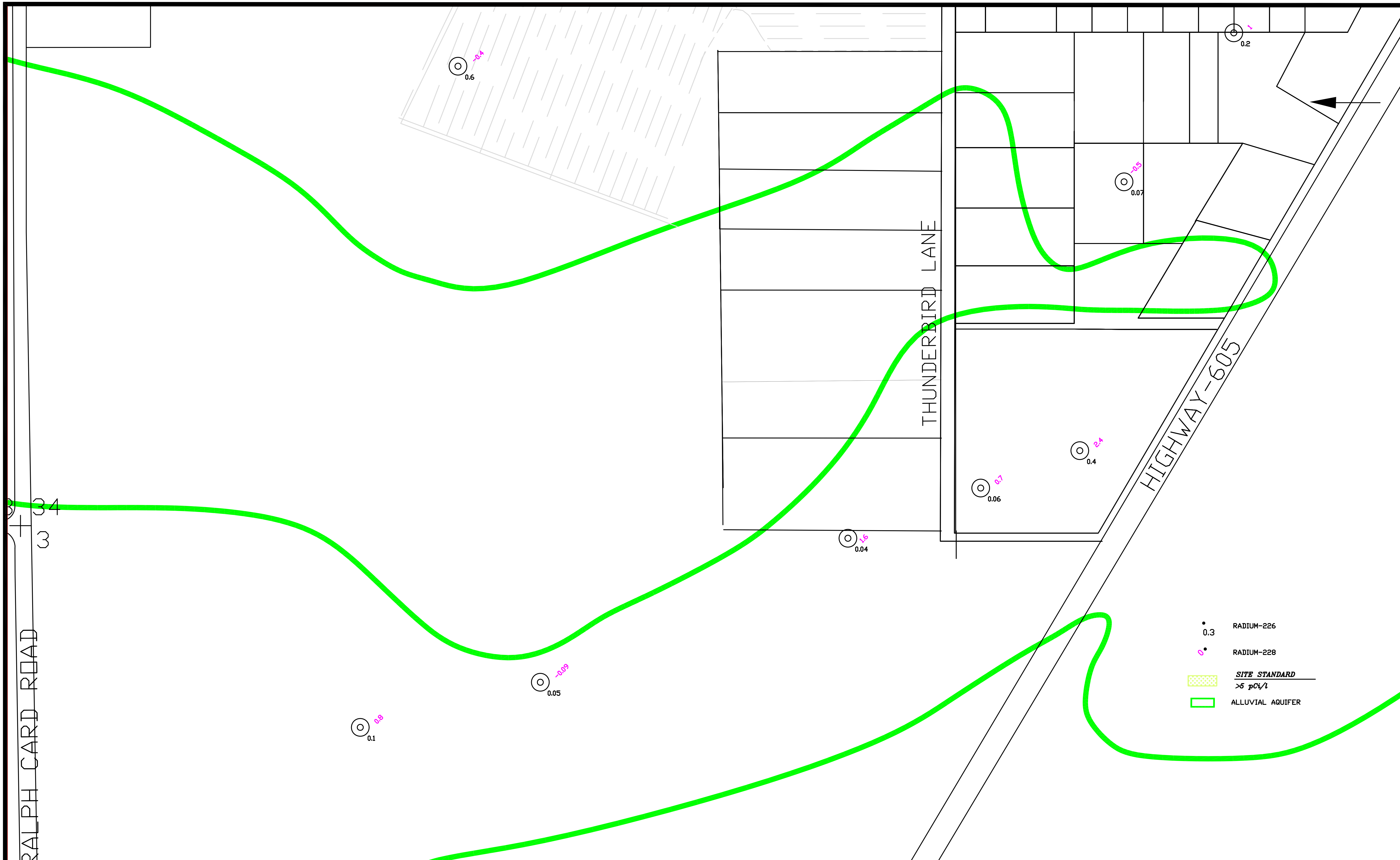
DATE: 3/5/2020

FIGURE 4.3-121. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, pCi/L



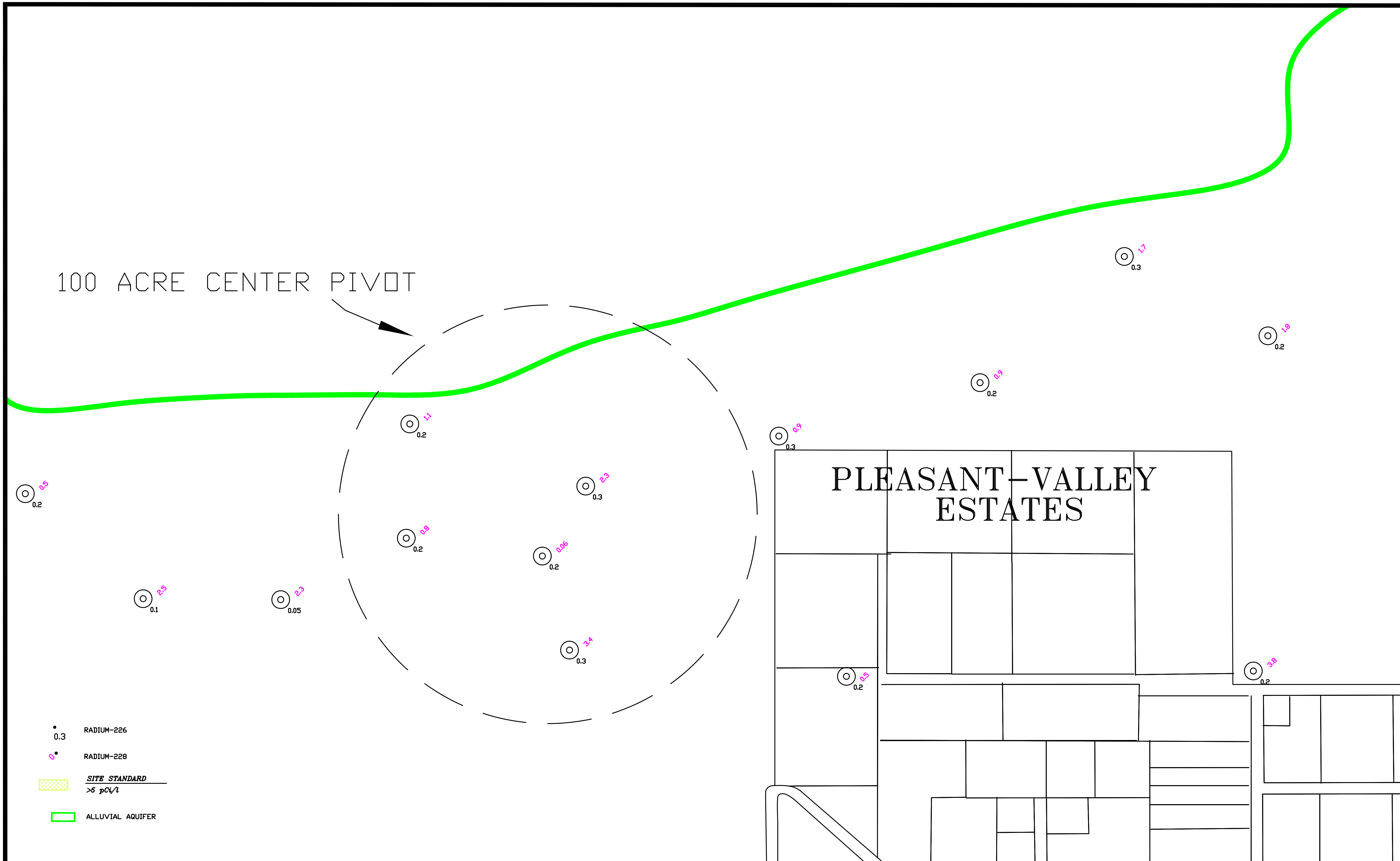
SCALE: 1"=500'
C:\PROJECTS\ 2020–06 1600QAL19
DATE: 1/13/2020

FIGURE 4.3–121A. RADIUM–226 AND RADIUM–228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, pCi/L



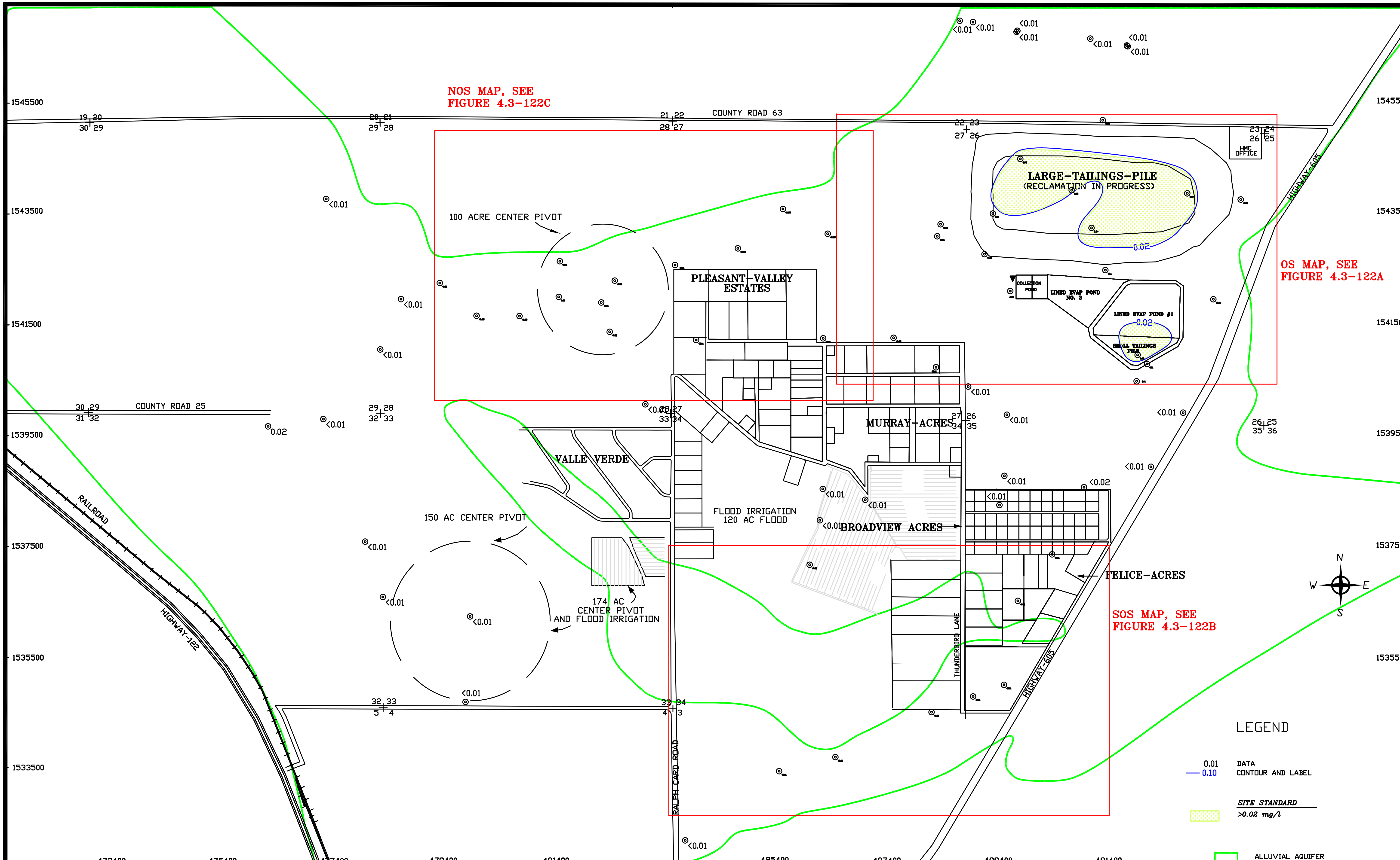
SCALE: 1"=500'
C:\PROJECTS\ 2020-06 1600QAL19
DATE: 1/10/2020

FIGURE 4.3-121B. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, pCi/L



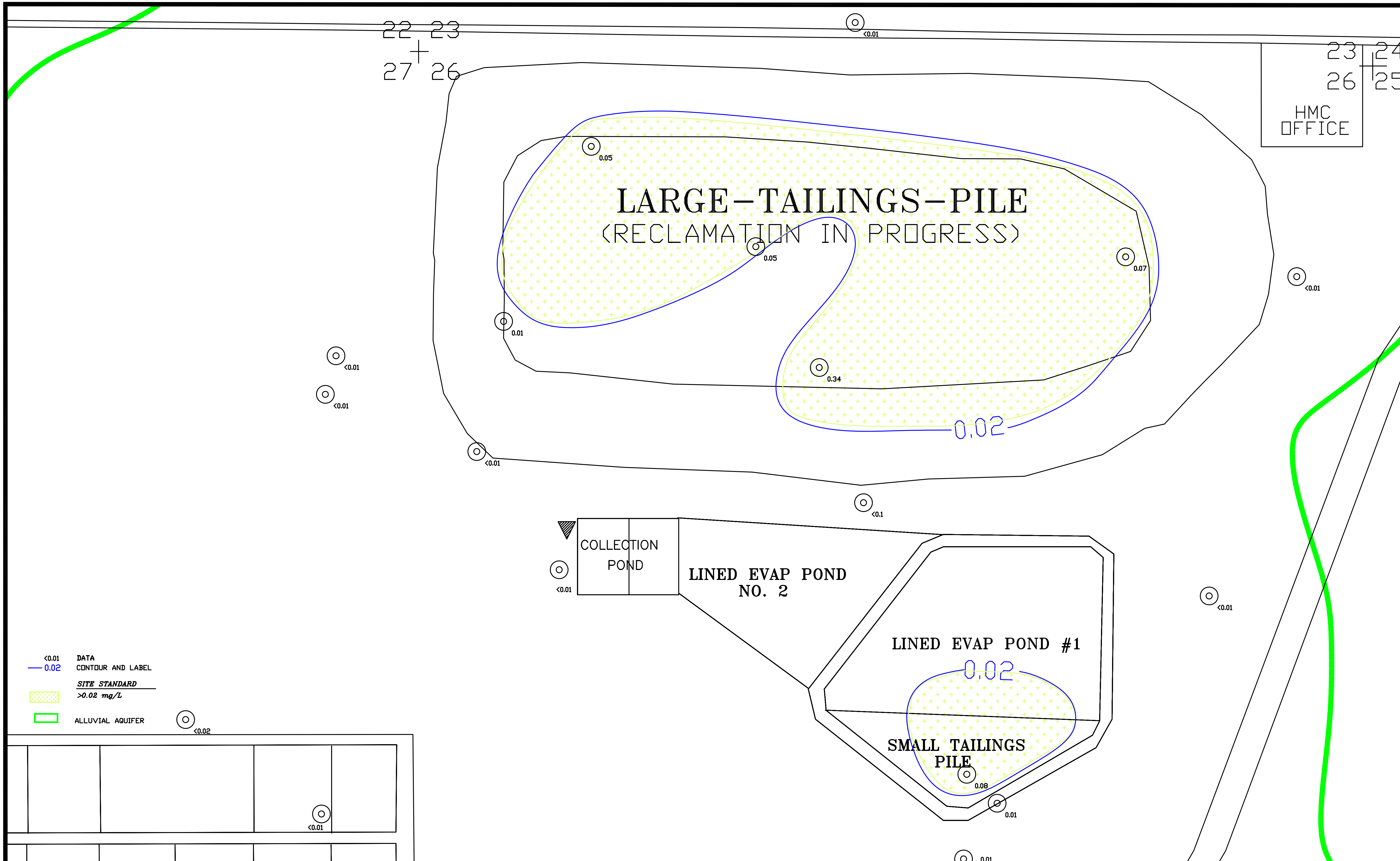
SCALE: 1"=500'
C:\PROJECTS\ 2020-06 16000AL19
DATE: 1/17/2020

FIGURE 4.3-121C. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, pCi/L



SCALE: 1"=1600'
C:\PROJECTS\ 2020-06 1600QAL19
DATE: 1/22/2020

FIGURE 4.3-122. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, mg/L

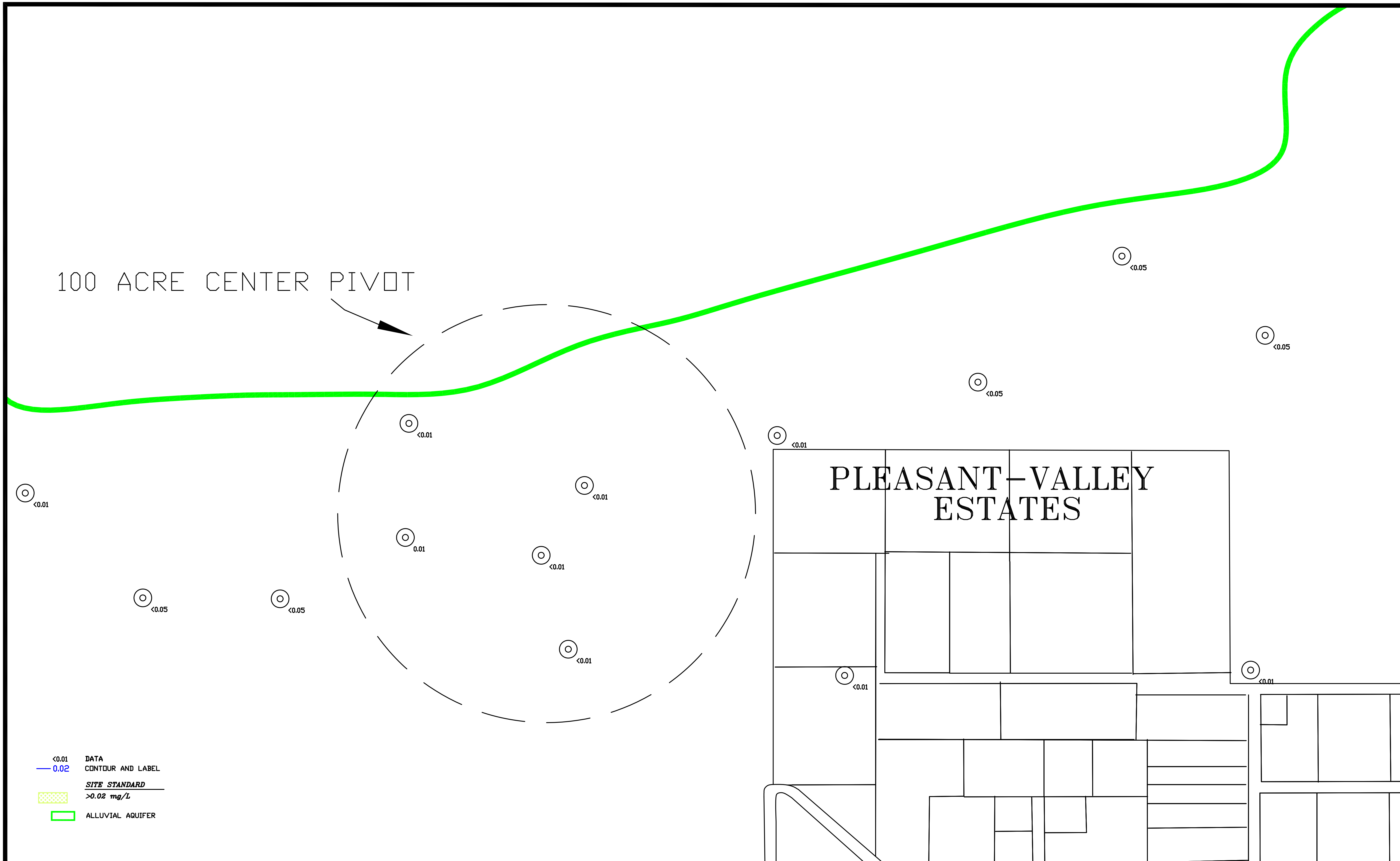


SCALE: 1"=500'
C:\PROJECTS\2020-06
1600QAL19
DATE: 1/13/2020

FIGURE 4.3-122A. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, mg/L

SCALE: 1"=500'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/10/2020

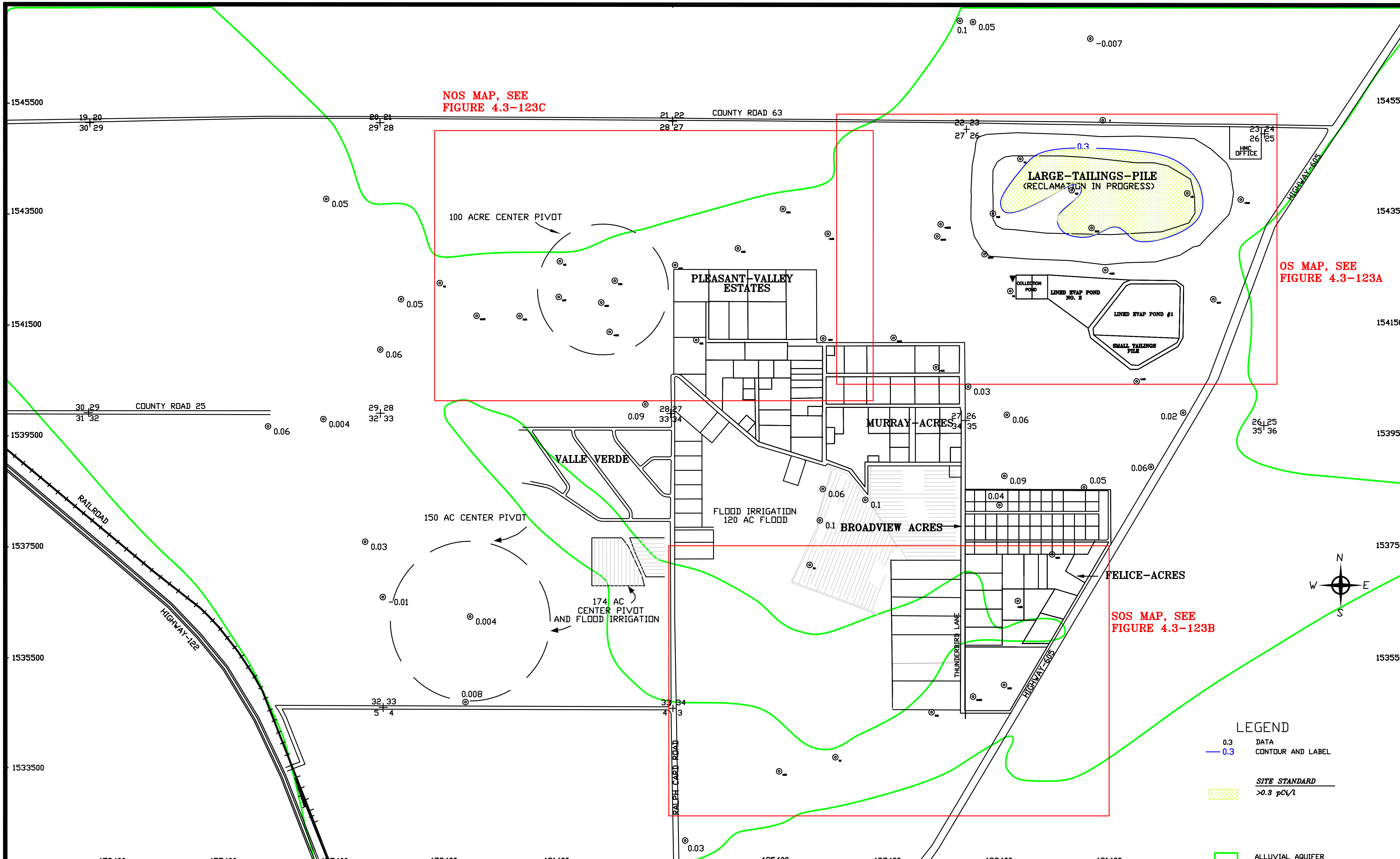
FIGURE 4.3-122B. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, mg/L



SCALE: 1"=500'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/17/2020

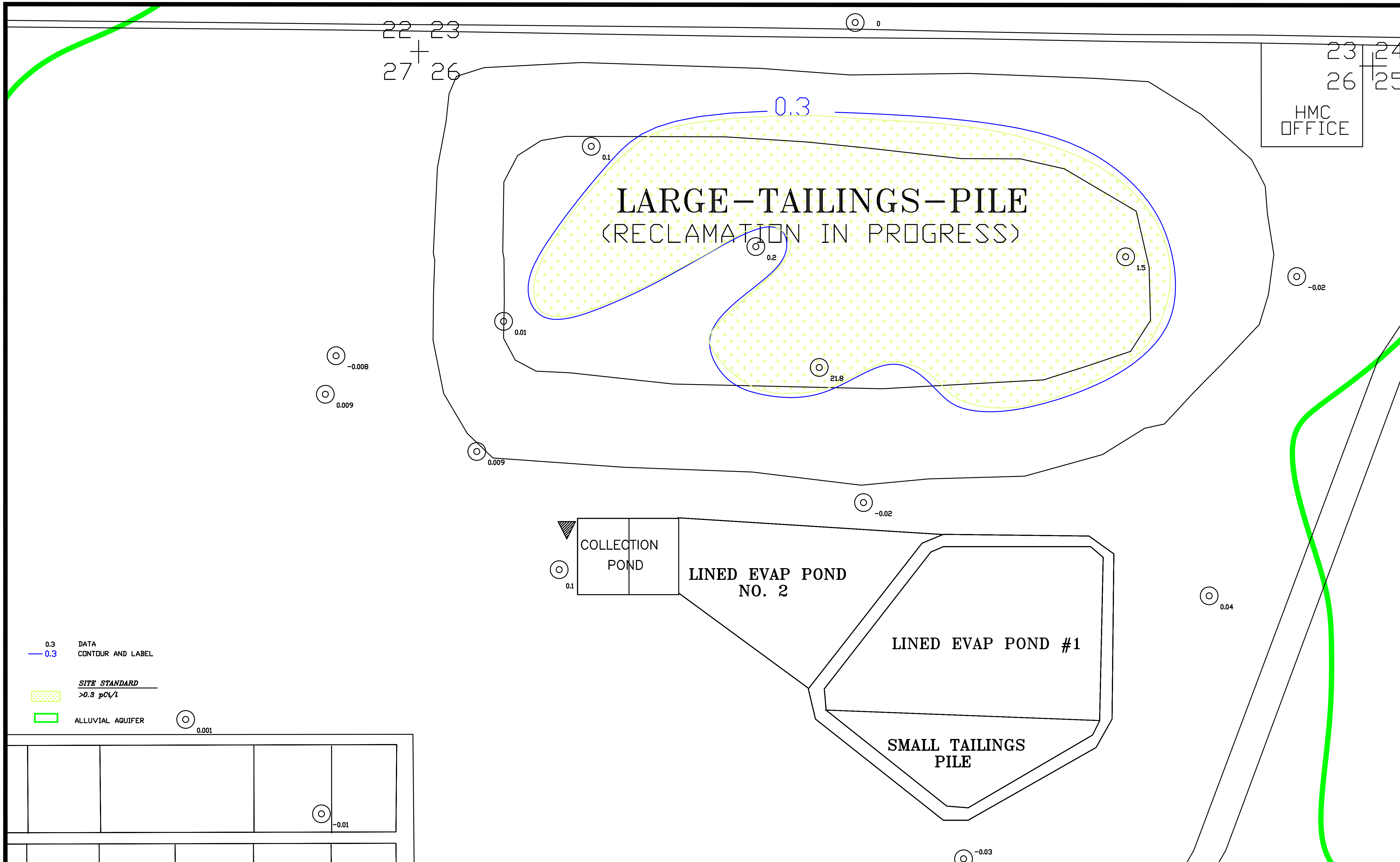
FIGURE 4.3-122C. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, mg/L

4.3-200



SCALE: 1"=1600'
C:\PROJECTS\ 2020-06 1600QAL19
DATE: 1/22/2020

FIGURE 4.3-123. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2019, pCi/L

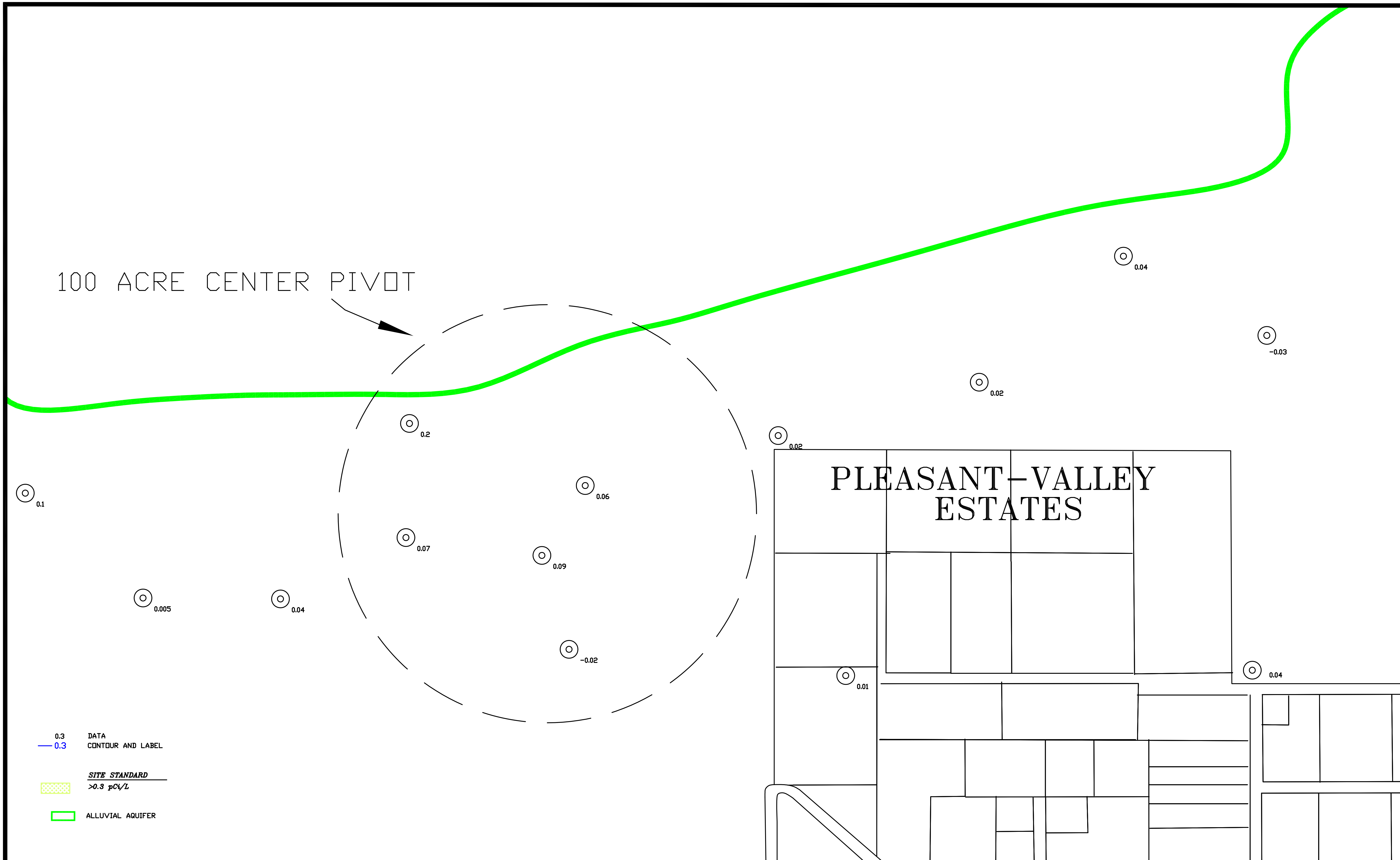


SCALE: 1"=500'
C:\PROJECTS\2020-06 1600QAL19
DATE: 1/13/2020

FIGURE 4.3-123A. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, OS, 2019, pCi/L

SCALE: 1"=500'
C:\PROJECTS\ 2020-06
1600QAL19
DATE: 1/10/2020

FIGURE 4.3-123B. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, SOS, 2019, pCi/L



SCALE: 1"=500'
C:\PROJECTS\ 2020-06 16000AL19
DATE: 1/17/2020

FIGURE 4.3-123C. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, NOS, 2019, pCi/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 2019 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 2019.

[2] Wells DD, ND, P, P1, P2, P3, P4, Q and R were used to establish site standards.

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FOR HOMESTAKE'S GRANTS PROJECT

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FIGURES
(continued)

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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 2019 to define conditions in this aquifer and define Upper Chinle restoration for the year.

5.1 UPPER CHINLE WELL COMPLETIONS

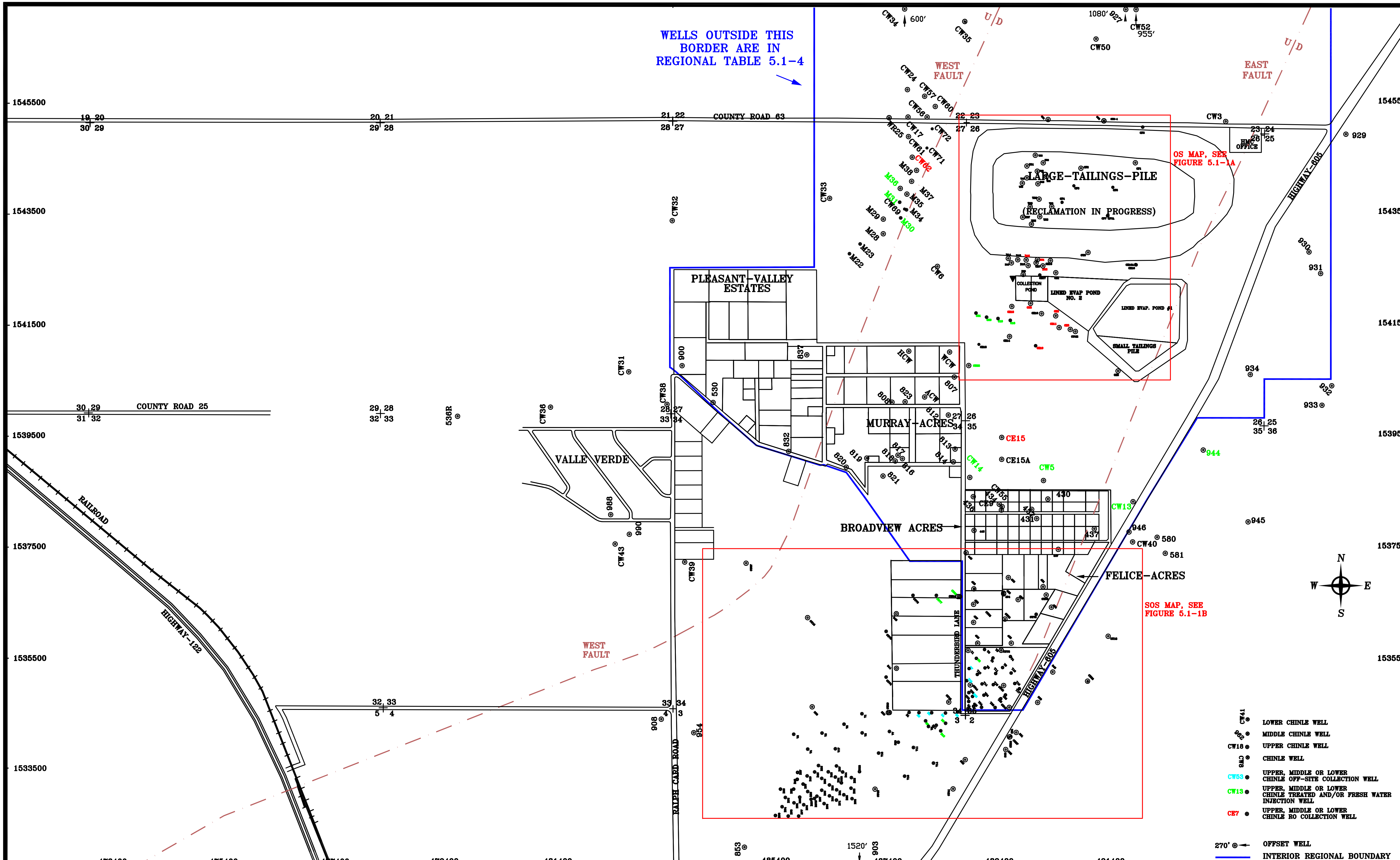
Chinle aquifer well locations are shown on Figures 5.1-1, 5.1-1A and 5.1-1B. The Upper and Middle Chinle aquifers do not exist in the area west of Ralph Card Road. Table 5.1-1 presents basic information for the Chinle wells located on the HMC property. This table indicates well coordinates, well depth, 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 2019.

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, CW5, CW13 and CW25 are shown in green to denote that these are treated and/or fresh-water injection wells. Upper Chinle wells B16, B31, B32, CE2, CE5, CE6, CE11, CE12, CE15 and CE19 were pumped to supply the R.O. plant in 2019 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.

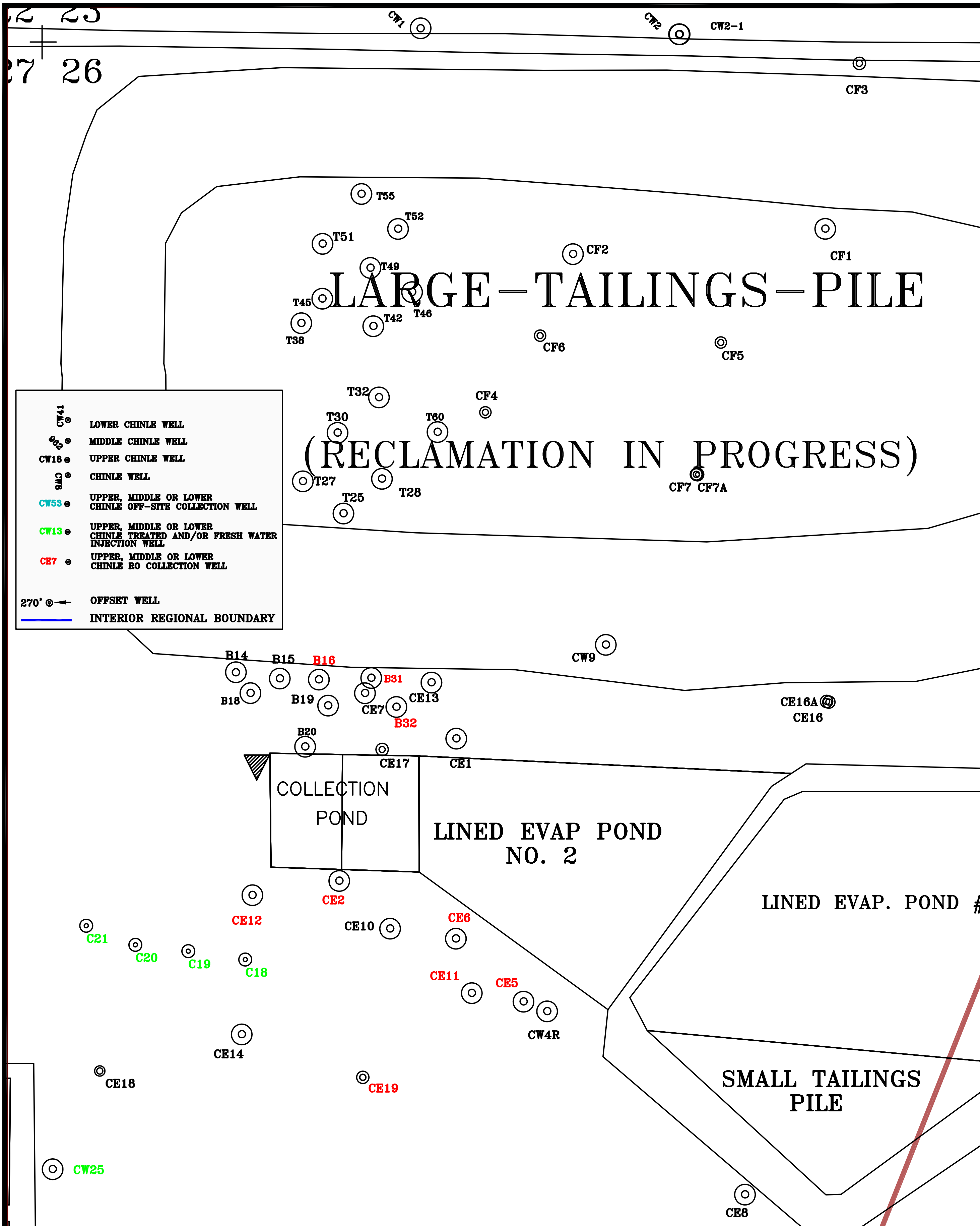


SCALE: 1"=1600'

C:\PROJECTS\2020-06
BASE19chinle.DWG

DATE: 1/16/2020

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS, 2019

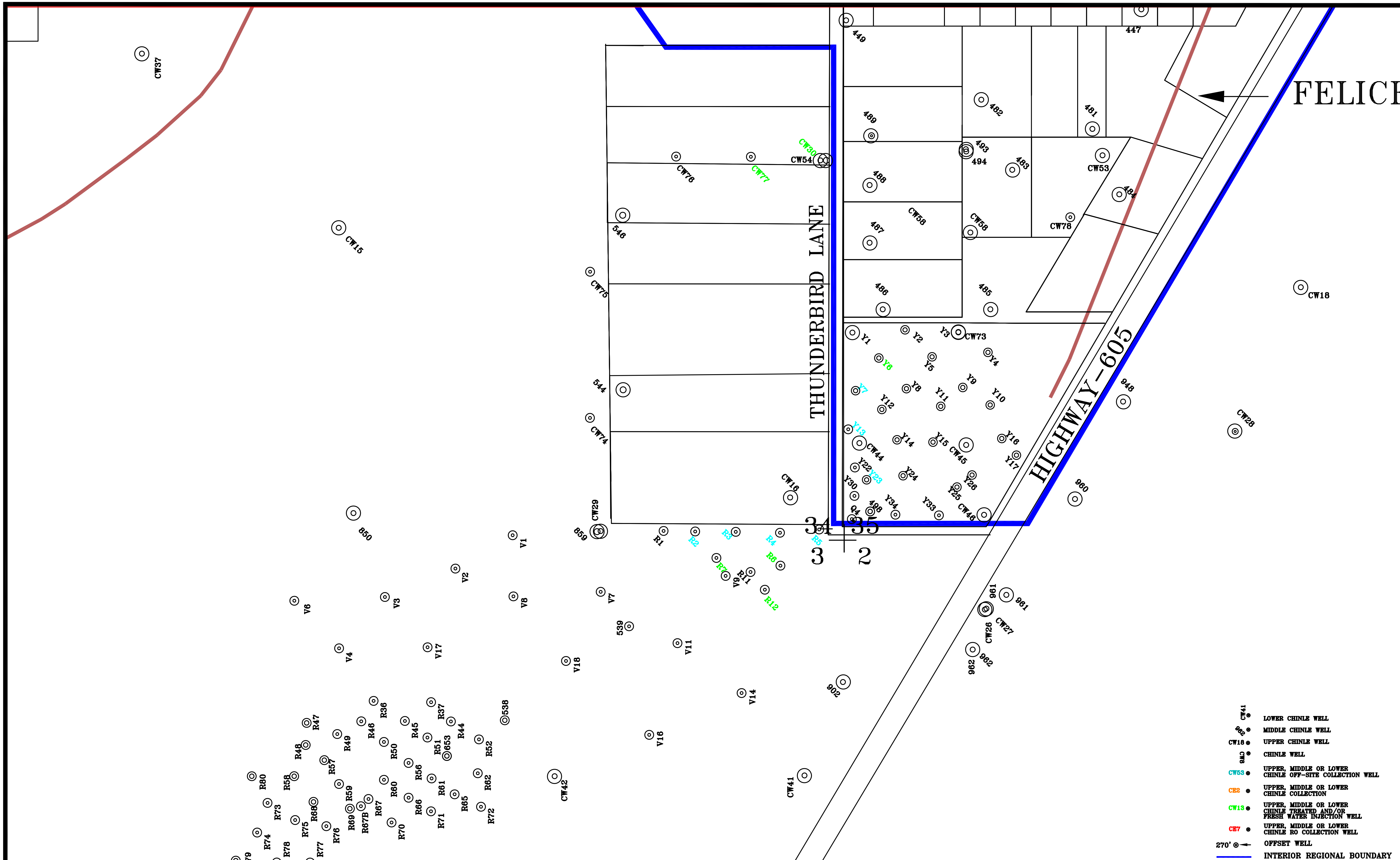


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-1A. CHINLE AQUIFER WELL LOCATIONS, OS, 2019

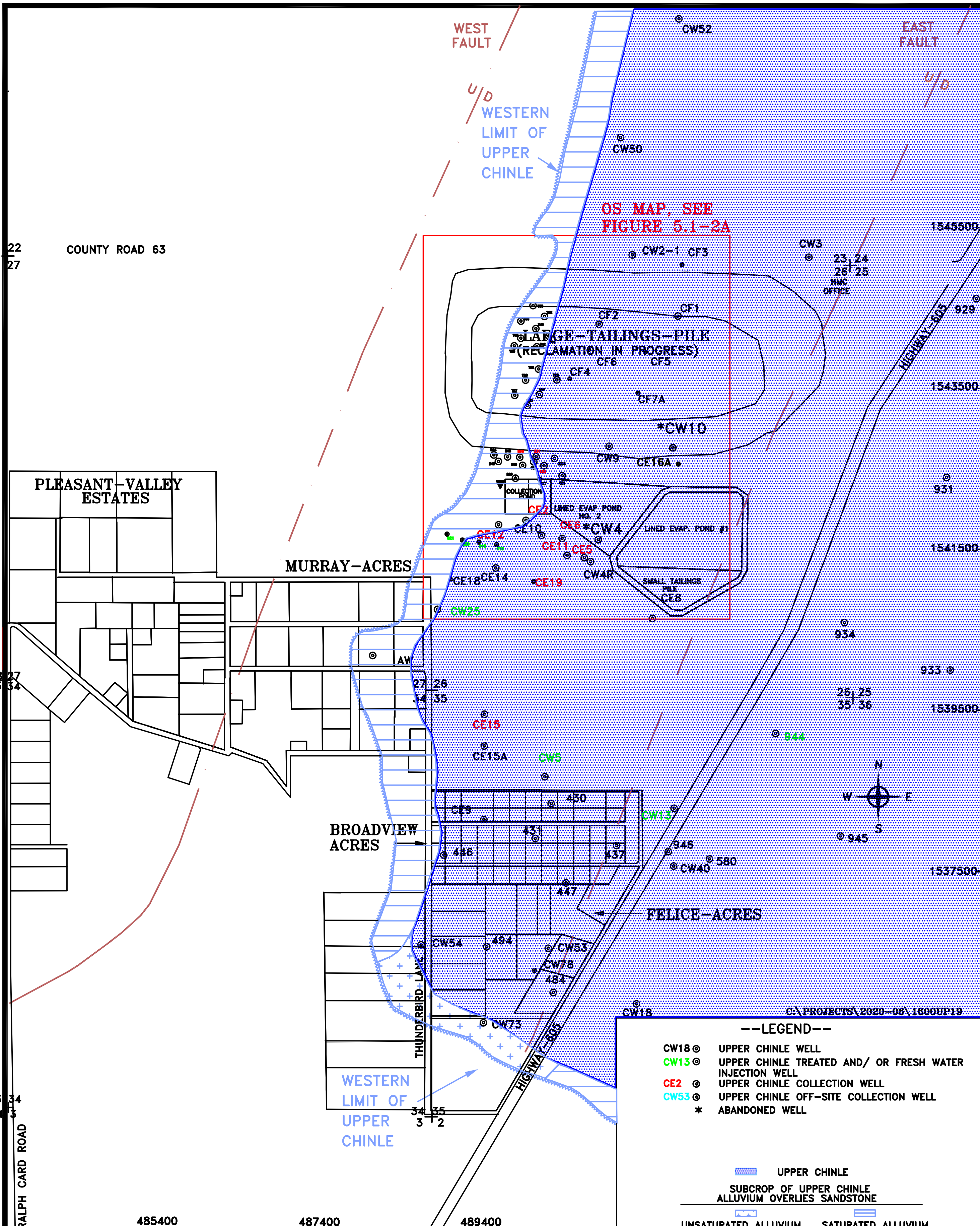
DATE: 1/16/2020

SCALE: 1"=500'



SCALE: 1"=500'
C:\PROJECTS\2020-06
BASE19chinle.DWG
DATE: 1/16/2020

FIGURE 5.1-1B CHINLE AQUIFER WELL LCOATIONS, SOS, 2019

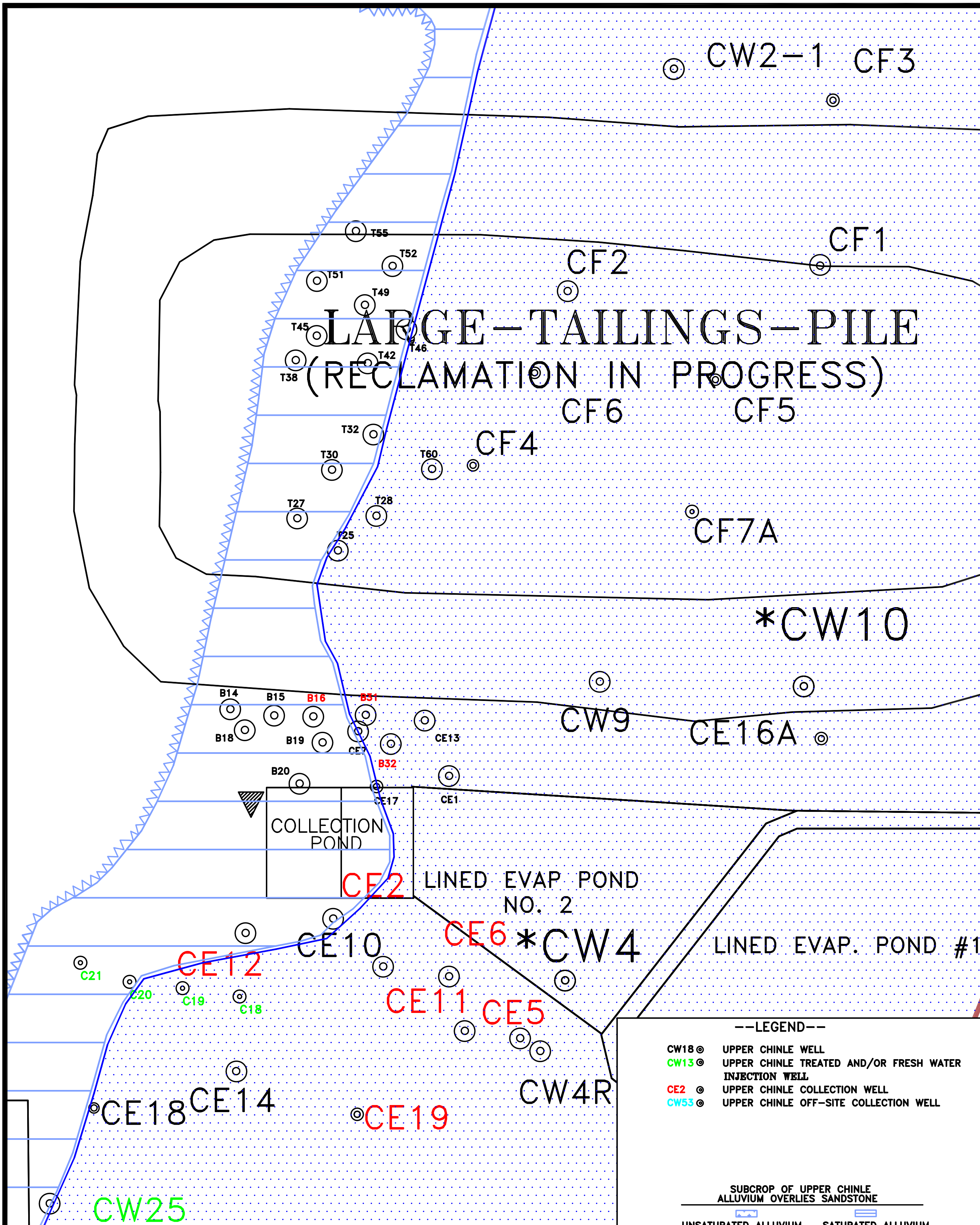


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.1-2 LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, 2019

DATE: 1/16/2020

SCALE: 1"= 1600'



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

FIGURE 5.1-2A. LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS, OS, 2019

DATE: 1/16/2020

SCALE: 1"= 500'

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	12/18/2019	104.58	6493.96	0.0	6598.54	30	6569	A	-	---
										335	6264	M	330-400	Middle
0931	1542461	495207	366.7	6.0	12/18/2019	91.49	6519.07	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	U	60-120	Upper
										68	6506	A	60-120	Alluvium
B15	1542708	489749	120.0	4.5	10/28/2019	46.20	6530.11	2.0	6576.31	72	6502	A	60-120	Alluvium
										72	6502	U	60-120	Upper
B16	1542705	489900	120.0	4.5	10/28/2019	60.75	6514.62	2.0	6575.37	83	6490	U	60-120	Upper
										83	6490	A	60-120	Alluvium
B17	1542659	489493	95.0	4.5	10/28/2019	42.80	6531.51	2.0	6574.31	---	---	U	55-95	Upper
										---	---	A	55-95	Alluvium
B18	1542652	489634	120.0	4.5	10/28/2019	45.60	6530.53	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	10/28/2019	59.40	6516.56	2.0	6575.96	83	6491	U	60-100	Upper
										83	6491	A	60-100	Alluvium
B32	1542598	490201	120.0	4.5	10/28/2019	46.10	6529.29	2.0	6575.39	93	6480	U	60-120	Upper
										93	6480	A	60-120	Alluvium
C18	1541616	489614	120.0	4.5	10/28/2019	10.40	6560.70	0.5	6571.10	---	---	U	40-120	Upper
										60	6511	A	40-120	Alluvium
C19	1541648	489392	120.0	4.5	10/28/2019	18.60	6551.31	0.5	6569.91	---	---	U	40-120	Upper
										80	6489	A	40-120	Alluvium
C20	1541673	489187	110.0	4.5	10/28/2019	17.20	6552.96	0.5	6570.16	---	---	U	50-110	Upper
										70	6500	A	50-110	Alluvium
C21	1541747	488996	100.0	4.5	10/28/2019	26.24	6545.75	0.5	6571.99	---	---	U	40-100	Upper
										90	6481	A	40-100	Alluvium
CE1	1542475	490434	137.0	5.0	12/18/2019	60.01	6510.18	4.4	6570.19	75	6491	A	-	---
										106	6460	U	98-138	Upper
CE2	1541923	489979	119.7	5.0	10/28/2019	39.90	6536.45	1.8	6576.35	74	6501	A	-	---
										74	6501	U	78-118	Upper
CE5	1541453	490695	140.0	5.0	10/28/2019	42.53	6526.02	1.6	6568.55	63	6504	A	-	---
										103	6464	U	100-140	Upper
CE6	1541698	490433	140.0	6.0	10/28/2019	38.55	6526.64	1.5	6565.19	75	6489	U	-	Upper
CE7	1542652	490079	120.0	6.0	12/18/2019	45.01	6530.98	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			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
CE8	1540704	491556	216.6	6.0	12/18/2019	45.36	6524.34	1.7	6569.70	166	6402	U 160-200	Upper
CE10	1541737	490177	130.0	6.0	12/18/2019	47.54	6523.32	2.3	6570.86	80	6489	U 90-130	Upper
CE11	1541487	490494	140.0	6.0	10/28/2019	38.90	6526.52	1.6	6565.42	90	6474	U 100-140	Upper
CE12	1541867	489642	120.0	6.0	10/28/2019	41.90	6530.33	2.1	6572.23	80	6490	U 80-120	Upper
CE13	1542693	490338	129.2	6.0	12/18/2019	44.29	6530.35	1.7	6574.64	95	6478	U 90-130	Upper
CE14	1541326	489600	130.0	5.0	12/18/2019	39.49	6529.96	2.0	6569.45	80	6487	U 90-130	Upper
CE15	1539507	489460	130.0	5.0	12/18/2019	45.76	6520.32	2.0	6566.08	77	6487	U 90-130	Upper
CE15A	1539111	489459	130.0	4.5	12/18/2019	40.22	6524.59	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	---	10/2/2019	47.13	6532.91	2.0	6580.04	---	---	U 125-185	Upper
CE17	1542434	490146	130.0	4.5	4/15/2014	38.43	6537.97	2.0	6576.40	94	6480	A -	---
										94	6480	U 90-130	Upper
CE18	1541185	489048	130.0	4.5	10/17/2019	39.41	6529.47	2.0	6568.88	74	6493	A -	---
										74	6493	U 90-130	Upper
CE19	1541160	490070	130.0	4.5	10/28/2019	42.40	6526.43	2.0	6568.83	88	6479	U 90-130	Upper
										88	6479	A -	---
CF1	1544456	491868	285.0	5.0	10/25/2019	131.91	6534.00	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	12/18/2019	50.63	6536.16	2.0	6586.79	156	6429	U 146-166	Upper
CF4	1543680	490520	197.0	4.5	12/18/2019	61.41	6602.28	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	12/18/2019	134.93	6533.18	2.0	6668.11	160	6506	A -	---
										220	6446	U 225-265	Upper
CW1	1545235	490295	325.0	5.0	12/18/2019	90.03	6495.19	0.7	6585.22	105	6480	A -	---
										272	6313	M 212-323	Middle
CW2	1545212	491302	355.0	5.0	12/18/2019	90.25	6495.23	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/18/2019	45.84	6539.64	1.7	6585.48	85	6499	A -	---
										136	6448	U 243-253	Upper
CW3	1545200	493496	235.0	5.0	12/18/2019	56.25	6530.93	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	12/18/2019	56.25	6530.93	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	10/28/2019	43.65	6525.08	1.3	6568.73	61	6506	A -	---
										104	6463	U 102-142	Upper
CW5	1538729	490221	170.0	5.0	10/28/2019	10.40	6558.94	1.6	6569.34	65	6503	A -	---
										137	6431	U 135-170	Upper
CW6	1542588	488301	282.0	4.0	12/18/2019	40.40	6535.24	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	12/18/2019	62.42	6529.41	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	10/28/2019	22.60	6554.10	2.7	6576.70	230	6344	U 225-265	Upper
										378	6196	M -	---
CW14	1538786	488884	360.9	6.0	10/28/2019	36.00	6530.09	2.9	6566.09	56	6507	A -	---
										66	6497	U -	---
										310	6253	M 278-358	Middle
CW17	1545279	487771	108.0	5.0	12/18/2019	65.36	6523.96	3.1	6589.32	73	6513	A -	---
										85	6501	M 83-103	Middle
CW24	1545773	487760	118.0	5.0	12/18/2019	50.27	6538.40	3.0	6588.67	61	6525	A -	---
										65	6521	M 78-118	Middle
CW25	1540802	488866	102.0	5.0	10/28/2019	32.60	6534.60	3.0	6567.20	53	6511	U 62-102	Upper
										53	6511	A -	---
CW33	1543814	486347	347.0	6.0	12/18/2019	106.46	6468.43	1.8	6574.89	63	6510	M -	---
										63	6510	A -	---
										272	6301	L 307-347	---
										272	6301	L 267-287	Lower
CW34	1547827	487707	65.7	6.0	12/18/2019	52.80	6541.60	3.2	6594.40	20	6571	A -	---
										40	6551	M 33-63	Middle
CW35	1547001	488794	120.0	5.0	12/18/2019	52.03	6539.14	1.9	6591.17	63	6526	A -	---
										90	6499	M 93-118	Middle
CW50	1546687	491159	170.0	5.0	12/18/2019	48.36	6540.20	3.0	6588.56	128	6458	U 130-170	Upper
CW52	1548171	491887	180.0	5.0	12/18/2019	38.51	6553.89	2.0	6592.40	138	6452	U 140-180	Upper
CW56	1545279	488115	130.0	5.0	8/29/2019	57.07	6530.79	2.6	6587.86	51	6534	A -	---
										98	6487	M 90-110	Middle
CW57	1545654	488070	140.0	5.0	12/18/2019	49.38	6535.52	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			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
CW57	1545654	488070	140.0	5.0	12/18/2019	49.38	6535.52	2.1	6584.90	101	6482	M 100-140	Middle
CW60	1545470	488262	150.0	5.0	12/18/2019	47.11	6537.09	2.8	6584.20	50	6531	A -	---
										114	6467	M 100-140	Middle
CW61	1544927	487779	130.0	5.0	12/18/2019	61.12	6521.71	2.2	6582.83	62	6519	A -	---
										108	6473	M 90-130	Middle
CW62	1544555	487847	150.0	5.0	12/18/2019	121.59	6458.27	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	12/18/2019	83.45	6496.68	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	9/30/2019	36.00	6538.91	2.0	6574.91	---	---	M 80-110	Middle
										80	6493	A 80-110	Alluvium
M31	1543745	487620	120.0	4.5	10/28/2019	40.40	6535.53	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	10/28/2019	122.30	6535.04	2.0	6657.34	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T27	1543474	489837	200.0	4.5	10/28/2019	121.40	6535.74	2.0	6657.14	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T28	1543484	490145	200.0	4.5	9/30/2019	118.55	6540.16	2.0	6658.71	---	---	A 140-200	Alluvium

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	9/30/2019	118.55	6540.16	2.0	6658.71	---	---	U 140-200	Upper
T30	1543663	489972	200.0	4.5	10/28/2019	123.00	6536.62	2.0	6659.62	---	---	A 140-200	Alluvium
										---	---	U 140-200	Upper
T32	1543801	490134	200.0	4.5	10/28/2019	123.70	6537.91	2.0	6661.61	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T38	1544089	489832	200.0	4.5	---	---	---	2.0	6658.46	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
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	10/28/2019	118.40	6539.66	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	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T52	1544456	490208	200.0	4.5	6/3/2014	109.87	6548.13	2.0	6658.00	---	---	U 140-200	Upper
										---	---	A 140-200	Alluvium
T55	1544592	490063	195.0	4.5	6/3/2014	1110.87	5546.79	2.0	6657.66	---	---	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	12/18/2019	54.43	6532.03	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	12/18/2019	37.98	6525.14	1.2	6563.12	---	---	U	90-130	Upper
CW55	1538283	489471	360.0	6.0	12/18/2019	53.88	6510.28	2.3	6564.16	260	6302	M	-	Middle
						Felice Acres								
0481	1536820	490210	320.0	4.0	6/27/2019	72.00	6496.00	2.0	6568.00	0	---	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	4/29/2019	41.45	6521.21	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
0489	1536850	488950	---	---	---	---	---	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			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
0493	1536702	489492	300.0	5.0	12/18/2019	65.94	6494.34	0.9	6560.28	40	6519	A -	---
										65	6494	U -	---
										236	6323	M 270-300	Middle
0494	1536689	489494	85.0	5.0	12/18/2019	38.58	6521.56	0.6	6560.14	40	6520	A -	---
										65	6495	U 65-85	Upper
0498	1534661	488953	150.0	6.0	4/9/2019	54.23	6506.36	2.0	6560.59	80	6479	M 130-150	Middle
										80	6479	A 70-110	Alluvium
CW44	1535048	488891	208.0	6.0	3/25/2019	55.51	6505.23	2.5	6560.74	94	6464	A -	Alluvium
										130	6428	M 69-208	Middle
CW45	1535036	489494	193.0	5.0	12/18/2019	55.41	6505.90	0.6	6561.31	90	6471	A -	---
										166	6395	M 163-193	Middle
CW46	1534642	489595	187.3	5.0	3/25/2019	56.31	6505.95	1.5	6562.26	88	6473	A -	---
										112	6449	M 125-185	Middle
CW53	1536668	490262	157.0	5.0	12/18/2019	47.47	6517.47	3.0	6564.94	110	6452	U 117-157	Upper
CW58	1536230	489520	305.0	4.5	12/18/2019	67.03	6493.77	2.0	6560.80	45	6514	A -	---
										45	6514	U -	---
										226	6333	M 265-305	Middle
CW73	1535670	489450	100.0	4.5	12/18/2019	51.88	6511.57	2.0	6563.45	68	6493	U 80-100	Upper
										68	6493	A -	---
CW78	1536319	490080	160.0	4.5	12/18/2019	47.26	6519.89	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	6/5/2019	40.98	6523.50	1.6	6564.48	61	6502	A 40-80	Alluvium
										61	6502	U 40-80	Upper
Q48	1535653	490120	105.0	4.5	12/18/2019	51.70	6516.14	2.0	6567.84	73	6493	U 65-105	Upper
										73	6493	A 65-105	Alluvium
Q50	1536680	490288	85.0	4.5	6/6/2019	44.97	6523.96	2.0	6568.93	43	6524	A 45-85	Alluvium
										61	6506	U 45-85	Upper
Y1	1535670	488850	260.0	4.5	12/18/2019	67.34	6494.10	2.0	6561.44	77	6482	A -	---
										77	6482	U -	---
										172	6387	M 220-260	Middle
Y2	1535678	489151	250.0	4.5	12/18/2019	68.24	6493.37	2.9	6561.61	64	6495	A -	---
										66	6493	U -	---
										198	6361	M 210-250	Middle
Y3	1535660	489440	280.0	4.5	12/18/2019	67.82	6495.56	2.0	6563.38	61	6500	A -	---
										61	6500	U -	---
										196	6365	M 260-280	Middle
										196	6365	M 220-240	Middle
Y4	1535558	489612	260.0	4.5	12/1/2014	82.68	6480.46	2.4	6563.14	64	6497	A -	---
										64	6497	U -	---
										194	6367	M 220-260	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			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)							
Y5	1535528	489302	260.0	4.5	12/1/2014	87.82	6474.92	3.6	6562.74	82	6477	A	-	---
										82	6477	U	-	---
										178	6381	M	220-260	Middle
Y6	1535518	489002	250.0	4.5	3/25/2019	57.68	6501.40	0.9	6559.08	100	6458	A	-	---
										178	6380	M	210-250	Middle
Y7	1535339	488870	220.0	4.5	8/20/2019	99.64	6460.79	2.5	6560.43	90	6468	A	-	---
										158	6400	M	180-220	Middle
Y8	1535349	489161	240.0	4.5	12/18/2019	67.02	6494.45	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	A	-	---
										84	6476	U	-	---
										178	6382	M	195-235	Middle
Y10	1535258	489632	220.0	4.5	12/18/2019	70.04	6496.14	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	3/25/2019	60.24	6499.44	1.2	6559.68	95	6463	A	-	---
										156	6402	M	170-210	Middle
Y13	1535135	488830	212.0	4.5	12/18/2019	85.57	6475.27	2.0	6560.84	106	6453	A	-	---
										140	6419	M	172-212	Middle
Y14	1535057	489113	200.0	4.5	12/18/2019	55.43	6505.59	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	12/18/2019	62.76	6501.87	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	8/27/2019	54.90	6506.40	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	12/18/2019	63.33	6499.34	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
Y30	1534752	488865	180.0	4.5	12/18/2019	63.48	6496.57	2.0	6560.05	108	6450	M	140-180	Middle
Y33	1534639	489337	180.0	4.5	3/25/2019	57.06	6506.16	2.0	6563.22	100	6461	M	140-180	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
Y34	1534642	489091	180.0	4.5	3/25/2019	52.16	6508.76	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	7/12/2019	67.70	6493.30	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	12/18/2019	69.10	6494.70	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	12/18/2019	37.10	6526.33	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	12/18/2019	39.20	6528.17	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	4/16/2019	88.19	6466.81	2.0	6555.00	62	6491	A -	---
										160	6393	L -	Lower
0538	1533486	486899	170.0	6.0	4/22/2019	66.84	6482.10	2.0	6548.94	95	6452	A 50-90	Alluvium
										133	6414	L 130-170	Lower
0539	1534014	487596	210.0	6.0	12/17/2019	27.31	6528.01	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	11/29/2018	63.05	---	---	---	---	---	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	12/18/2019	66.80	6478.17	1.6	6544.97	97	6446	A 69-206	Alluvium
										135	6408	L -	Lower
0850	1534652	486044	54.0	5.0	12/17/2019	54.02	6495.13	3.2	6549.15	37	6509	A -	---
										37	6509	M 29-54	Middle
0853	1532124	484824	95.0	5.0	12/17/2019	73.28	6468.10	1.7	6541.38	60	6480	L 55-95	Lower
										60	6480	A -	---
0859	1534549	487426	83.0	5.0	12/17/2019	60.09	6492.67	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	---	---	12/18/2019	102.40	6492.60	1.0	6595.00	---	---	M -	Middle
										---	---	C -	Chinle
0929	1544684	495585	320.0	5.0	12/18/2019	72.62	6519.95	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	10/28/2019	66.20	6522.41	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	12/17/2019	56.12	6495.20	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	12/18/2019	53.67	6518.98	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	12/18/2019	71.82	6499.86	1.9	6571.68	90	6480	A -	---
										110	6460	U -	---
										294	6276	M 280-360	Middle
CW29	1534551	487435	290.0	5.0	12/17/2019	78.47	6473.75	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	12/17/2019	78.47	6473.75	1.7	6552.22	52	6499	M -	---
										228	6323	L 230-270	Lower
CW30	1536642	488704	251.5	5.0	3/25/2019	65.22	6493.09	2.0	6558.31	35	6521	A -	---
										220	6336	M 219-249	Middle
CW31	1540689	482738	311.0	6.0	12/18/2019	86.03	6474.23	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	12/18/2019	147.69	6419.59	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	12/18/2019	77.45	6473.64	2.8	6551.09	96	6452	A -	---
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	12/17/2019	62.52	6488.65	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	12/18/2019	59.91	6519.03	2.6	6578.94	75	6501	A -	---
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	12/17/2019	80.19	6475.22	1.5	6555.41	59	6495	A -	---
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	12/17/2019	70.95	6477.83	0.0	6548.78	98	6451	A -	---
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	12/18/2019	69.01	6479.78	2.0	6548.79	57	6490	L 81-101	Lower
										57	6490	A -	---
CW54	1536645	488675	103.1	5.0	12/18/2019	39.72	6518.83	2.2	6558.55	70	6486	C 60-100	Chinle
CW74	1535188	487376	130.0	4.5	12/17/2019	58.25	6495.16	3.1	6553.41	40	6510	A -	---
										100	6450	M 90-130	Middle
CW75	1536012	487376	190.0	4.5	12/17/2019	58.66	6494.92	1.8	6553.58	59	6493	A -	---
										136	6416	M 150-190	Middle
CW76	1536661	487861	270.0	4.5	12/17/2019	61.66	6494.95	2.4	6556.61	40	6514	A -	---
										210	6344	M 230-270	Middle
CW77	1536659	488282	280.0	4.5	3/25/2019	57.22	6502.09	2.3	6559.31	53	6504	A -	---
										210	6347	M 240-280	Middle
R1	1534551	487790	120.0	5.0	12/17/2019	55.85	6499.27	2.0	6555.12	84	6469	A 80-120	Alluvium
										84	6469	M 80-120	Middle
R2	1534548	487968	115.0	5.0	8/28/2019	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	11/11/2019	54.40	6501.33	2.0	6555.73	88	6466	M 100-140	Middle
										88	6466	A 60-80	Alluvium
R4	1534541	488446	130.0	5.0	8/28/2019	56.58	6502.20	2.0	6558.78	84	6473	A 90-130	Alluvium
										84	6473	M 90-130	Middle
R5	1534560	488666	125.0	5.0	8/28/2019	55.55	6502.20	2.0	6557.75	71	6485	M 65-125	Middle
										71	6485	A 65-125	Alluvium
R6	1534356	488448	130.0	5.0	3/25/2019	38.42	6521.22	2.0	6559.64	68	6490	A 50-90	Alluvium
										68	6490	M 110-130	Middle
R7	1534399	488087	145.0	5.0	3/25/2019	31.52	6523.29	2.0	6554.81	74	6479	M 125-145	Middle
										74	6479	A 65-105	Alluvium
R11	1534320	488280	120.0	4.5	12/17/2019	62.11	6496.34	2.0	6558.45	70	6486	M 60-120	Middle
										70	6486	A 60-120	Alluvium
R12	1534220	488360	120.0	4.5	3/25/2019	36.82	6520.13	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	L 100-160	Lower
										103	6442	A 100-160	Alluvium
R48	1533345	485775	160.0	4.5	---	---	---	2.0	6545.24	100	6443	A 100-160	Alluvium
										100	6443	L 100-160	Lower
R49	1533407	485953	200.0	4.5	12/17/2019	71.65	6474.34	2.0	6545.99	109	6435	L 160-200	Lower
										109	6435	A -	---
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	A 75-135	Alluvium
										99	6446	L 75-135	Lower
R58	1533170	485710	160.0	4.5	4/8/2014	70.98	6473.47	2.0	6544.45	98	6444	A 100-160	Alluvium

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	L 100-160	Lower
R59	1533125	485963	150.0	4.5	8/2/2016	66.61	6478.40	2.0	6545.01	107	6436	L 110-150	Lower
										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	12/17/2019	70.12	6475.41	2.0	6545.53	105	6439	A -	---
										105	6439	L 140-180	Lower
R67B	1533000	486086	145.0	4.5	---	---	---	2.0	6544.87	100	6443	L 105-145	Lower
R68	1533025	485819	160.0	4.5	10/10/2014	69.44	6475.41	2.0	6544.85	99	6444	L 100-160	Lower
										99	6444	A 100-160	Alluvium
R69	1532987	486024	160.0	4.5	4/8/2014	70.53	6474.82	2.0	6545.35	96	6447	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	A 110-150	Alluvium
										99	6443	L 110-150	Lower
R74	1532852	485502	140.0	4.5	12/17/2019	71.38	6472.65	2.4	6544.03	104	6438	A 100-140	Alluvium
										104	6438	L 100-140	Lower
R75	1532922	485716	140.0	4.5	5/13/2015	69.14	6475.74	2.3	6544.88	98	6445	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	A 100-140	Alluvium
										106	6437	L 100-140	Lower
R77	1532683	485800	140.0	4.5	5/13/2015	68.28	6476.69	2.4	6544.97	80	6463	L 100-140	Lower
										80	6463	A 100-140	Alluvium
R78	1532683	485612	140.0	4.5	5/13/2015	69.16	6474.87	2.0	6544.03	85	6457	A 100-140	Alluvium
										85	6457	L 100-140	Lower
R80	1533169	485471	120.0	4.5	---	---	---	2.0	6543.72	---	---	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	12/17/2019	77.53	6474.58	2.0	6552.11	220	6330	L	230-270	Lower
V2	1534339	486618	270.0	4.5	12/17/2019	75.57	6474.52	2.0	6550.09	102	6446	A	-	---
										206	6342	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	12/17/2019	75.20	6472.23	2.4	6547.43	108	6437	A	-	---
										182	6363	L	220-260	Lower
V7	1534208	487436	270.0	4.5	12/17/2019	79.71	6475.52	2.0	6555.23	---	---	L	230-270	Lower
										80	6473	A	-	---
V8	1534183	486945	260.0	4.5	12/17/2019	74.77	6476.72	2.0	6551.49	100	6449	A	-	---
										211	6338	L	220-260	Lower
V9	1534298	488140	280.0	4.5	12/17/2019	80.21	6475.48	2.0	6555.69	79	6475	A	-	---
										231	6323	L	240-280	Lower
V11	1533919	487868	270.0	4.5	12/17/2019	80.13	6475.77	2.0	6555.90	98	6456	A	-	---
										210	6344	L	230-270	Lower
V14	1533638	488229	240.0	4.5	12/17/2019	81.37	6474.32	2.0	6555.69	---	---	L	200-240	Lower
										80	6474	A	-	---
V16	1533402	487709	220.0	4.5	12/17/2019	76.12	6475.86	2.0	6551.98	90	6460	A	-	---
										173	6377	L	180-220	Lower
V17	1533896	486461	240.0	4.5	12/17/2019	75.52	6474.63	2.0	6550.15	93	6455	A	-	---
										166	6382	L	200-240	Lower
V18	1533819	487241	240.0	4.5	12/17/2019	76.02	6475.36	2.0	6551.38	95	6454	A	-	---
										195	6354	L	200-240	Lower

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

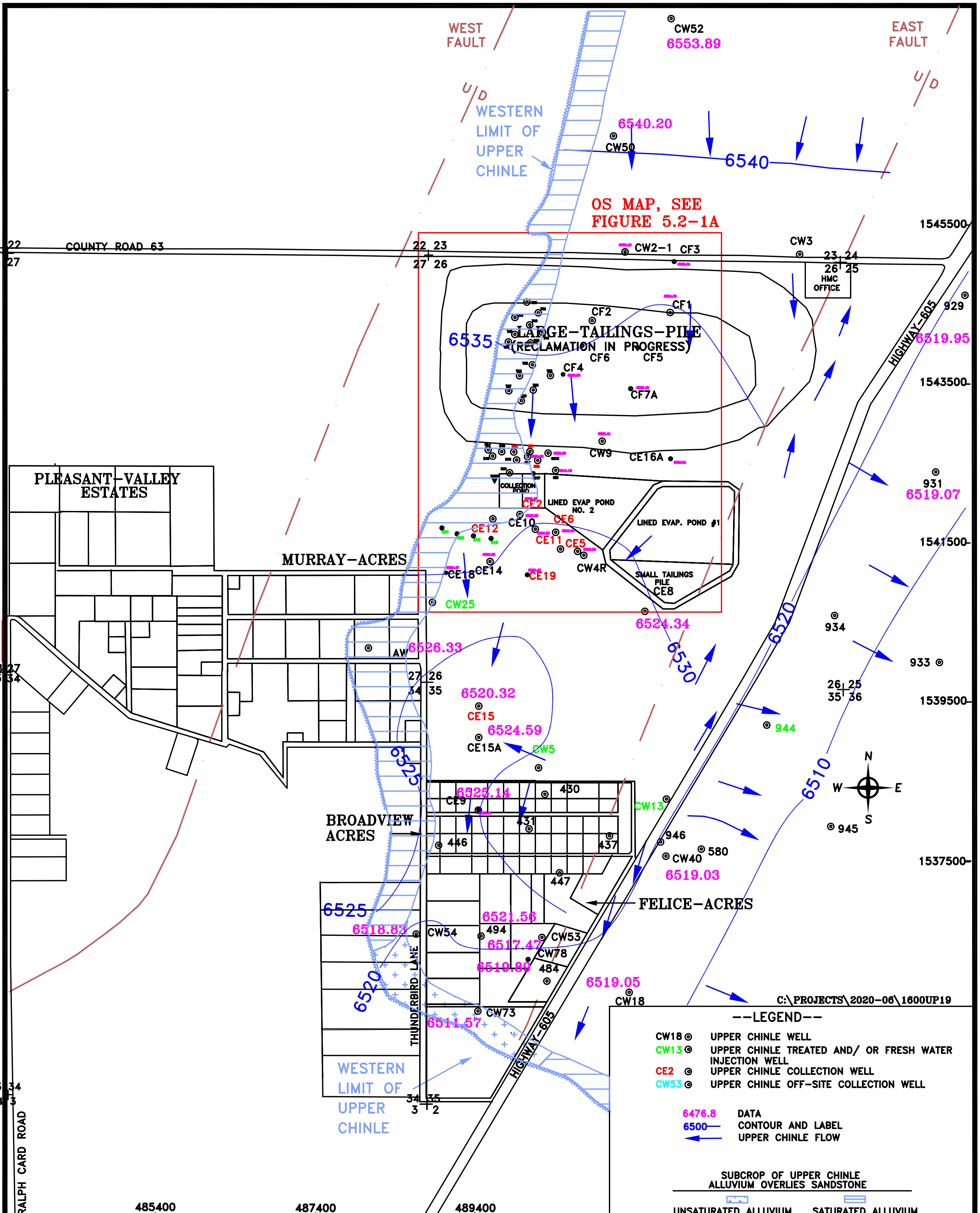
5.2 UPPER CHINLE WATER LEVELS

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 2019. The blue arrows on Figure 5.2-1 show the direction of ground-water flow, which is greatly influenced by the treated and/or fresh-water injection into the Upper Chinle at wells C18, C19, C20, C21, CW5, CW13 and CW25, and by collection from wells B16, B31, B32, CE2, CE5, CE6, CE11, CE12, CE15 and CE19. 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 occur quickly in response to changes 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.

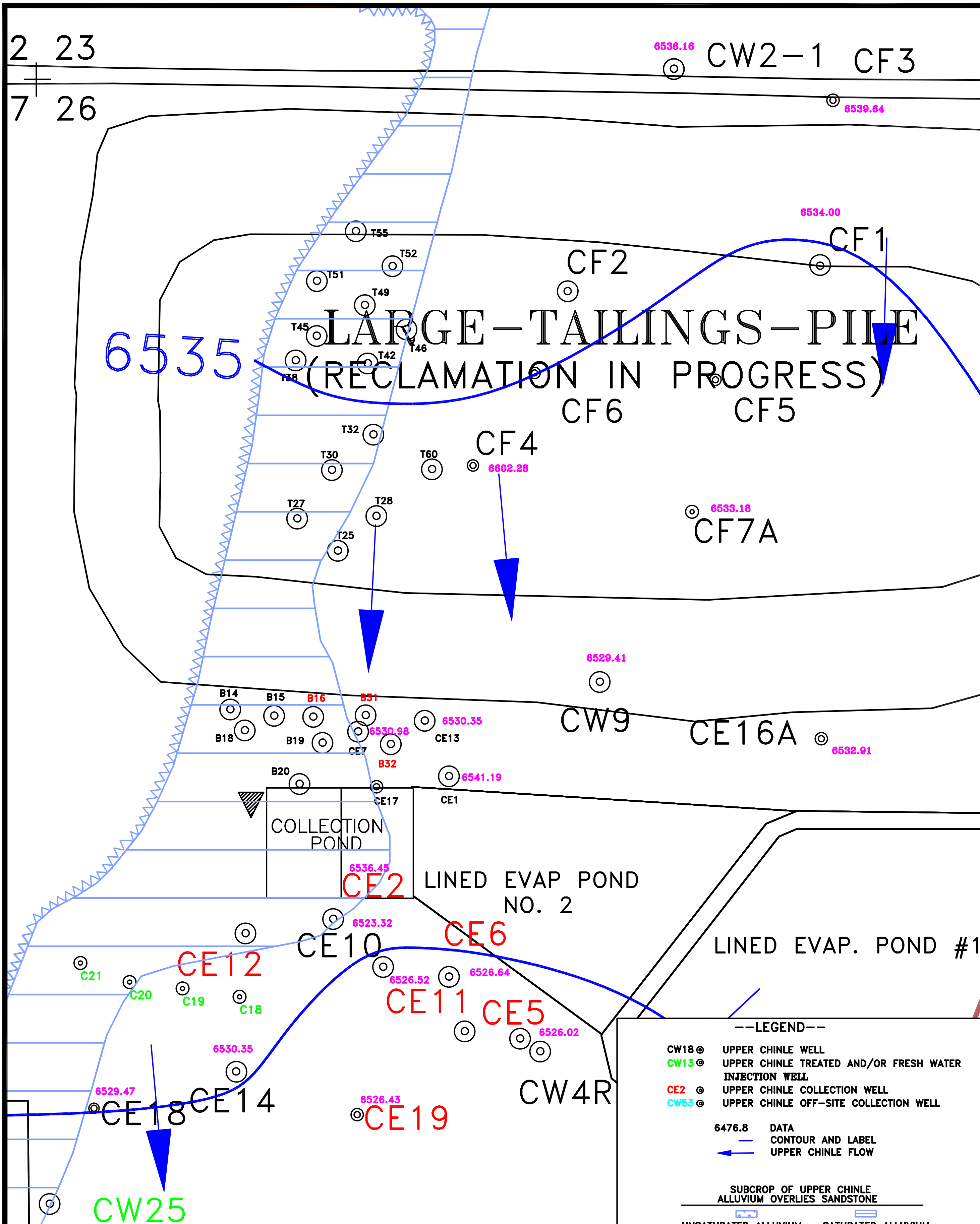
Injection of treated and/or fresh water into Upper Chinle well CW5 is causing ground water flow to the north and south of this area. The flow that moves to the south discharges to the alluvial aquifer in the subcrop area of the Upper Chinle, and the flow that moves to the north converges toward collection wells CE2, CE5, CE6, CE11, CE12, CE15 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, CE8, 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

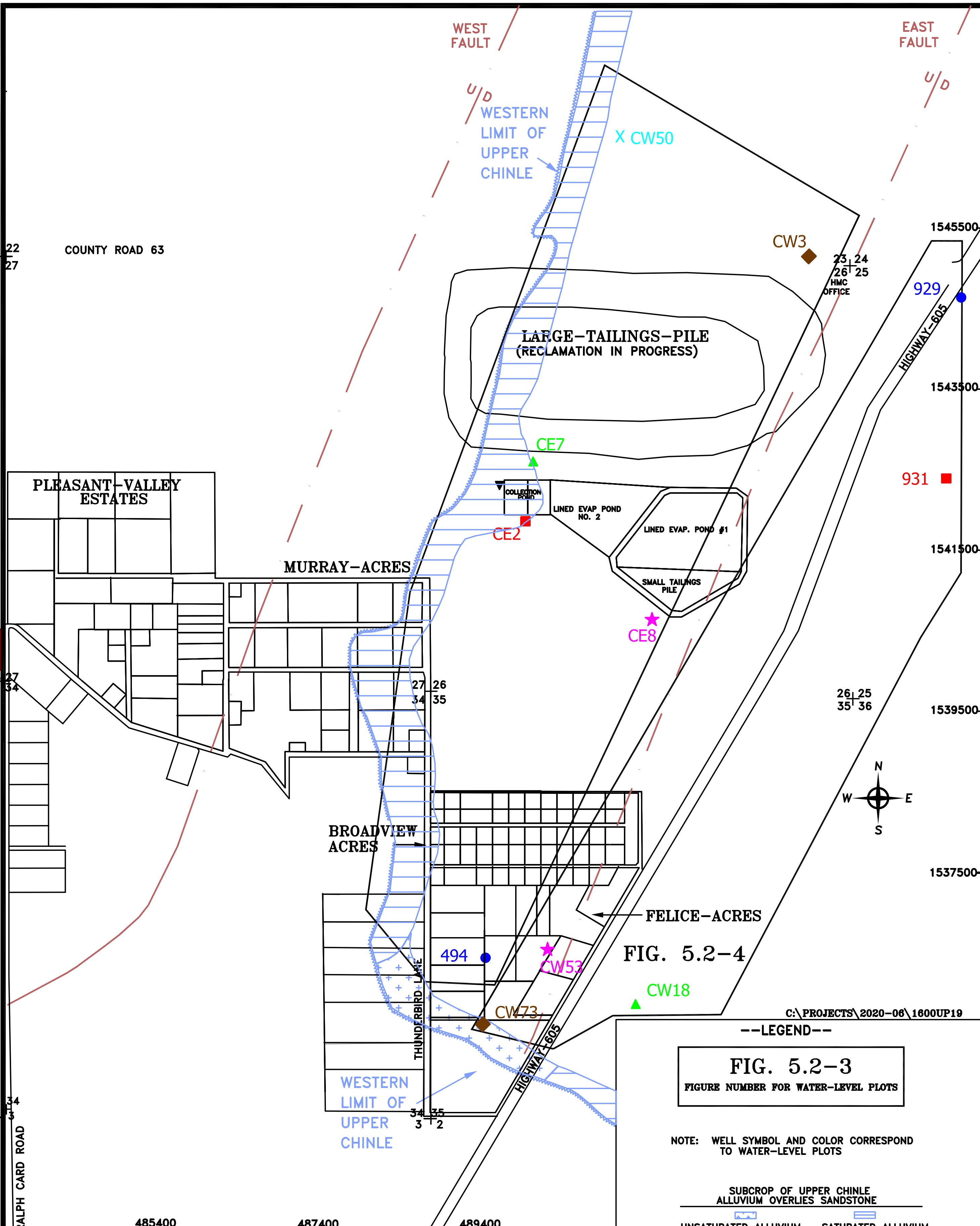
929, 931, CW18 and CW53 were due to variations in injection rates into well CW13 during 2019. Water levels from well CW53 were included with on Figure 5.2-4 because the water level response in well CW53 is similar to that of the wells east of the East Fault. The water level in well CW73 in the subcrop area in southern Felice Acres has been steady in 2019 and does not seem to be affected by variations in the CW13 injection.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.2-1. WATER-LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2019, FT-MSL	SCALE: 1"= 1600'
	PAGE: 5.2-3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.2-1A. WATER LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, OS, FALL 2019, 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, 2019

DATE: 1/2/2020

SCALE: 1"= 1600'

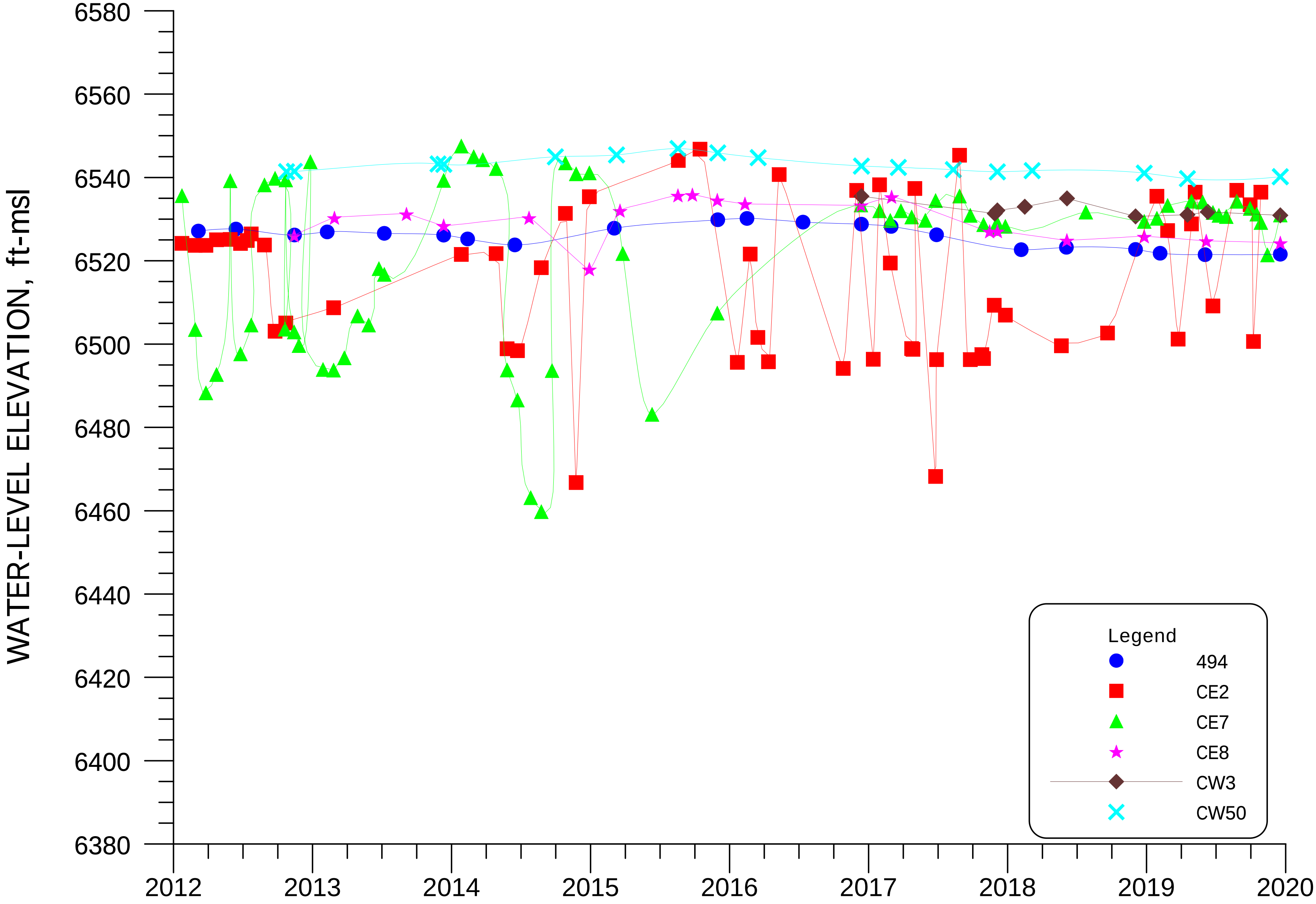


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CE7, CE8, CW3 AND CW50

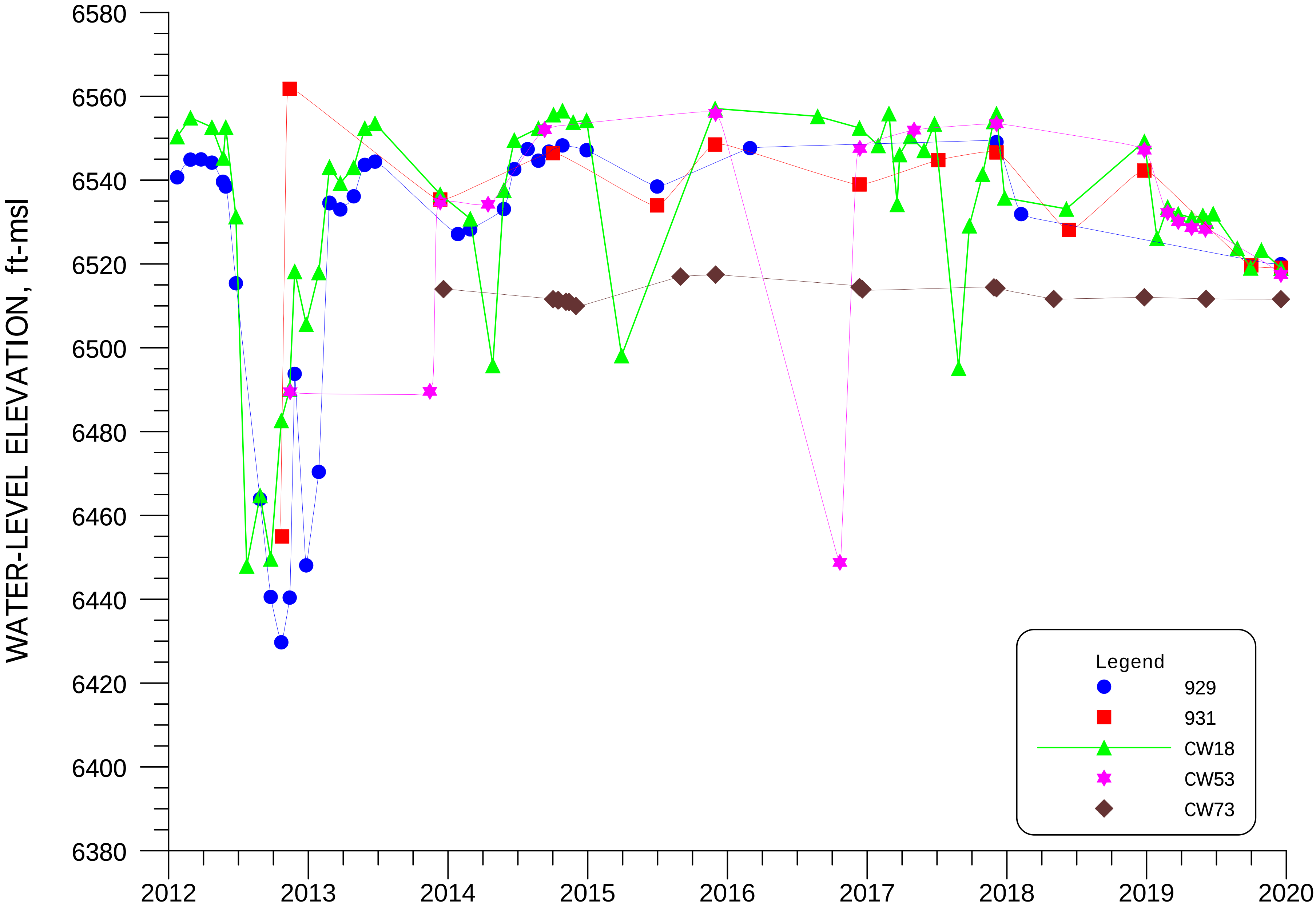


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, CW 18, CW53 AND CW73.

5.3 UPPER CHINLE WATER QUALITY

The Upper Chinle aquifer site standards are initially defined in this subsection because they are useful in evaluating progress in Upper Chinle groundwater restoration and indicate where additional restoration is needed in this aquifer. Water-quality data for 2019 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 legend 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 indicating 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 used, respectively) 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 2019 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 2019 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, in one well just north of Broadview Acres and in one and two wells in Broadview and Felice Acres, respectively. Molybdenum concentrations in the Upper Chinle aquifer exceed the site standard in wells in close proximity to the tailings piles and in the area of 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 2019. 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 2019 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, the area beneath the LTP extending to the collection pond area requires restoration in the mixing zone and an area on the east side of the LTP requires restoration in the non-mixing zone. The references describing the analysis of background results used in developing the 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 discussed in this section for the Upper Chinle aquifer. 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, CW18 and CW40 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 2019 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, CW18 and CW40 is presented on Figure 5.3-4 (see Figure 5.3-2 for location of these wells). All of these plotted sulfate concentrations are below the non-mixing zone site standard and none of the concentration changes indicate a consistent trend.

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 2019. Like the second sulfate figure in the preceding section, Figure 5.3-5A is useful for viewing the TDS concentrations in the LTP area shown 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 larger concentrations occur naturally. 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 activities at the Grants site. 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 and shows a general declining trend in well CE19 during the last few years except for an increase in 2019. A time plot of TDS concentrations for non-mixing zone wells 929, 931, CW3, CW18 and CW40 is presented in Figure 5.3-7. The TDS concentrations from wells CW18 and CW40 are near the non-mixing zone standard.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2019 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 in an area extending 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 with all of the recent chloride concentrations below the site standard. The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10 which shows that these concentrations are well below the non-mixing zone standard.

5.3.4 URANIUM - UPPER CHINLE

Uranium is an important constituent 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 2019. Uranium concentrations in the Upper Chinle aquifer 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 2019. One uranium value exceeds the mixing zone site standard of 0.18 mg/L just north of Broadview Acres while one sample in Broadview Acres and two samples in Felice Acres also exceed this site standard. These concentrations are expected to gradually decrease to below site standards 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). An increase in uranium concentration was observed in wells CE2 and CE19 in 2019. Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells 929, 931, CW3, CW18 and CW40. This plot shows that additional restoration is needed in the CW3 area while the remaining non-mixing zone wells are below the standard.

5.3.5 SELENIUM - UPPER CHINLE

Contours of selenium concentrations for 2019 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 south to the Collection Ponds. The non-mixing zone site standard of 0.06 mg/L is exceeded in only a small area near well CF1 in 2019.

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. Concentrations in well CE19 have gradually declined the last few years except for an increase in 2019. Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells 929, 931, CW3, CW18 and CW40 which are all below the non-mixing zone site standard in 2019.

5.3.6 MOLYBDENUM - UPPER CHINLE

Figures 5.3-17 and 5.3-17A present the molybdenum concentrations in the Upper Chinle aquifer during 2019. 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 2019.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. The plot shows that the 2019 concentrations in wells CE2, CE15 and CE19 still need additional restoration. Figure 5.3-19 contains time plots of molybdenum concentrations for wells 929, 931, CW3, CW18 and CW40 and shows elevated molybdenum concentrations in well CW3.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2019 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 the nitrate concentrations in the Upper Chinle aquifer during 2019. All measured nitrate concentrations in the Upper Chinle aquifer in 2019 are less than the site standard. Routine monitoring of nitrate concentrations in the Upper Chinle aquifer is only warranted near the LTP because concentrations in the alluvial aquifer are elevated only near the LTP.

Plots of nitrate concentration versus time were not prepared, because historic values in Upper Chinle wells are similar to the low concentrations measured in 2019. 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

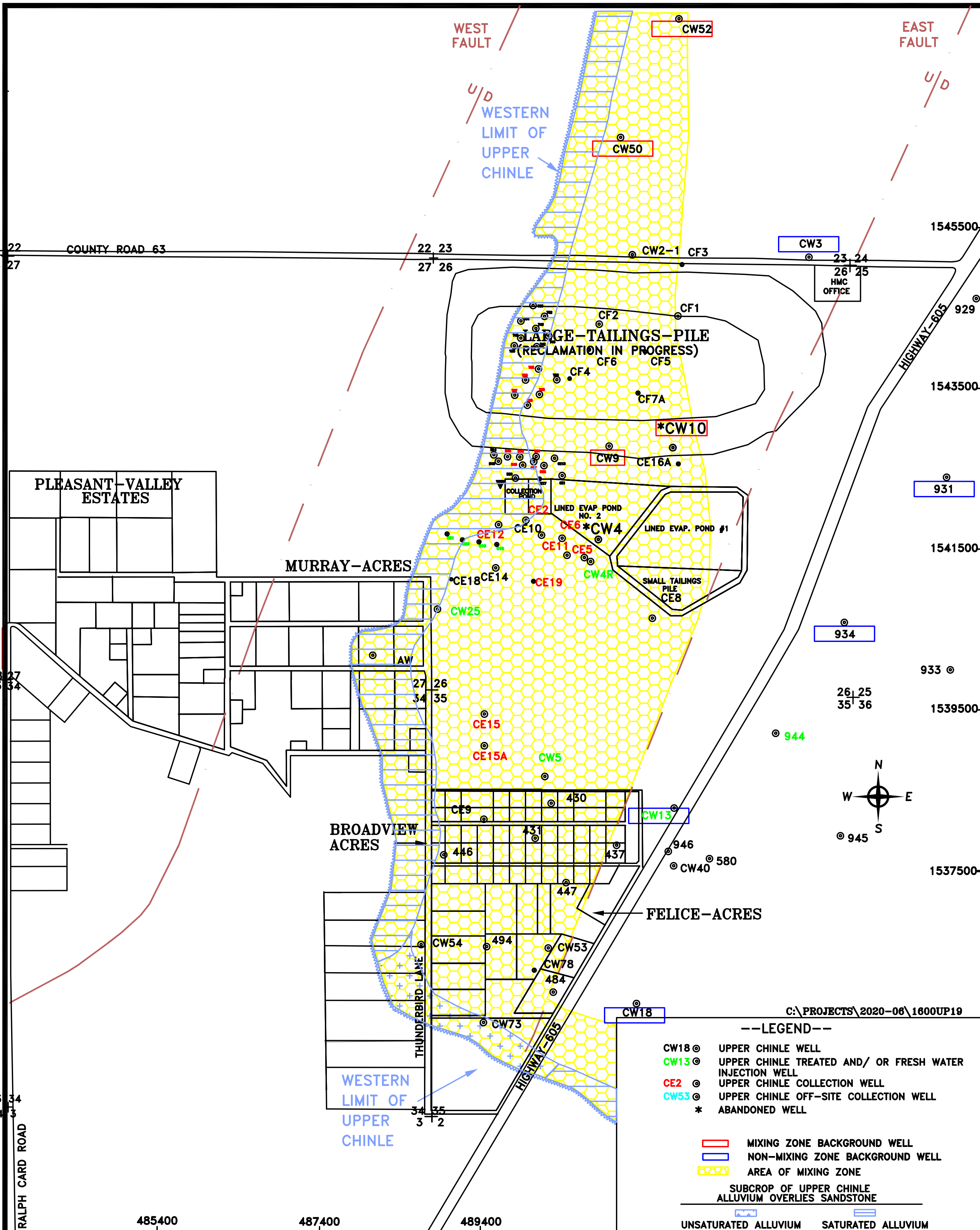
All radium concentrations in the Upper Chinle aquifer have been relatively low at the Grants site. Past radium values have slightly exceeded 5 pCi/L in the Upper Chinle aquifer in the western portion of the LTP but restoration efforts for other constituents should easily reduce radium-226 and radium-228 concentration to below levels of concern. Figures 5.3-21 and 5.3-21A present the radium-226 and the radium-228 values measured in 2019. The measured 2019 values in the Upper Chinle wells are all small and the 2019 values in well CW3 shows that a 2018 sample with elevated radium-226 level in this well was an outlier. 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 HMC 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 2019 measured vanadium concentrations are equal to or less than 0.01 mg/L except for a slightly higher value in wells CW3 and CW50. The 2019 value from background well CW50 indicates the 0.01 mg/L standard may be slightly too small. 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 2019 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2019 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.

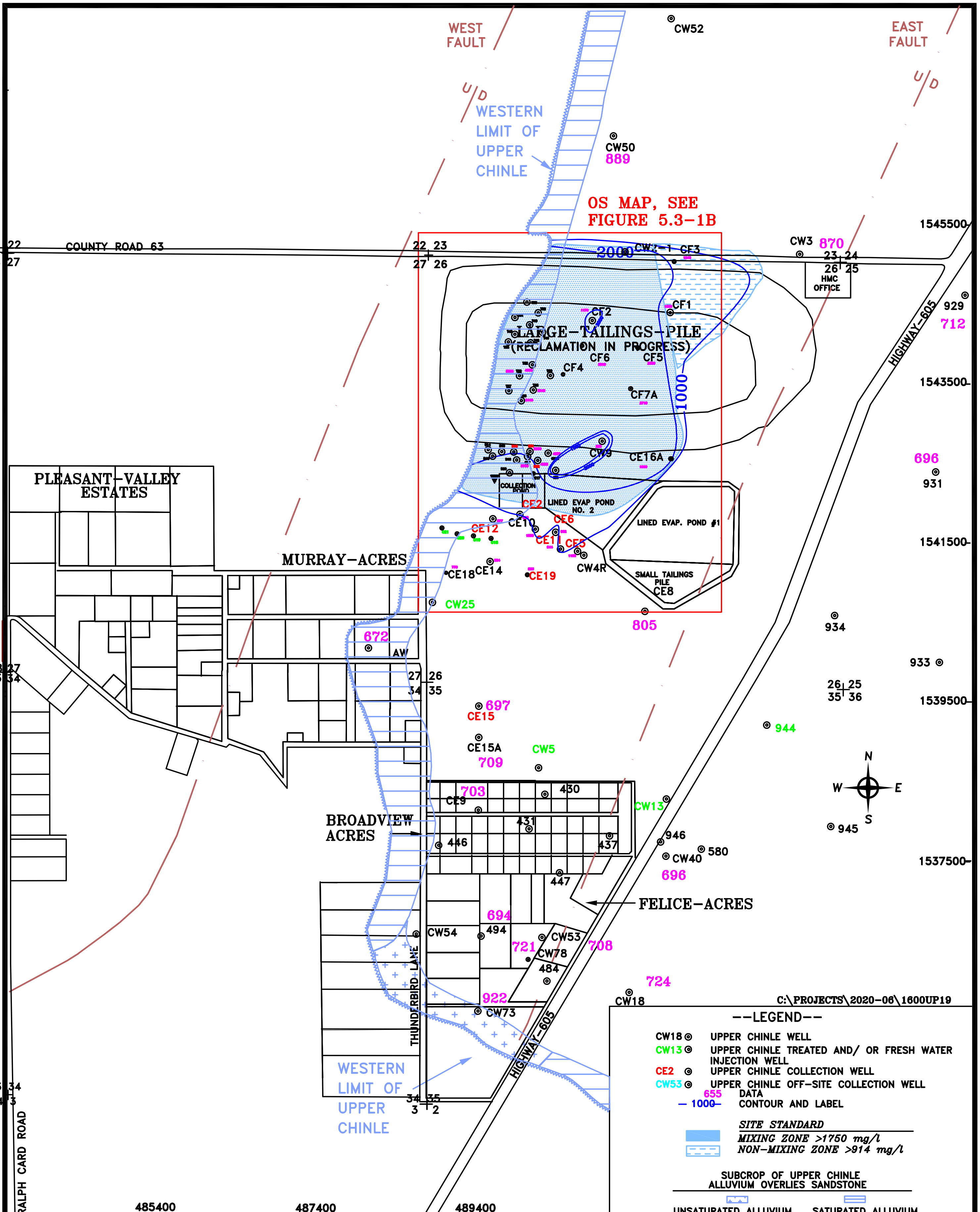


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

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

DATE: 11/12/2019

SCALE: 1"= 1600'

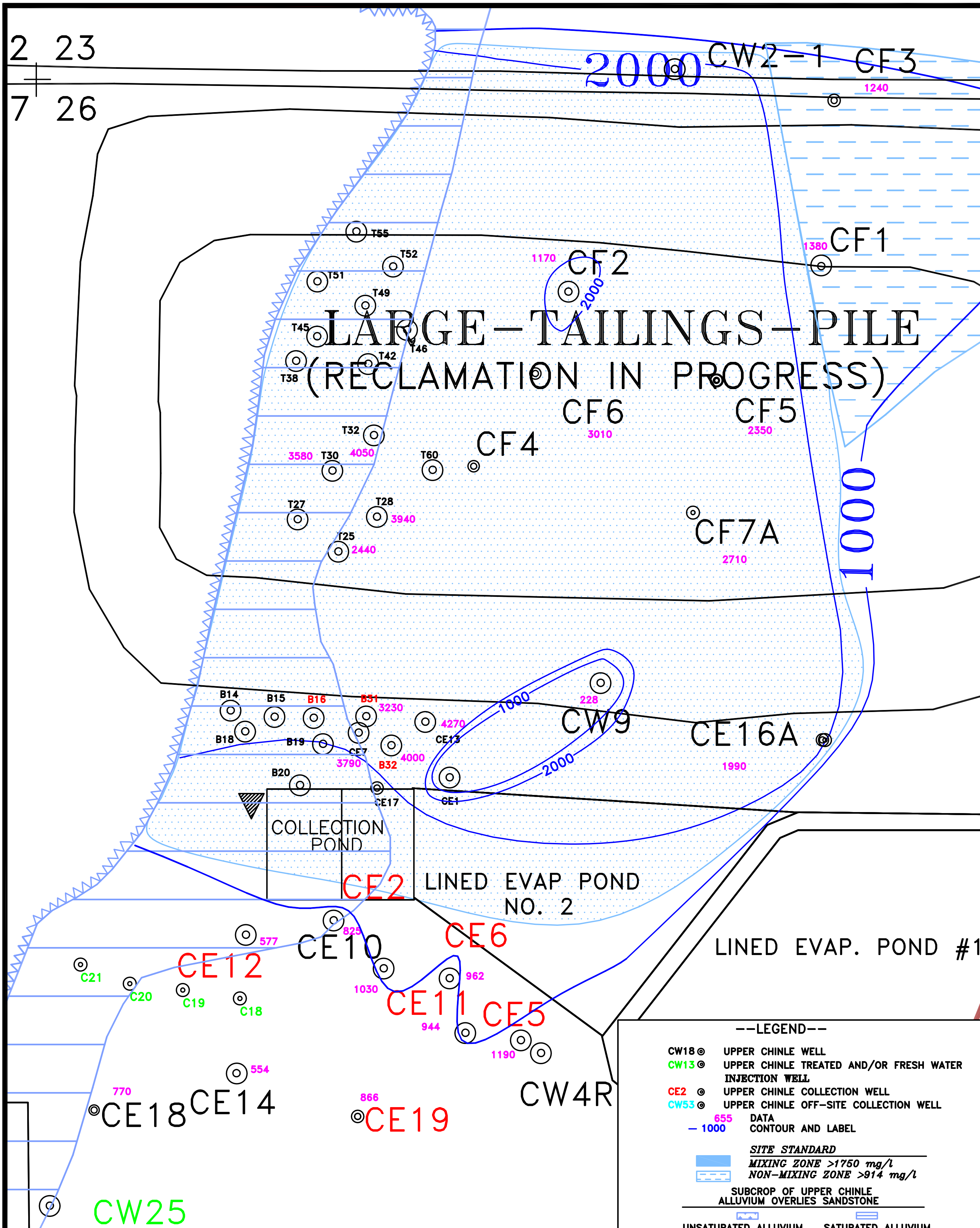


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/16/2020

FIGURE 5.3-1A. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

SCALE: 1"= 1600'

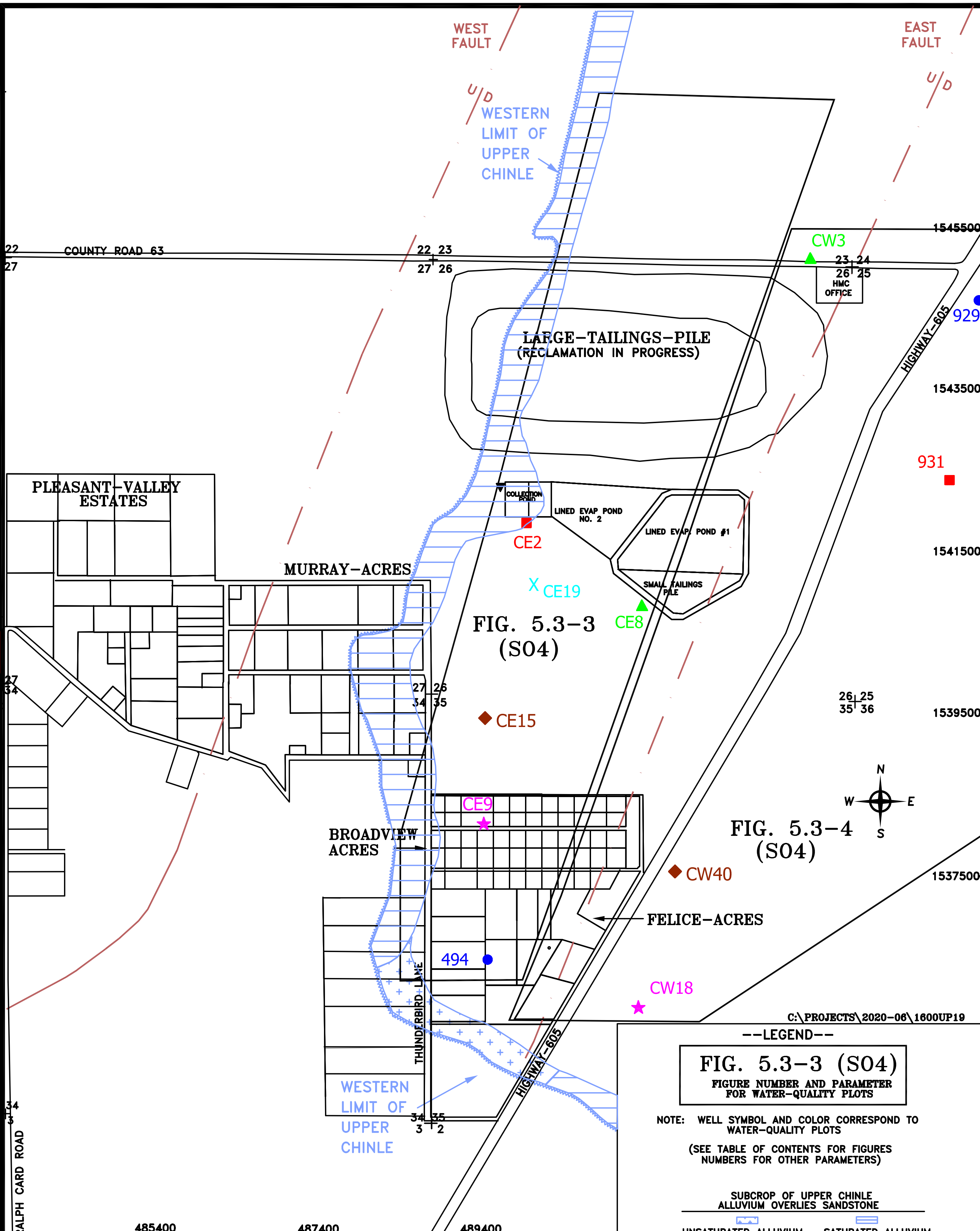


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-1B. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 500'



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

DATE: 11/12/2019

FIGURE 5.3-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2019

SCALE: 1"= 1600'

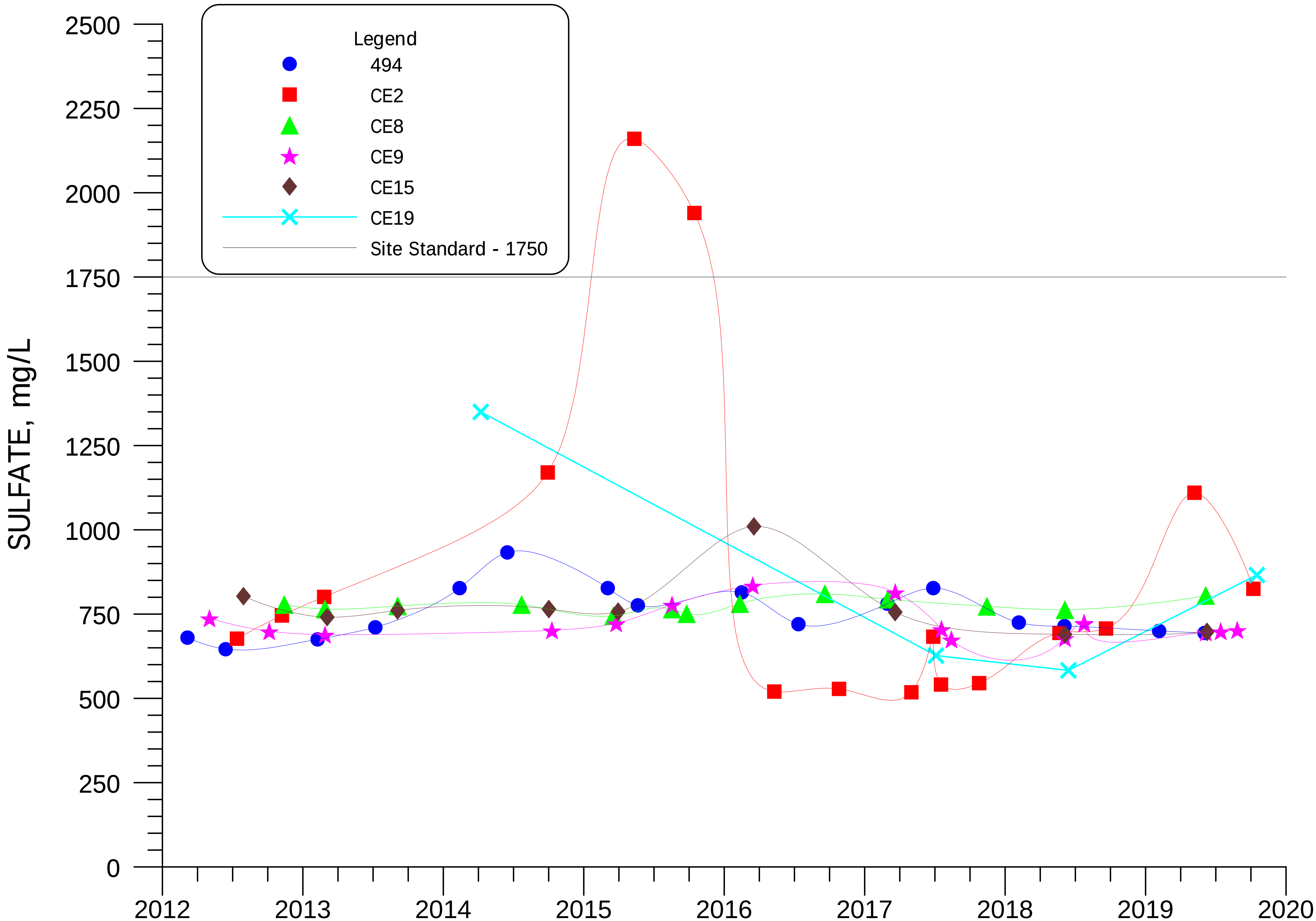


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

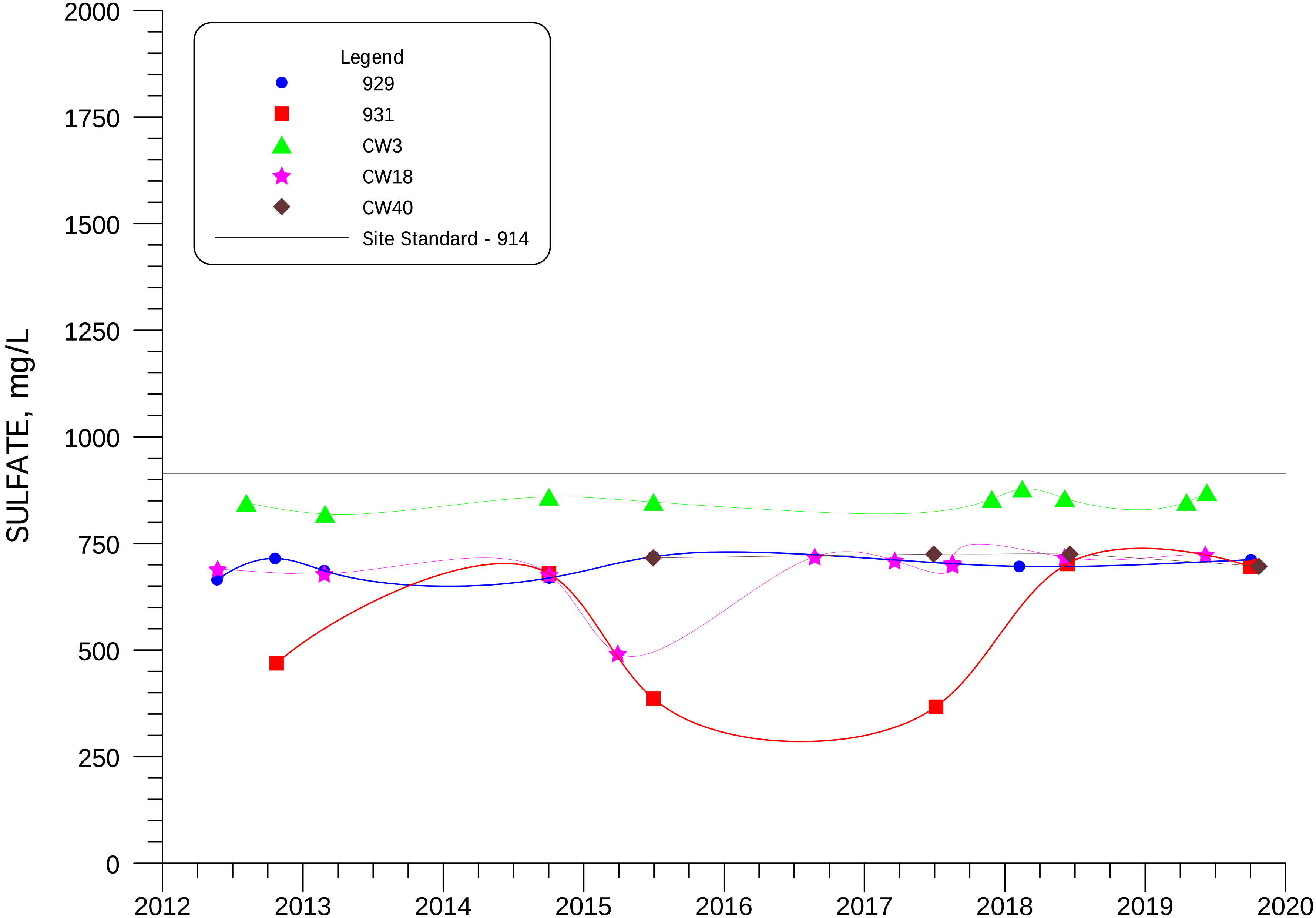
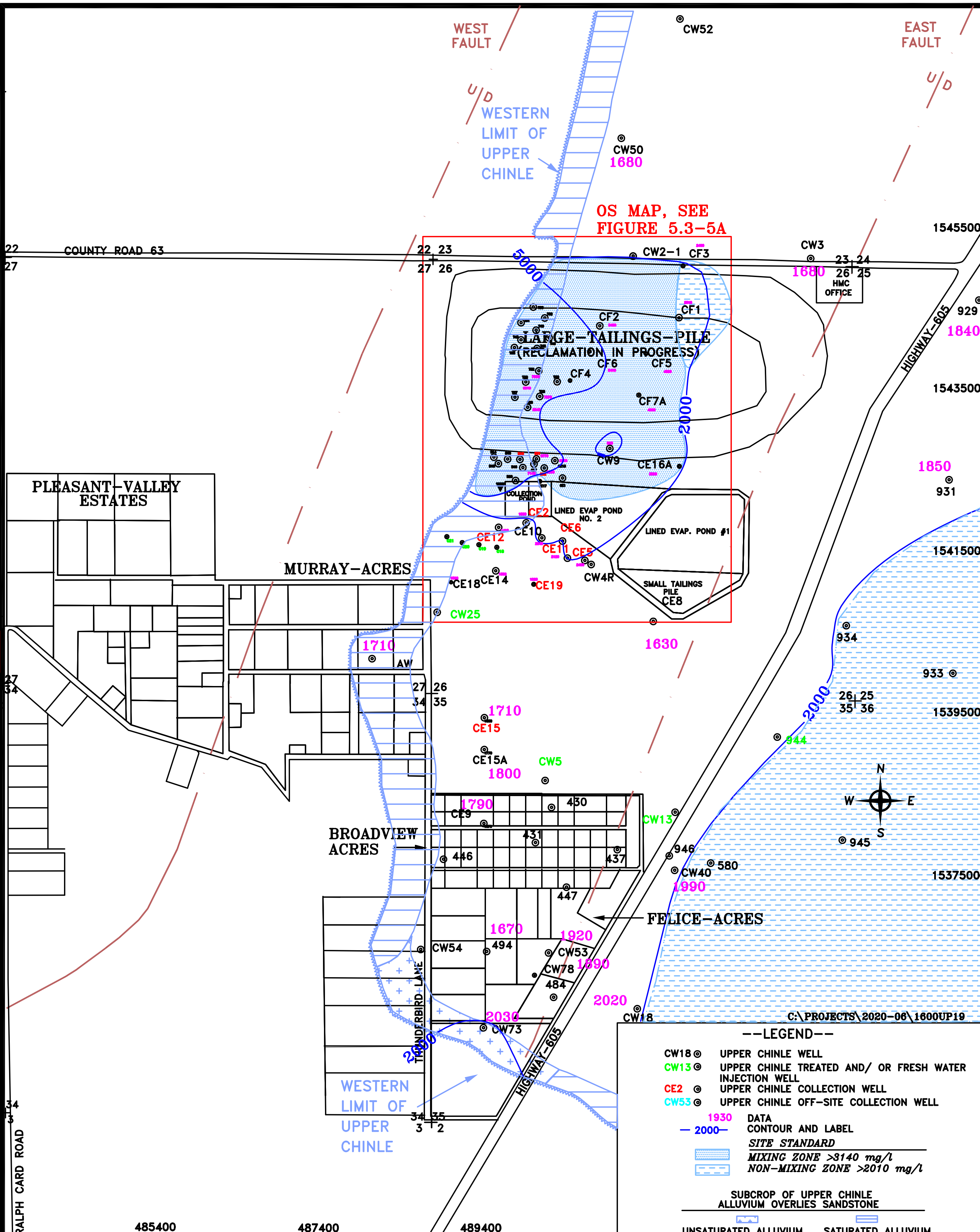


