IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3 North E
SOIL SALINITY

		DRAIN 2					DRAIN 1A		
	DEPTH (in.)	DISTANCE (feet) 0	10	30	50	70	90	100	AVG EC (mmho/cm)
NORTH 1985	6	9.3	7.4	6.1	8.2	6.5	5.9	5.9	7.0
	12	9.1	7.4	6.8	7.9	7.4	6.3	4.8	7.1
	24	9.2	7.9	7.1	8.4	7.9	5.5	4.5	7.2
	36	9.3	7.4	7.3	6.6	7.9	5.8	5.2	7.1
	48	5.4	8.7	7.1	6.9	8.4	5.4	5.2	6.7
	60	7.3	8.1	6.6	7.1	7.3	5.7	4.3	6.6
	AVG EC	8.3	7.8	6.8	7.5	7.6	5.8	5.0	7.0
1988	6	9.7	8.0	10.3	8.5	7.6	7.8	4.9	8.1
	12	10.7	8.2	10.3	5.5	6.6	8.9	6.0	8.0
	24	10.1	8.6	10.3	9.2	8.9	9.4	7.8	9.2
	36	9.0	8.8	9.0	8.4	8.1	9.6	7.5	8.6
	48	8.2	9.2	7.0	7.2	6.3	8.4	4.6	7.3
	60	6.1	10.0	5.6	5.2	5.4	7.6	5.2	6.5
	AVG EC	9.0	8.8	8.8	7.3	7.1	8.6	6.0	7.9
1990	6	8.2	6.3	6.7	8.0	5.6	7.1	3	6.4
	12	9.4	6.3	7.0	10.6	4.8	10.2	3.9	7.5
	24	9.8	6.3	6.4	8.4	5.0	8.4	4.7	7.0
	36	10.6	7.5	6.3	9.0	7.3	8	5.3	7.7
	48	8.0	7.8	8.4	8.0	7.1	7.2	4.3	7.3
	60	6.1	7.0	6.0	8.2	6.3	7.5	4.5	6.5
	AVG EC	8.7	6.9	6.8	8.7	6.0	8.1	4.3	7.1

		DRAIN 3A				DRAIN 2A			
SOUTH 1985	6	8.6	6.5	2.4	7.4	9.0	4.5	6.6	6.4
	12	7.2	4.6	7.6	7.2	7.3	6.6	8.2	7.0
	24	7.8	7.3	8.2	7.7	7.1	6.7	7.5	7.5
	36	6.7	6.8	8.1	6.8	6.3	6.1	7.5	6.9
	48	6.1	5.8	6.5	6.0	4.8	5.1	6.2	5.8
	60	6.3	6.9	6.3	5.4	5.4	4.7		5.8
	AVG EC	7.1	6.3	6.5	6.8	6.7	5.6	7.2	6.6
1988	6	8.1	9.0	6.4	7.7	9.8	6.2	8.0	7.9
	12	7.0	9.0	6.1	9.2	7.1	7.4	5.5	7.3
	24	5.0	8.7	8.2	6.9	8.3	7.6	7.9	7.5
	36	5.8	7.6	6.8	7.3	6.9	7.1	6.1	6.8
	48	5.0	6.5	5.6	4.3	7.0	4.4	5.9	5.5
	60	5.3	5.7	3.8	4.3	5.7	4.2	5.0	4.9
	AVG EC	6.0	7.7	6.1	6.6	7.5	6.2	6.4	6.6
1990	6	12.1	11.3	13.1	15.2	19.4	11.0	15.8	14.0
	12	9.6	12.5	9.0	8.6	11.2	10.0	9.2	10.0
	24	10.0	11.3	10.2	10.0	7.9	10.0	9.0	9.8
	36	8.8	10.4	11.0	9.4	10.4	9.0	9.0	9.7
	48	8.6	9.8	8.6	8.9	8.4	9.6	9.6	9.1
	60	8.9	8.8	7.3	7.9	8.6	7.3	8.6	8.2
	AVG EC	9.7	10.7	9.9	10.0	11.0	9.5	10.2	10.1

1990	6	12.1	11.3	13.1	15.2	19.4	11.0	15.8	14.0
	12	9.6	12.5	9.0	8.6	11.2	10.0	9.2	10.0
	24	10.0	11.3	10.2	10.0	7.9	10.0	9.0	9.8
	36	8.8	10.4	11.0	9.4	10.4	9.0	9.0	9.7
	48	8.6	9.8	8.6	8.9	8.4	9.6	9.6	9.1
	60	8.9	8.8	7.3	7.9	8.6	7.3	8.6	8.2
	AVG EC	9.7	10.7	9.9	10.0	11.0	9.5	10.2	10.1

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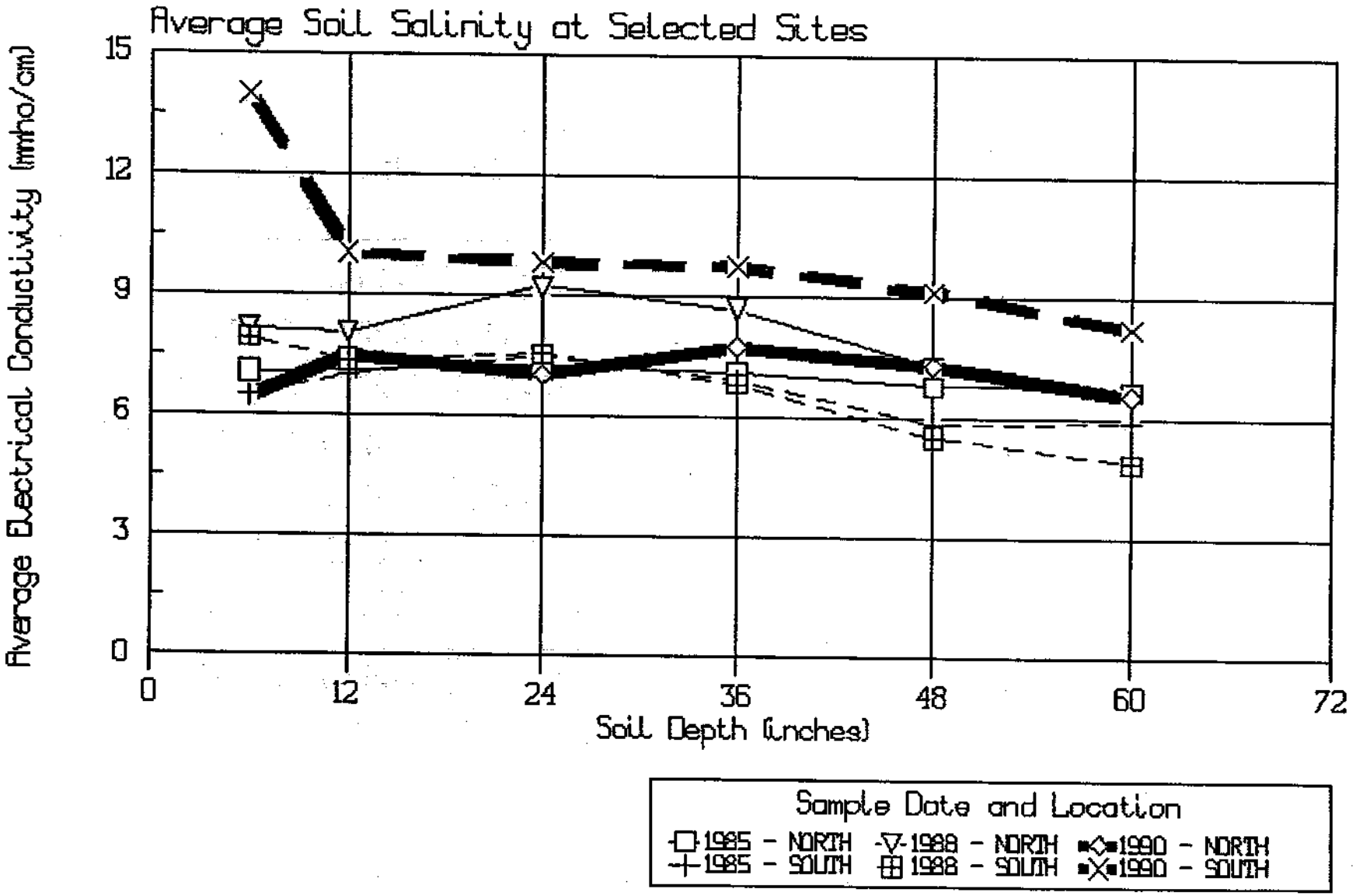
1990 6 12.1 11.3 13.1 15.2 19.4 11.0 15.8 14.0

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 North E



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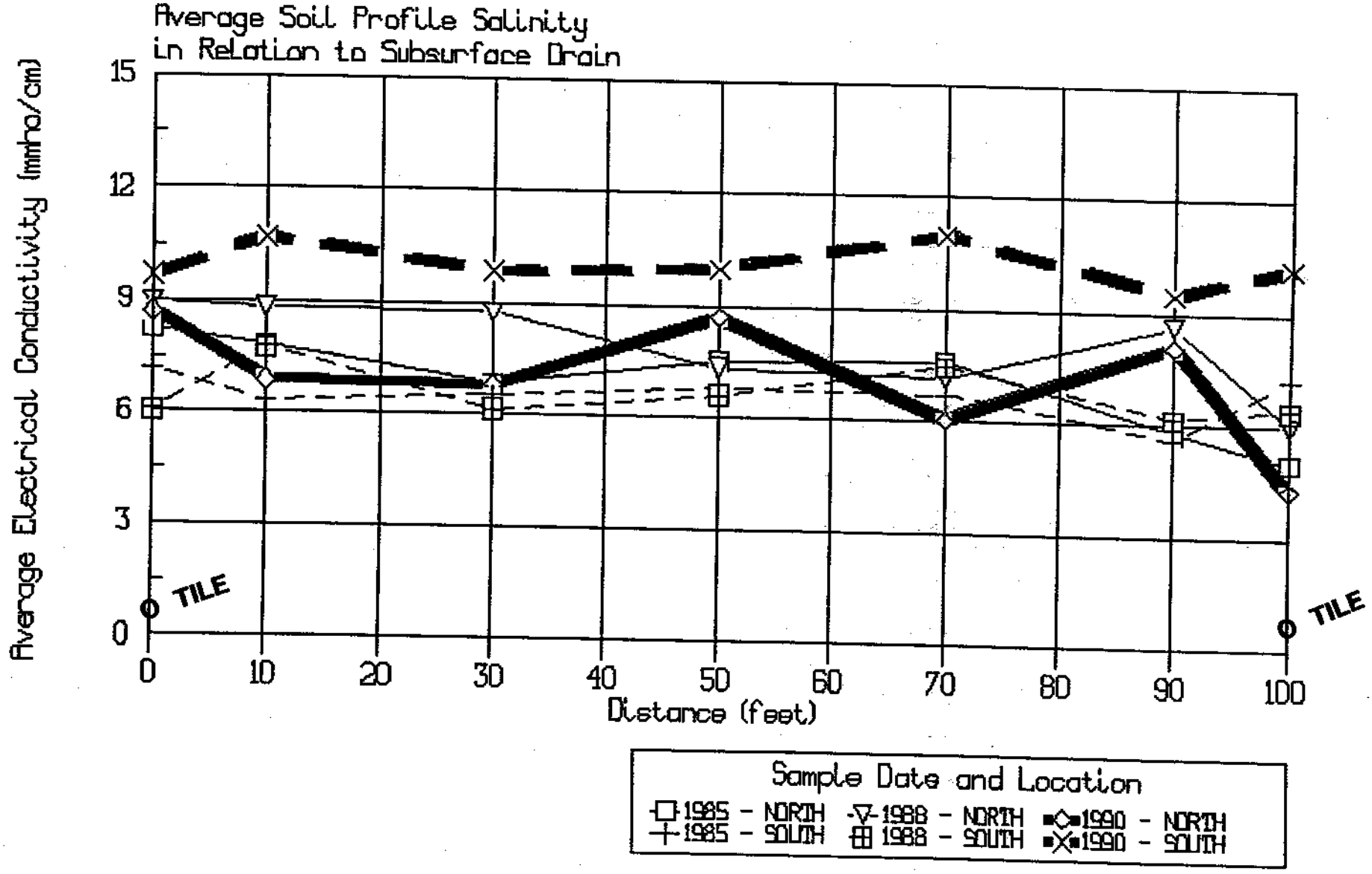
Pumpback Demonstration Project - Site 3 North E

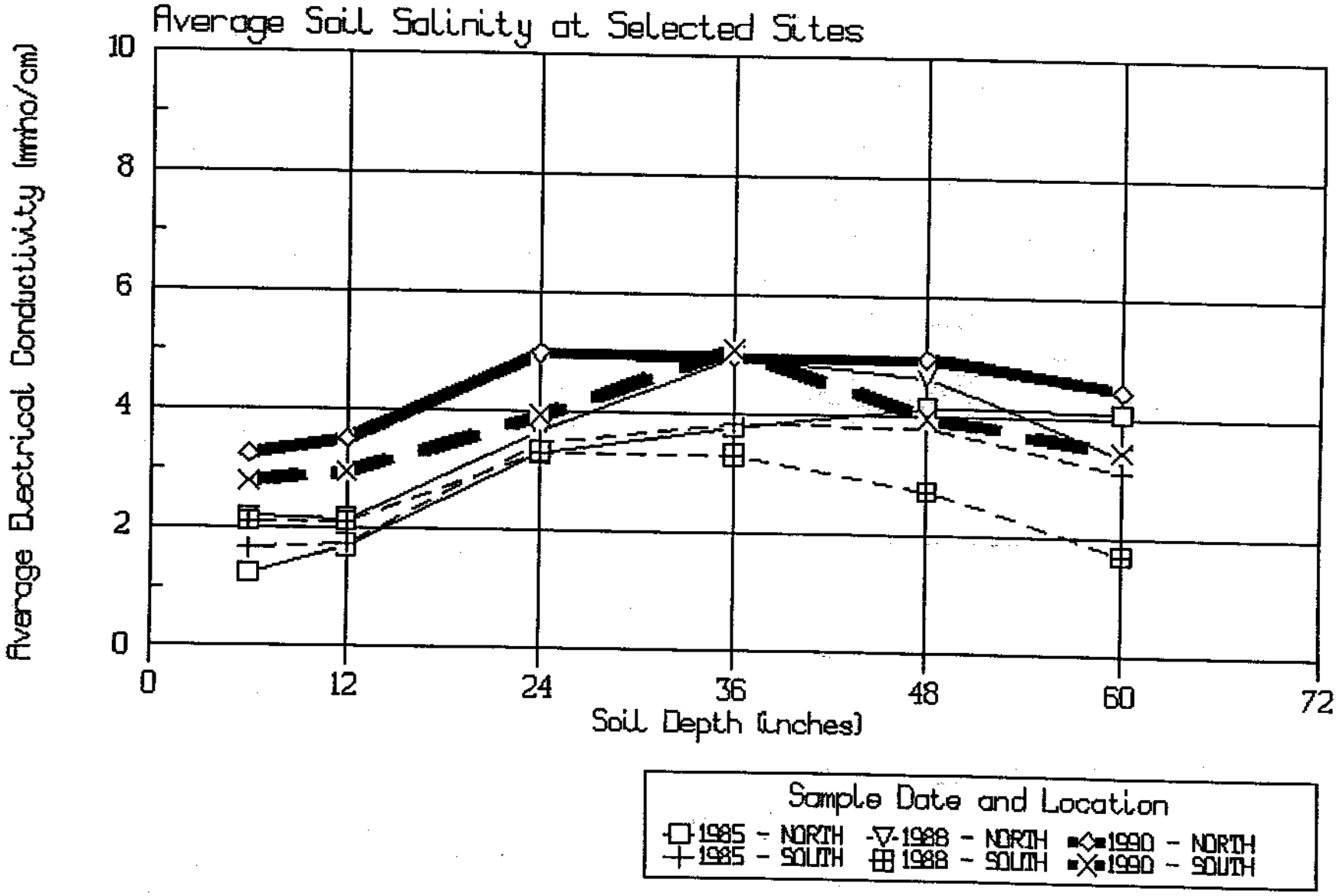


IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3 North W
SOIL SALINITY

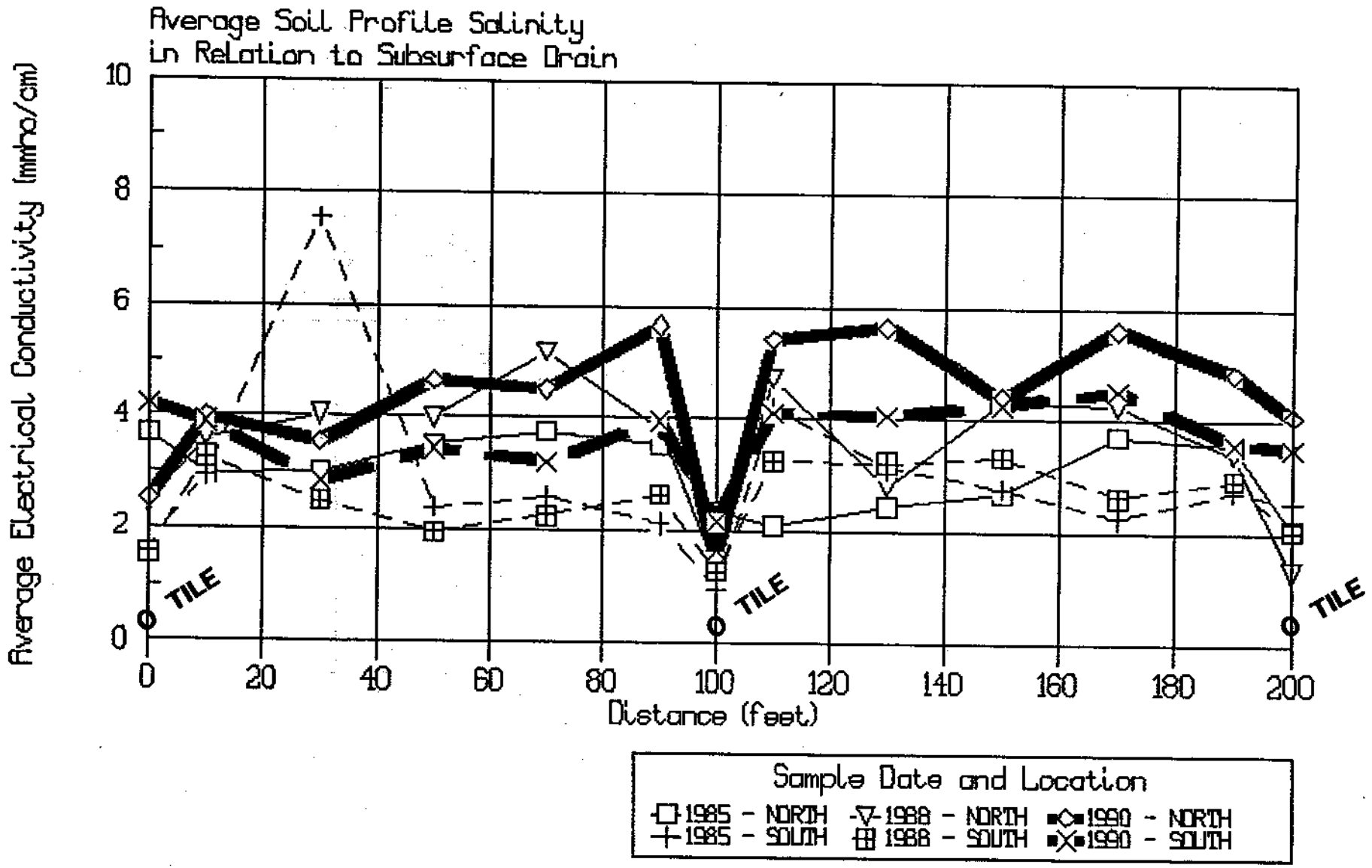
		DRAIN 25												DRAIN 23	
	DEPTH (in.)	DISTANCE (feet) 0	10	30	50	70	90	100	110	130	150	170	190	200	AVG EC (mmho/cm)
NORTH 1985	6	1.5	1.8	.5	1.4	1.3	1.8	1.1	1.2	.9	.9	1.3	1.4	.9	1.2
	12	4.2	3.1	1.3	1.3	1.9	1.4	1.3	1.1	1.2	1.4	1.6	1.2	1.0	1.7
	24	4.1	3.1	3.5	3.9	4.5	3.9	1.5	1.5	3.7	3.7	4.0	3.9	1.3	3.3
	36	3.8	3.3	4.7	4.4	4.9	4.4	3.1	2.7	2.3	4.1	3.1	4.2	3.7	3.7
	48	3.7	3.7	4.1	5.1	5.0	4.6	3.5	3.1	4.1	3.0	5.7	5.0	3.1	4.1
	60	4.7	2.8	3.9	4.9	4.9	5.0	3.7	3.0	2.5	3.0	6.5	5.6	2.4	4.1
	AVG EC	3.7	3.0	3.0	3.5	3.8	3.5	2.4	2.1	2.5	2.7	3.7	3.6	2.1	3.0
1988	6	2.8	1.4	2.2	2.5	2.9	2.3	1.5	2.6	1.3	2.5	2.4	2.2	1.6	2.2
	12	3.0	2.0	2.0	2.9	3.0	2.1	1.2	2.4	2.0	1.8	2.1	1.9	1.2	2.1
	24	2.0	5.0	5.3	2.9	5.2	3.3	1.6	4.6	1.7	5.8	5.1	3.5	1.2	3.6
	36	2.0	5.3	5.9	5.8	7.9	6.3	1.3	6.7	4.2	6.2	5.8	5.4	1.4	4.9
	48	2.0	4.4	4.8	6.3	7.1	5.3	1.2	6.8	3.6	5.8	6.5	4.9	1.4	4.6
	60	2.5	3.6	3.9	3.5	4.9	3.6	1.2	5.3	4.1	3.8	3.5	2.4	1.4	3.3
	AVG EC	2.4	3.6	4.0	4.0	5.2	3.8	1.3	4.7	2.8	4.3	4.2	3.4	1.3	3.5
1990	6	2.2	3.2	3.1	2.0	2.7	5.3	2.0	4.3	4.4	2.0	4.1	3.2	3.3	3.2
	12	3.6	2.9	2.9	3.2	2.5	4.3	1.4	4.0	6.1	2.1	4.6	3.9	3.8	3.5
	24	2.9	6.7	2.7	5.9	6.6	6.3	1.4	6.3	6.7	3.8	4.9	6.2	4.0	5.0
	36	2.2	2.0	3.0	6.6	5.2	6.7	1.3	5.8	6.5	5.4	6.9	6.6	6.0	4.9
	48	2.1	3.3	3.1	5.0	5.7	6.5	1.4	6.9	6.3	7.0	6.6	5.6	4.7	4.9
	60	2.1	5.8	6.5	5.1	4.3	4.8	1.4	5.2	3.8	5.9	6.5	3.5	2.7	4.4
	AVG EC	2.5	4.0	3.6	4.6	4.5	5.7	1.5	5.4	5.6	4.4	5.6	4.8	4.1	4.3

		DRAIN 26A												DRAIN 24A	
SOUTH 1985	6	3.0	1.7	2.0	.8	1.9	1.2	1.0	1.5	1.7	2.2	1.6	1.5	1.2	1.6
	12	2.1	2.3	1.2	1.4	2.4	1.3	1.0	1.8	2.2	2.0	1.6	1.7	1.3	1.7
	24	1.3	1.8	12.9	3.1	2.7	1.9	.9	4.1	4.2	4.1	2.1	3.8	2.1	3.5
	36	1.0	4.2	5.9	4.3	2.6	3.0	.9	10.7	4.3	2.6	3.1	3.6	3.4	3.8
	48	1.4	5.4	13.4	3.0	2.9	2.8	1.0	4.2	3.5	2.9	2.5	2.8	3.0	3.8
	60	1.4	2.2	10.0	1.8	2.9	2.5	1.0	2.8	2.8	2.9	2.6	3.1	4.3	3.1
	AVG EC	1.7	2.9	7.6	2.4	2.6	2.1	1.0	4.2	3.1	2.8	2.3	2.8	2.6	2.9
1988	6	2.0	2.1	2.2	1.7	1.8	2.0	1.6	2.3	1.8	2.5	2.7	2.0	2.4	2.1
	12	1.8	2.5	1.5	1.9	2.0	1.5	1.8	1.8	2.5	2.6	2.6	2.5	2.4	2.1
	24	1.6	5.1	3.1	2.4	4.9	3.1	1.1	4.6	4.5	4.5	2.4	4.0	1.5	3.3
	36	1.3	4.8	3.5	2.0	1.5	3.4	1.1	5.5	4.6	5.4	3.1	4.8	1.7	3.3
	48	1.2	3.4	3.2	2.2	2.0	3.9	1.1	3.7	4.0	3.0	3.2	2.4	2.3	2.7
	60	1.3	1.7	1.5	1.5	1.3	2.0	1.0	1.7	2.0	2.0	1.7	2.1	2.0	1.7
	AVG EC	1.6	3.3	2.5	2.0	2.3	2.6	1.3	3.2	3.2	3.3	2.6	3.0	2.0	2.5
1990	6	4.5	2.7	2.5	2.4	2.9	2.9	1.8	1.8	2.0	3.0	4.0	3.6	1.9	2.8
	12	3.8	3.9	2.3	4.0	2.6	2.8	1.7	2.7	2.7	2.7	3.9	2.8	2.0	2.9
	24	2.9	4.3	1.7	3.8	3.6	4.9	2.5	5.6	4.9	4.0	5.3	3.1	4.2	3.9
	36	3.7	5.4	4.4	3.6	5.6	6.0	2.9	6.2	6.0	6.2	6.2	4.5	4.9	5.0
	48	4.3	4.1	3.0	3.5	2.4	4.2	2.4	4.3	5.1	5.6	3.9	3.6	4.9	3.9
	60	6.0	2.9	3.1	3.3	2.1	2.9	1.8	4.0	3.7	4.0	3.8	3.9	3.2	3.4
	AVG EC	4.2	3.9	2.8	3.4	3.2	4.0	2.2	4.1	4.1	4.3	4.5	3.6	3.5	3.7

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 North W



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 North W



IMPERIAL IRRIGATION DISTRICT
AVERAGE SOIL SALINITY ACROSS SELECTED LOCATIONS - PUMPBACK SYSTEM #3-SOUTH

NORTHWEST - SITE 3-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	3.4	3.4	0%	4.1	21%
12	4.8	2.8	-42%	5.2	86%
24	5.6	4.5	-20%	6.4	42%
36	6.9	6.2	-10%	6.1	-2%
48	6.6	5.7	-14%	4.8	-16%
60	5.8	4.4	-24%	4.7	7%
AVG	5.5	4.5	-18%	5.2	16%

NORTHEAST - SITE 3-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	5.6	4.3	-23%	7.6	77%
12	7.1	4.6	-35%	9.5	107%
24	8.0	7.2	-10%	9.2	28%
36	8.6	7.5	-13%	10.4	39%
48	8.5	7.4	-13%	9.3	26%
60	8.1	6.1	-25%	8.5	39%
AVG	7.7	6.2	-19%	9.1	47%

SOUTHWEST - SITE 3-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.8	3.5	25%	3.4	-3%
12	3.3	3.0	-9%	4.2	40%
24	5.7	4.8	-16%	5.9	23%
36	4.0	6.7	68%	6.1	-9%
48	3.2	3.6	13%	3.9	8%
60	3.1	2.9	-6%	4.1	41%
AVG	3.7	4.1	11%	4.6	13%

SOUTHEAST - SITE 3-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.5	1.6	-36%	4.0	150%
12	2.5	1.4	-44%	4.2	200%
24	1.8	1.9	6%	4.1	116%
36	2.7	1.0	-63%	1.7	70%
48	2.8	1.2	-57%	2.2	83%
60	2.5	1.4	-44%	2.2	57%
AVG	2.5	1.4	-43%	3.1	116%

AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1988 PERCENT INCREASE FOR SITE 3S = -16%
AVERAGE ELECTRICAL CONDUCTIVITY 1988 TO 1990 PERCENT INCREASE FOR SITE 3S = 36%
AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1990 PERCENT INCREASE FOR SITE 3S = 14%

NOTE: NEGATIVE VALUES SIGNIFY DECREASES IN THE AVERAGE SOIL SALINITY.
ECe VALUES (MMHOS/CM) AVERAGED FROM SAMPLES OVER TILE DRAINS.

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3 South E
SOIL SALINITY

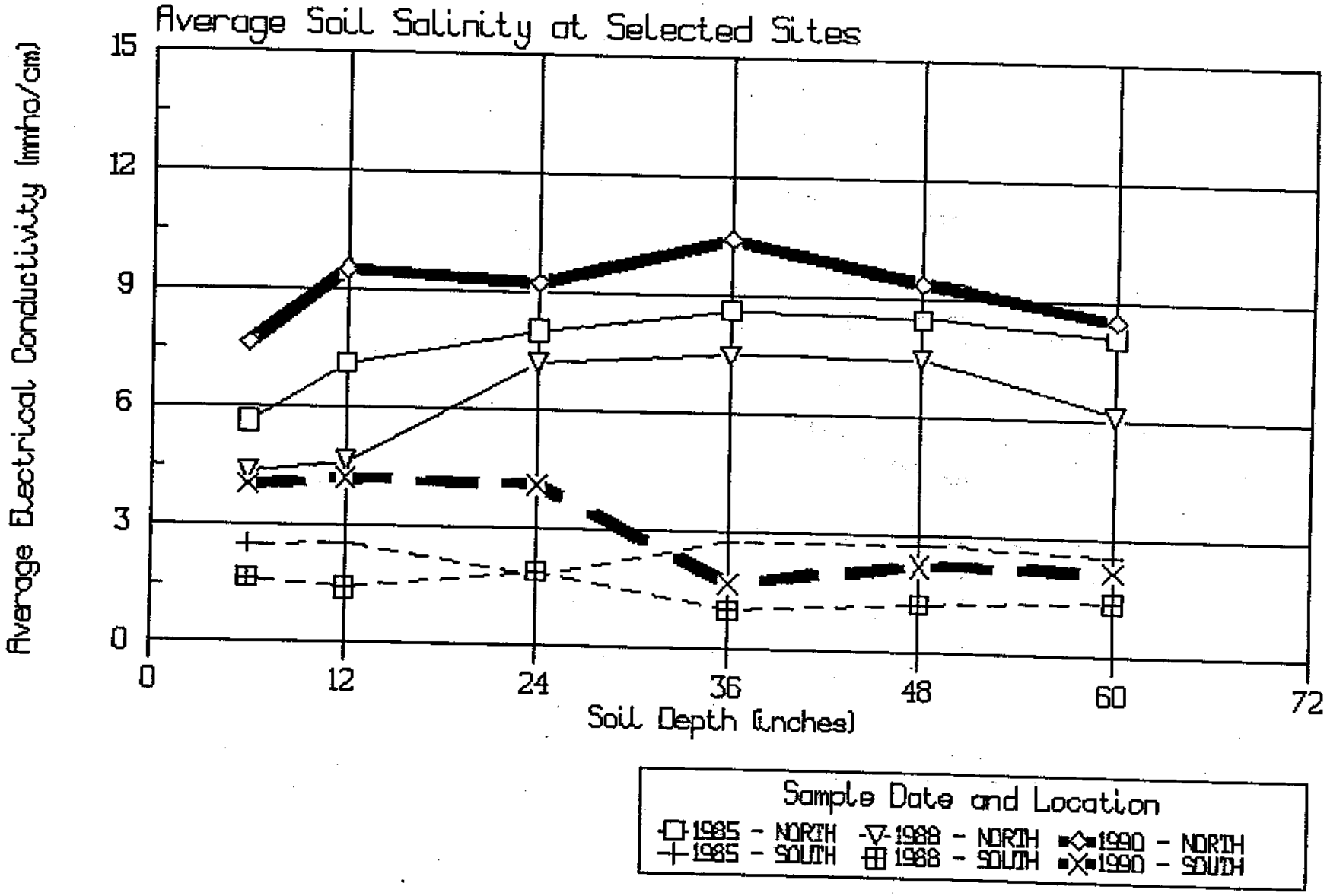
NORTH

	DEPTH (in.)	DRAIN 29 DISTANCE (feet) 0	20	40	60	80	100	120	140	160	DRAIN 31 AVG EC (mmho/cm)
1985	6	2.1	3.6	6.7	5.4	3.7	6.9	7.9	6.9	7.1	5.6
	12	3.8	4.8	6.9	9.4	4.6	8.4	10.8	7.9	7.1	7.1
	24	4.6	6.5	8.9	10.4	5.2	9.1	9.8	9.8	7.6	8.0
	36	5.0	7.3	8.9	8.3	4.3	10.9	9.8	10.8	12.1	8.6
	48	5.2	7.3	7.8	8.3	7.8	9.4	8.9	9.3	12.1	8.5
	60	4.6	7.3	9.1	7.1	7.8	8.4	8.9	9.8	9.6	8.1
	AVG EC	4.2	6.1	8.1	8.2	5.6	8.9	9.4	9.1	9.3	7.6
1988	6	3.4	6.1	4.3	5.5	4.4	3.8	3.7	3.2	4.4	4.3
	12	3.6	4.3	5.1	2.6	5.5	7.2	3.8	4.8	4.4	4.6
	24	8.2	8.4	8.4	7.1	6.5	8.1	6.7	5.7	5.6	7.2
	36	9.0	8.4	6.7	8.0	6.7	8.6	8.7	5.9	5.0	7.5
	48	8.8	7.8	10.2	6.7	7.7	4.9	9.4	5.5	5.9	7.4
	60	8.0	2.2	5.6	6.6	6.4	5.9	9.1	7.3	3.7	6.1
	AVG EC	6.8	6.2	6.7	6.1	6.2	6.4	6.9	5.4	4.8	6.2
1990	6	7.5	6.2	4.6	11.8	6.3	8.3	11.0	6.9	5.9	7.6
	12	8.5	10.6	10.4	9.3	7.1	9.4	10.8	10.2	9.1	9.5
	24	8.5	9.9	10.3	5.5	7.3	10.4	11.6	10.6	8.8	9.2
	36	9.2	10.9	12.0	11.1	8.5	10.4	11.0	11.6	8.7	10.4
	48	4.1	10.0	10.9	10.6	9.1	10.4	10.2	10.3	8.3	9.3
	60	2.5	9.8	9.5	5.4	9.5	9.6	9.9	10.8	9.3	8.5
	AVG EC	6.7	9.6	9.6	9.0	8.0	9.8	10.8	10.1	8.4	9.1

