



Groundwater Report

Fall 2010

**San Joaquin County
Flood Control and Water Conservation District**



San Joaquin County Flood Control and Water Conservation District

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Copies of the Fall 2010 Groundwater Report may be purchased for \$30 and 36"X48" Contour Maps for \$25 each from:

San Joaquin County Department of Public Works
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Acknowledgements

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This Groundwater Report is a product of the commitment that the San Joaquin County Flood Control and Water Conservation District together with many other interested agencies made to sustain and enhance the groundwater resources of the Eastern San Joaquin Basin. The District extends thanks to...

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City of Lathrop

City of Lodi

City of Manteca

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Most of all, we would like to thank all of the individual well owners, who give us access to their wells and in some cases some of their time.



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Table of Contents

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Acknowledgements	iii
Table of Contents	v
Fall 2010 Groundwater Report.....	vii
Introduction	vii
Purpose.....	vii
Procedure	viii
Section 1–Rainfall Distribution	1-1
Summary of Rainfall Distribution	1-1
Annual Rainfall Distribution	1-2
Figure 1-1: Total Annual Rainfall (Stockton Fire Station 4).....	1-2
Figure 1-2: Total Annual Rainfall (Tracy Carbona Station).....	1-3
Figure 1-3: Total Annual Rainfall (Lodi Station)	1-4
Figure 1-4: Total Annual Rainfall (Camp Pardee).....	1-5
Monthly Rainfall Distribution.....	1-6
Figure 1-5: Monthly Rainfall Distribution (Stockton Fire Station 4)	1-6
Figure 1-6: Monthly Rainfall Distribution (Tracy Carbona Station).....	1-6
Figure 1-7: Monthly Rainfall Distribution (Lodi Station)	1-7
Figure 1-8: Monthly Rainfall Distribution (Camp Pardee).....	1-7
Section 2 – Groundwater Quality Monitoring	2-1
Summary of Groundwater Quality	2-1
Figure 2-1: Salinity Monitoring Well Locations.....	2-2
Table 2-1: Groundwater Quality Mineral Analysis Fall 2010	2-3
Figure 2-2: Quality Comparison Graph Well 27R2.....	2-4
Figure 2-3: Quality Comparison Graph Well 34A3.....	2-5
Figure 2-4: Quality Comparison Graph Well 35G2.....	2-6
Figure 2-5: Quality Comparison Graph Well 35N1.....	2-7
Figure 2-6: Quality Comparison Graph Well 25M3.....	2-8
Figure 2-7: Quality Comparison Graph Well 25M4.....	2-9
Figure 2-8: Quality Comparison Graph Well 36B1.....	2-10
Figure 2-9: Quality Comparison Graph Well 4E1	2-11
Figure 2-10: Quality Comparison Graph Well 8C1.....	2-12
Figure 2-11: Quality Comparison Graph Well 8Q2.....	2-13
Figure 2-12: Quality Comparison Graph Well 16E1	2-14
Figure 2-13: Quality Comparison Graph Well 29M1	2-15
Figure 2-14: Quality Comparison Graph Well 7D2.....	2-16
Figure 2-15: Quality Comparison Graph Well 34E5.....	2-17

Section 3 – Groundwater Elevation Monitoring.....	3-1
Summary of Groundwater Elevations	3-1
Table 3-1: Comparison of BCID Area Fall Water Levels	3-2
Table 3-2: Comparison of CSJWCD Area Fall Water Levels.....	3-2
Table 3-3: Comparison of NSJWCD Area Fall Water Levels.....	3-4
Table 3-4: Comparison of OID Area Fall Water Levels.....	3-8
Table 3-5: Comparison of SEWD Area Fall Water Levels	3-8
Table 3-6: Comparison of SSJID Area Fall Water Levels.....	3-11
Table 3-7: Comparison of WID Area Fall Water Levels.....	3-12
Table 3-8: Comparison of Miscellaneous County Area Fall Water Levels.....	3-13
Figure 3-1: Well Hydrograph Locations.....	3-15
Figure 3-2: Fall Hydrograph Well A.....	3-16
Figure 3-3: Fall Hydrograph Well B.....	3-17
Figure 3-4: Fall Hydrograph Well C.....	3-18
Figure 3-5: Fall Hydrograph Well D.....	3-19
Figure 3-6: Fall Hydrograph Well E	3-20
Figure 3-7: Fall Hydrograph Well F	3-21
Figure 3-8: Fall Hydrograph Well G.....	3-22
Figure 3-9: Fall Hydrograph Well H.....	3-23
Figure 3-10: Fall Hydrograph Well I.....	3-24
Figure 3-11: Fall Hydrograph Well J.....	3-25
Figure 3-12: Fall Hydrograph Well K.....	3-26
Figure 3-13: Fall Hydrograph Well L	3-27
Figure 3-14: Fall Hydrograph Well M.....	3-28
Figure 3-15: Fall Hydrograph Well N.....	3-29
Figure 3-16: Fall Hydrograph Well O.....	3-30
Figure 3-17: Fall Hydrograph Well P	3-31
Figure 3-18: Fall Hydrograph Well Q.....	3-32
Figure 3-19: Fall Hydrograph Well R.....	3-33
Figure 3-20: Fall Hydrograph Well S	3-34
Figure 3-21: Fall Hydrograph Well T	3-35
Figure 3-22: Fall Hydrograph Well U.....	3-36
Figure 3-23: Fall Hydrograph Well V.....	3-37
Figure 3-24: Fall Hydrograph Well W.....	3-38
Figure 3-25: Fall Hydrograph Well X.....	3-39
Figure 3-26: Fall Hydrograph Well Y.....	3-40
Figure 3-27: Fall Hydrograph Well Z	3-41
Figure 3-28: Cross Section Alignments.....	3-42
Figure 3-29: Highway 99 Cross Section Fall 2010.....	3-43
Figure 3-30: Highway 4 & Highway 26 Cross Section Fall 2010	3-44
Figure 3-31: Jacktone Rd Cross Section Fall 2010.....	3-45
Figure 3-32: Differences in Groundwater Elevations Fall 2010.....	3-47
Figure 3-32: Lines of Equal Elevation of Groundwater Fall 2010	3-47
Figure 3-33: Lines of Equal Depth to Groundwater Fall 2010	3-48

San Joaquin County Flood Control and Water Conservation District

Fall 2010 Groundwater Report

Introduction

Since the fall of 1971, the San Joaquin County Flood Control and Water Conservation District has monitored groundwater levels and groundwater quality and has published the data in the Semi-annual Groundwater Report. This report utilizes data from federal, state and local government agencies as well as non-governmental sources.

Water level data is collected on a semi-annual basis, during the months of April and October, to observe groundwater levels before and after peak groundwater pumping conditions. Over 450 wells, of which 250 are measured by County staff, are included in the Monitoring Program. The exact number of wells varies from year to year, depending on circumstances such as destructions, new well construction, well accessibility, and well condition.

Purpose

The purpose of the Semi-annual Groundwater Report is to provide information on groundwater conditions in San Joaquin County and to publish the results of the groundwater monitoring program which consists of the following:

1. Monitor groundwater quality along a North-South line from the north of the City of Stockton to the City of Lathrop.
2. Measure groundwater levels on a County-wide basis.

In general, water quality data is more meaningful after peak production which usually occurs during the summer month. Therefore, groundwater quality data will be published only in the fall report. The groundwater depth and elevation data will be published in both the spring and fall.

Saline intrusion from the west is a continuing concern, affecting the quality of groundwater in the Basin. Groundwater quality analysis is completed on an annual basis, from approximately 18 municipal and domestic supply wells (exact number varies from year to year), located in proximity to the saline front.

Procedure

Groundwater quality sampling is conducted on an annual basis during the month of October, along with the Fall Measurements. Approximately 18 wells are currently sampled in the county (Figure 2-1). The exact number of wells may vary depending on well access and other conditions. Replicate groundwater samples (two) are analyzed for Chloride (Cl⁻) using the Thomas Scientific 675 pH/ISE meter in conjunction with the ISE Cl⁻ Combination Electrode, and analyzed for Electrical Conductivity (EC) using DiST 3 by Hanna Instruments. Total Dissolved Solids (TDS) are calculated using the formula: $TDS = 0.64 \times EC(\text{umhos})$. Data is then stored in a database for accessibility and reporting requirements.

Water Level Measurements are performed with the use of either a steel chain or sounder. Data is immediately recorded in field books and then stored in a database for accessibility and reporting requirements.

Section 1–Rainfall Distribution

Summary of Rainfall Distribution

The underlying groundwater basin levels in San Joaquin County respond to changes in annual precipitation. There are four total annual precipitation graphs and four monthly precipitation graphs included in this report (Figures 1-1 through 1-8). These graphs reflect three areas located across San Joaquin County and one area in Calaveras County. The station located at the Stockton Fire Station No. 4, as well as the station located in Tracy Carbona, has pertinent data beginning in 1940. Lodi station has data from 1949 to 2010. The Camp Pardee station has data available from 1949 to 2010.

Annual Rainfall Distribution

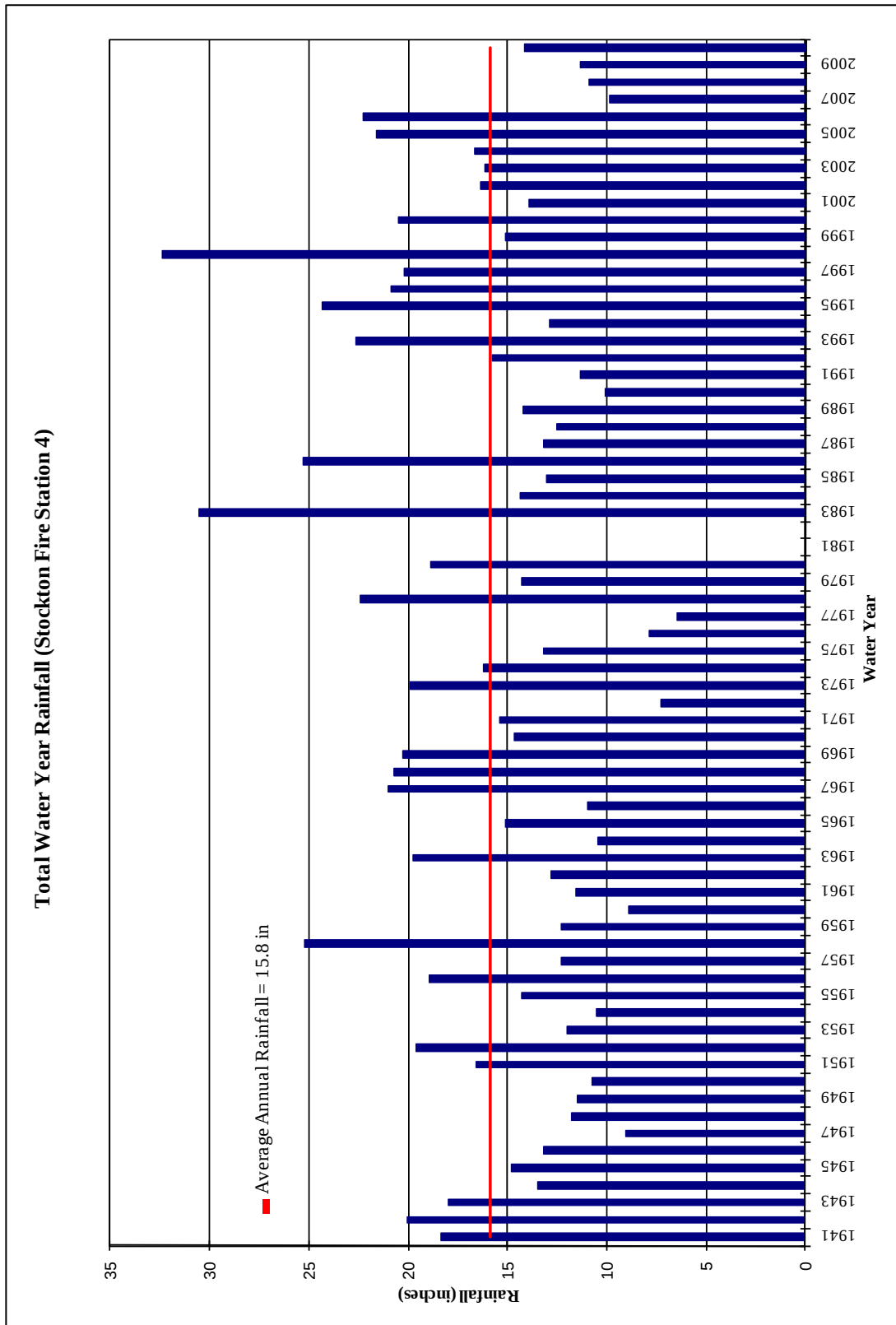


Figure 1-1: Total Annual Rainfall (Stockton Fire Station 4)

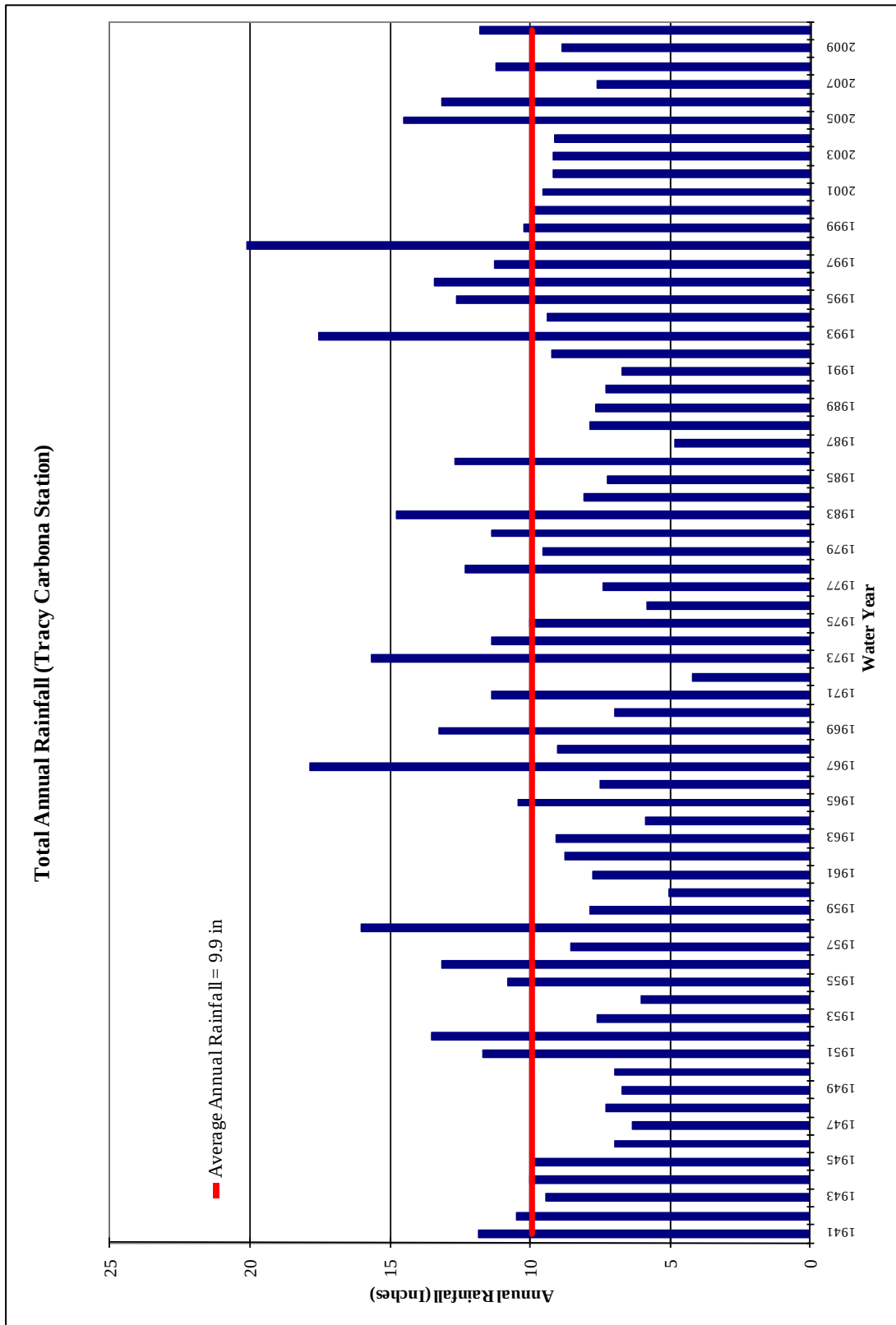


Figure 1-2: Total Annual Rainfall (Tracy Carbona Station)

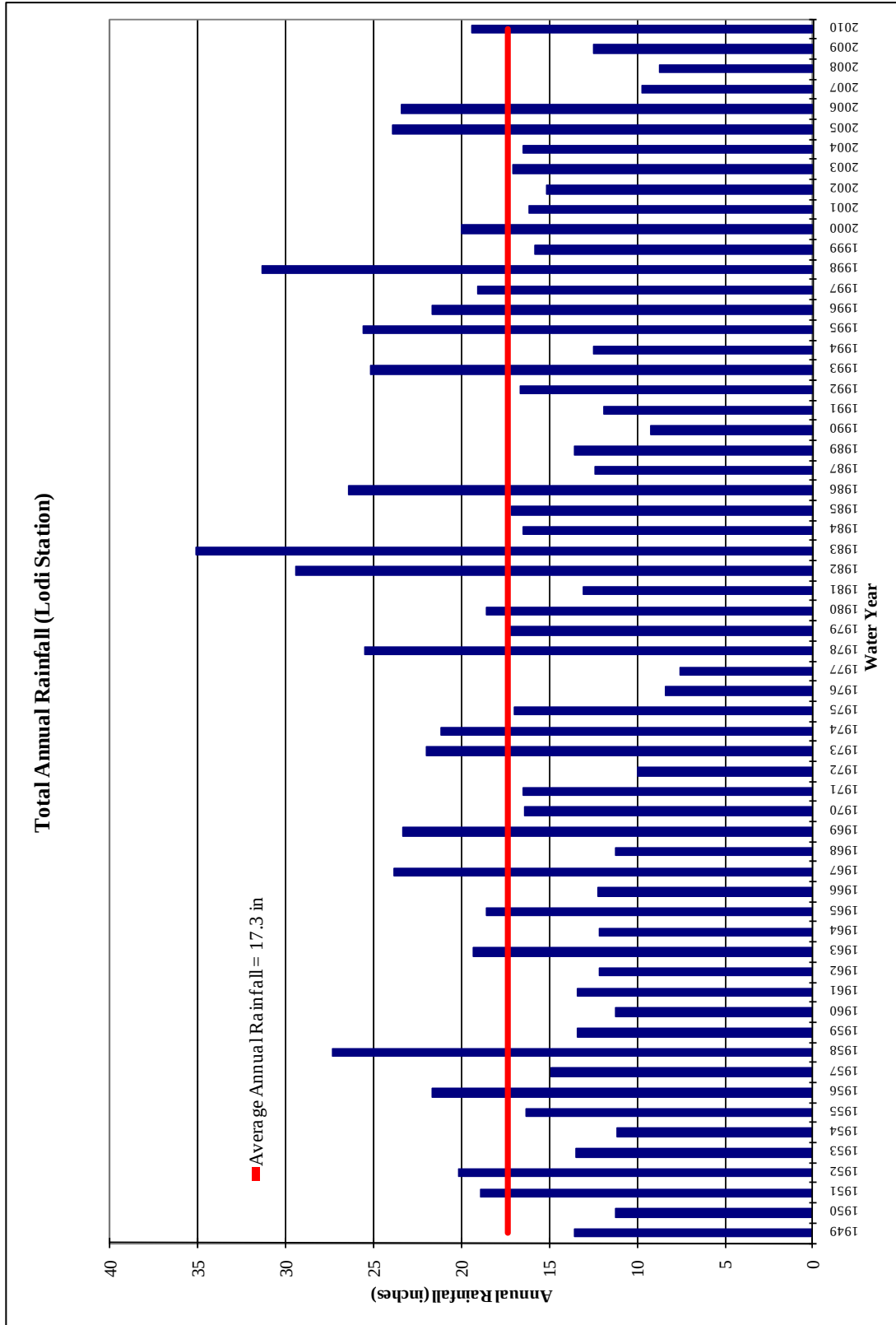


Figure 1-3: Total Annual Rainfall (Lodi Station)

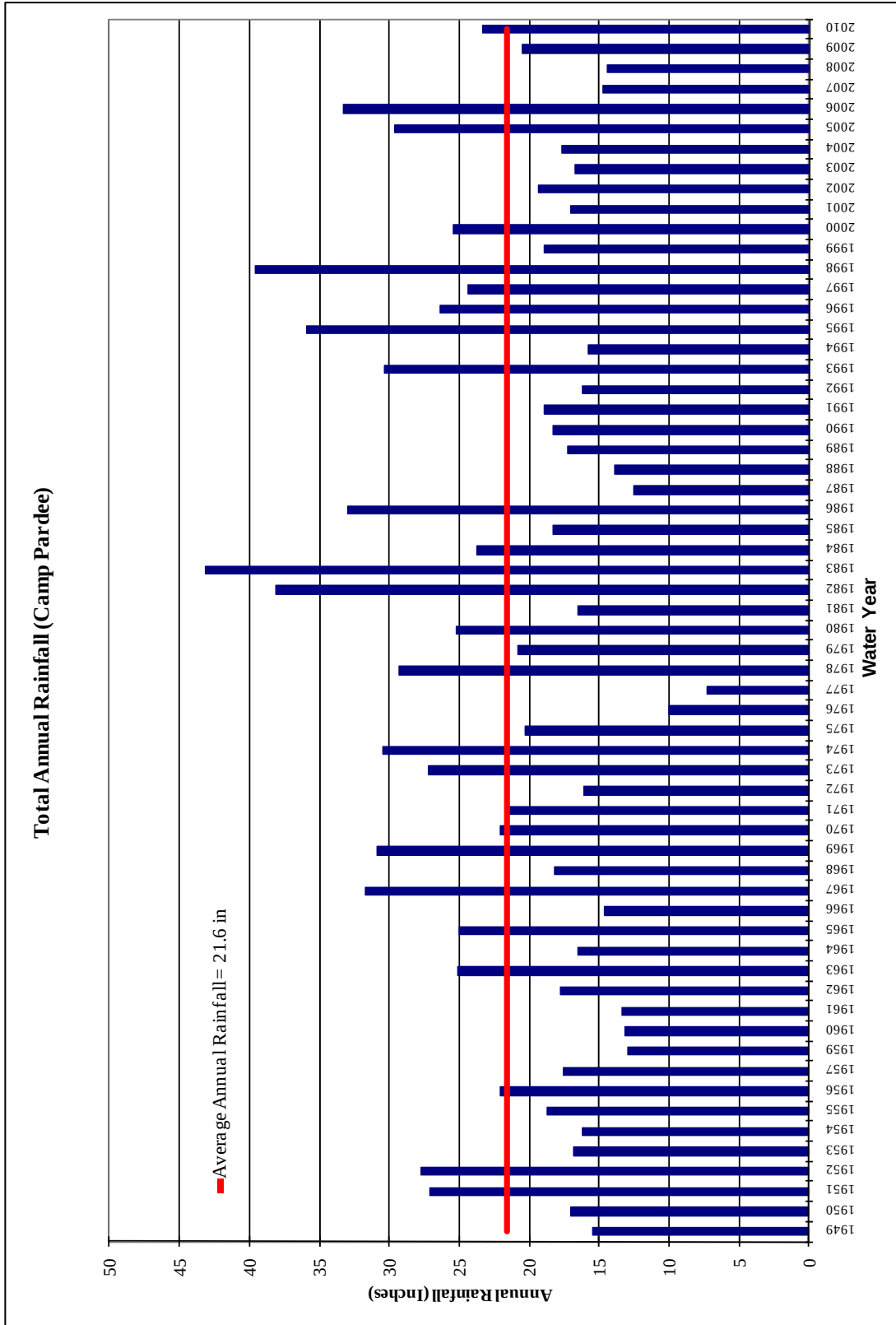


Figure 1-4: Total Annual Rainfall (Camp Pardee)

Monthly Rainfall Distribution

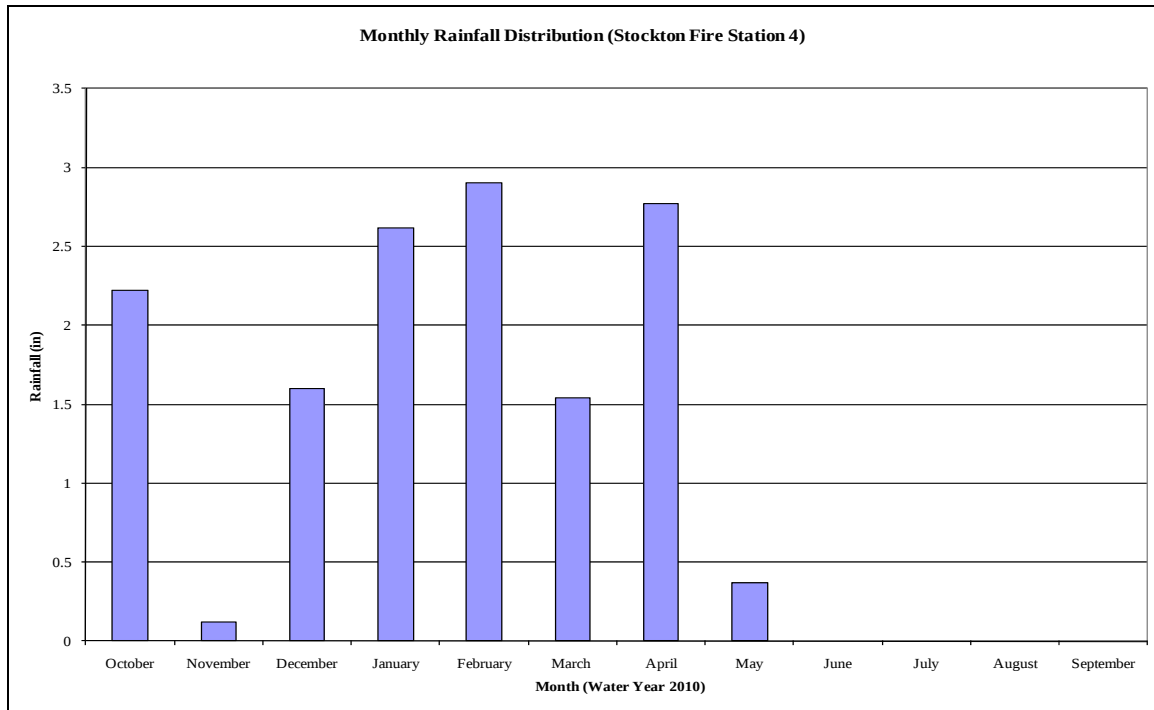


Figure 1-5: Monthly Rainfall Distribution (Stockton Fire Station 4)

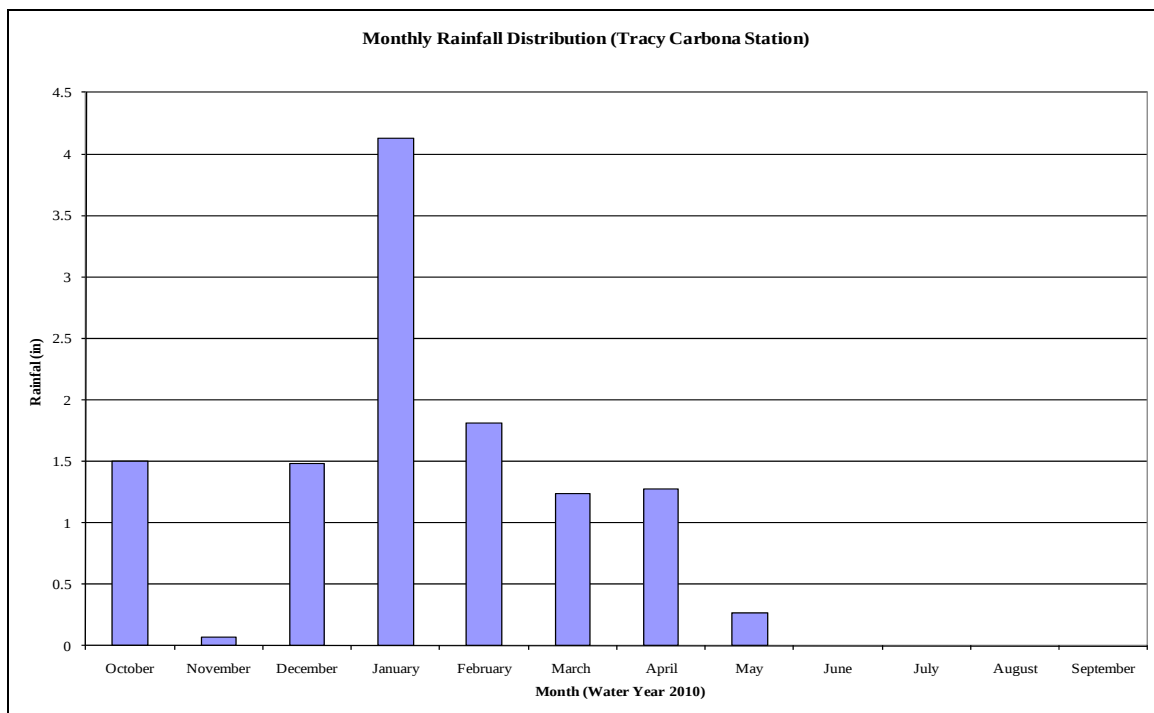


Figure 1-6: Monthly Rainfall Distribution (Tracy Carbona Station)

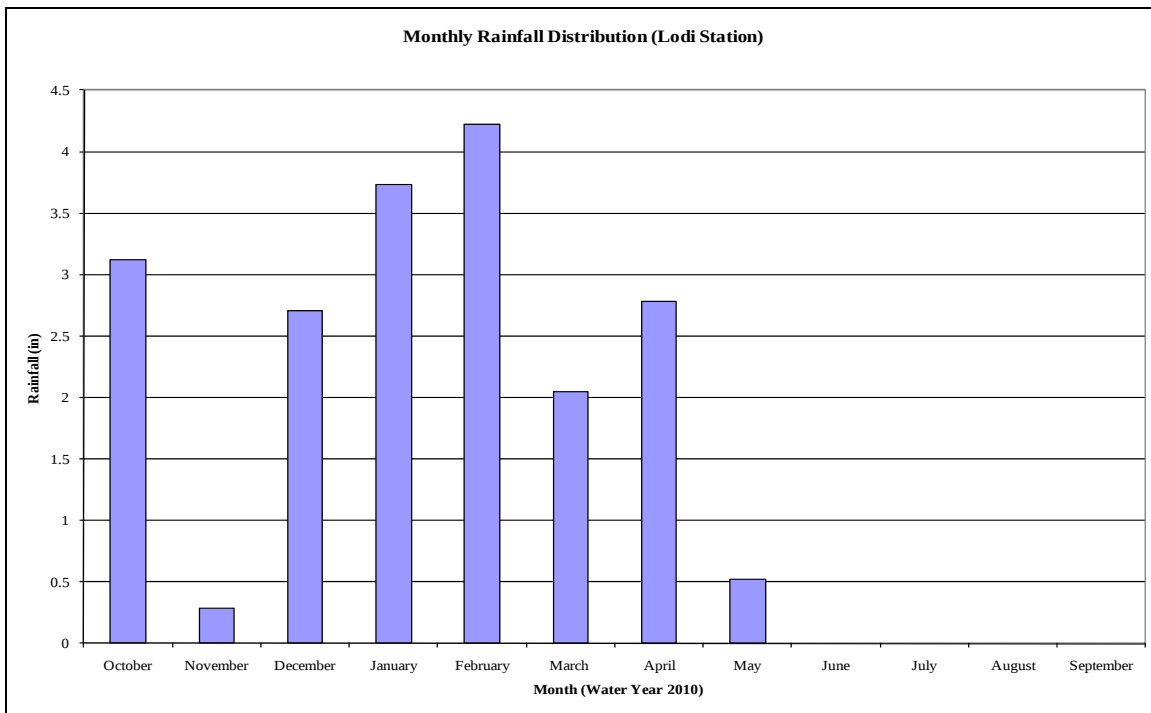


Figure 1-7: Monthly Rainfall Distribution (Lodi Station)

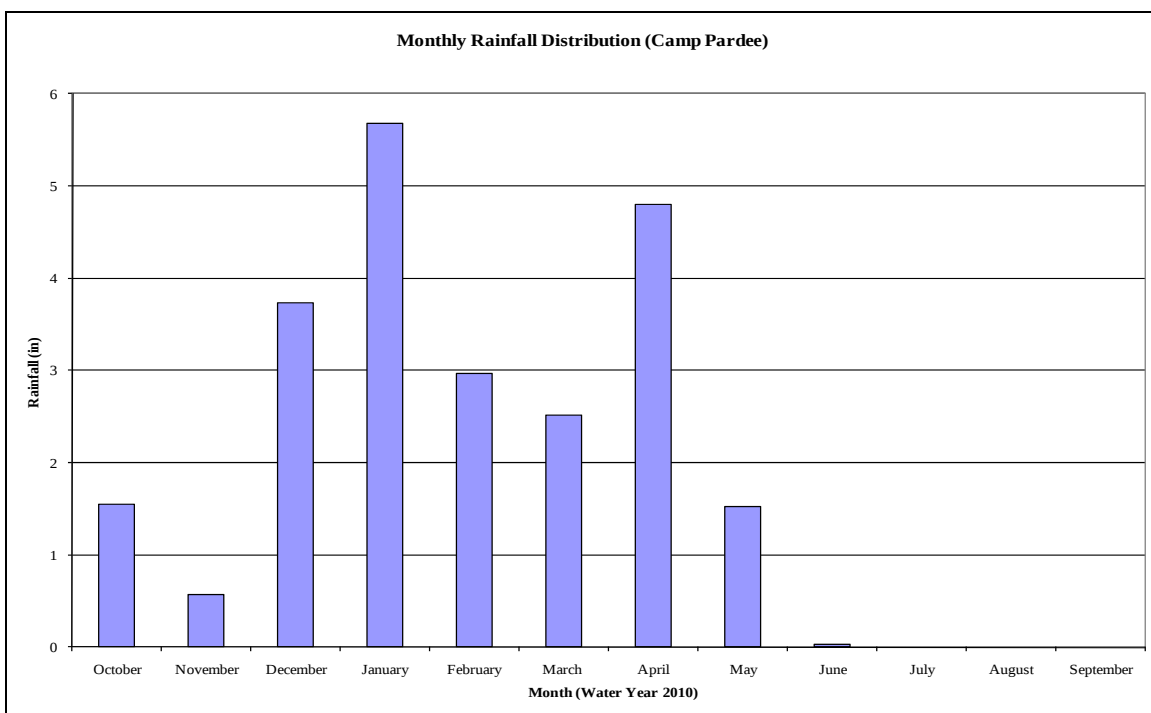


Figure 1-8: Monthly Rainfall Distribution (Camp Pardee)

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Section 2 – Groundwater Quality Monitoring

Summary of Groundwater Quality Results

The information contained in the Fall 2010 Groundwater Report is summarized as follows:

North San Joaquin County – One well was tested for chloride ions (Cl^-), electrical conductivity (EC) and total dissolved solids (TDS). There was a slight decrease in EC and TDS concentration from the previous measurements in the fall of 2009. A slight increase in Cl^- was measured.

