SECTION 5

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 5

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

TABLES

5.0 UPPER CHINLE AQUIFER MONITORING

5.1 UPPER CHINLE WELL COMPLETION

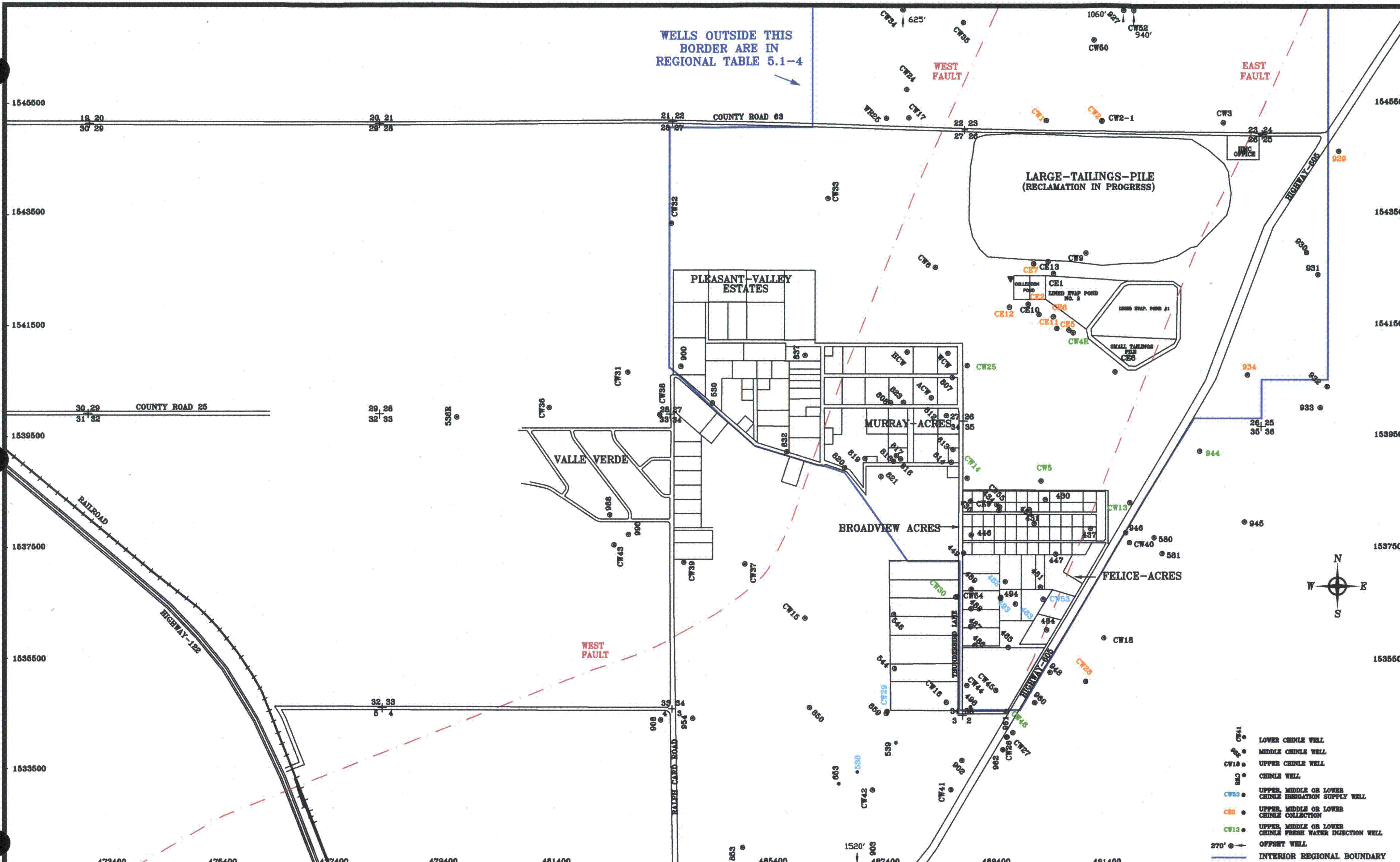
Chinle aquifer well locations are shown on Figure 5.1-1. The Upper and Middle Chinle aquifers do not exist in the area west of Ralph Card Road. Table 5.1-1 presents basic information for the Chinle wells located on the Homestake property. This table indicates well coordinates, well depth, casing diameter,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

Table 5.1-2 presents basic well data for Chinle wells in Broadview Acres and Felice Acres. Table 5.1-3 presents similar data for Murray Acres and Pleasant Valley Estates Chinle wells. Wells that are not located within the immediate Grants Project property or within the four subdivision boundaries are denoted on Table 5.1-4 as the regional Chinle wells (see Figure 5.1-1 for inner regional boundary shown in blue). No new Chinle wells were drilled by HMC in 2010.

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

The location of Upper Chinle wells and the areal extent of the Upper Chinle aquifer at the Grants Project are shown on Figure 5.1-2. Upper Chinle wells 944, CW4R, CW5, CW13 and CW25 are shown in green to denote that these are fresh-water injection wells. Upper Chinle wells 929, 934, CE2, CE5, CE6, CE11 and CE12 were pumped as a source of flushing water for the Large Tailings Pile in 2010 and are shown in orange. Upper Chinle well CE7 is also shown in orange because it was pumped some in October and November as feed to the R.O. plant. Well CW18 was used as a supply for fresh-water injection starting in late September of 2002 but was not used continuously after May of 2004. It was not used as a freshwater injection supply in 2010. 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 5.1-3 presents a typical geologic cross section to show the relative position of the alluvial and Chinle aquifers (see Figure 5.1-2 for the location of this cross section).

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. The Upper Chinle aquifer does not exist to the west and south of the subcrop area. The Upper Chinle sandstone, therefore, does not exist west of the West Fault.



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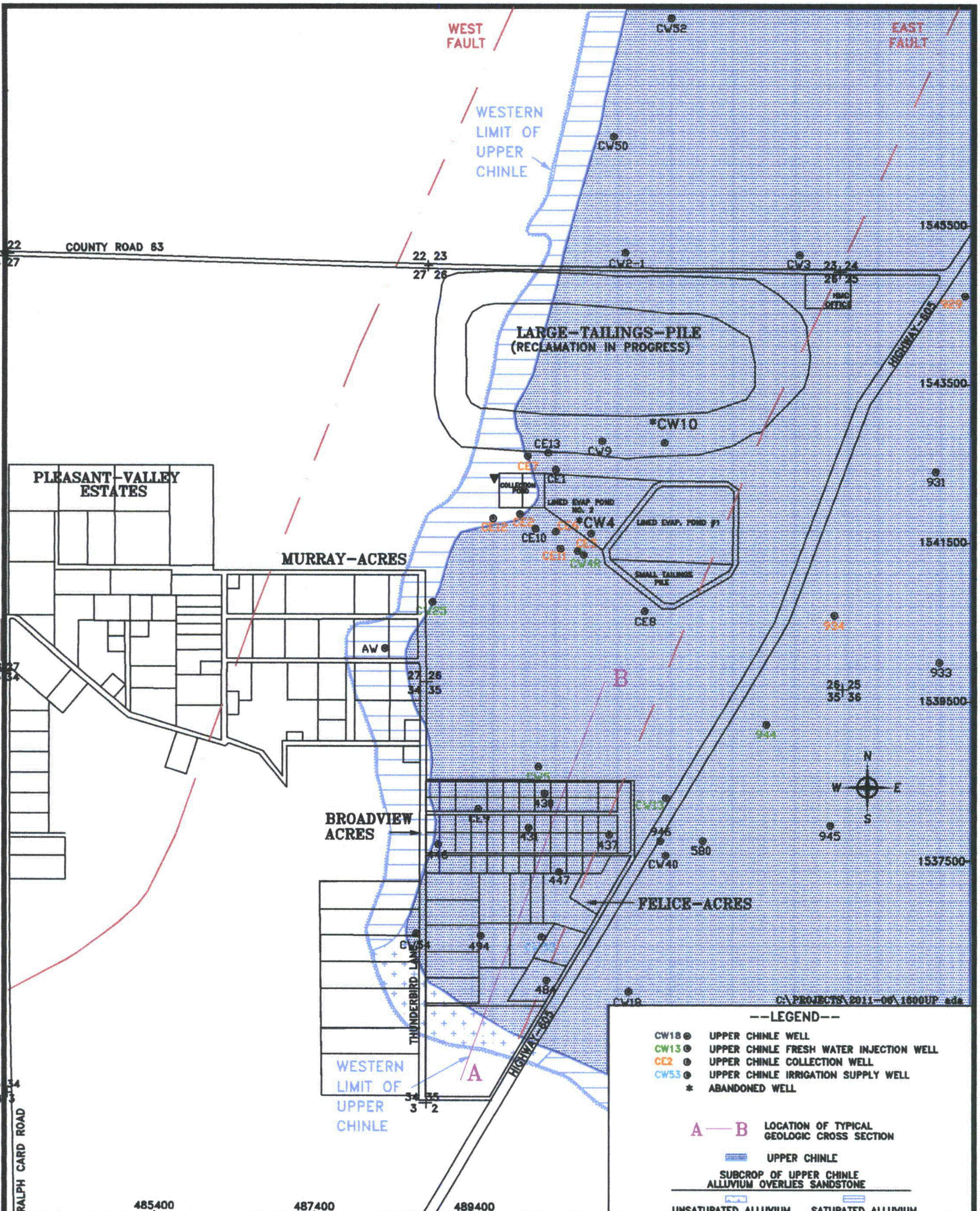
C:\PROJECTS\2010-06
BASE09.DWG ada
DATE: 2/22/2011

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/11
FIGURE 5.1-2 LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS	SCALE: 1"=1600'
	PAGE: 5.1-4

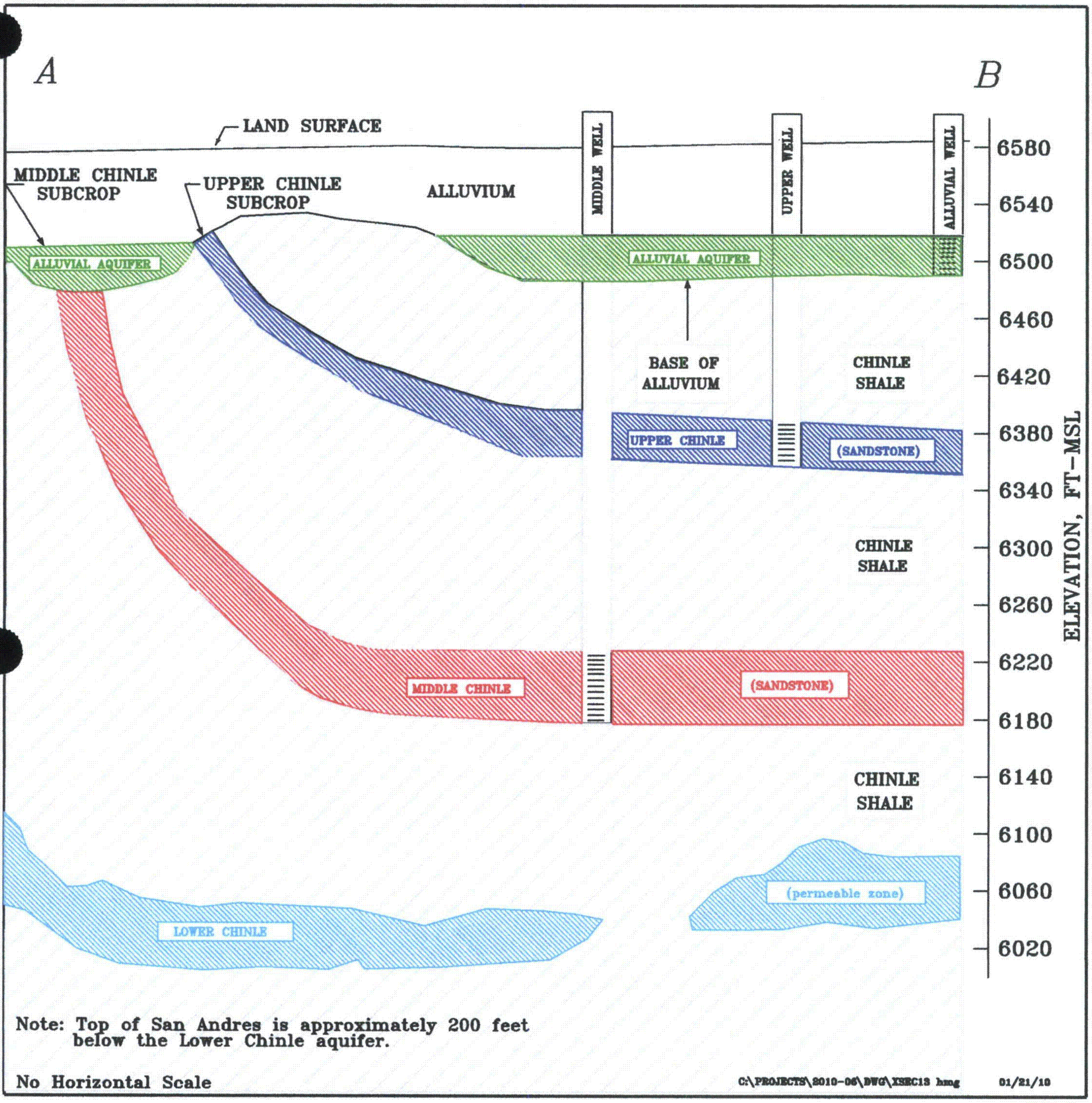


FIGURE 5.1-3. TYPICAL GEOLOGIC CROSS SECTION

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	12/15/2010	136.00	6462.54	0.0	6598.54	30	6569	A	-	—
										335	6264	M	330-400	Middle
0931	1542461	495207	366.7	6.0	12/15/2010	133.50	6477.06	0.9	6610.56	339	6271	U	-	Upper
0934	1540641	493941	293.0	6.0	12/27/2010	67.78	6517.81	2.0	6585.59	30	6554	A	-	—
										282	6302	U	330-400	Upper
CE1	1541923	489979	137.0	5.0	12/15/2010	45.08	6525.11	4.4	6570.19	75	6491	A	-	—
										106	6460	U	98-138	Upper
CE2	1542475	490434	119.7	5.0	12/27/2010	60.91	6515.44	1.8	6576.35	74	6501	A	-	—
										74	6501	U	78-118	Upper
CE5	1541453	490695	140.0	5.0	12/27/2010	46.09	6522.46	1.6	6568.55	63	6504	A	-	—
										103	6464	U	100-140	Upper
CE6	1541698	490433	140.0	6.0	12/27/2010	86.74	6478.45	1.5	6565.19	75	6489	U	-	Upper
CE7	1542652	490079	120.0	6.0	12/27/2010	38.30	6537.69	1.9	6575.99	95	6479	U	100-140	Upper
CE8	1540704	491556	216.6	6.0	12/15/2010	44.00	6525.70	1.7	6569.70	90	6478	U	160-200	Upper
CE10	1541737	490177	130.0	6.0	12/15/2010	44.80	6526.06	2.3	6570.86	75	6494	U	90-130	Upper
CE11	1541487	490494	140.0	6.0	12/27/2010	46.48	6518.94	1.6	6565.42	90	6474	U	100-140	Upper
CE12	1541867	489642	120.0	6.0	12/27/2010	57.71	6514.52	2.1	6572.23	80	6490	U	80-120	Upper
CE13	1542693	490338	129.2	6.0	12/15/2010	39.62	6535.02	1.7	6574.64	95	6478	U	90-130	Upper
CW1	1545235	490295	325.0	5.0	12/27/2010	143.50	6441.72	0.7	6585.22	105	6480	A	-	—
										272	6313	M	212-323	Middle
CW2	1545212	491302	355.0	5.0	12/27/2010	127.98	6457.50	1.7	6585.48	85	6499	A	-	—
										136	6448	U	-	—
										305	6279	M	306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/16/2010	131.57	6453.91	1.7	6585.48	85	6499	A	-	—
										136	6448	U	243-253	Upper
CW3	1545200	493496	235.0	5.0	12/27/2010	55.15	6532.03	0.7	6587.18	70	6516	A	-	—
										209	6377	U	210-235	Upper
										348	6238	M	-	—
* CW4	1541682	490874	145.0	5.0	9/7/1994	39.06	6531.89	0.8	6570.95	70	6500	A	-	—
										112	6458	U	110-145	Upper
CW4R	1541416	490787	138.9	6.0	11/22/2010	0.68	6568.05	1.3	6568.73	61	6506	A	-	—
										104	6463	U	102-142	Upper
CW5	1538729	490221	170.0	5.0	11/22/2010	0.72	6568.62	1.6	6569.34	65	6503	A	-	—
										137	6431	U	135-170	Upper
CW6	1542588	488301	282.0	4.0	12/15/2010	108.10	6467.54	1.0	6575.64	236	6339	M	246-276	Middle
CW7	1545285	488773	—	—	10/17/1995	60.80	6522.79	0.0	6583.59	—	—	C	120-130	Chinle
CW8	1545009	491238	285.0	6.0	12/5/2000	38.90	6552.93	0.0	6591.83	—	—	C	276-286	Chinle
										85	6507	A	-	—
CW9	1542840	491015	180.0	5.0	12/15/2010	59.55	6532.28	0.0	6591.83	—	—	U	130-180	Upper

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)		CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW9	1542840	491015	180.0	5.0	12/15/2010	59.55	6532.28	0.0	6591.83	80	6512	A	-	—
* CW10	1542823	491803	185.0	5.0	11/13/1995	50.03	6537.86	0.0	6587.89	75	6513	A	-	—
										167	6421	U	155-185	Upper
CW13	1538349	491827	267.7	6.0	11/22/2010	0.55	6576.15	2.7	6576.70	230	6344	U	225-265	Upper
										378	6196	M	-	—
CW14	1538786	488884	360.9	6.0	11/22/2010	0.49	6565.60	2.9	6566.09	56	6507	A	-	—
										66	6497	U	-	—
										310	6253	M	278-358	Middle
CW17	1545279	487771	108.0	5.0	12/16/2010	50.30	6539.02	3.1	6589.32	73	6513	A	-	—
										85	6501	M	83-103	Middle
CW24	1545773	487760	118.0	5.0	12/16/2010	48.86	6539.81	3.0	6588.67	61	6525	A	-	—
										65	6521	M	78-118	Middle
CW25	1540802	488866	102.0	5.0	11/22/2010	0.92	6566.28	3.0	6567.20	53	6511	U	62-102	Upper
										53	6511	A	-	—
CW32	1543413	483523	300.0	6.0	12/15/2010	141.20	6426.08	1.7	6567.28	70	6496	A	-	—
										157	6409	L	158-188	Lower
										157	6409	L	218-303	—
CW33	1543814	486347	347.0	6.0	12/15/2010	105.85	6469.04	1.8	6574.89	83	6490	A	-	—
										272	6301	L	307-347	—
										272	6301	L	267-287	Lower
CW34	1547827	487707	65.7	6.0	8/27/1996	65.65	6528.75	3.2	6594.40	20	6571	A	-	—
										40	6551	M	33-63	Middle
CW35	1547001	488794	120.0	5.0	12/16/2010	50.06	6541.11	1.9	6591.17	63	6526	A	-	—
										90	6499	M	93-118	Middle
CW50	1546687	491159	170.0	5.0	12/16/2010	48.21	6540.35	3.0	6588.56	128	6458	U	130-170	Upper
CW52	1548171	491887	180.0	5.0	12/16/2010	72.10	6520.30	2.0	6592.40	138	6452	U	140-180	Upper
WR25	1545267	487430	113.3	5.0	12/16/2010	45.81	6540.65	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

E = Estimated Depth

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

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
						Broadview							
0430	1538469	490300	145.0	—	—	—	—	0.0	6568.00	72	6496	A -	Alluvium
										135	6433	U -	Upper
0431	1538045	490090	130.0	6.0	4/12/1994	35.00	6533.00	0.0	6568.00	60	6508	A 125-130	Alluvium
										118	6450	U 125-130	Upper
0434	1538370	489420	280.0	6.0	10/4/2007	39.51	6524.17	0.0	6563.68	75	6489	A -	—
										265	6299	M -	Middle
0436	1538439	488947	295.0	5.0	10/29/1996	71.82	6490.91	0.0	6562.73	90	6473	A -	—
										280	6283	M 280-295	Middle
0437	1537859	491128	340.0	5.0	10/29/1996	63.23	6508.77	1.8	6572.00	90	6480	A -	—
										180	6390	U -	—
										280	6290	M 240-300	Middle
0446	1537830	488960	110.0	6.0	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500	U 60-95	Upper
										60	6500	A 60-95	Alluvium
0447	1537490	490480	142.0	6.0	4/11/1985	41.18	6526.82	0.0	6568.00	80	6488	A 120-142	Alluvium
										138	6430	U 120-142	Upper
0449	1537440	488830	267.0	6.0	12/5/1994	63.42	6496.58	0.0	6560.00	—	—	M -	Middle
0456	1538240	490060	300.0	5.0	—	—	—	—	6559.00	—	—	M -	Middle
										—	—	A -	Alluvium
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	12/15/2010	36.04	6527.08	1.2	6563.12	—	—	U 90-130	Upper
CW55	1538283	489471	360.0	6.0	12/15/2010	40.56	6523.60	2.3	6564.16	260	6302	M -	Middle
						Felice Acres							
0481	1538350	490180	320.0	4.0	—	—	—	0.0	6568.00	110	6458	A 270-310	Alluvium
										270	6298	M 270-310	Middle
0482	1536981	489579	260.0	5.0	5/26/2010	36.94	6525.72	0.0	6562.66	80	6483	A 220-260	Alluvium
										210	6353	M 220-260	Middle
0483	1536586	489753	280.0	5.0	10/27/2010	54.32	6508.34	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 -	—

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
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
0493	1536702	489492	300.0	5.0	12/15/2010	95.03	6465.25	0.9	6560.28	40	6519	A	-	—
										65	6494	U	-	—
										236	6323	M	270-300	Middle
0494	1536689	489494	85.0	5.0	12/15/2010	35.21	6524.93	0.6	6560.14	40	6520	A	-	—
										65	6495	U	65-85	Upper
0498	1534661	488953	150.0	6.0	12/14/2010	54.78	6505.81	2.0	6560.59	80	6479	M	130-150	Middle
										80	6479	A	70-110	Alluvium
CW44	1535048	488891	208.0	6.0	12/15/2010	56.71	6504.03	2.5	6560.74	94	6464	A	-	Alluvium
										130	6428	M	69-208	Middle
CW45	1535036	489494	193.0	5.0	12/15/2010	55.96	6505.35	0.6	6561.31	90	6471	A	-	—
										166	6395	M	163-193	Middle
CW46	1534642	489595	187.3	5.0	12/18/2006	72.20	6490.06	1.5	6562.26	88	6473	A	-	—
										112	6449	M	125-185	Middle
CW53	1536668	490262	157.0	5.0	12/15/2010	63.09	6501.85	3.0	6564.94	110	6452	U	117-157	Upper

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

E = Estimated Depth

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

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
						Murray							
0803	1540800	487430	—	6.0	9/19/1983	84.86	6476.14	0.0	6561.00	—	—	C 85-180	Chinle
										85	6476	A 85-180	Alluvium
0807	1540598	488610	287.0	6.0	—	—	—	0.0	6565.00	63	6502	A -	—
										275	6290	M 275-285	Middle
0808	1540080	487490	290.0	5.0	—	—	—	1.6	6561.00	85	6474	A -	—
										255	6304	M 260-290	Middle
0812	1539910	488505	300.0	6.0	—	—	—	0.6	6566.00	68	6497	A -	—
										268	6297	M 264-284	Middle
0813	1539300	488620	280.0	6.0	—	—	—	0.0	6565.00	63	6502	A -	—
										230	6335	M 235-255	Middle
0814	1539030	488590	280.0	6.0	—	—	—	0.0	6565.00	—	—	M -	Middle
0816	1539110	487705	255.0	6.0	—	—	—	0.0	6557.00	35	6522	A -	—
										240	6317	M 240-250	Middle
0817	1539190	487590	—	—	7/22/1995	70.34	6486.66	0.0	6557.00	—	—	M -	Middle
0818	1539085	487547	243.0	4.0	—	—	—	0.0	6557.00	62	6495	A -	—
										230	6327	M 223-243	Middle
0819	1539000	487000	222.0	6.0	—	—	—	0.0	6557.00	62	6495	A -	—
										210	6347	M 210-220	Middle
0820	1539254	486513	230.0	—	5/9/2002	99.20	6458.80	0.0	6558.00	—	—	M 125-230	Middle
0821	1538810	487320	260.0	7.0	11/1/1994	35.88	6524.12	0.0	6560.00	—	—	M -	Middle
0823	1540150	487720	265.0	6.0	—	—	—	0.0	6561.00	—	—	M 257-267	Middle
										40	6521	A -	—
ACW	1540235	488070	325.0	6.0	12/15/2010	104.34	6459.46	1.2	6563.80	40	6523	A -	—
										57	6506	U -	—
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	12/15/2010	34.34	6529.09	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	9/27/2010	88.00	6479.37	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

E = Estimated Depth

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 PERFORATIONS (FT-LSD)	AQUIFER
0536	1539560	479701	160.0	5.0	9/12/2000	144.70	—	-2.0	—	—	—	L -	Lower
0536R	1539888	479654	264.0	4.0	12/5/2007	139.06	6415.94	2.0	6555.00	62	6491	A -	—
										160	6393	L -	Lower
0538	1533486	486899	170.0	6.0	12/15/2010	76.21	6472.73	2.0	6548.94	95	6452	A 50-90	Alluvium
										133	6414	L 130-170	Lower
0539	1534014	487596	210.0	6.0	12/15/2010	73.09	6482.23	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
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
0581	1537400	492400	300.0	—	—	—	—	—	6578.00	—	—	U -	Upper
0653	1533283	486570	206.0	6.0	12/15/2010	75.55	6469.42	1.6	6544.97	97	6446	A 69-206	Alluvium
										135	6408	L -	Lower
0850	1534652	486044	54.0	5.0	12/15/2010	55.70	6493.45	3.2	6549.15	37	6509	A -	—
										37	6509	M 29-54	Middle
0853	1532124	484824	95.0	5.0	12/15/2010	82.74	6458.64	1.7	6541.38	60	6480	A -	—
										60	6480	L 55-95	Lower
0859	1534549	487426	83.0	5.0	12/15/2010	64.54	6488.22	2.7	6552.76	52	6498	M 50-83	Middle
0901	1531531	492846	270.0	5.0	11/4/1981	46.88	6552.12	0.0	6599.00	40	6559	A -	—
										190	6409	L 240-260	Lower
0902	1533700	488800	150.0	6.0	1/28/1995	52.10	6507.90	0.0	6560.00	72	6488	A -	—
										72	6488	M 78-102	Middle
0903	1530250	486900	281.0	5.0	—	—	—	0.0	6559.00	220	6339	L 120-260	Lower
0904	1531100	487150	200.0	4.0	—	—	—	0.0	6560.00	—	—	L 170-200	Lower
0908	1534430	483325	282.8	5.0	11/3/1998	81.16	6463.21	1.5	6544.37	107	6436	A -	—
										232	6311	L -	Lower
0927	1548300	491700	—	—	12/16/2010	156.86	6438.14	1.0	6595.00	—	—	M -	Middle
0929	1544684	495585	320.0	5.0	12/27/2010	74.55	6518.02	2.0	6592.57	—	—	U 290-320	Upper
0932	1540436	495407	501.0	6.0	4/19/2001	86.73	6515.38	0.0	6602.11	354	6248	U -	—
										492	6110	M 450-490	Middle
0933	1540087	495231	—	5.0	12/14/2009	78.28	6522.23	0.5	6600.51	—	—	U -	Upper
0937	1542180	471478	182.0	5.0	—	—	—	0.0	6578.00	70	6508	A -	—
										160	6418	L 95-182	Lower
0944	1539280	493091	300.0	5.0	12/27/2010	3.80	6584.81	1.6	6588.61	64	6523	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
0944	1539280	493091	300.0	5.0	12/27/2010	3.80	6584.81	1.6	6588.61	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	L 200-240	Lower
0962	1533750	489796	238.0	6.0	—	—	—	0.0	6560.00	225	6335	L 220-238	Lower
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	6489.14	1.3	6549.00	18	6530	A -	—
										152	6396	L 152-155	Lower
0990	1537600	482750	—	—	—	—	—	0.5	6550.00	—	—	L -	Lower
CW15	1536259	485961	134.6	5.0	12/15/2010	94.10	6457.22	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	12/27/2010	46.68	6525.97	1.5	6572.65	90	6481	A -	—
										190	6381	U 177-232	Upper
										340	6231	M -	—
CW26	1534116	489593	300.0	5.0	12/15/2010	102.41	6459.02	0.5	6561.43	50	6511	A -	—
										50	6511	M -	—
										231	6330	L 245-285	Lower
CW27	1534109	489600	110.0	5.0	12/15/2010	66.92	6495.96	1.9	6562.88	50	6511	M 80-110	Middle
										50	6511	A -	—
CW28	1535112	491008	370.0	5.0	12/27/2010	89.65	6482.03	1.9	6571.68	90	6480	A -	—
										110	6460	U -	—
										294	6276	M 280-360	Middle
CW29	1534551	487435	290.0	5.0	12/15/2010	91.10	6461.12	1.7	6552.22	52	6499	A -	—
										52	6499	M -	—
										228	6323	L 230-270	Lower
CW30	1536642	488704	251.5	5.0	12/14/2004	8.00	6550.31	2.0	6558.31	35	6521	A -	—

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

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
CW30	1536642	488704	251.5	5.0	12/14/2004	8.00	6550.31	2.0	6558.31	220	6336	M 219-249	Middle
CW31	1540689	482738	311.0	6.0	12/15/2010	87.30	6472.96	2.0	6560.26	111	6447	A -	—
										254	6304	L 231-271	—
										254	6304	L 291-311	—
										254	6304	L 136-156	Lower
CW36	1540053	481329	180.0	5.0	12/15/2010	78.80	6472.29	2.8	6551.09	96	6452	A -	—
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	12/15/2010	63.85	6487.32	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	12/15/2010	63.15	6487.56	3.4	6550.71	40	6507	A -	—
										87	6460	L 90-123	Lower
CW40	1537624	491819	264.0	5.0	12/15/2010	75.25	6503.69	2.6	6578.94	75	6501	A -	—
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	12/15/2010	96.45	6458.96	1.5	6555.41	59	6495	A -	—
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	12/15/2010	83.96	6464.82	0.0	6548.78	98	6451	A -	—
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	12/15/2010	69.37	6479.42	2.0	6548.79	57	6490	A -	—
										57	6490	L 81-101	Lower
CW54	1536645	488675	103.1	5.0	12/15/2010	26.45	6532.10	2.2	6558.55	70	6486	C 60-100	Chinle

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

E = Estimated Depth

5.2 UPPER CHINLE WATER LEVELS

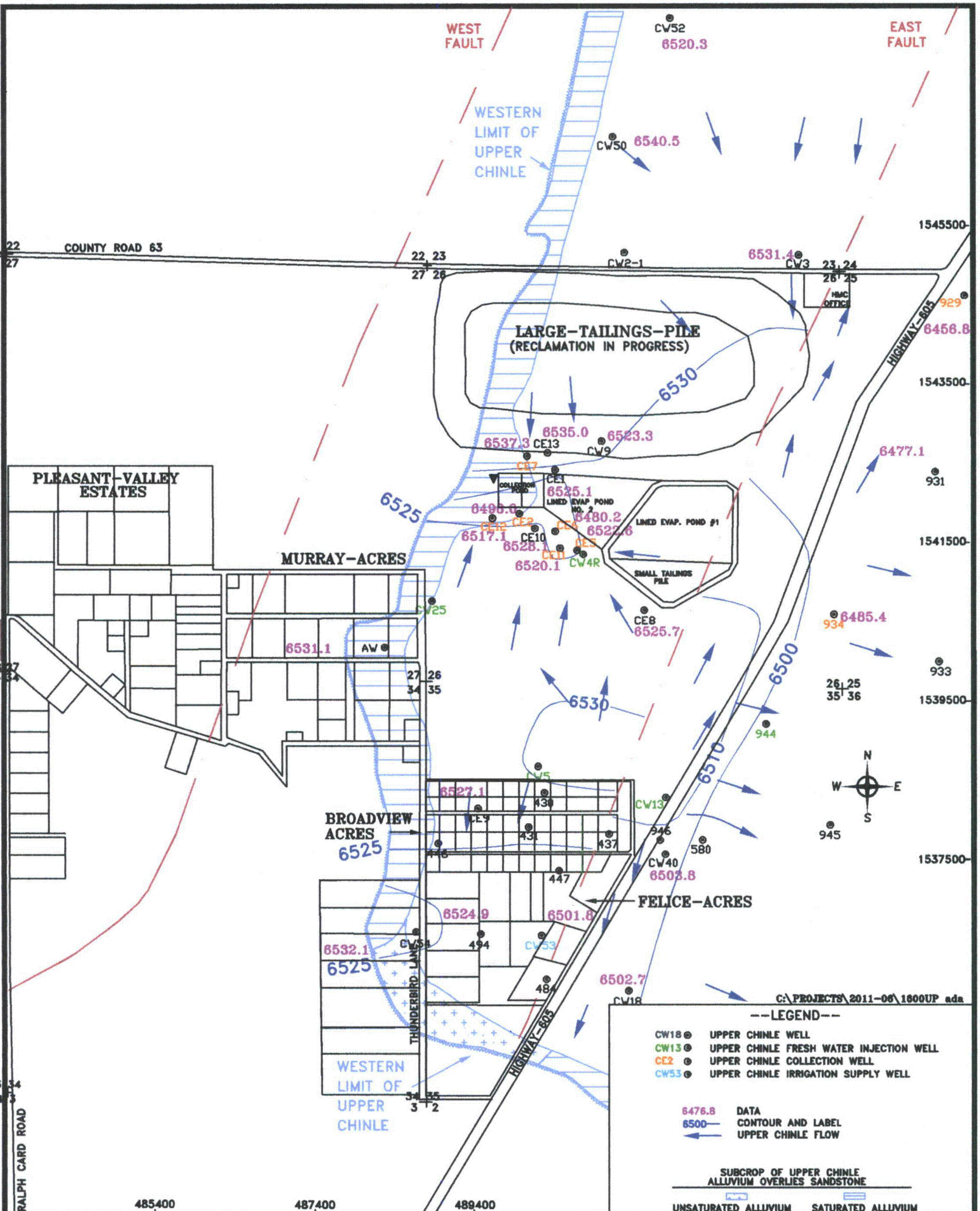
Measured water levels in Homestake's Upper, Middle and Lower Chinle aquifer wells are presented in Appendix A. Table A.2-1 of Appendix A includes water levels for Homestake, subdivision, and regional Chinle wells. Figure 5.2-1 presents water-level elevation contours of the Upper Chinle aquifer during the fall of 2010. The blue arrows on Figure 5.2-1 show the direction of ground-water flow, which is greatly influenced by the fresh-water injection into the Upper Chinle at wells CW4R, CW5, CW13 and CW25 and collection from wells CE2, CE5, CE6, CE11 and CE12. Well CW13, an injection well on the east side of the East Fault, is in the high permeability zone of the Upper Chinle aquifer that parallels the East Fault. This high permeability zone extends to a distance of at least 1000 feet parallel and adjacent to the East Fault near well CW18. Injection of fresh water has created piezometric-surface mounds along the east side of the East Fault. The permeability is much smaller at greater distances to the east of the East Fault and, therefore, an easterly gradient occurs in the Upper Chinle away from the East Fault near injection well CW13. The CW13 injection affects water levels on the west side of the East Fault in the area of Upper Chinle well CW53. Water level changes in well CW53 respond quickly to change in levels in well CW13 showing that a good connection exists in the Upper Chinle where the East Fault pinches out south of well CW53.

Injection of 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 or CE12. Injection into Upper Chinle well CW25 was started in 2000, and this injection is causing ground water to flow from this well back toward these collection wells. The naturally occurring flow direction in the Upper Chinle aquifer west of the East Fault is from the north. Well CW3 has not been pumped since January 2007 and therefore does not intercept any of the flow from the north.

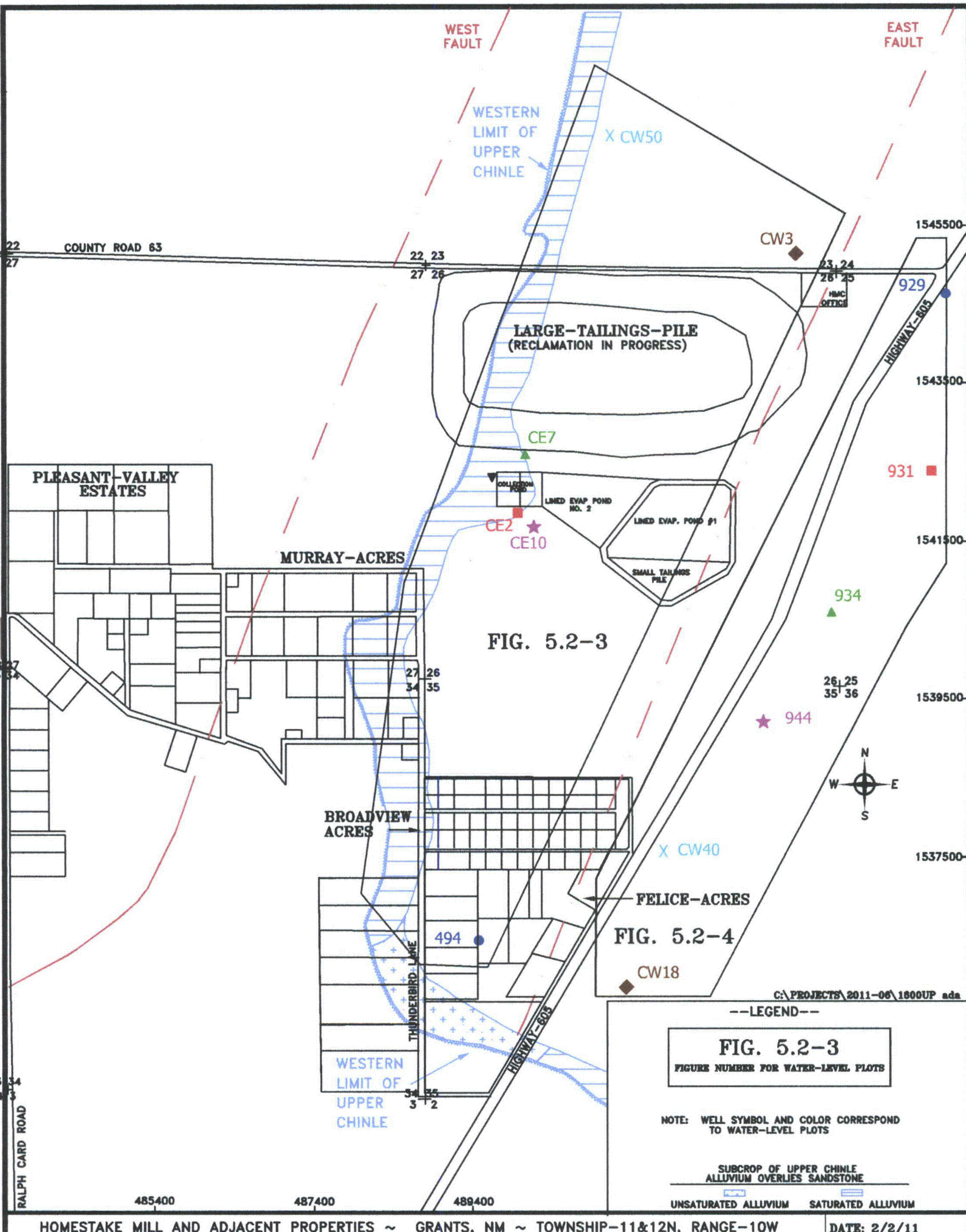
Figure 5.2-2 shows the location of the Upper Chinle wells that are used to monitor water-level changes with time. Figure 5.2-3 presents water-level elevations for Upper Chinle wells 494, CE2, CE7, CE10, CW3 and CW50. The water level in well CW3 remained high in 2010 without the pumping of this well. The changes in water levels from collection well CE2 are due to variations in pumping rate in this well and collection from wells CE5, CE6, CE11 and

CE12. This pumping has caused a small decline in the water levels in wells CE7 and CE10. The larger drop in water level well CE7 in October and November is due to pumping of this well to the R.O. Water levels in well 494 were overall steady in 2010 with a small affect from the irrigation supply pumping.

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, 934, CW18 and CW40 were due to variation in injection into well CW13 and pumping from well CW53 during 2010.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/11
FIGURE 5.2-1. WATER-LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2010, FT-MSL	SCALE: 1"=1600'
	PAGE: 5.2-3



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, 2010

DATE: 2/2/11

SCALE: 1"=1600'

PAGE: 5.2-4

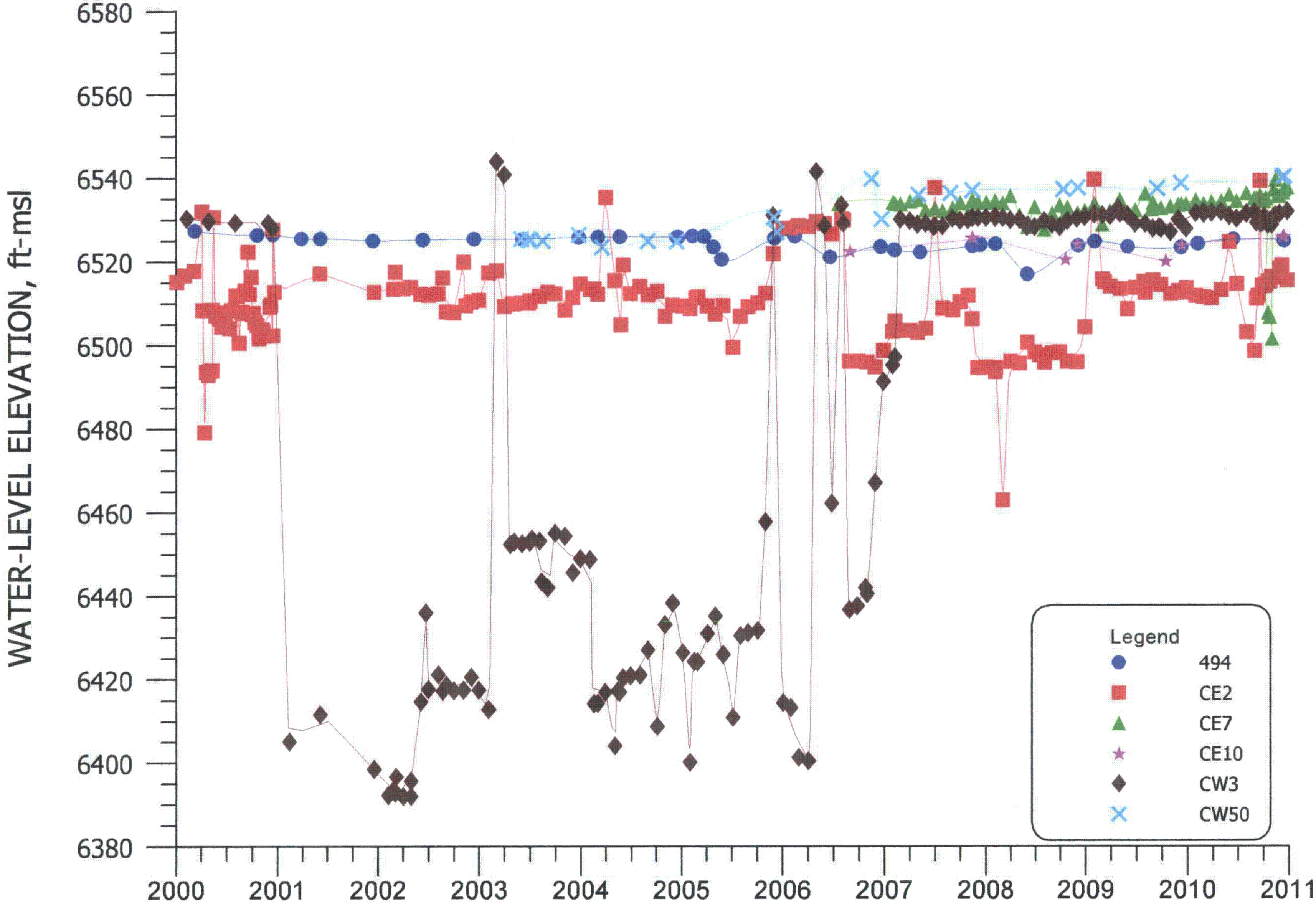


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CE7, CE10, CW3, AND CW50.