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40

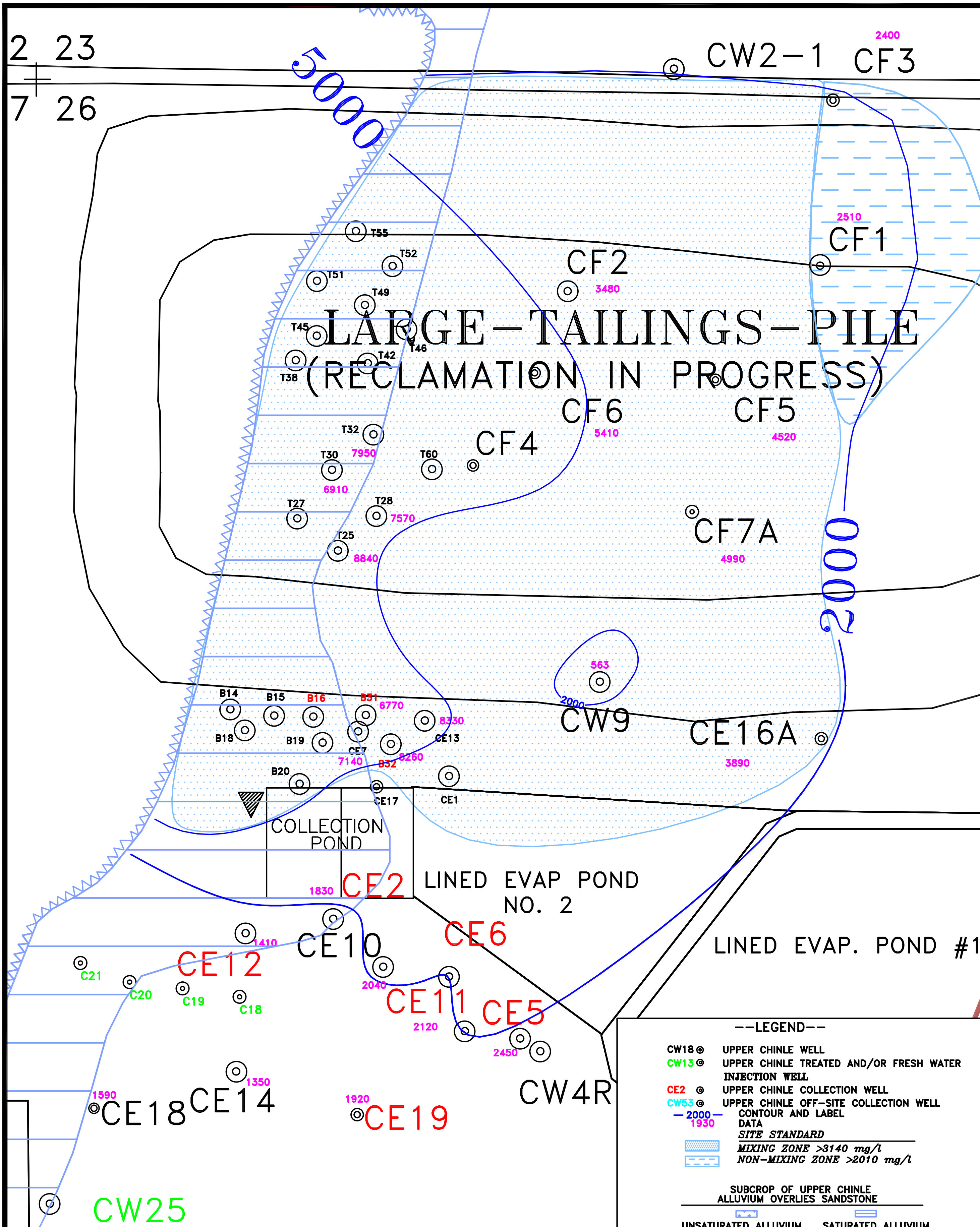


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 1600'



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

FIGURE 5.3-5A. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

DATE: 1/16/2020
SCALE: 1"= 500'
PAGE: 5.3-15

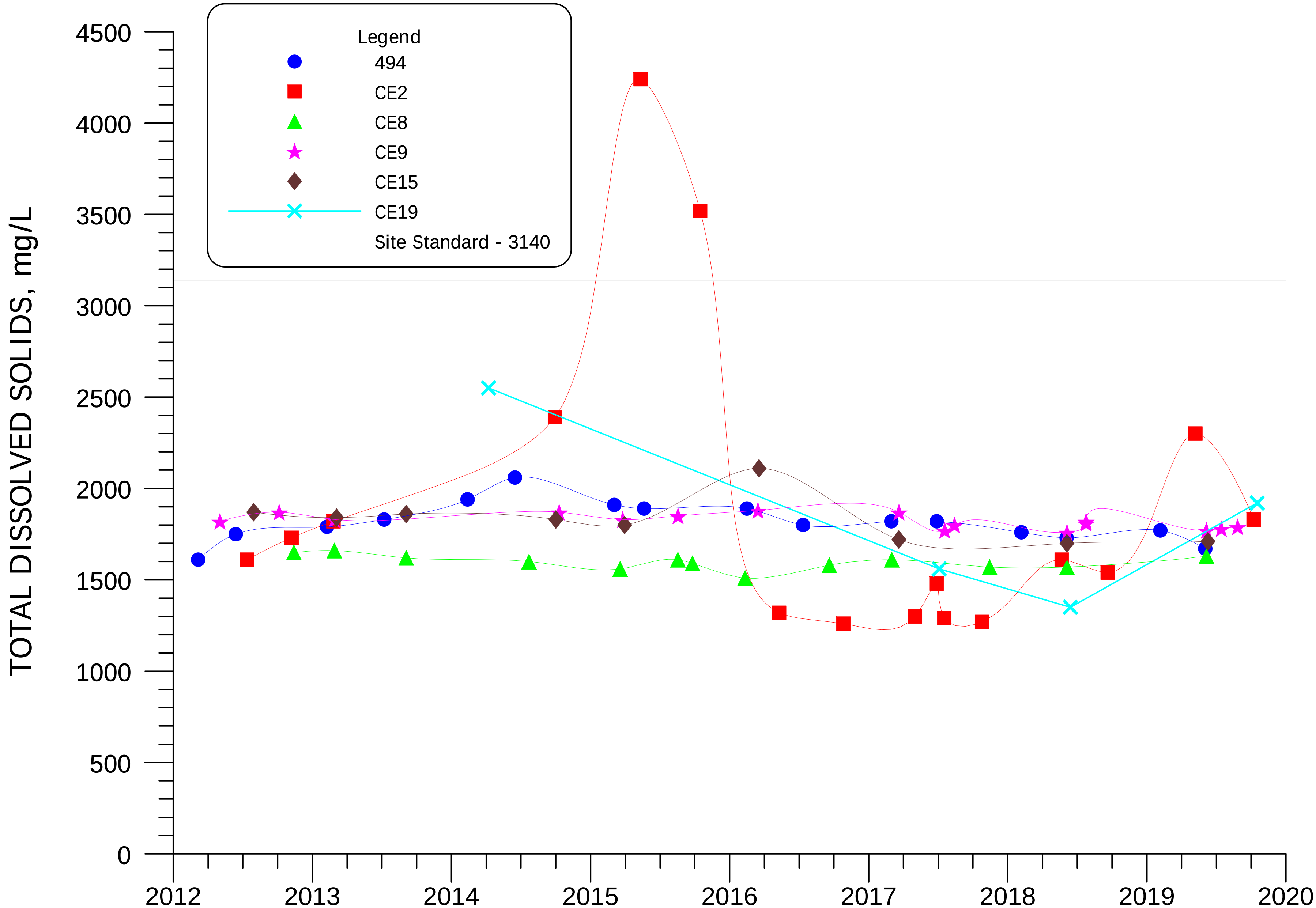


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

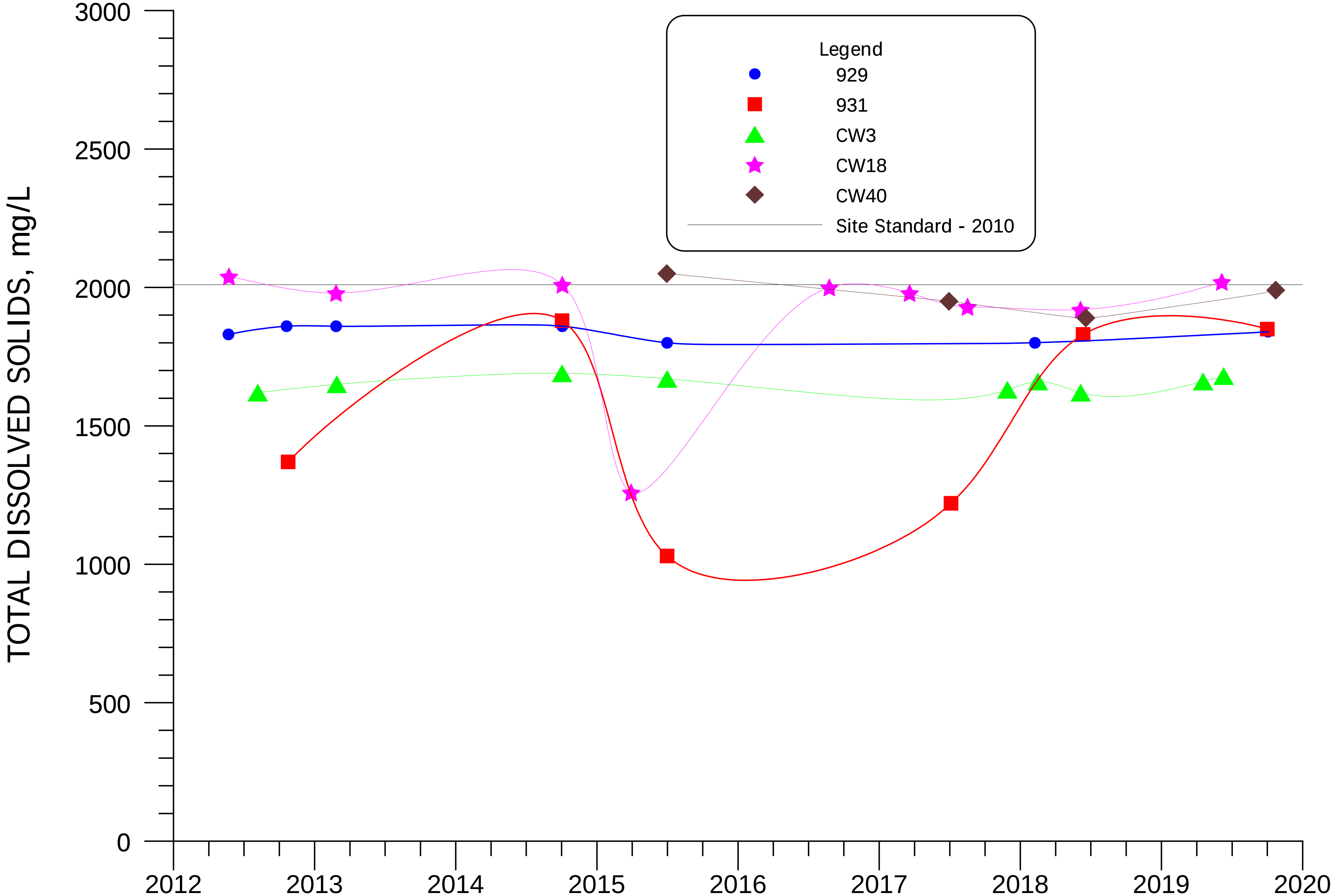
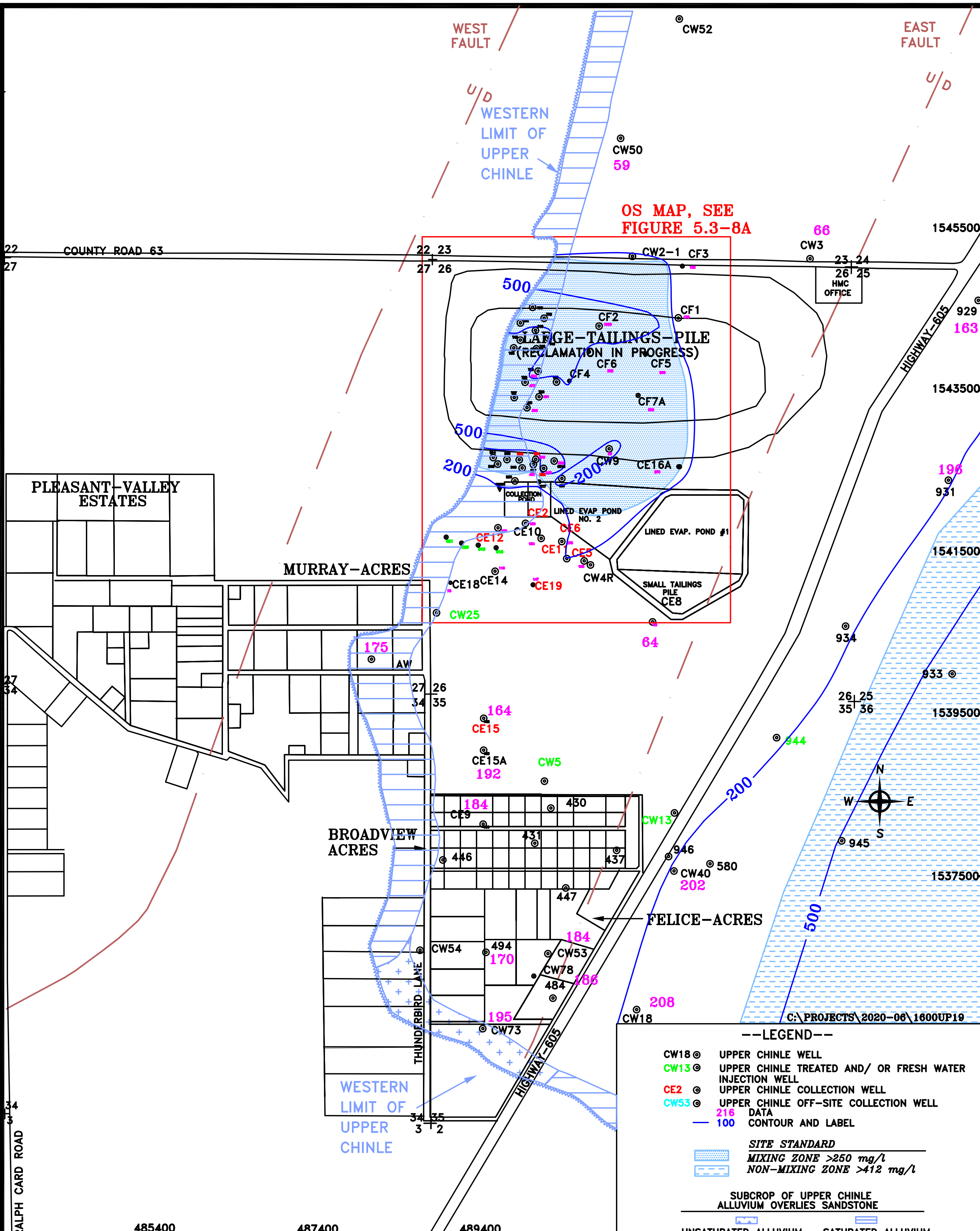
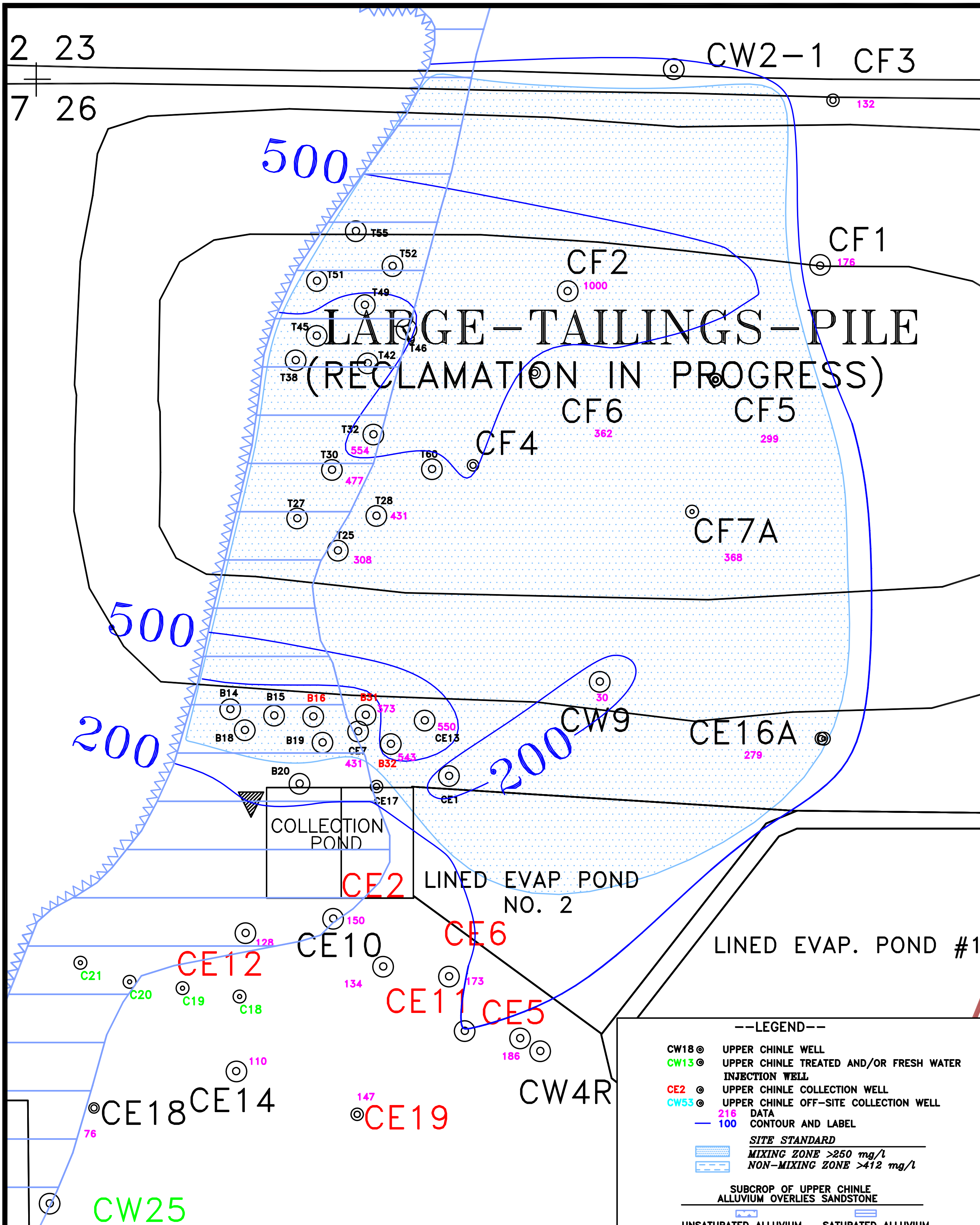


FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L	SCALE: 1"= 1600'
	PAGE: 5.3-18



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

FIGURE 5.3-8A. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 500'

PAGE: 5.3-19

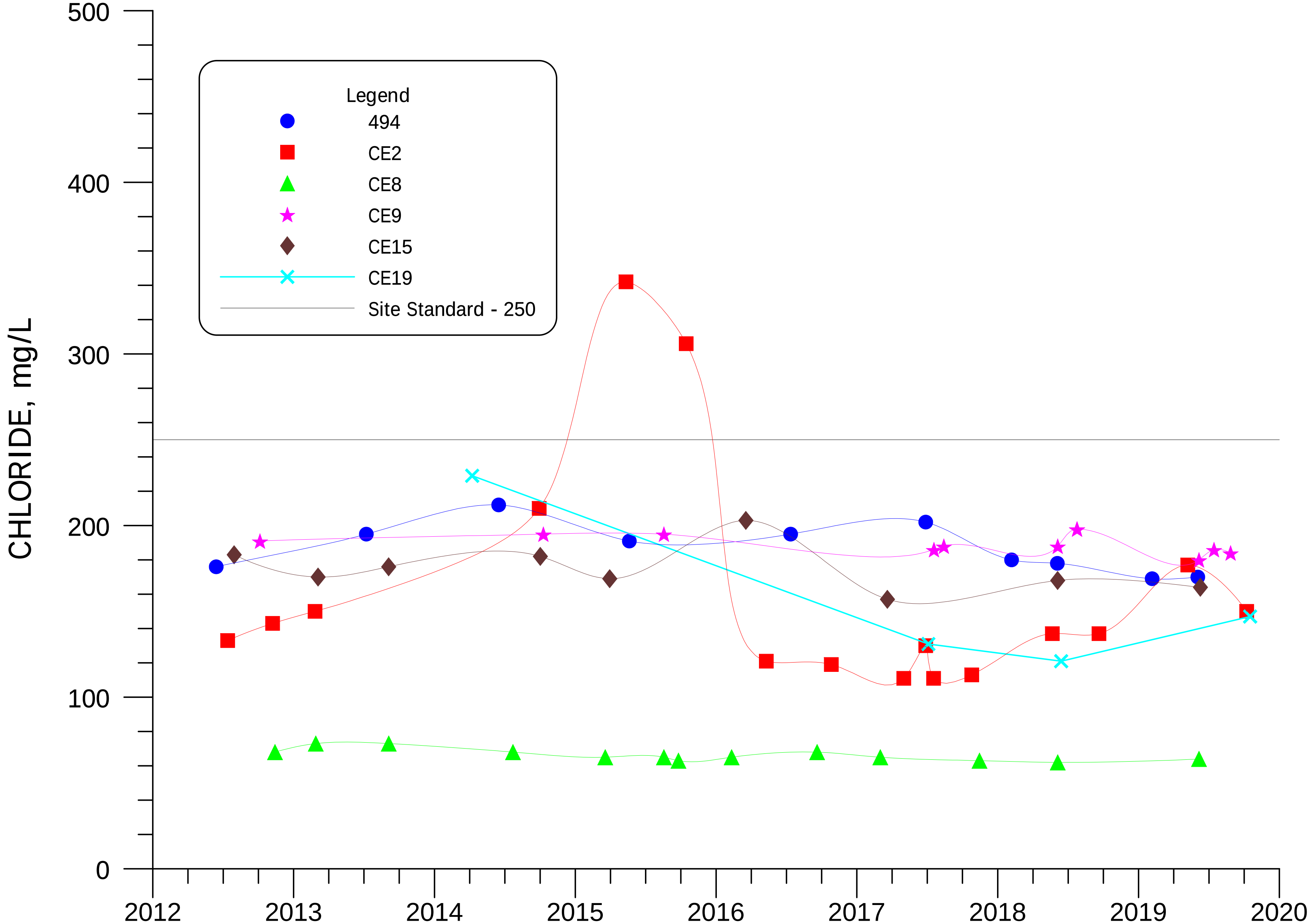


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

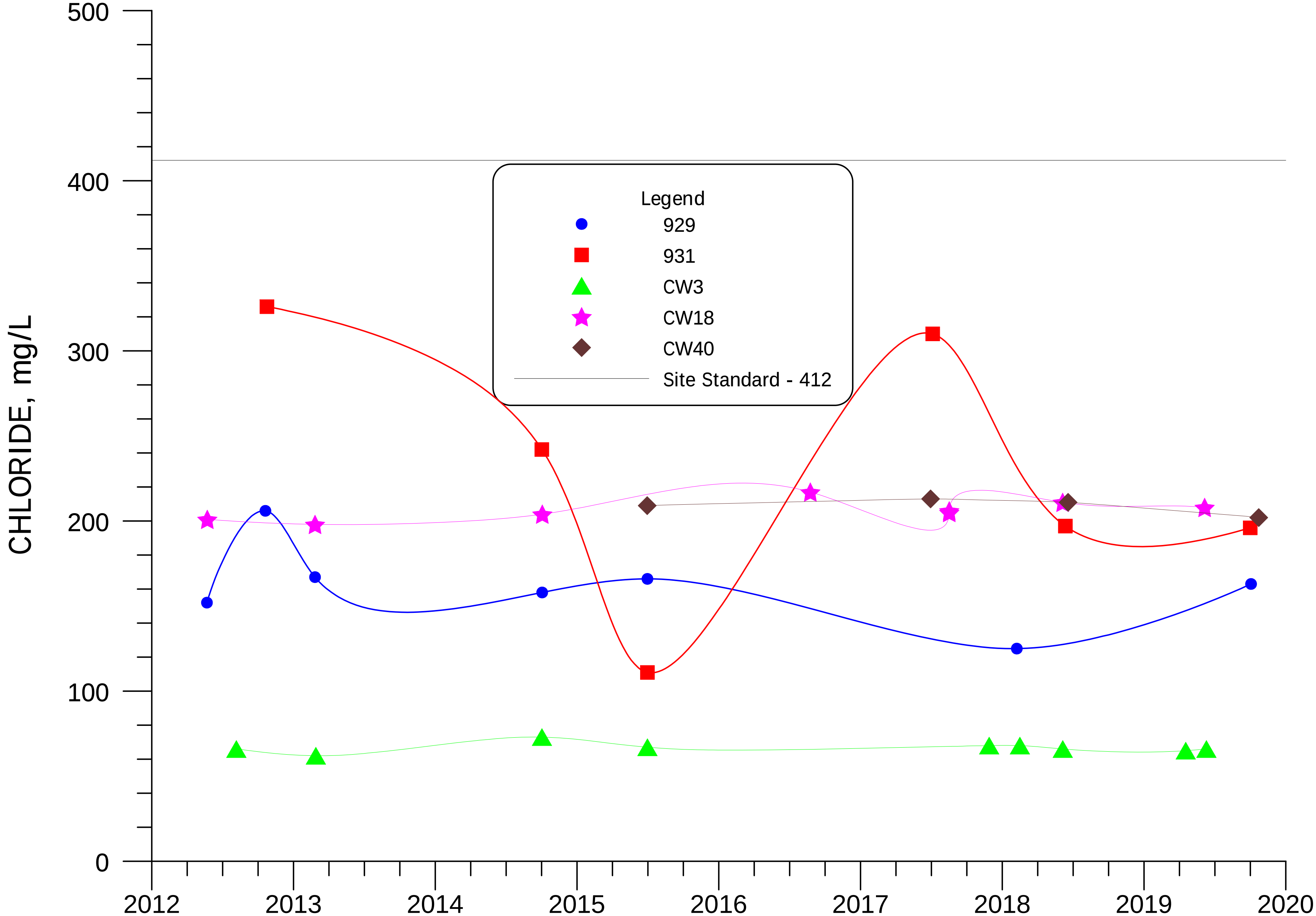
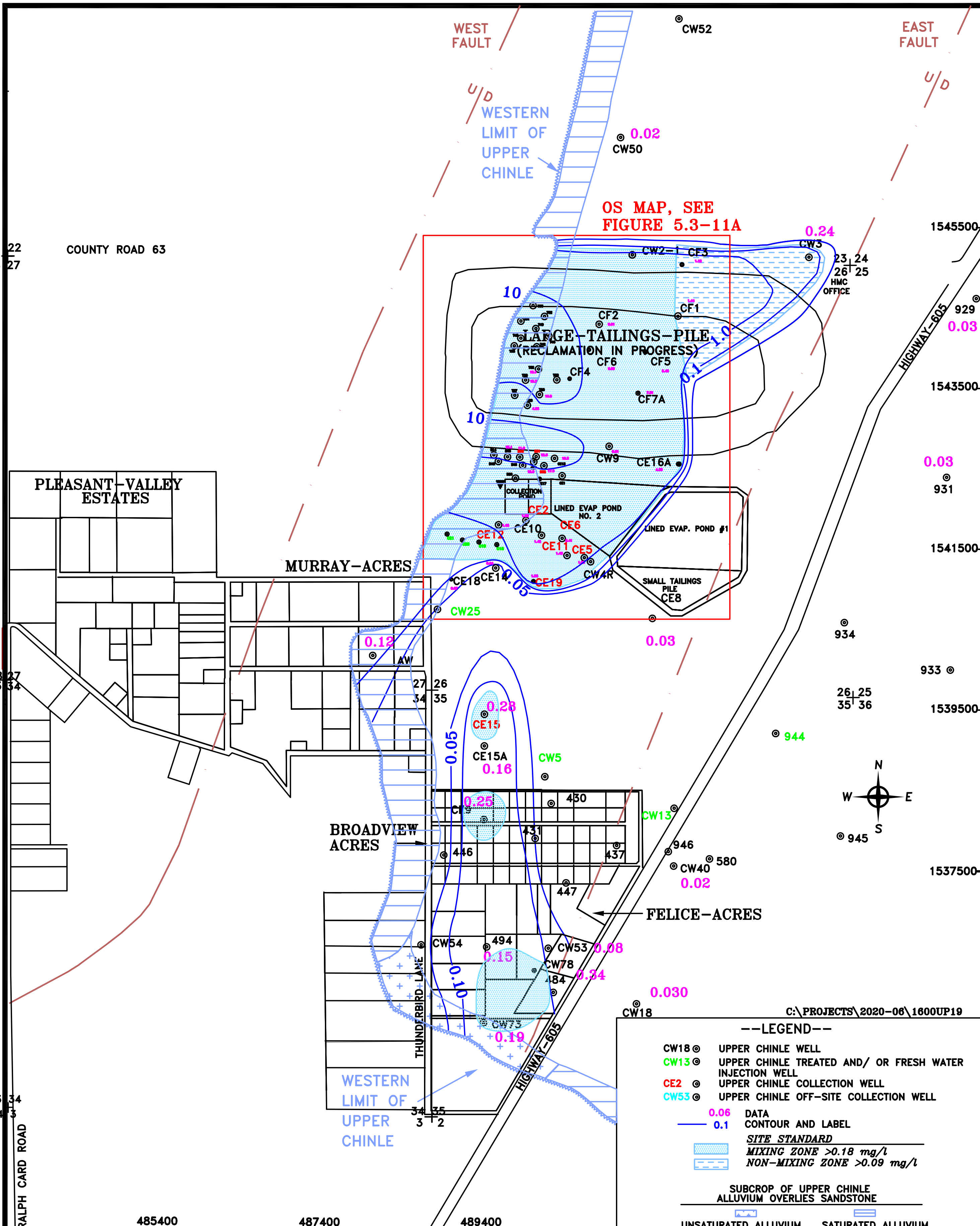
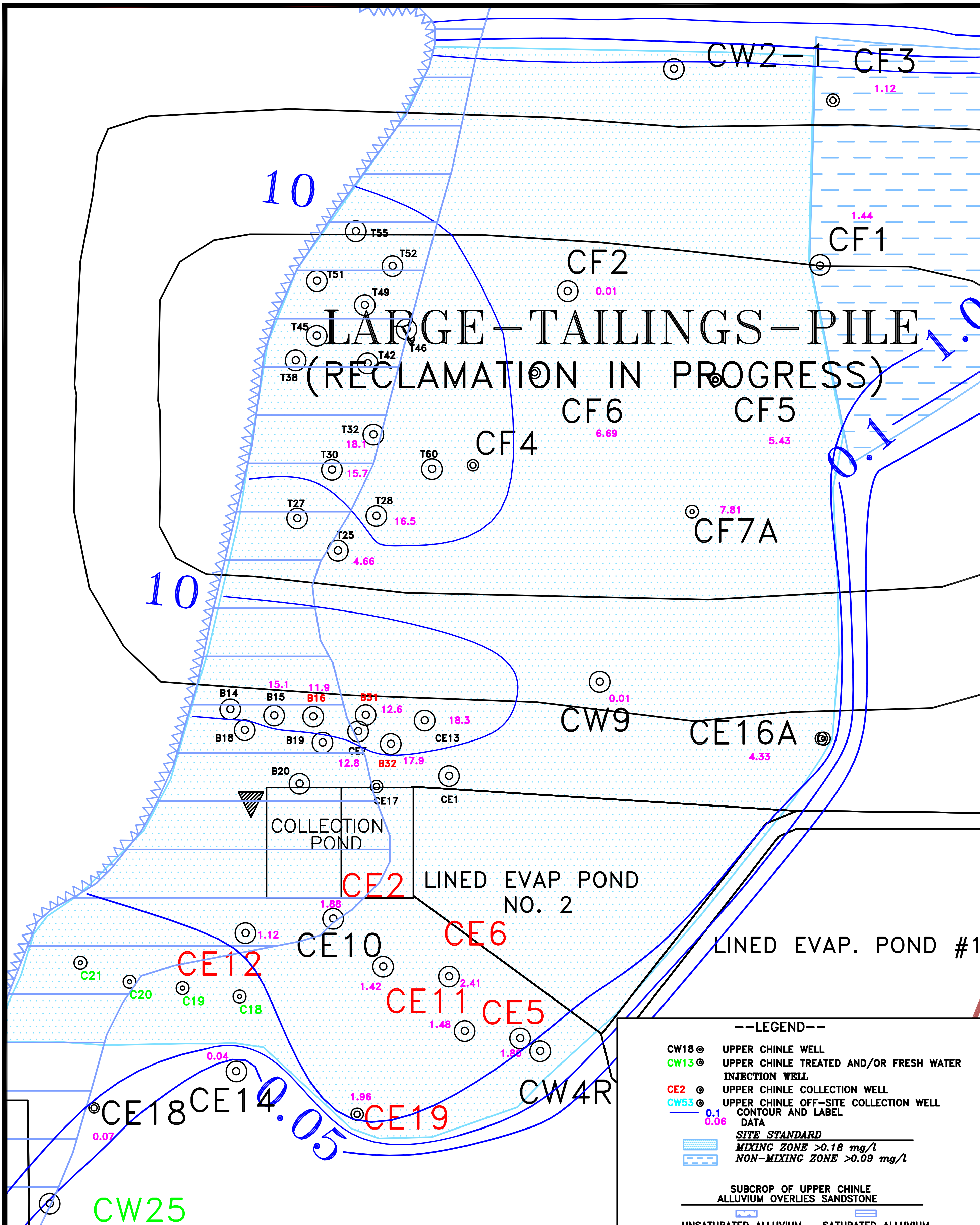


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L	SCALE: 1"= 1600'
	PAGE: 5.3-22



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.3-11A. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L	SCALE: 1"= 500'
	PAGE: 5.3-23

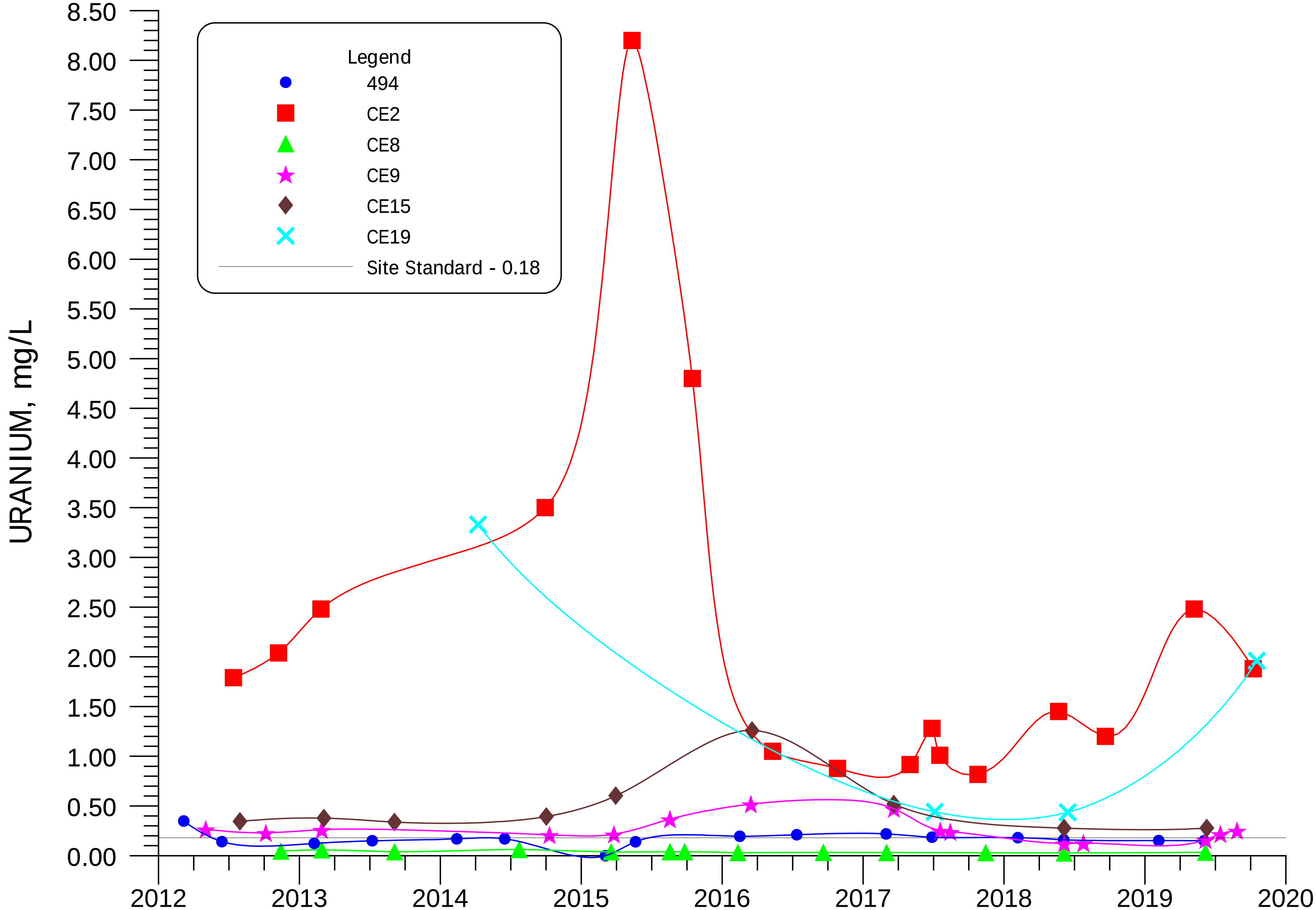


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

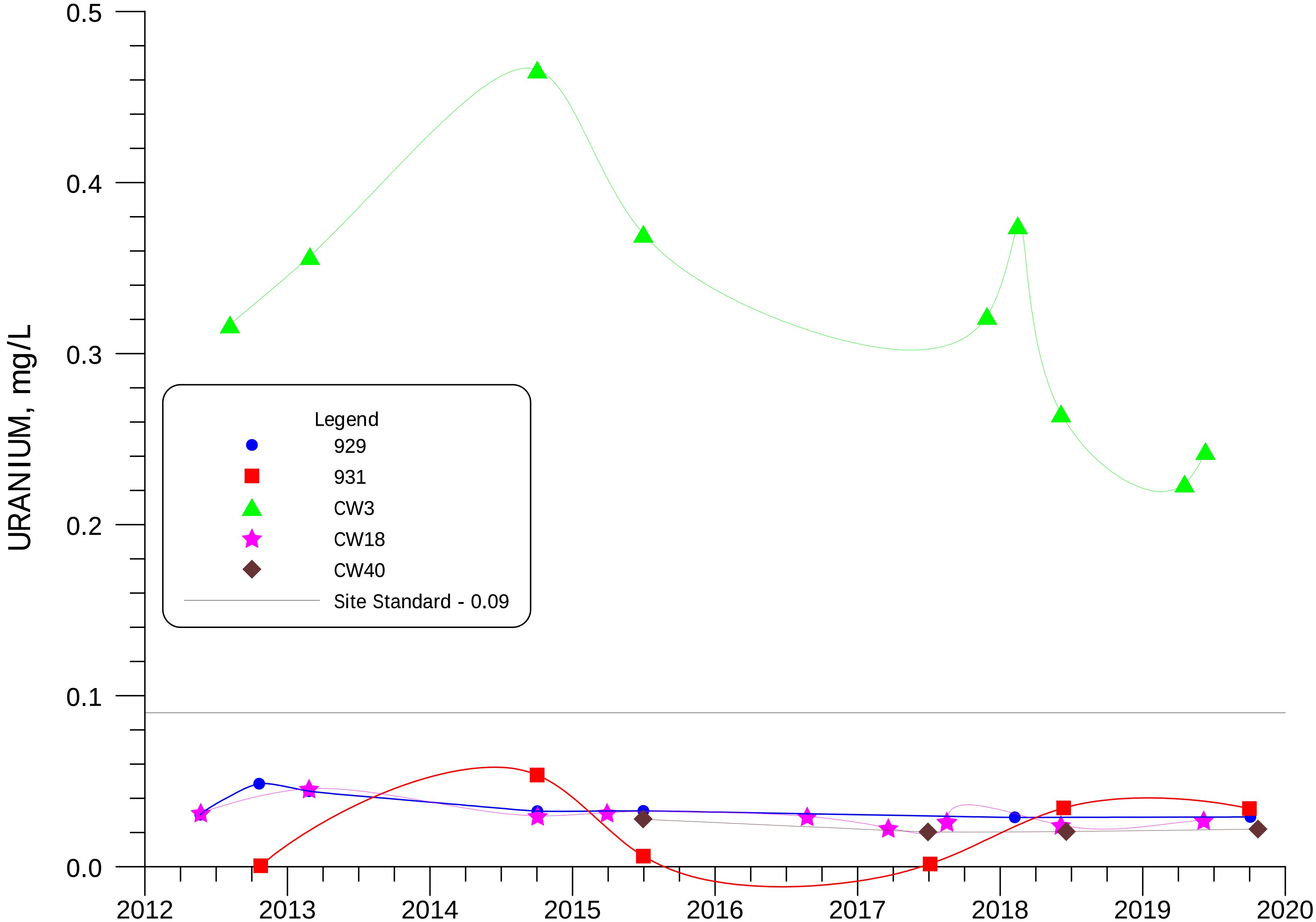
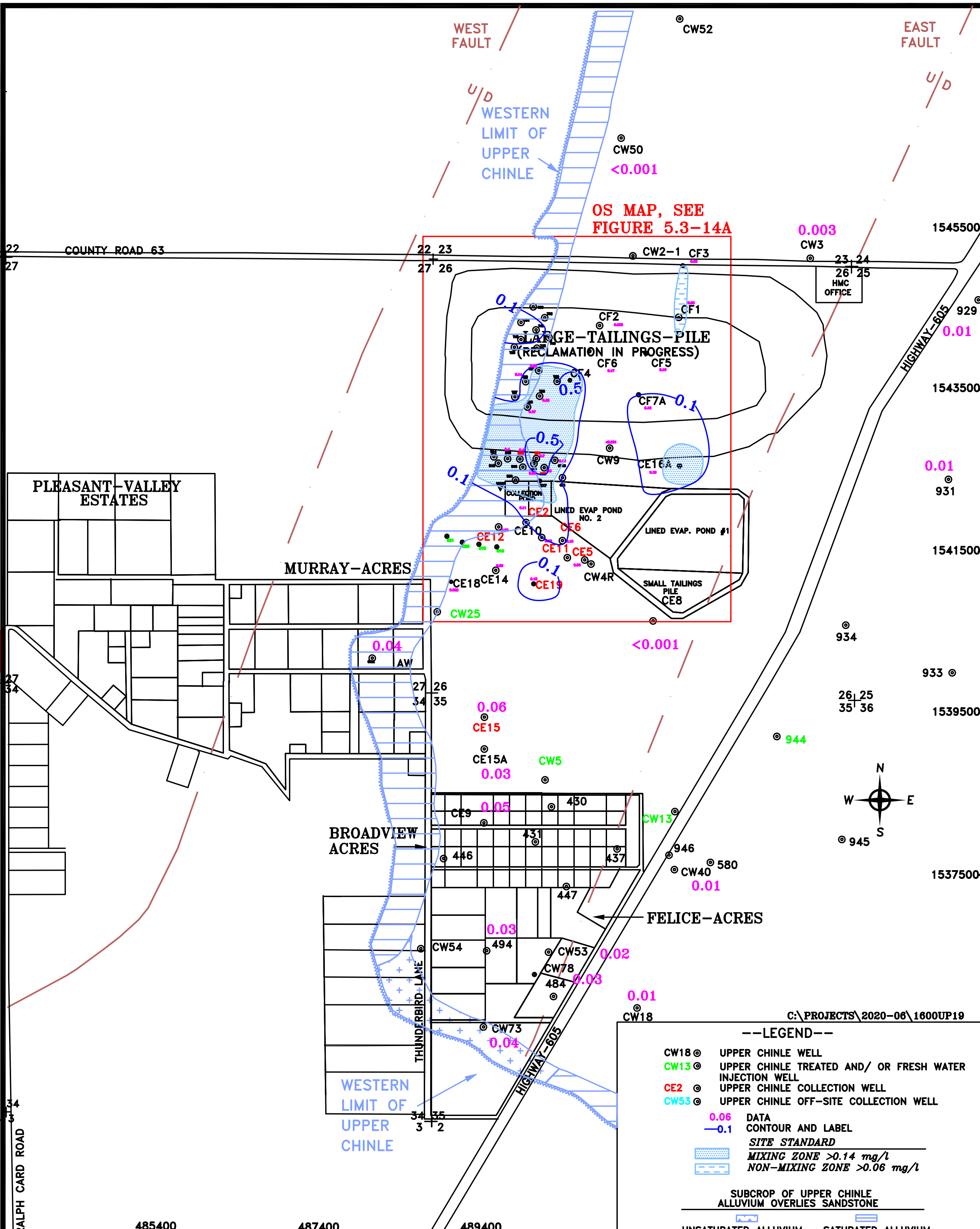


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40



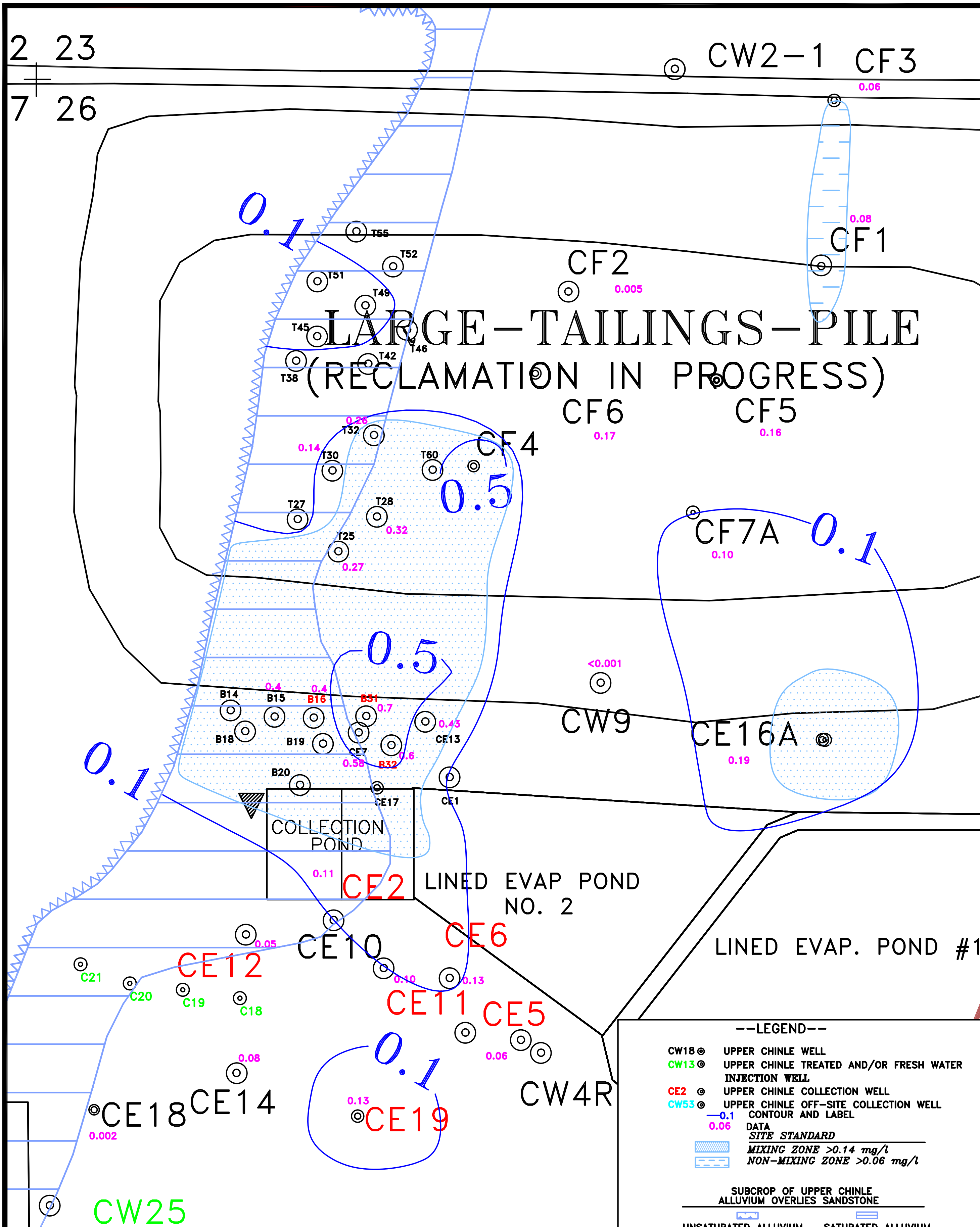
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/16/2020

FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

SCALE: 1"= 1600'

PAGE: 5.3-26



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

FIGURE 5.3-14A. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 500'

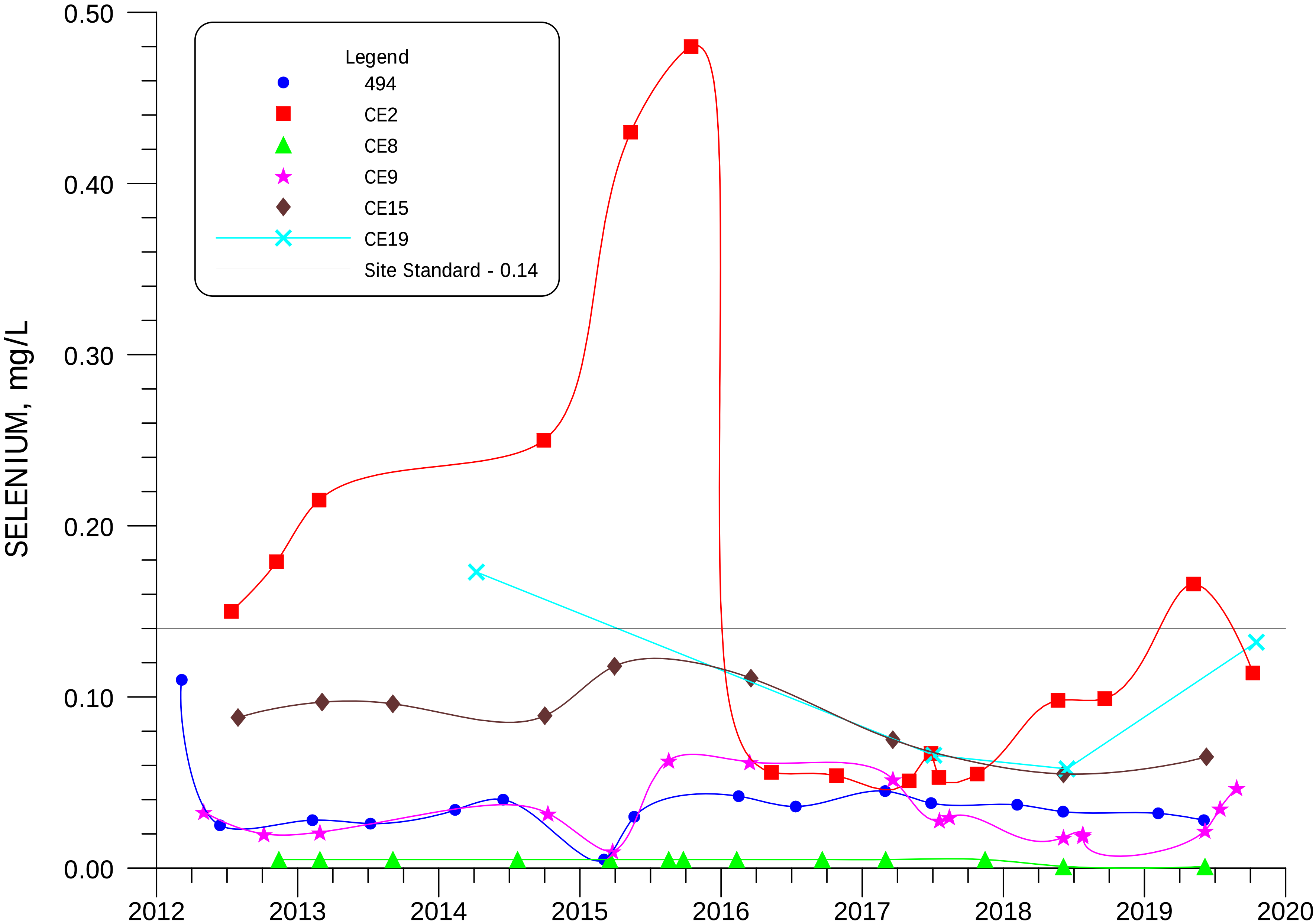


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

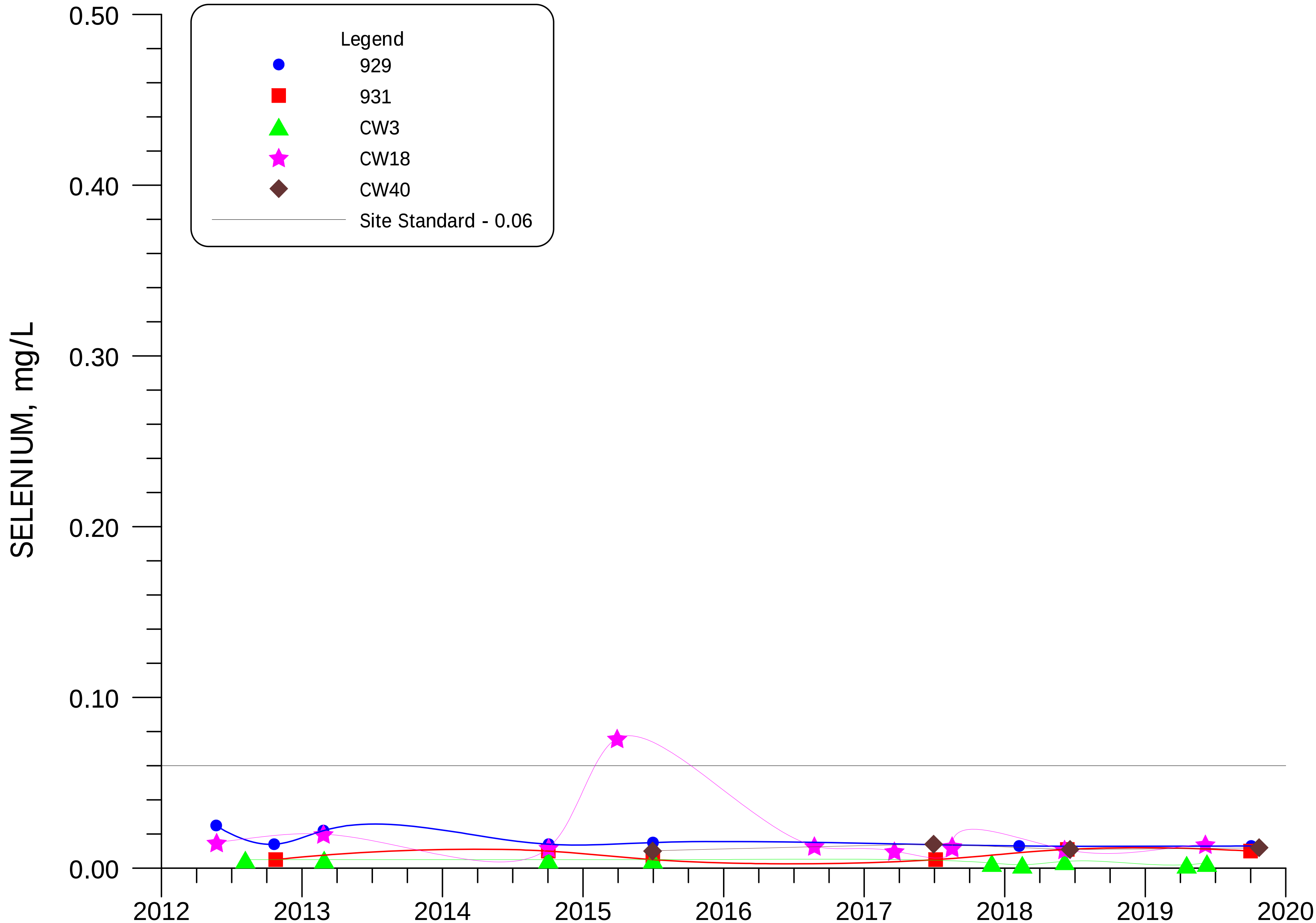
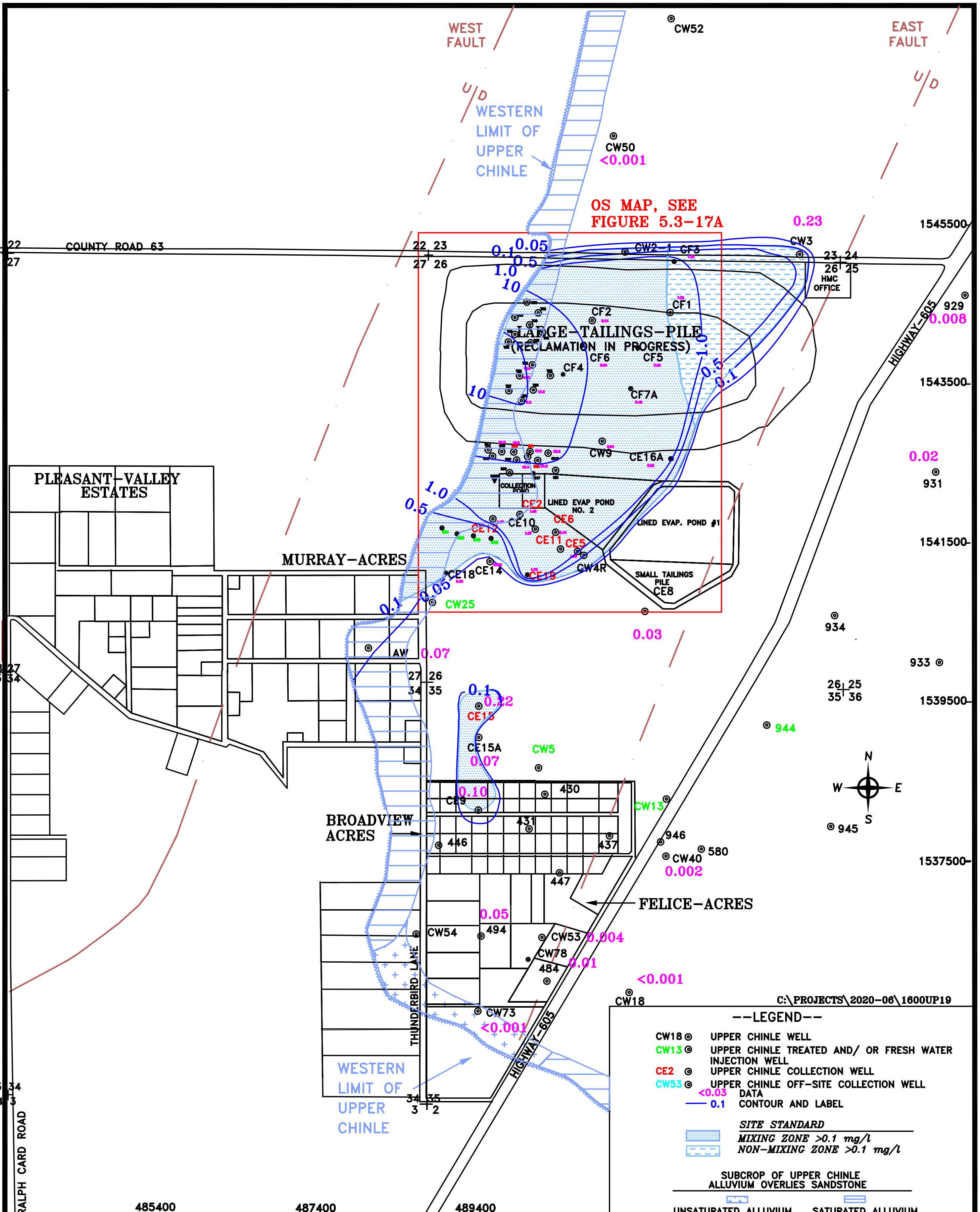


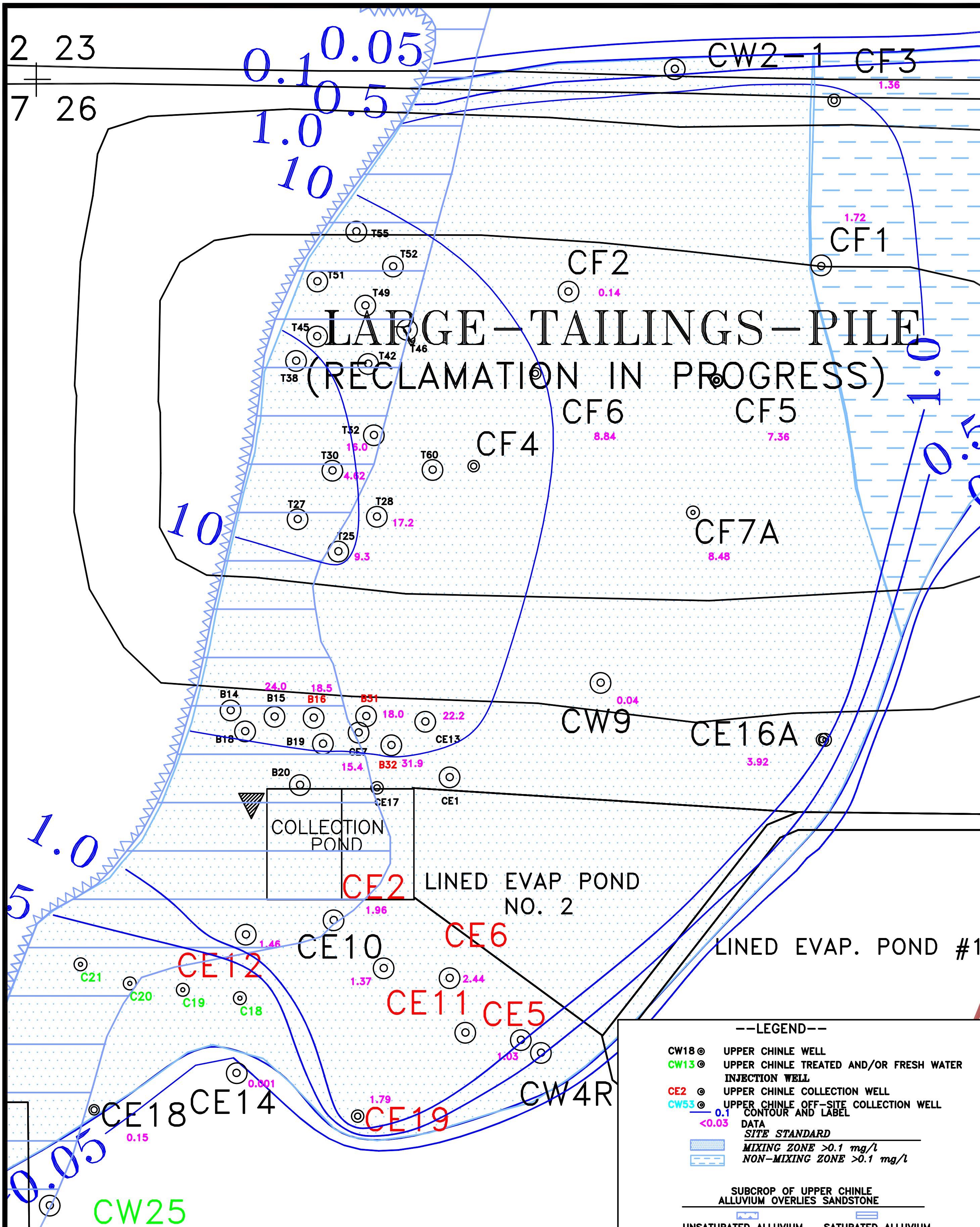
FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40



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

FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

DATE: 1/16/2020
SCALE: 1"= 1600'



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

DATE: 1/16/2020

FIGURE 5.3-17A. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

SCALE: 1"= 500'

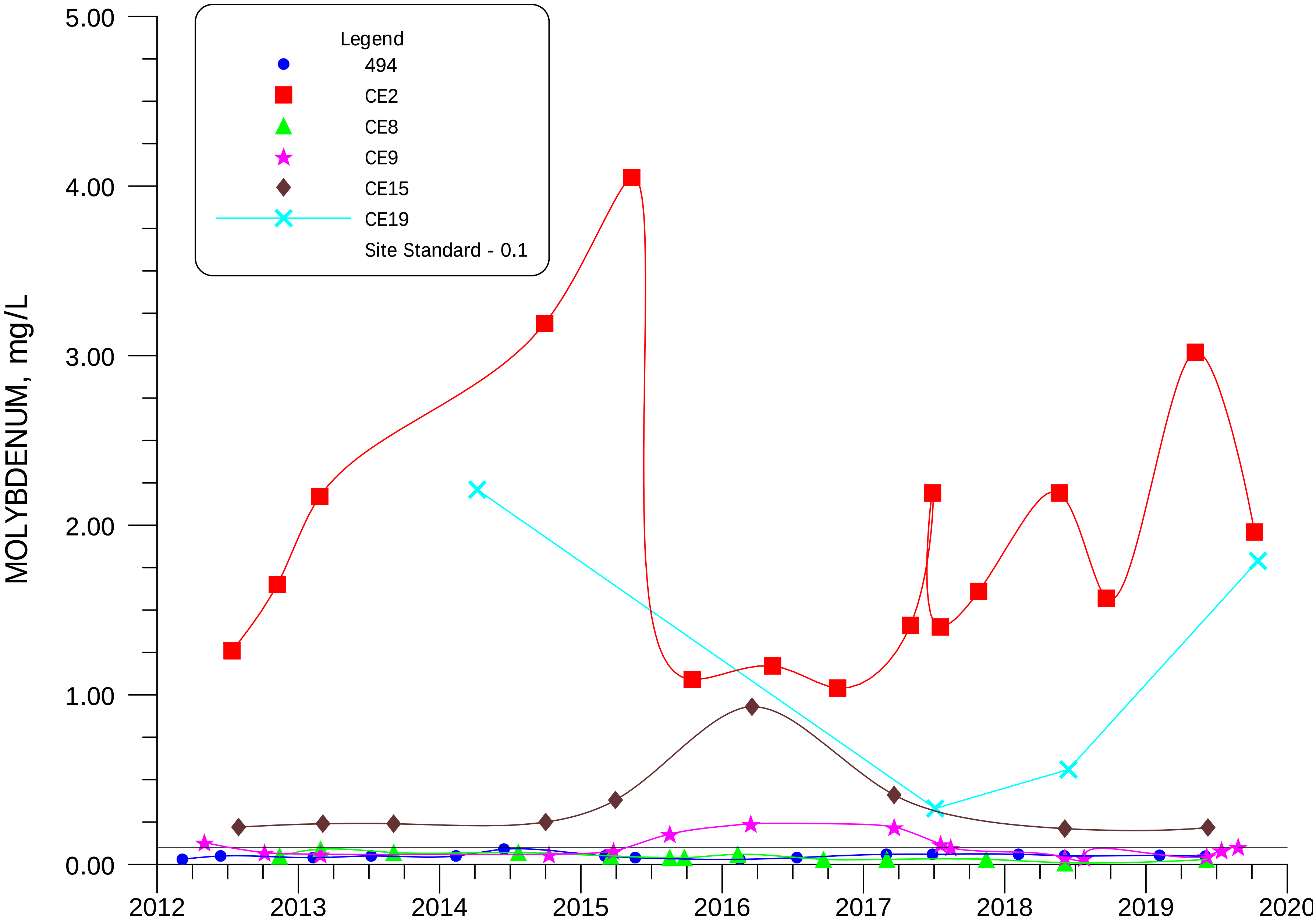


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE8, CE9, CE15 AND CE19

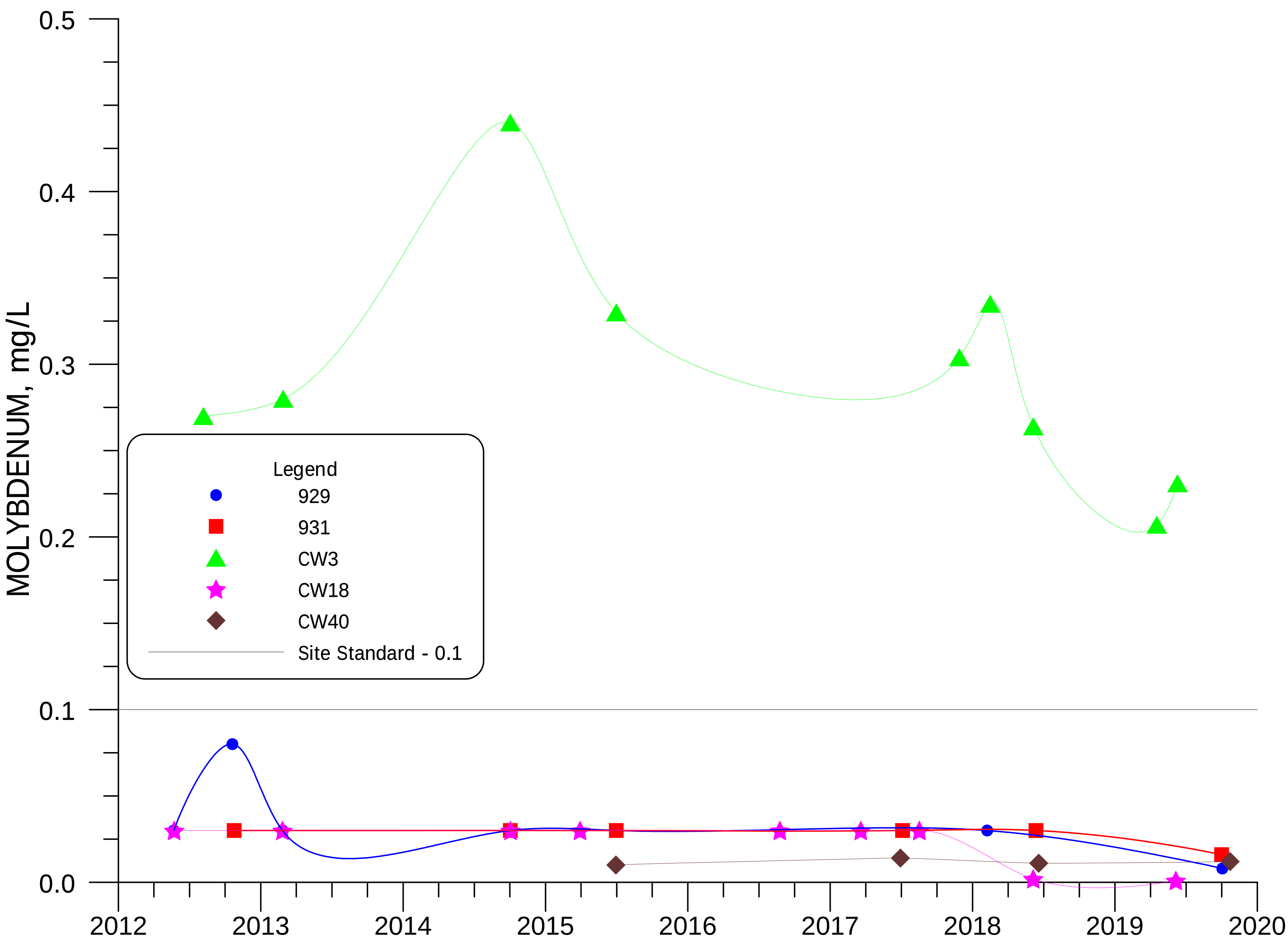
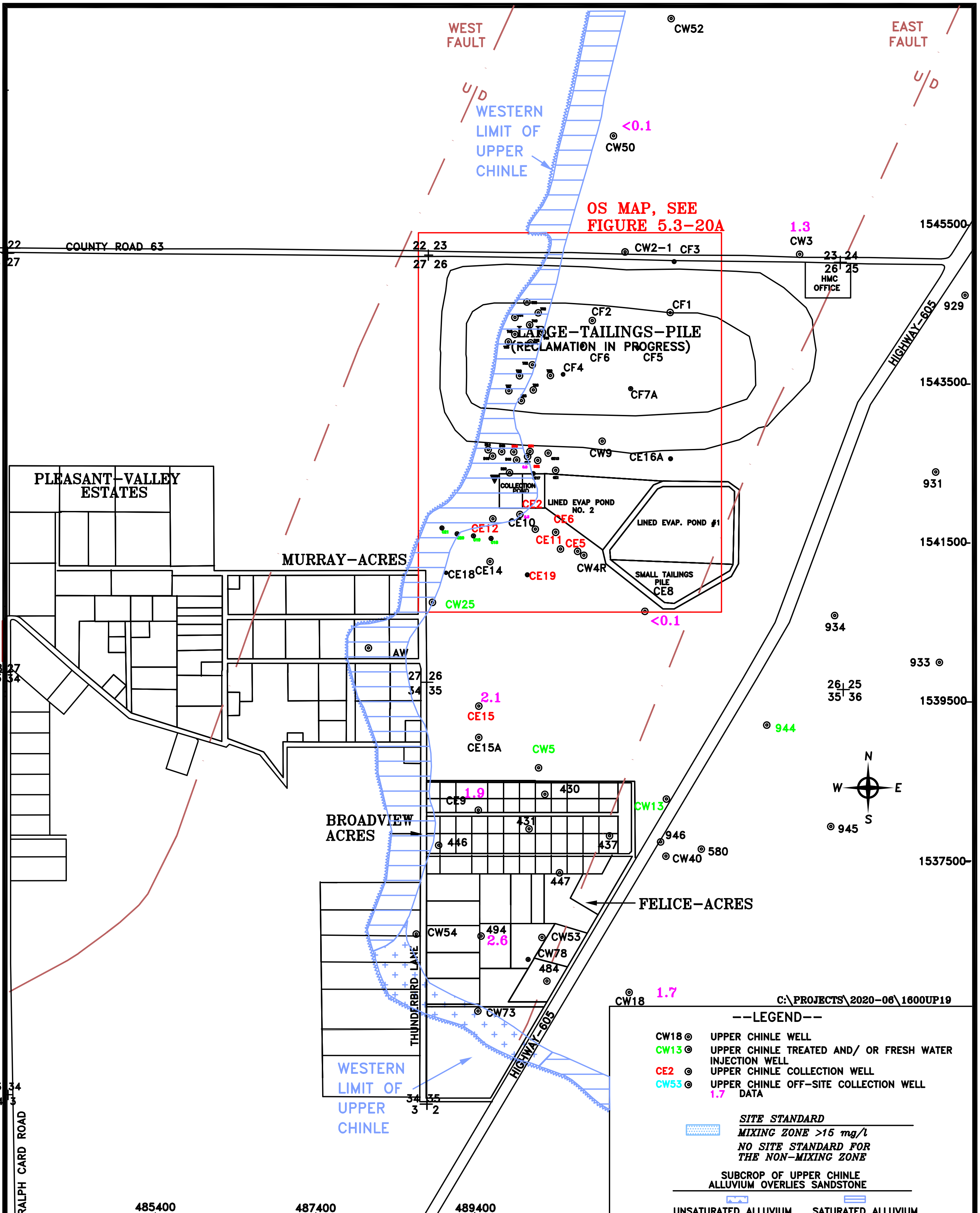


FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, CW3, CW18 AND CW40

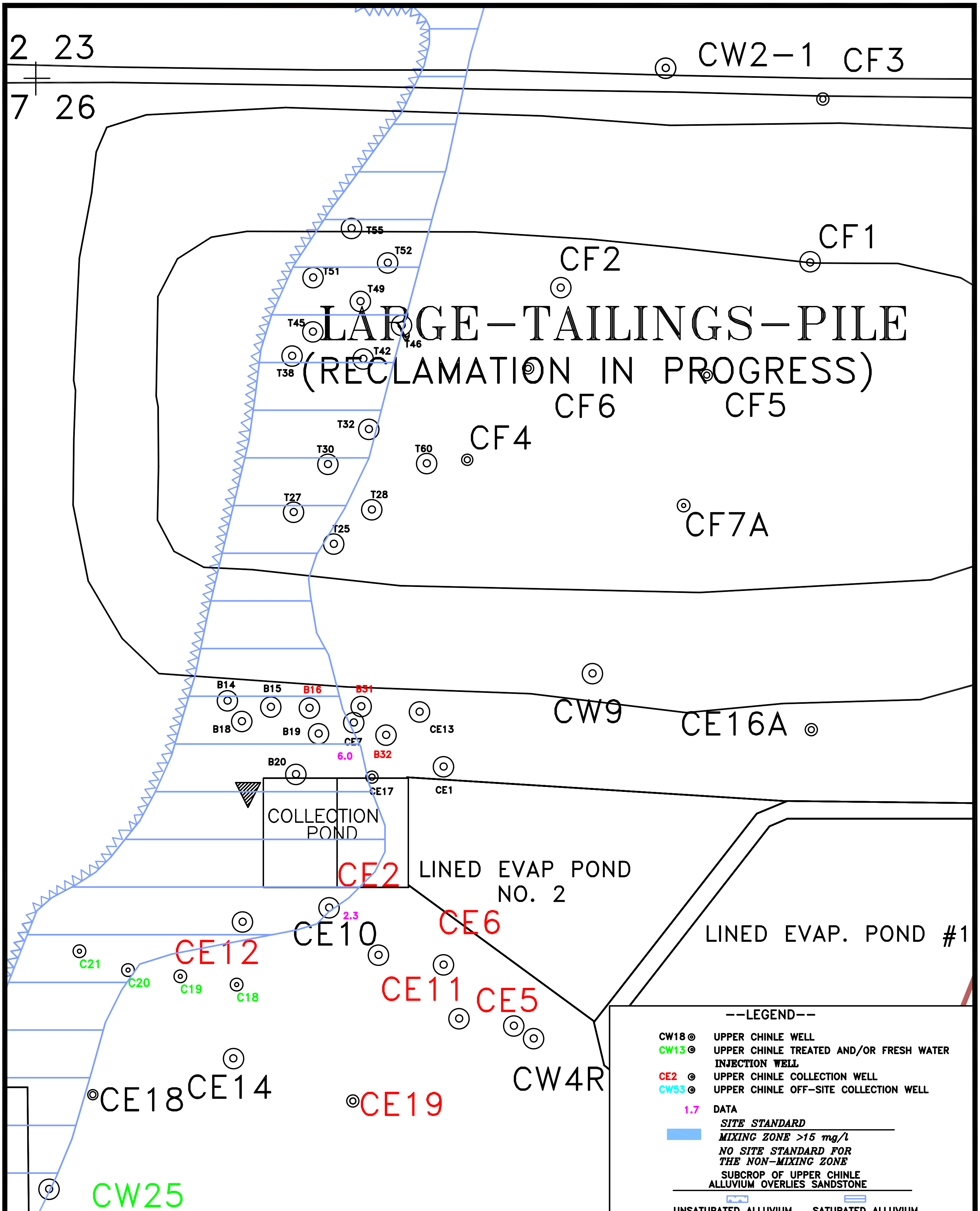


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 1600'

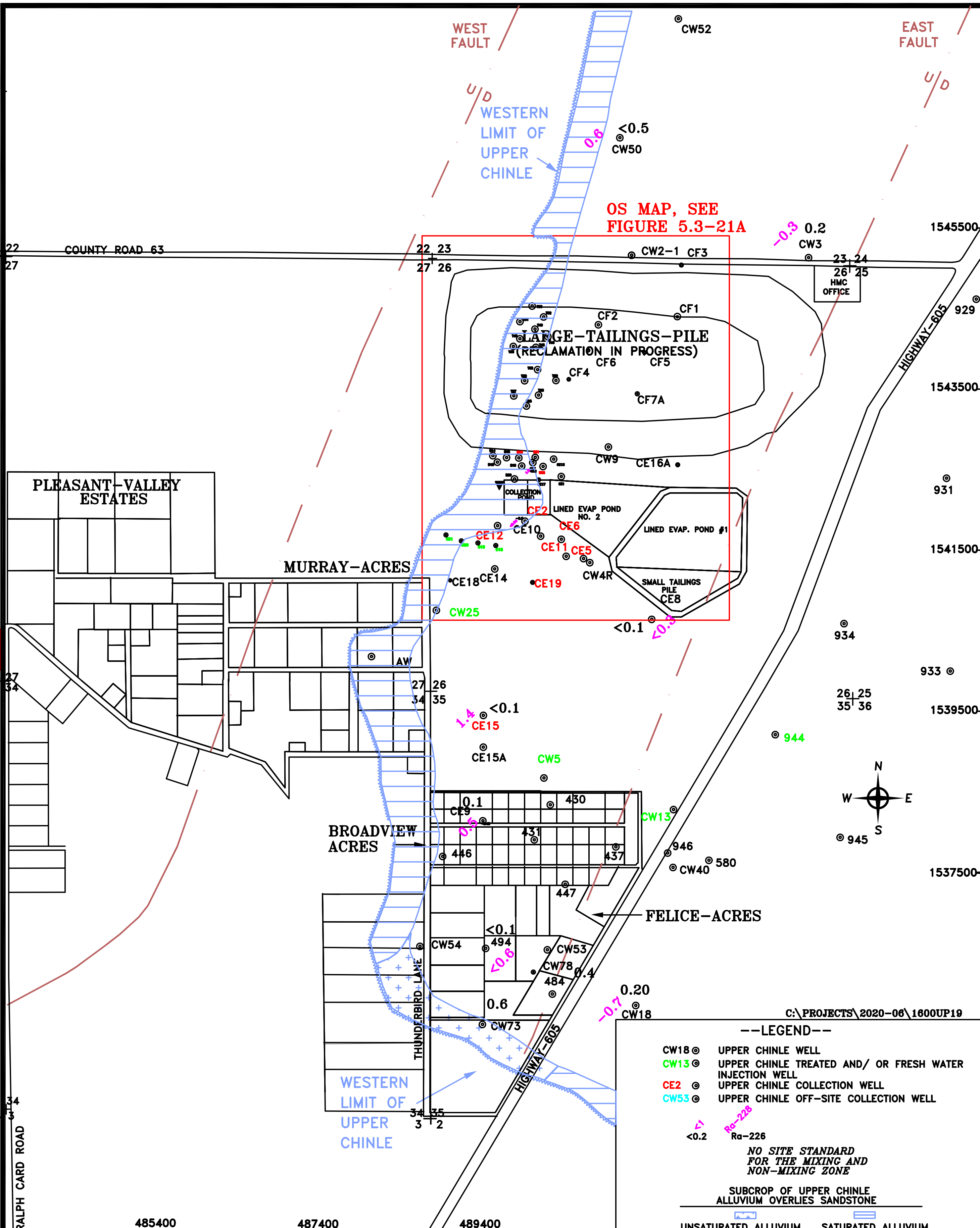


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20A. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 500'

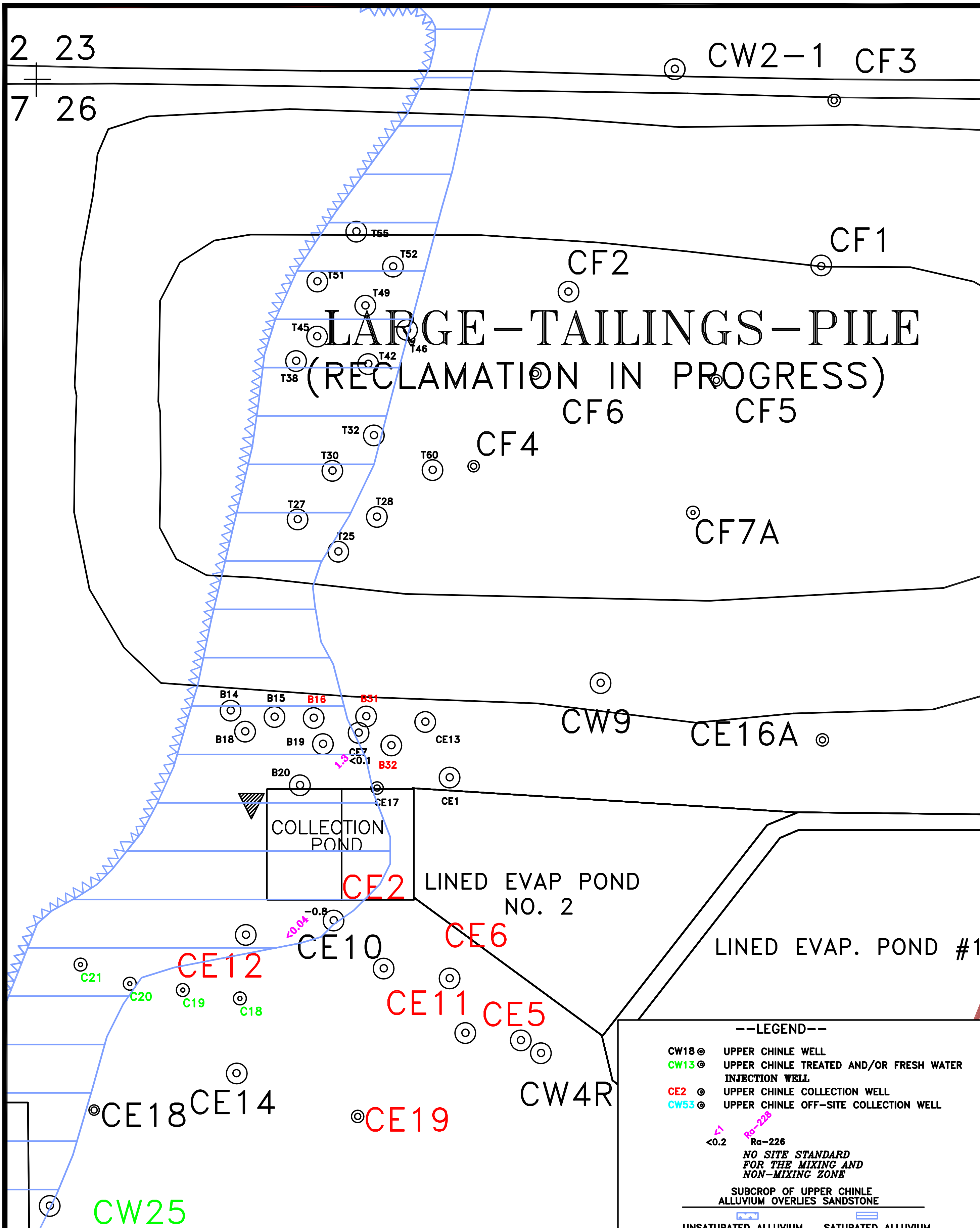


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

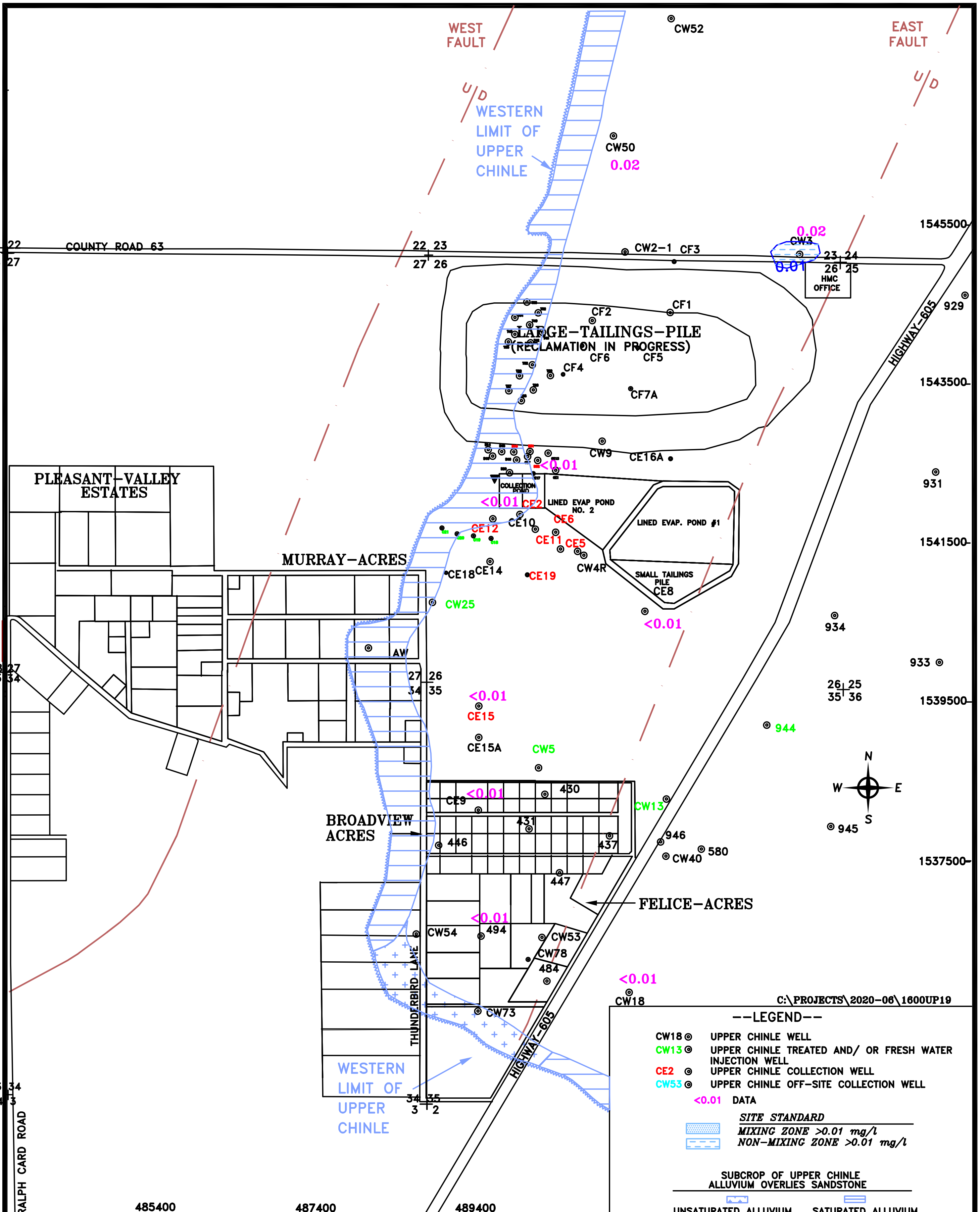
FIGURE 5.3-21. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, pCi/L

DATE: 1/16/2020

SCALE: 1"= 1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 1/16/2020
FIGURE 5.3-21A. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, OS, 2019, pCi/L	SCALE: 1"= 500'
	PAGE: 5.3-37

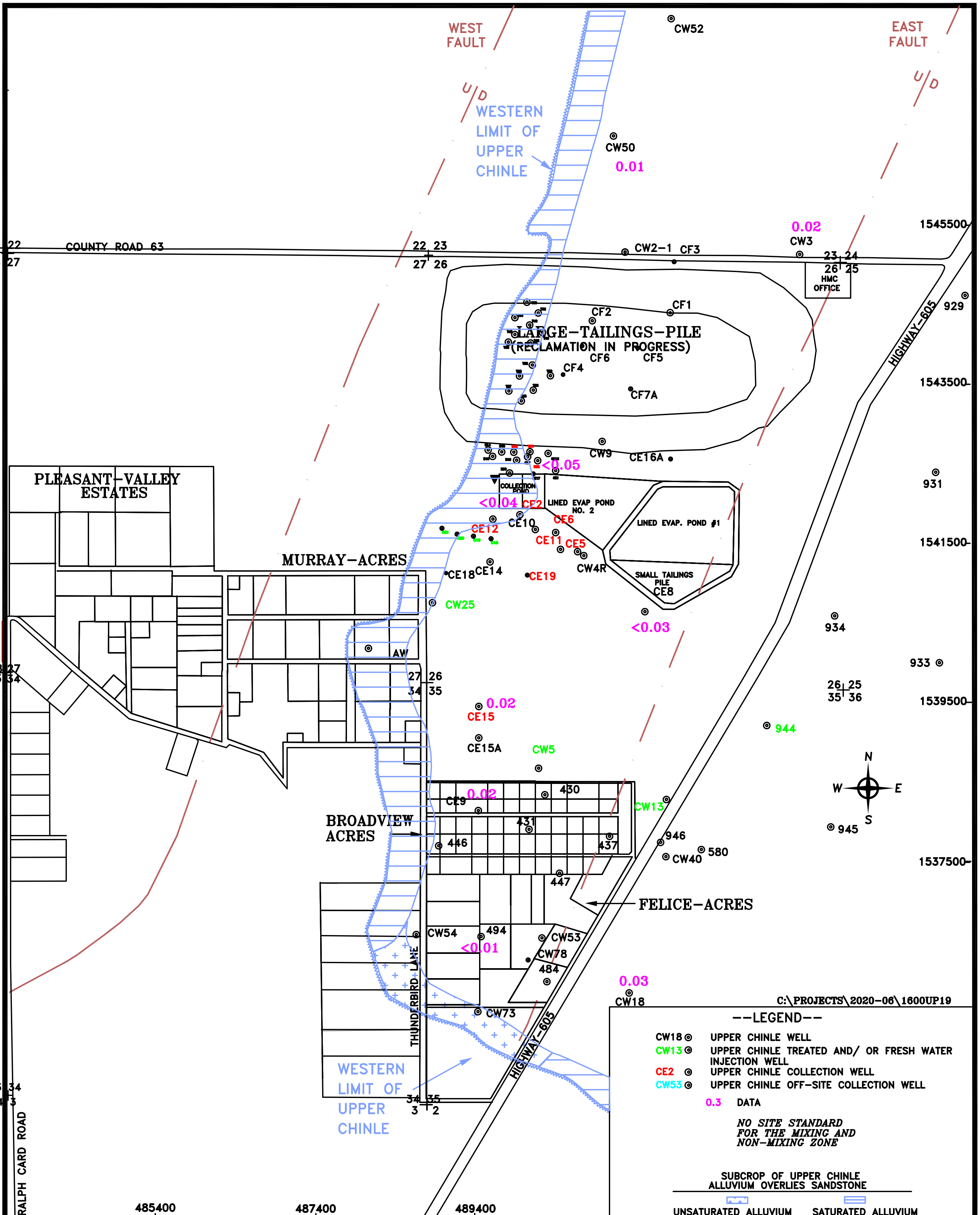


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, mg/L

DATE: 1/16/2020

SCALE: 1"= 1600'



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

FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2019, pCi/L

DATE: 1/16/2020

SCALE: 1"= 1600'

TABLE 5.3-1. UPPER CHINLE SITE STANDARDS AND 2019 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	<0.001	0.01	0.04	563	278	30	-	-
CW50	<0.001	0.02	<0.001	1680	889	59	<0.1	0.02
CW52	-	-	-	-	-	-	-	-
CW15	0.05	0.04	0.002	2310	1250	91	8.6	<0.01
CW24	0.05	0.14	<0.001	3140	1860	76	-	-
CW35	0.05	0.17	<0.001	2390	1150	60	3.1	0.02
CW36	<0.001	0.005	0.005	1970	1100	71	-	-
CW37	0.07	0.03	<0.001	1940	1050	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.05	0.044	<0.001	2730	1320	222	7.6	<0.01
UPPER CHINLE NON-MIXING ZONE WELLS								
931	0.01	0.03	0.02	1850	696	196	-	-
934	-	-	-	-	-	-	-	-
CW18	0.01	0.03	<0.001	2020	724	208	1.7	<0.01

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

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FIGURES
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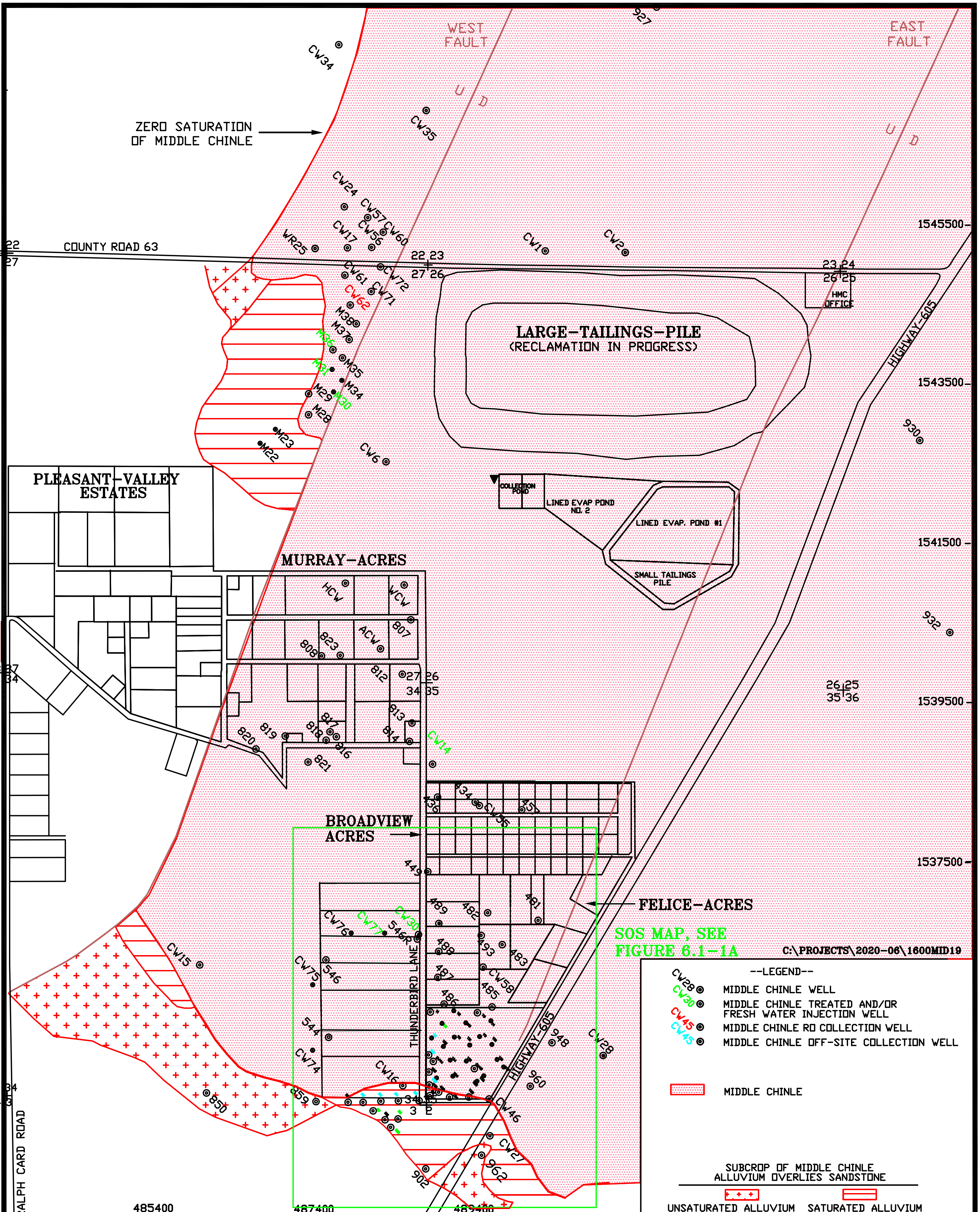
6.0 MIDDLE CHINLE AQUIFER MONITORING

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 2019.

Wells CW14, CW30, CW77, M30, M31, M36, R6, R7, R12 and Y6 were used for treated and/or fresh-water injection in 2019. Middle Chinle wells R2, R3, R4, R5, Y7, Y13 and Y23 were used as South collection wells in 2019 for the zeolite treatment process. Well CW62 was used as an On-site Middle Chinle collection well to the R.O. plant in 2019.

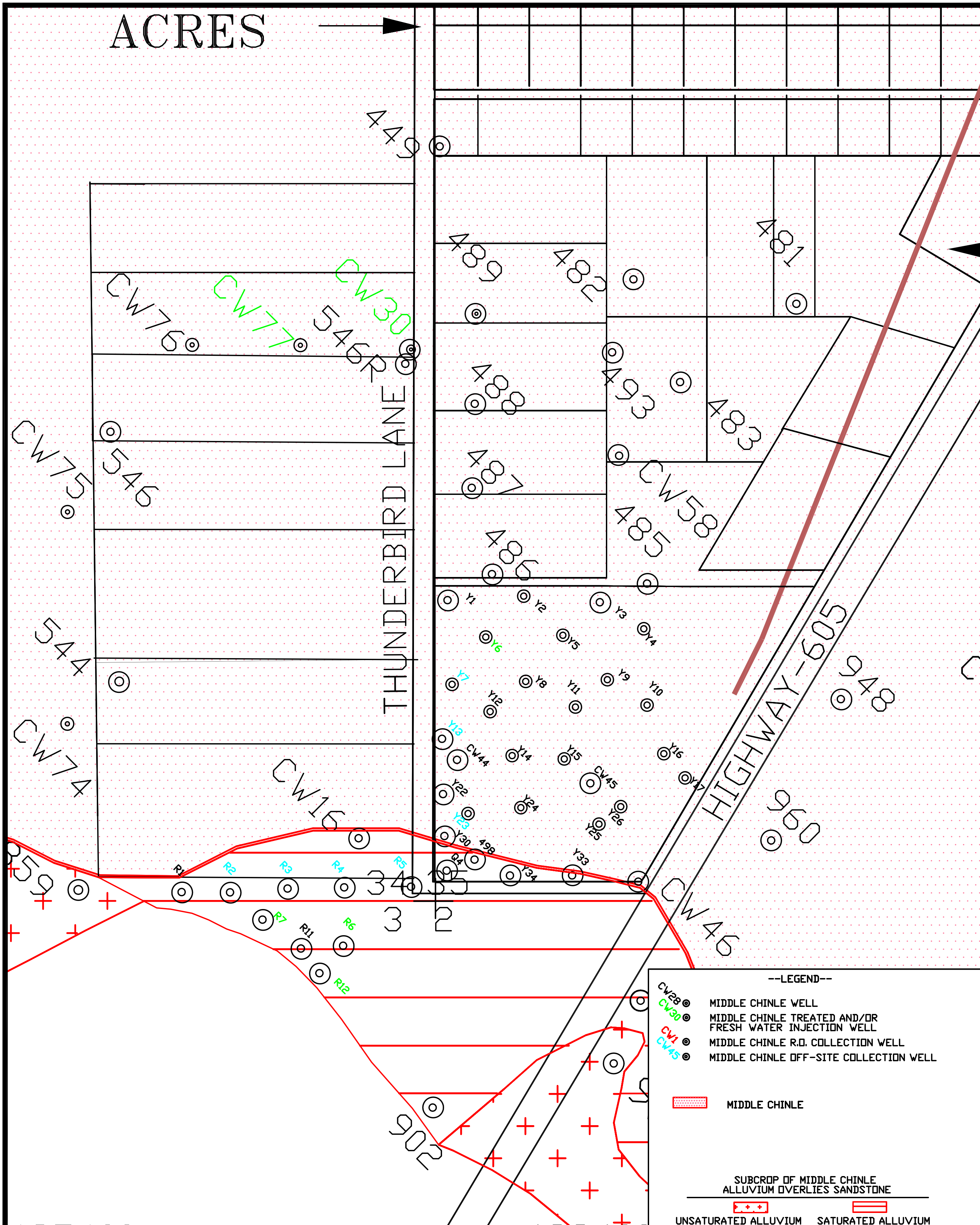


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/3/2020

6.1-1 LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, 2019

SCALE: 1"=1600'



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

6.1-1A. LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2019

DATE: 1/3/2020	
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 2019 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 Y7, Y13 and Y23 extends at least 300 feet to the northeast of collection well Y7 in the fall of 2019. This depression intercepts flow in the Middle Chinle in this portion of South Felice Acres but is smaller in 2019 due to the reduced collection rates from this area. 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 2019. 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 wells 493, CW58, CW75 and CW76 recovered in 2019 due to the smaller rate of collection from the Middle Chinle aquifer in the Felice Acres area.

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 2019 caused the water levels in the Middle Chinle aquifer west of the West Fault to decline as shown in the plot of the CW17 water level data. Water levels overall rose in Middle Chinle wells ACW and CW2 in 2019, 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 in the future after the South Felice pumping is increased. 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.

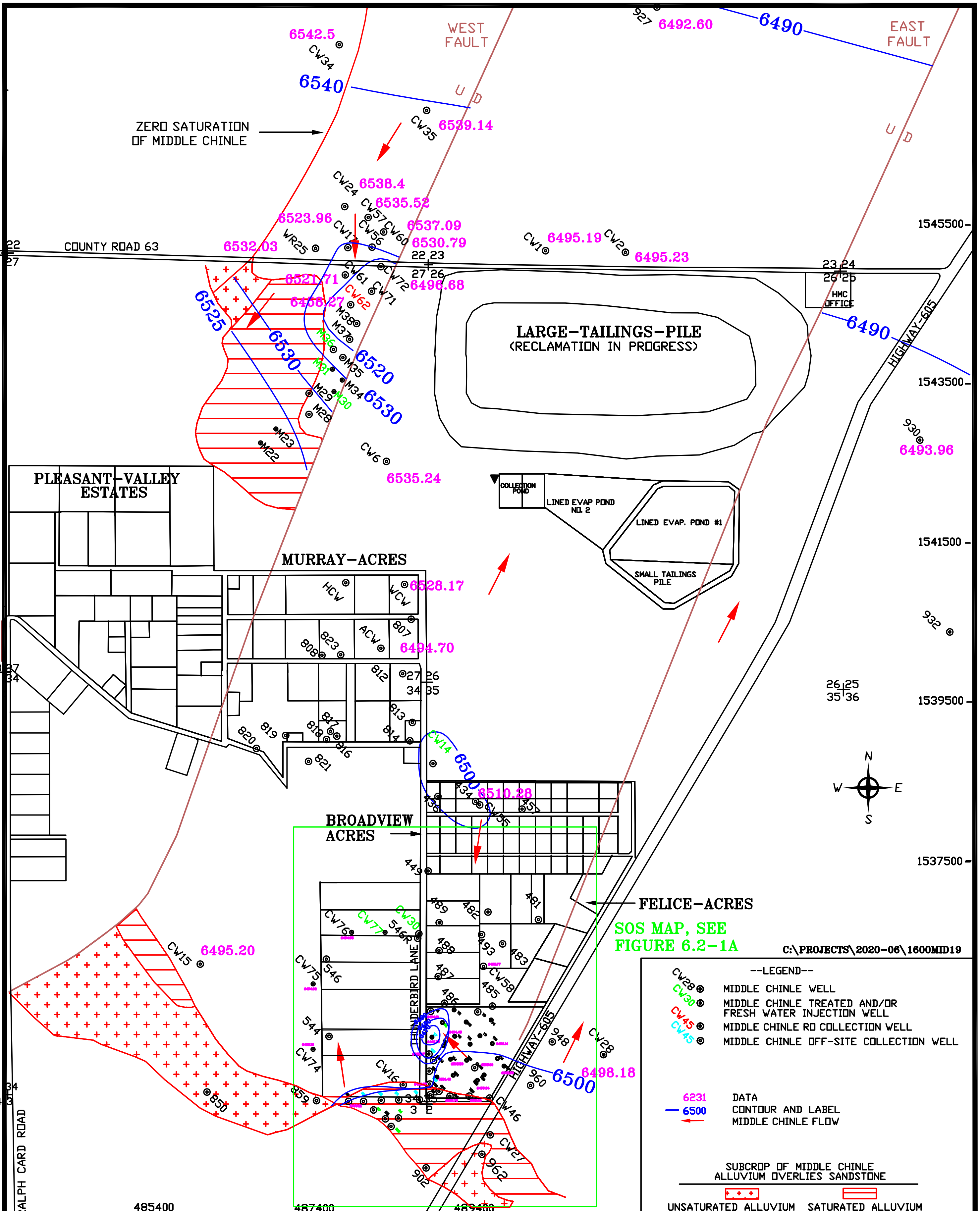


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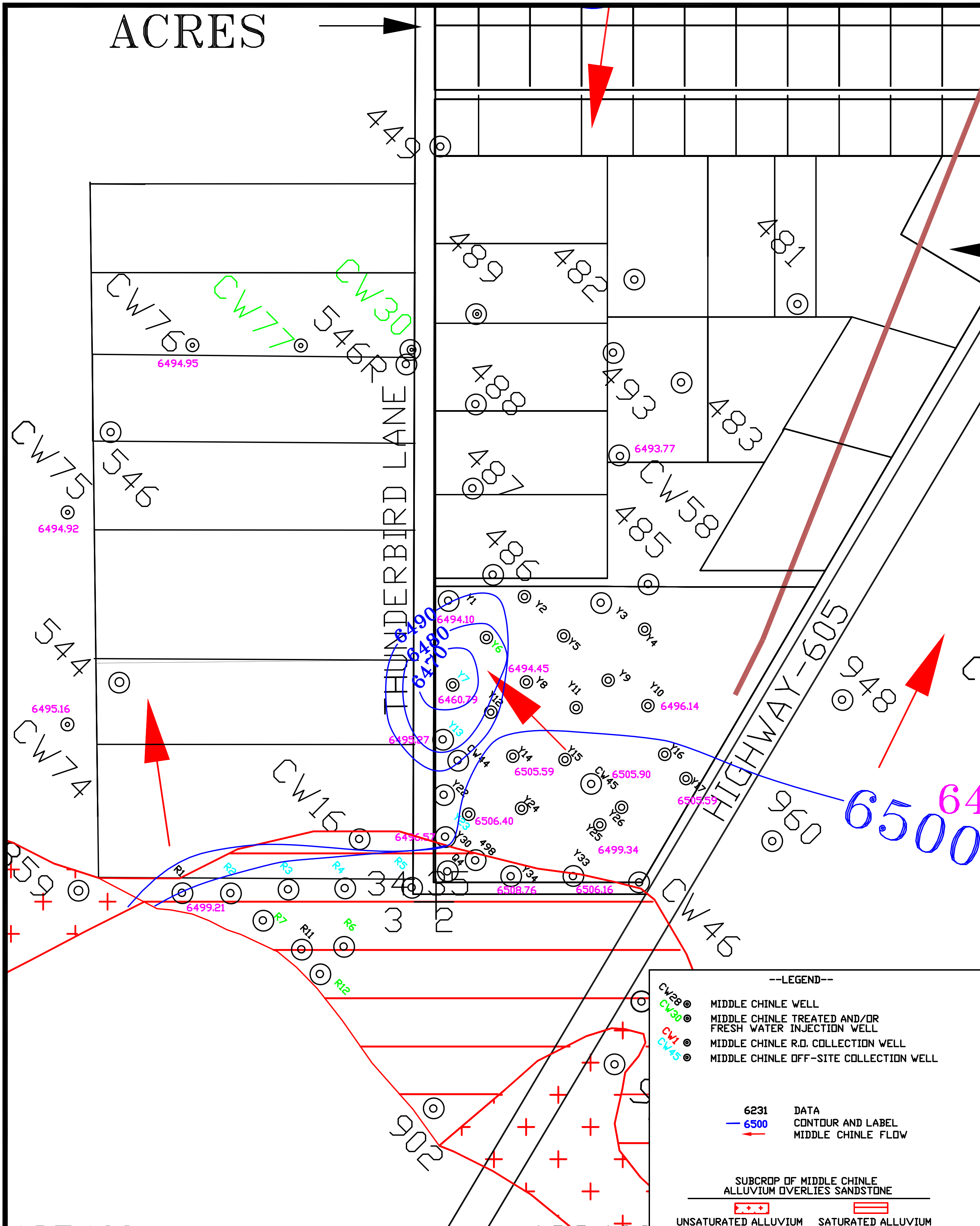
FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2019, FT-MSL

DATE: 1/3/2020

SCALE: 1"=1600'

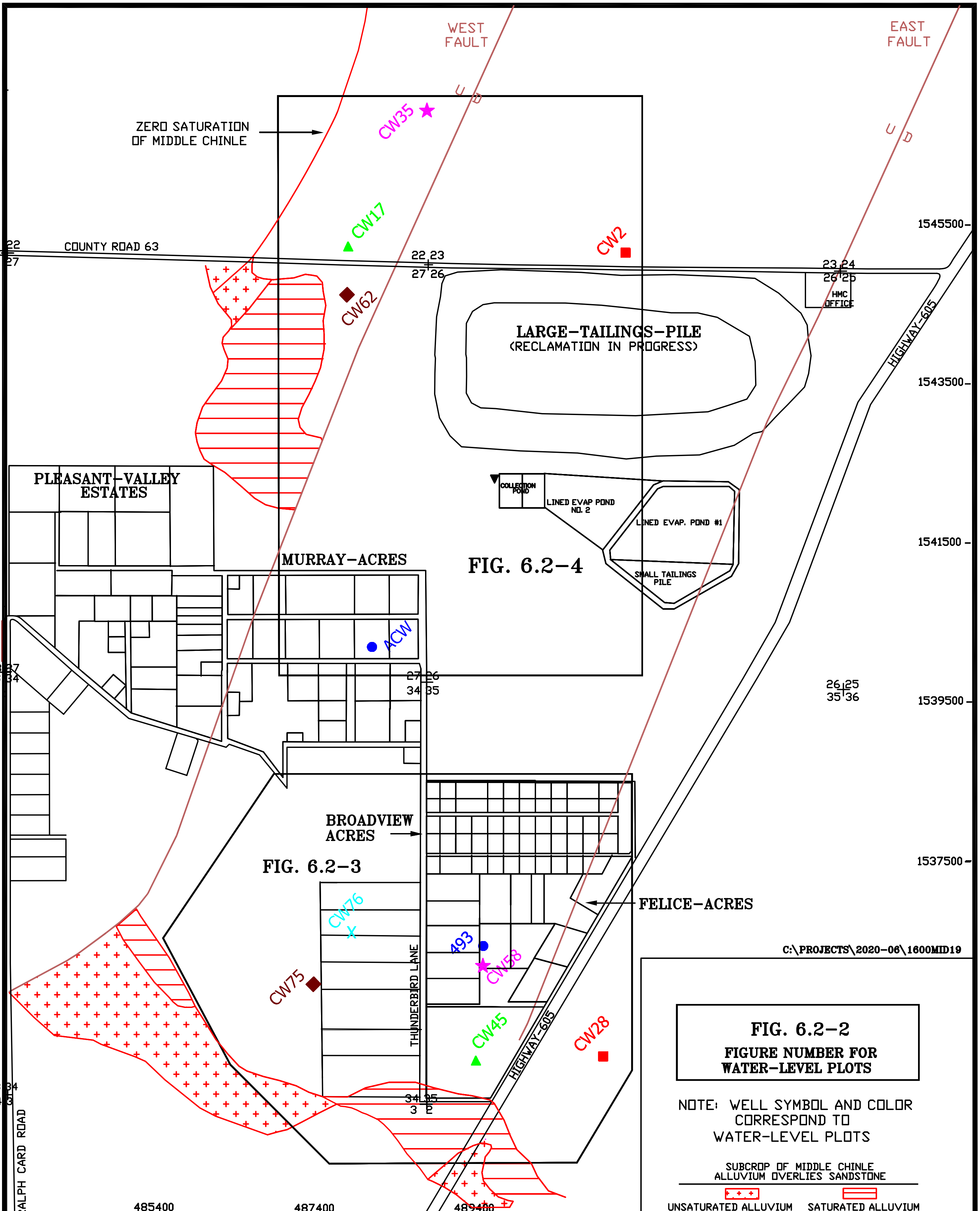


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/3/2020

FIGURE 6.2-1A. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2019, SOS, FT-MSL

SCALE: 1"=500'



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

FIGURE 6.2–2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER–LEVEL PLOTS, 2019

DATE: 1/2/2020

SCALE: 1"=1600'

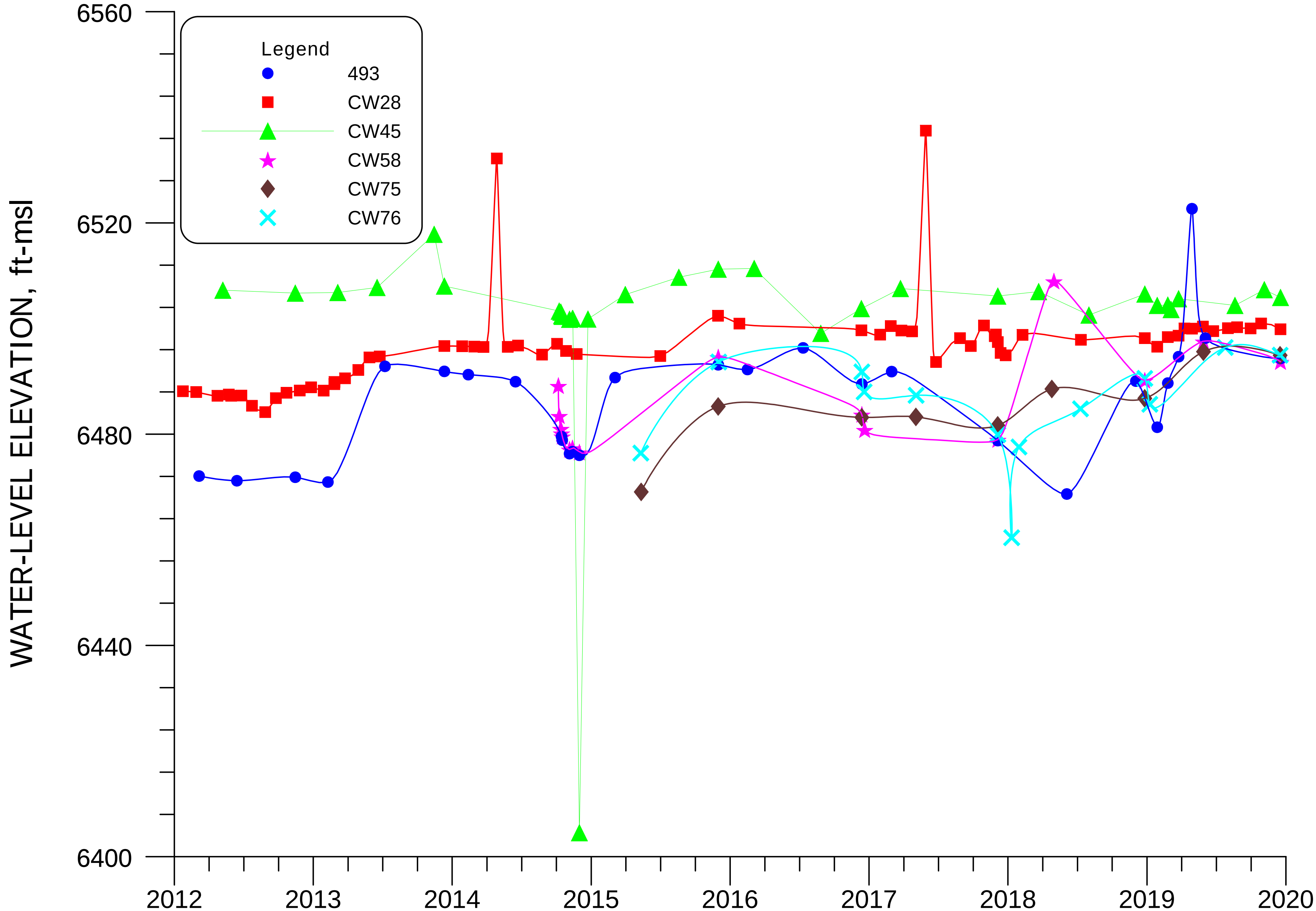


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, CW28, CW45, CW58, CW75 AND CW76

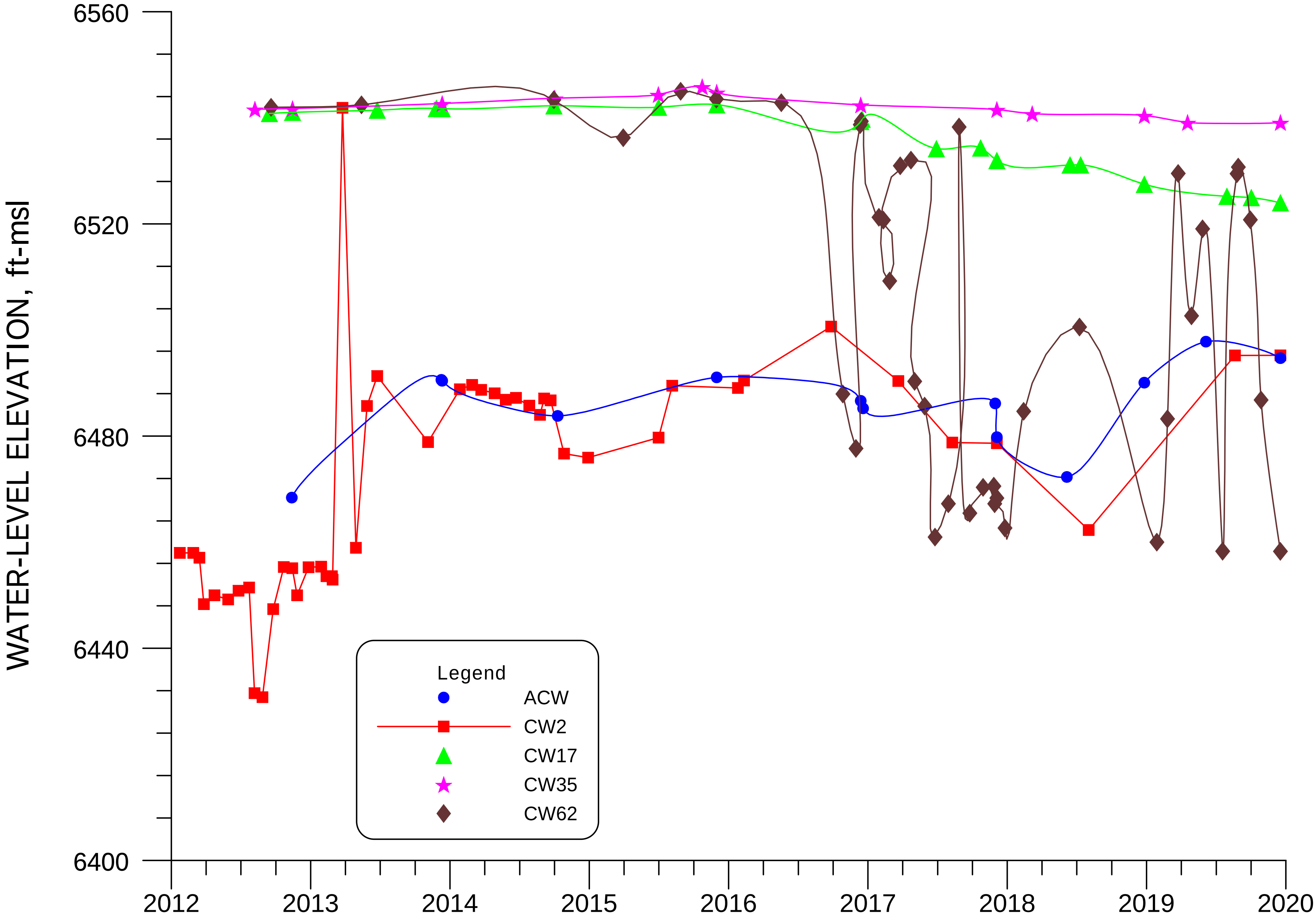


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS ACW, CW2, CW17, CW35 AND CW62

6.3 MIDDLE CHINLE WATER QUALITY

The 2019 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 2019 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 2019 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 2019 are within the site standard except for one well west of the West Fault which is only slightly above the standard. Likewise, two TDS concentrations in the Middle Chinle aquifer in 2019 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 two Felice Acres area wells and three 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 2019 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 one well 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 well 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 2019 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, CW76, Y7, Y13 and Y23 in Felice Acres. None of the sulfate concentrations in these wells exceed the mixing zone site standard in 2019 in these two group of wells. Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 493, ACW, CW2 and CW55 located between the two faults and wells 930 and CW28 east of the East Fault.

This plot shows that all of the sulfate concentrations in these wells is less than the non-mixing zone site standard.

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 2019 and shows that all values are below 2000 mg/L near the alluvial subcrop area in the southern portion of the map (see Figure 6.3-5A for posting of Y wells in South Felice Acres and the R collection wells in the northeast portion of Section 3). Two of the wells west of the West Fault exceed the TDS site standard and three 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 2019, except for wells 483, ACW, CW55, CW62 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). The TDS in wells CW62 and WR25 are above the mixing zone site standard while concentrations in wells CW56, CW60 and CW72 are near the standard. A plot of TDS concentrations for Middle Chinle collection wells Y7, Y13 and Y23 and Middle Chinle wells CW58 and CW76 are presented in Figure 6.3-6B which shows that all of these concentrations are significantly below the site standard. Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 493, 930, ACW, CW2, CW28 and CW55. TDS concentrations in wells ACW and CW55 both exceed the non-mixing zone site standard.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figures 6.3-8 and 6.3-8A present chloride concentrations in the Middle Chinle aquifer during 2019. None of the concentrations exceeded the site standard of 250 mg/L for the mixing and non-mixing zones of the Middle Chinle aquifer. Therefore, 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 which show fairly steady concentrations in 2019. A second set of chloride concentration plots for the Middle Chinle wells west of the West Fault is presented in Figure 6.3-9A with none of these wells above the site standard in 2019. An additional plot of chloride concentrations for the Middle Chinle wells in South Felice Acres was added in Figure 6.3-9B with all of these concentrations significantly less than 250 mg/L. 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 with all of these chloride concentrations below the site standard in 2019.

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 2019. 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 and 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). This plot shows the decline in uranium concentrations in wells 498 and CW17 to below the site standard. The uranium concentration plots for the Middle Chinle wells in the mixing zone west of the West Fault are presented on Figure 6.3-12A and shows that the uranium concentrations in all of these wells need some restoration except well CW60. Figure 6.3-12B shows the concentrations in pumping South Felice wells Y7, Y13 and Y23 and monitoring wells CW58 and CW76 and shows that additional restoration is needed in all of these wells except well CW76. The uranium concentration plots for the Middle Chinle wells in the non-mixing zone are presented on Figure 6.3-13, showing that additional restoration is needed in non-mixing zone wells 493 and CW55.