North Stockton – Six wells were tested for Cl^- , EC and TDS in North Stockton. One well decreased in Cl^- concentrations while four increased in Cl^- concentration from the analysis in the fall 2009. Two wells decreased in EC levels and three increased. Of the six wells three have higher concentrations of TDS and two have lower concentrations when compared to the fall 2009 measurements.

Central Stockton – One well was tested for Cl^- , EC and TDS in Central Stockton. Concentrations in all of the analysis conducted in this well increased.

County Hospital Area - Four wells are usually tested near the San Joaquin County Hospital, two wells were not tested this year because the wells have been destroyed. Of the two wells that were tested both increased in Cl^- concentration and both of the wells decreased in EC levels and TDS concentrations.

Lathrop – Three wells were sampled in Lathrop. One well increase in Cl^- concentrations while two remained constant in Cl^- concentration from the analysis in the fall 2009. All three wells decreased in EC levels and concentrations of TDS when compared to the fall 2010 measurements.

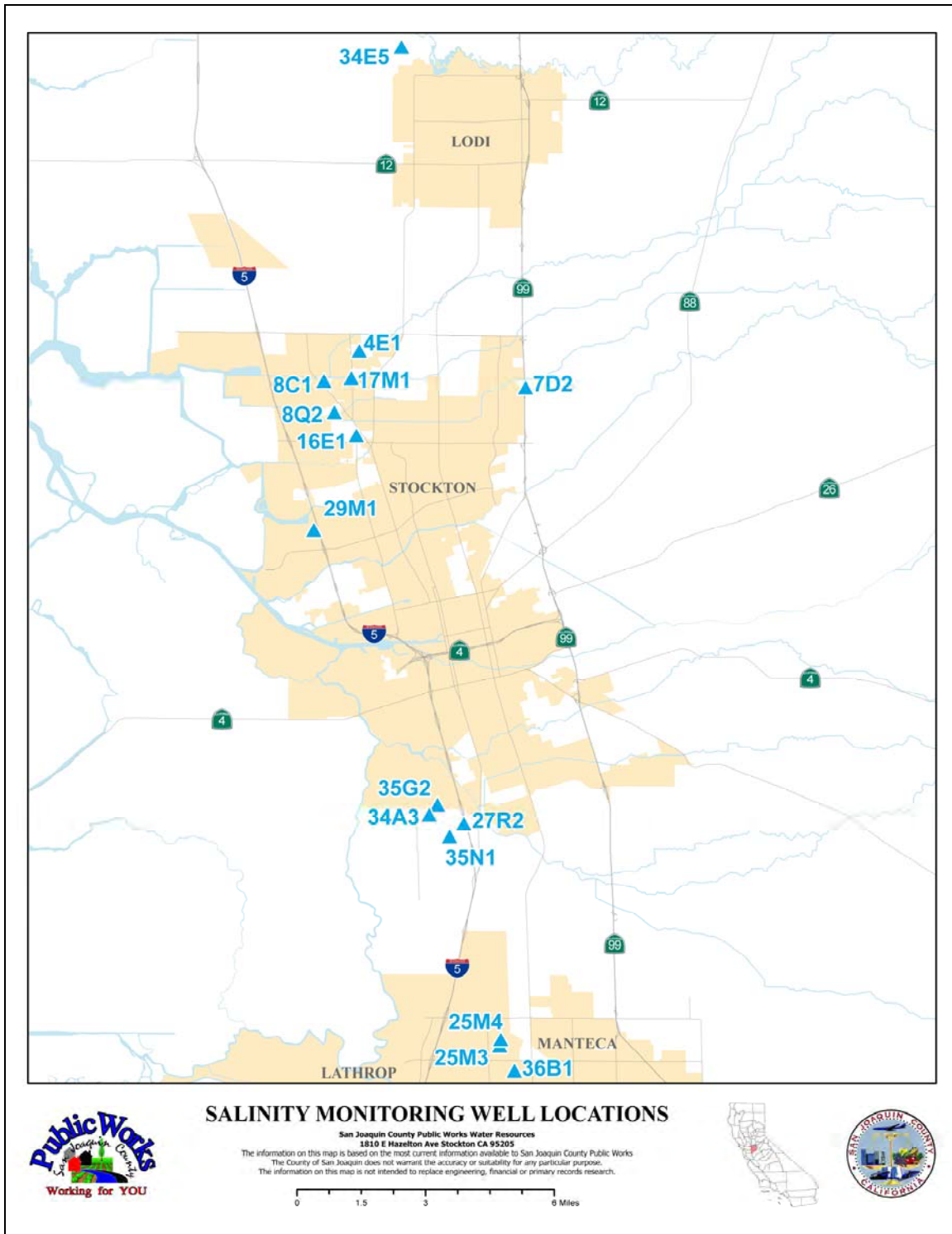


Figure 2-1: Salinity Monitoring Well Locations

Table 2-1: Groundwater Quality Mineral Analysis Fall 2010

Well	Chloride ppm	EC mmho	TDS* ppm
27R2	-	-	-
34A3	2049	6.010	3846.4
35G2	838	3.110	1990.4
35N1	-	-	-
25M3	71	0.608	389.12
25M4	30	0.432	276.48
36B1	16	0.503	321.92
4E1	32	0.545	348.8
8C1	25	0.623	398.72
8Q2	96	0.930	595.2
16E1	49	0.890	569.6
17M1	24	0.290	185.6
29M1	78	0.560	358.4
7D2	14	0.401	256.64
34E5	23	0.720	460.8

*TDS values are calculated by the following formula: $TDS = .64 * 1000 * EC$

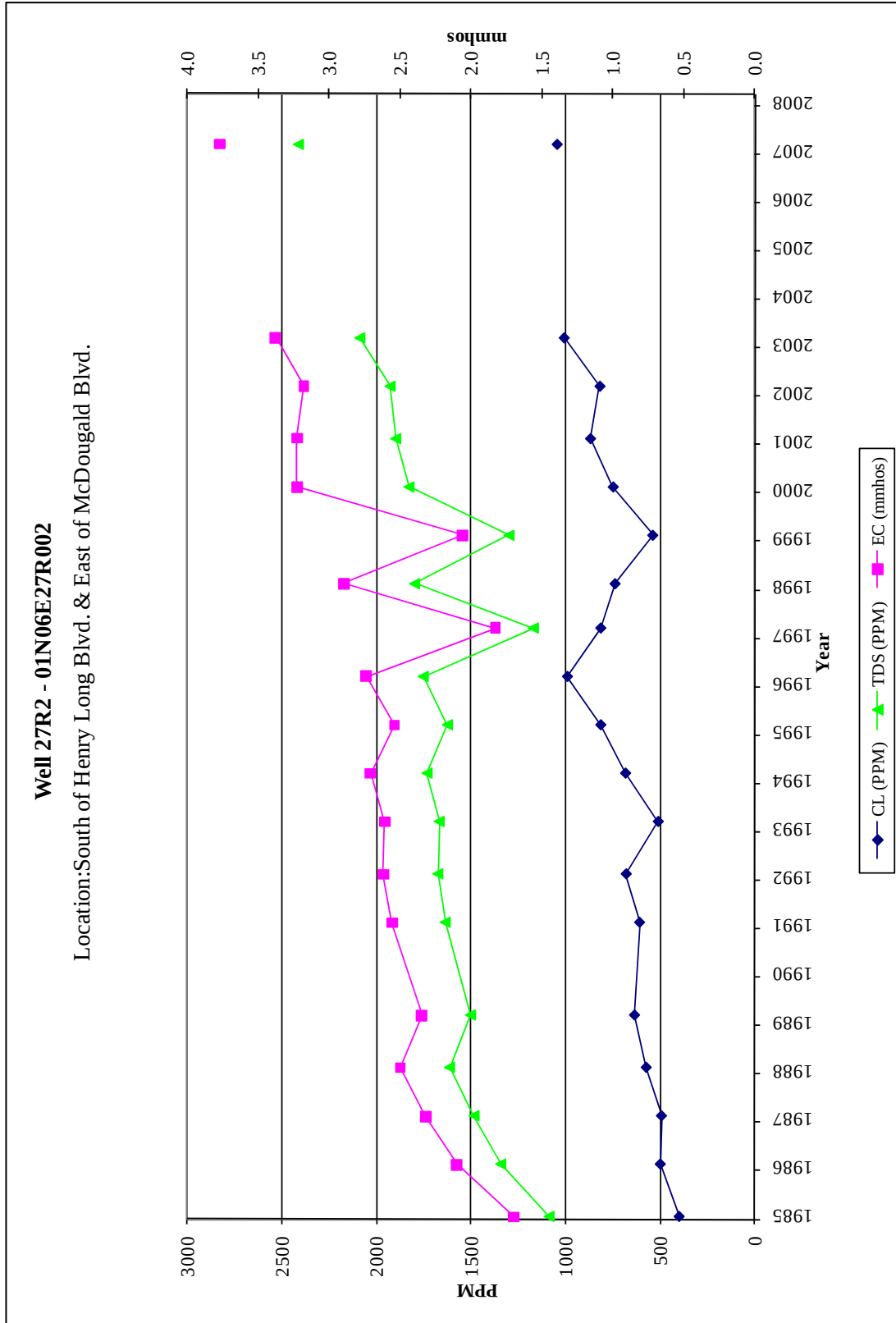


Figure 2-2: Quality Comparison Graph Well 27R2

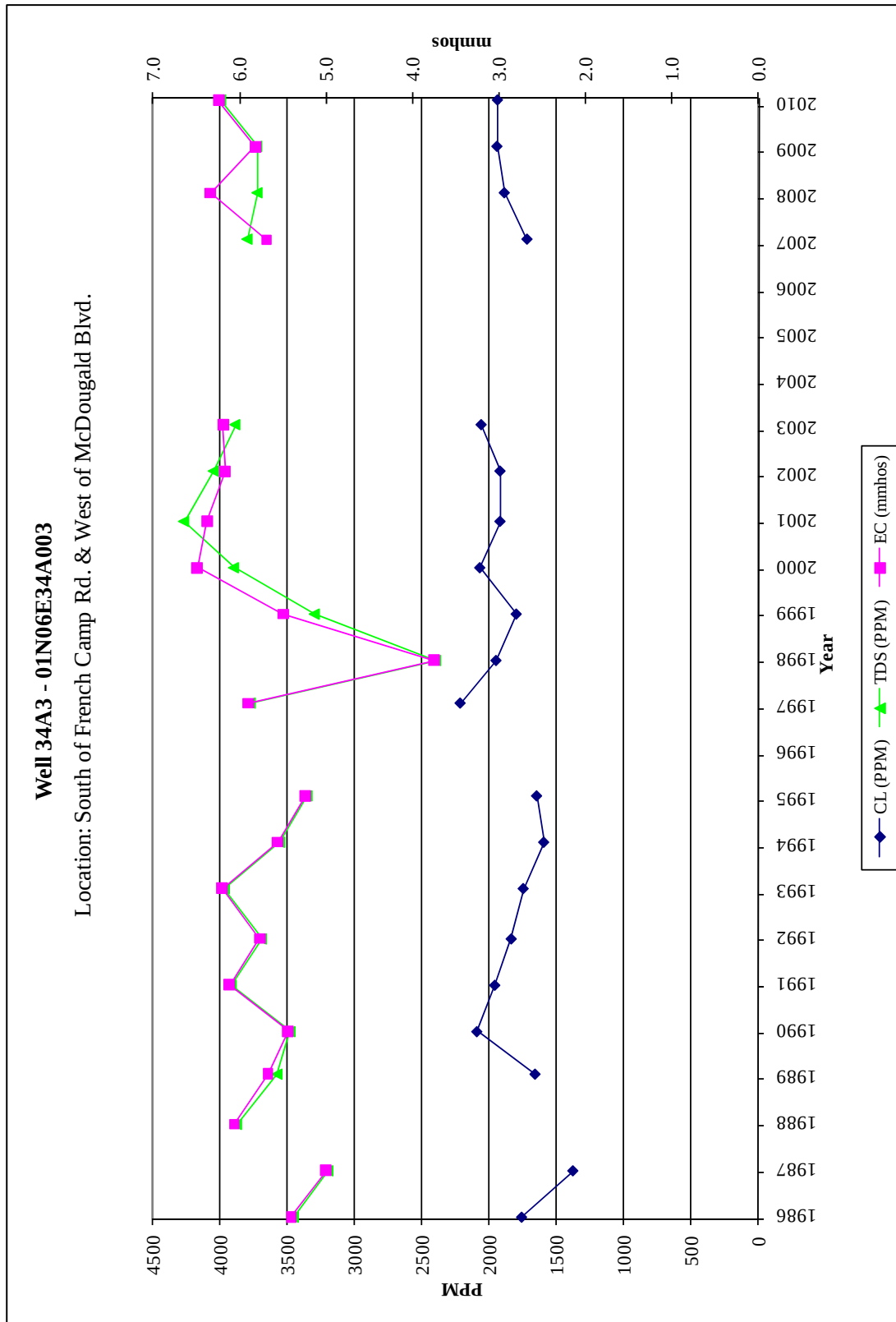


Figure 2-3: Quality Comparison Graph Well 34A3

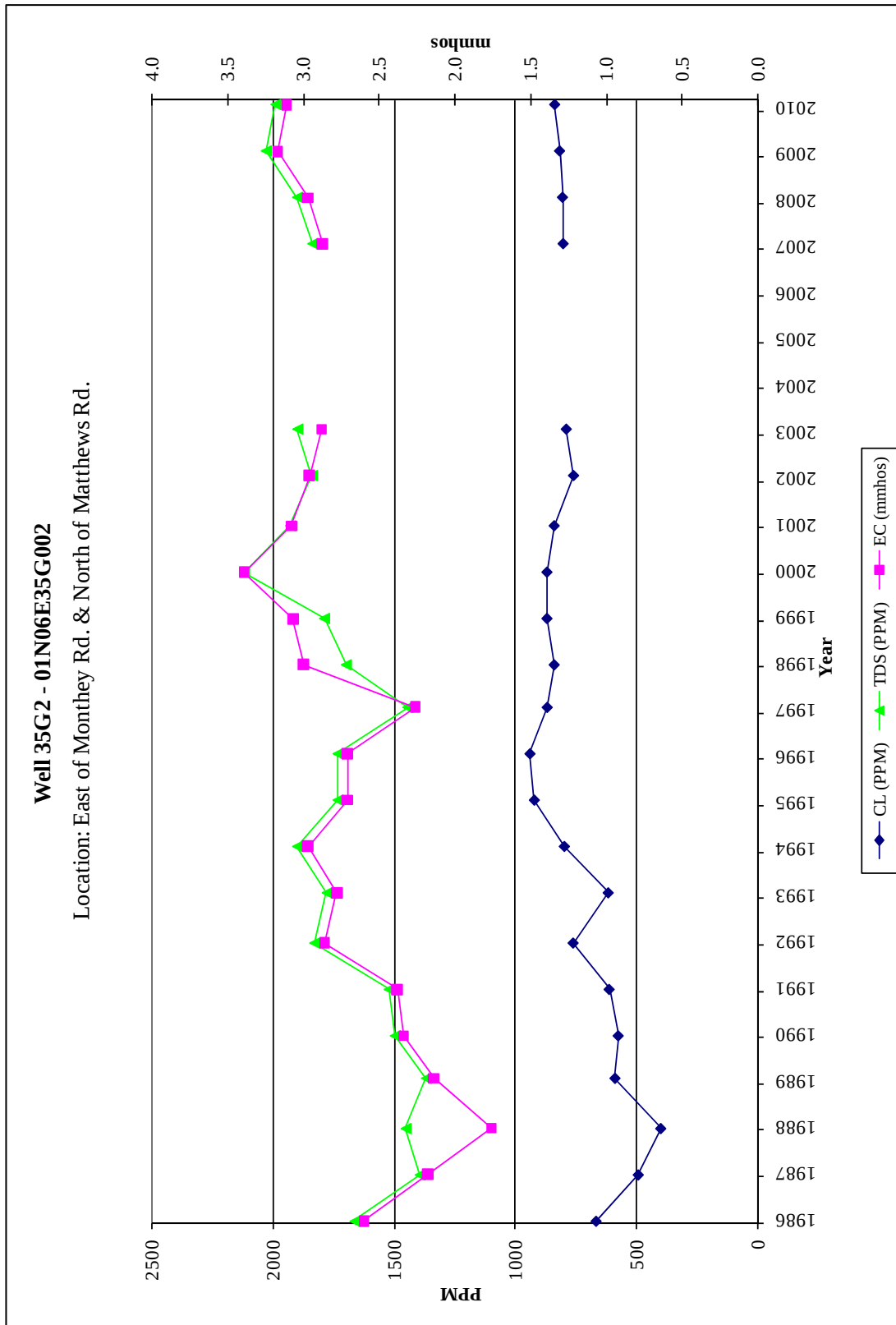


Figure 2-4: Quality Comparison Graph Well 35G2

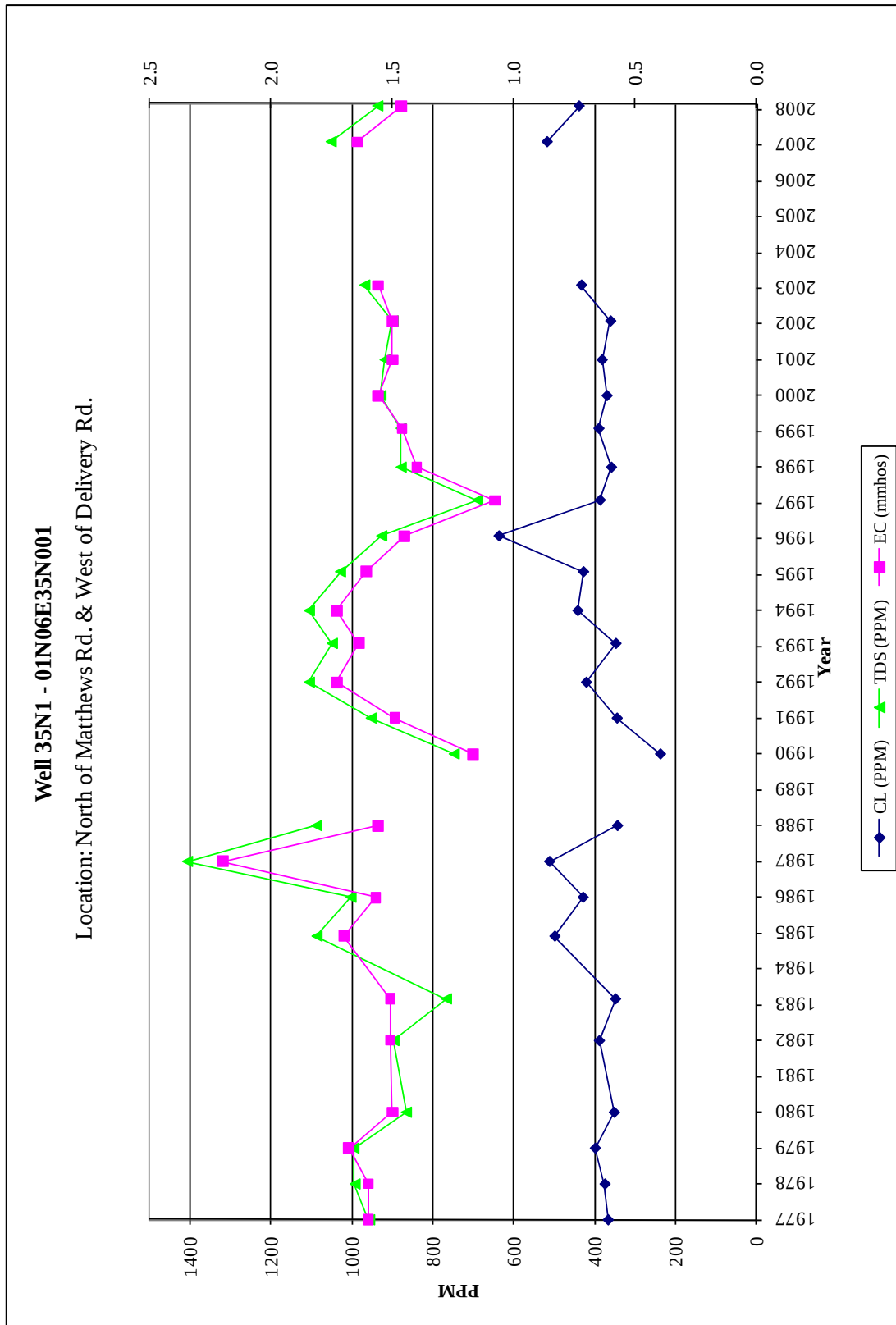


Figure 2-5: Quality Comparison Graph Well 35N1

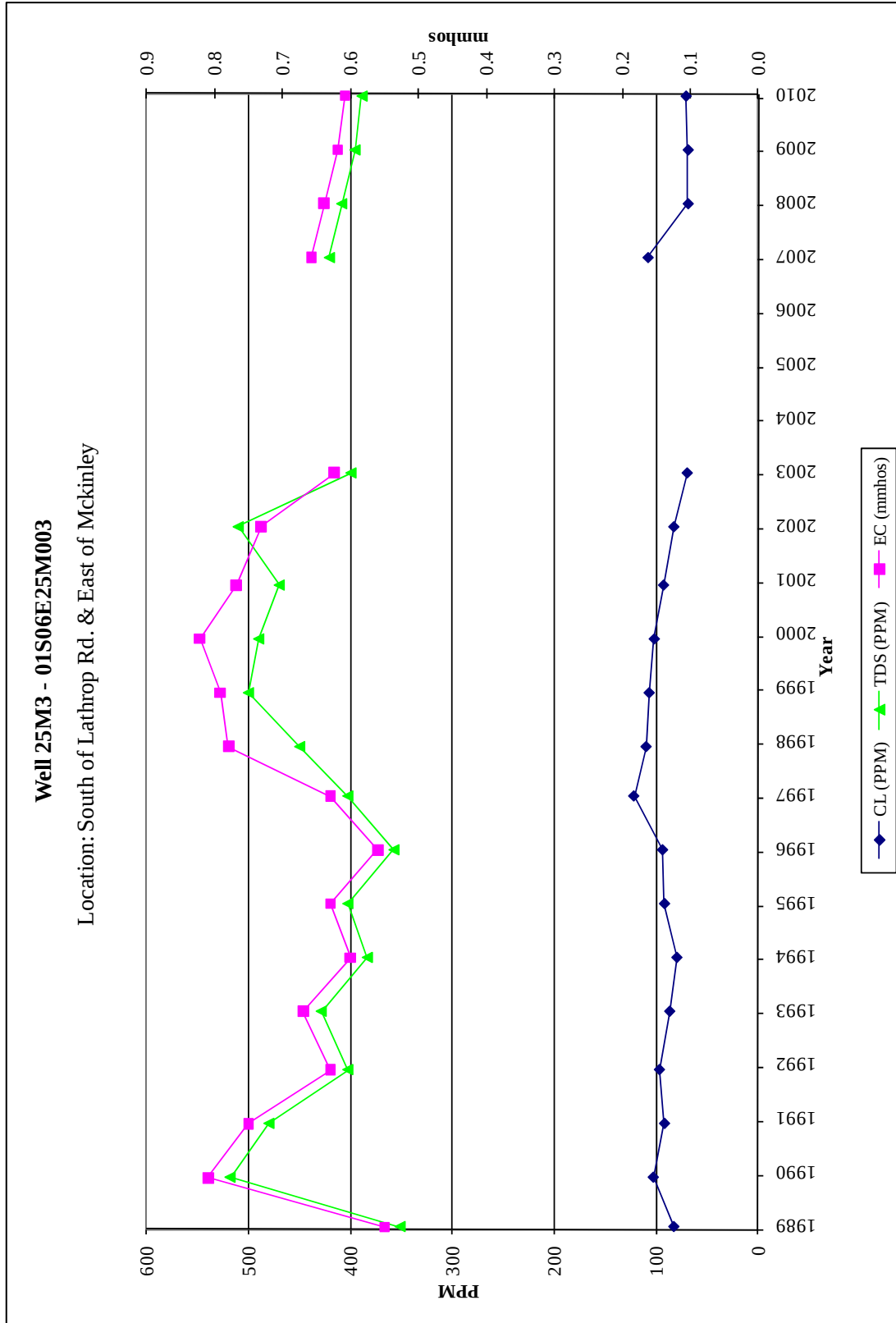
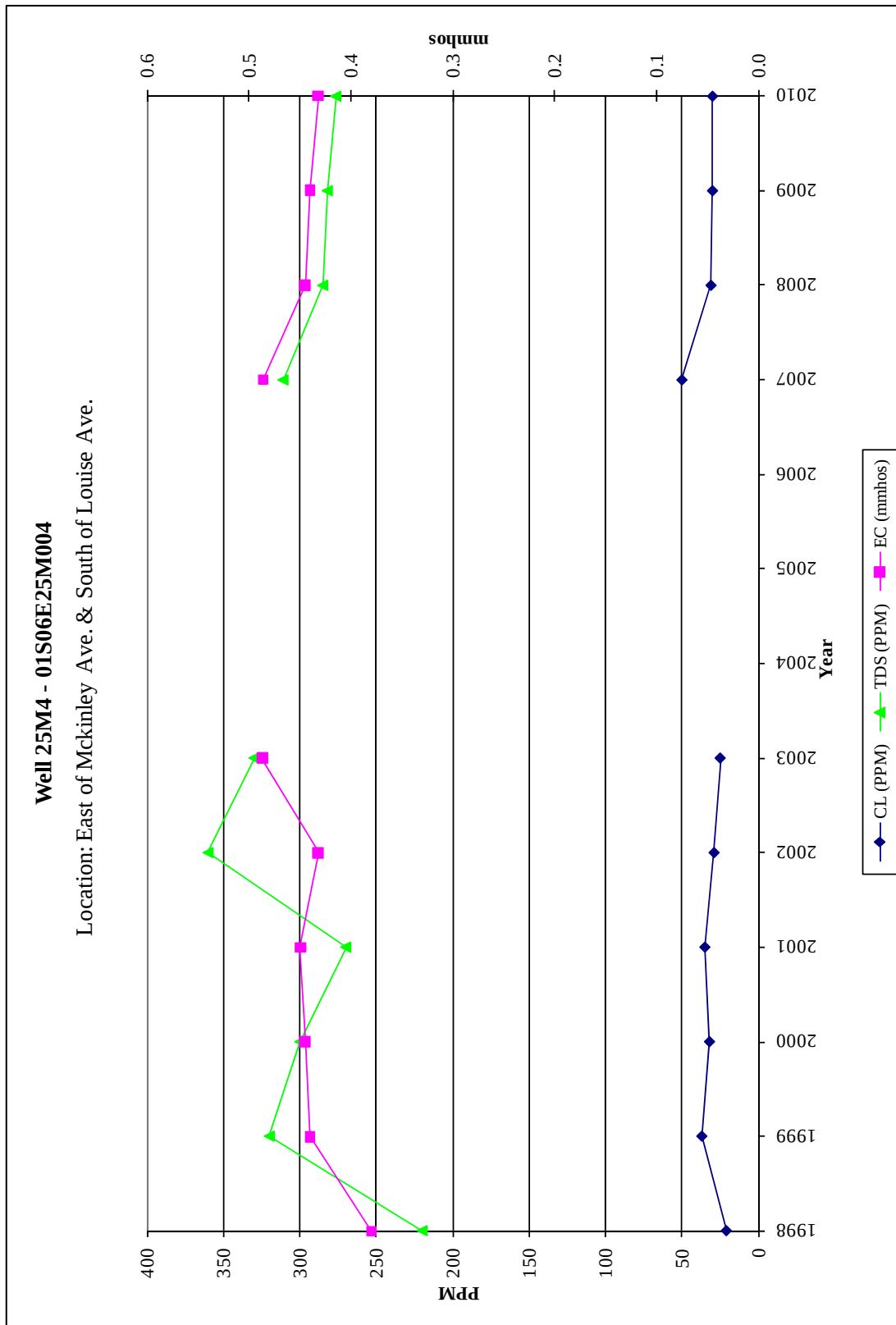
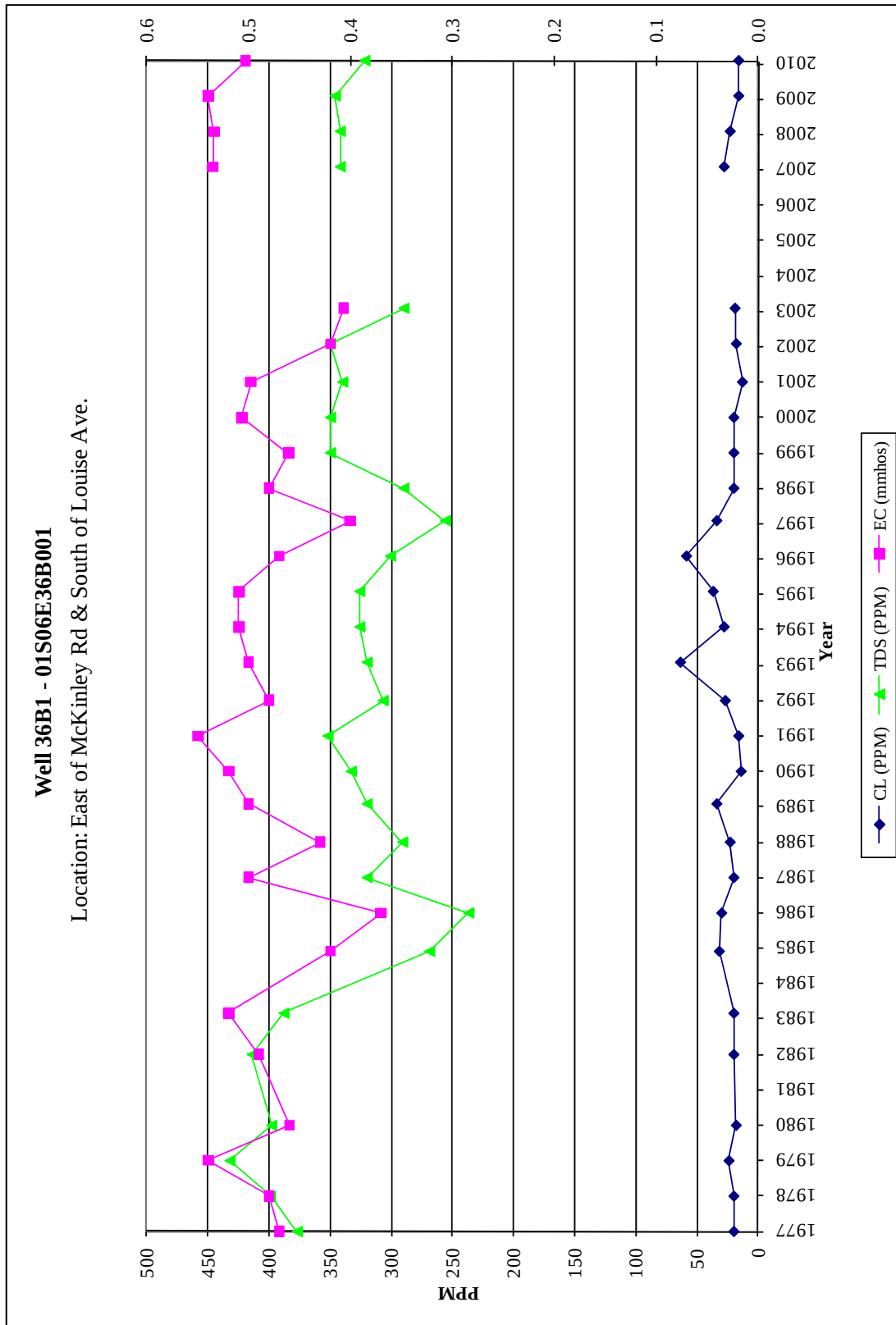


