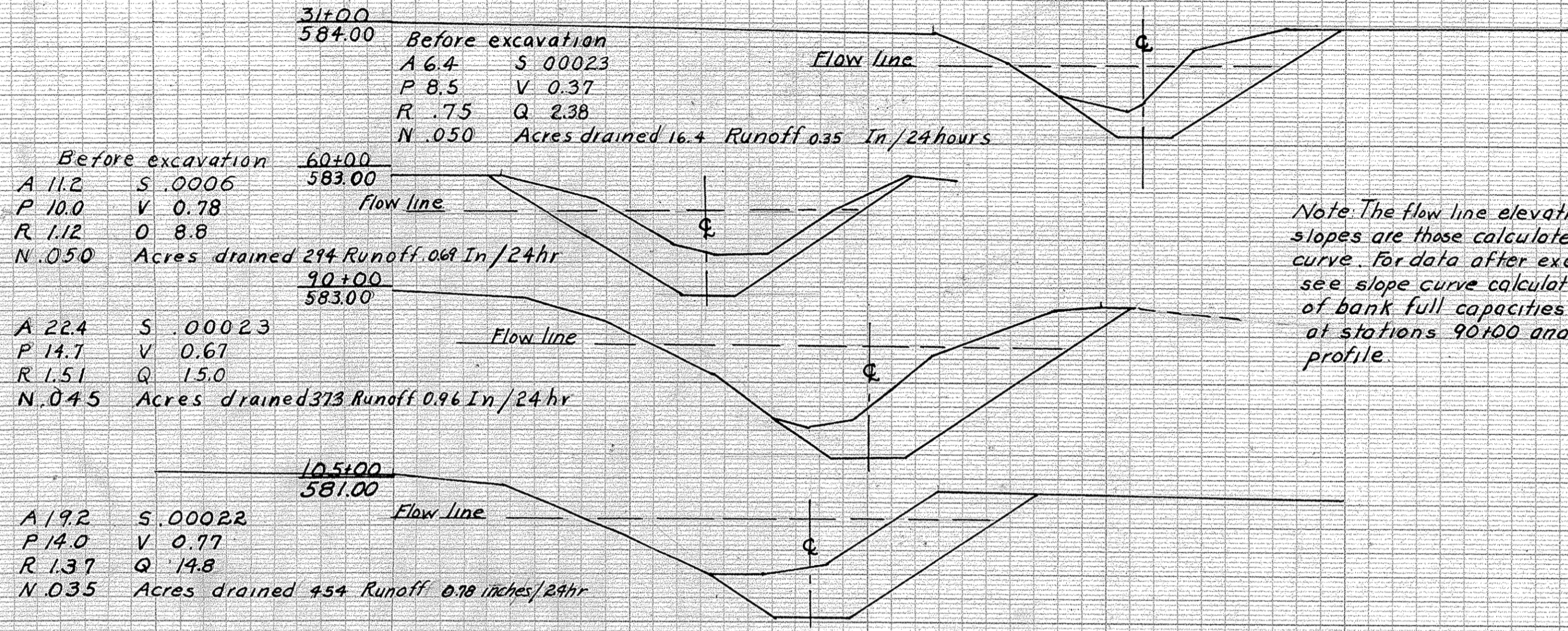


TYPICAL SECTIONS EPPLING DITCH



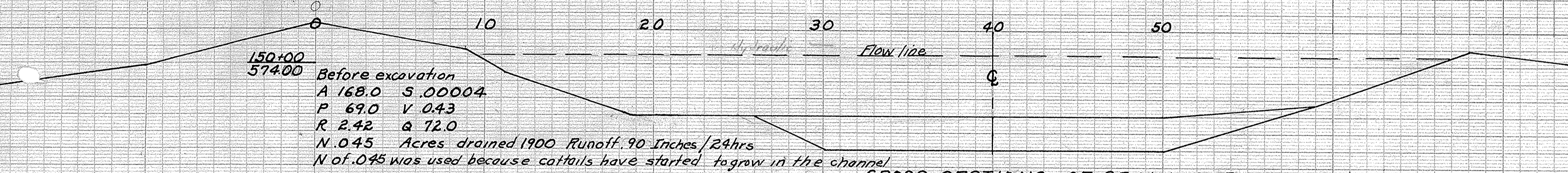
Note: The flow line elevations and slopes are those calculated in slope curve. For data after excavation see slope curve calculations. Comparison of bank full capacities are best at stations 90+00 and 105+00 See profile.

For Hatched Headwalls only
Design on basis of 1 1/2" Runoff below 2' width

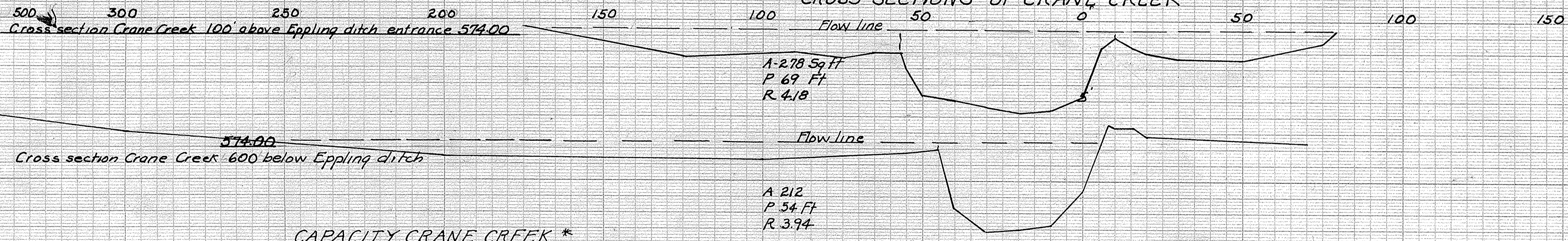
Determination of Q
Q=C/A Q=CFS C=10
I=10 year rainfall intensity
A=Area in acres 1/2 is the time of concentration in hours
SLOPE CURVE CALCULATIONS
From Manning formula $Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$ $S = \frac{(nV)^2}{2.2082 \times K}$
 $S = (nV)^2 \times 2.2082 \times \frac{1}{K}$ but $2.2082 \times \frac{1}{K} = K$ $S = (nV)^2 \times K$ Elev. water in Crane Creek 574.43

Station	% c	Acres	I	Q	Sta to Sta	Dist	Acres	CFS	Runoff	Bottom slope	Depth	Area	R	N	V	(1/V) ²	K	Slope	Fall	Elev		
150+00	-	1900	-	1478	162+00	145+37	1663	1900	1478	1.85	20'-2"	5.5	222.0	3.80	.035	.66	.00054	.0764	.00004	.07	574.50	
					145+37	139+39	598	530	41.3	1.85	3'-1 1/2"	3.8	33.06	1.98	.035	1.25	0.0019	.182	.00035	.21	574.71	
					139+39																575.88	
					139+39	133+84	555	530	41.3	1.85	3'-1 1/2"	3.6	30.24	1.89	.035	1.37	0.0023	.194	.00044	.25	576.13	
					133+84																576.83	
					133+84	128+50	534	530	41.3	1.85	3'-1 1/2"	3.4	27.54	1.80	.035	1.49	0.0028	.207	.00048	.26	577.19	
					128+50																577.89	
122+60	3.3	530	0.28	41.3	128+50	119+00	950	530	41.3	1.85	3'-1 1/2"	3.6	30.24	1.89	.035	1.37	0.0028	.194	.00044	.22	578.31	
					119+00																578.45	
					119+00	113+56	544	530	41.3	1.85	3'-1 1/2"	3.8	33.06	1.98	.035	1.25	0.0019	.182	.00035	.19	578.62	
					113+56																578.80	
					113+56	112+13	143	530	41.3	1.85	3'-1 1/2"	3.8	33.06	1.98	.035	1.25	0.0019	.182	.00035	.05	578.85	
					112+13																579.15	
					112+13	95+71	1642	454	36.3	1.91	3'-1 1/2"	4.0	36.00	2.07	.035	1.01	0.0013	.172	.00022	.35	579.50	
					95+71																579.65	
					95+71	94+00	171	454	36.3	1.91	3'-1 1/2"	4.0	36.00	2.07	.035	1.01	0.0013	.172	.00022	.24	579.69	
					94+00																580.00	
94+00	3.0	454	0.20	36.3	94+00	72+25	2175	373	29.8	1.93	3'-1 1/2"	3.6	30.24	1.89	.035	.99	0.012	.194	.00023	.50	580.50	
					72+25																580.67	
					72+25	61+00	1025	29.4	27.0	2.19	2 1/2"	3.4	25.84	1.75	.040	1.05	.0018	.215	.00039	.40	581.07	
61+00	2.6	294	0.92	27.0	61+00	47+70	1330	29.4	27.0	2.19	2 1/2"	3.0	21.50	1.58	.040	1.25	.0021	.230	.0006	.61	581.68	
					47+70																581.88	
					47+70	30+51	3100	1676	164	164	2.19	2 1/2"	3.0	21.50	1.58	.040	.77	.001	.230	.0003	.39	582.27

TYPICAL SECTION EPPLING DREDGE CUT



CROSS SECTIONS OF CRANE CREEK



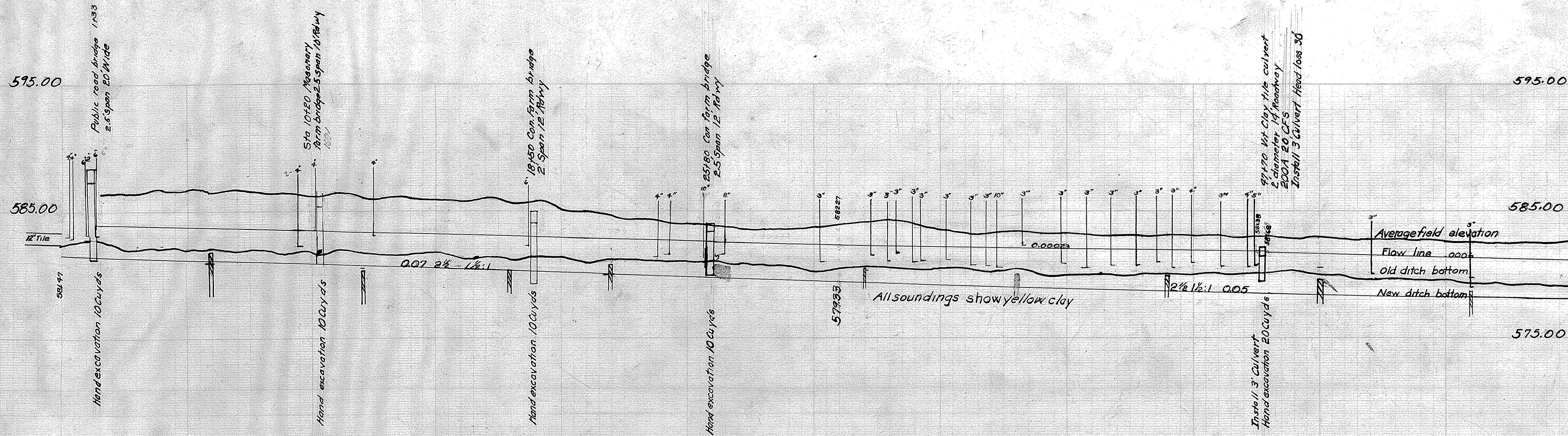
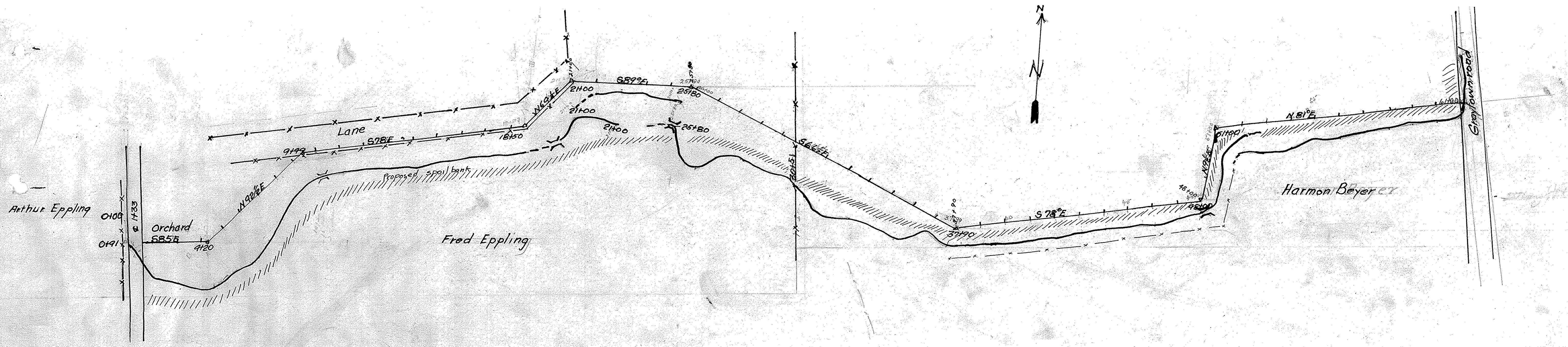
CAPACITY CRANE CREEK *

Area	245 Sq ft	Slope	0.0001
Wetted perimeter	62 Ft	Velocity Ft/Sec	1.2
Hydraulic Radius	3.80	Capacity Cubic Ft/Sec	296.0
N	.030	Acres drained	247.90
		Runoff Coefficient	0.28 inches per 24 hours.