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 2019, except for three 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 wells 481 and 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 which shows that all of these concentrations have been below the site standard for a few years. The selenium concentrations in wells CW56, CW60, CW61, CW62 and CW72 are shown in Figure 6.3-15A. Concentrations in wells CW56 and CW61 do not exceed the site standard in this group of wells. 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 wells 493 and CW28.

6.3.6 MOLYBDENUM - MIDDLE CHINLE

The 2019 molybdenum concentrations in the Middle Chinle aquifer are presented on Figures 6.3-17 and 6.3-17A. None of the molybdenum concentrations for 2019 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. This second plot shows the concentrations for the four wells west of the West Fault that need additional restoration. 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. The smaller levels in the last two years are due to the laboratory using smaller detection limits.

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 2019. A small area west of the West Fault needs a small amount of nitrate restoration. 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

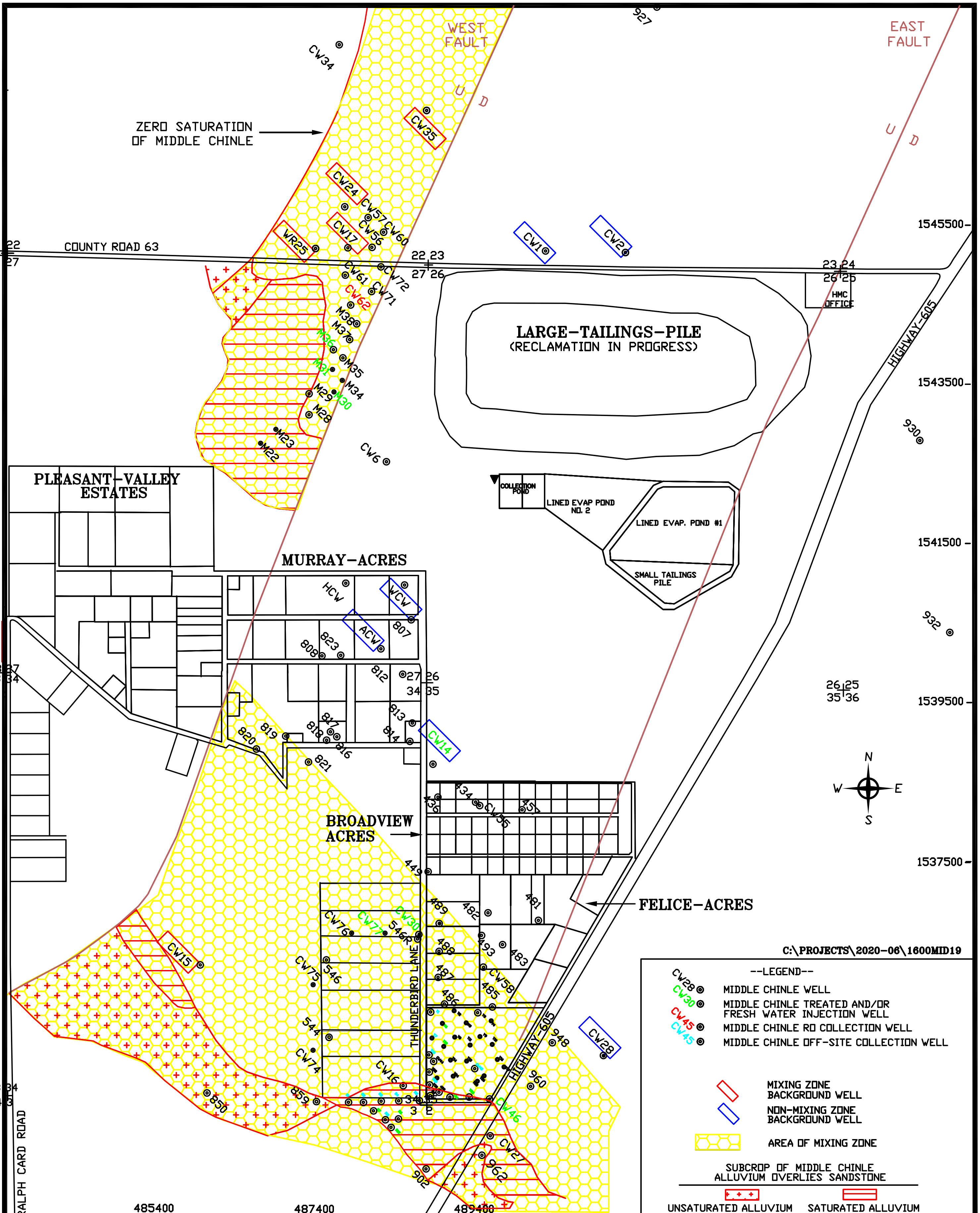
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. All of the radium-226 and radium-228 values measured in 2019 were very small. Radium-226 and radium-228 are not important 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 2019 vanadium measurements for the Middle Chinle aquifer are at or below the detection limit except for a value of 0.02 mg/L in background well CW35. 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 2019 were very small at values of less than 0.3 pCi/L. These thorium-230 levels are consistent with concentrations previously measured in the Middle Chinle aquifer, which shows that thorium-230 is not an important parameter in the Middle Chinle aquifer and thus a site standard has not been set.

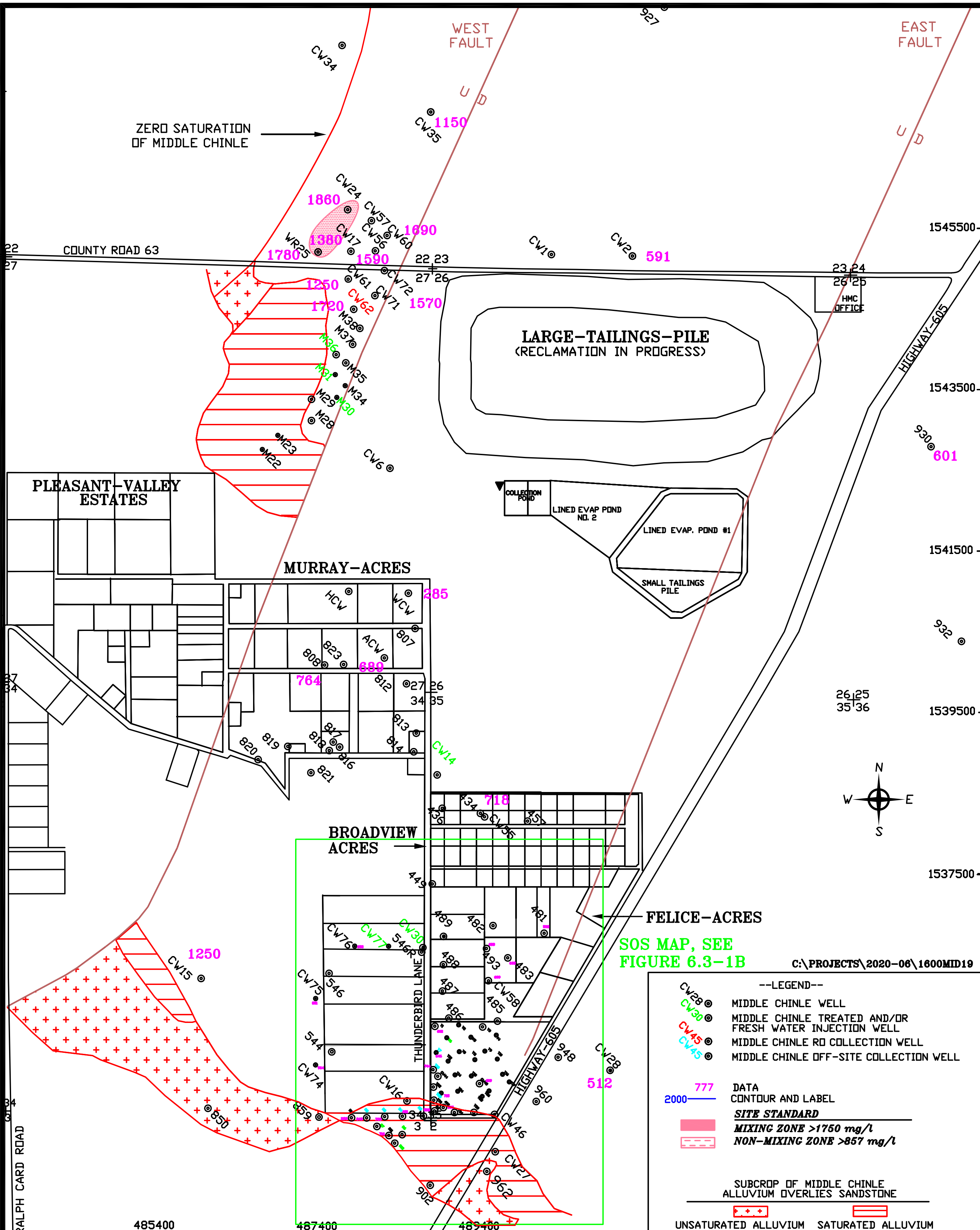


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 11/12/2019

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

SCALE: 1"=1600'

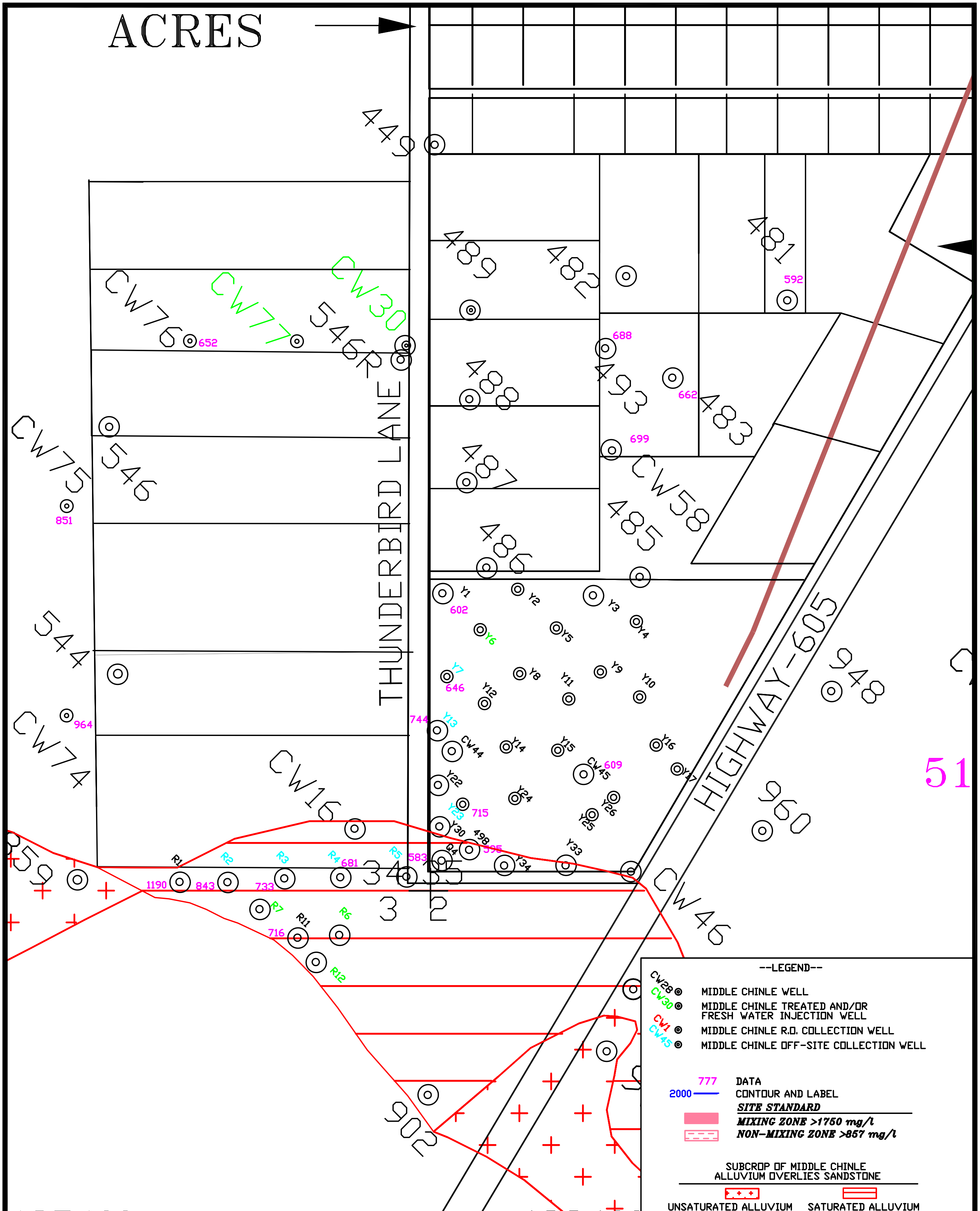


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

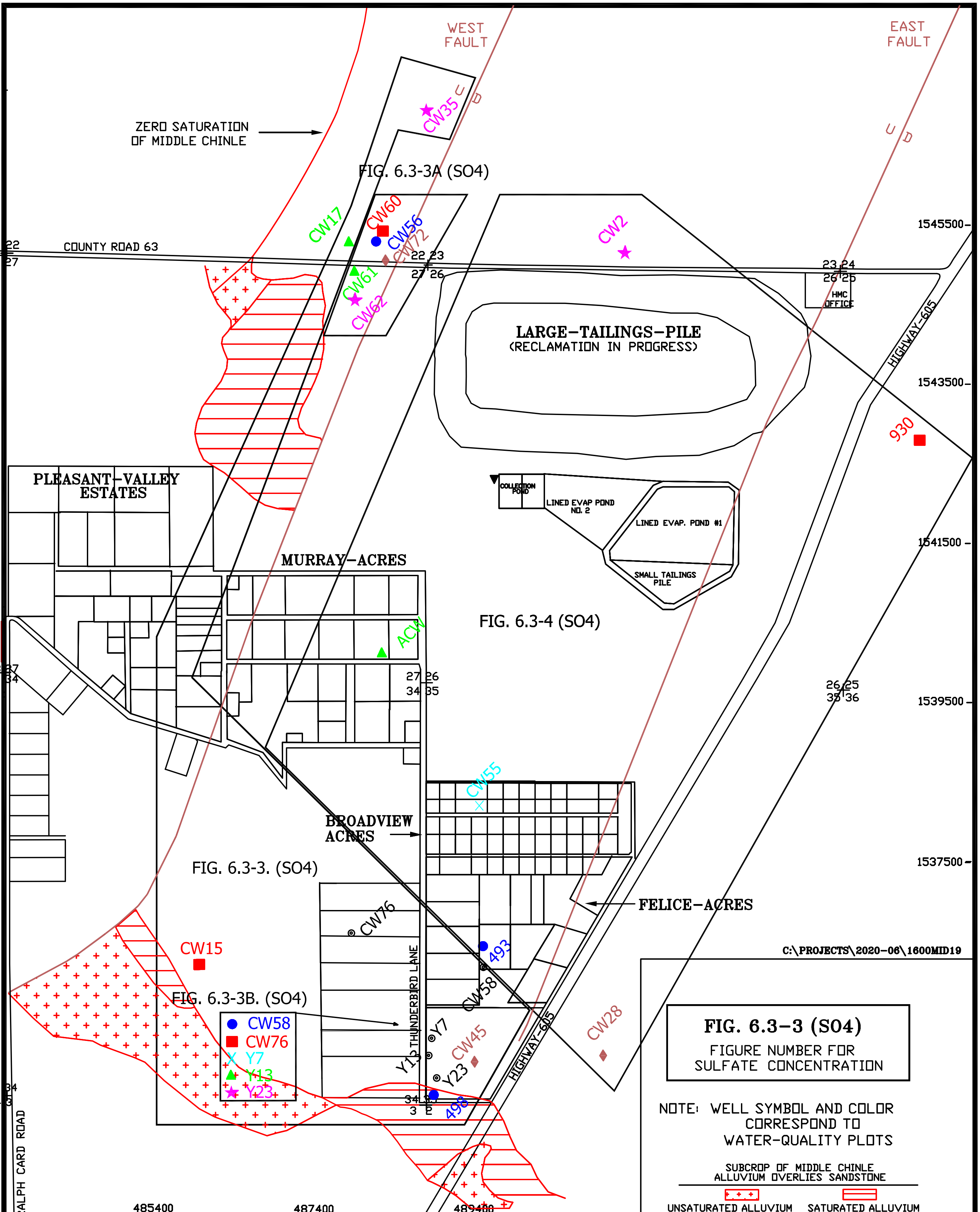
FIGURE 6.3–1A. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L

DATE: 1/3/2020

SCALE: 1"=1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 1/3/2020**
FIGURE 6.3-1B. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, SOS, mg/L	**SCALE: 1"=500'**
	PAGE: 6.3-10



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

FIGURE 6.3-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-QUALITY PLOTS, 2019

DATE: 12/30/2019

SCALE: 1"=1600'

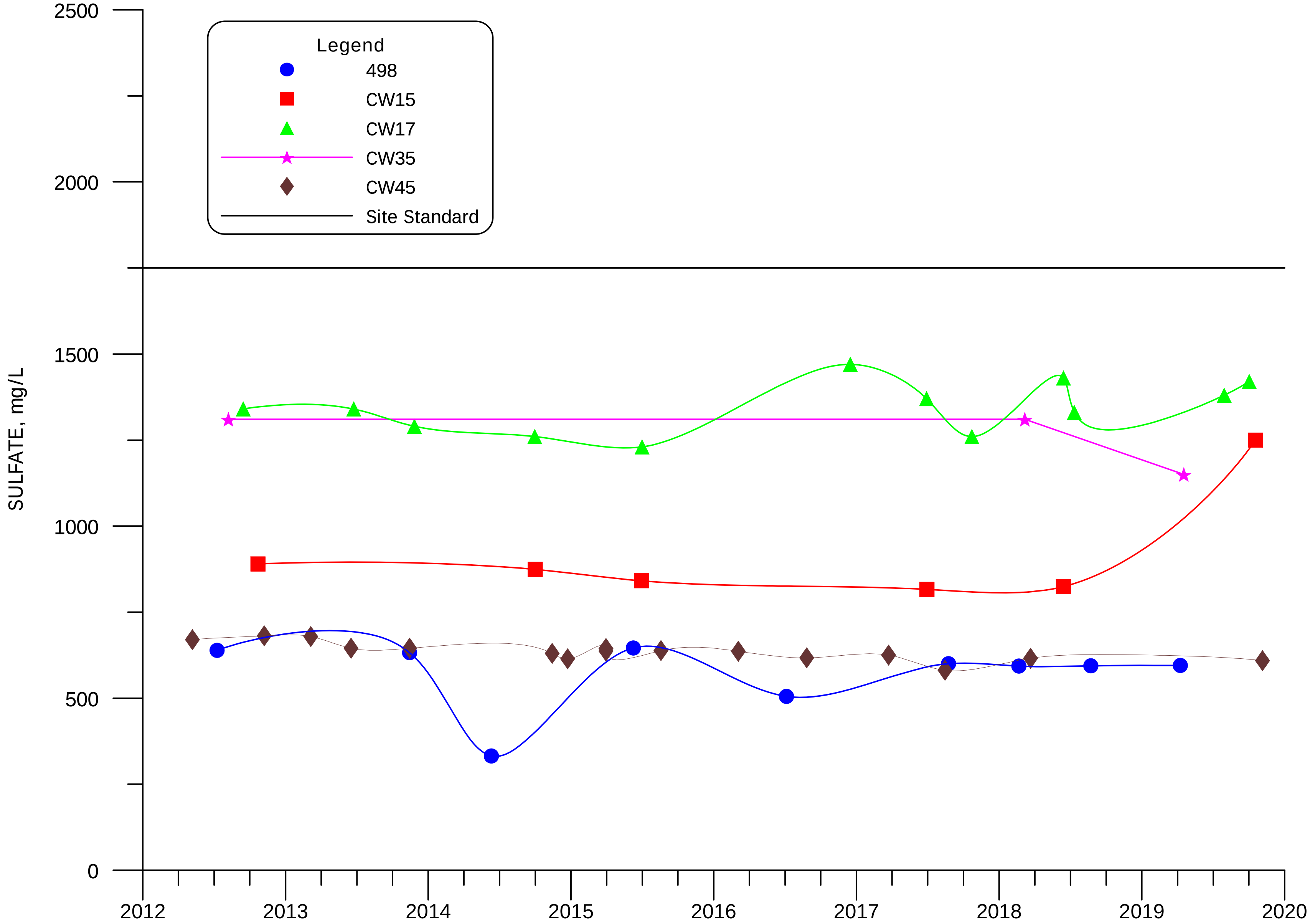


FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

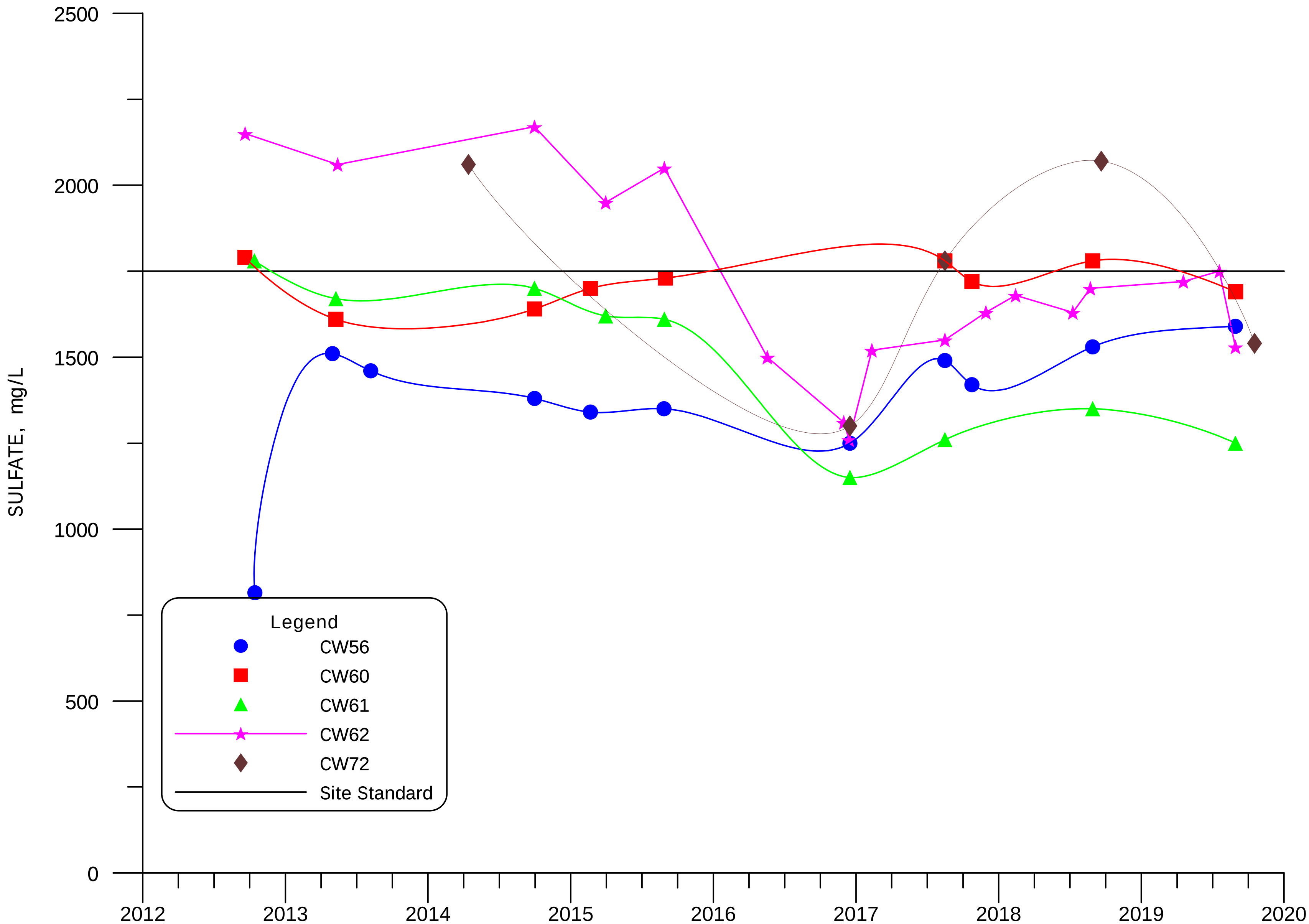


FIGURE 6.3-3A. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

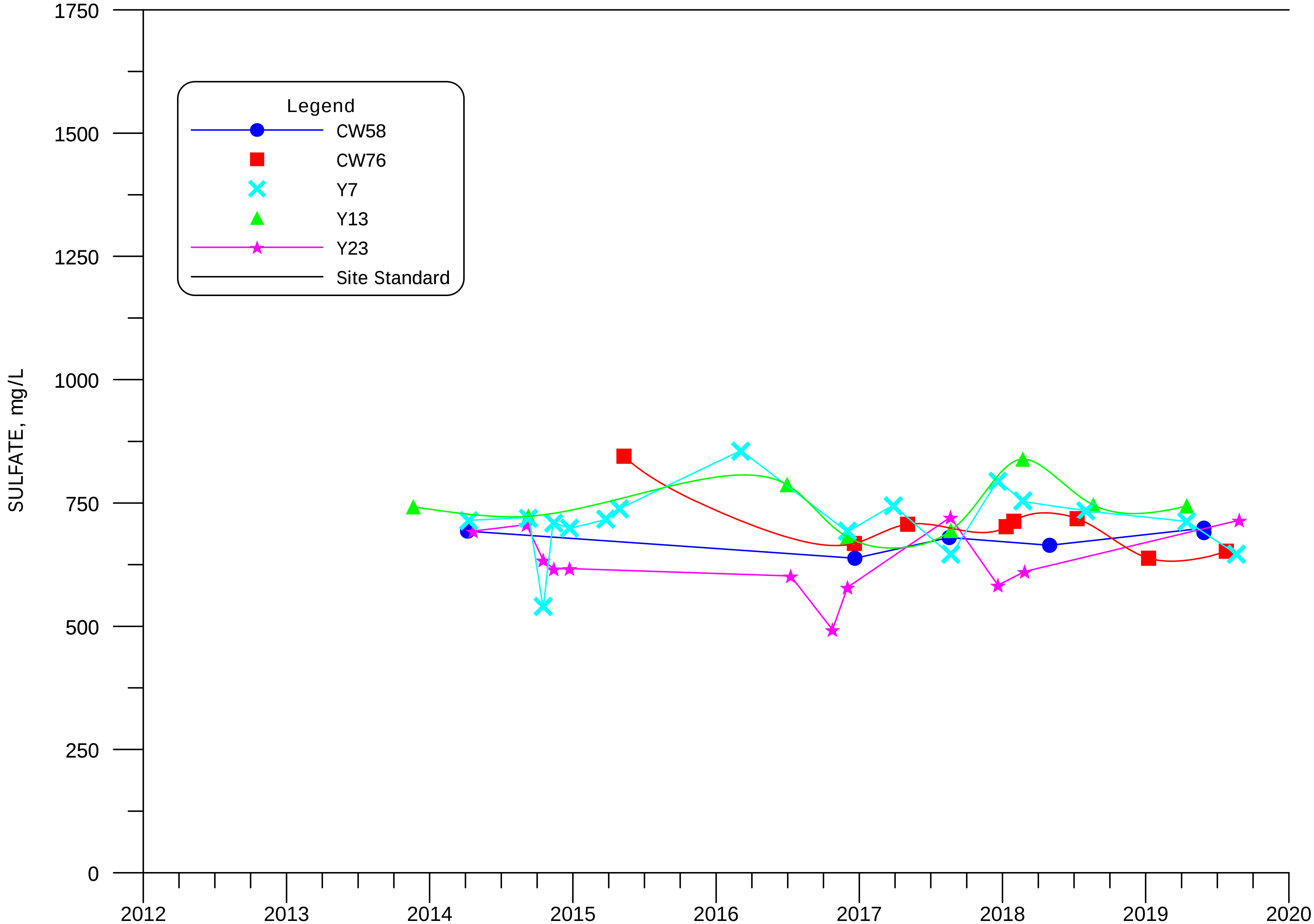


FIGURE 6.3-3B. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

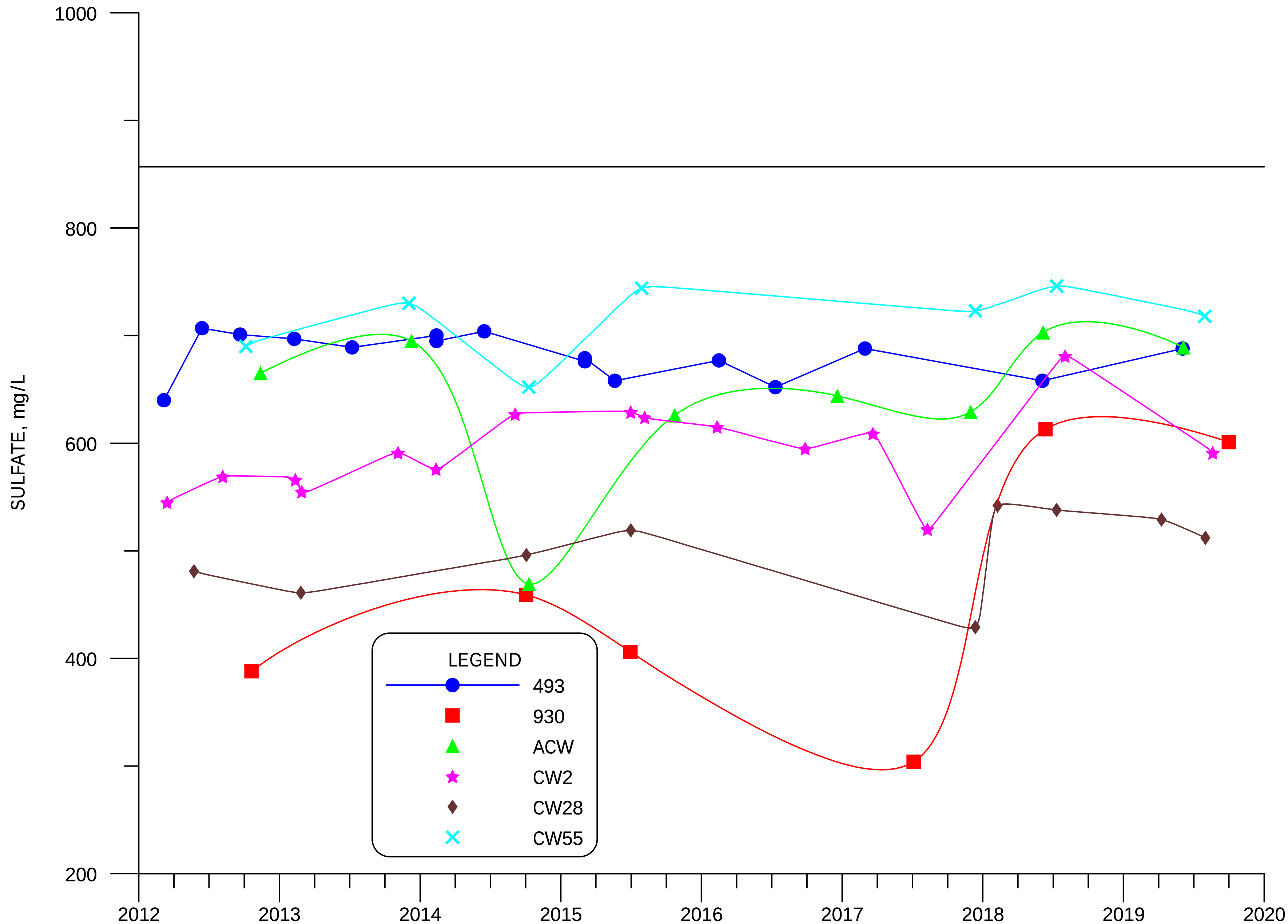
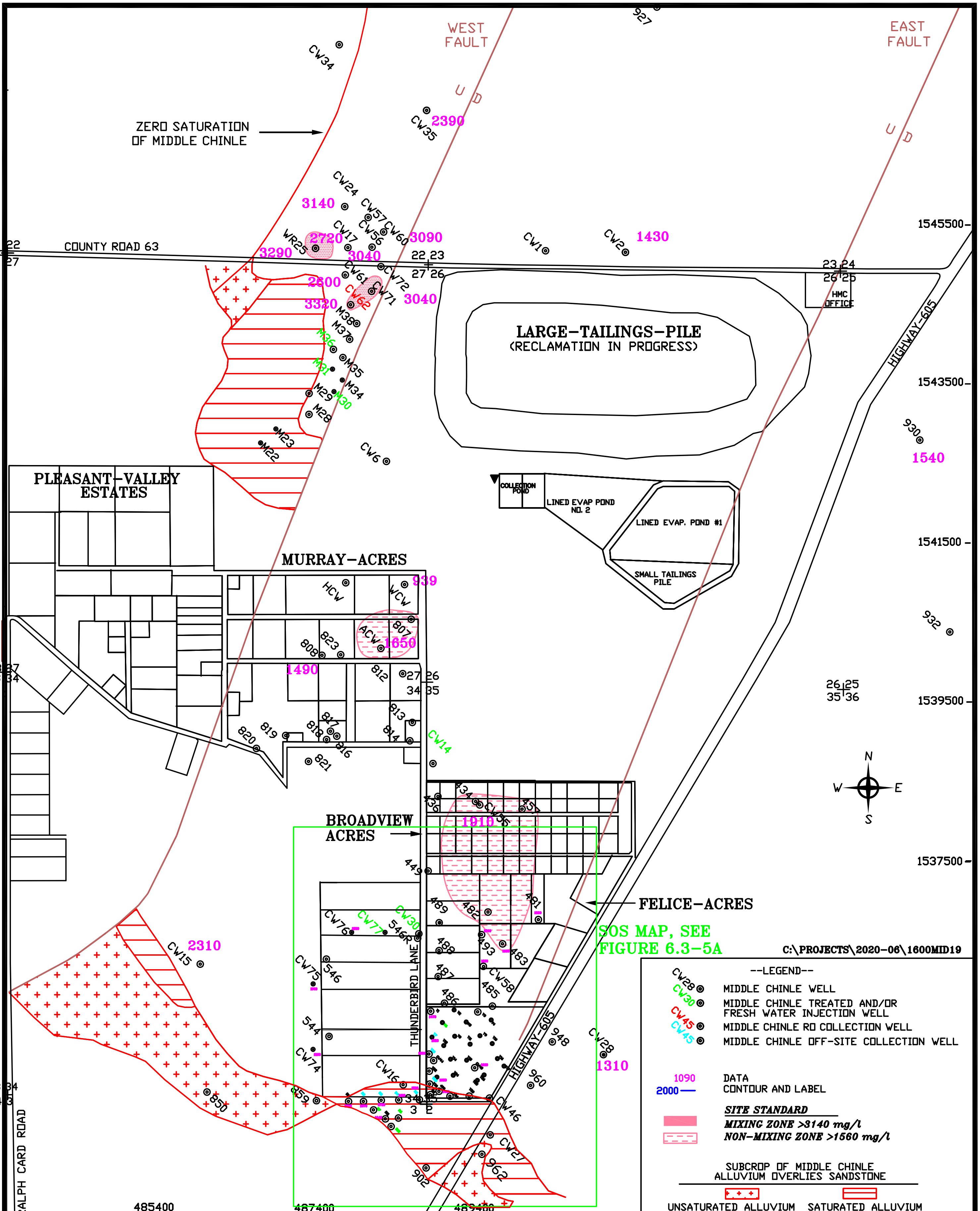
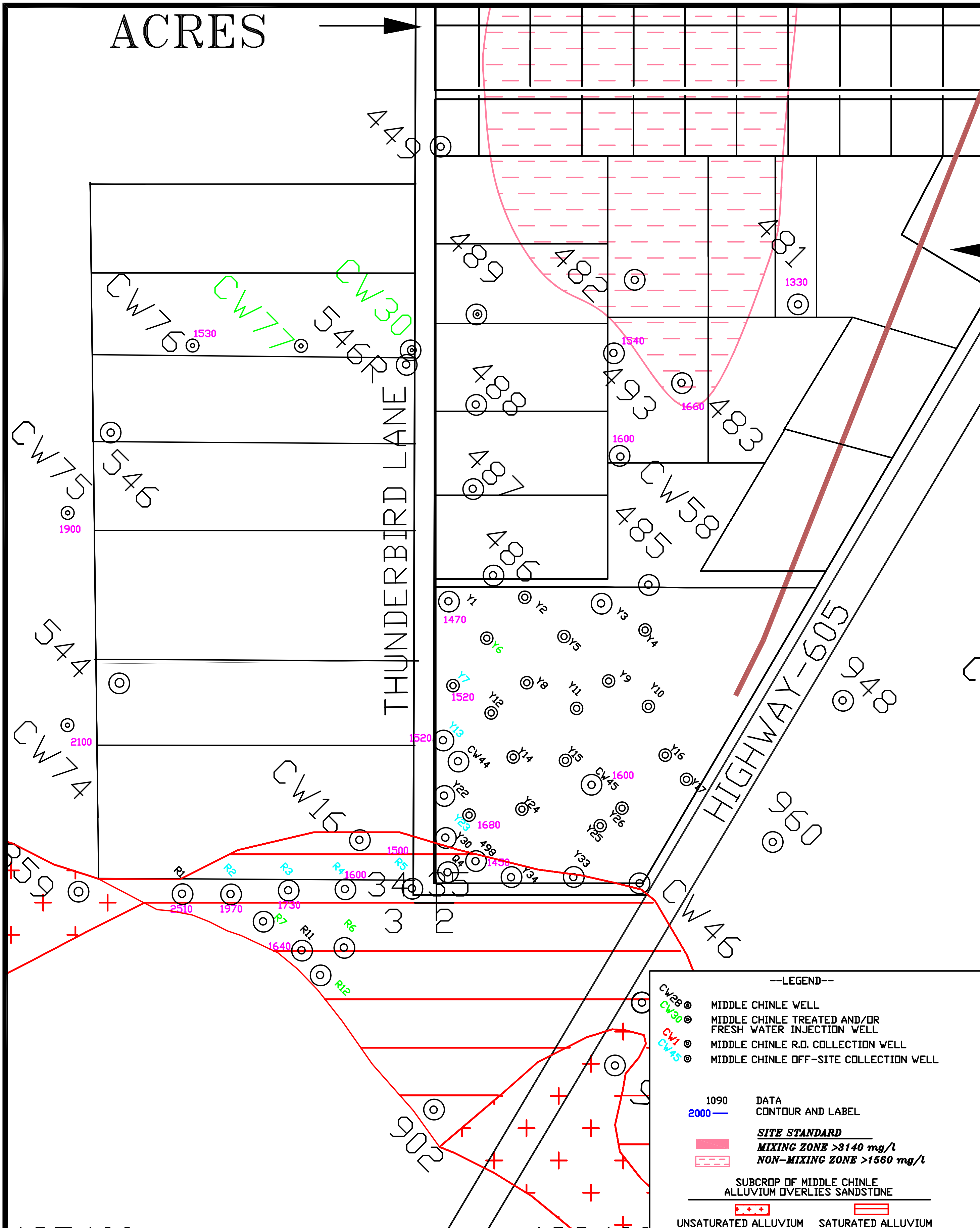


FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



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

FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L	DATE: 1/3/2020
	SCALE: 1"=1600'
	PAGE: 6.3-16



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

DATE: 1/3/2020

SCALE: 1"=500'

FIGURE 6.3-5A. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, SOS, mg/L

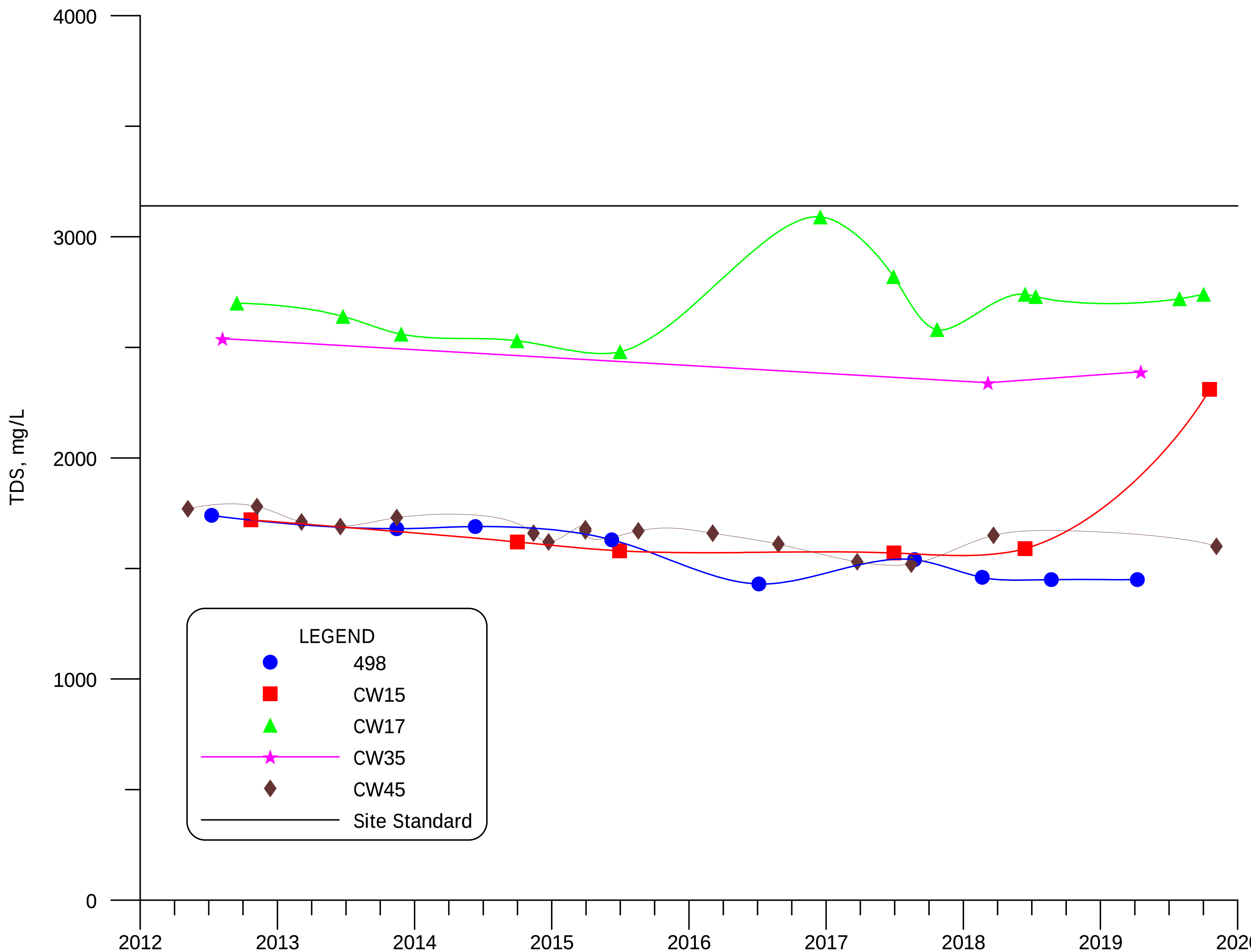


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

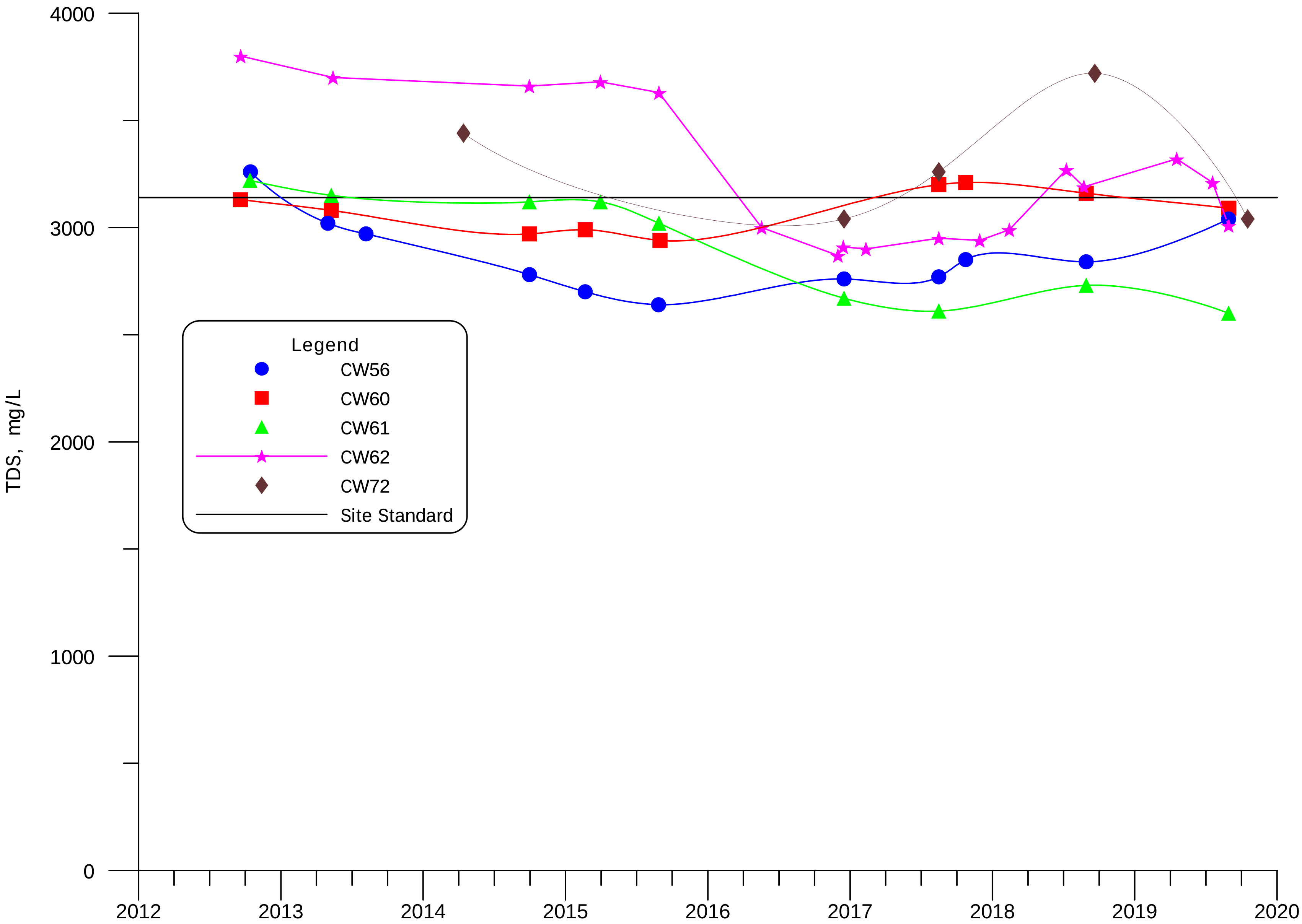


FIGURE 6.3-6A. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

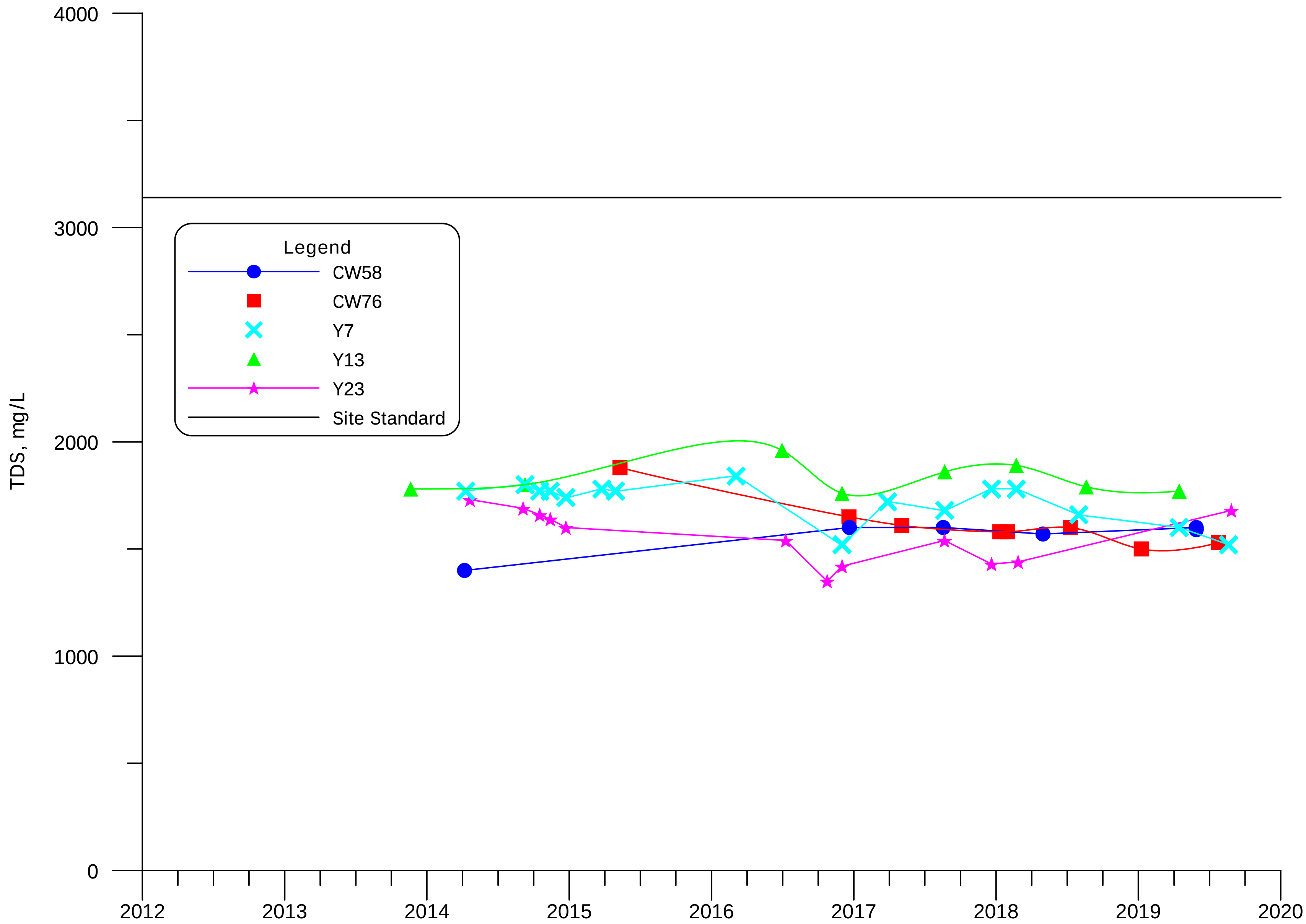


FIGURE 6.3-6B. TDS CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

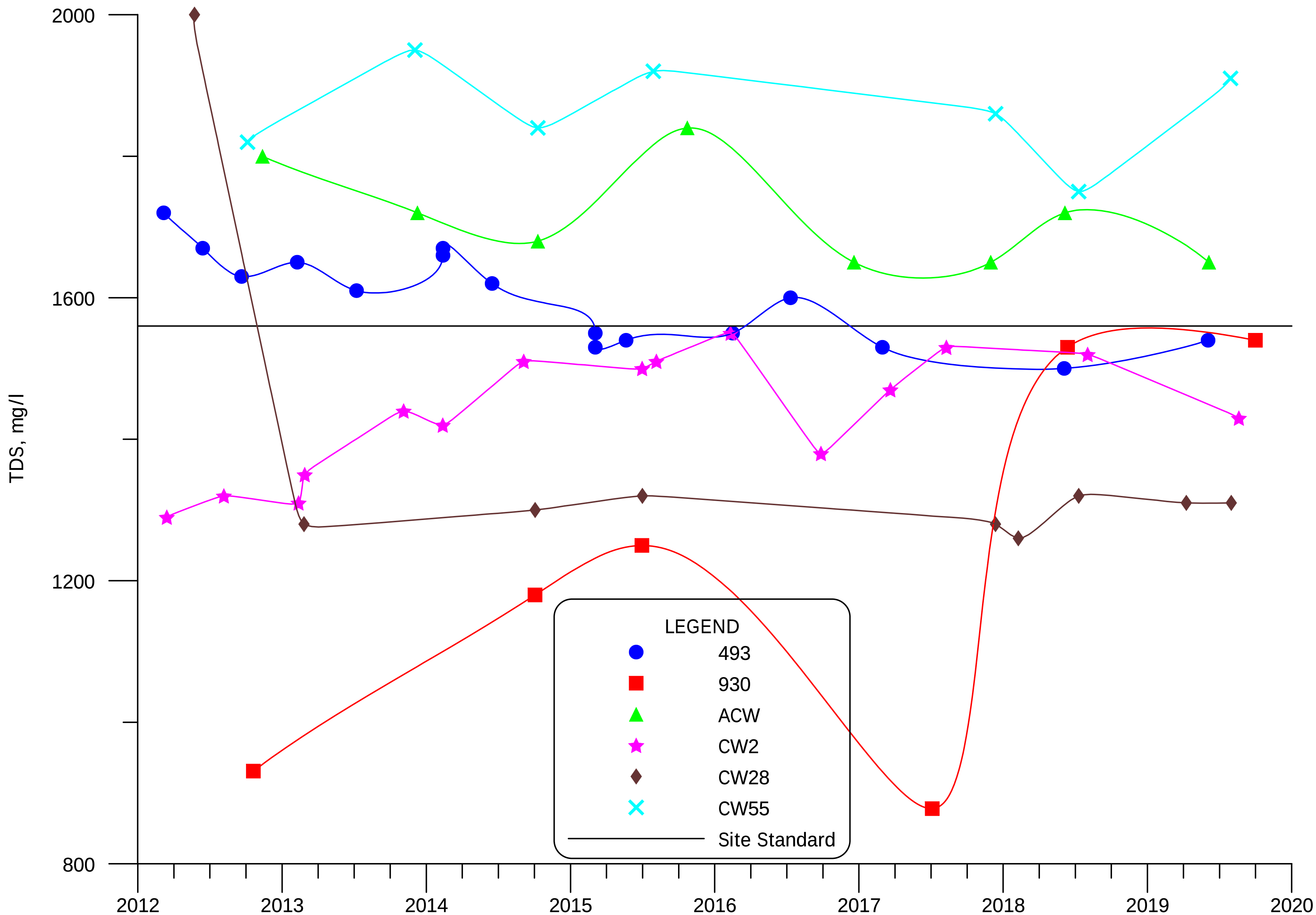
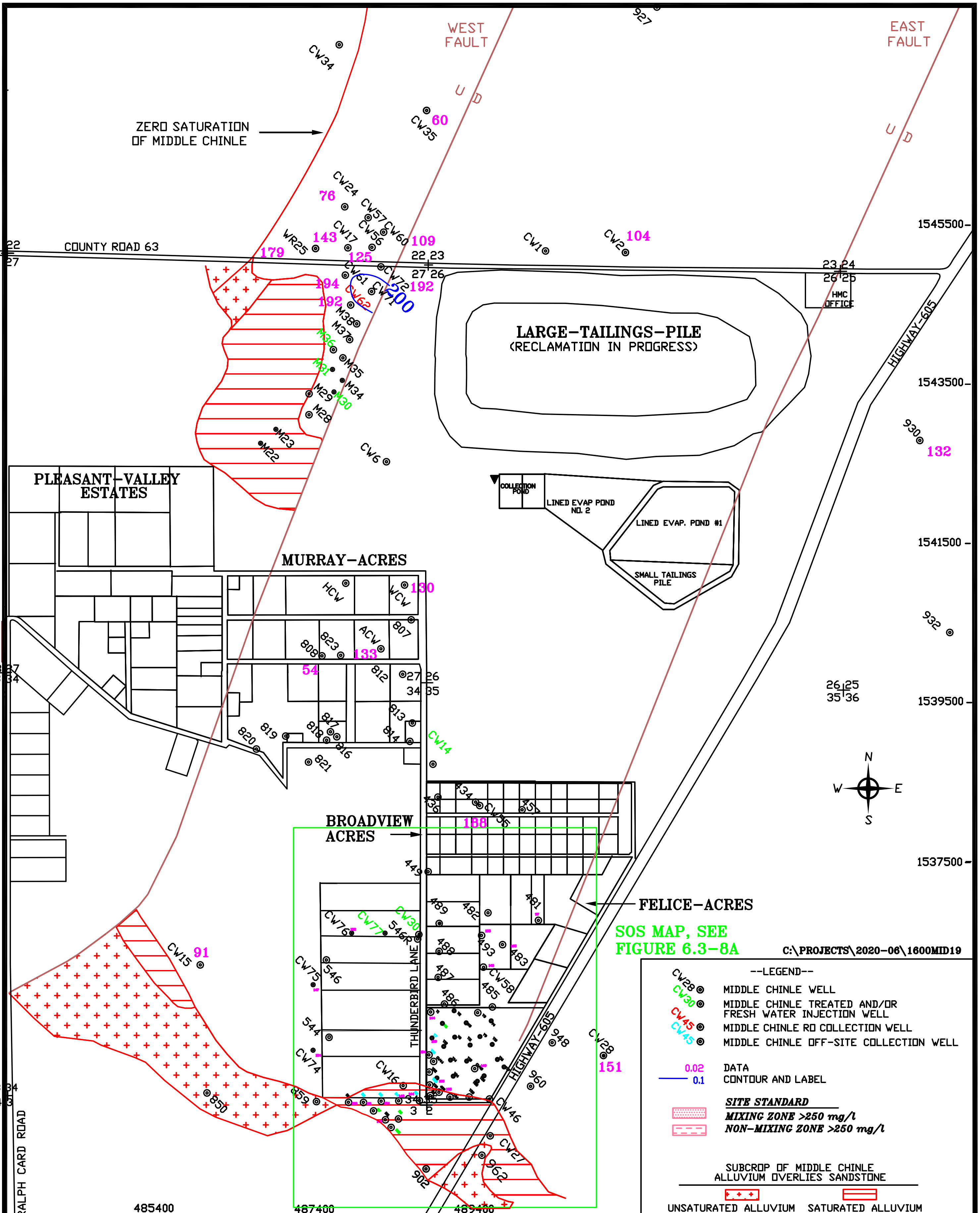


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

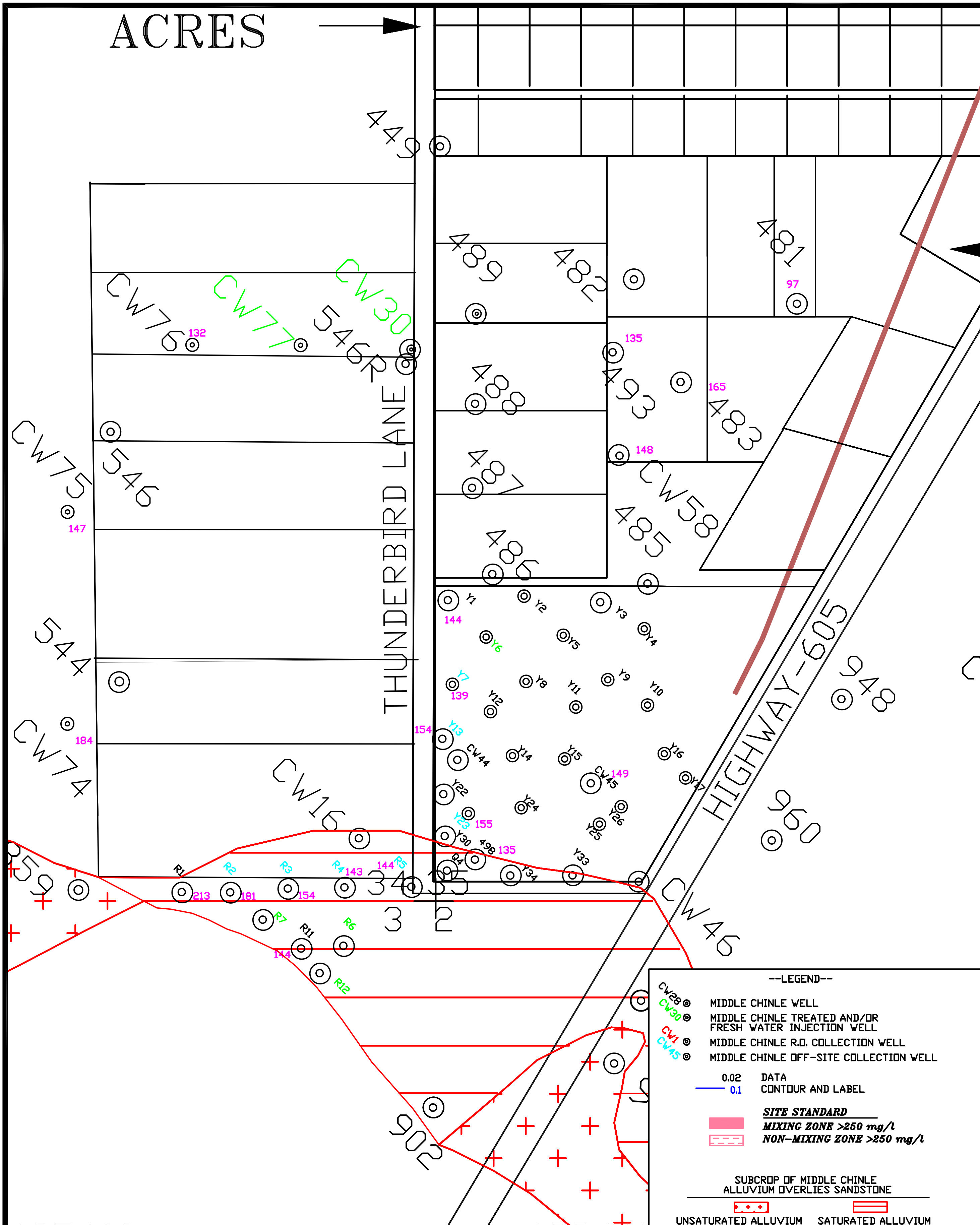


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-8. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L

DATE: 1/3/2020

SCALE: 1"=1600'



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

FIGURE 6.3-8A. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, SOS, mg/L

DATE: 1/3/2020

SCALE: 1"=500'

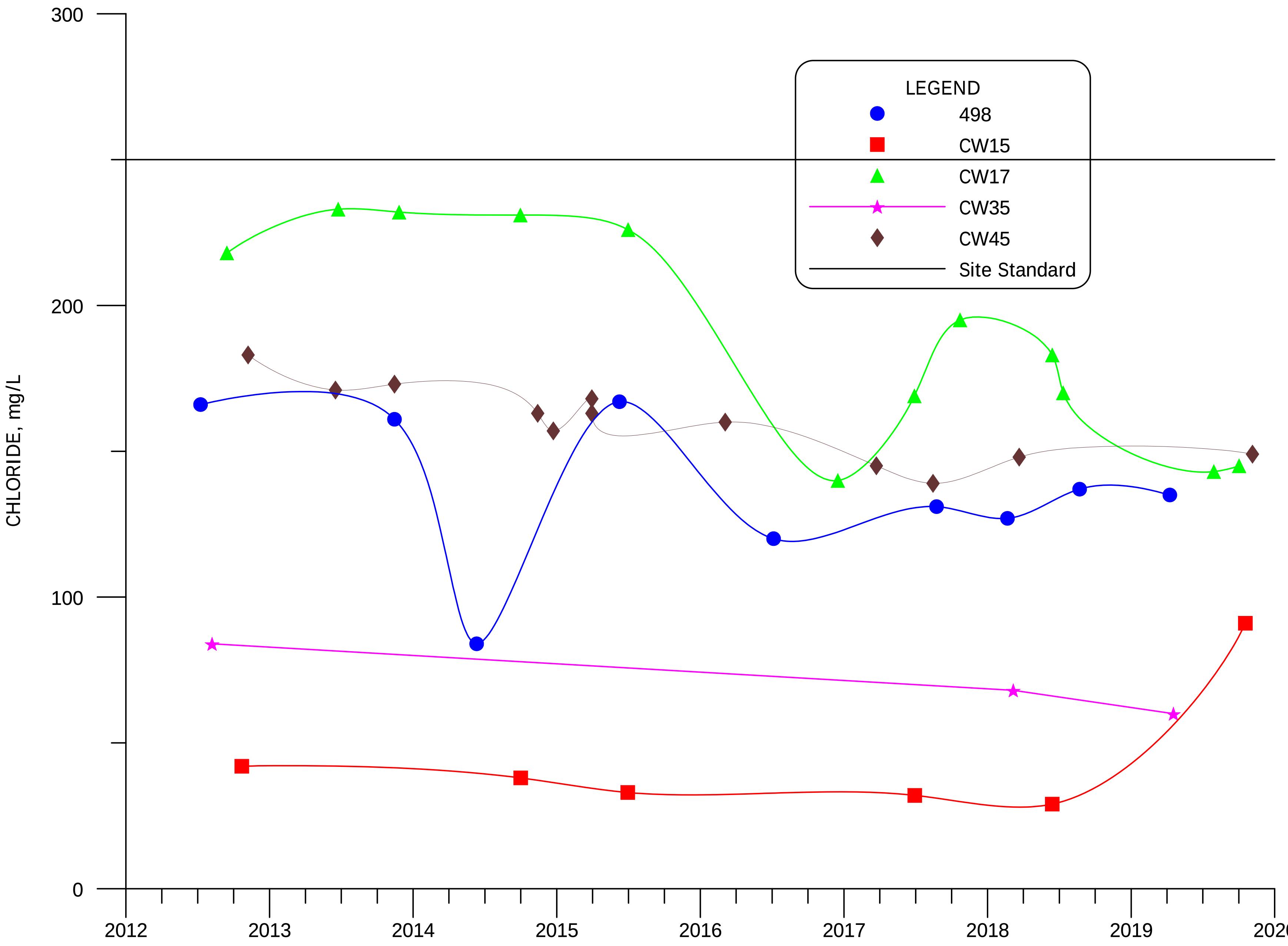


FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

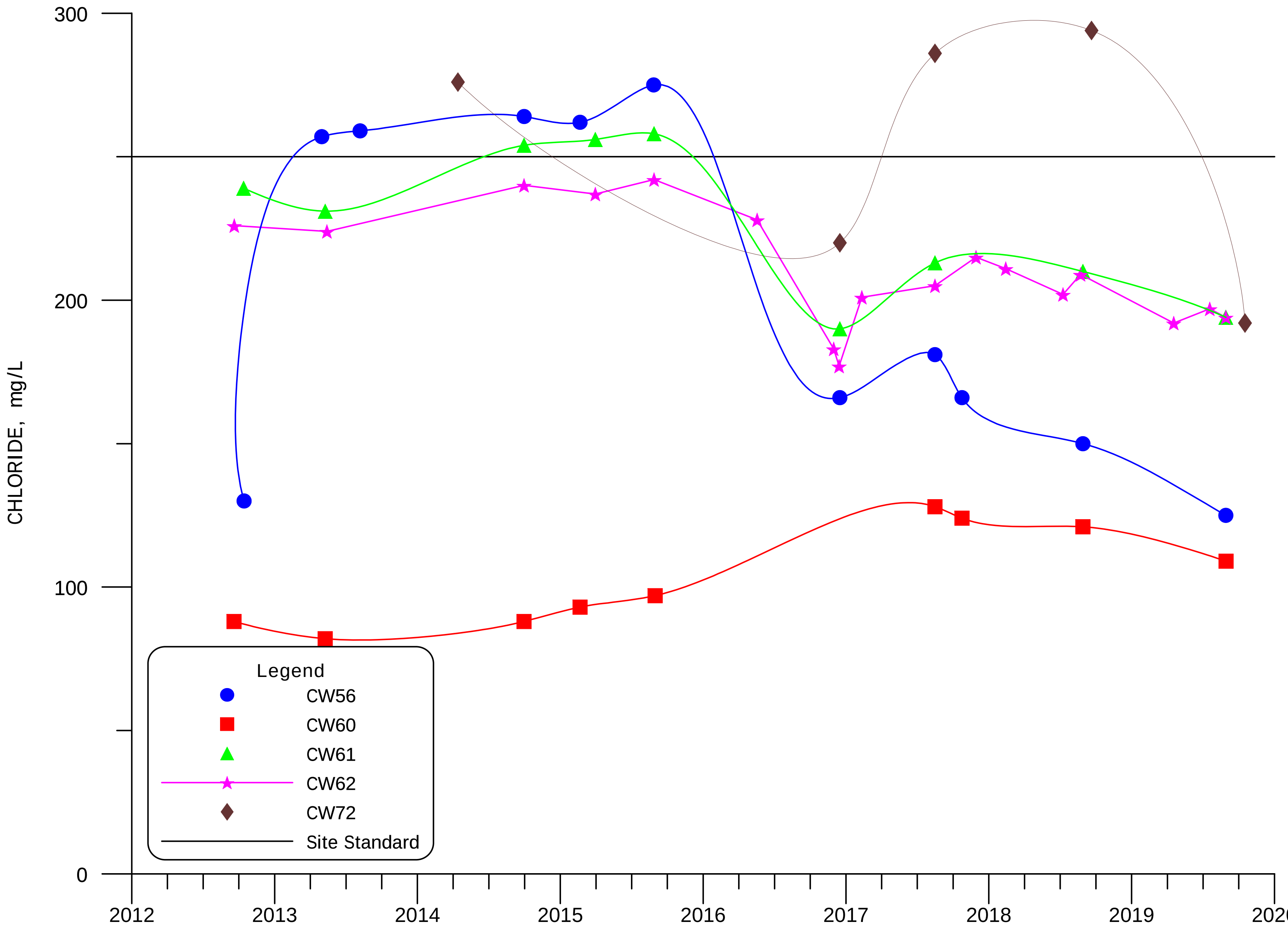


FIGURE 6.3-9A. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

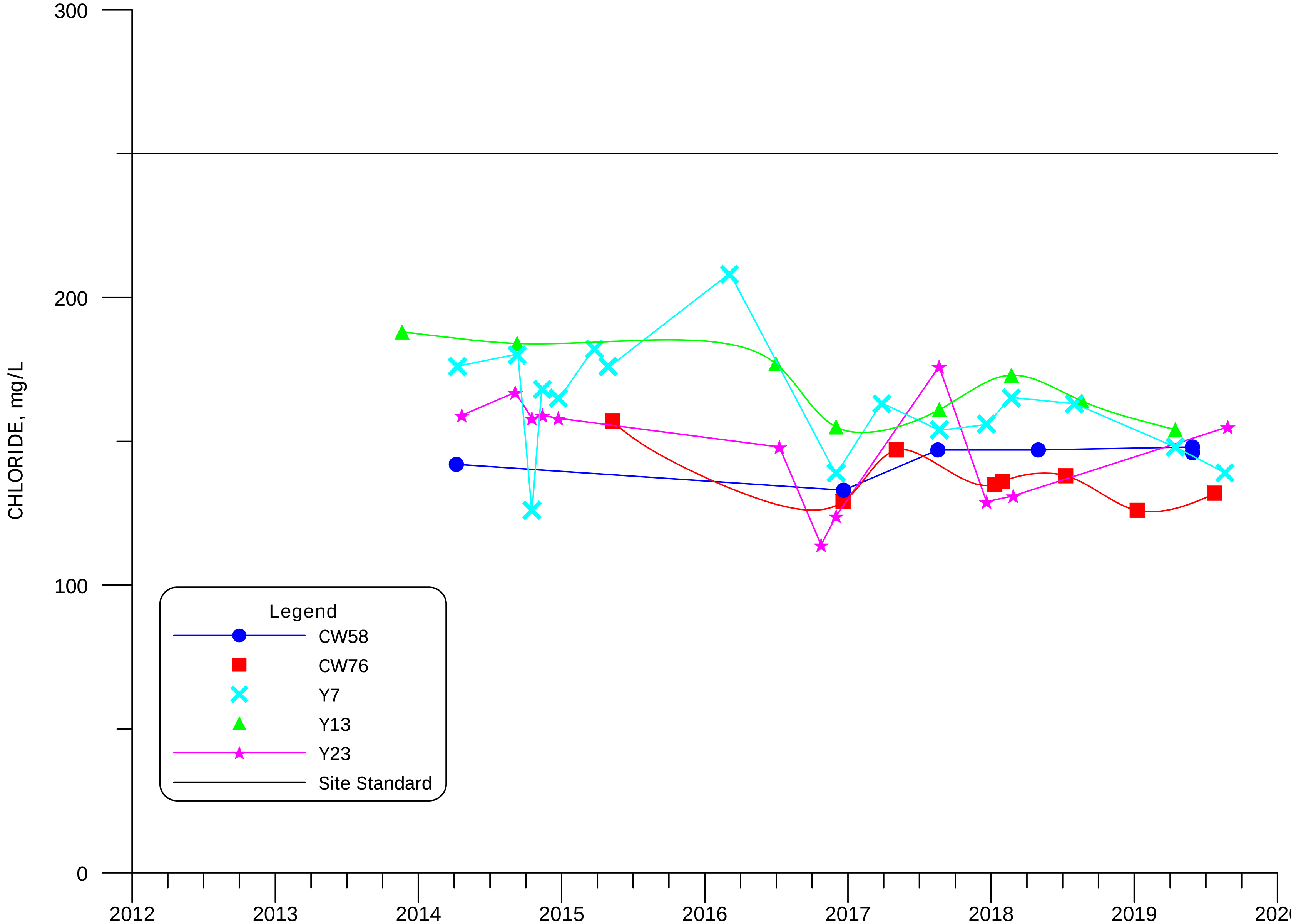


FIGURE 6.3-9B. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

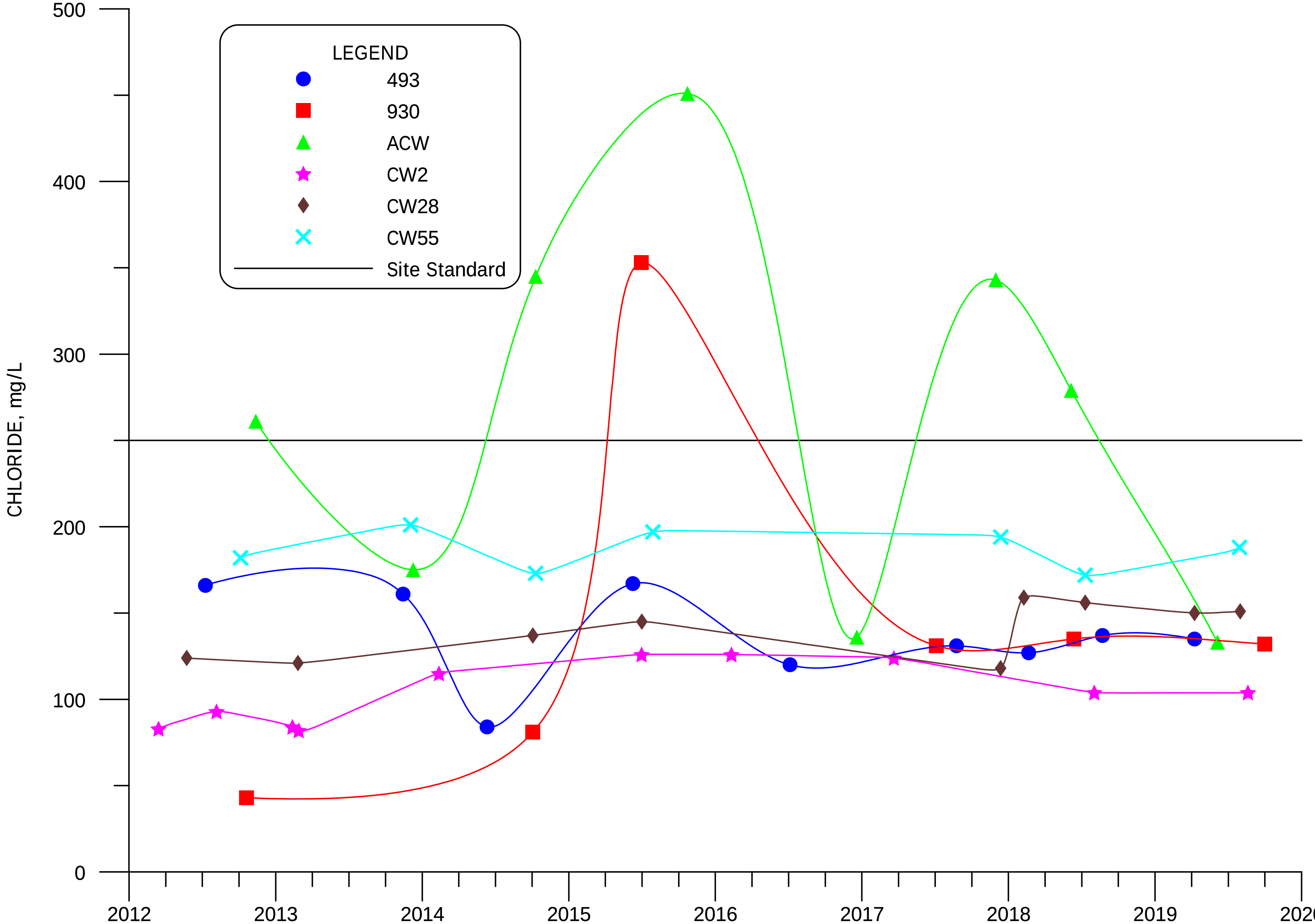
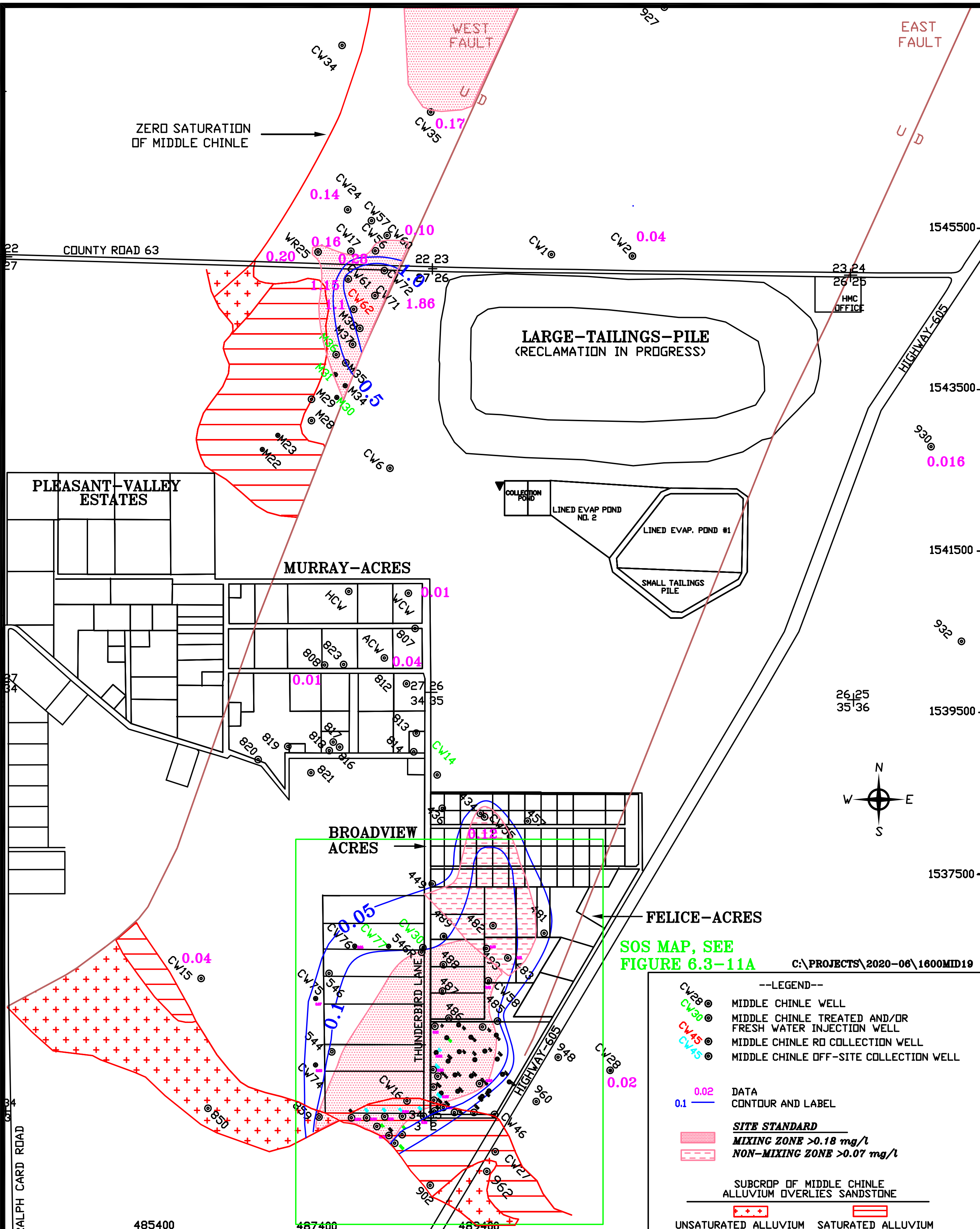


FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

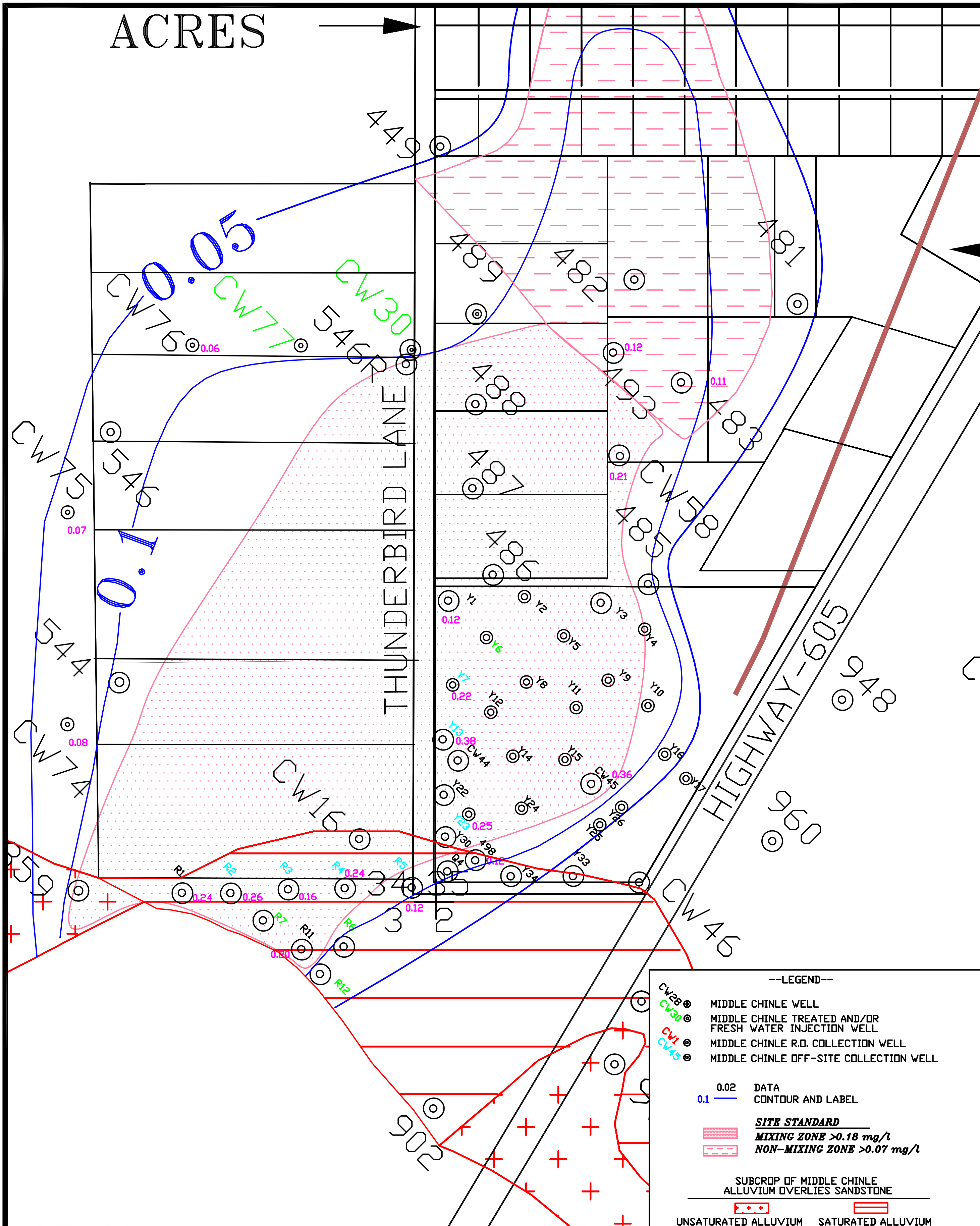


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-11. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L

DATE: 1/3/2020

SCALE: 1"=1600'



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

FIGURE 6.3-11A. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2019, mg/L

DATE: 1/3/2020

SCALE: 1"=500'

PAGE: 6.3-29

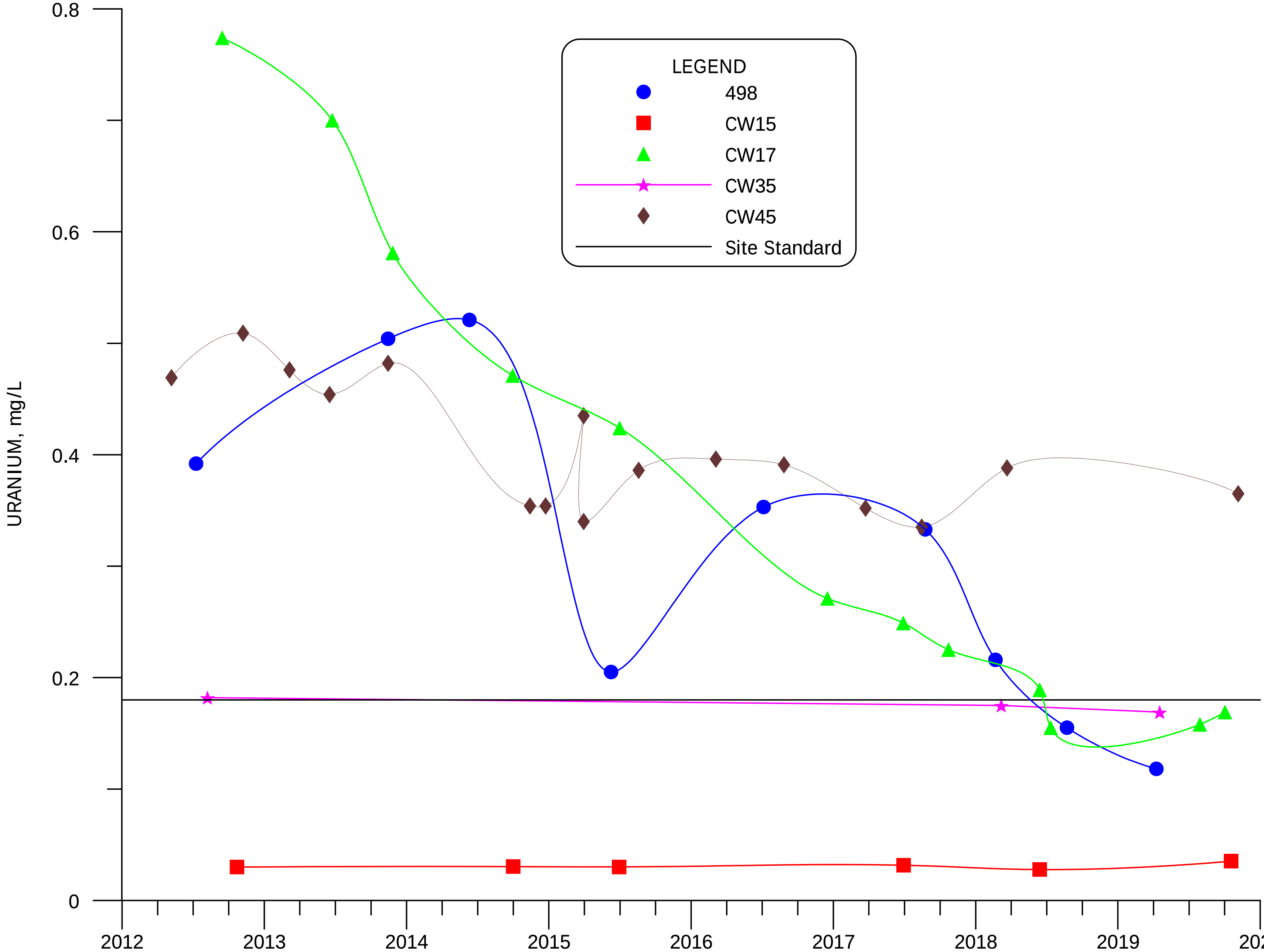


FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

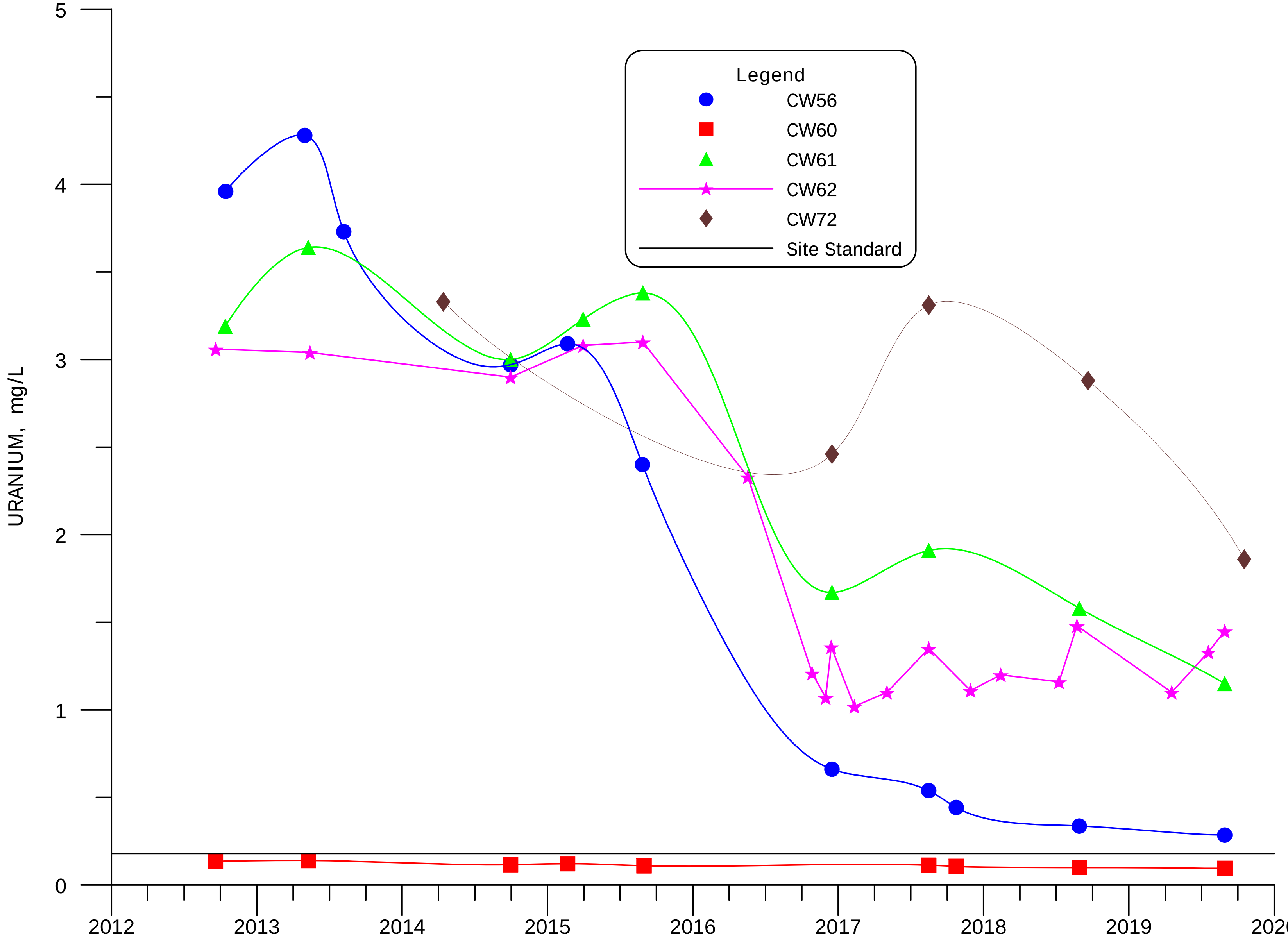


FIGURE 6.3-12A. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

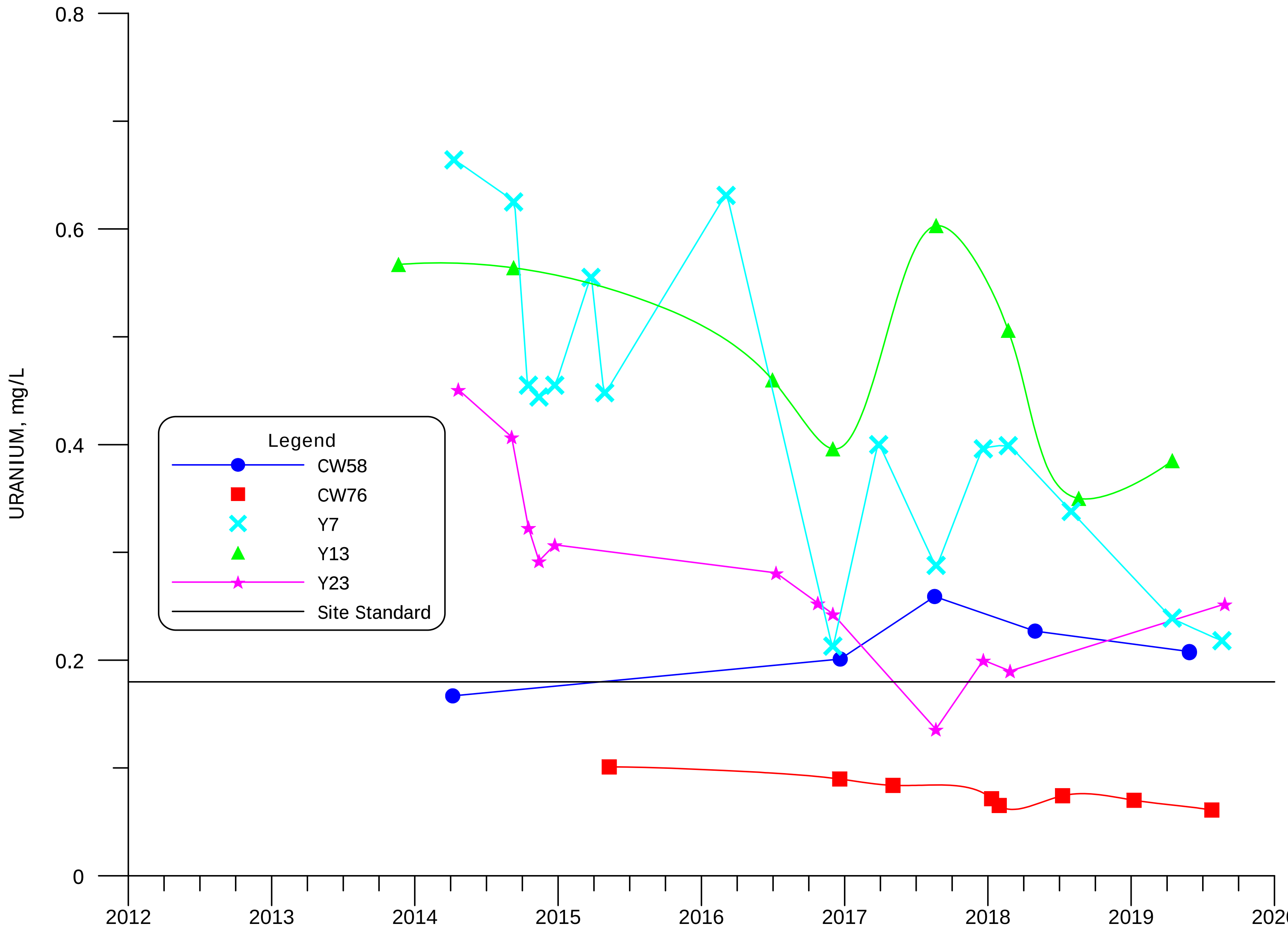


FIGURE 6.3-12B. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

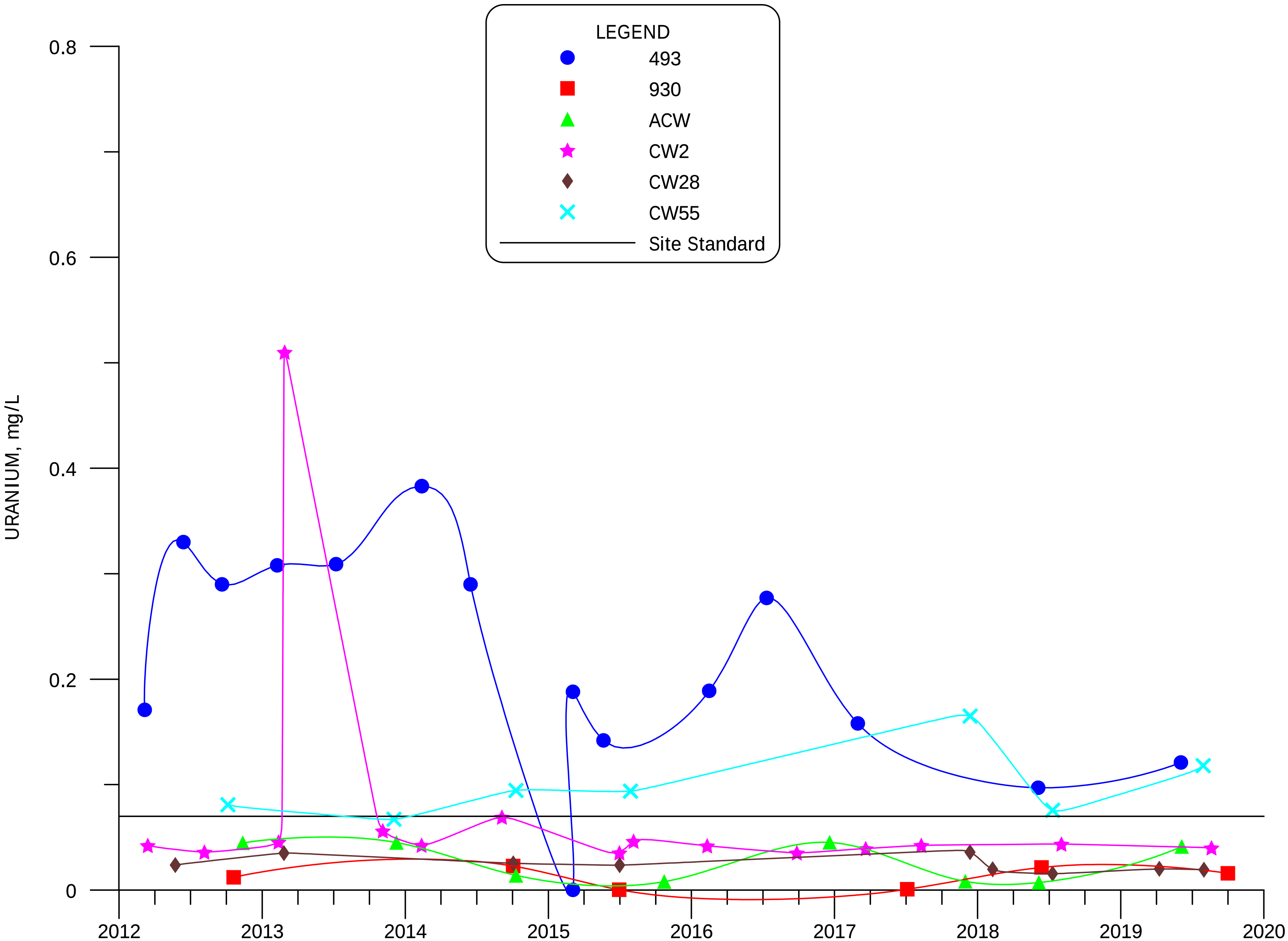
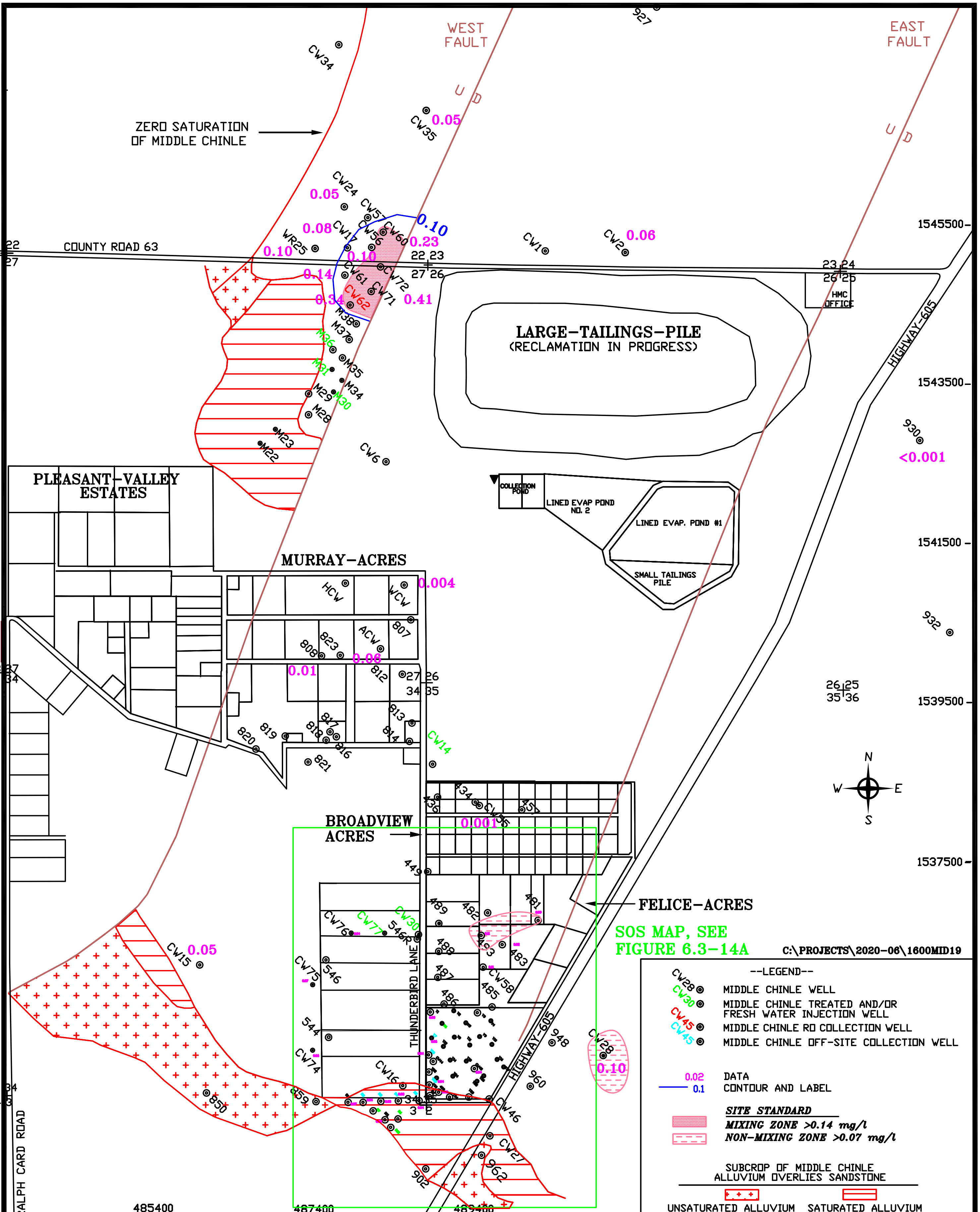


FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55

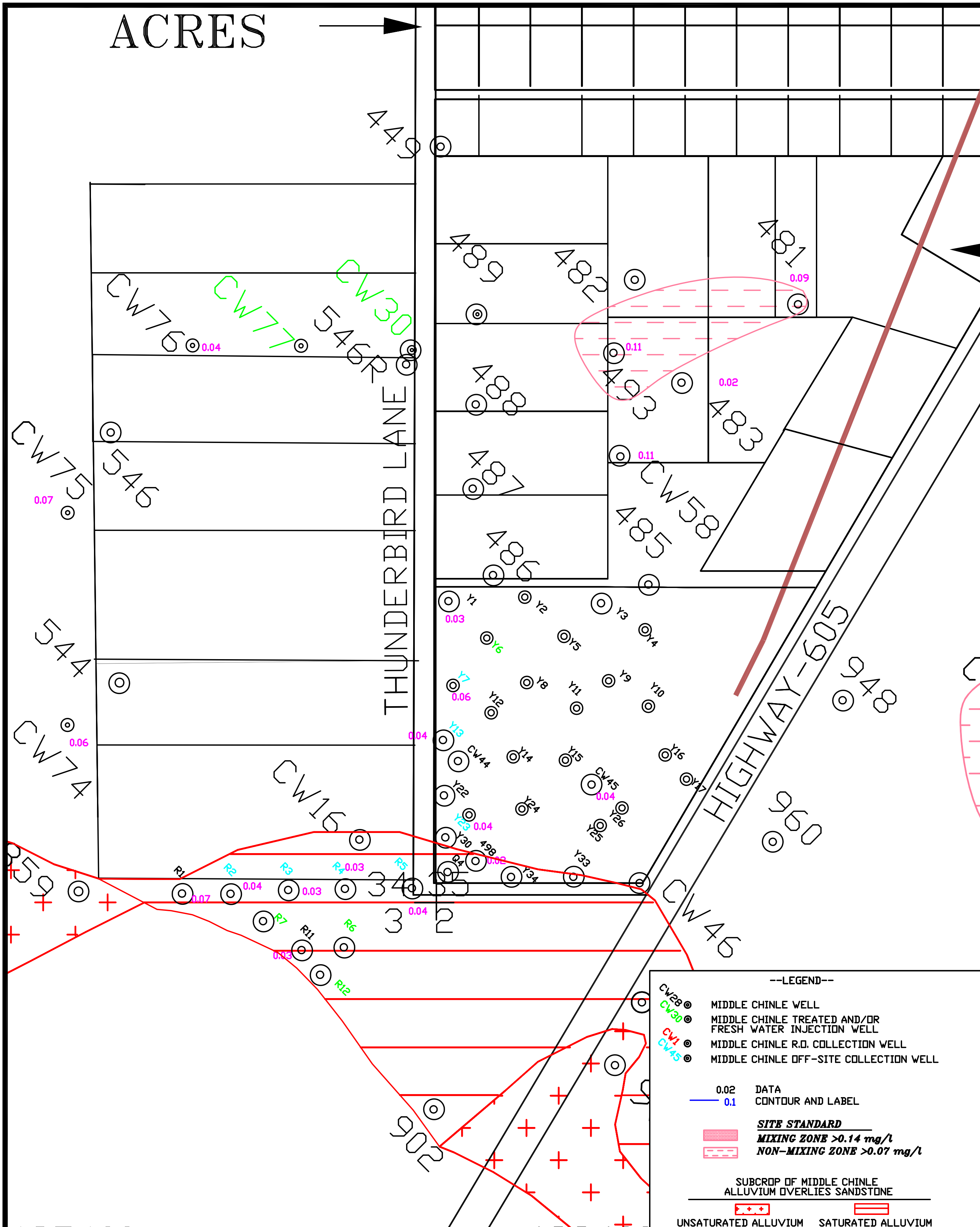


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 1/3/2020

SCALE: 1"=1600'

FIGURE 6.3-14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L



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

FIGURE 6.3-14A. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, SOS, 2019, mg/L

DATE: 1/3/2020

SCALE: 1"=500'

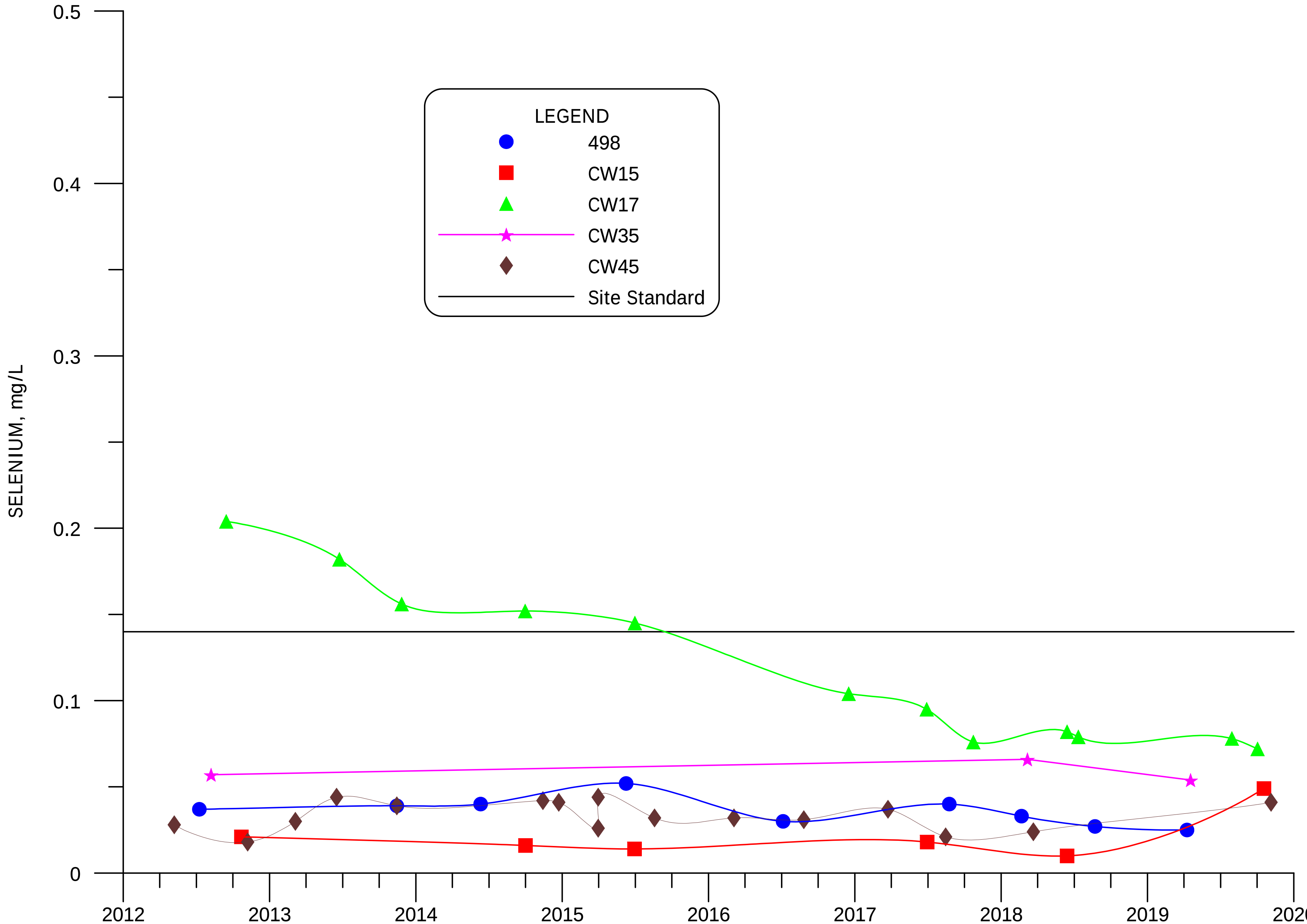


FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

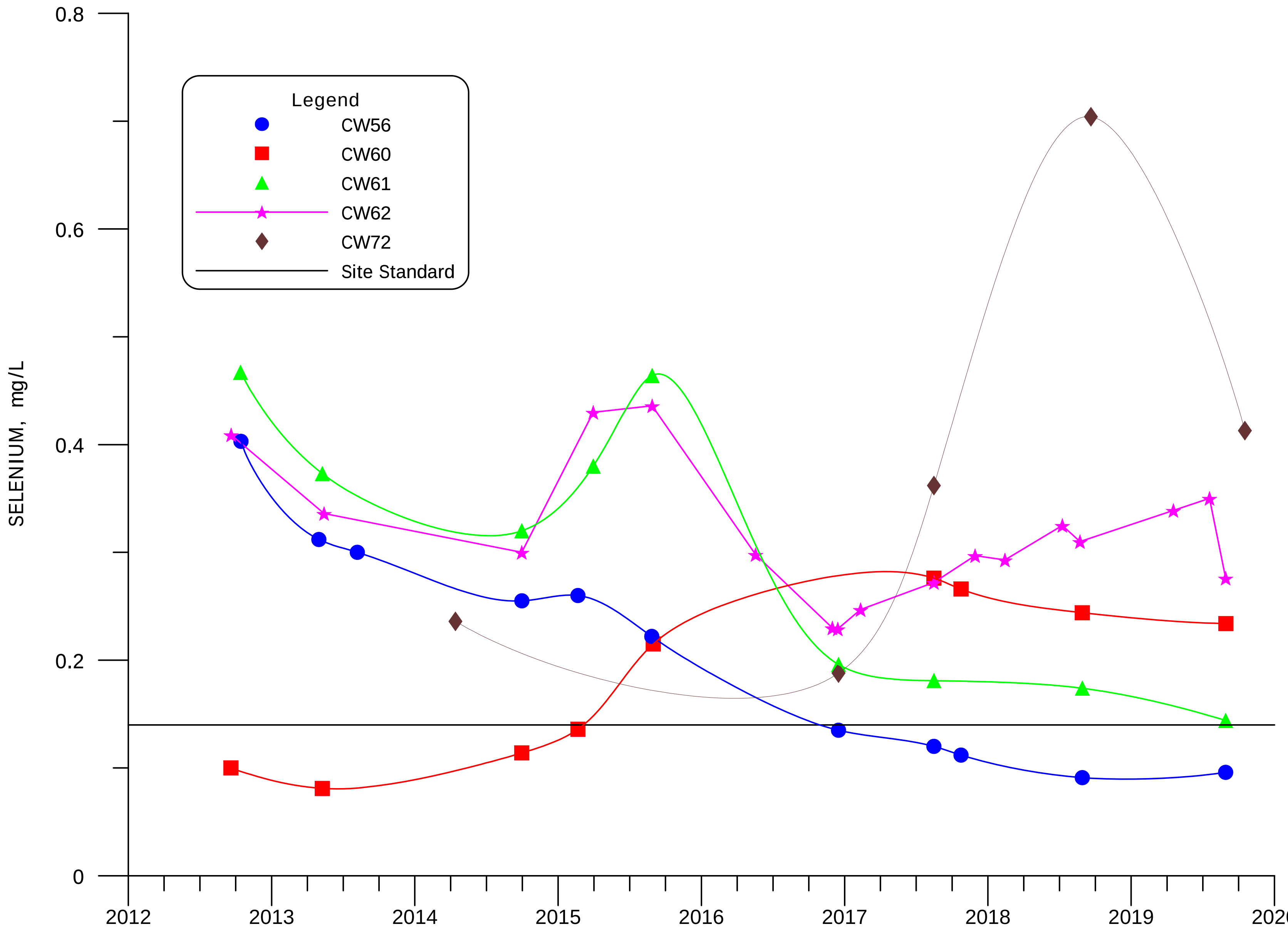


FIGURE 6.3-15A. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

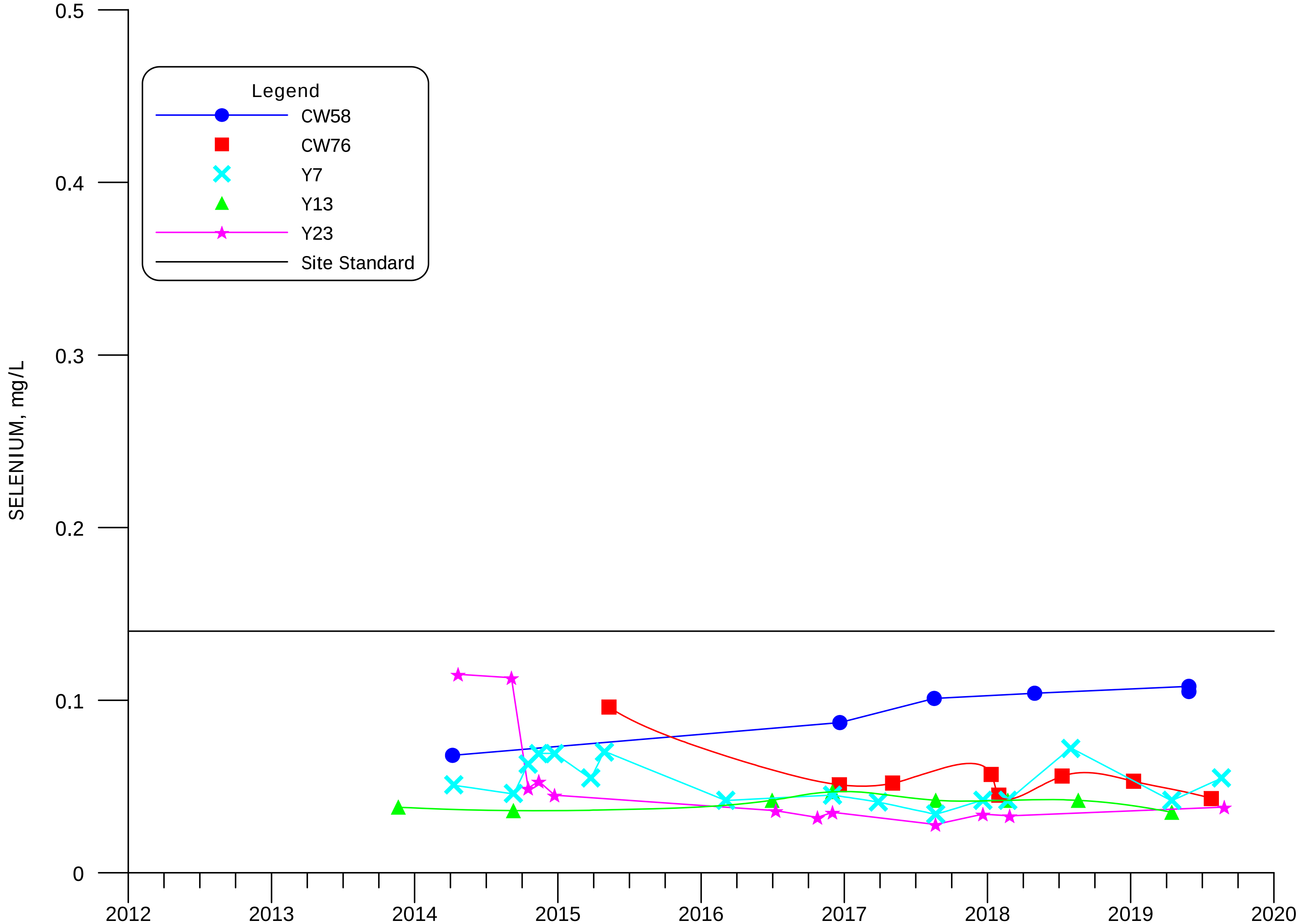


FIGURE 6.3-15B. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

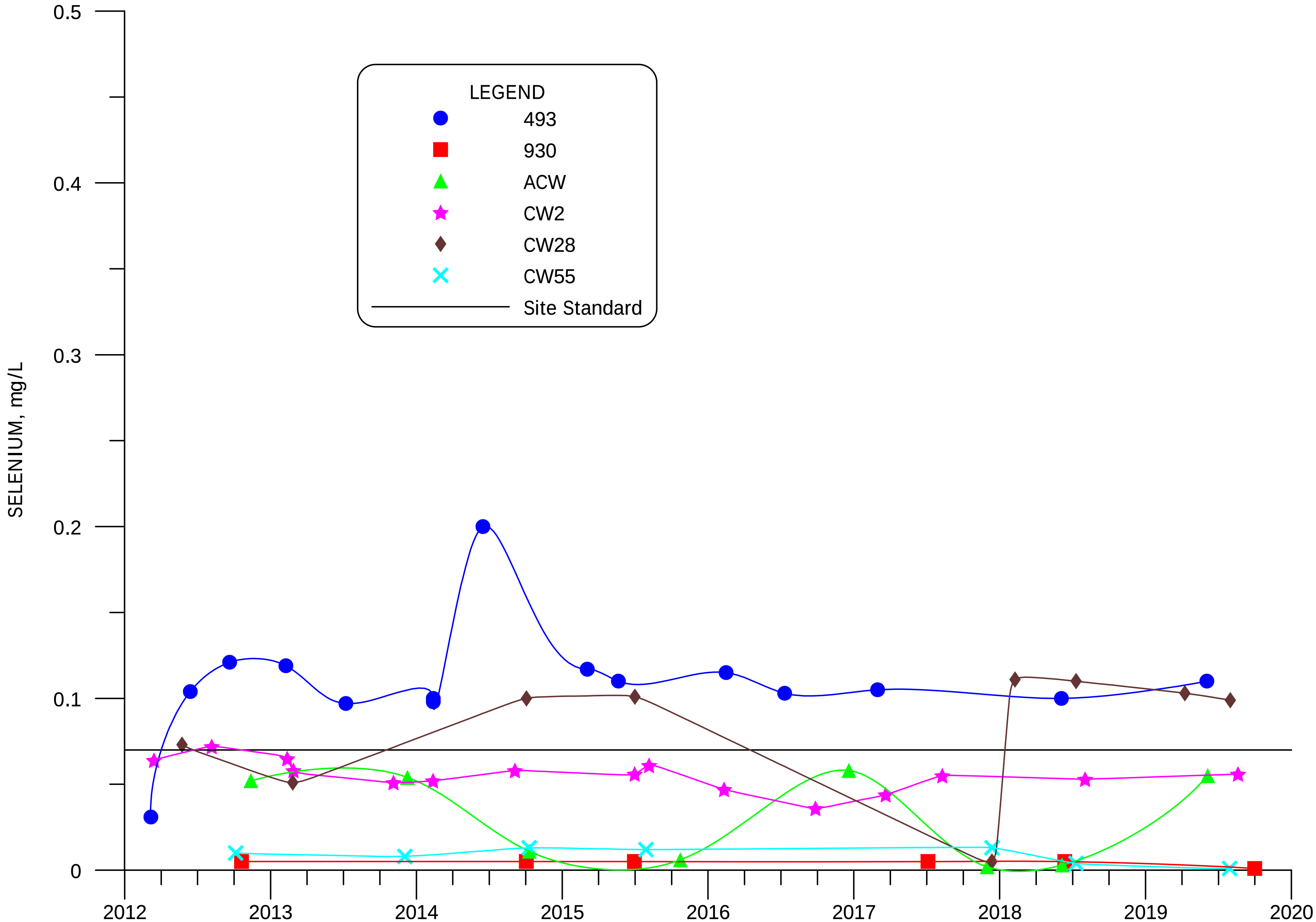
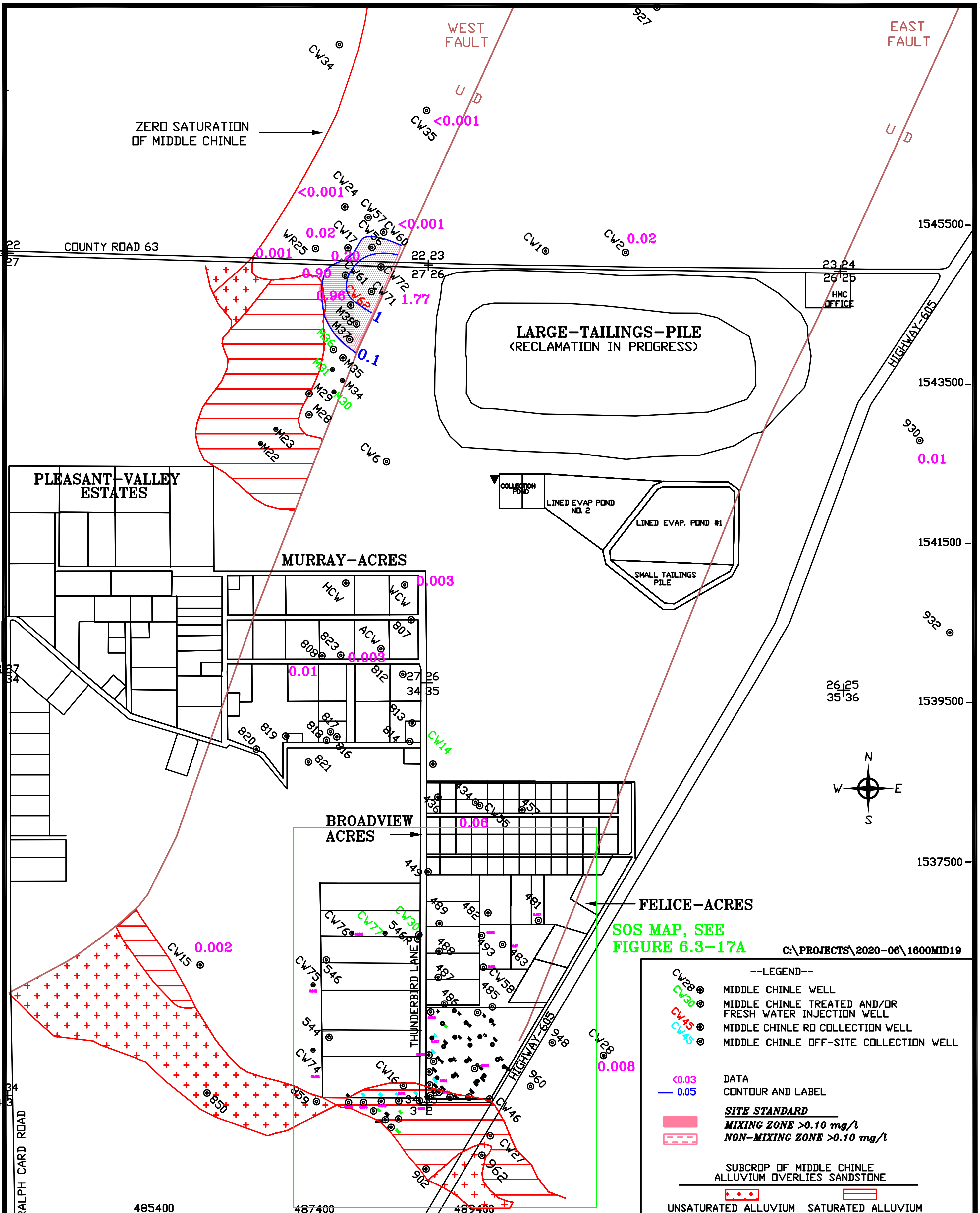


FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



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

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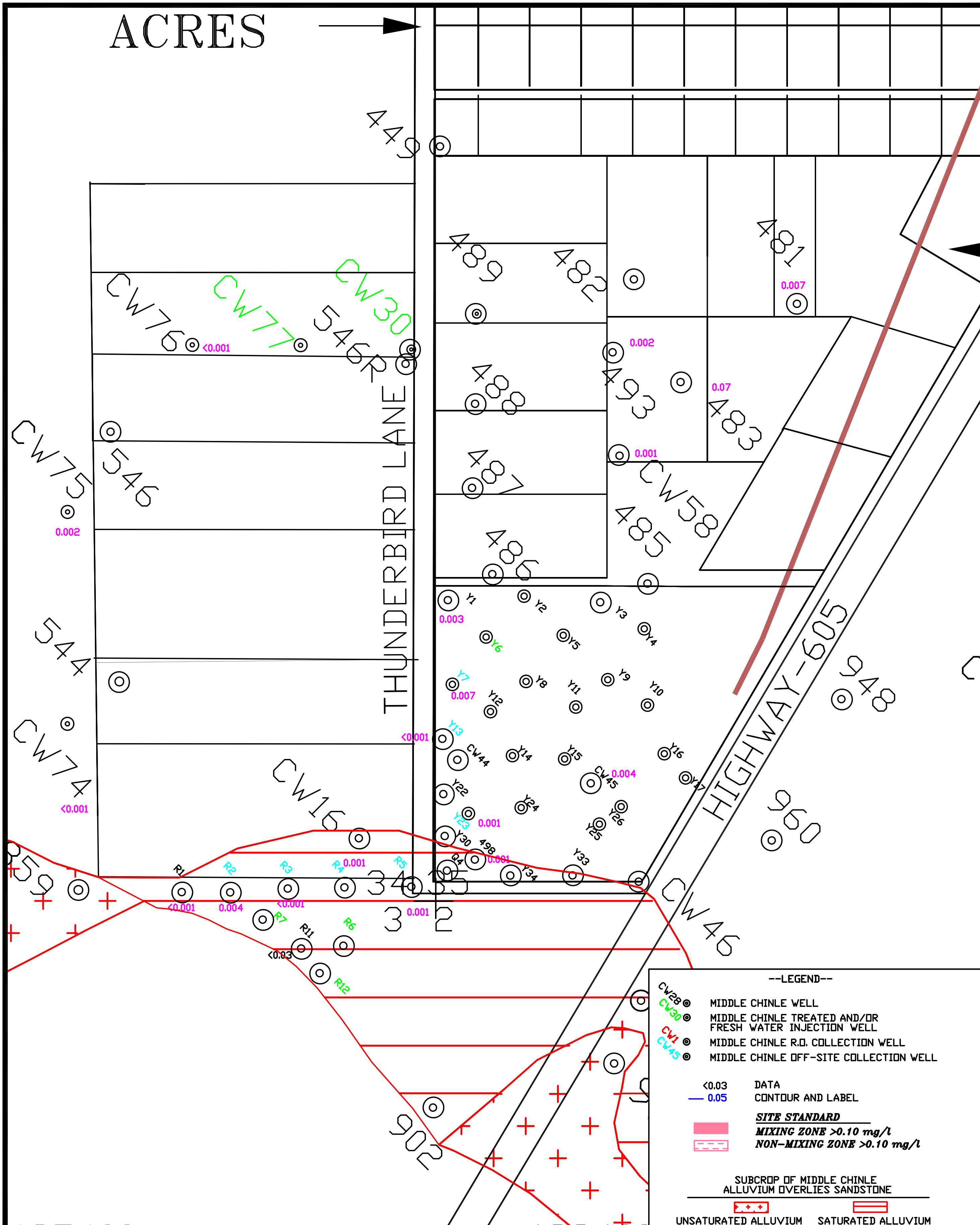
SCALE: 1"=1600'

FIGURE 6.3-17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L



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

DATE: 1/3/2020

FIGURE 6.3–17A. MOLYBDENUM OF THE MIDDLE CHINLE AQUIFER, SOS, 2019, mg/L

SCALE: 1"=500'

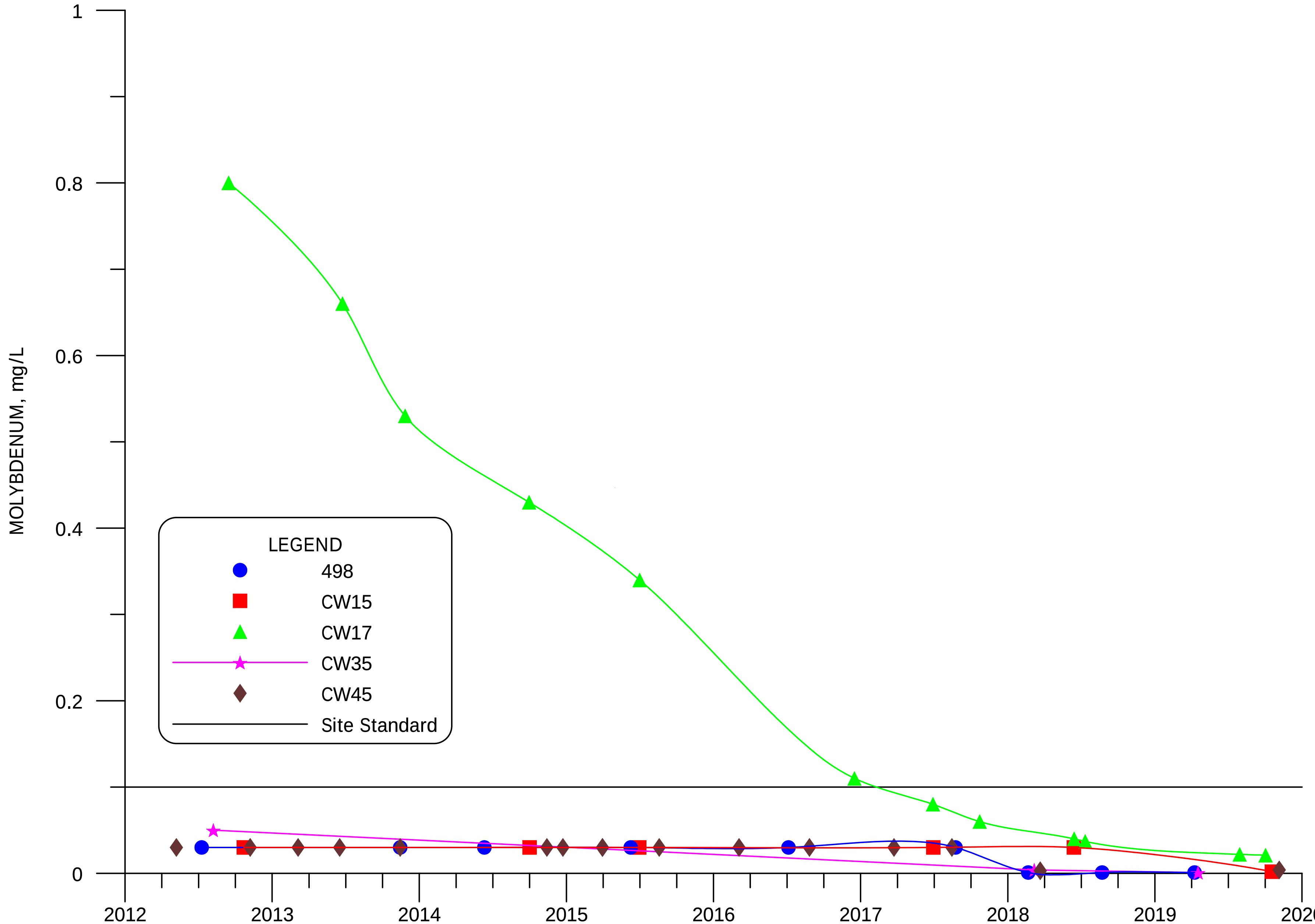


FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35 AND CW45

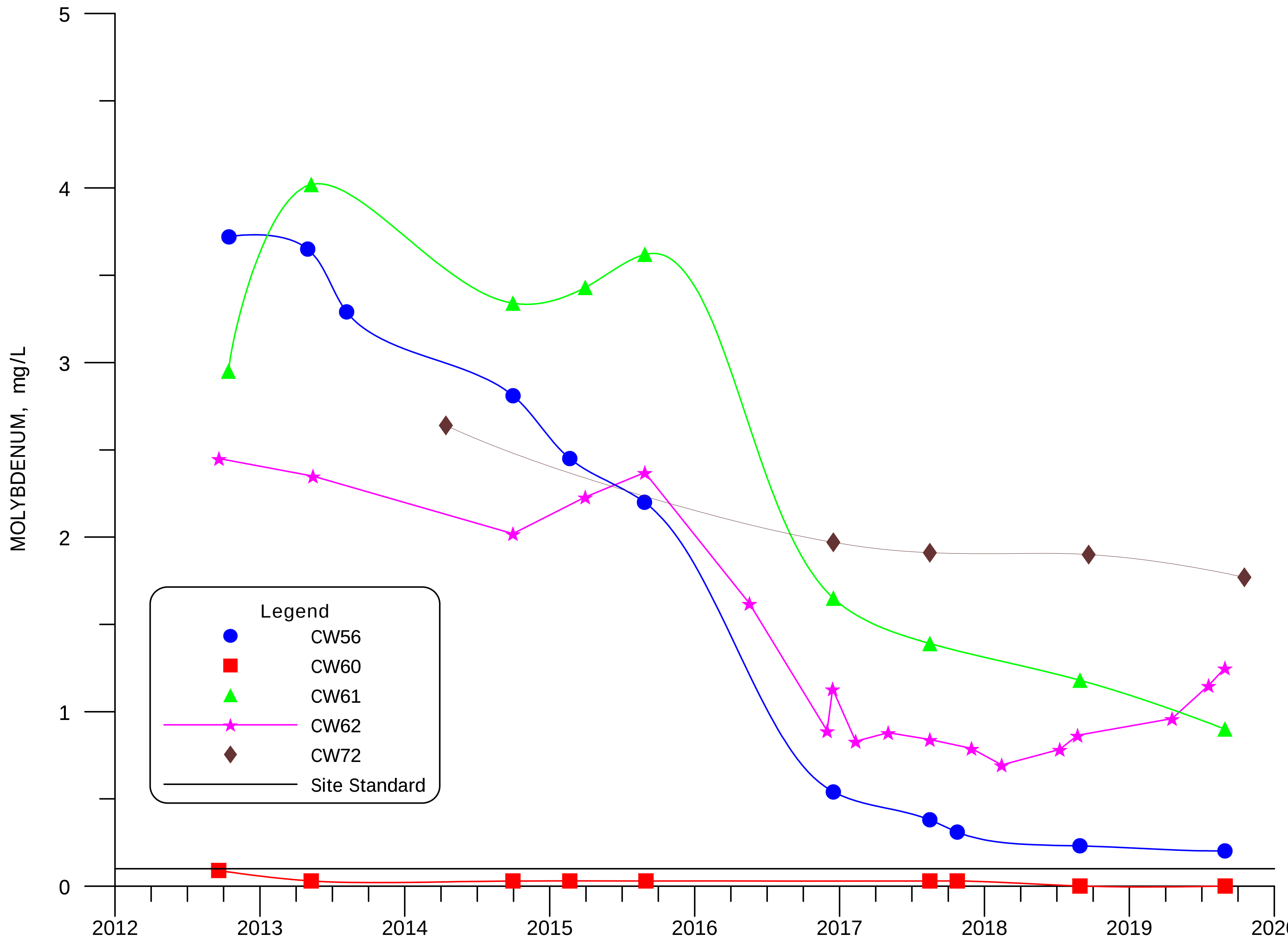


FIGURE 6.3-18A. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW56, CW60, CW61, CW62 AND CW72

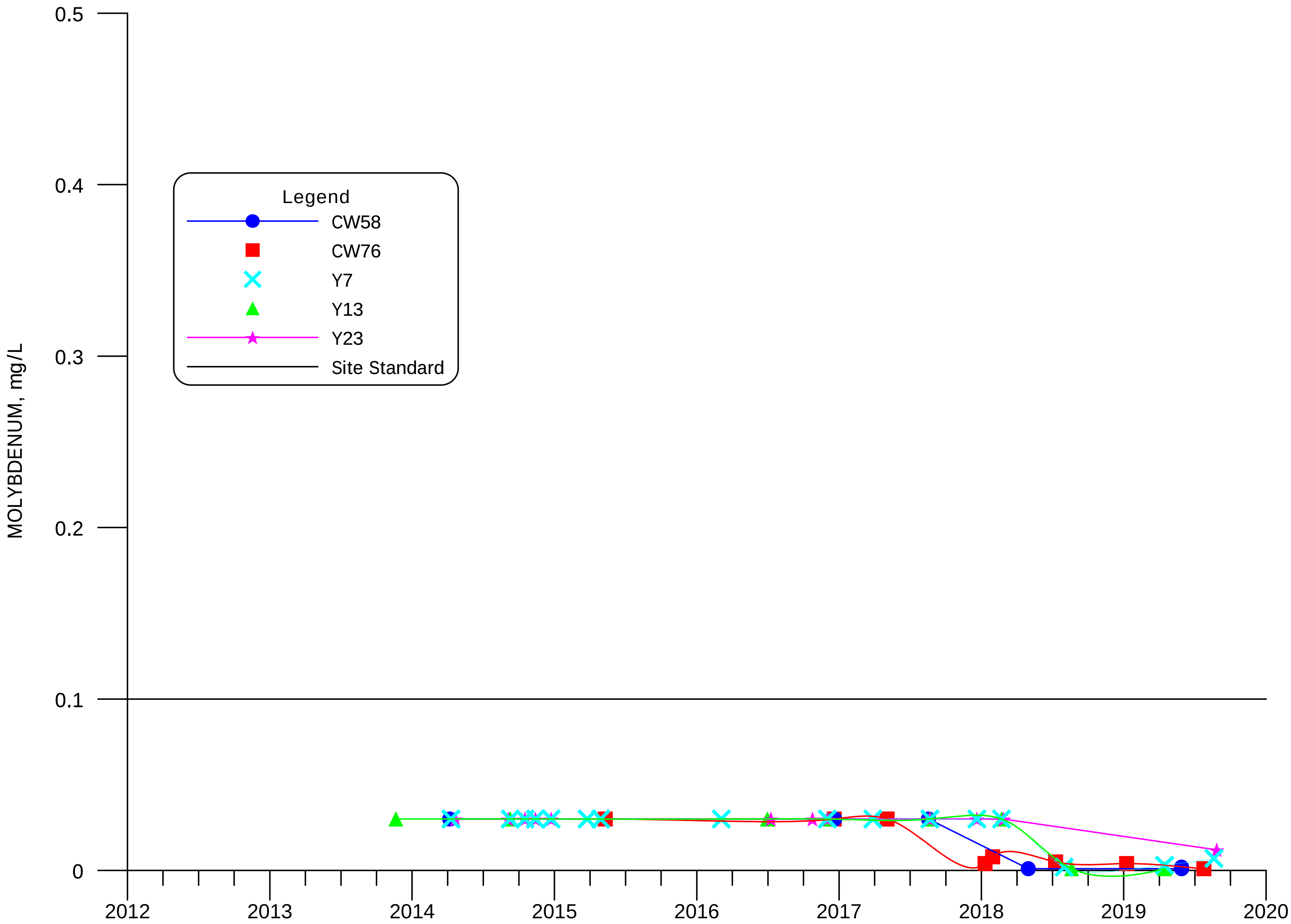


FIGURE 6.3-18B. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS CW58, CW76, Y7, Y13 AND Y23

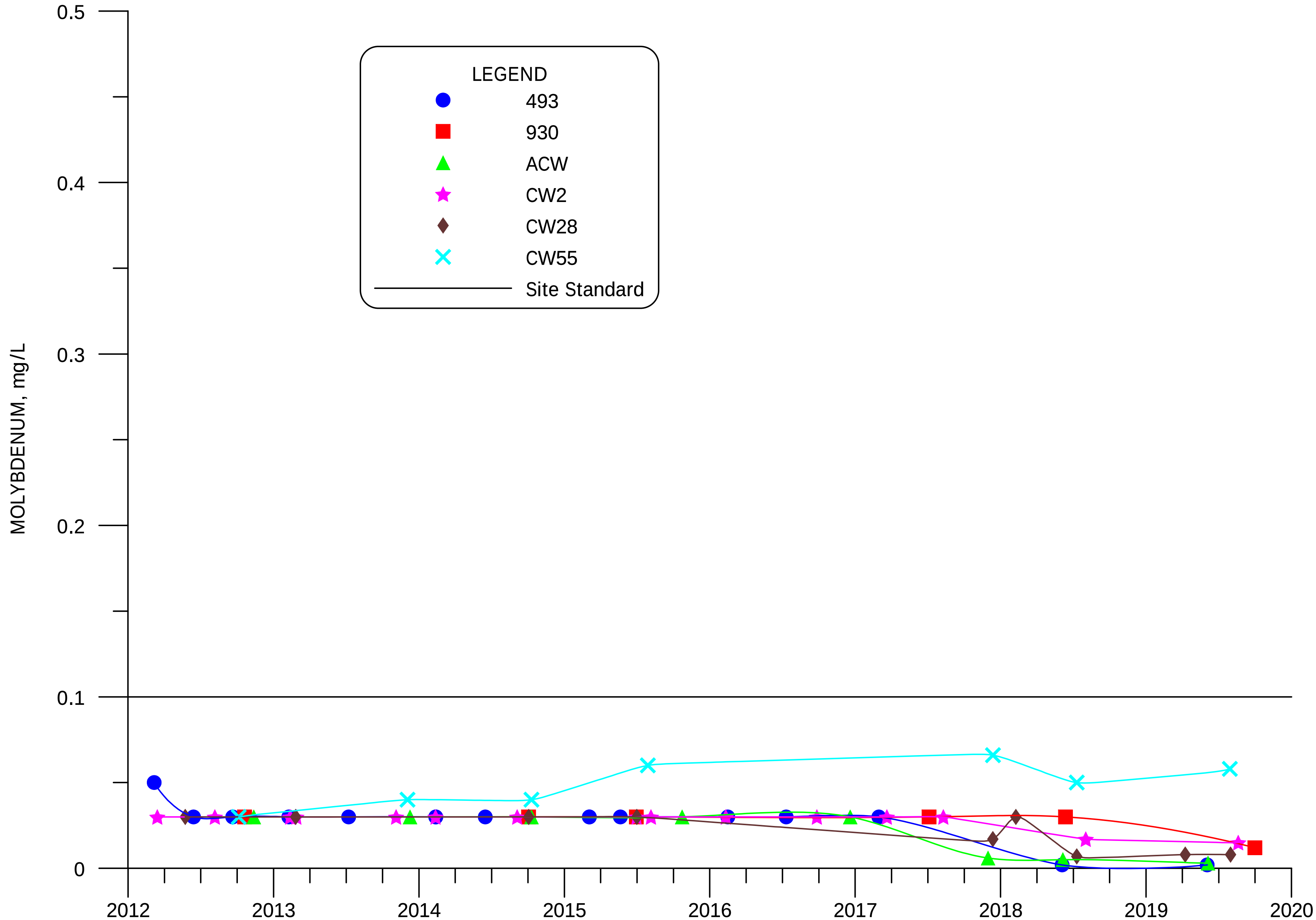
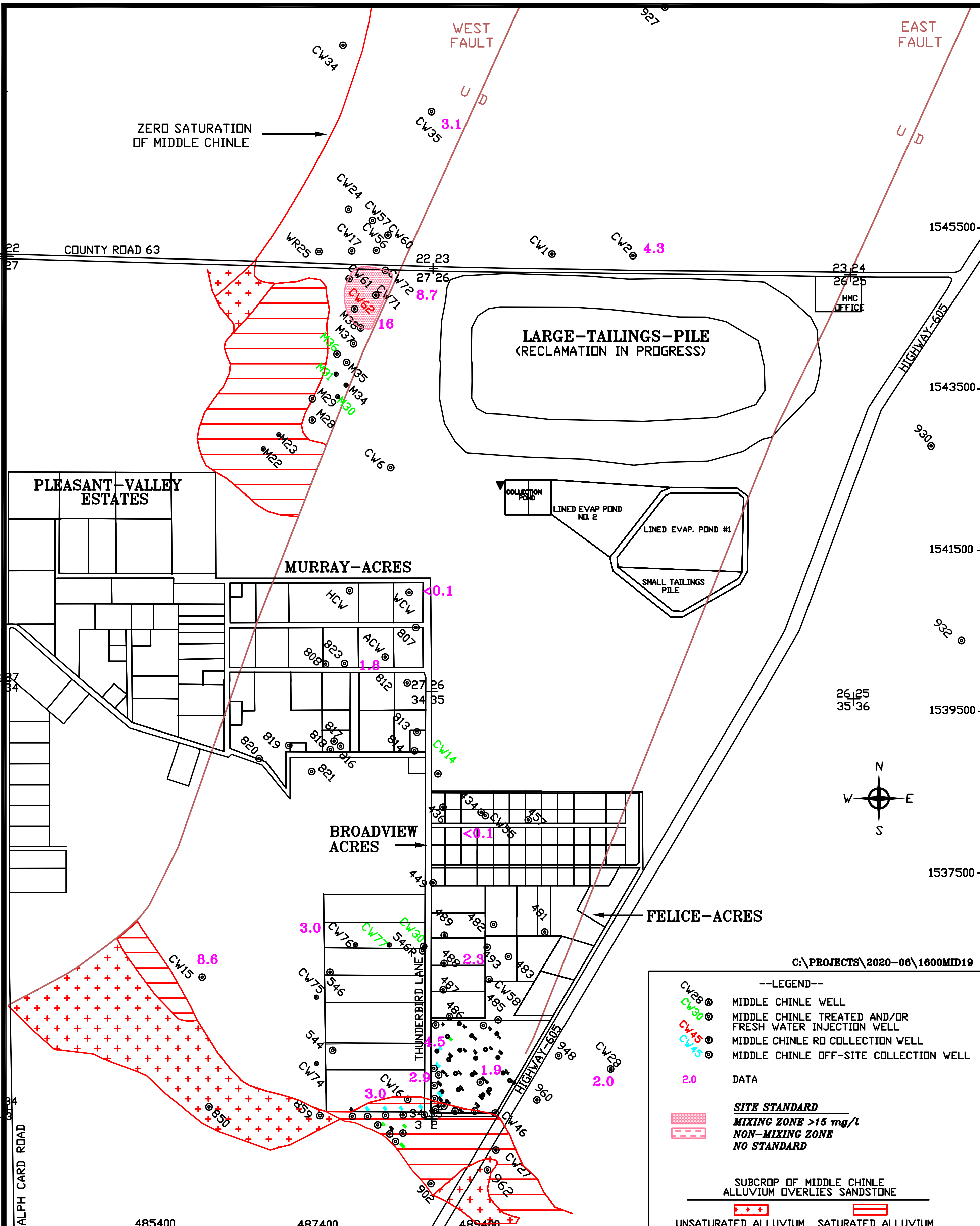


FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, ACW, CW2, CW28 AND CW55



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

DATE: 1/3/2020

SCALE: 1"=1600'

FIGURE 6.3-20. NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2019, mg/L

TABLE 6.3-1. MIDDLE CHINLE SITE STANDARDS AND 2019 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	<0.001	0.01	0.04	563	278	30	-	-
CW50	<0.001	0.02	<0.001	1680	889	59	<0.1	0.02
CW52	-	-	-	-	-	-	-	-
CW15	0.05	0.04	0.002	2310	1250	91	8.6	<0.01
CW24	0.05	0.14	<0.001	3140	1860	76	-	-
CW35	0.05	0.17	<0.001	2390	1150	60	3.1	0.02
CW36	<0.001	0.005	0.005	1970	1100	71	-	-
CW37	0.07	0.03	<0.001	1940	1050	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.05	0.044	<0.001	2730	1320	222	7.6	<0.01
MIDDLE CHINLE NON-MIXING ZONE WELLS								
ACW	0.06	0.04	0.003	1650	689	133	1.8	<0.01
CW1	-	-	-	-	-	-	-	-
CW2	0.06	0.04	0.01	1430	591	104	4.3	0.01
CW28	0.10	0.02	0.008	1310	512	151	2.0	0.01
WCW	0.004	0.01	0.003	939	285	130	-	-

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

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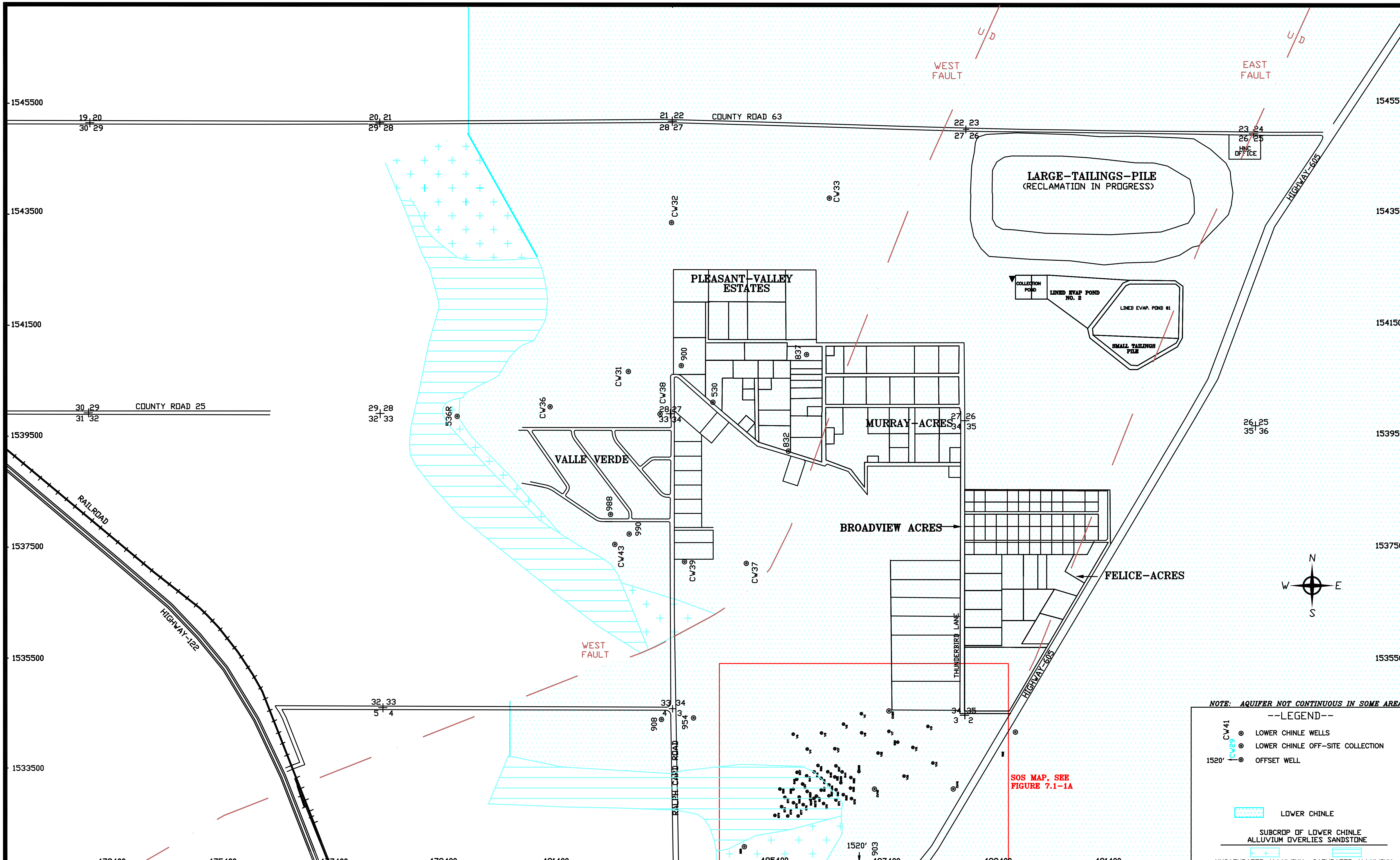
7.0 LOWER CHINLE AQUIFER MONITORING

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 2019 and no Lower Chinle wells were used for south collection in 2019.



SCALE: 1" = 1600'

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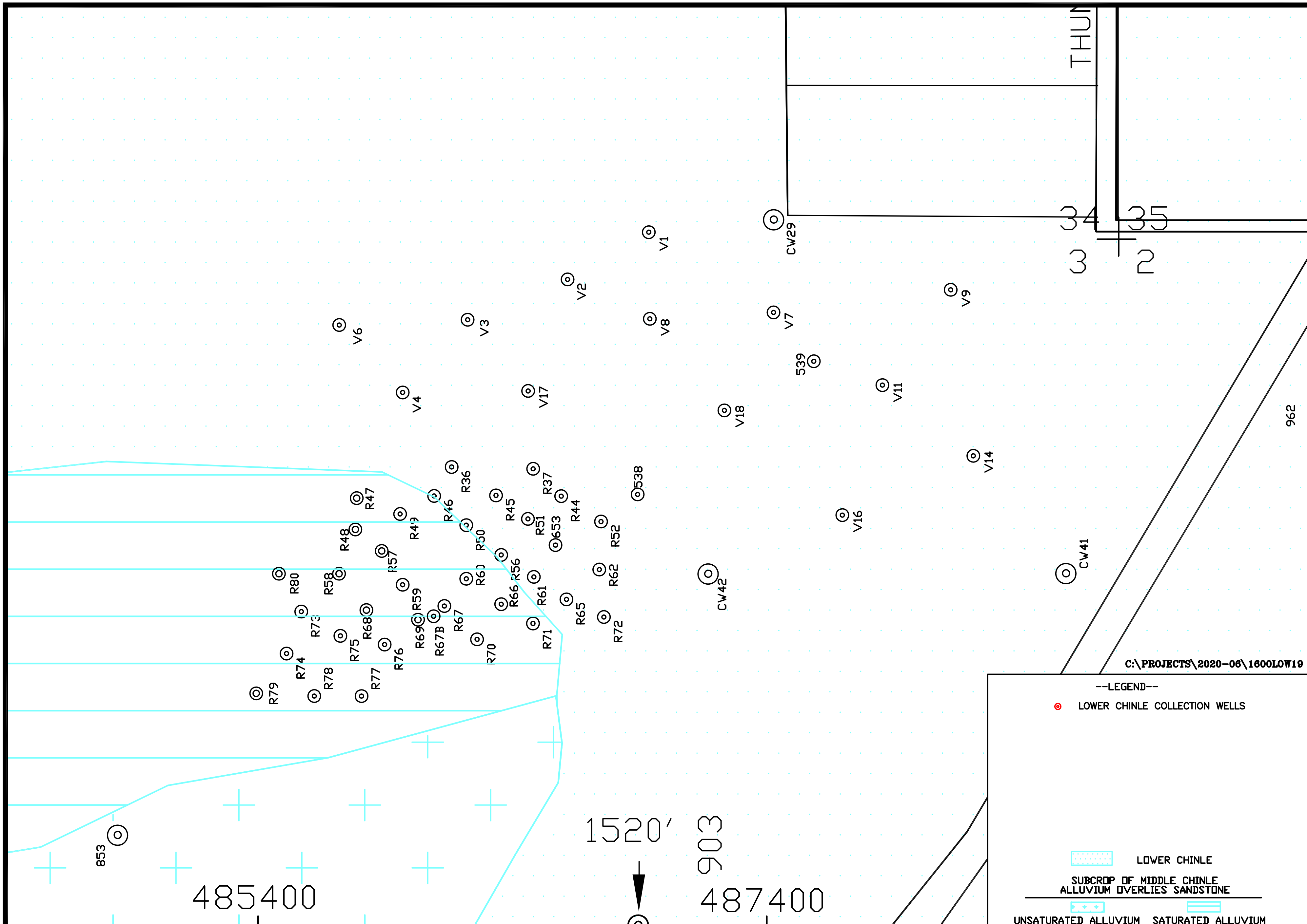
DATE: 11/15/2019

FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, 2019

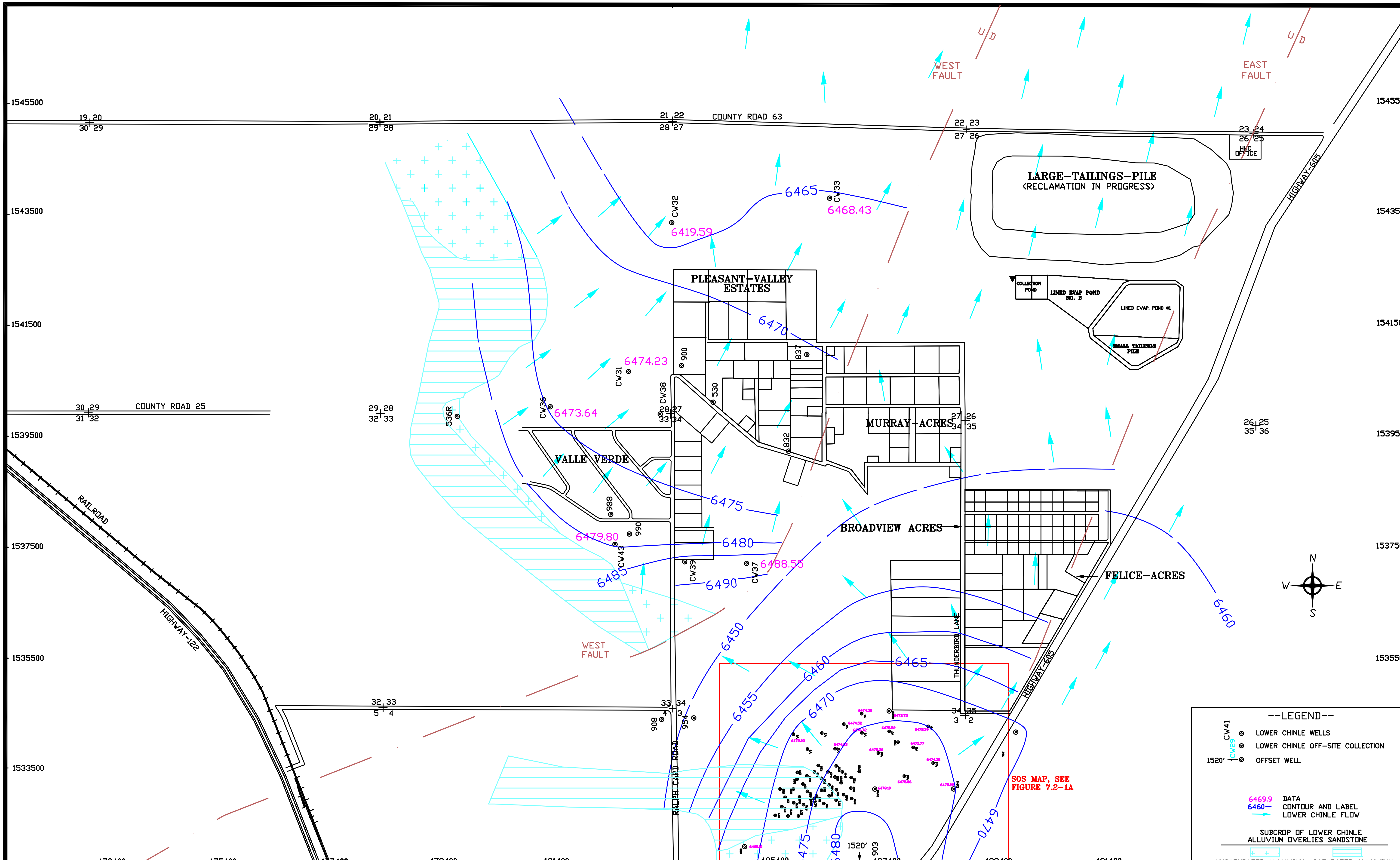


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 11/8/2019
FIGURE 7.1-1A. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS, SOS, 2019	SCALE: 1"=500'
	PAGE: 7.1-3

7.2 LOWER CHINLE WATER LEVELS

Water-level elevations in the Lower Chinle wells are presented along with the data for the Upper and Middle Chinle wells in Appendix A. Figures 7.2-1 and 7.2-1A presents water-level elevations in the Lower Chinle wells and the fall of 2019 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. The water levels in the wells located in Section 3 showed recovery from 2012 through 2016 that was likely a result of cessation of pumping for the irrigation supply in 2012. After 2016, there is a mild declining water-level trend resulting from collection from alluvial wells in the northeast Section 3 area. 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). This figure shows fairly steady water levels in the Lower Chinle aquifer for the last few years.



SCALE: 1" = 1600'

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DATE: 12/30/2019

FIGURE 7.2-1 WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, 2019, FT-MSL

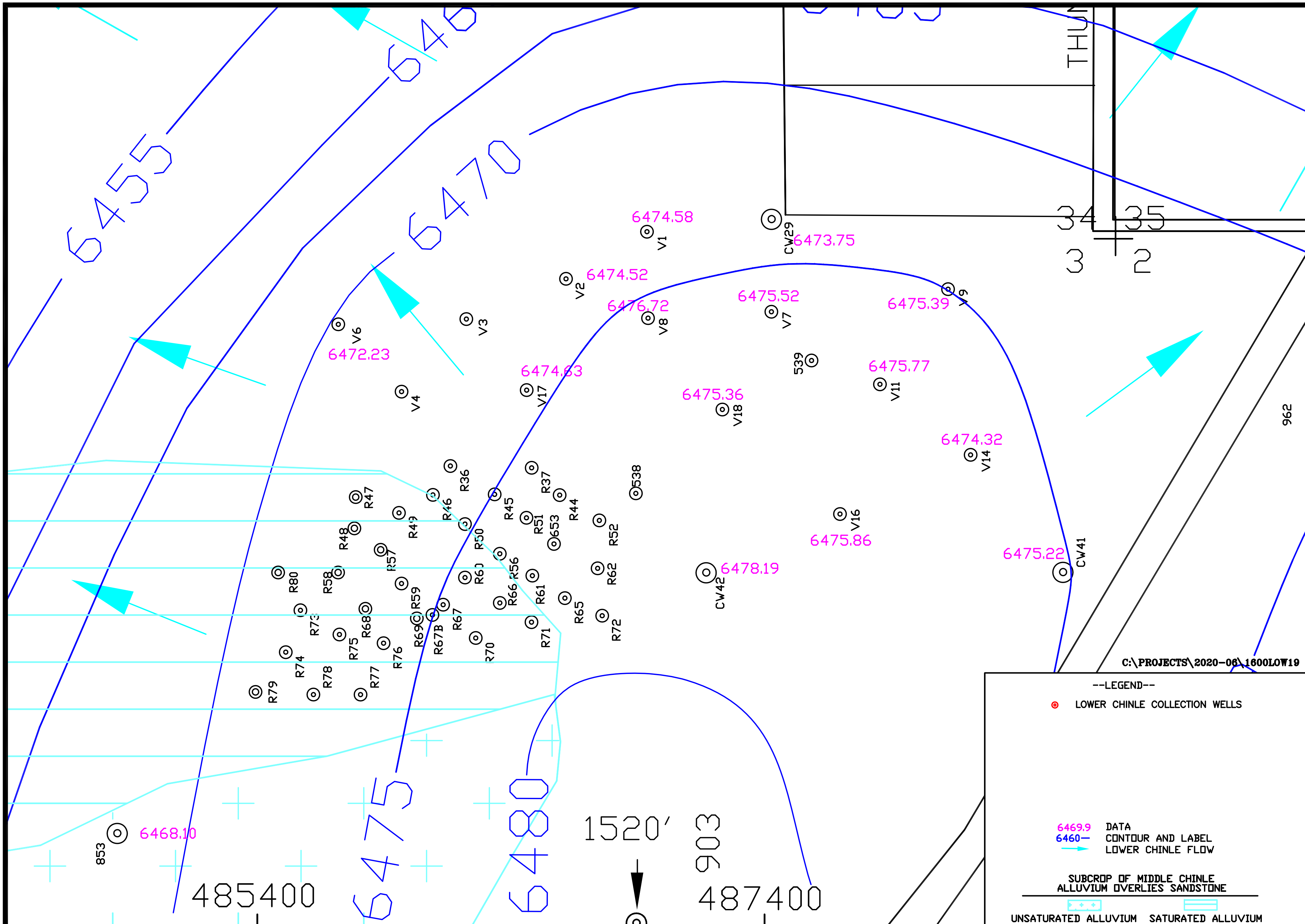

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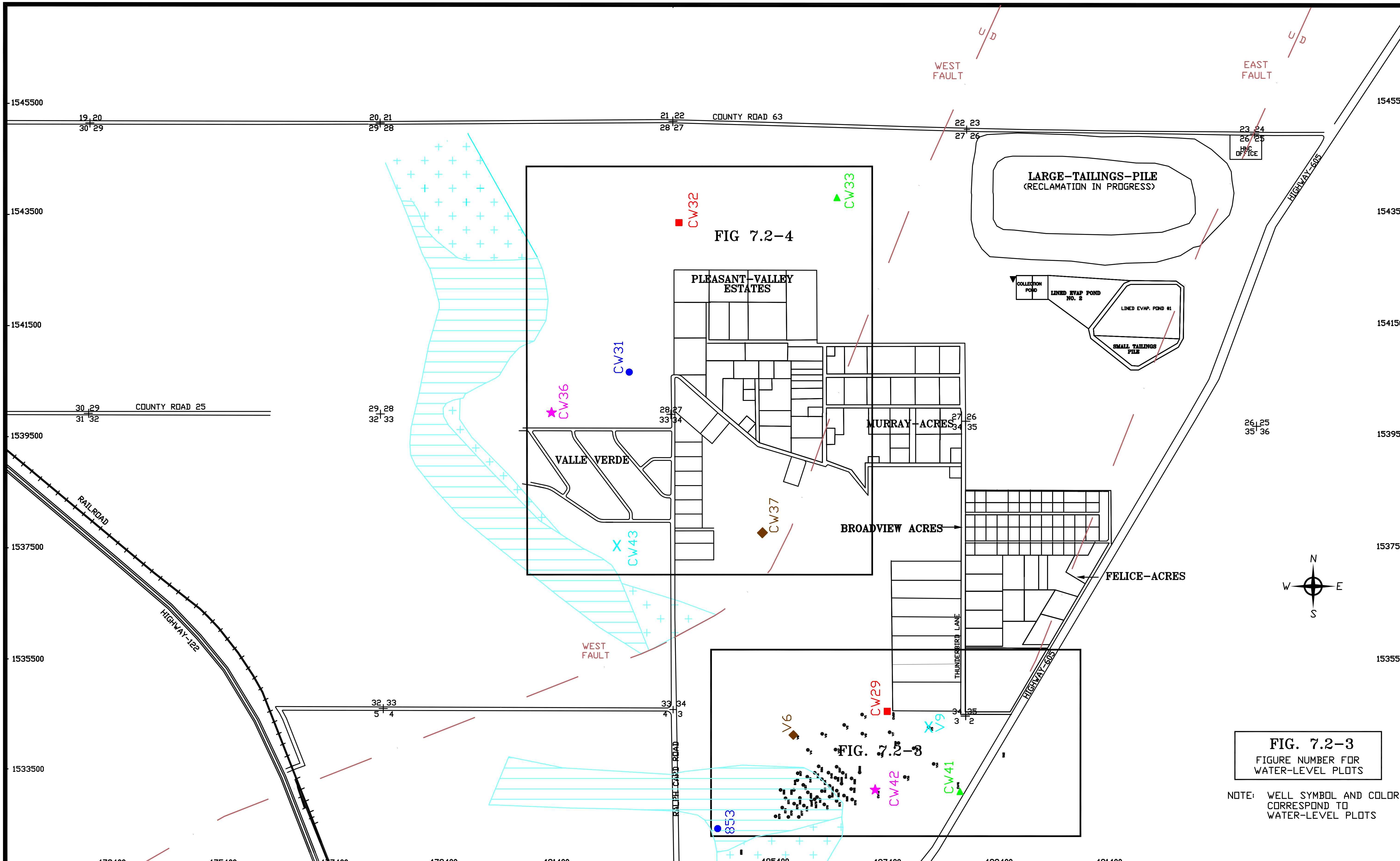
FIGURE 7.2-1A. WATER LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2019, FT-MSL

DATE: 12/30/2019

SCALE: 1"=500'



SCALE: 1" = 1600'

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DATE: 12/30/2019

FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2019

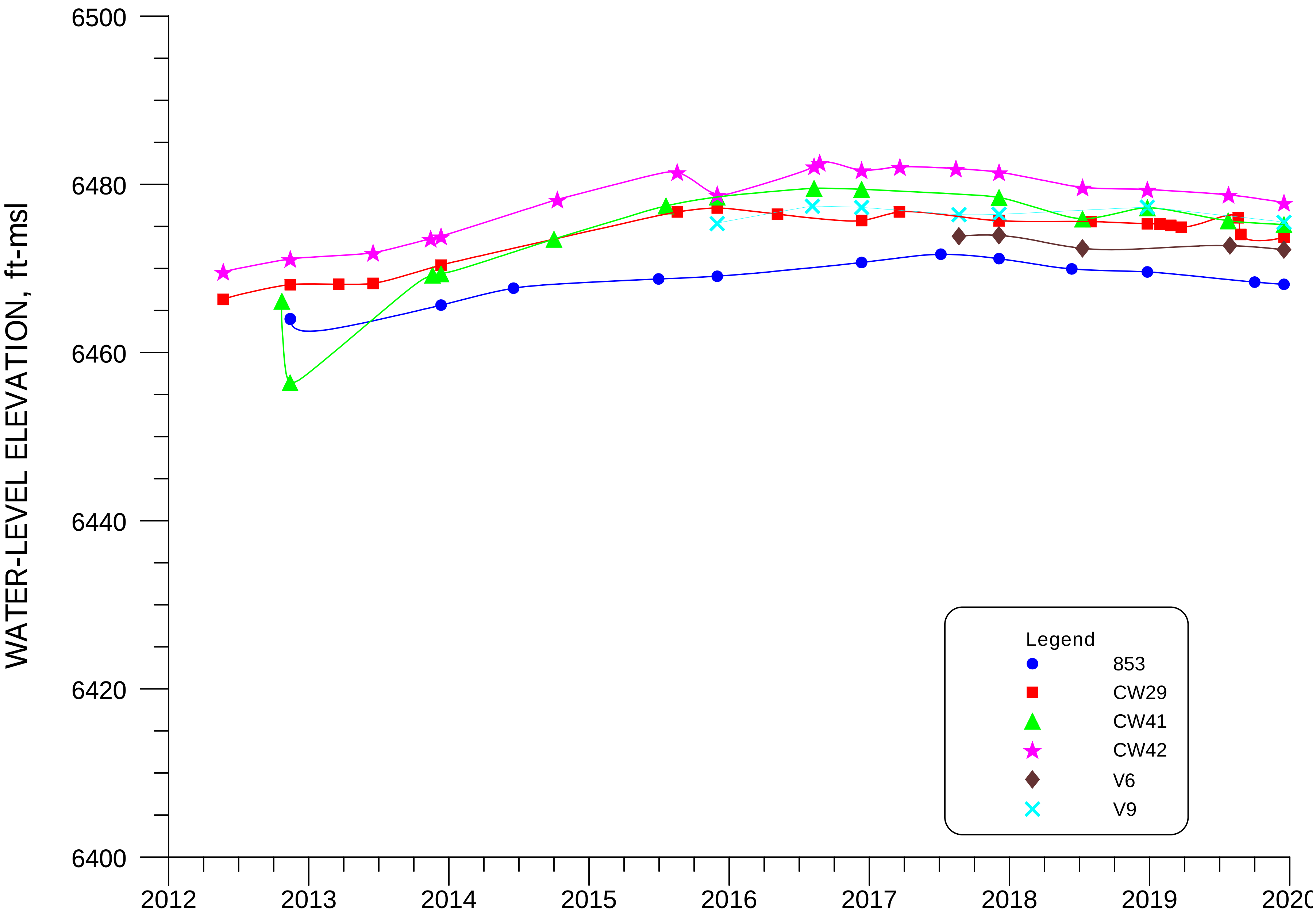


FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 853, CW29, CW41, CW42, V6 AND V9.

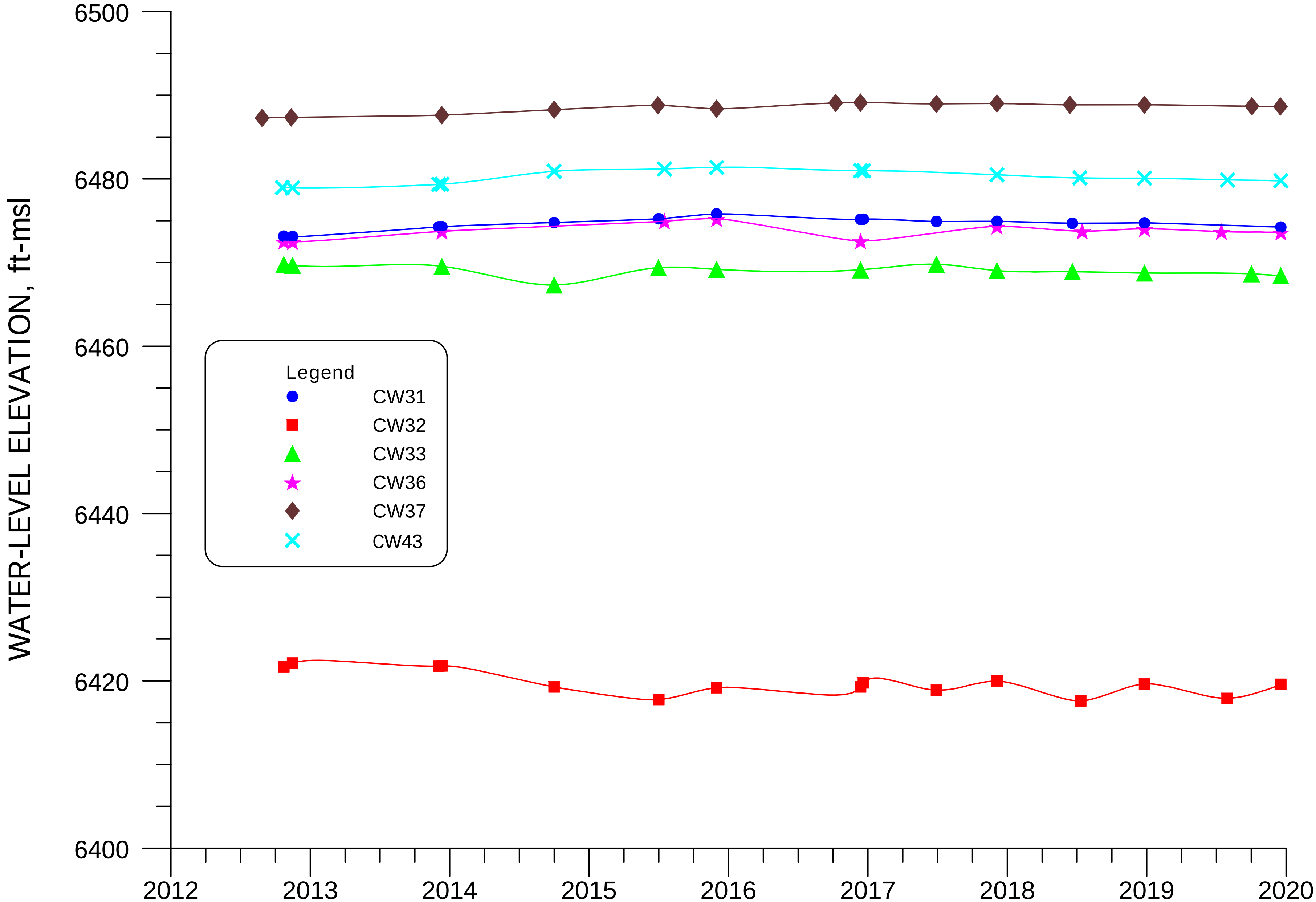


FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW36, CW37 AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2019 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 used, respectively) 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 2019 data for the Chinle mixing zone wells and the Lower Chinle non-mixing zone wells.

Constituent concentrations in the Lower Chinle aquifer exceed site standards only in Section 3, except for some natural exceedances in the far down-gradient wells. Sulfate concentrations in the Lower Chinle aquifer are below the NRC site standards except in far down-gradient wells where naturally occurring concentrations exceed the relevant non-mixing site standard 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 2019. 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. The pattern at well CW33 shows that its sulfate level is slightly greater than the non-mixing zone standard of 2000 mg/L. This natural exceedance is due to the limited non-mixing zone data set that was used to set the standard, and the natural groundwater quality deterioration with down-gradient movement in the shale. 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 538, CW36, CW37, CW42, CW43 and V6 are grouped together on the water-quality time plots, and data for non-mixing zone wells CW29, CW32, CW33 and CW41 are presented on a second plot. Figure 7.3-3 presents sulfate concentrations plotted versus time for the Lower Chinle mixing-zone wells and shows that all of these concentrations are below the mixing zone standard. Sulfate concentrations plotted for Lower Chinle wells CW29, 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. This plot shows that the 2019 concentration for well CW33 is slightly above the 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 2019. All concentrations for 2019 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, and show that the 2019 TDS in well CW33 is just below the site standard.

7.3.3 CHLORIDE – LOWER CHINLE

Chloride concentration data in the Lower Chinle aquifer were reviewed during 2003 to confirm that restoration for this constituent is not necessary in the Lower Chinle aquifer. The chloride concentrations measured during 2019 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. Therefore, chloride concentration maps or time plots are not presented for the Lower Chinle aquifer.

7.3.4 URANIUM – LOWER CHINLE

Uranium is an important constituent with respect to aquifer restoration in the Lower Chinle aquifer in the central portion of Section 3. Figures 7.3-8 and 7.3-8A present the uranium concentrations in the Lower Chinle aquifer for 2019. Uranium concentrations in the Lower Chinle exceeded the mixing-zone site standard concentration in the central portion of Section 3, while concentrations in two wells exceeded the non-mixing zone site standard. Uranium concentrations plotted versus time for Lower Chinle wells 538, CW36, CW37, CW42, CW43 and V6 are presented on Figure 7.3-9. A gradual decline in the uranium concentration in wells 538 and CW42 has been observed, and some restoration is needed at well V6. The uranium concentrations in the Lower Chinle non-mixing zone wells with data presented on Figure 7.3-10 have remained at low levels with the exception of higher values in well CW29.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2019 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 538, CW36, CW37, CW42, CW43 and V6. Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW29, CW32, CW33 and CW41. All of these selenium concentrations in these two plots are less than their corresponding standards.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2019 were generally very small with all values less than or equal to 0.011 mg/L and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2019 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

Monitoring of nitrate concentration in the Lower Chinle aquifer in 2019 confirms that concentrations remain significantly below the site standard of 15 mg/L for the mixing zone except for the nitrate concentration of 16.9 mg/L from well 536R. This well has historically contained higher nitrate concentration than other Lower Chinle wells in this area and its elevated nitrate concentrations are thought to be from a septic system. 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 that are similar to those measured in 2019. Nitrate concentration in the tailings seepage and the majority of the alluvial aquifer is low and therefore there is very little potential for elevated nitrate concentration in the Lower Chinle aquifer resulting from seepage impacts.

7.3.8 RADIUM-226 AND RADIUM-228 – LOWER CHINLE

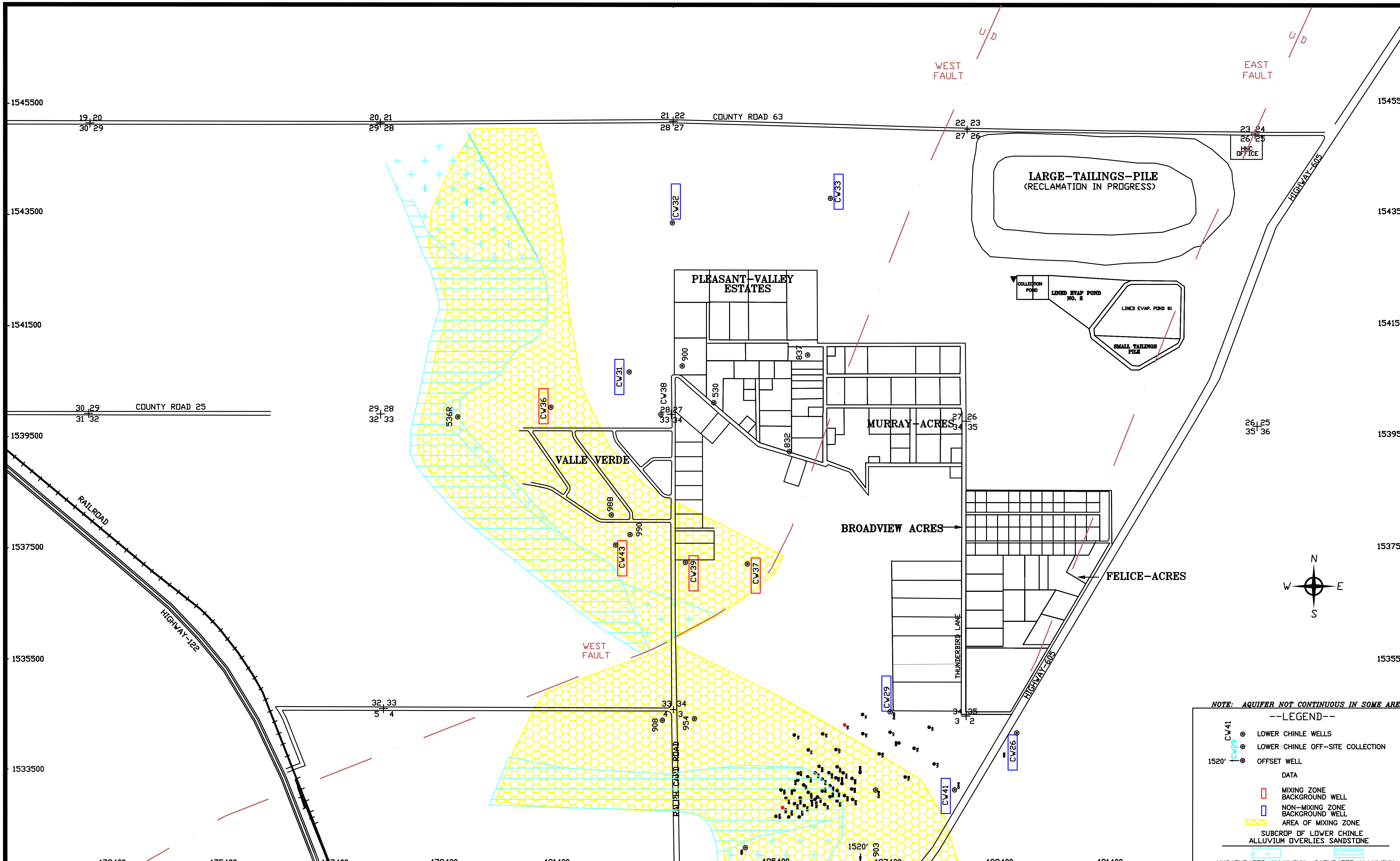
All radium concentrations for 2019 were low in the Lower Chinle aquifer. Radium-226 and radium-228 are not important parameters relative to the Lower Chinle aquifer; therefore, a site standard for the Lower Chinle has not been set. These low levels of radium do not warrant the development of a figure presenting areal distribution of radium. Radium-228 analysis is typically more erratic than other constituents but the available data shows that radium-226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the HMC 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. All 2019 vanadium concentrations in the Lower Chinle aquifer were 0.01 mg/L or less.

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. All 2019 thorium-230 levels were less than 0.1 pCi/L.



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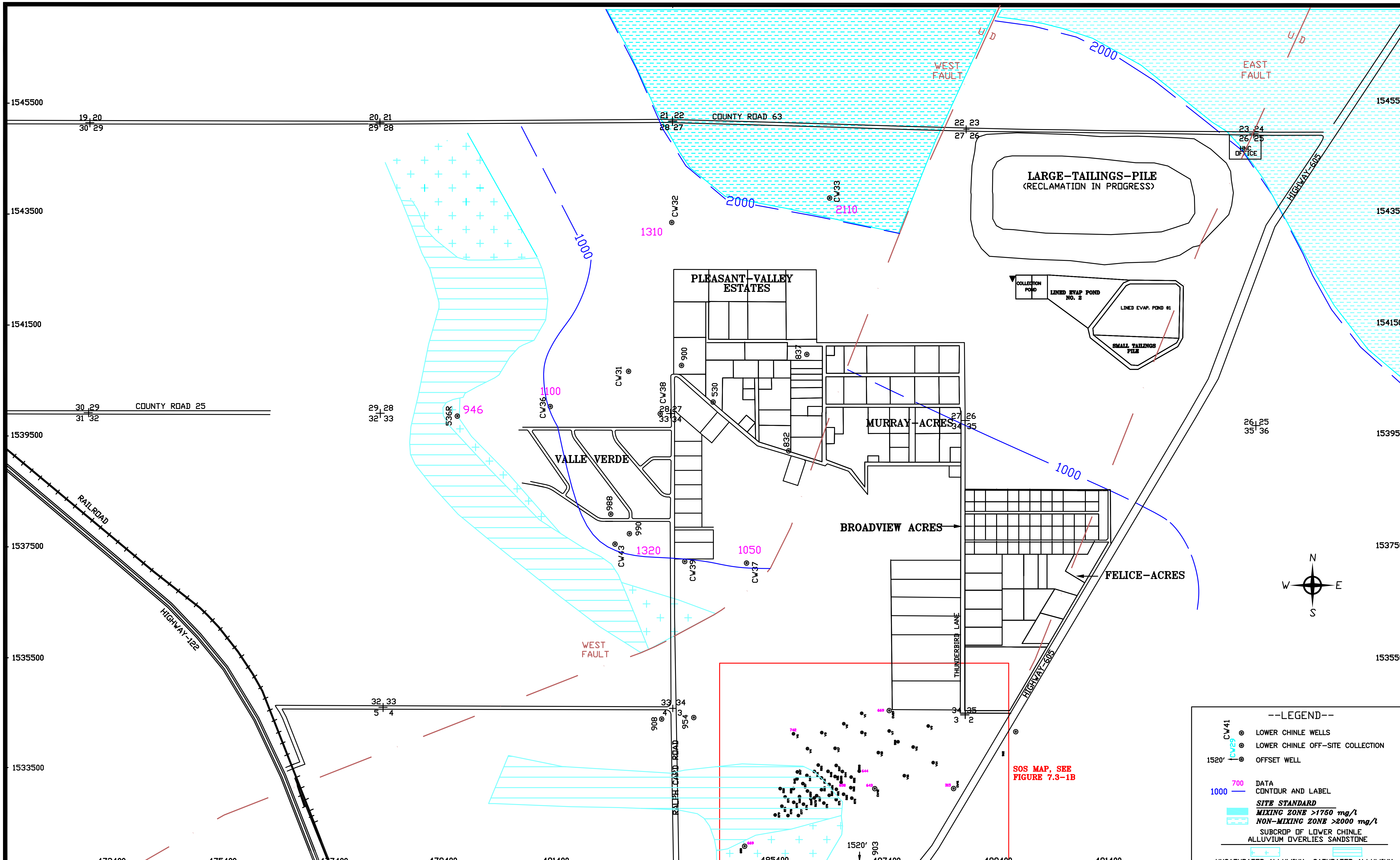
DATE: 11/15/2019

FIGURE 7.3-1. LOCATION OF LOWER CHINLE WELLS USED FOR SITE STANDARDS AND LOWER CHINLE MIXING ZONE



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DATE: 11/15/2019

FIGURE 7.3–1A. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2019, mg/L

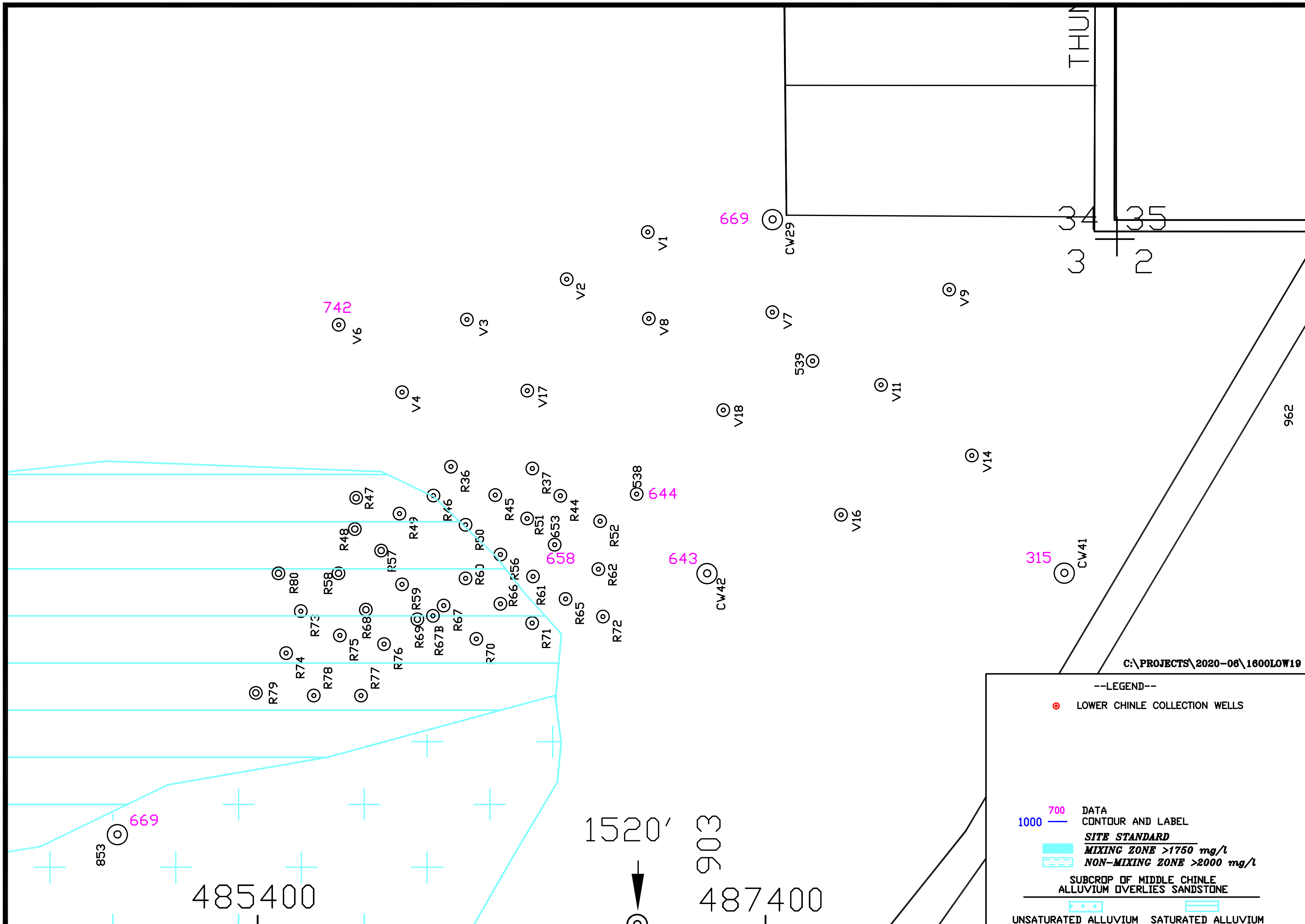

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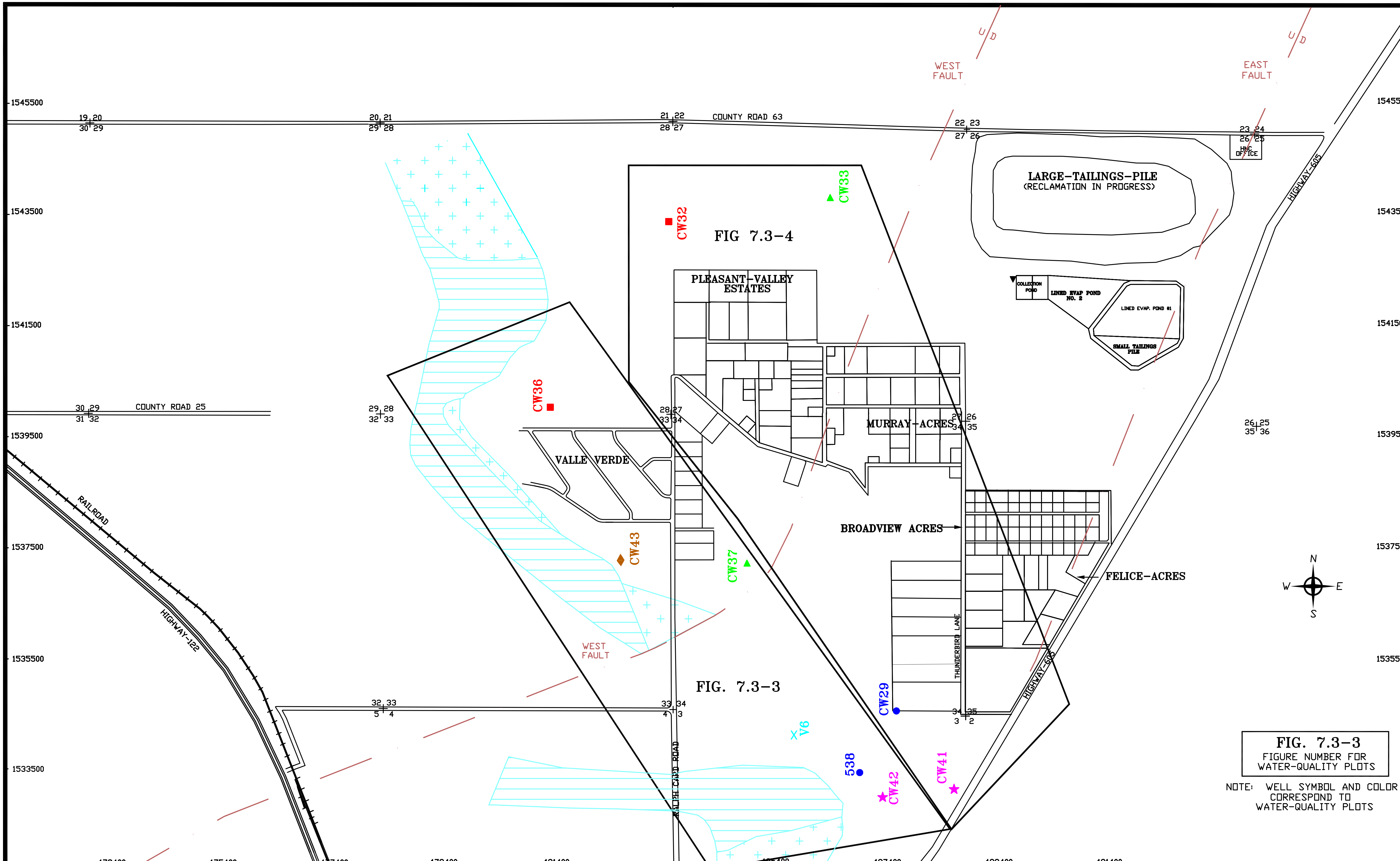
FIGURE 7.3-1B. SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2019, mg/L

DATE: 11/8/2019

SCALE: 1"=500'



SCALE: 1" = 1600'

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DATE: 11/15/2019

FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2019

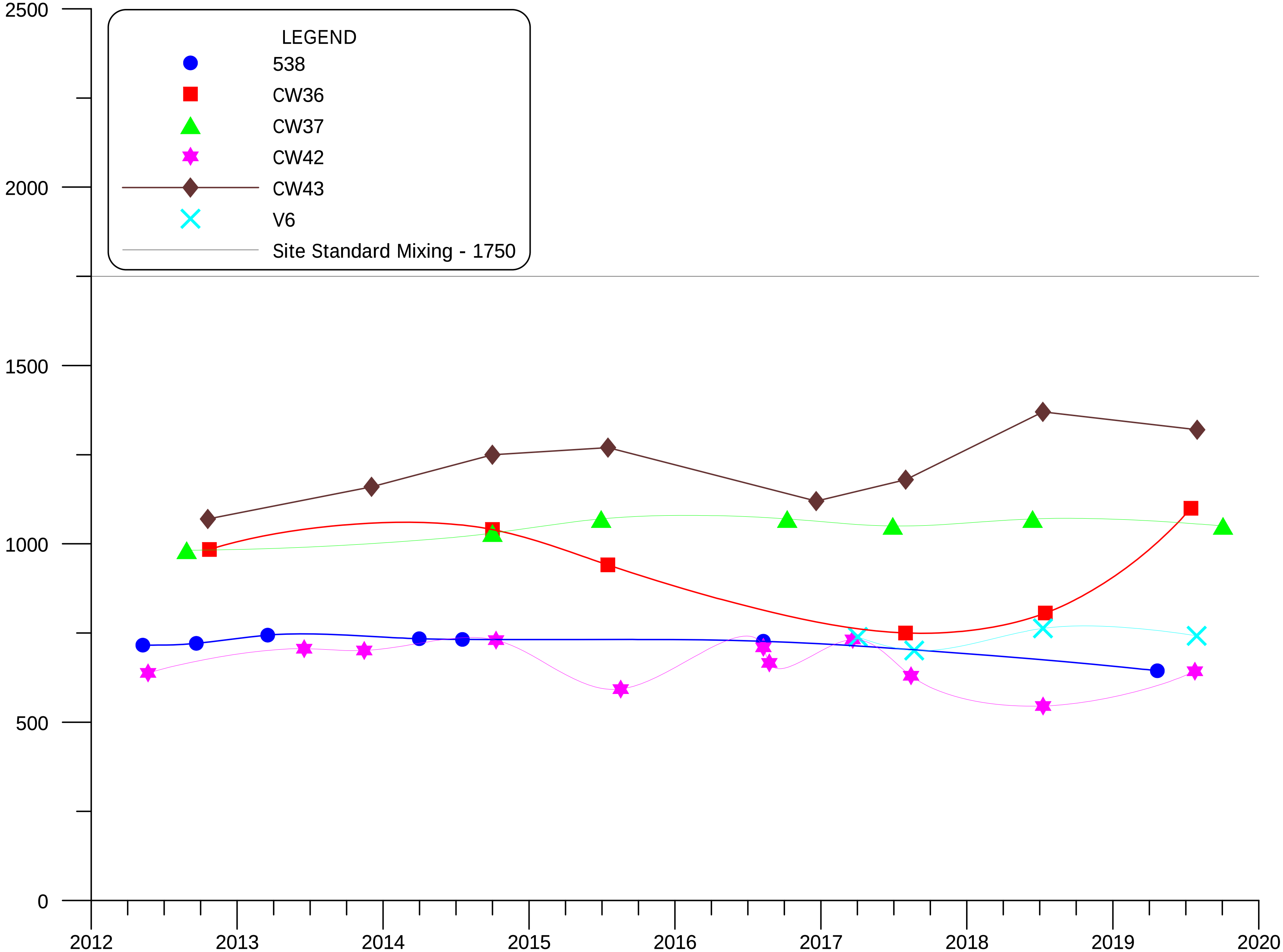


FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 538, CW36, CW37, CW42, CW43 AND V6

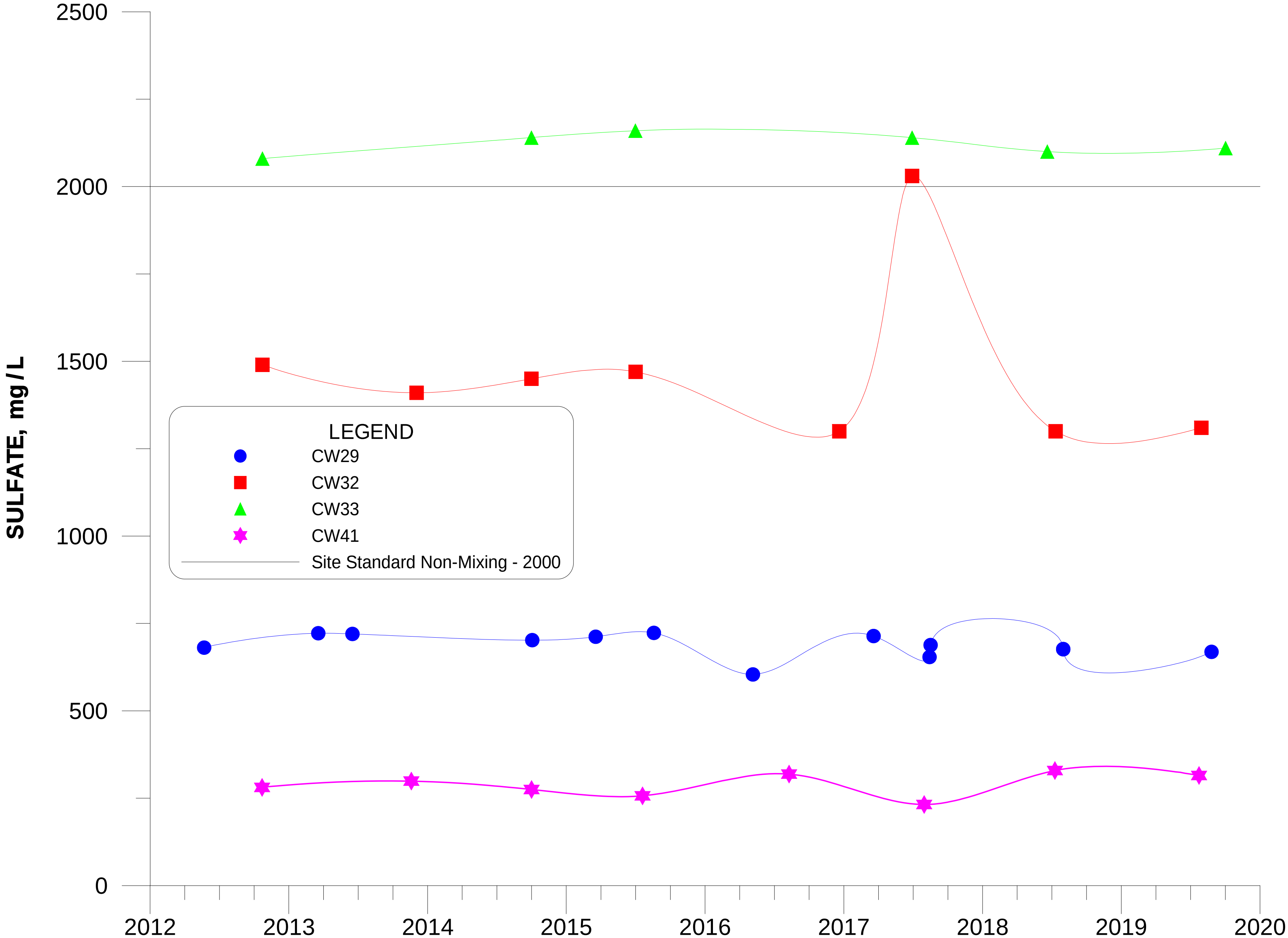
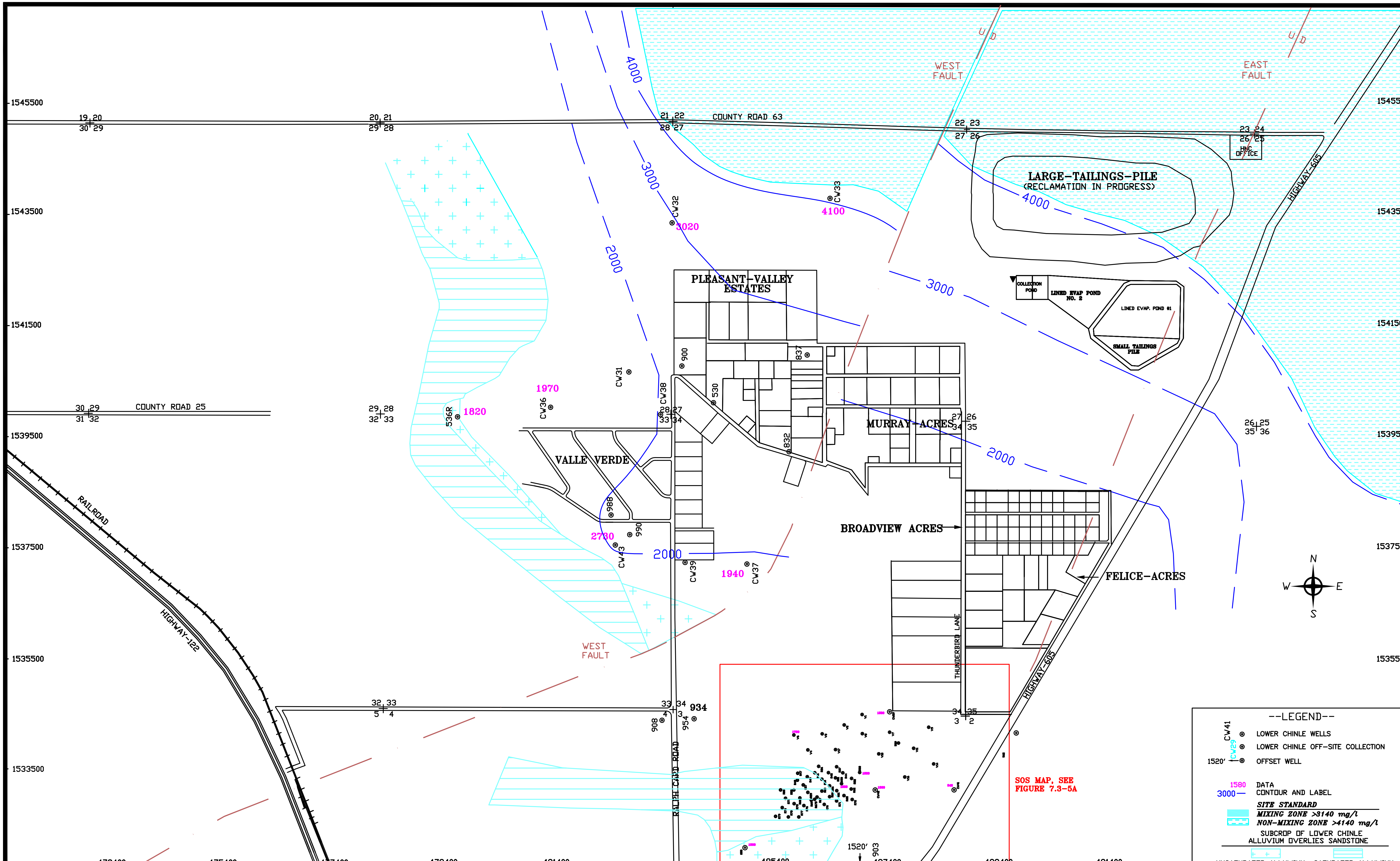


FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33 AND CW41.



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DATE: 11/15/2019

FIGURE 7.3-5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2019, mg/L

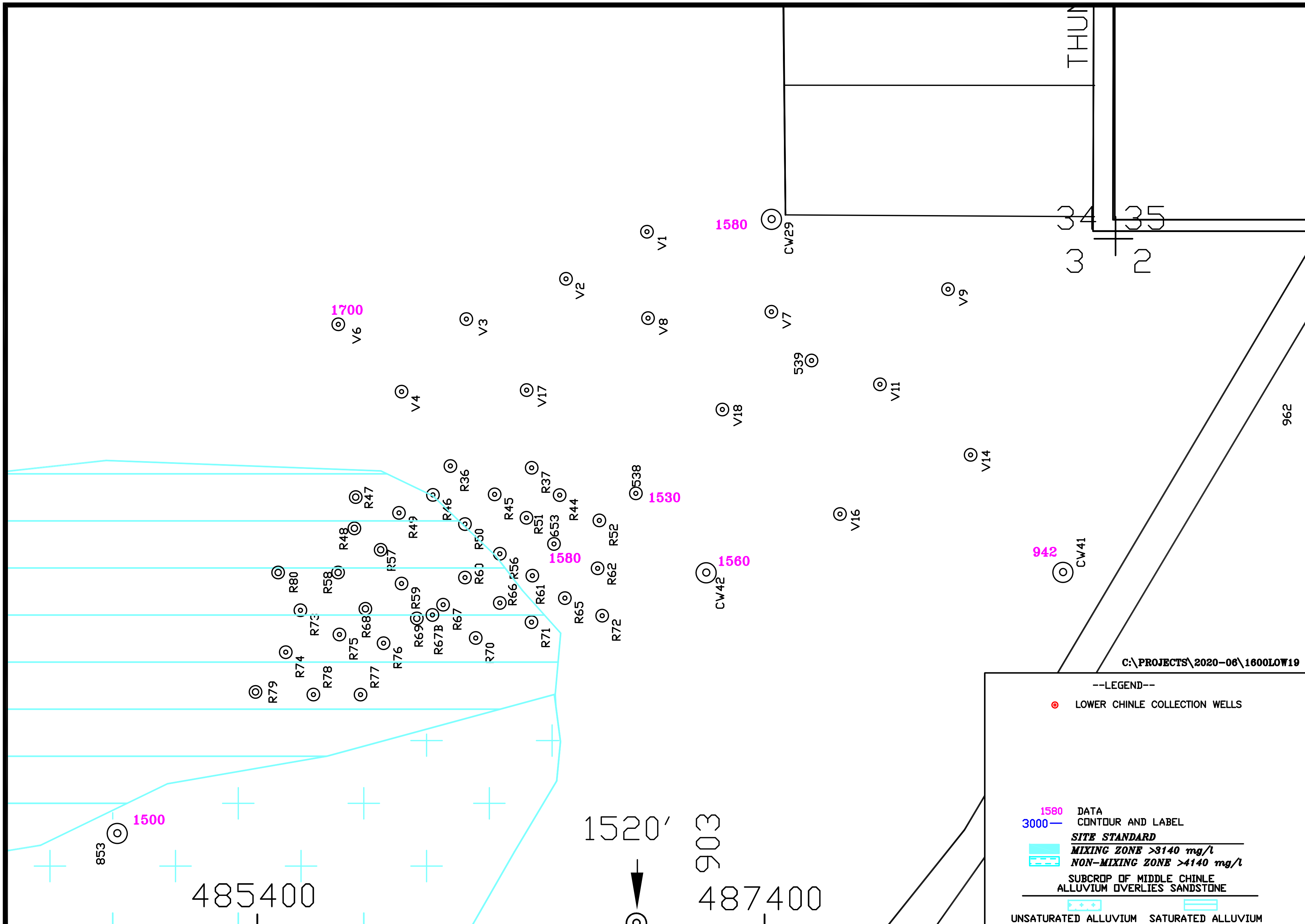

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FIGURE 7.3-5A. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2019, mg/L

DATE: 11/8/2019

SCALE: 1"=500'

PAGE: 7.3-13

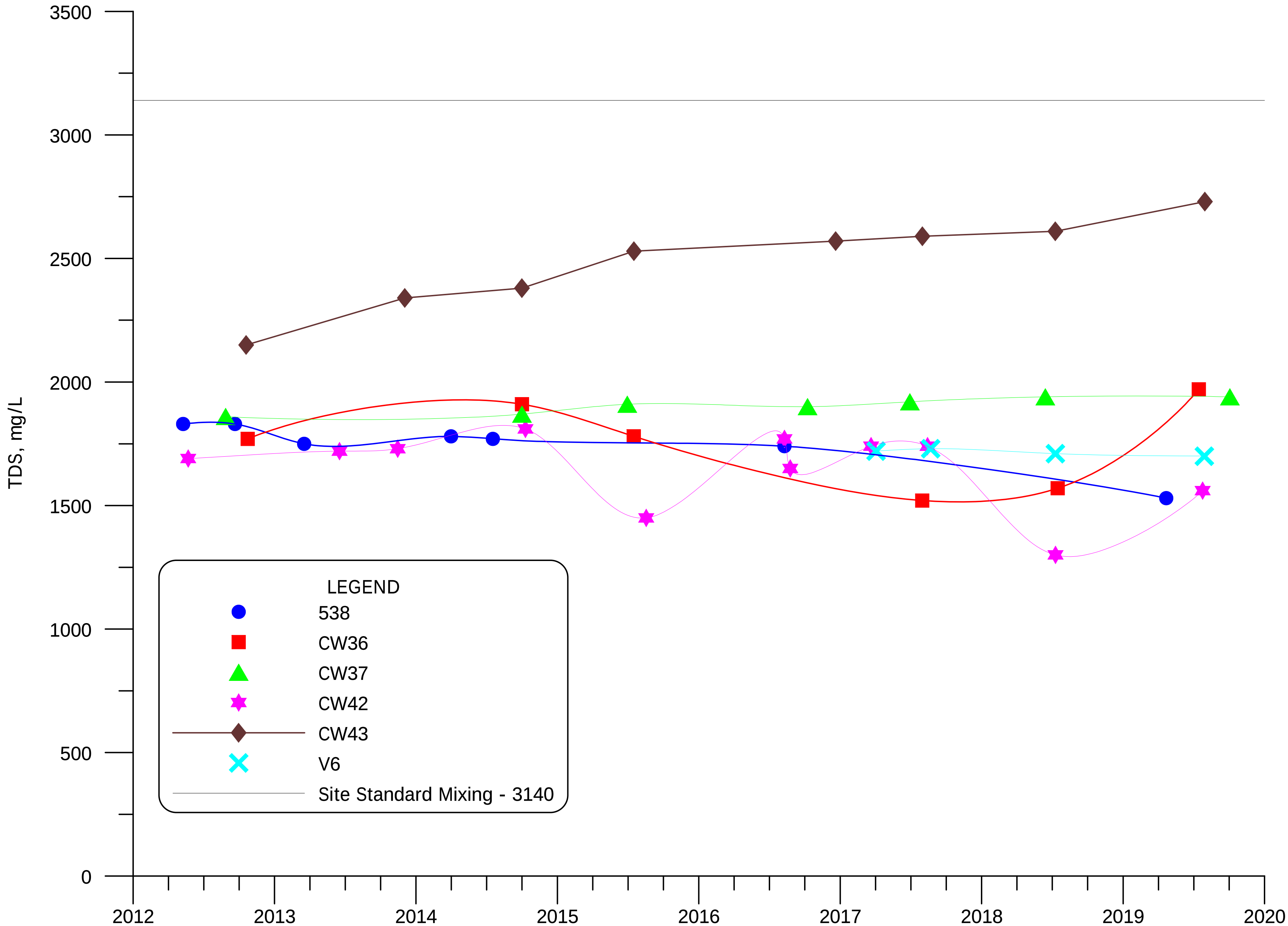


FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 538, CW36, CW37, CW42, CW43 AND V6

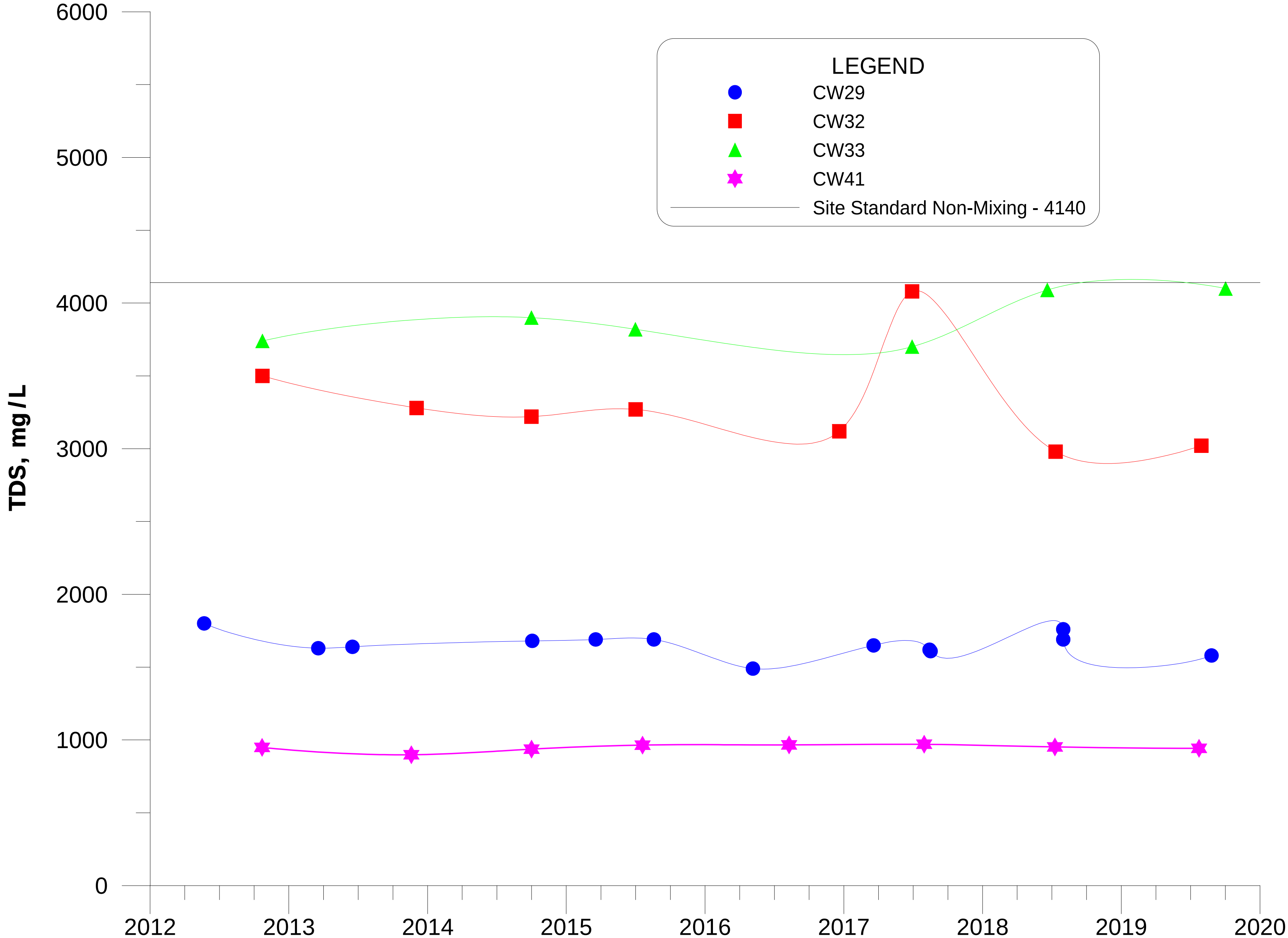
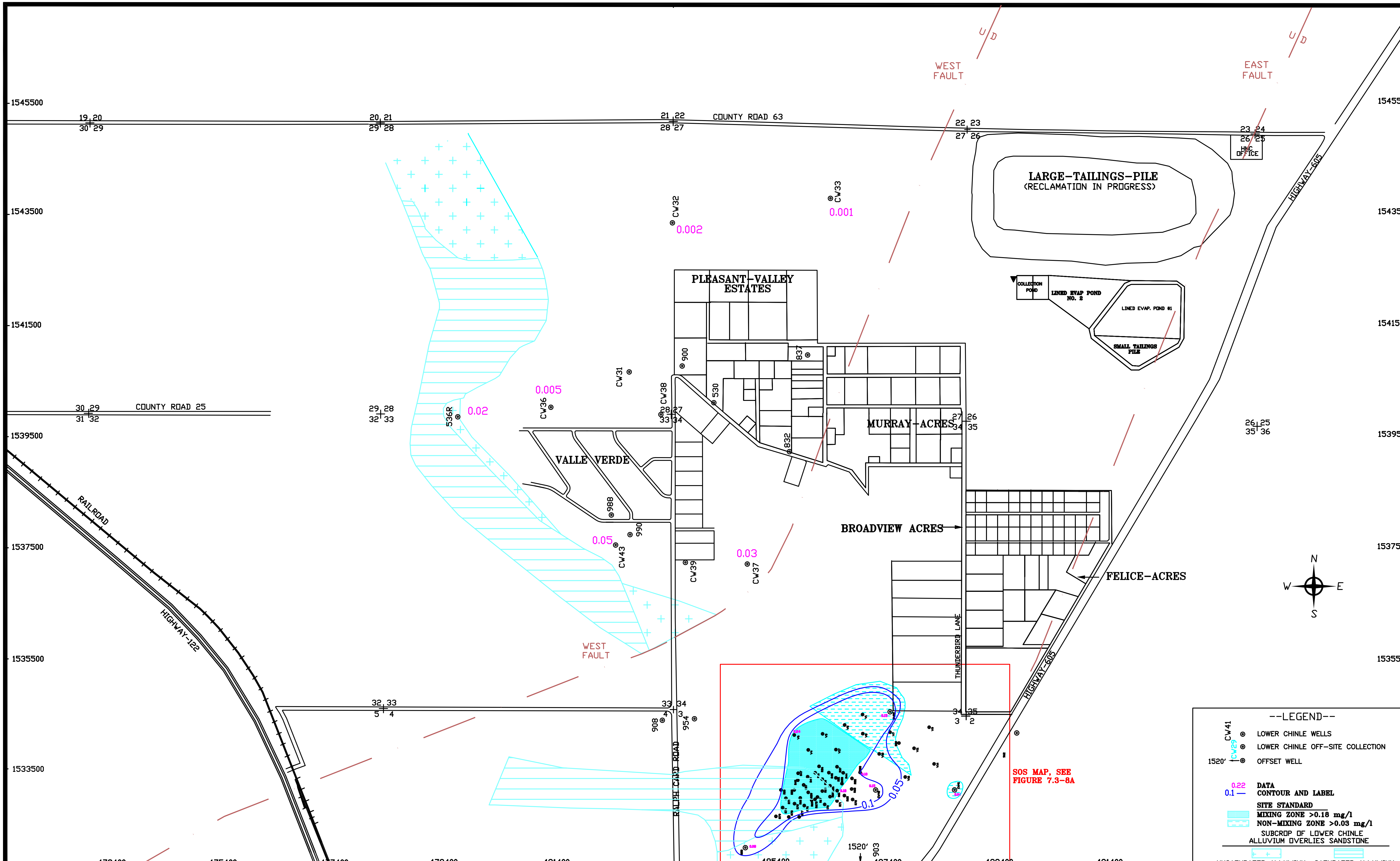


FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33 AND CW41.



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DATE: 11/15/2019

FIGURE 7.3-8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2019, mg/L

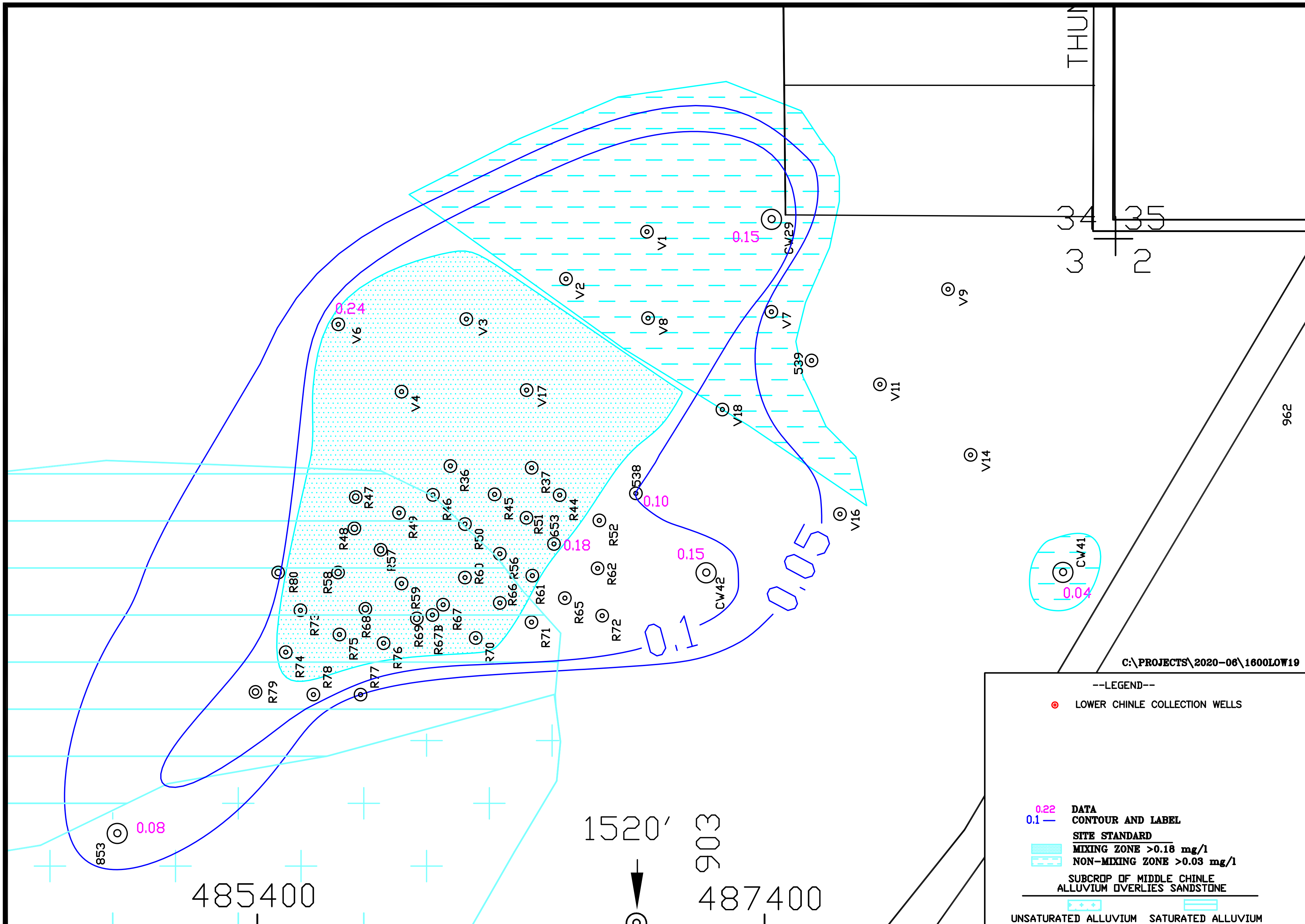

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FIGURE 7.3-8A. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2019, mg/L

DATE: 12/30/2019

SCALE: 1"=500'

PAGE: 7.3-17

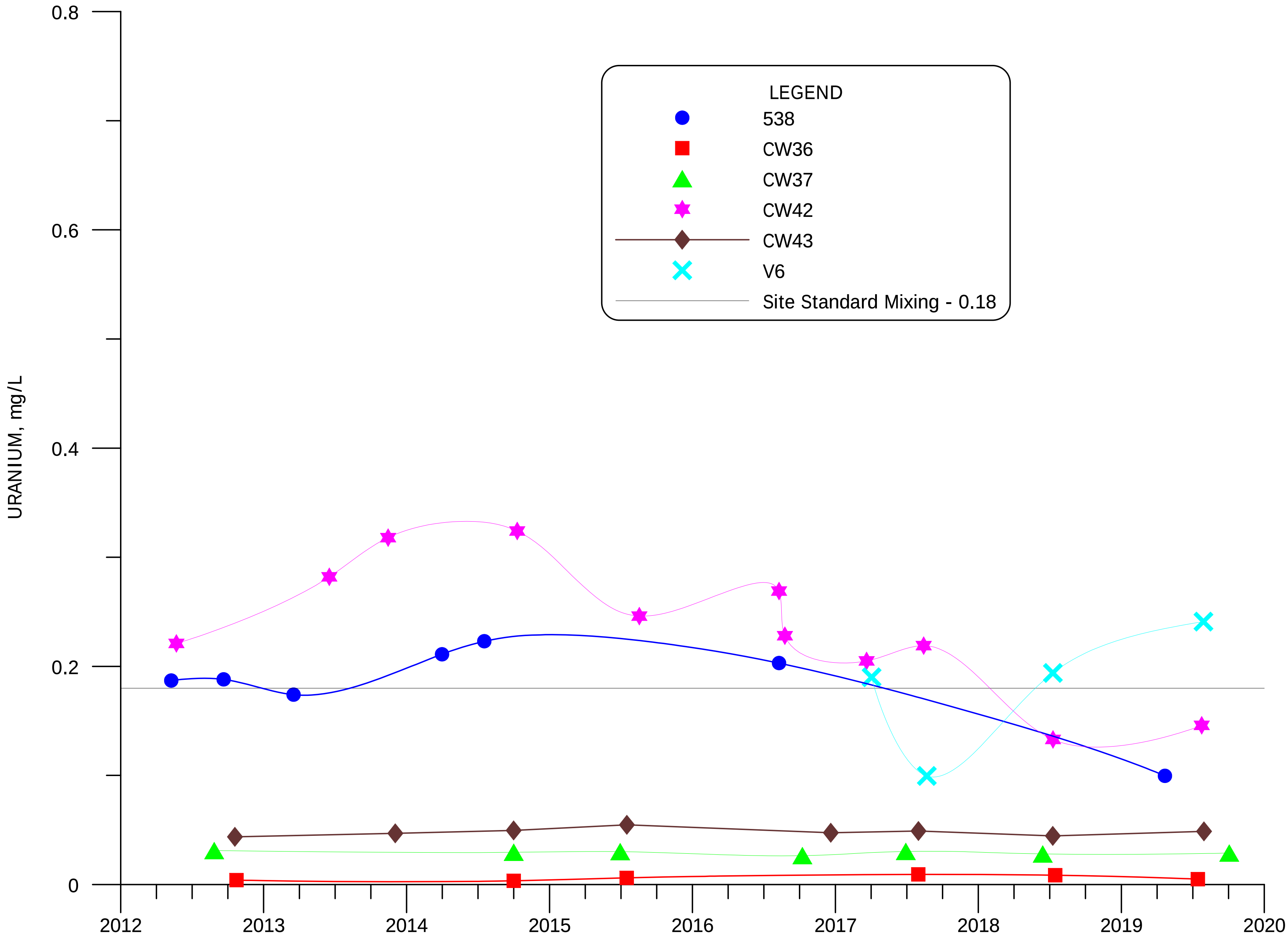

FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 538, CW36, CW37, CW42, CW43 AND V6

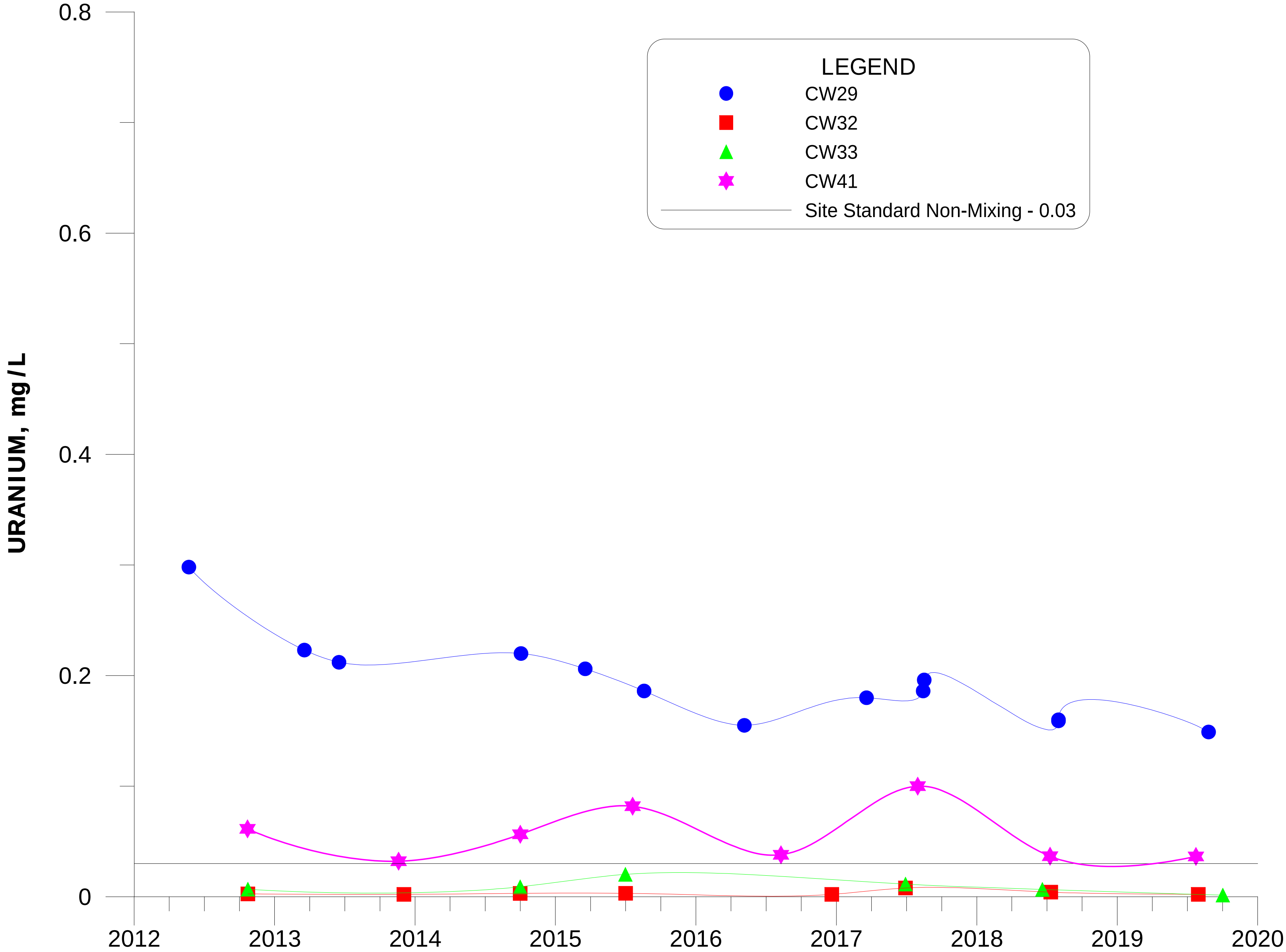

FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33 AND CW41.

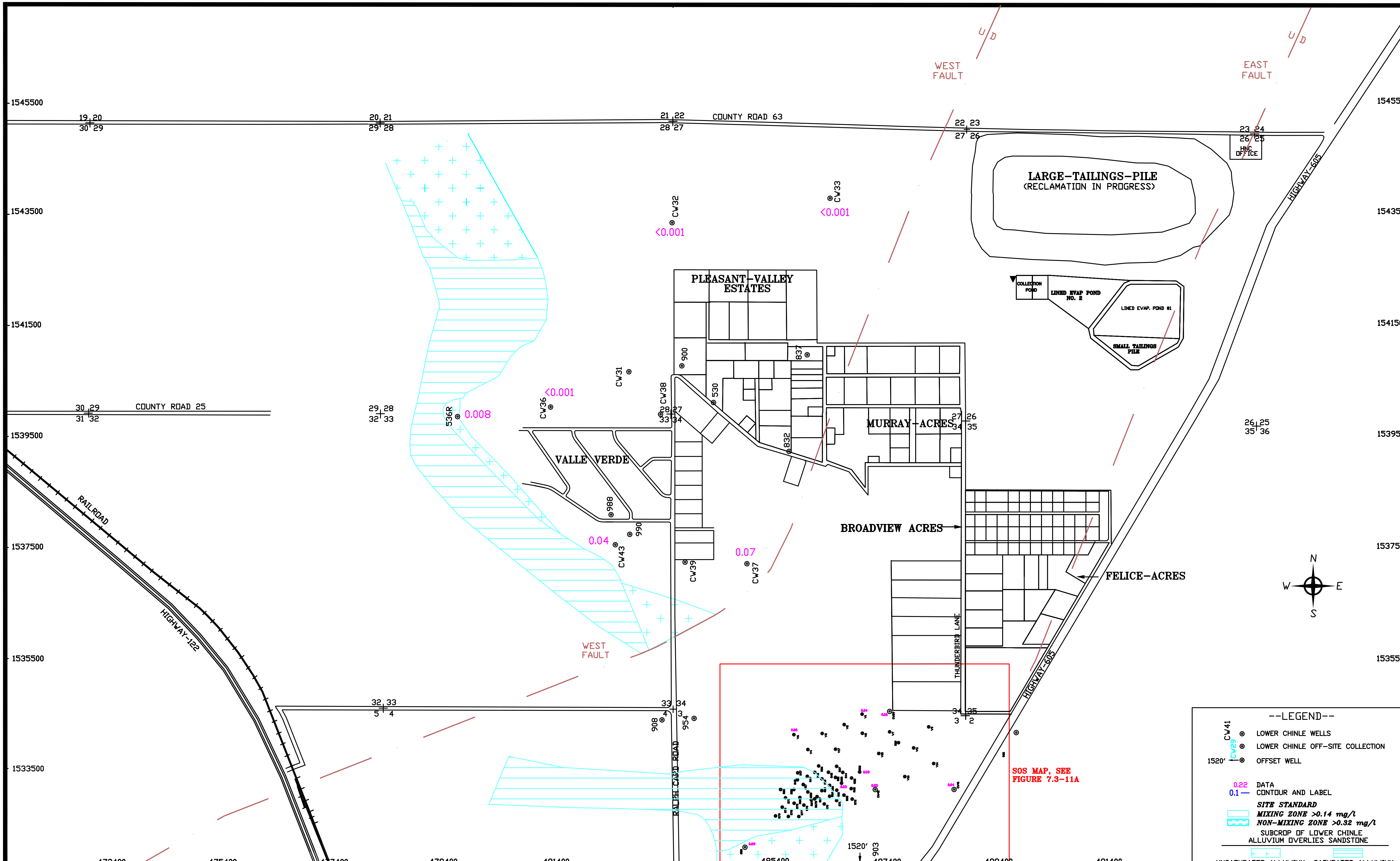

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FIGURE 7.3-11. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2019, mg/L

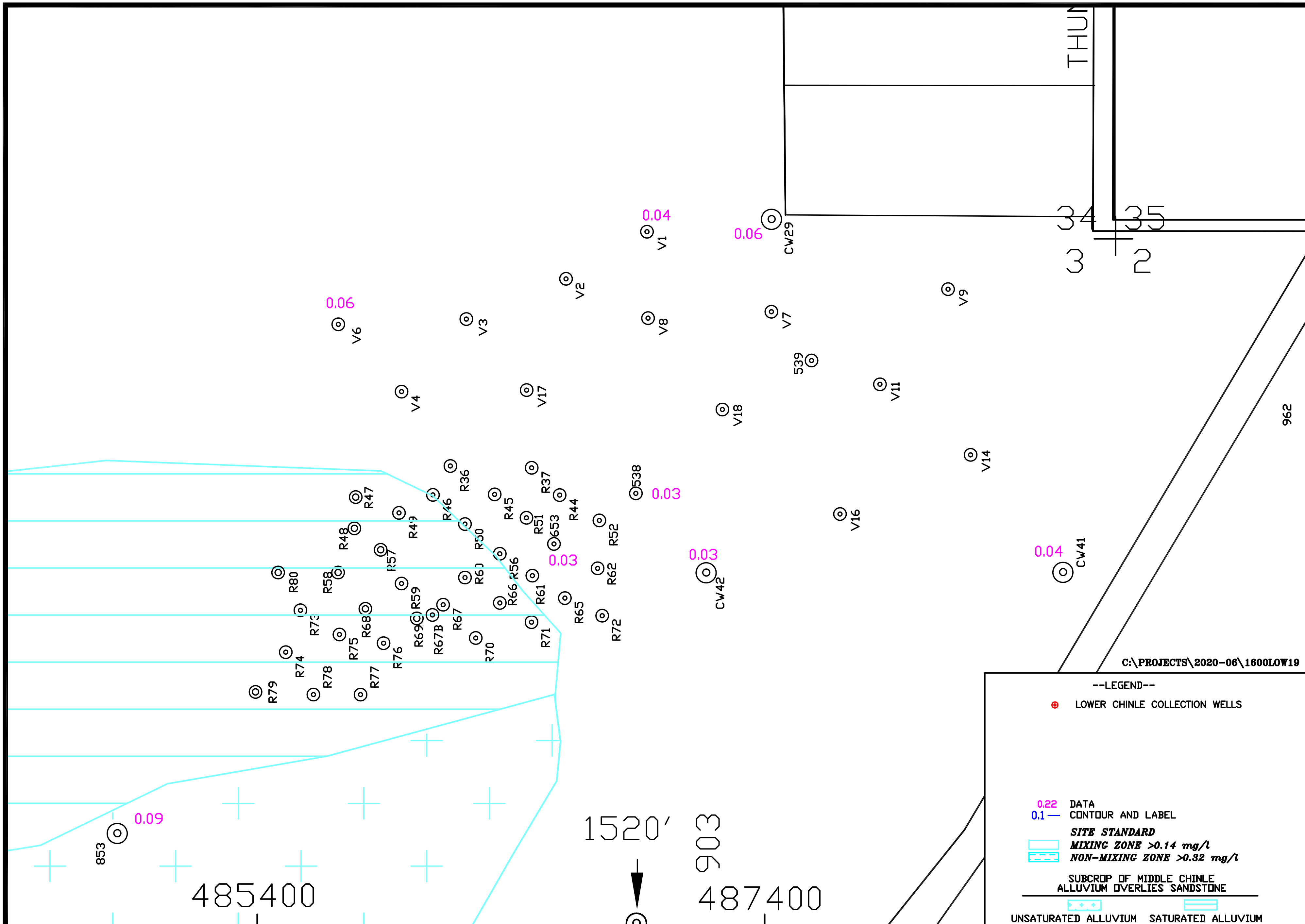

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FIGURE 7.3-11A. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, SOS, 2019, mg/L

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SCALE: 1"=500'

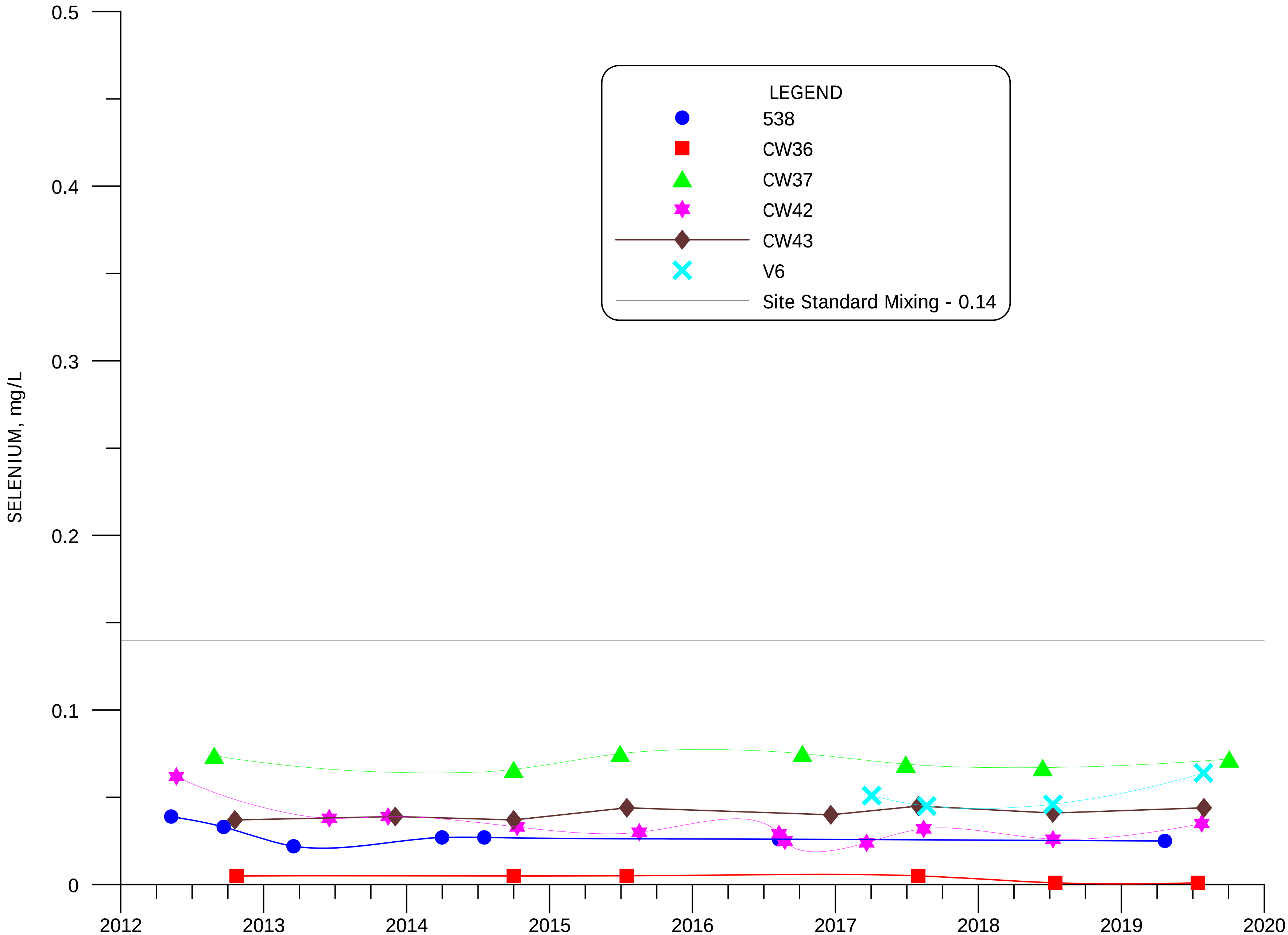

FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 538, CW36, CW37, CW42, CW43 AND V6

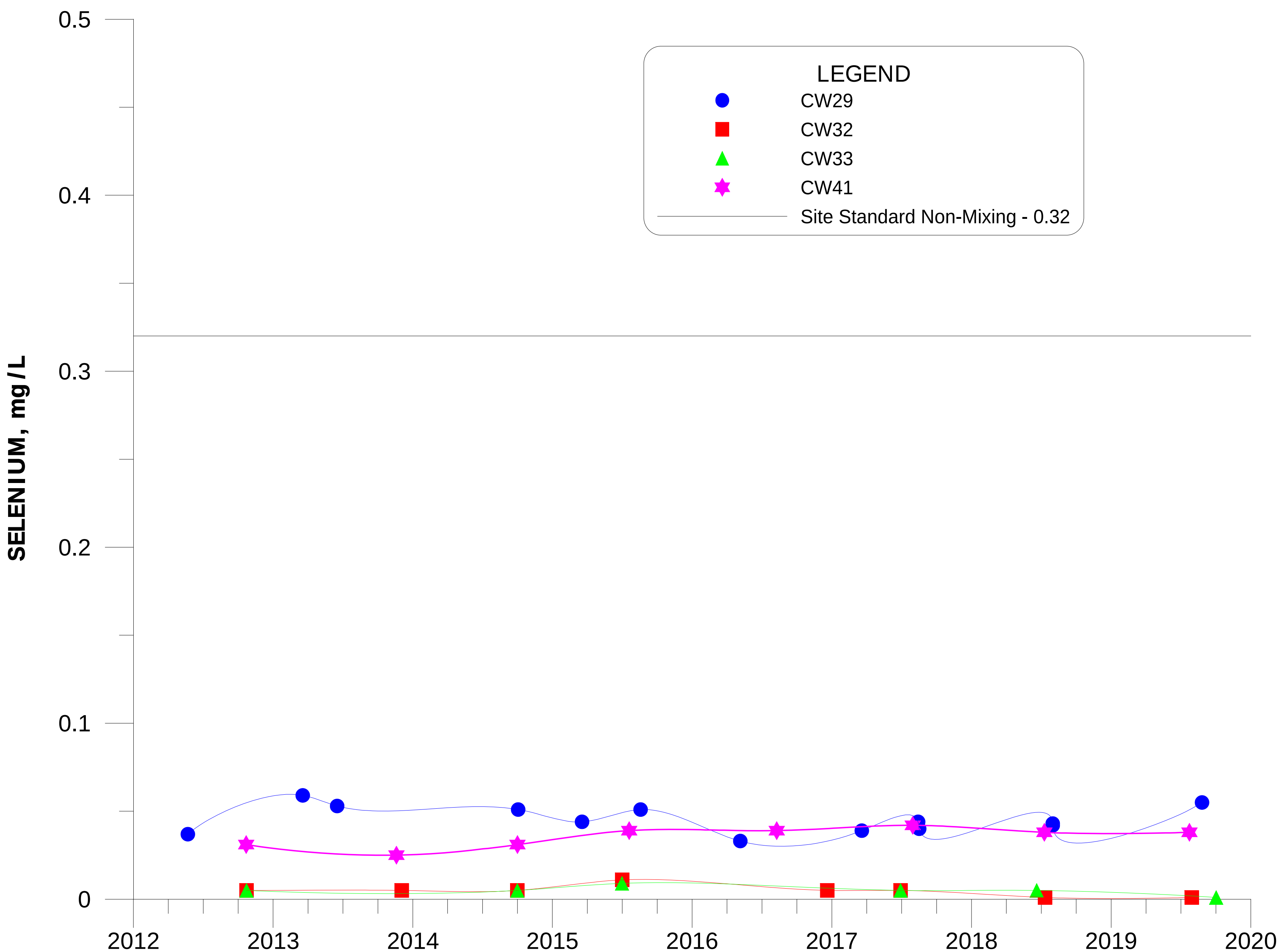

FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33 AND CW41.