Figure 2-6: Quality Comparison Graph Well 25M3





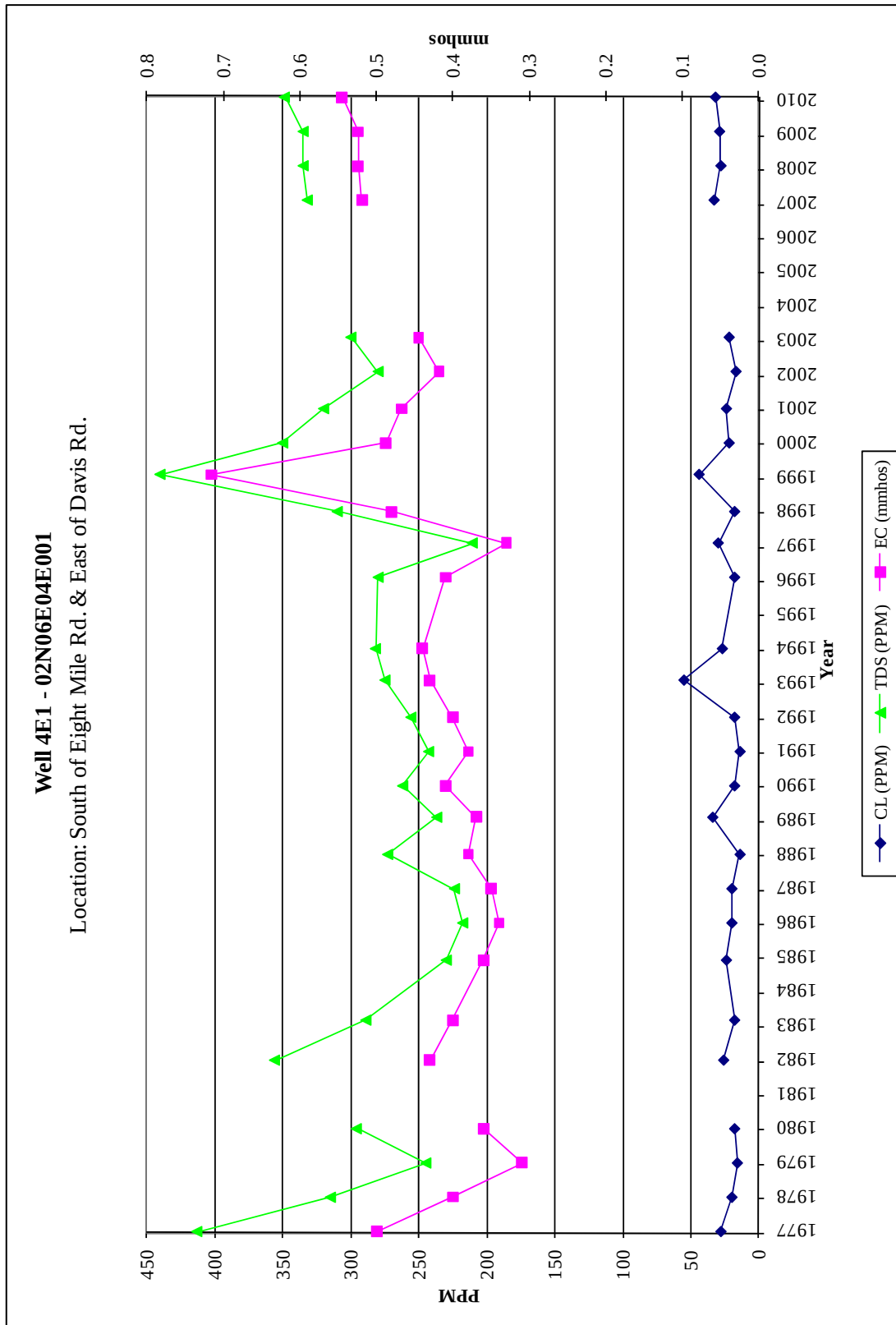


Figure 2-9: Quality Comparison Graph Well 4E1

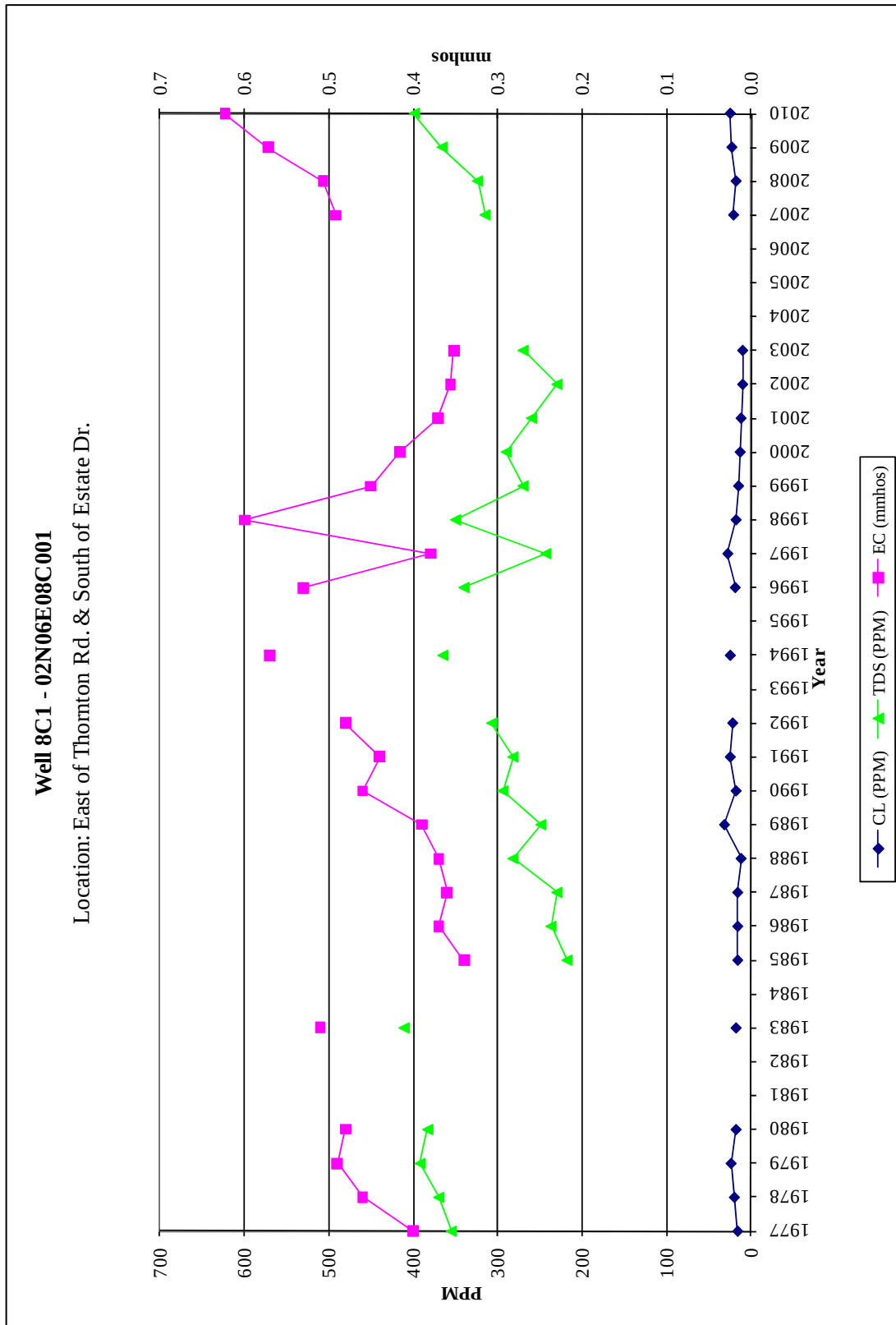


Figure 2-10: Quality Comparison Graph Well 8C1

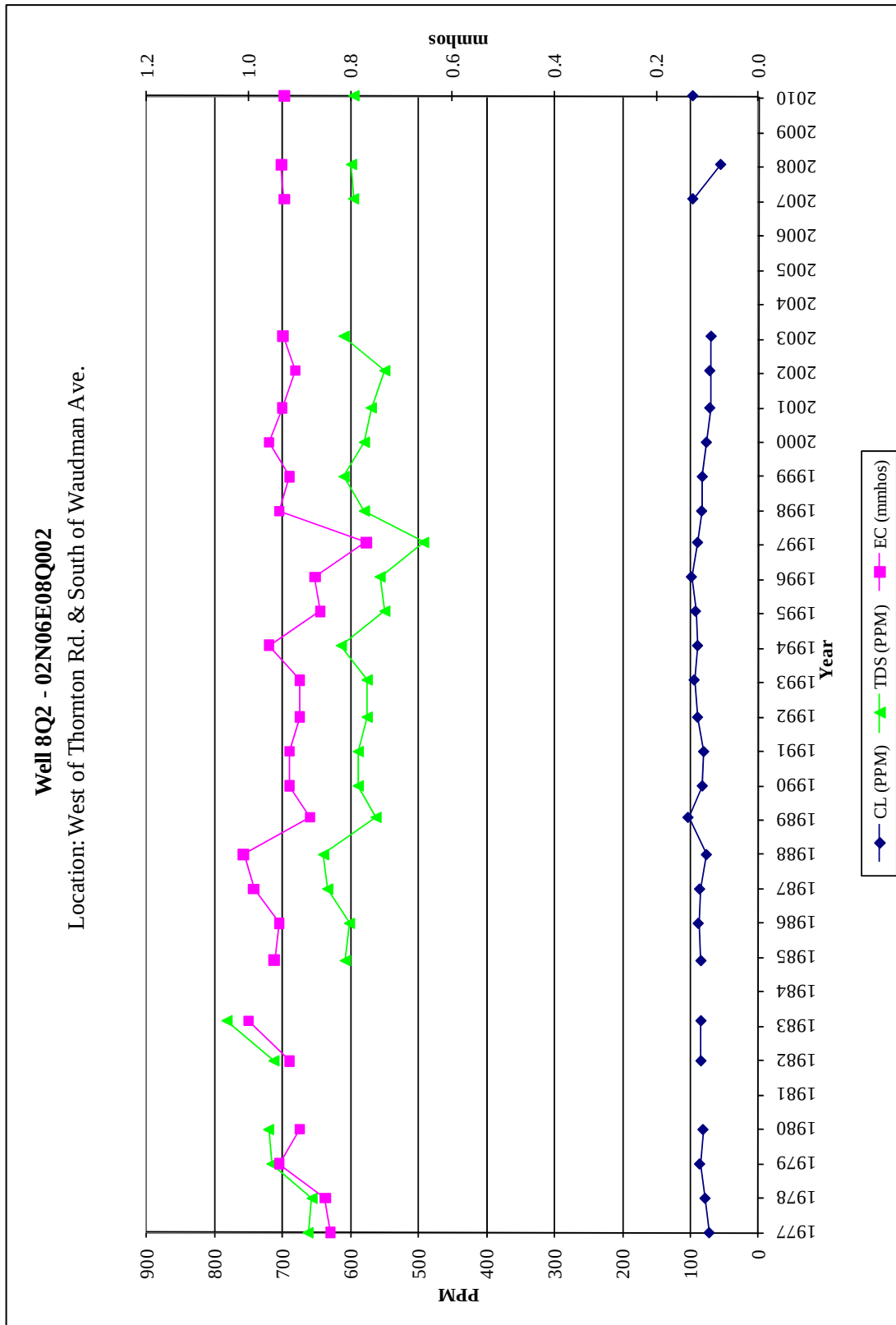


Figure 2-11: Quality Comparison Graph Well 8Q2

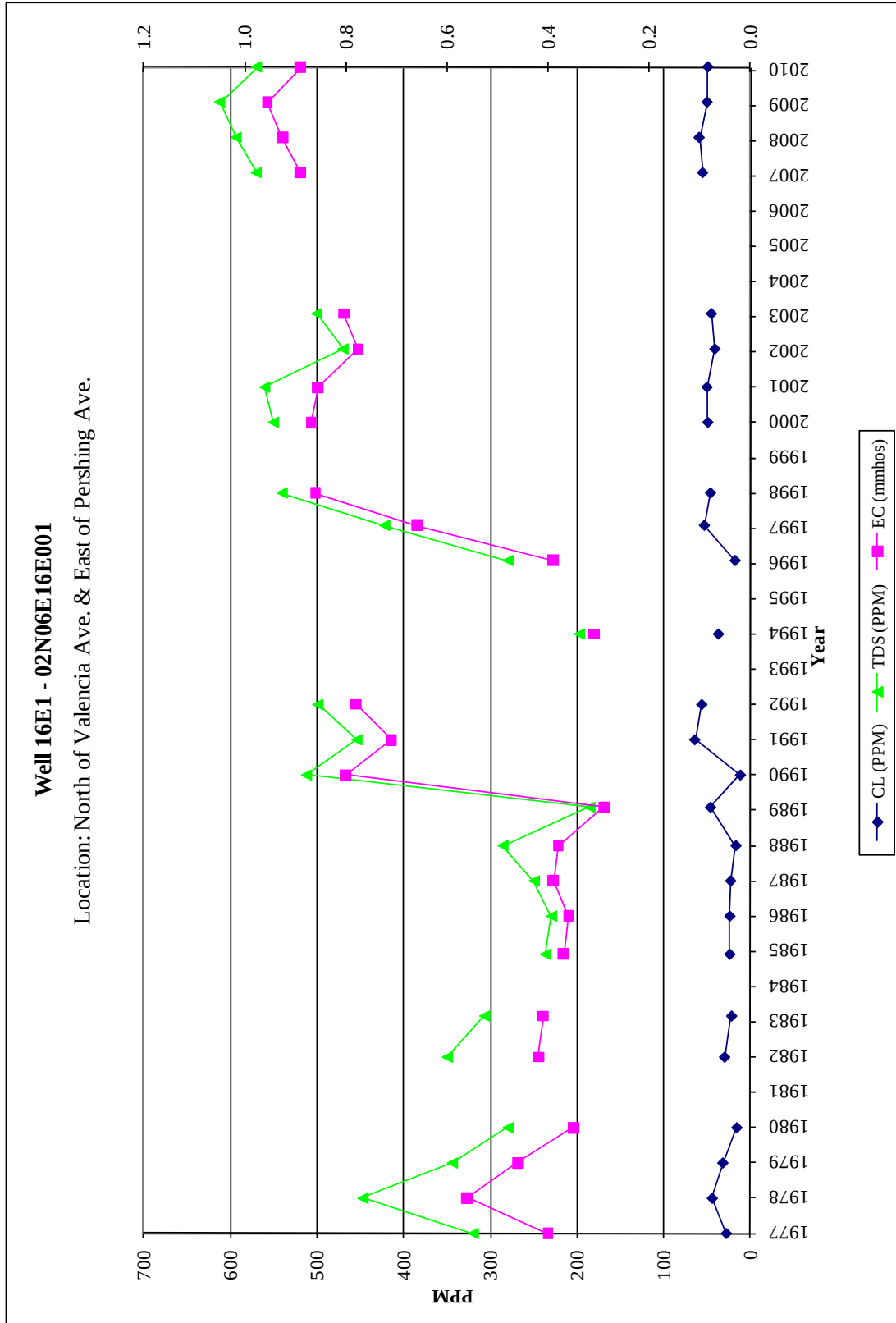


Figure 2-12: Quality Comparison Graph Well 16E1

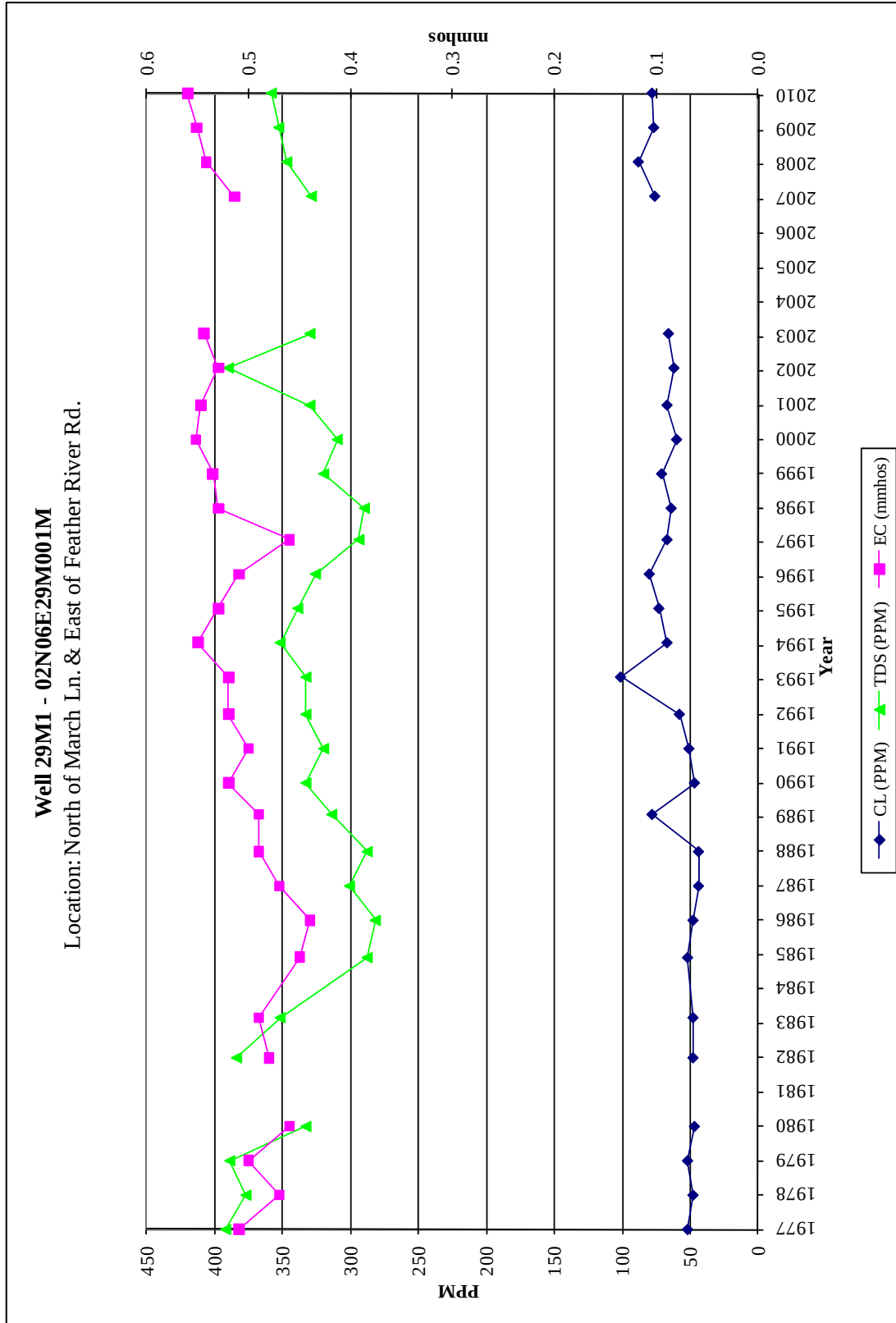


Figure 2-13: Quality Comparison Graph Well 29M1

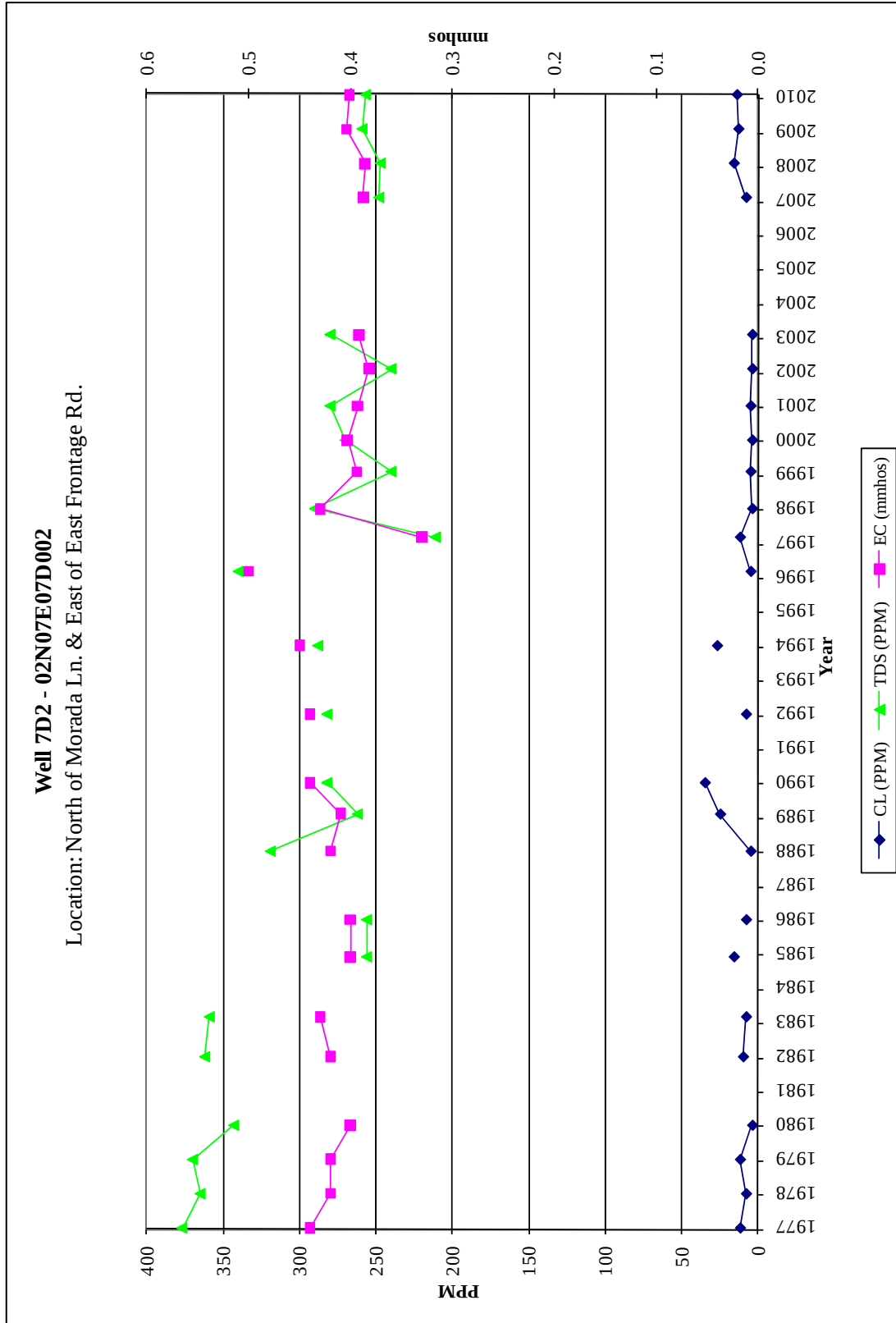


Figure 2-14: Quality Comparison Graph Well 7D2

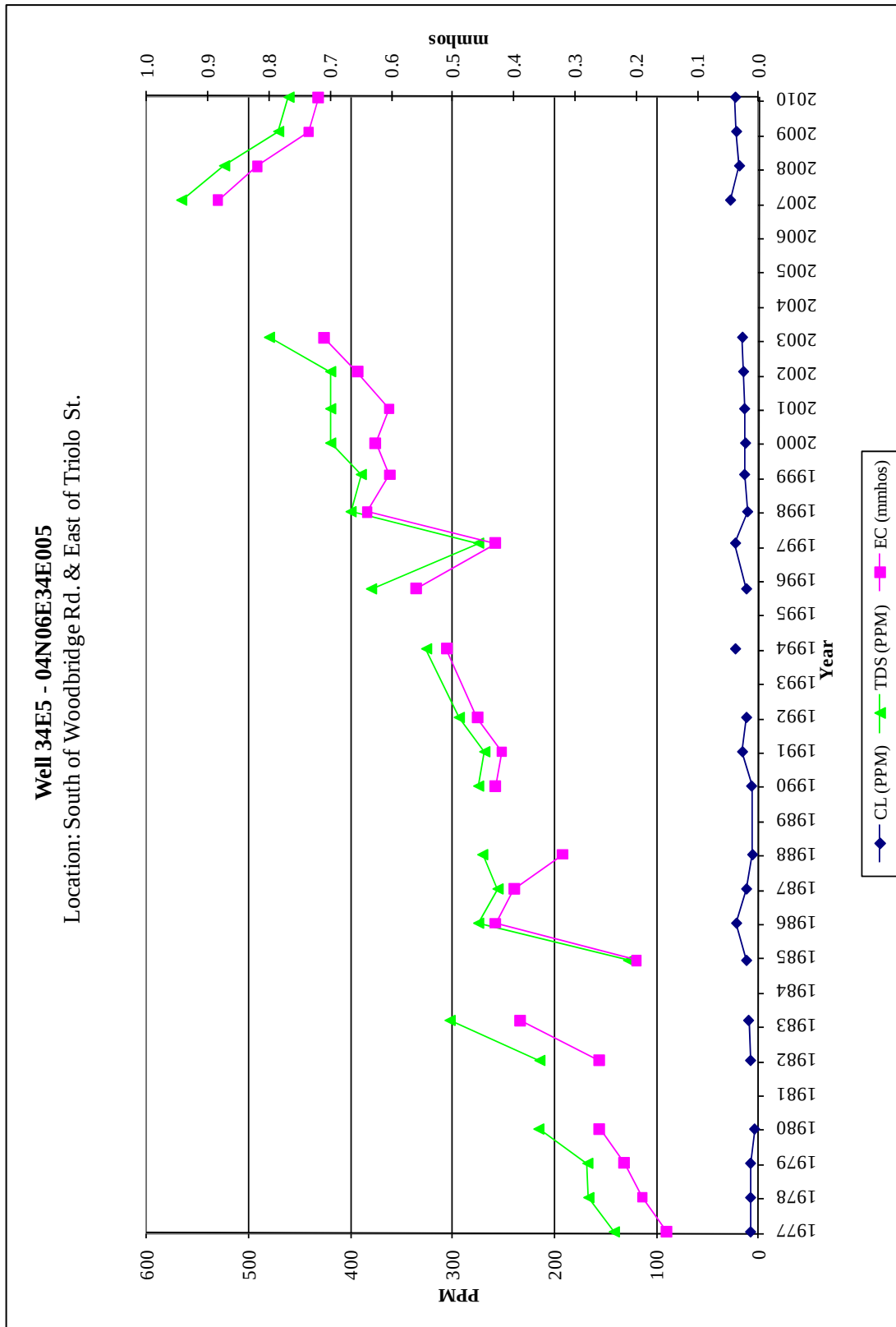


Figure 2-15: Quality Comparison Graph Well 34E5

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Section 3 – Groundwater Elevation Monitoring

Summary of Groundwater Elevations

The information contained in the Fall 2010 Groundwater Report is summarized as follows:

GROUNDWATER LEVELS

Banta-Carbona Irrigation District (BCID) – Two wells were compared in the BCID area. One well gained a half foot in groundwater level and the other well remained constant in groundwater level.