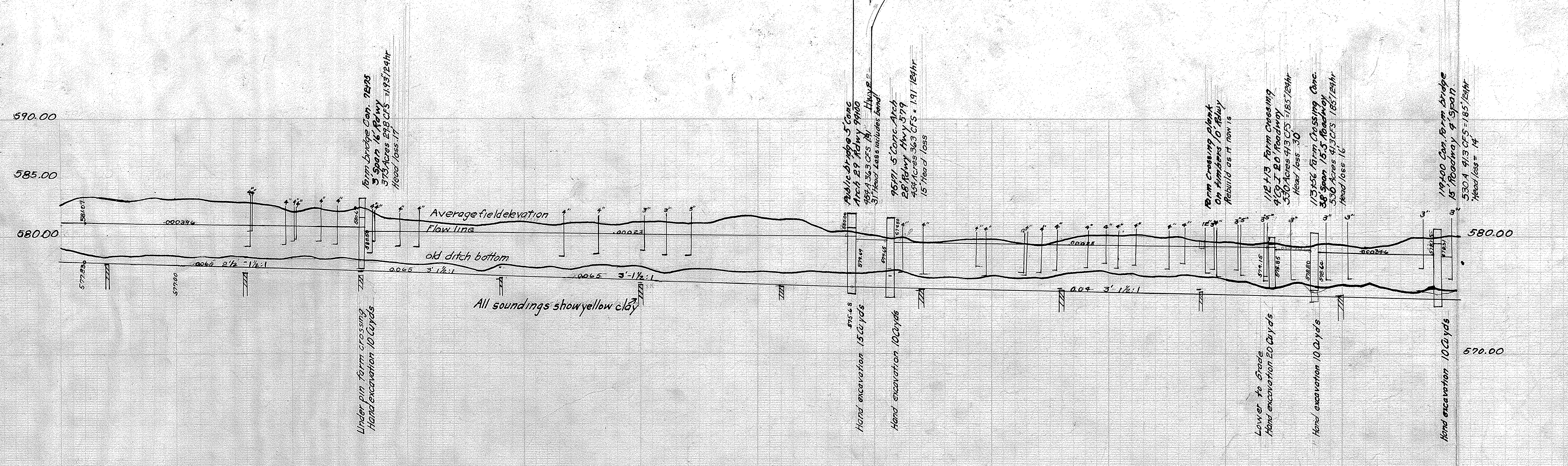
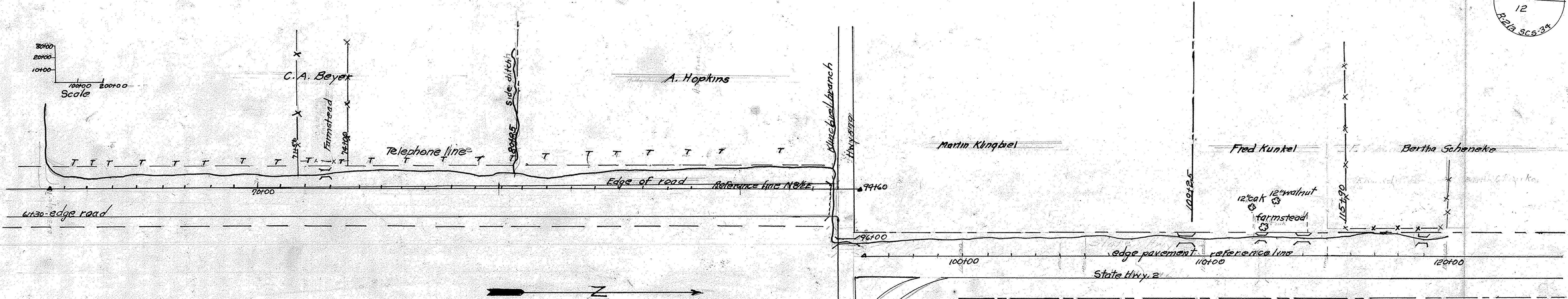
* This capacity was arrived at by using flow line elevation of 574.40 and disregarding flow over adjacent bottom lands, because many places dikes interfere with this flow. The data used is a composite of the two sections show above.

LEDGEND & QUANTITIES

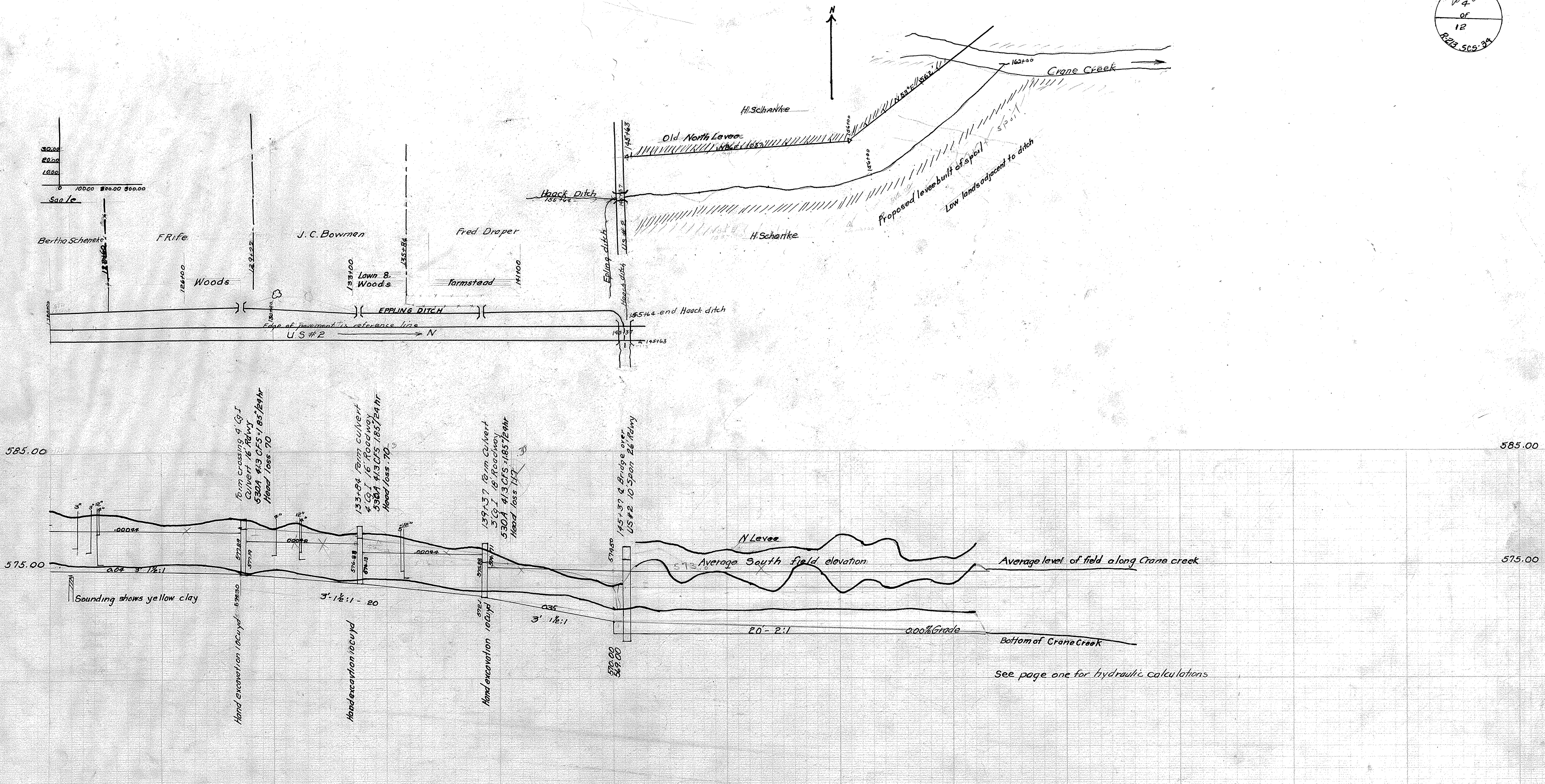
Clearing done as project A-219	US DEPARTMENT OF AGRICULTURE
Excavation dragline 128.34 Cu yd 16200 L.Ft	Soil Conservation Service
Excavation hand 200 Cu yd inaccessible places	CCC Camp SCS-34 Bowling Green Ohio
Fence 177 rods	Sand Beach Side Camp Project R-213
Tile outlets to be cleaned 99-990 L.Ft	EPPLING DITCH
Spoil bank leveling 9799 Cu yd 14537 L.Ft	Benton Township Ottawa Co Ohio
Tile on right	Approved _____ Date _____
Proposed spoil bank	Approved _____ Date _____
Tile on left	Approved _____ Date _____
	Approved _____ Date _____