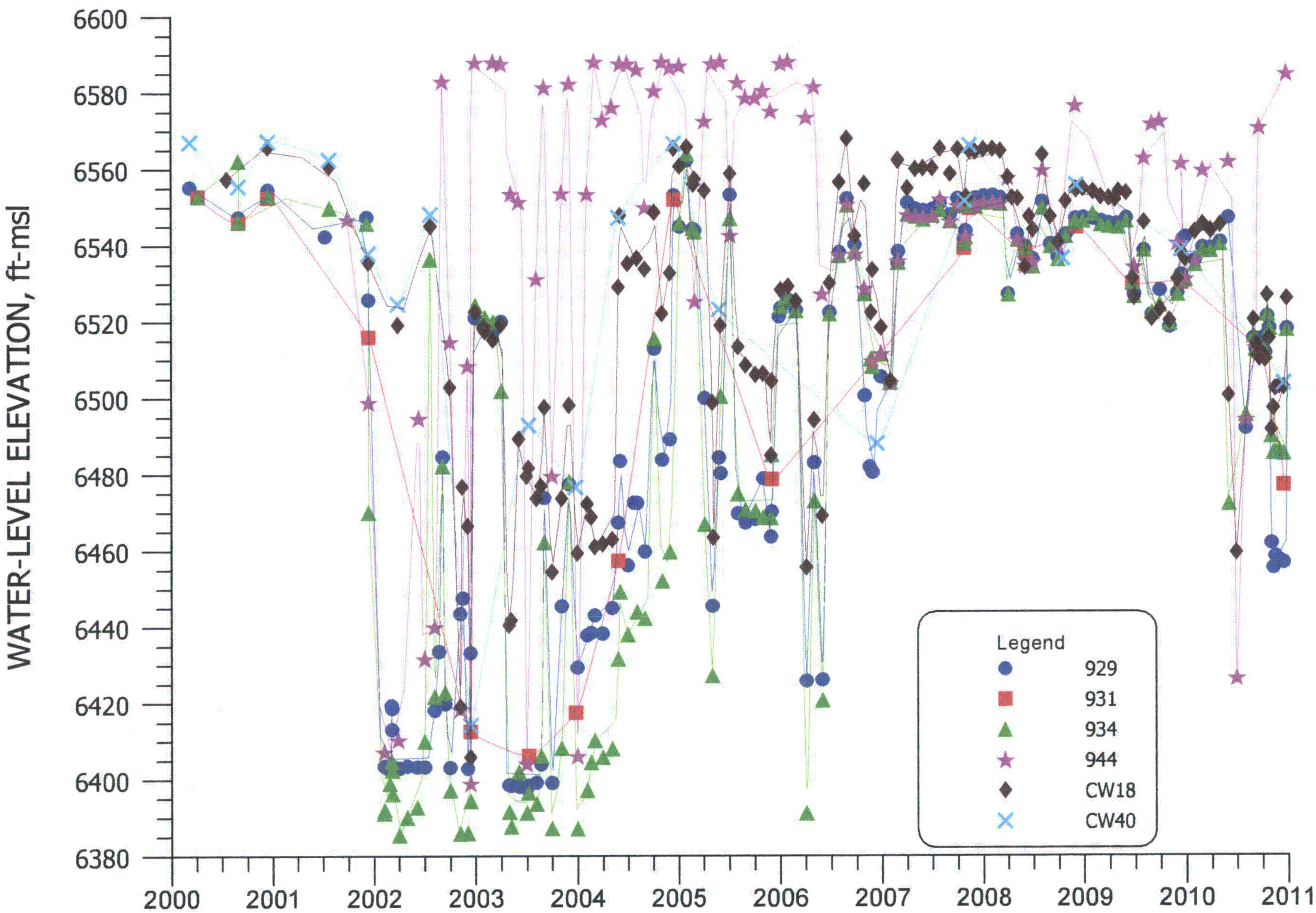


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, 934, 944, CW18, AND CW40

5.3 UPPER CHINLE WATER QUALITY

Water-quality data for 2010 for the Chinle aquifers is presented in Tables B.5-1 and B.5-2 of Appendix B. The basic well data is presented in Tables 5.1-1 through 5.1-4 and Figure 5.1-2 shows locations of the Upper Chinle wells.

Concentrations of key constituents exceed site standards for the Upper Chinle aquifer in only a few locations. Sulfate concentrations have been adequately restored in the Upper Chinle aquifer except for an area near the Large Tailings Pile. Selenium concentrations during 2010 are less than the site standard in all Upper Chinle wells except wells CE2, CE6, CE7, CE10, CE12 and CE13 which are all near the LTP. Uranium concentrations exceed the site standard in twelve wells. The slower pace of restoration is attributed to leaching of this constituent from the formation. Molybdenum concentrations in the Upper Chinle aquifer exceed the site standard in nine wells in close proximity to the tailings piles and one well east of the East Fault.

5.3.1 SULFATE - UPPER CHINLE

Figure 5.3-1 presents sulfate concentrations in the Upper Chinle aquifer during 2010. Upper Chinle sulfate concentrations varied from 601 to 6480 mg/l. Only the values from wells CE7 and CE13 exceeded the site standards for the mixing zone of 1750 mg/l and no non-mixing zone wells exceeded the site standard of 914 mg/l in the Upper Chinle in 2010 (see Section 3 or the well grouping on Figure 5.3-2 for zone areas). Upper Chinle site standards based on background data are presented for sulfate in the legend of Figure 5.3-1. These site standards have a greater than sign in front of the numeric value which is associated with the pattern for the particular zone. Therefore, only an area in the western portion of the Large Tailings to the north side of the collection ponds requires restoration in the mixing zone. The information regarding the analysis of background results that were used to develop the background and related site standards are presented previously in Section 3 of this report.

The locations of wells used in the time plots of water quality are presented on Figure 5.3-2. The color and symbol of the individual wells correspond with those used on the various water-quality time plots. Sulfate time-plot figure numbers are also shown on Figure 5.3-2 for each group. The same color and symbol scheme is used for other constituents in the Upper

Chinle discussed in this section. Notations on Figure 5.3-2 indicate that mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE11 and CW50 are grouped together on the water-quality time plots, whereas the non-mixing zone wells 929, 931, 934, CW3, and CW18 are grouped together on a second plot.

Figure 5.3-3 presents sulfate concentrations versus time for the mixing zone group of wells listed above. The sulfate concentrations in water sampled from each of these wells are less than the mixing-zone site standard (see Figure 5.3-3). Sulfate concentrations in well CE2, near the subcrop area south of the Large Tailings Pile, have increased in 2010 to a level similar to the remainder of the Upper Chinle wells in this area. The concentrations in the Upper Chinle well CE2 had previously been decreased due to the R.O. product injection into the alluvium in this area. The sulfate concentrations in well CE5 were steady in 2010.

A plot of sulfate concentrations versus time for non-mixing zone Upper Chinle wells 929, 931, 934, CW3, and CW18 is presented on Figure 5.3-4 (see Figure 5.3-2 for location of these wells). This plot shows some minor variability with fairly steady sulfate concentrations in these Upper Chinle wells in 2010. The sulfate concentration in 2007 in well CW3 declined to near the 2001 pre-pumping concentration in this well and has recently very gradually decreased. Pumping of well CW3 ceased after January of 2007. A rise in sulfate concentration to 2008 levels was observed in 2010 for well 931.

5.3.2 TOTAL DISSOLVED SOLIDS - UPPER CHINLE

Figure 5.3-5 presents contours of total dissolved solids (TDS) concentrations for the Upper Chinle aquifer during 2010. All concentrations are less than 2000 mg/l, with the exception of areas of the Upper Chinle near the Large Tailings Pile and east of State Highway 605 in Sections 25, 35 and 36. 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 Figure 5.3-5 shows where the Upper Chinle TDS concentrations are greater than 2010 mg/l, which is the non-mixing zone site standard. TDS concentrations in this area east of Highway 605 are natural and not attributable to the Grants tailings piles. The sulfate concentrations exceed the mixing zone standard of 3140 mg/l near the Large Tailings in wells CE7 and CE13. The Upper Chinle aquifer near the Large Tailings Pile still requires restoration with respect to TDS concentration.

Figure 5.3-6 presents TDS concentrations for mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE11 and CW50. The TDS concentrations in well CE2 increased in 2010 to a level similar to the Upper Chinle wells in this area. The TDS gradually declined in well CE11 in 2010 as this well was continuously pumped. All of these wells contain water with TDS concentrations less than the mixing zone standard of 3140 mg/l.

Time plots of TDS concentrations for non-mixing zone wells 929, 931 934, CW3, and CW18 are presented in Figure 5.3-7. This figure shows overall steady TDS concentrations in these wells for 2010 except an increase in well 931. The TDS concentrations in well CW3 in 2010 gradually declined to close to pre-pumping levels in 2001.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2010 are presented on Figure 5.3-8. In the two up-gradient Upper Chinle wells CW50 and CW52, 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 western portion of the Large Tailings exceed 250 mg/l and require restoration in this area. Chloride concentrations east of the East Fault naturally increase due to the slower movement of ground water with increasing distance east of the East Fault and are not attributable to the Grants site.

The chloride concentrations in water collected from mixing zone Upper Chinle wells 494, CE2, CE5, CE8, CE11 and CW50 are presented on Figure 5.3-9. In Upper Chinle well CE2 chloride concentrations gradually increased in 2010. The September 2008 chloride concentration from well CE5 is thought to be an outlier. Overall, the chloride concentrations in wells 494, CE5, CE11 and CW50 have not changed significantly in 2010.

The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10. This plot shows a gradual decrease in chloride concentrations in 2010 in well CW3. A decrease in concentrations in well CW3 has been observed due to the ceasing of pumping of this Upper Chinle well in January of 2007. The chloride concentration in well CW3 is still above the pre-pumping levels in 2001.

5.3.4 URANIUM - UPPER CHINLE

Uranium is an important parameter for identifying impacts to the Upper Chinle aquifer. Figure 5.3-11 presents contours of uranium concentrations in the Upper Chinle aquifer for 2010. Twelve of the uranium concentrations measured in Upper Chinle water in 2010 exceeded the corresponding mixing or non-mixing zone site standards. These concentrations are expected to gradually decrease to below background concentrations with the ongoing ground water-quality restoration efforts in the Large Tailings Pile area. The highest value measured east of the East Fault in 2010 was observed in well 934 at 0.14 mg/l. This value is above the corresponding non-mixing zone standard of 0.09 mg/l and needs additional data with time prior to giving it much significance.

Plots of uranium concentrations versus time for Upper Chinle wells 494, CE2, CE5, CE8, CE11 and CW50 are presented on Figure 5.3-12 (see Figure 5.3-2 for location of these wells). This plot demonstrates that the uranium concentrations in Upper Chinle well CE11 increased in early 2008 and then declined in 2009 and 2010. Uranium concentrations in wells 494, CE8 and CW50 were overall steady in 2010. The uranium concentrations in Upper Chinle collection well CE2 increased in 2010, likely due to the continued pumping of this well. The initiation of pumping Upper Chile well CE7 upgradient of well CE2 should keep concentration in CE2 from increasing.

The uranium concentrations in all of the Upper Chinle wells in the non-mixing zone are very low except for a larger value measured in well CW3. The decrease in uranium concentration at well CW3 in 2007 is due to the cessation of pumping this well after January of 2007. Concentrations in well CW3 were fairly steady in 2008 but have declined in 2009 and 2010. Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells 929, 931, 934, CW3, and CW18. With the exception of wells 934 and CW3, concentrations in these wells are less than the site standard.

5.3.5 SELENIUM - UPPER CHINLE

Contours of 2010 selenium concentrations in the Upper Chinle aquifer are presented on Figure 5.3-14. This figure shows that the selenium concentrations are less than the mixing-zone site standard of 0.14 mg/l with the exception of wells CE2, CE6, CE7, CE10, CE12 and CE13. The non-mixing zone NRC site standard of 0.06 mg/l is not exceeded.

Figure 5.3-15 presents selenium concentrations for wells 494, CE2, CE5, CE8, CE11 and CW50. The selenium concentration in collection wells CE5 and CE11 were steady in 2010 while pumping of these wells. The selenium concentration in collection well CE2, further to the north increased in 2010. The selenium concentrations for all of the remaining wells on this plot are low.

Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells 929, 931, 934, CW3, and CW18. This plot shows that selenium concentrations for these wells have remained low during 2010. The selenium concentration in water collected from Upper Chinle well CW3 declined in 2007 to a level that existed prior to its continuous pumping which started in 2001. The previously observed decreases in selenium concentrations in wells CW40 and CW18 were due to the injection of fresh water in Upper Chinle well CW13 east of the East Fault; selenium concentrations remain low in these wells. The higher selenium from well 929 in early 2007 is questionable because the value before and after is very small as with all previous and subsequent observations.

5.3.6 MOLYBDENUM - UPPER CHINLE

Figure 5.3-17 presents the molybdenum concentrations in the Upper Chinle aquifer during 2010. Molybdenum concentrations near and underlying the Large Tailings Pile 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 Large Tailings Pile, and toward well CW3. Additional restoration is needed in this area, and should be easily accomplished after the alluvial aquifer is restored in the subcrop area. All molybdenum concentrations south of the Small Tailings Pile and east of the East Fault in the Upper Chinle aquifer are below the site standards except for a value of 0.11 mg/l in well 934.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. In 2010, concentrations in wells 494, CE8 and CW50 were fairly similar to those observed in previous years. Concentrations overall increased at collection well CE2 in 2010. Selenium concentrations increased in 2008 due to pumping well CE11 but has steadily declined the last three years. Concentrations were steady in 2010 in collection well CE5.

Figure 5.3-19 contains time plots of molybdenum concentrations for wells 929, 934, CW3, CW18 and CW40. Small concentrations of molybdenum are generally present in each of these wells except for the larger values observed in well CW3. Molybdenum concentrations in well CW3 decreased in 2007 due to the ceasing of pumping this well but were fairly steady in 2008 and have declined in 2009 and 2010.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2010 to confirm that concentrations are significantly below the site standards of 15 mg/l for the mixing zone. Figure 5.3-20 presents nitrate concentrations in the Upper Chinle aquifer during 2010. The largest nitrate concentration observed in 2010 was 9.6 mg/l in well CE13. Therefore, all of the nitrate concentrations are less than the site standard. Routine monitoring of nitrate concentrations in the Upper Chinle aquifer is only warranted near the west edge of the LTP because concentrations are well below levels of concern except near the subcrop area 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 2010. 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 is not considered necessary.

5.3.8 RADIUM-226 AND RADIUM-228 - UPPER CHINLE

All radium concentrations in the Upper Chinle aquifer have been low in past years. Radium concentrations were analyzed for all Upper Chinle wells in 2003 to update the database. Figure 5.3-21 presents the radium-226 and the radium-228 concentrations measured in 2010.

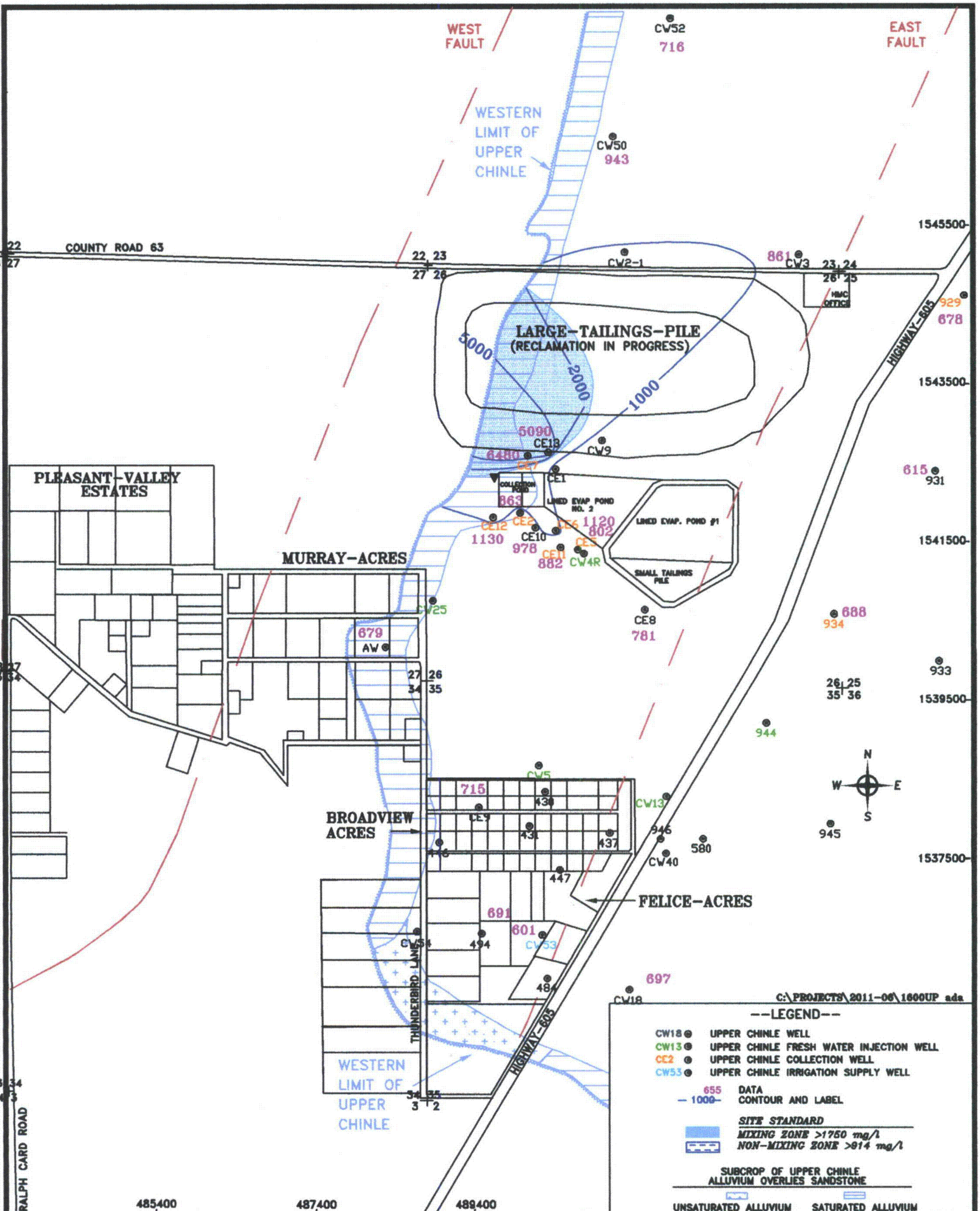
The largest radium-226 concentration measured in the Upper Chinle wells in 2010 was 0.6 pCi/l in wells CE13 and CW50. All of the radium-228 values were less than or equal to one pCi/l. This data shows that radium-226 and radium-228 are not present at concentrations that are significant in the Upper Chinle aquifer at the Homestake site. No concentration plots were prepared for radium because observed concentrations have been low and remained so through 2010. A radium site standard is not considered to be necessary for the Upper Chinle aquifer and has therefore not been established.

5.3.9 VANADIUM - UPPER CHINLE

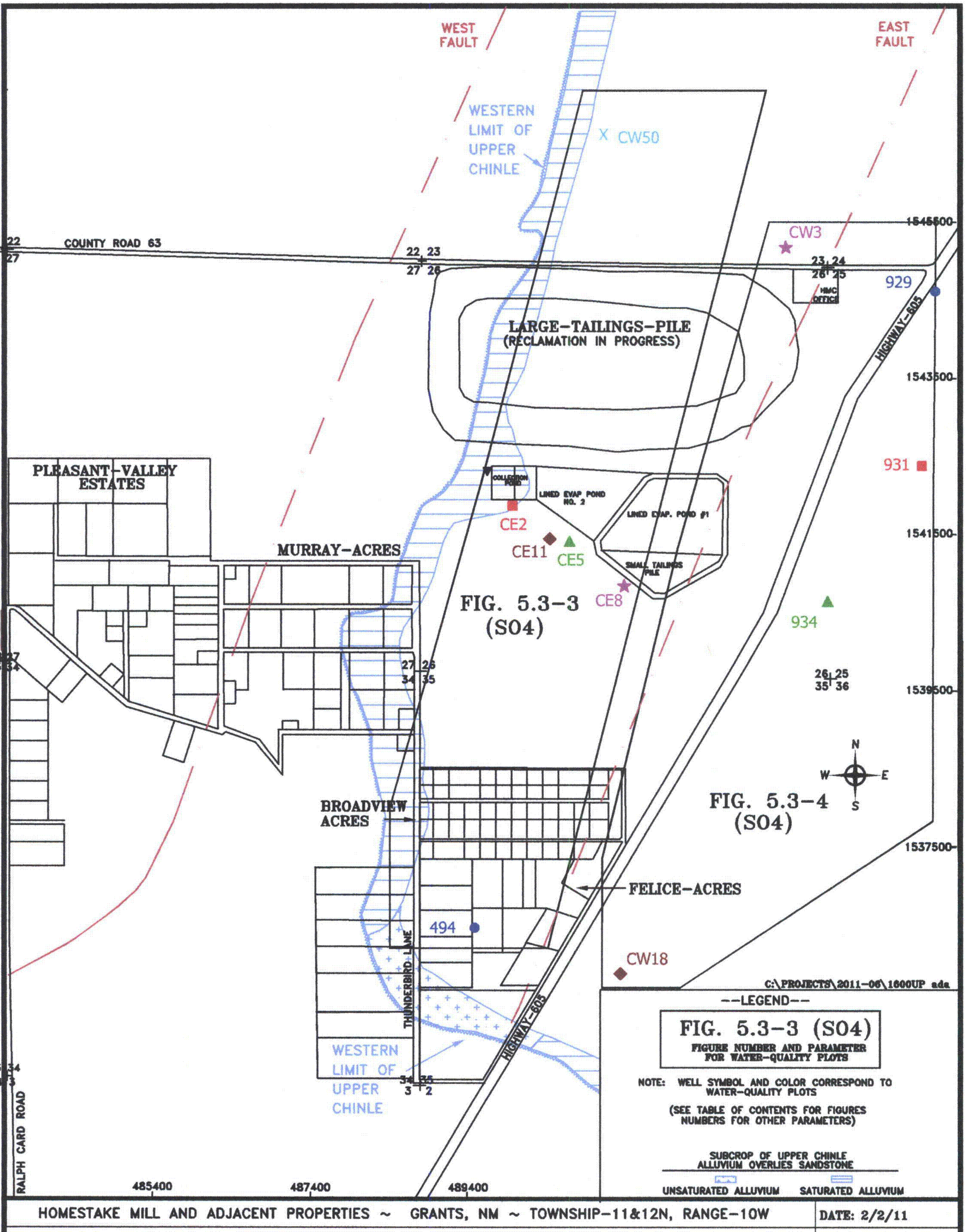
Vanadium concentrations have always been low in the Upper Chinle aquifer except the recent values in wells CE13 and CE7 that have been only slightly elevated above detection limits. The occurrence of significant concentrations in the Upper Chinle aquifer is unlikely because this constituent is not present at elevated concentrations in the alluvial aquifer with the exception of the immediate tailings area. Figure 5.3-22 shows that all of the 2010 measured vanadium concentrations are less than 0.01 mg/l except for the two wells previously mentioned. Vanadium was measured in well CE13 in 2010 at slightly above the site standard. 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 2010 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2010 were less than or equal to 0.2. None of the concentrations in 2010 exceed the mixing zone or non-mixing zone background values therefore, a site standard for thorium has not been set for the Upper Chinle aquifer. No plots of the thorium-230 concentration with time were developed due to the lack of any significant change in the low concentrations over the period of record. Thorium-230 levels do not warrant establishment of a site standard for this constituent.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/11
FIGURE 5.3-1. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l	SCALE: 1"=1600'
	PAGE: 5.3-8



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

DATE: 2/2/11

FIGURE 5.3-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2010

SCALE: 1"=1600'

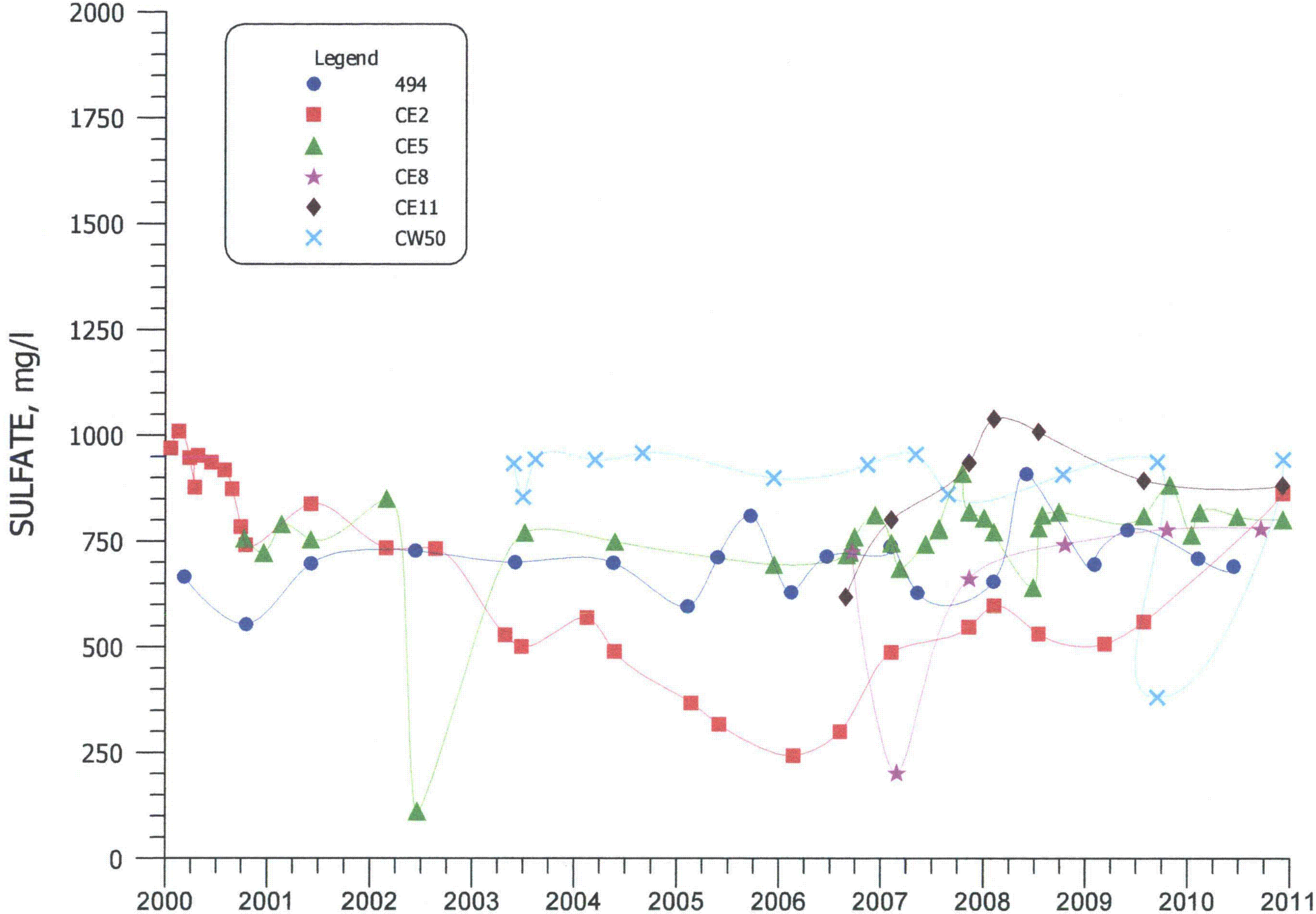


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

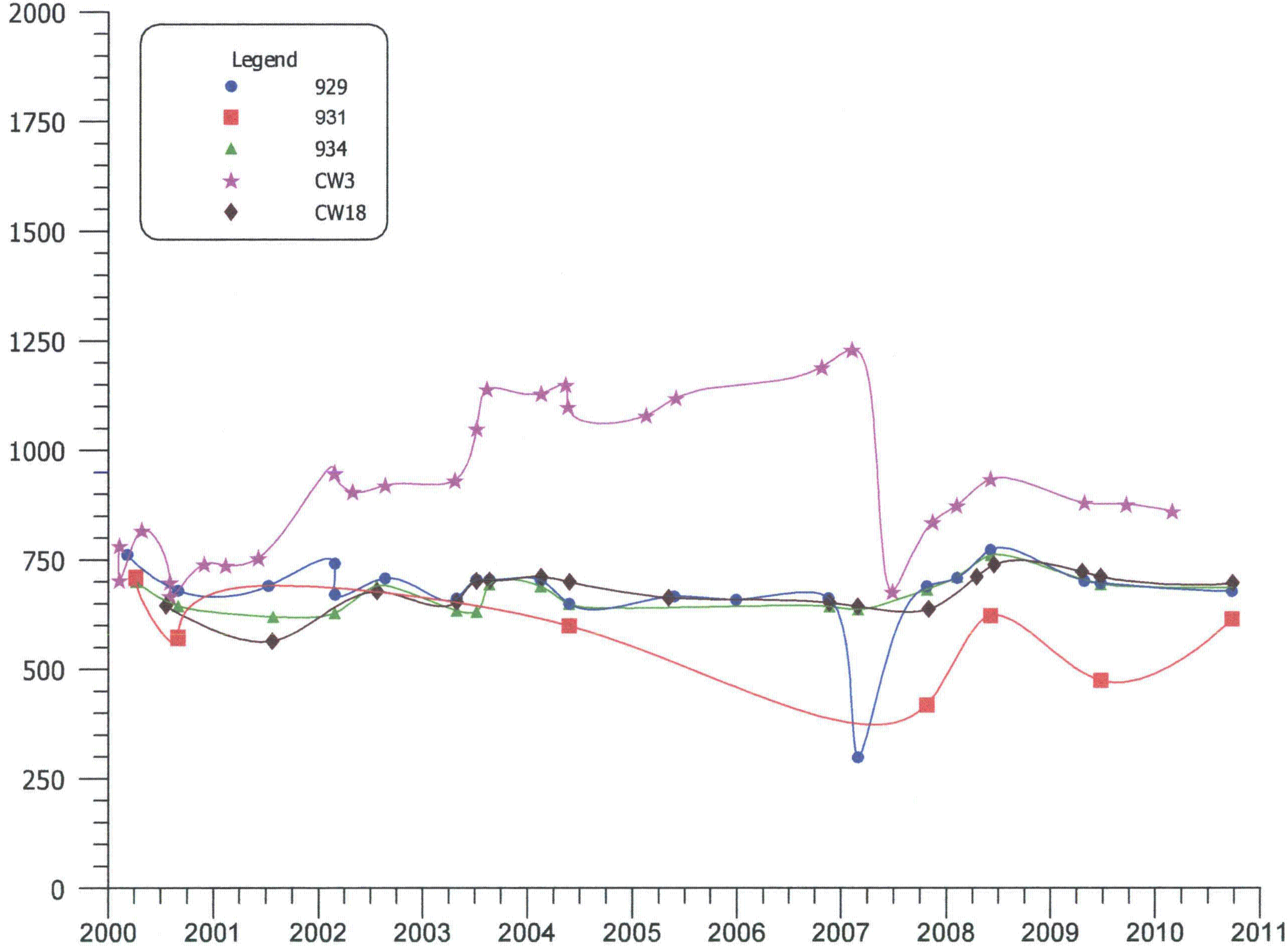
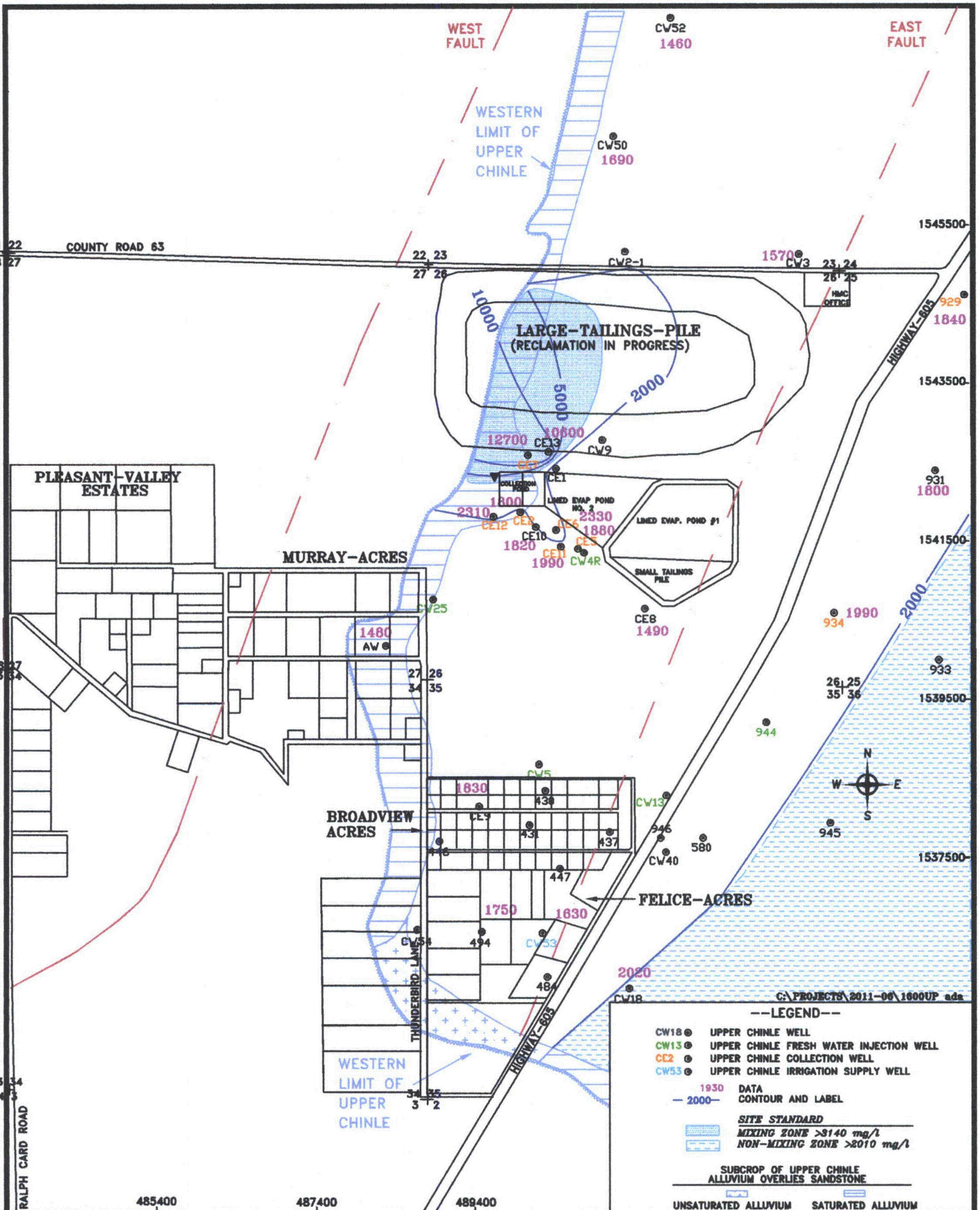


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, 934, CW3, AND CW18.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/11
FIGURE 5.3-5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l	SCALE: 1"=1600'
	PAGE: 5.3-12

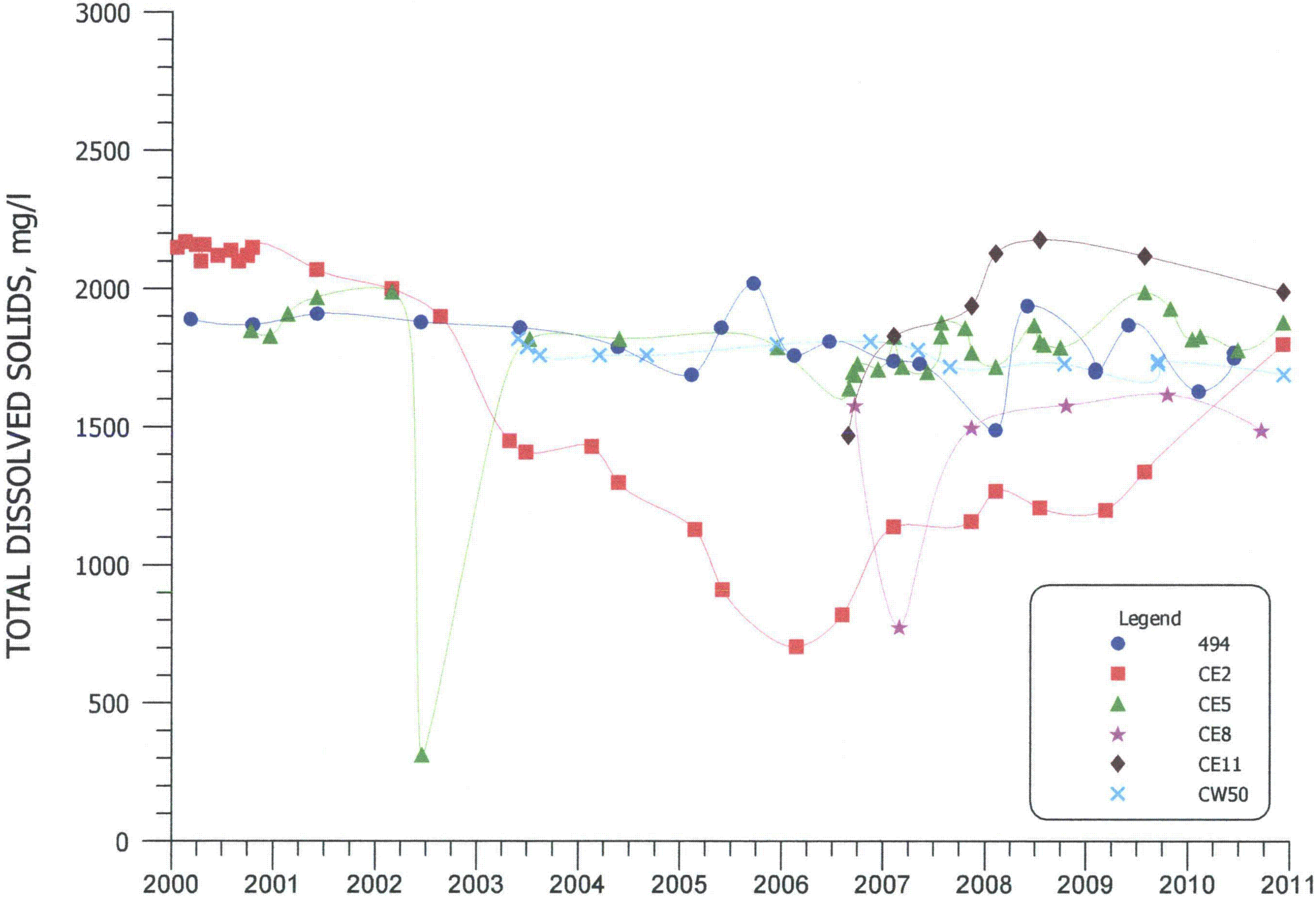


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

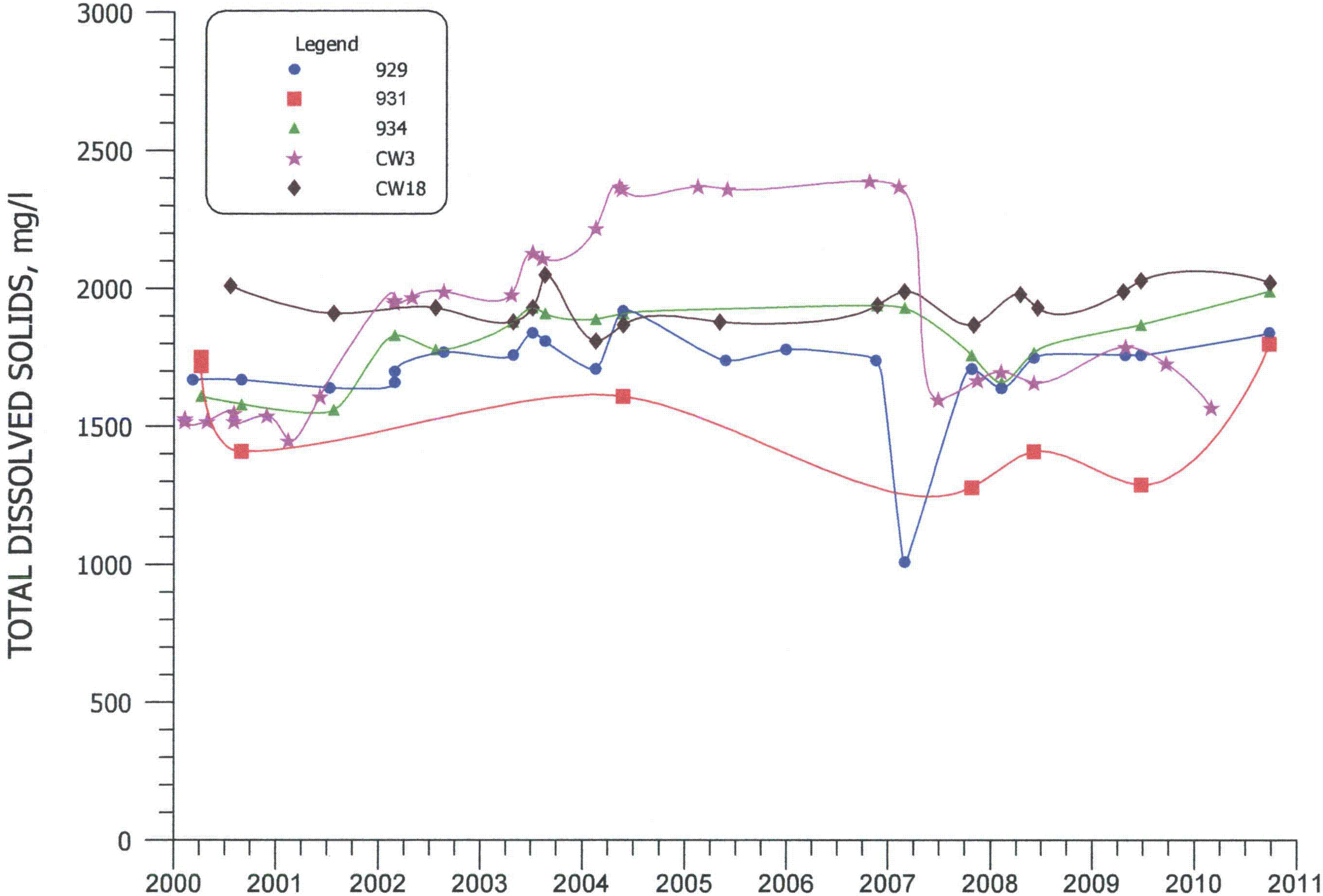
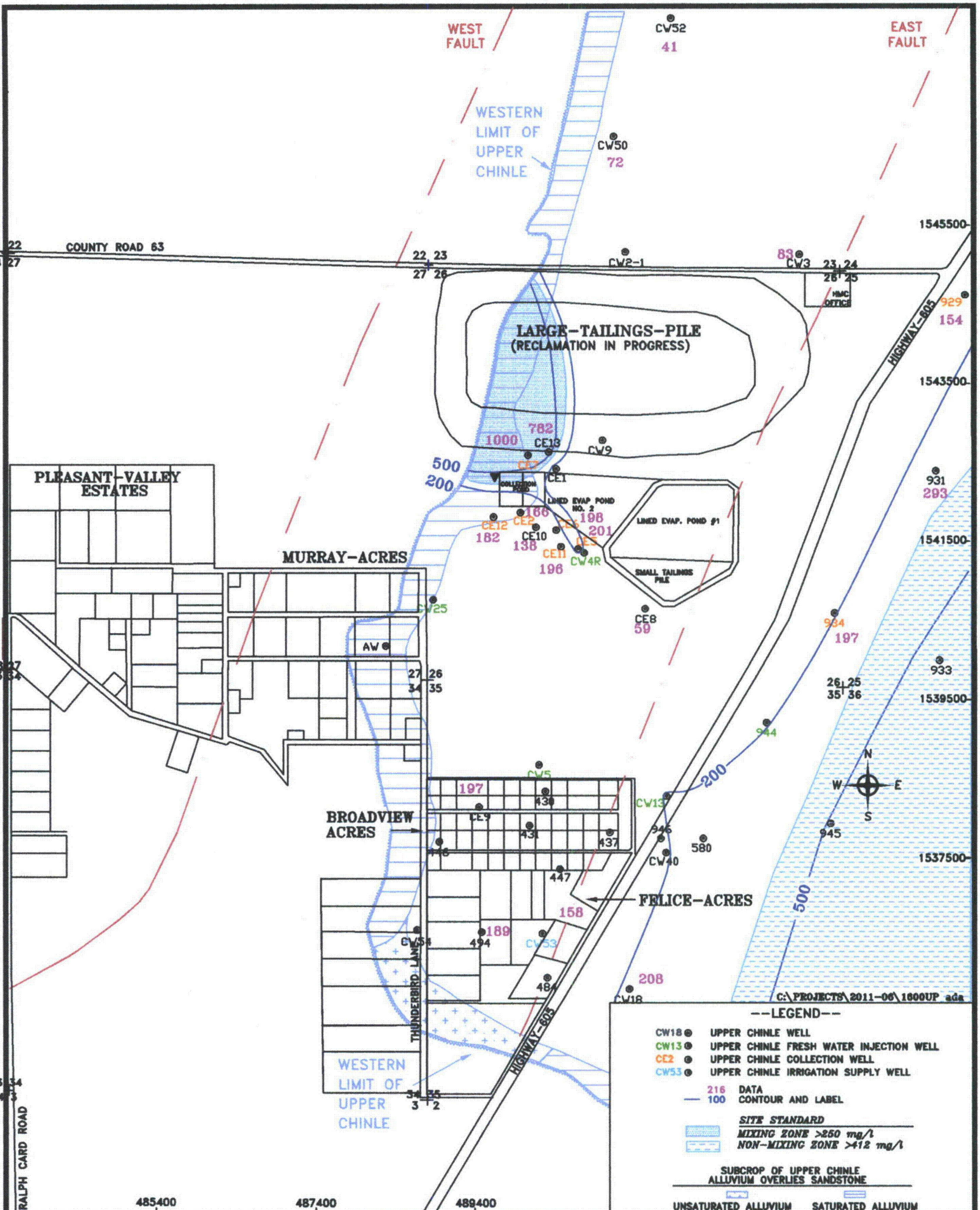


FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, 934, CW3, AND CW18.