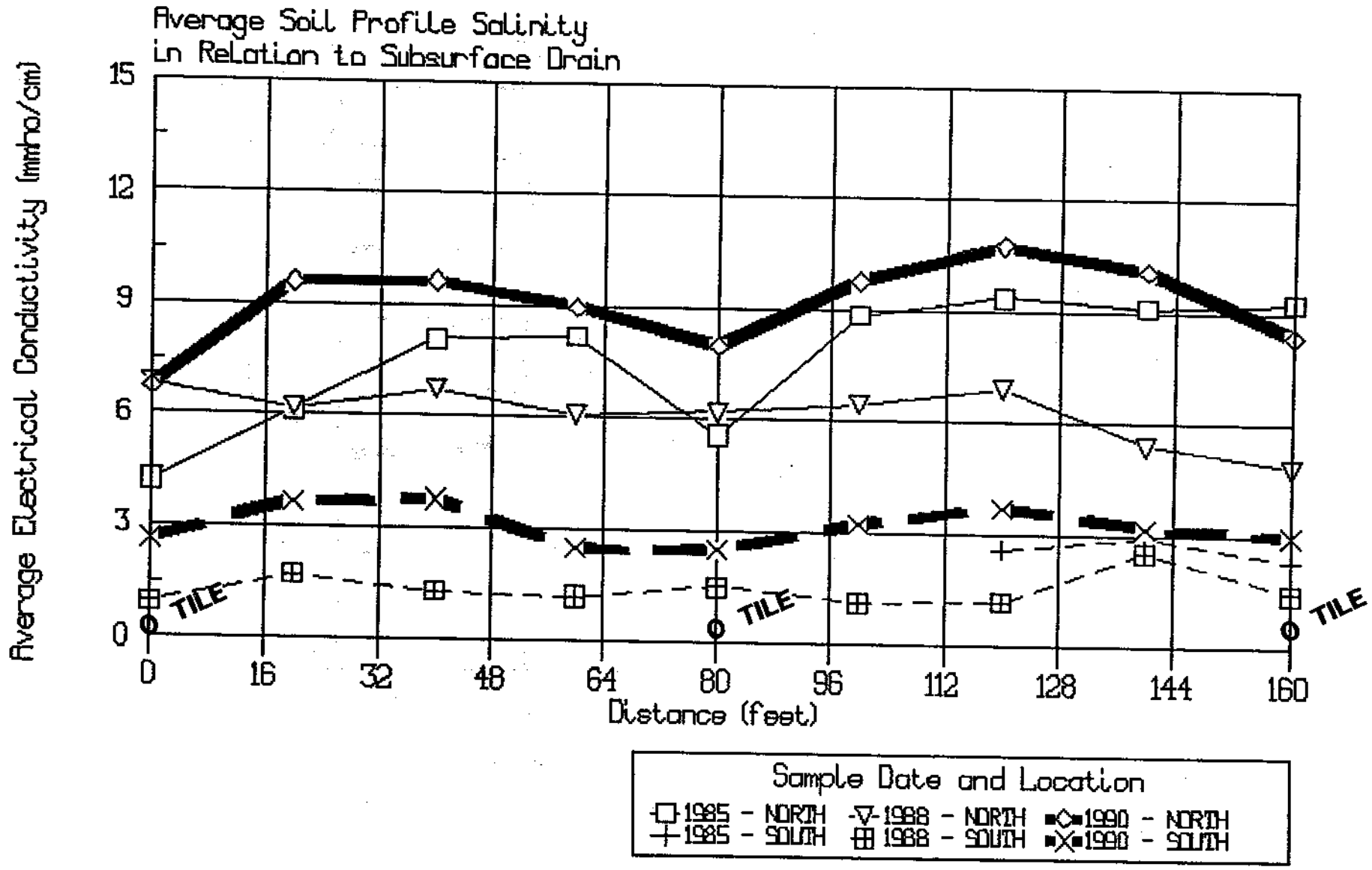
SOUTH

	DEPTH (in.)	DRAIN 30 DISTANCE (feet) 0	10	30	50	70	80	90	110	130	150	160	DRAIN 32 AVG EC (mmho/cm)
1985	6								2.3	2.7	3.0	2.0	2.5
	12								3.4	3.0	1.7	2.0	2.5
	24								1.7	1.3	2.1	2.1	1.8
	36								3.8	3.4	1.5	2.2	2.7
	48								1.5	4.5	3.2	1.8	2.8
	60								3.0	3.0	2.4	1.7	2.5
	AVG EC								2.6	3.0	2.3	2.0	2.5
1988	6	1.5	1.8	2.3	1.3	1.6	1.6	1.3	1.2	2.1	1.7	1.2	1.6
	12	1.0	1.2	1.6	1.2	1.7	1.4	1.0	1.2	2.1	1.3	1.3	1.4
	24	.9	.6	1.6	2.6	1.7	2.4	1.4	1.4	4.0	2.1	1.6	1.9
	36	.7	.5	1.1	.9	.9	1.0	.8	1.1	1.8	1.0	1.1	1.0
	48	.6	.8	1.5	.6	.9	1.2	.9	1.2	2.6	1.3	1.6	1.2
	60	1.8	.8	2.1	1.1	.4	1.3	1.3	1.0	2.4	1.2	1.4	1.4
	AVG EC	1.1	1.0	1.7	1.3	1.2	1.5	1.1	1.2	2.5	1.5	1.4	1.4
1990	6	.0	3.4	6.3	5.9	4.7	3.4	5.5	3.6	3.1	3.7	4.4	4.0
	12	3.7	3.9	4.7	5.1	3.4	3.2	4.0	4.5	4.6	4.8	3.9	4.2
	24	2.9	2.4	4.6	7.1	2.9	4.2	4.3	3.9	3.2	4.5	4.9	4.1
	36	1.2	2.3	.8	1.1	1.5	1.1	1.6	3.3	3.4	1.1	1.1	1.7
	48	3.0	2.1	2.8	1.3	1.3	1.7	2.1	3.5	2.5	1.9	1.9	2.2
	60	2.6	1.8	2.8	2.0	1.1	1.5	2.0	3.5	2.4	2.1	1.9	2.2
	AVG EC	2.2	2.7	3.7	3.8	2.5	2.5	3.3	3.7	3.2	3.0	3.0	3.0

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 South E



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 South E



IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3 South W
SOIL SALINITY

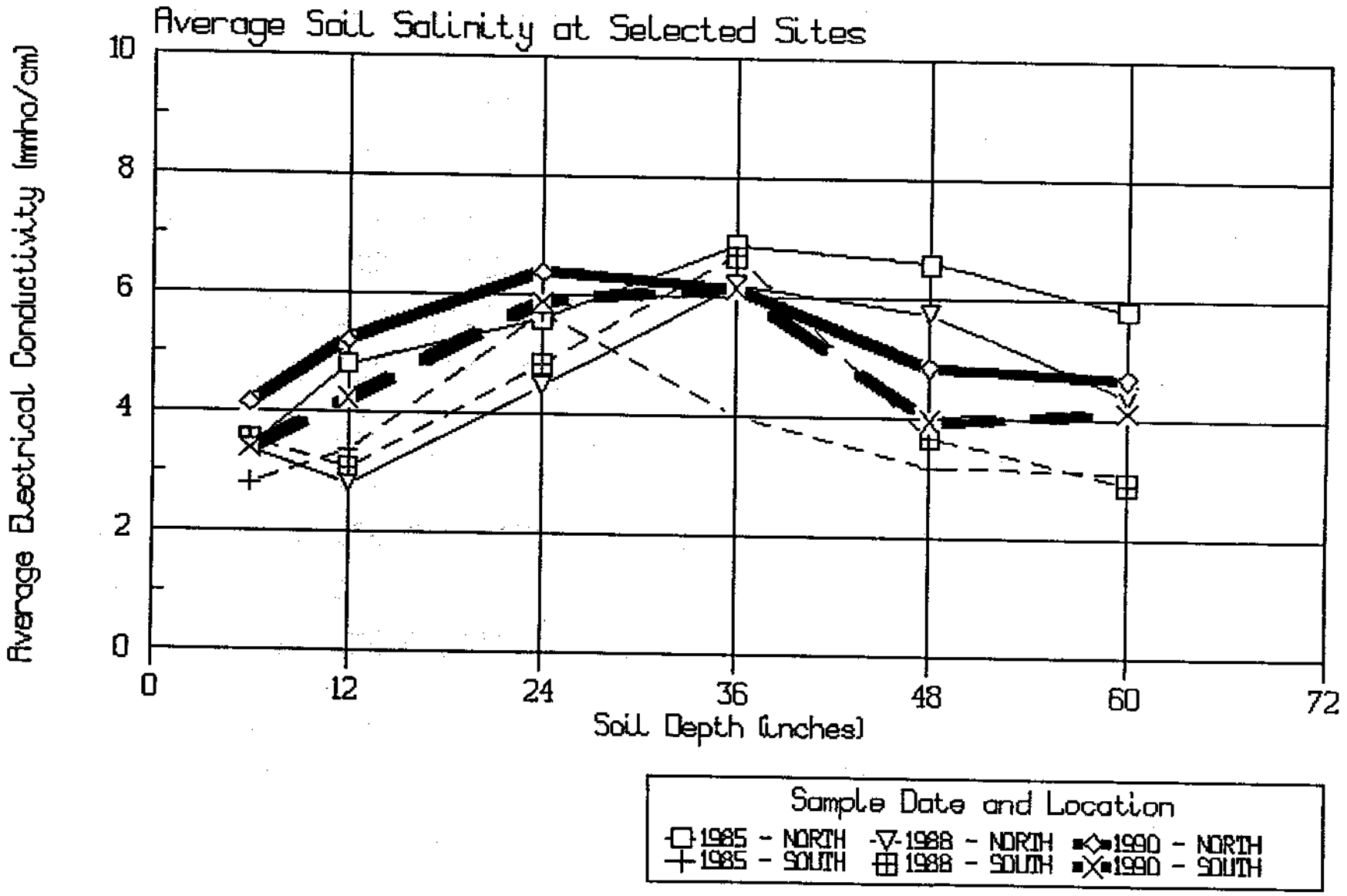
NORTH

	DEPTH (in.)	DRAIN 2 DISTANCE (feet) 0	20	40	60	80	100	120	140	160 DRAIN 4	AVG EC (mmho/cm)
1985	6	3.1	3.1				6.3	3.1	2.5	2.2	3.4
	12	8.2	5.1				4.2	5.3	3.1	2.8	4.8
	24	4.1	7.0	4.1			6.7	7.1	5.2	4.8	5.6
	36	8.2	7.0	6.2			7.6	5.9		6.2	6.9
	48	8.2	5.7	8.7			7.7	4.8	4.8	6.0	6.6
	60	6.8	7.2	6.2			7.2	4.8	3.8	4.6	5.8
	AVG EC	6.4	5.9	6.3			6.6	5.2	3.9	4.4	5.5
1988	6	4.1	3.9	3.8	1.8	2.9	4.6	2.5	3.3	3.5	3.4
	12	2.5	2.7	3.3	3.8	2.0	2.1	2.5	3.7	2.8	2.8
	24	7.9	5.1	4.0	6.6	3.0	3.3	5.1	3.3	2.1	4.5
	36	8.4	6.9	11.0	5.2	4.5	5.6	2.2	6.7	5.1	6.2
	48	5.5	6.9	9.0	7.1	5.5	5.6	4.4	4.8	2.5	5.7
	60	4.6	5.8	5.4	5.0	5.3	4.8	1.0	4.9	2.5	4.4
	AVG EC	5.5	5.2	6.1	4.9	3.9	4.3	3.0	4.4	3.1	4.5
1990	6	2.5	3.8	5.2	3.6	5.6	5.0	6.4	2.2	2.8	4.1
	12	3.4	4.6	7.7	6.4	6.2	5.1	5.7	5.0	2.7	5.2
	24	6.5	7.5	8.4	8.8	6.6	4.9	5.6	6.3	2.7	6.4
	36	5.9	7.6	8.4	5.2	6.6	4.3	7.2	6.5	3.2	6.1
	48	3.9	5.5	7.2	6.2	4.3	5.4	4.1	4.8	2.0	4.8
	60	3.7	5.0	6.5	5.7	5.0	5.0	3.1	5.4	2.5	4.7
	AVG EC	4.3	5.7	7.2	6.0	5.7	5.0	5.4	5.0	2.7	5.2

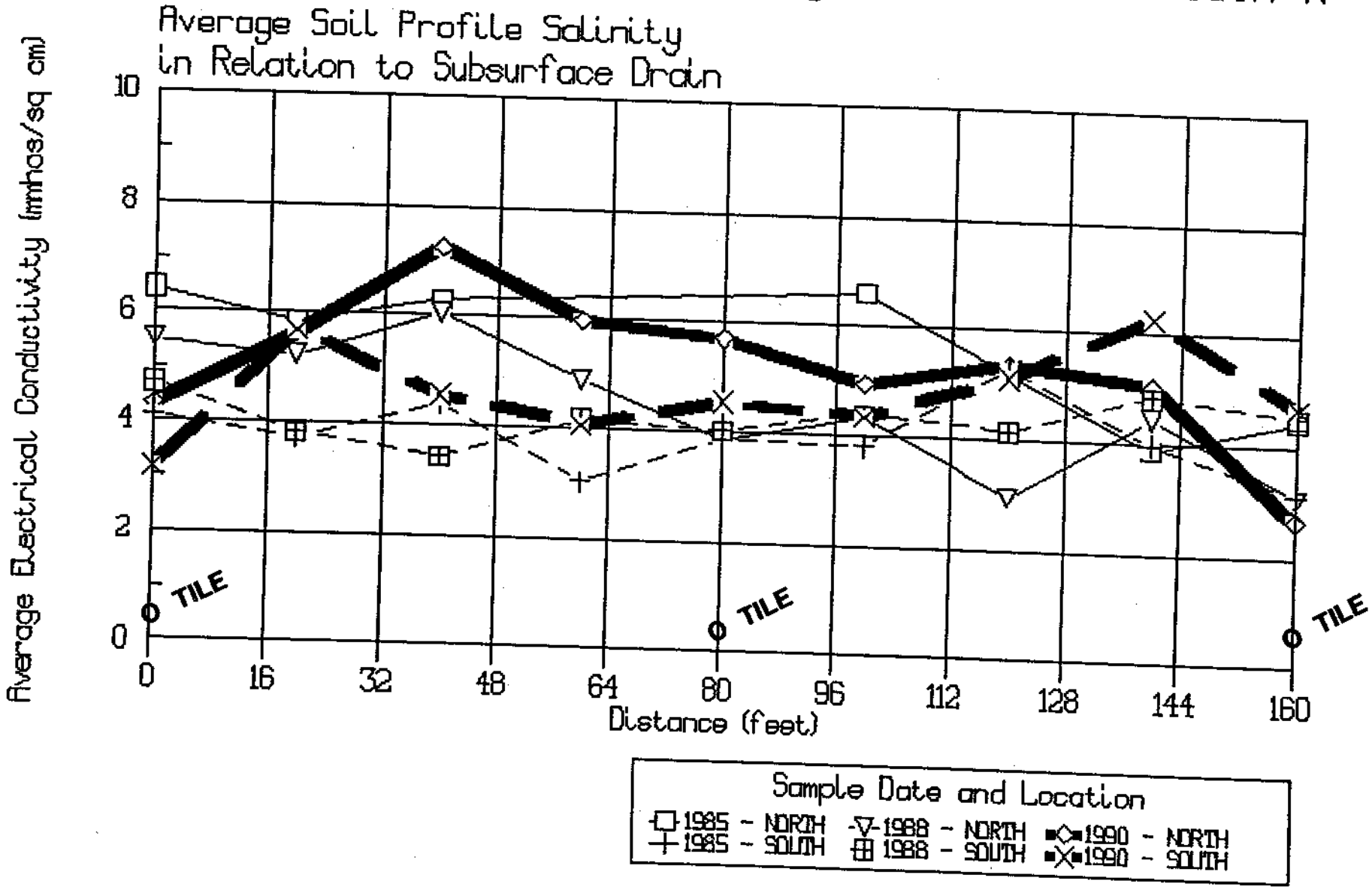
SOUTH

	DEPTH (in.)	DRAIN 2 DISTANCE (feet) 0	10	30	50	70	80	90	110	130	150	160 DRAIN 4	AVG EC (mmho/cm)
1985	6	2.1	2.5	2.6	3.8	2.5	2.0	2.6	4.8	4.4	2.0	1.3	2.8
	12	2.2	3.1	2.8	4.8	3.1	3.4	3.1	5.6	4.8	2.0	1.8	3.3
	24	2.3	9.1	7.7	6.8	3.4	6.8	6.9	5.6	5.2	4.6	4.3	5.7
	36	3.0	3.6	3.0	4.6	3.6	4.9	4.0	6.5	2.8	3.7	3.8	4.0
	48	2.5	3.3	2.9	3.2	3.4	3.3	3.4	4.8	1.9	3.2	2.9	3.2
	60	2.6	3.0	3.3	3.1	2.1	2.6	2.8	4.4	4.8	3.2	2.2	3.1
	AVG EC	2.5	4.1	3.7	4.4	3.0	3.8	3.8	5.3	4.0	3.1	2.7	3.7
1988	6	2.7	4.5	4.5	4.1	4.0	2.8	3.8	4.3	2.4	3.0	2.6	3.5
	12	2.2	2.2	3.0	2.9	4.1	2.6	1.1	3.2	4.9	4.5	2.9	3.0
	24	1.6	6.5	3.0	3.6	6.4	5.6	6.6	1.2	7.7	4.9	5.9	4.8
	36	5.1	7.3	5.5	5.9	6.5	7.3	7.7	9.4	4.7	7.7	6.1	6.7
	48	3.3	4.8	3.9	2.2	2.2	4.3	4.2	3.7	4.7	3.8	3.0	3.6
	60	3.0	2.9	3.1	1.8	1.8	1.5	2.9	3.2	4.6	3.4	3.7	2.9
	AVG EC	3.0	4.7	3.8	3.4	4.2	4.0	4.4	4.1	4.8	4.5	4.0	4.1
1990	6	1.6	3.5	3.2	2.4	2.5	3.1	3.8	4.2	5.0	3.4	4.4	3.4
	12	1.6	3.9	3.4	2.8	3.2	4.1	3.8	4.8	5.7	6.5	6.5	4.2
	24	2.3	3.1	7.2	5.4	6.2	6.3	6.5	7.8	8.4	5.2	6.2	5.9
	36	2.5	3.1	7.5	5.7	5.8	5.4	7.2	7.3	9.2	6.8	6.9	6.1
	48	2.0	2.3	6.9	6.0	3.2	3.8	2.6	3.1	4.1	2.2	7.0	3.9
	60	1.9	3.0	6.0	5.0	3.5	4.6	2.2	3.5	5.3	4.0	6.1	4.1
	AVG EC	2.0	3.2	5.7	4.6	4.1	4.6	4.4	5.1	6.3	4.7	6.2	4.6

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 South W



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 3 South W



WATER SALINITY

PUMPBACK SYSTEM #3

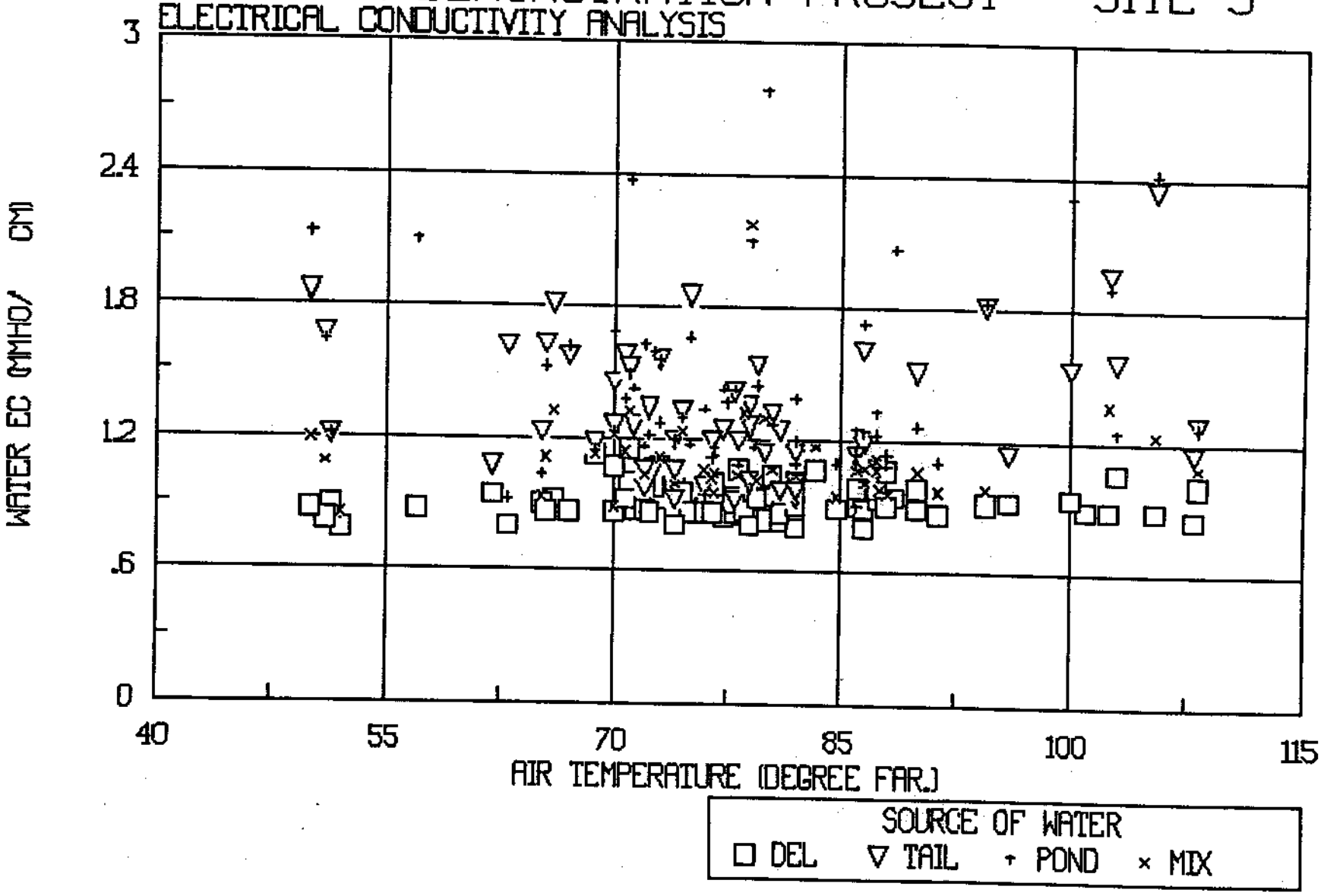
		AIR TEMPERATURE (DEGREES FAR.)						WATER TEMPERATURE (DEGREES FAR.)					CHANGE FROM DELIVERY TEMP (DEGREES FAR.)				WATER EC (MMHO/CM)					CHANGE FROM DELIVERY EC (MMHO/CM)			
DATE	TIME	DEL	TAIL	POND	MIX	TILE	AVG	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE
11/12/85	1324	65	67		66		66	62	65		56		3	*	(6)	*	.93	1.81		1.33		.88	*	.40	*
1/ 4/86	1005	64	68	69			67	58	58	58			0	0	*	*	.87	1.57	1.62			.70	.75	*	*
1/22/86	900	60	64				62	54	50				(4)	*	*	*	.95	1.08				.13	*	*	*
2/28/86	845	80	80				80	64	60				(4)	*	*	*	.84	1.14				.30	*	*	*
3/10/86	1015	68	73	73			71	73	68	73			(5)	0	*	*	.88	1.26	1.43			.38	.55	*	*
3/28/86	858	75	75	75			75	67	68	66			1	(1)	*	*	.87	1.85	1.66			.98	.79	*	*
4/10/86	930	80	84				82	68	72				4	*	*	*	.90	1.00				.10	*	*	*
4/16/86	1515	74	74				74	72	74				2	*	*	*	.98	1.06				.08	*	*	*
4/21/86	930	92	88	78			86	72	68	68			(4)	(4)	*	*	.91	1.12	1.14			.21	.23	*	*
4/30/86	900	78		80			79	70		70			*	0	*	*	.98		2.10			*	1.12	*	*
5/ 5/86	907	76	70	72	80		75	66	62	62	64		(4)	(4)	(2)	*	.96	1.33	1.30	1.24		.37	.34	.28	*
5/ 7/86	1220	80	78				79	70	80				10	*	*	*	.98	1.26				.28	*	*	*
5/12/86	845	78	78				78	70	67				(3)	*	*	*	.86	.95				.09	*	*	*
5/13/86	833	73		73			73	68		70			*	2	*	*	.93		1.56			*	.63	*	*
5/14/86	845	78	80				79	70	66				(4)	*	*	*	.95	1.36				.41	*	*	*
5/15/86	800	74	80	78			77	70	66	64			(4)	(6)	*	*	.85	1.25	1.43			.40	.58	*	*
5/30/86	815	82	80				81	76	72				(4)	*	*	*	.84	1.25				.41	*	*	*
6/ 9/86	715	72	72				72	74	70				(4)	*	*	*	.88	.98				.10	*	*	*
6/16/86	630	74	74				74	74	68				(6)	*	*	*	.85	.93				.08	*	*	*
6/23/86	650	76	76				76	76	74				(2)	*	*	*	.87	.99				.12	*	*	*
6/25/86	1115	100	102				101	84	96				12	*	*	*	.89					*	*	*	*
7/ 7/86	700	78	80				79	76	70				(6)	*	*	*	.89	1.01				.12	*	*	*
7/ 8/86	736	86	87	86	87		87	80	78	76	78		(2)	(4)	(2)	*	.80	1.61	1.73	1.08		.81	.93	.28	*
7/ 9/86	1355	102	104	102	102		103	87	101	87	88		14	0	1	*	.89	1.96	1.90	1.37		1.07	1.01	.48	*
7/16/86	705	80	84				82	78	74				(4)	*	*	*	.87	.94				.07	*	*	*
7/23/86	1130	98	94				96	84	100				16	*	*	*	.93	1.14				.21	*	*	*
7/24/86	640	78	78				78	78	72				(6)	*	*	*	.87	.93				.06	*	*	*
8/ 6/86	705	82	82				82	80	79				(1)	*	*	*	.86	1.12				.26	*	*	*
8/ 7/86	725	82	82				82	82	78				(4)	*	*	*	.80	.97				.17	*	*	*
8/11/86	726	82	80				81	82	84				2	*	*	*	.87	.97				.10	*	*	*
8/22/86	1345	106	105	106	105		106	92	107	94	92		15	2	0	*	.89	2.35	2.42	1.24		1.46	1.53	.35	*
9/ 8/86	820	90		90	90		90	83		78	82		*	(5)	(1)	*	.89		1.27	1.06		*	.38	.17	*
9/16/86	1150	87	87	86	86		87	76	88	76	75		12	0	(1)	*	.89	1.18	1.24	1.01		.29	.35	.12	*
9/17/86	745	74		74	80		76	70		64	68		*	(6)	(2)	*	.89		1.34	1.06		*	.45	.17	*
9/18/86	1235	90		92	92		91	76		80	76		*	4	0	*	.87		1.11	.97		*	.24	.10	*
9/21/86	1255	78			80		79	66			62		*	*	(4)	*	.88			2.18		*	*	1.30	*
10/ 1/86	855	76		74			75	68		60			*	(8)	*	*	.87		1.18			*	.31	*	*
10/ 2/86	840	73	70	74			72	64	60	56			(4)	(8)	*	*	.87	1.34	1.22			.47	.35	*	*
12/ 8/86	800	54	50	50			51	52	50	48			(2)	(4)	*	*	.90	1.21	1.22			.31	.32	*	*
12/10/86	1515	57		57			57	55		54			*	(1)	*	*	.88		2.10			*	1.22	*	*
12/12/86	1330	66	65	65	65		65	54	55	48	52		1	(6)	(2)	*	.91	1.23	1.04	.94		.32	.13	.03	*
1/13/87	1450	63	63	63			63	54	57	57			3	3	*	*	.80	1.62	.93			.82	.13	*	*
1/14/87	845	52		52	52		52	48		44	48		*	(4)	0	*	.79		.84	.86		*	.05	.07	*
1/15/87	1350	52	52	50	50		51	50	48	47	48		(2)	(3)	(2)	*	.83	1.67	1.64	1.09		.84	.81	.26	*
2/17/87	1450	70	70	70	70		70	62	63	55	62		1	(7)	0	*	.87	1.46	1.69	.89		.59	.82	.02	*
2/18/87	900	66	64	66	66		66	54	52	48	52		(2)	(6)	(2)	*	.87	1.63	1.53	1.12		.76	.66	.25	*
3/23/87	1334	78		77		77	78	60		70		60	*	10	*	0	.95		1.37		1.49	*	.42	*	.54
4/28/87	1430	94	95	94	95	94	95	86	88	86	84		2	0	(2)	*	.92	1.81	1.83	.99		.89	.91	.07	*
4/29/87	845	80		80	80		80	72		70	72		*	(2)	0	*	.95		2.78	1.30		*	1.83	.35	*

PUMPBACK SYSTEM #3

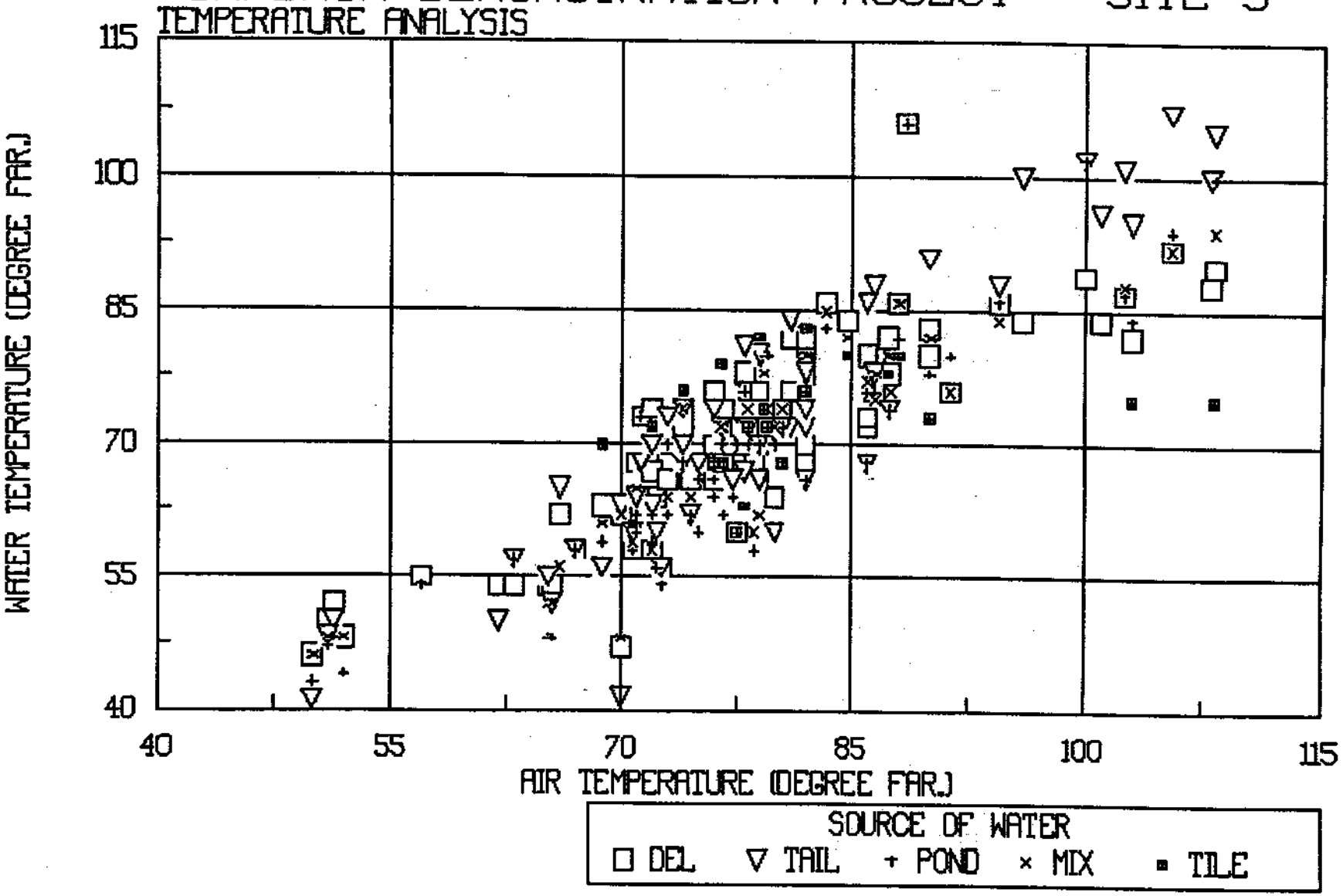
		AIR TEMPERATURE (DEGREES FAR.)						WATER TEMPERATURE (DEGREES FAR.)					CHANGE FROM DELIVERY TEMP (DEGREES FAR.)				WATER EC (MMHO/CM)					CHANGE FROM DELIVERY EC (MMHO/CM)			
DATE	TIME	DEL	TAIL	POND	MIX	TILE	AVG	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE
6/ 3/87	630	70		72			71	68		60			*	(8)	*	*	1.00		2.38			*	1.38	*	*
8/25/87	1255	87		90			89	106		106			*	0	*	*	.95		2.07			*	1.12	*	*
8/27/87	1355	100	100	100			100	89	102	102			13	13	*	*	.95	1.53	2.31			.58	1.36	*	*
9/ 1/87	1300	108	108				108	88	100				12	*	*	*	.86	1.15				.29	*	*	*
10/20/87	1505	88		86	88		87	78		78	78		*	0	0	*	.97		1.33	1.12		*	.36	.15	*
10/23/87	1343	86	86	86	86		86	73	86	77	77		13	4	4	*	.99	1.13	1.25	1.07		.14	.26	.08	*
12/ 9/87	1000	72	74	72			73	56	56	54			0	(2)	*	*	.98	1.07	1.60			.09	.62	*	*
12/30/87	745	50	50	50	50		50	46	41	43	46		(5)	(3)	0	*	.88	1.86	2.13	1.20		.98	1.25	.32	*
2/26/88	1005	71	71	70	71	71	71	58	60	58	59	61	2	0	1	3	.93	1.58	1.38	1.14	3.26	.65	.45	.21	2.33
3/29/88	1409	78	78	78		78	78	70	81	76		63	11	6	*	(7)	.92	1.42	1.43		2.78	.50	.51	*	1.86
4/ 1/88	1245	78		80	80	80	79	72		80	78	74	*	8	6	2	.93		1.17	1.03	5.19	*	.24	.10	4.26
4/11/88	830	78		74		76	76	66		66		68	*	0	*	2	.87		.95		4.10	*	.08	*	3.23
5/ 2/88	930	78		80	78		79	68		58	60		*	(10)	(8)	*	.88		1.31	1.32		*	.43	.44	*
5/ 3/88	920	72		78	80	80	77	68		62	68	68	*	(6)	0	0	.93		1.13	.96	3.69	*	.20	.03	2.76
5/16/88	910	88	86	88	88		88	78	74	74	76		(4)	(4)	(2)	*	.94	1.08	1.08	.98		.14	.14	.04	*
5/17/88	845	78		76	76	78	77	74		70	72	68	*	(4)	(2)	(6)	1.00		1.17	1.05	2.78	*	.17	.05	1.78
5/25/88	1044	90	90			92	90	80	91			73	11	*	*	(7)	.99	1.51			9.29	.52	*	*	8.30
6/ 6/88	730	68	70	69	68	72	69	63	56	59	61	70	(7)	(4)	(2)	7	1.13	1.18	1.15	1.13	5.83	.05	.02		4.70
6/ 7/88	900	72		72		76	72	67		62		72	*	(5)	*	5	.99		1.63		3.42	*	.64	*	2.43
6/ 9/88	800	80	78	80	80	78	80	72	70	80	74	72	(2)	8	2	0	.94	1.54	1.45	1.02	3.91	.60	.51	.08	2.97
6/20/88	800	80	82	80	80	80	81	74	72	72	74	68	(2)	(2)	0	(6)	1.04	1.32	1.28	1.07	5.40	.28	.24	.03	4.36
6/21/88	745	78	79	78	78	80	78	76	72	70	74	72	(4)	(6)	(2)	(4)	1.07	1.20	1.09	1.04	2.35	.13	.02	(.03)	1.28
7/ 5/88	830	82		82	82	86	82	80		76	80	76	*	(4)	0	(4)	1.01		1.20	1.04	3.02	*	.19	.03	2.01
7/ 6/88	1415	108	109	108	108	109	108	90	105	100	94	75	15	10	4	(15)	1.01	1.29	1.28	1.09	2.55	.28	.27	.08	1.54
7/11/88	740	88		88	86	86	87	82		80	80	78	*	(2)	(2)	(4)	.99		1.23	1.07	1.47	*	.24	.08	.48
7/12/88	1125	103	103	103		103	103	82	95	84		75	13	2	*	(7)	1.06	1.56	1.25		2.54	.50	.19	*	1.48
7/21/88	750	82		82			82	82		80			*	(2)	*	*	.91		1.39			*	.48	*	*
7/25/88	830	88		88	88	92	88	86		86	86	80	*	0	0	(6)	.91		1.14	.96	3.90	*	.23	.05	2.99
7/26/88	800	86		90			88	86		82			*	(4)	*	*	1.07		1.09			*	.02	*	*
8/ 4/88	730	86		84	84	86	85	84		80	82	80	*	(4)	(2)	(4)	.89		1.10	.95	1.33	*	.21	.06	.44
8/16/88	730	72	76	76	72	82	74	74	70	68	74	76	(4)	(6)	0	2	.81	1.20	1.20	1.00	4.72	.39	.39	.19	3.91
8/18/88	805	86		86			86	80		76			*	(4)	*	*	.99		.90			*	(.09)	*	*
8/30/88	710	82		84	84		83	86		83	85		*	(3)	(1)	*	1.07		1.17	1.17		*	.10	.10	*
9/13/88	735	76	82			82	79	76	70			82	(6)	*	*	6	.81	1.01			1.01	.20	*	*	.20
10/24/88	840	76	78	76	76	79	77	72	72	70	72	79	0	(2)	0	7	.87	1.20	1.12	1.03	1.49	.33	.25	.16	.62
11/ 7/88	825	82	82	82		83	82	70	66	66		83	(4)	(4)	*	13	.97	1.14	1.10		1.17	.17	.13	*	.20
1/29/90	745	70	70	70	70		70	47	41.5	42.5	48		(6)	(5)	1	*	1.08	1.26	1.23	1.22		.18	.15	.14	*
2/23/90	1055	72	72	72	72		72	58	63	59	58		5	1	0	*	.99	1.06	1.17	1.04		.07	.18	.05	*
3/27/90	914	73	73	73	73		73	66	73	62	64		7	(4)	(2)	*	1.08	1.56	1.28	1.12		.48	.20	.04	*
4/10/90		71	71	71	71		71	68	64	62	65		(4)	(6)	(3)	*	1.16	1.52	1.50	1.33		.36	.34	.17	*
AVERAGES		79	79	78	79	83	79	72	72	69	70	73	1	(2)	(1)	(1)	.92	1.31	1.42	1.12	3.33	.39	.48	.18	2.38
STD DEV		11.7	12.8	12.3	12.6	8.9	11.6	11.2	15.3	13.9	12.5	6.2	6.8	4.6	2.4	6.2	.08	.30	.40	.21	1.87	.31	.41	.22	1.85