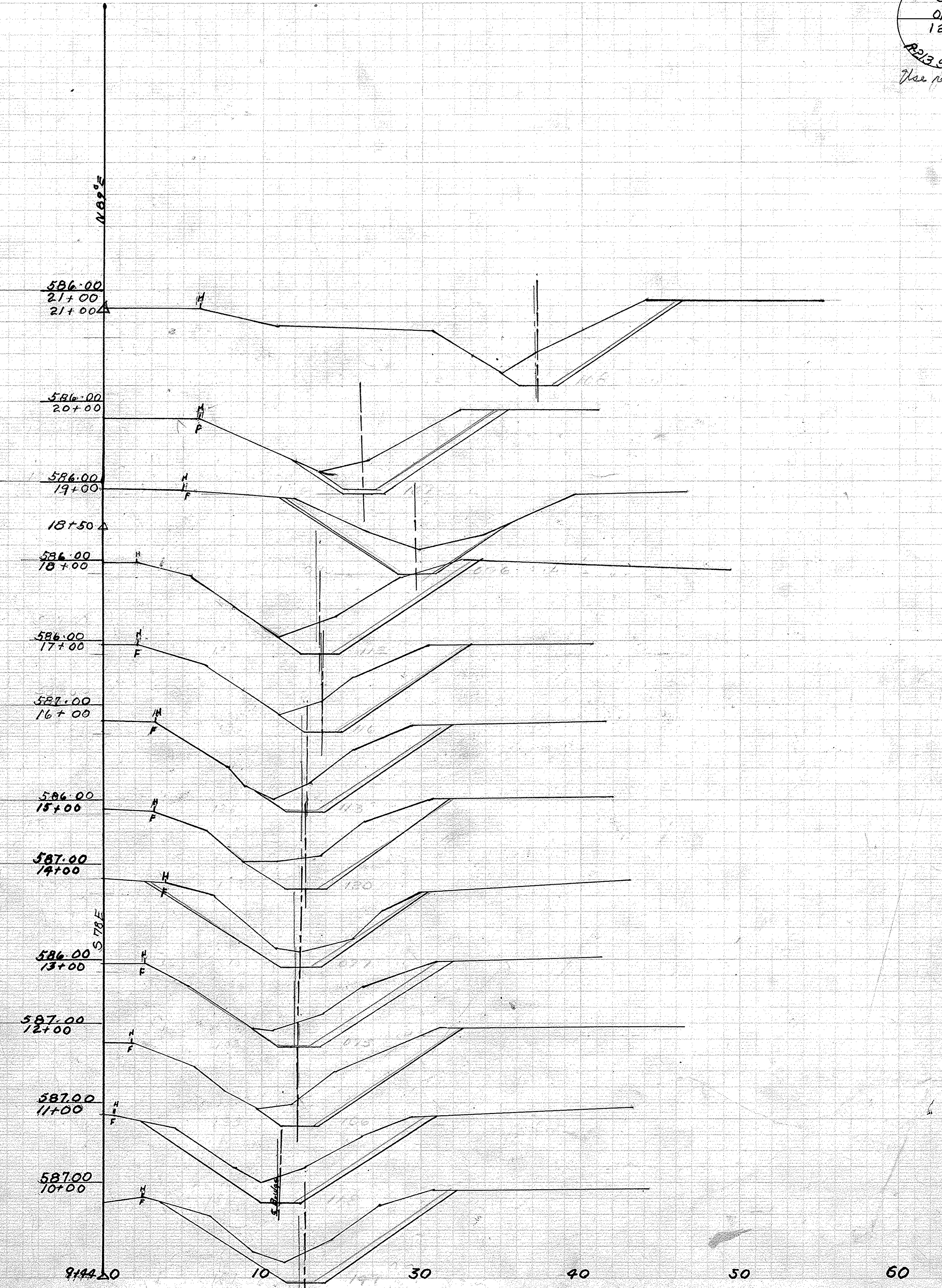
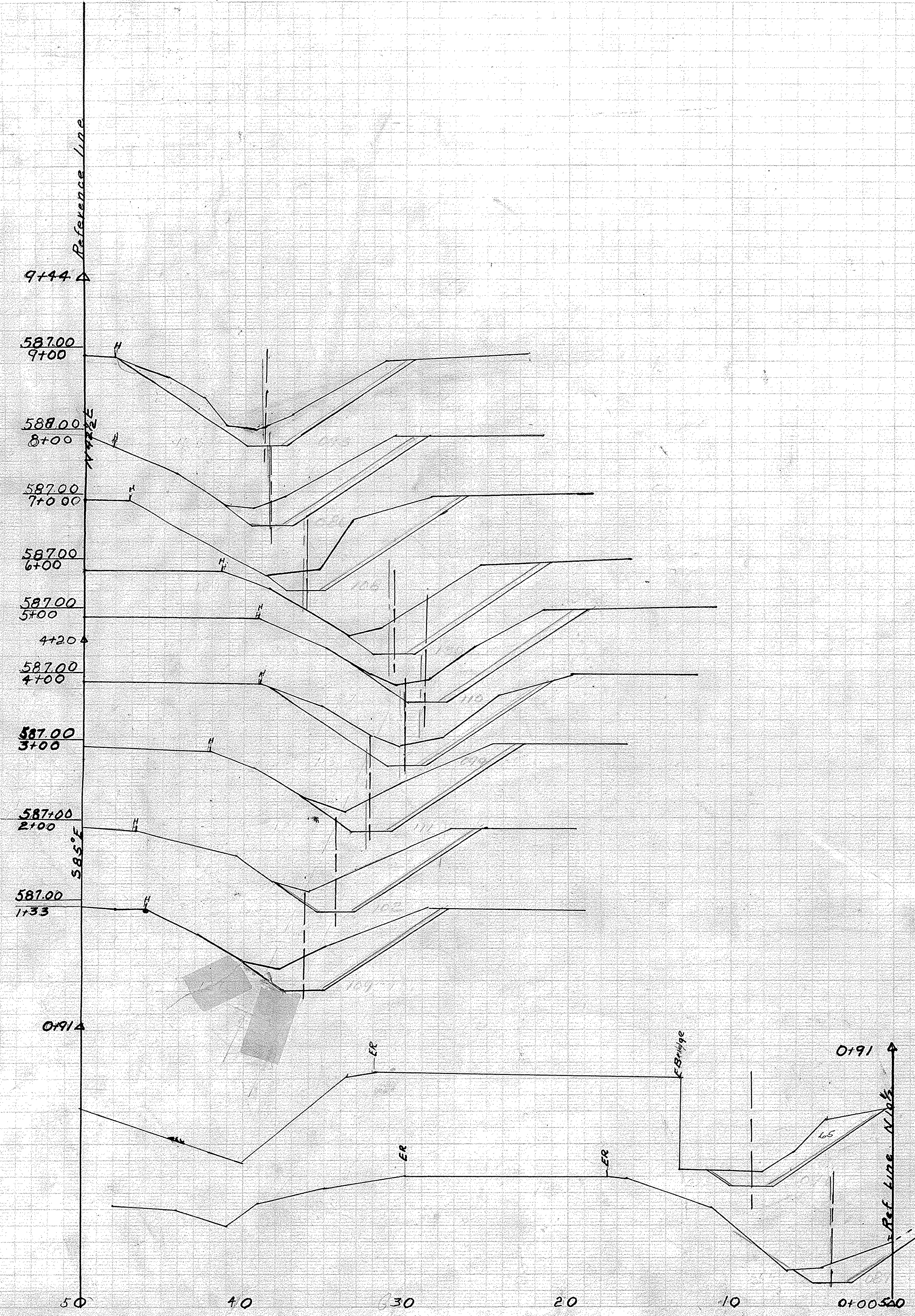
Bench Marks	Sta 0190 Nail in pole left 586.98	Sta. 12715 nail in elm R Elev. 586.70	Station 49170 Nail in fence past L. 583.91
Cubic Yards	0 39.2	1 97.2	2 123.9
Hub Cuts	3 9.9	4 9.0	5 10.3
Dist. hub to ditch	6 10.7	7 11.0	8 9.8
Station Number	9 9.5	10 12.2	11 10.5
	12 10.5	13 9.8	14 8.6
	15 9.5	16 9.5	17 11.7
	18 11.5	19 14.6	20 12.2
	21 12.2	22 9.2	23 8.8
	24 8.8	25 8.0	26 6.0
	27 9.5	28 9.4	29 7.8
	30 9.9	31 8.8	32 6.9
	33 5.3	34 3.4	35 6.7
	36 6.0	37 5.3	38 4.8
	39 4.2	40 4.1	41 3.6
	42 3.6	43 3.9	44 5.0
	45 5.3	46 4.0	47 4.0
	48 5.5	49 5.0	50 5.2
	51 4.2	52 9.5	53 12.5
	54 12.5	55 7.2	56 8.5
	57 7.2	58 5.7	59 7.2
	60 7.6		



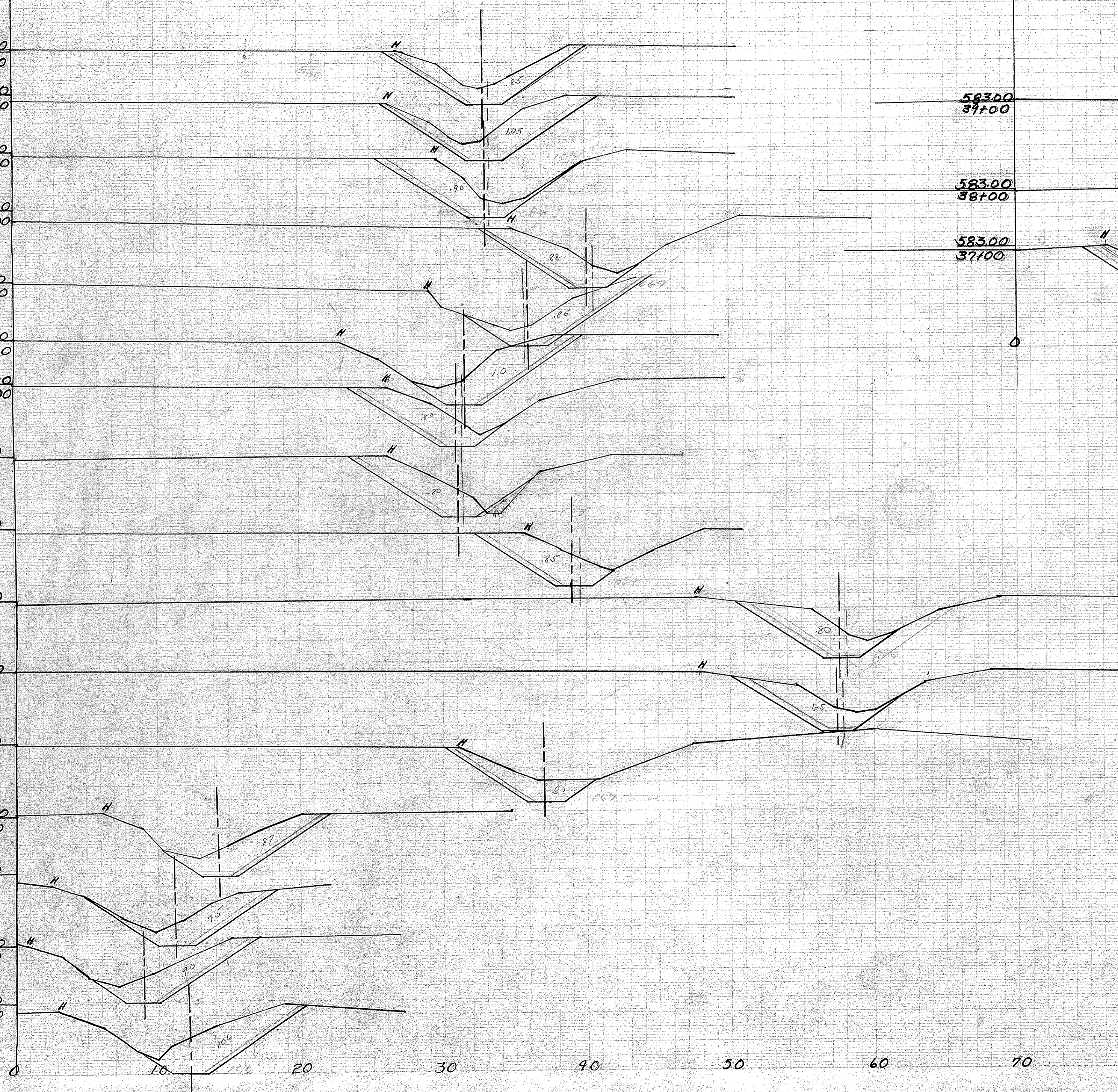
Bench Marks	Sta. 62+00 Nail T pole	Sta. 67+90 Nail T pole-L	Sta. 72+95 Nail cor. NW 1/4	Sta. 79+00 Nail T pole-L	Sta. 85+20 Nail T pole-L	Sta. 94+25 E bridge Wall	Sta. 97+00 Nail 10° Dk L	Sta. 103+50 Nail T pole-L	Sta. 109+20 Nail 10° Dk L																																																			
Elev.	589.52	589.37	583.14	583.05	582.37	582.34	581.17	581.94	581.13																																																			
Cubic Yards	52028	59975	660	825	938	882	693	756	520																																																			
Hublots	52028	59975	660	825	938	882	693	756	520																																																			
Dist hub to ditch Station Number	61 92.9	62 63.9	63 76.8	64 75.9	65 68.5	66 78.9	67 67.5	68 73.5	69 65.5	70 71.9	71 76.9	72 65.9	73 85.5	74 60.9	75 99.9	76 52.9	77 56.9	78 70.9	79 90.9	80 75.9	81 109.9	82 109.9	83 129.9	84 159.9	85 189.9	86 169.9	87 109.9	88 109.9	89 98.9	90 97.9	91 119.9	92 109.9	93 83.9	94 79.9	95 129.9	96 88.9	97 62.9	98 58.9	99 68.9	100 65.9	101 69.9	102 60.9	103 62.9	104 53.9	105 59.9	106 58.9	107 56.9	108 64.9	109 60.9	110 62.9	111 80.9	112 78.9	113 66.9	114 50.9	115 60.9	116 67.9	117 68.9	118 82.9	119 129.9	120 66.9