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

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FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l

SCALE: 1"=1600'

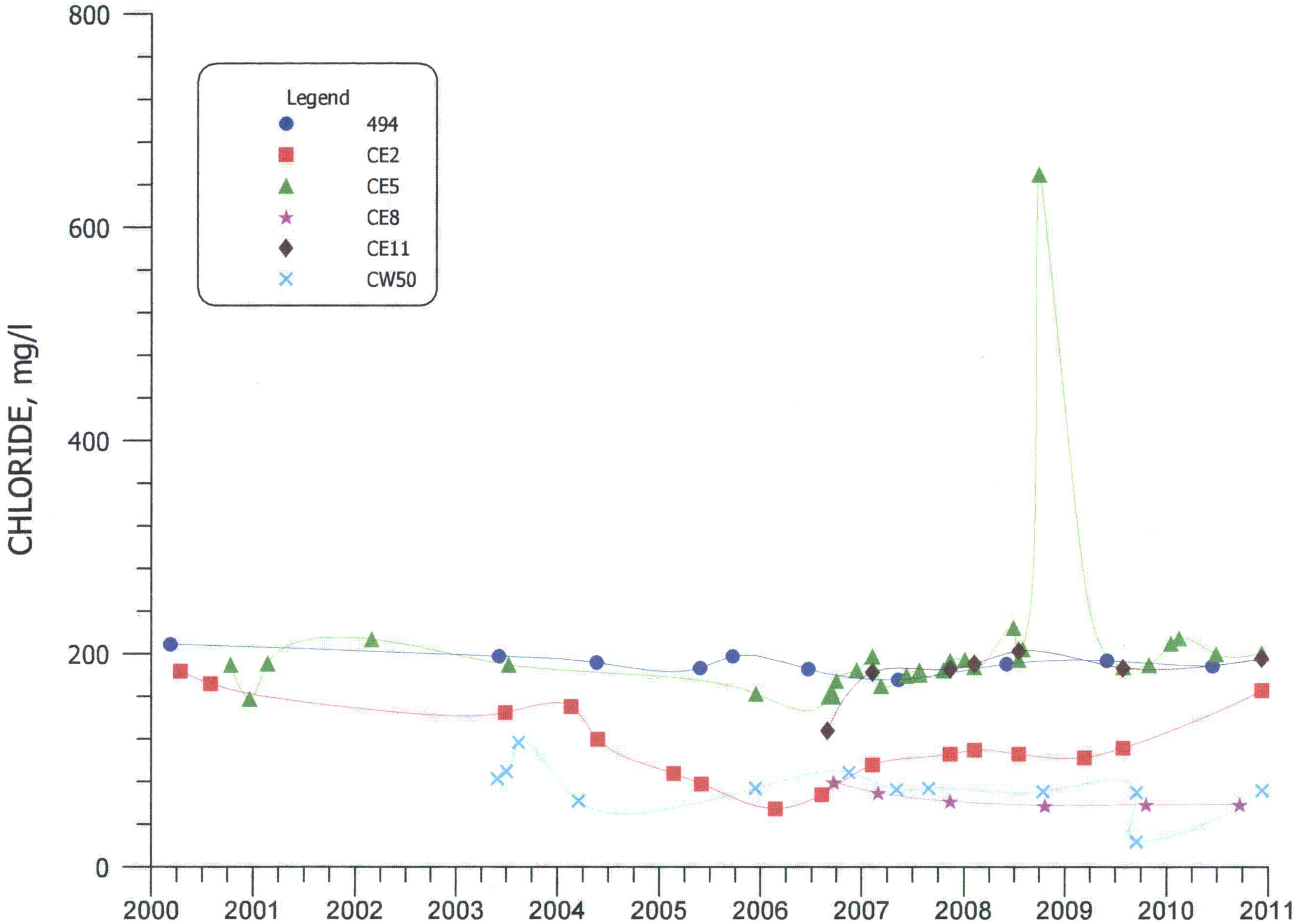


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

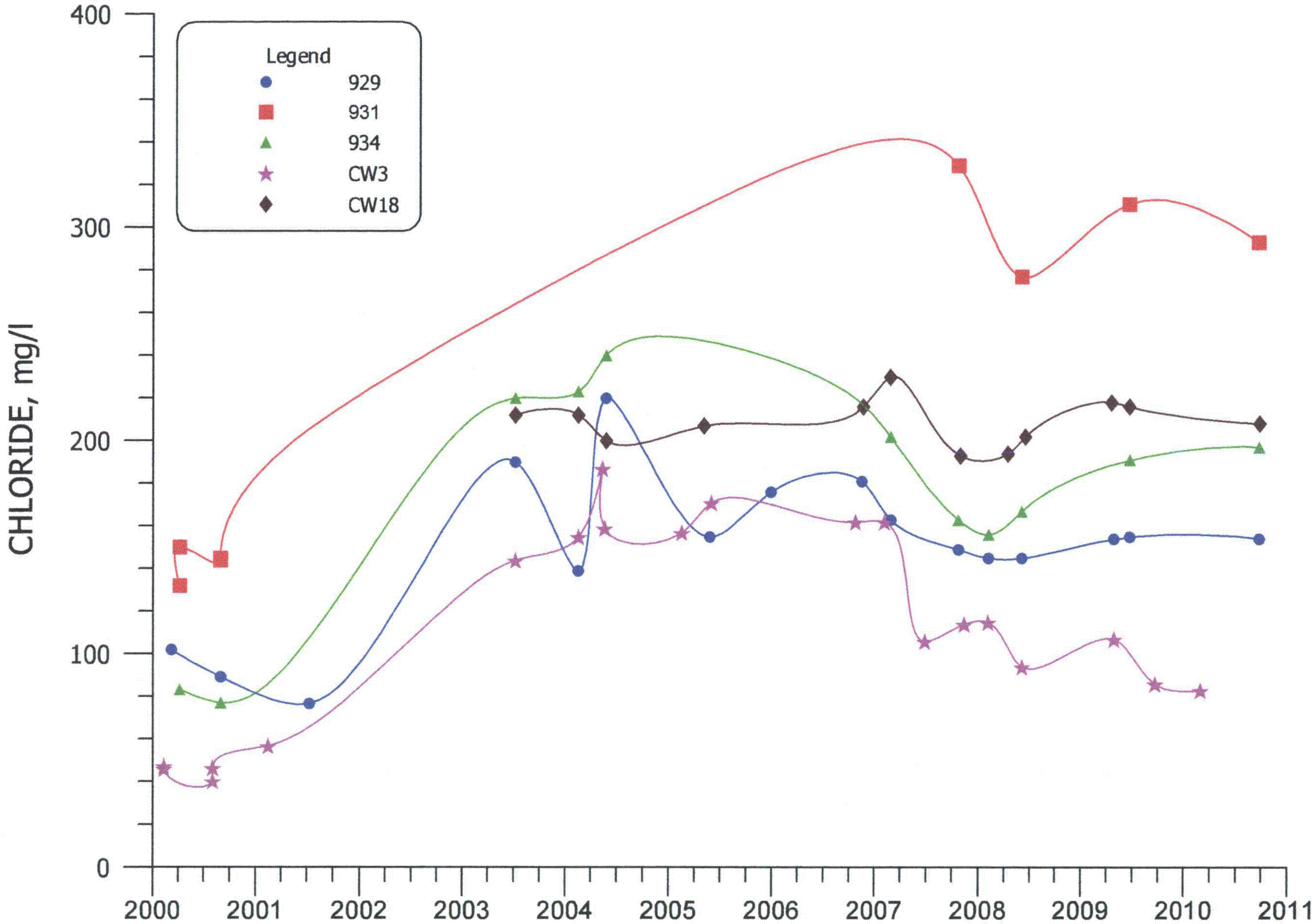
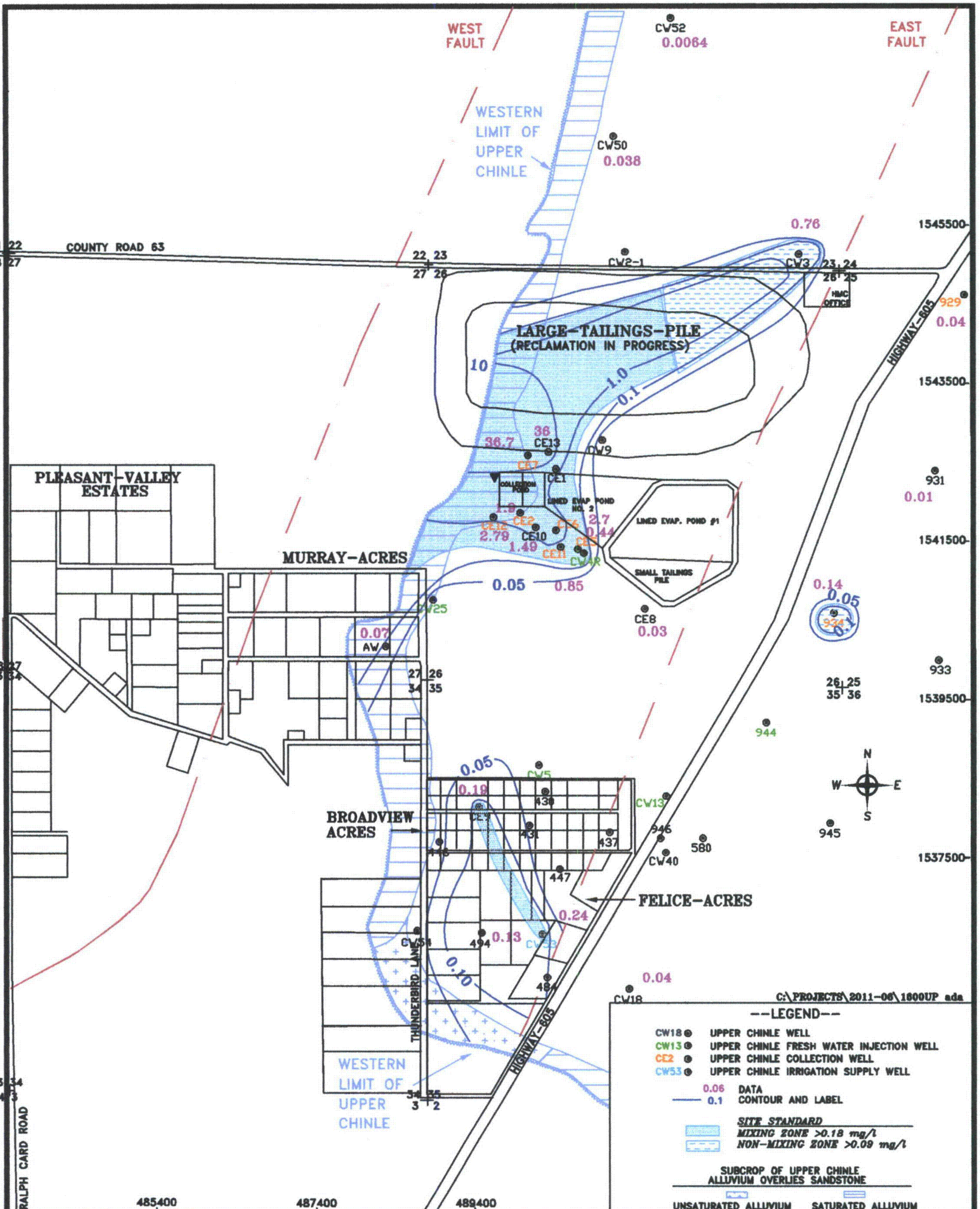


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, 934, CW3, AND CW18.



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

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FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l

SCALE: 1"=1600'

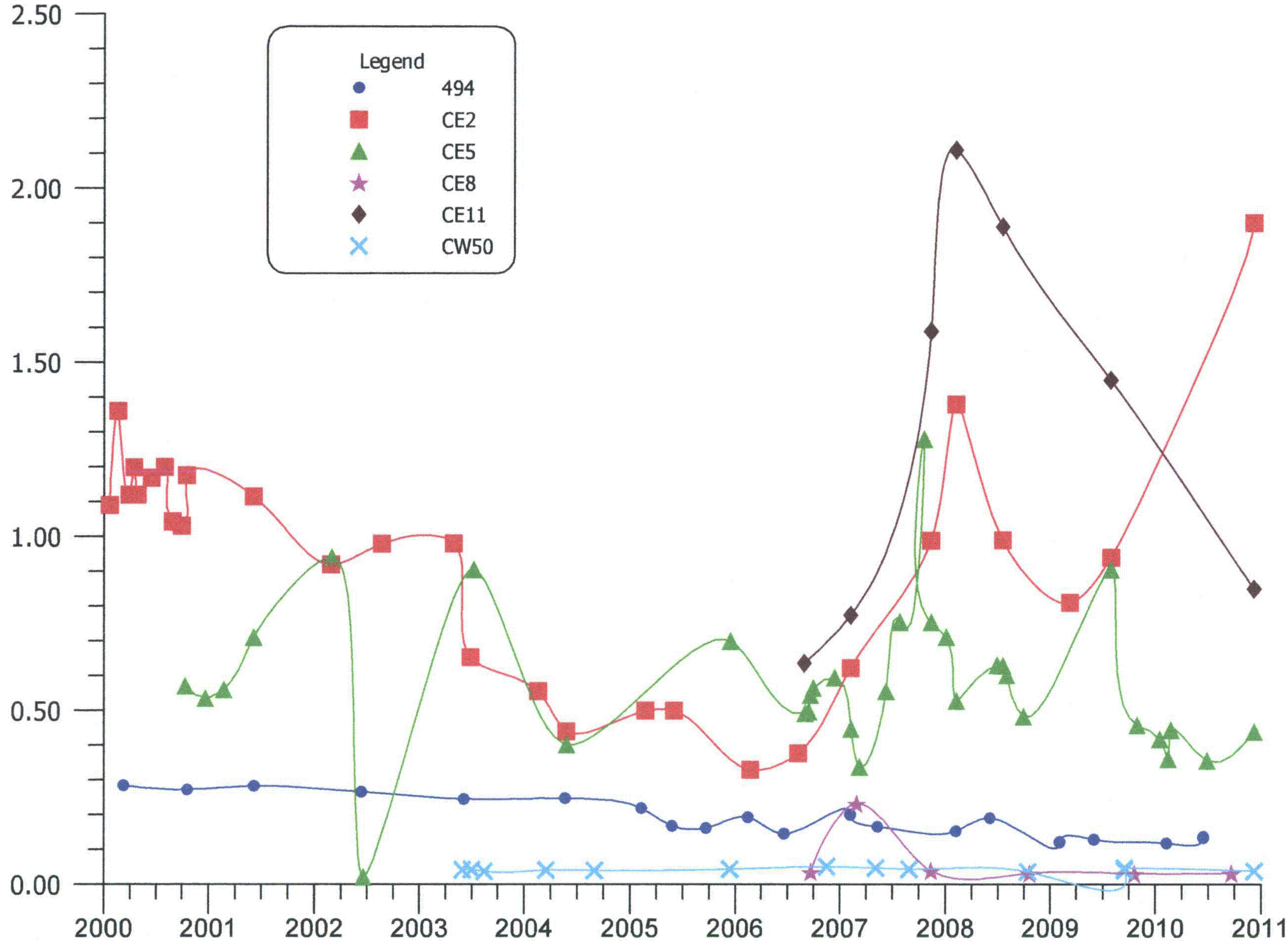


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

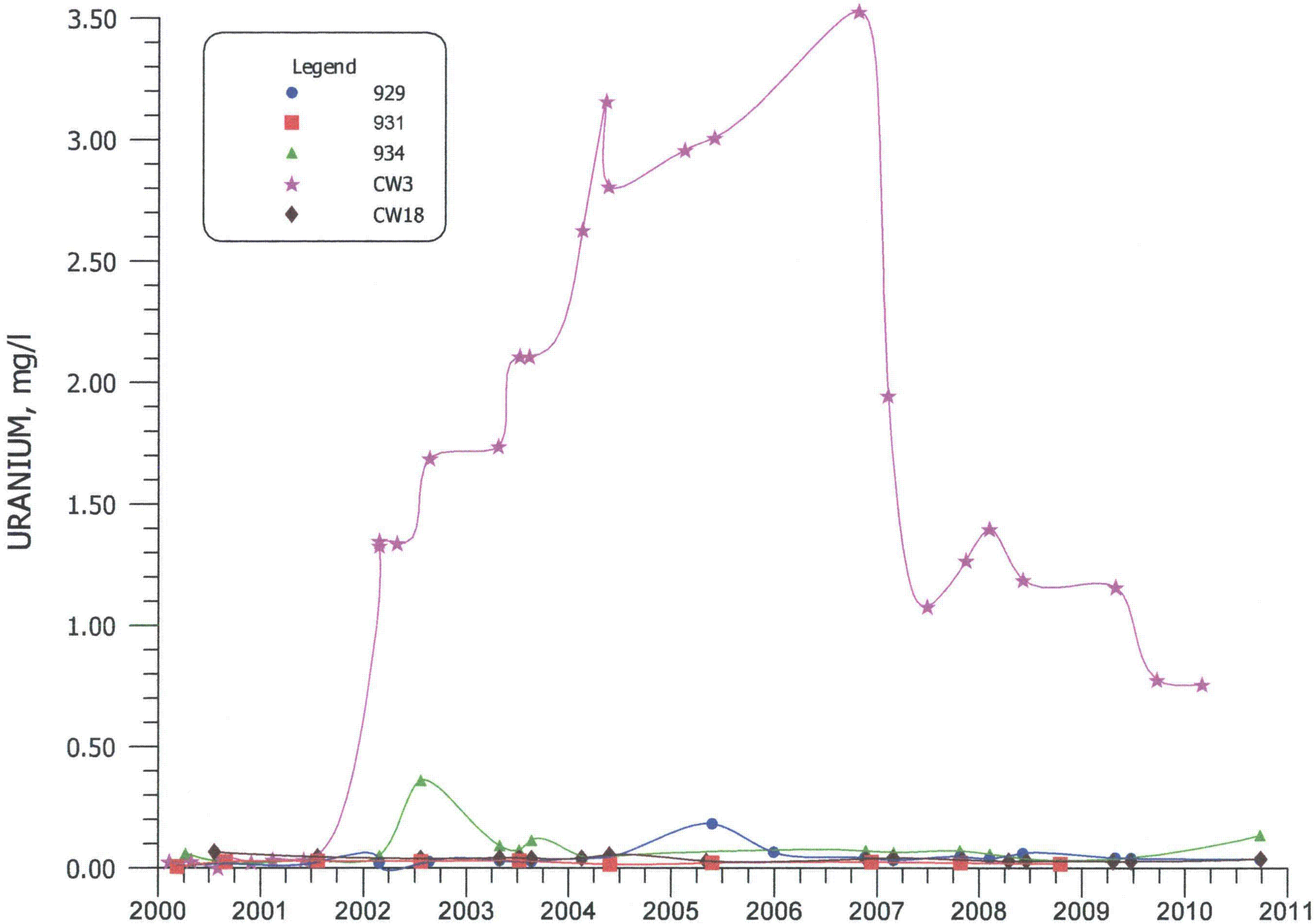
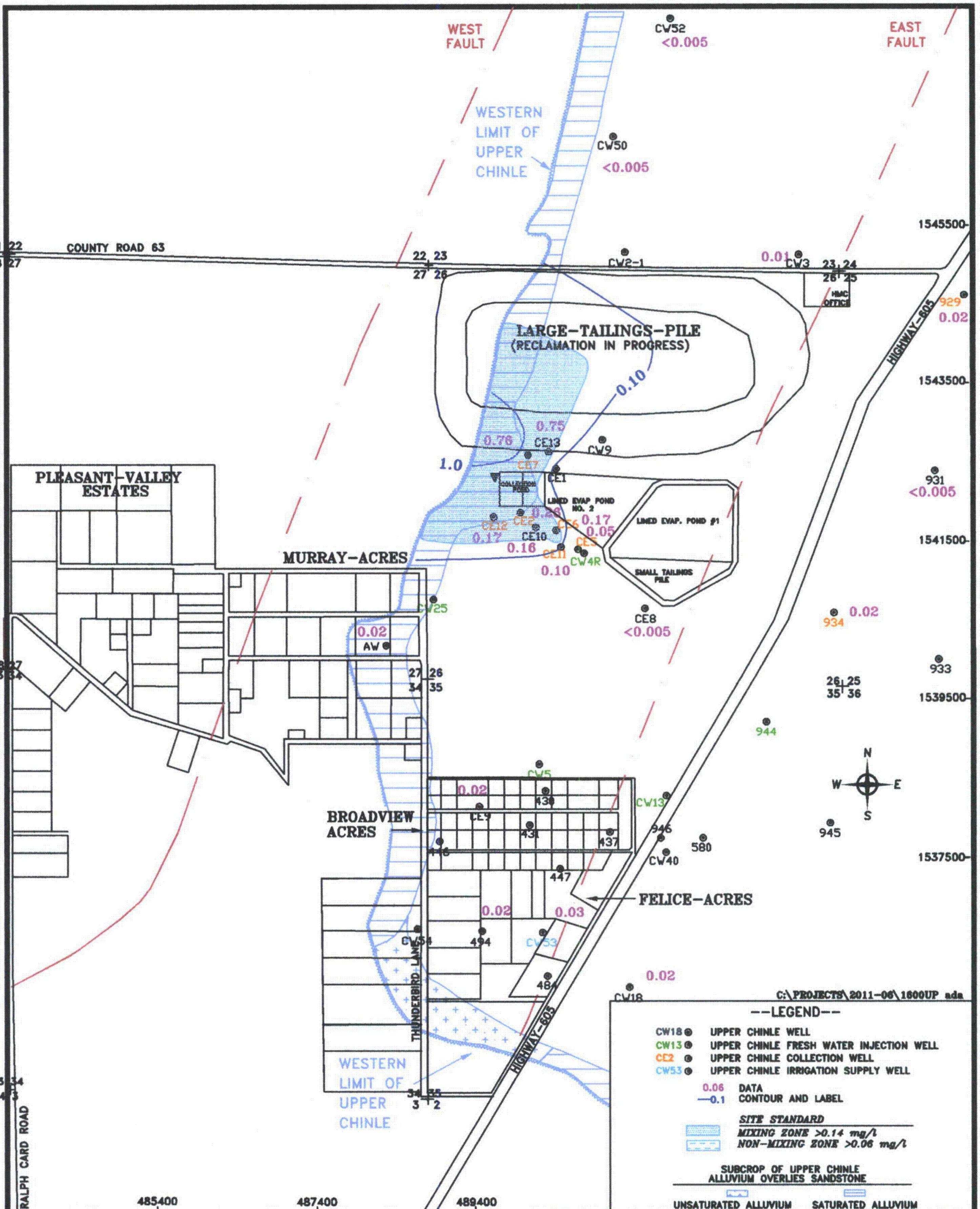


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, 934, CW3, AND CW18.



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

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SCALE: 1"=1600'

PAGE: 5.3-21

FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l

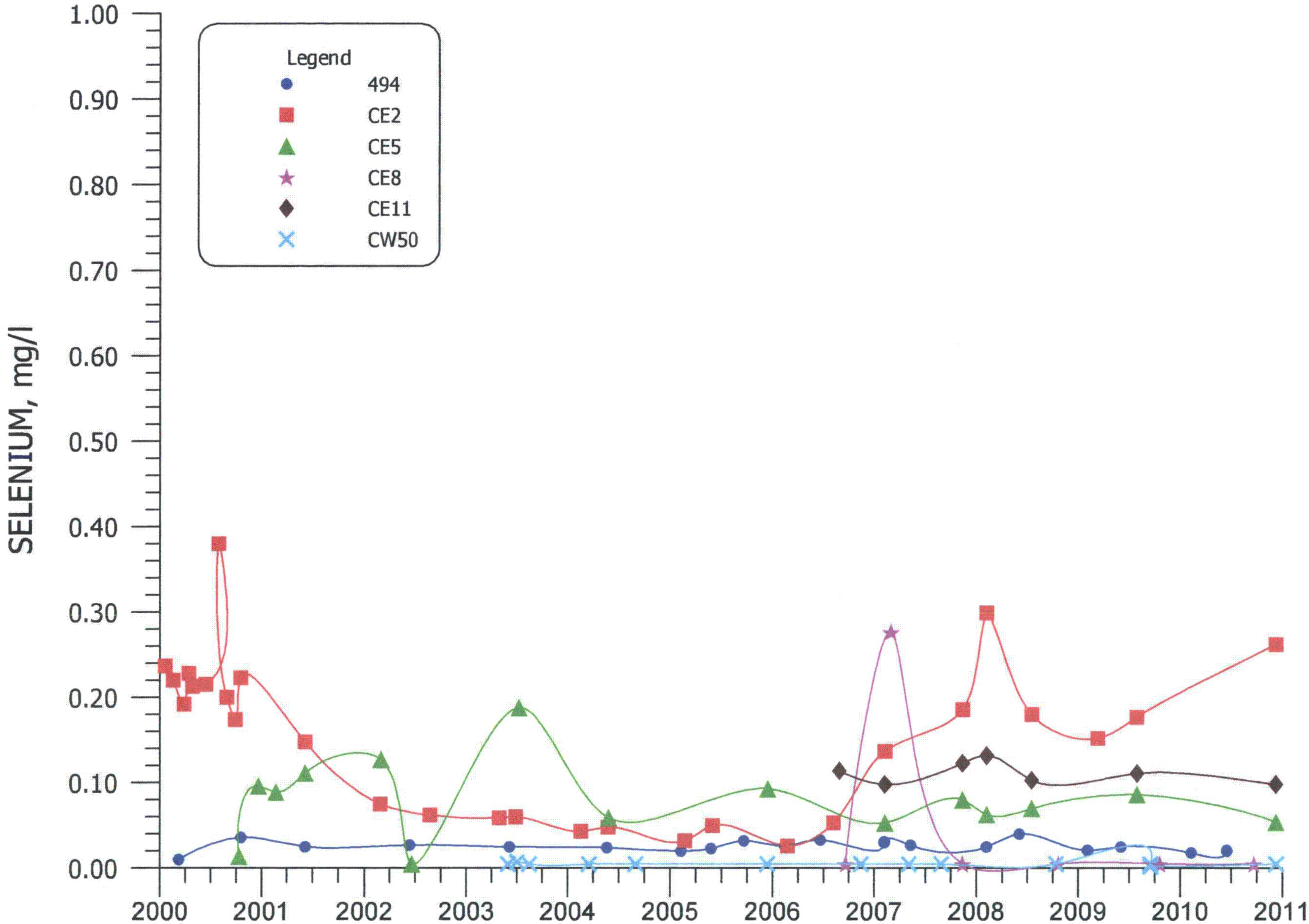


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

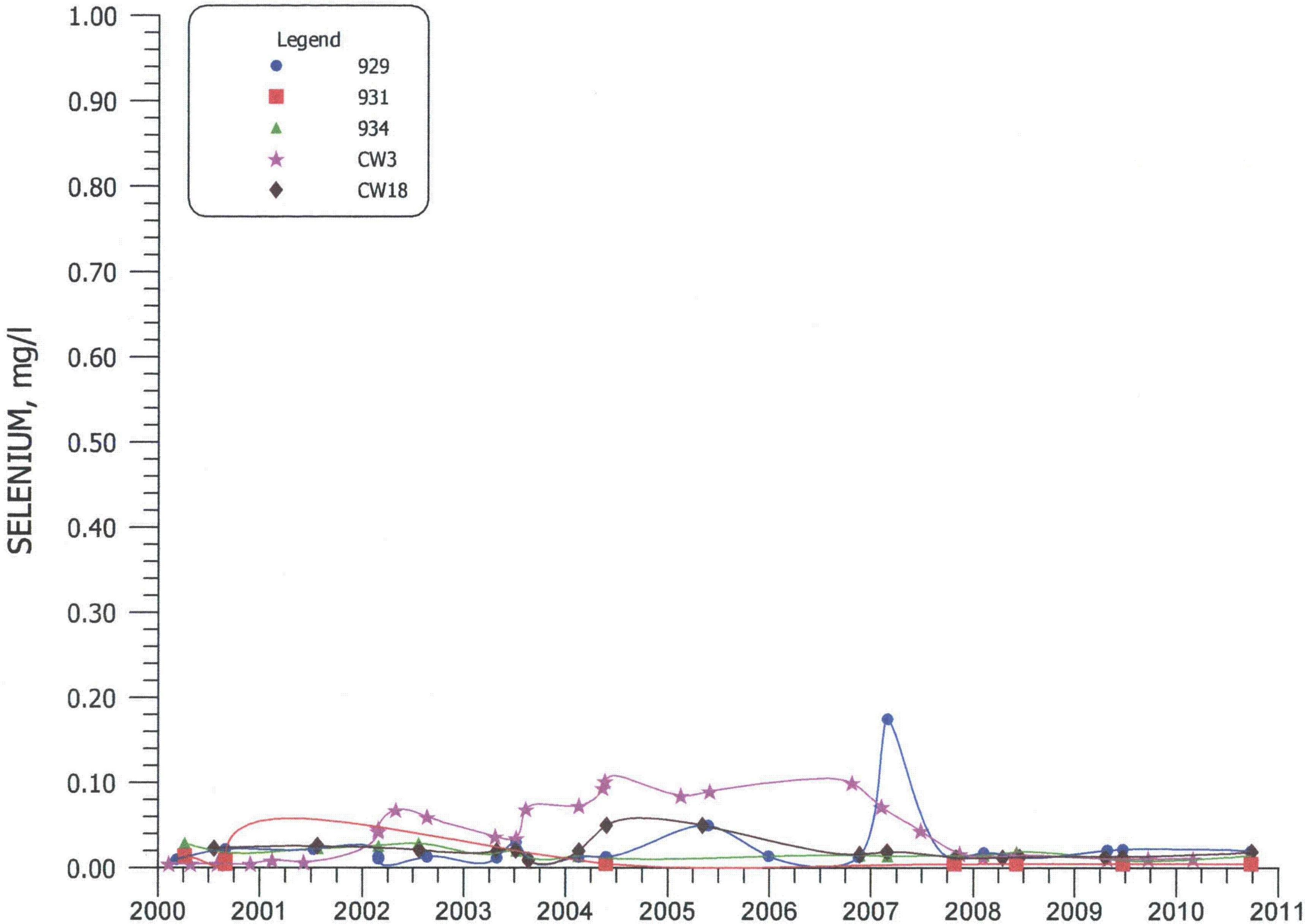
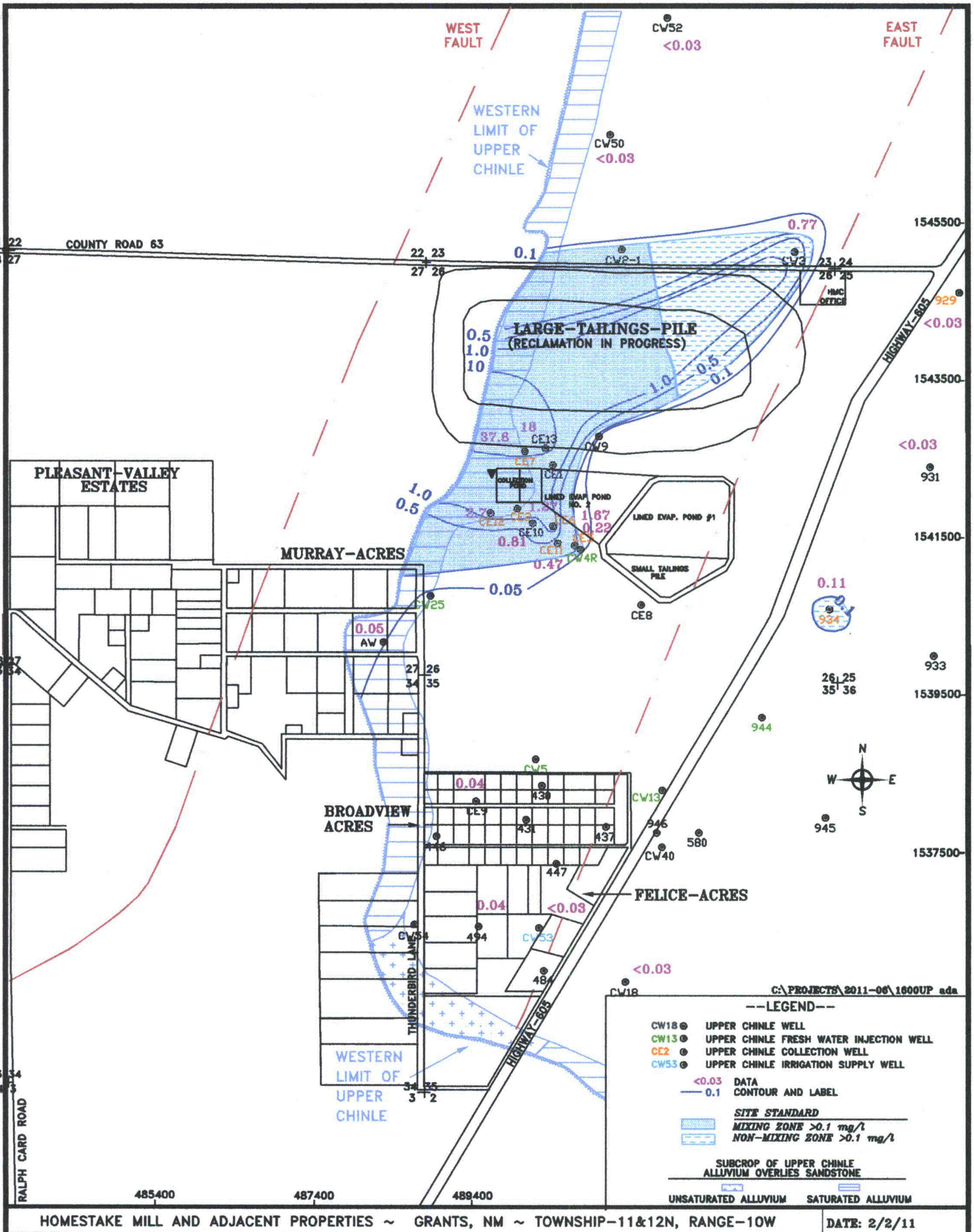


FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931 934, CW3, AND CW18.



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

FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l

DATE: 2/2/11

SCALE: 1"=1600'

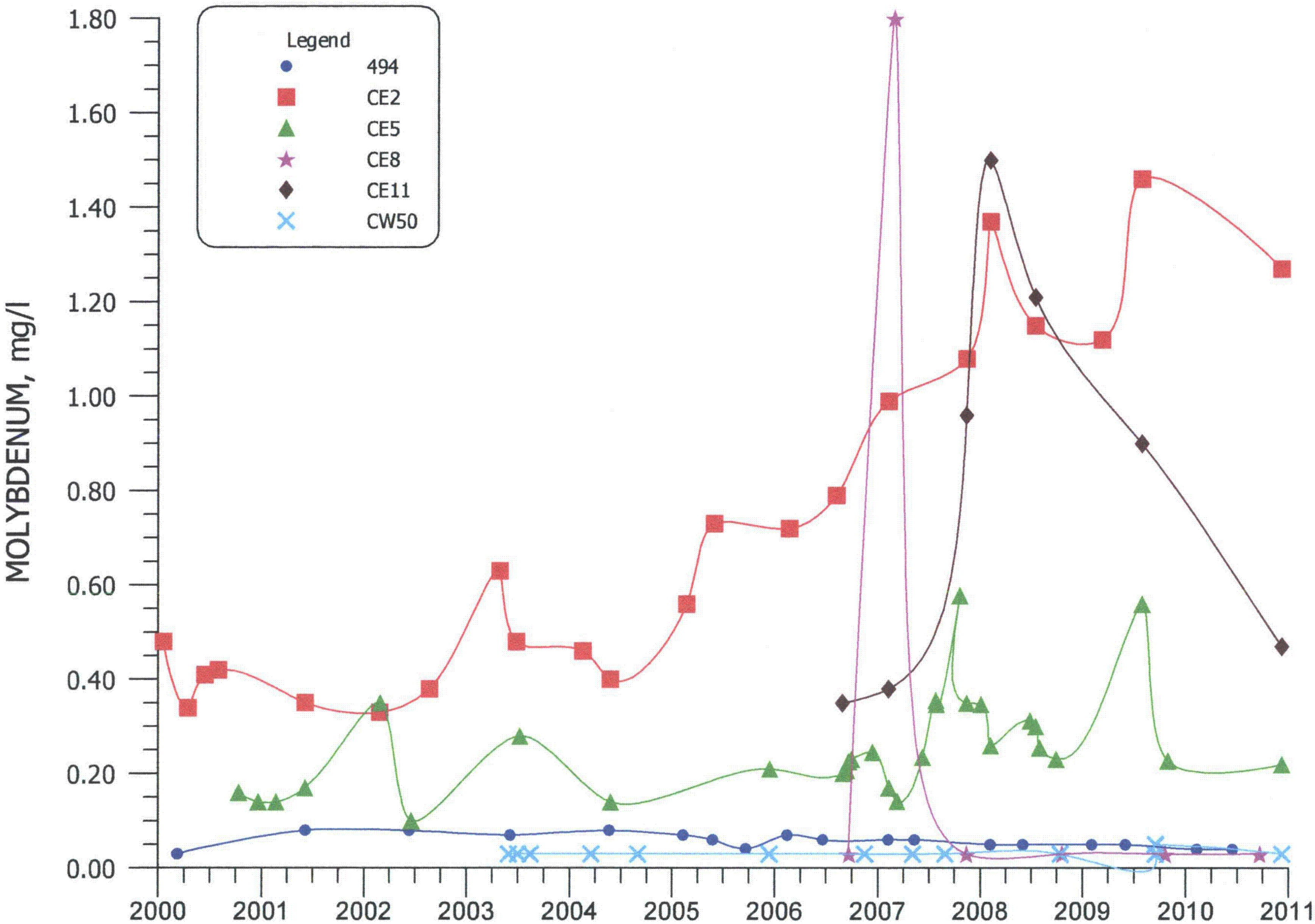


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CE8, CE11, AND CW50.