Central San Joaquin Water Conservation District (CSJWCD) – Forty-nine wells were compared in CSJWCD. Nine show decreases in groundwater levels. Forty wells show an increase in groundwater levels.

North San Joaquin Water Conservation District (NSJWCD) – One-hundred twenty-seven wells were compared in NSJWCD. One-hundred two wells decreased in groundwater levels. Twenty-two wells increased in groundwater levels. Three wells had no change in groundwater elevations.

Oakdale Irrigation District (OID) – Three wells were compared in the OID area. All wells show increase in groundwater levels.

Stockton East Water District (SEWD) – Eighty-six wells were compared in SEWD. Twenty-five wells decreased in groundwater levels. Fifty-eight wells show increases in groundwater levels. Three wells experienced no change in groundwater level.

South San Joaquin Irrigation District (SSJID) – Sixteen wells were compared in the SSJID area. One well decreased in groundwater elevation. Fifteen wells show increase in groundwater elevations.

Woodbridge Irrigation District (WID) – Twenty-six wells were compared in the WID. Ten wells decreased in groundwater levels. Six wells show increases in groundwater levels.

Miscellaneous County Areas – Thirty-five wells compare across the County in areas that are not a part of any major irrigation district. Seven wells descended in groundwater levels. Twenty-six wells increased in groundwater. Two wells remained constant.

Table 3-1 Comparison of BCID Water Levels

State Well	Fall 2010	Fall 2009	Change
02S06E31N001	53.50	53.00	0.50
03S06E27N001	72.80	72.80	0.00
Total Number of Wells			2
Number of Wells with Decrease			0
Number of Wells with Increase			1
Number of Wells with No Change			1
Range of Change			0 ft to 0.5 ft
Average Change			0.25 ft

Table 3-2 Comparison of CSJWCD Area Water Levels

State Well	Fall 2010	Fall 2009	Change
01N07E11L001	-40.50	-40.00	-0.50
01N07E11M001	-39.90	-40.20	0.30
01N07E13J002	-48.00	-48.50	0.50
01N07E14J002	-43.10	-44.60	1.50
01N07E14L001	-43.00	-44.30	1.30
01N07E15M002	*	-34.50	-----
01N07E24A001	*	-44.10	-----
01N07E24R001	-46.50	-44.50	-2.00
01N07E26H003	-35.90	-36.50	0.60
01N07E32A001	-31.60	-36.00	4.40
01N08E02B001	*	-19.30	-----
01N08E07M001	*	-57.60	-----
01N08E09L001	-51.40	-61.40	10.00
01N08E11L001	*	-47.00	-----
01N08E13J001	-30.70	-31.20	0.50
01N08E15J001	-40.50	-42.20	1.70
01N08E16G001	-40.80	-42.70	1.90
01N08E16H002	-39.20	-41.50	2.30
01N08E16P001	-41.80	-42.20	0.40
01N08E18A002	-42.50	-44.50	2.00
01N08E22J001	-37.60	-40.00	2.40
01N08E26A002	-27.30	-28.30	1.00
01N08E27R002	-31.30	-34.00	2.70
01N08E29M002	*	-59.00	-----
01N08E35F001	-28.50	-27.90	-0.60
01N08E35R002	-22.00	*	-----
01N08E36F001	-18.80	-19.00	0.20

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
01N09E01C001	15.90	16.30	-0.40
01N09E05J001	-9.70	-11.50	1.80
01N09E06N001	-32.00	-34.00	2.00
01N09E13D001	17.70	18.00	-0.30
01N09E15B002	1.60	1.00	0.60
01N09E17D001	-21.70	-24.50	2.80
01N09E17M001	-21.80	-25.50	3.70
01N09E19C001	-28.50	-26.50	-2.00
01N09E29R001	-4.50	-5.50	1.00
01N09E30C005	-14.70	-16.70	2.00
01N09E31J001	-6.15	-8.45	2.30
01S07E01J001	-25.60	-26.60	1.00
01S07E02J001	-28.30	-29.00	0.70
01S07E12H001	*	*	----
01S08E04R001	-25.30	-27.00	1.70
01S08E05A001	-27.40	-31.40	4.00
01S08E05R001	-27.40	-28.80	1.40
01S08E06D001	-26.60	-28.10	1.50
01S08E09Q001	-20.40	-18.90	-1.50
01S08E11F001	-15.40	-17.90	2.50
01S08E12B001	*	-10.70	----
01S08E14B001	-7.70	-8.70	1.00
01S08E15P001	-10.80	-9.80	-1.00
01S08E20B001	-5.70	-7.70	2.00
01S08E23A001	-1.90	-1.50	-0.40
01S09E05H002	3.80	0.50	3.30
01S09E07A001	-1.60	-2.80	1.20
01S09E07N001	1.60	-0.30	1.90
01S09E09R001	13.30	11.30	2.00
01S09E18R003	9.90	8.50	1.40
01S09E19Q002	16.50	15.00	1.50
Total Number of Wells			49
Number of Wells with Decrease			9
Number of Wells with Increase			40
Number of Wells with No Change			0
Range of Change			-2 ft to 10 ft
Average Change			1.4 ft



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Table 3-3 Comparison of NSJWCD Area Water Levels

State Well	Fall 2010	Fall 2009	Change
03N06E23A003	*	*	----
03N06E25C001	-37.40	-35.40	-2.00
03N06E25H015	-41.80	-39.10	-2.70
03N07E03R001	-25.80	-24.30	-1.50
03N07E05D005	17.40	17.40	0.00
03N07E08B012	-21.80	-20.10	-1.70
03N07E08E002	-26.80	-25.00	-1.80
03N07E09C001	-27.30	-24.70	-2.60
03N07E09C003	*	*	----
03N07E09P002	-34.00	-31.00	-3.00
03N07E10L004	-32.70	-30.20	-2.50
03N07E15C004	-33.30	-34.50	1.20
03N07E17A006	-35.30	-30.80	-4.50
03N07E17D003	*	*	----
03N07E17D004	-29.20	-28.90	-0.30
03N07E17K002	-36.50	-36.00	-0.50
03N07E18D012	-30.10	-29.50	-0.60
03N07E18M002	-36.40	-31.90	-4.50
03N07E19J004	-53.10	-52.00	-1.10
03N07E19Q012	-42.70	-39.90	-2.80
03N07E20C012	-39.60	-39.00	-0.60
03N07E21L003	-41.50	-39.00	-2.50
03N07E22C011	-43.70	-40.40	-3.30
03N07E23C002	*	-39.00	----
03N07E23K011	-45.40	-44.40	-1.00
03N07E25G001	*	-49.90	----
03N07E26G012	-47.70	-45.90	-1.80
03N07E32Q012	-45.60	-44.60	-1.00
03N07E33G002	-45.00	-48.20	3.20
03N08E04Q001	-35.10	-33.60	-1.50
03N08E05K011	-36.10	-35.40	-0.70
03N08E07J001	-41.80	*	----
03N08E12P011	-33.30	-32.20	-1.10
03N08E12P011	-33.30	-32.20	-1.10
03N08E17B001	-43.30	-42.90	-0.40
03N08E17Q011	-47.10	-46.40	-0.70
03N08E19C001	-43.60	-45.10	1.50
03N08E19M003	-49.20	-47.00	-2.20
03N08E22A001	-44.30	-46.60	2.30
04N06E02R011	-28.80	-25.30	-3.50

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
04N06E03A012	-21.30	-17.30	-4.00
04N06E06N012	2.90	-5.60	8.50
04N06E12C004	-35.00	-31.50	-3.50
04N06E12N002	-33.90	-26.80	-7.10
04N06E15B002	-15.10	-14.70	-0.40
04N06E16A011	-12.60	-12.70	0.10
04N06E16C001	-4.10	-4.80	0.70
04N06E16K011	-1.20	-1.40	0.20
04N06E23D004	-25.80	-22.60	-3.20
04N06E23K00	-11.50	-8.00	-3.50
04N06E24D012	-19.50	-19.00	-0.50
04N06E24F001	-23.00	-23.00	0.00
04N06E25B001	-13.80	-13.70	-0.10
04N06E25R001	-5.50	-4.50	-1.00
04N06E27B012	*	0.90	-----
04N06E27D002	*	14.70	-----
04N06E27Q012	14.60	14.90	-0.30
04N06E35D011	16.00	15.90	0.10
04N06E36J012	4.10	3.90	0.20
04N07E01B011	-37.20	*	-----
04N07E02R001	*	-37.50	-----
04N07E02R001	*	-37.50	-----
04N07E04B012	*	-42.10	-----
04N07E04Q012	-43.50	-42.00	-1.50
04N07E04Q012	-43.50	-42.00	-1.50
04N07E07A001	*	-40.50	-----
04N07E07H011	-40.40	-37.50	-2.90
04N07E11D012	-41.90	-39.60	-2.30
04N07E11D012	-41.90	-39.60	-2.30
04N07E12E001	-42.50	-42.50	0.00
04N07E12G012	*	-34.00	-----
04N07E12G012	*	-34.00	-----
04N07E14P011	-32.90	-31.00	-1.90
04N07E14P011	-32.90	-31.00	-1.90
04N07E15B012	-37.70	-35.80	-1.90
04N07E16D001	*	-35.20	-----
04N07E16D001	*	-35.20	-----
04N07E17J013	*	-29.60	-----
04N07E17J013	*	-29.60	-----
04N07E17N001	-35.30	-39.80	4.50
04N07E19K001	-23.60	-20.10	-3.50
04N07E19R011	-21.40	-20.70	-0.70
04N07E21F001	-26.30	-26.80	0.50

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
04N07E23J012	-29.10	-26.80	-2.30
04N07E24N002	-26.60	-26.10	-0.50
04N07E25G015	-22.10	*	----
04N07E26B011	-24.30	-22.40	-1.90
04N07E27C002	-27.00	-30.50	3.50
04N07E28J002	-19.20	-18.70	-0.50
04N07E28P011	8.00	8.10	-0.10
04N07E29H001	-18.40	-17.50	-0.90
04N07E29N012	-9.80	-8.10	-1.70
04N07E31Q031	15.00	14.80	0.20
04N07E33H001	26.70	25.50	1.20
04N07E34K011	-13.20	-10.60	-2.60
04N07E34K011	-13.20	-10.60	-2.60
04N07E35C002	-14.10	-13.80	-0.30
04N07E35E013	-15.50	-14.00	-1.50
04N07E36L001	-24.60	-24.00	-0.60
04N08E01K001	49.50	50.40	-0.90
04N08E02E011	-6.60	-8.60	2.00
04N08E04P014	-26.20	-23.80	-2.40
04N08E04P014	-26.20	-23.80	-2.40
04N08E06C002	-36.50	-37.20	0.70
04N08E06N002	-36.00	-37.20	1.20
04N08E11M012	-6.10	-4.30	-1.80
04N08E12A011	*	75.60	----
04N08E12B011	50.60	51.10	-0.50
04N08E12N001	20.80	25.00	-4.20
04N08E14B011	-1.60	0.20	-1.80
04N08E14K001	-5.40	-4.10	-1.30
04N08E15D011	-16.40	-14.60	-1.80
04N08E15J011	-12.20	*	----
04N08E17A001	-27.80	-31.30	3.50
04N08E17J001	-27.60	-25.50	-2.10
04N08E18Q011	-32.60	-29.90	-2.70
04N08E19B002	-27.10	-24.60	-2.50
04N08E21M001	-30.80	-30.10	-0.70
04N08E22C015	-17.80	-15.70	-2.10
04N08E26A012	-7.30	-6.30	-1.00
04N08E27J011	-17.20	-16.10	-1.10
04N08E27J011	-17.20	-16.10	-1.10
04N08E32N001	-34.80	-31.60	-3.20
04N08E34Q011	-30.40	-28.90	-1.50
04N08E34Q011	-30.40	-28.90	-1.50
04N09E06L011	108.30	108.90	-0.60

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
04N09E07D012	80.80	83.30	-2.50
04N09E07E011	89.40	90.50	-1.10
04N09E16Q002	162.50	162.60	-0.10
04N09E17E001	137.20	134.10	3.10
04N09E18A011	151.50	152.20	-0.70
04N09E18D002	51.50	52.10	-0.60
04N09E18N011	22.90	25.20	-2.30
04N09E20M001	113.30	114.30	-1.00
04N09E20M001	113.30	114.30	-1.00
04N09E21A001	169.30	169.10	0.20
04N09E28C002	185.50	185.80	-0.30
05N06E36R001	-36.00	-34.80	-1.20
05N07E31J001	*	*	-----
05N07E31Q001	*	*	-----
05N07E34G001	-49.30	-47.10	-2.20
05N07E34Q001	-47.20	-45.90	-1.30
05N08E24Q011	*	54.50	-----
05N08E25P011	51.60	51.70	-0.10
05N08E32R011	-34.40	-32.60	-1.80
05N08E32R011	-34.40	-32.60	-1.80
05N08E35K012	3.90	5.10	-1.20
05N08E35K012	3.90	5.10	-1.20
05N09E30C011	160.00	160.20	-0.20
05N09E30M011	144.00	144.20	-0.20
05N09E31L011	124.30	124.20	0.10
03N06E36N001	-36.41	-36.31	-0.10
Total Number of Wells			127
Number of Wells with Decrease			102
Number of Wells with Increase			22
Number of Wells with No Change			3
Range of Change			-7.1 ft to 8.5 ft
Average Change			-1.0 ft



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Table 3-4 Comparison of OID Area Water Levels

State Well	Fall 2010	Fall 2009	Change
01S09E14K001	43.00	41.30	1.70
01S09E21J002	39.20	38.50	0.70
01S09E23N001	50.70	48.50	2.20
01S09E24R001	*	65.60	-----
01S09E28M002	*	37.70	-----
Total Number of Wells			3
Number of Wells with Decrease			0
Number of Wells with Increase			3
Number of Wells with No Change			2
Range of Change			0.7 ft to 2.2 ft
Average Change			1.5 ft

Table 3-5 Comparison of SEWD Area Water Levels

State Well	Fall 2010	Fall 2009	Change
01N06E04J002	-7.40	-15.90	8.50
01N06E05H001	-9.60	-11.00	1.40
01N06E05M004	*	*	-----
01N06E12G001	*	-31.80	-----
01N06E23J001	-12.90	-10.40	-2.50
01N06E27R002	-7.70	-9.20	1.50
01N07E01A002	*	-53.30	-----
01N07E01M002	-53.50	-53.00	-0.50
01N07E02G001	-48.40	-48.90	0.50
01N07E03L001	-9.10	*	-----
01N07E03M001	7.50	-27.50	35.00
01N07E04R001	-40.60	-30.50	-10.10
01N07E08B001	-33.00	-35.00	2.00
01N07E09E004	-32.00	-34.40	2.40
01N07E09H001	-34.70	*	-----
01N07E09Q003	-36.00	-36.00	0.00
01N07E10D001	-28.00	-34.00	6.00
01N07E10G001	-38.20	*	-----
01N07E19G001	-23.10	-24.50	1.40
01N07E20G001	*	-28.00	-----
01N08E03P001	-44.50	-54.00	9.50
01N08E04E001	-52.00	-54.50	2.50
01S06E01C002	-7.30	-10.00	2.70
01S06E02D004	-8.20	-10.50	2.30

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
01S06E02G002	-9.40	-11.30	1.90
01S06E10G001	-4.80	-10.30	5.50
01S06E11E001	8.00	-8.50	16.50
01S07E06M002	-6.10	-10.50	4.40
01S07E08J002	-5.80	-9.00	3.20
02N06E11L001	*	-32.80	-----
02N06E15F001	*	-35.00	-----
02N06E17J001	*	-24.30	-----
02N06E20F001	*	-2.60	-----
02N06E22D001	*	-34.40	-----
02N06E24F001	-37.50	-38.50	1.00
02N06E32G001	-12.50	-14.20	1.70
02N07E03D001	-47.80	-51.50	3.70
02N07E08D001	-52.20	-54.70	2.50
02N07E08K003	-59.40	-62.20	2.80
02N07E10F002	*	*	-----
02N07E11F001	-62.00	-58.50	-3.50
02N07E11R002	-57.00	-59.00	2.00
02N07E12A003	-51.90	-60.70	8.80
02N07E15C001	-61.80	-63.40	1.60
02N07E16F002	-60.64	-63.64	3.00
02N07E16L001	-59.80	-63.30	3.50
02N07E20N002	-44.50	-48.00	3.50
02N07E21A002	-63.91	-66.81	2.90
02N07E21K002	-58.70	-56.00	-2.70
02N07E21N001	-55.50	-51.00	-4.50
02N07E23B001	-65.10	-63.00	-2.10
02N07E24B001	-55.80	-62.00	6.20
02N07E24J001	*	*	-----
02N07E24Q001	-62.40	-61.00	-1.40
02N07E26H003	-63.10	-62.00	-1.10
02N07E26N001	-57.20	-60.50	3.30
02N07E28K002	-65.50	-54.00	-11.50
02N07E28N004	-48.00	*	-----
02N07E28P001	-60.50	-57.00	-3.50
02N07E29B001	-50.50	-50.50	0.00
02N07E29M002	-42.10	-46.00	3.90
02N07E30E001	-37.20	-43.10	5.90
02N07E30H001	-42.20	-46.50	4.30
02N07E31M001	-29.30	-33.80	4.50
02N07E32J002	-33.60	-42.50	8.90
02N07E32M002	-31.50	-39.00	7.50



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

State Well	Fall 2010	Fall 2009	Change
02N07E32R001	-31.10	-42.10	11.00
02N07E33L001	-48.00	-45.50	-2.50
02N07E34R001	-41.80	-42.10	0.30
02N07E35L001	*	*	----
02N07E36H001	-61.50	-60.80	-0.70
02N07E36P002	*	-56.30	----
02N08E03G002	-36.40	-38.70	2.30
02N08E04C001	-51.80	-54.70	2.90
02N08E05C001	-55.00	-56.50	1.50
02N08E08N001	-61.00	-60.50	-0.50
02N08E09G002	-56.00	-58.30	2.30
02N08E10H002	-48.30	-49.20	0.90
02N08E12C002	-33.20	-33.00	-0.20
02N08E13K001	-37.60	-39.40	1.80
02N08E14C001	-50.00	-48.00	-2.00
02N08E15M002	-50.20	*	----
02N08E16D001	-54.10	-58.80	4.70
02N08E18C001	-69.70	-68.70	-1.00
02N08E20F001	-62.30	-64.30	2.00
02N08E24J001	-50.10	*	----
02N08E24P001	-38.80	*	----
02N08E28H002	-48.60	-45.60	-3.00
02N08E32L002	-54.70	-56.20	1.50
02N08E33E001	-55.10	-56.60	1.50
02N09E03A001	61.10	61.80	-0.70
02N09E04H001	*	53.10	----
02N09E05H001	-4.30	0.30	-4.60
02N09E08N001	*	-24.90	----
02N09E09D001	*	-15.30	----
02N09E18Q001	-38.00	-39.00	1.00
02N09E22D001	3.10	4.90	-1.80
02N09E28N001	-9.70	-9.10	-0.60
03N07E28K012	-48.70	-47.30	-1.40
03N07E35C002	-48.30	-51.80	3.50
03N07E35L001	-51.50	-54.00	2.50
03N07E36J001	-51.30	-51.80	0.50
03N08E27R001	-44.40	-45.40	1.00
03N09E25R001	83.00	83.50	-0.50
03N09E36G001	76.70	78.70	-2.00
02N06E03A003	-30.80	-30.80	0.00
02N06E06C002	-13.90	-14.00	0.10
02N06E13R002	-39.00	-40.00	1.00
02N06E24J002	-36.00	-39.40	3.40

*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Total Number of Wells	86
Number of Wells with Decrease	25
Number of Wells with Increase	58
Number of Wells with No Change	3
Range of Change	-11.5 ft to 3.4 ft
Average Change	0.5 ft

Table 3-6 Comparison of SSJID Area Water Levels

State Well	Fall 2010	Fall 2009	Change
01S07E25E001	12.00	11.50	0.50
01S07E26G001	12.00	11.00	1.00
01S07E27K001	13.70	11.00	2.70
01S08E25Q001	*	*	-----
01S09E29M002	*	31.50	-----
01S09E34A001	58.30	56.50	1.80
02S07E07D002	10.80	9.00	1.80
02S07E11N002	35.80	36.50	-0.70
02S07E12R001	24.40	20.30	4.10
02S07E12R002	29.40	27.50	1.90
02S07E19H001	20.00	19.50	0.50
02S07E26B001	29.00	27.00	2.00
02S08E04M001	21.90	21.50	0.40
02S08E06J001	21.50	20.50	1.00
02S08E07R001	33.50	33.00	0.50
02S08E08A001	25.30	25.00	0.30
02S08E08E001	24.20	22.70	1.50
02S09E03K001	61.90	60.50	1.40

Total Number of Wells	16
Number of Wells with Decrease	1
Number of Wells with Increase	15
Number of Wells with No Change	0
Range of Change	-0.7 ft to 4.1 ft
Average Change	1.3 ft



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Table 3-7 Comparison of WID Area Water Levels

State Well	Fall 2010	Fall 2009	Change
03N05E13L001	-11.00	-11.50	0.50
03N05E14C001	-4.30	-3.80	-0.50
03N06E04P012	-13.30	-13.00	-0.30
03N06E05C002	-4.70	-4.40	-0.30
03N06E05N003	*	-13.00	----
03N06E07D013	-8.50	-9.00	0.50
03N06E07H003	-15.60	-16.50	0.90
03N06E10D001	-9.90	-10.40	0.50
03N06E17A004	-26.20	-24.70	-1.50
03N06E18M003	-15.30	-17.10	1.80
03N06E20D002	-20.00	-24.50	4.50
03N06E26P002	-31.40	-29.70	-1.70
03N06E27E001	-33.70	-33.20	-0.50
03N06E28B012	*	-29.20	----
03N06E32R001	-29.50	-30.00	0.50
04N05E09D001	-5.80	-6.80	1.00
04N05E10K001	-4.60	-5.50	0.90
04N05E13C012	-5.00	-5.50	0.50
04N05E13H001	-6.50	-9.00	2.50
04N05E13R004	-6.40	-6.50	0.10
04N05E14B002	-5.40	-5.90	0.50
04N05E14P001	-1.00	-2.00	1.00
04N05E22H001	*	-6.00	----
04N05E24J004	-1.10	-0.60	-0.50
04N05E26F001	-0.60	1.70	-2.30
04N05E36H003	-0.10	1.00	-1.10
04N06E19R012	1.10	1.00	0.10
04N06E29A001	*	*	----
04N06E29N002	-1.70	-2.00	0.30
04N06E30E001	0.20	1.70	-1.50
05N05E32M001	*	-7.20	----
Total Number of Wells			26
Number of Wells with Decrease			10
Number of Wells with Increase			16
Number of Wells with No Change			0
Range of Change			-2.3 ft to 4.5 ft
Average Change			0.2 ft



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Table 3-8 Comparison of Miscellaneous Area Water Levels

State Well	Fall 20010	Fall 2009	Change
01N09E26A001	14.00	4.90	9.10
01N09E36P001	*	*	-----
01S05E31R002	0.60	1.10	-0.50
01S06E04J001	-1.00	-2.00	1.00
01S06E12P001	-4.00	-9.50	5.50
01S06E14F001	-2.10	-3.60	1.50
01S06E15F001	-0.60	-1.00	0.40
01S06E23C003	1.80	0.80	1.00
01S06E26K001	1.50	-0.50	2.00
01S07E10A001	*	-22.20	-----
01S07E13J001	-5.80	-7.00	1.20
01S07E14M001	0.80	-2.10	2.90
01S07E14P003	-0.30	-2.80	2.50
01S07E15F002	-2.40	-5.60	3.20
01S08E19R001	3.80	3.80	0.00
01S08E29K001	7.00	6.50	0.50
01S08E30C002	6.30	5.50	0.80
01S09E02R001	32.60	30.80	1.80
01S09E11J002	36.90	36.70	0.20
02S05E08B001	-2.00	-2.70	0.70
02S05E13N001	14.00	14.70	-0.70
02S06E10K001	3.00	2.00	1.00
02S06E25J001	15.70	14.50	1.20
02S06E26B001	7.00	5.50	1.50
02S06E27E001	9.00	9.00	0.00
02S07E31N001	14.00	11.50	2.50
02S09E19B002	56.80	55.60	1.20
03N06E09N011	*	*	-----
03N06E15C004	-23.40	-21.80	-1.60
03N06E29C001	-29.30	-29.80	0.50
03S05E04H001	56.50	57.00	-0.50
03S06E03F002	15.00	15.50	-0.50
03S06E23C001	-4.20	-8.70	4.50
04N05E03D003	-4.80	-5.70	0.90
04N05E36C004	-1.10	-0.80	-0.30
04N06E18R012	-4.20	-5.50	1.30
04N06E34J002	21.50	21.90	-0.40
05N05E28L003	-3.80	-5.00	1.20



*Measurement wasn't able to be completed due to one or more of the following reasons: pumping, pump house locked, unable to get tape in casing, insects or dogs.

Total Number of Wells	35
Number of Wells with Decrease	7
Number of Wells with Increase	26
Number of Wells with No Change	2
Range of Change	-1.6 ft to 9.1 ft
Average Change	1.3 ft