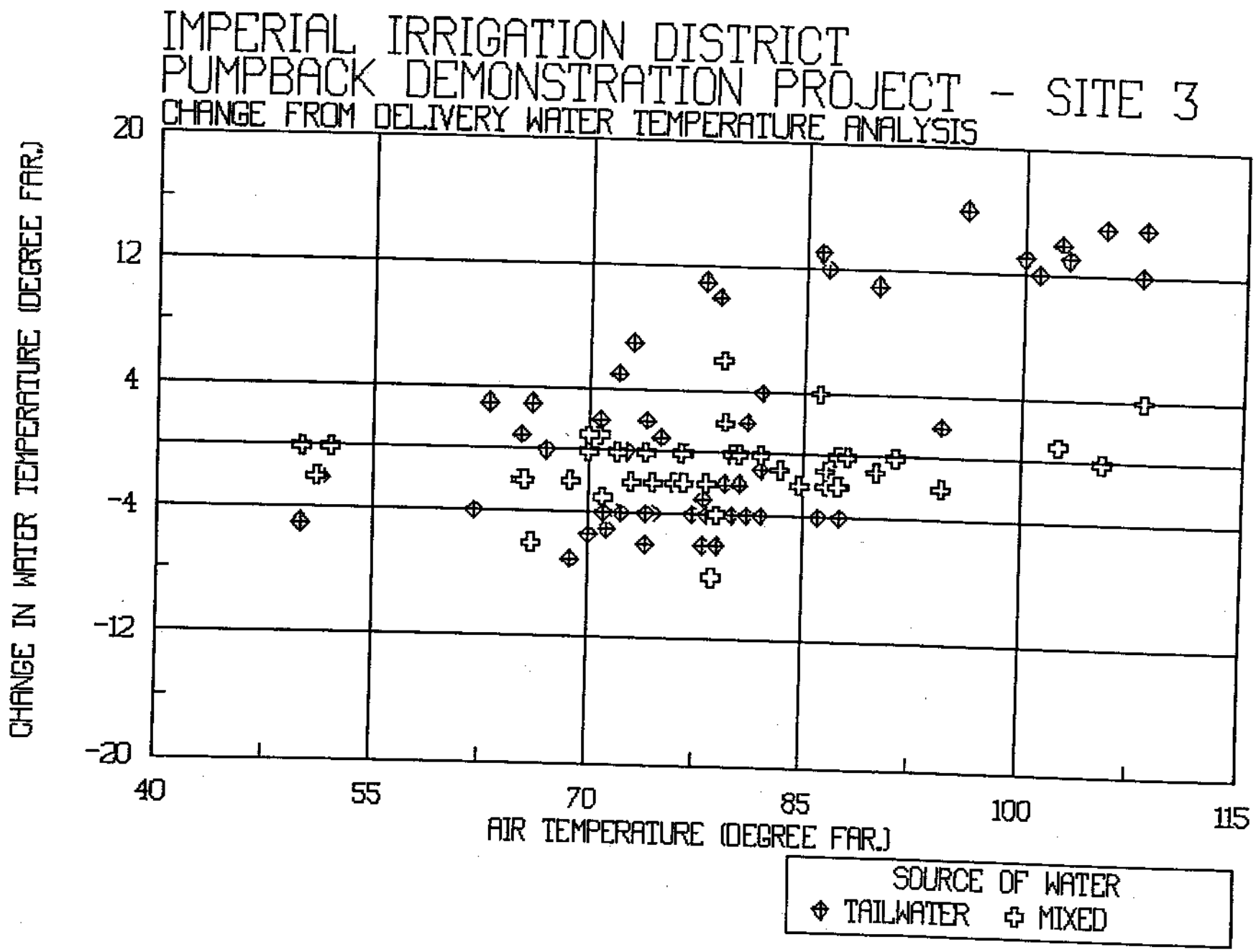
AVERAGE PERCENT INCREASE FROM DELIVERY EC 42% 54% 21%

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3

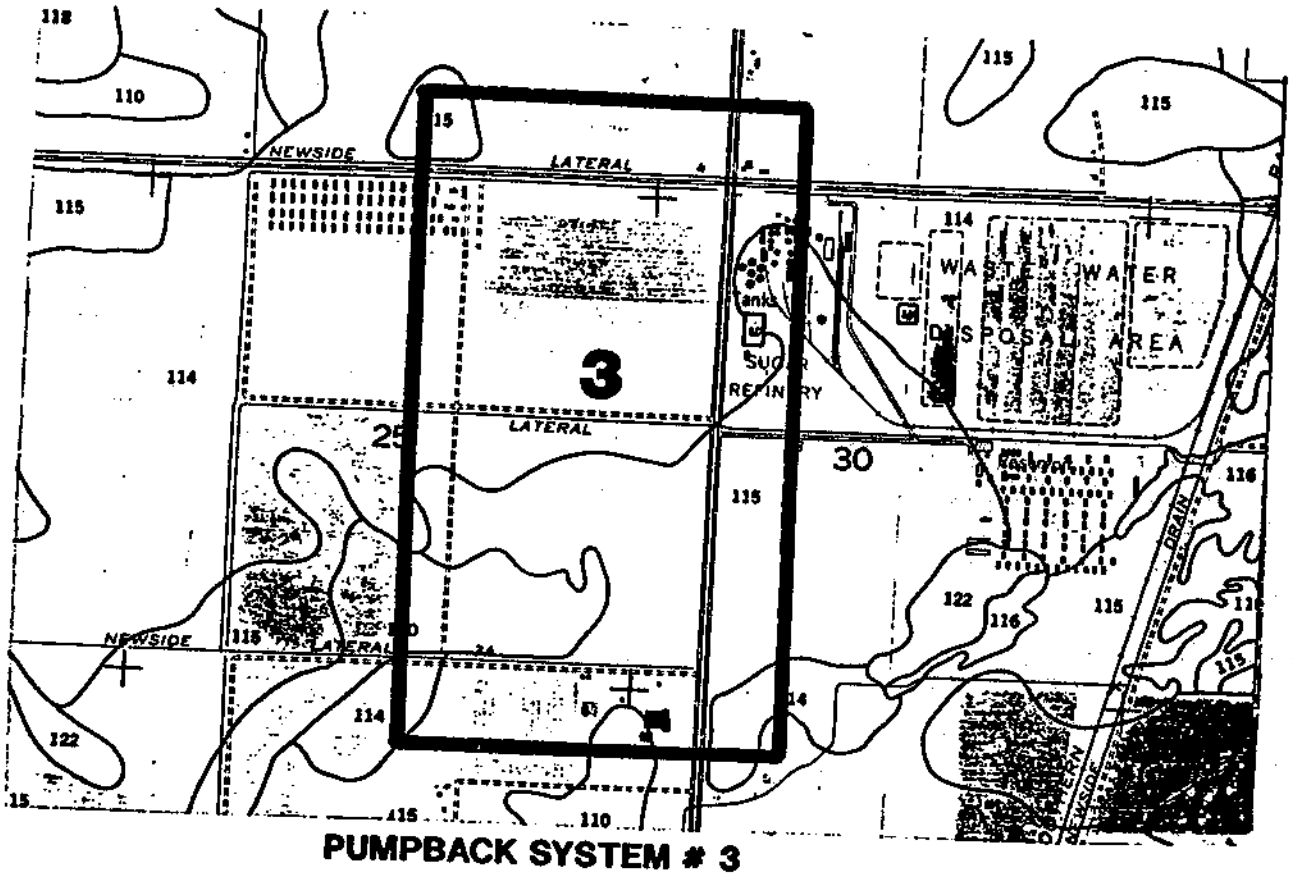


IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3




IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 3
CHANGE FROM DELIVERY WATER TEMPERATURE ANALYSIS
CHANGE IN WATER TEMPERATURE (DEGREE FAR.)
20
12
4
-4
-12
-20
40
55
70
85
100
115
AIR TEMPERATURE (DEGREE FAR.)
SOURCE OF WATER
TAILWATER
MIXED

SCS SOIL BORINGS

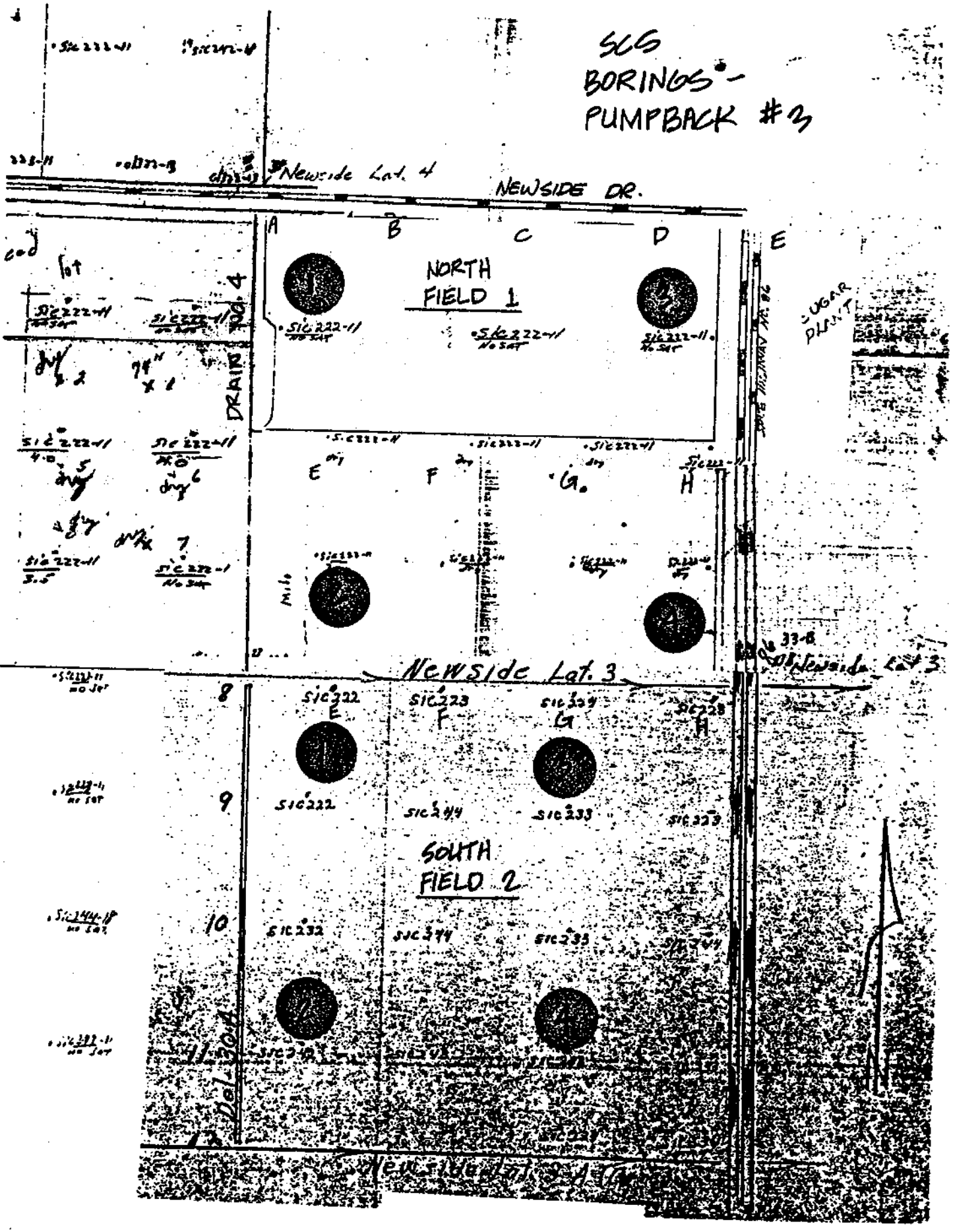


PUMPBACK SYSTEM # 3

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL LEGEND

SYMBOL	NAME
100	Antho loamy fine sand
101	Antho-Superstition complex
102	Badland
103	Carsitas gravelly sand, 0 to 5 percent slopes
104	Fluvaquents, saline
105	Glenbar clay loam
106	Glenbar clay loam, wet
107	Glenbar complex
108	Holtville loam
109	Holtville silty clay
110	Holtville silty clay, wet
111	Holtville-Imperial silty clay loams
112	Imperial silty clay
113	Imperial silty clay, saline
114	Imperial silty clay, wet
115	Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes
116	Imperial-Glenbar silty clay loams, 2 to 5 percent slopes
117	Indio loam
118	Indio loam, wet
119	Indio-Vint complex
120	Laveen loam
121	Meloland fine sand
122	Meloland very fine sandy loam, wet
123	Meloland and Holtville loams, wet
124	Niland gravelly sand
125	Niland gravelly sand, wet
126	Niland fine sand
127	Niland loamy fine sand
128	Niland-Imperial complex, wet
129	Pits
130	Rositas sand, 0 to 2 percent slopes
131	Rositas sand, 2 to 5 percent slopes
132	Rositas fine sand, 0 to 2 percent slopes
133	Rositas fine sand, 2 to 9 percent slopes
134	Rositas fine sand, 9 to 30 percent slopes
135	Rositas fine sand, wet, 0 to 2 percent slopes
136	Rositas loamy fine sand, 0 to 2 percent slopes
137	Rositas silt loam, 0 to 2 percent slopes
138	Rositas-Superstition loamy fine sand
139	Superstition loamy fine sand
140	Torriorthents-Rock outcrop complex, 5 to 60 percent slopes
141	Torriorthents and Orthids, 5 to 30 percent slopes
142	Vint loamy very fine sand, wet
143	Vint fine sandy loam
144	Vint and Indio very fine sandy loams, wet


SCS
BORINGS -
PUMPBACK #3
NEWSIDE DR.
Newside Lot. 4
NORTH
FIELD 1
DRAIN
SUGAR
PLANT
Newside Lot. 3
SOUTH
FIELD 2
Del. Sod
Newside Lot. 2

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

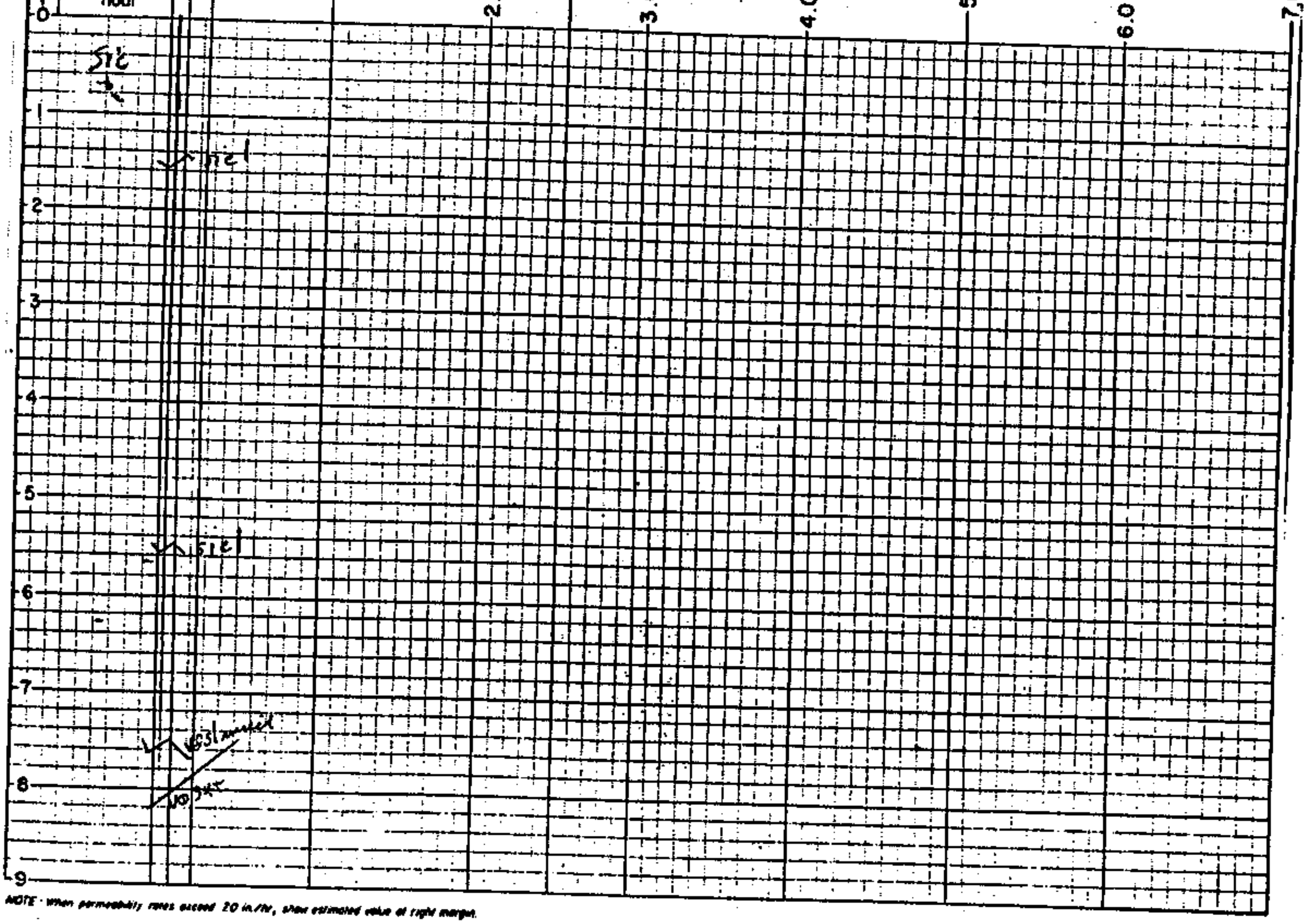
PUMPBACK #3
NORTH #1

PROPERTY ______________________ WEIGHTED AVERAGE PERMEABILITY ______ in./hr.

BORING NO. B 2/3 - 1 LAND USE ______ CROP CONDITION ______

TECHNICIAN ______ DATE SURVEY ______ SYMBOL sic 222-11

DEPTH IN FEET										
IMP. IRRIG. DIST. DRAINAGE SYM.	IL	SLL	SL		SLS		FS		MS	CS
STANDARD TEXTURE SYMBOLS	c sic sicl	cl scl sil	l vfsl	fsl	sl	lvfs	lfs ls fs		s	cos
STANDARD PERMEABILITY SYM.	2	3	4		5		6		7	
PERMEABILITY inches per hour	.10	.25	1.0	2.0	2.5	3.0	4.0	5.0	6.0	7.0



NOTE - When permeability rates exceed 20 in./hr., show estimated value at right margin.

M-3254

7-L-15000-386

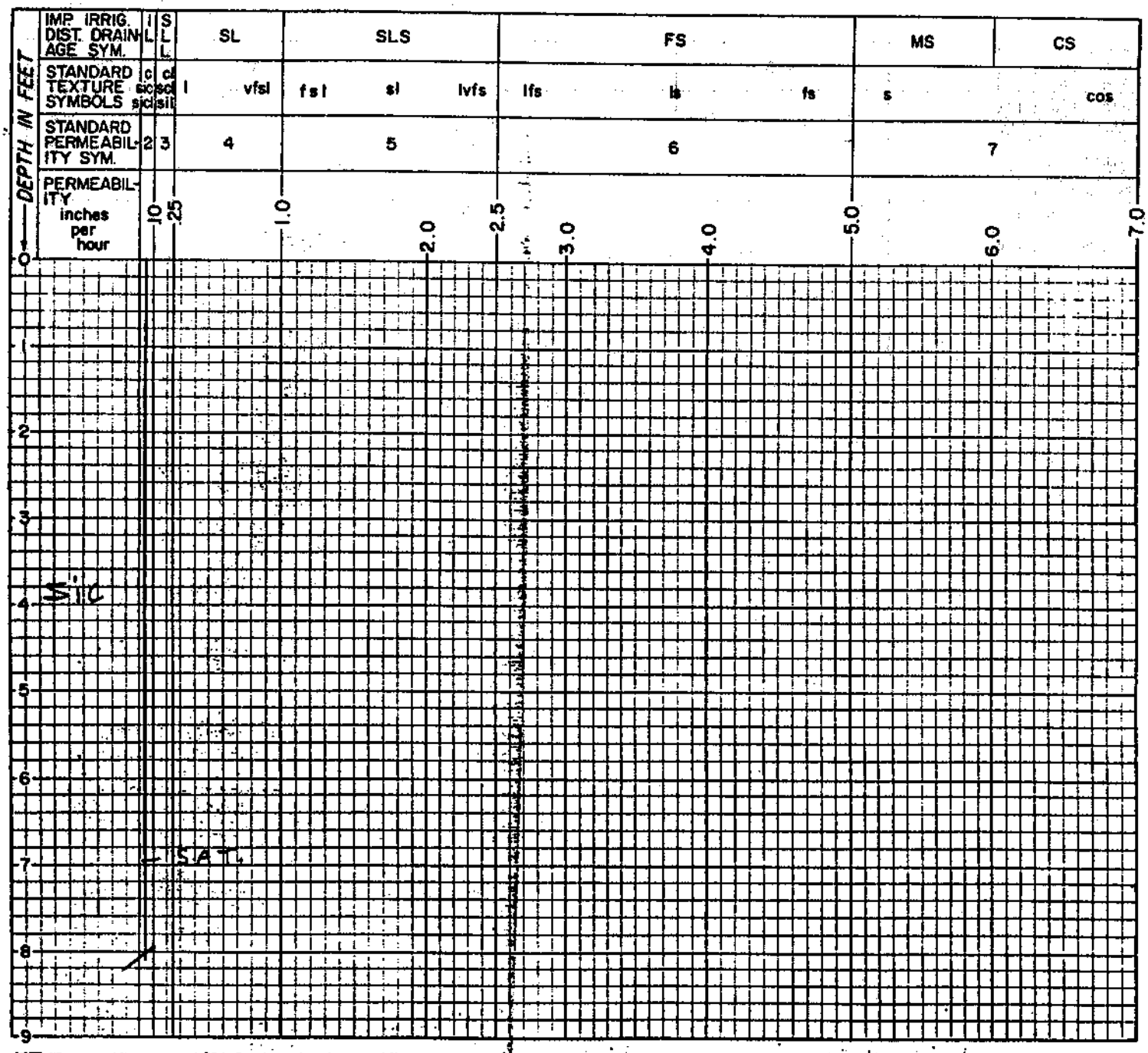
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #3
NORTH #2

PROPERTY _____ WEIGHTED AVERAGE PERMEABILITY _____ in./hr.

BORING NO. E-7 LAND USE _____ CROP CONDITION _____

TECHNICIAN _____ DATE SURVEY _____ SYMBOL SIC 222-11



NOTE: When permeability rates exceed 20 in./hr., show estimated value at right margin.

M-3254

7-L-15000-386

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #3
NORTH #3

PROPERTY # 3337

WEIGHTED AVERAGE PERMEABILITY _____ in./hr.

BORING NO. D½-1

LAND USE _____

CROP CONDITION _____

TECHNICIAN J. Fischer

DATE SURVEY 10-6-66

SYMBOL sic 222-11 / NOSAT

IMP. IRRIG. DIST. DRAINAGE SYM.	IL	SLL	SL	SLS			FS			MS	CS
STANDARD TEXTURE SYMBOLS	c sic sicl	cl sc sil	l vfsl	fsl	sl	lvfs	lfs	ls	fs	s	cos
STANDARD PERMEABILITY SYM.	2	3	4		5			6		7	
PERMEABILITY inches per hour	.10	.25		1.0		2.0	2.5	3.0	4.0	5.0	6.0	7.0

DEPTH IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

sic

fill

fl
lf
sil

NOSAT

NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin

M-3254

7-L-15000-386

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #3
NORTH #4

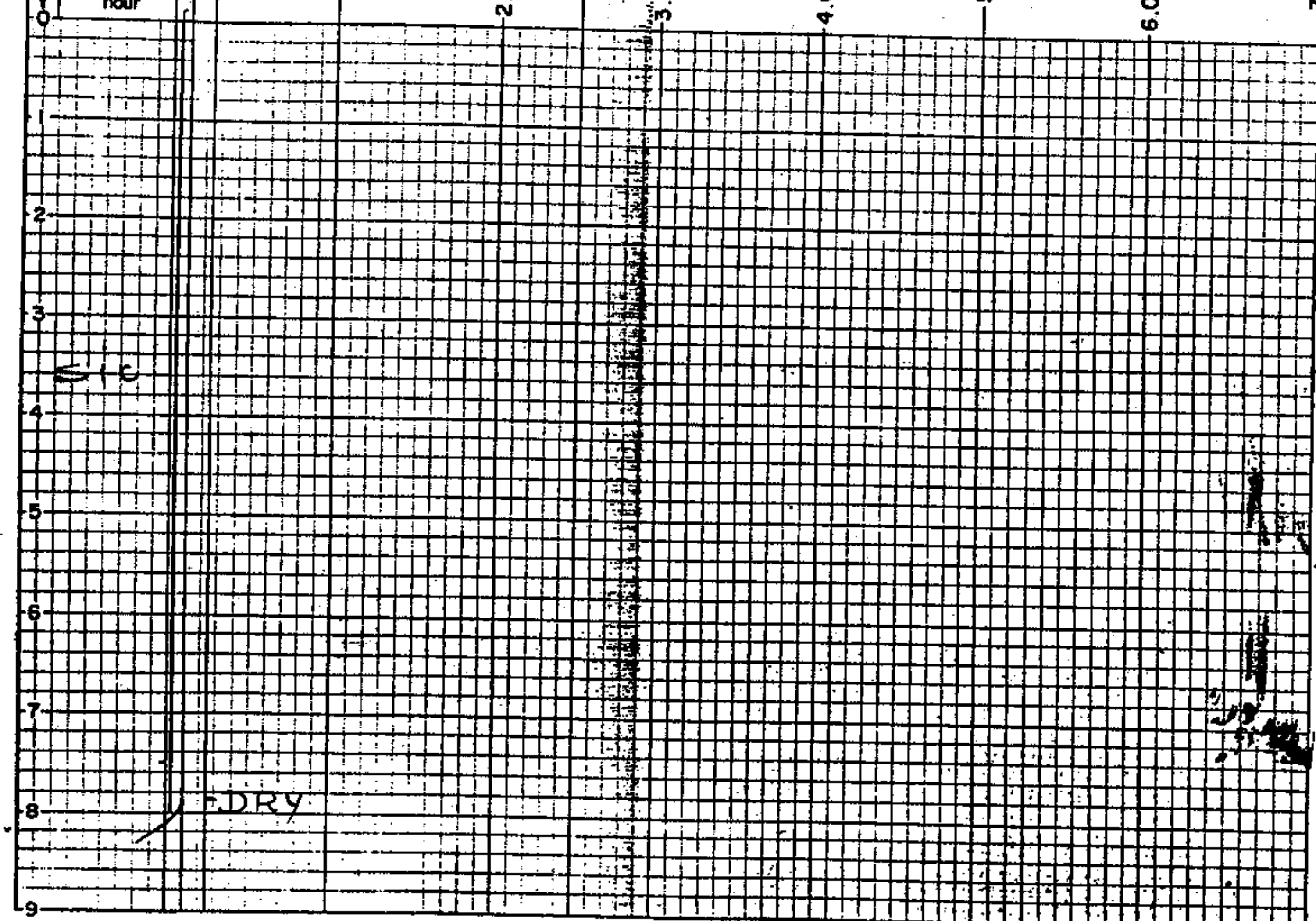
PROPERTY Borchard, A. (Co.) (S#2943)

WEIGHTED AVERAGE PERMEABILITY ______ in./hr.

BORING NO. H-7 LAND USE Fallow CROP CONDITION ______

TECHNICIAN R. Pratt. DATE SURVEY 5/23/66 SYMBOL Sic 222-11

DEPTH IN FEET		I	S	SL	SLS	FS	MS	CS
	IMP. IRRIG. DIST. DRAINAGE SYM.	I	L	SL	SLS	FS	MS	CS
	STANDARD TEXTURE SYMBOLS	c sic sicl	cl scl sil	l vfsl	fsl sl lvfs	lfs ls fs	s	cos
	STANDARD PERMEABILITY SYM.	2	3	4	5	6	7	
	PERMEABILITY inches per hour	.10	.25	1.0	2.0 2.5	3.0 4.0 5.0	6.0	7.0



NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin.

M-3254

7-L-15000-386

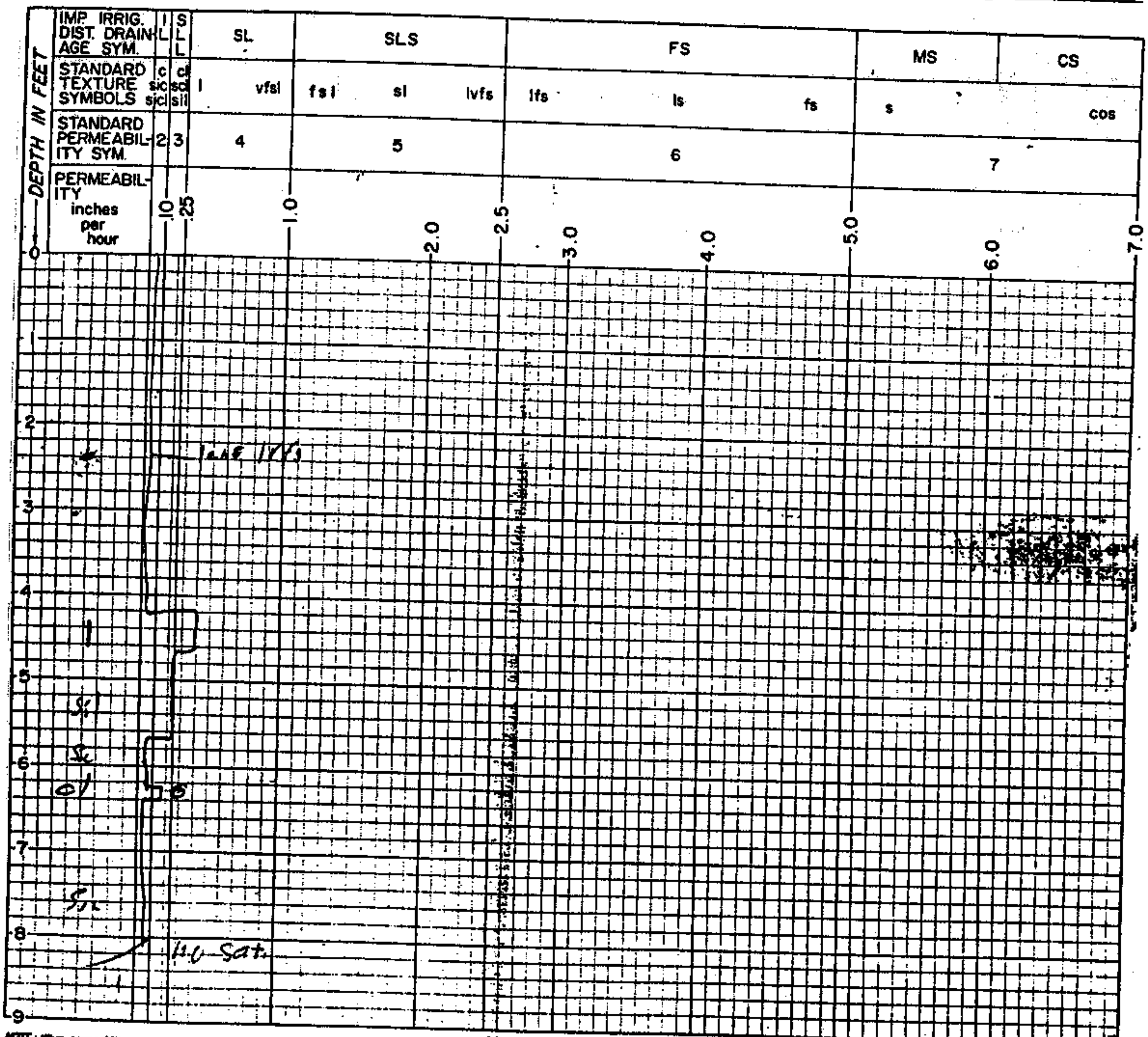
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #3
SOUTH #3

PROPERTY ______________________ WEIGHTED AVERAGE PERMEABILITY ______________ in./hr.

BORING NO. G-9 ______ LAND USE ______ CROP CONDITION ______

TECHNICIAN ______ DATE SURVEY ______ SYMBOL Sic 233-11



NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin.

7-L-15000-386

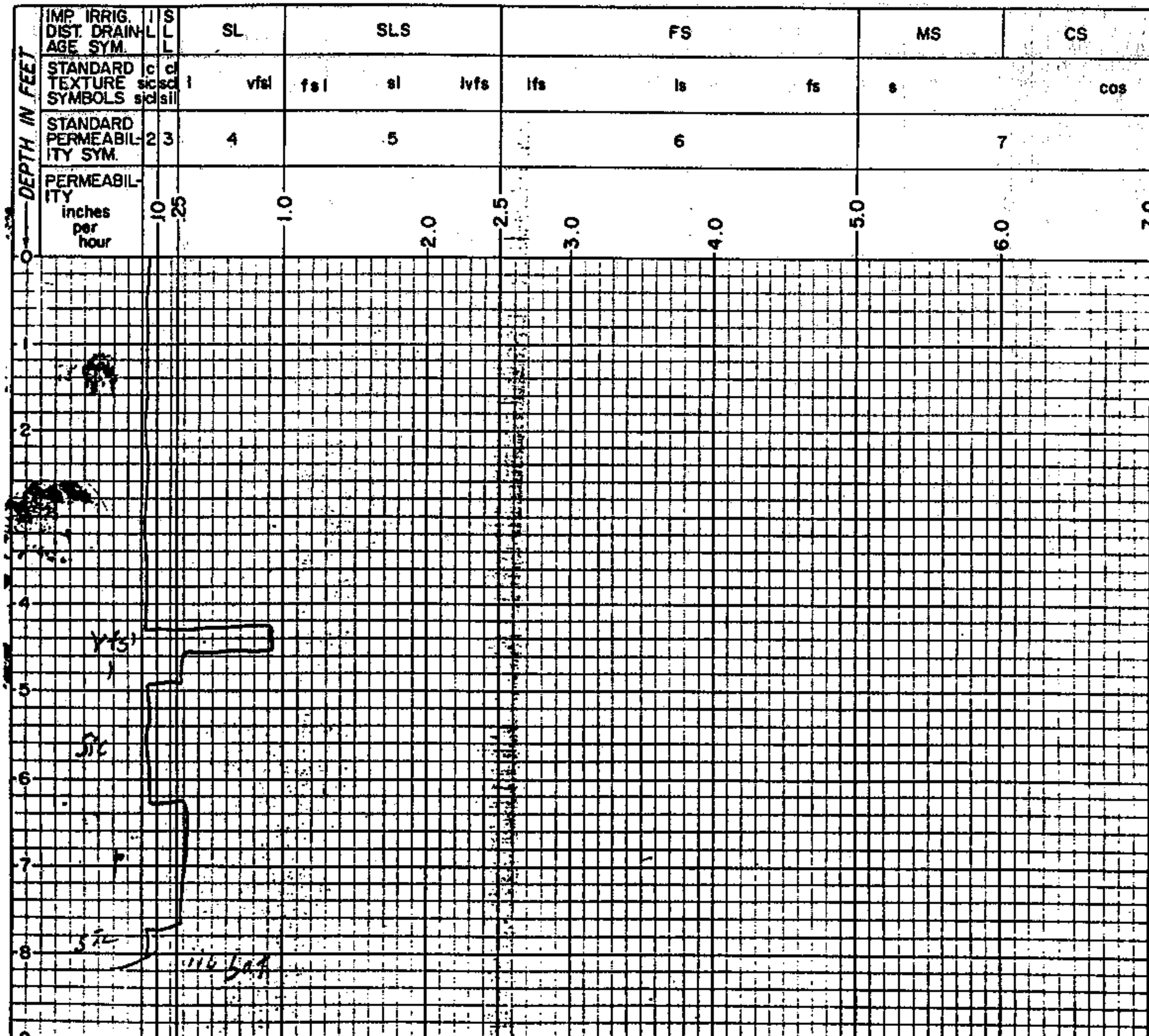
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #3
SOUTH #4

PROPERTY ____________________ WEIGHTED AVERAGE PERMEABILITY ____________ in./hr.