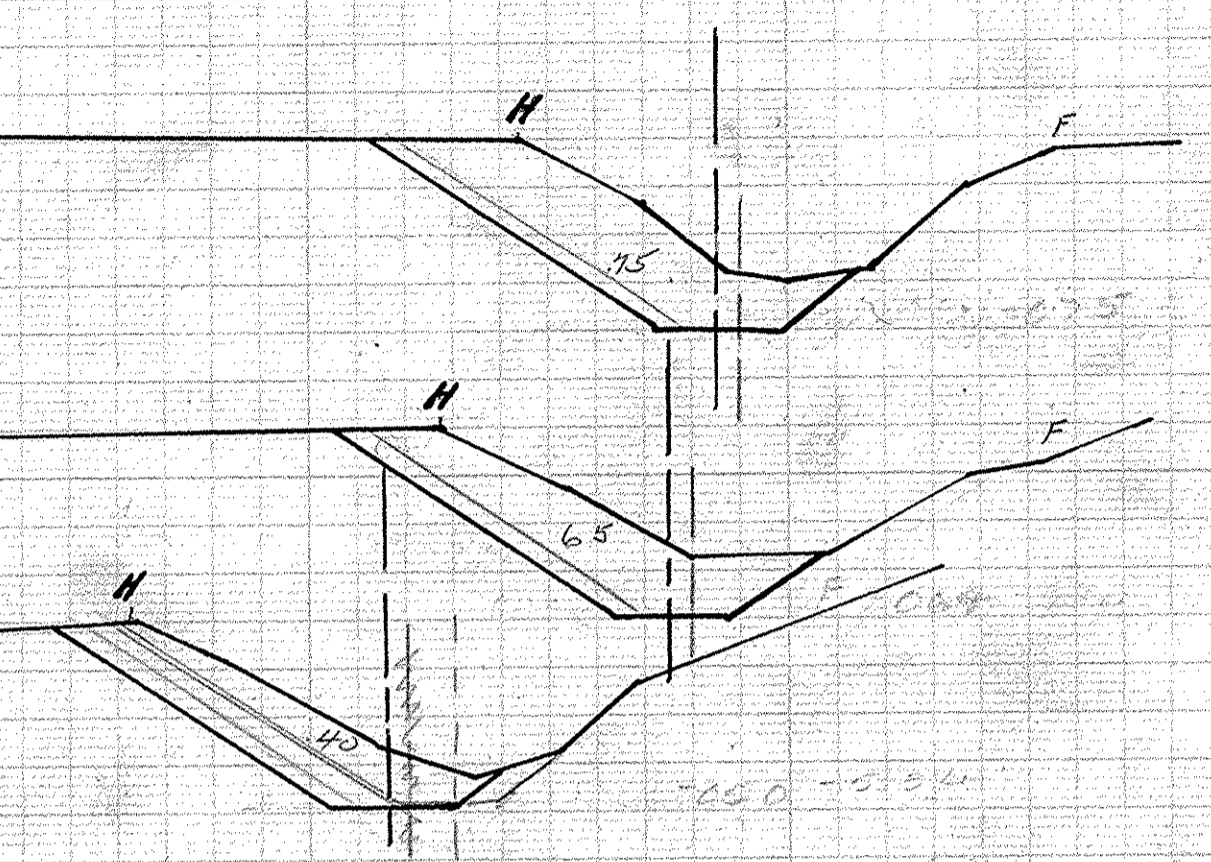
Bench Marks	120+90 Nail in fence	126+90 Nail in Post	139+30 SW SW Wing	E Headwall bridge Hwy #2 510 145+45 456-5 571 Elm conc 578.30	157+35 Nail in elm on left 574.16
Cubic Yards	44.7	20.7	579.97	577.05	
Hub Cuts	121.81R 48.1	122.02R 49.09	123.05R 51.1	124.85R 50.5	125.76R 48.02
Dist Hub to ditch	126.82R 47.09	127.74R 42.3	128.80R 45.2	129.72R 47.82	130.52R 49.0
Station Number	121.81R	122.02R	123.05R	124.85R	125.76R
	126.82R	127.74R	128.80R	129.72R	130.52R
	131.60R	132.42R	133.20R	134.62R	135.68R
	136.50R	137.47R	138.41R	139.97R	140.80R
	141.92R	142.75R	143.89R	144.70R	145.64R
	146.31R	147.80R	148.31R	149.31R	150.31R
	151.31R	152.35R	153.46R	154.46R	155.46R
	156.46R	157.46R	158.46R	159.46R	160.46R
	161.46R	162.46R			

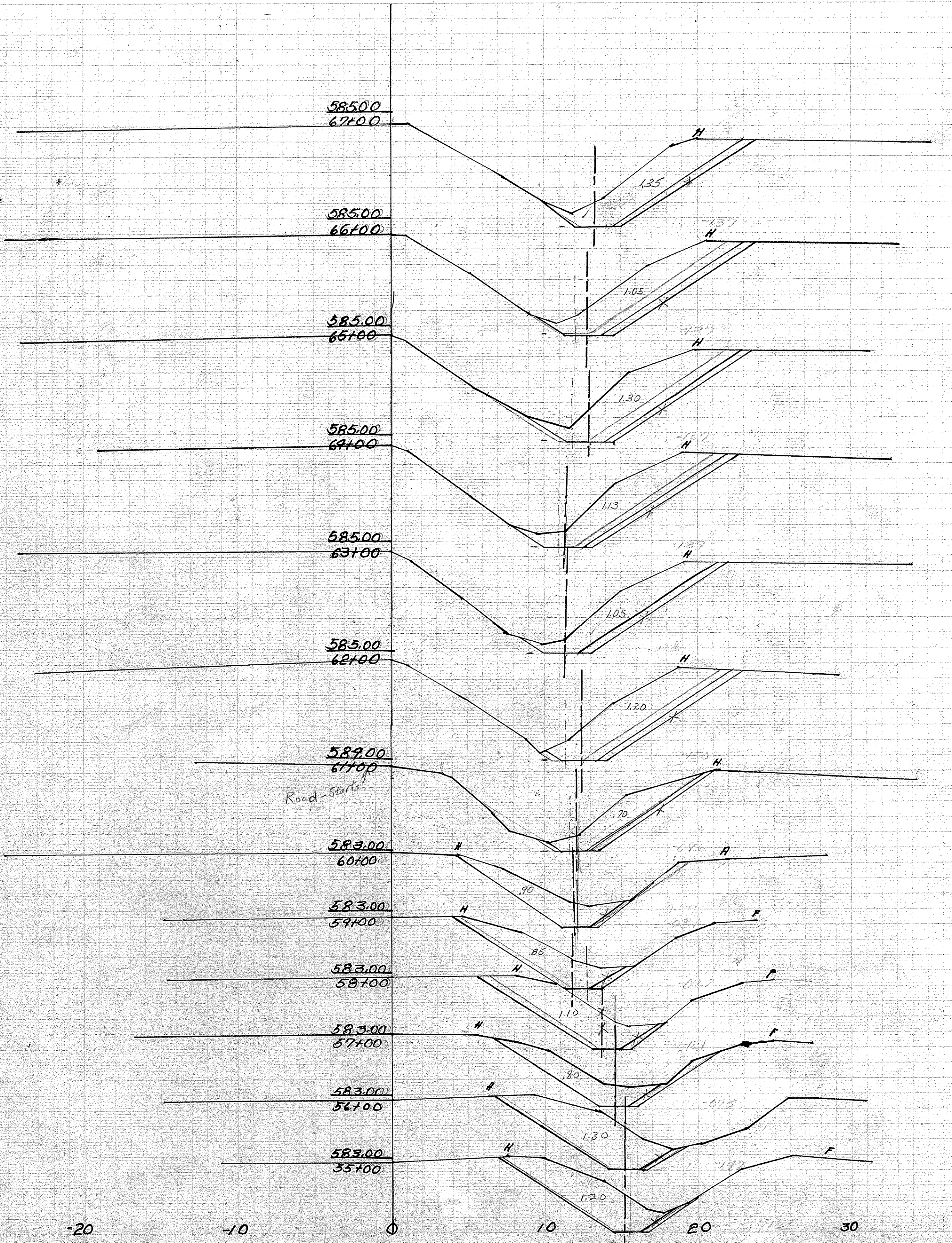
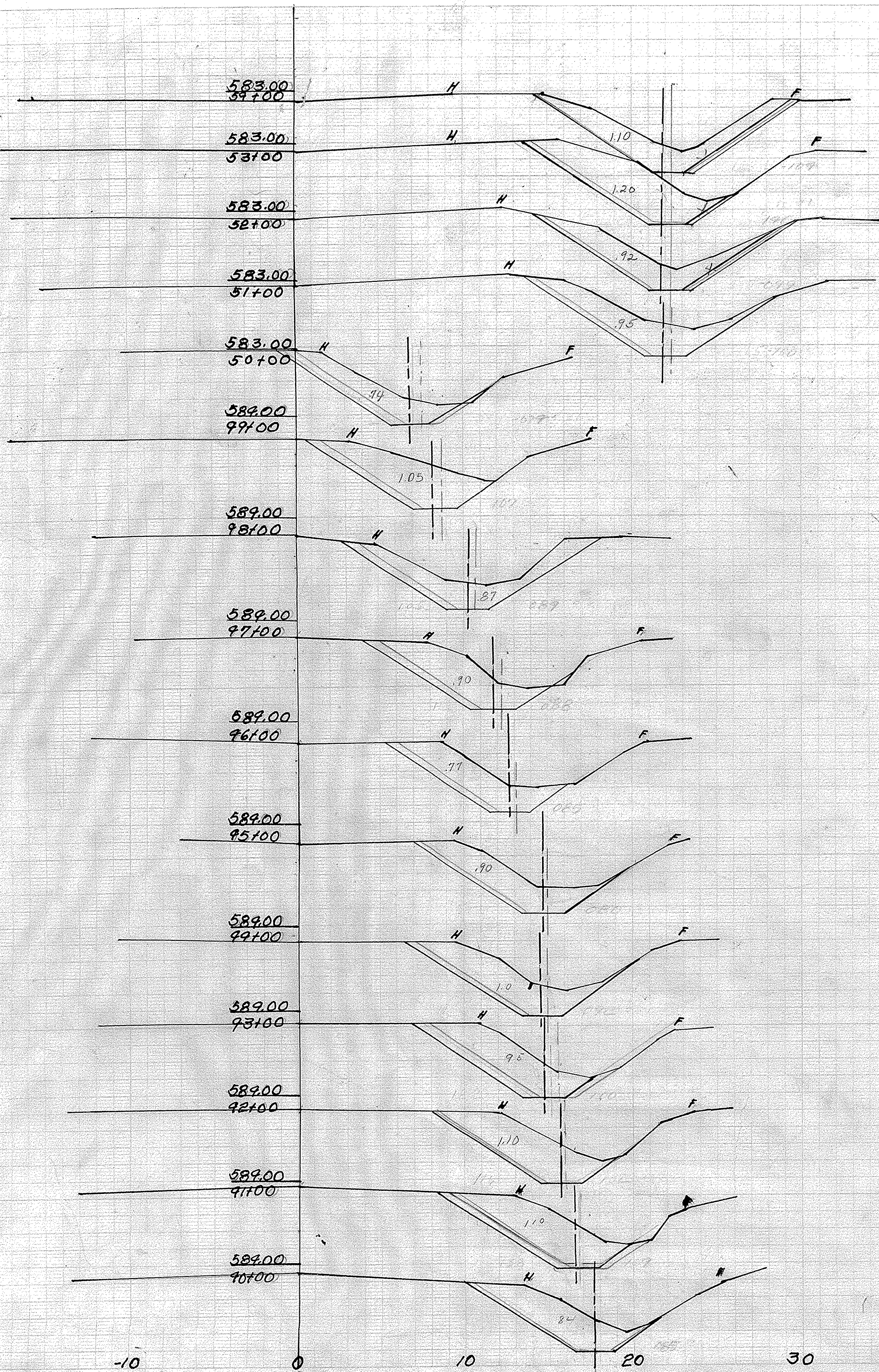