HYDROGRAPHS

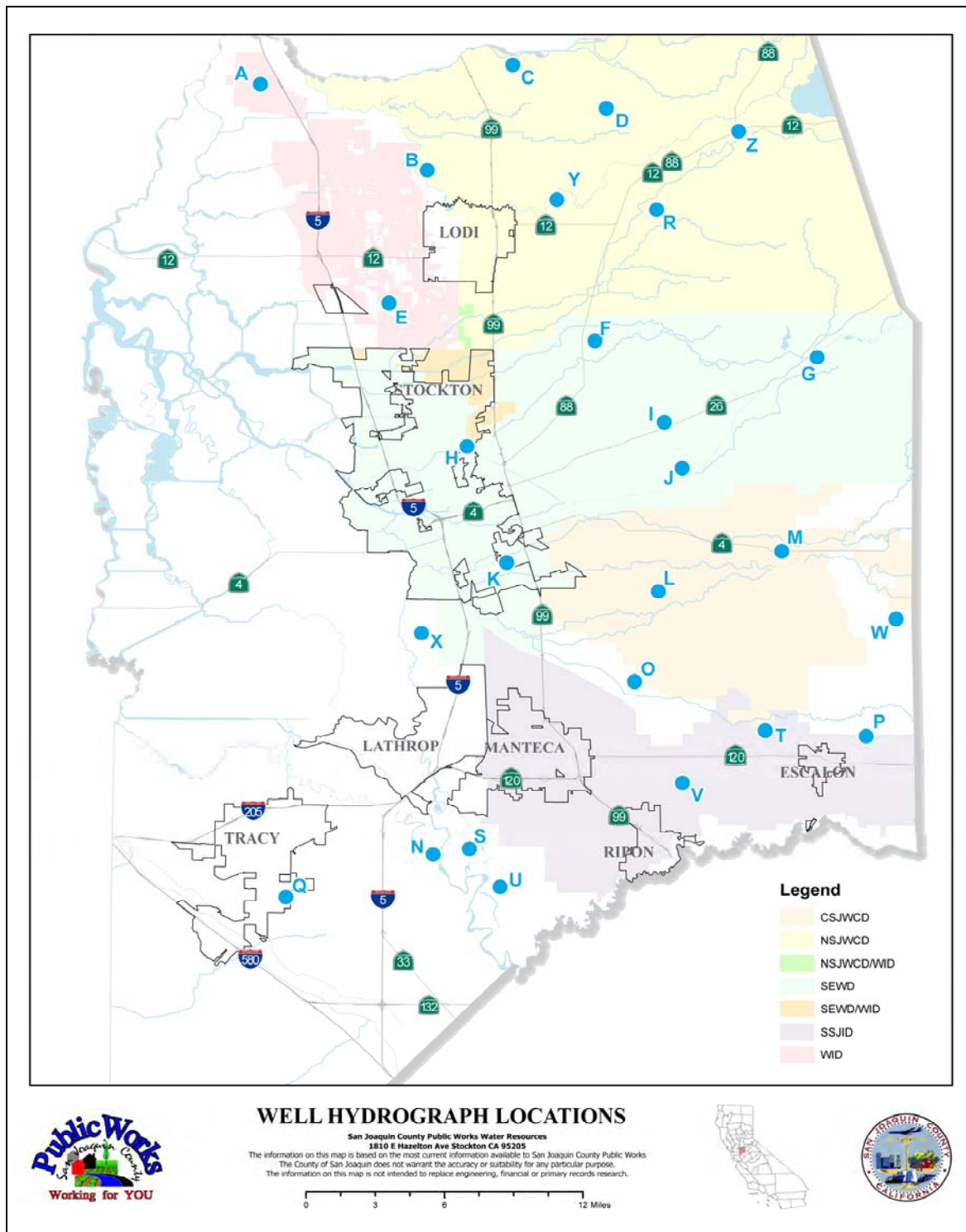


Figure 3-1: Well Hydrograph Locations

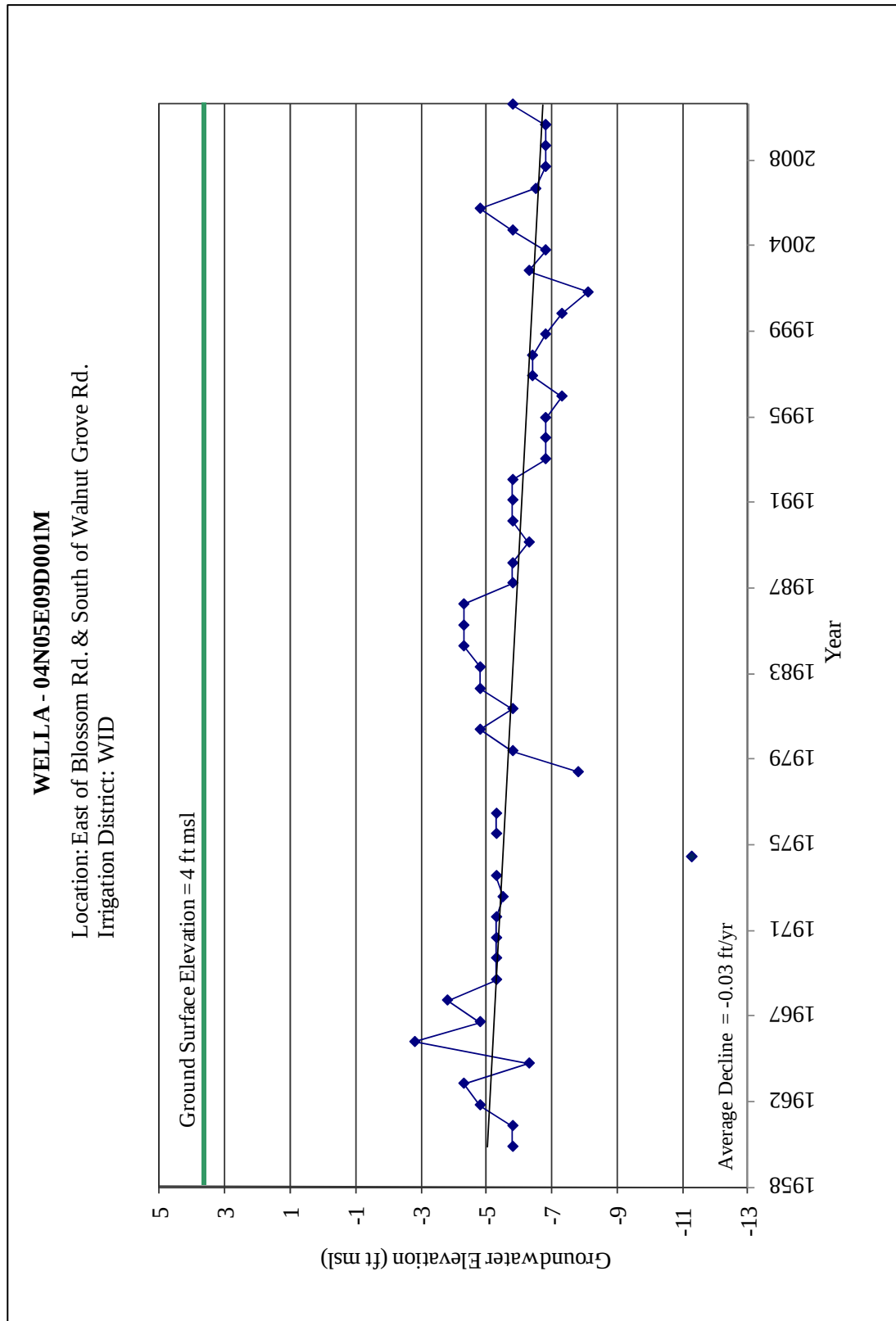


Figure 3-2: Fall Hydrograph Well A

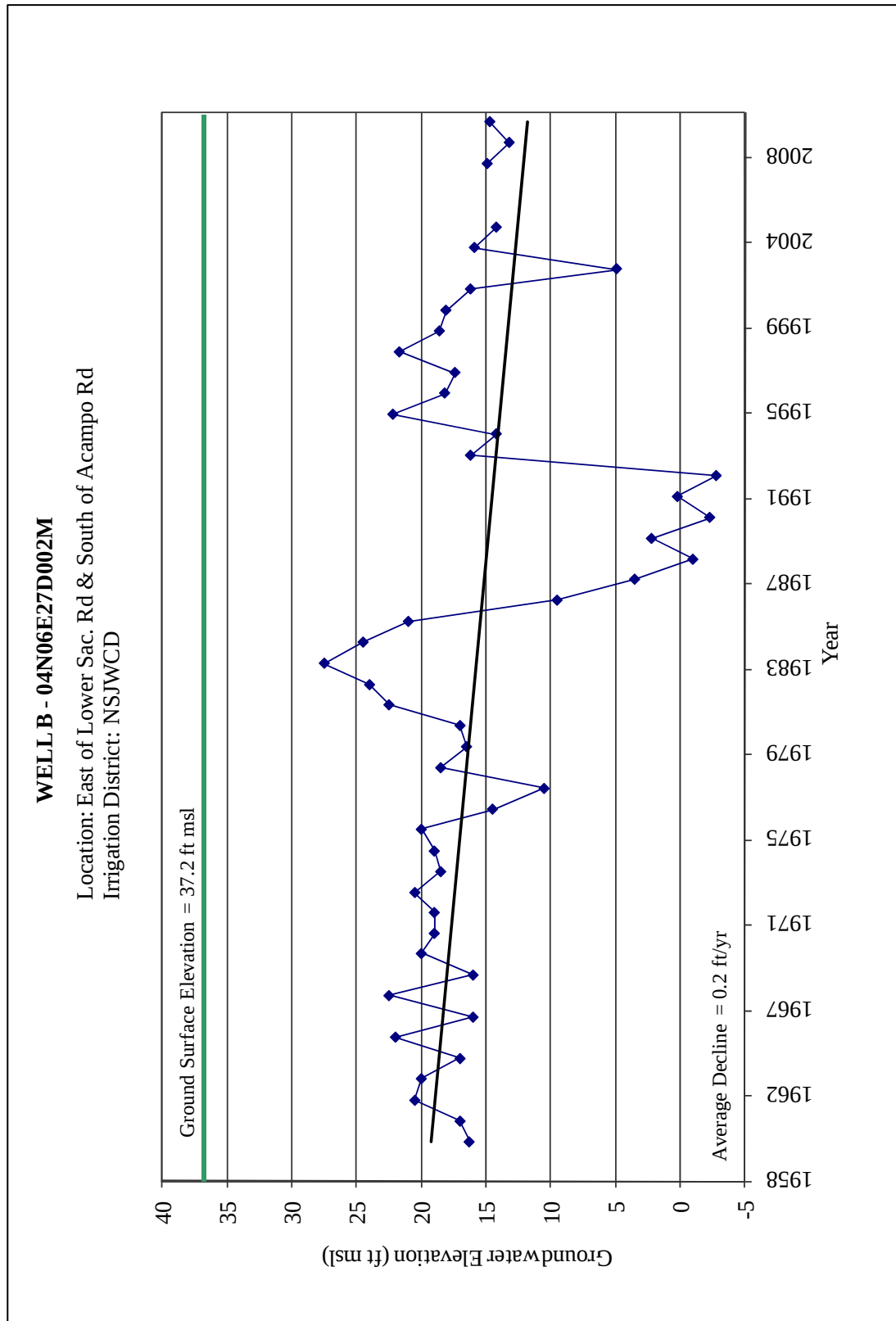


Figure 3-3: Fall Hydrograph Well B

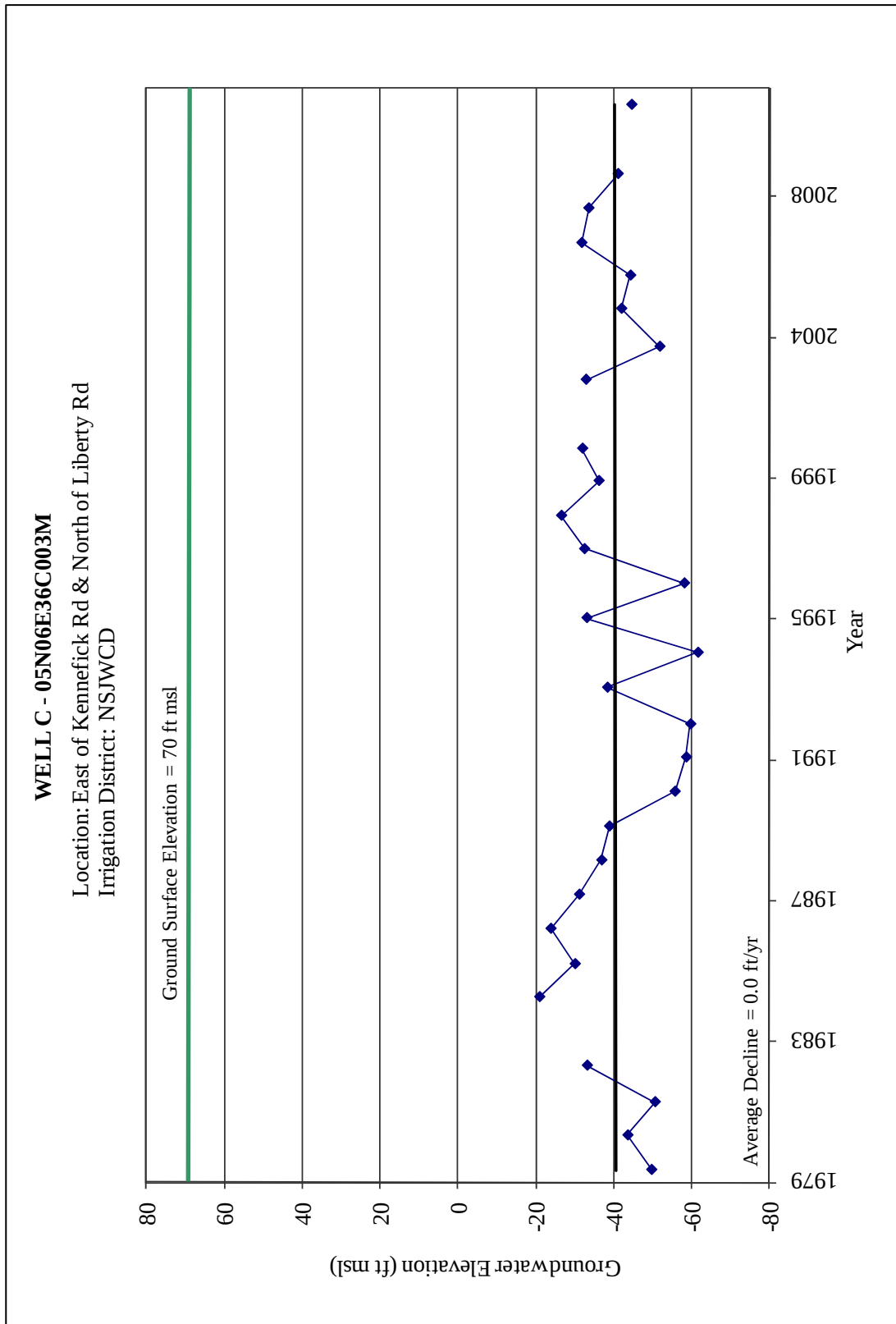


Figure 3-4: Fall Hydrograph Well C

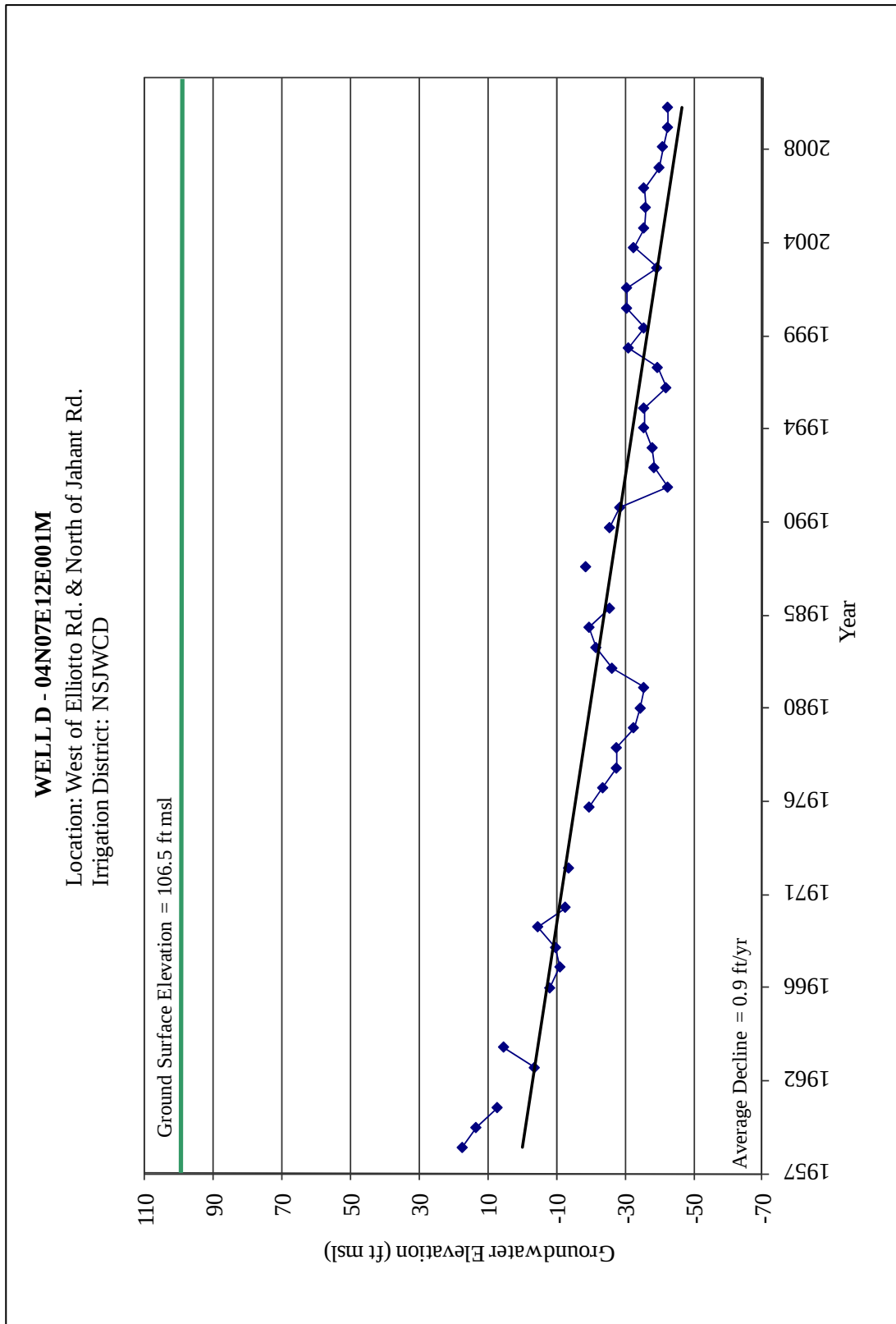


Figure 3-5: Fall Hydrograph Well D

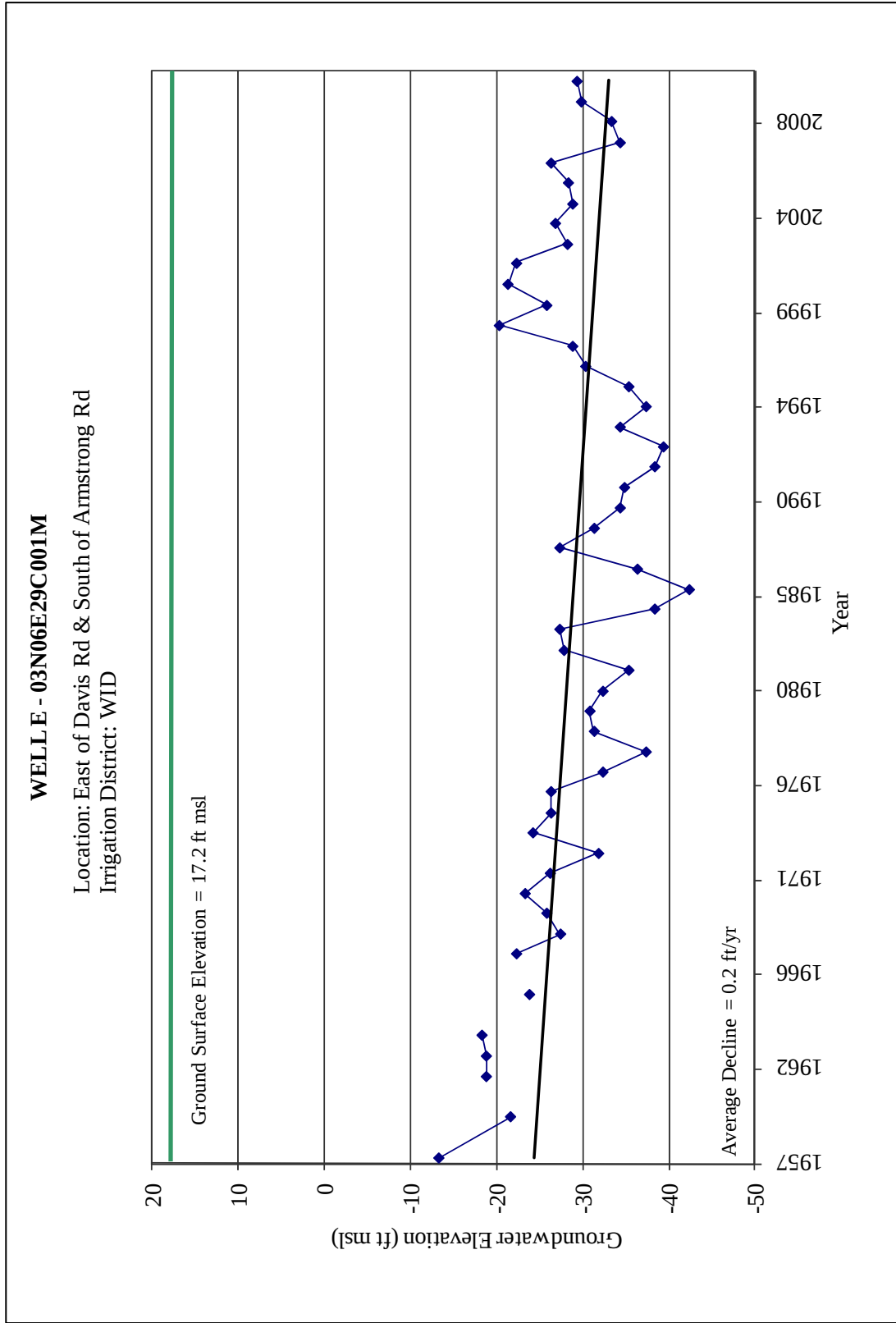


Figure 3-6: Fall Hydrograph Well E

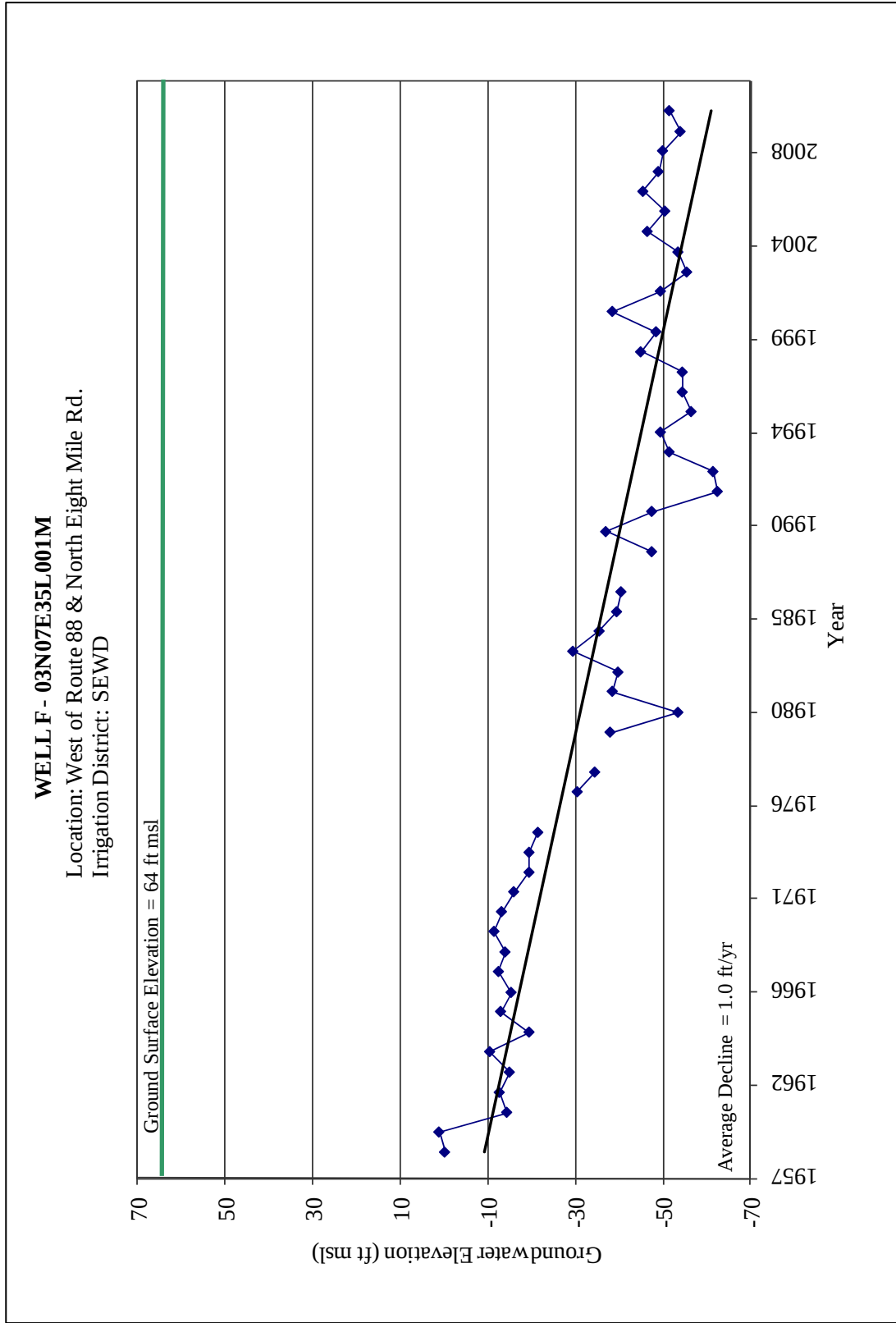


Figure 3-7: Fall Hydrograph Well F

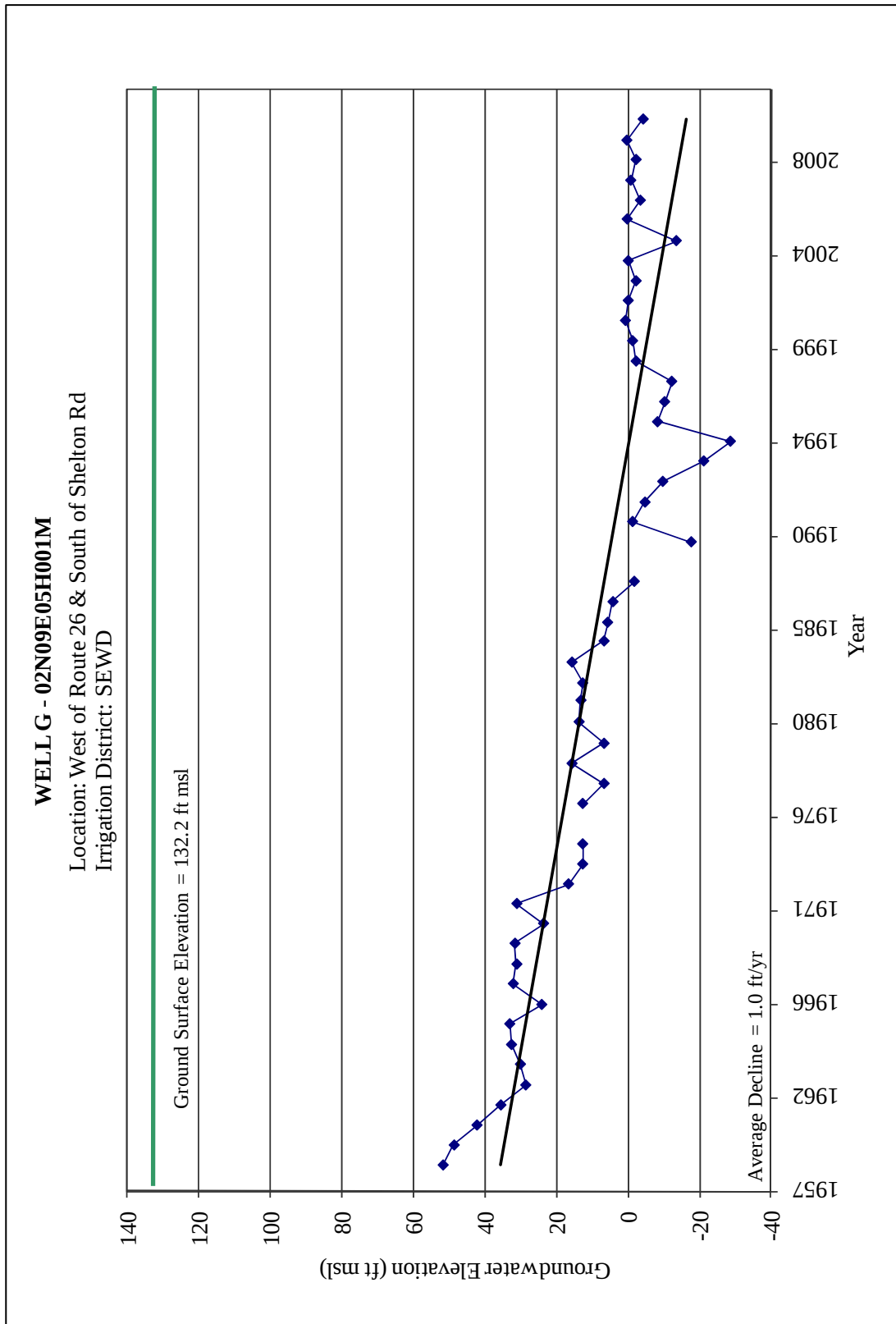


Figure 3-8: Fall Hydrograph Well G

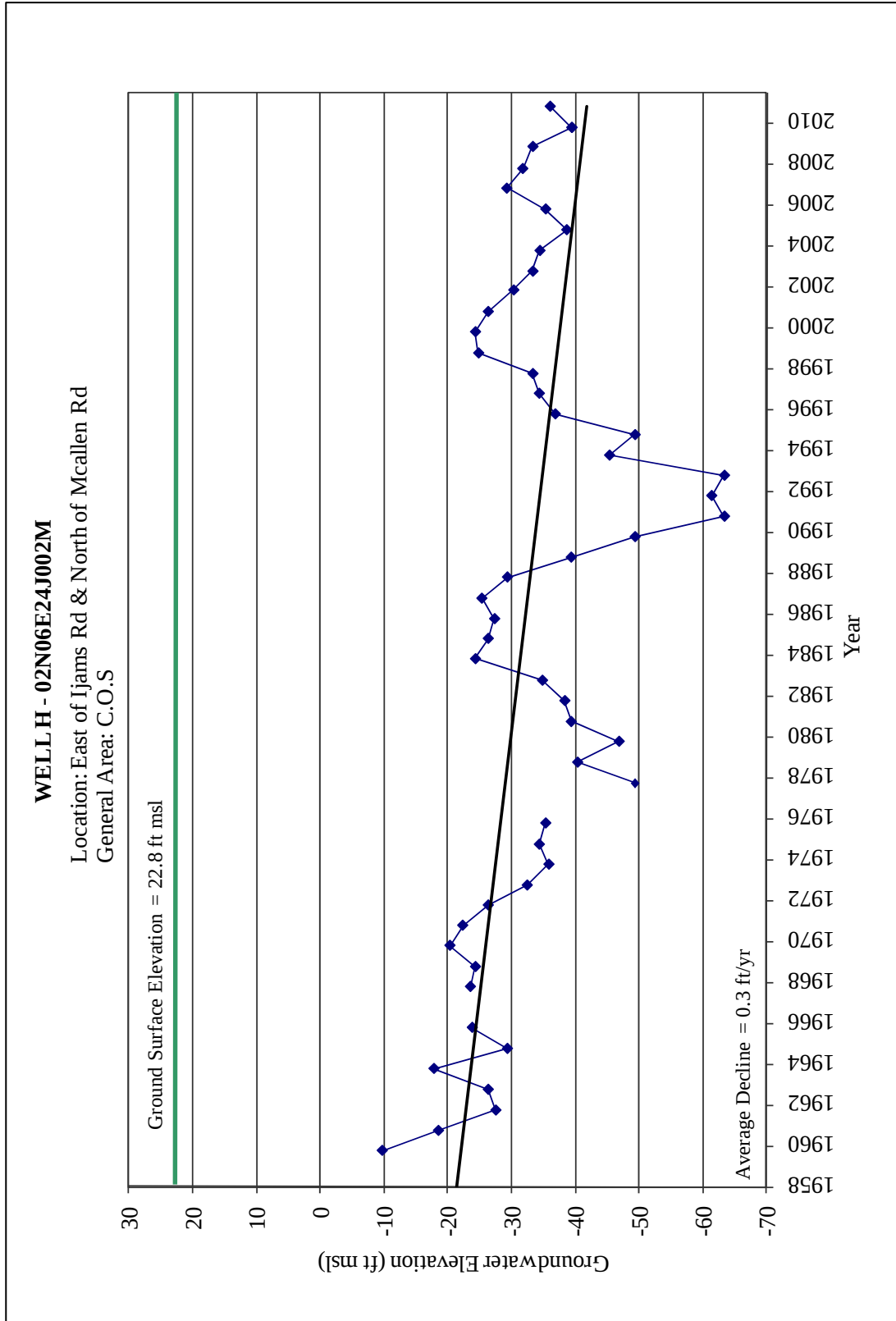


Figure 3-9: Fall Hydrograph Well H