BORING NO. G-11 LAND USE ____________ CROP CONDITION ____________

TECHNICIAN ____________ DATE SURVEY ____________ SYMBOL SiCL 33-11



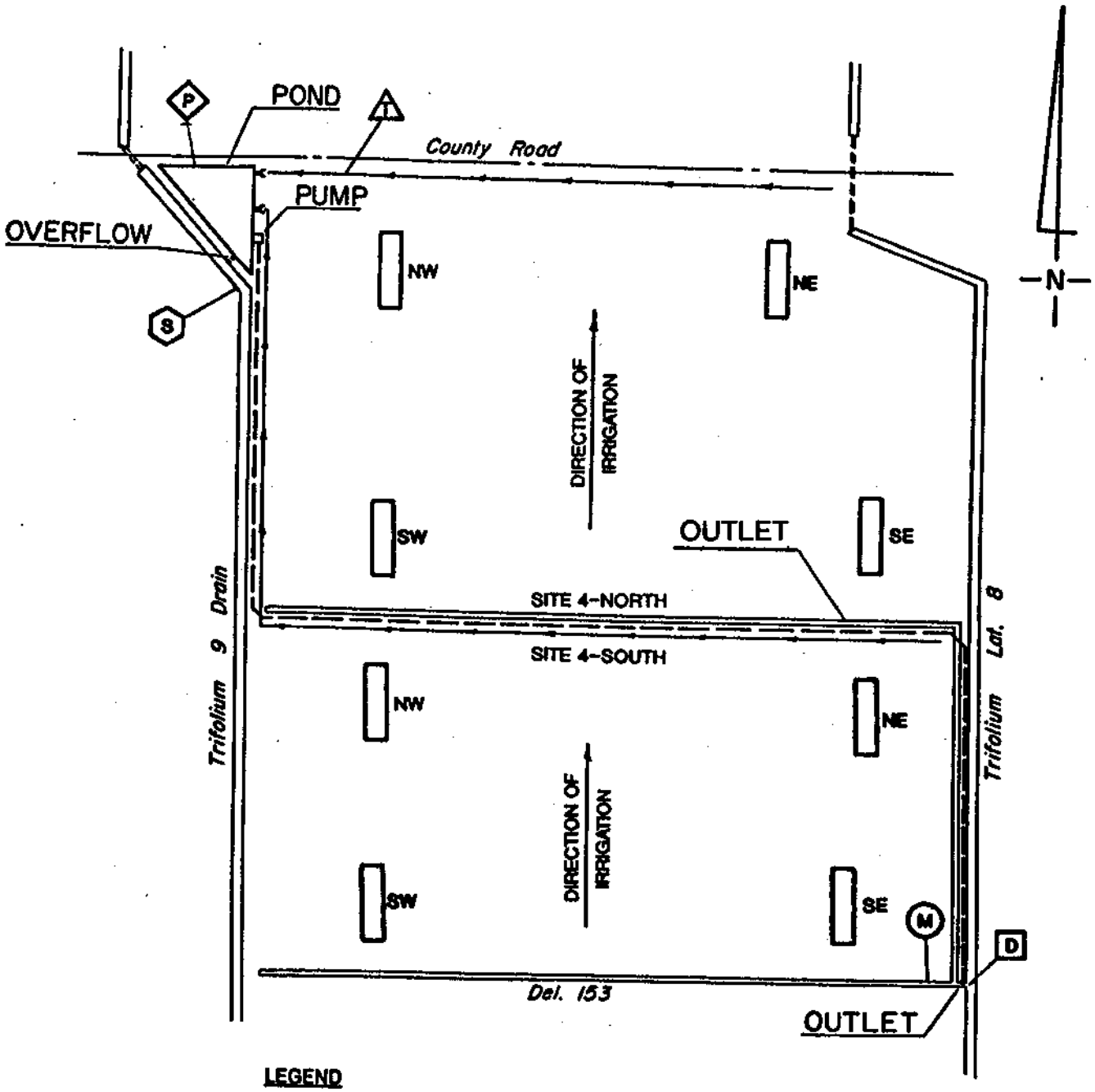
NOTE - When permeability rates exceed 7.0 in./hr., show estimated value at rt.

7-1-15000-386

APPENDIX D

PUMPBACK SYSTEM #4

DWG. L-2883



LEGEND

- RETURN PIPELINE
- TAILWATER DITCH
- NW — SOIL SALINITY SAMPLE SITE
- D — DELIVERY WATER TEMPERATURE AND EC SAMPLE SITE
- T — TAILWATER TEMPERATURE AND EC SAMPLE SITE
- P — POND WATER TEMPERATURE AND EC SAMPLE SITE
- M — MIXED WATER TEMPERATURE AND EC SAMPLE SITE
- S — SPILL WATER TEMPERATURE AND EC SAMPLE SITE

Refer Dwg. 12F-6924

PUMPBACK SYSTEM #4

N1/2 TRACT 128
T13S.-R.13E.

WATER DELIVERY/TAILWATER/SPILL

PUMPBACK SYSTEM #4

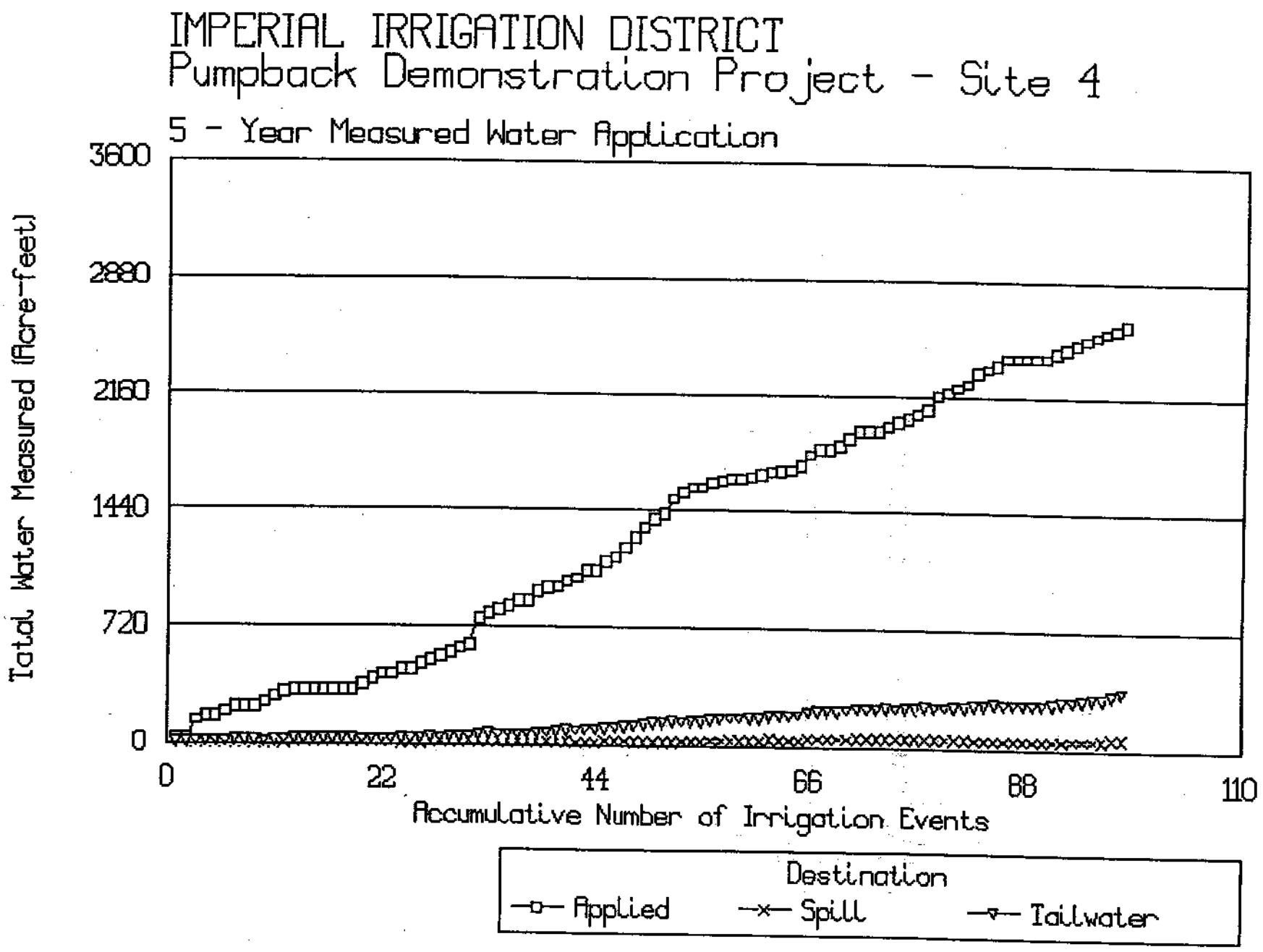
EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
1	9/25/84	SUGAR BEETS	*87.4	*7.7		*7.7					
2	10/ 5/84	SUGAR BEETS	*17.0	*2.5		*2.5					
3	11/30/84	SUGAR BEETS	*50.8	*1.6		*1.6					
4	1/23/85	SUGAR BEETS	*38.2	*1.8		*1.8					
5	2/21/85	SUGAR BEETS	*22.8	*2.1		*2.1					
6	3/31/85	SUGAR BEETS	*21.0	*2.3		*2.3					
7	4/ 8/85	SUGAR BEETS	*32.8	*0.6		*0.6					
8	4/17/85	SUGAR BEETS	*17.8	*0.3		*0.3					
9	4/26/85	SUGAR BEETS	*9.0	*1.0		*1.0					
10	4/30/85	SUGAR BEETS	*21.4	*2.5		*2.5					
11	5/ 8/85	SUGAR BEETS	*14.2	*1.4		*1.4					
12	9/ 6/85	SUGAR BEETS	*53.4	*1.0		*1.0					
1	11/ 4/85	ALFALFA	38.8	.9	.0	.9	100%	2%	2%		Pumpback system installed
2	3/21/86	ALFALFA	*28.8								
3	4/ 6/86	COTTON	104.2	.0	8.7	8.7	0%	0%	8%		
4	4/25/86	ALFALFA	28.0	.0	1.1	1.1	0%	0%	4%		
5	5/12/86	ALFALFA	*28.8								
6	5/22/86	COTTON	27.6	.0	.5	.5	0%	0%	2%		
7	6/ 3/86	COTTON	27.2	.0	.4	.4	0%	0%	1%		
8	6/20/86	ALFALFA	*29.2								
9	6/24/86	COTTON	*16.0								
10	7/ 1/86	ALFALFA	31.0	2.6	.5	3.1	84%	8%	10%		
11	7/10/86	ALFALFA	29.8	.0	3.2	3.2	0%	0%	11%		
12	7/12/86	COTTON	25.0	.0	3.9	3.9	0%	0%	16%		
13	7/23/86	COTTON	20.6	.3	.9	1.2	25%	1%	6%		
14	8/ 5/86	COTTON	*18.2								
15	8/16/86	COTTON	*17.8								
16	8/27/86	COTTON	*19.6								
17	9/ 6/86	COTTON	*19.4								
18	9/18/86	COTTON	*19.7								
19	10/21/86	ALFALFA	*44.7								
20	11/18/86	ALFALFA	26.7	.0	2.7	2.7	0%	0%	10%		
21	1/16/87	ALFALFA	33.2	.0	1.5	1.5	0%	0%	5%		
22	3/10/87	ALFALFA	34.4	.0	.3	.3	0%	0%	1%		
23	4/ 1/87	ALFALFA	*18.0								
24	4/21/87	ALFALFA	32.2	2.1	.0	2.1	100%	7%	7%		
25	5/ 4/87	ALFALFA	*24.50								
26	5/20/87	ALFALFA	26.1	.3	.0	.3	100%	1%	1%		
27	5/31/87	ALFALFA	29.5	5.4	.8	6.2	87%	18%	21%		
28	6/10/87	ALFALFA	25.0	.0	3.6	3.6	0%	0%	14%		
29	6/22/87	ALFALFA	23.9	.0	1.7	1.7	0%	0%	7%		
30	6/30/87	ALFALFA	24.0	.0	1.5	1.5	0%	0%	6%		
31	7/ 7/87	ALFALFA	22.4	.0	2.5	2.5	0%	0%	11%		
32	7/14/87	FLAT FLOOD	160.7	.0	8.3	8.3	0%	0%	5%		
33	7/25/87	ALFALFA	26.9	.0	3.9	3.9	0%	0%	14%		

PUMPBACK SYSTEM #4

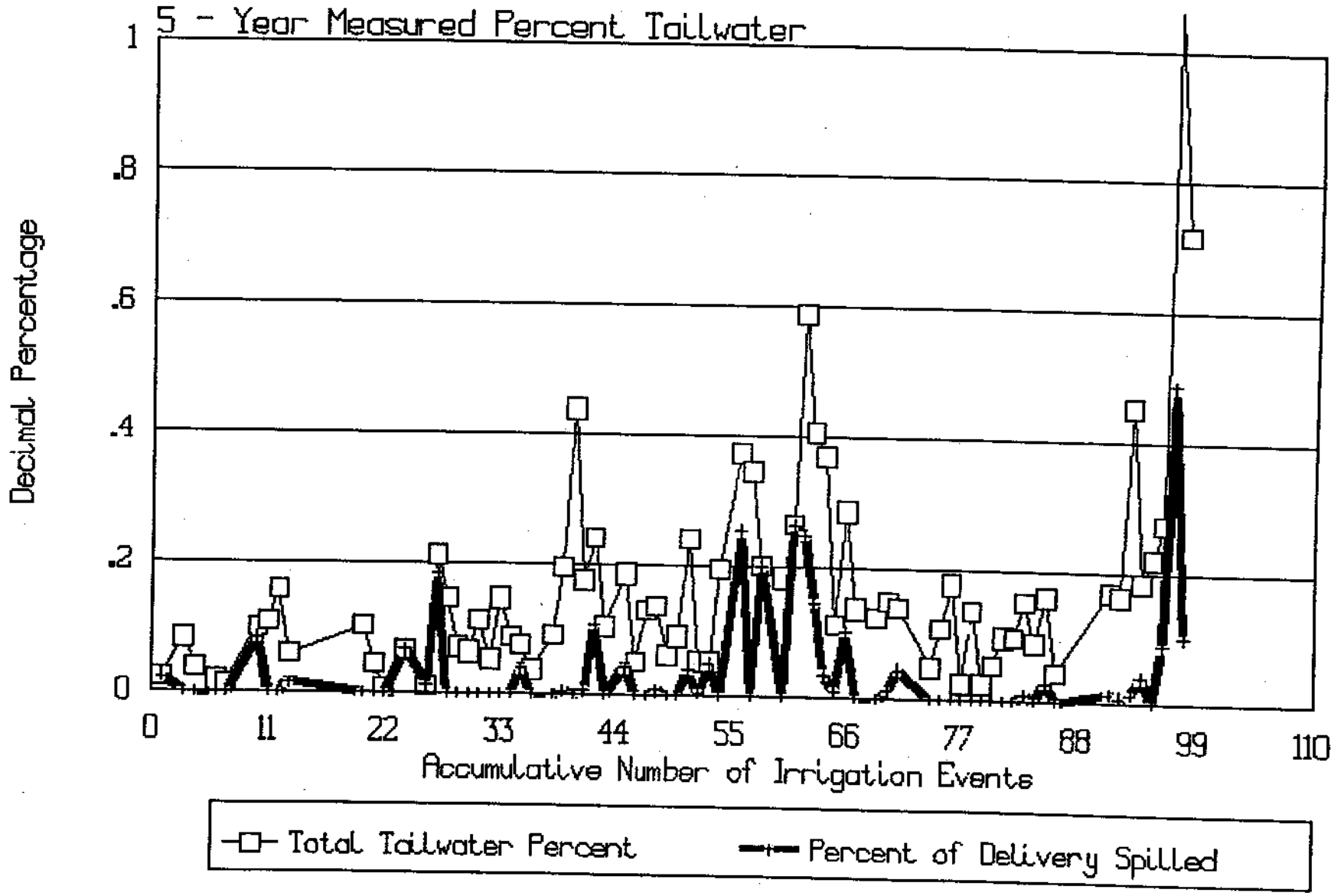
EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
34	8/ 4/87	ALFALFA	29.6	.0	2.6	2.6	0%	0%	9%		
35	8/14/87	ALFALFA	23.0	.9	.8	1.7	53%	4%	7%		
36	10/13/87	ALFALFA	27.5	.0	1.0	1.0	0%	0%	4%		
37	10/28/87	ALFALFA	*20.0		*2.6	*2.6				NR	
38	11/30/87	ALFALFA	66.4	.0	5.9	5.9	0%	0%	9%		
39	12/15/87	ALFALFA	22.1	.1	4.2	4.3	2%	0%	19%		
40	12/27/87	ALFALFA	6.4	.0	2.8	2.8	0%	0%	44%		
41	1/ 5/88	ALFALFA	30.9	.2	5.2	5.4	4%	1%	17%		
42	1/18/88	ALFALFA	17.5	1.9	2.3	4.2	45%	11%	24%		
43	2/25/88	ALFALFA	48.7	.0	5.1	5.1	0%	0%	10%		
44	3/23/88	ALFALFA	*56.3		*5.7	*5.7					
45	4/11/88	ALFALFA	59.1	2.5	8.4	10.9	23%	4%	18%	NR	EMPTY REPORT ON SPILL
46	4/28/88	ALFALFA	24.3	.0	1.2	1.2	0%	0%	5%		
47	5/11/88	ALFALFA	62.3	.0	8.0	8.0	0%	0%	13%		
48	5/24/88	ALFALFA	55.1	.4	7.1	7.5	5%	1%	14%		
49	6/17/88	ALFALFA	67.6	.0	4.2	4.2	0%	0%	6%		
50	6/29/88	ALFALFA	55.6	.0	5.0	5.0	0%	0%	9%		RECORDER MALFUNCTION ON SPILL
51	7/10/88	ALFALFA	32.9	1.3	6.6	7.9	16%	4%	24%		
52	7/26/88	ALFALFA & FLAT FLOOD	90.6	.3	4.5	4.8	6%	0%	5%		PRE-IRRIGATION ON LETTUCE
53	8/ 5/88	ALFALFA	40.4	2.0	.1	2.1	95%	5%	5%		
54	8/14/88	ALFALFA	28.0	.0	5.4	5.4	0%	0%	19%		
55	9/20/88	LETTUCE	*20.0								
56	9/26/88	LETTUCE	28.4	7.2	3.4	10.6	68%	25%	37%		SPRINKLER IRRIG ON LETTUCE
57	10/15/88	LETTUCE	16.2	.0	5.6	5.6	0%	0%	35%		SPILL RECALC. BOARD PULLED
58	10/31/88	LETTUCE	8.0	1.6	.0	1.6	100%	20%	20%		SPRINKLER IRRIGATION
59	11/ 6/88	ALFALFA	*46.9								SPILL RECALC. BOARD PULLED
60	11/12/88	LETTUCE	16.0	.0	2.9	2.9	0%	0%	18%	NR	POND DATA LOST
61	11/29/88	LETTUCE	8.0	2.1	.0	2.1	100%	26%	26%		GATED PIPE IRRIGATION
62	12/ 6/88	ALFALFA & LETTUCE	17.3	4.3	5.9	10.2	42%	25%	59%		GATED PIPE IRRIGATION
63	12/13/88	LETTUCE	6.9	1.0	1.8	2.8	36%	14%	41%		
64	12/28/88	LETTUCE	8.4	.3	2.8	3.1	10%	4%	37%		SECOND DAY JUST RECYCLED TW
65	2/17/89	ALFALFA	31.3	.3	3.2	3.5	9%	1%	11%		
66	2/21/89	CANTALOUPE	68.4	7.0	12.5	19.5	36%	10%	29%		CROP GERMINATION
67	3/24/89	ALFALFA	29.5	.0	4.0	4.0	0%	0%	14%		
68	3/28/89	ALFALFA	*3.8								
69	4/10/89	ALFALFA	29.8	.0	3.7	3.7	0%	0%	12%		
70	4/16/89	CANTALOUPE	40.2	.5	5.4	5.9	8%	1%	15%		
71	5/ 3/89	ALFALFA & CANTALOUPE	51.6	2.3	4.9	7.2	32%	4%	14%		
72	5/12/89	CANTALOUPE	*19.7		*3.4	*3.4					
73	5/17/89	ALFALFA & CANTALOUPE	*33.0		*6.1	*6.1				NR	POND RECORD MALFUNCTION
74	6/ 4/89	ALFALFA	30.2	.0	1.5	1.5	0%	0%	5%	NR	NO RECORD ON SPILL
75	6/15/89	ALFALFA	28.0	.0	3.0	3.0	0%	0%	11%		
76	6/23/89	ALFALFA	22.8	.0	4.0	4.0	0%	0%	18%		
77	7/ 8/89	ALFALFA	31.7	.0	.8	.8	0%	0%	3%		
78	7/17/89	ALFALFA	20.5	.0	2.8	2.8	0%	0%	14%		

PUMPBACK SYSTEM #4

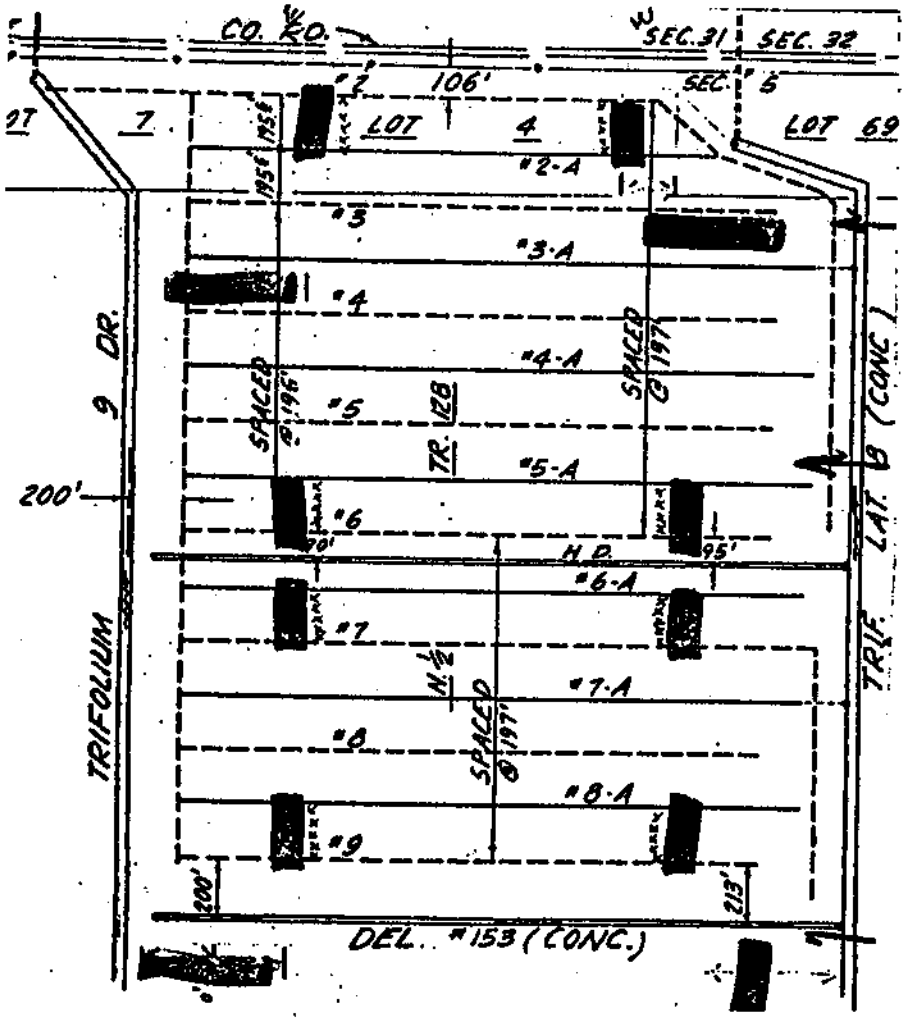
EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
79	7/19/89	ALFALFA & IDLE	90.1	.0	2.2	2.2	0%	0%	2%		SOUTH FIELD WAS IDLE
80	8/ 8/89	ALFALFA	27.5	.0	1.5	1.5	0%	0%	5%		
81	8/19/89	ALFALFA	24.0	.0	2.3	2.3	0%	0%	10%		
82	8/29/89	ALFALFA	23.2	.0	2.2	2.2	0%	0%	9%		
83	9/13/89	ONIONS	66.0	.7	9.3	10.0	7%	1%	15%		DEL RECORD SHUT OFF
84	9/19/89	ALFALFA	26.0	.0	2.3	2.3	0%	0%	9%		PREIRRIGATION ON SOUTH FIELD
85	10/ 5/89	ALFALFA	20.8	.6	2.7	3.3	18%	3%	16%		
86	11/ 6/89	ALFALFA & ONIONS	49.0	.0	2.2	2.2	0%	0%	4%		
87	11/13/89	ONIONS	*6.5								BOTH FIELDS IRRIGATED
88	11/17/89	ONIONS	*7.2								
89	11/24/89	ONIONS	*4.6								12 HOUR RUN - SPRINKLERS
90	12/ 2/89	ONIONS	*3.6								12 HOUR RUN - SPRINKLERS
91	12/12/89	ONIONS	36.7	.5	5.7	6.2	8%	1%	17%		12 HOUR RUN - SPRINKLERS
92	12/27/89	ALFALFA	24.0	.2	3.7	3.9	5%	1%	16%		
93	2/ 4/90	ONIONS	29.4	.4	12.9	13.3	3%	1%	45%		
94	2/13/90	ALFALFA	25.7	1.0	3.7	4.7	21%	4%	18%		
95	2/24/90	ONIONS	22.3	.0	4.9	4.9	0%	0%	22%		
96	3/ 2/90	ALFALFA	23.9	2.1	4.4	6.5	32%	9%	27%		
97	3/ 7/90	ONIONS	21.4	10.4	12.3	22.7	46%	49%	106%		
98	3/16/90	ONIONS	26.7	2.7	16.5	19.2	14%	10%	72%		
		TOTAL	2,615.1	66.4	283.4	349.8	19%	3%	13%		
		AVG	34.9	.9	3.8	4.7					
		STD DEV	23.8	1.8	3.3	4.3					


IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4
5 - Year Measured Water Application
Total Water Measured (Acre-feet)
3600
2880
2160
1440
720
0
0
22
44
66
88
110
Accumulative Number of Irrigation Events
Destination
Applied
Spill
Tailwater

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4



SOIL SALINITY



PUMPBACK SYSTEM #4

N1/2 TRACT 128
T13S.-R.13E.

IMPERIAL IRRIGATION DISTRICT
AVERAGE SOIL SALINITY ACROSS SELECTED LOCATIONS - PUMPBACK SYSTEM #4-NORTH

NORTHWEST - SITE 4-NORTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.2	1.2	-45%	3.1	158%
12	4.2	2.0	-52%	4.6	130%
24	5.0	2.4	-52%	4.7	96%
36	6.6	1.5	-77%	4.7	213%
48	6.2	2.2	-65%	4.3	95%
60	6.0	3.3	-45%	5.3	61%
AVG	5.0	2.1	-58%	4.5	112%

NORTHEAST - SITE 4-NORTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.5	1.8	-28%	2.4	33%
12	3.9	5.8	49%	3.4	-41%
24	2.4	4.6	92%	5.7	24%
36	3.8	4.1	8%	3.2	-22%
48	5.4	5.6	4%	2.1	-63%
60	4.4	5.8	32%	5.0	-14%
AVG	3.7	4.6	24%	3.6	-21%

SOUTHWEST - SITE 4-NORTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	1.4	1.0	-29%	2.5	150%
12	1.7	1.1	-35%	3.2	191%
24	1.6	1.3	-19%	5.8	346%
36	1.8	1.1	-39%	3.8	245%
48	1.8	.7	-61%	3.1	343%
60	2.2	.9	-59%	3.0	233%
AVG	1.8	1.0	-42%	3.6	251%

SOUTHEAST - SITE 4-NORTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.0	1.2	-40%	2.5	108%
12	2.2	1.3	-41%	3.0	131%
24	3.1	2.3	-26%	4.9	113%
36	2.7	3.0	11%	7.2	140%
48	2.9	2.4	-17%	5.2	117%
60	2.5	1.7	-32%	3.8	124%
AVG	2.6	2.0	-23%	4.4	124%

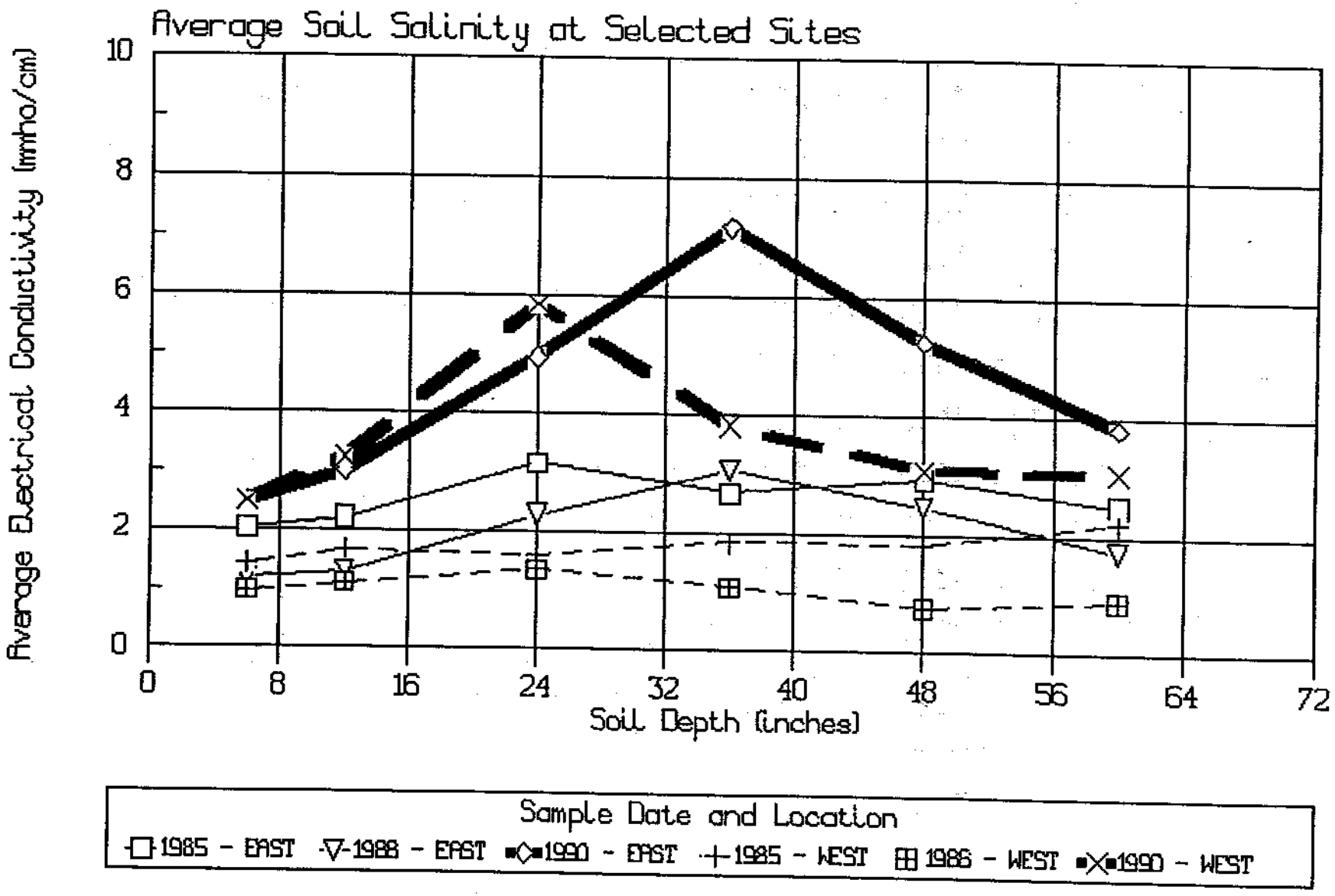
AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1988 PERCENT INCREASE FOR SITE 4N = -26%
AVERAGE ELECTRICAL CONDUCTIVITY 1988 TO 1990 PERCENT INCREASE FOR SITE 4N = 66%
AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1990 PERCENT INCREASE FOR SITE 4N= 23%

NOTE: NEGATIVE VALUES SIGNIFY DECREASES IN THE AVERAGE SOIL SALINITY.
ECe VALUES (MMHOS/CM) AVERAGED FROM SAMPLES OVER TILE DRAINS.

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4 NORTH H
SOIL SALINITY

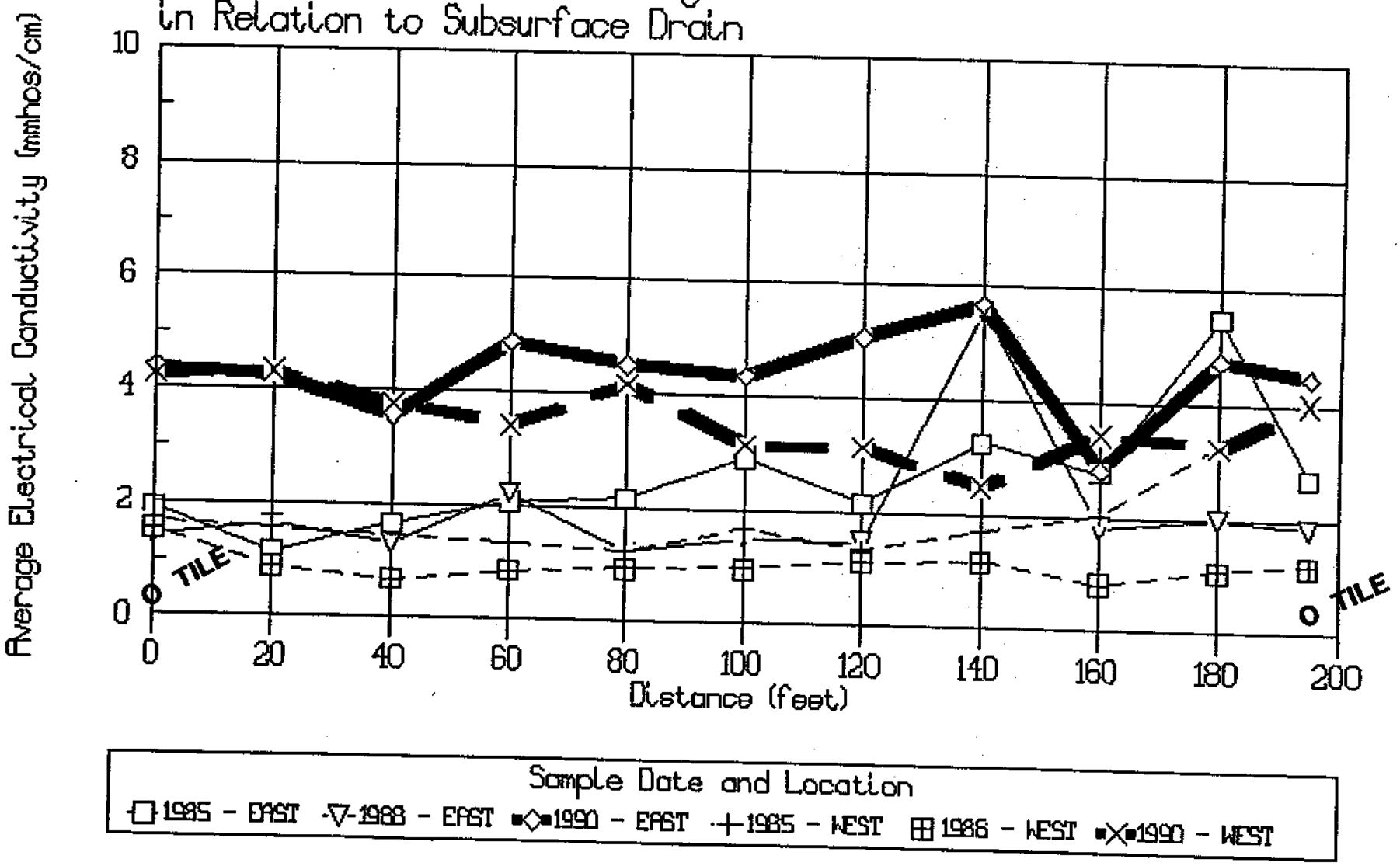
		DRAIN 6										DRAIN 5A	
	DEPTH (in.)	DISTANCE (feet) 0	20	40	60	80	100	120	140	160	180	195	AVG EC (mmho/cm)
EAST 1985	6	1.7	1.3	1.4	1.7	2.2	1.6	1.4	2.3	2.1	4.8	1.6	2.0
	12	1.6	1.5	1.6	2.0	2.2	1.9	1.8	3.3	1.9	4.2	2.1	2.2
	24	2.4	1.2	1.4	3.0	1.6	2.8	2.4	2.8	4.3	8.6	4.0	3.1
	36	1.0	1.0	2.3	2.4	2.2	4.5	3.0	3.9	2.6	3.9	2.4	2.7
	48	2.5	1.0	1.8	1.8	2.3	4.0	1.9	4.5	2.8	6.2	3.2	2.9
	60	2.2	.8	1.4	1.4	2.4	2.7	2.4	2.7	3.0	5.4	3.0	2.5
	AVG EC	1.9	1.1	1.7	2.1	2.2	2.9	2.2	3.3	2.8	5.5	2.7	2.6
1988	6	.8	.9	1.0	1.0	.8	.8	.8	3.6	1.1	.7	1.2	1.2
	12	1.0	1.0	1.0	1.6	.5	1.4	1.4	1.5	1.8	1.4	1.5	1.3
	24	1.3	2.2	1.9	1.9	1.0	1.5	2.4	8.8	1.0	1.9	.8	2.3
	36	3.0	3.2	1.8	3.8	1.5	1.9	2.2	6.2	3.3	3.3	3.4	3.0
	48	1.1	1.2	.7	2.7	1.8	1.7	.8	9.7	2.5	2.6	2.0	2.4
	60	1.3	1.0	1.3	2.2	1.6	1.7	1.2	3.6	1.0	2.0	2.0	1.7
	AVG EC	1.4	1.6	1.3	2.2	1.2	1.5	1.5	5.6	1.8	2.0	1.8	2.0
1990	6	2.0	1.9	2.8	2.0	2.5	2.1	2.7	4.0	2.1	2.5	2.6	2.5
	12	2.1	4.3	2.3	2.8	2.2	2.5	4.0	5.0	1.4	2.8	3.5	3.0
	24	2.7	5.9	6.6	7.1	3.9	5.3	5.1	6.1	3.5	4.3	3.7	4.9
	36	9.0	5.7	4.3	8.2	9.6	6.5	6.8	8.6	3.9	8.7	7.4	7.2
	48	6.3	3.5	2.6	6.1	5.6	5.5	3.0	8.4	2.6	6.5	7.3	5.2
	60	4.1	4.0	2.7	3.1	3.2	4.2	8.8	2.1	3.4	3.7	2.3	3.8
	AVG EC	4.4	4.2	3.6	4.9	4.5	4.4	5.1	5.7	2.8	4.8	4.5	4.4
WEST 1985	6	.9	.9		1.0	1.1	1.2	1.3	.9	1.5	3.9		1.4
	12	1.1	1.5		1.0	.9	2.1	1.4	1.6	1.9	3.5		1.7
	24	1.0	.8		.9	1.2	1.6	1.3	3.1	2.4	2.1		1.6
	36	1.9	1.7		1.7	1.3	2.0	1.3	1.6	1.7	3.2		1.8
	48	2.4	2.1		1.5	1.5	1.6	1.4	1.3	2.5	2.2		1.8
	60	2.6	2.4		1.8	1.5	1.3	1.3	1.7	2.1	5.0		2.2
	AVG EC	1.7	1.6		1.3	1.3	1.6	1.3	1.7	2.0	3.3		1.8
1988	6	.9	.6	.7	.8	1.5	.7	1.2	1.0	.8	1.1	1.1	1.0
	12	1.4	.5	.6	.8	.9	1.3	1.3	1.2	1.0	1.2	1.6	1.1
	24	2.0	1.1	1.0	1.3	1.1	1.0	1.0	1.7	.9	1.5	2.0	1.3
	36	1.6	1.4	.5	.6	.8	1.0	1.8	1.0	1.0	1.0	.8	1.1
	48	2.0	.5	.4	.5	.7	.5	.5	.8	.7	.7	.8	.7
	60	1.2	1.0	.8	1.0	.5	1.1	.8	1.2	.5	.7	.6	.9
	AVG EC	1.5	.9	.7	.8	.9	1.0	1.1	1.2	.8	1.1	1.2	1.0
1990	6	5.7	2.6	2.7	1.9	2.2	2.1	2.1	1.6	1.7	1.8	2.8	2.5
	12	2.5	2.8	3.6	4.4	6.1	2.5	2.5	1.9	1.6	3.5	3.9	3.2
	24	5.2	8.8	6.5	7.1	8.2	5.0	5.6	3.4	2.4	6.2	5.6	5.8
	36	5.1	4.8	4.0	1.8	4.4	2.7	4.0	3.0	2.8	3.9	5.2	3.8
	48	4.7	3.5	3.1	2.6	1.8	3.8	2.5	2.7	4.8	2.8	1.4	3.1
	60	2.1	3.3	2.6	2.6	2.2	2.6	2.0	2.3	7.3	1.3	5.2	3.0
	AVG EC	4.2	4.3	3.8	3.4	4.2	3.1	3.1	2.5	3.4	3.3	4.0	3.6