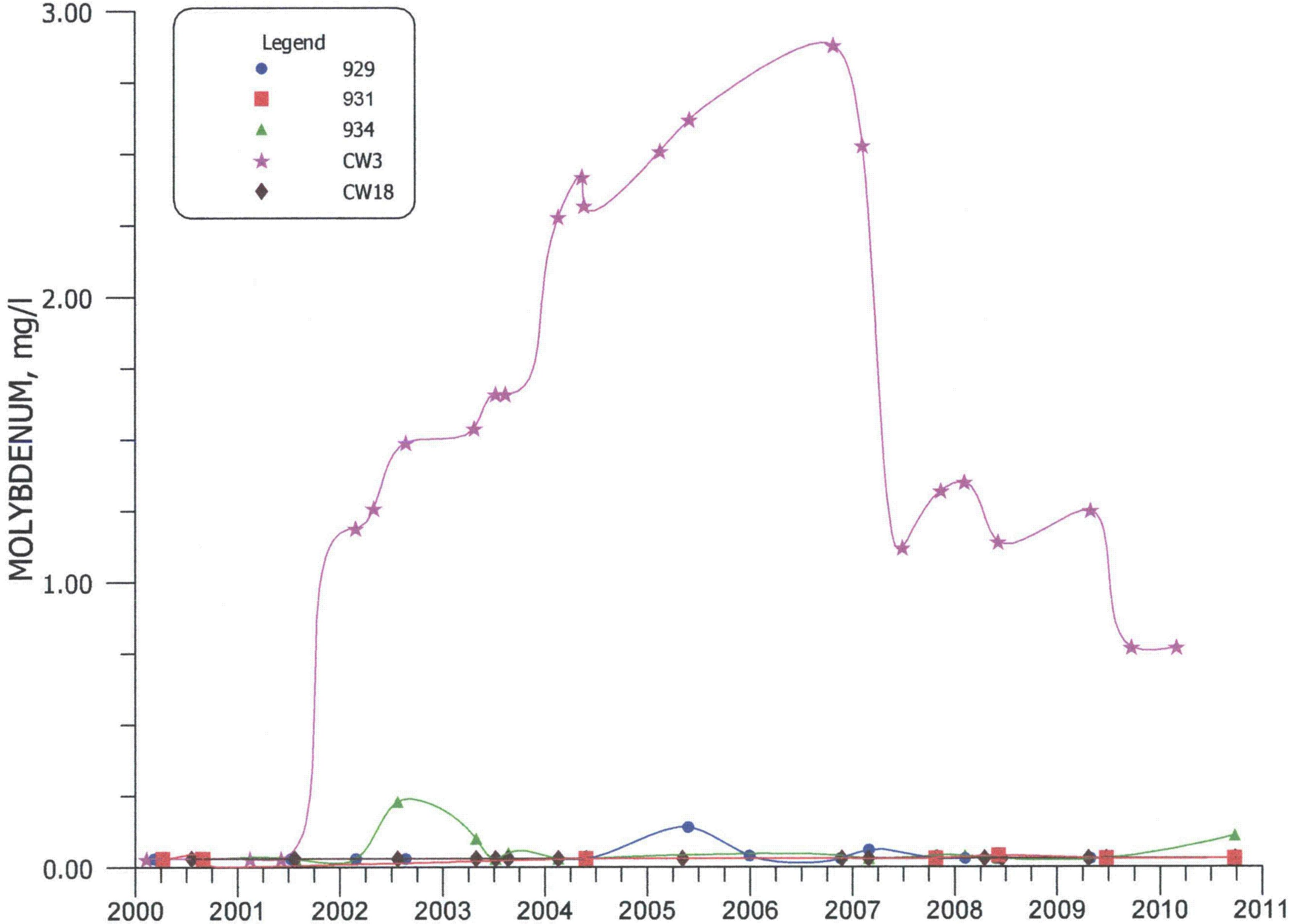
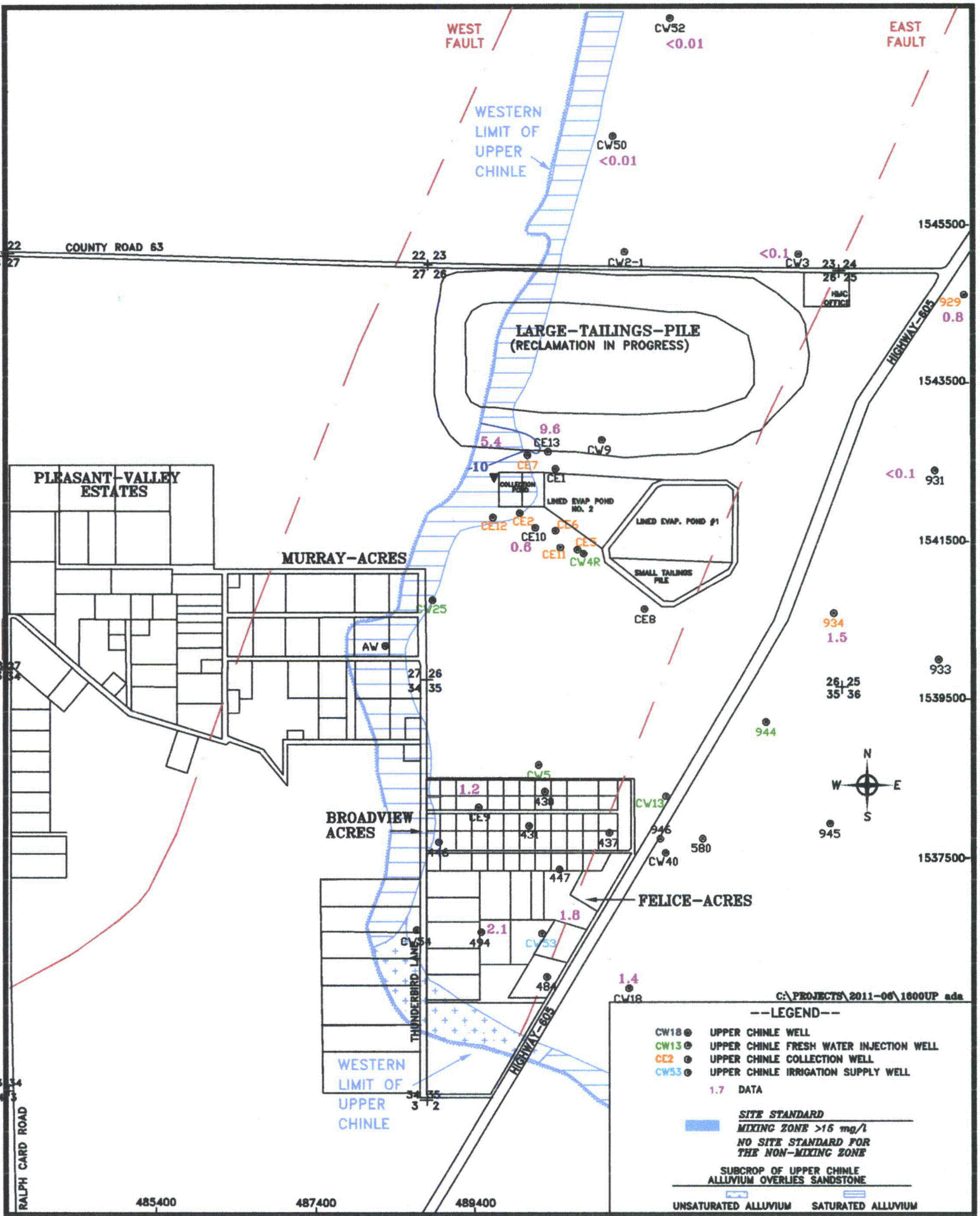


FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 931, 934, CW3, AND CW18.

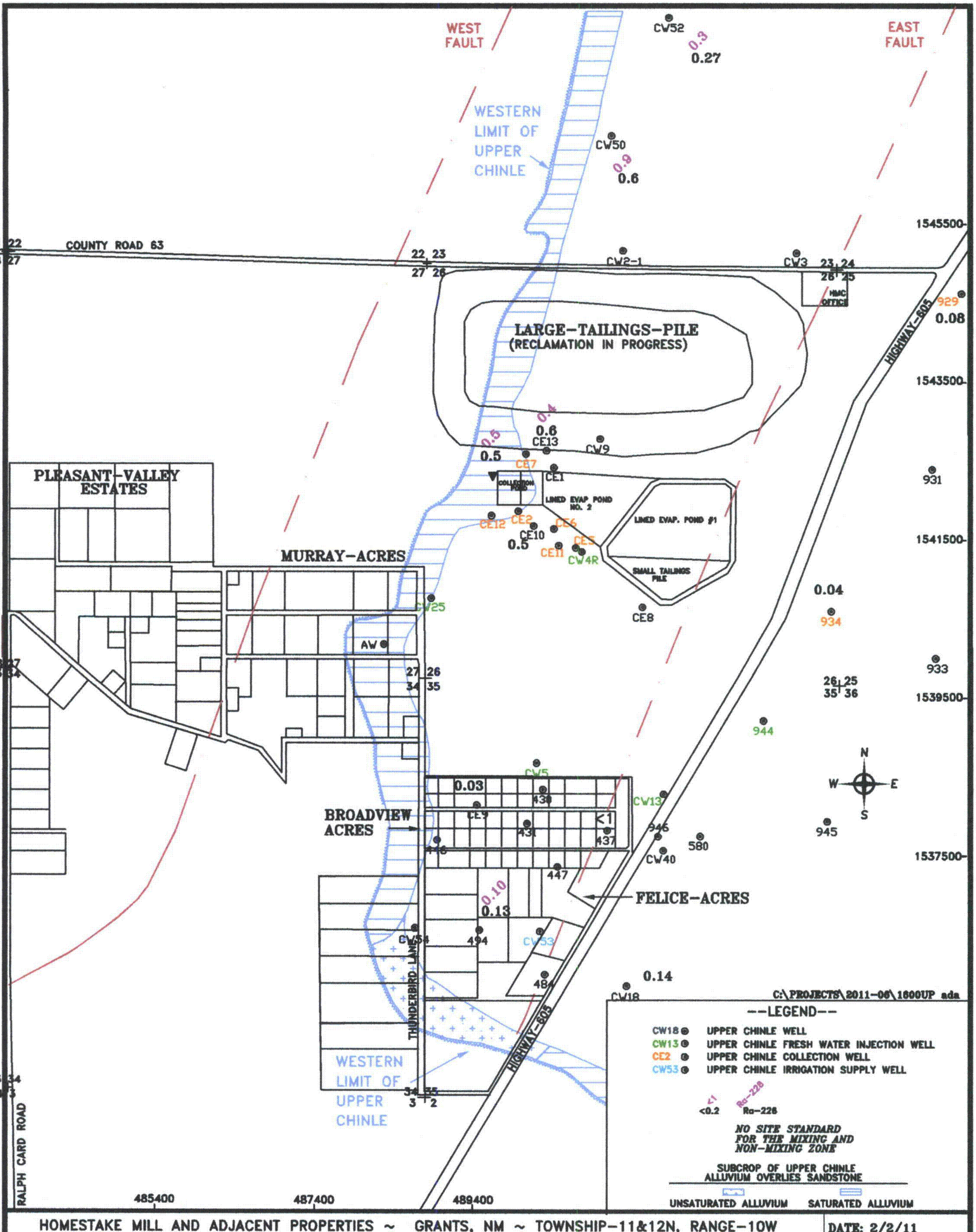


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/2/11

FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l

SCALE: 1"=1600'

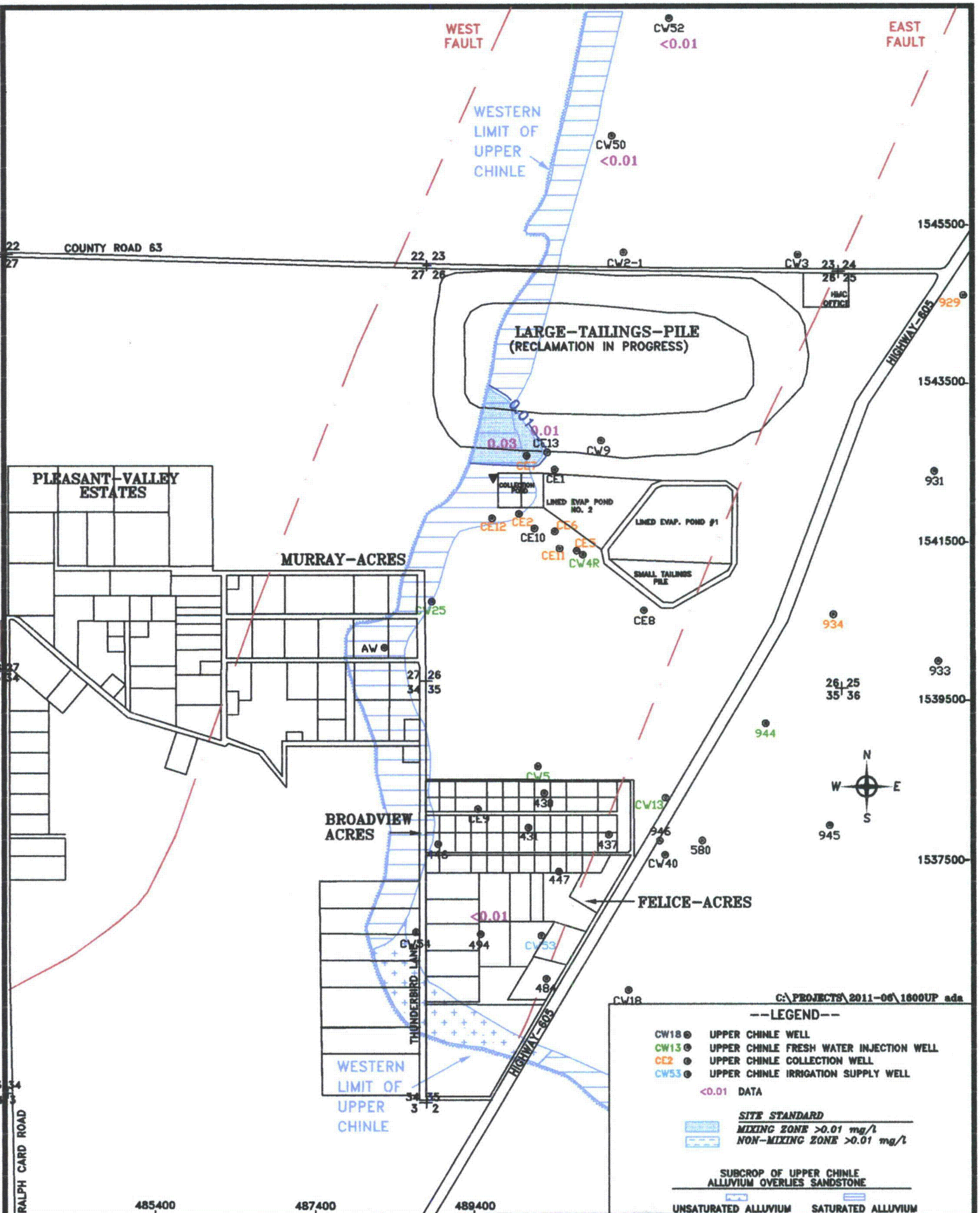


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

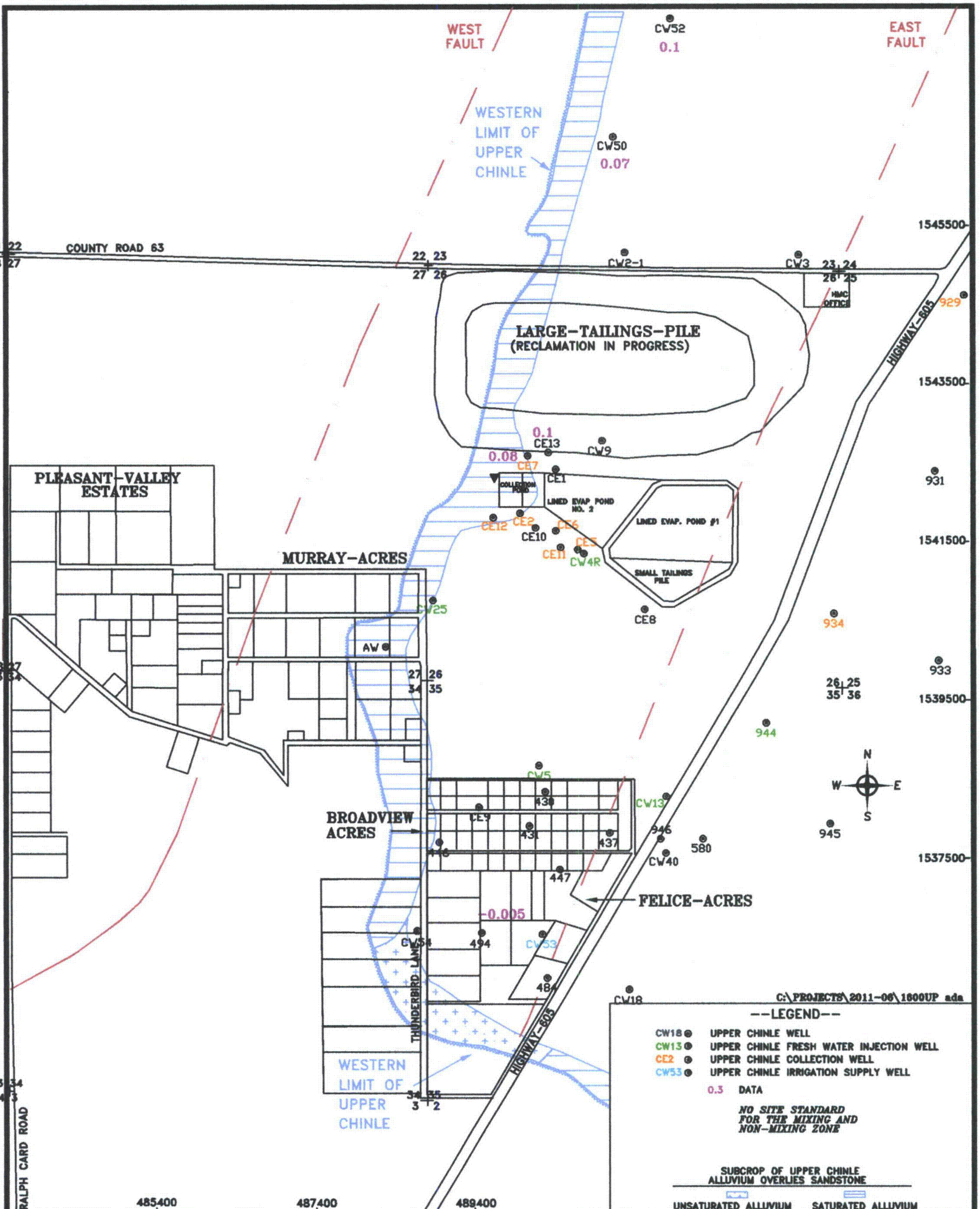
DATE: 2/2/11

FIGURE 5.3-21. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, pCi/l

SCALE: 1"=1600'



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/2/11
FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, mg/l	SCALE: 1"=1600'
	PAGE: 5.3-29



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

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FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2010, pCi/l

SCALE: 1"=1600'

SECTION 6

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GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 6

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES (continued)

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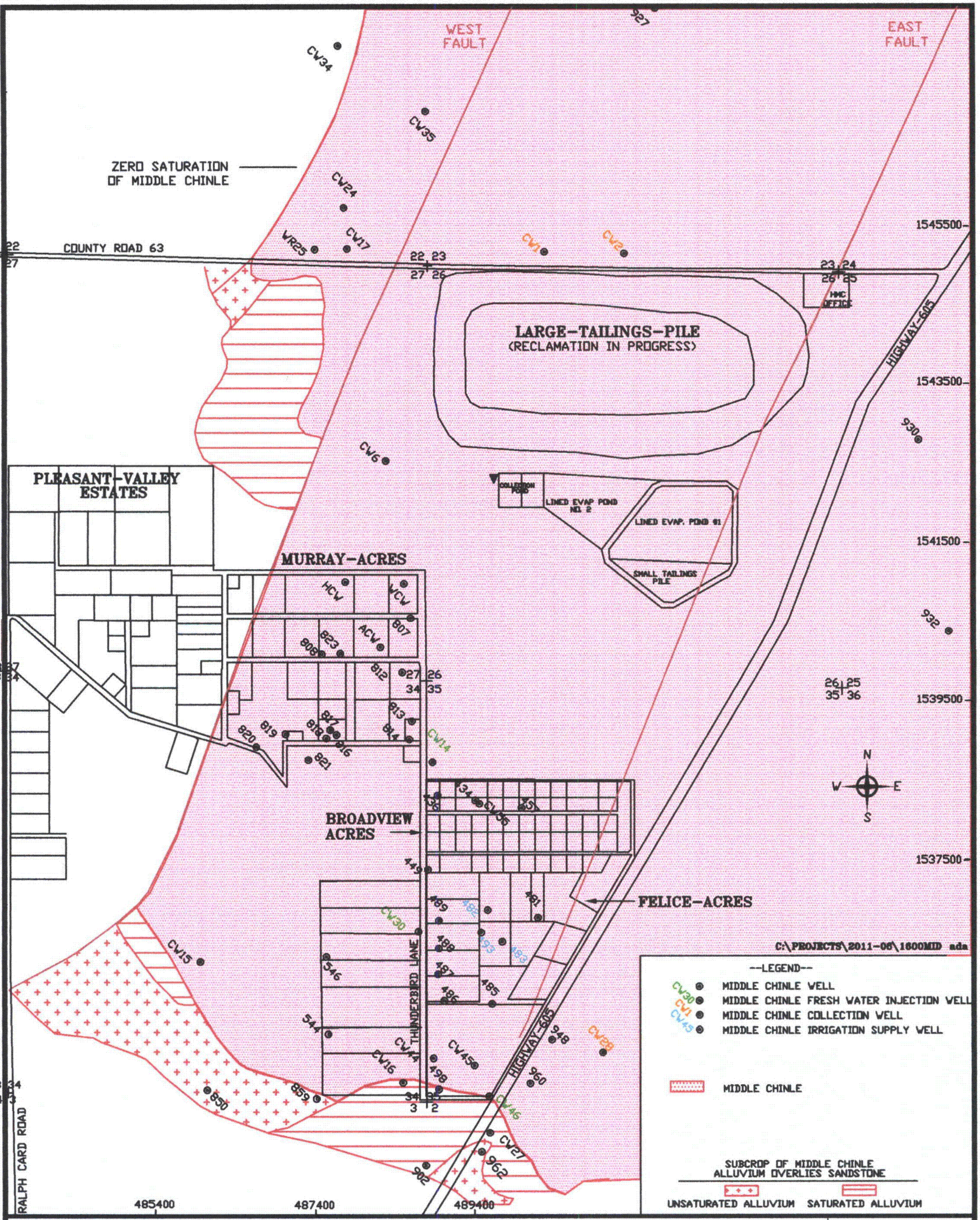
6.0 MIDDLE CHINLE AQUIFER MONITORING

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. Figure 6.1-1 shows the locations of the Middle Chinle wells and areas where the Middle Chinle aquifer exists at the Grants Project. 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.

The Middle Chinle aquifer also exists east of the extension of the East Fault (shown as a red pattern area on Figure 6.1-1) with an alluvium-Middle Chinle subcrop zone on the south side of this area. A limited area of Middle Chinle aquifer exists west of the West Fault. All three of these areas in the Middle Chinle aquifer act as separate ground water systems, except that there is some connection between two of the three areas of the Middle Chinle near the south end of the East Fault in the southwest corner of Section 35.

Middle Chinle wells CW1 and CW2 were used in 2010 as a source of water for the tailings flushing effort. Wells CW14, CW30 and CW46 were used for fresh-water injection in 2010. Wells 482, 483, and 493, were used as irrigation supply wells. Well CW28 was used as a source for fresh water injection in 2010.



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

DATE: 2/22/11

SCALE: 1"=1600'

6.1-1 LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS, 2010

6.2 MIDDLE CHINLE WATER LEVELS

Water levels in Homestake's Upper, Middle and Lower Chinle wells are presented in Appendix A. Fall 2010 water-level elevation contours for the Middle Chinle aquifer are presented on Figure 6.2-1. The hydraulic gradient in the Middle Chinle aquifer is steeper in its alluvial subcrop area in the southern portion of Felice Acres near wells 498, CW45 and CW46. This increase in gradient is due to an influx of water to the Middle Chinle aquifer from the alluvial aquifer. The red arrows on Figure 6.2-1 show the direction of ground water flow in the Middle Chinle aquifer. Flow on the east side of the East Fault is mainly toward well CW28 near the East Fault.

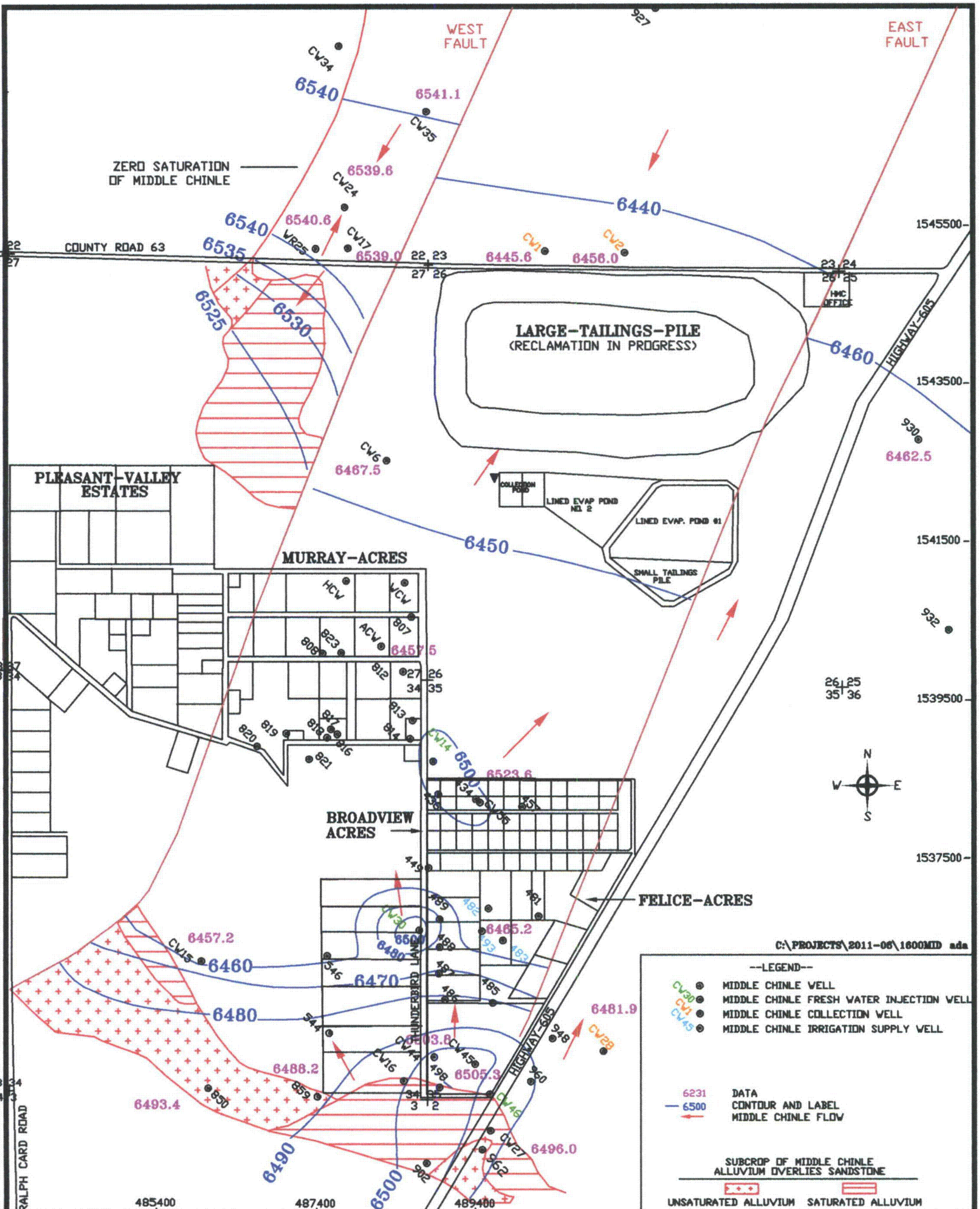
Ground water flow west of the West Fault in the Middle Chinle aquifer is mainly to the southwest, and it discharges into the alluvial aquifer. This prevents the alluvial aquifer from affecting the water quality of the Middle Chinle aquifer on the west side of the West Fault. This Middle Chinle water flows from up-gradient of the site into the area west of the Large Tailings Pile. The alluvial injection in the northern portion of Section 27 has temporarily reversed the gradient near wells CW17 and CW24 in 2006 through 2010. This has allowed some movement to the north until the water level elevation is increased in this area above those near wells CW17 and WR25. The remainder of the Middle Chinle aquifer is recharged by the alluvial aquifer south of Felice Acres.

The injection of fresh water into wells CW14 (north of Broadview Acres) and CW30 (west of Felice Acres) has created ground water mounds in their respective areas. These mounds cause the ground water to flow both north and south from these two wells. Collection of ground water from wells CW1 and CW2 intercepts the water flowing from the south in the Middle Chinle aquifer between the two faults. Pumping from these wells also draws water flow from the north. The head in the Middle Chinle aquifer on each side of the two faults is significantly different than the head between the two faults, which demonstrates that the ground water is not readily connected on each side of these faults.

Figure 6.2-2 shows the locations of the Middle Chinle wells that are used to monitor water-level changes with time. The colors and symbols used on this figure are the same as those used on the water-level elevation time plots. Figure 6.2-3 presents the water-level elevation changes versus time in Middle Chinle wells 493, 859, CW15, CW27, CW28 and CW45. The water levels are higher in Middle Chinle well CW45 than they are farther north in well 493. The pumping of irrigation wells 482, 483, and 493, has caused the water levels in wells 493, 859 and

CW15 to decline. Some of this decline could also be attributable to collection of water from wells CW1 and CW2.

The water-level plots for the Middle Chinle wells located west of the West Fault and wells CW1, CW2 and WCW are presented on Figure 6.2-4. Water levels have been gradually increasing in the Middle Chinle aquifer west of the West Fault. Water levels were variable in pumping wells CW1 and CW2 in 2010 due to their variable pumping rates. Water levels have increased in well WCW as a result of less pumping of well CW2. As expected, water levels west of the West Fault have not responded to the pumping of water from wells CW1 and CW2 situated east of the West Fault.

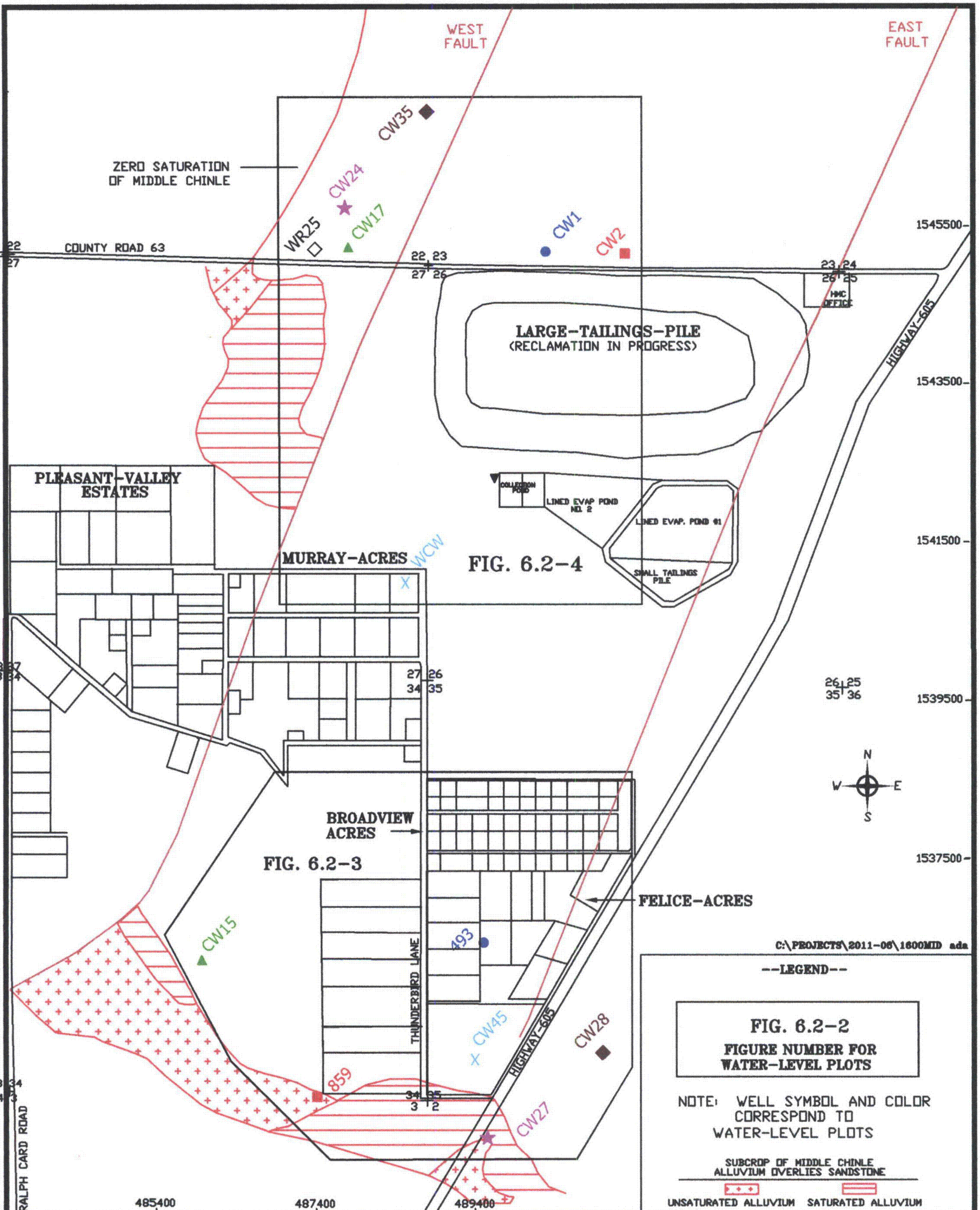


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 2/22/11

FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2010, FT-MSL

SCALE: 1"=1600'



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

DATE: 2/22/11

FIGURE 6.2-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-LEVEL PLOTS, 2010

SCALE: 1"=1600'

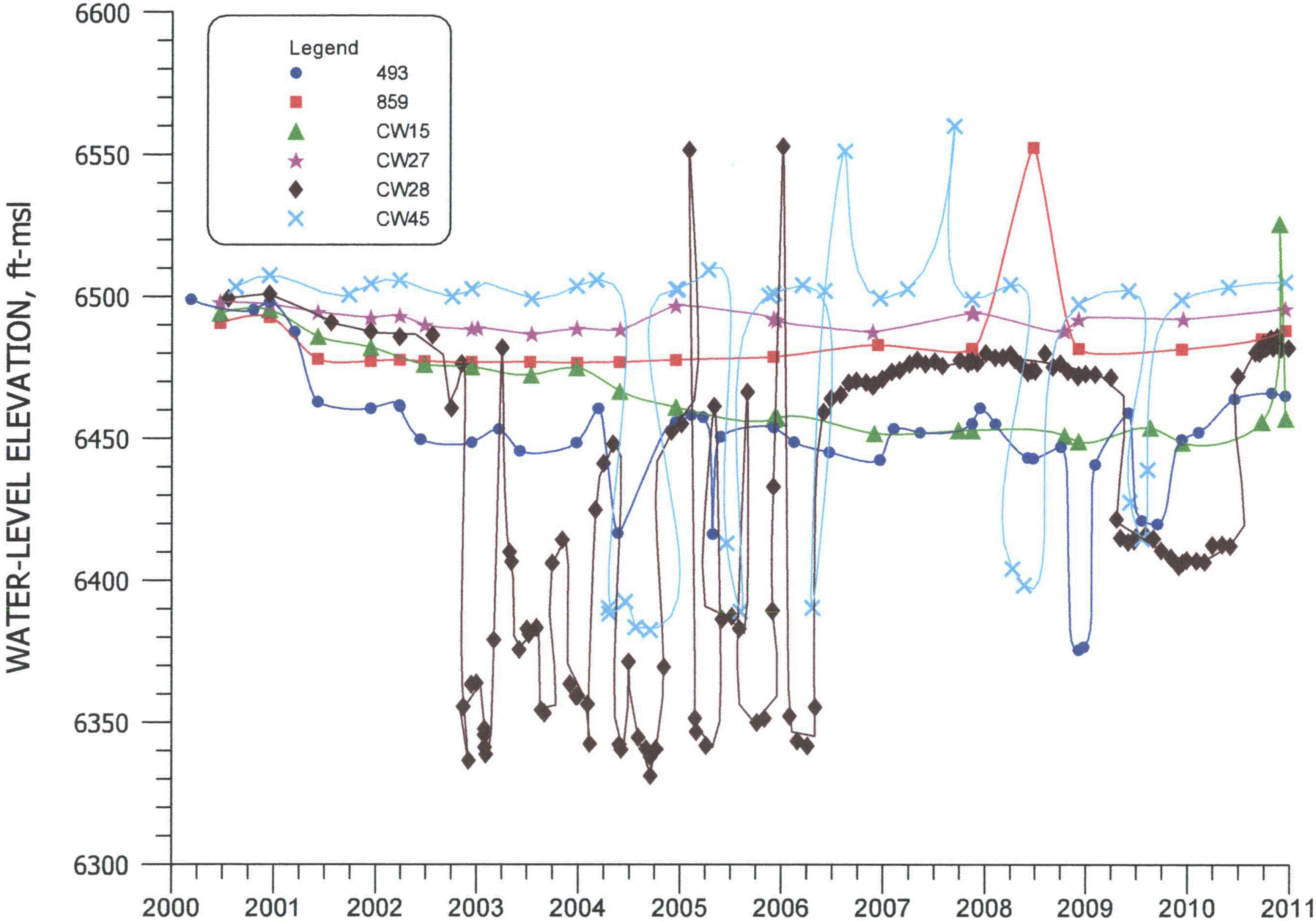


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, 859, CW15, CW27, CW28, AND CW45.

6.2-6

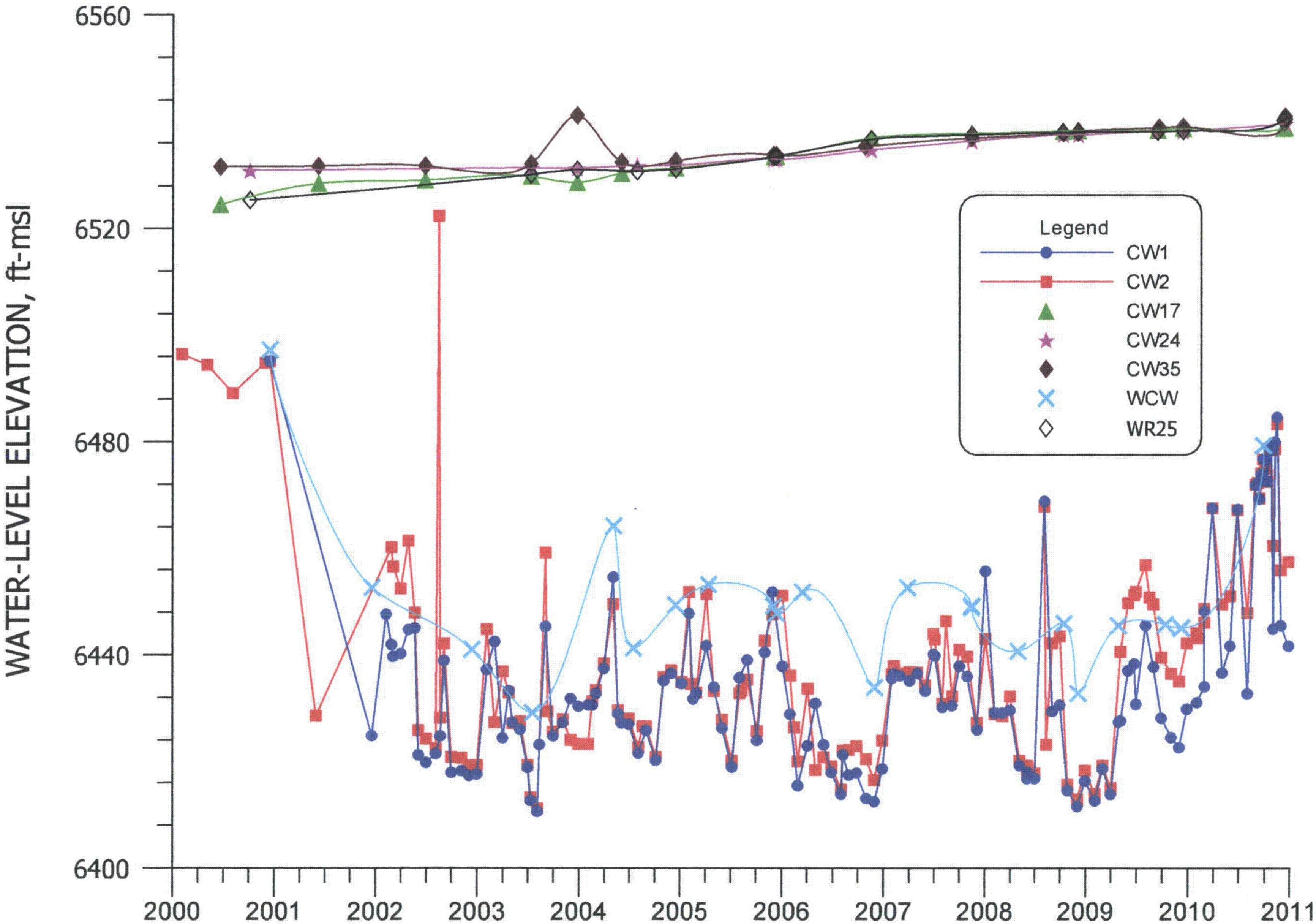


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS CW1, CW2, CW17, CW24, CW35, WCW, AND WR25.