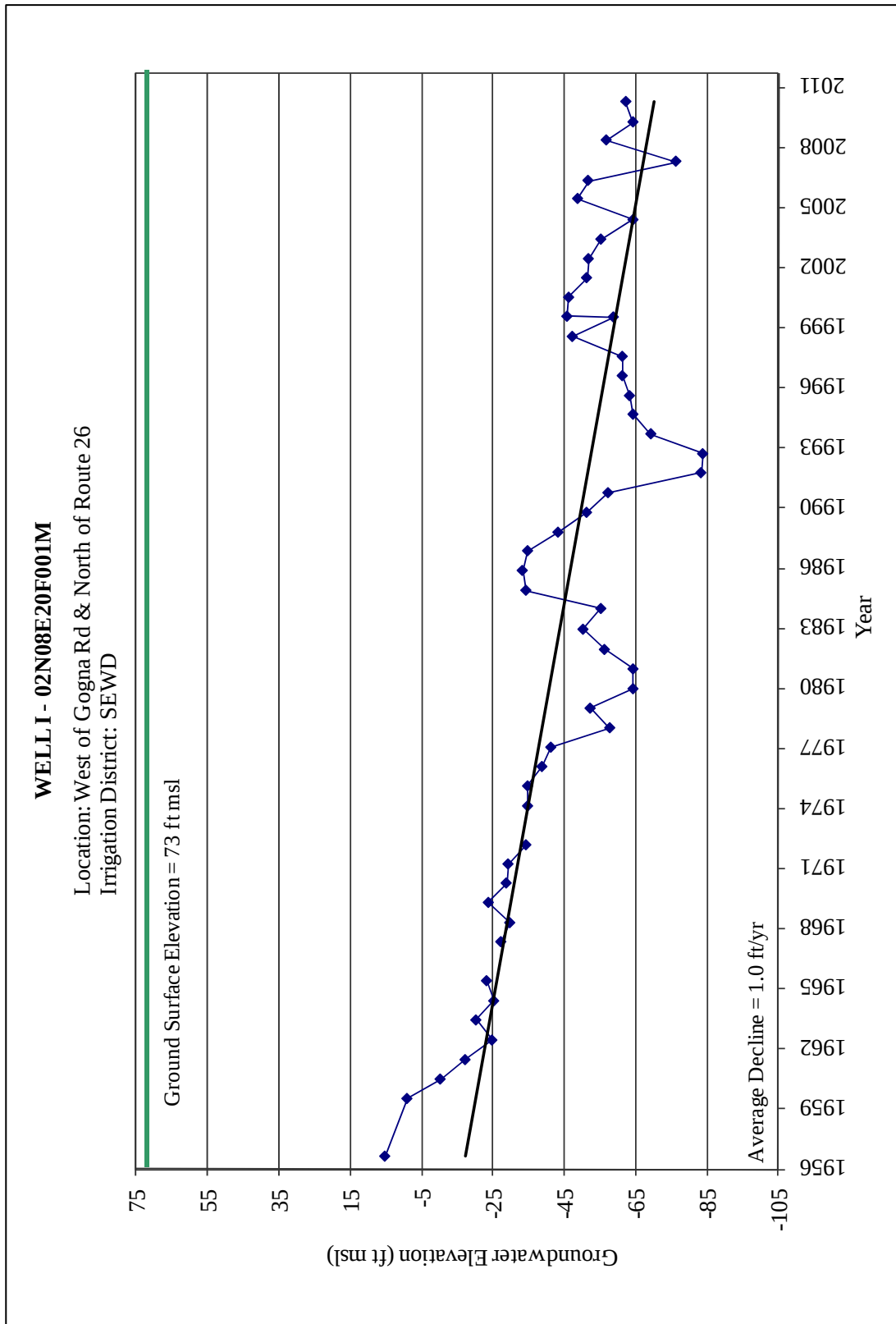


Figure 3-10: Fall Hydrograph Well I

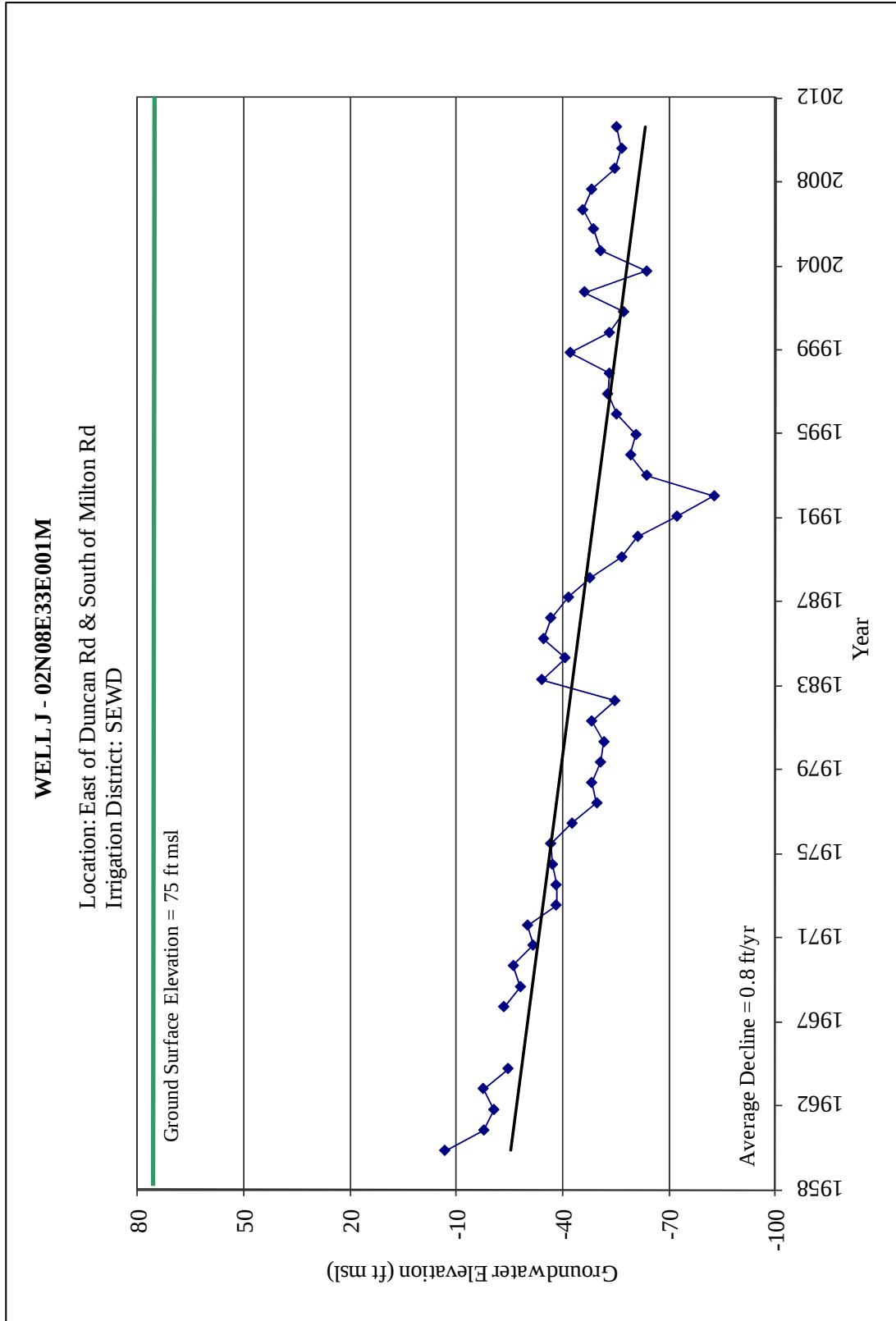


Figure 3-11: Fall Hydrograph Well J

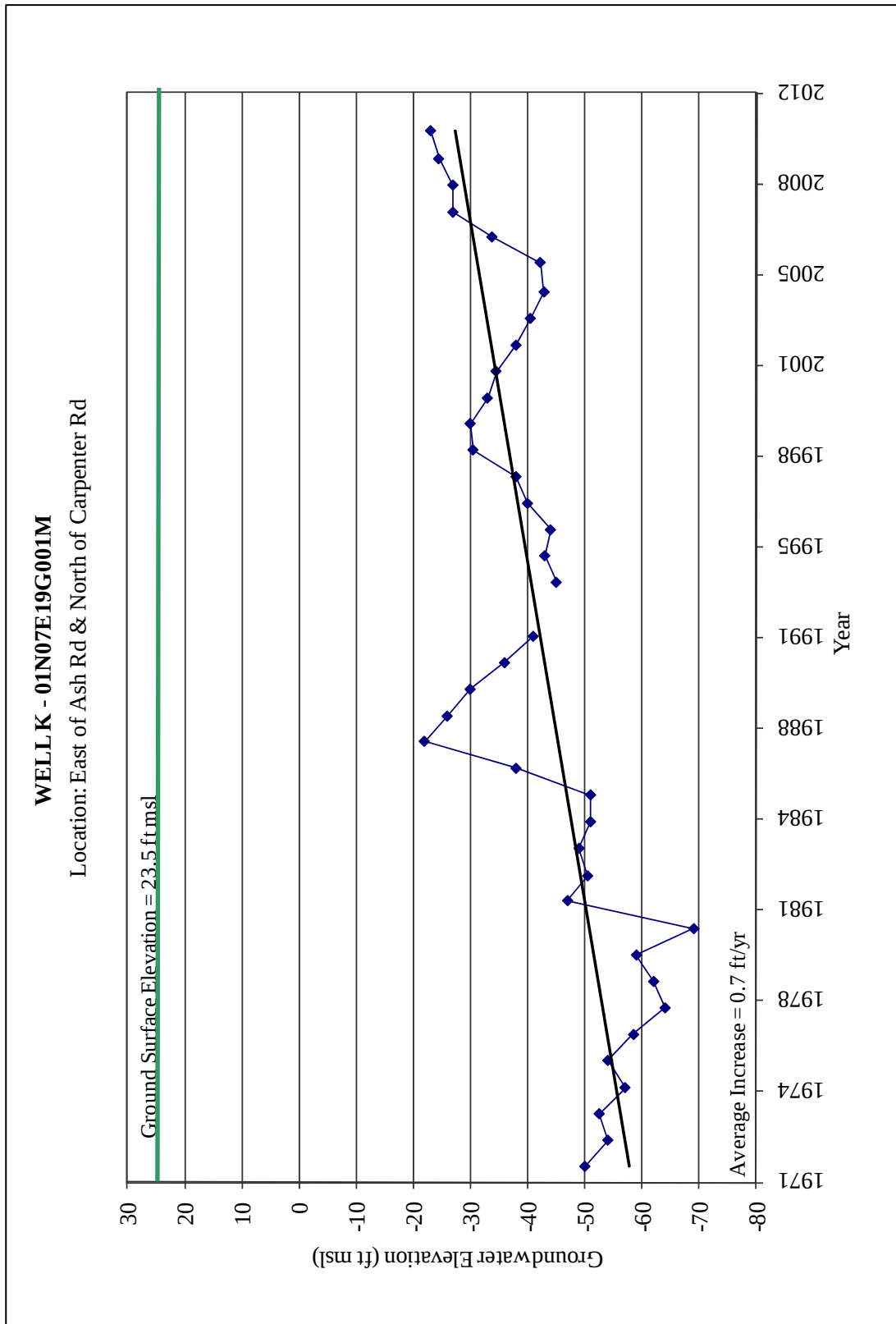


Figure 3-12: Fall Hydrograph Well K

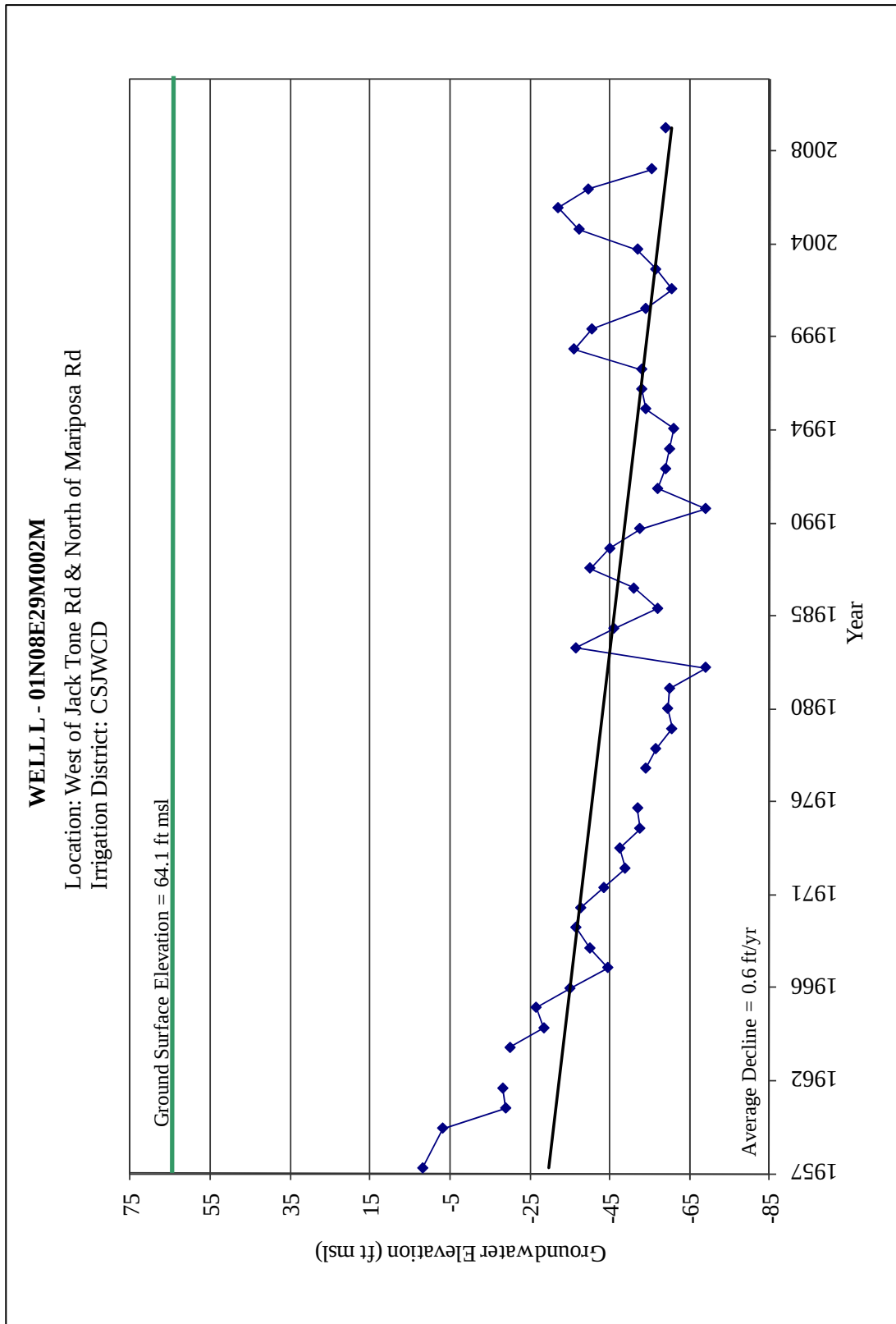


Figure 3-13: Fall Hydrograph Well L

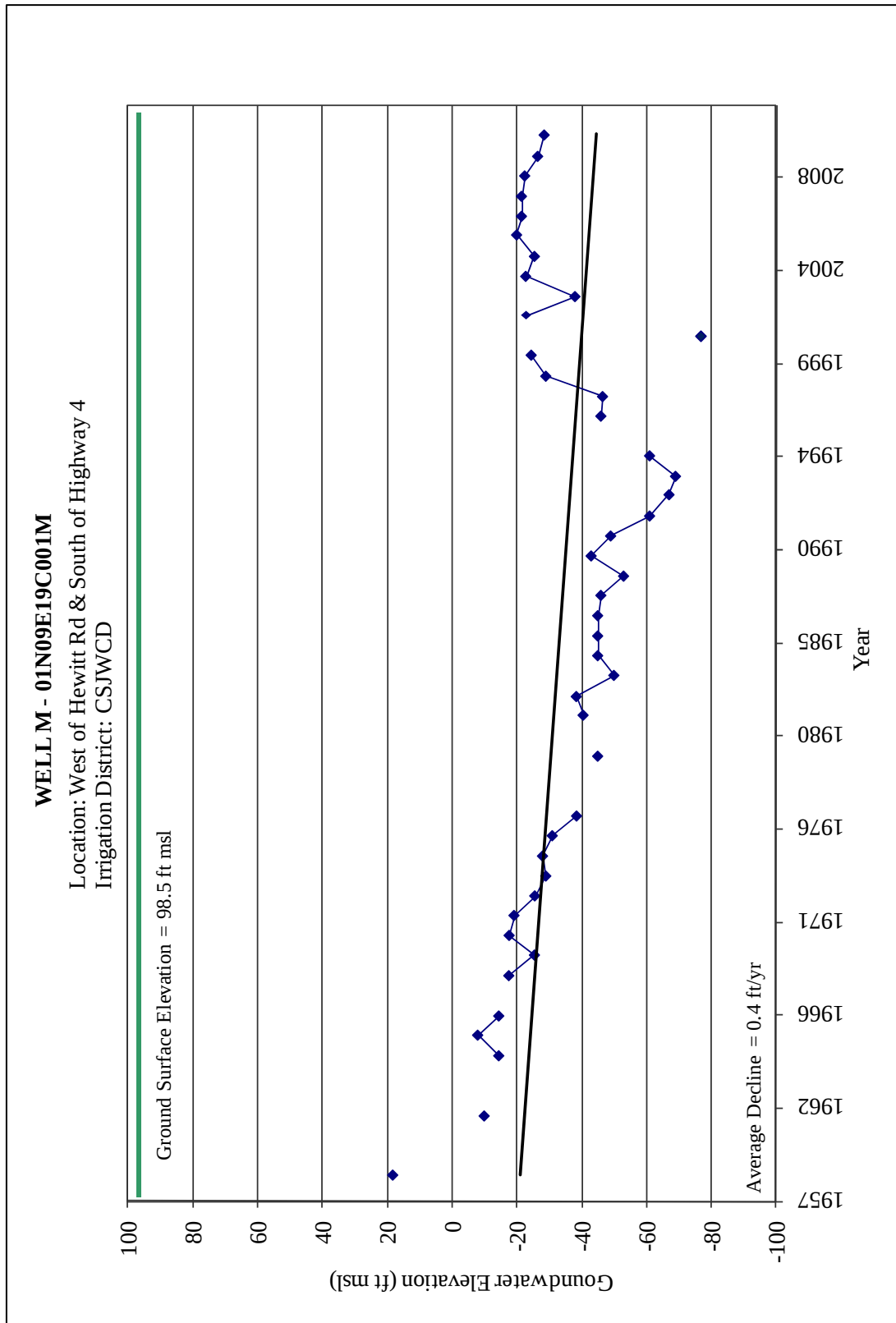


Figure 3-14: Fall Hydrograph Well M

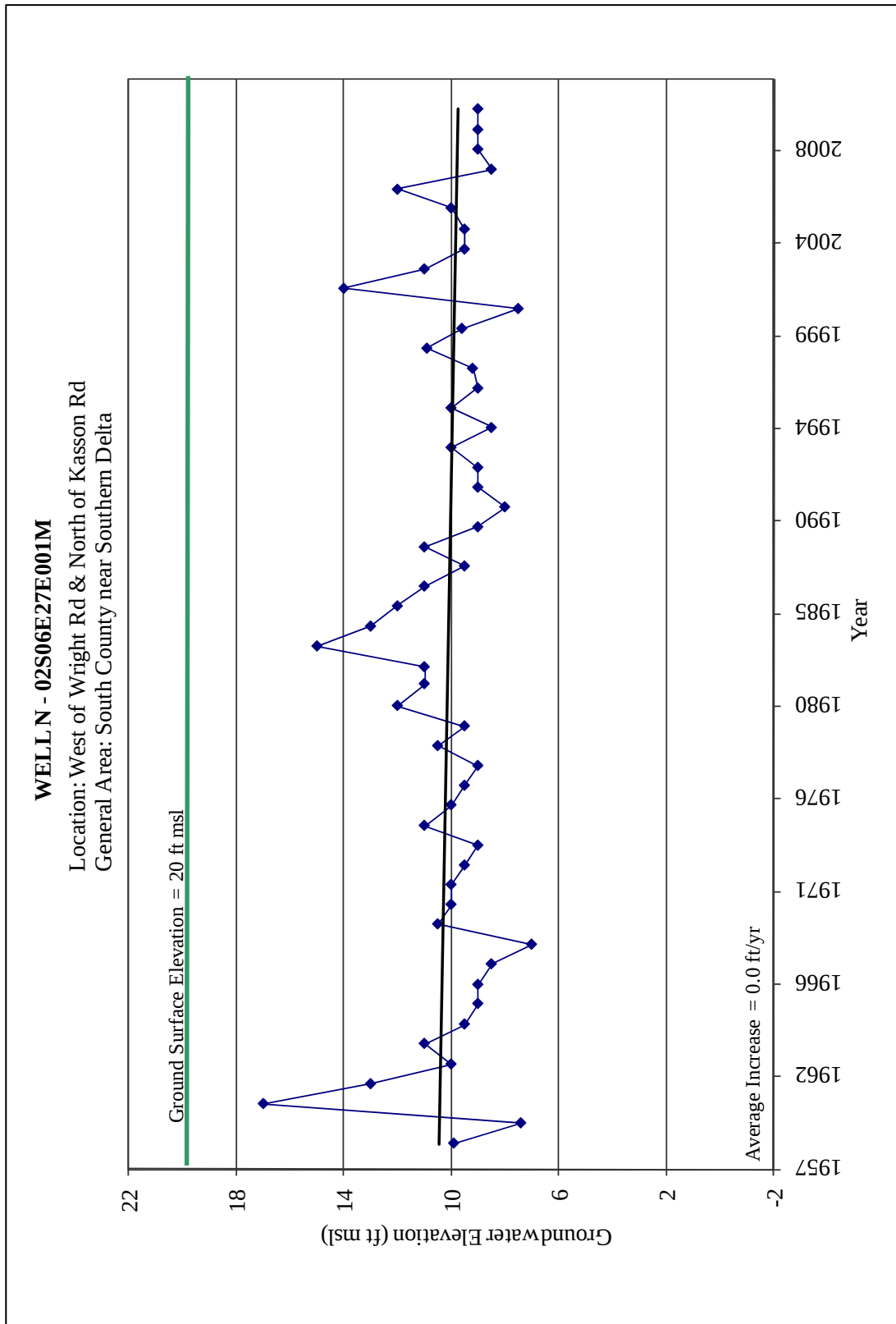


Figure 3-15: Fall Hydrograph Well N

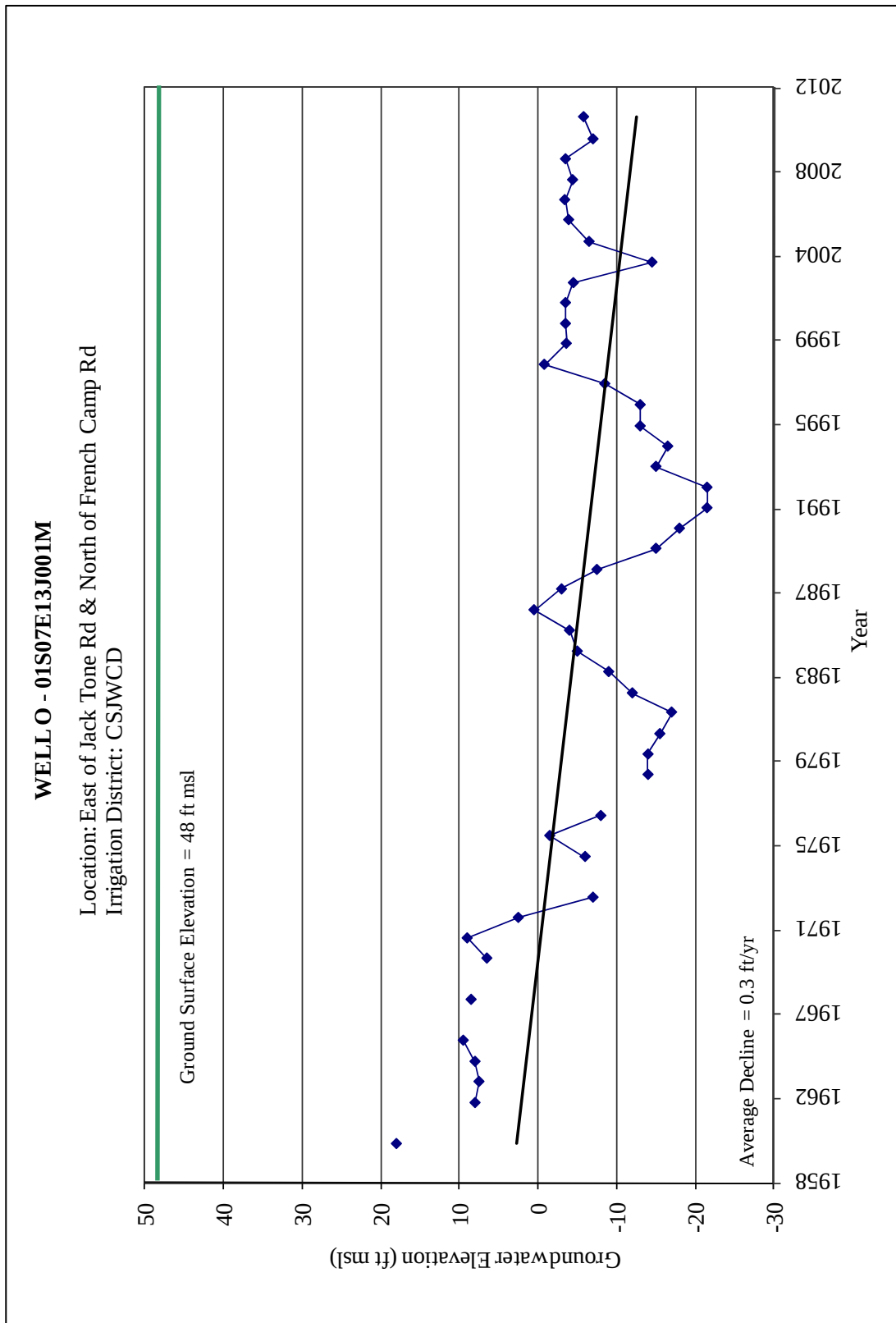


Figure 3-16: Fall Hydrograph Well O

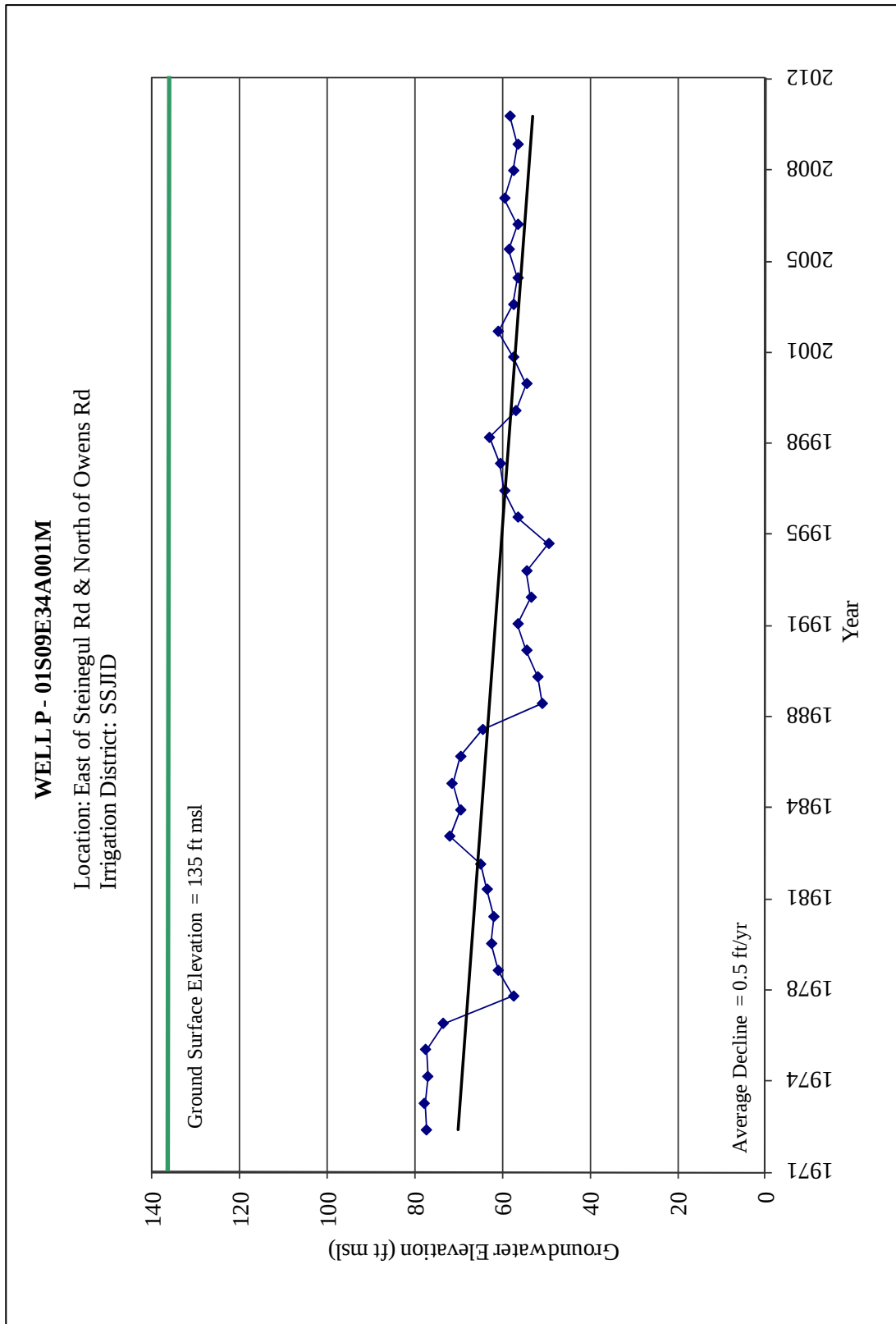


Figure 3-17: Fall Hydrograph Well P

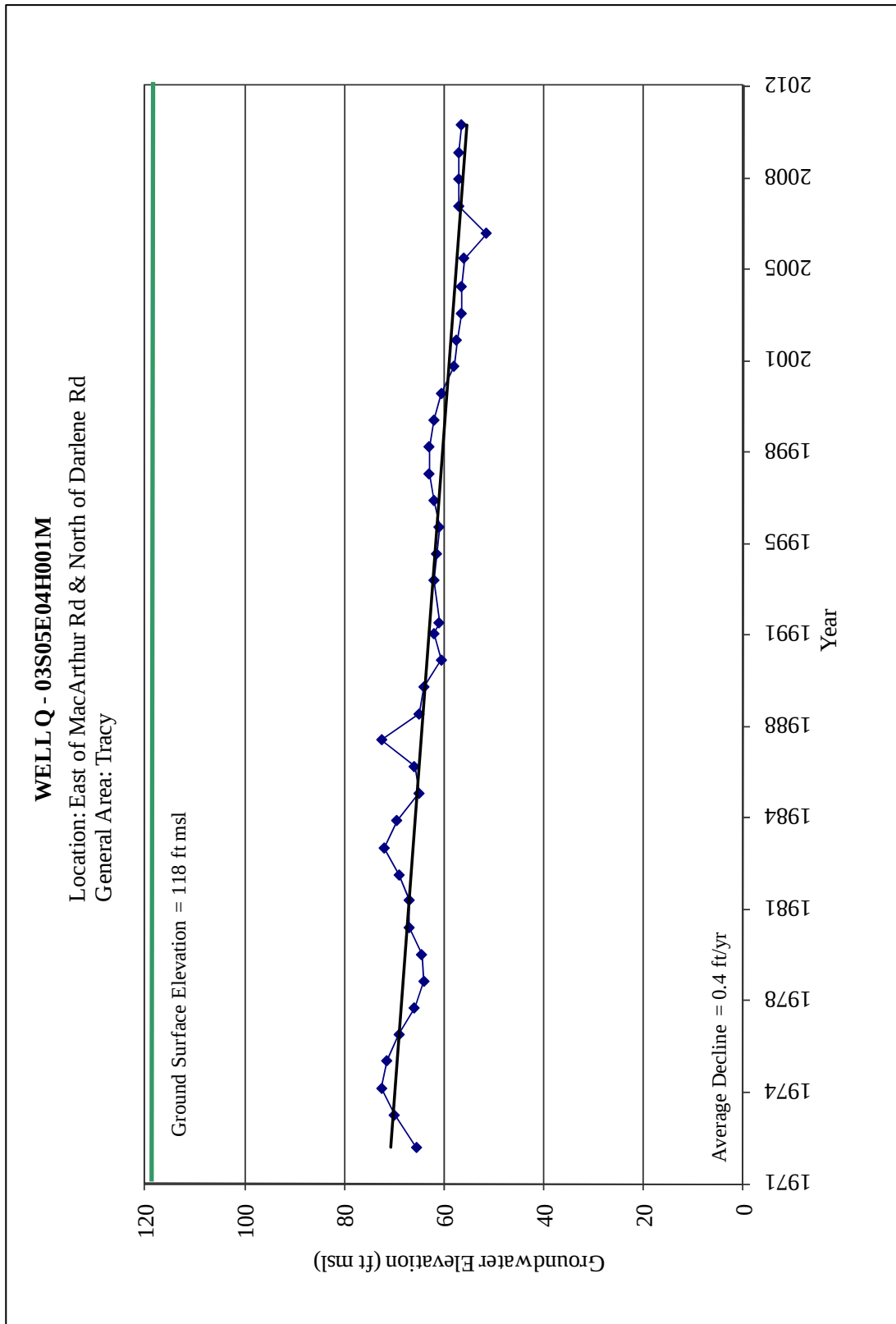


Figure 3-18: Fall Hydrograph Well Q