583.00
36+00
584.00
35+00
584.00
34+00
585.00
33+00
584.00
32+00
584.00
31+00
584.00
30+00
589.00
29+00
589.00
28+00
589.00
27+50
589.00
27+00
589.00
26+00
589.00
25+00
586.00
24+00
589.00
23+00
5
589.00
22+00



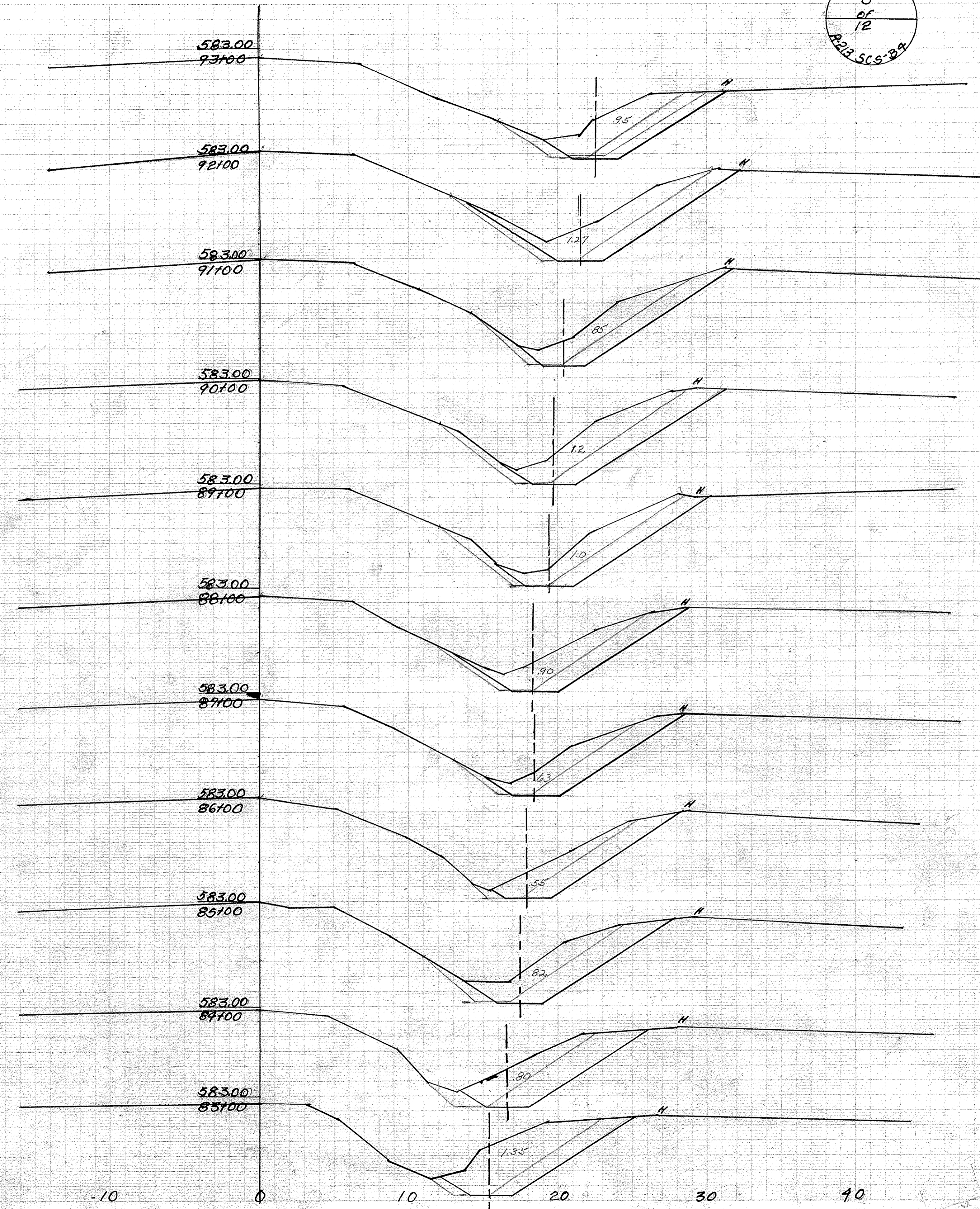
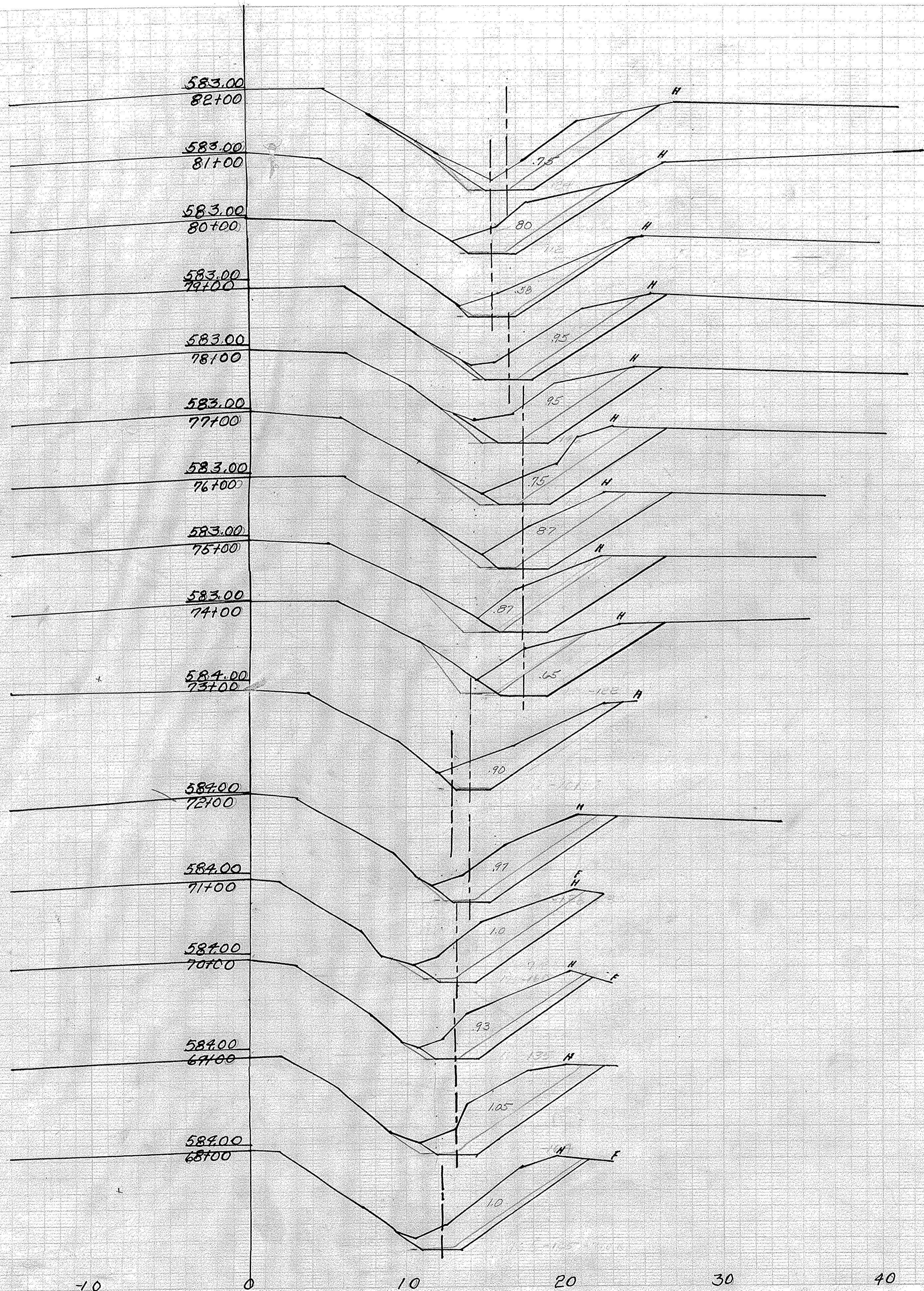
583.00
37+00
583.00
38+00
583.00
37+00