6.3 MIDDLE CHINLE WATER QUALITY

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

The area of water-quality concern in the Middle Chinle aquifer exists in the western portion of Broadview Acres and Felice Acres. All sulfate concentrations are within the site standard except for the concentrations from wells CW24 and WR25, located in the mixing zone west of the West Fault where concentrations were natural until alluvial water has moved into this area. Uranium concentrations are above site standards in western Broadview Acres and Felice Acres, west of the West Fault and well CW1. One natural exceedance in uranium concentration exists west of the West Fault. Selenium concentrations also exceed the site standard in a Felice Acres area well, one well east of Felice Acres and one well west of the West Fault. The only significant molybdenum concentrations identified in the Middle Chinle aquifer are at well CW17 and well 482 in Felice Acres.

6.3.1 SULFATE - MIDDLE CHINLE

Figure 6.3-1 presents sulfate concentration contours for the Middle Chinle aquifer for 2010. This figure shows that the Middle Chinle sulfate concentrations range from 451 to a high of 1950 mg/l at well WR25. Sulfate site standard concentrations are given in the legend of Figure 6.3-1. All mixing-zone sulfate concentrations in the Middle Chinle aquifer are below the site standard of 1750 mg/l except for values in wells CW24 and WR25. Sulfate concentrations in these wells, which are located west of the West Fault have been recently affected by the alluvial water. 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 standards.

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. Two groups of wells for the Middle Chinle aquifer are presented. The colors and symbols on Figure 6.3-2 correspond to those used in the concentration time plots.

Figure 6.3-3 presents sulfate concentrations for the mixing zone Middle Chinle wells 498, CW17, CW24, CW35, CW44, and CW45. Fairly stable sulfate concentrations were observed in 2010 in wells 498, CW35, CW44 and CW45. The slightly higher sulfate concentrations in the past few years in well CW24 are due to alluvial water moving into the Middle Chinle from the subcrop area. Sulfate levels in CW17 were slightly lower in 2010.

Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 493, CW1, CW2 and WCW, located between the two faults, and wells 930 and CW28, which are located east of the East Fault. Data presented on this plot demonstrate that sulfate concentrations have been fairly steady over time in these wells except a large increase in well WCW in October 2009 and a decline in 2010 to similar previous values. A re-sample of this well shows that little significance should be given the large increase.

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. Figure 6.3-5 presents contours of TDS concentrations for the Middle Chinle aquifer during 2010 and shows that all values are below 2000 mg/l near the alluvial subcrop area in the southern portion of the map except for a value of 2600 from well 546.

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 2010, except for well WR25, located in the mixing zone, and wells 482, 483, and 493 in the non-mixing zone.

Plots of TDS concentrations for Middle Chinle wells 498, CW17, CW24, CW35, CW44 and CW45 are presented in Figure 6.3-6. The TDS concentrations have been fairly steady over the last few years in these wells.

Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 493, 930, CW1, CW2, CW28 and WCW. Analysis of this data indicates stable TDS concentrations in water collected from these wells in 2010.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figure 6.3-8 presents chloride concentrations in the Middle Chinle aquifer during 2010, and observed concentrations varied from roughly 50 to values slightly greater than 200 mg/l. None of the concentrations exceeded the site standard of 250 mg/l for the mixing and non-mixing zones of the Middle Chinle aquifer except for a value of 272 mg/l for well ACW. Therefore, in general chloride concentrations are not useful for defining the degree of, or the need for, restoration of the Middle Chinle aquifer.

Time plots of chloride concentration are presented on Figure 6.3-9 for Middle Chinle wells 498, CW17, CW24, CW35, CW44 and CW45. Chloride concentrations increased in Middle Chinle well CW17 in 2006 through 2010 while they were fairly steady in the remainder of the wells. The chloride data from well CW24 indicates that the alluvial water has not affected the Middle Chinle water quality at well CW24.

A second set of chloride concentration plots for the Middle Chinle aquifer is presented in Figure 6.3-10. Data plotted on this figure shows fairly steady 2010 concentrations, except for a small increase in wells CW1 and CW2. These small changes are deemed to be within natural variation in the Middle Chinle aquifer.

6.3.4 URANIUM - MIDDLE CHINLE

Uranium is an important constituent in the Middle Chinle aquifer due to the presence of elevated concentrations in the aquifer in western Broadview Acres and in the southern and western portions of Felice Acres. These elevated concentrations are a result of alluvial recharge to the Middle Chinle aquifer in this area. Water in the saturated portion of the alluvial aquifer flows across a subcrop of the Middle Chinle aquifer just south of Felice Acres, and alluvial ground water has entered the Middle Chinle aquifer in this area. Figure 6.3-11 presents contours of uranium concentrations in the Middle Chinle aquifer during 2010. An area of concentrations greater than the mixing-zone site standard exists in the southwestern portion of Felice Acres. Uranium concentrations in the Middle Chinle aquifer, west of the West Fault, northwest of the Large Tailings Pile, naturally exceed 0.1 mg/l but values in wells CW17 and WR25 have increased above this level from the movement of alluvial water in the subcrop to these wells. The 2010 value from well CW35 slightly exceeds the mixing-zone site standard concentration of 0.18 mg/l, but is naturally occurring because gradient in the Middle Chinle has not been reversed to well CW35. 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, at wells 482, 483 and 493 in Broadview Acres and Felice Acres.

Figure 6.3-12 presents uranium concentration plots versus time for Middle Chinle wells 498, CW17, CW24, CW35, CW44 and CW45 (see Figure 6.3-2 for well locations). The 2010 uranium concentrations shown on this plot are fairly steady, except for variable uranium concentrations in wells 498 and CW45 and a decrease in wells CW17 and CW44. This plot shows that water taken from Middle Chinle wells 498 and CW45 contains significant concentrations of uranium and did not overall decline as observed in previous years. Additional monitoring of these wells with time will better define this collection-induced trend.

The uranium concentration plots for the Middle Chinle wells in the non-mixing zone are presented on Figure 6.3-13. Uranium concentrations were small in wells 930, CW2, CW28 and WCW in 2010. The uranium concentration in well 493 water, which increased for several years through mid 2010, declined in the late 2010. Uranium concentrations have gradually increased in well CW1 for the last few years.

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 2010, except well CW17 (see Figure 6.3-14). The higher selenium concentration in well CW17 is caused by movement of alluvial water in the subcrop area to this well. The selenium concentration in the non-mixing zone wells 493 and CW28 currently exceeds the site standard of 0.07 mg/l. These areas of elevated concentrations have 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 Figure 6.3-14).

Selenium concentrations somewhat less than 0.1 mg/l have been measured in Middle Chinle wells west of the West Fault. These concentrations have been determined to be naturally occurring, because the flow prior to 2006 was from the north in this area, and therefore the ground water could not have been influenced by tailings seepage. The higher selenium observed in well CW17 is due to alluvial water flowing into this area of the Middle Chinle aquifer in 2006 through 2010. All other selenium concentrations in the Middle Chinle aquifer beyond these areas are low values.

Selenium concentrations with time for the mixing zone Middle Chinle wells 498, CW17, CW24, CW35, CW44 and CW45 are presented in Figure 6.3-15. Overall steady selenium concentrations have been observed in these wells in 2010 except the decrease in well CW17. The observed higher concentration in well CW17 is believed to be a short term result of the alluvial injection near the subcrop with the Middle Chinle.

Figure 6.3-16 presents the selenium concentrations for Middle Chinle wells in the non-mixing zone. Selenium concentrations in wells CW1 and CW2, which are located north of the Large Tailings Pile, have varied over the past few years, but their values are small. In 2010, selenium concentrations measured in water collected from wells 493 and CW28 were fairly steady. 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. The injection of fresh water into Middle Chinle wells CW14, CW30 and CW46 and the use of Middle Chinle wells 482, 483, 493, 498, CW44 and CW45 for irrigation should cause these elevated concentrations to decrease.

6.3.6 MOLYBDENUM - MIDDLE CHINLE

The 2010 molybdenum concentrations in the Middle Chinle aquifer are presented on Figure 6.3-17. None of the molybdenum concentrations for 2010 exceed the site standard of 0.10 mg/l except wells CW17 and 482. Some restoration of molybdenum in these areas will be needed.

Figure 6.3-18 presents the molybdenum concentrations with time for Middle Chinle wells 498, CW17, CW24, CW35, CW44 and CW45, while Figure 6.3-19 presents the molybdenum concentrations with time for wells 493, 930, CW1, CW2, CW28 and WCW. These plots show that the concentration in each of these wells has been low for 2010 except for a decrease in concentration in well CW17. The increase in molybdenum concentrations in well CW17 will require some restoration of this constituent in the Middle Chinle aquifer.

6.3.7 NITRATE - MIDDLE CHINLE

Nitrate concentrations have always been low in the Middle Chinle aquifer and therefore are not routinely monitored. However, nitrate concentrations were measured in all of the Middle Chinle aquifer wells in 2003 and in a number of the wells in 2010 in order to update the database. Figure 6.3-20 presents the nitrate concentrations in the Middle Chinle aquifer and shows that the only notable levels of nitrate in the Middle Chinle aquifer are west of the West Fault. Nitrate concentrations are less than 15 mg/l, the mixing zone site standard, in all of the Middle Chinle wells west of West Fault. Due to the change in flow direction in the Middle Chinle aquifer west of the West Fault since 2006, alluvial water has entered this portion of the Middle Chinle. The concentrations were naturally occurring prior to 2006. 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

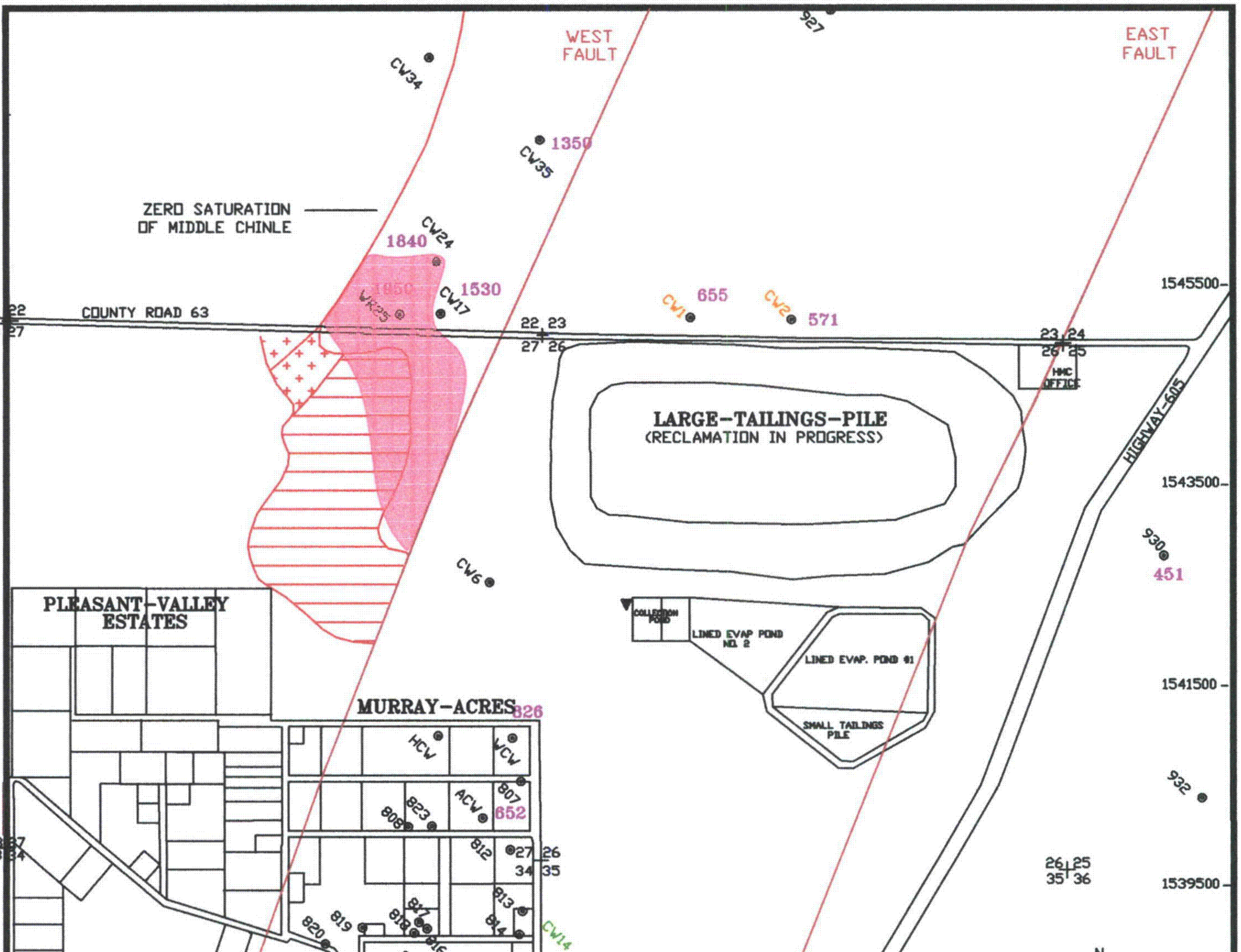
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. The 2003 updated radium-226 and radium-228 concentrations in the Middle Chinle aquifer showed that radium levels are remaining low. All of the radium-226 and radium-228 values measured in 2010 were less than detection or 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

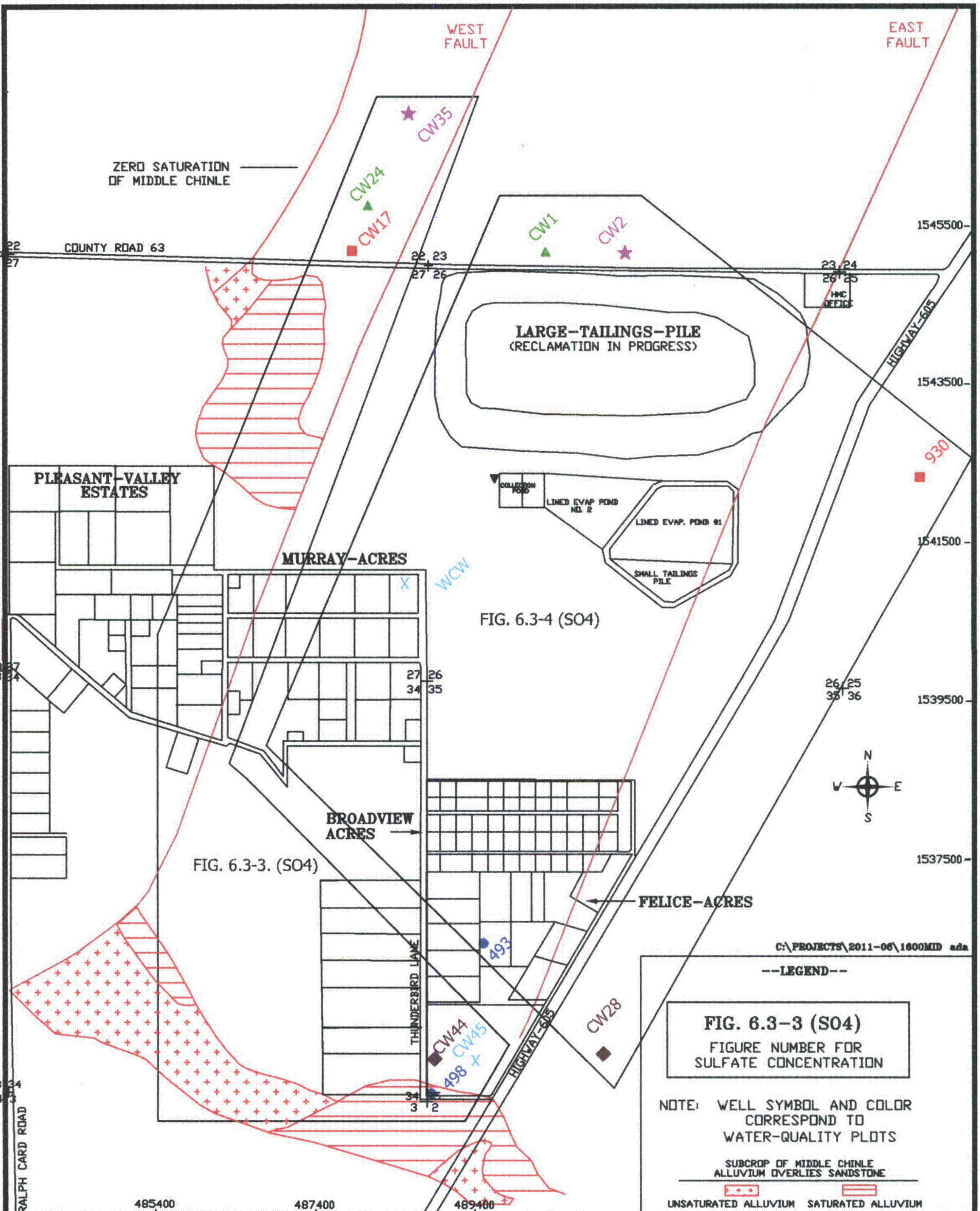
Vanadium concentrations in the Middle Chinle aquifer have always been low. Previous monitoring of vanadium in the Middle Chinle aquifer has demonstrated that vanadium is not a significant parameter in this aquifer and the 2003 updated vanadium measurements confirmed the low values. Monitoring of vanadium 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 2010 vanadium measurements for the Middle Chinle aquifer are low levels near the detection limit. These values are consistent with values observed previously and, therefore, reinforce the conclusion that continued monitoring of vanadium concentrations in the Middle Chinle aquifer should not be required. A site standard for vanadium has therefore not been set for the Middle Chinle aquifer.

6.3.10 THORIUM-230 - MIDDLE CHINLE

Thorium-230 concentrations are not significant in the alluvial aquifer outside of the Large Tailings Pile. Therefore, the Middle Chinle aquifer does not have the potential for containing significant thorium concentrations from the tailings seepage. Thorium-230 is, therefore, not a significant parameter in the Middle Chinle aquifer and should be eliminated from future monitoring in the Middle Chinle aquifer. Thorium-230 concentrations were measured in all wells sampled from Middle Chinle wells in 2003, and all of these values were less than detection. All of the thorium-230 values measured in 2010 were very small. These thorium-230 levels are consistent with concentrations previously measured in the Middle Chinle aquifer, which shows that thorium-230 is not an important parameter in the Middle Chinle aquifer and thus a site standard has not been set.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 2/22/11**
FIGURE 6.3-1. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010 mg/l	**SCALE: 1"=1600'**
	PAGE: 6.3-8



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, 2010

DATE: 2/22/11

SCALE: 1"=1600'

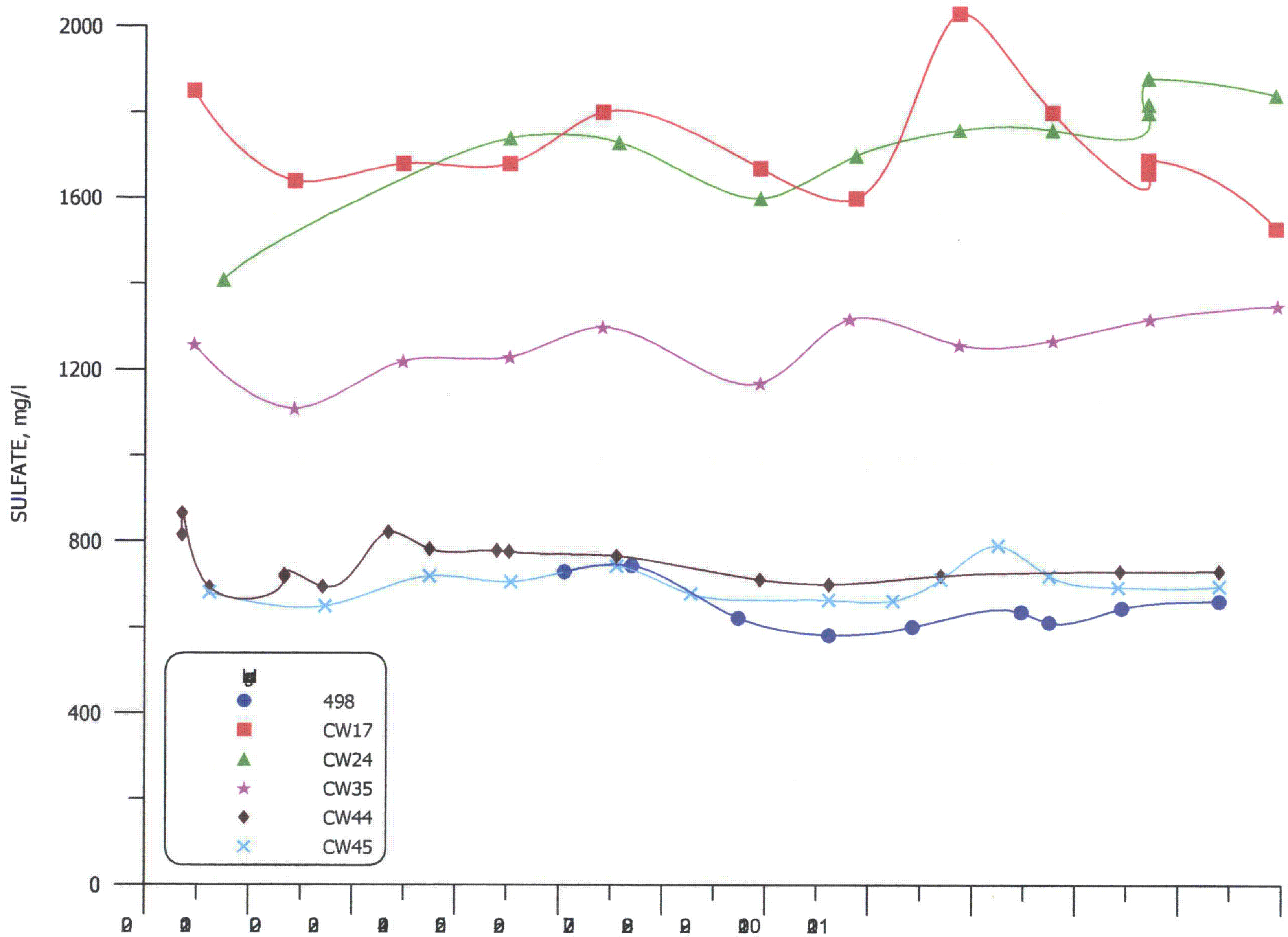


FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44, AND CW45

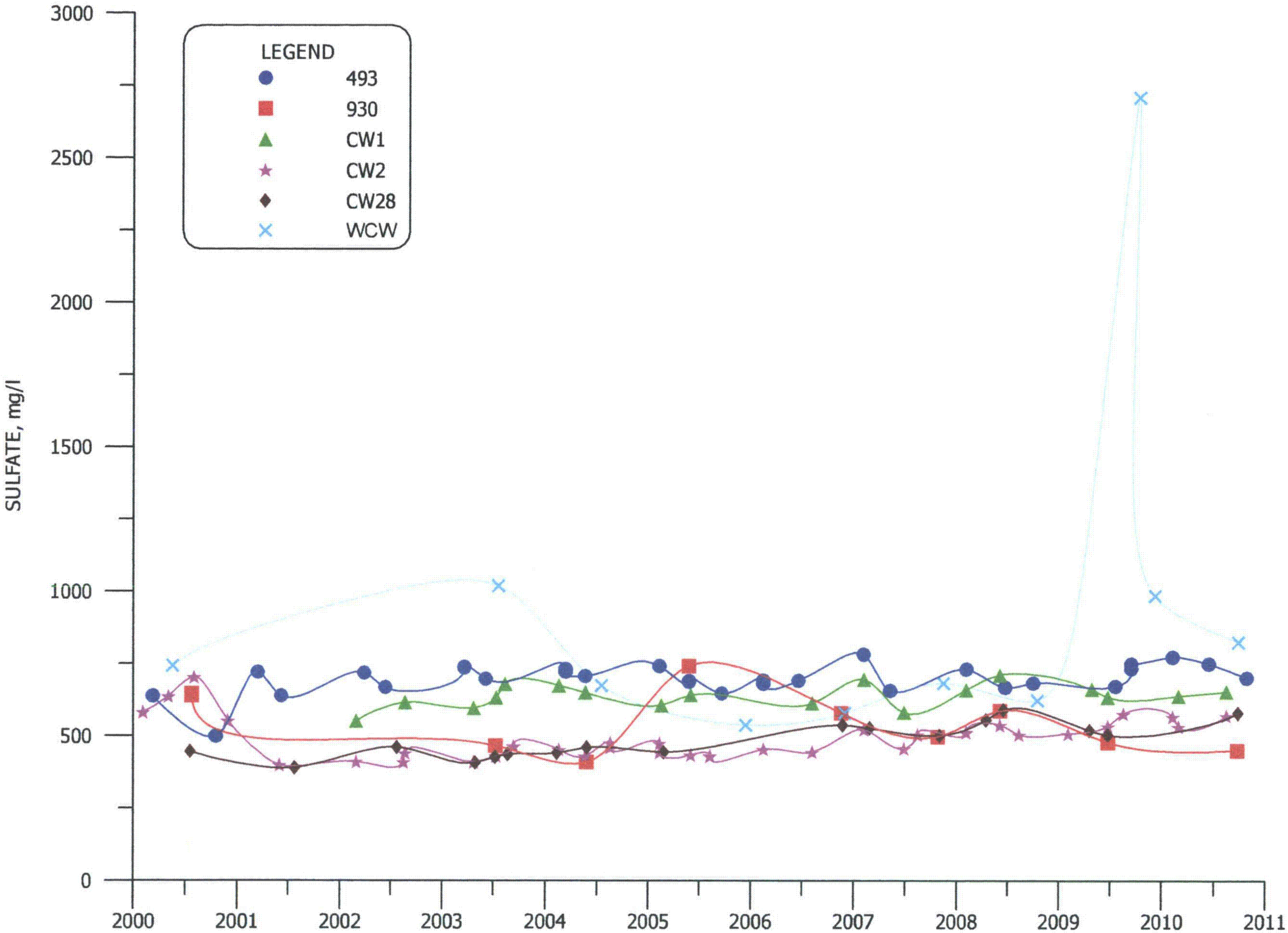
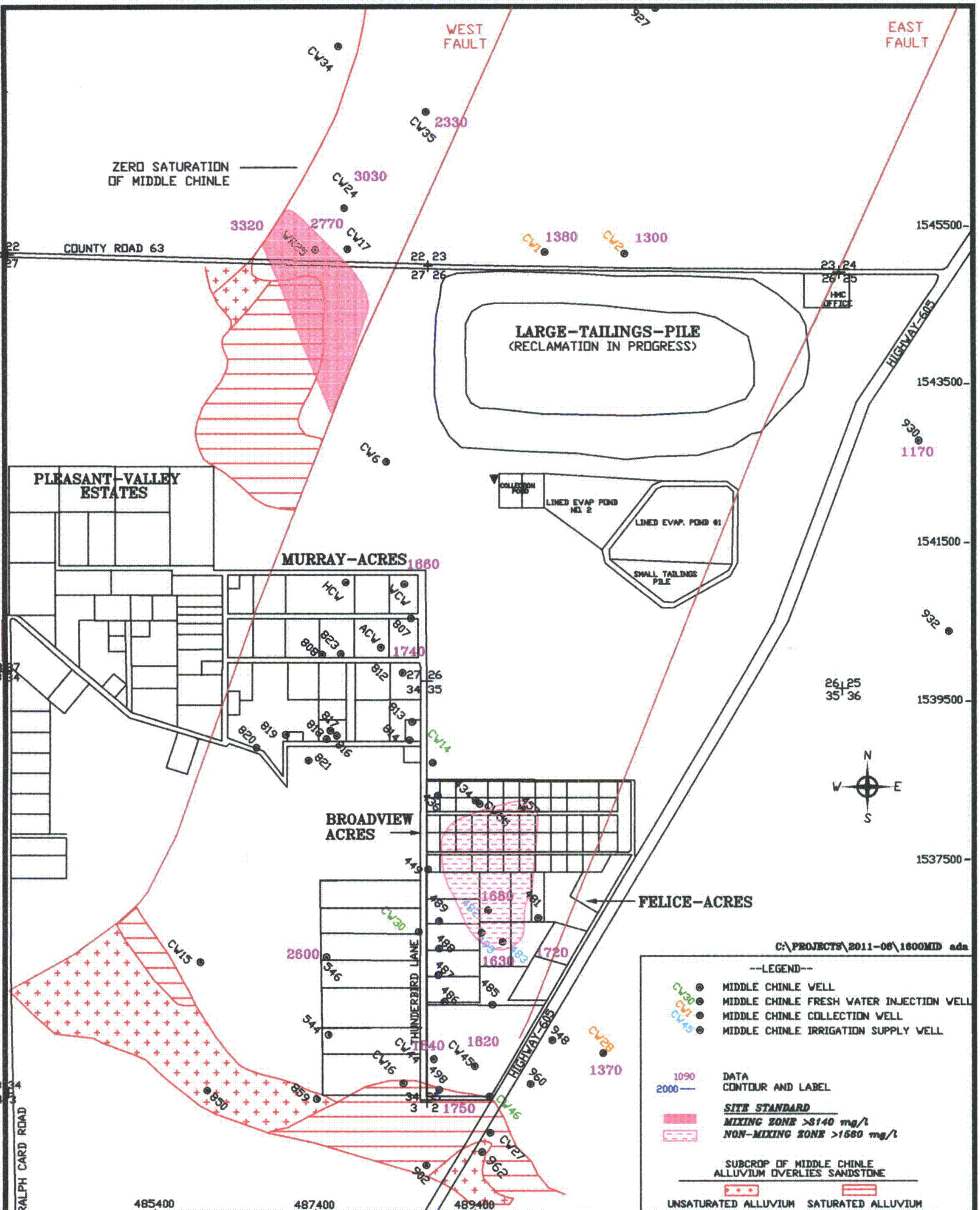


FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, CW1, CW2, CW28, AND WCW



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/22/11
FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010, mg/l	SCALE: 1"=1600'
	PAGE: 6.3-12

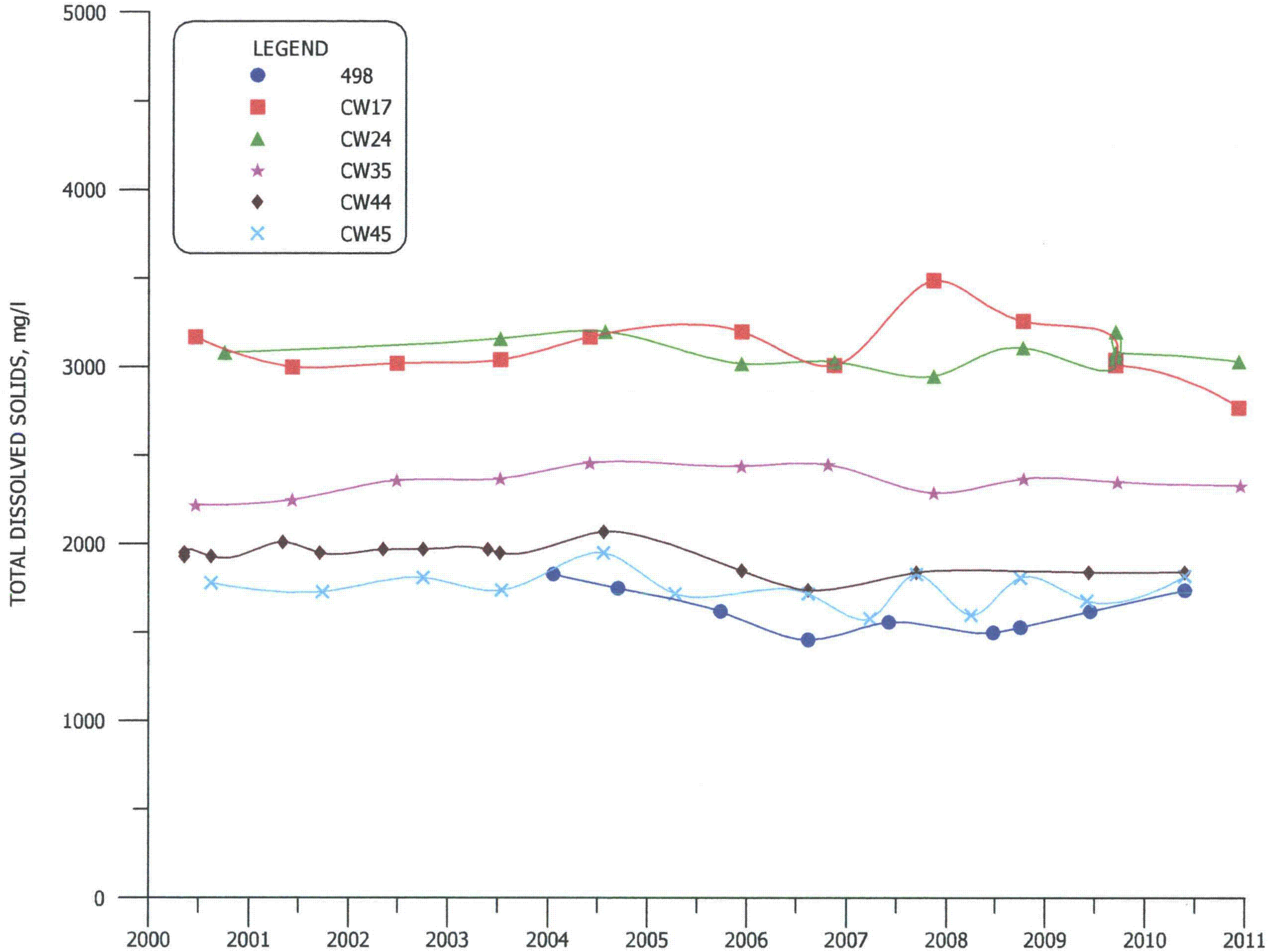


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44, AND CW45

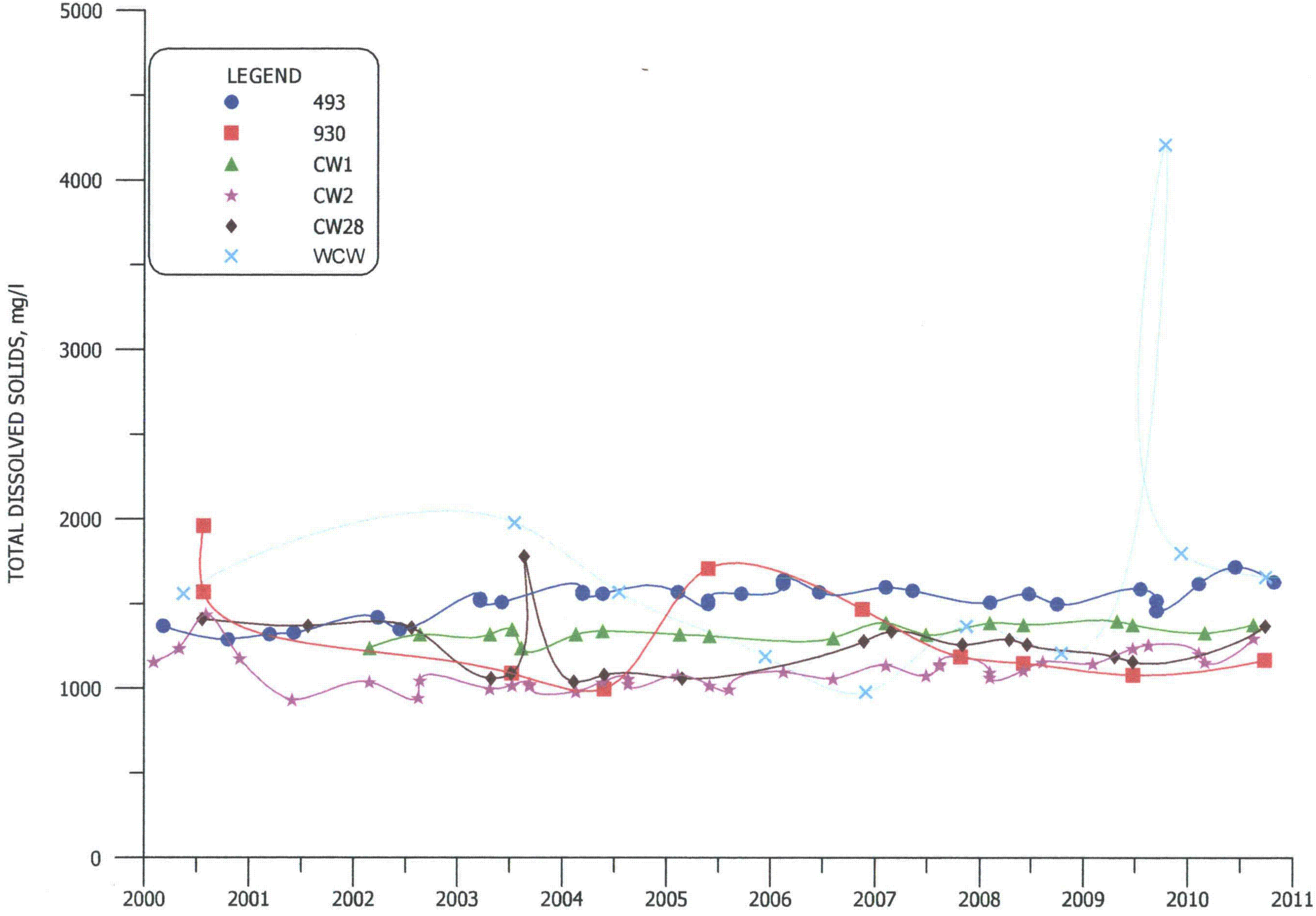
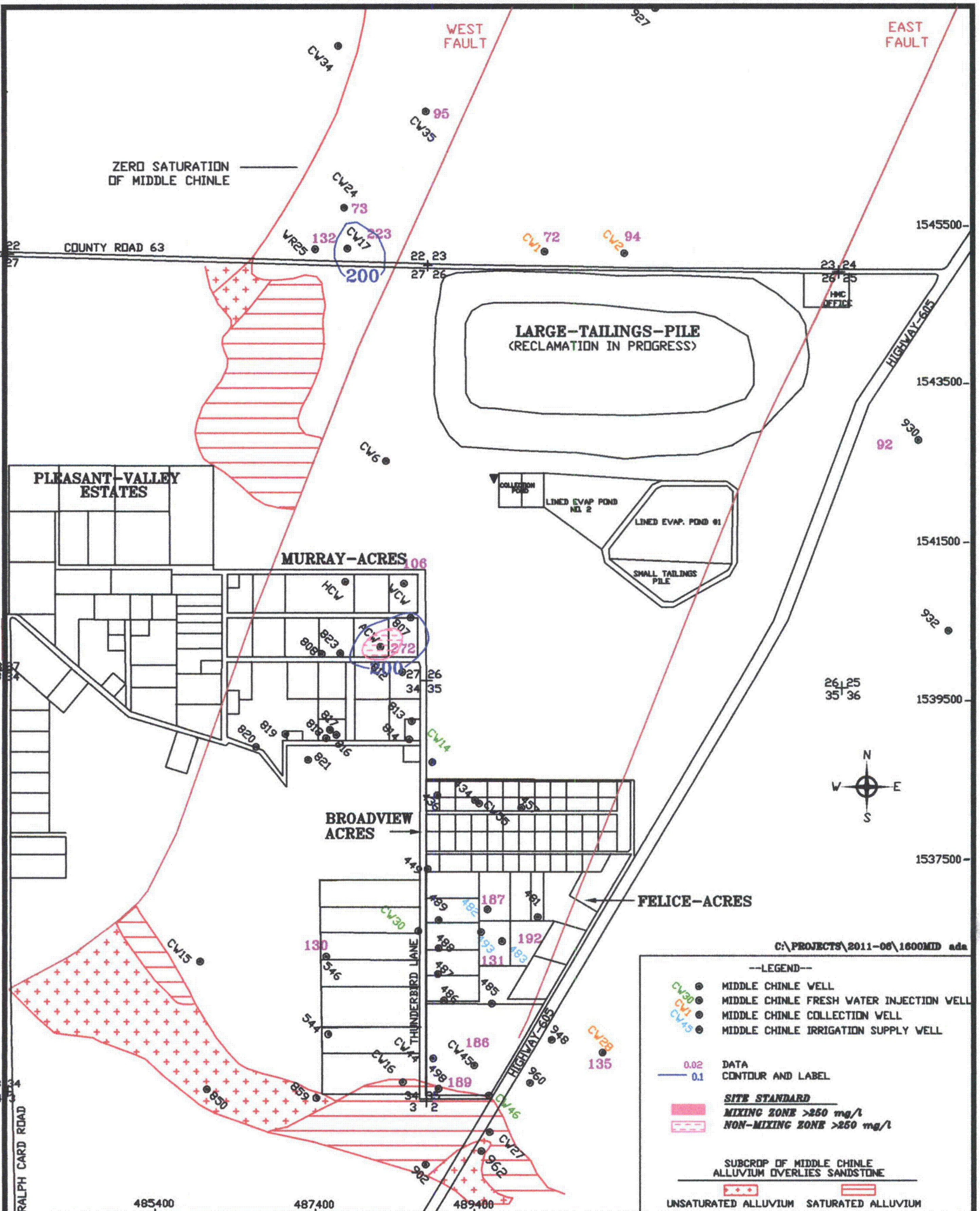


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493. 930, CW1, CW2 AND CW28



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

DATE: 2/22/11

SCALE: 1"=1600'