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 North H



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 North H

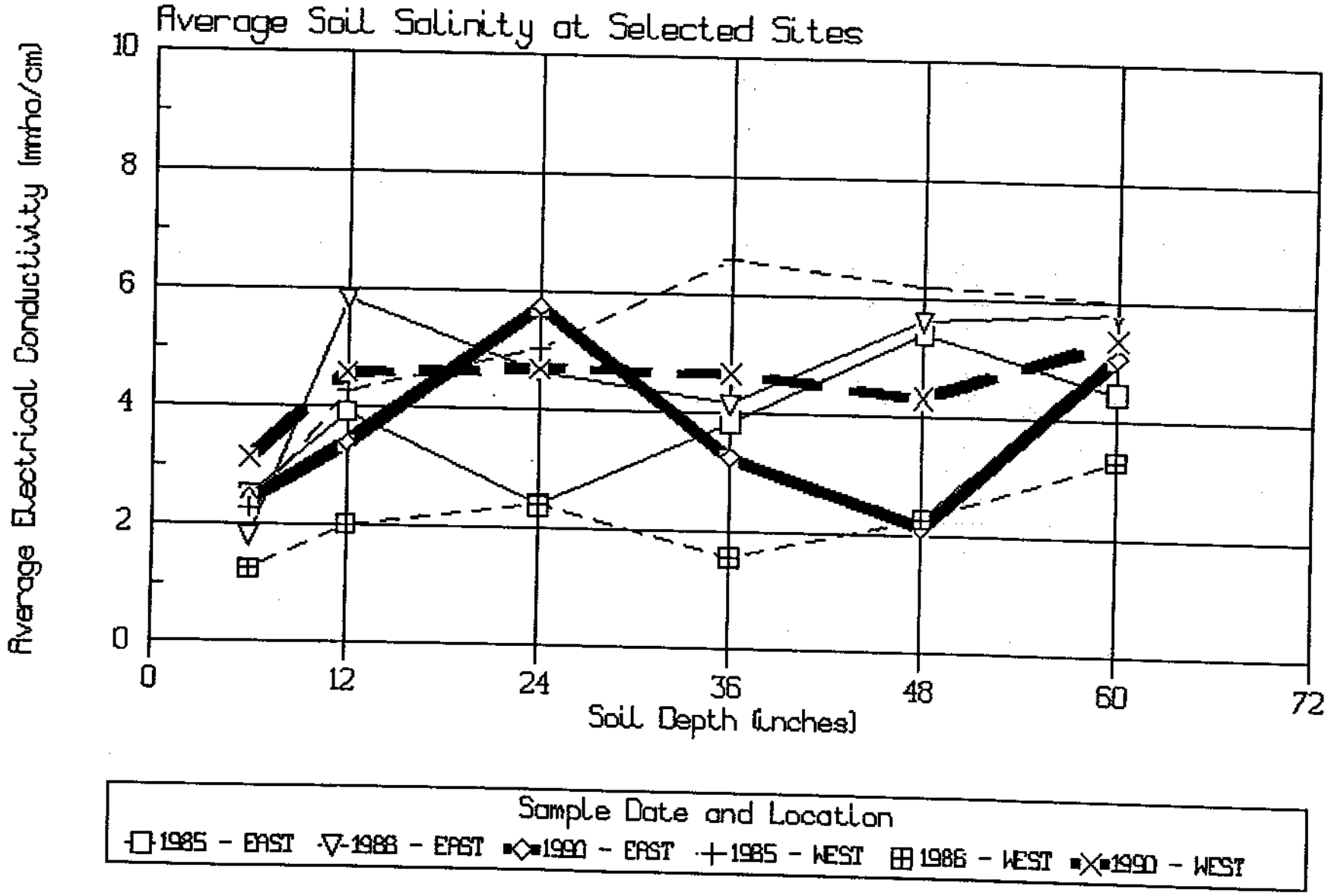
Average Soil Profile Salinity
in Relation to Subsurface Drain



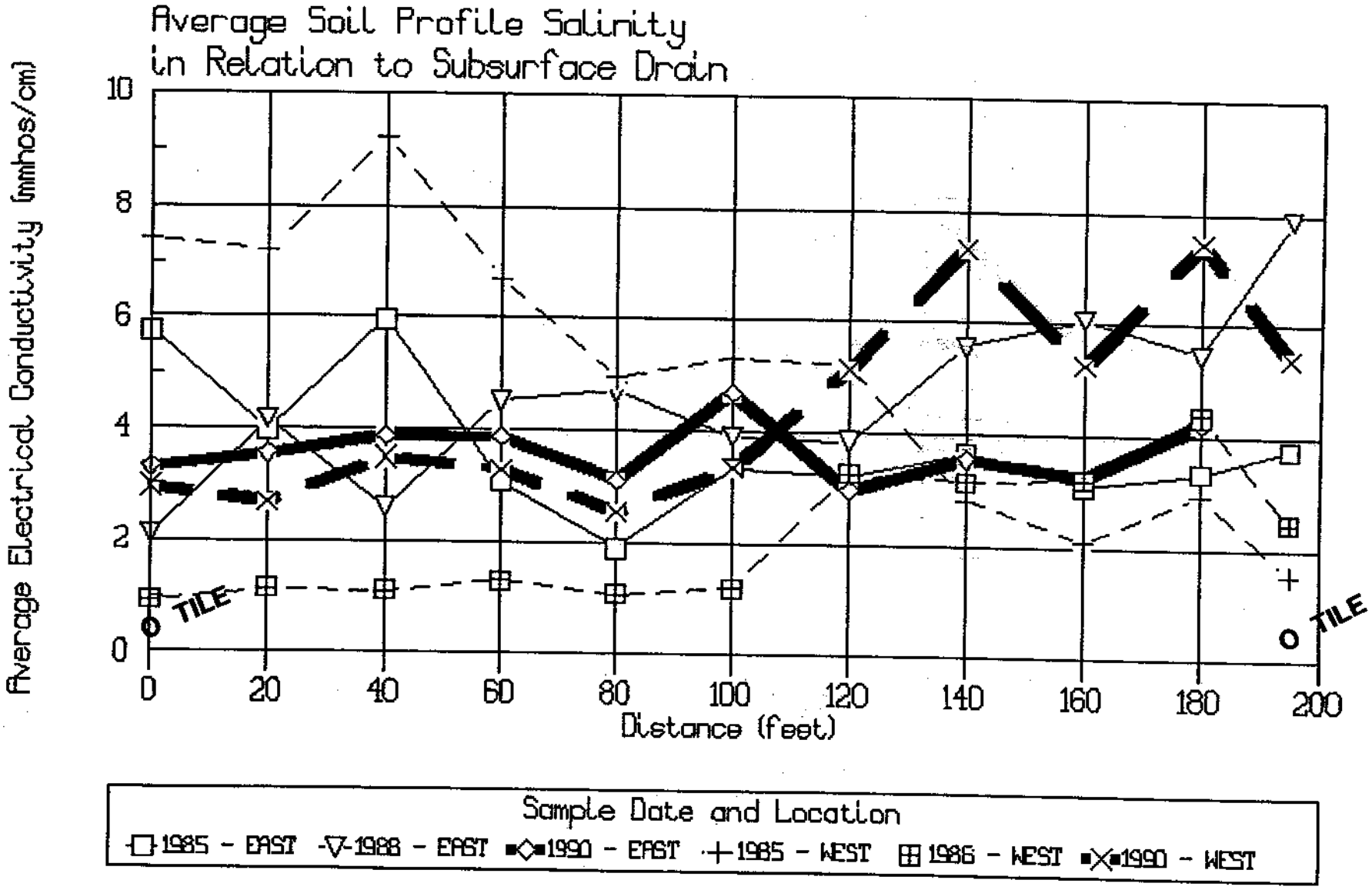
IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4 NORTH T
SOIL SALINITY

		DEPTH (in.)	DRAIN 2A 195	180	160	140	120	100	80	60	40	20	DRAIN 2 0	AVG EC (mmho/cm)
			DISTANCE (feet)											
EAST	1985	6	3.3	1.8	.9	1.6	1.6	1.5	1.4	2.1	6.2	1.8	5.0	2.5
		12	1.8	5.0	4.5	4.8	2.5	3.2	2.5	2.0	4.7	4.6	7.1	3.9
		24	1.4	3.5	1.7	1.0	3.2	2.4	.8	2.1	4.5	2.4	3.4	2.4
		36	3.5	2.6	3.6	2.3	3.2	5.8	2.6	3.3	6.0	4.0	5.2	3.8
		48	7.2	3.3	4.1	8.3	4.0	3.7	2.0	3.6	9.3	6.0	7.6	5.4
		60	5.5	3.8	3.6	4.0	4.8	3.5	2.0	5.2	5.1	5.0	6.2	4.4
		AVG EC	3.8	3.3	3.1	3.7	3.2	3.4	1.9	3.1	6.0	4.0	5.8	3.7
	1988	6	1.4	3.5	3.0	1.0	1.3	2.2	1.3	1.9	.9	1.4	1.5	1.8
		12	10.2	10.1	7.1	10.2	1.7	2.2	6.4	3.4	2.4	7.3	3.0	5.8
		24	10.3	5.9	5.4	1.0	3.0	3.5	5.1	5.0	2.3	6.0	3.4	4.6
		36	7.5	7.0	8.8	10.2	3.5	1.6	1.8	1.8	1.0	1.3	.9	4.1
		48	9.7	5.0	6.4	2.8	5.7	6.7	7.5	7.5	4.6	4.0	1.8	5.6
		60	8.2	1.3	5.9	8.2	7.8	7.3	6.0	7.5	4.5	5.0	2.2	5.8
		AVG EC	7.9	5.5	6.1	5.6	3.8	3.9	4.7	4.5	2.6	4.2	2.1	4.6
	1990	6	2.6	3.1	2.4	2.3	2.5	2.9	2.3	2.2	2.3	2.1	1.6	2.4
		12	3.1	4.0	3.1	2.9	1.7	5.2	2.9	4.0	4.0	4.1	2.1	3.4
		24	2.9	5.2	4.1	6.7	2.5	7.7	5.2	7.5	7.5	6.9	6.7	5.7
		36	7.2	7.1	3.1	2.6	4.9	2.1	1.5	1.5	1.5	1.9	2.0	3.2
		48	4.5	1.9	1.6	1.8	3.9	1.9	1.2	1.1	1.1	1.3	2.9	2.1
		60	1.8	4.0	5.2	5.0	2.3	8.3	5.5	6.9	6.9	5.0	4.5	5.0
		AVG EC		4.2	3.3	3.6	3.0	4.7	3.1	3.9	3.9	3.6	3.3	3.6
WEST	1985	6	1.0	1.5	1.1	1.7	1.9	5.4	2.2	2.6	4.4	1.6	1.3	2.2
		12	.9	1.8	1.1	1.1	8.0	4.6	2.8	8.1	8.0	5.3	5.0	4.2
		24	1.6	2.3	1.3	2.4	9.0	2.5	2.6	5.6	12.5	7.1	8.0	5.0
		36	1.8	4.0	1.1	3.4	1.9	6.6	7.6	10.1	15.6	10.2	10.0	6.6
		48	1.5	3.9	3.5	4.6	4.2	7.5	9.1	8.1	8.3	10.2	7.0	6.2
		60	2.3	4.1	4.5	3.6	6.2	5.4	5.3	5.8	6.5	8.8	13.0	6.0
		AVG EC	1.5	2.9	2.1	2.8	5.2	5.3	4.9	6.7	9.2	7.2	7.4	5.0
	1988	6	1.5	2.5	1.1	1.0	1.1	1.1	1.0	1.1	1.1	.8	1.2	1.2
		12	2.1	3.6	2.4	1.2	3.9	1.2	1.8	1.7	1.3	1.0	1.5	2.0
		24	1.6	6.6	2.6	5.2	2.8	.8	1.1	1.3	2.0	.9	.8	2.4
		36	1.1	2.9	1.6	1.4	1.6	1.0	1.3	2.4	.8	2.0	.8	1.5
		48	3.3	6.6	3.3	2.2	5.1	1.1	.5	.7	.7	.6	.6	2.2
		60	5.1	4.1	8.1	7.9	5.1	2.0	.7	.6	.7	1.3	.7	3.3
		AVG EC	2.5	4.4	3.2	3.1	3.3	1.2	1.1	1.3	1.1	1.1	.9	2.1
	1990	6	3.9	2.3	3.3	4.0	3.7	3.2	2.2	2.8	2.5	2.6	3.7	3.1
		12	5.3	9.8	1.1	5.7	3.7	5.1	3.0	3.7	4.3	4.2	4.4	4.6
		24	3.0	8.2	1.1	7.7	4.8	5.6	4.0	3.5	6.4	3.5	3.5	4.7
		36	6.3	8.3	8.0	7.5	5.0	2.4	2.0	3.0	4.3	2.9	1.5	4.7
		48	6.5	7.8	8.0	8.8	6.8	1.6	1.3	1.5	1.4	1.3	2.2	4.3
		60	7.5	8.3	10.0	10.3	6.8	2.1	2.6	5.2	2.0	1.6	2.4	5.3
		AVG EC	5.4	7.5	5.3	7.3	5.1	3.3	2.5	3.3	3.5	2.7	3.0	4.4

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 North T



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 North T



IMPERIAL IRRIGATION DISTRICT
AVERAGE SOIL SALINITY ACROSS SELECTED LOCATIONS - PUMPBACK SYSTEM #4-SOUTH

NORTHWEST - SITE 4-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.0	1.1	-45%	2.0	82%
12	2.6	1.5	-42%	1.4	-7%
24	3.4	3.8	12%	2.1	-45%
36	4.0	4.5	13%	1.9	-58%
48	4.8	3.8	-21%	2.9	-24%
60	4.0	4.2	5%	2.1	-50%
AVG	3.5	3.2	-9%	2.1	-34%

NORTHEAST - SITE 4-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	2.5	1.2	-52%	2.0	67%
12	3.5	1.0	-71%	1.8	80%
24	5.2	1.7	-67%	1.9	12%
36	5.6	4.4	-21%	2.8	-36%
48	5.9	2.2	-63%	2.8	27%
60	7.3	2.1	-71%	2.5	19%
AVG	5.0	2.1	-58%	2.3	10%

SOUTHWEST - SITE 4-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	1.4	1.0	-29%	1.5	50%
12	1.1	1.1	0%	1.4	27%
24	1.3	1.3	0%	1.5	15%
36	1.6	1.8	13%	1.6	-11%
48	1.4	1.1	-21%	1.8	64%
60	1.6	1.3	-19%	2.0	54%
AVG	1.4	1.3	-10%	1.6	29%

SOUTHEAST - SITE 4-SOUTH

DEPTH (in.)	EC SUMMER 1985	EC SUMMER 1988	'85 TO '88 PERCENT INCREASE	EC WINTER 1990	'88 TO '90 PERCENT INCREASE
6	1.6	1.1	-31%	1.7	55%
12	1.5	1.2	-20%	1.4	17%
24	3.2	2.1	-34%	1.5	-29%
36	3.3	3.2	-3%	1.7	-47%
48	2.6	3.0	15%	1.7	-43%
60	3.2	2.2	-31%	2.0	-9%
AVG	2.6	2.1	-17%	1.7	-22%

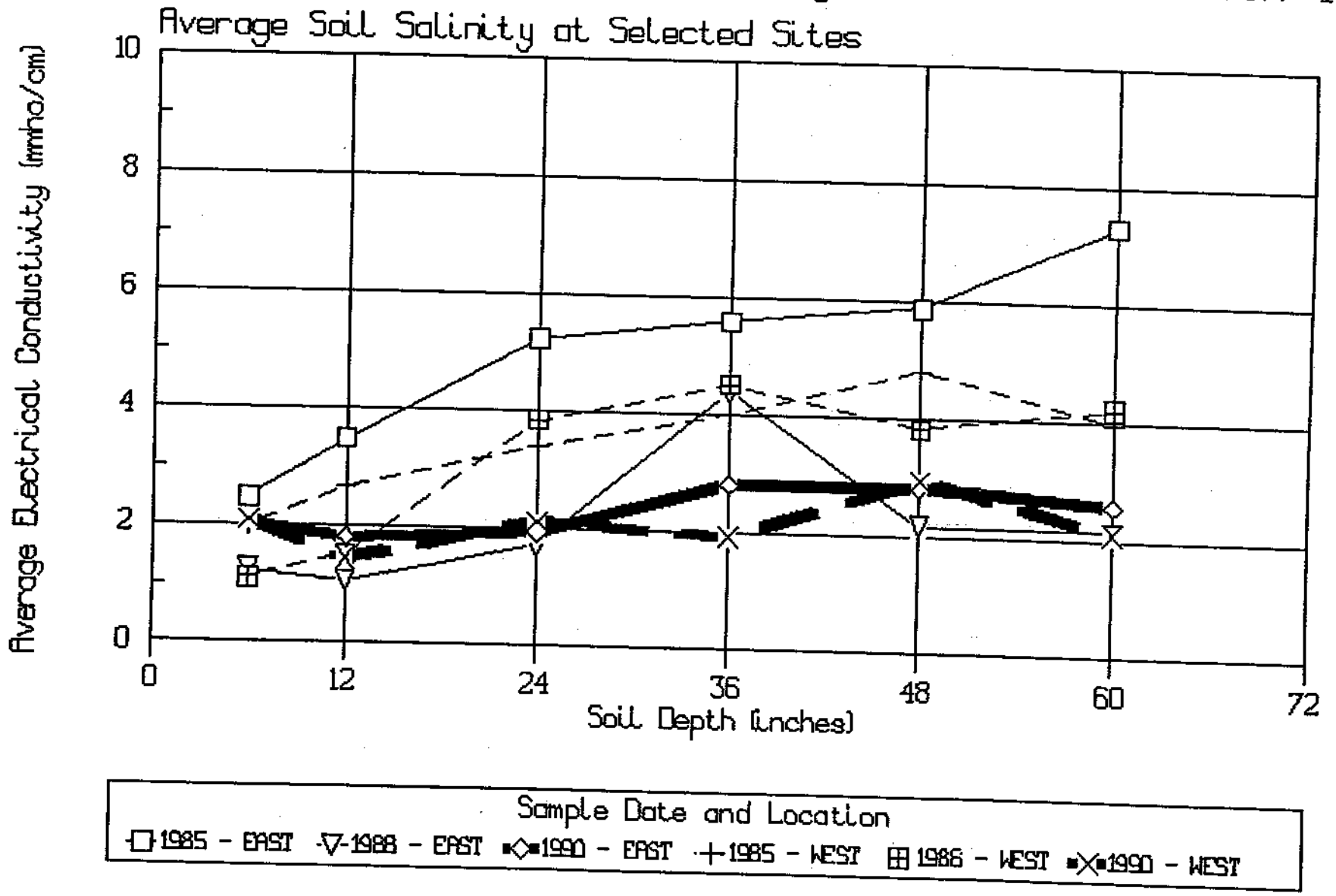
AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1988 PERCENT INCREASE FOR SITE 4S = -30%
AVERAGE ELECTRICAL CONDUCTIVITY 1988 TO 1990 PERCENT INCREASE FOR SITE 4S = -11%
AVERAGE ELECTRICAL CONDUCTIVITY 1985 TO 1990 PERCENT INCREASE FOR SITE 4S = -38%

NOTE: NEGATIVE VALUES SIGNIFY DECREASES IN THE AVERAGE SOIL SALINITY.
ECe VALUES (MMHOS/CM) AVERAGED FROM SAMPLES OVER TILE DRAINS.

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4 SOUTH T
SOIL SALINITY

		DEPTH (in.)	DRAIN 7 195	180	160	140	120	100	80	60	40	20	DRAIN 6A 0	AVG EC (mmho/cm)
			DISTANCE (feet)											
EAST	1985	6	1.7	3.7	2.0	1.9	1.6	2.2	3.5	2.2	5.2	1.8	1.2	2.5
		12	3.0	2.7	5.5	2.9	4.9	5.1	4.5	2.3	2.4	3.4	1.4	3.5
		24	5.3	4.5	6.1	5.1	6.2	6.8	6.2	4.9	4.1	5.3	2.8	5.2
		36	3.0	7.0	10.5	4.3	6.6	9.3	4.0	6.3	3.4	4.4	2.5	5.6
		48	7.9	8.2	7.2	8.9	6.4	4.6	4.9	5.1	3.9	4.3	3.0	5.9
		60	10.5	10.4	7.7	9.9	10.5	2.5	7.2	6.3	5.5	5.8	4.0	7.3
		AVG EC	5.2	6.1	6.5	5.5	6.0	5.1	5.1	4.5	4.1	4.2	2.5	5.0
	1988	6	.9	1.1	.6	1.0	3.8	1.0	1.1	1.0	1.0	1.0	.8	1.2
		12	1.0	1.0	1.4	1.1	.7	1.1	1.0	1.2	.9	.9	.9	1.0
		24	2.6	1.9	2.7	1.4	1.0	2.2	1.6	1.5	1.1	1.3	1.2	1.7
		36	5.7	4.0	3.6	3.6	8.3	5.3	5.1	4.7	3.4	2.1	2.2	4.4
		48	2.8	5.1	2.6	.8	2.3	1.5	2.4	1.1	1.1	1.0	3.0	2.2
		60	2.7	3.1	2.8	.8	2.7	1.0	.9	1.3	1.1	.8	6.1	2.1
		AVG EC	2.6	2.7	2.3	1.5	3.1	2.0	2.0	1.8	1.5	1.2	2.4	2.1
	1990	6	1.4	3.0	2.6	2.1	1.9	2.7	2.0	1.9	1.6	1.2	1.8	2.0
		12	1.6	2.1	2.2	1.6	1.5	2.1	1.6	1.8	1.9	1.2	2.0	1.8
		24	1.4	5.7	2.0	1.6	1.5	2.0	1.6	1.4	1.4	1.1	1.3	1.9
		36	2.4	4.4	3.2	7.0	1.2	4.8	1.5	1.5	1.7	1.3	1.6	2.8
		48	1.9	1.9	2.6	6.2	1.2	2.9	8.7	1.5	1.3	1.1	1.6	2.8
		60	1.1	2.4	2.0	1.9	1.8	2.2	1.3	6.8	1.6	5.6	1.3	2.5
		AVG EC	1.6	3.3	2.4	3.4	1.5	2.8	2.8	2.5	1.6	1.9	1.6	2.3
WEST	1985	6		2.1	1.5	1.6	2.4		1.6	2.7	2.0	2.0	1.9	2.0
		12	2.7	1.5	2.0	1.9	2.3	2.6	1.7	1.7	3.0	5.8	3.9	2.6
		24	1.2	1.4	3.6	2.5	4.3	1.7	3.6	3.6		7.4	4.7	3.4
		36	7.6	1.0	2.3	1.9	4.3	3.9	6.2	2.1	3.7	5.1	5.8	4.0
		48	10.1	2.0	2.8	4.1	3.4	6.4	6.1	3.0	4.8	6.8	3.0	4.8
		60		2.4	3.3	3.0	4.0	6.3	2.5	4.1	6.4	2.7	4.9	4.0
		AVG EC	5.4	1.7	2.6	2.5	3.5	4.2	3.6	2.9	4.0	5.0	4.0	3.6
	1988	6	.9	.9	.8	1.0	1.4	1.0	1.5	1.3	.9	1.1	1.0	1.1
		12	.6	.9	1.0	1.5	1.5	3.3	3.1	1.0	1.3	1.3	1.0	1.5
		24	.8	.9	4.1	2.7	7.1	6.1	8.2	2.9	3.3	1.7	4.2	3.8
		36	1.1	5.8	4.9	3.6	2.7	5.6	6.3	4.5	5.2	5.4	4.2	4.5
		48	1.8	3.7	3.0	4.0	3.2	7.6	3.8	3.5	5.2	2.8	3.2	3.8
		60	4.2	4.1	4.7	4.7	3.5	5.8	3.6	3.8	3.4	3.2	5.1	4.2
		AVG EC	1.6	2.7	3.1	2.9	3.3	4.9	4.4	2.8	3.2	2.6	3.1	3.1
	1990	6	3.2	1.4	2.3	1.9	1.5	2.4	2.0	1.9	2.4	1.7	1.8	2.0
		12	1.5	1.1	1.3	1.5	1.4	1.7	1.6	1.5	1.4	1.2	1.5	1.4
		24	1.2	1.0	2.9	1.6	1.4	4.9	1.6	2.9	1.1	1.1	3.2	2.1
		36	1.2	1.0	1.2	1.2	1.4	3.7	3.7	1.9	1.1	2.0	2.6	1.9
		48	7.3	1.0	1.8	1.7	1.6	3.9	4.8	2.9	1.2	2.0	3.9	2.9
		60	1.7	1.0	1.8	1.8	1.4	4.9	1.5	1.7	3.8	1.9	1.5	2.1
		AVG EC	2.7	1.1	1.9	1.6	1.5	3.6	2.5	2.1	1.8	1.7	2.4	2.1

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 South T



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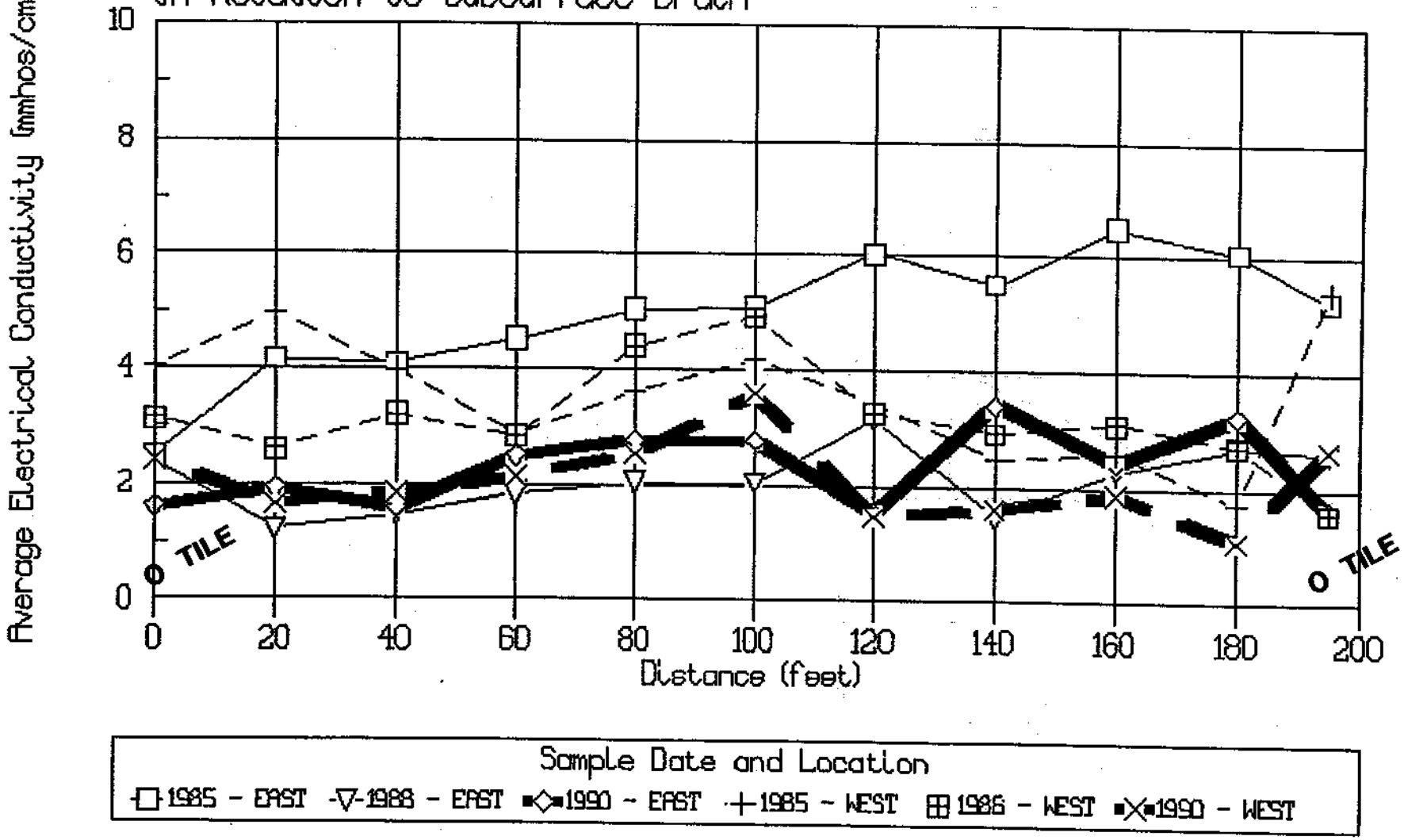
Pumpback Demonstration Project - Site 4 South T

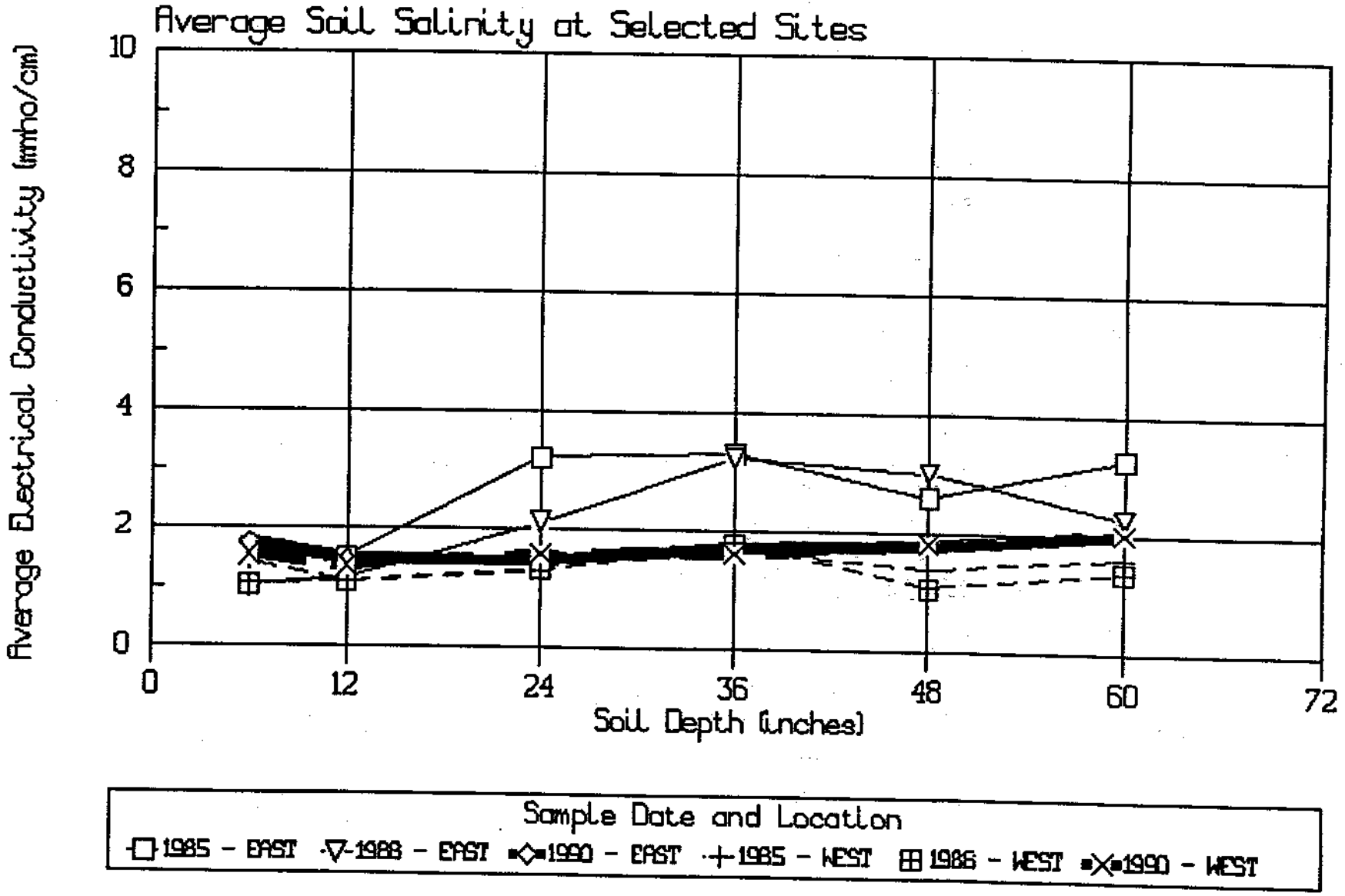
Average Soil Profile Salinity
in Relation to Subsurface Drain