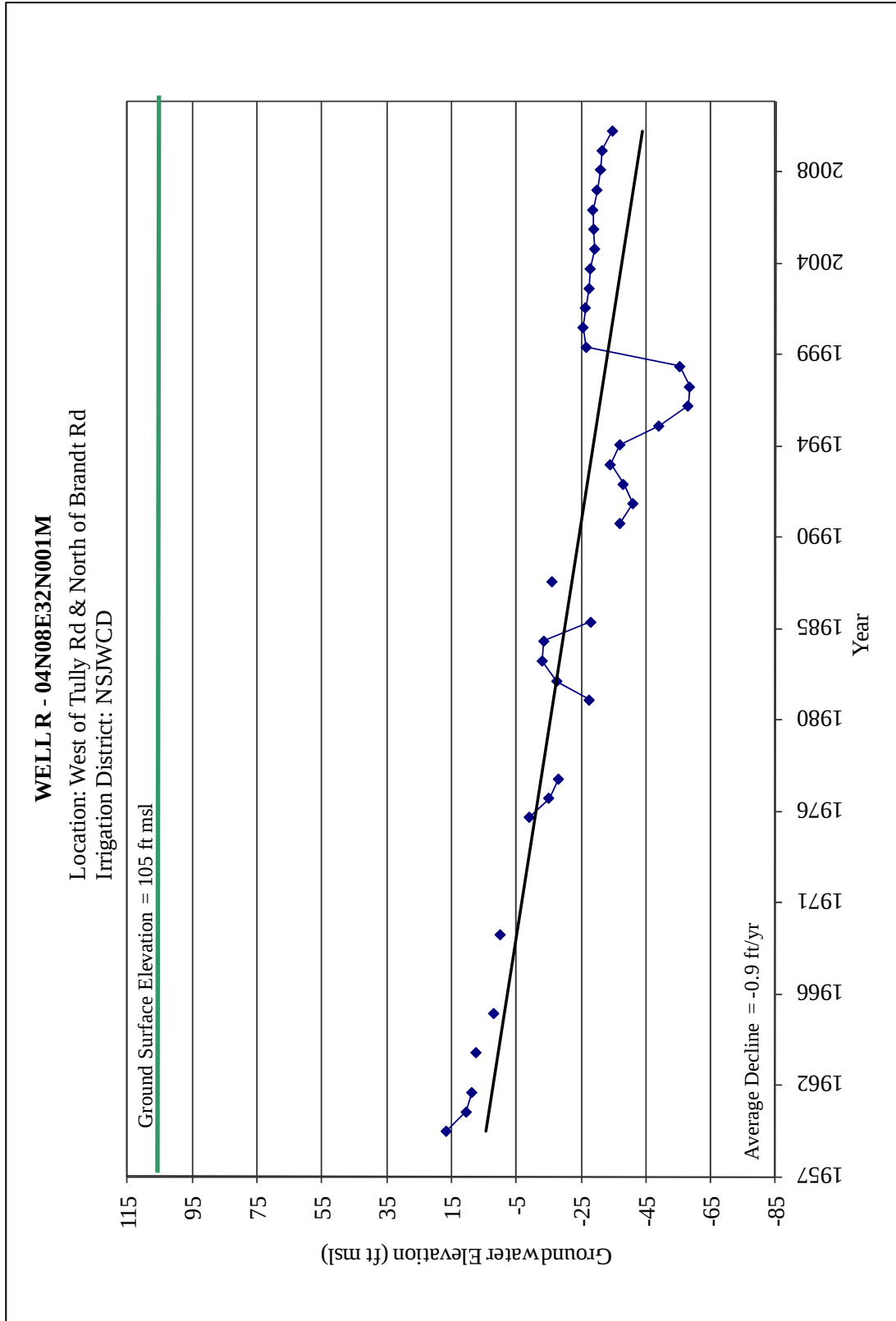


Figure 3-19: Fall Hydrograph Well R

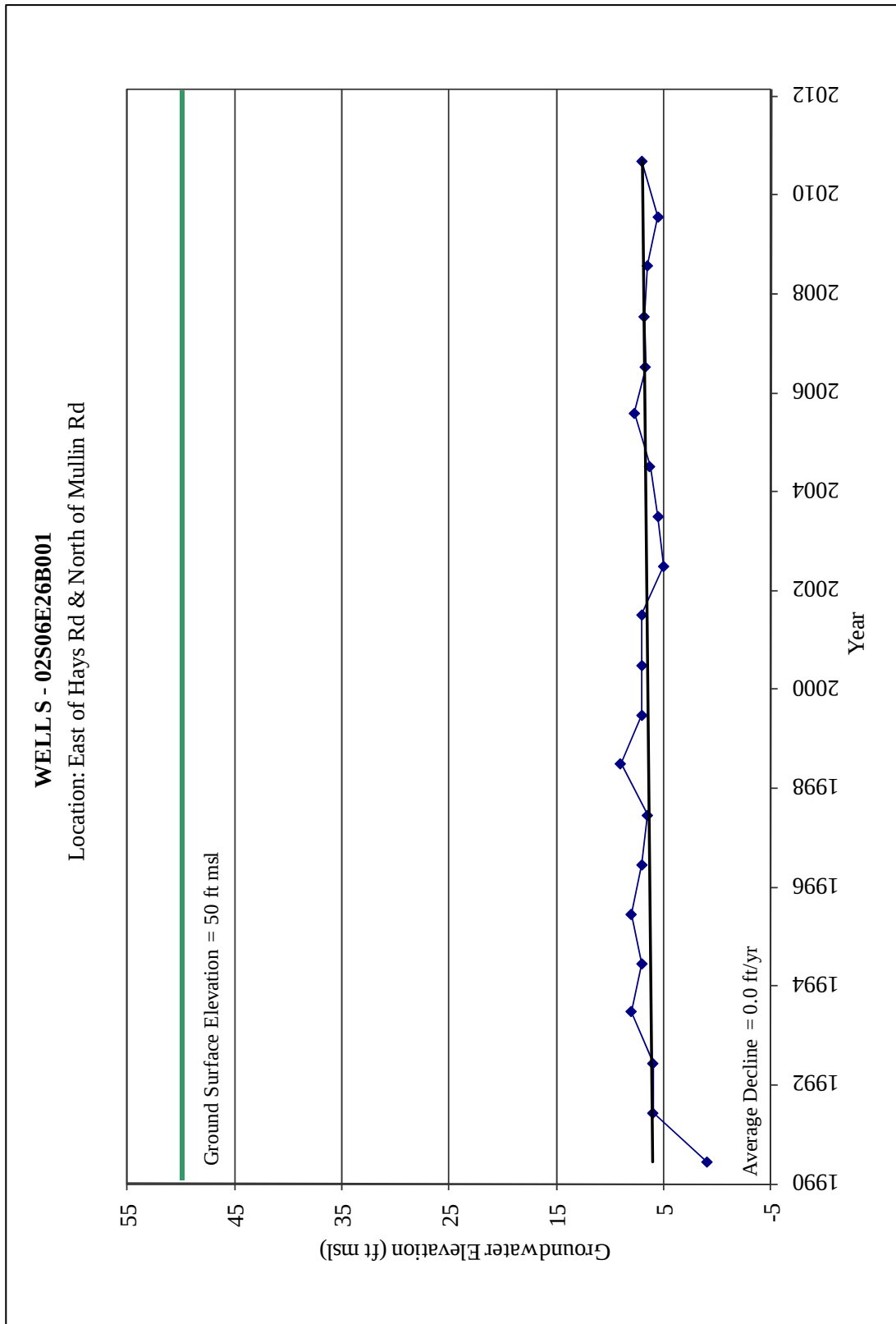


Figure 3-20: Fall Hydrograph Well S

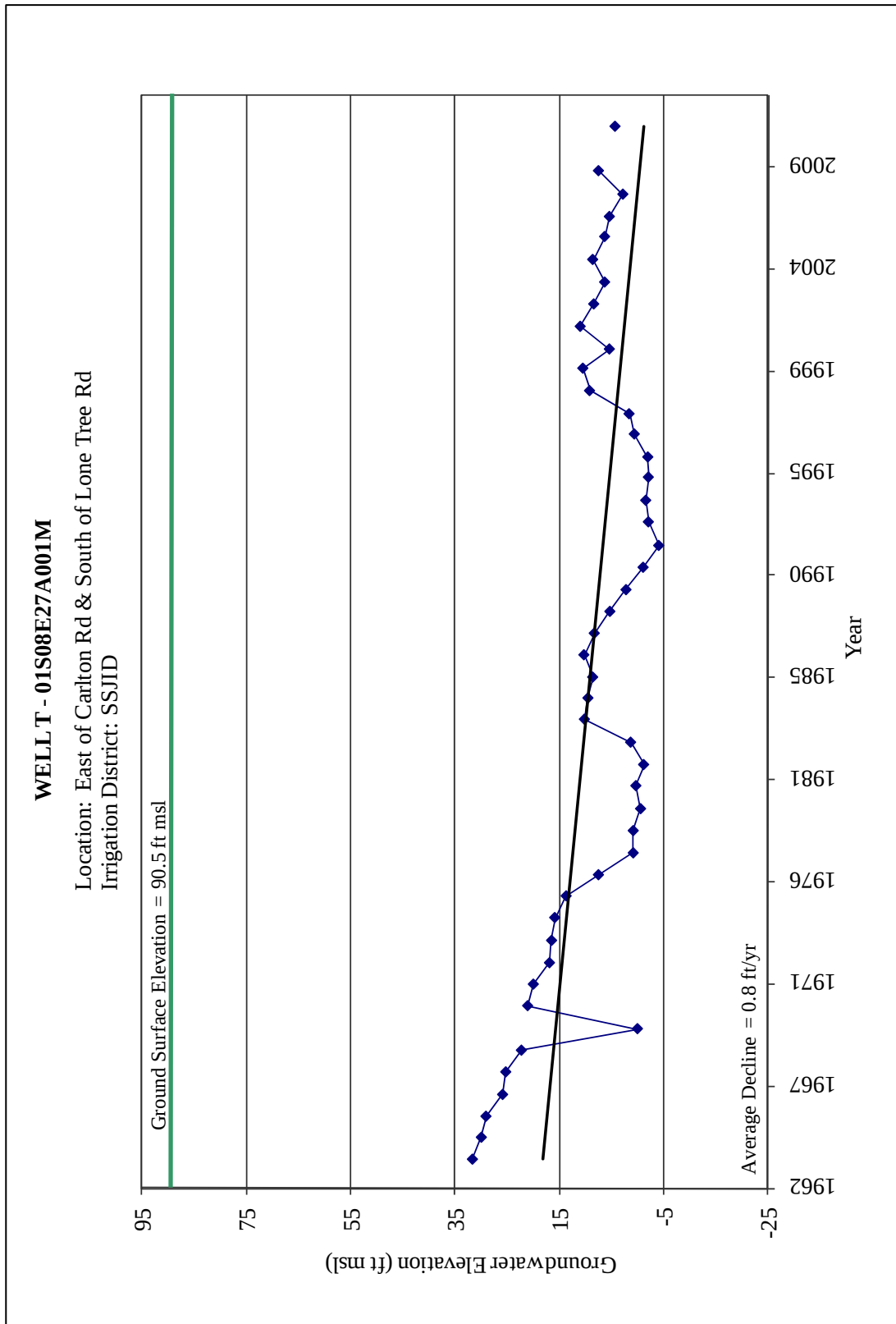


Figure 3-21: Fall Hydrograph Well T

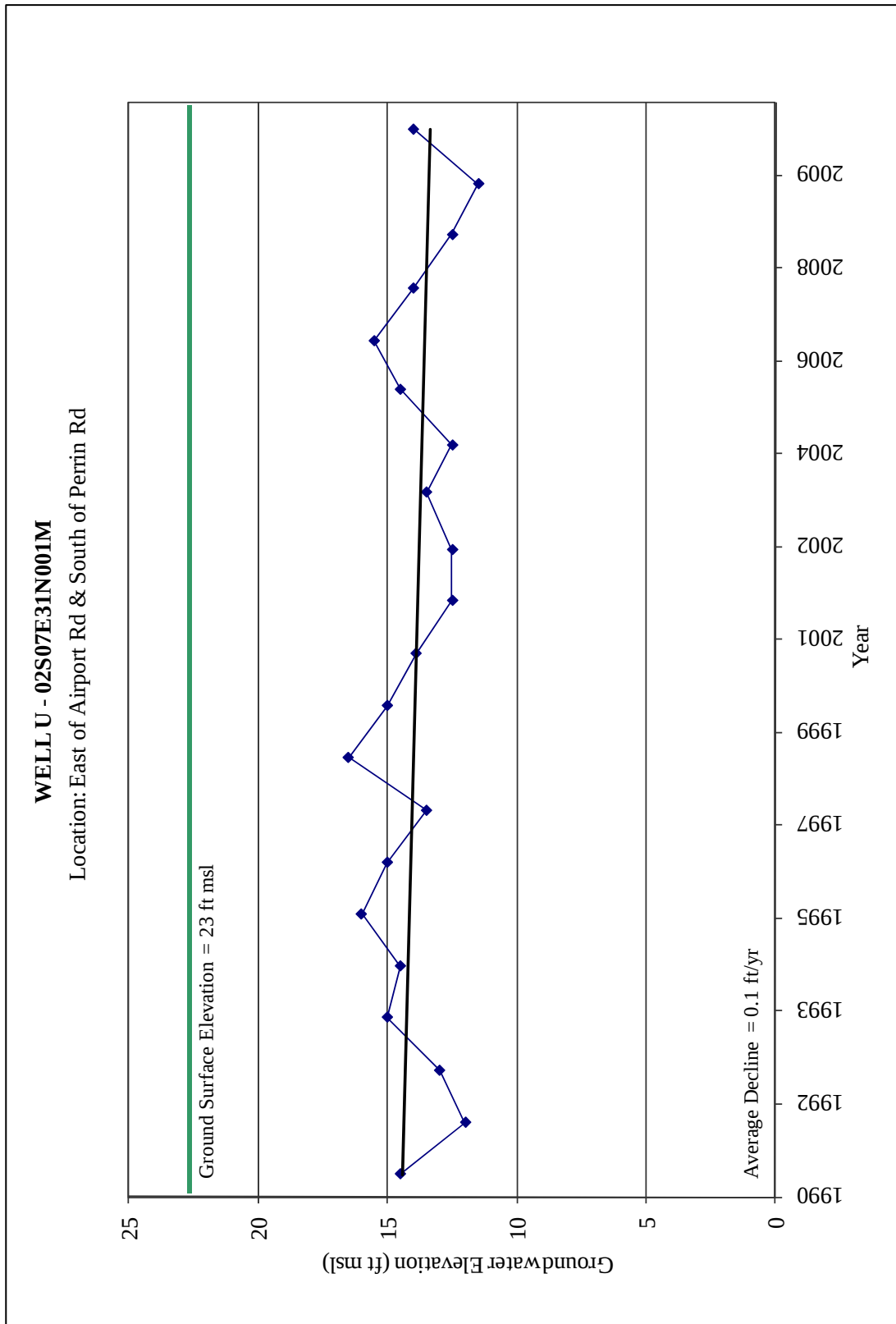


Figure 3-22: Fall Hydrograph Well U

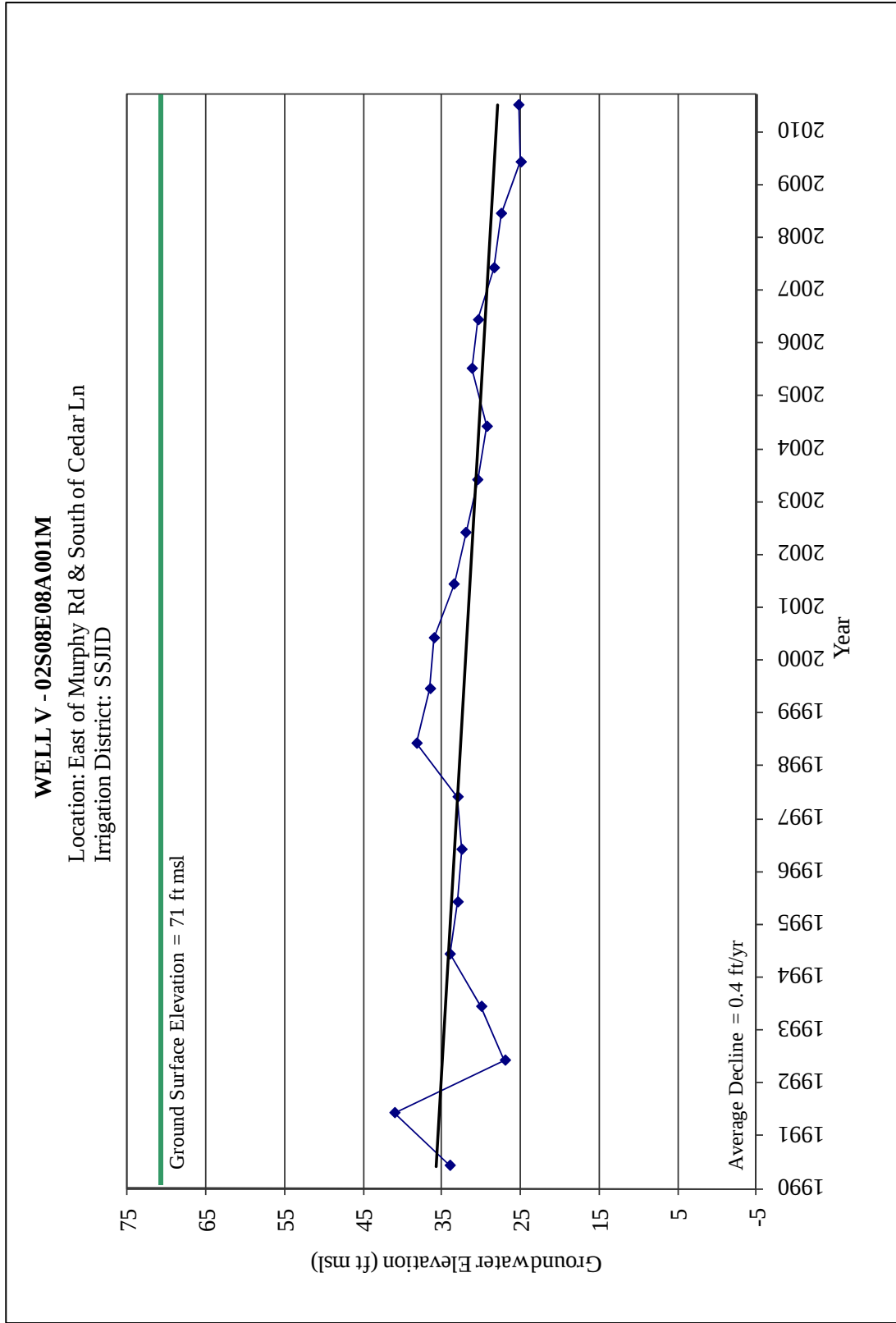


Figure 3-23: Fall Hydrograph Well V

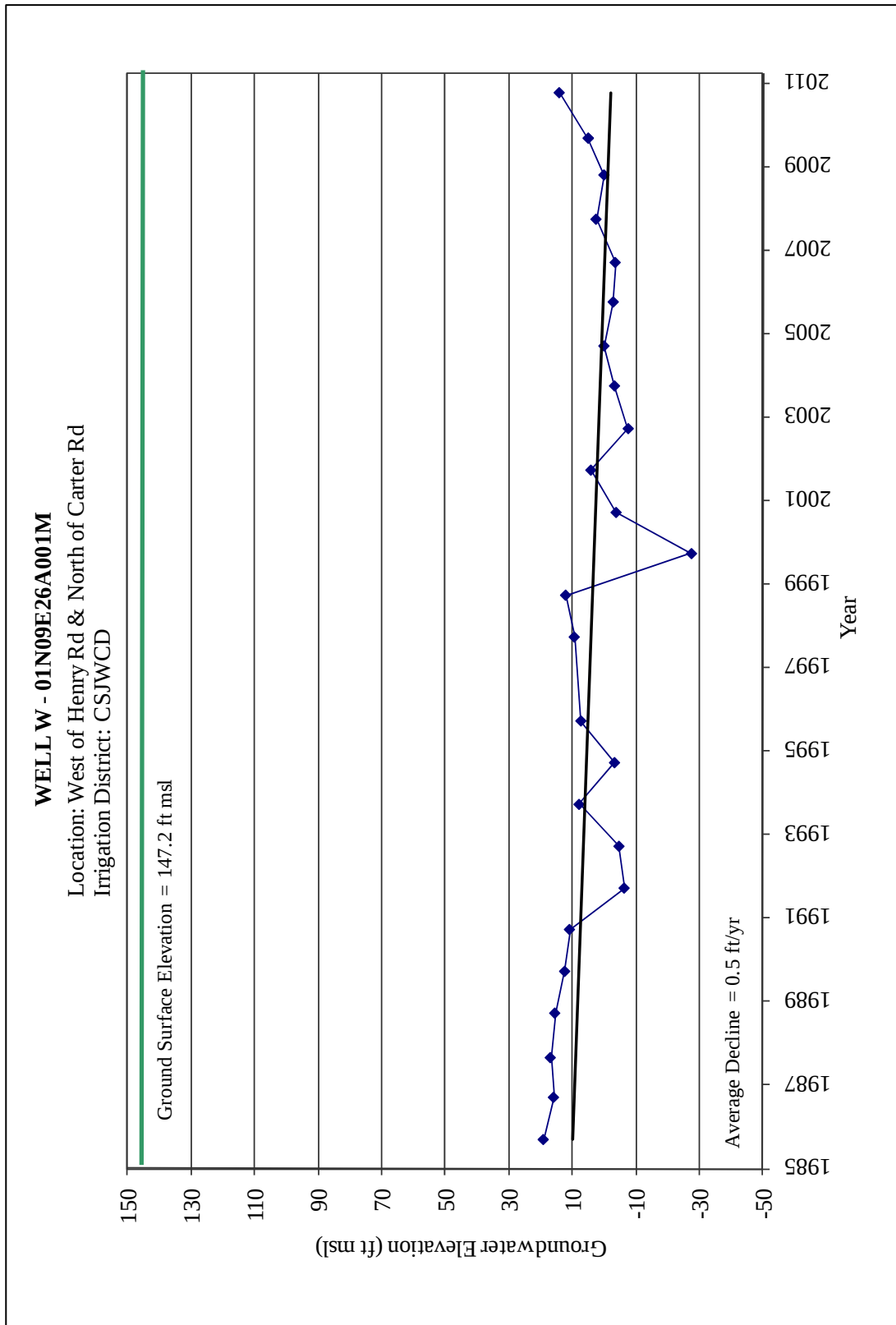


Figure 3-24: Fall Hydrograph Well W

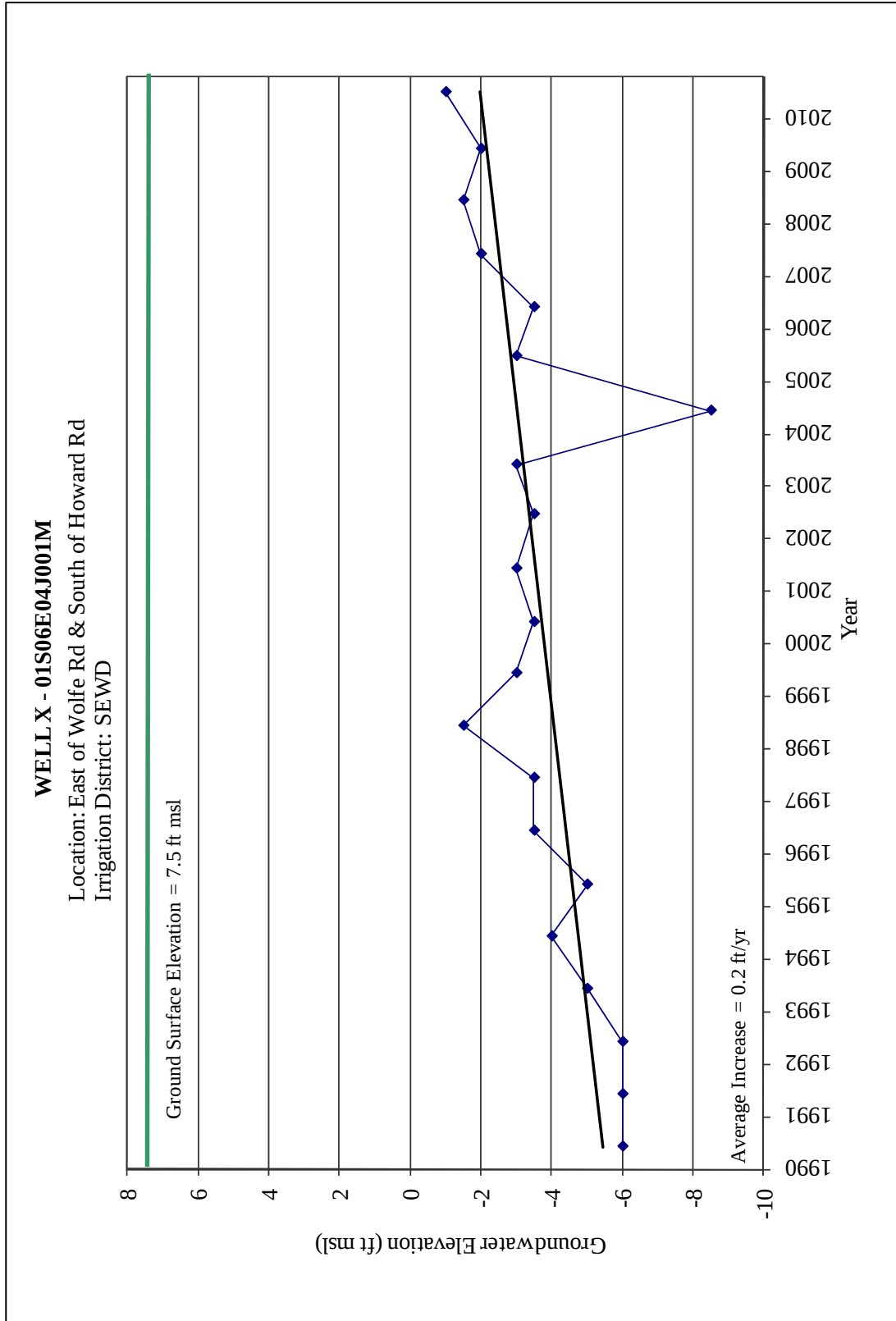


Figure 3-25: Fall Hydrograph Well X

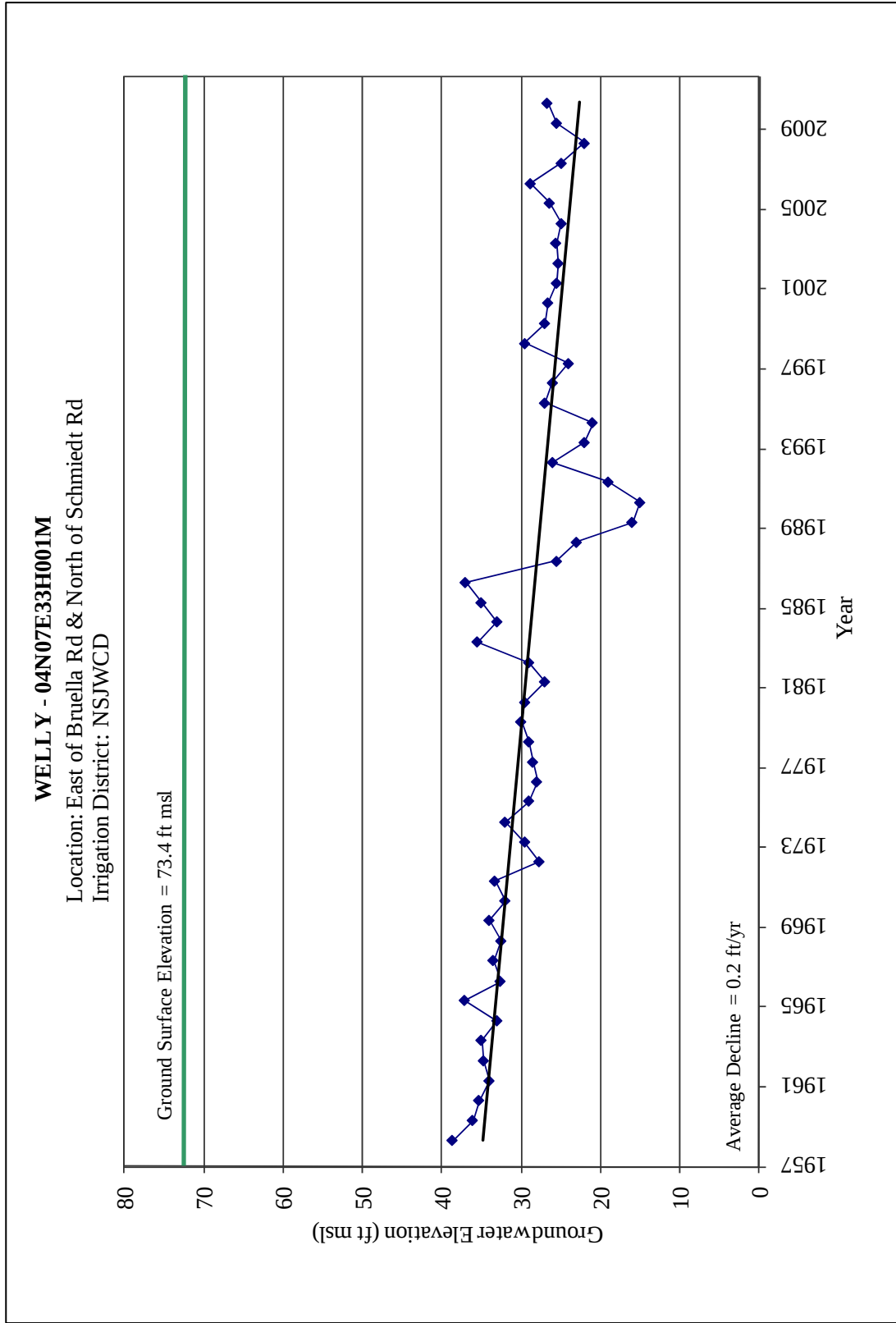


Figure 3-26: Fall Hydrograph Well Y

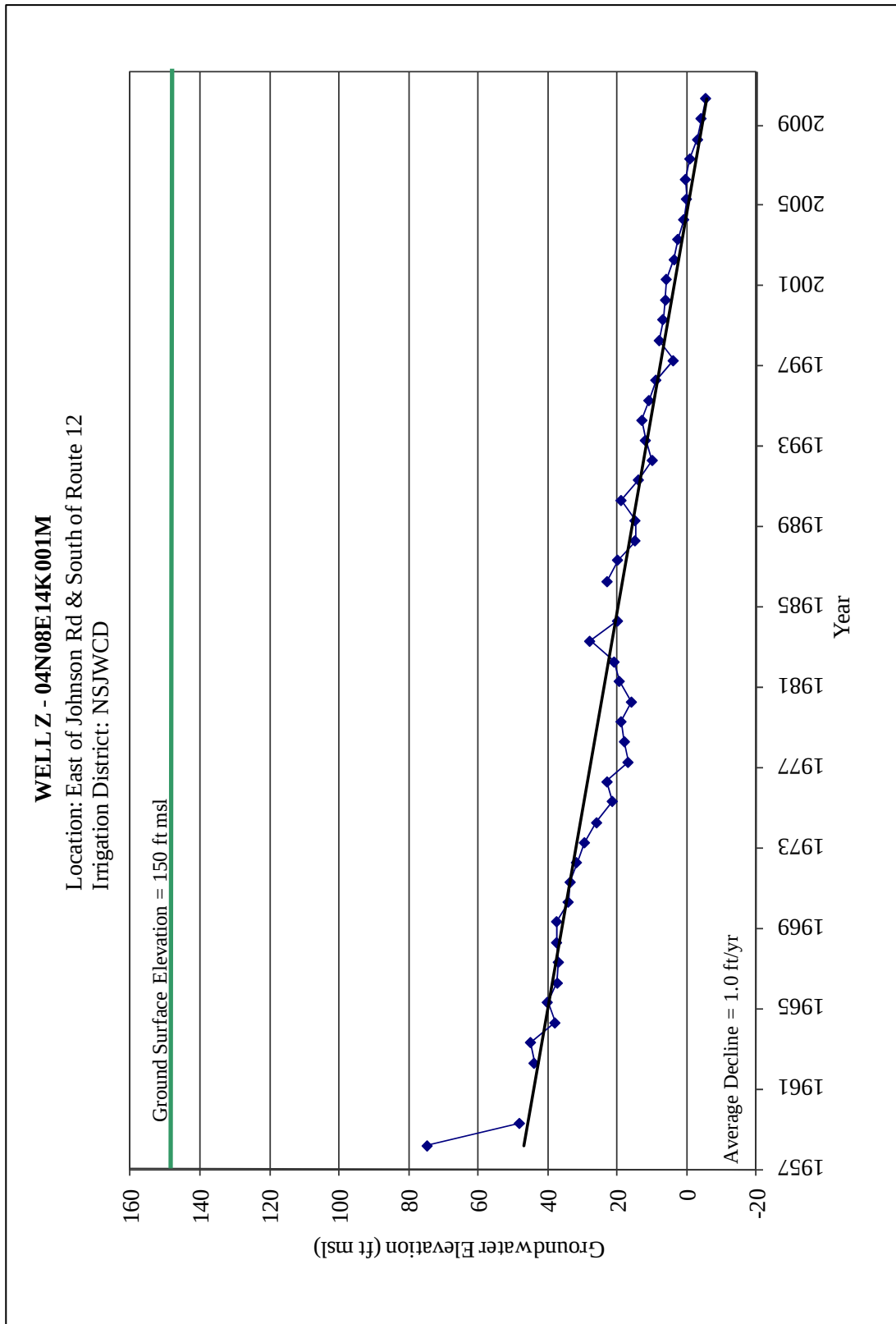


Figure 3-27: Fall Hydrograph Well Z

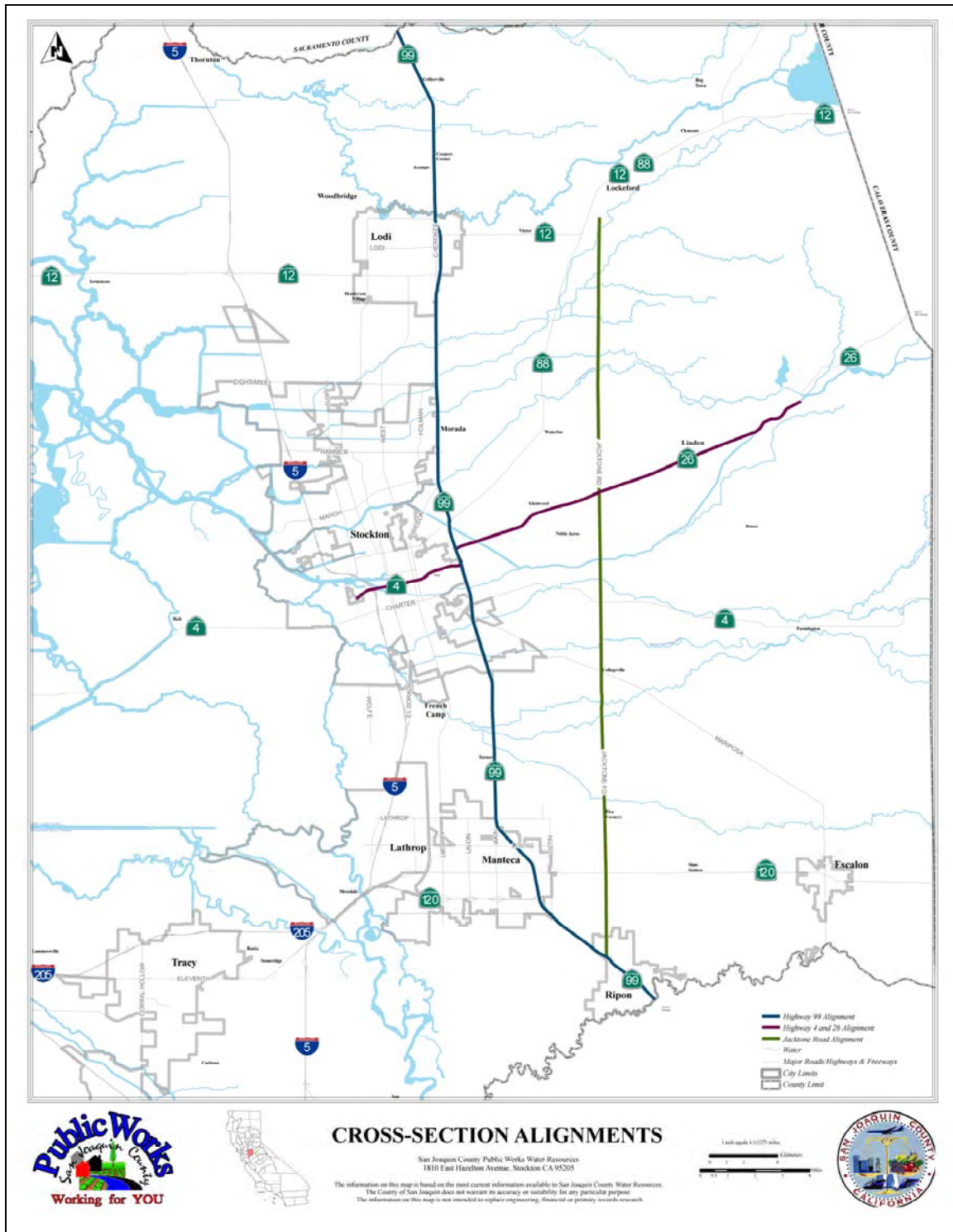