FIGURE 6.3-8. CHLORIDE CONCENTRATIONS OF THE MIDDLE AQUIFER, 2010, mg/l

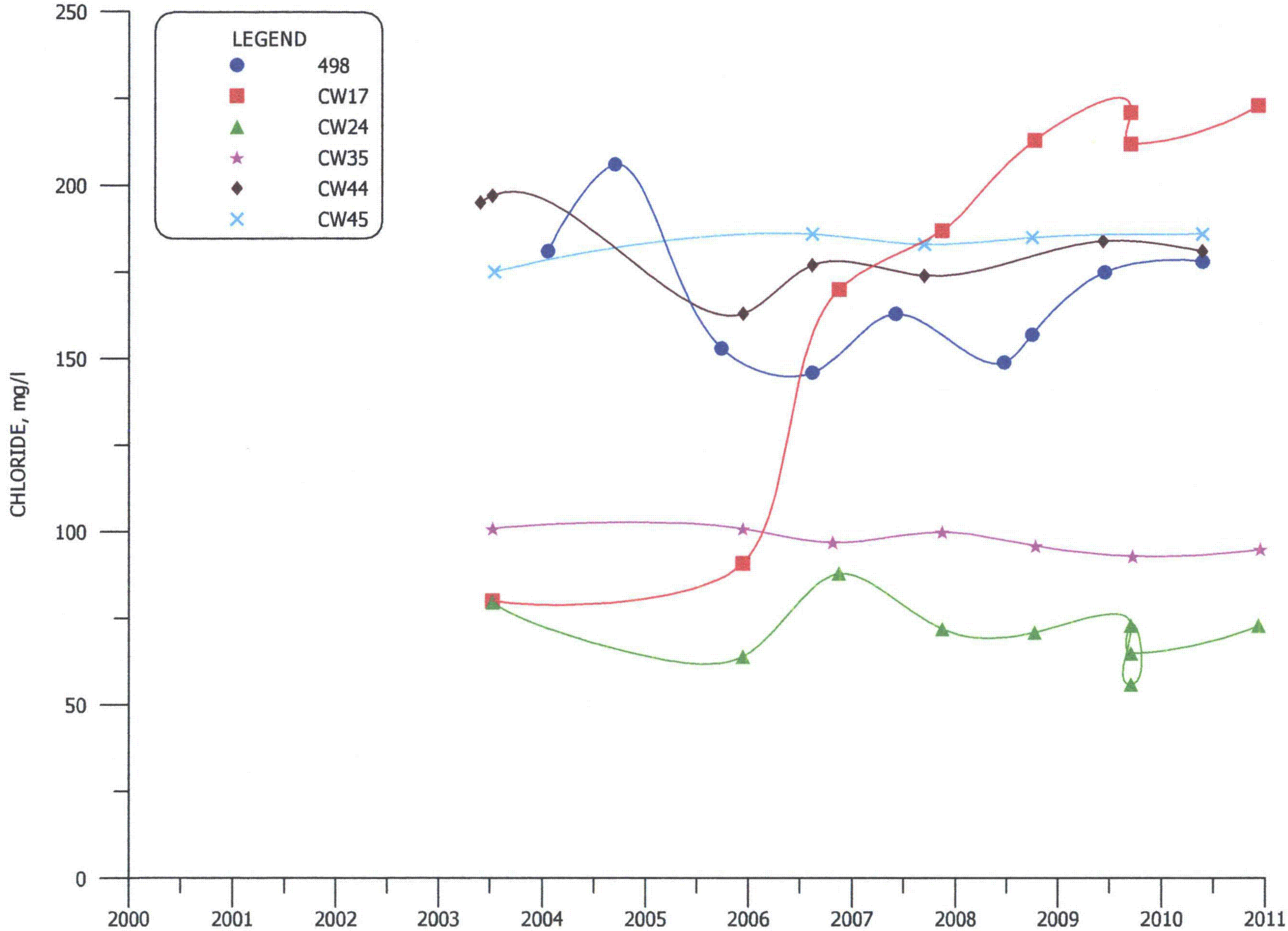


FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44 AND CW45

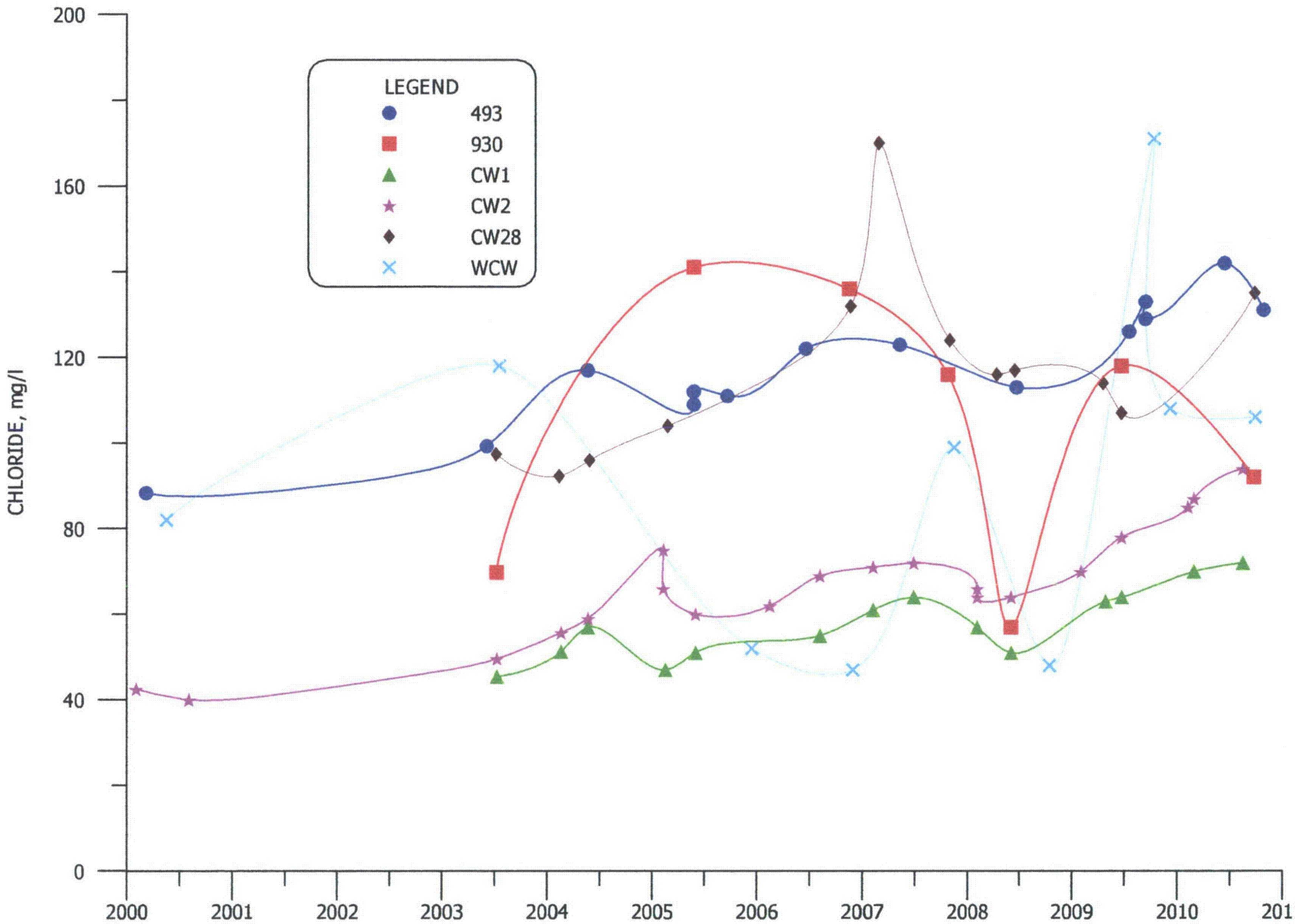
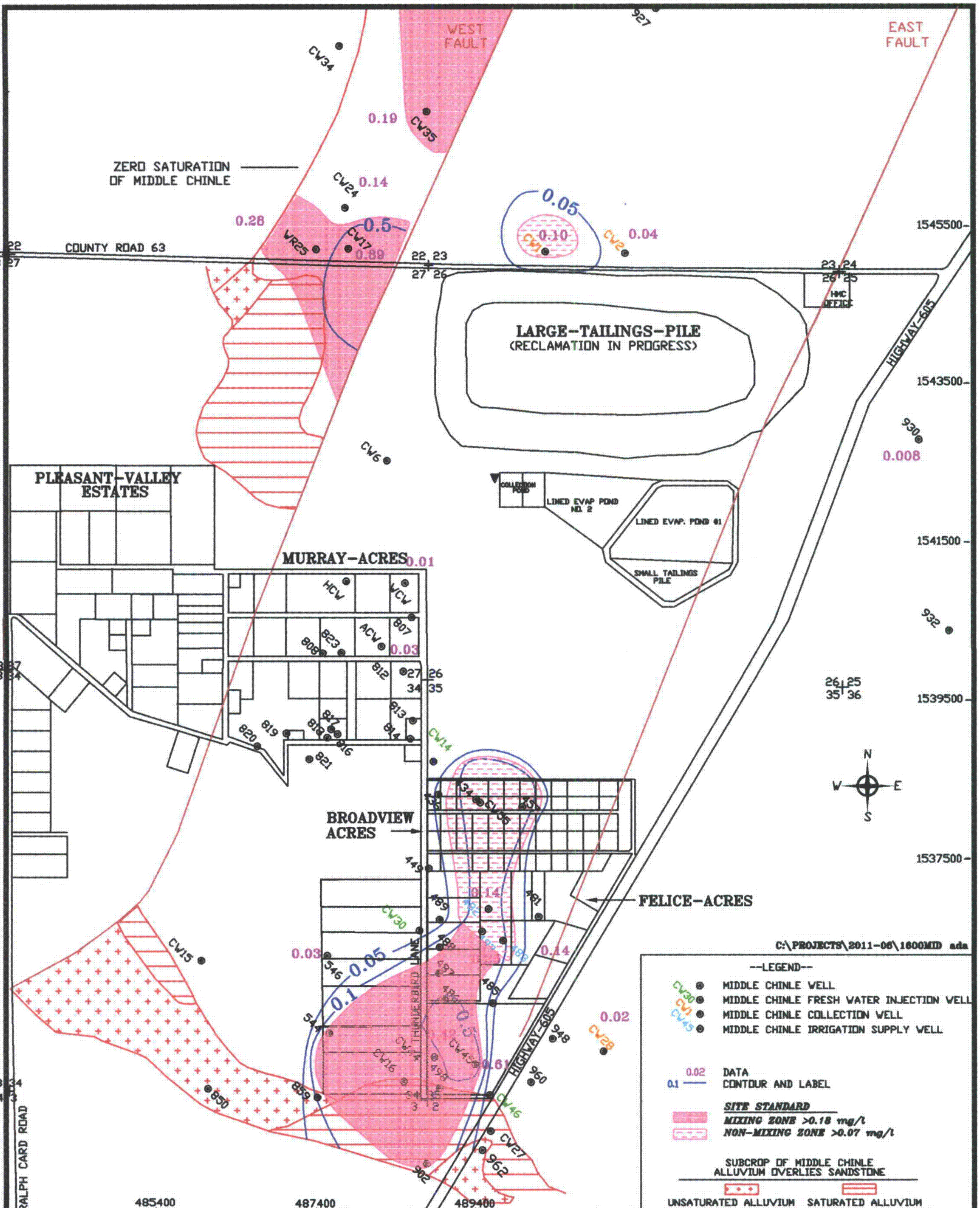


FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, CW1, CW2, CW28, AND WCW



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	**DATE: 2/22/11**
FIGURE 6.3-11. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010, mg/l	**SCALE: 1"=1600'**
	PAGE: 6.3-18

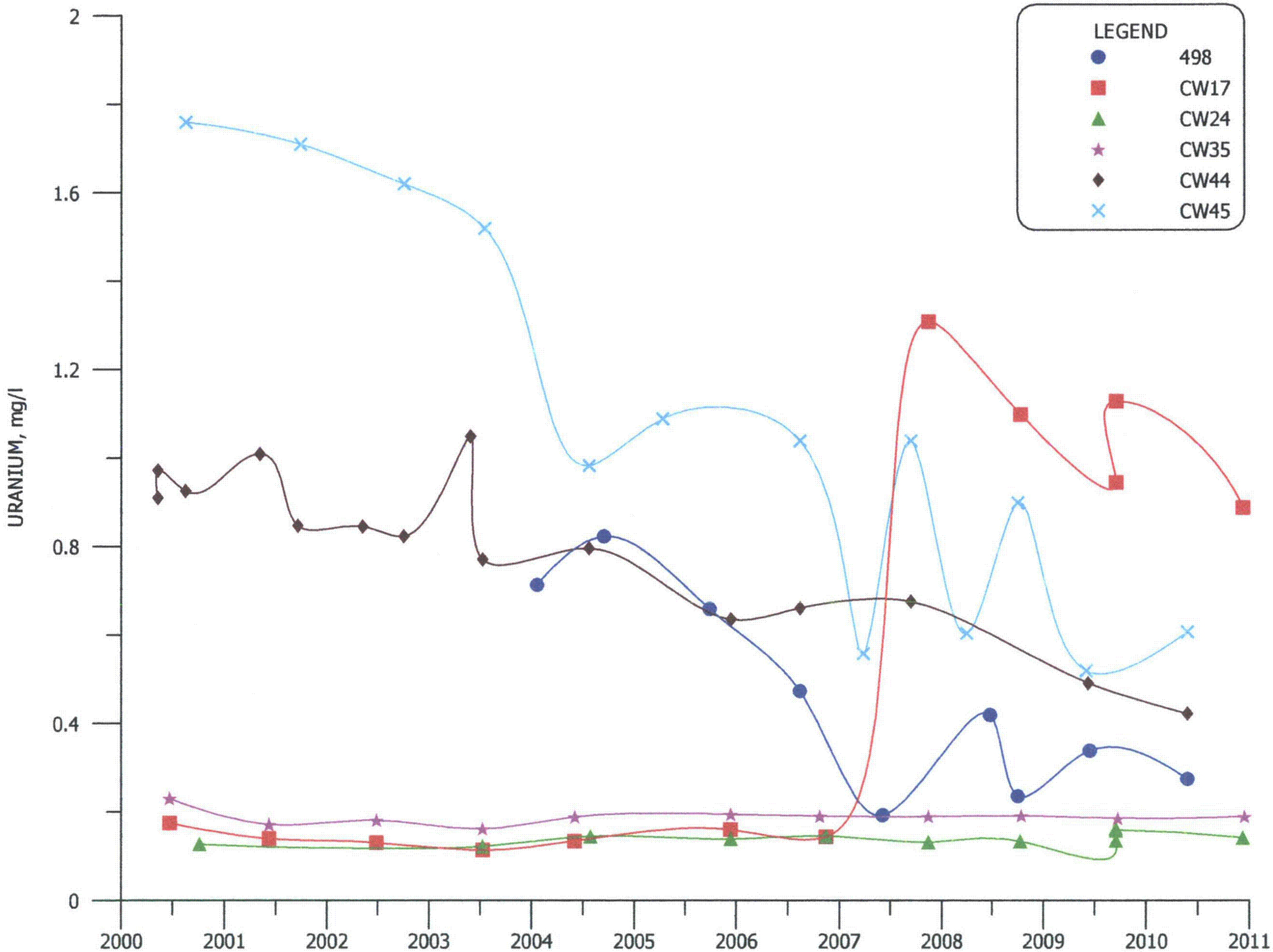


FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44, AND CW45

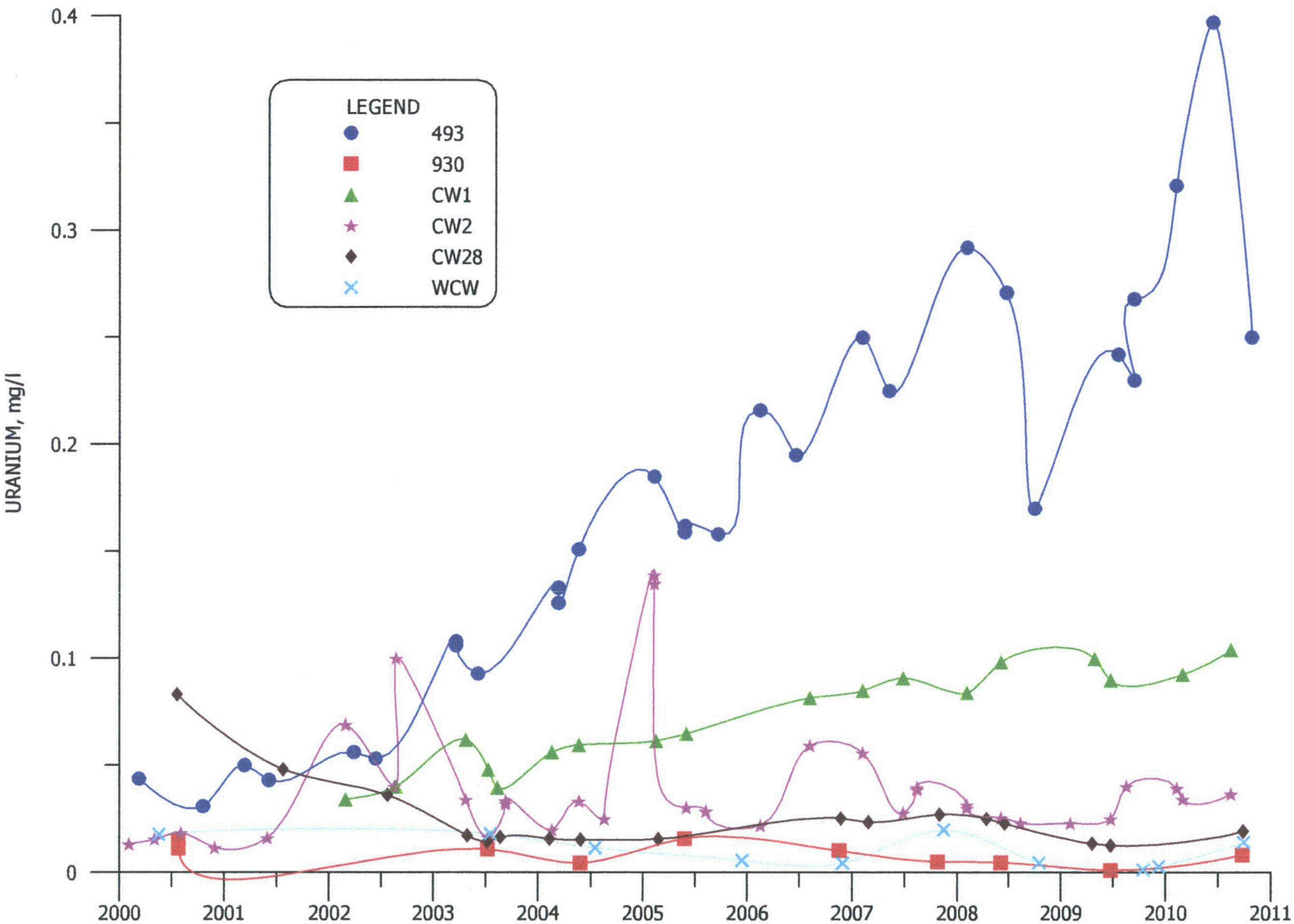
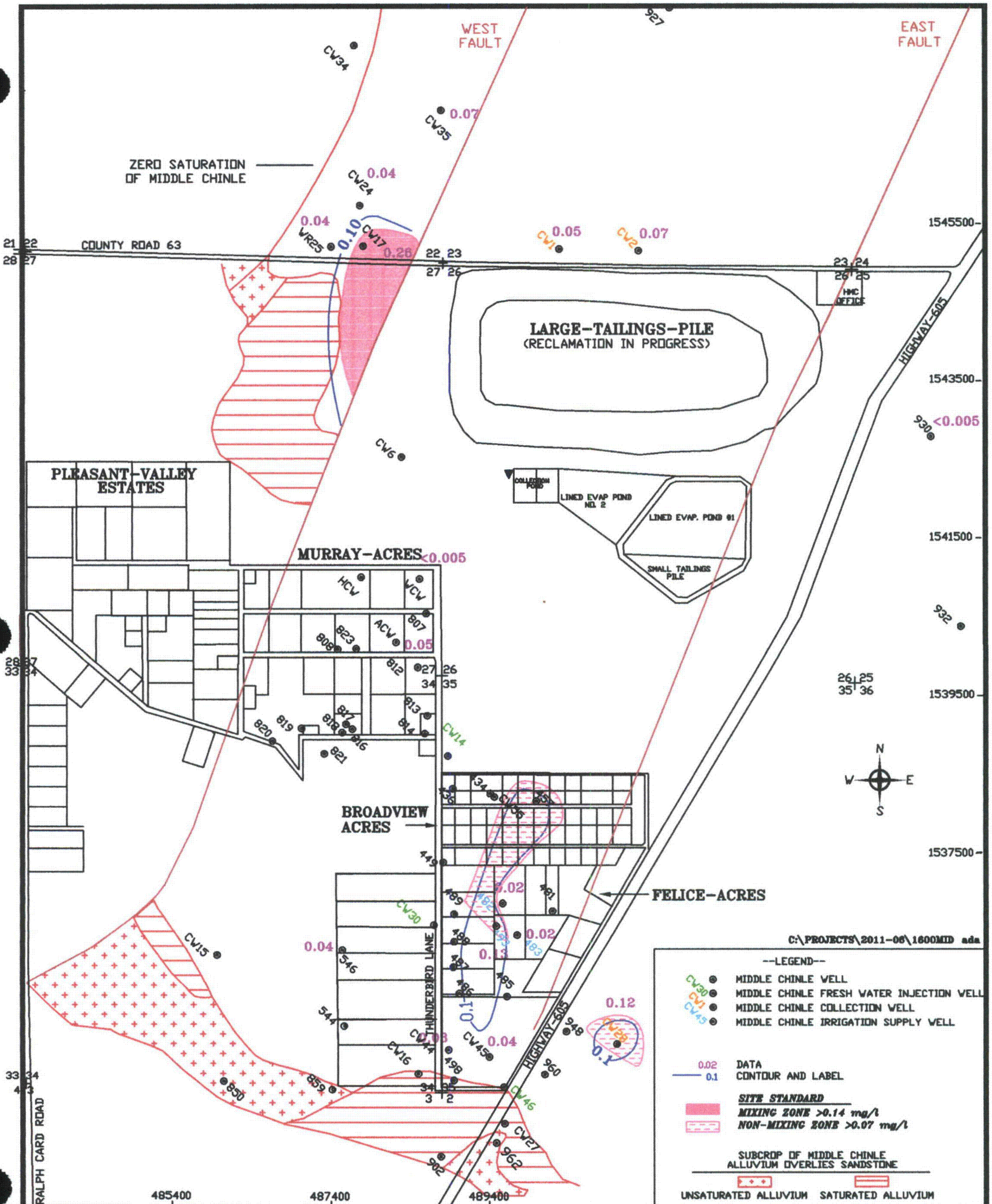


FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, CW1, CW2, CW28, AND WCW



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 2/22/11
FIGURE 6.3-14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010, mg/l	SCALE: 1"=1600'
	PAGE: 6.3-21

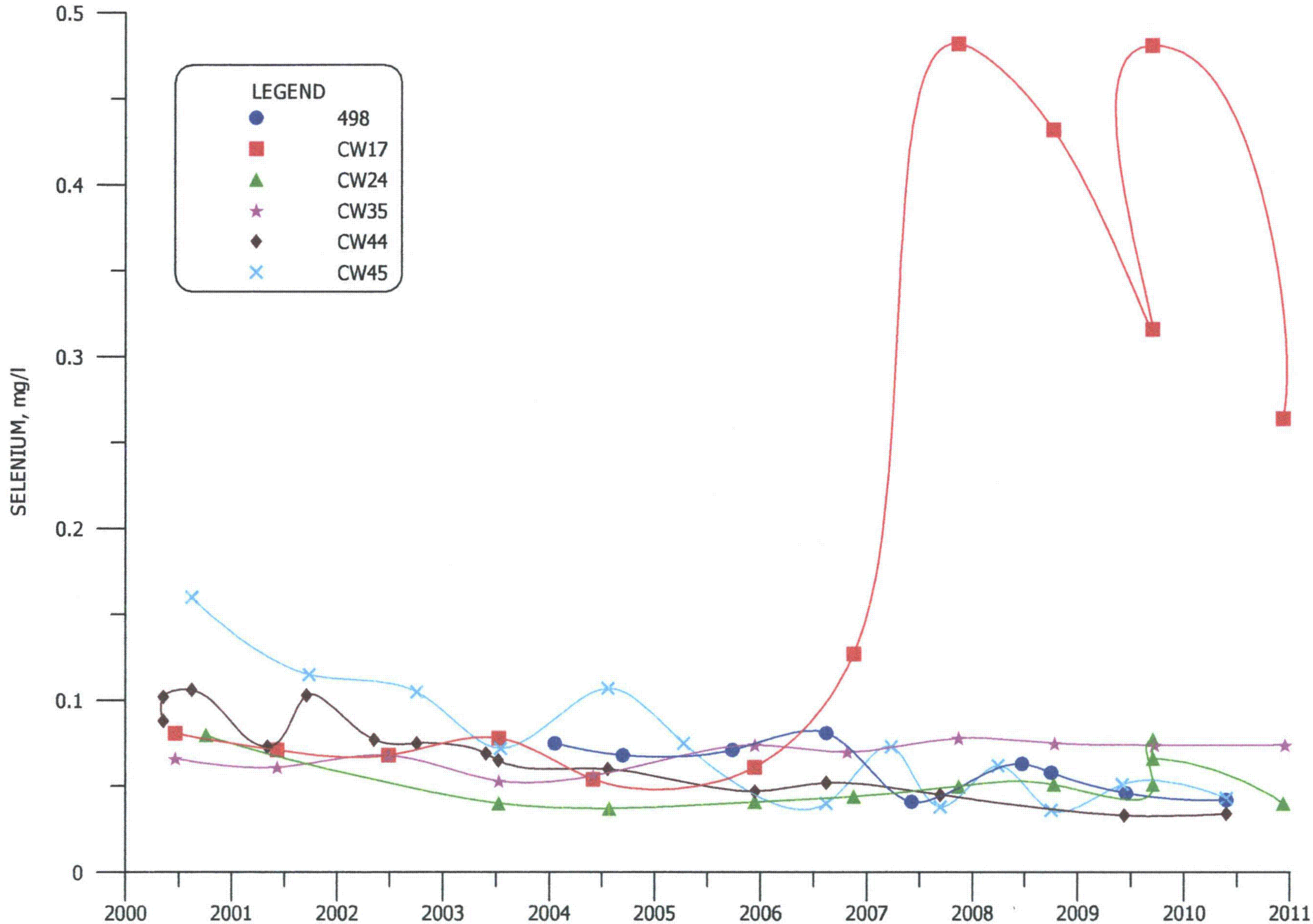


FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44, AND CW45

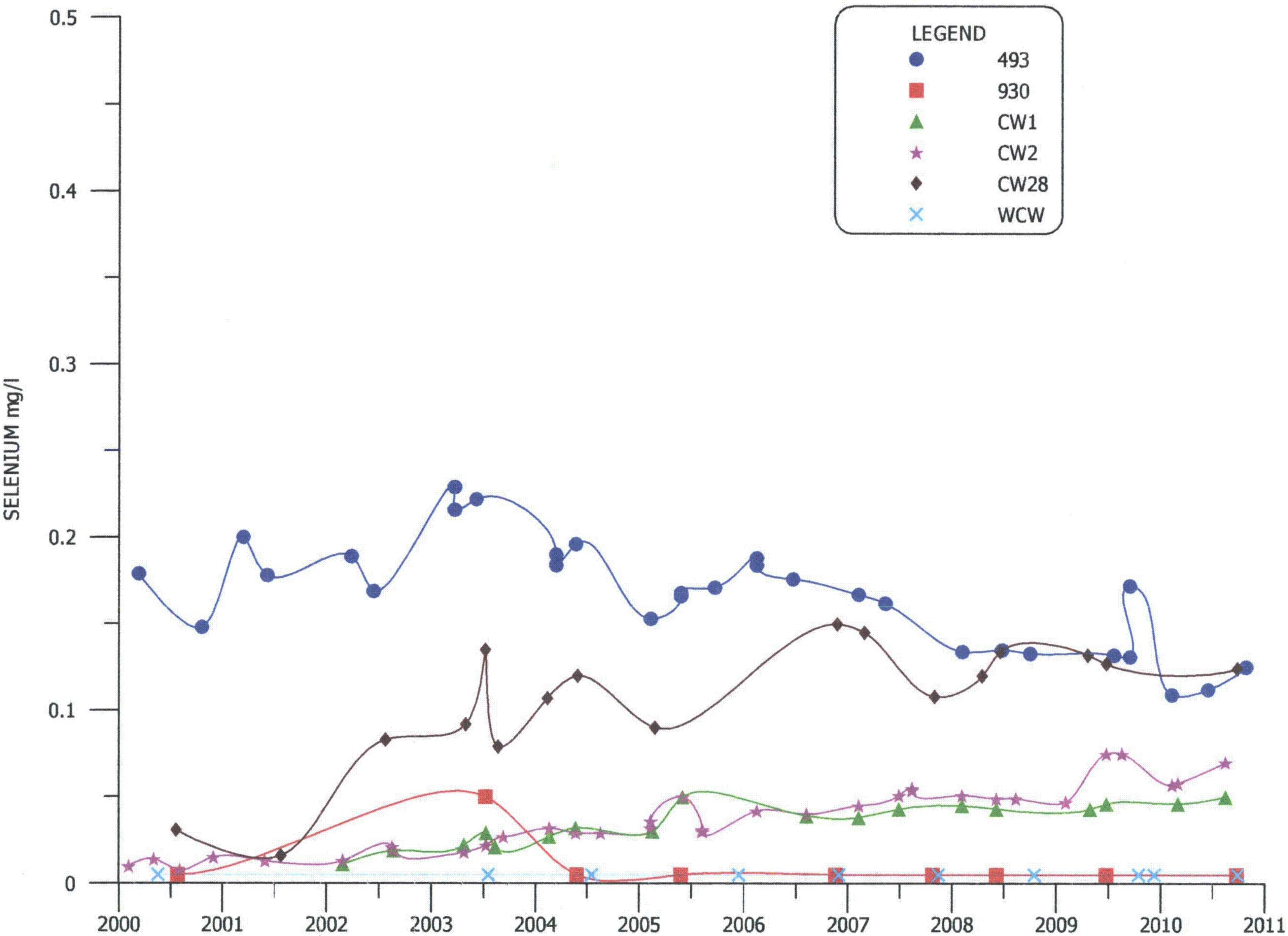
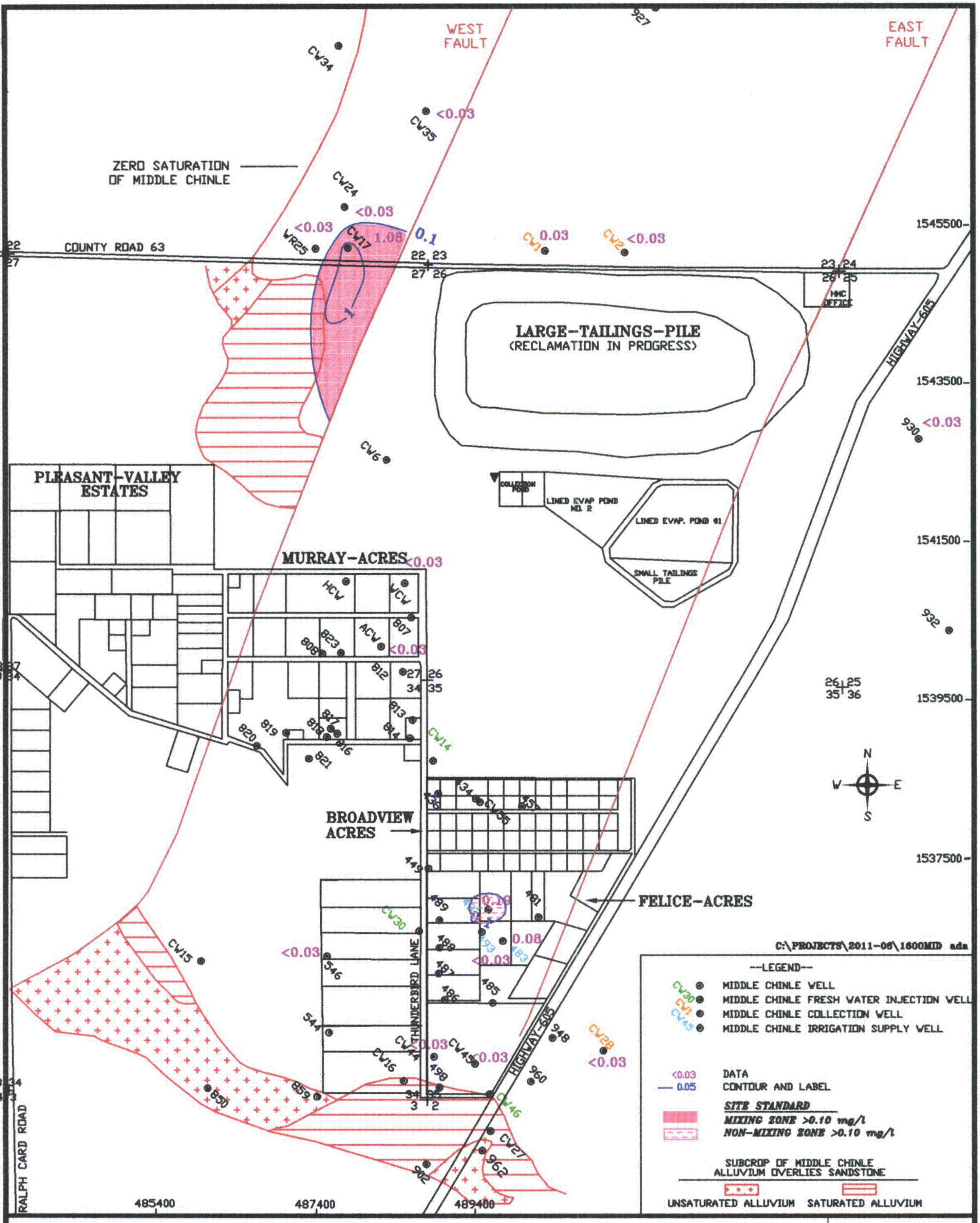


FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, CW1, CW2, CW28, AND WCW



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

FIGURE 6.3-17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010, mg/l

DATE: 2/22/11

SCALE: 1"=1600'

6.3-25

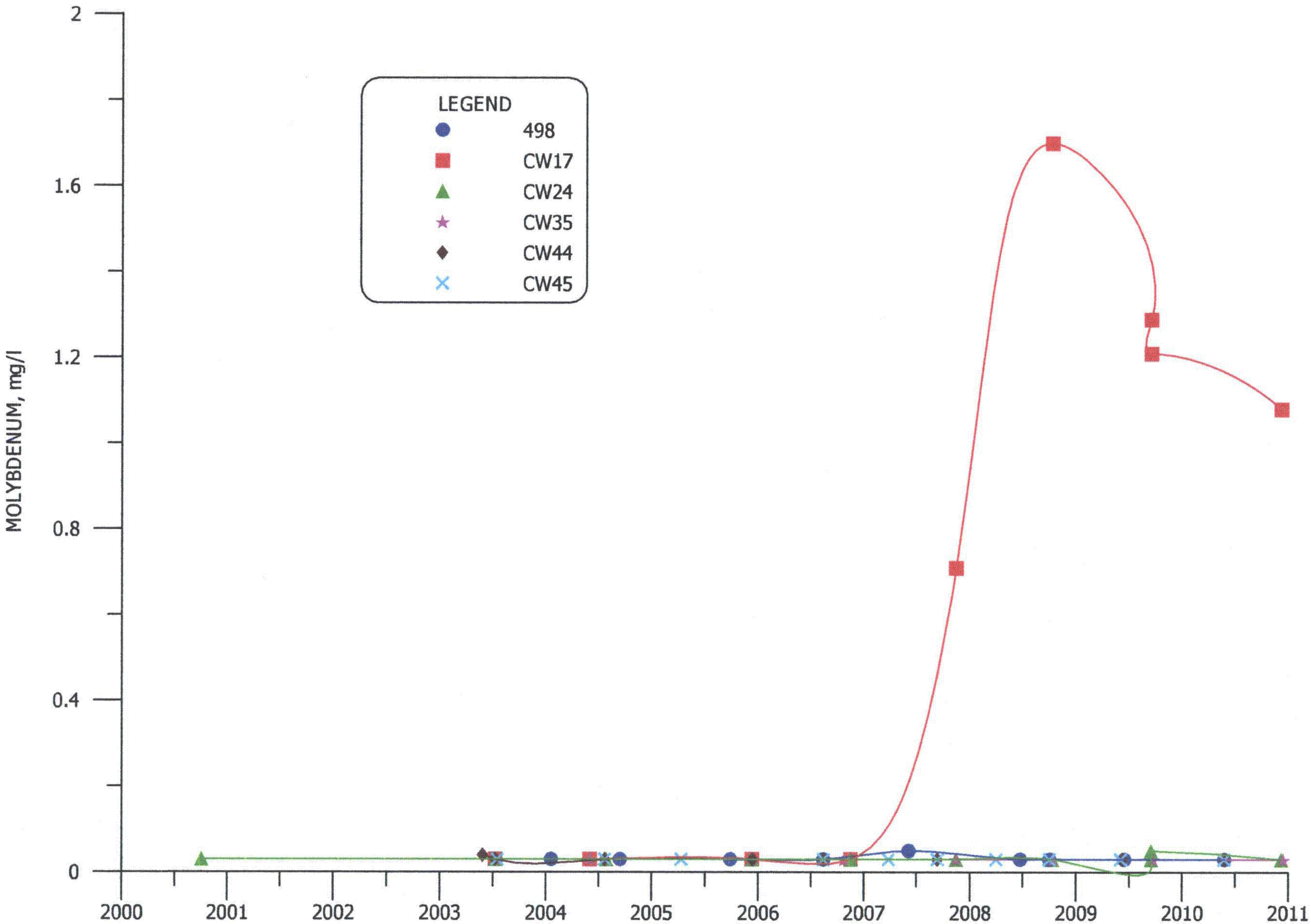


FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW17, CW24, CW35, CW44 AND CW45

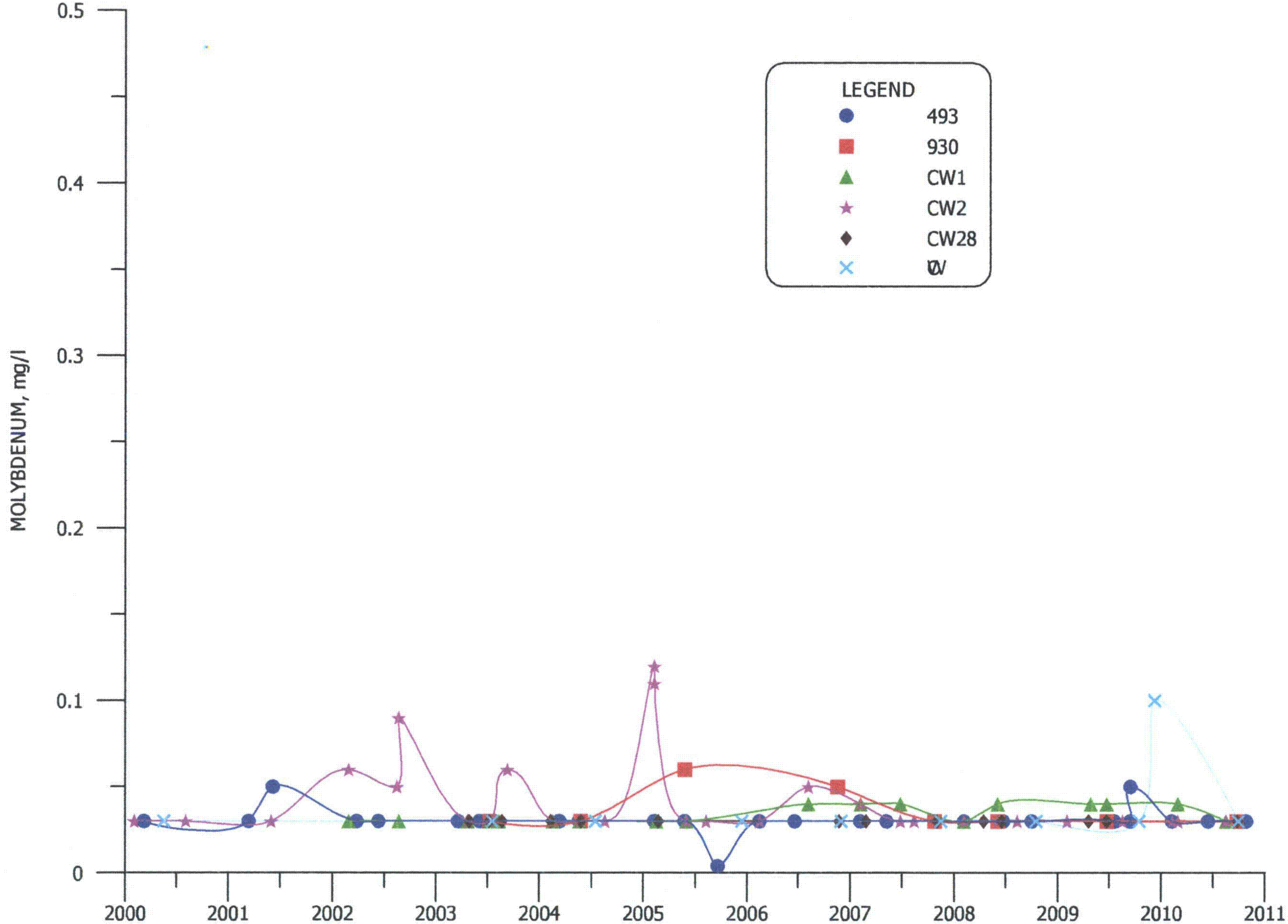
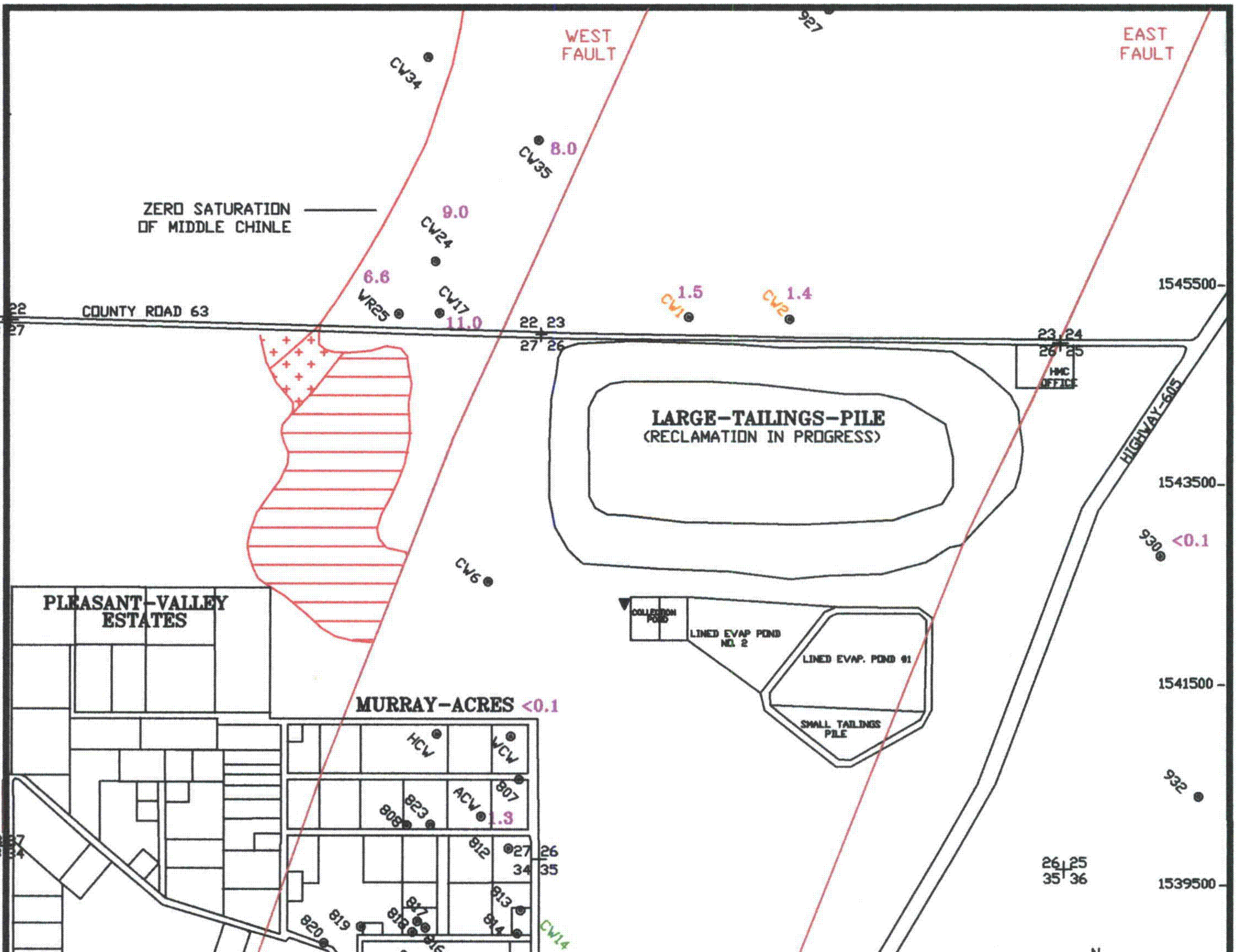


FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 493, 930, CW1, CW2, CW28, AND WCW



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

DATE: 2/22/11

FIGURE 6.3-20. NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2010, mg/l

SCALE: 1"=1600'

SECTION 7

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 7

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GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

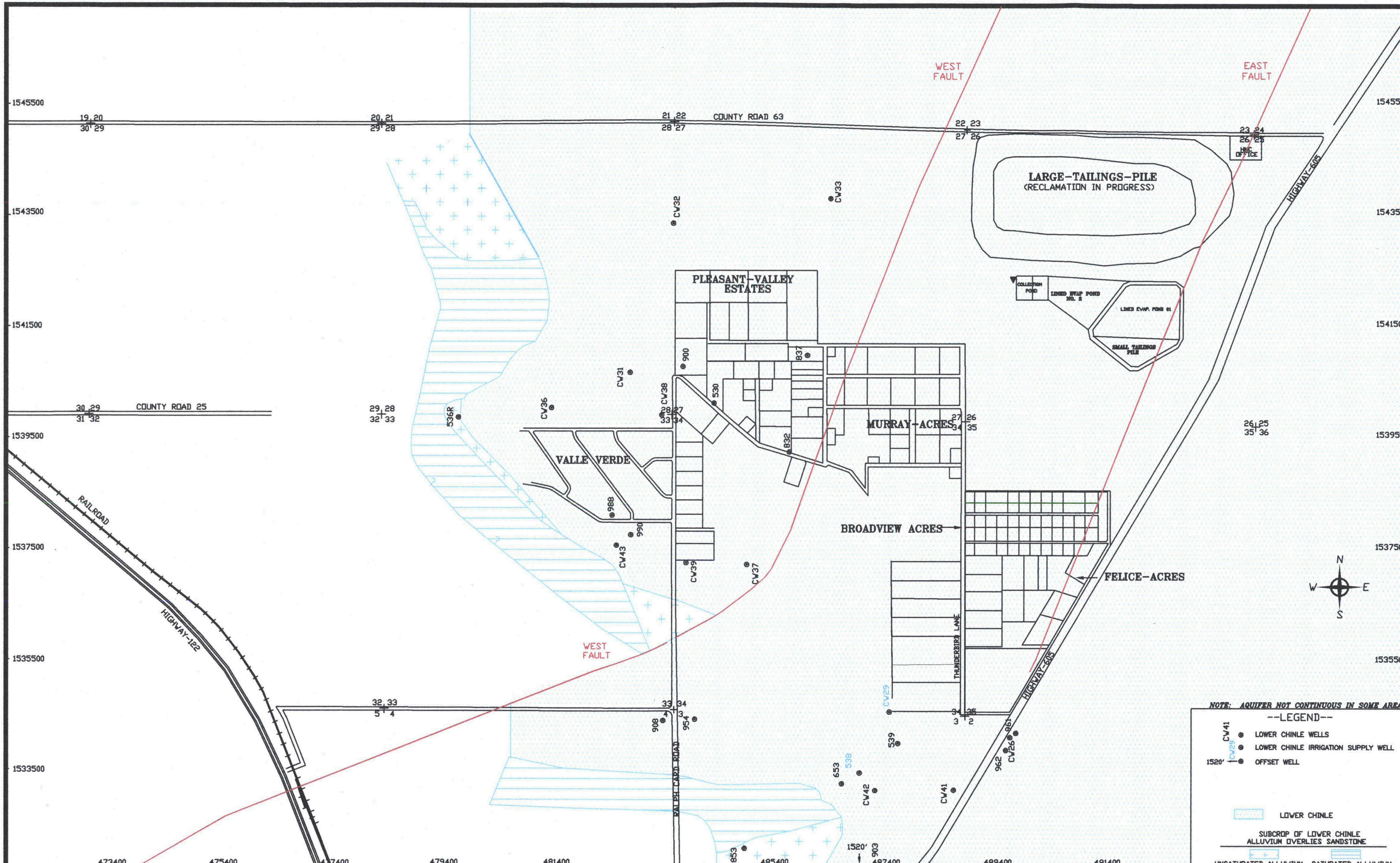
FIGURES
(continued)

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 a 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 Figure 7.1-1. 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 crosshatch 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. Lower Chinle wells 538, and CW29 were used as irrigation supply wells in 2010.



SCALE: 1" = 1600'
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FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS

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. Figure 7.2-1 presents water-level elevations in the Lower Chinle wells and the fall of 2010 water-level elevation contours. The West and East Faults are also shown on this figure. The approximate alluvial-Lower Chinle subcrop areas are also shown on this figure. Flow west of the West Fault in the Lower Chinle is mainly to the northeast. Flow between the two faults is to the northeast in the area of the tailings. The flow is to the northwest in the southern portion of the Lower Chinle aquifer between the faults. The northwesterly flow direction in this area indicates that the Lower Chinle water moves across the West Fault in the area west of Broadview Acres. Lower Chinle water levels in 2010 were similar to the 2009 values in Section 3 with continued pumping from wells CW29, and 538 for the purpose of providing irrigation supply.

The Lower Chinle wells for which water-level time plots were prepared are shown on Figure 7.2-2. Water levels are presented for Lower Chinle wells 653, 853, CW26, CW29, CW41 and CW42 on Figure 7.2-3. Water levels in Lower Chinle wells 653 and CW42, which were not used as irrigation supply wells in 2010, show a gradual increasing trend throughout 2010. Water levels gradually decreased in Lower Chinle well CW29 prior to its use as a fresh-water injection supply well in 2003 and irrigation supply in 2004 through 2010. Small overall water-level decreases had been observed over the last few years in Lower Chinle wells 853, CW26, and CW41 but the 2010 water levels very gradually rose.

Figure 7.2-4 presents water-level elevations versus time for Lower Chinle wells CW31, CW32, CW33, CW36, CW37 and CW43 (see Figure 7.2-2 for location of these wells). Water levels had gradually declined over the last few years in wells CW31 and CW36 but gradually rose in 2010. Water levels in wells CW37 and CW43 near the subcrop area were slightly higher in 2010 than in recent years except for the higher values in 2009. Water levels in 2010 have been fairly steady in well CW33. Water levels have decreased in Lower Chinle well CW32 for several years, and this trend may have ceased in 2010 because the water levels were steady. The rate and magnitude of decrease in this Lower Chinle well is similar to that observed in the alluvial and San Andres aquifers to the west in Sections 29, 32 and 33. These declines are different than the steady alluvial water levels near well CW33. This indicates that the Lower

Chinle aquifer near well CW32 is hydrologically connected to the alluvial aquifer west of this area but is isolated from the alluvial aquifer in its immediate area.

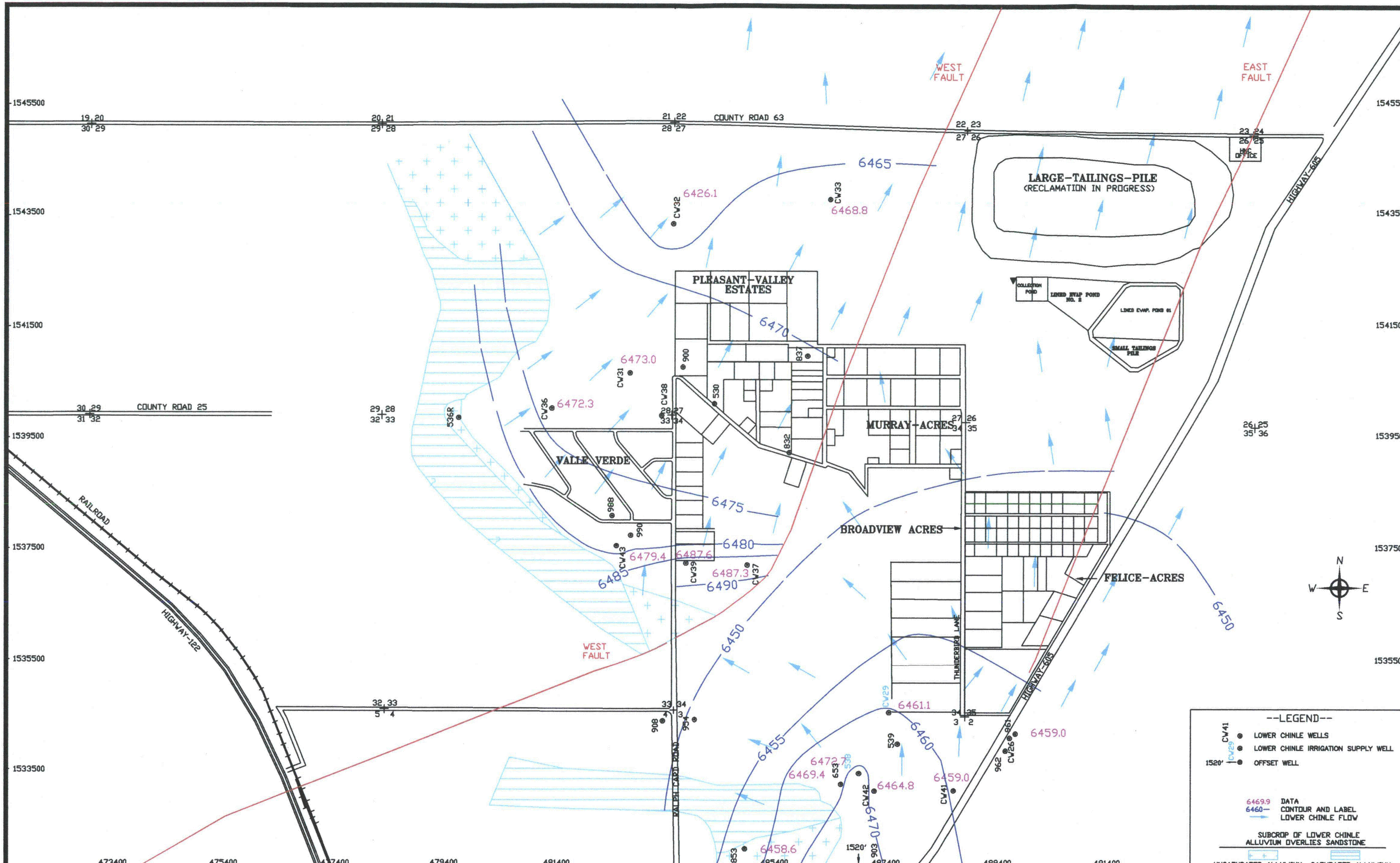

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FIGURE 7.2-1. WATER-LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, FALL 2010, FT-MSL

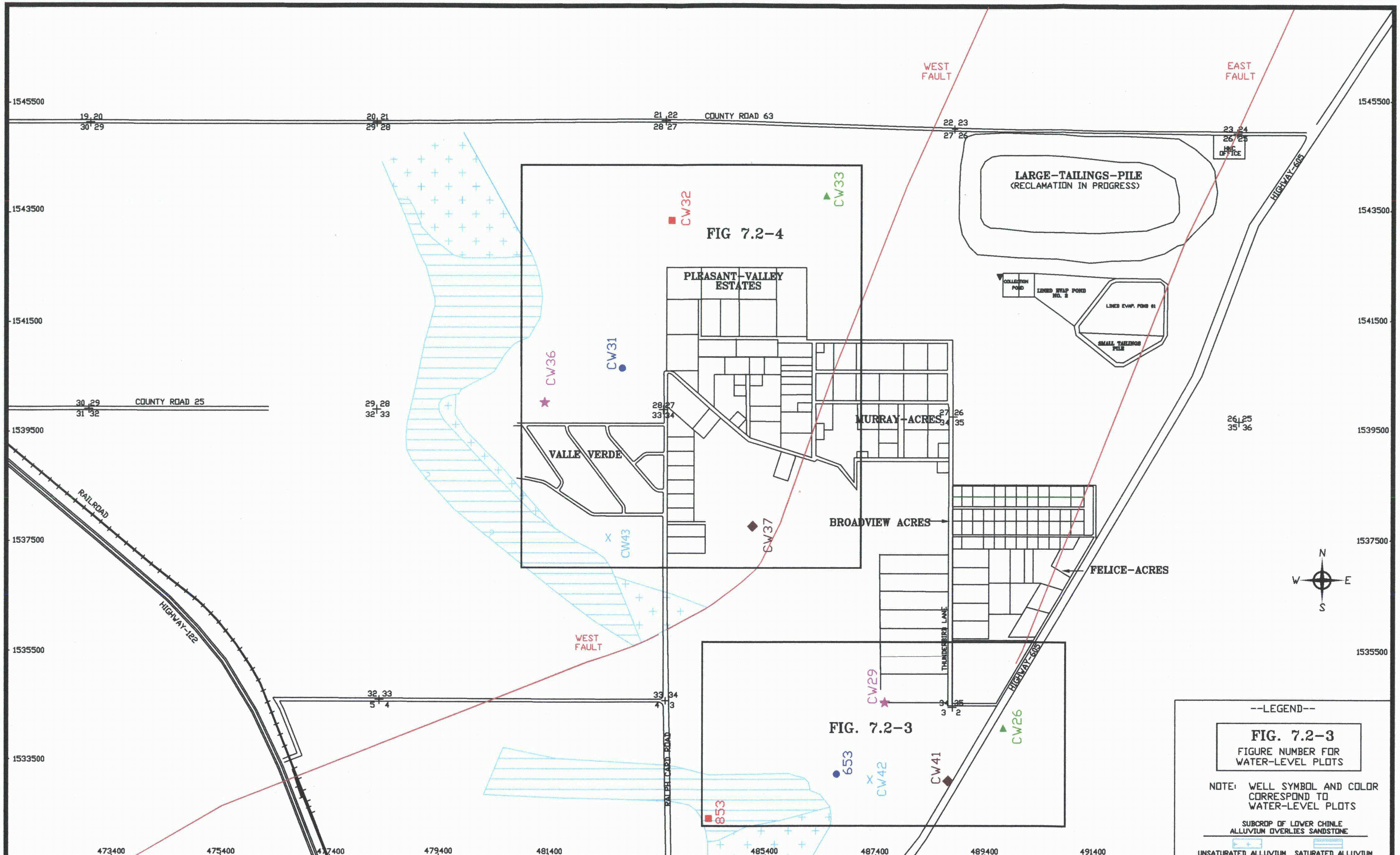

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FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS, 2010.

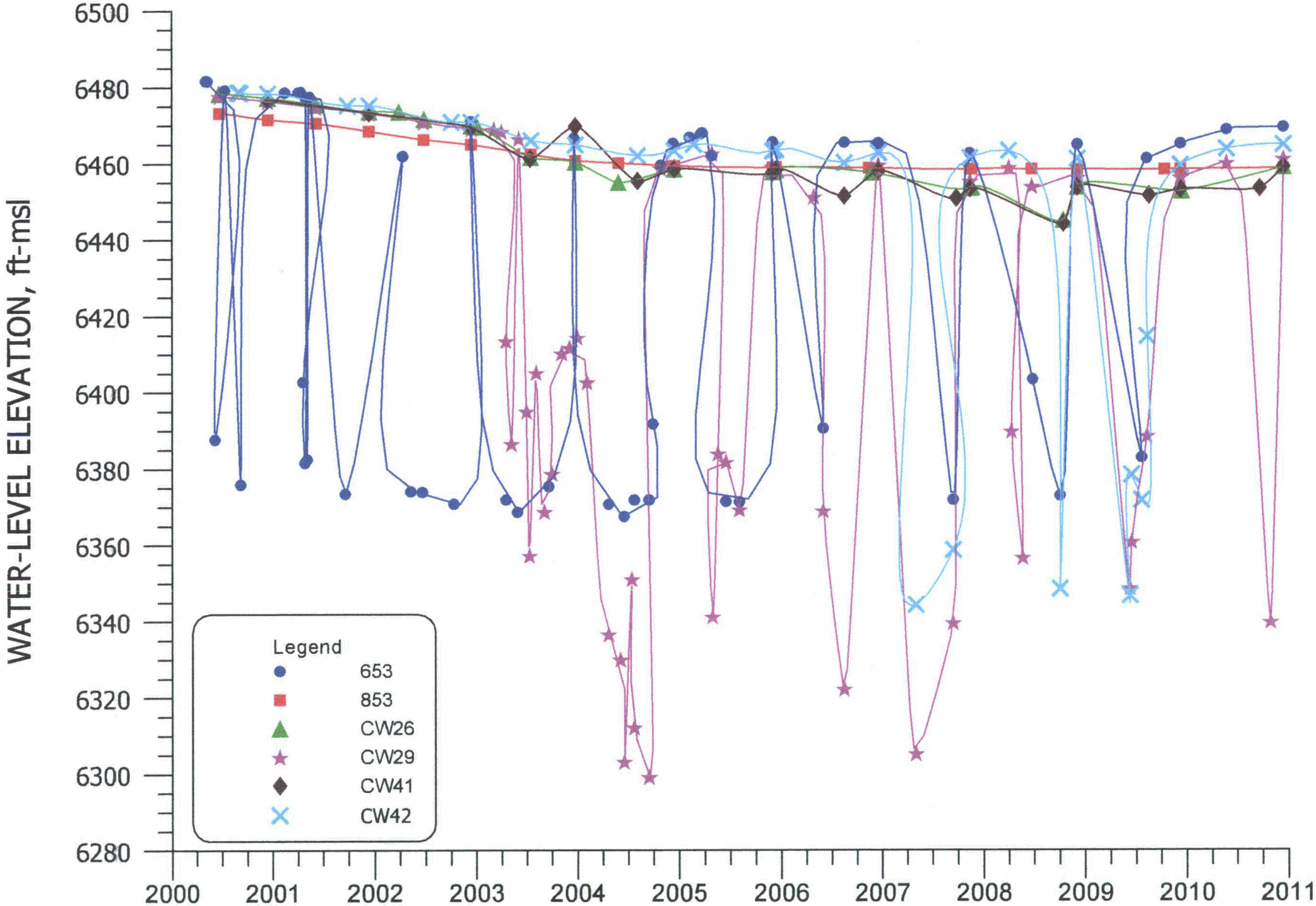

FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 653, 853, CW26, CW29, CW41, AND CW42.

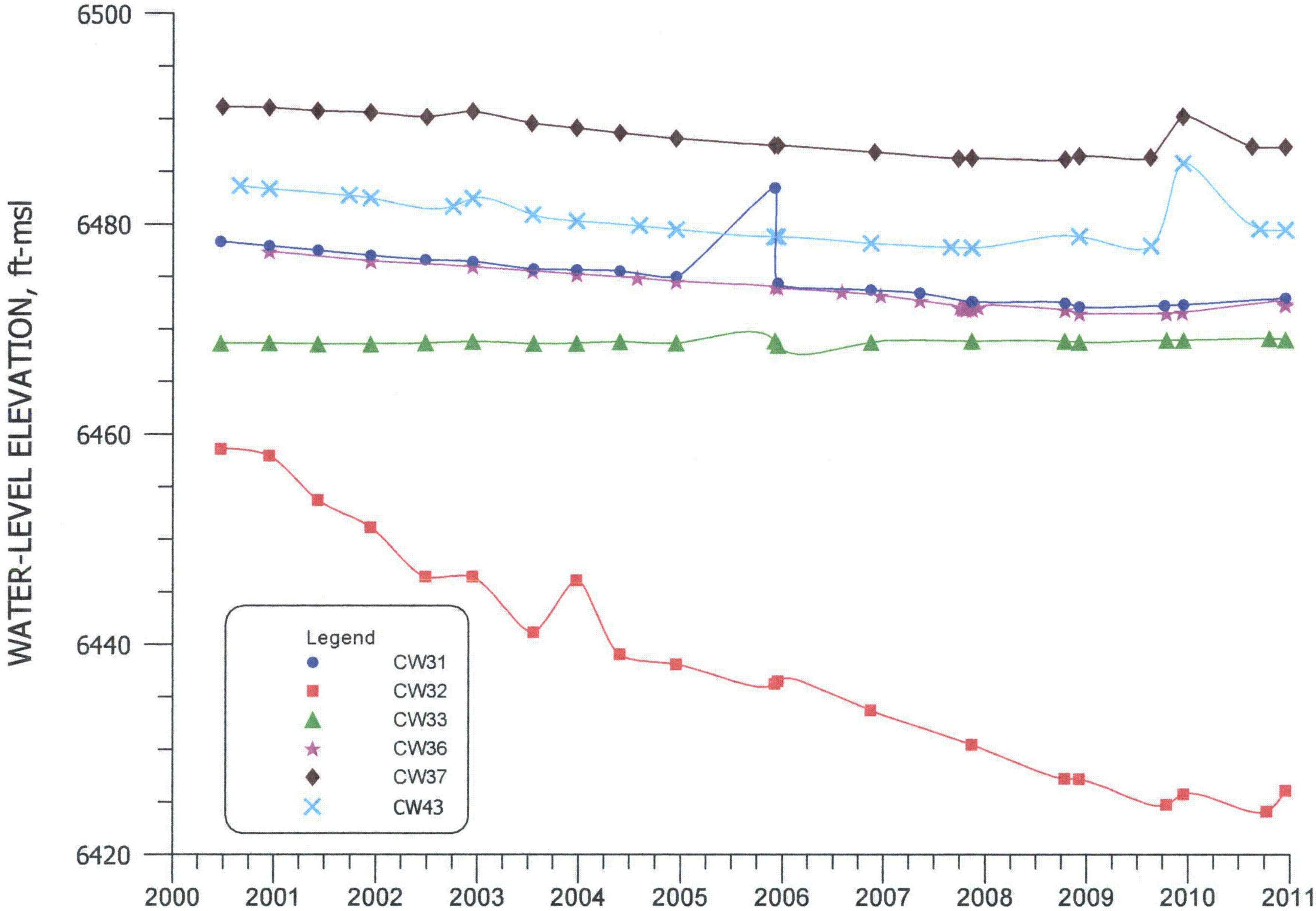

FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW36, CW37, AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2010 for the Lower Chinle aquifer are presented in Tables B.5-1 and B.5-2 of Appendix B along with water-quality data for the other Chinle aquifer wells. The basic well data presented in Tables 5.1-1 through 5.1-4, and the orientation of the well name on Figure 5.1-1 indicate which of the Chinle wells are completed in the Lower Chinle.

Constituent concentrations in the Lower Chinle aquifer exceed background conditions only in Section 3, except for some natural exceedances in the far down-gradient wells. Sulfate concentrations in the Lower Chinle aquifer are within the NRC standards except in far down-gradient well CW33 where concentrations only slightly exceed the relevant non-mixing background value. These concentrations are deemed to be of natural origin and only slightly exceed the 95th percentile level of the data base. Uranium concentrations exceed the NRC site standards only in the northeastern and central portions of Section 3. Molybdenum concentrations in the Lower Chinle aquifer are all less than the limit of detection.

7.3.1 SULFATE – LOWER CHINLE

Figure 7.3-1 presents contours of sulfate concentrations in the Lower Chinle aquifer during 2010. Lower Chinle standards based on background data are presented for sulfate in the legend of Figure 7.3-1. The Lower Chinle concentrations varied from 266 to 2200 mg/l. Only the value from well CW33 exceeded the 2000 mg/l upper limit of background for the non-mixing zone. This concentration is thought to be naturally occurring and likely exceed the full range of background because the data is limited in the downgradient portion of the Lower Chinle aquifer. None of the Lower Chinle concentrations in the mixing zone (see Section 3 and Figure 3.3-3 for zone areas) exceeded the mixing-zone sulfate site standard of 1750 mg/l. Therefore, the Lower Chinle aquifer does not require any restoration with respect to sulfate.

The locations of wells used in the plots of water quality for the Lower Chinle are presented on Figure 7.3-2. Figure 7.3-2 shows that data for mixing zone Lower Chinle wells 538, 653, CW36, CW37, CW42 and CW43 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. The sulfate concentrations in water collected from each of these wells are less than the mixing-zone site standard, showing that sulfate restoration of the Lower Chinle is not needed in the southern portion of the aquifer.

Sulfate concentrations 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). Sulfate concentrations were fairly steady in 2010 in these Lower Chinle wells. The data collected since mid-2003 was not available when the background level was calculated. The exceedance in sulfate value from well CW33 is thought to be natural.

7.3.2 TOTAL DISSOLVED SOLIDS – LOWER CHINLE

Figure 7.3-5 presents the total dissolved solids (TDS) concentrations in the Lower Chinle aquifer during 2010. All concentrations for 2010 sampled wells are less than the non-mixing zone site standard value of 4140 mg/l. Concentrations are thought to naturally exceed this level farther down-gradient as shown by the cyan pattern. The TDS concentration naturally increases down-gradient due to the low permeability and correspondingly slow movement of water through this shale aquifer.

Figure 7.3-6 presents TDS concentrations for Upper Chinle wells 538, 653, CW36, CW37, CW42 and CW43. TDS concentrations in these wells have been fairly steady in 2010 except the increase observed in well CW43. The TDS in well CW43 has increased to a level that is typical of the lower Chinle aquifer. TDS concentrations increase in well CW43 started prior to the Section 33 Flood irrigation which was initially done in 2004. All of these concentrations are below the mixing-zone site standard of 3140 mg/l.

TDS concentrations for wells CW29, CW32, CW33 and CW41 are presented on Figure 7.3-7. This figure demonstrates that, overall, TDS concentrations have remained fairly stable during 2010. Additionally, these historical TDS concentrations are well within the range of natural fluctuation in the non-mixing zone of the Lower Chinle aquifer, except for the values from wells CW32 and CW33 being near the top of the natural observed concentrations.

7.3.3 CHLORIDE – LOWER CHINLE

Chloride concentration data in the Lower Chinle aquifer were updated during 2003 to confirm that restoration for this constituent is not necessary in the Lower Chinle aquifer. The chloride concentrations measured during 2010 continue to support this conclusion and are all less than the NRC standard.

7.3.4 URANIUM – LOWER CHINLE

Uranium concentration in the Lower Chinle aquifer is an important constituent with respect to aquifer restoration in Section 3. Figure 7.3-8 presents the uranium concentrations in the Lower Chinle aquifer for 2010. Only two of the uranium concentrations in the Lower Chinle exceeded the mixing-zone background concentration, and three exceeded the non-mixing zone background concentration. The highest values are in the northeast portion of Section 3 in water from collection wells 538, 653, CW29 and CW42. These concentrations should gradually decrease to less than background concentrations with the continuing use of this water in the irrigation program.

Uranium concentrations plotted versus time for Lower Chinle wells 538, 653, CW36, CW37, CW42 and CW43 are presented on Figure 7.3-9. The overall decline in uranium concentration in wells 538 and 653 are due to pumping of Lower Chinle wells to obtain a water supply for the irrigation system. An increase in uranium concentration was observed in well CW42 in 2010, possible due to the lack of pumping of this well last year. Additional results with time will be needed to show when the restoration of this area is adequate. Uranium concentrations in wells CW36, CW37 and CW43 have remained low.

The uranium concentrations in all of the Lower Chinle wells with data presented on Figure 7.3-10 have remained at low levels with steady and higher values in well CW29. Well CW29 is used to supply irrigation water and its pumping should eventually decrease these concentrations.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2010 are presented on Figure 7.3-11. 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, 653, CW36, CW37, CW42 and CW43. The selenium concentrations in these Lower Chinle aquifer wells were steady in 2009 except for a small decline in wells 538, 653 and CW42.

Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW29, CW32, CW33 and CW41. Selenium concentrations measured during 2010 were consistent with the 2009 levels for each of these wells with a gradual decline in well CW29.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2010 were all low at levels near the detection limit and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2010 results are consistent with historical measurements of molybdenum in the Lower Chinle aquifer. Molybdenum is not a constituent of concern in the Lower Chinle aquifer.

7.3.7 NITRATE – LOWER CHINLE

Nitrate monitoring of the Lower Chinle aquifer was updated in 2003 to confirm that concentrations remain significantly below the site standard of 15 mg/l for the mixing zone. Nitrate concentrations measured in 2010 are presented in Figure 7.3-14 and are all significantly below the site standard.

Plots of nitrate concentrations versus time were not prepared, because historically, values measured in Lower Chinle wells contained very low concentrations, similar to those measured in 2010. Nitrate concentrations from the tailings seepage are not expected to be significant in the future and therefore the potential in the Lower Chinle aquifer does not exist due to the very limited extent of elevated concentrations in the alluvial aquifer. Establishment of a site standard for nitrate in the Lower Chinle non-mixing zone therefore has not been set.

7.3.8 RADIUM-226 AND RADIUM-228 – LOWER CHINLE

All radium concentrations have been low in past years in the Lower Chinle aquifer. Radium-226 and radium-228 are not important parameters relative to the Lower Chinle aquifer; therefore a site standard for the Lower Chinle has not been set. Radium concentrations were analyzed in all Lower Chinle wells in the 2003 update. These low levels of radium do not warrant the development of a figure presenting areal distribution of radium. Radium-228 analysis is typically more erratic than other constituents but the available data shows that radium-226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the Homestake site.

7.3.9 VANADIUM - LOWER CHINLE

Vanadium concentrations have always been low in the Lower Chinle aquifer. Significant concentrations in the Lower Chinle aquifer would not be expected because concentrations of this constituent have only been slightly elevated in the alluvial aquifer near the tailings. Vanadium concentrations in the Lower Chinle aquifer have never been large enough to support consideration of this constituent for setting a site standard. The vanadium concentration data was updated in 2003 for the Lower Chinle aquifer.

7.3.10 THORIUM-230 – LOWER CHINLE

Thorium-230 concentrations have never been significant in the Lower Chinle aquifer and, therefore, should be dropped from the Lower Chinle monitoring list and eliminated from consideration as a Lower Chinle standard. The thorium-230 concentrations measured in the Lower Chinle aquifer during 2003 were all very small. No plots of thorium-230 concentrations with time were prepared, because concentrations have historically been low.

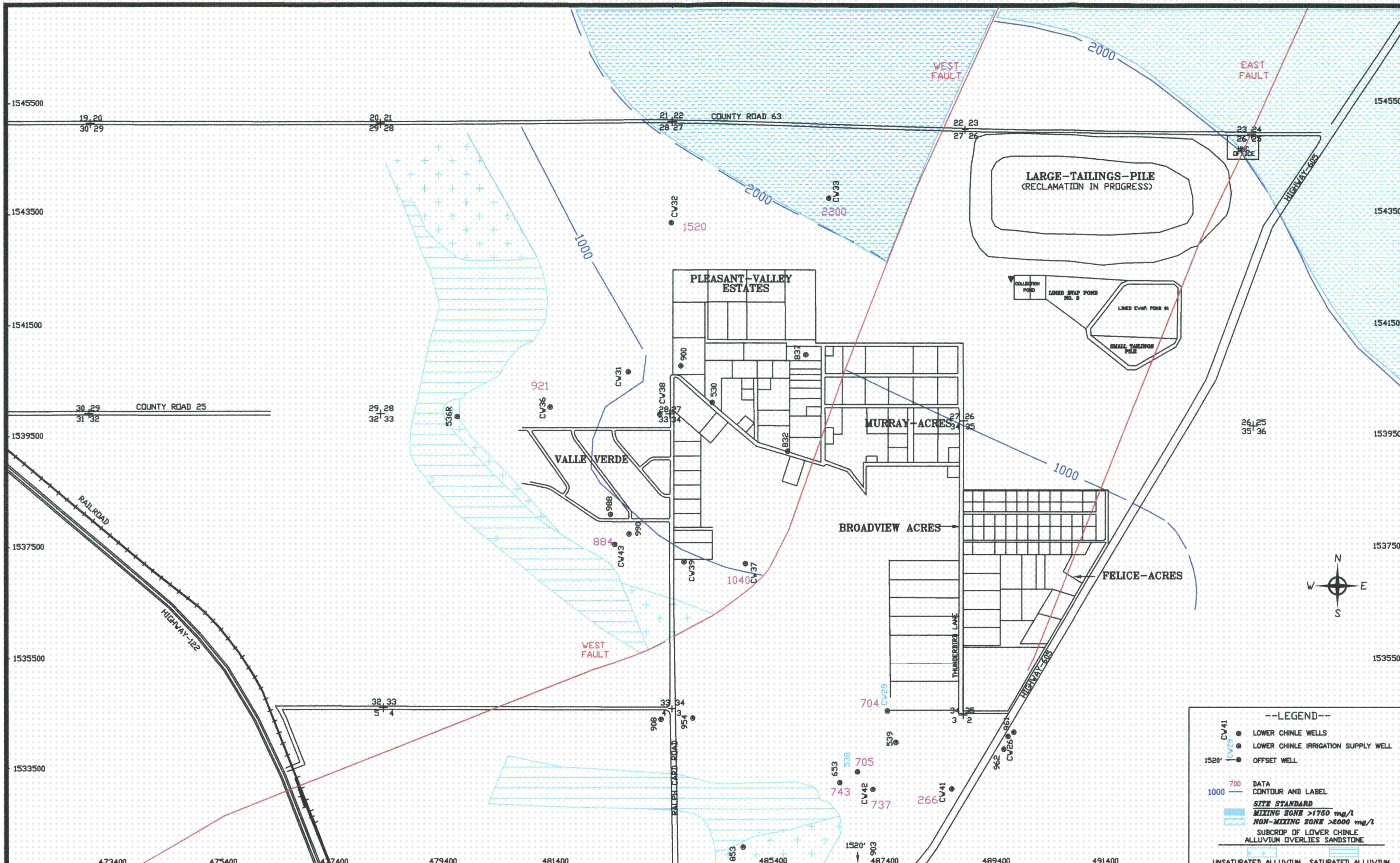

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FIGURE 7.3-1 SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2010, mg/l

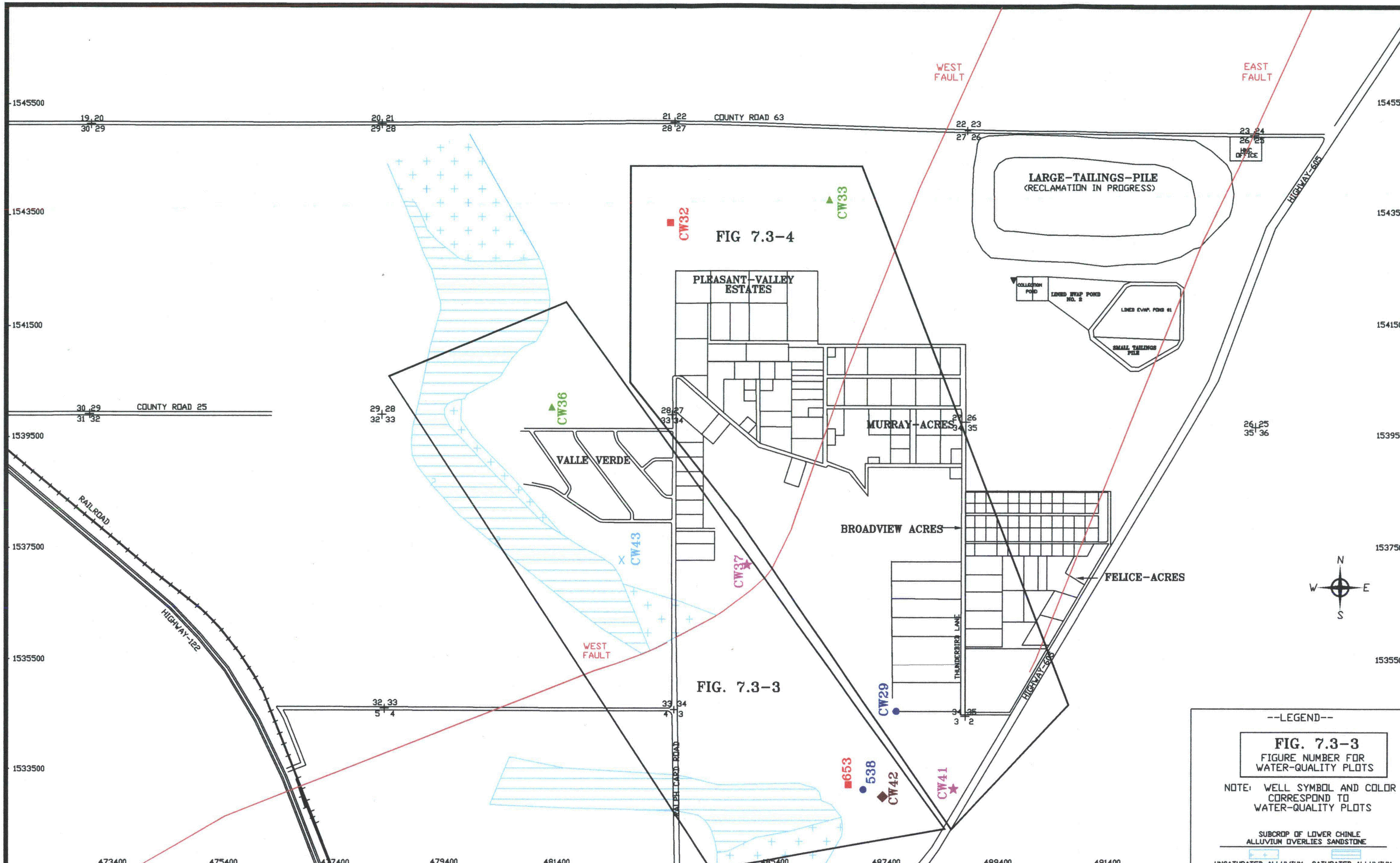

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FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS, 2010

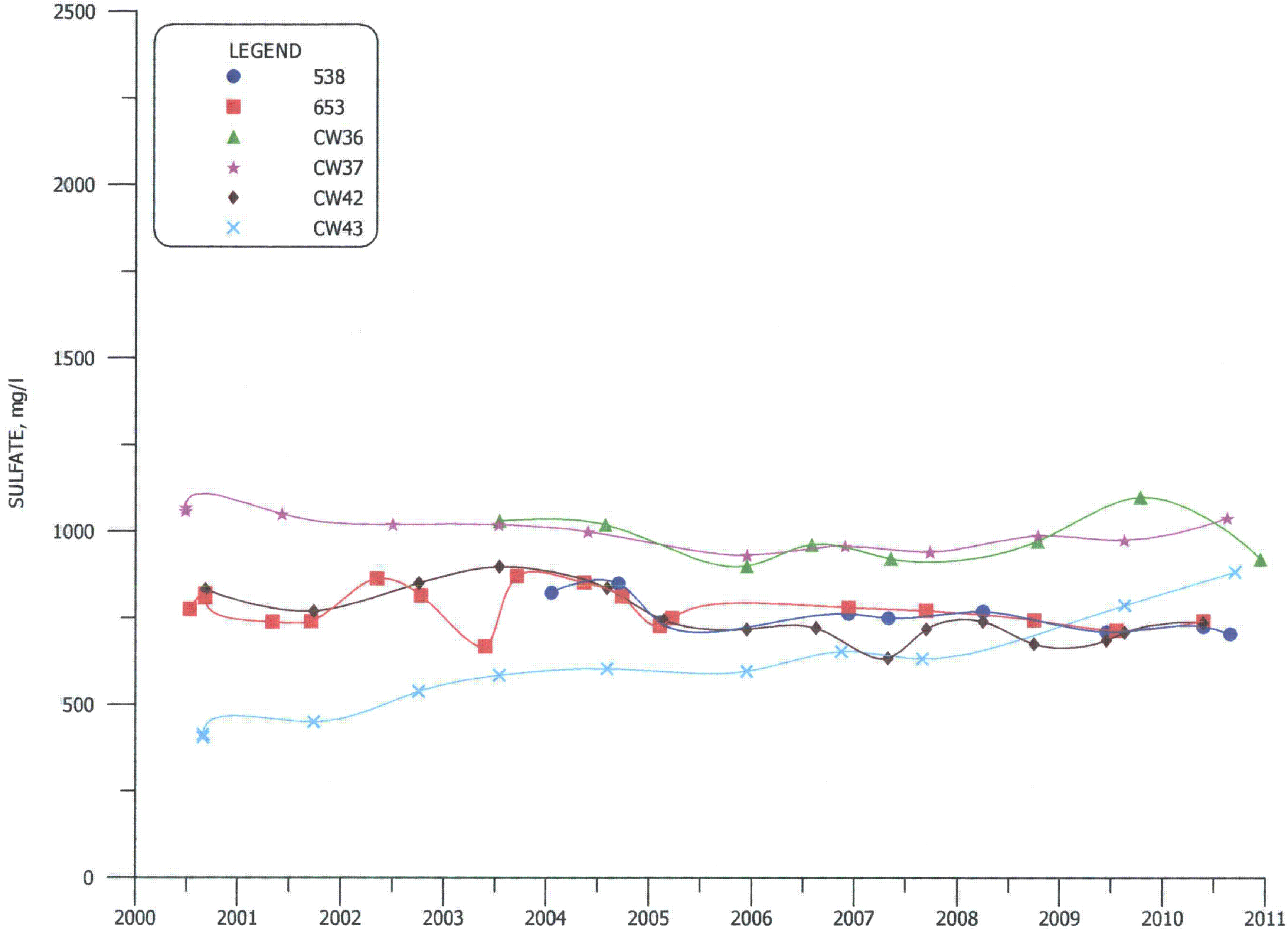

FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 538, 653, CW36, CW37, CW42, CW43