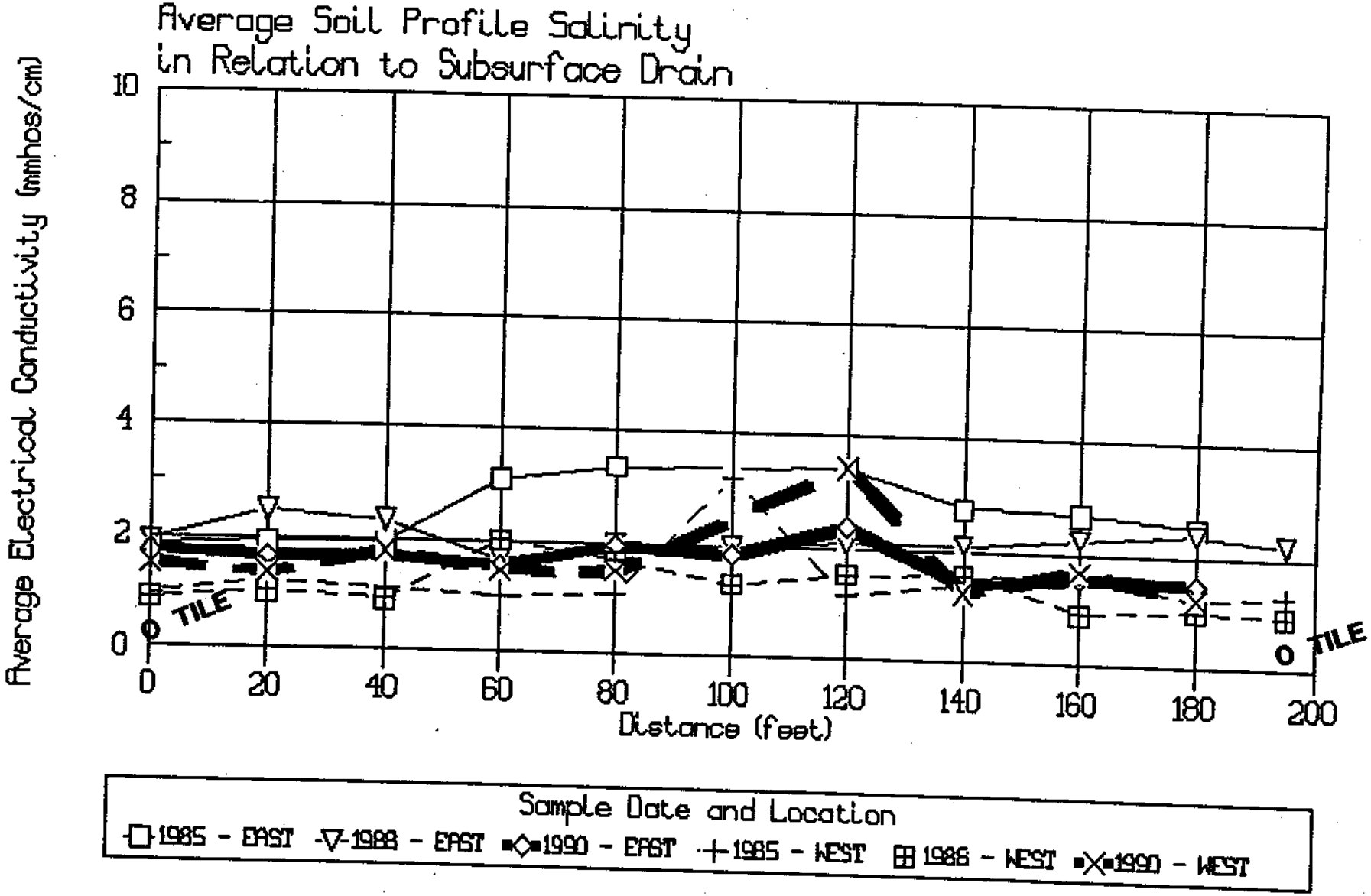
IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4 SOUTH H
SOIL SALINITY

		DEPTH (in.)	DRAIN 9 0	20	40	60	80	100	120	140	160	180	DRAIN 8A 195	AVG EC (mmho/cm)
			DISTANCE (feet)											
EAST	1985	6	1.4	1.7	1.1	1.2	1.3		1.1	2.2	1.6	2.9		1.6
		12	1.6	1.7	1.1		1.9		1.7	1.8	1.0	1.1		1.5
		24	1.6	1.7	3.5	6.7			4.9	2.1	3.1	1.9		3.2
		36	2.6	2.0	2.4	2.3			5.1	3.7	4.5	3.6		3.3
		48	1.5	2.4	1.3		4.9		4.5	2.5	2.0	1.5		2.6
		60	2.5	2.1	2.3	2.1	5.3		3.1	4.1	3.8	3.9		3.2
		AVG EC	1.9	1.9	2.0	3.1	3.4		3.4	2.7	2.7	2.5		2.6
	1988	6	.5	1.2	1.0	1.1	.7	.7	1.2	1.0	1.0	1.3	1.0	1.0
		12	1.2	1.0	1.2	.6	1.2	1.2	1.4	1.1	1.0	1.1	1.5	1.2
		24	2.7	3.6	3.2	1.1	1.6	1.6	1.6	1.5	1.7	1.8	2.4	2.1
		36	3.8	6.0	4.5	2.1	2.4	2.4	2.5	3.5	3.7	2.8	1.5	3.2
		48	2.5	2.0	2.4	2.6	3.4	3.4	2.7	3.7	2.8	3.9	3.4	3.0
		60	.8	.9	1.5	2.5	2.3	2.3	3.0	1.8	3.1	3.2	3.3	2.2
		AVG EC	1.9	2.5	2.3	1.7	2.0	2.0	2.1	2.1	2.2	2.4	2.2	2.1
	1990	6	1.7	1.8	1.9	2.0	1.5	2.3	2.1	1.9	1.2	1.2	1.5	1.7
		12	1.2	1.4	1.7	1.4	2.4	1.5	1.5	1.0	1.2	1.4	1.2	1.4
		24	1.3	1.6	1.1	1.3	1.3	1.5	2.7	1.1	2.0	1.1	1.0	1.5
		36	1.7	1.7	1.1	1.6	1.6	1.9	3.4	1.7	1.3	1.5	1.2	1.7
		48	2.3	1.9	1.3	1.4	2.3	1.9	2.2	1.5	1.4	1.9	1.1	1.7
		60	2.3	1.7	3.1	1.5	2.6	1.9	2.3	1.3	2.2	1.8	1.2	2.0
		AVG EC	1.8	1.7	1.7	1.5	2.0	1.8	2.4	1.4	1.6	1.5	1.2	1.7
WEST	1985	6	1.2	1.0	1.0	1.0	1.0	2.3	1.5		2.4	1.2	1.5	1.4
		12	.8	.9	1.2	.9	1.0	1.2	1.0		1.3	1.1	1.3	1.1
		24	1.5	1.1	1.4	1.3	1.3	1.5	1.3		1.6		1.0	1.3
		36	.8	1.4	1.1	.8	1.2	6.4	.8			1.0	1.1	1.6
		48	.7	1.3	.8	1.0	.9	4.5	1.2		1.3	1.2	.9	1.4
		60	1.1	1.7	1.1	1.1	1.1	3.3			1.5	1.5	2.0	1.6
		AVG EC	1.0	1.2	1.1	1.0	1.1	3.2	1.2		1.6	1.2	1.3	1.4
	1988	6	.8	1.0	.9	1.4	.8	1.3	1.1	1.3	.8	.9	.8	1.0
		12	.9	1.0	1.0	1.6	1.2	1.1	.8	1.4	1.0	.9	1.0	1.1
		24	.9	.8	1.2	2.2	1.6	1.2	1.3	1.6	1.1	1.2	.9	1.3
		36	.7	1.3	1.0	3.5	3.3	1.8	2.4	2.4	.6	1.3	1.1	1.8
		48	.8	1.1	.8	1.3	1.0	.9	1.6	1.4	.7	.9	1.0	1.1
		60	1.3	.9	.7	2.2	2.1	1.5	2.0	1.2	1.2	.8	.8	1.3
		AVG EC	.9	1.0	.9	2.0	1.7	1.3	1.5	1.6	.9	1.0	.9	1.3
	1990	6	1.8	1.2	1.5	1.4	1.3	1.5	2.0	1.2	2.0	1.4	1.5	1.5
		12	1.1	1.2	1.4	1.1	1.4	1.4	1.9	1.2	1.3	1.1	1.8	1.4
		24	1.2	1.2	3.8	1.3	1.1	1.1	2.6	1.3	1.1	1.1	1.2	1.5
		36	1.6	1.5	1.4	1.7	1.1	1.2	4.0	1.2	1.2	1.4	1.3	1.6
		48	1.7	1.5	1.1	1.6	1.5	1.0	3.9	1.7	3.2	1.1	1.3	1.8
		60	1.7	1.7	1.5	1.7	2.5	1.9	6.1	.9	1.2	1.3	1.3	2.0
		AVG EC	1.5	1.4	1.8	1.5	1.5	1.4	3.4	1.3	1.7	1.2	1.4	1.6

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 South H



IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 4 South H



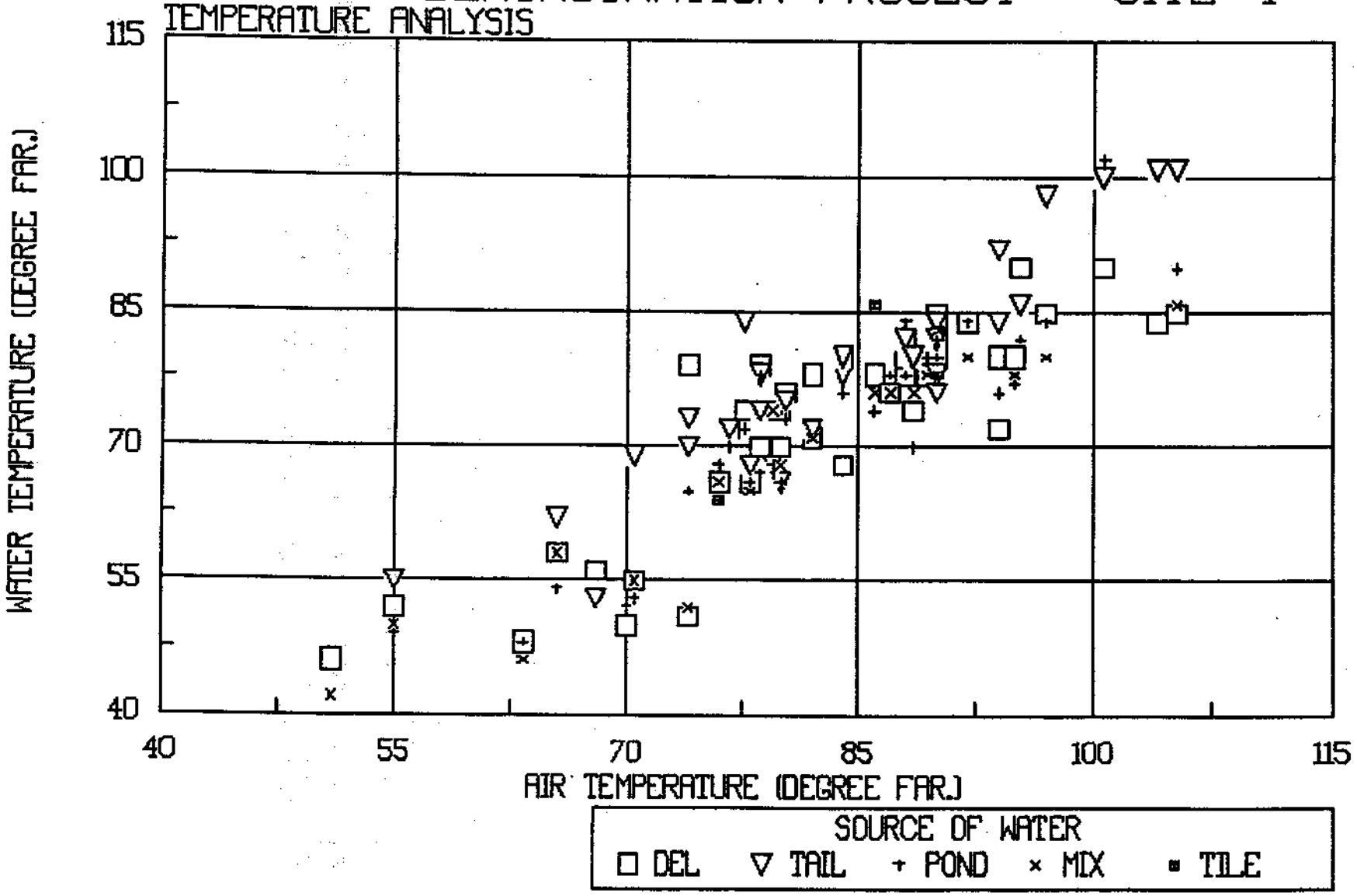
WATER SALINITY

PUMPBACK SYSTEM #4

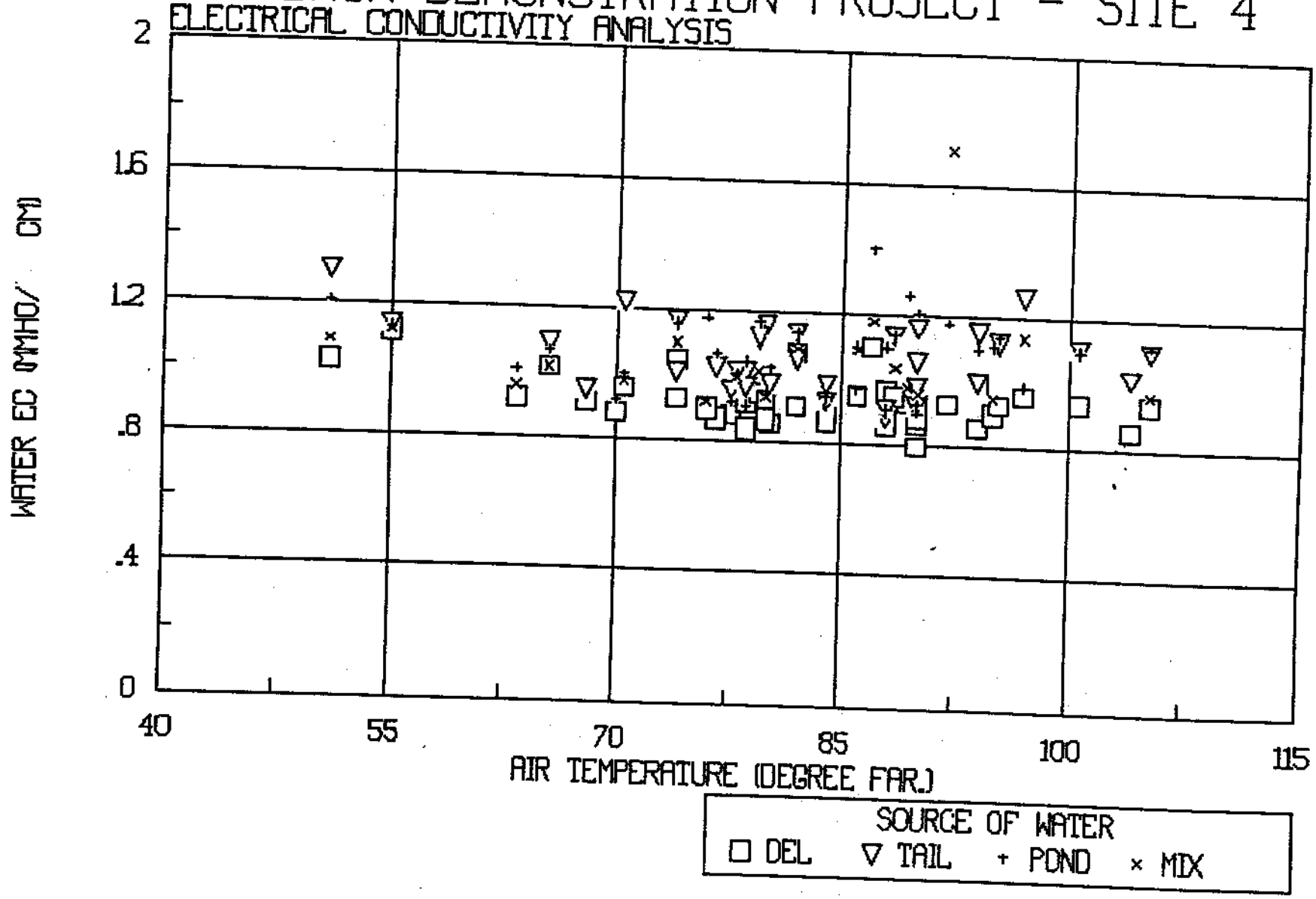
		AIR TEMPERATURE (DEGREES FAR.)						WATER TEMPERATURE (DEGREES FAR.)					CHANGE FROM DELIVERY TEMP (DEGREES FAR.)				WATER EC (MMHO/CM)					CHANGE FROM DELIVERY EC (MMHO/CM)			
DATE	TIME	DEL	TAIL	POND	MIX	TILE	AVG	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE
8/22/85	610	73	75				74	79	73				(6)	*	*	*	.93	1.01				.08	*	*	*
11/ 6/85	1130	84	84				84	68	78				10	*	*	*	.88	.98				.10	*	*	*
1/ 9/86	1010	68	68				68	56	53				(3)	*	*	*	.91	.95				.04	*	*	*
3/11/86	1418	78	77	78			78	74	84	72			10	(2)	*	*	.88	.96	.92			.08	.04	*	*
4/26/86	1019	76	82	78			79	70	74	67			4	(3)	*	*	.92	1.02	1.05			.10	.13	*	*
5/13/86	955	76	74	80			77	72	72	70			0	(2)	*	*	.87	1.03	1.07			.16	.20	*	*
5/23/86	1520	94	94				94	80	92				12	*	*	*	.86	1.15				.29	*	*	*
5/24/86	915	80	80	81			80	76	75	73			(1)	(3)	*	*	.86	.98	1.03			.12	.17	*	*
5/28/86	945	88	92				90	80	78				(2)	*	*	*	.87	1.06				.19	*	*	*
6/ 9/86	1005	90	86				88	78	82				4	*	*	*	.86	.88				.02	*	*	*
6/11/86	950	90	90				90	82	82				0	*	*	*	.88	.98				.10	*	*	*
6/12/86	810	80	84				82	78	72				(6)	*	*	*	.91	1.06				.15	*	*	*
6/21/86	1530	104	104				104	84	101				17	*	*	*	.86	1.02				.16	*	*	*
6/23/86	900	84	84	84			84	80	80	76			0	(4)	*	*	.87	.93	.94			.06	.07	*	*
6/25/86	740	79	78	79			79	79	78	78			(1)	(1)	*	*	.84	.97	.91			.13	.07	*	*
7/17/86	830	80	80				80	74	66				(8)	*	*	*	.87	1.16				.29	*	*	*
7/24/86	900	84	90	90			88	80	82	78			2	(2)	*	*	.88	.91	.91			.03	.03	*	*
7/30/86	905	88	90	92			90	80	76	80			(4)	0	*	*	.88	.92	.90			.04	.02	*	*
8/ 6/86	830	92	88	90			90	84	84	82			0	(2)	*	*	.80	.92	.93			.12	.13	*	*
7/21/87	805	80	80	78	80		80	74	68	68	74		(6)	(6)	0	*	.95	1.12	1.17	1.02		.17	.22	.07	*
10/14/87	1230	86		86	86		86	78		76	76		*	(2)	(2)	*	.95		1.10	1.09		*	.15	.14	*
12/ 1/87	1035	64	70	64	64		66	58	62	54	58		4	(4)	0	*	1.02	1.09	1.07	1.02		.07	.05		*
12/15/87	1045	64		62	64		63	48		48	46		*	0	(2)	*	.92		1.01	.96		*	.09	.04	*
1/ 5/88	1130	70		70			70	50		52			*	2	*	*	.88		.92			*	.04	*	*
1/ 6/88	1305	70	72	70	70		71	55	69	53	55		14	(2)	0	*	.96	1.22	1.00	.98		.26	.04	.02	*
3/ 1/88	1310	76		76	76	76	76	66		68	66	64	*	2	0	(2)	.90		1.18	.92	3.96	*	.28	.02	3.06
4/12/88	1030	80		80	80		80	70		66	68		*	(4)	(2)	*	.93		.96	.94		*	.03	.01	*
5/12/88	1600	105	105	105	106		105	85	101	90	86		16	5	1	*	.94	1.10	1.12	.97		.16	.18	.03	*
5/13/88	1033	95		95	95		95	80		77	78		*	(3)	(2)	*	.90		1.11	.95		*	.21	.05	*
5/24/88	1040	90		88	90		89	78		80	78		*	2	0	*	.93		1.26	.98		*	.33	.05	*
5/25/88	1340	97	97	97	97		97	85	98	84	80		13	(1)	(5)	*	.96	1.26	.99	1.14		.30	.03	.18	*
5/26/88	1225	92		92	92		92	84		84	80		*	0	(4)	*	.93		1.18	1.71		*	.25	.78	*
6/21/88	1020	86		90			88	82		84			*	2	*	*	.97		1.10			*	.13	*	*
7/ 1/88	925	90	90	90	90	90	90	85	82	83	83	78	(3)	(2)	(2)	(7)	.93	1.16	1.21	.96	3.24	.23	.28	.03	2.31
7/11/88	1145	98	90	98			95	90	86	82			(4)	(8)	*	*	.93	1.12	1.14			.19	.21	*	*
7/28/88	1200	100	100	102			101	90	100	102			10	12	*	*	.94	1.11	1.10			.17	.16	*	*
10/ 6/88	1250	94	94	94			94	72	84	76			12	4	*	*	1.00	1.00	1.10				.10	*	*
10/ 7/88	1155	88	90	88	88		89	74	80	70	76		6	(4)	2	*	.95	1.14	1.14	1.04		.19	.19	.09	*
10/18/88	1200	86		86		86	86	78		74		86	*	(4)	*	8	.95		.97		1.02	*	.02	*	.07
2/ 5/90	1329	74	74	74	74		74	51	70	65	52		19	14	1	*	1.05	1.17	1.16	1.10		.12	.11	.05	*
2/ 6/90	1003	55	55	55	55		55	52	55	49	50		3	(3)	(2)	*	1.12	1.14	1.13	1.12		.02	.01		*
2/15/90	830	51	51	51	51		51	46	39	38	42		(7)	(8)	(4)	*	1.03	1.30	1.21	1.09		.27	.18	.06	*
3/20/90	944	78	78	78	78		78	66	68	66	65		2	0	(1)	*	.99	1.02	1.01	1.00		.03	.02	.01	*
5/ 9/90	1007	82	82	82	82		82	71	72		71		1	*	0	*	1.08	1.14	1.14	1.09		.06	.06	.01	*
5/23/90	1001	87		87	87		87	76		78	76		*	2	0	*	1.10		1.40	1.18		*	.30	.08	*
AVERAGES		83	83	83	80	84	83	73	77	72	68	76	3	(1)	(1)	0	.93	1.06	1.07	1.06	2.74	.13	.13	.09	1.81
STD DEV		11.6	11.8	12.2	13.8	5.9	11.5	11.4	13.2	13.1	12.8	9.1	7.5	4.5	1.8	6.2	.07	.10	.11	.17	1.25	.08	.09	.17	1.27

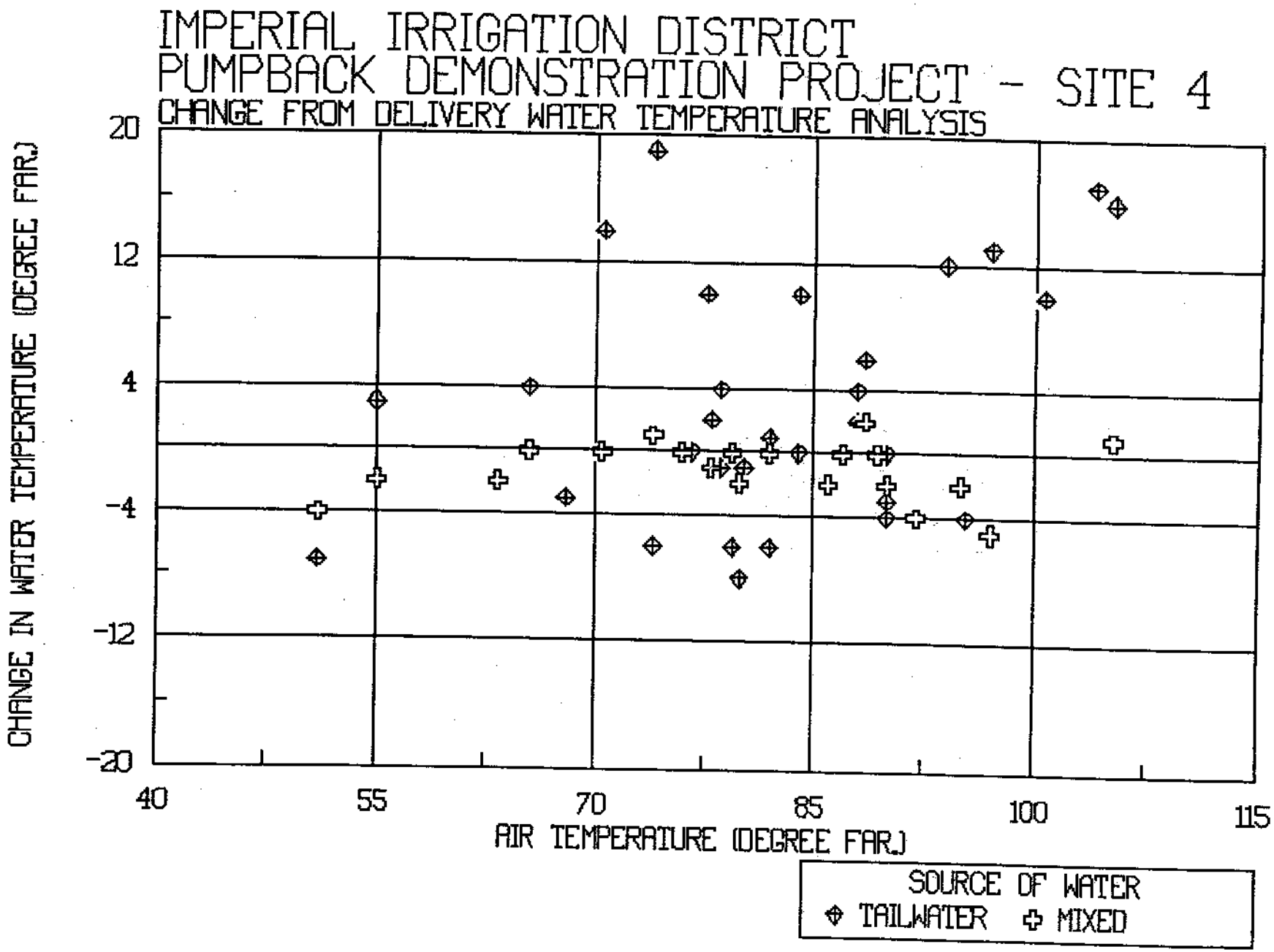
AVERAGE PERCENT INCREASE FROM DELIVERY EC 14% 15% 14%

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4

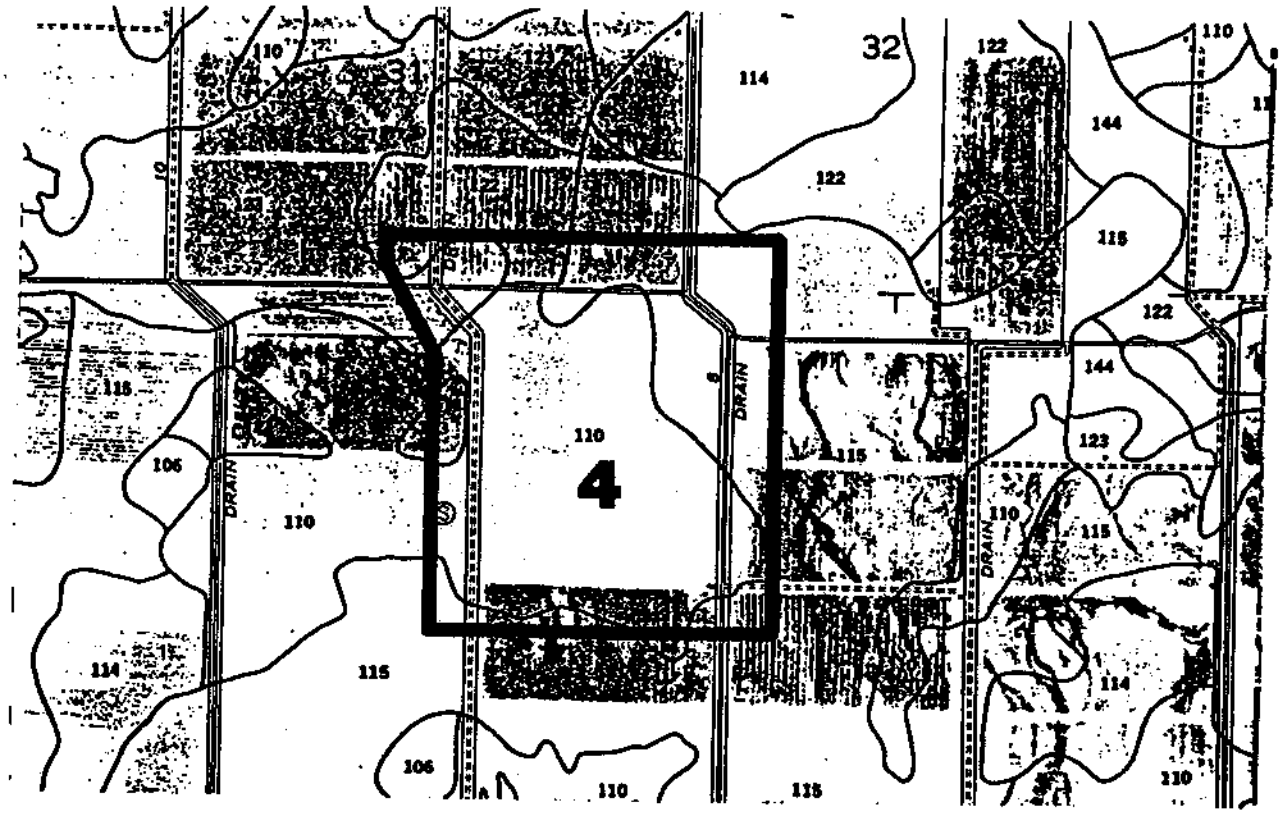


IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4




IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 4
CHANGE FROM DELIVERY WATER TEMPERATURE ANALYSIS
CHANGE IN WATER TEMPERATURE (DEGREE FAR.)
20
12
4
-4
-12
-20
40
55
70
85
100
115
AIR TEMPERATURE (DEGREE FAR.)
SOURCE OF WATER
TAILWATER
MIXED

SCS SOIL BORINGS



PUMPBACK SYSTEM # 4

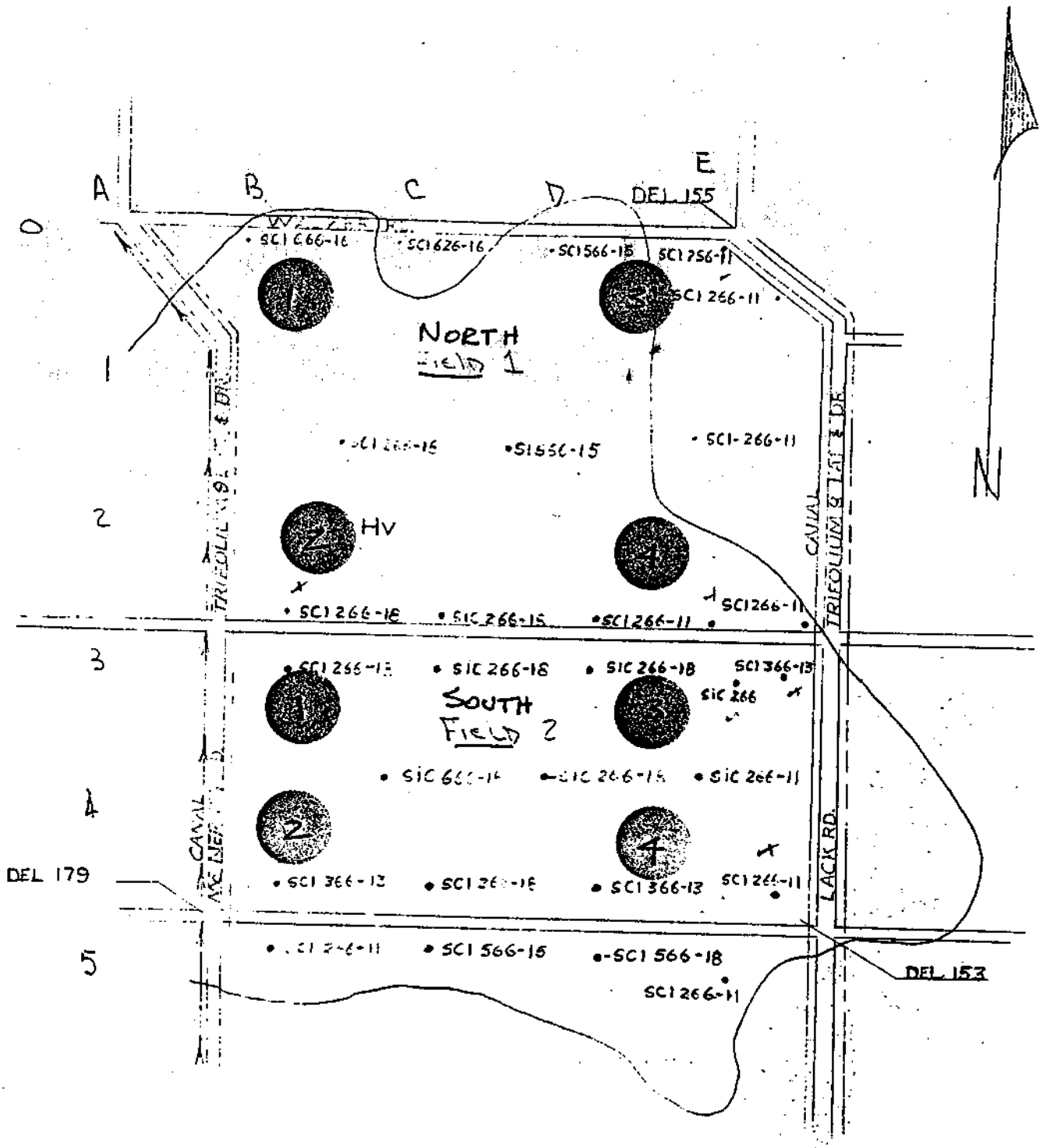
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL LEGEND

SYMBOL	NAME
100	Antho loamy fine sand
101	Antho-Superstition complex
102	Badland
103	Carsitas gravelly sand, 0 to 5 percent slopes
104	Fluvaquents, saline
105	Glenbar clay loam
106	Glenbar clay loam, wet
107	Glenbar complex
108	Holtville loam
109	Holtville silty clay
110	Holtville silty clay, wet
111	Holtville-Imperial silty clay loams
112	Imperial silty clay
113	Imperial silty clay, saline
114	Imperial silty clay, wet
115	Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes
116	Imperial-Glenbar silty clay loams, 2 to 5 percent slopes
117	Indio loam
118	Indio loam, wet
119	Indio-Vint complex
120	Laveen loam
121	Meloland fine sand
122	Meloland very fine sandy loam, wet
123	Meloland and Holtville loams, wet
124	Niland gravelly sand
125	Niland gravelly sand, wet
126	Niland fine sand
127	Niland loamy fine sand
128	Niland-Imperial complex, wet
129	Pits
130	Rositas sand, 0 to 2 percent slopes
131	Rositas sand, 2 to 5 percent slopes
132	Rositas fine sand, 0 to 2 percent slopes
133	Rositas fine sand, 2 to 9 percent slopes
134	Rositas fine sand, 9 to 30 percent slopes
135	Rositas fine sand, wet, 0 to 2 percent slopes
136	Rositas loamy fine sand, 0 to 2 percent slopes
137	Rositas silt loam, 0 to 2 percent slopes
138	Rositas-Superstition loamy fine sand
139	Superstition loamy fine sand
140	Torriorthents-Rock outcrop complex, 5 to 60 percent slopes
141	Torriorthents and Orthids, 5 to 30 percent slopes
142	Vint loamy very fine sand, wet
143	Vint fine sandy loam
144	Vint and Indio very fine sandy loams, wet

SCS

BORINGS –
PUMPBACK #4



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

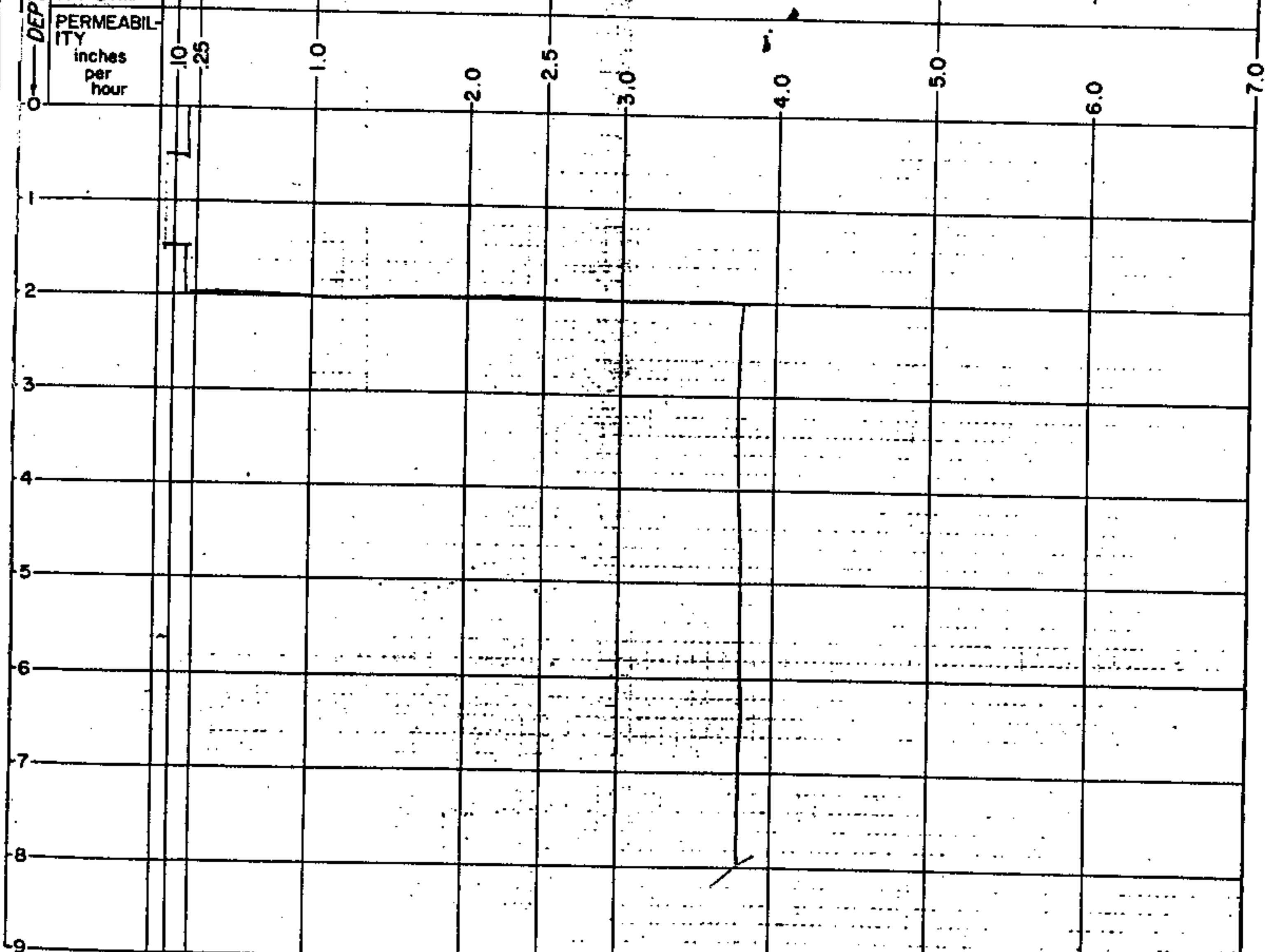
PUMPBACK #4
NORTH #2

PROPERTY ______________________ WEIGHTED AVERAGE PERMEABILITY __________ in./hr.