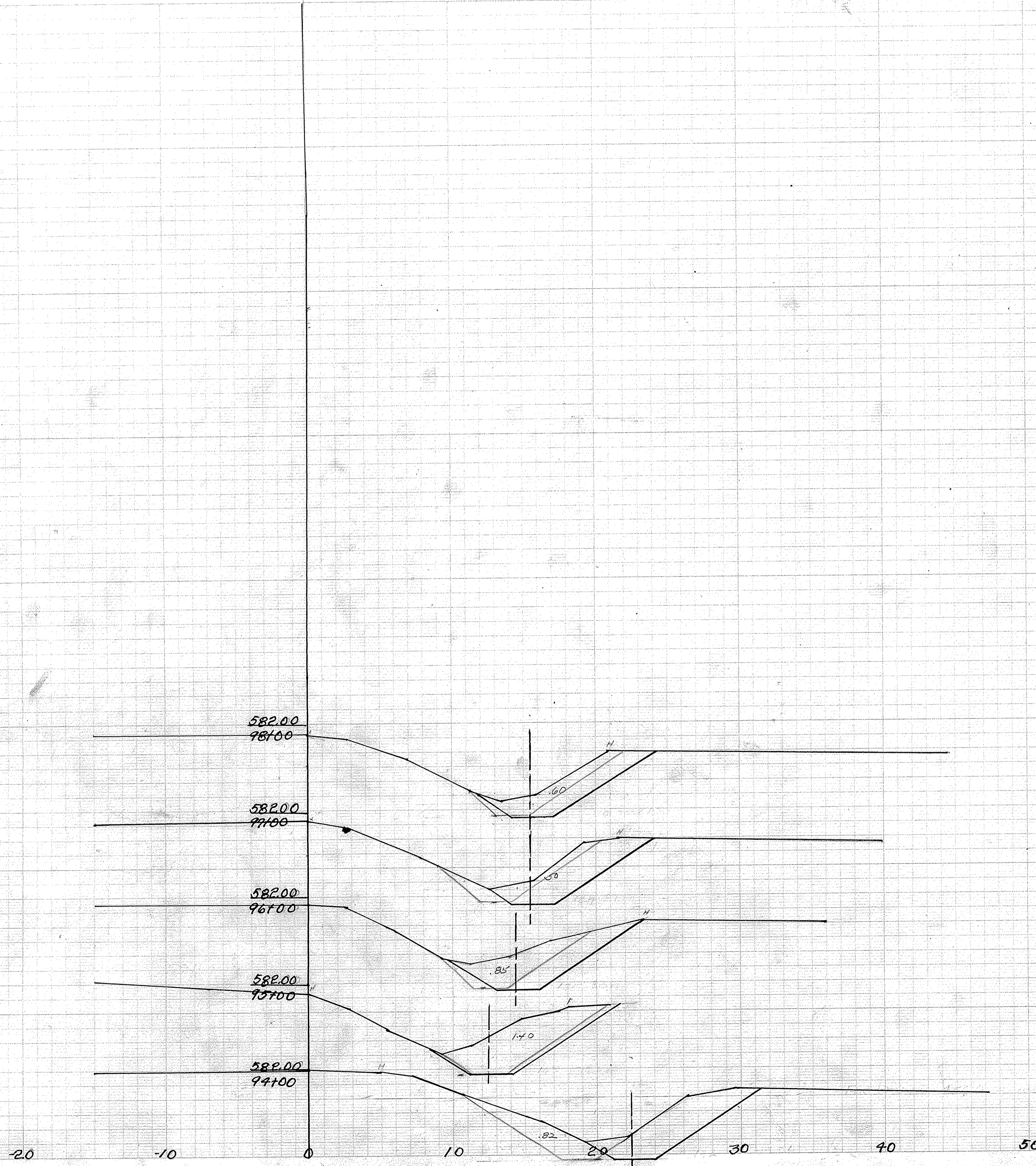


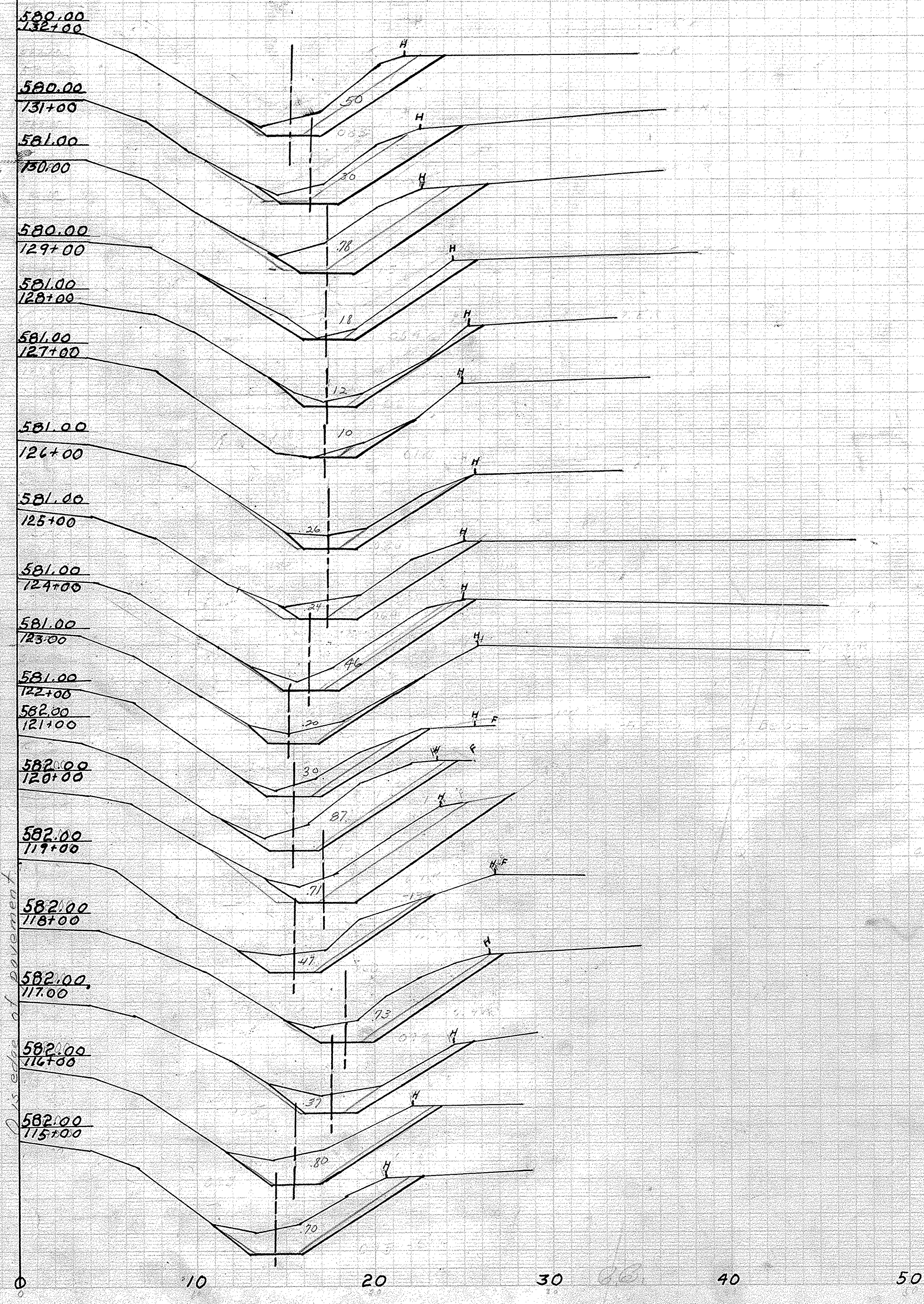
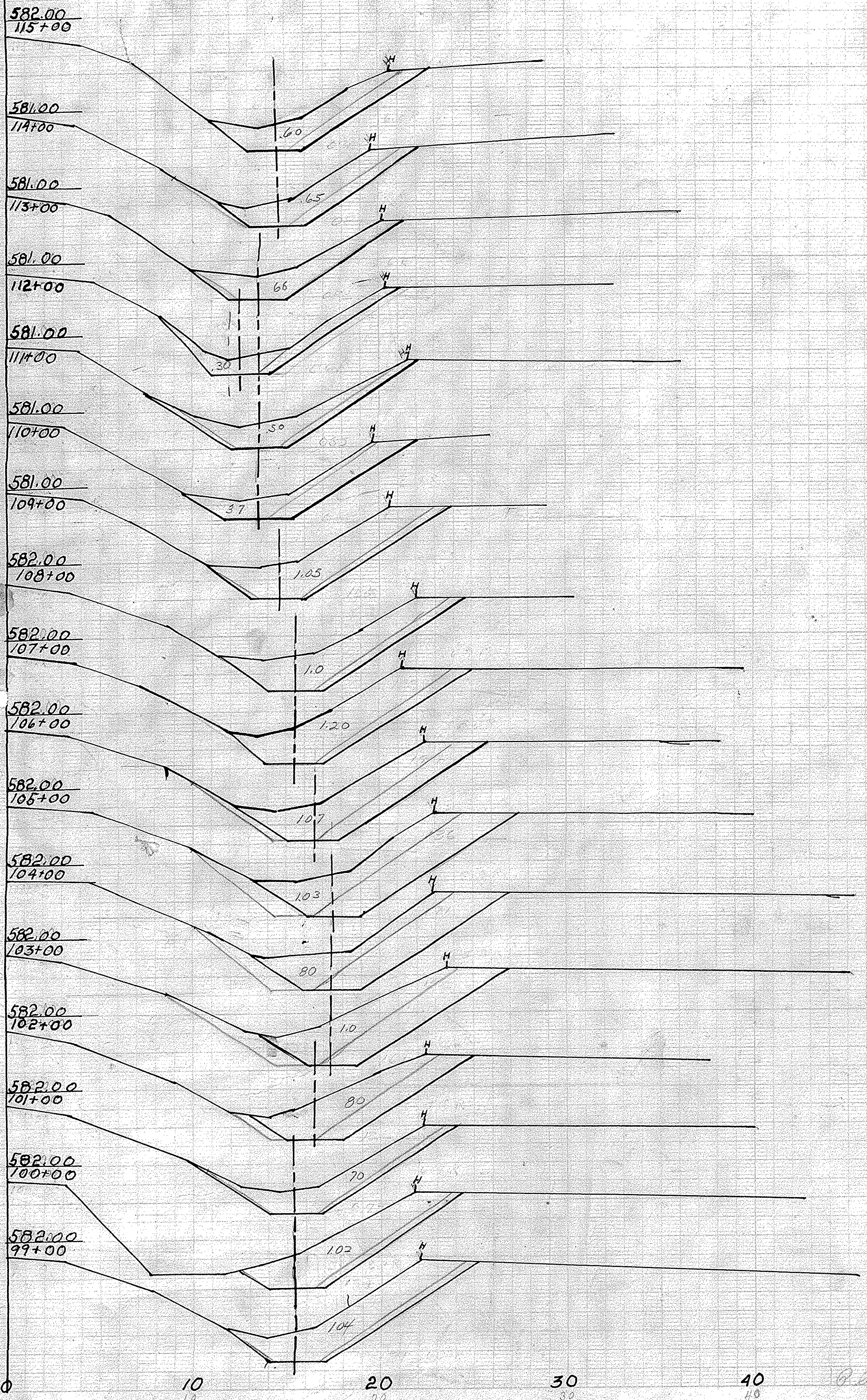