TABLE 7.3-1. LOWER CHINLE SITE STANDARDS AND 2019 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	<0.001	0.01	0.04	563	278	30	-	-
CW50	<0.001	0.02	<0.001	1680	889	59	<0.1	0.02
CW52	-	-	-	-	-	-	-	-
CW15	0.05	0.04	0.002	2310	1250	91	8.6	<0.01
CW24	-	-	-	-	-	-	-	-
CW35	0.05	0.17	<0.001	2390	1150	60	3.1	0.02
CW36	<0.001	0.005	0.005	1970	1100	71	-	-
CW37	0.07	0.03	<0.001	1940	1050	80	-	-
CW39	-	-	-	-	-	-	-	-
CW43	0.05	0.044	<0.001	2730	1320	222	7.6	<0.01
LOWER CHINLE NON-MIXING ZONE WELLS								
CW26	-	-	-	-	-	-	-	-
CW29	0.05	0.15	0.002	1580	669	149	3.0	<0.01
CW31	-	-	-	-	-	-	-	-
CW32	<0.001	0.002	0.001	3020	1310	403	<0.1	<0.01
CW33	<0.001	0.001	0.01	4100	2110	446	-	-
CW41	0.04	0.04	0.002	942	315	90	3.2	0.01

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

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FIGURES (CONTINUED)

TABLES

8.0 SAN ANDRES AQUIFER MONITORING

8.1 SAN ANDRES WELL COMPLETIONS AND WATER LEVELS

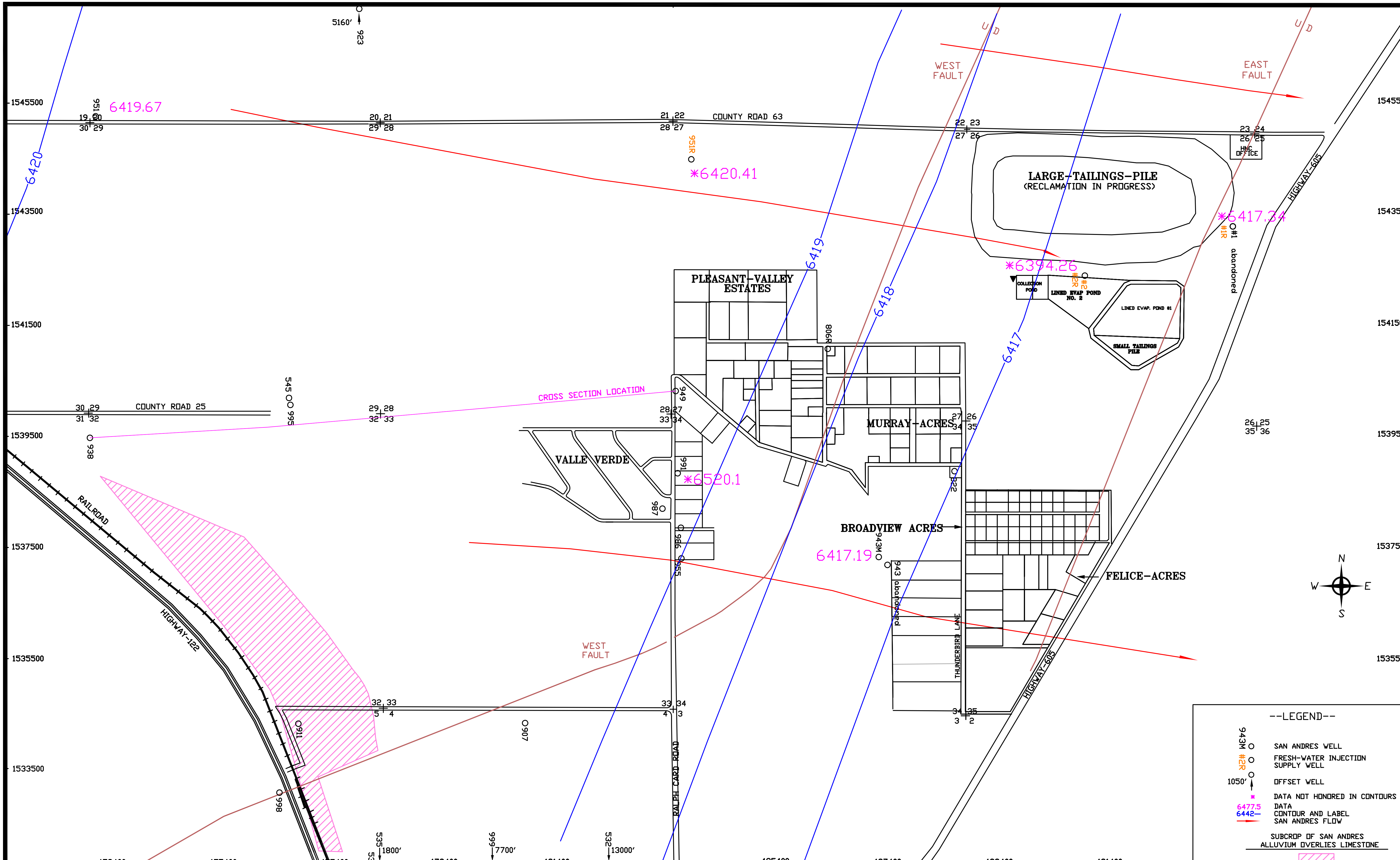
The San Andres aquifer is the most important regional aquifer in the Grants Project area and is typically referred to as the San Andres-Glorieta (SAG) aquifer due to the connection between the San Andres limestone and Glorieta sandstone. This report refers to only the San Andres aquifer because the monitoring and pumping for the GRP is only from the San Andres limestone. 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 monitoring of San Andres supply well 943 has shown an exception due to the leakage in this well from a shallower aquifer that had slightly impacted the San Andres aquifer near this well prior to its abandonment in July of 2018. The San Andres aquifer has been used as the source for fresh-water injection into the alluvium and Chinle aquifers at the GRP, and as a result, a monitoring program was established for the San Andres aquifer. Additional monitoring has been added to address the former 943 leakage.

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 through 2019 and drilling replacement well #1R Deep was started in late 2017 and completed in early 2018. The use of well #1R Deep is expected to start in 2020. 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 and a small amount in late 2019. 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 2019 (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 displacement at the faults would cause the water in the upper portion of the San Andres aquifer to mix with some of the deeper aquifer water prior to continuing to flow to the east. 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.



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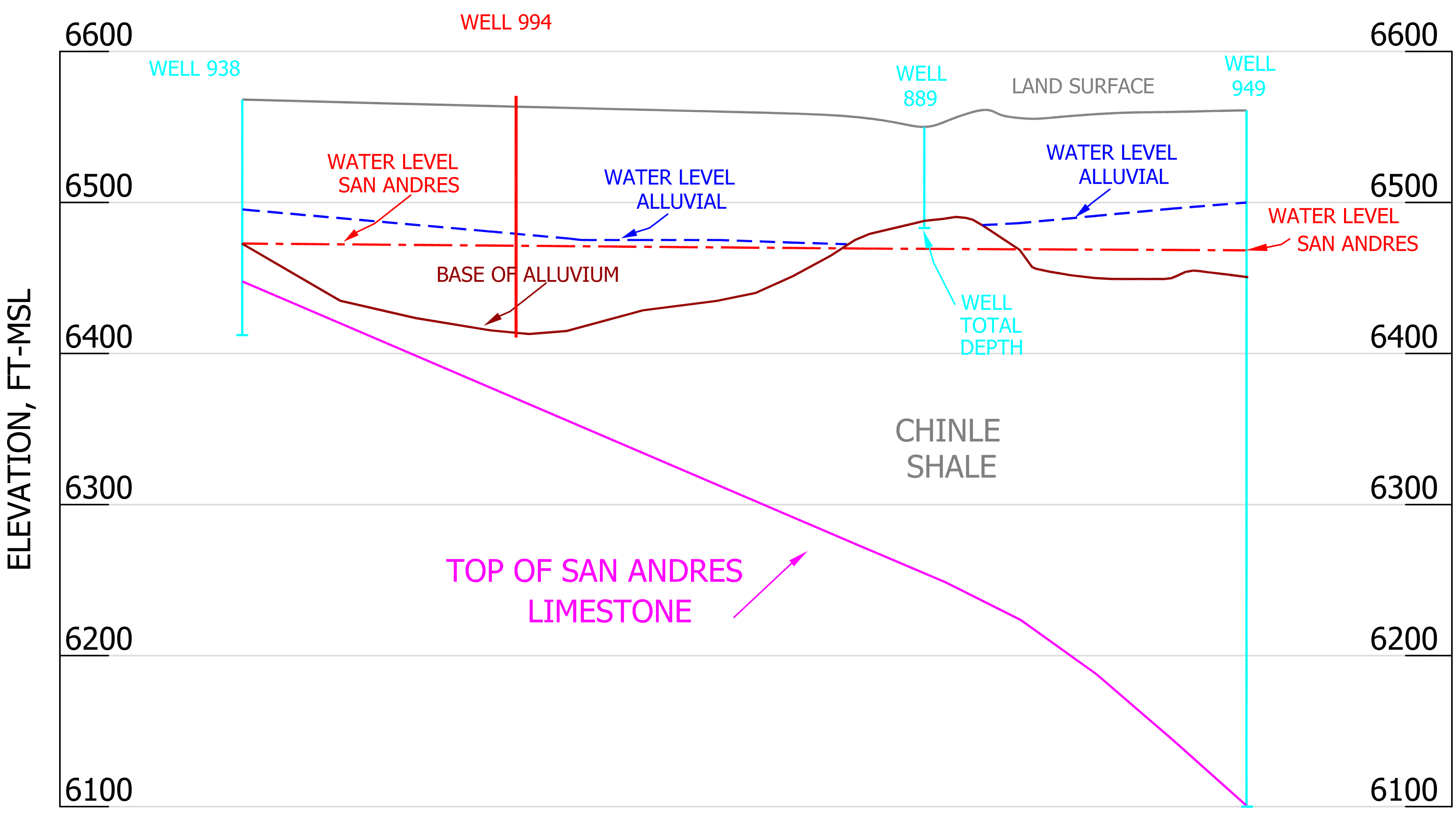
DATE: 12/23/19

FIGURE 8.1-1. LOCATION OF SAN ANDRES WELLS AND WATER-LEVEL ELEVATION FOR SAN ANDRES AQUIFER, 2019, 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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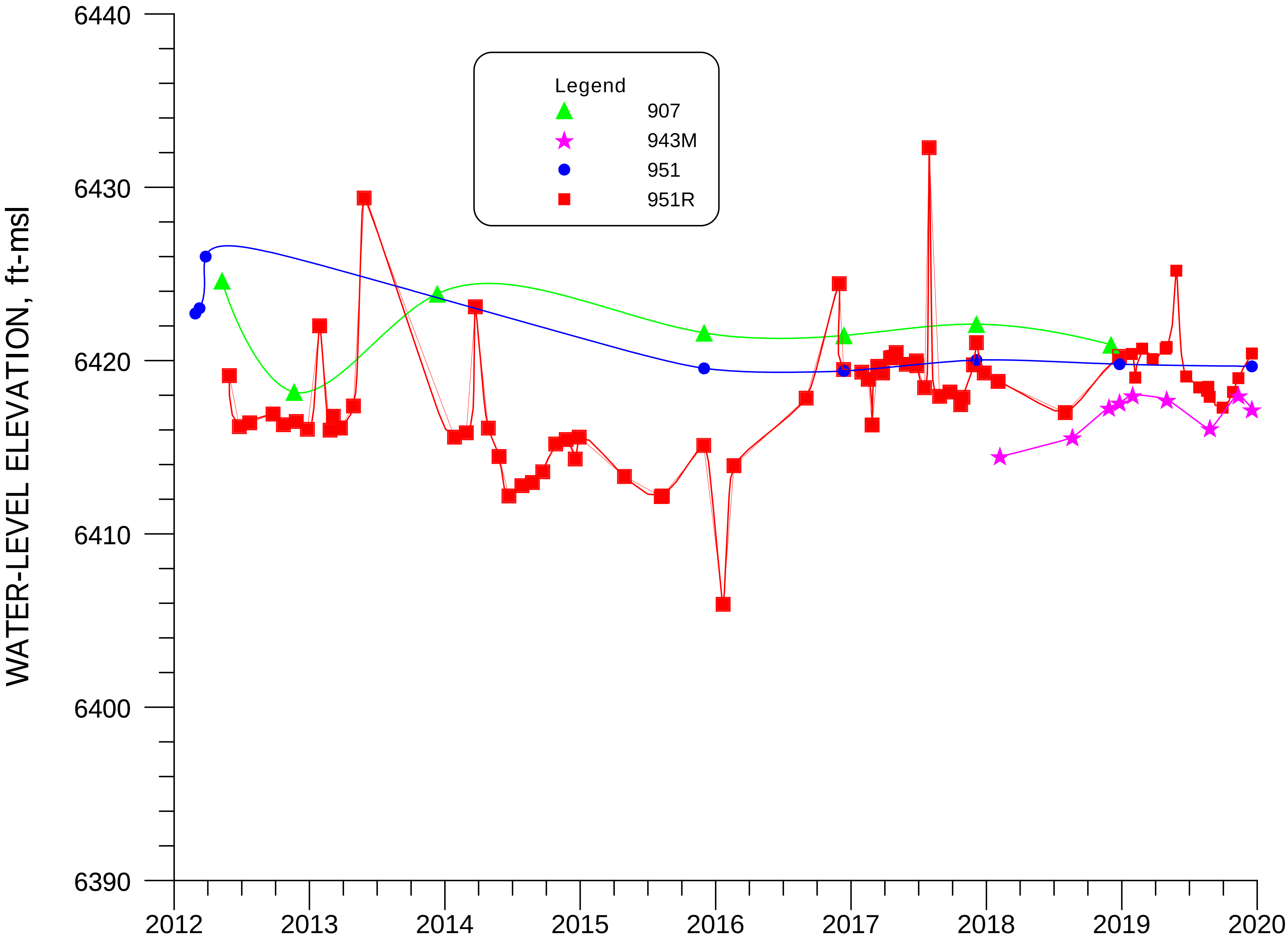


FIGURE 8.1-3. WATER-LEVEL ELEVATION FOR SAN ANDRES WELLS 907, 943M, 951 AND 951R.

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	152.30	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	10.0	12/18/2019	172.05	6417.34	2.4	6589.39	955	5632	S	955-1025
#2 Dee	1542424	490972	870.0	---	10/8/2019	175.62	6400.04	0.0	6575.66	110	6466	A	---
										800	5776	S	-
#2R DE	1542424	2713881	870.0	10.0	12/18/2019	184.91	6394.28	1.5	6579.19	800	5778	S	800-870
0806R	1541177	486264	600.0	16.0	12/3/2018	149.99	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	120.01	6432.56	0.0	6552.57	---	---	S	-
0535	1530100	478450	198.0	12.0	12/17/2010	117.85	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	135.60	6421.40	0.0	6557.00	790	5767	S	790-875
0907	1534250	480800	360.0	16.0	12/3/2018	124.69	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	132.21	6465.39	1.2	6597.60	138	6458	A	---
										801	5795	S	-
0938	1539500	473040	---	---	12/5/2017	157.70	6411.10	0.0	6568.80	95	6474	A	---
										120	6449	S	-
* 0943	1537222	487407	978.0	18.0	12/26/2017	134.00	6421.91	0.0	6555.91	704	5852	S	703-978
0943M	1537358	487238	800.0	6.0	12/18/2019	138.91	6417.19	2.3	6556.10	710	5844	S	740-800
0949	1540350	483600	551.0	6.0	2/13/2008	130.60	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	12/18/2019	154.03	6419.67	0.9	6573.70	110	6463	A	---
										227	6346	S	241-275
0951R	1544500	484100	525.0	8.0	12/18/2019	156.37	6420.41	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	78.05	6471.95	0.2	6550.00	40	6510	A	---
										420	6130	S	385-498
0986	1537894	483690	467.0	5.0	8/23/2008	124.00	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	54.48	6595.52	1.0	6650.00	70	6579	A	---
										385	6264	S	425-470
0991	1538873	483630	500.0	6.0	5/21/2019	130.90	6520.10	1.4	6651.00	---	---	S	-
0995	1540115	476594	---	---	---	---	---	0.0	6474.00	---	---	S	-
0998	1533080	476450	145.0	16.0	3/15/2018	128.22	6521.78	0.0	6650.00	---	---	S	-
0999	1524230	480187	180.0	16.0	3/15/2018	111.39	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 2019 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 and semiannual samples from wells 806R and 991 were obtained but the semiannual samples from wells 949 and 955 were not collected. The owners of wells 949 and 955 would not give permission to sample these wells in 2019. A pitless adapter was removed from well 991 prior to obtaining the 2019 samples.

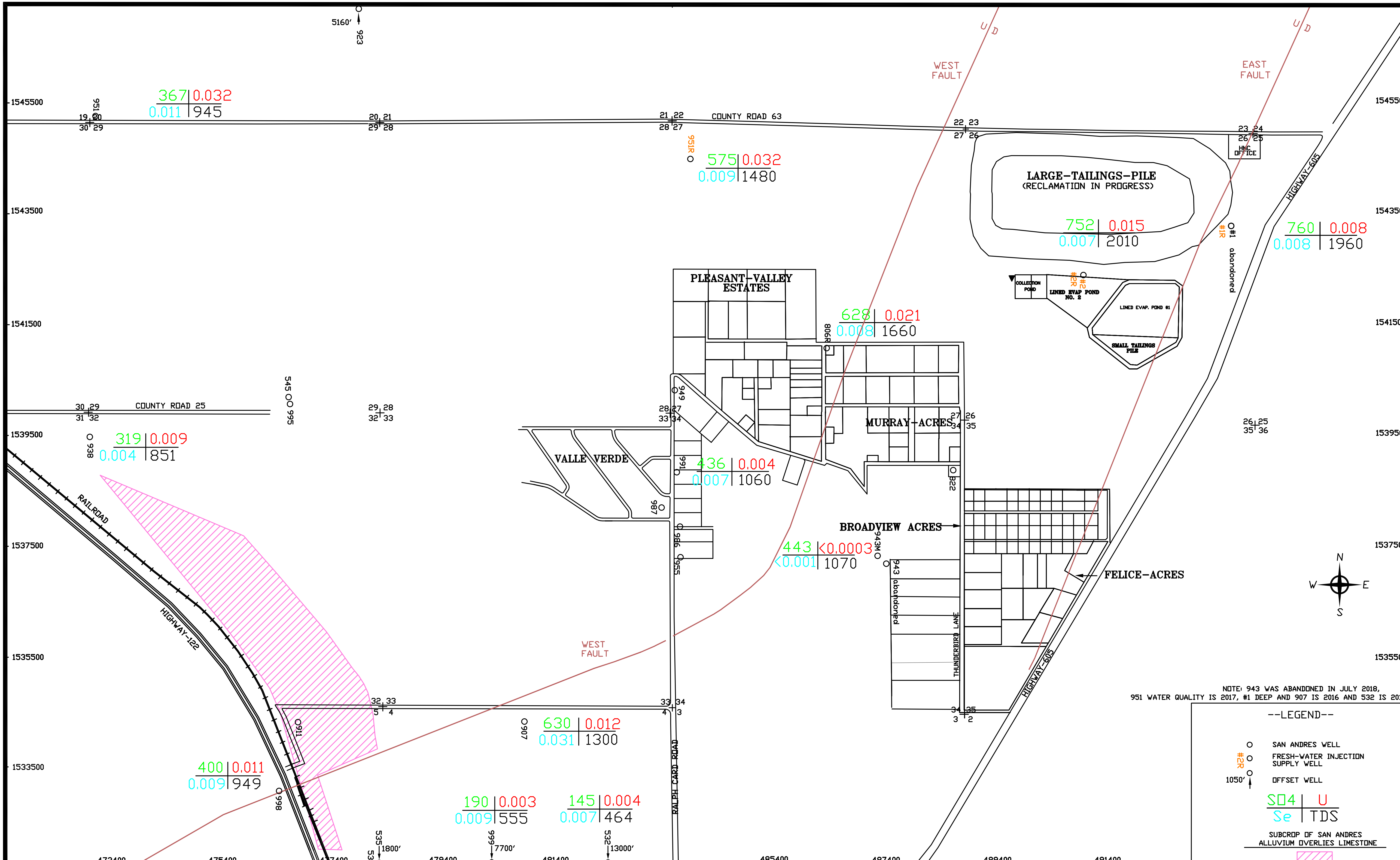
Sulfate concentrations are typically near 700 mg/L for Homestake #1 Deep and #2 Deep wells. Sulfate concentrations in the San Andres aquifer generally increase from near its outcrop at wells 532, 938, 998 and 999 to higher levels farther to the east as the water has been in the formation for a longer period of time. The sulfate concentration from well 991 is less than the sulfate concentrations in wells 806R and 943M due to being closer to the recharge area for the San Andres aquifer. TDS concentrations have varied from 464 to approximately 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 to the down dip area is expected. Uranium concentrations were generally small in all of the San Andres wells monitored during 2019 with the largest value of 0.03 mg/L in well 951R. Selenium concentrations in the San Andres aquifer vary from 0.004 to 0.011 mg/L. All measured molybdenum concentrations are less than 0.01 mg/L.

The additional monitoring of the San Andres aquifer in the GRP area relative to the past leakage from well 943 in 2019 does not show an increase in concentrations that could be due to impacts from the historical leakage into well 943. The recent decline in concentrations in well 943M to the very low values similar to those in well 991 indicates the small increase due to the past annulus leakage in well 943 has dissipated in the area of well 943M.

Figure 8.2-2 presents sulfate concentrations with time for Homestake's wells 943M, 951, 951R, #1 Deep and #2 Deep wells. This data shows that sulfate concentrations in 2019 for these San Andres wells were similar to their historical average since injection water supply has occurred. Figure 8.2-3 presents the sulfate concentrations with time for San Andres wells 532, 806R, 991, 998 and 999. Updated sulfate concentrations for wells 938, 991, 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 with distance from the San Andres outcrop which exist in the western portion of Figure 8.2-1.

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 increase in uranium concentration in well 806R in 2017 is not supported by other constituents and is shown to be an outlier based on the 2018 and 2019 values. No trends in these constituents in wells 806R, 943M or 991 exist to indicate any impact from the former 943 well leakage while the very small recent decline in concentrations in well 943M indicate the 943M impacts have dissipated.



SCALE: 1" = 1000'

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DATE: 12/23/19

FIGURE 8.2-1. LOCATION OF SAN ANDRES WELLS AND WATER QUALITY DATA FOR THE SAN ANDRES AQUIFER 2019, mg/l

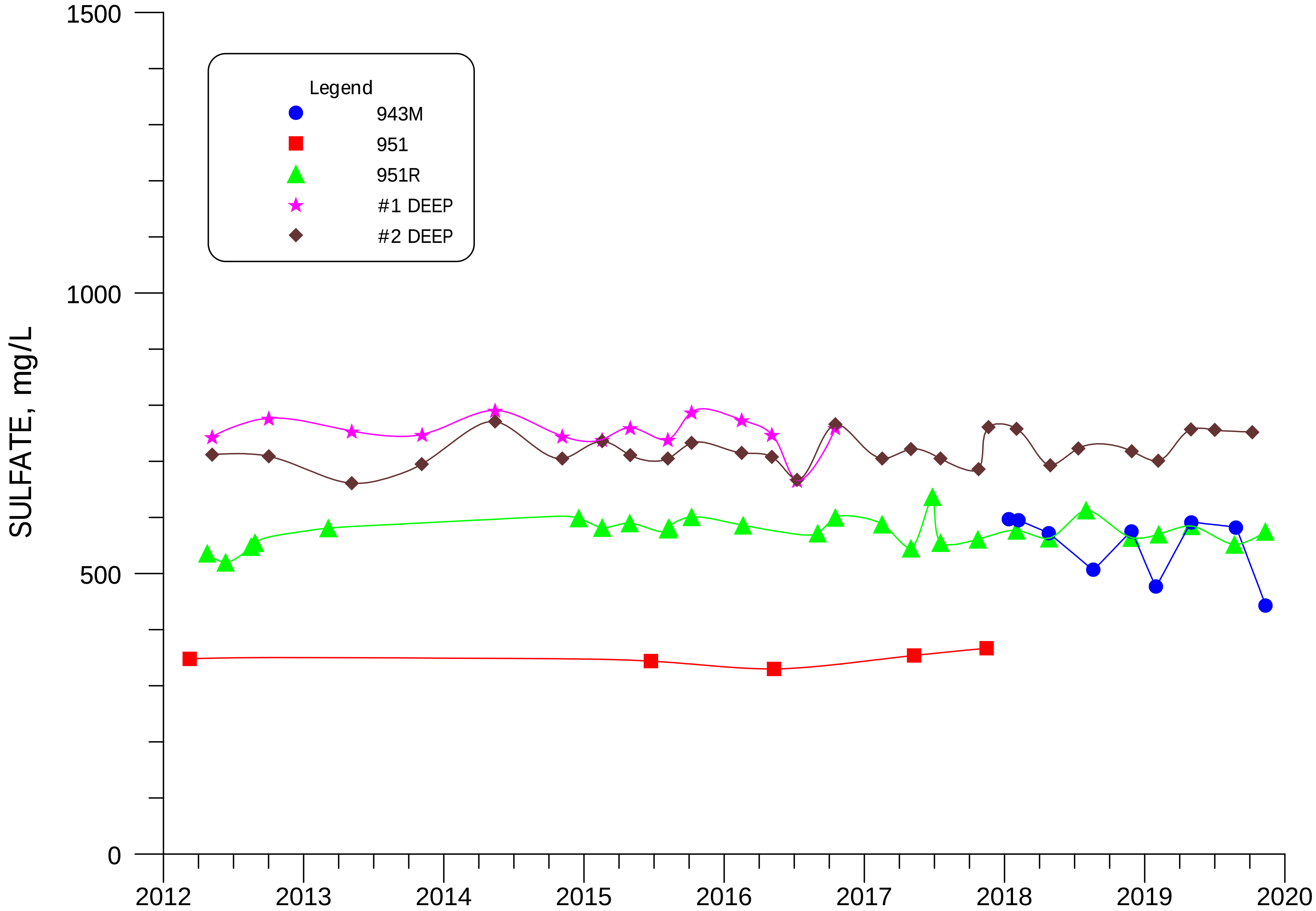

FIGURE 8.2-2. SULFATE CONCENTRATIONS FOR WELLS 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

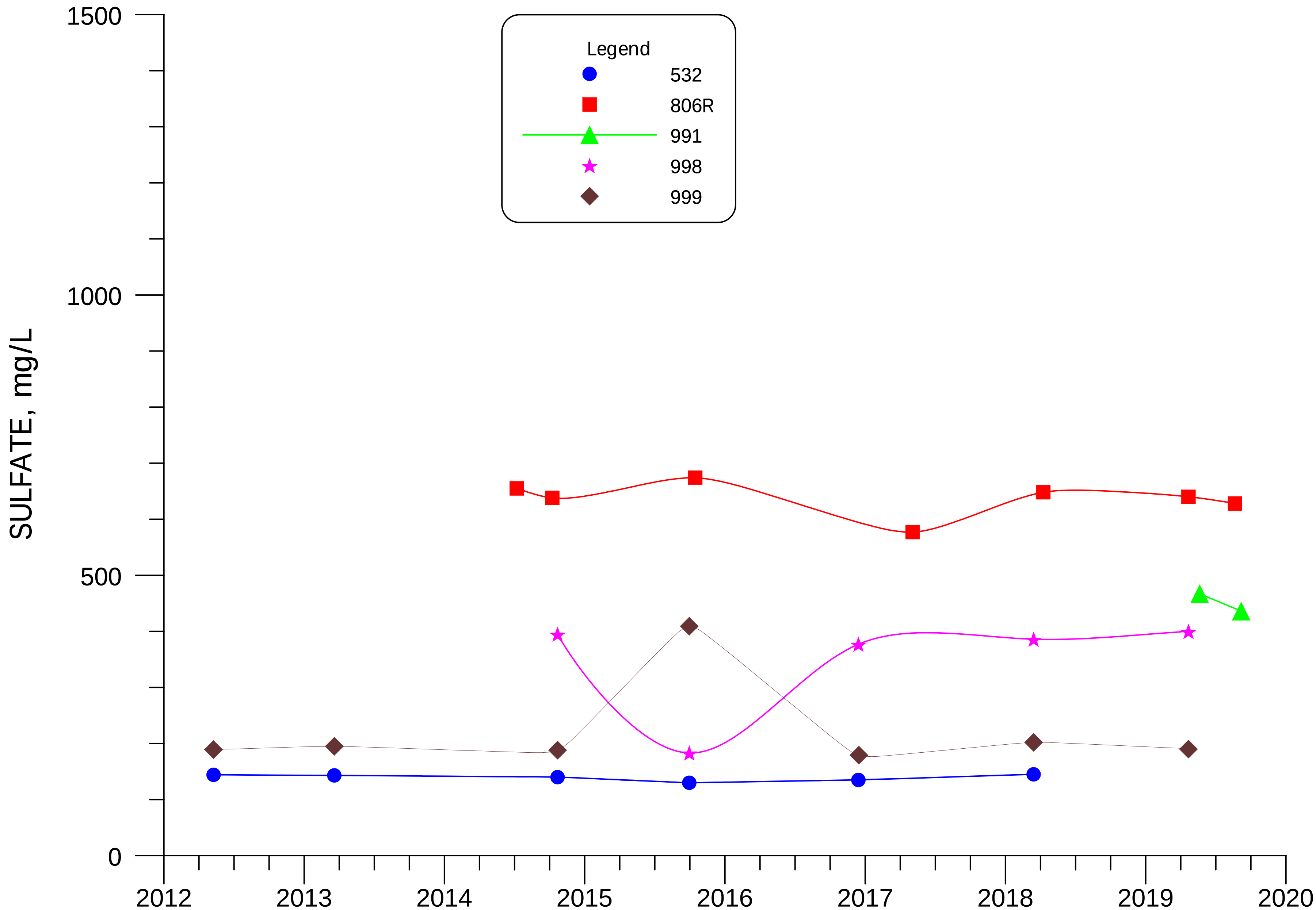

FIGURE 8.2-3. SULFATE CONCENTRATIONS FOR WELLS 532, 806R, 991, 998 AND 999.

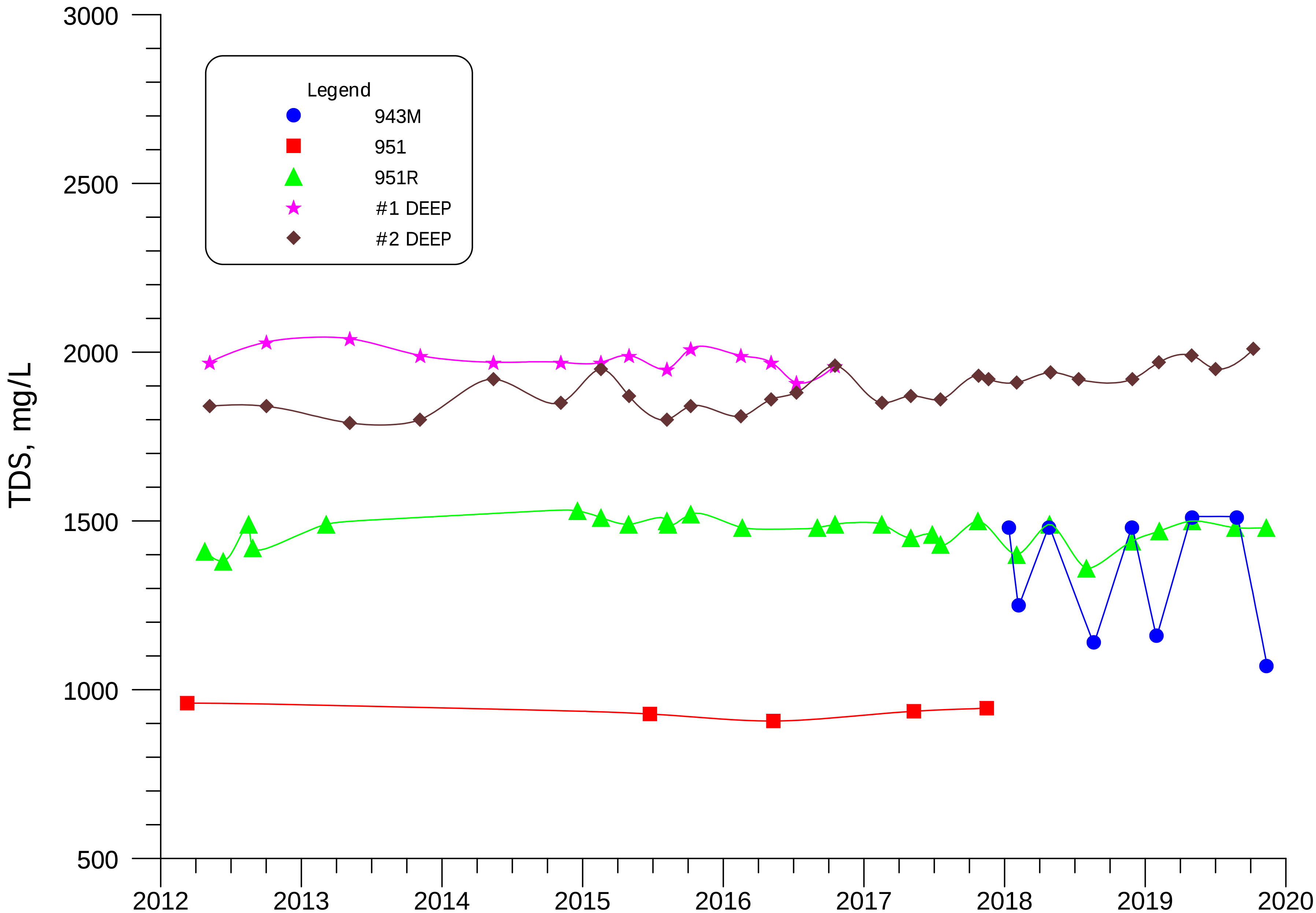

FIGURE 8.2-4. TDS CONCENTRATIONS FOR WELLS 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

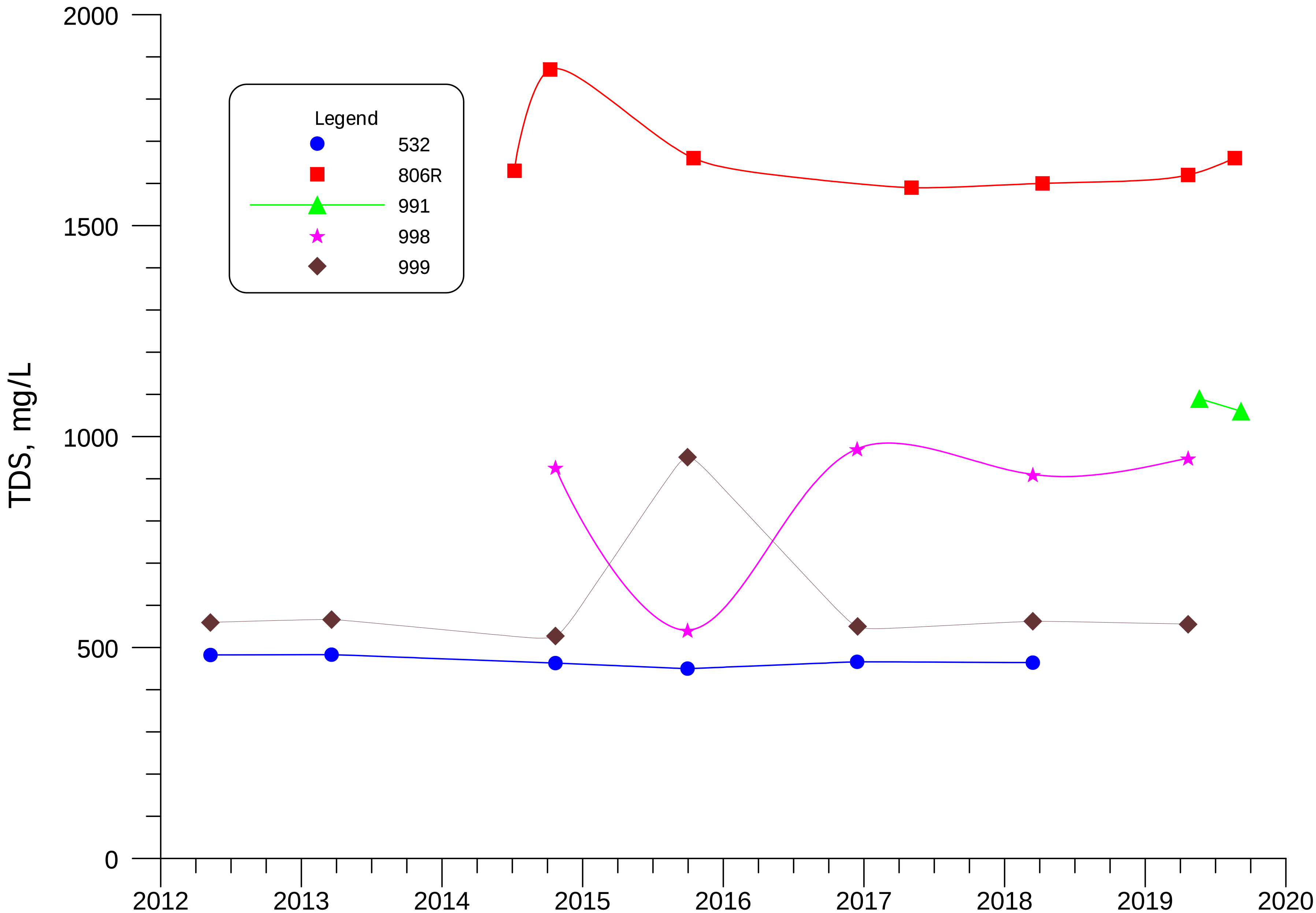

FIGURE 8.2-5. TDS CONCENTRATIONS FOR WELLS 532, 806R, 991, 998 AND 999.

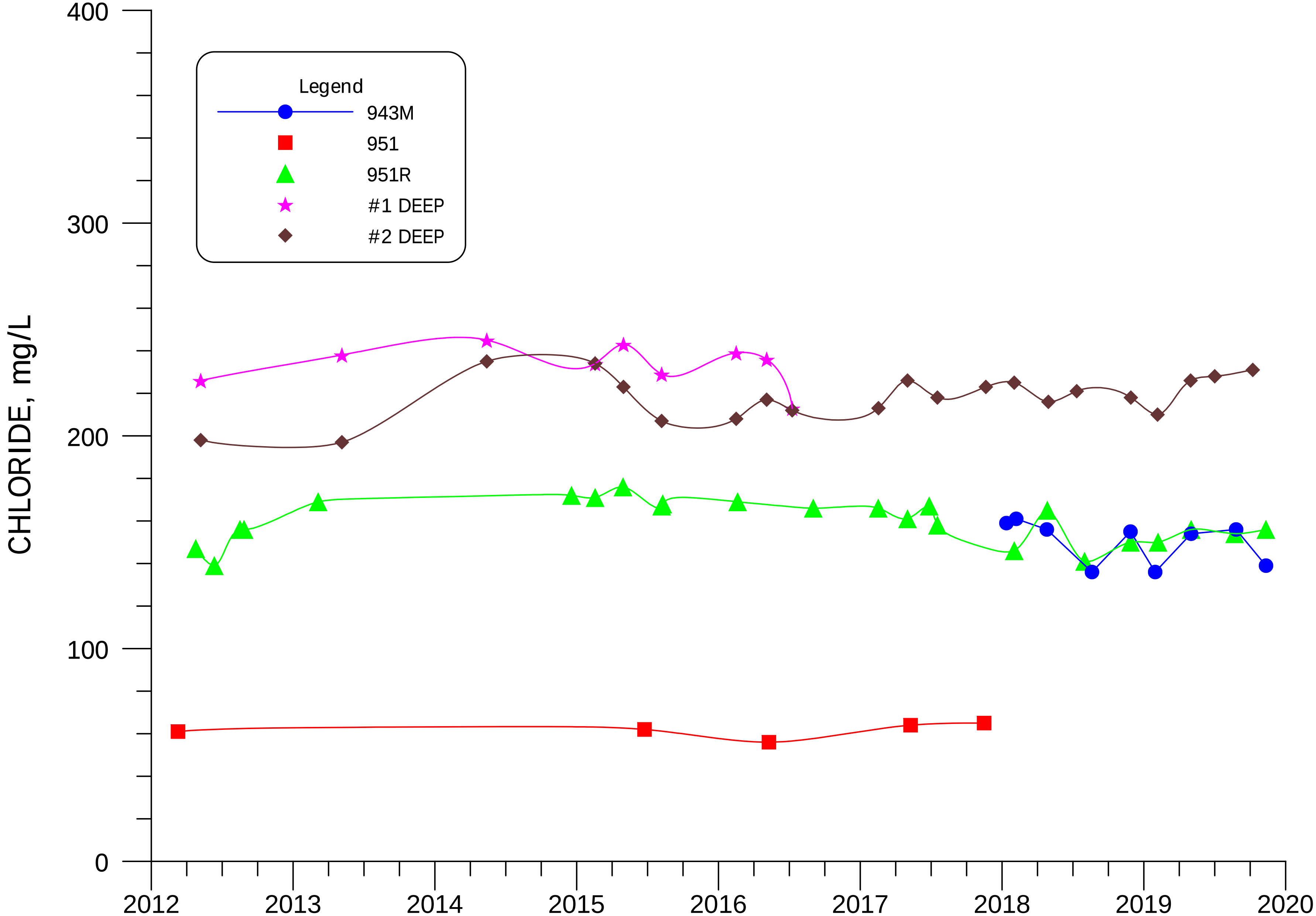

FIGURE 8.2-6. CHLORIDE CONCENTRATIONS FOR WELLS 943M, 951, 951R, #1 DEEP, AND #2 DEEP.

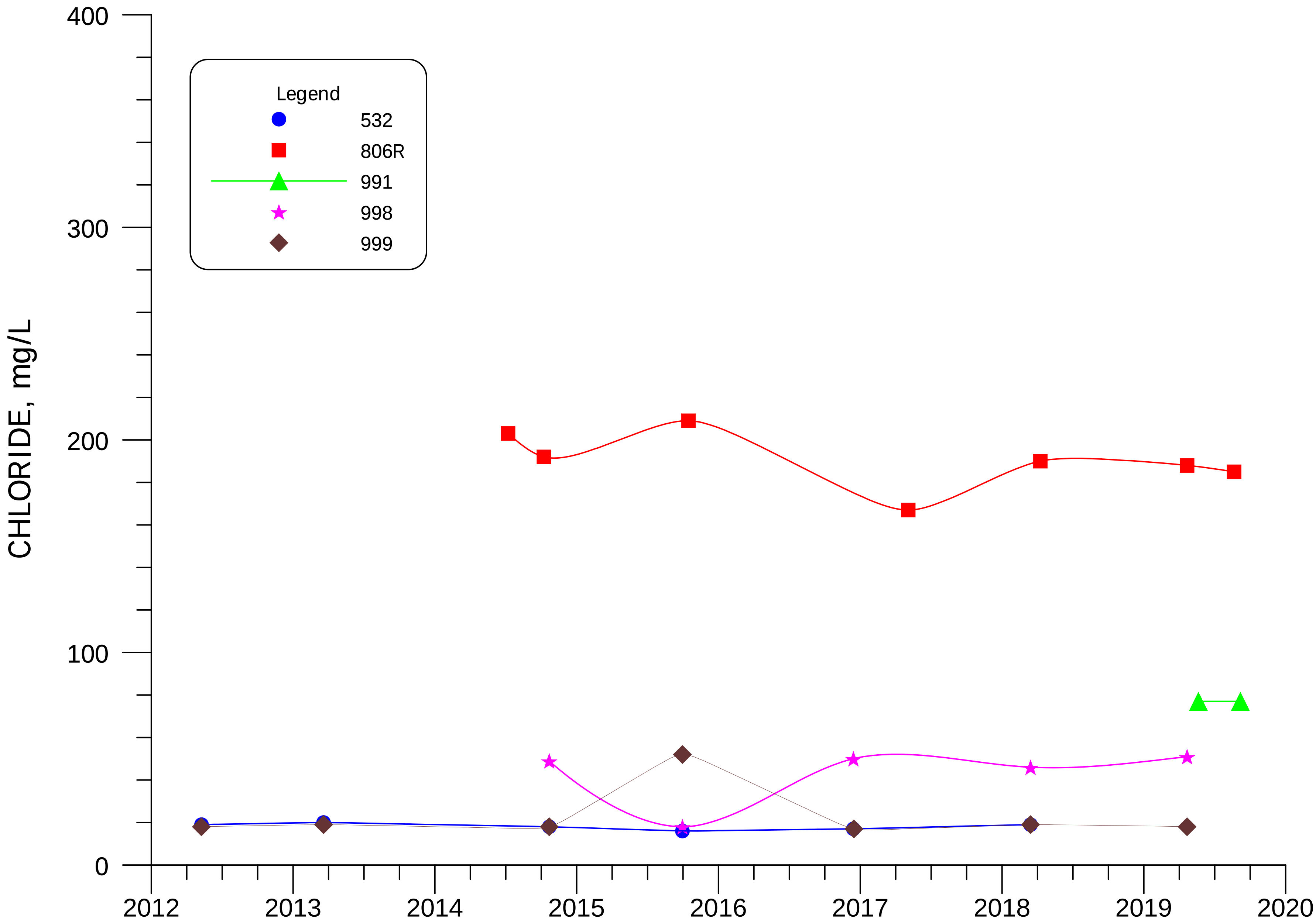

FIGURE 8.2-7. CHLORIDE CONCENTRATIONS FOR WELLS 532, 806R, 991, 998 AND 999.

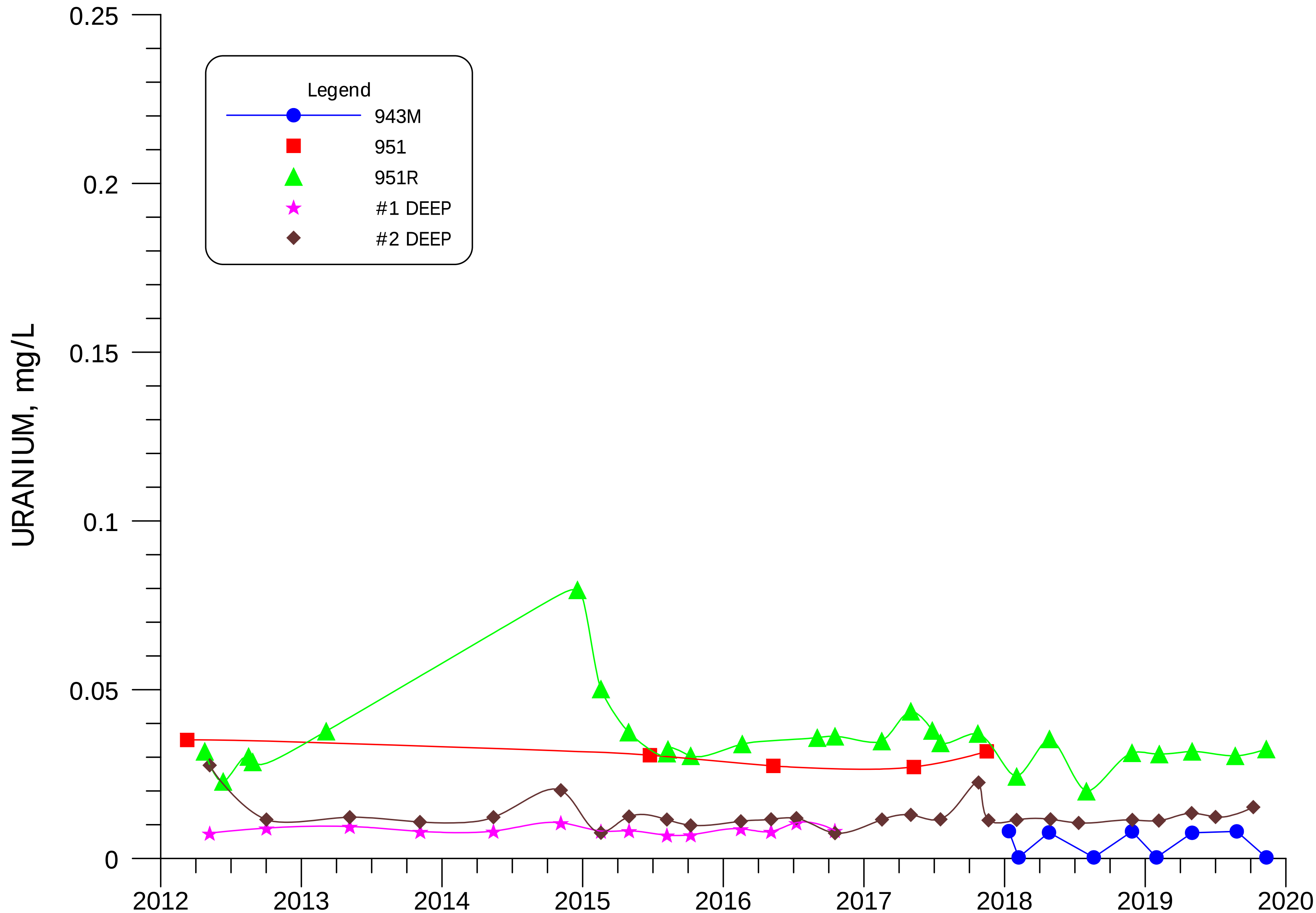

FIGURE 8.2-8. URANIUM CONCENTRATIONS FOR WELLS 943M, 951, 951R, #1 DEEP AND #2 DEEP.

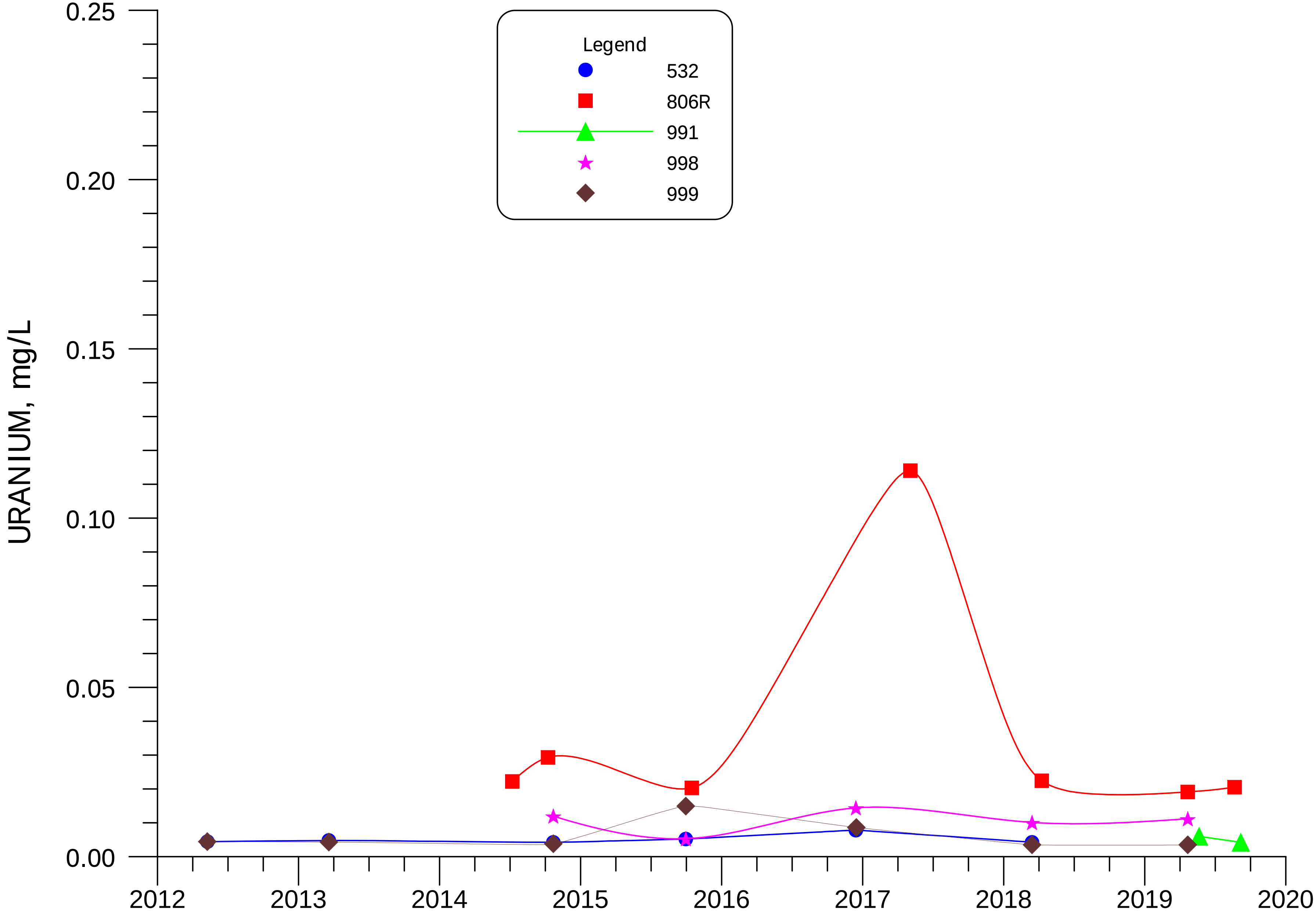

FIGURE 8.2-9. URANIUM CONCENTRATIONS FOR WELLS 532, 806R, 991, 998 AND 999.

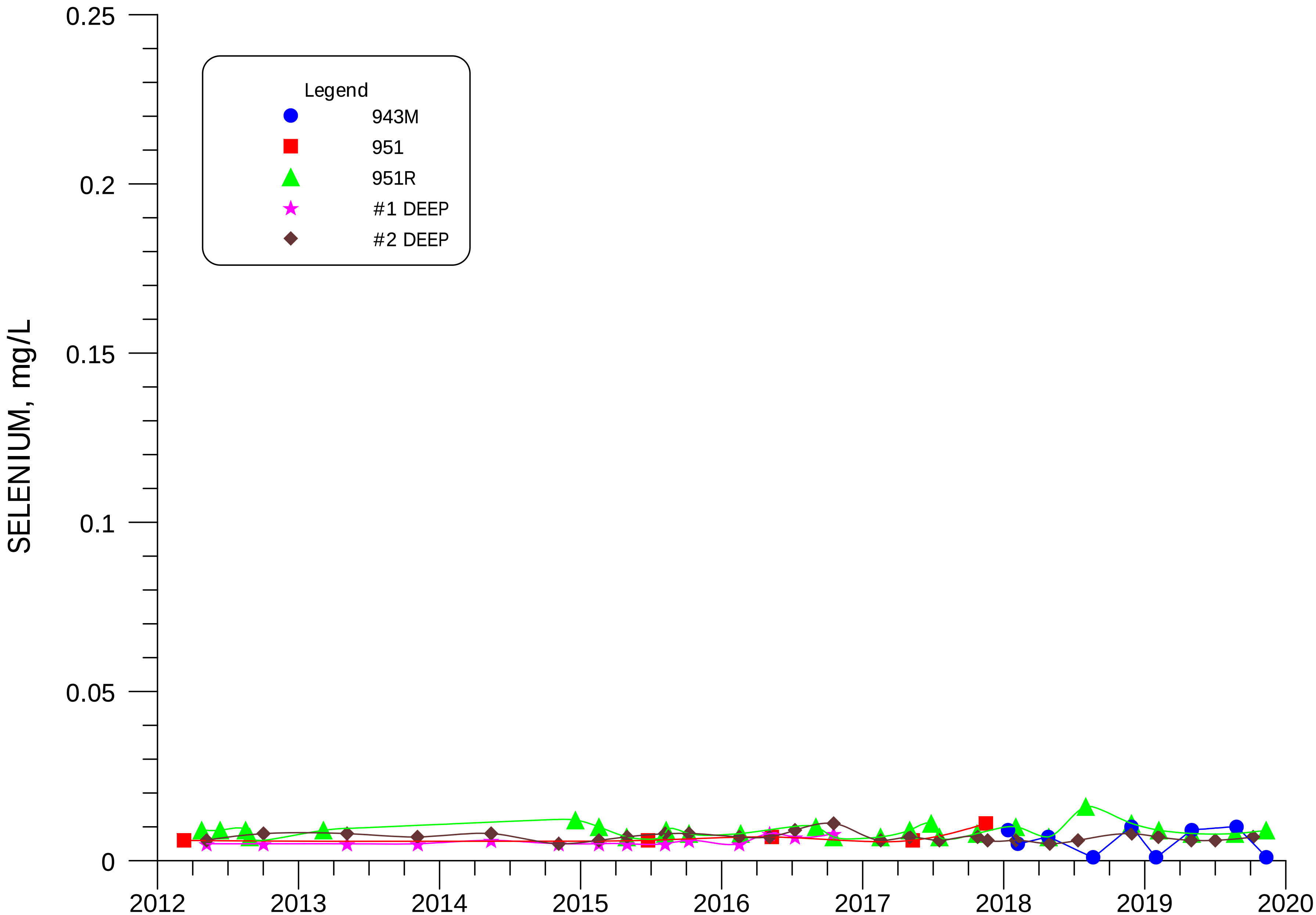

FIGURE 8.2-10. SELENIUM CONCENTRATIONS FOR WELLS 943M, 951, 951R, #1 DEEP AND #2 DEEP.

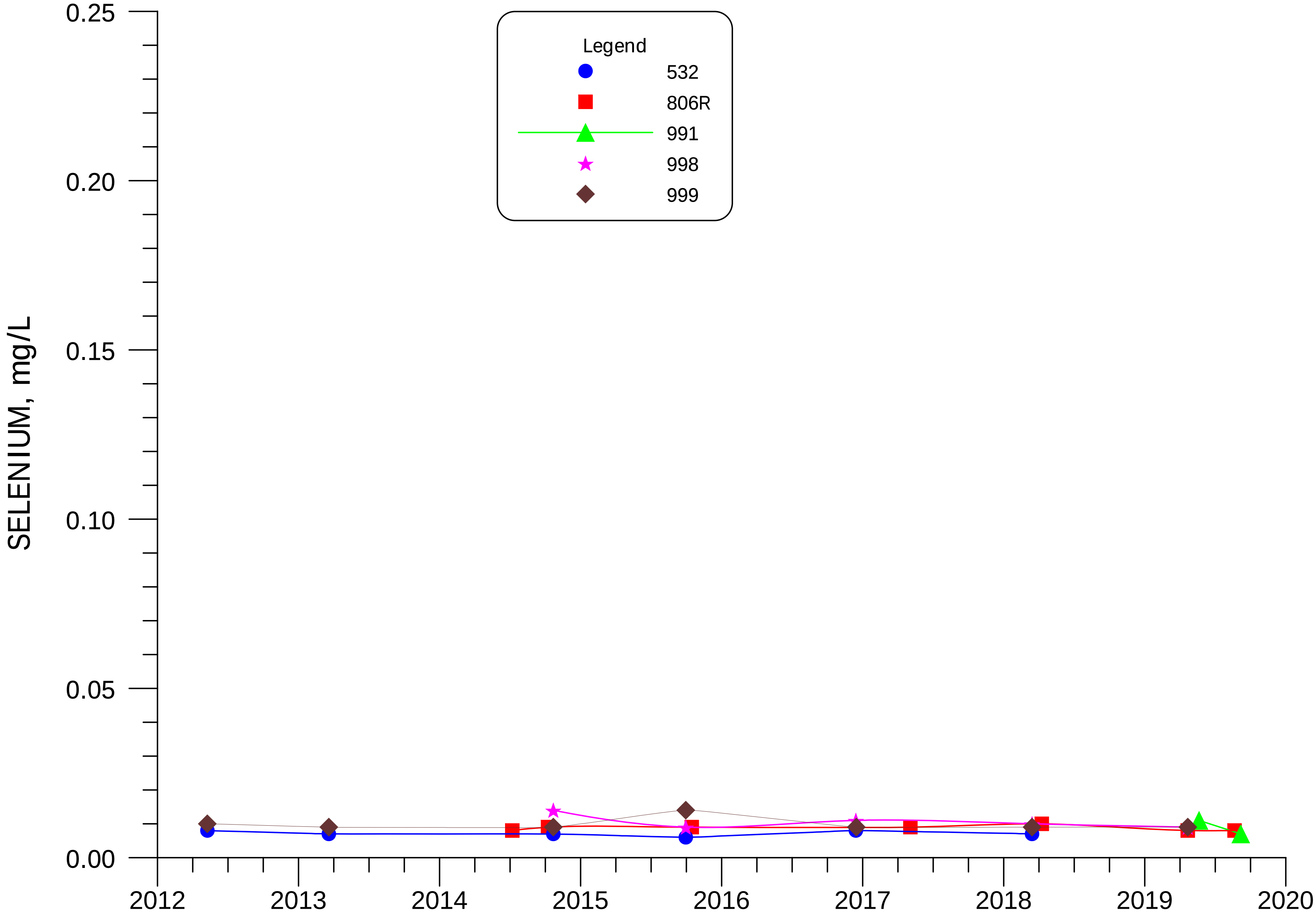

FIGURE 8.2-11. SELENIUM CONCENTRATIONS FOR WELLS 532, 806R, 991, 998 AND 999.

SECTION 9

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9.0 REFERENCES

Arcadis U.S., 2019, Supplemental Background Soil and Groundwater Investigation Report, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Baldwin, J.A. and S.K. Anderholm, 1992, Hydrogeology and Ground-Water Chemistry of San Andres-Glorieta Aquifer in the Acoma Embayment and Eastern Zuni Uplift, West-Central New Mexico, U.S. Geological Survey, Water-Resources Investigation Report 91-4033.

Environmental Restoration Group, 1999a, Statistical Evaluation of Alluvial Groundwater Quality Upgradient of the Homestake Site near Grants, NM, Molybdenum, Selenium and Uranium, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group, 1999b, Statistical Evaluation of Alluvial Groundwater Quality Upgradient of the Homestake Site near Grants, NM, Nitrate, Sulfate and Total Dissolved Solids, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group, 2003, Grants Project, Statistical Evaluation of Chinle Aquifer Quality at the Homestake Site, Near Grants, NM, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group and Hydro-Engineering, LLC, 2011, Evaluation of the Year 2000-2010 Irrigation with Alluvial Water, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group and Hydro-Engineering, LLC, 2012, Evaluation of the Year 2000-2011 Irrigation with Alluvial Water, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group and Hydro-Engineering, LLC, 2013, Evaluation of the Year 2000-2012 Irrigation with Alluvial Water, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hoffman, G.L., 1976, Groundwater Hydrology of the Alluvium, Consulting Report to Homestake Mining Company.

Hoffman, G.L., 1977, Modeling, Design and Specifications of the Collection and Injection Systems, Consulting Report to Homestake Mining Company.

Homestake, 2012, Grants Reclamation Project Updated Corrective Action Program (CAP) for Nuclear Regulatory Commission, Grants, New Mexico.

Homestake, 2019, Grants Reclamation Project Updated Corrective Action Program (CAP) for Nuclear Regulatory Commission, Grants, New Mexico.

Hydro-Engineering, 1981, Ground-Water Discharge Plan for Homestake's Mill near Milan, New Mexico, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983, Ground-Water Discharge Plan for Homestake's Mill near Milan, New Mexico, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1983, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985d, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1987a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third and Fourth Quarters 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1987b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First and Second Quarters 1987, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third and Fourth Quarters 1987, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First and Second Quarters 1988, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988c, Renewal Ground-Water Discharge Plan, DP-200 for Homestake's Mill Near Milan, New Mexico, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1989, Corrective Action Plan for Homestake's Tailings, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1990, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1989, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1991, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1990, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1992, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1991, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1993a, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1992, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1993b, Water Quality Changes in the Alluvial Aquifer Adjacent to the Homestake Tailings, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1994, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SCA-1471, 1993, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1995, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1994, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1996. Ground-Water Monitoring for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C, 1997. Ground-Water Monitoring for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1996. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 1998, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1997. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 1999, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1998. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2000a, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1999. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2000b, Ground-Water Hydrology at the Grants Reclamation Site, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001a, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2000. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001b, Ground-Water Hydrology and Restoration at the Grants Reclamation Site, 2001, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001c, Ground-Water Hydrology for Support of Background Concentrations at the Grants Reclamation Site, 2001, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2002, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2001. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2003a, Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2002. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2003b, Grants Reclamation Project, Background Water Quality Evaluation of the Chinle Aquifers. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2004, Grants Reclamation Project, 2003 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2005, Grants Reclamation Project, 2004 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2006, Grants Reclamation Project, 2005 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2007, Grants Reclamation Project, 2006 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC

License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2008, Grants Reclamation Project, 2007 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2009, Grants Reclamation Project, 2008 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2010a, Grants Reclamation Project, 2009 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2010b, Ground-Water Hydrology, Restoration and Monitoring at the Grants Reclamation Site for NMED DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2011, Grants Reclamation Project, 2010 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2012, Grants Reclamation Project, 2011 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2013, Grants Reclamation Project, 2012 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2014, Grants Reclamation Project, 2013 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2015, Grants Reclamation Project, 2014 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC

License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2016, Grants Reclamation Project, 2015 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2017, Grants Reclamation Project, 2016 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2018, Grants Reclamation Project, 2017 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2019, Grants Reclamation Project, 2018 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

New Mexico Environmental Department, 2008, Summary report on 2005-2007 residential well sampling within the vicinity of the Homestake Mining Company Uranium Mill Superfund Site, CERCLIS#HMD007860935.

APPENDIX A

WATER LEVELS

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GROUND-WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX A

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Table A.1-1. WATER LEVELS FOR THE TAILINGS WELLS

WATER LEVEL ELEVATION (FT-MSL)

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CN1	1/28/2019	16.60	6598.41
CN1	2/25/2019	16.83	6598.18
CN1	3/25/2019	17.05	6597.96
CN1	4/29/2019	17.10	6597.91
CN1	5/28/2019	17.30	6597.71
CN1	6/24/2019	17.45	6597.56
CN1	8/26/2019	17.70	6597.31
CN1	9/30/2019	17.77	6597.24
CN1	10/28/2019	17.45	6597.56
CN1	11/25/2019	18.05	6596.96
CN1	12/30/2019	18.36	6596.65
CN2	1/28/2019	68.90	6589.27
CN2	2/25/2019	69.10	6589.07
CN2	3/25/2019	69.15	6589.02
CN2	4/29/2019	71.50	6586.67
CN2	5/28/2019	69.00	6589.17
CN2	6/24/2019	71.75	6586.42
CN2	8/26/2019	71.90	6586.27
CN2	9/30/2019	71.71	6586.46
CN2	10/28/2019	71.90	6586.27
CN2	11/12/2019	72.34	6585.83
CN2	11/25/2019	72.00	6586.17
CN2	12/30/2019	72.34	6585.83
CS1	6/12/2019	17.00	6591.30
CS2	1/28/2019	58.55	6593.43
CS2	2/25/2019	58.60	6593.38
CS2	3/25/2019	59.05	6592.93
CS2	4/29/2019	59.15	6592.83
CS2	5/28/2019	59.30	6592.68
CS2	6/11/2019	59.30	6592.68
CS2	6/24/2019	59.60	6592.38
CS2	8/26/2019	59.70	6592.28
CS2	9/30/2019	59.76	6592.22
CS2	10/28/2019	60.00	6591.98
CS2	11/25/2019	59.90	6592.08
CS2	12/30/2019	60.25	6591.73
CS7	6/12/2019	69.00	6595.69
EE2	1/28/2019	63.80	6604.04
EE2	2/25/2019	63.95	6603.89
EE2	3/25/2019	64.15	6603.69
EE2	4/29/2019	64.15	6603.69
EE2	5/28/2019	64.40	6603.44
EE2	6/24/2019	64.52	6603.32
EE2	8/26/2019	64.65	6603.19
EE2	9/30/2019	64.71	6603.13
EE2	10/28/2019	64.90	6602.94
EE2	11/11/2019	64.91	6602.93
EE2	11/25/2019	64.90	6602.94
EE2	12/30/2019	65.07	6602.77
EN1	1/28/2019	31.10	6587.76
EN1	2/25/2019	30.95	6587.91
EN1	3/25/2019	31.40	6587.46
EN1	4/29/2019	30.20	6588.66
EN1	5/28/2019	30.05	6588.81
EN1	6/24/2019	31.73	6587.13
EN1	8/26/2019	31.75	6587.11
EN1	9/30/2019	31.18	6587.68
EN1	10/28/2019	31.40	6587.46
EN1	11/25/2019	31.40	6587.46
EN1	12/30/2019	31.60	6587.26
EN2	1/28/2019	51.15	6600.46
EN2	2/25/2019	51.40	6600.21
EN2	3/25/2019	51.65	6599.96
EN2	4/29/2019	51.80	6599.81
EN2	5/28/2019	51.90	6599.71
EN2	6/24/2019	52.10	6599.51
EN2	8/26/2019	52.40	6599.21
EN2	9/30/2019	52.43	6599.18
EN2	10/28/2019	52.58	6599.03
EN2	11/25/2019	52.80	6598.81
EN2	12/30/2019	52.95	6598.66
EO14	10/21/2019	54.75	6615.25
EP23	6/25/2019	58.15	6609.85
EP31	11/5/2019	56.40	6610.60
ES1	1/28/2019	30.35	6584.83
ES1	2/25/2019	30.30	6584.88
ES1	3/25/2019	30.32	6584.86
ES1	4/29/2019	30.30	6584.88
ES1	5/28/2019	30.39	6584.79
ES1	6/24/2019	30.00	6585.18
ES1	8/26/2019	30.43	6584.75
ES1	9/30/2019	30.21	6584.97
ES1	10/28/2019	30.15	6585.03
ES1	11/25/2019	29.92	6585.26
ES1	12/30/2019	30.16	6585.02
ES2	9/30/2019	57.47	6597.83
ES2	10/28/2019	57.50	6597.80
ES2	11/25/2019	57.48	6597.82
ES2	12/30/2019	> 76.00	< 6579.30
ES4	10/22/2019	70.84	6594.96
ES6	10/22/2019	67.20	6592.80
ET19	1/8/2019	54.49	6611.51
ET19	10/21/2019	55.80	6610.20
ET20	6/25/2019	65.80	6598.20
NE1	1/28/2019	48.60	6600.22
NE1	2/25/2019	48.85	6599.97
NE1	3/25/2019	49.10	6599.72
NE1	4/29/2019	49.00	6599.82
NE1	5/28/2019	49.15	6599.67
NE1	6/24/2019	49.45	6599.37
NE1	8/26/2019	49.55	6599.27
NE1	9/30/2019	49.51	6599.31
NE1	10/28/2019	49.66	6599.16
NE1	11/25/2019	49.40	6599.42
NE1	12/30/2019	50.04	6598.78
NE2	11/11/2019	63.70	6597.28
NW3	11/12/2019	66.41	6588.60
NW4	9/30/2019	33.90	6622.25
NW4	10/28/2019	33.64	6622.51
NW4	11/25/2019	33.62	6622.53
NW4	12/30/2019	> 33.70	< 6622.45
SE2	1/28/2019	67.45	6593.92
SE2	2/25/2019	67.75	6593.62
SE2	3/25/2019	67.90	6593.47
SE2	4/29/2019	67.90	6593.47
SE2	5/28/2019	68.00	6593.37
SE2	6/24/2019	68.10	6593.27
SE2	8/26/2019	68.25	6593.12
SE2	9/30/2019	68.32	6593.05
SE2	10/28/2019	68.55	6592.82
SE2	11/5/2019	68.62	6592.75
SE2	11/25/2019	70.98	6590.39
SE2	12/30/2019	71.41	6589.96
SW1	1/28/2019	24.00	6575.83
SW1	2/25/2019	24.20	6575.63
SW1	3/25/2019	24.50	6575.33
SW1	4/29/2019	24.23	6575.60
SW1	5/28/2019	24.10	6575.73
SW1	6/24/2019	24.60	6575.23
SW1	8/26/2019	24.60	6575.23
SW1	9/30/2019	24.50	6575.33
SW1	10/28/2019	24.65	6575.18
SW1	11/25/2019	24.62	6575.21
SW1	12/30/2019	24.77	6575.06

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1. WATER LEVELS FOR THE TAILINGS WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

SW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	44.10	6593.77
2/25/2019	44.05	6593.82
3/25/2019	44.30	6593.57
4/29/2019	44.30	6593.57
5/28/2019	44.00	6593.87
6/24/2019	44.40	6593.47
8/26/2019	44.15	6593.72
9/30/2019	44.17	6593.70
10/28/2019	44.25	6593.62
11/25/2019	44.30	6593.57
12/30/2019	44.46	6593.41

SW3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/5/2019	63.02	6592.98

WE9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/29/2019	58.60	6603.36
2/13/2019	58.70	6603.26
3/19/2019	60.05	6601.91

WF2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/29/2019	63.80	6597.02
2/13/2019	64.00	6596.82
3/19/2019	64.20	6596.62

WF9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/29/2019	65.35	6600.35
2/12/2019	65.60	6600.10
3/18/2019	65.80	6599.90

WF11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/29/2019	57.60	6607.24
2/12/2019	57.70	6607.14
3/18/2019	57.70	6607.14

WME-1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	53.55	6605.68
4/9/2019	53.50	6605.73
6/21/2019	54.60	6604.63

WME-2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	58.75	6602.30
4/9/2019	58.95	6602.10
6/21/2019	59.30	6601.75
12/12/2019	60.18	6600.87

WME-3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	63.00	6601.31
6/21/2019	62.80	6601.51
12/11/2019	63.31	6601.00

WME-4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	58.15	6604.16
4/9/2019	59.40	6602.91
6/21/2019	58.10	6604.21
12/11/2019	58.20	6604.11

WME-5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	70.60	6601.75
4/9/2019	70.70	6601.65
12/12/2019	65.51	6606.84

WME-6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/26/2019	55.55	6615.95
4/9/2019	55.80	6615.70
6/21/2019	54.50	6617.00
12/12/2019	54.59	6616.91

WN1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	19.10	6587.58
2/25/2019	19.25	6587.43
3/25/2019	19.35	6587.33
4/29/2019	19.45	6587.23
5/28/2019	19.50	6587.18
6/24/2019	19.60	6587.08
8/26/2019	19.80	6586.88
9/30/2019	19.75	6586.93
10/28/2019	19.95	6586.73
11/25/2019	19.90	6586.78
12/30/2019	20.08	6586.60

WN2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	53.25	6591.07
2/25/2019	53.37	6590.95
3/25/2019	53.60	6590.72
4/29/2019	53.70	6590.62
5/28/2019	53.80	6590.52
6/24/2019	53.90	6590.42
8/26/2019	54.20	6590.12
9/30/2019	54.22	6590.10
10/28/2019	54.35	6589.97
11/25/2019	54.50	6589.82
12/30/2019	54.55	6589.77

WO10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/11/2019	61.50	6595.50

WO21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/12/2019	60.87	6592.13

WP10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/22/2019	64.92	6593.08
11/12/2019	66.30	6591.70

WS1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	10.05	6597.06
2/25/2019	10.05	6597.06
3/25/2019	10.05	6597.06
4/29/2019	10.00	6597.11
5/28/2019	10.00	6597.11
6/24/2019	9.98	6597.13
8/26/2019	9.85	6597.26
9/30/2019	9.66	6597.45
10/28/2019	9.66	6597.45
11/25/2019	9.70	6597.41
12/30/2019	9.86	6597.25

WS2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	57.10	6592.34
2/25/2019	57.30	6592.14
3/25/2019	57.65	6591.79
4/29/2019	57.80	6591.64
5/28/2019	57.70	6591.74
6/24/2019	58.00	6591.44
8/26/2019	58.10	6591.34
9/30/2019	58.11	6591.33
10/28/2019	58.20	6591.24
11/25/2019	58.35	6591.09
12/30/2019	58.48	6590.96

WT15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/22/2019	48.45	6611.55

WW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	23.40	6579.69
2/25/2019	23.50	6579.59
3/25/2019	23.60	6579.49
4/29/2019	23.70	6579.39
5/28/2019	23.80	6579.29
6/24/2019	23.95	6579.14
8/26/2019	24.10	6578.99
9/30/2019	24.16	6578.93
10/28/2019	24.26	6578.83
11/25/2019	24.30	6578.79
12/30/2019	24.46	6578.63

WW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	45.08	6598.56
10/28/2019	45.15	6598.49
11/25/2019	45.15	6598.49
12/30/2019	> 64.90	< 6578.74

WW3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/11/2019	50.79	6608.75

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0690	2/12/2019	40.72	6541.34
0690	12/18/2019	41.48	6540.58
0691	2/12/2019	45.55	6543.26
0691	12/18/2019	46.34	6542.47
0891	3/27/2019	36.81	6544.31
0892	12/18/2019	42.60	6544.61
1A	4/2/2019	37.51	6547.92
1C	12/18/2019	37.50	6550.49
1F	9/30/2019	38.97	6548.41
1H	12/18/2019	> 30.65	< 6555.74
1I	12/13/2019	> 49.80	< 6548.55
1I	12/18/2019	> 34.45	< 6563.90
1J	1/9/2019	38.42	6546.98
1J	12/16/2019	40.50	6544.90
1K	4/2/2019	21.40	6562.73
1M	2/19/2019	31.62	6543.91
1N	12/18/2019	31.91	6558.94
1O	12/18/2019	> 44.70	< 6550.24
1P	12/13/2019	39.58	6545.66
1P	12/18/2019	49.47	6535.77
1U	1/9/2019	36.56	6549.66
B	1/7/2019	39.50	6531.40
B	1/14/2019	39.10	6531.80
B	1/21/2019	39.11	6531.79
B	1/28/2019	39.10	6531.80
B	2/4/2019	39.32	6531.58
B	2/11/2019	39.11	6531.79
B	2/19/2019	38.98	6531.92
B	2/25/2019	39.13	6531.77
B	3/4/2019	39.01	6531.89
B	3/11/2019	38.71	6532.19
B	3/18/2019	38.55	6532.35
B	3/25/2019	38.90	6532.00
B	4/1/2019	38.81	6532.09
B	4/8/2019	38.81	6532.09
B	4/15/2019	38.81	6532.09
B	4/22/2019	38.75	6532.15
B	4/29/2019	38.68	6532.22
B	5/6/2019	38.85	6532.05
B	5/13/2019	38.90	6532.00
B	5/20/2019	38.75	6532.15
B	5/28/2019	38.90	6532.00
B	6/3/2019	38.88	6532.02
B	6/10/2019	38.95	6531.95
B	7/1/2019	39.10	6531.80
B	7/8/2019	39.18	6531.72
B	7/15/2019	39.35	6531.55
B	7/22/2019	39.50	6531.40
B	7/29/2019	39.50	6531.40
B	8/5/2019	39.38	6531.52
B	8/12/2019	39.39	6531.51
B	8/19/2019	39.42	6531.48
B	8/26/2019	39.40	6531.50
B	9/2/2019	39.43	6531.47
B	9/9/2019	39.33	6531.57
B	9/16/2019	39.32	6531.58
B	9/23/2019	39.45	6531.45
B	9/30/2019	39.32	6531.58
B	10/7/2019	39.22	6531.68
B	10/14/2019	39.45	6531.45
B	10/21/2019	39.34	6531.56
B	10/28/2019	39.35	6531.55
B	11/4/2019	39.29	6531.61
B	11/11/2019	39.36	6531.54
B	11/18/2019	39.35	6531.55
B	11/25/2019	39.47	6531.43
B	12/2/2019	39.72	6531.18
B	12/9/2019	39.66	6531.24
B	12/13/2019	39.70	6531.20
B	12/16/2019	40.00	6530.90
B	12/23/2019	39.90	6531.00
B	12/30/2019	39.97	6530.93
B1	12/18/2019	41.40	6530.42
B4	11/1/2019	58.24	6516.42
B7	12/9/2019	44.74	6529.66
B8	12/9/2019	46.52	6529.23
B12	2/20/2019	39.94	6533.08
B12	12/17/2019	41.45	6531.57
B13	2/20/2019	39.13	6530.91
B13	7/1/2019	36.00	6534.04
B13	12/18/2019	37.95	6532.09
B15	4/29/2019	42.60	6533.71
B15	5/28/2019	42.55	6533.76
B15	6/24/2019	45.00	6531.31
B15	7/29/2019	45.50	6530.81
B15	8/26/2019	43.55	6532.76
B15	9/30/2019	44.70	6531.61
B15	10/28/2019	46.20	6530.11
B16	4/29/2019	42.35	6533.02
B16	5/28/2019	42.35	6533.02
B16	6/24/2019	61.55	6513.82
B16	7/29/2019	56.15	6519.22
B16	8/26/2019	43.40	6531.97
B16	9/30/2019	59.10	6516.27
B16	10/28/2019	60.75	6514.62
B17	4/29/2019	40.35	6533.96
B17	5/28/2019	40.40	6533.91
B17	6/24/2019	41.40	6532.91
B17	7/29/2019	42.05	6532.26
B17	8/26/2019	41.50	6532.81
B17	9/30/2019	42.20	6532.11
B17	10/28/2019	42.80	6531.51
B18	4/29/2019	42.25	6533.88
B18	5/28/2019	42.25	6533.88
B18	6/24/2019	44.05	6532.08
B18	7/29/2019	44.55	6531.58
B18	8/26/2019	43.10	6533.03
B18	9/30/2019	44.20	6531.93
B18	10/28/2019	45.60	6530.53
B31	4/29/2019	43.15	6532.81
B31	5/28/2019	43.30	6532.66
B31	6/24/2019	45.40	6530.56
B31	7/29/2019	46.80	6529.16
B31	8/26/2019	44.45	6531.51
B31	9/30/2019	44.70	6531.26
B31	10/28/2019	59.40	6516.56

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

B32

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	43.50	6531.89
5/28/2019	43.40	6531.99
6/24/2019	50.20	6525.19
7/29/2019	51.90	6523.49
8/26/2019	45.25	6530.14
9/30/2019	44.20	6531.19
10/28/2019	46.10	6529.29

BA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	40.97	6530.61
1/14/2019	40.35	6531.23
1/21/2019	41.98	6529.60
1/28/2019	40.60	6530.98
2/4/2019	42.69	6528.89
2/11/2019	41.34	6530.24
2/19/2019	40.10	6531.48
2/25/2019	41.00	6530.58
3/4/2019	40.09	6531.49
3/11/2019	37.35	6534.23
3/18/2019	40.11	6531.47
3/25/2019	40.60	6530.98
4/1/2019	38.51	6533.07
4/8/2019	40.22	6531.36
4/15/2019	39.71	6531.87
4/22/2019	40.00	6531.58
4/29/2019	39.83	6531.75
5/6/2019	40.00	6531.58
5/13/2019	40.00	6531.58
5/20/2019	39.80	6531.78
5/28/2019	40.00	6531.58
6/3/2019	39.92	6531.66
6/10/2019	40.00	6531.58
7/1/2019	40.50	6531.08
7/8/2019	40.53	6531.05
7/15/2019	41.10	6530.48
7/22/2019	41.40	6530.18
7/29/2019	39.65	6531.93
8/5/2019	40.40	6531.18
8/12/2019	40.57	6531.01
8/19/2019	40.68	6530.90
8/26/2019	40.27	6531.31
9/2/2019	40.47	6531.11
9/9/2019	40.20	6531.38
9/16/2019	44.40	6527.18
9/23/2019	40.67	6530.91
9/30/2019	40.40	6531.18
10/7/2019	40.46	6531.12
10/14/2019	39.73	6531.85
10/21/2019	40.79	6530.79
10/28/2019	40.64	6530.94
11/4/2019	40.53	6531.05
11/11/2019	40.65	6530.93
11/18/2019	40.58	6531.00
11/25/2019	41.31	6530.27
12/2/2019	41.61	6529.97
12/9/2019	41.48	6530.10
12/16/2019	41.75	6529.83
12/23/2019	41.80	6529.78
12/30/2019	42.00	6529.58

BC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	39.73	6534.88
12/17/2019	39.37	6535.24

BK1c

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/10/2019	44.25	6539.75

BK1f

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/10/2019	44.79	6539.21

BK2c

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/10/2019	40.29	6551.71

BK2f

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/10/2019	40.06	6551.94

BP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/1/2019	43.20	6529.10
12/13/2019	43.00	6529.30

C1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/16/2019	38.83	6533.03

C2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/27/2019	34.33	6530.69

C5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/27/2019	34.82	6535.03

C6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	27.78	6557.11
11/1/2019	78.17	6506.72

C7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/1/2019	44.96	6539.48

C8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	58.50	6525.99
11/1/2019	59.77	6524.72

C9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/1/2019	56.51	6528.04

C11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/5/2019	43.08	6538.30

C12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/1/2019	25.26	6555.29

C18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/28/2019	10.40	6560.70

C19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	26.20	6543.71
10/28/2019	18.60	6551.31

C20

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	18.00	6552.16
10/28/2019	17.20	6552.96

C21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	22.40	6549.59
9/30/2019	26.70	6545.29
10/28/2019	26.24	6545.75

D1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/6/2019	40.20	6530.70
7/19/2019	43.13	6527.77

DC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	41.80	6529.51

DD

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	48.45	6544.14
1/15/2019	48.42	6544.17
1/21/2019	48.10	6544.49
1/28/2019	48.30	6544.29
2/4/2019	48.20	6544.39
2/11/2019	48.23	6544.36
2/12/2019	48.65	6543.94
2/20/2019	48.40	6544.19
2/25/2019	48.55	6544.04
3/5/2019	48.60	6543.99
3/11/2019	48.55	6544.04
3/19/2019	48.50	6544.09
3/25/2019	48.57	6544.02
4/2/2019	48.45	6544.14
4/8/2019	48.60	6543.99
4/18/2019	48.60	6543.99
4/24/2019	48.50	6544.09
4/29/2019	48.45	6544.14
5/8/2019	48.55	6544.04
5/13/2019	48.60	6543.99
5/22/2019	48.40	6544.19
5/28/2019	48.60	6543.99
6/13/2019	48.25	6544.34
6/24/2019	48.32	6544.27
7/29/2019	48.28	6544.31
8/19/2019	48.62	6543.97
8/26/2019	48.80	6543.79
9/30/2019	48.70	6543.89
10/8/2019	48.59	6544.00
10/28/2019	48.88	6543.71

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

DD2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	45.95	6547.33
1/15/2019	45.90	6547.38
1/21/2019	45.42	6547.86
1/28/2019	45.77	6547.51
2/4/2019	45.70	6547.58
2/11/2019	45.73	6547.55
2/12/2019	46.10	6547.18
2/20/2019	45.70	6547.58
2/25/2019	43.95	6549.33
3/5/2019	46.05	6547.23
3/11/2019	45.95	6547.33
3/19/2019	45.85	6547.43
3/25/2019	46.05	6547.23
4/2/2019	45.90	6547.38
4/8/2019	46.03	6547.25
4/18/2019	46.10	6547.18
4/24/2019	46.00	6547.28
4/29/2019	45.90	6547.38
5/8/2019	45.90	6547.38
5/13/2019	46.00	6547.28
5/22/2019	45.75	6547.53
5/28/2019	45.90	6547.38
6/13/2019	45.90	6547.38
6/24/2019	46.05	6547.23
7/29/2019	46.04	6547.24
8/19/2019	46.14	6547.14
8/26/2019	46.00	6547.28
9/30/2019	42.10	6551.18
10/8/2019	46.06	6547.22
10/28/2019	46.10	6547.18

DD3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	48.50	6552.44
1/15/2019	48.80	6552.14
1/21/2019	48.40	6552.54
1/28/2019	48.47	6552.47
2/4/2019	48.40	6552.54
2/12/2019	48.56	6552.38
2/20/2019	48.45	6552.49
2/25/2019	48.60	6552.34
3/5/2019	48.55	6552.39
3/11/2019	48.55	6552.39
3/19/2019	48.53	6552.41
3/25/2019	48.60	6552.34
3/28/2019	48.52	6552.42
4/2/2019	48.50	6552.44
4/8/2019	48.60	6552.34
4/18/2019	48.55	6552.39
4/24/2019	48.65	6552.29
5/9/2019	48.50	6552.44
5/13/2019	48.53	6552.41
5/22/2019	48.50	6552.44
6/13/2019	48.60	6552.34
10/23/2019	48.65	6552.29

DD4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	47.98	6551.45
1/15/2019	47.95	6551.48
1/21/2019	47.45	6551.98
1/28/2019	47.90	6551.53
2/4/2019	47.70	6551.73
2/12/2019	48.10	6551.33
2/20/2019	47.80	6551.63
2/25/2019	47.95	6551.48
3/5/2019	48.10	6551.33
3/11/2019	48.00	6551.43
3/19/2019	47.95	6551.48
3/25/2019	48.10	6551.33
3/28/2019	47.98	6551.45
4/2/2019	47.85	6551.58
4/8/2019	48.10	6551.33
4/18/2019	48.15	6551.28
4/24/2019	48.00	6551.43
5/13/2019	48.00	6551.43
5/22/2019	47.80	6551.63
5/23/2019	47.90	6551.53
6/13/2019	47.98	6551.45
10/23/2019	48.15	6551.28

DD5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	49.80	6545.55
1/15/2019	49.85	6545.50
1/21/2019	49.45	6545.90
1/28/2019	49.80	6545.55
2/4/2019	49.70	6545.65
2/12/2019	50.05	6545.30
2/20/2019	49.75	6545.60
2/25/2019	49.95	6545.40
3/5/2019	50.05	6545.30
3/11/2019	50.00	6545.35
3/19/2019	49.95	6545.40
3/25/2019	50.05	6545.30
3/28/2019	49.99	6545.36
4/2/2019	49.95	6545.40
4/8/2019	50.00	6545.35
4/18/2019	50.05	6545.30
4/24/2019	49.90	6545.45
5/9/2019	49.90	6545.45
5/13/2019	49.90	6545.45
5/22/2019	49.70	6545.65
6/13/2019	49.90	6545.45
10/23/2019	50.45	6544.90

DD6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	> 35.00	< 6560.81
1/15/2019	> 35.00	< 6560.81
1/21/2019	> 35.00	< 6560.81
1/28/2019	> 35.00	< 6560.81
2/4/2019	> 35.00	< 6560.81
2/12/2019	> 35.00	< 6560.81
2/20/2019	> 35.00	< 6560.81
2/25/2019	> 35.00	< 6560.81
3/5/2019	> 35.00	< 6560.81
3/11/2019	> 35.00	< 6560.81
3/19/2019	> 35.00	< 6560.81
3/25/2019	> 35.00	< 6560.81
4/2/2019	> 35.00	< 6560.81
4/8/2019	> 35.00	< 6560.81
4/18/2019	> 35.00	< 6560.81
4/24/2019	> 35.00	< 6560.81
5/13/2019	> 35.00	< 6560.81
5/22/2019	> 35.00	< 6560.81
6/13/2019	> 35.00	< 6560.81

DD7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/2/2019	> 24.20	< 6572.63
1/15/2019	> 24.20	< 6572.63
1/21/2019	> 24.20	< 6572.63
1/28/2019	> 24.20	< 6572.63
2/4/2019	> 24.20	< 6572.63
2/12/2019	> 24.20	< 6572.63
2/20/2019	> 24.20	< 6572.63
2/25/2019	> 24.20	< 6572.63
3/5/2019	> 24.20	< 6572.63
3/11/2019	> 24.20	< 6572.63
3/19/2019	> 24.20	< 6572.63
3/25/2019	> 24.20	< 6572.63
4/2/2019	> 24.20	< 6572.63
4/8/2019	> 24.20	< 6572.63
4/18/2019	> 24.20	< 6572.63
4/24/2019	> 24.20	< 6572.63
5/13/2019	> 24.20	< 6572.63
5/22/2019	> 24.20	< 6572.63
6/13/2019	> 24.20	< 6572.63

DT

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/1/2019	48.80	6535.01
7/8/2019	48.71	6535.10
7/15/2019	48.60	6535.21
7/22/2019	55.30	6528.51
7/29/2019	55.14	6528.67
8/5/2019	48.96	6534.85
8/12/2019	49.59	6534.22
8/19/2019	49.21	6534.60
8/26/2019	48.80	6535.01
9/2/2019	48.93	6534.88
9/9/2019	50.60	6533.21
9/16/2019	54.90	6528.91
9/23/2019	56.35	6527.46
9/30/2019	56.25	6527.56
10/7/2019	56.22	6527.59
10/14/2019	48.97	6534.84
10/21/2019	49.22	6534.59
10/28/2019	56.75	6527.06
11/4/2019	50.28	6533.53
11/11/2019	57.39	6526.42
11/18/2019	56.97	6526.84
11/25/2019	42.96	6540.85
12/2/2019	50.04	6533.77
12/9/2019	51.06	6532.75
12/16/2019	57.10	6526.71
12/23/2019	56.30	6527.51
12/30/2019	56.58	6527.23

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

DZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	54.56	6535.97
1/21/2019	55.69	6534.84
1/28/2019	54.60	6535.93
2/4/2019	52.48	6538.05
2/11/2019	54.24	6536.29
2/19/2019	53.72	6536.81
2/25/2019	54.60	6535.93
3/4/2019	53.58	6536.95
3/11/2019	53.34	6537.19
3/18/2019	54.05	6536.48
3/25/2019	54.35	6536.18
4/1/2019	54.51	6536.02
4/8/2019	54.22	6536.31
4/15/2019	53.31	6537.22
4/22/2019	54.00	6536.53
4/29/2019	53.93	6536.60
5/6/2019	54.00	6536.53
5/13/2019	54.15	6536.38
5/20/2019	54.75	6535.78
5/28/2019	55.05	6535.48
6/3/2019	54.99	6535.54
6/10/2019	55.50	6535.03
7/1/2019	54.35	6536.18
7/8/2019	54.84	6535.69
7/15/2019	55.20	6535.33
7/22/2019	55.60	6534.93
7/29/2019	55.47	6535.06
8/5/2019	55.53	6535.00
8/12/2019	55.58	6534.95
8/19/2019	55.59	6534.94
8/26/2019	54.05	6536.48
9/2/2019	55.20	6535.33
9/9/2019	53.88	6536.65
9/16/2019	55.30	6535.23
9/23/2019	55.42	6535.11
9/30/2019	55.36	6535.17
10/7/2019	55.25	6535.28
10/14/2019	55.08	6535.45
10/21/2019	54.92	6535.61
10/28/2019	54.65	6535.88
11/4/2019	54.79	6535.74
11/11/2019	55.32	6535.21
11/18/2019	55.52	6535.01
11/25/2019	55.52	6535.01
12/2/2019	55.97	6534.56
12/9/2019	55.66	6534.87
12/16/2019	55.90	6534.63
12/23/2019	55.35	6535.18
12/30/2019	55.40	6535.13

F

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/6/2019	35.29	6529.53
9/23/2019	35.73	6529.09
12/18/2019	36.00	6528.82

FB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/6/2019	37.00	6528.66
9/23/2019	37.23	6528.43

GA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	39.05	6523.74

GF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	38.60	6527.41

GH

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/6/2019	35.65	6527.11
9/30/2019	35.57	6527.19

GN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/5/2019	39.73	6528.24

GV

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/13/2019	61.65	6515.73
12/18/2019	51.90	6525.48

GW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	37.40	6527.87

GW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	39.85	6526.23

I

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	37.75	6529.45

K4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/9/2019	80.96	6521.06

K5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/9/2019	82.50	6519.23

K7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/11/2019	62.68	6538.85

K8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/9/2019	61.78	6538.71
11/5/2019	79.97	6520.52

K9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/22/2019	63.97	6536.37

K10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/9/2019	63.47	6537.34
11/5/2019	62.88	6537.93

K11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/9/2019	64.18	6536.43

KEB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/26/2019	31.09	6538.64

KF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/26/2019	34.19	6536.02

KZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	35.76	6535.96
1/14/2019	35.83	6535.89
1/21/2019	35.71	6536.01
1/28/2019	35.40	6536.32
2/4/2019	35.53	6536.19
2/11/2019	35.51	6536.21
2/19/2019	35.51	6536.21
2/25/2019	35.20	6536.52
3/4/2019	35.49	6536.23
3/11/2019	35.34	6536.38
3/18/2019	35.28	6536.44
3/25/2019	34.95	6536.77
3/26/2019	35.25	6536.47
4/1/2019	35.35	6536.37
4/8/2019	35.44	6536.28
4/15/2019	35.49	6536.23
4/22/2019	35.40	6536.32
4/29/2019	35.26	6536.46
5/6/2019	35.35	6536.37
5/13/2019	35.40	6536.32
5/20/2019	35.45	6536.27
5/28/2019	35.45	6536.27
6/3/2019	35.45	6536.27
6/10/2019	35.35	6536.37
7/1/2019	35.40	6536.32
7/8/2019	35.44	6536.28
7/15/2019	39.20	6532.52
7/22/2019	35.60	6536.12
7/29/2019	35.75	6535.97
8/5/2019	35.66	6536.06
8/12/2019	35.70	6536.02
8/19/2019	35.63	6536.09
8/26/2019	37.73	6533.99
9/2/2019	35.57	6536.15
9/9/2019	37.68	6534.04
9/16/2019	35.55	6536.17
9/23/2019	35.70	6536.02
9/30/2019	35.69	6536.03
10/7/2019	35.61	6536.11
10/14/2019	35.97	6535.75
10/21/2019	35.88	6535.84
10/28/2019	35.91	6535.81
11/4/2019	35.93	6535.79
11/11/2019	35.95	6535.77
11/18/2019	35.98	6535.74
11/25/2019	35.98	6535.74
12/2/2019	36.06	6535.66
12/9/2019	36.01	6535.71
12/16/2019	36.10	6535.62
12/23/2019	36.10	6535.62
12/30/2019	36.15	6535.57

L5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/3/2019	44.49	6531.58
11/22/2019	47.09	6528.98

L6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/10/2019	32.74	6541.90
10/21/2019	33.27	6541.37

L9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/10/2019	45.88	6531.35
12/17/2019	29.80	6547.43

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
M5	12/10/2019	43.89	6531.45
M5	12/18/2019	44.00	6531.34
M6	2/13/2019	61.00	6514.04
M6	12/17/2019	61.80	6513.24
M7	2/13/2019	56.65	6516.20
M7	12/17/2019	57.60	6515.25
M9	11/12/2019	65.51	6511.30
M9	12/17/2019	65.10	6511.71
M10	2/19/2019	62.05	6511.31
M30	8/26/2019	22.00	6552.91
M30	9/30/2019	36.00	6538.91
M31	7/29/2019	40.75	6535.18
M31	8/26/2019	41.15	6534.78
M31	9/30/2019	41.40	6534.53
M31	10/28/2019	40.40	6535.53
MA	12/17/2019	44.45	6527.77
MB	3/5/2019	43.57	6528.49
MC	12/17/2019	45.85	6526.21
MF	12/17/2019	48.50	6523.78
MH	12/17/2019	52.75	6521.17
MJ	12/17/2019	> 54.35	< 6518.59
ML	2/19/2019	53.48	6519.22
ML	12/17/2019	54.50	6518.20
MN	12/17/2019	> 64.30	< 6513.26
MU	10/15/2019	43.60	6530.59
MU	12/17/2019	44.32	6529.87
MW	2/19/2019	61.93	6512.98
MW	12/17/2019	64.45	6510.46
MX	8/21/2019	51.30	6517.31
MY	10/14/2019	57.11	6516.45
MZ	2/19/2019	64.25	6512.39
MZ	12/17/2019	65.15	6511.49
N	8/29/2019	41.60	6542.37
NA	8/29/2019	46.02	6544.96
NB	8/29/2019	48.45	6544.85
NC	4/2/2019	40.91	6544.92
NC	12/18/2019	41.54	6544.29
ND	12/11/2019	40.61	6552.28
O	8/28/2019	40.48	6547.35
P	5/1/2019	38.50	6548.76
P1	12/18/2019	43.44	6549.03
P2	3/27/2019	42.11	6547.68
P3	3/27/2019	42.15	6547.80
P4	3/27/2019	39.14	6550.38
Q	5/1/2019	41.83	6551.99
S	12/17/2019	47.70	6533.47
S1	7/1/2019	40.40	6534.79
S1	7/8/2019	40.32	6534.87
S1	7/15/2019	40.50	6534.69
S1	7/22/2019	40.70	6534.49
S1	7/29/2019	40.38	6534.81
S1	8/5/2019	40.57	6534.62
S1	8/12/2019	40.63	6534.56
S1	8/19/2019	40.69	6534.50
S1	8/26/2019	40.40	6534.79
S1	9/2/2019	40.75	6534.44
S1	9/9/2019	40.75	6534.44
S1	9/16/2019	40.90	6534.29
S1	9/23/2019	40.97	6534.22
S1	9/30/2019	40.99	6534.20
S1	10/7/2019	41.06	6534.13
S1	10/14/2019	41.09	6534.10
S1	10/21/2019	41.10	6534.09
S1	10/28/2019	41.12	6534.07
S1	11/4/2019	41.16	6534.03
S1	11/11/2019	41.11	6534.08
S1	11/18/2019	41.13	6534.06
S1	11/25/2019	41.04	6534.15
S1	12/2/2019	41.07	6534.12
S1	12/9/2019	41.08	6534.11
S1	12/16/2019	41.25	6533.94
S1	12/23/2019	41.20	6533.99
S1	12/30/2019	41.18	6534.01

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

S2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	39.45	6534.27
1/8/2019	39.40	6534.32
1/21/2019	39.21	6534.51
1/28/2019	39.55	6534.17
2/4/2019	39.51	6534.21
2/11/2019	41.12	6532.60
2/19/2019	39.56	6534.16
3/4/2019	39.71	6534.01
3/11/2019	39.74	6533.98
3/18/2019	39.74	6533.98
4/1/2019	39.84	6533.88
4/8/2019	39.97	6533.75
4/15/2019	40.07	6533.65
4/22/2019	40.00	6533.72
4/29/2019	39.96	6533.76
5/6/2019	40.05	6533.67
5/13/2019	40.10	6533.62
6/3/2019	40.00	6533.72
6/10/2019	40.10	6533.62
7/8/2019	40.31	6533.41
7/22/2019	40.70	6533.02
7/29/2019	39.52	6534.20
8/1/2019	40.48	6533.24
8/5/2019	40.52	6533.20
8/12/2019	40.63	6533.09
8/19/2019	40.67	6533.05
8/26/2019	40.85	6532.87
9/2/2019	40.76	6532.96
9/9/2019	40.90	6532.82
9/16/2019	40.98	6532.74
9/23/2019	41.00	6532.72
9/30/2019	40.98	6532.74
10/7/2019	41.03	6532.69
10/14/2019	41.00	6532.72
10/21/2019	39.98	6533.74
10/28/2019	41.08	6532.64
11/4/2019	41.18	6532.54
11/11/2019	41.06	6532.66
11/18/2019	41.08	6532.64
11/25/2019	40.98	6532.74
12/2/2019	41.57	6532.15
12/9/2019	41.02	6532.70
12/16/2019	41.20	6532.52
12/17/2019	41.10	6532.62
12/23/2019	41.02	6532.70
12/30/2019	41.15	6532.57

S3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	42.60	6532.18

S4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/31/2019	41.47	6533.82
12/17/2019	42.10	6533.19

S5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	46.01	6528.68
1/14/2019	44.93	6529.76
1/21/2019	44.83	6529.86
1/28/2019	45.00	6529.69
2/4/2019	44.89	6529.80
2/11/2019	44.81	6529.88
2/19/2019	44.74	6529.95
2/25/2019	44.90	6529.79
3/4/2019	44.69	6530.00
3/11/2019	44.72	6529.97
3/18/2019	44.80	6529.89
3/25/2019	45.00	6529.69
4/1/2019	48.29	6526.40
4/8/2019	44.79	6529.90
4/15/2019	42.71	6531.98
4/22/2019	44.75	6529.94
4/29/2019	44.67	6530.02
5/6/2019	44.90	6529.79
5/13/2019	45.00	6529.69
5/20/2019	44.80	6529.89
5/28/2019	44.85	6529.84
6/3/2019	44.74	6529.95
6/10/2019	44.90	6529.79
7/1/2019	45.35	6529.34
7/8/2019	45.19	6529.50
7/15/2019	45.40	6529.29
7/22/2019	45.60	6529.09
7/29/2019	45.43	6529.26
8/5/2019	45.45	6529.24
8/12/2019	45.52	6529.17
8/19/2019	45.55	6529.14
8/26/2019	45.24	6529.45
9/2/2019	45.52	6529.17
9/9/2019	45.35	6529.34
9/16/2019	45.50	6529.19
9/23/2019	45.70	6528.99
9/30/2019	45.71	6528.98
10/7/2019	45.82	6528.87
10/14/2019	45.87	6528.82
10/21/2019	45.84	6528.85
10/28/2019	45.84	6528.85
11/4/2019	45.96	6528.73
11/11/2019	45.95	6528.74
11/18/2019	46.06	6528.63
11/25/2019	45.93	6528.76
12/2/2019	46.07	6528.62
12/9/2019	46.02	6528.67
12/16/2019	46.03	6528.66
12/23/2019	46.00	6528.69
12/30/2019	46.12	6528.57

S5R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/14/2019	49.10	6531.39

S11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2019	40.42	6537.97
12/9/2019	41.22	6537.17
12/17/2019	41.13	6537.26

S12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/16/2019	44.38	6534.47

S19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/19/2019	41.00	6536.97
12/17/2019	41.70	6536.27

S21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	39.75	6540.53

SA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/1/2019	47.00	6533.31
7/8/2019	46.72	6533.59
7/15/2019	47.00	6533.31
7/22/2019	47.30	6533.01
7/29/2019	47.13	6533.18
8/5/2019	47.15	6533.16
8/12/2019	47.31	6533.00
8/19/2019	47.30	6533.01
8/26/2019	46.98	6533.33
9/2/2019	47.36	6532.95
9/9/2019	47.10	6533.21
9/16/2019	47.20	6533.11
9/23/2019	47.60	6532.71
9/30/2019	47.32	6532.99
10/7/2019	47.66	6532.65
10/14/2019	47.65	6532.66
10/21/2019	47.64	6532.67
10/28/2019	47.68	6532.63
11/4/2019	47.77	6532.54
11/11/2019	48.64	6531.67
11/18/2019	47.62	6532.69
11/25/2019	47.53	6532.78
12/2/2019	47.62	6532.69
12/9/2019	47.69	6532.62
12/16/2019	48.05	6532.26
12/23/2019	47.65	6532.66
12/30/2019	47.90	6532.41

SB

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/9/2019	48.31	6532.78

SE6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/15/2019	44.13	6534.78

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

SM

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	42.91	6535.83
1/14/2019	42.90	6535.84
1/21/2019	42.72	6536.02
1/28/2019	42.93	6535.81
2/4/2019	42.95	6535.79
2/11/2019	42.83	6535.91
2/19/2019	42.89	6535.85
2/25/2019	43.16	6535.58
3/4/2019	42.98	6535.76
3/11/2019	43.11	6535.63
3/18/2019	43.06	6535.68
3/25/2019	43.30	6535.44
4/1/2019	42.56	6536.18
4/8/2019	43.19	6535.55
4/15/2019	43.15	6535.59
4/22/2019	43.25	6535.49
4/29/2019	43.24	6535.50
5/6/2019	43.30	6535.44
5/7/2019	43.30	6535.44
5/13/2019	43.40	6535.34
5/20/2019	43.30	6535.44
5/28/2019	43.40	6535.34
6/3/2019	43.32	6535.42
6/10/2019	43.55	6535.19
7/1/2019	43.60	6535.14
7/8/2019	43.51	6535.23
7/15/2019	43.55	6535.19
7/22/2019	43.70	6535.04
7/29/2019	43.63	6535.11
8/5/2019	43.63	6535.11
8/12/2019	43.69	6535.05
8/19/2019	43.74	6535.00
8/26/2019	44.32	6534.42
9/2/2019	43.76	6534.98
9/9/2019	43.80	6534.94
9/16/2019	44.00	6534.74
9/23/2019	44.00	6534.74
9/30/2019	44.02	6534.72
10/7/2019	44.14	6534.60
10/14/2019	44.18	6534.56
10/21/2019	44.21	6534.53
10/28/2019	44.19	6534.55
11/4/2019	44.22	6534.52
11/11/2019	44.21	6534.53
11/18/2019	44.23	6534.51
11/25/2019	44.13	6534.61
12/2/2019	44.37	6534.37
12/9/2019	44.17	6534.57
12/16/2019	44.36	6534.38
12/23/2019	44.15	6534.59
12/30/2019	44.22	6534.52

SN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	42.92	6536.34
1/14/2019	42.89	6536.37
1/21/2019	42.71	6536.55
1/28/2019	42.90	6536.36
2/4/2019	42.77	6536.49
2/11/2019	42.52	6536.74
2/19/2019	42.72	6536.54
2/25/2019	42.65	6536.61
3/4/2019	42.83	6536.43
3/11/2019	43.24	6536.02
3/18/2019	42.97	6536.29
3/25/2019	43.05	6536.21
4/1/2019	42.83	6536.43
4/8/2019	42.98	6536.28
4/15/2019	42.90	6536.36
4/22/2019	43.00	6536.26
4/29/2019	39.97	6539.29
5/6/2019	43.10	6536.16
5/13/2019	42.80	6536.46
5/20/2019	43.00	6536.26
5/28/2019	43.15	6536.11
6/3/2019	43.06	6536.20
6/10/2019	43.15	6536.11
7/1/2019	43.30	6535.96
7/8/2019	43.23	6536.03
7/15/2019	42.30	6536.96
7/22/2019	43.45	6535.81
7/29/2019	43.45	6535.81
8/5/2019	43.35	6535.91
8/12/2019	43.51	6535.75
8/19/2019	43.60	6535.66
8/26/2019	43.30	6535.96
9/2/2019	43.46	6535.80
9/9/2019	43.50	6535.76
9/16/2019	43.75	6535.51
9/23/2019	44.40	6534.86
9/30/2019	43.84	6535.42
10/7/2019	43.95	6535.31
10/14/2019	44.00	6535.26
10/21/2019	44.03	6535.23
10/28/2019	44.02	6535.24
11/4/2019	44.08	6535.18
11/11/2019	44.06	6535.20
11/18/2019	44.06	6535.20
11/25/2019	43.99	6535.27
12/2/2019	44.03	6535.23
12/9/2019	44.03	6535.23
12/16/2019	44.60	6534.66
12/17/2019	44.45	6534.81
12/23/2019	44.02	6535.24
12/30/2019	44.10	6535.16

SO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	43.57	6535.22
1/14/2019	43.50	6535.29
1/21/2019	43.33	6535.46
1/28/2019	43.58	6535.21
2/4/2019	42.53	6536.26
2/11/2019	43.45	6535.34
2/19/2019	43.65	6535.14
2/25/2019	43.80	6534.99
3/4/2019	44.63	6534.16
3/11/2019	43.75	6535.04
3/18/2019	43.83	6534.96
3/25/2019	43.90	6534.89
4/1/2019	42.83	6535.96
4/8/2019	43.97	6534.82
4/15/2019	43.82	6534.97
4/22/2019	44.00	6534.79
4/29/2019	39.98	6538.81
5/6/2019	44.05	6534.74
5/13/2019	44.10	6534.69
5/20/2019	44.00	6534.79
5/28/2019	44.05	6534.74
5/30/2019	44.10	6534.69
6/3/2019	43.98	6534.81
6/10/2019	44.15	6534.64
7/1/2019	44.30	6534.49
7/8/2019	44.28	6534.51
7/15/2019	44.40	6534.39
7/22/2019	44.40	6534.39
7/29/2019	44.40	6534.39
8/5/2019	44.43	6534.36
8/12/2019	44.49	6534.30
8/19/2019	44.55	6534.24
8/26/2019	44.63	6534.16
9/2/2019	44.61	6534.18
9/9/2019	44.63	6534.16
9/16/2019	44.73	6534.06
9/23/2019	44.85	6533.94
9/30/2019	44.87	6533.92
10/7/2019	44.91	6533.88
10/14/2019	44.90	6533.89
10/21/2019	44.97	6533.82
10/28/2019	44.94	6533.85
11/4/2019	45.97	6532.82
11/11/2019	44.96	6533.83
11/18/2019	44.97	6533.82
11/25/2019	44.86	6533.93
12/2/2019	45.01	6533.78
12/9/2019	44.90	6533.89
12/16/2019	45.05	6533.74
12/23/2019	44.90	6533.89
12/30/2019	45.00	6533.79

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SP	1/7/2019	41.36	6537.30
SP	1/14/2019	43.48	6535.18
SP	1/21/2019	43.31	6535.35
SP	1/28/2019	43.53	6535.13
SP	2/4/2019	42.30	6536.36
SP	2/11/2019	43.21	6535.45
SP	2/19/2019	43.30	6535.36
SP	2/25/2019	43.60	6535.06
SP	3/4/2019	43.36	6535.30
SP	3/11/2019	42.82	6535.84
SP	3/18/2019	43.65	6535.01
SP	3/25/2019	43.70	6534.96
SP	4/1/2019	43.58	6535.08
SP	4/8/2019	43.67	6534.99
SP	4/15/2019	43.62	6535.04
SP	4/22/2019	43.75	6534.91
SP	4/29/2019	40.24	6538.42
SP	5/6/2019	43.80	6534.86
SP	5/13/2019	43.90	6534.76
SP	5/20/2019	43.80	6534.86
SP	5/28/2019	43.90	6534.76
SP	6/3/2019	43.83	6534.83
SP	6/10/2019	43.90	6534.76
SP	7/1/2019	44.10	6534.56
SP	7/8/2019	40.02	6538.64
SP	7/15/2019	44.10	6534.56
SP	7/22/2019	44.40	6534.26
SP	7/29/2019	44.13	6534.53
SP	8/5/2019	44.18	6534.48
SP	8/12/2019	44.24	6534.42
SP	8/19/2019	44.30	6534.36
SP	8/26/2019	44.30	6534.36
SP	9/2/2019	44.32	6534.34
SP	9/9/2019	44.35	6534.31
SP	9/16/2019	44.45	6534.21
SP	9/23/2019	44.55	6534.11
SP	9/30/2019	44.58	6534.08
SP	10/7/2019	44.66	6534.00
SP	10/14/2019	44.68	6533.98
SP	10/21/2019	44.74	6533.92
SP	10/28/2019	44.72	6533.94
SP	11/4/2019	44.78	6533.88
SP	11/11/2019	44.76	6533.90
SP	11/18/2019	44.78	6533.88
SP	11/25/2019	44.69	6533.97
SP	12/2/2019	44.82	6533.84
SP	12/9/2019	44.73	6533.93
SP	12/16/2019	45.85	6532.81
SP	12/23/2019	44.70	6533.96
SP	12/30/2019	44.80	6533.86
SS	7/1/2019	46.40	6531.98
SS	7/8/2019	46.22	6532.16
SS	7/15/2019	46.40	6531.98
SS	7/22/2019	46.75	6531.63
SS	7/29/2019	46.43	6531.95
SS	8/5/2019	46.65	6531.73
SS	8/12/2019	56.36	6522.02
SS	8/19/2019	46.60	6531.78
SS	8/26/2019	46.40	6531.98
SS	9/2/2019	46.59	6531.79
SS	9/9/2019	46.50	6531.88
SS	9/16/2019	45.50	6532.88
SS	9/23/2019	46.90	6531.48
SS	9/30/2019	46.80	6531.58
SS	10/7/2019	46.92	6531.46
SS	10/14/2019	46.99	6531.39
SS	10/21/2019	46.98	6531.40
SS	10/28/2019	46.99	6531.39
SS	11/4/2019	47.06	6531.32
SS	11/11/2019	46.46	6531.92
SS	11/18/2019	47.02	6531.36
SS	11/25/2019	46.90	6531.48
SS	12/2/2019	47.05	6531.33
SS	12/9/2019	46.96	6531.42
SS	12/16/2019	47.20	6531.18
SS	12/23/2019	46.95	6531.43
SS	12/30/2019	47.10	6531.28
ST	1/9/2019	49.21	6530.10
ST	7/1/2019	50.10	6529.21
ST	7/8/2019	49.51	6529.80
ST	7/15/2019	50.30	6529.01
ST	7/22/2019	47.50	6531.81
ST	7/29/2019	49.94	6529.37
ST	8/5/2019	50.91	6528.40
ST	8/12/2019	50.86	6528.45
ST	8/19/2019	50.47	6528.84
ST	8/26/2019	46.30	6533.01
ST	9/2/2019	51.06	6528.25
ST	9/9/2019	46.40	6532.91
ST	9/16/2019	51.05	6528.26
ST	9/23/2019	51.20	6528.11
ST	9/30/2019	51.30	6528.01
ST	10/7/2019	52.41	6526.90
ST	10/14/2019	51.34	6527.97
ST	10/21/2019	51.45	6527.86
ST	10/28/2019	51.42	6527.89
ST	11/4/2019	51.54	6527.77
ST	11/11/2019	46.81	6532.50
ST	11/18/2019	46.86	6532.45
ST	11/25/2019	46.73	6532.58
ST	12/2/2019	46.90	6532.41
ST	12/9/2019	46.83	6532.48
ST	12/10/2019	46.98	6532.33
ST	12/16/2019	46.90	6532.41
ST	12/23/2019	46.80	6532.51
ST	12/30/2019	47.00	6532.31
SUR	12/9/2019	47.23	6533.49
SW	6/11/2019	45.70	6535.59
SZ	1/9/2019	41.13	6540.34
SZ	12/10/2019	42.49	6538.98
SZ	12/17/2019	42.62	6538.85
T	12/10/2019	39.10	6540.13
T2	6/4/2019	116.00	6548.82
T15	12/10/2019	120.85	6544.44
T19	6/4/2019	126.85	6540.91
T23	6/4/2019	116.10	6545.01
T24	1/15/2019	139.75	6517.28
T25	1/30/2019	121.70	6535.64
T25	4/29/2019	120.80	6536.54
T25	5/28/2019	120.85	6536.49
T25	6/24/2019	121.50	6535.84
T25	7/29/2019	122.05	6535.29
T25	8/26/2019	121.55	6535.79
T25	9/30/2019	123.81	6533.53
T25	10/28/2019	122.30	6535.04
T26	1/15/2019	120.15	6536.51
T27	1/15/2019	121.20	6535.94
T27	4/29/2019	120.80	6536.34
T27	5/28/2019	120.80	6536.34
T27	6/24/2019	121.00	6536.14
T27	7/29/2019	121.80	6535.34
T27	8/26/2019	121.60	6535.54
T27	9/30/2019	125.90	6531.24
T27	10/28/2019	121.40	6535.74
T28	1/15/2019	123.18	6535.53
T28	7/29/2019	133.85	6524.86
T28	9/30/2019	118.55	6540.16
T29	1/17/2019	121.13	6535.58
T30	1/16/2019	121.81	6537.81
T30	4/29/2019	121.55	6538.07
T30	5/28/2019	121.65	6537.97
T30	6/24/2019	122.00	6537.62
T30	7/29/2019	122.30	6537.32
T30	8/26/2019	122.35	6537.27
T30	9/30/2019	122.40	6537.22
T30	10/28/2019	123.00	6536.62
T31	1/16/2019	120.98	6538.05

* Drawdown Tube Pressure, # Transducer Reading

Table A.2-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
T32		
1/16/2019	123.69	6537.92
4/29/2019	123.55	6538.06
5/28/2019	123.60	6538.01
6/24/2019	123.80	6537.81
7/29/2019	123.05	6538.56
8/26/2019	124.00	6537.61
10/28/2019	123.70	6537.91
T36		
1/15/2019	123.51	6531.93
T41		
6/4/2019	67.95	6592.01
T43		
1/17/2019	118.93	6538.59
T45		
4/29/2019	118.20	6539.86
5/28/2019	118.20	6539.86
6/24/2019	118.40	6539.66
7/29/2019	118.60	6539.46
8/26/2019	118.60	6539.46
10/28/2019	118.40	6539.66
T47		
1/30/2019	117.57	6539.64
T48		
1/30/2019	118.35	6539.21
T53		
1/30/2019	116.58	6540.40
T54		
6/5/2019	116.55	6540.55
TA		
12/10/2019	39.39	6540.91
WME-9		
2/27/2019	57.50	6543.32
5/22/2019	57.30	6543.52
12/13/2019	57.38	6543.44
WME-10		
2/27/2019	60.15	6542.68
5/22/2019	60.00	6542.83
12/13/2019	60.54	6542.29
WR12		
12/17/2019	26.30	6541.89
X		
1/28/2019	32.81	6538.80
2/7/2019	32.79	6538.82
2/25/2019	33.30	6538.31
3/25/2019	33.40	6538.21
4/8/2019	32.02	6539.59
4/29/2019	33.05	6538.56
5/28/2019	33.40	6538.21
6/24/2019	33.65	6537.96
7/29/2019	33.53	6538.08
7/31/2019	33.56	6538.05
8/26/2019	33.90	6537.71
9/30/2019	34.02	6537.59
10/8/2019	33.73	6537.88
10/18/2019	33.78	6537.83
10/28/2019	33.60	6538.01
X18		
12/11/2019	37.85	6548.23

* Drawdown Tube Pressure, # Transducer Reading

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

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0410	6/27/2019	38.00	6521.66
0421	7/11/2019	43.20	6528.80
0481	6/27/2019	72.00	6496.00
0483	1/28/2019	40.56	6522.10
0483	2/25/2019	41.53	6521.13
0483	3/25/2019	40.30	6522.36
0483	4/9/2019	40.82	6521.84
0483	4/29/2019	41.45	6521.21
0490	1/28/2019	44.26	6518.16
0490	6/3/2019	45.15	6517.27
0496	1/28/2019	50.91	6511.61
0496	2/25/2019	51.78	6510.74
0496	3/25/2019	52.04	6510.48
0497	1/28/2019	47.42	6515.20
0497	2/25/2019	51.82	6510.80
0497	3/25/2019	52.11	6510.51
0497	4/22/2019	51.71	6510.91
0497	6/3/2019	51.60	6511.02
0497	12/18/2019	51.20	6511.42
0498	1/28/2019	57.33	6503.26
0498	2/25/2019	57.84	6502.75
0498	3/25/2019	54.51	6506.08
0498	4/9/2019	54.23	6506.36
0525	6/27/2019	53.45	6516.55
0688	8/21/2019	59.69	6502.93
0688	12/18/2019	60.30	6502.32
0802	8/21/2019	88.02	6474.70
0844	2/4/2019	37.44	6518.69
0844	12/18/2019	38.25	6517.88
0845	1/7/2019	35.95	6521.10
0845	2/12/2019	36.11	6520.94
0845	12/18/2019	36.80	6520.25
AW	4/10/2019	36.46	6526.97
AW	12/18/2019	37.10	6526.33
CW44	1/28/2019	56.48	6504.26
CW44	2/25/2019	57.53	6503.21
CW44	3/25/2019	55.51	6505.23
Q1	2/25/2019	36.19	6525.42
Q1	3/25/2019	41.32	6520.29
Q2	1/28/2019	72.52	6489.16
Q2	2/25/2019	81.49	6480.19
Q2	3/25/2019	56.52	6505.16
Q2	4/15/2019	54.71	6506.97
Q2	8/27/2019	55.60	6506.08
Q3	1/28/2019	68.97	6490.77
Q3	2/25/2019	60.25	6499.49
Q3	3/25/2019	54.20	6505.54
Q3	4/15/2019	53.07	6506.67
Q5	1/28/2019	59.12	6502.36
Q5	2/25/2019	67.80	6493.68
Q5	3/25/2019	55.65	6505.83
Q5	4/3/2019	54.98	6506.50
Q5	11/11/2019	53.50	6507.98
Q7	1/28/2019	54.66	6506.51
Q7	2/25/2019	56.24	6504.93
Q7	3/25/2019	54.05	6507.12
Q8	1/28/2019	55.06	6505.74
Q8	2/25/2019	56.21	6504.59
Q8	3/25/2019	53.55	6507.25
Q8	12/18/2019	46.65	6514.15
Q9	4/15/2019	52.77	6508.56
Q9	8/26/2019	53.51	6507.82
Q11	1/28/2019	56.29	6504.73
Q11	2/25/2019	56.50	6504.52
Q11	3/25/2019	54.67	6506.35
Q11	4/15/2019	53.46	6507.56
Q11	8/26/2019	54.20	6506.82
Q12	1/28/2019	53.98	6507.14
Q12	2/25/2019	55.32	6505.80
Q12	3/25/2019	56.24	6504.88
Q12	4/15/2019	52.90	6508.22
Q12	8/26/2019	53.90	6507.22
Q13	1/28/2019	54.71	6507.43
Q13	2/25/2019	17.10	6545.04
Q13	3/25/2019	40.02	6522.12
Q14	1/28/2019	52.10	6509.87
Q14	2/25/2019	54.05	6507.92
Q14	3/25/2019	33.06	6528.91
Q15	1/28/2019	53.22	6509.03
Q15	2/25/2019	53.90	6508.35
Q15	3/25/2019	53.09	6509.16
Q15	6/24/2019	54.25	6508.00
Q16	3/25/2019	54.86	6508.42
Q18	1/28/2019	49.06	6512.63
Q18	2/25/2019	49.46	6512.23
Q18	3/25/2019	53.86	6507.83
Q18	4/15/2019	52.70	6508.99
Q18	6/24/2019	49.15	6512.54
Q19	4/15/2019	69.64	6492.53
Q19	8/23/2019	53.42	6508.75
Q21	1/28/2019	51.36	6511.73
Q21	2/25/2019	52.20	6510.89
Q21	3/25/2019	52.35	6510.74
Q21	6/24/2019	52.30	6510.79
Q22	1/28/2019	51.38	6511.41
Q22	2/25/2019	50.17	6512.62
Q22	3/25/2019	52.41	6510.38
Q22	6/24/2019	52.25	6510.54
Q23	1/28/2019	47.49	6516.77
Q23	2/25/2019	47.56	6516.70
Q23	3/25/2019	54.40	6509.86
Q23	4/15/2019	52.63	6511.63
Q23	4/15/2019	54.30	6509.96
Q23	6/24/2019	48.70	6515.56
Q23	12/18/2019	48.25	6516.01

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-2 WATER LEVELS FOR THE SUBDIVISION ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
Q25		
1/28/2019	50.45	6514.06
2/25/2019	50.30	6514.21
3/25/2019	51.69	6512.82
6/24/2019	51.35	6513.16
Q26		
1/28/2019	51.49	6513.34
2/25/2019	52.21	6512.62
3/25/2019	52.71	6512.12
6/24/2019	52.40	6512.43
Q27		
1/28/2019	52.98	6511.90
2/25/2019	53.60	6511.28
3/25/2019	54.04	6510.84
4/15/2019	53.27	6511.61
6/24/2019	53.80	6511.08
8/23/2019	54.20	6510.68
Q28		
1/28/2019	50.81	6513.13
2/25/2019	51.69	6512.25
3/25/2019	52.24	6511.70
4/15/2019	51.51	6512.43
6/24/2019	51.90	6512.04
8/27/2019	52.54	6511.40
Q29		
1/28/2019	51.53	6514.93
2/25/2019	52.06	6514.40
3/25/2019	52.52	6513.94
6/24/2019	52.25	6514.21
12/17/2019	52.02	6514.44
12/18/2019	52.45	6514.01
Q30		
1/28/2019	52.00	6514.13
2/25/2019	52.63	6513.50
3/25/2019	47.04	6519.09
4/15/2019	53.74	6512.39
6/24/2019	52.80	6513.33
8/27/2019	53.75	6512.38
Q42		
6/5/2019	40.98	6523.50
Q43		
6/5/2019	39.70	6523.49
Q44		
6/5/2019	53.83	6507.50
12/18/2019	54.34	6506.99
Q46		
6/5/2019	51.10	6510.60
Q47		
6/4/2019	52.22	6508.94
Q48		
6/4/2019	51.31	6516.53
12/18/2019	51.70	6516.14
Q49		
6/4/2019	51.25	6513.46
Q50		
6/6/2019	44.97	6523.96
SUB2		
4/2/2019	43.46	6524.11
SUB3		
4/2/2019	46.69	6510.38