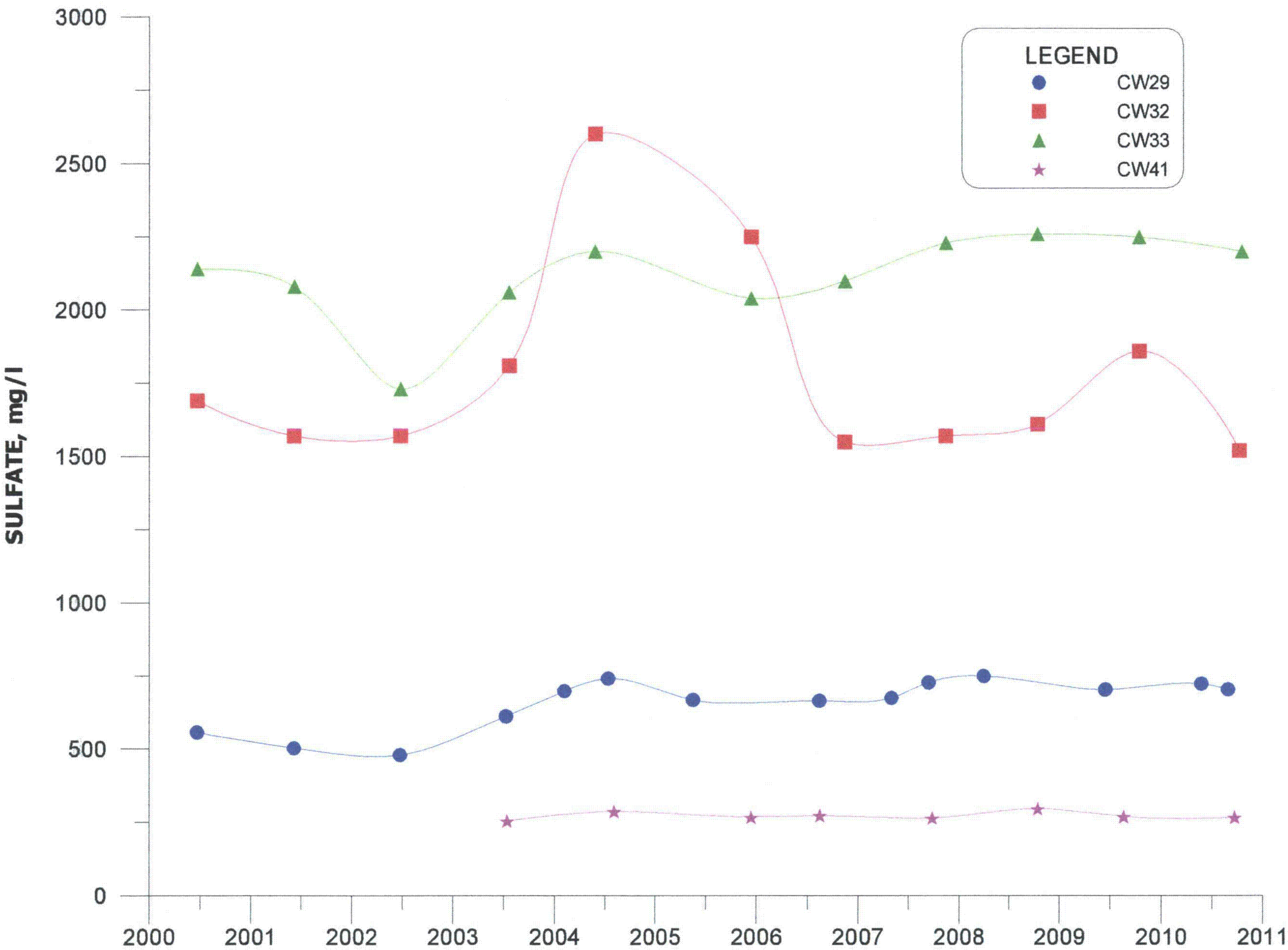

FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33, AND CW41

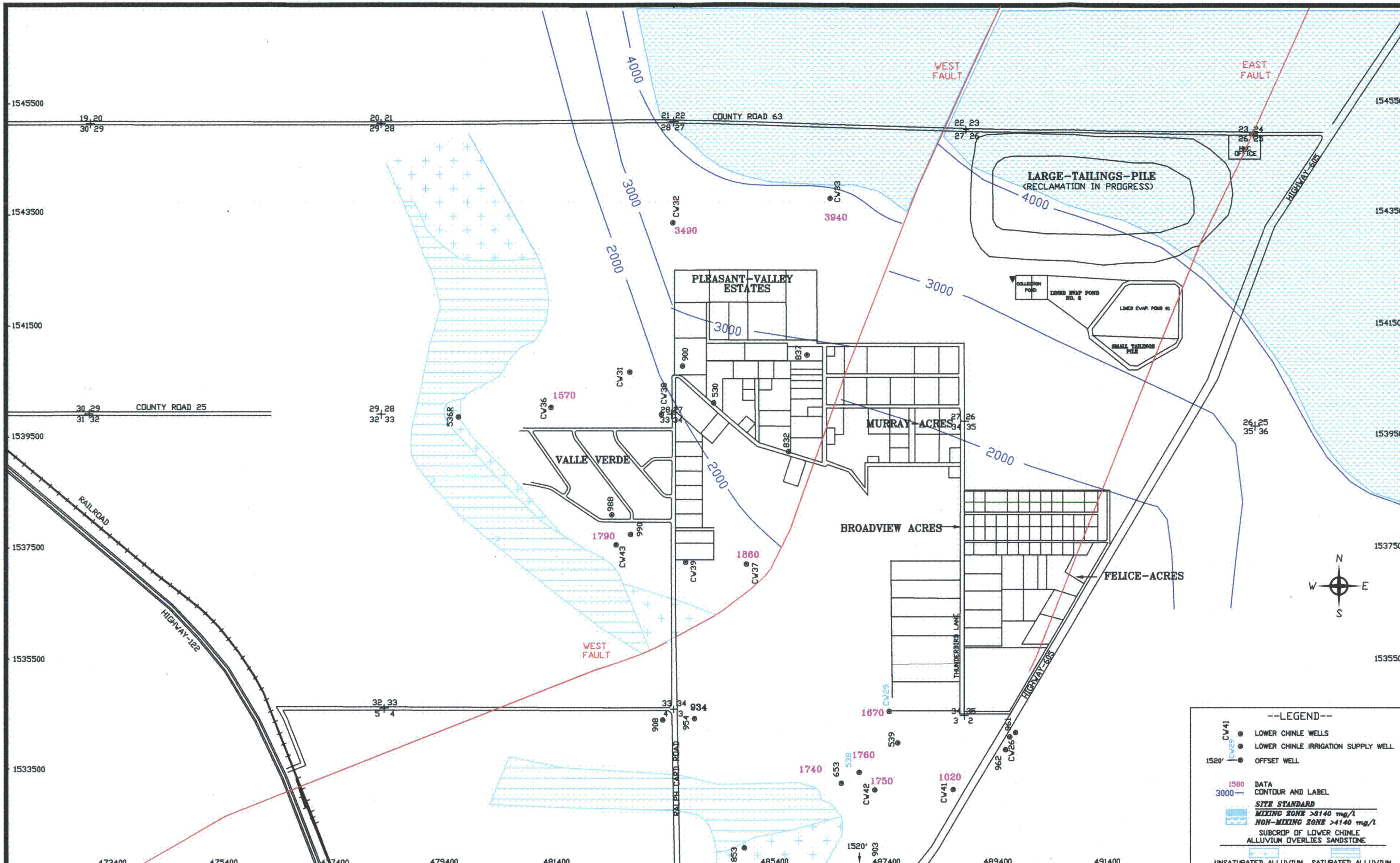

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FIGURE 7.3-5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2010, mg/l

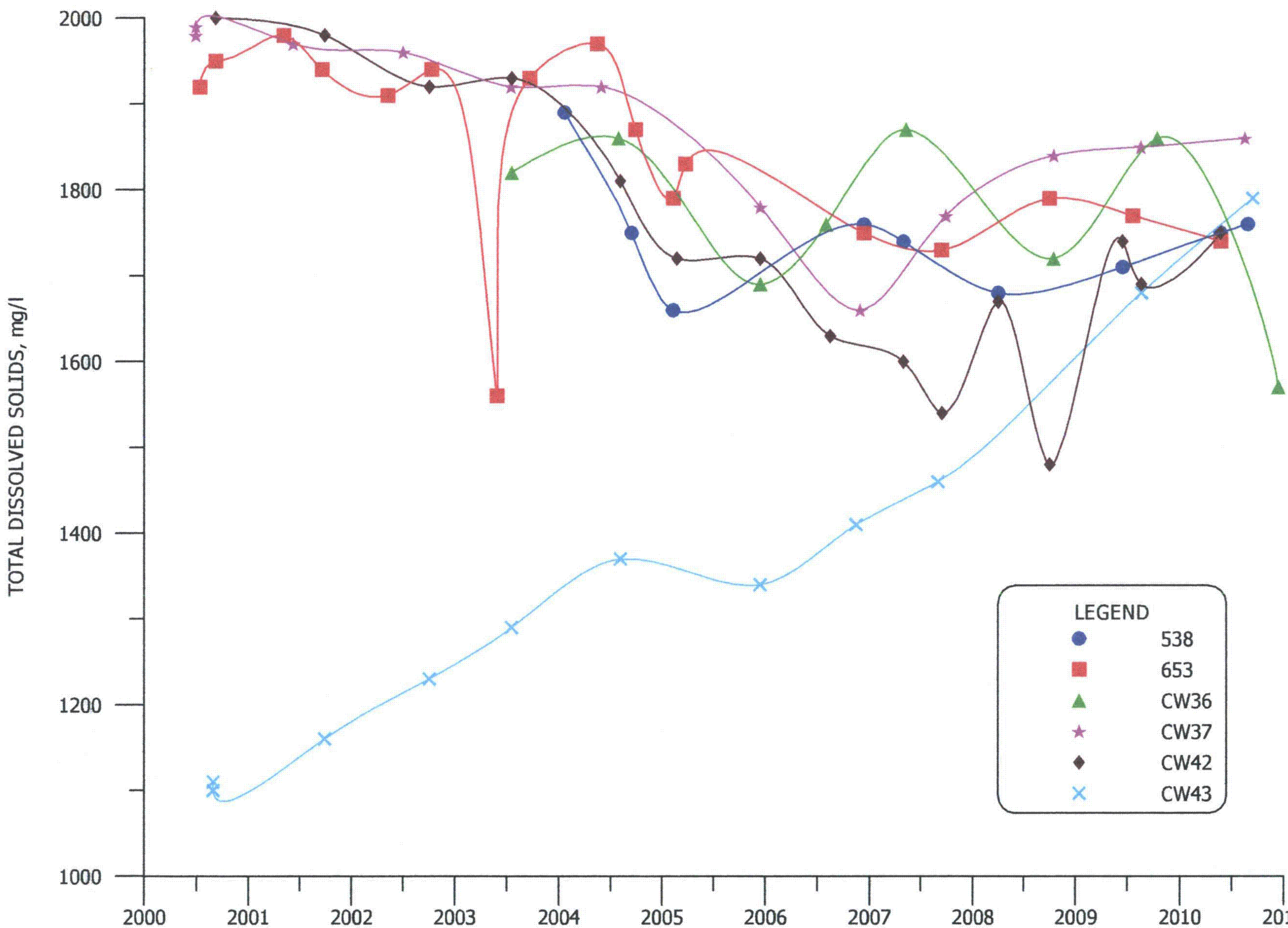

FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 538, 653, CW36, CW37, CW42 AND CW43

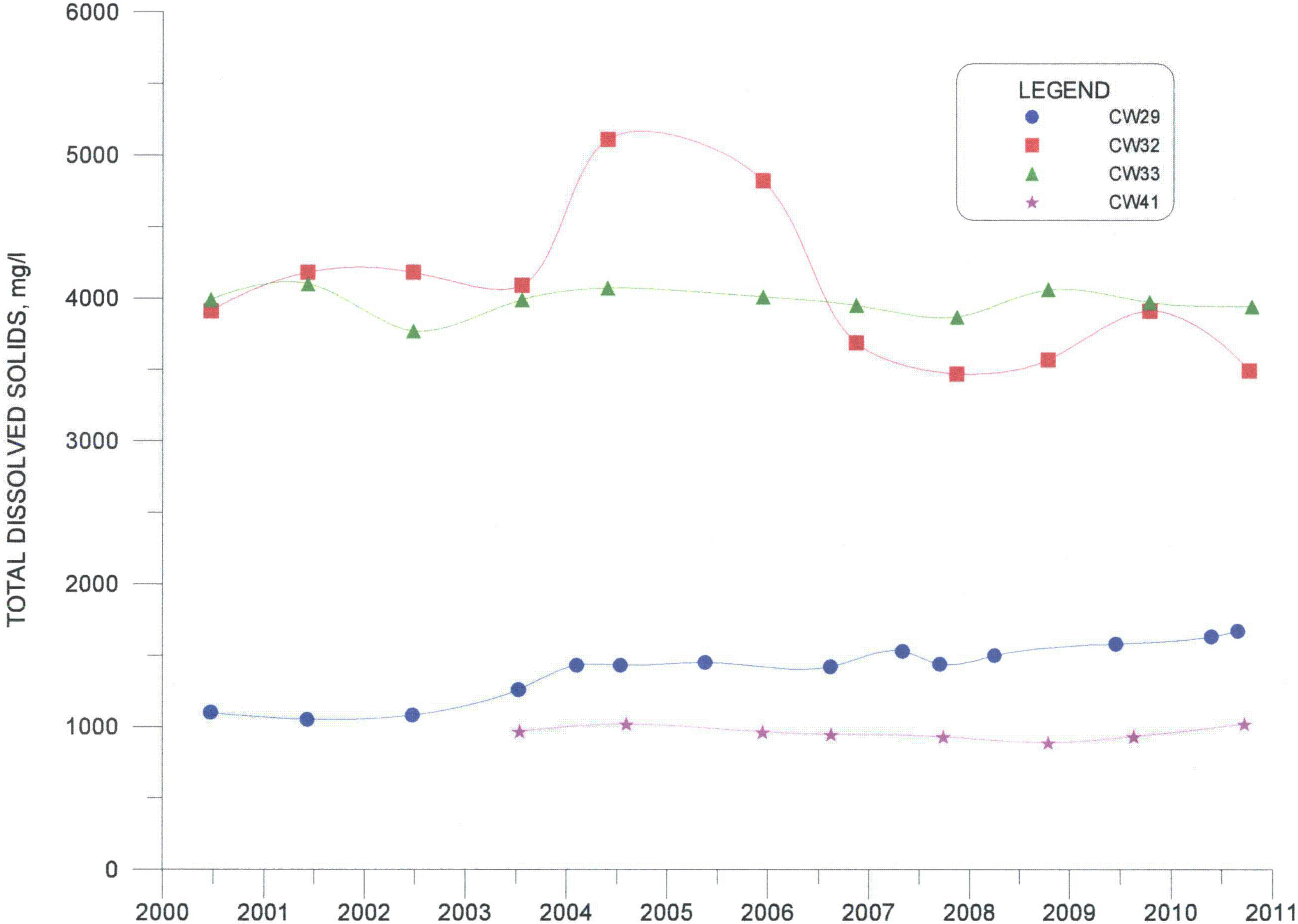

FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW29, CW32, CW33, AND CW41

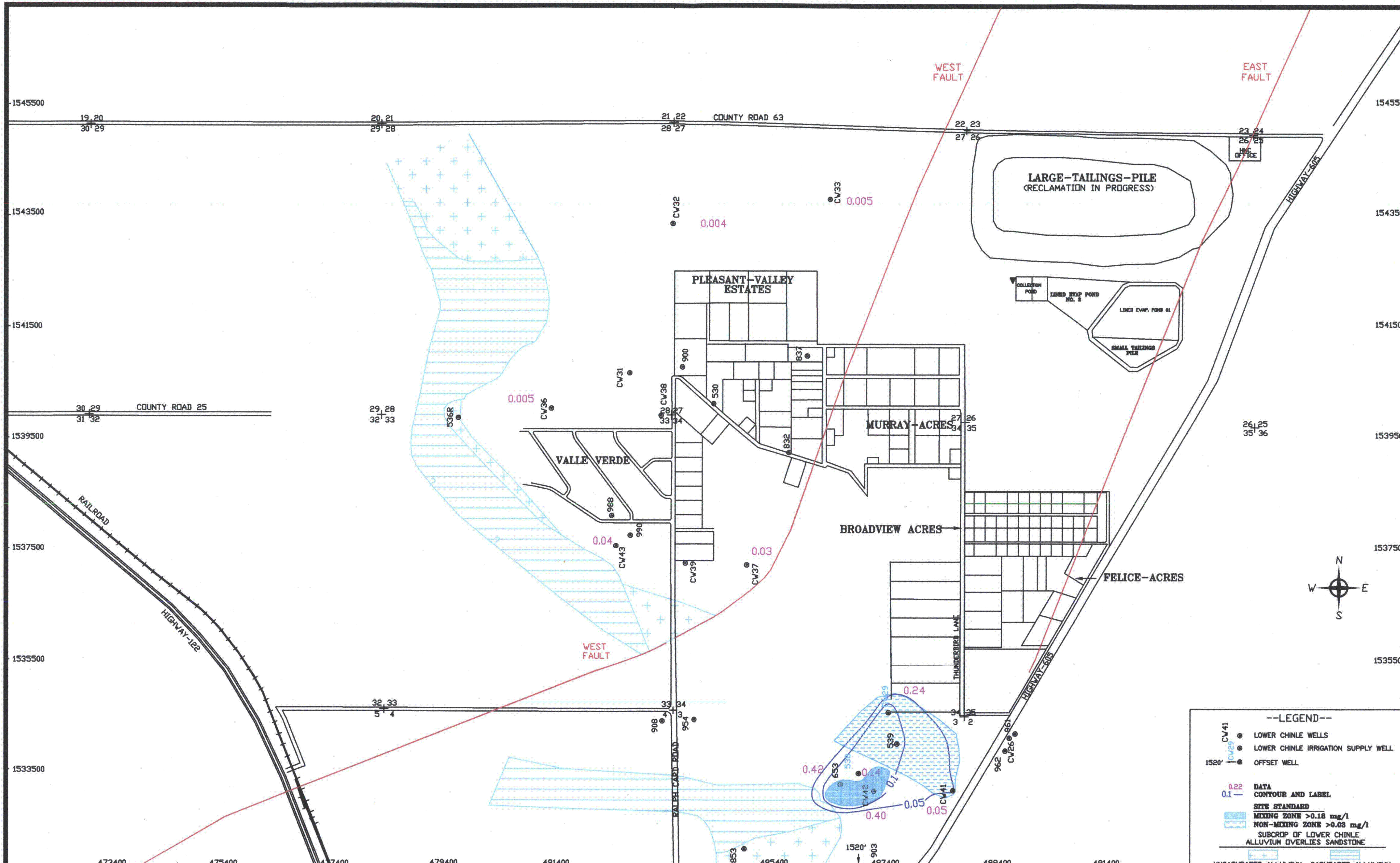

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FIGURE 7.3-8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2010, mg/l

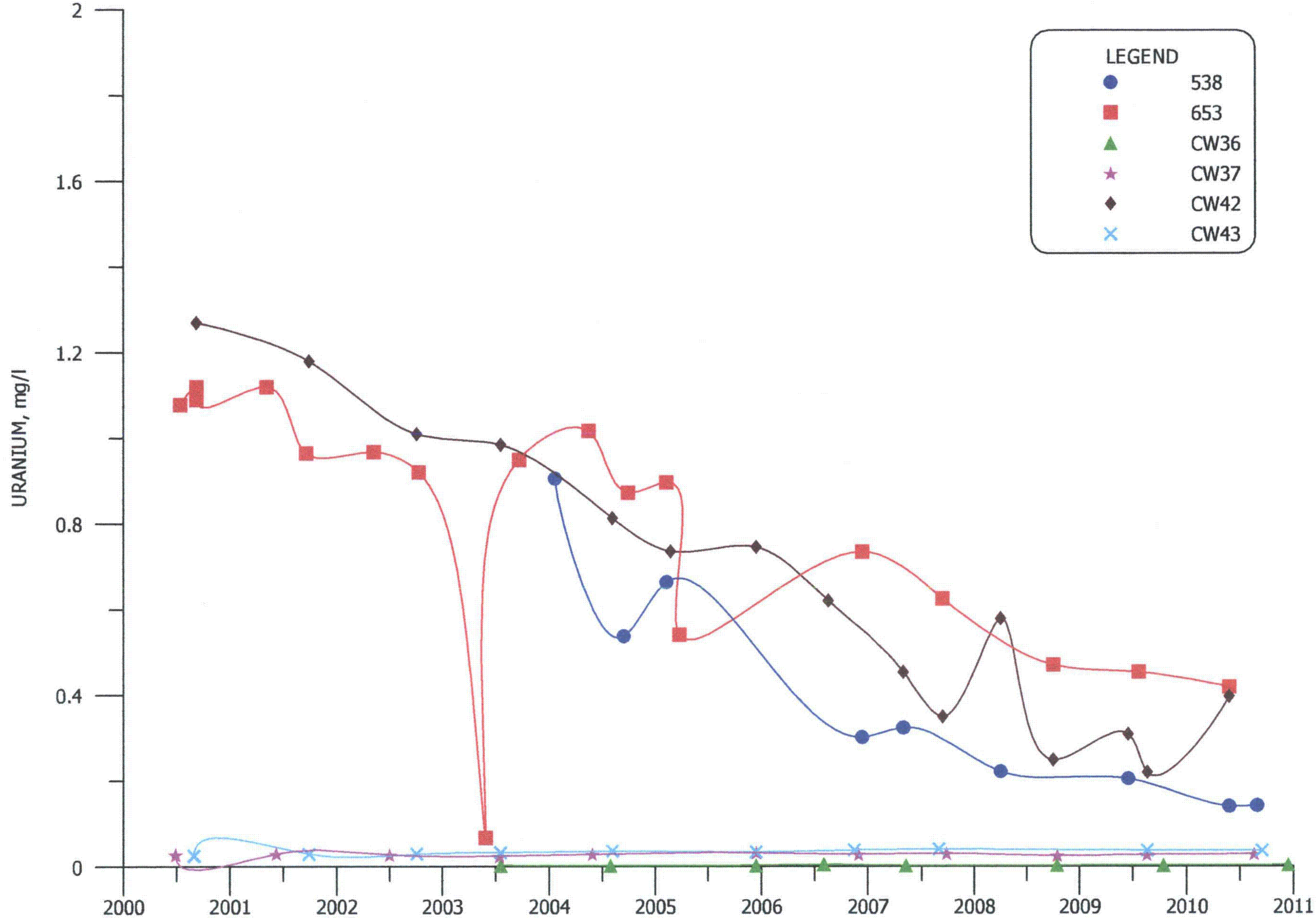

FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 538, 653, CW36, CW37, CW42, CW43

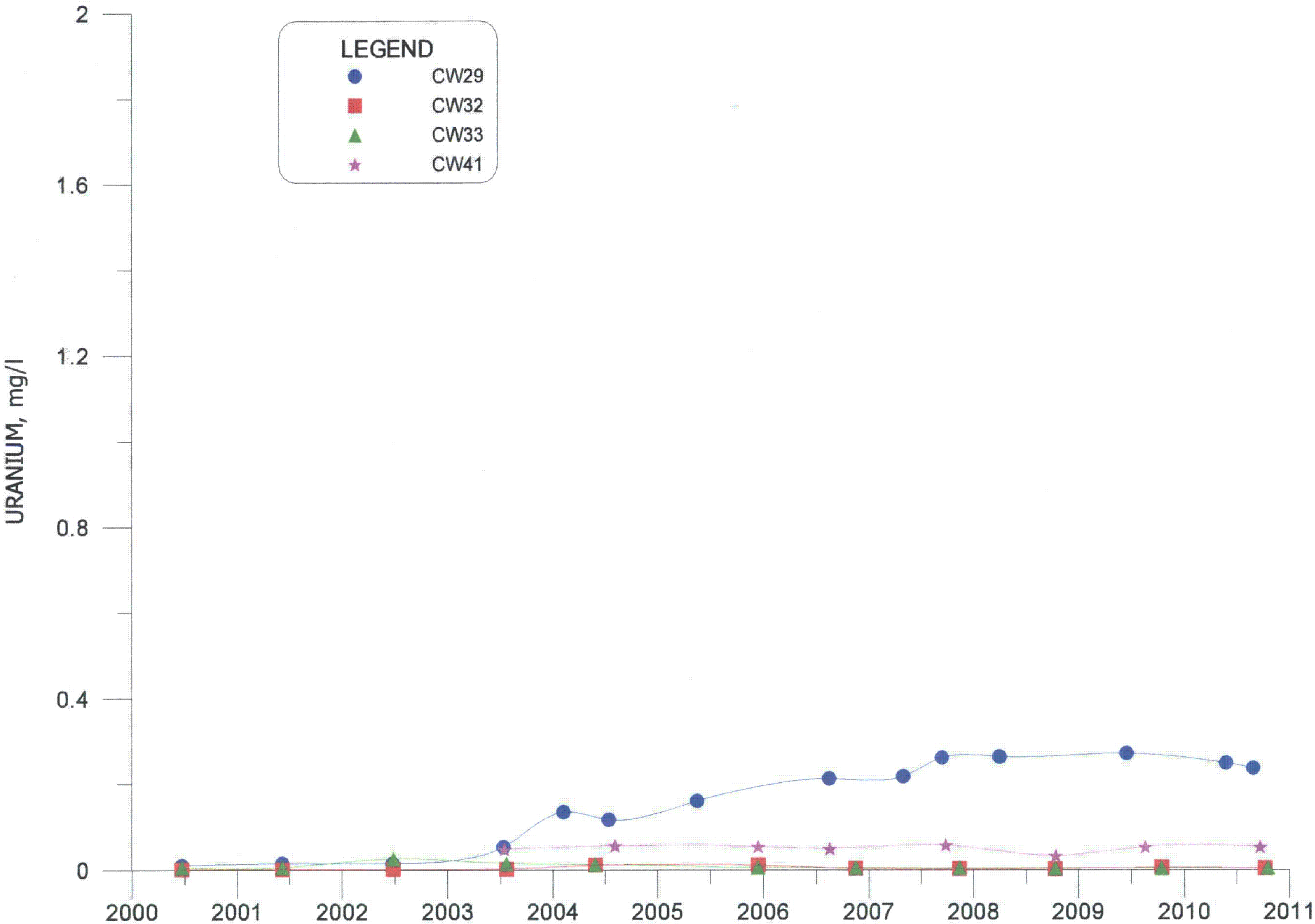

FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING WELLS CW29, CW32, CW33, AND CW34

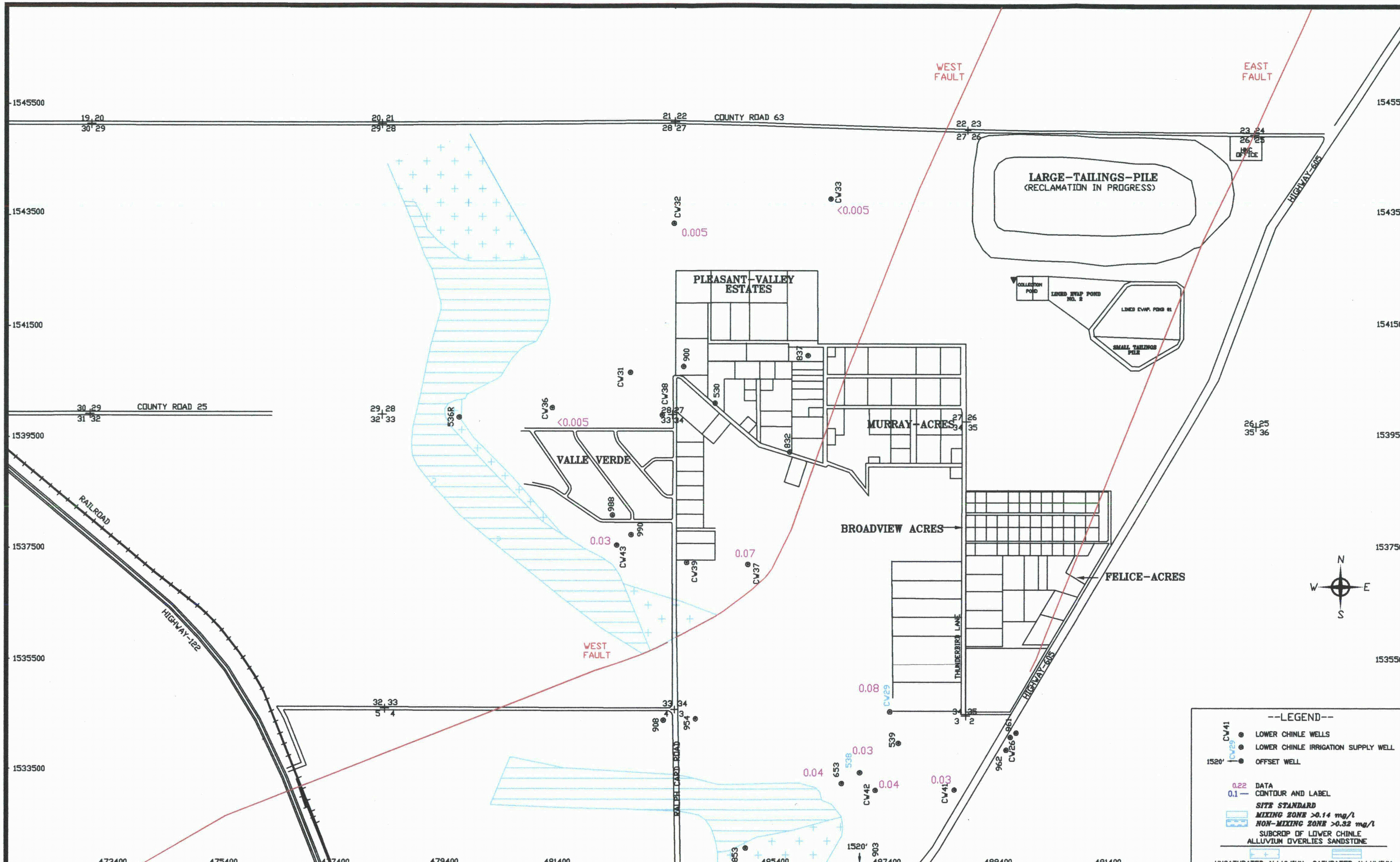

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FIGURE 7.3-11. SELENIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2010, mg/l

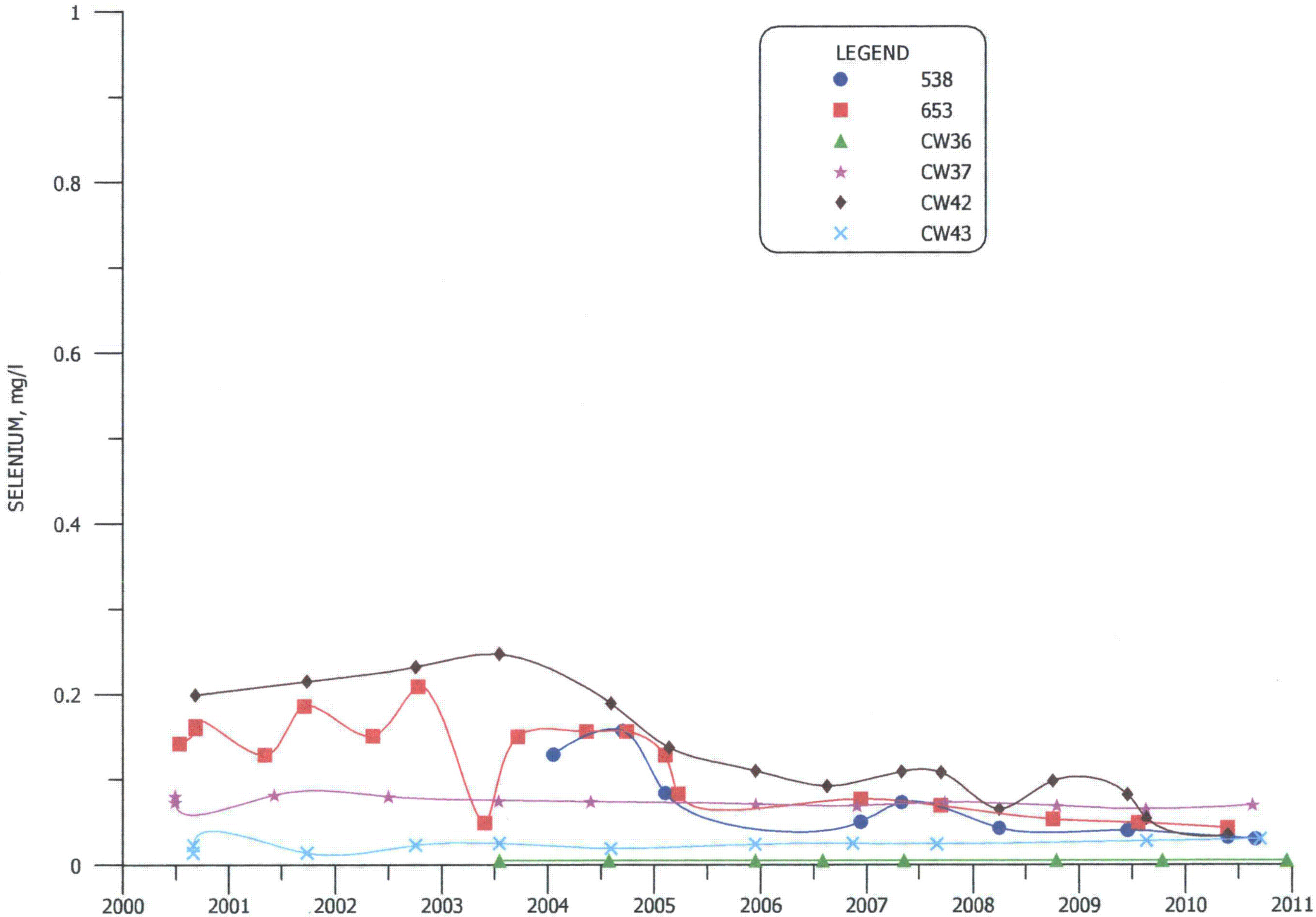

FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 538, 653, CW36, CW37, CW42 AND CW43

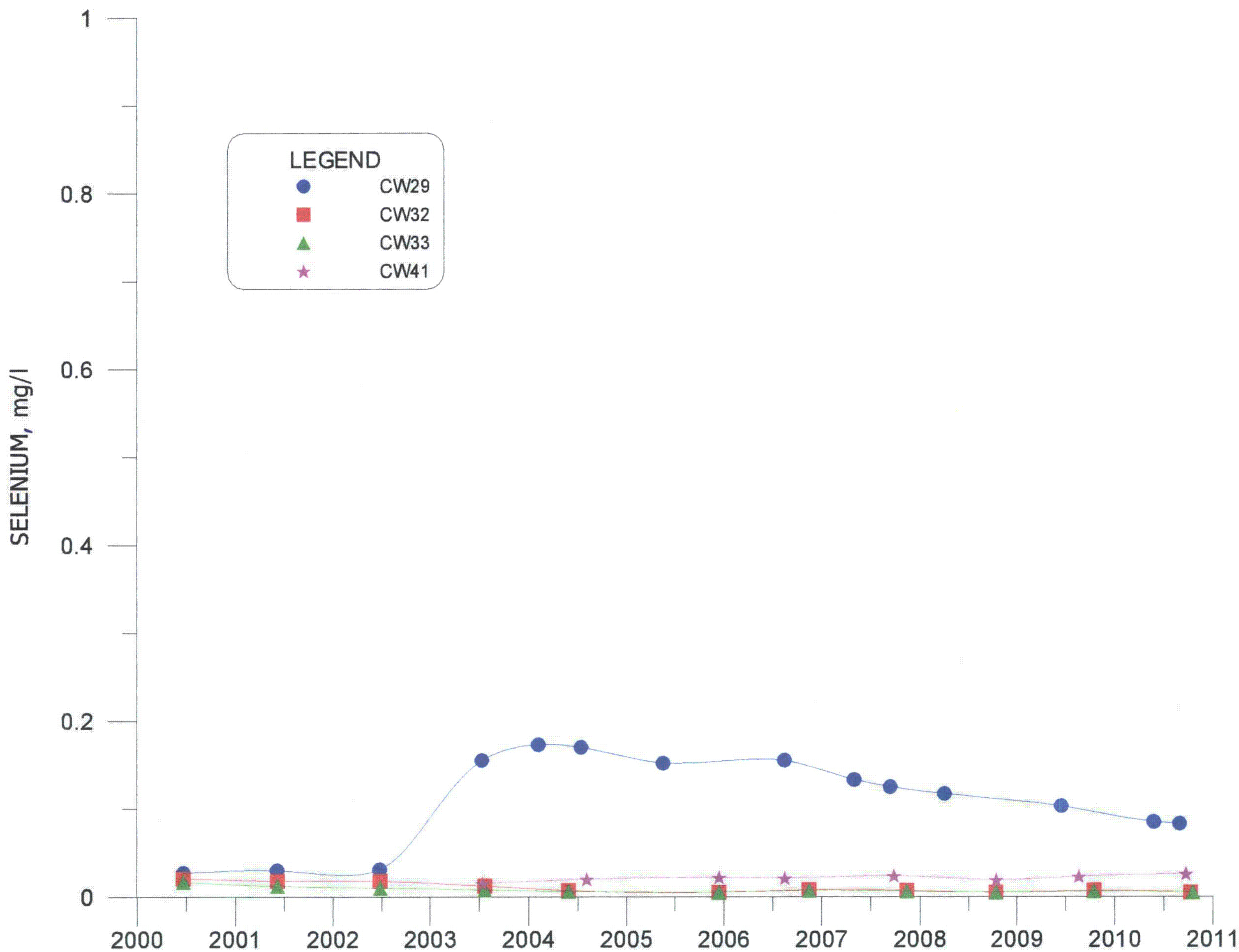

FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW29, CW32, CW33, AND CW41

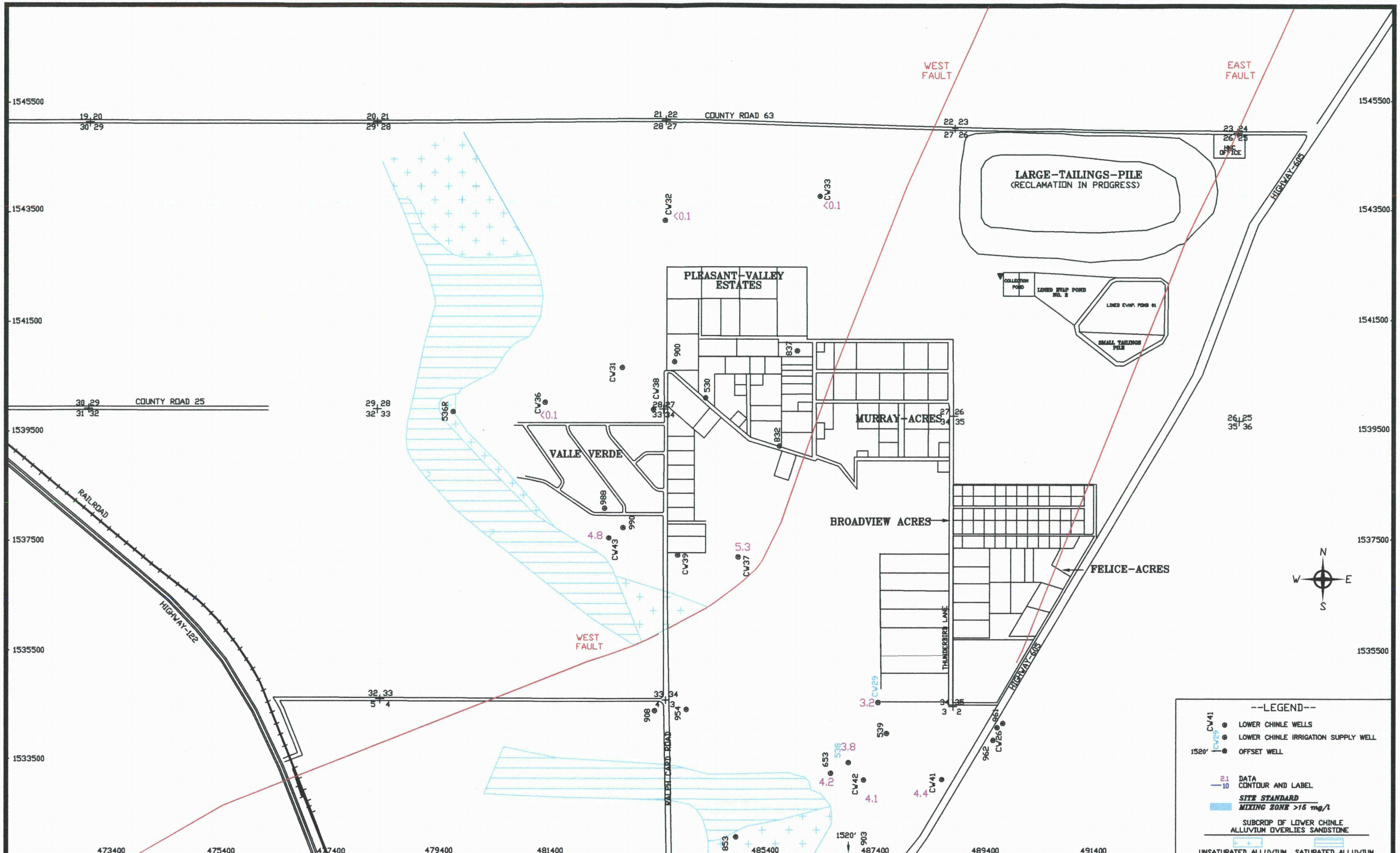

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FIGURE 7.3-14. NITRATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2010, mg/l