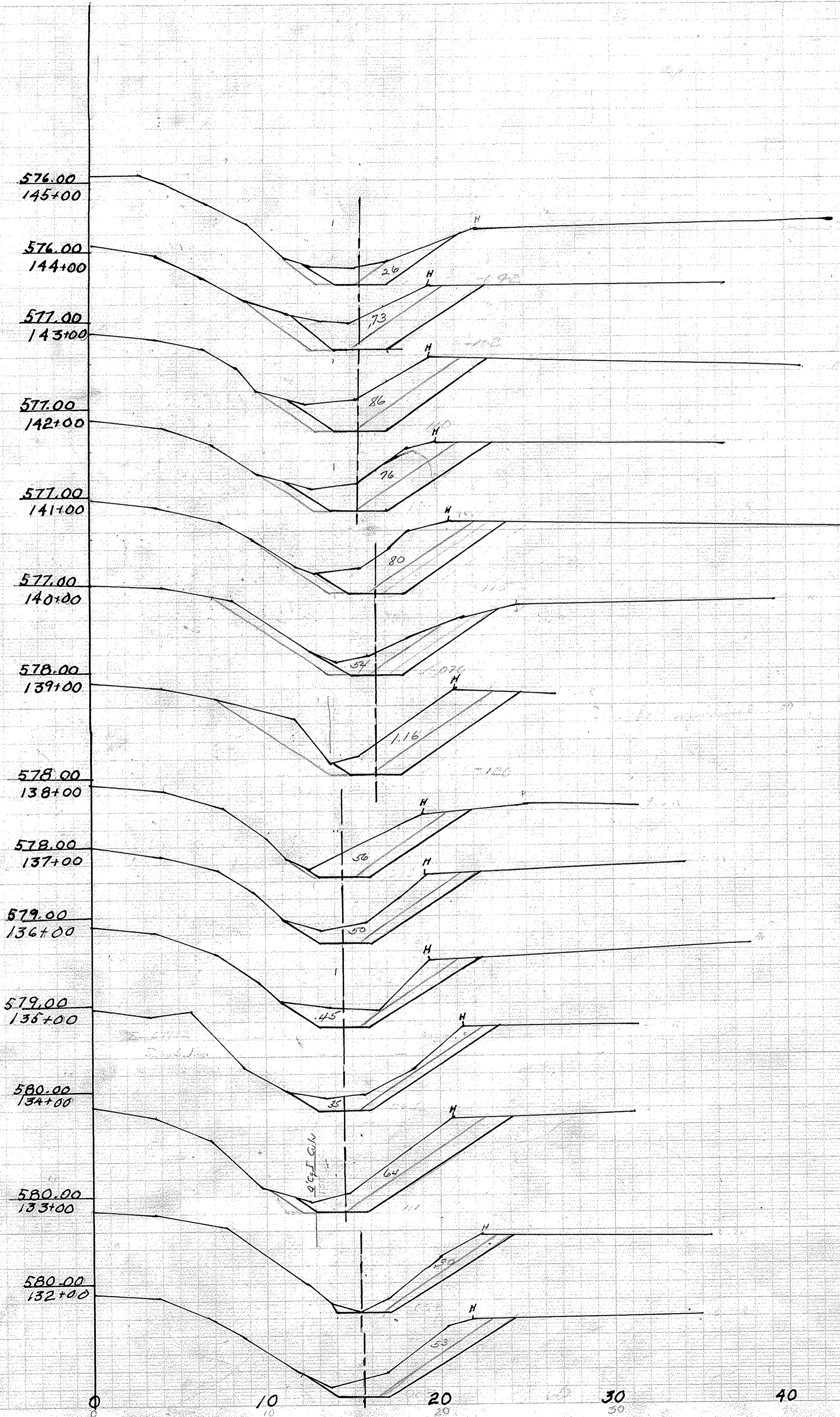
4

20 -10 0 10 20 30 -20 -10 0 10 20 30 40 50

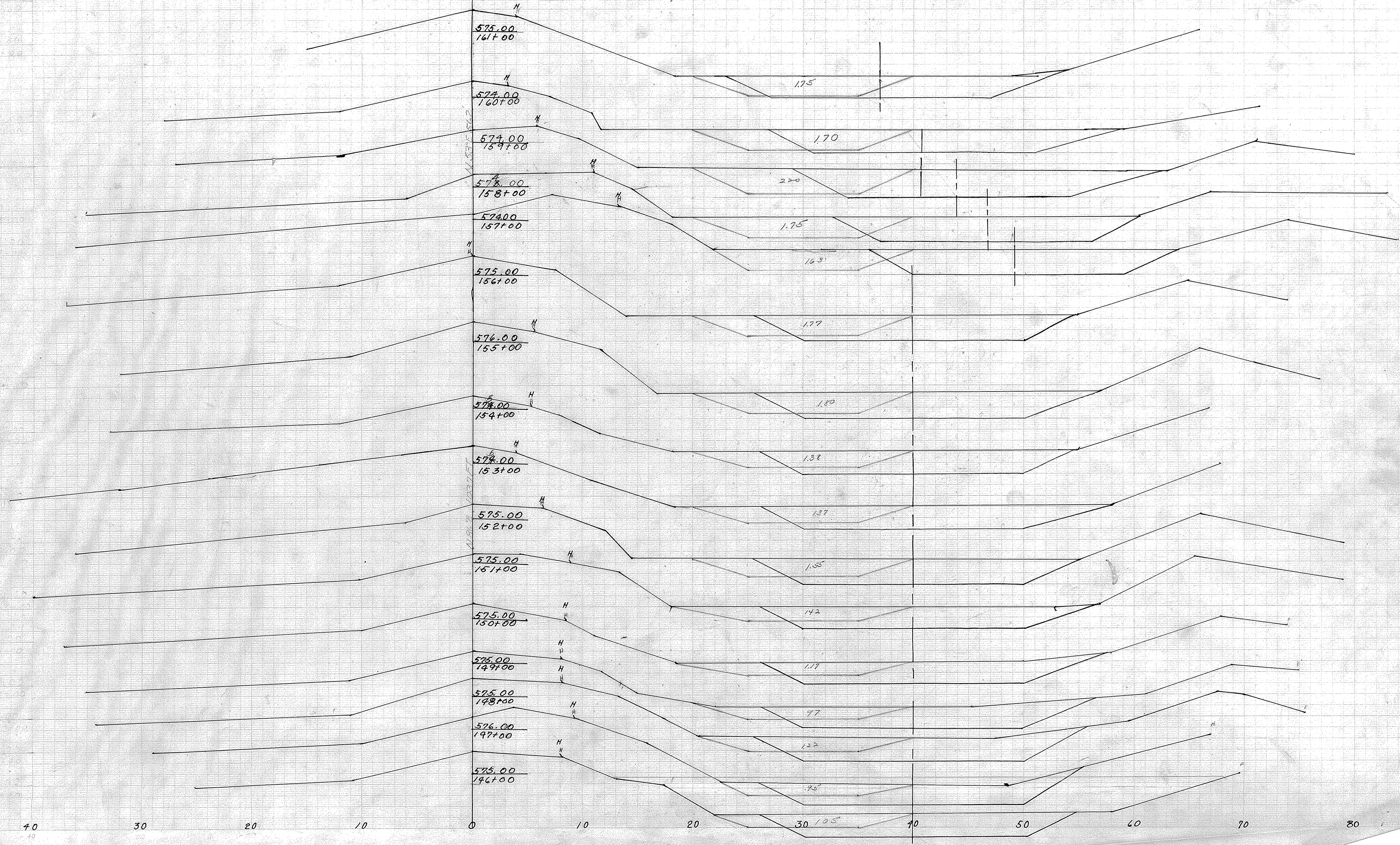


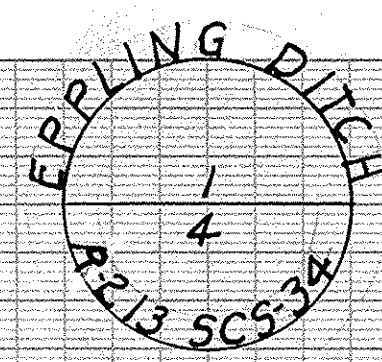




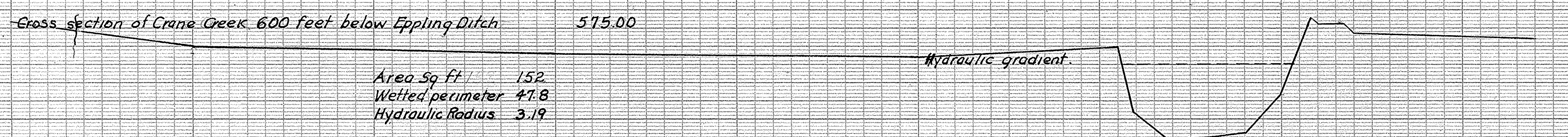
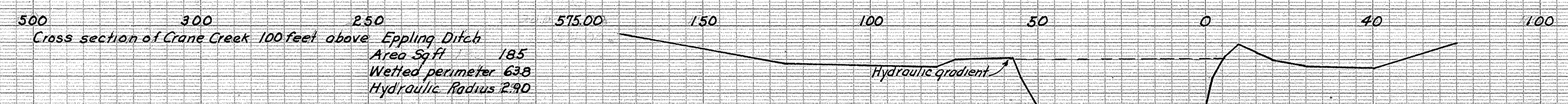
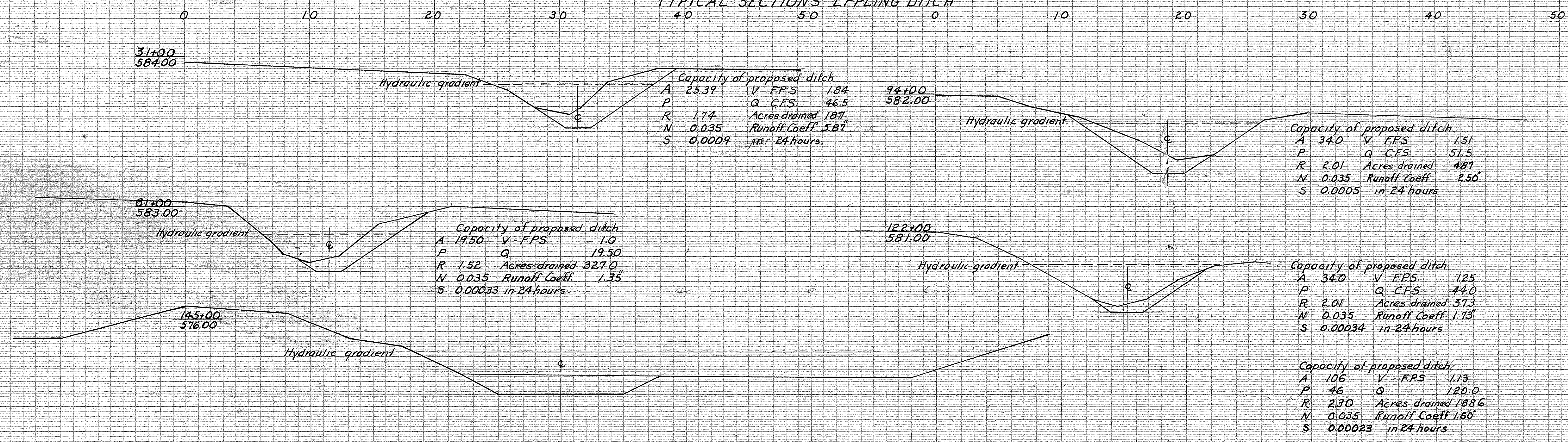


Use 161 for 162





TYPICAL SECTIONS EPPLING DITCH



CAPACITY OF CRANE CREEK

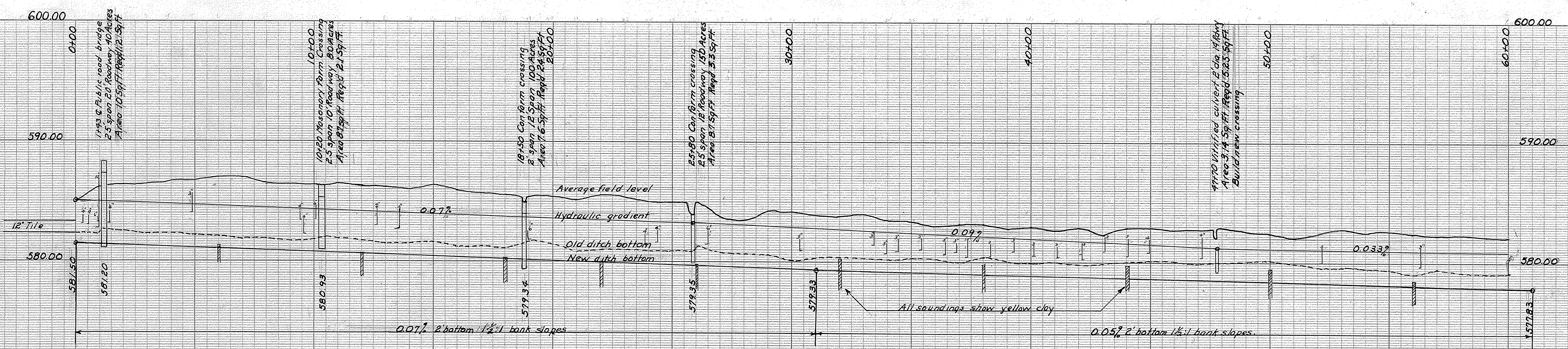
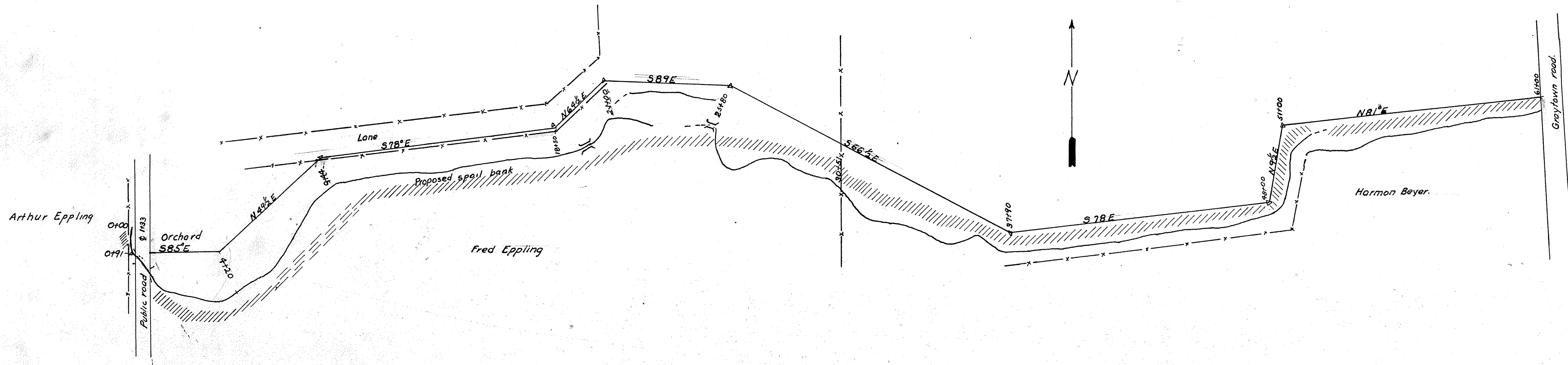
Area	168 Sq Ft	Slope	0.0001
Wetted perimeter	55.8 Ft	Velocity Ft per Sec.	1.03
Hydraulic radius	3.04	Capacity Cubic Feet per Sec.	173.00
N	0.30	Acres drained	24790
	Runoff Coefficient 0.16 per 24 hours		