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL)

1/10/2020

0460

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/12/2019	---	---

0520

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/13/2019	54.00	6532.02
12/18/2019	54.51	6531.51

0521

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/13/2019	56.36	6528.08

0522

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/13/2019	51.73	6528.80

0531

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/9/2019	83.05	6470.74

0538

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/22/2019	66.84	6482.10

0539

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	> 27.31	< 6528.01

0540

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	57.63	6498.28
2/25/2019	58.76	6497.15
3/25/2019	59.89	6496.02
4/1/2019	59.86	6496.05
4/29/2019	59.70	6496.21
12/17/2019	61.05	6494.86

0541

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	91.03	6464.59
4/1/2019	90.74	6464.88
7/2/2019	91.70	6463.92
10/11/2019	90.63	6464.99
12/18/2019	91.10	6464.52

0551

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	89.93	6457.37
4/1/2019	99.05	6448.25
7/2/2019	99.20	6448.10
10/9/2019	99.17	6448.13
12/18/2019	98.95	6448.35

0553

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	104.20	6443.28

0554

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	106.15	6441.02

0555

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/4/2019	41.78	6515.36

0556

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/4/2019	43.98	6512.04
4/16/2019	42.43	6513.59

0557

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/4/2019	42.87	6510.90

0631

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/22/2019	83.98	6457.12
12/17/2019	84.03	6457.07

0632

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/16/2019	83.48	6457.82
12/17/2019	83.97	6457.33

0633

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/25/2019	72.63	6484.93

0634

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	74.84	6485.23
2/21/2019	67.96	6492.11
2/25/2019	68.00	6492.07
3/25/2019	69.06	6491.01
5/28/2019	71.50	6488.57
6/24/2019	69.45	6490.62
7/29/2019	69.45	6490.62
9/30/2019	69.50	6490.57
10/28/2019	69.50	6490.57
12/17/2019	70.48	6489.59

0637

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	112.29	6462.91

0638

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/12/2019	48.98	6536.58
12/18/2019	49.91	6535.65

0639

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/2/2019	55.46	6532.42

0640

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	> 84.00	< 6495.97

0644

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/2/2019	70.07	6473.83
11/14/2019	71.00	6472.90
12/17/2019	70.94	6472.96
12/18/2019	71.04	6472.86

0646

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/16/2019	73.17	6470.18
12/17/2019	74.05	6469.30

0647

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	104.93	6446.98
4/1/2019	103.27	6448.64
7/8/2019	73.50	6478.41
10/9/2019	103.63	6448.28
12/18/2019	104.60	6447.31

0648

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	> 120.10	< 6427.69

0649

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	104.01	6439.28
4/1/2019	102.98	6440.31
7/8/2019	78.10	6465.19
10/9/2019	103.00	6440.29
12/18/2019	102.85	6440.44

0650

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	81.91	6465.20

0652

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	84.42	6453.73

0653

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/10/2019	64.39	6480.58
12/18/2019	66.80	6478.17

0654

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/8/2019	74.54	6475.96
4/2/2019	73.67	6476.83
7/8/2019	74.10	6476.40
10/3/2019	73.96	6476.54
10/15/2019	74.00	6476.50
12/18/2019	74.43	6476.07

0655

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	73.88	6484.30
2/25/2019	72.04	6486.14
3/25/2019	72.48	6485.70
5/28/2019	73.90	6484.28
7/29/2019	73.20	6484.98
9/30/2019	73.10	6485.08
10/28/2019	73.00	6485.18

0657

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/6/2019	100.50	6451.31
12/18/2019	99.56	6452.25

0658

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	106.92	6443.26

0659

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.41	6490.76
2/25/2019	67.10	6493.07
3/6/2019	67.57	6492.60
3/25/2019	69.42	6490.75
5/28/2019	69.55	6490.62
6/24/2019	68.80	6491.37
7/29/2019	68.90	6491.27
9/30/2019	63.85	6496.32
10/28/2019	68.80	6491.37
12/17/2019	70.22	6489.95

0680

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	73.65	6485.22

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0681	12/18/2019	64.11	6496.41
0683	4/16/2019	90.31	6465.73
0684	5/6/2019	86.25	6467.03
0685	12/18/2019	95.55	6461.02
0686	9/30/2019	114.12	6464.68
0687	12/18/2019	> 68.30	< 6487.66
0846	2/12/2019	43.90	6505.02
	12/18/2019	40.00	6508.92
	12/18/2019	44.00	6504.92
0851	12/18/2019	82.68	6463.76
0852	12/18/2019	69.65	6520.49
0855	2/13/2019	82.04	6459.07
	12/17/2019	73.40	6467.71
0862	1/28/2019	55.10	6501.08
	2/25/2019	57.17	6499.01
	3/25/2019	57.51	6498.67
	4/9/2019	56.71	6499.47
	4/29/2019	57.40	6498.78
	12/17/2019	57.75	6498.43
0863	1/28/2019	60.66	6495.90
	2/25/2019	63.83	6492.73
	4/29/2019	63.10	6493.46
0864	4/2/2019	66.61	6480.11
0865	1/28/2019	56.67	6500.11
	2/25/2019	59.62	6497.16
	3/25/2019	60.79	6495.99
	4/16/2019	61.22	6495.56
	4/29/2019	61.10	6495.68
0866	1/28/2019	62.71	6495.41
	2/25/2019	47.62	6510.50
	3/25/2019	59.16	6498.96
	4/9/2019	57.90	6500.22
	4/29/2019	59.90	6498.22
	11/12/2019	59.01	6499.11
0867	8/28/2019	62.16	6493.74
	12/17/2019	62.33	6493.57
0869	1/28/2019	68.33	6476.16
	2/25/2019	67.84	6476.65
	3/25/2019	67.90	6476.59
	4/1/2019	67.72	6476.77
	12/18/2019	68.85	6475.64
0876	12/18/2019	68.60	6475.66
0877	12/18/2019	64.80	6488.28
0879	12/18/2019	68.05	6476.50
0881	1/8/2019	69.65	6495.39
	1/28/2019	71.05	6493.99
	2/6/2019	69.64	6495.40
	2/25/2019	90.04	6475.00
	3/25/2019	71.24	6493.80
	5/28/2019	73.00	6492.04
	6/24/2019	71.90	6493.14
	7/29/2019	71.70	6493.34
	9/30/2019	71.80	6493.24
	10/28/2019	71.80	6493.24
	12/17/2019	73.35	6491.69
0882	2/7/2019	63.20	6497.96
0883	2/7/2019	59.10	6498.03
	12/17/2019	59.85	6497.28
0884	2/7/2019	70.00	6496.10
0885	4/18/2019	64.92	6499.72
	12/17/2019	66.10	6498.54
0886	2/6/2019	76.78	6487.77
	12/17/2019	69.72	6494.83
0887	4/18/2019	61.13	6506.60
	12/17/2019	62.56	6505.17
0888	2/7/2019	76.65	6480.68
	12/18/2019	77.60	6479.73
0889	12/18/2019	66.00	6483.63
0890	1/28/2019	76.49	6481.94
	2/21/2019	72.50	6485.93
	2/25/2019	72.62	6485.81
	3/25/2019	73.06	6485.37
	5/28/2019	74.60	6483.83
	6/24/2019	74.00	6484.43
	7/29/2019	73.70	6484.73
	9/30/2019	73.80	6484.63
	10/28/2019	73.90	6484.53
0893	2/7/2019	66.69	6497.28
	12/17/2019	69.85	6494.12
0897	12/18/2019	80.34	6481.91
0899	1/8/2019	100.82	6470.02
	4/3/2019	100.59	6470.25
	7/8/2019	101.50	6469.34
	10/14/2019	101.32	6469.52
0914	2/20/2019	48.25	6593.75
0921	2/4/2019	40.69	6583.31
0922	2/12/2019	49.51	6572.19
0935	5/7/2019	92.10	6466.02
0994	4/16/2019	93.55	6461.45
	5/30/2019	93.90	6461.10

* Drawdown Tube Pressure, # Transducer Reading

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TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

0996

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/7/2019	118.42	6434.10
4/1/2019	89.82	6462.70
7/11/2019	74.10	6478.42
10/11/2019	95.23	6457.29

H1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	72.16	6487.09
2/20/2019	73.47	6485.78
2/25/2019	74.21	6485.04
3/25/2019	74.93	6484.32
5/28/2019	76.80	6482.45
6/24/2019	75.90	6483.35
7/29/2019	75.90	6483.35
9/30/2019	75.70	6483.55
10/28/2019	75.45	6483.80

H2A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	76.25	6483.62
3/6/2019	74.31	6485.56
3/25/2019	74.94	6484.93
5/28/2019	76.30	6483.57
6/24/2019	75.75	6484.12
7/29/2019	75.90	6483.97
9/30/2019	75.55	6484.32
12/17/2019	76.45	6483.42

H3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	73.90	6483.20
2/25/2019	71.48	6485.62
3/25/2019	71.94	6485.16
5/28/2019	73.40	6483.70
6/24/2019	72.90	6484.20
7/29/2019	72.65	6484.45
9/30/2019	72.55	6484.55
10/28/2019	74.45	6482.65

H4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	73.23	6484.37
2/25/2019	71.54	6486.06
3/25/2019	72.19	6485.41
5/28/2019	74.00	6483.60
6/24/2019	73.10	6484.50
7/29/2019	73.00	6484.60
9/30/2019	72.95	6484.65
10/28/2019	72.80	6484.80

H5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	73.67	6484.77
2/25/2019	71.98	6486.46
3/25/2019	72.66	6485.78
5/28/2019	74.45	6483.99
6/24/2019	73.50	6484.94
7/29/2019	33.75	6524.69
9/30/2019	73.33	6485.11
10/28/2019	73.45	6484.99

H6A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	71.04	6486.53
2/25/2019	69.39	6488.18
3/25/2019	70.02	6487.55
5/28/2019	71.10	6486.47
6/24/2019	70.75	6486.82
7/29/2019	70.70	6486.87
9/30/2019	70.50	6487.07
10/28/2019	70.40	6487.17

H7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	70.72	6488.82
2/20/2019	83.68	6475.86
2/25/2019	69.62	6489.92
3/25/2019	70.51	6489.03
5/28/2019	71.70	6487.84
6/24/2019	71.05	6488.49
7/29/2019	70.85	6488.69
9/30/2019	70.95	6488.59
10/28/2019	70.83	6488.71

H7A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	71.77	6487.32

H7B

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.81	6489.57
2/20/2019	68.60	6490.78
2/25/2019	71.63	6487.75
3/25/2019	69.65	6489.73
5/28/2019	70.65	6488.73
6/24/2019	70.00	6489.38
7/29/2019	70.10	6489.28
9/30/2019	69.90	6489.48
10/28/2019	69.90	6489.48

H9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.80	6490.82
2/25/2019	68.72	6491.90
3/25/2019	69.81	6490.81
5/28/2019	71.00	6489.62
6/24/2019	70.20	6490.42
7/29/2019	70.40	6490.22
9/30/2019	70.20	6490.42
10/28/2019	70.15	6490.47

H10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	67.31	6491.25
2/25/2019	66.03	6492.53
3/25/2019	67.21	6491.35
5/28/2019	68.35	6490.21
6/24/2019	67.80	6490.76
7/29/2019	67.50	6491.06
9/30/2019	67.65	6490.91
10/28/2019	67.60	6490.96

H11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	61.21	6498.21
2/25/2019	17.32	6542.10
3/25/2019	64.12	6495.30
6/24/2019	68.55	6490.87
7/29/2019	68.55	6490.87
9/30/2019	68.60	6490.82
10/28/2019	68.60	6490.82

H12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	78.86	6484.76
2/20/2019	69.30	6494.32
2/25/2019	69.63	6493.99
3/25/2019	70.94	6492.68
5/28/2019	72.30	6491.32
6/24/2019	71.30	6492.32
7/29/2019	71.20	6492.42
8/22/2019	76.30	6487.32
9/30/2019	71.30	6492.32
10/28/2019	71.40	6492.22

H13

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	77.81	6484.61
2/25/2019	14.73	6547.69
3/25/2019	68.83	6493.59
5/28/2019	70.40	6492.02

H14

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	38.80	6520.05
2/25/2019	23.98	6534.87
3/25/2019	37.66	6521.19

H15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	62.74	6497.67
3/25/2019	67.17	6493.24
6/24/2019	67.70	6492.71
7/29/2019	67.60	6492.81
9/30/2019	67.80	6492.61
10/28/2019	67.75	6492.66

H16

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/25/2019	62.50	6495.48
3/25/2019	63.78	6494.20
5/28/2019	65.40	6492.58
6/24/2019	64.20	6493.78
7/29/2019	64.10	6493.88
10/28/2019	64.40	6493.58
11/12/2019	66.75	6491.23

H17

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/21/2019	71.84	6491.52

H18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	66.87	6493.90
2/25/2019	14.71	6546.06

H19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	67.18	6495.36
2/25/2019	67.45	6495.09
3/25/2019	68.73	6493.81
5/28/2019	70.10	6492.44
6/24/2019	69.20	6493.34
7/29/2019	69.10	6493.44
9/30/2019	69.25	6493.29
10/28/2019	69.25	6493.29

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

H20

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	68.12	6489.56
2/25/2019	18.42	6539.26
3/25/2019	61.73	6495.95
9/30/2019	63.85	6493.83
10/28/2019	63.60	6494.08

H21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	67.14	6497.26
2/25/2019	17.41	6546.99
3/25/2019	59.57	6504.83
7/29/2019	70.10	6494.30
9/30/2019	70.20	6494.20
10/28/2019	70.20	6494.20

H22

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	67.29	6494.24
2/25/2019	64.79	6496.74
3/25/2019	66.38	6495.15
5/28/2019	67.85	6493.68
9/30/2019	67.13	6494.40
10/28/2019	67.20	6494.33

H23

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.43	6495.53
3/25/2019	69.41	6495.55
5/28/2019	71.30	6493.66
7/29/2019	69.90	6495.06
9/30/2019	70.15	6494.81
10/28/2019	70.10	6494.86

H24

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	73.46	6492.41
2/25/2019	68.72	6497.15
3/25/2019	71.16	6494.71
6/24/2019	86.00	6479.87
7/29/2019	71.60	6494.27
8/28/2019	72.45	6493.42
9/30/2019	71.75	6494.12
10/28/2019	71.80	6494.07

H25

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.42	6495.37
2/25/2019	68.39	6496.40
3/25/2019	69.28	6495.51
5/28/2019	70.90	6493.89
6/24/2019	69.40	6495.39
7/29/2019	70.10	6494.69
9/30/2019	70.10	6494.69
10/28/2019	70.10	6494.69

H26

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	70.88	6495.93
2/25/2019	69.98	6496.83
3/25/2019	70.64	6496.17
5/28/2019	72.25	6494.56
6/24/2019	71.65	6495.16
7/29/2019	71.70	6495.11

H27

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/25/2019	68.45	6496.80
3/25/2019	69.47	6495.78
5/28/2019	70.80	6494.45
6/24/2019	69.95	6495.30
7/29/2019	70.05	6495.20
9/30/2019	70.15	6495.10
10/28/2019	70.20	6495.05

H31

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/13/2019	67.57	6497.49
8/28/2019	69.33	6495.73

H36

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2019	52.11	6507.85

H46

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	66.41	6500.95
2/21/2019	65.81	6501.55
2/25/2019	65.98	6501.38
3/25/2019	66.38	6500.98
5/28/2019	67.20	6500.16
6/24/2019	67.40	6499.96
7/29/2019	67.80	6499.56
8/28/2019	67.49	6499.87
9/30/2019	67.50	6499.86
10/28/2019	67.50	6499.86

H55

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/5/2019	62.88	6506.37

H56

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	62.54	6506.95
2/25/2019	62.66	6506.83
3/25/2019	62.81	6506.68
5/28/2019	63.15	6506.34
6/24/2019	63.60	6505.89
7/29/2019	63.90	6505.59
9/30/2019	63.55	6505.94
10/28/2019	63.80	6505.69

H70

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	64.78	6509.84
2/25/2019	65.12	6509.50
3/25/2019	65.04	6509.58
5/28/2019	65.70	6508.92
6/24/2019	64.50	6510.12
7/29/2019	66.45	6508.17
9/30/2019	66.05	6508.57
10/28/2019	66.30	6508.32

H71

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	63.52	6508.80
2/25/2019	63.67	6508.65
3/25/2019	63.66	6508.66
5/28/2019	64.15	6508.17
6/24/2019	66.05	6506.27
7/29/2019	65.10	6507.22
9/30/2019	64.40	6507.92
10/28/2019	64.65	6507.67

H95

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	64.86	6504.05

H107

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	69.15	6493.21
2/25/2019	61.02	6501.34
3/25/2019	66.46	6495.90
5/28/2019	67.85	6494.51
9/30/2019	67.30	6495.06
10/28/2019	67.30	6495.06

M16

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	62.06	6508.53

MO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/5/2019	62.67	6510.22
12/17/2019	62.90	6509.99

MP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	64.82	6509.66

MR

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	66.91	6499.35
2/25/2019	66.53	6499.73
3/25/2019	67.04	6499.22
5/28/2019	68.60	6497.66
6/24/2019	68.05	6498.21
7/29/2019	68.20	6498.06
9/30/2019	68.10	6498.16
10/28/2019	68.10	6498.16
11/5/2019	68.24	6498.02
11/12/2019	68.60	6497.66
12/17/2019	68.98	6497.28

MS

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/14/2019	65.20	6505.47
12/17/2019	61.34	6509.33

MT

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	> 60.55	< 6506.88

MV

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/3/2019	65.88	6503.90
12/17/2019	67.15	6502.63

R1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	53.65	6501.47
2/21/2019	55.22	6499.90
2/25/2019	55.43	6499.69
3/25/2019	55.31	6499.81
4/29/2019	55.20	6499.92
8/27/2019	54.55	6500.57
12/17/2019	55.85	6499.27

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 1/10/2020

Well	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
R2	1/28/2019	89.95	6464.21
	2/25/2019	101.06	6453.10
	3/25/2019	53.32	6500.84
	4/9/2019	54.46	6499.70
	4/29/2019	96.90	6457.26
	8/28/2019	55.05	6499.11
R3	1/28/2019	54.97	6500.76
	2/25/2019	75.26	6480.47
	3/25/2019	54.82	6500.91
	4/9/2019	54.57	6501.16
	4/29/2019	56.65	6499.08
	11/11/2019	54.40	6501.33
R4	1/28/2019	56.57	6502.21
	2/25/2019	59.15	6499.63
	3/25/2019	56.81	6501.97
	4/9/2019	55.72	6503.06
	4/29/2019	58.20	6500.58
	8/28/2019	56.58	6502.20
R5	1/28/2019	54.68	6503.07
	2/25/2019	105.39	6452.36
	3/25/2019	54.21	6503.54
	4/9/2019	55.11	6502.64
	4/29/2019	105.50	6452.25
	8/28/2019	55.55	6502.20
R6	1/28/2019	30.73	6528.91
	2/25/2019	27.14	6532.50
	3/25/2019	38.42	6521.22
R7	1/28/2019	23.90	6530.91
	2/25/2019	26.02	6528.79
	3/25/2019	31.52	6523.29
R8	1/28/2019	37.16	6517.00
	2/25/2019	21.74	6532.42
	3/25/2019	34.16	6520.00
R9	1/28/2019	36.42	6519.33
	2/25/2019	22.14	6533.61
	3/25/2019	33.61	6522.14
R10	1/28/2019	55.48	6499.74
	2/21/2019	57.00	6498.22
	2/25/2019	57.67	6497.55
	3/25/2019	57.68	6497.54
	4/29/2019	57.95	6497.27
	8/28/2019	58.05	6497.17
R11	1/28/2019	67.56	6490.89
	2/25/2019	60.90	6497.55
	3/25/2019	61.14	6497.31
	4/9/2019	61.15	6497.30
	4/29/2019	61.30	6497.15
	12/17/2019	62.11	6496.34
R12	1/28/2019	53.20	6503.75
	2/25/2019	26.72	6530.23
	3/25/2019	36.82	6520.13
R13	1/28/2019	29.03	6527.86
	2/25/2019	26.44	6530.45
	3/25/2019	43.18	6513.71
R14	1/28/2019	25.41	6531.38
	2/25/2019	16.09	6540.70
	3/25/2019	33.91	6522.88
R15	1/28/2019	30.34	6525.89
	2/25/2019	20.21	6536.02
	3/25/2019	37.64	6518.59
R17	1/28/2019	27.63	6527.59
	2/25/2019	20.19	6535.03
	3/25/2019	40.38	6514.84
R18	1/28/2019	57.17	6498.83
	2/25/2019	58.05	6497.95
	3/25/2019	62.16	6493.84
	4/3/2019	61.99	6494.01
	4/29/2019	62.25	6493.75
	11/12/2019	63.30	6492.70
R19	1/28/2019	41.36	6515.14
	2/25/2019	36.32	6520.18
	3/25/2019	48.62	6507.88
R20	1/28/2019	35.43	6520.91
	2/25/2019	60.04	6496.30
	3/25/2019	67.72	6488.62
	4/3/2019	57.09	6499.25
	4/29/2019	61.25	6495.09
R21	1/28/2019	35.16	6520.41
	2/25/2019	21.56	6534.01
	3/25/2019	31.52	6524.05
R22	1/28/2019	59.66	6497.48
	2/25/2019	61.03	6496.11
	3/25/2019	62.32	6494.82
	4/3/2019	62.50	6494.64
	4/29/2019	62.85	6494.29
R74	12/17/2019	71.38	6472.65

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS

WATER LEVEL ELEVATION (FT-MSL)

2/3/2020

0481

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/27/2019	72.00	6496.00

0483

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	40.56	6522.10
2/25/2019	41.53	6521.13
3/25/2019	40.30	6522.36
4/9/2019	40.82	6521.84
4/29/2019	41.45	6521.21

0493

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	78.98	6481.30
2/25/2019	70.60	6489.68
3/25/2019	65.61	6494.67
4/29/2019	37.60	6522.68
6/3/2019	62.10	6498.18
12/18/2019	65.94	6494.34

0494

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/5/2019	38.32	6521.82
6/3/2019	38.65	6521.49
12/18/2019	38.58	6521.56

0498

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	57.33	6503.26
2/25/2019	57.84	6502.75
3/25/2019	54.51	6506.08
4/9/2019	54.23	6506.36

0536R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/16/2019	88.19	6466.81

0538

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/22/2019	66.84	6482.10

0539

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	> 27.31	< 6528.01

0653

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/10/2019	64.39	6480.58
12/18/2019	66.80	6478.17

0808

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/12/2019	67.70	6493.30

0850

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	54.02	6495.13

0853

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/1/2019	73.01	6468.37
12/17/2019	73.28	6468.10

0859

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/2/2019	59.79	6492.97
12/17/2019	60.09	6492.67

0927

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	102.40	6492.60
12/18/2019	102.40	6492.60

0929

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	72.62	6519.95

0930

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/1/2019	104.38	6494.16
12/18/2019	104.58	6493.96

0931

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/1/2019	90.90	6519.66
12/18/2019	91.49	6519.07

0944

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/25/2019	56.50	6532.11
3/25/2019	59.20	6529.41
4/29/2019	59.89	6528.72
7/29/2019	51.95	6536.66
8/26/2019	64.27	6524.34
9/30/2019	69.10	6519.51
10/28/2019	66.20	6522.41

ACW

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/5/2019	66.00	6497.80
12/18/2019	69.10	6494.70

AW

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/10/2019	36.46	6526.97
12/18/2019	37.10	6526.33

B15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	42.60	6533.71
5/28/2019	42.55	6533.76
6/24/2019	45.00	6531.31
7/29/2019	45.50	6530.81
8/26/2019	43.55	6532.76
9/30/2019	44.70	6531.61
10/28/2019	46.20	6530.11

B16

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	42.35	6533.02
5/28/2019	42.35	6533.02
6/24/2019	61.55	6513.82
7/29/2019	56.15	6519.22
8/26/2019	43.40	6531.97
9/30/2019	59.10	6516.27
10/28/2019	60.75	6514.62

B17

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	40.35	6533.96
5/28/2019	40.40	6533.91
6/24/2019	41.40	6532.91
7/29/2019	42.05	6532.26
8/26/2019	41.50	6532.81
9/30/2019	42.20	6532.11
10/28/2019	42.80	6531.51

B18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	42.25	6533.88
5/28/2019	42.25	6533.88
6/24/2019	44.05	6532.08
7/29/2019	44.55	6531.58
8/26/2019	43.10	6533.03
9/30/2019	44.20	6531.93
10/28/2019	45.60	6530.53

B31

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	43.15	6532.81
5/28/2019	43.30	6532.66
6/24/2019	45.40	6530.56
7/29/2019	46.80	6529.16
8/26/2019	44.45	6531.51
9/30/2019	44.70	6531.26
10/28/2019	59.40	6516.56

B32

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	43.50	6531.89
5/28/2019	43.40	6531.99
6/24/2019	50.20	6525.19
7/29/2019	51.90	6523.49
8/26/2019	45.25	6530.14
9/30/2019	44.20	6531.19
10/28/2019	46.10	6529.29

C18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/28/2019	10.40	6560.70

C19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	26.20	6543.71
10/28/2019	18.60	6551.31

C20

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/30/2019	18.00	6552.16
10/28/2019	17.20	6552.96

C21

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/29/2019	22.40	6549.59
9/30/2019	26.70	6545.29
10/28/2019	26.24	6545.75

CE1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/17/2019	29.00	6541.19
12/18/2019	60.01	6510.18

CE2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	40.85	6535.50
2/25/2019	49.10	6527.25
3/25/2019	75.15	6501.20
4/29/2019	47.50	6528.85
5/8/2019	39.90	6536.45
6/24/2019	67.20	6509.15
8/26/2019	39.43	6536.92
9/30/2019	42.90	6533.45
10/8/2019	75.73	6500.62
10/28/2019	39.90	6536.45

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 2/3/2020

CE5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	46.55	6522.00
2/25/2019	48.05	6520.50
3/25/2019	47.10	6521.45
4/29/2019	48.60	6519.95
5/28/2019	48.70	6519.85
6/24/2019	43.00	6525.55
7/10/2019	42.68	6525.87
7/29/2019	41.50	6527.05
8/26/2019	42.14	6526.41
9/30/2019	42.48	6526.07
10/28/2019	42.53	6526.02

CE6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	42.75	6522.44
2/25/2019	82.80	6482.39
3/25/2019	84.50	6480.69
4/29/2019	96.55	6468.64
5/28/2019	87.80	6477.39
6/24/2019	39.30	6525.89
7/10/2019	38.36	6526.83
7/29/2019	37.94	6527.25
8/26/2019	37.79	6527.40
9/30/2019	38.60	6526.59
10/28/2019	38.55	6526.64

CE7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	45.80	6530.19
2/25/2019	42.70	6533.29
4/29/2019	41.70	6534.29
5/28/2019	41.90	6534.09
6/24/2019	44.40	6531.59
7/10/2019	45.06	6530.93
7/29/2019	45.39	6530.60
8/26/2019	41.72	6534.27
9/30/2019	43.42	6532.57
10/17/2019	44.80	6531.19
10/28/2019	46.80	6529.19
11/14/2019	54.60	6521.39
12/18/2019	45.01	6530.98

CE8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/6/2019	44.90	6524.80
12/18/2019	45.36	6524.34

CE9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/6/2019	37.85	6525.27
7/15/2019	36.84	6526.28
8/27/2019	36.44	6526.68
12/18/2019	37.98	6525.14

CE10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/11/2019	43.54	6527.32
12/18/2019	47.54	6523.32

CE11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	42.41	6523.01
2/25/2019	48.40	6517.02
3/25/2019	43.30	6522.12
4/29/2019	47.40	6518.02
5/28/2019	43.90	6521.52
6/24/2019	39.10	6526.32
7/15/2019	38.67	6526.75
7/29/2019	38.63	6526.79
8/26/2019	38.39	6527.03
9/30/2019	38.70	6526.72
10/17/2019	38.50	6526.92
10/28/2019	38.90	6526.52
12/20/2019	42.20	6523.22

CE12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	42.31	6529.92
2/25/2019	46.50	6525.73
3/25/2019	42.20	6530.03
4/29/2019	40.80	6531.43
5/28/2019	41.30	6530.93
6/24/2019	42.10	6530.13
7/10/2019	78.66	6493.57
7/29/2019	41.91	6530.32
8/26/2019	41.25	6530.98
9/30/2019	40.80	6531.43
10/28/2019	41.90	6530.33

CE13

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/15/2019	46.23	6528.41
12/18/2019	44.29	6530.35

CE14

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
3/28/2019	39.00	6530.45
12/18/2019	39.49	6529.96

CE15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	45.87	6520.21
2/25/2019	47.90	6518.18
3/25/2019	46.20	6519.88
4/29/2019	47.50	6518.58
5/28/2019	47.15	6518.93
6/10/2019	46.40	6519.68
6/24/2019	46.00	6520.08
7/29/2019	43.85	6522.23
8/26/2019	38.55	6527.53
9/30/2019	43.30	6522.78
10/28/2019	47.10	6518.98
12/18/2019	45.76	6520.32

CE15A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	40.71	6524.10
2/25/2019	42.35	6522.46
3/25/2019	42.20	6522.61
5/23/2019	40.90	6523.91
12/18/2019	40.22	6524.59

CE16A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/2/2019	47.13	6532.91

CE18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/17/2019	39.41	6529.47

CE19

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	65.22	6503.61
2/25/2019	69.80	6499.03
3/25/2019	46.20	6522.63
4/29/2019	47.53	6521.30
5/28/2019	46.10	6522.73
6/24/2019	42.75	6526.08
7/29/2019	42.02	6526.81
8/26/2019	41.56	6527.27
9/30/2019	41.82	6527.01
10/17/2019	42.60	6526.23
10/28/2019	42.40	6526.43

CF1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/25/2019	131.91	6534.00

CF2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2019	122.03	6544.13

CF3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/24/2019	50.01	6536.78
12/18/2019	50.63	6536.16

CF4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	61.41	6602.28
12/19/2019	61.38	6602.31

CF5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/19/2019	137.10	6534.36

CF6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2019	105.49	6561.94

CF7A

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/25/2019	133.25	6534.86
12/18/2019	134.93	6533.18

CW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/18/2019	88.24	6496.98
10/17/2019	29.00	6556.22
12/18/2019	90.03	6495.19

CW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/20/2019	90.28	6495.20
12/18/2019	90.25	6495.23

CW2-1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	45.84	6539.64

CW3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/18/2019	56.12	6531.06
6/10/2019	55.45	6531.73
12/18/2019	56.25	6530.93

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 2/3/2020

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CW4R		
1/28/2019	46.04	6522.69
3/25/2019	46.50	6522.23
4/29/2019	47.43	6521.30
5/28/2019	47.10	6521.63
6/24/2019	43.90	6524.83
8/26/2019	43.19	6525.54
9/30/2019	43.65	6525.08
10/28/2019	43.65	6525.08
CW5		
2/25/2019	41.40	6527.94
8/26/2019	39.90	6529.44
9/30/2019	18.60	6550.74
10/28/2019	10.40	6558.94
CW6		
12/18/2019	40.40	6535.24
CW9		
10/18/2019	61.60	6530.23
11/22/2019	61.60	6530.23
12/18/2019	62.42	6529.41
CW13		
1/28/2019	13.75	6562.95
3/25/2019	10.00	6566.70
4/29/2019	11.13	6565.57
6/24/2019	16.00	6560.70
8/26/2019	52.70	6524.00
9/30/2019	57.40	6519.30
10/28/2019	22.60	6554.10
CW14		
1/28/2019	121.82	6444.27
5/28/2019	12.60	6553.49
6/24/2019	8.00	6558.09
7/29/2019	60.68	6505.41
8/26/2019	65.31	6500.78
9/30/2019	63.60	6502.49
10/28/2019	36.00	6530.09
CW15		
10/18/2019	56.60	6494.72
12/17/2019	56.12	6495.20
CW17		
7/30/2019	64.11	6525.21
10/2/2019	64.37	6524.95
12/18/2019	65.36	6523.96
CW18		
1/28/2019	46.49	6526.16
2/25/2019	39.10	6533.55
3/25/2019	40.70	6531.95
4/29/2019	41.65	6531.00
5/28/2019	41.10	6531.55
6/6/2019	42.40	6530.25
6/24/2019	40.65	6532.00
8/26/2019	48.92	6523.73
9/30/2019	53.60	6519.05
10/28/2019	49.36	6523.29
12/18/2019	53.67	6518.98
CW24		
12/18/2019	50.27	6538.40
12/20/2019	50.32	6538.35
CW25		
1/28/2019	12.68	6554.52
2/25/2019	38.05	6529.15
3/25/2019	7.00	6560.20
5/28/2019	15.00	6552.20
6/24/2019	6.00	6561.20
7/29/2019	3.80	6563.40
8/26/2019	35.64	6531.56
9/30/2019	32.00	6535.20
10/28/2019	32.60	6534.60
CW28		
1/28/2019	75.12	6496.56
2/25/2019	73.30	6498.38
3/25/2019	73.05	6498.63
4/9/2019	71.65	6500.03
4/29/2019	71.70	6499.98
5/28/2019	71.30	6500.38
6/24/2019	72.15	6499.53
8/1/2019	71.61	6500.07
8/26/2019	71.44	6500.24
9/30/2019	71.65	6500.03
10/28/2019	70.71	6500.97
12/18/2019	71.82	6499.86
CW29		
1/28/2019	76.95	6475.27
2/25/2019	77.11	6475.11
3/25/2019	77.32	6474.90
8/20/2019	76.20	6476.02
8/26/2019	78.18	6474.04
12/17/2019	78.47	6473.75
CW30		
1/28/2019	77.04	6481.27
2/25/2019	69.88	6488.43
3/25/2019	65.22	6493.09
CW31		
12/18/2019	86.03	6474.23
CW32		
7/30/2019	149.38	6417.90
12/18/2019	147.69	6419.59
CW33		
10/2/2019	106.24	6468.65
12/18/2019	106.46	6468.43
CW34		
12/18/2019	52.80	6541.60
CW35		
4/18/2019	52.02	6539.15
12/18/2019	52.03	6539.14
CW36		
7/15/2019	77.39	6473.70
12/18/2019	77.45	6473.64
CW37		
10/3/2019	62.49	6488.68
12/17/2019	62.52	6488.65
CW40		
10/23/2019	56.60	6522.34
12/18/2019	59.91	6519.03
CW41		
7/24/2019	79.74	6475.67
12/17/2019	80.19	6475.22
CW42		
7/25/2019	70.02	6478.76
12/17/2019	70.95	6477.83
CW43		
7/31/2019	68.90	6479.89
12/18/2019	69.01	6479.78
CW44		
1/28/2019	56.48	6504.26
2/25/2019	57.53	6503.21
3/25/2019	55.51	6505.23
CW45		
1/28/2019	56.93	6504.38
2/25/2019	56.86	6504.45
3/5/2019	57.72	6503.59
3/25/2019	55.67	6505.64
8/20/2019	56.94	6504.37
11/5/2019	53.96	6507.35
12/18/2019	55.41	6505.90
CW46		
1/28/2019	56.18	6506.08
2/25/2019	56.61	6505.65
3/25/2019	56.31	6505.95
CW50		
4/18/2019	48.85	6539.71
12/18/2019	48.36	6540.20
CW52		
12/18/2019	38.51	6553.89

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

CW53

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/25/2019	32.70	6532.24
3/25/2019	34.84	6530.10
4/29/2019	36.30	6528.64
6/3/2019	36.68	6528.26
12/18/2019	47.47	6517.47

CW54

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	39.72	6518.83

CW55

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/30/2019	54.78	6509.38
12/18/2019	53.88	6510.28

CW56

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/29/2019	57.07	6530.79

CW57

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/18/2019	49.38	6535.52

CW58

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/29/2019	63.20	6497.60
12/18/2019	67.03	6493.77

CW60

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/30/2019	46.50	6537.70
12/18/2019	47.11	6537.09

CW61

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/29/2019	51.10	6531.73
12/18/2019	61.12	6521.71

CW62

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	119.85	6460.01
2/25/2019	96.60	6483.26
3/25/2019	50.35	6529.51
4/29/2019	77.20	6502.66
5/28/2019	60.80	6519.06
7/19/2019	121.57	6458.29
8/26/2019	50.39	6529.47
8/29/2019	49.15	6530.71
9/30/2019	59.10	6520.76
10/28/2019	93.05	6486.81
12/18/2019	121.59	6458.27

CW72

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/17/2019	81.20	6498.93
12/18/2019	83.45	6496.68

CW73

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/5/2019	51.77	6511.68
12/18/2019	51.88	6511.57

CW74

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/29/2019	58.75	6494.66
12/17/2019	58.25	6495.16

CW75

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
5/29/2019	57.95	6495.63
12/17/2019	58.66	6494.92

CW76

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/8/2019	70.93	6485.68
7/25/2019	60.18	6496.43
12/17/2019	61.66	6494.95

CW77

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	76.61	6482.70
2/25/2019	49.47	6509.84
3/25/2019	57.22	6502.09

CW78

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/3/2019	37.64	6529.51
12/18/2019	47.26	6519.89

M30

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/26/2019	22.00	6552.91
9/30/2019	36.00	6538.91

M31

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
7/29/2019	40.75	6535.18
8/26/2019	41.15	6534.78
9/30/2019	41.40	6534.53
10/28/2019	40.40	6535.53

Q42

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/5/2019	40.98	6523.50

Q48

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/4/2019	51.31	6516.53
12/18/2019	51.70	6516.14

Q50

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
6/6/2019	44.97	6523.96

R1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	53.65	6501.47
2/21/2019	55.22	6499.90
2/25/2019	55.43	6499.69
3/25/2019	55.31	6499.81
4/29/2019	55.20	6499.92
8/27/2019	54.55	6500.57
12/17/2019	55.85	6499.27

R2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	89.95	6464.21
2/25/2019	101.06	6453.10
3/25/2019	53.32	6500.84
4/9/2019	54.46	6499.70
4/29/2019	96.90	6457.26
8/28/2019	55.05	6499.11

R3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	54.97	6500.76
2/25/2019	75.26	6480.47
3/25/2019	54.82	6500.91
4/9/2019	54.57	6501.16
4/29/2019	56.65	6499.08
11/11/2019	54.40	6501.33

R4

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	56.57	6502.21
2/25/2019	59.15	6499.63
3/25/2019	56.81	6501.97
4/9/2019	55.72	6503.06
4/29/2019	58.20	6500.58
8/28/2019	56.58	6502.20

R5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	54.68	6503.07
2/25/2019	105.39	6452.36
3/25/2019	54.21	6503.54
4/9/2019	55.11	6502.64
4/29/2019	105.50	6452.25
8/28/2019	55.55	6502.20

R6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	30.73	6528.91
2/25/2019	27.14	6532.50
3/25/2019	38.42	6521.22

R7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	23.90	6530.91
2/25/2019	26.02	6528.79
3/25/2019	31.52	6523.29

R11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	67.56	6490.89
2/25/2019	60.90	6497.55
3/25/2019	61.14	6497.31
4/9/2019	61.15	6497.30
4/29/2019	61.30	6497.15
12/17/2019	62.11	6496.34

R12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/28/2019	53.20	6503.75
2/25/2019	26.72	6530.23
3/25/2019	36.82	6520.13

R49

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	71.65	6474.34

R67

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	70.12	6475.41

R74

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/17/2019	71.38	6472.65

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 2/3/2020

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
T25		
1/30/2019	121.70	6535.64
4/29/2019	120.80	6536.54
5/28/2019	120.85	6536.49
6/24/2019	121.50	6535.84
7/29/2019	122.05	6535.29
8/26/2019	121.55	6535.79
9/30/2019	123.81	6533.53
10/28/2019	122.30	6535.04
T27		
1/15/2019	121.20	6535.94
4/29/2019	120.80	6536.34
5/28/2019	120.80	6536.34
6/24/2019	121.00	6536.14
7/29/2019	121.80	6535.34
8/26/2019	121.60	6535.54
9/30/2019	125.90	6531.24
10/28/2019	121.40	6535.74
T28		
1/15/2019	123.18	6535.53
7/29/2019	133.85	6524.86
9/30/2019	118.55	6540.16
T30		
1/16/2019	121.81	6537.81
4/29/2019	121.55	6538.07
5/28/2019	121.65	6537.97
6/24/2019	122.00	6537.62
7/29/2019	122.30	6537.32
8/26/2019	122.35	6537.27
9/30/2019	122.40	6537.22
10/28/2019	123.00	6536.62
T32		
1/16/2019	123.69	6537.92
4/29/2019	123.55	6538.06
5/28/2019	123.60	6538.01
6/24/2019	123.80	6537.81
7/29/2019	123.05	6538.56
8/26/2019	124.00	6537.61
10/28/2019	123.70	6537.91
T45		
4/29/2019	118.20	6539.86
5/28/2019	118.20	6539.86
6/24/2019	118.40	6539.66
7/29/2019	118.60	6539.46
8/26/2019	118.60	6539.46
10/28/2019	118.40	6539.66
V1		
12/17/2019	77.53	6474.58
V2		
12/17/2019	75.57	6474.52
V6		
7/29/2019	74.72	6472.71
12/17/2019	75.20	6472.23
V7		
12/17/2019	79.71	6475.52
V8		
12/17/2019	74.77	6476.72
V9		
12/17/2019	80.21	6475.48
V11		
12/17/2019	80.13	6475.77
V14		
12/17/2019	81.37	6474.32
V16		
12/17/2019	76.12	6475.86
V17		
12/17/2019	75.52	6474.63
V18		
12/17/2019	76.02	6475.36
WCW		
10/25/2019	39.10	6528.27
12/18/2019	39.20	6528.17
WR25		
10/2/2019	53.72	6532.74
12/18/2019	54.43	6532.03
Y1		
1/28/2019	87.80	6473.64
2/25/2019	72.55	6488.89
3/25/2019	65.31	6496.13
4/15/2019	63.52	6497.92
11/11/2019	60.20	6501.24
12/18/2019	67.34	6494.10
Y2		
12/18/2019	68.24	6493.37
Y3		
12/18/2019	67.82	6495.56
12/18/2019	67.82	6495.56
Y6		
1/28/2019	50.87	6508.21
2/25/2019	43.91	6515.17
3/25/2019	57.68	6501.40
Y7		
1/28/2019	124.12	6436.31
2/25/2019	75.63	6484.80
3/25/2019	69.42	6491.01
8/20/2019	99.64	6460.79
Y8		
12/18/2019	67.02	6494.45
Y10		
12/18/2019	70.04	6496.14
Y12		
1/28/2019	75.91	6483.77
2/25/2019	68.41	6491.27
3/25/2019	60.24	6499.44
Y13		
1/28/2019	89.24	6471.60
2/25/2019	93.66	6467.18
12/18/2019	85.57	6475.27
Y14		
12/18/2019	55.43	6505.59
Y17		
12/18/2019	62.76	6501.87
Y23		
1/28/2019	131.48	6429.82
2/25/2019	56.58	6504.72
3/25/2019	55.32	6505.98
8/27/2019	54.90	6506.40
Y25		
12/18/2019	63.33	6499.34
Y30		
12/18/2019	63.48	6496.57
Y33		
1/28/2019	54.91	6508.31
2/25/2019	55.14	6508.08
3/25/2019	57.06	6506.16
Y34		
1/28/2019	35.17	6525.75
3/25/2019	52.16	6508.76

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.4-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER

WATER LEVEL ELEVATION (FT-MSL) 12/23/2019

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
#1R DEEPWELL		
12/18/2019	172.05	6417.34
#2 DEEPWELL		
5/1/2019	65.30	6510.36
7/2/2019	150.80	6424.86
10/8/2019	175.62	6400.04
#2R DEEPWELL		
12/18/2019	184.91	6394.28
0943M		
1/30/2019	138.09	6418.01
5/2/2019	138.35	6417.75
8/26/2019	140.00	6416.10
11/11/2019	138.10	6418.00
12/18/2019	138.91	6417.19
0951		
12/18/2019	154.03	6419.67
0951R		
1/28/2019	156.40	6420.38
2/6/2019	157.76	6419.02
2/25/2019	156.10	6420.68
3/25/2019	156.70	6420.08
4/29/2019	156.10	6420.68
5/2/2019	156.00	6420.78
5/28/2019	151.60	6425.18
6/24/2019	157.70	6419.08
7/29/2019	158.33	6418.45
8/19/2019	158.52	6418.26
8/22/2019	158.30	6418.48
8/26/2019	158.87	6417.91
9/30/2019	159.50	6417.28
10/28/2019	158.60	6418.18
11/11/2019	157.80	6418.98
12/18/2019	156.37	6420.41
0991		
5/21/2019	130.90	6520.10

* Drawdown Tube Pressure, # Transducer Reading

APPENDIX B

WATER QUALITY

TABLE OF CONTENTS

GROUND-WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX B

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

Ca THROUGH pH

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)	pH(f) (std. units)
CS1	6/12/2019	ENER	---	---	---	---	---	---	382	2360	4810	6676	---	8.08
CS2	6/11/2019	ENER	---	---	---	---	---	---	640	3850	7920	10210	---	7.93
CS7	6/12/2019	ENER	---	---	---	---	---	---	582	3430	8360	11030	---	9.50
EE2	11/11/2019	ENER	---	---	---	---	---	---	254	2450	6840	9564	---	10.63
EP23	6/25/2019	ENER	---	---	---	---	---	---	305	2230	5060	6697	---	8.40
ES6	10/22/2019	ENER	---	---	---	---	---	---	826	5150	12700	1810	---	9.60
ET20	6/25/2019	ENER	---	---	---	---	---	---	187	1540	3080	4180	---	8.15
NE2	11/11/2019	ENER	---	---	---	---	---	---	899	6100	12700	2403	---	9.71
NW3	11/12/2019	ENER	---	---	---	---	---	---	280	2010	4120	5006	---	9.62
SE2	11/5/2019	ENER	---	---	---	---	---	---	233	1630	4370	5640	---	10.26
SW3	11/5/2019	ENER	---	---	---	---	---	---	276	1340	2880	3632	---	10.60
WE9	1/29/2019	ENER	---	---	---	---	---	---	236	---	---	4934	---	10.05
	2/13/2019	ENER	---	---	---	---	---	---	243	---	---	5014	---	10.06
	3/19/2019	ENER	---	---	---	---	---	---	202	---	---	5234	---	10.21
WF2	1/29/2019	ENER	---	---	---	---	---	---	263	---	---	5575	---	10.33
	2/13/2019	ENER	---	---	---	---	---	---	266	---	---	5615	---	10.33
	3/19/2019	ENER	---	---	---	---	---	---	241	---	---	5992	---	10.38
WF9	1/29/2019	ENER	---	---	---	---	---	---	260	---	---	5394	---	10.26
	2/12/2019	ENER	---	---	---	---	---	---	258	---	---	5304	---	10.15
	3/18/2019	ENER	---	---	---	---	---	---	302	---	---	5364	---	10.24
WF11	1/29/2019	ENER	---	---	---	---	---	---	214	---	---	3823	---	9.47
	2/12/2019	ENER	---	---	---	---	---	---	214	---	---	3777	---	8.99
	3/18/2019	ENER	---	---	---	---	---	---	218	---	---	3833	---	9.26
WME-1	2/26/2019	ENER	3	< 1.0	23.0	8000	1640	1370	1620	7890	---	17950	1.23	10.34
	4/9/2019	ENER	4	< 1.0	16.0	5980	1570	1370	1610	7840	---	34240	0.93	10.26

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(f) (std. units)
WME-1	6/21/2019	ENER	12	0.3	15.0	5440	1580	1320	1630	7730	---	10523	0.86	10.28
WME-2	2/26/2019	ENER	5	1.3	8.0	1600	686	151	265	1440	---	4936	1.31	10.16
	4/9/2019	ENER	3	< 1.0	6.0	1220	672	153	269	1520	---	13080	0.97	10.50
	6/21/2019	ENER	8	0.9	5.0	1110	680	152	274	1520	---	6970	0.88	9.99
	12/12/2019	ENER	3	< 1.0	7.0	1180	669	145	275	1530	---	4518	0.93	10.30
WME-3	2/26/2019	ENER	2	0.2	8.3	1700	580	452	151	1230	---	6120	1.36	10.48
	4/9/2019	ENER	1	< 1.0	6.0	1350	561	453	154	1290	---	8990	1.06	10.43
	6/21/2019	ENER	6	0.3	5.0	1220	665	443	166	1350	---	4969	0.92	10.56
	12/11/2019	ENER	3	0.3	7.0	1260	636	485	157	1290	---	4638	0.95	10.87
WME-4	2/26/2019	ENER	3	0.6	39.0	12000	3940	4930	600	9610	---	40800	1.17	10.43
	4/9/2019	ENER	2	< 1.0	29.0	10700	3830	4980	603	9940	---	17910	1.03	10.65
	6/21/2019	ENER	30	< 1.0	26.0	9560	4040	5080	641	10400	---	24460	0.89	10.53
	12/11/2019	ENER	10	0.5	36.0	9650	3760	5120	588	9630	---	27174	0.94	11.04
WME-5	2/26/2019	ENER	2	< 1.0	44.0	4800	716	2110	232	3250	---	12784	1.34	10.87
	4/9/2019	ENER	3	< 1.0	31.0	3810	984	2250	254	3640	---	26100	0.96	10.20
	6/21/2019	ENER	15	0.8	27.0	3620	1000	2070	262	3740	---	12757	0.93	10.91
	12/12/2019	ENER	5	0.2	30.0	3460	756	2130	232	3340	---	11515	0.95	11.23
WME-6	2/26/2019	ENER	2	1.6	20.0	4200	1280	1490	357	2660	---	11000	1.35	10.62
	4/9/2019	ENER	2	< 1.0	14.0	3090	1300	1570	360	2830	---	37100	0.95	10.53
	6/21/2019	ENER	12	0.9	12.0	3000	1300	1490	374	2790	---	7248	0.94	10.71
	12/12/2019	ENER	4	0.8	17.0	2900	1310	1330	363	2670	---	9522	0.96	11.00
WO10	11/11/2019	ENER	---	---	---	---	---	---	277	2610	6990	8260	---	12.11
WO21	11/12/2019	ENER	---	---	---	---	---	---	183	1040	2780	3781	---	12.05
WP10	10/22/2019	ENER	---	---	---	---	---	---	228	1740	3530	4360	---	7.94
	11/12/2019	ENER	---	---	---	---	---	---	220	1680	3550	4204	---	8.40
WW3	11/11/2019	ENER	---	---	---	---	---	---	399	2460	5150	5820	---	8.15

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)
CS1	6/12/2019	ENER	6.74	± 1.0900	16.400	0.012	---	---	---	---	---	---	---	---
CS2	6/11/2019	ENER	6.35	± 1.0200	21.300	0.010	---	---	---	---	---	---	---	---
CS7	6/12/2019	ENER	9.90	± 1.6000	22.200	0.028	---	---	---	---	---	---	---	---
EE2	11/11/2019	ENER	3.32	± 0.5350	24.100	0.094	---	---	---	---	---	---	---	---
EP23	6/25/2019	ENER	12.2	± 1.9600	21.700	0.090	---	---	---	---	---	---	---	---
ES6	10/22/2019	ENER	15.5	± 2.5000	37.100	0.087	---	---	---	---	---	---	---	---
ET20	6/25/2019	ENER	3.37	± 0.5450	6.070	0.085	---	---	---	---	---	---	---	---
NE2	11/11/2019	ENER	17.5	± 2.8200	41.400	1.120	---	---	---	---	---	---	---	---
NW3	11/12/2019	ENER	3.73	± 0.6020	10.700	0.043	---	---	---	---	---	---	---	---
SE2	11/5/2019	ENER	3.65	± 0.5900	11.700	0.029	---	---	---	---	---	---	---	---
SW3	11/5/2019	ENER	1.45	± 0.2340	2.500	0.050	---	---	---	---	---	---	---	---
WE9	1/29/2019	ENER	1.02	---	4.880	0.032	---	---	---	---	---	---	---	---
	2/13/2019	ENER	1.02	---	4.700	0.037	---	---	---	---	---	---	---	---
	3/19/2019	ENER	1.02	---	4.840	0.013	---	---	---	---	---	---	---	---
WF2	1/29/2019	ENER	1.66	---	7.250	0.111	---	---	---	---	---	---	---	---
	2/13/2019	ENER	1.62	---	6.970	0.048	---	---	---	---	---	---	---	---
	3/19/2019	ENER	1.23	---	7.500	0.004	---	---	---	---	---	---	---	---
WF9	1/29/2019	ENER	1.67	---	6.320	0.064	---	---	---	---	---	---	---	---
	2/12/2019	ENER	1.65	---	5.920	0.052	---	---	---	---	---	---	---	---
	3/18/2019	ENER	1.67	---	6.600	0.012	---	---	---	---	---	---	---	---
WF11	1/29/2019	ENER	0.247	---	1.820	0.007	---	---	---	---	---	---	---	---
	2/12/2019	ENER	0.242	---	1.770	0.008	---	---	---	---	---	---	---	---
	3/18/2019	ENER	0.246	---	1.740	0.050	---	---	---	---	---	---	---	---
WME-1	2/26/2019	ENER	13.0	---	52.000	0.058	2.7	---	---	---	---	< 0.20	---	---
	4/9/2019	ENER	10.00	---	39.800	0.046	2.1	---	---	---	---	< 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)
WME-1	6/21/2019	ENER	8.38	---	37.400	0.043	2.4	---	---	---	---	0.02	---	---
WME-2	2/26/2019	ENER	0.750	---	7.900	< 0.050	0.0	---	---	---	---	< 0.10	---	---
	4/9/2019	ENER	0.611	---	5.210	0.007	0.0	---	---	---	---	< 0.02	---	---
	6/21/2019	ENER	0.488	---	6.660	0.028	0.1	---	---	---	---	0.02	---	---
	12/12/2019	ENER	0.496	---	4.940	0.183	0.5	---	---	---	---	0.07	---	---
WME-3	2/26/2019	ENER	2.40	---	7.100	0.036	0.0	---	---	---	---	0.06	---	---
	4/9/2019	ENER	1.58	---	4.740	0.031	0.0	---	---	---	---	< 0.02	---	---
	6/21/2019	ENER	1.98	---	5.180	0.023	0.1	---	---	---	---	0.07	---	---
	12/11/2019	ENER	1.89	---	3.890	0.010	0.1	---	---	---	---	0.04	---	---
WME-4	2/26/2019	ENER	58.0	---	170.000	< 0.500	0.0	---	---	---	---	< 0.20	---	---
	4/9/2019	ENER	37.4	---	141.000	0.116	0.1	---	---	---	---	< 0.02	---	---
	6/21/2019	ENER	37.8	---	140.000	0.110	0.1	---	---	---	---	< 0.02	---	---
	12/11/2019	ENER	44.4	---	128.000	0.131	0.5	---	---	---	---	< 0.01	---	---
WME-5	2/26/2019	ENER	17.0	---	68.000	0.110	0.4	---	---	---	---	1.10	---	---
	4/9/2019	ENER	19.6	---	61.900	0.043	1.4	---	---	---	---	0.23	---	---
	6/21/2019	ENER	13.1	---	49.700	0.107	0.2	---	---	---	---	0.15	---	---
	12/12/2019	ENER	12.7	---	47.100	0.031	1.0	---	---	---	---	0.02	---	---
WME-6	2/26/2019	ENER	11.0	---	34.000	0.090	0.1	---	---	---	---	< 0.20	---	---
	4/9/2019	ENER	7.88	---	24.900	0.031	0.2	---	---	---	---	< 0.01	---	---
	6/21/2019	ENER	6.92	---	20.800	0.039	2.3	---	---	---	---	0.01	---	---
	12/12/2019	ENER	6.13	---	19.100	0.023	0.1	---	---	---	---	0.00	---	---
WO10	11/11/2019	ENER	7.38	± 1.1900	21.000	0.040	---	---	---	---	---	---	---	---
WO21	11/12/2019	ENER	0.306	± 0.0494	1.910	0.024	---	---	---	---	---	---	---	---
WP10	10/22/2019	ENER	5.27	± 0.8500	11.100	0.042	---	---	---	---	---	---	---	---
	11/12/2019	ENER	5.00	± 0.8080	10.300	0.050	---	---	---	---	---	---	---	---
WW3	11/11/2019	ENER	7.35	± 1.1900	10.700	0.035	---	---	---	---	---	---	---	---

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(f) (std. units)
East 1 Sump	1/9/2019	ENER	---	---	---	---	---	---	796	---	---	19091	---	10.28
	3/11/2019	ENER	---	---	---	---	---	---	770	---	---	17872	---	10.16
	5/22/2019	ENER	---	---	---	---	---	---	678	---	---	16536	---	10.40
	7/17/2019	ENER	---	---	---	---	---	---	695	---	---	16307	---	10.50
	12/12/2019	ENER	---	---	---	---	---	---	695	---	---	5591	---	10.78
East 2 Sump	1/9/2019	ENER	---	---	---	---	---	---	662	---	---	16359	---	10.23
	3/11/2019	ENER	---	---	---	---	---	---	684	---	---	16038	---	10.26
	5/22/2019	ENER	---	---	---	---	---	---	677	---	---	15466	---	10.41
	7/17/2019	ENER	---	---	---	---	---	---	674	---	---	15224	---	10.31
	12/13/2019	ENER	---	---	---	---	---	---	656	---	---	13594	---	9.94
North 1 Sump	1/8/2019	ENER	---	---	---	---	---	---	654	---	---	15650	---	10.07
	3/6/2019	ENER	---	---	---	---	---	---	597	---	---	---	---	9.63
	5/20/2019	ENER	---	---	---	---	---	---	675	---	---	15320	---	10.19
	7/17/2019	ENER	---	---	---	---	---	---	597	---	---	13427	---	10.35
	12/12/2019	ENER	---	---	---	---	---	---	651	---	---	13035	---	10.72
North 3 Sump	1/8/2019	ENER	---	---	---	---	---	---	623	---	---	12528	---	9.71
	3/6/2019	ENER	---	---	---	---	---	---	577	---	---	---	---	9.50
	5/20/2019	ENER	---	---	---	---	---	---	586	---	---	9676	---	9.65
	7/17/2019	ENER	---	---	---	---	---	---	568	---	---	---	---	9.40
	12/12/2019	ENER	---	---	---	---	---	---	595	---	---	9767	---	10.10
South 1 Sump	1/9/2019	ENER	---	---	---	---	---	---	333	---	---	6642	---	9.27
	3/6/2019	ENER	---	---	---	---	---	---	360	---	---	---	---	9.15
	5/21/2019	ENER	---	---	---	---	---	---	375	---	---	7275	---	9.39
	7/17/2019	ENER	---	---	---	---	---	---	401	---	---	7291	---	8.96
	12/12/2019	ENER	---	---	---	---	---	---	394	---	---	6917	---	9.42
West 1 Sump	1/8/2019	ENER	---	---	---	---	---	---	757	---	---	15171	---	9.68
	3/6/2019	ENER	---	---	---	---	---	---	598	---	---	---	---	9.84

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(f) (std. units)
West 1 Sump	5/20/2019	ENER	---	---	---	---	---	---	503	---	---	11133	---	10.20
	7/17/2019	ENER	---	---	---	---	---	---	611	---	---	13761	---	10.18
	12/12/2019	ENER	---	---	---	---	---	---	485	---	---	10873	---	10.76

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	1/9/2019	ENER	20.2	---	53.500	0.385	---	---	---	---	---	---	---	---
	3/11/2019	ENER	19.2	---	50.600	0.216	---	---	---	---	---	---	---	---
	5/22/2019	ENER	17.5	---	45.600	0.230	---	---	---	---	---	---	---	---
	7/17/2019	ENER	17.4	---	47.700	0.200	---	---	---	---	---	---	---	---
	12/12/2019	ENER	18.3	---	45.700	0.210	---	---	---	---	---	---	---	---
East 2 Sump	1/9/2019	ENER	13.7	---	39.300	0.408	---	---	---	---	---	---	---	---
	3/11/2019	ENER	14.1	---	40.800	0.453	---	---	---	---	---	---	---	---
	5/22/2019	ENER	14.3	---	39.900	0.470	---	---	---	---	---	---	---	---
	7/17/2019	ENER	14.3	---	40.900	0.490	---	---	---	---	---	---	---	---
	12/13/2019	ENER	13.8	---	37.800	0.480	---	---	---	---	---	---	---	---
North 1 Sump	1/8/2019	ENER	16.9	---	42.700	0.469	---	---	---	---	---	---	---	---
	3/6/2019	ENER	17.0	---	40.000	0.400	---	---	---	---	---	---	---	---
	5/20/2019	ENER	16.8	---	43.800	0.394	---	---	---	---	---	---	---	---
	7/17/2019	ENER	16.5	---	37.300	0.370	---	---	---	---	---	---	---	---
	12/12/2019	ENER	16.5	---	36.400	0.314	---	---	---	---	---	---	---	---
North 3 Sump	1/8/2019	ENER	11.3	---	27.800	0.223	---	---	---	---	---	---	---	---
	3/6/2019	ENER	7.00	---	18.000	< 0.200	---	---	---	---	---	---	---	---
	5/20/2019	ENER	6.64	---	18.400	0.063	---	---	---	---	---	---	---	---
	7/17/2019	ENER	6.57	---	17.900	0.060	---	---	---	---	---	---	---	---
	12/12/2019	ENER	8.14	---	20.400	0.045	---	---	---	---	---	---	---	---
South 1 Sump	1/9/2019	ENER	7.10	---	11.400	0.110	---	---	---	---	---	---	---	---
	3/6/2019	ENER	11.0	---	17.000	< 0.100	---	---	---	---	---	---	---	---
	5/21/2019	ENER	9.12	---	13.600	0.034	---	---	---	---	---	---	---	---
	7/17/2019	ENER	10.4	---	15.500	0.016	---	---	---	---	---	---	---	---
	12/12/2019	ENER	9.32	---	13.100	0.023	---	---	---	---	---	---	---	---
West 1 Sump	1/8/2019	ENER	16.6	---	38.100	0.367	---	---	---	---	---	---	---	---
	3/6/2019	ENER	19.0	---	43.000	0.340	---	---	---	---	---	---	---	---

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)
West 1 Sump	5/20/2019	ENER	12.8	---	32.000	0.266	---	---	---	---	---	---	---	---
	7/17/2019	ENER	16.0	---	37.600	0.360	---	---	---	---	---	---	---	---
	12/12/2019	ENER	12.2	---	28.000	0.173	---	---	---	---	---	---	---	---

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(f) (std. units)
E Coll Pond	2/5/2019	ENER	---	---	---	---	---	---	285	2230	3990	5067	---	8.60
	4/8/2019	ENER	---	---	---	---	---	---	321	2390	4330	5524	---	8.72
	7/17/2019	ENER	55	83.0	7.7	1690	356	41	418	3260	5940	7463	0.96	8.75
	10/10/2019	ENER	---	---	---	---	---	---	367	3030	5470	7116	---	8.77
Evap Pond 1	2/5/2019	ENER	---	---	---	---	---	---	2130	17300	30800	30070	---	9.29
	4/8/2019	ENER	---	---	---	---	---	---	2300	18600	32000	32030	---	9.17
	7/18/2019	ENER	97	334.0	37.0	8180	983	317	1920	15500	27300	28190	0.96	9.18
	10/10/2019	ENER	---	---	---	---	---	---	2460	20600	34800	35530	---	9.61
Evap Pond 2	2/5/2019	ENER	---	---	---	---	---	---	963	7890	14300	15290	---	8.83
	4/8/2019	ENER	---	---	---	---	---	---	1180	9190	16200	17890	---	9.07
	7/18/2019	ENER	115	245.0	21.0	5050	610	130	1340	10500	18600	20220	0.91	9.00
	10/10/2019	ENER	---	---	---	---	---	---	1510	12400	21400	23070	---	8.78
Evap Pond 3A	2/11/2019	ENER	---	---	---	---	---	---	7890	29400	66400	56810	---	9.75
	4/8/2019	ENER	---	---	---	---	---	---	17400	25800	77000	69010	---	9.29
	7/18/2019	ENER	80	664.0	227.0	29700	6200	5370	16900	31300	104000	86660	0.96	9.35
	10/10/2019	ENER	---	---	---	---	---	---	5110	20300	42100	42380	---	9.39
Evap Pond 3B	2/11/2019	ENER	---	---	---	---	---	---	10600	27600	67000	58940	---	9.46
	4/8/2019	ENER	---	---	---	---	---	---	9880	25700	68600	69030	---	9.30
	7/18/2019	ENER	77	635.0	174.0	26900	6440	5530	13300	27200	72500	80210	1.00	9.36
	10/10/2019	ENER	---	---	---	---	---	---	6060	23900	50800	49430	---	9.48
W Coll Pond	4/8/2019	ENER	---	---	---	---	---	---	317	2330	4220	5398	---	8.81
	7/17/2019	ENER	37	69.3	3.9	1380	96	28	347	2680	4690	6023	0.99	9.15

TABLE B.3-2 WATER QUALITY ANALYSES FOR THE LINED PONDS

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
E Coll Pond	2/5/2019	ENER	5.15	± 0.8310	9.610	0.313	---	---	---	---	---	---	---	---
	4/8/2019	ENER	6.56	± 0.9830	10.700	0.303	---	---	---	---	---	---	---	---
	7/17/2019	ENER	6.70	± 1.0800	16.900	0.482	3.8	1.80	0.400	1.2	0.8	< 0.01	0.70	0.70
	10/10/2019	ENER	6.19	± 0.9990	16.500	0.475	---	---	---	---	---	---	---	---
Evap Pond 1	2/5/2019	ENER	35.0	± 5.9600	47.000	0.826	---	---	---	---	---	---	---	---
	4/8/2019	ENER	36.4	± 5.8300	47.300	0.746	---	---	---	---	---	---	---	---
	7/18/2019	ENER	38.0	± 6.1300	65.900	0.659	2.0	2.80	0.700	2.4	1.0	0.03	0.80	0.70
	10/10/2019	ENER	40.2	± 6.4900	41.800	0.618	---	---	---	---	---	---	---	---
Evap Pond 2	2/5/2019	ENER	15.0	± 2.4300	35.400	0.796	---	---	---	---	---	---	---	---
	4/8/2019	ENER	17.4	± 2.7400	34.800	0.747	---	---	---	---	---	---	---	---
	7/18/2019	ENER	18.3	± 2.9500	47.800	0.621	3.0	1.60	0.400	0.4	1.3	0.03	0.40	0.40
	10/10/2019	ENER	23.2	± 3.7500	46.300	0.452	---	---	---	---	---	---	---	---
Evap Pond 3A	2/11/2019	ENER	142	± 22.7000	222.000	0.280	---	---	---	---	---	---	---	---
	4/8/2019	ENER	333	± 32.3000	314.000	0.390	---	---	---	---	---	---	---	---
	7/18/2019	ENER	199	± 32.2000	412.000	0.730	1.4	11.20	2.200	4.6	1.2	0.07	73.30	13.90
	10/10/2019	ENER	63.2	± 10.2000	141.000	0.578	---	---	---	---	---	---	---	---
Evap Pond 3B	2/11/2019	ENER	140	± 22.5000	204.000	0.410	---	---	---	---	---	---	---	---
	4/8/2019	ENER	181	± 27.9000	236.000	0.310	---	---	---	---	---	---	---	---
	7/18/2019	ENER	183	± 29.0000	346.000	0.590	< 0.1	10.90	2.200	9.2	2.0	0.06	62.90	11.90
	10/10/2019	ENER	99.3	± 16.0000	164.000	0.611	---	---	---	---	---	---	---	---
W Coll Pond	4/8/2019	ENER	5.85	± 0.9350	10.600	0.320	---	---	---	---	---	---	---	---
	7/17/2019	ENER	4.56	± 0.7350	13.600	0.543	6.8	0.20	0.100	-0.2	0.8	< 0.01	0.20	0.30

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(f) (std. units)
0690	2/12/2019	ENER	---	---	---	---	---	---	102	327	930	1345	---	7.89
0691	2/12/2019	ENER	---	---	---	---	---	---	96	257	803	1284	---	7.95
0891	3/27/2019	ENER	---	---	---	---	---	---	460	733	2090	3023	---	7.28
	3/27/2019	ENER	---	---	---	---	---	---	# 453	# 721	# 2090	---	---	# 7.28
1A	4/2/2019	ENER	136	41.9	7.2	638	449	< 5	281	1090	2530	3427	1.00	7.26
1F	9/30/2019	ENER	---	---	---	---	---	---	257	1160	2580	3558	---	7.30
1J	1/9/2019	ENER	---	---	---	---	---	---	62	236	569	889	---	8.23
	12/16/2019	ENER	---	---	---	---	---	---	185	387	1220	1476	---	7.63
1K	4/2/2019	ENER	78	16.2	2.5	278	363	< 5	110	416	1130	1649	0.97	7.29
1M	2/19/2019	ENER	---	---	---	---	---	---	312	1620	3380	4432	---	7.36
1P	12/13/2019	ENER	---	---	---	---	---	---	321	491	1580	1981	---	7.60
1U	1/9/2019	ENER	---	---	---	---	---	---	90	419	1030	1433	---	7.36
B	12/13/2019	ENER	---	---	---	---	---	---	98	446	1150	1400	---	7.43
B3	4/11/2019	ENER	---	---	---	---	---	---	84	424	1890	2599	---	7.06
B4	11/1/2019	ENER	---	---	---	---	---	---	355	2720	5550	6491	---	7.84
B6	4/11/2019	ENER	---	---	---	---	---	---	150	676	1650	2313	---	7.23
B7	12/9/2019	ENER	---	---	---	---	---	---	483	3290	6340	7520	---	7.81
B10	4/11/2019	ENER	---	---	---	---	---	---	402	2810	5840	7406	---	7.14
B11	3/6/2019	ENER	260	67.0	10.0	1100	571	< 5	255	1730	3440	4542	1.26	7.19
	4/11/2019	ENER	---	---	---	---	---	---	317	1860	3790	5307	---	7.29
B12	2/20/2019	ENER	---	---	---	---	---	---	267	1750	3500	4321	---	6.94
B13	2/20/2019	ENER	---	---	---	---	---	---	113	393	1120	1578	---	7.18
	7/1/2019	ENER	121	35.4	3.7	171	383	< 5	102	372	1080	1519	0.97	7.33
B15	4/11/2019	ENER	---	---	---	---	---	---	427	3570	7380	9025	---	7.16

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(f) (std. units)
B16	4/11/2019	ENER	---	---	---	---	---	---	395	3280	6410	7904	---	7.28
B31	4/11/2019	ENER	---	---	---	---	---	---	373	3230	6770	8490	---	7.26
B32	4/11/2019	ENER	---	---	---	---	---	---	543	4000	8260	10280	---	7.54
B40	4/11/2019	ENER	---	---	---	---	---	---	481	4050	8160	9718	---	7.05
B42	4/11/2019	ENER	---	---	---	---	---	---	682	5960	11600	13260	---	6.99
BC	12/17/2019	ENER	---	---	---	---	---	---	80	1560	2790	2600	---	7.86
BK1c	6/10/2019	ENER	345	85.0	5.0	272	300	< 5	69	1410	---	2815	0.99	7.83
BK1f	6/10/2019	ENER	330	82.0	5.0	276	309	< 5	70	1380	---	2772	0.98	7.88
BK2c	6/10/2019	ENER	248	42.0	5.0	263	189	< 5	53	1130	---	2276	0.97	8.12
BK2f	6/10/2019	ENER	174	33.0	4.0	242	233	< 5	47	878	---	1906	0.93	8.13
BP	7/1/2019	ENER	148	38.2	3.7	244	326	< 5	113	643	1430	1937	0.96	13.90
	12/13/2019	ENER	---	---	---	---	---	---	132	796	1720	1978	---	7.44
	12/13/2019	ENER	---	---	---	---	---	---	# 132	# 790	# 1700	---	---	# 7.40
C2	3/27/2019	ENER	---	---	---	---	---	---	119	444	1210	1708	---	7.25
C5	3/27/2019	ENER	---	---	---	---	---	---	105	438	1110	1528	---	7.29
C6	3/26/2019	ENER	---	---	---	---	---	---	118	509	1290	1788	---	7.32
	11/1/2019	ENER	---	---	---	---	---	---	115	545	1440	1847	---	7.80
C7	3/26/2019	ENER	---	---	---	---	---	---	249	1880	3730	4693	---	7.14
	11/1/2019	ENER	---	---	---	---	---	---	303	2520	4880	5613	---	7.83
C8	3/26/2019	ENER	---	---	---	---	---	---	194	872	2030	2989	---	7.49
	11/1/2019	ENER	---	---	---	---	---	---	159	775	1860	2629	---	7.98
C9	3/26/2019	ENER	---	---	---	---	---	---	184	608	1670	2435	---	7.71
	11/1/2019	ENER	---	---	---	---	---	---	181	697	1830	2374	---	7.89
C10	3/26/2019	ENER	---	---	---	---	---	---	276	1190	2770	3922	---	7.58

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(f) (std. units)
C11	3/26/2019	ENER	---	---	---	---	---	---	198	950	2120	2975	---	7.36
	11/5/2019	ENER	---	---	---	---	---	---	149	638	1690	2433	---	7.29
C12	3/26/2019	ENER	---	---	---	---	---	---	247	1020	2390	3448	---	7.73
	11/1/2019	ENER	---	---	---	---	---	---	150	683	1750	2133	---	7.77
D1	3/6/2019	ENER	---	---	---	---	---	---	157	719	1730	2262	---	7.07
	7/19/2019	ENER	195	41.2	3.8	291	377	< 5	131	843	1790	2291	0.94	7.40
DA3	4/11/2019	ENER	---	---	---	---	---	---	248	1590	3220	4096	---	7.03
DD	2/11/2019	ENER	---	---	---	---	---	---	70	2210	3730	3843	---	7.22
	5/8/2019	ENER	471	107.0	6.4	382	339	< 5	71	2120	3590	3839	0.95	7.13
	8/19/2019	ENER	---	---	---	---	---	---	77	2180	3560	3634	---	7.03
	10/8/2019	ENER	---	---	---	---	---	---	74	2060	3540	3886	---	6.97
DD2	5/8/2019	ENER	350	83.7	5.7	312	356	< 5	62	1590	2740	3070	0.93	7.05
	8/19/2019	ENER	---	---	---	---	---	---	64	1580	2760	3024	---	7.00
	10/8/2019	ENER	---	---	---	---	---	---	63	1570	2750	3160	---	6.91
DD3	3/28/2019	ENER	---	---	---	---	---	---	137	2000	3710	3998	---	6.95
	5/9/2019	ENER	479	132.0	8.0	442	210	< 5	165	1980	3800	4078	1.10	7.36
	10/23/2019	ENER	---	---	---	---	---	---	172	2020	3900	3820	---	7.56
DD4	3/28/2019	ENER	---	---	---	---	---	---	61	1640	2780	3078	---	6.85
	5/23/2019	ENER	384	84.5	5.7	337	353	< 5	60	1570	2760	3056	1.01	7.00
	10/23/2019	ENER	---	---	---	---	---	---	60	1550	2760	2770	---	7.50
DD5	3/28/2019	ENER	---	---	---	---	---	---	79	1960	3440	3769	---	7.18
	5/9/2019	ENER	484	121.0	9.0	384	334	< 5	83	2060	3560	3791	1.00	7.30
	10/23/2019	ENER	---	---	---	---	---	---	81	2030	3660	3465	---	7.57
DT	4/11/2019	ENER	---	---	---	---	---	---	362	2680	5240	6551	---	7.19
F	3/6/2019	ENER	---	---	---	---	---	---	185	707	1830	2430	---	6.98
	9/23/2019	ENER	227	58.7	4.9	276	492	< 5	189	714	1880	2364	1.00	7.16

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(f) (std. units)
FB	3/6/2019	ENER	---	---	---	---	---	---	198	758	1880	2469	---	6.94
	9/23/2019	ENER	243	63.5	5.0	266	531	< 5	213	717	1970	2479	0.97	6.97
GH	3/6/2019	ENER	---	---	---	---	---	---	161	626	1620	2187	---	6.98
	9/30/2019	ENER	209	56.1	4.3	272	479	< 5	167	626	1660	2287	1.05	6.94
GN	3/5/2019	ENER	220	69.0	11.0	300	379	< 5	163	594	1480	2027	1.28	7.06
GV	12/13/2019	ENER	---	---	---	---	---	---	188	699	1690	1903	---	7.80
K4	3/26/2019	ENER	---	---	---	---	---	---	115	504	1310	1851	---	7.26
	7/9/2019	ENER	---	---	---	---	---	---	118	528	1330	1770	---	7.70
K5	3/26/2019	ENER	---	---	---	---	---	---	116	510	1300	1861	---	7.46
	7/9/2019	ENER	---	---	---	---	---	---	118	544	1340	1748	---	7.20
K7	7/11/2019	ENER	---	---	---	---	---	---	109	426	1210	1754	---	7.47
K8	11/5/2019	ENER	---	---	---	---	---	---	113	571	1490	2121	---	7.35
K10	3/26/2019	ENER	---	---	---	---	---	---	116	511	1300	1852	---	7.41
	11/5/2019	ENER	---	---	---	---	---	---	113	547	1470	2116	---	7.26
	11/5/2019	ENER	---	---	---	---	---	---	# 113	# 569	# 1490	---	---	# 7.35
K11	3/26/2019	ENER	---	---	---	---	---	---	117	515	1300	1861	---	7.44
	7/9/2019	ENER	---	---	---	---	---	---	118	525	1320	1789	---	7.38
KEB	3/26/2019	ENER	---	---	---	---	---	---	83	366	937	1322	---	7.27
KF	3/26/2019	ENER	---	---	---	---	---	---	105	487	1100	1516	---	7.44
KZ	3/26/2019	ENER	---	---	---	---	---	---	82	346	840	1211	---	7.37
L	4/3/2019	ENER	168	40.5	5.4	307	398	< 5	181	620	1580	2164	1.02	7.19
L5	11/22/2019	ENER	98	22.8	4.0	241	352	< 5	121	373	1090	1457	1.01	6.85
L6	4/10/2019	ENER	---	---	---	---	---	---	204	490	1380	1951	---	7.28
	10/21/2019	ENER	---	---	---	---	---	---	205	480	1430	1840	---	7.66

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(f) (std. units)
L7	4/10/2019	ENER	---	---	---	---	---	---	130	352	1050	1564	---	7.49
L8	4/10/2019	ENER	---	---	---	---	---	---	132	432	1200	1701	---	7.28
L9	12/17/2019	ENER	---	---	---	---	---	---	150	512	1350	1564	---	7.66
L10	4/10/2019	ENER	---	---	---	---	---	---	149	504	1330	1936	---	7.29
M3	3/28/2019	ENER	---	---	---	---	---	---	208	1180	2550	3198	---	7.06
	4/3/2019	ENER	463	129.0	7.8	2170	1370	< 5	468	4350	8140	9504	1.02	6.88
M5	12/10/2019	ENER	---	---	---	---	---	---	140	824	1800	2135	---	7.79
M6	2/13/2019	ENER	---	---	---	---	---	---	181	1010	2330	2975	---	7.09
M7	2/13/2019	ENER	---	---	---	---	---	---	195	765	1910	2514	---	7.13
M9	11/12/2019	ENER	---	---	---	---	---	---	174	1300	2610	3375	---	7.06
M10	2/19/2019	ENER	---	---	---	---	---	---	226	1480	3010	3527	---	7.22
MB	3/5/2019	ENER	230	58.0	7.5	220	504	< 5	189	730	1850	2473	0.90	6.86
ML	2/19/2019	ENER	---	---	---	---	---	---	226	1920	3690	4045	---	7.12
MQ	3/5/2019	ENER	370	92.0	8.4	390	465	< 5	191	1010	2260	2849	1.26	6.99
MU	10/15/2019	ENER	---	---	---	---	---	---	219	1600	3160	3620	---	7.16
MW	2/19/2019	ENER	---	---	---	---	---	---	231	1940	3650	4080	---	7.18
MX	8/21/2019	ENER	220	54.8	6.7	254	514	< 5	171	633	1730	2266	1.00	7.09
MY	10/14/2019	ENER	---	---	---	---	---	---	145	574	1520	2112	---	7.15
MZ	2/19/2019	ENER	---	---	---	---	---	---	249	1390	2870	3406	---	7.20
N	8/29/2019	ENER	---	---	---	---	---	---	122	1670	2970	3370	---	7.42
NA	8/29/2019	ENER	---	---	---	---	---	---	69	735	1500	2110	---	8.79
NB	8/29/2019	ENER	---	---	---	---	---	---	1080	8460	16500	18950	---	8.51
NC	4/2/2019	ENER	161	28.1	3.3	230	184	< 5	53	779	1420	1830	0.98	7.53

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(f) (std. units)
ND	12/11/2019	ENER	---	---	---	---	---	---	97	964	1850	2336	---	8.68
	12/11/2019	ENER	---	---	---	---	---	---	# 96	# 962	# 1850	---	---	# 8.68
O	8/28/2019	ENER	---	---	---	---	---	---	104	829	1600	2121	---	7.71
P	5/1/2019	ENER	229	46.7	4.6	253	253	< 5	50	1050	1870	2258	0.96	7.44
P2	3/27/2019	ENER	---	---	---	---	---	---	73	1440	2400	2798	---	7.26
	3/27/2019	ENER	---	---	---	---	---	---	# 67	# 1410	# 2400	---	---	# 7.26
P3	3/27/2019	ENER	---	---	---	---	---	---	74	1380	2360	2739	---	7.29
P4	3/27/2019	ENER	---	---	---	---	---	---	47	925	1620	2023	---	7.47
Q	5/1/2019	ENER	405	72.3	7.1	268	229	< 5	65	1610	2750	3062	0.97	7.36
S2	1/8/2019	ENER	---	---	---	---	---	---	215	898	2230	2883	---	7.12
	8/1/2019	ENER	247	67.3	6.1	459	647	< 5	208	1100	2540	3256	0.96	7.08
S4	7/31/2019	ENER	183	45.5	4.4	251	503	< 5	137	633	1590	2153	0.94	7.36
S5R	11/14/2019	ENER	---	---	---	---	---	---	805	7170	14400	1610	---	7.15
S11	1/9/2019	ENER	---	---	---	---	---	---	97	440	1040	1489	---	7.50
	12/9/2019	ENER	---	---	---	---	---	---	161	632	1550	1956	---	8.09
S12	1/16/2019	ENER	---	---	---	---	---	---	262	1320	2890	5703	---	7.22
S19	2/19/2019	ENER	---	---	---	---	---	---	350	1880	3870	4390	---	7.26
SA	3/28/2019	ENER	---	---	---	---	---	---	940	8380	15800	18080	---	7.24
SE6	1/15/2019	ENER	---	---	---	---	---	---	237	761	2130	2923	---	7.12
SM	5/7/2019	ENER	---	---	---	---	---	---	257	1690	3520	4376	---	7.34
SO	5/30/2019	ENER	---	---	---	---	---	---	222	1220	2590	3260	---	7.12
ST	1/9/2019	ENER	---	---	---	---	---	---	330	1950	4120	5369	---	7.48
	3/28/2019	ENER	---	---	---	---	---	---	386	2580	5040	6363	---	7.24
	12/10/2019	ENER	---	---	---	---	---	---	581	4100	8140	9177	---	8.42

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(f) (std. units)
SUR	12/9/2019	ENER	---	---	---	---	---	---	622	5380	11000	12357	---	9.53
SV	3/28/2019	ENER	---	---	---	---	---	---	643	4610	9020	11060	---	7.44
SW	6/11/2019	ENER	---	---	---	---	---	---	651	4370	8200	9519	---	7.13
SZ	1/9/2019	ENER	---	---	---	---	---	---	1350	12000	24700	26270	---	8.53
	12/10/2019	ENER	---	---	---	---	---	---	1430	12100	24000	23683	---	9.00
T2	6/4/2019	ENER	73	63.7	6.4	3430	2320	< 5	608	4930	9850	12130	1.00	8.05
T15	12/10/2019	ENER	---	---	---	---	---	---	550	4540	10400	11451	---	9.56
T19	6/4/2019	ENER	41	12.0	2.5	2050	1570	214	375	2680	6160	8034	0.93	8.96
T23	6/4/2019	ENER	154	194.0	16.0	7020	3950	< 5	1620	13200	23700	26700	0.85	7.45
T24	1/15/2019	ENER	---	---	---	---	---	---	391	3930	7580	8756	---	6.96
T25	1/30/2019	ENER	---	---	---	---	---	---	308	2440	4840	6193	---	7.24
T26	1/15/2019	ENER	---	---	---	---	---	---	400	4220	8090	9625	---	7.14
T27	1/15/2019	ENER	---	---	---	---	---	---	399	3470	6600	7956	---	7.07
T28	1/15/2019	ENER	---	---	---	---	---	---	431	3940	7570	8866	---	7.01
T29	1/17/2019	ENER	---	---	---	---	---	---	997	7960	16100	18460	---	8.95
T30	1/16/2019	ENER	---	---	---	---	---	---	477	3580	6910	7854	---	6.91
T31	1/16/2019	ENER	---	---	---	---	---	---	489	4390	8110	9308	---	7.13
T32	1/16/2019	ENER	---	---	---	---	---	---	554	4050	7950	9087	---	6.90
T36	1/15/2019	ENER	---	---	---	---	---	---	303	2580	5120	6344	---	7.27
T41	6/4/2019	ENER	6	< 0.5	10.4	2610	910	1170	371	2870	7540	10200	0.92	9.80
T43	1/17/2019	ENER	---	---	---	---	---	---	683	5480	11000	13380	---	9.22
T47	1/30/2019	ENER	---	---	---	---	---	---	585	4410	10000	12290	---	9.49
T53	1/30/2019	ENER	---	---	---	---	---	---	173	1780	3550	4335	---	8.45

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(f) (std. units)
T54	6/5/2019	ENER	11	9.6	5.4	2250	1030	318	344	3320	6830	8936	0.93	9.36
WME-9	2/27/2019	ENER	160	38.0	7.3	260	300	< 5	117	465	---	1699	1.25	7.94
	5/22/2019	ENER	126	30.0	5.0	205	310	< 5	117	470	---	1649	0.97	7.76
	12/13/2019	ENER	---	---	---	---	---	---	59	---	---	773	---	8.08
WME-10	2/27/2019	ENER	140	26.0	4.1	180	342	< 5	111	430	---	1639	0.96	7.68
	5/22/2019	ENER	142	30.0	3.0	187	342	< 5	112	489	---	1688	0.93	7.84
	12/13/2019	ENER	---	---	---	---	---	---	114	---	---	1397	---	7.67
X	2/7/2019	ENER	---	---	---	---	---	---	63	310	823	1211	---	7.44
	4/8/2019	ENER	---	---	---	---	---	---	87	417	1010	1407	---	7.25
	7/31/2019	ENER	153	33.5	4.6	154	307	< 5	110	468	1150	1588	0.95	7.46
	10/8/2019	ENER	---	---	---	---	---	---	108	441	1110	1582	---	7.16
	10/18/2019	ENER	---	---	---	---	---	---	105	424	1100	1519	---	7.39
	10/18/2019	ENER	---	---	---	---	---	---	# 105	# 425	# 1100	---	---	---
X18	12/11/2019	ENER	---	---	---	---	---	---	252	1120	2570	3128	---	8.42

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	2/12/2019	ENER	0.117	± 0.0188	0.875	0.452	---	---	---	---	---	---	---	---
0691	2/12/2019	ENER	0.0148	± 0.0024	0.262	0.168	---	---	---	---	---	---	---	---
0891	3/27/2019	ENER	0.843	± 0.1360	0.088	0.729	---	---	---	---	---	---	---	---
	3/27/2019	ENER	# 0.839	# ± 0.1350	# 0.086	# 0.728	---	---	---	---	---	---	---	---
1A	4/2/2019	ENER	2.34	± 0.3780	1.550	0.966	9.4	0.10	0.200	1.1	0.9	< 0.01	-0.02	0.07
1F	9/30/2019	ENER	0.0594	± 0.0096	< 0.001	0.027	---	---	---	---	---	---	---	---
1J	1/9/2019	ENER	0.0163	± 0.0026	0.006	0.008	---	---	---	---	---	---	---	---
	12/16/2019	ENER	0.112	± 0.0181	0.082	0.064	---	---	---	---	---	---	---	---
1K	4/2/2019	ENER	0.602	± 0.0971	0.532	0.046	4.1	0.10	0.100	-0.2	1.2	< 0.01	0.04	0.09
1M	2/19/2019	ENER	6.51	± 1.0500	5.610	0.754	---	---	---	---	---	---	---	---
1P	12/13/2019	ENER	0.151	± 0.0244	0.005	0.061	---	---	---	---	---	---	---	---
1U	1/9/2019	ENER	0.242	± 0.0391	0.241	< 0.001	---	---	---	---	---	---	---	---
B	12/13/2019	ENER	0.0973	± 0.0157	0.009	0.024	---	---	---	---	---	---	---	---
B3	4/11/2019	ENER	1.65	± 0.2670	2.150	0.169	---	---	---	---	---	---	---	---
B4	11/1/2019	ENER	10.9	± 1.7700	24.200	0.620	---	---	---	---	---	---	---	---
B6	4/11/2019	ENER	2.13	± 0.3440	4.490	0.330	---	---	---	---	---	---	---	---
B7	12/9/2019	ENER	11.9	± 1.9200	14.400	0.770	---	---	---	---	---	---	---	---
B10	4/11/2019	ENER	14.0	± 2.2700	14.800	3.000	---	---	---	---	---	---	---	---
B11	3/6/2019	ENER	8.20	---	9.700	2.500	14.7	0.40	0.100	0.4	0.9	< 0.10	-0.02	0.09
	4/11/2019	ENER	6.80	± 1.1000	10.700	1.400	---	---	---	---	---	---	---	---
B12	2/20/2019	ENER	1.96	± 0.3150	1.460	0.128	---	---	---	---	---	---	---	---
B13	2/20/2019	ENER	0.317	± 0.0512	0.179	0.012	---	---	---	---	---	---	---	---
	7/1/2019	ENER	0.586	± 0.0946	0.340	0.012	1.0	0.40	0.200	---	---	---	---	---
B15	4/11/2019	ENER	15.1	± 2.4400	24.000	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)
B16	4/11/2019	ENER	11.9	± 1.9200	18.500	0.400	---	---	---	---	---	---	---	---
B31	4/11/2019	ENER	12.6	± 2.0400	18.000	0.700	---	---	---	---	---	---	---	---
B32	4/11/2019	ENER	17.9	± 2.9000	31.900	0.600	---	---	---	---	---	---	---	---
B40	4/11/2019	ENER	19.3	± 3.1200	33.200	0.600	---	---	---	---	---	---	---	---
B42	4/11/2019	ENER	28.1	± 4.5300	45.700	1.200	---	---	---	---	---	---	---	---
BC	12/17/2019	ENER	1.06	± 0.1700	0.054	0.037	---	---	---	---	---	---	---	---
BK1c	6/10/2019	ENER	0.0353	---	0.004	0.245	11.2	---	---	---	---	< 0.01	---	---
BK1f	6/10/2019	ENER	0.0402	---	0.001	0.251	11.4	---	---	---	---	< 0.01	---	---
BK2c	6/10/2019	ENER	0.0212	---	0.008	0.318	10.8	---	---	---	---	< 0.01	---	---
BK2f	6/10/2019	ENER	0.0155	---	0.006	0.039	1.4	---	---	---	---	< 0.01	---	---
BP	7/1/2019	ENER	0.627	± 0.1010	0.601	0.076	1.8	0.40	0.200	---	---	---	---	---
	12/13/2019	ENER	1.25	± 0.2020	1.150	0.092	---	---	---	---	---	---	---	---
	12/13/2019	ENER	# 1.27	# ± 0.2040	# 1.150	# 0.094	---	---	---	---	---	---	---	---
C2	3/27/2019	ENER	0.404	± 0.0653	0.258	0.025	---	---	---	---	---	---	---	---
C5	3/27/2019	ENER	0.0589	± 0.0095	0.051	0.024	---	---	---	---	---	---	---	---
C6	3/26/2019	ENER	0.721	± 0.1160	1.460	0.359	---	---	---	---	---	---	---	---
	11/1/2019	ENER	1.07	± 0.1720	2.730	0.474	---	---	---	---	---	---	---	---
C7	3/26/2019	ENER	9.92	± 1.6000	27.900	0.959	---	---	---	---	---	---	---	---
	11/1/2019	ENER	9.39	± 1.5100	25.600	2.120	---	---	---	---	---	---	---	---
C8	3/26/2019	ENER	3.12	± 0.5030	5.280	0.586	---	---	---	---	---	---	---	---
	11/1/2019	ENER	2.43	± 0.3930	5.070	0.612	---	---	---	---	---	---	---	---
C9	3/26/2019	ENER	3.84	± 0.6190	4.310	0.288	---	---	---	---	---	---	---	---
	11/1/2019	ENER	3.54	± 0.5720	6.100	0.369	---	---	---	---	---	---	---	---
C10	3/26/2019	ENER	5.44	± 0.8780	10.300	0.636	---	---	---	---	---	---	---	---

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)
C11	3/26/2019	ENER	3.29	± 0.5300	4.220	0.808	---	---	---	---	---	---	---	---
	11/5/2019	ENER	2.09	± 0.3370	4.630	0.480	---	---	---	---	---	---	---	---
C12	3/26/2019	ENER	2.07	± 0.3350	3.520	0.317	---	---	---	---	---	---	---	---
	11/1/2019	ENER	2.23	± 0.3590	5.240	0.521	---	---	---	---	---	---	---	---
D1	3/6/2019	ENER	2.80	---	3.800	0.075	---	---	---	---	---	---	---	---
	7/19/2019	ENER	1.03	± 0.1660	1.350	0.068	1.2	0.20	0.200	0.5	1.1	< 0.01	0.10	0.05
DA3	4/11/2019	ENER	2.92	± 0.4710	3.820	0.200	---	---	---	---	---	---	---	---
DD	2/11/2019	ENER	0.0870	± 0.0140	< 0.001	0.107	---	---	---	---	---	---	---	---
	5/8/2019	ENER	0.0956	± 0.0154	0.002	0.073	11.1	0.10	0.100	0.1	1.4	< 0.01	0.05	0.06
	8/19/2019	ENER	0.110	± 0.0177	0.001	0.110	---	---	---	---	---	---	---	---
	10/8/2019	ENER	0.124	± 0.0201	0.001	0.066	---	---	---	---	---	---	---	---
DD2	5/8/2019	ENER	0.207	± 0.0335	< 0.001	< 0.001	< 0.1	0.40	0.200	0.0	1.3	< 0.01	0.06	0.06
	8/19/2019	ENER	0.236	± 0.0381	< 0.001	< 0.001	---	---	---	---	---	---	---	---
	10/8/2019	ENER	0.246	± 0.0398	< 0.001	< 0.001	---	---	---	---	---	---	---	---
DD3	3/28/2019	ENER	0.0897	± 0.0145	0.004	0.318	---	---	---	---	---	---	---	---
	5/9/2019	ENER	0.0948	± 0.0153	0.002	0.466	86.5	-0.02	0.100	-0.4	1.1	< 0.01	0.07	0.07
	10/23/2019	ENER	0.102	± 0.0164	0.003	0.530	---	---	---	---	---	---	---	---
DD4	3/28/2019	ENER	0.224	± 0.0362	< 0.001	0.032	---	---	---	---	---	---	---	---
	5/23/2019	ENER	0.220	± 0.0354	0.001	0.010	< 0.1	0.90	0.200	1.6	1.1	< 0.01	0.05	0.06
	10/23/2019	ENER	0.222	± 0.0358	0.002	0.006	---	---	---	---	---	---	---	---
DD5	3/28/2019	ENER	0.227	± 0.0367	0.002	0.144	---	---	---	---	---	---	---	---
	5/9/2019	ENER	0.209	± 0.0338	0.002	0.170	24.0	0.90	0.300	0.2	1.1	< 0.01	0.10	0.10
	10/23/2019	ENER	0.206	± 0.0333	0.004	0.173	---	---	---	---	---	---	---	---
DT	4/11/2019	ENER	8.04	± 1.3000	11.200	0.400	---	---	---	---	---	---	---	---
F	3/6/2019	ENER	0.0730	---	< 0.020	0.034	---	---	---	---	---	---	---	---
	9/23/2019	ENER	0.0383	± 0.0062	< 0.001	0.027	2.3	0.20	0.100	1.0	1.1	< 0.01	0.06	0.10

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)
FB	3/6/2019	ENER	0.0960	---	< 0.020	0.051	---	---	---	---	---	---	---	---
	9/23/2019	ENER	0.0437	± 0.0071	< 0.001	0.012	1.7	0.20	0.100	1.2	1.1	< 0.01	0.03	0.06
GH	3/6/2019	ENER	0.0640	---	< 0.010	0.017	---	---	---	---	---	---	---	---
	9/30/2019	ENER	0.0613	± 0.0099	< 0.001	0.018	1.8	0.20	0.100	-0.5	0.8	< 0.01	0.09	0.10
GN	3/5/2019	ENER	0.0540	---	< 0.010	0.057	2.1	0.30	0.200	1.0	1.0	< 0.02	0.05	0.08
GV	12/13/2019	ENER	0.163	± 0.0263	0.002	0.035	---	---	---	---	---	---	---	---
K4	3/26/2019	ENER	0.606	± 0.0977	1.240	0.261	---	---	---	---	---	---	---	---
	7/9/2019	ENER	0.768	± 0.1240	1.540	0.362	---	---	---	---	---	---	---	---
K5	3/26/2019	ENER	0.662	± 0.1070	1.390	0.313	---	---	---	---	---	---	---	---
	7/9/2019	ENER	0.809	± 0.1310	1.740	0.380	---	---	---	---	---	---	---	---
K7	7/11/2019	ENER	0.351	± 0.0567	0.549	0.211	---	---	---	---	---	---	---	---
K8	11/5/2019	ENER	1.25	± 0.2010	3.110	0.506	---	---	---	---	---	---	---	---
K10	3/26/2019	ENER	0.596	± 0.0961	1.280	0.269	---	---	---	---	---	---	---	---
	11/5/2019	ENER	1.11	± 0.1790	3.020	0.552	---	---	---	---	---	---	---	---
	11/5/2019	ENER	# 1.22	# ± 0.1970	# 3.130	# 0.500	---	---	---	---	---	---	---	---
K11	3/26/2019	ENER	0.678	± 0.1090	1.430	0.330	---	---	---	---	---	---	---	---
	7/9/2019	ENER	0.776	± 0.1250	1.680	0.338	---	---	---	---	---	---	---	---
KEB	3/26/2019	ENER	0.0708	± 0.0114	0.098	0.016	---	---	---	---	---	---	---	---
KF	3/26/2019	ENER	0.0336	± 0.0054	0.090	0.013	---	---	---	---	---	---	---	---
KZ	3/26/2019	ENER	0.0309	± 0.0050	0.100	0.011	---	---	---	---	---	---	---	---
L	4/3/2019	ENER	0.431	± 0.0695	0.582	0.104	1.6	0.10	0.100	0.7	1.2	< 0.01	0.06	0.07
L5	11/22/2019	ENER	0.272	± 0.0439	0.535	0.123	1.4	0.30	0.100	1.5	0.6	< 0.01	0.02	0.04
L6	4/10/2019	ENER	0.289	± 0.0466	0.354	0.266	---	---	---	---	---	---	---	---
	10/21/2019	ENER	0.304	± 0.0491	0.279	0.277	---	---	---	---	---	---	---	---

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)
L7	4/10/2019	ENER	0.231	± 0.0373	0.334	0.148	---	---	---	---	---	---	---	---
L8	4/10/2019	ENER	0.152	± 0.0245	0.223	0.088	---	---	---	---	---	---	---	---
L9	12/17/2019	ENER	0.287	± 0.0463	0.413	0.097	---	---	---	---	---	---	---	---
L10	4/10/2019	ENER	0.343	± 0.0554	0.565	0.096	---	---	---	---	---	---	---	---
M3	3/28/2019	ENER	1.48	± 0.2380	1.550	0.144	---	---	---	---	---	---	---	---
	4/3/2019	ENER	14.6	± 2.3500	19.300	0.575	2.5	0.40	0.200	1.3	1.0	< 0.01	0.01	0.06
M5	12/10/2019	ENER	0.583	± 0.0941	1.140	0.069	---	---	---	---	---	---	---	---
M6	2/13/2019	ENER	1.80	± 0.2900	1.560	0.154	---	---	---	---	---	---	---	---
M7	2/13/2019	ENER	0.520	± 0.0839	0.477	0.053	---	---	---	---	---	---	---	---
M9	11/12/2019	ENER	2.16	± 0.3490	1.980	0.214	---	---	---	---	---	---	---	---
M10	2/19/2019	ENER	0.122	± 0.0197	0.008	0.038	---	---	---	---	---	---	---	---
MB	3/5/2019	ENER	0.0360	---	< 0.010	0.012	2.0	0.30	0.100	0.6	1.0	< 0.02	0.00	0.07
ML	2/19/2019	ENER	0.0959	± 0.0155	0.002	0.025	---	---	---	---	---	---	---	---
MQ	3/5/2019	ENER	1.000	---	0.500	0.099	3.4	0.20	0.100	1.8	1.3	< 0.05	-0.03	0.06
MU	10/15/2019	ENER	0.113	± 0.0183	0.051	0.013	---	---	---	---	---	---	---	---
MW	2/19/2019	ENER	0.0946	± 0.0153	0.001	0.015	---	---	---	---	---	---	---	---
MX	8/21/2019	ENER	0.0349	± 0.0056	0.001	0.014	1.4	0.20	0.100	3.8	1.3	< 0.01	0.04	0.05
MY	10/14/2019	ENER	0.0378	± 0.0061	< 0.001	0.010	---	---	---	---	---	---	---	---
MZ	2/19/2019	ENER	0.0933	± 0.0151	0.001	0.050	---	---	---	---	---	---	---	---
N	8/29/2019	ENER	0.414	± 0.0668	0.184	0.198	---	---	---	---	---	---	---	---
NA	8/29/2019	ENER	0.512	± 0.0827	1.460	0.090	---	---	---	---	---	---	---	---
NB	8/29/2019	ENER	30.6	± 4.9300	42.700	0.568	---	---	---	---	---	---	---	---
NC	4/2/2019	ENER	0.0327	± 0.0053	0.023	0.122	5.2	0.20	0.100	0.3	0.9	< 0.01	0.00	0.06

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)
ND	12/11/2019	ENER	0.0242	± 0.0039	0.006	0.160	---	---	---	---	---	---	---	---
	12/11/2019	ENER	# 0.0237	# ± 0.0038	# 0.006	# 0.160	---	---	---	---	---	---	---	---
O	8/28/2019	ENER	0.0230	± 0.0037	0.001	0.156	---	---	---	---	---	---	---	---
P	5/1/2019	ENER	0.0267	± 0.0043	0.001	0.137	5.5	0.30	0.100	-0.6	1.2	< 0.01	-0.01	0.04
P2	3/27/2019	ENER	0.0290	± 0.0047	0.002	0.410	---	---	---	---	---	---	---	---
	3/27/2019	ENER	# 0.0288	# ± 0.0047	# 0.001	# 0.409	---	---	---	---	---	---	---	---
P3	3/27/2019	ENER	0.0239	± 0.0039	0.001	0.408	---	---	---	---	---	---	---	---
P4	3/27/2019	ENER	0.0186	± 0.0030	0.003	0.189	---	---	---	---	---	---	---	---
Q	5/1/2019	ENER	0.0530	± 0.0086	0.001	0.450	14.8	0.30	0.100	1.0	1.4	< 0.01	-0.02	0.06
S2	1/8/2019	ENER	1.55	± 0.2500	2.420	0.195	---	---	---	---	---	---	---	---
	8/1/2019	ENER	2.95	± 0.4760	3.350	0.332	2.2	0.20	0.100	-0.3	1.1	< 0.01	0.01	0.02
S4	7/31/2019	ENER	0.122	± 0.0197	0.378	0.043	1.1	0.20	0.100	1.2	1.1	< 0.01	-0.01	0.04
S5R	11/14/2019	ENER	27.5	± 4.4400	44.000	1.130	---	---	---	---	---	---	---	---
S11	1/9/2019	ENER	0.0098	± 0.0016	0.011	0.017	---	---	---	---	---	---	---	---
	12/9/2019	ENER	0.195	± 0.0314	0.205	0.020	---	---	---	---	---	---	---	---
S12	1/16/2019	ENER	2.31	± 0.3730	2.140	0.012	---	---	---	---	---	---	---	---
S19	2/19/2019	ENER	4.10	± 0.6620	3.610	0.515	---	---	---	---	---	---	---	---
SA	3/28/2019	ENER	32.3	± 5.2100	35.200	0.980	---	---	---	---	---	---	---	---
SE6	1/15/2019	ENER	0.148	± 0.0000	0.004	0.024	---	---	---	---	---	---	---	---
SM	5/7/2019	ENER	3.89	± 0.6270	7.110	0.386	---	---	---	---	---	---	---	---
SO	5/30/2019	ENER	2.23	± 0.3610	3.630	0.058	---	---	---	---	---	---	---	---
ST	1/9/2019	ENER	5.30	± 0.8560	8.900	0.287	---	---	---	---	---	---	---	---
	3/28/2019	ENER	7.79	± 1.2600	11.700	0.265	---	---	---	---	---	---	---	---
	12/10/2019	ENER	14.0	± 2.2600	25.800	0.828	---	---	---	---	---	---	---	---

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)
SUR	12/9/2019	ENER	20.2	± 3.2700	39.700	0.673	---	---	---	---	---	---	---	---
SV	3/28/2019	ENER	14.0	± 2.2600	26.100	1.200	---	---	---	---	---	---	---	---
SW	6/11/2019	ENER	11.5	± 1.8600	13.200	1.560	---	---	---	---	---	---	---	---
SZ	1/9/2019	ENER	53.9	± 8.7000	73.800	4.400	---	---	---	---	---	---	---	---
	12/10/2019	ENER	54.2	± 8.7500	80.800	4.100	---	---	---	---	---	---	---	---
T2	6/4/2019	ENER	17.8	± 2.8700	40.000	0.251	0.7	1.40	0.400	-0.5	1.2	0.01	0.01	0.10
T15	12/10/2019	ENER	20.8	± 3.3600	27.700	0.650	---	---	---	---	---	---	---	---
T19	6/4/2019	ENER	5.71	± 0.9220	13.500	0.037	0.6	1.80	0.500	-0.2	1.2	0.05	0.20	0.10
T23	6/4/2019	ENER	79.0	± 12.8000	81.100	0.469	132.0	1.30	0.400	0.2	1.2	0.07	1.50	0.30
T24	1/15/2019	ENER	14.1	± 2.2800	19.800	0.100	---	---	---	---	---	---	---	---
T25	1/30/2019	ENER	4.66	± 0.7530	9.300	0.266	---	---	---	---	---	---	---	---
T26	1/15/2019	ENER	19.8	± 3.1900	34.000	0.030	---	---	---	---	---	---	---	---
T27	1/15/2019	ENER	12.1	± 1.9500	10.300	0.120	---	---	---	---	---	---	---	---
T28	1/15/2019	ENER	16.5	± 2.6700	17.200	0.320	---	---	---	---	---	---	---	---
T29	1/17/2019	ENER	31.1	± 5.0200	53.300	0.614	---	---	---	---	---	---	---	---
T30	1/16/2019	ENER	15.7	± 2.5300	4.620	0.143	---	---	---	---	---	---	---	---
T31	1/16/2019	ENER	19.9	± 3.2200	15.200	0.096	---	---	---	---	---	---	---	---
T32	1/16/2019	ENER	18.1	± 2.9200	16.000	0.255	---	---	---	---	---	---	---	---
T36	1/15/2019	ENER	7.53	± 1.2100	17.100	0.070	---	---	---	---	---	---	---	---
T41	6/4/2019	ENER	4.95	± 0.7990	25.800	0.026	< 0.1	122.00	22.900	1.7	1.3	0.34	21.80	4.10
T43	1/17/2019	ENER	16.8	± 2.7100	24.400	1.010	---	---	---	---	---	---	---	---
T47	1/30/2019	ENER	11.0	± 1.7800	22.500	0.819	---	---	---	---	---	---	---	---
T53	1/30/2019	ENER	1.22	± 0.1980	2.600	0.117	---	---	---	---	---	---	---	---

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)
T54	6/5/2019	ENER	6.52	± 1.0500	11.200	0.340	7.0	1.00	0.300	-0.2	1.0	0.05	0.10	0.20
WME-9	2/27/2019	ENER	0.190	---	0.540	0.032	0.7	---	---	---	---	0.02	---	---
	5/22/2019	ENER	0.0921	---	0.224	0.036	0.6	---	---	---	---	0.01	---	---
	12/13/2019	ENER	0.0400	---	0.264	0.014	---	---	---	---	---	---	---	---
WME-10	2/27/2019	ENER	0.160	---	0.290	0.120	1.2	---	---	---	---	0.07	---	---
	5/22/2019	ENER	0.120	---	0.240	0.115	1.2	---	---	---	---	0.08	---	---
	12/13/2019	ENER	0.175	---	0.319	0.129	---	---	---	---	---	---	---	---
X	2/7/2019	ENER	0.0321	± 0.0052	0.164	0.010	---	---	---	---	---	---	---	---
	4/8/2019	ENER	0.0385	± 0.0062	0.144	0.015	---	---	---	---	---	---	---	---
	7/31/2019	ENER	0.0479	± 0.0077	0.122	0.033	1.4	0.20	0.100	-0.5	1.2	0.01	-0.03	0.03
	10/8/2019	ENER	0.0530	± 0.0086	0.105	0.026	---	---	---	---	---	---	---	---
	10/18/2019	ENER	0.0480	± 0.0078	0.107	0.022	---	---	---	---	---	---	---	---
	10/18/2019	ENER	# 0.0546	# ± 0.0088	# 0.105	# 0.020	---	---	---	---	---	---	---	---
X18	12/11/2019	ENER	6.86	± 1.1100	0.293	0.370	---	---	---	---	---	---	---	---

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(f) (std. units)
0410	6/27/2019	ENER	---	---	---	---	---	---	191	717	1790	2380	---	6.99
0421	7/11/2019	ENER	---	---	---	---	---	---	210	941	2070	2634	---	7.16
0425	7/11/2019	ENER	---	---	---	---	---	---	177	604	1630	2172	---	7.18
0483	4/9/2019	ENER	---	---	---	---	---	---	165	662	1660	2223	---	7.06
0490	2/5/2019	ENER	---	---	---	---	---	---	170	709	1800	2882	---	7.23
	6/3/2019	ENER	188	55.6	4.8	269	470	< 5	171	698	1690	2240	0.95	7.15
0497	4/22/2019	ENER	---	---	---	---	---	---	181	955	2120	2731	---	7.16
	6/3/2019	ENER	233	64.7	5.6	320	489	< 5	177	963	2100	2680	0.93	7.07
0498	4/9/2019	ENER	---	---	---	---	---	---	135	595	1450	1971	---	7.09
0525	6/27/2019	ENER	---	---	---	---	---	---	160	730	1740	2291	---	7.39
0688	8/21/2019	ENER	235	51.4	5.0	258	538	< 5	184	663	1780	2358	0.98	7.18
0802	3/6/2019	ENER	---	---	---	---	---	---	120	498	1330	1834	---	7.06
	8/21/2019	ENER	160	39.8	4.6	186	423	< 5	119	501	1300	1772	0.93	7.24
0834	8/20/2019	ENER	---	---	---	---	---	---	205	765	1880	2538	---	7.19
0843	6/27/2019	ENER	---	---	---	---	---	---	186	647	1720	2300	---	6.93
0844	2/4/2019	ENER	325	88.1	5.0	589	446	< 5	303	1310	3110	3881	1.14	7.15
0845	1/7/2019	ENER	---	---	---	---	---	---	228	1020	2340	3046	---	7.19
	2/12/2019	ENER	---	---	---	---	---	---	230	1030	2340	3048	---	7.13
AW	4/10/2019	ENER	---	---	---	---	---	---	175	672	1710	2251	---	7.04
Q2	4/15/2019	ENER	---	---	---	---	---	---	# 172	# 880	# 2030	---	---	---
	4/15/2019	ENER	---	---	---	---	---	---	169	859	2030	2598	---	7.07
	8/27/2019	ENER	---	---	---	---	---	---	166	842	1970	2570	---	7.35
Q3	4/15/2019	ENER	---	---	---	---	---	---	123	565	1410	1912	---	7.16
Q5	4/3/2019	ENER	202	52.7	6.0	329	478	< 5	163	787	1850	2436	1.00	7.07

Signifies Quality Control Sample

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(f) (std. units)
Q5	11/11/2019	ENER	---	---	---	---	---	---	145	672	1640	2253	---	7.25
Q9	4/15/2019	ENER	---	---	---	---	---	---	120	597	1360	1806	---	7.16
	8/26/2019	ENER	---	---	---	---	---	---	135	579	1410	1870	---	7.29
Q11	4/15/2019	ENER	---	---	---	---	---	---	137	654	1530	2061	---	7.10
	8/26/2019	ENER	---	---	---	---	---	---	160	768	1810	2372	---	7.26
Q12	4/15/2019	ENER	---	---	---	---	---	---	172	920	2140	2692	---	6.93
	8/26/2019	ENER	---	---	---	---	---	---	154	783	1810	2351	---	7.33
Q19	4/15/2019	ENER	---	---	---	---	---	---	190	930	2120	2728	---	6.90
	8/23/2019	ENER	---	---	---	---	---	---	364	1820	2130	2683	---	7.19
	8/23/2019	ENER	---	---	---	---	---	---	# 186	# 937	# 2130	---	---	# 7.19
Q23	4/15/2019	ENER	---	---	---	---	---	---	132	638	1420	1947	---	7.44
Q27	4/15/2019	ENER	---	---	---	---	---	---	148	648	1620	2196	---	7.01
	8/23/2019	ENER	---	---	---	---	---	---	139	584	1560	2107	---	7.28
Q28	4/15/2019	ENER	---	---	---	---	---	---	185	976	2150	2750	---	6.97
	8/27/2019	ENER	---	---	---	---	---	---	180	947	2110	2686	---	7.22
Q29	12/17/2019	ENER	---	---	---	---	---	---	177	889	2010	2175	---	7.36
Q30	4/15/2019	ENER	---	---	---	---	---	---	157	742	1770	2366	---	6.96
	8/27/2019	ENER	---	---	---	---	---	---	180	699	1680	2246	---	7.30
Q42	6/5/2019	ENER	---	---	---	---	---	---	185	763	1790	2383	---	7.15
Q43	6/5/2019	ENER	---	---	---	---	---	---	170	703	1680	2283	---	7.10
Q44	6/5/2019	ENER	---	---	---	---	---	---	192	864	1970	2580	---	7.14
Q46	6/5/2019	ENER	---	---	---	---	---	---	194	1050	2260	2866	---	7.12
Q47	6/4/2019	ENER	---	---	---	---	---	---	176	987	2190	2822	---	7.17
Q48	6/4/2019	ENER	---	---	---	---	---	---	179	742	1810	2468	---	7.16

Signifies Quality Control Sample

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(f) (std. units)
Q49	6/4/2019	ENER	---	---	---	---	---	---	187	921	2060	2726	---	7.18
Q50	6/6/2019	ENER	---	---	---	---	---	---	201	953	2090	2642	---	7.29
	6/6/2019	ENER	---	---	---	---	---	---	# 200	# 946	# 2090	---	---	---
SUB2	4/2/2019	ENER	151	42.4	4.4	228	439	< 5	149	487	1350	1896	0.97	7.07
SUB3	4/2/2019	ENER	170	63.4	7.9	387	231	< 5	170	1090	2080	2723	0.98	7.25

Signifies Quality Control Sample

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)
0410	6/27/2019	ENER	0.0934	± 0.0151	0.017	0.024	---	---	---	---	---	---	---	---
0421	7/11/2019	ENER	0.0650	± 0.0105	0.004	0.061	---	---	---	---	---	---	---	---
0425	7/11/2019	ENER	0.0614	± 0.0099	< 0.001	0.013	---	---	---	---	---	---	---	---
0483	4/9/2019	ENER	0.107	± 0.0172	0.066	0.022	---	---	---	---	---	---	---	---
0490	2/5/2019	ENER	0.179	± 0.0289	0.071	0.034	---	---	---	---	---	---	---	---
	6/3/2019	ENER	0.178	± 0.0287	0.077	0.033	3.0	0.07	0.200	-0.5	1.2	< 0.01	-0.02	0.06
0497	4/22/2019	ENER	0.627	± 0.1010	0.013	0.051	---	---	---	---	---	---	---	---
	6/3/2019	ENER	0.694	± 0.1120	0.014	0.061	3.1	0.40	0.200	2.4	1.3	< 0.01	0.02	0.04
0498	4/9/2019	ENER	0.118	± 0.0191	0.001	0.025	---	---	---	---	---	---	---	---
0525	6/27/2019	ENER	0.0709	± 0.0115	0.001	< 0.001	---	---	---	---	---	---	---	---
0688	8/21/2019	ENER	0.0499	± 0.0081	0.002	0.006	2.9	0.20	0.100	0.5	1.0	< 0.01	0.01	0.05
0802	3/6/2019	ENER	0.130	---	0.034	0.011	---	---	---	---	---	---	---	---
	8/21/2019	ENER	0.0782	± 0.0126	0.027	0.011	2.3	0.10	0.100	0.6	1.0	< 0.01	-0.01	0.05
0834	8/20/2019	ENER	0.0493	± 0.0080	< 0.001	0.027	---	---	---	---	---	---	---	---
0843	6/27/2019	ENER	0.0268	± 0.0043	< 0.001	0.008	---	---	---	---	---	---	---	---
0844	2/4/2019	ENER	0.0994	± 0.0160	0.001	0.062	8.7	0.30	0.100	0.7	1.4	< 0.01	0.10	0.10
0845	1/7/2019	ENER	0.0760	± 0.0123	< 0.001	0.040	---	---	---	---	---	---	---	---
	2/12/2019	ENER	0.0798	± 0.0129	0.013	0.038	---	---	---	---	---	---	---	---
AW	4/10/2019	ENER	0.120	± 0.0193	0.073	0.037	---	---	---	---	---	---	---	---
Q2	4/15/2019	ENER	# 0.312	# ± 0.0504	# 0.003	# 0.039	---	---	---	---	---	---	---	---
	4/15/2019	ENER	0.310	± 0.0500	0.003	0.040	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.330	± 0.0533	0.003	0.044	---	---	---	---	---	---	---	---
Q3	4/15/2019	ENER	0.161	± 0.0260	0.002	0.024	---	---	---	---	---	---	---	---
Q5	4/3/2019	ENER	0.468	± 0.0755	0.002	0.049	2.6	0.06	0.100	0.7	1.2	< 0.01	0.01	0.07

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
Q5	11/11/2019	ENER	0.316	± 0.0510	0.022	0.041	---	---	---	---	---	---	---	---
Q9	4/15/2019	ENER	0.0721	± 0.0116	0.024	0.019	---	---	---	---	---	---	---	---
	8/26/2019	ENER	0.0773	± 0.0125	0.008	0.023	---	---	---	---	---	---	---	---
Q11	4/15/2019	ENER	0.220	± 0.0354	0.004	0.028	---	---	---	---	---	---	---	---
	8/26/2019	ENER	0.487	± 0.0786	0.002	0.054	---	---	---	---	---	---	---	---
Q12	4/15/2019	ENER	0.270	± 0.0436	0.005	0.035	---	---	---	---	---	---	---	---
	8/26/2019	ENER	0.232	± 0.0375	0.006	0.036	---	---	---	---	---	---	---	---
Q19	4/15/2019	ENER	0.531	± 0.0857	0.010	0.040	---	---	---	---	---	---	---	---
	8/23/2019	ENER	0.540	± 0.0872	0.010	0.050	---	---	---	---	---	---	---	---
	8/23/2019	ENER	# 0.545	# ± 0.0880	# 0.010	# 0.053	---	---	---	---	---	---	---	---
Q23	4/15/2019	ENER	0.117	± 0.0189	0.006	0.024	---	---	---	---	---	---	---	---
Q27	4/15/2019	ENER	0.475	± 0.0767	< 0.001	0.045	---	---	---	---	---	---	---	---
	8/23/2019	ENER	0.407	± 0.0656	< 0.001	0.048	---	---	---	---	---	---	---	---
Q28	4/15/2019	ENER	0.705	± 0.1140	0.014	0.062	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.673	± 0.1090	0.013	0.069	---	---	---	---	---	---	---	---
Q29	12/17/2019	ENER	0.635	± 0.1020	0.014	0.053	---	---	---	---	---	---	---	---
Q30	4/15/2019	ENER	0.653	± 0.1050	< 0.001	0.057	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.566	± 0.0913	< 0.001	0.061	---	---	---	---	---	---	---	---
Q42	6/5/2019	ENER	0.183	± 0.0295	0.067	0.041	---	---	---	---	---	---	---	---
Q43	6/5/2019	ENER	0.144	± 0.0233	0.045	0.030	---	---	---	---	---	---	---	---
Q44	6/5/2019	ENER	0.180	± 0.0290	< 0.001	0.043	---	---	---	---	---	---	---	---
Q46	6/5/2019	ENER	0.265	± 0.0427	< 0.001	0.049	---	---	---	---	---	---	---	---
Q47	6/4/2019	ENER	0.224	± 0.0362	0.019	0.049	---	---	---	---	---	---	---	---
Q48	6/4/2019	ENER	0.207	± 0.0335	0.073	0.039	---	---	---	---	---	---	---	---

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
Q49	6/4/2019	ENER	0.400	± 0.0645	0.038	0.046	---	---	---	---	---	---	---	---
Q50	6/6/2019	ENER	0.0448	± 0.0072	< 0.001	0.036	---	---	---	---	---	---	---	---
	6/6/2019	ENER	# 0.0434	# ± 0.0070	# < 0.001	# 0.036	---	---	---	---	---	---	---	---
SUB2	4/2/2019	ENER	0.0263	± 0.0042	< 0.001	0.013	1.5	0.20	0.100	1.0	1.0	< 0.01	0.03	0.08
SUB3	4/2/2019	ENER	0.0096	± 0.0015	0.001	0.004	0.2	0.20	0.100	-0.2	1.0	< 0.01	0.04	0.07

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(f) (std. units)
0460	7/12/2019	ENER	---	---	---	---	---	---	227	833	1800	2341	---	7.55
0520	2/13/2019	ENER	---	---	---	---	---	---	219	706	1880	2502	---	7.30
0521	2/13/2019	ENER	---	---	---	---	---	---	208	662	1660	2330	---	7.34
0531	5/9/2019	ENER	192	53.3	6.6	233	353	< 5	156	710	1600	2101	0.97	7.10
0538	4/22/2019	ENER	---	---	---	---	---	---	148	644	1530	2066	---	7.03
0540	4/1/2019	ENER	---	---	---	---	---	---	126	642	1390	1876	---	7.21
0541	1/7/2019	ENER	187	54.3	7.7	221	343	< 5	146	660	1540	2065	1.00	7.59
	4/1/2019	ENER	---	---	---	---	---	---	149	673	1540	2050	---	7.23
	7/2/2019	ENER	192	56.8	8.0	229	351	< 5	155	706	1580	2073	0.98	7.21
	10/11/2019	ENER	---	---	---	---	---	---	155	705	1650	2214	---	7.36
0551	1/7/2019	ENER	284	61.8	5.4	281	390	< 5	194	940	2110	2666	1.00	7.46
	4/1/2019	ENER	---	---	---	---	---	---	210	1010	2150	2704	---	7.09
	7/2/2019	ENER	297	65.2	5.7	303	400	< 5	204	973	2190	2771	1.02	7.28
	10/9/2019	ENER	---	---	---	---	---	---	216	1010	2230	2867	---	7.10
0555	2/4/2019	ENER	331	85.8	5.2	655	418	< 5	349	1580	3330	4204	1.05	7.05
0556	2/4/2019	ENER	278	77.9	4.9	558	410	< 5	249	1250	2880	3678	1.12	7.20
	4/16/2019	ENER	---	---	---	---	---	---	281	1450	2920	3650	---	7.06
	4/16/2019	ENER	---	---	---	---	---	---	# 280	# 1440	# 2920	---	---	---
0557	2/4/2019	ENER	216	59.3	4.2	503	410	< 5	184	1060	2520	3224	1.10	7.42
0631	11/22/2019	ENER	158	38.3	7.0	333	366	< 5	160	709	1660	2109	1.01	7.69
0632	4/16/2019	ENER	---	---	---	---	---	---	144	665	1510	2082	---	7.20
0634	2/21/2019	ENER	---	---	---	---	---	---	164	839	1830	2484	---	7.05
0637	9/30/2019	ENER	---	---	---	---	---	---	144	589	1450	1962	---	7.26
0638	2/12/2019	ENER	---	---	---	---	---	---	189	613	1610	2292	---	7.31