BORING NO. 2 B-2½ LAND USE __________ CROP CONDITION __________

TECHNICIAN __________ DATE SURVEY __________ SYMBOL M266-1B
Scl

IMP. IRRIG. DIST. DRAINAGE SYM.	IL	SLL	SL		SLS			FS			MS	CS
STANDARD TEXTURE SYMBOLS	c sic sicl	cl scl sil	l	vfsl	fsl	sl	lvfs	lfs	ls	fs	s	cos
STANDARD PERMEABILITY SYM.	2	3	4			5			6		7	



NOTE: When permeability rates exceed 20 in./hr., show estimated value at right margin.

M-3254

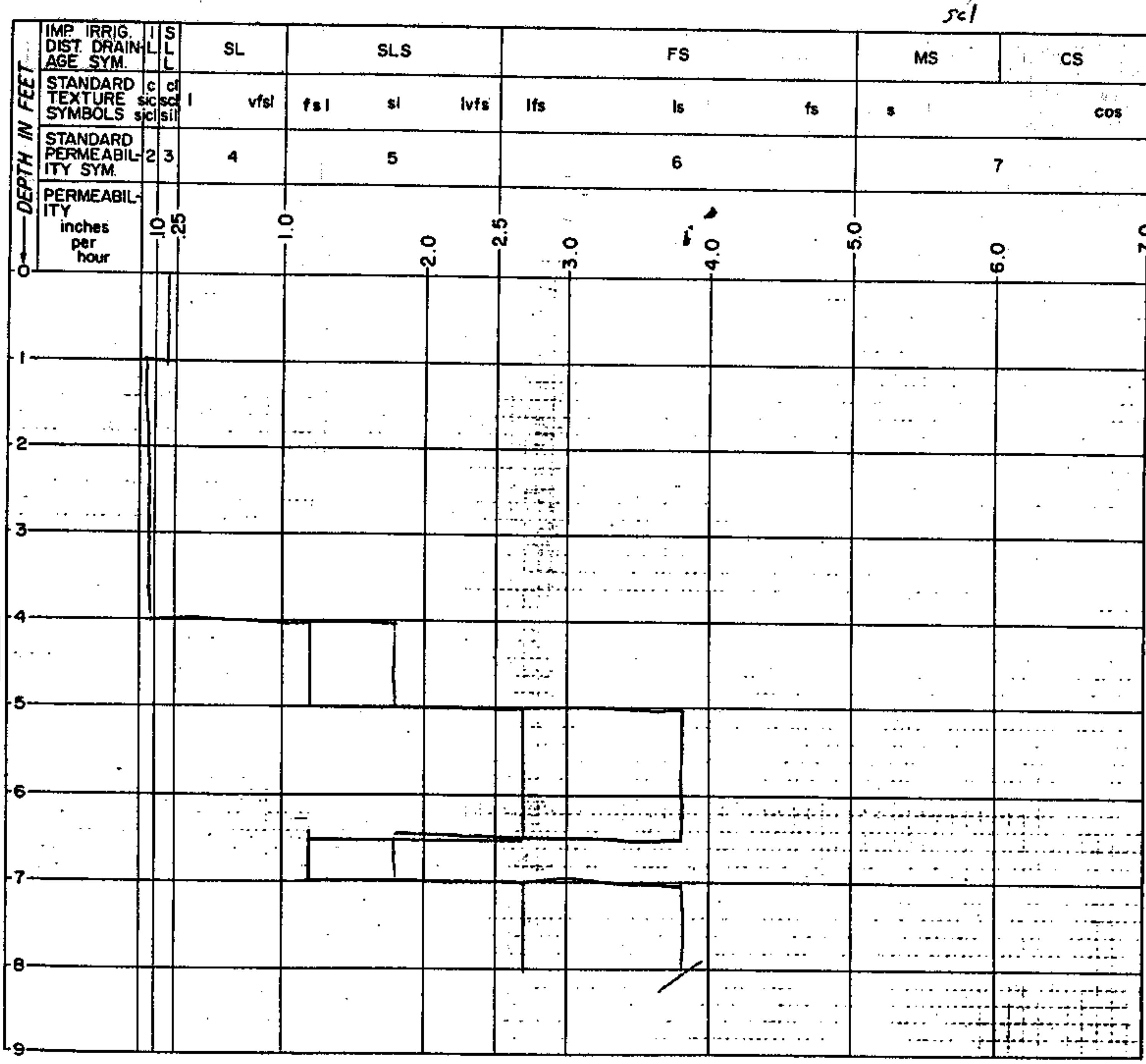
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #4
NORTH #3

PROPERTY ____________ WEIGHTED AVERAGE PERMEABILITY ____________ in./hr.

BORING NO. 7E-0 LAND USE ____________ CROP CONDITION ____________

TECHNICIAN ____________ DATE SURVEY ____________ SYMBOL 11 2 5 C -11 scl



NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin

M-3254

7-L-15000-386

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA

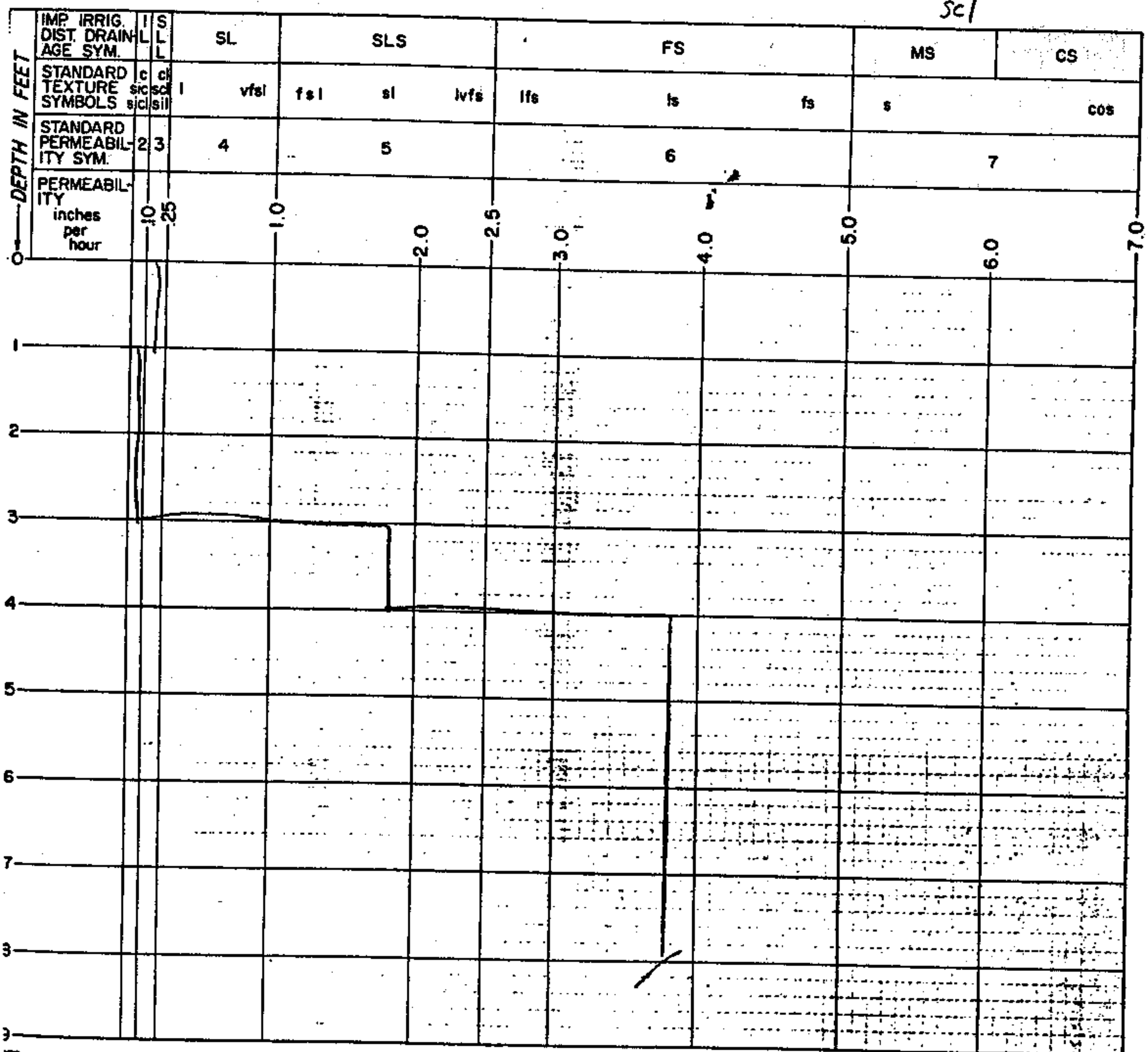
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #4
NORTH #4

PROPERTY ________ WEIGHTED AVERAGE PERMEABILITY ________ in./hr.

BORING NO. 13 E-2½ LAND USE ________ CROP CONDITION ________

TECHNICIAN ________ DATE SURVEY ________ SYMBOL M260-11 scl



NOTE: When permeability rates exceed 20 in./hr., show estimated value at right margin.

M-3254

7-L-15000-386

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #4
SOUTH #1

PROPERTY _____ WEIGHTED AVERAGE PERMEABILITY _____ in./hr.

BORING NO. 14 B-3 LAND USE _____ CROP CONDITION _____

TECHNICIAN _____ DATE SURVEY _____ SYMBOL M2C6-18 SCI

IMP. IRRIG. DIST. DRAINAGE SYM.	I L	S L L	SL				SLS					FS							MS		CS			
STANDARD TEXTURE SYMBOLS	c sic sicl	cl sc sil	l		vfsl		fsl		sl		lvfs	lfs		ls		fs		s				cos		
STANDARD PERMEABILITY SYM.	2	3	4				5					6						7						
PERMEABILITY: inches per hour	.10	.25			1.0			2.0		2.5	3.0		4.0			5.0				6.0			7.0	

DEPTH IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

NOTE: When permeability rates exceed 20 in./hr., show estimated value at right margin

M-3254

7-L-15000-386

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

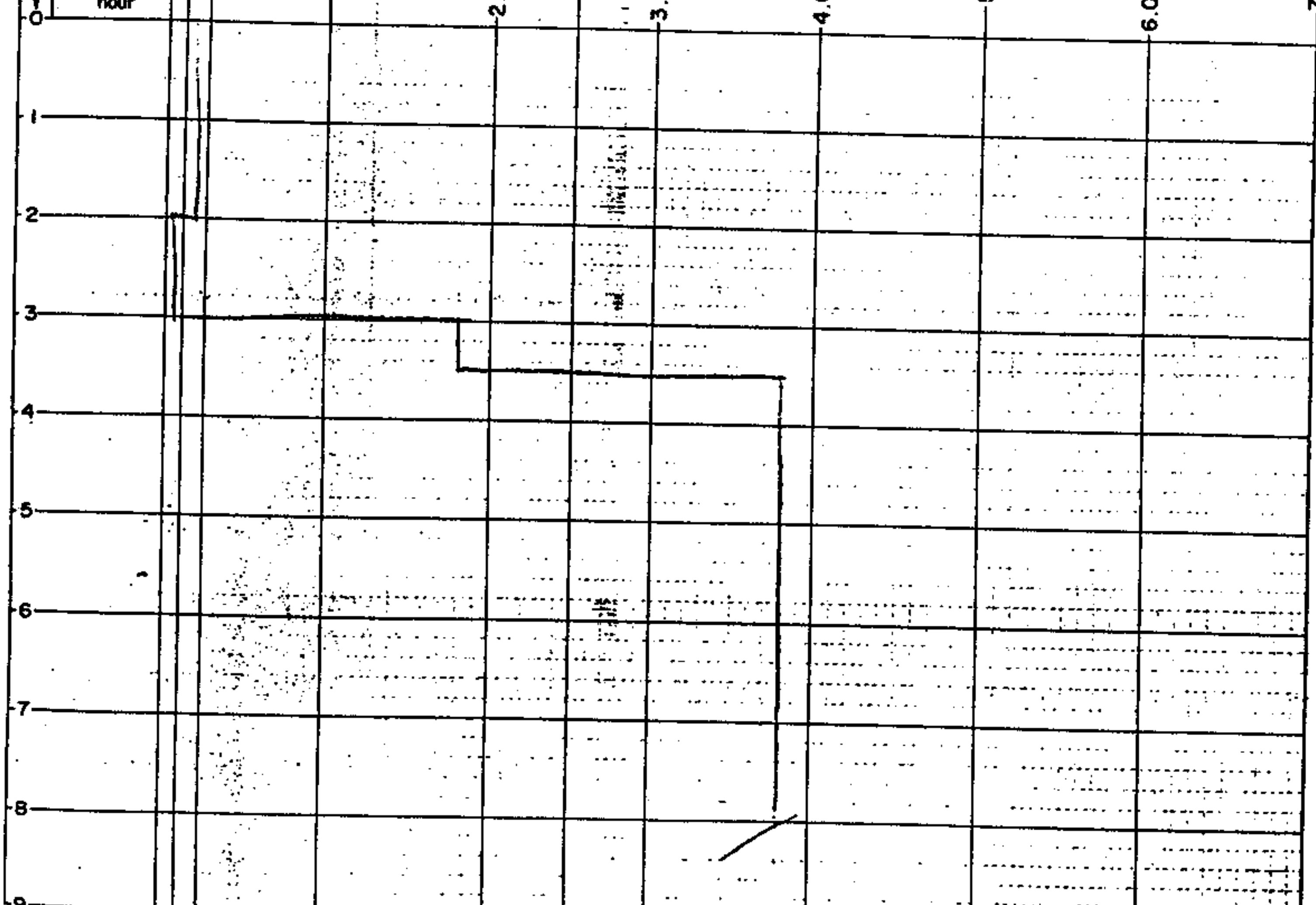
PUMPBACK #4
SOUTH #2

PROPERTY ______ WEIGHTED AVERAGE PERMEABILITY ______ in./hr.

BORING NO. 15 8-45' LAND USE ______ CROP CONDITION ______

TECHNICIAN ______ DATE SURVEY ______ SYMBOL 11366-13
scl

DEPTH IN FEET							
IMP. IRRIG. DIST. DRAINAGE SYM.	ILL	SLL	SL	SLS	FS	MS	CS
STANDARD TEXTURE SYMBOLS	c sic sicl	cl scl sil	l vfsl	fsl sl lvfs	lfs ls fs	s	cos
STANDARD PERMEABILITY SYM.	2	3	4	5	6	7	
PERMEABILITY inches per hour	.10	.25	1.0	2.0 2.5	3.0 4.0 5.0	6.0	7.0



NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin.

M-3254

SOIL CONSERVATION SERVICE
CALIFORNIA

SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #4
SOUTH #3

PROPERTY _____ WEIGHTED AVERAGE PERMEABILITY _____ in./hr.

BORING NO. #0 E-3 LAND USE _____ CROP CONDITION _____

TECHNICIAN _____ DATE SURVEY _____ SYMBOL HLR6-1P SiC

IMP. IRRIG. DIST. DRAINAGE SYM.	I L	S L L	SL	SLS				FS			MS	CS
STANDARD TEXTURE SYMBOLS	c sic sicl	cl scl sil	l	vfsl	fsl	sl	lvfs	lfs	ls	fs	s	cos
STANDARD PERMEABILITY SYM.	2	3	4			5			6		7	
PERMEABILITY inches per hour	.10	.25	1.0		2.0		2.5	3.0	4.0	5.0	6.0	7.0

DEPTH IN FEET

*E When permeability rates exceed 7.0 in./hr., show estimated value at right margin

M-3254

7-L-15000-386

CALIFORNIA

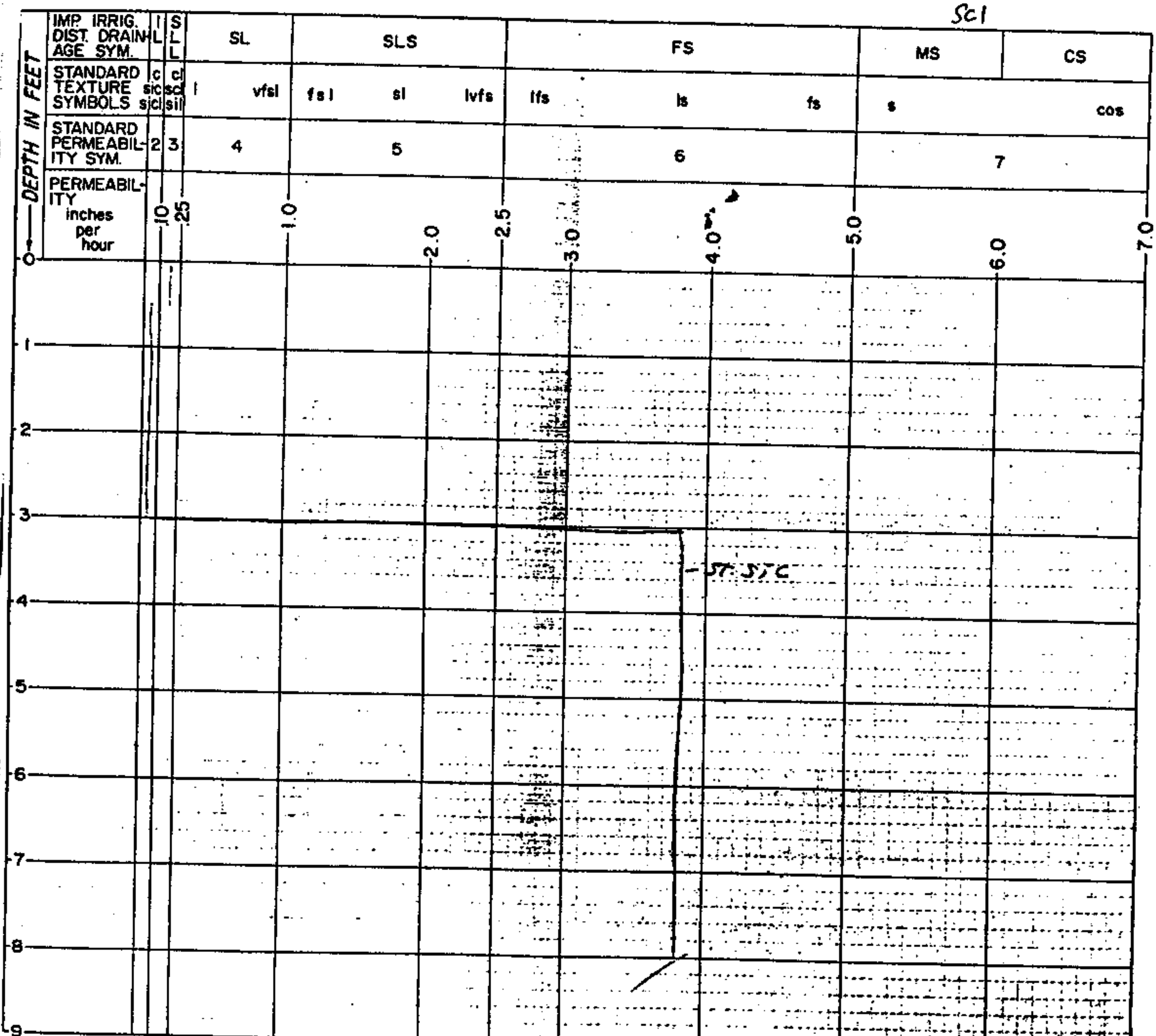
SOIL PROFILE CHART
FOR DRAINAGE INVESTIGATION

PUMPBACK #4
SOUTH #4

PROPERTY______________________ WEIGHTED AVERAGE PERMEABILITY______________ in./hr.

BORING NO. 17 E½-4½ LAND USE______________ CROP CONDITION______________

TECHNICIAN______________ DATE SURVEY______________ SYMBOL M 2-66-11



NOTE: When permeability rates exceed 7.0 in./hr., show estimated value at right margin.

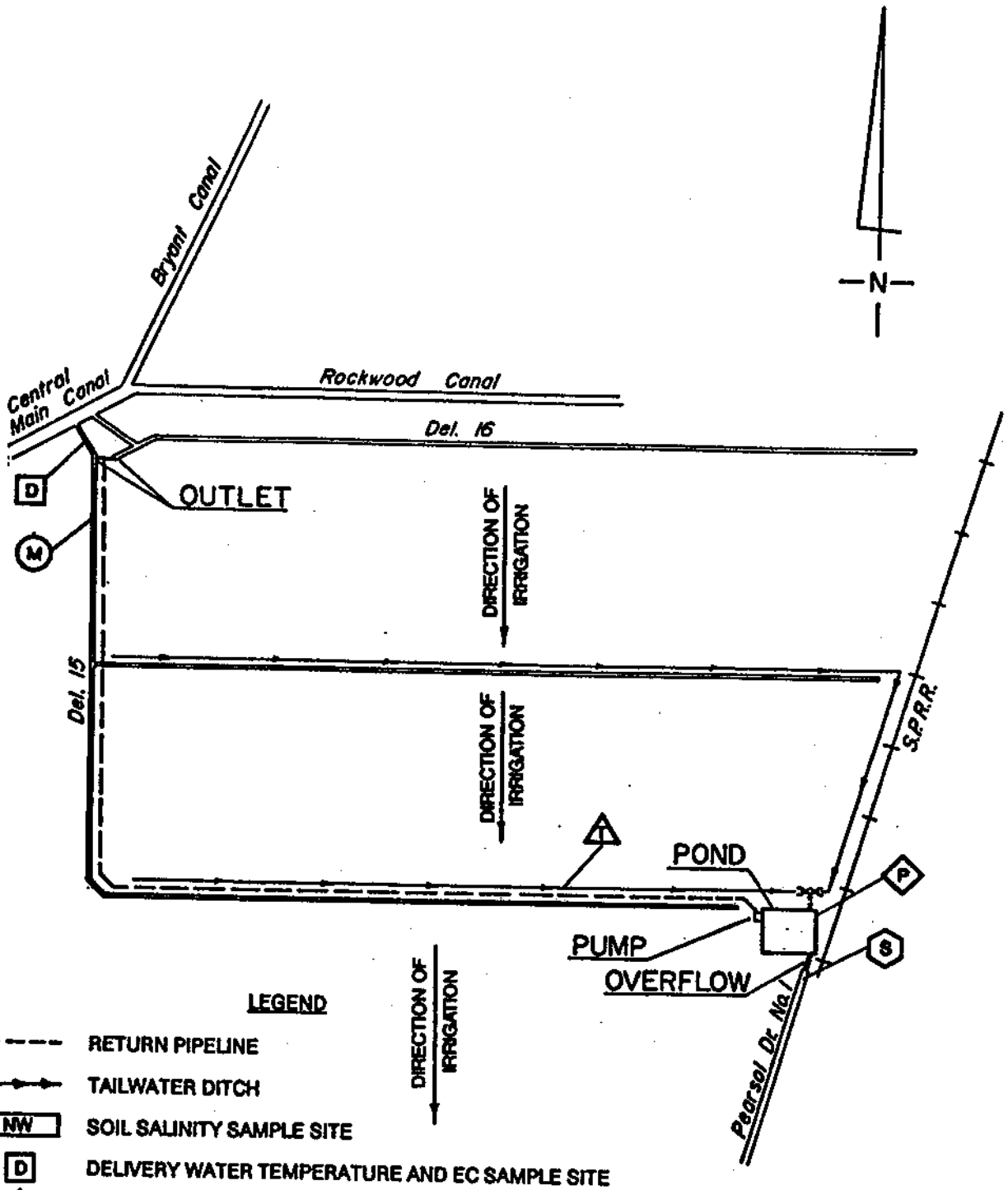
M-3254

7-L-15000-386

APPENDIX E

PUMPBACK SYSTEM #5

DWG. L-2886



LEGEND

- RETURN PIPELINE
- TAILWATER DITCH
- NW — SOIL SALINITY SAMPLE SITE
- D — DELIVERY WATER TEMPERATURE AND EC SAMPLE SITE
- T — TAILWATER TEMPERATURE AND EC SAMPLE SITE
- P — POND WATER TEMPERATURE AND EC SAMPLE SITE
- M — MIXED WATER TEMPERATURE AND EC SAMPLE SITE
- S — SPILL WATER TEMPERATURE AND EC SAMPLE SITE

Refer Dwg. 12F-6932

PUMPBACK SYSTEM #5

TRACT 117
T.14S. - R.14E.

NOTE: NO SOIL SAMPLES TAKEN FROM THIS FIELD.

PUMPBACK SYSTEM #5

EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
1	2/22/86	WHEAT	*1.8							NR	Pumpback system installed
2	2/25/86	WHEAT	12.3	.0	2.8	2.8	0%	0%	23%	NR	
3	3/ 4/86	WHEAT	*12.4							NR	
4	3/10/86	WHEAT	*17.8							NR	
5	3/17/86	WHEAT	97.6	.0	16.6	16.6	0%	0%	17%	NR	
6	3/25/86	WHEAT	56.4	5.3	5.9	11.2	47%	9%	20%		
7	4/ 2/86	WHEAT	60.6	8.8	10.2	19.0	46%	15%	31%		
8	4/ 7/86	WHEAT	54.6	8.1	8.8	16.9	48%	15%	31%		
9	4/17/86	WHEAT	*40.8								
10	4/28/86	WHEAT	*40.8							NR	
11	5/23/86	WHEAT	12.4	2.5	.0	2.5	100%	20%	20%	NR	
12	5/30/86	SUDAN GRASS	12.5	.0	4.1	4.1	0%	0%	33%		
13	6/13/86	SUDAN GRASS	24.0	4.5	9.3	13.8	33%	19%	58%	GR	
14	6/26/86	ALFALFA	10.4	.7	.0	.7	100%	7%	7%		
15	7/30/86	SUDAN GRASS	9.8	.0	12.2	12.2	0%	0%	100%	GR	
16	8/ 1/86	FLAT FLOOD	91.8	20.0	.0	20.0	100%	22%	22%		
17	8/ 1/86	FLAT FLOOD	91.8	20.0	12.2	32.2	62%	22%	35%		
18	8/12/86	FLAT FLOOD	24.0	4.6	28.8	33.4	14%	19%	100%		
19	8/12/86	FLAT FLOOD	24.0	4.6	.0	4.6	100%	19%	19%		
20	8/19/86	FLAT FLOOD	37.1	12.0	.0	12.0	100%	32%	32%		
21	8/19/86	FLAT FLOOD	37.1	12.0	27.4	39.4	30%	32%	100%		
22	9/18/86	FLAT FLOOD	142.0	4.0	33.6	37.6	11%	3%	26%		
23	10/30/86	WHEAT	35.8	3.4	29.2	32.6	10%	9%	91%		
24	11/29/86	WHEAT	*32.1		*6.8	*6.8					
25	12/ 9/86	WHEAT	*34.0		*4.2	*4.2				NR	
26	12/22/86	SUGAR BEETS	*16.0		*0.5	*0.5				NR	
27	12/29/86	SUGAR BEETS	*25.2		*1.0	*1.0				NR	
28	1/16/87	SUGAR BEETS	13.1	1.9	3.8	*5.7				NR	
29	1/20/87	TOMATOES	32.6	9.4	.0	9.4	100%	15%	0%		
30	1/26/87	TOMATOES	10.1		2.3	2.3		29%	29%		
31	1/28/87	TOMATOES	*4.3						23%	NR	
32	1/30/87	TOMATOES	*4.2							NR	
33	2/ 2/87	TOMATOES	*3.9							NR	
34	2/ 5/87	TOMATOES	*3.3							NR	
35	2/ 7/87	TOMATOES	*2.7							PB	
36	2/10/87	TOMATOES	8.0	.3	.0	.3	100%	4%	4%	PB	
37	2/14/87	SUGAR BEETS	22.0	3.6	.6	4.2	85%	16%	19%		
38	2/17/87	WHEAT	10.9	5.3	15.4	20.7	26%	49%	100%		
39	2/19/87	WHEAT	6.9	.0	15.4	15.4	0%	0%	100%		
40	2/23/87	TOMATOES	14.8	.4	15.4	15.8	3%	3%	100%		
41	3/ 3/87	SUGAR BEETS	14.0	3.1	.0	3.1	100%	22%	22%		
42	3/17/87	SUGAR BEETS & WHEAT	34.3	.0	7.0	7.0	0%	0%	20%		
43	3/24/87	TOMATOES & WHEAT	41.7	8.6	8.7	17.3	50%	21%	41%		
44	4/ 1/87	SUGAR BEETS	31.9	.1	14.6	14.7	1%	0%	46%		
45	4/10/87	TOMATOES	72.8	11.4	17.8	29.2	39%	16%	40%		

PUMPBACK SYSTEM #5

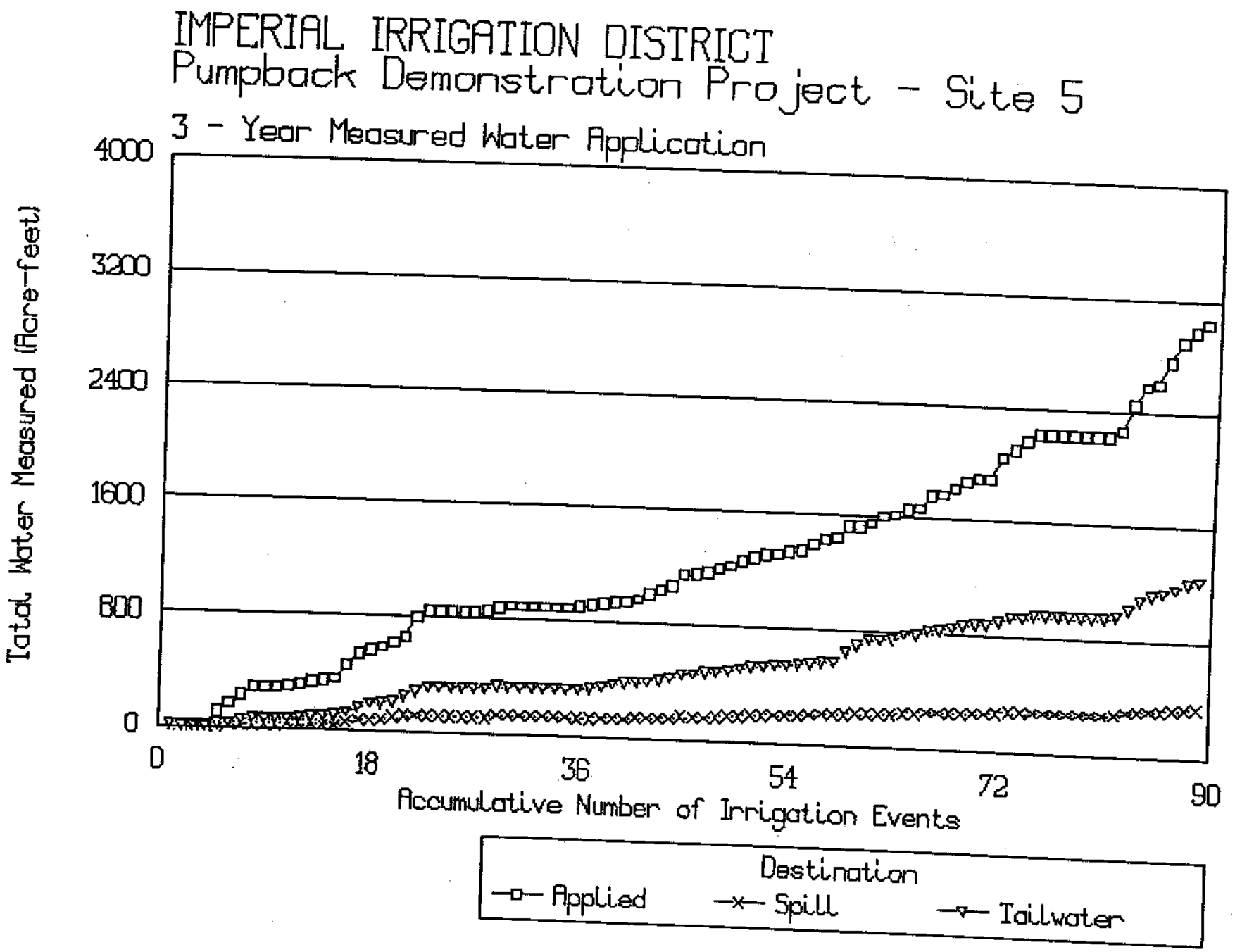
EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
46	4/18/87	TOMATOES	13.8	1.5	1.3	2.8	54%	11%	20%		
47	4/20/87	SUGAR BEETS	13.3	.0	9.7	9.7	0%	0%	73%		
48	4/25/87	TOMATOES	35.1	6.7	7.8	14.5	46%	19%	41%		
49	5/ 1/87	SUGAR BEETS	14.4	5.7	5.9	11.6	49%	40%	81%		
50	5/ 4/87	SUGAR BEETS	43.0	7.6	7.1	14.7	52%	18%	34%		
51	5/11/87	SUGAR BEETS	22.8	10.0	.4	10.4	96%	44%	46%		
52	5/12/87	TOMATOES	20.0	2.7	11.5	14.2	19%	14%	71%		
53	5/19/87	TOMATOES	13.0	2.7	5.2	7.9	34%	21%	61%		
54	5/21/87	SUGAR BEETS	17.7	3.5	.6	4.1	85%	20%	23%		
55	5/26/87	TOMATOES	12.5	.0	5.9	5.9	0%	0%	47%		
56	5/31/87	TOMATOES	43.2	8.1	5.7	13.8	59%	19%	32%		
57	5/31/87	TOMATOES	43.2	8.1	3.2	11.3	72%	19%	26%		
58	6/11/87	TOMATOES	7.7	1.3	3.2	4.5	29%	17%	58%		
59	6/30/87	FLAT FLOOD	80.9	1.4	73.2	74.6	2%	2%	92%		
60	7/21/87	FLAT FLOOD	8.4	4.9	36.9	41.8	12%	58%	100%		
61	7/30/87	COTTON	19.6	.7	48.1	48.8	1%	4%	100%		
62	9/19/87	ALFALFA	51.3	6.1	.0	6.1	100%	12%	12%		
63	9/26/87	ALFALFA	13.3	.1	4.1	4.2	2%	1%	32%		
64	10/ 1/87	ALFALFA	42.3	14.4	20.4	34.8	41%	34%	82%		
65	10/10/87	ALFALFA	8.6	.0	5.2	5.2	0%	0%	60%		
66	10/26/87	ALFALFA	87.1	7.9	23.6	31.5	25%	9%	36%		
67	12/ 3/87	BERMUDA	15.8	.3	3.7	4.0	8%	2%	25%		
68	12/ 8/87	ALFALFA & BERMUDA	49.9	3.6	19.2	22.8	16%	7%	46%		
69	1/11/88	ALFALFA	41.2	.0	17.0	17.0	0%	0%	41%		
70	2/ 1/88	ALFALFA	30.0	4.1	7.0	11.1	37%	14%	37%		
71	2/12/88	ALFALFA & BERMUDA	*113.2		*29.9	*29.9					ULTRASONIC METER MEAS. 4.1 AF
72	3/19/88	ALFALFA & BERMUDA	160.2	11.0	16.4	27.4	40%	7%	17%	NR	ON SPILL
73	4/ 1/88	ALFALFA & BERMUDA	57.1	2.8	20.9	23.7	12%	5%	42%		
74	4/13/88	BERMUDA	64.1	.0	5.8	5.8	0%	0%	9%		
75	4/17/88	ALFALFA & WHEAT	49.8	5.5	9.6	15.1	36%	11%	30%		
76	4/26/88	ALFALFA & BERMUDA	*141.6		*26.8	*26.8				NR	ON SPILL
77	5/ 7/88	ALFALFA & BERMUDA	*109.0		*9.2	*9.2				NR	ON SPILL
78	5/17/88	ALFALFA & BERMUDA	*53.9		*8.9	*8.9				NR	RECORDER MALFUNCTION ON SPILL
79	5/24/88	ALFALFA	*23.4		*10.0	*10.0				NR	ON SPILL
80	5/31/88	BERMUDA	*44.3		*12.5	*12.5				NR	RECORDER MALFUNCTION ON SPILL
81	6/ 6/88	ALFALFA & BERMUDA	*95.1		*15.0	*15.0				NR	RECORDER MALFUNCTION ON SPILL
82	6/14/88	ALFALFA	41.6	6.3	15.1	21.4	29%	15%	51%	NR	GRADE BOARDS UNEVEN
83	6/28/88	ALFALFA & LEACHING	188.6	19.1	23.7	42.8	45%	10%	23%		
84	7/ 5/88	ALFALFA & LEACHING	124.6	9.8	60.0	69.8	14%	8%	56%		
85	7/19/88	LEACHING	25.4	3.0	36.8	39.8	8%	12%	100%		
86	8/ 2/88	ALF,BER,LET	159.0	3.3	16.1	19.4	17%	2%	12%		
87	8/ 9/88	ALF,BER,LET	140.8	11.0	17.2	28.2	39%	8%	20%		
88	8/16/88	ALF,BER,LET	76.6	8.9	25.3	34.2	26%	12%	45%		
89	8/23/88	ALF,BER,LET	58.4	6.4	22.0	28.4	23%	11%	49%		
90	9/ 6/88	ALFALFA	*21.3		*2.9	*2.9				NR	