Figure 3-28: Cross Section Alignments

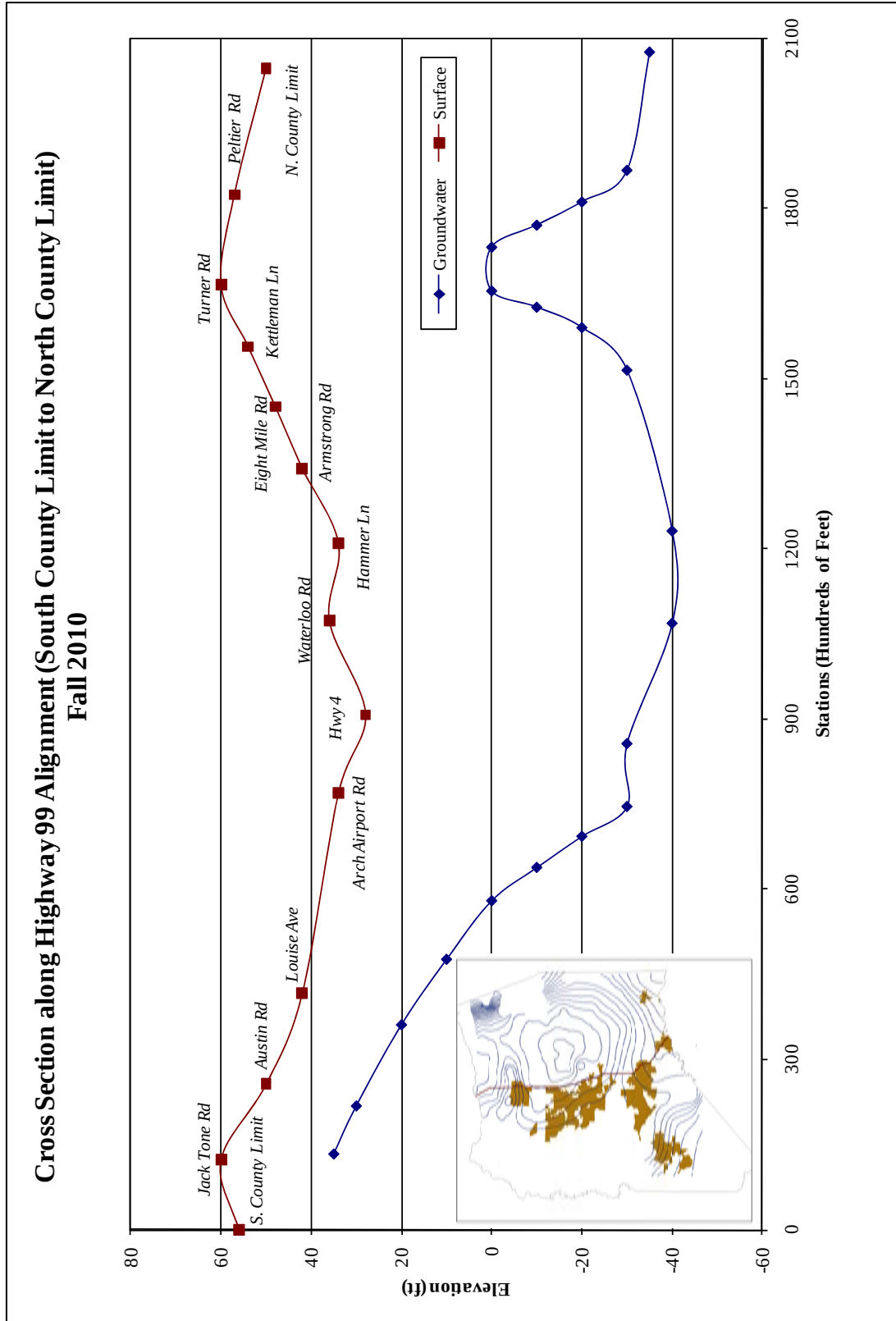


Figure 3-29: Highway 99 Cross Section Fall 2010

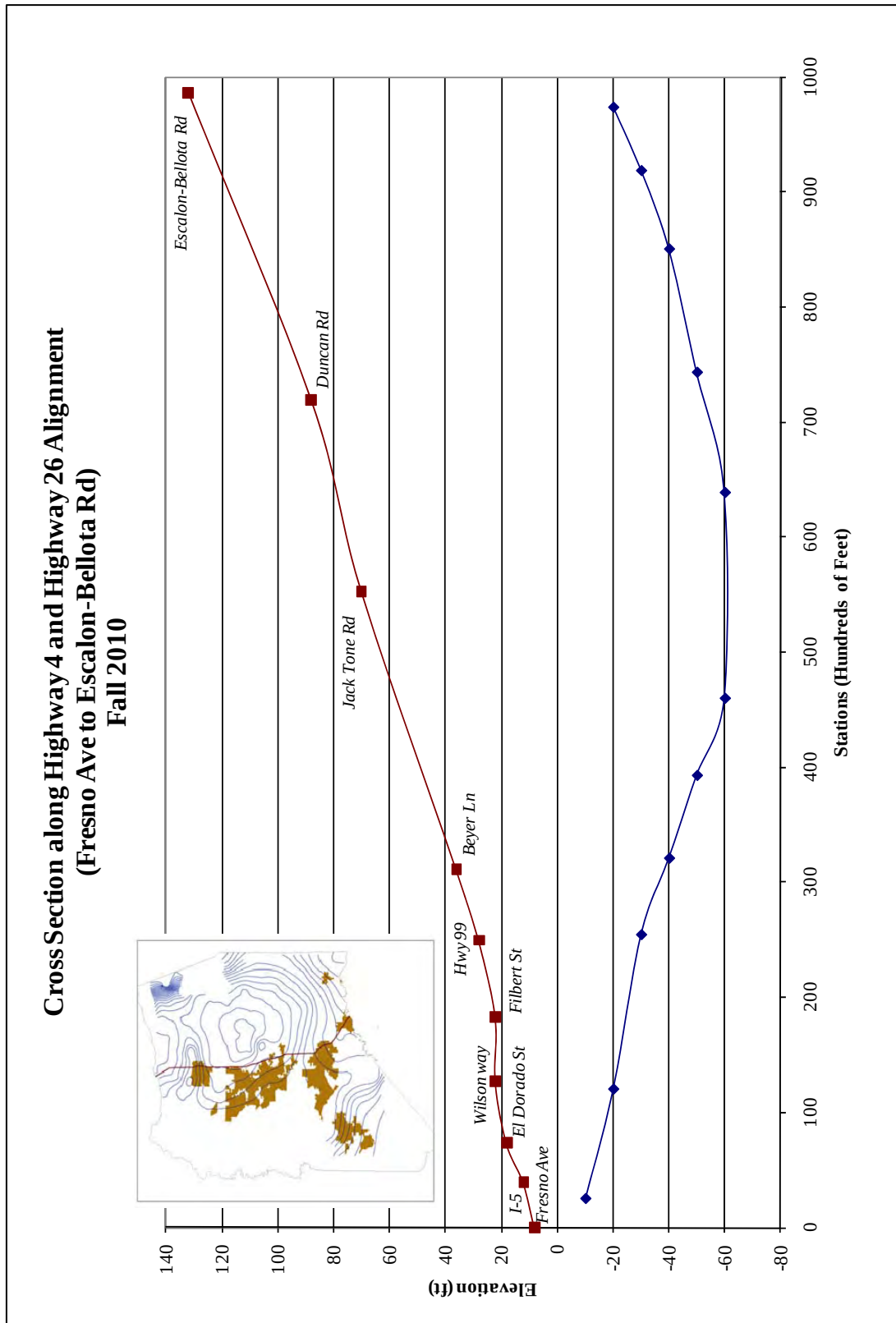


Figure 3-30: Highway 4 & Highway 26 Cross Section Fall 2010

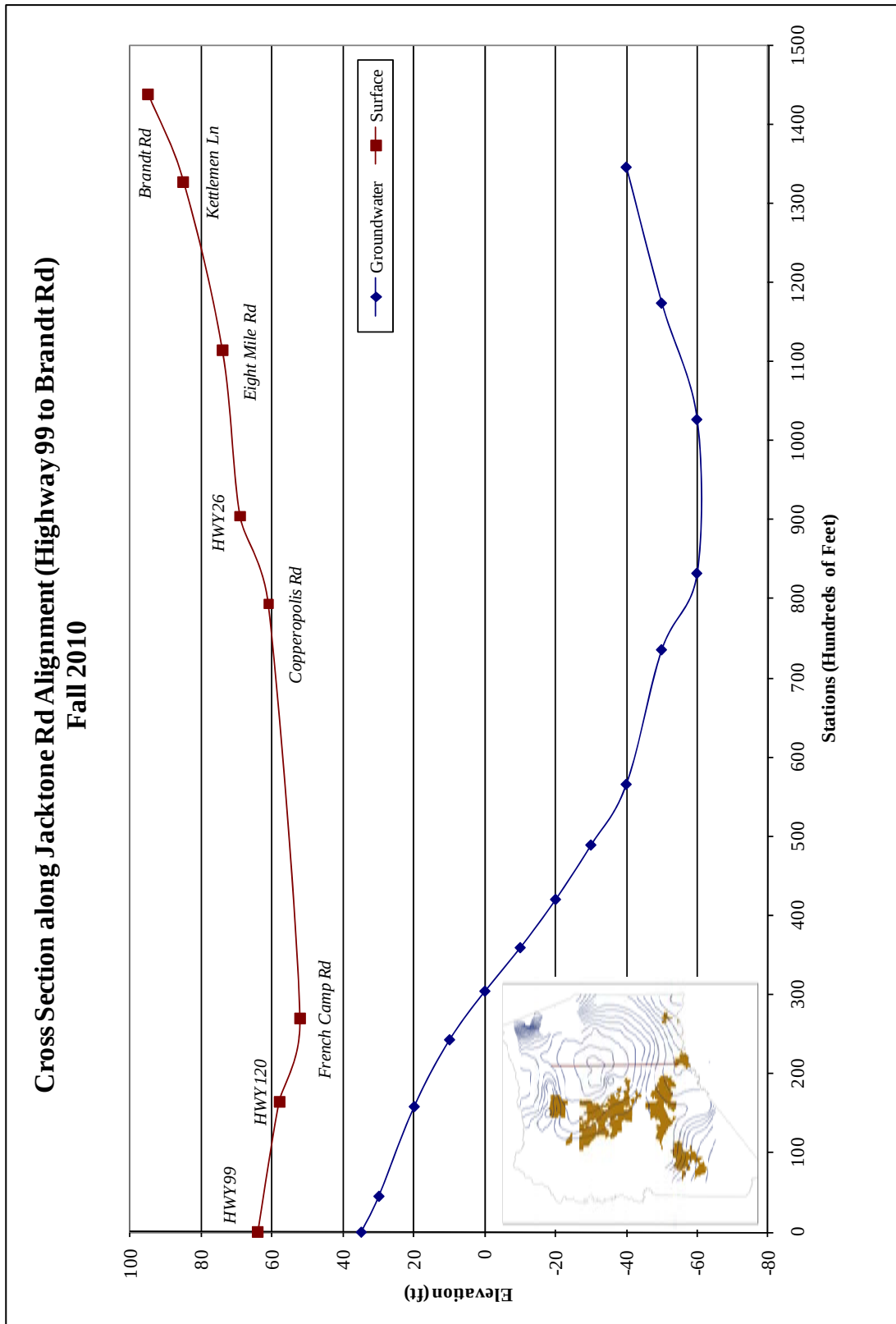
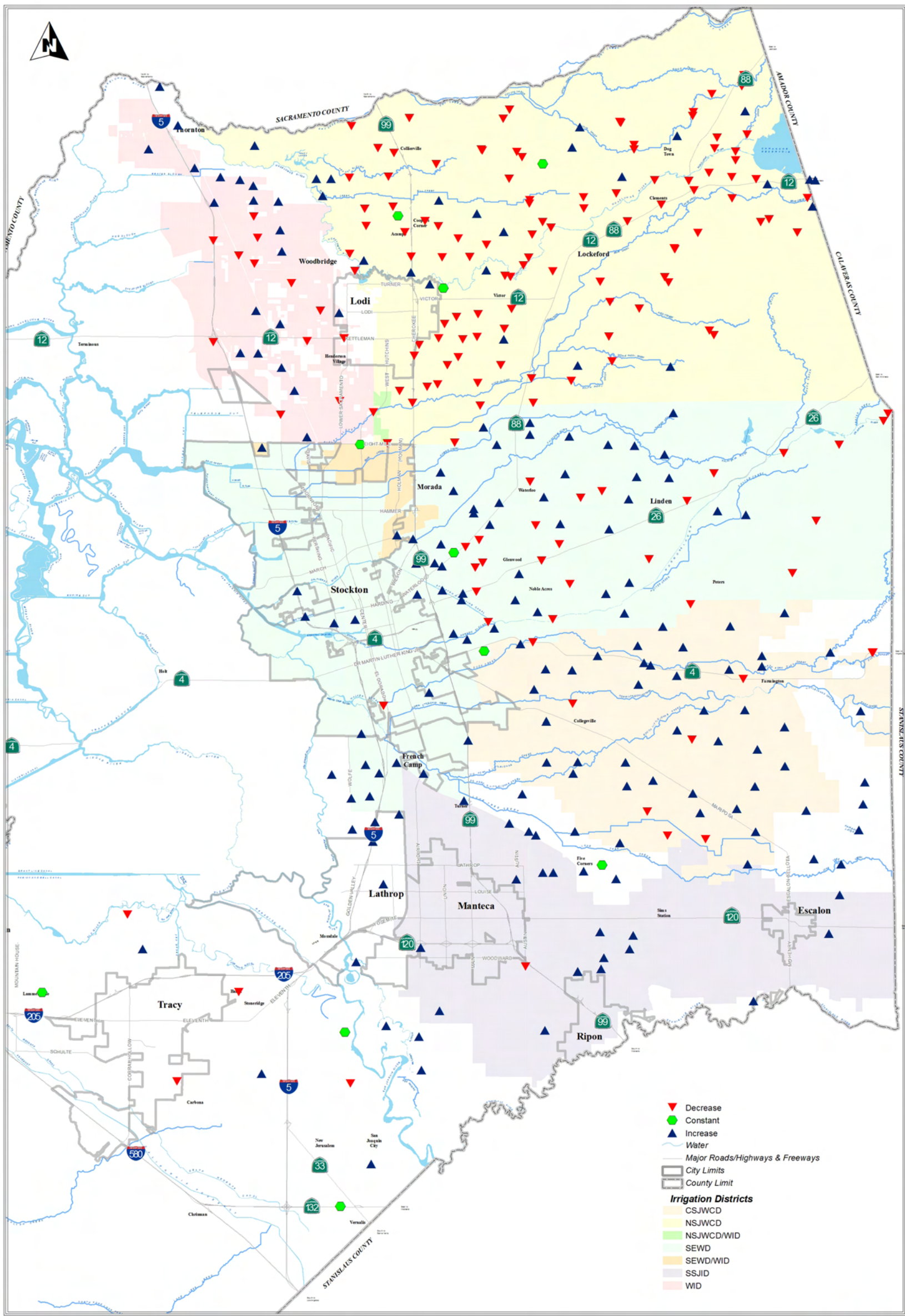


Figure 3-31: Jacktone Rd Cross Section Fall 2010

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Datum: North American of 1983

Figure 3-32: Differences in Groundwater Elevations Fall 2010

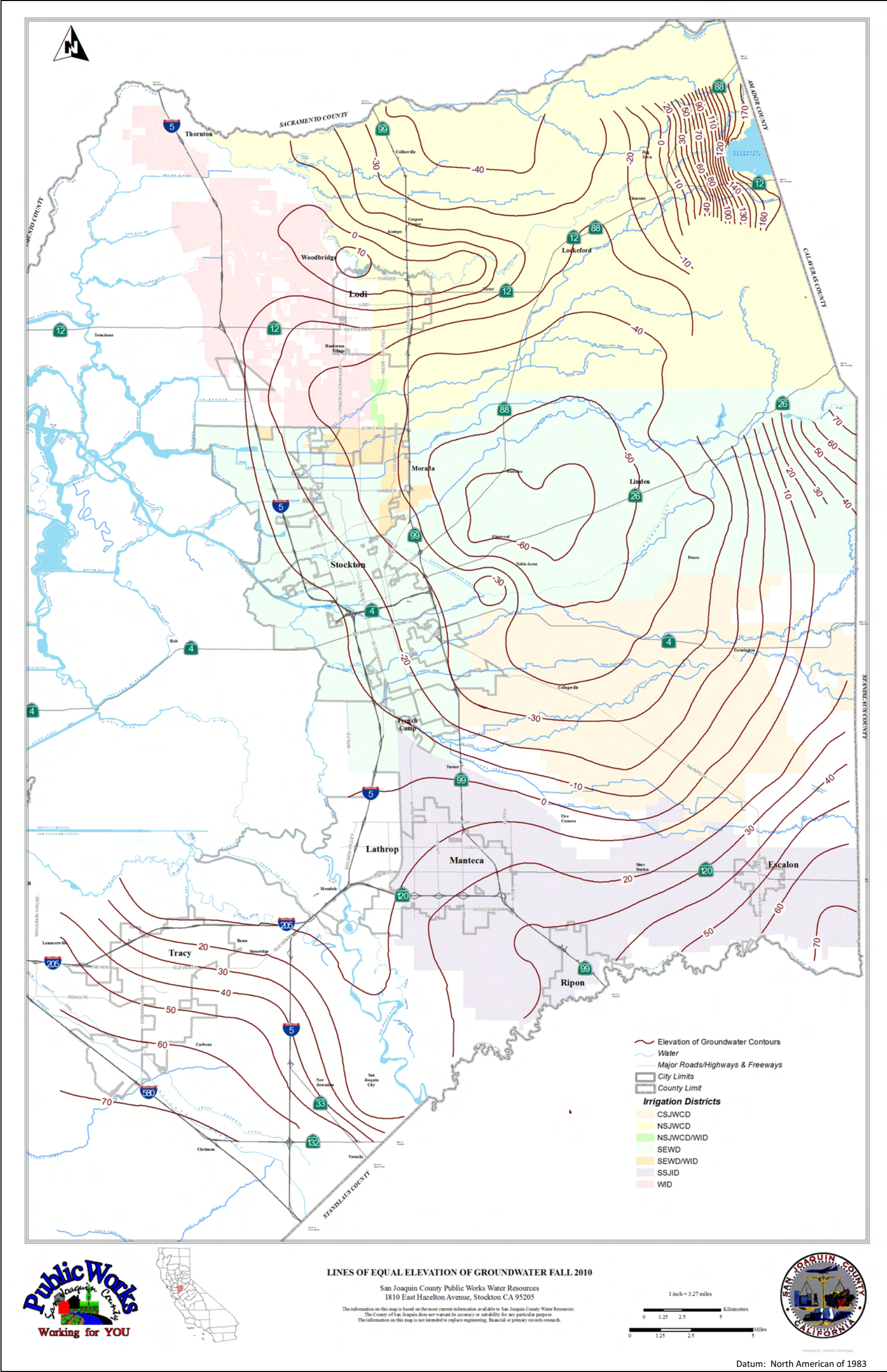


Figure 3-33: Lines of Equal Elevation of Groundwater Fall 2010

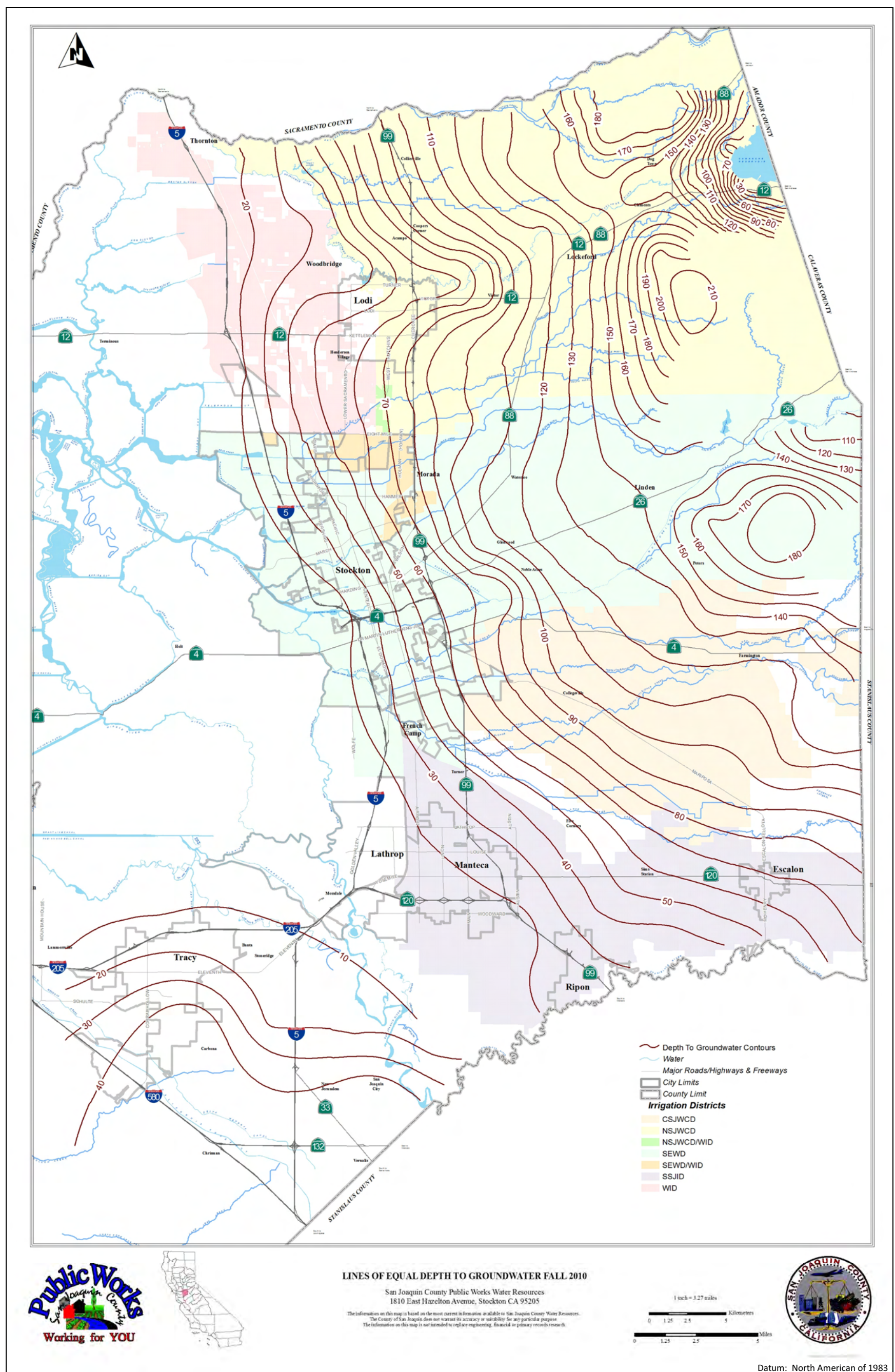


Figure 3-34: Lines of Equal Depth to Groundwater Fall 2010