Signifies Quality Control Sample

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(f) (std. units)
0644	11/14/2019	ENER	187	47.5	7.4	331	396	< 5	181	744	1750	2451	1.02	7.36
	12/18/2019	ENER	---	---	---	---	---	---	179	738	1760	1983	---	7.53
0646	4/16/2019	ENER	---	---	---	---	---	---	161	741	1680	2255	---	7.12
0647	1/7/2019	ENER	---	---	---	---	---	---	161	676	1650	2196	---	7.40
	4/1/2019	ENER	---	---	---	---	---	---	167	688	1660	2173	---	7.08
	7/8/2019	ENER	215	58.6	6.6	221	402	< 5	166	691	1650	2134	0.98	7.32
	10/9/2019	ENER	---	---	---	---	---	---	162	670	1650	2222	---	7.22
0649	1/7/2019	ENER	---	---	---	---	---	---	140	710	1610	2148	---	7.36
	4/1/2019	ENER	---	---	---	---	---	---	150	724	1640	2153	---	7.06
	7/8/2019	ENER	223	52.2	5.4	235	355	< 5	157	756	1690	2146	0.99	7.21
	10/9/2019	ENER	---	---	---	---	---	---	163	756	1740	2287	---	7.17
0653	4/10/2019	ENER	---	---	---	---	---	---	147	658	1580	2156	---	7.24
	4/10/2019	ENER	---	---	---	---	---	---	# 149	# 661	# 1590	---	---	---
0654	1/8/2019	ENER	---	---	---	---	---	---	140	661	1510	2058	---	7.20
	4/2/2019	ENER	---	---	---	---	---	---	156	789	1700	2192	---	7.96
	7/8/2019	ENER	211	59.1	8.2	255	349	< 5	167	795	1730	2238	0.98	7.06
	10/3/2019	ENER	200	56.4	7.7	240	361	< 5	155	735	1750	2296	0.98	6.96
	10/15/2019	ENER	222	57.7	8.5	242	360	< 5	162	767	1720	2270	1.00	7.12
0659	3/6/2019	ENER	300	78.0	10.0	350	364	< 5	174	839	1840	2419	1.29	6.93
0683	4/16/2019	ENER	---	---	---	---	---	---	101	570	1240	1613	---	7.24
0684	5/6/2019	ENER	---	---	---	---	---	---	168	693	1660	2155	---	7.39
0686	9/30/2019	ENER	---	---	---	---	---	---	146	591	1470	1969	---	7.24
0846	2/12/2019	ENER	---	---	---	---	---	---	193	2130	3780	4443	---	7.32
	12/18/2019	ENER	---	---	---	---	---	---	211	2060	3600	3558	---	7.68
0855	2/13/2019	ENER	---	---	---	---	---	---	141	653	1500	2083	---	7.68

Signifies Quality Control Sample

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(f) (std. units)
0862	4/9/2019	ENER	---	---	---	---	---	---	145	668	1550	2094	---	7.15
0864	4/2/2019	ENER	136	39.2	6.3	272	374	< 5	140	613	1450	2024	0.96	7.28
0865	4/16/2019	ENER	---	---	---	---	---	---	143	624	1480	2059	---	7.25
0866	4/9/2019	ENER	---	---	---	---	---	---	149	746	1670	2207	---	7.12
	11/12/2019	ENER	---	---	---	---	---	---	140	693	1600	2169	---	7.39
0867	8/28/2019	ENER	---	---	---	---	---	---	128	424	1170	1676	---	7.52
0869	4/1/2019	ENER	---	---	---	---	---	---	169	700	1690	2284	---	7.59
0881	1/8/2019	ENER	---	---	---	---	---	---	183	839	2000	2602	---	7.25
	1/8/2019	ENER	---	---	---	---	---	---	# 184	# 844	# 1990	---	---	# 7.25
	2/6/2019	ENER	245	63.7	7.6	272	474	< 5	180	796	1950	2556	1.00	7.17
0882	2/7/2019	ENER	201	53.1	6.5	300	482	< 5	168	712	1810	2435	1.00	7.62
0883	2/7/2019	ENER	261	50.2	5.3	282	506	< 5	195	764	1930	2566	0.99	7.16
0884	2/7/2019	ENER	100	30.8	5.3	351	291	< 5	89	690	1460	2054	1.05	7.50
0885	4/18/2019	ENER	---	---	---	---	---	---	188	692	1800	2368	---	6.97
0886	2/6/2019	ENER	287	78.4	7.2	340	449	< 5	171	988	2270	2855	1.09	7.20
0887	4/18/2019	ENER	---	---	---	---	---	---	59	891	1700	2126	---	7.24
0888	2/7/2019	ENER	198	62.1	8.2	262	298	< 5	144	745	1690	2219	1.08	7.21
0890	2/21/2019	ENER	---	---	---	---	---	---	149	789	1660	2178	---	6.83
0893	2/7/2019	ENER	211	57.4	7.8	273	481	< 5	179	692	1780	2388	0.99	7.26
0899	1/8/2019	ENER	---	---	---	---	---	---	143	566	1360	1856	---	7.47
	4/3/2019	ENER	---	---	---	---	---	---	149	591	1420	1882	---	7.24
	4/3/2019	ENER	---	---	---	---	---	---	# 147	# 585	# 1420	---	---	---
	7/8/2019	ENER	175	56.2	6.5	181	311	< 5	146	582	1390	1840	1.00	7.43
	10/14/2019	ENER	181	54.1	6.2	164	307	< 5	143	554	1330	1835	1.00	7.58

Signifies Quality Control Sample

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(f) (std. units)
0914	2/20/2019	ENER	---	---	---	---	---	---	75	1010	1760	2240	---	7.78
0920	2/12/2019	ENER	---	---	---	---	---	---	59	1570	2660	2977	---	7.42
0921	2/4/2019	ENER	400	72.1	7.3	330	225	< 5	62	1620	2850	3230	1.03	7.29
0922	2/12/2019	ENER	---	---	---	---	---	---	78	378	977	1534	---	8.77
0935	5/7/2019	ENER	---	---	---	---	---	---	154	744	1650	2172	---	7.26
0950	12/19/2019	ENER	---	---	---	---	---	---	116	674	1490	1852	---	8.48
0994	4/16/2019	ENER	228	51.9	4.2	146	352	< 5	147	644	1560	2031	0.94	7.01
	5/30/2019	ENER	---	---	---	---	---	---	155	678	1570	2046	---	7.08
0996	1/7/2019	ENER	200	56.4	6.3	210	377	< 5	151	640	1550	2082	1.00	7.65
	4/1/2019	ENER	---	---	---	---	---	---	158	650	1570	2079	---	7.34
	7/11/2019	ENER	198	52.0	6.4	208	381	< 5	160	665	1590	2030	0.94	7.44
	10/11/2019	ENER	---	---	---	---	---	---	147	609	1540	2111	---	7.57
H1	2/20/2019	ENER	---	---	---	---	---	---	149	769	1630	2147	---	6.86
H2A	3/6/2019	ENER	290	76.0	9.6	320	330	< 5	166	857	1810	2380	1.24	7.14
H7	2/20/2019	ENER	---	---	---	---	---	---	150	810	1720	2236	---	6.97
H7B	2/20/2019	ENER	---	---	---	---	---	---	151	851	1700	2223	---	6.80
H12	2/20/2019	ENER	---	---	---	---	---	---	163	859	1900	2462	---	7.09
	8/22/2019	ENER	---	---	---	---	---	---	127	680	1520	2523	---	7.12
H16	11/12/2019	ENER	---	---	---	---	---	---	179	973	2130	2843	---	7.16
	11/12/2019	ENER	---	---	---	---	---	---	# 181	# 983	# 2140	---	---	# 7.16
H17	2/21/2019	ENER	---	---	---	---	---	---	174	788	1830	2418	---	7.05
H24	2/21/2019	ENER	---	---	---	---	---	---	180	984	2200	2804	---	7.28
H31	2/13/2019	ENER	---	---	---	---	---	---	170	917	2100	2700	---	7.52
	8/28/2019	ENER	---	---	---	---	---	---	186	993	2160	2726	---	7.36

Signifies Quality Control Sample

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(f) (std. units)
H46	2/21/2019	ENER	---	---	---	---	---	---	181	837	2020	2610	---	7.27
	8/28/2019	ENER	---	---	---	---	---	---	182	812	1940	2548	---	7.42
H55	3/5/2019	ENER	320	85.0	9.8	360	484	< 5	187	871	2060	2441	1.23	7.02
MO	3/5/2019	ENER	480	110.0	11.0	450	377	< 5	194	1310	2640	3216	1.35	7.08
	3/5/2019	ENER	# 440	# 100.0	# 10.0	# 410	# 375	# < 5	# 195	# 1310	# 2650	---	# 1.23	# 7.08
MR	11/5/2019	ENER	280	73.5	8.6	307	463	< 5	186	953	2170	2846	1.02	7.03
	11/12/2019	ENER	280	66.4	8.6	287	465	< 5	189	967	---	2890	0.97	7.17
MS	10/14/2019	ENER	---	---	---	---	---	---	149	585	1520	2180	---	7.20
MV	4/3/2019	ENER	---	---	---	---	---	---	175	666	1700	2259	---	7.08
R1	2/21/2019	ENER	---	---	---	---	---	---	194	1010	2240	2844	---	7.12
	8/27/2019	ENER	---	---	---	---	---	---	213	1190	2510	3061	---	7.33
R2	4/9/2019	ENER	---	---	---	---	---	---	150	738	1640	2223	---	7.23
	8/28/2019	ENER	---	---	---	---	---	---	181	843	1970	2540	---	7.33
R3	4/9/2019	ENER	207	54.3	5.7	284	399	< 5	172	820	1840	2409	0.95	7.25
	11/11/2019	ENER	---	---	---	---	---	---	154	733	1730	2298	---	7.23
R4	4/9/2019	ENER	---	---	---	---	---	---	149	746	1690	2252	---	7.10
	8/28/2019	ENER	---	---	---	---	---	---	143	681	1600	2126	---	7.38
R5	4/9/2019	ENER	---	---	---	---	---	---	142	599	1510	2113	---	7.17
	8/28/2019	ENER	---	---	---	---	---	---	144	583	1500	2095	---	7.47
R10	2/21/2019	ENER	---	---	---	---	---	---	137	645	1510	2053	---	7.32
	8/28/2019	ENER	---	---	---	---	---	---	174	819	1870	2440	---	7.30
R11	12/17/2019	ENER	---	---	---	---	---	---	144	716	1640	1815	---	7.64
R18	4/3/2019	ENER	---	---	---	---	---	---	142	680	1550	2133	---	7.35
	11/12/2019	ENER	---	---	---	---	---	---	132	579	1340	1886	---	7.27
R22	4/3/2019	ENER	---	---	---	---	---	---	133	635	1430	1956	---	7.40

Signifies Quality Control Sample

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)
0460	7/12/2019	ENER	0.0149	± 0.0024	0.004	0.449	---	---	---	---	---	---	---	---
0520	2/13/2019	ENER	0.0311	± 0.0050	0.012	0.009	---	---	---	---	---	---	---	---
0521	2/13/2019	ENER	0.558	± 0.0901	0.977	0.148	---	---	---	---	---	---	---	---
0531	5/9/2019	ENER	0.0721	± 0.0116	0.007	0.021	1.6	-0.04	0.100	-0.2	1.1	< 0.01	0.06	0.08
0538	4/22/2019	ENER	0.0996	± 0.0161	< 0.001	0.025	---	---	---	---	---	---	---	---
0540	4/1/2019	ENER	0.0608	± 0.0098	0.007	0.023	---	---	---	---	---	---	---	---
0541	1/7/2019	ENER	0.0833	± 0.0134	0.014	0.024	2.2	0.06	0.090	1.1	0.7	< 0.01	0.06	0.10
	4/1/2019	ENER	0.0854	± 0.0138	0.008	0.026	---	---	---	---	---	---	---	---
	7/2/2019	ENER	0.0910	± 0.0147	0.007	0.025	2.7	0.09	0.100	-0.2	1.1	< 0.01	0.00	0.06
	10/11/2019	ENER	0.109	± 0.0175	0.010	0.031	---	---	---	---	---	---	---	---
0551	1/7/2019	ENER	0.0374	± 0.0060	< 0.001	0.040	3.3	0.10	0.100	0.0	0.8	< 0.01	-0.02	0.07
	4/1/2019	ENER	0.0381	± 0.0062	< 0.001	0.043	---	---	---	---	---	---	---	---
	7/2/2019	ENER	0.0402	± 0.0065	0.002	0.041	3.6	0.30	0.200	0.8	1.1	< 0.01	0.00	0.05
	10/9/2019	ENER	0.0399	± 0.0064	0.071	0.044	---	---	---	---	---	---	---	---
0555	2/4/2019	ENER	0.0686	± 0.0111	0.001	0.071	11.2	0.10	0.100	0.5	1.3	< 0.01	0.06	0.10
0556	2/4/2019	ENER	0.0732	± 0.0118	0.001	0.072	7.2	0.20	0.100	0.6	1.3	< 0.01	0.10	0.10
	4/16/2019	ENER	0.0672	± 0.0115	< 0.001	0.058	---	---	---	---	---	---	---	---
	4/16/2019	ENER	# 0.0688	# ± 0.0118	# < 0.001	# 0.060	---	---	---	---	---	---	---	---
0557	2/4/2019	ENER	0.0523	± 0.0084	< 0.001	0.063	6.6	0.60	0.200	-0.4	1.3	< 0.01	0.10	0.10
0631	11/22/2019	ENER	0.116	± 0.0188	0.002	0.048	3.4	0.20	0.100	1.5	0.6	< 0.01	0.03	0.09
0632	4/16/2019	ENER	0.101	± 0.0163	0.004	0.050	---	---	---	---	---	---	---	---
0634	2/21/2019	ENER	0.124	± 0.0200	0.020	0.036	---	---	---	---	---	---	---	---
0637	9/30/2019	ENER	0.0557	± 0.0090	< 0.001	0.026	---	---	---	---	---	---	---	---
0638	2/12/2019	ENER	0.0267	± 0.0043	0.038	0.140	---	---	---	---	---	---	---	---

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)
0644	11/14/2019	ENER	0.130	± 0.0210	0.002	0.034	4.2	0.10	0.100	0.8	0.6	< 0.01	0.02	0.05
	12/18/2019	ENER	0.135	± 0.0218	0.001	0.032	---	---	---	---	---	---	---	---
0646	4/16/2019	ENER	0.0581	± 0.0094	< 0.001	0.029	---	---	---	---	---	---	---	---
0647	1/7/2019	ENER	0.0733	± 0.0118	< 0.001	0.029	---	---	---	---	---	---	---	---
	4/1/2019	ENER	0.0717	± 0.0116	< 0.001	0.028	---	---	---	---	---	---	---	---
	7/8/2019	ENER	0.0723	± 0.0117	< 0.001	0.029	2.7	0.30	0.200	2.9	1.4	< 0.01	-0.01	0.06
	10/9/2019	ENER	0.0745	± 0.0120	0.022	0.028	---	---	---	---	---	---	---	---
0649	1/7/2019	ENER	0.0264	± 0.0043	< 0.001	0.026	---	---	---	---	---	---	---	---
	4/1/2019	ENER	0.0261	± 0.0042	< 0.001	0.025	---	---	---	---	---	---	---	---
	7/8/2019	ENER	0.0263	± 0.0042	0.001	0.024	2.0	0.20	0.100	-0.4	1.2	< 0.01	0.01	0.05
	10/9/2019	ENER	0.0258	± 0.0042	0.014	0.024	---	---	---	---	---	---	---	---
0653	4/10/2019	ENER	0.182	± 0.0294	0.001	0.027	---	---	---	---	---	---	---	---
	4/10/2019	ENER	# 0.191	# ± 0.0309	# < 0.001	# 0.027	---	---	---	---	---	---	---	---
0654	1/8/2019	ENER	0.105	± 0.0169	0.017	0.029	---	---	---	---	---	---	---	---
	4/2/2019	ENER	0.0879	± 0.0142	0.013	0.030	---	---	---	---	---	---	---	---
	7/8/2019	ENER	0.136	± 0.0220	0.017	0.034	5.9	0.30	0.200	0.4	1.3	< 0.01	0.02	0.06
	10/3/2019	ENER	0.149	± 0.0240	0.015	0.032	2.3	0.20	0.100	-0.1	0.9	< 0.01	0.00	0.05
	10/15/2019	ENER	0.148	± 0.0239	0.016	0.038	2.2	0.20	0.200	0.7	1.6	< 0.01	0.05	0.10
0659	3/6/2019	ENER	0.190	---	0.020	0.042	2.1	0.05	0.100	2.3	0.9	< 0.05	0.04	0.08
0683	4/16/2019	ENER	0.0047	± 0.0008	< 0.001	0.010	---	---	---	---	---	---	---	---
0684	5/6/2019	ENER	0.0766	± 0.0124	0.002	0.028	---	---	---	---	---	---	---	---
0686	9/30/2019	ENER	0.0566	± 0.0091	< 0.001	0.026	---	---	---	---	---	---	---	---
0846	2/12/2019	ENER	0.0576	± 0.0093	0.021	0.124	---	---	---	---	---	---	---	---
	12/18/2019	ENER	0.0584	± 0.0094	0.002	0.103	---	---	---	---	---	---	---	---
0855	2/13/2019	ENER	0.0906	± 0.0146	0.003	0.068	---	---	---	---	---	---	---	---

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)
0862	4/9/2019	ENER	0.128	± 0.0207	0.002	0.024	---	---	---	---	---	---	---	---
0864	4/2/2019	ENER	0.107	± 0.0173	< 0.001	0.025	2.4	0.05	0.200	-0.1	1.1	< 0.01	0.10	0.10
0865	4/16/2019	ENER	0.145	± 0.0234	< 0.001	0.043	---	---	---	---	---	---	---	---
0866	4/9/2019	ENER	0.198	± 0.0319	< 0.001	0.030	---	---	---	---	---	---	---	---
	11/12/2019	ENER	0.159	± 0.0257	< 0.001	0.028	---	---	---	---	---	---	---	---
0867	8/28/2019	ENER	0.0306	± 0.0050	0.002	0.042	---	---	---	---	---	---	---	---
0869	4/1/2019	ENER	0.226	± 0.0366	0.001	0.031	---	---	---	---	---	---	---	---
0881	1/8/2019	ENER	0.238	± 0.0383	0.029	0.044	---	---	---	---	---	---	---	---
	1/8/2019	ENER	# 0.241	# ± 0.0389	# 0.029	# 0.044	---	---	---	---	---	---	---	---
	2/6/2019	ENER	0.213	± 0.0343	0.028	0.039	2.4	0.20	0.100	0.8	0.9	0.01	0.07	0.09
0882	2/7/2019	ENER	0.0645	± 0.0104	0.002	< 0.001	< 0.1	0.30	0.100	3.4	1.2	< 0.01	-0.02	0.10
0883	2/7/2019	ENER	0.0465	± 0.0075	< 0.001	0.024	2.5	0.30	0.100	-0.1	1.1	< 0.01	0.09	0.10
0884	2/7/2019	ENER	0.0238	± 0.0038	0.001	0.063	5.3	0.20	0.100	1.1	0.9	< 0.01	0.20	0.10
0885	4/18/2019	ENER	0.0659	± 0.0106	0.019	0.024	---	---	---	---	---	---	---	---
0886	2/6/2019	ENER	0.314	± 0.0506	0.048	0.055	4.3	0.30	0.100	2.3	1.0	< 0.01	0.06	0.10
0887	4/18/2019	ENER	0.0311	± 0.0050	0.017	0.001	---	---	---	---	---	---	---	---
0888	2/7/2019	ENER	0.0997	± 0.0161	0.006	0.034	2.6	0.20	0.100	0.5	1.2	< 0.01	0.10	0.10
0890	2/21/2019	ENER	0.0735	± 0.0119	0.010	0.031	---	---	---	---	---	---	---	---
0893	2/7/2019	ENER	0.0726	± 0.0117	0.004	0.031	1.3	0.20	0.100	0.1	1.0	< 0.01	0.09	0.10
0899	1/8/2019	ENER	0.0520	± 0.0084	< 0.001	0.017	---	---	---	---	---	---	---	---
	4/3/2019	ENER	0.0640	± 0.0103	0.001	0.024	---	---	---	---	---	---	---	---
	4/3/2019	ENER	# 0.0600	# ± 0.0097	# 0.001	# 0.019	---	---	---	---	---	---	---	---
	7/8/2019	ENER	0.0638	± 0.0103	0.001	0.018	3.1	0.30	0.200	-0.7	1.2	< 0.01	0.00	0.10
	10/14/2019	ENER	0.0602	± 0.0097	0.002	0.017	2.8	0.02	0.200	0.2	1.4	< 0.01	0.05	0.07

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)
0914	2/20/2019	ENER	0.0272	± 0.0044	0.002	0.081	---	---	---	---	---	---	---	---
0920	2/12/2019	ENER	0.201	± 0.0324	0.001	0.292	---	---	---	---	---	---	---	---
0921	2/4/2019	ENER	0.221	± 0.0357	0.007	0.581	15.7	0.50	0.100	-0.7	1.2	< 0.01	0.00	0.07
0922	2/12/2019	ENER	0.0078	± 0.0013	0.024	0.005	---	---	---	---	---	---	---	---
0935	5/7/2019	ENER	0.0850	± 0.0137	0.006	0.027	---	---	---	---	---	---	---	---
0950	12/19/2019	ENER	0.150	± 0.0242	0.009	0.149	---	---	---	---	---	---	---	---
0994	4/16/2019	ENER	0.0066	± 0.0011	< 0.001	0.031	4.1	0.10	0.100	1.2	0.9	0.02	0.06	0.09
	5/30/2019	ENER	0.0062	± 0.0010	< 0.001	0.036	---	---	---	---	---	---	---	---
0996	1/7/2019	ENER	0.0704	± 0.0114	0.001	0.025	2.7	0.02	0.100	1.3	0.8	< 0.01	-0.01	0.09
	4/1/2019	ENER	0.0678	± 0.0110	< 0.001	0.024	---	---	---	---	---	---	---	---
	7/11/2019	ENER	0.0690	± 0.0111	0.001	0.023	2.7	0.10	0.100	-0.2	0.8	< 0.01	0.03	0.07
	10/11/2019	ENER	0.0728	± 0.0117	0.010	0.026	---	---	---	---	---	---	---	---
H1	2/20/2019	ENER	0.0749	± 0.0121	0.010	0.030	---	---	---	---	---	---	---	---
H2A	3/6/2019	ENER	0.190	---	0.020	0.037	2.3	0.10	0.100	2.5	1.0	< 0.05	0.01	0.06
H7	2/20/2019	ENER	0.0838	± 0.0135	0.010	0.033	---	---	---	---	---	---	---	---
H7B	2/20/2019	ENER	0.0532	± 0.0086	0.008	0.032	---	---	---	---	---	---	---	---
H12	2/20/2019	ENER	0.161	± 0.0260	0.016	0.041	---	---	---	---	---	---	---	---
	8/22/2019	ENER	0.203	± 0.0327	0.023	0.044	---	---	---	---	---	---	---	---
H16	11/12/2019	ENER	0.258	± 0.0417	0.032	0.059	---	---	---	---	---	---	---	---
	11/12/2019	ENER	# 0.260	# ± 0.0420	# 0.033	# 0.059	---	---	---	---	---	---	---	---
H17	2/21/2019	ENER	0.116	± 0.0188	0.013	0.037	---	---	---	---	---	---	---	---
H24	2/21/2019	ENER	0.266	± 0.0430	0.042	0.055	---	---	---	---	---	---	---	---
H31	2/13/2019	ENER	0.125	± 0.0202	0.005	0.004	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.210	± 0.0339	0.024	0.026	---	---	---	---	---	---	---	---

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)
H46	2/21/2019	ENER	0.335	± 0.0541	0.057	0.050	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.362	± 0.0585	0.052	0.046	---	---	---	---	---	---	---	---
H55	3/5/2019	ENER	0.630	---	0.120	0.070	2.7	0.20	0.200	0.9	1.0	< 0.05	0.02	0.10
MO	3/5/2019	ENER	0.290	---	0.021	0.098	8.0	0.30	0.200	1.5	1.0	< 0.05	0.00	0.07
	3/5/2019	ENER	# 0.270	---	# 0.019	# 0.075	# 8.0	# 0.30	# 0.100	# 1.7	# 1.1	# < 0.05	# 0.04	# 0.07
MR	11/5/2019	ENER	0.387	± 0.0624	0.044	0.061	3.3	0.20	0.100	1.0	0.7	< 0.01	0.01	0.08
	11/12/2019	ENER	0.426	± 0.0687	0.049	0.063	4.0	0.30	0.100	0.9	1.0	< 0.01	0.02	0.05
MS	10/14/2019	ENER	0.115	± 0.0186	0.007	0.027	---	---	---	---	---	---	---	---
MV	4/3/2019	ENER	0.168	± 0.0272	0.015	0.028	---	---	---	---	---	---	---	---
R1	2/21/2019	ENER	0.234	± 0.0378	0.001	0.058	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.242	± 0.0391	< 0.001	0.073	---	---	---	---	---	---	---	---
R2	4/9/2019	ENER	0.189	± 0.0306	0.005	0.032	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.263	± 0.0424	0.004	0.044	---	---	---	---	---	---	---	---
R3	4/9/2019	ENER	0.187	± 0.0302	< 0.001	0.032	3.0	0.04	0.100	1.6	0.9	< 0.01	0.01	0.06
	11/11/2019	ENER	0.164	± 0.0265	< 0.001	0.034	---	---	---	---	---	---	---	---
R4	4/9/2019	ENER	0.270	± 0.0436	0.001	0.031	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.245	± 0.0396	0.001	0.031	---	---	---	---	---	---	---	---
R5	4/9/2019	ENER	0.136	± 0.0220	0.002	0.033	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.125	± 0.0202	0.001	0.035	---	---	---	---	---	---	---	---
R10	2/21/2019	ENER	0.135	± 0.0218	0.043	0.028	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.205	± 0.0331	0.003	0.042	---	---	---	---	---	---	---	---
R11	12/17/2019	ENER	0.204	± 0.0330	0.003	0.028	---	---	---	---	---	---	---	---
R18	4/3/2019	ENER	0.186	± 0.0300	0.008	0.032	---	---	---	---	---	---	---	---
	11/12/2019	ENER	0.0680	± 0.0110	0.005	0.018	---	---	---	---	---	---	---	---
R22	4/3/2019	ENER	0.130	± 0.0209	0.004	0.024	---	---	---	---	---	---	---	---

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(f) (std. units)
0481	6/27/2019	ENER	---	---	---	---	---	---	97	592	1330	1962	---	8.48
0483	4/9/2019	ENER	---	---	---	---	---	---	165	662	1660	2223	---	7.06
0493	6/3/2019	ENER	11	2.0	1.6	496	350	8	135	688	1540	2289	0.93	8.39
0494	2/5/2019	ENER	---	---	---	---	---	---	169	700	1770	2353	---	7.11
	6/3/2019	ENER	185	51.2	5.4	260	466	< 5	170	694	1670	2253	0.92	7.15
0498	4/9/2019	ENER	---	---	---	---	---	---	135	595	1450	1971	---	7.09
0536R	4/16/2019	ENER	153	46.5	8.4	316	290	< 5	75	946	1820	2399	0.95	7.18
0538	4/22/2019	ENER	---	---	---	---	---	---	148	644	1530	2066	---	7.03
0653	4/10/2019	ENER	---	---	---	---	---	---	147	658	1580	2156	---	7.24
	4/10/2019	ENER	---	---	---	---	---	---	# 149	# 661	# 1590	---	---	---
0808	7/12/2019	ENER	---	---	---	---	---	---	54	764	1490	2117	---	8.49
	7/12/2019	ENER	---	---	---	---	---	---	# 53	# 760	# 1490	---	---	# 8.49
0853	10/1/2019	ENER	---	---	---	---	---	---	137	669	1500	2155	---	7.86
0929	10/3/2019	ENER	---	---	---	---	---	---	163	712	1840	2861	---	8.19
0930	10/1/2019	ENER	---	---	---	---	---	---	132	601	1540	2441	---	8.61
0931	10/1/2019	ENER	---	---	---	---	---	---	196	696	1850	2888	---	8.42
ACW	6/5/2019	ENER	8	1.3	1.5	518	435	19	133	689	1650	2452	0.89	8.60
AW	4/10/2019	ENER	---	---	---	---	---	---	175	672	1710	2251	---	7.04
B15	4/11/2019	ENER	---	---	---	---	---	---	427	3570	7380	9025	---	7.16
B16	4/11/2019	ENER	---	---	---	---	---	---	395	3280	6410	7904	---	7.28
B31	4/11/2019	ENER	---	---	---	---	---	---	373	3230	6770	8490	---	7.26
B32	4/11/2019	ENER	---	---	---	---	---	---	543	4000	8260	10280	---	7.54
CE2	5/8/2019	ENER	199	48.9	3.5	435	449	< 5	177	1110	2300	2950	0.93	7.33
	10/8/2019	ENER	---	---	---	---	---	---	150	825	1830	2515	---	7.39

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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(f) (std. units)
CE5	7/10/2019	ENER	---	---	---	---	---	---	186	1190	2450	3050	---	7.26
CE6	7/10/2019	ENER	---	---	---	---	---	---	173	962	2030	2625	---	7.29
CE7	11/14/2019	ENER	168	68.0	6.6	2160	1190	< 5	431	3790	7140	9112	0.98	7.50
CE8	6/6/2019	ENER	13	1.3	1.3	567	385	8	64	805	1630	2324	1.01	8.25
CE9	6/6/2019	ENER	207	57.0	6.6	270	517	< 5	180	696	1770	2294	0.95	6.92
	7/15/2019	ENER	---	---	---	---	---	---	186	699	1780	2364	---	7.20
	8/27/2019	ENER	221	62.7	7.0	281	500	< 5	184	703	1790	2376	1.01	7.14
CE10	7/11/2019	ENER	---	---	---	---	---	---	134	1030	2040	2834	---	7.67
	7/11/2019	ENER	---	---	---	---	---	---	# 133	# 1030	# 2040	---	---	---
CE11	12/20/2019	ENER	---	---	---	---	---	---	176	944	2120	2275	---	7.45
CE12	7/10/2019	ENER	---	---	---	---	---	---	128	577	1410	1887	---	7.28
CE13	7/15/2019	ENER	---	---	---	---	---	---	550	4270	8330	9844	---	7.25
CE14	3/28/2019	ENER	---	---	---	---	---	---	110	554	1350	1824	---	7.18
CE15	6/10/2019	ENER	196	51.4	4.9	276	442	< 5	164	697	1710	2239	0.98	7.22
CE15A	5/23/2019	ENER	---	---	---	---	---	---	192	709	1800	2356	---	7.13
CE16A	10/2/2019	ENER	---	---	---	---	---	---	279	1990	3890	4558	---	6.94
	10/2/2019	ENER	---	---	---	---	---	---	# 276	# 1990	# 3920	---	---	# 6.94
CE18	10/17/2019	ENER	---	---	---	---	---	---	76	770	1590	2351	---	7.79
CE19	10/17/2019	ENER	---	---	---	---	---	---	147	866	1920	2502	---	7.30
CF1	10/25/2019	ENER	---	---	---	---	---	---	176	1380	2510	2975	---	7.63
CF2	12/20/2019	ENER	---	---	---	---	---	---	1000	1170	3480	5755	---	12.03
CF3	10/24/2019	ENER	---	---	---	---	---	---	132	1240	2400	2740	---	7.68
CF5	12/19/2019	ENER	---	---	---	---	---	---	299	2350	4520	4484	---	7.28
	12/19/2019	ENER	---	---	---	---	---	---	# 306	# 2420	# 4500	---	---	---

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(f) (std. units)
CF6	12/20/2019	ENER	---	---	---	---	---	---	362	3010	5410	5447	---	7.77
CF7A	10/25/2019	ENER	---	---	---	---	---	---	368	2710	4990	5216	---	7.34
	10/25/2019	ENER	---	---	---	---	---	---	# 367	# 2710	# 5060	---	---	# 7.63
CW2	8/20/2019	ENER	11	1.7	1.6	491	371	14	104	591	1430	2145	1.01	8.52
CW3	4/18/2019	ENER	36	8.0	1.7	495	331	8	65	847	1660	2367	0.95	7.88
	6/10/2019	ENER	40	8.8	1.9	500	342	6	66	870	1680	2346	0.95	7.92
CW9	11/22/2019	ENER	---	---	---	---	---	---	30	228	563	8076	---	8.26
CW15	10/18/2019	ENER	105	28.4	3.4	621	275	< 5	91	1250	2310	3208	1.04	7.77
CW17	7/30/2019	ENER	376	89.8	5.8	275	382	< 5	143	1380	2720	3111	0.98	7.17
	10/2/2019	ENER	---	---	---	---	---	---	145	1420	2740	3199	---	6.92
CW18	6/6/2019	ENER	43	7.9	2.8	673	666	< 5	208	724	2020	2942	1.00	7.50
CW24	12/20/2019	ENER	---	---	---	---	---	---	76	1860	3140	2900	---	7.27
CW28	4/9/2019	ENER	---	---	---	---	---	---	150	529	1310	1995	---	8.25
	8/1/2019	ENER	8	1.2	1.3	431	297	8	151	512	1310	2003	0.96	8.59
CW29	8/26/2019	ENER	150	41.0	6.1	312	482	< 5	149	669	1580	2154	0.94	7.51
CW32	7/30/2019	ENER	146	55.7	8.1	744	533	< 5	403	1310	3020	4073	0.93	7.30
CW33	10/2/2019	ENER	---	---	---	---	---	---	446	2110	4100	5535	---	7.10
CW35	4/18/2019	ENER	256	64.4	4.8	329	419	< 5	60	1150	2390	2824	0.99	6.77
CW36	7/15/2019	ENER	---	---	---	---	---	---	71	1100	1970	2650	---	7.64
CW37	10/3/2019	ENER	---	---	---	---	---	---	80	1050	1940	2501	---	7.36
CW40	10/23/2019	ENER	---	---	---	---	---	---	202	696	1990	2691	---	7.82
CW41	7/24/2019	ENER	14	3.7	2.6	294	312	10	90	315	942	1410	0.95	8.14
CW42	7/25/2019	ENER	152	39.2	6.2	273	381	< 5	151	643	1560	2070	0.95	7.40

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(f) (std. units)
CW43	7/31/2019	ENER	313	78.7	5.1	372	371	< 5	222	1320	2730	3324	0.96	7.32
CW45	11/5/2019	ENER	169	43.2	5.2	315	509	< 5	149	609	1600	2297	1.02	7.14
CW50	4/18/2019	ENER	175	43.0	3.7	263	321	< 5	59	889	1680	2146	0.93	7.17
CW53	6/3/2019	ENER	---	---	---	---	---	---	184	708	1920	2788	---	7.63
CW55	7/30/2019	ENER	33	6.8	3.2	607	611	< 5	188	718	1910	2507	0.94	7.82
CW56	8/29/2019	ENER	---	---	---	---	---	---	125	1590	3040	3400	---	7.17
CW58	5/29/2019	ENER	---	---	---	---	---	---	148	699	1600	2364	---	8.01
	5/29/2019	ENER	---	---	---	---	---	---	# 146	# 690	# 1590	---	---	# 8.01
CW60	8/30/2019	ENER	---	---	---	---	---	---	109	1690	3090	3476	---	7.08
CW61	8/29/2019	ENER	---	---	---	---	---	---	194	1250	2600	3117	---	7.12
CW62	4/18/2019	ENER	395	95.0	6.1	439	378	< 5	192	1720	3320	3793	0.98	7.04
	7/19/2019	ENER	383	94.8	6.1	418	383	< 5	197	1750	3210	3760	0.93	7.28
	8/29/2019	ENER	---	---	---	---	---	---	194	1530	3010	3492	---	7.29
CW72	10/17/2019	ENER	344	77.0	4.7	463	403	< 5	192	1540	3040	3606	0.99	7.09
CW73	6/5/2019	ENER	---	---	---	---	---	---	195	922	2030	2692	---	7.10
CW74	5/29/2019	ENER	---	---	---	---	---	---	184	964	2100	2982	---	7.78
CW75	5/29/2019	ENER	---	---	---	---	---	---	147	851	1900	2721	---	8.20
CW76	1/8/2019	ENER	---	---	---	---	---	---	126	638	1500	2267	---	8.54
	7/25/2019	ENER	8	1.2	1.6	485	351	7	132	652	1530	2219	0.93	8.50
CW78	6/3/2019	ENER	---	---	---	---	---	---	186	721	1890	2674	---	7.56
Q42	6/5/2019	ENER	---	---	---	---	---	---	185	763	1790	2383	---	7.15
Q48	6/4/2019	ENER	---	---	---	---	---	---	179	742	1810	2468	---	7.16
Q50	6/6/2019	ENER	---	---	---	---	---	---	201	953	2090	2642	---	7.29
	6/6/2019	ENER	---	---	---	---	---	---	# 200	# 946	# 2090	---	---	---

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(f) (std. units)
R1	2/21/2019	ENER	---	---	---	---	---	---	194	1010	2240	2844	---	7.12
	8/27/2019	ENER	---	---	---	---	---	---	213	1190	2510	3061	---	7.33
R2	4/9/2019	ENER	---	---	---	---	---	---	150	738	1640	2223	---	7.23
	8/28/2019	ENER	---	---	---	---	---	---	181	843	1970	2540	---	7.33
R3	4/9/2019	ENER	207	54.3	5.7	284	399	< 5	172	820	1840	2409	0.95	7.25
	11/11/2019	ENER	---	---	---	---	---	---	154	733	1730	2298	---	7.23
R4	4/9/2019	ENER	---	---	---	---	---	---	149	746	1690	2252	---	7.10
	8/28/2019	ENER	---	---	---	---	---	---	143	681	1600	2126	---	7.38
R5	4/9/2019	ENER	---	---	---	---	---	---	142	599	1510	2113	---	7.17
	8/28/2019	ENER	---	---	---	---	---	---	144	583	1500	2095	---	7.47
R11	12/17/2019	ENER	---	---	---	---	---	---	144	716	1640	1815	---	7.64
T25	1/30/2019	ENER	---	---	---	---	---	---	308	2440	4840	6193	---	7.24
T27	1/15/2019	ENER	---	---	---	---	---	---	399	3470	6600	7956	---	7.07
T28	1/15/2019	ENER	---	---	---	---	---	---	431	3940	7570	8866	---	7.01
T30	1/16/2019	ENER	---	---	---	---	---	---	477	3580	6910	7854	---	6.91
T32	1/16/2019	ENER	---	---	---	---	---	---	554	4050	7950	9087	---	6.90
V6	7/29/2019	ENER	150	38.5	5.6	296	360	< 5	161	742	1700	2215	0.91	7.61
WCW	10/25/2019	ENER	---	---	---	---	---	---	130	285	939	1367	---	8.89
WR25	10/2/2019	ENER	---	---	---	---	---	---	179	1780	3290	3765	---	6.99
Y1	11/11/2019	ENER	---	---	---	---	---	---	144	602	1470	2202	---	7.32
Y7	4/15/2019	ENER	---	---	---	---	---	---	148	712	1600	2257	---	7.19
	8/20/2019	ENER	82	20.3	4.3	403	348	< 5	139	646	1520	2188	1.01	7.57
Y13	4/15/2019	ENER	---	---	---	---	---	---	154	744	1770	2413	---	7.04
Y23	8/27/2019	ENER	---	---	---	---	---	---	155	715	1680	2232	---	7.42

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)
0481	6/27/2019	ENER	0.0668	± 0.0108	0.007	0.092	---	---	---	---	---	---	---	---
0483	4/9/2019	ENER	0.107	± 0.0172	0.066	0.022	---	---	---	---	---	---	---	---
0493	6/3/2019	ENER	0.121	± 0.0195	0.002	0.110	2.3	0.10	0.200	-1.0	1.2	< 0.01	0.00	0.06
0494	2/5/2019	ENER	0.152	± 0.0245	0.053	0.032	---	---	---	---	---	---	---	---
	6/3/2019	ENER	0.150	± 0.0243	0.048	0.028	2.6	0.10	0.200	0.6	1.2	< 0.01	0.01	0.06
0498	4/9/2019	ENER	0.118	± 0.0191	0.001	0.025	---	---	---	---	---	---	---	---
0536R	4/16/2019	ENER	0.0168	± 0.0027	0.004	0.008	16.9	0.30	0.100	---	---	---	---	---
0538	4/22/2019	ENER	0.0996	± 0.0161	< 0.001	0.025	---	---	---	---	---	---	---	---
0653	4/10/2019	ENER	0.182	± 0.0294	0.001	0.027	---	---	---	---	---	---	---	---
	4/10/2019	ENER	# 0.191	# ± 0.0309	# < 0.001	# 0.027	---	---	---	---	---	---	---	---
0808	7/12/2019	ENER	0.0114	± 0.0018	0.012	0.013	---	---	---	---	---	---	---	---
	7/12/2019	ENER	# 0.0105	# ± 0.0017	# 0.011	# 0.015	---	---	---	---	---	---	---	---
0853	10/1/2019	ENER	0.0788	± 0.0127	0.004	0.091	---	---	---	---	---	---	---	---
0929	10/3/2019	ENER	0.0291	± 0.0047	0.008	0.013	---	---	---	---	---	---	---	---
0930	10/1/2019	ENER	0.0160	± 0.0026	0.012	< 0.001	---	---	---	---	---	---	---	---
0931	10/1/2019	ENER	0.0340	± 0.0055	0.016	0.010	---	---	---	---	---	---	---	---
ACW	6/5/2019	ENER	0.0413	± 0.0067	0.003	0.055	1.8	0.20	0.200	-0.5	1.0	< 0.01	-0.01	0.05
AW	4/10/2019	ENER	0.120	± 0.0193	0.073	0.037	---	---	---	---	---	---	---	---
B15	4/11/2019	ENER	15.1	± 2.4400	24.000	0.400	---	---	---	---	---	---	---	---
B16	4/11/2019	ENER	11.9	± 1.9200	18.500	0.400	---	---	---	---	---	---	---	---
B31	4/11/2019	ENER	12.6	± 2.0400	18.000	0.700	---	---	---	---	---	---	---	---
B32	4/11/2019	ENER	17.9	± 2.9000	31.900	0.600	---	---	---	---	---	---	---	---
CE2	5/8/2019	ENER	2.48	± 0.4000	3.020	0.166	2.3	0.04	0.100	-0.8	1.2	< 0.01	0.04	0.05
	10/8/2019	ENER	1.88	± 0.3030	1.960	0.114	---	---	---	---	---	---	---	---

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)
CE5	7/10/2019	ENER	1.80	± 0.2900	1.030	0.063	---	---	---	---	---	---	---	---
CE6	7/10/2019	ENER	2.41	± 0.3890	2.440	0.133	---	---	---	---	---	---	---	---
CE7	11/14/2019	ENER	12.8	± 2.0700	15.400	0.575	6.0	0.10	0.100	1.3	0.6	0.01	0.05	0.10
CE8	6/6/2019	ENER	0.0347	± 0.0056	0.030	< 0.001	< 0.1	0.10	0.090	0.3	1.1	< 0.01	0.03	0.05
CE9	6/6/2019	ENER	0.160	± 0.0259	0.049	0.022	1.8	0.10	0.100	0.6	0.9	< 0.01	0.02	0.05
	7/15/2019	ENER	0.219	± 0.0353	0.084	0.035	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.253	± 0.0408	0.104	0.047	1.9	0.10	0.100	0.5	1.0	< 0.01	0.02	0.09
CE10	7/11/2019	ENER	1.42	± 0.2290	1.370	0.101	---	---	---	---	---	---	---	---
	7/11/2019	ENER	# 1.42	# ± 0.2290	# 1.340	# 0.101	---	---	---	---	---	---	---	---
CE11	12/20/2019	ENER	1.48	± 0.2380	1.250	0.057	---	---	---	---	---	---	---	---
CE12	7/10/2019	ENER	1.12	± 0.1820	1.460	0.049	---	---	---	---	---	---	---	---
CE13	7/15/2019	ENER	18.3	± 2.9600	22.200	0.434	---	---	---	---	---	---	---	---
CE14	3/28/2019	ENER	0.0411	± 0.0066	0.001	0.084	---	---	---	---	---	---	---	---
CE15	6/10/2019	ENER	0.278	± 0.0449	0.218	0.065	2.1	0.10	0.100	1.4	0.9	< 0.01	0.02	0.05
CE15A	5/23/2019	ENER	0.162	± 0.0262	0.073	0.028	---	---	---	---	---	---	---	---
CE16A	10/2/2019	ENER	4.33	± 0.6990	3.920	0.193	---	---	---	---	---	---	---	---
	10/2/2019	ENER	# 4.38	# ± 0.7060	# 3.890	# 0.192	---	---	---	---	---	---	---	---
CE18	10/17/2019	ENER	0.0692	± 0.0112	0.146	0.002	---	---	---	---	---	---	---	---
CE19	10/17/2019	ENER	1.96	± 0.3160	1.790	0.132	---	---	---	---	---	---	---	---
CF1	10/25/2019	ENER	1.44	± 0.2320	1.720	0.075	---	---	---	---	---	---	---	---
CF2	12/20/2019	ENER	0.0148	± 0.0024	0.140	0.005	---	---	---	---	---	---	---	---
CF3	10/24/2019	ENER	1.12	± 0.1810	1.360	0.061	---	---	---	---	---	---	---	---
CF5	12/19/2019	ENER	5.43	± 0.8760	7.360	0.164	---	---	---	---	---	---	---	---
	12/19/2019	ENER	# 5.64	# ± 0.9110	# 7.360	# 0.160	---	---	---	---	---	---	---	---

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)
CF6	12/20/2019	ENER	6.69	± 1.0800	8.840	0.171	---	---	---	---	---	---	---	---
CF7A	10/25/2019	ENER	7.81	± 1.2600	8.480	0.101	---	---	---	---	---	---	---	---
	10/25/2019	ENER	# 7.60	# ± 1.2300	# 8.240	# 0.100	---	---	---	---	---	---	---	---
CW2	8/20/2019	ENER	0.0401	± 0.0065	0.015	0.056	4.3	0.10	0.100	-0.4	1.2	< 0.01	0.05	0.08
CW3	4/18/2019	ENER	0.224	± 0.0361	0.207	0.002	< 0.1	0.10	0.100	1.3	1.2	0.03	0.04	0.06
	6/10/2019	ENER	0.243	± 0.0392	0.231	0.003	1.3	0.20	0.100	2.5	1.0	0.02	0.00	0.05
CW9	11/22/2019	ENER	0.0125	± 0.0020	0.038	< 0.001	---	---	---	---	---	---	---	---
CW15	10/18/2019	ENER	0.0353	± 0.0057	0.002	0.049	8.6	0.30	0.100	0.1	1.0	< 0.01	0.01	0.04
CW17	7/30/2019	ENER	0.158	± 0.0256	0.022	0.078	9.3	0.30	0.200	-0.2	0.9	< 0.01	0.02	0.03
	10/2/2019	ENER	0.169	± 0.0273	0.021	0.072	---	---	---	---	---	---	---	---
CW18	6/6/2019	ENER	0.0272	± 0.0044	< 0.001	0.014	1.7	0.20	0.100	-0.7	0.9	< 0.01	0.03	0.05
CW24	12/20/2019	ENER	0.138	± 0.0223	< 0.001	0.047	---	---	---	---	---	---	---	---
CW28	4/9/2019	ENER	0.0201	± 0.0032	0.008	0.103	---	---	---	---	---	---	---	---
	8/1/2019	ENER	0.0194	± 0.0031	0.008	0.099	2.0	0.30	0.100	0.0	0.9	< 0.01	0.01	0.03
CW29	8/26/2019	ENER	0.149	± 0.0240	0.002	0.055	3.0	0.09	0.090	0.8	1.1	< 0.01	0.02	0.06
CW32	7/30/2019	ENER	0.0021	± 0.0003	0.001	< 0.001	< 0.1	0.90	0.200	3.6	1.1	< 0.01	0.06	0.03
CW33	10/2/2019	ENER	0.0014	± 0.0002	0.011	< 0.001	---	---	---	---	---	---	---	---
CW35	4/18/2019	ENER	0.169	± 0.0273	< 0.001	0.054	3.1	0.60	0.200	0.9	1.4	0.02	-0.03	0.04
CW36	7/15/2019	ENER	0.0050	± 0.0008	0.005	< 0.001	---	---	---	---	---	---	---	---
CW37	10/3/2019	ENER	0.0289	± 0.0047	< 0.001	0.072	---	---	---	---	---	---	---	---
CW40	10/23/2019	ENER	0.0220	± 0.0036	0.002	0.012	---	---	---	---	---	---	---	---
CW41	7/24/2019	ENER	0.0364	± 0.0059	0.002	0.038	3.2	0.20	0.200	3.2	1.1	0.01	0.10	0.04
CW42	7/25/2019	ENER	0.146	± 0.0235	< 0.001	0.035	2.6	0.09	0.100	3.8	1.3	< 0.01	0.01	0.04

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)
CW43	7/31/2019	ENER	0.0487	± 0.0079	< 0.001	0.044	7.6	0.30	0.100	0.0	0.9	< 0.01	0.04	0.03
CW45	11/5/2019	ENER	0.365	± 0.0589	0.004	0.041	1.9	0.20	0.090	1.6	0.8	< 0.01	0.02	0.05
CW50	4/18/2019	ENER	0.0215	± 0.0035	< 0.001	< 0.001	< 0.1	0.60	0.200	0.5	1.2	0.02	0.01	0.03
CW53	6/3/2019	ENER	0.0770	± 0.0124	0.004	0.022	---	---	---	---	---	---	---	---
CW55	7/30/2019	ENER	0.118	± 0.0191	0.058	0.001	< 0.1	0.30	0.100	0.4	0.8	< 0.01	-0.01	0.03
CW56	8/29/2019	ENER	0.285	± 0.0460	0.202	0.096	---	---	---	---	---	---	---	---
CW58	5/29/2019	ENER	0.208	± 0.0335	0.001	0.108	---	---	---	---	---	---	---	---
	5/29/2019	ENER	# 0.207	# ± 0.0333	# 0.002	# 0.105	---	---	---	---	---	---	---	---
CW60	8/30/2019	ENER	0.0948	± 0.0153	< 0.001	0.234	---	---	---	---	---	---	---	---
CW61	8/29/2019	ENER	1.15	± 0.1860	0.900	0.144	---	---	---	---	---	---	---	---
CW62	4/18/2019	ENER	1.10	± 0.1800	0.960	0.339	16.0	0.30	0.100	0.4	1.4	< 0.01	0.03	0.08
	7/19/2019	ENER	1.33	± 0.2140	1.150	0.350	14.6	0.30	0.200	3.7	1.4	< 0.01	0.10	0.04
	8/29/2019	ENER	1.45	± 0.2330	1.250	0.276	---	---	---	---	---	---	---	---
CW72	10/17/2019	ENER	1.86	± 0.3010	1.770	0.413	8.7	0.30	0.100	-2.0	1.3	< 0.01	0.01	0.09
CW73	6/5/2019	ENER	0.191	± 0.0308	< 0.001	0.044	---	---	---	---	---	---	---	---
CW74	5/29/2019	ENER	0.0753	± 0.0122	< 0.001	0.058	---	---	---	---	---	---	---	---
CW75	5/29/2019	ENER	0.0667	± 0.0108	0.002	0.068	---	---	---	---	---	---	---	---
CW76	1/8/2019	ENER	0.0701	± 0.0113	0.004	0.053	---	---	---	---	---	---	---	---
	7/25/2019	ENER	0.0610	± 0.0098	< 0.001	0.043	3.0	0.20	0.200	0.7	1.1	< 0.01	0.05	0.04
CW78	6/3/2019	ENER	0.344	± 0.0555	0.011	0.033	---	---	---	---	---	---	---	---
Q42	6/5/2019	ENER	0.183	± 0.0295	0.067	0.041	---	---	---	---	---	---	---	---
Q48	6/4/2019	ENER	0.207	± 0.0335	0.073	0.039	---	---	---	---	---	---	---	---
Q50	6/6/2019	ENER	0.0448	± 0.0072	< 0.001	0.036	---	---	---	---	---	---	---	---
	6/6/2019	ENER	# 0.0434	# ± 0.0070	# < 0.001	# 0.036	---	---	---	---	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Unat THROUGH Th-230

Sample Point Name	Date	Lab	Unat (mg/l)	Unat (e) (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	V (mg/l)	Th230 (pCi/l)	Th230(e) (pCi/l)
R1	2/21/2019	ENER	0.234	± 0.0378	0.001	0.058	---	---	---	---	---	---	---	---
	8/27/2019	ENER	0.242	± 0.0391	< 0.001	0.073	---	---	---	---	---	---	---	---
R2	4/9/2019	ENER	0.189	± 0.0306	0.005	0.032	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.263	± 0.0424	0.004	0.044	---	---	---	---	---	---	---	---
R3	4/9/2019	ENER	0.187	± 0.0302	< 0.001	0.032	3.0	0.04	0.100	1.6	0.9	< 0.01	0.01	0.06
	11/11/2019	ENER	0.164	± 0.0265	< 0.001	0.034	---	---	---	---	---	---	---	---
R4	4/9/2019	ENER	0.270	± 0.0436	0.001	0.031	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.245	± 0.0396	0.001	0.031	---	---	---	---	---	---	---	---
R5	4/9/2019	ENER	0.136	± 0.0220	0.002	0.033	---	---	---	---	---	---	---	---
	8/28/2019	ENER	0.125	± 0.0202	0.001	0.035	---	---	---	---	---	---	---	---
R11	12/17/2019	ENER	0.204	± 0.0330	0.003	0.028	---	---	---	---	---	---	---	---
T25	1/30/2019	ENER	4.66	± 0.7530	9.300	0.266	---	---	---	---	---	---	---	---
T27	1/15/2019	ENER	12.1	± 1.9500	10.300	0.120	---	---	---	---	---	---	---	---
T28	1/15/2019	ENER	16.5	± 2.6700	17.200	0.320	---	---	---	---	---	---	---	---
T30	1/16/2019	ENER	15.7	± 2.5300	4.620	0.143	---	---	---	---	---	---	---	---
T32	1/16/2019	ENER	18.1	± 2.9200	16.000	0.255	---	---	---	---	---	---	---	---
V6	7/29/2019	ENER	0.241	± 0.0389	0.002	0.064	3.1	0.30	0.100	0.1	0.9	< 0.01	0.02	0.03
WCW	10/25/2019	ENER	0.0105	± 0.0017	0.003	0.004	---	---	---	---	---	---	---	---
WR25	10/2/2019	ENER	0.200	± 0.0322	0.001	0.099	---	---	---	---	---	---	---	---
Y1	11/11/2019	ENER	0.117	± 0.0189	0.003	0.031	---	---	---	---	---	---	---	---
Y7	4/15/2019	ENER	0.239	± 0.0386	0.003	0.042	---	---	---	---	---	---	---	---
	8/20/2019	ENER	0.218	± 0.0352	0.007	0.055	4.5	0.10	0.100	0.9	1.3	< 0.01	0.10	0.10
Y13	4/15/2019	ENER	0.385	± 0.0622	< 0.001	0.035	---	---	---	---	---	---	---	---
Y23	8/27/2019	ENER	0.252	± 0.0407	0.012	0.038	---	---	---	---	---	---	---	---

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(f) (std. units)
#2 Deepwell	2/5/2019	ENER	---	---	---	---	---	---	210	701	1970	2641	---	7.11
	5/1/2019	ENER	233	75.8	12.6	286	569	< 5	226	757	1990	2664	0.97	6.69
	7/2/2019	ENER	---	---	---	---	---	---	228	756	1950	2615	---	6.98
	10/8/2019	ENER	---	---	---	---	---	---	231	752	2010	2739	---	6.74
0806R	4/22/2019	ENER	214	68.0	10.0	193	440	< 5	188	640	1620	2206	0.96	6.72
	8/21/2019	ENER	---	---	---	---	---	---	185	628	1660	2220	---	7.02
0938	5/30/2019	ENER	---	---	---	---	---	---	35	319	851	1154	---	7.20
0943M	1/30/2019	ENER	---	---	---	---	---	---	136	477	1160	1899	---	7.63
	5/2/2019	ENER	210	59.0	8.4	159	414	< 5	154	591	1510	2045	0.95	7.09
	8/26/2019	ENER	---	---	---	---	---	---	156	582	1510	1990	---	7.13
	11/11/2019	ENER	---	---	---	---	---	---	139	443	1070	1640	---	7.56
0951R	2/6/2019	ENER	---	---	---	---	---	---	150	570	1470	2041	---	7.11
	5/2/2019	ENER	190	60.1	8.8	174	403	< 5	156	585	1500	2004	0.95	7.10
	8/22/2019	ENER	---	---	---	---	---	---	154	552	1480	2040	---	7.08
	11/11/2019	ENER	---	---	---	---	---	---	156	575	1480	2072	---	7.70
0991	5/21/2019	ENER	156	47.8	5.3	114	342	< 5	77	467	1090	1499	0.95	7.47
	9/6/2019	ENER	---	---	---	---	---	---	77	436	1060	1434	---	7.44
0998	4/22/2019	ENER	164	45.4	4.1	71	314	< 5	51	400	949	1280	1.00	6.92
0999	4/22/2019	ENER	98	31.7	2.8	37	261	< 5	18	190	555	803	1.03	6.98

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	2/5/2019	ENER	0.0112	± 0.0018	0.005	0.007	---	---	---	---	---	---	---	---
	5/1/2019	ENER	0.0134	± 0.0022	0.004	0.006	1.7	0.20	0.090	-0.1	1.1	< 0.01	0.01	0.05
	7/2/2019	ENER	0.0123	± 0.0020	0.003	0.006	---	---	---	---	---	---	---	---
	10/8/2019	ENER	0.0152	± 0.0025	0.003	0.007	---	---	---	---	---	---	---	---
0806R	4/22/2019	ENER	0.0191	± 0.0031	< 0.001	0.008	3.6	0.30	0.100	1.4	1.0	< 0.01	0.04	0.07
	8/21/2019	ENER	0.0205	± 0.0033	0.001	0.008	---	---	---	---	---	---	---	---
0938	5/30/2019	ENER	0.0095	± 0.0015	0.001	0.004	---	---	---	---	---	---	---	---
0943M	1/30/2019	ENER	< 0.0003	< 0.0001	0.001	< 0.001	---	---	---	---	---	---	---	---
	5/2/2019	ENER	0.0076	± 0.0012	< 0.001	0.009	4.0	0.40	0.200	-0.4	1.4	< 0.01	0.04	0.06
	8/26/2019	ENER	0.0080	± 0.0013	< 0.001	0.010	---	---	---	---	---	---	---	---
	11/11/2019	ENER	< 0.0003	< 0.0001	< 0.001	< 0.001	---	---	---	---	---	---	---	---
0951R	2/6/2019	ENER	0.0309	± 0.0050	0.004	0.009	---	---	---	---	---	---	---	---
	5/2/2019	ENER	0.0317	± 0.0051	0.003	0.008	3.9	0.40	0.200	1.0	1.2	< 0.01	0.01	0.04
	8/22/2019	ENER	0.0304	± 0.0049	0.003	0.008	---	---	---	---	---	---	---	---
	11/11/2019	ENER	0.0324	± 0.0052	0.001	0.009	---	---	---	---	---	---	---	---
0991	5/21/2019	ENER	0.0060	± 0.0010	0.002	0.011	3.6	1.20	0.300	0.9	1.5	< 0.01	0.07	0.08
	9/6/2019	ENER	0.0042	± 0.0007	0.001	0.007	---	---	---	---	---	---	---	---
0998	4/22/2019	ENER	0.0112	± 0.0018	< 0.001	0.009	3.5	0.20	0.100	---	---	---	---	---
0999	4/22/2019	ENER	0.0035	± 0.0006	0.002	0.009	2.7	0.02	0.100	---	---	---	---	---

APPENDIX C

ANNUAL ALARA AUDIT

ANNUAL ALARA AUDIT REPORT FOR 2019

Grants Operations
Homestake Mining Company
P. O. Box 98
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Prepared by:

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February 28, 2020

ABSTRACT

The Annual ALARA Audit for 2019 was conducted by Janet Johnson, PhD, CHP on December 4 and 5, 2019 with the assistance of the Radiation Safety Officer[1], Mr. Randy Whicker, at the Homestake facility in Grants, New Mexico. Data for the first three quarters of 2019 were reviewed during the on-site audit. Fourth quarter 2019 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 2019 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, Amendments 52, 53, and 54[2]. 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 maximum radiation dose to a worker in 2019 was 40.3 mrem, including internal doses calculated for workers monitored using lapel samplers as required under specific Radiation Work Permits (RWPs). Radiation doses to members of the public during 2019 will be included in the Semi-annual monitoring report for July through September. Measured particulate and radon air concentrations for 2019 were consistent with data from previous years. Calculated public doses are consistent with previous years. 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 is one recommendation, related to review of laboratory data in a timely manner, and two best practices noted with regard to documentation of site inspections. The recommendations from the 2018 ALARA Audit Report have been addressed.

[1] The Radioactive Materials License (RML SUA-1471)) references a Radiation Protection Administrator (RPA) (LC 21). The RPA role was formerly performed by the site Closure Manager (CM). Mr. Randy Whicker, a certified health physicist, was appointed through the SERP process as the Radiation Safety Officer (RSO) of record in April 2017. Radiation safety responsibilities now rest primarily with the RSO and Alternate RSO (contracted services) as well as the on-site Radiation Safety Technicians (RSTs) (HMC employees).

[2] License Amendments 52, 53, and 54 were each applicable to HMC operations during a portion of 2019.

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1.0 INTRODUCTION

The Annual ALARA Audit (the Audit), required by License Condition 42 (LC 42) of Homestake Mining Company of California's (HMC) Grants Uranium Mill facility (NRC Materials License Number SUA-1471, Amendments 52, 53, and 54), was conducted on December 4 and 5, 2019 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. David Pierce, 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, 2019. In addition, Mr. William Archuleta, Senior Shift Supervisor, and Mr. Kyle Martinez, Radiation Safety Technician (RST), and Mr. Brad Bingham, Safety, Health, and Environmental Compliance Officer (SHECO) attended the opening meeting and assisted with the audit.

Mr. David Pierce has been the CM since the first quarter of 2019, replacing Mr. Tom Wohlford. 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 has undergone 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 was applicable for most of the first half of 2019. License Amendment 53 which increased the surety bond requirement (LC 28) was issued in April, 2019. License Amendment 54, issued in November 2019, adopts an updated Groundwater Monitoring Plan (LC 35A) and is currently applicable.

Homestake submitted an application for an updated license amendment in November 2018. The changes that were 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 noted 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 (RPPM), submitted with the license amendment application, was designed to reflect the existing site conditions (HMC, 2018a). The Nuclear Regulatory Commission (NRC) responded that the license amendment request did not provide "sufficient information necessary for a detailed technical review." The NRC comments are currently under review by Homestake.

Homestake employed a total of 12 permanent staff members in 2019. Contractors periodically perform temporary work on site to support and maintain facility operations. Contractors are responsible for abiding by Homestake radiation protection policies and procedures.

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.

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 RPPM (HMC, 2018a) defines “restricted areas” in association with Radiation Work Permits (RWP) as areas that require temporary restricted access for specific projects as warranted at the discretion of the RSO. The “Controlled Area”, also defined in the RPPM, 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 (NRC, 2002) 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 2019 Activities

Activities conducted in 2019 included continued groundwater collection and treatment, operation of the RO system and operation of zeolite treatment units as well as general site maintenance and environmental and radiological monitoring. Additional non-routine activities were conducted under specific RWPs.

Groundwater remediation is a three-pronged process. The evaporation ponds receive liquid waste streams from groundwater treatment processes at the site. Water from groundwater extraction wells is pumped to either the reverse osmosis (RO) treatment plant or to the zeolite treatment facility. The RO facility treats impacted on-site groundwater for a number of constituents of potential concern. The zeolite units remove uranium from impacted off-site groundwater. The RO plant has a nominal treatment capacity of 1,200 gallons per minute. At the time of the December 4-5, 2019 audit, the RO plant was running at approximately 300 gallons per minute. The clarifier is in the process of being rebuilt under RWP 12-2019. The RO plant treats impacted groundwater for compliance with Site groundwater protection standards as indicated in RML Condition 35(B).

An initial pilot zeolite water treatment facility operating at a rate of 60 gallons per minute was upgraded with a 300 gallon per minute facility. 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 normal 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 2019 on-site audit, the 1,200 gallon per minute plant was operating at 200 gallons per minute; the older 300 gallon per minute plant is no longer in operation. A new aeration system has been installed in the Zeolite Ponds to mitigate algae growth.

A Final Status Survey (FSS) of former land application areas was conducted by ERG in July 2018 on behalf of HMC. Results indicate compliance with release criteria for Ra-226 as defined in the approved Decommissioning Plan (AKG and Jenkins, 1993a and 1993b) under 10 CFR 40, Appendix A, Criterion 6(6). Criteria for other constituents of potential concern (uranium and selenium) were proposed in the Land Application Impact Assessment under the Confirmatory Order (HMC, 2017) as well as in the FSS Plan for the land application areas (ERG, 2017). Oak Ridge Institute for Science and Education (ORISE) performed an independent confirmatory survey on behalf of the NRC. Results appear to confirm HMC's FSS results. The FSS and Confirmatory Survey reports are currently under NRC review.

Other activities conducted on site include, but were not limited to, water management for the planned re-lining of EP-1 and the collection ponds, routine environmental monitoring, rebuilding of Clarifier 1 outside of the RO plant, cleanout of algae in the zeolite treatment cells and respective installation of water aerators to help mitigate algae growth. A radiological scan out station has been established just outside the RO building to support RO rebuild and pond relining activities under RWPS. Additional 2019 activities are described in RWPs issued during 2019 and the monthly ALARA Reports.

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 RPPM, requires badging of all Homestake workers with the exception of administrative staff. Contractors spending more than five consecutive days on site inside Controlled Areas, are badged. Internal doses are calculated for workers who were monitored using lapel samplers worn by representative workers under RWPs. Internal committed effective doses from intake of radionuclides had not been calculated in previous years because there is limited potential for airborne radionuclide sources remaining on the site as demonstrated by investigations conducted in 2017 and 2018 and described in the Annual ALARA Audit Report for 2018 (Sopris, 2019). The maximum internal dose calculated for a worker in 2019 was 40.3 mrem.

The maximum quarterly occupational radiation deep dose for 2019, as measured by the Optically Stimulated Luminescent (OSL) badges, was 8 mrem. Nearly all badges show doses below the reporting limit of 1 mrem in a quarter. The measured deep dose has in the past been considered equivalent to the total effective dose equivalent (TEDE) for the year. In 2018 and 2019, internal doses incurred during activities conducted under specific RWPs (based on breathing zone air monitoring) were 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).

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 resident (HMC-4 and HMC-5). Net differences between measured annual average values at background monitoring stations (HMC-6 for gamma and air particulates and HMC-16 for radon) and the nearest resident (HMC-4 and HMC-5, whichever is higher) are assumed representative of radiological effluent emissions from Site facilities/operations. The net differences are used to calculate public dose to the nearest resident. 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 each 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 (based on default values cited in NUREG/CR-5512). The dose from 0.1 pCi/L radon gas continuous occupancy at an equilibrium fraction of 100% is assumed to be equal to 50 mrem/year (based on 10CFR20, Appendix B, Table 2 effluent concentration limits). Based on the results provided in the 2019 2^{nd} half semiannual report, the 2019 calculated total effective dose equivalents (TEDEs) at HMC4 and HMC5, assumed to be representative of the nearest residents, were 50 mrem/y and 31 mrem/y, respectively. The calculated dose at HMC4 in 2019 (50 mrem) is similar to that calculated in 2018 (52 mrem), while the dose at HMC5 in 2019 (31 mrem) was lower than in 2018 (50 mrem).

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 location. The doses from inhalation of radionuclides in airborne particulate material are negligible at the nearest resident location. 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 2018 dose calculations, reported in the 2018 Semi-Annual Report for July through December (HMC, 2019b), were reviewed and found to be accurate. More than 75 percent of the calculated dose to the nearest resident in 2018 was due to potential inhalation of radon decay products. Calculated public radon dose for 2019 accounted for 60% of the calculated

TEDE with direct radiation contributing the remaining 40%. 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, 2019a, 2020).

2.1 Routine Operations

Routine operations at the HMC mill site in 2019 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 RPPM, Version 2 (HMC, 2018a and associated SOPs) and, where applicable, with the requirements of specific RWPs issued by the RSO.

2.1.1 Bioassay Data

Homestake Mining Company collects routine urine bioassay samples semi-annually from Homestake employees and as needed from contractors who spend more than five consecutive days working inside the Controlled Area as defined in the RPPM. In addition, bioassay samples mandated by RWPs are collected at the start of the activity and at termination. The samples are submitted to Energy Laboratories, Inc. (ELI) in Casper Wyoming for analysis for uranium.

A total of approximately 200 bioassay samples from employees and contractors were submitted to ELI from January 1 through December 2019. Homestake discontinued the previous practice of submitting a blank and a spiked sample with each batch of samples in 2019 in accordance with Revision 2 of Regulatory Guide 8.22 (NRC, 2014) which no longer requires this practice. The samples were accompanied by a standard Chain of Custody form. None of the bioassay samples submitted in 2019 exceeded the laboratory reporting limit of 5 micrograms per liter (μg/L). Workers would be notified if their bioassay results exceed the laboratory reporting limit.

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. Homestake has submitted a license amendment application that included radiation protection procedures that would have eliminated routine bioassay for such workers based on the results of bioassay samples from previous years. However, the NRC rejected the license amendment application and HMC is in the process of evaluating whether to revise and resubmit the amendment request.

2.1.2 Internal Doses

Aside from individuals working under RWPs that require air monitoring, internal doses are not assessed because there is little potential for inhalation or ingestion of radioactive materials for routine operations. 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 RO 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. In fact, radon gas concentrations in the RO building appear to have decreased over the past four years. (See Section 2.6, Table 4b.)

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 that radon and particulate concentrations are 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. Twelve quarterly badges were issued to Homestake employees in 2019. Badges were issued to contractors as necessary. The number of badges used in 2019 varied by quarter according to how many contractors were on site for more than five days. Most 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 not logged out, based on a review of representative logs.

Contractors are often only on site for short periods of time, or only one quarter. Therefore, the same badge number may be issued to different workers who are on site during different quarters. Contractor personnel from Environmental Radiation Group (ERG) track the OSL results and badge assignment forms in a database that “allows them to relate and query the results of all personnel based on the badges they use” (Alecksen, 2020). The number of badges issued for any one quarter varies according to the number of contractors on site.

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 Whicker (2018) and the 2018 ALARA Audit Report (Sopris, 2019) verified this expectation. However, doses to workers monitored using lapel or area air samplers under specific RWPs are included in the 2018 and 2019 annual TEDE.

The maximum quarterly deep doses reported by the OSL vendor for the years 2012 through 2019 was 23 mrem (in 2014) and 11 (in 2015). In all other years the maximum was 8 mrem or less. The deep doses for nearly all OSL badges have been reported as non-detect, i.e., less than 1 mrem.

Beginning in 2018 worker doses were calculated using the detection limit as the dose rather than zero for reported non-detect doses. Therefore, a worker badged for any quarter would have a calculated annual dose of at least 1 mrem, with workers badged for all four quarters having a calculated annual dose of at least 4 mrem. In addition, the 2018 and 2019 worker TEDEs include calculated internal dose based on air monitoring data. The 2018 and 2019 worker doses are shown in Table 1.

Table 1: Annual Worker Deep Doses

Year	Number of badged workers	Maximum Annual Deep Dose	Maximum CEDE	Maximum TEDE	Percent of reported doses <4 mrem
2018	108	6	13	19	89
2019	105	8	39	40	72

The individual worker doses are recorded and filed annually on a form comparable to the NRC Form 5. Results are provided to workers upon request. 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.

Due to the very low reported doses and the change in the method of calculating annual dose, it is not practical to determine any significant trends. However, given that the maximum annual TEDE for any individual worker was less than 20 mrem, or 20% of the maximum allowable dose to a member of the public, and less than 4% of the annual dose that would require monitoring for workers, an analysis of trends, either as a whole or by occupation, would not be meaningful.

2.2 Safety Meetings and Training Programs

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 and in May 2019 to fulfill the biennial refresher training specified in NRC Regulatory Guide 8.31. The RST, Kyle Martinez, along with all HMC employees, attended annual Radiation Worker Refresher Training on December 4-5, 2019 at the Grants site. The training was presented by the RSO. In addition, between May 2017 and March 2018 Mr. Martinez received 53 hours of individualized formal training presented by the RSO and ARSO to address the qualifications recommended in Reg Guide 8.31 for Radiation Safety Technicians. The individualized training included but was not limited to: 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 initially reviewed by NRC inspectors and the quantity and content determined to be adequate given the low potential for radiation exposures and because the site is not an operational uranium mill. However, the NRC issued a NOV after its March 18-21, 2019 inspection related to the RST qualifications. In response to the NOV, Mr. Martinez, along with Mr. Farr (ARSO), ERG contractor, attended a 40-hour Refresher Training Course conducted by RSCS in December 2019 to complete the training requirement.

As noted above, HMC employees received annual Radiation Worker Refresher Training on December 4, 2019. The training was conducted by the RSO and was documented by a written test which the RSO covered with the trainees on December 5, 2019. The test was reviewed and found to be appropriate.

Contractors receive annual radiation safety orientation through a video with additional information provided by ERG or Homestake radiation safety personnel. A total of 85 contractors were trained by video in 2019. Contractors and new employees complete a test prior to receiving a dosimeter. A sample of the tests was reviewed. The test questions are appropriate for the potential hazard present at the site. The trainer grades the test and initials the grade as recommended in the 2018 ALARA Audit Report. The test is reviewed with the individuals in the class. A training log documenting successful completion of the test is maintained. Maintaining up-to-date records on contractors is challenging given the temporary nature of their work on site.

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. Kyle Martinez, RST, received transportation training on 7/19/19. Billy Archuleta, Senior Shift Supervisor, received transportation training on 7/24/19. Potentially contaminated environmental media samples were shipped out of the Homestake facility as “excepted packages” (UN 2910). All contaminated media samples originating from the site are considered 11.e(2) material.

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. A sample of safety meeting logs was reviewed. The subjects were appropriate, and attendees signed the log sheet. The ARSO meets with the RST and other staff on a weekly basis to tour the site and review operations. **The observations and actions taken based on the weekly tour are well-documented in the monthly ALARA Report. This is a significant improvement in the program and a best practice.**

2.3 Inspection Reports

Daily site inspections have been conducted by Billy Archuleta and Kyle Martinez (RST) since July 22, 2019. A view of the records showed a few gaps in the inspection reports due to lack of personnel, primarily over Thanksgiving weekend (11/22/19 to 11/25/19). Homestake is attempting to address this issue via a license amendment request to permit qualified and trained designees to perform daily site inspections when the RSO or RST are unavailable (e.g. weekends, holidays, illness, vacation, professional training, etc.). The RSO has developed a special training program for this purpose, but the amendment request is currently under review by NRC and has not been approved. The inspection reports were helpful in documenting work on site, identifying problems and follow up. For example, on 7/23/19 the inspection report noted an air bubble in the EP1 transfer line. The line was shut down. The 7/24/19 report noted the follow-up actions on the EP1 transfer line bubble. **The detail in the daily site inspection reports is a best practice.**

The NRC conducted a routine on-site inspection on March 18-21, 2019. The inspection resulted in three violations of NRC requirements (NOVs): 1) failure to perform an environmental evaluation of an activity not previously assessed by the NRC; 2) failure to conduct weekly inspections of all facility areas and daily walk-through inspections of all work and storage areas, inadequate qualifications of a RST, and failure to conduct semi-annual fire drills; 3) lack of specific spill procedures. Homestake responded to the NOVs on July 12 and 23, 2019. The NRC, in an August 19, 2019 letter, noted weakness in the response and requested further clarification. HMC responded on August 28, 2019. The NRC accepted HMC’s response as adequately addressing the NOV.

The NRC conducted an unannounced inspection on October 22-24, 2019 and issued two NOVs: 1) failure to ensure that the instruments are properly calibrated; and 2) failure to establish a Standard Operating Procedure (SOP) for startup of the RO water treatment system.

HMC responded, in a letter dated December 20, 2019 noting that the calibration label on the instrument in question had two digits transposed and that the instrument had, indeed, been properly calibrated. HMC is amending the SOP for shutdown of the RO plant to include the procedure for startup. The NRC accepted HMC's responses in a letter dated January 17, 2020.

The references for the NRC Inspection Reports are given below along with the references to HMC responses to the NOVs.

- NRC Inspection Report 040-08903/2019-001 And Notice of Violation. June 12, 2019.
- NRC Letter. Homestake Mining Company of California, Response to NRC Inspection Report 040-08903/2019-001 and Notice of Violation. September 6, 2019.
- NRC Letter. Homestake Mining Company of California, U. S. Nuclear Regulatory Commission Comments on Request for Amendments to License SUA-1471 to Clarify and Update Current License Conditions and Commitments; Docket 04008903; Confirmatory Order EA-16-114. October 4, 2019.
- NRC Inspection Report 040-08903/2019-002. November 22, 2019.
- NRC Letter. Homestake Mining Company of California Response to NRC Inspection Report 040-08903/2019-002 and Notice of Violation. January 17.
- Homestake Mining Company of California. Reply to "Request for Additional Information – Compliance of Homestake Grants, New Mexico Site with 10 CFR 20.1301 and 10 CFR 20.1302." Docket No. 040-08903, License No. SUA-1471. Homestake Grants Reclamation Project, Cibola County, New Mexico. August 20, 2019.
- Homestake Mining Company. HC Response to Notice of Violation – NRC Inspection Report 040-08903/2019-002 and Notice of Violation; Homestake Mining Company of California – Grants Reclamation Project – Docket No. 040-08903, License No. SUA-1471. December 20, 2019.

2.4 Contamination Surveys

Personal contamination surveys are conducted by individuals trained by the radiation safety staff to perform the surveys in accordance with the requirements of specific RWPs. A change in procedure was implemented in 2019. When personnel exit surveys are required under an RWP, workers are now required to scan out at the boundary of the corresponding temporary restricted area. Previously workers scanned out at the radiation safety office. A mobile scan-out shed, obtained primarily for pond relining projects, is currently established near the RO plant for use on collection pond relining activities and the clarifier rebuild project. Contamination surveys are conducted using a Ludlum Model 43-93 alpha probe coupled to a Model 2360 meter (or comparable 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.

Scan-out records at the RO plant scan station were reviewed. The calibration date on the instrument used at the scan out station was checked (Model 2360 meter 334005; Model 43-93 alpha/beta probe PR372636). The calibration date was 9/17/19. The ARSO and/or the RST conduct spot contamination surveys. The results are included in the monthly ALARA reports. One individual, working under the clarifier rebuild RWP showed higher than expected alpha count rates on his clothing and hands. An investigation was conducted by the ARSO and a report submitted to the RSO. Based on subsequent measurements, it was determined that the elevated count rates were due to short-lived radon decay products. The incident was documented in a technical memorandum (Farr, 2019). No further action was necessary.

Equipment release surveys are generally conducted by the RST using a Ludlum Model 43-93 alpha/beta probe coupled to a Model 2360 meter as part of an RWP. In some instances, as deemed advisable, the RSO or ARSO required equipment release surveys for activities that didn't warrant an RWP (as a conservative ALARA protocol). 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, or in a "miscellaneous surveys" folder. The method for determining the counting efficiency for alphas was clarified in that the count per 2π disintegration, i.e., efficiency, is multiplied by a factor of 0.25 to account for geometry and actual scan efficiency in the field, as per ISO 7503-1 Annex.

Contamination surveys in clean areas have been conducted weekly since late 2018. A total of 51 clean area surveys were documented in 2019. One survey report in November was missing. The technician believes that the survey was performed but that the documentation was lost. All areas met the required contamination limit, and surveys that bracketed the weekly survey where documentation was missing showed no evidence of contamination. Results of clean area surveys are recorded on EDF-4 or EDF-5, Radiological Contamination Survey Form. The efficiency recorded on the form was checked for accuracy.

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. Eleven RWPs were issued in 2019. One additional work permit, RWP 2-2019 was numbered but not issued due to long-term postponement of the EP-1 relining project (now planned for the spring of 2020). RWPs include a field level risk assessment (FLRA) to cover general safety issues. The 2019 and open 2018 RWPs are listed in Table 2, below:

Table 2. Radiation Work Permits Issued in 2019

ID	Issue Date	Subject	Bioassay	Other Monitoring	Workers trained	Date Closed Out
7-2018	6/13/18	Drilling and Handling Tailings from LTP and STP	Yes	Dosimetry; Personal and equipment release surveys; BZ	7	Not closed out
11-2018	9/28/18	Cleaning Algae from 1200 Zeolite Plant	Yes (entry and exit)	Personnel contamination survey; equipment release survey; dosimetry; BZ	4	4/18/19
1-2019	1/09/19	Replacing membranes in RO#1	Yes	Personal contamination and equipment release survey; PPE; (Contamination was	6	Terminated – 1/10/19 Review Signatures had 2018 date

				noted on the RO building floor.)		
2-2019	Not issued					
3-2019	4/29/19	Sonic drilling in LTP and STP	Yes	Personal contamination and equipment release survey; air sampling; gamma exposure rate sampling.	7	5/20/19
4-2019	4/12/19	Removing pipes, dead heads, and transfer pumps	Yes	PPE; personal contamination and equipment release survey	3	5/3/19
5-2019	6/18/19	Geochemical testing of soil and tailings material	Yes	PPE; personal contamination and equipment release survey; air sampling, gamma exposure rate survey.	1	9/11/19
6-2019	6/26/19	Collection pond liner repair	No	Personal contamination survey	4	8/7/19
7-2019	7/10/19	Cleaning Algae out of 1200 Zeolite system	No	Personal contamination and equipment release survey	6	12/31/19 Consideration being given to including this as part of the SOP for pond operations.
8-2019	7/31/19	Drilling offsite into plume to test for geochemical soil	No	Personal contamination and equipment release survey; gamma exposure rate survey	5	8/7/19
9-2019	7/31/19	Topographic and Bathymetric surveys of collection ponds	No	PPE; personal contamination and equipment release survey	2	8/7/19
10-2019	8/18/19 Dated 8/18/18	Annual RO cleaning	Yes	PPE; personal contamination and equipment release survey	4	8/27/19
11-2019	9/20/19	Cleaning out sludge and liner removal of west collection	Yes	PPE; personal contamination and equipment release survey; weekly contamination survey of equipment in restricted area; air sampling	5	10/11/19

12-2019	10/30/19 Dated 10/30/18	Clarifier #1 rebuild	Yes	PPE; personal contamination survey; equipment release survey; air monitoring (BZ)	10	1/27/20Elevated scan readings for Westech contractors due to radon decay products.

2.6 Radiological Effluent and Environmental Monitoring Data

The Semi-Annual Environmental Monitoring Reports for the periods July through December 2018 (HMC, 2019b) and January through June 2019(HMC, 2019c) were reviewed prior to, and during the on-site audit. No issues with the environmental data were identified. A draft Semi-Annual Environmental Monitoring Report for July through December 2019 (HMC, 2020b) was made available after the on-site audit. The public dose calculations were reviewed and found to be accurate.

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, 2019a, 2020a). Radionuclide concentrations in airborne particulate matter are monitored at seven locations around the site, including four locations at the property boundary in the predominant downwind 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 The radionuclide data for 2019 were reviewed. No trends or anomalous results were observed. All concentrations were less than 1.5% of the 10CFR20, Appendix B effluent limits, though this is not how compliance with public dose limits is determined. The initial Q4 2018 air particulate results were questioned because the results for uranium for all but one location were reported as less than 1 E-18 μCi L^{-1} and were inconsistent with previous data; thus, the laboratory report was resubmitted on May 17, 2019. The amended results for those locations were in the range of 2 E-17 μCi L^{-1} to 1 E-16 μCi L^{-1}. (The laboratory had, apparently, used the wrong air volume in the calculations.) The discrepancy was initially noted by the NRC.

Recommendation: All laboratory results should be reviewed for consistency with previous data and apparent discrepancies investigated as soon as practicable after receipt at HMC.

The environmental gamma dose rates for 2016, 2017, 2018 and 2019 are shown in Table 3. The 2018 and 2019 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 reported gamma dose rates in 2018. The 2019 annual doses for most of the monitoring stations were essentially the same in 2019 as in 2018 with the exception of HMC 4 which showed an increase of approximately 16% over the 2017 and 2018 annual doses. The relative consistency between 2018 and 2019 doses for most sites lends credence to the possibility that the observed slight increase in 2018 was due to the difference in the type of environmental monitor used rather than a trend in actual dose rates.

Table 3: Environmental Gamma Monitoring Results

Location	Q1-Q2 2017	Q3-Q4 2017	2017 Total	Q1-Q2 2018	Q3-Q4 2018	2018 Total	Q1-Q2 2019	Q3-Q4 2019	2019 Total
	mrem	mrem	mrem	mrem	mrem	mrem	mrem	mrem	mrem
HMC 1	51	61	112	57.5	58.0	115.5	56.0	67.6	124
HMC 1A	52	60	112	56.8	59.9	118.7	54.4	62.3	117
HMC 2	58	63	121	70.3	63.5	133.8	65.2	66.7	132
HMC 3	51	59	110	58.0	65.6	123.6	60.4	69.6	130
HMC 4	59	69	128	61.1	68.8	129.9	71.6	78.6	150
HMC 5	59	66	125	65.6	65.1	130.7	63.8	72.1	136
HMC 6	55	65	120	67.3	62.3	129.6	60.2	68.8	129
HMC 16 Bkgd	lost	54	108*	59.5	57.3	116.8	59.0	64.7	124

*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 station with the measured concentrations averaged.

The quarterly radon concentrations for 2018 and 2019 along with the annual average concentrations for 2017 through 2019 are shown in Table 4a. Annual average concentration for the years 2016 through 2019 are shown in Table 4b. As noted in previous ALARA Audit Reports, the reported concentrations for the detectors deployed outdoors appear to have decreased significantly with the use of the Rapidos detectors. However, the indoor measurements with the Rapidos detectors appear to be consistent with the previous 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 likely 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) tend to occur during the first and fourth quarters (fall/winter months) most likely due to reduced ventilation during colder months. The annual average radon concentrations in the RO plant have decreased over the past four 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, 2019b, 2020b).

Table 4a: Quarterly Radon Gas Concentrations

Location	Radon Gas Concentration (pCi L^{-1})										
	2017 Ave.	2018 Q1	2018 Q2	2018 Q3	2018 Q4	**2018 Ave.**	2019 Q1	2019 Q2	2019 Q3	2019 Q4	**2019 Ave.**
HMC1	**0.73**	0.83	0.42	0.86	1.1	**0.80**	0.51	0.525	0.81	0.95	**0.70**
HMC1A	**0.62**	0.75	0.45	0.64	1.08	**0.73**	0.555	0.445	0.77	0.75	**0.63**
HMC1OFF	**0.68**	0.79	0.45	0.79	1.15	**0.79**	0.61	0.49	0.77	0.865	**0.68**
HMC2	**0.72**	0.92	0.53	0.77	1.5	**0.93**	0.62	0.59	0.77	1.1	**0.77**
HMC3	**0.57**	0.75	0.48	0.64	0.96	**0.71**	0.485	0.43	0.555	0.81	**0.57**
HMC4	**0.71**	1.01	0.61	0.79	1.15	**0.89**	0.675	0.51	0.745	1.0	**0.73**
HMC5	**0.68**	0.85	0.49	0.82	1.2	**0.84**	0.595	0.42	0.635	0.87	**0.63**
HMC6	**0.69**	0.49	0.54	0.76	0.98	**0.69**	0.475	0.38	0.745	0.71	**0.58**
HMC7	**0.69**	0.84	0.41	0.77	1.2	**0.81**	0.645	0.445	0.73	0.79	**0.65**
HMC16	**0.32**	0.26	0.21	0.37	0.55	**0.35**	0.28	0.22	0.42	0.42	**0.34**
HMC Office	**1.57**	2.3	1.4	1.9	2.6	**2.05**	2.2	1.80	1.5	1.6	**1.78**
R. O. Plant	**1.58**	1.35	0.77	1.5	1.5	**1.28**	0.68	0.57	0.95	1.0	**0.80**

Table 4b: Annual Average Radon Gas Concentrations

Location	**Annual Average Radon Gas Concentration (pCi L^{-1})**			
	2016 Ave.	**2017 Ave.**	**2018 Ave.**	**2019 Ave.**
HMC1	0.91	0.73	0.80	0.70
HMC1A	0.94	0.62	0.73	0.63
HMC1OFF	0.95	0.68	0.79	0.68
HMC2	0.97	0.72	0.93	0.77
HMC3	0.72	0.57	0.71	0.57
HMC4	0.1.1	0.71	0.89	0.73
HMC5	0.91	0.68	0.84	0.63
HMC6	0.92	0.69	0.69	0.58
HMC7	0.85	0.69	0.81	0.65
HMC16	0.49	0.32	0.35	0.34
HMC Office	1.46	1.57	2.05	1.78
R. O. Plant	2.03	1.58	1.28	0.80

On October 7-8, 2019 one hundred radon flux canisters were placed on the side slopes and a portion of the top of the Small Tailings Pond (STP). EP1 covers more than half of the top surface of the STP and is considered to have a radon flux of zero for the purpose of calculating the average flux across the tailings pile. The average measured flux across the side slopes and portion of the STP not covered by EP1 was 22.1 pCi m^{-2} s^{-1}.(HMC, 2019d) The calculated overall average radon flux from the STP was 10.5 pCi m^{-2} s^{-1}. One hundred canisters were placed on the top of the Large Tailings Pond (LTP) on September 10-11, 2019. The average measured flux was 35.4 pCi m^{-2} s^{-1}. Assuming no credit for the embankments of the LTP, the average flux exceeds the standard required by the license, 20 pCi m^{-2} s^{-1}. The LTP flux was somewhat lower in 2019 than in 2018.

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. Two pancake probes were in the instrument cabinet but were red-tagged as out of calibration. 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).

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 activities for the sources are 4.44 µCi and 1.275 µCi. The sources are both more than 25 years old; however, the activities were corrected for decay in 2016. The exposure rate check is used only to demonstrate reproducibility from day to day so the actual 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*	1/23/19 7/22/19
MicroR meter	Model 19 (310400)	NA	2/28/19 8/29/19
MicroR meter	Model 19 (82709)	NA	3/22/19 9/17/19
Alpha	12 (102859)	43-5 (082781)	3/23/19 9/17/19
Alpha	12 (87919)	43-5 (077534)	2/28/19 9/3/19
Alpha/Beta scaler	3030 (245268)	NA	3/4/19 8/30/19
Alpha/Beta survey meter	2360 (334038)	43-93 (372633)	2/28/19 8/29/19
Alpha/Beta survey meter	2360 (184920)	43-93 (199831)	Initial calibration 9/25/19

*NA = not applicable

2.8 Review of Standard Operating Procedures and SERPs

Standard Operating Procedures are contained in the RPPM (HMC, 2018a) and the Homestake Manual of Standard Practices Policy Guidance Documents and Standard Operating Procedures. A single controlled copy of these documents is maintained in the office of the CM. All procedures were reviewed as part of the self-assessment required under the 2017 NRC

Confirmatory Order. A Radiation Protection Program Manual (RPPM) was developed in 2018 and is undergoing review and revision.

There were no Safety and Environmental Review Panel (SERP) evaluations conducted in 2019. A SERP document was prepared for liner replacement in EP1; however, the project has been postponed until the spring of 2020. The SERP evaluation will be conducted prior to commencement of EP1 liner replacement activities.

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 December 4, 2019. 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. As noted in previous ALARA Audit reports, 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 June 6, 2019 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, indicate 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 6. Radtrak detectors supplied by Landauer were used until third quarter 2016 when Landauer discontinued that line. Since that time, Rapidos detectors supplied by Radonova 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. 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 five years. It is not clear whether this is a trend or simply due to normal variation.

Table 6: 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
2019	1.77	0.88

2.11 Unusual Events

The only unusual event reported in 2019 was an elevated alpha count on a contractor's clothing and hands. The incident was investigated and determined to be due to short-lived radon decay products. The investigation was documented in the Technical Memorandum (Farr, 2019).

2.12 Review of 2018 Audit Findings and Recommendations

The 2018 ALARA Audit contained four recommendations as follows (Sopris, 2019):

- Develop a method for ensuring that safety meeting records are kept up-to-date.
  Safety meeting reports were improved for 2019.

- Adjust the beta efficiency calculation to be consistent with the ISO requirements for lower energy betas.
  Efficiency calculation was modified.

- Modify the air particulate and radon decay product spreadsheets to properly calculate efficiency based on 2π emission rate from the calibration source.
  This recommendation was satisfactorily addressed at the time of the 2018 audit.

- Include the instructor signature or initials on contractor tests.
  The instructor initials the grade on the contractor tests.

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 six years. The annual worker TEDEs, including internal doses, were calculated for 2018 and 2019 to include the detection limit for all reported non-detect doses. It is not possible to compare the data from previous years to current worker doses. However, the doses are so low, in most cases reported as non-detect, there are no trends to report. There are no discernable trends in environmental radon, air particulates or direct radiation measurements except for indoor radon in the RO building where average annual concentrations appear to be decreasing. Calculated public doses have been generally consistent for the past six years.

3.2 Summary of Recommendations

There is one recommendation from this audit.

Recommendation: All laboratory results should be reviewed for consistency with previous data and apparent discrepancies investigated as soon as practicable after receipt at HMC.

3.3 Significant Improvements in 2019

Documentation of daily and weekly site inspections has improved significantly.

Best practice: The Monthly ALARA reports now include documentation of the weekly ARSO site inspection. This is very helpful to the reviewer in understanding site activities.

Best practice: The daily site walk-over inspections include observations of potential radiological or safety issues as well as commentary on what actions were taken to mitigate the situations.

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 have been reviewed resulting in updated versions that are designed to ensure compliance with the license and 10 CFR Part 20.

4.0 REFERENCES

AK Geoconsult, Inc. and Jenkins Environmental Inc. (AKG and Jenkins). 1993a. Homestake Reclamation Plan Revision 10/93. Volume I Text, Tables and Figures. October.

AKG and Jenkins. 1993b. Homestake Reclamation Plan Revision 10/93. Volume 2, Appendices. October.

Alecksen, T. 2020. Personal Communication. January 28

Environmental Restoration Group, Inc. (ERG). 2017. Final Status Survey Plan for Release of Former Land Application Areas. Grants Reclamation Project. Revision 1.

Farr, C. 2019. Technical Memorandum: Assessment of elevated alpha/beta counts encountered while performing personnel scanning of contractors at the HMC Grants Reclamation Project. November 27.

Homestake Mining Company of California (HMC). 2017. Land Application Impact Assessment. September 25, 2017 (ML17270A066).

Homestake Mining Company of California (HMC). 2019a. Monthly ALARA Reports. January through December 2019.

Homestake Mining Company of California (HMC). 2020. Monthly ALARA Reports. January and February 2020.

Homestake Mining Company of California (HMC). 2019b. Semi-Annual Environmental Monitoring Report. Period July through December 2018.

Homestake Mining Company of California (HMC). 2018. Radiation Protection Program Manual. Homestake Grants Reclamation Project, Cibola County, New Mexico. Revision 2. October 26.

Homestake Mining Company of California (HMC). 2019c. Semi-Annual Environmental Monitoring Report. Period January through June 2019

Homestake Mining Company of California (HMC). 2019d. Semi-Annual Environmental Monitoring Report. Period July through December 2019.

Homestake Mining Company of California (HMC). 2019f. Radon Flux Measurements for the HMC Tailings Piles. October.

Sopris Environmental (Sopris). 2019. Annual ALARA Audit Report for 2018. February 28.

U. S. Nuclear Regulatory Commission (NRC). 2014. NRC Regulatory Guide 8.22, Revision 2. *Bioassay at Uranium Mills*. May.

U. S. Nuclear Regulatory Commission (NRC). 2002a. NRC Regulatory Guide 8.31, Revision 1. *Information relevant to ensuring that occupational radiation exposures at uranium recovery facilities will be as low as is reasonably achievable*. May.

U. S. Nuclear Regulatory Commission (NRC). 2002b. NRC Regulatory Guide 8.30, Revision 1. *Health Physics Surveys in Uranium Recovery Facilities*. May.

Whicker, R. 2018. Occupational Radiation Exposures Study – Final Report. August 20.

Whicker, R. 2019. Technical Memorandum. Evaluation of positive uranium bioassay urine sample for a worker involved in RO maintenance work under Radiation Work Permit RWP 10-2018. January 25.

APPENDIX D

INSPECTION OF TAILINGS PILES AND PONDS

Stantec

Grants Reclamation Project
2019 Annual EOR Inspection

Annual Inspection of Tailings and Evaporation Ponds

March 27, 2020

Prepared for:

Homestake Mining Company of California

Prepared by:

Stantec Consulting Services Inc.

Revision Record

Rev.	Description	Author		Quality Check		Independent Review	
0	Draft for HMC review	S. Downey	3/19/2020	M. Davis	3/24/2020	C. Strachan	3/25/2020
1	Incorporate HMC review			M. Davis	3/27/2020		

Limitations

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Executive Summary

This report documents the 2019 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 6, 2019.

Stantec visually inspected the crests, toes, slopes, and liners along the crests of two of the three evaporation ponds (Evaporation Pond-1, Evaporation Pond-2) as well as the tops and outslopes of both tailings piles (Small Tailings Pile and Large Tailings Pile). The weather was cloudy and intermittent rain with temperatures in the mid-40s during the site visit. The ground surface was wet with standing water and puddles. The inspection observations are summarized below by facility.

Large Tailings Pile

Stantec staff walked the Large Tailings Pile (LTP) 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 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 consisted of several inlet holes approximately 10 inches in diameter that spanned approximately 5 feet in length parallel to the slope and were connected just below the ground surface. The sinkhole exited the LTP slope approximately 20 feet downslope from 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 46 piezometers or wells in 2019. Of the 46 locations with data in 2019, 45 also had data recorded in 2018. Stantec compared the water level elevations between 2019 and 2018 for these locations. Thirty-seven locations showed no change or a decrease in water level elevation. The other eight locations showed an increase in water level elevation.

The 2019 settlement monument survey indicates that, of the 48 settlement monuments found and surveyed, 44 showed either no change (0 feet) or minor settlement ranging from -0.01 to -0.08 feet (negative denotes settlement), compared with the 2018 survey. The other 4 monuments showed minor heaving since 2018, ranging from 0.01 feet to 0.06 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.

Small Tailings Pile

Stantec staff walked the Small Tailings Pile (STP) toe and crest during the inspection and observed the side slopes from both the toe and crest. Rills were present along all the downstream slopes of the 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). Except for 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

The toe and crest of Evaporation Pond 2 (EP-2) 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 was unable to access Evaporation Pond 3 (EP-3) during the inspection due to muddy, impassable roads. Stantec reviewed the LDRS pumping records for EP-3.

Recommended Action Items

Stantec has ten recommendations from the 2019 site inspection, primarily related to erosion control and drainage management. Seven recommendations are carryover action items from 2018 and three recommendations are updated from 2018. One action item is rated as “high” priority; to grout the sinkhole observed on the crest of the LTP. Six action items are rated as “medium” priority and three action items are rated as “low” priority.

Stantec recommends that annual tailings inspections continue on the current schedule, with the next inspection in November 2020. 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 2020 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 2019 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. 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 and inspection on November 6, 2019.

The GRP 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 second 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 impoundment, 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 tailings 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 restoration 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. Data and documents received in 2019-2020 include:

- Piezometer readings (Hydro Engineering, 2019)
- Historic piezometer readings from 2015 to present
- LTP 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.

3.0 SITE VISIT

Stantec personnel conducting the inspection included the EOR Melanie Davis, PE and Stephanie Downey, PE. Reginald Shirley (HMC Site Engineer) accompanied Stantec personnel during the site visit.

Following the annual inspection, Stantec personnel discussed observations and action items with Reginald Shirley and David Pierce 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 two of the evaporation ponds (EP-1 and EP-2) as well as the tops and outslopes of both tailings piles (STP and LTP). Stantec was unable to observe EP-3 due to muddy, impassible roads that access the evaporation pond. The weather during the site visit was cloudy and rainy with temperatures in the mid-40s. The ground surface was wet and muddy with standing water and puddles. 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 LTP 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 sediments cause 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. The majority of downdrains had water flowing through them due to the storm event that occurred the day of the site visit. A few drains did not have water flowing, primarily those located on the west side slopes. Upon inspection, this is caused by the ground surface upgradient of the pipe inlet being at a lower elevation than the pipe inlet. This elevation difference between the ground surface and concrete causes water to pool at and around the downdrain inlets, which then propagates into the roadway. Photo 11 shows this condition for downdrains 5 and 6. For the downdrains where this condition occurs the ground surface should be regraded to drain to the pipe inlet.

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 around the LTP was wet. Stantec was unable to determine if the water at the toe was from the French drains and sumps, from the recent storm event, or both. HMC notified Stantec that salt precipitate had recently been observed along the southwest toe of the LTP (near the RO Plant). Due to the recent storm event, Stantec did not observe the precipitate at this location.

The top surface and crest of the LTP was generally in stable condition. Rilling existed (up to 1 foot deep) on the south/southeast 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 photos 15 to 18 in Appendix B for general locations). The sinkhole exited the slope of the LTP approximately 20 feet down from the crest. There were multiple inlet holes at the crest that connected just below the surface which were approximately 10 inches in diameter and ranged from 2 to 3 feet deep. The sinkhole was approximately 4 to 5 feet in length, parallel to the crest. A similar sinkhole was also present at Stantec's 2018 EOR inspection site visit. Stantec provided HMC a contractor scope of work to repair the rilling and the sinkhole on the LTP top surface (Stantec, 2018a) and HMC completed the repairs in 2019. Stantec reviewed the as-built information from the repairs made and determined that a low spot still exists in between downdrains 11 and 12 that could be contributing to the recurring drainage issues at this location. HMC also did not construct the berm on the north side of the road as recommended in the scope of work. Stantec recommends that HMC conduct the same repairs (adding material to the road to grade to drain to the downdrains and construct the berm on the north side of the road) that were previously recommended in the contractor scope of work (Stantec, 2018a).

The zeolite facilities on the LTP appear stable with no apparent impact on the stability of the LTP. The side slopes near the zeolite facility had some rilling present. HMC installed new piping near the southwest corner of the 1200 gpm zeolite plant facilities in 2018 and partially repaired the berm at the toe and side slope above the installed piping (see Appendix B, Photo 20) where the berm material was partially removed. Stantec recommends HMC complete repairs to the berm so that slope stability is not compromised.

4.2.2 Piezometer 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. Figure 1 shows the LTP monitoring well locations.

HMC measured water levels on 46 wells in 2019. Of the 46 locations with 2019 data, 45 also had data recorded in 2018. Thirty-seven locations showed no change or a decrease in water level elevation, ranging in an annual change of 0.0 feet to -14.8 feet with the average decrease being -1.35 feet. The other eight locations (EO14, EP31, ET20, NW3, SW3, WME-5, WME-6, and WS1) showed an increase in water level elevation, ranging from 0.11 feet to 5.24 feet corresponding to an average increase of 2.7 feet.

Stantec plotted the water level elevations between 2015 and 2019 for 52 locations, although several locations do not have data starting until 2016 or later. Piezometer water levels were compared from the first reading (ranging from January 2015 to late 2016) to the most current reading, typically 2019 or late 2018. Of the 52 piezometers on LTP, one location (EG9) has only one reading and was not analyzed. Of the remaining 51 locations, 46 showed no change or a decrease in water level elevation, ranging in an overall change of 0.0 feet to -28.5 feet. The other five locations (ES1, ET19, NW3, WME-5, and WT15) showed an increase in overall water level elevation, ranging from 0.9 feet to 2.5 feet. There is some scatter and abnormalities within the data; however, the majority of piezometers show a downwards trend and overall decrease in water elevation. ES1 increased from May 2018 to November 2018 but then decreased and has stayed at a fairly consistent water level with fluctuations of less than 1 foot. ET19 has an overall upwards trend but decreased from the previous reading in January 2019. WT15 has only 4 measurements since November 2016 and the water levels vary up and down significantly between elevations of 6603.4 and 6614.75 ft amsl. NW3 and WME-5 are discussed further below.

Most wells (WME-5, WME-6, EO14, ET20, and EP31) with an upwards trend since 2018 are located on east side of the top of the LTP and are slime wells. WME-5 trends downwards from 6604.4 ft amsl on October 29, 2018 until a reading of 6601.65 ft amsl on April 9, 2019. The next reading in December 2019 shows an increase in water level of 5.19 feet. HMC should monitor this location to follow up on the increased reading in December 2019. WME-6 trend downwards for most of 2019 until the last reading in June 2019, which shows an increase of 1.3 feet before going back down slightly in December 2019. EO14 is monitored annually and has shown an increase in water level of 7.1 feet since January 2018. EP31 increased slightly (0.11 feet) since 2018 but is generally trending downwards. ET20 water level dropped significantly from October 2017 to May 2018 (3.7 feet) and increased 4.8 feet from May 2018 to June 2019. The water level in June 2019 correlates with readings prior to May 2018, and ET20 shows an overall downward trend.

The three other locations (NW3, SW3, and WS1) are located on the northwest and southwest slopes and are sand well locations. NW3 and SW3 water levels dropped for one measurement in May 2018, then increased again in November 2019, but both locations generally show a downwards trend since June 2017. WS1 shows an overall downwards trend and shows minimal fluctuation (1 foot or less) in 2018 and 2019.

Due to the increasing trend in water levels from 2018 to 2019 for WME-5, EO14, WME-6, ET19, and ET20, the recommended action items (Section 9) include monthly monitoring of the LTP north slope and the water levels in the vicinity of these piezometer locations in 2020 to confirm there are no impacts to slope stability.

4.2.3 Settlement Monitoring

The 2019 settlement monument survey was conducted by Hammon Enterprises, Inc. on August 22, 2019. Of the 48 settlement monuments found and surveyed, 44 showed either no change (0 feet) or minor settlement ranging from -0.01 to -0.08 feet (negative denotes settlement), compared with the 2018 survey. The other 4 monuments showed minor heaving since 2017, ranging from 0.01 feet to 0.06 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 present 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 tailings 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 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.

4.2.4 French Drain Tailings Sumps

HMC provided Stantec with the 2019 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 2019. Cumulative flows for all sumps on a monthly basis ranged from 4.8 to 7.1 gpm, with an average cumulative monthly flow of 5.6 gpm. The flow rates do not appear to vary seasonally. The average collection rate in the sumps was down from the average of 8.8 gpm reported in the 2018 annual inspection report.

4.3 SMALL TAILINGS PILE

4.3.1 Inspection

HMC had recently conducted bi-annual maintenance on the STP side slopes by grading and compacting the side slopes. Rills existed along all the downstream slopes of the STP embankments and 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). Except for 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. Stantec provided temporary erosion control options to HMC in a memorandum in 2019 (Stantec, 2019).

The overall averaged measured radon flux from the STP in 2019 was 10.5 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 had previously expressed concern regarding elevated radon flux measurements from the STP interim cover along the crest of the EP-1 east embankment. HMC placed approximately six inches of additional fill along the east embankment crest and downstream slope in September 2019 as a temporary solution to address the elevated radon flux. This temporary measure may be more effective if combined with temporary erosion control measures to prevent windblown loss of interim cover soil (Stantec, 2019).

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. The evaporators were not operating during the visit.

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). EP-1 re-lining is planned for 2020 dependent on agency approval. 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 10.5 feet with a freeboard of 4.5 feet. The minimum freeboard requirement was not exceeded in 2019 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. 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. Ponded water was observed at the toe of the slope on the west embankment (i.e., along the bench in between EP-2 and the east collection pond). 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 2019, 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 early 2019, but data was collected beginning on February 25, 2019. After the pumps were turned on in February, the Action Leakage Rate (ALR) was exceeded for one measurement in Zone 1 and two measurements in Zone 5. The exceedances are likely due to water ponded and the pumps catching up since they were offline in 2018. Zones 2 and 3 also had high pumping rates above the ALR from late January to early March 2019. Zone 2 also had pumping rates exceeding the ALR from May 13 to June 17; Zone 3 also had pumping rates exceeding the ALR from May 13 to June 10; and Zone 5 also had pumping rates exceeding the ALR from May 20 to July 15. In Zones 2 and 3, the exceedances appear to correlate with water depths greater than 80 feet, typically 81 to 83 feet. The exceedances for Zone 5 from May to July also appear to correlate with water depths greater than 80 feet.

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 21.9 feet with a freeboard of 3.1 feet. The minimum freeboard requirement was not exceeded for EP-2 in 2019.

4.5 EVAPORATION POND 3

4.5.1 Inspection

Stantec personnel were unable to inspect Evaporation Pond 3 (EP-3) due to muddy and impassable roads that access EP-3.

4.5.2 Data Review

HMC recorded weekly leakage rates through the LDRS. The pump in each of these cells was removed for general maintenance in 2018, and the casing pipe collapsed in cells A-1, A-3, and A-4. The sump pumps were re-installed as deep as possible and are functional but could not be placed at the bottom of the pipes due to the collapsed casing.

Cells A-2 and A-5 exceeded the ALR in early 2018. Weekly measurements for Cell A-2 from January 7 to February 4 (except for the January 28 reading) and again from March 4 to April 1 shows leakage rates above the ALR for all measurements. The leakage rates range from 848 to 2,293 gpd/acre. Measured water depths for these periods ranged from 41.15 to 44.37 feet. Cell A-5 had four leakage rate measurements exceeding the ALR on January 14 and 21 and again on May 6 and 13. The leakage rates range from 973 to 1,150 gpd/acre and corresponded to water depths ranging from 44.2 to 45.5 feet.

Cells B-3 and B-4 exceeded the ALR during 2019. Cell B-3 exceeded the ALR from February 11 to March 25 for all except one reading within the time period. These leakage rate measurements range from 830 to 949 gpd/acre and the water depths ranged from 41.2 to 45.2 feet. Cell B-4 exceeded the ALR from January 7 to January 28. These leakage rate measurements range from 817 to 1,255 gpd/acre and the water depths ranged from 33.1 to 44.5 feet.

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 10.8 feet with a freeboard of 2.6 feet. For EP-3B, the maximum water level was 11.4 feet with a freeboard of 2.0 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 changed the status of the evaporation ponds from Low to Significant hazard potential in 2018, requiring the completion of Emergency Action Plans (EAP), Operations & Maintenance (O&M) manuals, dam breach and flood routing analysis. General conditions and applicable design criteria are listed below.

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 for water storage dams of approximately 2,500 years for dams classified as significant hazard potential and 5,000 years for dams classified as high hazard potential. From HMC requirements (Barrick, 2016) the seismic event return period for low and high consequence of failure is 2,500 and 5,000 years, respectively.

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 along the embankment crest, and the fine fraction was deposited within the cell. Process water was recovered through two decant towers and returned to the mill for re-use in the 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 was completed 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 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 high.

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 embankment crest had a minimum 10-foot width and a width of approximately 40feetat the base. 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 six inches (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 mils (0.060 inches) and a secondary liner of 40-mil 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 disposal location 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 mils thick and the secondary liner is 40 mils 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 in 2018. Due to this reclassification, NMOSE requires HMC to submit a dam breach analysis report, an Operation and Maintenance Manual, and Emergency Action Plan for each pond. HMC submitted these documents for EP-1 and are under review by NMOSE. The documents will be submitted for EP-2 and EP-3. The significant hazard classification for the dams may change dependent upon final NMOSE approval of the dam breach analyses.

The NMOSE recommends that dams classified as significant or high hazard be inspected at least every 5 years by a professional engineer licensed in the state of New Mexico. NMOSE does not specify dam inspection requirements for dams classified as *low*. For dams classified as low or significant, NMOSE requires that the owner re-evaluate the hazard classification if a downstream development occurs. HMC has had dam safety inspections conducted annually by the EOR since 2002.

HMC internal policy requires a Dam Safety Review (DSR) every 7 years for facilities classified as high failure consequence in the transition phase. A DSR has not been conducted for the evaporation ponds.

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 April 2020, 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 2020, 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 water levels in the vicinity of piezometer locations WME-5, EO14, WME-6, ET19, and ET20, 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.

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.

Table 1 shows recommendations from the 2019 site visit and inspection 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.	Recommendation	Priority	Status
1	Fill (grout) sinkhole near LTP Downdrain 11 to prevent continued sideslope erosion and eliminate risk for loss of containment. Construct berm on north side of road to help mitigate flow across the road surface.	High	Recommendation renewed in 2019 for new sinkhole in the same area.
2	Fill and compact additional soil over cover rilling on LTP to prevent tailings exposure. Follow existing reclamation plan specifications.	Medium	Recommendation renewed in 2019 for new areas requiring repair.
3	Add and compact material to match grade at concrete near inlets for LTP Downdrains to prevent clogging.	Medium	2018 safety inspection recommendation.
4	Protect existing settlement monuments on the LTP to prevent equipment damage.	Medium	2018 safety inspection recommendation.
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	2018 safety inspection recommendation. Currently done on an annual basis.
6	Regrade LTP interim cover access road to drain to downdrains in all locations, specifically between Downdrains 11 and 12, around perimeter to prevent ponding and erosion.	Medium	2018 safety inspection recommendation
7	Monthly monitoring of the LTP north slope and the water levels in the vicinity of piezometer locations WME-5, EO14, WME-6, ET19, and ET20 in 2020 to confirm there are no impacts to slope stability.	Medium	Recommendation renewed in 2019 for piezometer locations requiring continued short-term monitoring.
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	2018 safety inspection recommendation.
9	Maintain perimeter berms on STP and LTP to prevent concentrated runoff and provide safe vehicle access.	Low	2018 safety inspection recommendation.
10	Consider repairs to damaged LDRS piping for EP-2 and EP-3.	Low	2018 safety inspection recommendation.

9.0 REFERENCES

AK GeoConsult, Inc, 1990. Design Brief Evaporation Pond.

AK GeoConsult, Inc, 1991. Completion Report Construction of Evaporation Pond Homestake Mining Company Grants Operation. March.

Alan Kuhn Associates (AKA), 2016. Report of 2015 Annual Inspection of Tailing Impoundments and Ponds, Homestake Grants Project, Grants, New Mexico. February 9.

Alan Kuhn Associates (AKA), 2018. Report of 2017 Annual Inspection of Tailing Impoundments and Ponds, Homestake Grants Project, Grants, New Mexico. January 31.

Arcadis, 2013. Decommissioning and Reclamation Plan (DRP) Update 2013 SUA-1471. April.

Barrick, 2016. Tailings and Heap Leach Management Standard. Document Reference BCG-MI-ST-01. Effective March 11.

CH2M, 2018. Grants Reclamation Project Water Management Prefeasibility Study. March 20.

Environmental Restoration Group, Inc. 2018. Radon Flux Measurements for the HMC Tailings Piles. June.

Kelley, V.C. 1967. Tectonics of the Zuni-Defiance Region, New Mexico and Arizona. *In:* F.D. Trauger (ed.), Guidebook of Defiance-Zuni-Mt. Taylor Region, Arizona and New Mexico. Eighteenth Field Conference, October 19, 20, and 21 1967. Pp. 27-32.

Kleinfelder, 2006. Design Report, Evaporation Pond #3, Homestake Mining Company of California, Grants Project, Cibola County, New Mexico. Revision 1. December 1.

NMAC, 2010. Dam Design, Construction and Dam Safety. NMAC Title 19, Chapter 25, Part 12 (19.25.12 NMAC).

Stantec, 2018a. Scope of Work for Monitoring and Maintenance (M&M) Activities, Grants Reclamation Project, Cibola County, New Mexico. December 7.

Stantec, 2018b. Grants Reclamation Project EP-1 Re-Lining Design Report. Cibola County, NM. November 28.

Stantec, 2019. Erosion Protection Options for STP East and South Embankments, Grants Reclamation Project, Cibola County, New Mexico. October 21.

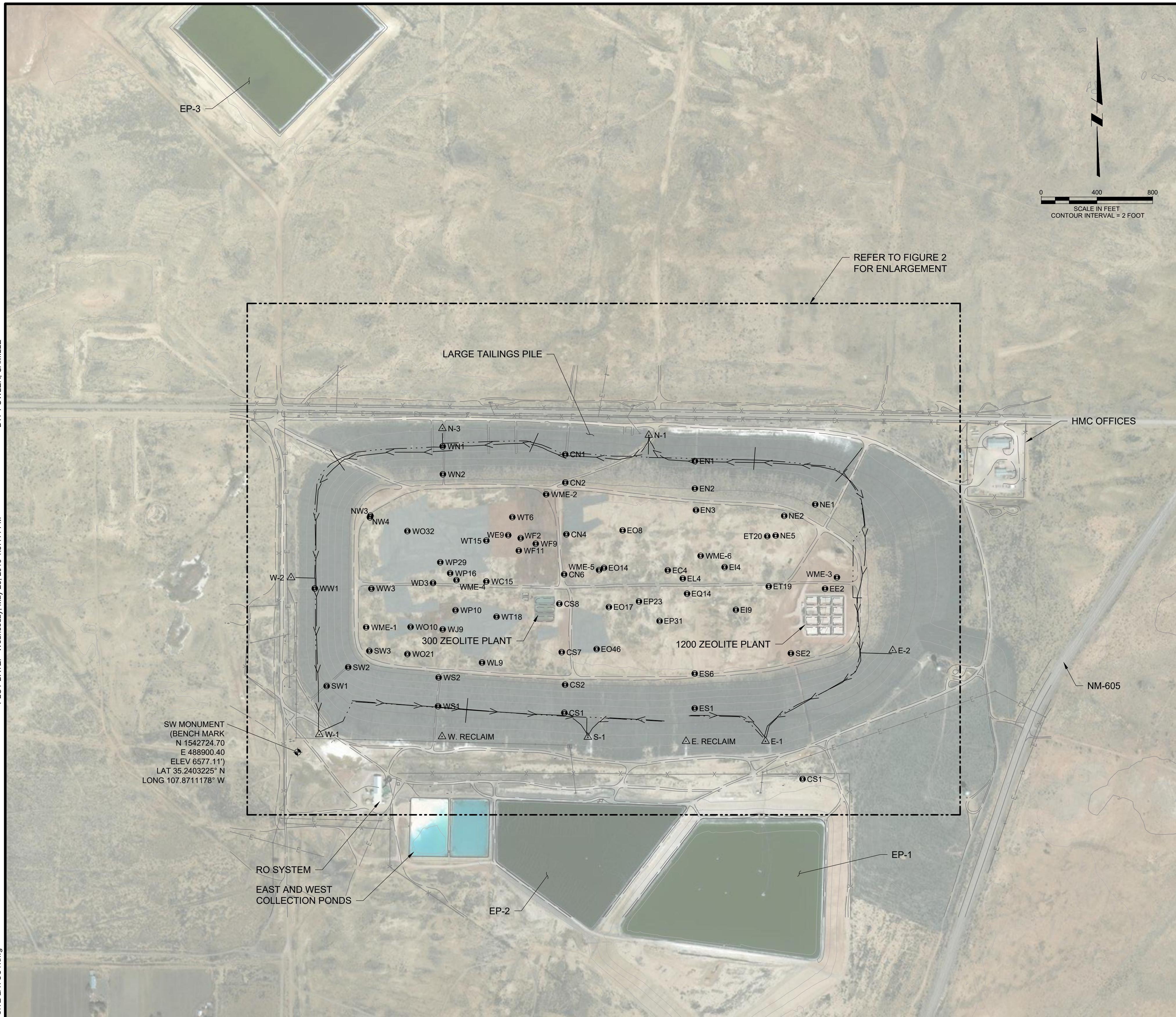
US Nuclear Regulatory Agency (NRC), 2003. Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978. NUREG-1620, Revision 1. June.

US Nuclear Regulatory Commission (NRC), 2008. Regulatory Guide 3.11 Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills, Rev. 2, December.

References

US Department of Energy (DOE), 1989. Technical Approach Document, Revision II. DOE/UMTRA 050425-002, December.

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.

DWG FILE: C:\pwworkdir-sta\dms36300\F1 SITE LAYOUT.dwg PLOT DATE: Wednesday, May 25, 2016 1:37:44 PM BY: FOWLER, CAMILLE

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

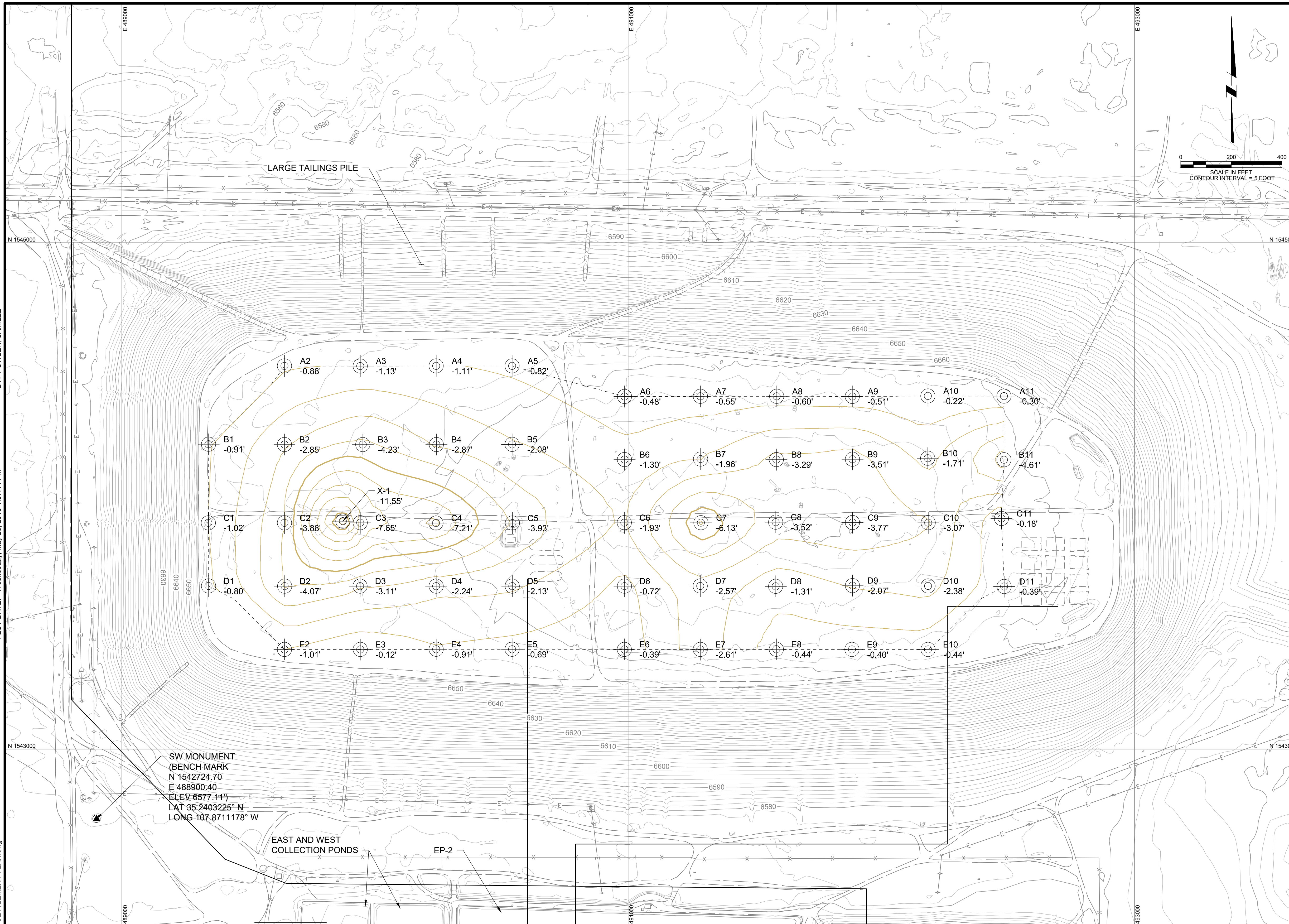
GRANTS RECLAMATION PROJECT

2019 ANNUAL EOR INSPECTION
SITE LAYOUT

SHEET 1 OF 2

1

233001293



CUMULATIVE TOTAL SETTLEMENT CONTOURS

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 2019

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.

BY: FOWLER, CAMILLE

PLOT DATE: Wednesday, May 25, 2016 1:37:44 PM

DWG FILE: C:\pwworkdir-sta\dms36300\F2 SETTLEMENT PLAN.dwg

REV	DATE	BY	DESCRIPTION
A	01/19	RW	ISSUED FOR CLIENT REVIEW

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

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GRANTS RECLAMATION PROJECT

2019 ANNUAL EOR INSPECTION
LTP CUMULATIVE TOTAL SETTLEMENT CONTOURS

SHEET 2 OF 2

2

233001293

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): STP [LTP] Inspection Date: Nov 6, 2019

Inspector(s): M. Davis, S. Downey Weather Conditions: Cloudy, AM Rain, 45° Ground Conditions: Wet, muddy

Reason for Inspection: Annual EOR Inspection Photos Taken: : ☐ NO ☒ YES

Additional Comments:

1. Tailings Top Cover

Is the general condition of cover 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 on south side of top of pile (see comment)
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: Rilling present in same area that was re-graded in 2019. There is new rilling present on the east side of the top slope (immediately adjacent to where the re-grading efforts ended).

2. Tailings Crest/Crest Road

Is the general condition of crest surface/road inadequate?	☐ N/A	☒ NO	☐ YES	
Observed sinkholes, depressions, or unusual settlement?	☐ N/A	☐ NO	☒ YES	Sinkhole on south side near downdrain #11 (see comment)
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 just east of downdrain #11, same as previous location identified during 2018 DSI that was filled with grout and re-graded. Grading appeared adequate between downdrains #11 and #12.

3. Tailings Side Slopes

Slope protection material: Riprap D50=6 inches; natural vegetation Uniform or benched slope: Uniform

Slope height: 80 vertical feet 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	Sinkhole on crest discharges down slope ~20 feet.
Evidence of rills, gullies, or other surface erosion?	☐ N/A	☐ NO	☒ YES	Minimal, near crest/top of slope
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	Where sinkhole discharges

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 At toe along north side of LTP

Additional Comments: Difficult to tell how much water was from recent storm event or from French drains along toe of LTP

Stantec

TAILINGS SAFETY INSPECTION

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project   Structure (circle one): STP [LTP]   Inspection Date: Nov 6, 2019

4. Downdrain Structures

Outlet type: HDPE pipe dissipated by large riprap   Other water removal systems: N/A

Observed wet areas adjacent to outlet structure?	☐ N/A	☐ NO	☒ YES	Most drains were discharging stormwater at time of inspection
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: Some downdrains are not properly graded at the inlet, which is causing no flow to some downdrains and forming puddles and ponded water at the inlets.