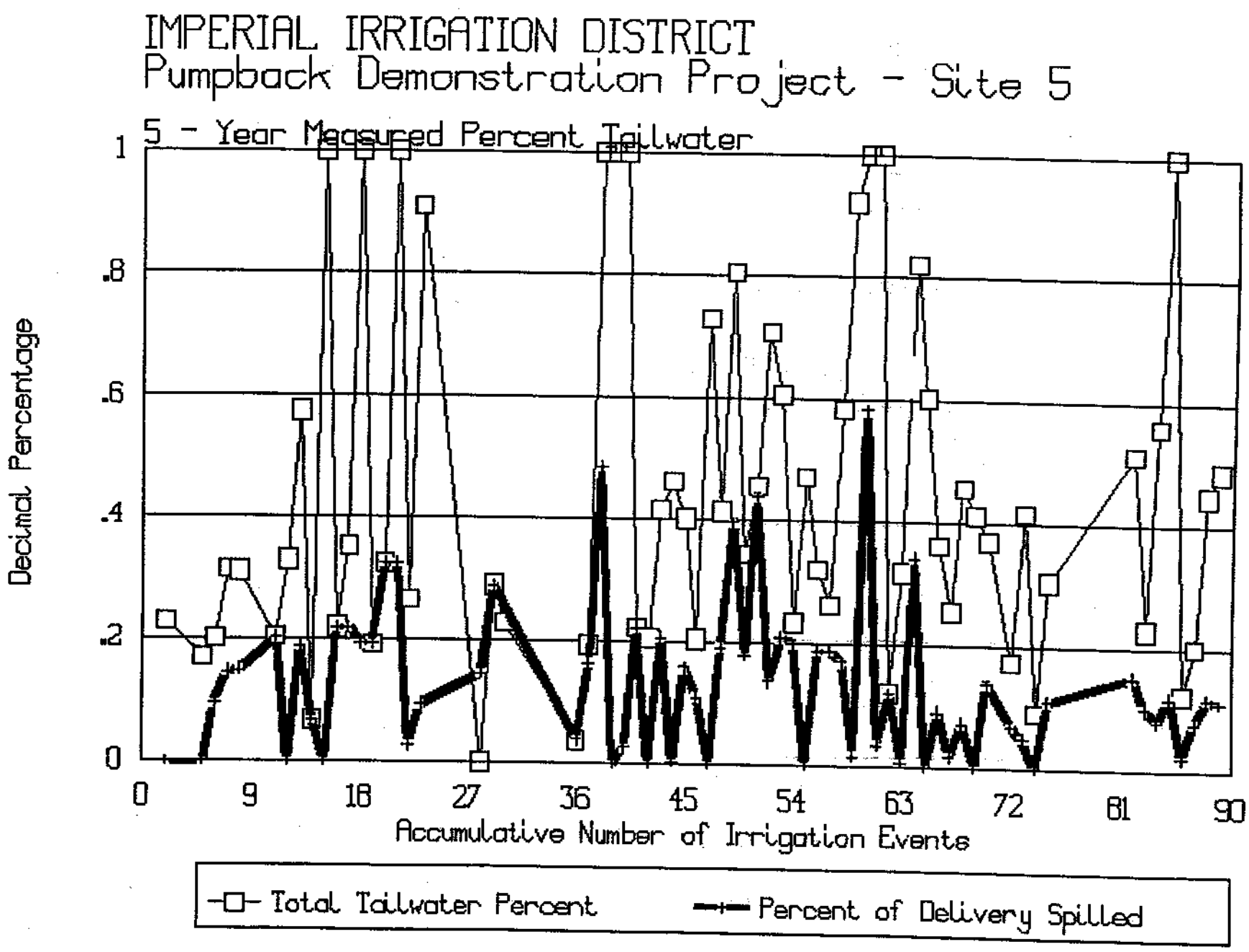
PUMPBACK SYSTEM #5

EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
91	9/13/88	ALFALFA & BERMUDA	*70.6		*3.5	*3.5				NR	
92	9/20/88	ALFALFA & BERMUDA	*64.8		*2.0	*2.0				NR	
93	9/27/88	ALFALFA & BERMUDA	*10.8							NR	GRADE BOARDS ADDED TO TW
94	10/ 4/88	ALFALFA & BERMUDA	*17.8							NR	
95	10/18/88	ALFALFA			*2.8	*2.8				NR	GRADE BOARDS ADDED TO TW
96	10/25/88	ALFALFA & BERMUDA	*115.2		*15.0	*15.0				NR	MIDDLE & SOUTH FIELDS DROPPED
97	11/ 1/88	ALFALFA								NR	DELIVERY&RECYCLED TW ESTIMATED
98	11/15/88	ALFALFA	*41.2		*17.1	*17.1				NR	NO ORDER
99	11/22/88	RYE GRASS	*9.2		*24.0	*24.0				NR	
100	1/24/89	ALFALFA & RYE	*67.4		*24.7	*24.7				NR	POND RECORDER MALFUNCTION
101	1/31/89	ALFALFA & RYE			*1.9	*1.9				NR	
102	2/ 7/89	ALFALFA & RYE	*20.6		*0.3	*0.3				NR	NO ORDER
103	2/14/89	ALFALFA & RYE	*14.4		*3.1	*3.1				NR	
104	2/21/89	ALFALFA & RYE	*59.7		*13.2	*13.2				NR	
105	2/28/89	ALFALFA & RYE								NR	
106	3/ 7/89	ALFALFA & RYE								NR	COULDN'T DETERMINE DELIVERY
107	3/14/89	ALFALFA & RYE								NR	NO DELIVERY
108	3/21/89	ALFALFA & RYE	*73.0							NR	NO DELIVERY
109	3/28/89	ALFALFA & RYE								NR	
110	4/ 4/89	ALFALFA & RYE								NR	NO ORDER
111	4/11/89	ALFALFA & RYE	*61.3							NR	NO ORDER
112	4/18/89	ALFALFA & RYE								NR	
113	4/26/89	ALFALFA	*71.7		*10.7	*10.7				NR	NO ORDER
114	5/ 2/89	ALFALFA	*112.4		*24.8	*24.8				NR	
115	5/ 9/89	ALFALFA	*64.8		*6.5	*6.5				NR	
116	5/16/89	ALFALFA	*24.0		*13.2	*13.2				NR	
117	5/23/89	ALFALFA								NR	
118	5/30/89	ALFALFA	*78.7		*13.9	*13.9				NR	NO ORDER
119	6/ 6/89	ALFALFA	*35.2		*9.2	*9.2				NR	
120	6/13/89	ALFALFA	*94.2		*33.0	*33.0				NR	
121	6/20/89	ALFALFA	*50.6		*33.0	*33.0				NR	
122	6/27/89	ALFALFA	*12.8		*11.3	*11.3				NR	DELIVERY WAS ESTIMATED
123	7/ 4/89	ALFALFA	*88.4		*20.9	*20.9				NR	
124	7/11/89	ALFALFA	*50.3		*32.1	*32.1				NR	
125	7/18/89	ALFALFA	*27.7		*9.9	*9.9				NR	
126	7/25/89	ALFALFA	*14.2		*11.1	*11.1				NR	
127	8/ 1/89	ALFALFA	*21.1							NR	
128	8/ 8/89	ALFALFA	*60.2		*12.9	*12.9				NR	
129	8/15/89	ALFALFA	*64.6		*19.1	*19.1				NR	
130	8/22/89	ALFALFA								NR	
131	8/29/89	ALFALFA	*55.7		*19.5	*19.5				NR	NO ORDER
132	9/ 5/89	ALFALFA								NR	
133	9/12/89	ALFALFA	*111.7		*5.8	*5.8				NR	NO ORDER
134	9/19/89	ALFALFA	*80.7		*19.9	*19.9				NR	RECYCLED TW WENT TO THE SOUTH
135	9/26/89	ALFALFA			*7.6	*7.6				NR	
										NR	

PUMPBACK SYSTEM #5

EVENT (1)	DATE (2)	CROP (3)	WATER QUANTITIES (ACRE FEET) DELIVERY (4)	SPILL (5)	RECYCLED TAILWATER (6)	TOTAL TAILWATER (7)	%TAILWATER SPILLED (8)	%DELIVERY SPILLED (9)	%DELIVERY TAILWATER (10)	NO RECORD (11)	COMMENTS (12)
136	10/ 3/89	ALFALFA	*15.4		*2.8	*2.8				NR	
137	10/10/89	ALFALFA	*59.8		*18.6	*18.6				NR	
138	10/17/89	ALFALFA	*5.7		*5.4	*5.4				NR	
139	10/24/89	ALFALFA	*59.1							NR	
140	10/31/89	ALFALFA								NR	NO ORDER
141	11/ 7/89	ALFALFA								NR	NO ORDER
142	11/ 7/89	ALFALFA								NR	NO ORDER
143	11/14/89	ALFALFA	*32.0		*13.5	*13.5				NR	
144	11/21/89	ALFALFA	*39.0		*14.6	*14.6				NR	
145	11/28/89	ALFALFA	*11.1		*3.7	*3.7				NR	RECYCLED TW WENT TO LAV.5-B
146	12/ 5/89	ALFALFA			*6.5	*6.5				NR	RECYCLED TW WENT TO SOUTH FLD
147	12/12/89	ALFALFA	*33.3		*4.6	*4.6				NR	
148	12/19/89	ALFALFA	*21.7		*4.6	*4.6				NR	
149	12/26/89	ALFALFA								NR	
150	1/ 2/90	ALFALFA								NR	NO ORDER
151	1/ 9/90	ALFALFA								NR	NO ORDER
152	1/16/90	ALFALFA			*10.0	*10.0				NR	NO ORDER
153	1/23/90	ALFALFA								NR	NO ORDER
154	1/30/90	ALFALFA	*18.1		*5.2	*5.2				NR	
155	2/ 6/90	ALFALFA	*27.6		*19.2	*19.2				NR	WATER PUMPED TO SOUTH FEILD
156	2/13/90	ALFALFA			*0.3	*0.3				NR	RECYCLED TW CALCULATED W/POWER
157	2/20/90	ALFALFA			*7.3	*7.3				NR	
158	2/27/90	ALFALFA	*51.4		*16.6	*16.6				NR	
159	3/ 6/90	ALFALFA	*29.5		*10.5	*10.5				NR	
160	3/13/90	ALFALFA			*21.8	*21.8				NR	LAV 5B TW WENT TO CM POND
		TOTAL	3,041.6	343.1	896.9	1,234.3	28%	11%	41%		
		AVG	44.7	5.1	13.2	18.4					
		STD DEV	41.2	4.9	14.1	15.3					

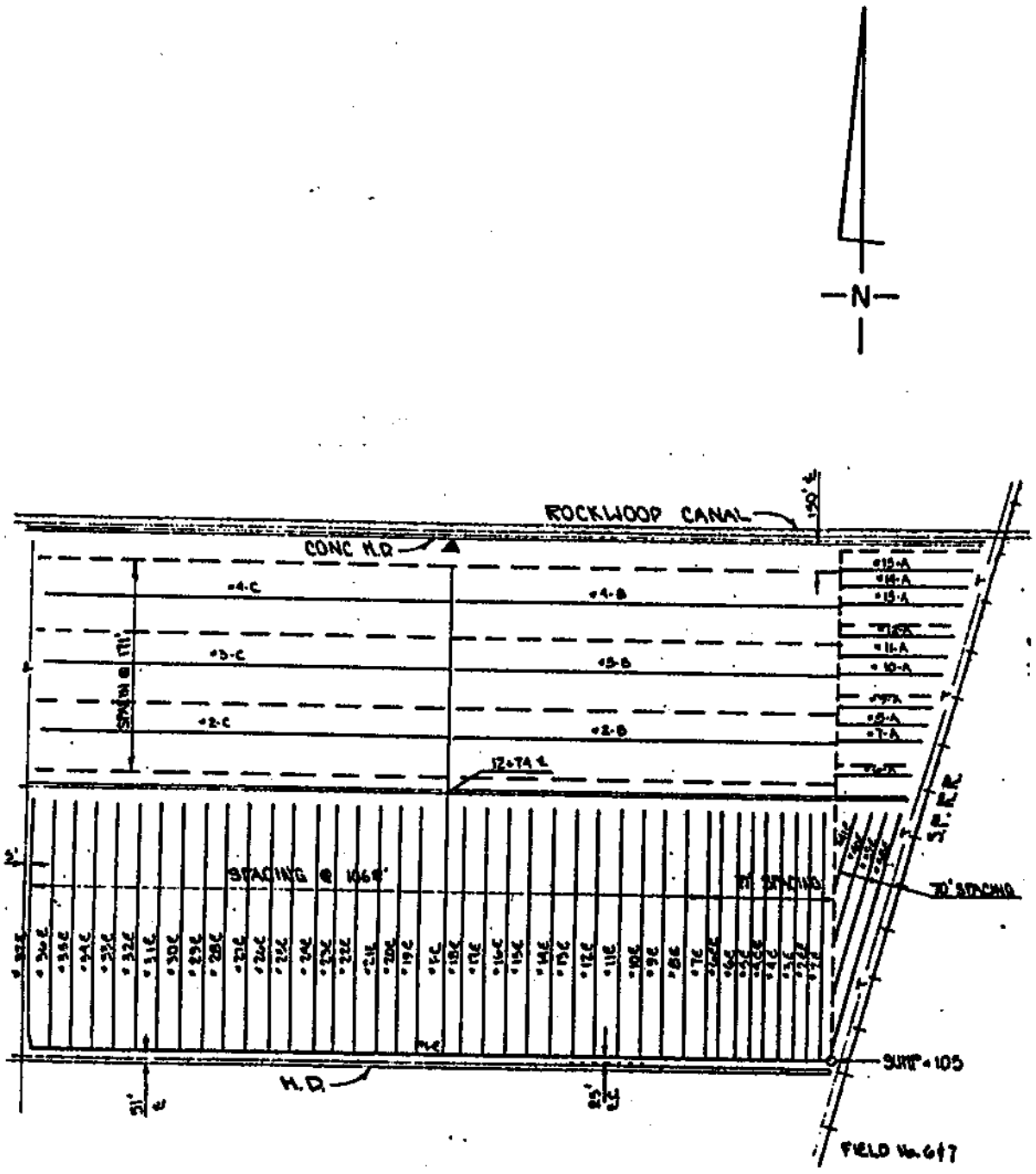

IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 5
3 - Year Measured Water Application
Total Water Measured (Acre-feet)
4000
3200
2400
1600
800
0
0
18
36
54
72
90
Accumulative Number of Irrigation Events
Destination
Applied
Spill
Tailwater


IMPERIAL IRRIGATION DISTRICT
Pumpback Demonstration Project - Site 5
5 - Year Measured Percent Tailwater
Decimal Percentage
1
.8
.6
.4
.2
0
0
9
18
27
36
45
54
63
72
81
90
Accumulative Number of Irrigation Events
Total Tailwater Percent
Percent of Delivery Spilled

SOIL SALINITY

SOIL SALINITY DATA NOT COLLECTED

FOR PUMPBACK SYSTEM #5



PUMPBACK SYSTEM #5

TRACT 117
T.14S. - R.14E.

WATER SALINITY

PUMPBACK SYSTEM #5

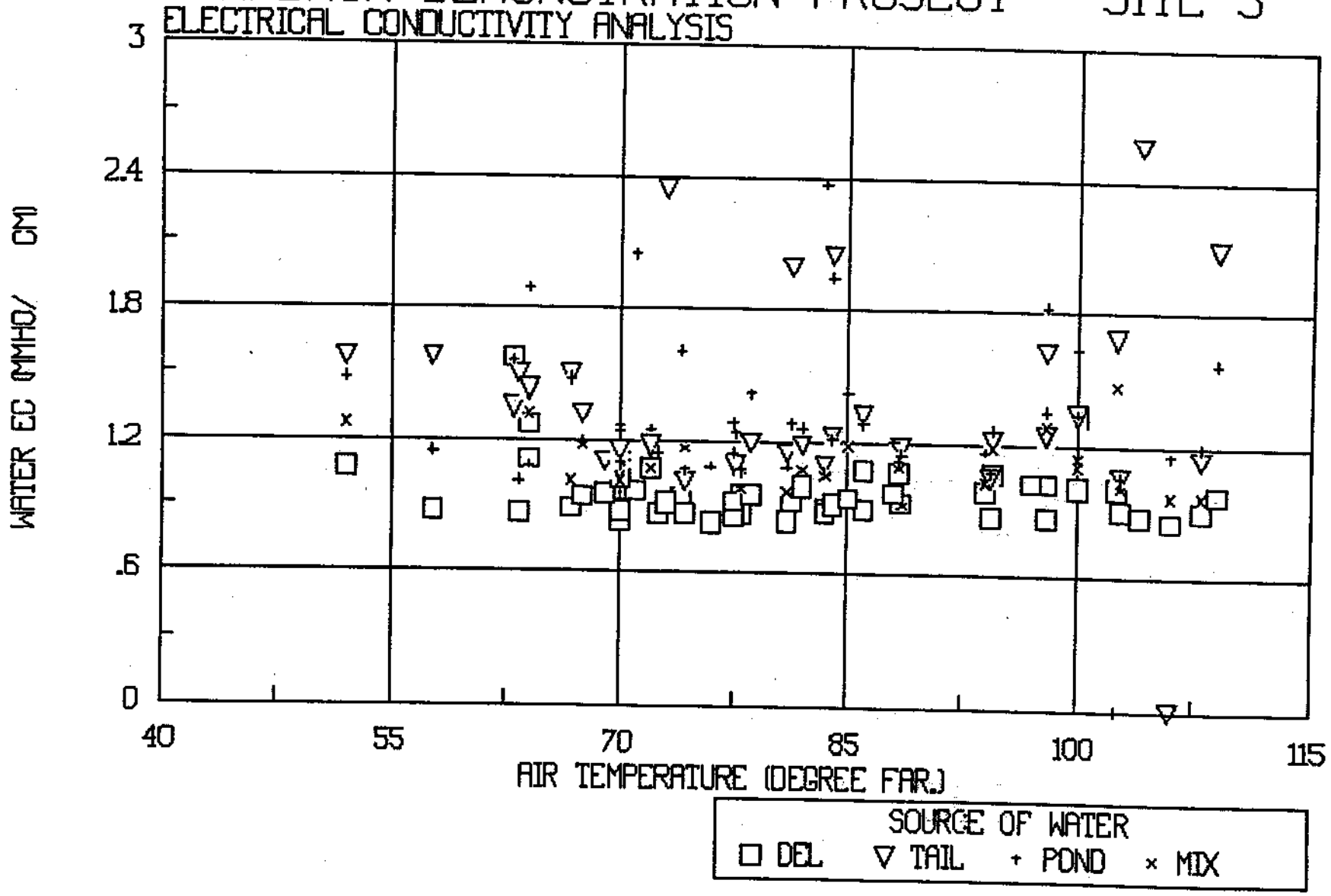
		AIR TEMPERATURE (DEGREES FAR.)						WATER TEMPERATURE (DEGREES FAR.)					CHANGE FROM DELIVERY TEMP (DEGREES FAR.)				WATER EC (MMHO/CM)					CHANGE FROM DELIVERY EC (MMHO/CM)			
DATE	TIME	DEL	TAIL	POND	MIX	TILE	AVG	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE
4/ 3/86	1020	73	80	80			78	68	77	78			9	10	*	*	.88	1.09	1.24			.21	.36	*	*
4/30/86	1121	86	86	86			86	73	77	79			4	6	*	*	.90	1.33	1.29			.43	.39	*	*
5/ 9/86	1315	84	85	83			84	72	80	66			8	(6)	*	*	.92	1.23	1.22			.31	.30	*	*
5/23/86	1350	94	94	95			94	76	90	82			14	6	*	*	.87	1.05	1.07			.18	.20	*	*
5/30/86	1306	103	102	103	103		103	85	92	93	84		7	8	(1)	*	.91	1.06	1.06	1.01		.15	.15	.10	*
6/21/86	1508	106	106	106	106		106	82	86	85	84		4	3	2	*	.86	.00	1.16	.97		*	.30	.11	*
6/25/86	655	76		76			76	80		86			*	6	*	*	.83		1.09			*	.26	*	*
7/18/86	756	83	84	84	83		84	79	79	79	80		0	0	1	*	.90	1.10	1.06	1.05		.20	.16	.15	*
7/30/86	735	80	82	82	80		81	82	74	74	78		(8)	(8)	(4)	*	.84	1.15	1.09	.97		.31	.25	.13	*
8/ 5/86	634	78		78			78	85		85			*	0	*	*	.87		1.06			*	.19	*	*
8/12/86	720	83		84			84	85		84			*	(1)	*	*	.88		2.38			*	1.50	*	*
8/19/86	1325	104	104				104	88	95				7	*	*	*	.88	2.57				1.69	*	*	*
8/26/86	1130	98	98	98	98		98	88	94	84	86		6	(4)	(2)	*	.87	1.62	1.82	1.29		.75	.95	.42	*
11/ 3/86	1348	84	84	84			84	66	80	63			14	(3)	*	*	.92	2.05	1.95			1.13	1.03	*	*
12/ 2/86	1040	66	67	67	67		67	57	63	58	56		6	1	(1)	*	.89	1.50	1.48	1.02		.61	.59	.13	*
12/ 8/86	1305	70	70	70			70	57	67	62			10	5	*	*	.84	1.07	1.24			.23	.40	*	*
12/10/86	940	66		62			64	50		52			*	2	*	*	1.28		1.09			*	(.19)	*	*
12/16/86	1110	70		70			70	54		54			*	0	*	*	.89		1.09			*	.20	*	*
12/23/86	1210	70	70	70			70	57	69	58			12	1	*	*	.88	1.11	1.11			.23	.23	*	*
12/24/86	930	57	58	58			58	55	51	54			(4)	(1)	*	*	.88	1.57	1.15			.69	.27	*	*
12/31/86	1240	69	69				69	56	58				2	*	*	*	.96	1.11				.15	*	*	*
1/20/87	1330	60	65	65			63	50	54	48			4	(2)	*	*	.87	1.50	1.02			.63	.15	*	*
2/10/87	1246	78		77			78	60		64			*	*	*	*	.86		1.29			*	.43	*	*
2/17/87	1435	73		72			73	60		64			*	4	*	*	.87		1.15			*	.28	*	*
4/14/87	1325	85		85	85	85	85	70		67	70	68	*	(3)	0	(2)	.95		1.42	1.19	9.55	*	.47	.24	8.60
4/20/87	1205	78		78	78	78	78	68		66	70	67	*	(2)	2	(1)	.96		1.07	.99	10.00	*	.11	.03	9.04
5/12/87	1335	100	100	100	100	100	100	78	76	75	82	67	(2)	(3)	4	(11)	1.34	1.34	1.35	1.14	7.60		.01	(.20)	6.26
5/19/87	1300	88	89	89	88	89	89	76	85	78	76	70	9	2	0	(6)	.93	1.18	1.15	.92	9.52	.25	.22	(.01)	8.59
6/ 2/87	1130	98	98	98		98	98	80	90	80		70	10	0	*	(10)	1.03	1.25	1.36		7.21	.22	.33	*	6.18
6/ 5/87	1430	78		77			78	62		60			*	(2)	*	*	.93		1.15			*	.22	*	*
7/21/87	715	71		71		71	71	78		74		76	*	(4)	*	(2)	.97		2.05		8.32	*	1.08	*	7.35
7/23/87	755	74		74		74	74	78		77		75	*	(1)	*	(3)	.95		1.61		7.19	*	.66	*	6.24
8/ 4/87	1230	103	102	103	102	102	103	90	98	88	89	78	8	(2)	(1)	(12)	1.01	1.68	.00	1.47	8.02	.67	*	.46	7.01
3/21/88	1345	88		88			88	68		70			*	2	*	*	.97		1.21			*	.24	*	*
3/22/88	1055	80	82	82		69	81	66	84	74		65	18	8	*	(1)	.93	1.99	1.29		8.67	1.06	.36	*	7.74
4/ 5/88	900	74	75	74	74	75	74	66	59	64	65	64	(7)	(2)	(1)	(2)	.87	1.02	1.07	1.17	7.67	.15	.20	.30	6.80
4/15/88	1235	70	76			76	73	64	87			68	23	*	*	4	.92	2.35			10.56	1.43	*	*	9.64
4/19/88	835	63	63	63		63	63	69	63	69		67	(6)	0	*	(2)	1.57	1.35	1.56		9.89	(.22)	(.01)	*	8.32
4/20/88	930	80	78	78			79	68	66	68			(2)	0	*	*	.96	1.20	1.42			.24	.46	*	*
5/ 3/88	815	68	66	68	68	64	68	68	62	66	65	67	(6)	(2)	(3)	(1)	.95	1.32	1.20	1.18	8.85	.37	.25	.23	7.90
5/10/88	1405	95	95	93	95	94	95	75	97	70	75	69	22	(5)	0	(6)	1.07	1.22	1.27	1.19	7.47	.15	.20	.12	6.40
5/20/88	1400	100		100	100	100	100	79		78	80	70	*	(1)	1	(9)	1.01		1.63	1.11	6.94	*	.62	.10	5.93
5/25/88	1249	97		97			97	82		90			*	8	*	*	1.03		8.74			*	7.71	*	*
6/ 7/88	1300	89		88	88	88	88	76		68	72	71	*	(8)	(4)	(5)	1.07		1.12	1.09	5.77	*	.05	.02	4.70
6/ 9/88	1317	94		94	94	94	94	78		90	77	72	*	12	(1)	(6)	.99		1.17	1.03	5.94	*	.18	.04	4.95
7/ 1/88	1340	108	108	108	108	108	108	88	100	85	86	79	12	(3)	(2)	(9)	.91	1.14	1.20	.97	6.57	.23	.29	.06	5.66
7/ 5/88	1240	109	109	109		109	109	84	102	97		79	18	13	*	(5)	.98	2.09	1.57		7.19	1.11	.59	*	6.21
8/ 2/88	755	86		86			86	80		82			*	2	*	*	1.08		4.45			*	3.37	*	*
2/ 5/90	1420	64	64	64	64		64	54	65	57	54		11	3	0	*	1.12	1.43	1.89	1.32		.31	.77	.20	*

PUMPBACK SYSTEM #5

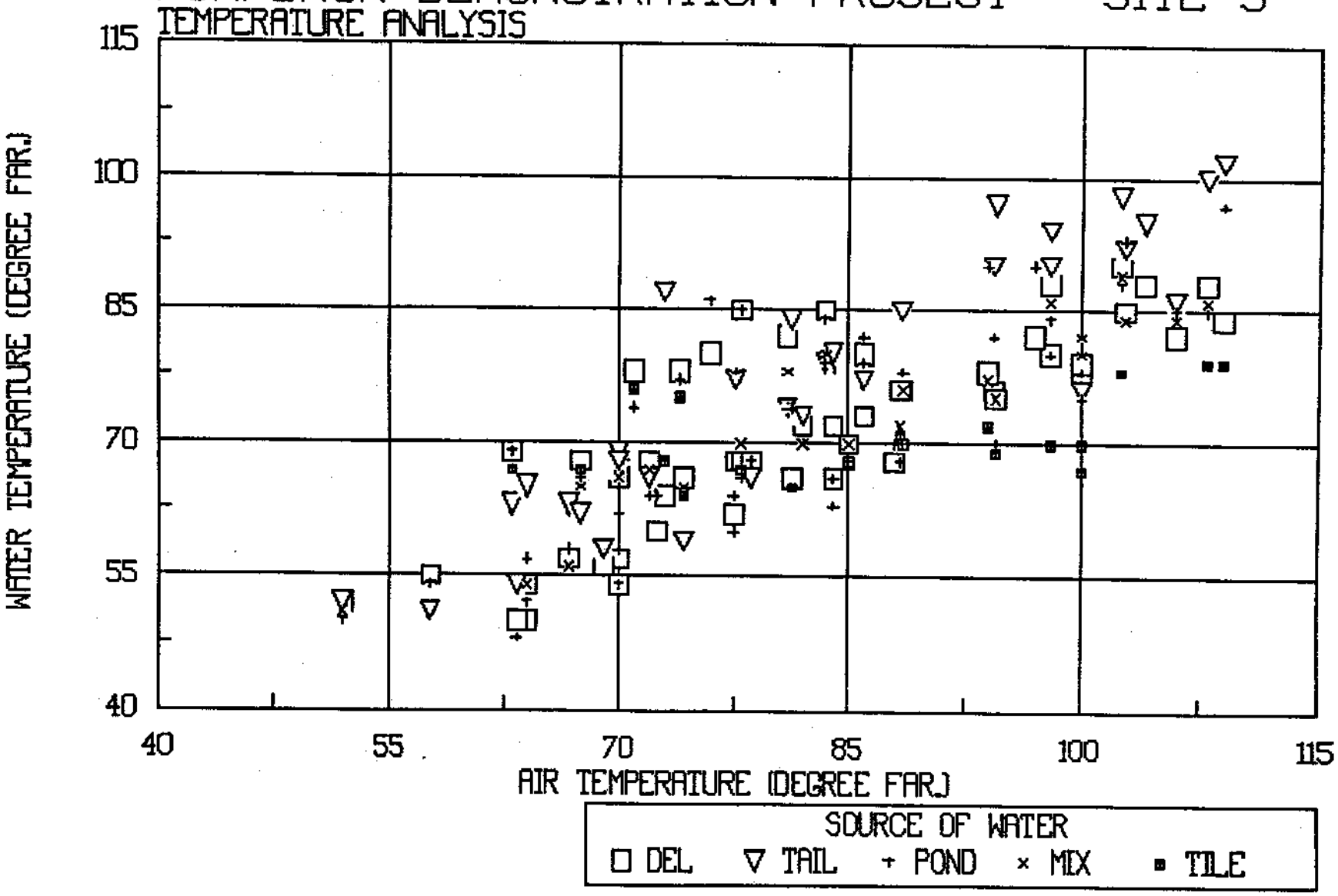
		AIR TEMPERATURE (DEGREES FAR.)						WATER TEMPERATURE (DEGREES FAR.)					CHANGE FROM DELIVERY TEMP (DEGREES FAR.)				WATER EC (MMHO/CM)					CHANGE FROM DELIVERY EC (MMHO/CM)			
DATE	TIME	DEL	TAIL	POND	MIX	TILE	AVG	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE	DEL	TAIL	POND	MIX	TILE	TAIL	POND	MIX	TILE
2/ 6/90	920	52	52	52	52		52	52	52	50	51		0	(2)	(1)	*	1.08	1.57	1.48	1.28		.49	.40	.20	*
4/17/90	854	72	72	72	72		72	68	66	64	67		(2)	(4)	(1)	*	1.08	1.18	1.26	1.08		.10	.18		*
5/ 1/90	854	70	70	70	70		70	66	68	65	66		2	(1)	0	*	1.03	1.16	1.28	1.02		.13	.25	(.01)	*
5/16/90	933	82	82	82	82		82	72	73	70	70		1	(2)	(2)	*	1.00	1.19	1.27	1.08		.19	.27	.08	*
	AVERAGES	82	82	82	85	86	82	71	77	72	73	71	6	1	(1)	(5)	.97	1.36	1.51	1.11	8.05	.43	.57	.13	7.03
	STD DEV	13.9	15.3	13.6	15.0	14.3	13.7	11.0	14.4	11.8	10.3	4.5	7.9	4.7	1.8	4.1	.13	.45	1.17	.13	1.36	.42	1.15	.14	1.35

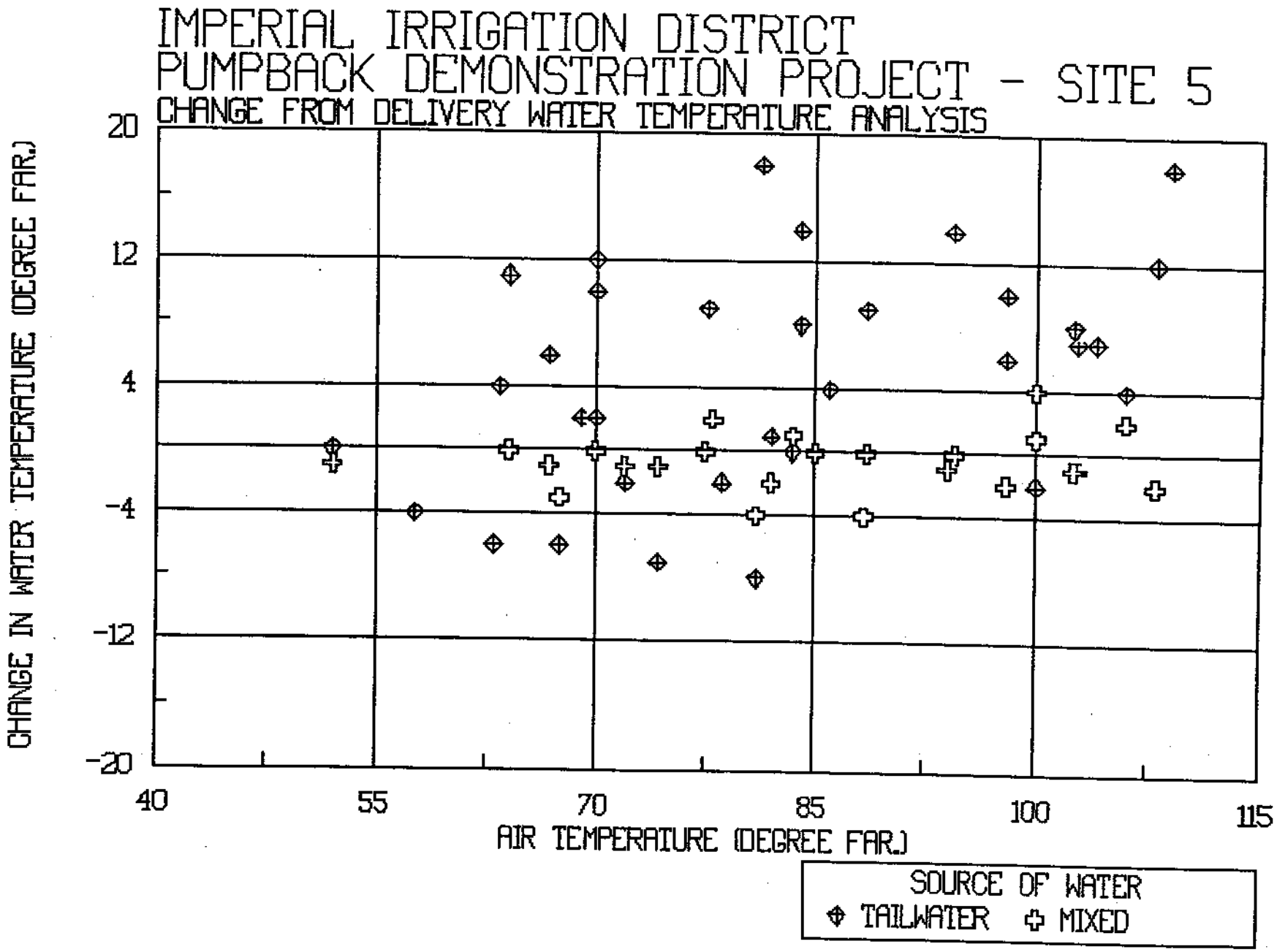
AVERAGE PERCENT INCREASE FROM DELIVERY EC	41%	56%	15%

IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 5



IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 5




IMPERIAL IRRIGATION DISTRICT
PUMPBACK DEMONSTRATION PROJECT - SITE 5
CHANGE FROM DELIVERY WATER TEMPERATURE ANALYSIS
CHANGE IN WATER TEMPERATURE (DEGREE FAR.)
20
12
4
-4
-12
-20
40
55
70
85
100
115
AIR TEMPERATURE (DEGREE FAR.)
SOURCE OF WATER
TAILWATER
MIXED