* Slope of 0.0001 is assumed. Data is a composite of two sections shown above Crane Creek floods adjacent lowlands. The cleaning of this ditch will not affect the area of land flooded because the area drained by Crane Creek at the point this ditch enters is very large

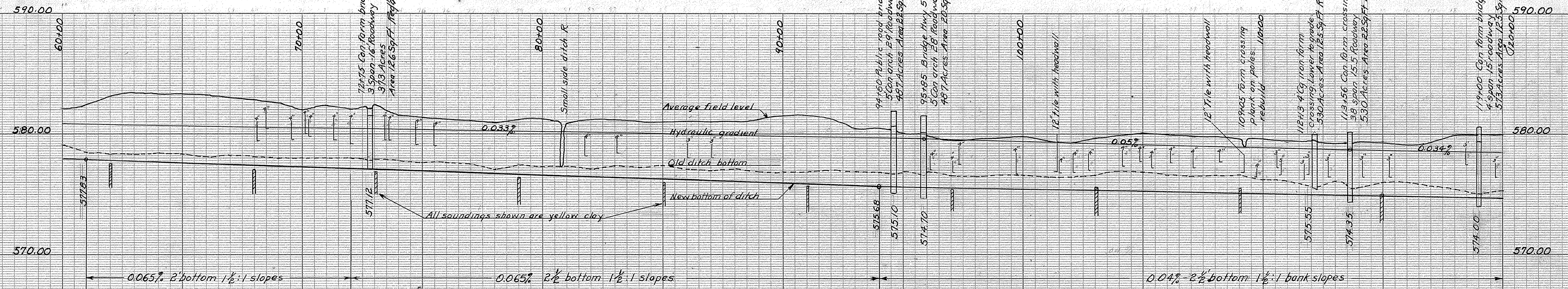
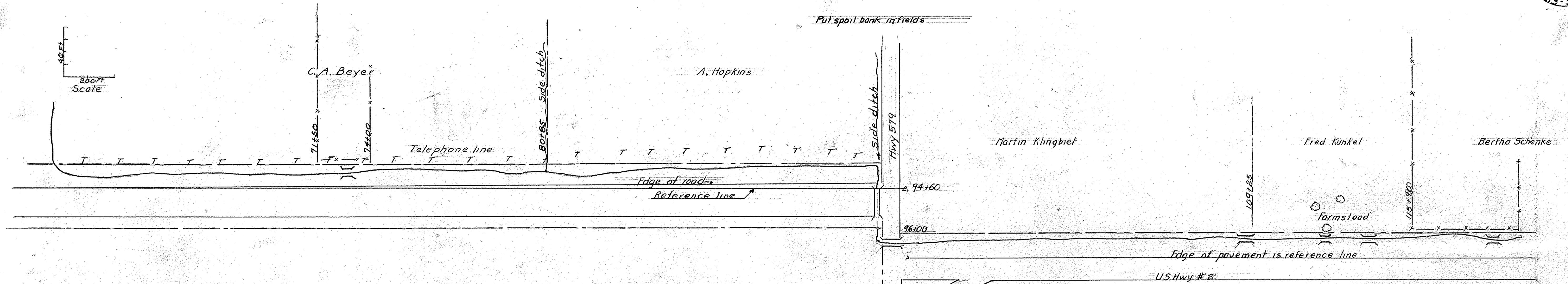
LEDGEND & QUANTITIES

- Machine excavation 8662 Cu Yd 16200 L.Ft
- Hand excavation 200 Cu Yd
- Fence 135 rods
- Tile 86; 3'-3 1/2'; 4'-4 1/2'; 5'-2'; 6'-4'; 10'-1'; 12'-7'
- Tile on left 1" Tile on right 1" Lineal Ft 860
- Spoil bank leveling 7234 Cu Yd 14500 L.Ft
- Proposed spoil bank |||||

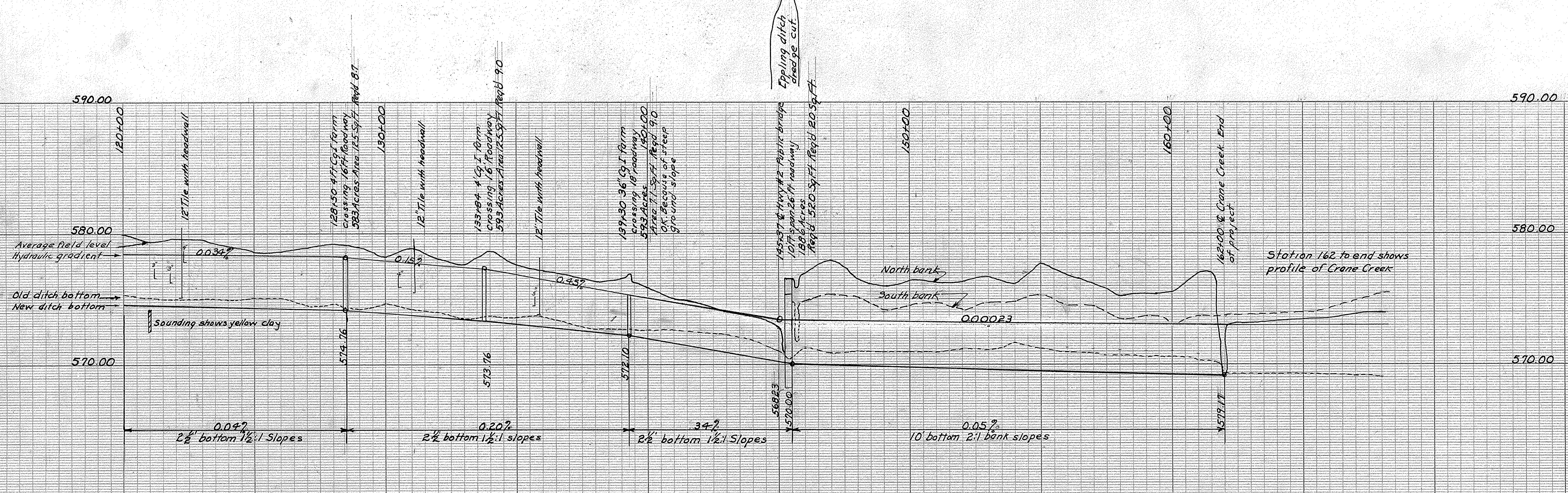
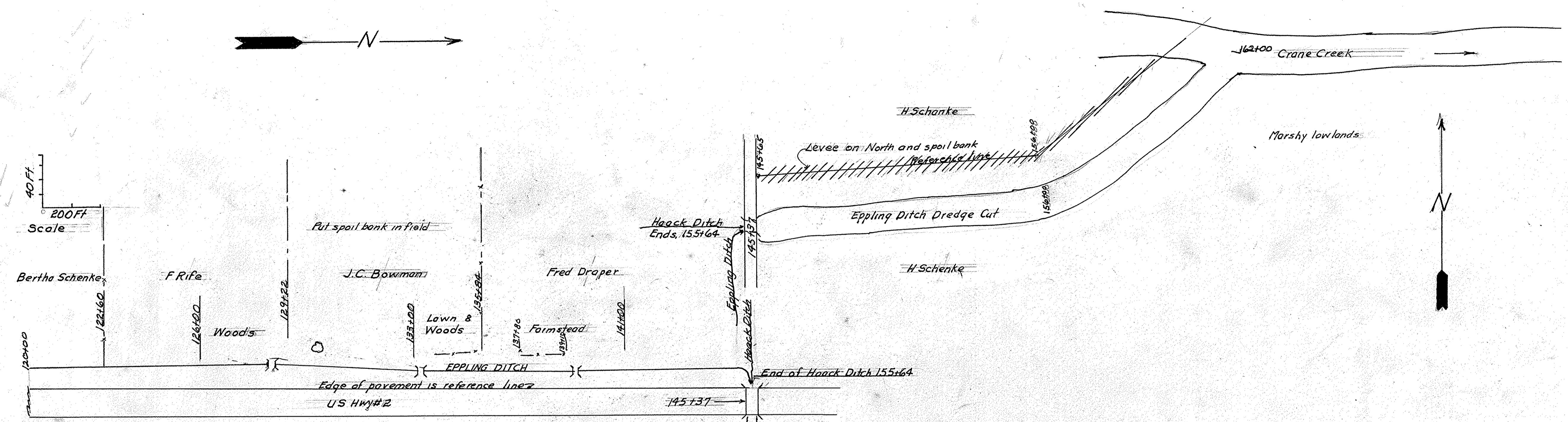
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
CCC Camp SCS-34 Bowling Green Ohio	
Sand Beach Side Camp Project R-213	
EPPLING DITCH	
Benton Township Ottawa Co. Ohio	
Approved	comp supt Date
Approved	drainage tech Date
Approved	drainage eng Date



Bench Marks	0+90 Nail in Tel. pole on left 586.98	12+75 Nail in elm tree on left 586.70	49+70 Nail in fence post Right 583.91
Cubic Yards	34	72	51
Hub Cuts	3.98	5.14	4.16
Distance hub to Q. of ditch	9.7	8.0	4.5
Station number	0	10	50



Bench Marks	62+00 Nail in Tel. pole right 584.52	67+90 Nail in Tel. pole right 584.37	72+95 NWc NW wing farm bridge 583.14	79+00 Nail in Tel. pole right 583.05	85+20 Nail in Tel. pole right 582.37	94+25 □ on E wall of bridge 582.34	95+00 Nail in 10" oak left 581.17	103+50 Nail in Tel. pole left 581.94	109+20 Nail in 10" Oak left 581.13																																																			
Cubic yards	56	67	65	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120						
Hub cuts	51.7	592	586	601	593	569	563	562	533	532	498	472	537	512	567	548	524	501	553	580	539	540	559	628	618	594	438	608	581	460	436	438	523	501	452	441	493	523	502	499	574	469	447	453	452	417	385	437	422	308	484	539	509							
Distance hub to C. of ditch	9.5	7.5	7.6	8.0	7.8	7.5	8.0	8.4	6.6	7.5	7.4	6.7	7.2	8.0	7.2	8.0	7.2	9.5	11.2	11.6	11.0	11.2	11.0	11.2	12.0	10.6	9.0	12.6	10.5	8.5	6.7	6.6	6.5	7.0	6.0	6.7	7.4	6.5	8.0	7.8	6.5	5.3	6.5	6.5	7.0	7.3	11.1	8.0	7.0	7.3	11.1	8.0								
Station Number	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120



Bench Marks	120+90 Nail in fence post left	580.84	126+90 Nail in 12" Oak left	579.77	139+30 SWc SW wing of form bridge	577.05	a E headwall of bridge on route 2	USGS 57830																																			
Cubic yards	34	15	20	20	10	11	7	9	28	30	51	58	40	47	49	49	31	39	41	64	65	64	88	87	82	94	106	102	100	107	106	104	Total Crane Creek	Total cubic yards.									
Hub cuts	479	407	509	503	426	405	421	450	424	432	414	437	438	444	404	413	517	263	263	650	709	630	525	613	619	554	740	736	569	583	607	708	162 & Crane Creek										
Distance hub to 1/4 of ditch	80	102	103	88	88	87	80	78	78	67	74	70	65	75	54	54	55	80	216	218	206	216	235	235	260	245	240	300	170	190	240	260	162 & Crane Creek										
Station number	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	