5. Instrumentation

Observed: Piezometers: ☒ NO ☐ YES   Monitoring Wells: ☒ NO ☐ YES   Inclinometers: ☒ NO ☐ YES

Other/Notes: Settlement monuments, wells, piping, zeolite treatment plants located on LTP top surface

6. General Observations and Recommendations

Zeolite plant – rilling present on side slopes. HMC should place and compact additional material on the SW corner by the valves at the toe of slope.

Billy (HMC) showed us the location on the SW corner of the LTP where salt/sediment was appearing recently, approximately 20 feet up the slope. The salts/sediments were not visible during the inspection likely due to the rainy conditions.

Stantec

TAILINGS SAFETY INSPECTION

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project | Structure (circle one): [STP] LTP | Inspection Date: Nov 6, 2019

Inspector(s): M. Davis, S. Downey | Weather Conditions: Cloudy, AM Rain, 45° | Ground Conditions: Wet, muddy

Reason for Inspection: Annual EOR Inspection | Photos Taken: : ☐ NO ☒ YES

Additional Comments:

1. Tailings Top Cover

	N/A	NO	YES	
Is the general condition of cover inadequate?	☐	☒	☐	See comment
Observed sinkholes, depressions, or unusual settlement?	☐	☒	☐	
Evidence of rills, gullies, or other surface erosion?	☐	☒	☐	
Evidence of animal burrows or damage from wildlife?	☐	☒	☐	
Evidence of debris accumulation along the slope?	☐	☒	☐	
Vegetation?	☐	☒	☐	

Additional Comments: Evaporation Pond 1 is located on the STP and covers the majority of the STP top surface (see EP-1 DSI Form)

2. Tailings Crest/Crest Road

	N/A	NO	YES	
Is the general condition of crest surface/road inadequate?	☐	☒	☐	
Observed sinkholes, depressions, or unusual settlement?	☐	☒	☐	
Evidence of rills, gullies, or other surface erosion?	☐	☒	☐	
Evidence of animal burrows or damage from wildlife?	☐	☒	☐	
Evidence of surface cracks? Direction? Offset?	☐	☒	☐	
Evidence of lateral movement?	☐	☒	☐	
Vegetation?	☐	☒	☐	

Additional Comments:

3. Tailings Side Slopes

Slope protection material: Sandy clay fill | Uniform or benched slope: Uniform

Slope height: 20 to 25 feet | Slope gradient: 5H:1V

	N/A	NO	YES	
Is the general condition of slope protection inadequate?	☐	☒	☐	No slope protection in place, except north slope
Observed sinkholes, depressions, or unusual settlement?	☐	☒	☐	
Evidence of rills, gullies, or other surface erosion?	☐	☐	☒	Rilling present along all side slopes (see comment)
Evidence of animal burrows or damage from wildlife?	☐	☒	☐	
Evidence of debris accumulation along the slope?	☐	☒	☐	
Evidence of seepage?	☐	☒	☐	

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

Stantec

TAILINGS SAFETY INSPECTION

Routine Visual Inspection Checklist for Tailings Storage Facility

Facility: Grants Reclamation Project Structure (circle one): [STP] LTP Inspection Date: Nov 6, 2019

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	Due to recent storm
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

HMC added 6 inches of clayey material during the week of September 23, 2019 on the east downstream embankment and graded and compacted the material. Some rilling was present near the SE corner of this embankment due to the recent storm event. Rilling was also present on the north and south embankments.

Stantec

DAM SAFETY INSPECTION

Routine Visual Inspection Checklist for Embankment Dam

Facility: Grants Reclamation Project Structure: EP-1 Inspection Date: Nov 6, 2019

Inspector(s): M. Davis, S. Downey Weather Conditions: Cloudy, AM rain, 45° Ground Conditions: Wet, muddy

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 (see comments)
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 at and above water elevation
Evidence of operational activity in upstream area?	☐ N/A	☒ NO	☒ YES	See comments
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments: EP-1 re-lining scheduled for 2020. HMC's subcontractor had recently placed salts/sediments removed from the West Collection Pond into EP-1 along the upstream slope of the south embankment near the SW corner of EP-1.

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 and eroding through safety berm, continuing 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:

Stantec

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-1 Inspection Date: Nov 6, 2019

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 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 downstream slope of north embankment and still present on east and south downstream slopes that were that were recently re-graded and compacted.

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: Nov 6, 2019

Inspector(s): M. Davis, S. Downey Weather Conditions: Cloudy, AM rain 45° Ground Conditions: Wet, muddy

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	
Vegetation?	☐ N/A	☒ NO	☐ YES	

Additional Comments:

2. Pond Crest/Crest Road

Dam crest surface material: Road base, 1" minus gravel Crest width: 15-20 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 the east embankment (shared with EP-1) and 15 feet on the other embankments.

Stantec

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-2 Inspection Date: Nov 6, 2019

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

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: Water ponded at toe of downstream slope of the west embankment along the small bench in between EP-2 and the East Collection

Pond.

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-3 | Inspection Date: Nov 6, 2019

Inspector(s): M. Davis, S. Downey | Weather Conditions: Cloudy, AM rain 45° | Ground Conditions: Wet, muddy

Reason for Inspection: Annual EOR Inspection | Photos Taken: : ☐ NO ☒ YES

Additional Comments: EP-3 was not able to be observed on this site visit due to impassable, muddy roads.

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

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

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:

Stantec

DAM SAFETY INSPECTION

Facility: Grants Reclamation Project Structure: EP-3 Inspection Date: Nov 6, 2019

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

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:

4. Instrumentation

Observed: LDRS Sump Pumps: ☐ NO ☐ YES Staff Gauge: ☐ NO ☐ YES

Other/Notes:

5. General Observations and Recommendations

EP-3 was not able to be observed on this site visit due to impassable, muddy roads.

Could be a potential safety concern if there is no access to EP-3 during an event (flood, large stormwater event, dam breach)

Appendix B PHOTO LOG

Photo 1: LTP, downstream toe along north side slope (looking west)

Photo 2: LTP, precipitate build up along downstream toe of north side slope

Photo 3: LTP, ponded water at downstream toe of north side slope

Photo 4: LTP, downdrain outlet on north side slope

Photo 5: LTP, rilling along the side of the access road on north slope

Photo 6: LTP, French drain/sump system at downstream toe of north side slope

Photo 7: LTP, ponded water (from recent storm) at downstream toe of northwest corner of impoundment

Photo 8: LTP, water draining from downdrain outlet on west slope

Photo 9: LTP, absence of water draining from downdrain on west slope

Photo 10: LTP, ponded water on top surface near the western edge

Photo 11: LTP, water ponded on west crest in front of downdrains 5 and 6 with water pooled in front. Water is not entering the inlet.

Photo 12: LTP, ponded water along crest road of south side slope

Photo 13: LTP, animal burrow on crest of south slope

Photo 14: LTP, top surface of regraded area near south slope crest road

Photo 15: LTP, sinkhole near downdrain #11 on outer edge of south embankment crest

Photo 16: LTP, sinkhole near downdrain #11, shovel used to show approximate depth of hole

Photo 17: LTP, sinkhole extending to the east of downdrain #11

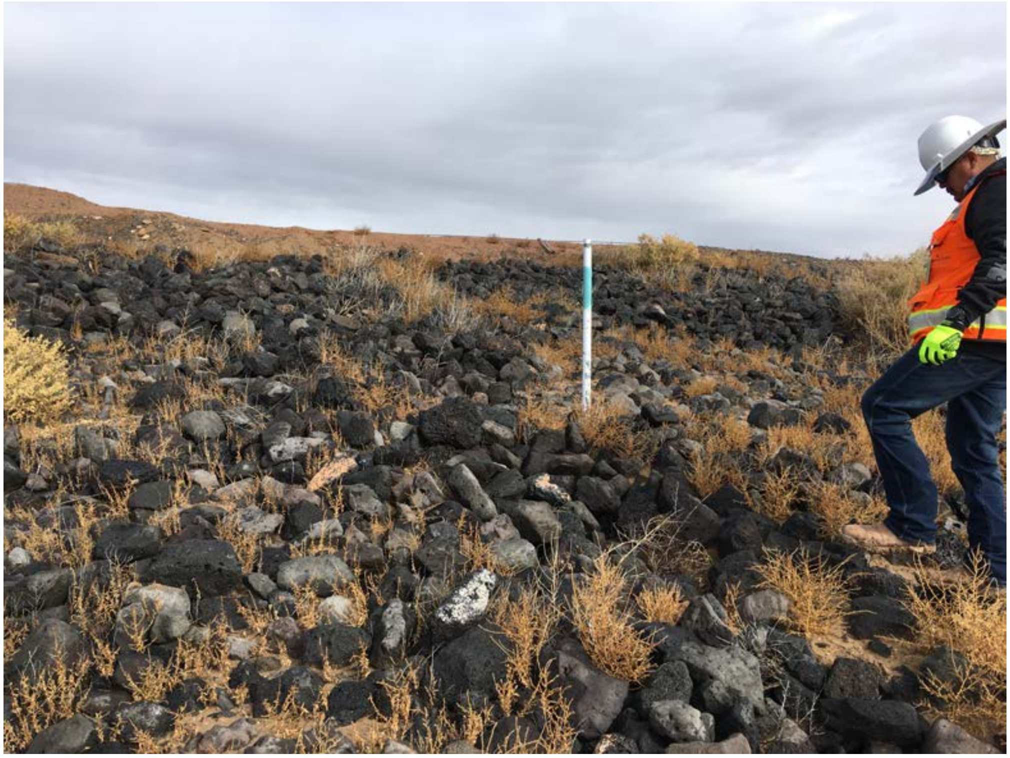

Photo 18: LTP, approximate location on downstream slope of south embankment where the sinkhole daylights downslope

Photo 19: LTP, rilling on south side of top surface, adjacent to area regraded in 2019

Photo 20: LTP, new pipes near zeolite system on east end. Partial repair of berm corner completed

Photo 21: LTP, top surface rilling on east/southeast area

Photo 22: West collection pond, drained and some sediment removed from west end of pond

Photo 23: EP-2, ponded water along ridge at the toe of the west side slope of EP-2 and crest of east side slope of the east collection pond

Photo 24: EP-2, ponded water along the access road and crest of the north embankment

Photo 25: EP-2, downslope and crest road of the south embankment

Photo 26: EP-1, erosion mat on the north embankment downslope

Photo 27: EP-1, rilling present underneath erosion mat on the north embankment downslope

Photo 28: EP-1, erosion through crest safety berm and rilling on the east embankment downslope

Photo 29: EP-1, rilling on the east embankment downslope

Photo 30: STP/EP-1, drainage feature on the southwest corner

Photo 31: STP/EP-1, toe of slope along the south embankment

Photo 32: EP-1, location where WCP sediment being deposited to EP-1 along south embankment

Photo 33: EP-1, location where WCP sediment being deposited to EP-1 along south embankment

Photo 34: EP-1, general conditions of northeast corner, looking west

Photo 35: EP-1, rilling present on downslope of west embankment. Looking towards EP-2

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	10/3/2000	10/10/2001	11/4/2002
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	6656.84	6656.79	6656.72
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	6657.20	6657.14	6657.01
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	6657.65	6657.61	6657.47
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	6659.22	6659.19	6659.03
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	6665.68	6665.67	6665.53
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	6666.10	6666.08	6666.01
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	6666.61	6666.56	6666.49
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	6666.36	6666.38	6666.25
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	6666.30	6666.41	6666.30
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	6663.97	6664.07	6663.95
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	6656.65	6656.59	6656.50
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	6658.63	6658.53	6658.44
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	6659.29	6659.21	6659.09
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	6662.53	6662.49	6662.35
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	6665.38	6665.33	6665.22
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	6668.80	6668.75	6668.60
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	6671.87	6671.86	6671.77
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	6668.60	6668.53	6668.49
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	6670.09	6668.94	6668.81
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	6670.08	6670.11	6670.02
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	6666.01	6666.11	6666.00
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	6657.00	6656.93	6656.83
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	6660.34	6660.24	6660.17
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	6665.00	6664.94	6664.84
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	6667.46	6666.85	6666.68
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	6671.44	6671.34	6671.25
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	6671.02	6670.96	6670.82
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	6670.72	6670.67	6670.58
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	6671.96	6671.92	6671.89
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	6671.47	6671.48	6671.43
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	6672.58	6672.58	6672.49
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	6666.61	6666.70	6666.60
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	6658.44	6658.34	6658.29
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	6657.59	6657.52	6657.44
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	6659.30	6659.24	6659.11
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	6661.26	6661.22	6661.07
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	6665.11	6665.02	6664.94
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	6669.05	6669.02	6668.88
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	6668.16	6668.12	6668.06
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	6669.20	6669.20	6671.43
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	6669.03	6669.02	6668.95
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	6665.63	6665.72	6665.69
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	6657.06	6656.99	6656.92
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	6658.00	6657.99	6657.88
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	6656.18	6656.14	6655.96
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	6660.96	6660.89	6660.80
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	6664.98	6664.95	6664.85
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	6666.72	6666.70	6666.62
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	6666.14	6666.12	6666.05
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	6665.43	6665.45	6665.14
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	6665.79	6665.90	6665.80
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	6662.37	6662.27	6662.16

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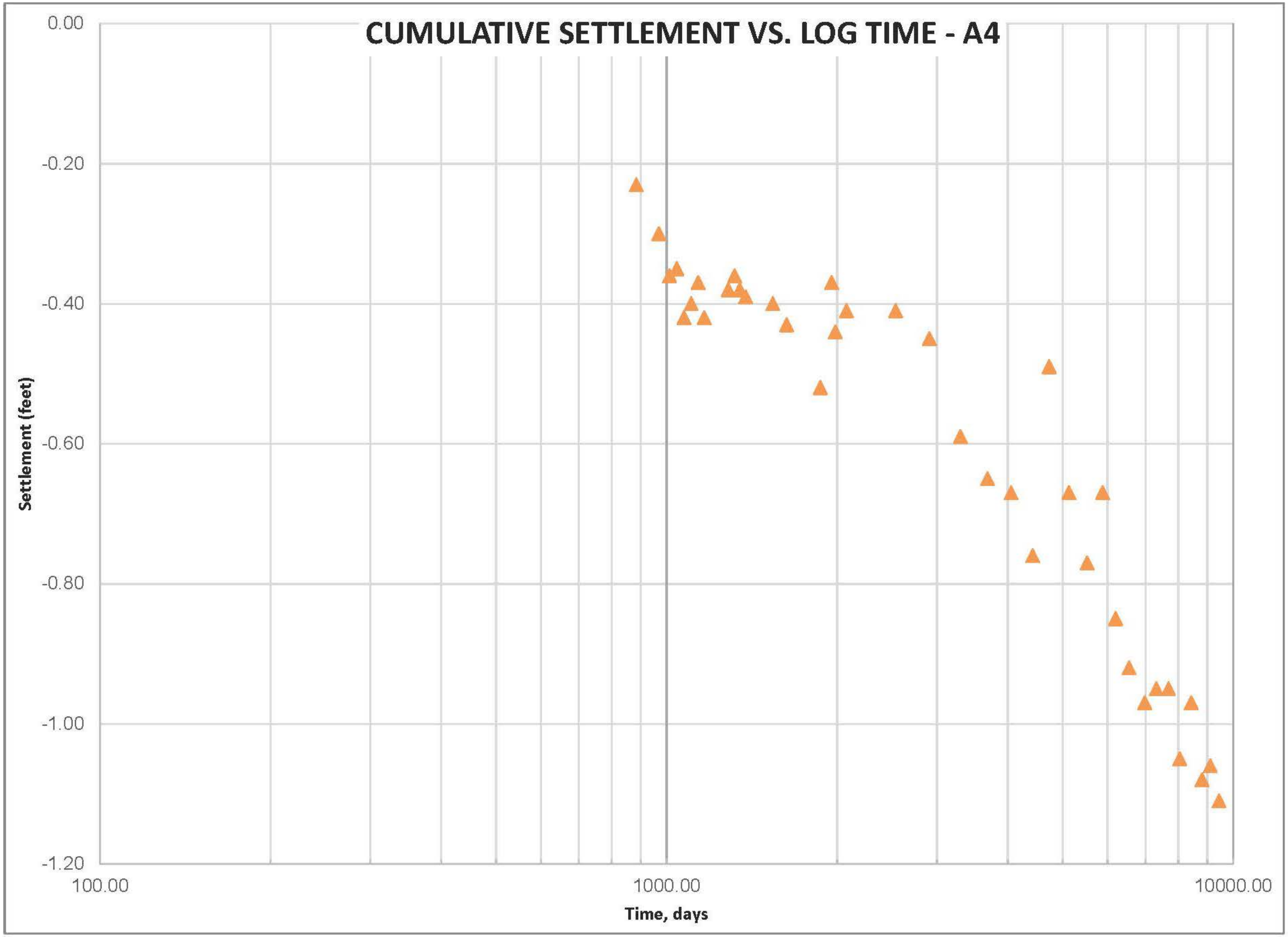
GRP EOR Annual Inspection
Settlement Monument Survey Data

Stantec

Date	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	8/22/2019
A2	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	6656.27
A3	6657.07	6657.08	6657.03	6655.16	6655.10										6656.71	6656.68	6656.67
A4	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	6656.95
A5	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	6658.85
A6	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	6665.31
A7	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	6665.63
A8	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	6666.08
A9	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	6665.90
A10	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	6665.94
A11	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	6663.67
B1	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	6656.08
B2	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	6657.81
B3	6659.12	6659.12	6659.07	6658.98													#N/A
B4	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	6661.91
B5	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	6664.69
B6	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	6668.04
B7	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	6671.19
B8	6668.45	6668.47	6668.56	6668.44	6668.44										6668.00	6667.99	6667.95
B9	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	6668.28
B10	6670.02	6670.03	6670.04														#N/A
B11	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	6661.39
C1	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	6656.38
C2	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	6659.65
C3	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	6664.17
C4	6666.72	6666.85	6666.69	6666.76	6666.72										6664.33	6664.30	6664.28
C5	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	6670.74
C6	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	6670.34
C7	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	6670.00
C8	6671.86	6671.88	6671.95	6671.80	6671.87												#N/A
C9	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	6670.90
C10	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	6671.93
C11	6666.61	6666.63	6666.65	6666.60	6666.63												#N/A
D1	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	6657.98
D2	6657.48	6657.43	6657.50	6657.43	6657.47										6655.12	6655.12	6655.12
D3	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	6658.59
D4	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	6660.58
D5	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	6664.40
D6	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	6668.42
D7	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	6667.61
D8																	#N/A
D9	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	6668.55
D10	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	6668.40
D11	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	6665.27
E2	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	6656.56
E3	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	6657.70
E4	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	6655.59
E5	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	6660.47
E6	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	6664.66
E7	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	6664.23
E8	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	6665.76
E9	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	6665.13
E10	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	6665.49
X-1	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	6661.61



Grants Reclamation Project

GRP EOR Annual Inspection
Cumulative Settlement Plot for A4

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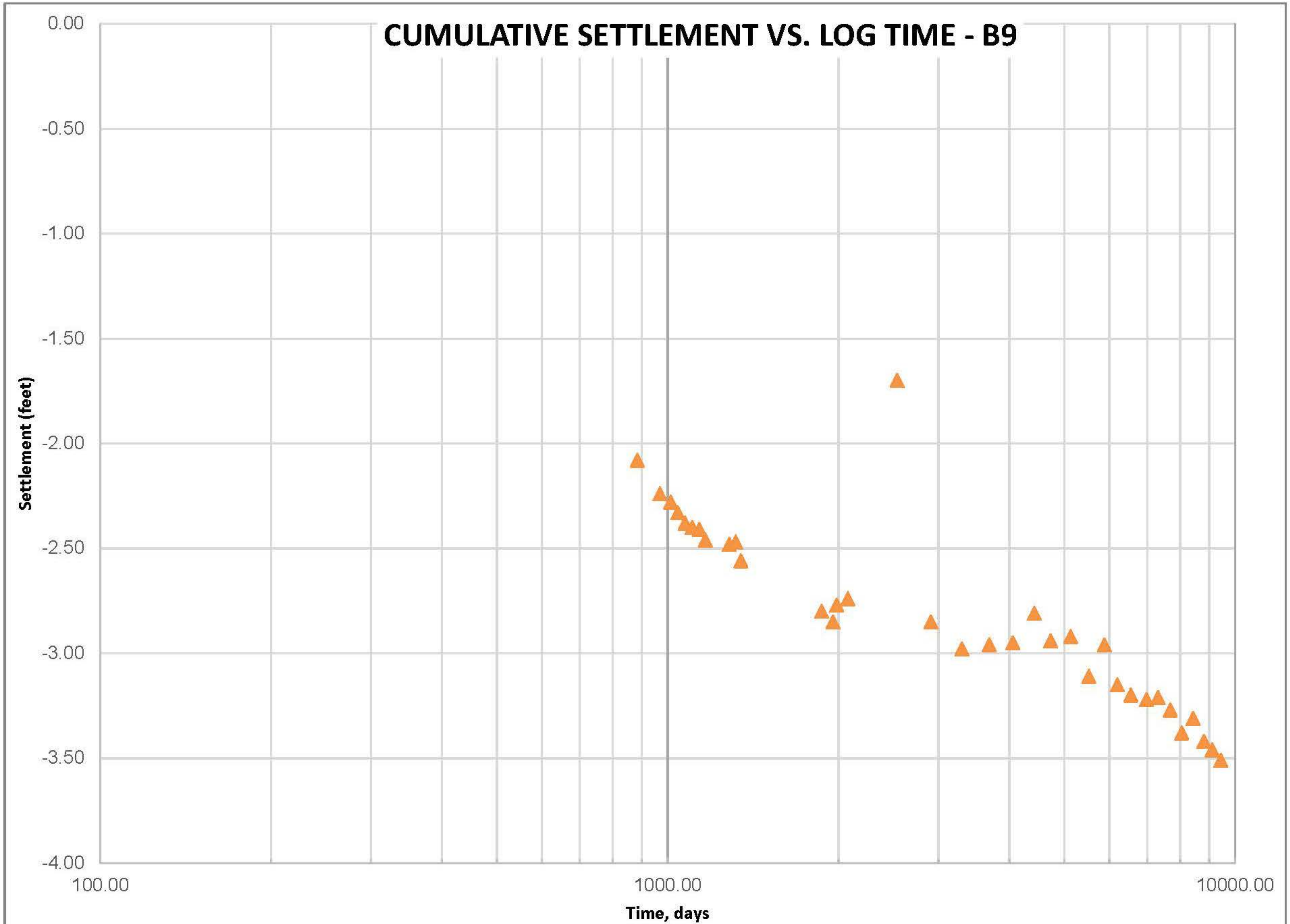
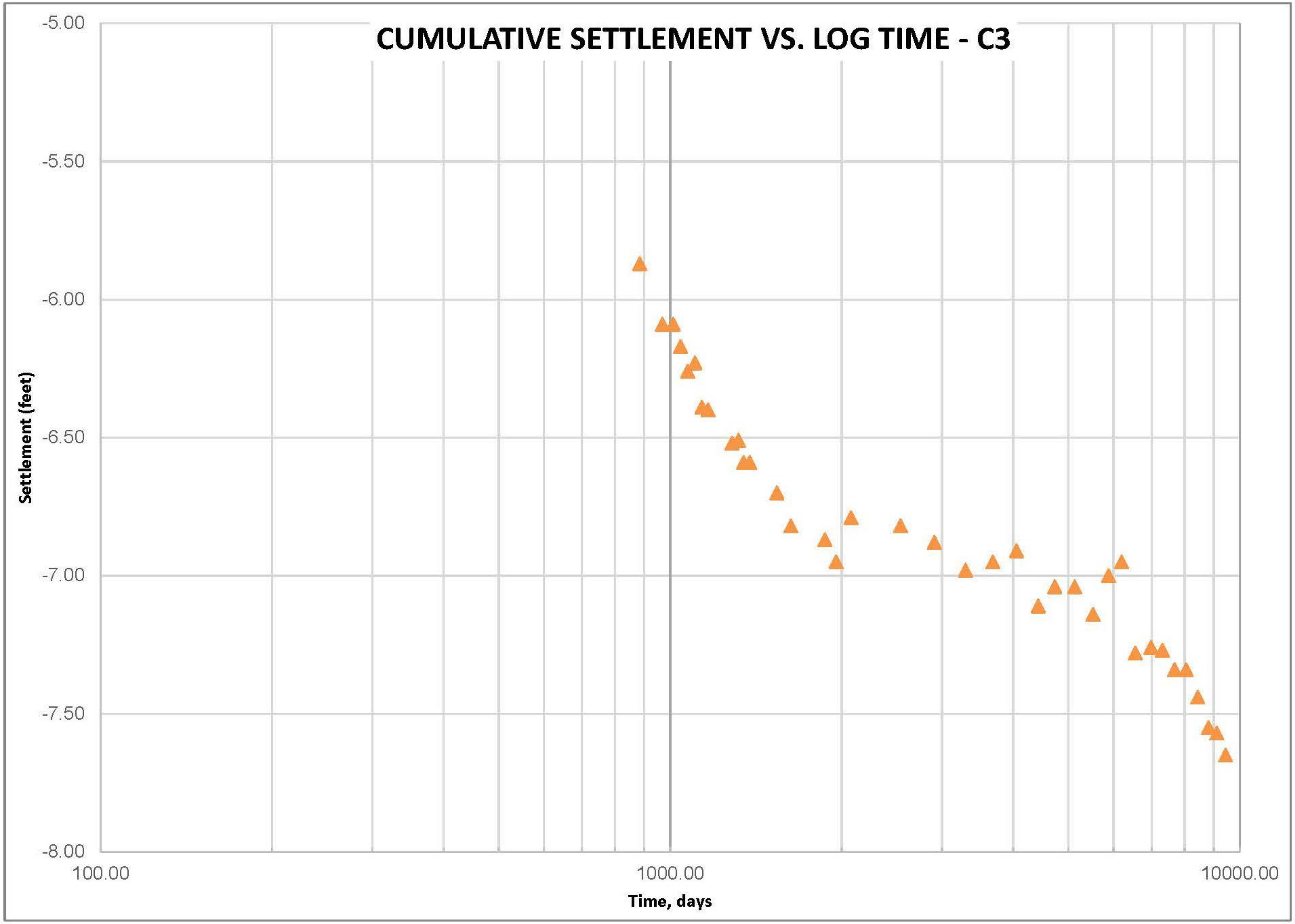
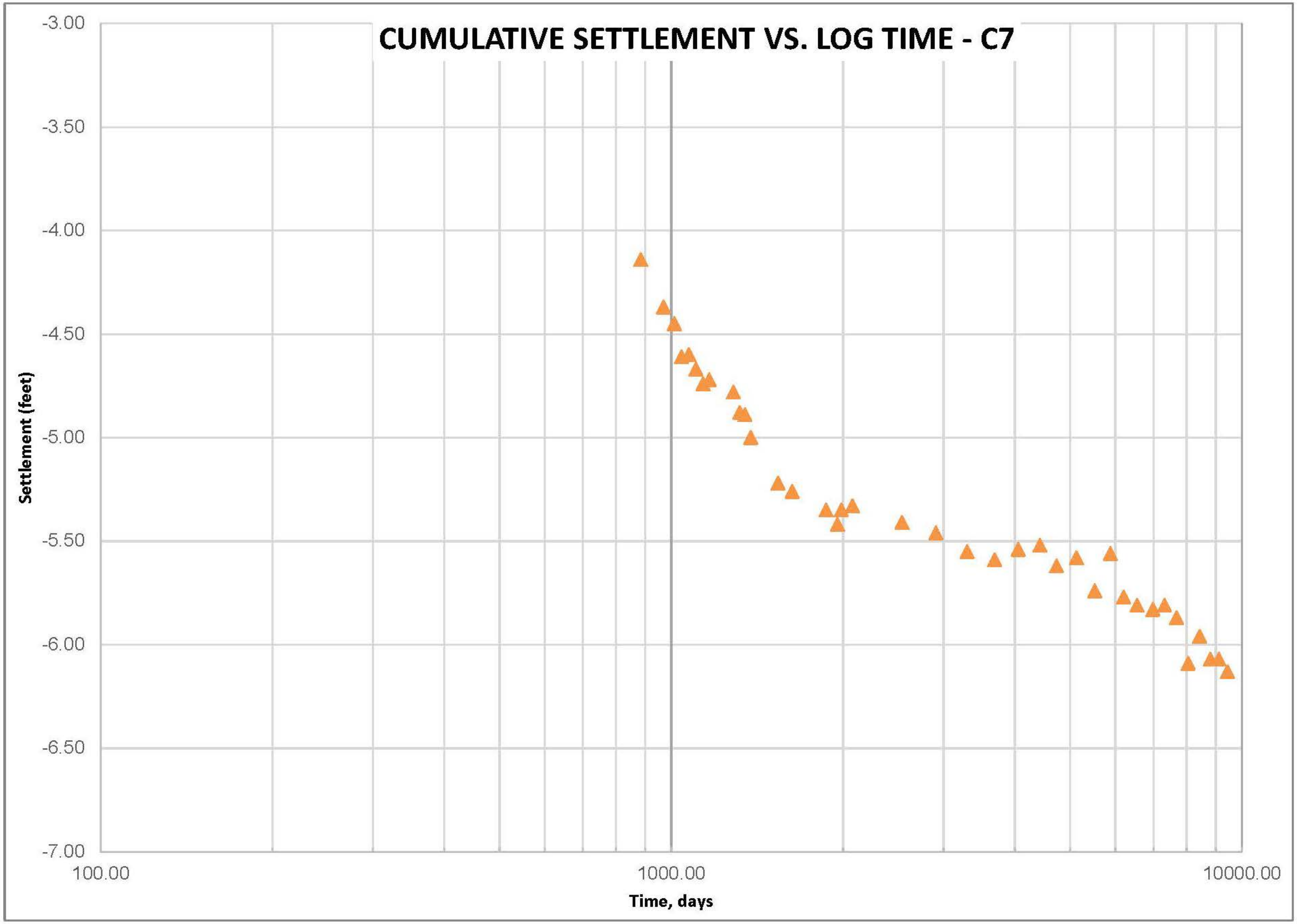
JANUARY 2020	C-3


CUMULATIVE SETTLEMENT VS. LOG TIME - B9
Settlement (feet)
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
100.00
1000.00
10000.00
Time, days



GRP EOR Annual Inspection
Cumulative Settlement Plot for C3

JANUARY 2020	C-5



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GRP EOR Annual Inspection
Cumulative Settlement Plot for C7

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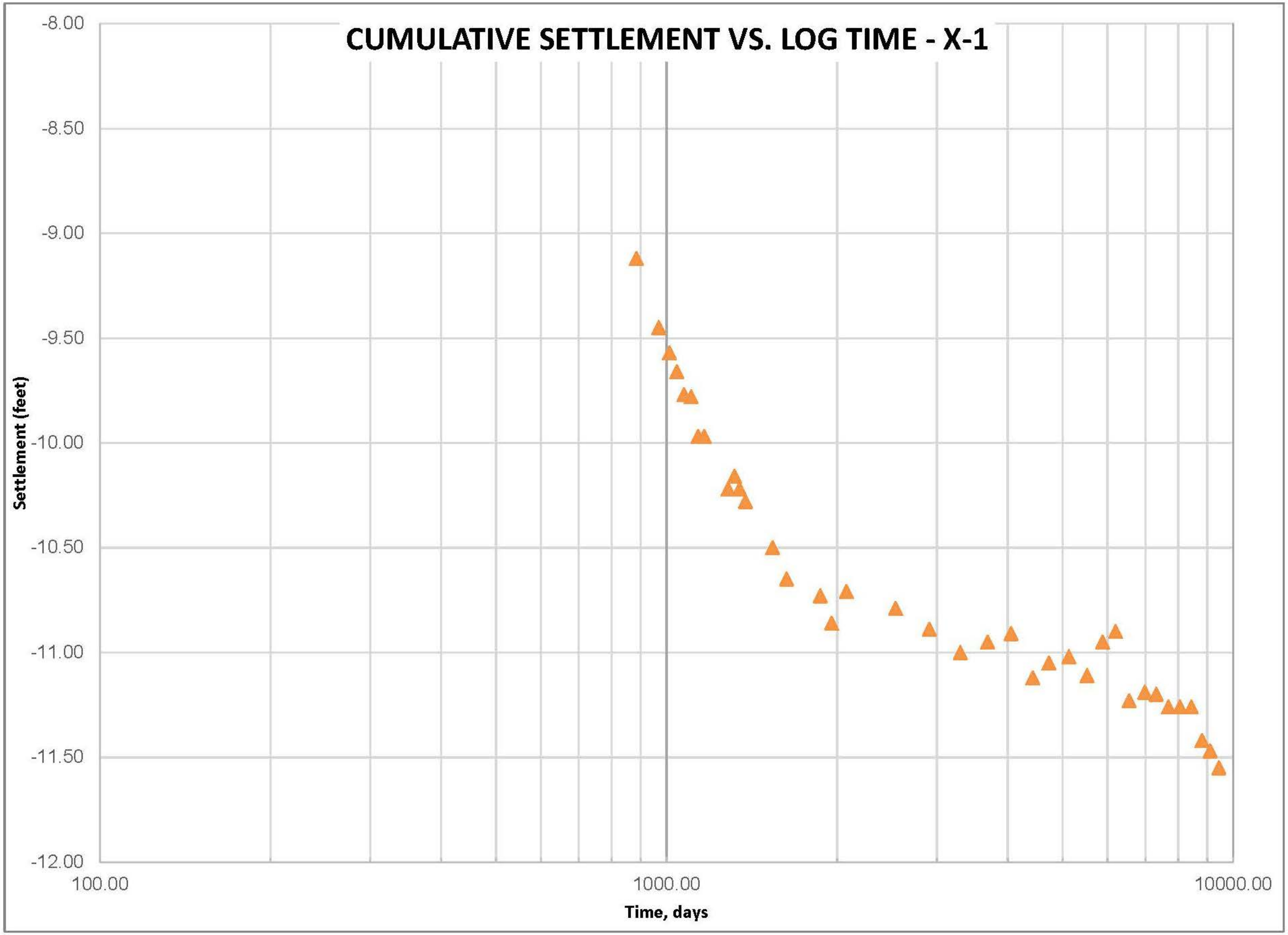
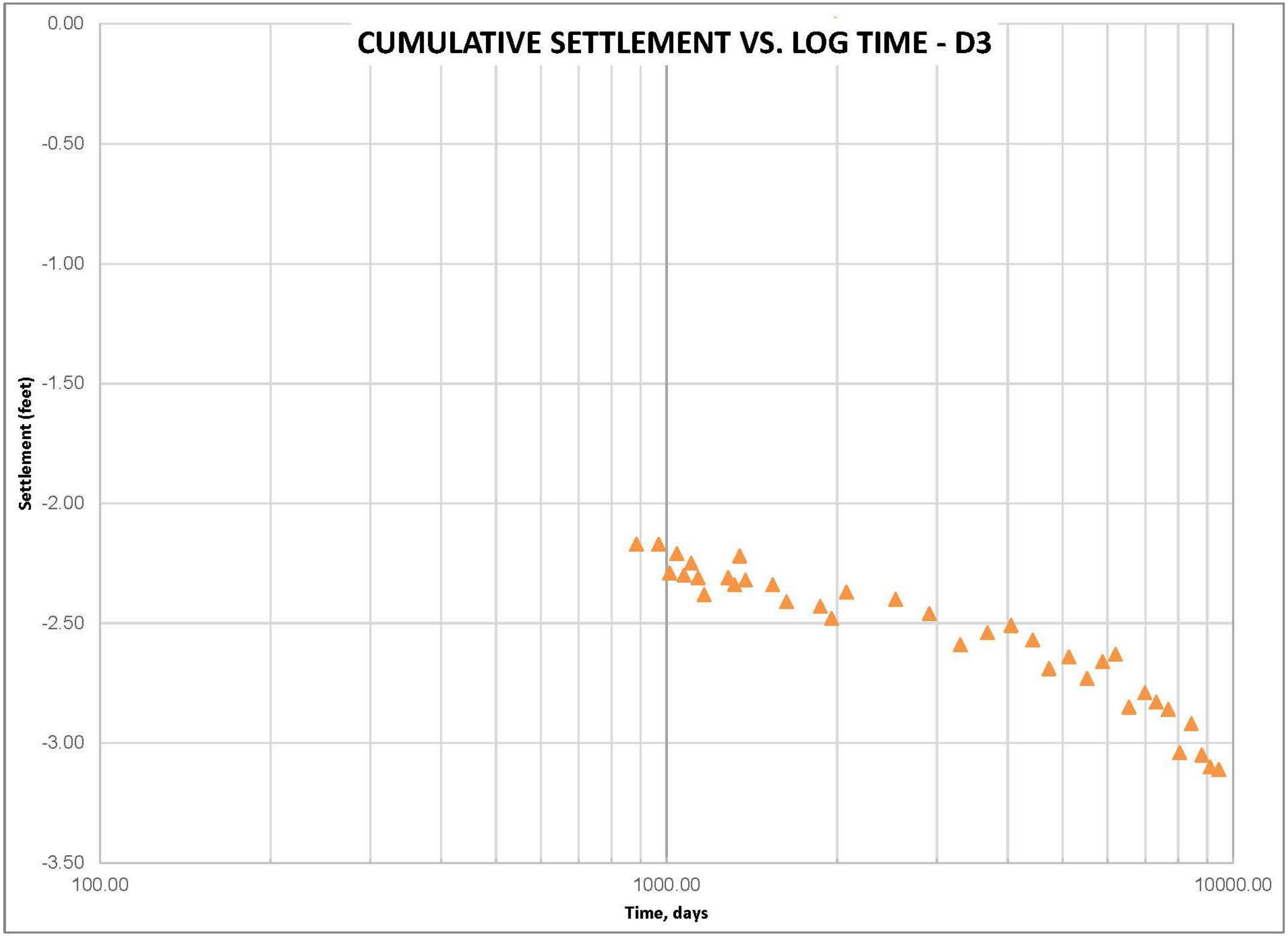
JANUARY 2020	C-6



GRP EOR Annual Inspection
Cumulative Settlement Plot for X1



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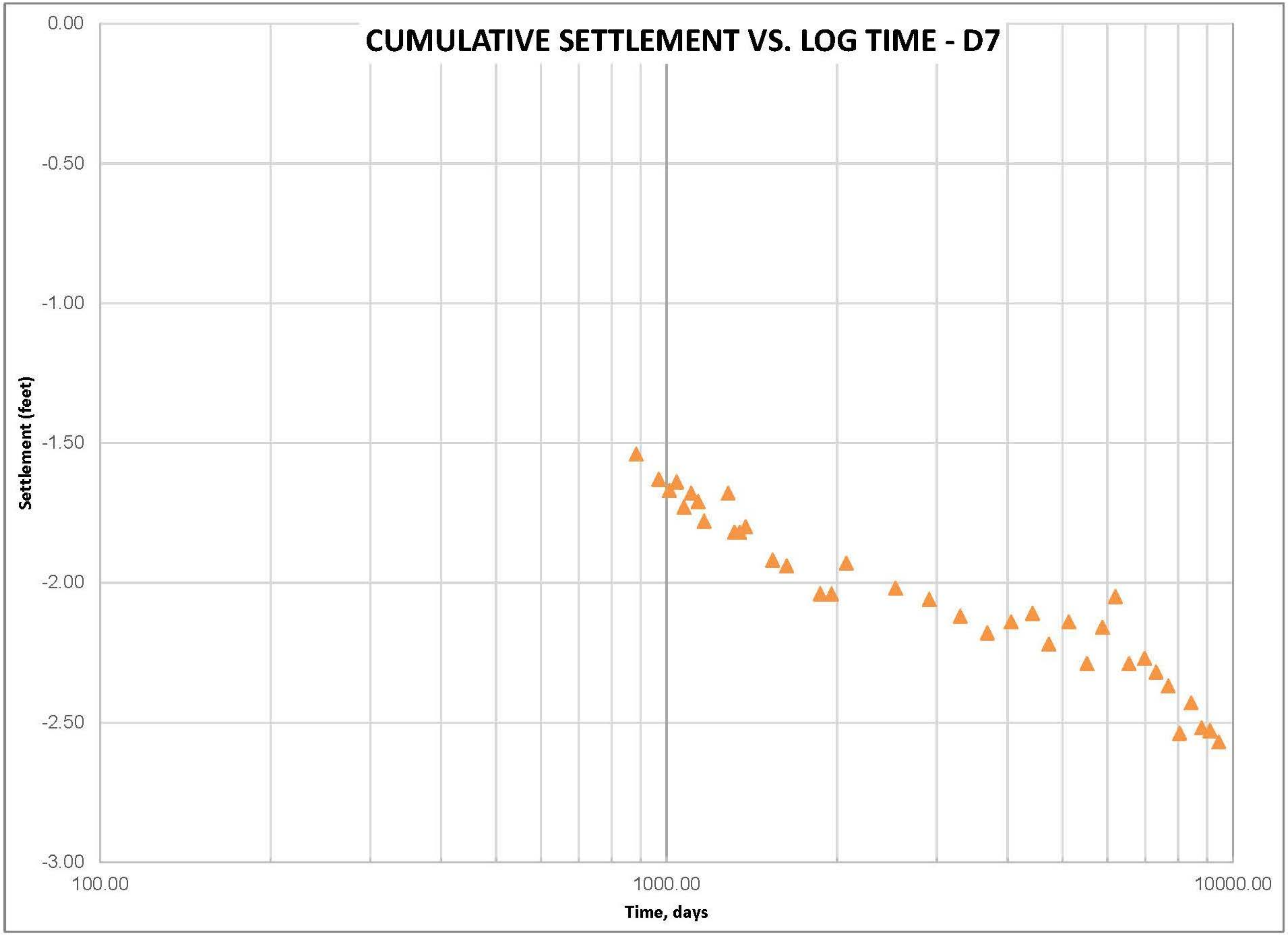
GRP EOR Annual Inspection
Cumulative Settlement Plot for D3

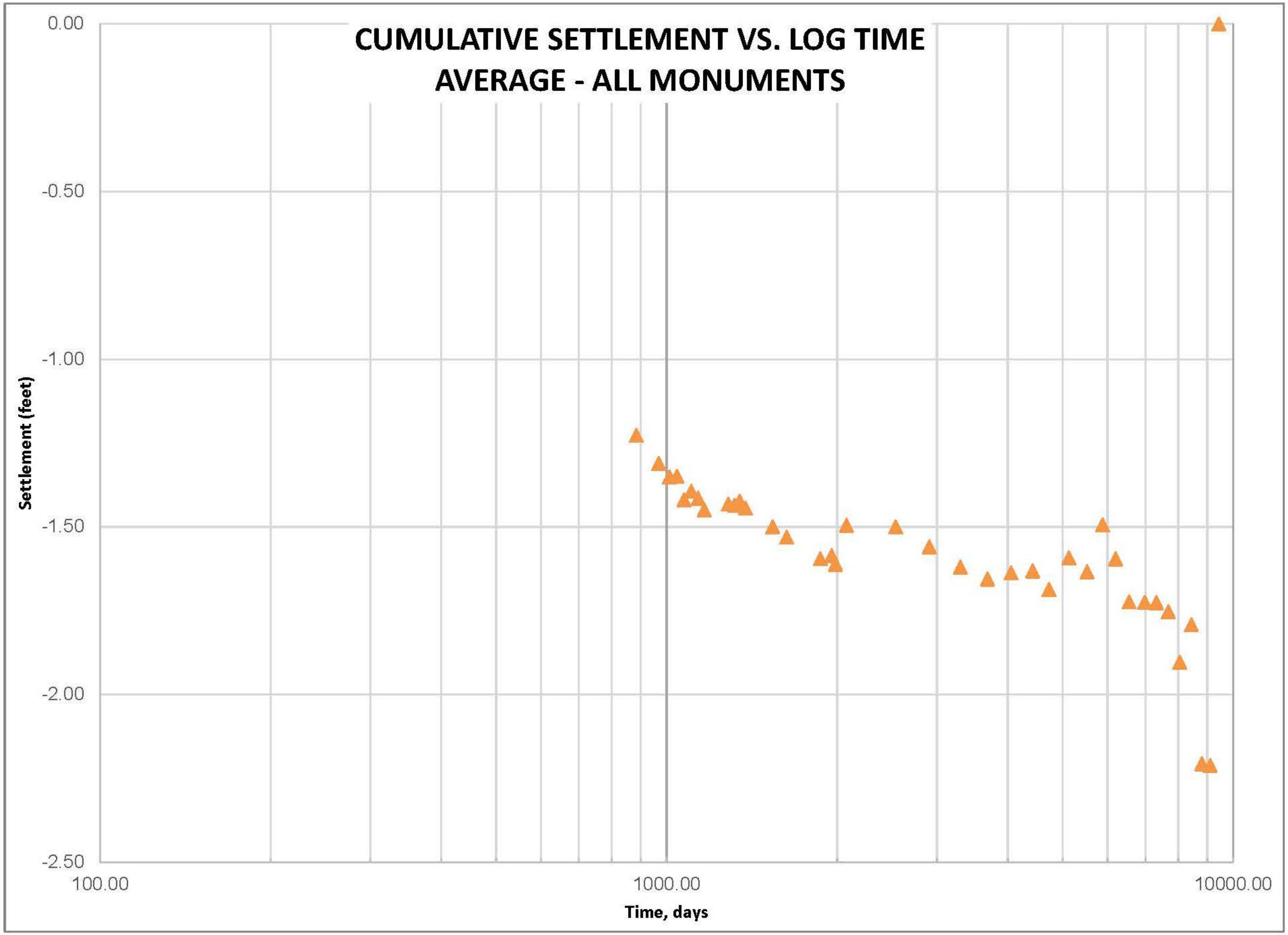
Stantec

JANUARY 2020	C-8



GRP EOR Annual Inspection
Cumulative Settlement Plot for D7

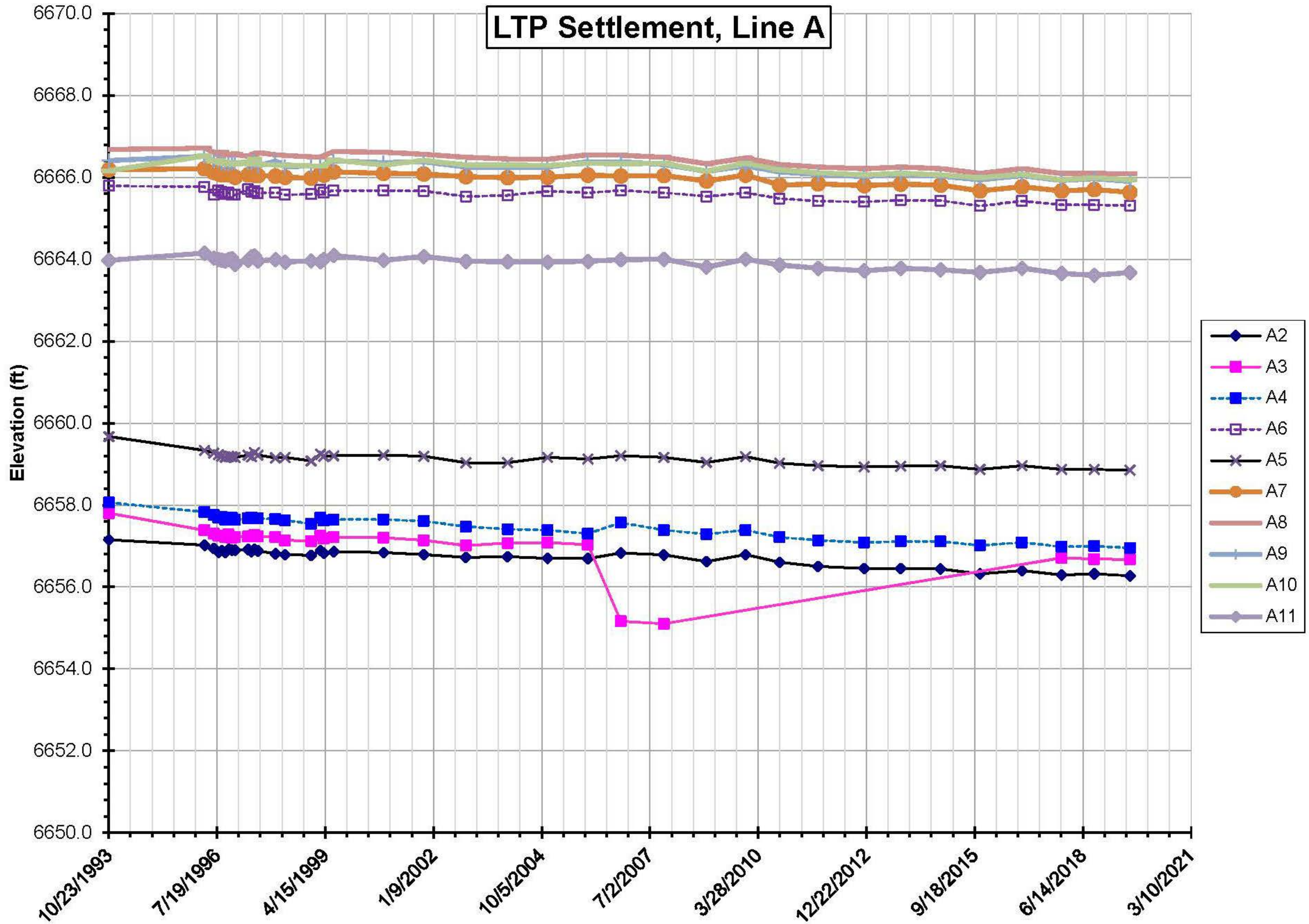
JANUARY 2020	C-9



GRP EOR Annual Inspection
Cumulative Settlement Plot for Average of all Monuments

Stantec

JANUARY 2020	C-10

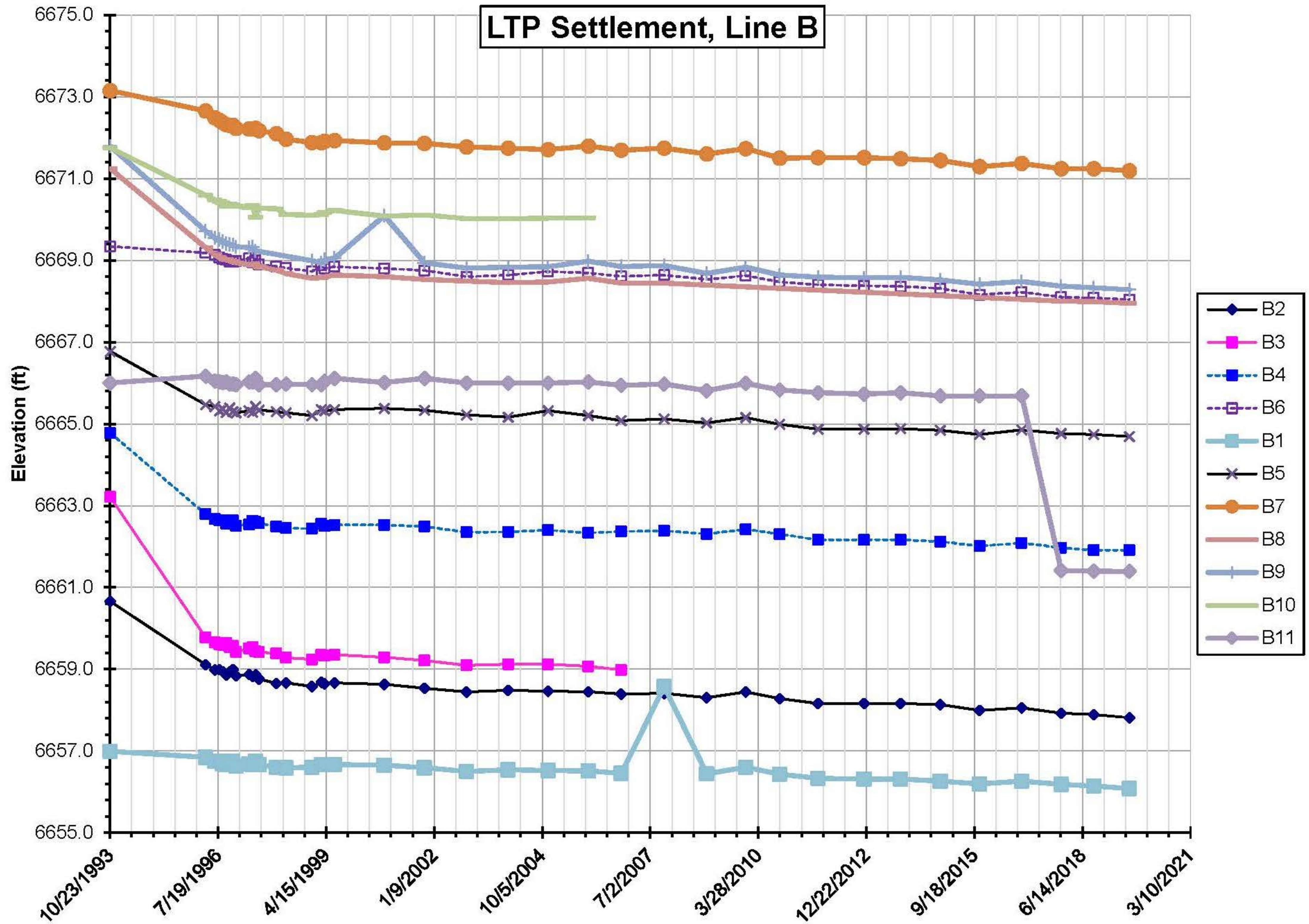


HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line A Monuments

Stantec

JANUARY 2020	C-11

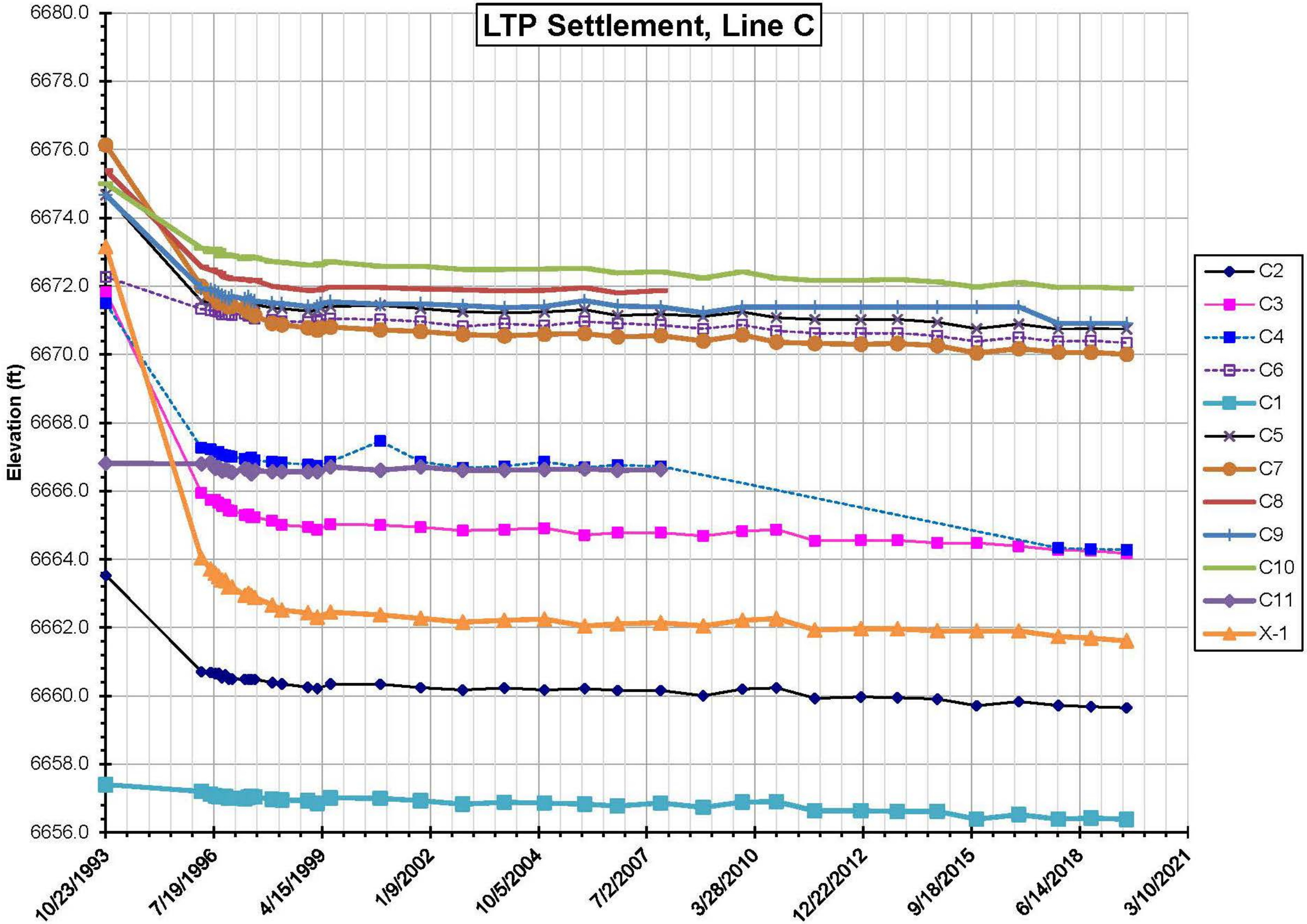


HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line B Monuments

Stantec

JANUARY 2020	C-12

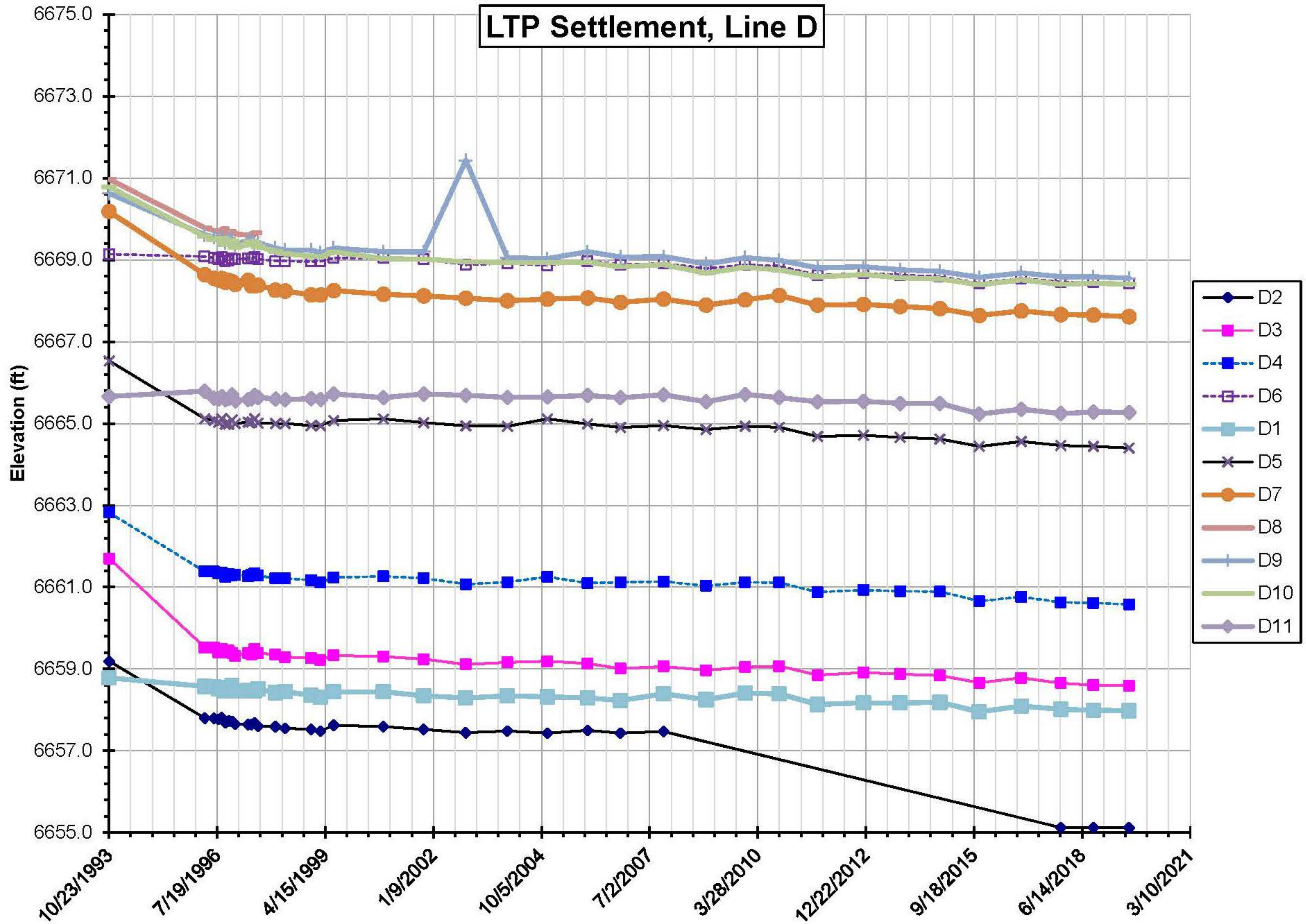


Doing it right... HOMESTAKE ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line C Monuments

Stantec

JANUARY 2020	C-13

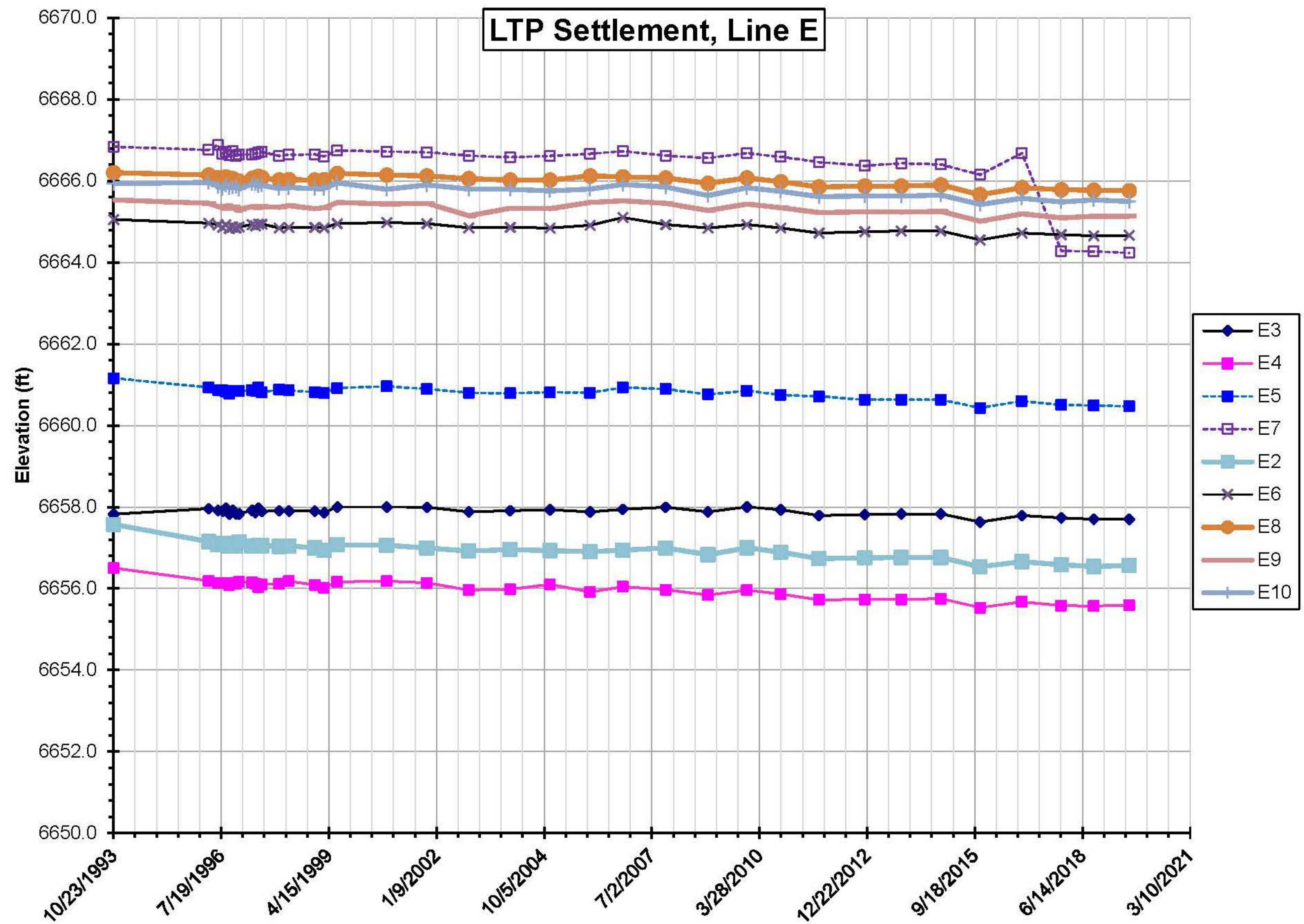


HOMESTAKE Doing it right... ...Right to the end. Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line D Monuments

Stantec

JANUARY 2020	C-14



HOMESTAKE
Doing it right... ...Right to the end.
Grants Reclamation Project

GRP EOR Annual Inspection
Settlement over Time, Line E Monuments

Stantec

JANUARY 2020	C-15

Appendix D PIEZOMETER DATA AND PLOTS

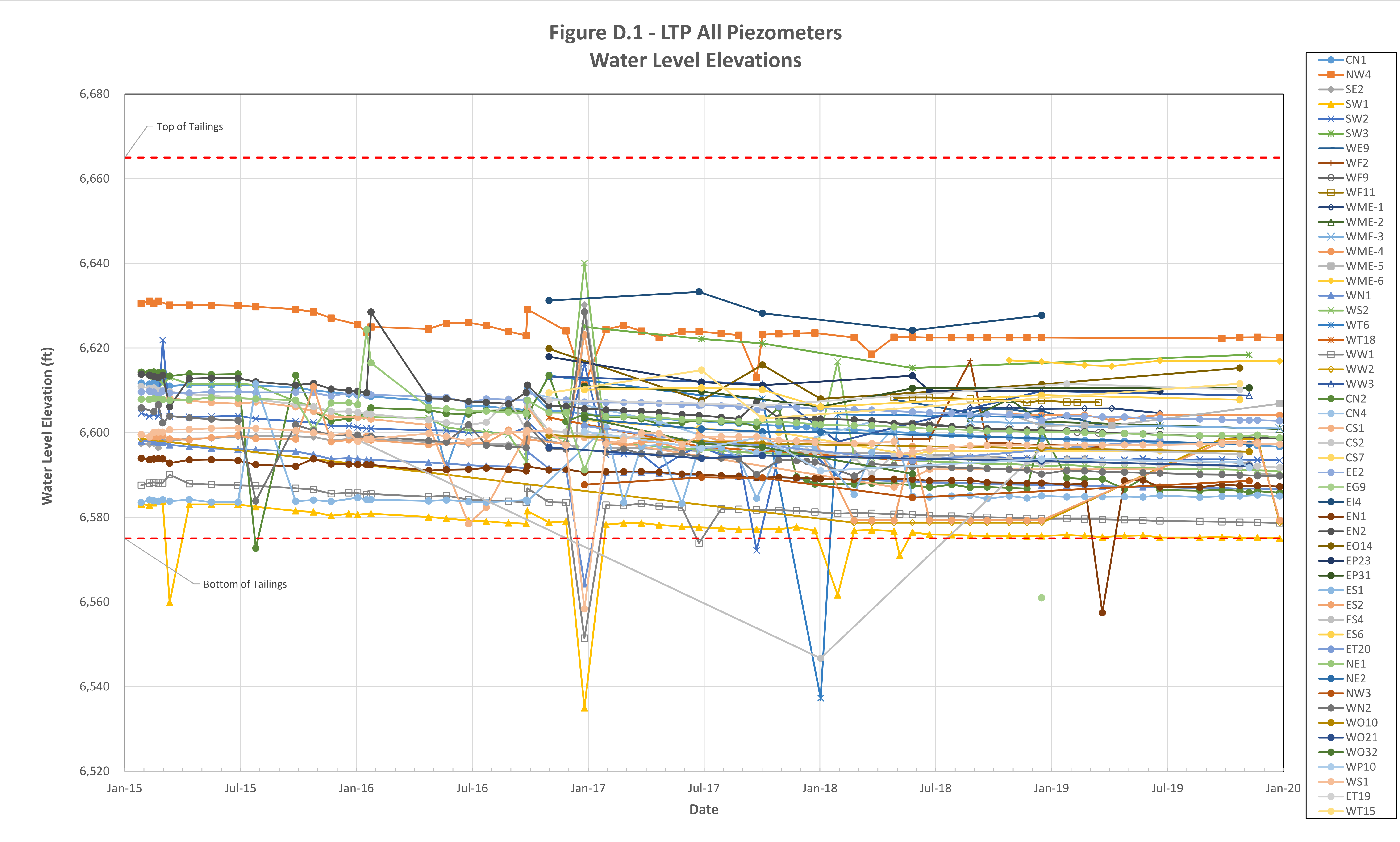


Figure D.1 - LTP All Piezometers
Water Level Elevations
Top of Tailings
Bottom of Tailings
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
CN1
NW4
SE2
SW1
SW2
SW3
WE9
WF2
WF9
WF11
WME-1
WME-2
WME-3
WME-4
WME-5
WME-6
WN1
WS2
WT6
WT18
WW1
WW2
WW3
CN2
CN4
CS1
CS2
CS7
EE2
EG9
EI4
EN1
EN2
EO14
EP23
EP31
ES1
ES2
ES4
ES6
ET20
NE1
NE2
NW3
WN2
WO10
WO21
WO32
WP10
WS1
ET19
WT15

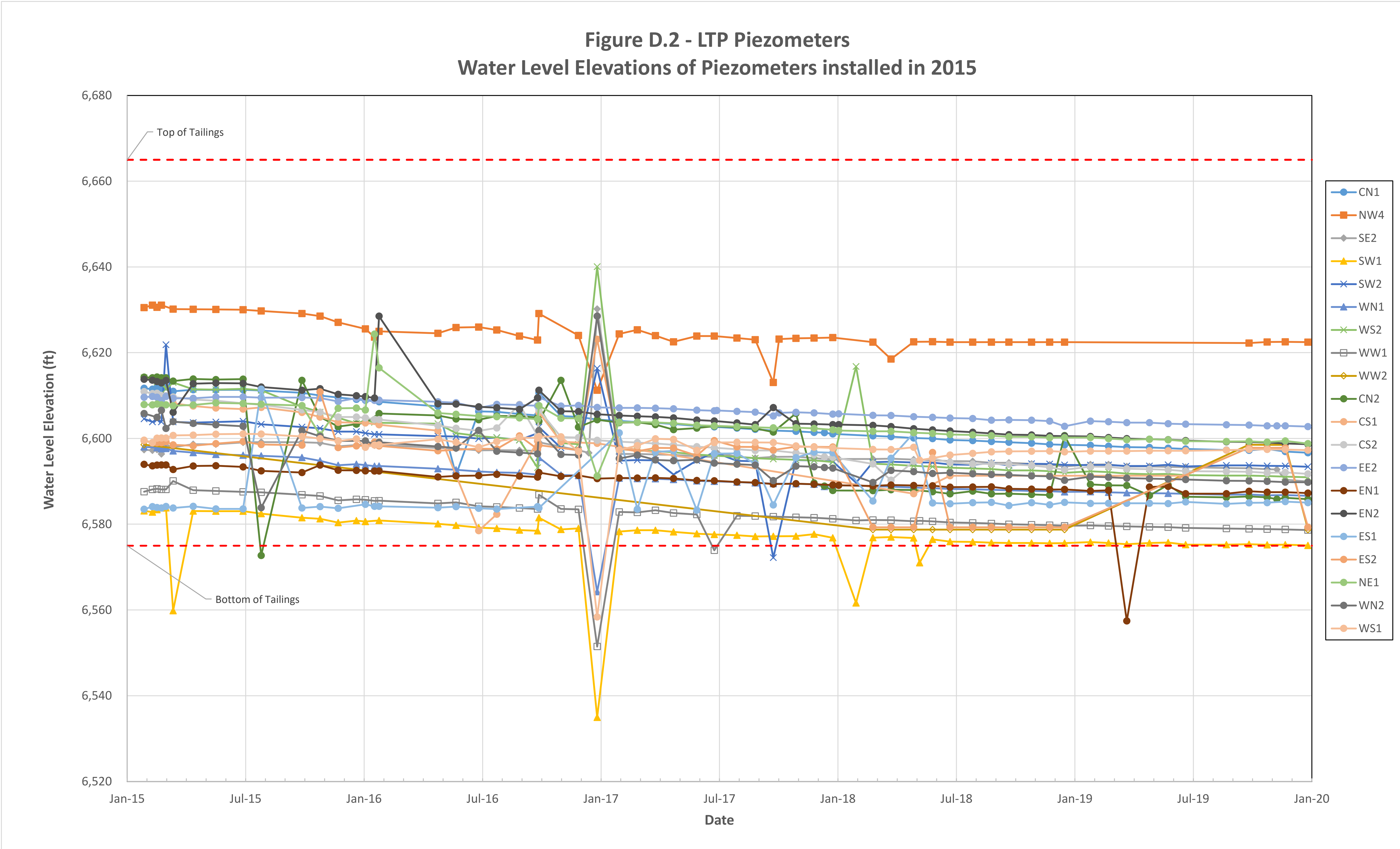


Figure D.2 - LTP Piezometers
Water Level Elevations of Piezometers installed in 2015
Top of Tailings
Bottom of Tailings
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
CN1
NW4
SE2
SW1
SW2
WN1
WS2
WW1
WW2
CN2
CS1
CS2
EE2
EN1
EN2
ES1
ES2
NE1
WN2
WS1

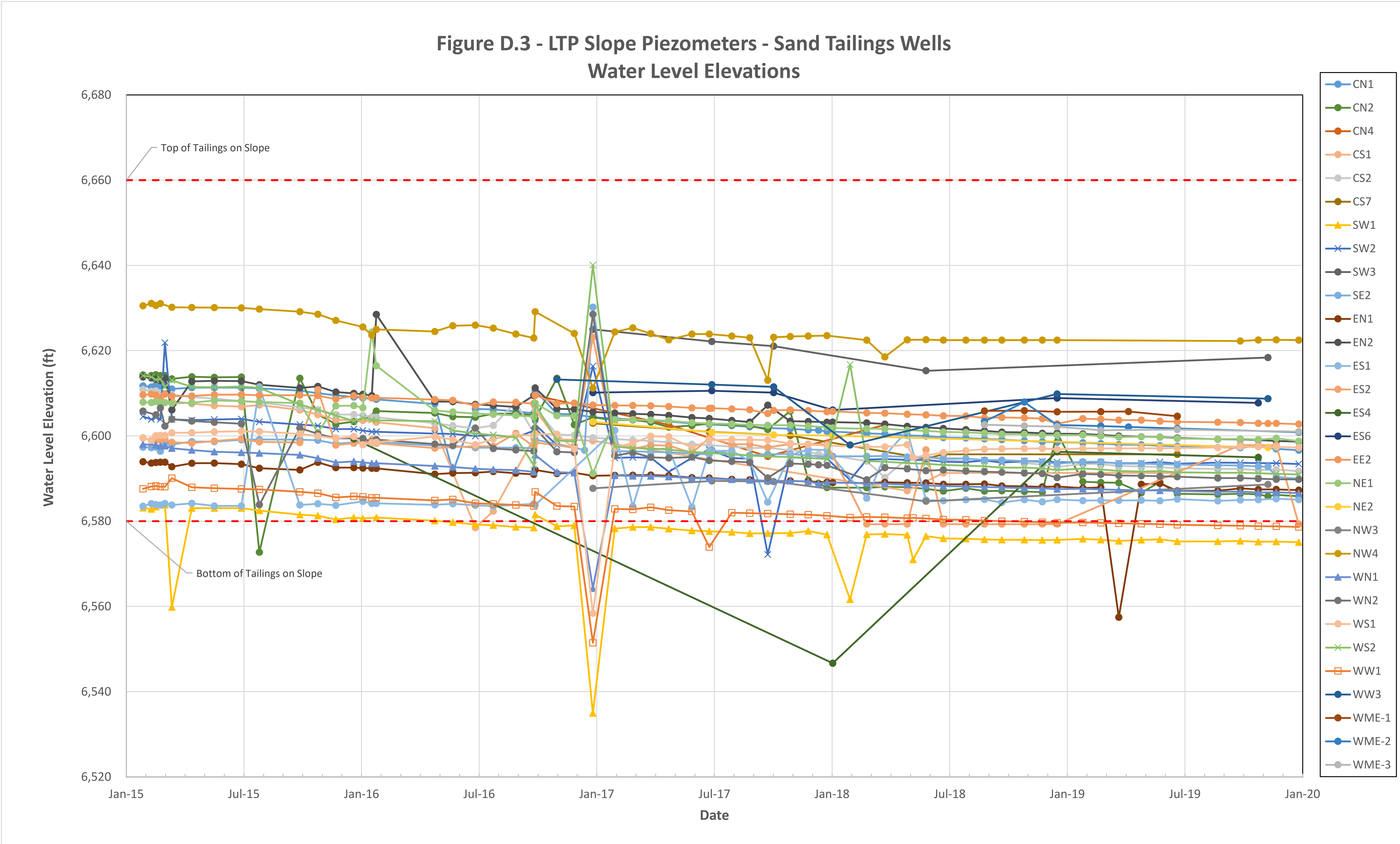


Figure D.3 - LTP Slope Piezometers - Sand Tailings Wells
Water Level Elevations
Top of Tailings on Slope
Bottom of Tailings on Slope
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
CN1
CN2
CN4
CS1
CS2
CS7
SW1
SW2
SW3
SE2
EN1
EN2
ES1
ES2
ES4
ES6
EE2
NE1
NE2
NW3
NW4
WN1
WN2
WS1
WS2
WW1
WW3
WME-1
WME-2
WME-3

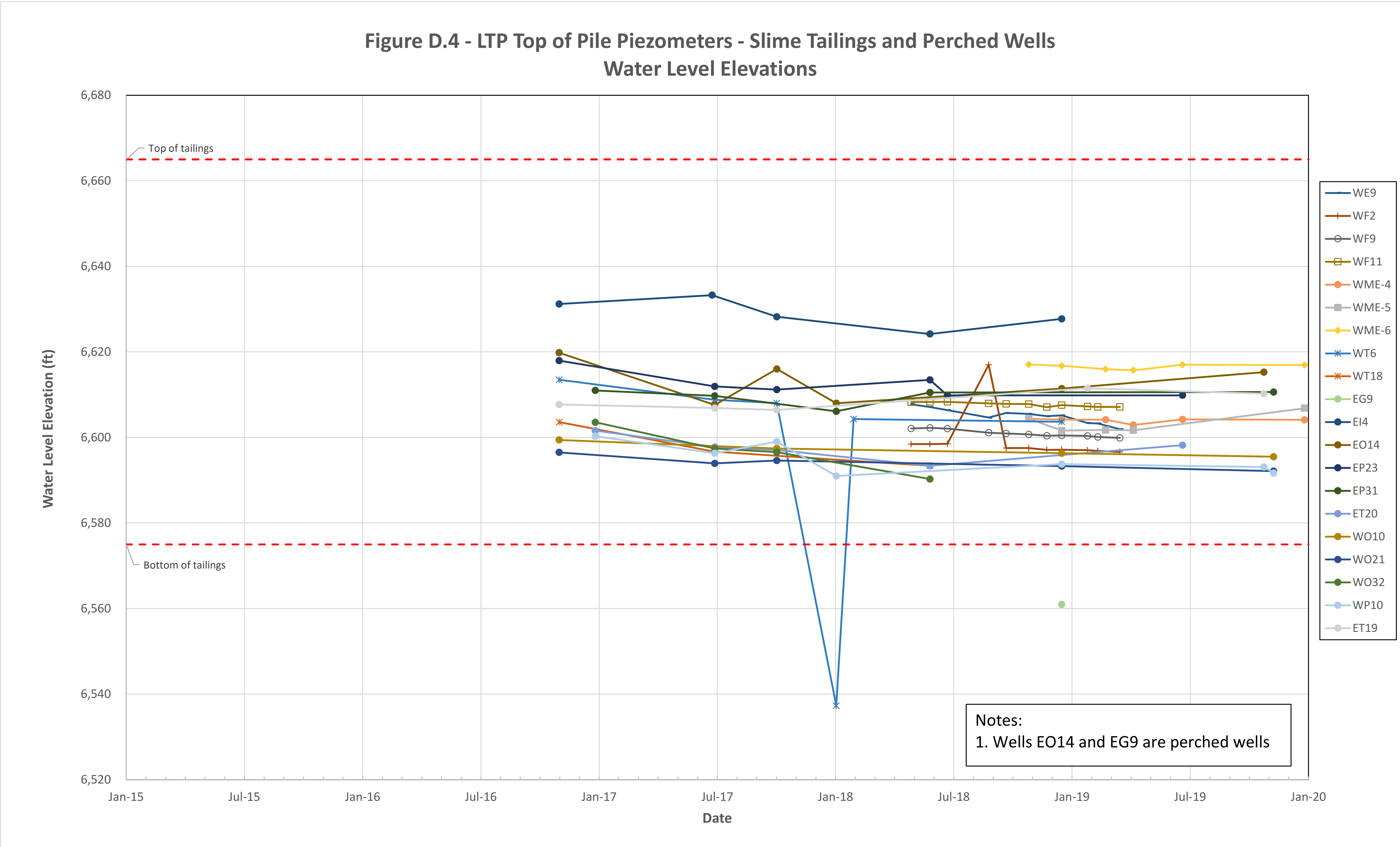


Figure D.4 - LTP Top of Pile Piezometers - Slime Tailings and Perched Wells
Water Level Elevations
Top of tailings
Bottom of tailings
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
WE9
WF2
WF9
WF11
WME-4
WME-5
WME-6
WT6
WT18
EG9
EI4
EO14
EP23
EP31
ET20
WO10
WO21
WO32
WP10
ET19
Notes:
1. Wells EO14 and EG9 are perched wells

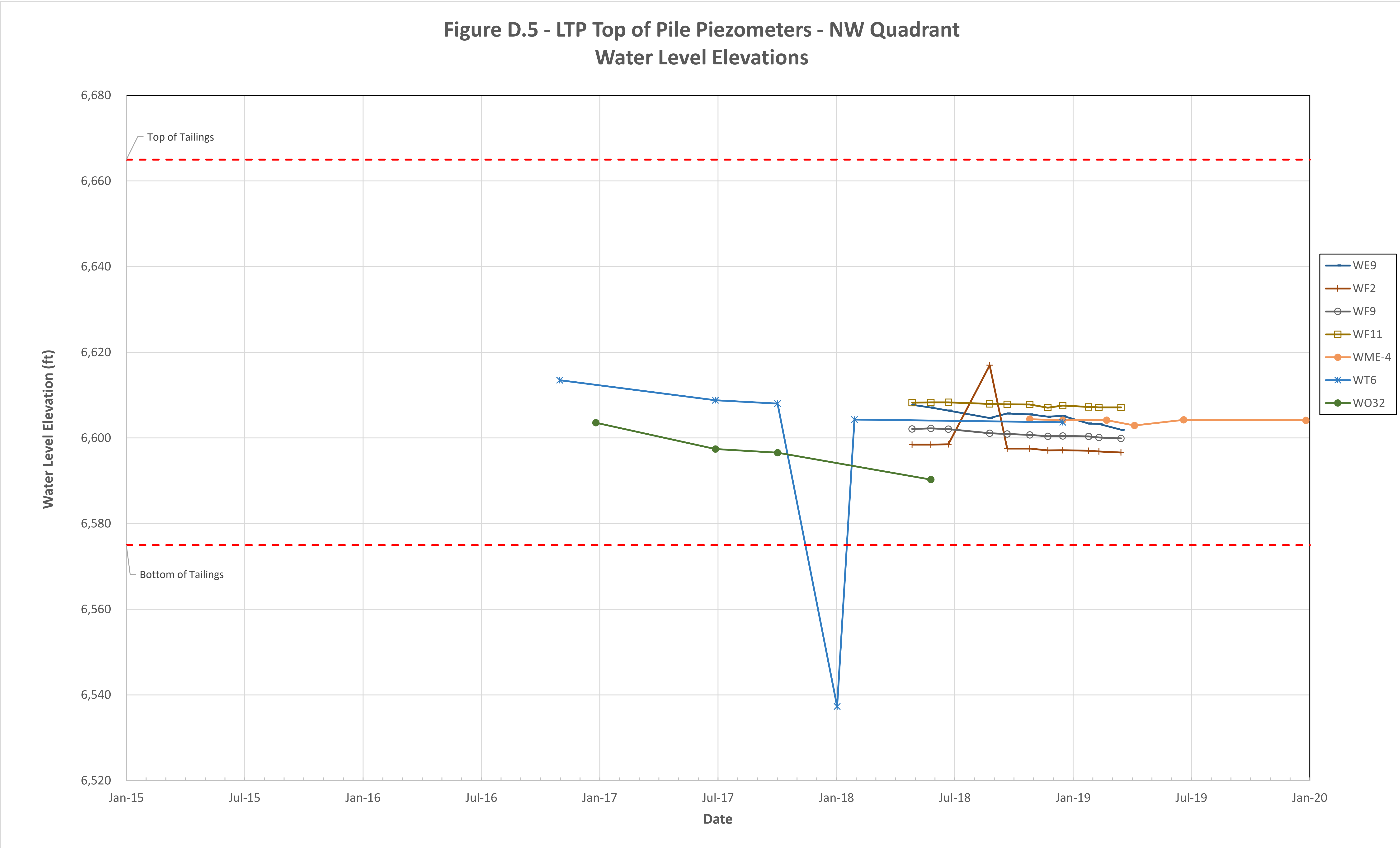


Figure D.5 - LTP Top of Pile Piezometers - NW Quadrant
Water Level Elevations
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Top of Tailings
Bottom of Tailings
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
WE9
WF2
WF9
WF11
WME-4
WT6
WO32

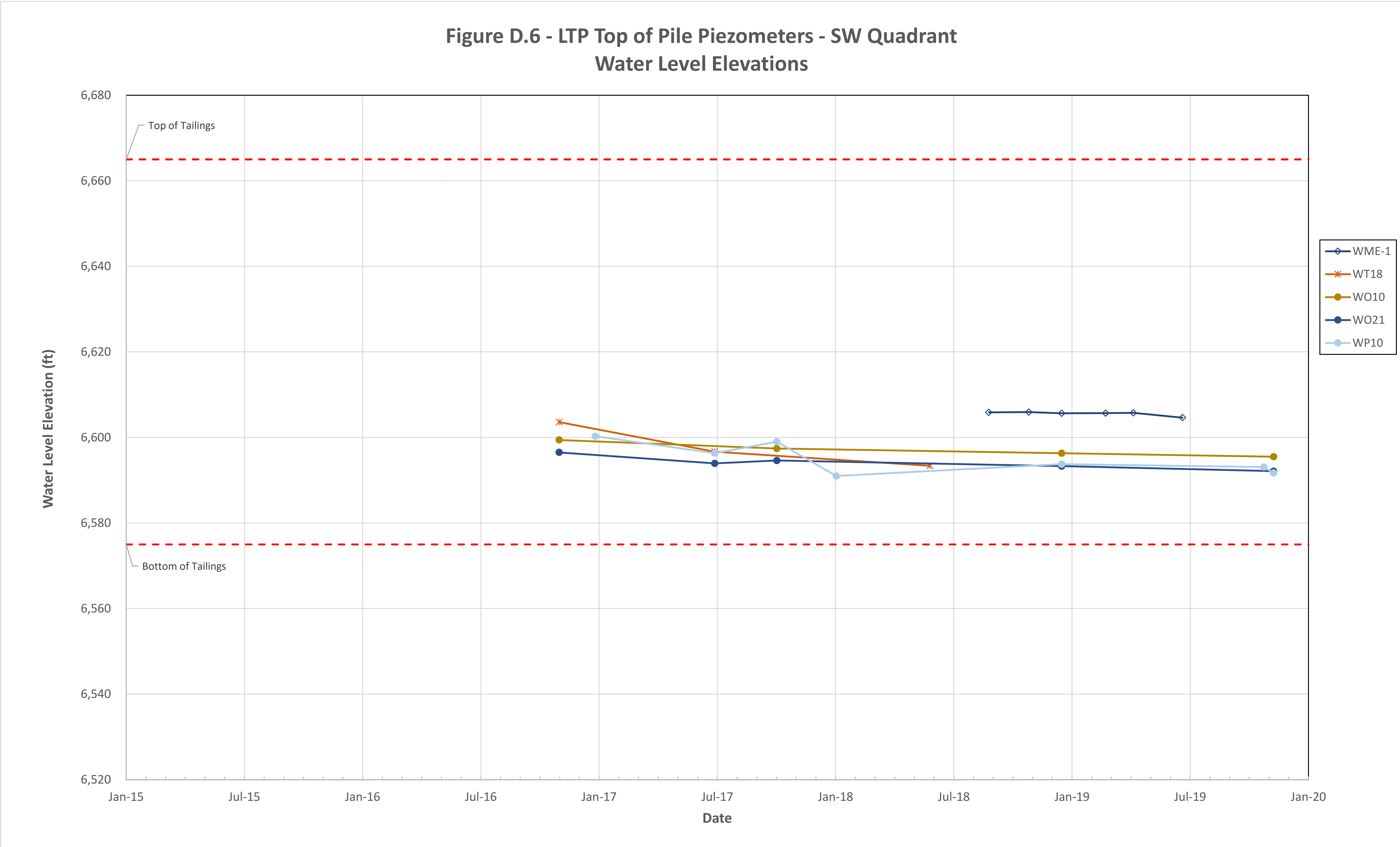


Figure D.6 - LTP Top of Pile Piezometers - SW Quadrant
Water Level Elevations
Water Level Elevation (ft)
Date
Top of Tailings
Bottom of Tailings
WME-1
WT18
WO10
WO21
WP10
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20

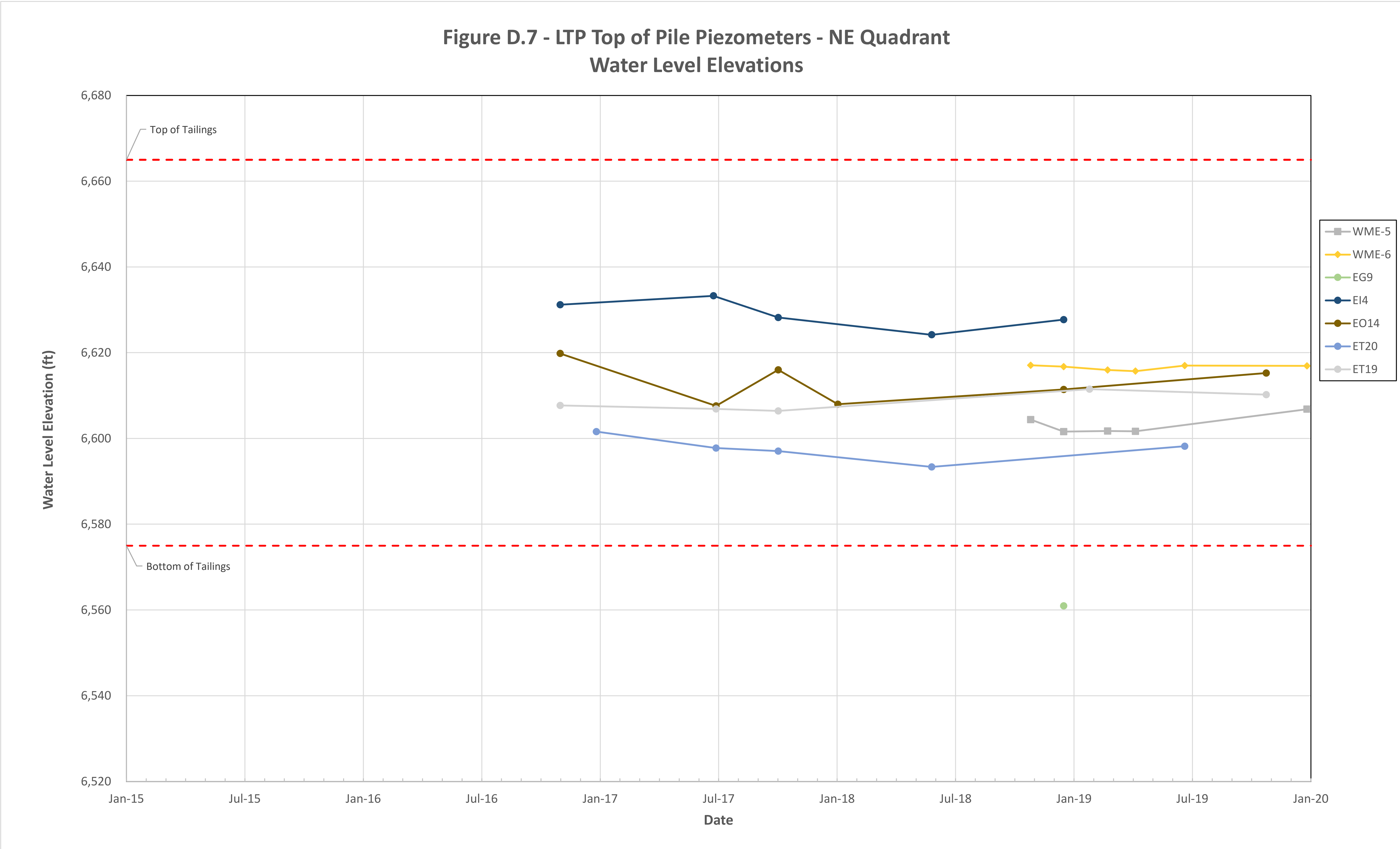


Figure D.7 - LTP Top of Pile Piezometers - NE Quadrant
Water Level Elevations
Water Level Elevation (ft)
Date
Top of Tailings
Bottom of Tailings
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
WME-5
WME-6
EG9
EI4
EO14
ET20
ET19

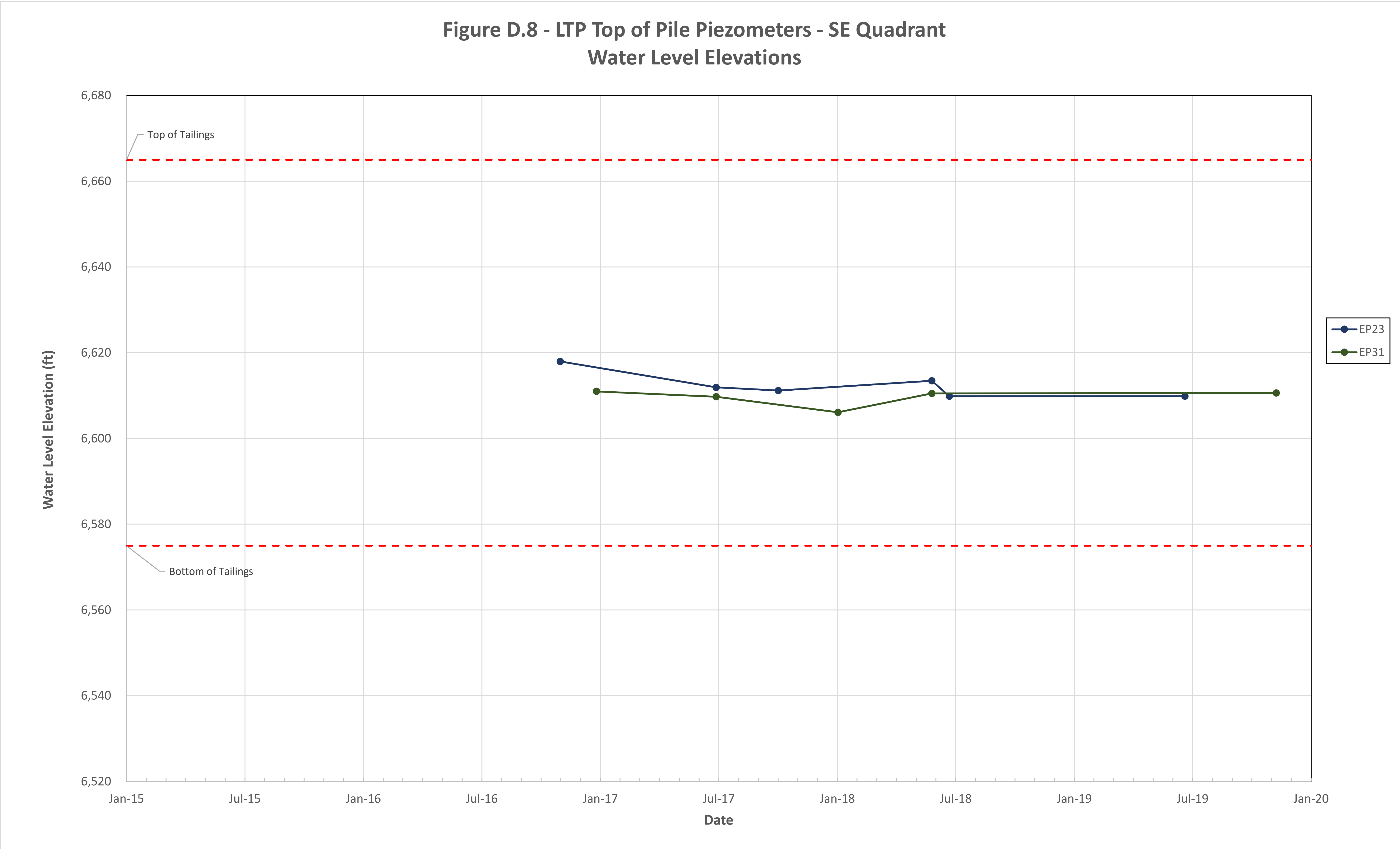


Figure D.8 - LTP Top of Pile Piezometers - SE Quadrant
Water Level Elevations
Water Level Elevation (ft)
6,680
6,660
6,640
6,620
6,600
6,580
6,560
6,540
6,520
Top of Tailings
Bottom of Tailings
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Date
EP23
EP31

APPENDIX E

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

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GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

APPENDIX E

Page Number

FIGURES

TABLES

Grants Reclamation Project

Land Use Review / Survey
Annual Report No. 18 - CY2019

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 eighteenth 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 2019 – 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 2019 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 2019, 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 2019 – 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 December 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 2018 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 December 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 2019. See Tables E-1 through E-5 for 2019 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 2019, 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

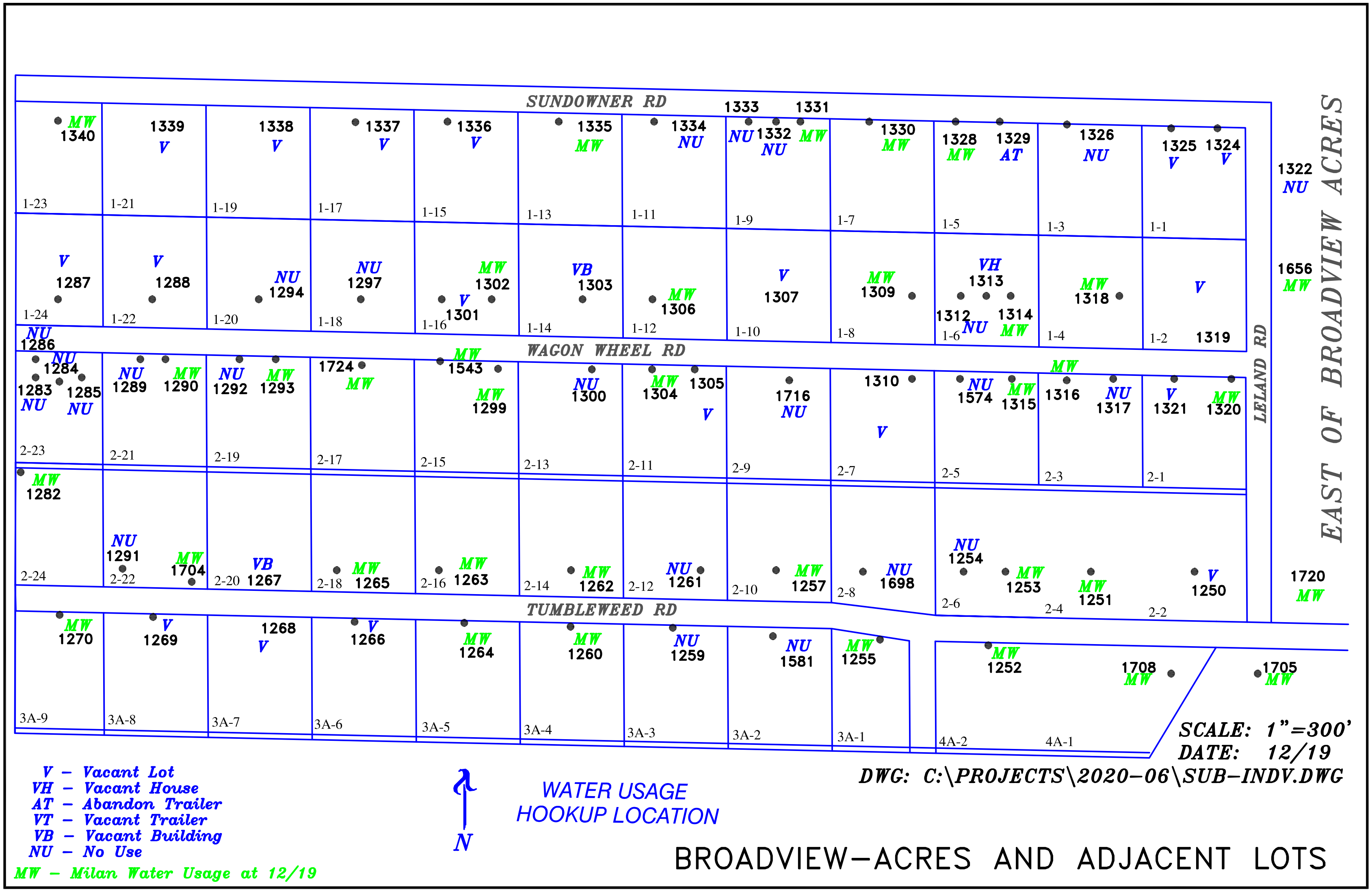
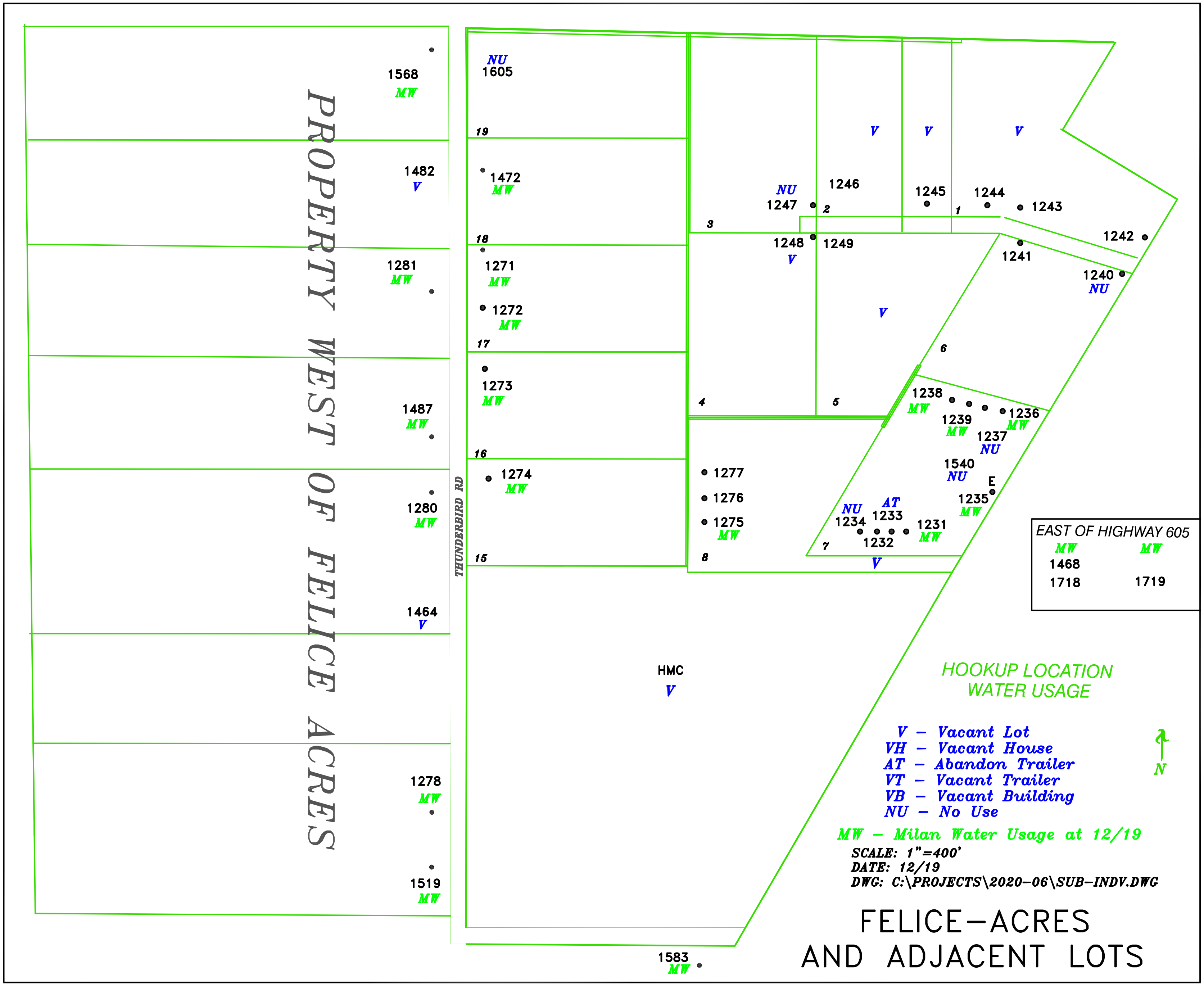


FIGURE E-2. FELICE ACRES – LAND USE STATUS AND WATER USE



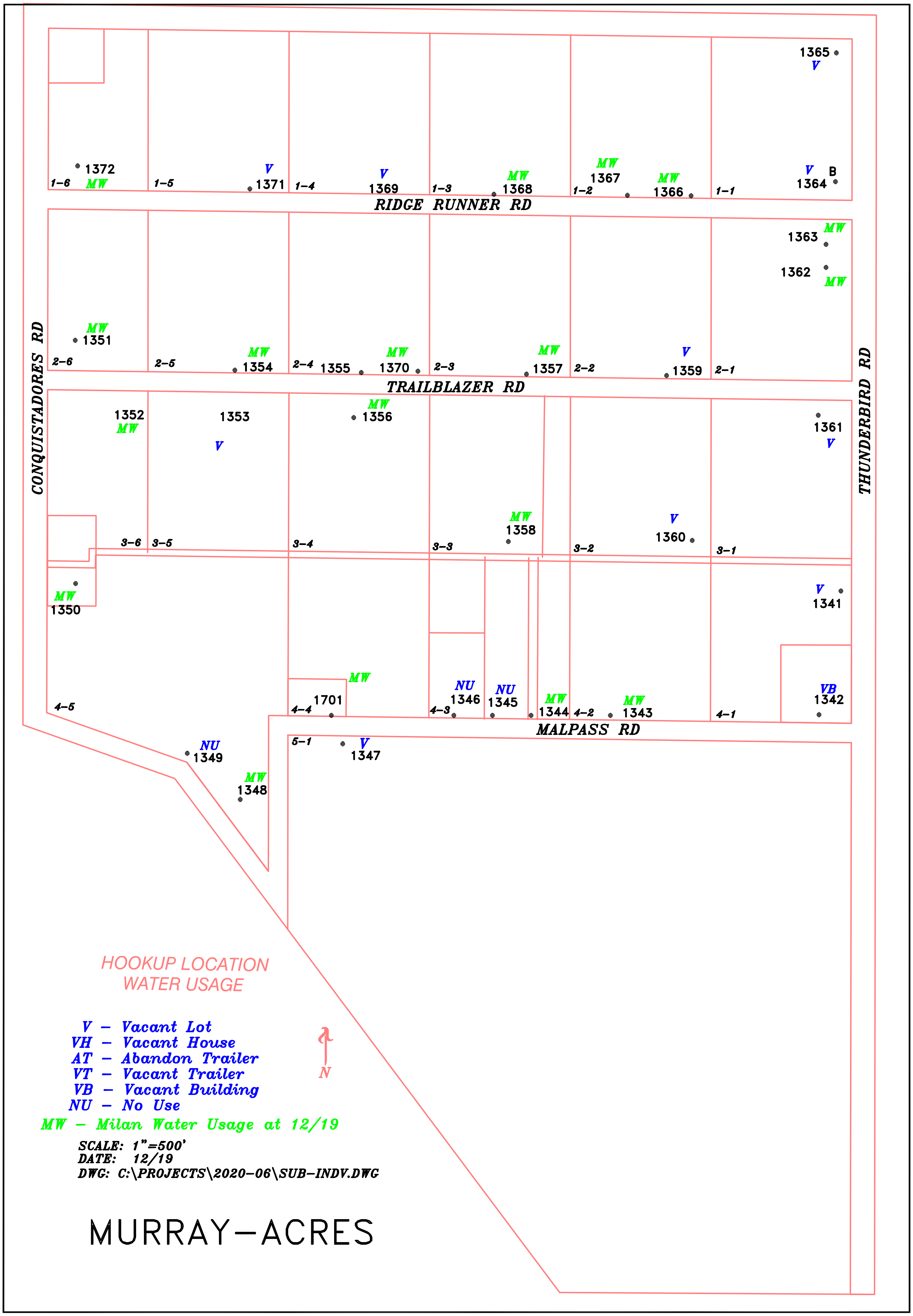


FIGURE E-3. MURRAY ACRES–LAND USE STATUS AND WATER USE

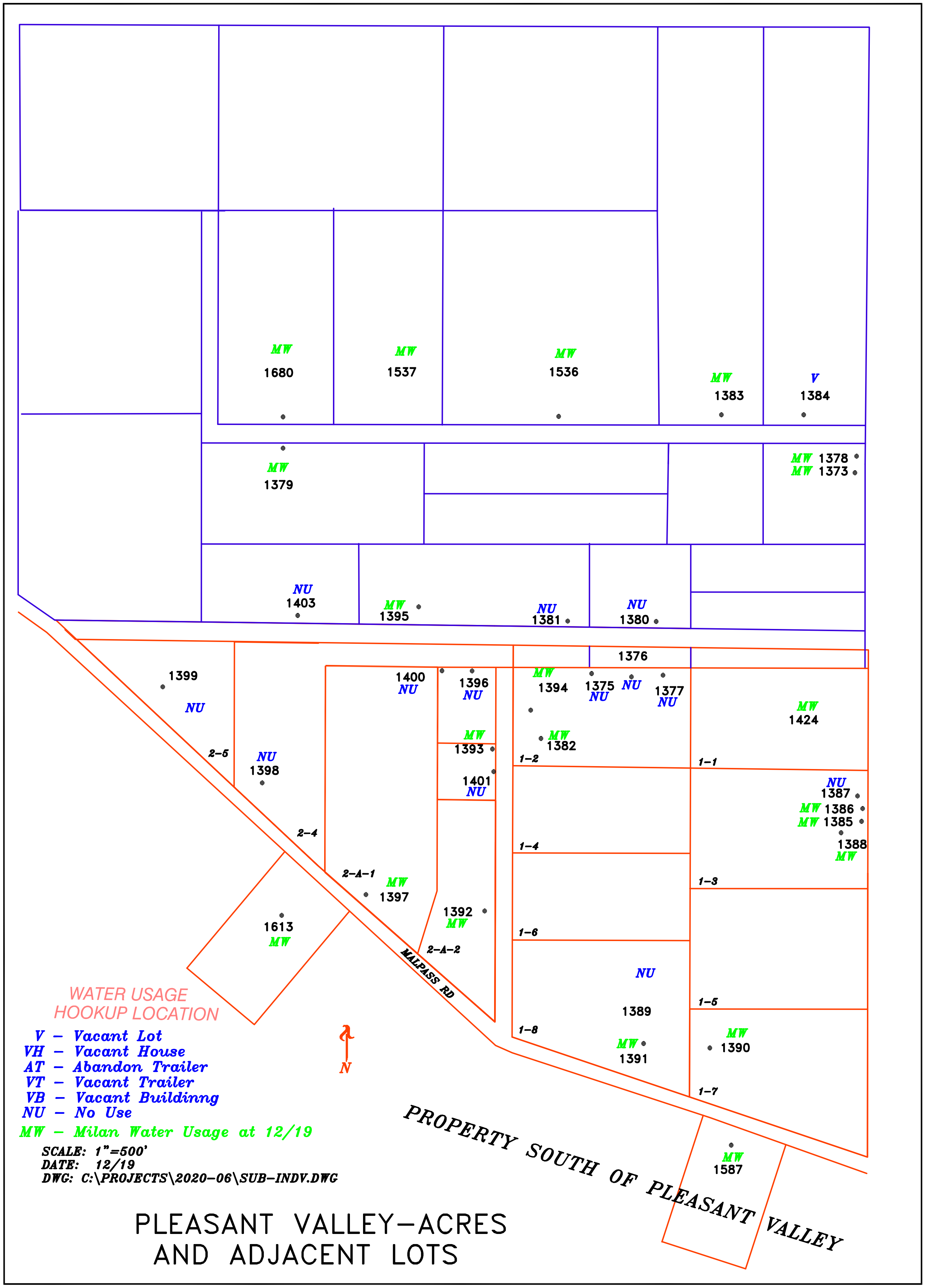


FIGURE E-4. PLEASANT VALLEY ESTATES-
LAND USE STATUS AND WATER USE

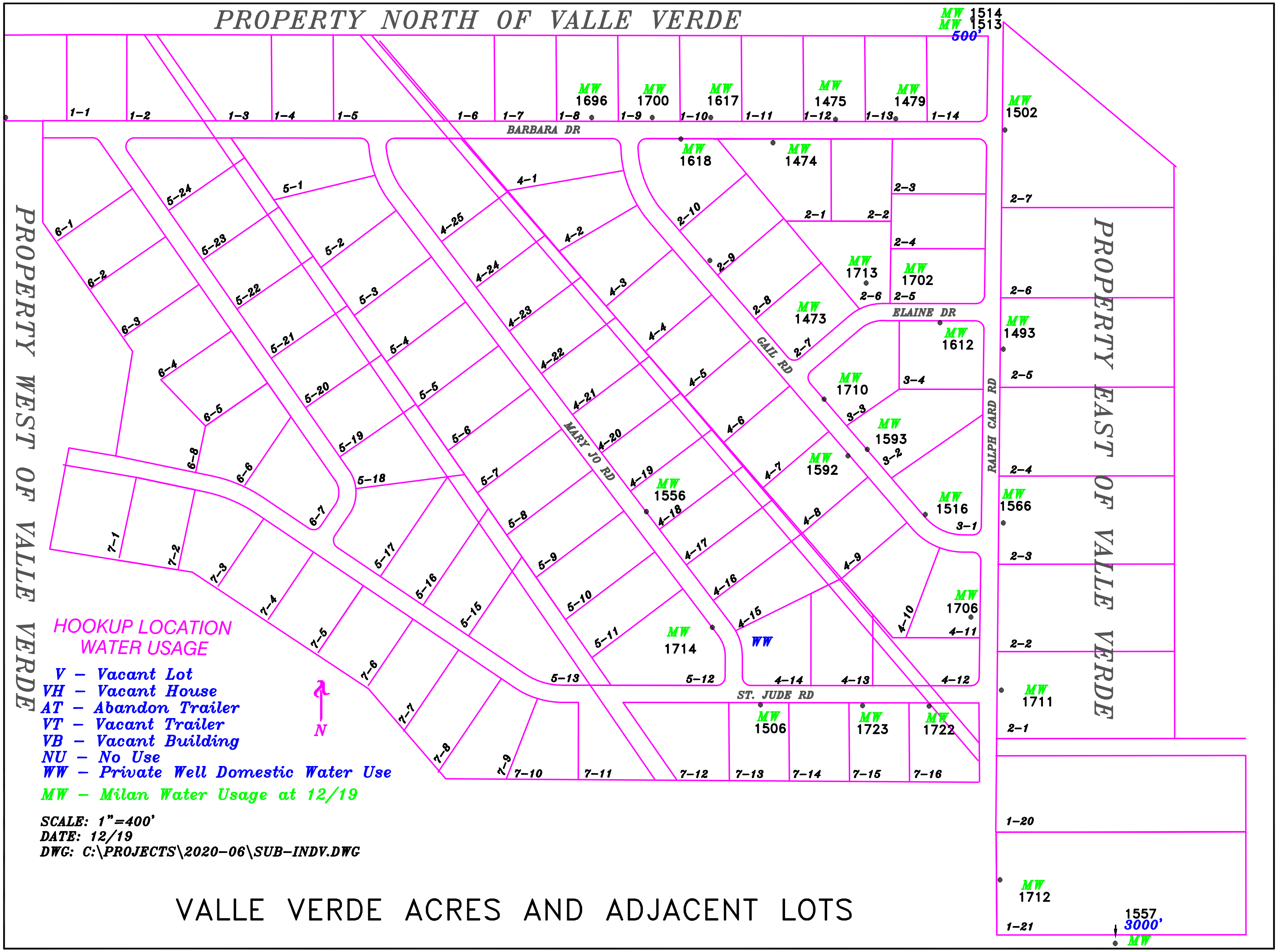


FIGURE E-5. VALLE VERDE ACRES–LAND USE STATUS AND WATER USE

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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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		
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		
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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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	
2 / 23	1286		
2 / 24	1282	X	X
3A / 1	1255	X	X
3A / 2	1581	X	
3A / 3	1259		
3A / 4	1260	X	X
3A / 5	1264	X	X

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 WATER USAGE
1	1242		
1	1243		
1	1244		
2	1245		
2	1246		
3	1247	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	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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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	
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 2018 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 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		X
1 / 3	1386	X	X
1 / 3	1387		
1 / 3	1388	X	X
1 / 7	1390	X	X
1 / 8	1389		
1 / 8	1391	X	X
2 / 4	1398		
2 / 5	1399		
2 / A1	1397	X	X
2 / A2	1392	X	X
2 / A2	1393	X	X
2 / A2	1396		
2 / A2	1400		
2 / A2	1401		
	1373	X	X
	1378	X	X
	1379	X	X
	1380		
	1381		
	1383	X	X
	1384		
	1395	X	X
	1403		
	1536	X	X
	1537	X	X
	1680	X	X

PROPERTY SOUTH OF PLEASANT VALLEY ESTATES			
17 - 2	1587	X	X
11 - 2	1613	X	X

TABLE E-5 WATER USE IN VALLE VERDE AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2018 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2018	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2019 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2019
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

GRANTS RECLAMATION PROJECT METEOROLOGICAL DATA SUMMARY

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Meteorological Data

CY2019

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 2019.

2.0 Wind

The annual wind rose developed from data taken at HMC's meteorological station is presented in Figure F-1. The maximum, minimum and mean monthly wind speeds are presented in Table F-1.

3.0 Precipitation

The monthly precipitation depths are presented in Table F-1. The total measured precipitation depth at the Grant's was 10.03 inches in 2019.

4.0 Temperature and Humidity

The maximum, minimum and mean monthly temperatures are presented in Table F-1. The maximum, minimum and mean monthly relative humidity for 2019 is presented in Table F-1.

5.0 Solar Radiation and Evaporation

The solar radiation measurements are presented in Table F-1. Table F-1 also presents an estimate of monthly potential evaporation based on available meteorological data.

Figure F-1. Grants Site 2019 Annual Wind Rose

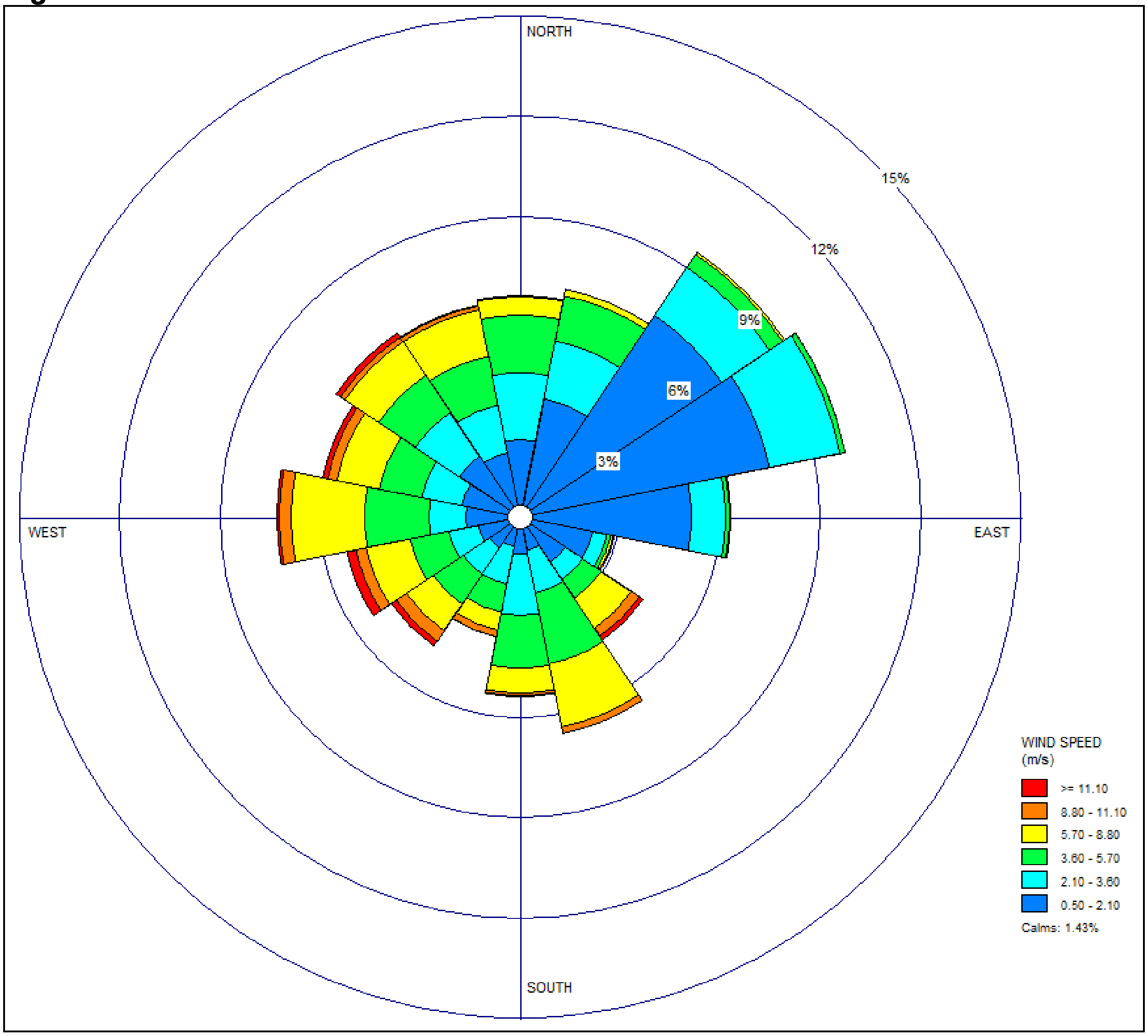

Table F-1. Grants Site 2019 Monthly Meteorological Data Summary

Month	Simple Stats	Wind Speed (m/s)	Air Temperature (c)	Relative Humidity (%)	Monthly Precipitation (in)	Solar Radiation (W/m²)	Net Solar Radiation (W/m²)	Average Daily Temp (c)	Calculated Heat Index	Evaporation Potential (cc/month)
Jan-19	*max*	13.5	13.0	95.0	0.7	135.077847	90.5	0.00	0.00	0.00
	min	0.2	-25.5	10.9						
	mean	2.9	-1.5	65.7						
Feb-19	*max*	14.1	13.7	89.6	0.71	169.971615	113.9	0.75	0.06	0.17
	min	0.2	-14.9	7.6						
	mean	3.9	0.8	52.4						
Mar-19	*max*	14.8	20.3	94.4	0.26	216.2804	144.9	6.24	1.40	2.58
	min	0.2	-7.5	8.0						
	mean	4.4	6.2	44.4						
Apr-19	*max*	13.3	23.8	92.9	0.67	248.719094	166.6	10.10	2.90	4.87
	min	0.3	-6.9	7.6						
	mean	3.7	10.1	38.2						
May-19	*max*	13.7	25.9	92.1	1.04	277.511238	185.9	11.73	3.64	6.45
	min	0.2	-2.0	6.6						
	mean	3.8	11.7	37.6						
Jun-19	*max*	13.0	30.7	87.4	0.28	311.581846	208.8	19.46	7.82	11.83
	min	0.4	4.0	5.8						
	mean	3.9	19.5	28.2						
Jul-19	*max*	10.2	32.4	86.8	0.8	268.334427	179.8	22.85	9.98	14.58
	min	0.3	8.8	6.3						
	mean	3.2	22.8	34.6						
Aug-19	*max*	9.8	32.6	91.5	1.27	250.734151	168.0	21.73	9.25	12.94
	min	0.3	10.2	8.8						
	mean	2.6	21.7	39.0						
Sep-19	*max*	9.0	31.0	94.2	2.05	236.940697	158.8	18.15	7.04	9.29
	min	0.4	3.3	6.9						
	mean	2.9	18.2	43.6						
Oct-19	*max*	12.1	24.7	89.6	0.24	216.335505	144.9	8.72	2.32	3.62
	min	0.1	-14.5	6.8						
	mean	3.2	8.7	31.4						
Nov-19	*max*	13.7	19.3	95.4	1.78	147.695176	99.0	3.00	0.46	0.89
	min	0.3	-12.2	5.4						
	mean	2.8	3.0	53.5						
Dec-19	*max*	12.5	12.5	91.5	0.23	119.735024	80.2	0.00	0.00	0.00
	min	0.2	-14.2	14.8						
	mean	2.8	-0.2	60.7						

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	90331.0	6.10E-02
	7.71E-05	2013.2	1.55E-01
	1.79E-02	44.9	8.04E-01
			0.49239
	α =		1.20E+00

$I = \Sigma$ *(for i = 1 to 12)* $(T_{ai}/5)^{1.514}$ = Heat index which depends on the 12 monthly mean temperatures (T_{ai}).

	I =		44.87